

Autonics

Full Metal Long Sensing Distance
Proximity Sensor
PRFD 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

1. **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.

2. **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.

3. **Do not disassemble or modify the unit.**

Failure to follow this instruction may result in fire.

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

Failure to follow this instruction may result in fire.

5. **Check 'Connections' before wiring.**

Failure to follow this instruction may result in fire.

Caution

1. **Use the unit within the rated specifications.**

Failure to follow this instruction may result in fire or product damage.

2. **Use dry cloth to clean the unit, and do not use water or organic solvent.**

Failure to follow this instruction may result in fire.

3. **Do not supply power without load.**

Failure to follow this instruction may result in fire or product damage.

Ordering Information

P

R

FD

T

12

-

3

DO

-

V

Standard/
Cable
material

Output

Sensing distance

Dimension

Cable form

Cable type

Feature

Shape

Item

Cable

Cable connector

DO

Number

Number

T

No mark

W

FD

FDA

R

P

Oil resistant cable type

Oil resistant cable type (IEC standard)

DC 2-wire N.O. (Normally Open)

Standard sensing distance (unit: mm)

Diameter of head (unit: mm)

2-wire

Cable type

Cable connector type

Full metal, Long sensing distance type

Full metal, Long sensing distance, Spatter resistance type

Cylindrical type

Inductive proximity sensor

Control Output Diagram & Load Operating

Main circuit

Load

Blue

0V

Stability indicator (green LED)

Operation indicator (red LED)

Sensing distance (Sn)

Non-sensing area

Unstable sensing area (Sn×Approx. 70%)

Stable sensing area

Load ON

Load OFF

Stability indicator (green LED) ON

Stability indicator (green LED) OFF

Operation indicator (red LED) ON

Operation indicator (red LED) OFF

※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	PRFDT08-2DO-V PRFDAT08-2DO-V	PRFDT12-3DO-V PRFDAT12-3DO-V	PRFDT18-7DO-V PRFDAT18-7DO-V	PRFDT30-12DO-V PRFDAT30-12DO-V				
	Cable connector type	PRFDWT08-2DO-IV PRFDAWT08-2DO-IV	PRFDWT12-3DO-IV PRFDAWT12-3DO-IV	PRFDWT18-7DO-IV PRFDAWT18-7DO-IV	PRFDWT30-12DO-IV PRFDAWT30-12DO-IV				
Diameter of the sensing side	8mm	12mm	18mm	30mm					
Sensing distance※1	2mm	3mm	7mm	12mm					
Installation	Shield (flush)								
Hysteresis	Max. 15% of sensing distance								
Standard sensing target	12×12×1mm (iron)	12×12×1mm (iron)	30×30×1mm (iron)	54×54×1mm (iron)					
Setting distance	0 to 1.4mm	0 to 2.1mm	0 to 4.9mm	0 to 8.4mm					
Power supply (operating voltage)	12-24VDC≒ (10-30VDC≒)								
Leakage current	Max. 0.8mA								
Response frequency※2	150Hz	80Hz	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 1,000m/s ² (approx. 100G) in each X, Y, Z direction for 10 times								
Indicator	Stability indicator: green LED, Operation indicator: red LED								
Environ	Ambient temperature	-25 to 70°C, storage: -25 to 70°C							
ment	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	Ø5mm, 2-wire, 2m※4 (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 of PRFD(A)T08: 0.2mm, PRFD(A)T12/18: 0.4mm, PRFD(A)T30: 0.5mm), 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

• PRFD(A)T08

Ø15

13

48

28

4

M8×1

Stability indicator (green)

Operation indicator (red)

Ø4, 2m

• PRFD(A)WT08

Ø15

13

48

28

4

M8×1

Stability indicator (green)

Operation indicator (red)

Ø4

M12

• PRFD(A)T12

Ø21

17

46

33

4

M12×1

Stability indicator (green)

Operation indicator (red)

Ø5, 2m

• PRFD(A)WT12

Ø21

17

46

33

4

M12×1

Stability indicator (green)

Operation indicator (red)

Ø5

M12

• PRFD(A)T18

Ø29

24

50

36

4

M18×1

Stability indicator (green)

Operation indicator (red)

Ø5, 2m

• PRFD(A)WT18

Ø29

24

50

36

4

M18×1

Stability indicator (green)

Operation indicator (red)

Ø5

M12

• PRFD(A)T30

Ø42

36

54

40

5

M30×1.5

Stability indicator (green)

Operation indicator (red)

Ø5, 2m

• PRFD(A)WT30

Ø42

36

54

40

5

M30×1.5

Stability indicator (green)

Operation indicator (red)

Ø5

M12

Connections

Cable type

Brown

Load

0

+24VDC

Blue

Load

0

0V

Cable connector type (IEC standard)

②

①

Brown

Load

0

+24VDC

③

④

Blue

Load

0

0V

※Load can be wired to any direction.

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.

Setting Distance

Target

Moving direction

Sn: Sensing distance

Sa: Setting distance (70% of Sn)

(a)

Target

Moving direction

Sn

Sa

(b)

• 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).

• In case of PRFD Series, when the sensing target is placed over approx. 70% of sensing distance (Sn), the operation indicator (red LED) turns ON. When the target is placed within approx. 70% of sensing distance (Sn), the stability indicator (green LED) turns ON. Use the sensor at the position where the stability indicator turns ON.

• Setting distance (Sa): Sensing distance×70%
E.g.)PRFDAT12-3DO-V
Setting distance (Sa)=3mm×0.7=2.1mm

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

(d)

(D)

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

External pressure

Aluminum scraps

Installation and Tightening Torque

[Figure 1]

[Figure 2]

Washer

Mounting bracket

[Allowable tightening torque]	
Model	Torque
PRFD(A)T08-2DO-□	3.5N·m
PRFD(A)T12-3DO-□	25N·m
PRFD(A)T18-7DO-□	70N·m
PRFD(A)T30-12DO-□	180N·m

Cautions during Use

1. Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.

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

3. Use the product, after 0.5 sec of supplying power.

4. 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.

5. Do NOT connect the sensors more than three in parallel.

6. If the surface of the product is rubbed with a hard object, PTFE coating can be worn out.

7. This unit may be used in the following environments.

①Indoors (in the environment condition rated in 'Specifications')

②Altitude max. 2,000m

③Pollution degree 2

④Installation 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

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