Cylindrical Inductive Long-Distance Proximity Sensors

PRD Series (DC 2-wire)

INSTRUCTION MANUAL

DRW200027AB

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

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

↑ 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.

- 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 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.

For selecting the specific model, follow the Autonics web site.

PRD 0 2 T 3 - 4 5 6 -

∩ Connection

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

O body size

No-mark: Standard L: Ling body

3 DIA. of sensing side

08: Ø 8 mm 12: Ø 12 mm 18: Ø 18 mm 30: Ø 30 mm

4 Sensing distance Number: Sensing distance (unit: mm)

O Power supply

D: 12-24 VDC== X: 12-24 VDC== (non-polarity)

3 Control output

O: Normally Open
C: Normally Closed

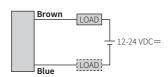
② Standard/Cable material

No-mark: Standard type
I: Standard type (IEC standard)
V: Oil resistant cable type
IV: Oil resistant cable type (IEC standard)

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

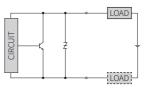
- For LOAD connection, follow the cable type connection.
- Fasten the connector not to shown the thread. (0.39 to 0.49 N m)
- Fasten the vibration part with PTFE tape.



Star	Standard type						
Pin	Color	Func.					
1	-	-					
2	-	-					
3	Blue	0 V					
4	Brown	+V					

EC standard type								
in	Normal	Normally Open		ly Close				
III	Color	Func.	Color	Func.				
)	Brown	+V	Brown	+V				
2)	-	-	Blue	0 V				
3)	-	-	-	-				
9	Blue	0 V	-	-				

■ Control Output Circuit



Operation Timing Chart									
	Normally Open	Normally Closed							
Sensing	Presence	Presence							
target	Nothing — L	Nothing — L							
Load	Operation	Operation							
	Return — L	Return							
Operation	ON D	ON D D							
indicator (red)	OFF	OFF L.							

Sold Separately

- Connector cable,
- Connector connection cable

 Transmission coupler
- Spatter protection coverFixing bracket
- O

Specifications

Installation	Flush type			
Model	PRD T08-2	PRD T12-4	PRD□T18-7□	PRD□T30-15 □
DIA. of sensing side	Ø8 mm	Ø 12 mm Ø 18 mm Ø		Ø 30 mm
Sensing distance	2 mm	4 mm	4 mm 7 mm	
Setting distance	0 to 1.4 mm	0 to 2.8 mm	0 to 4.9 mm	0 to 10.5 mm
Hysteresis	≤ 15 % of sensing distance	≤ 10 % of sensing	distance	
Standard sensing target: iron	8 × 8 × 1 mm	12 × 12 × 1 mm	20 × 20 × 1 mm	45 × 45 × 1 mm
Response frequency 01)	1 kHz	450 Hz	250 Hz	100 Hz
Affection by temperature		sing distance at amb le Ø 8 mm: $\leq \pm$ 15)°C
Indicator	Operating indicato	r (red)		
Approval	C € EHI	C€ EHI C€ EHI		C € ERI
Installation	Non-Flush type			
Model	PRD□T08-4□□	PRD T12-8	PRD T18-14	PRD□T30-25 □
DIA. of sensing side	PRD □ T08-4 □ Ø 8 mm	PRD □ T12-8 □ Ø 12 mm	PRD □ T18-14	Ø 30 mm
DIA. of				
DIA. of sensing side Sensing	Ø 8 mm	Ø 12 mm	Ø 18 mm	Ø 30 mm
DIA. of sensing side Sensing distance Setting	Ø 8 mm 4 mm	Ø 12 mm	Ø 18 mm 14 mm 0 to 9.8 mm	Ø 30 mm 25 mm
DIA. of sensing side Sensing distance Setting distance	Ø 8 mm 4 mm 0 to 2.8 mm ≤ 15 % of	Ø 12 mm 8 mm 0 to 5.6 mm	Ø 18 mm 14 mm 0 to 9.8 mm	Ø 30 mm 25 mm
DIA. of sensing side Sensing distance Setting distance Hysteresis Standard sensing	Ø 8 mm 4 mm 0 to 2.8 mm ≤ 15 % of sensing distance	Ø 12 mm 8 mm 0 to 5.6 mm ≤ 10 % of sensing	Ø 18 mm 14 mm 0 to 9.8 mm distance	Ø 30 mm 25 mm 0 to 17.5 mm
DIA. of sensing side Sensing distance Setting distance Hysteresis Standard sensing target: iron Response	Ø 8 mm 4 mm 0 to 2.8 mm ≤ 15 % of sensing distance 12 × 12 × 1 mm 800 Hz ≤ ± 10 % for sensing to the sen	Ø 12 mm 8 mm 0 to 5.6 mm ≤ 10 % of sensing 25 × 25 × 1 mm	Ø 18 mm 14 mm 0 to 9.8 mm distance 40 × 40 × 1 mm 200 Hz eient temperature 20	Ø 30 mm 25 mm 0 to 17.5 mm 75 × 75 × 1 mm 100 Hz
DIA. of sensing side Sensing distance Setting distance Hysteresis Standard sensing target: iron Response frequency (1) Affection by	Ø 8 mm 4 mm 0 to 2.8 mm ≤ 15 % of sensing distance 12 × 12 × 1 mm 800 Hz ≤ ± 10 % for sensing to the sen	\emptyset 12 mm 8 mm 0 to 5.6 mm \leq 10 % of sensing $25 \times 25 \times 1$ mm 400 Hz sing distance at amble \emptyset 8 mm; \leq ± 15	Ø 18 mm 14 mm 0 to 9.8 mm distance 40 × 40 × 1 mm 200 Hz eient temperature 20	Ø 30 mm 25 mm 0 to 17.5 mm 75 × 75 × 1 mm 100 Hz

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 8 mm Ø 12 mm		Ø 18 mm	Ø 30 mm	
Cable type	Standard	≈ 43 g (≈ 63 g)	≈ 62 g (≈ 74 g)	≈ 97 g (≈ 115 g)	≈ 143 g (≈ 180 g)	
	Long body	-	\approx 82 g (\approx 94 g)	≈ 127 g (≈ 145 g)	≈ 183 g (≈ 220 g)	
Cable connector type	Standard	≈ 25 g (≈ 45 g)	≈ 32 g (≈ 55 g)	≈ 62 g (≈ 80 g)	≈ 130 g (≈ 145 g)	
	Long body	-	-	≈ 92 g (≈ 110 g)	-	
Connector type	Standard	≈ 10 g (≈ 32 g)	≈ 20g (≈ 50 g)	≈ 42 g (≈ 60 g)	≈ 110 g (≈ 150 g)	
	Long body	-	-	≈ 60 g (≈ 78 g)	≈ 150 g (≈ 190 g)	

Connector type	Stan	dard	≈ 10 g (≈ 32 g)	≈ 20g (≈ 50 g)	≈ 42 g (≈ 60 g)	≈ 110 g (≈ 150 g)		
Lor		body	-	-	≈ 60 g (≈ 78 g)	≈ 150 g (≈ 190 g)		
Power supply	supply 12-24 VDC== (operating voltage: 10-30 VDC==)							
Leakage current	:		DIA. of sensing side Ø 8mm: ≤ 0.8 mA DIA. of sensing side Ø 12 mm, Ø 18 mm, Ø 30 mm: ≤ 0.6 mA					
Control output		2 to 10	00 mA					
Residual voltage	e ⁰¹⁾	≤ 3.5	V (non-polarity:	≤ 5 V)				
Protection circu	it		protection circu e polarity protec	it, output short (tion	over current pro	tection circuit,		
Insulation resist	ance	≥ 50 1	MΩ (500 VDC=	megger)				
Dielectric streng	gth	DIA. of sensing side Ø 8mm : 1,000 VAC ~ 50/60Hz for 1 minute (between all terminals and case) (connector type: 1,500 VAC ~ 50/60Hz for 1 minute (between all terminals and case)) DIA. of sensing side Ø 12 mm, Ø 18 mm, Ø 30 mm : 1,500 VAC ~ 50/60Hz for 1 minute (between all terminals and case)						
Vibration		1 mm a	mplitude at freque	ency 10 to 55 Hz in	each of X, Y, Z dire	ctions for 2 hours		
Shock		500 m	$/s^2 (\approx 50 \text{ G}) \text{ X, Y}$, Z directions for	3 times			
Ambient temp.		-25 to	70°C, storage: -	30 to 80 °C (non	freezing or non-	-condensation)		
Ambient humi.			95 %RH, storage nsation)	35 to 95 %RH (non-freezing or	non-		
Protection		IP67 (I	EC standards)					
Connection		Cable	type / Cable cor	nector type / Co	onnector type m	iodel		
Cable spec. 02)		DIA. of sensing side Ø 8 mm: Ø 3.5 mm, 2-wire 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						
Wire spec.		Ø 3.5 mm: AWG 24 (0.08 mm), 40-wire, insulator diameter: Ø 1 mm Ø 4 mm, Ø 5 mm : AWG 22 (0.08 mm), 60-wire, insulator diameter: Ø 1.25 mm						
Connector		M12 co	onnector					
Material		Case/Nut: Nikel plated Brass, (connector case of DIA. of sensing side Ø 8 mm: SUS303), washer: Nikel plated Iron, sensing side: polybutylene terephthalate, standard cable (black): polyvinyl chloride (PVC), oil resistant cable (gray): oil resistant polyvinyl chloride (PVC)						

01) Check the condition of connected device.

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

Cut-out Dimensions

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



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

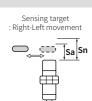
Setting Distance Formula

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

Setting distance (Sa)

= Sensing distance (Sn) × 70%



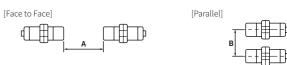


Mutual-interference & Influence by Surrounding Metals

■ 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.







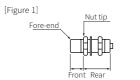
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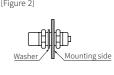
								. ,
Sensing side			Ø 12 mm		Ø 18 mm		Ø 30 mm	
	Flush	Non- flush	Flush	Non- flush	Flush	Non- flush	Flush	Non- flush
Α	20	80	25	120	50	200	110	350
В	15	60	25	100	35	110	90	300
l	0	12	2.5	15	3.5	14	6	20
Ød	8	24	18	40	27	70	45	120
m	6	8	12	20	24	40	45	90
n	12	24	18	40	27	70	45	120

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].





Sensing			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 m		14.7 N m		49 N m	
Rear torque	8.82 N m		11.76 N n	n	14.7 N m		78.4 N m	

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