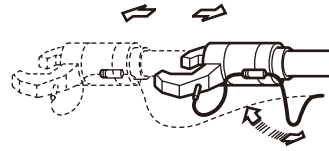


Small Proximity Sensors EM Series



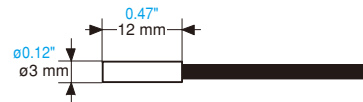
Flexible cable

The output cable is made of a high-tensile copper alloy giving it 5 times greater flexibility than conventional sheathed cables.



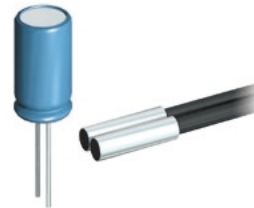
Compact sensor heads

With a sensor head diameter as small as 3 mm 0.12" for the cylindrical type and M5 for the threaded type, the EM Series sensor is an effective space-saver.



Can be mounted in close proximity

Alternate frequency models are available to prevent mutual interference, even when sensors are used in close proximity to each other.



Detecting capacitor leads



For standard certification and conformance list, see our website.
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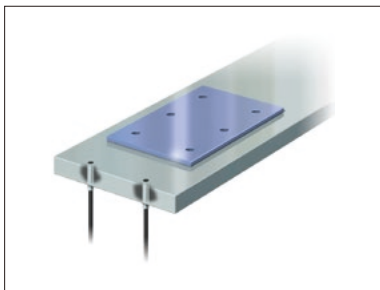


FREE DOWNLOAD

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Free downloads for product and technical support are readily available in one convenient location

Applications



Detecting presence/absence of small holes



Confirming that a target is in transfer press grips



Detecting cam switch position

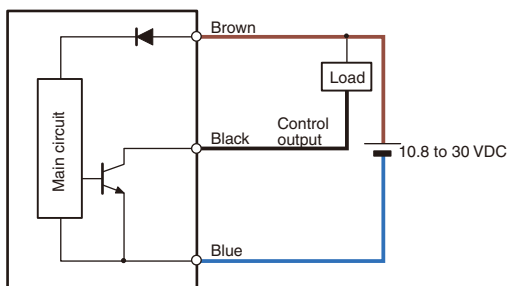
Specifications

| Type | Shielded | | | | | | | | |
|--|----------|--|--------------------|-------------------|-------------------|-------------------|----------------|-------------------|--|
| | | | Cylindrical | | Threaded | Cylindrical | | Threaded | |
| Model | NPN | EM-030 | EM-038 | EM-005 | EM-054 | EM-080 | EM-010 | EM-014 | |
| | PNP | EM-030P | EM-038P | EM-005P | EM-054P | EM-080P | EM-010P | EM-014P | |
| Size | | 3 mm 0.12" dia. | 3.8 mm 0.15" dia. | M5 | 5.4 mm 0.21" dia. | 8 mm 0.31" dia. | M10 | M14 | |
| Appearance | | | | | | | | | |
| Detecting distance | | 0.6 mm 0.02" ±15% | 0.8 mm 0.031" ±15% | 1.0 mm 0.04" ±15% | 1.2 mm 0.05" ±10% | 2.0 mm 0.08" ±10% | | 4.0 mm 0.16" ±10% | |
| Detectable object | | Ferrous metals (see Characteristics for non-ferrous metals) | | | | | | | |
| Standard target (iron, t=1 mm 0.04") | | | 5 x 5 mm 0.20" | | 6 x 6 mm 0.24" | 10 x 10 mm 0.39" | | 15 x 15 mm 0.59" | |
| Hysteresis | | 10% max. of detecting distance | | | | | | | |
| Response frequency | | 1.2 kHz | | | | | | | |
| Operation mode | | N.O. | | | | | | | |
| Temperature fluctuation | | ±10% max. of detecting distance at +23°C (73.4°F), within -10 to +70°C (14 to 158°F) | | | | | | | |
| Control output | | NPN/PNP: 200 mA (40 V) max., Residual voltage: 1 V max. | | | | | | | |
| Power supply | | 10.8 to 30 VDC, Ripple (P-P) 10% max. ¹⁾ | | | | | | | |
| Current consumption | | 12 mA max. | | | | | | | |
| Enclosure rating | | IP67 | | | | | | | |
| Ambient temperature | | -25 to +80°C (-13 to +176°F), No freezing | | | | | | | |
| Relative humidity | | 35 to 95%, No condensation | | | | | | | |
| Housing | | Stainless steel | | | | | | Cr-plated brass | |
| Weight (including nuts and 2-m 6.6' cable) | | Approx. 36 g | Approx. 38 g | Approx. 40 g | | Approx. 42 g | Approx. 50 g | Approx. 60 g | |

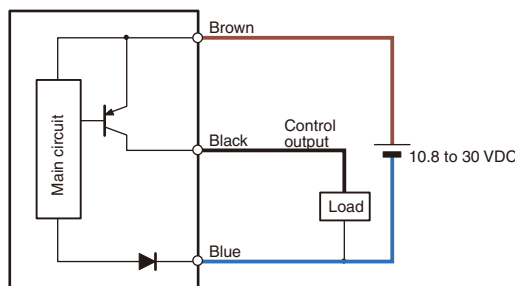
1. Make sure that the power voltage stays within 10.8 V to 30 V even if it is affected by ripple effects.

Input/Output Circuits

NPN

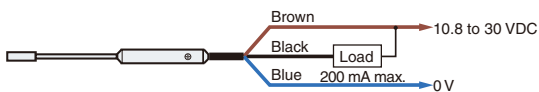


PNP

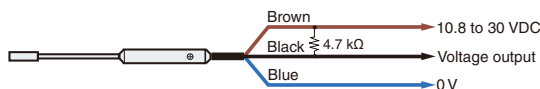


Connections

When driving a direct load (NPN output type)



When connecting to a voltage input device (NPN output type)



Low level is used when a target approaches.



New Products

Fiberoptic Sensors

Photoelectric Sensors

Proximity Sensors

Safety Equipment

Flow/ Pressure/ Temperature

Measurement Sensors

Controls

Static Eliminators

Vision Systems

Marking Equipment

Code Readers

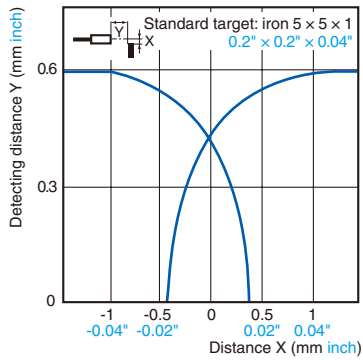
Handheld Mobile Computers

Microscopes

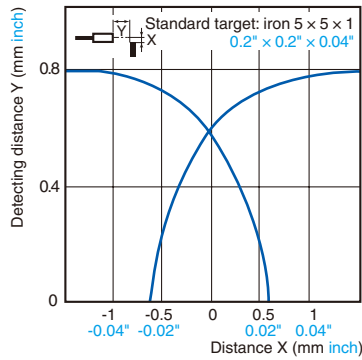
Projector/ 3D Measurement Systems

Detecting range (Typical)

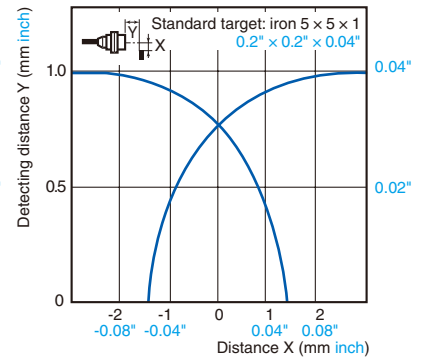
EM-030/030P



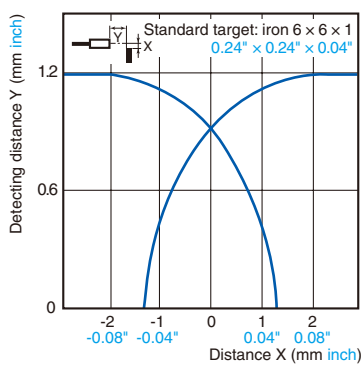
EM-038/038P



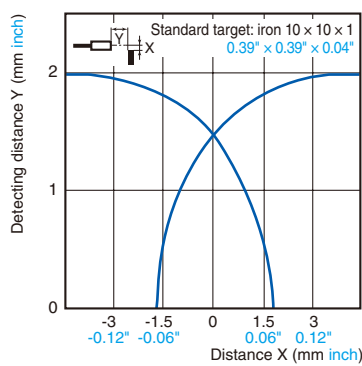
EM-005/005P



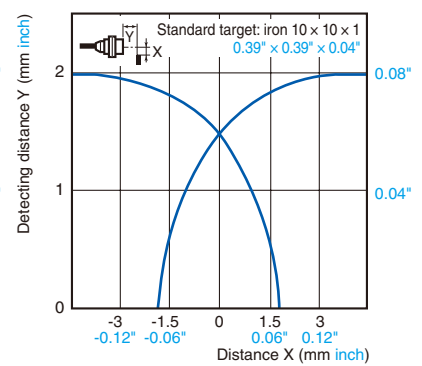
EM-054/054P



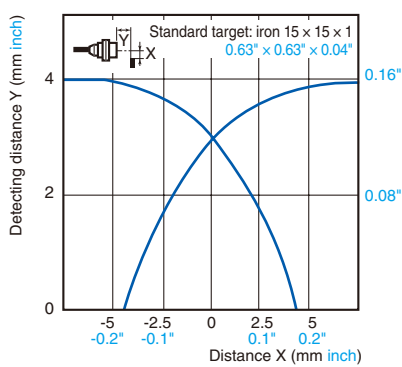
EM-080/080P



EM-010/010P



EM-014/014P



PROXIMITY SENSORS

- EV
- EZ
- ED
- EM
- ES
- ET
- TA
- EG
- DD

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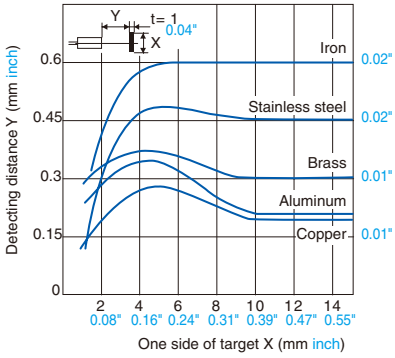
Microscopes

Projector/3D Measurement Systems

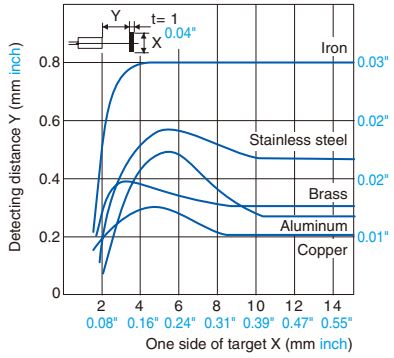


Detecting distance vs. size and material of target (Typical)

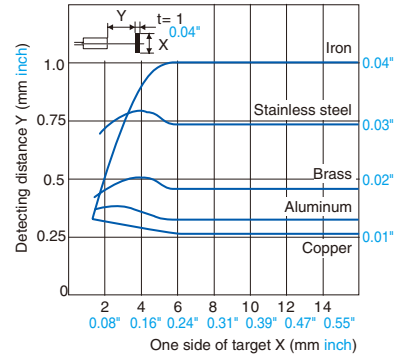
EM-030(P)



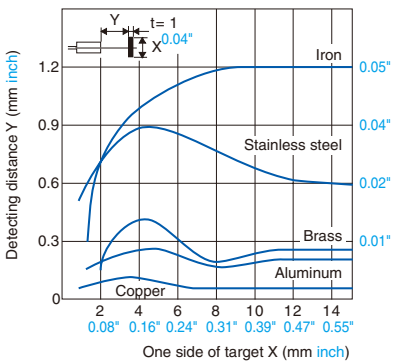
EM-038(P)



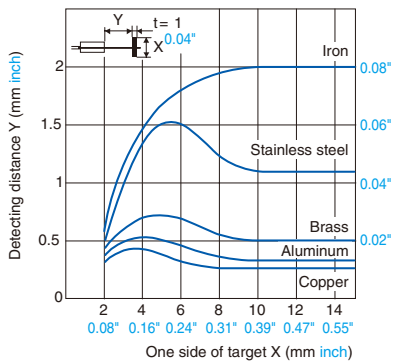
EM-005(P)



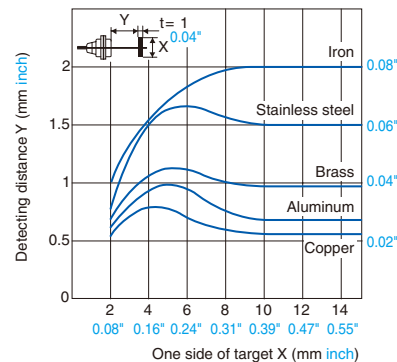
EM-054(P)



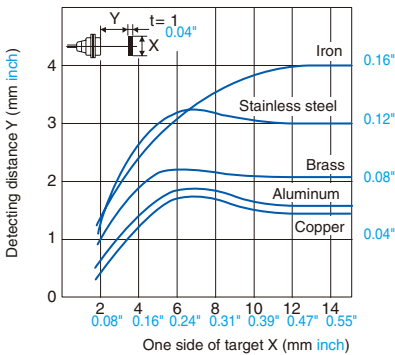
EM-080(P)



EM-010(P)



EM-014(P)



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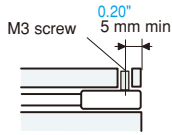
Projector/3D Measurement Systems



Hints on Correct Use

Mounting

- Cylindrical type
Secure the sensor head with a screw at a position 5 mm 0.20" or more from the tip of the head.
[Tightening torque: 0.4 N·m]



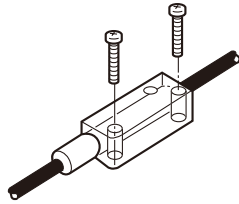
- Threaded type
When mounting the threaded-type sensor head, do not tighten beyond the torque specified in the following table.

| Model | Tightening torque |
|-----------|-------------------|
| EM-005(P) | 1.5 N·m max. |
| EM-010(P) | 10 N·m max. |
| EM-014(P) | 20 N·m max. |

Amplifier unit

Use the dedicated mounting bracket supplied with the unit.
* Do not use setscrews to mount the amplifier unit.

Amplifier mounting bracket (accessory)



Wiring

Limit the length of extension to within 50 m 164.0'. The sensor cable (coaxial cable) must not be extended or cut.

Surrounding metal

When embedding the sensor in an iron base, follow the guidelines given below in order to minimize interference from the surrounding metal.



| Model | L (mm inch min.) | D (mm inch min.) | d (mm inch min.) |
|-----------|------------------|------------------|------------------|
| EM-030(P) | 4 0.16" | 6 0.24" | 5 0.20" |
| EM-038(P) | 4 0.16" | 7.6 0.30" | 5 0.20" |
| EM-005(P) | 4 0.16" | 10 0.39" | 5 0.20" |
| EM-054(P) | 4 0.16" | 10.8 0.43" | 5 0.20" |
| EM-080(P) | 5 0.20" | 16 0.63" | 8 0.31" |
| EM-010(P) | 5 0.20" | 20 0.79" | 8 0.31" |
| EM-014(P) | 5 0.20" | 28 1.10" | 8 0.31" |

Interference

When installing 2 sensors of the same model face-to-face or in parallel, separate by the distance specified in the following table to prevent interference.

| Model | Distance | |
|-----------|-----------------------------|-------------------------|
| | Face-to-face (mm inch min.) | Parallel (mm inch min.) |
| EM-030(P) | 12(1) 0.47*(0.04") | 11(0) 0.43" |
| EM-038(P) | 15(1) 0.59*(0.04") | 12(0) 0.47" |
| EM-005(P) | 12(1.5) 0.47*(0.06") | 13(0) 0.51" |
| EM-054(P) | 20(1.5) 0.79*(0.06") | 18(0) 0.71" |
| EM-080(P) | 24(2.5) 0.94*(0.10") | 23(0) 0.91" |
| EM-010(P) | 20(2.5) 0.79*(0.10") | 25(0) 0.98" |
| EM-014(P) | 40(4.5) 1.57*(0.18") | 34(0) 1.34" |

[Note]
The values in parentheses apply to the alternate-frequency type.

EV
EZ
ED
EM
ES
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EG
DD

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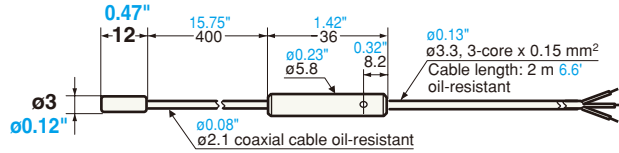
Projector/3D Measurement Systems



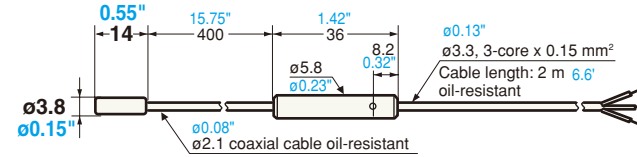
Dimensions

Unit: mm inch

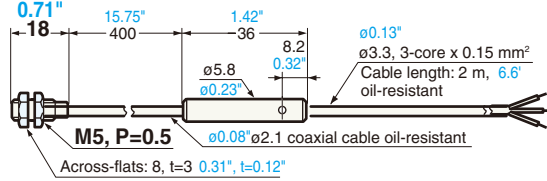
EM-030(P)



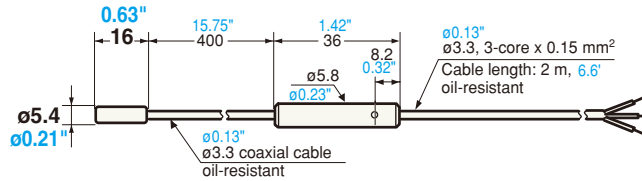
EM-038(P)



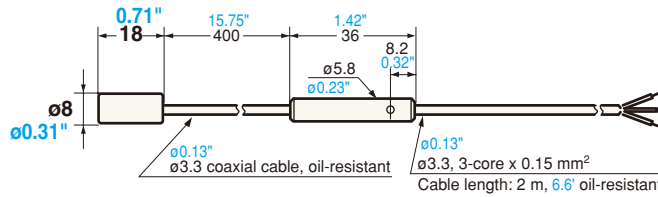
EM-005(P)



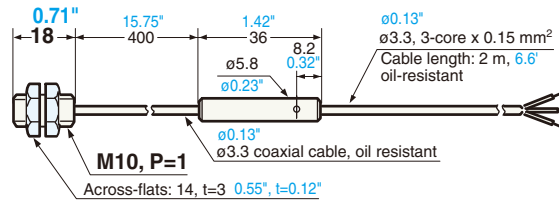
EM-054(P)



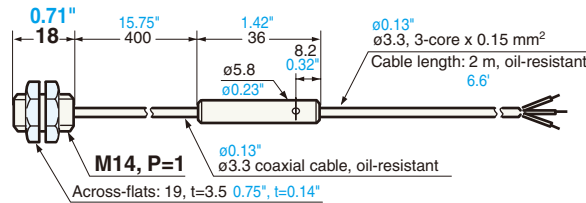
EM-080(P)



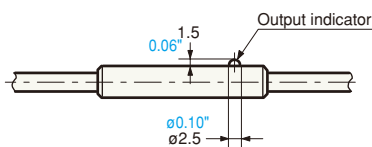
EM-010(P)



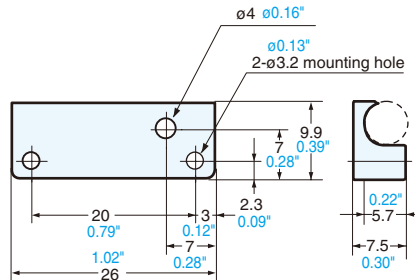
EM-014(P)



Detail of output indicator



Amplifier mounting bracket (accessory)



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