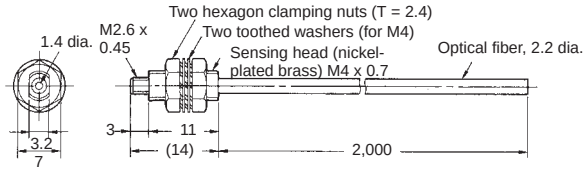
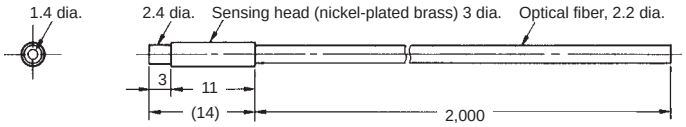
# ■ Fiber Units

## Through-beam (Sold in Pairs)

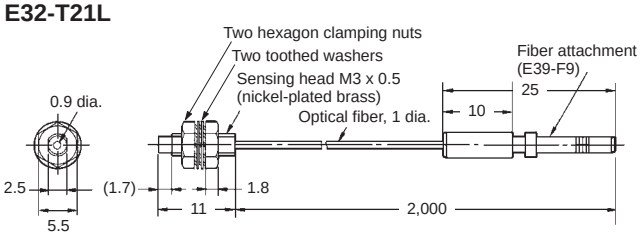
### E32-T11L



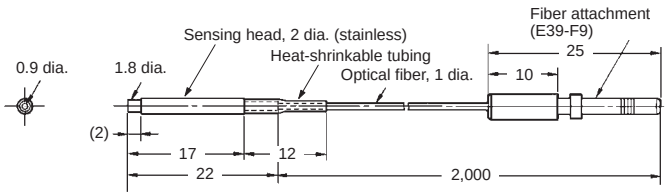

### E32-T12L



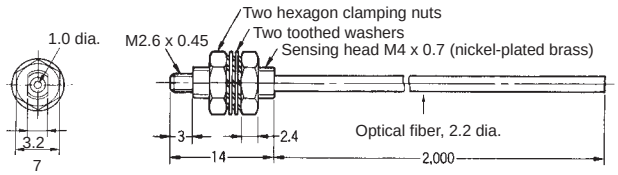

### E32-T21L



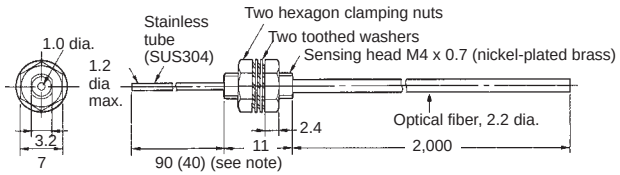

### E32-T22L




### E32-TC200

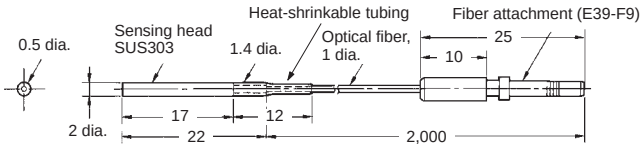



### E32-TC200B
### E32-TC200B4

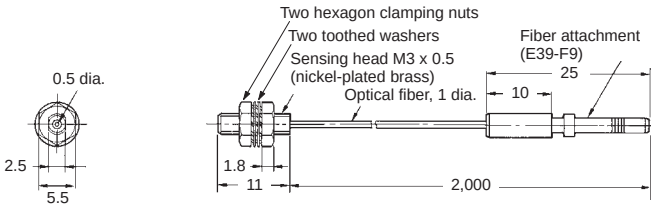



**Note:** The value in the parentheses is for the E32-TC200B4.

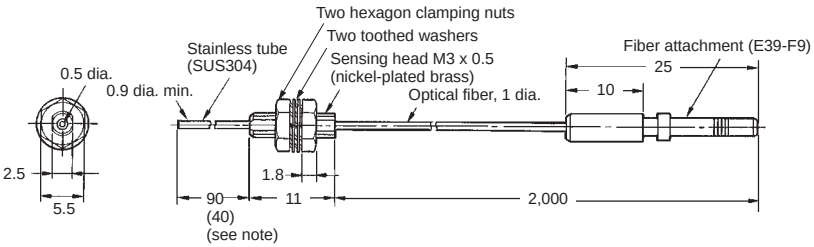
### E32-T22




### E32-TC200E

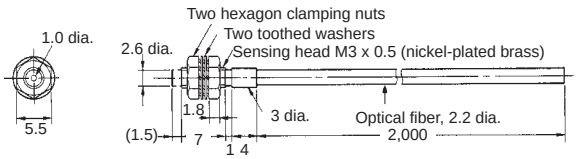



### E32-TC200F
### E32-TC200F4

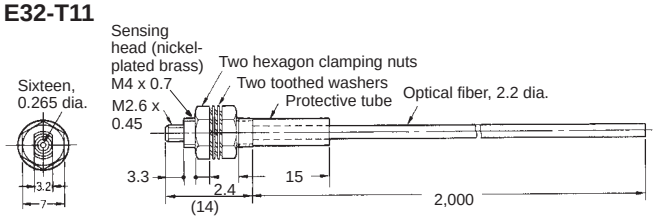



**Note:** The value in the parentheses is for the E32-TC200F4.

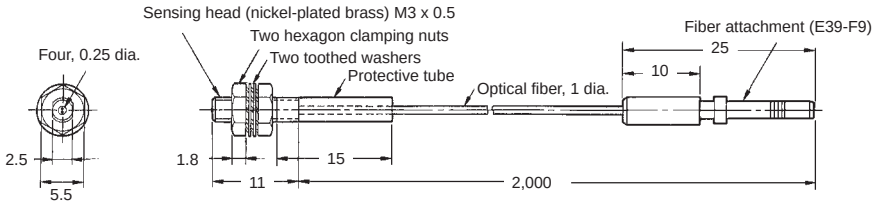
### E32-TC200A



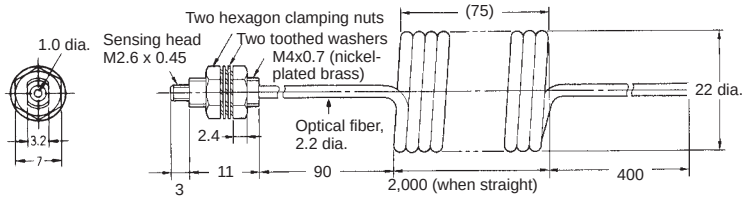

### E32-T11



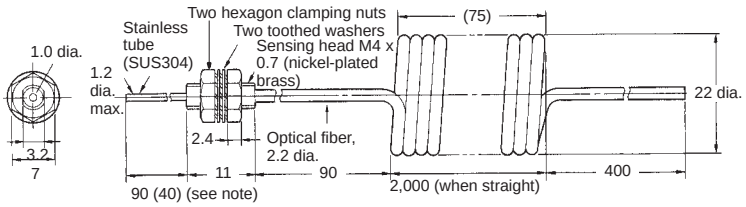
**E32-T21**




**E32-TC200C**

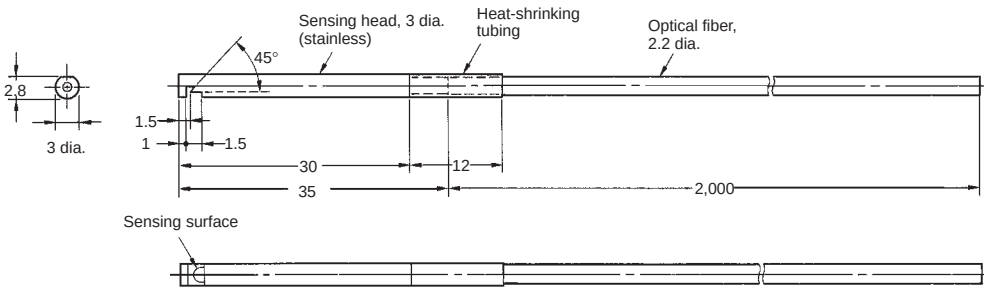



**E32-TC200D**
**E32-TC200D4**

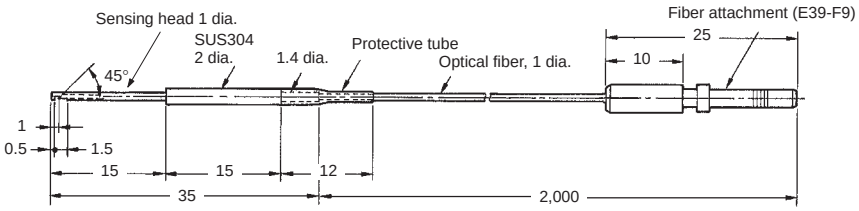



**Note:** The value in the parentheses is for the E32-TC200D4.

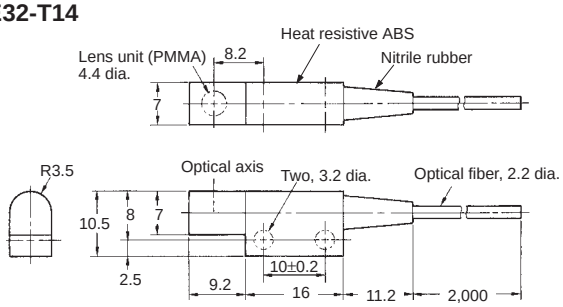
**E32-T14L**



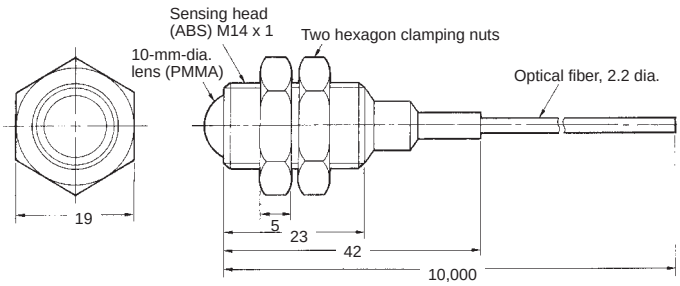

**E32-T24**



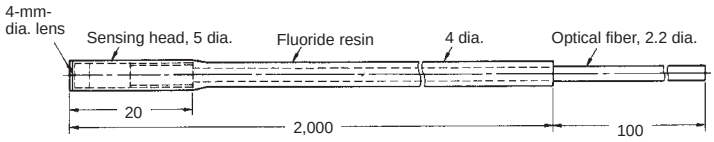

**E32-T14**



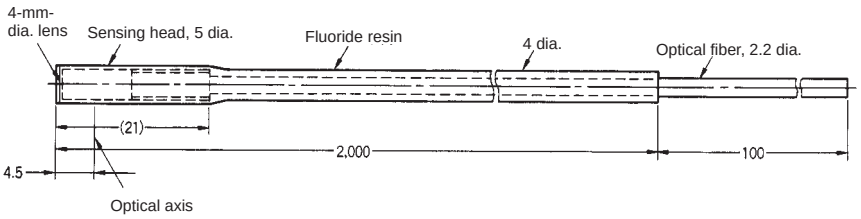

**E32-T17L**



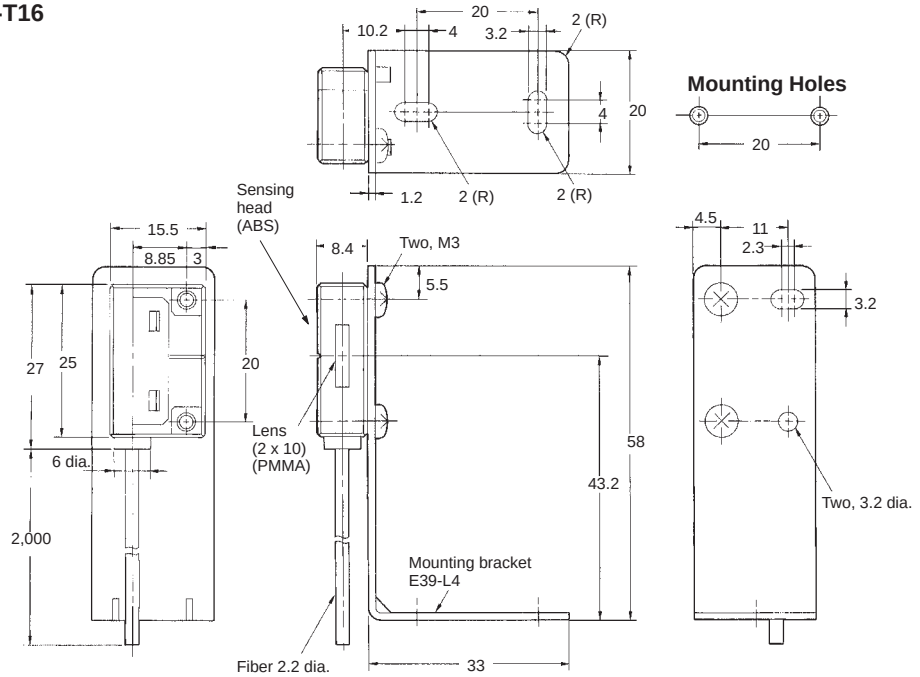

**E32-T12F**



## E32-T14F



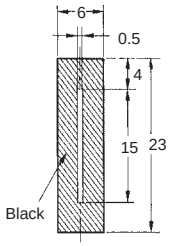

## E32-T16



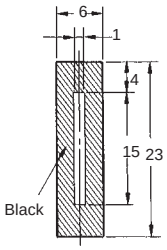

**Mounting Holes**



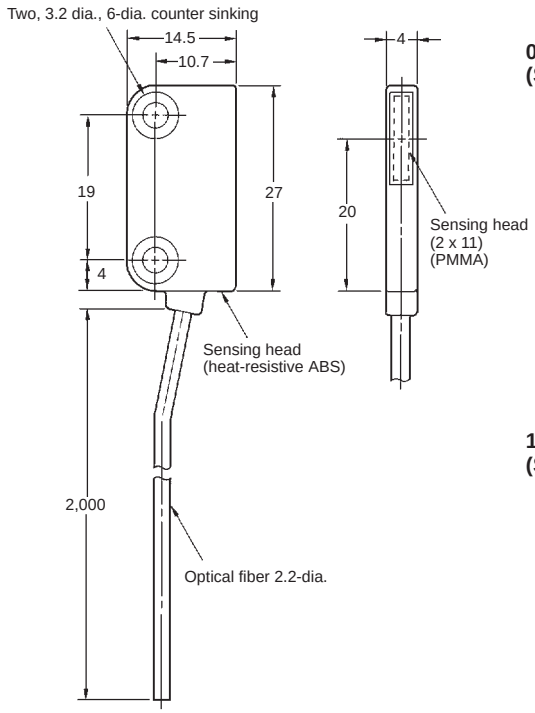

**0.5-mm Wide Silt Seal (Sold in Pairs)**



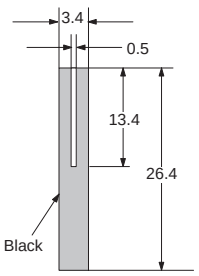

**1-mm Wide Silt Seal (Sold in Pairs)**



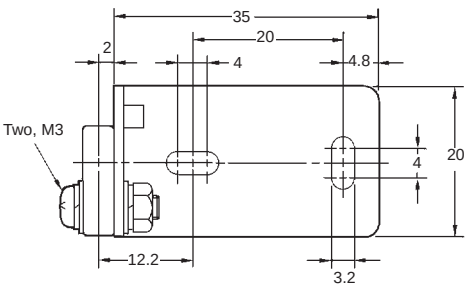

## E32-T16P



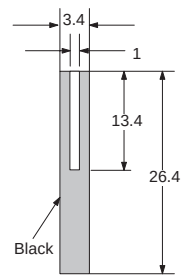

**0.5-mm-wide Slit Seal (Sold in Pairs)**

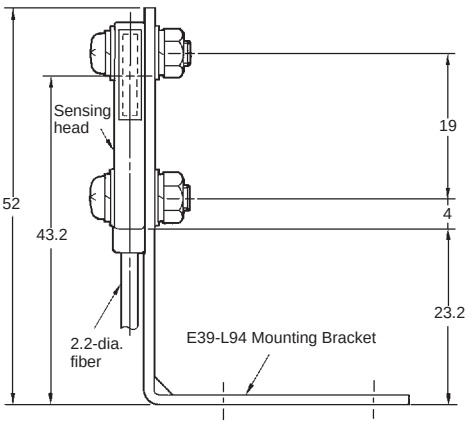



**E32-T16P with E39-L94 (Order Separately) Mounting**

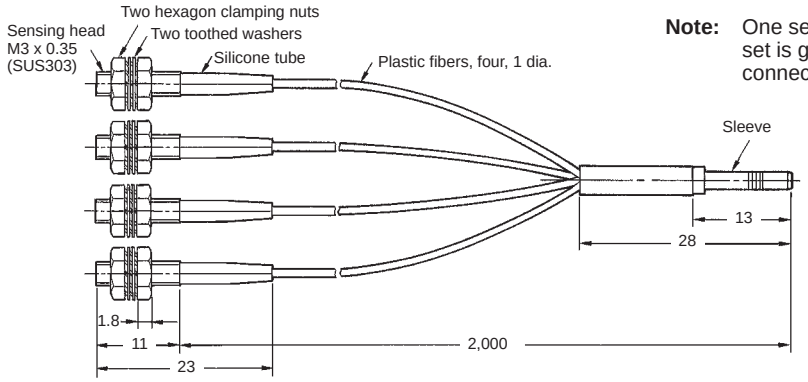



**1-mm-wide Slit Seal (Sold in Pairs)**



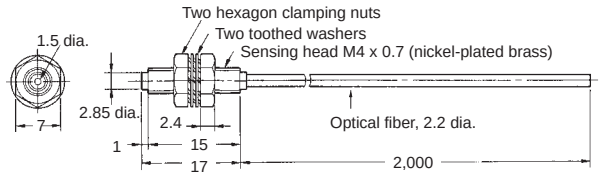



### E32-M21



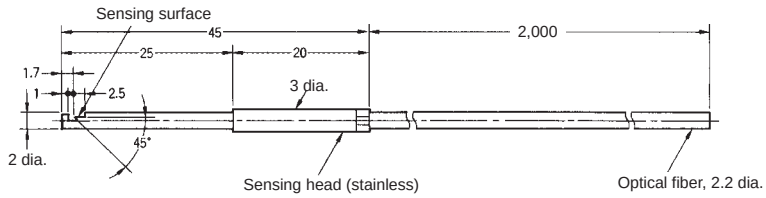

**Note:** One set of silicone tubes is black while the other set is grey for easy identification when they are connected to the emitter and receiver.

### E32-T51



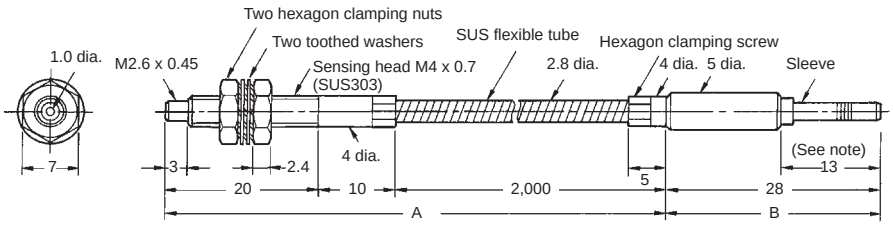

**Note:** Resistant temperature is 150°C. Resistant temperature is 130°C when used continuously.

### E32-T54



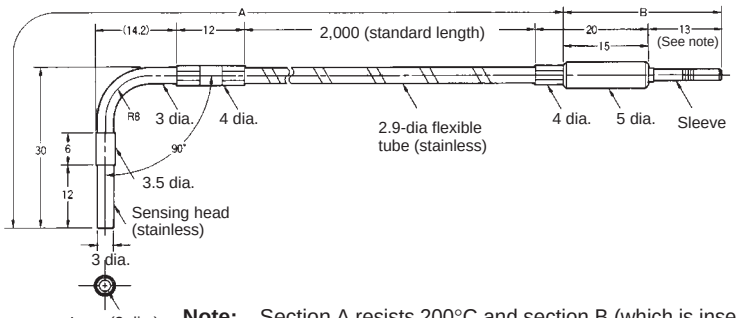

**Note:** Resistant temperature is 150°C. Resistant temperature is 130°C when used continuously.

### E32-T61




**Note:** Section A resists 300°C and section B (which is inserted to the Amplifier) resists 110°C. The operating temperature of section B must also be within the withstand temperature range of the Amplifier.

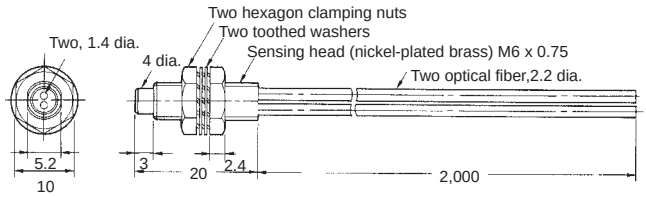
### E32-T84S



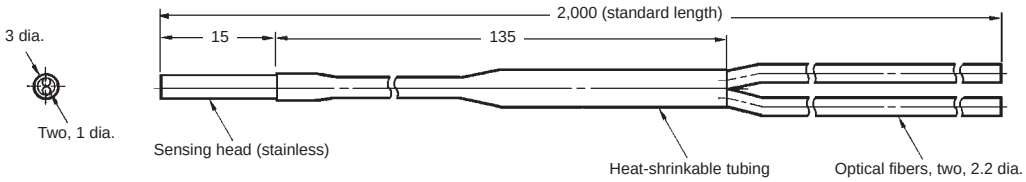

**Note:** Section A resists 200°C and section B (which is inserted to the Amplifier) resists 110°C. The operating temperature of section B must also be within the withstand temperature range of the Amplifier.

## Reflective

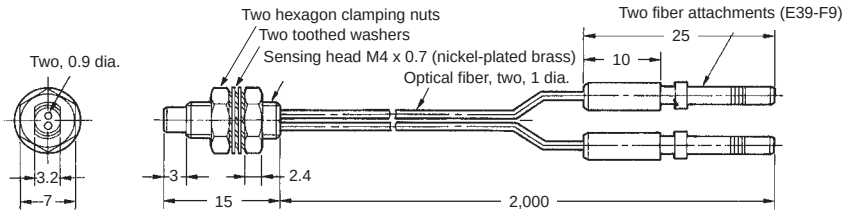
### E32-D11L



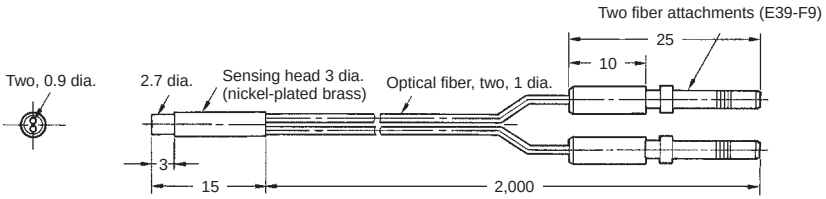

### E32-D12



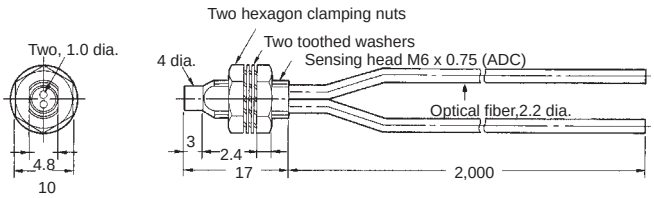

### E32-D21L



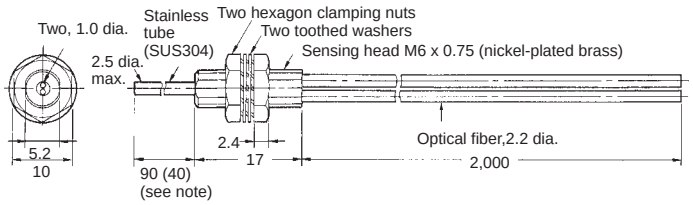

### E32-D22L




### E32-DC200

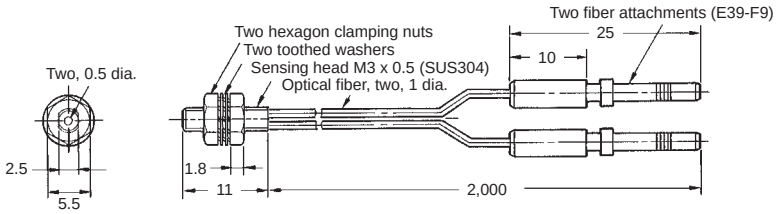



### E32-DC200B
### E32-DC200B4

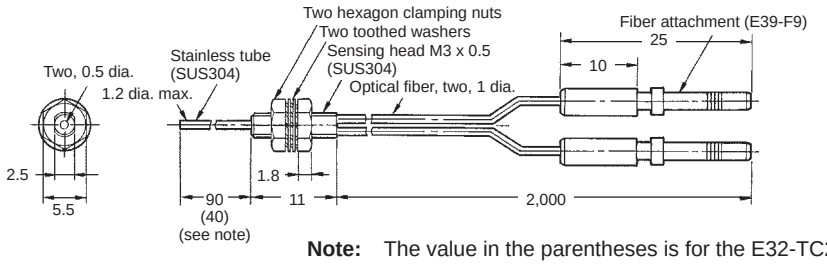



**Note:** The value in the parentheses is for the E32-DC200B4.

### E32-DC200E

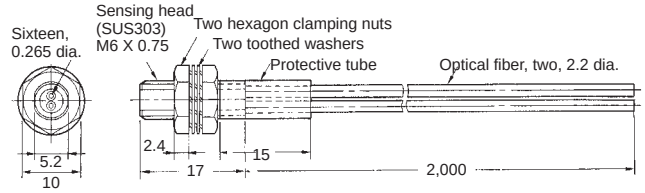


**E32-DC200F**
**E32-DC200F4**

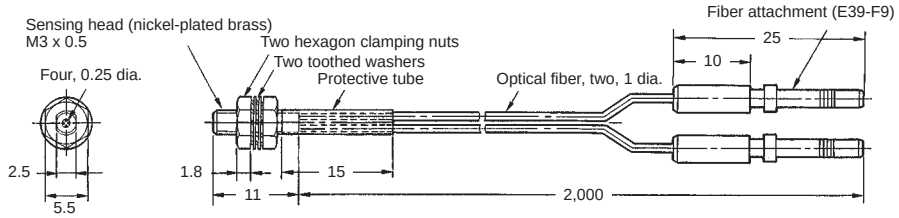



**Note:** The value in the parentheses is for the E32-TC200F4.

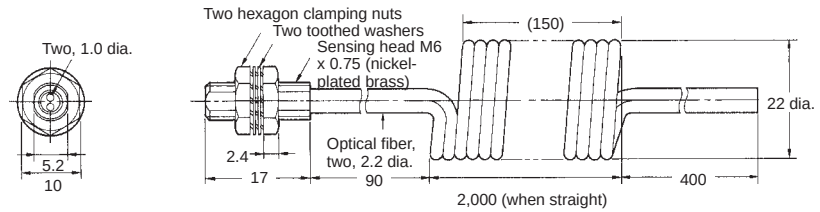
**E32-D11**



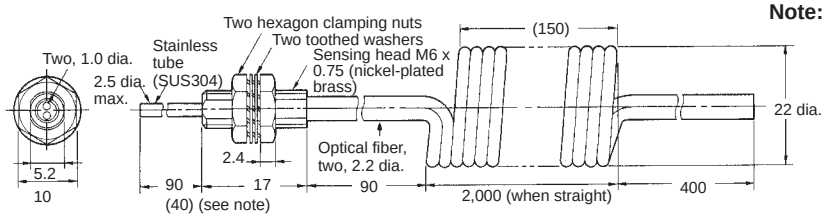

**E32-D21**




**E32-DC200C**

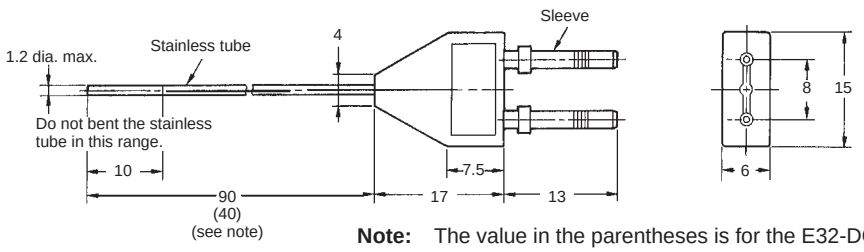



**E32-DC200D**
**E32-DC200D4**



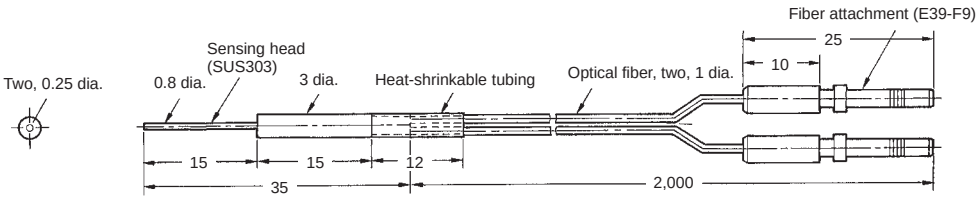

**Note:** The value in the parentheses is for the E32-DC200D4.

**E32-DC9G**
**E32-DC9G4**

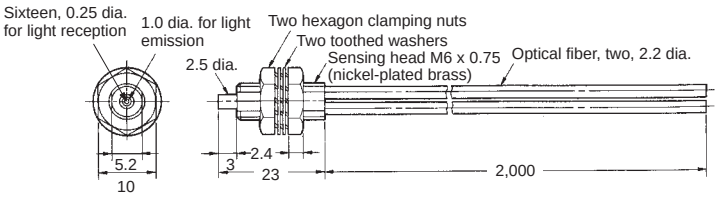



**Note:** The value in the parentheses is for the E32-DC9G4.

### E32-D33

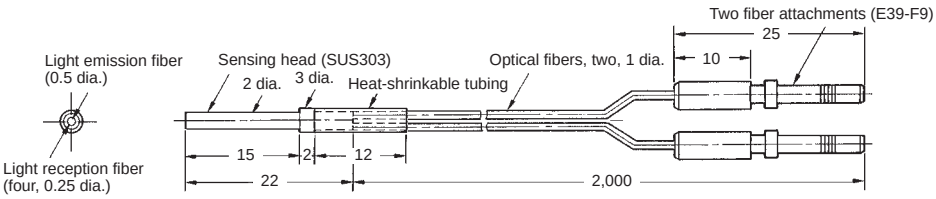



### E32-CC200



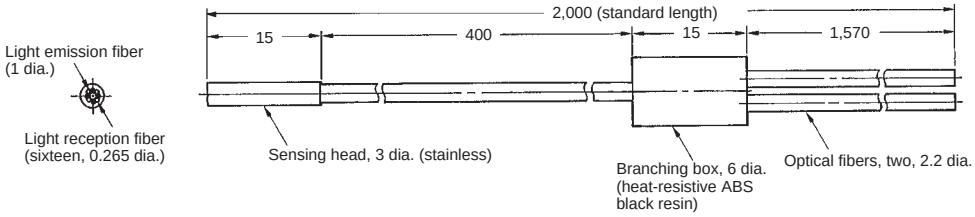

**Note:** The fiber for the emitter is identified by a white line.

### E32-D32



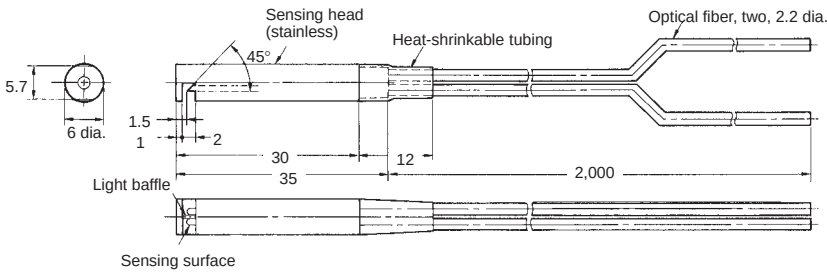

**Note:** The fiber for the emitter is identified by a white line.

### E32-D32L

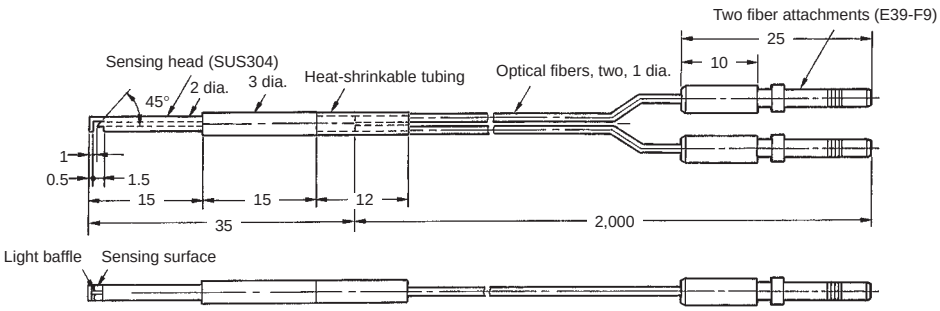



**Note:** The fiber for the emitter is identified by a yellow dotted line.

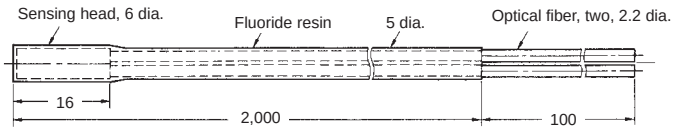
### E32-D14L



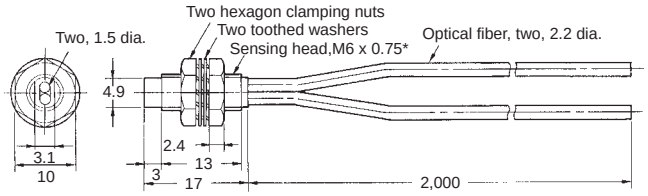

### E32-D24



### E32-D12F



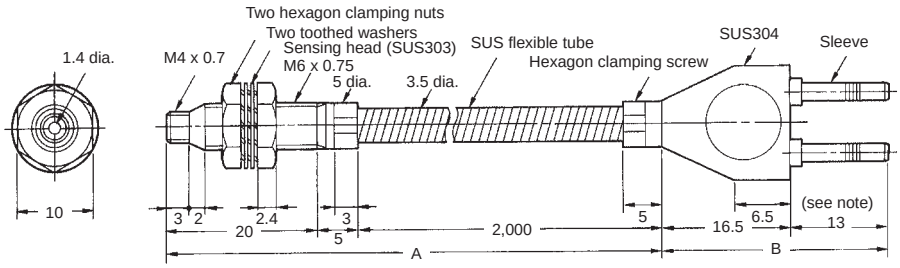

### E32-D51




*nickel-plated brass

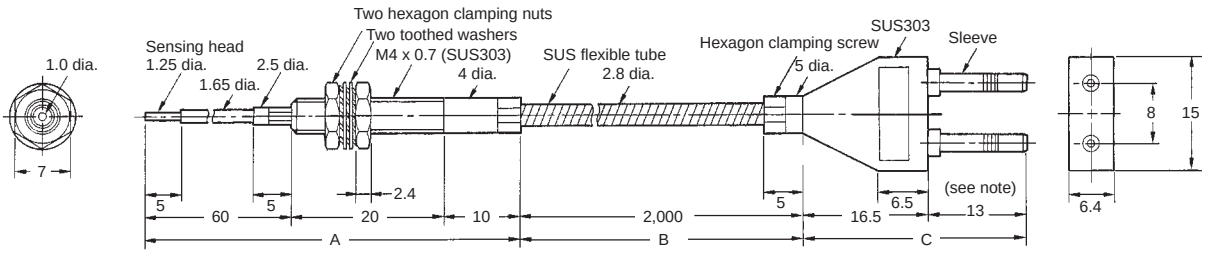
**Note:** Resistant temperature is 150°C. Resistant temperature is 130°C when used continuously.

### E32-D61



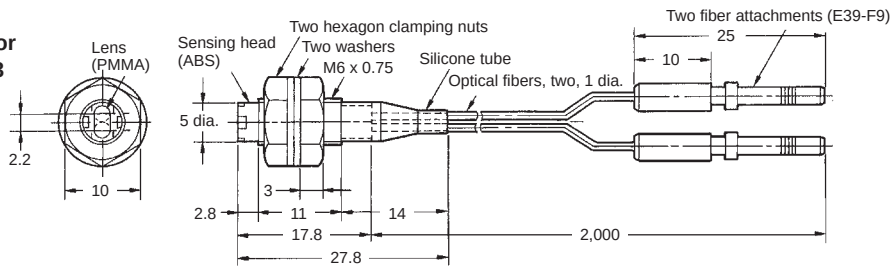

**Note:** Section A resists 300°C and section B (which is inserted to the Amplifier) resists 110°C. The operating temperature of section B must also be within the withstand temperature range of the Amplifier.

### E32-D73

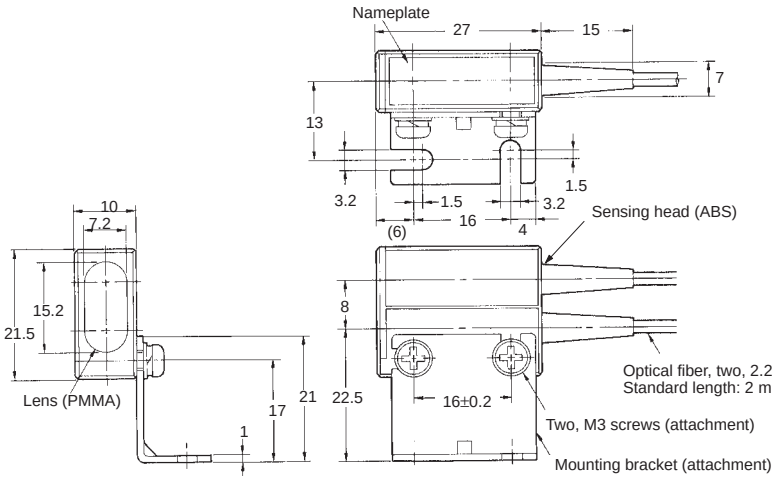



**Note:** Section A resists 400°C, section B resists 300°C, and section C (which is inserted to the Amplifier) resists 110°C. The operating temperature of section C must also be within the withstand temperature range of the Amplifier.

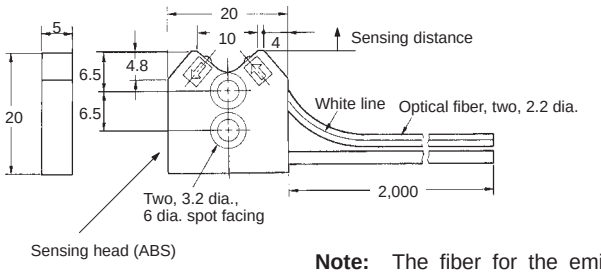
### E32-R21 (One Unit supplied for the E39-R3 Reflector)



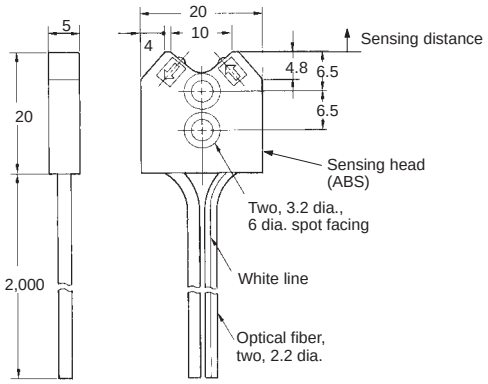
**E32-R16**
**(One Unit supplied for the E39-R1 Reflector)**




**E32-L25**

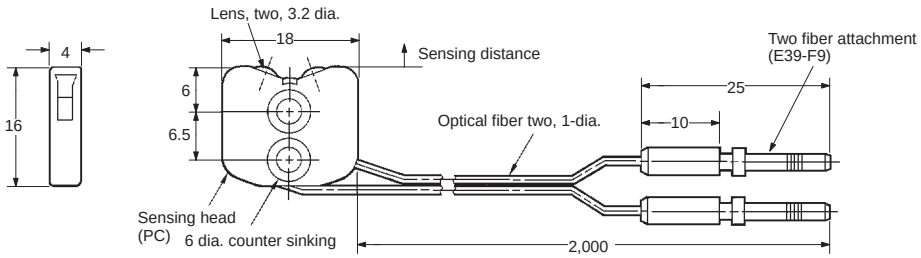



**E32-L25A**

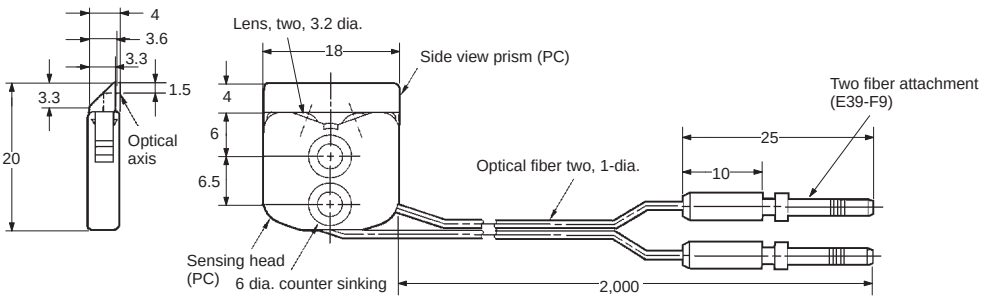



**Note:** The fiber for the emitter is identified by a white line.

**E32-L25L**

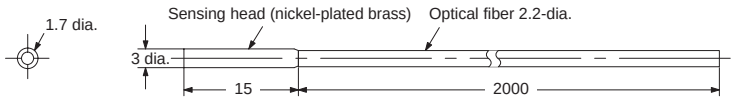



**E32-L24L**

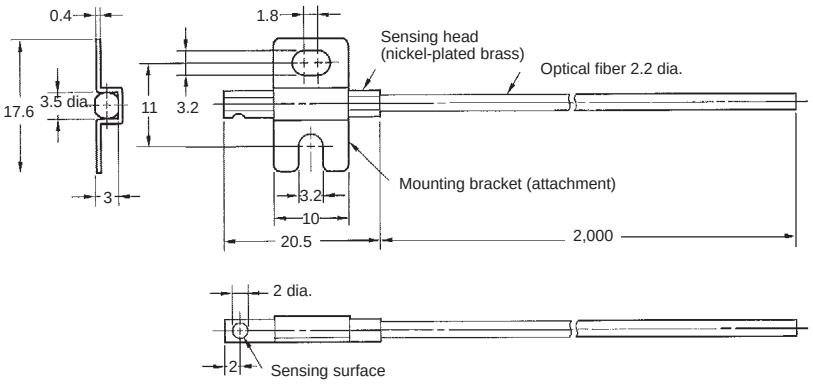


### Fine Through-beam

**E32-T22S**

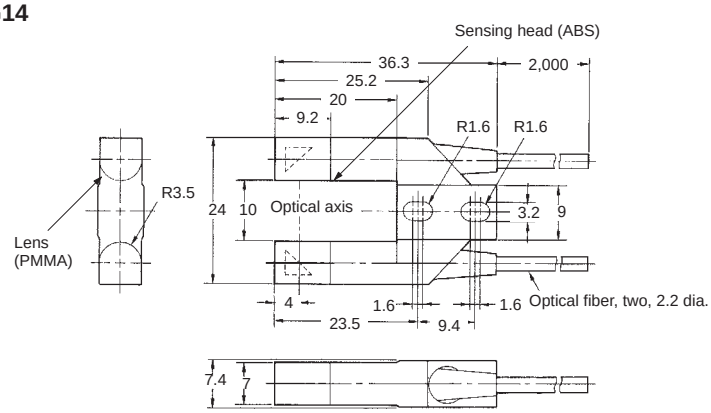



**E32-T24S**

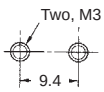



## ■ Slot Sensor

**E32-G14**




**Mounting Holes**



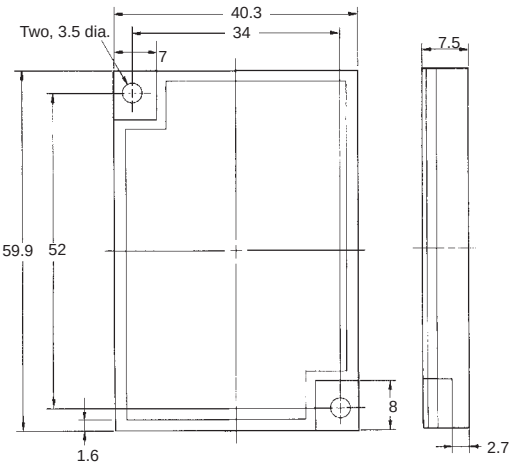

## ■ Reflector

**Reflector (Miniature)**
**E39-R3**

**Note:** Mounting bracket is attached.

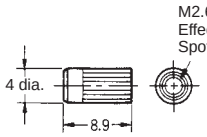



**Reflector**
**E39-R1**

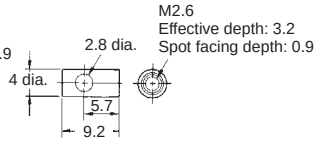


## ■ Attachments

**E39-F1**
**Long-distance Lens Unit**

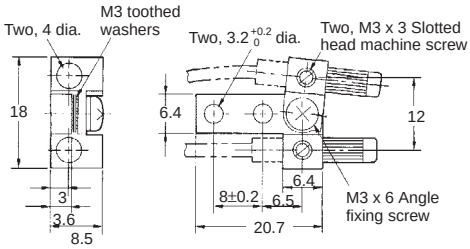



**E39-F2**
**Side-view Unit**

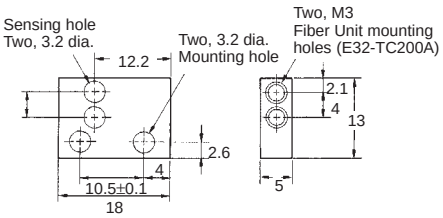



**Note:** One set includes two units.

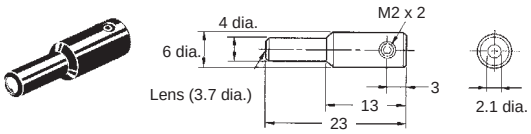
**E39-F3**
**Lens-equipped Reflective Unit**




**E39-F5**
**Side-view Reflective Unit**




**E39-F3A**
**Small Spot Lens Unit**

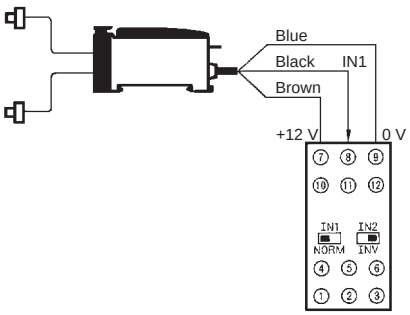



**Note:** When mounting, remove all of the accompanying screws first and then screw the E32-TC200A into the E39-F5 until the stopper comes into contact.

# Installation

## ■ Connection

**Connection with S3D2 Sensor Controller**




**Note:** A maximum of two E3X-NH Sensors can be connected.

| Power supply voltage | Output | Functions | Model |
|---|---|---|---|
| 100 to 240 VAC | Relay | AND, OR | S3D2-AK |
| | | AND, OR, and timer | S3D2-CK |
| | | Flip-flop | S3D2-BK |
| | Transistor | AND, OR, and timer | S3D2-CC |
| | Relay | 2 inputs, 2 outputs, | S3D2-DK |
| | | 2 inputs, 2 outputs, and timer | S3D2-EK |
| 24 VDC | | AND, OR | S3D2-AKD |
| | | AND, OR, and timer | S3D2-CKD |

# Precautions

## General

Do not impose any voltage exceeding the rated voltage on the E3X-NH. Do not impose 100 VAC or more on models that operate with DC. In both cases, the E3X-NH may be damaged.

Do not short-circuit the load connected to the E3X-NH, otherwise the E3X-NH may be damaged.

When supplying power to the E3X-NH, make sure that the polarity of the power is correct, otherwise the E3X-NH may be damaged.

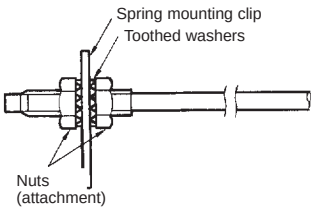
The load must be connected to the E3X-NH in operation, otherwise the E3X-NH may be damaged.

## ■ Fiber Unit

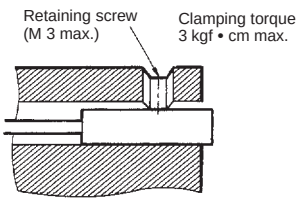
### Tightening Force

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

**Screw-mounting Model**

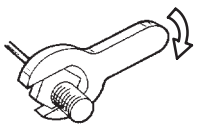



**Cylindrical Model**




| Fiber Units | Clamping torque |
|---|---|
| M3/M4 screw | 8 kgf • cm max. (0.78 N • m) |
| M6 screw | 10 kgf • cm max. (0.98 N • m) |
| 2-mm-dia. column | 3 kgf • cm max. (0.29 N • m) |
| 3-mm-dia. column | 3 kgf • cm max. (0.29 N • m) |
| E32-D14L | 10 kgf • cm max. (0.98 N • m) |
| E32-T12F | 8 kgf • cm max. (0.78 N • m) |
| E32-D12F | 8 kgf • cm max. (0.78 N • m) |
| E32-T16 | 5 kgf • cm max. (0.49 N • m) |
| E32-R21 | 6 kgf • cm max. (0.59 N • m) |
| E32-M21 | Up to 5 mm to the tip: 5 kgf • cm max. (0.49 N • m)<br>Up to 5 mm from the tip: 8 kgf • cm max. (0.78 N • m) |
| E32-L25A | 8 kgf • cm max. (0.78 N • m) |
| E32-T16P<br>E32-T24S<br>E32-L24L<br>E32-L25L | 3 kgf • cm max. (0.29 N • m) |

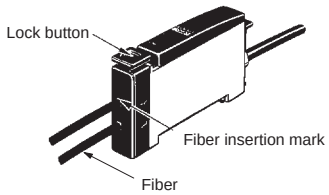
Use a proper-sized spanner.



### Fiber Connection and Disconnection

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

1. Connection




After cutting the fibers using the Fiber Cutter (E39-F4), place an insertion mark on the fiber so that it can be properly inserted into the Amplifier. Insert the fiber into the Amplifier up to this insertion mark.

2. Disconnection

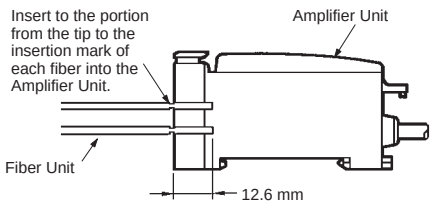
Be sure to press the lock button again to unlock before pulling out the fiber, otherwise the fiber may be deteriorated.

3. The fiber must be locked or released in a temperature range of –10°C to 40°C.

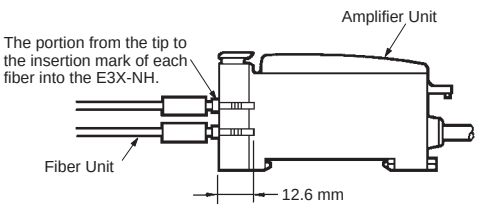
### Fiber Insertion

If the portion from the tip to the insertion mark of the fibers are not inserted into the Amplifier Unit, the sensing distance will be reduced.

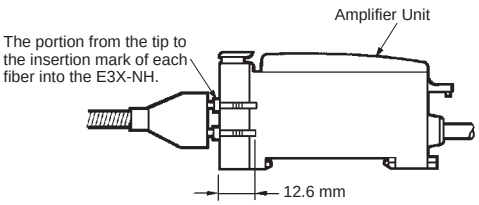
**2.2-mm-dia. Fiber**




**Thin Fiber with the E39-F9 Attachment**




**Fiber with Fixed Length**



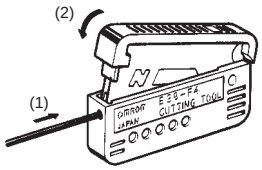
## Cutting Fiber

Insert a fiber into the Fiber Cutter and determine the length of the fiber to be cut.

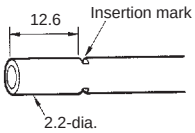
Press down the Fiber Cutter in a single stroke to cut the fiber.

An insertion mark can be placed on the fiber to serve as a reference when inserting the fiber into the Amplifier. Use the following procedure.

Insert the fiber all the way into the cutter and confirm that you can see it in the hole at the back of the cutter, then press firmly down on the cutter.



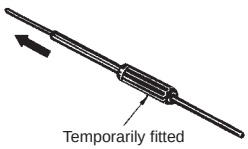

Insert the fiber into the Amplifier up to the insertion mark. Proper fiber performance will not be achieved unless the fiber is inserted all the way to the insertion mark. (This method is applicable to standard, 2.2-mm-diameter fibers only.)




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.

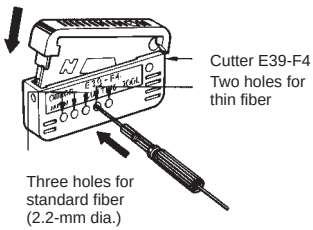
Use either one of the two holes on the right (refer to the following figure) to cut a thin fiber as follows:

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 into the E39-F4 to cut.




4. Finished state (proper cutting state)

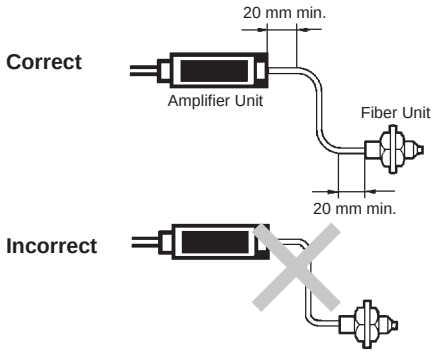

**Note:** Insert the fiber in the direction indicated by the arrow.

## Connection

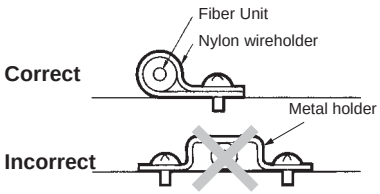
Do not pull or press the Fiber Units. The Fiber Units have a withstand force of 1 kgf (9.8 N) or 3 kgf (29.4 N) max. (pay utmost attention because the fibers are thin).

Do not bend the Fiber Units beyond the permissible bending radius.

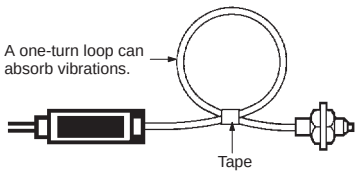
Do not bend the edge of the Fiber Units.




Do not apply excess force on the Fiber Units.




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

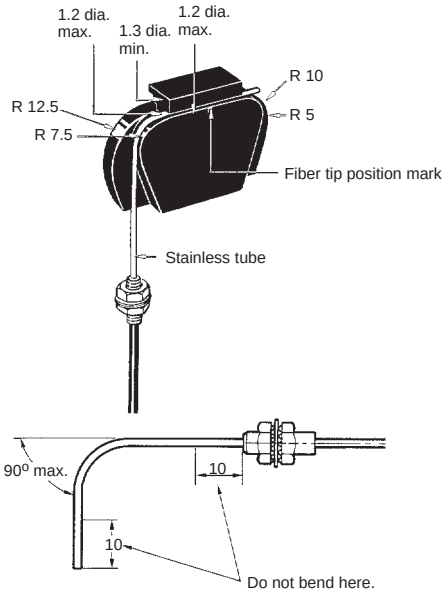


## Bending Radius

### E39-F11 Sleeve Bender

The bending radius of the stainless 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 sleeve to the Sleeve Bender and bend the stainless sleeve slowly along the curve of the Sleeve Bender (refer to the figure).



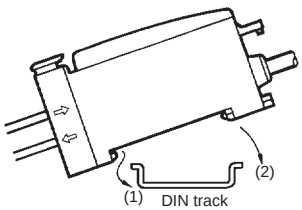

# ■ Amplifier Units

## Mounting

### Mounting

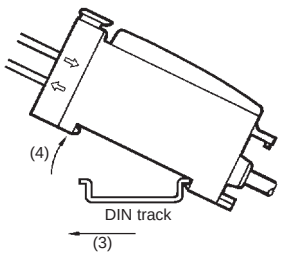
1. Mount the front part on the mounting bracket (attachment) or a DIN track.
2. Press the back part onto the mounting bracket or the DIN track.

**Note:** Do not mount the back part onto the mounting bracket or the DIN track first and then mount the front part on the mounting bracket or the DIN track, or the mounting strength of the Amplifier Unit may decrease.

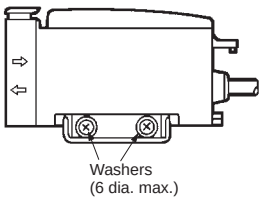



### Dismounting

By pressing the Amplifier Unit in direction (3) and lifting the fiber insertion part in direction “4” as shown in the following, the Amplifier can be dismounted with ease.




In the case of side mounting, attach the mounting bracket on the Amplifier first, and secure the Amplifier with M3 screws and washers. The diameter of the washers should be 6 mm max.



**Turning the Power On**

After the E3X-NH is turned on, the E3X-NH will be ready to operate in 100 ms maximum. If power is supplied to the E3X-NH and the load is connected to the E3X-NH independently, be sure to turn on the power supply connected to the E3X-NH first.

**Mutual Interference Protection Function**

Perform two-point teaching if two to three Fiber Units are closely mounted together, at which time supply power only to the Unit in teaching operation in turn or block the emitters of the Fiber Units not in teaching operation.

**EEPROM Writing Error**

Write errors may result at the time of teaching due to power failure or static noise, in which case the Unit beeps and the operation indicators flash. If any of these occur, re-input teaching using the teaching button on the Amplifier.

**Minute Sensing Object**

This datasheet shows typical examples for detecting minute objects. These typical examples are for reference use only, because these example operations were tested on Units sampled at random from a lot and the values described are average values. Do not assume that all Units ensure such operations.

**Others**

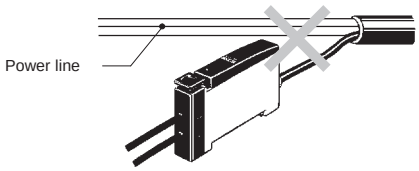
When the power is off:
The moment power is turned off, the E3X-NH may output a pulse signal which could affect the operation of the devices connected to it. This will occur more often if power is supplied to the E3X-NH from an external power supply, thus affecting the connected timer and counter. Use a built-in power supply as much as possible to avoid this.

In a case where the cord is extended, use a wire with 0.3 $mm^2$ min. The total length of the cord should be 100 m max.

Power supply:
If a standard switching regulator is used as a power supply, the frame ground (FG) terminal and the ground (G) terminal must be grounded, or otherwise the E3X-NH can malfunction influenced by the switching noise of the power supply.

The supplied voltage must be within the rated voltage range. Unregulated full- or half-wave rectifiers must not be used as power supplies.

Do not lay wiring to the Optical Sensor together with power lines in the same piping or ducts. Doing so will cause induction between the lines, possibly resulting in faulty operation or destruction. Always lay wiring to the Optical Sensor in separate or dedicated piping.

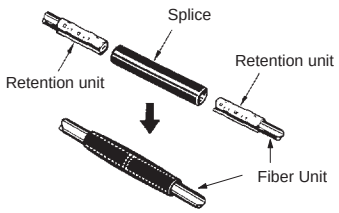



## ■ Attachment Units

### Applications

**E39-F10 Fiber Connector**

Use the following procedure (refer to the figure) to connect fibers via the Fiber Connector.



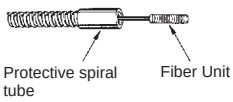

Each Fiber Unit should be as close as possible before they are connected.

Sensing distance will be reduced by approximately 25% when fibers are connected.

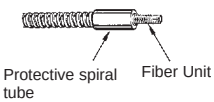
Only fibers with a 2.2-mm dia. can be connected. (Refer to page NO TAG for applicable Fiber Units.)

**Protective Spiral Tube**

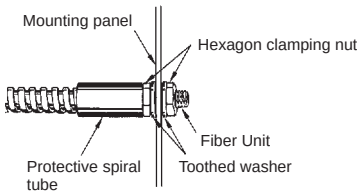
Insert a fiber to the Protective Spiral Tube from the head connector side (screwed) of the tube.



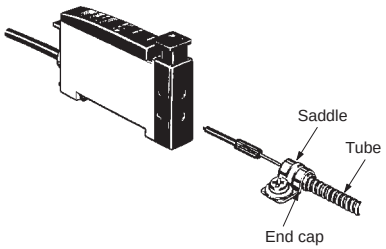

Push the fiber into the Protective Spiral Tube. The tube should be straight so that the fiber is not twisted when inserted. Then turn the end cap of the spiral tube.




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



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.




**⚠ WARNING**

The E3X-NH is not a safety component for ensuring the safety of people as defined in EC Directive 91/368/EEC, or as covered by separate European standards or by any other regulations or standards.

## ■ Reflector

**Observe the Following Precautions when Using the Reflector (E39-R3)**

Use detergent, etc., to remove any dust or oil from the surfaces where tape is applied. Adhesive tape will not be attached properly if oil or dust remains on the surface.

The E39-R3 cannot be used in places where it is exposed to oil or chemicals.

**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. E258-E1-2 **In the interest of product improvement, specifications are subject to change without notice.**

**OMRON Corporation**
Systems Components Division H.Q.
28th Fl., Crystal Tower Bldg.
1-2-27, Shiromi, Chuo-ku,
Osaka 540 Japan
Phone: 06-949-6012 Fax: 06-949-6021

Printed in Japan
0797-1M (0297) a