

## Output circuit diagram

### PNP Output

| Model                            | Operation mode           | Timing charts                                                                                                                                                                         | Operation selector                                                                 | Output circuit                                                             |
|----------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| E3F1-TP□<br>E3F1-RP□<br>E3F1-DP□ | Light-ON                 | Light incident<br>Light interrupted<br>Operation indicator (orange) ON<br>OFF<br>Output transistor ON<br>OFF<br>Load (e.g., relay) Operate<br>Reset<br>(Between blue and black leads) | Connect the pink wire (Pin(2)) to the brown (Pin(1))                               | Through-beam Receivers, Retro-reflective Models, Diffuse-reflective Models |
|                                  | Dark-ON                  | Light incident<br>Light interrupted<br>Operation indicator (orange) ON<br>OFF<br>Output transistor ON<br>OFF<br>Load (e.g., relay) Operate<br>Reset<br>(Between blue and black leads) | Connect the pink wire (Pin(2)) to the blue (Pin(3)) or open the pink wire (Pin(2)) |                                                                            |
|                                  | Through-beam Emitter<br> |                                                                                                                                                                                       |                                                                                    |                                                                            |

### NPN Output

| Model                            | Operation mode           | Timing charts                                                                                                                                                                          | Operation selector                                                                  | Output circuit                                                             |
|----------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| E3F1-TN□<br>E3F1-RN□<br>E3F1-DN□ | Light-ON                 | Light incident<br>Light interrupted<br>Operation indicator (orange) ON<br>OFF<br>Output transistor ON<br>OFF<br>Load (e.g., relay) Operate<br>Reset<br>(Between brown and black leads) | Connect the pink wire (Pin(2)) to the brown (Pin(1)) or open the pink wire (Pin(2)) | Through-beam Receivers, Retro-reflective Models, Diffuse-reflective Models |
|                                  | Dark-ON                  | Light incident<br>Light interrupted<br>Operation indicator (orange) ON<br>OFF<br>Output transistor ON<br>OFF<br>Load (e.g., relay) Operate<br>Reset<br>(Between brown and black leads) | Connect the pink wire (Pin(2)) to the blue (Pin(3))                                 |                                                                            |
|                                  | Through-beam Emitter<br> |                                                                                                                                                                                        |                                                                                     |                                                                            |

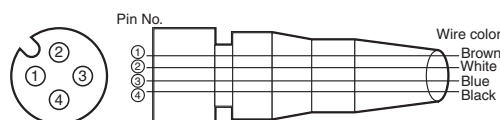
### Connector Pin Arrangement

#### M12 Connector Pin Arrangement



### Connectors (Sensor I/O connectors)

#### M12 4-wire Connectors



| Classification | Wire color | Connector pin No. | Application            |
|----------------|------------|-------------------|------------------------|
| DC             | Brown      | ①                 | Power supply (+V)      |
|                | White      | ②                 | L/on · D/on selectable |
|                | Blue       | ③                 | Power supply (0 V)     |
|                | Black      | ④                 | Output                 |

## Nomenclature

### Straight

with an adjuster:

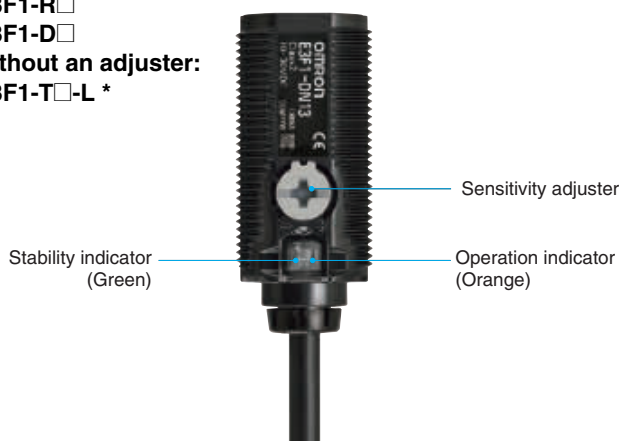
E3F1-T□-D

E3F1-R□

E3F1-D□

without an adjuster:

E3F1-T□-L \*



\* The Emitter has two Power indicators (Green) instead of the Stability indicator (Green) and the Operation indicator (Orange).

## Safety Precautions

Refer to *Warranty and Limitations of Liability*.

### ⚠ 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

Never use the product with an AC power supply.

Do not use the product with voltage in excess of the rated voltage.



Do not use the product with incorrect wiring.

Otherwise, explosion, fire, malfunction may result.



### Precautions for Safe Use

Be sure to follow the safety precautions below for added safety.

1. Do not use the sensor under the environment with explosive, flammable or corrosive gas.
2. Do not use the sensor under the oil or chemical environment.
3. Do not use the sensor in the water, rain or outdoors.
4. Do not use the sensor in the environment where humidity is high and condensation may occur.
5. Do not use the sensor under the environment under the other conditions in excess of rated.
6. Do not use the sensor in place that is exposed by direct sunlight.
7. Do not use the sensor in place where the sensor may receive direct vibration or shock.
8. Do not use the thinner, alcohol, or other organic solvents.
9. Never disassemble, repair nor tamper with the sensor.
10. Please process it as industrial waste.

### Precautions for Correct Use

1. Laying Sensor wiring in the same conduit or duct as high-voltage wires or power lines may result in malfunction or damage due to conduit or use shielded cable.
2. Do not pull on the cable with excessive force.
3. If a commercial switching regulator is used, ground the FG (frame ground) terminal.
4. The sensor will be available 100 ms after the power supply is tuned ON. Start to use the sensor 100 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.
5. 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.
6. The sensor must be mounted using the provided nuts. The proper tightening torque range is between 0.4 and 0.5 N·m.