

# Cylindrical Capacitive Proximity Sensors

## CP Series (AC 2-wire)

PRODUCT MANUAL

**For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.**

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

## Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

**⚠ Warning** Failure to follow instructions may result in serious injury or death.

**01. 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 personal injury, economic loss or fire.

**02. Do not use or store the unit in the place where flammable / explosive / corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.**
Failure to follow this instruction may result in explosion or fire.

**03. Do not disassemble or modify the unit.**
Failure to follow this instruction may result in fire.

**04. Do not connect, repair, or inspect the unit while connected to a power source.**
Failure to follow this instruction may result in fire.

**05. Check 'Connections' before wiring.**
Failure to follow this instruction may result in fire.

**⚠ Caution** Failure to follow instructions may result in injury or product damage.

**01. Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.

**02. Use a dry cloth to clean the unit, and do not use water or organic solvent.**
Failure to follow this instruction may result in fire.

**03. Do not supply power without load.**
Failure to follow this instruction may result in fire or product damage.

## Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- 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.
- Do not connect capacitive load to the output terminal directly.
- This unit may be used in the following environments.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude max. 2,000 m
  - Pollution degree 2
  - Installation category II

## Cautions for Installation

- Install the unit correctly with the usage environment, location, and the designated specifications.
- When the product is installed in an embedded (flush-mounted) configuration, the detection distance may differ from the rated value, or malfunction may occur.
- The waterproof function may be damaged if the product is subjected to impact from a hard object or bent excessively or repeatedly.
- Do NOT pull the Ø 4 mm cable with a tensile strength of 30 N or over.
  It may result in fire due to the broken wire.
- When extending wire, use AWG 22 cable or over within 200 m.

CE UK CA

## Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

CP ❶ ❷ - ❸ ❹ ❺ - ❻

**❶ Connection**
No mark: Cable type
CM: Connector type

**❷ DIA. of sensing side**
Number: DIA. of sensing side (unit: mm)

**❸ Sensing distance**
Number: Sensing distance (unit: mm)

**❹ Power supply**
A: 110 - 220 VAC

**❺ Control output**
O: Normally Open
C: Normally Closed

**❻ Cable**
No mark: Standard type
V: Oil Resistant cable type

## Product Components

- Product × 1
- Nut × 2
- Instruction manual × 1
- Adjustment screwdriver × 1

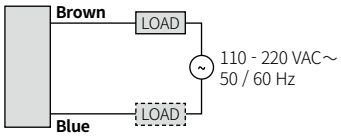
## Sold Separately

- M12 Connector cable: C□A(H)2-□

## Connections

- LOAD can be wired to any direction.
- Connect LOAD before supplying the power.

### ■ Cable type



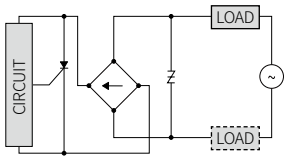

### ■ Connector type

- For LOAD connection, follow the cable type connection.
- Fasten the connector along the thread. (tightening torque: 0.39 to 0.49 N m)
- Fasten the vibration part with PTFE tape.

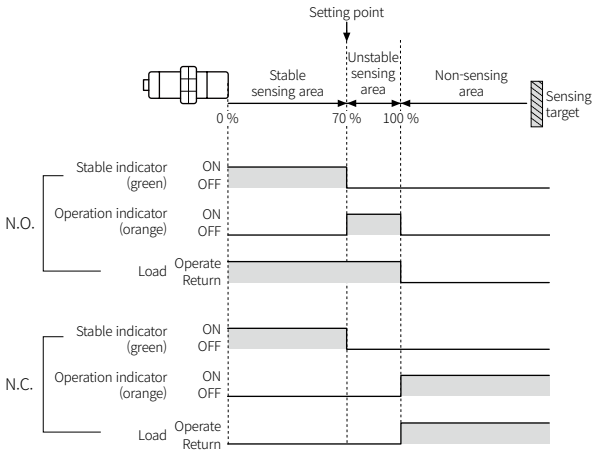



| Pin | Color | Function |
|---|---|---|
| ① | - | - |
| ② | - | - |
| ③ | Blue | 110 - 220 VAC∼ 50 / 60 Hz |
| ④ | Brown | |

### ■ Inner circuit



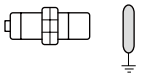

## Operation Timing Chart




## Grounding

The sensing distance may vary depending on the grounding status.
Adjust the sensitivity according to the usage environment.

- Use the sensor with the sensing target grounded. If it is not grounded, the sensing distance may be shortened due to a small induced electric charge.



## Specifications

| Installation | Non-flush type | |
|---|---|---|
| **Model** | **CP□18-15A□-□** | **CP□30-25A□-□** |
| **DIA. of sensing side** | Ø 18 mm | Ø 30 mm |
| **Sensing distance** | 15 mm | 25 mm |
| **Setting distance**[01] | 0 to 10.5 mm | 0 to 17.5 mm |
| **Hysteresis** | ≤ 20 % of sensing distance | |
| **Standard sensing target: iron**[02] | 45 × 45 × 1 mm | 75 × 75 × 1 mm |
| **Response frequency**[03] | 25 Hz | |
| **Affection by temperature** | ≤ ± 20 % for sensing distance at ambient temperature 20 °C | |
| **Indicator** | Operation indicator (orange), stable indicator (green) | |
| **Certification** | CE UKCA | CE UKCA |

01) Use the device within the range where the stable indicator (green) is ON.
02) Based on grounding status of the standard target.
03) 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.

| Unit weight (package) | Ø 18 mm | Ø 30 mm |
|---|---|---|
| **Cable type** | ≈ 72 g (≈ 88 g) | ≈ 92 g (≈ 112 g) |
| **Connector type** | ≈ 18 g (≈ 36 g) | ≈ 38 g (≈ 60 g) |

| | |
|---|---|
| **Power supply** | 110 -220 VAC∼ 50 / 60 Hz, operating voltage: 100 - 240 VAC∼ |
| **Leakage current** | ≤ 3 mA |
| **Control output** | ≤ 5 to 100 mA |
| **Residual voltage** | ≤ 20 VAC∼ |
| **Protection circuit** | Surge protection circuit |
| **Insulation resistance** | ≥ 50 MΩ (500 VDC⎓ megger) |
| **Dielectric strength** | Between the charging part and the case<br>: 1,500 VAC∼ 50 / 60 Hz for 1 min |
| **Vibration** | 1.5 mm double amplitude at frequency 10 to 55 Hz each X, Y, Z direction for 2 hours |
| **Shock** | 500 m/s² (≈ 50 G) in each X, Y, Z direction for 3 times |
| **Ambient temp.** | -25 to 70 °C, storage: -30 to 80 °C (no freezing or condensation) |
| **Ambient humi.** | 35 to 95 %RH, storage: 35 to 95 %RH (no freezing or condensation) |
| **Protection structure** | IP67 (IEC standard) |
| **Connection** | Cable / Connector type models |
| **Cable spec.** | Ø 4 mm, 2-wire, 2 m |
| **Wire spec.** | AWG 23 (0.08 mm, 60-core), insulator diameter: Ø 1.28 mm |
| **Connector spec.** | M12 plug connector |
| **Material** | Case / Nut: PBT (DIA. of sensing side Ø 18 mm nut: PA6),<br>Standard type cable (black): polyvinyl chloride (PVC),<br>Oil resistant cable type cable (gray): polyvinyl chloride (oil resistant PVC) |

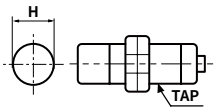
## Sensitivity Adjustment

- The sensitivity adjustment volume increases sensitivity when turned to the right, and decreases sensitivity when turned to the left.
- The sensitivity adjustment is available from 30 % (min.) to 150 % (max.) of the rated sensing distance.
  If the sensitivity is at min. or max., the green LED flashes 5 times at 0.1 sec intervals.
- The number of valid rotation is 20±3 times for adjustment.
  The adjustment volume does not stop and just spins idle even after being turned more than the adjustment number of times.
- Use the offered adjustment screwdriver. Do NOT turn with excessive force to prevent product damage.
- ( ) is for Normally closed type.

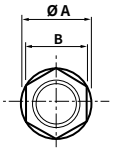
| Procedure | Description | |
|---|---|---|
| 1 | <br>Stop at OFF (ON) position | Put the object in right sensing position, turn the sensitivity adjustment volume slowly to the left and stop at the point proximity sensor is OFF (ON). |
| 2 | <br>Stop at ON (OFF) position | With the sensing object present, turn the sensitivity adjustment volume slowly to the right and stop at the point proximity sensor is ON (OFF). |

## Cut-out Dimensions

• Unit: mm, Refer to the dimensions in the product manual or on the Autonics website.




| | Ø 18 mm | Ø 30 mm |
|---|---|---|
| Mounting hole (H) | Ø 18.5 $^{+0.5}_{0}$ | Ø 30.5 $^{+0.5}_{0}$ |
| TAP | M18×1 | M30×1.5 |

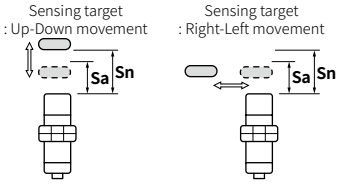



| | Ø 18 mm | Ø 30 mm |
|---|---|---|
| Ø A | 26.5 | 39 |
| B | 24 | 36 |

## Setting Distance Formula

Detecting distance can be changed by the shape, size or material of the target. For stable sensing, install the unit within the 70% of sensing distance.

**Setting distance (Sa)**
**= Sensing distance (Sn) × 70%**

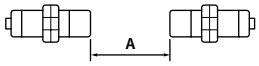



## Mutual-interference & Influence by Surrounding Metals

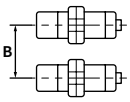
### ■ Mutual-interference

When plural proximity sensors are mounted in a close row, malfunction of sensor may be caused due to mutual interference.
Therefore, be sure to maintain at least the minimum distances specified in the table below.

[Face to Face]

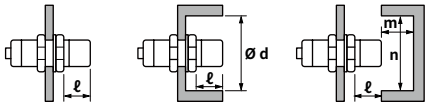



[Parallel]




### ■ Influence by surrounding metals

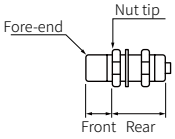
When sensors are mounted on metallic panel, it must be prevented sensors from being affected by any metallic object except target for preventing malfunction of long sensing distance or return error. Therefore, be sure to provide a minimum distance as below chart. If the detection distance increases during installation, adjust the sensitivity accordingly.




(unit: mm)

| Item \ Sensing side | Ø 18 mm | Ø 30 mm |
|---|---|---|
| A | 45 | 75 |
| B | 36 | 60 |
| ℓ | 18 | 20 |
| Ø d | 54 | 90 |
| m | 45 | 75 |
| n | 36 | 90 |

## Tightening Torque



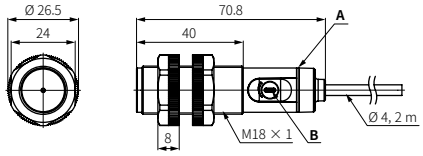

| Strength \ Sensing side | Ø 18 mm | Ø 30 mm |
|---|---|---|
| Front / Rear torque | 2 N m | 7 N m |

## Dimensions

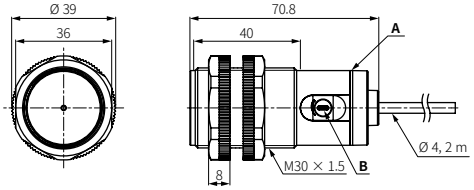
• Unit: mm, For the detailed drawings, follow the Autonics website.
• The indicator operates by detection state. Refer to the 'Specification' for details.

| A | Indicator | B | Sensitivity adjustment volume |
|---|---|---|---|

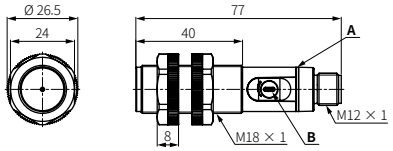
• CP18-15AO
• CP18-15AC
• CP18-15AO-V
• CP18-15AC-V



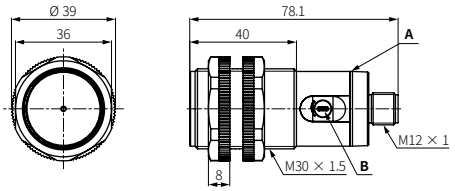

• CP30-25AO
• CP30-25AC
• CP30-25AO-V
• CP30-25AC-V




• CPCM18-15AO
• CPCM18-15AC




• CPCM30-25AO
• CPCM30-25AC




## Sold Separately: M12 Connector Cable

• For detailed information, refer to the 'M8/M12 Connector Cable' manual.

| Appearance | Power | Connector 1 | Connector 2 | Length | Feature | Model |
|---|---|---|---|---|---|---|
|  | AC | M12 (Socket-Female) 4-pin | 2-wire | 2 m | PVC | CIA2-2 |
| | | | | 5 m | | CIA2-5 |
|  | AC | M12 (Socket-Female) 4-pin | 2-wire | 2 m | Oil resistant PVC | CIAH2-2 |
| | | | | 5 m | | CIAH2-5 |
|  | AC | M12 (Socket-Female) 4-pin, L type | 2-wire | 2 m | PVC | CLA2-2 |
| | | | | 3 m | | CLA2-3 |
| | | | | 5 m | | CLA2-5 |
|  | AC | M12 (Socket-Female) 4-pin, L type | 2-wire | 2 m | Oil resistant PVC | CLAH2-2 |
| | | | | 5 m | | CLAH2-5 |

18, Bansong-ro 513Beon-gil, Haeundae-gu, Busan, Republic of Korea, 48002
**www.autonics.com | +82-2-2048-1577 | sales@autonics.com**

Autonics