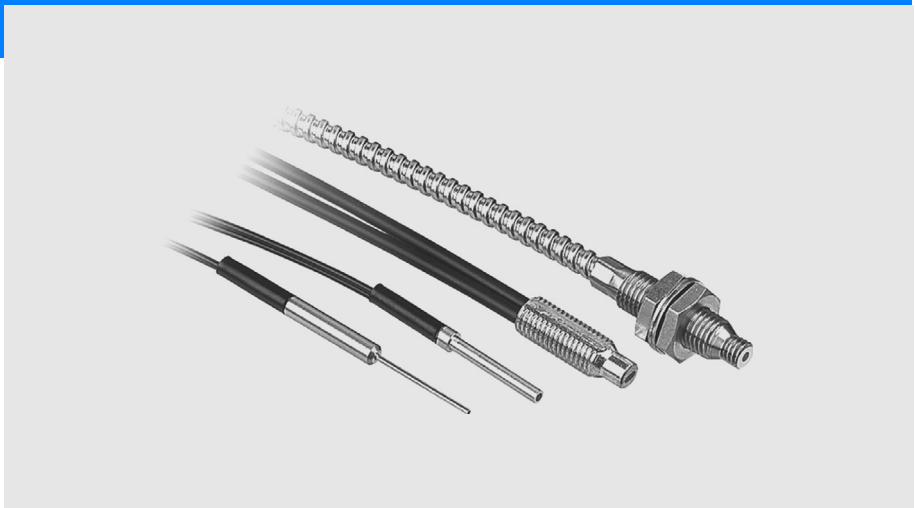
Standard fiber unit

E32

The fiber optic - E32 series provides for each sensing problem the optimum solution



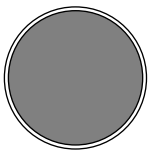
Omron offers with the E32-fiber optics series a huge range of fiber optic sensors for all automation tasks, whether it's for basic object detection, positioning, color analysis or high accuracy sensing.
Omrons takes a leading part in fiber technology with a long time experience in producing
fiber optic solutions for all kind of industry.

Everything from head size, sensing distance, mounting, beam size up to special heat - and chemical resistant materials can be chosen in order to best suit your application.
The E32 series provides for each sensing problem the optimum solution
On top of it, Omron provide customised fiber solutions based on your demand and specification, made in Germany.

Variation of fiber optics

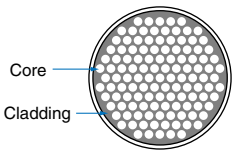
Flexible fiber models are indicated by an "R" at the end of the model number.

Flexible fiber contains multiple cores. These cores are all surrounded by cladding, giving a minimum bending radius of 1 mm. The fiber can be bent at right angles without affecting the light intensity. Handle it just like any other cable.



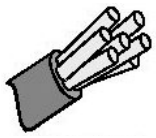
Conventional Fiber

Conventional fiber uses just one core and one cladding section. Bending the fiber may break it or reduce the light intensity.



Flexible Fiber

Flexible fiber contains multiple independent cores all surrounded by cladding. The fiber can be bent without breaking or reducing the light intensity.



Fiber for robot application

Individual cores in one bundle, Surrounded by cladding, Strong against repeatable bending.
Bending radius 4 mm

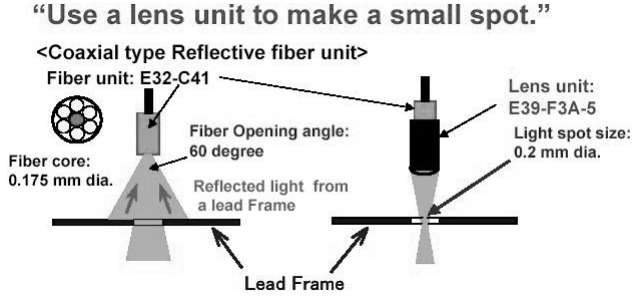
Coaxial fibers

The accuracy of coaxial fibers is very high, due to the special orientation of transmitter- and receiver fibers.
With the special lens unit, the spot beam can be reduced to min. 0,1 mm.

E32-EC31

E32-EC41

Coaxial fibers and lens unit (small spot)



Beam Spot variable type E39-F3A

Beam spot can be changed from 0.1 to 1 mm dia., applicable to various size of sensing objects.

Applicable fiber unit:

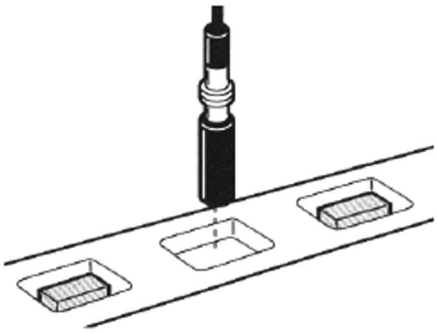
Beam spot 0.5 to 1 mm: E32-D32

Beam spot 0.1 to 0.6 mm: E32-C42

Long distance & Minute spot E39-F3B

Achieving 0.2 mm dia. spot & 15 mm sensing distance.

Detection of chips on embossed tape.



Applicable fiber unit:

E32-EC31

E32-EC41

Minute beam spot E39-F3A-5

Achieving 0.1 mm dia. spot & 7 mm sensing distance. Optimum solution for downsizing of electronic parts.

Detection of front or back of "0603" chips.

Applicable fiber unit:

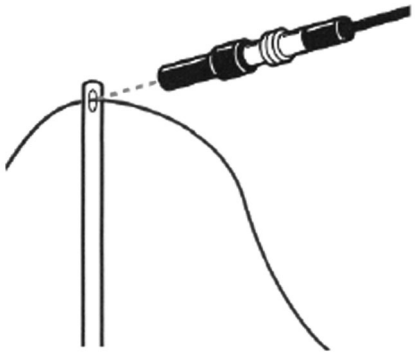
E32-EC31

E32-EC41

Long distance type E39-F3C

Achieving 0.2 mm dia. spot & 20 mm sensing distance.

Detection of yarn for industrial sewing machine.

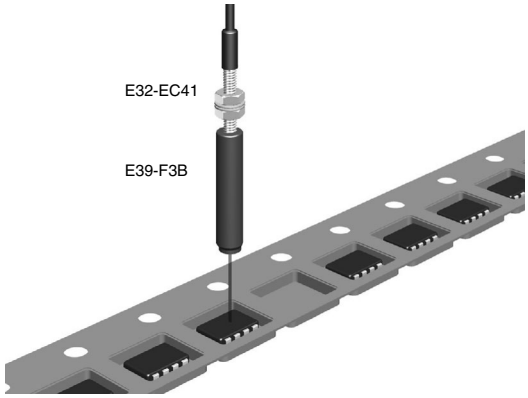


Applicable fiber unit:

E32-EC31

E32-EC41

Detection missing chips on embossed tape. Adding a lens unit to a fiber sensor permits the detection of very small workpieces at a detection distance of 17 mm with a 0.2 mm diameter spot.



E32-EC41 Fiber Unit

E39-F3B Lens Unit.

Fibers for Robot application (Strong against repeatable bending)

Omron offers special fibers with independent cores in one bundle.

This fibers are very strong against repeatable bending and suitable for moving- and robot applications.

Moving-piece-mounting Fiber Unit E32-D11/D21

Detecting workpiece by robot hand

An allowable bending radius of 4 mm enables the E32-D11/D21 to withstand repeated bending, making it ideal applicable to moving parts subject to frequent bending

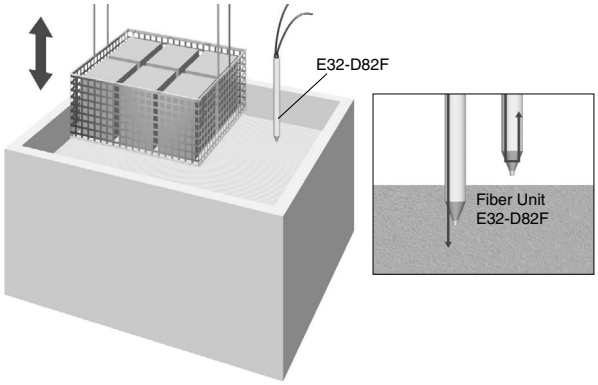
Liquid level detection

Direct contact type E32-D82F

The E32-D82F1 / E32-D82F2 are suitable for high accuracy detection of fluid level detection in tanks. The principle is based on the change of the refractive index when the sensor touches the medium. The fiber head is Teflon®[1] covered and therefore chemical resist and can be used for high temperature up to 200°C.

Level detection in heated chemicals

The fiber unit uses Teflon®[1] so that chemical levels can be precisely and directly detected in cleaning tanks or chemical processing tanks.

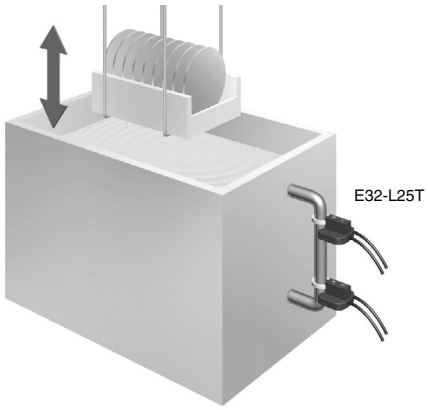


Tube mounting E32-L25T

Omron offers a variation of different level detection sensors. Depending on the mounting situation the applicable tube can be from 3,2 to 10mm dia. For special purpose the fiber material is Teflon®[1] covered and therefore chemical resist.

Chemical level detection with pipe mounting

A minimum level difference of 4 mm can be detected in stages to control resist liquid levels.

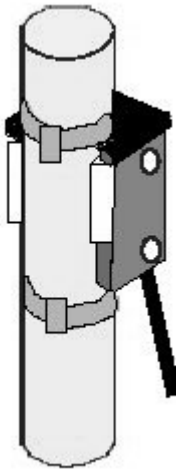


E32-D36F

The wide sensing area provide a stable liquid detection without influence of bubbles.

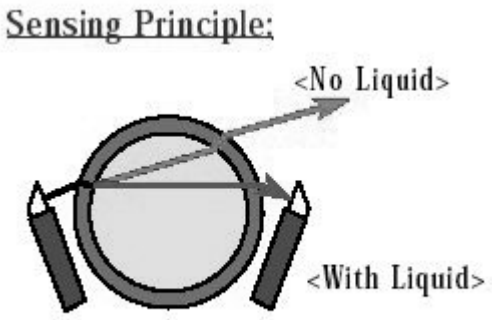
[1] Teflon is a registered trademark of DuPont Company and Mitsui DuPont Chemical Company for their fluriode resin

Due to the special sensing head there is no limitation to tube diameter, (thickness of tube max. 1,6 mm, bending radius 4 mm).



Product Features:

- Omron original optical design using prism to provide a great signal noise ratio. The wide area sensing method (11mm) is nearly not influenced by bubbles or water drops in a tube.
- E32-A1 has a fail-safe function output an faulty signal, which is the same as " No Liquid" signal when the fiber unit is accidentally broken or released from the fiber amplifier unit.
- Dark red resist liquid can stably be detected by a high power amplifier unit of E3X-DA-N which has an LED auto power control circuit.
- Fluorine resin coated, bundle type fiber cable (bending radius: 4 mm) can be cut freely.

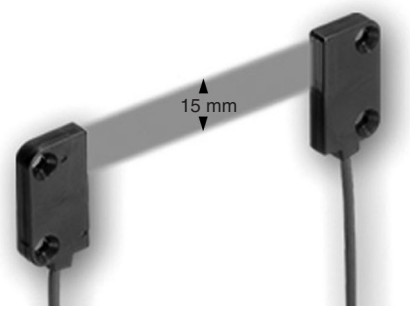


Area Type

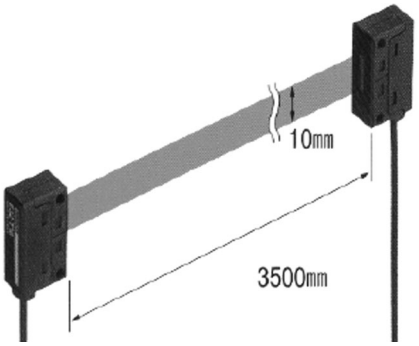
Omron offers a variation of area sensing fibers from 10 mm area up to 30 mm area. Due to the area the sensor can easily detect parts somewhere on a conveyer even when the parts are not very good guided.

Standard screen E32-T16P/-T16

E32-T16P standard screen fiber sensor, providing 11 mm width of area detection.



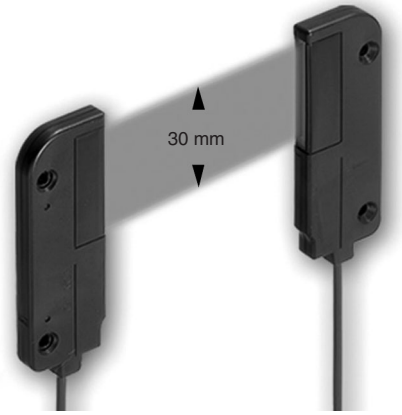
E32-T16 long distance screen sensor, providing 11 mm width & 3,500 mm max. distance of area detection.



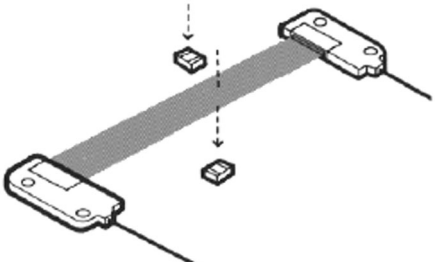
Wide Screen E32-T16WR

Widest screen in the industry

By the 30 mm wide optical screen, provide wide area detection.



Applicable to parts feeder for various size of parts.

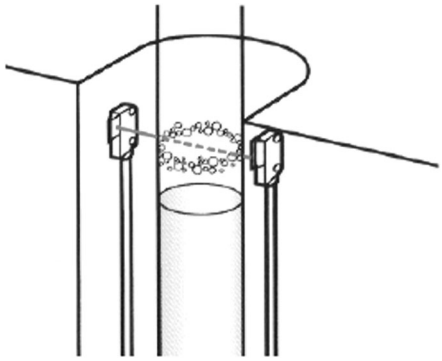


Side-view E32-T16J

First in the industry

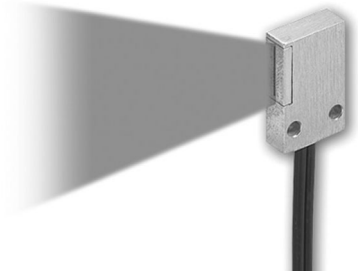
By the adoption of prism, achieved side-view screen reflective sensor. Optimum for mounting to limited space.

Detection of liquid level throug transparent tube.

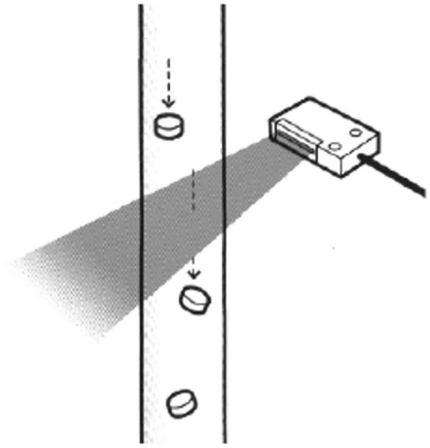


Screen reflective E32-D36P1

Screen reflective sensor provide wide area detection and space saving mounting.



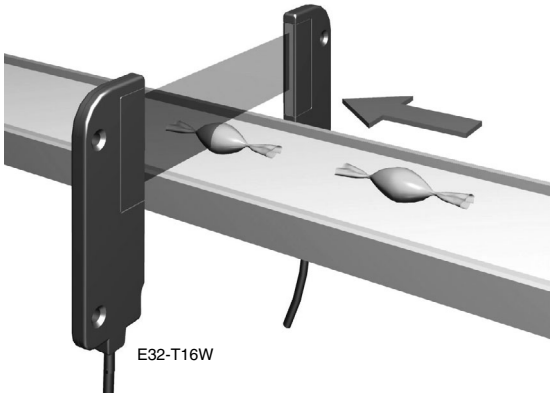
Detection of pills through transparent tube.



Area detecting fiber unit E32-T16W

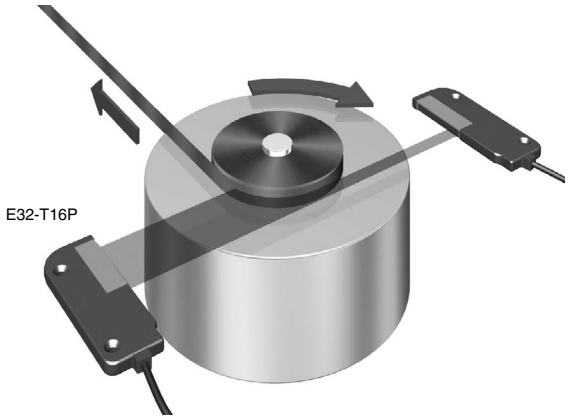
Detecting the front edge location of candies

Area detection using a screen fiber enables positioning of even irregularly shaped objects.



Area detecting fiber unit E32-T16P

Inspection of tape remaining in tape take-up application



Chemical resistant

Due to the Teflon®[1] covered sensor head and fiber, the sensor is resist against oil and chemicals. Also the combination of chemical- and temperature resistant for 200 °C is available.

Overview of chemical and temperature resistant fibers:

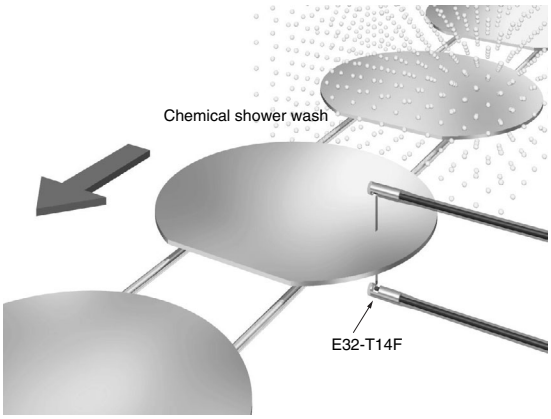
Temperature	Through Beam Type	Reflection Type
-40 °C to 200 °C	E32-T81F-S	
-30 °C to 70 °C	E32-T11F E32-T12F E32-T14F	E32-D12F

1 Teflon is a registered trademark of DuPont Company and Mitsui DuPont Chemical Company for their fluriode resin

Teflon®[1] side-view fiber unit E32-T14F

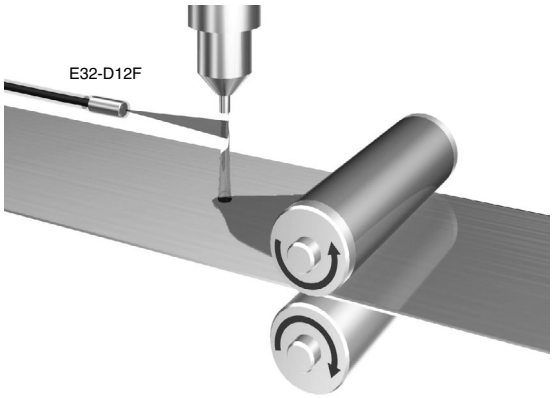
Detection on narrow lines for chemical washing

Teflon®[1] side view fiber units are ideal for applications requiring resistance to chemicals when the sensor can be installed on a narrow line.



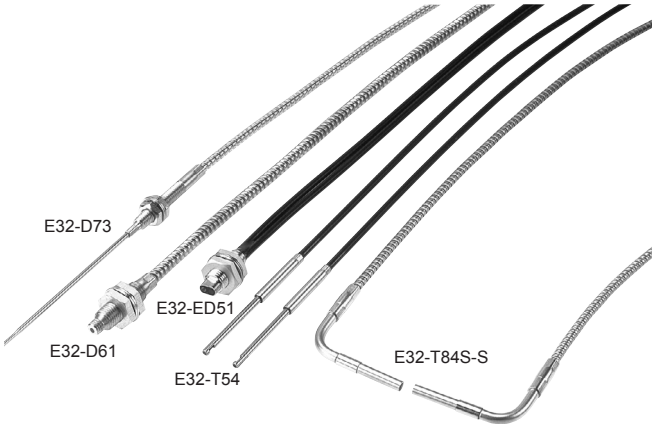
Chemical-resistant fiber unit E32-D12F

The E32-D12F can detect light reflected from oil drops. The Teflon®[1] fiber can also be safely used in an environment where oil is likely to be spattered.



Heat resistant fibers

Omron offers a huge variation of heat resistant fibers, beginning from 150 °C, Teflon®[1] covered and for extreme temperature resist up to 400 °C. For strong mechanical strength there are special fibers with stainless steel spiral tubes available.



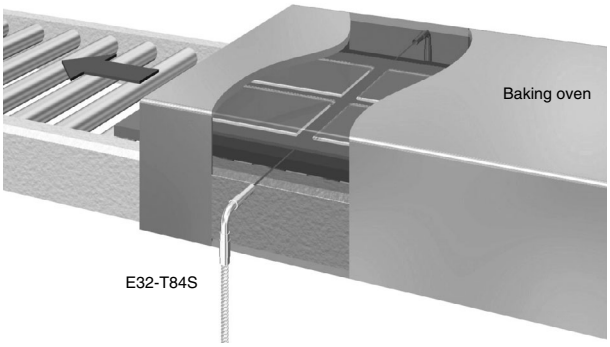
Overview of heat resistant fibers:

Temperature	Trough Beam Type	Reflection Type
150 °C	E32-T54	E32-ED51
	E32-ET51	
200 °C	E32-T84S-S	E32-D81R-S
	E32-T81R-S	E32-D81R
300 °C		E32-D61
350 °C	E32-T61-S	E32-D61-S
400 °C		E32-D73
		E32-D73-S

Heat-resistant, narrow beam fiber unit E32-T84S

Detecting glass substrates in baking ovens

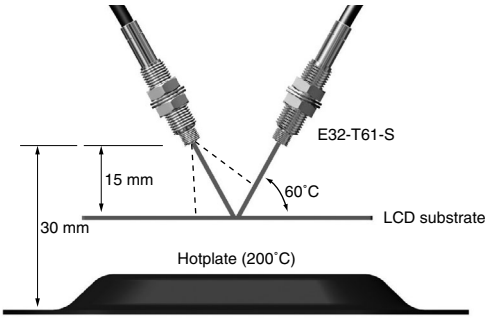
An L-shaped side-view sensor requiring little space and providing 200 °C heat resistance is used. The detection distance of 1,300 mm (for E3X-DA-N standard mode) is more then sufficient to detect even large glass substrates.



Heat-resistant fiber unit E32-T61-S

Detecting liquid crystal substrates in ovens

Regular reflective light from the LCD substrates is received with a fiber to detect the presence or absence of the substrates. The large spot ensures stable detection of substrates even if positioning is not completely consistent.



1 Teflon is a registered trademark of DuPont Company and Mitsui DuPont Chemical Company for their fluriode resin

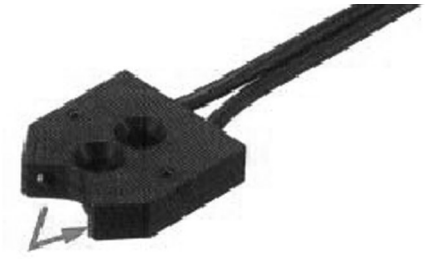
Limited reflective

Minute difference of displacement E32-L25L

Sensing distance: 7.2 ± 1.8 mm

Minute difference of displacement E32-L25/-L25A

Sensing distance: 3.3 mm

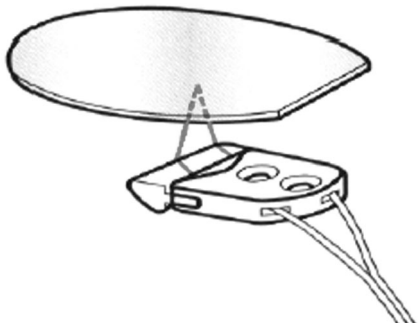


Minute difference & Side-view E32-L24L

With special optical lens

Sensing distance: 4 ± 2 mm

Detection of wafer



E32-L24S

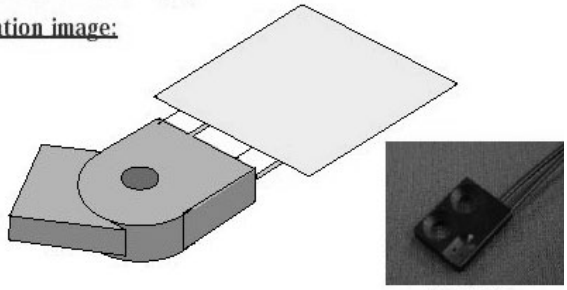
Special optical design provides stable sensing

Sensing distance 0-4 mm

Convergent reflective fiber with a thin and compact housing.

Stable sensing even inclined glass

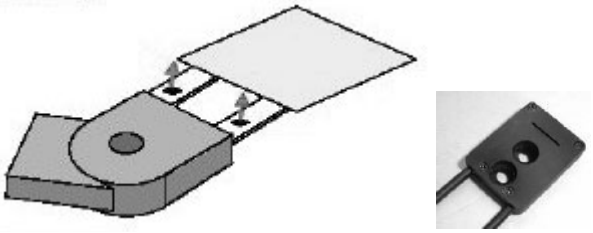
Application image:



E32-L24S

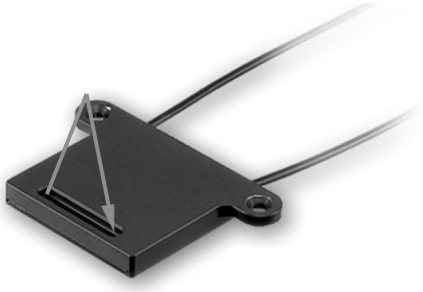
LCD edge positioning sensor E32-L16

- E32L-16 can make super accurate positioning for an LCD glass sheet on a roboter hand
- E32-L16 can stably detect the inclined surface of LCD
- Ultra thin and small body can fit into robot hand.

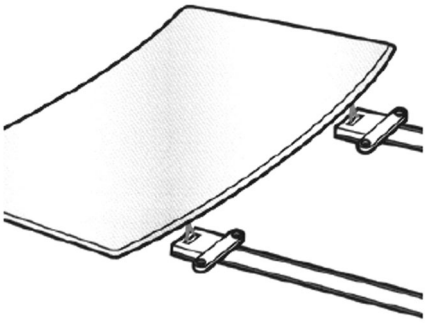


Heat-resistive & precise positioning

For precise positioning at the sensing range of 4 mm to 12 mm under high temperature environment.



Positioning of LCD (E32-L56E1/-L56E2)



Mapping sensors

With the narrow beam fibers of E32-A03 and E32-A04 Omron offers very successful fiber mapping sensors, with an opening angle of 1,5 for E32-A03 to 3 ° for E32-A04.

Depending on the amplifier mode the sensing distance can be set up from 500 to 1.100 mm.

Mapping fiber units E32-A03/-A04

Mapping wafers with a through-beam side-view sensor

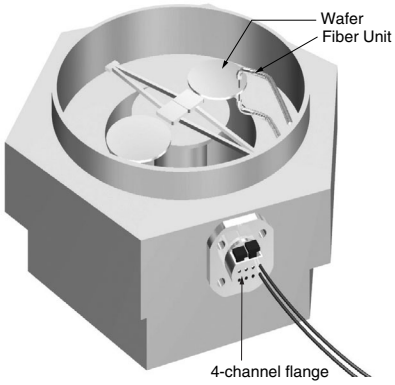
The narrow beam permits the detection of single wafers, even of wafers with mirror surfaces.

Vacuum resist sensors

Vacuum sensors E32-V

Detecting wafers in a vacuum conveyance system

The E32-V provides an easy-connecting fiber and easy-to-use 4-channel flange system, making it ideally applicable to vacuum systems.

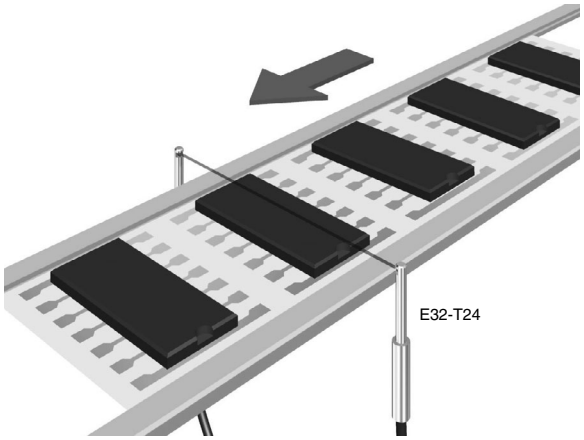


Side-view sensors

Thin side-view fiber unit E32-T24

Detecting rises in lead frames

Easy detection even in tight spaces, is possible with no sleeve bending.

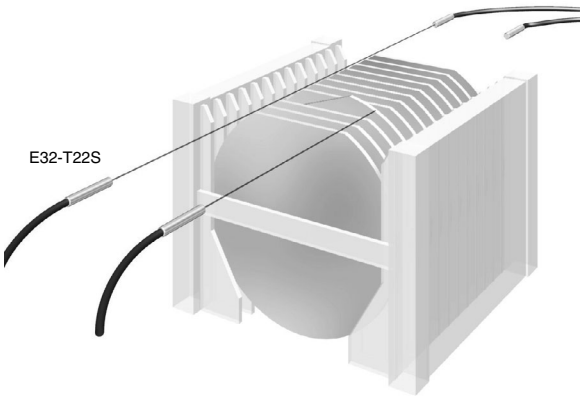


High precision

Narrow-view fiber unit E32-T22S

Checking orientation flat directions with a fiber unit

High-precision detection is possible using a narrow-view beam.

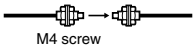


Sensing Distance

General purpose

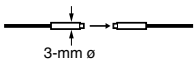
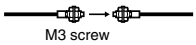
Throughbeam fiber units

High resolution mode
Super long-distance mode
Green light
Red light
Standard mode
Super high-speed mode
Infrared ray

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm) *1 (Parentheses: With E39-F1 Lens Unit)	Standard object (min. sensing object *2) (Parentheses: Opaque object)	Model	Permissible bending radius
M4 Free-cut		E3X-DA□-S	1,000 (4,000)*3 760 (4,000)*3 200 (1,500)	1.0 mm ø (0.005 mm ø)	E32-TC200	25 mm
		E3X-DAG□-S E3X-DAB□-S	100 (700) 75 (550) 45 (350)			
		E3X-DA□-N	950 (4,000)*3 760 (4,000)*3 280 (2,100)	1 mm ø (0.01 mm ø)		
		E3X-DAB #-N	100 (700) 75 (550) 45 (350)			
		E3X-DAH□-N	250 200 70			
		E3X-MDA	650 (4,000)*3 500 (3,700) 200 (1,500)	1.0 mm ø (0.005 mm ø)		
		E3X-NA□(V)	400 (3,000)	1.0 mm ø (0.03 mm ø)		
		E3X-NAG□	75 (550)			
		E3X-NA□F	120 (900)	1.0 mm ø (0.2 mm ø)		
M4 Free-cut		E3X-DA□-S	700 (4,000)*3 530 (3,700) 140 (970)	1.0 mm ø (0.005 mm ø)	E32-ET11R	1 mm
		E3X-DA□-N	670 (4,000) 530 (3,700)*3 200 (1,400)	1.0 mm ø (0.03 mm ø)		
		E3X-MDA	450 (3,100) 350 (2,400) 140 (970)	1.0 mm ø (0.005 mm ø)		
		E3X-NA□(V)	280 (2,100)	1.0 mm ø (0.03 mm ø)		
		E3X-NAG□	50 (375)			
		E3X-NA□F	80	1.0 mm ø (0.2 mm ø)		

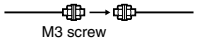
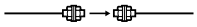
*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.
*3. Longer sensing distance by using the lens unit E39-F1.

High resolution mode / Standard mode
Super long-distance mode / Super high-speed mode
Green light / Red light / Infrared ray

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm) *1 (Parentheses: With E39-F1 Lens Unit)	Standard object (min. sensing object *2) (Parentheses: Opaque object)	Model	Permissible bending radius
M4 Fiber sheat material: fluorine resin Free-cut		E3X-DA□-S	900 (4,000)*2 680 (3,600) 180 (930)	1.0 mm ø (0.005 mm ø)	E32-T11U NEW	4 mm
		E3X-DA#-N	850 (4,000)*3 680 (3,800)*3 250 (1,300)	1.0 mm ø (0.01 mm ø)		
		E3X-MDA	580 (3,000)*3 450 (2,300) 180 (930)	1.0 mm ø (0.005 mm ø)		
		E3X--NA#(V)	360	1.0 mm ø (0.003 mm ø)		
		E3X--NA#F	100	1.0 mm ø (0.02 mm ø)		
3 mm ø Free-cut		E3X-DA□-S	700 530 140	1.0 mm ø (0.005 mm ø)	E32-T12R	1 mm
		E3X-DA□-N	670*3 530 200	1 mm ø (0.01 mm ø)		
		E3X-MDA	450 350 140	1.0 mm ø (0.005 mm ø)		
		E3X-NA□(V)	280	1.0 mm ø (0.03 mm ø)		
		E3X-NAG□	50			
		E3X-NA□F	80	1.0 mm ø (0.2 mm ø)		
M3 Possible to mount the E39-F5 reflective side-view conversion attachment Free-cut		E3X-DA□-S	900 680 180	1.0 mm ø (0.005 mm ø)	E32-TC200A	25 mm
		E3X-DA□-N	850 680 250	1 mm ø (0.01 mm ø)		
		E3X-MDA	580 450 180	1.0 mm ø (0.005 mm ø)		
		E3X-NA□(V)	360	1.0 mm ø (0.03 mm ø)		
		E3X-NAG□	65			
		E3X-NA□F	100	1.0 mm ø (0.2 mm ø)		

*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.
*3. Longer sensing distance by using the lens unit E39-F1.

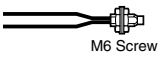
High resolution mode / Standard mode
Super long-distance mode / Super high-speed mode
Green light / Red light / Infrared ray

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm) *1 (Parentheses: With E39-F1 Lens Unit)	Standard object (min. sensing object *2) (Parentheses: Opaque object)	Model	Permissible bending radius
M3 For detecting minute sensing objects Free-cut		E3X-DA□-S	270 220 50	0.5 mm ø (0.005 mm ø)	E32-TC200E	10 mm
		E3X-DAG□-S E3X-DAB□-S	25 20 12			
		E3X-DA□-N	250 220 90	0.5 mm ø (0.01 mm ø)		
		E3X-DAB#-N	25 20 12			
		E3X-MDA	170 130 50	0.5 mm ø (0.005 mm ø)		
		E3X-NA□(V)	100	0.5 mm ø (0.03 mm ø)		
		E3X-NAG□	20			
		E3X-NA□F	30	0.5 mm ø (0.1 mm ø)		
M3 Free-cut		E3X-DA□-S	160 130 30	0.5 mm ø (0.005 mm ø)	E32-ET21R	1 mm
		E3X-DA□-N	150 130 50	0.5 mm ø (0.005 mm ø)		
		E3X-MDA	100 75 45	0.5 mm ø (0.01 mm ø)		
		E3X-NA□(V)	60	0.5 mm ø (0.03 mm ø)		
		E3X-NAG□	12			
		E3X-NA□F	18	0.5 mm ø (0.1 mm ø)		

*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.
*3. Longer sensing distance by using the lens unit E39-F1.

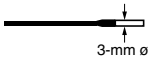
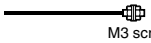
Diffuse reflective fibre units

High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light
Infrared ray

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object (min. sensing object *2) (Parentheses: Opaque object)	Model	Permissible bending radius
M6 Free-cut		E3X-DA□-S	500 300 90	400x400 (0.005 mm ø)	E32-DC200	25 mm
		E3X-DAG□-S E3X-DAB□-S	32 25 16	100x100 (0.1 mm ø)		
		E3X-DA□-N	400 300 100	400x400 (0.01 mm ø)		
		E3X-DAB#-N	32 25 16	100x100 (0.1 mm ø)		
		E3X-DAH□-N	100 75 25	100x100 (0.01 mm ø)		
		E3X-MDA	300 210 90	400x400 (0.005 mm ø)		
		E3X-NA□(V)	150	200x200 (0.01 mm ø)		
		E3X-NAG□	25	50x50 (0.1 mm ø)		
		E3X-NA□F	50	75x75 (0.015 mm ø)		
M6 Free-cut		E3X-DA□-S	300 170 50	300x300 (0.005 mm ø)	E32-D11R	1 mm
		E3X-DA□-N	220 170 80	300x300 (0.01 mm ø)		
		E3X-MDA	300 170 50	300x300 (0.005 mm ø)		
		E3X-NA□(V)	90	150x150 (0.01 mm ø)		
		E3X-NAG□	15	25x25 (0.1 mm ø)		
		E3X-NA□F	30	50x50 (0.02 mm ø)		

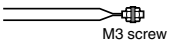
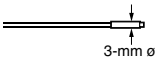
*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.

High resolution mode / Standard mode
Super long-distance mode / Super high-speed mode
Green light / Red light / Infrared ray

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object (min. sensing object *2) (Parentheses: Opaque object)	Model	Permissible bending radius
M6 Fiber sheat material: fluorine resin Free-cut	 M6 screw	E3X-DA□-S	300 170 50	300x300 (0.005 mm ø)	E32-D11U NEW	4 mm
		E3X-DA#-N	220 170 80	300x300 (0.01 mm ø)		
		E3X-MDA	170 120 50	300x300 (0.005 mm ø)		
		E3X--NA#(V)	90	150x150 (0.01 mm ø)		
		E3X--NA#F	30	50x50 (0.0015 mm ø)		
3 mm ø Free-cut	 3-mm ø	E3X-DA□-S	300 170 50	300x300 (0.005 mm ø)	E32-D12R	1 mm
		E3X-DA□-N	220 170 80	300x300 (0.01 mm ø)		
		E3X-MDA	170 120 50	300x300 (0.005 mm ø)		
		E3X-NA□(V)	90	150x150 (0.01 mm ø)		
		E3X-NAG□	15	25x25 (0.1 mm ø)		
		E3X-NA□F	30	50x50 (0.02 mm ø)		
M3 Free-cut	 M3 screw	E3X-DA□-S	130 80 22	100x100 (0.005 mm ø)	E32-DC200E	10 mm
		E3X-DAG□-S E3X-DAB□-S	32 25 16	25x25 (0.2 mm ø)		
		E3X-DA□-N	100 80 30	100x100 (0.01 mm ø)		
		E3X-DAB#-N	8 6 4	25x25 (0.2 mm ø)		
		E3X-MDA	80 55 22	100x100 (0.005 mm ø)		
		E3X-NA□(V)	36	50x50 (0.01 mm ø)		
		E3X-NAG□	6	25x25 (0.1 mm ø)		
		E3X-NA□F	12	25x25 (0.02 mm ø)		

*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.

High resolution mode | Standard mode
Super long-distance mode | Super high-speed mode
Green light | Red light | Infrared ray

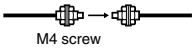
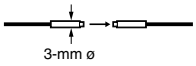
Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1				Standard object (min. sensing object *2) (Parentheses: Opaque object)	Model	Permissible bending radius
M3 (small ø) Free-cut		E3X-DA□-S	□50 ▒30 ▮8				50x50 (0.005 mm ø)	E32-ED21R	1 mm
		E3X-DA□-N	■40 ▒30 ▮10				50x50 (0.01 mm ø)		
		E3X-MDA	□30 ▒22 ▮8				50x50 (0.005 mm ø)		
		E3X-DA□-N	■40 ▒30 ▮10				50x50 (0.01 mm ø)		
		E3X-NA□(V)	▮15				25x25 (0.01 mm ø)		
		E3X-NA□F	▮5				25x25 (0.03 mm ø)		
3 mm ø (small ø) Free-cut		E3X-DA□-S	□50 ▒30 ▮8				50x50 (0.005 mm ø)	E32-D22R	1 mm
		E3X-DA□-N	■40 ▒30 ▮10				50x50 (0.01 mm ø)		
		E3X-MDA	□30 ▒22 ▮8				50x50 (0.005 mm ø)		
		E3X-NA□(V)	▮15				25x25 (0.01 mm ø)		
		E3X-NA□F	▮5				25x25 (0.03 mm ø)		

*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.

Long-distance

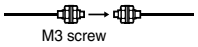
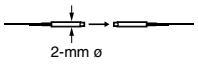
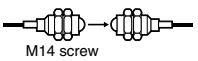
Throughbeam fiber units

High resolution mode
Super long-distance mode
Green light
Red light
Standard mode
Super high-speed mode
Infrared ray

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm) *1 (Parentheses: With E39-F1 Lens Unit)	Standard object (min. sensing object *2) (Parentheses:	Model	Permissible bending radius
M4 Free-cut		E3X-DA□-S	1,700 (4,000)*3 1,330 (3,200) 350 (840)	1.4 mm ø (0.01 mm ø)	E32-T11L	25 mm
		E3X-DAG□-S E3X-DAB□-S	150 120 75			
		E3X-DA□-N	1,660 (4,000) 1,330 (3,200) 490 (1,200)	1.4 mm ø (0.02 mm ø)		
		E3X-DAB#-N	150 120 75			
		E3X-DAH□-N	430 350 120			
		E3X-MDA	1,100 (2,600)*3 870 (2,000) 350 (840)	1.4 mm ø (0.01 mm ø)		
		E3X-NA□(V)	700 (2,000)	1.4 mm ø (0.03 mm ø)		
		E3X-NAG□	130 (370)			
		E3X-NA□F	210 (600)	1.4 mm ø (0.5 mm ø)		
3-mm ø Free-cut		E3X-DA□-S	1,700 1,330 350	1.4-mm ø (0.01-mm ø)	E32-T12L	
		E3X-DA□-N	1,660 1,330 490			
		E3X-MDA	1,100 870 350			
		E3X-NA□(V)	700	1.4 mm ø (0.03 mm ø)		
		E3X-NAG□	130			
		E3X-NA□F	210	1.4 mm ø (0.5 mm ø)		

*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.
*3. Longer sensing distance by using the lens unit E39-F

High resolution mode / Standard mode
Super long-distance mode / Super high-speed mode
Green light / Red light / Infrared ray

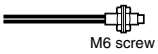
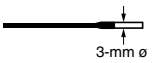
Features	Shape	Applicable Amplifier Unit	Sensing distance (mm) *1 (Parentheses: With E39-F1 Lens Unit)	Standard object (min. sensing object *2) (Parentheses:	Model	Permissible bending radius
M3 Free-cut		E3X-DA□-S	540 440 100	0.9 mm ø (0.005 mm ø)	E32-T21L	10 mm
		E3X-DA□-N	500 440 180	0.9 mm ø (0.01 mm ø)		
		E3X-MDA	340 260 100	0.9-mm ø (0.005-mm ø)		
		E3X-NA□(V)	200	0.9 mm ø (0.03 mm ø)		
		E3X-NAG□	40			
		E3X-NA□F	60	0.9 mm ø (0.2 mm ø)		
2-mm ø; small ø Free-cut		E3X-DA□-S	540 440 100	0.9-mm ø (0.005-mm ø)	E32-T22L	
		E3X-DA□-N	500 440 180	0.9 mm ø (0.01 mm ø)		
		E3X-MDA	340 260 100	0.9 mm ø (0.005 mm ø)		
		E3X-NA□(V)	200	0.9 mm ø (0.03 mm ø)		
		E3X-NAG□	40			
		E3X-NA□F	60	0.9 mm ø (0.2 mm ø)		
M14; with lens; ideal for explosion-proof applications Free-cut		E3X-DA□-S	20,000*5 20,000*5 4,000*5	10 mm ø	E32-T17L	25 mm
		E3X-DA□-N	20,000*3 20,000 9,800	10 mm ø (0.01 mm ø)		
		E3X-MDA	13,000 10,000 4,000	10-mm ø		
		E3X-NA□(V)	14,000	10 mm ø (0.1 mm ø)		
		E3X-NA□F	4,200	10 mm ø (1.5 mm ø)		

*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.
*3. Longer sensing distance by using the lens unit E39-F

Long distance

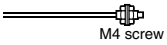
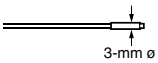
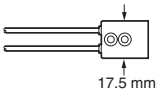
Diffuse reflective fiber units

High resolution mode
Super long-distance mode
Green light
Red light
Standard mode
Super high-speed mode
Infrared ray

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm) *1	Standard object *2 (min. sensing object: Gold wire)	Model	Permissible bending radius
M6 Free-cut		E3X-DA□-S	650 400 110	500x500 (0.005 mm ø)	E32-D11L	25 mm
		E3X-DAG□-S E3X-DAB□-S	44 35 22	100x100 (0.1 mm ø)		
		E3X-DA□-N	500 400 150	500x500 (0.01 mm ø)		
		E3X-DAB#-N	44 35 22	100x100 (0.1 mm ø)		
		E3X-DAH□-N	130 100 30	200x200 (0.01 mm ø)		
		E3X-MDA	400 270 110	500x500 (0.005 mm ø)		
		E3X-NA□(V)	200	250x250 (0.01 mm ø)		
		E3X-NAG□	35	50x50 (0.1 mm ø)		
		E3X-NA□F	65	100x100 (0.015 mm ø)		
3 mm ø; small ø Free-cut		E3X-DA□-S	400 230 70	300x300 (0.005 mm ø)	E32-D12	
		E3X-DA□-N	300 230 100	300x300 (0.01 mm ø)		
		E3X-MDA	230 160 70	300x300 (0.005 mm ø)		
		E3X-NA□(V)	120	150x150 (0.01 mm ø)		
		E3X-NAG□	20	25x25 (0.1 mm ø)		
		E3X-NA□F	40	50x50 (0.015 mm ø)		

*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.

High resolution mode | Standard mode
Super long-distance mode | Super high-speed mode
Green light | Red light | Infrared ray

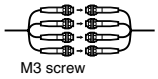
Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
M4 Free-cut		E3X-DA□-S	210 130 35	200x200 (0.005 mm ø)	E32-D21L	10 mm
		E3X-DA□-N	160 130 45	200x200 (0.01 mm ø)		
		E3X-MDA	130 85 35	200x200 (0.005 mm ø)		
		E3X-NA□(V)	50	100x100 (0.01 mm ø)		
		E3X-NAG□	10	25x25 (0.1 mm ø)		
		E3X-NA□F	17	25x25 (0.015 mm ø)		
3 mm ø; small ø Free-cut		E3X-DA□-S	210 130 35	200x200 (0.005 mm ø)	E32-D22L	10 mm
		E3X-DA□-N	160 130 45			
		E3X-MDA	130 85 35			
		E3X-NA□(V)	50	100x100 (0.01 mm ø)		
		E3X-NAG□	10	25x25 (0.1 mm ø)		
		E3X-NA□F	17	25x25 (0.015 mm ø)		
Square head, super-long distance Free-cut		E3X-DA□-S	40 to 1,000 40 to 700 40 to 240	300x300	E32-D16 NEW	4 mm
		E3X-MDA	40 to 600 40 to 490 40 to 240			
		E3X-DA#-N	40~1,000 40~700 40~400			
		E3X--NA#(V)	40~400			
		E3X--NA#F	55~70			

*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.

Area sensing

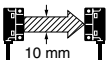
Throughbeam fiber units

High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light

Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm) *1 (Parentheses: With E39-F1 Lens Unit)	Standard object *2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
Multi-point detection (4-head)		E3X-DA□-S	750 610 140	2 mm ø (0.1 mm ø)	E32-M21	25 mm
		E3X-DA□-N	700 610 250	2.0 mm ø (0.01 mm ø)		
		E3X-MDA	470 360 140	2 mm ø (0.1 mm ø)		
		E3X-NA□(V)	300	2.0 mm ø (0.03 mm ø)		
		E3X-NA□F	90	2.0 mm ø (0.3 mm ø)		
Detects in a 30 mm area Free-cut		E3X-DA□-S	2,300 1,800 450	(0.3 mm ø) *4	E32-T16W	10 mm
		E3X-DA□-N	2,300 1,800 660			
		E3X-MDA	1,400 1,100 450			
		E3X-NA□(V)	920	(0.5 mm ø) *3		
		E3X-NAG□	170			
		E3X-NA□F	270	(4.0 mm ø) *3		
		E3X-DA□-S	1,700 1,300 340	(0.3 mm ø) *4	E32-T16WR	1 mm
		E3X-DA□-N	1,700 1,300 500			
		E3X-MDA	1,100 860 340			
		E3X-NA□(V)	690	(0.5 mm ø) *3		
		E3X-NA□F	200	(4.0 mm ø) *3		

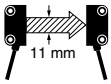
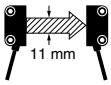
*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.
*3. The sensing distance is 100 mm, possible detection within specified area under static condition
*4. The sensing distance is 300 mm, possible detection within specified area under static condition.

High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light

Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm) *1 (Parentheses: With E39-F1 Lens Unit)	Standard object *2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
Side-view suitable for applications with limited spatial depth Free-cut		E3X-DA□-S	1,300 1,000 260	(0.2 mm ø) *4	E32-T16J	10 mm
		E3X-DA□-N	1,300 1,000 280			
		E3X-MDA	800 650 260			
		E3X-NA□(V)	520	(0.3 mm ø) *3		
		E3X-NAG□	95			
		E3X-NA□F	150	(2.0 mm ø) *3		
		E3X-DA□-S	980 750 190	(0.2 mm ø) *4	E32-T16JR	1 mm
		E3X-DA□-N	980 750 210			
		E3X-MDA	600 480 190			
		E3X-NA□(V)	390	(0.3 mm ø) *3		
		E3X-NA□F	110	(2.0 mm ø) *3		
Suitable for detecting over a 10 mm area; long distance Free-cut		E3X-DA□-S	3,700 2,800 740	(0.6 mm ø) *5	E32-T16	25 mm
		E3X-DA□-N	3,500 2,800 1,000			
		E3X-MDA	2,400 1,800 740			
		E3X-NA□(V)	1,500	(0.9 mm ø) *3		
		E3X-NAG□	275			
		E3X-NA□F	450	(1.5 mm ø) *3		

*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.
*3. The sensing distance is 100 mm, possible detection within specified area under static condition
*4. The sensing distance is 300 mm, possible detection within specified area under static condition.

High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light

Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm) *1 (Parentheses: With E39-F1 Lens Unit)	Standard object *2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
Stable for detecting minute sensing objects in a wide area Free-cut		E3X-DA□-S	1,500 1,100 300	(0.2 mm ø) *4	E32-T16P	10 mm
		E3X-DA□-N	1,400 1,100 420			
		E3X-MDA	970 750 300			
		E3X-NA□(V)	600	(0.3 mm ø) *3		
		E3X-NAG□	110			
		E3X-NA□F	180	(2.0 mm ø) *3		
Stable detection of minute sensing objects, wide sensing area Free-cut		E3X-DA□-S	1,100 840 220	(0.2 mm ø) *4	E32-T16PR	1 mm
		E3X-DA□-N	1,050 840 320			
		E3X-MDA	730 560 220			
		E3X-NA□(V)	450	(0.3 mm ø) *3		
		E3X-NA□F	130	(2.0 mm ø) *3		

*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.
*3. The sensing distance is 100 mm, possible detection within specified area under static condition
*4. The sensing distance is 300 mm, possible detection within specified area under static condition.

Diffuse reflective fiber units

High resolution mode / Standard mode
Super long-distance mode / Super high-speed mode
Green light / Red light

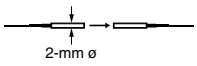
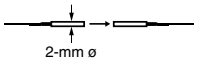
Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
Side-view detection over wide areas Free-cut		E3X-DA□-S	250 150 45	300x300 (0.005 mm ø)	E32-D36P1	25 mm
		E3X-DA□-N	200 150 50	300x300 (0.01 mm ø)		
		E3X-MDA	150 100 45	300x300 (0.005 mm ø)		
		E3X-NA□(V)	75	100x100 (0.03 mm ø)		
		E3X-NA□F	25	50x50 (0.03 mm ø)		

*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.

Small fiber head

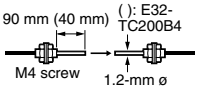
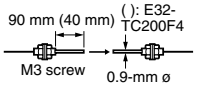
Throughbeam fiber unit

High resolution mode / Standard mode
Super long-distance mode / Super high-speed mode
Green light / Red light

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1 (Parentheses:With E39-F1 Lens Unit)	Standard object*2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
2 mm ø For detecting minute sensing objects Free-cut		E3X-DA□-S	270 220 50	0.5 mm ø (0.005 mm ø)	E32-T22	10 mm
		E3X-DA□-N	250 220 90	0.5 mm ø (0.01 mm ø)		
		E3X-MDA	170 130 50	0.5 mm ø (0.005 mm ø)		
		E3X-NA□(V)	100	0.5 mm ø (0.03 mm ø)		
		E3X-NAG□	20			
		E3X-NA□F	30	0.5 mm ø (0.1 mm ø)		
2 mm ø For detecting minute sensing objects Free-cut		E3X-DA□-S	160 130 30	0.5 mm ø (0.005 mm ø)	E32-T22R	1 mm
		E3X-DA□-N	150 130 50	0.5 mm ø (0.01 mm ø)		
		E3X-MDA	100 75 30	0.5 mm ø (0.005 mm ø)		
		E3X-NA□(V)	60	0.5 mm ø (0.03 mm ø)		
		E3X-NA□F	18	0.5 mm ø (0.1 mm ø)		

*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.

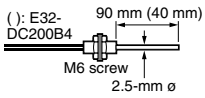
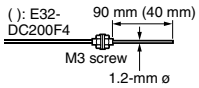
High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1 (Parentheses:With E39-F1 Lens Unit)	Standard object*2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
1.2 mm ø with sleeve Free-cut		E3X-DA□-S	1,000 760 200	1.0 mm ø (0.005 mm ø)	E32-TC200B E32-TC200B4	25 mm
		E3X-DAG□-S E3X-DAB□-S	100 75 45			
		E3X-DA□-N	950 760 280	1 mm ø (0.01 mm ø)		
		E3X-DAB#-N	100 75 45			
		E3X-MDA	650 500 200	1.0 mm ø (0.005 mm ø)		
		E3X-NA□(V)	400	1.0 mm ø (0.03 mm ø)		
		E3X-NAG□	75			
		E3X-NA□F	120	1.0 mm ø (0.2 mm ø)		
0.9 mm ø with sleeve Free-cut		E3X-DA□-S	270 220 50	0.5 mm ø (0.005 mm ø)	E32-TC200F E32-TC200F4	10 mm
		E3X-DA□-N	250 220 90	0.5 mm ø (0.01 mm ø)		
		E3X-MDA	170 130 50	0.5 mm ø (0.005 mm ø)		
		E3X-NA□(V)	100	0.5 mm ø (0.03 mm ø)		
		E3X-NAG□	20			
		E3X-NA□F	30	0.5 mm ø (0.1 mm ø)		

*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.

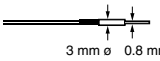
Diffuse reflective fiber units

High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1 (Parentheses: With E39-F1 Lens Unit)	Standard object*2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
2.5 mm ø with sleeve Free-cut		E3X-DA□-S	500 300 90	400x400 (0.005 mm ø)	E32-DC200B E32-DC200B4	25 mm
		E3X-DAG□-S E3X-DAB□-S	32 25 16	100x100 (0.1 mm ø)		
		E3X-DA□-N	400 300 100	400x400 (0.01 mm ø)		
		E3X-DAB#-N	32 25 16	100x100 (0.1 mm ø)		
		E3X-MDA	300 210 90	400x400 (0.005 mm ø)		
		E3X-NA□(V)	150	200x200 (0.01 mm ø)		
		E3X-NAG□	25	50x50 (0.1 mm ø)		
		E3X-NA□F	50	75x75 (0.015 mm ø)		
1.2 mm ø with sleeve Free-cut		E3X-DA□-S	130 80 22	100x100 (0.005 mm ø)	E32-DC200F E32-DC200F4	10 mm
		E3X-DA□-N	100 80 30	100x100 (0.01 mm ø)		
		E3X-MDA	80 55 22	100x100 (0.005 mm ø)		
		E3X-NA□(V)	36	50x50 (0.01 mm ø)		
		E3X-NAG□	6	25x25 (0.1 mm ø)		
		E3X-NA□F	12	25x25 (0.02 mm ø)		

*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.

High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light

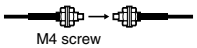
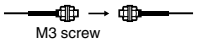
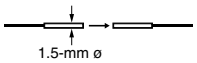
Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1 (Parentheses: With E39-F1 Lens Unit)				Standard object*2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
0.8 mm ø For detecting minute sensing objects Free-cut		E3X-DA□-S	□25 ▮16 ▮4				25x25 (0.005 mm ø)	E32-D33	4 mm
		E3X-DA□-N	■21 ▮16 ▮6				25x25 (0.01 mm ø)		
		E3X-MDA	□16 ▮10 ▮4				25x25 (0.005 mm ø)		
		E3X-NA□(V)	▮10				25x25 (0.01 mm ø)		
		E3X-NA□F	▮3.3				25x25 (0.03 mm ø)		
0.5 mm ø For detecting very minute sensing objects		E3X-DA□-S	▮5 ▮3 ▮0.8				25x25 (0.005 mm ø)	E32-D331	
		E3X-DA□-N	▮4 ▮3 ▮1				25x25 (0.01 mm ø)		
		E3X-MDA	▮3 ▮2 ▮0.8				25x25 (0.005 mm ø)		
		E3X-NA□(V)	▮1.5				25x25 (0.01 mm ø)		
		E3X-NA□F	▮0.5				25x25 (0.05 mm ø)		

*1. Sensing distance based on white paper.
*2. Indicates values for standard mode.

Fiber for Robot Application R4 (Strong against repeatable bending)

Throughbeam fiber unit

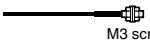
High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1 (Parentheses: With E39-F1 Lens Unit)	Standard object*2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
Ideal for mounting on moving sections (R4) Free-cut	 M4 screw	E3X-DA□-S	900 (4,000)*3 680 (3,600) 180 (930)	1.0 mm ø (0.005 mm ø)	E32-T11	4 mm
		E3X-DA□-N	850 (4,000)*3 680 (3,600) 250 (1,300)	1.0 mm ø (0.01 mm ø)		
		E3X-MDA	580 (3,000) 450 (2,300) 180 (930)	1.0 mm ø (0.005 mm ø)		
		E3X-NA□(V)	360	1.0 mm ø (0.03 mm ø)		
		E3X-NAG□	65			
		E3X-NA□F	100	1.0 mm ø (0.2 mm ø)		
	 M3 screw	E3X-DA□-S	240 200 45	0.5 mm ø (0.005 mm ø)	E32-T21	
		E3X-DA□-N	220 200 80	0.5 mm ø (0.01 mm ø)		
		E3X-MDA	150 110 45	0.5 mm ø (0.005 mm ø)		
		E3X-NA□(V)	100	0.5 mm ø (0.03 mm ø)		
		E3X-NAG□	18			
		E3X-NA□F	30	0.5 mm ø (0.1 mm ø)		
	 1.5-mm ø	E3X-DA□-S	240 200 45	0.5 mm ø (0.005 mm ø)	E32-T22B	
		E3X-DA□-N	220 200 80	0.5 mm ø (0.01 mm ø)		
		E3X-MDA	150 110 45	0.5 mm ø (0.005 mm ø)		
		E3X-NA□(V)	100	0.5 mm ø (0.03 mm ø)		
		E3X-NAG□	18			
		E3X-NA□F	30	0.5 mm ø (0.1 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.
*3. Sensing distance by using the lens unit E39-F1.

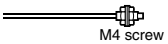
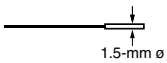
Diffuse reflection fiber units

High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object*2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
Ideal for mounting on moving sections (R4)	 M6 screw	E3X-DA□-S	300 170 50	300x300 (0.005 mm ø)	E32-D11	4 mm
		E3X-DA□-N	220 170 80	300x300 (0.01 mm ø)		
		E3X-MDA	170 125 50	300x300 (0.005 mm ø)		
		E3X-NA□(V)	90	150x150 (0.01 mm ø)		
		E3X-NAG□	15	25x25 (0.1 mm ø)		
		E3X-NA□F	30	50x50 (0.015 mm ø)		
	 M3 screw	E3X-DA□-S	50 30 8	50x50 (0.005 mm ø)	E32-D21	
		E3X-DA□-N	40 30 10	50x50 (0.01 mm ø)		
		E3X-MDA	30 22 8	50x50 (0.005 mm ø)		
		E3X-NA□(V)	15	25x25 (0.01 mm ø)		
		E3X-NA□F	5	25x25 (0.02 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.

High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light

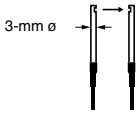
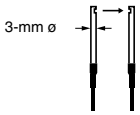
Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1				Standard object*2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
Ideal for mounting on moving sections (R4)		E3X-DA□-S	110 70 20				100x100 (0.005 mm ø)	E32-D21B	4 mm
		E3X-DA□-N	90 70 25				100x100 (0.01 mm ø)		
		E3X-MDA	70 50 20				100x100 (0.005 mm ø)		
		E3X-NA□(V)	15				25x25 (0.01 mm ø)		
		E3X-NAG□	2.4				25x25 (0.1 mm ø)		
		E3X-NA□F	5				25x25 (0.02 mm ø)		
		E3X-DA□-S	50 30 8				50x50 (0.005 mm ø)	E32-D22B	
		E3X-DA□-N	40 30 10				50x50 (0.01 mm ø)		
		E3X-MDA	30 22 8				50x50 (0.005 mm ø)		
		E3X-NA□(V)	7				25x25 (0.01 mm ø)		
		E3X-NA□F	2.3				25x25 (0.02 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.

Side view

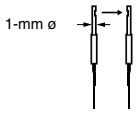
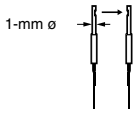
Throughbeam fiber units

High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light

Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm)*1 (Parentheses: With E39-F1 Lens Unit)	Standard object (min. sensing object*2) (Parentheses: Opaque object)	Model	Permissible bending radius
Long distance; space-saving Free-cut		E3x-DA□-S	600 460 120	1.0 mm ø (0.005 mm ø)	E32-T14L	25 mm
		E3x-DAG□-S E3x-DAB□-S	50 40 25			
		E3x-DA□-N	570 460 170	1 mm ø (0.01 mm ø)		
		E3x-DAB11-N	50 40 25			
		E3x-DAH□-N	150 120 40			
		E3x-MDA	390 300 120	1.0 mm ø (0.005 mm ø)		
		E3x-NA□(V)	240	1.0 mm ø (0.03 mm ø)		
		E3x-NAG□	45			
		E3x-NA□F	70	1.0 mm ø (0.2 mm ø)		
Space-saving Free-cut		E3x-DA□-S	270 210 50	1.0 mm ø (0.005 mm ø)	E32-T14LR	1 mm
		E3x-DA□-N	270 210 90	1 mm ø (0.01 mm ø)		
		E3x-MDA	170 130 50	1.0 mm ø (0.005 mm ø)		
		E3x-NA□(V)	110	1.0 mm ø (0.03 mm ø)		
		E3x-NA□F	33	1.0 mm ø (0.2 mm ø)		

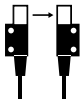
*1. Sensing distance beased on white paper.
*2. Indicates values for standard mode.

High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light

Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm)*1 (Parentheses: With E39-F1 Lens Unit)	Standard object (min. sensing object*2) (Parentheses: Opaque object)	Model	Permissible bending radius
Suitable for detecting minute sensing objects; small ø Free-cut		E3x-DA□-S	160 130 30	0.5 mm ø (0.005 mm ø)	E32-T24	10 mm
		E3x-DA□-N	150 130 55	0.5 mm ø (0.01 mm ø)		
		E3x-MDA	100 70 30	0.5 mm ø (0.005 mm ø)		
		E3x-NA□(V)	90	0.5 mm ø (0.03 mm ø)		
		E3x-NAG□	12			
		E3x-NA□F	27	0.5 mm ø (0.3 mm ø)		
Suitable for detecting minute sensing objects; small ø Free-cut		E3x-DA□-S	60 50 10	0.5 mm ø (0.005 mm ø)	E32-T24R	1 mm
		E3x-DA□-N	60 50 25	0.5 mm ø (0.01 mm ø)		
		E3x-MDA	35 27 10	0.5 mm ø (0.005 mm ø)		
		E3x-NA□(V)	30	0.5 mm ø (0.03 mm ø)		
		E3x-NA□F	9	0.5 mm ø (0.3 mm ø)		

*1. Sensing distance beased on white paper.
*2. Indicates values for standard mode.

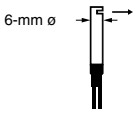
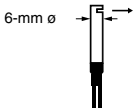
High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light

Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm)*1 (Parentheses: With E39-F1 Lens Unit)	Standard object (min. sensing object*2) (Parentheses: Opaque object)	Model	Permissible bending radius
Screw-mounting type Free-cut		E3x-DA□-S	4,500 3,400 900	4 mm ø (0.1 mm ø)	E32-T14	25 mm
		E3x-DAG□-S E3x-DAB□-S	320 260 160			
		E3x-DA□-N	4,000 3,400 1,250	4 mm ø (0.01 mm ø)		
		E3x-DAB11-N	320 260 160			
		E3x-DAH□-N	1,120 900 330			
		E3x-MDA	2,900 2,200 900	4 mm ø (0.1 mm ø)		
		E3x-NA□(V)	1,800	4.0 mm ø (0.03 mm ø)		
		E3x-NAG□	330			
		E3x-NA□F	540	4.0 mm ø (0.2 mm ø)		

*1. Sensing distance beased on white paper.
*2. Indicates values for standard mode.

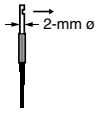
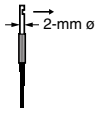
Diffuse reflective fiber units

High resolution mode
Standard mode
Super long-distance mode
Super high-speed mode
Green light
Red light
Infrared ray

Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
6 mm ø Long distance Free-cut		E3x-DA□-S	200 110 36	200x200 (0.005 mm ø)	E32-D14L	25 mm
		E3x-DA□-N	150 110 50	200x200 (0.01 mm ø)		
		E3x-DAH□-N	35 25 10	50x50 (0.01 mm ø)		
		E3x-MDA	110 80 36	200x200 (0.005 mm ø)		
		E3x-NA□(V)	40	50x50 (0.03 mm ø)		
		E3x-NAG□	10	25x25 (0.3 mm ø)		
		E3x-NA□F	13	25x25 (0.03 mm ø)		
6 mm ø Free-cut		E3x-DA□-S	80 45 14	100x100 (0.005 mm ø)	E32-D14LR	1 mm
		E3x-DA□-N	60 45 25	100x100 (0.01 mm ø)		
		E3x-MDA	45 33 14	100x100 (0.005 mm ø)		
		E3x-NA□(V)	16	25x25 (0.03 mm ø)		
		E3x-NA□F	5			

*1. Sensing distance beased on white paper.
*2. Indicates values for standard mode.

High resolution mode　Standard mode
Super long-distance mode　Super high-speed mode
Green light　Red light　Infrared ray

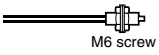
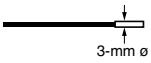
Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm)*1				Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
2 mm ø small ø; space-saving Free.cut		E3x-DA□-S	□50 30 8				50x50 (0.005 mm ø)	E32-D24	10 mm
		E3x-DA□-N	40 30 10				50x50 (0.01 mm ø)		
		E3x-MDA	□30 22 8				50x50 (0.005 mm ø)		
		E3x-NA□(V)	15				25x25 (0.03 mm ø)		
		E3x-NAG□	2.4				25x25 (0.3 mm ø)		
		E3x-NA□F	5				25x25 (0.03 mm ø)		
		E3x-DA□-S	□26 15 4				50x50 (0.005 mm ø)	E32-D24R	1 mm
		E3x-DA□-N	25 15 6				50x50 (0.01 mm ø)		
		E3x-MDA	□15 10 4				50x50 (0.005 mm ø)		
		E3x-NA□(V)	7				25x25 (0.03 mm ø)		
		E3x-NA□F	2.3						

*1. Sensing distance beased on white paper.
*2. Indicates values for standard mode.

Coaxial fiber

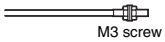
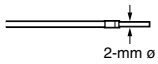
Diffuse reflective fiber units

High resolution mode
Super long-distance mode
Green light
Red light
Standard mode
Super high-speed mode
Infrared ray

Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
M6 coaxial; high-precision positioning Free-cut		E3X-DA□-S	500 300 90	500x500 (0.005 mm ø)	E32-CC200	25 mm
		E3X-DAG□-S E3X-DAB□-S	32 25 16	100x100 (0.1 mm ø)		
		E3X-DA□-N	400 300 100	500x500 (0.01 mm ø)		
		E3X-DAB#-N	32 25 16	100x00 (0.1 mm ø)		
		E3X-DAH□-N	100 75 25	100x100 (0.01 mm ø)		
		E3X-MDA	300 210 90	500x500 (0.005 mm ø)		
		E3X-NA□(V)	150	200x200 (0.01 mm ø)		
		E3X-NAG□	25	50x50 (0.1 mm ø)		
		E3X-NA□F	50	75x75 (0.015 mm ø)		
3 mm ø; small ø; coaxial; high-precision positioning Free-cut		E3X-DA□-S	250 150 45	300x300 (0.005 mm ø)	E32-D32L	25 mm
		E3X-DA□-N	200 150 50	300x300 (0.01 mm ø)		
		E3X-MDA	150 100 45	300x300 (0.005 mm ø)		
		E3X-NA□(V)	80	100x100 (0.01 mm ø)		
		E3X-NAG□	12	25x25 (0.1 mm ø)		
		E3X-NA□F	25	50x50 (0.02 mm ø)		

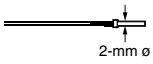
*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.
*3. Refer to page “AB-” when using the optional lens unit

High resolution mode | Standard mode
Super long-distance mode | Super high-speed mode
Green light | Red light | Infrared ray

Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
M3 coaxial high precision positioning Free-cut Small spot lens mountable (E39-F3A, F3A-5, F3B, F3C)		E3X-DA□-S	120 75 22	Spot ø*3 • Adjustable in the range 0.1 to 0.6-mm ø	100x100 (0.005 mm ø)	E32-EC31	25 mm
		E3X-DA□-N	100 75 25	Spot ø Adjustable in the range 0.5 to 1.0 mm ø.	100x100 (0.01 mm ø)		
		E3X-MDA	75 50 22		100x100 (0.005 mm ø)		
		E3X-NA□(V)	40		50x50 (0.01 mm ø)		
		E3X-NAG□	6		25x25 (0.1 mm ø)		
		E3X-NA□F	13		25x25 (0.02 mm ø)		
M3 coaxial high precision positioning Free-cut Small spot lens mountable (E39-F3A, F3A-5, F3B, F3C)		E3X-DA□-S	50 35 8	Spot ø • 0.1-mm ø • 0.2-mm ø • 4.0-mm ø max	50x50 (0.005 mm ø)	E32-EC41	
		E3X-DA□-N	45 35 10	Spot ø • 0.1 mm ø • 0.2 mm ø • 4.0 mm ø max.	50x50 (0.01 mm ø)		
		E3X-MDA	35 22 8		50x50 (0.005 mm ø)		
		E3X-NA□(V)	15		25x25 (0.01 mm ø)		
		E3X-NA□F	5		25x25 (0.02 mm ø)		
2 mm ø coaxial; high-precision positioning Small spot lens mountable (E39-F3A,)		E3X-DA□-S	50 35 8	Spot ø • Adjustable in the range 0.1 to 0.6-mm ø.	50x50 (0.005 mm ø)	E32-C42	
		E3X-DA□-N	45 35 10	Spot ø • Adjustable in the range 0.1 to 0.6 mm ø	50x50 (0.01 mm ø)		
		E3X-MDA	35 22 8		50x50 (0.005 mm ø)		
		E3X-NA□(V)	15		25x25 (0.01 mm ø)		
		E3X-NA□F	5		25x25 (0.02 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.
*3. Refer to page “AB-” when using the optional lens unit

High resolution mode / Standard mode
Super long-distance mode / Super high-speed mode
Green light / Red light / Infrared ray

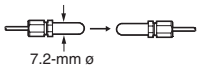
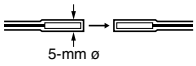
Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
2 mm ø coaxial; high-precision positioning Free-cut Small spot lens mountable (E39-F3A,)		E3X-DA□-S	120 75 22 Spot ø*3 • Adjustable in the range 0.1 to 0.6-mm ø	100x100 (0.005 mm ø)	E32-D32	25 mm
		E3X-DA□-N	100 75 25	100x100 (0.01 mm ø)		
		E3X-MDA	75 52 22	100x100 (0.005 mm ø)		
		E3X-NA□(V)	40	50x50 (0.01 mm ø)		
		E3X-NAG□	6	25x25 (0.1 mm ø)		
		E3X-NA□F	13	25x25 (0.02 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.
*3. Refer to page “AB-” when using the optional lens unit

Chemical resistant

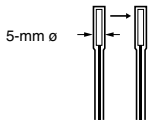
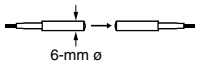
Throughbeam fiber unit

High resolution mode / Standard mode
Super long-distance mode / Super high-speed mode
Green light / Red light

Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm)*1 (Parentheses: With E39-F1 Lens Unit)	Standard object*2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
Teflon-covered*3; round head that resists water drops Free-cut		E3X-DA□-S	2,500 2,000 520	4 mm ø (0.1 mm ø)	E32-T11F	4 mm
		E3X-MDA	1,600 1,300 520	4 mm ø (0.1 mm ø)		
Teflon-covered*3; withstands chemicals and harsh environments (operating ambient temperature: -30°C to 70°C) Free-cut		E3X-DA□-S	4,000 3,000 800	4 mm ø (0.1 mm ø)	E32-T12F	40 mm
		E3X-DA□-N	3,800 3,000 1,100	4 mm ø (0.01 mm ø)		
		E3X-MDA	2,600 2,000 800	4 mm ø (0.1 mm ø)		
		E3X-NA□(V)	1,600	4.0 mm ø (0.2 mm ø)		
		E3X-NAG□	300			
		E3X-NA□F	480	4.0 mm ø (0.7 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.
*3. Teflon is a registered trademark of Dupont Company and Mitsui Dupont Company for their fluoride resin.

High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light

Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm)*1 (Parentheses: With E39-F1 Lens Unit)	Standard object*2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
Teflon-covered*3; withstands chemicals and harsh environments; side-view (operating ambient temperature: −30°C to 70°C) Free-cut		E3X-DA□-S	500 400 100	3 mm ø (0.1 mm ø)	E32-T14F	
		E3X-DA□-N	500 400 150	3 mm ø (0.01 mm ø)		
		E3X-MDA	320 250 100	3 mm ø (0.1 mm ø)		
		E3X-NA□(V)	200	3.0 mm ø (0.2 mm ø)		
		E3X-NAG□	37			
		E3X-NA□F	60	3.0 mm ø (0.7 mm ø)		
Teflon*3; withstands chemicals and harsh environments (operating ambient temperature: −40°C to 200°C)		E3X-DA□-S	920 700 190	1.0 mm ø (0.005 mm ø)	E32-T81F-S	10 mm
		E3X-DA□-N	880 700 260	1 mm ø (0.01 mm ø)		
		E3X-MDA	600 460 190	1.0 mm ø (0.005 mm ø)		
		E3X-NA□(V)	350	1.0 mm ø (0.2 mm ø)		
		E3X-NA□F	100	1.0 mm ø (0.5 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.
*3. Teflon is a registered trademark of Dupont Company and Mitsui Dupont Company for their fluoride resin.

Diffuse reflective fiber units

High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light

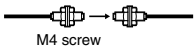
Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
Teflon-covered*3; withstands chemicals and harsh environments (operating ambient temperature: -30°C to 70°C Free-cut	 6-mm ø	E3X-DA□-S	160 95 30	200x200 (0.005 mm ø)	E32-D12F	40 mm
		E3X-DA□-N	120 95 45	200x200 (0.01 mm ø)		
		E3X-MDA	95 70 30	200x200 (0.005 mm ø)		
		E3X-NA□(V)	50	100x100 (0.03 mm ø)		
		E3X-NAG□	8	25x25 (0.3 mm ø)		
		E3X-NA□F	16	25x25 (0.03 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.
*3. Teflon is a registered trademark of Dupont Company and Mitsui Dupont Company for their fluoride resin.

Heat resistant

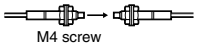
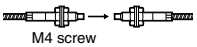
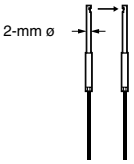
Throughbeam fiber unit

High resolution mode
Super long-distance mode
Red light
Standard mode
Super high-speed mode

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1 (Parentheses: With E39-F1 Lens Unit)	Standard object*2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
Resists 150°C*3; fiber sheath fiber sheat material: fluorine resin (operating ambient temperature: -40°C to 150°C) Free-cut	 M4 screw	E3X-DA□-S	1,000 760 200	1.5 mm ø (0.1 mm ø)	E32-ET51	35 mm
		E3X-DA□-N	950 760 280	1.5 mm ø (0.01 mm ø)		
		E3X-MDA	650 500 200	1.5 mm ø (0.1 mm ø)		
		E3X-NA□(V)	400	1.5 mm ø (0.03 mm ø)		
		E3X-NA□F	120	1.5 mm ø (1 mm ø)		

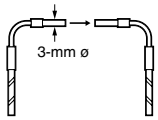
*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.
*3. For continuous operation, us the products within the temperature ranging from -40°C to 130°C.
*4. Indicates the heat resistant temperature at the fiber tip.
*5. Teflon is a registered trademark of the Dupont Company and the Mitsui Dupont Chemical Company for their fluoride resin.
*6. Longer sensing distance by using the lens unit E39-F1.

High resolution mode
Super long-distance mode
Red light
Standard mode
Super high-speed mode

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1 (Parentheses: With E39-F1 Lens Unit)	Standard object*2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
Resists 200°C; flexible (R10); fiber sheath material: Teflon*5 (operating ambient temperature: -40°C to 200°C)	 M4 screw	E3X-DA□-S	360 (2,650) 280 (2,100) 70 (520)	1.0 mm ø (0.005 mm ø)	E32-T81R-S NEW	10 mm
		E3X-DA□-N	350 280 100	1.5 mm ø (0.01 mm ø)		
		E3X-MDA	230 (1,700) 180 (1,300) 70 (520)	1.0 mm ø (0.005 mm ø)		
		E3X-NA□(V)	180	1.0 mm ø (0.2 mm ø)		
		E3X-NA□F	50	1.0 mm ø (0.5 mm ø)		
Resists 350°C*4, with spiral tube; high mechanical strength; fiber sheath material: stainless steel (operating ambient temperature: -60°C to 350°C)	 M4 screw	E3X-DA□-S	600 (4,000)*6 450 (3,400) 120 (900)	1.0 mm ø (0.005 mm ø)	E32-T61-S NEW	25 mm
		E3X-DA□-N	570 (4,000)*6 450 (3,400) 170 (1,300)	1 mm ø (0.01 mm ø)		
		E3X-MDA	390 (3,000) 300 (2,200) 120 (900)	1.0 mm ø (0.005 mm ø)		
		E3X-NA□(V)	300 (3,000)	1.0 mm ø (0.03 mm ø)		
		E3X-NA□F	90	1.0 mm ø (0.5 mm ø)		
Side-view; resists 150°C*3; suitable for detecting minute sensing objects; fiber sheath material: fluorine resin (operating ambient temperature: –40°C to 150°C) Free-cut	 2-mm ø	E3X-DA□-S	300 230 60	1.0 mm ø (0.005 mm ø)	E32-T54	35 mm
		E3X-DA□-N	290 230 80	1 mm ø (0.01 mm ø)		
		E3X-MDA	190 150 60	1.0 mm ø (0.005 mm ø)		
		E3X-NA□(V)	130	1.0 mm ø (0.03 mm ø)		
		E3X-NA□F	35	1.0 mm ø (0.3 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.
*3. For continuous operation, us the products within the temperature ranging from -40°C to 130°C.
*4. Indicates the heat resistant temperature at the fiber tip.
*5. Teflon is a registered trademark of the Dupont Company and the Mitsui Dupont Chemical Company for their fluoride resin.
*6. Longer sensing distance by using the lens unit E39-F1.

High resolution mode
Super long-distance mode
Red light
Standard mode
Super high-speed mode

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1 (Parentheses: With E39-F1 Lens Unit)	Standard object*2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
Resists 200° C*4; L-shaped; fiber sheath material: stainless steel SUS		E3X-DA□-S	1,750 1,300 350	1.7 mm ø (0.1 mm ø)	E32-T84S-S NEW	25 mm
		E3X-DA□-N	1,700 1,300 500	1.7 mm ø (0.01 mm ø)		
		E3X-MDA	1,100 870 350	1.7 mm ø (0.1 mm ø)		
		E3X-NA□(V)	700	1.7 mm ø (0.03 mm ø)		
		E3X-NA□F	210	1.7 mm ø (0.4 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.
*3. For continuous operation, us the products within the temperature ranging from -40°C to 130°C.
*4. Indicates the heat resistant temperature at the fiber tip.
*5. Teflon is a registered trademark of the Dupont Company and the Mitsui Dupont Chemical Company for their fluoride resin.
*6. Longer sensing distance by using the lens unit E39-F1.

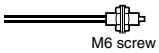
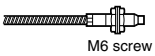
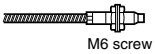
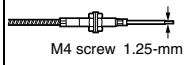
Diffuse reflective fiber unit

High resolution mode
Super long-distance mode
Red light
Standard mode
Super high-speed mode

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
Resists 150° C*3; fiber sheath material: fluorine resin (operating ambient temperature: -40° C to 150° C) Free-cut		E3X-DA□-S	400 230 72	200x200 (0.005 mm ø)	E32-ED51	35 mm
		E3X-DA□-N	300 230 100	200x200 (0.01 mm ø)		
		E3X-MDA	230 165 72	100x100 (0.005 mm ø)		
		E3X-NA□(V)	120	150x150 (0.03 mm ø)		
		E3X-NA□F	40	50x50 (0.03 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.
*3. For continius operation use the product within a temperature range of -40° to 130°C.
*4. Indicates the heat-resistant temperature at the fiber tip.

High resolution mode
Super long-distance mode
Red light
Standard mode
Super high-speed mode

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
Resists 200°C*4; fiber sheath material: fluorine resin (operating ambient temperature: -40°C to 200°C)	 M6 screw	E3X-DA□-S	150 90 27	200x200 (0.005 mm ø)	E32-D81R-S E32-D81R	10 mm
		E3X-DA□-N	120 90 30	200x200 (0.01 mm ø)		
		E3X-MDA	90 63 27	100x100 (0.005 mm ø)		
Resists 350°C*4; fiber sheath material: stainless steel (operating ambient temperature: -60°C to 350°C)	 M6 screw	E3X-DA□-S	150 90 27	200×200 (0.005 mm ø)	E32-D61-S NEW	25 mm
		E3X-MDA	90 60 27			
300°C Operating ambient temperature: -40 to +300°C Fiber sheath material: SUS	 M6 screw	E3X-DA□-N	120 90 30	200x200 (0.01 mm ø)	E32-D61 NEW	
		E3X-NA□(V)	45	100x100 (0.03 mm ø)		
		E3X-NA□F	15	25x25 (0.03 mm ø)		
400°C Operating ambient temperature: -40 to +400°C Fiber sheath material: SUS	 M4 screw 1.25-mm ø	E3X-DA□-N	80 60 20	100x100 (0.01 mm ø)	E32-D73	25 mm
		E3X-NA□(V)	30	50x50 (0.03 mm ø)		
		E3X-NA□F	10	25x25 (0.03 mm ø)		
Resists 400°C*4; fiber sheath material: stainless steel (operating ambient temperature: -40°C to 400°C)		E3X-DA□-S	100 60 18	200x200 (0.005 mm ø)	E32-D73-S NEW	
		E3X-MDA	60 40 18			

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.
*3. For continius operation use the product within a temperature range of -40° to 130°C.
*4. Indicates the heat-resistant temperature at the fiber tip.

Grooved

Throughbeam fiber unit

High resolution mode
Super long-distance mode
Green light
Standard mode
Super high-speed mode
Red light

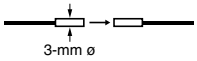
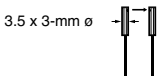
Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1 (Parentheses: With E39-F1 Lens Unit)				Standard object*2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
Suitable for film sheet detection; no optical axis adjustment required; easy to mount Free-cut		E3X-DA□-S	10 10 10				4.0 mm ø (0.1 mm ø)	E32-G14	25 mm
		E3X-DAG□-S E3X-DAB□-S	10 10 10						
		E3X-DA□-N	10 10 10				4.0 mm ø (2.0 mm ø)		
		E3X-DAB#-N	10 10 10						
		E3X-DAH□-N	10 10 10						
		E3X-MDA	10 10 10				4.0 mm ø (0.1 mm ø)		
		E3X-NA□(V)	10						
		E3X-NAG□	10						
		E3X-NA□F	10				4.0.0 mm ø (1.0 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.

Narrow Vision Field

Throughtbeam fiber unit

High resolution mode
Super long-distance mode
Red light
Standard mode
Super high-speed mode

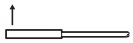
Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1 (Parentheses: With E39-F1 Lens Unit)	Standard object*2 (min. sensing object) (Parentheses: Opaque object)	Model	Permissible bending radius
Suitable for detecting wafers Free-cut		E3X-DA□-S	2,500 1,900 500	1.7 mm ø (0.1 mm ø)	E32-T22S	25 mm
		E3X-DA□-N	2,300 1,900 700	1.7 mm ø (0.01 mm ø)		
		E3X-MDA	1,600 1,250 500	1.7 mm ø (0.1 mm ø)		
		E3X-NA□(V)	1,000	1.7 mm ø (0.5 mm ø)		
		E3X-NA□F	300			
Side-view; suitable for detecting wafers Free-cut		E3X-DA□-S	1,750 1,300 350	2 mm ø (0.1 mm ø)	E32-T24S	10 mm
		E3X-DA□-N	1,700 1,300 500	2 mm ø (0.01 mm ø)		
		E3X-MDA	1,100 870 350	2 mm ø (0.1 mm ø)		
		E3X-NA□(V)	700	2.0 mm ø (0.03 mm ø)		
		E3X-NA□F	210	2.0 mm ø (0.5 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.

Limited-reflective

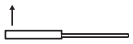
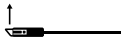
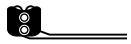
Diffuse reflective fiber units

High resolution mode
Super long-distance mode
Red light
Standard mode
Super high-speed mode

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
Suitable for positioning of crystal glass Free-cut		E3X-DA□-S	0 to 15 0 to 15 0 to 15	100x100 Soda glass with reflection factor of 7%	E32-L16 NEW	25 mm
		E3X-DA#-N	0 to 15 0 to 15 0 to 15			
		E3X-MDA	0 to 15 0 to 15 0 to 15			
		E3X-NA#(V)	0 to 15			
		E3X-NA#F	0 to 13			
Suitable for positioning of crystal glass Free-cut		E3X-DA□-S	4 to 12 4 to 12 4 to 12		E32-L56E1 E32-L56E2	35 mm
		E3X-DA□-N	4 to 12 4 to 12 4 to 12			
		E3X-MDA	4 to 12 4 to 12 4 to 12			
		E3X-NA□(V)	4 to 12	---		
		E3X-NA□F	4 to 12			
Suitable for positioning of crystal glass Heat resists up to 300°C Free-cut		E3X-DA□-S	5 to 18 5 to 18 5 to 18	100x100 Soda glass with reflection factor of 7%	E32-L66 NEW	25 mm
		E3X-DA#-N	5 to 18 5 to 18 5 to 18			
		E3X-MDA	5 to 18 5 to 18 5 to 18			
		E3X-NA#(V)	5 to 18			
		E3X-NA#F	7 to 14			

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.

High resolution mode
Super long-distance mode
Red light
Standard mode
Super high-speed mode

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
Siutable for crystal glass detection Thin and compact type Free-cut		E3X-DA□-S	0 to 4 0 to 4 0 to 4	25x25 (0.005 mm ø)	E32-L24S NEW	10 mm
		E3X-DA#-N				
		E3X-MDA	0 to 4 0 to 4 0 to 4			
		E3X-NA#(V)	0 to 4	25x25		
		E3X-NA#F	0 to 4			
Detects wafers and small differences in height; (operating ambient temperature: -40° C to 105° C); degree of protection: IEC60529 IP50 Free-cut		E3X-DA□-S	4±2 4±2 4±2	25x25 (0.005 mm ø)	E32-L24L	10 mm
		E3X-DA□-N	4 ±2 4 ±2 4 ±2	25x25 (0.01 mm ø)		
		E3X-MDA	4±2 4±2 4±2	25x25 (0.005 mm ø)		
		E3X-NA□(V)	4 ± 2	25x25 (0.015 mm ø)		
		E3X-NA□F	4 ± 2	25x25 (0.03 mm ø)		
		E3X-DA□-S	7.2±1.8 7.2±1.8 7.2±1.8	25x25 (0.005 mm ø)	E32-L25L	10 mm
		E3X-DA□-N	7.2 ±1.8 7.2 ±1.8 7.2 ±1.8	25x25 (0.01 mm ø)		
		E3X-MDA	7.2±1.8 7.2±1.8 7.2±1.8	25x25 (0.005 mm ø)		
		E3X-NA□(V)	7.2±1.8	25x25 (0.015 mm ø)		
		E3X-NA□F	7.2±1.8	25x25 (0.03 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.

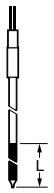
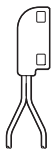
High resolution mode
Super long-distance mode
Red light
Standard mode
Super high-speed mode

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1				Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
Detects wafers and small differences in height; degree of protection: IEC60529 IP50 Free-cut		E3X-DA□-S	3.3 3.3 3.3				25x25 (0.005 mm ø)	E32-L25	25 mm
		E3X-DA□-N	3.3 3.3 3.3				25x25 (0.01 mm ø)		
		E3X-MDA	3.3 3.3 3.3				25x25 (0.005 mm ø)		
		E3X-NA□(V)	3.3				25x25 (0.015 mm ø)		
		E3X-NA□F	3.3				25 x 25 (0.03 mm ø)		
		E3X-DA□-S	3.3 3.3 3.3				25x25 (0.005 mm ø)	E32-L25A	25 mm
		E3X-DA□-N	3.3 3.3 3.3				25x25 (0.01 mm ø)		
		E3X-MDA	3.3 3.3 3.3				25x25 (0.005 mm ø)		
		E3X-NA□(V)	3.3				25x25 (0.015 mm ø)		
		E3X-NA□F	3.3				25x25 (0.03 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.

Fluid-level Detection Fiber Units

Diffuse reflective fiber units

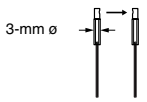
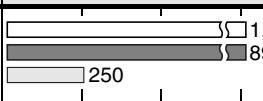
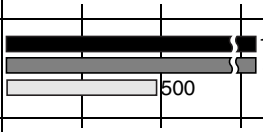
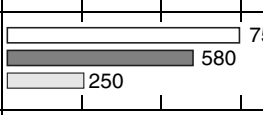
Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
Fluid contact type: unbendable section L 150 mm, 350 mm (two types); (operating ambient temperature: -40°C to 200°C)		E3X-DA□-S DA□-N E3X-MDA NA□(V NA□F	---	Pure water at 25°C	E32-D82F1 E32-D82F2	40 mm
Tube-mounting type; Light ON when fluid is present; minimal influence from bubbles and water drops Free-cut		E3X-DA□-S DA□-N E3X-MDA	Applicable tube: FEP, transparent tube,. 3.2, 6.4, 9.5 mm ø, wall thickness 1mm		E32-A01	4 mm
Tube-mounting type; light ON when fluid is present; minimal influence from bubbles and water drops Free-cut		E3X-DA□-S DA□-N E3X-MDA	Applicable tube: FEP, transparent tube,. 6- to 13 mm ø, wall thickness 1mm		E32-A02	
Tube-mounting type; dense mounting to detect level differences of 4 mm Free-cut		E3X-DA□-S DA□-N E3X-MDA NA□(V) NA□F	Applicable tube: FEP, transparent tube,. 8- to 10 mm ø, wall thickness 1mm ---	 ---	E32-L25T	10 mm
Teflon*3-covered Tube-mounting type; unlimited tube diameter; minimal influence from bubbles and water drops Free-cut		E3X-DA□-S E3X-MDA	Applicable tube: Transparent tube Tube diameter: No restriction (Tube must be FEP or material with equivalent transparency)		E32-D36F	4 mm

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.
*3. Teflon is a registered trademark of Dupont Company and Mitsui Chemical Company for fluorine resin.

Mapping sensors

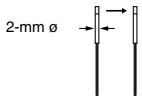
Diffuse reflective fiber units

High resolution mode
Super long-distance mode
Standard mode
Super high-speed mode

Features	**Shape**	**Applicable Amplifier Unit**	**Sensing distance (mm)*1**	**Standard object*2 (min. sensing object: Gold wire)**	**Model**	**Permissible bending radius**
Super-narrow vision field; side-view; opening angle: 1.5°; simple adjustment Free-cut		E3X-DA□-S		2 mm ø (0.1 mm ø)	E32-A03	1 mm
		DA□-N		2 mm ø (0.01 mm ø)		
		E3X-MDA		2 mm ø (0.1 mm ø)		
		NA□(V)	---	---		
		NA□F				

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.

High resolution mode
Super long-distance mode
Standard mode
Super high-speed mode

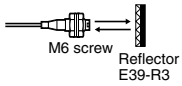
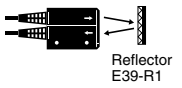
Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
Super-narrow vision field; small; side-view; opening angle: 3° ; simple adjustment Free-cut		E3X-DA□-S	460 340 100	1.2 mm ø (0.1 mm ø)	E32-A04	10 mm
		DA□-N	440 340 170	1.2 mm ø (0.01 mm ø)		
		E3X-MDA	300 220 100	1.2 mm ø (0.1 mm ø)		
		NA□(V)	---	---		
		NA□F				

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.

Retroreflective

Diffuse reflective fiber

High resolution mode
Super long-distance mode
Red light
Standard mode
Super high-speed mode

Features	Shape	Applicable Amplifier Unit	Sensing distance (mm)*1	Standard object*2 (min. sensing object: Gold wire)	Model	Permissible bending radius
Opaque object detection Free-cut		E3X-DA□-S	10 to 250 10 to 250 10 to 250	35 mm ø (0.1 mm ø)	E32-R21 + E39-R3 (Attachment)	10 mm
		E3X-DA□-N	10 to 250 10 to 2 50 10 to 250			
		E3X-MDA	10 to 250 10 to 250 10 to 250			
		E3X-NA□(V)	10 to 250	35.0 mm ø (0.3 mm ø)		
		E3X-NA□F	10 to 250	35.0 mm ø (0.5 mm ø)		
Opaque object detection		E3X-DA□-S	150 to 1,500 150 to 1,500 150 to 1,500	35 mm ø (0.2 mm ø)	E32-R16 + E39-R1 (Attachment)	25 mm
		E3X-DA□-N	150 to 1,500 150 to 1,500 150 to 1,500			
		E3X-MDA	150 to 1,500 150 to 1,500 150 to 1,500			
		E3X-NA□(V)	150 to 1500	35.0 mm ø (0.6 mm ø)		
		E3X-NA□F	150 to 1000	35.0 mm ø (0.4 mm ø)		

*1. Sensing distance based an white paper.
*2. Indicates values for standard mode.

Rating/Performance

Fiber Units

Through-beam fiber unit

Item \ Type/application		Long distance, general purpose, Thin fiber, side view	Flexible (break-resistant)	Chemical resistant	
			E32-T11, E32-T21, E32-T22B	E32-T12F, E32-T14F	E32-T81F
Ambient temperature	Operation	-40°C to 70°C (with no icing or condensation)			-40° to 200°C (with no icing or condensation)
	Storage				-40° to 110°C (with no icing or condensation)
Ambient humidity		Operating: 35% to 85% RH, Storage: 35% to 95% RH (with no icing or condensation)			
Admissible bending radius		25 mm min. (10 mm min. for 1 mm dia. fiber)	4 mm min.	40 mm min.	10 mm min.
Fiber sheath material		Black polyethylene	Vinyl chloride	Teflon (*) covered	
Protective structure		IEC 60529 IP67			

* Teflon is a registered trademark of the Dupont Company and the Mitsui Dupont Chemical Company for their fluoride resin.

Item \ Type/application		Flexible					
		E32-T12R	E32-T22R	E32-T16WR	E32-T16JR E32-T16PR	E32-T24R	E32-T14LR E32-ET11R E32-ET21R
Ambient temperature	Operation	-40° to 70°C (with no icing or condensation)		-25°C to 55°C (with no icing or condensation)	-40° to 70°C (with no icing or condensation)		
	Storage	-40° to 70°C (with no condensation)					
Ambient humidity		Operating: 35% to 85% RH, Storage: 35% to 95% RH (with no icing or condensation)					
Admissible bending radius		1 mm min.					
Fiber sheath material		Mixed vinyl chloride	Black polyethylene	Mixed vinyl chloride		Black polyethylene	Mixed vinyl chloride
Protective structure		IEC 60529 IP67		IEC 60529 IP50		IEC 60529 IP67	

Item \ Type/application		Heat resistant				
		300 °C	200°C		150°C	
		E32-T61-S	E32-T84S	E32-T81R-S	E32-ET51	E32-T54
Ambient temperature	Operation	-40° to 300°C *1 (with no icing or condensation)	-40° to 200°C (with no icing or condensation)	-40° to 200°C (with no icing or condensation)	-40° to 150°C *2 (with no incing or condensation)	
	Storage	-40° to 110°C (with no icing or condensation)				
Ambient humidity		Operating: 35% to 85% RH, Storage: 35% to 95% RH (with no icing or condensation)				
Admissible bending radius		25 mm min.		10 mm min.	35 mm min.	
Fiber sheath material		SUS303		Fluororesin		
Protective structure		IEC 60529 IP67				

*1 Since the heat resistance changes depending on the fiber area, refer to the external dimensions.
*2 For continuous operation, use the products within a temperature range of -40°C to 130°C

Item \ Type/application		Slot Sensor	Narrow vision field	Area sensing			
		E32-G14	E32-T22S E32-T24S	E32-T16W	E32-T16J	E32-T16	E32-T16P
Ambient temperature	Operation	-40° to 70°C (with no icing or condensation)		-25°C to 55°C (with no icing or condensation)	-40° to 70°C (with no icing or condensation)		
	Storage	-40° to 70°C (with no icing or condensation)					
Ambient humidity		Operating: 35% to 85% RH, storage: 35% to 95% RH (with no icing or condensation)					
Admissible bending radius		25 mm min.		10 mm min. (25 mm max. for E32-T16 only)			
Fiber sheath material		Black polyethylene	Mixed vinyl chloride	Vinyl chloride (black polyethylene for E32-T16 only)			
Protective structure		IEC 60529 IP67		IEC 60529 IP50 (IP67 for E32-T16 only)			

Item \ Type/application		Mapping Sensor	
		E32-A03	E32-A04
Ambient temperature	Operation	-40° to 70°C (with no icing or condensation)	
	Storage		
Ambient humidity		Operating: 35% to 85% RH, storage: 35% to 95% RH (with no icing or condensation)	
Admissible bending radius		1 mm min.	10 mm min.
Fiber sheath material		Black polyethylene	
Protective structure		IEC 60529 IP50	

Fiber Units with Reflective Sensor

Item \ Type/application		Long distance, general purpose, thin fiber, side view	Coaxial				Flexible (resists breaking)
			E32-EC31	E32-EC41	E32-C42	E32-D32	E32-D11, E32-D21, E32-D21B, E32-D22B
Differential distance		20% max. of sensing distance					
Ambient temperature	Operation	-40°C to 70°C (with no icing or condensation)					
	Storage						
Ambient humidity	Operation	35% to 85%RH (with no condensation)					
	Storage	35% to 95%RH (with no condensation)					
Admissible bending radius		25 mm min. (10 mm min. for 1 mm dia. fiber)	25 mm min.				4 mm min.
Fiber sheath material		Black polyethylene					Vinyl chloride
Protective structure		IEC 60529 IP67					

Item \ Type/application		Flexible			
		E32-D12R	E32-D22R, E32-D24R	E32-D14LR, E32-ED11R	E32-ED21R
Differential distance		20% max. of sensing distance			
Ambient temperature	Operation	-40°C to 70°C (with no icing or condensation)			
	Storage				
Ambient humidity	Operation	35% to 85%RH (with no condensation)			
	Storage	35% to 95%RH (with no condensation)			
Admissible bending radius		1 mm min.			
Fiber sheath material		Mixed vinyl chloride	Black polyethylene	Mixed vinyl chloride	Black polyethylene
Protective structure		IEC 60529 IP67			

Type/application / Item		Chemical resistance	Heat resistance			
		E32-D12F	150°C	200°C	300 °C	400 °C
			E32-ED51	E32-D81R	E32-D61	E32-D73
Differential distance		20% max. of sensing distance				
Ambient temperature	Operation	-30°C to 70°C (with no incing or condensation)	-40° to 150°C *1(with no incing or condensation)	-40° to 200°C (with no icing or condensation)	-40° to 300°C *2(with no icing or condensation)	-40° to 400°C (with no incing or condensation)
	Storage	-30°C to 70°C (with no incing or condensation)	-40° to 110°C (with no icing or condensation)			
Ambient humidity		Operating: 35% to 85% RH, Storage: 35% to 95% RH (with no icing or condensation)				
Admissible bending radius		40 mm min.	35 mm min.	10 mm min.	25 mm min.	
Fiber sheath material		Teflon (*3) covered	Fluororesin		SUS	
Protective structure		IEC 60529 IP67				

*1 For continuous operation, use the products within a temperature range of -40°C to 130°C
*2 Since the heat resistance changes depending on the fiber area, refer to the external dimensions on page AB- for details.
*3 Teflon is a registered trademark of the Dupont Company and the Mitsui Dupont Chemical Company for their fluoride resin.

Type/application / Item		Retroreflective		Limited reflective		Area sensing
		E32-R21	E32-R16	E32-L25, E32-L25A	E32-L25L, E32-L24L	E32-D36P1
Differential distance		20% max. of sensing distance			5% max. of sensing distance	20% max. of sensing distance
Ambient temperature	Operation	-40° to 70°C (with no icing or condensation)	-25°C to 55°C (with no incing or condensation)	-40° to 70°C (with no icing or condensation)	-40°C to 105°C * (with no incing or condensation)	-40° to 70°C (with no icing or condensation)
	Storage	-40° to 70°C (with no icing or condensation)			-40°C to 95°C (with no incing or condensation)	-40° to 70°C (with no incing or condensation)
Ambient humidity		Operating: 35% to 85% RH, Storage: 35% to 95% RH (with no icing or condensation)				
Admissible bending radius		10 mm min.				25 mm min.
Fiber sheath material		Black polyethylene			Reinforced polyethylene	Black polyethylene
Protective structure		IEC 60529 IP67	IEC 60529 IP66	IEC 60529 IP50		---

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

Type/application / Item / Model		Limited reflective
		E32-L56E1/E32-L56E2
Standard sensing object		Soda glass (SCG) having 7% reflection factor T=0.7 end face radius chamfering
Work inclination		2°
Sensing position accuracy		+0.1/-0.3
Differential distance		20% max. of sensing distance
Ambient temperature	Operation	0°C to 70°C *
	Storage	-40° to 70°C
Ambient humidity	Operation	35% to 85%
	Storage	35% to 95%
Protective structure		IEC 60529 IP40
Material	Case	Aluminum
	Cover	SPCC steel sheet
	Lens	Glass (BK7)
	Fiber cladding	Fluororesin

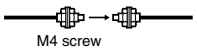
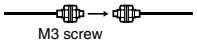
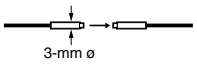
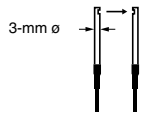
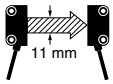
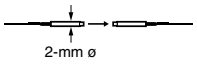
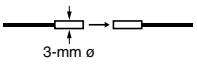
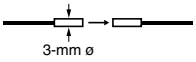
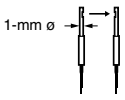
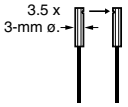
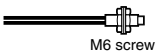
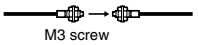
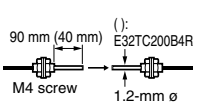
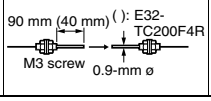
* +200°C for short-time use.

Flexible fiber unit

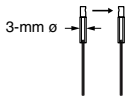
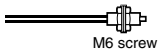
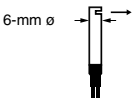
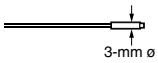
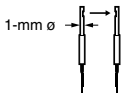
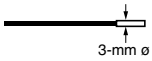
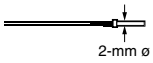
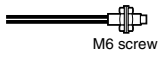
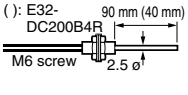
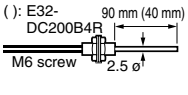
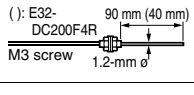
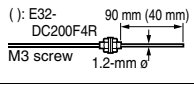
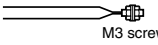
The following fibers are available as flexible type (1 week). (Up to 10 sets) Contact your trading company for the prices, delivery time and types.

Flexible fiber (R1) type

Throughbeam

Application	Shape	Model
General purpose		E32-ET11R
General purpose		E32-ET21R
General purpose		E32-T12R
Side view		E32-T14LR
Area sensing		E32-T16JR
Area sensing		E32-T16PR
Area sensing		E32-T16WR
Small fibre head		E32-T22R
Narrow vision field		E32-T22SR
Narrow vision field		E32-T22SR
Small fibre head		E32-T24R
Narrow vision field		E32-T24SR
Heat resistance		E32-T81R-S
General purpose		E32-TC200AR
General purpose		E32-TC200B4R
General purpose		E32-TC200F4R

Reflective model

Application	Shape	Model
Mapping Sensor		E32-A03
Coaxial fibre		E32-CC200R
General purpose		E32-D12R
Side view		E32-D14LR
Small fibre heat		E32-D22R
Side view		E32-D24R
Coaxial fibre		E32-D32LR
Coaxial fibre		E32-D32R
Heat resisrant		E32-D81R
General purpose		E32-DC200B4R
General purpose		E32-DC200BR
General purpose		E32-DC200F4R
General purpose		E32-DC200FR
General purpose		E32-ED11R
General purpose		E32-ED21R
Limited reflective		E32-L24LR
Limited reflective		E32-L25LR
Liquid-level detection		E32-L25TR

Special compatibility of fiber units

Sensing distance (Unit: mm)

Fiber type	Amplifier type	Mode	Standard product	R5	R7.5	R10	R12.5
E32-TC200B	E3X-DA11-N	Super-long-distance	950	590	770	840	950
		Standard	760	470	610	670	760
		Super-high-speed	280	170	220	250	280
E32-TC200F		Super-long-distance	250	110	250	250	250
		Standard	220	100	220	220	220
		Super-high-speed	90	40	90	90	90
E32-DC200F		Super-long-distance	100	70	100	100	100
		Standard	80	55	80	80	80
		Super-high-speed	30	20	30	30	30

Long fiber type

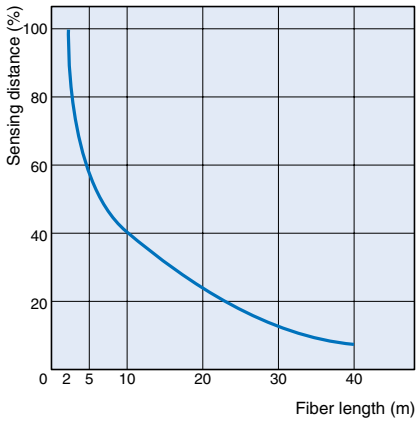
Applicable model (default type)

E32-T11L/-D11L, E32-TC200/-DC200, E32-TC200B/-DC200B, E32-TC200E/-DC200E, E32-TC200F/-DC200F, E32-TC200A4E32-T11/-D11

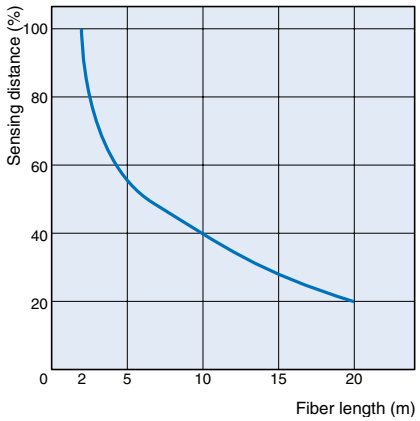
1 m increments in the range 6 m l 20 m [l=2 m, l=5 m (E32-T11L/E32-T11/E32-TC200/E32-DC200 only) are standard products.]

Fiber length vs. sensing distance

Through-beam fiber unit (assuming that the fiber length of 2 m is 100%)



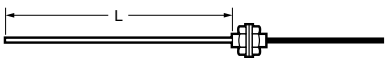
Reflective fiber unit (assuming that the fiber length of 2 m is 100%)



Different stainless steel tube length type

Applicable model

E32-TC200F (tube diameter 0.9 mm) E32-TC200B, E32-DC200F (tube diameter 1.2 mm) E32-DC200B (tube diameter 2.5 mm)



Can be produced within the range 10 mm L 120

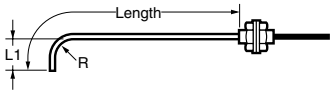
Tolerance: ±1 mm when L 40 mm, ±2 mm when L 40 mm (L=90 mm, L=40 mm is a standard product.)

Stainless steel tube front-end or root bent type

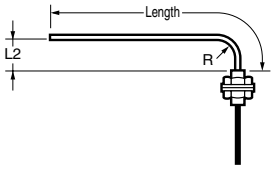
Applicable model

E32-TC200B, E32-TC200F, E32-DC200F

(When tube is bent at front end)



(When tube is bent at root)



Bending radius and L1, L2 dimensions (Unit: mm)

Bending radius	Control No.	L1		L2		SUS tube full length
		1	2	3	4	S□
R5	A	10	15	5	10	120 max.
R7.5	B	12.5	17.5	7.5	17.5	
R10	C	15	20	10	20	
R12.5	D	17.5	22.5	12.5	22.5	

Note: Only the products of the above dimensions can be manufactured. If the product is bent to other than the above dimension, the sleeve bender E39-F11 (option) is available.

Type list based on bending radius and L1, L2 dimensions

(When only L1 is specified) (Unit: mm)

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

*1 "T" for through-beam type, "D" for reflective type.
*2 B or "F" at the end of E32-TC200B.
*3 "50" for 50 mm full length. Full length 120 mm

(If only L2 is specified) (Unit: mm)

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

*1 "T" for through-beam type, "D" for reflective type.
*2 B or "F" at the end of E32-TC200B.
*3 "50" for 50 mm full length. Full length 120 mm

(When L1 and L2 are both specified) (Unit: mm)

Bending radius	L1 (±1)	L2 (±1)	Model
R5	10	5	E32-*1C200*2-A13
	10	10	E32-□C200□-A14
	15	5	E32-□C200□-A23
	15	10	E32-□C200□-A24
R7.5	12.5	7.5	E32-□C200□-B13
	12.5	17.5	E32-□C200□-B14
	17.5	7.5	E32-□C200□-B23
	17.5	17.5	E32-□C200□-B24
R10	15	10	E32-□C200□-C13
	15	20	E32-□C200□-C14
	20	10	E32-□C200□-C23
	20	20	E32-□C200□-C24
R12.5	17.5	12.5	E32-□C200□-D13
	17.5	22.5	E32-□C200□-D14
	22.5	12.5	E32-□C200□-D23
	22.5	22.5	E32-□C200□-D24

*1 "T" for through-beam type, "D" for reflective type.
*2 B or "F" at the end of E32-TC200B.

Precautions

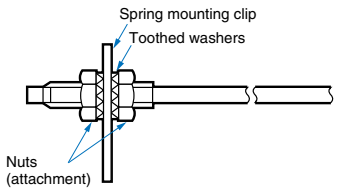
Fiber Units

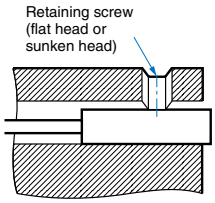
Installation

Tightening Force

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

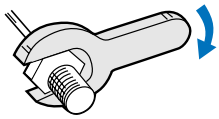
Screw-mounting Model Cylindrical Model





Fiber Units	Clamping torque
M3/M4 screw	0.78 Nm max.
M6 screw/6-mm dia. column	0.98 Nm max.
1.5-mm dia. column	0.2 Nm max.
2-mm dia./3-mm dia. column	0.29 Nm max.
E32-T12F 5-mm dia. Teflon model	0.78 Nm max.
E32-D12F 6-mm dia. Teflon model	
E32-T16	0.49 Nm max.
E32-R21	0.59 Nm max.
E32-M21	0.49 Nm max. for up to 5 mm from front end, 0.78 Nm max. for more than 5 mm from front end
E32-L25A	0.78 Nm max.
E32-T16P E32-T16PR E32-T24S E32-L24L E32-L25L E32-T16J E32-T16JR	0.29 Nm max.
E32-T16W E32-T16WR	0.3 Nm max.

Use a proper-sized wrench.

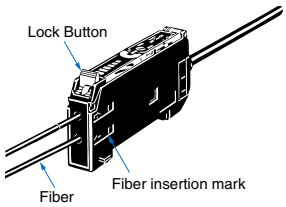


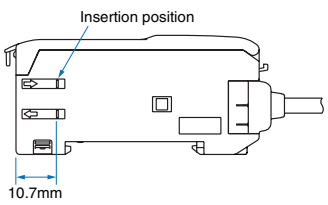
Fiber Connection and Disconnection

The E3X Amplifier Unit has a lock button. Connect or disconnect the fibers to or from the E3X Amplifier Unit using the following procedures:

1. Connection

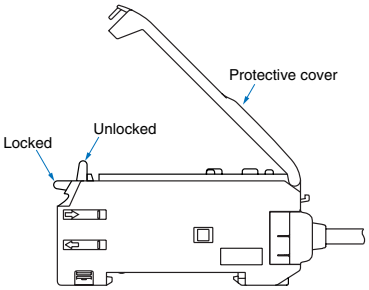
Open the protective cover, insert the fibers according to the fiber insertion marks on the side of the Amplifier Unit, and lower the lock button.





2. Disconnection

Remove the protective cover and raise the lock button to pull out the fiber.



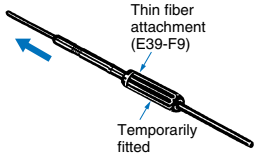
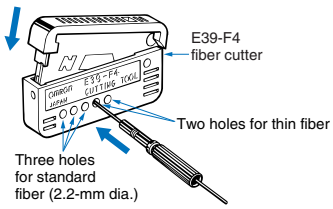
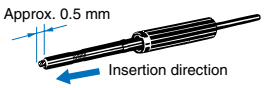
Note:To maintain the fiber properties, confirm that the lock is released before removing the fiber.

3. Precautions for Fiber Connection/Disconnection

Be sure to lock or unlock the lock button within an ambient temperature range between -10°C and 40°C.

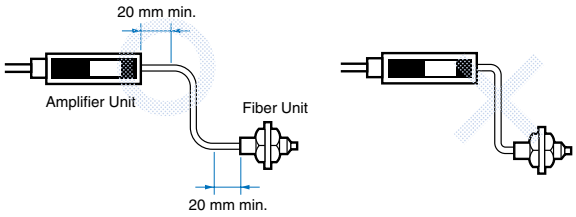
Cutting Fiber

- Insert a fiber into the Fiber Cutter and determine the length of the fiber to be cut.
- Press down the Fiber Cutter in a single stroke to cut the fiber.
- The cutting holes cannot be used twice. If the same hole is used twice, the cutting face of the fiber will be rough and the sensing distance will be reduced. Always use an unused hole.
- Cut a thin fiber as follows:

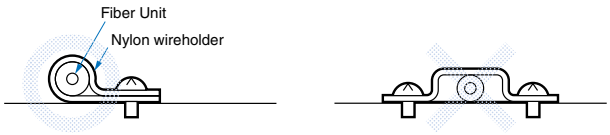
①	An attachment is temporarily fitted to a thin fiber before shipment.	
②	Secure the attachment after adjusting the position of it in the direction indicated by the arrow.	
③	Insert the fiber to be cut into the E39-F4.	
④	Finished state (proper cutting state)	 Note: Insert the fiber in the direction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

Connection

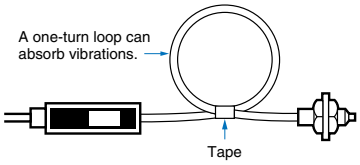
- Do not strain the fiber unit, e.g. do not apply tensile or compression force. (Within 9.8 Nm or 29.4 Nm) Use special care since the fiber is thin.
- The bending radius of the fiber unit should exceed the admissible bending radius given in "Type/standard price" and "Ratings/performance".
- Do not bend the edge of the fiber units (excluding the E32-T□R and E32-D□R).



- Do not apply excess force on the fiber units.

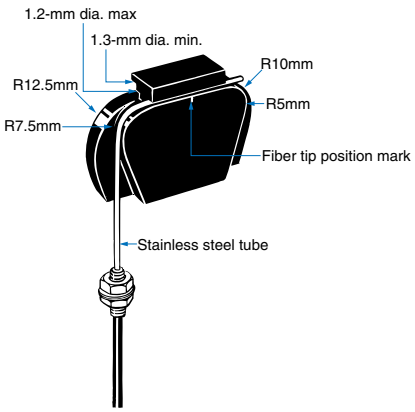


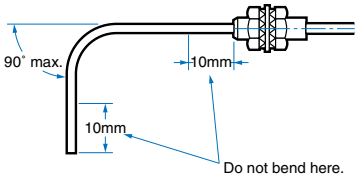
- The fiber head could be break from excessive vibration. To prevent this, the following is applied:



E39-F11 Sleeve Bender

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



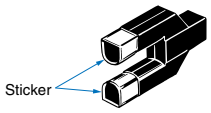


Heat-resistant fibers (E32-D51, E32-T51)

- The bending radius should be 35 mm up.
- The fiber connector E39-F10 cannot be used for extension.
- +130 max. for continuous operation at high temperature. The upper limit of the short-time operable temperature is +150

E32-T14/E32-G14

The presence of a reflective object at the front ends of the lenses may place the unit in an incident state. In this case, apply the supplied black seals to the front ends of the lenses.



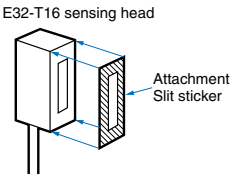
Wafer sensor (E32-L25 (A))

- Insert the fiber with a white line into the emission side of the amplifier.
- When installing the sensor head, tighten it to the 0.78Nm torque.
- Do not expose the sensor to water.

Supplied slit for E32-T16

When using the supplied slit, peel off the back paper and apply it along the outline of the sensing surface. For use at 45 mm or less, always fit a slit of 0.5 mm width.

Example



E32-M21

Set the four fibers at a sufficient distance to avoid interfering with each other.

Adjustment

E32-G14

Because of a short sensing distance, the incident level becomes excessive, disabling "without-work teaching". Use with/without-work teaching.

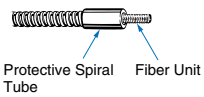
Accessories

Use of E39-R3 Reflector

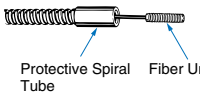
1. When using an adhesive tape on the rear face, apply it after washing off oil, dust, etc. with detergent from the place of application. The reflector cannot be installed if there remains oil, etc.
2. The E39-R3 cannot be used in places where it is exposed to oil or chemicals.

Protective Spiral Tubes

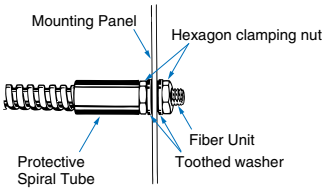
1. Insert a fiber to the protective spiral tube from the head connector side (screwed) of the tube.



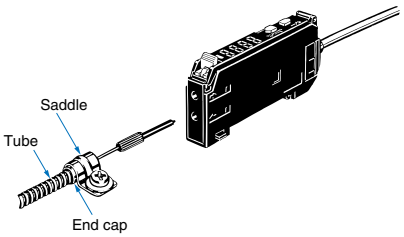
2. Push the fiber into the protective spiral tube. The tube should be straight so that the fiber is not twisted when inserted. Then turn the end cap of the spiral tube.



3. Secure the protective spiral tube at a suitable place with the attached nut.

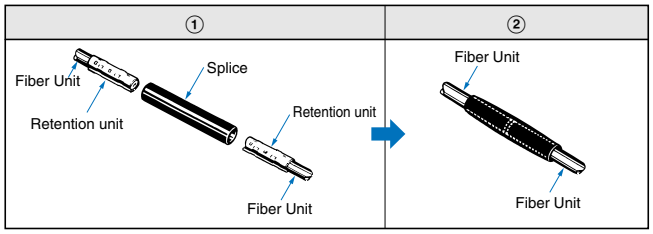


4. Use the attached saddle to secure the end cap of the protective spiral tube. To secure the protective spiral tube at a position other than the end cap, apply tape to the tube so that the portion becomes thicker in diameter.



E39-F10 Fiber Connector

Fit the connector in the following procedure.



- 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.

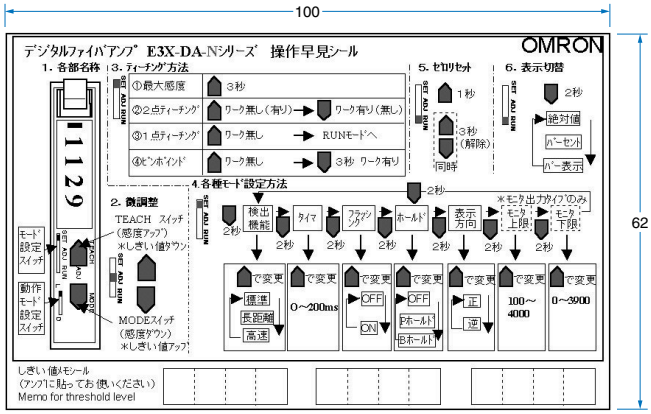
Only 2.2 mm dia. fibers can be connected.

For E3X-DA-N

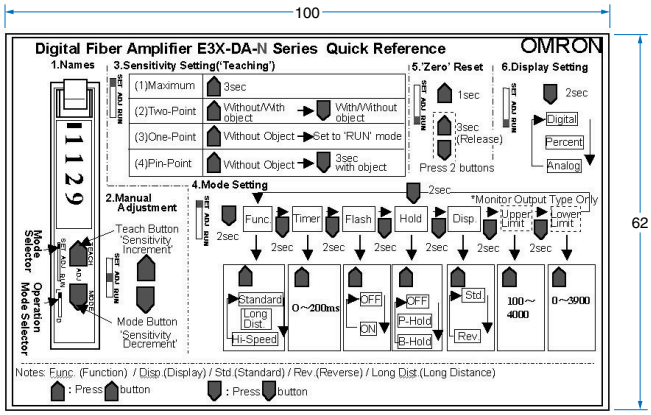
Operating Instructions Sticker E39-Y1

- Apply this seal next to the sensor.
- (1 English and 1 Japanese stickers per set)
- Material: (Front) Paper, (rear) adhesive tape

Japanese Sticker



English Sticker

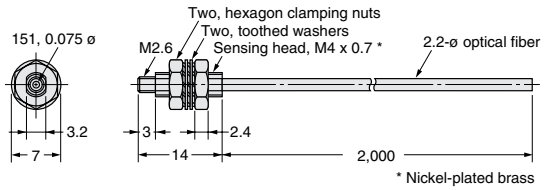


Dimensions

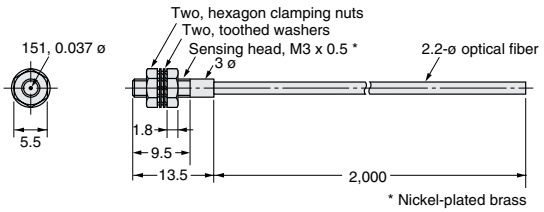
General purpose

Throughbeam

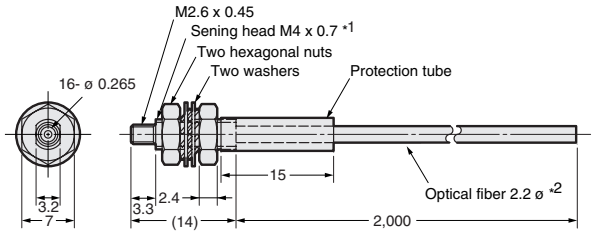
E32-ET11R



E32-ET21R

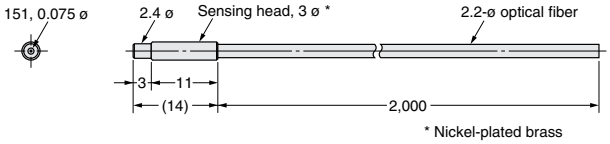


E32-T11U

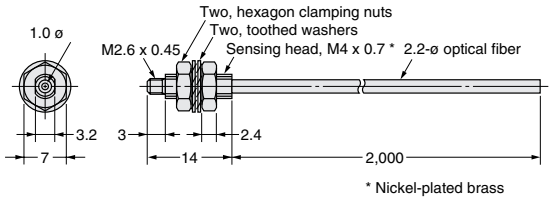


*1 Material: nickel-plated brass
*2 Sheath: flouroresin

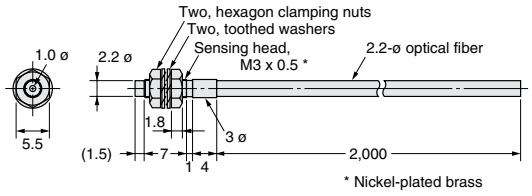
E32-T12R



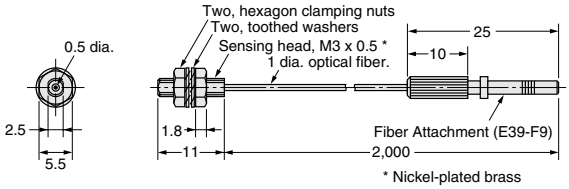
E32-TC200



E32-TC200A

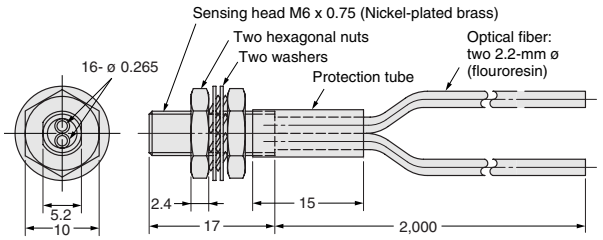


E32-TC200E



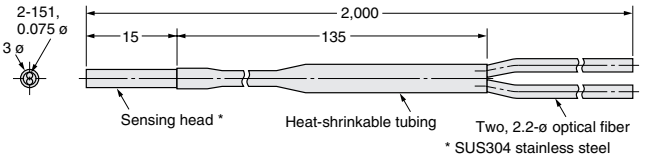
Diffuse reflective

E32-D11U

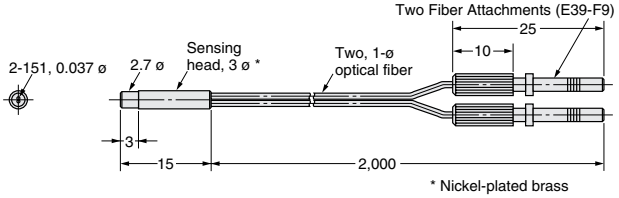


*1. material: nickel plated brass
*2. outside: kind of fluorine resin

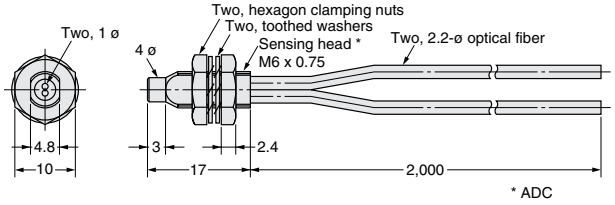
E32-D12R



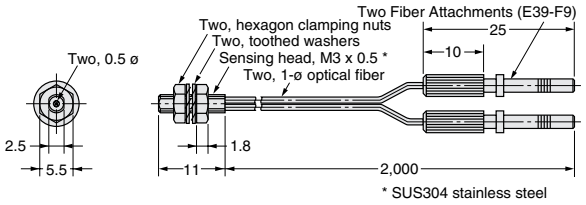
E32-D22R



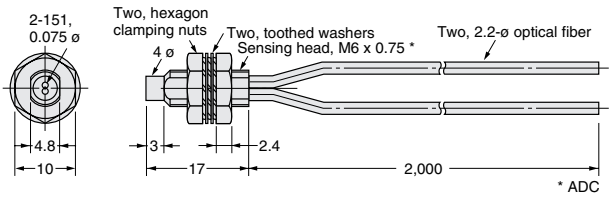
E32-DC200



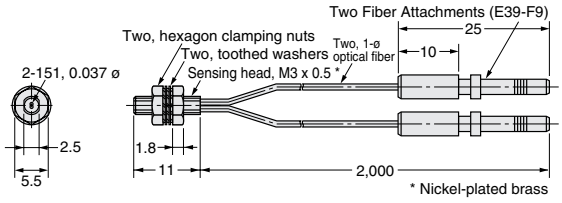
E32-DC200E



E32-ED11R



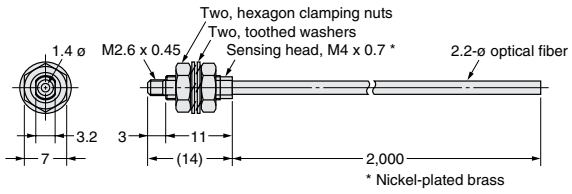
E32-ED21R



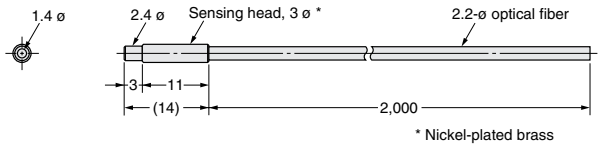
Long Distance

Throughbeam

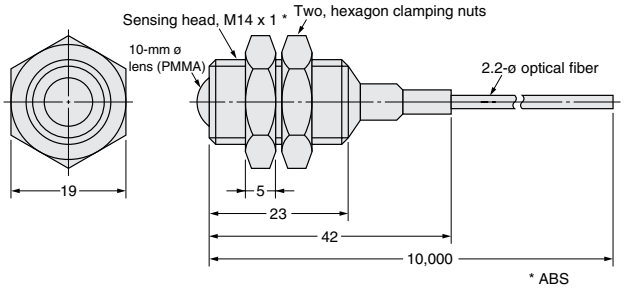
E32-T11L



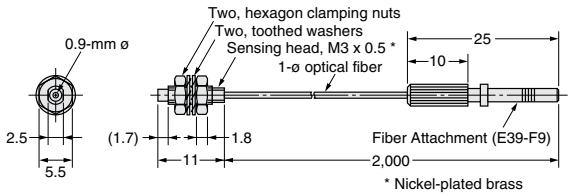
E32-T12L



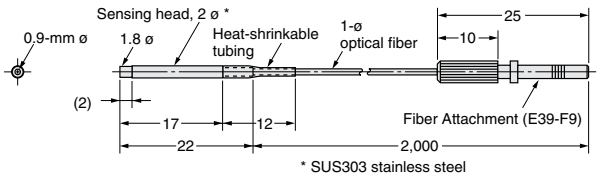
E32-T17L



E32-T21L

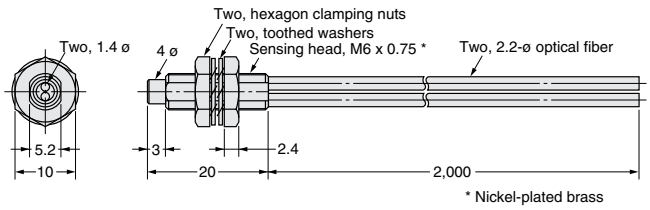


E32-T22L

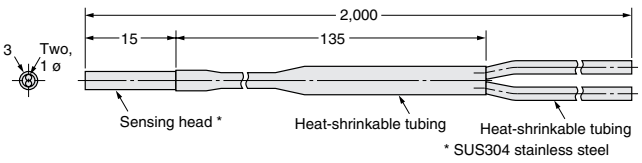


Diffuse reflective

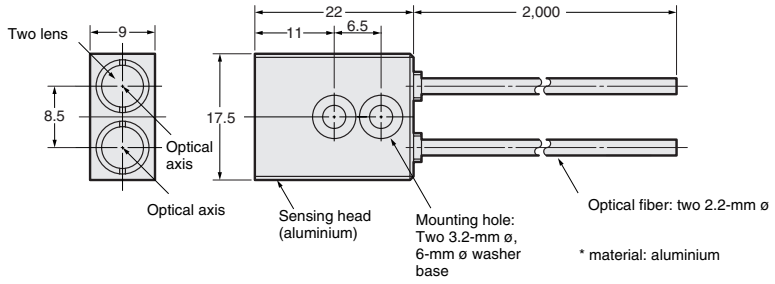
E32-D11L



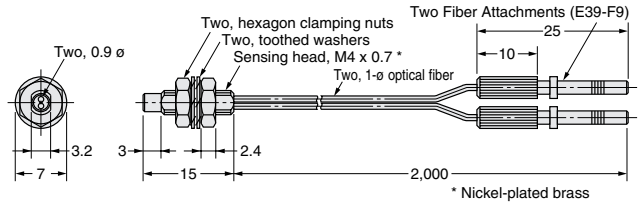
E32-D12



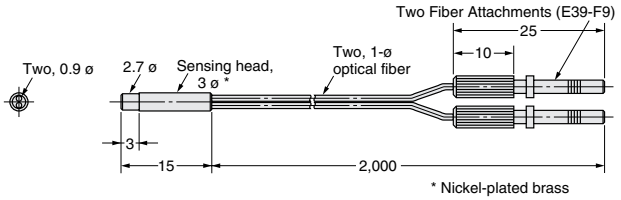
E32-D16



E32-D21L



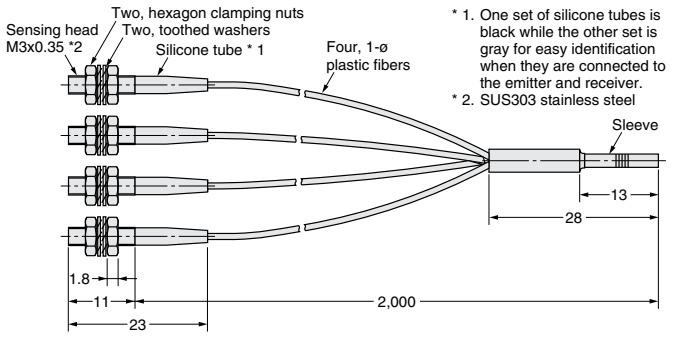
E32-D22L



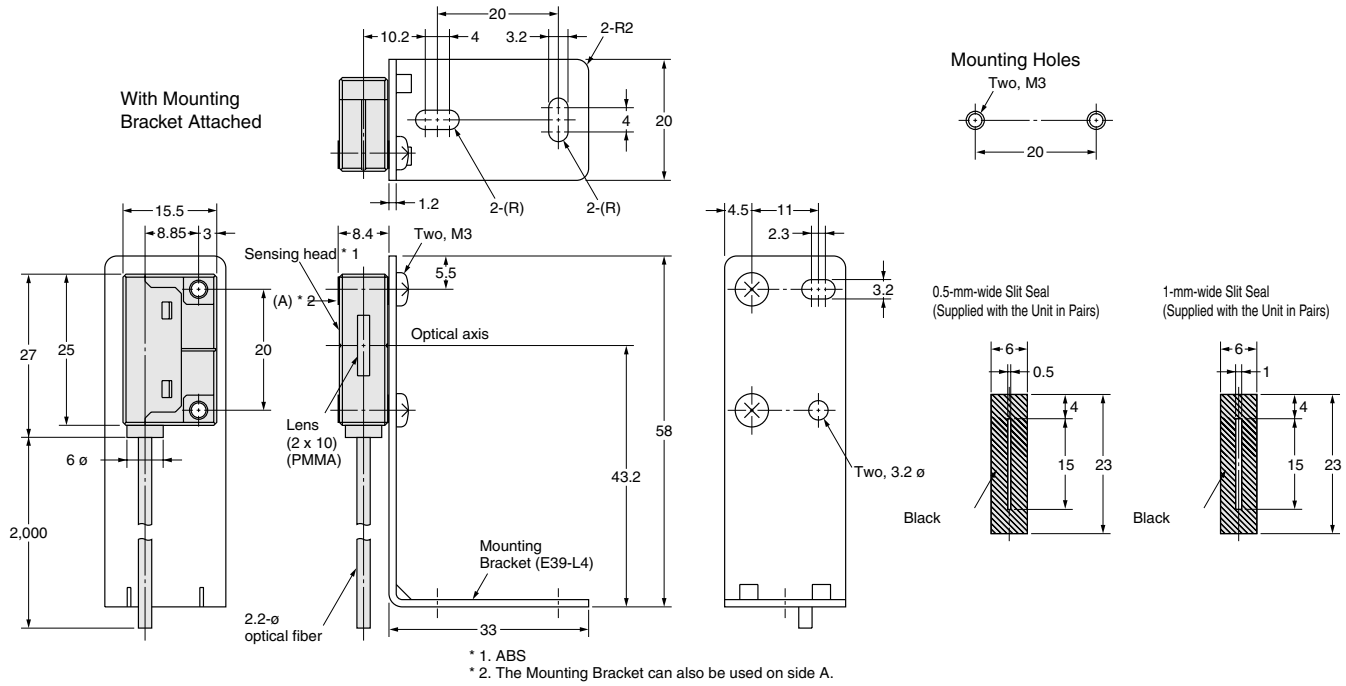
Area sensing

Throughbeam

E32-M21

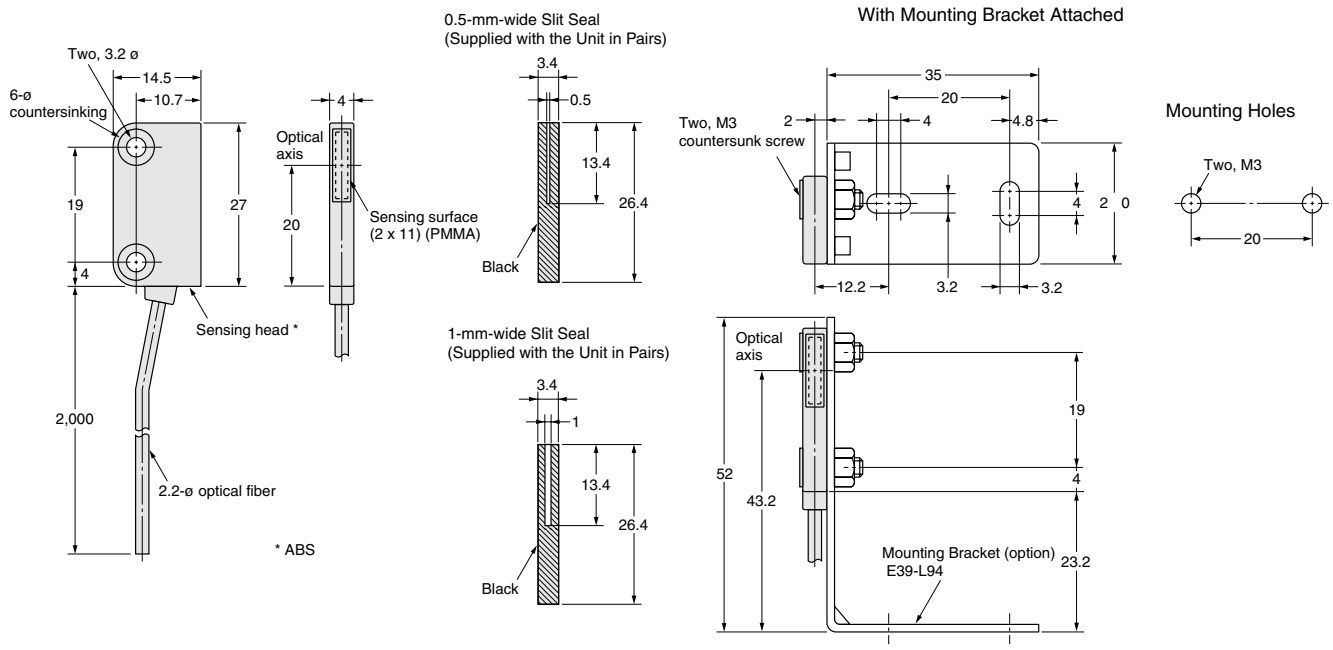


E32-T16

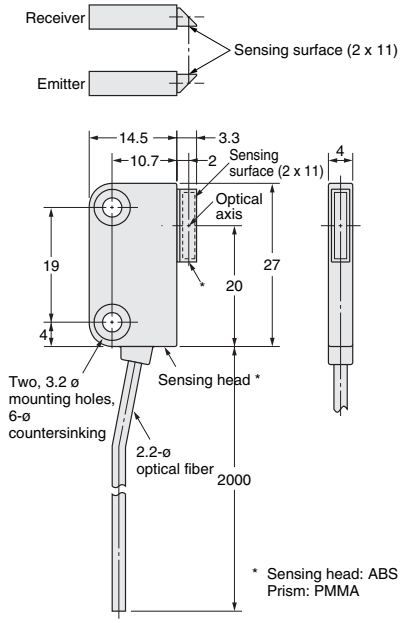


* 1. ABS
* 2. The Mounting Bracket can also be used on side A.

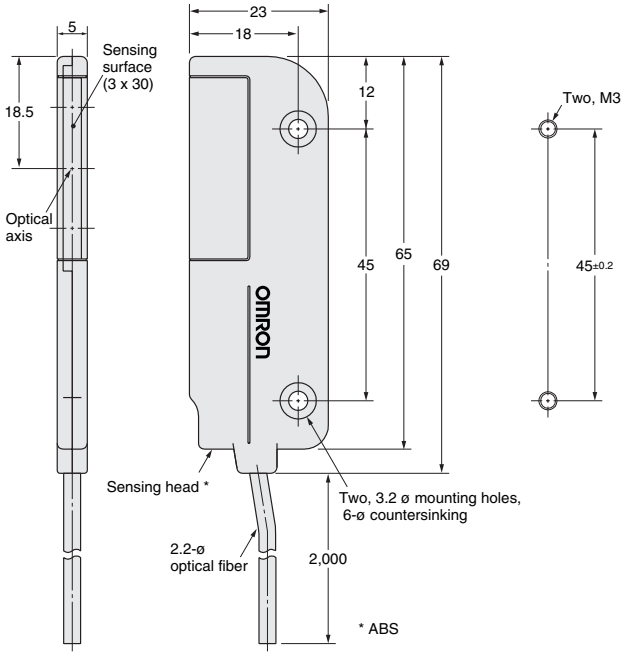
E32_T16P
E32_T16PR



E32-T16
E32-T16JR

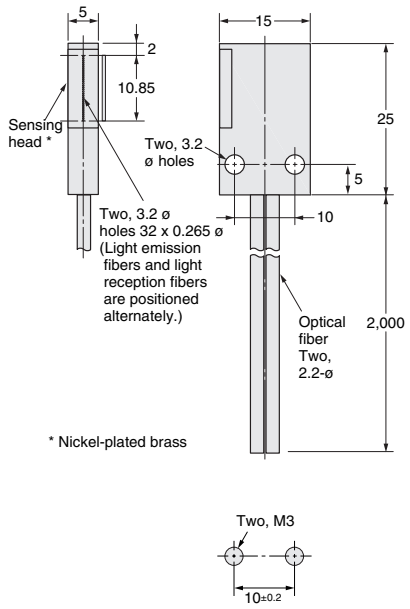


E32-T16W
E32-T16WR



Diffuse reflective

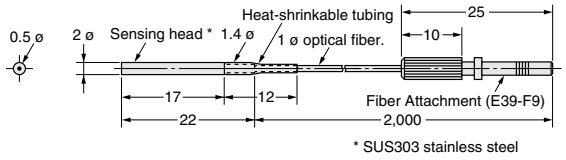
E32-D36P1



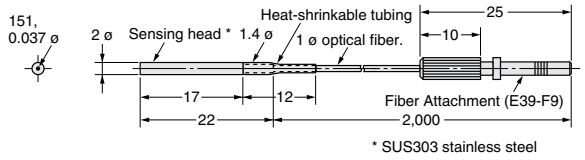
Small fiber head

Throughbeam

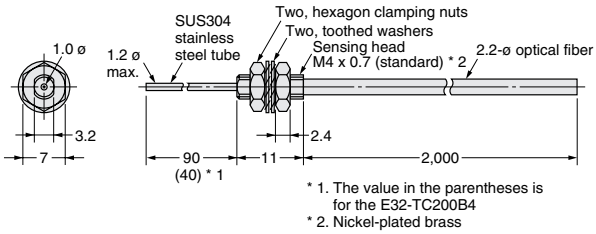
E32-T22



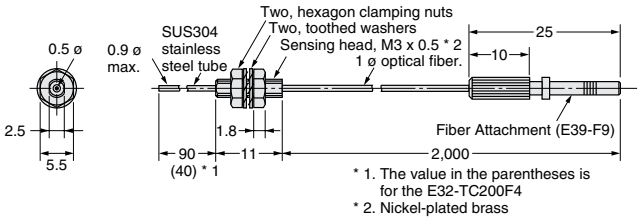
E32-T22R



E32-TC200B
E32-TC200B4

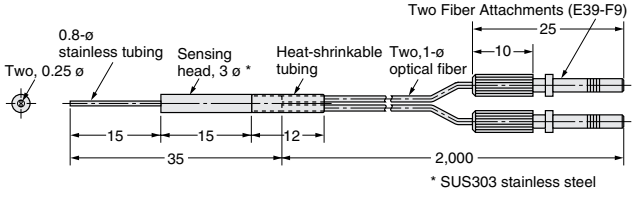


E32-TC200F
E32-TC200F4

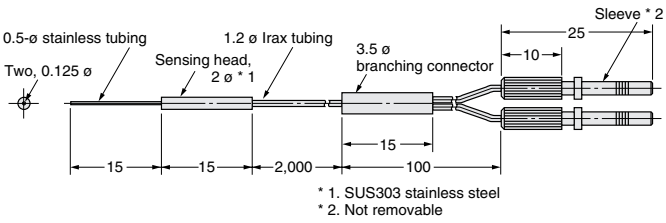


Diffuse reflective

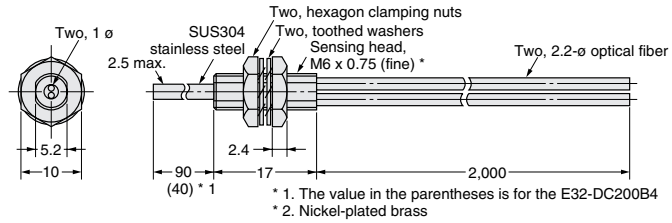
E32-D33



E32-D331

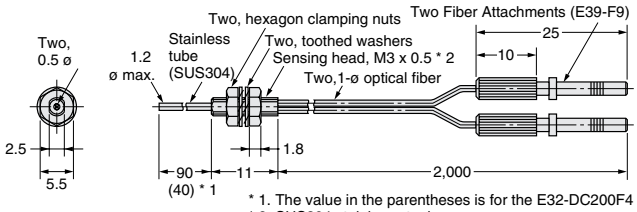


E32-DC200B
E32-DC200B4



* 1. The value in the parentheses is for the E32-DC200B4
* 2. Nickel-plated brass

E32-DC200F
E32-DC200F4

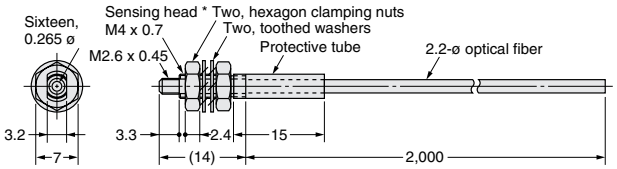


* 1. The value in the parentheses is for the E32-DC200F4
* 2. SUS304 stainless steel

Fiber for Robot Application R4

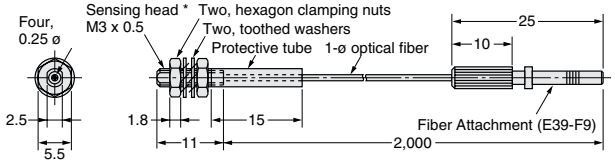
Throughbeam

E32-T11



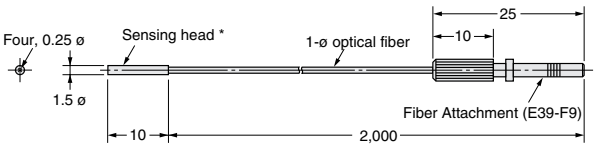
* Nickel-plated brass

E32-T21



* Nickel-plated brass

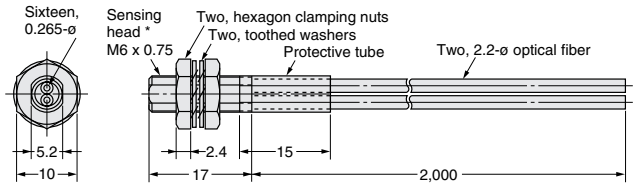
E32-T22B



* Nickel-plated brass

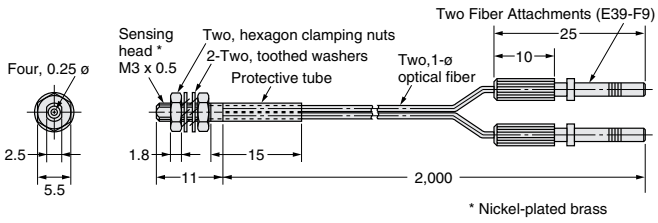
Diffuse reflective

E32-D11



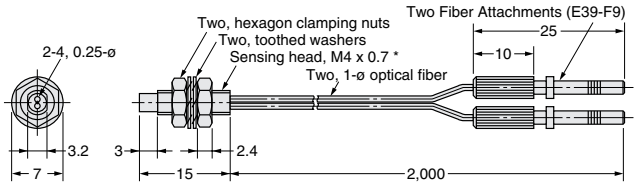
* Nickel-plated brass

E32-D21



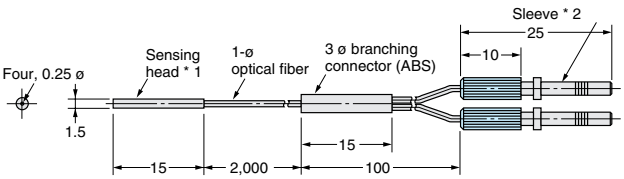
* Nickel-plated brass

E32-D21B



* SUS303 stainless steel

E32-D22B

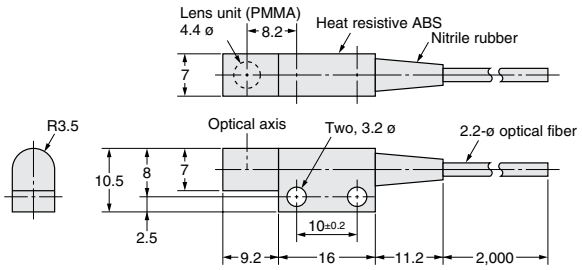


* 1. SUS304 stainless steel
* 2. Not removable

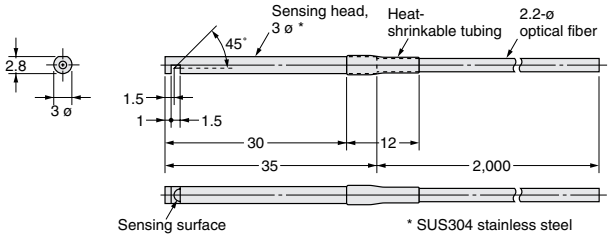
Side view

Throughbeam

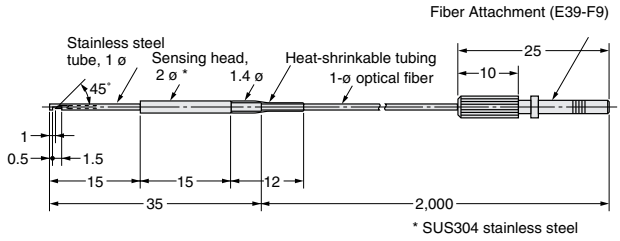
E32-T14



E32-T14L
E32-T14LR

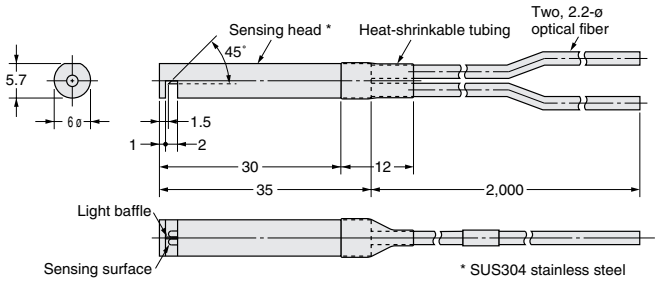


E32-T24
E32-T24R

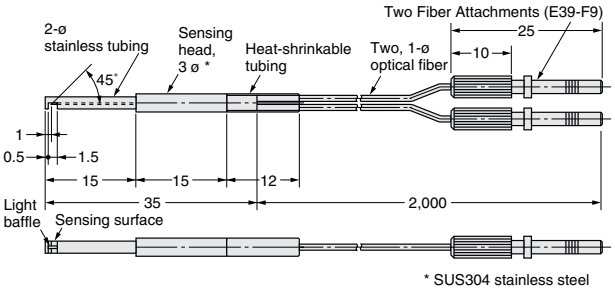


Diffuse reflective

E32-D14L
E32-D14LR



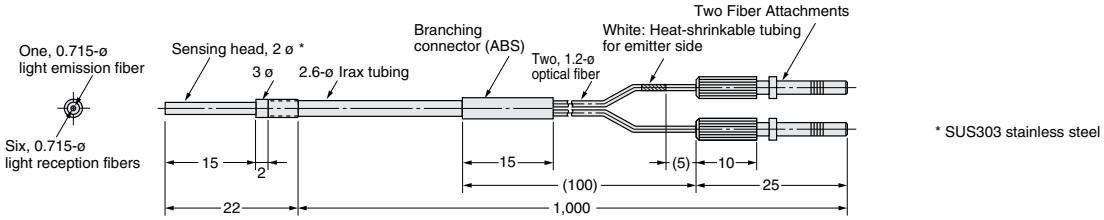
E32-D24
E32-D24R



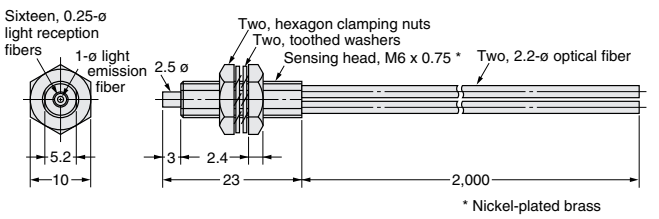
Coaxial fiber

Diffuse reflective

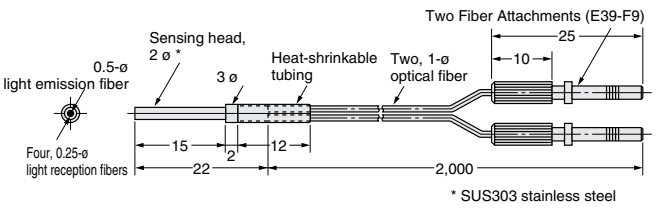
E32-C42



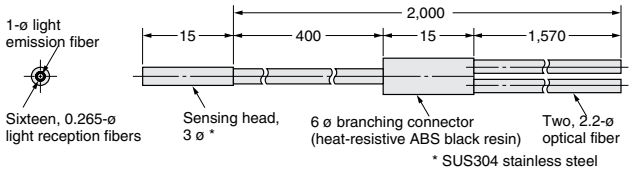
E32-CC200



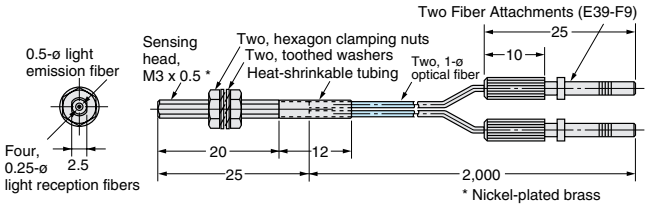
E32-D32



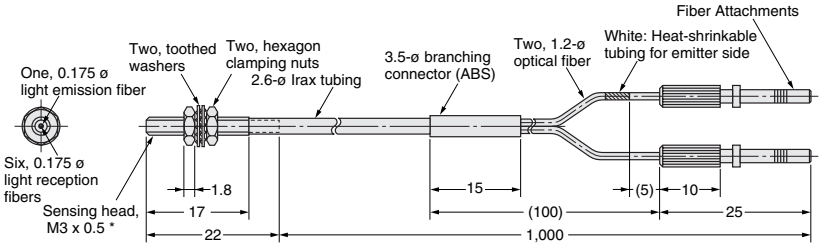
E32-D32L



E32-EC31



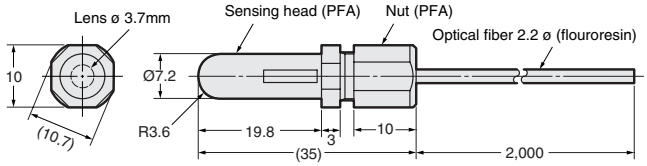
E32-EC41



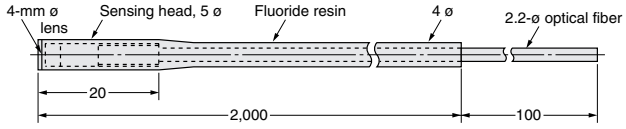
Chemical resistant

Throughbeam

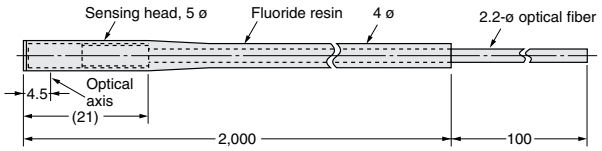
E32-T11F



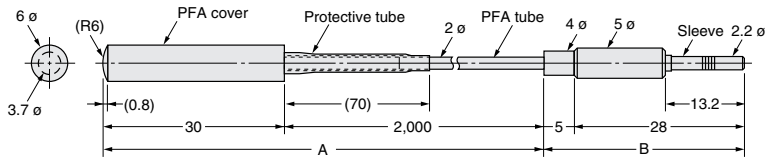
E32-T12F



E32-T14F

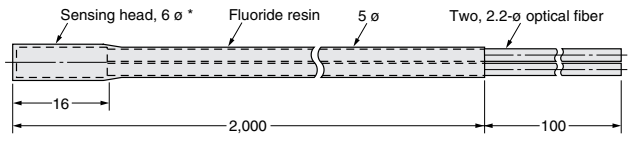


E32-T81F-S



Diffuse reflective

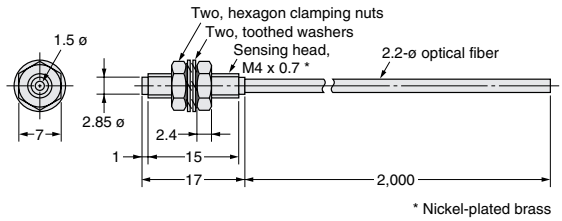
E32-D12F



Heat resistant

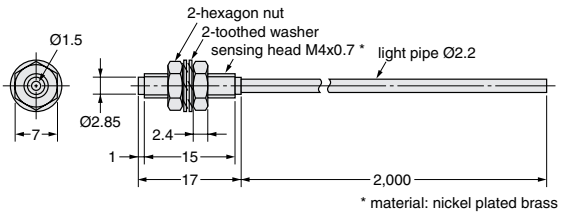
Throughbeam

E32-ET51



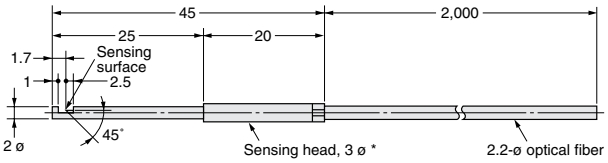
* Nickel-plated brass

E32-T51



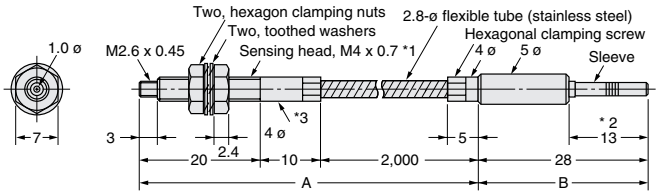
* material: nickel plated brass

E32-T54



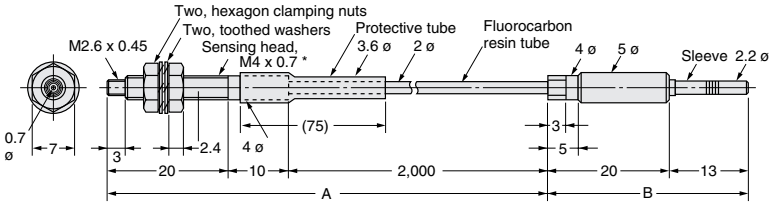
* SUS303 stainless steel

E32-T61-S



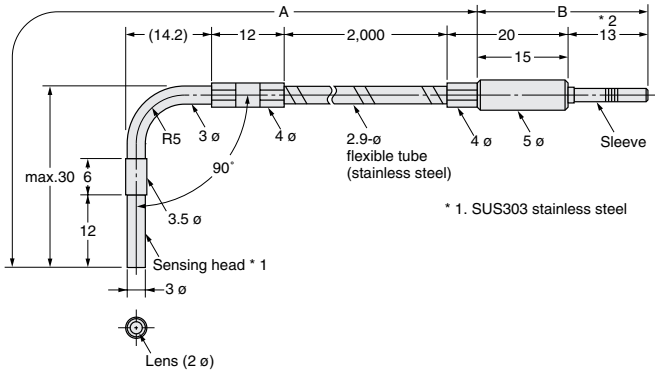
* 1. SUS303 stainless steel
* 3. Fiber length 10 m and more

E32-T81R-S



* SUS303 stainless steel

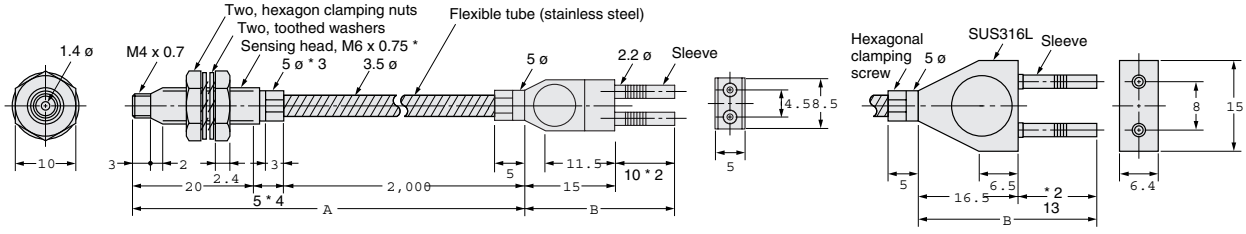
E32-T84S-S



* 1. SUS303 stainless steel

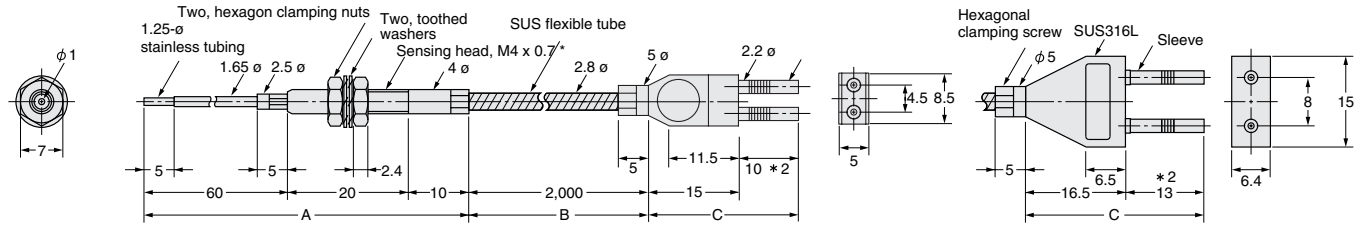
Diffuse reflective

E32-D61
E32-D61-S



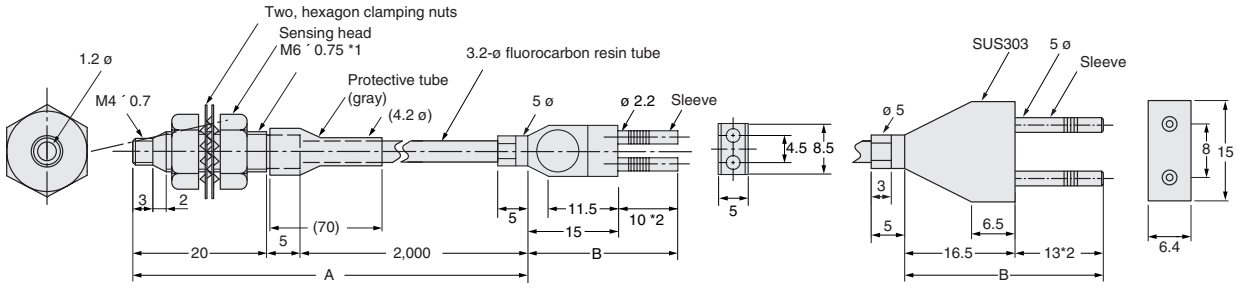
* 1. SUS303 stainless steel
* 3. Fiber length 10 m and more becomes 6-diameter.
* 4. Fiber length 10 m and more becomes 10-diameter.

E32-D73
E32-D73-S



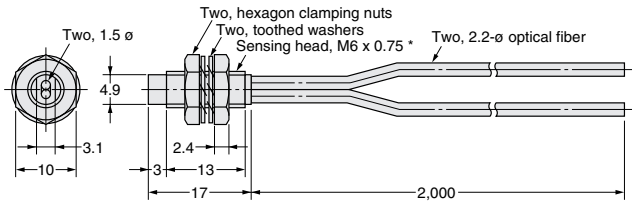
* 1. SUS303 stainless steel

E32-D81R
E32-D81R-S



* 1. SUS303 stainless steel

E32-ED51

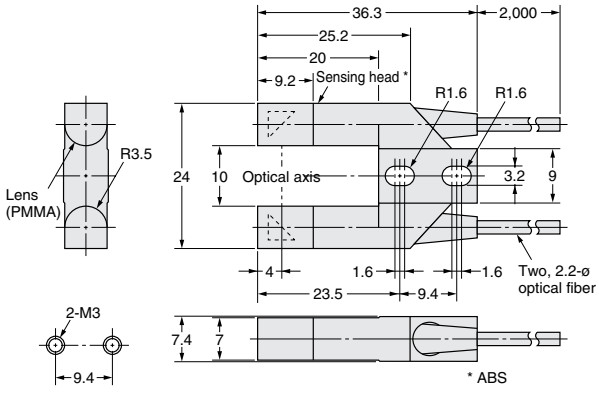


* Nickel-plated brass

Grooved

Throughbeam

E32-G14

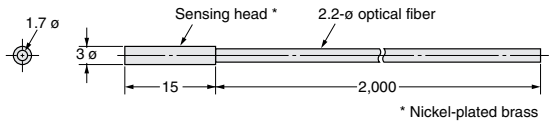


* ABS

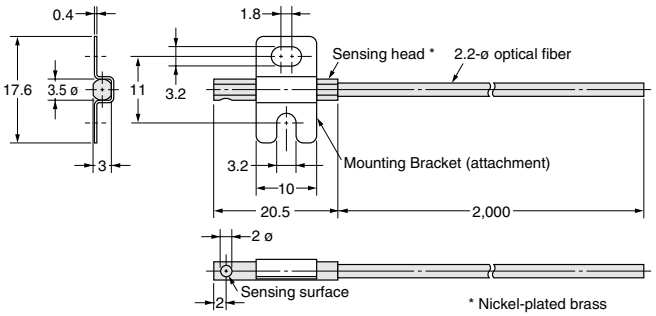
Narrow Vision Field

Throughbeam

E32-T22S



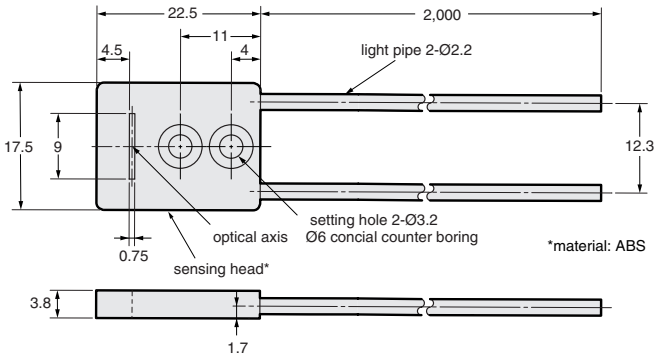
E32-T24S



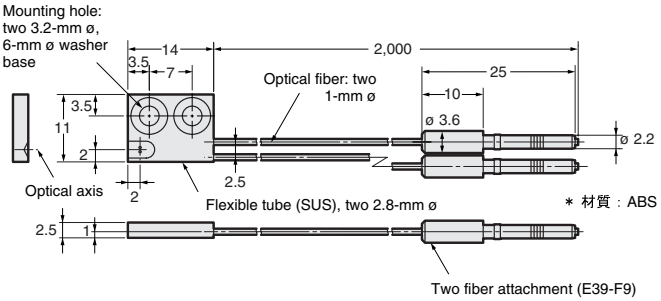
Limited-reflective

Diffuse reflective

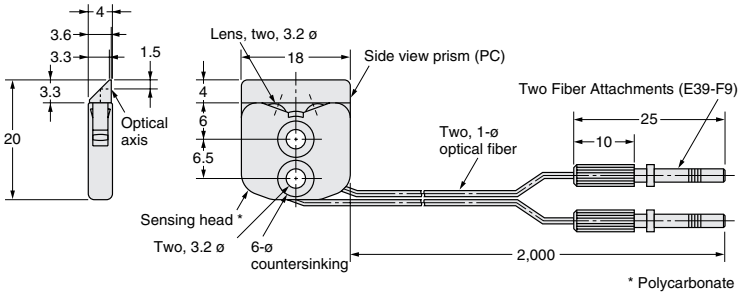
E32-L16



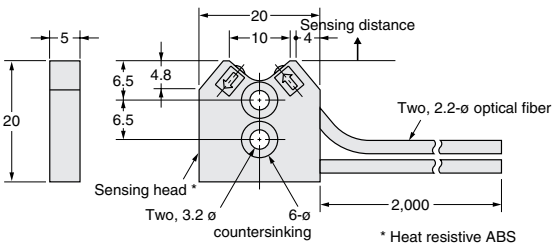
E32-L24S



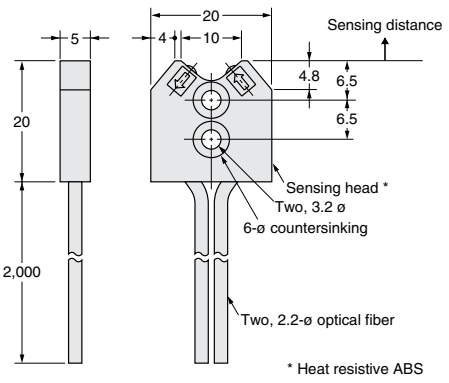
E32-L24L



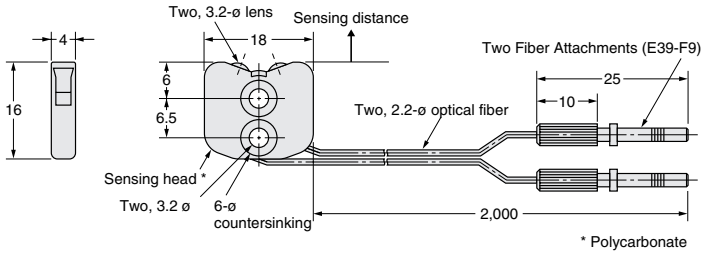
E32-L25



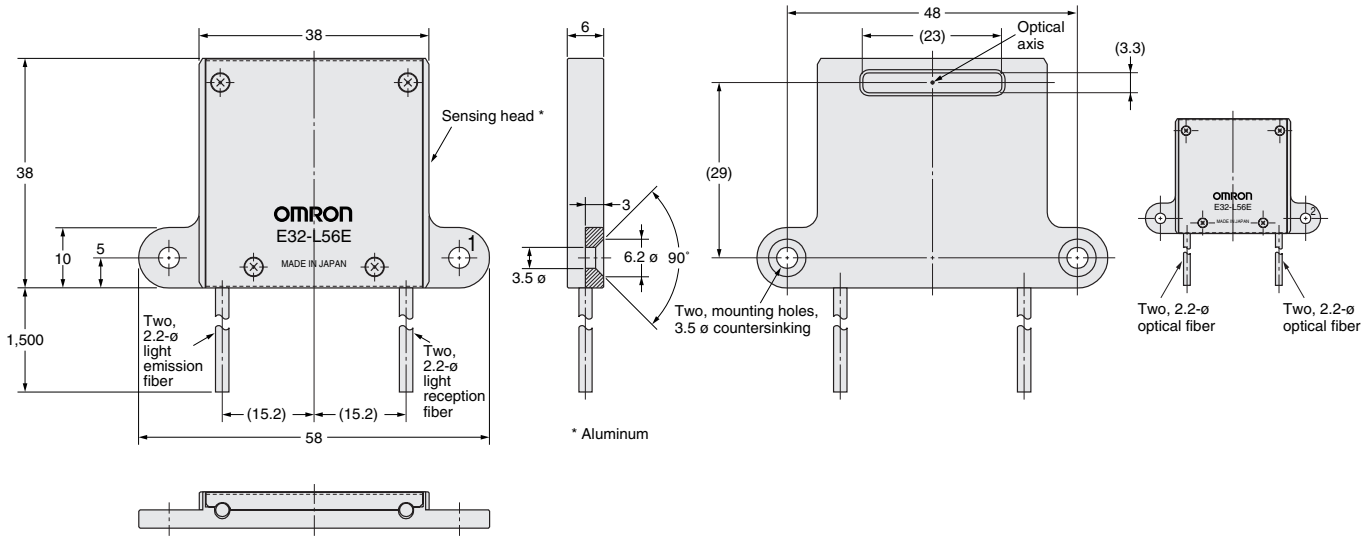
E32-L25A



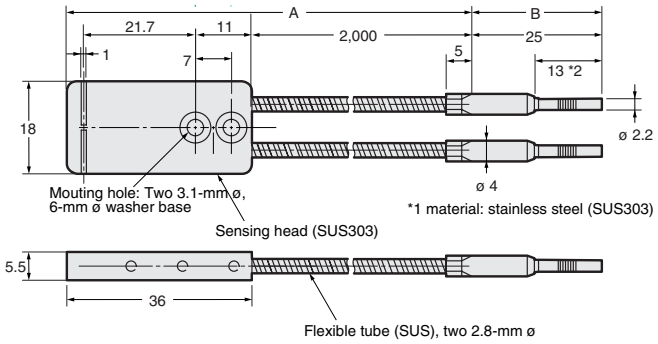
E32-L25L



E32-L56E1
E32-L56E2



E32-L66

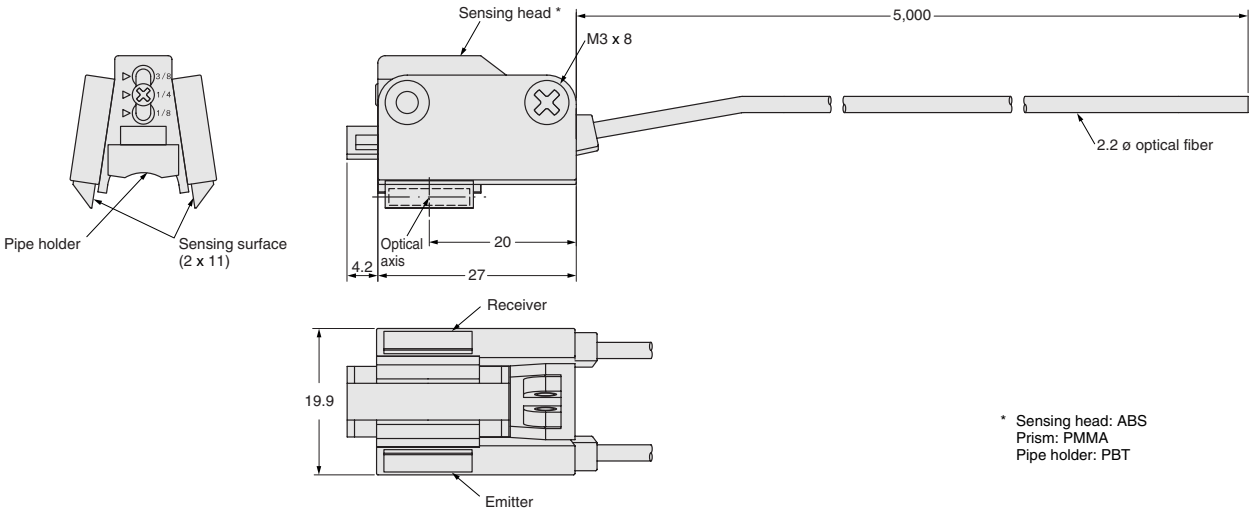


Note: Ambient temperature of A part is 300 degree C and of B part is 110 degree C. When the part indicated by *2 is inserted into amplifier, ambient temperature of *2 part is the same as that of amplifier unit.

Fluid-level Detection Fiber Units

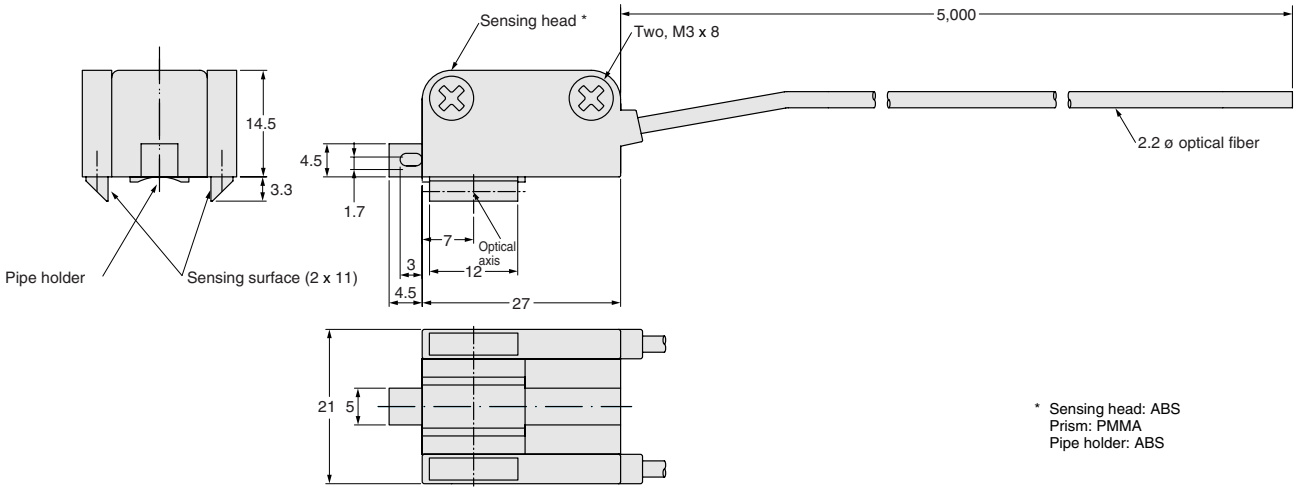
Diffuse reflective

E32-A01



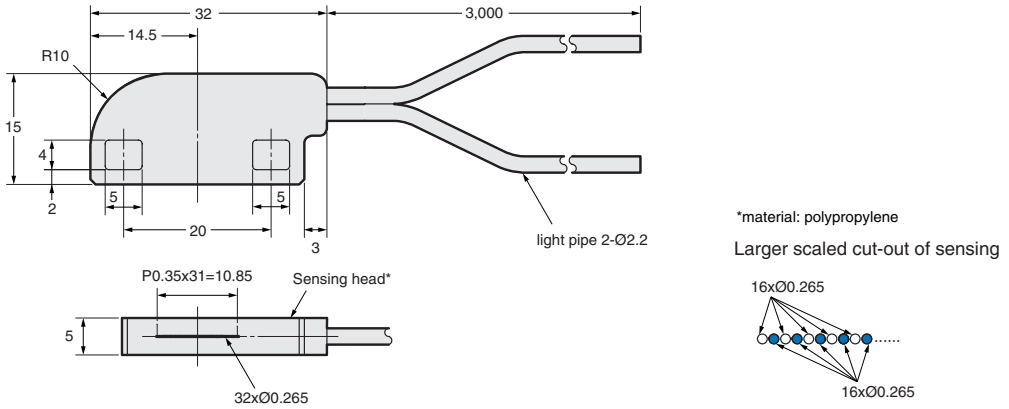
* Sensing head: ABS
Prism: PMMA
Pipe holder: PBT

E32-A02



* Sensing head: ABS
Prism: PMMA
Pipe holder: ABS

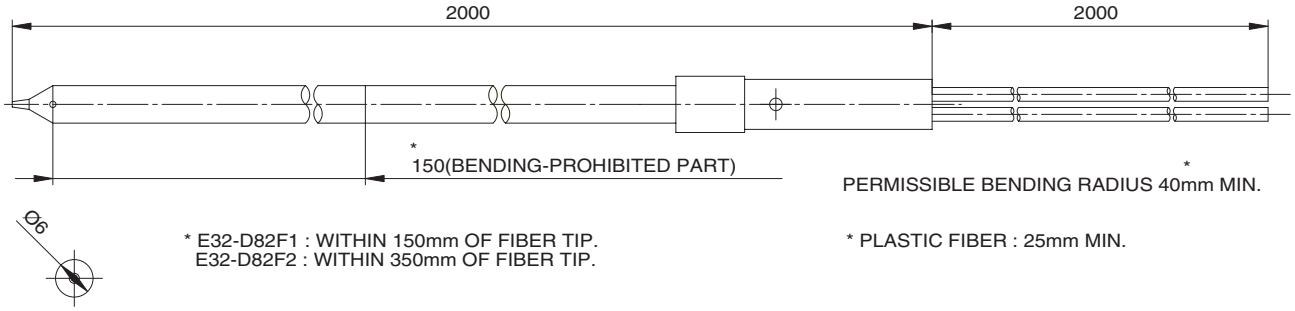
E32-D36F



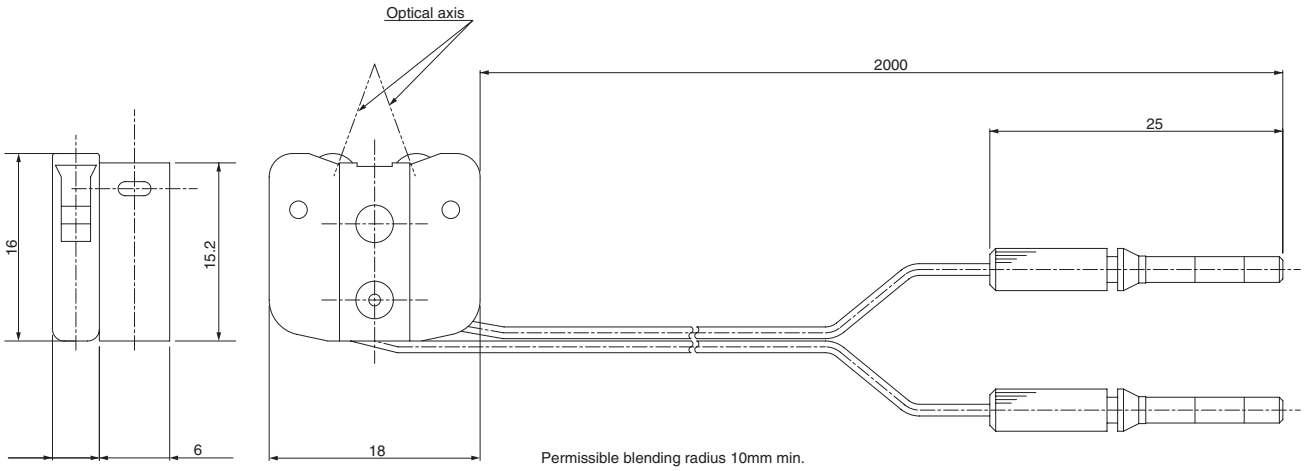
*material: polypropylene

Larger scaled cut-out of sensing

E32-D82F1
E32-D82F2



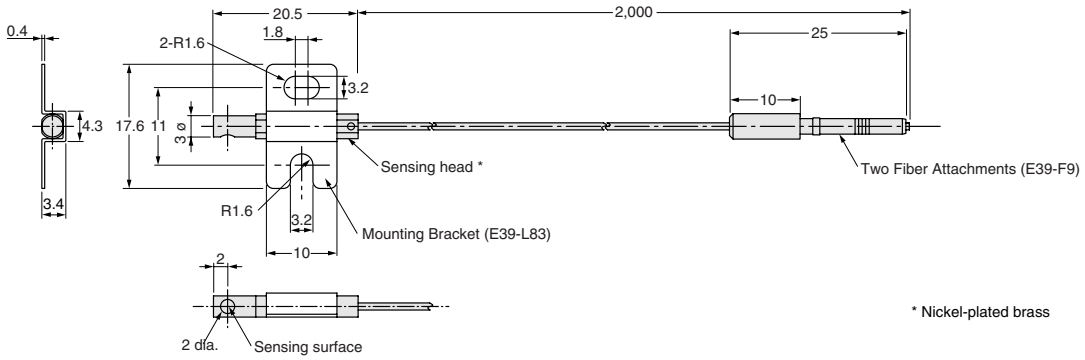
E32-L25T



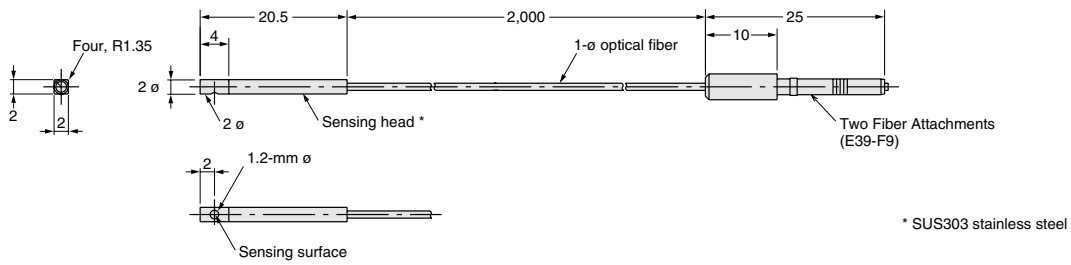
Mapping sensors

Diffuse reflective

E32-A03

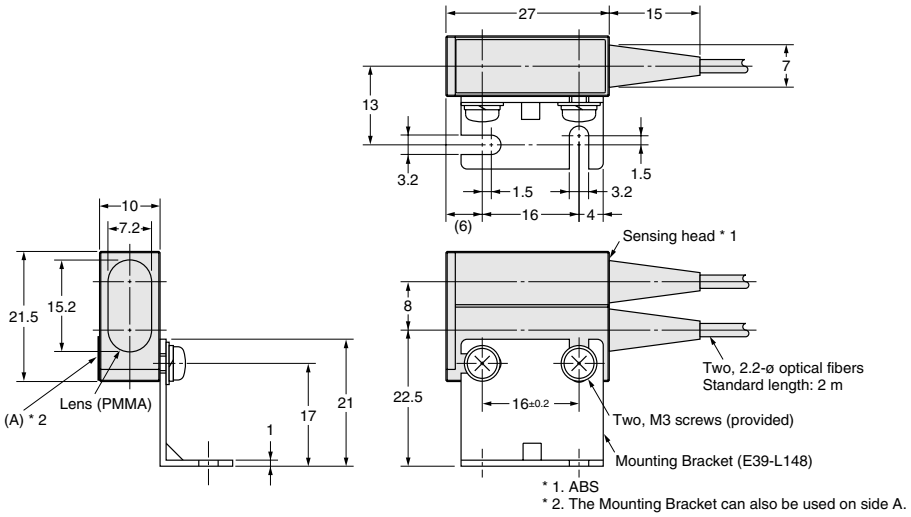


E32-A04

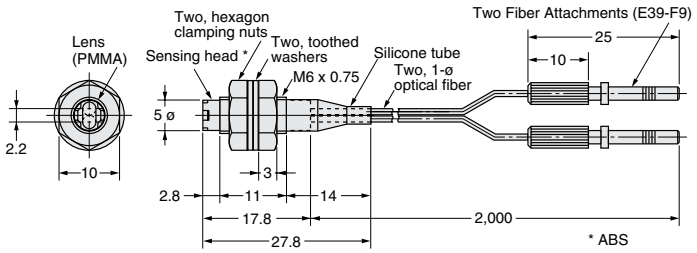


Retroreflective

E32-R16



E32-R21



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. E21E-EN-01

In the interest of product improvement, specifications are subject to change without notice.