

# Cylindrical Inductive Proximity Sensors



## PR Series (AC 2-wire)

### PRODUCT MANUAL

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

#### Major Features

- Spatter-resistant type  
: PTFE coated for high heat resistance (prevent malfunction from welding spatter)
- Operation indicator (red LED)
- IP67 Protection structure (IEC standards)

#### Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

**⚠ Warning** Failure to follow instructions may result in serious injury or death.

- 01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)**  
Failure to follow this instruction may result in personal injury, economic loss or fire.
- 02. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**  
Failure to follow this instruction may result in explosion or fire.
- 03. Do not disassemble or modify the unit.**  
Failure to follow this instruction may result in fire or electric shock.
- 04. Do not connect, repair, or inspect the unit while connected to a power source.**  
Failure to follow this instruction may result in fire or electric shock.
- 05. Check 'Connections' before wiring.**  
Failure to follow this instruction may result in fire or electric shock.

**⚠ Caution** Failure to follow instructions may result in injury or product damage.

- 01. Use the unit within the rated specifications.**  
Failure to follow this instruction may result in fire or product damage.
- 02. Use a dry cloth to clean the unit, and do not use water or organic solvent.**  
Failure to follow this instruction may result in fire or electric shock.
- 03. Do not supply power without load.**  
Failure to follow this instruction may result in fire or product damage.

#### Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- Wire as short as possible and keep away from high voltage lines or power lines, to prevent surge and inductive noise.  
Do not use near the equipment which generates strong magnetic force or high frequency noise (transceiver, etc.).  
In case installing the product near the equipment which generates strong surge (motor, welding machine, etc.), use diode or varistor to remove surge.
- Do not connect capacity load to the output terminal directly.
- If the surface is rubbed with a hard object, PTFE coating can be worn out.
- This unit may be used in the following environments.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude max. 2,000 m
  - Pollution degree 2
  - Installation category II

#### Cautions for Installation

- Install the unit correctly with the usage environment, location, and the designated specifications.
- Do NOT impacts with a hard object or excessive bending of the wire lead-out. It may cause damage the water resistance.
- Do NOT pull the  $\varnothing 3.5$  mm cable with a tensile strength of 25 N, the  $\varnothing 4$  mm cable with a tensile strength of 30 N or over and the  $\varnothing 5$  mm cable with a tensile strength of 50 N or over. It may result in fire due to the broken wire.
- When extending wire, use AWG 22 cable or over within 200 m.

## Ordering Information

This is only for reference, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website.

PR ① ② ③ ④ - ⑤ A ⑥

### ① Characteristic

No mark: General type  
A: Spatter-resistant type

### ② Connection

No mark: Cable type  
W: Cable connector type  
CM: Connector type

### ③ Body length

No mark: Normal  
L: Long

### ④ DIA. of sensing side

Number: DIA. of sensing side (unit: mm)

### ⑤ Sensing distance

Number: Sensing distance (unit: mm)

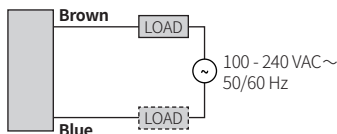
### ⑥ Control output

O: Normally open  
C: Normally closed

## Connections

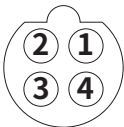
- LOAD can be wired to any direction.
- Connect LOAD before supplying the power.

### ■ Cable type



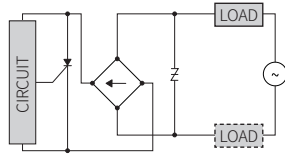
### ■ Cable connector type / Connector type

- For LOAD connection, follow the cable type connection.
- Fasten the connector not to show the thread. (0.39 to 0.49 N m)
- Fasten the vibration part with PTFE tape.



Pin	Color	Function
①	-	-
②	-	-
③	Blue	100 - 240 VAC~ 50 / 60 Hz
④	Brown	100 - 240 VAC~ 50 / 60 Hz

### ■ Inner circuit



## Operation Timing Chart

	Normally open	Normally closed
<b>Sensing target</b>	Presence: High pulse Nothing: Low	Presence: High pulse Nothing: Low
<b>Load</b>	Operation: High pulse Return: Low	Operation: High pulse Return: Low
<b>Operation indicator (red)</b>	ON: High pulse OFF: Low	ON: High pulse OFF: Low

## Sold Separately

- Connector cable, connector connection cable
- Transmission coupler
- Spatter protection cover
- Fixed bracket

## Specifications

Installation	Flush type		
	PR□12-2A□	PR□18-5A□	PR□30-10A□
General	PRA□12-2A□	PRA□18-5A□	PRA□30-10A□
DIA. of sensing side	Ø 12 mm	Ø 18 mm	Ø 30 mm
Sensing distance	2 mm	5 mm	10 mm
Setting distance	0 to 1.4 mm	0 to 3.5 mm	0 to 7 mm
Hysteresis	≤ 10% of sensing distance		
Standard sensing target: iron	12 × 12 × 1 mm	18 × 18 × 1 mm	30 × 30 × 1 mm
Response frequency <sup>01)</sup>	20 Hz		
Affection by temperature	≤ ± 10% for sensing distance at ambient temperature 20 °C		
Indicator	Operation indicator (red)		
Approval	CE ENEC	CE ENEC	CE ENEC

Installation	Non-flush type		
	PR□12-4A □	PR□18-8A □	PR□30-15A □
General			
DIA. of sensing side	Ø 12 mm	Ø 18 mm	Ø 30 mm
Sensing distance	4 mm	8 mm	15 mm
Setting distance	0 to 2.8 mm	0 to 5.6 mm	0 to 10.5 mm
Hysteresis	≤ 10% of sensing distance		
Standard sensing target: iron	12 × 12 × 1 mm	25 × 25 × 1 mm	45 × 45 × 1 mm
Response frequency <sup>01)</sup>	20 Hz		
Affection by temperature	≤ ± 10% for sensing distance at ambient temperature 20 °C		
Indicator	Operation indicator (red)		
Approval	CE ENEC	CE ENEC	CE ENEC

01) The response frequency is the average value. The standard sensing target is used and the width is set as 2 times of the standard sensing target, 1/2 of the sensing distance for the distance.

Unit weight (package)	Ø 12 mm	Ø 18 mm	Ø 30 mm	
Cable	Normal	≈ 72 g (≈ 84 g) <sup>01)</sup>	≈ 118 g (≈ 130 g) <sup>02)</sup>	≈ 170 g (≈ 207 g)
	Long	-	≈ 130 g (≈ 142 g)	≈ 208 g (≈ 245 g)
Cable connector	Normal	≈ 42 g (≈ 54 g)	≈ 66 g (≈ 78 g)	≈ 122 g (≈ 134 g)
	Long	-	≈ 78 g (≈ 90 g)	≈ 158 g (≈ 195 g)
Connector	Normal	≈ 30 g (≈ 42 g)	≈ 54 g (≈ 66 g)	≈ 142 g (≈ 154 g)
	Long	-	≈ 66 g (≈ 78 g)	≈ 182 g (≈ 194 g)

01) Spatter-resistant type: ≈ 66 g (≈ 78 g)

02) Spatter-resistant type: ≈ 106 g (≈ 118 g)

<b>Power supply</b>	100 - 240 VAC~ 50 / 60 Hz, operating voltage: 85 - 264 VAC~
<b>Leakage current</b>	≤ 2.5 mA
<b>Control output</b>	DIA. of sensing side Ø 12 mm: 5 to 150 mA DIA. of sensing side Ø 18 mm, Ø 30 mm: 5 to 200 mA
<b>Residual voltage</b>	≤ 10 V
<b>Protection circuit</b>	Surge protection circuit
<b>Insulation resistance</b>	≥ 50 MΩ (500 VDC≡ megger)
<b>Insulation type</b>	Double insulation or reinforced insulation (symbol: □) dielectric strength between the measuring input part and the power part: general type 1 kV, spatter-resistant type 1.5 kV
<b>Dielectric strength</b>	General type : 2,500 VAC~ 50/60 Hz for 1 min (between all terminals and case) Spatter-resistant type : 1,500 VAC~ 50/60 Hz for 1 min (between all terminals and case)
<b>Vibration</b>	1 mm double amplitude at frequency 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 2 hours
<b>Shock</b>	500 m/s <sup>2</sup> (≈ 50 G) in each X, Y, Z direction for 3 times
<b>Ambient temperature</b>	-25 to 70 °C, storage: -30 to 80 °C (no freezing or condensation)
<b>Ambient humidity</b>	35 to 95 %RH, storage: 35 to 95 %RH (no freezing or condensation)
<b>Protection structure</b>	IP67 (IEC standards)
<b>Connection</b>	Cable type / Cable connector type <sup>01)</sup> / Connector type <sup>01)</sup> model
<b>Cable spec.</b> <sup>02)</sup>	DIA. of sensing side Ø 12 mm: Ø 4 mm, 2-wire DIA. of sensing side Ø 18 mm, Ø 30 mm: Ø 5 mm, 2-wire
<b>Wire spec.</b>	AWG 22 (0.08 mm, 60-core), insulator diameter: Ø 1.25 mm
<b>Connector spec.</b>	M12 connector
<b>Material</b>	Standard type cable (black): polyvinyl chloride (PVC)
General	Case/Nut: nickel plated brass, washer: nickel plated iron, sensing side: PBT
Spatter-resistant	Case/Nut: PTFE coated brass, washer: PTFE coated iron, sensing side: PTFE

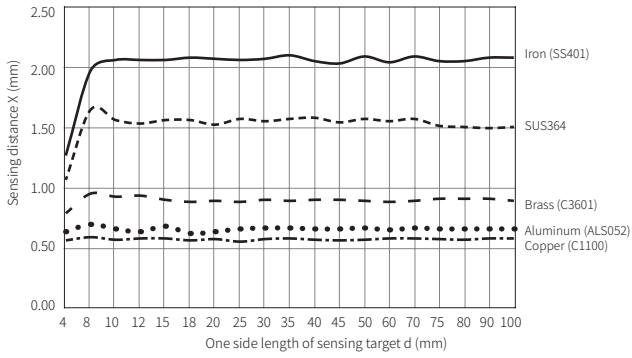
01) Except spatter-resistant type

02) Cable type: 2 m, cable connector type: 300 mm

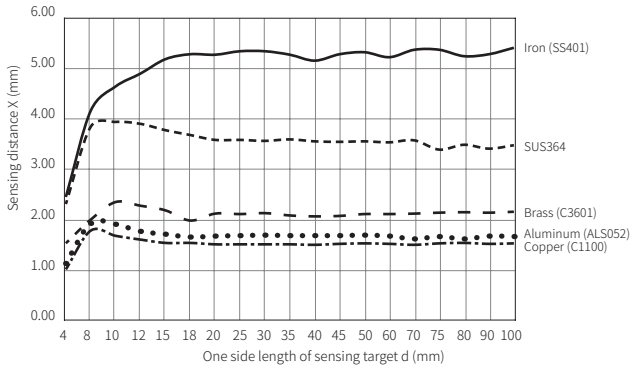


■ Flush + Spatter-resistant type

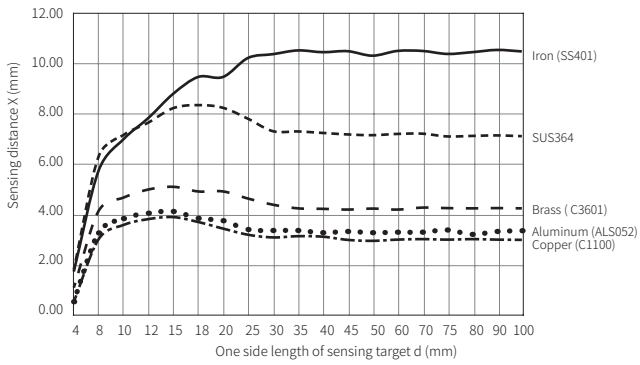
• Ø 12 mm



• Ø 18 mm

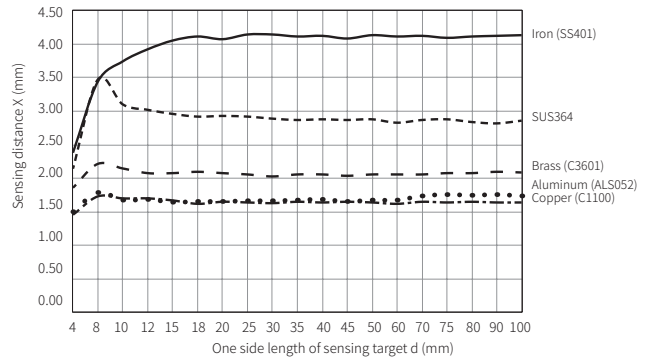


• Ø 30 mm

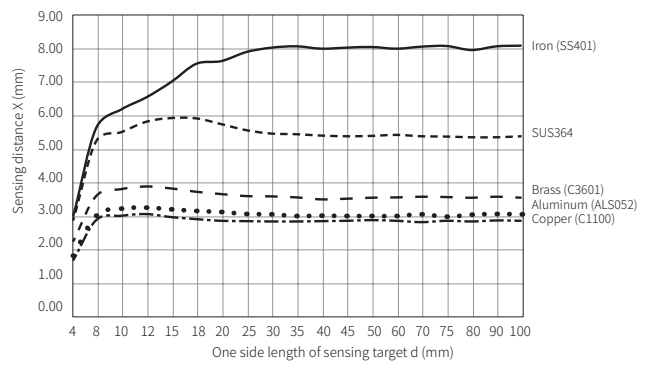


■ Non-flush + General type

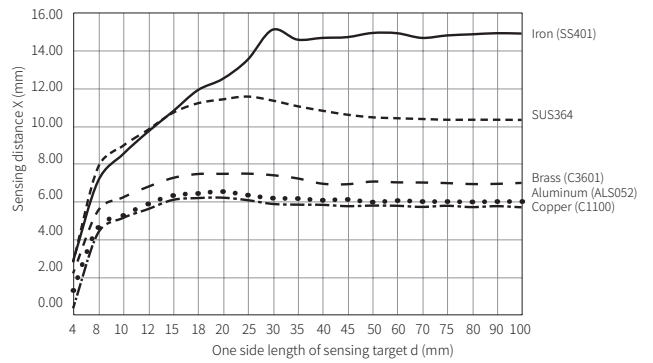
• Ø 12 mm



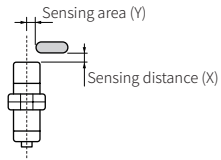
• Ø 18 mm



• Ø 30 mm



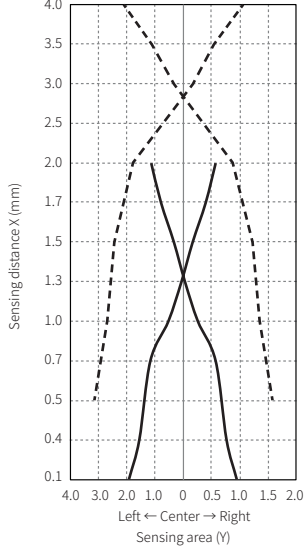
## Sensing Distance Feature Data by Parallel (left/right) Movement



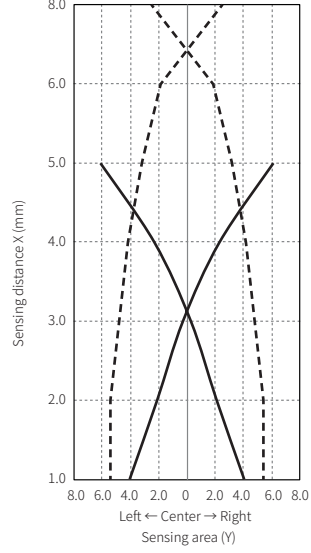
—	Flush type
- - -	Non-flush type

### ■ General type

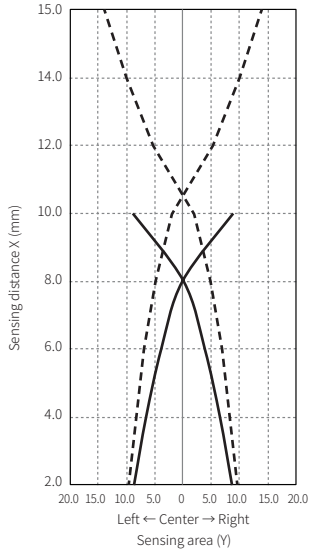
• Ø 12 mm



• Ø 18 mm

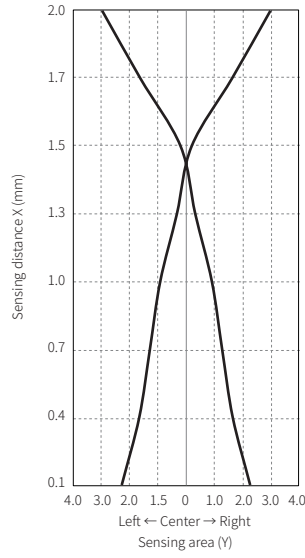


• Ø 30 mm

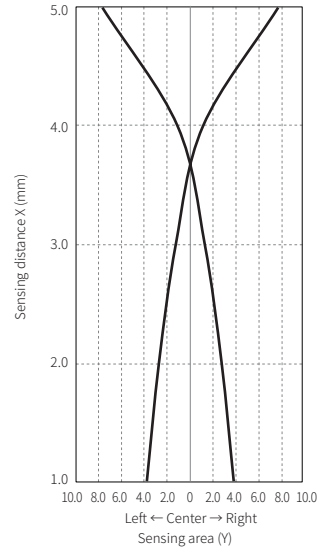


### ■ Spatter-resistant type

• Ø 12 mm



• Ø 18 mm



• Ø 30 mm

