

Cylindrical, Spatter-Resistance, Cable Type Proximity Sensor

■ Features

- Prevent malfunction due to welding spatter with PTFE coating
- Improved the noise immunity with dedicated IC
- Built-in reverse polarity protection circuit (DC 3-wire type)
- Built-in surge protection circuit
- Built-in output short over current protection circuit (DC type)
- IP67 protection structure (IEC standard)
- Replaceable for spatter-resistance type limit switches



⚠ Please read "Safety Considerations" in the instruction 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.

■ Specifications

● DC 2-wire type

※When the □ model name is X, it is non-polarity model.

| Model | PRAT12-2□DO PRAT12-2□DC PRAT12-2DO-V PRAT12-2DC-V | PRAT18-5□DO PRAT18-5□DC PRAT18-5DO-V PRAT18-5DC-V | PRAT30-10□DO PRAT30-10□DC PRAT30-10DO-V PRAT30-10DC-V |
|----------------------------------|--|--|--|
| Diameter of the sensing side | 12mm | 18mm | 30mm |
| Sensing distance | 2mm | 5mm | 10mm |
| Installation | Shield (flush) | | |
| Hysteresis | Max. 10% of sensing distance | | |
| Standard sensing target | 12×12×1mm (iron) | 18×18×1mm (iron) | 30×30×1mm (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. 0.6mA | | |
| Response frequency※1 | 1.5kHz | 500Hz | 400Hz |
| Residual voltage※2 | Max. 3.5V (non-polarity type is max. 5V) | | |
| Affection by Temp. | Max. ±10% for sensing distance at ambient temperature 20°C | | |
| Control output | 2 to 100mA | | |
| Insulation resistance | Over 50MΩ (at 500VDC megger) | | |
| Dielectric strength | 1,500VAC 50/60Hz for 1 min (between all terminals and case) | | |
| Vibration | 1mm 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 directions for 3 times | | |
| Indicator | Operation indicator: Red LED | | |
| Environment | Ambient temperature | -25 to 70°C, storage: -30 to 80°C | |
| | Ambient humidity | 35 to 95%RH, storage: 35 to 95%RH | |
| Protection circuit | Surge protection circuit, output short over current protection circuit | | |
| Protection structure | IP67 (IEC standard) | | |
| Cable | ∅4mm, 2-wire, 2m | ∅5mm, 2-wire, 2m | |
| | AWG22, Core diameter: 0.8mm, Number of cores: 60, Insulator diameter: ∅1.25mm | | |
| Material | Case/Nut: PTFE coated brass, Washer: PTFE coated iron, Sensing surface: PTFE, Standard cable (black): Polyvinyl chloride (PVC), Oil resistant cable (gray): Oil resistant polyvinyl chloride (PVC) | | |
| Approval | CE | | |
| Weight※3 | Approx. 84g (approx. 72g) | Approx. 122g (approx. 110g) | Approx. 207g (approx. 170g) |

※1: 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.

※2: Before using non-polarity type, check the condition of connected device because residual voltage is 5V.

※3: The weight includes packaging. The weight in parenthesis is for unit only.

※For more information about cable and specification, refer to the (I) Connectors/Cable Connectors/Sensor Distribution Boxes/Sockets

※The □ of model name is for power type. 'D' is 12-24VDC, 'X' is non-polarity 12-24VDC.

※Environment resistance is rated at no freezing or condensation.


Cylindrical, Spatter-Resistance, Cable Type

■ Specifications

● DC 3-wire type

| Model | PRA12-2DN PRA12-2DP PRA12-2DN2 PRA12-2DP2 | PRA18-5DN PRA18-5DP PRA18-5DN2 PRA18-5DP2 | PRA30-10DN PRA30-10DP PRA30-10DN2 PRA30-10DP2 |
|----------------------------------|--|--|--|
| Diameter of the sensing side | 12mm | 18mm | 30mm |
| Sensing distance | 2mm | 5mm | 10mm |
| Installation | Shield (flush) | | |
| Hysteresis | Max. 10% of sensing distance | | |
| Standard sensing target | 12×12×1mm (iron) | 18×18×1mm (iron) | 30×30×1mm (iron) |
| Setting distance | 0 to 1.4mm | 0 to 3.5mm | 0 to 7mm |
| Power supply (operating voltage) | 12-24VDC= (10-30VDC=) | | |
| Current consumption | Max. 10mA | | |
| Response frequency ^{※1} | 1.5kHz | 500Hz | 400Hz |
| Residual voltage | Max. 1.5V | | |
| Affection by Temp. | Max. ±10% for sensing distance at ambient temperature 20°C | | |
| Control output | Max. 200mA | | |
| Insulation resistance | Over 50MΩ (at 500VDC megger) | | |
| Dielectric strength | 1,500VAC 50/60Hz for 1 min | | |
| Vibration | 1mm 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 3 times | | |
| Indicator | Operation indicator: Red LED | | |
| Environment | Ambient temperature: -25 to 70°C, storage: -30 to 80°C | | |
| | Ambient humidity: 35 to 95%RH, storage: 35 to 95%RH | | |
| Protection circuit | Surge protection circuit, reverse polarity protection circuit, output short over current protection circuit | | |
| Protection structure | IP67 (IEC standard) | | |
| Cable | ∅4mm, 3-wire, 2m | ∅5mm, 3-wire, 2m | |
| | AWG22, Core diameter: 0.8mm, Number of cores: 60, Insulator diameter: ∅1.25mm | | |
| Material | Case/Nut: PTFE coated brass, Washer: PTFE coated iron, Sensing surface: PTFE, Standard cable (black): Polyvinyl chloride (PVC) | | |
| Approval | CE | | |
| Weight ^{※2} | Approx. 84g (approx. 72g) | Approx. 122g (approx. 110g) | Approx. 207g (approx. 170g) |

● AC 2-wire type

| Model | PRA12-2AO PRA12-2AC | PRA18-5AO PRA18-5AC | PRA30-10AO PRA30-10AC |
|----------------------------------|--|-----------------------------|-----------------------------|
| Diameter of the sensing side | 12mm | 18mm | 30mm |
| Sensing distance | 2mm | 5mm | 10mm |
| Installation | Shield (flush) | | |
| Hysteresis | Max. 10% of sensing distance | | |
| Standard sensing target | 12×12×1mm (iron) | 18×18×1mm (iron) | 30×30×1mm (iron) |
| Setting distance | 0 to 1.4mm | 0 to 3.5mm | 0 to 7mm |
| Power supply (operating voltage) | 100-240VAC~ (85-264VAC~) | | |
| Leakage current | Max. 2.5mA | | |
| Response frequency ^{※1} | 20Hz | | |
| Residual voltage | Max. 10V | | |
| Affection by Temp. | Max. ±10% for sensing distance at ambient temperature 20°C | | |
| Control output | 5 to 150mA | 5 to 200mA | |
| Insulation resistance | Over 50MΩ (at 500VDC megger) | | |
| Dielectric strength | 2,500VAC 50/60Hz for 1 min | | |
| Vibration | 1mm 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 3 times | | |
| Indicator | Operation indicator: Red LED | | |
| Environment | Ambient temperature: -25 to 70°C, storage: -30 to 80°C | | |
| | Ambient humidity: 35 to 95%RH, storage: 35 to 95%RH | | |
| Protection circuit | Surge protection circuit | | |
| Protection structure | IP67 (IEC standard) | | |
| Cable | ∅4mm, 2-wire, 2m | ∅5mm, 2-wire, 2m | |
| | AWG22, Core diameter: 0.8mm, Number of cores: 60, Insulator diameter: ∅1.25mm | | |
| Material | Case/Nut: PTFE coated brass, Washer: PTFE coated iron, Sensing surface: PTFE, Standard cable (black): Polyvinyl chloride (PVC) | | |
| Insulation type | Double insulation or reinforced insulation (Mark:  , Dielectric strength between the measuring input part and the power part: 1.5kVAC) | | |
| Approval | CE | | |
| Weight ^{※2} | Approx. 78g (approx. 66g) | Approx. 118g (approx. 106g) | Approx. 207g (approx. 170g) |

※1: 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.

※2: The weight includes packaging. The weight in parenthesis is for unit only.

※Environment resistance is rated at no freezing or condensation.

SENSORS

CONTROLLERS

MOTION DEVICES

SOFTWARE

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) LIDAR

(D) Door/Area Sensors

(E) Vision Sensors

(F) Proximity Sensors

(G) Pressure Sensors

(H) Rotary Encoders

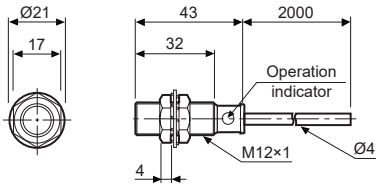
(I) Connectors/ Connector Cables/ Sensor Distribution Boxes/ Sockets

PRA Series

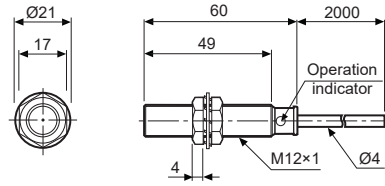
■ Dimensions

(unit: mm)

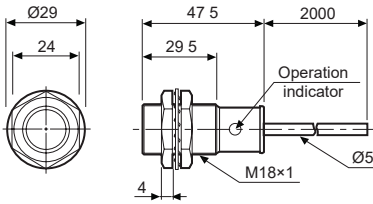
● PRA12-2D□ / PRAT12-2D□



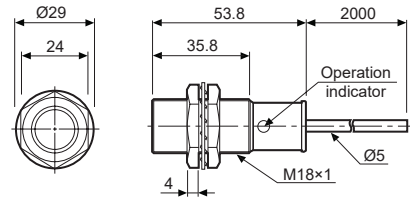
● PRA12-2A□



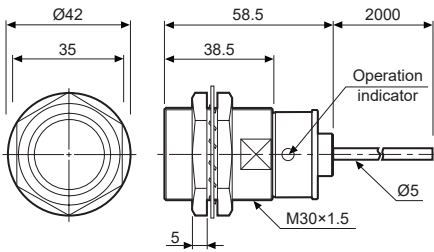
● PRA18-5D□ / PRAT18-5D□



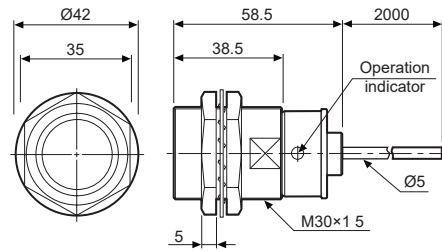
● PRA18-5A□



● PRA30-10D□ / PRAT30-10D□

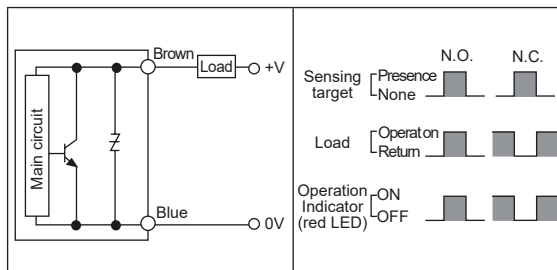


● PRA 30-10A□

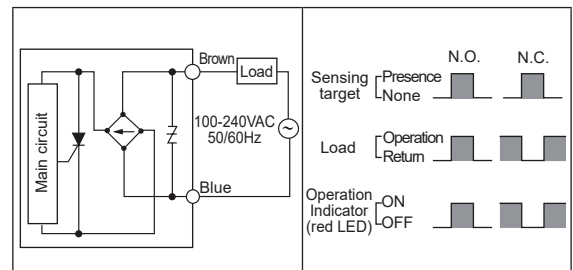


■ Control Output Diagram and Load Operation

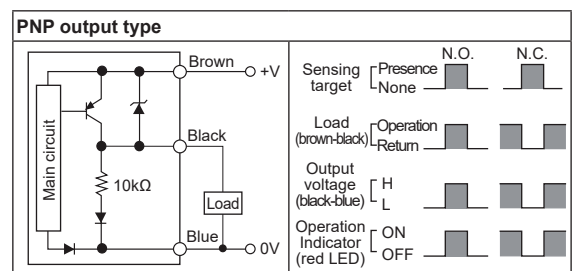
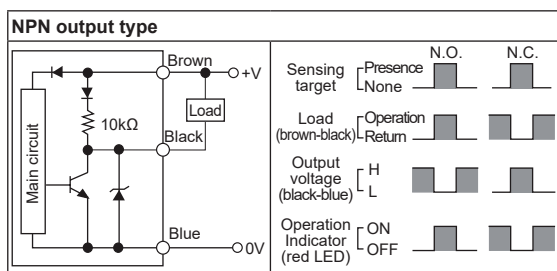
◎ DC 2-wire type



◎ AC 2-wire type

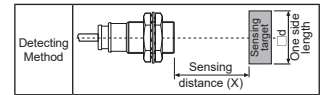


◎ DC 3-wire type

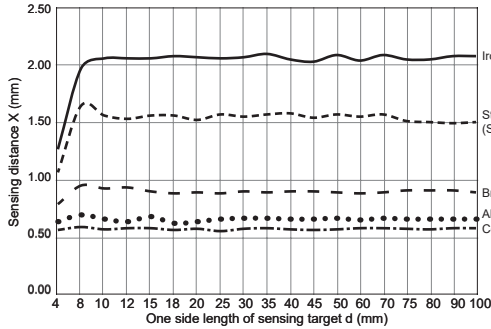


Cylindrical, Spatter-Resistance, Cable Type

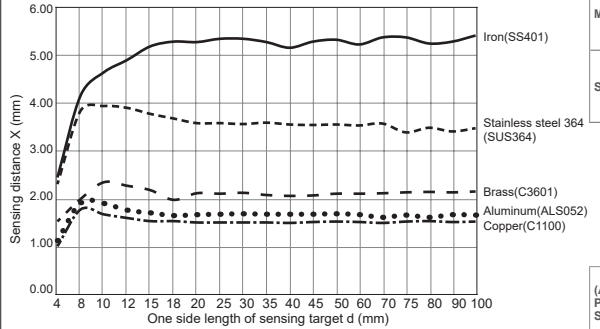
■ Sensing Distance Feature Data by Target Material and Size



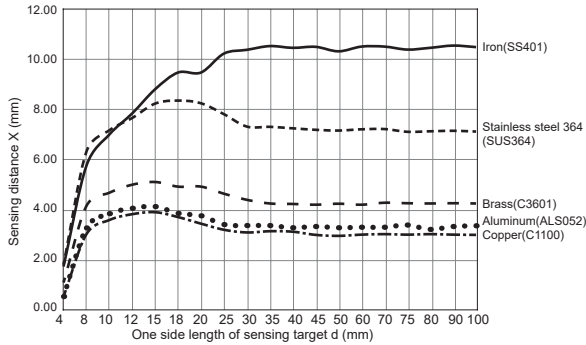
● PRAT12-2D, PRA12-2A



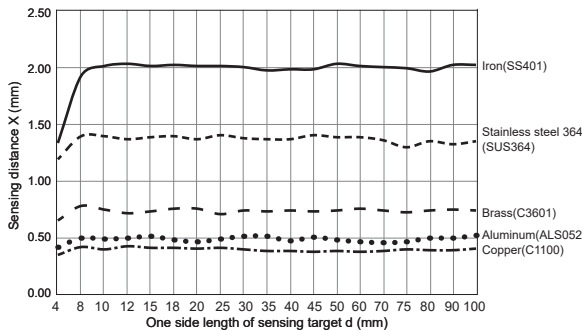
● PRAT18-5D, PRA18-5A



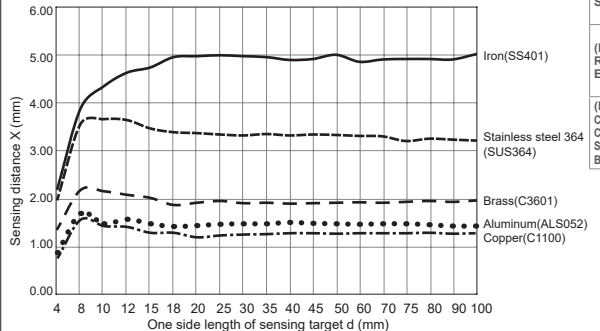
● PRAT30-10D, PRA30-10A



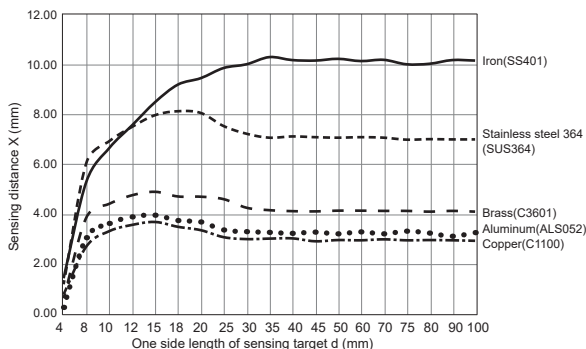
● PRA12-2D



● PRA18-5D



● PRA30-10D



SENSORS

CONTROLLERS

MOTION DEVICES

SOFTWARE

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) LiDAR

(D) Door/Area Sensors

(E) Vision Sensors

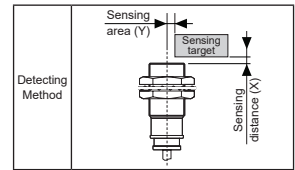
(F) Proximity Sensors

(G) Pressure Sensors

(H) Rotary Encoders

(I) Connectors/ Connector Cables/ Sensor Distribution Boxes/ Sockets

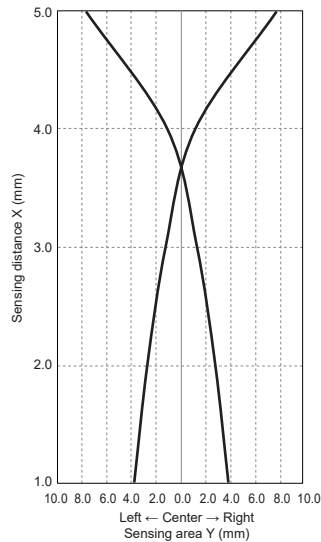
■ Sensing Distance Feature Data by Parallel (Left/Right) Movement



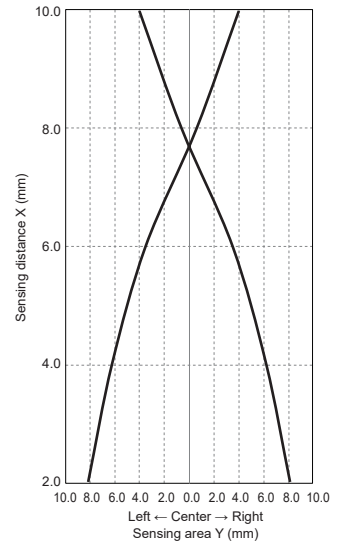
● PRAT12-2D□, PRA12-2A□



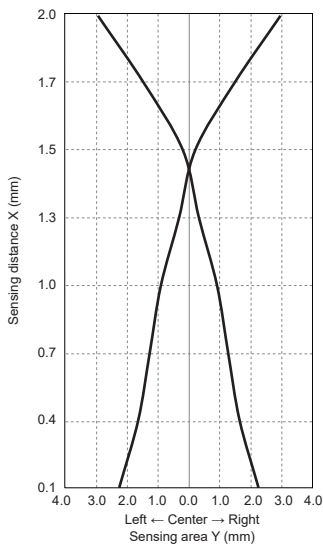
● PRAT18-5D□, PRA18-5A□



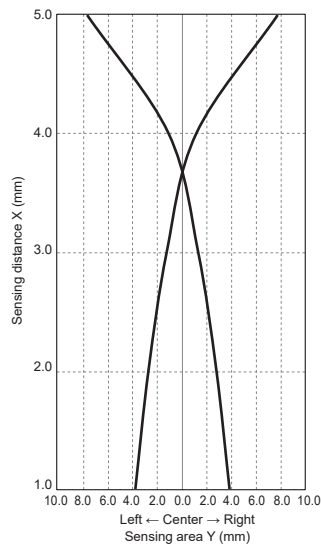
● PRAT30-10D□, PRA30-10A□



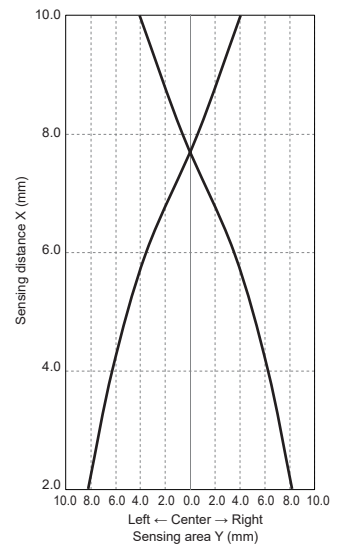
● PRA12-2D□



● PRA18-5D□



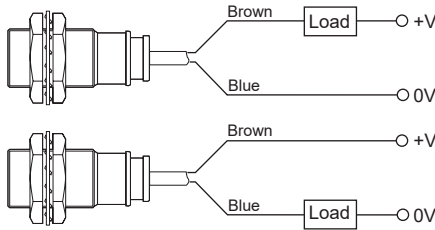
● PRA30-10D□



Cylindrical, Spatter-Resistance, Cable Type

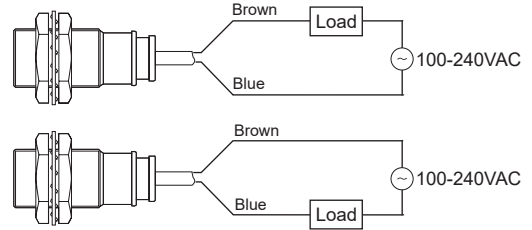
■ Connections

◎ DC 2-wire type



※The load can be connected to either wire.

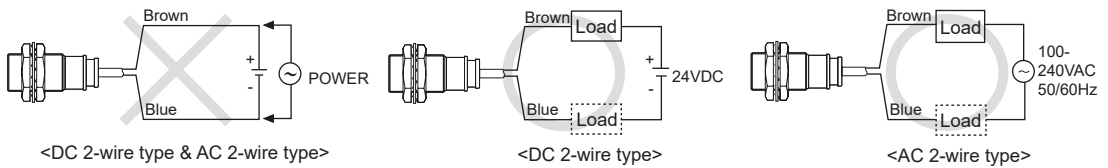
◎ AC 2-wire type



※No need to consider polarity for non-polarity type of power supply.

■ Proper Usage

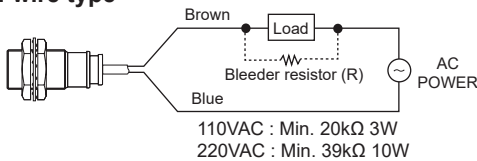
◎ Load connections



When using DC or AC 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

● AC 2-wire type



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.

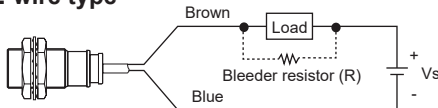
$$R \leq \frac{V_s}{I} \text{ (k}\Omega\text{)} \quad P > \frac{V_s^2}{R} \text{ (W)}$$

[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.

● DC 2-wire type

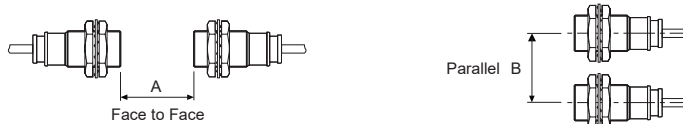


$$R \leq \frac{V_s}{I_o - I_{off}} \text{ (k}\Omega\text{)} \quad P > \frac{V_s^2}{R} \text{ (W)}$$

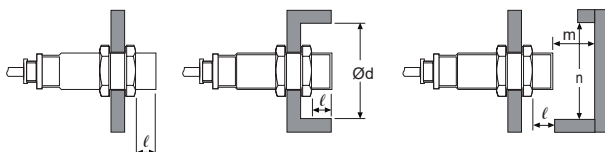
[Vs: Power supply, I_o: Min. action current of proximity sensor
I_{off}: Return current of load, P: Number of Bleeder resistance watt]

◎ Mutual-interference & Influence by surrounding metals

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



When sensors are mounted on metallic panel, you must prevent 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)



| Model | PRAT12-2D□ | PRAT18-5D□ | PRAT30-10D□ |
|-------|--------------------------|--------------------------|----------------------------|
| Item | PRAT12-2D□ PRAT12-2A□ | PRAT18-5D□ PRAT18-5A□ | PRAT30-10D□ PRAT30-10A□ |
| A | 12 | 30 | 60 |
| B | 24 | 36 | 60 |
| ℓ | 0 | 0 | 0 |
| Ød | 12 | 18 | 30 |
| m | 6 | 15 | 30 |
| n | 18 | 27 | 45 |

SENSORS

CONTROLLERS

MOTION DEVICES

SOFTWARE

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) LIDAR

(D) Door/Area Sensors

(E) Vision Sensors

(F) Proximity Sensors

(G) Pressure Sensors

(H) Rotary Encoders

(I) Connectors/
Connector Cables/
Sensor Distribution
Boxes/ Sockets