OMRON

Model E3H2

PHOTOELECTRIC SENSOR

INSTRUCTION SHEET

Thank you for selecting an OMRON product. This sheet describes precautions required in installing and operating the product.
Before operating the product, read the sheet thoroughly to acquire sufficient knowledge of the product. For your convenience, keep the sheet at your disposal.

KFBN0001

Specifications

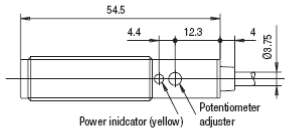
Item	Through-beam		Retro-reflective with M.S.R.	Diffuse-reflective	
	E3H2-T4	E3H2-T2	E3H2-R	E3H2-DS30	E3H2-DS10
Sensing distance	4 m (adjustable)	2 m	2 m (teachable) (when using E39-R1S)	300 mm (teachable)	100 mm (fixed)
Differential travel	20% max of sensing distance	10% max of sensing distance			
Light source (wave length)	Infrared LED (880 nm)		Red LED (660 nm)	Infrared LED (880 nm)	
Power supply voltage	10 to 30 VDC, 10% ripple				
Current consumption	45 mA max				
Control output	Load current: 100 mA max. (residual voltage 2 V max.); E3H2-_C_: NPN E3H2-_B_: PNP				
	Light-on/dark-on selectable by wire	E3H2-T2_2_: dark on E3H2-T2_1_: light on	Light-on/dark-on selectable by wire		
Protective circuits	Power supply reverse polarity protection, output short circuit protection				
Response time	Operation or reset: 2 ms max	Operation or reset: 1 ms max.	Operation or reset: 1.1 ms max		
Sensitivity adjustment	Potentiometer adjuster	–	Teach-in		–
Ambient illumination	Incandescent lamp: 1500 lx max.; Sunlight: 5000 lx max.				
Ambient temperature	Operating: -25 to +55°C	Operating: -25 to +50°C	Operating: -25 to +55°C		
Degree of protection	EN 60529: IP67				
Indicators	Emitter: Power supply indicator: yellow Receiver: Operation indicator: yellow		Output indicator: yellow		
Weight pre-wired connector	approx 110 g approx 40 g	approx 90 g approx 30 g	approx 55 g approx 20 g		
Material case lens	nickel-plated brass plastic	stainless steel plastic	nickel-plated brass plastic		

Dimensions

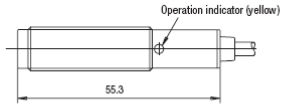
Note: All units are in millimeters unless otherwise stated.

Pre-wired models

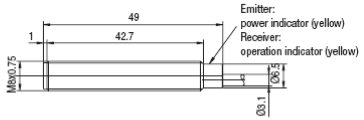
E3H2-T4 Emitter



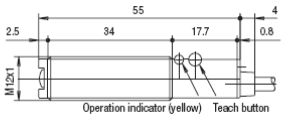
E3H2-T4 Receiver



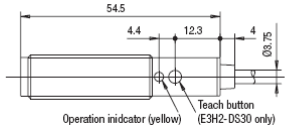
E3H2-T2 Emitter/ Receiver



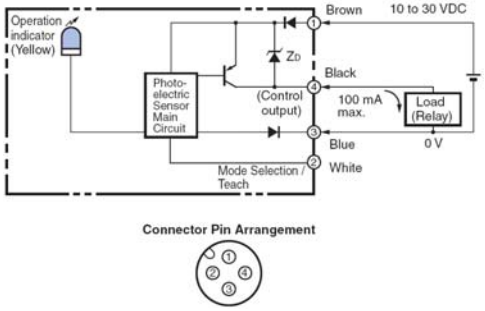
E3H2-R2



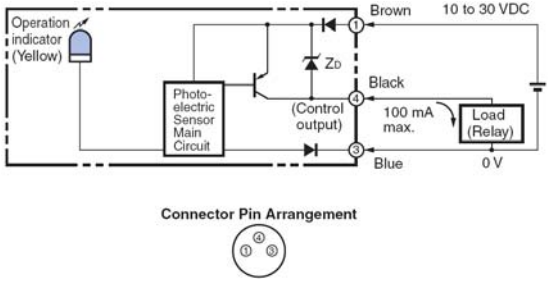
E3H2-D



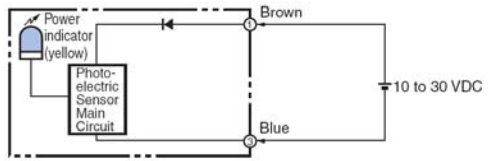
PNP E3H2-T4 receiver, E3H2-R, E3H2-D



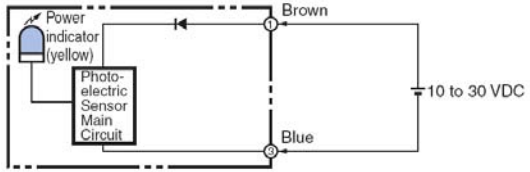
PNP E3H2-T2 receiver



E3H2-T4 emitter



E3H2-T2 emitter



Model	Operation mode	Timing charts	Mode selector switch
E3H2-T4B□ E3H2-R2B□ E3H2-D□B□	Light ON	Light Incident / Light Interrupted; Operation indicator (yellow) ON/OFF; Output transistor ON/OFF; Load (e.g. relay) Operate/Reset	For through-beam and retro-reflective: connect the white wire (Pin 2) to the brown wire (Pin 1). For diffuse-reflective: open (do not connect) the white wire (Pin 2).
	Dark ON	Light Incident / Light Interrupted; Operation indicator (yellow) ON/OFF; Output transistor ON/OFF; Load (e.g. relay) Operate/Reset	For through-beam and retro-reflective: open (do not connect) the white wire (Pin 2). For diffuse-reflective: connect the white wire (Pin 2) to the brown wire (Pin 1).

Safety precautions

⚠ Warning

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

⚠ Caution

Do not use the product with voltage in excess of the rated voltage. Excess voltage may result in malfunction or fire.

Never use the product with an AC power supply. Otherwise, explostion may result.

When cleaning the product, do not apply a high-pressure spray of water to one part of the product. Otherwise, parts may become damaged and the degree of protection may be degraded.

High-temperature environments may result in burn injury.

Sensitivity adjustment

E3H2-T4

The emitter of the E3H2-T4 allows an adjustment of the emitted amount of light by turning the potentiometer. Turn the potentiometer clockwise for increasing the amount of emitted light and counter-clockwise for decreasing the amount of emitted light.

E3H2-R2

a) standard mode

To teach the retro-reflective model E3H2-R, place the sensor with the lens facing the reflector. Press the teach button for 2-5 seconds. For remote teach connect the white wire (Pin 2) for 2-5 seconds to common.

The threshold is now set to 50% of the received light level.

b) high sensitivity mode (e.g. for semi-transparent models)

To teach the retro-reflective model E3H2-R in high sensitivity mode, place the sensor with the lens facing the reflector.

Press the teach button for >8 seconds. For remote teach connect the white wire (Pin 2) for >8 seconds to common.

The threshold is now set just below the received light level.

If the teaching was successful the LED should no longer be flashing and a state change occurs when the light is interrupted.

E3H2-DS30

a) standard mode

To teach the diffuse-reflective model E3H2-DS, place the object in front of the sensor at the required sensing distance.

Press the teach button for 2-5 seconds. For remote teach connect the white wire (Pin 2) for 2-5 seconds to earth.

The threshold is now set to 50% of the received light level.

When the object is removed, a state change at the sensor should occur. If this is not the case the high sensitivity mode may be required.

b) high sensitivity mode

To teach the diffuse-reflective model E3H2-DS in high sensitivity mode, place the object in front of the sensor at the required sensing distance.

Press the teach button for >8 seconds. For remote teach connect the white wire (Pin 2) for >8 seconds to earth.

The threshold is now set just below the received light level.

If the teaching was successful the LED should no longer be flashing and when the object is removed, a state change at the sensor should occur.

For E3H2-T2 and E3H2-DS10 the sensitivity setting is fixed.

Operation mode selection

The light-on / dark-on operation mode can be selected by wire (except for E3H2-T2). The white wire (Pin 2) can be connected to plus (+), common (-) or left open (not connected) for the default setting.

a) E3H2-T4 receiver

Default setting (wire left open): DARK-ON

Connected to plus (+): LIGHT-ON

Connected to common (-): DARK-ON

b) E3H2-R2

Default setting (wire left open): DARK-ON

Connected to plus (+): LIGHT-ON

Connected to common (-): TEACH[*1]

c) E3H2-DS30

Default setting (wire left open): LIGHT-ON

Connected to plus (+): DARK-ON

Connected to common (-): TEACH[*1]

d) E3H2-DS10

Default setting (wire left open): LIGHT-ON

Connected to plus (+): DARK-ON

Connected to common (-): LIGHT-ON

For E3H2-T2 the operation mode is fixed by model.

Note 1: In case the remote teach operation is required when the white wire is connected to plus (+), add a 2.2kΩ resistor between the white wire and (+) to avoid a short circuit.

Precautions for Correct Use

Do not use the sensor in any atmosphere or environment that exceeds the ratings.

Do not install the Sensor in the following locations.

(1)Locations subject to direct sunlight

(2)Locations subject to condensation due to high humidity

(3)Locations subject to corrosive gas

(4)Locations where the Sensor may receive direct vibration or shock

Connecting and Mounting

(1)The maximum power supply voltage is 30VDC. Before turning the power ON, make sure that the power supply voltage does not exceed the maximum voltage.

(2)Laying Sensor wiring in the same conduit or duct as high-voltage wires or power lines may result in malfunction or damage due to induction. As a general rule, wire the Sensor in a separate conduit or use shielded cable.

(3)Use an extension cable with a minimum thickness of 1 mm^2 and less than 100 m long.

(4)Do not pull on the cable with excessive force.

(5)Pounding the photoelectric sensor with a hammer or other tool during mounting will impair water resistance.

(6)Mount the sensor either using the bracket (sold separately) or on a flat surface.

(7)Be sure to turn OFF the power supply before inserting or removing the connector.

Cleaning

Never use thinner or other solvents. Otherwise, the sensor surface may be dissolved.

Power Supply

If a commercial switching regulator is used, ground the FG (frame ground) terminal.

Power Supply Reset Time

The sensor will be able to detect objects 150 ms after the power supply is tuned ON. Start using the sensor 150 ms or more after turning ON the power supply. If the load and the sensor are connected to separate power supplies, be sure to turn ON the Sensor first.

Turning OFF the Power Supply

Output pulses may be generated even when the power supply is OFF. Therefore, it is recommended to first turn OFF the power supply for the load or the load line.

Load Short-circuit Protection

This sensor is equipped with load short-circuit protection, but be sure to not short circuit the load. Be sure to not use an output current flow that exceeds the rated current.

Water Resistance

Do not use the sensor in water, rainfall, or outdoors.

Precautions for Safe Use

The following precautions must be observed to ensure safe operation of the sensor.

Operating Environment

Do not use the sensor in an environment where explosive or flammable gas is present.

Connecting Connectors

Be sure to hold the connector cover when inserting or removing the connector. Be sure to tighten the connector lock by hand; do not use pliers or other tools. If the tightening is insufficient, the degree of protection will not be maintained and the sensor may become loose due to vibration. The appropriate tightening torque is 0.4 to 0.5 N·m for M12 connectors and 0.3 Nm for M8 connectors.

Load

Do not use a load that exceeds the rated load.

Environements with Cleaners and Disinfectants

Do not use the sensor in environments subject to cleaners and disifectants. They may reduce the degree of protection.

Modifications

Do not attempt to disassemble, repair, or modify the sensor.

Outdoor Use

Do not use the sensor in locations subject to direct sunlight.

Cleaning

Do not use thinner, alcohol, or other organic solvents. Otherwise, the optical properties and degree of protection may be degraded.

Surface Temperature

Burn injury may occur. The sensor surface temperature rises depending on application conditions, such as the surrounding temperature and the power supply voltage. Use caution when operating or washing the sensor.