

PART2

PROXIMITYSENSOR

PROXIMITY SENSOR

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PROXIMITY SENSOR

KPX Series

	Model	Dimensions	Shielded/ Unshielded	Rated Operating Distance	Power	Certification
	KPX-D04-X8E1M (Discontinued)	Cylindrical Ø4mm	Shielded	0.8mm ± 15%	12~24VDC (10~30VDC)	
	KPX-D08-01E1M KPX-D08-01E3M	Cylindrical Ø8mm	Shielded	1.0mm ± 15%		
	KPX-D08-2E1MN KPX-D08-2E3MN	Cylindrical Ø8mm	Unshielded	2.0mm ± 15%		

IPX Series

DC 3-wires Cylindrical Pre-wired Type

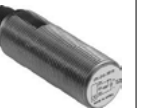
Ø12mm		Ø18mm		Ø30mm	
Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
					
IPX-D12-02E1	IPX-D12-04E1N	IPX-D18-05E1	IPX-D18-08E1N	IPX-D30-10E1	IPX-D30-15E1N
IPX-D12-02E2	IPX-D12-04E2N	IPX-D18-05E2	IPX-D18-08E2N	IPX-D30-10E2	IPX-D30-15E2N
IPX-D12-02E3	IPX-D12-04E3N	IPX-D18-05E3	IPX-D18-08E3N	IPX-D30-10E3	IPX-D30-15E3N
IPX-D12-02E4	IPX-D12-04E4N	IPX-D18-05E4	IPX-D18-08E4N	IPX-D30-10E4	IPX-D30-15E4N
2.0mm ± 10%	4.0mm ± 10%	5.0mm ± 10%	8.0mm ± 10%	10.0mm ± 10%	15.0mm ± 10%

Rated Operating Voltage: 12~24VDC (Supply Voltage: 10~30VDC)

CE Certified Product (CE: EN 55011 / 60947-5-2)

IPX Series

DC 3-wires Cylindrical Connector Type

Ø12mm		Ø18mm		Ø30mm	
Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
					
IPX-D12-02E1R	IPX-D12-04E1RN	IPX-D18-05E1R	IPX-D18-08E1RN	IPX-D30-10E1R	IPX-D30-15E1RN
IPX-D12-02E2R	IPX-D12-04E2RN	IPX-D18-05E2R	IPX-D18-08E2RN	IPX-D30-10E2R	IPX-D30-15E2RN
IPX-D12-02E3R	IPX-D12-04E3RN	IPX-D18-05E3R	IPX-D18-08E3RN	IPX-D30-10E3R	IPX-D30-15E3RN
IPX-D12-02E4R	IPX-D12-04E4RN	IPX-D18-05E4R	IPX-D18-08E4RN	IPX-D30-10E4R	IPX-D30-15E4RN
2.0mm ± 10%	4.0mm ± 10%	5.0mm ± 10%	8.0mm ± 10%	10.0mm ± 10%	15.0mm ± 10%

Rated Operating Voltage: 12~24VDC (Supply Voltage: 10~30VDC)

CE Certified Product (CE: EN 55011 / 60947-5-2)

IPX Series

DC 3-wires Cylindrical Wire Connector Type

Ø12mm		Ø18mm		Ø30mm	
Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
IPX-D12-02E1W	IPX-D12-04E1WN	IPX-D18-05E1W	IPX-D18-08E1WN	IPX-D30-10E1W	IPX-D30-15E1WN
IPX-D12-02E2W	IPX-D12-04E2WN	IPX-D18-05E2W	IPX-D18-08E2WN	IPX-D30-10E2W	IPX-D30-15E2WN
IPX-D12-02E3W	IPX-D12-04E3WN	IPX-D18-05E3W	IPX-D18-08E3WN	IPX-D30-10E3W	IPX-D30-15E3WN
IPX-D12-02E4W	IPX-D12-04E4WN	IPX-D18-05E4W	IPX-D18-08E4WN	IPX-D30-10E4W	IPX-D30-15E4WN
2.0mm ± 10%	4.0mm ± 10%	5.0mm ± 10%	8.0mm ± 10%	10.0mm ± 10%	15.0mm ± 10%
Rated Operating Voltage: 12~24VDC (Supply Voltage: 10~30VDC)					
CE Certified Product (CE: EN 55011 / 60947-5-2)					

IPX Series

DC 3-wires RectRectangular Pre-wired Type

□ 17mm	□ 25mm	□ 30mm	□ 40mm
IPX-D17-05E1S	IPX-D25-05E1S	IPX-D30-10E1S	IPX-D40-20E1S
IPX-D17-05E2S	IPX-D25-05E2S	IPX-D30-10E2S	IPX-D40-20E2S
IPX-D17-05E3S	IPX-D25-05E3S	IPX-D30-10E3S	IPX-D40-20E3S
IPX-D17-05E4S	IPX-D25-05E4S	IPX-D30-10E4S	IPX-D40-20E4S
5.0mm ± 10%	5.0mm ± 10%	10.0mm ± 10%	20.0mm ± 10%
Rated Operating Voltage: 12~24VDC (Supply Voltage: 10~30VDC)			
CE Certified Product (CE: EN 55011 / 60947-5-2)			

IPX Series

AC 2-wires Cylindrical Pre-wired Type

Ø12mm		Ø18mm		Ø30mm	
Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
IPX-A12-02A1	IPX-A12-04A1N	IPX-A18-05A1	IPX-A18-08A1N	IPX-A30-10A1	IPX-A30-15A1N
IPX-A12-02A2	IPX-A12-04A2N	IPX-A18-05A2	IPX-A18-08A2N	IPX-A30-10A2	IPX-A30-15A2N
2.0mm ± 10%	4.0mm ± 10%	5.0mm ± 10%	8.0mm ± 10%	10.0mm ± 10%	15.0mm ± 10%
Rated Operating Voltage: 110VAC (Power Supply Voltage: 90~250VAC, 50/60Hz)					
CE Certified Product (CE: EN 55011 / 60947-5-2)					

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

S Floatless controller

T Temp. controller

PROXIMITY SENSOR

IPX Series

AC 2-wires Cylindrical Connector Type

Ø12mm		Ø18mm		Ø30mm	
Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
					
IPX-A12-02A1R	IPX-A12-04A1RN	IPX-A18-05A1R	IPX-A18-08A1RN	IPX-A30-10A1R	IPX-A30-15A1RN
IPX-A12-02A2R	IPX-A12-04A2RN	IPX-A18-05A2R	IPX-A18-08A2RN	IPX-A30-10A2R	IPX-A30-15A2RN
2.0mm ± 10%	4.0mm ± 10%	5.0mm ± 10%	8.0mm ± 10%	10.0mm ± 10%	15.0mm ± 10%
Rated Operating Voltage: 110VAC (Power Supply Voltage: 90~250VAC, 50/60Hz)					
CE Certified Products (CE: EN 60947-1 / 60947-5-2)					

IPX Series

AC 2-wires Cylindrical Wire Connector Type

Ø12mm		Ø18mm		Ø30mm	
Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
					
IPX-A12-02A1W	IPX-A12-04A1WN	IPX-A18-05A1W	IPX-A18-08A1WN	IPX-A30-10A1W	IPX-A30-15A1WN
IPX-A12-02A2W	IPX-A12-04A2WN	IPX-A18-05A2W	IPX-A18-08A2WN	IPX-A30-10A2W	IPX-A30-15A2WN
2.0mm ± 10%	4.0mm ± 10%	5.0mm ± 10%	8.0mm ± 10%	10.0mm ± 10%	15.0mm ± 10%
Rated Operating Voltage: 110VAC (Power Supply Voltage: 90~250VAC, 50/60Hz)					
CE Certified Products (CE: EN 60947-1 / 60947-5-2)					

IPX Series

AC 2-wires RectRectangular Pre-wired Type

□ 25mm	□ 30mm	□ 40mm
		
IPX-A25-05A1S	IPX-A30-10A1S	IPX-A40-20A1S
IPX-A25-05A2S	IPX-A30-10A2S	IPX-A40-20A2S
5.0mm ± 10%	10.0mm ± 10%	20.0mm ± 10%
Certified Product, Rated Operating Voltage: 110VAC (Power Supply Voltage: 90~250VAC, 50/60Hz)		
CE Certified Products (CE: EN 60947-1 / 60947-5-2)		

IPX Series

DC 2-wires Cylindrical Pre-wired Type

Ø12mm		Ø18mm		Ø30mm	
Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
IPX-2D12-02A1	IPX-2D12-04A1N	IPX-2D18-05A1	IPX-2D18-08A1N	IPX-2D30-10A1	IPX-2D30-15A1N
IPX-2D12-02A2	IPX-2D12-04A2N	IPX-2D18-05A2	IPX-2D18-08A2N	IPX-2D30-10A2	IPX-2D30-15A2N
IPX-2D12-02A1F	IPX-2D12-04A1NF	IPX-2D18-05A1F	IPX-2D18-08A1NF	IPX-2D30-10A1F	IPX-2D30-15A1NF
IPX-2D12-02A2F	IPX-2D12-04A2NF	IPX-2D18-05A2F	IPX-2D18-08A2NF	IPX-2D30-10A2F	IPX-2D30-15A2NF
2.0mm ± 10%	4.0mm ± 10%	5.0mm ± 10%	8.0mm ± 10%	10.0mm ± 10%	15.0mm ± 10%

Rated Operating Voltage: 24VDC (Supply Voltage: 15~30VDC)

CE Certified Product (CE: EN 60947-5-2)

IPX Series

DC 2-wires Cylindrical Connector Type

Ø12mm		Ø18mm		Ø30mm	
Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
IPX-2D12-02A1R	IPX-2D12-04A1RN	IPX-2D18-05A1R	IPX-2D18-08A1RN	IPX-2D30-10A1R	IPX-2D30-15A1RN
IPX-2D12-02A2R	IPX-2D12-04A2RN	IPX-2D18-05A2R	IPX-2D18-08A2RN	IPX-2D30-10A2R	IPX-2D30-15A2RN
IPX-2D12-02A1RF	IPX-2D12-04A1RNF	IPX-2D18-05A1RF	IPX-2D18-08A1RNF	IPX-2D30-10A1RF	IPX-2D30-15A1RNF
IPX-2D12-02A2RF	IPX-2D12-04A2RNF	IPX-2D18-05A2RF	IPX-2D18-08A2RNF	IPX-2D30-10A2RF	IPX-2D30-15A2RNF
2.0mm ± 10%	4.0mm ± 10%	5.0mm ± 10%	8.0mm ± 10%	10.0mm ± 10%	15.0mm ± 10%

Rated Operating Voltage: 24VDC (Supply Voltage: 15~30VDC)

CE Certified Product (CE: EN 60947-5-2)

IPX Series

DC 2-wires Cylindrical Wire Connector Type

Ø12mm		Ø18mm		Ø30mm	
Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
IPX-2D12-02A1W	IPX-2D12-04A1WN	IPX-2D18-05A1W	IPX-2D18-08A1WN	IPX-2D30-10A1W	IPX-2D30-15A1WN
IPX-2D12-02A2W	IPX-2D12-04A2WN	IPX-2D18-05A2W	IPX-2D18-08A2WN	IPX-2D30-10A2W	IPX-2D30-15A2WN
IPX-2D12-02A1WF	IPX-2D12-04A1WNF	IPX-2D18-05A1WF	IPX-2D18-08A1WNF	IPX-2D30-10A1WF	IPX-2D30-15A1WNF
IPX-2D12-02A2WF	IPX-2D12-04A2WNF	IPX-2D18-05A2WF	IPX-2D18-08A2WNF	IPX-2D30-10A2WF	IPX-2D30-15A2WNF
2.0mm ± 10%	4.0mm ± 10%	5.0mm ± 10%	8.0mm ± 10%	10.0mm ± 10%	15.0mm ± 10%

Rated Operating Voltage: 24VDC (Supply Voltage: 15~30VDC)

CE Certified Product (CE: EN 60947-5-2)

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

S Floatless controller

T Temp. controller

PROXIMITY SENSOR

IPX Series

DC 2-wires RectRectangular Pre-wired Type

□ 17mm	□ 25mm	□ 30mm	□ 40mm
			
IPX-2D17-05A1S	IPX-2D25-05A1S	IPX-2D30-10A1S	IPX-2D40-20A1S
IPX-2D17-05A2S	IPX-2D25-05A2S	IPX-2D30-10A2S	IPX-2D40-20A2S
IPX-2D17-05A1SF	IPX-2D25-05A1SF	IPX-2D30-10A1SF	IPX-2D40-20A1SF
IPX-2D17-05A2SF	IPX-2D25-05A2SF	IPX-2D30-10A2SF	IPX-2D40-20A2SF
5.0mm ± 10%	5.0mm ± 10%	10.0mm ± 10%	20.0mm ± 10%
Rated Operating Voltage: 24VDC (Supply Voltage: 15~30VDC)			
CE Certified Product (CE: EN 60947-5-2)			

IPX Series

Connector Cable

DC	AC
IPW-D6SW-1	IPW-A6SW-1
IPW-D6SW-2	IPW-A6SW-2
IPW-D6SP-3	IPW-A6SP-3
IPW-D6SP-4	IPW-A6SP-4
IPW-D6SP-5	IPW-A6SP-5
IPW-D6SP-6	IPW-A6SP-6
IPW-D6PW-1	IPW-A6PW-1
IPW-D6PW-2	IPW-A6PW-2
CE Certified Product (CE: EN 60947-5-2)	

CPX Series

DC 3-wires Capacitive Proximity Sensor

Ø18mm	Ø30mm
	
CPX-D18-08E1N	CPX-D30-15E1N
CPX-D18-08E2N	CPX-D30-15E2N
CPX-D18-08E3N	CPX-D30-15E3N
CPX-D18-08E4N	CPX-D30-15E4N
8.0mm ± 10%	15.0mm ± 10%
Rated Operating Voltage: 12~24VDC (Supply Voltage: 10~30VDC)	

PROXIMITY SENSOR

CPX Series

AC/DC 2-wires Capacitive Proximity Sensor

Ø18mm	Ø30mm
	
CPX-C18-08A1N	CPX-C30-15A1N
CPX-C18-08A2N	CPX-C30-15A2N
8.0mm ± 10%	15.0mm ± 10%
Rated Operating Voltage: AC/DC 20~240V (Power Supply Voltage: AC/DC 18~250V)	

KLS Series

Product	Model	Applicable Pipe	Time Specifications	Control Output	Operation Mode	Certification
	KLS-3A	Ø12~26	0~3 sec	NPN Open Collector	NO	CE
	KLS-3B				NC	

KMS Series

Product	Model	Rated Current	Rated Current	Contact Resistance	Certification
	KMS-1C	3A	24VDC	50m Ω max. (initial value)	

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

S Floatless controller

T Temp. controller

PROXIMITY SENSOR

KPX Series

Features

- Ingress Protection: IP 67

KPX-D04-X8 E □ M
(Discontinued)

KPX-D08-01 E □ M
(Shielded Type)

KPX-D08-02 E □ MN
(Unshielded Type)



Specifications

Model Name	NPN NO	KPX-D04-X8E1M (Discontinued)	KPX-D08-01E1M	KPX-D08-02E1MN
	PNP NO	—	KPX-D08-01E3M	KPX-D08-02E3MN
Dimensions		Cylindrical		
Outer Diameter		Ø4mm	Ø8mm	
Detection Range		0.8mm ± 15%	1.0mm ± 15%	2.0mm ± 15%
Set Distance		0 ~0.5mm	0 ~0.7mm	0 ~1.6mm
Response Distance		15% max. (at detection distance)	10% max. (at detection distance)	
Standard Test Object		Iron: 5 × 5 × 1mm	Iron: 8 × 8 × 1mm	
Object		Magnetic and non-magnetic metals		
Power Supply Voltage		12~24VDC (DC10~30V)		
Current Consumption		5 mA max. (at DC24V)	10 mA max. (at DC24V)	
Response Frequency		1 kHz	1 kHz	800 Hz
Residual Voltage		2.0V max.		
Output Current		80 mA max.	100 mA max.	
Output Type		NPN Open Collector NO	NPN or PNP Open Collector NO	
Operation Indicator		None	Operation Pilot Light (Red LED)	
Ingress Protection		IP 67		
Wiring		Wiring Connection Type		
Insulation Resistance Meter			50MΩ min. (DC 500V Insulation Resistance Meter)	
Withstand Voltage		Between Charging Section and Non-Charging Section: 500VAC (50/60Hz) for 1 minute	Between Charging Section and Non-Charging Section: 1,000VAC (50/60Hz) for 1 minute	
Operating Ambient Temperature		-25°C to +70°C (without freezing)		
Storage Temperature Range		-30°C to +80°C (without freezing)		
Ambient Operating Humidity		35~95%RH		
Vibration Resistance		10 to 55 Hz, Double amplitude 1.5 mm, 2 hours per axis		
Shock Resistance		Approx. 50G (500 ㏹), 3 axis in each direction		
Material		Housing: STAINLESS Detection Surface: PP (Blue)	Housing: Brass (Chrome Plated) Detection Surface: PP (Blue)	
Weight		Approx. 21g	Approx. 46g	
Wiring		2m		

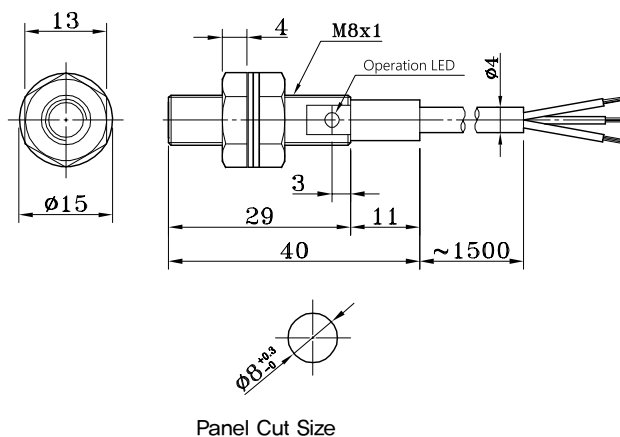
PROXIMITY SENSOR

Dimensions

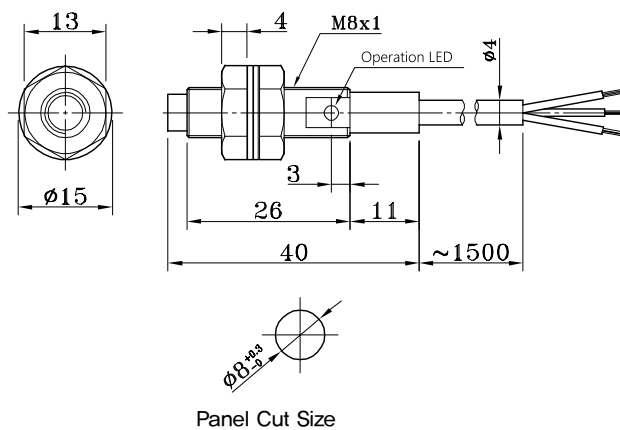
KPX-D04-X8 E □ M (Shielded Type – Discontinued)



KPX-D08-01 E □ M (Shielded Type)



KPX-D08-02 E □ MN (Unshielded)



K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

S Floatless controller

T Temp. controller

PROXIMITY SENSOR

IPX Series

Features

- DC 3-wires  Certified
- AC 2-wires  Certified
- DC 2-wires  Certified



Classification

IPX-D18-05E1RN □

Power Connection	A	AC 2-wires	
	D	DC 3-wires	
	2D	DC 2-wires	
Outer Dimensions	Number	Cylindrical: 12, 18, 30	
		Rectangular: 17, 25, 30, 40	
Detection Range	Number	Rated Operating Distance (Sn)	
Control Output	E1	NPN NO Voltage Output	For DC 3-wires type
	E2	NPN NC Voltage Output	
	E3	PNP NO Voltage Output	
	E4	PNP NC Voltage Output	For AC 2-wires type For DC 2-wires type
	A1	NO Voltage Output	
	A2	NC Voltage Output	
Dimensions and Connection Method	No Marking	Cylindrical, Pre-wired	
	R	Cylindrical, Connector	
	W	Cylindrical, Wire Connector	
	S	Rectangular, Pre-wired	
Shielded/Unshielded	No Marking	Shielded	
	N	Unshielded	
Polarity	F		
	No Marking	Polarity Type	

PROXIMITY SENSOR



DC 3-wires Cylindrical Pre-wired Type Inductive Proximity Sensor

Specifications

 Certified Product		Ø 12		Ø 18		Ø 30	
		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
NPN	NO	IPX-D12-02E1	IPX-D12-04E1N	IPX-D18-05E1	IPX-D18-08E1N	IPX-D30-10E1	IPX-D30-15E1N
	NC	IPX-D12-02E2	IPX-D12-04E2N	IPX-D18-05E2	IPX-D18-08E2N	IPX-D30-10E2	IPX-D30-15E2N
PNP	NO	IPX-D12-02E3	IPX-D12-04E3N	IPX-D18-05E3	IPX-D18-08E3N	IPX-D30-10E3	IPX-D30-15E3N
	NC	IPX-D12-02E4	IPX-D12-04E4N	IPX-D18-05E4	IPX-D18-08E4N	IPX-D30-10E4	IPX-D30-15E4N
Rated Operating Distance		2.0 mm ± 10%	4.0 mm ± 10%	5.0 mm ± 10%	8.0 mm ± 10%	10.0 mm ± 10%	15.0 mm ± 10%
Set Distance		0~1.6 mm	0~3.2 mm	0~4.0 mm	0~6.4 mm	0~8.0 mm	0~12.0 mm
Response Frequency		600 Hz	400 Hz	400 Hz	200 Hz	250 Hz	100 Hz
Rated Operating Voltage		12~24VDC					
Power Supply Voltage		10~30VDC					
Control Output Current		200 mA max,					
Current Consumption		10 mA max,					
Object		Magnetic and non-magnetic metals					
Response Distance		10% max. of detection distance					
Operation Indicator Light		Red LED					
Surge Protection Circuit		Included					
Overcurrent Protection Circuit		Included					
Reverse Voltage Protection Circuit		Included					
Operating Ambient Temperature		-25°C to +70°C					
Storage Ambient Temperature		-30°C to +80°C					
Ambient Operating Humidity		35~95%RH					
Ingress Protection		IP67					
Connection		Pre-wired					
Wiring Length		2m					
Material	Body	Brass +Nickel plated					
	Detection Surface	PBT					
Insulation Resistance		100MΩ min.(500VDC Insulation Resistance Meter)					
Withstand Voltage		1,500VAC, 50/60Hz for 1 minute					
Vibration Resistance		10~55Hz (1-minute cycle) Double amplitude 1.5mm X, Y, Z directions 2 hours					
Shock Resistance		500 ㉫ (50 G) X, Y, Z directions 3 times					
Certifications		CE: EN 55011 / 60947-5-2					

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

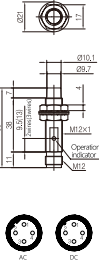
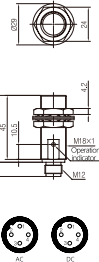
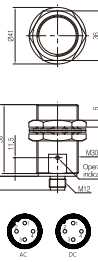
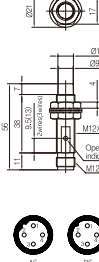
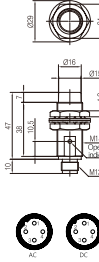
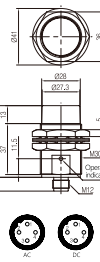
S Floatless controller

T Temp. controller

PROXIMITY SENSOR

DC 3-wires Cylindrical Connector Type Inductive Proximity Sensor

Specifications

		Ø 12		Ø 18		Ø 30	
		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
 Certified Product							
							
NPN	NO	IPX-D12-02E1R	IPX-D12-04E1RN	IPX-D18-05E1R	IPX-D18-08E1RN	IPX-D30-10E1R	IPX-D30-15E1RN
	NC	IPX-D12-02E2R	IPX-D12-04E2RN	IPX-D18-05E2R	IPX-D18-08E2RN	IPX-D30-10E2R	IPX-D30-15E2RN
PNP	NO	IPX-D12-02E3R	IPX-D12-04E3RN	IPX-D18-05E3R	IPX-D18-08E3RN	IPX-D30-10E3R	IPX-D30-15E3RN
	NC	IPX-D12-02E4R	IPX-D12-04E4RN	IPX-D18-05E4R	IPX-D18-08E4RN	IPX-D30-10E4R	IPX-D30-15E4RN
Rated Operating Distance		2.0 mm ± 10%	4.0 mm ± 10%	5.0 mm ± 10%	8.0 mm ± 10%	10.0 mm ± 10%	15.0 mm ± 10%
Set distance		0~1.6 mm	0~3.2 mm	0~4.0 mm	0~6.4 mm	0~8.0 mm	0~12.0 mm
Response frequency		600 Hz	400 Hz	400 Hz	200 Hz	250 Hz	100 Hz
Rated Operating Voltage		12~24VDC					
Power Supply Voltage		10~30VDC					
Control Output Current		200 mA max.					
Current Consumption		10 mA max.					
Object		Magnetic and non-magnetic metals					
Response Distance		10% max. of detection distance					
Operation indicator light		Red LED					
Surge protection circuit		Included					
Overcurrent protection circuit		Included					
Reverse voltage protection circuit		Included					
Operating ambient temperature		-25°C to +70°C					
Storage ambient temperature		-30°C to +80°C					
Ambient operating humidity		35~95%RH					
Ingress Protection		IP67					
Connection		Connector					
Material	Body	Brass +Nickel plated					
	Detection Surface	PBT					
Insulation resistance		100MΩ min.(500VDC Insulation Resistance Meter)					
Withstand Voltage		1,500VAC, 50/60Hz for 1 minute					
Vibration resistance		10~55Hz (1-minute cycle) Double amplitude 1.5mm X, Y, Z directions 2 hours					
Shock resistance		500 ㉫ (50 G) X, Y, Z directions 3 times					
Certifications		CE: EN 55011 / 60947-5-2					

PROXIMITY SENSOR



DC 3-wires Cylindrical Wire Connector Type Inductive Proximity Sensor

Specifications

		Ø 12		Ø 18		Ø 30	
		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
 Certified Product							
NPN	NO	IPX-D12-02E1W	IPX-D12-04E1WN	IPX-D18-05E1W	IPX-D18-08E1WN	IPX-D30-10E1W	IPX-D30-15E1WN
	NC	IPX-D12-02E2W	IPX-D12-04E2WN	IPX-D18-05E2W	IPX-D18-08E2WN	IPX-D30-10E2W	IPX-D30-15E2WN
PNP	NO	IPX-D12-02E3W	IPX-D12-04E3WN	IPX-D18-05E3W	IPX-D18-08E3WN	IPX-D30-10E3W	IPX-D30-15E3WN
	NC	IPX-D12-02E4W	IPX-D12-04E4WN	IPX-D18-05E4W	IPX-D18-08E4WN	IPX-D30-10E4W	IPX-D30-15E4WN
Rated Operating Distance		2.0 mm ± 10%	4.0 mm ± 10%	5.0 mm ± 10%	8.0 mm ± 10%	10.0 mm ± 10%	15.0 mm ± 10%
Set distance		0~1.6 mm	0~3.2 mm	0~4.0 mm	0~6.4 mm	0~8.0 mm	0~12.0 mm
Response frequency		600 Hz	400 Hz	400 Hz	200 Hz	250 Hz	100 Hz
Rated Operating Voltage		12~24VDC					
Power Supply Voltage		10~30VDC					
Control Output Current		200 mA max.					
Current Consumption		10 mA max.					
Object		Magnetic and non-magnetic metals					
Response Distance		10% max. of detection distance					
Operation indicator light		Red LED					
Surge protection circuit		Included					
Overcurrent protection circuit		Included					
Reverse voltage protection circuit		Included					
Operating ambient temperature		-25°C to +70°C					
Storage ambient temperature		-30°C to +80°C					
Ambient operating humidity		35~95%RH					
Ingress Protection		IP67					
Connection		Wire Connector					
Material	Body	Brass +Nickel plated					
	Detection Surface	PBT					
Insulation resistance		100M Ω min.(500VDC Insulation Resistance Meter)					
Withstand Voltage		1,500VAC, 50/60Hz for 1 minute					
Vibration resistance		10~55Hz (1-minute cycle) Double amplitude 1.5mm X, Y, Z directions 2 hours					
Shock resistance		500 %g (50 G) X, Y, Z directions 3 times					
Certifications		CE: EN 55011 / 60947-5-2					

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

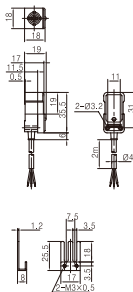
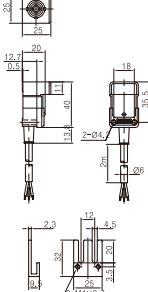
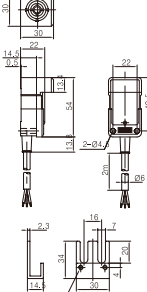
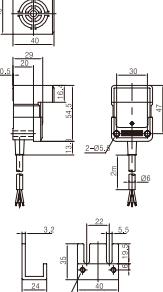
S Floatless controller

T Temp. controller

PROXIMITY SENSOR

DC 3-wires Rectangular Pre-wired Type Inductive Proximity Sensor

Specifications

 Certified Product		□ 17mm	□ 25mm	□ 30mm	□ 40mm
					
NPN	NO	IPX-D17-05E1S	IPX-D25-05E1S	IPX-D30-10E1S	IPX-D40-20E1S
	NC	IPX-D17-05E2S	IPX-D25-05E2S	IPX-D30-10E2S	IPX-D40-20E2S
PNP	NO	IPX-D17-05E3S	IPX-D25-05E3S	IPX-D30-10E3S	IPX-D40-20E3S
	NC	IPX-D17-05E4S	IPX-D25-05E4S	IPX-D30-10E4S	IPX-D40-20E4S
Rated Operating Distance		5.0 mm ± 10%	5.0 mm ± 10%	10.0 mm ± 10%	20.0 mm ± 10%
Set distance		0~4.0 mm	0~4.0 mm	0~8.0 mm	0~16.0 mm
Response frequency		500 Hz	350Hz	250 Hz	100 Hz
Rated Operating Voltage		12~24VDC			
Power Supply Voltage		10~30VDC			
Control Output Current		200 mA max.			
Current Consumption		10 mA max.			
Object		Magnetic and non-magnetic metals			
Response Distance		10% max. of detection distance			
Operation indicator light		Red LED			
Surge protection circuit		Included			
Overcurrent protection circuit		Included			
Reverse voltage protection circuit		Included			
Operating ambient temperature		-25°C to +70°C			
Storage ambient temperature		-30°C to +80°C			
Ambient operating humidity		35~95%RH			
Ingress Protection		IP67			
Connection		Pre-wired			
Wiring Length		2m			
Material		PBT			
Insulation resistance		100M Ω min.(500VDC Insulation Resistance Meter)			
Withstand Voltage		1,500VAC, 50/60Hz for 1 minute			
Vibration resistance		10~55Hz (1-minute cycle) Double amplitude 1.5mm X, Y, Z directions 2 hours			
Shock resistance		500 ٪ (50 G) X, Y, Z directions 3 times			
Certifications		CE: EN 55011 / 60947-5-2			

PROXIMITY SENSOR



AC 2-wires Cylindrical Pre-wired Type Inductive Proximity Sensor

Specifications

		Ø 12		Ø 18		Ø 30		
		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded	
CE Certified Product								
		NO	IPX-A12-02A1	IPX-A12-04A1N	IPX-A18-05A1	IPX-A18-08A1N	IPX-A30-10A1	IPX-A30-15A1N
		NC	IPX-A12-02A2	IPX-A12-04A2N	IPX-A18-05A2	IPX-A18-08A2N	IPX-A30-10A2	IPX-A30-15A2N
		Rated Operating Distance	2.0 mm ± 10%	4.0 mm ± 10%	5.0 mm ± 10%	8.0 mm ± 10%	10.0 mm ± 10%	15.0 mm ± 10%
Set distance	0~1.6 mm	0~3.2 mm	0~4.0 mm	0~6.4 mm	0~8.0 mm	0~12.0 mm		
Response frequency	20 Hz							
Rated Operating Voltage	110VAC							
Power Supply Voltage	90~250VAC (50/60Hz)							
Control Output Current	10~200 mA max.							
Current Consumption	2.5 mA max.							
Object	Magnetic and non-magnetic metals							
Response Distance	10% max. of detection distance							
Operation indicator light	Red LED							
Surge protection circuit	Included							
Operating ambient temperature	-25℃ to +70℃							
Storage ambient temperature	-30℃ to +80℃							
Ambient operating humidity	35~95%RH							
Ingress Protection	IP67							
Connection	Pre-wired							
Wiring Length	2m							
Material	Body	Brass +Nickel plated						
	Detection Surface	PBT						
Insulation resistance	100M Ω min.(500VDC Insulation Resistance Meter)							
Withstand Voltage	1,500VAC, 50/60Hz for 1 minute							
Vibration resistance	10~55Hz (1-minute cycle) Double amplitude 1.5mm X, Y, Z directions 2 hours							
Shock resistance	500 %g (50 G) X, Y, Z directions 3 times							
Certifications	CE: EN 60947-1 / 60947-5-2							

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

S Floatless controller

T Temp. controller

PROXIMITY SENSOR

AC 2-wires Cylindrical Connector Type Inductive Proximity Sensor

Specifications

CE Certified Product		Ø 12		Ø 18		Ø 30	
		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded

AC 2-wires Cylindrical Wire Connector Type Inductive Proximity Sensor

Specifications

CE Certified Product	Ø 12		Ø 18		Ø 30	
	Shieldeded	Unshielded	Shieldeded	Unshielded	Shieldeded	Unshielded
NO	IPX-A12-02A1W	IPX-A12-04A1WN	IPX-A18-05A1W	IPX-A18-08A1WN	IPX-A30-10A1W	IPX-A30-15A1WN
NC	IPX-A12-02A2W	IPX-A12-04A2WN	IPX-A18-05A2W	IPX-A18-08A2WN	IPX-A30-10A2W	IPX-A30-15A2WN
Rated Operating Distance	2.0 mm ± 10%	4.0 mm ± 10%	5.0 mm ± 10%	8.0 mm ± 10%	10.0 mm ± 10%	15.0 mm ± 10%
Set distance	0~1.6 mm	0~3.2 mm	0~4.0 mm	0~6.4 mm	0~8.0 mm	0~12.0 mm
Response frequency	20 Hz					
Rated Operating Voltage	110VAC					
Power Supply Voltage	90~250VAC (50/60Hz)					
Control Output Current	10~200 mA max.					
Current Consumption	2.5 mA max.					
Object	Magnetic and non-magnetic metals					
Response Distance	10% max. of detection distance					
Operation indicator light	Red LED					
Surge protection circuit	Included					
Operating ambient temperature	-25℃ to +70℃					
Storage ambient temperature	-30℃ to +80℃					
Ambient operating humidity	35~95%RH					
Ingress Protection	IP67					
Connection	Wire Connector					
Material	Body	Brass +Nickel plated				
	Detection Surface	PBT				
Insulation resistance	100M Ω min.(500VDC Insulation Resistance Meter)					
Withstand Voltage	1,500VAC, 50/60Hz for 1 minute					
Vibration resistance	10~55Hz (1-minute cycle) Double amplitude 1.5mm X, Y, Z directions 2 hours					
Shock resistance	500 ㎐ (50 G) X, Y, Z directions 3 times					
Certifications	CE: EN 60947-1 / 60947-5-2					

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

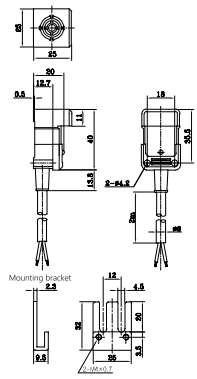
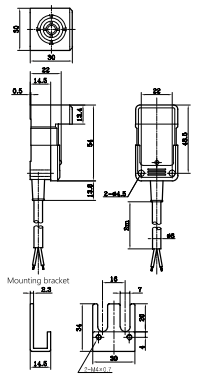
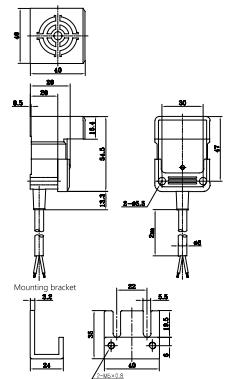
S Floatless controller

T Temp. controller

PROXIMITY SENSOR

AC 2-wires Rectangular Pre-wired Type Inductive Proximity Sensor

Specifications

	□ 25mm	□ 30mm	□ 40mm
			
NO	IPX-A25-05A1S	IPX-A30-10A1S	IPX-A40-20A1S
NC	IPX-A25-05A2S	IPX-A30-10A2S	IPX-A40-20A2S
Rated Operating Distance	5.0 mm ± 10%	10.0 mm ± 10%	20.0 mm ± 10%
Set distance	0~4.0 mm	0~8.0 mm	0.16 mm
Response frequency	20 Hz		
Rated Operating Voltage	110VAC		
Power Supply Voltage	90~250VAC (50/60Hz)		
Control Output Current	10~200 mA max.		
Current Consumption	2.5 mA max.		
Object	Magnetic and non-magnetic metals		
Response Distance	10% max. of detection distance		
Operation indicator light	Red LED		
Surge protection circuit	Included		
Operating ambient temperature	-25°C to +70°C		
Storage ambient temperature	-30°C to +80°C		
Ambient operating humidity	35~95%RH		
Ingress Protection	IP67		
Connection	Pre-wired		
Wiring Length	2m		
Material	PBT		
Insulation resistance	100M Ω min.(500VDC Insulation Resistance Meter)		
Withstand Voltage	1,500VAC, 50/60Hz for 1 minute		
Vibration resistance	10 to 55 Hz (1-minute cycle) Double amplitude 1.5 mm X, Y, Z directions 2 hours		
Shock resistance	500 %g (50 G) X, Y, Z directions 3 times		
Certifications	CE / EN60947-1, EN60947-5-2		

PROXIMITY SENSOR



DC 2-wires Cylindrical Pre-wired Type Inductive Proximity Sensor

Specifications

		Ø 12		Ø 18		Ø 30	
		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
 Certified Product							
Polarity	NO	IPX-2D12-02A1	IPX-2D12-04A1N	IPX-2D18-05A1	IPX-2D18-08A1N	IPX-2D30-10A1	IPX-2D30-15A1N
	NC	IPX-2D12-02A2	IPX-2D12-04A2N	IPX-2D18-05A2	IPX-2D18-08A2N	IPX-2D30-10A2	IPX-2D30-15A2N
Non-polarity	NO	IPX-2D12-02A1F	IPX-2D12-04A1NF	IPX-2D18-05A1F	IPX-2D18-08A1NF	IPX-2D30-10A1F	IPX-2D30-15A1NF
	NC	IPX-2D12-02A2F	IPX-2D12-04A2NF	IPX-2D18-05A2F	IPX-2D18-08A2NF	IPX-2D30-10A2F	IPX-2D30-15A2NF
Rated Operating Distance		2.0 mm ± 10%	4.0 mm ± 10%	5.0 mm ± 10%	8.0 mm ± 10%	10.0 mm ± 10%	15.0 mm ± 10%
Set distance		0~1.6 mm	0~3.2 mm	0~4.0 mm	0~6.4 mm	0~8.0 mm	0~12.0 mm
Response frequency		600 Hz	400 Hz	400 Hz	200 Hz	250 Hz	100 Hz
Rated Operating Voltage		24VDC					
Power Supply Voltage		15~30VDC					
Control Output Current		ON: 3~100 mA					
Leakage Current		OFF: 0.7 mA max.					
Object		Magnetic and non-magnetic metals					
Response Distance		10% max. of detection distance					
Operation indicator light		Red LED					
Surge protection circuit		Included					
Overcurrent protection circuit		Included					
Operating ambient temperature		-25°C to +70°C					
Storage ambient temperature		-30°C to +80°C					
Ambient operating humidity		35~95%RH					
Ingress Protection		IP67					
Connection		Pre-wired					
Wiring Length		2m					
Material	Body	Brass +Nickel plated					
	Detection Surface	PBT					
Insulation resistance		100MΩ min.(500VDC Insulation Resistance Meter)					
Withstand Voltage		1,500VAC, 50/60Hz for 1 minute					
Vibration resistance		10~55Hz (1-minute cycle) Double amplitude 1.5mm X, Y, Z directions 2 hours					
Shock resistance		500 %g (50 G) X, Y, Z directions 3 times					
Certifications		CE: EN 60947-1 / 60947-5-2					

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

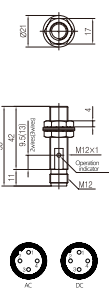
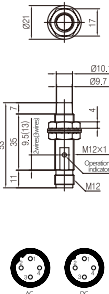
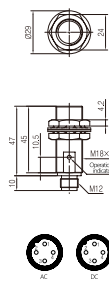
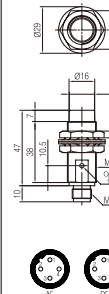
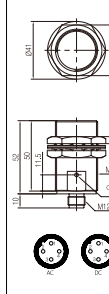
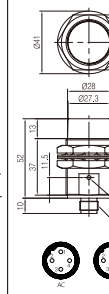
S Floatless controller

T Temp. controller

PROXIMITY SENSOR

DC 2-wires Cylindrical Connector Type Inductive Proximity Sensor

Specifications

CE Certified Product		Ø 12		Ø 18		Ø 30	
		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
							
AC	DC	AC	DC	AC	DC	AC	DC
Polarity	NO	IPX-2D12-02A1R	IPX-2D12-04A1RN	IPX-2D18-05A1R	IPX-2D18-08A1RN	IPX-2D30-10A1R	IPX-2D30-15A1RN
	NC	IPX-2D12-02A2R	IPX-2D12-04A2RN	IPX-2D18-05A2R	IPX-2D18-08A2RN	IPX-2D30-10A2R	IPX-2D30-15A2RN
Non-polarity	NO	IPX-2D12-02A1RF	IPX-2D12-04A1RNF	IPX-2D18-05A1RF	IPX-2D18-08A1RNF	IPX-2D30-10A1RF	IPX-2D30-15A1RNF
	NC	IPX-2D12-02A2RF	IPX-2D12-04A2RNF	IPX-2D18-05A2RF	IPX-2D18-08A2RNF	IPX-2D30-10A2RF	IPX-2D30-15A2RNF
Rated Operating Distance		2.0 mm ± 10%	4.0 mm ± 10%	5.0 mm ± 10%	8.0 mm ± 10%	10.0 mm ± 10%	15.0 mm ± 10%
Set distance		0~1.6 mm	0~3.2 mm	0~4.0 mm	0~6.4 mm	0~8.0 mm	0~12.0 mm
Response frequency		600 Hz	400 Hz	400 Hz	200 Hz	250 Hz	100 Hz
Rated Operating Voltage		24VDC					
Power Supply Voltage		15~30VDC					
Control Output Current		ON: 3~100 mA					
Leakage Current		OFF: 0.7 mA max.					
Object		Magnetic and non-magnetic metals					
Response Distance		10% max. of detection distance					
Operation indicator light		Red LED					
Surge protection circuit		Included					
Overcurrent protection circuit		Included					
Operating ambient temperature		-25℃ to +70℃					
Storage ambient temperature		-30℃ to +80℃					
Ambient operating humidity		35~95%RH					
Ingress Protection		IP67					
Connection		Connector					
Materials	Body	Brass +Nickel plated					
	Detection Surface	PBT					
Insulation resistance		100M Ω min.(500VDC Insulation Resistance Meter)					
Withstand Voltage		1,500VAC, 50/60Hz for 1 minute					
Vibration resistance		10~55Hz (1-minute cycle) Double amplitude 1.5mm X, Y, Z directions 2 hours					
Shock resistance		500 %g (50 G) X, Y, Z directions 3 times					
Certifications		CE: EN 60947-1 / 60947-5-2					

PROXIMITY SENSOR



DC 2-wires Cylindrical Wire Connector Type Inductive Proximity Sensor

Specifications

 Certified Product		Ø 12		Ø 18		Ø 30	
		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Polarity	NO	IPX-2D12-02A1W	IPX-2D12-04A1WN	IPX-2D18-05A1W	IPX-2D18-08A1WN	IPX-2D30-10A1W	IPX-2D30-15A1WN
	NC	IPX-2D12-02A2W	IPX-2D12-04A2WN	IPX-2D18-05A2W	IPX-2D18-08A2WN	IPX-2D30-10A2W	IPX-2D30-15A2WN
Non-Polarity	NO	IPX-2D12-02A1WF	IPX-2D12-04A1WNF	IPX-2D18-05A1WF	IPX-2D18-08A1WNF	IPX-2D30-10A1WF	IPX-2D30-15A1WNF
	NC	IPX-2D12-02A2WF	IPX-2D12-04A2WNF	IPX-2D18-05A2WF	IPX-2D18-08A2WNF	IPX-2D30-10A2WF	IPX-2D30-15A2WNF
Rated Operating Distance		2.0 mm ± 10%	4.0 mm ± 10%	5.0 mm ± 10%	8.0 mm ± 10%	10.0 mm ± 10%	15.0 mm ± 10%
Set distance		0~1.6 mm	0~3.2 mm	0~4.0 mm	0~6.4 mm	0~8.0 mm	0~12.0 mm
Response frequency		600 Hz	400 Hz	400 Hz	200 Hz	250 Hz	100 Hz
Rated Operating Voltage		24VDC					
Power Supply Voltage		15~30VDC					
Control Output Current		ON: 3~100 mA					
Leakage Current		OFF: 0.7 mA max.					
Object		Magnetic and non-magnetic metals					
Response Distance		10% max. of detection distance					
Operation indicator light		Red LED					
Surge protection circuit		Included					
Overcurrent protection circuit		Included					
Operating ambient temperature		-25°C to +70°C					
Storage ambient temperature		-30°C to +80°C					
Ambient operating humidity		35~95%RH					
Ingress Protection		IP67					
Connection		Wire Connector					
Materials	Body	Brass +Nickel plated					
	Detection Surface	PBT					
Insulation resistance		100MΩ min.(500VDC Insulation Resistance Meter)					
Withstand Voltage		1,500VAC, 50/60Hz for 1 minute					
Vibration resistance		10~55Hz (1-minute cycle) Double amplitude 1.5mm X, Y, Z directions 2 hours					
Shock resistance		500 % (50 G) X, Y, Z directions 3 times					
Certifications		CE: EN 60947-1 / 60947-5-2					

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

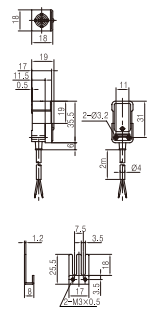
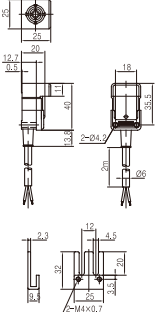
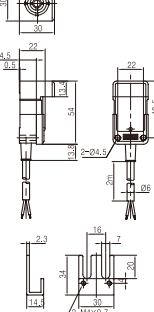
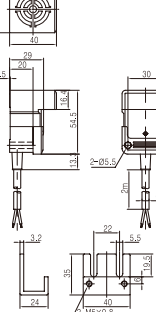
S Floatless controller

T Temp. controller

PROXIMITY SENSOR

DC 2-wires Rectangular Pre-wired Type Inductive Proximity Sensor

Specifications

 Certified Product		□ 17mm	□ 25mm	□ 30mm	□ 40mm
					
Polarity	NO	IPX-2D17-05A1S	IPX-2D25-05A1S	IPX-2D30-10A1S	IPX-2D40-20A1S
	NC	IPX-2D17-05A2S	IPX-2D25-05A2S	IPX-2D30-10A2S	IPX-2D40-20A2S
Non-polarity	NO	IPX-2D17-05A1SF	IPX-2D25-05A1SF	IPX-2D30-10A1SF	IPX-2D40-20A1SF
	NC	IPX-2D17-05A2SF	IPX-2D25-05A2SF	IPX-2D30-10A2SF	IPX-2D40-20A2SF
Rated Operating Distance		5.0 mm ± 10%	5.0 mm ± 10%	10.0 mm ± 10%	20.0 mm ± 10%
Set Distance		0~4.0 mm	0~4.0 mm	0~8.0 mm	0~16.0 mm
Response Frequency		500 Hz	350 Hz	250 Hz	100 Hz
Rated Operating Voltage		24VDC			
Power Supply Voltage		15~30VDC			
Control Output Current		ON: 3~100 mA			
Leakage Current		OFF: 0.7 mA max.			
Object		Magnetic and non-magnetic metals			
Response Distance		10% max. of detection distance			
Operation Indicator Light		Red LED			
Surge Protection Circuit		Included			
Overcurrent Protection Circuit		Included			
Operating Ambient Temperature		-25°C to +70°C			
Storage Ambient Temperature		-30°C to +80°C			
Ambient Operating Humidity		35~95%RH			
Ingress Protection		IP67			
Connection		Pre-wired			
Wiring Length		2m			
Material		PBT			
Insulation Resistance		100MΩ min.(500VDC Insulation Resistance Meter)			
Withstand Voltage		1,500VAC, 50/60Hz for 1 minute			
Vibration Resistance		10~55Hz (1-minute cycle) Double amplitude 1.5mm X, Y, Z directions 2 hours			
Shock Resistance		500 ㉫ (50 G) X, Y, Z directions 3 times			
Certifications		CE: EN 60947-1 / 60947-5-2			

PROXIMITY SENSOR

Operating Characteristics and Wiring Diagram

DC 3-wires

Control Output Type	Operating Characteristics	Wiring Diagram
NPN Output Type NO	Object Detected Not detected Operation Reset Output voltage (Black-Blue) H L Operation indicator (LED) ON OFF	
NPN Output Type NC	Object Detected Not detected Operation Reset Output voltage (Black-Blue) H L Operation indicator (LED) ON OFF	
PNP Output Type NO	Object Detected Not detected Operation Reset Output voltage (Black-Blue) H L Operation indicator (LED) ON OFF	
PNP Output Type NC	Object Detected Not detected Operation Reset Output voltage (Black-Blue) H L Operation indicator (LED) ON OFF	

AC 2-wires

Control Output Type	Operating Characteristics	Wiring Diagram
NO	Object Detected Not detected Operation Reset Operation indicator (LED) ON OFF	
NC	Object Detected Not detected Operation Reset Operation indicator (LED) ON OFF	

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

S Floatless controller

T Temp. controller

PROXIMITY SENSOR

Operating Characteristics and Wiring Diagram

DC 2-wires

Control Output Type	Operating Characteristics	Wiring Diagram
NO	Object Detected Not detected Load Operation Reset Operation indicator (LED) ON OFF	Polarity type
NC	Object Detected Not detected Load Operation Reset Operation indicator (LED) ON OFF	Non-polarity type

Detection Distance Based on Detected Object Material

Material	Detection Range
Iron	100%
Stainless Steel	Approx. 60%
Brass	Approx. 40%
Aluminum	Approx. 30%
Brass	Approx. 28%

Electrical/Mechanical Characteristics

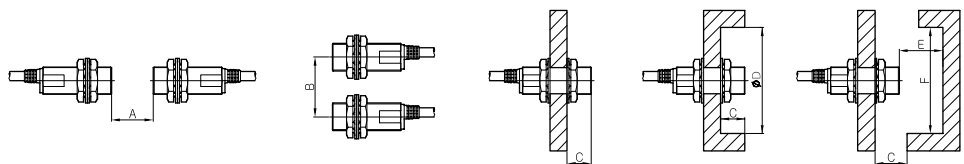
Rated Insulation Voltage (Ui)	250VAC
Insulation Voltage	50 M Ω min. (500 VDC) Between Charging Section and Enclosure
Withstand Voltage	1,000VAC 50/60Hz, 1 minute between charging part and housing
Vibration resistance	10~55Hz, Double amplitude 1.5mm, X, Y, Z 3-axis each direction for 2 hours
Shock resistance	Approx. 50G (500 $\frac{m}{s^2}$) X, Y, Z 3-axis in each direction

Power Connection

DC 3-wires (NPN)	DC 3-wires (PNP)	DC 2-wires (NPN)	AC 2-wires

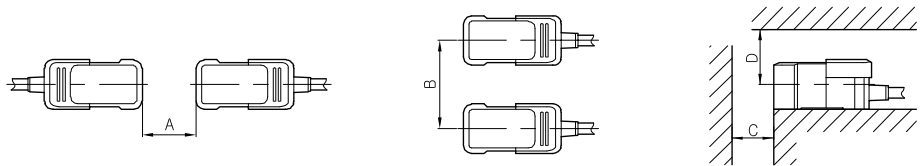
※ For the DC 2-wires, the (black) wiring in parentheses indicates connection to the black wire of the connector when using a 3-wires connector.

Installation Precautions



※ Mutual interference and effects of Surrounding metals: To prevent malfunction, maintain a distance greater than the values shown in the table below.

Model Item	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	B	C	D	E	F
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



Model Item	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	B	C	D
A	30	30	60	120
B	36	50	60	80
C	15	15	30	60
D	24	25	30	45

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

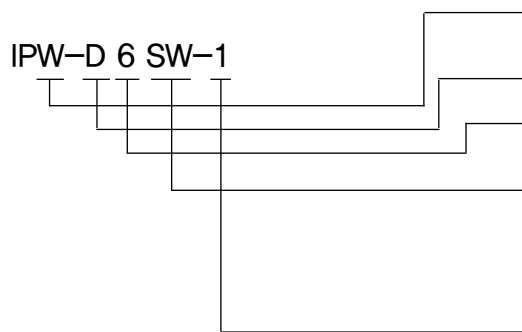
R Touch switch

S Floatless controller

T Temp. controller

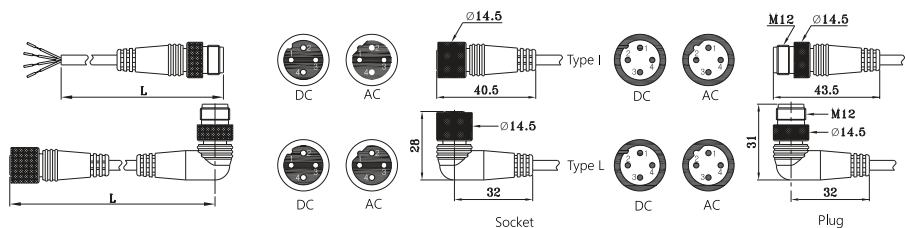
PROXIMITY SENSOR

IPW Connector Cable



Classification		
Classification	Symbol	Symbol Description
Wiring	W	Connector Cable
	A	AC Power Input
Voltage	D	DC Power Input
	6	Ø 6mm
Outer Diameter	SW	Socket Pull-Out Type
	PW	Plug-In Type
	SP	Socket-Plug Type
Dimensions	1	Type I
	2	Type L
	3	Type I – Type I
	4	Type I – Type L
	5	Type L – Type I
	6	Type L – Type L

Cable Outer Distinction and Dimensions



DC		AC	
D6SW-1		A6SW-1	
D6SW-2		A6SW-2	
D6SP-3		A6SP-3	
D6SP-4		A6SP-4	
D6SP-5		A6SP-5	
D6SP-6		A6SP-6	
D6PW-1		A6PW-1	
D6PW-2		A6PW-2	

Wiring Diagram

Cable Wiring Diagram	Connector Wiring Diagram
Terminal number: 1, 2, 3, 4 * SW & PW are the same Wire color: Brown(BN), White(WH), Blue(BL), Black(BK)	Terminal number: 1, 2, 3, 4

PROXIMITY SENSOR

CPX Series (Capacitive Type)

Features

- All dielectrics such as metals, non-metals, glass, wood, water, oil, etc.
- Facilitates level and position detection by utilizing changes in dielectric constant
- Enhanced reliability with built-in protection circuit
- Ingress Protection IP 67



Classification

CPX-D18-08 E1 □

Classification	Symbol	Symbol Description
	CPX	Capacitive Proximity Sensor
Voltage	C	AC/DC 2-wires (Free Voltage)
	D	DC 3-wires
Outer Diameter	Number	Housing Diameter
Detection Range	Number	Rated Detection Distance
Control Output Method	E1	NPN NO Voltage Output
	E2	NPN NC Voltage Output
	E3	PNP NO Voltage Output
	E4	PNP NC Voltage Output
	A1	Normally Open
	A2	Normally Closed
Shielded/Unshielded	N	Unshielded

Operating Characteristics and Wiring Diagram

AC/DC 2-wires

Control Output Type	Operating Characteristics	Wiring Diagram
Normally Open	Object Detected Not detected Operation Load Reset Operation indicator (LED) ON OFF	
Normally Closed	Object Detected Not detected Operation Load Reset Operation indicator (LED) ON OFF	

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

S Floatless controller

T Temp. controller

PROXIMITY SENSOR

AC/DC 2-wires Capacitive Proximity Sensor

Specifications

Outer Diameter	Ø18mm	Ø30mm
Normally Open	CPX-C18-08A1N	CPX-C30-15A1N
Normally Closed	CPX-C18-08A2N	CPX-C30-15A2N
Rated Operating Distance (Sn)	8.0 mm	15.0 mm
Setting Distance (Sa)	0~5.6 mm	0~10.5 mm
Standard Detection Object	Iron 50 × 50 × 1 mm (grounded)	
Rated Operating Voltage (Ue)	AC/DC 20~240V	
Supply Voltage (Us)	AC/DC 18~250V	
Control Output	Load current 5~200 mA max.	
Residual Voltage	AC/DC 7V max.	
Leakage Current	AC/DC 2mA max.	
Object	Conductors and Dielectrics	
Response Distance	20% max. of rated operating distance	
Response Frequency	20 Hz	
Operation Indicator Light	Yellow LED	
Ingress Protection	IP67	
Wiring	Wiring connection type	
Insulation Resistance	50 MΩ min.(500 VDC Insulation Resistance Meter)	
Withstand Voltage	1,500VAC (50/60Hz) for 1 minute between charged and non-charged sections	
Operating Ambient Temperature	- 25°C to +70°C (in non-freezing conditions)	
Temperature Effect	± 20% max. of the detection distance at 20°C within the operating ambient temperature range	
Storage Temperature Range	-30°C to +80°C	
Ambient Operating Humidity	35~95%RH	
Vibration Resistance	10 to 55 Hz (1-minute cycle) Double amplitude 1 mm in X, Y, Z directions for 2 hours	
Shock Resistance	Approx. 50G (500 ⅈ), 3 axis in each direction	
Wiring Length	2m	
Material	Body	Brass
	Detection Surface	PBT

PROXIMITY SENSOR

DC 3-wires Capacitive Proximity Sensor

Specifications

Outer Diameter		Ø18mm	Ø30mm
Model Name	NPN NO	CPX-D18-08E1N	CPX-D30-15E1N
	NPN NC	CPX-D18-08E2N	CPX-D30-15E2N
	PNP NO	CPX-D18-08E3N	CPX-D30-15E3N
	PNP NC	CPX-D18-08E4N	CPX-D30-15E4N
Rated Operating Distance (Sn)		8.0 mm	15.0 mm
Setting Distance (Sa)		0~5.6 mm	0~10.5 mm
Standard Detection Object		Iron 50 × 50 × 1 mm (grounded)	
Rated Operating Voltage (Ue)		12~24VDC	
Supply Voltage (Us)		10~30VDC	
Output Type		NPN or PNP Voltage Output	
Control Output Current		200 mA max.	
Current Consumption		15 mA max.	
Object		Conductors and Dielectrics	
Response Distance		20% max. of rated operating distance	
Response frequency		100 Hz	
Operation indicator light		Yellow LED	
Protection Circuit		Reverse Power Connection Protection Circuit, Surge Protection Circuit, Output Short-Circuit Protection Circuit	
Ingress Protection		IP67	
Wiring		Wiring connection type	
Insulation resistance		50 MΩ min.(500 VDC Insulation Resistance Meter)	
Withstand Voltage		1,500VAC (50/60Hz) for 1 minute between charged and non-charged sections	
Operating ambient temperature		- 25°C to +70°C (in non-freezing conditions)	
Temperature effect		± 20% max. of the detection distance at 20°C within the operating ambient temperature range	
Storage Temperature Range		-30°C to +80°C	
Ambient operating humidity		35~95%RH	
Vibration resistance		10 to 55 Hz (1-minute cycle) Double amplitude 1 mm in X, Y, Z directions for 2 hours	
Shock resistance		Approx. 50G (500 %g), 3 axis in each direction	
Wiring Length		2m	
Material	Body	Nylon glass	Brass
	Detection Surface	Nylon glass	PBT

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

S Floatless controller

T Temp. controller

PROXIMITY SENSOR

Operating Characteristics and Wiring Diagram

DC 3-wires

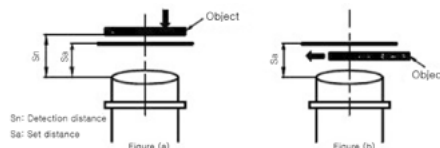
Control Output Type	Operating Characteristics	Wiring Diagram
NPN Voltage Output Type NO	Object: Detected (High), Not detected (Low) Load (Brown-Black): Operation (High), Reset (Low) Output voltage (Black-Blue): H (High), L (Low) Operation indicator (LED): ON (High), OFF (Low)	
NPN Voltage Output Type NC	Object: Detected (Low), Not detected (High) Load (Brown-Black): Operation (Low), Reset (High) Output voltage (Black-Blue): H (Low), L (High) Operation indicator (LED): ON (Low), OFF (High)	
PNP Voltage Output Type NO	Object: Detected (Low), Not detected (High) Load (Brown-Black): Operation (Low), Reset (High) Output voltage (Black-Blue): H (Low), L (High) Operation indicator (LED): ON (Low), OFF (High)	
PNP Voltage Output Type NC	Object: Detected (High), Not detected (Low) Load (Brown-Black): Operation (High), Reset (Low) Output voltage (Black-Blue): H (High), L (Low) Operation indicator (LED): ON (High), OFF (Low)	

Detection Distance Setting

- With the product installed, position the object to be detected at the set distance (S_a).
Set the detection distance (S_a) to within 70% of the rated operating distance (S_n), as shown in Figure (a).
- Adjust the sensitivity adjustment knob as follows based on the status of the indicator light.
(Based on NO output mode; for NC output mode, apply the opposite illumination state for adjustment.)
 - When off: Rotate the sensitivity adjustment knob clockwise until it lights up, and once it lights up, sensitivity adjustment is complete.
 - When lit: Rotate the sensitivity adjustment knob to the left to turn off the operation indicator light, then rotate it back to the right until the indicator light turns on. When it turns on, sensitivity adjustment is complete.

※ Precautions during sensitivity adjustment

- Do not place your hand or other objects close to the sensor body during sensitivity adjustment.
- Set the detection distance (S_a) so that horizontally moving objects trigger within 70% of the set distance, as shown in Figure (b).
- Turning the sensitivity adjustment knob clockwise increases the detection distance.
- Detection distance may vary depending on the shape, size, and material of the detected object.
- The sensitivity adjustment knob will not break even if turned excessively.



PROXIMITY SENSOR

Effects of Surrounding Objects and Mutual Interference

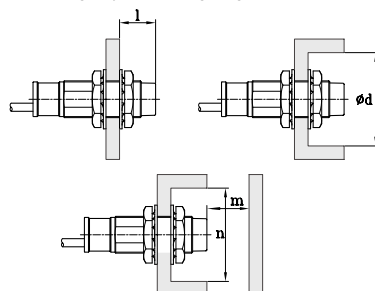
※ If detectable objects are Included near the proximity sensor, performance may be affected. Please mount it at a distance greater than the dimensions indicated below.

Model Item	CPX- □ 18	CPX- □ 30
l	10	20
Ød	54	90
m	24	45
n	54	90

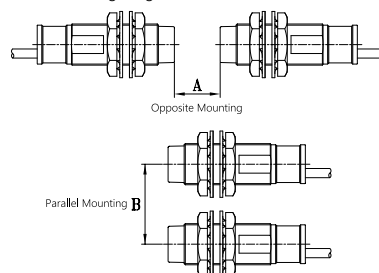
※ When mounting two min. proximity sensors facing each other or in parallel, mutual interference may cause malfunction. Please mount them at a distance equal to or greater than the dimensions indicated below.

Model Item	CPX- □ 18	CPX- □ 30
A (Parallel Mounting)	54	90
B (Opposite Mounting)	48	90

Surrounding Object Mounting Diagram



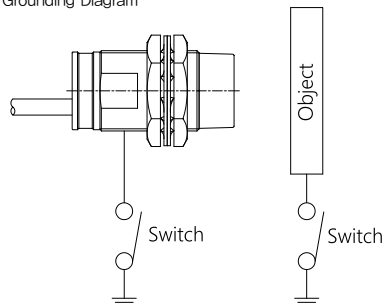
Mutual Mounting Diagram



Distance Changes by Grounding

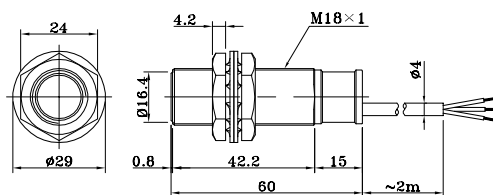
Grounding Status	Main Unit	Grounded	Ungrounded	Grounding	Ungrounded
	Object	Grounded	Grounding	Ungrounded	Ungrounded
Operation Distance (mm)	Ø 18mm	10	8	4	4
	Ø 30mm	18	15	6	6

Grounding Diagram

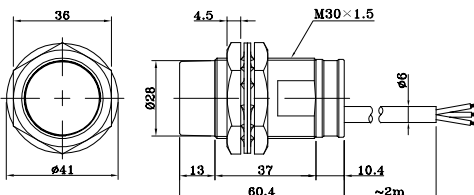


Dimensions

CPX- □ 18



CPX- □ 30



K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

S Floatless controller

T Temp. controller

Level Sensor

KLS series (liquid level sensor)

Features

- Capacitive Method (Unaffected by pipe or liquid color)
- Bypass pipe installation type
- Available with wide range of pipe diameters from Ø12 to 26mm
- Built-in Amplifier
- Built-in timer
- CE Certified



Classification

KLS- □ □

Classification	Symbol	Symbol Description
Product Name	KLS	 Liquid Level Sensor
Time Specifications	3	0~3 sec
Output Method	A	NPN NO
	B	NPN NC

Product Type

Detection Method	Model	Applicable Pipe	Time Specifications	Control Output	Operation Mode
Capacitive Method	KLS-3A	Ø12~26	0~3 sec	NPN Open Collector	NO
	KLS-3B				NC

Specifications

Category		KLS-3A	KLS-3B
Applicable Pipe	Material	Non-metallic	
	Outer Diameter	Ø12 ~ 26	
	Thickness	1.5mm max.	
Detectable Objects (Note ¹)		Liquid	
Repeatability Accuracy		± 0.3 mm max.	
Response Distance		0.3 ~ 3 mm max. (varies depending on pipe size and solution)	
Rated Voltage		12 to 24 VDC ± 10%, ripple (p-p) 10% max.	
Power Consumption		15 mA max.	
Control Output		NPN open collector type, Load power supply voltage 30V max., Load current 200mA max.	
Operating Mode		NO	NC
Time Specifications		0 ~ 3 sec single rotation Volume	
Detection Liquid Level Position (Note ²)		Liquid level setting position mark	
Sensitivity Adjustment		14T Multi-Turn Volume	
Indicator Lights		Power indicator light: RED, Operation indicator light: YELLOW	
Voltage Influence		± 10% max. of rated power supply voltage: ± 0.5mm max. from detection level at rated power supply voltage	
Operating Ambient Temperature		Operating: 0 to +55°C Storage: -10 to +65°C (without freezing & condensation)	
Operating Ambient Humidity		Operating/Storage: 25 to 85% RH (without condensation)	
Temperature Effects (Note ³)		Within the temperature range of 0°C ~ +55°C, ± 4 mm from the detection level at +25°C (ambient temperature)	
Ingress Protection		IEC Standard IP 67	
Certifications		CE: EN55011, EN61326-1, EN61000-3-2, EN61000-3-3	

Specifications

Category	KLS-3A	KLS-3B
Connection Method	Pre-wired (Standard Length 2m)	
Insulation Resistance	50M Ω min.(DC500V Insulation Resistance Meter)	
Withstand Voltage	500VAC (50~60Hz) for 1 minute	
Vibration Resistance	10 to 50 Hz, Double amplitude 1.5 mm, 3 axis each direction for 2 hours	
Shock resistance	Approx. 50G (500 $\%$), 3 axis in each direction	
Material	Case, Cover: Nylon Glass 15%, Cord Clamp: Silicon	
Weight	Approx. 70g	
Accessories	2 fastening bands, 2 anti-slip tubes, instruction manual	

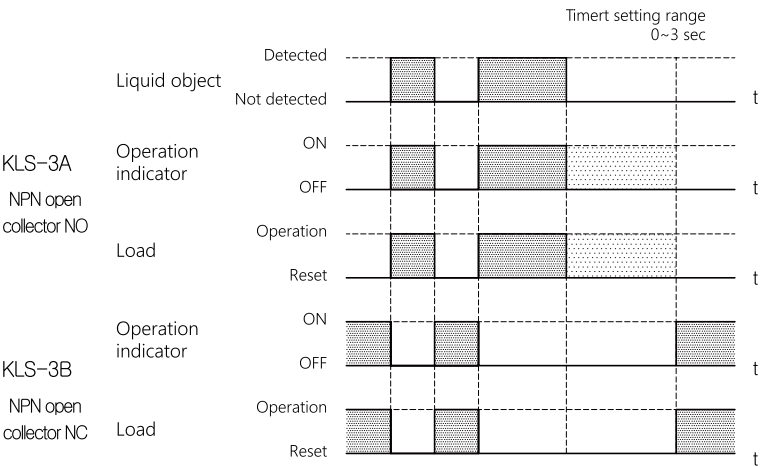
Note ¹⁾ Liquids: In the following cases, stable detection may not be possible.
Please verify detection performance on the installed device before use.

- * If the liquid has low dielectric constant or conductivity, detection may be impossible as this device uses a capacitive method.
- * When the liquid volume is small, or the pipe diameter or wall thickness is narrow, resulting in minimal volume change relative to liquid level changes.
- * When a high-viscosity liquid film, large amounts of residual bubbles, contamination, or deposits are included on the pipe inner/outer walls.

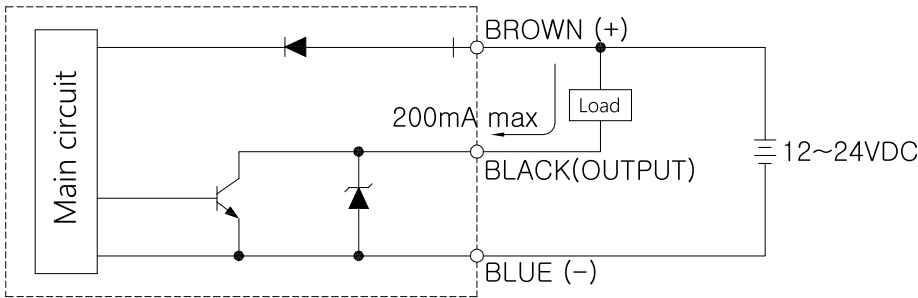
Note ²⁾ Liquid level setting position mark: Please refer to the sensitivity adjustment explanation section.

Note ³⁾ Temperature effect: Refer to the temperature effect characteristic data for the detected liquid level.

Operating Characteristics



Circuit Connection Diagram

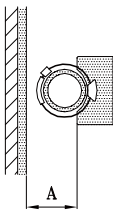
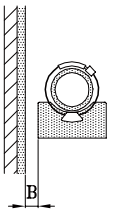
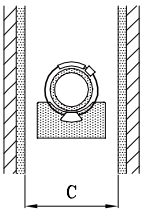


- K Photo sensor
- L Proximity sensor
- M Counter Timer
- N Buzzer
- O Signal phone
- P Tower light
- Q Square light
- R Touch switch
- S Floatless controller
- T Temp. controller

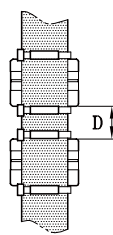
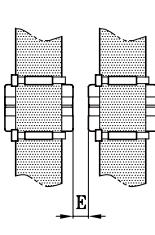
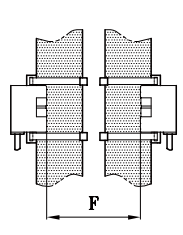
Level Sensor

Effects of Surrounding Objects and Mutual Interference

Influence of Surrounding objects: If Surrounding objects are conductive materials such as metal, performance may be affected. Therefore, install at a distance exceeding the dimensions indicated below.

			A	25mm
			B	0mm
			C	40mm
Face-to-face	On one Side	On Both Sides		

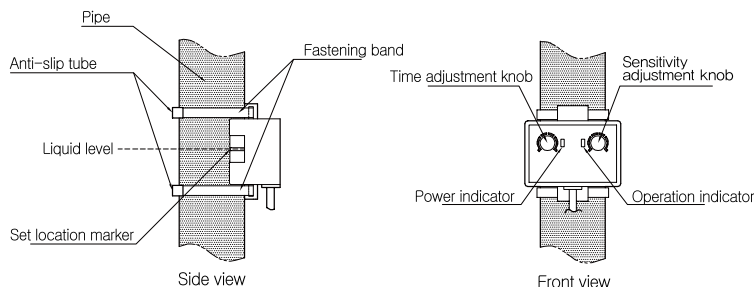
* Mutual interference: When installing in series, parallel, or facing each other, be sure to mount them at least the distance indicated.

			D	10mm
			E	10mm
			F	30mm
Serial Installation	Parallel Installation	Facing Installation		

Installation and Setup Methods

■ Installation Method

- Securely install the unit onto the pipe as shown in the illustration below using the two included fastening bands and two anti-slip tubes.
- Install the sensor so its detection surface is fully flush along the pipe's centerline.



■ Timer Adjustment

- Once the liquid level has been detected, the output is maintained for a set period of time from the moment detection ceases.



TIME

Rotate the time adjustment knob left or right to set the output delay time. (0 ~ 3 sec)
* The default setting is 0 seconds.

■ Sensitivity Adjustment

- Install the sensor at the position indicated on the mark



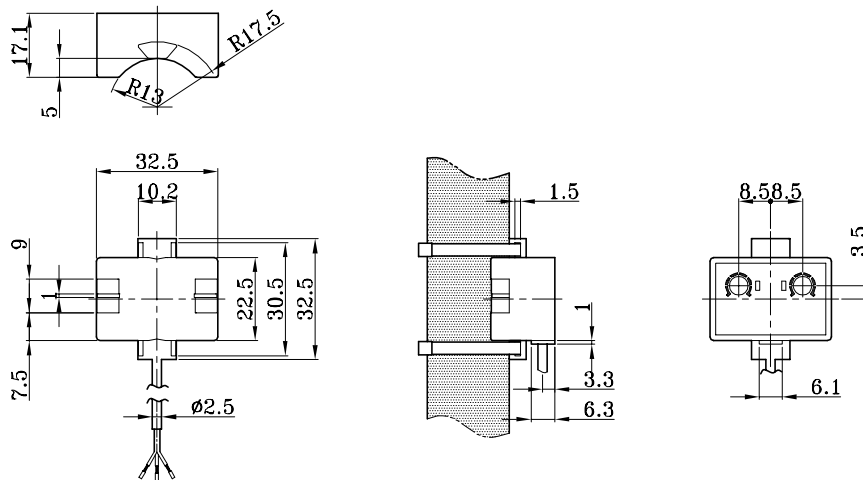
Rotate the sensitivity adjustment knob to the left to set it to non-detection mode. Rotate it to the right until the indicator light detects the target. Once detection is active, sensitivity adjustment is complete.

■ Referencelltem

- During sensitivity adjustment, do not place hands or other objects close to the sensor body. Also, ensure the cord is completely secured.
- When using multiple sensors (e.g., upper limit, lower limit), adjust them in order starting from the lower limit sensor.

Dimensions

KLS-3A, KLS-3B



Precautions

- Always use within the rated specifications.
- Be careful as incorrect wiring may cause product damage.
- Avoid using in areas with high static electricity or noise, as these can cause malfunctions.
- This sensor is waterproof but capacitive, so avoid using it in environments where it comes into direct contact with liquids (such as water or cutting oil).
- Please note that when the dielectric constant of the liquid being detected is low, the detection level may fluctuate by approximately ± 2 mm for about 30 minutes from power-on until stabilization.

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

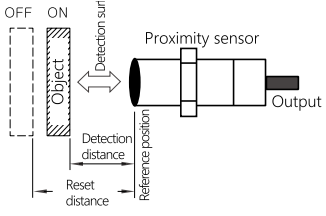
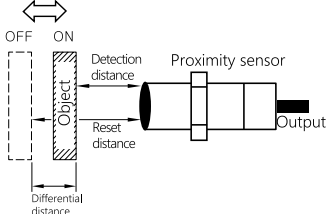
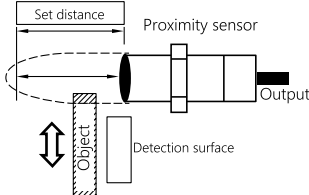
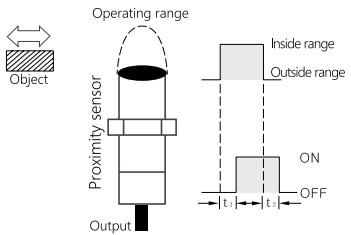
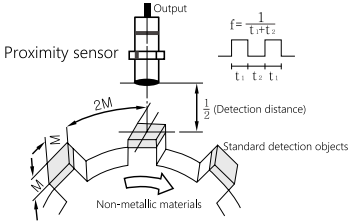
R Touch switch

S Floatless controller

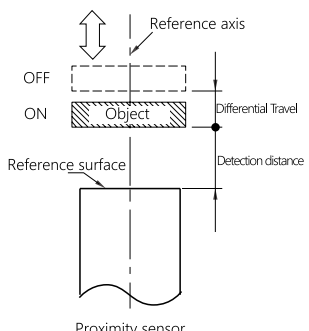
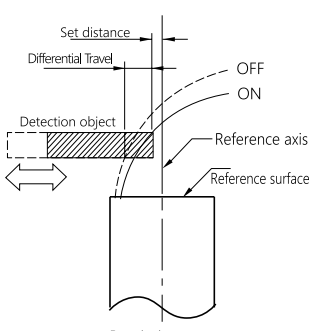
T Temp. controller

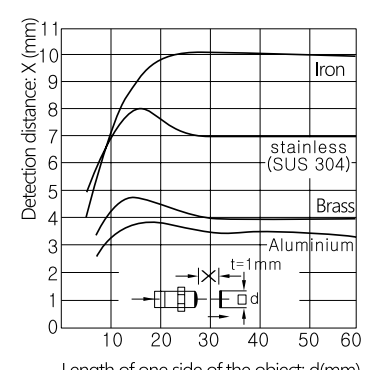
Proximity Sensor Reference Guide

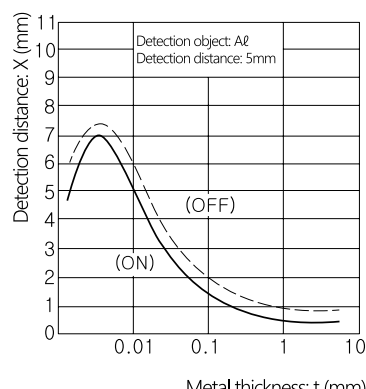
Proximity Sensor Glossary

Item	Glossary	
Detection Range		■ This refers to the distance measured on the detection plane when the detected object moves. ■ The detection range of the proximity sensor is the detection distance when using the standard detection object.
Response Distance		■ It refers to the difference between the distance when activated and the distance when deactivated. ■ The sensing distance of the proximity sensor is the distance when using the standard detection object.
Set Distance		■ This is the distance from the detection plane to the object's passage point up to the detection plane and the object's passing position. ■ The setting distance of the proximity sensor is the setting distance.
Response Time		■ t1: Time when the proximity sensor turns ON when the detected object enters the operational area ■ t2: Time taken for the proximity sensor to turn OFF when the detected object leaves the operational area
Response Frequency		■ The number of times the proximity sensor can detect a moving object within one second.
Shielded	■ A type where the magnetic flux is concentrated forward, with the detection coil sides covered in metal ■ Can be embedded within metal during installation.	
Unshielded	■ A type where the magnetic flux is generated widely, with the sides of the detection coil not covered in metal ■ Caution is required during installation as it is susceptible to interference from surrounding metal.	

PROXIMITY SENSOR

Detection Distance Indication Method	
Vertical Detection Distance	Horizontal Detection Distance
 ■ Detected object Distance between the reference plane and the detected object when approaching perpendicular to the detection plane	 ■ Detected object When the detected object is translated parallel to the reference plane, the distance between the reference axis and the detected object

Detectable Object Size and Detection Distance	
Description and Characteristics	
	■ The detection distance was measured while varying the length of one side while varying the length of one side. ■ When the detection object is larger than the standard detection object, the detection distance remains constant.

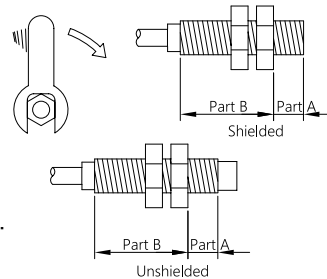
Detection Object Thickness and Detection Distance	
Description and Characteristics	
	■ When the detected object is a non-ferromagnetic metal, the detection distance is similar to that of a magnetic metal when the thickness $t \geq 0.01$ mm, is similar to the detection distance for magnetic metals. ■ When the thickness of the magnetic metal is $t \geq 1$ mm or greater, the detection distance is almost remains constant.

- K Photo sensor
- L Proximity sensor
- M Counter Timer
- N Buzzer
- O Signal phone
- P Tower light
- Q Square light
- R Touch switch
- S Floatless controller
- T Temp. controller

Proximity Sensor Reference Guide

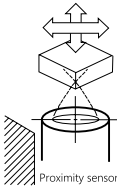
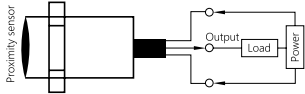
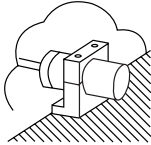
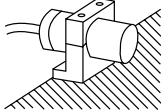
Tightening torque for Proximity enclosure torque installation

- The allowable strength varies depending on the distance from the head tip, varies depending on the distance from the head tip. The allowable tightening strength for parts A and B in the figure is shown in the table below. (Section A is the range from the head end to the dimension in the table below. Section B includes the nut on the head side as shown in the figure. Therefore, if the nut end extends even slightly into Section A, apply the torque specified for Section A. enters Section A, apply the strength value for Section A.
- The tightening allowable strength in the table below indicates values when washers are used.



Type		Section A		Section B
		Dimension (mm)	Torque	Torque
M8	Shielded	9	90 kgf · cm	120 kgf · cm
	Unshielded	3		
M12	Shielded	10	65 kgf · cm	120 kgf · cm
	Unshielded	3		
M18	Shielded	10	150 kgf · cm	150 kgf · cm
	Unshielded	3		
M30	Shielded	22	500 kgf · cm	800 kgf · cm
	Unshielded	9		

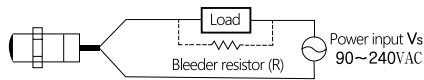
Precautions

Classification	Precautions	
Operating conditions		Verify the relationship between the detected object and the proximity sensor before use. ■ Movement Direction: Detection object's passage interval and speed, presence of vibration ■ Detected object: Magnetic material, non-magnetic material, size, shape, presence of plating ■ Detection distance: Irregularity of passage position, response distance ■ Detector shape: Cylindrical, Rectangular ■ Surrounding metal influence: Material of Surrounding metal
Electrical conditions		■ Verify DC (direct current) or AC (alternating current) power supply before use. ■ When connecting power directly to an AC proximity sensor, the sensor may be damaged. Always connect it to a load before use. ■ Verify the control output (DC type: NPN NO, NC, PNP NO, NC; AC type: NO, NC) before use.
Environmental conditions		■ Proximity sensors have better environmental characteristics than other detection sensors. ■ Use within the specified temperature and humidity ranges. ■ Take care to prevent metal dust or similar particles from adhering to the detection surface. ■ Take care to ensure that the detection surface is not exposed to any special chemicals or impact.
Mounting conditions		■ Proximity sensors are easy to maintain and inspect from machinery. ■ Proximity sensors are susceptible to mutual interference between sensors and the influence of surrounding metals, and install them with care. ■ In locations where the DC magnetic field changes rapidly, there is a possibility of malfunction so please exercise caution. ■ Avoid using in locations where DC electromagnets are frequently turned ON and OFF.

PROXIMITY SENSOR

Detectable Object Size and Detection Distance

Vertical Detection Distance



$$R \leq \frac{V_s}{I_o - I} \text{ (K}\Omega\text{)} \quad P > \frac{V_s^2}{R} \text{ (mW)}$$

P: Wattage(W) of the bleeder resistor

I: Load current (mA)

I_o: 10mA

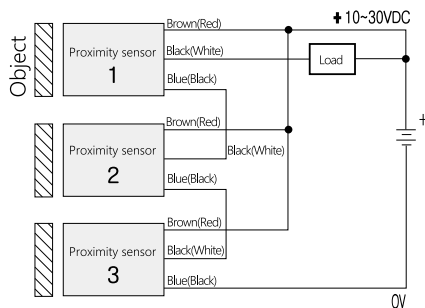
■ When the load operating current is 10 mA max., connect a bleeder resistor in parallel to ensure the proximity sensor current exceeds 10 A and the residual voltage to be lower than the load's return voltage.

■ Lead resistance: 20Ω (3W) min. for AC110V; 39Ω (5W) min. for AC220V. 39Ω (5W) or higher

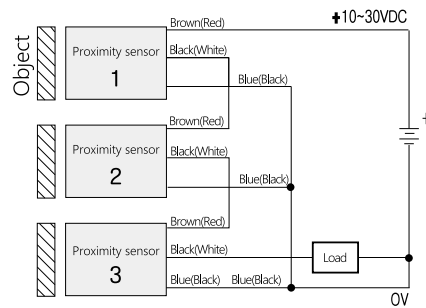
■ If resistance heating becomes an issue, use a resistor with a rated power (W).

DC (Direct Current) Proximity Sensor Connection Method

NPN Series (AND)



PNP Series (AND)

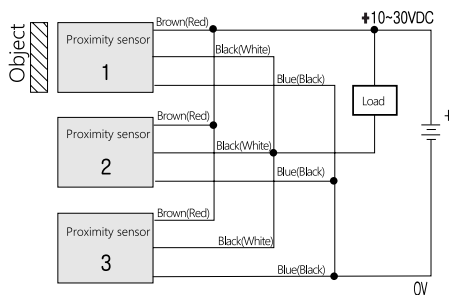


■ When DC Normally Open proximity sensors are connected in series (AND), the load will only activate (ON) when the detected object is close to all proximity sensors.

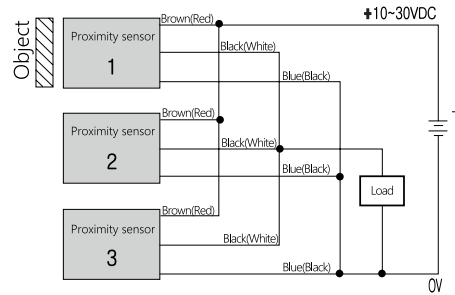
■ When connecting three min. proximity sensors in series, malfunctions may occur due to increased internal impedance (Z_o). Therefore, series connection is not recommended.

■ NPN and PNP types cannot be used together.

NPN Parallel (OR)



PNP Parallel (OR)



■ When DC open-close proximity sensors are connected in parallel (AND), the load will activate (ON) even if only one detected object approaches the proximity sensor.

■ When connecting in parallel (OR), the number of proximity sensors can be connected up to the point where the sum of the leakage currents from the connected proximity sensors does not affect the load.

■ NPN and PNP types cannot be used together.

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

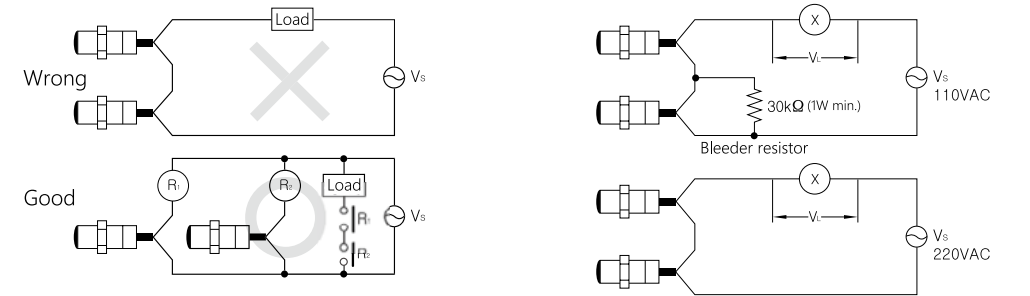
S Floatless controller

T Temp. controller

Proximity Sensor Reference Guide

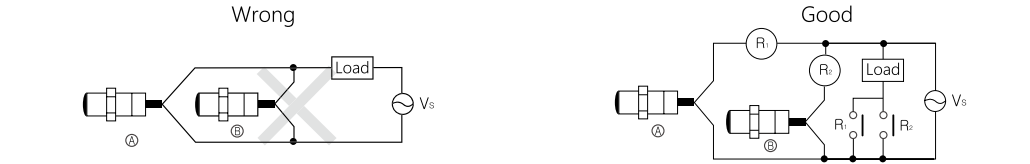
DC (AC) Proximity Sensor Connection Method

Series (AND)



- AC proximity sensors can be connected in series (AND), but a relay contact should be used to configure the series (AND) circuit.
- When the power supply voltage is AC110V, a pull-down resistor must be connected to ensure accurate AND operation.
- For AC220V, a pull-down resistor is unnecessary.

Parallel (OR)



- AC proximity sensors cannot be connected in parallel (OR), but a parallel (OR) circuit can be configured using relay contacts.

AC Power Connection Method (2-group connection): Good	AC Power Connection Method (Single Pair Connection): Faulty
■ When the proximity sensor is ON, $V_L = V_s - 20(V)$. If the load voltage falls below the load operating voltage, the load will not operate. VL: Load voltage, Vs.: Input voltage ■ When configuring an AND circuit by connecting two or more proximity sensors in series, do not connect and use three min. proximity sensors.	■ When connecting AC-type proximity sensors directly to AC power, to prevent damage to the proximity sensor.

PROXIMITY SENSOR

Influence of Plating on Object

Plating type & thickness \ Material	Iron (%)	Brass (%)	Output
Unplated	100	100	- Values in the table are based on the unplated state (100%). The detection distance based on the plating state as a percentage. - If the detected object is plated, the detection distance will change, so use with caution.
Zn 5~15 μm	90~120	90~105	
Cd 5~15 μm	100~110	90~105	
Ag 5~15 μm	60~90	85~100	
Cu 10~20 μm	70~95	90~105	
Cu 5~15 μm	—	90~105	
Cu (5~10 μm) + Ni (10~20 μm)	70~95	—	
Cu (5~10 μm) + Ni (10 μm) + Cr (0.3 μm)	75~95	—	

Definition of Terms

- **Overview:** A proximity sensor is a non-contact switch that operates without mechanical contact. It detects the presence or absence of a target object when it approaches the sensor. Examples include high-frequency oscillating proximity sensors and Capacitive Proximity Sensors.
- **Rated Operating Distance (S_n):** The rated operating distance is a standardized value used to indicate the operating distance. This value manufacturing tolerances or deviations caused by external conditions such as voltage or temperature.
- **Setting Distance (S_a):** The distance from the detection plane at which the proximity sensor's accurate operation is guaranteed under specified conditions.
- **Rated Operating Voltage (U_e):** A value used, along with the rated operating current (I_e), to define the equipment's application and related tests.
- **Supply Voltage (U_8):** The range of limit values encompassing all rated operating voltage differences

Precautions

- Verify the rated power supply voltage before using the proximity sensor.
- Detection distance may vary depending on the electrical properties (conductivity, permittivity), moisture absorption state, and size of the detected object.
- Malfunctions may occur if high-frequency electric field-emitting equipment is located nearby.
- Do not connect a capacitive load to the output terminal of the proximity sensor.
- Prevent direct impact or collision of other objects with the proximity sensor's sensing surface.
- Take care to prevent metal dust or similar particles from adhering to the sensing surface.
- When wiring the proximity sensor, keep it separate from surrounding power lines or high-voltage lines.
- When installing the proximity sensor, if there are devices nearby that induce large surges (such as motors or welders), this may cause malfunctions.
- Although the proximity sensor's internal circuitry includes a surge absorption circuit, additional varistors or surge suppressors (absorption devices) near the surge source.
- Exercise caution during installation to avoid detection of nearby objects, as this may cause malfunction.
- When installing and using multiple proximity sensors, be cautious as mutual interference may cause malfunctions.
- Avoid using the sensor in outdoor environments where it is exposed to direct sunlight or rain.
- Avoid using the sensor in locations where chemical agents are sprayed.
- If water, oil, chemicals, or frost forms on the detection surface, it may be recognized as a detection object and cause malfunction.
- When used for level detection, foreign substances adhering to the inner walls of the container may cause malfunctions.

K Photo sensor

L Proximity sensor

M Counter Timer

N Buzzer

O Signal phone

P Tower light

Q Square light

R Touch switch

S Floatless controller

T Temp. controller

Magnetic Door Sensor

KMS Series (Magnetic Door Sensor)

Features

- KMS-1C: Sensor with contact state change by magnetic force
- Made with flame-retardant material
- Optional accessories – Bracket, Terminal cover
- UL, RoHSCertification

Rated Voltage	Rated Current
24VDC	3A Resistive (AC220V Compatible)



Classification

KMS- □ □

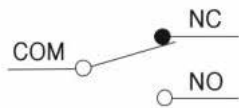
Product Category	KMS	Magnetic Door Sensor
Contact Type	1C	1C (NO, NC) Contact
Product Category	No Marking	Set (Contact Sensor + Magnet)
	S	Contact Sensor
	M	Magnet
Accessories	KMS-1C-B1	Bracket (sold separately)
	KMS-1C-TC	Terminal Cover (Sold Separately)

* Products dedicated to NO(A) and NC(B) require separate ordering.

Specifications

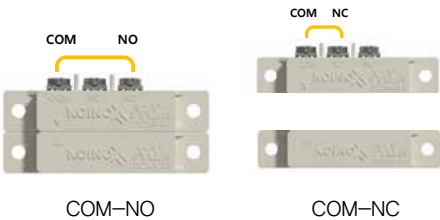
Category	KMS-1C-S Specifications
Rated Current	3A
Rated Voltage	250VAC, 24VDC
Contact Resistance	50mΩ max. (initial value)
Operating Gap	Sensor/Magnet Distance 10mm max.
Insulation resistance	100MΩ min.(DC500V Insulators Resistance Meter)
Withstand Voltage	Charging section: 1,000VAC 50/60Hz, 1 minute Non-charging section: 1,500VAC 50/60Hz, 1 minute
Operating ambient temperature	-25℃ to 50℃ (without freezing)
lifespan	Electrical: 200,000 cycles min. (1,800/h), Mechanical: 1,000,000 cycles min. (1,800/h)

Internal Circuit Diagram

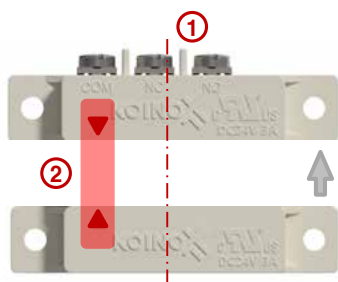


- COM . . . COMMON (Common Terminal)
- NC(b) . . . NORMALLY CLOSED
- NO(a) . . . Normally Opended

Sensor Operation Example



Magnet Placement and Usage Method

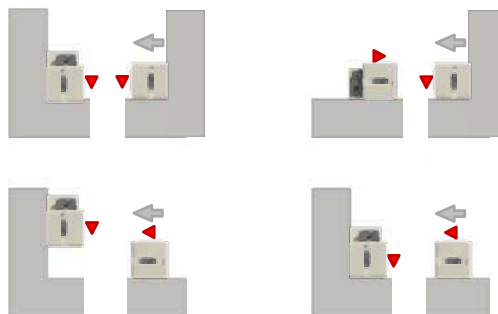


Recommended

Sensor/Magnet Placement Guidelines.

- ① The centers of the sensor and magnet must align.
- ② The arrow markings must be aligned.

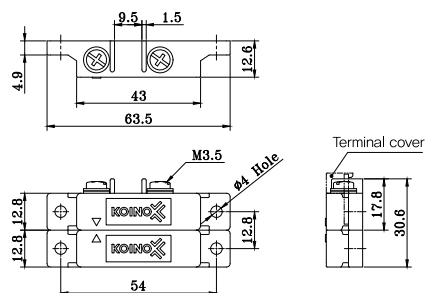
[Application Example]



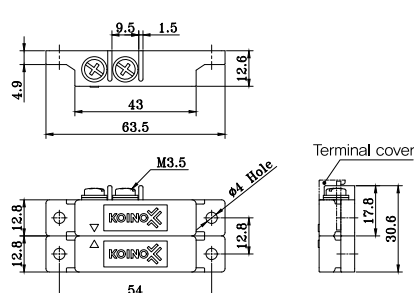
※ When using the sensor in an applied manner, the operating distance may be slightly shorter than that of the recommended method.

Dimensions

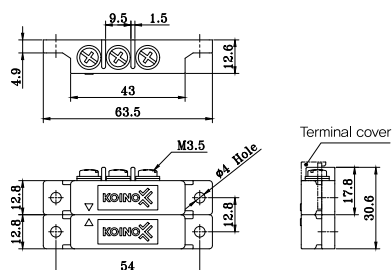
■ KMS-1C A



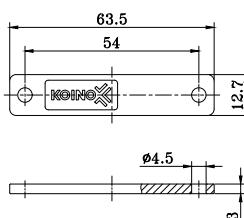
■ KMS-1C B



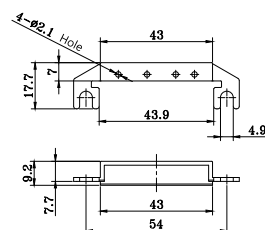
■ KMS-1C



■ KMS-1C-B1 (Bracket)



■ KMS-1C-TC (Terminal Cover)



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