

Autonics

INDUCTIVE PROXIMITY SENSOR
(SPATTER RESISTANT TYPE)
PRA SERIES

M A N U A L



Thank you very much for selecting Autonics products.
For your safety, please read the following before using.

Caution for your safety

※Please keep these instructions and review them before using this unit.

※Please observe the cautions that follow;

⚠Warning Serious injury may result if instructions are not followed.

⚠Caution Product may be damaged, or injury may result if instructions are not followed.

※The following is an explanation of the symbols used in the operation manual.

⚠Caution: Injury or danger may occur under special conditions.

Warning

1. In case of using this unit with machinery(Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device.

It may cause a fire, human injury or damage to property.

2. Do not connect power directly without load.

It may cause damage to inner components or burn them out.

Caution

1. Do not use this unit in place where there are flammable, explosive gas, chemical or strong alkalis, acids.

It may cause a fire or explosion.

2. Do not impact on this unit.

It may cause malfunction or damage to the product.

3. Do not apply AC power and observe the rated specifications.

It may cause serious damage to the product.

Ordering information

P R A W T 18 - 5 DO - I

Cable type	No mark	Standard cable
	I	Standard cable(IEC standards model)
Output type	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.)
Sensing distance	Number	Standard sensing distance(Unit: mm)
	Number	Diameter of head(mm)
Dimension	No mark	DC 3-wire
	T	DC 2-wire
Connection	No mark	Cable outgoing type
	W	cable outgoing connector type
Feature	A	Spatter resistance type
	R	Cylindrical type
Shape	P	Inductive proximity sensor

Dimensions

Type	Cable outgoing type	Cable outgoing connector type	Nut, Washer
	PRA/PRAT(M12, M18, M30)	PRAWT(M12, M18, M30)	
Flush			

Type		A	B	C	D	F	G	H	J
DC type	M12	PRA	M12×1	43	32	4	17	21	2,000
		PRAT							2,000
		PRAWT							300
	M18	PRA	M18×1	47.5	29.5	4	24	29	2,000
		PRAT							2,000
		PRAWT							300
AC type	M30	PRA	M30×1.5	58.5	38.5	5	35	42	2,000
		PRAT							2,000
		PRAWT							300
	M12	PRA	M12×1	60	49	4	17	21	2,000
		PRAT							2,000
		PRAWT							300
AC type	M18	PRA	M18×1	53.8	35.8	4	5	24	2,000
	M30	PRA	M30×1.5	58.5	38.5	5	5	35	42
	M30	PRA	M30×1.5	58.5	38.5	5	5	35	42

※"J" type standard: Cable outgoing type/2,000mm, Cable outgoing connector type/300mm

※The above specifications are subject to change and some models may be discontinued without notice.

Specifications

Model	PRAT12-2┐ PRAT12-2┘ PRAWT12-2┐ PRAWT12-2┘ PRAT18-5┐ PRAT18-5┘ PRAWT18-5┐ PRAWT18-5┘ PRAT30-10┐ PRAT30-10┘ PRAWT30-10┐ PRAWT30-10┘ PRAT12-2DN PRAT12-2DP PRAWT12-2DN PRAWT12-2DP┐ PRAT18-5DN PRAT18-5DP PRAWT18-5DN PRAWT18-5DP┐ PRAT30-10DN PRAT30-10DP PRAWT30-10DN PRAWT30-10DP┐ PRA12-2AO PRA12-2AC PRA18-5AO PRA18-5AC PRA30-10AO PRA30-10AC	PRAT18-5┐ PRAT18-5┘ PRAWT18-5┐ PRAWT18-5┘ PRAT30-10┐ PRAT30-10┘ PRAWT30-10┐ PRAWT30-10┘ PRAT12-2DN PRAT12-2DP PRAWT12-2DN PRAWT12-2DP┐ PRAT18-5DN PRAT18-5DP PRAWT18-5DN PRAWT18-5DP┐ PRAT30-10DN PRAT30-10DP PRAWT30-10DN PRAWT30-10DP┐ PRA12-2AO PRA12-2AC PRA18-5AO PRA18-5AC PRA30-10AO PRA30-10AC	PRAT30-10┐ PRAT30-10┘ PRAWT30-10┐ PRAWT30-10┘ PRAT12-2DN PRAT12-2DP PRAWT12-2DN PRAWT12-2DP┐ PRAT18-5DN PRAT18-5DP PRAWT18-5DN PRAWT18-5DP┐ PRAT30-10DN PRAT30-10DP PRAWT30-10DN PRAWT30-10DP┐ PRA12-2AO PRA12-2AC PRA18-5AO PRA18-5AC PRA30-10AO PRA30-10AC	PRAT12-2DN PRAT12-2DP PRAWT12-2DN PRAWT12-2DP┐ PRAT18-5DN PRAT18-5DP PRAWT18-5DN PRAWT18-5DP┐ PRAT30-10DN PRAT30-10DP PRAWT30-10DN PRAWT30-10DP┐ PRA12-2AO PRA12-2AC PRA18-5AO PRA18-5AC PRA30-10AO PRA30-10AC	PRAT18-5DN PRAT18-5DP PRAWT18-5DN PRAWT18-5DP┐ PRAT30-10DN PRAT30-10DP PRAWT30-10DN PRAWT30-10DP┐ PRA12-2AO PRA12-2AC PRA18-5AO PRA18-5AC PRA30-10AO PRA30-10AC	PRAT30-10DN PRAT30-10DP PRAWT30-10DN PRAWT30-10DP┐ PRA12-2AO PRA12-2AC PRA18-5AO PRA18-5AC PRA30-10AO PRA30-10AC	PRAT12-2DN PRAT12-2DP PRAWT12-2DN PRAWT12-2DP┐ PRAT18-5DN PRAT18-5DP PRAWT18-5DN PRAWT18-5DP┐ PRAT30-10DN PRAT30-10DP PRAWT30-10DN PRAWT30-10DP┐ PRA12-2AO PRA12-2AC PRA18-5AO PRA18-5AC PRA30-10AO PRA30-10AC	PRAT18-5DN PRAT18-5DP PRAWT18-5DN PRAWT18-5DP┐ PRAT30-10DN PRAT30-10DP PRAWT30-10DN PRAWT30-10DP┐ PRA12-2AO PRA12-2AC PRA18-5AO PRA18-5AC PRA30-10AO PRA30-10AC	PRAT30-10DN PRAT30-10DP PRAWT30-10DN PRAWT30-10DP┐ 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)			100-240VA 50/60Hz(85-264VAC)			
Current consumption	-			Max. 10mA			-			
Leakage current	Max. 0.6mA			-			Max. 2.5mA			
Response frequency ^{※1}	1.5kHz	500Hz	400Hz	1.5kHz	500Hz	400Hz	20Hz			
Residual voltage ^{※2}	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 (50G) X, Y, Z directions for 3 times									
Indicator	Operating indicator(red LED)									
Environment	Ambient temperature -25 to 70°C, Storage: -30 to 80°C									
	Ambient humidity 35 to 95%RH, Storage: 35 to 95%RH									
Protection circuit	Surge protection circuit, Overload & Short protection circuit			Surge protection circuit, Overload & Short protection circuit Reverse polarity protection circuit			Surge protection circuit			
Protection	IP67(IEC Standards)									
Cable	PRA(T) Ø4, 2-wire, 2m Ø5, 2-wire, 2m (AWG22, Core diameter: 0.08mm, Number of cores: 60, Insulator out diameter: Ø1.25mm)			Ø4, 3-wire, 2m Ø5, 3-wire, 2m			Ø4, 2-wire, 2m Ø5, 2-wire, 2m			
	PRAWT Ø4, 2-wire, 300mm M12 connector Ø5, 2-wire, 300mm, M12 connector			-						
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									
Unit weight	PRAT: Approx. 84g (Approx. 72g) PRAWT: Approx. 54g (Approx. 42g)	PRAT: Approx. 122g (Approx. 110g) PRAWT: Approx. 70g (Approx. 58g)	PRAT: Approx. 207g (Approx. 170g) PRAWT: Approx. 134g (Approx. 122g)	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: 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			Sensing target	Normally Open	Normally Closed
				Presence Nothing	Presence Nothing
DC-3wire	NPN		Load (Brown-Black)	Operation Return	Operation Return
			Output voltage (Black-Blue)	H L	H L
			Operating Indicator (red LED)	ON OFF	ON OFF
	PNP		Sensing target	Normally Open	Normally Closed
			Load (Black-Blue)	Operation Return	Operation Return
			Output voltage (Black-Blue)	H L	H L
AC-2wire			Sensing target	Normally Open	Normally Closed
			Load	Operation Return	Operation Return
			Operating Indicator (red LED)	ON OFF	ON OFF

Connections

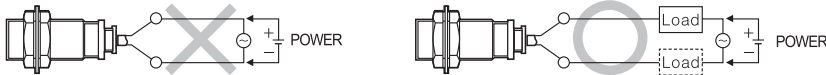
DC 2-wire standard type / AC 2-wire	Connector connection for standard type model	Connector connection for IEC standards model
<DC 2-wire type> 		
<AC 2-wire type> 		

※Load can be wired to any direction.

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

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.

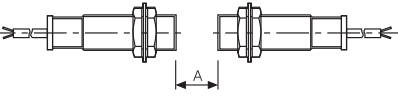


Mutual-interference & Influence by surrounding metals

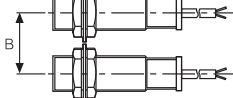
ⓂMutual- interference

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.

Face to Face

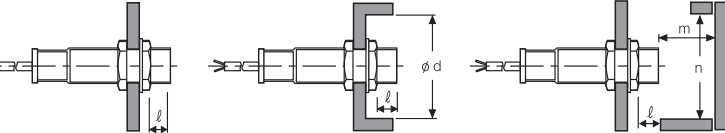


Parallel



ⓂInfluence by surrounding metals

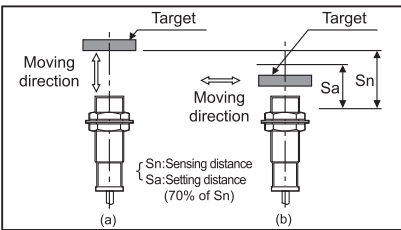
When sensors are mounted on metallic panel, it is required to protect the sensors from being affected by any metallic object except target. Therefore, be sure to provide a minimum distance as below chart.



(Unit:mm)

PRA□12-2□□				PRA□18-5□□				PRA□30-10□□			
A	12	ød	12	A	30	ød	18	A	60	ød	30
B	24	m	6	B	36	m	15	B	60	m	30
ℓ	0	n	18	ℓ	0	n	27	ℓ	0	n	45

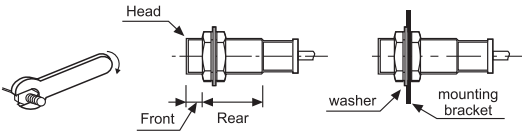
Setting distance



- 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%
Ex)PRA30-10DN
Setting distance(Sa) = 10mm × 0.7 = 7mm

Caution for using

1. This equipment shall not be used outdoors or beyond specified temperature range.
2. Do not apply over tensile strength of cord. (ø4: 30N max., ø5: 50N max.)
3. Do not use the same conduit with cord of this unit and electric power line or power line.
4. Do not put overload to tighten nut, please use the supplied washer for tightening.



[Figure 1]

[Figure 2]

Note1) Allowable tightening torque of a nut may be different by the distance from the head. For allowable tightening torque and the range of front and rear parts, refer to [Table 1] and above [Figure 1] respectively. The rear part includes a nut on the head side(see above [Figure 1]). Please apply a tightening torque of the front part when the nut on the front is located in the front part.

Note2)The allowable tightening torque denotes a torque value when using a provided washer as above [Figure 2].

5. Please check the voltage changes of power source in order not to excess rating power input.
6. Do not use this unit during transient time(80ms) after apply power.
7. It might result in damage to this product, if use automatic transformer. So please use insulated transformer.
8. Please make wire as short as possible