OMRON

Best Selection

Fiber Sensors

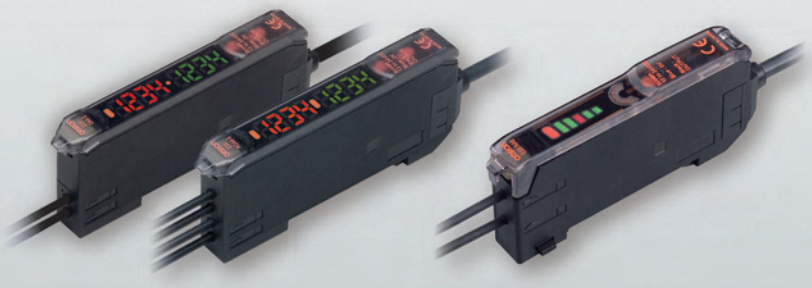
Best Selection Catalog

OMRON's Fiber Sensors continue to support an increasing range of applications.

This catalog brings you the latest information on our Fiber Units.

E32-series Fiber Units

Amplifier Units



E3X-DA-S/-MDA Series

E3X-NA Series

realizing

Fiber Unit

Standard Models First, Our Standard Lineup

P6

These Fibers Units can be used in a variety of applications, such as detecting the presence of workpieces and positioning.

A Wide Variety of Shapes for Adapting to Different Installation Locations

Choose the model that suits the installation space from a wide variety of shapes and sizes (7 shapes, in standard or small sizes).

Screw-shaped | Cylindrical | Flat | Equipped with sleeve

Space Savings and Simple Mounting

Flat Models

Flat models that allow simple screw mounting and straightforward wiring have been added to the lineup. Using these models eliminates the problem of fibers getting caught on surrounding objects.

Flat model

Detect Workpieces in Tight Spaces

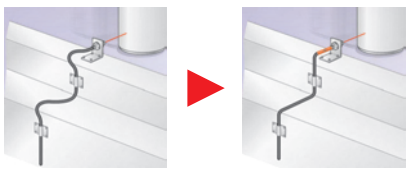
Custom-produced Sleeves

Models with sleeves allow detection in tight spaces. We will perform the time-consuming task of fashioning the sleeve, with a length and bends to suit the space (except for ultrafine sleeves).

Models with sleeves

Flexible, Pliable Fiber That Can Be Handled Like Wire

We have developed a broad range of fibers to meet a wide variety of needs. Multicore (flexible) fiber is a new type of standard fiber that can be used like wire without worrying about the bending radius. We have also produced fiber that will not break when used in moving parts and fiber that is not degraded by contact with oil.



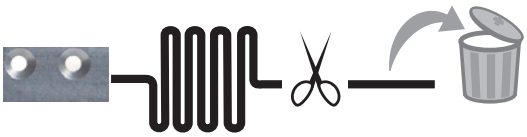
Conventional fiber | Flexible fiber

You will certainly appreciate the ease of use that flexible fiber ensures.

Length Can Be Specified in 1-m Units

Saving Energy and Work

We will produce fiber of the required length (in meter units). For large-scale installations, specifications of up to 20 m can be handled. (Specifications of 0.3 m and 0.5 m are also possible.)



Special-beam Models

Detection with Increased Reliability

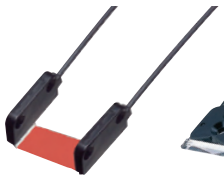
P10

A variety of heads incorporating the latest optical technology makes it possible to solve common problems related to detection and to increase reliability.

- Resistant to dust and dirt
- Capable of detecting small workpieces
- Resistant to workpiece vibration

Use these models to handle unstable detection conditions.

Small-spot models
E32-C42+
E39-F3A



Area-sensing models
E32-T16J

Limited-reflective models
E32-L24L

High-power models
E32-T17L

Environment-resistive Models

High Resistance to External Conditions with Fiber

P14

We have developed model variations for adapting to a variety of environmental conditions. These models enable detection in high-temperature environments and vacuums.

Heat-resistant models

Chemical-resistant models

- High-temperature environments
- Environments subject to the splattering of chemicals
- Vacuums

Use these models to handle applications in special environments.

Application-specific Models

Fiber Units for the Food-packaging, Semiconductor, and FPD Industries

P16

These models, which were developed for specific applications, offer top-quality detection performance.

- Label detection
- Liquid-level detection
- Alignment and mapping of glass substrates
- Wafer mapping

Use these models for specific applications.

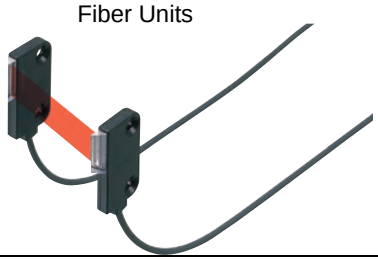
Label-detection models
E32-G14

Alignment-check models
E32-L16

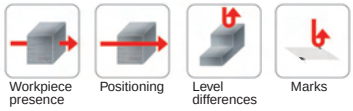
Liquid-level detection models
E32-D36T

Selection Guide

We have developed model variations for handling a broad range of applications.



Fiber Units

Detection conditions \ Environmental conditions	Standard environments	Special environments ■ High-temperature environments (up to 400°C) ■ Environments subject to scattering of chemicals and oil ■ Vacuum environments
Standard detection ■ Workpiece presence ■ Positioning ■ Level differences and marks	Standard Models •••▶P.6  Workpiece presence / Positioning / Level differences / Marks	Environment-resistive Models •••▶P.14  Workpiece presence / Positioning / Level difference
Special-beam ■ Long-distance sensing, resistance to dust and dirt ■ Small beam, resistance to rattling ■ Detection of transparent objects	Special-beam Models •••▶P.10  High power / Small spot / Area sensing / Retroreflective sensing	
Application-specific ■ Labels ■ Liquid level ■ Alignment and mapping of glass substrates ■ Wafer mapping	Application-specific Models •••▶P.16  Labels / Liquid level / Alignment / Mapping	

Amplifier Units

Type	Digital		Manual
Appearance		 2-channel models	
Response time	48 µs, 1 ms, or 4 ms (2-output models: 80 µs, 1 ms, or 4 ms)	100 µs, 1 ms, or 4 ms	200 µs (high-speed models: 20 µs)
Light source	Red, green, blue, or infrared LED		Red or green LED
Function	Dual display (including digital, bar, percent, and hold display functions) Threshold adjustment performed manually or by teaching OFF-delay, ON-delay, one-shot timer (adjustable from 1 ms to 5 s)		LED bar display (5 levels) 8-turn sensitivity adjuster OFF delay timer (fixed at 40 ms)
	Advanced-function models are available (2-output/input models).		Water-resistant models are available.
Models	E3X-DA□-S E3X-DA□TW-S (2-output model) E3X-DA□RM-S (input model)	E3X-MDA□	E3X-NA□ E3X-NA□F (high-speed model) E3X-NA□V (water-resistant model)

CONTENTS

Features/Applications

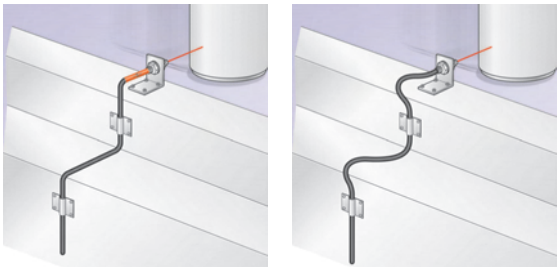
Standard Models

Flexible (New Standard)

R

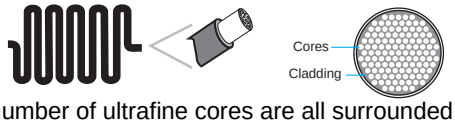
- Perform wiring without worrying about the bending radius.
- Choose the model to suit the installation space from a variety of shapes.

Flexible fiber | Conventional fiber



Fewer problems ◀ Light intensity affected by bends in fiber
Fiber broken by getting caught on surrounding objects

■ Feature: Multicore (Flexible) Fibers



A large number of ultrafine cores are all surrounded by cladding. As a result, the fiber is flexible and can be bent without significantly reducing the light intensity. This helps solve problems, such as fiber being broken by getting caught on other objects.

■ Ratings/Characteristics

Min. sensing object	0.005-mm dia.
Min. bending radius	1 mm
Ambient temperature	–40°C to 70°C (no icing or condensation)
Fiber material	Plastic (Free-cut)

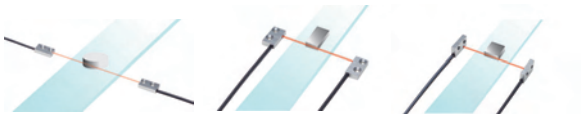
Standard

- Choose the model to suit the installation space from a variety of shapes.
- New flat models allow space savings and simple installation.

Screw-shaped | Cylindrical | Flat | Equipped with sleeve

■ Feature: Flat Models

Flat models, which allow simple attachment and wiring, have been added to the lineup. Choose the model to suit the installation space from 3 sensing directions and 2 sizes, standard and small.



■ Ratings/Characteristics

Min. sensing object	0.005-mm dia.
Min. bending radius	10 or 25 mm*
Ambient temperature	–40°C to 70°C (no icing or condensation)
Fiber material	Plastic (Free-cut)

*Depends on the fiber diameter.

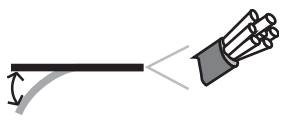
Break-resistant

B

- Bundle-fiber models can be used for moving parts.
- Capable of withstanding at least one million repeated bends (in typical applications).

■ Feature: Bundle Fibers

The Fiber Units contain a large number of independent fine fibers, ensuring a high degree of flexibility.



■ Ratings/Characteristics

Min. sensing object	0.005-mm dia.
Min. bending radius	4 mm (withstands repeated bending)
Ambient temperature	–40°C to 70°C (no icing or condensation)
Fiber material	Plastic (Free-cut)

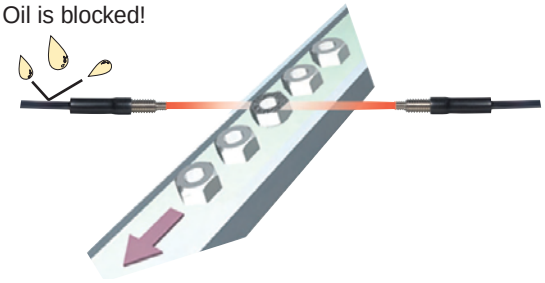
Standard Models

Fluorine Coating

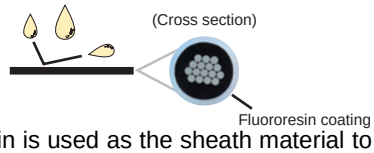
U

- Fiber degradation due to oil is prevented using a fluororesin coating.
- Free cutting is possible with cutter provided.

Oil is blocked!



■ Feature: Fluorine Coating



Fluororesin is used as the sheath material to prevent fiber degradation resulting from oil adhesion.
Note: The tip of the head is not chemical-resistant.

■ Ratings/Characteristics

Min. sensing object	0.005-mm dia.
Min. bending radius	4 mm
Ambient temperature	–40°C to 70°C (with no icing or condensation)
Fiber material	Plastic (Free-cut)

Fiber Customization Service (Fiber Length, Sleeve Length, and Bends)

This customization/delivery service applies to standard models. It is aimed at reducing industrial waste and simplifying the installation procedure.

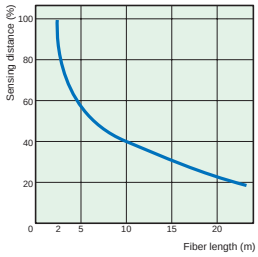
Fiber Length

■ Applicable Models
Standard models

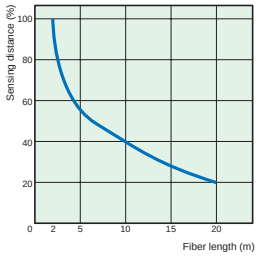
■ Model Number Used for Ordering
Standard model number + Fiber length
Fiber length: 0.3 m, 0.5 m, or any length from 1 to 20 m (in 1-m units)

■ Fiber Length vs. Sensing Distance

Through-beam Fiber Units
(Fiber length of 2 m corresponds to 100%.)



Fiber Units with Reflective Sensors
(Fiber length of 2 m corresponds to 100%.)



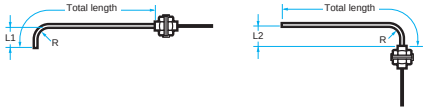
Sleeve Length and Bends

■ Applicable Models
E32-TC200B/E32-TC200F
E32-DC200B/E32-DC200F
The E32-DC200B cannot be bent.

■ Model Number Used When Changing Only the Sleeve Length

Model: E32-*1C200*2-S*3

■ Model Number Used When Changing the Sleeve Length and Bends



Model Numbers Incorporating the Bending Radius, R, and Dimensions L1 and L2

Specifying L1 Only (Units: mm)

Bending radius	L1 (±1)	Model number
R5	10	E32-*1C200*2-S*3A1
	15	E32-*1C200*2-S*3A2
R7.5	12.5	E32-*1C200*2-S*3B1
	17.5	E32-*1C200*2-S*3B2
R10	15	E32-*1C200*2-S*3C1
	20	E32-*1C200*2-S*3C2
R12.5	17.5	E32-*1C200*2-S*3D1
	22.5	E32-*1C200*2-S*3D2

Specifying L2 Only (Units: mm)

Bending radius	L2 (±1)	Model number
R5	5	E32-*1C200*2-S*3A3
	10	E32-*1C200*2-S*3A4
R7.5	7.5	E32-*1C200*2-S*3B3
	17.5	E32-*1C200*2-S*3B4
R10	10	E32-*1C200*2-S*3C3
	20	E32-*1C200*2-S*3C4
R12.5	12.5	E32-*1C200*2-S*3D3
	22.5	E32-*1C200*2-S*3D4

*1: Insert "T" for Through-beam Fiber Units and "D" for Fiber Units with Reflective Sensors.
*2: Insert the "B" or "F" that appears at the end of the original model number.
*3: Insert "50" if the total length is 50 mm. The total length must not exceed 120 mm.

Features/Applications

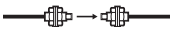
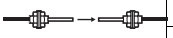
Standard Models

Overview of Model Variations

Through-beam Fiber Units

Sensing distance (mm) (See note 1.)

Model

Shape of head	Type (See note 2.)	Flexible (New Standard) R Flexible and pliable	Standard 	Break-resistant B Withstands repeated bending	Fluorine coating U (Cross section) Fluororesin coating Cable protected against oil
Screw-shaped (top-view) 	M4	530	760	680	680
		E32-T11R	E32-TC200	E32-T11	E32-T11U
	M3	130	220	200	
		E32-T21R	E32-TC200E	E32-T21	
(with sleeve) 	M4 (1.2-dia. sleeve)	530	760		
		E32-TC200BR	E32-TC200B		
	M3 (0.9-dia. sleeve)	130	220		
		E32-TC200FR	E32-TC200F		
Cylindrical (top-view)	3 dia.	530	760	680	
		E32-T12R	E32-T12	E32-T12B	
	1.5 dia.	130	220	200	
		E32-T22R	E32-T222	E32-T22B	
(side-view) 	3 dia.	210	460		
		E32-T14LR	E32-T14L		
	1 dia.	50	130		
		E32-T24R	E32-T24		
Flat (top-view) 	15 × 8 × 3	530	760	680	
		E32-T15XR	E32-T15X	E32-T15XB	
	12 × 7 × 2	130	220	150	
		E32-T25XR	E32-T25X	E32-T25XB	
(side-view) 	15 × 8 × 3	210	460		
		E32-T15YR	E32-T15Y		
	12 × 7 × 2	50	130		
		E32-T25YR	E32-T25Y		
(flat-view) 	15 × 8 × 3	210	460		
		E32-T15ZR	E32-T15Z		
	12 × 7 × 2	50	130		
		E32-T25ZR	E32-T25Z		

Note 1. The sensing distances apply for use in combination with the E3X-DA-S Amplifier Unit (general-purpose, standard mode).
2. These symbols are defined as follows. R: Flexible fiber, B: Bendable fiber, U: Fluorine-coated fiber.

Standard Models

Overview of Model Variations

Fiber Units with Reflective Sensors

Sensing distance (mm) (See note 1)
Model

Shape of head		Type (See note 2.)	Flexible (New Standard) R Flexible and pliable	Standard 	Break-resistant B Withstands repeated bending	Fluorine coating U Cable protected against oil
Screw-shaped (top-view)	M6		170	300	170	170
			E32-D11R	E32-DC200	E32-D11	E32-D11U
	M3		30	80	30	
			E32-D21R	E32-DC200E	E32-D21	
(with sleeve)	M6 (2.5-dia. sleeve)		170	300		
			E32-DC200BR	E32-DC200B		
	M3 (1.2-dia. sleeve)		30	80		
			E32-DC200FR	E32-DC200F		
Cylindrical (top-view)	3 dia.		170	230	70	
			E32-D12R	E32-D12	E32-D221B	
	3 dia. (1.5 dia.)		30	80	30	
			E32-D22R	E32-D22	E32-D22B	
(side-view)	6 dia.		45	110		
			E32-D14LR	E32-D14L		
	2 dia.		15	30		
			E32-D24R	E32-D24		
Flat (top-view)	15 × 10 × 3		170	300	170	
			E32-D15XR	E32-D15X	E32-D15XB	
	12 × 7 × 2		30	80	50	
			E32-D25X	E32-D25X	E32-D25XB	
(side-view)	15 × 10 × 3		40	100		
			E32-D15YR	E32-D15Y		
	12 × 8 × 2		8	20		
			E32-D25YR	E32-D25Y		
(flat-view)	15 × 10 × 3		40	100		
			E32-D15ZR	E32-D15Z		
	12 × 8 × 2		8	20		
			E32-D25ZR	E32-D25Z		

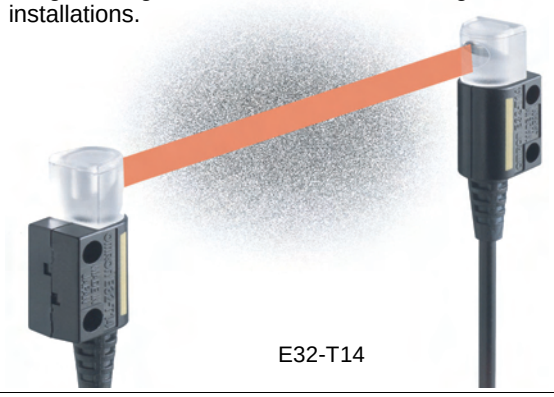
Note 1. The sensing distances apply for use in combination with the E3X-DA-S Amplifier Unit (general-purpose, standard mode).
2. These symbols are defined as follows. R: Flexible fiber, B: Bendable fiber, U: Fluorine-coated fiber.

Features/Applications

Special-beam Models

Long Distance, High Power

- Powerful beam reduces influence of dust and dirt.
- Long sensing distance enables use in large-scale installations.



E32-T14

■ Applications

Detecting parts inside (translucent) containers

E32-T11L

Detecting workpieces in coating processes

E32-T17L

■ Ratings/Characteristics

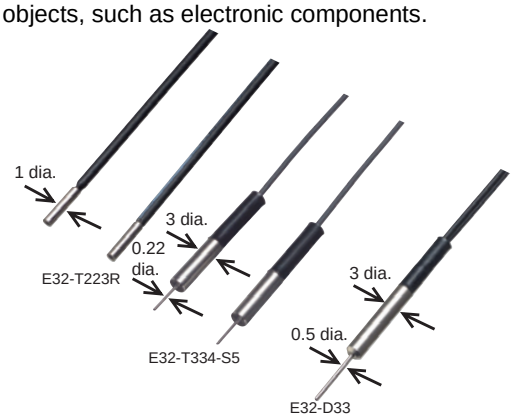
Ambient temperature	–40°C to 70°C (no icing or condensation)
Fiber material	Plastic (Free-cut)

■ Overview of Model Variations

Type	Features	Shape, sensing distance (mm)*	Model number
Through-beam	Equipped with large lens	20,000	E32-T17L
	Side-view, screw mounting	3,400	E32-T14
	M4 screw	1,330	E32-T11L
Reflective	Equipped with large lens	700	E32-D16
	M6 screw	400	E32-D11L

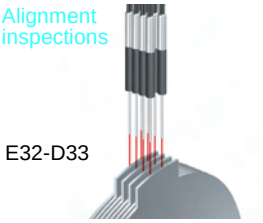
Ultracompact, Ultrafine Sleeve

- Ultracompact head can be installed in tight spaces.
- Ultrafine sleeve ensures reliable detection of small objects, such as electronic components.



■ Applications

Alignment inspections



E32-D33

Detection of terminals

E32-T33-S5

■ Ratings/Characteristics

Min. sensing object	0.005-mm dia.
Ambient temperature	–40°C to 70°C (no icing or condensation)
Material	Plastic

■ Overview of Model Variations

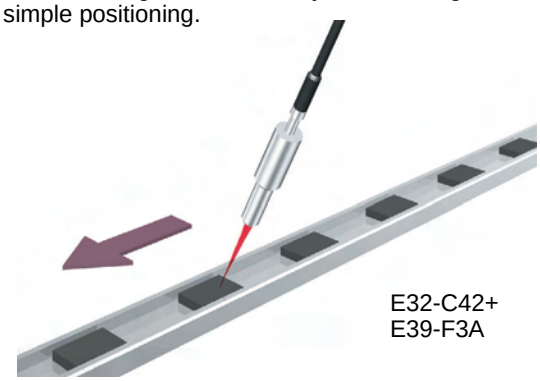
Type	Features	Shape, sensing distance (mm)*	Model number
Through-beam	1-dia. cylinder	130	E32-T223R
	0.5-dia. sleeve (0.25-dia. opening)	44	E32-T33-S5
	0.22-dia. sleeve (0.1-dia. opening)	5	E32-T334-S5
Reflective	0.8-dia. sleeve	16	E32-D33
	0.5-dia. sleeve	3	E32-D331

*The sensing distances apply for use in combination with the E3X-DA-S Amplifier Unit (general-purpose, standard mode).

Special-beam Models

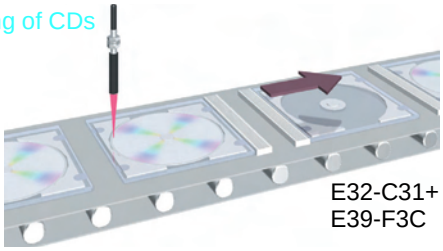
Coaxial, Small Spot

- Small spot diameter (0.1 mm min. in diameter) enables the reliable detection of small workpieces.
- Use of red light ensures easy visual recognition and simple positioning.



■ Applications

Detecting of CDs



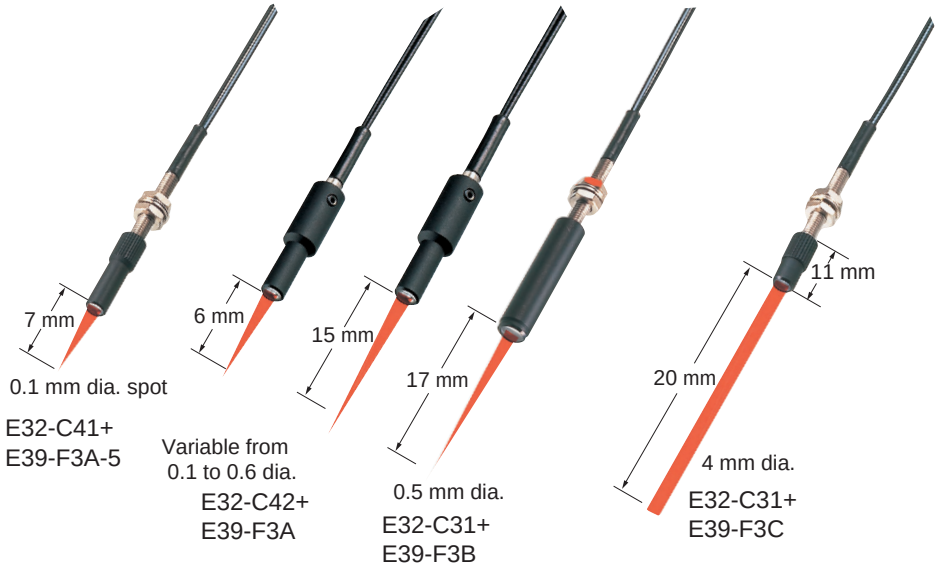
■ Ratings/Characteristics

Min. sensing object	0.005-mm dia.
Ambient temperature	–40°C to 70°C (no icing or condensation)
Fiber material	Plastic

■ Overview of Model Variations

Type	Features	Shape, sensing distance (mm)*	Model number
Coaxial, reflective	Coaxial, M6 screw	300	E32-CC200
	Coaxial, 3-dia. cylinder	150	E32-D32L
	Small spot	0.1-dia. spot at a distance of 7 mm	E32-C41+ E39-F3A-5
	Small variable spot	Spot diameter variable in the range 0.1 to 0.6 mm at distances in the range 6 to 15 mm	E32-C42+ E39-F3A
	Long distance, small spot	0.5-dia. spot at 17 mm	E32-C31+ E39-F3B
	Long distance, parallel light	Spot diameter of 4 mm max. at distances in the range 0 to 20 mm	E32-C31+ E39-F3C

*The sensing distances apply for use in combination with the E3X-DA-S Amplifier Unit (general-purpose, standard mode).

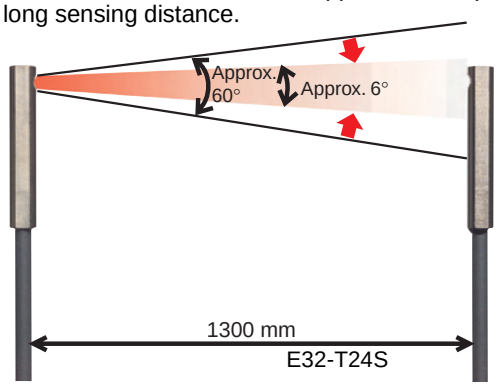


Features/Applications

Special-beam Models

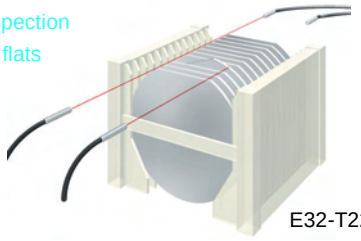
Fine Beam (Narrow Vision Field)

- Fine beam reduces unwanted light in surrounding area.
- Powerful beam allows use in applications requiring a long sensing distance.



■ Applications

Alignment inspection of orientation flats



E32-T22S

■ Ratings/Characteristics

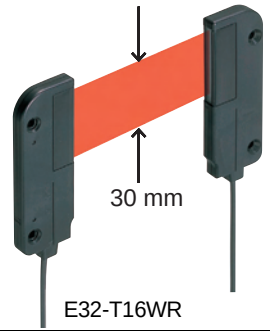
Min. bending radius	10 mm
Ambient temperature	–40°C to 70°C (no icing or condensation)
Fiber material	Plastic (Free-cut)

■ Overview of Model Variations

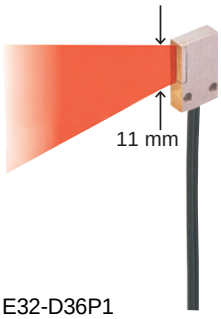
Type	Features	Shape, sensing distance (mm)*	Model number
Through-beam	Top view	1,900	E32-T22S
	Side view	1,300	E32-T24S

Area Sensing

- These Fiber Units ensure greater reliability with the detection of position inconsistencies in passing workpieces and the presence of workpieces with holes.
- Wide sensing bands of 11 and 30 mm (through-beam models) enable the detection of large position inconsistencies.



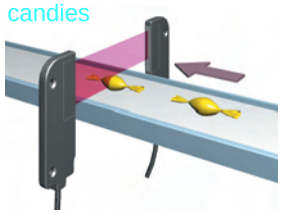
E32-T16WR



E32-D36P1

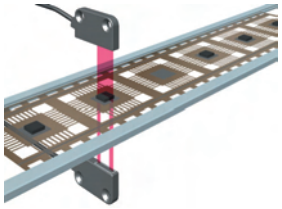
■ Applications

Detecting passage of candies



E32-T16WR

Detecting chips on film



E32-T16PR

■ Ratings/Characteristics

Ambient temperature	–40°C to 70°C (no icing or condensation) E32-T16W□ only: –25°C to 55°C
Fiber material	Plastic (Free-cut)

■ Overview of Model Variations

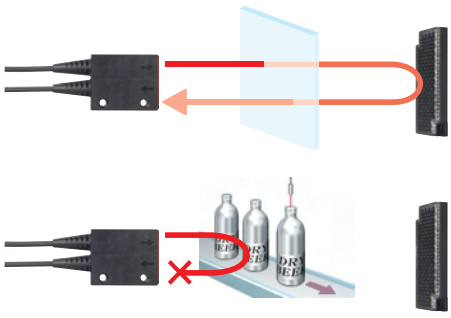
Type	Features	Shape, sensing distance (mm)*	Model number
Through-beam	Sensing width: 11 mm	840	E32-T16PR
	Sensing width: 11 mm Flat-view	750	E32-T16JR
	Sensing width: 30 mm	1,300	E32-T16WR
Reflective	Beam width: 11 mm	150	E32-D36P1

*The sensing distances apply for use in combination with the E3X-DA-S Amplifier Unit (general-purpose, standard mode).

Special-beam Models

Retroreflective

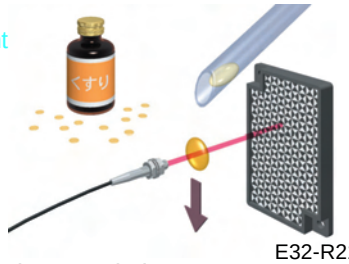
- The return optical path ensures that more light is interrupted by transparent workpieces than with through-beam models.
- Equipped with MSR function to eliminate light reflect-



E32-R16

■ Applications

Detecting translucent medicine



E32-R21

■ Ratings/Characteristics

Ambient temperature	E32-R21: –40°C to 70°C E32-R16: –25°C to 55°C (with no icing or condensation)
Fiber material	Plastic (Free-cut)

■ Overview of Model Variations

Type	Features	Shape, sensing distance (mm)*	Model number
Retroreflective	MSR function, M6 screw	250	E32-R21
	MSR function, screw mounting, long distance	1,500	E32-R16

Limited-reflective

- Limited-reflective models eliminate light reflected from distant objects.
- Small level differences can be reliably detected.
- The optical-axis direction can be selected according to the installation space.

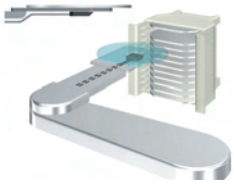
E32-L24L

■ Applications

Detecting connector pins

E32-L25L

Detecting wafers (glass substrates)



E32-L24L

■ Ratings/Characteristics

Min. sensing object	0.005-mm dia.
Fiber material	Plastic (Free-cut) 200°C models only: Glass

■ Overview of Model Variations

Type	Features	Shape, sensing distance (mm)*	Model number
Limited-reflective	Ultracompact, flat-view Ideal for checking stocks of glass substrates	0 to 4	E32-L24S
	Heat-resistant up to 105°C, top-view	5.4 to 9 (center: 7.2)	E32-L25L
	Wide sensing range, flat-view	0 to 15	E32-L16
	Heat-resistant up to 200°C, flat-view	4 to 10	E32-L86

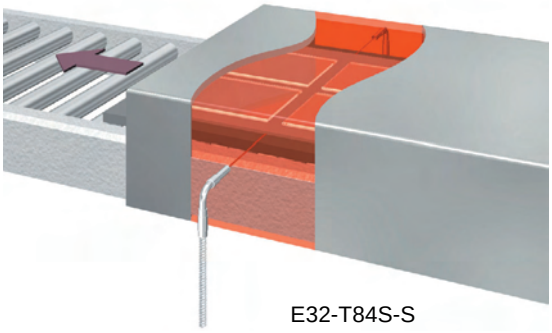
*The sensing distances apply for use in combination with the E3X-DA-S Amplifier Unit (general-purpose, standard mode).

Features/Applications

Environment-resistive Models

Heat-resistant

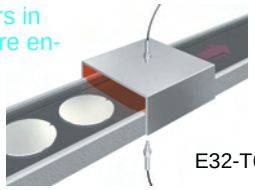
- These Fiber Units can be used for various applications in temperatures up to 400°C.



E32-T84S-S

■ Applications

Detecting wafers in high-temperature environments



E32-T61-S

■ Ratings/Characteristics

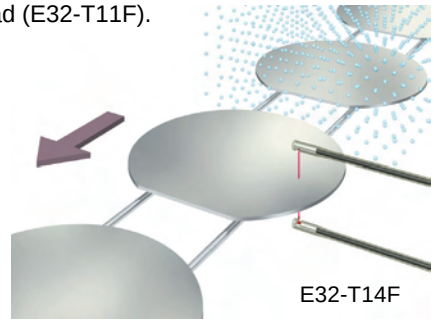
	150°C models	200°C and higher models	
		E32-T81R E32-D81R	All other models
Min. bending radius	35 mm	10 mm	25 mm
Fiber material	Plastic (Free-cut) (fluororesin coating)	Glass (fluororesin coating)	Glass (SUS spiral coating)

■ Overview of Model Variations

Type	Ambient temperature	Features	Shape, sensing distance (mm)*	Model number
Through-beam	–40°C to 150°C	M4 screw	760	E32-T51
	–40°C to 200°C	L-shaped, long distance	1,300	E32-T84S-S
	–60°C to 350°C	M4 screw	450	E32-T61-S
Reflective	–60°C to 350°C	M6 screw	90	E32-D61-S
	–40°C to 400°C	M6 screw, with sleeve	60	E32-D73-S

Chemical-resistant

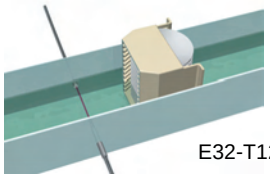
- Built-in lens and high-power beam reduce the influence of dirt and drops of water.
- Round design prevents drops of water sticking to the head (E32-T11F).



E32-T14F

■ Applications

Detecting workpieces in cleaning processes



E32-T12F

■ Ratings/Characteristics

	All other models	E32-T51F	E32-T81F-S
Ambient temperature	–40°C to 70°C	–40°C to 150°C	–40°C to 200°C
Fiber material	Plastic (Free-cut) (fluororesin coating)		Glass (fluororesin coating)

■ Overview of Model Variations

Type	Features	Shape, sensing distance (mm)*	Model number
Through-beam	Water-resistant round head	2,000	E32-T11F
	Built-in lens, high power	3,000	E32-T12F
	Heat-resistant up to 200°C	700	E32-T81F-S
Reflective	Built-in lens, high power	95	E32-D12F

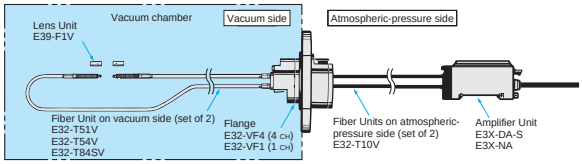
*The sensing distances apply for use in combination with the E3X-DA-S Amplifier Unit (general-purpose, standard mode).

Environment-resistive Models

Vacuum-resistant

- These models can be used in high-vacuum environments at pressures from 10^{-5} to 0.1 Pa.
- The 4-channel multi-flange, which has a maximum leakage rate of 1×10^{-10} Pa·m^3/s, contributes to space savings.

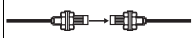
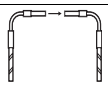
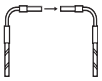
■ Applications (Configuration Example)



■ Ratings/Characteristics

	120°C models	200°C models	Atmospheric-pressure side
Min. bending radius	30 mm	25 mm	
Fiber material	Glass (fluororesin coating)	Glass (SUS spiral coating)	Plastic (Free-cut)

■ Overview of Model Variations

Type	Features	Shape, sensing distance (mm)*	Model number
Through-beam	M4 screw, top-view, heat-resistant up to 120°C, long distance	 1,000	E32-T51V+ E39-F1V
	L-shaped, heat-resistant up to 120°C	 130	E32-T54V 1M
	L-shaped, long distance, heat-resistant up to 200°C	 480	E32-T84SV 1M

*The sensing distances apply for use in combination with the E3X-DA-S Amplifier Unit (general-purpose, standard mode).

Fiber Units on Atmospheric-pressure Side

Appearance	Type	Model number
	Common	E32-T10V 2M

Flanges

Appearance	Type	Model number
	4-channel flange	E32-VF4
	1-channel flange	E32-VF1

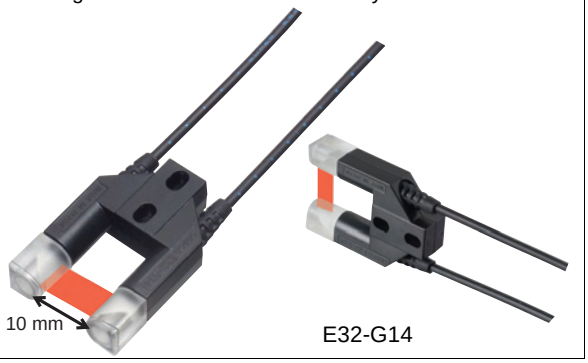
■ Ratings/Characteristics

Item \ Number of channels	4 channels	1 channels
Item \ Model number	E32-VF4	E32-VF1
Leakage rate	1×10^{-10} Pa·m^3/s max.	
Ambient temperature	Operating: −25°C to 55°C Storage: −25°C to 55°C	
Material	Aluminum (A5056)	Stainless steel (SUS304) Aluminum (A5056)
Flange-seal material	Fluorocarbon rubber (Viton)	
Weight (packed state)	Approx. 280 g	Approx. 240 g

Application-specific Models

Label Detection

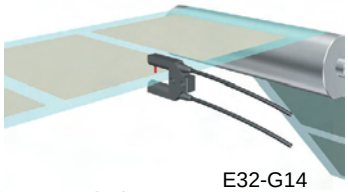
- Built-in lens and high-power beam enable the reliable detection of labels through a mounting board.
- These Fiber Units can be washed with hydrogen peroxide, making them ideal for the food industry.



E32-G14

■ Applications

Detecting labels



E32-G14

■ Ratings/Characteristics

Ambient temperature	–40°C to 70°C (no icing or condensation)
Fiber material	Plastic (Free-cut)
Degree of protection	IP67

■ Overview of Model Variations

Type	Features	Shape, sensing distance (mm)*	Model number
Through-beam	Slot sensor, no adjustment of optical axis required	10	E32-G14
	Screw mounting, side-view	3,400	E32-T14

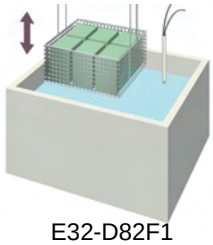
Liquid-level Detection

- Area sensing is possible with minimal influence from bubbles and drops of water (E32-A01/A02/D36T).
- For safety when disconnections occur, two models have been developed, a light ON model for liquid presence and a light ON model for liquid absence (E32-A01/A02).

Tube-mounting model

E32-D36T

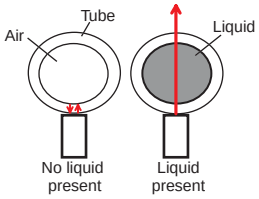
Liquid-contact model



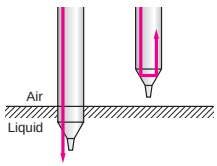
E32-D82F1

■ Operating Principle

Tube-mounting



Liquid-contact model



The presence/absence of liquid is detected using the refractive properties of light. More specifically, it utilizes the fact that the difference in refractive index between the air and the tip/tube is larger than the difference between the liquid and the tip/tube.

■ Overview of Model Variations

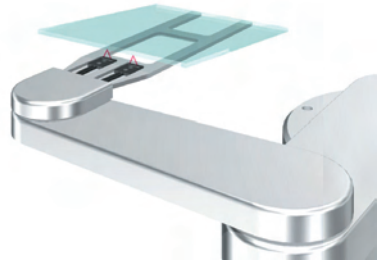
Type	Features	Shape, sensing distance (mm)*	Model number
Tube-mounting	Light ON when liquid is present (ideal for checking lower limits)	Applicable tube: Transparent tube with a diameter of 3.2, 6.4, or 9.5 mm and a recommended wall thickness of 1 mm	E32-A01
	Light ON when liquid is absent (ideal for checking for overflow)	Applicable tube: Transparent tube with a diameter in the range 6 to 13 mm and a recommended wall thickness of 1 mm	E32-A02
	No restriction on tube diameter, resistant to bubbles and drops of water	Applicable tube: Transparent tube (no restriction on diameter)	E32-D36T
Liquid-contact	Heat-resistant up to 200°C, shape prevents liquid buildup	Liquid-contact model	E32-D82F1

*The sensing distances apply for use in combination with the E3X-DA-S Amplifier Unit (general-purpose, standard mode).

Application-specific Models

Glass-substrate Alignment

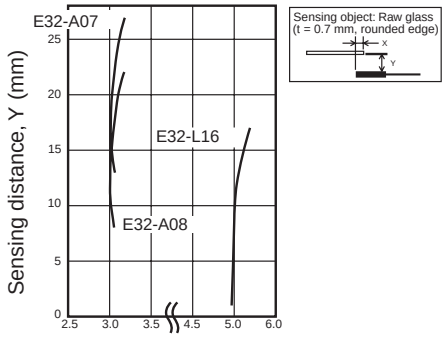
- There is little variation of detection position within the detection range (±0.1 mm max.)
- The different model variations can handle a variety of sensing distances and temperature conditions.



E32-L16

■ Engineering Data (E32-A07/A08/L16)

Detection-Position Characteristic (Typical Examples)

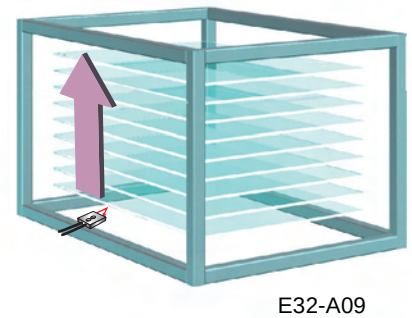


■ Overview of Model Variations

Type	Features	Shape, sensing distance (mm)*	Model number
Limited-reflective	0 to 15 mm, wide-range sensing	0 to 15	E32-L16
	Long-distance sensing	10 to 20	E32-A08
		15 to 25	E32-A07E1 E32-A07E2
	Heat-resistant up to 300°C	5 to 18	E32-L66

Glass-substrate Mapping

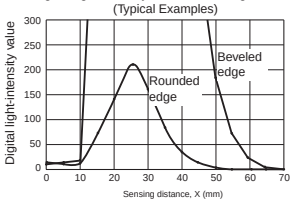
- These models can reliably detect thin glass-substrate end faces (t = 0.5 mm, beveled edge).
- Using a large-diameter lens makes it possible to cope with tilting of the glass substrates.



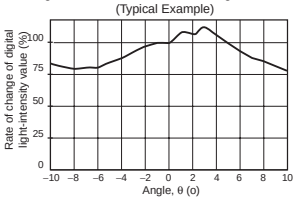
E32-A09

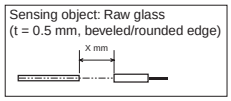
■ Engineering Data (E32-A09)

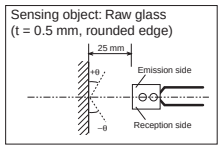
Digital Light-intensity Value vs Sensing Distance (Typical Examples)



Angle Characteristics in Left and Right Directions (Typical Example)







■ Overview of Model Variations

Type	Features	Shape, sensing distance (mm)*	Model number
Limited-reflective	Large-diameter lens ensures resistance to tilting	15 to 38 (center: 25)	E32-A09
	Heat-resistant up to 150°C		E32-A09H
	Heat-resistant up to 300°C	20 to 30 (center: 25)	E32-A09H2

*The sensing distances apply for use in combination with the E3X-DA-S Amplifier Unit (general-purpose, standard mode).

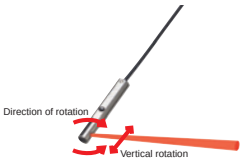
Application-specific Models

Wafer Mapping

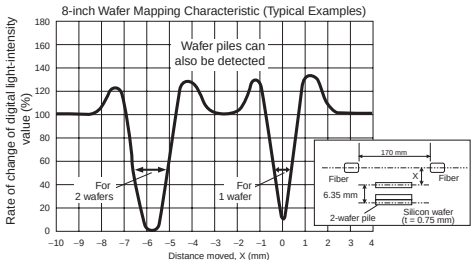
- Wafers are reliable detected with an ultrafine beam.
- The optical axis is adjusted before delivery to allow easy installation.

■ Features

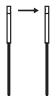
Optical axis adjusted before delivery so that displacement is typically within 0.1°.



■ Engineering Data



■ Overview of Model Variations

Type	Features		Shape, sensing distance (mm)*	Model number
Through-beam	Opening angle: 1.5°		 890	E32-A03
		With mounting flange		E32-A03-1
	Opening angle: 3° ultraslim		 340	E32-A04
		With mounting flange		E32-A04-1

*The sensing distances apply for use in combination with the E3X-DA-S Amplifier Unit (general-purpose, standard mode).

Ordering Information

Through-beam Fiber Units

*1. The values for the minimum sensing object are representative values that indicate values obtained in standard mode with the sensing distance and sensitivity set to optimum values.

*2. Free-cut Indicates models that allow free cutting.

High-resolution mode Standard mode Super-high-speed mode *When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type		Appearance (mm) *2	Sensing distance (mm)	Standard object (min. sensing object) (mm) *1	Min. bending radius (mm)	Features	Model number
Standard models	Flexible (new standard)	Standard size					
		Free-cut M4				M4 screw	E32-T11R
		Free-cut 3 dia.				3-dia. cylinder	E32-T12R
		Free-cut 15 × 8 × 3	700 530 140			Flat shape	E32-T15XR NEW
		Free-cut 90 (40) ( ): E32-TC200B4R M4 1.2 dia. Min. bending radius of sleeve: 5		1 dia. (0.005 dia.)		M4 screw, with sleeve	E32-TC200BR E32-TC200B4R NEW
		Free-cut 3 dia.				3-dia. cylinder, side-view	E32-T14LR
		Free-cut 15 × 8 × 3	270 210 50			Flat shape, side-view	E32-T15YR NEW
		Free-cut 15 × 8 × 3				Flat shape, flat-view	E32-T15ZR NEW
		Small size					
		Free-cut M3			R R1	M3 screw (small)	E32-T21R
		Free-cut 2 dia.				2-dia. cylinder (small)	E32-T22R
		Free-cut 1.5 dia.	160 130 30			1.5-dia. cylinder (small)	E32-T222R NEW
		Free-cut 12 × 7 × 2				Flat shape (small)	E32-T25XR NEW
		Free-cut 90 (40) ( ): E32-TC200F4R M3 0.9 dia. Min. bending radius of sleeve: 5		0.5 dia. (0.005 dia.)		M3 screw (small), with sleeve	E32-TC200FR E32-TC200F4R NEW
		Free-cut 1 dia.				1-dia. cylinder (small), side-view	E32-T24R
		Free-cut 12 × 7 × 2	60 50 10			Flat shape (small), side-view	E32-T25YR NEW
		Free-cut 12 × 7 × 2				Flat shape (small), flat-view	E32-T25ZR NEW

Through-beam Fiber Units

*1. The values for the minimum sensing object are representative values that indicate values obtained in standard mode with the sensing distance and sensitivity set to optimum values.

*2. Free-cut Indicates models that allow free cutting.

High-resolution mode Standard mode Super-high-speed mode *When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type	Appearance (mm) *2	Sensing distance (mm)	Standard object (min. sensing object) (mm) *1	Min. bending radius (mm)	Features	Model number
Standard models / Standard / Standard size	Free-cut M4	1,000 / 760 / 200	1 dia. (0.005 dia.)	R25	M4 screw	E32-TC200
	Free-cut M4				3-dia. cylinder	E32-T12 NEW
	Free-cut 15 × 8 × 3				Flat shape	E32-T15X NEW
	Free-cut 90 (40) ( ): E32-TC200B4R M4 1.2 dia. Min. bending radius of sleeve: 5				M4 screw, with sleeve	E32-TC200B E32-TC200B4
	Free-cut 3 dia.				3-dia. cylinder, side-view	E32-T14L
	Free-cut 15 × 8 × 3	600 / 460 / 120			Flat shape, side-view	E32-T15Y NEW
	Free-cut 15 × 8 × 3				Flat shape, flat-view	E32-T15Z NEW
Standard models / Standard / Small size	Free-cut M3	900 / 680 / 180			M3 screw (small)	E32-TC200A
	Free-cut M3		0.5 dia. (0.005 dia.)	R10		E32-TC200E
	Free-cut 2 dia.				2-dia. cylinder (small)	E32-T22
	Free-cut 1.5 dia.	270 / 220 / 50			1.5-dia. cylinder (small)	E32-T222 NEW
	Free-cut 12 × 7 × 2				Flat shape (small)	E32-T25X NEW
	Free-cut 90 (40) ( ): E32-TC200F4R M3 0.9 dia. Min. bending radius of sleeve: 5				M3 screw (small), with sleeve	E32-TC200F E32-TC200F4
	Free-cut 1 dia.				1-dia. cylinder (small), side-view	E32-T24
	Free-cut 12 × 7 × 2	160 / 130 / 30			Flat shape (small), side-view	E32-T25Y NEW
	Free-cut 12 × 7 × 2				Flat shape (small), flat-view	E32-T25Z NEW

Through-beam Fiber Units

Type		Appearance (mm) *2	Sensing distance (mm)	Standard object (min. sensing object) (mm) *1	Min. bending radius (mm)	Features	Model number
Standard models	Break-resistant	Standard size	900 680 180	1 dia (0.005 dia.)	R4	M4 screw	E32-T11
						3-dia. cylinder	E32-T12B NEW
						Flat shape	E32-T15XB NEW
		Small size	240 200 45	0.5 dia (0.005 dia.)		M3 screw (small)	E32-T21
						2-dia. cylinder (small)	E32-T221B NEW
						1.5-dia. cylinder (small)	E32-T22B
			180 150 35			Flat shape (small)	E32-T25XB NEW
	Coating		900 680 180	1 dia. (0.005 dia.)	R4	M4 screw, fluorine coating	E32-T11U
Special-beam models	Long-distance, high-power		20,000*3 20,000*3 4,000	10 dia.	R25	Large built-in lens, M14 screw	E32-T17L
			4,000*4 4,000*4 1,500	4 dia. (0.1 dia.)		M4 screw	E32-TC200+ E39-F1
			4,000*4 3,700 970		R1	M4 screw, flexible fiber	E32-T11R+ E39-F1
			4,000*4 3,600 930		R4	M4 screw, break-resistant	E32-T11+ E39-F1
			4,000*4 3,400 900		R25	Screw mounting, side-view	E32-T14
			1,700 1,330	1.4 dia. (0.01 dia.)		M4 screw	E32-T11L
			350			3-dia. cylinder	E32-T12L

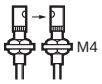
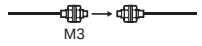
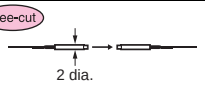
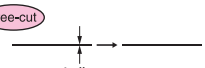
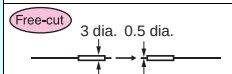
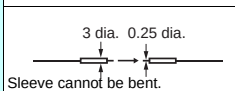
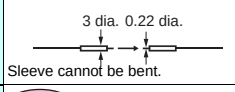
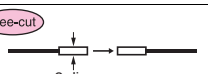
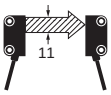
*3. The optical fiber is 10 m long on each side, so the sensing distance is 20,000 mm.
*4. The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm.

Through-beam Fiber Units

*1. The values for the minimum sensing object are representative values that indicate values obtained in standard mode with the sensing distance and sensitivity set to optimum values.

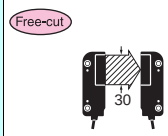
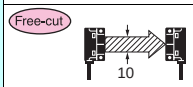
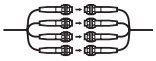
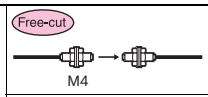
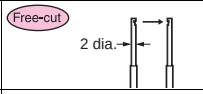
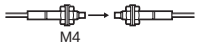
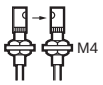
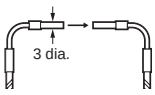
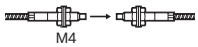
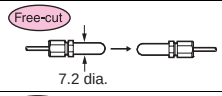
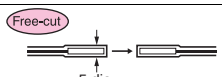
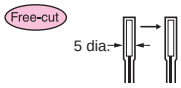
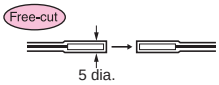
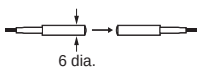
*2. Free-cut Indicates models that allow free cutting.

High-resolution mode Standard mode Super-high-speed mode *When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type		Appearance (mm) *2	Sensing distance (mm)	Standard object (min. sensing object) (mm)*1	Min. bending radius (mm)	Features	Model number
Special-beam models	Long-distance, high-power	Free-cut 	910 800 180	3 dia. (0.1 dia.)	R25	M4 screw, side-view	E32-T11L+ E39-F2
			520 400 100		R1	M4 screw, side-view, flexible fiber	E32-T11R+ E39-F2
			820 660 160		R4	M4 screw, side-view, break-resistant	E32-T11+ E39-F2
		Free-cut 	540 440 100	0.9 dia. (0.005 dia.)	R10	M3 screw (small)	E32-T21L
		Free-cut 				2-dia. cylinder (small)	E32-T22L
	Ultracompact, thin-sleeve	Free-cut 	160 130 30	0.5 dia. (0.005 dia.)	R1	1-dia. cylinder, flexible fiber	E32-T223R NEW
		Free-cut 	53 44 10	0.25 dia. (0.005 dia.)	R10	0.5-dia. sleeve; 0.25-dia. opening	E32-T33-S5 NEW
			12 10 4	0.125 dia. (0.005 dia.)		0.25-dia. sleeve, 0.125-dia. opening	E32-T333-S5 NEW
			6 5 2	0.1 dia. (0.005 dia.)		0.22-dia. sleeve, 0.1-dia. opening	E32-T334-S5 NEW
	Fine-beam	Free-cut 	2,500 1,900 500	1.7 dia. (0.1 dia.)	R10	3-dia. cylinder	E32-T22S
		Free-cut 	1,750 1,300 350	2 dia. (0.1 dia.)		3.5-dia. cylinder, side-view	E32-T24S
	Area-sensing	Free-cut 	1,100 840 220	(0.2 dia.) *3	R1	Area width: 11 mm	E32-T16PR
			1,500 1,100 300		R10		E32-T16P
		Free-cut 	980 750 190		R1	Area width: 11 mm; side-view	E32-T16JR
			1,300 1,000 260		R10		E32-T16J

*3. This is the value for which detection is possible within the sensing area, with the sensing distance set to 300 mm. (The sensing object is stationary.)

Through-beam Fiber Units

Type		Appearance (mm) *2	Sensing distance (mm)	Standard object (min. sensing object) (mm)*1	Min. bending radius (mm)	Features	Model number
Special-beam models	Area-sensing		1,700 1,300 340	(0.3 dia.) *3	R R1	Area width: 30 mm	E32-T16WR
			2,300 1,800 450		R10		E32-T16W
			3,700 2,800 740	(0.6 dia.) *4	R25	Area width: 10 mm; long distance	E32-T16
			750 610 140	2 dia. (0.1 dia)		Multi-point detection (4-head)	E32-M21
Environment-resistive models	Heat-resistant	150°C*5 	1,000 760 200	1.5 dia. (0.1 dia.)	R35	Heat-resistant up to 150°C	E32-T51
			300 230 60			Heat-resistant up to 150°C; side-view	E32-T54
		200°C*6 	360 280 70	1 dia. (0.005 dia.)	R10	Heat-resistant up to 200°C	E32-T81R-S
			600 450 120	3 dia. (0.1 dia.)	R25	Heat-resistant up to 200°C; side-view	E32-T61-S+ E39-F2
			4,000*7 3,400 900	4 dia. (0.1 dia.)		Heat-resistant up to 200°C, long distance	E32-T61-S+ E39-F1
			1,750 1,300 350	1.7 dia. (0.1 dia)		Heat-resistant up to 200°C; L-shaped; long distance	E32-T84S-S
		350°C*6 	600 450 120	1 dia. (0.005 dia.)		Heat-resistant up to 350°C	E32-T61-S
	Chemical-resistant		2,500 2,000 520	4 dia. (0.1 dia.)	R4	Fluororesin cover, round head	E32-T11F
			4,000*7 3,000 800		R40	Fluororesin cover, long distance	E32-T12F
			500 400 100	3 dia. (0.1 dia.)		Fluororesin cover, side-view	E32-T14F
			1,800 1,400 350	4 dia. (0.1 dia.)		Fluororesin cover, heat-resistant up to 150°C *5	E32-T51F NEW
			920 700 190	1 dia. (0.005 dia.)	R10	Fluororesin cover, heat-resistant up to 200°C *6	E32-T81F-S

*4. This is the value for which detection is possible within the sensing area, with the sensing distance set to give a digital value of 1,000. (The sensing object is stationary.)
*5. For continuous operation, use the products within a temperature range of–40°C to 130°C.
*6. The maximum temperature that can be withstood varies with the location. Refer to dimensions diagrams for details.
*7. The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm.

Through-beam Fiber Units

*1. The values for the minimum sensing object are representative values that indicate values obtained in standard mode with the sensing distance and sensitivity set to optimum values.

*2. (Free-cut) Indicates models that allow free cutting.

High-resolution mode Standard mode Super-high-speed mode *When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type		Appearance (mm) *2	Sensing distance (mm)	Standard object (min. sensing object) (mm) *1	Min. bending radius (mm)	Features	Model number
Environment-resistive models	Vacuum-resistant		260 200 50	1.2 dia. (0.01 dia.)	R30	M4 screw, heat-resistant up to 120°C	E32-T51V 1M
			1,350 1,000 260	4 dia. (0.1 dia.)		M4 screw, heat-resistant up to 120°C, long distance	E32-T51V 1M+ E39-F1V
			210 130 35	1.2 dia. (0.01 dia.)		L-shaped, heat-resistant up to 120°C	E32-T54V 1M
			660 500 180	4 dia. (0.1 dia.)		L-shaped, heat-resistant up to 120°C, long distance	E32-T54V 1M+ E39-F1V
			630 480 130	2 dia. (0.1 dia.)	R25	L-shaped, heat-resistant up to 200°C, long distance	E32-T84SV 1M

Flanges

Appearance (mm)	Type	Model number
	4-channel flange	E32-VF4
	1-channel flange	E32-VF1

Fiber Units for Atmospheric-pressure Side

Appearance (mm)	Type	Model number
(Free-cut) 	Amplifier-Flange Connection Fiber	E32-T10V 2M

Lens Units

Appearance (mm)	Type	Quantity	Remarks
	E39-F1V	2	Long-distance Lens Unit Can be used for the E32-T51V and the E32-T54V.

Mounting Brackets

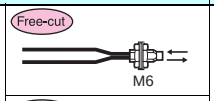
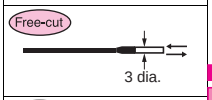
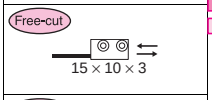
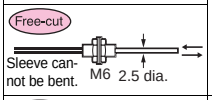
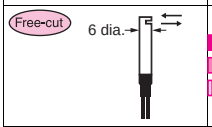
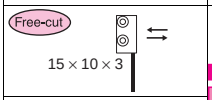
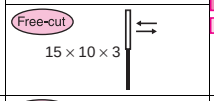
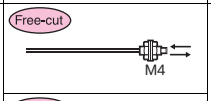
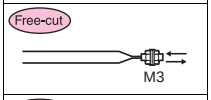
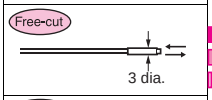
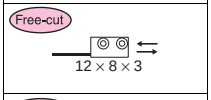
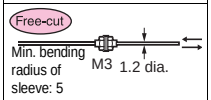
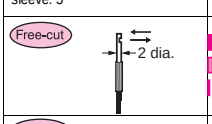
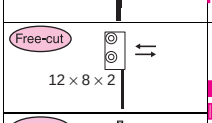
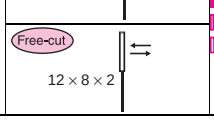
Appearance (mm)	Type	Quantity	Remarks
	E39-L54V	2	Can be used for the E32-T54V.

Ordering Information

Fiber Units with Reflective Sensors

*1. The sensing distances are for white paper.
*2. The values for the minimum sensing object are representative values that indicate values obtained in standard mode with the sensing distance and sensitivity set to optimum values.
*3. Free-cut Indicates models that allow free cutting.

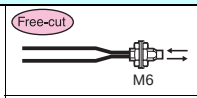
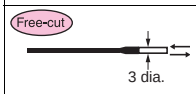
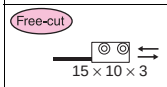
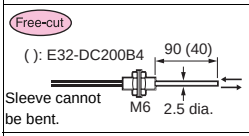
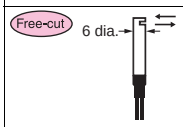
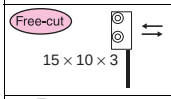
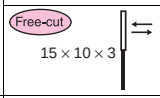
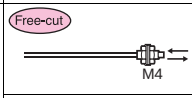
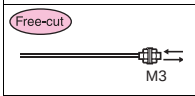
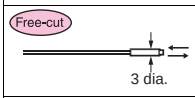
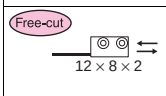
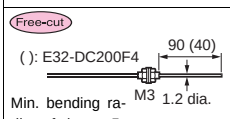
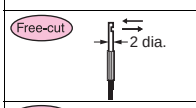
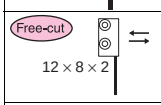
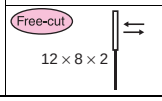
High-resolution mode Standard mode Super-high-speed mode *When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type	Appearance (mm) *3	Sensing distance (mm) *1	(Min. sensing object) (mm) *2	Min. bending radius (mm)	Features	Model number
Standard models / Flexible (new standard) — Standard size	Free-cut 	300 / 170 / 50	(0.005 dia.)	R1	M6 screw	E32-D11R
	Free-cut 				3-dia. cylinder	E32-D12R
	Free-cut 				Flat shape	E32-D15XR NEW
	Free-cut 				M6 screw, with sleeve	E32-DC200BR E32-DC200B4R NEW
	Free-cut 	80 / 45 / 14			6-dia. cylinder, side-view	E32-D14LR
	Free-cut 	70 / 40 / 12			Flat shape, side-view	E32-D15YR NEW
	Free-cut 				Flat shape, flat-view	E32-D15ZR NEW
Small size	Free-cut 	50 / 30 / 8			M4 screw (small)	E32-D211R NEW
	Free-cut 				M3 screw (small)	E32-D21R
	Free-cut 				3-dia. cylinder (small)	E32-D22R
	Free-cut 				Flat panel (small)	E32-D25XR NEW
	Free-cut 				M3 screw (small), with sleeve	E32-DC200FR E32-DC200F4R NEW
	Free-cut 	26 / 15 / 4			2-dia. cylinder (small), side-view	E32-D24R
	Free-cut 	14 / 8 / 2			Flat shape (small), side-view	E32-D25YR NEW
	Free-cut 				Flat shape (small), flat-view	E32-D25ZR NEW

Fiber Units with Reflective Sensors

*1. The sensing distances are for white paper.
*2. The values for the minimum sensing object are representative values that indicate values obtained in standard mode with the sensing distance and sensitivity set to optimum values.
*3. Free-cut Indicates models that allow free cutting.

High-resolution mode Standard mode Super-high-speed mode *When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type		Appearance (mm) *3	Sensing distance (mm) *1	(Min. sensing object) (mm) *2	Min. bending radius (mm)	Features	Model number
Standard models	Standard	Standard size	 500 300 90	(0.005 dia.)	R25	M6 screw	E32-DC200
			 400 230 70			3-dia. cylinder	E32-D12
			 500 300 90			Flat shape	E32-D15X NEW
						M6 screw, with sleeve	E32-DC200B E32-DC200B4
			 200 110 36			6-dia. cylinder, side-view	E32-D14L
			 170 100 30			Flat shape, side-view	E32-D15Y NEW
						Flat shape, flat-view	E32-D15Z NEW
		Small size			R10	M4 screw (small)	E32-D211 NEW
						M3 screw (small)	E32-DC200E
			 130 80 22			3-dia. cylinder (small)	E32-D22 NEW
						Flat shape (small)	E32-D25X NEW
						M3 screw (small), with sleeve	E32-DC200F E32-DC200F4
			 50 30 8			2-dia. cylinder (small), side-view	E32-D24
			 35 20 6			Flat shape (small), side-view	E32-D25Y NEW
						Flat shape (small), flat-view	E32-D25Z NEW

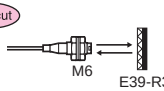
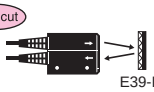
Fiber Units with Reflective Sensors

Type		Appearance (mm) *3	Sensing distance (mm) *1	(Min. sensing object) (mm) *2	Min. bending radius (mm)	Features	Model number
Standard models	Break-resistant	Standard size	Free-cut, M6	300 / 170 / 50	(0.005 dia.)	B R4	M6 screw	E32-D11
			Free-cut, 15 × 10 × 3				Flat shape	E32-D15XB NEW
		Small size	Free-cut, M4	110 / 70 / 20			M4 screw (small)	E32-D21B
			Free-cut, 3 dia.				3-dia. cylinder (small)	E32-D221B NEW
			Free-cut, M3	50 / 30 / 8			M3 screw (small)	E32-D21
			1.5 dia.				1.5-dia. cylinder (small)	E32-D22B
			Free-cut, 12 × 8 × 2	85 / 50 / 15			Flat shape (small)	E32-D25XB NEW
	Coating	Free-cut, M6	300 / 170 / 50	(0.005 dia.)	U R4	M6 screw, fluorine coating	E32-D11U
Special-beam models	Long-distance, high-power	Free-cut, 17.5	40 to 1,000 / 40 to 700 / 40 to 240	---	B R4	Large built-in lens, screw mounting	E32-D16
		Free-cut, M6	650 / 400 / 110	(0.005 dia.)	R25	M6 screw	E32-D11L
		Free-cut, M4	210 / 130 / 35		R10	M4 screw	E32-D21L
		Free-cut, 3 dia.				3-dia. cylinder	E32-D22L
	Ultracompact, thin-sleeve	Free-cut, 3 dia. 0.8 dia. Sleeve cannot be bent.	25 / 16 / 4		R4	0.8-dia. sleeve	E32-D33
		2 dia. 0.5 dia. Sleeve cannot be bent.	5 / 3 / 0.8			0.5-dia. sleeve	E32-D331

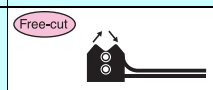
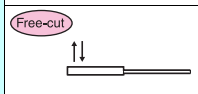
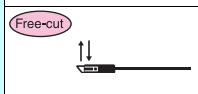
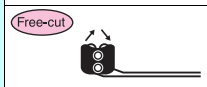
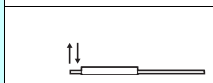
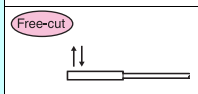
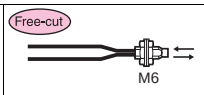
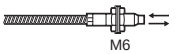
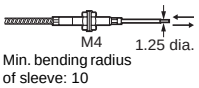
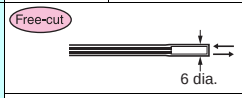
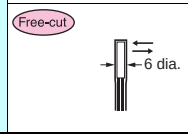
Fiber Units with Reflective Sensors

*1. The sensing distances are for white paper.
*2. The values for the minimum sensing object are representative values that indicate values obtained in standard mode with the sensing distance and sensitivity set to optimum values.
*3. Free-cut Indicates models that allow free cutting.

High-resolution mode Standard mode Super-high-speed mode *When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type		Appearance (mm) *3	Sensing distance (mm) *1	(Min. sensing object) (mm) *2	Min. bending radius (mm)	Features	Model number
Special-beam models	Coaxial, small-spot	Free-cut  M6	250 150 45	(0.005 dia.)	R4	M6 screw	E32-CC200R NEW
			500 300 90		R25		E32-CC200
		Free-cut  3 dia.	250 150 45			3-dia. cylinder	E32-D32L
		Free-cut  M3	120 75 22			M3 screw (small)	E32-C31
		Free-cut  2 dia.				2-dia. cylinder (small)	E32-D32
			6 to 15 mm; spot diameter: 0.1 to 0.6 mm			Small spot (variable)	E32-C42+ E39-F3A
			Spot diameter of 0.5 to 1 mm at distances in the range 6 to 15 mm Free-cut				E32-D32+ E39-F3A
			Spot diameter of 0.1 mm at 7 mm			Small spot	E32-C41+ E39-F3A-5
			Spot diameter of 0.5 mm at 7 mm Free-cut				E32-C31+ E39-F3A-5
			Spot diameter of 0.2 mm at 17 mm			Long distance, small spot	E32-C41+ E39-F3B
			Spot diameter of 0.5 mm at 17 mm Free-cut				E32-C31+ E39-F3B
		Free-cut  4-dia. spot	Spot diameter of 4 mm max. at distances in the range 0 to 20 mm			Long-distance sensing, parallel light	E32-C31+ E39-F3C
	Area-sensing	Free-cut 	250 150 45	(0.005 dia.)	B R4	Beam width: 11 mm	E32-D36P1
	Retroreflective	Free-cut  M6 E39-R3 Reflector	10 to 250 10 to 250 10 to 250	(0.1 dia.)	R10	M6 screw	E32-R21+ E39-R3 (Attached)
		Free-cut  E39-R3 Reflector	150 to 1,500 150 to 1,500 150 to 1,500	(0.2 dia.)	R25	Screw mounting, long distance	E32-R16+ E39-R1 (Attached)

Fiber Units with Reflective Sensors

Type		Appearance (mm) *3	Sensing distance (mm) *1	(Min. sensing object) (mm) *2	Min. bending radius (mm)	Features	Model number
Special-beam models	Limited-reflective		3.3	(0.005 dia.)	R25	Small level differences, high power, side-view	E32-L25
			3.3			Small level differences, top-view	E32-L25A
			0 to 4		R10	Ultracompact, flat-view	E32-L24S
			2 to 6 (center: 4)			Heat resistant up to 105°C *4, top-view	E32-L24L
			5.4 to 9 (center: 7.2)			Heat resistant up to 105°C *4, top-view	E32-L25L
			4 to 10		R25	Heat resistant up to 200°C, flat-view	E32-L86 NEW
			0 to 15			Wide-range sensing, flat-view	E32-L16
Environment-resistive models	Heat-resistant	150°C*5 	400	(0.005 dia.)	R35	Heat resistant up to 150°C	E32-D51
		200°C*6 	150		R10	Heat resistant up to 200°C	E32-D81R-S E32-D81R
		350°C*6 	90		R25	Heat resistant up to 350°C	E32-D61-S E32-D61
		400°C*6 	100			Heat resistant up to 400°C, with sleeve	E32-D73-S E32-D73
	Chemical-resistant		160		R40	Fluororesin cover, long distance	E32-D12F
			70			Fluororesin cover, side-view	E32-D14F NEW

*4. For continuous operation, use the products within a temperature range of –40°C to 90°C.

*5. For continuous operation, use the products within a temperature range of –40°C to 130°C.

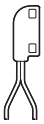
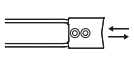
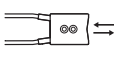
*6. The maximum temperature that can be withstood varies with the location. Refer to dimensions diagrams for details.

Ordering Information

Application-specific Fiber Units

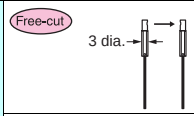
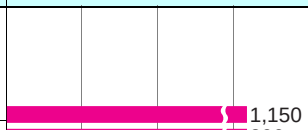
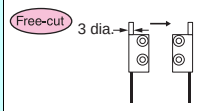
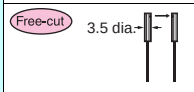
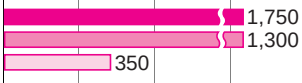
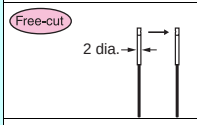
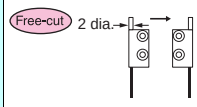
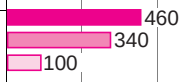
*1. The values for the minimum sensing object are representative values that indicate values obtained in standard mode with the sensing distance and sensitivity set to optimum values.
*2. Free-cut Indicates models that allow free cutting.

High-resolution mode Standard mode Super-high-speed mode *When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type		Appearance (mm) *2	Sensing distance (mm)	Standard object (min. sensing object) (mm)*1	Min. bending radius (mm)	Features	Model number
Application-specific models	Label-detection	Free-cut 	10 10 10	4 dia. (0.1 dia.)	R25	Slot sensor (no adjustment of optical axis required)	E32-G14
		Free-cut 	4,500 3,400 900			Screw mounting, side-view	E32-T14
	Liquid-level detection	Free-cut 	Applicable tube: Transparent tube with a diameter in the range 8 to 10 mm and a recommended wall thickness of 1 mm		R10	Compact	E32-L25T
		Free-cut 	Applicable tube: Transparent tube (no restriction on diameter)		R4	No restriction on tube diameter, resistant to bubbles and drops of water	E32-D36T NEW
		Free-cut 	Applicable tube: Transparent tube with a diameter of 3.2, 6.4, or 9.5 mm and a recommended wall thickness of 1 mm			Light ON when fluid is present, resistant to bubbles and drops of water	E32-A01
		Free-cut 	Applicable tube: Transparent tube with a diameter in the range 6 to 13 mm and a recommended wall thickness of 1 mm			Light ON when fluid is not present, resistant to bubbles and drops of water	E32-A02
			Liquid-contact models		R40	Heat resistant up to 200°C, fluororesin cover	E32-D82F1 E32-D82F2
	Glass-substrate-alignment	Free-cut 	0 to 15 0 to 15 0 to 12	Soda glass with reflection factor of 7%	R25	Variation of detection position within the detection range: 0.2 mm	E32-L16
			10 to 20 10 to 20				E32-A08 NEW
			15 to 25 15 to 25				E32-A07E1 E32-A07E2 NEW
			5 to 18 5 to 18 5 to 15		R25	Heat resistant up to 300°C *4, *5	E32-L66
	Glass-substrate-mapping	Free-cut 	15 to 38 (center: 25) 15 to 38 (center: 25)	Edge of soda glass with reflection factor of 7% (t = 0.5 mm, rounded edge)	R25	Resistant to tilting	E32-A09 NEW
					R35	Heat resistant up to 150°C *3	E32-A09H NEW
			20 to 30 (center: 25) 20 to 30 (center: 25)		R25	Heat resistant up to 300°C *4, *5	E32-A09H2 NEW

*3. For continuous operation, use the products within a temperature range of –40°C to 130°C.
*4. The maximum temperature that can be withstood varies with the location. Refer to dimensions diagrams for details.
*5. These values are based on the assumption that there are no repeated sudden changes in temperature.

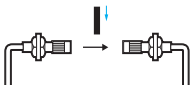
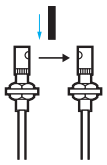
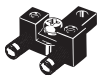
Application-specific Fiber Units

Type		Appearance (mm) *2	Sensing distance (mm)	Standard object (min. sensing object) (mm)*1	Min. bending radius (mm)	Features	Model number
Application-specific models	Wafer-mapping			2 dia. (0.1 dia.)	R1	Opening angle: 1.5°; optical axis adjusted before delivery	E32-A03
					R10	Opening angle: 1.5°; with mounting flange; optical axis adjusted before delivery	E32-A03-1 NEW
						Long distance; opening angle: 6°	E32-T24S
				1.2 dia. (0.1 dia.)		Ultraslim (t = 2 mm); opening angle: 3°; optical axis adjusted before delivery	E32-A04
						Ultraslim (t = 2 mm); opening angle: 3°; with mounting flange; optical axis adjusted before delivery	E32-A04-1 NEW

Accessories

*1. The values for the minimum sensing object are representative values that indicate values obtained in standard mode with the sensing distance and sensitivity set to optimum values.

Lens Units

Type		Appearance	Applicable Fiber Units	Sensing distance (mm)			Standard object (min. sensing object) (mm) *1	Features	Model number
				High-resolution mode	Standard mode	Super-high-speed			
Through-beam Lens Units	Long-distance Lens Units		E32-T11L	4,000*2	3,200	840	4 dia. (0.1 dia.)	Long-distance sensing; opening angle: 5°C to 40°C (heat resistant up to 200°C)	E39-F1
			E32-TC200	4,000*2	4,000*2	1,500			
			E32-T11R	4,000*2	3,700	970			
			E32-T11	4,000*2	3,600	930			
			E32-T11U	4,000*2	3,600	930			
			E32-T81R-S	2,650	2,100	520			
			E32-T61-S	4,000*2	3,400	900			
	Side-view Units		E32-T11L	910	800	180	3 dia. (0.1 dia.)	Side-view, space-saving (heat resistant up to 200°C)	E39-F2
			E32-TC200	840	700	160			
			E32-T11R	520	400	100			
			E32-T11	820	660	160			
			E32-T11U	820	660	160			
			E32-T81R-S	360	280	70			
			E32-T61-S	600	450	120			
	Reflection Units		E32-T11L E32-TC200 E32-T11R E32-T11 E32-T11U E32-T81R-S E32-T61-S	---			---	Long distance reflection (heat resistant up to 200°C)	E39-F3
Reflective Lens Units	Small-spot Lens Units		E32-C42	Spot diameter variable in the range 0.1 to 0.6 mm at distances in the range 6 to 15 mm				Small spot (variable)	E39-F3A
			E32-D32	Spot diameter variable in the range 0.5 to 1 mm at distances in the range 6 to 15 mm					
			E32-C41	0.1-dia. spot at a distance of 7 mm				Small spot	E39-F3A-5
			E32-C31	0.5-dia. spot at a distance of 7 mm					
			E32-C41	0.2-dia. spot at a distance of 17 mm				Long distance, small spot	E39-F3B
			E32-C31	0.5-dia. spot at a distance of 17 mm					
			E32-C31 E32-C41	Spot diameter of 4 mm max. at distances in the range 0 to 20 mm				Long-distance sensing, parallel light	E39-F3C

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

Accessories

Protective Spiral Tube

Appearance	Application	Applicable Fiber Units	Tube length	Model number
	Fiber protection	M3-screw models E32-D21□ E32-DC200E E32-DC200F□ E32-C31	500 mm	E39-F32A5
			1 m	E39-F32A
		M3-screw models E32-T21□ (Except the E32-T21R.) E32-TC200E E32-TC200F□	500 mm	E39-F32B5
			1 m	E39-F32B
		M4-screw models E32-T11□ E32-TC200 E32-TC200B□ E32-T51	500 mm	E39-F32C5
			1 m	E39-F32C
		M6-screw models E32-D11□ E32-DC200 E32-DC200B E32-CC200□ E32-D51	500 mm	E39-F32D5
			1 m	E39-F32D

Note: Before using a Protective Spiral Tube, remove the protective tube that protects the area between the head and the optical fiber provided with some models.

Other Accessories

Appearance	Application	Name	Applicable Fiber Units	Remarks	Model number
	Used to cut the fiber.	Cutter	Fiber Units that allow free cutting	Provided with applicable Fiber Units.	E39-F4
	Attachments for inserting thin fibers into Amplifier Units	Thin-fiber Attachments	Fiber Units that allow free cutting and have a 1.0-dia. sheath	• 2 per set • Provided with applicable Fiber Units.	E39-F9
	Used to extend fibers.	Fiber Connectors	Fiber Units that allow free cutting and have a 2.2-dia. sheath	---	E39-F10
	Easy-to-use, one-touch relay connectors		Fiber Units that allow free cutting	E39-F13: Used for Fiber Units with a 2.2-dia. sheath. E39-F14: Used for Fiber Units with a 1.0-dia. sheath. E39-F15: Used for Fiber Units with a sheath diameter between 1.0 and 2.2 mm.	E39-F13 E39-F14 E39-F15
	Used to bends in sleeves.	Sleeve Bender	E32-TC200B(4) E32-TC200F(4) E32-DC200F(4)	---	E39-F11

Ratings/Characteristics

Fiber Units

Item \ Type	Standard models				
	Flexible		Standard	Break-resistant	Fluorine-coating
	E32-T1□R E32-D1□R	E32-T2□R E32-D2□R			
Ambient operating temperature *1	−40°C to 70°C				
Ambient humidity *1	35% to 85%				
Fiber material	Plastic (PVC coating)	Plastic (polyethylene coating)		Plastic (PVC coating)	Plastic (fluororesin coating)
Degree of protection	IEC standard: IP67				

Item \ Type	Special-beam models				
	Long-distance, high-power		Ultracompact, ultrafine-sleeve	Coaxial, small-spot	Fine-beam (narrow vision field)
	All other models	E32-D16			
Ambient operating temperature *1	−40°C to 70°C				
Ambient humidity *1	35% to 85%				
Fiber material	Plastic (polyethylene coating)	Plastic (PVC coating)	Plastic (combination of PVC, polyethylene, and polyolefin sheaths)		Plastic (PVC coating)
Degree of protection	IEC standard: IP67	IEC standard: IP40	IEC standard: IP67		

Item \ Type	Special-beam models				
	Area-sensing			Retroreflective	
	All other models	E32-D36P1 E32-T16	E32-T16W(R)	E32-R21	E32-R16
Ambient operating temperature *1	−40°C to 70°C		−25°C to 55°C	−40°C to 70°C	−25°C to 55°C
Ambient humidity *1	35% to 85%				
Fiber material	Plastic (PVC coating)	Plastic (polyethylene coating)	Plastic (PVC coating)	Plastic (polyethylene coating)	
Degree of protection	IEC standard: IP50 (IP67 for E32-T16)			IEC standard: IP67	IEC standard: IP66

Item \ Type	Special-beam models		
	Limited-reflective		
	All other models	E32-L25L E32-L24L	E32-L86
Ambient operating temperature *1	−40°C to 70°C	−40°C to 105°C *2	−40°C to 200°C *3
Ambient humidity *1	35% to 85%		
Fiber material	Plastic (polyethylene coating)		Glass (SUS spiral coating)
Degree of protection	IEC standard: IP50 (IP40 for E32-L24S, E32-L16, and E32-L86)		

*1. There must be no icing or condensation within the range specified for the ambient operating temperature.
*2. For continuous operation, use the products within a temperature range of −40°C to 90°C.
*3. The maximum temperature that can be withstood varies with the location. Refer to dimensions diagrams for details.

Fiber Units

Item \ Type	Environment-resistive models				
	Heat-resistant				
	E32-T5□ E32-D5□	E32-T8□R-S E32-D8□R-S	E32-T84S-S	E32-T6□-S E32-D6□-S	E32-D73-S
Ambient operating temperature *1	–40°C to 150°C *4	–40°C to 200°C *3		–60°C to 350°C *3	–40°C to 400°C *3
Ambient humidity *1	35% to 85%				
Fiber material	Plastic (fluororesin coating)	Glass (fluororesin coating)	Glass (SUS spiral coating)		
Degree of protection	IEC standard: IP67				

Item \ Type	Environment-resistive models				
	Chemical-resistant			Vacuum-resistant	
	All other models	E32-T51F	E32-T81F-S	All other models	32-T84SV
Ambient operating temperature *1	–40°C to 70°C	–40°C to 150°C *4	–40°C to 200°C *3	–25°C to 120°C	–25°C to 200°C
Ambient humidity *1	35% to 85%				
Fiber material	Plastic (fluororesin cover)		Glass (fluororesin cover)	Glass (fluororesin coating)	Glass (SUS spiral coating)
Degree of protection	IEC standard: IP67			---	

Item \ Type	Application-specific models				
	Label-detection	Liquid-level detection			Wafer-mapping
		All other models	E32-A01 E32-A02	E32-D82F	
Ambient operating temperature *1	–40°C to 70°C			–40°C to 200°C *3	–40°C to 70°C
Ambient humidity *1	35% to 85%				
Fiber material	Plastic (polyethylene coating)		Plastic (fluororesin coating)	Fluororesin cover	Plastic (polyethylene coating)
Degree of protection	IEC standard: IP67	IEC standard: IP50		IEC standard: IP68	IEC standard: IP50
Other		Repeat accuracy: 1 mm max.		Repeat accuracy: 0.5 mm max.	

Item \ Type	Application-specific models				
	Glass-substrate-alignment		Glass-substrate-mapping		
	All other models	E32-L66	E32-A09	E32-A09H	E32-A09H2
Ambient operating temperature *1	–40°C to 70°C	0°C to 300°C *3, *5	–40°C to 70°C	–40°C to 150°C *4	–40°C to 300°C *3
Ambient humidity *1	35% to 85%				
Fiber material	Plastic (polyethylene coating)	Glass (SUS spiral coating)	Plastic (polyethylene coating)	Plastic (fluororesin coating)	Glass (SUS spiral coating)
Degree of protection	IEC standard: IP40				

*1. There must be no icing or condensation within the range specified for the ambient operating temperature.
*2. For continuous operation, use the products within a temperature range of –40°C to 90°C.
*3. The maximum temperature that can be withstood varies with the location. Refer to dimensions diagrams for details.
*4. For continuous operation, use the products within a temperature range of –40°C to 130°C.
*5. These values are based on the assumption that there are no repeated sudden changes in temperature.

Dimensions

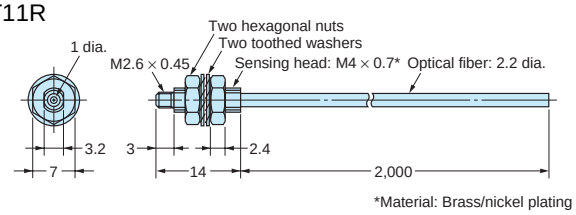
Through-beam Fiber Units

Standard/Flexible Models

Free-cut Indicates models that allow free cutting.

E32-TC200
E32-T11R

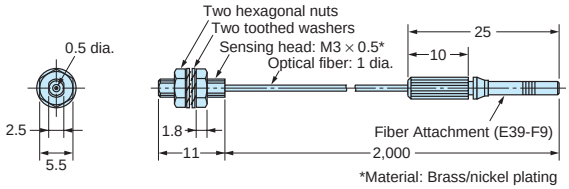
Free-cut



*Material: Brass/nickel plating

E32-TC200E

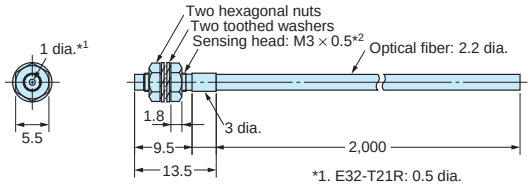
Free-cut



*Material: Brass/nickel plating

E32-TC200A
E32-T21R

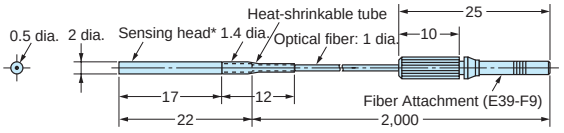
Free-cut



*1. E32-T21R: 0.5 dia.
*2. Material: Brass/nickel plating

E32-T22
E32-T22R

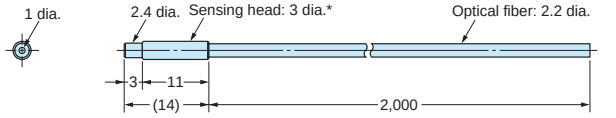
Free-cut



*Material: Stainless steel (SUS303)

E32-T12
E32-T12R

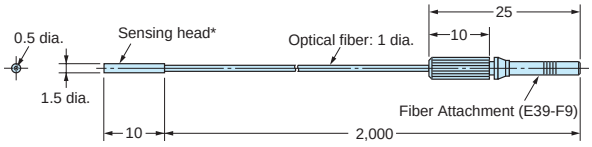
Free-cut



*Material: Brass/nickel plating

E32-T222
E32-T222R

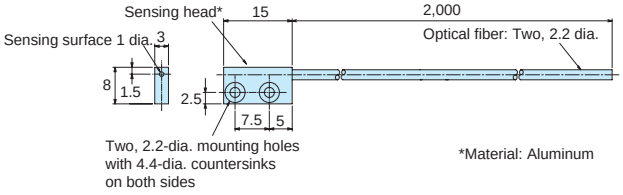
Free-cut



*Material: Brass/nickel plating

E32-T15X
E32-T15XR

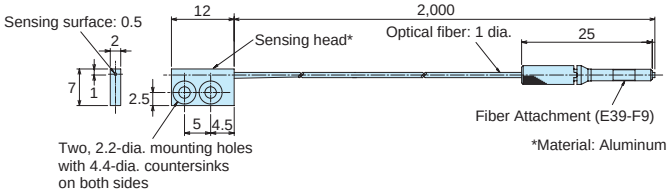
Free-cut



*Material: Aluminum

E32-T25X
E32-T25XR

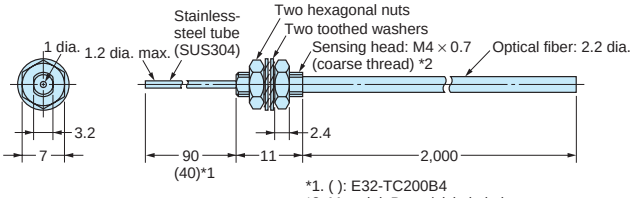
Free-cut



*Material: Aluminum

E32-TC200B(B4)
E32-TC200BR(B4R)

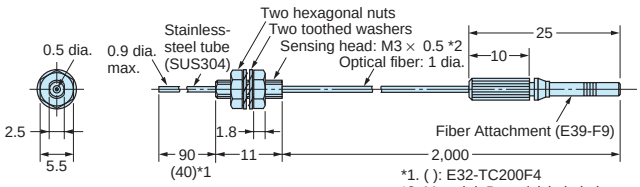
Free-cut



*1. ( ): E32-TC200B4
*2. Material: Brass/nickel plating

E32-TC200(F4)
E32-TC200F(F4R)

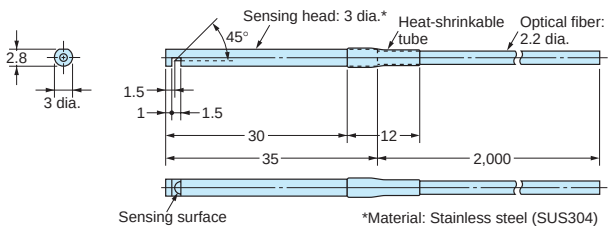
Free-cut



*1. ( ): E32-TC200F4
*2. Material: Brass/nickel plating

E32-T14L
E32-T14LR

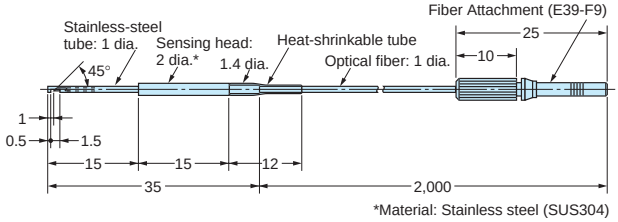
Free-cut



*Material: Stainless steel (SUS304)

E32-T24
E32-T24R

Free-cut



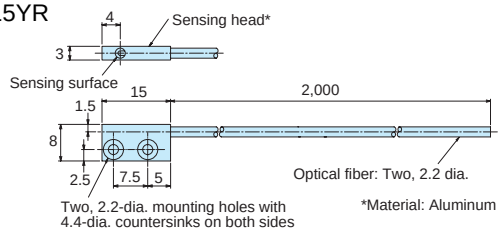
*Material: Stainless steel (SUS304)

Through-beam Fiber Units

Standard/Flexible Models

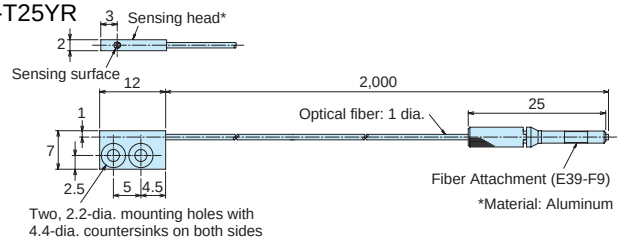
E32-T15Y
E32-T15YR

Free-cut



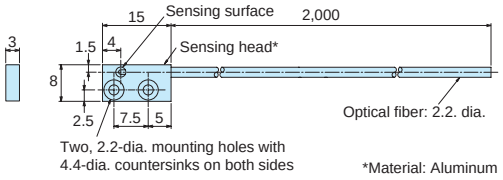
E32-T25Y
E32-T25YR

Free-cut



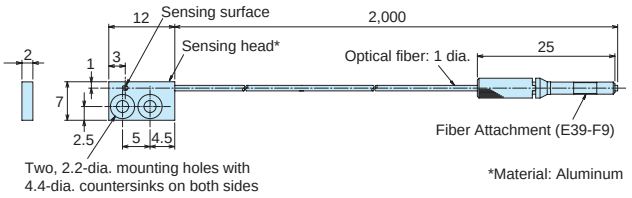
E32-T15Z
E32-T15ZR

Free-cut



E32-T25Z
E32-T25ZR

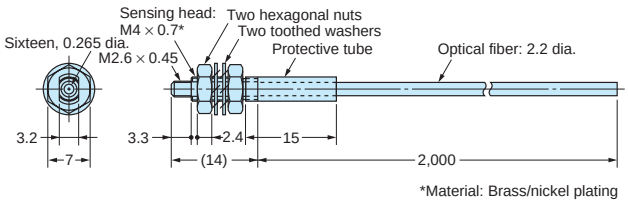
Free-cut



Break-resistant/Coated Models

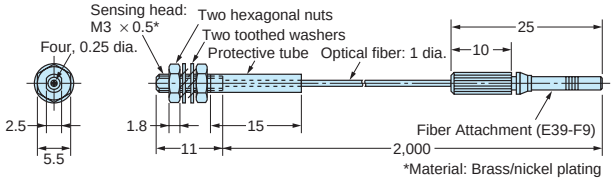
E32-T11
E32-T11U

Free-cut



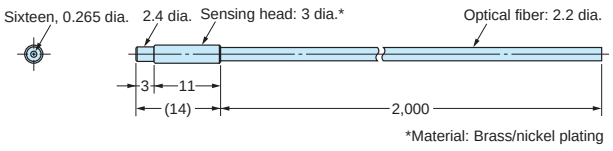
E32-T21

Free-cut



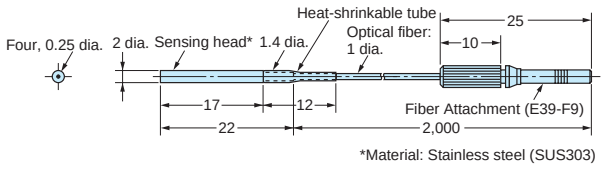
E32-T12B

Free-cut



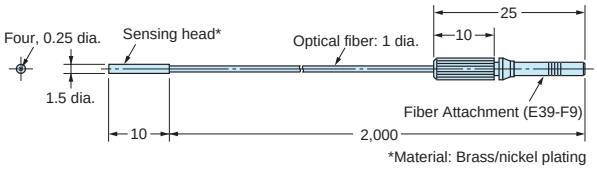
E32-T221B

Free-cut



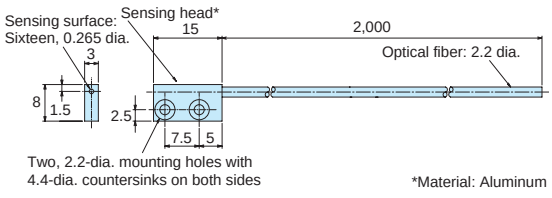
E32-T22B

Free-cut



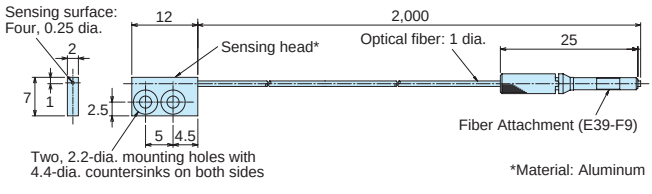
E32-T15XB

Free-cut



E32-T25XB

Free-cut



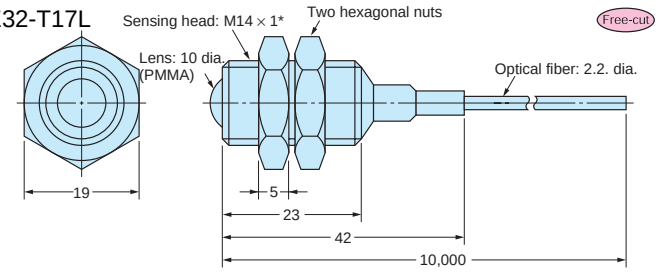
Through-beam Fiber Units

Long-distance/High-power Models

Free-cut Indicates models that allow free cutting.

E32-T17L

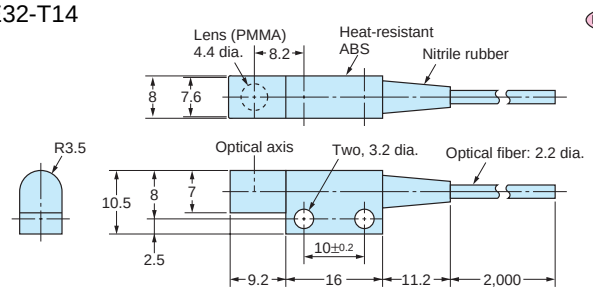
Free-cut



*Material: ABS

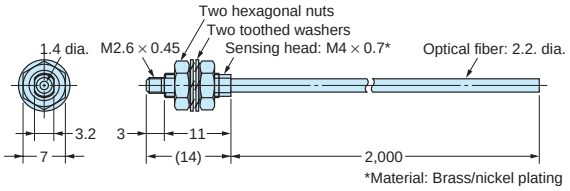
E32-T14

Free-cut



E32-T11L

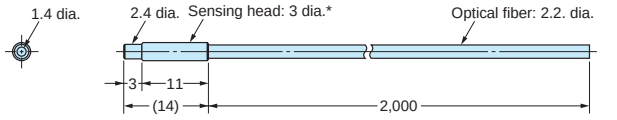
Free-cut



*Material: Brass/nickel plating

E32-T12L

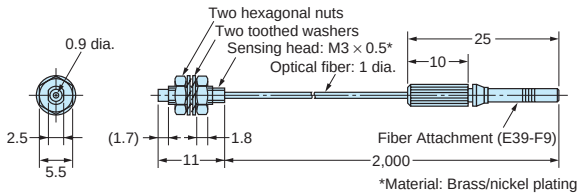
Free-cut



*Material: Brass/nickel plating

E32-T21L

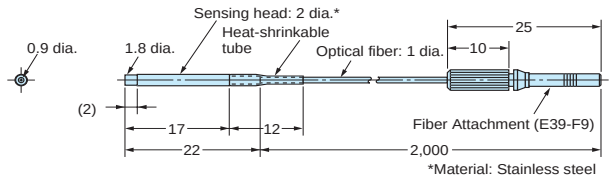
Free-cut



*Material: Brass/nickel plating

E32-T22L

Free-cut

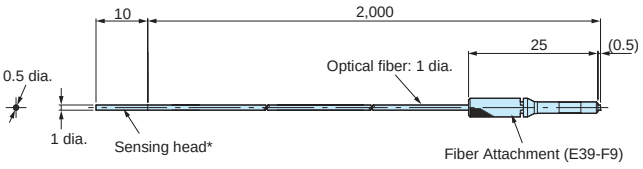


*Material: Stainless steel

Ultracompact/Thin-sleeve Models

E32-T223R

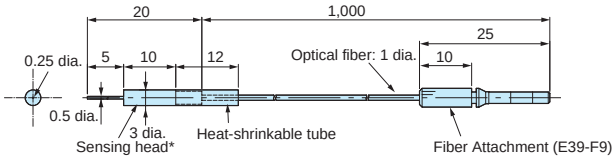
Free-cut



*Material: Stainless steel

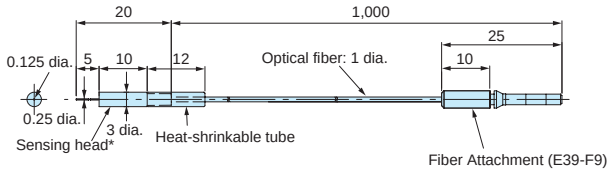
E32-T33-S5

Free-cut



*Material: Stainless steel

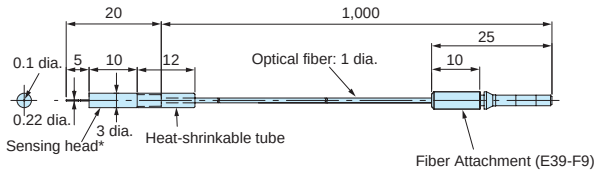
E32-T333-S5



Note: The Fiber Attachment is attached with adhesive and cannot be removed.

*Material: Stainless steel

E32-T334-S5



Note: The Fiber Attachment is attached with adhesive and cannot be removed.

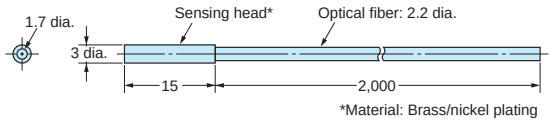
*Material: Stainless steel

Through-beam Fiber Units

Fine-beam (narrow vision field) Models

E32-T22S

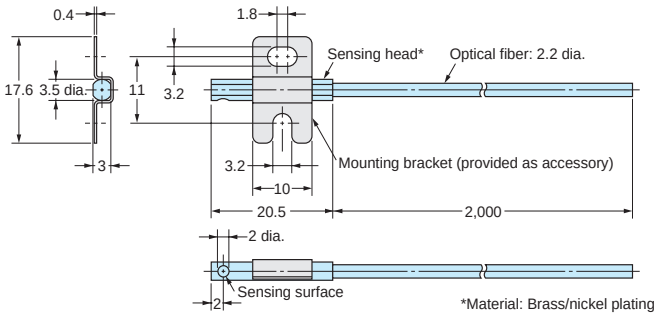
Free-cut



*Material: Brass/nickel plating

E32-T24S

Free-cut

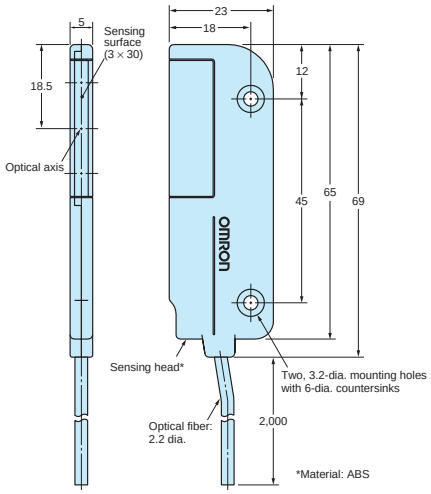


*Material: Brass/nickel plating

Area-sensing Models

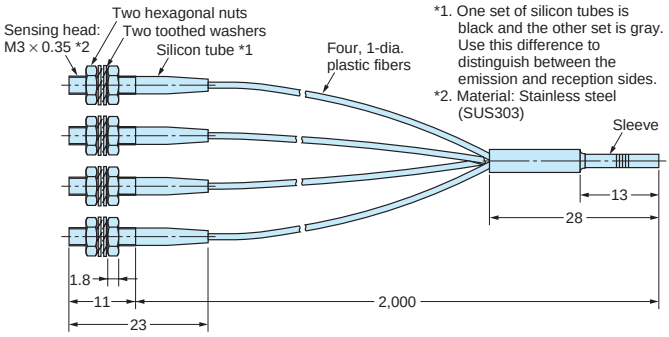
E32-T16W
E32-T16WR

Free-cut



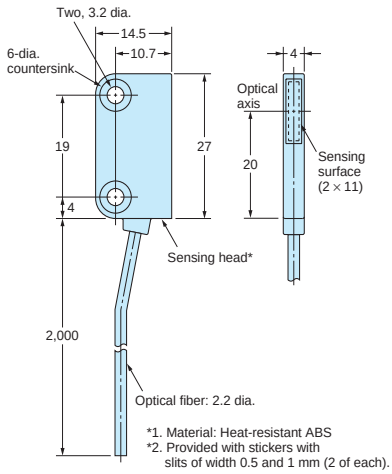
*Material: ABS

E32-M21



E32-T16P
E32-T16PR

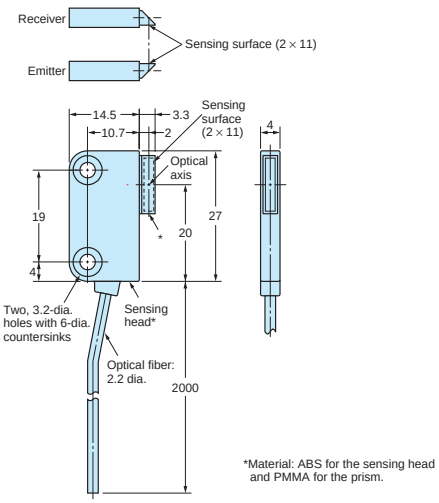
Free-cut



*1. Material: Heat-resistant ABS
*2. Provided with stickers with slits of width 0.5 and 1 mm (2 of each).

E32-T16J
E32-T16JR

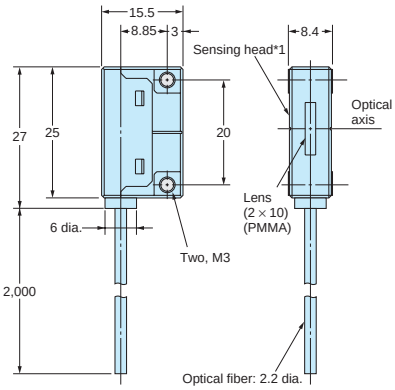
Free-cut



*Material: ABS for the sensing head and PMMA for the prism.

E32-T16

Free-cut

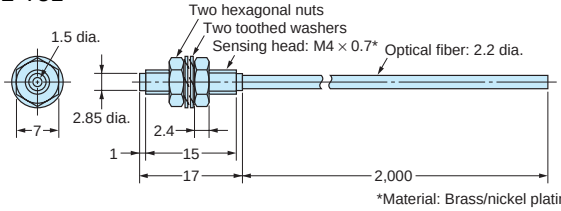


*1. Material: Heat-resistant ABS
*2. Provided with stickers with slits of width 0.5 and 1 mm (2 of each).

Heat-resistant Models

E32-T51

Free-cut

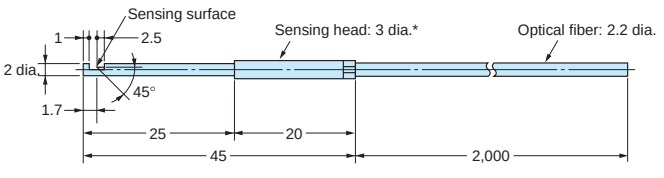


*Material: Brass/nickel plating

Note: The maximum allowable temperature is 150°C. The maximum allowable temperature for continuous operation is 130°C.

E32-T54

Free-cut



*Material: Stainless steel (SUS303)

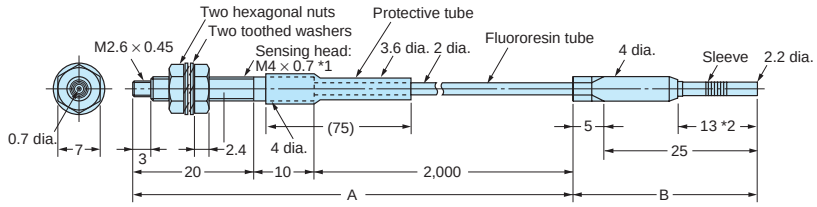
Note: The maximum allowable temperature is 150°C. The maximum allowable temperature for continuous operation is 130°C.

Through-beam Fiber Units

Heat-resistant Models

Free-cut Indicates models that allow free cutting.

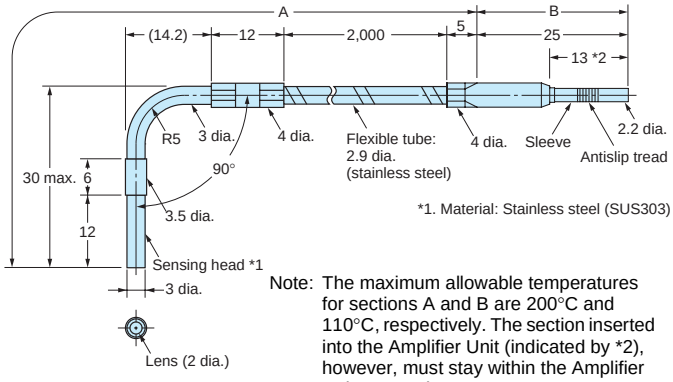
E32-T81R-S



*1. Material: Stainless steel (SUS303)

Note: 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 *2), however, must stay within the Amplifier Unit's operating temperature range.

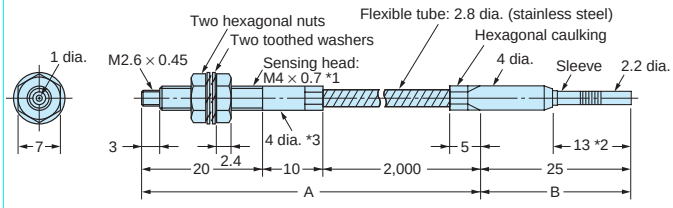
E32-T84S-S



*1. Material: Stainless steel (SUS303)

Note: 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 *2), however, must stay within the Amplifier Unit's operating temperature range.

E32-T61-S



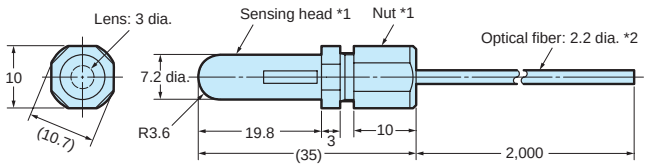
*1. Material: Stainless steel (SUS303)
*3. The diameter is 6 mm if the fiber length exceeds 10 m.

Note: 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 *2), however, must stay within the Amplifier Unit's operating temperature range.

Chemical-resistant Models

E32-T11F

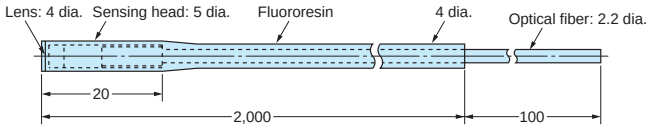
Free-cut



*1. Material: PFA
*2. Sheath material: Fluororesin

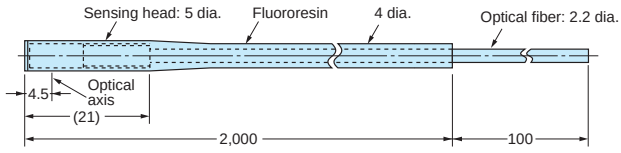
E32-T12F

Free-cut



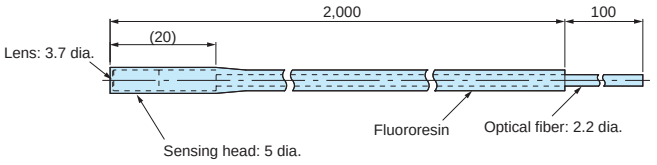
E32-T14F

Free-cut

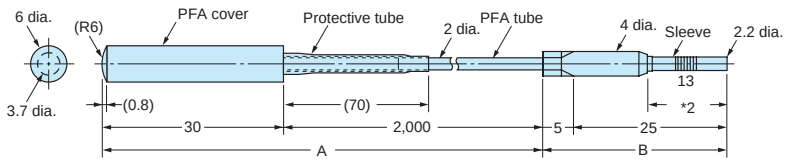


E32-T51F

Free-cut



E32-T81F-S

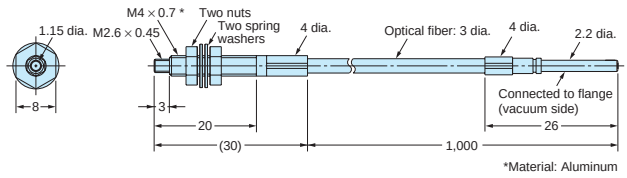


Note: The maximum allowable temperatures for sections A and B are 200°C and 110°C, respectively. The section inserted into the Amplifier Unit (indicated by *2), however, must stay within the Amplifier Unit's operating temperature range.

Through-beam Fiber Units

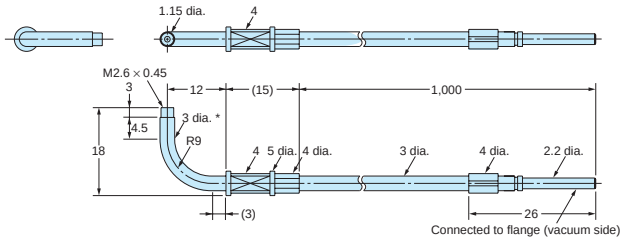
Vacuum-resistant Models

E32-T51V



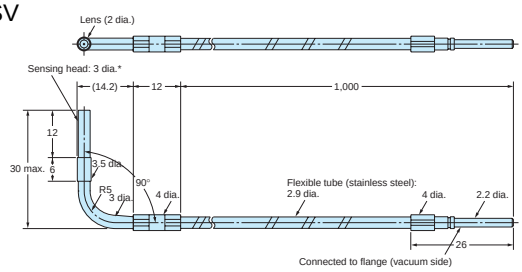
*Material: Aluminum

E32-T54V



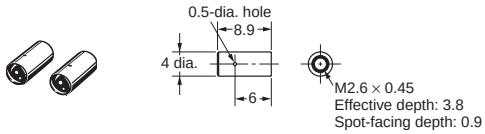
*Material: Stainless steel (SUS304)

E32-T84SV

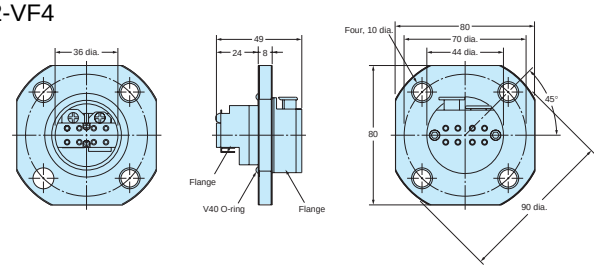


*Material: Stainless steel (SUS304)

E39-F1V

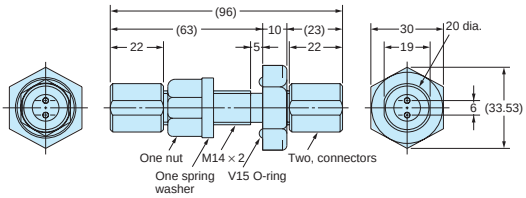


E32-VF4



Note 1. Perform mounting so that the V15 O-ring is on the atmospheric-pressure side of the vacuum chamber wall.
2. Mounting-hole cutout dimensions: 14.5 dia. ±0.2 mm

E32-VF1



Note 1. Perform mounting so that the V15 O-ring is on the atmospheric-pressure side of the vacuum chamber wall.
2. Mounting-hole cutout dimensions: 14.5 dia. ±0.2 mm

Dimensions

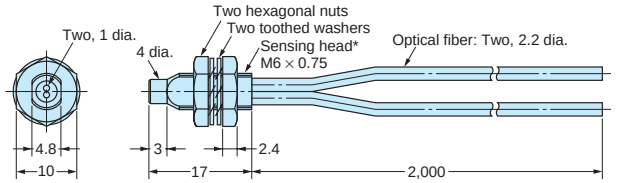
Fiber Units with Reflective Sensors

Standard/Flexible Models

Free-cut Indicates models that allow free cutting.

E32-DC200
E32-D11R

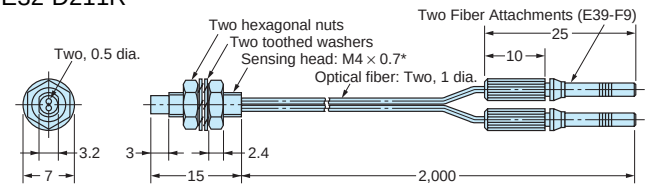
Free-cut



*Material: ADC

E32-D211
E32-D211R

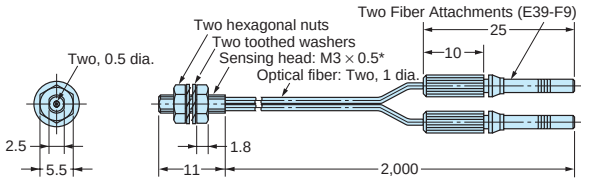
Free-cut



*Material: Stainless steel (SUS303)

E32-DC200E
E32-D21R

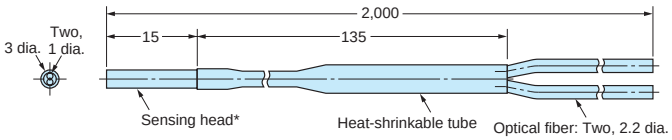
Free-cut



*Material: Stainless steel (SUS304)

E32-D12
E32-D12R

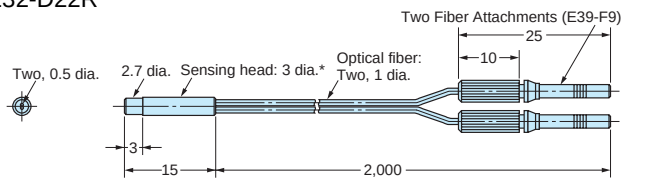
Free-cut



*Material: Stainless steel (SUS304)

E32-D22
E32-D22R

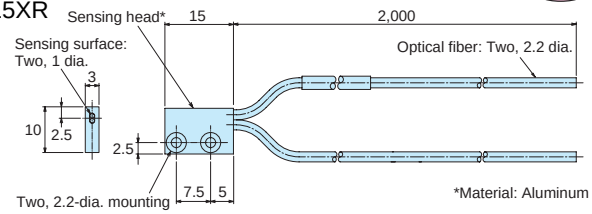
Free-cut



*Material: Brass/nickel plating

E32-D15X
E32-D15XR

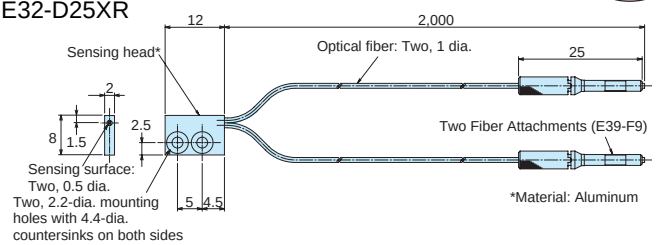
Free-cut



*Material: Aluminum

E32-D25X
E32-D25XR

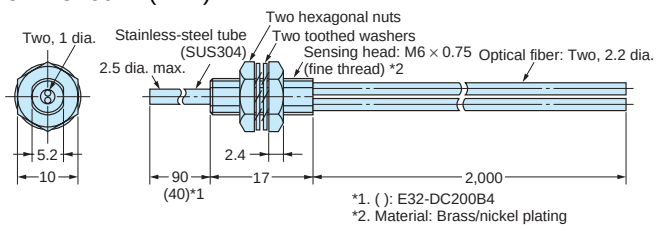
Free-cut



*Material: Aluminum

E32-DC200B(B4)
E32-DC200BR(B4R)

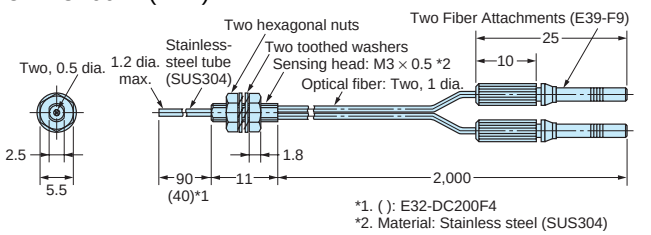
Free-cut



*1. ( ): E32-DC200B4
*2. Material: Brass/nickel plating

E32-DC200F(F4)
E32-DC200FR(F4R)

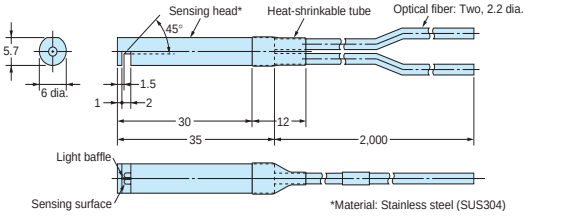
Free-cut



*1. ( ): E32-DC200F4
*2. Material: Stainless steel (SUS304)

E32-D14L
E32-D14LR

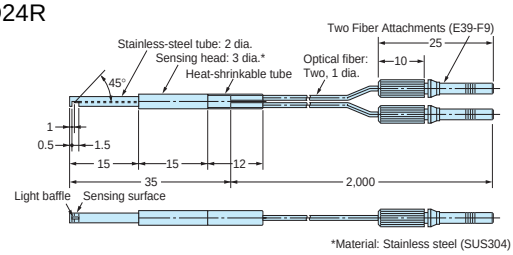
Free-cut



*Material: Stainless steel (SUS304)

E32-D24
E32-D24R

Free-cut



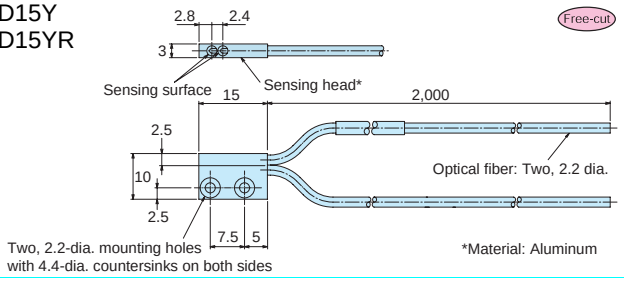
*Material: Stainless steel (SUS304)

Fiber Units with Reflective Sensors

Standard/Flexible Models

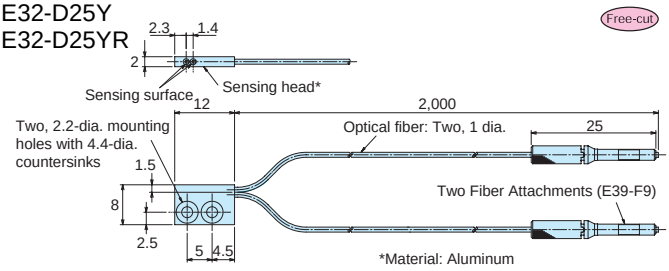
E32-D15Y
E32-D15YR

Free-cut



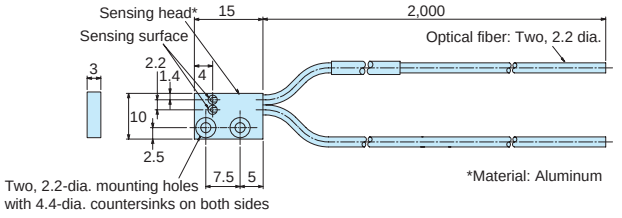
E32-D25Y
E32-D25YR

Free-cut



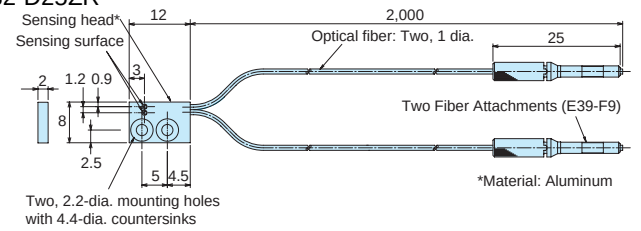
E32-D15Z
E32-D15ZR

Free-cut



E32-D25Z
E32-D25ZR

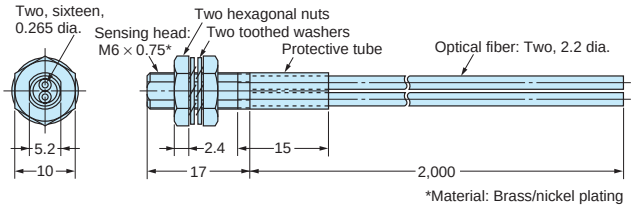
Free-cut



Break-resistant/Coated Models

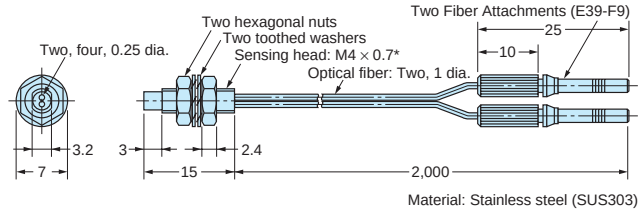
E32-D11
E32-D11U

Free-cut



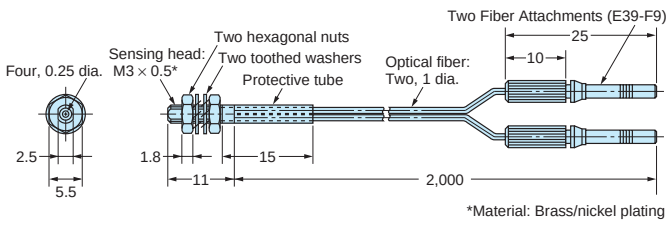
E32-D21B

Free-cut



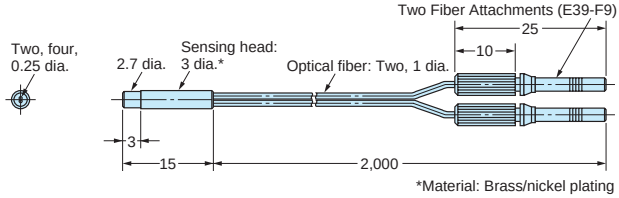
E32-D21

Free-cut

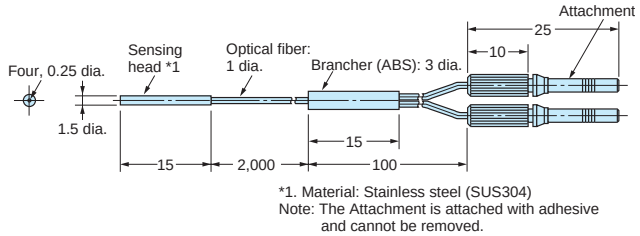


E32-D221B

Free-cut

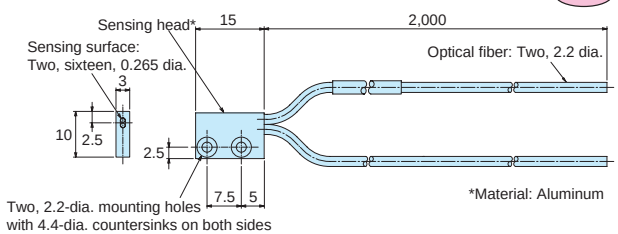


E32-D22B



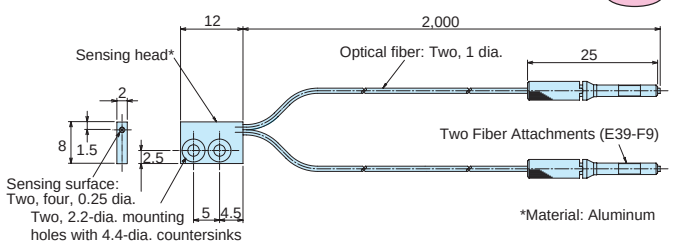
E32-D15XB

Free-cut



E32-D25XB

Free-cut



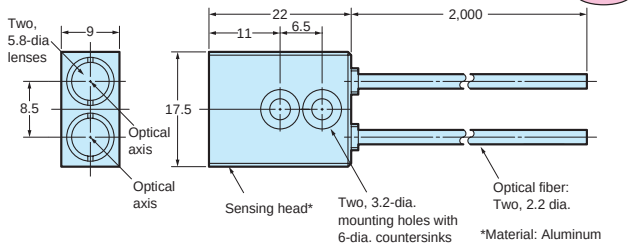
Fiber Units with Reflective Sensors

Long-distance/High-power Models

Free-cut Indicates models that allow free cutting.

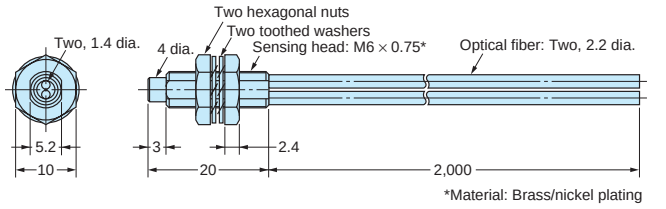
E32-D16

Free-cut



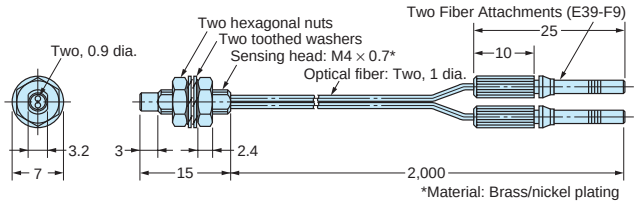
E32-D11L

Free-cut



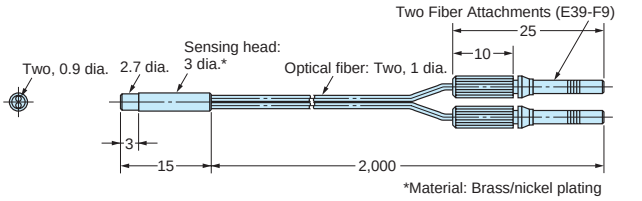
E32-D21L

Free-cut



E32-D22L

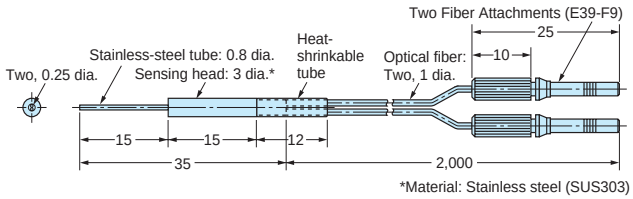
Free-cut



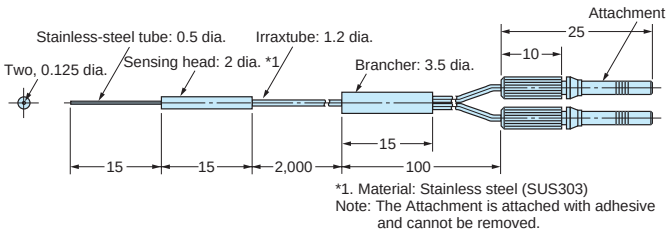
Ultracompact/Thin-sleeve Models

E32-D33

Free-cut



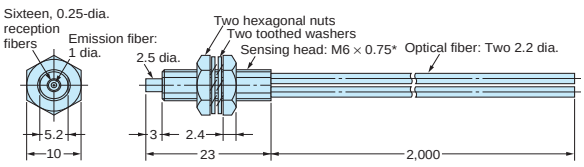
E32-D331



Coaxial/Small-spot Models

E32-CC200
E32-CC200R

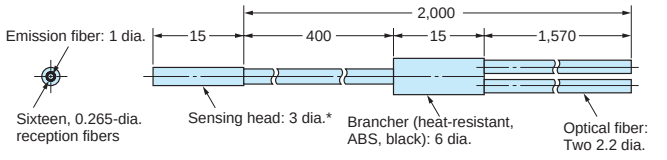
Free-cut



Note: There is a white line on the fiber that is inserted in the emitter-side port.

E32-D32L

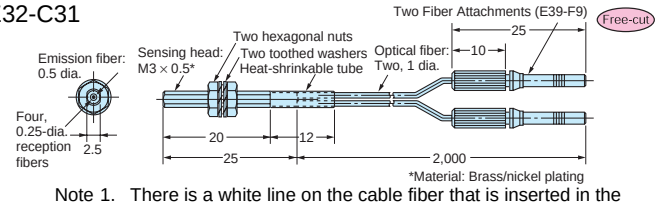
Free-cut



Note: There is a yellow dotted line on the fiber that is inserted in the emitter-side port.

E32-C31

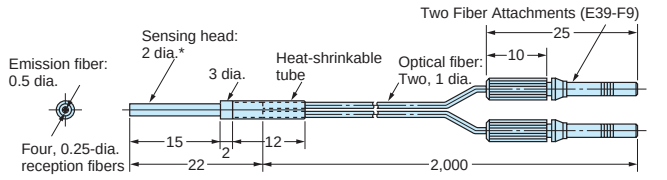
Free-cut



Note 1. There is a white line on the cable fiber that is inserted in the emitter-side port.
2. The core diameter of the sensing head is assumed to lie in the range 2.44 to 2.49 mm.

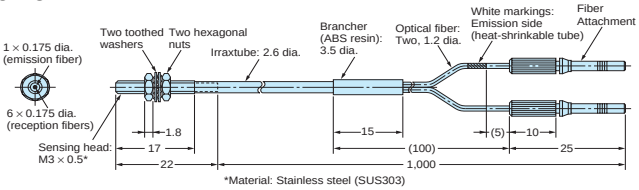
E32-D32

Free-cut



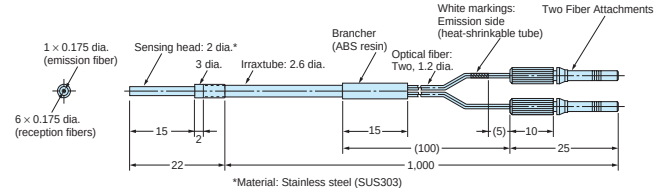
Note: There is a white line on the cable fiber that is inserted in the emitter-side port.

E32-C41



Note: The Fiber Attachment is attached with adhesive and cannot be removed.

E32-C42



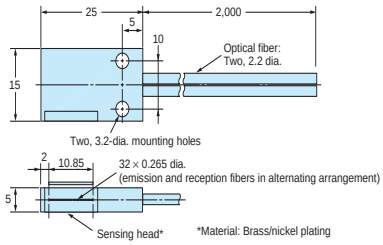
Note: The Fiber Attachment is attached with adhesive and cannot be removed.

Fiber Units with Reflective Sensors

Area-sensing Models

E32-D36P1

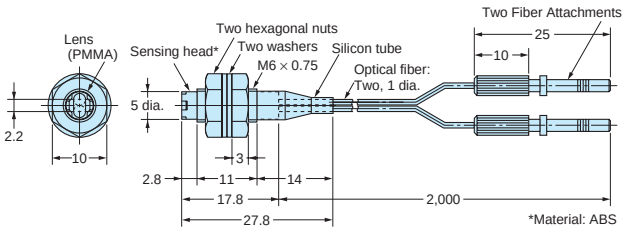
Free-cut



Retroreflective Fiber Units

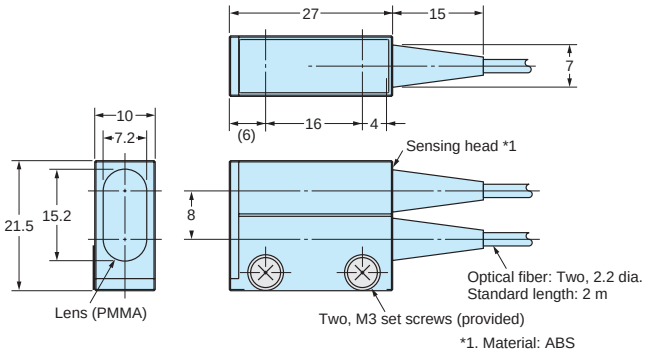
E32-R21
(An E39-R3 Reflector is provided as an accessory.)

Free-cut



E32-R16
(An E39-R1 Reflector is provided as an accessory.)

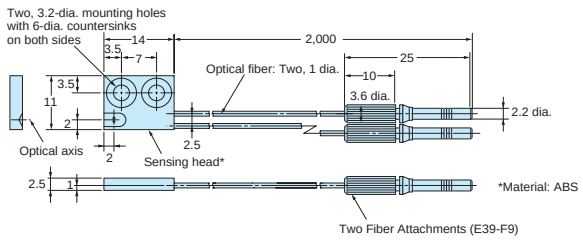
Free-cut



Limited-reflective Models

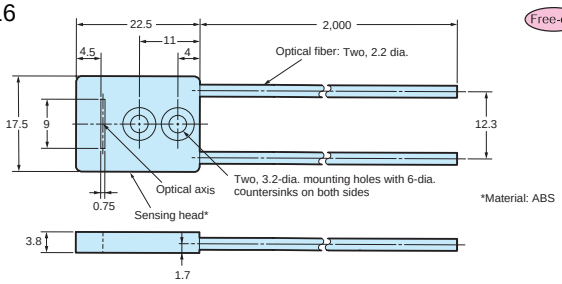
E32-L24S

Free-cut



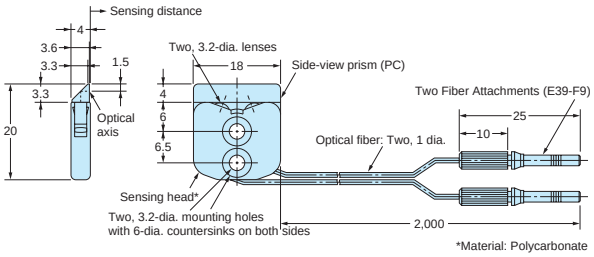
E32-L16

Free-cut



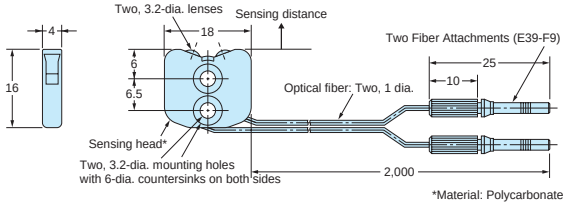
E32-L24L

Free-cut



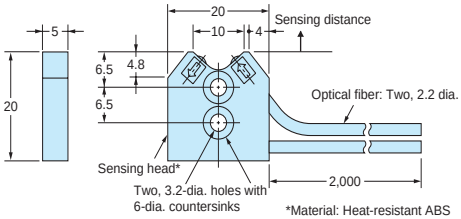
E32-L25L

Free-cut



E32-L25

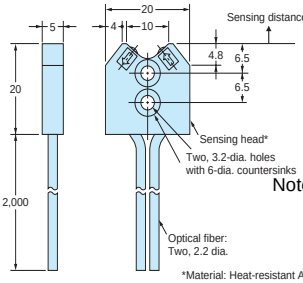
Free-cut



Note: There is a white line on the fiber that is inserted in the emitter-side port.

E32-L25A

Free-cut



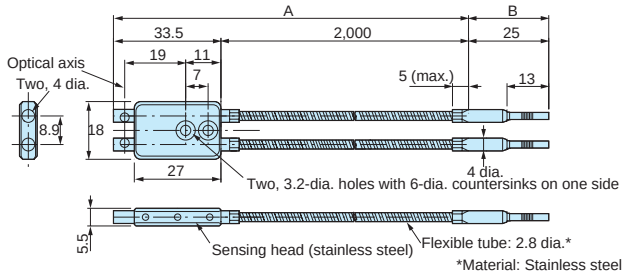
Note: There is a white line on the fiber that is inserted in the emitter-side port.

Fiber Units with Reflective Sensors

Limited-reflective Models

Free-cut Indicates models that allow free cutting.

E32-L86

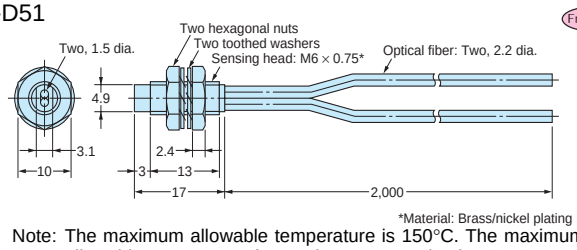


Note: The maximum allowable temperatures for sections A and B are 200°C and 110°C, respectively. The section inserted into the Amplifier Unit (indicated by *2), however, must stay within the Amplifier Unit's operating temperature range.

Heat-resistant Models

E32-D51

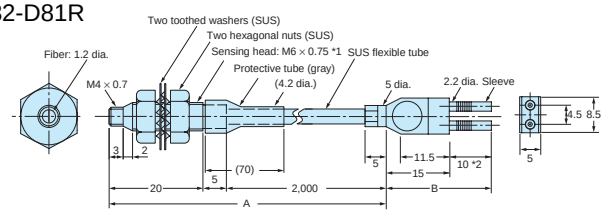
Free-cut



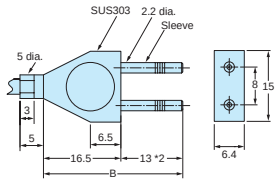
Note: The maximum allowable temperature is 150°C. The maximum allowable temperature for continuous operation is 130°C.

E32-D81R-S
E32-D81R

Using the E32-D81R-S



Using the E32-D81R

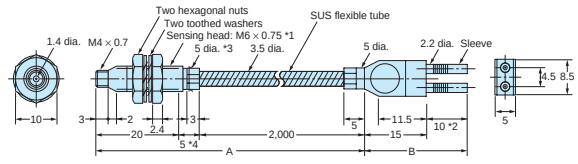


*1. Material: Stainless steel (SUS303)

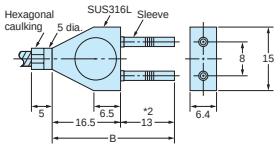
Note: The maximum allowable temperatures for sections A and B are 200°C and 110°C, respectively. The section inserted into the Amplifier Unit (indicated by *2), however, must stay within the Amplifier Unit's operating temperature range.

E32-D61-S
E32-D61

Using the E32-D61-S



Using the E32-D61

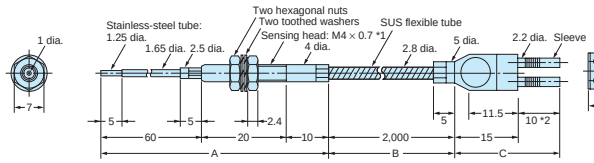


*1. Material: Stainless steel (SUS303)
*3. The diameter is 6 if the fiber length exceeds 10 m.
*4. The diameter is 10 if the fiber length exceeds 10 m.

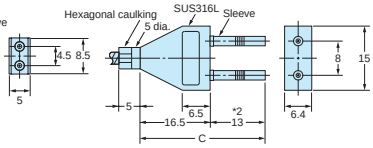
Note: The maximum allowable temperatures for sections A and B are 350°C and 110°C, respectively. The section inserted into the Amplifier Unit (indicated by *2), however, must stay within the Amplifier Unit's operating temperature range.

E32-D73-S
E32-D73

Using the E32-D73-S



Using the E32-D73



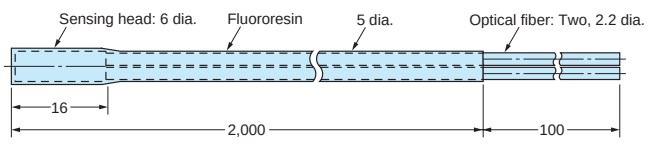
*1. Material: Stainless steel (SUS303)

Note: The maximum allowable temperatures for sections A, B, and C are 400°C, 300°C, and 110°C, respectively. The section inserted into the Amplifier Unit (indicated by *2), however, must stay within the Amplifier Unit's operating temperature range.

Chemical-resistant Models

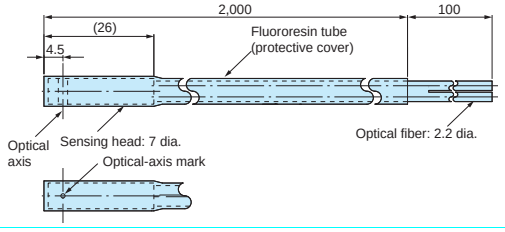
E32-D12F

Free-cut



E32-D14F

Free-cut



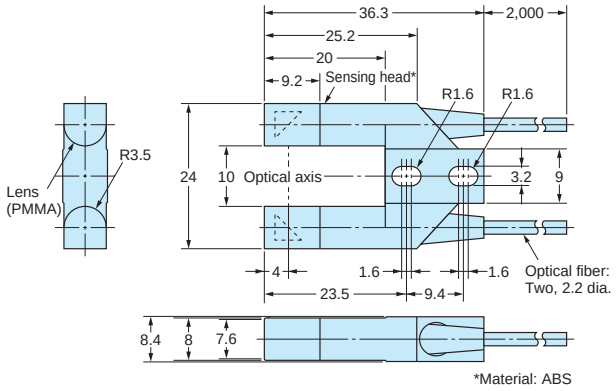
Dimensions

Application-specific Fiber Units

Label-detection Models

E32-G14

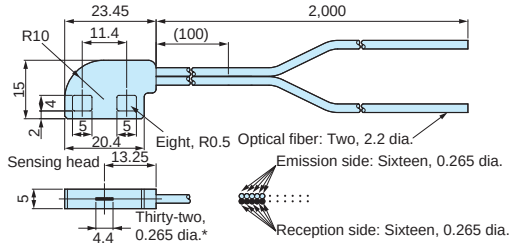
Free-cut



Liquid-level Detection Models

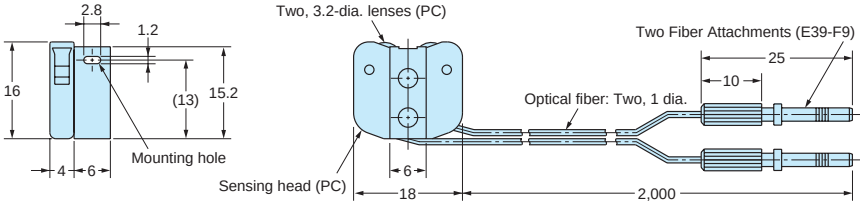
E32-D36T

Free-cut



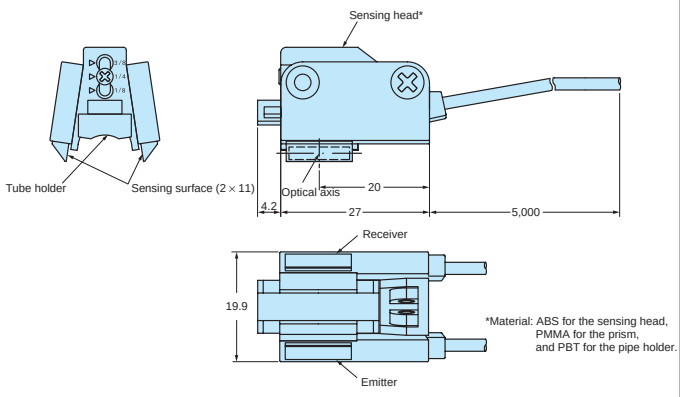
E32-L25T

Free-cut



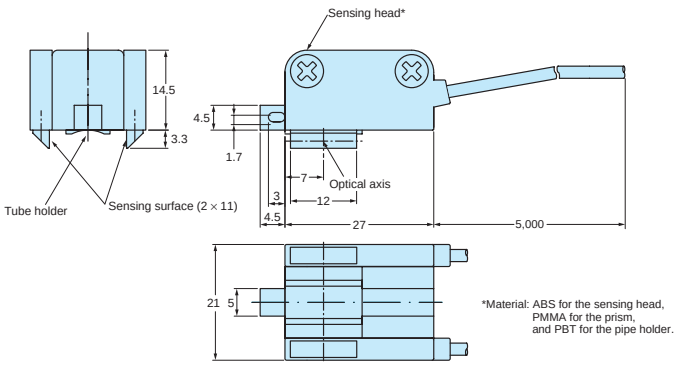
E32-A01

Free-cut

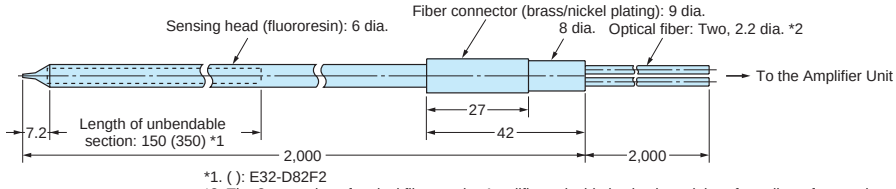


E32-A02

Free-cut



E32-D82F1
E32-D82F2



*1. ( ): E32-D82F2
*2. The 2-m section of optical fiber on the Amplifier-unit side is plastic and therefore allows free cutting.

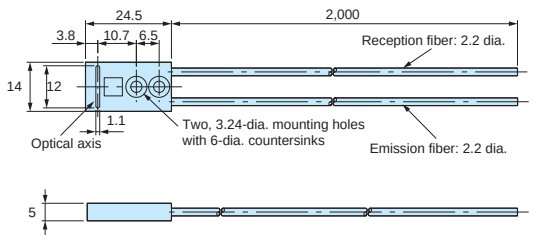
Application-specific Fiber Units

Models for Glass-substrate Alignment/Mapping

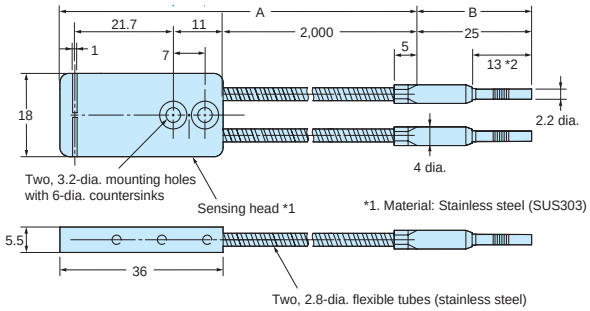
Free-cut Indicates models that allow free cutting.

E32-A08
E32-A07E1(E2)

Free-cut



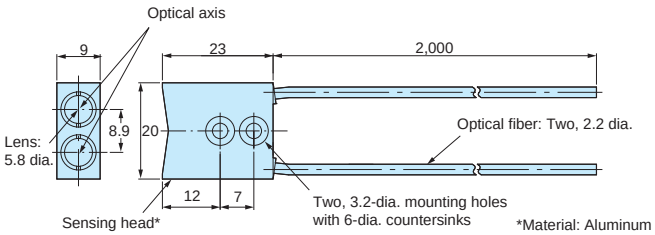
E32-L66



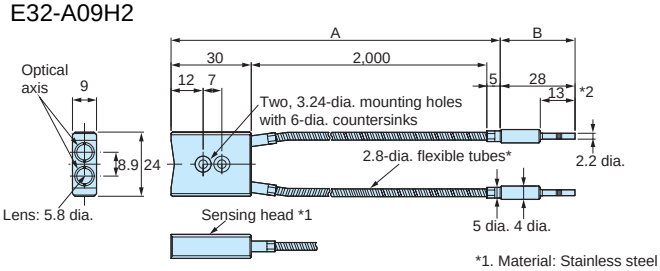
Note: The maximum allowable temperatures for sections A and B are 300°C and 110°C, respectively. The section inserted into the Amplifier Unit (indicated by *2), however, must stay within the Amplifier Unit's operating temperature range.

E32-A09
E32-A09H

Free-cut



E32-A09H2

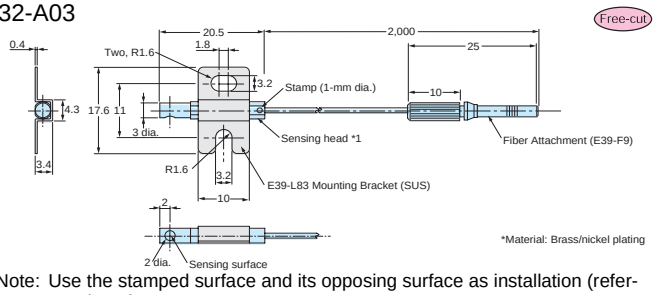


Note: The maximum allowable temperatures for sections A and B are 300°C and 110°C, respectively. The section inserted into the Amplifier Unit (indicated by *2), however, must stay within the Amplifier Unit's operating temperature range.

Wafer-mapping Models

E32-A03

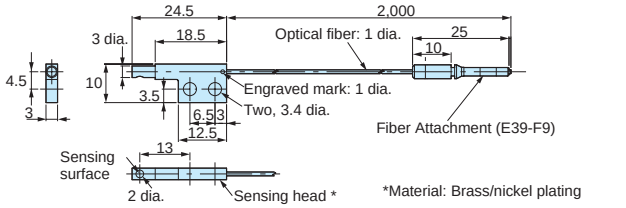
Free-cut



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

E32-A03-1

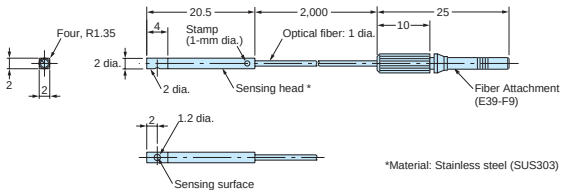
Free-cut



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

E32-A04

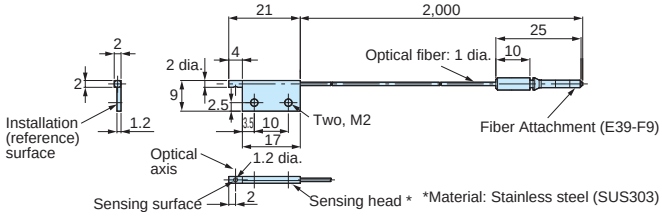
Free-cut



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

E32-A04-1

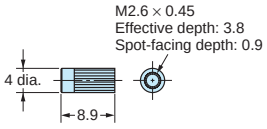
Free-cut



Accessories

Lens Units

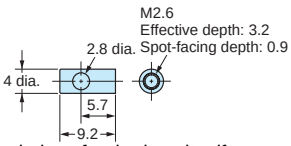
Lens Units
E39-F1



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

Note: Two per set.

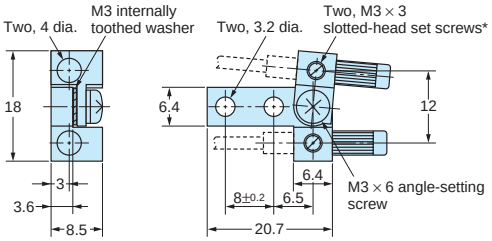
Side-view Units
E39-F2



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

Note: Two per set.

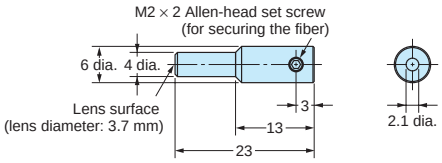
Reflection Unit with Lens
E39-F3



Material:
Brass for the body and aluminum for the base.

*Secure the fiber head with the slotted-head set screws. Do not insert a lens (E39-F1).

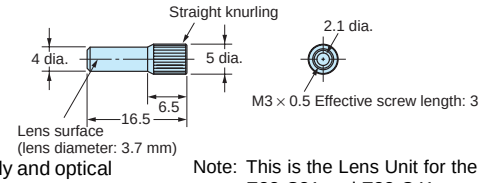
Lens Unit for Reflective Fiber Units
E39-F3A



Material:
Aluminum for body and optical glass for lens.

Note: This is the Lens Unit for the E32-D32 and E32-C42.

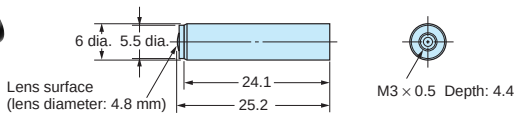
Lens Unit for Reflective Fiber Units
E39-F3A-5



Material:
Aluminum for body and optical glass for lens

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

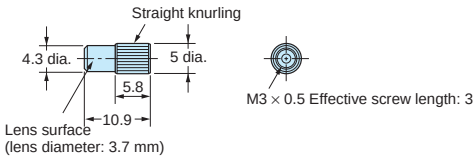
Lens Unit for Reflective Fiber Units
E39-F3B



Material:
Aluminum for body and optical glass for lens.

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

Lens Unit for Reflective Fiber Units
E39-F3C



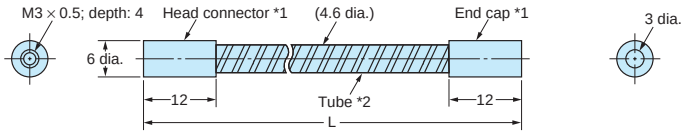
Material:
Aluminum for body and optical glass for lens.

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

Accessories

Protective Spiral Tubes

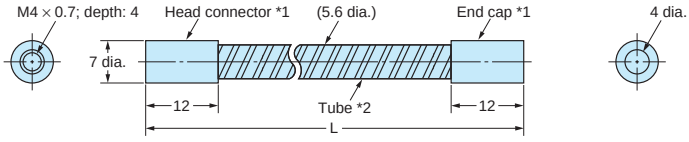
E39-F32A/F32A5
E39-F32B/F32B5



*1. Material: Brass/nickel plating
*2. Material: Stainless steel (SUS304)

Note 1. The length L is 1,000 for the E39-F32A/-F32B and 500 for the E39-F32A5/-F32B5.
2. The E39-F32B(5) consists of two E39-F32A(5)s.

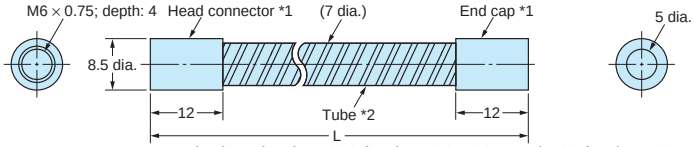
E39-F32C/F32C5



*1. Material: Brass/nickel plating
*2. Material: Stainless steel (SUS304)

Note: The length L is 1,000 for the E39-F32C and 500 for the E39-F32C5.

E39-F32D/F32D5

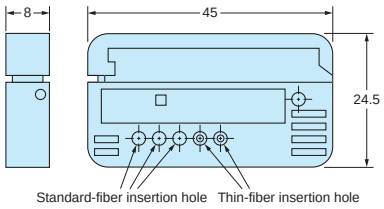


*1. Material: Brass/nickel plating
*2. Material: Stainless steel (SUS304)

Note: The length L is 1,000 for the E39-F32D and 500 for the E39-F32D5.

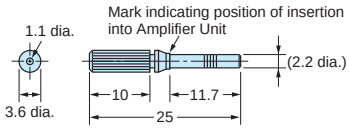
Other Accessories

Fiber Cutter
E39-F4



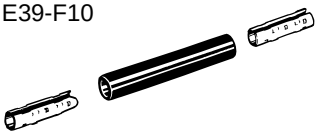
Thin-fiber Attachments
E39-F9

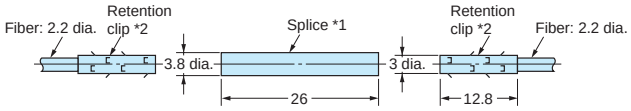
Material: ABS



Note: Two per set.
*Provided with thin-fiber models.

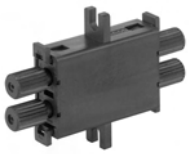
Fiber Connector
E39-F10

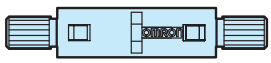


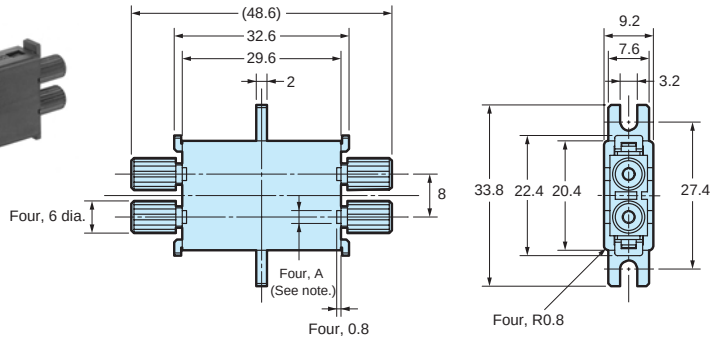


*1. Material: Polyester
*2. Material: Brass

Fiber Connector
E39-F13
E39-F14
E39-F15



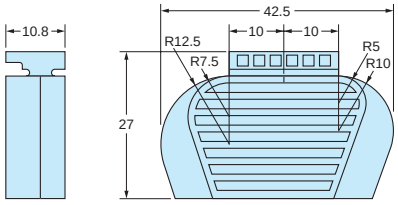




Note: Dimension A varies with the model number as shown in the following table.

Model	Dimension A
E39-F13	2.4
E39-F14	1.2
E39-F15	2.4/1.2

Sleeve Bender
E39-F11



Precautions for Correct Use

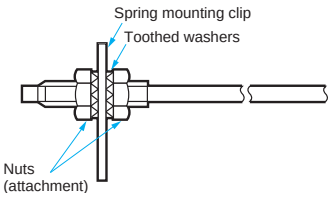
■ Fiber Units

Mounting

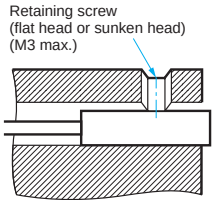
Tightening Force

The tightening force applied to the Fiber Unit should be as follows:

Screw-mounting Model

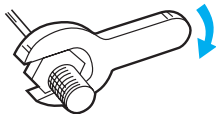


Cylindrical Model



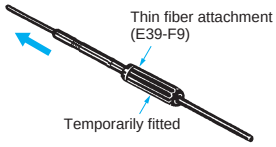
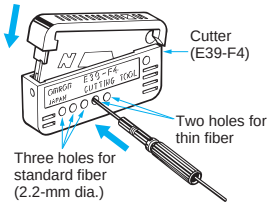
Fiber Units	Clamping torque
M6 screw/ 6-mm dia. cylinder	0.98 N·m max.
M3/M4 screw	0.78 N·m max.
2-mm dia./3-mm dia. cylinder	0.29 N·m max.
1.5-mm dia./1-mm dia. cylinder	0.2 N·m max.
E32-T12F 5-mm dia. fluororesin model	0.78 N·m max.
E32-D12F 6-mm dia. fluororesin model	
E32-L25A	
E32-M21	Up to 5 mm to the tip: 0.49 N·m max. More than 5 mm from the tip: 0.78 N·m max.
E32-T16	0.49 N·m max.
E32-R21	0.39 N·m max.
E32-T16W(R) E32-T16P(R) E32-T16J(R) E32-L24S E32-L24L E32-T25L	0.29 N·m max.

Use a proper-sized wrench.



Fiber Cutting Procedure

Cut a thin fiber as follows:

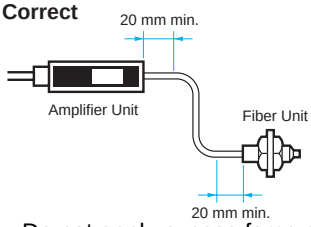
①	An attachment is temporarily fitted to a thin fiber before shipment.	
②	Secure the attachment after adjusting the position of it in the direction indicated by the arrow.	
③	Insert the fiber to be cut into the E39-F4.	
④	Finished state (proper cutting state)	

Note: Insert the fiber in the direction indicated by the arrow.

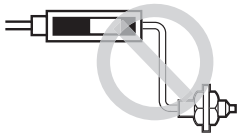
Connection

- Do not pull or press the Fiber Units. The Fiber Units have a withstand force of 9.8 N or 29.4 N maximum.
- Do not bend the Fiber Unit beyond the permissible bending radius given under *Ordering Information*.
- Do not bend the edge of the Fiber Units (excluding the E32-T□R and E32-D□R).

Correct

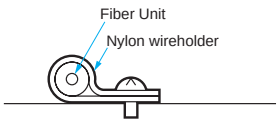


Incorrect

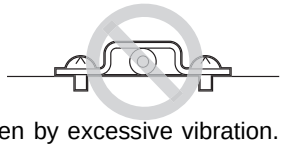


- Do not apply excess force on the Fiber Units.

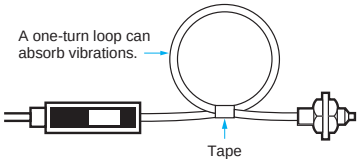
Correct



Incorrect

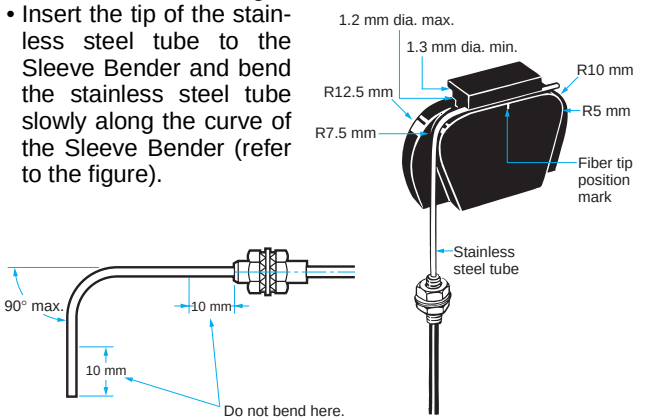


The Fiber Head could be broken by excessive vibration. To prevent this, the following is effective:



E39-F11 Sleeve Bender

- The bending radius of the stainless steel tube should be as large as possible. The smaller the bending radius becomes, the shorter the sensing distance will be.
- Insert the tip of the stainless steel tube to the Sleeve Bender and bend the stainless steel tube slowly along the curve of the Sleeve Bender (refer to the figure).

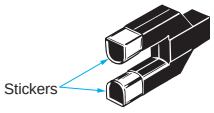


Heat-resistant Fiber Units (E32-D51 and E32-T51)

- The fibers of these Units cannot be extended using the E39-F10 Fiber Connector.
- The maximum allowable temperature for continuous operation with these Units is 130°C. It is 150°C for short-term use.

E32-T14 and E32-G14

These Units may enter the light-ON state if there are reflecting objects at the ends of the lenses. In this case, attach the black stickers provided to the ends of the lenses.



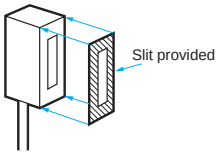
Wafer Sensors (E32-L25(A))

- To ensure correct performance, insert the fiber with a white line into the emitter-side port of the Amplifier Unit.

E32-T16 and E32-T16P

Example

E32-T16's sensing head



To use the slit provided, peel off the backing sheet, align it 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 light intensity cannot be obtained) due to short sensing distances.

E32-M21

Separate the 4 fibers by distances sufficient to prevent interference.

Vacuum-resistant Fiber Units (E32-V)

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

Liquid-level Detection Sensors (E32-D82F)

- 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 Sensors: Tube-mounting Models

- Ensure that the tube is not deformed when using a band to secure the Fiber Unit.
- Drops of water, bubbles, or haze inside the tube may cause malfunctions.

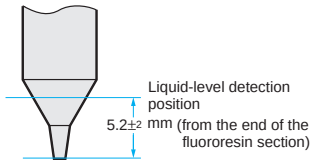
● Adjustment

E32-G14

The sensing distance is short, making the incident light intensity large. This makes it impossible to teach without a workpiece. Perform teaching with and without a workpiece.

Liquid-level (E32-D82F) Detection Position

The liquid-level detection position is at a distance of 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 Considerations

Liquid Level (E32-D82F)

- Operation may become unstable in the following cases:
  ① Bubbles stick to the cone of the sensing head.
  ② Solute is deposited 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 another object. Damage to, or deformation of, the sensing head may result in unstable operation.

Heat-resistant Fiber Units (E32-D81R, E32-D61, and E32-D73)

The pitch of the emission-side and reception-side fiber-insertion ports varies with the Amplifier Unit. Be sure to use an appropriate Fiber Unit.

Amplifier Unit	Fiber Unit
E3X-DA□-S E3X-MDA□	E32-D□-S
E3X-DA□-N E3X-NA□	E32-D□

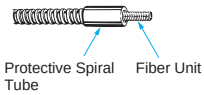
■ Accessories

Use of E39-R3 Reflector

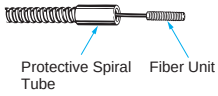
1. Use detergent, etc., to remove any dust or oil from the surfaces where tape is applied. Adhesive tape will not be attached properly if oil or dust remains on the surface.
2. The E39-R3 cannot be used in places where it is exposed to oil or chemicals.

E39-F32□ Protective Spiral Tubes

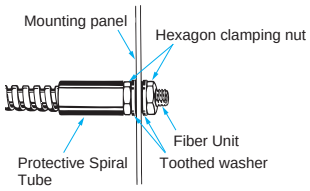
1. Insert a fiber to the Protective Spiral Tube from the head connector side (screwed) of the tube.



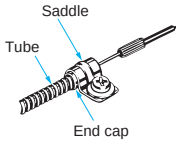
2. Push the fiber into the Protective Spiral Tube. The tube should be straight so that the fiber is not twisted when inserted. Then turn the end cap of the spiral tube.



3. Secure the Protective Spiral Tube on a suitable place with the attached nut.

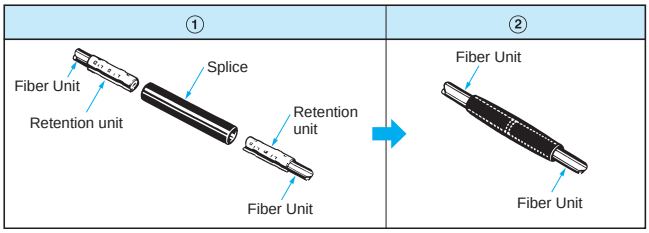


4. Use the attached saddle to secure the end cap of the Protective Spiral Tube. To secure the Protective Spiral Tube at a position other than the end cap, apply tape to the tube so that the portion becomes thicker in diameter.



E39-F10 Fiber Connector

Mount the Fiber Connector as shown in the following illustrations.



- The Fiber Units should be as close as possible when they are connected.
  Sensing distance will be reduced by approximately 25% when fibers are connected.
- Only 2.2-mm dia. fibers can be connected.

MEMO

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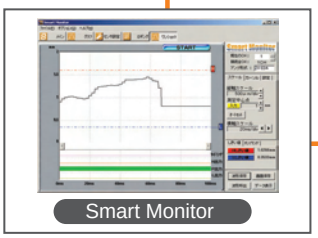

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