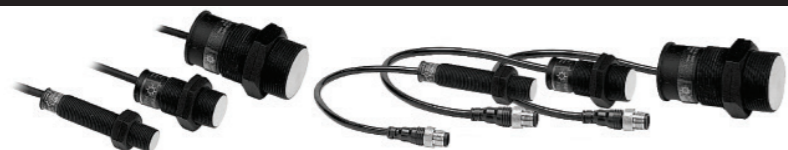


# Autonics INDUCTIVE PROXIMITY SENSOR (SPATTER RESISTANT TYPE) PRA SERIES INSTRUCTION MANUAL



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 fire, personal injury, or economic loss.
- Do not disassemble or modify the unit.**  
Failure to follow this instruction may result in electric shock or fire.
- Do not connect, repair, or inspect the unit while connected to a power source.**  
Failure to follow this instruction may result in electric shock or 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 electric shock or fire.
- Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**  
Failure to follow this instruction may result in fire or explosion.
- Do not supply power without load.**  
Failure to follow this instruction may result in fire or product damage.

## Ordering Information

|          |          |          |          |          |           |          |          |           |          |          |                             |   |
|----------|----------|----------|----------|----------|-----------|----------|----------|-----------|----------|----------|-----------------------------|---|
| <b>P</b> | <b>R</b> | <b>A</b> | <b>W</b> | <b>T</b> | <b>18</b> | <b>-</b> | <b>5</b> | <b>DO</b> | <b>-</b> | <b>I</b> | Standard/<br>Cable material |   |
|          |          |          |          |          |           |          |          |           |          |          | No mark                     | Standard cable                                    |
|          |          |          |          |          |           |          |          |           |          |          | I                           | EC standards model                                |
|          |          |          |          |          |           |          |          |           |          |          | V                           | Oil resistant cable                               |
|          |          |          |          |          |           |          |          |           |          |          | <b>DO</b>                   | DC 2-wire Normally Open(N.O.)                     |
|          |          |          |          |          |           |          |          |           |          |          | <b>DC</b>                   | DC 2-wire Normally Closed(N.C.)                   |
|          |          |          |          |          |           |          |          |           |          |          | <b>DN</b>                   | NPN Normally Open(N.O.)                           |
|          |          |          |          |          |           |          |          |           |          |          | <b>DN2</b>                  | NPN Normally Closed(N.C.)                         |
|          |          |          |          |          |           |          |          |           |          |          | <b>DP</b>                   | PNP Normally Open(N.O.)                           |
|          |          |          |          |          |           |          |          |           |          |          | <b>DP2</b>                  | PNP Normally Closed(N.C.)                         |
|          |          |          |          |          |           |          |          |           |          |          | <b>AO</b>                   | AC Normally Open(N.O.)                            |
|          |          |          |          |          |           |          |          |           |          |          | <b>AC</b>                   | AC Normally Closed(N.C.)                          |
|          |          |          |          |          |           |          |          |           |          |          | <b>XO</b>                   | DC 2-wire Non-polarity type Normally Open(N.O.)   |
|          |          |          |          |          |           |          |          |           |          |          | <b>XC</b>                   | DC 2-wire Non-polarity type Normally Closed(N.C.) |
|          |          |          |          |          |           |          |          |           |          |          | <b>Number</b>               | Standard sensing distance (unit: mm)              |
|          |          |          |          |          |           |          |          |           |          |          | <b>Number</b>               | Diameter of head (unit: mm)                       |
|          |          |          |          |          |           |          |          |           |          |          | No mark                     | DC 3-wire   |
|          |          |          |          |          |           |          |          |           |          |          | T                           | DC 2-wire   |
|          |          |          |          |          |           |          |          |           |          |          | No mark                     | Cable type  |
|          |          |          |          |          |           |          |          |           |          |          | W                           | Cable connector type                              |
|          |          |          |          |          |           |          |          |           |          |          | A                           | Spatter resistance type                           |
|          |          |          |          |          |           |          |          |           |          |          | R                           | Cylindrical type                                  |
|          |          |          |          |          |           |          |          |           |          |          | P                           | Inductive proximity sensor                        |

## Dimensions

| Type  | Cable type              | Cable connector type | Nut, Washer |      |
|-------|-------------------------|----------------------|-------------|------|
|       | PRA/PRAT(M12, M18, M30) | PRAWT(M12, M18, M30) |             |      |
| Flush | M12                     | M12×1                | 43          | 32   |
|       | M18                     | M18×1                | 47.5        | 35.8 |
|       | M30                     | M30×1.5              | 58.5        | 38.5 |

| Type    | A   | B     | C     | D   | F | G  | H  | J     |
|---------|-----|-------|-------|-----|---|----|----|-------|
| DC type | M12 | 2,000 | 2,000 | 300 | 4 | 17 | 21 | 2,000 |
|         | M18 | 2,000 | 2,000 | 300 | 5 | 24 | 29 | 2,000 |
|         | M30 | 2,000 | 2,000 | 300 | 5 | 35 | 42 | 2,000 |
| AC type | M12 | 2,000 | 2,000 | 300 | 4 | 17 | 21 | 2,000 |
|         | M18 | 2,000 | 2,000 | 300 | 5 | 24 | 29 | 2,000 |
|         | M30 | 2,000 | 2,000 | 300 | 5 | 35 | 42 | 2,000 |

※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                            | PRAT12-2-O<br>PRAT12-2-C<br>PRAT12-2-CV<br>PRAWT12-2-O<br>PRAWT12-2-C<br>PRAWT12-2-CV  | PRAT18-5-O<br>PRAT18-5-C<br>PRAT18-5-CV<br>PRAWT18-5-O<br>PRAWT18-5-C<br>PRAWT18-5-CV | PRAT30-10-O<br>PRAT30-10-C<br>PRAT30-10-CV<br>PRAWT30-10-O<br>PRAWT30-10-C<br>PRAWT30-10-CV | PRA12-2DN<br>PRA12-2DP<br>PRA12-2DN2<br>PRA12-2DP2                     | PRA18-5DN<br>PRA18-5DP<br>PRA18-5DN2<br>PRA18-5DP2 | PRA30-10DN<br>PRA30-10DP<br>PRA30-10DN2<br>PRA30-10DP2 | PRA12-2AO<br>PRA12-2AC            | PRA18-5AO<br>PRA18-5AC      | PRA30-10AO<br>PRA30-10AC    |                          |
|----------------------------------|--|---|---|--|--|--|-----------------------------------|-----------------------------|-----------------------------|--------------------------|
| Sensing distance                 | 2mm  | 5mm   | 10mm  | 2mm  | 5mm  | 10mm   | 2mm                               | 5mm                         | 10mm                        |                          |
| Hysteresis                       | Max. 10% of sensing distance   |   |   |  |  |  |                                   |                             |                             |                          |
| Standard sensing target          | 12×12×1mm (Iron)   | 18×18×1mm (Iron)  | 30×30×1mm (Iron)  | 12×12×1mm (Iron)   | 18×18×1mm (Iron)                                   | 30×30×1mm (Iron)                                       | 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  | 0 to 1.4mm   | 0 to 3.5mm   | 0 to 7mm   | 0 to 1.4mm                        | 0 to 3.5mm                  | 0 to 7mm                    |                          |
| Power supply (Operating voltage) | 12-24VDC (10-30VDC)  |   |   | 12-24VDC (10-30VDC)  |  |  | 100-240VAC ~ 50/60Hz (85-264VAC~) |                             |                             |                          |
| Current consumption              | —  |   |   | Max. 10mA  |  |  | —                                 |                             |                             |                          |
| Leakage current                  | Max. 0.6mA   |   |   | —  |  |  | Max. 2.5mA                        |                             |                             |                          |
| Response frequency <sup>※1</sup> | 1.5kHz   | 500Hz   | 400Hz   | 1.5kHz   | 500Hz  | 400Hz  | 20Hz                              | —                           | —                           |                          |
| Residual voltage <sup>※2</sup>   | Max. 3.5V(Non-polarity type is Max. 5V)  |   |   | Max. 1.5V  |  |  | Max. 10V                          |                             |                             |                          |
| Affection by Temp.               | Max. ±10% for sensing distance at ambient temperature 20°C   |   |   |  |  |  |                                   |                             |                             |                          |
| Control output                   | 2 to 100mA   |   |   | 200mA  |  |  | 5 to 150mA                        |                             |                             | 5 to 200mA               |
| Insulation resistance            | Over 50MΩ (at 500VDC megger)   |   |   |  |  |  |                                   |                             |                             |                          |
| Dielectric strength              | 1,500VAC 50/60Hz for 1 minute (between all terminals and case)   |   |   |  |  |  |                                   |                             |                             |                          |
| Vibration                        | 1mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z direction for 2 hours  |   |   |  |  |  |                                   |                             |                             |                          |
| Shock                            | 500m/s <sup>2</sup> (approx. 50G) X, Y, Z direction for 3 times  |   |   |  |  |  |                                   |                             |                             |                          |
| Indicator                        | Operation indicator (red LED)  |   |   |  |  |  |                                   |                             |                             |                          |
| Environment                      | Ambient temp. -25 to 70°C, Storage: -30 to 80°C<br>Ambient hum. 35 to 95%RH, Storage: 35 to 95%RH  |   |   |  |  |  |                                   |                             |                             |                          |
| Protection circuit               | Surge protection circuit, output short over current protection circuit   |   |   | Surge protection circuit, output short over current protection circuit |  |  | Surge protection circuit          |                             |                             | Surge protection circuit |
| Protection                       | IP67 (EC Standard)   |   |   |  |  |  |                                   |                             |                             |                          |
| Cable type <sup>※3</sup>         | Cable type   |   | Ø4mm, 2-wire, 2m  | Ø5mm, 2-wire, 2m   | Ø4mm, 3-wire, 2m                                   | Ø5mm, 3-wire, 2m                                       | Ø4mm, 2-wire, 2m                  | Ø5mm, 2-wire, 2m            | —                           |                          |
|                                  | Cable connector type   |   | AWG22, Core diameter: 0.08mm, Number of cores: 60, Insulator out diameter: Ø1.25mm          |  | —  |  | —                                 |                             | —                           |                          |
| Materials                        | 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) |   |   |  |  |  |                                   |                             |                             |                          |
| Insulation type                  | —  |   |   |  |  |  |                                   |                             |                             |                          |
| Approval                         | CE   |   |   |  |  |  |                                   |                             |                             |                          |
| Weight <sup>※4</sup>             | PRAT: Approx. 84g (approx. 72g)  | PRAT: Approx. 122g (approx. 110g)   | PRAT: Approx. 207g (approx. 170g)   | Approx. 84g (approx. 72g)  | Approx. 122g (approx. 110g)                        | Approx. 207g (approx. 170g)                            | 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: Before using non-polarity type, check the condition of connected device because residual voltage is 5V.  
 ※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: The weight with packaging and the weight in parenthesis is only unit weight. ※Environment resistance is rated at no freezing or condensation.

## Control Output Diagram & Load Operation

| DC-2-wire   | DC-3-wire NPN  | DC-3-wire PNP   | AC-2-wire       |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
|---|----------------|-----------------|-----------------|----------|----|-----|---------|-----|----|------|-----------|-----------|--------|----|-----|-------------------------------|----|-----|--|----------------|---------------|-----------------|----------|----|-----|---------|-----|----|--------------------|-----------|-----------|--------|----|-----|-----------------------------|---|---|---|----|-----|-------------------------------|----|-----|---|----------------|---------------|-----------------|----------|----|-----|---------|-----|----|-------------------|-----------|-----------|--------|----|-----|-----------------------------|---|---|---|----|-----|-------------------------------|----|-----|---|----------------|---------------|-----------------|----------|----|-----|---------|-----|----|------|-----------|-----------|--------|----|-----|-------------------------------|----|-----|
|   |                |                 |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
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| Sensing target  | Normally Open  | Normally Closed |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Presence  | ON             | OFF             |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Nothing   | OFF            | ON              |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Load  | Operation      | Operation       |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Return  | ON             | OFF             |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Operation indicator (Red LED)   | ON             | OFF             |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Sensing target  | Normally Open  | Normally Closed |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Presence  | ON             | OFF             |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Nothing   | OFF            | ON              |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Load (Brown-Black)  | Operation      | Operation       |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Return  | ON             | OFF             |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Output voltage (Black-Blue)   | H              | L               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| L   | ON             | OFF             |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Operation indicator (Red LED)   | ON             | OFF             |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Sensing target  | Normally Open  | Normally Closed |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Presence  | ON             | OFF             |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Nothing   | OFF            | ON              |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Load (Black-Blue)   | Operation      | Operation       |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Return  | ON             | OFF             |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Output voltage (Black-Blue)   | H              | L               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| L   | ON             | OFF             |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Operation indicator (Red LED)   | ON             | OFF             |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Sensing target  | Normally Open  | Normally Closed |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Presence  | ON             | OFF             |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Nothing   | OFF            | ON              |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Load  | Operation      | Operation       |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Return  | ON             | OFF             |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |
| Operation indicator (Red LED)   | ON             | OFF             |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |  |                |               |                 |          |    |     |         |     |    |                    |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |                   |           |           |        |    |     |                             |   |   |   |    |     |                               |    |     |   |                |               |                 |          |    |     |         |     |    |      |           |           |        |    |     |                               |    |     |

## Connections

| DC 2-wire standard type / AC 2-wire  | Connector connection for standard type model                            | Connector connection for IEC standards model |
|--------------------------------------|---|--|
|                                      |   |  |
| <p>※⓪, ② are not used terminals.</p> | <p>※⓪, ③ of N.O. type and ③, ④ of N.C. type are not used terminals.</p> |  |

## Power Supply Connection

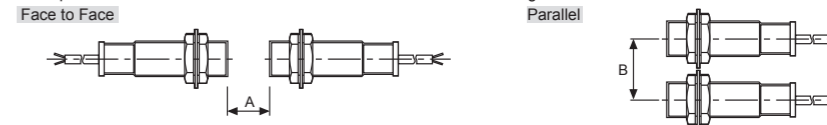
Be sure to connect the power after connecting the load, because direct connection of the proximity sensor may cause damage to the inner elements of this product.



## Mutual-interference & Influence by Surrounding Metals

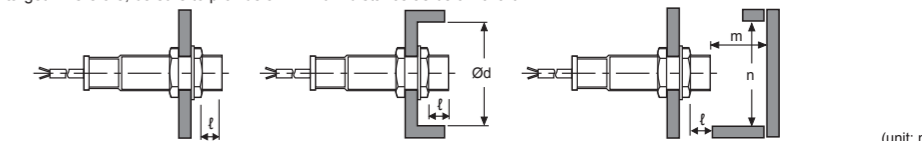
### Mutual-interference

When several proximity sensors are mounted closely, malfunction of sensor may be caused due to mutual interference. Therefore, be sure to provide a minimum distance between the two sensors with referring to the chart below.



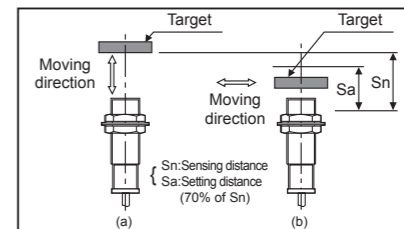
### Influence by surrounding metals

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.



| PRA□12-2□□ |    |    |    | PRA□18-5□□ |    |    |    | PRA□30-10□□ |    |    |    |
|------------|----|----|----|------------|----|----|----|-------------|----|----|----|
| A          | B  | Ød | ℓ  | A          | B  | Ød | ℓ  | A           | B  | Ød | ℓ  |
| 12         | 24 | m  | 0  | 30         | 36 | m  | 0  | 60          | 60 | m  | 0  |
| 12         | 18 | n  | 18 | 15         | 27 | n  | 27 | 30          | 30 | n  | 45 |

## 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).

• Setting distance(Sa) = Sensing distance(Sn) × 70%  
 E.g.) PRA30-10DN  
 Setting distance(Sa) = 10mm × 0.7 = 7mm

## Installation and Tightening Torque

When tightening the nut, use the provided washer as [Figure 1]. When installing the product, the tightening torque of the nut varies according to the distance from the fore-end.

The front part of the product is from the fore-end to the dimension on the below table, and the rear part is from the tip of the nut to the end of the product. [Figure 2]

In case the nut is torqued in the front part of the product, apply tightening torque for front part.

[Table 1] the allowable tightening torque table is for inserting the washer as [Figure 3].

| Model              | Strength | Front |         | Rear |          |
|--------------------|----------|-------|---------|------|----------|
|                    |          | Size  | Torque  | Size | Torque   |
| PRA12 Flush Series | Flush    | 13mm  | 6.37N m | 7mm  | 11.76N m |
| PRA18 Flush Series | Flush    | -     | 14.7N m | -    | 14.7N m  |
| PRA30 Flush Series | Flush    | 26mm  | 49N m   | 12mm | 78.4N m  |

## Caution 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 0.8 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.
  - ⓪ 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
- 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
- Temperature Controllers
- Temperature/Humidity Transducers
- SSRs/Power Controllers
- Counters
- Timers
- Panel Meters
- Tachometers/Pulse (Rate) Meters
- Display Units
- Sensor Controllers