

### Omron's First Complete System for Sensing Under Vacuum

- Vacuum rated to  $1 \times 10^{-10}$  Pa • m<sup>3</sup>/s max. ( $7.5 \times 10^{-10}$  torr • l/s)
- The industry's First *4-Channel Snap-On Fiber Mounting Feature* allows ease of use and implementation
- A Single-Channel Flange with screw-mounting is also available
- Increases process productivity by performing operations inside vacuum chambers
- The external fiber can be cut on both ends, allowing customized lengths
- Stainless steel and fluoro-resin fiber cables are available for vacuum processes
- CE approval



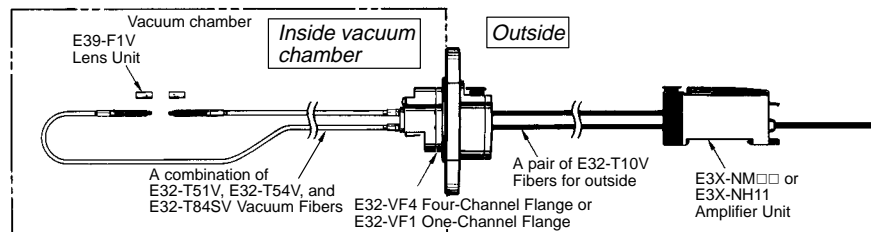
## Ordering Information

### ■ CONFIGURATION EXAMPLE (TYPICAL)

To Order a Complete Fiber-Optic System for Sensing Under Vacuum

Select:

- A Flange
- Vacuum Fibers
- External Fiber Cable
- A Lens Unit (if necessary)
- The Appropriate Fiber-Optic Amplifier



### ■ FLANGES

| Item         | Part number |
|--------------|-------------|
| Four channel | E32-VF4     |
| One-channel  | E32-VF1     |

### ■ VACUUM FIBERS

| Item        | Through-beam, straight model | Through-beam, 90° model      | Through-beam, heat-resistant model |
|-------------|------------------------------|------------------------------|------------------------------------|
| Part number | E32-T51V 1M<br>E32-T51V 0.5M | E32-T54V 1M<br>E32-T54V 0.5M | E32-T84SV 1M<br>—                  |

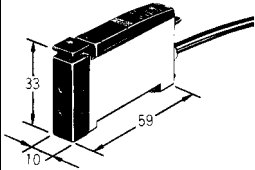
## ■ FIBERS FOR OUTSIDE

| Item                 | Part number |
|----------------------|-------------|
| External Fiber Cable | E32-T10V 2M |

## ■ LENS UNIT

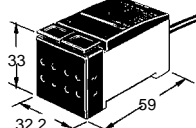
| Item               | Part number |
|--------------------|-------------|
| Long distance lens | E39-F1V     |

## ■ AMPLIFIER UNIT W/HIGH-PRECISION SENSING AND TEACH FUNCTION (SOLD SEPARATELY)

| Item                        | NPN output  | PNP output   |
|-----------------------------|---|--|
| Part number                 | E3X-NH11  | E3X-NH41   |
| Appearance                  |  |  |
| Light source                | Red LED ( $\lambda = 680 \text{ nm}$ )  |  |
| Power supply voltage        | 12 to 24 VDC $\pm 10\%$ , ripple (p-p) 10% max.                                   |  |
| Current consumption         | 75 mA max.  |  |
| Response time               | 1 ms max. (see note)  |  |
| Output                      | Control output  | NPN open collector, load current: 50 mA max., residual voltage: 1 V max. |
|                             | Alarm output  |  |
| Sensitivity setting         | Teaching method   |  |
| Fine sensitivity adjustment | Automatic or manual fine threshold adjustment (13 levels)                         |  |

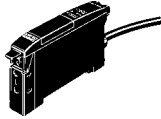
Note: The E3X-NH adopts a new digital sensing algorithm and has the same capacity for detecting minute objects as the conventional E3X-NT□1 (response time of 0.5 ms).

## ■ FOUR-CHANNEL AMPLIFIER UNIT WITH TEACH FUNCTION (SOLD SEPARATELY)

| Item                           | Four-channel  |
|--------------------------------|---|
| Part number                    | E3X-NM11 (NPN output)<br>E3X-NM41 (PNP output)  |
| Appearance                     |    |
| Light source                   | Red LED ( $\lambda = 680 \text{ nm}$ )  |
| Power supply voltage           | 12 to 24 VDC $\pm 10\%$ , ripple (p-p) 10% max.   |
| Current consumption            | 150 mA max.   |
| Response time                  | 500 $\mu\text{s}$ max. at rated sensing distance  |
| Control output                 | PNP or NPN open collector, load current: 100 mA, residual voltage: 1 V max.   |
| Timer function (see note)      | OFF-delay timer (fixed to 40 ms) (independent channel)  |
| Teaching confirmation function | Indicator (red/green LEDs) and buzzer   |
| Remote teaching input          | Pink and blue (0 V) wires are short-circuited when remote input is ON. (0 V short-circuit current: 1 mA max.)<br>Pink and blue (0 V) wires are not short-circuited when remote input is OFF. (Open or 9 V min.; max. input voltage: 24 V)<br>Response time is 0.5 ms max. when remote input is OFF. |
| Mode                           | Light-ON and Dark-ON switch-selectable  |

Note: It is possible to disable the OFF-delay timer function by using the switch setting.

### ■ DIGITAL FIBER AMPLIFIER UNIT (SOLD SEPARATELY)

| Item                      | NPN output  |  | PNP output   |  | NPN output   |  | PNP output |  |
|---------------------------|---|--|--|--|--|--|------------|--|
| Part number               | E3X-DA11  |  | E3X-DA41   |  | E3X-DA21   |  | E3X-DA51   |  |
| Appearance                |    |  |  |  |  |  |            |  |
| Light source (wavelength) | Red LED (660 nm)  |  |  |  |  |  |            |  |
| Supply voltage            | 12 to 24 VDC $\pm$ 10%, ripple (p-p) 10% max.   |  |  |  |  |  |            |  |
| Current consumption       | 75 mA max.  |  |  |  |  |  |            |  |
| Response time             | High-speed mode: 250 $\mu$ s for operation and reset<br>Standard mode: 1 ms for operation and reset<br>Long-distance mode: 4 ms for operation and reset |  |  |  |  |  |            |  |
| Control output            | ON/OFF output   | NPN open collector<br>Load current:<br>50 mA max.<br>Residual voltage:<br>1 V max. | PNP open collector<br>Load current:<br>50 mA max.<br>Residual voltage:<br>2 V max. | NPN open collector<br>Load current:<br>50 mA max.<br>Residual voltage:<br>1 V max. | PNP open collector<br>Load current:<br>50 mA max.<br>Residual voltage:<br>2 V max. |  |            |  |
|                           | Monitor output  | ---  |  |  | Load 1 to 5 VDC, 10 k $\Omega$ min. Load resistance<br>10 k $\Omega$ min.          |  |            |  |
| Sensitivity setting       | Teaching or manual method   |  |  |  |  |  |            |  |
| Timer function            | OFF-delay timer, range: 0 to 200 ms (5 ms increment)  |  |  |  |  |  |            |  |

# Specifications

## ■ RATINGS/CHARACTERISTICS

### Flanges

|                               |  |                          |
|-------------------------------|--|--------------------------|
| Item                          | E32-VF4  | E32-VF1                  |
| Number of channels            | Four-channel   | One-channel              |
| Vacuum ratings                | 1 x 10 <sup>-10</sup> Pa • m <sup>3</sup> /s max. (7.5 x 10 <sup>-10</sup> torr • l/s) |                          |
| Ambient operating temperature | -25°C to 55°C (-13°F to 131°F) with no icing   |                          |
| Material                      | Aluminum (A5056)   | Stainless steel (SS 304) |
| Flange seal material          | Fluoro rubber  |                          |
| Weight                        | Approx. 250 g  | Approx. 220 g            |

### Fiber Unit for Outside

|                               |  |                    |
|-------------------------------|--|--------------------|
| Item                          | E32-T10V                                     |                    |
| Standard length               | 2 m (cut freely)                             |                    |
| Ambient operating temperature | -25°C to 70°C (-13°F to 158°F) with no icing |                    |
| Permissible bending radius    | 25 mm max.                                   |                    |
| Material                      | Core   | Acrylic resin      |
|                               | Sheath                                       | Fluoro-resin       |
|                               | Protection tube                              | Black polyethylene |

### Vacuum Fibers

|                               |   |  |                          |        |
|-------------------------------|---|--|--------------------------|--------|
| Item                          | E32-T51V                                      | E32-T54V                                   | E32-T84SV                |        |
| Sensing method                | Through-beam                                  |  |                          |        |
| Standard length               | 1 m (not cut freely)                          |  |                          |        |
| Sensing distance              | E3X-NM11/NM41                                 | 60 mm                                      | 40 mm                    | 150 mm |
|                               | E3X-NH11                                      | 100 mm                                     | 100 mm                   | 400 mm |
| Ambient operating temperature | -25°C to 120°C (-13°F to 248°F) with no icing |  | -25°C to 200°C           |        |
| Permissible bending radius    | 30 mm max.                                    |  | 25 mm max.               |        |
| Material                      | Core  | Quartz                                     | Optical glass            |        |
|                               | Sheath  | Fluoro-resin                               | Optical glass            |        |
|                               | Protection tube                               | Fluoro-resin                               | Stainless steel (SS 304) |        |
|                               | Fiber head/<br>Connection tube                | Aluminum (A5056), Stainless steel (SS 304) |                          |        |

### Lens Unit

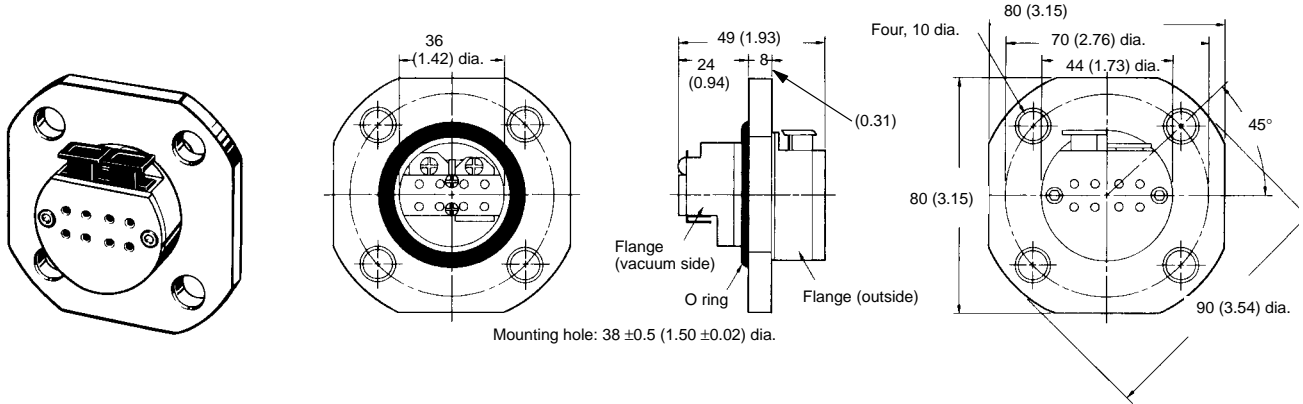
|                               |   |                  |        |
|-------------------------------|---|------------------|--------|
| Item                          | E39-F1V                                       |                  |        |
| Applicable fiber              | E32-T51V                                      | E32-T54V         |        |
| Sensing distance              | E3X-NM11/NM41                                 | 360 mm           | 240 mm |
|                               | E3X-NH11                                      | 700 mm           | 600 mm |
| Ambient operating temperature | -25°C to 120°C (-13°F to 248°F) with no icing |                  |        |
| Material                      | Housing                                       | Aluminum (A5056) |        |
|                               | Lens  | Optical glass    |        |

# Dimensions

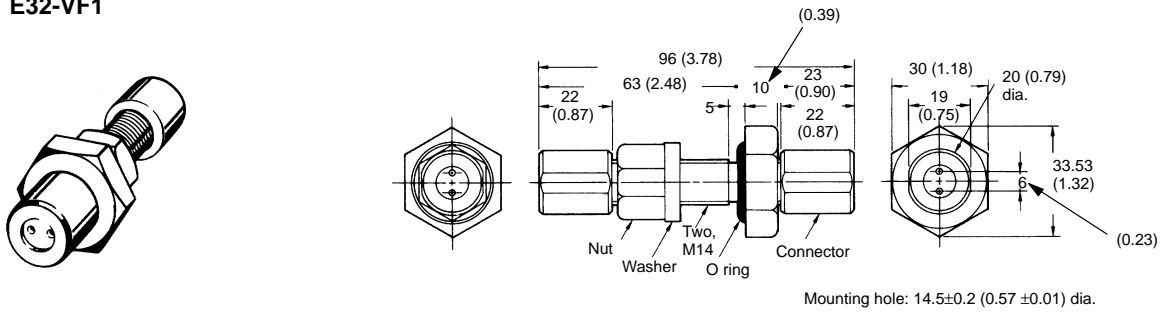
Unit: mm (inch)

## ■ FLANGES

### E32-VF4

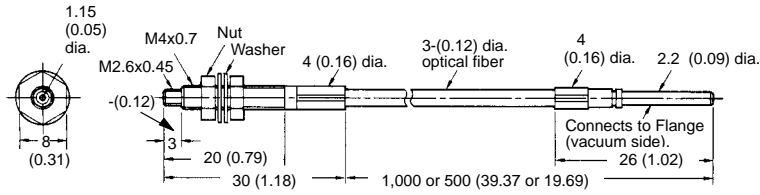
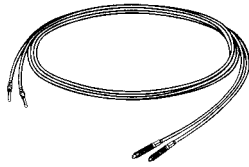


### E32-VF1

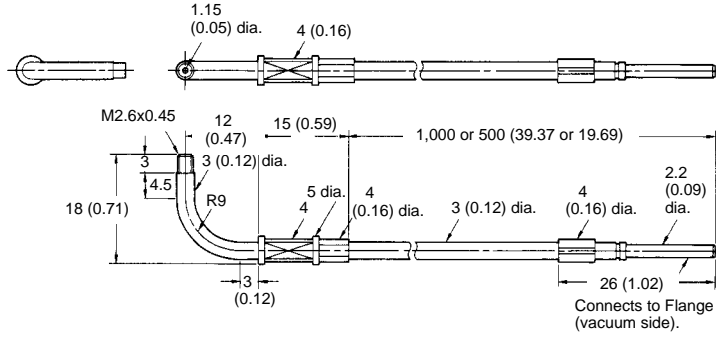
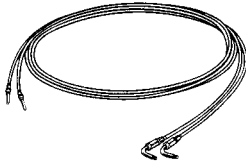


■ VACUUM FIBERS

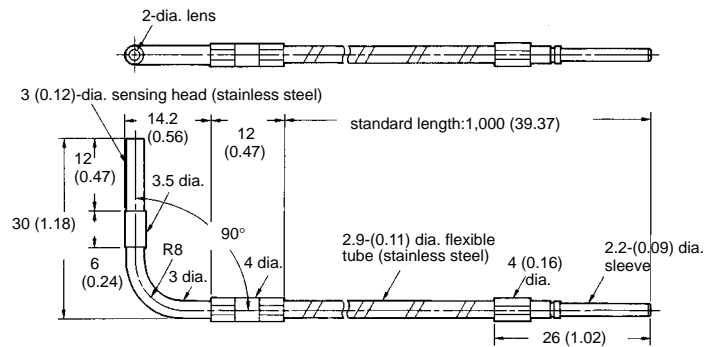
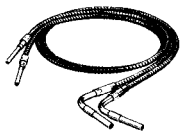
E32-T51V



E32-T54V

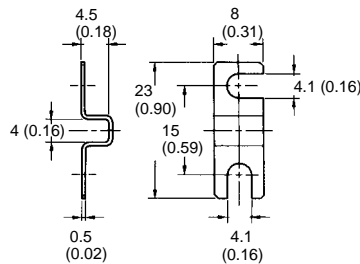


E32-T84SV



■ MOUNTING BRACKET

E39-L54V Mounting Bracket (Sold Separately)

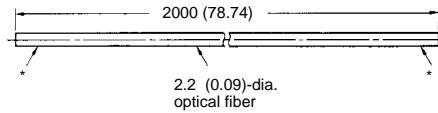
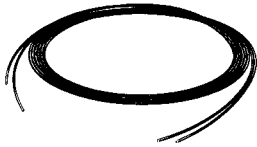


Material: SS 304

Unit: mm (inch)

■ EXTERNAL FIBER CABLE

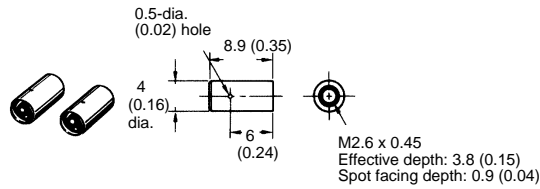
E32-T10V



\* Freely cut and connected to the outside Flange or Amplifier Unit.

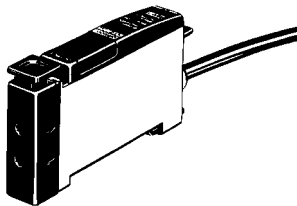
■ LENS UNIT

E32-F1V

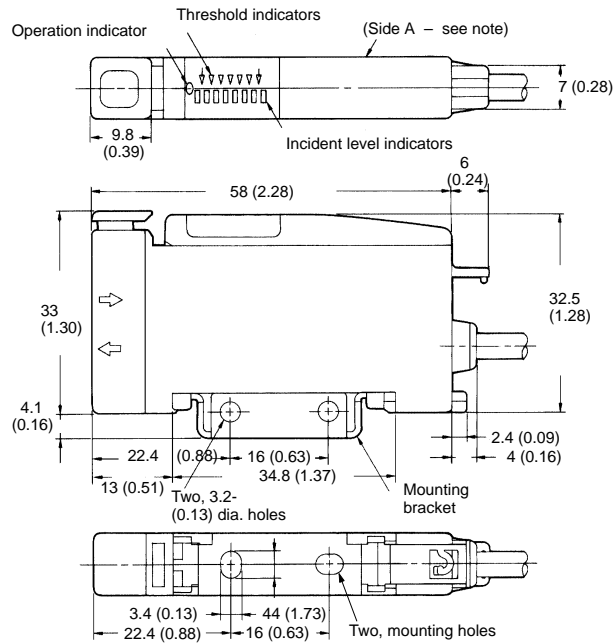
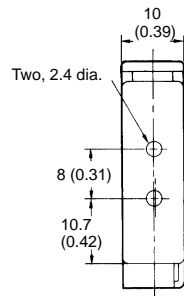


■ AMPLIFIER (SOLD SEPARATELY)

E3X-NH11



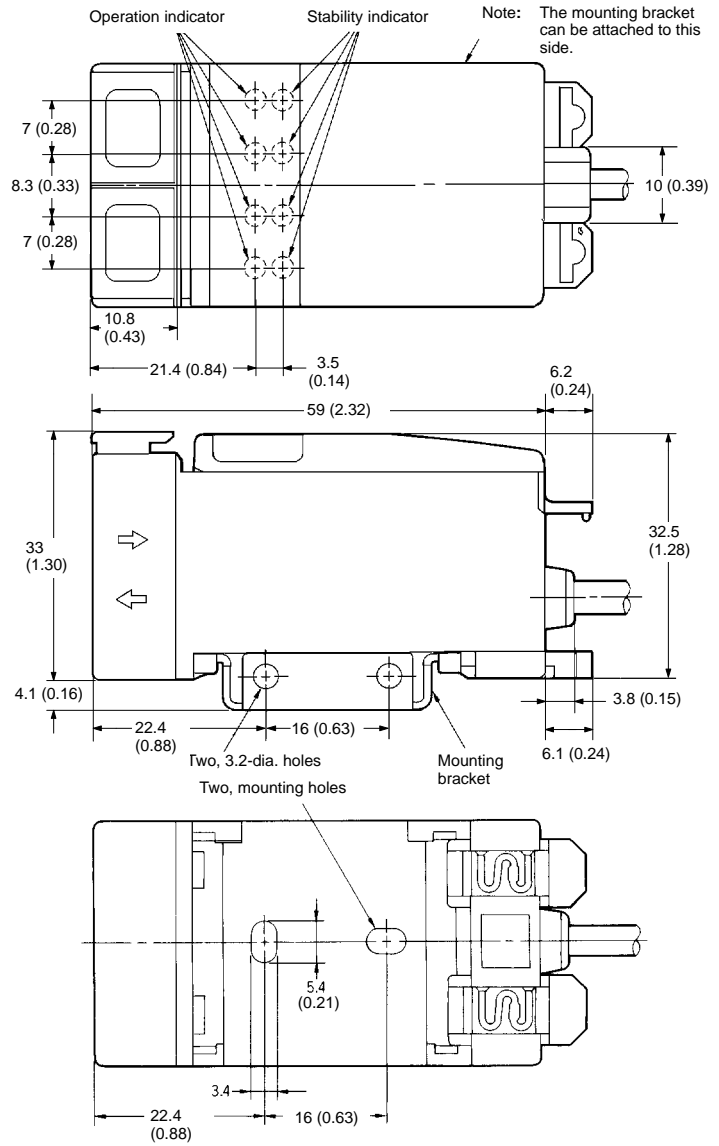
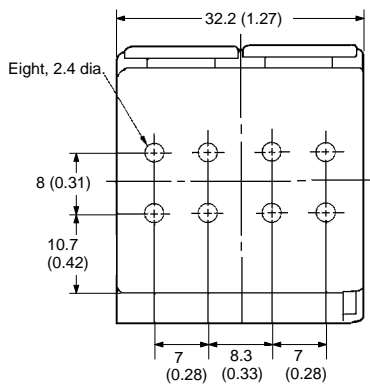
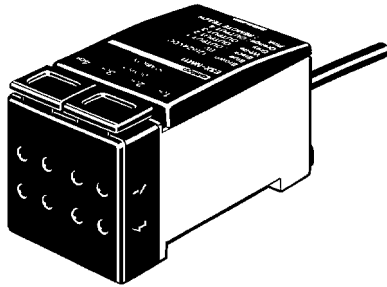
Note: The mounting bracket can be attached to side A.



Cable: Polyvinyl chloride covered cable  
 4-mm dia. (18/0.12 dia), 4 cores  
 Standard length: 2 m  
 Weight: Approx. 100 g

■ AMPLIFIER UNIT (SOLD SEPARATELY)

E3X-NM11  
E3X-NM41

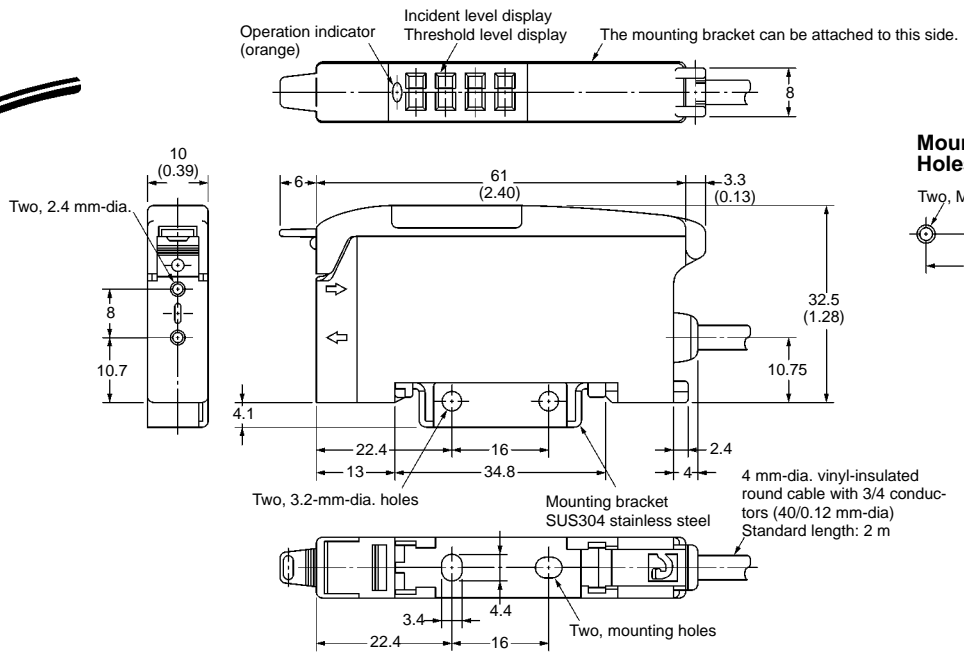
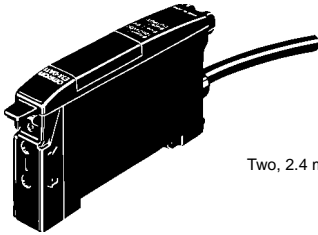


Cable: Polyvinyl chloride-covered cable  
4-mm dia. (40/0.08 dia), 7 cores  
Standard length: 2 m  
Weight: Approx. 200 g



■ AMPLIFIER

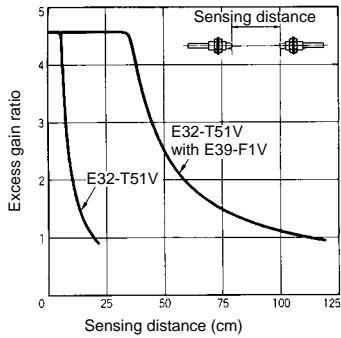
E3X-DA□1



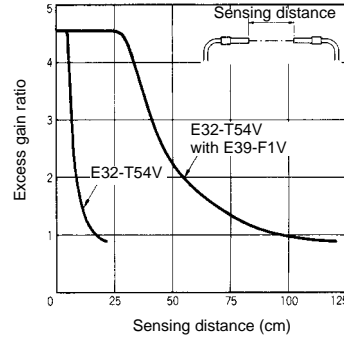
# Engineering Data (with E3X-NM11/NM41 Amplifier Unit)

## EXCESS GAIN RATIO VS. DISTANCE CHARACTERISTICS (TYPICAL)

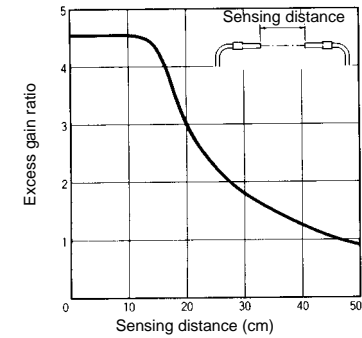
**E32-T51V**



**E32-T54V**

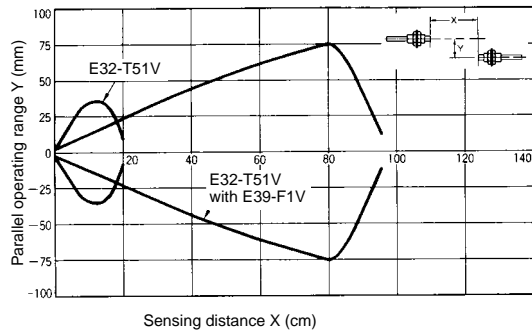


**E32-T84SV**

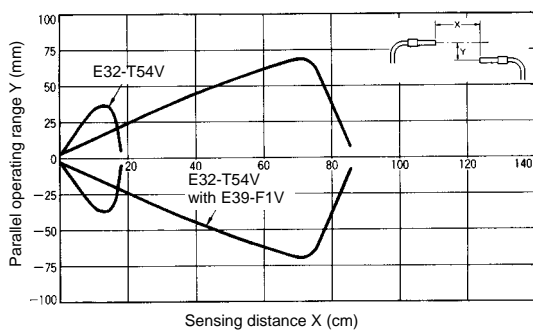


## PARALLEL OPERATING RANGE (TYPICAL)

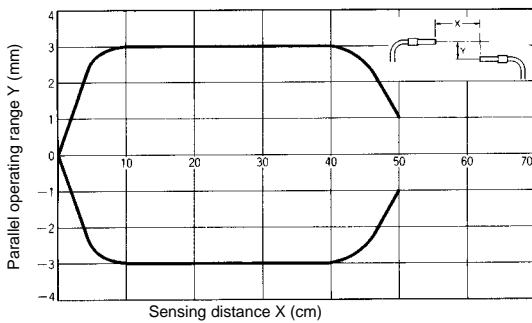
**E32-T51V**



**E32-T54V**



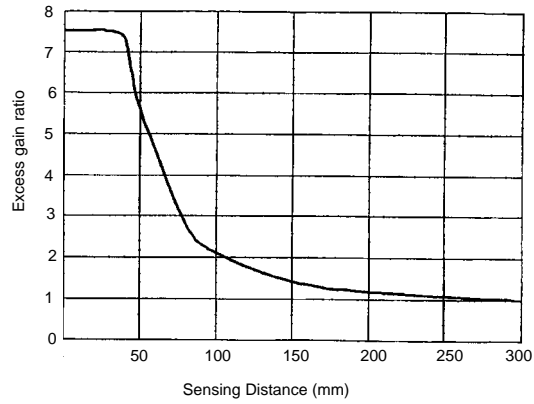
**E32-T84SV**



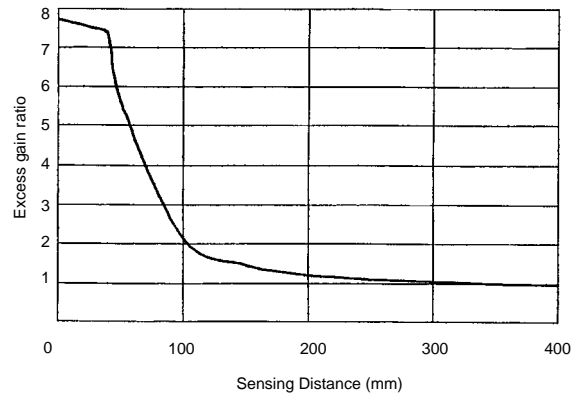
# Engineering Data (with E3X-NH11 Amplifier Unit)

## ■ EXCESS GAIN RATIO VS. DISTANCE CHARACTERISTICS (TYPICAL)

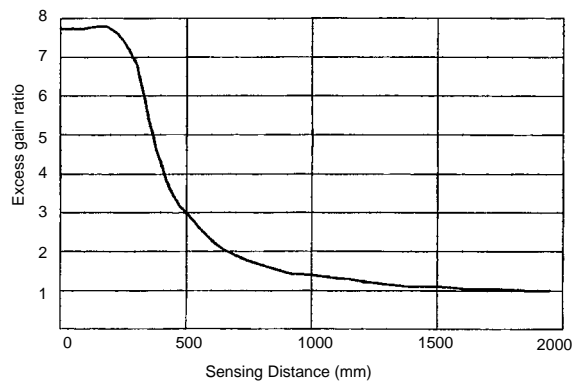
**E32-T51V**



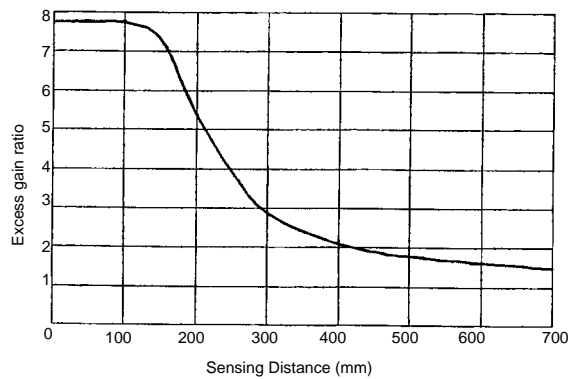
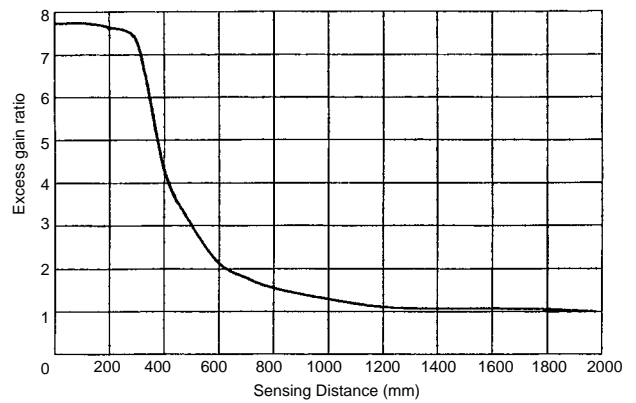
**E32-T54V**



**E32-T51V + E39-F1V**

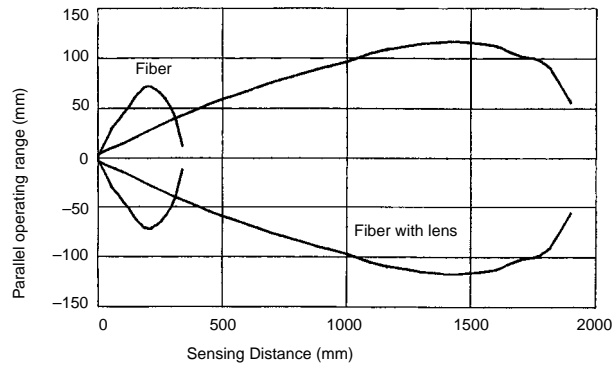


**E32-T54V - E39-F1V**

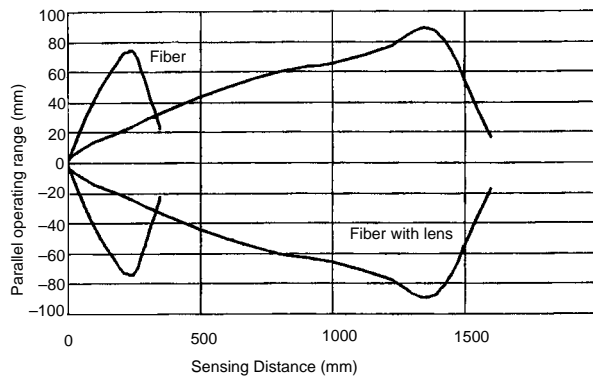


■ PARALLEL OPERATING RANGE (TYPICAL)

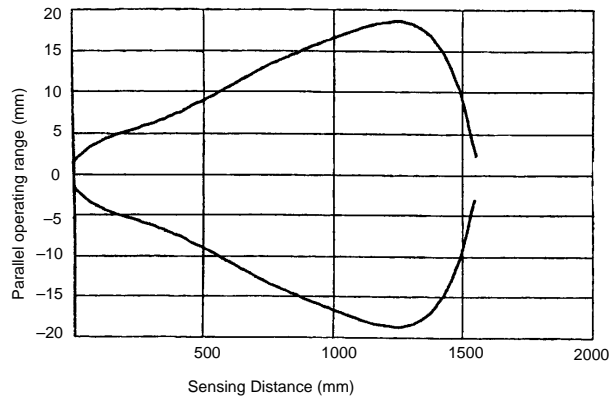
E32-T51V  
E32-T51V + E39-F1V



E32-T54V  
E32-T54V + E39-F1V



E32-T84SV



## Precautions

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### ■ APPLICATIONS

The E32-V Vacuum Fiber Unit is used to detect a variety of objects located in high-vacuum chambers heated up to 120°C (some chambers operate at a maximum temperature of 200°C).

### ■ CLEANING

Although Flanges, Vacuum Fibers, and Lens Units are cleaned before shipping, clean them with alcohol before use in high-vacuum chambers to make sure there is no foreign matter on them.

### ■ ORGANIC SOLVENTS

Keep organic solvents away from the E32-V Vacuum Sensor.

### ■ EXCESSIVE FORCE

The E32-V Vacuum Fiber Unit can resist a maximum force of 29.4 N (3 kgf). Do not impose extreme force, such as pulling force or pressure, on the E32-V Fibers.

### ■ FOR CONDITIONS OR ENVIRONMENTS NOT SPECIFIED FOR THIS PRODUCT

Consult your OMRON representative before attempting an application for: conditions or environments not specified in instruction manuals, and applications insuring safety, including nuclear reactor control, train facilities, aviation facilities, motorized vehicles, furnaces, medical equipment, amusement equipment, and safety equipment.

Note: You must allow a sufficient margin between ratings and required performance in addition to providing appropriate fail-safe measures and other safety measures when using the E32-V in applications such as mentioned above.

**NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.**

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