Cylindrical Inductive
Long-Distance / Long-Distance Spatter-Resistant
Proximity Sensors
PRD / PRDA Series (DC 3-wire)

INSTRUCTION MANUAL

DRW200028AA

Autonics

Thank you for choosing our Autonics product.

Read and understand the instruction manual and manual thoroughly before using the product.

For your safety, read and follow the below safety considerations before using. For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

Keep this instruction manual in a place where you can find easily.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Follow Autonics website for the latest information.

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ▲ symbol indicates caution due to special circumstances in which hazards may occur.

↑ Warning Failure to follow instructions may result in serious injury or death.

- 01. 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 personal injury, economic loss or fire.
- 02. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.
- Failure to follow this instruction may result in explosion or fire.
- 03. Do not disassemble or modify the unit.
- Failure to follow this instruction may result in fire.
- 04. Do not connect, repair, or inspect the unit while connected to a power
 - $\label{eq:Failure} \textit{Failure to follow this instruction may result in fire.}$
- ${\bf 05.\ Check\ `Connections'\ before\ wiring.}$

Failure to follow this instruction may result in fire.

⚠ Caution Failure to follow instructions may result in injury or product damage

- 01. Use the unit within the rated specifications.
 - Failure to follow this instruction may result in fire or product damage
- **02.** Use a dry cloth to clean the unit, and do not use water or organic solvent. Failure to follow this instruction may result in fire.

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- 12-24 VDC = 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.
- If the surface is rubbed with a hard object, PTFE coating can be worn out.
- This unit may be used in the following environments.
 Indoors (in the environment condition rated in 'Specifications')
- Altitude max. 2,000 m
- Pollution degree 2 - Installation category II

Cautions for Installation

- Install the unit correctly with the usage environment, location, and the designated specifications.
- Do NOT impacts with a hard object or excessive bending of the wire lead-out. It may cause damage the water resistance.
- Do NOT pull the Ø 3.5 mm cable with a tensile strength of 25 N, the Ø 4 mm cable with a tensile strength of 30 N or over and the Ø 5 mm cable with a tensile strength of 50 N or over. It may result in fire due to the broken wire.
- When extending wire, use AWG 22 cable or over within 200 m.

Ordering Information

This is only for reference.

For selecting the specific model, follow the Autonics web site.

PRD 0 0 0 0 - 0

O Characteristic

No mark: General type A: Spatter-resistant type

6 Sensing distance

Number: Sensing distance (unit: mm)

2 Connection

No mark: Cable type W: Cable connector type CM: Connector type

⊙ Control output

N: NPN Normally open N2: NPN Normally closed P: PNP Normally open P2: PNP Normally closed

ด

No mark: Normal No mark: Standard type L: Long V: Oil resistant cable type

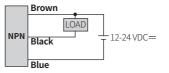
4 DIA. of sensing side

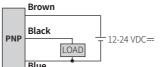
Number: DIA. of sensing side (unit: mm)

Connections

Body length

■ Cable type





■ Cable connector type / Connector type

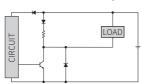
- For LOAD connection, follow the cable type connection.
- Fasten the connector not to shown the thread. (0.39 to 0.49 N m)
- Fasten the vibration part with PTFE tape.

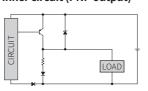


Pin	Color	Function
1	Brown	+V
2	-	-
3	Blue	0 V
4	Black	OUT

■ Inner circuit (NPN output)

■ Inner circuit (PNP output)





Operation Timing Chart

		Normally o	pen			Normally clos	sed		
Sensing target		Presence		1 [7	Presence			
Sensing	target	Nothing -				Nothing —	Nothing —		_
Load		Operation		1		Operation _			
		Return				Return			
	NPN	н				Н			
Output	output	L	L.			L -			_
voltage	PNP	Н		1 [нг		П	
	output	L ·		Ш		L		Ш	
Operation indicator (red)		ON		1 [ON [П	
		OFF				OFF I			

Sold Separately

· Transmission coupler

- Connector cable,
 connector connection cable
- Spatter protection cover
- Fixed bracket

Specifications

nstallation	Flush type			
General	PRD□08-2D□	PRD□12-4D□	PRD□18-7D□	PRD 30-15D
Spatter- esistant	-	PRDACM12-4D	PRDACM18-7D	PRDACM30-15D
OIA. of sensing ide	Ø8 mm	Ø 12 mm	Ø 18 mm	Ø 30 mm
Sensing listance	2 mm	4 mm	7 mm	15 mm
Setting listance	0 to 1.4 mm	0 to 2.8 mm	0 to 4.9 mm	0 to 10.5 mm
lysteresis	≤ 15 % of sensing distance	≤ 10 % of sensing di	istance	
Standard ensing target: ron	8 × 8 × 1 mm	12 × 12 × 1 mm	20 × 20 × 1 mm	45 × 45 × 1 mm
Response requency 01)	1 kHz	500 Hz	300 Hz	100 Hz
Affection by emperature	≤ ± 10 % for sensin (DIA. of sensing side	g distance at ambient Ø 8 mm: ≤ ± 15 %)	temperature 20 °C	
ndicator	Operation indicator	(red)		
pproval	C € EHI	C € EHI	C € EHI	C € ERI
nstallation	Non-flush type			
General	PRD□08-4D□	PRD□12-8D □	PRD□18-14D □	PRD□30-25D □
OIA. of sensing ide	Ø8mm	Ø 12 mm	Ø 18 mm	Ø 30 mm
Setting listance	0 to 2.8 mm	0 to 5.6 mm	0 to 9.8 mm	0 to 17.5 mm
Sensing listance	4 mm	8 mm	14 mm	25 mm
lysteresis	≤ 15 % of sensing distance	≤ 10 % of sensing di	stance	
Standard ensing target: ron	12 × 12 × 1 mm	25 × 25 × 1 mm	40 × 40 × 1 mm	75 × 75 × 1 mm
Response requency 01)	800 Hz	400 Hz	200 Hz	100 Hz
Affection by emperature	\leq \pm 10 % for sensin (DIA. of sensing side	g distance at ambient Ø 8 mm: ≤ ± 15 %)	temperature 20 °C	
ndicator	Operation indicator	(red)		
Approval	C € ERI	C € ERI	C € ERI	C € ERI

01) 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.

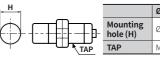
Unit weight	Unit weight (package)		Ø 12 mm	Ø 18 mm	Ø 30 mm
Cable	Normal	\approx 43 g (\approx 63 g)	\approx 62 g (\approx 74 g)	\approx 97 g (\approx 115 g)	\approx 143 g (\approx 180 g)
Cable	Long	-	\approx 82 g (\approx 94 g)	\approx 127 g (\approx 145 g)	≈ 183 g (≈ 220 g)
Cable	Normal	\approx 25 g (\approx 45 g)	\approx 37 g (\approx 67 g)	\approx 62 g (\approx 80 g)	$\approx 108 \mathrm{g} (\approx 145 \mathrm{g})$
connector	Long	-	\approx 32 g (\approx 55 g)	pprox 92 g ($pprox$ 110 g)	\approx 130 g (\approx 203 g)
Connector	Normal	\approx 12 g (\approx 32 g)	\approx 20g (\approx 49 g)	≈ 41 g (≈ 81 g)	≈ 138 g (≈ 197 g)
	Long	-	\approx 24 g (\approx 54 g)	≈ 60 g (≈ 78 g)	≈ 193 g (≈ 252 g)

Power supply	12-24 VDC== (ripple P-P: ≤ 10 %), operating voltage: 10-30 VDC==
Current consumption	≤ 10 mA
Control output	≤ 200 mA
Residual voltage	DIA. of sensing side Ø 8mm: ≤ 2 V DIA. of sensing side Ø 12 mm, Ø 18 mm, Ø 30 mm: ≤ 1.5 V
Protection circuit	Surge protection circuit, output short over current protection circuit, reverse polarity protection
Insulation resistance	≥ 50 MΩ (500 VDC megger)
Dielectric strength	DIA. of sensing side Ø 8mm : 1,000 VAC ~ 50/60 Hz for 1 min (between all terminals and case) (connector type: 1,500 VAC ~ 50/60 Hz for 1 min (between all terminals and case)) DIA. of sensing side Ø 12 mm, Ø 18 mm, Ø 30 mm : 1,500 VAC ~ 50/60 Hz for 1 min (between all terminals and case)
Vibration	1 mm amplitude at frequency 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 2 hours
Shock	500 m/s² (≈ 50 G) in each X, Y, Z direction for 3 times
Ambient temperature	-25 to 70 °C, storage: -30 to 80 °C (non-freezing or non-condensation)
Ambient humidity	35 to 95 %RH, storage: 35 to 95 %RH (non-freezing or non-condensation)
Protection structure	IP67 (IEC standards)
Connection	Cable type ⁰¹⁾ / Cable connector type ⁰¹⁾ / Connector type model
Cable spec. 02)	DIA. of sensing side Ø 8 mm: Ø 3.5 mm, 3-wire DIA. of sensing side Ø 12 mm: Ø 4 mm, 3-wire DIA. of sensing side Ø 18 mm, Ø 30 mm: Ø 5 mm, 3-wire
Wire spec.	Ø 3.5 mm cable : AWG 24 (0.08 mm, 40-wire), insulator diameter: Ø 1 mm Ø 4 mm, Ø 5 mm cable : AWG 22 (0.08 mm, 60-wire), insulator diameter: Ø 1.25 mm
Connector spec.	M12 connector
Material	Standard type cable (black): polyvinyl chloride (PVC) Oil resistant cable (gray): polyvinyl chloride (oil resistant PVC)
General	Case/Nut: nickel plated brass (DIA. of sensing side Ø 8 mm connector type case: SUS303), washer: nickel plated iron, sensing side: PBT
Spatter-resistant	Case/Nut: PTFE coated brass, washer: PTFE coated iron, sensing side: PTFE

- 01) Except spatter-resistant type
- 02) Cable type: 2 m, Cable connector type: 300 mm

Cut-out Dimensions

· Unit: mm, For the detailed drawings, follow the Autonics web site.



	Ø8mm	Ø 12 mm	Ø 18 mm	Ø 30 mm
ounting le (H)	Ø 8.5 ^{+0.5} ₀	Ø 12.5 ^{+0.5} ₀	Ø 18.5 ^{+0.5} ₀	Ø 30.5 ^{+0.5} ₀
P	M8×1	M12×1	M18×1	M30×1.5



	Ø8mm	Ø 12 mm	Ø 18 mm	Ø 30 mm
ØA	15	21	29	42
В	13	17	24	35

Setting Distance Formula

Detecting distance can be changed by the shape, size or material of the target. For stable sensing, install the unit within the 70% of sensing distance.







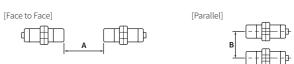
Mutual-interference & Influence by Surrounding Metals

■ Mutual-interference

= Sensing distance (Sn) \times 70%

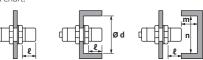
When plural proximity sensors are mounted in a close row, malfunction of sensor may be caused due to mutual interference.

Therefore, be sure to provide a minimum distance between the two sensors, as below table.



■ Influence by surrounding metals

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



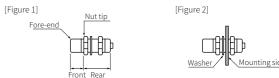
(unit: mm)

	Ø8mm		Ø 12 mm		Ø 18 mm		Ø 30 mm	
ltem side	Flush	Non- flush	Flush	Non- flush	Flush	Non- flush	Flush	Non- flush
Α	9	12	12	24	30	48	60	90
В	16	24	24	36	36	54	60	90
٤	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

Tightening Torque

Use the provided washer to tighten the nuts.

The tightening torque of the nut varies with the distance from the fore-end. [Figure 1] If the nut tip is located at the front of the product, apply the front tightening torque. the allowable tightening torque table is for inserting the washer as [Figure 2].



	Sensing Ø 8 mm		Ø 12 mm		Ø 18 mm		Ø 30 mm	
side Strength	Flush	Non- flush	Flush	Non- flush	Flush	Non- flush	Flush	Non- flush
Front size	7 mm	5 mm	13 mm	7 mm	-	-	26 mm	12 mm
Front torque	3.92 N m		6.37 N m		14.7 N m		49 N m	
Rear torque	8.82 N m		11.76 N n	n	14.7 N m		78.4 N m	

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- Failure to follow this instruction may result in personal injury, economic loss or fire. 02. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, or salinity

Failure to follow this instruction may result in explosion or fire.

03. Do not disassemble or modify the unit.

may be present.

- Failure to follow this instruction may result in fire.
- 04. Do not connect, repair, or inspect the unit while connected to a power source.
- Failure to follow this instruction may result in fire.
- 05. Check 'Connections' before wiring.

Failure to follow this instruction may result in fire.

▲ Caution Failure to follow instructions may result in injury or product damage

01. Use the unit within the rated specifications.

Failure to follow this instruction may result in fire or product damage.

- 02. Use a dry cloth to clean the unit, and do not use water or organic solvent. Failure to follow this instruction may result in fire.
- 03. Do not supply power without load.

Failure to follow this instruction may result in fire or product damage.

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected
- 12-24 VDC 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.

- If the surface is rubbed with a hard object, PTFE coating can be worn out. • This unit may be used in the following environments
- Indoors (in the environment condition rated in 'Specifications')
- Altitude max. 2,000 m
- Pollution degree 2
- Installation category II

Cautions for Installation

- Install the unit correctly with the usage environment, location, and the designated
- Do NOT impacts with a hard object or excessive bending of the wire lead-out. It may cause damage the water resistance.
- \bullet Do NOT pull the Ø 3.5 mm cable with a tensile strength of 25 N, the Ø 4 mm cable with a tensile strength of 30 N or over and the Ø 5 mm cable with a tensile strength of 50 N or over. It may result in fire due to the broken wire.
- · When extending wire, use AWG 22 cable or over within 200 m.

Ordering Information

This is only for reference

For selecting the specific model, follow the Autonics web site.

PRD 0 0 0 1 T 0 - 5 6 7 -

♠ Characteristic

No mark: General type A: Spatter-resistant type

2 Connection

No mark: Cable type W: Cable connector type CM: Connector type

Body length

No mark: Normal L: Long

4 DIA. of sensing side

Number: DIA. of sensing side (unit: mm)

Sensing distance

Number: Sensing distance (unit: mm)

6 Power supply

D: 12-24 VDC= X: 12-24 VDC== (non-polarity)

Control output

O: Normally open C: Normally closed

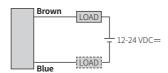
Cable

No mark: Standard type I: Standard type (IEC standards) V: Oil resistant cable type IV: Oil resistant cable type (IEC standards)

Connections

- LOAD can be wired to any direction.
- Connect LOAD before suppling the power.
- No need to consider polarity for non-polarity type of power supply.

Cable type



■ Cable connector type / Connector type

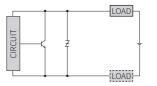
- For LOAD connection, follow the cable type connection
- Fasten the connector not to shown the thread. (0.39 to 0.49 N m)
- Fasten the vibration part with PTFE tape.



Standard type					
Pin	Color	Func.			
1	-	-			
2	-	-			
3	Blue	0 V			
4	Brown	+V			

IEC:	IEC standards						
Pin	Normal	ly open	Normally close				
PIII	Color	Func.	Color	Func.			
1	Brown	+V	Brown	+V			
2	-	-	Blue	0 V			
3	-	-	-	-			
4	Blue	0 V	-	-			

Inner circuit



Operation Timing Chart					
	Normally open	Normally closed			
Sensing target	Presence	Presence			
Sensing target	Nothing — L	Nothing — L			
Load	Operation	Operation			
Loau	Return — L	Return L L L			
Operation indicator (red)	ON	ON			
	OFF — L	OFF L.			

Sold Separately

- · Connector cable, connector connection cable
- Spatter protection cover
- Transmission coupler
- Fixed bracket

Specifications

Installation	Flush type				
General	PRD T08-2	PRD□T12-4□	PRD□T18-7□	PRD T30-15	
Spatter-resistant	-	PRDA T12-4	PRDA T18-7	PRDAT30-15	
DIA. of sensing side	Ø8mm	Ø 12 mm	Ø 18 mm	Ø 30 mm	
Sensing distance	2 mm	4 mm	7 mm	15 mm	
Setting distance	0 to 1.4 mm	0 to 2.8 mm	0 to 4.9 mm	0 to 10.5 mm	
Hysteresis	≤ 15 % of sensing distance	≤ 10 % of sensing of	listance		
Standard sensing target: iron	8 × 8 × 1 mm	12 × 12 × 1 mm	20 × 20 × 1 mm	45 × 45 × 1 mm	
Response frequency ⁰¹⁾	1 kHz	450 Hz	250 Hz	100 Hz	
Affection by temperature		ng distance at ambien Ø8mm: ≤ ± 15%)	t temperature 20 °C		
Indicator	Operation indicator	(red)			
Approval	C € ERI	C € ERE	C € ERI	C€EHI	
Installation	Non-flush type				
	Non-flush type PRD T08-4	PRD T12-8	PRD T18-14	PRD T30-25	
General DIA. of sensing	, , , , , , , , , , , , , , , , , , ,	PRD□T12-8 □ Ø 12 mm	PRD □ T18-14 □ Ø 18 mm	PRD □ T30-25 □ Ø 30 mm	
General DIA. of sensing side	PRD T08-4 Ø 8 mm				
General DIA. of sensing side Sensing distance	PRD T08-4 Ø 8 mm	Ø 12 mm	Ø 18 mm	Ø 30 mm	
General DIA. of sensing side Sensing distance Setting distance	PRD T08-4 Ø 8 mm 4 mm	Ø 12 mm 8 mm	Ø 18 mm 14 mm 0 to 9.8 mm	Ø 30 mm 25 mm	
Installation General DIA. of sensing side Sensing distance Setting distance Hysteresis Standard sensing target: iron	PRD□T08-4□ Ø8 mm 4 mm 0 to 2.8 mm ≤ 15 % of sensing	Ø 12 mm 8 mm 0 to 5.6 mm	Ø 18 mm 14 mm 0 to 9.8 mm	Ø 30 mm 25 mm	
General DIA. of sensing side Sensing distance Setting distance Hysteresis Standard sensing target:	PRD□T08-4□ Ø8 mm 4 mm 0 to 2.8 mm ≤ 15 % of sensing distance	Ø 12 mm 8 mm 0 to 5.6 mm ≤ 10 % of sensing of	Ø 18 mm 14 mm 0 to 9.8 mm	Ø 30 mm 25 mm 0 to 17.5 mm	
General DIA. of sensing side Sensing distance Setting distance Hysteresis Standard sensing target: iron Response	PRD□T08-4 Ø8 mm 4 mm 0 to 2.8 mm ≤ 15 % of sensing distance 12 × 12 × 1 mm 800 Hz ≤ ± 10 % for sensing	Ø 12 mm 8 mm 0 to 5.6 mm ≤ 10 % of sensing of 25 × 25 × 1 mm	Ø 18 mm 14 mm 0 to 9.8 mm listance 40 × 40 × 1 mm 200 Hz	Ø 30 mm 25 mm 0 to 17.5 mm	
General DIA. of sensing side Sensing distance Setting distance Hysteresis Standard sensing target: iron Response frequency (1) Affection by	PRD□T08-4 Ø8 mm 4 mm 0 to 2.8 mm ≤ 15 % of sensing distance 12 × 12 × 1 mm 800 Hz ≤ ± 10 % for sensing	\emptyset 12 mm 8 mm 0 to 5.6 mm ≤ 10 % of sensing of $25 \times 25 \times 1$ mm = 400 Hz = 400 Hz = 400 Hz = 400 Hz	Ø 18 mm 14 mm 0 to 9.8 mm listance 40 × 40 × 1 mm 200 Hz	Ø 30 mm 25 mm 0 to 17.5 mm	
General DIA. of sensing side Sensing distance Setting distance Hysteresis Standard sensing target: iron Response frequency (1) Affection by temperature	PRD□T08-4□ Ø8 mm 4 mm 0 to 2.8 mm ≤ 15 % of sensing distance 12 × 12 × 1 mm 800 Hz ≤ ± 10 % for sensing tide (DIA of sensing side	\emptyset 12 mm 8 mm 0 to 5.6 mm ≤ 10 % of sensing of $25 \times 25 \times 1$ mm = 400 Hz = 400 Hz = 400 Hz = 400 Hz	Ø 18 mm 14 mm 0 to 9.8 mm listance 40 × 40 × 1 mm 200 Hz	Ø 30 mm 25 mm 0 to 17.5 mm	

2 times of the standard sensing target, 1/2 of the sensing distance for the distance.

Unit weight (package) 01		Ø 8 mm	Ø 12 mm	Ø 18 mm	Ø 30 mm	
	Normal	≈ 43 g (≈ 63 g)	≈ 62 g (≈ 74 g)	\approx 97 g (\approx 115 g)	≈ 143 g (≈ 180 g)	
Cable	Normal	-	≈ 72 g (≈ 84 g)	≈ 122 g (≈ 134 g)	≈ 221 g (≈ 184 g)	
	Long	-	≈ 82 g (≈ 94 g)	\approx 127 g (\approx 145 g)	≈ 183 g (≈ 220 g)	
	Normal	≈ 25 g (≈ 45 g)	≈ 32 g (≈ 55 g)	≈ 62 g (≈ 80 g)	≈ 130 g (≈ 145 g)	
Cable connector		-	≈ 42 g (≈ 54 g)	≈ 65 g (≈ 77 g)	≈ 143 g (≈ 155 g)	
connector	Long	-	-	≈ 92 g (≈ 110 g)	-	
	Normal	≈ 10 g (≈ 32 g)	≈ 20g (≈ 50 g)	≈ 42 g (≈ 60 g)	≈ 110 g (≈ 150 g)	
Connector		-	≈ 26g (≈ 38 g)	≈ 49g (≈ 61 g)	≈ 134 g (≈ 146 g)	
	Long	-	-	≈ 60 g (≈ 78 g)	≈ 150 g (≈ 190 g)	

01) In case of normal body length, it is written in General type

Spatter-resistant ty In case of long body length, it is only available general type.

in case of long body len	giri, it is only available general type.
Power supply	12-24 VDC== (ripple P-P: ≤ 10 %), operating voltage: 10-30 VDC==
Leakage current	DIA. of sensing side Ø 8mm: ≤ 0.8 mA DIA. of sensing side Ø 12 mm, Ø 18 mm, Ø 30 mm: ≤ 0.6 mA
Control output	2 to 100 mA
Residual voltage 01)	≤ 3.5 V (Non-polarity: ≤ 5 V)
Protection circuit	Surge protection circuit, output short over current protection circuit, reverse polarity protection
Insulation resistance	\geq 50 M Ω (500 VDC== megger)
Dielectric strength	DIA. of sensing side Ø 8 mm: 1.000 VAC~ 50/60 Hz for 1 min (between all terminals and case) (connector type: 1,500 VAC~ 50/60 Hz for 1 min (between all terminals and case)) DIA. of sensing side Ø 12 mm, Ø 18 mm, Ø 30 mm: 1,500 VAC~ 50/60 Hz for 1 min (between all terminals and case)
/ibration	$1\mathrm{mm}$ amplitude at frequency 10 to $55\mathrm{Hz}$ (for $1\mathrm{min}$) in each X, Y, Z direction for $2\mathrm{hours}$
Shock	500 m/s² (≈ 50 G) in each X, Y, Z direction for 3 times
Ambient temperature	-25 to 70 °C, storage: -30 to 80 °C (non-freezing or non-condensation)
Ambient humidity	35 to 95 %RH, storage: 35 to 95 %RH (non-freezing or non-condensation)
Protection structure	IP67 (IEC standards)
Connection	Cable type / Cable connector type / Connector type model
Cable spec. 02)	DIA. of sensing side Ø 8 mm: Ø 3.5 mm, 2-wire DIA. of sensing side Ø 12 mm: Ø 4 mm, 2-wire DIA. of sensing side Ø 18 mm, Ø 30 mm: Ø 5 mm, 2-wire
Wire spec.	Ø 3.5 mm cable : AWG 24 (0.08 mm, 40-wire), insulator diameter: Ø 1 mm Ø 4 mm, Ø 5 mm cable : AWG 22 (0.08 mm, 60-wire), insulator diameter: Ø 1.25 mm
Connector spec.	M12 connector
Material	Standard type cable (black): polyvinyl chloride (PVC) Oil resistant cable (gray): polyvinyl chloride (oil resistant PVC)
	Case/Nut: nickel plated brass (DIA, of sensing side Ø 8 mm connector type
General	case: SUS303), washer: nickel plated iron, sensing side: PBT

- 02) Cable type: 2 m, Cable connector type: 300 mr

Cut-out Dimensions

• Unit: mm, For the detailed drawings, follow the Autonics web site.



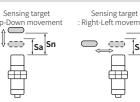


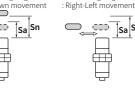
	Ø8mm	Ø 12 mm	Ø 18 mm	Ø 30 mm	
ØA	15	21	29	42	
В	13	17	24	35	

Setting Distance Formula

Detecting distance can be changed by the shape, size or material of the target. For stable sensing, install the unit within the 70% of sensing distance.

Setting distance (Sa)





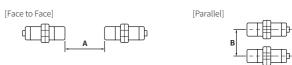
Mutual-interference & Influence by Surrounding Metals

■ Mutual-interference

= Sensing distance (Sn) × 70%

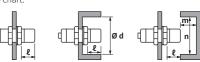
When plural proximity sensors are mounted in a close row, malfunction of sensor may be caused due to mutual interference.

Therefore, be sure to provide a minimum distance between the two sensors, as below



■ Influence by surrounding metals

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



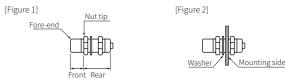
(unit: mm)

	Sensing			Ø 12 mm		Ø 18 mm		Ø 30 mm	
ltem side	Flush	Non- flush	Flush	Non- flush	Flush	Non- flush	Flush	Non- flush	
	A	9	12	12	24	30	48	60	90
	В	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

Tightening Torque

Use the provided washer to tighten the nuts.

The tightening torque of the nut varies with the distance from the fore-end. [Figure 1] If the nut tip is located at the front of the product, apply the front tightening torque. the allowable tightening torque table is for inserting the washer as [Figure 2].



Sensing			Ø 12 mm		Ø 18 mm		Ø 30 mm	
side Strength	Flush	Non- flush	Flush	Non- flush	Flush	Non- flush	Flush	Non- flush
Front size	7 mm	5 mm	13 mm	7 mm	-	-	26 mm	12 mm
Front torque	3.92 N m		6.37 N m		14.7 N m		49 N m	
Rear torque	8.82 N m		11.76 N m		14.7 N m		78.4 N m	

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