Spatter-Resistance Type Proximity Sensor

▣ Features

- Coated with teflon against thermal resistance (Prevention of malfunction due to spatter)
- Improved the noise resistance with dedicated IC
- Built-in surge protection circuit
- Built-in overcurrent protection circuit (DC 2-wire, 3-wire type)
- Built-in reverse polarity protection circuit (DC 3-wire type)
- Protection structure IP67 (IEC standard)
- Replaceable for spatter-resistance type limit switches

⚠ **Please read "Caution for your safety" in operation manual before using.**

CE

▣ The Characteristic Of Spatter-Resistance Type

The hot arc from arc welding machine is adhesive even with metals or plastics.
Therefore, normal proximity sensor might have malfunction even though there are no sensing object if the arcs are put on the sensing surface. The arcs are not adhered on the sensing part of the spatter-resistance type proximity sensor as the part is coated with teflon against thermal resistance.
Also, the protection cover sold optionally has the same function.

▣ Specifications

● DC 2-wire type

※When the □ model name is X, it is non-polarity model.

Model		PRAT12-2□O PRAT12-2□C	PRAWT12-2□O PRAWT12-2□C PRAWT12-2□O-I PRAWT12-2□C-I	PRAT18-5□O PRAT18-5□C	PRAWT18-5□O PRAWT18-5□C PRAWT18-5□O-I PRAWT18-5□C-I	PRAT30-10□O PRAT30-10□C	PRAWT30-10□O PRAWT30-10□C PRAWT30-10□O-I PRAWT30-10□C-I
Sensing distance		2mm		5mm		10mm	
Hysteresis		Max. 10% of sensing distance					
Standard sensing target		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	
Power supply (Operating voltage)		12-24VDC (10 -30VDC)					
Leakage current		Max. 0.6mA					
Response frequency※1		1.5kHz		500Hz		400Hz	
Residual voltage※2		Max. 3.5V (Non-polarity type is Max. 5V)					
Affection by Temp.		Max. ±10% for sensing distance at ambient temperature 20℃					
Control output		2 to 100mA					
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 (for 1 min.) in each X, Y, Z direction for 2 hours					
Shock		500m/s² (approx. 50G) in each of X, Y, Z directions for 3 times					
Indicator		Operation indicator (red LED)					
Environment	Ambient temperature	-25 to 70℃, storage: -30 to 80℃					
	Ambient humidity	35 to 95%RH, storage: 35 to 95%RH					
Protection circuit		Surge protection circuit, Overcurrent protection circuit					
Protection structure		IP67 (IEC standard)					
Cable		Ø4mm, 2-wire, 2m		Ø5mm, 2-wire, 2m			
		(For cable type, 300mm, M12 connector), (AWG22, Core diameter: 0.08mm, Number of cores: 60, Insulator diameter: Ø1.25)					
Material		Case/Nut: Teflon coated Brass, Washer: Teflon coated Iron, Sensing surface: Teflon, Standard cable (Black): Polyvinyl chloride (PVC)					
Approval		CE					
Weight※3		Approx. 84g (approx. 72g)	Approx. 54g (approx. 42g)	Approx. 122g (approx. 110g)	Approx. 70g (approx. 58g)	Approx. 207g (approx. 170g)	Approx. 134g (approx. 122g)

※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 divice because residual voltage is 5V.
※3: The weight includes packaging. The weight in parentheses in for unit only.
※Environment resistance is rated at no freezing or condensation.
※Refer to the G-5 for IEC standard connector cables and specifications.
※The '□' of model name is for power type. 'D' is 12-24VDC, 'X' is non-polarity 12-24VDC.

▣ Specifications

● DC 3-wire type

Model		PRA12-2DN PRA12-2DP PRA12-2DN2 PRA12-2DP2	PRA18-5DN PRA18-5DP PRA18-5DN2 PRA18-5DP2	PRA30-10DN PRA30-10DP PRA30-10DN2 PRA30-10DP2
Sensing distance		2mm	5mm	10mm
Hysteresis		Max. 10% of sensing distance		
Standard sensing target		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
Power supply (Operating voltage)		12-24VDC (10-30VDC)		
Current consumption		Max. 10mA		
Response frequency※1		1.5kHz	500Hz	400Hz
Residual voltage		Max. 1.5V		
Affection by Temp.		Max. ±10% for sensing distance at ambient temperature 20℃		
Control output		Max. 200mA		
Insulation resistance		Min. 50MΩ (at 500VDC megger)		
Dielectric strength		1,500VAC 50/60Hz for 1 minute		
Vibration		1mm amplitude at frequency of 10 to 55Hz (for 1 min.) in each X, Y, Z direction for 2 hours		
Shock		500m/s² (appox. 50G) in each X, Y, Z direction for 3 times		
Indicator		Operation indicator (red LED)		
Environment	Ambient temperature	-25 to 70℃, storage: -30 to 80℃		
	Ambient humidity	35 to 95%RH, storage: 35 to 95%RH		
Protection circuit		Surge protection circuit, Reverse polarity protection circuit, Overcurrent protection circuit		
Protection structure		IP67 (IEC standard)		
Cable		Ø4mm, 3-wire, 2m	Ø5mm, 2-wire, 2m	
		(AWG22, Core diameter: 0.08mm, Number of cores: 60, Insulator diameter: Ø1.25)		
Material		Case/Nut: Teflon coated Brass, Washer: Teflon coated Iron, Sensing surface: Teflon, Standard cable (Black): Polyvinyl chloride (PVC)		
Approval		CE		
Weight※2		Approx. 84g (approx. 72g)	Approx. 122g (appox. 110g)	Approx. 207g (approx. 170g)

● AC 2-wire type

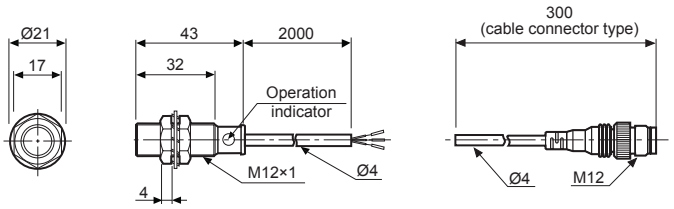
Model		PRA12-2AO PRA12-2AC	PRA18-5AO PRA18-5AC	PRA30-10AO PRA30-10AC
Sensing distance		2mm	5mm	10mm
Hysteresis		Max. 10% of sensing distance		
Standard sensing target		12×12×1mm (Iron)	18×18×1mm (Iron)	30×30×1mm (Iron)
Setting distance		0 to 1.4mm	0 to 3.5mm	0 to 7mm
Power supply (Operating voltage)		100-240VAC (85-264VAC)		
Leakage current		Max. 2.5mA		
Response frequency※1		20Hz		
Residual voltage		Max. 10V		
Affection by Temp.		Max. ±10% for sensing distance at ambient temperature 20℃		
Control output		5 to 150mA	5 to 200mA	
Insulation resistance		Min. 50MΩ (at 500VDC megger)		
Dielectric strength		2,500VAC 50/60Hz for 1 minute		
Vibration		1mm amplitude at frequency of 10 to 55Hz (for 1 min.) in each X, Y, Z direction for 2 hours		
Shock		500m/s² (approx. 50G) in each X, Y, Z direction for 3 times		
Indicator		Operation indicator (red LED)		
Environment	Ambient temperature	-25 to 70℃, storage: -30 to 80℃		
	Ambient humidity	35 to 95%RH, storage: 35 to 95%RH		
Protection circuit		Surge protection circuit		
Protection structure		IP67 (IEC standard)		
Cable		Ø4mm, 2-wire, 2m	Ø5mm, 2-wire, 2m	
		(For cable type, 300mm, M12 connector), (AWG22, Core diameter: 0.08mm, Number of cores: 60, Insulator diameter: Ø1.25)		
Material		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※2		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: The weight includes packaging. The weight in parentheses in for unit only.
※ Environment resistance is rated at no freezing or condensation.

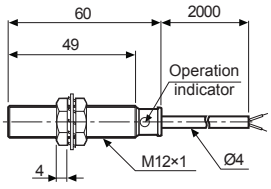
▣ Dimensions

(unit: mm)

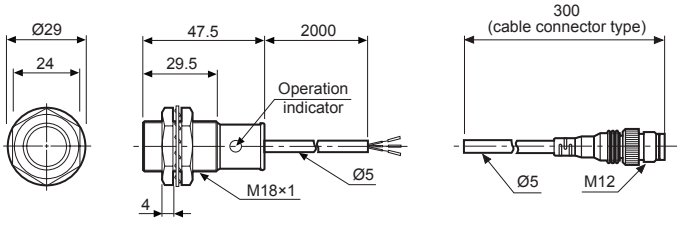
● PRA12-2D□ / PRAT12-2D□ / PRAWT12 -2D□



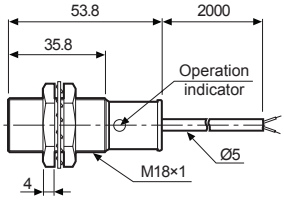
● PRA12-2A□



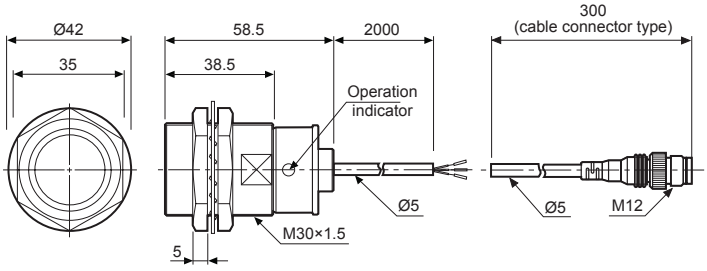
● PRA18-5D□ / PRAT18-5D□ / PRAWT18 -5D□



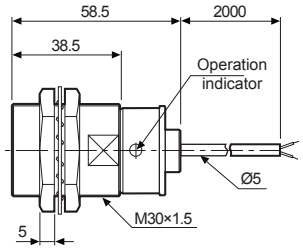
● PRA18-5A□



● PRA30-10D□ / PRAT30 -10D□ / PRAWT30 -10D□

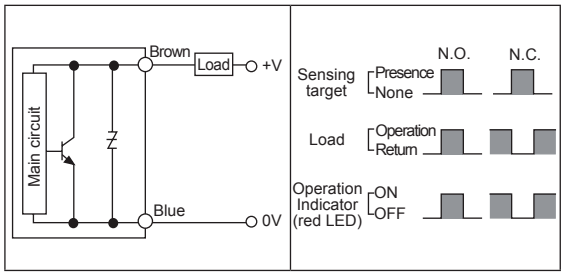


● PRA 30-10A□

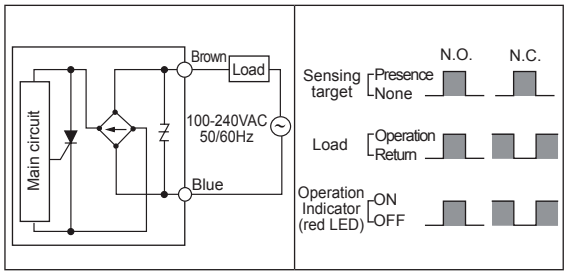


▣ Control Output Diagram

◎ DC 2-wire type

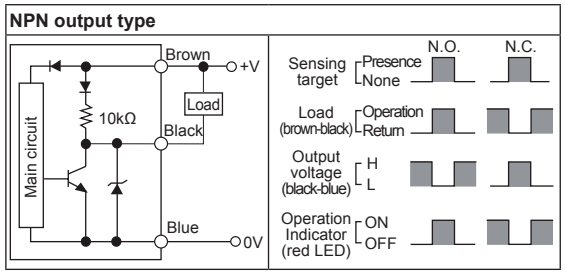


◎ AC 2-wire type

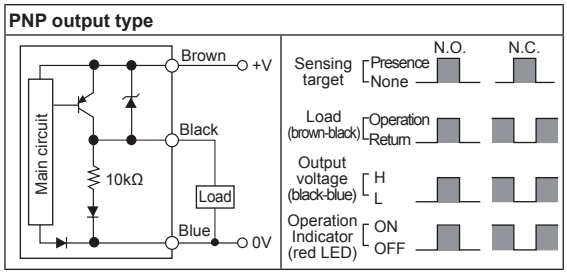


◎ DC 3-wire type

NPN output type

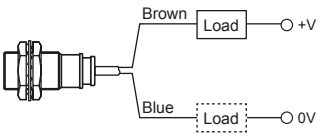


PNP output type

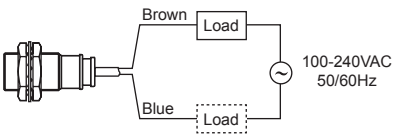


▣ Connections

◎ DC 2-wire standard type / AC 2-wire type



<DC 2-wire type>

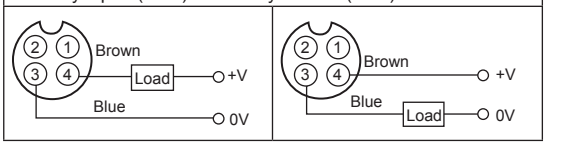


<AC 2-wire type>

※When using DC 2-wire and AC 2-wire type, a load must be connected before applying power; otherwise, components can be damaged.
※Load can be wired to any direction.
※No need to consider polarity for non-polarity type of power supply.

◎ Connector

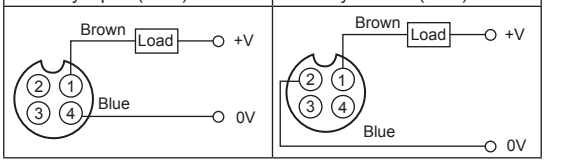
Normally Open (N.O.) / Normally Closed (N.C.)



※①, ② are not used terminals.

◎ DC 2-wire type (IEC standard type)

Normally Open (N.O.)	Normally Closed (N.C.)

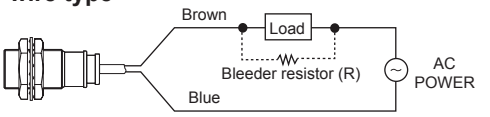


※②,③ of N.O. type and ③,④ of N.C. type are not used terminals.
※The pin arrangement of connector applying IEC standard is being developed.
※Please attach "I" at the end of the name of standard type for purchasing the IEC standard product. E.g.) PRAWT12-2DO-I
※The connector cable for IEC standard is being developed. Please attach "I" at the end of the name of standard type.
E.g.) CID2-2-I, CLD2-5-I

▣ Proper Usage

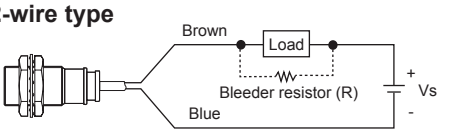
◎ In case of the load current is small

● AC 2-wire type



110VAC : Min. 20kΩ 3W
220VAC : Min. 39kΩ 10W

● DC 2-wire type



If the load current is under 5mA, please make sure the residual voltage is less than the return voltage of the load by connecting a bleeder resistor in parallel with the load as shown in the diagram.

$$R \le \frac{Vs}{I}(\Omega) \qquad P > \frac{Vs^2}{R}(W)$$

[I:Action current of load, R:Bleeder resistance, P:Permissible power]

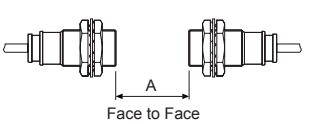
Please make the current on proximity sensor smaller than the return current of load by connecting a bleeder resistor in parallel.
※W value of Bleeder resistor should be bigger for proper heat.

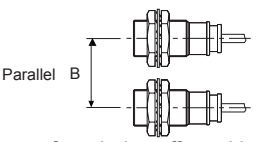
$$R \le \frac{Vs}{Io\text{-}Ioff}(\Omega) \qquad P > \frac{Vs^2}{R}(W)$$

[Vs : Power supply, Io : Min. action current of proximity sensor
Ioff : Return current of load, P : Number of Bleeder resistance watt]

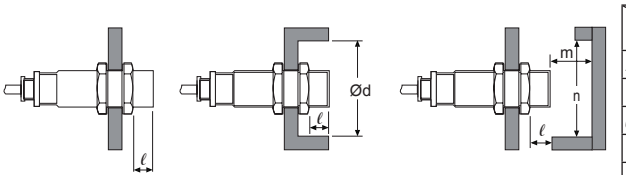
◎ Mutual-interference & Influence by surrounding metals

When several proximity sensors are mounted close to one another a malfunction of th may be caused due to mutual interference. Therefore, be sure to provide a minimum distance between the two sensors as below chart indicates.





When sensors are mounted on metallic panel, you must prevent the sensors from being affected by any metallic object except target. Therefore, be sure to provide a minimum distance as below chart indicates.



(unit: mm)

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
m	6	15	30
n	18	27	45