

Autonics

Full Metal Proximity Sensor

PRF SERIES

INSTRUCTION MANUAL



Thank you for choosing our Autonics product.
Please read the following safety considerations before use.

Safety Considerations

- ※Please observe all safety considerations for safe and proper product operation to avoid hazards.
※⚠ symbol represents caution due to special circumstances in which hazards may occur.
- ⚠Warning** Failure to follow these instructions may result in serious injury or death.
⚠Caution Failure to follow these instructions may result in personal injury or product damage.
- ⚠Warning**
- 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, fire or economic loss.
 - 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.
 - Do not disassemble or modify the unit.**
Failure to follow this instruction may result in fire.
 - Do not connect, repair, or inspect the unit while connected to a power source.**
Failure to follow this instruction may result in fire.
 - Check 'Connections' before wiring.**
Failure to follow this instruction may result in fire.
- ⚠Caution**
- Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
 - Use dry cloth to clean the unit, and do not use water or organic solvent.**
Failure to follow this instruction may result in fire.
 - Do not supply power without load.**
Failure to follow this instruction may result in fire or product damage.

Ordering Information

P

R

F

T

12

-

5

DO

-

V

Standard/
Cable
material

Cable

Cable
connector

Output

Sensing distance

Dimension

Cable form

Cable type

Feature

Shape

Item

V	Oil resistant cable type
IV	Oil resistant cable type (IEC standard)
DO	DC 2-wire N.O. (Normally Open)
Number	Standard sensing distance (unit: mm)
Number	Diameter of head (unit: mm)
T	2-wire
No mark	Cable type
W	Cable connector type
F	Full metal, Standard type
FA	Full metal, Spatter resistance type
R	Cylindrical type
P	Inductive proximity sensor

Control Output Diagram & Load Operating

Normally Open	
Sensing target	Presence
Load	Operation Return
Operation Indicator (red LED)	ON OFF

Connections

Cable type	Cable connector type (IEC standard)

※Load can be wired to any direction.
※The above specifications are subject to change and some models may be discontinued without notice.
※Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).

Specifications

Model	Cable type	PRFT08-1.5DO-V PRFAT08-1.5DO-V	PRFT12-2DO-V PRFAT12-2DO-V	PRFT18-5DO-V PRFAT18-5DO-V	PRFT30-10DO-V PRFAT30-10DO-V
	Cable connector type	PRFWT08-1.5DO-IV PRFAWT08-1.5DO-IV	PRFWT12-2DO-IV PRFAWT12-2DO-IV	PRFWT18-5DO-IV PRFAWT18-5DO-IV	PRFWT30-10DO-IV PRFAWT30-10DO-IV
Diameter of sensing side		8mm	12mm	18mm	30mm
Sensing distance※1		1.5mm	2mm	5mm	10mm
Installation		Shield (flush)			
Hysteresis		Max. 15% of sensing distance			
Standard sensing target		8×8×1mm (iron)	12×12×1mm (iron)	30×30×1mm (iron)	54×54×1mm (iron)
Setting distance		0 to 1.05mm	0 to 1.4mm	0 to 3.5mm	0 to 7mm
Power supply (operating voltage)		12-24VDC≒ (10-30VDC≒)			
Leakage current		Max. 0.8mA			
Response frequency※2		200Hz	100Hz	80Hz	50Hz
Residual voltage		Max. 3.5V			
Affection by temperature		Max. ±20% for sensing distance at ambient temperature 20°C			
Control output		Max. 3 to 100mA			
Insulation resistance		Over 50MΩ (at 500VDC megger)			
Dielectric strength		1,000VAC 50/60Hz for 1 min			
Vibration		1.5mm amplitude at frequency 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours			
Shock		500m/s ² (approx. 50G) in each X, Y, Z direction for 10 times			
Indicator		Operation indicator: red LED			
Environ ment	Ambient temperature	-25 to 70°C, storage: -25 to 70°C			
	Ambient humidity	35 to 95%RH, storage: 35 to 95%RH			
Protection circuit		Surge protection circuit, output short over current protection circuit			
Protection		IP67 (IEC standard)			
Cable	Cable type※3	Ø4mm, 2-wire, 2m※4 (AWG22, core diameter: 0.08mm, no. of cores: 60, insulator diameter: Ø1.25mm)			
	Cable connector type	Ø4mm, 2-wire, 300mm, M12 connector (AWG22, core diameter: 0.08mm, no. of cores: 60, insulator diameter: Ø1.25mm)			
Material		Case/Nut: stainless steel 303 (SUS303, PTFE coated※5), washer: stainless steel 304 (SUS304), sensing side: stainless steel 303 (SUS303, PTFE coated※5, thickness is 0.8mm, in case of PRF(A)□T08 is 0.4mm), oil resistant cable (gray): oil resistant polyvinyl chloride (PVC)			
Approval		CE			
Weight※6		Approx. 80g (approx. 55g)	Approx. 110g (approx. 83g)	Approx. 132g (approx. 97g)	Approx. 225g (approx. 170g)

- ※1: Use accessories (nut, washer) made of SUS. Or, sensing distance cannot be guaranteed.
※2: 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.
※3: Do not pull the Ø4mm cable with a tensile strength of 30N or over and the Ø5mm cable with a tensile strength of 50N or over. It may result in fire due to the broken wire. When extending wire, use AWG22 cable or over within 200m.
※4: Option is 5m.
※5: PTFE coated is only for spatter resistance type model.
※6: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

Dimensions

• PRF(A)T08

• PRF(A)WT08

• PRF(A)T12

• PRF(A)WT12

• PRF(A)T18

• PRF(A)WT18

• PRF(A)T30

• PRF(A)WT30

Mutual-Interference & Influence by Surrounding Metals

- Mutual-interference**
When more than 2 proximity sensors are mounted closely, malfunction of sensor may be caused due to mutual frequency interference. Therefore, be sure to set a minimum distance between the two sensors by referring to the chart below.
- Face to Face
- Parallel
- Influence by surrounding metals**
When sensors are mounted on metallic panel, it is required to prevent sensors from being affected by any metallic object except target. Therefore, be sure to set a minimum distance as below chart.

(unit: mm)				
Item \ Model	PRF (A)□T08-1.5DO-□	PRF (A)□T12-2DO-□	PRF (A)□T18-5DO-□	PRF (A)□T30-10DO-□
A	35	40	65	110
B	30	35	60	100
ℓ	0	0	0	0
Ød	8	12	18	30
m	4.5	8	20	40
n	30	40	60	100

Setting Distance

• Sensing distance can be changed by the shape, size or material of the target. Therefore please check the sensing distance like (a), then pass the target within range of setting distance (Sa) of (b).

• Setting distance (Sa): Sensing distance×70%
E.g.)PRFAT12-2DO-V
Setting distance (Sa)=2mm×0.7=1.4mm

Effect of Aluminum Scraps

When aluminum scraps are attached or stacked at sensing side, the proximity sensor does not detect and sensing signal is OFF. However, the below cases may occur to sensing signal. In this case, remove the scraps.

(1) When the size of aluminum scraps (d) is bigger than 2/3 of the sensing side size (D)

(2) When aluminum scraps are attached on the sensing side by external pressure

Model	Size	D (mm)
PRF(A)□T08	6	
PRF(A)□T12	10	
PRF(A)□T18	16	
PRF(A)□T30	28	

Installation and Tightening Torque

When tightening the nut, use the provided washer as [Figure 1].
The allowable tightening torque table is for inserting the washer as [Figure 2].

[Allowable tightening torque]	
Model	Torque
PRF(A)□T08-1.5DO-□	3.5N·m
PRF(A)□T12-2DO-□	25N·m
PRF(A)□T18-5DO-□	70N·m
PRF(A)□T30-10DO-□	180N·m

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- 12-24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Use the product, after 0.5 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 of the product 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. 2,000m
 - Pollution degree 2
 - Installation category II

Major Products

- Photoelectric Sensors
 - Fiber Optic Sensors
 - Door Sensors
 - Door Side Sensors
 - Area Sensors
 - Proximity Sensors
 - Pressure Sensors
 - Rotary Encoders
 - Connector/Sockets
- Temperature Controllers
 - Temperature/Humidity Transducers
 - SSRs/Power Controllers
 - Counters
 - Timers
 - Panel Meters
 - Tachometers/Pulse (Rate) Meters
 - Display Units
 - Sensor Controllers
- Switching Mode Power Supplies
 - Control Switches/Lamps/Buzzers
 - I/O Terminal Blocks & Cables
 - Stepper Motors/Drivers/Motion Controllers
 - Graphic/Logic Panels
 - Field Network Devices
 - Laser Marking System (Fiber, Co., Nd: YAG)
 - Laser Welding/Cutting System

Autonics Corporation
http://www.autonics.com

■ **HEADQUARTERS:**
18, Bansong-ro 513beon-gil, Haeundae-gu, Busan,
South Korea, 48002
TEL: 82-51-519-3232
■ **E-mail:** sales@autonics.com