

Autonics

**INDUCTIVE PROXIMITY SENSOR
CYLINDRICAL TYPE DC 3WIRE**

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 fire.
 - Do not connect, repair, or inspect the unit while connected to a power source.
Failure to follow this instruction may result in 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 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.

■ Ordering Information

P R W L 18 - 5 DN - V

Cable type: **V** (Oil resistant cable), **S** (Option)

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))

Sensing distance: **Number** (Standard sensing distance(Unit: mm))

Dimension: **Number** (Diameter of head(Unit: mm))

Body size: **No mark** (Standard), **S** (Short body), **L** (Long body)

Connection: **No mark** (DC 3 wire, Cable type), **W** (DC 3 wire, Cable connector type)

Shape: **R** (Cylindrical type)

Item: **P** (Inductive proximity sensor)

■ Control Output Diagram & Load Operation

NPN output

Main circuit diagram showing NPN output configuration with load and 10kΩ pull-up resistor.

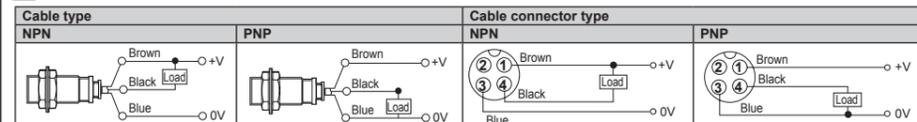
	Normally Open	Normally Closed
Sensing target	Presence: High, Nothing: Low	Presence: Low, Nothing: High
Load (Brown-Black)	Operation: High, Return: Low	Operation: Low, Return: High
Output voltage (Black-Blue)	H, L	H, L
Operation indicator (RED LED)	ON, OFF	ON, OFF

PNP output

Main circuit diagram showing PNP output configuration with load and 10kΩ pull-up resistor.

	Normally Open	Normally Closed
Sensing target	Presence: High, Nothing: Low	Presence: Low, Nothing: High
Load (Black-Blue)	Operation: High, Return: Low	Operation: Low, Return: High
Output voltage (Black-Blue)	H, L	H, L
Operation indicator (RED LED)	ON, OFF	ON, OFF

■ Connections



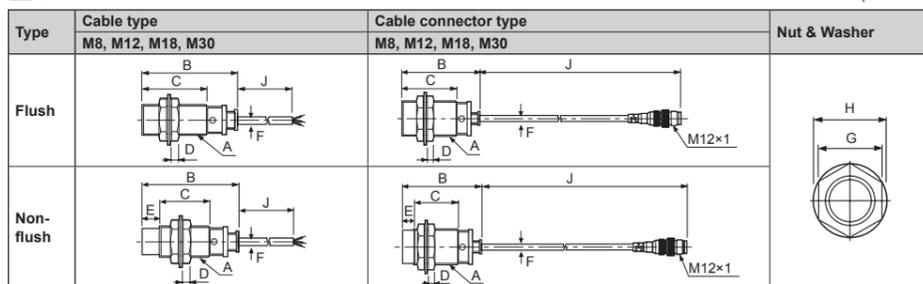
※The above specifications are subject to change and some models may be discontinued without notice.
※Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).

■ Specifications

Model	PR08-1 5DN PR08-1 5DP PR08-1 5DN2 PRL08-1 5DN PRL08-1 5DP PRL08-1 5DN2 PRW08-1 5DN PRW08-1 5DP PRW08-1 5DN2 PRWL08-1 5DN PRWL08-1 5DP PRWL08-1 5DN2	PR08-2DN PR08-2DP PR08-2DN2 PRL08-2DN PRL08-2DP PRL08-2DN2 PRW08-2DN PRW08-2DP PRW08-2DN2 PRWL08-2DN PRWL08-2DP PRWL08-2DN2	PR12-2DN PR12-2DP PR12-2DN2 PRS12-2DN PRS12-2DP PRS12-2DN2 PRW12-2DN PRW12-2DP PRW12-2DN2 PRL12-2DN PRL12-2DP	PR12-4DN PR12-4DP PR12-4DN2 PRS12-4DN PRS12-4DP PRS12-4DN2 PRW12-4DN PRW12-4DP PRW12-4DN2 PRL12-4DN PRL12-4DP	PR18-5DN PR18-5DP PR18-5DN2 PRL18-5DN PRL18-5DP PRL18-5DN2 PRW18-5DN PRW18-5DP PRW18-5DN2 PRWL18-5DN PRWL18-5DP PRWL18-5DN2	PR18-8DN PR18-8DP PR18-8DN2 PRL18-8DN PRL18-8DP PRL18-8DN2 PRW18-8DN PRW18-8DP PRW18-8DN2 PRWL18-8DN PRWL18-8DP PRWL18-8DN2	PR30-10DN PR30-10DP PR30-10DN2 PRL30-10DN PRL30-10DP PRL30-10DN2 PRW30-10DN PRW30-10DP PRW30-10DN2 PRWL30-10DN PRWL30-10DP PRWL30-10DN2	PR30-15DN PR30-15DP PR30-15DN2 PRL30-15DN PRL30-15DP PRL30-15DN2 PRW30-15DN PRW30-15DP PRW30-15DN2 PRWL30-15DN PRWL30-15DP PRWL30-15DN2
Sensing distance	15mm	2mm	2mm	4mm	5mm	8mm	10mm	15mm
Hysteresis	Max. 10% of sensing distance							
Standard sensing target	8×8×1mm (Iron)		12×12×1mm (Iron)		18×18×1mm (Iron)		25×25×1mm (Iron)	
Setting distance	0 to 1.05mm		0 to 1.4mm		0 to 2.8mm		0 to 3.5mm	
Power supply (Operating voltage)	12-24VDC (10-30VDC)							
Current consumption	Max. 10mA							
Response frequency※1	1.5kHz	1kHz	1.5kHz	500Hz	500Hz	350Hz	400Hz	200Hz
Residual voltage	Max. 2.0V		Max. 1.5V					
Affection by Temp.	Within ±10°C max. of sensing distance at 20°C in temperature range of -25 to 70°C (PR: 08 Series: Max. ±20%)							
Control output	Max. 200mA							
Insulation resistance	Min. 50MΩ (at 500VDC megger)							
Dielectric strength	1,500VAC 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/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							
ment Ambient humi-	35 to 95%RH, Storage: 35 to 95%RH							
Protection circuit	Surge protection, Reverse polarity protection, Overload & short circuit protection							
Protection	P67 (IEC Standards)							
Cable size	Ø3.5mm, 3-wire, 2m (AWG24, Core diameter: 0.08mm, Number of cores: 40, Insulator diameter: Ø1mm)		Ø4mm, 3-wire, 2m (AWG22, Core diameter: 0.08mm, Number of cores: 60, Insulator diameter: Ø1.25mm)		Ø5mm, 3-wire, 2m			
Materials	Case/Nut: Nickel plated Brass, Washer: Nickel plated Iron, Sensing surface: PBT, Standard cable(Black): Polyvinyl chloride(PVC), Oil resistant cable(Gray): Oil resistant Polyvinyl chloride(PVC)							
Approval	CE							
Weight※3	PR: Approx. 64g(Approx. 52g) PRL: Approx. 66g(Approx. 54g) PRW: Approx. 44g(Approx. 32g) PRWL: Approx. 46g(Approx. 34g)		PR: Approx. 84g(Approx. 72g) PRL: Approx. 82g(Approx. 70g) PRW: Approx. 54g(Approx. 42g) PRWL: Approx. 88g(Approx. 76g)		PR: Approx. 122g(Approx. 110g) PRL: Approx. 142g(Approx. 130g) PRW: Approx. 70g(Approx. 58g) PRWL: Approx. 90g(Approx. 78g)		PR: Approx. 207g(Approx. 170g) PRL: Approx. 247g(Approx. 210g) PRW: Approx. 134g(Approx. 122g) PRWL: Approx. 195g(Approx. 158g)	

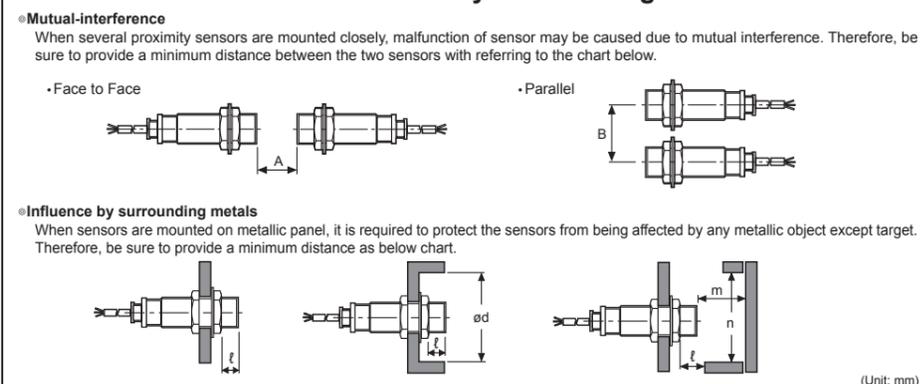
- ※1: The response frequency is the average value. The standard sensing target is used and the width is set as 2 times of the standard sensing target, 1/2 of the sensing distance for the distance.
- ※2: Do not pull the Ø3.5mm cable with a tensile strength of 25N, the Ø4mm cable with a tensile strength 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.
- ※3: The weight with packaging and the weight in parentheses is only unit weight.
- ※Environment resistance is rated at no freezing or condensation.

■ Dimensions



Type		A	B	C	D	E	F	G	H	J
M8	PR	M8×1	30	30	4	-	3.5	13	15	2,000
	PRL	M8×1	40	40	4	-	3.5	13	15	2,000
	PRW	M8×1	30	30	4	-	4	13	15	300
	PRWL	M8×1	40	40	4	-	4	13	15	300
M12	PR	M12×1	46	31.5	4	-	4	17	21	2,000
	PRS	M12×1	39	24.5	4	-	4	17	21	2,000
	PRW	M12×1	46	31.5	4	-	4	17	21	300
	PRL	M12×1	74.5	60	4	-	4	17	21	2,000
M18	PR	M18×1	47.5	29.5	4	-	5	24	29	2,000
	PRL	M18×1	80.5	62.5	4	-	5	24	29	2,000
	PRW	M18×1	47.5	29.5	4	-	5	24	29	300
	PRWL	M18×1	80.5	62.5	4	-	5	24	29	300
M30	PR	M30×1.5	58	38	5	-	5	35	42	2,000
	PRL	M30×1.5	80	60	5	-	5	35	42	2,000
	PRW	M30×1.5	58	38	5	-	5	35	42	300
	PRWL	M30×1.5	80	60	5	-	5	35	42	300
M8	PR	M8×1	30	30	4	4	3.5	13	15	2,000
	PRL	M8×1	40	40	4	4	3.5	13	15	2,000
	PRW	M8×1	30	30	4	4	4	13	15	300
	PRWL	M8×1	40	40	4	4	4	13	15	300
M12	PR	M12×1	46	24.5	4	7	4	17	21	2,000
	PRS	M12×1	39	17.5	4	7	4	17	21	2,000
	PRW	M12×1	46	24.5	4	7	4	17	21	300
	PRL	M12×1	58.5	37	4	7	4	17	21	2,000
M18	PR	M18×1	47	19	4	10	5	24	29	2,000
	PRL	M18×1	80.5	62.5	4	10	5	24	29	2,000
	PRW	M18×1	47	19	4	10	5	24	29	300
	PRWL	M18×1	80.5	62.5	4	10	5	24	29	300
M30	PR	M30×1.5	58	28	5	10	5	35	42	2,000
	PRL	M30×1.5	80	50	5	10	5	35	42	2,000
	PRW	M30×1.5	58	28	5	10	5	35	42	300
	PRWL	M30×1.5	80	50	5	10	5	35	42	300

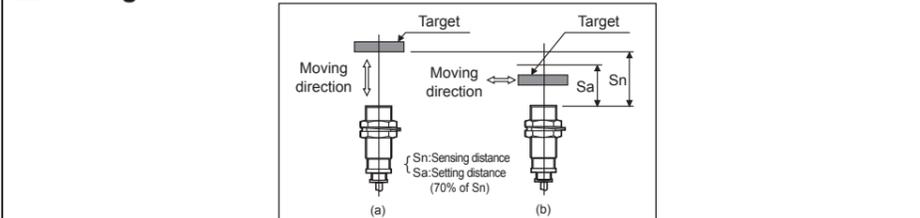
■ Mutual-interference & Influence by Surrounding Metals



(Unit: mm)

Model	PR_08-1.5D	PR_08-2D	PR_12-2D	PR_12-4D	PR_18-5D	PR_18-8D	PR_30-10D	PR_30-15D
A	9	12	12	24	30	48	60	90
B	16	24	24	36	36	54	60	90
ℓ	0	8	0	11	0	14	0	15
ød	8	24	12	36	18	54	30	90
m	4.5	6	6	12	15	24	30	45
n	12	24	18	36	27	54	45	90

■ 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.) PR30-10DN (See ordering information)
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].

[Table 1]

Model	Strength	Front		Rear	
		Size	Torque	Size	Torque
PR08 Series	Flush	7mm	3.92N m	-	-
	Non-flush	5mm	3.92N m	8.82N m	-
PR12 Series	Flush	13mm	6.37N m	-	-
	Non-flush	7mm	6.37N m	11.76N m	-
PR18 Series	Flush	-	-	14.7N m	-
	Non-flush	-	-	14.7N m	-
PR30 Series	Flush	26mm	49N m	-	-
	Non-flush	12mm	49N m	78.4N m	-

■ Cautions 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.
- This unit may be used in the following environments.
 - ① Indoors (in the environment condition rated in 'Specifications')
 - ② Altitude max. 2,000m
 - ③ Pollution degree 2
 - ④ 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, CO₂, Nd: YAG)
- Laser Welding/Cutting System
- Temperature Controllers
- Temperature/Humidity Transducers
- SSRs/Power Controllers
- Counters
- Timers
- Panel Meters
- Tachometer/Pulse (Rate) Meters
- Display Units
- Sensor Controllers