

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

P	R	A	W	T	18	-	5	DO	-	I
Item	Shape	Feature	Connection	Dimension	Sensing distance	Output type	Cable type	No mark	Standard cable	
								I	Standard cable(IEC standards model)	
								DO	DC 2-wire Normally Open(N.O.)	
								DC	DC 2-wire Normally Closed(N.C.)	
								DN	NPN Normally Open(N.O.)	
								DN2	NPN Normally Closed(N.C.)	
								DP	PNP Normally Open(N.O.)	
								DP2	PNP Normally Closed(N.C.)	
								AO	AC Normally Open(N.O.)	
								AC	AC Normally Closed(N.C.)	
								XO	DC 2-wire Non-polarity type Normally Open(N.O.)	
								XC	DC 2-wire Non-polarity type Normally Closed(N.C.)	
								Number	Standard sensing distance(Unit: mm)	
								Number	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	4	4	17	21
	M18	M18×1	47.5	29.5	4	5	24	29
	M30	M30×1.5	58.5	38.5	5	5	35	42
AC	M12	M12×1	60	49	4	4	17	21
	M18	M18×1	53.8	35.8	4	5	24	29
	M30	M30×1.5	58.5	38.5	5	5	35	42

Type	Cable type	A	B	C	D	F	G	H	J
DC type	M12	PRA PRAT PRAWT	M12×1	43	32	4	4	17	21
	M18	PRA PRAT PRAWT	M18×1	47.5	29.5	4	5	24	29
	M30	PRA PRAT PRAWT	M30×1.5	58.5	38.5	5	5	35	42
AC type	M12	PRA	M12×1	60	49	4	4	17	21
	M18	PRA	M18×1	53.8	35.8	4	5	24	29
	M30	PRA	M30×1.5	58.5	38.5	5	5	35	42

※ 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	PRA12-2-O PRA12-2-C PRAW12-2-O PRAW12-2-C PRAW12-2-O-I PRAW12-2-C-I	PRAT18-5-O PRAT18-5-C PRAW18-5-O PRAW18-5-C PRAW18-5-O-I PRAW18-5-C-I	PRAT30-10-O PRAT30-10-C PRAW30-10-O PRAW30-10-C PRAW30-10-O-I PRAW30-10-C-I	PRA12-2DN PRA12-2DP PRA12-2DN2 PRA12-2DP2	PRA18-5DN PRA18-5DP PRA18-5DN2 PRA18-5DP2	PRA30-10DN PRA30-10DP PRA30-10DN2 PRA30-10DP2	PRA12-2AO PRA12-2AC	PRA18-5AO PRA18-5AC	PRA30-10AO 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	1.5kHz	500Hz	400Hz	1.5kHz	500Hz	400Hz	—		
Residual voltage	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	Min. 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 directions for 2 hours								
Shock	500m/s ² (approx. 50G) X, Y, Z directions for 3 times								
Indicator	Operation indicator (Red LED)								
Environ. Ambient temp.	-25 to 70°C, Storage: -30 to 80°C								
Environ. Ambient humi.	35 to 95%RH, Storage: 35 to 95%RH								
Protection circuit	Surge protection circuit, Overload & Short protection circuit			Surge protection circuit, Overload & Short protection circuit, Reverse polarity protection circuit			Surge protection circuit		
Protection	IP67(IEC Standards)								
Cable type	Ø4mm, 2-wire, 2m		Ø5mm, 2-wire, 2m		Ø4mm, 3-wire, 2m		Ø5mm, 3-wire, 2m		Ø4mm, 2-wire, 2m
	AWG22, Core diameter: 0.08mm, Number of cores: 60, Insulator out diameter: Ø1.25mm		—		—		—		Ø5mm, 2-wire, 2m
Cable connector type	Ø4mm, 2-wire, 300mm, M12 connector		Ø5mm, 2-wire, 300mm, M12 connector		—		—		—
	AWG22, Core diameter: 0.08mm, Number of cores: 60, Insulator out diameter: Ø1.25mm		—		—		—		—
Materials	Case/Nut: Teflon coated Brass, Washer: Teflon coated Iron, Sensing surface: Teflon, 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	PRA12: Approx. 84g (Approx. 72g)	PRAT18: Approx. 122g (Approx. 110g)	PRAT30: Approx. 207g (Approx. 170g)	PRA12: Approx. 84g (Approx. 72g)	PRA18: Approx. 122g (Approx. 110g)	PRA30: Approx. 207g (Approx. 170g)	PRA12-2AO: Approx. 78g (Approx. 66g)	PRA18-5AO: Approx. 118g (Approx. 106g)	PRA30-10AO: Approx. 207g (Approx. 170g)
	PRAW12: Approx. 54g (Approx. 42g)	PRAW18: Approx. 70g (Approx. 58g)	PRAW30: Approx. 134g (Approx. 122g)	PRAW12-2AO: Approx. 78g (Approx. 66g)	PRAW18-5AO: Approx. 118g (Approx. 106g)	PRAW30-10AO: 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 parentheses is only unit weight. ※Environment resistance is rated at no freezing or condensation.								

■ Control Output Diagram & Load Operation

DC-2wire	DC-3wire	DC-2wire	AC-2wire
Normally Open	Normally Open	Normally Open	Normally Open
Normally Closed	Normally Closed	Normally Closed	Normally Closed
Sensing target	Presence Nothing	Presence Nothing	Presence Nothing
Load	Operation Return	Operation Return	Operation Return
Operation indicator (Red LED)	ON OFF	ON OFF	ON OFF

■ Connections

DC 2-wire standard type / AC 2-wire	Connector connection for standard type model	Connector connection for IEC standards model
<DC 2-wire type>	Brown Load +V	Brown Load +V
	Blue Load 0V	Blue Load 0V
<AC 2-wire type>	Brown Load +V	Brown Load +V
	Blue Load 0V	Blue Load 0V

■ Power Supply Connection

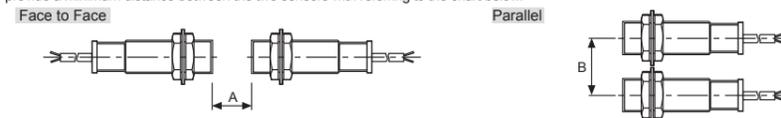
Be sure to connect the power after connecting the load, because direct connection of the proximity sensor may cause damage to the inner elements of this product.



■ Mutual-interference & Influence by Surrounding Metals

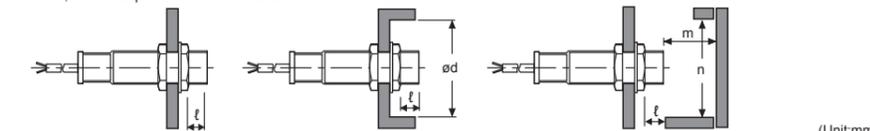
① Mutual-interference

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.



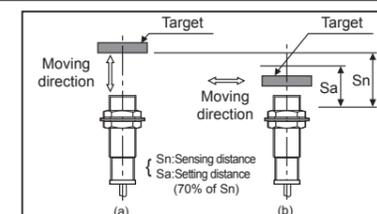
② Influence by surrounding metals

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.



PRA12-2□□	PRA18-5□□	PRA30-10□□
A 12	A 30	A 60
B 24	B 36	B 60
ℓ 0	ℓ 0	ℓ 0

■ 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 placed 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 Series	Flush	13mm	6.37N·m	11.76N·m	
	Non-Flush	7mm			
PRA18 Series	Flush	-	14.7N·m	14.7N·m	
	Non-Flush	-			
PRA30 Series	Flush	26mm	49N·m	78.4N·m	
	Non-Flush	12mm			

■ 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.
 - Ⓞ 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

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