

# CR Series

## Cylindrical, Capacitive type proximity sensor

### ■ Features

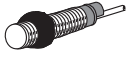

- Sensing of iron, metal, plastic, water, stone, wood etc.
- Long life cycle and high reliability
- DC type: Built-in surge protection circuit, reverse polarity protection circuit  
AC type: Built-in surge protection circuit
- Easy to adjust of the sensing distance with sensitivity adjuster
- Red LED operation indicator
- Easy to control of level and position



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


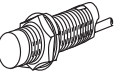
### ■ Type

#### ◎ DC 3-wire type

| Appearances   | Model        |
|---|--------------|
| M18  | CR18-8DN     |
|   | CR18-8DP     |
|   | CR18-8DN2 ※  |
| M30  | CR30-15DN    |
|   | CR30-15DP    |
|   | CR30-15DM2 ※ |

※ mark can be customized.

#### ◎ AC 2-wire type

| Appearances   | Model     |
|---|-----------|
| M18  | CR18-8AO  |
|   | CR18-8AC  |
| M30  | CR30-15AO |
|   | CR30-15AC |

### ■ Specifications

| Model                            | CR18-8DN<br>CR18-3DP<br>CR18-8DN2   | CR30-15DN<br>CR30-15DP<br>CR30-15DN2 | CR18-8AO<br>CR18-8AC                | CR30-15AO<br>CR30-15AC         |
|----------------------------------|---|--------------------------------------|-------------------------------------|--------------------------------|
| Sensing distance                 | 8mm   | 15mm                                 | 8mm                                 | 15mm                           |
| Hysteresis                       | Max. 20% of sensing distance  |                                      |                                     |                                |
| Standard sensing target          | 50×50×1mm (iron)  |                                      |                                     |                                |
| Setting distance                 | 0 to 5.6mm  | 0 to 10.5mm                          | 0 to 5.6mm                          | 0 to 10.5mm                    |
| Power supply (operating voltage) | 12-24VDC≒<br>(10-30VDC≒)  |                                      | 100-240VAC~ 50/60Hz<br>(85-264VAC~) |                                |
| Current consumption              | Max. 15mA   |                                      | —                                   |                                |
| Leakage current                  | —   |                                      | Max. 2.2mA                          |                                |
| Response frequency※1             | 50Hz  |                                      | 20Hz                                |                                |
| Residual voltage                 | Max. 1.5V   |                                      | Max. 20V                            |                                |
| Affection by Temp.               | Max. ±20% for sensing distance at ambient temperature 20°C  |                                      |                                     |                                |
| Control output                   | Max. 200mA  |                                      | 5 to 200mA                          |                                |
| Insulation resistance            | Over 50MΩ (at 500VDC megger)  |                                      |                                     |                                |
| Dielectric strength              | 1,500VAC 50/60Hz for 1minute  |                                      |                                     |                                |
| Vibration                        | 1mm amplitude at frequency of 10 to 55Hz (for 1 min) in each of X, Y, Z directions for 2 hours  |                                      |                                     |                                |
| Shock                            | 500m/s <sup>2</sup> (approx. 50G) in each of 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               | Reverse polarity protection circuit, Serge protection circuit   |                                      | Serge protection circuit            |                                |
| Protection structure             | IP66 (IEC standard)   | IP65 (IEC standard)                  | IP66 (IEC standard)                 | IP65 (IEC standard)            |
| Cable                            | Ø4mm, 3-wire, 2m  | Ø5mm, 3-wire, 2m                     | Ø4mm, 2-wire, 2m                    | Ø5mm, 2-wire, 2m               |
|                                  | AWG22, Core diameter: 0.08mm, Number of cores: 60, Insulator out diameter: Ø1.25mm  |                                      |                                     |                                |
| Material                         | CR18 - Case/Nut: PA6, Standard cable (black): Polyvinyl chloride (PVC)<br>CR30 - Case/Nut: Nickel plated brass, Washer: Nickel plated iron, Sensing surface: Polybutylene terephthalate, Standard cable (black): Polyvinyl chloride (PVC) |                                      |                                     |                                |
| Weight※2                         | Approx. 88g<br>(approx. 76g)  | Approx. 243g<br>(approx. 206g)       | Approx. 82g<br>(approx. 70g)        | Approx. 237g<br>(approx. 200g) |

※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.

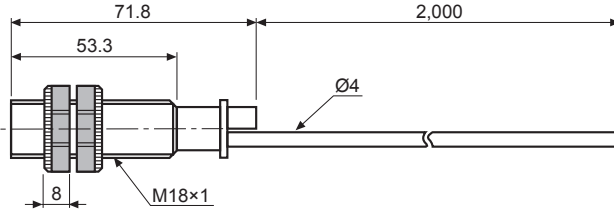
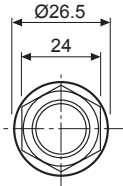
※Environment resistance is rated at no freezing or condensation.

# Cylindrical, Capacitive type

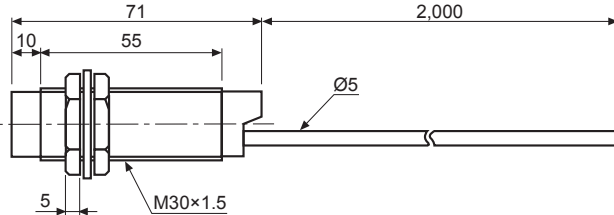
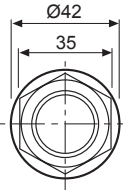
## ■ Dimensions

(unit: mm)

### ● CR18-8 □ □



### ● CR30-15 □ □

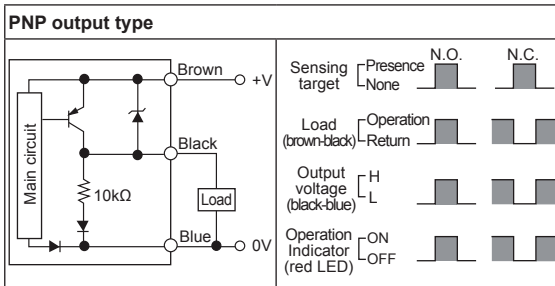
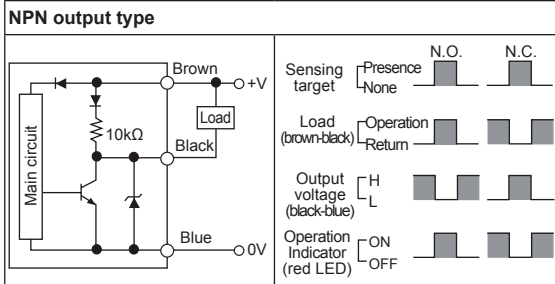


## ■ Control Output Diagram and Load Operation

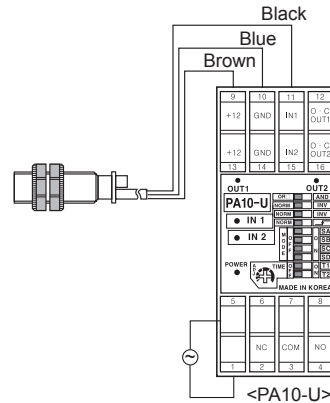
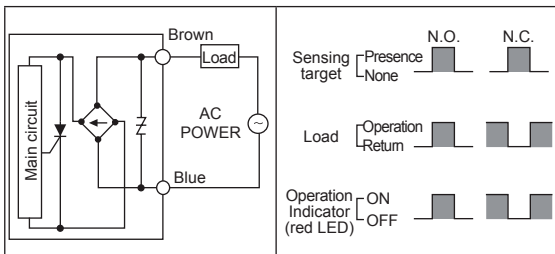
## ■ Connections

### ◎ DC 3-wire type

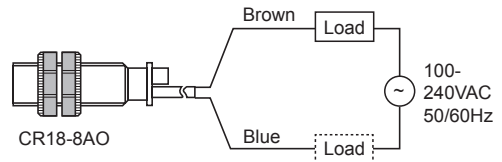
### ◎ DC 3-wire type



### ◎ AC 2-wire type



### ◎ AC 2-wire type



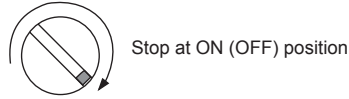
|     |   |
|-----|---|
| (A) | Photoelectric Sensors   |
| (B) | Fiber Optic Sensors   |
| (C) | Door/Area Sensors   |
| (D) | Proximity Sensors   |
| (E) | Pressure Sensors  |
| (F) | Rotary Encoders   |
| (G) | Connectors/ Connector Cables/ Sensor Distribution Boxes/Sockets |
| (H) | Temperature Controllers   |
| (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  |

# CR Series

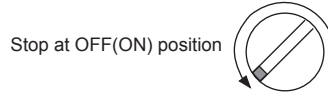
## ■ Sensitivity Adjustment

Please turn potention VR to set sensitivity as below procedure.

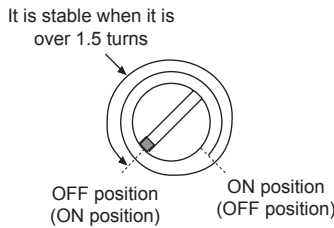
1. Without a sensing object, turn the potention VR to the right and stop at the proximity sensor is ON (OFF).



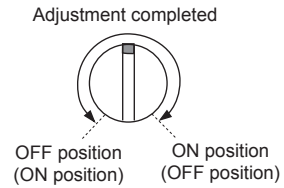
2. Put the object in right sensing position, turn the potention VR to the left and stop at the proximity sensor is OFF (ON).



3. If the difference of the number of potention VR rotation between the ON (OFF) point and the OFF (ON) point is more than 1.5 turns, the sensing operation will be stable.



4. If it is set in sensitivity adjustment position of potention VR at center between 1 and 2, sensitivity setting will be completed.



※When there is distance fluctuation between proximity sensor and the target, please adjust 2 at the farthest distance from this unit.

※Turning potention VR toward clockwise, it will be max., or turning toward counter clockwise, it will be min. The number of adjustment should be  $15 \pm 3$  revolution and if it is turned to the right or left excessively, it will not stop, but it idles without breakdown.

※( ) is for Normally closed type.

## ■ Grounding

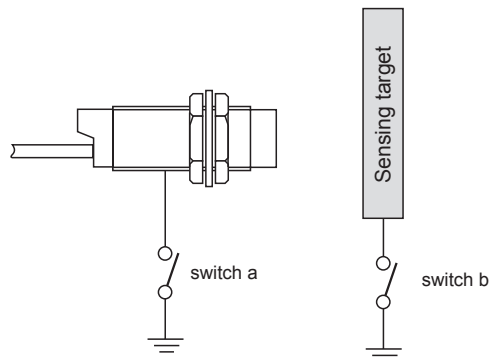
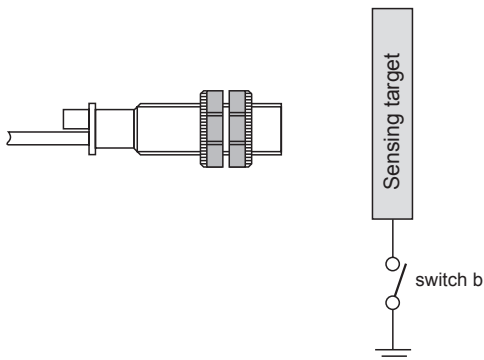
The sensing distance will be changed by grounding status of capacitive proximity sensor and the target[50×50×1mm(Iron)]. Please check the material when installing the sensor and selecting the target.

### ● CR18 type

|                             |    |     |
|-----------------------------|----|-----|
| Ground condition (switch b) | ON | OFF |
| Operating distance (mm)     | 8  | 4   |

### ● CR30 type

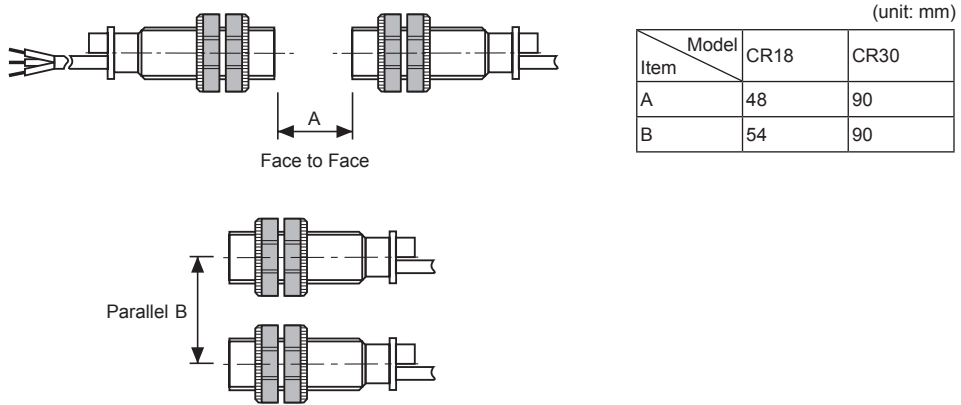
|                         |          |    |     |     |     |
|-------------------------|----------|----|-----|-----|-----|
| Ground condition        | Switch a | ON | OFF | ON  | OFF |
|                         | Switch b | ON | ON  | OFF | OFF |
| Operating distance (mm) |          | 15 | 18  | 6   | 6   |



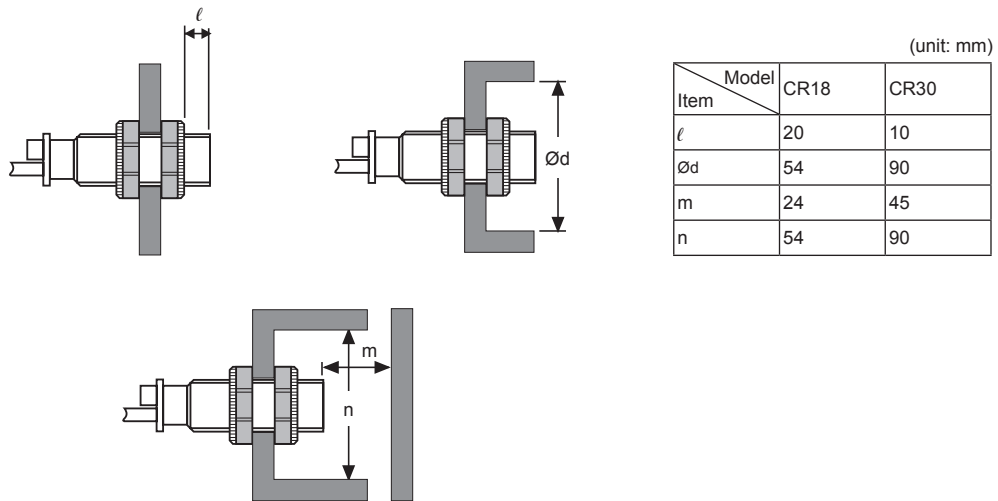
# Cylindrical, Capacitive type

## ■ Mutual-Interference & Influence by Surrounding Metals

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



When sensors are mounted on metallic panel, you must prevent the sensors from malfunction by any metallic object. Therefore, be sure to keep a minimum distance as below charts.



## ■ Materials

### ◎ Materials of sensing targets

Sensing distance may be different by electrical characteristic of sensing target (conductivity, non dielectric constant) and status of water absorption, size etc.

### ◎ Effect by high frequency electrical field

It may cause malfunction by machinery which generate high frequency of electrical field such as a washing machine etc.

### ◎ Surrounding environment

There is water or oil on surface of sensing part, it may cause malfunction.

If the bottle for sensing of level is coated by oil etc., it may cause malfunction.

Especially, 15mm type has high sensitivity for induced objects, please be careful of waterdrops.

### ◎ Organic solvents

Do not let the oil or oil liquid is flowed into the sensor because the case is made by plastic.

- (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
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