

PROXIMITY SENSORS

IPX SERIES

OVERVIEW

Standard sensors for detecting metals

IP-Rating : IP67



CLASSIFICATION

IPX - D 18 - 05 E1 R N

① Type	A		AC 2 - Wire Model
	D		DC 3 - Wire Model
	2D		DC 2 - Wire Model
② Shape / Size	Rectangular	12	∅12
		18	∅18
		30	∅30
	Cylindrical	17	17mm
		25	25mm
		30	30mm
	40	40mm	
③ Sensing Distance	number	Rated sensing distance (Sn)	
④ Control output	E1	AC 3 - wire model	NPN NO
	E2		NPN NC
	E3		PNP NO
	E4		PNP NC
	A1	AC 2 - Wire Model DC 2 - Wire Model	NO
	A2		NC
⑤ Connection Method	none	Pre - wired	
	Rectangular	Connector	
	W	Wired connector	
	S	Pre - wired (rectangular model)	
⑥ Shielding	none	Shielded	
	N	Unshielded	
⑦ Polarity	F	No polarity	
	none	Polarity	

DC 3-wire model (Shielded) - Cylindrical

Appearance	Sensing distance	Set distance	Response frequency	Connection method	Operation mode	Model	
Cylindrical	∅12	2.0mm ± 10%	0~1.6mm	600Hz	Pre-wired	NPN NO	IPX - D12 - 02E1
						NPN NC	IPX - D12 - 02E2
						PNP NO	IPX - D12 - 02E3
						PNP NC	IPX - D12 - 02E4
					Connector	NPN NO	IPX - D12 - 02E1R
						NPN NC	IPX - D12 - 02E2R
						PNP NO	IPX - D12 - 02E3R
						PNP NC	IPX - D12 - 02E4R
					Wire connector	NPN NO	IPX - D12 - 02E1W
						NPN NC	IPX - D12 - 02E2W
						PNP NO	IPX - D12 - 02E3W
						PNP NC	IPX - D12 - 02E4W
	∅18	5.0mm ± 10%	0~4.0mm	400Hz	Pre-wired	NPN NO	IPX - D18 - 05E1
						NPN NC	IPX - D18 - 05E2
						PNP NO	IPX - D18 - 05E3
						PNP NC	IPX - D18 - 05E4
					Connector	NPN NO	IPX - D18 - 05E1R
						NPN NC	IPX - D18 - 05E2R
						PNP NO	IPX - D18 - 05E3R
						PNP NC	IPX - D18 - 05E4R
					Wire connector	NPN NO	IPX - D18 - 05E1W
						NPN NC	IPX - D18 - 05E2W
						PNP NO	IPX - D18 - 05E3W
						PNP NC	IPX - D18 - 05E4W
∅30	10.0mm ± 10%	0~8.0mm	250Hz	Pre-wired	NPN NO	IPX - D30 - 10E1	
					NPN NC	IPX - D30 - 10E2	
					PNP NO	IPX - D30 - 10E3	
					PNP NC	IPX - D30 - 10E4	
				Connector	NPN NO	IPX - D30 - 10E1R	
					NPN NC	IPX - D30 - 10E2R	
					PNP NO	IPX - D30 - 10E3R	
					PNP NC	IPX - D30 - 10E4R	
				Wire connector	NPN NO	IPX - D30 - 10E1W	
					NPN NC	IPX - D30 - 10E2W	
					PNP NO	IPX - D30 - 10E3W	
					PNP NC	IPX - D30 - 10E4W	



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DC 3-wire model (Unshielded) - Cylindrical

Appearance		Sensing distance	Set distance	Response frequency	Connection method	Operation mode	Model
Cylindrical	∅12	4.0mm ± 10%	0~3.2mm	400Hz	Pre-wired	NPN NO	IPX - D12 - 04E1N
						NPN NC	IPX - D12 - 04E2N
						PNP NO	IPX - D12 - 04E3N
						PNP NC	IPX - D12 - 04E4N
					Connector	NPN NO	IPX - D12 - 04E1RN
						NPN NC	IPX - D12 - 04E2RN
						PNP NO	IPX - D12 - 04E3RN
						PNP NC	IPX - D12 - 04E4RN
					Wire connector	NPN NO	IPX - D12 - 04E1WN
						NPN NC	IPX - D12 - 04E2WN
						PNP NO	IPX - D12 - 04E3WN
						PNP NC	IPX - D12 - 04E4WN
	∅18	8.0mm ± 10%	0~6.4mm	200Hz	Pre-wired	NPN NO	IPX - D18 - 08E1RN
						NPN NC	IPX - D18 - 08E2RN
						PNP NO	IPX - D18 - 08E3RN
						PNP NC	IPX - D18 - 08E4RN
					Connector	NPN NO	IPX - D18 - 08E1WN
						NPN NC	IPX - D18 - 08E2WN
						PNP NO	IPX - D18 - 08E3WN
						PNP NC	IPX - D18 - 08E4WN
					Wire connector	NPN NO	IPX - D18 - 08E1SN
						NPN NC	IPX - D18 - 08E2SN
						PNP NO	IPX - D18 - 08E3SN
						PNP NC	IPX - D18 - 08E4SN
∅30	15.0mm ± 10%	0~12.0mm	100Hz	Pre-wired	NPN NO	IPX - D30 - 15E1N	
					NPN NC	IPX - D30 - 15E2N	
					PNP NO	IPX - D30 - 15E3N	
					PNP NC	IPX - D30 - 15E4N	
				Connector	NPN NO	IPX - D30 - 15E1RN	
					NPN NC	IPX - D30 - 15E2RN	
					PNP NO	IPX - D30 - 15E3RN	
					PNP NC	IPX - D30 - 15E4RN	
				Wire connector	NPN NO	IPX - D30 - 15E1WN	
					NPN NC	IPX - D30 - 15E2WN	
					PNP NO	IPX - D30 - 15E3WN	
					PNP NC	IPX - D30 - 15E4WN	



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DC 3- wire model (Unshielded) - Rectangular

Appearance	Sensing distance	Set distance	Response frequency	Connection method	Operation mode	Model
Rectangular	17	5.0mm ± 10%	0~4.0mm	Pre - wired	NPN NO	IPX - D12 - 02E1S
					NPN NC	IPX - D12 - 02E2S
					PNP NO	IPX - D12 - 02E3S
					PNP NC	IPX - D12 - 02E4S
	25	5.0mm ± 10%	0~4.0mm		NPN NO	IPX - D12 - 04E1S
					NPN NC	IPX - D12 - 04E2S
					PNP NO	IPX - D12 - 04E3S
					PNP NC	IPX - D12 - 04E4S
	30	10.0mm ± 10%	0~8.0mm		NPN NO	IPX - D18 - 05E1S
					NPN NC	IPX - D18 - 05E2S
					PNP NO	IPX - D18 - 05E3S
					PNP NC	IPX - D18 - 05E4S
	40	20.0mm ± 10%	0~16.0mm		NPN NO	IPX - D18 - 20E1S
					NPN NC	IPX - D18 - 20E2S
					PNP NO	IPX - D18 - 20E3S
					PNP NC	IPX - D18 - 20E4S

Specification for DC 3- wire model

Rated operating voltage		12~24VDC
Power supply voltage		10~30VDC
Detectable object		Ferrous metal
Differential travel		max. 10% of sensing distance
Control output		max. 200mA
Indicator		red LED
Protection circuit		Surge suppressor, load short - circuit protect, protection circuit of reverse power polarity
Ambient temperature	operating	- 15 ° C~+55 ° C
	storage	- 30 ° C~+80 ° C
Ambient humidity		35~95%RH
Insulation resistance		Minimum 50M (500VDC)
Dielectric strength		1,500VAC 50/60Hz for 1min.
Vibration resistance		10~55Hz double amplitude 1.5mm (at X, Y and Z axis) for 2hrs
Shock resistance		50G
Degree of protection		IP67
Materials	Case	Brass
	Sensing surface	PBT

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Dimensions for DC 3-wire model

DC 3-Wire Model	Ø12	
	Shielded	Unshielded
Pre-wired		
Connector	 	
Wired Connector	 	

Dimensions for DC 3-wire model

DC 3-Wire Model	Ø18	
	Shielded	Unshielded
Pre-wired		
Connector	<p>AC DC</p>	<p>AC DC</p>
Wired Connector	<p>AC DC</p>	<p>AC DC</p>

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Dimensions for DC 3-wire model

DC 3-Wire Model	Ø30	
	Shielded	Unshielded
Pre-wired		
Connector		
Wired Connector		

Dimensions for DC 3-wire model

DC 3-Wire Model
Rectangular

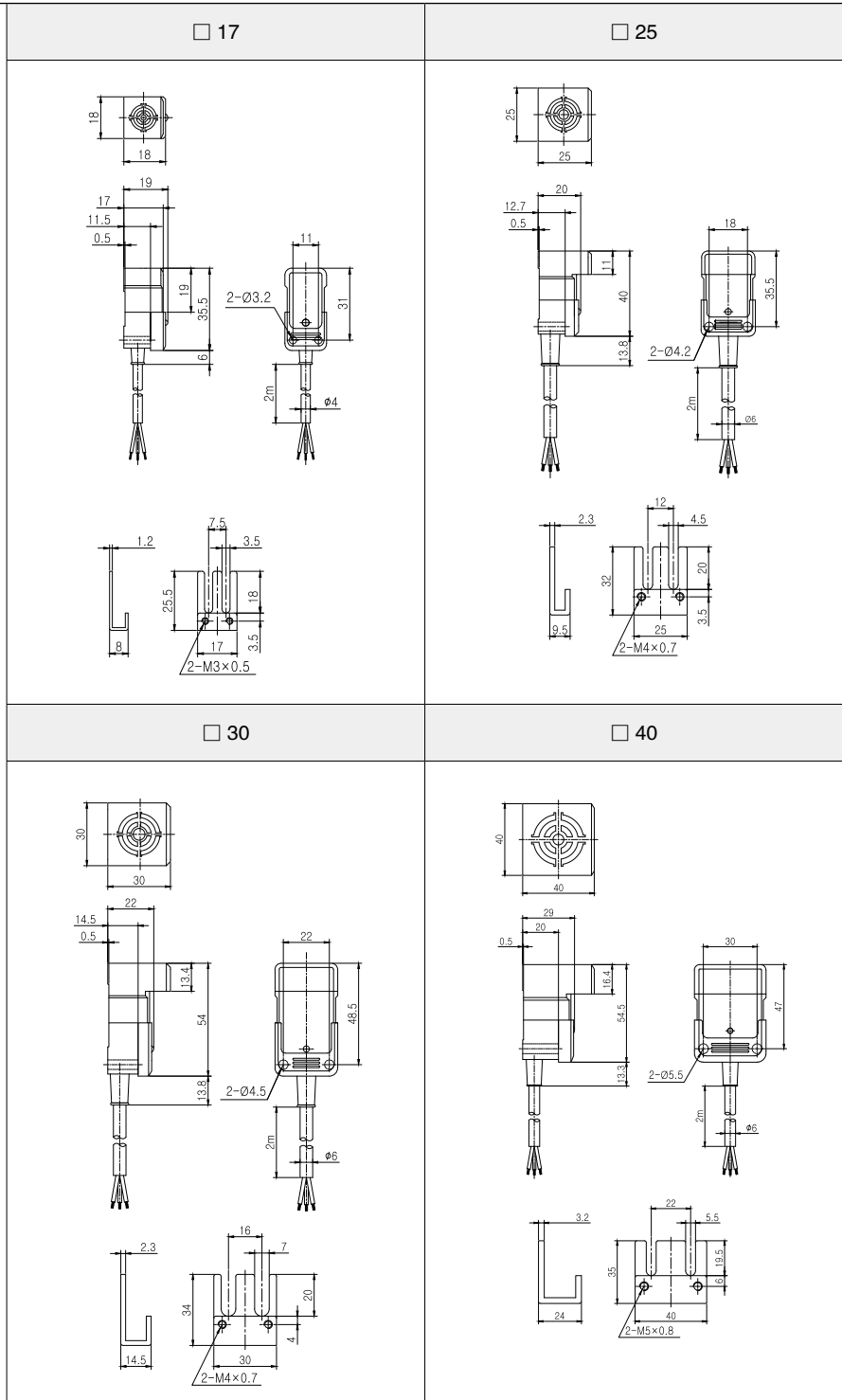


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I/O Circuit Diagram for DC 3-wire model

Control output	Timing chart	Output circuit
<p>NPN NO</p>		
<p>NPN NC</p>		
<p>PNP NO</p>		
<p>PNP NC</p>		



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DC 2-wire model (Shielded) - Cylindrical

Appearance	Sensing distance	Set distance	Response frequency	Connection method	Polarity	Operation mode	Model
Cylindrical	∅12	2.0mm ± 10%	0~1.6mm	Pre-wired	Polar	NO	IPX - 2D12 - 02A1
					Polar	NC	IPX - 2D12 - 02A2
					Non polar	NO	IPX - 2D12 - 02A1F
					Non polar	NC	IPX - 2D12 - 02A2F
				Connector	Polar	NO	IPX - 2D12 - 02A1R
					Polar	NC	IPX - 2D12 - 02A2R
					Non polar	NO	IPX - 2D12 - 02A1RF
					Non polar	NC	IPX - 2D12 - 02A2RF
				Wire connector	Polar	NO	IPX - 2D12 - 02A1W
					Polar	NC	IPX - 2D12 - 02A2W
					Non polar	NO	IPX - 2D12 - 02A1WF
					Non polar	NC	IPX - 2D12 - 02A2WF
	∅18	5.0mm ± 10%	0~4.0mm	Pre-wired	Polar	NO	IPX - 2D18 - 05A1
					Polar	NC	IPX - 2D18 - 05A2
					Non polar	NO	IPX - 2D18 - 05A1F
					Non polar	NC	IPX - 2D18 - 05A2F
				Connector	Polar	NO	IPX - 2D18 - 05A1R
					Polar	NC	IPX - 2D18 - 05A2R
					Non polar	NO	IPX - 2D18 - 05A1RF
					Non polar	NC	IPX - 2D18 - 05A2RF
				Wire connector	Polar	NO	IPX - 2D18 - 05A1W
					Polar	NC	IPX - 2D18 - 05A2W
					Non polar	NO	IPX - 2D18 - 05A1WF
					Non polar	NC	IPX - 2D18 - 05A2WF
∅30	10.0mm ± 10%	0~8.0mm	Pre-wired	Polar	NO	IPX - 2D30 - 10A1	
				Polar	NC	IPX - 2D30 - 10A2	
				Non polar	NO	IPX - 2D30 - 10A1F	
				Non polar	NC	IPX - 2D30 - 10A2F	
			Connector	Polar	NO	IPX - 2D30 - 10A1R	
				Polar	NC	IPX - 2D30 - 10A2R	
				Non polar	NO	IPX - 2D30 - 10A1RF	
				Non polar	NC	IPX - 2D30 - 10A2RF	
			Wire connector	Polar	NO	IPX - 2D30 - 10A1W	
				Polar	NC	IPX - 2D30 - 10A2W	
				Non polar	NO	IPX - 2D30 - 10A1WF	
				Non polar	NC	IPX - 2D30 - 10A2WF	

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DC 2-wire model (Unshielded) - Cylindrical

Appearance		Sensing distance	Set distance	Response frequency	Connection method	Polarity	Operation mode	Model
Cylindrical	Ø12	4.0mm ± 10%	0~3.2mm	400Hz	Pre-wired	Polar	NO	IPX - 2D12 - 04A1N
							NC	IPX - 2D12 - 04A2N
						Non polar	NO	IPX - 2D12 - 04A1NF
							NC	IPX - 2D12 - 04A2NF
					Connector	Polar	NO	IPX - 2D12 - 04A1RN
							NC	IPX - 2D12 - 04A2RN
						Non polar	NO	IPX - 2D12 - 04A1RNF
							NC	IPX - 2D12 - 04A2RNF
					Wire connector	Polar	NO	IPX - 2D12 - 04A1WN
							NC	IPX - 2D12 - 04A2WN
						Non polar	NO	IPX - 2D12 - 04A1WNF
							NC	IPX - 2D12 - 04A2WNF
	Ø18	8.0mm ± 10%	0~6.4mm	200Hz	Pre-wired	Polar	NO	IPX - 2D18 - 08A1N
							NC	IPX - 2D18 - 08A2N
						Non polar	NO	IPX - 2D18 - 08A1NF
							NC	IPX - 2D18 - 08A2NF
					Connector	Polar	NO	IPX - 2D18 - 08A1RN
							NC	IPX - 2D18 - 08A2RN
						Non polar	NO	IPX - 2D18 - 08A1RNF
							NC	IPX - 2D18 - 08A2RNF
					Wire connector	Polar	NO	IPX - 2D18 - 08A1WN
							NC	IPX - 2D18 - 08A2WN
						Non polar	NO	IPX - 2D18 - 08A1WNF
							NC	IPX - 2D18 - 08A2WNF
Ø30	15.0mm ± 10%	0~12.0mm	100Hz	Pre-wired	Polar	NO	IPX - 2D30 - 15A1N	
						NC	IPX - 2D30 - 15A2N	
					Non polar	NO	IPX - 2D30 - 15A1NF	
						NC	IPX - 2D30 - 15A2NF	
				Connector	Polar	NO	IPX - 2D30 - 15A1RN	
						NC	IPX - 2D30 - 15A2RN	
					Non polar	NO	IPX - 2D30 - 15A1RNF	
						NC	IPX - 2D30 - 15A2RNF	
				Wire connector	Polar	NO	IPX - 2D30 - 15A1WN	
						NC	IPX - 2D30 - 15A2WN	
					Non polar	NO	IPX - 2D30 - 15A1WNF	
						NC	IPX - 2D30 - 15A2WNF	

DC 2-wire model (Unshielded) - Rectangular

Appearance	Sensing distance	Set distance	Response frequency	Connection method	Polarity	Operation mode	Model	
Rectangular	17	5.0mm ± 10%	0~4.0mm	500Hz	Pre-wired	Polar	NO	IPX-2D17-05A1S
					Pre-wired	Polar	NC	IPX-2D17-05A2S
					Pre-wired	Non polar	NO	IPX-2D17-05A1SF
					Pre-wired	Non polar	NC	IPX-2D17-05A2SF
	25	5.0mm ± 10%	0~4.0mm	350Hz	Pre-wired	Polar	NO	IPX-2D25-05A1S
					Pre-wired	Polar	NC	IPX-2D25-05A2S
					Pre-wired	Non polar	NO	IPX-2D25-05A1SF
					Pre-wired	Non polar	NC	IPX-2D25-05A2SF
	30	10.0mm ± 10%	0~8.0mm	250Hz	Pre-wired	Polar	NO	IPX-2D30-10A1S
					Pre-wired	Polar	NC	IPX-2D30-10A2S
					Pre-wired	Non polar	NO	IPX-2D30-10A1SF
					Pre-wired	Non polar	NC	IPX-2D30-10A2SF
	40	20.0mm ± 10%	0~16.0mm	100Hz	Pre-wired	Polar	NO	IPX-2D40-20A1S
					Pre-wired	Polar	NC	IPX-2D40-20A2S
					Pre-wired	Non polar	NO	IPX-2D40-20A1SF
					Pre-wired	Non polar	NC	IPX-2D40-20A2SF

Specification for DC 2-wire model

Rated operating voltage		24VDC
Power supply voltage		10~30VDC
Detectable object		Ferrous metal
Differential travel		max. 10% of sensing distance
Control output		3~100mA
Leakage current		0.7mA max.
Indicator		red LED
Protection circuit		Surge suppressor, load short-circuit protect,
Ambient temperature	operating	-25 ° C~+70 ° C
	storage	-30 ° C~+80 ° C
Ambient humidity		35~95%RH
Insulation resistance		Minimum 100M (500VDC)
Dielectric strength		1,500VAC 50/60Hz for 1min.
Vibration resistance		10~55Hz double amplitude 1.5mm (at X, Y and Z axis) for 2hrs
Shock resistance		50G
Degree of protection		IP67
Materials	Case	Brass
Materials	Sensing surface	PBT

Dimensions for DC 2-wire model

DC 2-Wire Model	Ø12	
	Shielded	Unshielded
Pre-wired		
Connector		
Wired Connector		

Dimensions for DC 2-wire model

DC 2-Wire Model	Ø18	
	Shielded	Unshielded
Pre-wired		
Connector		
Wired Connector		

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Dimensions for DC 2-wire model

DC 2-Wire Model	Ø30	
	Shielded	Unshielded
Pre-wired		
Connector		
Wired Connector		

Dimensions for DC 3-wire model

DC 3-Wire Model
Rectangular

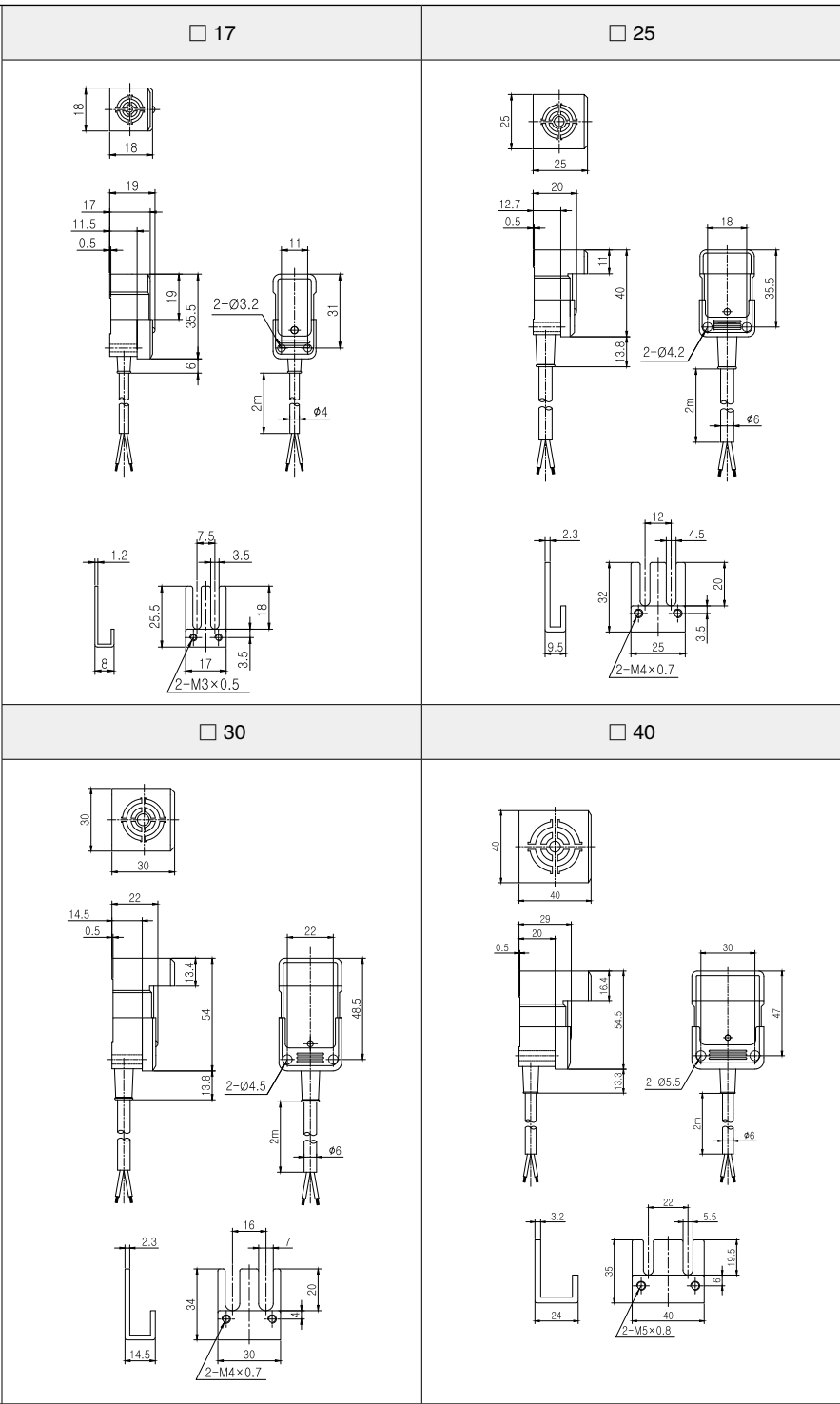


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I/O Circuit Diagram for DC 2-wire model

Control output	Timing chart	Output circuit
NO		
NC		

AC 2-wire model (Shielded) - Cylindrical

Appearance	Sensing distance	Set distance	Response frequency	Connection method	Operation mode	Model	
Cylindrical	Ø12	2.0mm ± 10%	0~1.6mm	20Hz	Pre-wired	NO	IPX - A12 - 02A1
						NC	IPX - A12 - 02A2
					Connector	NO	IPX - A12 - 02A1R
						NC	IPX - A12 - 02A2R
					Wire connector	NO	IPX - A12 - 02A1W
						NC	IPX - A12 - 02A2W
	Ø18	5.0mm ± 10%	0~4.0mm		Pre-wired	NO	IPX - A18 - 05A1
						NC	IPX - A18 - 05A2
					Connector	NO	IPX - A18 - 05A1R
						NC	IPX - A18 - 05A2R
					Wire connector	NO	IPX - A18 - 05A1W
						NC	IPX - A18 - 05A2W
Ø30	10.0mm ± 10%	0~8.0mm	Pre-wired	NO	IPX - A30 - 10A1		
				NC	IPX - A30 - 10A2		
			Connector	NO	IPX - A30 - 10A1R		
				NC	IPX - A30 - 10A2R		
			Wire connector	NO	IPX - A30 - 10A1W		
				NC	IPX - A30 - 10A2W		

AC 2-wire model (Unshielded) - Cylindrical

Appearance		Sensing distance	Set distance	Response frequency	Connection method	Operation mode	Model
Cylindrical	Ø12	4.0mm ± 10%	0~3.2mm	400Hz	Pre-wired	NO	IPX - A12 - 04A1N
						NC	IPX - A12 - 04A2N
					Connector	NO	IPX - A12 - 04A1RN
						NC	IPX - A12 - 04A2RN
					Wire connector	NO	IPX - A12 - 04A1WN
						NC	IPX - A12 - 04A2WN
	Ø18	8.0mm ± 10%	0~6.4mm	200Hz	Pre-wired	NO	IPX - A18 - 05A1N
						NC	IPX - A18 - 05A2N
					Connector	NO	IPX - A18 - 05A1RN
						NC	IPX - A18 - 05A2RN
					Wire connector	NO	IPX - A18 - 05A1WN
						NC	IPX - A18 - 05A2WN
Ø30	15.0mm ± 10%	0~12.0mm	100Hz	Pre-wired	NO	IPX - A30 - 10A1N	
					NC	IPX - A30 - 10A2N	
				Connector	NO	IPX - A30 - 10A1RN	
					NC	IPX - A30 - 10A2RN	
				Wire connector	NO	IPX - A30 - 10A1WN	
					NC	IPX - A30 - 10A2WN	

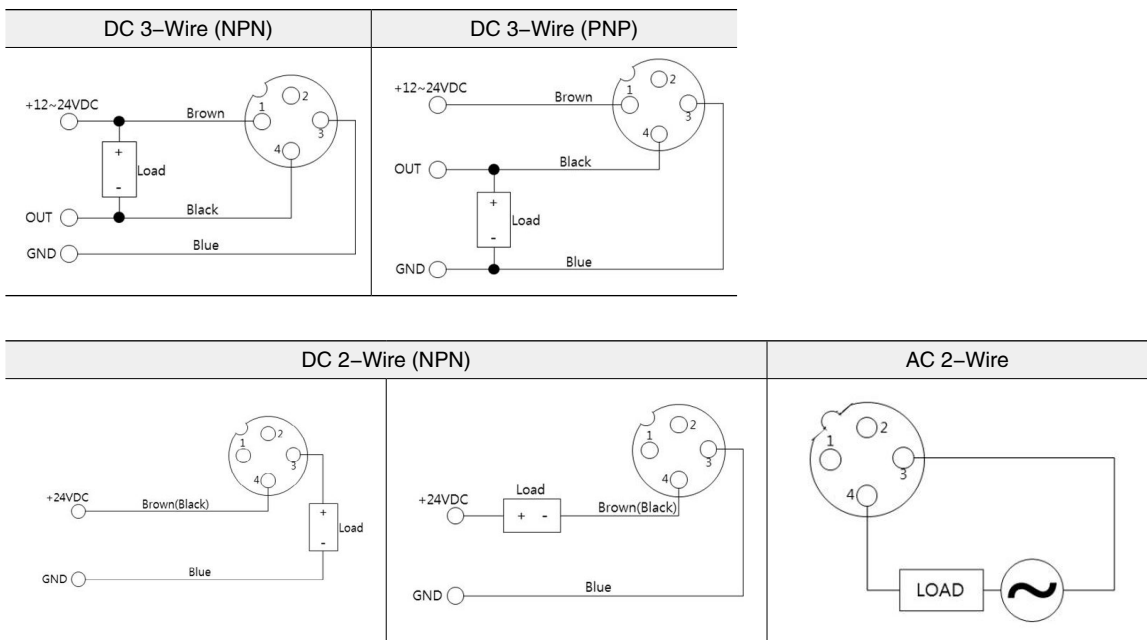
AC 2-wire model (Unshielded) - Rectangular

Appearance		Sensing distance	Set distance	Response frequency	Connection method	Operation mode	Model
Rectangular	25	5.0mm ± 10%	0~4.0mm	20Hz	Pre-wired	NO	IPX - A25 - 05A1S
						NC	IPX - A25 - 05A2S
	30	10.0mm ± 10%	0~8.0mm			NO	IPX - A30 - 10A1S
						NC	IPX - A30 - 10A2S
	40	20.0mm ± 10%	0~16.0mm			NO	IPX - A40 - 20A1S
						NC	IPX - A40 - 20A2S

Specification for AC 2-wire model

Rated operating voltage		110VAC
Power supply voltage		10~30VDC
Detectable object		90~250VAC(50/60Hz)
Differential travel		max. 10% of sensing distance
Control output		10~200mA
Indicator		red LED
Protection circuit		Surge suppressor
Ambient temperature	operating	- 15 ° C~+55 ° C
	storage	- 30 ° C~+80 ° C
Ambient humidity		35~95%RH
Insulation resistance		Minimum 100M (500VDC)
Dielectric strength		1,500VAC 50/60Hz for 1min.
Vibration resistance		10~55Hz double amplitude 1.5mm(at X, Y and Z axis) for 2hrs
Shock resistance		50G
Degree of protection		IP67
Materials	Case	Brass
	Sensing surface	PBT

Connector Diagram



Dimensions for AC 2-wire model

AC 2-Wire Model	Ø12	
	Shielded	Unshielded
Pre-wired		
Connector		
Wired Connector		

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Dimensions for AC 2-wire model

AC 2-Wire Model	Ø18	
	Shielded	Unshielded
Pre-wired		
Connector		
Wired Connector		



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Dimensions for DC 3-wire model

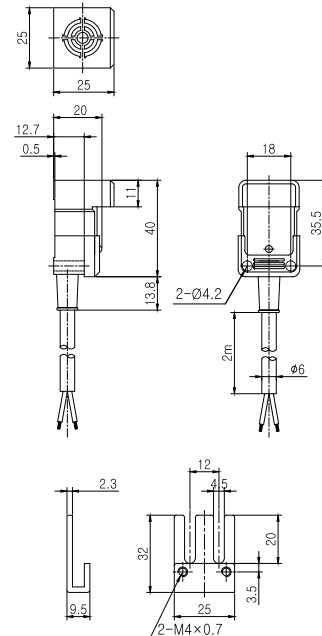
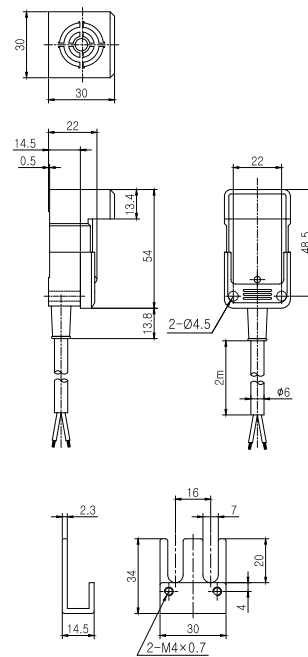
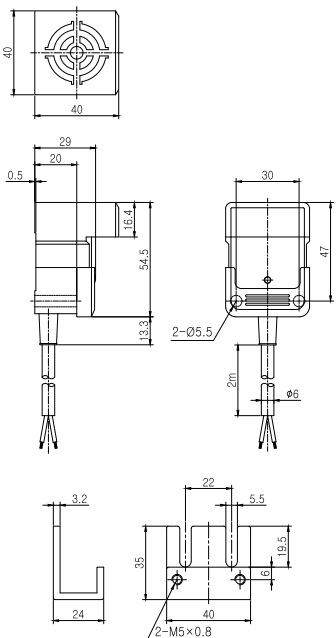
DC 3-Wire Model Rectangular	□ 17	□ 25
	None	
	□ 30	□ 40
		

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I/O Circuit Diagram for AC 2-wire model

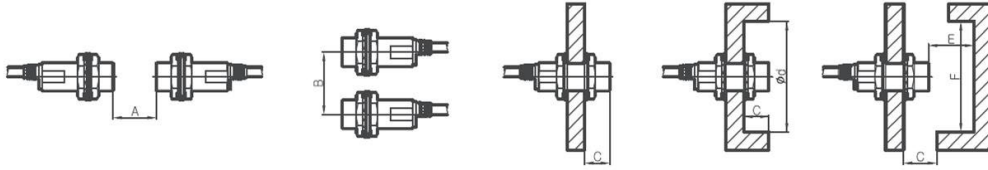
Control output	Timing chart	Output circuit
NO		
NC		

Influence of sensitivity with materials of detecting object

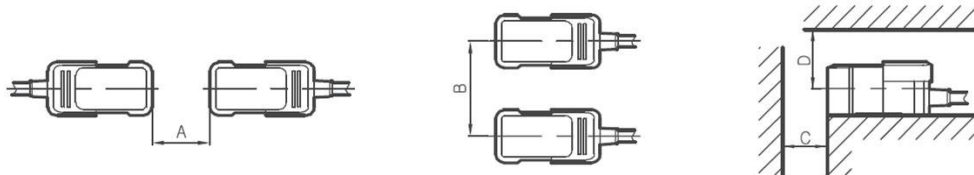
Material	Sensing distance
Iron	100%
Stainless steel	60%
Brass	40%
Aluminum	30%
Copper	28%

PROXIMITY SENSORS

Mutual interference and influence of surrounding metal



	IPX - A12 - 02 IPX - D12 - 02 IPX - 2D12 - 02	IPX - A12 - 05 IPX - D12 - 05 IPX - 2D12 - 05	IPX - A18 - 05 IPX - D18 - 05 IPX - 2D18 - 05	IPX - A18 - 08 IPX - D18 - 08 IPX - 2D18 - 08	IPX - A30 - 10 IPX - D30 - 10 IPX - 2D30 - 10	IPX - A30 - 15 IPX - D30 - 15 IPX - 2D30 - 15
A	12	30	30	48	60	90
B	24	36	36	54	60	90
C	0	11	0	14	0	18
D	12	36	18	54	30	90
E	6	15	15	24	30	45
F	18	36	27	54	45	90



	IPX - D17 - 05 IPX - 2D17 - 05	IPX - D25 - 05 IPX - A25 - 05 IPX - 2D25 - 05	IPX - D30 - 10 IPX - A30 - 10 IPX - 2D30 - 10	IPX - D40 - 20 IPX - A40 - 20 IPX - 2D40 - 20
A	30	30	60	120
B	36	50	60	80
C	15	15	30	60
D	24	25	30	45

PHOTO SENSOR

PROXIMITY SENSOR

WATER LEVEL CONTROLLER

PID TEMP. CONTROLLER