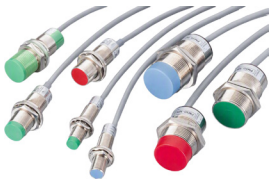
Inductive Proximity Sensor

RoHS Compliant



Description

These Series comprises cylindrical inductive proximity sensors for non-contact detection of metallic objects. This datasheet covers two PM product groups: DC switching-output sensors with NPN or PNP transistor outputs, and M12/M18 linear-output sensors providing either 0 to 10V or 4 to 20mA output. The PM family uses threaded cylindrical housings and is designed for industrial position, presence and movement detection.

Features

- PM threaded cylindrical construction
- NPN and PNP switching-output options
- Normally open and normally closed variants
- 10 to 30V DC operation
- 150 mA maximum switching output
- Short-circuit and reverse-polarity protection
- IP67 degree of protection
- Linear-output M12 and M18 versions
- 0 to 10 V and 4 to 20 mA linear outputs

Specifications

Sensor type	: Inductive proximity sensor
Output method	: NPN or PNP transistor output
Operating voltage	: 10 to 30 V DC
Power-supply ripple	: <20% peak-to-peak
Output current	: 150 mA Max.
Current consumption	: 10 mA Max.
Residual voltage	: <0.1 V
Leakage current	: <0.8 mA
Hysteresis	: <10% of sensing distance
Thermal drift	: <10 µm/°C
Voltage drift	: <1 µm/V
Protection circuits	: Short-circuit and reverse-polarity protection
Operating temperature	: -25°C to +80°C
Operating humidity	: 35% to 95% RH
Degree of protection	: IP67
Sensing-face colour	: NPN: Red; PNP: Green

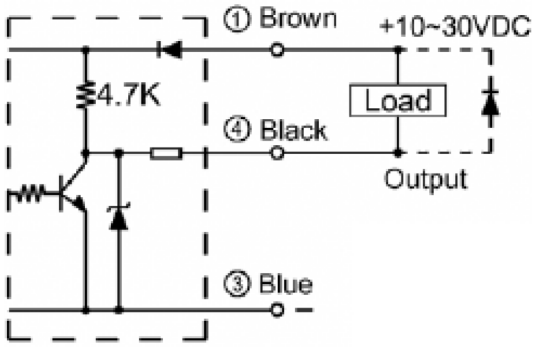
MP-PM switching-output variants are identified by a structured model code. The code defines body diameter, nominal sensing distance, transistor output, output state, body construction and connection method. Only PM screw-type, DC NPN and PNP options are included below.

Model code guide

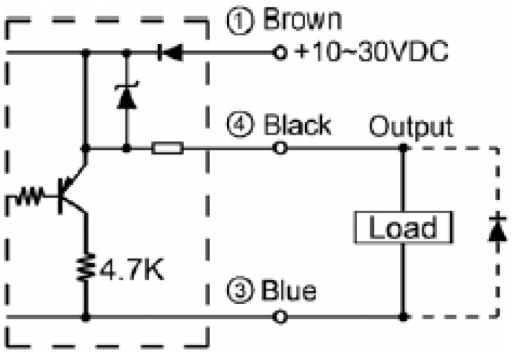
Code position	Meaning	PM options
Product type	Threaded cylindrical sensor family	PM = screw type
Body diameter / thread	Nominal threaded body size	05 = M5 x 0.5; 08 = M8 x 1.0; 12 = M12 x 1.0; 18 = M18 x 1.0; 30 = M30 x 1.5
Sensing distance	Nominal sensing-distance code	01 = 1 mm; 02 = 2 mm; 04 = 4 mm; 05 = 5 mm; 08 = 8 mm; 10 = 10 mm; 15 = 15 mm; 20 = 20 mm; 25 = 25 mm
Output method	DC transistor output	N = NPN; P = PNP
Output state	Switching state	Omitted = normally open; B = normally closed
Body construction	Body length or material option	Omitted = nickel-plated copper; S = short body; E = fully threaded body; K = stainless steel
Connection	Electrical connection method	Omitted = integral lead; PG = M8 lead-wire connection; M12 = M12 connector

NPN and PNP connection diagrams

NPN

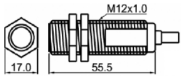
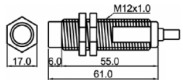
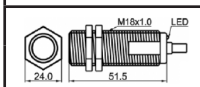
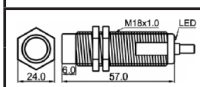


PNP



Brown: +10 to 30 V DC; blue: 0 V; black: switching output. Connect the load as shown for the selected output polarity. Disconnect the supply before wiring or servicing the sensor.

The PM linear-output range provides a signal proportional to target position within the stated sensing range. Voltage-output models use the suffix LV and provide 0 to 10 V; current-output models use the suffix LA and provide 4 to 20 mA.

Outline	Model	Output method	Sensing distance	Sensing adjuster	Mounting method	Response frequency	Operating voltage	Housing material
	MP-PM12-02LV	0~10V	0~2mm	non	Flushed	10Hz	10-30 VDC	Cu Plated Ni
	MP-PM12-02LA	4~20mA						
	MP-PM12-05LV	0~10V	0-5mm		Non-flushed			
	MP-PM12-05LA	4-20mA						
	MP-PM18-05LV	0~10V	0-5mm	Trimmer	Flushed			
	MP-PM18-05LA	4~20mA						
	MP-PM18-15LV	0~10V	0~15mm		Non-flushed			
	MP-PM18-15LA	4~20mA						

Linear-output range summary

Body / mounting	Models	Sensing range	Adjustment	Output
M12 flush-mounted	MP-PM12-02LV / MP-PM12-02LA	0 to 2 mm	None	0 to 10 V / 4 to 20 mA
M12 non-flush	MP-PM12-05LV / MP-PM12-05LA	0 to 5 mm	None	0 to 10 V / 4 to 20 mA
M18 flush-mounted	MP-PM18-05LV / MP-PM18-05LA	0 to 5 mm	Trimmer	0 to 10 V / 4 to 20 mA
M18 non-flush	MP-PM18-15LV / MP-PM18-15LA	0 to 15 mm	Trimmer	0 to 10 V / 4 to 20 mA

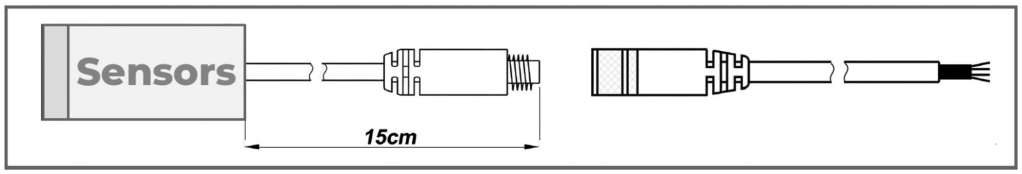
Common linear-range data

Operating voltage : 10 to 30 V DC
Response frequency : 10 Hz
Housing material : Nickel-plated copper

Mounting: Flush-mounted sensors may be surrounded by metal up to the level of the sensing face. Non-flush sensors require a clear area around the sensing face to prevent unwanted reduction of sensing distance.

M8 lead-wire connection option

M8 lead wire connection – Available for all sensors



The manufacturer shows a 15 cm sensor lead to the M8 connector and states that the M8 lead-wire connection is available for all sensors. Use the applicable order code and confirm model compatibility before ordering.

Reference target and material correction

The source reference target is a 1mm thick steel square with side length equal to the diameter of the sensing face. For other target materials, the sensing distance is reduced by the approximate correction factors below.

Target material	Approximate correction factor
Chrome	0.9 x nominal sensing distance
Nickel	0.9 x nominal sensing distance
Brass	0.5 x nominal sensing distance
Aluminium	0.4 x nominal sensing distance
Copper	0.4 x nominal sensing distance

Mounting and spacing

- Flush-mounted sensors: may be installed in metal with the sensing face level with the surrounding surface.
- Non-flush sensors: maintain a clear zone around and in front of the sensing face in accordance with the selected model and sensing distance.
- Mutual interference: when identical sensors are mounted face-to-face or side-by-side, maintain sufficient separation to prevent interaction.
- Switching-frequency tests: the source defines maximum response frequency using a 1:2 target-to-gap pulse ratio.
- Repeatability: describes variation of the operating point when the sensor is repeatedly operated under the same conditions.

Maximum mounting torque stated by the manufacturer

Body diameter	Maximum clamping torque
M5	10 kg-cm
M8	90 kg-cm
M12	100 kg-cm
M18	200 kg-cm
M30	300 kg-cm

Wiring and installation notes

- Use a spring washer when fixing the sensor and do not exceed the stated mounting torque.
- Route sensor cables separately from mains, high-voltage and high-current wiring to minimise electrical noise.
- When extending a sensor lead, use a cable with a conductor cross-section at least equivalent to the original lead.
- When a switching power supply is used, correctly earth the frame-ground and ground terminals and keep DC ripple below 20% peak-to-peak.
- Inductive proximity sensors are intended for object detection and are not safety-rated protective devices.

Part Number Table

Description	Part Number
Proximity Sensor, Inductive, 4mm, M12, NPN	MP-PM12-04N
Proximity Sensor, Inductive, 4mm, M12, PNP	MP-PM12-04P
Proximity Sensor, Inductive, 2mm, M12, PNP, Short Body	MP-PM12-02PS
Proximity Sensor, Inductive, 2mm, M12, PNP, M12 Connector	MP-PM12-02P-M12
Proximity Sensor, Inductive, 5mm, M18, PNP, M12 Connector	MP-PM18-05P-M12
Proximity Sensor, Inductive, 8mm, M18, PNP, M12 Connector	MP-PM18-08P-M12
Proximity Sensor, Inductive, 8mm, M18, PNP, Short Body	MP-PM18-08PS
Proximity Sensor, Inductive, 10mm, M30, PNP, M12 Connector	MP-PM30-10P-M12
Proximity Sensor, Inductive, 15mm, M30, PNP, M12 Connector	MP-PM30-15P-M12
Proximity Sensor, Inductive, 10mm, M30, PNP	MP-PM30-10P
Proximity Sensor, Inductive, 20mm, M30, PNP	MP-PM30-20P
Proximity Sensor, Inductive, 15mm, M30, NPN	MP-PM30-15N