



PROXIMITY SENSORS

IPX SERIES

OVERVIEW

Standard sensors for detecting metals

IP-Rating : IP67



CLASSIFICATION

IPX - D 18 - 05 E1 R N □
 ① ② ③ ④ ⑤
 ⑥ ⑦

① Type	A		AC 2-Wire Model		
	D		DC 3-Wire Model		
	2D		DC 2-Wire Model		
② Shape / Size	Rectangular	12	Ø12		
		18	Ø18		
		30	Ø30		
	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			



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DC 3-wire model (Shielded) - Cylindrical

Appearance		Sensing distance	Set distance	Response frequency	Connection method	Operation mode	Model
Cylindrical 1	Ø12	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
	Ø18	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
Ø30	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	



PROXIMITY SENSORS

DC 3-wire model (Unshielded) - Cylindrical

Appearance		Sensing distance	Set distance	Response frequency	Connection method	Operation mode	Model
Cylindrical 1	Ø12	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
	Ø18	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
Ø30	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	500Hz	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	350Hz		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	250Hz		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	100Hz		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 50MΩ (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		



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Dimensions for DC 3-wire model

DC 3-Wire Model	Ø18	
	Shielded	Unshielded
Pre-wired		
Connector	<p style="text-align: center;">AC DC</p>	<p style="text-align: center;">AC DC</p>
Wired Connector	<p style="text-align: center;">AC DC</p>	<p style="text-align: center;">AC DC</p>

Dimensions for DC 3-wire model

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

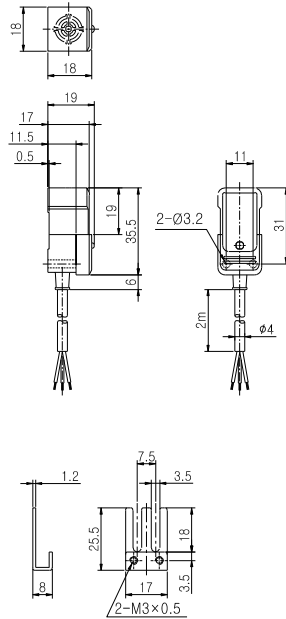


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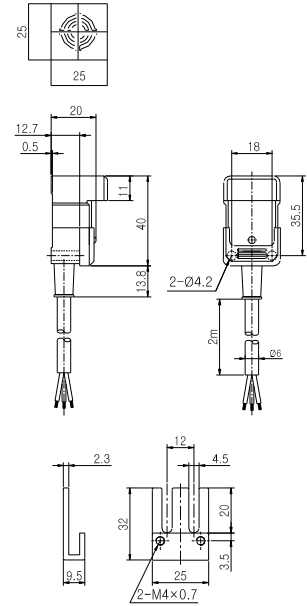
Dimensions for DC 3-wire model

DC 3-Wire Model
Rectangular

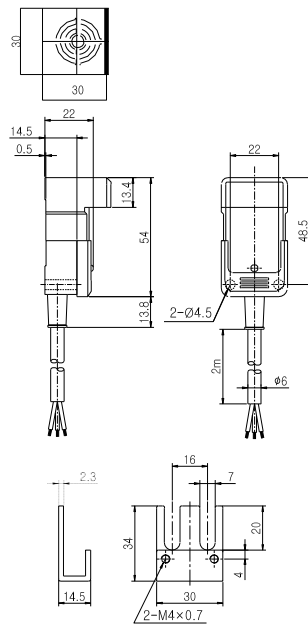
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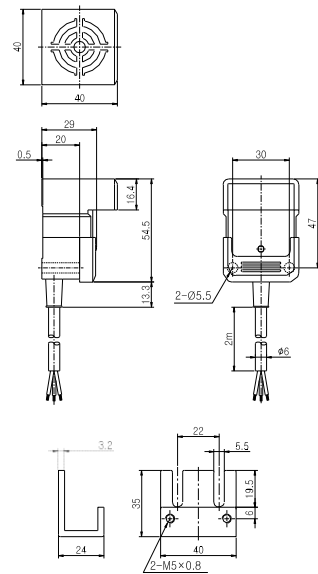
□ 25



□ 30



□ 40





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I/O Circuit Diagram for DC 3-wire model

Control output	Timing chart	Output circuit
NPN NO		
NPN NC		
PNP NO		
PNP NC		



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DC 2-wire model (Shielded) - Cylindrical

Appearance		Sensing distance	Set distance	Response frequency	Connection method	Polarity	Operation mode	Model				
Cylindrical 1	Ø12	2.0mm ±10%	0~1.6mm	600Hz	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				
	Ø18	5.0mm ±10%	0~4.0mm	400Hz	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				
					Ø30	10.0mm ±10%	0~8.0mm	250Hz	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									



PROXIMITY SENSORS

DC 2-wire model (Unshielded) - Cylindrical

Appearance		Sensing distance	Set distance	Response frequency	Connection method	Polarity	Operation mode	Model	
Cylindrical 1	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	



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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 100MΩ (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



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Dimensions for DC 2-wire model

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



PROXIMITY SENSORS

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

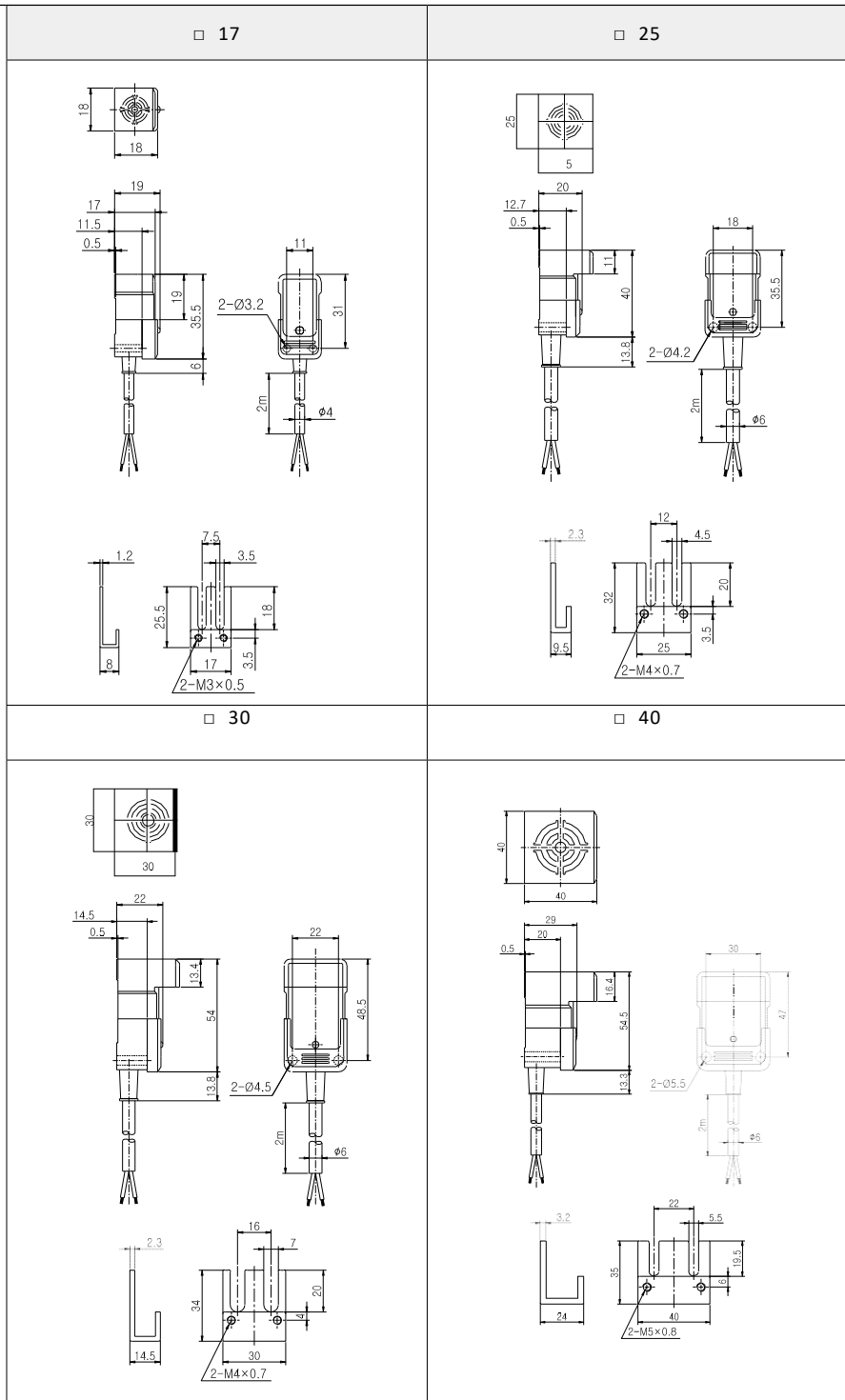
DC 2-Wire Model	Ø30	
	Shielded	Unshielded
Pre-wired		
Connector		
Wired Connector		



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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 1	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	20Hz	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	20Hz	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	



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AC 2-wire model (Unshielded) - Cylindrical

Appearance		Sensing distance	Set distance	Response frequency	Connection method	Operation mode	Model
Cylindrical 1	Ø12	4.0mm±10%	0~3.2mm	400Hz	Pre-wired	NO	IPX-A12-04A1N
						NC	IPX-A12-04A2N
						Connector	NO
						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
						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

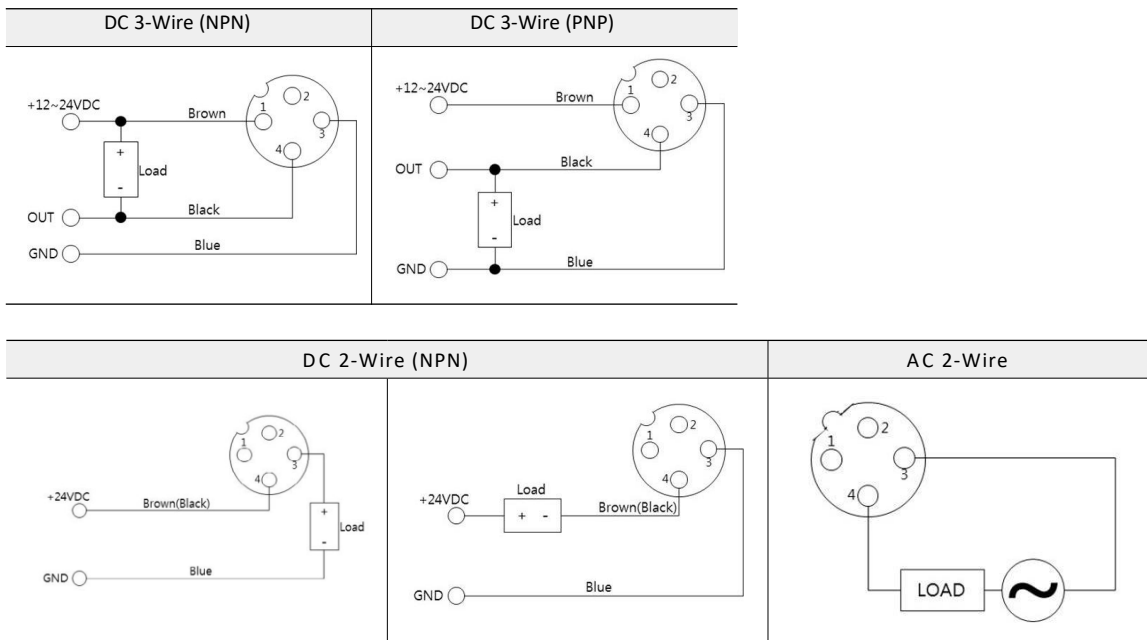


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Specification for AC 2-wire model

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 100MΩ (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





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Dimensions for AC 2-wire model

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



PROXIMITY SENSORS

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

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



PROXIMITY SENSORS

I/O Circuit Diagram for AC 2-wire model

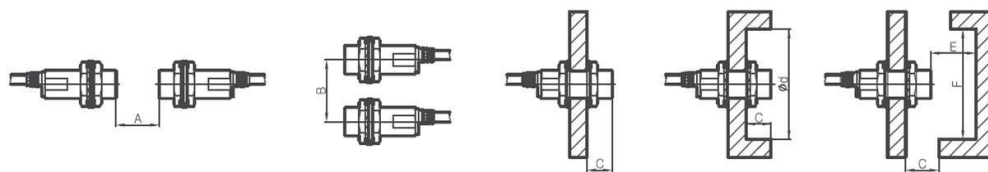
Control output	Timing chart	Output circuit
NO	<p> Sensing object Present Not present Control output (between brown and blue) ON OFF Operation indicator ON OFF </p>	
NC	<p> Sensing object Present Not present Control output (between brown and blue) ON OFF Operation indicator ON OFF </p>	

Influence of sensitivity with materials of detecting object

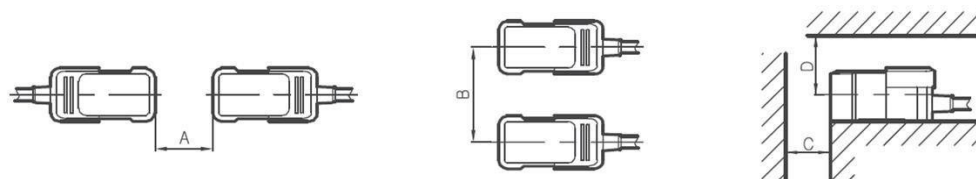
Material	Sensing distance
Iron	100%
Stainless steel	60%
Brass	40%
Aluminum	30%
Copper	28%

PROXIMITY SENSORS

Mutual interference and influence of surrounding metal



	IPX-A12-02 □□□□	IPX-A12-05 □□□□	IPX-A18-05 □□□□	IPX-A18-08 □□□□	IPX-A30-10 □□□□	IPX-A30-15 □□□□
	IPX-D12-02 □□□□	IPX-D12-05 □□□□	IPX-D18-05 □□□□	IPX-D18-08 □□□□	IPX-D30-10 □□□□	IPX-D30-15 □□□□
	IPX-2D12-02 □□□□	IPX-2D12-05 □□□□	IPX-2D18-05 □□□□	IPX-2D18-08 □□□□	IPX-2D30-10 □□□□	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-D25-05 □□□□	IPX-D30-10 □□□□	IPX-D40-20 □□□□
	IPX-2D17-05 □□□□	IPX-A25-05 □□□□	IPX-A30-10 □□□□	IPX-A40-20 □□□□
		IPX-2D25-05 □□□□	IPX-2D30-10 □□□□	IPX-2D40-20 □□□□
A	30	30	60	120
B	36	50	60	80
C	15	15	30	60
D	24	25	30	45

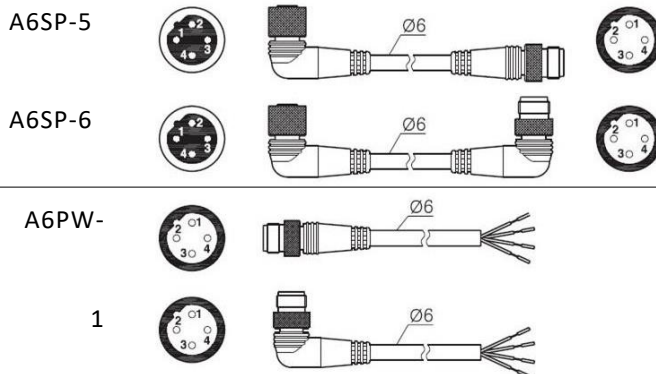
PROXIMITY SENSORS

IPW CONNECTOR CABLE

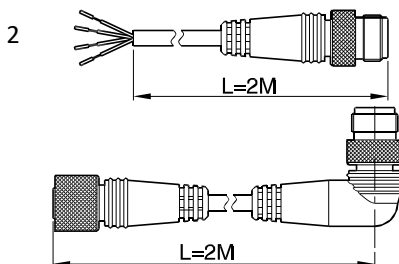
DC model			
D6SW-			
1			
D6SW-			
2			
D6SP-3			
D6SP-4			
D6SP-5			
D6SP-6			
D6PW-1			
D6PW-2			
AC model			
A6SW-			
1			
A6SW-			
2			
A6SP-3			

PROXIMITY SENSORS

AC model

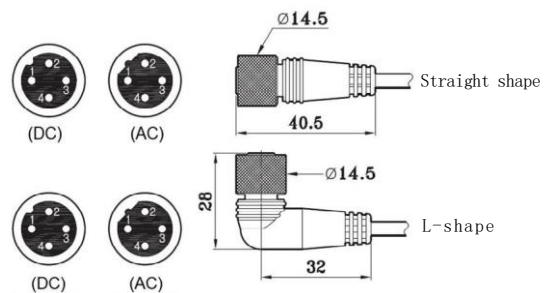


A6PW-

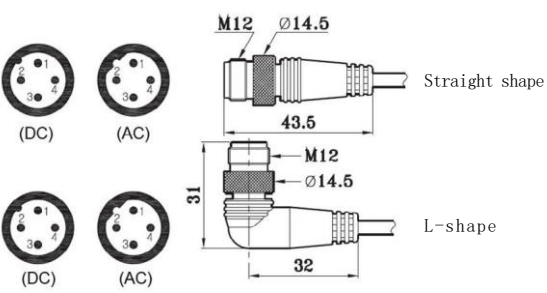


Dimensions

Socket



Plug



Wiring Diagram

