# Full metal, Cylindrical, Long Sensing Distance, Spatter-Resistance, Cable Connector Type

NEW

## ▣ Features

- Long sensing distance
- 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
- Prevent malfunction due to spatter with PTFE coating
- Excellent noise immunity with specialized sensor IC
- Built-in surge protection circuit and output short over current protection circuit
- Stability indicator (greed LED) and operation indicator (red LED) : excellent visibility with the 360˚ ring type indicator
- Equipped with the oil resistant cable
- Protection structure: IP67 (IEC standard)

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

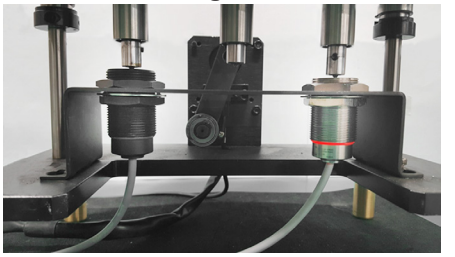
## ▣ The Characteristic of Spatter-Resistance Type

The hot arc from arc welding machine is adhesive even with metals or plastics.
Therefore, normal proximity sensor might have malfunction even though there are no sensing object if the arcs are put on the sensing surface. The arcs are not adhered on the sensing part of the spatter-resistance type proximity sensor as the part is coated with PTFE against thermal resistance.
Also, the protection cover sold optionally has the same function.

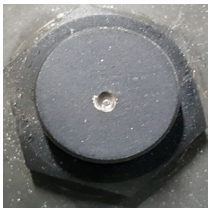
## ▣ Durability Test

Highly resistant to the impact of removing welding sludge attached to the sensing face

### ◎ Continuous hitting test

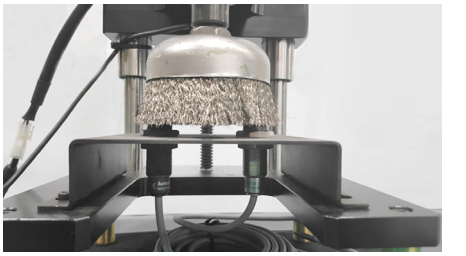


**Test conditions**
Hitting object: 1.3kg of weight
Hitting speed: 48 times per 1 min
The number of hitting times: 300 thousand times
Test model: PRFDAW18

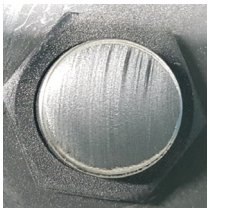


**<Test result>**

### ◎ Metallic brush test



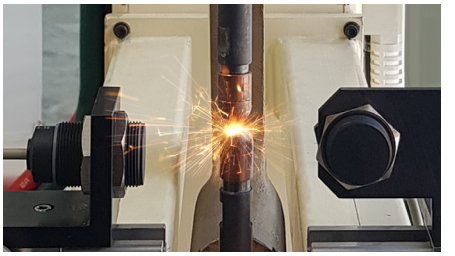
**Test conditions**
Testing object: stainless cup brush
Rotation speed: 80RPM
Testing time: 3 hours
Test model: PRFDAW18



**<Test result>**

## ▣ Electromagnetic Resistance Test

Large current from welding generates magnetic field which can affect the proximity sensor to malfunction due to noise.
This product, however, can be used near strong noise without malfunctioning, thanks to excellent electromagnetic resistance.
This test is conducted in the environment of welding.



**Test conditions**
Welding current: 13,000A
Installation direction: front and side
Test model: PRFDAW Series

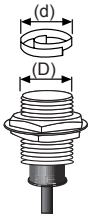
| Diameter of sensing side | Minimum sensing distance between weld and sensor | |
|---|---|---|
| Installation direction | Front | Side |
| 12mm | No effect from noise | 50mm |
| 18mm | 30mm | 50mm |
| 30mm | 120mm | 110mm |

※Minimum sensing distance can be different by welding environment.

## ▣ 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)




| Model \ Size | D (mm) |
|---|---|
| PRFDAW12 | 10 |
| PRFDAW18 | 16 |
| PRFDAW30 | 28 |

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

## ▣ Specifications

### ● DC 2-wire type

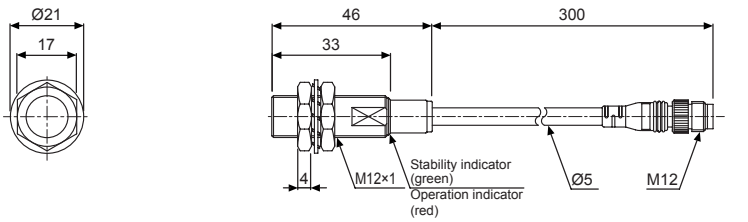
| Model | | PRFDAWT12-3DO-IV | PRFDAWT18-7DO-IV | PRFDAWT30-12DO-IV |
|---|---|---|---|---|
| Diameter of sensing side | | 12mm | 18mm | 30mm |
| Sensing distance※1 | | 3mm | 7mm | 12mm |
| Installation | | Shield (flush) | | |
| Hysteresis | | Max. 15% of sensing distance | | |
| Standard sensing target | | 12×12×1mm (iron) | 30×30×1mm (iron) | 54×54×1mm (iron) |
| Setting distance | | 0 to 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 | | 80Hz | 80Hz | 50Hz |
| Residual voltage | | Max. 3.5VDC⎓ | | |
| 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. 100G) in each X, Y, Z direction for 10 times | | |
| Indicator | | Stability indicator: green LED, 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, 300mm, M12 connector<br>(AWG22, core diameter: 0.08mm, no. of cores: 60, insulator diameter: Ø1.25mm) | | |
| Material | | Case/Nut: stainless steel 303 (SUS 303, PTFE coated), washer: stainless steel 304 (SUS 304), sensing side: stainless steel 303 (SUS 303, PTFE coated, thickness of PRFDAWT12/18: 0.4mm, RFDAWT30: 0.5mm), oil resistant cable (gray): oil resistant polyvinyl chloride (PVC) | | |
| Approval | | CE | | |
| Weight※3 | | 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: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

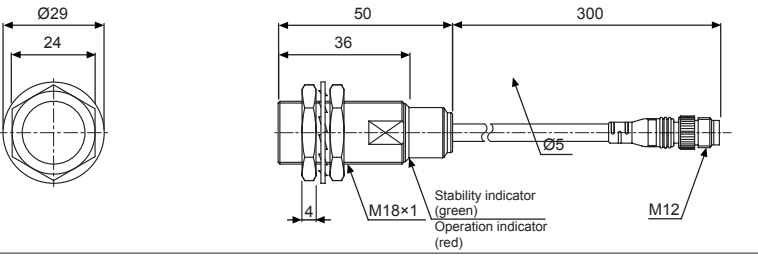
## ▣ Dimensions

(unit: mm)

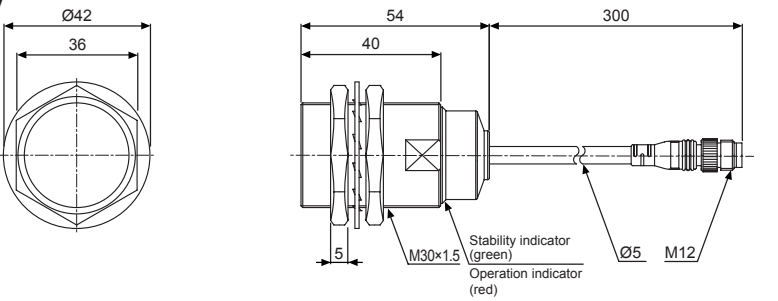
### ● PRFDAWT12-3DO-IV




### ● PRFDAWT18-7DO-IV

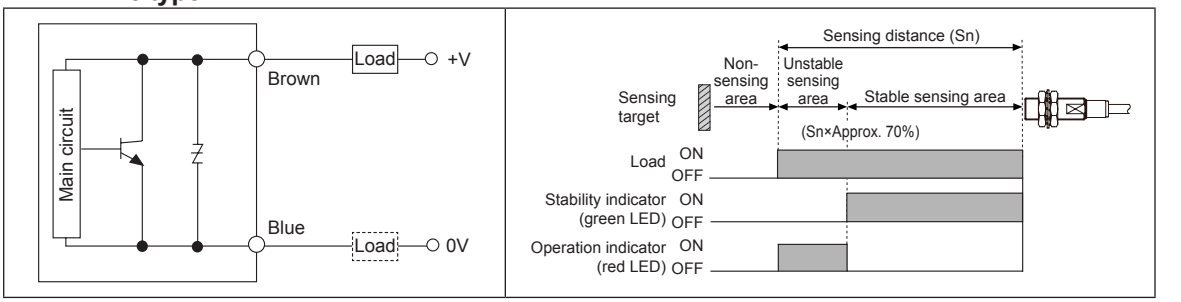



### ● PRFDAWT30-12DO-IV




## ▣ Control Output Diagram & Load Operating

### ● DC 2-wire type

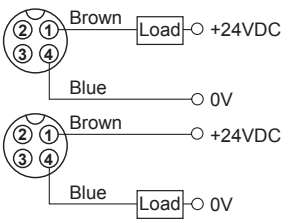



※When the sensing target is placed over approx. 70% of sensing distance (Sn), the operation indicator (red LED) turns ON.
When the target is placed within approx. 70% of sensing distance (Sn), the stability indicator (green LED) turns ON.
Use the sensor at the position where the stability indicator turns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

## ▣ Connections

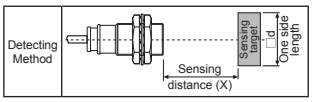
### ● DC 2-wire type (IEC standard)

Normally Open (N.O.)

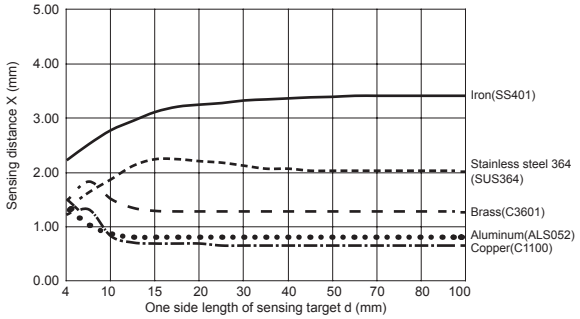



※②, ③ are N·C (Not Connected) terminals.
※For the type and specifications of connector wires, please refer to G-5 page.

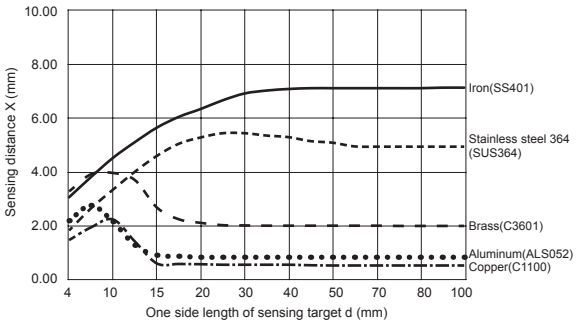
## ▣ Sensing Distance Feature Data by Target Material and Size



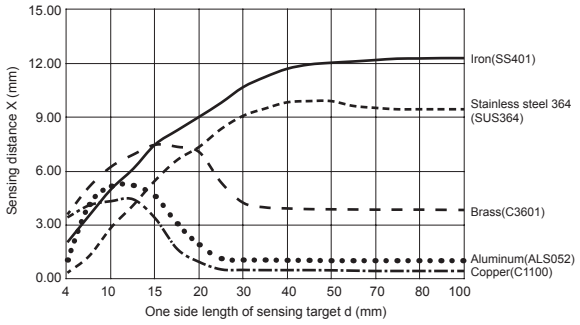

### ● PRFDAWT12-3DO-IV



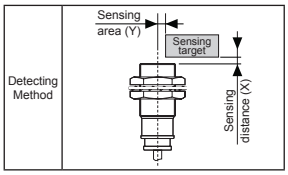

### ● PRFDAWT18-7DO-IV



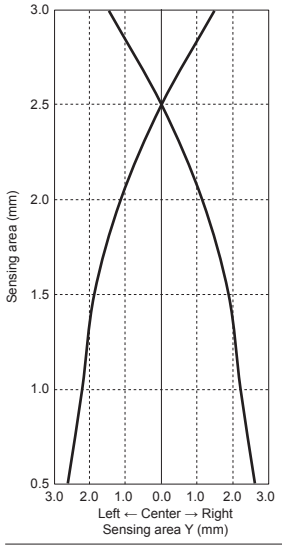

### ● PRFDAWT30-12DO-IV



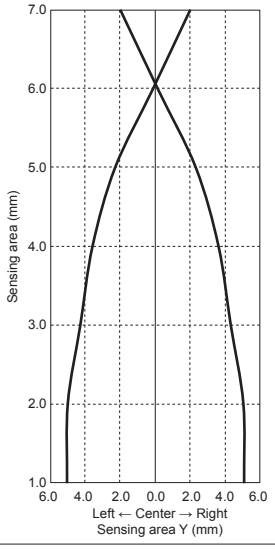

## ▣ Sensing Distance Feature Data by Parallel (Left/Right) Movement



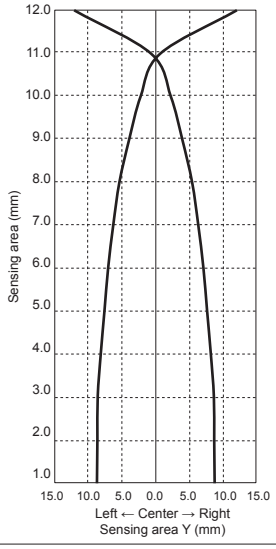

### ● PRFDAWT12-3DO-IV




### ● PRFDAWT18-7DO-IV

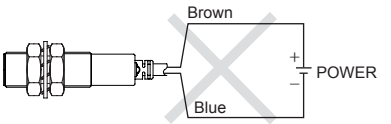



### ● PRFDAWT30-12DO-IV

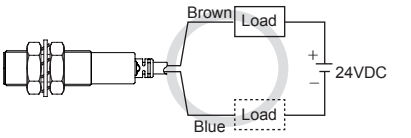


## ▣ Proper Usage

### ◎ Load connections




<DC 2-wire type>

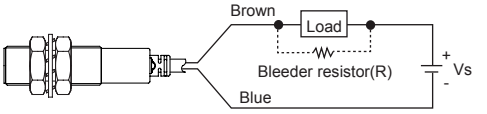



<DC 2-wire type>

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**



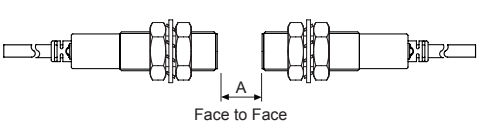

$$R \leq \frac{Vs}{Io\text{-}Ioff}\ (k\Omega) \qquad P > \frac{Vs^2}{R}\ (W)$$

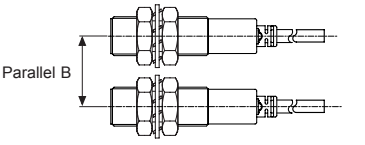
[ Vs: Power supply, Io: Min. action current of proximity sensor,
Ioff: Return current of load, P : Number of Bleeder resistance watt ]

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.

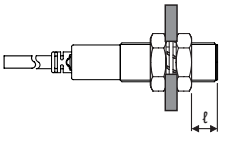
### ◎ Mutual-interference & Influence by surrounding metals

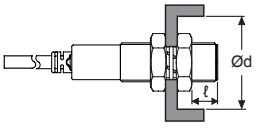
When several proximity sensors are mounted close to one another a malfunction of the may be caused due to mutual interference. Therefore, be sure to keep a minimum distance between the two sensors as below chart indicates.
Do NOT connect the sensors more than three in parallel.

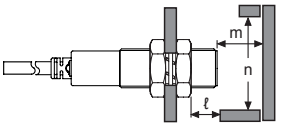



When sensors are mounted on metallic panel, it is required to protect the sensors from being affected by any metallic object except target. Therefore, be sure to provide a minimum distance as below chart indicates.




(unit: mm)

| Item \ Model | PRFDAWT12-3DO-IV | PRFDAWT18-7DO-IV | PRFDAWT30-12DO-IV |
|---|---|---|---|
| A | 40 | 65 | 110 |
| B | 35 | 60 | 100 |
| ℓ | 0 | 0 | 0 |
| Ød | 12 | 18 | 30 |
| m | 12 | 28 | 48 |
| n | 40 | 60 | 100 |