Cylindrical Inductive Proximity Sensors

PR Series (DC 2-wire) INSTRUCTION MANUAL

TCD210244AB

Autonics

Thank you for choosing our Autonics product.

Read and understand the instruction manual and manual thoroughly before using the product.

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

Keep this instruction manual in a place where you can find easily. The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Follow Autonics website for the latest information.

Safety Considerations

• Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.

 \cdot $\underline{\Lambda}$ 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.

04. Do not connect, repair, or inspect the unit while connected to a power source.

Failure to follow this instruction may result in fire **05. Check 'Connections' before wiring.**

Failure to follow this instruction may result in fire.

A 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.
- **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.

 12-24 VDC — power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.

• Use the product, after 0.8 sec of supplying power.

 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.
- 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
- installation categor

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 Ø 3.5 mm cable with a tensile strength of 25 N, the Ø 4 mm cable with a tensile strength of 30 N or over and the Ø 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 0 0 0 0	667-8
Characteristic No mark: General type A: Spatter-resistant type	G Sensing distance Number: Sensing distance (unit: mm)
Connection No mark: Cable type W: Cable connector type CM: Connector type	 G Power supply D: 12 - 24 VDC == X: 12 - 24 VDC == (non-polarity)
G Wire connection T: DC 2-wire	 Control output O: Normally open C: Normally closed
OIA. of sensing side Number: DIA. of sensing side (unit: mm)	© Cable No mark: Standard type I: Standard type (IEC standards) V: Oil resistant cable type IV: Oil resistant cable type (IEC standards)
Product Components	
• Product \times 1 • Instruction manual \times 1	• Nut × 2 • Washer × 1

Sold Separately

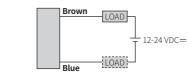
M12 Connector cable:
 C D(H)2- (C D(H)2--I)

Spatter protection cover: P90-M
Fixing bracket: P90-R

Connections

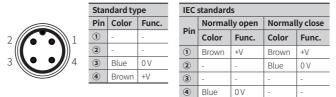
- LOAD can be wired to any direction.
- Connect LOAD before suppling the power
- No need to consider polarity for non-polarity type of power supply.

Cable type

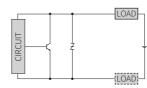


Cable connector type / Connector type

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



Inner circuit



Operation Timing Chart

	Normally open	Normally closed
Sensing	Presence	Presence
target	Nothing —	Nothing
Load	Operation	Operation
Loau	Return —	Return
Operation	ON	
indicator (red)	OFF	OFF

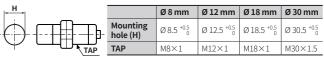
Specifications

Installation	Flush	type						
General	PR T08-1.5		PR T12-2 PR		T18-5	PR T30-10		
Spatter-			PRA T12-2		PRA T18-5		PRA T30-10	
resistant	-		FILA		FR	A_110-J	FRA 130-10	
DIA. of sensing side	Ø 8 mr	m	Ø 12	! mm	Ø 18 mm		Ø 30 mm	
Sensing distance	1.5 mn	n	2 mm		5 mm		10 mm	
Setting distance	0 to 1.0	05 mm	0 to 1.4 mm		0 to 3.5 mm		0 to 7 mm	
Hysteresis	$\leq 10 9$	% of sensing distance (DIA. of sensing side Ø 8 mm connector type: \leq 15						
Standard sensing target : iron	8×8	imes 8 $ imes$ 1 mm		$12 \times 12 \times 1$ mm		imes 18 $ imes$ 1 mm	30 × 30 × 1 mm	
Response frequency ⁰¹⁾	1.5 kHz	z	1.5 kHz		500 Hz		400 Hz	
Affection by temperature				ance at ambient im: $\leq \pm$ 20 %)	tem	perature 20 °C		
Indicator	Operat	tion indicator ((red)					
Approval	CEK	EAC						
In stall sting	Non 6							
Installation General		lush type	DD	T12-4	DD	T18-8	PR T30-15	
DIA. of sensing								
side	Ø8mr	n	Ø 12	! mm	Ø1	8 mm	Ø 30 mm	
Sensing distance	2 mm		4 mr	m	8 m	ากา	15 mm	
Setting distance	0 to 1.4	4 mm	0 to	2.8 mm	0 to	o 5.6 mm	0 to 10.5 mm	
Hysteresis	≤ 10 9	% of sensing di	istanc	e (DIA. of sensin	g side	eØ8mm connec	tor type: ≤ 15 %)	
Standard sensing target : iron	8 × 8	$8 \times 8 \times 1 \text{mm}$		12 × 12 × 1 mm		imes 25 $ imes$ 1 mm	45 × 45 × 1 mm	
Response frequency ⁰¹⁾	1.0 kHz		500 Hz		350 Hz		200 Hz	
Affection by temperature				ance at ambient m: $\leq \pm$ 20 %)	tem	perature 20 °C		
Indicator	Operat	Operation indicator (red)						
	l obergi	LIOITITUICALOI	(ieu)					
Approval	CER		(ieu)					
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1) The response fr 2 times of the st	CE 본K equency andard s	ERL is the average v ensing target, 1	alue. 1	he sensing distand		the distance.		
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I) The response fr 2 times of the st Unit weight (pac Cable Cable connector Cable connector II) Spatter-resistan Power supply Leakage current Control output Residual voltage Protection circu Insulation resist Dielectric streng Vibration Shock Ambient tempe Ambient humid Protection struc Connection Cable spec. ⁽⁰²⁾ Wire spec. Connector spec	CE LEAR CONTRACTOR CON	BI is the average v ensing target, 1 Ø 8 mm ≈ 52 g (≈ 64 ≈ 10 g (≈ 32 ≈ 134 g (≈ 146 g 12 - 24 VDC= ≤ 0.6 mA 2 to 100 mA ≤ 3.5 V (non Surge protect reverse polat 1 mm double 2 hours 500 m/s ² (≈ -25 to 70 °C, 3 35 to 95 %R+ IP67 (IEC statt) DIA of sensir DIA of sen	ralue 1 /2 of tl 4 g) 4 g) 2 g) -polar -polar tion c -rity pro 00 VDC -charg e amp 50 G) storage 1, stor Cable a sidd ng sidd ble : A mm c cable cabl	he sensing distance 0 = 2 mm $0 = 72 \text{ g} (\approx 84 \text{ g})$ $2 = 26 \text{ g} (\approx 38 \text{ g})$ 2 = 26	ope ort o e case ort o e case concy 1 rectice o free RH (n mm, mm, a, 40- ator o inyl o): pol of se	the distance. Ø 18 mm $\approx 110 g (\approx 122 g$ $\approx 58 g (\approx 70 g)$ $\approx 49 g (\approx 61 g)$ rating voltage: 10 ver current protection e: 1,500 VAC ~ 50 0 to 55 Hz in each on for 3 times tering or condens o freezing or condens o f	Ø 30 mm 3) ≈ 170 g (≈ 207 g ≈ 122 g (≈ 134 g ≈ 142 g (≈ 154 g) - 30 VDC= - 30 VDC= - 100 Hz for 1 min x Y, Z direction for - 30 vic - 30 vic <	

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

Cut-out Dimensions

• Unit: mm, For the detailed drawings, follow the Autonics web site.



1	ØA	
	. В	
	-	
-		

	Ø8mm	Ø 12 mm	Ø 18 mm	Ø 30 mm
ØA	15	21	29	42
В	13	17	24	35

Setting Distance Formula

Detecting distance can be changed by the shape, size or material of the target. For stable sensing, install the unit within the 70 % of sensing distance.

Setting distance (Sa)

= Sensing distance (Sn) × 70 %

Sensing	g targe	et
Up-Down	move	men
r n ⊂ .		F
. ∜	Ísa	Sn
	100	Ł

<u>ل</u>

Sensing target Right-Left moveme



Mutual-interference & Influence by Surrounding Metals

Mutual-interference

When plural proximity sensors are mounted in a close row, malfunction of sensor may be caused due to mutual interference.

Therefore, be sure to provide a minimum distance between the two sensors, as below table.



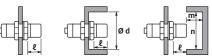






Influence by surrounding metals

When sensors are mounted on metallic panel, it must be prevented sensors from being affected by any metallic object except target. Therefore, be sure to provide a minimum distance as below chart.

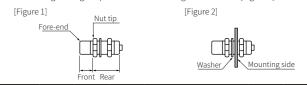


(unit: mm) Sensing Ø 8 mm Ø 12 mm Ø 18 mm Ø 30 mm Non Non Flush Flush Flush Flush flush flush flush flush 12 30 48 60 90 12 В 24 24 36 54 60 0 14 0 15 R 8 0 11 Ød 24 12 36 18 54 30 90 4.5 12 15 24 30 45 m 6 6 24 18 27 54 36 45 90

Tightening Torque

Use the provided washer to tighten the nuts.

The tightening torque of the nut varies with the distance from the fore-end. [Figure 1] If the nut tip is located at the front of the product, apply the front tightening torque. the allowable tightening torque table is for inserting the washer as [Figure 2].



	Ø8mm		Ø 12 mm		Ø 18 mm		Ø 30 mm	
side Strength	Flush	Non- flush	Flush	Non- flush	Flush	Non- flush	Flush	Non- flush
Front size	7 mm	5 mm	13 mm	7 mm	-	-	26 mm	12 mm
Front torque	3.92 N m	6.37 N r			14.7 N m		49 N m	
Rear torque	8.82 N m		11.76 N m		14.7 N m		78.4 N m	

