CSM_E32series_DS_E_10_1

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.

Right angle | 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-corresponding 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

■ Page Reference

Type		Feature/ applications	Variations	Type	Ratings and performance	Dimensions
Standard models		➜ Page 6	➜ Page 8	Through-beam ➜ Page 19 Reflective ➜ Page 26	➜ Page 37	Through-beam ➜ Page 40 Reflective ➜ Page 48
Special-beam models		➜ Page 10	---	Through-beam ➜ Page 22 Reflective ➜ Page 29	➜ Page 38	Through-beam ➜ Page 43 Reflective ➜ Page 51
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Selection Guide

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

Fiber Units

Amplifier Units

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-corresponding ■ Labels ■ Liquid level ■ Alignment and mapping of glass substrates ■ Wafer mapping	Application-corresponding 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)

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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 range	–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 range	–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 range	–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.

■ 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 range	–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
Flexible Break-resistant 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

Type (See note 2.) / Shape of head [For dimensions, refer to page 40.]		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
	M4	530			
		E32-T11N			
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-T222R	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

Type (See note 2.) / Shape of head [For dimensions, refer to page 40.]		Flexible (New Standard) R Flexible and pliable	Standard	Break-resistant B Withstands repeated bending	Fluorine coating U Cable protected against oil
	M6	170			
		E32-D11N			
	M6	170			
		E32-C11N			
	M3	25			
		E32-C31N			
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 range	–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 range	–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 range	–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

■ Ratings/Characteristics

Min. bending radius	10 mm
Ambient temperature range	–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

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

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.

■ Applications

Detecting passage of candies

Detecting chips on film

■ Ratings/Characteristics

Ambient temperature range	–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 reflected directly from the workpiece.

E32-R16

■ Applications

Detecting translucent medicine

E32-R21

■ Ratings/Characteristics

Ambient temperature range	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

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

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-A10
	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-resistant 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 range	Features	Shape, sensing distance (mm)*1	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*2	–60°C to 350°C	M6 screw	90	E32-D61-S
	–40°C to 400°C	M6 screw, with sleeve	60	E32-D73-S

*1 The sensing distances apply for use in combination with the E3X-DA-S Amplifier Unit (general-purpose, standard mode).
*2 Order the Fiber Unit based on the Amplifier Unit. Use the E32-D□-S if the E3X-DA□-S, E3X-MDA□, or E3X-DAC□-S is used. Use the E32-D□ if any other Amplifier is used.

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 range	–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*2	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-resistant 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·m³/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
Model	E32-VF4	E32-VF1
Leakage rate	1×10^{-10} Pa·m³/s max.	
Ambient temperature range	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

Features/Application

Application-corresponding 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 range	–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

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

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-corresponding 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-N

■ Engineering Data (E32-A07/A08/L16-N)

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-N
	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

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

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)

■ 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).

Features/Applications

Application-corresponding 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 Standard models

High-resolution mode | Standard mode | High-speed mode (Super-high-speed mode)

*When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type		Appearance (mm) *2	Dimensions page	Sensing distance (mm)	Standard object (min. sensing object) (mm) *1	Min. bending radius (mm)	Features	Model number
Flexible (new standard)	Standard size	Free-cut M4	40		1 dia. (0.005 dia.)	R1	M4 right angle	E32-T11N
		Free-cut M4	40				M4 screw	E32-T11R
		Free-cut 3 dia.	40	700 / 530 / 350 (140)			3-dia. cylinder	E32-T12R
		Free-cut 15 × 8 × 3	40				Flat shape	E32-T15XR
		Free-cut 90 (40) ( ): E32-TC200B4R M4 1.2 dia. Min. bending radius of sleeve: 5	40				M4 screw, with sleeve	E32-TC200BR E32-TC200B4R
		Free-cut 3 dia.	40				3-dia. cylinder, side-view	E32-T14LR
		Free-cut 15 × 8 × 3	41	270 / 210 / 130 (50)			Flat shape, side-view	E32-T15YR
		Free-cut 15 × 8 × 3	41				Flat shape, flat-view	E32-T15ZR
	Small size	Free-cut M3	40		0.5 dia. (0.005 dia.)		M3 screw (small)	E32-T21R
		Free-cut 2 dia.	40				2-dia. cylinder (small)	E32-T22R
		Free-cut 1.5 dia.	40	160 / 130 / 75 (30)			1.5-dia. cylinder (small)	E32-T222R
		Free-cut 12 × 7 × 2	40				Flat shape (small)	E32-T25XR
		Free-cut 90 (40) ( ): E32-TC200F4R M3 0.9 dia. Min. bending radius of sleeve: 5	40				M3 screw (small), with sleeve	E32-TC200FR E32-TC200F4R
		Free-cut 1 dia.	41				1-dia. cylinder (small), side-view	E32-T24R
		Free-cut 12 × 7 × 2	41	60 / 50 / 25 (10)			Flat shape (small), side-view	E32-T25YR
		Free-cut 12 × 7 × 2	41				Flat shape (small), flat-view	E32-T25ZR

*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.

R Flexible B Break-resistant U Fluororesin coating

Through-beam Fiber Units Standard models

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

Type		Appearance (mm) *2	Dimensions page	Sensing distance (mm)	Standard object (min. sensing object) (mm) *1	Min. bending radius (mm)	Features	Model number
Standard	Standard size	Free-cut M4	40	1,000 / 760 / 500 (200)	1 dia. (0.005 dia.)	R25	M4 screw	E32-TC200
		Free-cut M4	40				3-dia. cylinder	E32-T12
		Free-cut 15 × 8 × 3	40				Flat shape	E32-T15X
		Free-cut 90 (40) ( ): E32-TC200B4R M4 1.2 dia. Min. bending radius of sleeve: 5	40				M4 screw, with sleeve	E32-TC200B E32-TC200B4
		Free-cut 3 dia.	40				3-dia. cylinder, side-view	E32-T14L
		Free-cut 15 × 8 × 3	41	600 / 460 / 300 (120)			Flat shape, side-view	E32-T15Y
		Free-cut 15 × 8 × 3	41				Flat shape, flat-view	E32-T15Z
	Small size	Free-cut M3	40	900 / 680 / 450 (180)			M3 screw (small)	E32-TC200A
		Free-cut M3	40	270 / 220 / 125 (50)	0.5 dia. (0.005 dia.)	R10		E32-TC200E
		Free-cut 2 dia.	40				2-dia. cylinder (small)	E32-T22
		Free-cut 1.5 dia.	40				1.5-dia. cylinder (small)	E32-T222
		Free-cut 12 × 7 × 2	40				Flat shape (small)	E32-T25X
		Free-cut 90 (40) ( ): E32-TC200F4R M3 0.9 dia. Min. bending radius of sleeve: 5	40				M3 screw (small), with sleeve	E32-TC200F E32-TC200F4
		Free-cut 1 dia.	41	160 / 130 / 75 (30)			1-dia. cylinder (small), side-view	E32-T24
		Free-cut 12 × 7 × 2	41				Flat shape (small), side-view	E32-T25Y
		Free-cut 12 × 7 × 2	41				Flat shape (small), flat-view	E32-T25Z

*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.

R Flexible B Break-resistant U Fluororesin coating

Standard models

High-resolution mode | Standard mode | High-speed mode (Super-high-speed mode)

*When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type		Appearance (mm) *2	Dimensions page	Sensing distance (mm)	Standard object (min. sensing object) (mm) *1	Min. bending radius (mm)	Features	Model number
Break-resistant	Standard size	Free-cut M4	42	900 / 680 / 450 (180)	1 dia (0.005 dia.)	B R4	M4 screw	E32-T11
		Free-cut 3 dia.	42				3-dia. cylinder	E32-T12B
		Free-cut 15 × 8 × 3	42				Flat shape	E32-T15XB
	Small size	Free-cut M3	42	240 / 200 / 110 (45)	0.5 dia (0.005 dia.)		M3 screw (small)	E32-T21
		Free-cut 2 dia.	42				2-dia. cylinder (small)	E32-T221B
		Free-cut 1.5 dia.	42				1.5-dia. cylinder (small)	E32-T22B
		Free-cut 12 × 7 × 2	42	180 / 150 / 85 (35)			Flat shape (small)	E32-T25XB
Coating		Free-cut M4	42	900 / 680 / 450 (180)	1 dia. (0.005 dia.)	U R4	M4 screw, fluorine coating	E32-T11U

*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.

R Flexible B Break-resistant U Fluororesin coating

Through-beam Fiber Units | Special-beam models

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

Type	Appearance (mm) *2	Dimensions page	Sensing distance (mm)	Standard object (min. sensing object) (mm) *1	Min. bending radius (mm)	Features	Model number
Long-distance, high-power	Free-cut M14	43	20,000*3 20,000*3 10,000 (4,000)	10 dia.	R25	Large built-in lens, M14 screw	E32-T17L
	Free-cut M4	40 60	4,000 3,700 2,400 (970)	4 dia. (0.1 dia.)	R1	M4 right angle	E32-T11N+ E39-F1
	Free-cut M4	40 60	4,000*4 4,000*4 2,600 (1,500)		R25	M4 screw	E32-TC200+ E39-F1
		40 60	4,000*4 3,700 2,400 (970)		R1	M4 screw, flexible fiber	E32-T11R+ E39-F1
		42 60	4,000*4 3,600 2,300 (930)		R4	M4 screw, break-resistant	E32-T11+ E39-F1
	Free-cut	43	4,000*4 3,400 2,250 (900)		R25	Screw mounting, side-view	E32-T14
	Free-cut M4	43	1,700 1,330 870 (350)	1.4 dia. (0.01 dia.)		M4 screw	E32-T11L
	Free-cut 3 dia.	43				3-dia. cylinder	E32-T12L
	Free-cut M4	43 60	910 800 500 (180)	3 dia. (0.1 dia.)	R25	M4 screw, side-view	E32-T11L+ E39-F2
		40 60	520 400 250 (100)		R1	M4 screw, side-view, flexible fiber	E32-T11R+ E39-F2
		42 60	820 660 430 (160)		R4	M4 screw, side-view, break-resistant	E32-T11+ E39-F2
	Free-cut M3	43	540 440 250 (100)	0.9 dia. (0.005 dia.)	R10	M3 screw (small)	E32-T21L
	Free-cut 2 dia.	43				2-dia. cylinder (small)	E32-T22L

*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.
*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.

R Flexible B Break-resistant U Fluororesin coating

Special-beam models

High-resolution mode | Standard mode | High-speed mode (Super-high-speed mode)

*When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type	Appearance (mm) *2	Dimensions page	Sensing distance (mm)	Standard object (min. sensing object) (mm)*1	Min. bending radius (mm)	Features	Model number
Ultracompact, thin-sleeve	Free-cut 1 dia.	44	160 / 130 / 75 (30)	0.5 dia. (0.005 dia.)	R1	1-dia. cylinder, flexible fiber	E32-T223R
	Free-cut 3 dia. 0.5 dia. Sleeve cannot be bent.	44	53 / 44 / 25 (10)	0.25 dia. (0.005 dia.)	R10	0.5-dia. sleeve; 0.25-dia. opening	E32-T33-S5
	3 dia. 0.25 dia. Sleeve cannot be bent.	44	12 / 10 / 6 (4)	0.125 dia. (0.005 dia.)		0.25-dia. sleeve, 0.125-dia. opening	E32-T333-S5
	3 dia. 0.22 dia. Sleeve cannot be bent.	44	6 / 5 / 3 (2)	0.1 dia. (0.005 dia.)		0.22-dia. sleeve, 0.1-dia. opening	E32-T334-S5
Fine-beam	Free-cut 3 dia.	44	2,500 / 1,900 / 1,250 (500)	1.7 dia. (0.1 dia.)	R10	3-dia. cylinder	E32-T22S
	Free-cut 3.5 dia.	44	1,750 / 1,300 / 870 (350)	2 dia. (0.1 dia.)		3.5-dia. cylinder, side-view	E32-T24S
Area-sensing	Free-cut 11	45	1,100 / 840 / 560 (220)	(0.2 dia.) *3	R1	Area width: 11 mm	E32-T16PR
		45	1,500 / 1,100 / 750 (300)		R10		E32-T16P
	Free-cut 11	45	980 / 750 / 480 (190)		R1	Area width: 11 mm; side-view	E32-T16JR
		45	1,300 / 1,000 / 650 (260)		R10		E32-T16J
	Free-cut 30	44	1,700 / 1,300 / 850 (340)	(0.3 dia.) *3	R1	Area width: 30 mm	E32-T16WR
		44	2,300 / 1,800 / 1,150 (450)		R10		E32-T16W
	Free-cut 10	45	3,700 / 2,800 / 1,850 (740)	(0.6 dia.) *4	R25	Area width: 10 mm; long distance	E32-T16
	M3	44	750 / 610 / 350 (140)	2 dia. (0.1 dia)		Multi-point detection (4-head)	E32-M21

*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.
*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.)
*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.)

Through-beam Fiber Units | Environment-resistant models

High-resolution mode | Standard mode | High-speed mode (Super-high-speed mode)

*When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type	Appearance (mm) *2		Dimensions page	Sensing distance (mm)	Standard object (min. sensing object) (mm)*1	Min. bending radius (mm)	Features	Model number
Heat-resistant	150°C *5	Free-cut, M4	46	1,000 / 760 / 500 (200)	1.5 dia. (0.1 dia.)	R35	Heat-resistant up to 150°C	E32-T51
		Free-cut, 2 dia.	46	300 / 230 / 150 (60)			Heat-resistant up to 150°C; side-view	E32-T54
	200°C *6	M4	46	360 / 280 / 180 (70)	1 dia. (0.005 dia.)	R10	Heat-resistant up to 200°C	E32-T81R-S
		M4	46 60	600 / 450 / 300 (120)	3 dia. (0.1 dia.)	R25	Heat-resistant up to 200°C; side-view	E32-T61-S+ E39-F2
		M4	46 60	4,000*7 / 3,400 / 2,200 (900)	4 dia. (0.1 dia.)		Heat-resistant up to 200°C, long distance	E32-T61-S+ E39-F1
		3 dia.	46	1,750 / 1,300 / 870 (350)	1.7 dia. (0.1 dia)		Heat-resistant up to 200°C; L-shaped; long distance	E32-T84S-S
	350°C *6	M4	46	600 / 450 / 300 (120)	1 dia. (0.005 dia.)		Heat-resistant up to 350°C	E32-T61-S
Chemical-resistant		Free-cut, 7.2 dia.	46	2,500 / 2,000 / 1,300 (520)	4 dia. (0.1 dia.)	R4	Fluororesin cover, round head	E32-T11F
		Free-cut, 5 dia.	46	4,000*7 / 3,000 / 2,000 (800)		R40	Fluororesin cover, long distance	E32-T12F
		Free-cut, 5 dia.	46	500 / 400 / 250 (100)	3 dia. (0.1 dia.)		Fluororesin cover, side-view	E32-T14F
		Free-cut, 5 dia.	46	1,800 / 1,400 / 900 (350)	4 dia. (0.1 dia.)		Fluororesin cover, heat-resistant up to 150°C *5	E32-T51F
		6 dia.	46	920 / 700 / 460 (190)	1 dia. (0.005 dia.)	R10	Fluororesin cover, heat-resistant up to 200°C *6	E32-T81F-S

*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.
*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.)
*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.

Environment-resistant models

High-resolution mode | Standard mode | High-speed mode (Super-high-speed mode)

*When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type	Appearance (mm)	Dimensions page	Sensing distance (mm)	Standard object (min. sensing object) (mm) *	Min. bending radius (mm)	Features	Model number
Vacuum-resistant		47	260 200 130 (50)	1.2 dia. (0.01 dia.)	R30	M4 screw, heat-resistant up to 120°C	E32-T51V 1M
		47 47	1,350 1,000 680 (260)	4 dia. (0.1 dia.)		M4 screw, heat-resistant up to 120°C, long distance	E32-T51V 1M+ E39-F1V
		47	210 130 100 (35)	1.2 dia. (0.01 dia.)		L-shaped, heat-resistant up to 120°C	E32-T54V 1M
		47 47	660 500 330 (180)	4 dia. (0.1 dia.)		L-shaped, heat-resistant up to 120°C, long distance	E32-T54V 1M+ E39-F1V
		47	630 480 320 (130)	2 dia. (0.1 dia.)	R25	L-shaped, heat-resistant up to 200°C, long distance	E32-T84SV 1M

* 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.

Flanges

Appearance (mm)	Dimensions page	Type	Model number
	47	4-channel flange	E32-VF4
	47	1-channel flange	E32-VF1

Fiber Units for Atmospheric-pressure Side

Appearance (mm)	Dimensions page	Type	Model number
Free-cut	47	Amplifier-Flange Connection Fiber	E32-T10V 2M

* Free-cut Indicates models that allow free cutting.

Lens Units

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

Mounting Brackets

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

Fiber Units with Reflective Sensors | Standard models

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

Type		Appearance (mm) *3	Dimensions page	Sensing distance (mm) *1	(Min. sensing object) (mm) *2	Min. bending radius (mm)	Features	Model number
Flexible (new standard)	Standard size	Free-cut M6	48	300 / 170 / 120 (50)	(0.005 dia.)	R1	M6 right angle	E32-D11N
		Free-cut M6	48				M6 screw	E32-D11R
		Free-cut 3 dia.	48				3-dia. cylinder	E32-D12R
		Free-cut 15 × 10 × 3	48				Flat shape	E32-D15XR
		Free-cut Sleeve cannot be bent. M6 2.5 dia.	48				M6 screw, with sleeve	E32-DC200BR E32-DC200B4R
		Free-cut 6 dia.	49	80 / 45 / 30 (14)			6-dia. cylinder, side-view	E32-D14LR
		Free-cut 15 × 10 × 3	49	70 / 40 / 26 (12)			Flat shape, side-view	E32-D15YR
		Free-cut 15 × 10 × 3	49				Flat shape, flat-view	E32-D15ZR
	Small size	Free-cut M4	48	50 / 30 / 20 (8)			M4 screw (small)	E32-D211R
		Free-cut M3	48				M3 screw (small)	E32-D21R
		Free-cut 3 dia.	48				3-dia. cylinder (small)	E32-D22R
		Free-cut 12 × 8 × 3	48				Flat panel (small)	E32-D25XR
		Free-cut Min. bending radius of sleeve: 5 M3 1.2 dia.	48				M3 screw (small), with sleeve	E32-DC200FR E32-DC200F4R
		Free-cut 2 dia.	49	26 / 15 / 10 (4)			2-dia. cylinder (small), side-view	E32-D24R
		Free-cut 12 × 8 × 2	49	14 / 8 / 5 (2)			Flat shape (small), side-view	E32-D25YR
		Free-cut 12 × 8 × 2	49				Flat shape (small), flat-view	E32-D25ZR

*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.

R Flexible B Break-resistant U Fluororesin coating

Standard models

High-resolution mode | Standard mode | High-speed mode (Super-high-speed mode)

*When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type		Appearance (mm) *3	Dimensions page	Sensing distance (mm) *1	(Min. sensing object) (mm) *2	Min. bending radius (mm)	Features	Model number
Standard	Standard size	Free-cut	48	500 300 200 (90)	(0.005 dia.)	R25	M6 screw	E32-DC200
		Free-cut	48	400 230 160 (70)			3-dia. cylinder	E32-D12
		Free-cut	48	500 300 200 (90)			Flat shape	E32-D15X
		Free-cut	48				M6 screw, with sleeve	E32-DC200B E32-DC200B4
		Free-cut	49	200 110 80 (36)			6-dia. cylinder, side-view	E32-D14L
		Free-cut	49	170 100 65 (30)			Flat shape, side-view	E32-D15Y
		Free-cut	49				Flat shape, flat-view	E32-D15Z
	Small size	Free-cut	48	130 80 50 (22)		R10	M4 screw (small)	E32-D211
		Free-cut	48				M3 screw (small)	E32-DC200E
		Free-cut	48				3-dia. cylinder (small)	E32-D22
		Free-cut	48				Flat shape (small)	E32-D25X
		Free-cut	48				M3 screw (small), with sleeve	E32-DC200F E32-DC200F4
		Free-cut	49	50 30 20 (8)			2-dia. cylinder (small), side-view	E32-D24
		Free-cut	49	35 20 12 (6)			Flat shape (small), side-view	E32-D25Y
		Free-cut	49				Flat shape (small), flat-view	E32-D25Z

*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.

R Flexible B Break-resistant U Fluororesin coating

Fiber Units with Reflective Sensors | Standard models

High-resolution mode | Standard mode | High-speed mode (Super-high-speed mode)

*When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type		Appearance (mm) *3	Dimen-sions page	Sensing distance (mm) *1	(Min. sensing object) (mm) *2	Min. bending radius (mm)	Features	Model number
Break-resistant	Standard size	Free-cut M6	50	300 / 170 / 120 (50)	(0.005 dia.)	B R4	M6 screw	E32-D11
		Free-cut 15 × 10 × 3	50				Flat shape	E32-D15XB
	Small size	Free-cut M4	50	110 / 70 / 45 (20)			M4 screw (small)	E32-D21B
		Free-cut 3 dia.	50				3-dia. cylinder (small)	E32-D221B
		Free-cut M3	50	50 / 30 / 20 (8)			M3 screw (small)	E32-D21
		1.5 dia.	50				1.5-dia. cylinder (small)	E32-D22B
		Free-cut 12 × 8 × 2	50	85 / 50 / 30 (15)			Flat shape (small)	E32-D25XB
Coating		Free-cut M6	50	300 / 170 / 120 (50)	(0.005 dia.)	U R4	M6 screw, fluorine coating	E32-D11U

*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.

R Flexible B Break-resistant U Fluororesin coating

Special-beam models

High-resolution mode | Standard mode | High-speed mode (Super-high-speed mode)

*When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type	Appearance (mm) *3	Dimensions page	Sensing distance (mm) *1	(Min. sensing object) (mm) *2	Min. bending radius (mm)	Features	Model number
Long-distance, high-power	Free-cut	51	40 to 1,000 40 to 700 40 to 450 (40 to 240)	---	B R4	Large built-in lens, screw mounting	E32-D16
	Free-cut	51	650 400 260 (110)	(0.005 dia.)	R25	M6 screw	E32-D11L
	Free-cut	51	210 130 80 (35)		R10	M4 screw	E32-D21L
	Free-cut	51				3-dia. cylinder	E32-D22L
Ultracompact, thin-sleeve	Free-cut Sleeve cannot be bent.	51	25 16 10 (4)		R4	0.8-dia. sleeve	E32-D33
	Sleeve cannot be bent.	51	5 3 2 (0.8)			0.5-dia. sleeve	E32-D331

*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.

Fiber Units with Reflective Sensors | Special-beam models

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

Type	Appearance (mm) *3	Dimensions page	Sensing distance (mm) *1	(Min. sensing object) (mm) *2	Min. bending radius (mm)	Features	Model number
Coaxial, small-spot	Free-cut M6	52	280 170 160 (50)	(0.005 dia.)	R4	M6 right angle	E32-C11N
	Free-cut M3	52	40 25 23 (7)			M3 right angle	E32-C31N
	Free-cut M6	52	250 150 100 (45)			M6 screw	E32-CC200R
		52	500 300 200 (90)		R25		E32-CC200
	Free-cut 3 dia.	52	250 150 100 (45)			3-dia. cylinder	E32-D32L
	Free-cut M3	52	120 75 50 (22)			M3 screw (small)	E32-C31
	Free-cut 2 dia.	52				2-dia. cylinder (small)	E32-D32
		52 60	6 to 15 mm; spot diameter: 0.1 to 0.6 mm			Small spot (variable)	E32-C42+ E39-F3A
		52 60	Spot diameter of 0.5 to 1 mm at distances in the range 6 to 15 mm Free-cut				E32-D32+ E39-F3A
		52 60	Spot diameter of 0.1 mm at 7 mm			Small spot	E32-C41+ E39-F3A-5
		52 60	Spot diameter of 0.5 mm at 7 mm Free-cut				E32-C31+ E39-F3A-5
		52 60	Spot diameter of 0.2 mm at 17 mm			Long distance, small spot	E32-C41+ E39-F3B
		52 60	Spot diameter of 0.5 mm at 17 mm Free-cut				E32-C31+ E39-F3B
	Free-cut 4-dia. spot	52 60	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	53	250 150 100 (45)	(0.005 dia.)	R4	Beam width: 11 mm	E32-D36P1
Retroreflective	Free-cut M6 E39-R3 Reflector	53	10 to 250 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	53	150 to 1,500 150 to 1,500 150 to 1,500 (150 to 1,500)	(0.2 dia.)	R25	Screw mounting, long distance	E32-R16+ E39-R1 (Attached)

*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.

R Flexible B Break-resistant U Fluororesin coating

Special-beam models

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

Type	Appearance (mm) *3	Dimensions page	Sensing distance (mm) *1	(Min. sensing object) (mm) *2	Min. bending radius (mm)	Features	Model number
Convergent-reflective	Free-cut	54	3.3 3.3 3.3 (3.3)	(0.005 dia.)	R25	Small level differences, high power, side-view	E32-L25
	Free-cut	54				Small level differences, top-view	E32-L25A
	Free-cut	54	0 to 4 0 to 4 0 to 4 (0 to 4)		R10	Ultracompact, flat-view	E32-L24S
	Free-cut	54	2 to 6 (center: 4) 2 to 6 (center: 4) 2 to 6 (2 to 6) (center: 4)			Heat resistant up to 105°C *4, top-view	E32-L24L
	Free-cut	54	5.4 to 9 (center: 7.2) 5.4 to 9 (center: 7.2) 5.4 to 9 (5.4 to 9) (center: 7.2)			Heat resistant up to 105°C *4, top-view	E32-L25L
		55	4 to 10 4 to 10 4 to 10 (4 to 10)		R25	Heat resistant up to 200°C, flat-view	E32-L86
		55	1 to 5 1 to 5 1 to 5	Soda glass with reflection factor of 7%		Heat resistant up to 300°C	E32-L64
	Free-cut	55	0 to 8 0 to 8 0 to 6 0 to 4			Ideal for detecting glass stock.	E32-A10

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

Fiber Units with Reflective Sensors | Environment-resistant models

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

Type	Appearance (mm) *3	Dimensions page	Sensing distance (mm) *1	(Min. sensing object) (mm) *2	Min. bending radius (mm)	Features	Model number
Heat-resistant	150°C *4	56	400 230 160 (72)	(0.005 dia.)	R35	Heat resistant up to 150°C	E32-D51
	200°C *5	56	150 90 60 (27)		R10	Heat resistant up to 200°C	E32-D81R-S E32-D81R*6
	350°C *5	56			R25	Heat resistant up to 350°C	E32-D61-S E32-D61*6
	400°C *5 Min. bending radius of sleeve: 10	56	100 60 40 (18)			Heat resistant up to 400°C, with sleeve	E32-D73-S E32-D73*6
Chemical-resistant		56	160 95 65 (30)	(0.005 dia.)	R40	Fluororesin cover, long distance	E32-D12F
		56	70 40 30 (10)			Fluororesin cover, side-view	E32-D14F

*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.
*4. For continuous operation, use the products within a temperature range of –40°C to 90°C.
*5. The maximum temperature that can be withstood varies with the location. Refer to dimensions diagrams for details.
*6. Order the Fiber Unit based on the Amplifier Unit. Use the E32-D□-S if the E3X-DA□-S, E3X-MDA□, or E3X-DAC□-S is used. Use the E32-D□ if any other Amplifier is used.

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Ordering Information

Application-corresponding Fiber Units

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

Type	Appearance (mm) *2	Dimensions page	Sensing distance (mm)	Standard object (min. sensing object) (mm)*1	Min. bending radius (mm)	Features	Model number
Label-detection	Free-cut	57	10 10 10 (10)	4 dia. (0.1 dia.)	R25	Slot sensor (no adjustment of optical axis required)	E32-G14
	Free-cut	43	4,500 3,400 2,250 (900)			Screw mounting, side-view	E32-T14
Liquid-level detection	Free-cut	57	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	57	Applicable tube: Transparent tube (no restriction on diameter)		R4	No restriction on tube diameter, resistant to bubbles and drops of water	E32-D36T
	Free-cut	58	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	58	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
		58	Liquid-contact models		R40	Heat resistant up to 200°C, fluororesin cover	E32-D82F1 E32-D82F2
Glass-substrate-alignment	Free-cut	54	0 to 15 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: 0.1 mm	E32-L16-N
		58	10 to 20 10 to 20 10 to 20 (–)				E32-A08
		58	15 to 25 15 to 25 10 to 20 (–)				E32-A07E1 *5 E32-A07E2 *5
		58	5 to 18 5 to 18 5 to 16 (–)			Heat resistant up to 300°C *3, *4	E32-L66
		54	10 to 20 10 to 20 10 to 20			Heat resistant up to 300°C	E32-A08H2

*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.
*3. The maximum temperature that can be withstood varies with the location. Refer to dimensions diagrams for details.
*4. These values are based on the assumption that there are no repeated sudden changes in temperature.
*5. The characteristics for sensing object incline are different between the Attachments with model numbers ending in "E1" and "E2."
Refer to page 52 for installation precautions.

Application-corresponding Fiber Units

High-resolution mode | Standard mode | High-speed mode (Super-high-speed mode)

*When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type	Appearance (mm) *2	Dimensions page	Sensing distance (mm)	Standard object (min. sensing object) (mm)*1	Min. bending radius (mm)	Features	Model number
Glass-substrate-mapping	Free-cut	59	15 to 38 (center: 25) 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
		59			R35	Heat resistant up to 150°C *3	E32-A09H
		59	20 to 30 (center: 25) 20 to 30 (center: 25) 20 to 30 (center: 25) (–)		R25	Heat resistant up to 300°C *4, *5	E32-A09H2
Wafer-mapping	Free-cut 3 dia.	59	1,150 890 600 (250)	2 dia. (0.1 dia.)	R (R1)	Opening angle: 1.5°; optical axis adjusted before delivery	E32-A03
	Free-cut 3 dia.	59			R10	Opening angle: 1.5°; with mounting flange; optical axis adjusted before delivery	E32-A03-1
	Free-cut 3.5 dia.	44	1,750 1,300 870 (350)			Long distance; opening angle: 4°	E32-T24S
	Free-cut 2 dia.	59		1.2 dia. (0.1 dia.)		Ultraslim (t = 2 mm); opening angle: 3°; optical axis adjusted before delivery	E32-A04
	Free-cut 2 dia.	59	460 340 225 (100)			Ultraslim (t = 2 mm); opening angle: 3°; with mounting flange; optical axis adjusted before delivery	E32-A04-1

*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.
*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.

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Accessories

Lens Units

*When used in combination with the E3X-DA-S Amplifier Unit (general-purpose).

Type		Appearance	Dimensions page	Applicable Fiber Units	Sensing distance (mm)				Standard object (min. sensing object) (mm) *1	Features	Model number
					High-resolution mode	Standard mode	High-speed mode	Super-high-speed mode			
Through-beam Lens Units	Long-distance Lens Units		60	E32-T11L	4,000*2	3,200	2,100	840	4 dia. (0.1 dia.)	Long-distance sensing; opening angle: 5° to 40° (heat resistant up to 200°C)	E39-F1
				E32-TC200	4,000*2	4,000*2	2,600	1,500			
				E32-T11R	4,000*2	3,700	2,400	970			
				E32-T11	4,000*2	3,600	2,300	930			
				E32-T11U	4,000*2	3,600	2,300	930			
				E32-T81R-S	2,650	2,100	1,300	520			
				E32-T61-S	4,000*2	3,400	2,200	900			
	Side-view Units		60	E32-T11L	910	800	500	180	3 dia. (0.1 dia.)	Side-view, space-saving (heat resistant up to 200°C)	E39-F2
				E32-TC200	840	700	450	160			
				E32-T11R	520	400	250	100			
				E32-T11	820	660	430	160			
				E32-T11U	820	660	430	160			
				E32-T81R-S	360	280	180	70			
				E32-T61-S	600	450	300	120			
	Reflection Units		60	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		60	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						
			60	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						
			60	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						
			60	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

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

Accessories

Protective Spiral Tube

Appearance	Dimensions page	Application	Applicable Fiber Units	Tube length	Model number
	61	Fiber protection	M3-screw models E32-D21/E32-D21R 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
	61		M4-screw models E32-T11□ (except the E32-T11N Right-angle Model) E32-TC200 E32-TC200B□ E32-T51 E32-D21L/E32-D21B	500 mm	E39-F32C5
				1 m	E39-F32C
	61		M6-screw models E32-D11□ (except the E32-D11N Right-angle Model) 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. The Lens Unit and Spiral Tube cannot be used at the same time.

Other Accessories

Appearance	Dimensions page	Application	Name	Applicable Fiber Units	Remarks	Model number
	62	Used to cut the fiber.	Cutter	Fiber Units that allow free cutting	Provided with applicable Fiber Units.	E39-F4
	62	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
	62	Used to extend fibers.	Fiber Connectors	Fiber Units that allow free cutting and have a 2.2-dia. sheath	---	E39-F10
	62	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 to connect Fiber Units with different sheath diameters, 1.0 mm and 2.2 mm.	E39-F13 E39-F14 E39-F15
	62	Used to bends in sleeves.	Sleeve Bender	E32-TC200B(4) E32-TC200F(4) E32-DC200F(4)	---	E39-F11
	62	Used to secure the 3.5-dia. Fiber Head	Mounting Bracket	E32-T24S E32-A03	Provided with applicable Fiber Units.	E39-L83

Ratings/Characteristics

Standard models

Models	Ambient operating temperature range	Ambient humidity range	Fiber core material (sheath material)	Permissible bending radius	Tightening force (N·m)	Pulling force (N)	IEC standard degree of protection
E32-D11			Plastic (PVC coating)	R4	0.98	29.4	IP67
E32-D11N			Plastic (PVC coating)	R1	0.98	29.4	IP67
E32-D11R			Plastic (PVC coating)	R1	0.98	29.4	IP67
E32-D11U			Plastic (fluororesin coating)	R4	0.98	29.4	IP67
E32-D12			Plastic (polyethylene coating)	R25	0.29	29.4	IP67
E32-D12R			Plastic (PVC coating)	R1	0.29	29.4	IP67
E32-D14L			Plastic (polyethylene coating)	R25	0.98	29.4	IP67
E32-D14LR			Plastic (PVC coating)	R1	0.98	29.4	IP67
E32-D15X			Plastic (polyethylene coating)	R25	0.15	29.4	IP67
E32-D15XB			Plastic (PVC coating)	R4	0.15	29.4	IP67
E32-D15XR			Plastic (PVC coating)	R1	0.15	29.4	IP67
E32-D15Y			Plastic (polyethylene coating)	R25	0.15	29.4	IP40
E32-D15YR			Plastic (PVC coating)	R1	0.15	29.4	IP40
E32-D15Z			Plastic (polyethylene coating)	R25	0.15	29.4	IP40
E32-D15ZR			Plastic (PVC coating)	R1	0.15	29.4	IP40
E32-D21			Plastic (PVC coating)	R4	0.78	9.8	IP67
E32-D211			Plastic (polyethylene coating)	R10	0.78	9.8	IP67
E32-D211R			Plastic (polyethylene coating)	R1	0.78	9.8	IP67
E32-D21B			Plastic (PVC coating)	R4	0.78	9.8	IP67
E32-D21R			Plastic (polyethylene coating)	R1	0.78	9.8	IP67
E32-D22			Plastic (polyethylene coating)	R10	0.29	9.8	IP67
E32-D221B			Plastic (PVC coating)	R4	0.29	9.8	IP67
E32-D22B			Plastic (PVC coating)	R4	0.20	9.8	IP67
E32-D22R			Plastic (polyethylene coating)	R1	0.29	9.8	IP67
E32-D24			Plastic (polyethylene coating)	R10	0.29	9.8	IP67
E32-D24R			Plastic (polyethylene coating)	R1	0.29	9.8	IP67
E32-D25X			Plastic (polyethylene coating)	R10	0.15	9.8	IP67
E32-D25XB			Plastic (PVC coating)	R4	0.15	9.8	IP67
E32-D25XR			Plastic (polyethylene coating)	R1	0.15	9.8	IP67
E32-D25Y			Plastic (polyethylene coating)	R10	0.15	9.8	IP40
E32-D25YR			Plastic (polyethylene coating)	R1	0.15	9.8	IP40
E32-D25Z	−40 to +70°C	35% to 85%	Plastic (polyethylene coating)	R10	0.15	9.8	IP40
E32-D25ZR			Plastic (polyethylene coating)	R1	0.15	9.8	IP40
E32-DC200			Plastic (polyethylene coating)	R25	0.98	29.4	IP67
E32-DC200B(B4)			Plastic (polyethylene coating)	R25	0.98	29.4	IP67
E32-DC200BR(B4R)			Plastic (PVC coating)	R1	0.98	29.4	IP67
E32-DC200E			Plastic (polyethylene coating)	R10	0.78	9.8	IP67
E32-DC200F(F4)			Plastic (polyethylene coating)	R10	0.78	9.8	IP67
E32-DC200FR(F4R)			Plastic (polyethylene coating)	R1	0.78	9.8	IP67
E32-T11			Plastic (PVC coating)	R4	0.78	29.4	IP67
E32-T11N			Plastic (PVC coating)	R1	0.78	29.4	IP67
E32-T11R			Plastic (PVC coating)	R1	0.78	29.4	IP67
E32-T11U			Plastic (fluororesin coating)	R4	0.78	29.4	IP67
E32-T12			Plastic (polyethylene coating)	R25	0.29	29.4	IP67
E32-T12B			Plastic (PVC coating)	R4	0.29	29.4	IP67
E32-T12R			Plastic (PVC coating)	R1	0.29	29.4	IP67
E32-T14L			Plastic (polyethylene coating)	R25	0.29	29.4	IP67
E32-T14LR			Plastic (PVC coating)	R1	0.29	29.4	IP67
E32-T15X			Plastic (polyethylene coating)	R25	0.15	29.4	IP67
E32-T15XB			Plastic (PVC coating)	R4	0.15	29.4	IP67
E32-T15XR			Plastic (PVC coating)	R1	0.15	29.4	IP67
E32-T15Y			Plastic (polyethylene coating)	R25	0.15	29.4	IP40
E32-T15YR			Plastic (PVC coating)	R1	0.15	29.4	IP40
E32-T15Z			Plastic (polyethylene coating)	R25	0.15	29.4	IP40
E32-T15ZR			Plastic (PVC coating)	R1	0.15	29.4	IP40
E32-T21			Plastic (PVC coating)	R4	0.78	9.8	IP67
E32-T21R			Plastic (polyethylene coating)	R1	0.78	29.4	IP67
E32-T22			Plastic (polyethylene coating)	R10	0.29	9.8	IP67
E32-T221B			Plastic (PVC coating)	R4	0.29	9.8	IP67
E32-T222			Plastic (polyethylene coating)	R10	0.20	9.8	IP67
E32-T222R			Plastic (polyethylene coating)	R1	0.20	9.8	IP67
E32-T22B			Plastic (PVC coating)	R4	0.20	9.8	IP67
E32-T22R			Plastic (polyethylene coating)	R1	0.29	9.8	IP67

Standard models (continued)

Models	Ambient operating temperature range	Ambient humidity range	Fiber core material (sheath material)	Permissible bending radius	Tightening force (N·m)	Pulling force (N)	IEC standard degree of protection
E32-T24	−40 to +70°C	35% to 85%	Plastic (polyethylene coating)	R10	0.29	9.8	IP67
E32-T24R			Plastic (polyethylene coating)	R1	0.29	9.8	IP67
E32-T25X			Plastic (polyethylene coating)	R10	0.15	9.8	IP67
E32-T25XB			Plastic (PVC coating)	R4	0.15	9.8	IP67
E32-T25XR			Plastic (polyethylene coating)	R1	0.15	9.8	IP67
E32-T25Y			Plastic (polyethylene coating)	R10	0.15	9.8	IP40
E32-T25YR			Plastic (polyethylene coating)	R1	0.15	9.8	IP40
E32-T25Z			Plastic (polyethylene coating)	R10	0.15	9.8	IP40
E32-T25ZR			Plastic (polyethylene coating)	R1	0.15	9.8	IP40
E32-TC200			Plastic (polyethylene coating)	R25	0.78	29.4	IP67
E32-TC200A			Plastic (polyethylene coating)	R25	0.78	29.4	IP67
E32-TC200B(B4)			Plastic (polyethylene coating)	R25	0.78	29.4	IP67
E32-TC200BR(B4R)			Plastic (PVC coating)	R1	0.78	29.4	IP67
E32-TC200E			Plastic (polyethylene coating)	R10	0.78	9.8	IP67
E32-TC200F(F4)			Plastic (polyethylene coating)	R10	0.78	9.8	IP67
E32-TC200FR(F4R)			Plastic (polyethylene coating)	R1	0.78	9.8	IP67

Special-beam models

Models	Ambient operating temperature range	Ambient humidity range	Fiber core material (sheath material)	Permissible bending radius	Tightening force (N·m)	Pulling force (N)	IEC standard degree of protection
E32-A10	−40 to +70°C	35% to 85%	Plastic (polyethylene coating)	R25	0.53	29.4	IP30
E32-C11N	−40 to +70°C		Plastic (combination of PVC and polyethylene)	R4	0.98	29.4	IP67
E32-C31	−40 to +70°C		Plastic (polyethylene coating)	R25	0.78	9.8	IP67
E32-C31N	−40 to +70°C		Plastic (combination of PVC and polyethylene)	R4	0.29	9.8	IP67
E32-C41	−40 to +70°C		Plastic (polyethylene coating)	R25	0.78	9.8	IP67
E32-C42	−40 to +70°C		Plastic (polyethylene coating)	R25	0.29	9.8	IP67
E32-CC200	−40 to +70°C		Plastic (polyethylene coating)	R25	0.98	29.4	IP67
E32-CC200R	−40 to +70°C		Plastic (polyethylene coating)	R4	0.98	29.4	IP67
E32-D11L	−40 to +70°C		Plastic (polyethylene coating)	R25	0.98	29.4	IP67
E32-D16	−40 to +70°C		Plastic (PVC coating)	R4	0.53	29.4	IP40
E32-D21L	−40 to +70°C		Plastic (polyethylene coating)	R10	0.78	9.8	IP67
E32-D22L	−40 to +70°C		Plastic (polyethylene coating)	R10	0.29	9.8	IP67
E32-D32	−40 to +70°C		Plastic (polyethylene coating)	R25	0.29	9.8	IP67
E32-D32L	−40 to +70°C		Plastic (polyethylene coating)	R25	0.29	29.4	IP67
E32-D33	−40 to +70°C		Plastic (polyethylene coating)	R4	0.29	9.8	IP67
E32-D331	−40 to +70°C		Plastic (polyethylene coating)	R4	0.29	9.8	IP67
E32-D36P1	−40 to +70°C		Plastic (polyethylene coating)	R4	0.78	29.4	IP67
E32-L24L	−40 to +105°C		Plastic (polyethylene coating)	R10	0.29	9.8	IP50
E32-L24S	−40 to +70°C		Plastic (polyethylene coating)	R10	0.29	9.8	IP40
E32-L25	−40 to +70°C		Plastic (polyethylene coating)	R25	0.29	19.6	IP50
E32-L25A	−40 to +70°C		Plastic (polyethylene coating)	R25	0.29	19.6	IP50
E32-L25L	−40 to +105°C		Plastic (polyethylene coating)	R10	0.29	9.8	IP50
E32-L64	−40 to +300°C		Glass (SUS spiral coating)	R25	0.54	9.8	IP50
E32-L86	−40 to +200°C		Glass (SUS spiral coating)	R25	0.54	9.8	IP40
E32-M21	−40 to +70°C		Plastic (PVC coating)	R25	0.49. 0.78*	9.8	IP50
E32-R16	−25 to +55°C		Plastic (polyethylene coating)	R25	0.54	29.4	IP66
E32-R21	−40 to +70°C		Plastic (polyethylene coating)	R10	0.39	9.8	IP67
E32-T11L	−40 to +70°C		Plastic (polyethylene coating)	R25	0.78	29.4	IP67
E32-T12L	−40 to +70°C		Plastic (polyethylene coating)	R25	0.29	29.4	IP67
E32-T14	−40 to +70°C		Plastic (polyethylene coating)	R25	0.49	29.4	IP67
E32-T16	−40 to +70°C		Plastic (polyethylene coating)	R25	0.49	29.4	IP67
E32-T16J	−40 to +70°C		Plastic (PVC coating)	R10	0.29	29.4	IP50
E32-T16JR	−40 to +70°C		Plastic (PVC coating)	R1	0.29	29.4	IP50
E32-T16P	−40 to +70°C		Plastic (PVC coating)	R10	0.29	29.4	IP50
E32-T16PR	−40 to +70°C		Plastic (PVC coating)	R1	0.29	29.4	IP50
E32-T16W	−25 to +55°C		Plastic (PVC coating)	R10	0.29	9.8	IP50
E32-T16WR	−25 to +55°C		Plastic (PVC coating)	R1	0.29	9.8	IP50
E32-T17L	−40 to +70°C		Plastic (polyethylene coating)	R25	0.78	29.4	IP67
E32-T21L	−40 to +70°C		Plastic (polyethylene coating)	R10	0.78	9.8	IP67
E32-T223R	−40 to +70°C		Plastic (polyethylene coating)	R1	0.20	9.8	IP67
E32-T22L	−40 to +70°C		Plastic (polyethylene coating)	R10	0.29	9.8	IP67
E32-T22S	−40 to +70°C		Plastic (PVC coating)	R10	0.29	29.4	IP50
E32-T24S	−40 to +70°C		Plastic (PVC coating)	R10	0.29	29.4	IP50
E32-T333-S5	−40 to +70°C		Plastic (polyethylene coating)	R10	0.29	9.8	IP67
E32-T334-S5	−40 to +70°C		Plastic (polyethylene coating)	R10	0.29	9.8	IP67
E32-T33-S5	−40 to +70°C		Plastic (PVC coating)	R10	0.29	9.8	IP67

*The strength depends on the section. Use 0.49 N•m max. to 5 mm from the tip and 0.78 N•m max. at a distance of more than 5 mm from the tip.

Environment-resistant models

Models	Ambient operating temperature range	Ambient humidity range	Fiber core material (sheath material)	Permissible bending radius	Tightening force (N·m)	Pulling force (N)	IEC standard degree of protection
E32-D12F	–40 to +70°C	35% to 85%	Plastic (fluororesin coating)	R40	0.78	29.4	IP67
E32-D14F	–40 to +70°C		Plastic (fluororesin coating)	R40	0.78	29.4	IP67
E32-D51	–40 to +150°C		Plastic (fluororesin coating)	R35	0.98	29.4	IP67
E32-D61	–60 to +350°C		Glass (SUS spiral coating)	R25	0.98	29.4	IP67
E32-D61-S	–60 to +350°C		Glass (SUS spiral coating)	R25	0.98	29.4	IP67
E32-D73	–40 to +400°C		Glass (SUS spiral coating)	R25	0.78	29.4	IP67
E32-D73-S	–40 to +400°C		Glass (SUS spiral coating)	R25	0.78	29.4	IP67
E32-D81R	–40 to +200°C		Glass (fluororesin coating)	R10	0.78	9.8	IP67
E32-D81R-S	–40 to +200°C		Glass (fluororesin coating)	R10	0.78	9.8	IP67
E32-T11F	–40 to +70°C		Plastic (fluororesin coating)	R4	0.29	29.4	IP67
E32-T12F	–40 to +70°C		Plastic (fluororesin coating)	R40	0.78	29.4	IP67
E32-T14F	–40 to +70°C		Plastic (fluororesin coating)	R40	0.78	29.4	IP67
E32-T51	–40 to +150°C		Plastic (fluororesin coating)	R35	0.78	29.4	IP67
E32-T51F	–40 to +150°C		Plastic (fluororesin coating)	R40	0.78	29.4	IP67
E32-T51V	–25 to +120°C		Glass (fluororesin coating)	R30	0.29	29.4	---
E32-T54	–40 to +150°C		Plastic (fluororesin coating)	R35	0.29	29.4	IP67
E32-T54V	–25 to +120°C		Glass (fluororesin coating)	R30	0.29	29.4	---
E32-T61-S	–60 to +350°C		Glass (SUS spiral coating)	R25	0.78	29.4	IP67
E32-T81F-S	–40 to +200°C		Glass (fluororesin coating)	R10	0.78	9.8	IP67
E32-T81R-S	–40 to +200°C		Glass (fluororesin coating)	R10	0.78	9.8	IP67
E32-T84S-S	–40 to +200°C		Glass (fluororesin coating)	R25	0.29	9.8	IP67
E32-T84SV	–25 to +200°C		Glass (SUS spiral coating)	R25	0.29	29.4	---

Application-corresponding models

Models	Ambient operating temperature range	Ambient humidity range	Fiber core material (sheath material)	Permissible bending radius	Tightening force (N·m)	Pulling force (N)	IEC standard degree of protection
E32-A01	–40 to +70°C	35% to 85%	Plastic (fluororesin coating)	R4	---	9.8	IP50
E32-A02	–40 to +70°C		Plastic (fluororesin coating)	R4	---	9.8	IP50
E32-A03	–40 to +70°C		Plastic (polyethylene coating)	R1	0.29	9.8	IP50
E32-A03-1	–40 to +70°C		Plastic (polyethylene coating)	R10	0.29	9.8	IP50
E32-A04	–40 to +70°C		Plastic (polyethylene coating)	R10	0.29	9.8	IP50
E32-A04-1	–40 to +70°C		Plastic (polyethylene coating)	R10	0.29	9.8	IP50
E32-A07E1(E2)	–40 to +70°C		Plastic (polyethylene coating)	R25	0.53	9.8	IP40
E32-A08	–40 to +70°C		Plastic (polyethylene coating)	R25	0.53	9.8	IP40
E32-A08H2	–40 to +300°C		Glass (SUS spiral coating)	R25	0.53	29.4	IP30
E32-A09	–40 to +70°C		Plastic (polyethylene coating)	R25	0.53	9.8	IP40
E32-A09H	–40 to +150°C		Plastic (fluororesin coating)	R35	0.53	9.8	IP40
E32-A09H2	–40 to +300°C		Glass (SUS spiral coating)	R25	0.53	9.8	IP40
E32-D36T	–40 to +70°C		Plastic (polyethylene coating)	R4	---	29.4	IP67
E32-D82F1	–40 to +200°C		Tip: Glass and fluororesin coating Amplifier insert: Plastic (fluororesin coating)	R40	0.29	29.4	IP68
E32-D82F2	–40 to +200°C		(Fluororesin coating)	R40	0.29	29.4	IP68
E32-G14	–40 to +70°C		Plastic (polyethylene coating)	R25	0.49	29.4	IP67
E32-L16-N	–40 to +70°C		Plastic (polyethylene coating)	R25	0.29	29.4	IP40
E32-L25T	–40 to +70°C		Plastic (polyethylene coating)	R10	---	9.8	IP50
E32-L66	–40 to +300°C		Glass (SUS spiral coating)	R25	0.53	9.8	IP40
E32-T14	–40 to +70°C		Plastic (polyethylene coating)	R25	0.49	29.4	IP67

Dimensions

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

Through-beam Fiber Units

Through-beam models consist of two parts: an emitter and a receiver.

R Flexible B Break-resistant U Fluororesin coating R□ Standard
Free-cut Cutting free (Cutter provided)

Standard Standard/Flexible Models

E32-T11N R

Free-cut

E32-TC200 R25
E32-T11R R

Free-cut

E32-TC200E R10

Free-cut

E32-TC200A R25
E32-T21R R

Free-cut

E32-T22 R10
E32-T22R R

Free-cut

E32-T12 R25
E32-T12R R

Free-cut

E32-T222 R10
E32-T222R R

Free-cut

E32-T15X R25
E32-T15XR R

Free-cut

Note: 1. Set of two symmetrical parts.
2. Mounting screws (countersunk screw M2 × 8 4 pcs) included

E32-T25X R10
E32-T25XR R

Free-cut

Note: 1. Set of two symmetrical parts.
2. Mounting screws (countersunk screw M2 × 8 4 pcs) included

E32-TC200B R25
E32-TC200B4 R25
E32-TC200BR R
E32-TC200B4R R

Free-cut

* ( ): E32-TC200B4/E32TC200B4R

E32-TC200F R10
E32-TC200F4 R10
E32-TC200FR R
E32-TC200F4R R

Free-cut

* ( ):E32-TC200F4/E32TC200F4R

E32-T14L R25
E32-T14LR R

Free-cut

Through-beam Fiber Units

Through-beam models consist of two parts: an emitter and a receiver.

R Flexible B Break-resistant U Fluororesin coating R□ Standard
Free-cut Cutting free (Cutter provided)

Standard Standard/Flexible Models

E32-T24 R10
E32-T24R R

Free-cut

E32-T15Y R25
E32-T15YR R

Free-cut

Note: 1. Set of two symmetrical parts.
2. Mounting screws (countersunk screw M2 × 8 4 pcs) included

E32-T25Y R10
E32-T25YR R

Free-cut

Note: 1. Set of two symmetrical parts.
2. Mounting screws (countersunk screw M2 × 8 4 pcs) included

E32-T15Z R25
E32-T15ZR R

Free-cut

Note: 1. Set of two symmetrical parts.
2. Mounting screws (countersunk screw M2 × 8 4 pcs) included

E32-T25Z R10
E32-T25ZR R

Free-cut

Note: 1. Set of two symmetrical parts.
2. Mounting screws (countersunk screw M2 × 8 4 pcs) included

Mounting hole dimensions (recommended)

<Screw-mounting Model> (Unit:mm)

Outer diameter of fiber unit	M3	M4	M6	M14
F dimensions	$3^{+0.5}_{0}$ dia.	$4^{+0.5}_{0}$ dia.	$6^{+0.5}_{0}$ dia.	14^{+1}_{0} dia.

Example: Head size of E32-TC200 is M4. Open the mounting holes with 4 to 4.5 dia.

<Cylindrical Model> (Unit:mm)

Outer diameter of fiber unit	1 dia.	1.5 dia.	2 dia.	3 dia.
F dimensions	$1.2^{+0.2}_{0}$ dia.	$1.7^{+0.2}_{0}$ dia.	$2.2^{+0.2}_{0}$ dia.	$3.2^{+0.2}_{0}$ dia.
Outer diameter of fiber unit	3.5 dia.	4 dia.	5 dia.	6 dia.
F dimensions	$4^{+0.5}_{0}$ dia.	$4.5^{+0.5}_{0}$ dia.	$5.5^{+0.5}_{0}$ dia.	$6.5^{+0.5}_{0}$ dia.

Example: Head size of E32-T22 is 2 dia.. Open the mounting holes with 2.2 to 2.4 dia.

Minimum bending radius

R Flexible B Break-resistant U Fluororesin coating R□ Standard

(Unit:mm)

Type	A Minimum bending radius	B unbendable
R (except E32-C11N, E32-C31N and E32-CC200)	1	0
R (E32-C11N, E32-C31N, E32-CC200R)	4	0
B U R4	4	10
R10	10	10
R25	25	10
R30	30	10
R35	35	10
R40	40	10

R Flexible B Break-resistant U Fluororesin coating R□ Standard
Free-cut Cutting free (Cutter provided)

Standard Models Break-resistant/Coated Models

E32-T11 B
E32-T11U U

Free-cut

E32-T21 B

Free-cut

E32-T12B B

Free-cut

E32-T221B B

Free-cut

E32-T22B B

Free-cut

E32-T15XB B

Free-cut

Note: 1. Set of two symmetrical parts.
2. Mounting screws (countersunk screw M2 × 8 4 pcs) included

E32-T25XB B

Free-cut

Note: 1. Set of two symmetrical parts.
2. Mounting screws (countersunk screw M2 × 8 4 pcs) included

Through-beam Fiber Units

Through-beam models consist of two parts: an emitter and a receiver.

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard
(Free-cut) Cutting free (Cutter provided)

Special-beam Models Long-distance/High-power Models

E32-T17L (R25) (Free-cut)

E32-T14 (R25) (Free-cut)

E32-T11L (R25) (Free-cut)

E32-T12L (R25) (Free-cut)

E32-T21L (R10) (Free-cut)

E32-T22L (R10) (Free-cut)

Mounting hole dimensions (recommended)

<Screw-mounting Model> (Unit:mm)

Outer diameter of fiber unit	M3	M4	M6	M14
F dimensions	$3^{+0.5}_{0}$ dia.	$4^{+0.5}_{0}$ dia.	$6^{+0.5}_{0}$ dia.	14^{+1}_{0} dia.

Example: Head size of E32-TC200 is M4. Open the mounting holes with 4 to 4.5 dia.

<Cylindrical Model> (Unit:mm)

Outer diameter of fiber unit	1 dia.	1.5 dia.	2 dia.	3 dia.
F dimensions	$1.2^{+0.2}_{0}$ dia.	$1.7^{+0.2}_{0}$ dia.	$2.2^{+0.2}_{0}$ dia.	$3.2^{+0.2}_{0}$ dia.
Outer diameter of fiber unit	3.5 dia.	4 dia.	5 dia.	6 dia.
F dimensions	$4^{+0.5}_{0}$ dia.	$4.5^{+0.5}_{0}$ dia.	$5.5^{+0.5}_{0}$ dia.	$6.5^{+0.5}_{0}$ dia.

Example: Head size of E32-T22 is 2 dia.. Open the mounting holes with 2.2 to 2.4 dia.

Minimum bending radius

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard

(Unit:mm)

Type	A Minimum bending radius	B unbendable
Ⓡ (except E32-C11N, E32-C31N and E32-CC200)	1	0
Ⓡ (E32-C11N, E32-C31N, E32-CC200R)	4	0
Ⓑ Ⓤ (R4)	4	10
(R10)	10	10
(R25)	25	10
(R30)	30	10
(R35)	35	10
(R40)	40	10

Through-beam Fiber Units

Through-beam models consist of two parts: an emitter and a receiver.

R Flexible B Break-resistant U Fluororesin coating R□ Standard
Free-cut Cutting free (Cutter provided)

Special-beam Models Ultracompact/Thin-sleeve Models

E32-T223R R

Free-cut

E32-T33-S5 R10

Free-cut

E32-T333-S5 R10

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

E32-T334-S5 R10

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

Special-beam Models Fine-beam (narrow vision field) Models

E32-T22S R10

Free-cut

E32-T24S R10

Free-cut

Special-beam Models Area-sensing Models

E32-T16W R10
E32-T16WR R

Free-cut

E32-M21 R25

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard
(Free-cut) Cutting free (Cutter provided)

Special-beam Models Area-sensing Models

E32-T16P (R10)
E32-T16PR Ⓡ

(Free-cut)

E32-T16J (R10)
E32-T16JR Ⓡ

(Free-cut)

E32-T16 (R25)

(Free-cut)

Mounting hole dimensions (recommended)

<Screw-mounting Model> (Unit:mm)

Outer diameter of fiber unit	M3	M4	M6	M14
F dimensions	$3^{+0.5}_{0}$ dia.	$4^{+0.5}_{0}$ dia.	$6^{+0.5}_{0}$ dia.	14^{+1}_{0} dia.

Example: Head size of E32-TC200 is M4. Open the mounting holes with 4 to 4.5 dia.

<Cylindrical Model> (Unit:mm)

Outer diameter of fiber unit	1 dia.	1.5 dia.	2 dia.	3 dia.
F dimensions	$1.2^{+0.2}_{0}$ dia.	$1.7^{+0.2}_{0}$ dia.	$2.2^{+0.2}_{0}$ dia.	$3.2^{+0.2}_{0}$ dia.
Outer diameter of fiber unit	3.5 dia.	4 dia.	5 dia.	6 dia.
F dimensions	$4^{+0.5}_{0}$ dia.	$4.5^{+0.5}_{0}$ dia.	$5.5^{+0.5}_{0}$ dia.	$6.5^{+0.5}_{0}$ dia.

Example: Head size of E32-T22 is 2 dia.. Open the mounting holes with 2.2 to 2.4 dia.

Minimum bending radius

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard

(Unit:mm)

Type	A Minimum bending radius	B unbendable
Ⓡ (except E32-C11N, E32-C31N and E32-CC200)	1	0
Ⓡ (E32-C11N, E32-C31N, E32-CC200R)	4	0
Ⓑ Ⓤ (R4)	4	10
(R10)	10	10
(R25)	25	10
(R30)	30	10
(R35)	35	10
(R40)	40	10

Through-beam Fiber Units

Through-beam models consist of two parts: an emitter and a receiver.

R Flexible B Break-resistant U Fluororesin coating R□ Standard
Free-cut Cutting free (Cutter provided)

Environment-resistant Models Heat-resistant Models

E32-T51 (R35) Free-cut

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

E32-T54 (R35) Free-cut

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

E32-T81R-S (R10)

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

E32-T84S-S (R25)

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

E32-T61-S (R25)

*2 The diameter is 6 mm if the fiberlength 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 *1), however, must stay within the Amplifier Unit's operating temperature range.

Environment-resistant Models Chemical-resistant Models

E32-T11F (R4) Free-cut

E32-T12F (R40) Free-cut

E32-T14F (R40) Free-cut

E32-T51F (R40) Free-cut

E32-T81F-S (R10)

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

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard
(Free-cut) Cutting free (Cutter provided)

Environment-resistant Models Vacuum-resistant Models

E32-T51V (R30)

E32-T54V (R30)

E32-T84SV (R25)

E39-F1V

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

E32-VF4

Note 1. Perform mounting so that the V40 O-ring is on the atmospheric-pressure side of the vacuum chamber wall.
2. Mounting-hole cutout dimensions: 38 dia. ±0.5 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

E32-T10V-2M (R25)

(Free-cut)

E39-L54V

Material: Stainless steel (SUS304)

Mounting hole dimensions (recommended)

<Screw-mounting Model> (Unit:mm)

Outer diameter of fiber unit	M3	M4	M6	M14
F dimensions	$3^{+0.5}_{0}$ dia.	$4^{+0.5}_{0}$ dia.	$6^{+0.5}_{0}$ dia.	14^{+1}_{0} dia.

Example: Head size of E32-TC200 is M4. Open the mounting holes with 4 to 4.5 dia.

<Cylindrical Model> (Unit:mm)

Outer diameter of fiber unit	1 dia.	1.5 dia.	2 dia.	3 dia.
F dimensions	$1.2^{+0.2}_{0}$ dia.	$1.7^{+0.2}_{0}$ dia.	$2.2^{+0.2}_{0}$ dia.	$3.2^{+0.2}_{0}$ dia.
Outer diameter of fiber unit	3.5 dia.	4 dia.	5 dia.	6 dia.
F dimensions	$4^{+0.5}_{0}$ dia.	$4.5^{+0.5}_{0}$ dia.	$5.5^{+0.5}_{0}$ dia.	$6.5^{+0.5}_{0}$ dia.

Example: Head size of E32-T22 is 2 dia.. Open the mounting holes with 2.2 to 2.4 dia.

Minimum bending radius

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard

(Unit:mm)

Type	A Minimum bending radius	B unbendable
Ⓡ (except E32-C11N, E32-C31N and E32-CC200)	1	0
Ⓡ (E32-C11N, E32-C31N, E32-CC200R)	4	0
Ⓑ Ⓤ (R4)	4	10
(R10)	10	10
(R25)	25	10
(R30)	30	10
(R35)	35	10
(R40)	40	10

Fiber Units with Reflective Sensors

Standard Models Standard/Flexible Models

R Flexible B Break-resistant U Fluororesin coating R□ Standard
Free-cut Cutting free (Cutter provided)

E32-D11N R

Free-cut

E32-DC200 R25
E32-D11R R

Free-cut

E32-D211 R10
E32-D211R R

Free-cut

E32-DC200E R10
E32-D21R R

Free-cut

E32-D12 R25
E32-D12R R

Free-cut

E32-D22 R10
E32-D22R R

Free-cut

E32-D15X R25
E32-D15XR R

Free-cut

Note: Mounting screws (countersunk screw M2 × 8 2 pcs) included

E32-D25X R10
E32-D25XR R

Free-cut

Note: Mounting screws (countersunk screw M2 × 8 2 pcs) included

E32-DC200B R25
E32-DC200B4 R25
E32-DC200BR R
E32-DC200B4B R

Free-cut

E32-DC200F R10
E32-DC200F4 R10
E32-DC200FR R
E32-DC200F4R R

Free-cut

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard
(Free-cut) Cutting free (Cutter provided)

E32-D14L (R25)
E32-D14LR Ⓡ

(Free-cut)

E32-D24 (R10)
E32-D24R Ⓡ

(Free-cut)

E32-D15Y (R25)
E32-D15YR Ⓡ

(Free-cut)

Note: Mounting screws (countersunk screw M2 × 8 2 pcs) included

E32-D25Y (R10)
E32-D25YR Ⓡ

(Free-cut)

Note: Mounting screws (countersunk screw M2 × 8 2 pcs) included

E32-D15Z (R25)
E32-D15ZR Ⓡ

(Free-cut)

Note: Mounting screws (countersunk screw M2 × 8 2 pcs) included

E32-D25Z (R10)
E32-D25ZR Ⓡ

(Free-cut)

Note: Mounting screws (countersunk screw M2 × 8 2 pcs) included

Mounting hole dimensions (recommended)

<Screw-mounting Model>

(Unit:mm)

Outer diameter of fiber unit	M3	M4	M6	M14
F dimensions	$3^{+0.5}_{0}$ dia.	$4^{+0.5}_{0}$ dia.	$6^{+0.5}_{0}$ dia.	14^{+1}_{0} dia.

Example: Head size of E32-TC200 is M4. Open the mounting holes with 4 to 4.5 dia.

<Cylindrical Model>

(Unit:mm)

Outer diameter of fiber unit	1 dia.	1.5 dia.	2 dia.	3 dia.
F dimensions	$1.2^{+0.2}_{0}$ dia.	$1.7^{+0.2}_{0}$ dia.	$2.2^{+0.2}_{0}$ dia.	$3.2^{+0.2}_{0}$ dia.
Outer diameter of fiber unit	3.5 dia.	4 dia.	5 dia.	6 dia.
F dimensions	$4^{+0.5}_{0}$ dia.	$4.5^{+0.5}_{0}$ dia.	$5.5^{+0.5}_{0}$ dia.	$6.5^{+0.5}_{0}$ dia.

Example: Head size of E32-T22 is 2 dia.. Open the mounting holes with 2.2 to 2.4 dia.

Minimum bending radius

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard

(Unit:mm)

Type	A Minimum bending radius	B unbendable
Ⓡ (except E32-C11N, E32-C31N and E32-CC200)	1	0
Ⓡ (E32-C11N, E32-C31N, E32-CC200R)	4	0
Ⓑ Ⓤ (R4)	4	10
(R10)	10	10
(R25)	25	10
(R30)	30	10
(R35)	35	10
(R40)	40	10

Fiber Units with Reflective Sensors

Standard Models Break-resistant/Coated Models

R Flexible B Break-resistant U Fluororesin coating R□ Standard
Free-cut Cutting free (Cutter provided)

E32-D11 B
E32-D11U U

Free-cut

E32-D21B B

Free-cut

E32-D21 B

Free-cut

E32-D221B B

Free-cut

E32-D22B B

*The Attachment is attached with adhesive and cannot be removed.

E32-D15XB B

Free-cut

Note: Mounting screws (countersunk screw M2 × 8 2 pcs) included

E32-D25XB B

Free-cut

Note: Mounting screws (countersunk screw M2 × 8 2 pcs) included

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard
(Free-cut) Cutting free (Cutter provided)

Special-beam Models Long-distance/High-power Models

E32-D16 Ⓑ (Free-cut)

E32-D11L (R25) (Free-cut)

E32-D21L (R10) (Free-cut)

E32-D22L (R10) (Free-cut)

Special-beam Models Ultracompact/Thin-sleeve Models

E32-D33 (R4) (Free-cut)

E32-D331 (R4)

*The Attachment is attached with adhesive and cannot be removed.

Mounting hole dimensions (recommended)

<Screw-mounting Model> (Unit:mm)

Outer diameter of fiber unit	M3	M4	M6	M14
F dimensions	$3^{+0.5}_{0}$ dia.	$4^{+0.5}_{0}$ dia.	$6^{+0.5}_{0}$ dia.	14^{+1}_{0} dia.

Example: Head size of E32-TC200 is M4. Open the mounting holes with 4 to 4.5 dia.

<Cylindrical Model> (Unit:mm)

Outer diameter of fiber unit	1 dia.	1.5 dia.	2 dia.	3 dia.
F dimensions	$1.2^{+0.2}_{0}$ dia.	$1.7^{+0.2}_{0}$ dia.	$2.2^{+0.2}_{0}$ dia.	$3.2^{+0.2}_{0}$ dia.
Outer diameter of fiber unit	3.5 dia.	4 dia.	5 dia.	6 dia.
F dimensions	$4^{+0.5}_{0}$ dia.	$4.5^{+0.5}_{0}$ dia.	$5.5^{+0.5}_{0}$ dia.	$6.5^{+0.5}_{0}$ dia.

Example: Head size of E32-T22 is 2 dia.. Open the mounting holes with 2.2 to 2.4 dia.

Minimum bending radius

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard

(Unit:mm)

Type	A Minimum bending radius	B unbendable
Ⓡ (except E32-C11N, E32-C31N and E32-CC200)	1	0
Ⓡ (E32-C11N, E32-C31N, E32-CC200R)	4	0
Ⓑ Ⓤ (R4)	4	10
(R10)	10	10
(R25)	25	10
(R30)	30	10
(R35)	35	10
(R40)	40	10

Fiber Units with Reflective Sensors

Special-beam Models Coaxial/Small-spot Models

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard
(Free-cut) Cutting free (Cutter provided)

E32-C11N Ⓡ (Free-cut)

E32-C31N Ⓡ (Free-cut)

Note: The Emitter fiber is shown with a white line.
M3 nuts (brass/nickel plating)
Washer (brass/nickel plating) included (2 of each)

E32-CC200 (R25) / E32-CC200R Ⓡ (Free-cut)

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

E32-D32L (R25) (Free-cut)

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

E32-C31 (R25) (Free-cut)

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

E32-D32 (R25) (Free-cut)

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

E32-C41 (R25)

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

E32-C42 (R25)

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

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard
(Free-cut) Cutting free (Cutter provided)

Special-beam Models Area-sensing Models

E32-D36P1 Ⓑ

(Free-cut)

Special-beam Models Retroreflective Fiber Units

E32-R21 (R10)

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

(Free-cut)

E32-R16 (R25)

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

(Free-cut)

Mounting hole dimensions (recommended)

<Screw-mounting Model> (Unit:mm)

Outer diameter of fiber unit	M3	M4	M6	M14
F dimensions	$3^{+0.5}_{0}$ dia.	$4^{+0.5}_{0}$ dia.	$6^{+0.5}_{0}$ dia.	14^{+1}_{0} dia.

Example: Head size of E32-TC200 is M4. Open the mounting holes with 4 to 4.5 dia.

<Cylindrical Model> (Unit:mm)

Outer diameter of fiber unit	1 dia.	1.5 dia.	2 dia.	3 dia.
F dimensions	$1.2^{+0.2}_{0}$ dia.	$1.7^{+0.2}_{0}$ dia.	$2.2^{+0.2}_{0}$ dia.	$3.2^{+0.2}_{0}$ dia.
Outer diameter of fiber unit	3.5 dia.	4 dia.	5 dia.	6 dia.
F dimensions	$4^{+0.5}_{0}$ dia.	$4.5^{+0.5}_{0}$ dia.	$5.5^{+0.5}_{0}$ dia.	$6.5^{+0.5}_{0}$ dia.

Example: Head size of E32-T22 is 2 dia.. Open the mounting holes with 2.2 to 2.4 dia.

Minimum bending radius

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard

(Unit:mm)

Type	A Minimum bending radius	B unbendable
Ⓡ (except E32-C11N, E32-C31N and E32-CC200)	1	0
Ⓡ (E32-C11N, E32-C31N, E32-CC200R)	4	0
Ⓑ Ⓤ (R4)	4	10
(R10)	10	10
(R25)	25	10
(R30)	30	10
(R35)	35	10
(R40)	40	10

Fiber Units with Reflective Sensors

Special-beam Models Convergent-reflective Models

R Flexible B Break-resistant U Fluororesin coating R□ Standard
Free-cut Cutting free (Cutter provided)

E32-L24S (R10)

Free-cut

E32-L16-N (R25)

Free-cut

E32-L24L (R10)

Free-cut

E32-L25L (R10)

Free-cut

E32-L25 (R25)

Free-cut

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

E32-L25A (R25)

Free-cut

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

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard
(Free-cut) Cutting free (Cutter provided)

Special-beam Models Convergent-reflective Models

E32-L86 (R25)

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

E32-L64 (R25)

Note: The maximum allowable temperatures are 300°C for section A and 110°C for section B (section inserted into the Amplifier Unit).

Mounting holes

E32-A10 (R25)

Mounting holes

Mounting hole dimensions (recommended)

<Screw-mounting Model> (Unit:mm)

Outer diameter of fiber unit	M3	M4	M6	M14
F dimensions	$3^{+0.5}_{0}$ dia.	$4^{+0.5}_{0}$ dia.	$6^{+0.5}_{0}$ dia.	14^{+1}_{0} dia.

Example: Head size of E32-TC200 is M4. Open the mounting holes with 4 to 4.5 dia.

<Cylindrical Model> (Unit:mm)

Outer diameter of fiber unit	1 dia.	1.5 dia.	2 dia.	3 dia.
F dimensions	$1.2^{+0.2}_{0}$ dia.	$1.7^{+0.2}_{0}$ dia.	$2.2^{+0.2}_{0}$ dia.	$3.2^{+0.2}_{0}$ dia.
Outer diameter of fiber unit	3.5 dia.	4 dia.	5 dia.	6 dia.
F dimensions	$4^{+0.5}_{0}$ dia.	$4.5^{+0.5}_{0}$ dia.	$5.5^{+0.5}_{0}$ dia.	$6.5^{+0.5}_{0}$ dia.

Example: Head size of E32-T22 is 2 dia.. Open the mounting holes with 2.2 to 2.4 dia.

Minimum bending radius

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard

(Unit:mm)

Type	A Minimum bending radius	B unbendable
Ⓡ (except E32-C11N, E32-C31N and E32-CC200)	1	0
Ⓡ (E32-C11N, E32-C31N, E32-CC200R)	4	0
Ⓑ Ⓤ (R4)	4	10
(R10)	10	10
(R25)	25	10
(R30)	30	10
(R35)	35	10
(R40)	40	10

Fiber Units with Reflective Sensors

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard
(Free-cut) Cutting free (Cutter provided)

Environment-resistant Models Heat-resistant Models

E32-D51 (R35) (Free-cut)

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

E32-D81R-S (R10)
E32-D81R (R10)

Using the E32-D81R-S

Using the E32-D81R

Note 1. 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 *), however, must stay within the Amplifier Unit's operating temperature range.
2. Order the Fiber Unit based on the Amplifier Unit. Use the E32-D81R-S if the E3X-DA□-S, E3X-MDA□, or E3X-DAC□-S is used. Use the E32-D81R if any other Amplifier is used.

E32-D61-S (R25)
E32-D61 (R25)

Using the E32-D61-S

Using the E32-D61

Note 1. The maximum allowable temperatures for sections A and B are 350°C and 110°C, respectively. The section inserted into the Amplifier Unit (indicated by *1), however, must stay within the Amplifier Unit's operating temperature range.
2. Order the Fiber Unit based on the Amplifier Unit. Use the E32-D61-S if the E3X-DA□-S, E3X-MDA□, or E3X-DAC□-S is used. Use the E32-D61 if any other Amplifier is used.

*2. The diameter is 6 dia. if the fiber length exceeds 10 m.
*3. The diameter is 10 if the fiber length exceeds 10 m.

E32-D73-S (R25)
E32-D73 (R25)

Using the E32-D73-S

Using the E32-D73

Note 1. 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 *), however, must stay within the Amplifier Unit's operating temperature range.
2. Order the Fiber Unit based on the Amplifier Unit. Use the E32-D□-S if the E3X-DA□-S, E3X-MDA□, or E3XDAC□-S is used. Use the E32-D□ if any other Amplifier is used.

Environment-resistant Models Chemical-resistant Models

E32-D12F (R40) (Free-cut)

E32-D14F (R40) (Free-cut)

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard
(Free-cut) Cutting free (Cutter provided)

Application-corresponding Fiber Units

Label-detection Models

E32-G14 (R25) (Free-cut)

Liquid-level Detection Models

E32-D36T (R4) (Free-cut)

E32-L25T (R10) (Free-cut)

Mounting hole dimensions (recommended)

<Screw-mounting Model> (Unit:mm)

Outer diameter of fiber unit	M3	M4	M6	M14
F dimensions	$3^{+0.5}_{0}$ dia.	$4^{+0.5}_{0}$ dia.	$6^{+0.5}_{0}$ dia.	14^{+1}_{0} dia.

Example: Head size of E32-TC200 is M4. Open the mounting holes with 4 to 4.5 dia.

<Cylindrical Model> (Unit:mm)

Outer diameter of fiber unit	1 dia.	1.5 dia.	2 dia.	3 dia.
F dimensions	$1.2^{+0.2}_{0}$ dia.	$1.7^{+0.2}_{0}$ dia.	$2.2^{+0.2}_{0}$ dia.	$3.2^{+0.2}_{0}$ dia.
Outer diameter of fiber unit	3.5 dia.	4 dia.	5 dia.	6 dia.
F dimensions	$4^{+0.5}_{0}$ dia.	$4.5^{+0.5}_{0}$ dia.	$5.5^{+0.5}_{0}$ dia.	$6.5^{+0.5}_{0}$ dia.

Example: Head size of E32-T22 is 2 dia.. Open the mounting holes with 2.2 to 2.4 dia.

Minimum bending radius

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard

(Unit:mm)

Type	A Minimum bending radius	B unbendable
Ⓡ (except E32-C11N, E32-C31N and E32-CC200)	1	0
Ⓡ (E32-C11N, E32-C31N, E32-CC200R)	4	0
Ⓑ Ⓤ (R4)	4	10
(R10)	10	10
(R25)	25	10
(R30)	30	10
(R35)	35	10
(R40)	40	10

Fiber Units with Reflective Sensors

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard
(Free-cut) Cutting free (Cutter provided)

Application-corresponding Fiber Units

Liquid-level Detection Models

E32-A01 (R4) (Free-cut)

E32-A02 (R4) (Free-cut)

E32-D82F1 (R40)
E32-D82F2 (R40)

Note: The maximum allowable temperatures for sections A and B are 200°C and 85°C, respectively.

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

Models for Glass-substrate Alignment/Mapping

E32-A08 (R25)
E32-A07E1 (R25)
E32-A07E2 (R25)
(Free-cut)

*1 The E32-A07E1/E32-A07E2 has a reception fiber and an emission fiber. Use the fiber with a model display tube (fiber with blue dotted line) as light emitting side.
*2 E32-A08 : Countersinks on one side
E32-A07E1/E32-A07E2 : Countersinks on both sides

E32-L66 (R25)

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

E32-A08H2 (R25)

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

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard
(Free-cut) Cutting free (Cutter provided)

E32-A09 (R25)
E32-A09H (R35)

(Free-cut)

E32-A09H2 (R25)

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 *), 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 (R10)

(Free-cut)

Note 1. Use the stamped surface and its opposing surface as installation (reference) surfaces.
2. Set of two symmetrical parts.

E32-A04 (R10)

(Free-cut)

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

E32-A04-1 (R10)

(Free-cut)

Note: Set of two symmetrical parts.

Mounting hole dimensions (recommended)

<Screw-mounting Model> (Unit:mm)

Outer diameter of fiber unit	M3	M4	M6	M14
F dimensions	$3^{+0.5}_{0}$ dia.	$4^{+0.5}_{0}$ dia.	$6^{+0.5}_{0}$ dia.	14^{+1}_{0} dia.

Example: Head size of E32-TC200 is M4. Open the mounting holes with 4 to 4.5 dia.

<Cylindrical Model> (Unit:mm)

Outer diameter of fiber unit	1 dia.	1.5 dia.	2 dia.	3 dia.
F dimensions	$1.2^{+0.2}_{0}$ dia.	$1.7^{+0.2}_{0}$ dia.	$2.2^{+0.2}_{0}$ dia.	$3.2^{+0.2}_{0}$ dia.
Outer diameter of fiber unit	3.5 dia.	4 dia.	5 dia.	6 dia.
F dimensions	$4^{+0.5}_{0}$ dia.	$4.5^{+0.5}_{0}$ dia.	$5.5^{+0.5}_{0}$ dia.	$6.5^{+0.5}_{0}$ dia.

Example: Head size of E32-T22 is 2 dia.. Open the mounting holes with 2.2 to 2.4 dia.

Minimum bending radius

Ⓡ Flexible Ⓑ Break-resistant Ⓤ Fluororesin coating (R□) Standard

(Unit:mm)

Type	A Minimum bending radius	B unbendable
Ⓡ (except E32-C11N, E32-C31N and E32-CC200)	1	0
Ⓡ (E32-C11N, E32-C31N, E32-CC200R)	4	0
Ⓑ Ⓤ (R4)	4	10
(R10)	10	10
(R25)	25	10
(R30)	30	10
(R35)	35	10
(R40)	40	10

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.

Protective Spiral Tubes

E39-F32A/F32A5
E39-F32B/F32B5

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

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

E39-F32D/F32D5

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

Accessories

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

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

Mounting Bracket
E39-L83

Safety Precautions

Refer to *Warranty and Limitations of Liability*.

⚠ WARNING

This product is not designed or rated for ensuring safety of persons either directly or indirectly.
Do not use it for such purposes.

Precautions for Correct Use

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

Fiber Units

● Mounting

Tightening Force

The tightening force used to mount the Fiber Unit must not be more than the value given in Ratings/Characteristics.

Screw-mounting Model

Cylindrical Model

Chemical-resistive Models

The following method is recommended to prevent the fluororesin case from cracking when the Sensor is being secured. Be especially careful not to crack the case when using screws to secure the Sensor.

Fiber Cutting Procedure

Cut a thin fiber as follows:

(1)	The fiber is shipped loosely tightened as shown in the figure at the right.	
(2)	Adjust the fiber to the desired length and then tighten it securely.	
(3)	Insert the fiber to be cut into the E39-F4.	
(4)	Finished state (proper cutting state)	Note: Insert the fiber into the amplifier the direction indicated by the arrow.

Connection

- Do not excessively pull or press the Fiber Unit. Use a pulling force no higher than what is given in *Ratings/Characteristics*.
- 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).

- Do not apply excess force on the Fiber Units.

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.

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.

E32-A07E1(E2)

There is a difference in sensing object angle between E32-A07E1 and E32-A07E2. Select a model in accordance with the bending direction of a sensing object. Use the fiber with a model display tube as light emitting side.

● Adjustment

E32-G14

When a Digital Fiber Amplifier is used, the sensing distance is short, making the incident light intensity large. This makes it impossible to teach 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(-S), E32-D61(-S), and E32-D73(-S))

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□

Chemical-resistant Fiber and Liquid Level (E32-D82F)

Fluororesin has high chemical resistance. However, applications in the atmosphere of vaporized chemicals (gases) or steam may cause malfunction or damage inside sensors. Run a full check before using in such environments.

■ 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.
1. Insert the Fiber Unit into the retention clip.
2. Insert the retention clip into the splice.

- 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.

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