

**Features**

- Ultra-small sensor head
- Amplifier and operation indicator built into cable
- Strong, flexible cable
- IP67 waterproof housing



Check Technical Guide

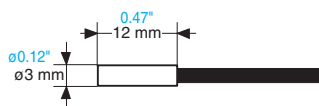
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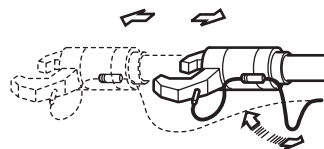
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www.keyence.com/cadg**Description****Compact sensor heads**

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.

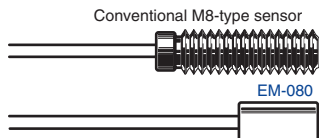
**Flexible cable**

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

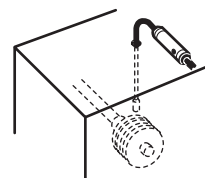
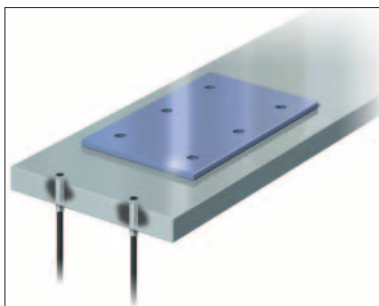
**Short length**

The sensor head is half the length of conventional M8-sized self-contained proximity sensors.

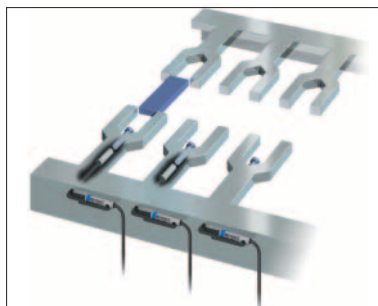
This enables the EM Series to be installed in limited spaces, thereby broadening its range of applications.

**Visible output indicator**

The output indicator is located on the amplifier housing installed in the cable, enabling sensor operation to be easily confirmed.

**Applications**

Detection of presence/absence of small holes



Confirmation that target is in transfer press grips



Cam switch

Selection Chart

Shape		Detecting distance	Model	Type
ø3 mm ø0.12"		0.6 mm 0.02"	EM-030 EM-030P	NPN PNP
ø3.8 mm ø0.15"		0.8 mm 0.03"	EM-038 EM-038P	NPN PNP
M5		1 mm 0.04"	EM-005 EM-005P	NPN PNP
ø5.4 mm ø0.21"		1.2 mm 0.05"	EM-054 EM-054P	NPN PNP
ø8 mm ø0.31"		2 mm 0.08"	EM-080 EM-080P	NPN PNP
M10		2 mm 0.08"	EM-010 EM-010P	NPN PNP
M14		4 mm 0.16"	EM-014 EM-014P	NPN PNP

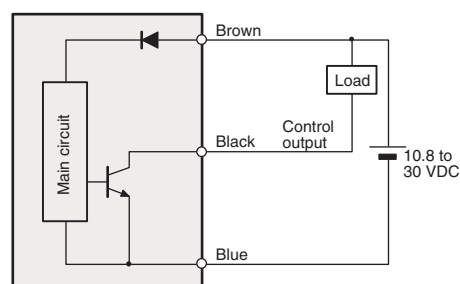
Specifications

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
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 condensation						
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

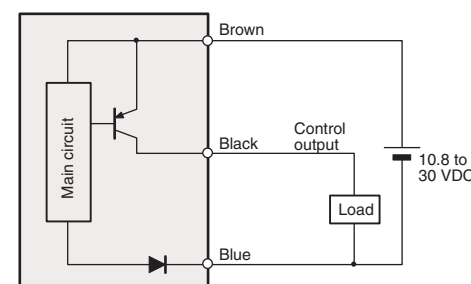
1. Make sure that the power voltage stays within 10.8 V to 30 V even if it is affected by ripple effects.

Output Circuits

NPN

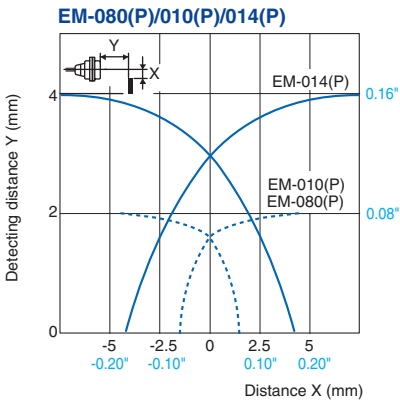
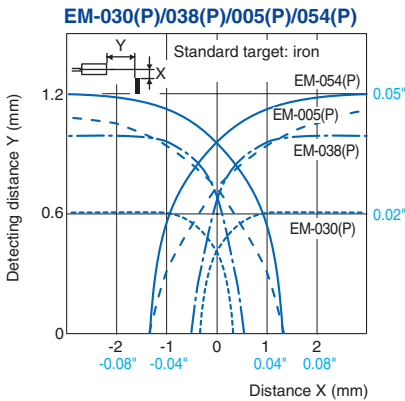


PNP

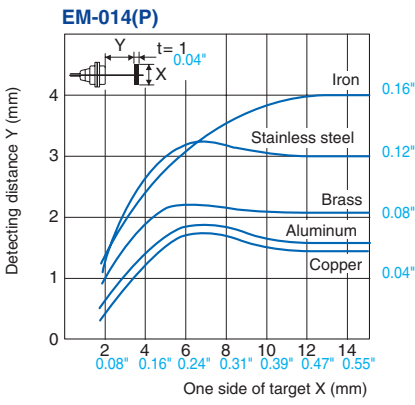
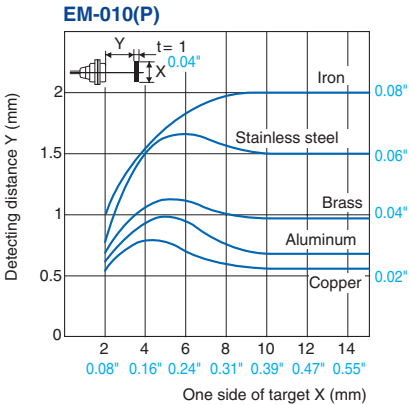
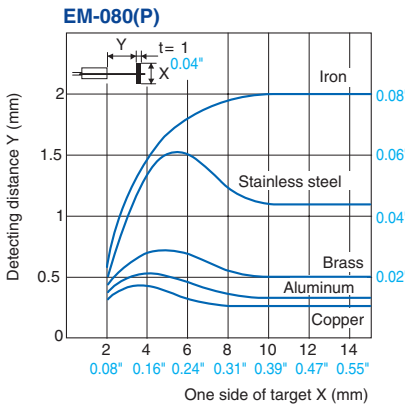
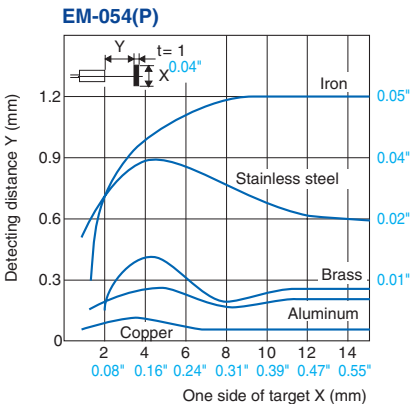
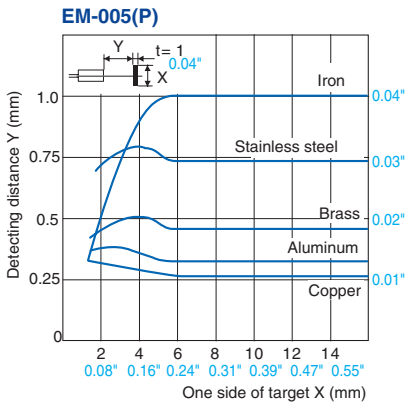
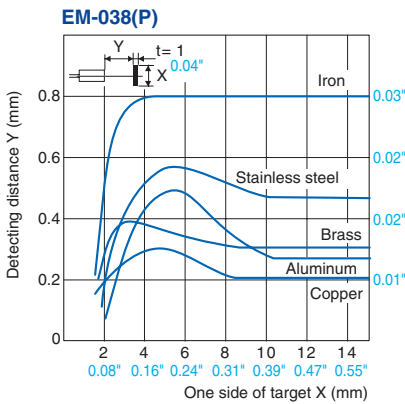
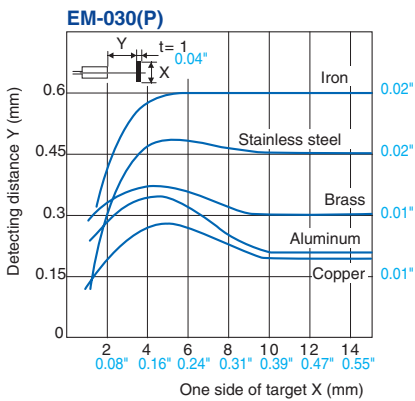


Characteristics

Detecting range (Typical)



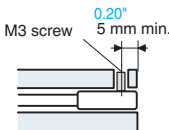
Detecting distance vs. size and material of target (Typical)



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]

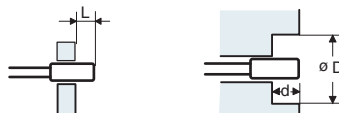


- Threaded type
When mounting the threaded-type sensor head, do not tighten beyond the torque specified in the following table.

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.

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 <i>Inch</i> min.)	D (mm <i>Inch</i> min.)	d (mm <i>Inch</i> 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"

Wiring

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

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 <i>Inch</i> min.)	Parallel (mm <i>Inch</i> 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]

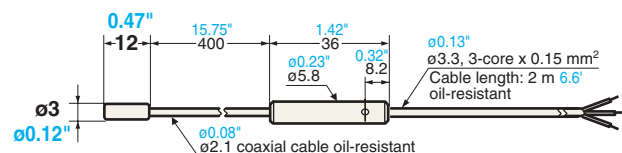
The values in parentheses apply to the alternate-frequency type.

Dimensions

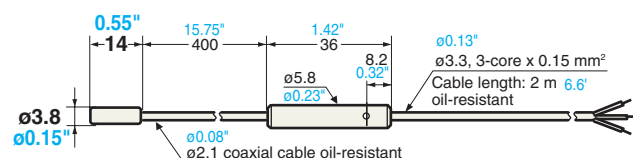
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Unit: mm *Inch*

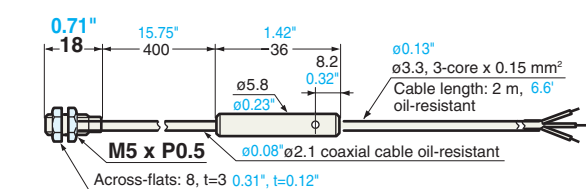
EM-030(P)



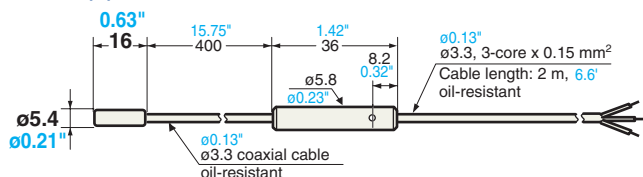
EM-038(P)



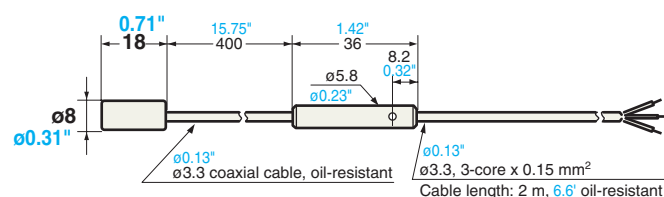
EM-005(P)



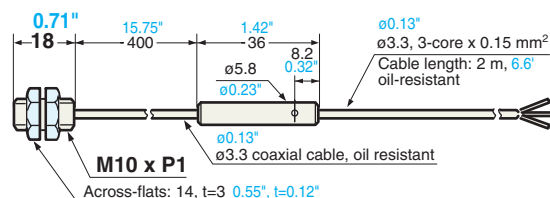
EM-054(P)



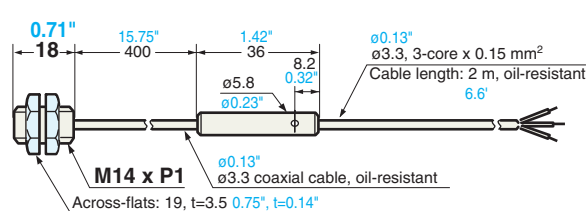
EM-080(P)



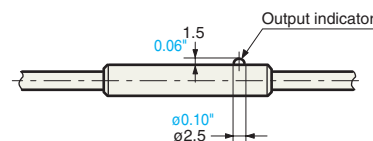
EM-010(P)



EM-014(P)



Detail of output indicator



Amplifier mounting bracket (standard)

