PRF Series

Full metal, Cylindrical, Cable Type Proximity Sensor

◼ Features

NEW

- High impact and wear resistance to friction with the work or metallic brush (sensing face/housing material: stainless steel)
- Reduced possibility of malfunction by aluminum scraps
- Excellent noise immunity with specialized sensor IC
- Built-in surge protection circuit and output short over current protection circuit
- Excellent visibility with a 360° ring type of indicator (red LED)
- Equipped with the oil resistant cable
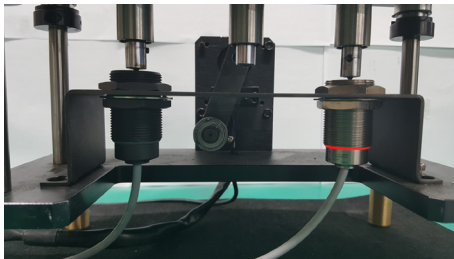- Protection structure: IP67 (IEC standard)

⚠ **Please read "Safety Considerations" in operation manual before using.**
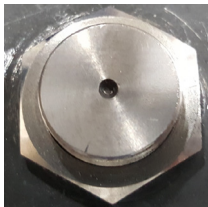
CE

◼ Durability Test

High resistance to the impact of removing Welding sludge attached to the sensing face
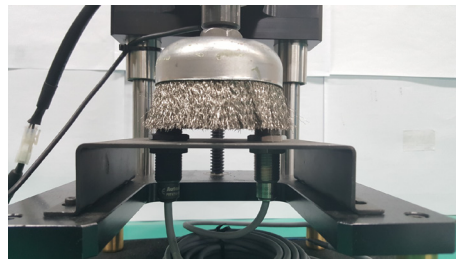
◎ **Continuous hitting test**

Test conditions
Hitting object: 1.3kg of weight
Hitting speed: 48 times per 1 min
The number of hitting times: 300 thousand times
Test model: PRF18

<Test result>

◎ **Metallic brush test**

Test conditions
Testing object: stainless cup brush
Rotation speed: 80RPM
Testing time: 3 hours
Test model: PRF18

<Test result>

◼ 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
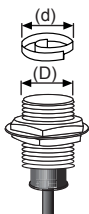
Model	Size D (mm)
PRF12	10
PRF18	16
PRF30	28

External pressure

Aluminum scraps
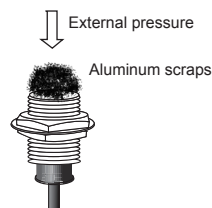
Full metal, Cylindrical, Cable Type

◼ Specifications
● DC 2-wire type

Model	PRFT12-2DO-V	PRFT18-5DO-V	PRFT30-10DO-V
Sensing distance[※1]	2mm	5mm	10mm
Hysteresis	Max. 15% of sensing distance		
Standard sensing target	12×12×1mm (iron)	30×30×1mm (iron)	54×54×1mm (iron)
Setting distance	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]	100Hz	80Hz	50Hz
Residual voltage	Max. 3.5V		
Affection by Temp.	Max. ±20% for sensing distance at ambient temperature 20℃		
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	1,000m/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℃, storage: -25 to 70℃		
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	Ø5mm, 2-wire, 2m[※3] (AWG22, core diameter: 0.08mm, no. of cores: 60, insulator diameter: Ø1.25mm)		
Material	Case/Nut: stainless steel 303 (SUS303), washer: stainless steel 304 (SUS304), sensing side: stainless steel 303 (SUS303, thickness is 0.8mm), oil resistant cable (gray): oil resistant polyvinyl chloride (PVC)		
Appoval	C€		
Weight[※4]	Approx. 110g (approx. 83g)	Approx. 132g (approx. 97g)	Approx. 225g (approx. 170g)

※1: When using the nut which is not stainless steel 303 (SUS303) material such as brass, the sensing distance is variable.
※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.
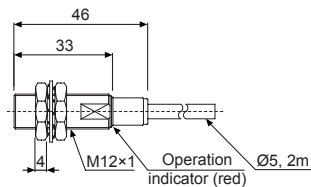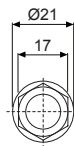※3: Option is 5m.
※4: The weight includes packaging. The weight in parenthesis is for unit only.
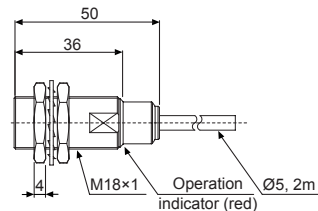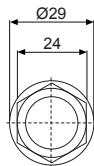※Environment resistance is rated at no freezing or condensation.
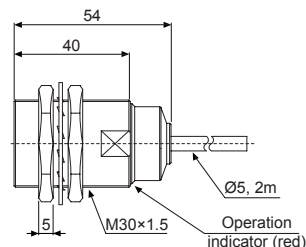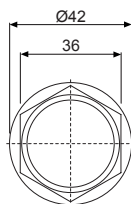
◼ Dimensions
● PRFT12-2DO-V

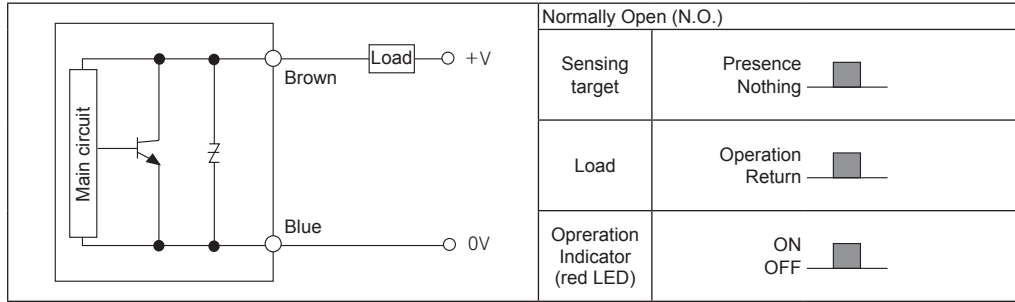(unit: mm)

● PRFT18-5DO-V

● PRFT30-10DO-V

(A) Photoelectric Sensors
(B) Fiber Optic Sensors
(C) Door/Area Sensors
(D) Proximity Sensors
(E) Pressure Sensors
(F) Rotary Encoders
(G) Connectors/ Connector Cables/ Sensor Distribution Boxes/Sockets
(H) Temperature Controllers
(I) SSRs / Power Controllers
(J) Counters
(K) Timers
(L) Panel Meters
(M) Tacho / Speed / Pulse Meters
(N) Display Units
(O) Sensor Controllers
(P) Switching Mode Power Supplies
(Q) Stepper Motors & Drivers & Controllers
(R) Graphic/ Logic Panels
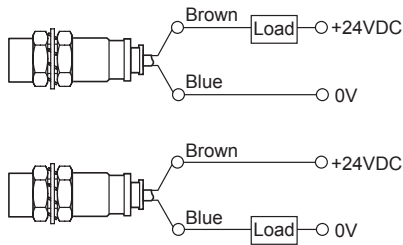(S) Field Network Devices
(T) Software

PRF Series

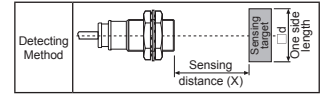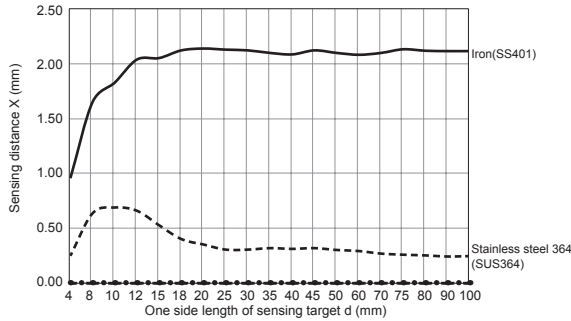## ▣ Control Output Diagram & Load Operating

● DC 2-wire type

	Normally Open (N.O.)	
Sensing target	Presence Nothing	
Load	Operation Return	
Opreration Indicator (red LED)	ON OFF	

Main circuit — Brown — Load — +V

Blue — 0V

▣ Connections

● DC 2-wire type

Brown — Load — +24VDC

Blue — 0V

Brown — +24VDC

Blue — Load — 0V

※Load can be wired to any direction.

▣ Sensing Distance Feature Data by Target Material and Size

Detecting Method — Sensing target / d / One side length — Sensing distance (X)

● PRFT12-2DO-V

Sensing distance X (mm) vs One side length of sensing target d (mm)
- Iron(SS401)
- Stainless steel 364 (SUS364)

● PRFT18-5DO-V

Sensing distance X (mm) vs One side length of sensing target d (mm)
- Iron(SS401)
- Stainless steel 364 (SUS364)
- Brass(C3601)
- Aluminum(ALS052)
- Copper(C1100)

● PRFT30-10DO-V

Sensing distance X (mm) vs One side length of sensing target d (mm)
- Iron(SS401)
- Stainless steel 364 (SUS364)
- Brass(C3601)
- Aluminum(ALS052)
- Copper(C1100)

▣ Sensing Distance Feature Data by Parallel (Left/Right) Movement

Detecting Method — Sensing area (Y) / Sensing target / Sensing distance (X)

● PRFT12-2DO-V

Sensing area (mm) vs Left ← Center → Right Sensing area Y (mm)

● PRFT18-5DO-V

Sensing area (mm) vs Left ← Center → Right Sensing area Y (mm)

● PRFT30-10DO-V

Sensing area (mm) vs Left ← Center → Right Sensing area Y (mm)

PRF Series

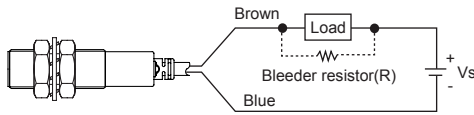## ▣ Proper Usage

◎ Load connections

\<DC 2-wire type\>

\<DC 2-wire type\>
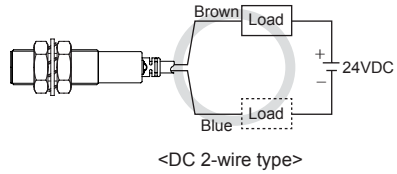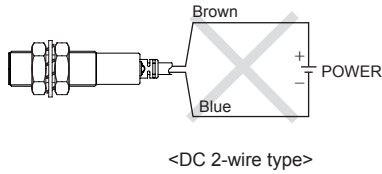
When using DC 2-wire type proximity sensor, the load must be connected, otherwise internal components may be damaged. The load can be connected to either wire.

◎ In case of the load current is small

● **DC 2-wire type**

It may cause return failure of load by residual voltage. If the load current is under 5mA, please make sure the residual voltage is less than the return voltage of the load by connecting a bleeder resistor in parallel with the load as shown in the diagram.

$$R \le \frac{Vs}{I}(k\Omega) \qquad P > \frac{Vs^2}{R}(W)$$

[I: Action current of load, R: Bleeder resistance, P: Permissible power]

Please make the current on proximity sensor smaller than the return current of load by connecting a bleeder resistor in parallel.

※W value of Bleeder resistor should be bigger for proper heat dissipation.

$$R \le \frac{Vs}{Io\text{-}Ioff}(k\Omega) \qquad P > \frac{Vs^2}{R}(W)$$

[Vs: Power supply, Io: Min. action current of proximity sensor, Ioff: Return current of load, P : Number of Bleeder resistance watt]

◎ Mutual-interference & Influence by surrounding metals

When several proximity sensors are mounted close to one another a malfunction of the may be caused due to mutual interference. Therefore, be sure to keep a minimum distance between the two sensors as below chart indicates.

Face to Face
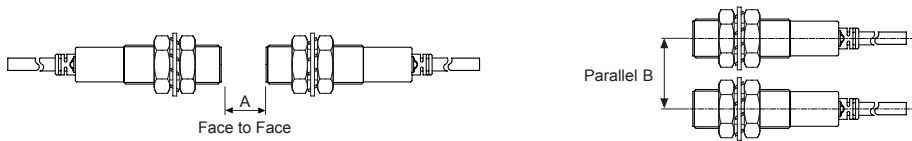
When sensors are mounted on metallic panel, it is required to protect the sensors from being affected by any metallic object except target. Therefore, be sure to provide a minimum distance as below chart indicates.
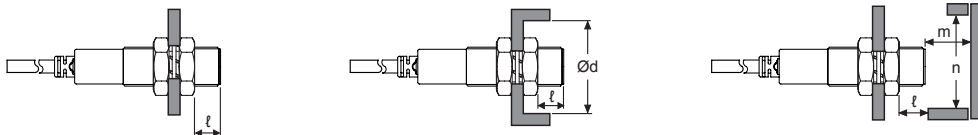
(unit: mm)

Item \ Model	PRFT12-2DO-V	PRFT18-5DO-V	PRFT30-10DO-V
A	40	65	110
B	35	60	100
ℓ	0	0	0
Ød	12	18	30
m	8	20	40
n	40	60	100

Autonics