For **Pricing** and **Days to Ship**, Please Configure Online.

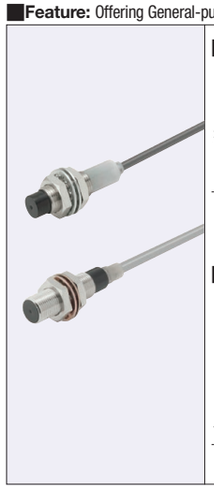
# Proximity Sensors with Built-In Amplifier

## 2-Wire, 3-Wire / Shielded, Non Shielded

**Do not use this product as a detection device for human body protection.**
(For human body protection, use products compliant with the local laws and regulations such as OSHA, ANSI and IEC.)

CE

**Feature:** Offering General-purpose Photoelectric Sensors with Built-in Amplifier at reasonable prices and short lead times. For Heat Resistant and Mini Type P.1783



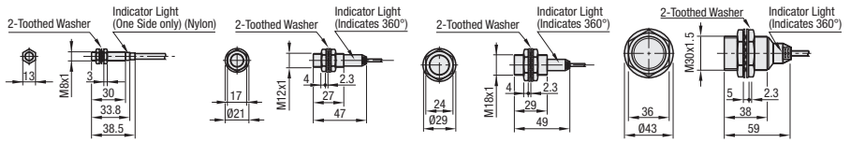
### Shield

**Screw Type M8**
EM2-8S (2-Wire)

**Screw Type M12**
EM3-12S (2-Wire)
EMZ3-12S (3-Wire)

**Screw Type M18**
EM7-18S (2-Wire)
EMZ7-18S (3-Wire)

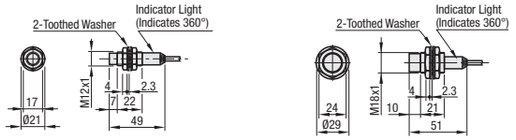
**Screw Type M30**
EM10-30S (2-Wire)




### Non Shield

**Screw Type M12**
EM8-12U (2-Wire)

**Screw Type M18**
EM14-18U (2-Wire)




For Material Specifications, see the "Case Material" and "Lead Wire" columns on the table below.

A Accessories: Toothed Washer (2 pcs.), Hex Nut (2 pcs.)

### 2-Wire, Shield

| Part Number | Shape | Detection Distance | Output | Connection Method | Unit Price 1~4 pc(s). | Volume Discount Rate 5~9 pcs. |
|---|---|---|---|---|---|---|
| EM2-8S | Screw Type M8 | 2mm | NPN N.O. | Integrated Cable Type 2m (Oil Resistant Cable) | | |
| EM3-12S | Screw Type M12 | 3mm | | | | |
| EM7-18S | Screw Type M18 | 7mm | | | | |
| EM10-30S | Screw Type M30 | 10mm | | | | |

For orders larger than indicated quantity, please request a quotation.

### 2-Wire, Non Shield

| Part Number | Shape | Detection Distance | Output | Connection Method | Unit Price 1~4 pc(s). | Volume Discount Rate 5~9 pcs. |
|---|---|---|---|---|---|---|
| EM8-12U | Screw Type M12 | 8mm | NPN N.O. | Integrated Cable Type 2m (Oil Resistant Cable) | | |
| EM14-18U | Screw Type M18 | 14mm | | | | |

For orders larger than indicated quantity, please request a quotation.

### 3-Wire, Shield

| Part Number | Shape | Detection Distance | Output | Connection Method | Unit Price 1~4 pc(s). | Volume Discount Rate 5~9 pcs. |
|---|---|---|---|---|---|---|
| EMZ3-12S | Screw Type M12 | 3mm | NPN N.O. | Integrated Cable Type 2m (Oil Resistant Cable) | | |
| EMZ7-18S | Screw Type M18 | 7mm | | | | |

For orders larger than indicated quantity, please request a quotation.

Ordering Example — Part Number: EM7-18S

Days to Ship

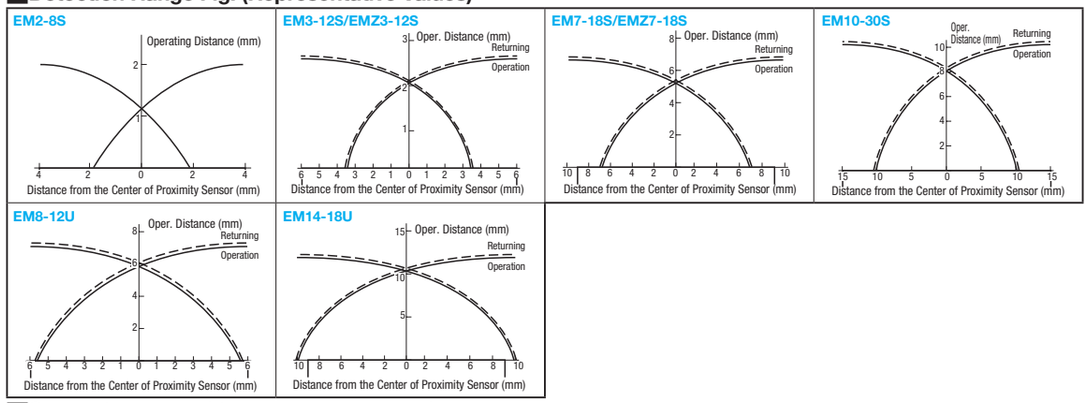
Configure Online

### Specifications

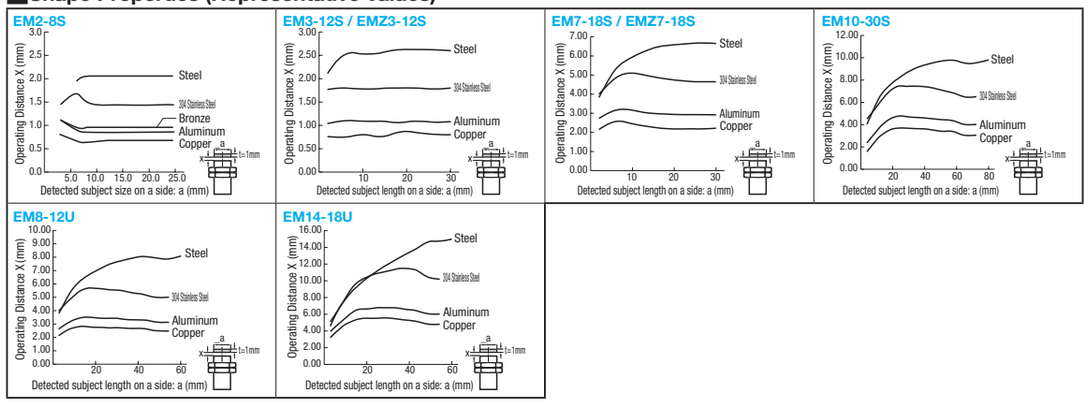
| Type | DC, 2-Wire | | | | | | DC, 3-Wire | |
|---|---|---|---|---|---|---|---|---|
| | Shield | | | | Non Shield | | Shield | |
| | M8 | M12 | M18 | M30 | M12 | M18 | M12 | M18 |
| Part Number | EM2-8S | EM3-12S | EM7-18S | EM10-30S | EM8-12U | EM14-18U | EMZ3-12S | EMZ7-18S |
| Rated Operating Voltage | DC12 / 24V (DC10~30V) Allowable Voltage Ripple 10%p-p or less | | | | DC12 / 24V (DC10~30V) Allowable Voltage Ripple 10%p-p or less | | DC12 / 24V (DC10~30V) Allowable Voltage Ripple 10%p-p or less | |
| Standard Detected Subject (mm) | Ferrous 8x8x1t | Ferrous 12x12x1t | Ferrous 18x18x1t | Ferrous 30x30x1t | Ferrous 30x30xt1 | Ferrous 30x30xt1 | Ferrous 12x12x1t | Ferrous 18x18x1t |
| Effective Operation Distance | 2mm±10% | 3mm±10% | 7mm±10% | 10mm±10% | 8mm±10% | 14mm±10% | 3mm±10% | 7mm±10% |
| Guaranteed Operation Distance | 0~1.4mm | 0~2.2mm | 0~5.6mm | 0~8.1mm | 0~6.4mm | 0~11.3mm | 0~2.2mm | 0~5.6mm |
| Reactive Material | Ferrous / Nonferrous Metals (Operation distance vary depending on the material) | | | | Ferrous / Nonferrous Metals (Operation distance vary depending on the material) | | Ferrous / Nonferrous Metals (Operation distance vary depending on the material) | |
| Hysteresis | 15% or less | 20% or less | | | 20% or less | | 20% or less | |
| Operation Cycle Frequency | 2kHz | 300kHz | 100Hz | | 100Hz | | 300Hz | 100Hz |
| Rated Operating Current | 3~100mA | | | | 5~100mA | | Up to 200mA | |
| Voltage Drop | 3V or less | | | | 3V or less | | 1.5V or less | |
| Off-state Current | 0.55mA or less | 1mA or less | | | 1mA or less | | 0.5mA or less | |
| Circuit Protection | Load Short Circuit Protection | Load Short Circuit Protection, Surge Absorbing Circuit | | | Load Short Circuit Protection, Surge Absorbing Circuit | | Load Short Circuit Protection, Surge Absorbing Circuit, Reverse Polarity Protection Circuit | |
| Indicator Light | Operation Indicator | | | | Operation Indicator | | Operation Indicator | |
| Service Ambient Temperature | -25~+70°C | | | | -25~+70°C | | -25~+70°C | |
| Temperature Property | Within ±10% (Operation Temp. +25°C) | Within ±15% (Operation Temp. +23°C) | Within ±10% (operation temp. +23°C) | | Within ±10% (operation temp. +23°C) | | Within ±15% (Operation Temp. +23°C) | Within ±10% (operation temp. +23°C) |
| Withstand Voltage | AC1000V 50/60Hz (1 min.) | AC500V 50/60Hz (1 min.) | | | AC600V 50/60Hz (1 min.) | | AC500V 50/60Hz (1 min.) | |
| Dielectric Strength | 50MΩ or more (DC500V) | | | | 50MΩ or more (DC500V) | | 50MΩ or more (DC500V) | |
| Vibration Resistance | Full Wave Amplitude: 1.5mm 10~55Hz (in Respective X, Y, Z Direction 2h) | | | | Full Wave Amplitude: 1.5mm 10~55Hz (in Respective X, Y, Z Direction 2h) | | Full Wave Amplitude: 1.5mm 10~55Hz (in Respective X, Y, Z Direction 2h) | |
| Shock Resistance | Within 980m/S² 11ms (in Respective X, Y, Z Direct. each 10 times) | Within 490m/s² 11ms (in Respective X, Y, Z Direct. each 10 times) | | | Within 490m/s² 11ms (in Respective X, Y, Z Direct. each 10 times) | | Within 490m/s² 11ms (in Respective X, Y, Z Direct. each 10 times) | |
| IP | IP67 | | | | IP67 | | IP67 | |
| Case Material: Case | Stainless Steel | Metal: Brass Nickel Plating | | | Metal: Brass Nickel Plating | | Metal: Brass Nickel Plating | |
| Case Material: Detecting Surface | PBT Polybutylene Terephthalate Resin | | | | PBT Polybutylene Terephthalate Resin | | PBT Polybutylene Terephthalate Resin | |
| Lead Wire | Oil Resistant Cable 2m O.D. (approx. Ø4.1) 0.3mm², 2 Conductors | Oil Resistant Cable 2m O.D. (approx. Ø3.8) 0.3mm², 2 Conductors | | Oil Resistant Cable 2m O.D. (approx. Ø6) 0.5mm², 2 Conductors | Oil Resistant Cable 2m O.D. (approx. Ø3.8) 0.3mm², 2 Conductors | | Oil Resistant Cable 2m O.D. (approx. Ø3.8) 0.3mm², 3 Conductors | |
| Tightening Torque | 10mm from the Detecting Surface: 9N·m or less Other Than Above: 12N·m or less | 5N·m or less | 10N·m or less | 20N·m or less | 5N·m or less | 10N·m or less | 5N·m or less | 10N·m or less |
| Mass | Approx. 50g | Approx. 90g | Approx. 150g | Approx. 250g | Approx. 90g | Approx. 150g | Approx. 80g | Approx. 150g |

Resistant and Mini Type P.1783

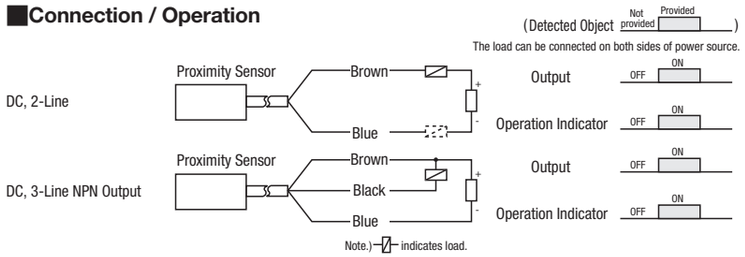
### Detection Range Fig. (Representative Values)




### Shape Properties (Representative Values)

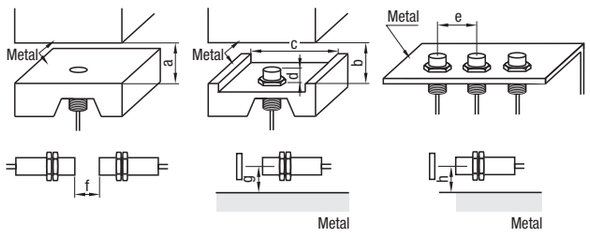



### Connection / Operation




### Effects from Surrounding Metals

In order to avoid effects from surrounding metals, mount each device farther enough than the distance shown on the right table.




(mm)

| Part Number | a | b | c | d | e | f | g | h |
|---|---|---|---|---|---|---|---|---|
| EM2-8S | 8 | — | — | — | 16 | 20 | 8 | 4 |
| EM3-12S/EMZ3-12S | 8 | — | — | — | 24 | 30 | 9 | 6 |
| EM7-18S/EMZ7-18S | 20 | — | — | — | 36 | 50 | 13.5 | 9 |
| EM10-30S | 40 | — | — | — | 60 | 100 | 20 | 15 |
| EM8-12U | — | 20 | 40 | 15 | 100 | 120 | 40 | 20 |
| EM14-18U | — | 40 | 70 | 22 | 110 | 200 | 70 | 35 |

### Precautions for Use

- Connect lead wires correctly and securely. Improper or unstable connection may damage sensor peripherals.
- Bending radius for lead wires is to be 30mm or more. Avoid bending within 30mm from exit points.
- When shutting down the power, output may turn ON or OFF for a moment. Turning off the load before shutting down the power is recommended.
- When there are big surge sources around such as motors or the sensor's own loads, insert surge absorbers such as varistors.