Autonics

INDUCTIVE PROXIMITY SENSOR
LONG DISTANCE CYLINDRICAL TYPE DC 3WIRE
M A N U A L

CE

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 machineries(Nuclear power control, medical equipment vehicle, train, airplane, combustion apparatus, entertainment or safety device etc), it requires installing fail-safe device, or contact us for information on type required.**
It may result in serious damage, fire or human injury.

⚠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 result in malfunction or damage to the product.
3. **Do not apply AC power and observe specification rating.**
It may result in serious damage to the product.

◼ Ordering information

| P | R | D | WL | 18 | – | 5 | DN | – | V |

Cable type		
V	Standard cable	
	Oil resistant cable	

Output		
DN	NPN N.O.(Normally Open)	
DN2	NPN N.C.(Normally Closed)	
DP	PNP N.O.(Normally Open)	
DP2	PNP N.C.(Normally Closed)	

Standard sensing distance		
Number	Unit: mm	

Dimension		
Cylindrical	Diameter of head(mm)	

Connection		
	DC 3 wire, cable outgoing type	[Picture 1]
L	DC 3 wire, long pipe, cable outgoing type	
W	DC 3 wire, cable outgoing connector type	
WL	DC 3 wire, long pipe, cable outgoing connector type	

Feature		
D	Long sensing distance type	

Shape		
R	Cylindrical type	

Item		
P	Inductive proximity sensor	

◼ Control output diagram & Load operating

NPN Output

	Normally Open	Normally Closed
Sensing target	Presence / Nothing	Presence / Nothing
Load (Brown–Black)	Operation / Return	Operation / Return
Output voltage (Black–Blue)	H / L	H / L
Indicator (LED)	ON / OFF	ON / OFF

PNP Output

	Normally Open	Normally Closed
Sensing target	Presence / Nothing	Presence / Nothing
Load (Black–Blue)	Operation / Return	Operation / Return
Output voltage (Black–Blue)	H / L	H / L
Indicator (LED)	ON / OFF	ON / OFF

※ **The above specifications are subject to change without notice.**

◼ Specifications

(Unit:mm)

Model				
	PRD12–4DN PRD12–4DP PRD12–4DN2 PRD12–4DP2 PRDL12–4DN PRDL12–4DP PRDL12–4DN2 PRDL12–4DP2 PRDW12–4DN PRDW12–4DP PRDW12–4DN2 PRDW12–4DP2 PRDWL12–4DN PRDWL12–4DP PRDWL12–4DN2 PRDWL12–4DP2 PRDW12–4DN–V PRDW12–4DP–V	PRD12–8DN PRD12–8DP PRD12–8DN2 PRD12–8DP2 PRDL12–8DN PRDL12–8DP PRDL12–8DN2 PRDL12–8DP2 PRDW12–8DN PRDW12–8DP PRDW12–8DN2 PRDW12–8DP2 PRDWL12–8DN PRDWL12–8DP PRDWL12–8DN2 PRDWL12–8DP2 PRDW12–8DN–V PRDW12–8DP–V	PRD18–7DN PRD18–7DP PRD18–7DN2 PRD18–7DP2 PRDL18–7DN PRDL18–7DP PRDL18–7DN2 PRDL18–7DP2 PRDW18–7DN PRDW18–7DP PRDW18–7DN2 PRDW18–7DP2 PRDWL18–7DN PRDWL18–7DP PRDWL18–7DN2 PRDWL18–7DP2 PRDW18–7DN–V PRDW18–7DP–V	PRD18–14DN PRD18–14DP PRD18–14DN2 PRD18–14DP2 PRDL18–14DN PRDL18–14DP PRDL18–14DN2 PRDL18–14DP2 PRDW18–14DN PRDW18–14DP PRDW18–14DN2 PRDW18–14DP2 PRDWL18–14DN PRDWL18–14DP PRDWL18–14DN2 PRDWL18–14DP2 PRDW18–14DN–V PRDW18–14DP–V
Sensing distance	4mm ±10%	8mm ±10%	7mm ±10%	14mm ±10%
Hysteresis	Max. 10% of sensing distance			
Standard sensing target	12×12×1mm(Iron)	25×25×1mm(Iron)	20×20×1mm(Iron)	40×40×1mm(Iron)
Setting distance	0~2.8mm	0~5.6mm	0~4.9mm	0~9.8mm
Power supply(Operating voltage)	12–24VDC(10~30VDC)			
Current consumption	Max. 10mA			
Response frequency(※1)	500Hz	400Hz	300Hz	200Hz
Residual voltage	Max. 1.5V			
Affection by Temp.	Within ±10% max. of sensing distance at 20℃ in temperature range of −25~70℃			
Control output	Max. 200mA			
Insulation resistance	Min. 50MΩ(500VDC megger)			
Dielectric strength	1,500VAC 50/60Hz for 1minute			
Vibration	1mm amplitude at frequency of 10~55Hz in each of X, Y, Z directions for 2 hours			
Shock	500m/s²(50G) X, Y, Z directions for 3 times			
Indicator	Operating indicator(Red LED)			
Ambient temperature	−25~70℃(at non–freezing status)			
Storage temperature	−30~80℃(at non–freezing status)			
Ambient humidity	35~95%RH(at non–dew status)			
Protection circuit	surge protection, Reverse polarity protection, overload & short circuit protection			
Protection	IP67(IEC Standards)			
Materials	Case/Nut: Nikel plated Brass, Washer: Nikel plated Iron, Sensing surface: Heat–resistant ABS, Standard cable(Black): Polyvinyl chloride(PVC), Oil resistant cable(Gray): Oil resistant Polyvinyl chloride(PVC)			
Approval	CE			
Weight	PRD: Approx. 74g PRDL: Approx. 94g PRDW: Approx. 44g PRDWL: Approx. 64g	PRD: Approx. 72g PRDL: Approx. 92g PRDW: Approx. 42g PRDWL: Approx. 62g	PRD: Approx. 115g PRDL: Approx. 145g PRDW: Approx. 80g PRDWL: Approx. 110g	PRD: Approx. 110g PRDL: Approx. 140g PRDW: Approx. 75g PRDWL: Approx. 105g

※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.

◼ Dimensions

Type	Cable outgoing type		Cable outgoing connector type		Nut & Washer
	M12, M18		**M12, M18**		
Flush					
Non-flush					
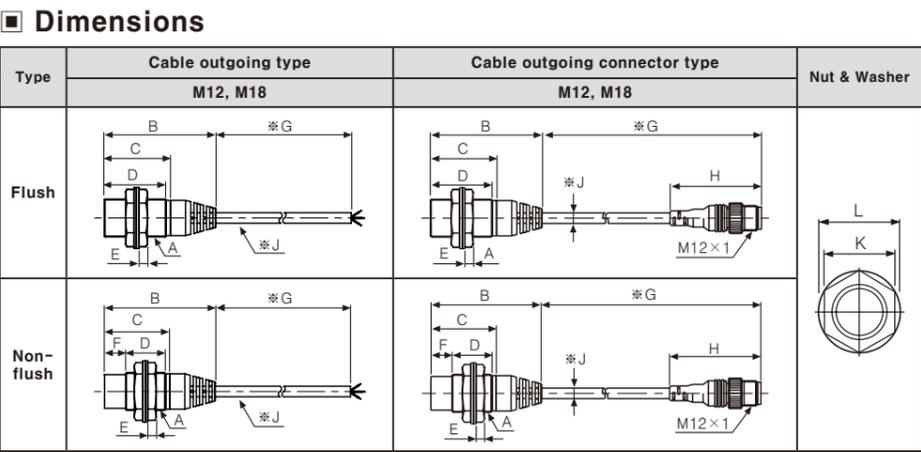
Type		A	B	C	D	E	F	G	H	J	K	L
Flush	**M12**											
	PRD	M12×1	51.8	33.5	31.5	4	—	2,000	—	4	17	21
	PRDW	M12×1	51.8	33.5	31.5	4	—	300	44	4		
	PRDL	M12×1	64.3	46	44	4	—	2,000	—	4		
	PRDWL	M12×1	64.3	46	44	4	—	300	44	4		
	M18											
	PRD	M18×1	53.2	31.5	29.5	4	—	2,000	—	5	24	29
	PRDW	M18×1	53.2	31.5	29.5	4	—	300	44	5		
	PRDL	M18×1	85.7	64	62	4	—	2,000	—	5		
	PRDWL	M18×1	85.7	64	62	4	—	300	44	5		
Non-flush	**M12**											
	PRD	M12×1	51.8	33.5	24.5	4	7	2,000	—	4	17	21
	PRDW	M12×1	51.8	33.5	24.5	4	7	300	44	4		
	PRDL	M12×1	64.3	46	37	4	7	2,000	—	4		
	PRDWL	M12×1	64.3	46	37	4	7	300	44	4		
	M18											
	PRD	M18×1	52.7	31	19	4	10	2,000	—	5	24	29
	PRDW	M18×1	52.7	31	19	4	10	300	44	5		
	PRDL	M18×1	85.7	64	52	4	10	2,000	—	5		
	PRDWL	M18×1	85.7	64	52	4	10	300	44	5		

※ "G" type standard : Cable outgoing type/2,000mm, Cable outgoing connector type/300mm
※ "J" type : φ4, 3 cores / φ5, 3 cores (Conductor cross section: 0.3㎟, Insulator diameter: φ1.25)

◼ Connections

Connector	NPN	PNP
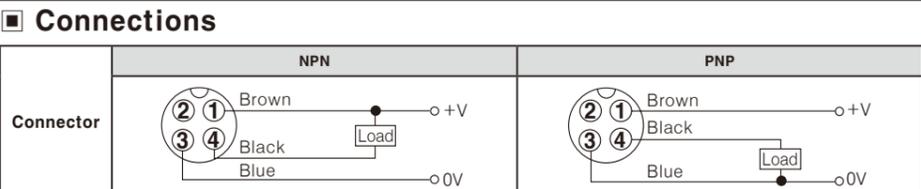
◼ Multi-interference & Influence by surrounding metals

○**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)

Item \ Model	PRD□12–4D□ PRDW□12–4D□	PRD□12–8D□ PRDW□12–8D□	PRD□18–7D□ PRDW□18–7D□	PRD□18–14D□ PRDW□18–14D□
A	24	48	42	84
B	24	36	36	54
ℓ	0	11	0	14
φ d	12	36	18	54
m	12	24	21	42
n	18	36	27	54

◼ 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)PRD18–7DN(See ordering information)
Setting distance(Sa) = 7mm × 0.7 = 4.9mm

◼ 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. (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.

Model		Strength		Front		Rear	
		Size		Torque		Torque	
PRD12 Series	Flush	13mm		65kgf·cm (6.37N·m)		120kgf·cm (11.76N·m)	
	Non-flush	7mm					
PRD18 Series	Flush	—		150kgf·cm (14.7N·m)			
	Non-flush						

[Table 1]

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 [Picture 1] respectively. The rear part includes a nut on the head side(see above [Picture 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 [Picture 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 in order to avoid noise.
9. Be sure to use cable as indicated specification on this product. If wrong cable or bended cable is used, it shall not maintain the water–proof.
10. It is possible to extend cable with over 0.3mm² and max. 200m.
11. If the target is plated, the operating distance can be changed by the plating material.
12. It may result in malfunction by metal particle on product.
13. 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.
14. If connecting the load with big inrush current(DC type bulb), the big inrush current will flow since 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 will be damaged by inrush current.
If you use DC type bulb, please connect extra relay or resistance in order to protect proximity sensor from.
15. If making a transceiver close to proximity sensor or wire connection, it may cause malfunction.

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

◼ Major products

- Proximity sensors
- Area sensors
- Photoelectric sensors
- Fiber optic sensors
- Door/Door side sensors
- Sensor controllers
- Graphic/Logic panels
- Temperature controllers
- Tachometer/Pulse(Rate) meters
- Temperature/Humidity transducers
- Switching power supplies
- Stepping motors/drivers/motion controllers
- Field network devices
- Laser marking system(CO₂, Nd:YAG)
- Laser welding/soldering system
- Counters
- Timers
- Display units
- Panel meters
- Pressure sensors
- Rotary encoders
- Power controllers

EP–KE–07–0480A