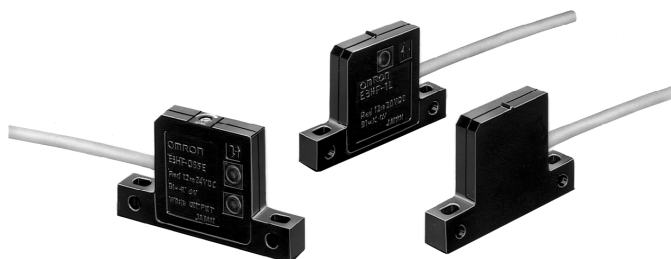


## Thin-Profile 7-mm Photoelectric Sensor

## E3HF

### Thin Flat-pack Style

- Just 7 mm (0.276 in) thick
- NPN transistor output switches 80 mA
- Choose Light-ON or Dark-ON operation models
- Top and side through holes make mounting easy
- 3 pairs of focusing slits supplied with separate type sensors



## Ordering Information

### ■ SENSORS

|                     |                    |               |                    |
|---------------------|--------------------|---------------|--------------------|
| Method of detection |                    | Through-beam  | Diffuse reflective |
| Sensing distance    |                    | 1 m (3.28 ft) | 5 cm (1.97 in)     |
| Part number         | Light-ON operation | E3HF-1E1      | E3HF-DS5E1         |
|                     | Dark-ON operation  | E3HF-1E2      | E3HF-DS5E2         |

## Specifications

|                        |          |                                                       |                                                                                      |
|------------------------|----------|-------------------------------------------------------|--------------------------------------------------------------------------------------|
| Part number            |          | E3HF-1E□                                              | E3HF-DS5E□□□                                                                         |
| Method of detection    |          | Through-beam                                          | Diffuse reflective                                                                   |
| Supply voltage         |          | 12 to 24 VDC                                          |                                                                                      |
| Current consumption    | Emitter  | 25 mA max.                                            | 30 mA max.                                                                           |
|                        | Receiver | 15 mA max.                                            |                                                                                      |
| Sensing distance       |          | 1 m (3.28 ft)                                         | 50 mm (1.97 in)<br>with 3 x 3 cm (1.18 x 1.18 in)<br>90% reflectance white mat paper |
| Light source           |          | Pulse modulate Infrared LED                           |                                                                                      |
| Detectable object type |          | Opaque materials,<br>6 mm (0.24 in) minimum dimension | Opaque materials                                                                     |
| Operation mode         | Light-ON | E3HF-□□□E1                                            |                                                                                      |
|                        | Dark-ON  | E3HF-□□□E2                                            |                                                                                      |
| Sensitivity            |          | Fixed                                                 | Adjustable                                                                           |

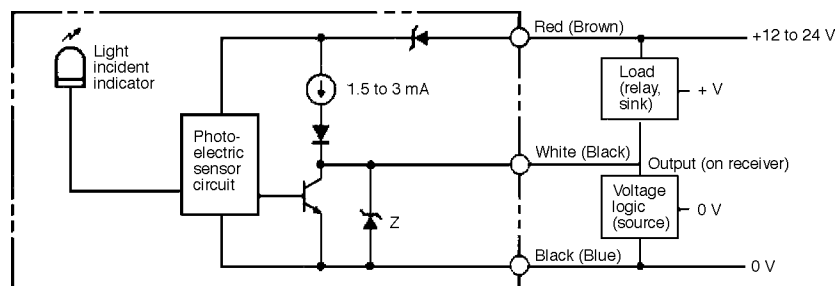
(Table continues on the next page)

Specifications Table - continued from previous page

| Part number         |                                  | E3HF-1E□                                    |                                                                        | E3HF-DS5E□□□ |                                  |
|---------------------|----------------------------------|---------------------------------------------|------------------------------------------------------------------------|--------------|----------------------------------|
| Output              | Type                             |                                             | NPN open collector with pull-up resistor                               |              |                                  |
|                     | Max. load                        |                                             | Load (relay, sink) logic: 80 mA<br>Voltage (source) logic: 1.5 to 3 mA |              |                                  |
|                     | Max. on-state voltage drop       |                                             | 1 VDC at 80 mA                                                         |              |                                  |
| Response time       | On                               |                                             | 5 ms max.                                                              |              | 3 ms max.                        |
|                     | Off                              |                                             | 5 ms max.                                                              |              | 3 ms max.                        |
| Circuit protection  | Output short-circuit             |                                             | Provided                                                               |              |                                  |
|                     | DC power supply reverse polarity |                                             | Provided                                                               |              |                                  |
| Indicators          | Emitter                          |                                             | Power On (red LED)                                                     |              | Light incident (red LED)         |
|                     | Receiver                         |                                             | Light Incident (red LED)                                               |              |                                  |
| Materials           | Lens                             |                                             | Plastic                                                                |              |                                  |
|                     | Case                             |                                             | Plastic                                                                |              |                                  |
| Mounting            |                                  | Top and side surface with two through holes |                                                                        |              |                                  |
| Connections         | Cable                            | Emitter                                     | 2-conductor cable, 2 m (6.56 ft) length                                |              | 3-conductor cable, 2 m (6.56 ft) |
|                     |                                  | Receiver                                    | 3-conductor cable, 2 m (6.56 ft)                                       |              |                                  |
| Weight              | Emitter                          |                                             | 40 g (1.4 oz)                                                          |              | 40 g (1.4 oz)                    |
|                     | Receiver                         |                                             | 40 g (1.4 oz)                                                          |              |                                  |
| Enclosure ratings   | NEMA                             |                                             | 1, 3, 4X, 12                                                           |              |                                  |
|                     | IEC 144                          |                                             | IP64                                                                   |              |                                  |
| Ambient temperature | Operating                        |                                             | -25° to 55°C (-13° to 131°F)                                           |              |                                  |
|                     | Storage                          |                                             | -30° to 70°C (-22° to 158°F)                                           |              |                                  |

## Operation

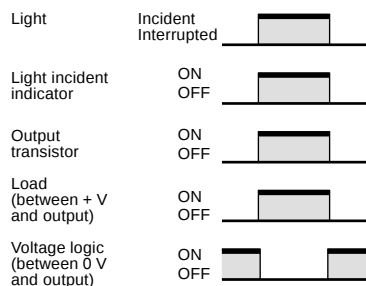
### ■ OUTPUT CIRCUIT DIAGRAM



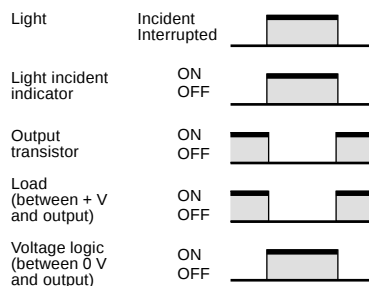
Note: IEC colors are shown in parentheses.

### ■ TIMING CHARTS

#### Light-ON operation mode



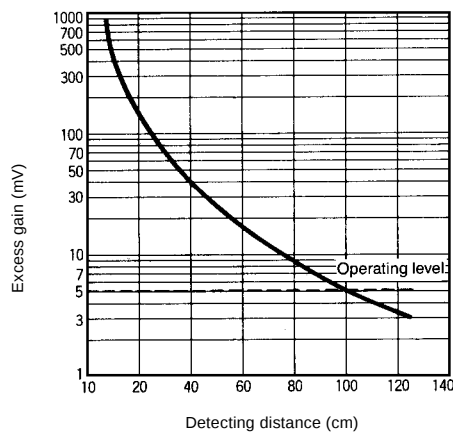
#### Dark-ON operation mode



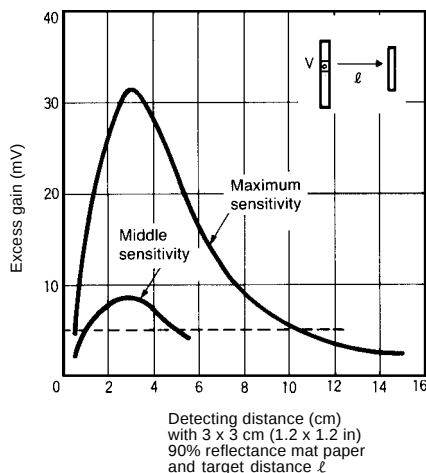
## Engineering Data

## ■ EXCESS GAIN

## Through-Beam Type

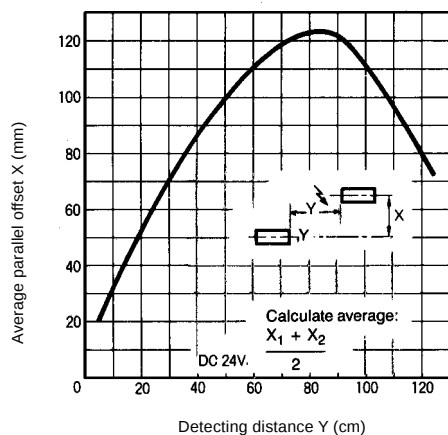


## ■ DIFFUSE REFLECTIVE TYPE



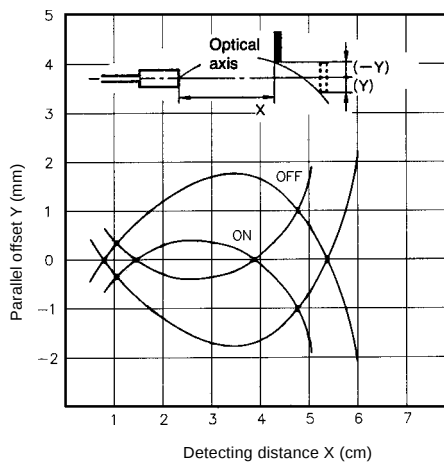
## ■ LIGHT SOURCE/RECEIVER SETTING RANGE

## Through-Beam Type



## ■ OPERATING RANGE

## Diffuse Reflective Type

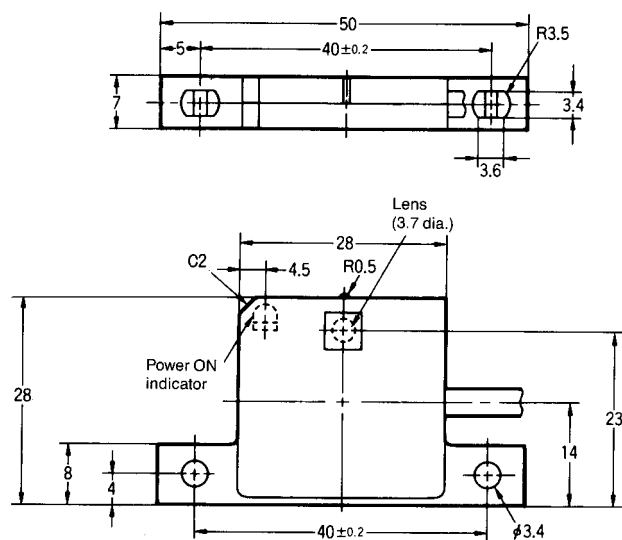


# Dimensions

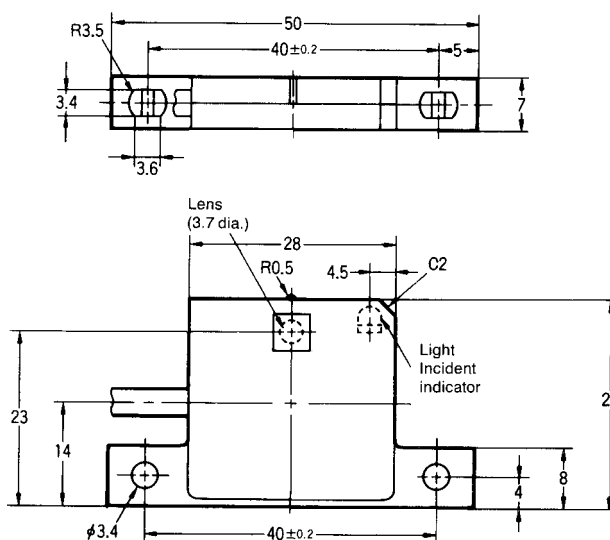
Unit: mm

## Through-beam Type

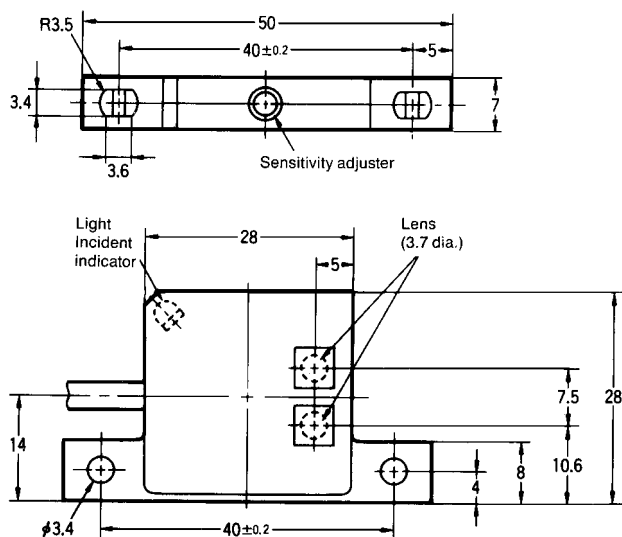
### Light Source



### Receiver



## Diffuse Reflective Type



## ■ SLITS FOR THROUGH-BEAM

Using slits reduces the sensing distance and allows smaller objects to be detected.

Three pairs of slits are supplied with E3HF-1E1 and E3HF-1E2 sensors. The slits are decals that can be peeled off the protective backing sheet and applied to the emitter and receiver. See table below for dimensions of slit openings.

|                                |                   |                 |                  |
|--------------------------------|-------------------|-----------------|------------------|
| Slit width                     | 0.5 mm (0.020 in) | 1 mm (0.039 in) | 2 mm (0.079 in)  |
| Sensing distance               | 12 cm (4.74 in)   | 20 cm (7.87 in) | 40 cm (15.75 in) |
| Minimum detectable object size | 0.5 mm (0.020 in) | 1 mm (0.039 in) | 2 mm (0.079 in)  |

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11/01

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