Autonics

INDUCTIVE PROXIMITY SENSOR (SPATTER RESISTANT TYPE)

PRA SERIES

M A N U A L

CE EAC A001572

(AC type approved only)

Thank you very much for selecting Autonics products.

For your safety, please read the following before using.

▣ Caution for your safety

※Please keep "Caution for your safety" to avoid accidents or damages as using it correctly.

※The meaning of 'Warning' and 'Caution' is as follows;

⚠ **Warning** In case a serious injury or dead may be occurred.

⚠ **Caution** In case a little injury or damage of this unit may be occurred.

※The meaning of the mark on the product and manual is as follows;

⚠ is a caution mark for danger in special condition.

⚠ Warning

1. **Please use it with double safety devices when it is used at the equipments which may cause damages to human life or assets(Ex:Nuclear power control, Medical equipment, Vehicle, Train, Air plane, Combustion apparatus, Entertainment or Safety device etc.)**
   It may cause a fire, human life or assets.
2. **Do not connect power directly without load.**
   It may result in damage to inner components or burn them out.

⚠ Caution

1. **Do not use this unit in place where there is flammable, explosive gas, chemical or strong alkalis, acids.**
   It may cause a fire or explosion.
2. **Do not impact on this unit.**
   It may result in malfunction or damage to the product.
3. **Do not use this product beyond rated voltage or apply AC power to DC power.**
   It may result in serious damage to the product.

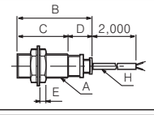
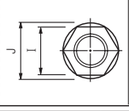
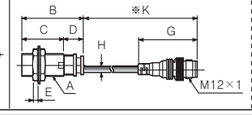
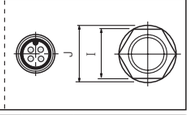
▣ Ordering information

P R A 18 — 5 DN — I

- IEC standard
- DO : DC 2-wire type Normal Open
- DC : DC 2-wire type Normal Close
- DN : NPN NO(Normal Open)
- DN2 : NPN NC(Normal Close)
- DP : PNP NO(Normal Open)
- DP2 : PNP NC(Normal Close)
- AO : AC type Normal Open
- AC : AC type Normal Close
- Standard sensing distance(mm)
- Diameter of head(mm)
- Type
  - A : Spatter resistant type
  - AT : DC 2-wire spatter resistant type
  - AWT : DC 2-wire spatter resistance cable outgoing connector type
- Appearance
  - Cylindrical type
- Inductive proximity sensor

▣ Dimensions

(Unit:mm)

Type	PRA/PRAT(M12, M18, M30)	Nut & Washer	PRAWT(M12, M18, M30)	Nut & Washer
Flush				

Type			A	B	C	D	E	G	H	I	J	K
DC type	M12	PRA	M12×1	42.5	31.5	11	4	–	4	17	21	–
		PRAT						–				–
		PRAWT						43.5				300
	M18	PRA	M18×1	47	29	18	4	–	5	24	29	–
		PRAT						–				–
		PRAWT						43.5				300
	M30	PRA	M30×1.5	58	38	20	5	–	5	35	42	–
		PRAT						–				–
		PRAWT						43.5				300
AC type	M12	PRA	M12×1	59.5	48.5	11	4	–	4	17	21	–
	M18	PRA	M18×1	53.3	35.3	18	4	–	5	24	29	–
	M30	PRA	M30×1.5	58	38	20	5	–	5	35	42	–

※ 300mm of cable outgoing connector type is a standard for "K".

※The above specifications are changeable at anytime without notice.

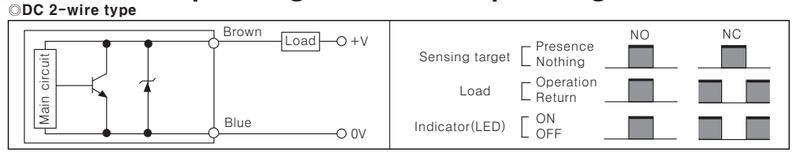
▣ Specifications

Model	PRAT12-2DO PRAT12-2DC PRAWT12-2DO PRAWT12-2DC PRAWT12-2DO-I PRAWT12-2DC-I	PRAT18-5DO PRAT18-5DC PRAWT18-5DO PRAWT18-5DC PRAWT18-5DO-I PRAWT18-5DC-I	PRAT30-10DO PRAT30-10DC PRAWT30-10DO PRAWT30-10DC PRAWT30-10DO-I PRAWT30-10DC-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±10%	5mm±10%	10mm±10%	2mm±10%	5mm±10%	10mm±10%	2mm±10%	5mm±10%	10mm±10%
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 1.4	0 to 3.5	0 to 7	0 to 1.4	0 to 3.5	0 to 7	0 to 1.4	0 to 3.5	0 to 7
Power supply (Operating voltage)	24VDC (15–30VDC)			12–24VDC (10–30VDC)			100–240VAC 50/60Hz (85–264VAC)		
Current consumption	———			Max. 10mA			———		
Leakage current	Max. 0.9mA			———			Max. 2.5mA		
Response frequency	800Hz	350Hz	250Hz	800Hz	350Hz	250Hz	20Hz		
Residual voltage	Max. 7V			Max. 1.5V			Max. 10V		
Affection by temp.	±10% Max. of sensing distance at +20℃ within temperature range of −25 to +70℃								
Control output	50mA			200mA			150mA	200mA	
Insulation resistance	Min. 50MΩ (500VDC)								
Dielectric strength	1500VAC 50/60Hz for 1minute								
Vibration	1mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours								
Shock	500m/s² (50G) X, Y, Z direction for 3 times								
Indicator	Operating indicator(RED LED)								
Ambient temperature	−25 to +70℃(non−freezing condition)								
Storage temperature	−30 to +80℃(non−freezing condition)								
Ambient humidity	35 to 95%RH								
Protection circuit	Surge protection circuit, Overload & short circuit protection.			Reverse polarity protection, Surge protection circuit, Overload & short circuit protection			Surge protection circuit		
Protection	IP67(IEC standard)								
Insulation type	▣						▣		
Unit weight	PRAT Approx. 63g / PRAWT Approx. 45g	PRAT Approx. 122g / PRAWT Approx. 65g	PRAT Approx. 181g / PRAWT Approx. 130g	Approx. 70g	Approx. 119g	Approx. 184g	About 66g	About 130g	About 185g

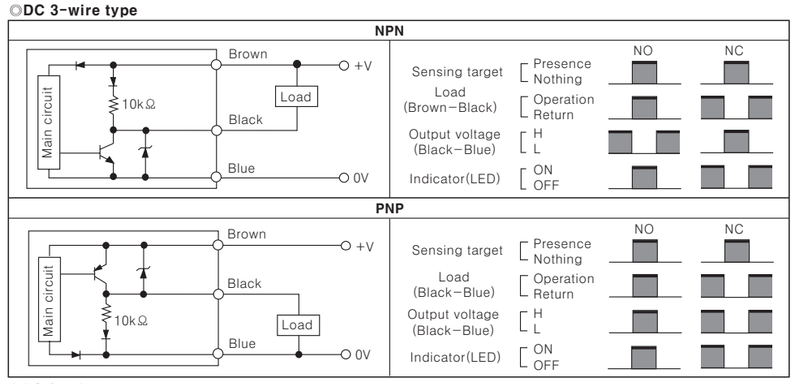
※(*1) "▣" Mark indicated that equipment protected throughout by double insulation or reinforced insulation.

▣ Control output diagram & Load operating

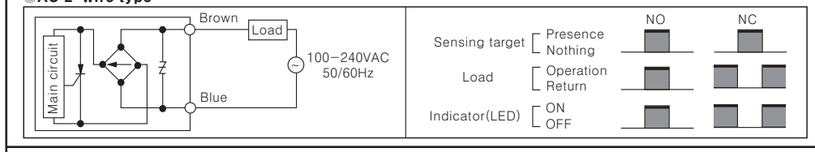
◎**DC 2-wire type**



◎**DC 3-wire type**

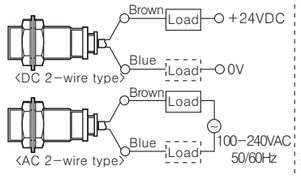


◎**AC 2-wire type**

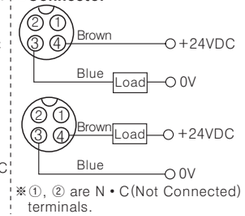


▣ Connections

●**DC 2-wire standard type, AC 2-wire type**
Load can be wired to any cable. :

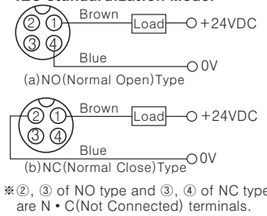


●**Connector**



※①, ② are N • C(Not Connected) terminals.

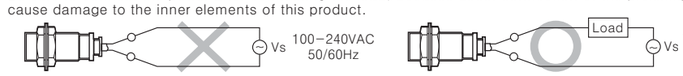
●**IEC standardization Model**



※②, ③ of NO type and ③, ④ of NC type are N • C(Not Connected) terminals.

▣ Connection of the power supply

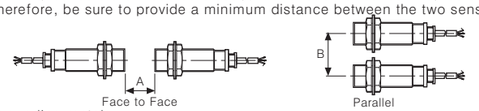
Be sure to connect the power after connecting the load, because direct connection of the proximity sensor may cause damage to the inner elements of this product.



▣ Mutual-interference & Influence by surrounding metals

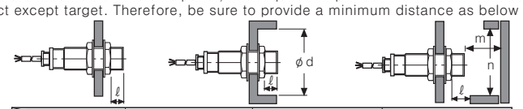
◎Mutual−interference

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, as below charts.



◎Influence by surrounding metals

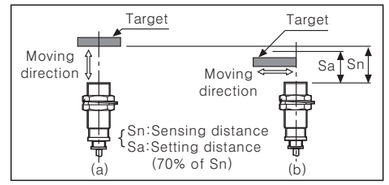
When sensors are mounted on metallic panel, it is required to protect the sensors from being affected by any metallic object except target. Therefore, be sure to provide a minimum distance as below chart.



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

(Unit:mm)

▣ Setting distance

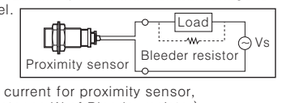


●Sensing distance can be changed by the shape, size or material of the target.
Therefore please check the sensing distance like (a), then pass the target within range of setting distance(Sa).

●Setting distance(Sa)
=Sensing distance(Sn)×70%
Ex)PRA30−10DN(See ordering information)
Setting distance(Sa)=10mm ×0.7=7mm

▣ Caution for using

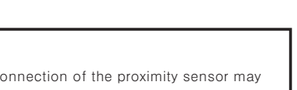
1. This equipment shall not be used outdoors or beyond specified temperature range.
2. Do not load over than tensile strength of cord. (φ4:30N max., φ5:50N max.)
3. Do not use the same conduit with cord of this unit and electric power line or power line. Also avoid the same connection.
4. Do not put overload to tighten nut, please use washer for tightening.
   Note1)Allowable strength may be different by the length of head. As see the picture, allowable tightening strength of front part and rear part are in (Chart 1). Rear part includes head nut as like picture.
   Note2)(Chart1) is for using washer.
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. Do not connect capacity load to output part directly.
8. It may result in damage to the product, if use automatic transformer. So please use insulated transformer.
9. Please make wire short as much as possible in order to avoid noise.
10. Be sure to cable as indicated specification on this product. If use wrong cable or bended cable, it shall not maintain the water−proof.
11. It is possible to extend cable with over 0.3mm² and max. 200m.
12. If the target is plated, the operating distance can be changed by the plating material.
13. It may result in malfunction by metal particle on product.
14. If there are machines(motor, welding etc), which occurs big surge around this unit, please install the varistor or absorber to source of surge, even though there is built−in surge absorber in this unit.
15. If connect the load with big inrush current(DC type bulb) to this unit, the big inrush current will flow due to the initial resistance is low. If the current flows, the resistance of load will be bigger, then it will return to standard current. In this case, proximity sensor might be damaged by inrush current.
    If you use DC type bulb, please connect extra relay or resistance in order to protect proximity sensor from.
16. In case of the load current is small(AC type):When the load current is under 5mA, make the residual voltage is less than return voltage to connect the bleeder resistor to load in parallel.
    ※110VAC 50/60Hz : 20kΩ, Min. 3W, 220VAC 50/60Hz : 39kΩ, Min. 5W
17. In case of the load current is small(DC 2 wire) : Please make flowing current in proximity sensor less than return current of load to connect bleeder resistor and load in parallel.



※$R \leq \frac{Vs}{Io-Ioff}$ (kΩ) $P > \frac{Vs^2}{R}$ (mW) (Vs:Power supply, Io:Min.operating current for proximity sensor, Ioff:Return current of load, P:Resistance W of Bleeder resistor)

18. If make a transceiver close to proximity sensor or wire connection, it may cause malfunction.

※It may cause malfunction if above instructions are not followed.



Strength / Model	Front Size	Front Torque	Rear Torque
PRA12 Series	13mm	65kgf·cm	120kgf·cm
PRA18 Series	22mm	150kgf·cm	150kgf·cm
PRA30 Series	26mm	500kgf·cm	800kgf·cm

(Chart1)

▣ Major products

■ PROXIMITY SENSOR ■ PHOTOELECTRIC SENSOR
■ AREA SENSOR ■ FIBER OPTIC SENSOR
■ DOOR/DOOR SIDE SENSOR ■ PRESSURE SENSOR
■ ROTARY ENCODER ■ COUNTER
■ TIMER ■ TEMPERATURE CONTROLLER
■ TEMPERATURE/HUMIDITY TRANSDUCER
■ POWER CONTROLLER ■ PANEL METER
■ TACHO/LINE SPEED/PULSE METER
■ DISPLAY UNIT ■ SENSOR CONTROLLER
■ SWITCHING POWER SUPPLY
■ GRAPHIC PANEL
■ STEPPING MOTOR & DRIVER & CONTROLLER
■ LASER MARKING SYSTEM(CO_2, Nd:YAG)

Autonics Corporation
http://www.autonics.com

Satisfiable Partner For Factory Automation

■**HEAD QUARTERS** :
41-5, Yongdang-dong, Yangsan-si, Gyeongnam, 626-847, Korea
■**OVERSEAS SALES** :
Bldg. 402 3rd Fl., Bucheon Techno Park, 193, Yakdae-dong, Wonmi-gu, Bucheon-si, Gyeonggi-do, 420-734, Korea
TEL:82-32-610-2730 / FAX:82-32-329-0728
■**E-mail** : sales@autonics.com

EP-KE-07-0190E