Proximity Sensors

Catalog
September
07

File 9006



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Proximity Sensors
Inductive Sensors
Interpretation of Catalog Numbers

Proximity Sensors	Example	X	S	8	C	1	A	1	P	A	L	2				
Inductive Sensor																
TYPE																
Tubular Optimum				5												
Tubular Universal				6												
Optimum Rectangular				7												
Universal Rectangular				8												
Application Specific				9												
FORMAT OR MODE																
Rectangular 8 x 8 x 20 mm					J	1										
Rectangular 8 x 15 x 32 mm					F	1										
Rectangular 13 x 26 x 26 mm					E	1										
Rectangular 15 x 40 x 40 mm					C	1										
Rectangular 26 x 80 x 80 mm					D	1										
Tubular Smooth 4 mm					L	4										
Tubular 5 mm					0	5										
Tubular Smooth 6 mm					L	6										
Tubular 8 mm					0	8										
Tubular 12 mm					1	2										
Tubular 18 mm					1	8										
Tubular 30 mm					3	0										
FAMILY TYPE OR MATERIAL																
Applications							1–9									
Plastic							A									
Metal							B									
Stainless Steel							S									
APPLICATION																
Operating Mode								1–9								
Food and Beverage								A								
Namur								E								
Ferrous Only								F								
Light Industry								L								
Ferrous/Non-Ferrous								M								
Non-Ferrous only								N								
Speed Control								R								
Serdac								S								
Weld Field Immune								W								
OUTPUTS																
DC 3-Wire PNP									P							
DC 3-Wire NPN									N							
DC 3-Wire PNP/NPN									K							
DC 2-Wire (3/4)									D							
DC 2-Wire Automobile (1/4)									C							
DC Analog Output									A							
AC 2-Wire									F							
AC/DC 2-Wire									M							
AC/DC 2-Wire SCP Protect									S							
AC/DC Relay Output									R							
Bus									B							
FUNCTION																
Analog 0–10 mA										1						
Analog 4–20 mA										2						
N.O.										A						
N.C.										B						
N.O. + N.C.										C						
Programmable/Wiring										P						
Programmable										S						
CABLING OR CONNECTION																
M8 x 1 Nano (S)											M	8				
M12 x 1 Micro (D)											M	1	2			
7/8 16UN Mini (A)											U	7	8			
1/2 20 UNF Micro (K)											U	2	0			
Cable 0.1 m (3.9 in.)											L	0	1			
Cable 2 m (6.6 ft)											L	2				
Cable 5 m (16.4 ft)											L	5				
Cable 10 m (32.8 ft)											L	1	0			
M12 Micro on 0.1 m (3.9 in.) Pigtail											L	0	1	M	1	2
PG 16 Cable Gland											T	1	6			

NOTE: Use these tables only for interpreting the catalog number. Some combinations are not available. Consult your local field office.

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Proximity Sensors
Inductive Sensors
Interpretation of Catalog Numbers

Rectangular

Example	X	S	7	C	4	0	P	C	4	4	0	R30	H*
SENSOR TYPE													
Self Contained	X												
Component	Z												
SENSING TECHNOLOGY													
Inductive Proximity		S											
Capacitive Proximity		T											
BODY STYLE													
Miniature			5										
Shielded			7										
Non-Shielded			8										
Block Style			D										
FAMILY TYPE													
Limit Switch Style—Plastic Body				C									
Compact Block				G									
Subcompact Block				H									
Miniature				L									
Cubic				T									
MANUFACTURING CODES					•	•							
OUTPUT TYPE													
NPN							N	P					
PNP							P	P					
AC/DC Universal							M	A					
2-Wire N.O./N.C.							D	P					
NPN N.O.+N.C.							N	C					
PNP N.O.+N.C.							P	C					
MANUFACTURING CODES									•	•	•		
SUFFIX													
2 m Cable or Conduit Opening												Blank	
Micro-Connector—DC												D	
Alternate Frequency												F	
Micro-Connector—AC/DC												K	
5 m (16.4 ft) Cable												L2	
10 m (32.8 ft) Cable												L10	
Mini-Connector, Normally Open												R30	
Mini-Connector, Normally Closed												R31	
Nano-Connector—DC												S	
Bulk Pack												TQ	

* H suffix, which **may** appear on the device or carton label, is for manufacturing purposes only. It designates compliance with specific national standards. EX: H7 = UL and CSA approval, 0.5 in. conduit opening (where applicable). Do not use H suffixes when ordering (except when non-U.S. standards are required)

Tubular

Example	X	S	1	M	1	8	P	A	3	7	0	D
SENSOR TYPE												
Self Contained	X											
SENSING TECHNOLOGY												
Inductive Proximity		S										
Capacitive Proximity		T										
BODY TYPE												
Shielded—Metal Body			1									
Non-Shielded—Metal Body			2									
Non-Shielded—Plastic Body			4									
TYPE OF ENCLOSURE OR FAMILY												
Economy				D								
Standard Length—Threaded Metal Case				M								
Short Length—Threaded Metal Case				N								
Unthreaded Metal Case				L								
Threaded Plastic Case				P								
BARREL DIAMETER												
4 mm					0	4						
5 mm					0	5						
6 mm					0	6						
8 mm					0	8						
12 mm					1	2						
18 mm					1	8						
30 mm					3	0						
32 mm					3	2						
MODEL TYPE												
Analog							AB					
DC PNP							P					
DC NPN							N					
DC PNP/NPN, N.O./N.C. (Selectable)							K					
DC 2-Wire							D					
AC/DC 2-Wire (Universal)							M					
OUTPUT MODE												
N.O. (Normally Open)								A				
N.C. (Normally Closed)								B				
N.O. + N.C. Complementary								C				
N.O. or N.C. Selectable								P				
MANUFACTURING CODES									•	•	•	
CONNECTORS												
Nano (M8), DC Only												S
Micro, DC Only												D
Micro, AC Only												K
Mini, AC or DC												A
Micro, DC Pigtail												LD
Mini, AC or DC Pigtail												LA
EXTENDED CABLE LENGTH												
5 m												L1
10 m												L2

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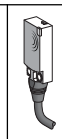
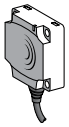
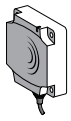
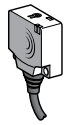
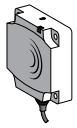
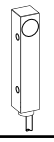
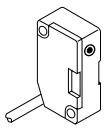
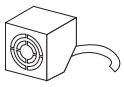
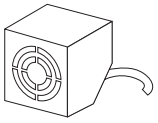
Proximity Sensors
Selection Guide
Rectangular

Description	Plastic, Shielded, Fixed and Adjustable Sensing Range							
	Fixed Sensing Range					Auto-Adaptable Adjustable Sensing Range		
	XS7					XS8		
								
Size / Dimensions H x W x D (mm)	J 22 x 8 x 8	F 32 x 15 x 8	E 26 x 26 x 13	C 40 x 40 x 15	D 80 x 80 x 26	E 26 x 26 x 13	C 40 x 40 x 15	D 80 x 80 x 26
Nominal Sensing Distance Sn (mm)	2.5	5	10	15	40	15	25	60
Supply (Voltage Limits)								
DC 3-Wire	10–36 V	10–36 V	10–36 V	10–36 V	10–36 V	10–36 V	10–36 V	10–36 V
Maximum Load	100 mA	100 mA	100 mA	100 mA	100 mA	100 mA	200 mA	200 mA
DC 2-Wire	10–36 V	10–36 V	10–36 V	10–36 V	10–36 V	—	—	—
Maximum Load	100 mA	100 mA	100 mA	100 mA	100 mA	—	—	—
AC/DC 2-Wire	—	—	—	—	—	20–264 V	20–264 V	20–264 V
Maximum Load	—	—	—	—	—	200 mA	300 mA	300 mA
Enclosure Rating								
Cable Version	IP68	IP68	IP68	IP68	IP68	IP68	IP68	IP68
Connector Version	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67
Connection								
Cable	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)
Connector	M8	M8	M8/M12	M8/M12	M12	M8/M12 / U20	M8/M12 / U20	M12 / U20
Temperature Range	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)
Page Number	182	182	182	182	182	180	180	180

Description		Plastic, Classic, Rectangular, Shielded and Non-Shielded				
		Miniature	Compact			
		XS5L	XS7G/H/T; XS8G/H/T			
						
Size (mm)		8 x 43	10 x 28	26 x 40	26 x 26	40 x 40
Nominal Sensing Distance Shielded Sn (mm)		1.5	2	2	10	15
Nominal Sensing Distance Non-Shielded Sn (mm)		—	3	4	15	20
Supply (Voltage Limits)						
DC 3-Wire		10–30 V	10–30 V	10–30 V	10–58 V	10–58 V
Maximum Load		100 mA	200 mA	200 mA	200 mA	200 mA
DC 2-Wire		—	—	—	10–58 V	10–58 V
Maximum Load		—	—	—	100 mA	100 mA
DC 4-Wire		—	—	10–58 V	10–58 V	10–58 V
Maximum Load		—	—	200 mA	200 mA	200 mA
AC 2-Wire		—	—	—	—	—
Maximum Load		—	—	—	—	—
AC/DC 2-Wire		—	—	20–264 V	—	—
Maximum Load		—	—	200 mA	—	—
Dimensions (mm)	Cable	43 x 8 x 8	28 x 10 x 16	40 x 12 x 26	26 x 26 x 26	40 x 40 x 40
	Connector	49 x 8 x 8	—	45 x 12 x 31	26 x 26 x 29	40 x 40 x 44
Enclosure Rating						
Cable Version		IP67	IP67	IP67	IP67	IP67
Connector Version		IP67	—	IP67	IP67	IP67
Connection						
Cable		2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)
Connector		M8	—	M8	M12	M12
Temperature Range		-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)
Page Number		246	248	250	252	252

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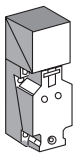
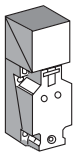
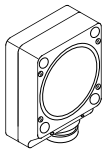
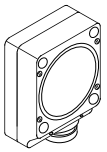
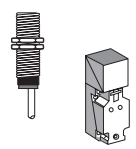
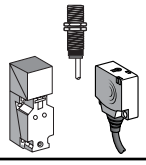
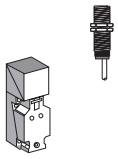
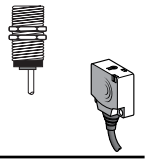
Proximity Sensors
Selection Guide
Rectangular and Application Specific

Description	Plastic, Classic, Rectangular, Shielded and Non-Shielded			
	Limit switch style		Long Range Block	
	XS7C/XS8C	**XS8 IQ Prox**	**XSD**	
				
Dimensions (mm)	117 x 40 x 40	117 x 40 x 40	100 x 80 x 40	100 x 80 x 40
Nominal Sensing Distance Shielded Sn (mm)	15	25	40	—
Nominal Sensing Distance Non-Shielded Sn (mm)	20	25	50	30–60
Supply (Voltage Limits)				
DC 3-Wire	10–58 V	19–30 V	—	—
Maximum Load	200 mA	200 mA	—	—
DC 2-Wire	10–58 V	—	10–58 V	10–58 V
Maximum Load	100 mA	—	100 mA	100 mA
DC 4-Wire	10–58 V	—	10–58 V	10–58 V
Maximum Load	200 mA	—	200 mA	200 mA
AC 2-Wire	20–264 V	—	20–264 V	20–264 V
Maximum Load	350 mA	—	500 mA	500 mA
AC/DC 2-Wire	20–264 V	—	—	—
Maximum Load	200 mA	—	—	—
Enclosure Rating				
Conduit Version	IP67	IP67	IP67	IP67
Connection				
Conduit	1/2 in. NPT	1/2 in. NPT	1/2 in. NPT	1/2 in. NPT
Temperature Range	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)
Page Number	254	256	258	260

Description	Tubular and Rectangular, Application Specific						
	Selective F, NF, N&NF	WFI	Factory Mutual (FM)	Analog	Capacitive	Magnet-Actuated	Rotation Control
							
Size (mm)	18, 30 mm Limit Switch	12, 18 mm Compact Block Style	4, 5, 6.5, 8, 12, 18, 30 mm Block Style	12, 18, 30 mm, F, E, C, D Limit Switch	12, 18, 30, 32 mm Limit Switch	Compact Block or Tubular Style	30 mm E, C
Nominal Sensing Distance Shielded Sn (mm) Maximum Sn shown	5–40	2–10	0.8–40	2–60	2–15	—	10–15
Supply (Voltage Limits)							
DC 3-Wire	10–38 V	10–36 V	—	24 V / 48 V	10–38 V	—	10–58 V
Maximum Load	200 mA	250 mA	—	—	300 mA	—	200 mA
DC 4-Wire	10–38 V	—	—	—	—	—	—
Maximum Load	200 mA	—	—	—	—	—	—
DC 2-Wire	—	10–58 V	7–12 V	24 V / 48 V	—	200 V	—
Maximum Load	—	100 mA	1.65 mA	—	—	0.5 A	—
AC 2-Wire	—	93–132 V	—	—	20–264 V	120–240 V	—
Maximum Load	—	150 mA	—	—	350 mA	0.5 A	—
AC/DC 2-Wire	20–264 V	—	—	—	—	130–200 V	20–264 V
Maximum Load	300 mA	—	—	—	—	0.5 A	0.35 A
Enclosure Rating							
Cable Version	IP68	IP67	IP64/IP67	IP67	IP63/IP67	IP67	IP67
Connector Version	IP67	IP67	—	IP67	—	IP67	IP67
Conduit Entry	IP67	IP67	—	IP67	—	IP67	—
Temperature Range	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)	-13 to +158 °F (-25 to +70 °C)	-40 to +140 °F (-40 to +60 °C)	-13 to +158 °F (-25 to +70 °C)
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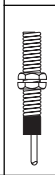
Proximity Sensors
Selection Guide
Tubular

Description		Metal, Fully Shielded, Fixed Sensing Range								Metal, Fully Shielded/ Non-Shielded		
		Standard Sensing Range				Extended Sensing Range				Auto-Adaptable Adjustable Range		
		XS5				XS6				XS6		
												
Diameter (mm)		∅ 8	∅ 12	∅ 18	∅ 30	∅ 8	∅ 12	∅ 18	∅ 30	∅ 12	∅ 18	∅ 30
Nominal Sensing Distance Sn (mm)		1.5	2	5	10	2.5	4	8	15	4	8	15
Supply (Voltage Limits)												
DC 3-Wire		10–36 V	10–36 V	10–36 V	10–36 V	10–58 V	10–58 V	10–58 V	10–58 V	10–36 V	10–36 V	10–36 V
Maximum Load		200 mA	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA	100 mA	100 mA	100 mA
Dimensions (mm)	Cable	M8 x 33	M12 x 33	M18 x 36.5	M30 x 40.6	M8 x 50	M12 x 50	M18 x 60	M18 x 60	—	—	—
	Connector	M8 x 42	M12 x 48	M18 x 48.6	M30 x 50.7	M8 x 61	M12 x 61	M18 x 72.2	M30 x 72.2	M12 x 50	M18 x 60	M30 x 60
DC 2-Wire		10–58 V	10–58 V	10–58 V	10–58 V	—	—	—	—	—	—	—
Maximum Load		100 mA	100 mA	100 mA	100 mA	—	—	—	—	—	—	—
Dimensions (mm)	Cable	M8 x 50	M12 x 50	M18 x 52.5	M30 x 50	—	—	—	—	—	—	—
	Connector	M8 x 61	M12 x 61	M18 x 64.6	M30 x 64.2	—	—	—	—	—	—	—
DC 4-Wire		—	—	—	—	—	—	—	—	—	—	—
Maximum Load		—	—	—	—	—	—	—	—	—	—	—
Dimensions (mm)	Cable	—	—	—	—	—	—	—	—	—	—	—
	Connector	—	—	—	—	—	—	—	—	—	—	—
AC/DC 2-Wire		—	—	—	—	—	20–264 V	20–264 V	20–264 V	—	—	—
Maximum Load		—	—	—	—	—	100 mA	100 mA	100 mA	—	—	—
Dimensions (mm)	Cable	—	—	—	—	—	M12 x 50	M18 x 60	M30 x 60	—	—	—
	Connector	—	—	—	—	—	M12 x 61	M18 x 72.2	M30 x 72.2	—	—	—
Enclosure Rating												
Cable		IP67	IP68	IP68	IP68	IP67	IP68	IP68	IP68	—	—	—
Connector		IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67
Connection												
Cable Version		2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	—	—	—
Connector Version		M8	M12	M12	M12	M8	M12/U20	M12/U20	M12/U20	—	—	—
Operating Temperature	°F	-13 to +158	-13 to +158	-13 to +158	-13 to +158	-13 to +158	-13 to +158	-13 to +158	-13 to +158	-13 to +158	-13 to +158	-13 to +158
	°C	-25 to +70	-25 to +70	-25 to +70	-25 to +70	-25 to +70	-25 to +70	-25 to +70	-25 to +70	-25 to +70	-25 to +70	-25 to +70
Page Number		186	186	186	186	184	184	184	184	184	184	184

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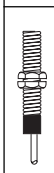
Proximity Sensors
Selection Guide
Tubular

Description		Plastic, Non-Shielded				Metal, Shielded/Non-Shielded, Fixed Sensing Range						
		Standard Sensing Range				Standard Sensing Range (Classic)				Nominal Range, Miniature		
		XS4P				**XS1M/N; XS2M/N**				**XS1L/N; XS2L/N**		
												
Diameter (mm)		∅ 8	∅ 12	∅ 18	∅ 30	∅ 8	∅ 12	∅ 18	∅ 30	∅ 4	∅ 5	∅ 6.5
Nominal Sensing Distance Shielded Sn (mm)		—	—	—	—	1.5	2	5	10	1	1	1.5
Nominal Sensing Distance Non-Shielded Sn (mm)		2.5	4	8	15	2.5	4	8	15	—	—	2.5
Supply (Voltage Limits)												
DC 3-Wire		10–38 V	10–38 V	10–38 V	10–38 V	10–58 V	10–58 V	10–58 V	10–58 V	5–30 V	5–30 V	10–38 V
Maximum Load		200 mA	200 mA	200 mA	200 mA	100 mA	200 mA	200 mA	200 mA	100 mA	100 mA	200 mA
Dimensions (mm)	Cable	M8 x 33	M12 x 33	M18 x 33	M30 x 40	M8 x 50	M12 x 50	M18 x 60	M30 x 60	M4 x 29	M5 x 29	M6.5 x 33
	Connector	M8 x 45	M12 x 45	M18 x 45	M30 x 50	M8 x 61	M12 x 61	M18 x 70	M30 x 70	M4 x 41	M5 x 41	M6.5 x 45
DC 2-Wire		—	—	—	—	10–58 V	10–58 V	10–58 V	10–58 V	—	—	—
Maximum Load		—	—	—	—	100 mA	100 mA	100 mA	100 mA	—	—	—
Dimensions (mm)	Cable	—	—	—	—	—	—	—	—	—	—	—
	Connector	—	—	—	—	—	—	—	—	—	—	—
DC 4-Wire		10–38 V	10–38 V	10–38 V	10–38 V	—	—	—	—	—	—	10–38 V
Maximum Load		200 mA	200 mA	200 mA	200 mA	—	—	—	—	—	—	200 mA
Dimensions (mm)	Cable	M8 x 50	M12 x 50	M18 x 60	M30 x 60	—	—	—	—	—	—	M6.5 x 50
	Connector	M8 x 61	M12 x 61	M18 x 70	M30 x 70	—	—	—	—	—	—	—
AC/DC 2-Wire		20–264 V	20–264 V	20–264 V	20–264 V	20–264 V	20–264 V	20–264 V	20–264 V	—	—	—
Maximum Load		100 mA	200 mA	200 mA	200 mA	100 mA	200 mA	200 mA	200 mA	—	—	—
Dimensions (mm)	Cable	M8 x 50	M12 x 50	M18 x 60	M30 x 60	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	—	—	—
	Connector	M8 x 61	M12 x 61	M18 x 70	M30 x 70	U20	U20	U20/U78	U20/U78	—	—	—
Enclosure Rating												
Cable		IP67	IP68	IP68	IP68	IP67	IP68	IP68	IP68	IP67	IP67	IP67
Connector		IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67
Connection												
Cable		2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)	2 m (6.6 ft)
Connector		M8/U20	M12/U20	M12/U20	M12/U20	M12/U20	M12/U20	M12/U20	M12/U20	M8	M8	M8/M12
Operating Temperature	°F	-13 to +158	-13 to +158	-13 to +158	-13 to +158	-13 to +176	-13 to +176	-13 to +176	-13 to +176	-13 to +158	-13 to +158	-13 to +158
	°C	-25 to +70	-25 to +70	-25 to +70	-25 to +70	-25 to +80	-25 to +80	-25 to +80	-25 to +80	-25 to +70	-25 to +70	-25 to +70
Page Number		206	216	220	228	204	212	220	228	198	200	202

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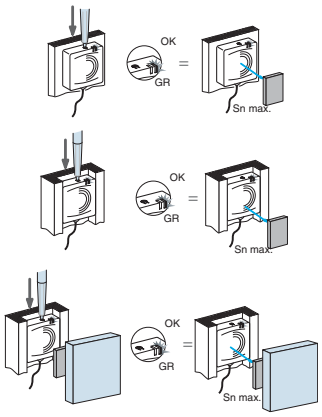
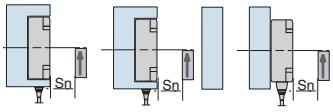


Principle of Operation

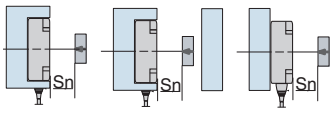
Osiconcept technology offers simplicity through innovation.

With Osiconcept, a single product meets all metal-object detection needs. By simply pressing the Teach Mode button, the product automatically adapts to an optimum configuration for all detection, flush mountability, and environmental requirements. Other advantages of Osiconcept technology include:

- Increased Performance
  - — Sensing distance is optimized regardless of the mounting configuration, the object, the environment, or the background.
  - — Products are suitable for all metal environments.
- Simplified Use
  - — Osiconcept technology is associated with the availability of the flattest, most compact sensors on the market, ensuring that the sensor is fully built into the machine, limiting risks of mechanical damage.
  - — Using the teach mode eliminates mechanical adjustments.
- Lower Costs
  - — Adjustment times and complex supports are eliminated.
  - — The elimination of flush-mountable and non-flush-mountable versions halves the number of catalog numbers.
  - — Product selection is easier and quicker.



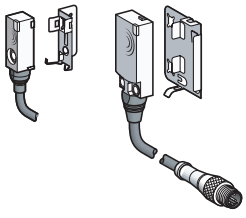
Precision side-approach detection



Precision frontal-approach detection

Fine Adjustment for Precise Positioning

- Precision **side-approach** detection makes it possible to accurately define the position where the object is detected as it passes the sensor. With Osiconcept technology, the desired detection position can be stored in memory by simply pressing the teach button.
- Precision **frontal-approach** detection makes it possible to accurately define the position where the object is detected as it approaches the sensor. With Osiconcept technology, the desired detection position can be stored in memory by simply pressing the teach button.



Installation

A full line of support brackets allows for simple, fast installation or maintenance. No tools are necessary; clip the sensor into place, and it is mounted and ready for operation. Brackets are available for all sizes—J, F, E, C, D—in flat and 90° styles.

Brackets are also available to substitute for existing XS•E, XS•C, and XS•D. See page 284.

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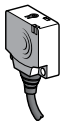
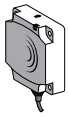
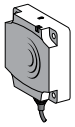
Flat			
Dimensions, in. (mm)	0.51 x 1.0 x 1.0 (13 x 26 x 26)	1.57 x 1.57 x 0.59 (40 x 40 x 15)	3.14 x 3.14 x 1.0 (80 x 80 x 26)
	Size E 	Size C 	Size D 
Applications	Machine Tooling, Molding, Welding Machinery, and Packaging		Material Handling, Conveyors
Sn—Flush Mounted, in. (mm)	0.2–0.39 (5–10)	0.31–0.59 (8–15)	0.78–1.57 (20–40)
Sn—Non-Flush Mounted, in. (mm)	0.2–0.59 (5–15)	0.31–0.98 (8–25)	0.78–2.36 (20–60)
Catalog Number	XS8E1A1	XS8CE1A1	XS8D1A1
Pages	180	180	180
Tubular			
Dimensions, in. (mm)	0.47 (12)	0.71 (18)	1.18 (30)
			
Applications	Machining, Food Industry		
Sn—Flush Mounted, in. (mm)	0.07–0.13 (1.7–3.4)	6.14–0.27 (3.5–7)	0.24–0.47 (6–12)
Sn—Non-Flush Mounted, in. (mm)	0.07–0.20 (1.7–5)	0.14–0.40 (3.5–10)	0.24–0.71 (6–18)
Catalog Number	XS612B•	XS618B•	XS630B•
Pages	184	184	184

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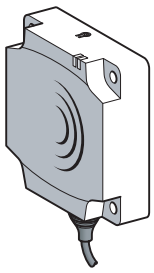
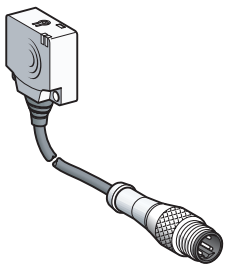
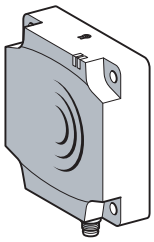
Proximity Sensors
XS8 Auto-Adaptable Inductive Sensor
Flat Rectangular, DC and AC/DC



XS8 •1A1••••L2



XS8 E1A1••M8



XS8 E1A1•••M8
XS8 C1A1•••M8

Features

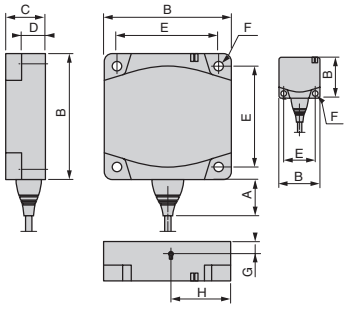
- Enhanced sensing distances
- Self-adapting to flush or non-flush mounted environments
- 3-wire DC and 2-wire AC/DC
- Self-teaching

Nominal Sensing Distance	Circuit Type	Output Mode	Voltage Range	Load Current Maximum	Operating Frequency	Catalog Number
DC						
Size E (13 x 26 x 26 mm) 2 m (6.6 ft) cable ▲						
15 mm	PNP	N.O.*	12–24 Vdc	100 mA	1,000 Hz	**XS8E1A1PAL2**
15 mm	NPN	N.O.*	12–24 Vdc	100 mA	1,000 Hz	**XS8E1A1NAL2**
Size E (13 x 26 x 26 mm) M8 connector						
15 mm	PNP	N.O.*	12–24 Vdc	100 mA	1,000 Hz	**XS8E1A1PAM8**
15 mm	NPN	N.O.*	12–24 Vdc	100 mA	1,000 Hz	**XS8E1A1NAM8**
Size E (13 x 26 x 26 mm) M12 pigtail, 0.1 m (3.9 in.)						
15 mm	PNP	N.O.*	12–24 Vdc	100 mA	1,000 Hz	**XS8E1A1PAL01M12**
15 mm	NPN	N.O.*	12–24 Vdc	100 mA	1,000 Hz	**XS8E1A1NAL01M12**
Size C (15 x 40 x 40 mm) 2 m (6.6 ft) cable ▲						
25 mm	PNP	N.O.*	12–24 Vdc	200 mA	1,000 Hz	**XS8C1A1PAL2**
25 mm	NPN	N.O.*	12–24 Vdc	200 mA	1,000 Hz	**XS8C1A1NAL2**
Size C (15 x 40 x 40 mm) M8 connector						
25 mm	PNP	N.O.*	12–24 Vdc	200 mA	1,000 Hz	**XS8C1A1PAM8**
25 mm	NPN	N.O.*	12–24 Vdc	200 mA	1,000 Hz	**XS8C1A1NAM8**
Size C (15 x 40 x 40 mm) M12 pigtail, 0.1 m (3.9 in.)						
25 mm	PNP	N.O.*	12–24 Vdc	200 mA	1,000 Hz	**XS8C1A1PAL01M12**
25 mm	NPN	N.O.*	12–24 Vdc	200 mA	1,000 Hz	**XS8C1A1NAL01M12**
Size D (26 x 80 x 80 mm) 2 m (6.6 ft) cable ▲						
60 mm	PNP	N.O.*	12–24 Vdc	200 mA	100 Hz	**XS8D1A1PAL2**
60 mm	NPN	N.O.*	12–24 Vdc	200 mA	100 Hz	**XS8D1A1NAL2**
Size D (26 x 80 x 80 mm) M12 connector						
60 mm	PNP	N.O.*	12–24 Vdc	200 mA	100 Hz	**XS8D1A1PAM12**
60 mm	NPN	N.O.*	12–24 Vdc	200 mA	100 Hz	**XS8D1A1NAM12**
AC						
Size E (13 x 26 x 26 mm) 2 m (6.6 ft) cable ▲						
15 mm	2-wire	N.O.*	24–240 Vac/24–210 Vdc	5–200 mA	1,000/50 Hz	**XS8E1A1MAL2**
Size E (13 x 26 x 26 mm) U20 pigtail, 0.1 m (3.9 in.)						
15 mm	2-wire	N.O.*	24–240 Vac/24–210 Vdc	5–200 mA	1,000/50 Hz	**XS8E1A1MAL01U20**
Size C (15 x 40 x 40 mm) 2 m (6.6 ft) cable ▲						
25 mm	2-wire	N.O.*	24–240 Vac/24–210 Vdc	5–300 mA	1,000/50 Hz	**XS8C1A1MAL2**
Size C (15 x 40 x 40 mm) U20 pigtail, 0.1 m (3.9 in.)						
25 mm	2-wire	N.O.*	24–240 Vac/24–210 Vdc	5–300 mA	1,000/50 Hz	**XS8C1A1MAL01U20**
Size D (26 x 80 x 80 mm) 2 m (6.6 ft) cable ▲						
60 mm	2-wire	N.O.*	24–240 Vac/24–210 Vdc	5–300 mA	100/50 Hz	**XS8D1A1MAL2**
Size D (26 x 80 x 80 mm) U20 connector						
60 mm	2-wire	N.O.*	24–240 Vac/24–210 Vdc	5–300 mA	100/50 Hz	**XS8D1A1MAU20**

★ To order a normally closed (N.C.) version, change the **A** to **B**. Example: XS8C1A1P**A**L2 to XS8C1A1P**B**L2.
▲ For a 5 m (16.4 ft) cable length, add suffix **L5.** For a 10 m (32.8 ft) cable length, add suffix **L10.**

Dimensions

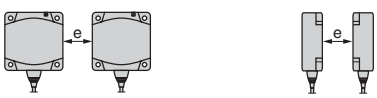
XS8 C/D **XS8E**



XS8 _	A L2	A M12	B	C	D	E	F	G	H
E	0.55	0.4	1.0	0.5	0.3	0.8	0.1	0.26	0.25
	14	11	26	13	8.8	20	3.5	6.8	6.6
C	0.55	0.4	1.6	0.6	0.4	1.3	0.1	0.32	0.53
	14	11	40	15	9.8	33	4.5	8.3	13.6
D	0.9	0.5	3.1	1.0	0.6	2.5	0.2	0.33	1.5
	23	14	80	26	16	65	5.5	8.5	37.8

in.
mm

Minimum Mounting Clearances, in. (mm)



	Side by Side		Face to Face	
XS8E	e ≥ 1.6 (40)	e ≥ 5.9 (150)	e ≥ 3.1 (80)	e ≥ 11.8 (300)
XS8C	e ≥ 2.4 (60)	e ≥ 4.9 (125)	e ≥ 4.7 (120)	e ≥ 9.8 (250)
XS8D	e ≥ 7.9 (200)	e ≥ 23.6 (600)	e ≥ 15.7 (400)	

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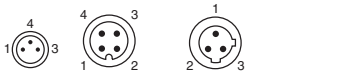
Proximity Sensors
XS8 Auto-Adaptable Inductive Sensor
Flat Rectangular, DC and AC/DC

Wiring

Connector

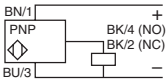
M8 M12 0.5 in. 20-UNF



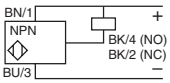
Cable

Blue	BU –
Brown	BN +
Black	BK Output

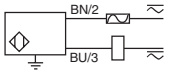
PNP/M12 or M8



NPN/M12 or M8



Type 2-Wire 0.5 in. 20-UNF



M8 connector, N.O. and N.C. to pin 4.

Specifications

Mechanical		**Shielded**	**Non-Shielded**
Fine Detection Zone	XS8E	5–10 mm	5–15 mm
	XS8C	8–15 mm	8–25 mm
	XS8D	20–40 mm	20–60 mm
Sn	XS8E	0–10 mm	0–15 mm
	XS8C	0–15 mm	0–25 mm
	XS8D	0–40 mm	0–60 mm
Temperature Range	Storage	-40 to +185 °F (-40 to +85 °C)	
	Operation	-13 to +158 °F (-25 to +70 °C)	
Enclosure Rating	NEMA Type	1, 4X, 12	
	IEC	IP68 cable version / IP67 connector version	
Vibration		25 g, ±2 mm amplitude (10–55 Hz)	
Shock Resistance		50 g, 11 ms duration	
Differential (% of Sr)		1–15%	
Repeatability (% of Sr)		2%	
LED Indicator	Output	Yellow	
	Power and Teach	Green	
Enclosure material		PBT	
Cable		PVR 3 x 0.34 mm^2	
Connector		M8 Nano 3-pin, M12 Micro 4-pin, U20 Micro 3-pin	
Electrical		**2-wire AC/DC**	**3-wire DC**
Voltage Range		24–240 Vac/24–210 Vdc	12–24 Vdc
Voltage Limit (Including Ripple)		20–264 Vac/Vdc	10–36 Vdc
Voltage Drop		5.5 V	2 V
Maximum Load Current	XS8E	5–200 mA	100 mA
	XS8C	DC: 5–300 mA; AC: 5–260 mA	200 mA
	XS8D	DC: 5–300 mA; AC: 5–260 mA	200 mA
Maximum Leakage (Residual) Current—Open State		1.5 mA	—
Current Consumption		—	10 mA
Power-up Delay (Maximum)	XS8E	10 ms	5 ms
	XS8C	10 ms	5 ms
	XS8D	15 ms	10 ms
On Delay (Maximum)	XS8E	0.3 ms	0.3 ms
	XS8C	0.3 ms	0.3 ms
	XS8D	0.3 ms	0.3 ms
Off Delay (Maximum)	XS8E	0.7 ms	0.7 ms
	XS8C	0.7 ms	0.7 ms
	XS8D	5 ms	5 ms
Protective Circuitry	Short Circuit Protection	No	Yes
	Overload Protection	No	Yes
Agency Listings			

Connector Cables (M8 or S suffix; M12 or D suffix; U20 or K suffix)

XSZCS101	Nano-style, 3-pin, 2 m, straight
XSZCS111	Nano-style, 3-pin, 2 m, 90°
XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°
XSZCK101Y	Micro-style, 3-pin, 2 m, straight
XSZCK111Y	Micro-style, 3-pin, 2 m, 90°

Additional cable options and lengths. . . . page 626

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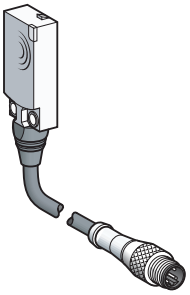
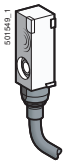
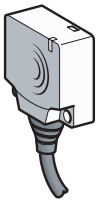
Proximity Sensors
XS7 Inductive Sensor
Flat Rectangular, DC



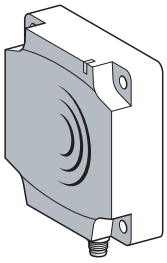
XS7FA1••L01M8



XS7J1A1••L2



XS7 1A1••L2



XS7 D1A1••M12

Features

Entire range of flat proximity sensors dedicated to OEMs and their applications.

- Complete flat range offering
- 2- and 3-wire DC
- Normally open or normally closed outputs available
- Cable and connector versions
- PNP or NPN

Nominal Sensing Distance	Circuit Type	Output Mode	Voltage Range	Load Current Maximum	Operating Frequency	Catalog Number
Size J (8 x 8 x 22 mm) 2 m (6.6 ft) cable ▲						
2.5 mm	2-wire	N.O.★	12–24 Vdc	1.5–100 mA	4,000 Hz	**XS7J1A1DAL2**
2.5 mm	PNP	N.O.★	12–24 Vdc	100 mA	2,000 Hz	**XS7J1A1PAL2**
2.5 mm	NPN	N.O.★	12–24 Vdc	100 mA	2,000 Hz	**XS7J1A1NAL2**
Size J (8 x 8 x 22 mm) M8 pigtail, 0.1 m (3.9 in.)						
2.5 mm	2-wire	N.O.★	12–24 Vdc	1.5–100 mA	4,000 Hz	**XS7J1A1DAL01M8**
2.5 mm	PNP	N.O.★	12–24 Vdc	100 mA	2,000 Hz	**XS7J1A1PAL01M8**
2.5 mm	NPN	N.O.★	12–24 Vdc	100 mA	2,000 Hz	**XS7J1A1NAL01M8**
Size F (8 x 15 x 32 mm) 2 m (6.6 ft) cable ▲						
5 mm	2-wire	N.O.★	12–24 Vdc	1.5–100 mA	5,000 Hz	**XS7F1A1DAL2**
5 mm	PNP	N.O.★	12–24 Vdc	100 mA	2,000 Hz	**XS7F1A1PAL2**
5 mm	NPN	N.O.★	12–24 Vdc	100 mA	2,000 Hz	**XS7F1A1NAL2**
Size F (8 x 15 x 32 mm) M8 pigtail, 0.1 m (3.9 in.)						
5 mm	2-wire	N.O.★	12–24 Vdc	1.5–100 mA	5,000 Hz	**XS7F1A1DAL01M8**
5 mm	PNP	N.O.★	12–24 Vdc	100 mA	2,000 Hz	**XS7F1A1PAL01M8**
5 mm	NPN	N.O.★	12–24 Vdc	100 mA	2,000 Hz	**XS7F1A1NAL01M8**
Size E (13 x 26 x 26 mm) 2 m (6.6 ft) cable ▲						
10 mm	2-wire	N.O.★	12–24 Vdc	1.5–100 mA	1,000 Hz	**XS7E1A1DAL2**
10 mm	PNP	N.O.★	12–24 Vdc	100 mA	1,000 Hz	**XS7E1A1PAL2**
10 mm	NPN	N.O.★	12–24 Vdc	100 mA	1,000 Hz	**XS7E1A1NAL2**
Size E (13 x 26 x 26 mm) M8 connector						
10 mm	2-wire	N.O.★	12–24 Vdc	1.5–100 mA	1,000 Hz	**XS7E1A1DAM8**
10 mm	PNP	N.O.★	12–24 Vdc	100 mA	1,000 Hz	**XS7E1A1PAM8**
10 mm	NPN	N.O.★	12–24 Vdc	100 mA	1,000 Hz	**XS7E1A1NAM8**
Size E (13 x 26 x 26 mm) M12 pigtail, 0.1 m (3.9 in.) ◆						
10 mm	2-wire	N.O.★	12–24 Vdc	1.5–100 mA	1,000 Hz	**XS7E1A1DAL01M12**
10 mm	PNP	N.O.★	12–24 Vdc	100 mA	1,000 Hz	**XS7E1A1PAL01M12**
10 mm	NPN	N.O.★	12–24 Vdc	100 mA	1,000 Hz	**XS7E1A1NAL01M12**
Size C (15 x 40 x 40 mm) 2 m (6.6 ft) cable ▲						
15 mm	2-wire	N.O.★	12–24 Vdc	1.5–100 mA	1,000 Hz	**XS7C1A1DAL2**
15 mm	PNP	N.O.★	12–24 Vdc	100 mA	1,000 Hz	**XS7C1A1PAL2**
15 mm	NPN	N.O.★	12–24 Vdc	100 mA	1,000 Hz	**XS7C1A1NAL2**
Size C (15 x 40 x 40 mm) M8 connector						
15 mm	2-wire	N.O.★	12–24 Vdc	1.5–100 mA	1,000 Hz	**XS7C1A1DAM8**
15 mm	PNP	N.O.★	12–24 Vdc	100 mA	1,000 Hz	**XS7C1A1PAM8**
15 mm	NPN	N.O.★	12–24 Vdc	100 mA	1,000 Hz	**XS7C1A1NAM8**
Size C (15 x 40 x 40 mm) M12 pigtail, 0.1 m (3.9 in.) ◆						
15 mm	2-wire	N.O.★	12–24 Vdc	1.5–100 mA	1,000 Hz	**XS7C1A1DAL01M12**
15 mm	PNP	N.O.★	12–24 Vdc	100 mA	1,000 Hz	**XS7C1A1PAL01M12**
15 mm	NPN	N.O.★	12–24 Vdc	100 mA	1,000 Hz	**XS7C1A1NAL01M12**
Size D (26 x 80 x 80 mm) 2 m (6.6 ft) cable ▲						
40 mm	2-wire	N.O.★	12–24 Vdc	1.5–100 mA	100 Hz	**XS7D1A1DAL2**
40 mm	PNP	N.O.★	12–24 Vdc	100 mA	100 Hz	**XS7D1A1PAL2**
40 mm	NPN	N.O.★	12–24 Vdc	100 mA	100 Hz	**XS7D1A1NAL2**
Size D (26 x 80 x 80 mm) M12 connector						
40 mm	2-wire	N.O.★	12–24 Vdc	1.5–100 mA	100 Hz	**XS7D1A1CAM12**
40 mm	2-wire	N.O.★	12–24 Vdc	1.5–100 mA	100 Hz	**XS7D1A1DAM12**
40 mm	PNP	N.O.★	12–24 Vdc	100 mA	100 Hz	**XS7D1A1PAM12**
40 mm	NPN	N.O.★	12–24 Vdc	100 mA	100 Hz	**XS7D1A1NAM12**

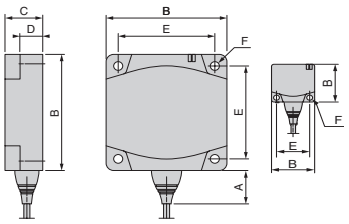
★ To order a normally closed (N.C.) version, change the **A** to **B**. Example: XS718B1P**A**L2 to XS718B1P**B**L2.

◆ 0.8 m and 0.15 m pigtail length available on 2-wire E and C.

▲ For a 5 m (16.4 ft) cable length, add suffix **L5.** For a 10 m (32.8 ft) cable length, add suffix **L10.**

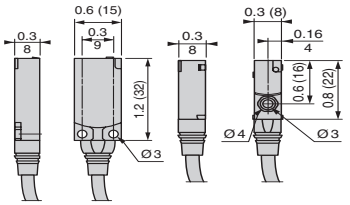
Dimensions

XS7C/D **XS7E**



XS7_	A L2	A M12	B	C	D	E	F
E	0.55 (14)	0.4 (11)	1.0 (26)	0.5 (13)	0.3 (8.8)	0.8 (20)	0.1 (3.5)
C	0.55 (14)	0.4 (11)	1.6 (40)	0.6 (15)	0.4 (9.8)	1.3 (33)	0.1 (4.5)
D	0.9 (23)	0.5 (14)	3.1 (80)	1.0 (26)	0.6 (16)	2.5 (65)	0.2 (5.5)

XS7F **XS7J**



in. (mm)

Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

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Proximity Sensors
XS7 Inductive Sensor
Flat Rectangular, DC

Wiring

XS7E, XS7C, XS7D

Connector



M12

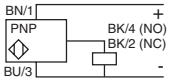


M8

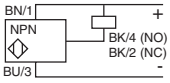
Cable

Blue	BU –
Brown	BN +
Black	BK Output

PNP/M12 or M8

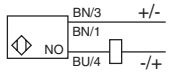


NPN/M12 or M8

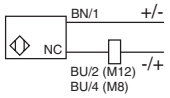


M8 connector, N.O. and N.C. to pin 4.

2-Wire N.O.



2-Wire N.C.



Connector M8

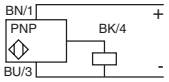


Cable

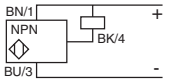
Blue	BU –
Brown	BN +
Black	BK Output

XS7J, XS7F

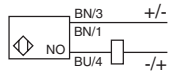
PNP N.O. or N.C.



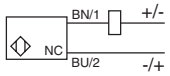
NPN N.O. or N.C.



2-Wire N.O.



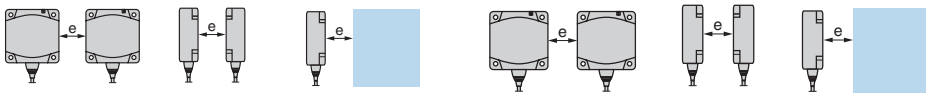
2-Wire N.C.



Specifications

Mechanical			
Usable Sensing Range	XS7J	0–2 mm	
	XS7F	0–4 mm	
	XS7E	0–8 mm	
	XS7C	0–12 mm	
	XS7D	0–32 mm	
Temperature Range	Storage	-40 to +185 °F (-40 to +85 °C)	
	Operational	-13 to +158 °F (-25 to +70 °C)	
Enclosure Rating	NEMA Type	1, 4X, 12	
	IEC	IP68 Cable version / IP67 Connector version	
Vibration		25 g, ±2 mm amplitude (10–55 Hz)	
Shock Resistance		50 g, 11 ms duration	
Differential (% of Sr)		1–15%	
Repeatability (% of Sr)		2%	
LED Indicator		Yellow output	
Enclosure Material		PBT	
Cable		PVR, 3 x 0.34 mm^2	
Connector		Nano-style 3-pin M8 / micro-style 4-pin M12	
Electrical		**2-wire**	**3-wire**
Voltage Range		12–24 Vdc	12–24 Vdc
Voltage Limit (Including Ripple)		10–36 Vdc	10–36 Vdc
Voltage Drop		2 V	4 V
Current Limit Maximum		100 mA	100 mA
Current consumption		0.5 mA	10 mA
Power-up Delay (Maximum)	XS7J	10 ms	5 ms
	XS7F	5 ms	5 ms
	XS7E	5 ms	10 ms
	XS7C	5 ms	5 ms
	XS7D	10 ms	30 ms
On Delay (Maximum)	XS7J	0.5 ms	0.1 ms
	XS7F	0.5 ms	0.1 ms
	XS7E	0.3 ms	2 ms
	XS7C	0.3 ms	2 ms
	XS7D	10 ms	5 ms
Off Delay (Maximum)	XS7J	1 ms	0.1 ms
	XS7F	5 ms	0.1 ms
	XS7E	0.7 ms	6 ms
	XS7C	0.7 ms	5 ms
	XS7D	10 ms	15 ms
Protective Circuitry	Short Circuit Protection	Yes	Yes
	Overload Protection	Yes	Yes
Agency Listings	E164869 CCN NRKH		

Minimum Mounting Clearances (mm)



	Side by Side	Face to Face	Face to Metal Object		Side by Side	Face to Face	Face to Metal Object
XS7E	e ≥ 0.2 (4)	e ≥ 0.9 (24)	e ≥ 0.2 (6)	**XS7J**	e ≥ 0.03 (1)	e ≥ 0.2 (6)	e ≥ 0.08 (2)
XS7C	e ≥ 0.4 (10)	e ≥ 2.4 (60)	e ≥ 0.6 (15)	**XS7F**	e ≥ 0.8(020)	e ≥ 0.4(12)	e ≥ 0.12 (3)
XS7D	e ≥ 0.8 (20)	e ≥ 4.7 (120)	e ≥ 1.2 (30)				

Connector Cables (M8 or S suffix; M12 or D suffix)

XSZCS101	Nano-style, 3-pin, 2 m, straight
XSZCS111	Nano-style, 3-pin, 2 m, 90°
XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths . . . page 626

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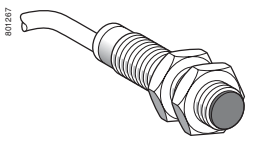
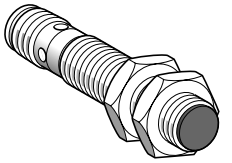
Proximity Sensors
XS6 Extended Range and Auto-Adaptable Inductive Sensor
Metal Tubular, DC and AC/DC

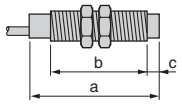


XS6 ••B1••L2



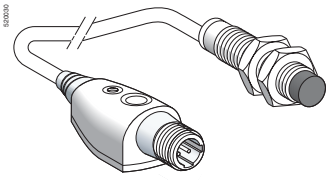
XS6 ••B1••M12

Dimensions



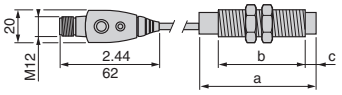
	Cable		Connector	
	a	b	a	b
∅ 8	1.9 (50)	1.6 (42)	2.4 (61)	1.6 (40)
∅ 12	1.9 (50)	1.6 (42)	2.4 (61)	1.6 (42)
∅ 18	2.3 (60)	0.09 (51)	2.8 (72.2)	2.0 (51)
∅ 30	2.3 (60)	0.09 (51)	2.8 (72.2)	2.0 (51)

in. (mm)



XS6••B2••L01M12

Dimensions



	Connector M12		
	a	b	c
∅ 12	1.9 (50)	1.4 (37)	0.2 (5)
∅ 18	2.3 (60)	1.5 (38.5)	0.31 (8)
∅ 30	29.9 (760)	1.5 (38.5)	0.5 (13)

in. (mm)

Dual Dimensions inches / mm

Features

Entire range of fully shielded metal body tubular inductive proximity sensors

- Increased sensing range, fully shielded
- 2-wire AC/DC and 3-wire DC
- Normally open or normally closed outputs available
- Cable and connector versions
- PNP or NPN, DC
- Self-Teach available on 12–30 mm versions

Nominal Sensing Distance	Circuit Type	Output Mode	Voltage Range	Load Current Maximum	Operating Frequency DC	Operating Frequency AC	Catalog Number
8 mm Diameter, 2 m (6.6 ft) cable ▲							
2.5 mm	PNP	N.O.★	12–48 Vdc	200 mA	5,000 Hz	—	**XS608B1PAL2**
2.5 mm	NPN	N.O.★	12–48 Vdc	200 mA	5,000 Hz	—	**XS608B1NAL2**
8 mm Diameter, M12 connector							
2.5 mm	PNP	N.O.★	12–48 Vdc	200 mA	5,000 Hz	—	**XS608B1PAM8**
2.5 mm	NPN	N.O.★	12–48 Vdc	200 mA	5,000 Hz	—	**XS608B1NAM8**
12 mm Diameter, 2 m (6.6 ft) cable ▲							
4 mm	2-wire	N.O.★	12–48 Vdc	1.5–100 mA	4,000 Hz	25 Hz	**XS612B1MAL2**
4 mm	PNP	N.O.★	12–48 Vdc	200 mA	5,000 Hz	—	**XS612B1PAL2**
4 mm	NPN	N.O.★	12–48 Vdc	200 mA	5,000 Hz	—	**XS612B1NAL2**
12 mm Diameter, M12 connector							
4 mm	2-wire	N.O.★	24–240 Vac/24–210 Vdc	1.5–100 mA	4,000 Hz	25 Hz	**XS612B1MAU20**
4 mm	PNP	N.O.★	12–48 Vdc	200 mA	5,000 Hz	—	**XS612B1PAM12**
4 mm	NPN	N.O.★	12–48 Vdc	200 mA	5,000 Hz	—	**XS612B1NAM12**
18 mm Diameter, 2 m (6.6 ft) cable ▲							
8 mm	2-wire	N.O.★	24–240 Vac/24–210 Vdc	1.5–100 mA	3,000 Hz	25 Hz	**XS618B1MAL2**
8 mm	PNP	N.O.★	12–48 Vdc	200 mA	2,000 Hz	—	**XS618B1PAL2**
8 mm	NPN	N.O.★	12–48 Vdc	200 mA	2,000 Hz	—	**XS618B1NAL2**
18 mm Diameter, M12 connector							
8 mm	2-wire	N.O.★	24–240 Vac/24–210 Vdc	1.5–100 mA	3,000 Hz	25 Hz	**XS618B1MAU20**
8 mm	PNP	N.O.★	12–48 Vdc	200 mA	2,000 Hz	—	**XS618B1PAM12**
8 mm	NPN	N.O.★	12–48 Vdc	200 mA	2,000 Hz	—	**XS618B1NAM12**
30 mm Diameter, 2 m (6.6 ft) cable ▲							
15 mm	2-wire	N.O.★	24–240 Vac/24–210 Vdc	1.5–100 mA	2,000 Hz	25 Hz	**XS630B1MAL2**
15 mm	PNP	N.O.★	12–48 Vdc	200 mA	1,000 Hz	—	**XS630B1PAL2**
15 mm	NPN	N.O.★	12–48 Vdc	200 mA	1,000 Hz	—	**XS630B1NAL2**
30 mm Diameter, M12 connector							
15 mm	2-wire	N.O.★	24–240 Vac/24–210 Vdc	1.5–100 mA	2,000 Hz	25 Hz	**XS630B1MAU20**
15 mm	PNP	N.O.★	12–48 Vdc	200 mA	1,000 Hz	—	**XS630B1PAM12**
15 mm	NPN	N.O.★	12–48 Vdc	200 mA	1,000 Hz	—	**XS630B1NAM12**

Self-Teach version◆ (Auto-Adaptable)

12 mm Diameter, M12 connector pigtail 0.1 m (3.9 in.)							
5 mm	PNP	N.O.★	12–24 Vdc	100 mA	1,000 Hz	—	**XS612B2PAL01M12**
5 mm	NPN	N.O.★	12–24 Vdc	100 mA	1,000 Hz	—	**XS612B2NAL01M12**
18 mm Diameter, M12 connector pigtail 0.1 m (3.9 in.)							
9 mm	PNP	N.O.★	12–24 Vdc	100 mA	1,000 Hz	—	**XS618B2PAL01M12**
9 mm	NPN	N.O.★	12–24 Vdc	100 mA	1,000 Hz	—	**XS618B2NAL01M12**
30 mm Diameter, M12 connector pigtail 0.1 m (3.9 in.)							
15 mm	PNP	N.O.★	12–24 Vdc	100 mA	1,000 Hz	—	**XS630B2PAL01M12**
15 mm	NPN	N.O.★	12–24 Vdc	100 mA	1,000 Hz	—	**XS630B2NAL01M12**

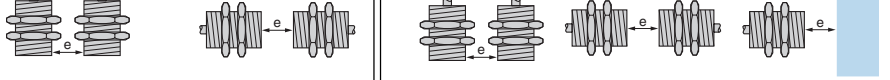
★ To order a normally closed (N.C.) version, change the A to B. Example: XS518B1P**A**L2 to XS518B1P**B**L2.

◆ Self-teach version only

▲ For a 5 m (16.4 ft) cable length, add suffix **L5.** For a 10 m (32.8 ft) cable length, add suffix **L10.**

Minimum Mounting Clearances, in. (mm)

Auto-Adaptable | **Extended Range**



	Auto-Adaptable: Side by Side		Auto-Adaptable: Face to Face			Extended Range: Side by Side	Extended Range: Face to Face	Extended Range: Face to Metal Object
—	Flush	Not Flush	Flush	Not Flush	∅ 8	e ≥ 0.1 (3)	e ≥ 0.7 (18)	e ≥ 0.17 (4.5)
∅ 12	e ≥ 0.55 (14)	1.9 (50)	e ≥ 1.9 (50)	3.9 (100)	∅ 12	e ≥ 0.2 (4)	e ≥ 0.9 (24)	e ≥ 0.2 (6)
∅ 18	e ≥ 1.1 (28)	3.9 (100)	e ≥ 3.9 (100)	7.9 (200)	∅ 18	e ≥ 0.4 (10)	e ≥ 2.4 (60)	e ≥ 0.6 (15)
∅ 30	e ≥ 1.9 (48)	7.1 (180)	e ≥ 7.1 (180)	14.1 (360)	∅ 30	e ≥ 0.8 (20)	e ≥ 4.7 (120)	e ≥ 1.2 (30)

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Wiring

3-Wire Selectable

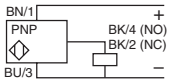
Connector M12



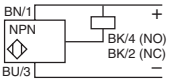
Cable

Blue	BU –
Brown	BN +
Black	BK Output

PNP



NPN



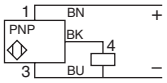
Connector M12



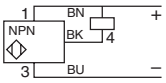
Cable

Blue	BU –
Brown	BN +
Black	BK Output

PNP



NPN



2-Wire AC/DC

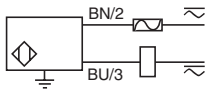
Connector U20

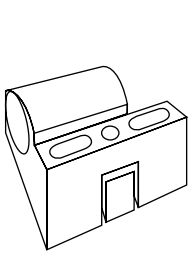


Cable

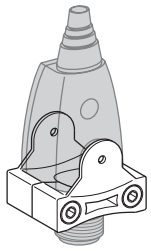
Blue	BU –
Brown	BN +
Black	BK Output

2-Wire Non-Polarized





XSZB1●●



XSZBPM12

Connector Cables
(M12 or D suffix; U20 or K suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°
XSZCK101Y	Micro-style, 3-pin, 2 m, straight
XSZCK111Y	Micro-style, 3-pin, 2 m, 90°

Additional cable options and lengths. . . .page 626

Specifications

Mechanical		Extended Range	Auto-Adaptable	
			Shielded	Non-Shielded
Fine Detection Zone	8 mm	0–2 mm	—	—
	12 mm	0–3.2 mm	1.7–3.4 mm	1.7–5 mm
	18 mm	0–6.4 mm	3.5–6 mm	3.5–9 mm
	30 mm	0–12 mm	6–12 mm	6–18 mm
Sn	12 mm	—	0–3.4 mm	0–5 mm
	18 mm	—	0–6 mm	0–9 mm
	30 mm	—	0–12 mm	0–18 mm
Temperature Rating	Storage	-40 to +185 °F (-40 to +85 °C)		
	Operation	-13 to +158 °F (-25 to +70 °C)		
Enclosure Rating	NEMA Type	3, 4X, 6P, 12, 13		
	IEC	IP68 cable versions (IP67 connector versions)		
Enclosure Material	Case	Nickel-plated brass		
	Face	PBT		
Maximum Tightening Torque	8 mm	9 N•m (6.7 lb-ft)		
	12 mm	15 N•m (11 lb-ft)		
	18 mm	35 N•m (26 lb-ft)		
	30 mm	50 N•m (37 lb-ft)		
Vibration		25 g, ±2 mm amplitude (10–55 Hz)		
Shock Resistance		50 g, 11 ms duration		
Differential (%of Sr)		15%		
Repeatability (% of Sr)		3%		
LED Indicator	Power and Teach	—	Green	
	Output	Yellow		
Cable		PVR 3 x 0.34 mm^2 / PVR2 x 0.5 mm^2	PVR – 4.2 mm (0.17 in.) O.D.	
Connector		M12 4-pin / U20 3-pin micro-style	M12 micro-style 4-pin	

Electrical		2-wire AC/DC	3-wire DC	Auto-adaptable DC
Voltage Range		24–240 Vac; 24–210 Vdc	12–48 Vdc	12–24 Vdc
Voltage Limit (Including Ripple)		20–264 Vac/Vdc	10–58 Vdc	10–36 Vdc
Voltage Drop		5.5 V	2 V	2 V
Maximum Leakage (Residual) Current—Open State		0.8 mA	—	—
Current Consumption		—	10 mA	10 mA
Maximum Current Limit		AC: 5–300 mA; DC: 5–200 mA	200 mA	100 mA
Power-up Delay (Maximum)		20 ms—12 mm; 25 ms—18/30 mm	5 ms	5 ms
On Delay (Maximum)	8 mm	—	0.2 ms	—
	12 mm	0.5 ms	0.2 ms	0.3 ms
	18 mm	0.5 ms	0.3 ms	0.3 ms
	30 mm	0.5 ms	0.6 ms	0.3 ms
Off Delay (Maximum)	8 mm	—	0.2 ms	—
	12 mm	0.2 ms	0.2 ms	0.7 ms
	18 mm	0.5 ms	0.7 ms	0.7 ms
	30 mm	2 ms	1.4 ms	0.7 ms
Operating Frequency, Maximum	8 mm	—	2,500 Hz	—
	12 mm	AC: 25 Hz / DC: 1,000 Hz	2,500 Hz	1,000 Hz
	18 mm	AC: 25 Hz / DC: 1,000 Hz	1,000 Hz	1,000 Hz
	30 mm	AC: 25 Hz / DC: 500 Hz	500 Hz	1,000 Hz
Protective Circuitry	Short Circuit Protection	No	Yes	Yes
	Overload Protection	Yes	Yes	Yes
	Reverse Polarity Protection	Yes	Yes	Yes
Agency Listings				

Accessories

Description	Catalog Number
Mounting bracket for teach connector	**XSZBPM12**
8 mm tubular mounting bracket	**XSZB108**
12 mm tubular mounting bracket	**XSZB112**
18 mm tubular mounting bracket	**XSZB118**
30 mm tubular mounting bracket	**XSZB130**

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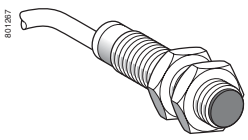
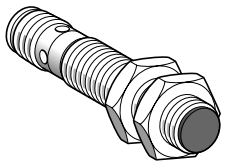
Proximity Sensors
XS5 Inductive Sensor
Metal Tubular, DC



thread M8 x 1

thread M12x1

XS5 ••B1••L2



thread M18x1

thread M30x1.5

XS5 ••B1••M12

Features

Complete range of tubular proximity sensors dedicated to OEMs and their applications

- Low cost shielded tubular inductive proximity sensors
- 2- and 3-wire DC
- Normally open or normally closed outputs available
- Cable and connector versions
- PNP or NPN

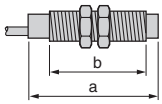
Nominal Sensing Distance	Circuit Type	Output Mode	Voltage Range	Load Current Maximum	Operating Frequency	Catalog Number
8 mm Diameter, 2 m (6.6 ft) cable ▲						
1.5 mm	2-wire	N.O.★	12–48 Vdc	1.5–100 mA	4,000 Hz	**XS508B1DAL2**
1.5 mm	PNP	N.O.★	12–24 Vdc	200 mA	5,000 Hz	**XS508B1PAL2**
1.5 mm	NPN	N.O.★	12–24 Vdc	200 mA	5,000 Hz	**XS508B1NAL2**
8 mm Diameter, M12 connector						
1.5 mm	2-wire	N.O.★	12–48 Vdc	1.5–100 mA	4,000 Hz	**XS508B1DAM8**
1.5 mm	PNP	N.O.★	12–24 Vdc	200 mA	5,000 Hz	**XS508B1PAM8**
1.5 mm	NPN	N.O.★	12–24 Vdc	200 mA	5,000 Hz	**XS508B1NAM8**
12 mm Diameter, 2 m (6.6 ft) cable ▲						
2 mm	2-wire	N.O.★	12–48 Vdc	1.5–100 mA	4,000 Hz	**XS512B1DAL2**
2 mm	PNP	N.O.★	12–24 Vdc	200 mA	5,000 Hz	**XS512B1PAL2**
2 mm	NPN	N.O.★	12–24 Vdc	200 mA	5,000 Hz	**XS512B1NAL2**
12 mm Diameter, M12 connector						
2 mm	2-wire	N.O.★	12–48 Vdc	1.5–100 mA	4,000 Hz	**XS512B1DAM12**
2 mm	PNP	N.O.★	12–24 Vdc	200 mA	5,000 Hz	**XS512B1PAM12**
2 mm	NPN	N.O.★	12–24 Vdc	200 mA	5,000 Hz	**XS512B1NAM12**
18 mm Diameter, 2 m (6.6 ft) cable ▲						
5 mm	2-wire	N.O.★	12–48 Vdc	1.5–100 mA	3,000 Hz	**XS518B1DAL2**
5 mm	PNP	N.O.★	12–24 Vdc	200 mA	2,000 Hz	**XS518B1PAL2**
5 mm	NPN	N.O.★	12–24 Vdc	200 mA	2,000 Hz	**XS518B1NAL2**
18 mm Diameter, M12 connector						
5 mm	2-wire	N.O.★	12–48 Vdc	1.5–100 mA	3,000 Hz	**XS518B1DAM12**
5 mm	PNP	N.O.★	12–24 Vdc	200 mA	2,000 Hz	**XS518B1PAM12**
5 mm	NPN	N.O.★	12–24 Vdc	200 mA	2,000 Hz	**XS518B1NAM12**
30 mm Diameter, 2 m (6.6 ft) cable ▲						
10 mm	2-wire	N.O.★	12–48 Vdc	1.5–100 mA	2,000 Hz	**XS530B1DAL2**
10 mm	PNP	N.O.★	12–24 Vdc	200 mA	1,000 Hz	**XS530B1PAL2**
10 mm	NPN	N.O.★	12–24 Vdc	200 mA	1,000 Hz	**XS530B1NAL2**
30 mm Diameter, M12 connector						
10 mm	2-wire	N.O.★	12–48 Vdc	1.5–100 mA	2,000 Hz	**XS530B1DAM12**
10 mm	PNP	N.O.★	12–24 Vdc	200 mA	1,000 Hz	**XS530B1PAM12**
10 mm	NPN	N.O.★	12–24 Vdc	200 mA	1,000 Hz	**XS530B1NAM12**

★ To order a normally closed (N.C.) version, change the **A** to **B**. Example: XS518B1P**A**L2 to XS518B1P**B**L2.

▲ For a 5 m (16.4 ft) cable length, add suffix **L5.** For a 10 m (32.8 ft) cable length, add suffix **L10.**

Dimensions

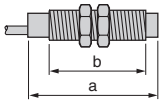
2-Wire



	Cable		Connector	
	a	**b**	**a**	**b**
∅ **8**	1.9 (50)	1.6 (42)	2.4 (61)	1.6 (40)
∅ **12**	1.9 (50)	1.6 (42)	2.4 (61)	1.6 (40)
∅ **18**	2.0 (52.5)	1.7 (44)	2.5 (64.6)	1.7 (44)
∅ **30**	1.9 (50)	1.6 (42)	2.5 (64.2)	1.6 (41)

in. (mm)

3-wire

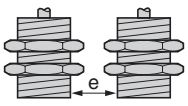


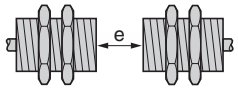
	Cable		Connector	
	a	**b**	**a**	**b**
∅ **8**	1.3 (33)	1.0 (25)	1.6 (42)	1.0 (26)
∅ **12**	1.3 (33)	1.0 (25)	1.9 (48)	1.1 (29)
∅ **18**	1.4 (36.5)	1.1 (28)	1.9 (48.6)	1.1 (28)
∅ **30**	1.6 (40.6)	1.2 (32)	2.0 (50.7)	1.3 (32)

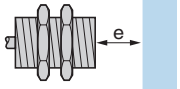
in. (mm)

Dual Dimensions inches / mm

Minimum Mounting Clearances, in. (mm)







	Side by Side	Face to Face	Facing a Metal Object
∅ **8**	e ≥ 0.11 (3)	e ≥ 0.7 (18)	e ≥ 0.17 (4.5)
∅ **12**	e ≥ 0.15 (4)	e ≥ 0.9 (24)	e ≥ 0.2 (6)
∅ **18**	e ≥ 0.4 (10)	e ≥ 2.4 (60)	e ≥ 0.6 (15)
∅ **30**	e ≥ 0.8 (20)	e ≥ 4.7 (120)	e ≥ 1.2 (30)

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Proximity Sensors
XS5 Inductive Sensor
Metal Tubular, DC

Wiring

2-Wire

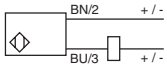
Connector M12



Cable

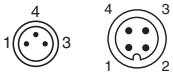
Blue	BU –
Brown	BN +

2-Wire Non-Polarized



3-Wire

Connector

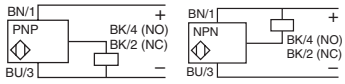


M8 M12

Cable

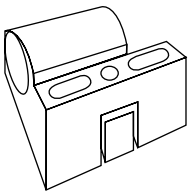
Blue	BU –
Brown	BN +
Black	BK Output

PNP NPN



Specifications

Mechanical			
Usable Sensing Range	8 mm	0–1.2 mm	
	12 mm	0–1.6 mm	
	18 mm	0–4 mm	
	30 mm	0–8 mm	
Temperature Range	Storage	-40 to +185 °F (-40 to +85 °C)	
	Operation	-13 to +158 °F (-25 to +70 °C)	
Enclosure Rating	NEMA Type	3, 4X, 6P, 12, 13	
	IEC	IP68 cable version (except 8 mm and connector version: IP67)	
Enclosure Material	Case	Nickel-plated brass	
	Face	PBT	
Maximum Tightening Torque	8 mm	5 N•m (3.7 lb-ft)	
	12 mm	6 N•m (4.4 lb-ft)	
	18 mm	15 N•m (11 lb-ft)	
	30 mm	40 N•m (29.5 lb-ft)	
Vibration		25 g, ±2 mm amplitude (10–50 Hz)	
Shock Resistance		50 g, 11 ms duration	
Differential (%of Sr)		15%	
Repeatability (% of Sr)		3%	
LED Indicator		Output status	
Cable		PVR 2 x 0.5 mm^2	PVR 3 x 0.34 mm^2
Connector		M12 4-pin	M8 3-pin / M12 4-pin
Electrical		**2-wire**	**3-wire**
Voltage Range		12–48 Vdc	12–24 Vdc
Voltage Limit (Including Ripple)		10–58 Vdc	10–36 Vdc
Voltage Drop		4 V	2 V
Maximum Load Current		1.5–100 mA	200 mA
Maximum Leakage (Residual) Current—Open State		0.5 mA	—
Current consumption		—	10 mA
Power-up Delay (maximum)		5 ms	5 ms
On Delay (maximum)	8 mm	0.2 ms	0.1 ms
	12 mm	0.2 ms	0.1 ms
	18 mm	0.2 ms	0.15 ms
	30 mm	0.3 ms	0.2 ms
Off Delay (maximum)	8 mm	0.2 ms	0.1 ms
	12 mm	0.2 ms	0.1 ms
	18 mm	0.2 ms	0.35 ms
	30 mm	0.3 ms	0.7 ms
Protective Circuitry	Short Circuit Protection	Yes	Yes
	Overload Protection	Yes	Yes
	Radio Frequency Immunity (RFI)	IEC 61000-4-3 Level 3	IEC 61000-4-3 Level 3
	Reverse Polarity Protection	Yes	Yes
Agency Listings	UL	CSA	CE



XSZB1●●

Accessories

Description	Catalog Numbers
8 mm tubular mounting bracket	**XSZB108**
12 mm tubular mounting bracket	**XSZB112**
18 mm tubular mounting bracket	**XSZB118**
30 mm tubular mounting bracket	**XSZB130**

Connector Cables (M8 or S suffix; M12 or D suffix)

XSZCS101	Nano-style, 3-pin, 2 m, straight
XSZCS111	Nano-style, 3-pin, 2 m, 90°
XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths . . . page 626

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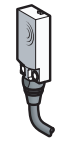
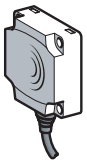
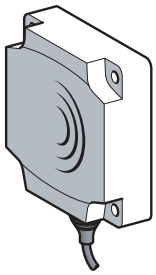
Proximity Sensors
XS9 Application-Specific Inductive Sensor
Flat Rectangular Analog Output, DC



XS9F111●●●L2



XS9E111●●●L2



XS9D111●●●L2

Features

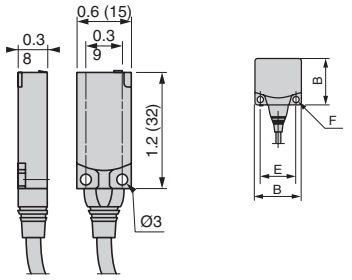
- DC output current is directly proportional to the target distance
- Four sizes: F (8 x 15 x 32); E (13 x 26 x 26); C (15 x 40 x 40); and D (26 x 80 x 80)
- Cable and connector versions

Nominal Sensing Distance	Circuit Type	Voltage Range	Output	Operating Frequency	Catalog Number
Size F (8 x 15 x 32), 2 m (6.6 ft) cable ▲					
5 mm	3-wire	12–24 Vdc	1–10 V	2,000 Hz	**XS9F111A1L2**
5 mm	3-wire	12–24 Vdc	4–20 mA	2,000 Hz	**XS9F111A2L2**
Size F (8 x 15 x 32), M8 connector pigtail 0.1 m (3.9 in.)					
5 mm	3-wire	12–24 Vdc	1–10 V	2,000 Hz	**XS9F111A1L01M8**
5 mm	3-wire	12–24 Vdc	4–20 mA	2,000 Hz	**XS9F111A2L01M8**
Size E (13 x 26 x 26), 2 m (6.6 ft) cable ▲					
10 mm	3-wire	12–24 Vdc	1–10 V	1,000 Hz	**XS9E111A1L2**
10 mm	3-wire	12–24 Vdc	4–20 mA	1,000 Hz	**XS9E111A2L2**
Size E (13 x 26 x 26), M12 connector pigtail 0.1 m (3.9 in.)					
10 mm	3-wire	12–24 Vdc	1–10 V	1,000 Hz	**XS9E111A1L01M12**
10 mm	3-wire	12–24 Vdc	4–20 mA	1,000 Hz	**XS9E111A2L01M12**
Size C (15 x 40 x 40), 2 m (6.6 ft) cable ▲					
15 mm	3-wire	12–24 Vdc	1–10 V	1,000 Hz	**XS9C111A1L2**
15 mm	3-wire	12–24 Vdc	4–20 mA	1,000 Hz	**XS9C111A2L2**
Size C (15 x 40 x 40), M12 connector pigtail 0.1 m (3.9 in.)					
15 mm	3-wire	12–24 Vdc	1–10 V	1,000 Hz	**XS9C111A1L01M12**
15 mm	3-wire	12–24 Vdc	4–20 mA	1,000 Hz	**XS9C111A2L01M12**
Size D (26 x 80 x 80), 2 m (6.6 ft) cable ▲					
40 mm	3-wire	12–24 Vdc	1–10 V	100 Hz	**XS9D111A1L2**
40 mm	3-wire	12–24 Vdc	4–20 mA	100 Hz	**XS9D111A2L2**
Size D (26 x 80 x 80), M12 connector					
40 mm	3-wire	12–24 Vdc	1–10 V	100 Hz	**XS9D111A1M12**
40 mm	3-wire	12–24 Vdc	4–20 mA	100 Hz	**XS9D111A2M12**

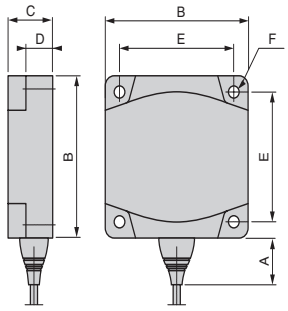
▲ For a 5 m (16.4 ft) cable length, add suffix L5. For a 10 m (32.8 ft) cable length, add suffix L10.

Dimensions

XS9 F **XS9E**



XS9C/D

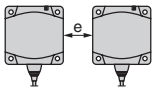


XS9 _	A L2	A M12	B	C	D	E	F
E	0.55 (14)	—	1.0 (26)	0.5 (13)	0.3 (8.8)	0.8 (20)	0.1 (3.5)
C	0.55 (14)	—	1.6 (40)	0.6 (15)	0.4 (9.8)	1.3 (33)	0.1 (4.5)
D	0.9 (23)	0.5 (14)	3.1 (80)	1.0 (26)	0.6 (16)	2.5 (65)	0.2 (5.5)

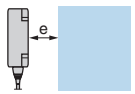
in. (mm)

Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

Minimum Mounting Clearances, in. (mm)







	Side by Side	Face to Face	Face to Metal Object
XS9F	e ≥ 0.08 (2)	e ≥ 0.47 (12)	e ≥ 0.12 (3)
XS9E	e ≥ 0.16 (4)	e ≥ 0.9 (24)	e ≥ 0.23 (6)
XS9C	e ≥ 0.40 (10)	e ≥ 2.3 (60)	e ≥ 0.6 (15)
XS9D	e ≥ 0.8 (20)	e ≥ 4.7 (120)	e ≥ 1.2 (30)

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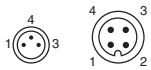
Proximity Sensors
XS9 Application-Specific Inductive Sensor
Flat Rectangular Analog Output, DC

Wiring

Connector

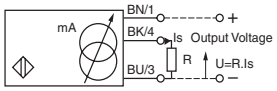


M8 M12

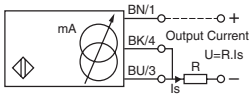
Cable

Blue	BU –
Brown	BN +
Black	BK Output

3-Wire (0–10 V)



2-Wire (4–20 mA)

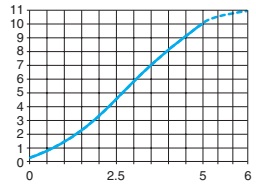
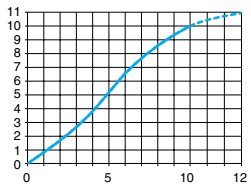
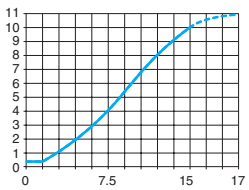
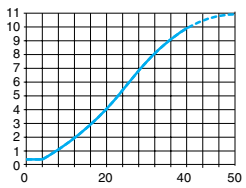


Specifications

Mechanical		
Usable sensing range	XS9F	1–5 mm
	XS9E	1–10 mm
	XS9C	2–15 mm
	XS9D	5–40 mm
Temperature range	Storage	-40 to +185 °F (-40 to +85 °C)
	Operation	-13 to +158 °F (-25 to +70 °C)
Enclosure rating	NEMA Type	1, 4X (indoor only), 12
	IEC	IP68 cable version / IP67 connector version
Vibration		25 g, ±2 mm amplitude (10–55 Hz)
Shock		50 g, 11 ms duration
Enclosure material		PBT
Cable		PVR 3 x 0.34 mm^2
Connector		M8 nano-style 3-pin / M12 micro-style 4-pin
Electrical		**2-wire DC**
Voltage range		12–24 Vdc
Voltage limit (including ripple)		10–36 Vdc
Maximum output current drift with the rated operating temperature		<10%
Linearity error		±5%
Protective circuitry	Short circuit protection	Yes
	Overload protection	Yes
Agency listings		

Output Curves

0 to 10 V

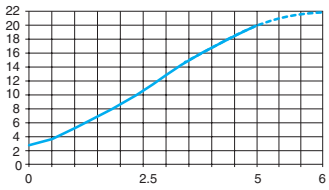
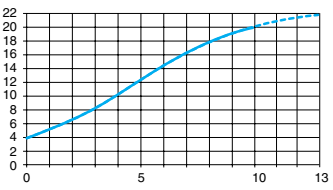
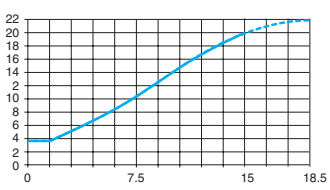
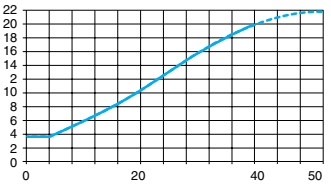
XS9F11	XS9E	XS9C	XS9D
Sn = 1–5 mm	Sn = 1–10 mm	Sn = 2–15 mm	Sn = 5–40 mm
			

Distance in mm.

	Output Current	Resistance	Output Voltage	Resistance
12 V	0–10 mA	R ≤ 560 Ω	0–10 V	Indeterminate
24 V	0–10 mA	R ≤ 1,500 Ω	0–10 V	R = 1,000 Ω

Note: Ensure a minimum of 5 V between the (+) positive and the sensor output (terminal 3).

4 to 20 mA

XS9F11	XS9E	XS9C	XS9D
Sn = 1–5 mm	Sn = 1–10 mm	Sn = 2–15 mm	Sn = 5–40 mm
			

Distance in mm.

	Output Current	Resistance
12 V	4–20 mA	R ≤ 82 Ω
24 V	4–20 mA	R ≤ 560 Ω

Note: Ensure a minimum of 10 V between the (+) positive and the sensor output (terminal 3).

Connector Cables (M8 or S suffix; M12 or D suffix)

XSZCS101	Nano-style, 3-pin, 2 m, straight
XSZCS111	Nano-style, 3-pin, 2 m, 90°
XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths . . . .page 626

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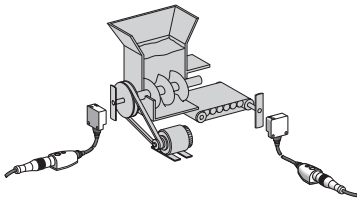
Features

- Universal AC/DC versions
- Linear speed threshold adjustment
- Built-in fixed startup delay to overcome startup inertia
- Reverse polarity protection on DC models
- Ease of mounting (flat body style)

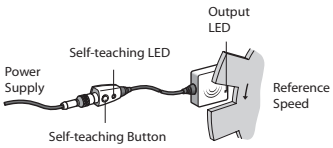
Principle and Applications



- Inductive proximity sensors for monitoring rotation or rolling speed operate by comparing a speed threshold preset by the operator with an instantaneous measurement of the speed of the moving part to be monitored or protected.
- These devices provide a simple and economical solution for monitoring drift, belt breakage, couplings, overloads, etc.
- They are commonly used for applications such as crushers and grinders, mixers and blenders, pumps, centrifuges and centrifugal separators, conveyor belts, bucket elevators, and archimedean screws.

Installation and Setup

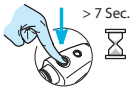
Installing and Positioning the Sensor



- The sensor must be properly positioned at the outset to ensure detection of all target points on the monitored moving part. The XS9 sensor facilitates this task with its ability to operate as a standard inductive sensor (Telemecanique® patent pending).
- Using this system, positioning is 100% reliable and can be checked at any time without changing the product parameters.

Self-Teaching Speed Setup





- The normal or reference speed for the moving part *(1)* to be monitored can be set by simply pressing the self-teaching button *(2)*. It is then confirmed with the display LED.

  — The product can be restarted at any time to return to the factory setting.

  a. To ensure that the moving part can attain its normal speed (inertia), the product output remains closed for 9 s.

  b. By default, the sensor's underspeed trip speed equals the preset speed minus 30%. For example, if the preset speed is 1000 rotations/minute, underspeed tripping occurs when the speed of the moving part falls below 1000 – (1000 x 0.3) = 700 rotations/minute. Thresholds of –20%, –11% and –6% can be set by pressing the self-teaching button.

Nominal Sensing Distance	Circuit Type	Threshold Range (Pulse/Min.)	Voltage Range	Load Current Maximum	Maximum Frequency (Pulse/Min.)	Startup Delay	Catalog Number
Size E (13 x 26 x 26 mm) M12 pigtail, 0.1 m (3.9 in.)							
10 mm	PNP	6–6,000	12–24 Vdc	100 mA	48,000	9 s	**XS9E11RPBL01M12**
Size E (13 x 26 x 26 mm) U20 pigtail, 0.1 m (3.9 in.)							
10 mm	2-wire	6–6,000	24–240 Vac/ 24–210 Vdc	5–100 mA	48,000	9 s	**XS9E11RMBL01U20**
Size C (15 x 40 x 40 mm) M12 pigtail, 0.1 m (3.9 in.)							
15 mm	PNP	6–6,000	12–24 Vdc	200 mA	48,000	9 s	**XS9C11RPBL01M12**
Size C (15 x 40 x 40 mm) U20 pigtail, 0.1 m (3.9 in.)							
15 mm	2-wire	6–6,000	24–240 Vac/ 24–210 Vdc	5–200 mA AC 5–300 mA DC	48,000	9 s	**XS9C11RMBL01U20**

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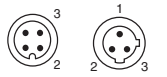
Proximity Sensors
XS9 Application-Specific Inductive Sensor
Flat Rectangular Motion Detection, DC and AC/DC

Wiring

Connector



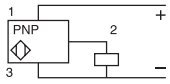
M12

Cable

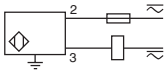
Blue	BU –
Brown	BN +
Black	BK Output

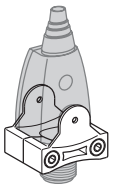
0.5 in. UNF

3-Wire DC
XS9•11RPBL01M12



2-Wire AC/DC
XS9•11RMBL01U2

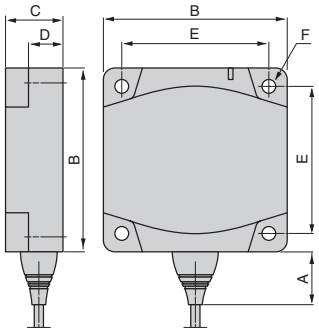


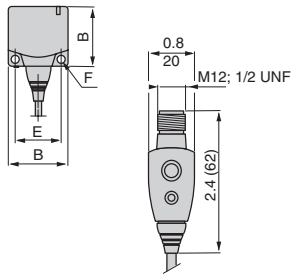


XSZBPM12

Dimensions

XS9 E/C





Type	A	B	C	D	E	F
XS9 E	0.55 (14)	1.0 (26)	0.5 (13)	0.3 (8.8)	0.8 (20)	0.1 (3.5)
XS9 C	0.55 (14)	1.6 (40)	0.6 (15)	0.4 (9.8)	1.3 (33)	0.1 (4.5)

in. (mm)

Connector Cables (M12 or D suffix; U20 or K suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°
XSZCK101Y	Micro-style, 3-pin, 2 m, straight
XSZCK111Y	Micro-style, 3-pin, 2 m, 90°

Additional cable options and lengths. . . . page 626

Specifications

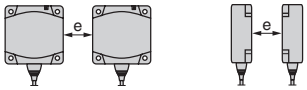
Mechanical			
Usable Sensing Range	XS9E	0–8 mm	
	XS9C	0–12 mm	
Temperature Range	Storage	-40 to +185 °F (-40 to +85 °C)	
	Operation	-13 to +158 °F (-25 to +70 °C)	
Enclosure Rating	NEMA Type	1, 4X, 12	
	IEC	IP67	
Vibration		25 g, ±2 mm amplitude (10–55 Hz)	
Shock Resistance		50 g, 11 ms duration	
LED Indicator	Output	Yellow	
	Power	Green	
Enclosure Material		PBT	
Connector		DC: M12 4-pin; AC/DC: U20 3-pin	
Electrical		**2-wire AC/DC**	**3-wire DC**
Voltage Range		24–240 Vac/24–210 Vdc	12–24 Vdc
Voltage Limit (Including Ripple)		20–264 Vac/Vdc	10–36 Vdc
Voltage Drop		5.5 V	2 V
Maximum Leakage (Residual) Current—Open State		1.5 mA	—
Current Consumption		—	10 mA
Load Current Maximum	XS9E	100 mA	5–100 mA
	XS9C	200 mA	5–200 mA; DC 5–300 mA; AC
Maximum Frequency (Pulse/Minute)		48,000	
Startup Delay (Maximum)	XS9E	9 s + 1/Fr ★	
	XS9C	9 s + 1/Fr ★	
Protection Circuitry	Overload Protection	—	Yes
	Short Circuit Protection	—	Yes
Agency Listings			

★ 1/Fr in the startup delay formula is the actual preset frequency adjusted via potentiometer

Accessories

Description	Catalog Number
Teach connector mounting bracket	**XSZBPM12**

Minimum Mounting Clearances, in. (mm)



	Side by Side	Face to Face
XS9E	e ≥ 1.6 (40)	e ≥ 3.1 (80)
XS9C	e ≥ 2.4 (60)	e ≥ 4.7 (120)

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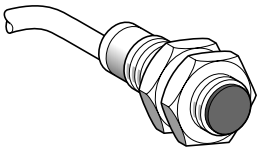
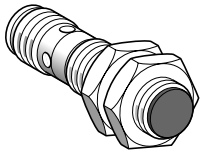
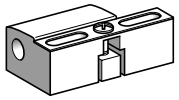
Proximity Sensors
Basic, Plastic, Cylindrical, Non-Flush Mountable
Three-Wire DC, Solid-State Output



XS2••AL••2



XS2••AL••12



XSZB1••

Selection

Sensing distance Sn mm (in.)	Function	Output	Connection	Reference	Weight g (oz)
Ø 8, threaded M8 x 1					
Three-wire 12-24 Vdc, non-flush mountable					
2.5 (0.10)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS208ALPAL2**	30 (1.06)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS208ALNAL2**	30 (1.06)
	NC	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS208ALPBL2**	30 (1.06)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS208ALNBL2**	30 (1.06)
Ø 12, threaded M12 x 1					
Three-wire 12-24 Vdc, non-flush mountable					
4 (0.16)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS212ALPAL2**	65 (2.29)
			M12 connector	**XS212ALPAM12**	10 (0.35)
		NPN	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS212ALNAL2**	65 (2.29)
			M12 connector	**XS212ALNAM12**	10 (0.35)
	NC	PNP	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS212ALPBL2**	65 (2.29)
			M12 connector	**XS212ALPBM12**	10 (0.35)
		NPN	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS212ALNBL2**	65 (2.29)
			M12 connector	**XS212ALNBM12**	10 (0.35)
Ø 18, threaded M18 x 1					
Three-wire 12-24 Vdc, non-flush mountable					
8 (0.31)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS218ALPAL2**	95 (3.35)
			M12 connector	**XS218ALPAM12**	25 (0.88)
		NPN	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS218ALNAL2**	95 (3.35)
			M12 connector	**XS218ALNAM12**	25 (0.88)
	NC	PNP	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS218ALPBL2**	95 (3.35)
			M12 connector	**XS218ALPBM12**	25 (0.88)
		NPN	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS218ALNBL2**	95 (3.35)
			M12 connector	**XS218ALNBM12**	25 (0.88)
Ø 30, threaded M30 x 1.5					
Three-wire 12-24 Vdc, non-flush mountable					
15 (0.59)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS230ALPAL2**	135 (4.76)
			M12 connector	**XS230ALPAM12**	65 (2.29)
		NPN	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS230ALNAL2**	135 (4.76)
			M12 connector	**XS230ALNAM12**	65 (2.29)
	NC	PNP	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS230ALPBL2**	135 (4.76)
			M12 connector	**XS230ALPBM12**	65 (2.29)
		NPN	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS230ALNBL2**	135 (4.76)
			M12 connector	**XS230ALNBM12**	65 (2.29)

Accessories *(3)*

Description		Reference	Weight g (oz)
Mounting clamps	Ø 8	**XSZB108**	6 (0.21)
	Ø 12	**XSZB112**	6 (0.21)
	Ø 18	**XSZB118**	10 (0.35)
	Ø 30	**XSZB130**	20 (0.71)

(1) For a 5 m (16.4 ft) cable, replace L2 with L5.
Example: XS208ALPAL2 becomes **XS208ALPAL5** with a 5 m cable.

(2) For a 5 m (16.4 ft) cable, replace L2 with L5; for a 10 m (32.8 ft) cable, replace L2 with L10.
Example: XS218ALPAL2 becomes **XS218ALPAL5** with a 5 m cable.

(3) For more information, see page 284.

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Proximity Sensors
Basic, Plastic, Cylindrical, Non-Flush Mountable
Three-Wire DC, Solid-State Output

Specifications

Sensor type			**XS2●●ALP●L2** **XS2●●ALN●L2**	**XS2●●ALP●M12** **XS2●●ALN●M12**
Product certifications			UL, CSA, CE	
Connection			Pre-cabled, length: 2 m (6.6 ft)	M12 connector
Operating zone *(1)*	Ø 8	**mm (in.)**	0–2 (0–0.08)	
	Ø 12	**mm (in.)**	0–3.2 (0–0.13)	
	Ø 18	**mm (in.)**	0–6.4 (0–0.25)	
	Ø 30	**mm (in.)**	0–12 (0–0.47)	
Differential travel		**%**	1–15 of real sensing distance (Sr)	
Degree of protection	Conforming to IEC 60529		IP67	
Temperature	Storage	**°C (°F)**	-40 to +85 (-40 to +185)	
	Operating	**°C (°F)**	-25 to +70 (-13 to +158)	
Materials	Case		PPS	
	Cable		PVC 3 x 0.34 mm^2, except Ø 8: 3 x 0.11 mm^2	—
Vibration resistance	Conforming to IEC 60068-2-6		25 gn, amplitude ±2 mm (@10 to 55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27		50 gn, duration 11 ms	
Output state indication			Yellow LED on rear	Yellow LED: 4 viewing ports at 90°
Rated supply voltage		**Vdc**	12–24 with protection against reverse polarity	
Voltage limits (including ripple)		**Vdc**	10–36	
Switching capacity		**mA**	≤100 (except Ø 8 ≤ 50) with overload and short-circuit protection	
Voltage drop, closed state		**V**	≤2	
Current consumption, no-load		**mA**	≤10	
Maximum switching frequency	Ø 8	**Hz**	3000	
	Ø 12	**Hz**	1000	
	Ø 18	**Hz**	250	
	Ø 30	**Hz**	60	
Delays	First-up	**ms**	≤5 (except Ø 30 ≤10)	
	Response	**ms**	≤0.5 for Ø 8, Ø 12; ≤1 for Ø 18; ≤2 for Ø 30	
	Recovery	**ms**	≤1 for Ø 8; ≤0.5 for Ø 12; ≤2 for Ø 18; 6 for Ø 30	

(1) Detection curves, see page 307.

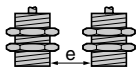
Wiring

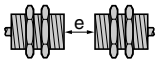
Connector	**Pre-cabled**	**PNP**	**NPN**
M12 4 3 1 2	BU: Blue BN: Brown BK: Black	BN/1 + PNP BK/4 (NO) BK/2 (NC) BU/3 –	BN/1 + NPN BK/4 (NO) BK/2 (NC) BU/3 –

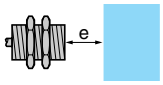
For connection information, refer to the *Cabling* section beginning on page 625.

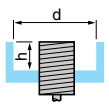
Setup

Minimum mounting distances, mm (in.)





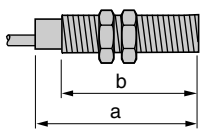




Sensors		**Side by side**	**Face to face**	**Facing a metal object**	**Mounted in a metal support**
Ø 8	XS208AL	e > 10 (0.39)	e > 30 (1.18)	e > 7.5 (0.30)	d > 24 (0.94), h > 5 (0.20)
Ø 12	XS212AL	e > 16 (0.63)	e > 48 (1.89)	e > 12 (0.47)	d > 36 (1.42), h > 8 (0.31)
Ø 18	XS218AL	e > 16 (0.63)	e > 96 (3.78)	e > 24 (0.94)	d > 54 (2.13), h > 16 (0.63)
Ø 30	XS230AL	e > 60 (2.36)	e > 180 (7.09)	e > 45 (1.77)	d > 90 (3.54), h > 30 (1.18)

Dimensions

Non-flush mountable in metal



Sensors		**Pre-cabled, mm (in.)**		**Connector, mm (in.)**	
		a	**b**	**a**	**b**
Ø 8	XS208AL	49 (1.93)	40 (1.57)	—	—
Ø 12	XS212AL	49 (1.93)	42 (1.65)	61 (2.40)	42 (1.65)
Ø 18	XS218AL	58.8 (2.31)	51.5 (2.03)	70.3 (2.77)	51.5 (2.03)
Ø 30	XS230AL	58.8 (2.31)	51.5 (2.03)	70.3 (2.77)	51.5 (2.03)

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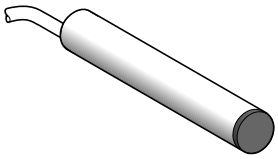
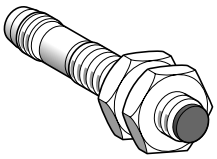
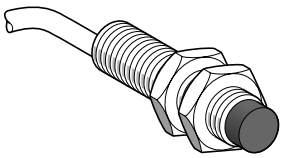
Proximity Sensors
Basic, Metal, Cylindrical, Flush and Non-Flush Mountable
Two-Wire AC; Three-Wire DC, Solid-State Output



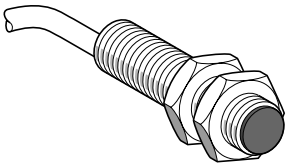
XS106BL••L2



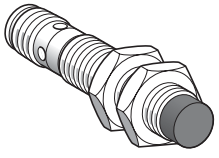
XS108BL••M8



XS208BL••L2



XS112BL••L2



XS212BL••M12

Selection

Sensing distance Sn mm (in.)	Function	Output	Connection	Reference	Weight g (oz)
Ø 6.5, plain					
Three-wire 12-24 Vdc, flush mountable					
1.5 (0.06)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS106BLPAL2**	30 (1.06)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS106BLNAL2**	30 (1.06)
	NC	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS106BLPBL2**	30 (1.06)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS106BLNBL2**	30 (1.06)
Ø 8, threaded M8 x 1					
Three-wire 12-24 Vdc, flush mountable					
1.5 (0.06)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS108BLPAL2**	35 (1.23)
			M8 connector	**XS108BLPAM8**	8 (0.28)
			M12 connector	**XS108BLPAM12**	15 (0.53)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS108BLNAL2**	35 (1.23)
			M8 connector	**XS108BLNAM8**	8 (0.28)
			M12 connector	**XS108BLNAM12**	15 (0.53)
	NC	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS108BLPBL2**	35 (1.23)
			M8 connector	**XS108BLPBM8**	8 (0.28)
			M12 connector	**XS108BLPBM12**	15 (0.53)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS108BLNBL2**	35 (1.23)
			M8 connector	**XS108BLNBM8**	8 (0.28)
			M12 connector	**XS108BLNBM12**	15 (0.53)
Three-wire 12-24 Vdc, non-flush mountable					
2.5 (0.10)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS208BLPAL2**	35 (1.23)
			M8 connector	**XS208BLPAM8**	8 (0.28)
			M12 connector	**XS208BLPAM12**	15 (0.53)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS208BLNAL2**	35 (1.23)
			M8 connector	**XS208BLNAM8**	8 (0.28)
			M12 connector	**XS208BLNAM12**	15 (0.53)
	NC	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS208BLPBL2**	35 (1.23)
			M8 connector	**XS208BLPBM8**	8 (0.28)
			M12 connector	**XS208BLPBM12**	15 (0.53)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS208BLNBL2**	35 (1.23)
			M8 connector	**XS208BLNBM8**	8 (0.28)
			M12 connector	**XS208BLNBM12**	15 (0.53)
Ø 12, threaded M12 x 1					
Three-wire 12-24 Vdc, flush mountable					
2 (0.08)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS112BLPAL2**	70 (2.47)
			M12 connector	**XS112BLPAM12**	15 (0.53)
		NPN	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS112BLNAL2**	70 (2.47)
			M12 connector	**XS112BLNAM12**	15 (0.53)
	NC	PNP	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS112BLPBL2**	70 (2.47)
			M12 connector	**XS112BLPBM12**	15 (0.53)
		NPN	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS112BLNBL2**	70 (2.47)
			M12 connector	**XS112BLNBM12**	15 (0.53)
Two-wire 24-240 Vac, flush mountable					
2 (0.08)	NO		Pre-cabled, 2 m (6.6 ft) *(2)*	**XS112BLFAL2**	75 (2.65)
Three-wire 12-24 Vdc, non-flush mountable					
4 (0.16)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS212BLPAL2**	70 (2.47)
			M12 connector	**XS212BLPAM12**	15 (0.53)
		NPN	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS212BLNAL2**	70 (2.47)
			M12 connector	**XS212BLNAM12**	15 (0.53)
	NC	PNP	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS212BLPBL2**	70 (2.47)
			M12 connector	**XS212BLPBM12**	15 (0.53)
		NPN	Pre-cabled, 2 m (6.6 ft) *(2)*	**XS212BLNBL2**	70 (2.47)
			M12 connector	**XS212BLNBM12**	15 (0.53)

(1) For a 5 m (16.4 ft) cable, replace L2 with L5. Example: XS106BLPAL2 becomes **XS106BLPAL5** with a 5 m cable.
(2) For a 5 m (16.4 ft) cable, replace L2 with L5; for a 10 m (32.8 ft) cable, replace L2 with L10. Example: XS112BLPAL2 becomes **XS112BLPAL5** with a 5 m cable.

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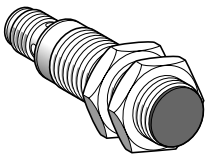
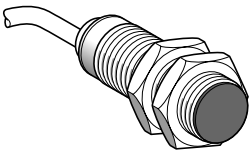
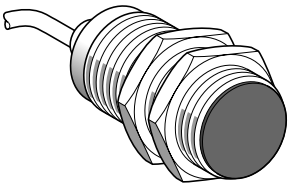
Proximity Sensors
Basic, Metal, Cylindrical, Flush and Non-Flush Mountable
Two-Wire AC; Three-Wire DC, Solid-State Output



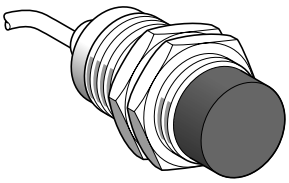
XS118BL••M12



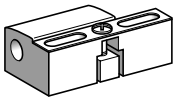
XS118BL•••L2



XS130BL••L2



XS230BL••L2



XSZB1••

Sensing distance Sn mm (in.)	Function	Output	Connection	Reference	Weight g (oz)
Ø 18, threaded M18 x 1					
Three-wire 12-24 Vdc, flush mountable					
5 (0.20)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS118BLPAL2**	105 (3.70)
			M12 connector	**XS118BLPAM12**	35 (1.23)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS118BLNAL2**	105 (3.70)
			M12 connector	**XS118BLNAM12**	35 (1.23)
	NC	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS118BLPBL2**	105 (3.70)
			M12 connector	**XS118BLPBM12**	35 (1.23)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS118BLNBL2**	105 (3.70)
			M12 connector	**XS118BLNBM12**	35 (1.23)
Two-wire 24-240 Vac, flush mountable					
5 (0.20)	NO	—	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS118BLFAL2**	120 (4.23)
Three-wire 12-24 Vdc, non-flush mountable					
8 (0.31)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS218BLPAL2**	105 (3.70)
			M12 connector	**XS218BLPAM12**	35 (1.23)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS218BLNAL2**	105 (3.70)
			M12 connector	**XS218BLNAM12**	35 (1.23)
	NC	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS218BLPBL2**	105 (3.70)
			M12 connector	**XS218BLPBM12**	35 (1.23)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS218BLNBL2**	105 (3.70)
			M12 connector	**XS218BLNBM12**	35 (1.23)
Ø 30, threaded M30 x 1.5					
Three-wire 12-24 Vdc, flush mountable					
10 (0.39)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS130BLPAL2**	165 (5.82)
			M12 connector	**XS130BLPAM12**	75 (2.65)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS130BLNAL2**	165 (5.82)
			M12 connector	**XS130BLNAM12**	75 (2.65)
	NC	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS130BLPBL2**	165 (5.82)
			M12 connector	**XS130BLPBM12**	75 (2.65)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS130BLNBL2**	165 (5.82)
			M12 connector	**XS130BLNBM12**	75 (2.65)
Two-wire 24-240 Vac, flush mountable					
10 (0.39)	NO	—	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS130BLFAL2**	205 (7.23)
Three-wire 12-24 Vdc, non-flush mountable					
15 (0.59)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS230BLPAL2**	155 (5.47)
			M12 connector	**XS230BLPAM12**	85 (3.00)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS230BLNAL2**	155 (5.47)
			M12 connector	**XS230BLNAM12**	85 (3.00)
	NC	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS230BLPBL2**	155 (5.47)
			M12 connector	**XS230BLPBM12**	85 (3.00)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS230BLNBL2**	155 (5.47)
			M12 connector	**XS230BLNBM12**	85 (3.00)

Accessories *(2)*

Description		Reference	Weight g (oz)
Mounting clamps	Ø 6.5	**XSZB165**	5 (0.18)
	Ø 8	**XSZB108**	6 (0.21)
	Ø 12	**XSZB112**	6 (0.21)
	Ø 18	**XSZB118**	10 (0.35)
	Ø 30	**XSZB130**	20 (0.71)

(1) For a 5 m (16.4 ft) cable, replace L2 with L5; for a 10 m (32.8 ft) cable, replace L2 with L10.
Example: XS118BLPAL2 becomes **XS118BLPAL5** with a 5 m cable.
(2) For further information, see page 284.

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Proximity Sensors
Basic, Metal, Cylindrical, Flush and Non-Flush Mountable
Two-Wire AC; Three-Wire DC, Solid-State Output

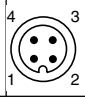
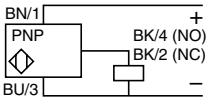
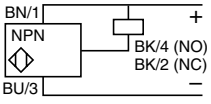
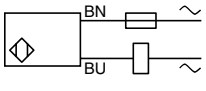
Specifications

Sensor type			XS1●●BLP●L2 XS1●●BLN●L2	XS1●●BLP●M● XS1●BLN●M●	XS2●●BLP●L2 XS2●●BLN●L2	XS2●●BLP●M● XS2●BLN●M●	XS1●●BLFAL2
Product certifications			UL, CSA, CE				
Connection	Pre-cabled		Length 2 m (6.6 ft)	—	Length 2 m (6.6 ft)	—	Length 2 m (6.6 ft)
	Connector		—	M8 on Ø 8 M12 on Ø 8, Ø 12, Ø 18 and Ø 30	—	M8 on Ø 8 M12 on Ø 8, Ø 12, Ø 18 and Ø 30	—
Operating zone *(1)*	Ø 6.5	**mm (in.)**	0–1.2 (0–0.05)		—		—
	Ø 8	**mm (in.)**	0–1.2 (0–0.05)		0–2 (0–0.08)		—
	Ø 12	**mm (in.)**	0–1.6 (0–0.06)		0–3.2 (0–0.13)		0–1.6 (0–0.06)
	Ø 18	**mm (in.)**	0–4 (0–0.16)		0–6.4 (0–0.25)		0–4 (0–0.16)
	Ø 30	**mm (in.)**	0–8 (0–0.31)		0–12 (0–0.47)		0–8 (0–0.31)
Differential travel		**%**	1–15 of real sensing distance (Sr)				
Degree of protection	Conforming to IEC 60529		IP67				
Storage temperature		**°C (°F)**	-40 to +85 (-40 to +185)				
Operating temperature		**°C (°F)**	-25 to +70 (-13 to +158)				
Materials	Case		Nickel plated brass				
	Cable		PVC 3 x 0.34 mm^2 except Ø 6.5 and_8: 3 x 0.11 mm^2	—	PVC 3 x 0.34 mm^2 except Ø 6.5 and_8: 3 x 0.11 mm^2	—	PVC 2 x 0.34 mm^2
Vibration resistance	Conforming to IEC 60068-2-6		25 gn, amplitude ±2 mm (@10 to 55 Hz)				
Shock resistance	Conforming to IEC 60068-2-27		50 gn, duration 11 ms				
Output state indication			Yellow LED, on rear	Yellow LED: 4 viewing ports at 90°	Yellow LED, on rear	Yellow LED: 4 viewing ports at 90°	Yellow LED, on rear
Rated supply voltage		**V**	12–24 Vdc with protection against reverse polarity				24–240 Vac
Voltage limits (including ripple)		**V**	10–36 Vdc				20–264 Vac
Switching capacity		**mA**	≤100 (except Ø 6.5 and 8: ≤50) with overload and short-circuit protection				5–300 (5–200 for Ø 12) *(2)*
Voltage drop, closed state		**V**	≤2				≤4.5 (≤7 for Ø 12)
Current consumption, no-load		**mA**	≤10				—
Residual current, open state		**mA**	—				≤ 1.5
Maximum switching frequency	Ø 6.5, Ø 8	**Hz**	3000				—
	Ø 12	**Hz**	2000		1000		25
	Ø 18	**Hz**	2000		250		25
	Ø 30	**Hz**	200		60		25
Delays	First-up	**ms**	≤5 (except Ø 30: ≤10)				≤40
	Response	**ms**	≤0.5 for Ø 8, Ø 12; ≤1 for Ø 18; ≤2 for Ø 30				≤10
	Recovery	**ms**	≤1 for Ø 8; ≤0.5 for Ø 12; ≤2 for Ø 18; ≤6 for Ø 30				≤15

(1) For detection curves, see page 307.

(2) These sensors do not incorporate overload or short-circuit protection, so it is essential to connect a 0.4 A quick-blow fuse in series with the load. See page 284.

Wiring Diagrams

Connector		Pre-cabled	PNP	NPN	2-wire ~
M8	M12				
		BU: Blue BN: Brown BK: Black			

For connection information, refer to the *Cabling* section beginning on page 625.

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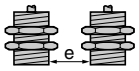
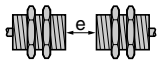
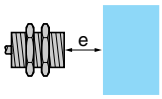
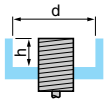
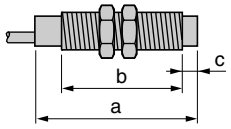
Setup

		Minimum mounting distances, mm (in.)				
						
Sensors		**Side by side**	**Face to face**	**Facing a metal object**	**Mounted in a metal support**	
Ø 6.5 flush mountable	XS106	e ≥ 3 (0.12)	e ≥ 18 (0.71)	e ≥ 4.5 (0.18)	d ≥ 6.5 (0.26)	h ≥ 0
Ø 8 flush mountable	XS108	e ≥ 3 (0.12)	e ≥ 18 (0.71)	e ≥ 4.5 (0.18)	d ≥ 8 (0.31)	h ≥ 0
Ø 8 non-flush mountable	XS208	e ≥ 10 (0.39)	e ≥ 30 (1.18)	e ≥ 7.5 (0.30)	d ≥ 24 (0.94)	h ≥ 5 (0.20)
Ø 12 flush mountable	XS112	e ≥ 4 (0.16)	e ≥ 24 (0.94)	e ≥ 6 (0.24)	d ≥ 12 (0.47)	h ≥ 0
Ø 12 non-flush mountable	XS212	e ≥ 16 (0.63)	e ≥ 48 (1.89)	e ≥ 12 (0.47)	d ≥ 36 (1.42)	h ≥ 8 (0.31)
Ø 18 flush mountable	XS118	e ≥ 10 (0.39)	e ≥ 60 (2.36)	e ≥ 15 (0.59)	d ≥ 18 (0.71)	h ≥ 0
Ø 18 non-flush mountable	XS218	e ≥ 16 (0.63)	e ≥ 96 (3.78)	e ≥ 24 (0.94)	d ≥ 54 (2.13)	h ≥ 16 (0.63)
Ø 30 flush mountable	XS130	e ≥ 20 (0.79)	e ≥ 120 (4.72)	e ≥ 30 (1.18)	d ≥ 30 (1.18)	h ≥ 0
Ø 30 non-flush mountable	XS230	e ≥ 60 (2.36)	e ≥ 180 (7.09)	e ≥ 45 (1.77)	d ≥ 90 (3.54)	h ≥ 30 (1.18)

Dimensions



Flush mountable in metal

Sensors		Pre-cabled, mm (in.)		M8 connector, mm (in.)		M12 connector, mm (in.)	
		a	b	a	b	a	b
Ø 6.5	**XS106**	42 (1.65)	—	—	—	—	—
Ø 8	**XS108**	42 (1.65)	39.4 (1.55)	52.2 (2.06)	41.3 (1.63)	61.4 (2.42)	39 (1.54)
Ø 12	**XS112**	41.3 (1.63)	38.7 (1.52)	—	—	53 (2.09)	39 (1.54)
Ø 18	**XS118**	51.3 (2.02)	48.4 (1.91)	—	—	64 (2.52)	48.5 (1.91)
Ø 30	**XS130**	51.3 (2.02)	48.4 (1.91)	—	—	64 (2.52)	48.5 (1.91)

Non-flush mountable in metal

Sensors		Pre-cabled, mm (in.)		M8 connector, mm (in.)			M12 connector, mm (in.)		
		a	b	a	b	c	a	b	c
Ø 8	**XS208**	42 (1.65)	35.8 (1.41)	52.2 (2.06)	37.7 (1.48)	4 (0.16)	61.4 (2.42)	35.4 (1.39)	4 (0.16)
Ø 12	**XS212**	41.3 (1.63)	34.1 (1.34)	—	—	—	52.6 (2.07)	34 (1.34)	5 (0.20)
Ø 18	**XS218**	50.6 (1.99)	40.4 (1.59)	—	—	—	63.4 (2.50)	40.5 (1.59)	8 (0.31)
Ø 30	**XS230**	50.6 (1.99)	35.4 (1.39)	—	—	—	63.4 (2.50)	35.5 (1.40)	13 (0.51)

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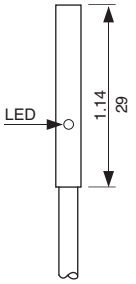
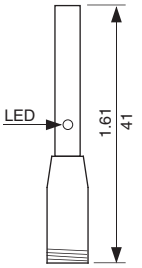
Proximity Sensors
XS Tubular, Inductive Sensors
4 mm Diameter, DC



XS1L●



XS1L●S

Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

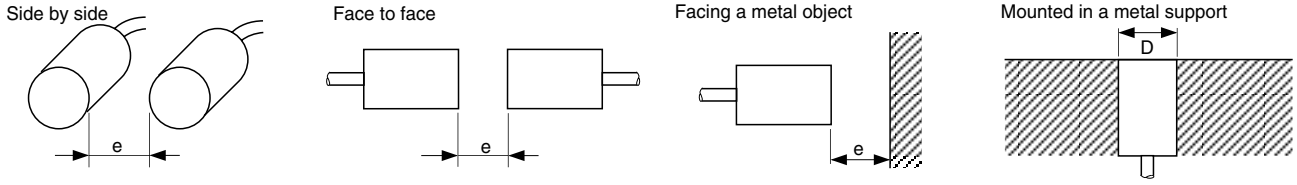
Features

- Rugged case designed for the industrial environment
- Mounting space savings due to short length
- Significant savings in replacement time by using the patented plastic mounting bracket (no gauging) or connectors
- Extensive protective circuitry for trouble-free operation
- Works with 24 V secondary transformers
- Normally closed (N.C.) output available on versions marked ★
- UL Listed, CSA Certified, and CE Marked

Nominal Sensing Distance	Circuit Type	Voltage Range	Output Mode	Operating Frequency	Mating Connector Style (See page 626)	Catalog Number
Nickel-plated brass case						
Shielded, 2 m (6.6 ft) cable						
1 mm	PNP	5–24 V	N.O.★	5,000 Hz	—	**XS1L04PA310**
1 mm	NPN	5–24 V	N.O.★	5,000 Hz	—	**XS1L04NA310**
Shielded, nano-style connector						
1 mm	PNP	5–24 V	N.O.★	5,000 Hz	1 thru 8	**XS1L04PA310S**
1 mm	NPN	5–24 V	N.O.★	5,000 Hz	1 thru 8	**XS1L04NA310S**
Stainless steel case						
Shielded, 2 m (6.6 ft) cable						
0.8 mm	PNP	5–24 V	N.O.	5,000 Hz	—	**XS1L04PA311**
0.8 mm	NPN	5–24 V	N.O.	5,000 Hz	—	**XS1L04NA311**
Shielded, nano-style connector						
0.8 mm	PNP	5–24 V	N.O.	5,000 Hz	1 thru 8	**XS1L04PA311S**
0.8 mm	NPN	5–24 V	N.O.	5,000 Hz	1 thru 8	**XS1L04NA311S**

★ To order a normally closed (N.C.) version, change the **A** to **B**, example: XS1L04P**A**310 to XS1L04P**B**310.

Minimum Mounting Clearances, mm (in.)



	Side by side	Face to face	Facing a metal object	Mounted in a metal support
XS1 Shielded	e: 2 (0.08)	e: 12 (0.47)	e: 3 (0.12)	D: 4 (0.16)

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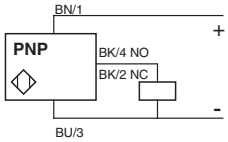
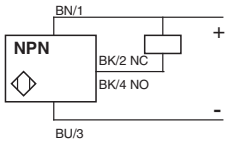
Proximity Sensors
XS Tubular, Inductive Sensors
4 mm Diameter, DC

Wiring

Connector M8	Cable	
	Blue	BU –
	Brown	BN +
	Black	BK Output

3 wire NO or NC
wire color/connector pin





Specifications

Mechanical		
Usable sensing range	Shielded brass case	0 to 0.8 mm
	Stainless steel case	0 to 0.64 mm
Standard temperature range		-25 to +70 °C (-13 to +158 °F)
Enclosure rating—cable	NEMA Types	3, 4X, 6P, 12, 13
(for connector, see page 626)	CENELEC	IP67
Enclosure material	Brass case	Nickel-plated brass
	Stainless steel case	Stainless steel
	Sensing face	PBT
Vibration resistance	(IEC 60068.2.6)	25 G, ±2 mm amplitude, 10–55 Hz
Shock resistance	(IEC 60068.2.27)	50 G, 11 ms duration
Standard target size (steel)		4 x 4 mm (0.16 x 0.16 in.)
Differential (% of Sr)		15%
Repeatability (% of Sr)		3%
LED indicator type		Side-mounted LED shows output status
Cable	3-wire	27 AWG (0.11 mm^2), PvR
Electrical		
Voltage range—nominal		5 to 24 Vdc
Voltage limit (Including Ripple)		5 to 30 Vdc
Voltage drop (across switch), closed state		2 V
Maximum load current		100 mA
Current consumption (no load)		10 mA
On delay (maximum)		0.1 ms
Off delay (maximum)		0.1 ms
Power-up delay (maximum)		5 ms
Protective circuitry	Short circuit protection	Yes
	Overload	Yes
	Radio frequency immunity (RFI)	IEC 61000-4-3 L3
	Electrostatic; transients; impulse	IEC 6100-4-2 L2; IEC 61000-4-4 L3; 60947.5.2 L3
	Reverse polarity protection	Yes
Agency listings	E164869 CCN NRKH	CR 44087 Class 3211 03

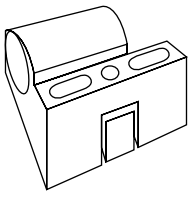
Options

Description		Suffix
Extended temperature range (cable type only)	Down to -40° C (-40° F)	TF
Extended cable length	5 m (16.4 ft) cable	L1
	10 m (32.8 ft) cable	L2

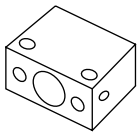
Accessories

Description	Catalog Number
Plastic mounting bracket	**XSZB104**
Diecast zinc mounting bracket	**831604**

Note: Refer to page 327 for target material correction coefficient Km.



XSZB1●●



8316●●

Connector Cables (M8 or S suffix)

XSZCS101	Nano-style, 3-pin, 2 m, straight
XSZCS111	Nano-style, 3-pin, 2 m, 90°

Additional cable options and lengths. . . . page 626
Accessories . . . . . page 284

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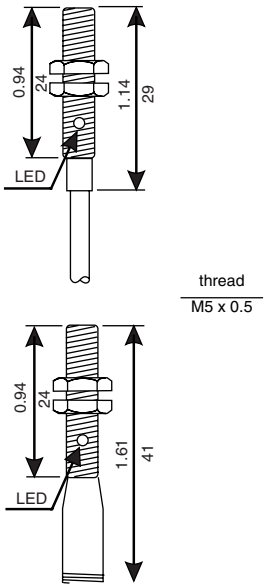
Proximity Sensors
XS Tubular, Inductive Sensors
5 mm Diameter, DC; Economy Short Length



Dual Dimensions inches / mm

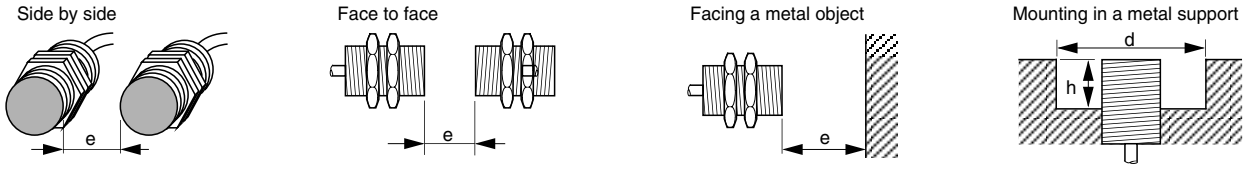
Features

- Rugged case designed for the industrial environment
- Mounting space savings due to short length
- Significant savings in replacement time by using the patented plastic mounting bracket (no gauging) or connectors
- Extensive protective circuitry for trouble-free operation
- Works with 24 V secondary transformers
- Metal mounting nuts included, diecast zinc
- Normally closed (N.C.) output available on versions marked ★
- UL Listed, CSA Certified, and CE Marked

Nominal Sensing Distance	Circuit Type	Voltage Range	Output Mode	Operating Frequency	Mating Connector Style (See page 518)	Catalog Number
Nickel-plated brass case						
Shielded, 2 m (6.6 ft) cable						
1 mm	PNP	5–24 V	N.O.★	5,000 Hz	—	**XS1N05PA310**
1 mm	NPN	5–24 V	N.O.★	5,000 Hz	—	**XS1N05NA310**
Stainless steel case						
Shielded, 2 m (6.6 ft) cable						
0.8 mm	PNP	5–24 V	N.O.	5,000 Hz	—	**XS1N05PA311**
0.8 mm	NPN	5–24 V	N.O.	5,000 Hz	—	**XS1N05NA311**
Shielded, nano-style connector						
0.8 mm	PNP	5–24 V	N.O.	5,000 Hz	1 thru 8	**XS1N05PA311S**
0.8 mm	NPN	5–24 V	N.O.	5,000 Hz	1 thru 8	**XS1N05NA311S**

★ To order a normally closed (N.C.) version, change the **A** to **B**, example: XS1N05P**A**310 to XS1N05P**B**310

Minimum Mounting Clearances, mm (in.)



	Side by side	Face to face	Facing a metal object	Mounting in a metal support
XS1 Shielded	e: 2 (0.08)	e: 12 (0.47)	e: 3 (0.12)	D: 5 (0.20)

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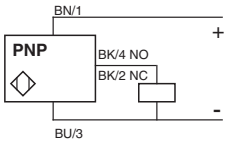
Proximity Sensors
XS Tubular, Inductive Sensors
5 mm Diameter, DC; Economy Short Length

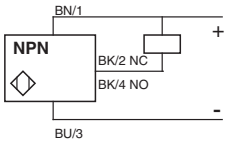
Wiring



Connector M8	Cable	
	Blue	BU –
	Brown	BN +
	Black	BK Output

3 wire NO or NC
wire color/connector pin





Specifications

Mechanical		
Usable sensing range	Shielded brass case	0 to 0.8 mm
	Stainless steel case	0 to 0.64 mm
Standard temperature range		-25 to +70° C (-13 to +158° F)
Enclosure rating—cable (for connector, see page 626)	NEMA Type	3, 4X, 6P, 12, 13
	IEC	IP67
Enclosure material	Brass case	Nickel-plated brass
	Stainless steel case	Stainless steel
	Sensing face	PBT
Maximum tightening torque	Brass	1.6 N•m (1.2 lb-ft)
	Stainless steel	2.2 N•m (1.75 lb-ft)
Vibration resistance	(IEC 60068.2.6)	25 G, ±2 mm amplitude, 10–55 Hz
Shock resistance	(IEC 60068.2.27)	50 G, 11 ms duration
Standard target size (steel)		4 x 4 mm (0.16 x 0.16 in.)
Differential (% of Sr)		15%
Repeatability (% of Sr)		3%
LED indicator type		Side-mounted LED shows output status
Cable	3-wire	27 AWG (0.11 mm^2), PvR
Electrical		
Voltage range—nominal		5 to 24 Vdc
Voltage limit (including ripple)		5 to 30 Vdc
Voltage drop (across switch), closed state		2 V
Maximum load current		100 mA
Current consumption (no load)		10 mA
On delay (maximum)		0.1 ms
Off delay (maximum)		0.1 ms
Power-up delay (maximum)		5 ms
Protective circuitry	Short circuit protection	Yes
	Overload	Yes
	Radio frequency immunity (RFI)	IEC 61000-4-3 L3
	Electrostatic; transients; impulse	IEC 61000-4-2 L2; IEC 61000-4-4 L3; 60947.5.2 L3
	Reverse polarity protection	Yes
Agency listings	E164869 CCN NRKH	CR 44087 Class 3211 03

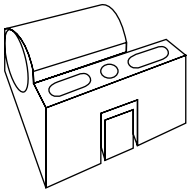
Options

Description		Suffix
Extended temperature range (cable type only)	Down to -40° C (-40° F)	TF
Extended cable length	5 m (16.4 ft) cable	L1
	10 m (32.8 ft) cable	L2

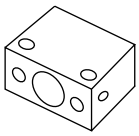
Accessories

Description	Catalog Number
Metal, diecast zinc mounting nuts and lockwasher	**XSZE105**
Plastic mounting bracket	**XSZB105**
Diecast zinc mounting bracket	**831605**
Stainless steel mounting nuts and lockwasher	**XSZE305**

Note: Refer to page 327 for target material correction coefficient Km.



XSZB1••



8316••

Connector Cables (M8 or S suffix)

XSZCS101	Nano-style, 3-pin, 2 m, straight
XSZCS111	Nano-style, 3-pin, 2 m, 90°

Additional cable options and lengths . . . page 626
Accessories. . . . . page 284

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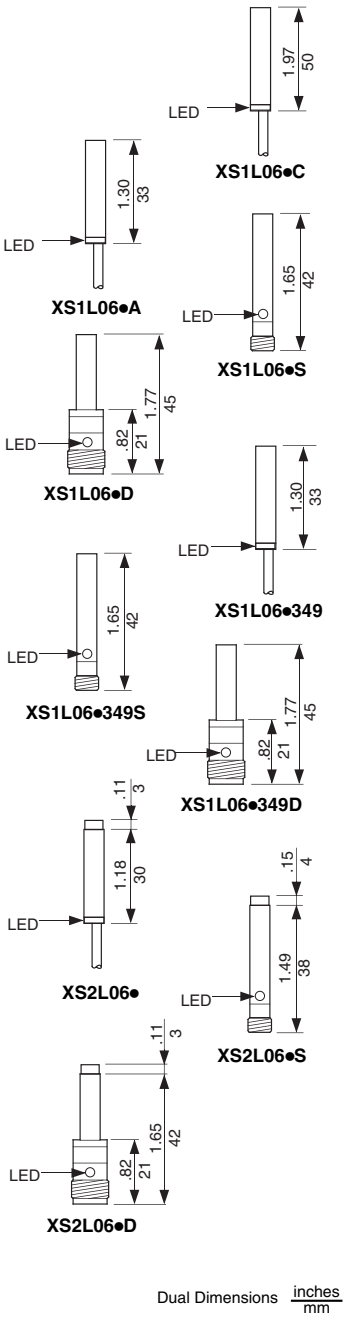
Proximity Sensors
XS Tubular, Inductive Sensors
6.5 mm Diameter, DC; Economy, Short Length, Smooth Barrel



Dual Dimensions inches / mm

Features

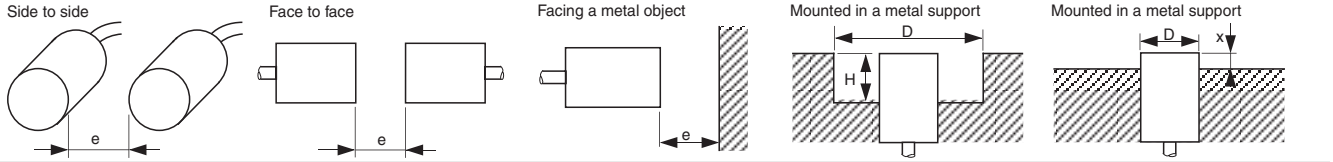
- Faster troubleshooting aided by high-visibility, 360° indicators
- Economy of size offered by extended range model
- Reduction of relay or software logic using complementary N.O. + N.C. outputs
- Significant savings in replacement time by using the patented plastic mounting bracket (no gauging) or connectors
- Extensive protective circuitry for trouble-free operation
- Works with an unregulated DC supply powered by a 24 V secondary transformer
- Metal mounting nuts included
- Diecast zinc
- Normally closed (N.C.) output available on versions marked ★
- UL Listed, CSA Certified, and CE Marked

Nominal Sensing Distance	Circuit Type	Voltage Range	Output Mode	Operating Frequency	Indicator LED (see next page)	Mating Connector (see page 626)	Catalog Number
Stainless steel case							
Shielded, 2 m (6.6 ft) cable							
1.5 mm	PNP	12–24 V	N.O. ★	5,000 Hz	A	—	**XS1L06PA340**
1.5 mm	NPN	12–24 V	N.O. ★	5,000 Hz	A	—	**XS1L06NA340**
1.5 mm	PNP	12–24 V	N.O.+N.C.	5,000 Hz	A	—	**XS1L06PC410**
1.5 mm	NPN	12–24 V	N.O.+N.C.	5,000 Hz	A	—	**XS1L06NC410**
Shielded, nano-style connector							
1.5 mm	PNP	12–24 V	N.O. ★	5,000 Hz	B	1 thru 8	**XS1L06PA340S**
1.5 mm	NPN	12–24 V	N.O. ★	5,000 Hz	B	1 thru 8	**XS1L06NA340S**
Shielded, micro-style connector							
1.5 mm	PNP	12–24 V	N.O.	5,000 Hz	B	11, 12, 13, 15, 16	**XS1L06PA340D**
1.5 mm	NPN	12–24 V	N.O.	5,000 Hz	B	11, 12, 14, 15, 16	**XS1L06NA340D**
Nickel-plated brass case							
Shielded◆, Extended Range, 2 m (6.6 ft) cable							
2.5 mm	PNP	12–24 V	N.O. ★	2,500 Hz	A	—	**XS1L06PA349**
2.5 mm	NPN	12–24 V	N.O. ★	2,500 Hz	A	—	**XS1L06NA349**
Shielded◆, Extended Range, nano-style connector							
2.5 mm	PNP	12–24 V	N.O.	2,500 Hz	B	1 thru 8	**XS1L06PA349S**
2.5 mm	NPN	12–24 V	N.O.	2,500 Hz	B	1 thru 8	**XS1L06NA349S**
Shielded◆, Extended Range, micro-style connector							
2.5 mm	PNP	12–24 V	N.O.	2,500 Hz	B	11, 12, 13, 15, 16	**XS1L06PA349D**
2.5 mm	NPN	12–24 V	N.O.	2,500 Hz	B	11, 12, 14, 15, 16	**XS1L06NA349D**
Stainless steel case							
Non-Shielded, 2 m (6.6 ft) cable							
2.5 mm	PNP	12–24 V	N.O.	5,000 Hz	A	—	**XS2L06PA340**
2.5 mm	NPN	12–24 V	N.O.	5,000 Hz	A	—	**XS2L06NA340**
Non-Shielded, nano-style connector							
2.5 mm	PNP	12–24 V	N.O.	5,000 Hz	B	1 thru 8	**XS2L06PA340S**
2.5 mm	NPN	12–24 V	N.O.	5,000 Hz	B	1 thru 8	**XS2L06NA340S**
Non-Shielded, micro-style connector DC							
2.5 mm	PNP	12–24 V	N.O.	5,000 Hz	B	11, 12, 13, 15, 16	**XS2L06PA340D**
2.5 mm	NPN	12–24 V	N.O.	5,000 Hz	B	11, 12, 14, 15, 16	**XS2L06NA340D**
2.5 mm	PNP	12–24 V	N.O.+N.C.	5,000 Hz	B	11, 12, 13, 15, 16	**XS2L06PC410D**
2.5 mm	NPN	12–24 V	N.O.+N.C.	5,000 Hz	B	11, 12, 14, 15, 16	**XS2L06NC410D**

★ To order a normally closed (N.C.) version, change **A** to **B**, example; XS1L06P**A**340 to XS1L06P**B**340.

◆ See dimension x below.

Minimum Mounting Clearances, mm (in.)



	Side to side	Face to face	Facing a metal object	Mounted in a metal support	Mounted in a metal support
XS1 Shielded	e: 3 (0.12)	e: 18 (0.71)	e: 4.5 (0.17)	—	D: 6.5 (0.26); x: 0
XS1 Extended range	e: 5 (0.20)	e: 30 (1.18)	e: 7.5 (0.30)	—	D: 10 (0.39); x: 1.6 (0.06)
XS2 Non-shielded	e: 10 (0.39)	e: 30 (1.18)	e: 7.5 (0.30)	D: 19.5 (0.77); H: 5 (0.20)	—

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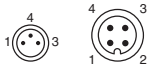
Proximity Sensors
XS Tubular, Inductive Sensors
6.5 mm Diameter, DC; Economy, Short Length, Smooth Barrel

Wiring

Connector

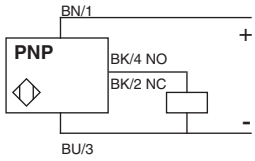


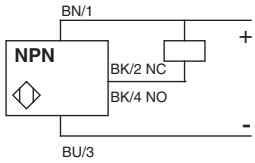
M8 M12

Cable

Blue	BU –
Brown	BN +
Black	BK Output

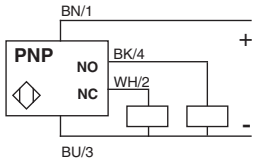
3 wire NO or NC
wire color/ connector pin

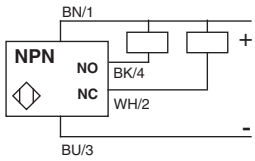




M8 connector, N.O. and N.C. to pin 4.

4 wire NO + NC





Specifications

Mechanical			
Usable sensing range	Shielded	Standard sensing range	0 to 1.2 mm
		Extended sensing range	0 to 2 mm
	Non-shielded		0 to 2 mm
Standard temperature range		Standard sensing range	-25 to +70 °C (-13 to +158 °F)
		Extended sensing range	-25 to 50 °C (13 to 122 °F)
Enclosure rating—cable (for connector see page 626)	NEMA Type		3, 4X, 6P, 12, 13
	IEC		IP67
Enclosure material	Case		Nickel-plated brass
	Sensing face		PBT
Vibration resistance	(IEC 60068.2.6)		25 G, ±2 mm amplitude, 10–55 Hz
Shock resistance	(IEC 60068.2.27)		50 G, 11 ms duration
Standard target size (steel)			6.5 x 6.5 mm (0.26 x 0.26 in.)
Differential (% of Sr)			15%
Repeatability (% of Sr)			3%
LED indicator type	A		360° ring LED shows output status
	B		One LED visible from 4 quadrants shows output status
Cable	3-wire		27 AWG (0.11 mm^2), PvR
	4-wire (N.O. + N.C.)		28 AWG (0.08 mm^2), PvR
Electrical			
Voltage range—nominal			12–24 Vdc
Voltage limit (including ripple)			10–38 Vdc
Voltage drop (across switch), closed state			2 V (2.6 V extended sensing range)
Maximum load current			200 mA
Current consumption (no load)			10 mA
On delay (maximum)		Standard sensing range	0.1 ms
		Extended sensing range	0.2 ms
Off delay (maximum)		Standard sensing range	0.1 ms
		Extended sensing range	0.2 ms
Power-up delay (maximum)			5 ms
Protective circuitry	Short circuit protection		Yes
	Overload		Yes
	Radio frequency immunity (RFI)		IEC 61000-4-3 L3
	Electrostatic; transients; impulse		IEC 61000-4-2 L2; IEC 61000-4-4 L3; 60947.5.2 L3
	Reverse polarity protection		Yes
Agency listings	E164869 CCN NRKH	CR 44087 Class 3211 03	CE

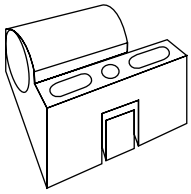
Options

Description		Suffix
Extended temperature range (cable type and standard sensing distance only)	Down to -40° C (-40° F)	TF
Extended cable length	5 m (16.4 ft) cable	L1
	10 m (32.8 ft) cable	L2

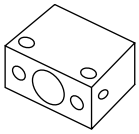
Accessories

Description	Catalog Number
Plastic mounting bracket	**XSZB165**
Diecast zinc mounting bracket	**831606**

Note: Refer to page 327 for target material correction coefficient Km.



XSZB1••



8316••

Connector Cables (M8 or S suffix; M12 or D suffix)

XSZCS101	Nano-style, 3-pin, 2 m, straight
XSZCS111	Nano-style, 3-pin, 2 m, 90°
XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths . . . page 626
Accessories. . . . . page 284

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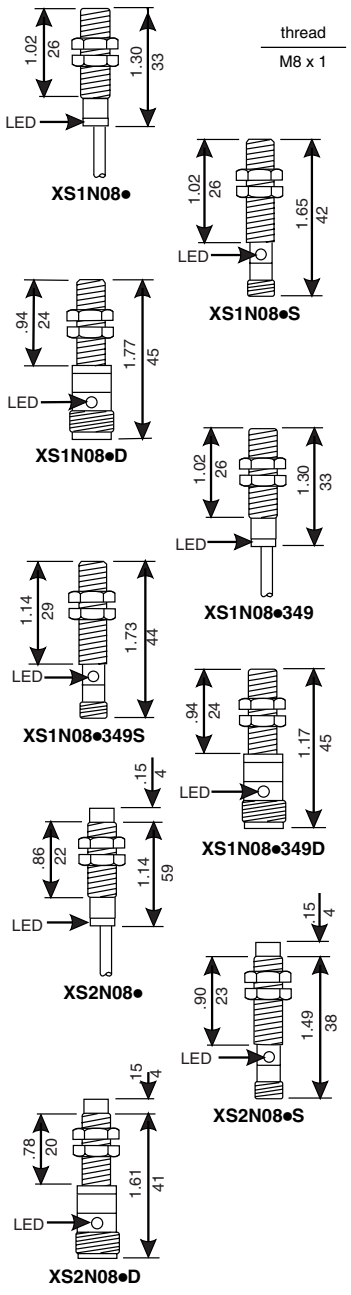
Proximity Sensors
XS Tubular, Inductive Sensors
8 mm Diameter, DC; Economy Short Length



Dual Dimensions inches / mm

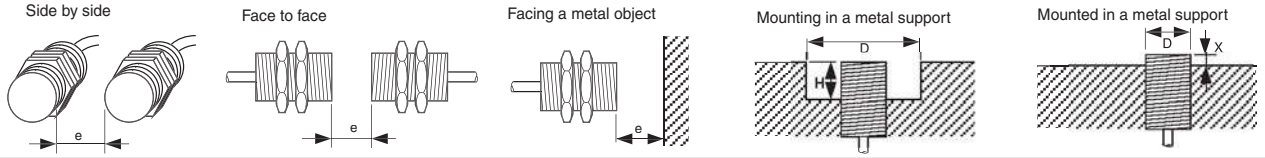
Features

- Faster troubleshooting aided by high-visibility, 360° indicators
- Economy of size offered by extended range model
- Significant savings in replacement time by using the patented plastic mounting bracket (no gauging) or connectors
- Extensive protective circuitry for trouble-free operation
- Works with an unregulated DC supply powered by a 24 V secondary transformer
- Metal mounting locknuts included
- Normally closed (N.C.) output available on versions marked ★
- UL Listed, CSA Certified, and CE Marked

Nominal Sensing Distance	Circuit Type	Voltage Range	Output Mode	Operating Frequency	Indicator LED (see next page)	Mating Connector Style (See page 626)	Catalog Number
Nickel-plated brass case							
Shielded, micro-style connector							
1.5 mm	PNP	12–24 V	N.O. ★	5,000 Hz	B	11, 12, 13, 15, 16	**XS1N08PA340D**
1.5 mm	NPN	12–24 V	N.O. ★	5,000 Hz	B	11, 12, 14, 15, 16	**XS1N08NA340D**
Shielded, ◆ Extended Range, 2 m (6.6 ft) cable							
2.5 mm	PNP	12–24 V	N.O. ★	2,500 Hz	A	—	**XS1N08PA349**
2.5 mm	NPN	12–24 V	N.O. ★	2,500 Hz	A	—	**XS1N08NA349**
Shielded, ◆ Extended Range, nano-style connector							
2.5 mm	PNP	12–24 V	N.O. ★	2,500 Hz	B	1 thru 8	**XS1N08PA349S**
2.5 mm	NPN	12–24 V	N.O. ★	2,500 Hz	B	1 thru 8	**XS1N08NA349S**
Shielded, ◆ Extended Range, micro-style connector DC							
2.5 mm	PNP	12–24 V	N.O. ★	2,500 Hz	B	11, 12, 13, 15, 16	**XS1N08PA349D**
2.5 mm	NPN	12–24 V	N.O. ★	2,500 Hz	B	11, 12, 14, 15, 16	**XS1N08NA349D**
Non-shielded, 2 m (6.6 ft) cable							
2.5 mm	NPN	12–24 V	N.O. ★	5,000 Hz	A	—	**XS2N08NA340**
Non-shielded, micro-style connector							
2.5 mm	NPN	12–24 V	N.O.	5,000 Hz	B	11, 12, 14, 15, 16	**XS2N08NA340D**

★ To order a normally closed (N.C.) version, change **A** to **B**, example; XS1N08P**A**349 to XS1N08P**B**349.
◆ See dimension x below.

Minimum Mounting Clearances mm (in.)



	Side by side	Face to face	Facing a metal object	Mounting in a metal support	Mounted in a metal support
XS1 Shielded	e: 3 (0.12)	e: 18 (0.71)	e: 4.5 (0.18)	D: 8 (0.31); H: 0	x: 0
XS1 Extended range	e: 5 (0.20)	e: 30 (1.18)	e: 7.5 (0.30)	D: 10 (0.39); H: 1.6 (0.06)	D: 8 (0.31); x: 1.6 (0.06)
XS2 Non-shielded	e: 10 (0.39)	e: 30 (1.18)	e: 7.5 (0.30)	D: 24 (0.94); H: 5 (0.20)	—

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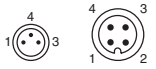
Proximity Sensors
XS Tubular, Inductive Sensors
8 mm Diameter, DC; Economy Short Length

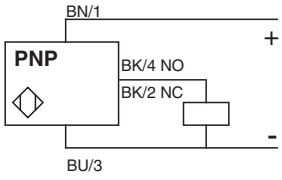
Wiring

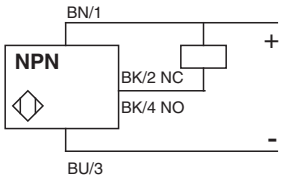
Connector		Cable	
		Blue	BU –
		Brown	BN +
		Black	BK Output



M8 M12

3 wire NO or NC
wire color/ connector pin





M8 connector, N.O. and N.C. to pin 4.

Specifications

Mechanical			
Usable sensing range	Shielded	Standard sensing range	0 to 1.2 mm
		Extended sensing range	0 to 2 mm
	Non-shielded		0 to 2 mm
Standard temperature range		Standard sensing range	-25 to +70 °C (-13 to +158 °F)
		Extended sensing range	-25 to 50 °C (-13 to 122 °F)
Enclosure rating—cable (see page 626)	NEMA Types		3, 4X, 6P, 12, 13
	IEC		IP67
Enclosure material	Case		Nickel-plated brass
	Sensing face		PBT
Maximum tightening torque			5 N•m (3.7 lb-ft)
Vibration resistance	(IEC 60068.2.6)		25 G, ±2 mm amplitude, 10–55 Hz
Shock resistance	(IEC 60068.2.27)		50 G, 11 ms duration
Standard target size (steel)			8 x 8 mm (0.31 x 0.31 in.)
Differential (% of Sr)			15%
Repeatability (% of Sr)			3%
LED indicator type	A		360° ring LED shows output status
	B		One LED visible from 4 quadrants shows output status
Cable	3-wire		27 AWG (0.11 mm^2), PvR
Electrical			
Voltage range—nominal			12–24 Vdc
Voltage limit (including ripple)			10–38 Vdc
Voltage drop (across switch), closed state			2 V (2.6 V extended sensing range)
Maximum load current			200 mA
Current consumption (no load)			10 mA
On delay (maximum)		Standard sensing range	0.1 ms
		Extended sensing range	0.2 ms
Off delay (maximum)		Standard sensing range	0.1 ms
		Extended sensing range	0.2 ms
Power-up delay (maximum)	Standard/extended sensing range		5 ms
Protective circuitry	Short circuit protection		Yes
	Overload		Yes
	Radio frequency immunity (RFI)		IEC 61000-4-3 L3
	Electrostatic; transients; impulse		IEC 61000-4-2 L2; IEC 61000-4-4 L3; 60947.5.2 L3 Extended sensing range: IEC 61000-4-4 L3
	Reverse polarity protection		Yes
Agency listings	UL E164869 CCN NRKH	CSA CR 44087 Class 3211 03	CE

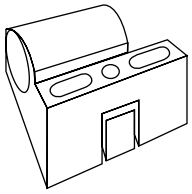
Options

Description		Suffix
Extended temperature range (cable type and standard sensing distance only)	Down to -40° C (-40° F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

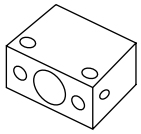
Accessories

Description	Catalog Number
Metal mounting locknuts	**XSZE108**
Plastic mounting bracket	**XSZB108**
Diecast zinc mounting bracket	**831608**

Note: Refer to page 327 for target material correction coefficient Km.



XSZB1••



8316••

Connector Cables
(M8 or S suffix; M12 or D suffix)

XSZCS101	Nano-style, 3-pin, 2 m, straight
XSZCS111	Nano-style, 3-pin, 2 m, 90°
XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths. . . . page 626
Accessories . . . . . page 284

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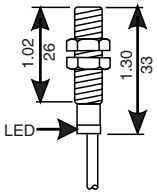
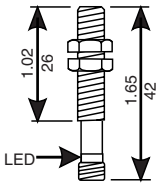
Proximity Sensors
XS Tubular, Inductive Sensors
8 mm Diameter, DC; Economy Short Length, Non-Corrosive

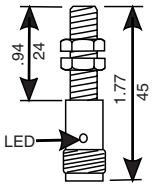


XS4P08●

thread
M8 x 1



XS4P08●D



XS4P08●D

Dual Dimensions inches / mm

Features

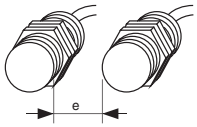
- Faster troubleshooting aided by high-visibility, 360° indicators
- Designed for chemically aggressive environments—cutting oils, grease, washdown, etc.
- Significant savings in replacement time using the patented plastic mounting bracket (no gauging) or connectors
- Extensive protective circuitry for trouble-free operation
- Works with an unregulated DC supply powered by a 24 V secondary transformer
- Plastic mounting nuts included
- UL Listed, CSA Certified, and CE Marked

Nominal Sensing Distance	Circuit Type	Voltage Range	Output Mode	Operating Frequency	Indicator LED (see next page)	Mating Connector Style (See page 626)	Catalog Number
Plastic							
Non-shielded, 2 m (6.6 ft) cable							
2.5 mm	PNP	12–24 V	N.O. ★	5,000 Hz	A	—	**XS4P08PA340**
2.5 mm	NPN	12–24 V	N.O. ★	5,000 Hz	A	—	**XS4P08NA340**
Non-shielded, nano-style connector							
2.5 mm	PNP	12–24 V	N.O.	5,000 Hz	A	1 thru 8	**XS4P08PA340S**
2.5 mm	NPN	12–24 V	N.O.	5,000 Hz	A	1 thru 8	**XS4P08NA340S**
Non-shielded, micro-style connector							
2.5 mm	PNP	12–24 V	N.O.	5,000 Hz	B	11, 12, 13, 15, 16	**XS4P08PA340D**
2.5 mm	NPN	12–24 V	N.O.	5,000 Hz	B	11, 12, 13, 15, 16	**XS4P08NA340D**

★ To order a normally closed (N.C.) version, change **A** to **B**, example XS3P08P**A**340 to XS3P08P**B**340

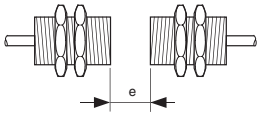
Minimum Mounting Clearances, mm (in.)

Side by side



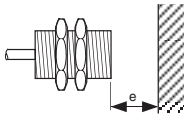
XS4 Non-shielded e: 10 (0.39)

Face to face



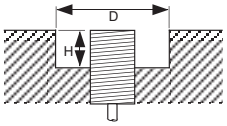
e: 30 (1.18)

Facing a metal object



e: 7.5 (0.30)

Mounting in a metal support



D: 24 (0.94); H: 5 (0.20)

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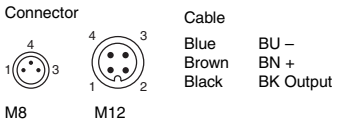
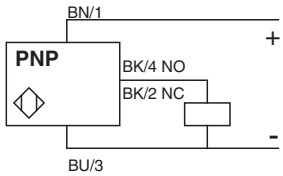
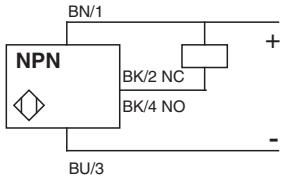
Wiring



3 wire NO or NC
wire color/ connector pin





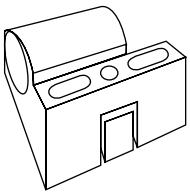
M8 connector, N.O. and N.C. to pin 4.

Specifications

Mechanical		
Usable sensing range	Shielded	0 to 1.2 mm
	Non-shielded	0 to 2 mm
Standard temperature range		-25 to +80 °C (-13 to +176 °F)
Enclosure rating—cable (for connector, see page 626)	NEMA Type	3, 4X, 6P, 12, 13
	IEC	IP67
Enclosure material	Case	PBT
	Sensing face	PBT
Tightening torque (maximum)		1 N•m (0.74 lb-ft)
Vibration resistance	(IEC 60068.2.6)	25 G, ±2 mm amplitude, 10–55 Hz
Shock resistance	(IEC 60068.2.27)	50 G, 11 ms duration
Standard target size (steel)		8 x 8 mm (0.31 x 0.31 in.)
Differential (% of Sr)		15%
Repeatability (% of Sr)		3%
LED indicator type	A	360° ring LED shows output status
	B	One LED visible from 4 quadrants shows output status
Cable	3-wire	27 AWG (0.11 mm^2), PvR
Electrical		
Voltage range—nominal		12–24 Vdc
Voltage limit (including ripple)		10–38 Vdc
Voltage drop (across switch), closed state		2 V
Maximum load current		200 mA
Current consumption (no load)		10 mA
On delay (maximum)		0.1 ms
Off delay (maximum)		0.1 ms
Power-up delay (maximum)		5 ms
Protective circuitry	Short circuit protection	Yes
	Overload	Yes
	Radio frequency immunity (RFI)	IEC 61000-4-3 L3
	Electrostatic; transients; impulse	IEC 61000-4-2 L3; IEC 61000-4-4 L3; 60947.5.2 L
	Reverse polarity protection	Yes
Agency listings	E164869 CCN NRKH	CR 44087 Class 3211 03

Options

Description		Suffix
Extended temperature range (cable type only)	Down to -40 °C (-40 °F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**



XSZB1••

Accessories

Description	Catalog Number
Plastic mounting nuts	**XSZE208**
Plastic mounting bracket	**XSZB108**

Note: Refer to page 327 for target material correction coefficient Km.

Connector Cables (M8 or S suffix; M12 or D suffix)

XSZCS101	Nano-style, 3-pin, 2 m, straight
XSZCS111	Nano-style, 3-pin, 2 m, 90°
XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths. . . .Page 626
Accessories . . . . . .Page 284, 281

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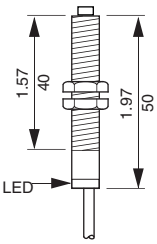
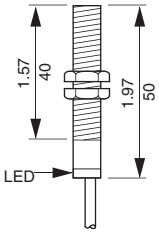
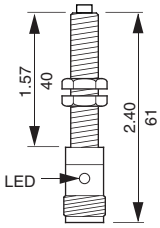
Proximity Sensors
XS Tubular, Inductive Sensors
8 mm Diameter, DC; Universal Standard Length



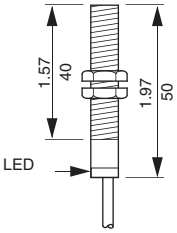
XS2M08PC410
XS2M08NC410



XS1M08••410

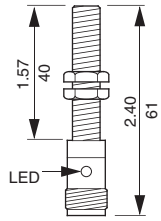


XS2M08PC410D
XS2M08NC410D

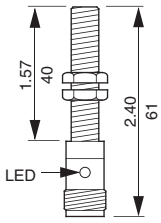


XS1M08•370

thread
M8 x 1



XS1M08••410D



XS1M08•370D

Dual Dimensions inches / mm

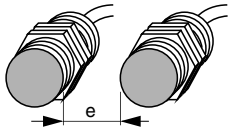
Features

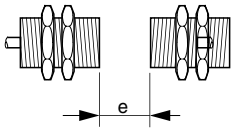
- Faster troubleshooting aided by high-visibility, 360° indicators
- Rugged case designed for very aggressive environments—cutting oils, grease, etc.
- Pigtail connectors maintain the cutting oil enclosure rating while removing the connector from the aggressive environment
- Worry-free replacement: standard length, extended temperature and supply voltage range, improved enclosure rating
- Significant savings in replacement time using the patented plastic mounting bracket (no gauging) or connectors
- Extensive protective circuitry for trouble-free operation
- Works with unfiltered rectified power supply
- Metal mounting locknuts included
- Normally closed (N.C.) output available on versions marked ★
- UL Listed, CSA Certified, and CE Marked

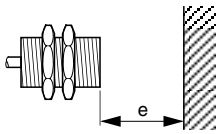
Nominal Sensing Distance	Circuit Type	Output Mode ★	Voltage Range	Maximum Load	Operating Frequency	Indicator LED (see next page)	Mating Connector Style (see page 626)	Catalog Number
Stainless steel case								
Shielded, 2 m (6.6 ft) cable								
1.5 mm	PNP	N.O. ★	12–48 V	200 mA	5,000 Hz	A	—	**XS1M08PA370**
1.5 mm	NPN	N.O. ★	12–48 V	200 mA	5,000 Hz	A	—	**XS1M08NA370**
1.5 mm ③	PNP	N.O.	12–48 V	200 mA	5,000 Hz	A	—	**XS1M08PA371**
Shielded, micro-style connector DC								
1.5 mm	PNP	N.O. ★	12–48 V	200 mA	5,000 Hz	B	11, 12, 15, 16	**XS1M08PA370D**
1.5 mm	NPN	N.O. ★	12–48 V	200 mA	5,000 Hz	B	11, 12, 15, 16	**XS1M08NA370D**
Plastic case								
Non-shielded, 2 m (6.6 ft) cable								
2.5 mm	PNP	N.O.★	12–48 V	200 mA	5,000 Hz	A	—	**XS4P08PA370**
2.5 mm	NPN	N.O.★	12–48 V	200 mA	5,000 Hz	A	—	**XS4P08NA370**
2.5 mm	PNP	N.O.+N.C.★	12–24 V	200 mA	5,000 Hz	A	—	**XS4P08PC410**
2.5 mm	NPN	N.O.+N.C.★	12–24 V	200 mA	5,000 Hz	A	—	**XS4P08NC410**
Nickel-plated brass case, complementary N.O.+N.C. outputs								
Shielded, 2 m (6.6 ft) cable								
1.5 mm	PNP	N.O.+N.C.	12–24 V	200 mA	5,000 Hz	A	—	**XS1M08PC410**
1.5 mm	NPN	N.O.+N.C.	12–24 V	200 mA	5,000 Hz	A	—	**XS1M08NC410**
Shielded, micro-style connector								
1.5 mm	PNP	N.O.+N.C.	12–24 V	200 mA	5,000 Hz	B	11, 12, 15, 16	**XS1M08PC410D**
1.5 mm	NPN	N.O.+N.C.	12–24 V	200 mA	5,000 Hz	B	11, 12, 15, 16	**XS1M08NC410D**
Non-shielded, 2 m (6.6 ft) cable								
2.5 mm	PNP	N.O.+N.C.	12–24 V	200 mA	5,000 Hz	A	—	**XS2M08PC410**
2.5 mm	NPN	N.O.+N.C.	12–24 V	200 mA	5,000 Hz	A	—	**XS2M08NC410**
Non-shielded, micro-style connector								
2.5 mm	PNP	N.O.+N.C.	12–24 V	200 mA	5,000 Hz	B	11, 12, 15, 16	**XS2M08PC410D**
2.5 mm	NPN	N.O.+N.C.	12–24 V	200 mA	5,000 Hz	B	11, 12, 15, 16	**XS2M08NC410D**

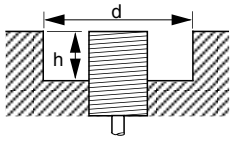
③ With stainless steel mounting nuts and washers.
★ To order a normally closed (N.C.) version, change **A** to **B**, example; XS1M08P**A**370 to XS1M08P**B**370.

Minimum Mounting Clearances, mm (in.)









XS1Shielded	e: 3 (0.11)	e: 18 (0.71)	e: 4.5 (0.18)	D: 8 (0.31); H: 0
XS2/XS4 Non-shielded	e: 10 (0.39)	e: 30 (1.18)	e: 7.5 (0.30)	D: 24 (0.94); H: 5 (0.20)

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Proximity Sensors
XS Tubular, Inductive Sensors
8 mm Diameter, DC; Universal Standard Length

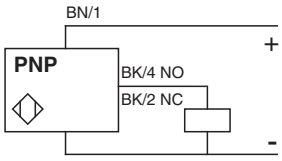
Wiring

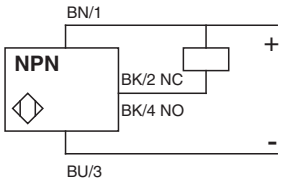
Connector M12



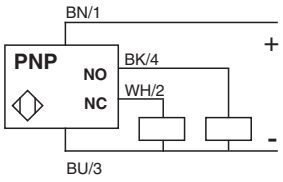
Cable	
Blue	BU –
Brown	BN +
Black	BK Output

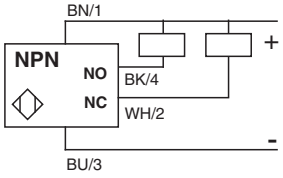
3 wire NO or NC
wire color/connector pin

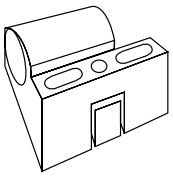




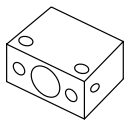
4 wire NO + NC







XSZB1●●



8316●●

Connector Cables (M12 or D suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths. . . . Page 626
Accessories . . . . . Page 284, 281

Specifications

Mechanical		
Usable sensing range	Shielded	0 to 1.2 mm
	Non-shielded	0 to 2 mm
Standard temperature range		-25 to +80 °C (-13 to +176 °F)
Enclosure rating—cable (for connector, see page 626)	NEMA Type	3, 4X, 6P, 12, 13
	IEC	IP67
Enclosure material	Stainless steel case	stainless steel
	Nickel-plated brass	Case: Nickel-plated brass Sensing face: PBT
	Plastic	PBT
Maximum tightening torque	Stainless steel	9 N•m (6.7 lb-ft)
	Plastic	1 N•m (0.74 lb-ft)
	Nickel-plated brass	9 N•m
Vibration resistance	(IEC 60068.2.6)	25 G, ±2 mm amplitude, 10–55 Hz
Shock resistance	(IEC 60068.2.27)	50 G, 11 ms duration
Standard target size (steel)		8 x 8 mm (0.31 x 0.31 in.)
Differential (% of Sr)		15%
Repeatability (% of Sr)		3%
LED indicator type	A	360° ring LED shows output status
	B	One LED visible from 4 quadrants shows output status
Cable	3-wire	27 AWG (0.11 mm^2), PvR
Electrical		
Voltage range—nominal		12–48 Vdc (12–24 complementary output)
Voltage limit (including ripple)		10–58 Vdc (10–38 complementary output)
Voltage drop (across switch), closed state	3-wire	2 V
Maximum load current	3-wire	100 mA
	4-wire complementary output	200 mA
Current consumption (no load)	3-wire	10 mA
On delay (maximum)	3-wire	0.1 ms
Off delay (maximum)	3-wire	0.1 ms
Power-up delay (maximum)	3-wire	5 ms
Protective circuitry	Short circuit protection	Yes
	Overload	Yes
	Radio frequency immunity (RFI)	IEC 61000-4-3 L3
	Electrostatic; transients; impulse	3-wire IEC 61000-4-2 L2, IEC 61000-4-4 L3; 60947.5.2 L2
	Reverse polarity protection	Yes
Agency listings	UL E164869 CCN NRKH	CSA CR 44087 Class 3211 03 CE

Options

Description		Suffix
Extended temperature range (cable type only)	Down to -40° C (-40° F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

Accessories

Description	Catalog Number
Plastic mounting nuts	**XSZE208**
Metal mounting nuts and lockwashers	**XSZE108**
Plastic mounting bracket	**XSZB108**
Diecast zinc mounting bracket	**831608**
Stainless steel mounting nuts	**XSZE208**
Stainless steel lockwashers	**XSZE908**

Note: Refer to page 327 for target material correction coefficient Km.

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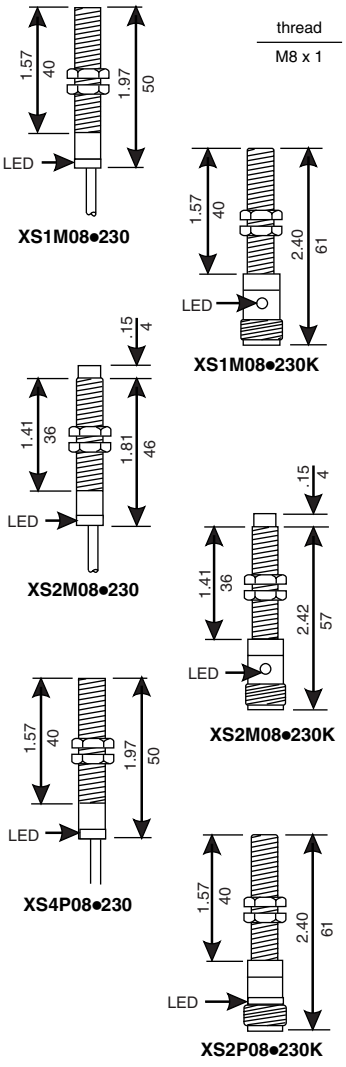
Proximity Sensors
XS Tubular, Inductive Sensors
8 mm Diameter, AC/DC; Universal Standard Length



Dual Dimensions inches / mm

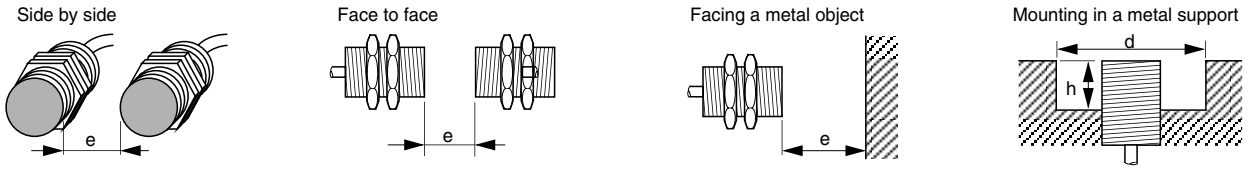
Features

- Faster troubleshooting aided by high-visibility, 360° indicator
- Rugged case designed for aggressive environments.
- Worry-free replacement: standard length, extended temperature range, AC or DC power supply
- Significant savings in replacement time using the patented plastic mounting bracket (no gauging) or connectors
- Extensive protective circuitry for trouble-free operation
- Normally closed (N.C.) output available on versions marked ★
- Plastic mounting nuts for plastic and locknuts for metal housing included
- UL Listed, CSA Certified, and CE Marked

Nominal Sensing Distance	Output Mode	Voltage Range AC	Voltage Range DC	Operating Frequency AC	Operating Frequency DC	Indicator LED (see next page)	Mating Connector Style (see page 626)	Catalog Number
Nickel-plated brass case								
Shielded, 2 m (6.6 ft) cable								
1.5 mm	N.O. ★	24–240 V	24–210 V	25 Hz	4,000 Hz	A	—	**XS1M08MA230**
Shielded, micro-style connector AC								
1.5 mm	N.O. ★	24–240 V	24–210 V	25 Hz	4,000 Hz	B	17, 18	**XS1M08MA230K**
Non-shielded, 2 m (6.6 ft) cable								
2.5 mm	N.O. ★	24–240 V	24–210 V	25 Hz	3,000 Hz	A	—	**XS2M08MA230**
Non-shielded, micro-style connector AC								
2.5 mm	N.O. ★	24–240 V	24–210 V	25 Hz	3,000 Hz	B	17, 18	**XS2M08MA230K**
Plastic case								
Non-shielded, 2 m (6.6 ft) cable								
2.5 mm	N.O. ★	24–240 V	24–210 V	25 Hz	3,000 Hz	A	—	**XS4P08MA230**
Non-shielded, micro-style connector AC								
2.5 mm	N.O. ★	24–240 V	24–210 V	25 Hz	3,000 Hz	A	17, 18	**XS4P08MA230K**

★ To order a normally closed (N.C.) version, change **A** to **B**, example; XS1M08M**A**230 to XS1M08M**B**230.

Minimum Mounting Clearances, mm (in.)



	Side by side	Face to face	Facing a metal object	Mounting in a metal support
XS1 Shielded	e: 3 (0.12)	e: 18 (0.71)	e: 4.5 (0.18)	D:8 (0.31); H: 0
XS2/XS4 Non-shielded	e: 10 (0.39)	e: 30 (1.18)	e: 7.5 (0.30)	D: 24 (0.94); H: 5 (0.20)

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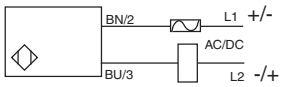
Proximity Sensors
XS Tubular, Inductive Sensors
8 mm Diameter, AC/DC; Universal Standard Length

Wiring

Connector	Cable	
0.5 in. 20-UNF		
	Blue	BU –
	Brown	BN +
	Black	BK Output

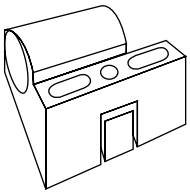


wire color/connector pin
2 wire, AC/DC for connector version only

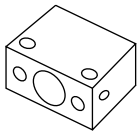


Specifications

Mechanical		
Usable sensing range	Shielded	0 to 1.2 mm
	Non-shielded	0 to 2 mm
Standard temperature range		-25 to +80 °C (-13 to +176 °F)
Enclosure rating—cable	NEMA Type	3, 4X, 6P, 12, 13
(for connector, see page 626)	IEC	IP67
Enclosure material	Nickel-plated brass	Case: nickel-plated brass Sensing face: PBT
	Plastic	PBT
Tightening torque (maximum)	Nickel-plated brass	9 N•m (79.6 lb-ft)
	Plastic	1 N•m (0.74 lb-ft)
Vibration resistance	IEC 60068.2.6	25 G, ±2 mm amplitude, 10–55 Hz
Shock resistance	IEC60068.2.27	50 G, 11 ms duration
Standard target size (steel)		8 x 8 mm (0.31 x 0.31 in.)
Differential (% of Sr)		15%
Repeatability (% of Sr)		3%
LED indicator type	A	360° ring LED shows output status
	B	One LED visible from 4 quadrants shows output status
Cable	2-wire	27 AWG (0.11 mm^2), PvR
Electrical		
Voltage range		24 to 240 Vac (50/60 Hz), 24 to 210 Vdc
Voltage limit (including ripple)		20 to 264 Vac/Vdc
Maximum voltage drop (across switch), closed state		5.5 V
Inrush current (inductive @ 20 ms)		2 A
Minimum load current		5 mA
Maximum load current		100 mA 20 ≤ Vdc ≤ 58 IEC 60947-5-2 Utilization category DC-13 Vdc > 58 IEC 60947-5-2 Utilization category DC-12
Residual (leakage) current,	24 Vac/Vdc	0.8 mA
open state	120 Vac/Vdc	1.5 mA
On delay (maximum)		0.2 ms
Off delay (maximum)		0.2 ms
Power-up delay (maximum)		40 ms
Protective circuitry	Short circuit protection	No (see page 284 for protective fuses)
	Radio frequency immunity (RFI)	IEC 61000-4-3 L3
	Electrostatic; transients; impulse	IEC 61000-4-2 L4; IEC 61000-4-4 L4; 60947.5.2 L3
Agency listings	UL E164869 CCN NRKH	CSA CR 44087 Class 3211 03 CE



XSZB1●●



8316●●

Options

Description		Suffix
Extended temperature range (cable type only)	Down to -40° C (-40° F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

Accessories

Description	Catalog Number
Plastic mounting nuts	**XSZE208**
Metal mounting locknuts	**XSZE108**
Plastic mounting bracket	**XSZB108**
Diecast zinc mounting bracket	**831608**

Note: Refer to page 327 for target material correction coefficient Km.

Connector Cables (U20 or K suffix)

XSZCK101Y	Micro-style, 3-pin, 2 m, straight
XSZCK111Y	Micro-style, 3-pin, 2 m, 90°

Additional cable options and lengths . . . page 626
Accessories . . . . . page 284

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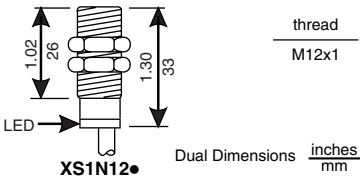
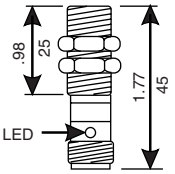
Proximity Sensors
XS Tubular, Inductive Sensors
12 mm Diameter, DC; Economy Short Length

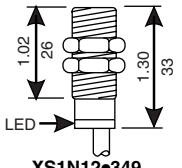


XS1N12•

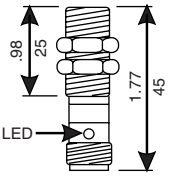
Dual Dimensions inches / mm



XS1N12•D



XS1N12•349



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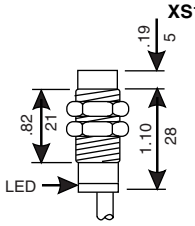

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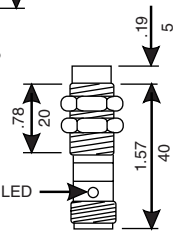

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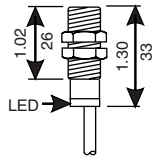
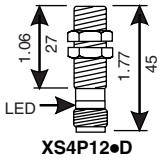


XS4P12•



XS4P12•D

Features

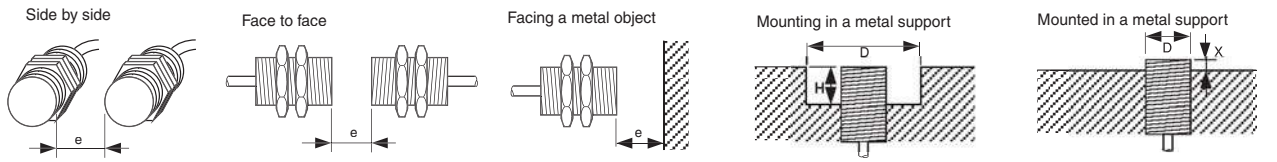
- 360° LED indicators
- Extended range models
- Complementary N.O. + N.C. models
- Rugged metal or plastic cases
- Patented plastic mounting bracket
- Connector options
- Extensive protective circuitry
- Works with an unregulated DC supply powered by a 24 V secondary transformer
- Metal locknuts or plastic mounting nuts included
- Normally closed (N.C.) output available on versions marked ★
- UL Listed, CSA Certified, and CE Marked

Nominal Sensing Distance	Circuit Type	Voltage Range	Output Mode	Operating Frequency	Indicator LED (see next page)	Mating Connector Style (see p. 626)	Catalog Number
Nickel-plated brass case							
Shielded, 2 m (6.6 ft) cable							
2 mm	PNP	12–24 V	N.O. + N.C.	5,000 Hz	A	—	**XS1N12PC410**
2 mm	NPN	12–24 V	N.O. + N.C.	5,000 Hz	A	—	**XS1N12NC410**
Shielded, micro-style connector							
2 mm	PNP	12–24 V	N.O. + N.C.	5,000 Hz	B	11, 12, 13, 15, 16	**XS1N12PC410D**
2 mm	NPN	12–24 V	N.O. + N.C.	5,000 Hz	B	11, 12, 14, 15, 16	**XS1N12NC410D**
Shielded◆, Extended Range, 2 m (6.6 ft) cable							
4 mm	PNP	12–24 V	N.O. ★	2,500 Hz	A	—	**XS1N12PA349**
4 mm	NPN	12–24 V	N.O. ★	2,500 Hz	A	—	**XS1N12NA349**
Shielded◆, Extended Range, micro-style connector DC							
4 mm	PNP	12–24 V	N.O.★	2,500 Hz	B	11, 12, 13, 15, 16	**XS1N12PA349D**
4 mm	NPN	12–24 V	N.O.★	2,500 Hz	B	11, 12, 14, 15, 16	**XS1N12NA349D**
Non-shielded, 2 m (6.6 ft) cable							
4 mm	PNP	12–24 V	N.O. + N.C.	5,000 Hz	A	—	**XS2N12PC410**
4 mm	NPN	12–24 V	N.O. + N.C.	5,000 Hz	A	—	**XS2N12NC410**
Non-shielded, micro-style connector DC							
4 mm	PNP	12–24 V	N.O. + N.C.	5,000 Hz	B	11, 12, 13, 15, 16	**XS2N12PC410D**
4 mm	NPN	12–24 V	N.O. + N.C.	5,000 Hz	B	11, 12, 14, 15, 16	**XS2N12NC410D**
Plastic case							
Non-shielded, 2 m (6.6 ft) cable							
4 mm	PNP	12–24 V	N.O. ★	5,000 Hz	A	—	**XS4P12PA340**
4 mm	NPN	12–24 V	N.O. ★	5,000 Hz	A	—	**XS4P12NA340**
4 mm	PNP	12–24 V	N.O. + N.C.	5,000 Hz	A	—	**XS4P12PC410**
4 mm	NPN	12–24 V	N.O. + N.C.	5,000 Hz	A	—	**XS4P12NC410**
Non-shielded, micro-style connector DC							
4 mm	PNP	12–24 V	N.O. ★	5,000 Hz	A	11, 12, 13, 15, 16	**XS4P12PA340D**
4 mm	NPN	12–24 V	N.O. ★	5,000 Hz	A	11, 12, 14, 15, 16	**XS4P12NA340D**
4 mm	PNP	12–24 V	N.O. + N.C.	5,000 Hz	A	11, 12, 13, 15, 16	**XS4P12PC410D**
4 mm	NPN	12–24 V	N.O. + N.C.	5,000 Hz	A	11, 12, 14, 15, 16	**XS4P12NC410D**

◆ See X dimension below.

★ To order a normally closed (N.C.) version, change **A** to **B**, example; XS1M08M**A**230 to XS1M08M**B**230.

Minimum Mounting Clearances, mm (in.)



	Side by side	Face to face	Facing a metal object	Mounting in a metal support	Mounted in a metal support
XS1 Shielded	e: 4 (0.16)	e: 24 (0.94)	e: 6 (0.24)	D: 12 (0.47)	x: 0
XS1 Extended range	e: 8 (0.31)	e: 48 (1.89)	e: 12 (0.47)	D: 12 (0.47)	D: 12 (0.47); x: 2.4 (0.09)
XS2/XS4 Non-shielded	e: 16 (0.63)	e: 48 (1.89)	e: 12 (0.47)	D: 36 (1.42); H: 8 (0.31)	D: 12 (0.47); X: 2.4 (0.09)

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Proximity Sensors
XS Tubular, Inductive Sensors
12 mm Diameter, DC; Economy Short Length

Wiring

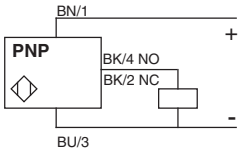
Connector M12

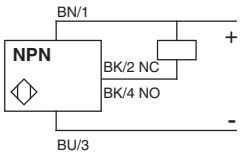


Cable

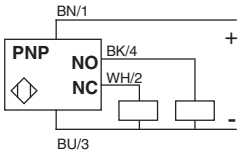
Blue	BU –
Brown	BN +
Black	BK Output

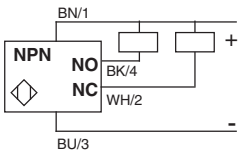
3 wire NO or NC
wire color/connector pin

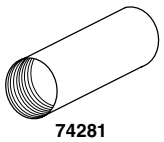




4 wire NO + NC







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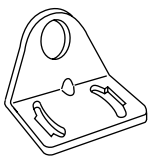
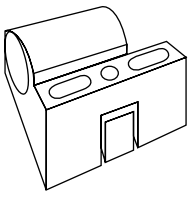
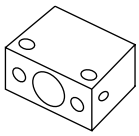


9006PA●●



XSZB1●●



8316●●

Connector Cables (M12 or D suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths . . . page 626
Accessories . . . . . page 284, 280

Specifications

Mechanical			
Usable sensing range	Shielded	Standard sensing range	0 to 1.6 mm
		Extended sensing range	0 to 3.2 mm
	Non-shielded		0 to 3.2 mm
Temperature range	Standard sensing range	Nickel-plated brass	-25 to +70 °C (-13 to +158 °F)
		Plastic	-25 to +80 °C (-13 to +176 °F)
	Extended sensing range		-25 to +50 °C (-13 to +122 °F)
Enclosure rating—cable (for connector see page 626)	Nickel-plated brass	NEMA Type	3, 4X, 6P, 12, 13
		IEC	IP67
	Plastic case	NEMA Type	3, 4X, 6P, 12, 13
		IEC	IP68
Enclosure material	Nickel-plated brass	Case	Nickel-plated brass
		Sensing face	PBT
	Plastic case		PBT
Tightening torque (maximum)	Nickel-plated brass		6 N•m (4.4 lb-ft)
	Plastic		2 N•m (1.5 lb-ft)
Vibration resistance	(IEC 60068.2.6)		25 G, ±2 mm amplitude, 10–55 Hz
Shock resistance	(IEC 60068.2.27)		50 G, 11 ms duration
Standard target size (steel)			12 x 12 mm (0.47 x 0.47 in.)
Differential (% of Sr)			15%
Repeatability (% of Sr)			3%
LED indicator type	A		360° ring LED shows output status
	B		One LED visible from 4 quadrants shows output status
Cable	3-wire		22 AWG (0.34 mm^2), PvR
	4-wire (N.O. + N.C.)		21 AWG (0.22 mm^2), PvR
Electrical			
Voltage range—nominal			12–24 Vdc
Voltage limit (including ripple)			10–38 Vdc
Voltage drop (across switch), closed state			2 V
Maximum load current			200 mA
Current consumption (no load)			10 mA
On delay (maximum)		Standard sensing range	0.1 ms
		Extended sensing range	0.2 ms
Off delay (maximum)		Standard sensing range	0.1 ms
		Extended sensing range	0.2 ms
Power-up delay (maximum)	Standard/extended sensing range		5 ms
Protective circuitry	Short circuit protection		Yes
	Overload		Yes
	Radio frequency immunity (RFI)		IEC 61000-4-3 L3
	Electrostatic; transients; impulse		IEC 61000-4-2 L2; IEC 61000-4-4 L3; 60947.5.2 L3
	Reverse polarity protection		Yes
Agency listings	UL E164869 CCN NRKH	CSA CR 44087 Class 3211 03	CE

Options

Description		Suffix
Extended temperature range (cable type only)	Down to -40 °C (-40 °F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

Accessories

Description		Catalog Number
Plastic mounting nuts		**XSZE212**
Metal mounting nuts		**XSZE112**
Steel mounting bracket, 90°		**9006PA12**
Plastic mounting bracket		**XSZB112**
Diecast zinc mounting bracket		**831612**
0.5 in. (12.7 mm) NPT conduit adapter, length: 2 in. (50.8 mm)	Aluminum	**74281**

Note: Refer to page 327 for target material correction coefficient Km.

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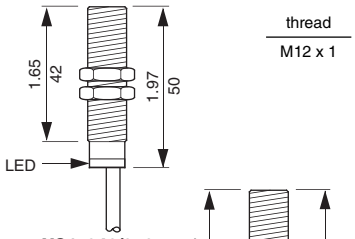
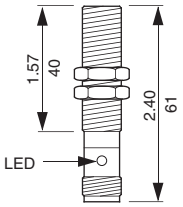
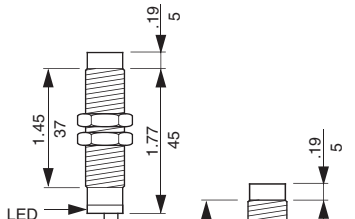
Proximity Sensors
XS Tubular, Inductive Sensors
12 mm Diameter, DC; Universal Standard Length



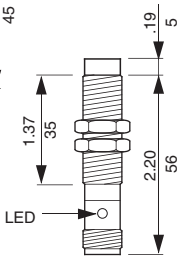
XS1●340/370



XS1●340/370D



XS2●370



XS2●370D

Dual Dimensions inches / mm

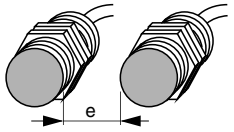
Features

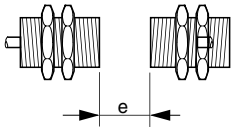
- Faster troubleshooting aided by high-visibility, 360° indicators
- Rugged case designed for aggressive environments
- Worry free replacement: standard length, extended temperature and supply voltage range, improved enclosure ratings (IP68), 3-wire complementary PNP + NPN with selectable N.O./N.C. output circuit
- Significant savings in replacement time using the patented plastic mounting bracket (no gauging) or connectors
- Pigtail connector version (0.8 m / 2.6 ft cable) provides cutting oil rating (IP68) and connection for aggressive environments
- Trouble free operation ensured by extensive protective circuitry
- Works with unfiltered rectified power supply
- Metal mounting locknuts included
- Normally closed (N.C.) output available on versions marked ★
- UL Listed, CSA Certified, and CE Marked

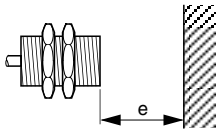
Nominal Sensing Distance	Circuit Type	Voltage Range	Output Mode	Maximum Load	Operating Frequency	Indicator LED (see page 215)	Mating Connector Style (see page 626)	Catalog Number
Nickel-plated brass case								
Shielded, 2 m (6.6 ft) cable								
2 mm	2-wire	12–48 V	N.O. ★	1.5–100 mA	4,000 Hz	A	—	**XS1M12DA210TF◆**
2 mm	PNP	12–48 V	N.O. ★	200 mA	5,000 Hz	A	—	**XS1M12PA370**
2 mm	NPN	12–48 V	N.O. ★	200 mA	5,000 Hz	A	—	**XS1M12NA370**
2 mm	PNP/NPN	12–24V	N.O./N.C.	200 mA	5,000 Hz	A	—	**XS1M12KP340**
Shielded, micro-style connector DC								
2 mm	PNP	12–48 V	N.O. ★	200 mA	5,000 Hz	B	11, 12, 13, 15, 16	**XS1M12PA370D**
2 mm	NPN	12–48 V	N.O. ★	200 mA	5,000 Hz	B	11, 12, 14, 15, 16	**XS1M12NA370D**
2 mm	PNP/NPN	12–24V	N.O./N.C.	200 mA	5,000 Hz	B	11, 12, 15, 16	**XS1M12KP340D**
Non-shielded, 2 m (6.6 ft) cable								
4 mm	PNP	12–48 V	N.O. ★	200 mA	5,000 Hz	A	—	**XS2M12PA370**
4 mm	NPN	12–48 V	N.O. ★	200 mA	5,000 Hz	A	—	**XS2M12NA370**
4 mm	PNP + NPN	12–24V	N.O./N.C.	200 mA	5,000 Hz	A	—	**XS2M12KP340**
Non-shielded, micro-style connector DC								
4 mm	PNP	12–48 V	N.O. ★	200 mA	5,000 Hz	B	11, 12, 13, 15, 16	**XS2M12PA370D**
4 mm	NPN	12–48 V	N.O. ★	200 mA	5,000 Hz	B	11, 12, 14, 15, 16	**XS2M12NA370D**
4 mm	PNP + NPN	12–24V	N.O./N.C.	200 mA	5,000 Hz	B	11, 12, 15, 16	**XS2M12KP340D**

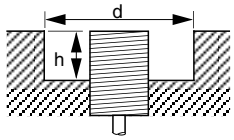
★ To order a normally closed (N.C.) version, change the **A** to **B**. Example: XS1M12P**A**370 to XS1M12P**B**370.
◆ Available with TF suffix only (extended temperature range, down to -40 °C).

Minimum Mounting Clearances, mm (in.)









	Side by side	Face to face	Facing a metal object	Mounting in a metal support
XS1 Shielded	e: 4 (0.16)	e: 24 (0.94)	e: 6 (0.24)	D: 12 (0.47); H: 0
XS2 Non-shielded	e: 16 (0.63)	e: 48 (1.89)	e: 12 (0.47)	D: 36 (1.42); H: 8 (0.31)

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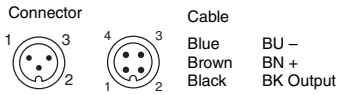
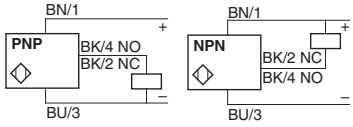
Proximity Sensors
XS Tubular, Inductive Sensors
12 mm Diameter, DC; Universal Standard Length

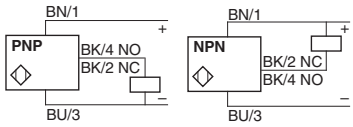
Wiring



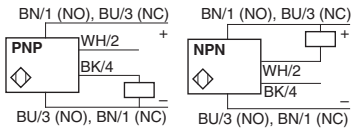
Wire color/connector pin
3 wire NO or NC

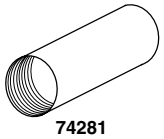


3 wire, selectable PNP/NPN, NO/NC



4 wire, programmable, NO or NC output





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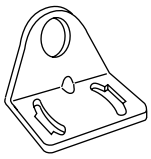
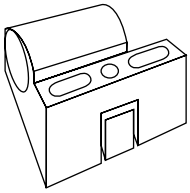
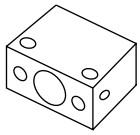


9006PA●●



XSZB1●●



8316●●

Connector Cables
(M12 or D suffix; U78 or A suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°
XSZCA101Y	Micro-style, 3-pin, 2 m, straight
XSZCA111Y	Micro-style, 3-pin, 2 m, 90°

Additional cable options and lengths . . . page 626
Accessories . . . . . page 284, 280

Specifications

Mechanical				
Usable sensing range ★	Shielded		0 to 1.6 mm	
	Non-shielded		0 to 3.2 mm	
Standard temperature range			-25 to +80 °C (-13 to +176 °F)	
Enclosure rating—cable (for connector, see page 626)	NEMA Types		3, 4X, 6P, 12, 13	
	IEC		IP68—cutting oil proof	
Enclosure material	Nickel-plated brass	Case	Nickel-plated brass	
		Sensing face	PBT	
Tightening torque (maximum)	Nickel-plated brass		15 N•m (11 lb-ft)	
Vibration resistance	(IEC 60068.2.6)		25 G, ±2 mm amplitude, 10–55 Hz	
Shock resistance	(IEC 60068.2.27)		50 G, 11 ms duration	
Standard target size (steel)			12 x 12 mm (0.47 x 0.47 in.)	
Differential (% of Sr)			15%	
Repeatability (% of Sr)			3%	
LED indicator type	A		360° ring LED shows output status	
	B		One LED visible from 4 quadrants: Shows output status	
Cable	3-wire		22 AWG (0.34 mm^2), PvR	
Electrical			**Standard**	**KP Models**
Voltage range—nominal			12–48 Vdc	12–24 Vdc
Voltage limit (including ripple)			10–58 Vdc	10–38 Vdc
Voltage drop (across switch), closed state	3-wire		2 V	2.6 V
Maximum load current	3-wire		200 mA	
Current consumption (no load)	3-wire		10 mA	
On delay (maximum)	3-wire		0.1 ms	
Off delay (maximum)	3-wire		0.1 ms	
Power-up delay (maximum)	3-wire		5 ms	
Protective circuitry	Short circuit protection		Yes	
	Overload		Yes	
	Radio frequency immunity (RFI)		IEC 61000-4-3 Level 3	
	Electrostatic; transients; impulse (L—indicates level number)		3-wire: IEC 61000-4-2 L2; IEC 61000-4-4 L3;60947.5.2 L3	
	Reverse polarity protection		Yes	
Agency listings	UL E164869 CCN NRKH		CSA CR 44087 Class 3211 03	CE

Options

Description		**Suffix**
Extended temperature range (cable type only)	Down to -40° C (-40° F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

Accessories

Description		**Catalog Number**
Plastic mounting nuts		**XSZE212**
Metal mounting locknuts		**XSZE112**
Steel mounting bracket, 90°		**9006PA12**
Plastic mounting bracket		**XSZB112**
Diecast zinc mounting bracket		**831612**
0.5 in. (12.7 mm) NPT conduit adapter, length 2 in. (50.8 mm)	Aluminum	**74281**

★ Refer to page 327 for target material correction coefficient Km.

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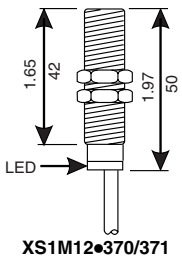
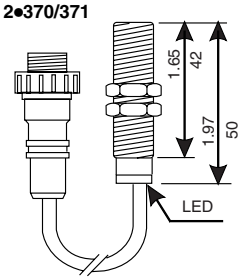
Proximity Sensors
XS Tubular, Inductive Sensors
12 mm Diameter, DC; Universal Standard Length, Non-Corrosive



XS1M12•370/371



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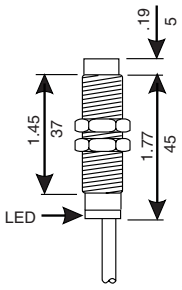
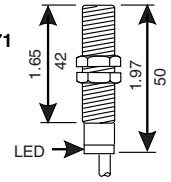
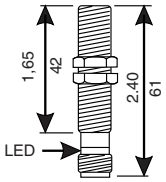


XS2M12•370/371



XS1P12•370



XS4P12•370D

Dual Dimensions inches / mm

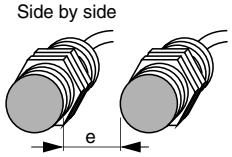
Features

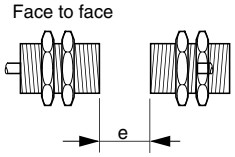
- Faster troubleshooting aided by high-visibility, 360° indicators
- 2-wire versions simplify wiring
- High-impact stainless steel and plastic cases for aggressive environments—cutting oils, grease, solvents, etc.
- Worry free replacement: standard length, extended temperature and supply voltage range, improved enclosure ratings (IP68), 3-wire complementary PNP + NPN with selectable N.O./N.C. output circuit
- Significant savings in replacement time using the patented plastic mounting bracket (no gauging) or connectors
- Pigtail connector version (0.8 m / 2.6 ft cable) provides cutting oil rating (IP68) and connection for aggressive environments.
- Trouble free operation ensured by extensive protective circuitry
- Works with unfiltered rectified power supply
- Stainless steel locknuts for metal or plastic mounting nuts for plastic housings included
- Normally closed (N.C.) output available on versions marked ★
- UL Listed, CSA Certified, and CE Marked

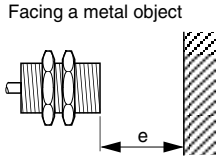
Nominal Sensing Distance	Circuit Type	Voltage Range	Output Mode	Maximum Load	Operating Frequency	Indicator LED (see page 217)	Mating Connector Style (see page 626)	Catalog Number
Stainless steel case								
Shielded, 2 m (6.6 ft) cable								
2 mm	2-wire	12–48 V	N.O.	1.5–100 mA	4,000 Hz	A	—	**XS1M12DA211**
2 mm	PNP	12–48 V	N.O.	200 mA	5,000 Hz	A	—	**XS1M12PA371**
2 mm	NPN	12–48 V	N.O.	200 mA	5,000 Hz	A	—	**XS1M12NA371**
Shielded, mini-style connector—0.8 m (2.6 ft) pigtail								
2 mm	2-wire	12–48 V	N.O.	1.5–100 mA	4,000 Hz	A	21, 22	**XS1M12DA211LA**
Non-shielded, 2 m (6.6 ft) cable								
4 mm	PNP	12–48 V	N.O.	200 mA	5,000 Hz	A	—	**XS2M12PA371**
4 mm	NPN	12–48 V	N.O.	200 mA	5,000 Hz	A	—	**XS2M12NA371**
Plastic case								
Non-shielded, 2 m (6.6 ft) cable								
4 mm	PNP	12–48 V	N.O.★	200 mA	5,000 Hz	A	—	**XS4P12PA370**
4 mm	NPN	12–48 V	N.O.★	200 mA	5,000 Hz	A	—	**XS4P12NA370**
4 mm	PNP + NPN	12–24 V	N.O./N.C.	200 mA	5,000 Hz	A	—	**XS4P12KP340**
Non-shielded, micro-style connector DC								
4 mm	PNP	12–48 V	N.O.★	200 mA	5,000 Hz	A	11, 12, 13, 15, 16	**XS4P12PA370D**
4 mm	NPN	12–48 V	N.O.★	200 mA	5,000 Hz	A	11, 12, 14, 15, 16	**XS4P12NA370D**
4 mm	PNP + NPN	12–24 V	N.O./N.C.	200 mA	5,000 Hz	A	11, 12, 15, 16	**XS4P12KP340D**

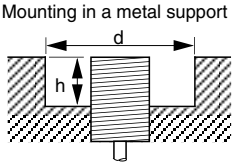
★ To order a normally closed (N.C.) version, change the **A** to **B**. Example: XS1M12P**A**371 to XS1M12P**B**371.

Minimum Mounting Clearances, mm (in.)









	Side by side	Face to face	Facing a metal object	Mounting in a metal support
XS1 Shielded	e: 4 (0.16)	e: 24 (0.94)	e: 6 (0.24)	D: 12 (0.47); H: 0
XS2/XS4 Non-shielded	e: 16 (0.63)	e: 48 (1.89)	e: 12 (0.47)	D: 36 (1.42); H: 8 (0.31)

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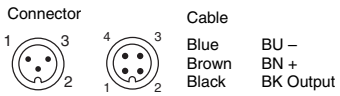
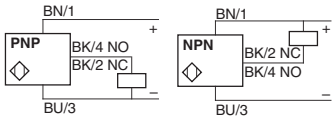
Proximity Sensors
XS Tubular, Inductive Sensors
12 mm Diameter, DC; Universal Standard Length, Non-Corrosive

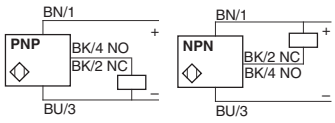
Wiring



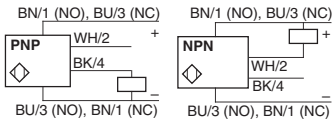
Wire color/connector pin
3 wire NO or NC



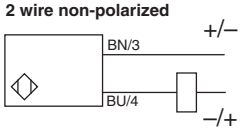
3 wire, selectable PNP/NPN, NO/NC

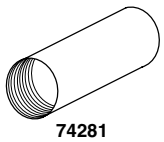


4 wire, programmable, NO or NC output



2 wire non-polarized





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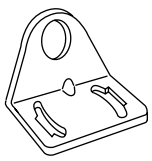

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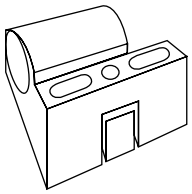
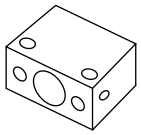


XSZB1••



8316••

Connector Cables
(M12 or D suffix; U78 or A suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°
XSZCA101Y	Mini-style, 3-pin, 2 m, straight
XSZCA111Y	Mini-style, 3-pin, 2 m, 90°

Additional cable options and lengths . . . page 626
Accessories . . . . . page 284, 280

Specifications

Mechanical			
Usable sensing range★	Shielded	0 to 1.6 mm	
	Non-shielded	0 to 3.2 mm	
Standard temperature range		-25 to +80 °C (-13 to +176 °F)	
Enclosure rating—cable (for connector, see page 626)	NEMA Type	3, 4X, 6P, 12, 13	
	IEC	IP68	
Enclosure material	Stainless steel case	#303 stainless steel	
	Sensing face	PBT	
	Plastic	PBT	
Tightening torque (maximum)	Stainless steel	30 N•m (22 lb-ft)	
	Plastic	2 N•m (1.5 lb-ft)	
Vibration resistance	(IEC 60068.2.6)	25 G, ±2 mm amplitude, 10–55 Hz	
Shock resistance	(IEC 60068.2.27)	50 G, 11 ms duration	
Standard target size (steel)		12 x 12 mm (0.47 x 0.47 in.)	
Differential (% of Sr)		15%	
Repeatability (% of Sr)		3%	
LED indicator type	A	360° ring LED shows output status	
Cable	2- or 3-wire	22 AWG (0.34 mm^2), PvR	
Electrical		**Standard**	**KP Models**
Voltage range—nominal		12–48 Vdc	12–24 Vdc
Voltage limit (including ripple)		10–58 Vdc	10–38 Vdc
Voltage drop (across switch), closed state	3-wire	2 V	2.6 V
	2-wire	4 V	
Minimum load current	2-wire	1.5 mA	
Maximum load current	2-wire	100 mA	
	3-wire	200 mA	
Current consumption (no load)	3-wire	10 mA	
Residual (leakage) current, open state	2-wire	0.6 mA	
On delay (maximum)	2-wire	0.5 ms	
	3-wire	0.1 ms	
Off delay (maximum)	2-wire	0.5 ms	
	3-wire	0.1 ms	
Power-up delay (maximum)	2-wire	5 ms	
	3-wire	5 ms	
Protective circuitry	Short circuit protection	Yes	
	Overload	Yes	
	Radio frequency immunity (RFI)	IEC 61000-4-3 Level 3	
	Electrostatic; transients; impulse	2-wire: IEC 61000-4-2 L3; IEC 61000-4-4 L3; 60947.5.2 L3	
	(L—indicates level number)	3-wire: IEC 61000-4-2 L2; IEC 61000-4-4 L3; 60947.5.2 L3	
	Reverse polarity protection	Yes	
Agency listings	UL E164869 CCN NRKH	CSA CR 44087 Class 3211 03	CE

Options

Description		**Suffix**
Extended temperature range (cable type only)	Down to -40° C (-40° F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

Accessories

Description		**Catalog Number**
Plastic mounting nuts		**XSZE212**
Stainless steel mounting nuts		**XSZE312**
Stainless steel locknut washers		**XSZE912**
Steel mounting bracket, 90°		**9006PA12**
Plastic mounting bracket		**XSZB112**
Diecast zinc mounting bracket		**831612**
0.5 in. (12.7 mm) NPT conduit adapter, length 2 in. (50.8 mm)	Aluminum	**74281**

★ Refer to page 327 for target material correction coefficient Km.

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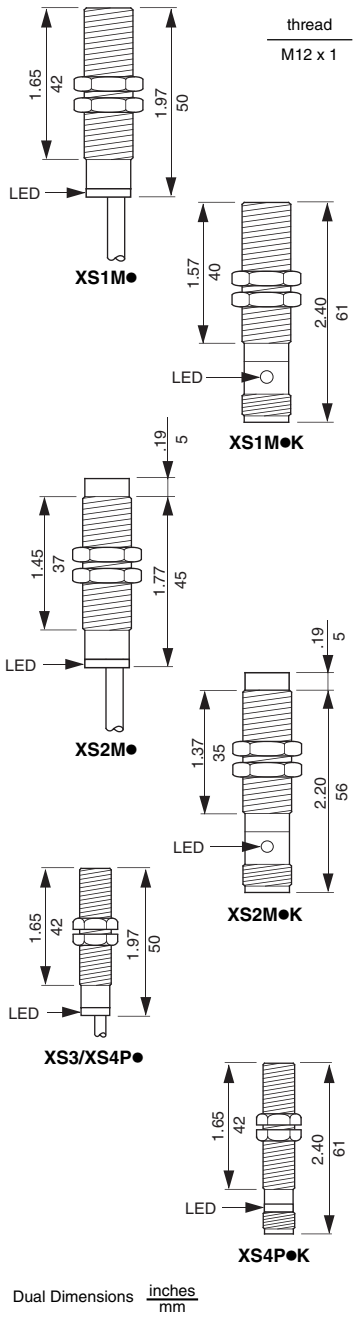
Proximity Sensors
XS Tubular, Inductive Sensors
12 mm Diameter, AC/DC; Universal Standard Length



Dual Dimensions inches / mm

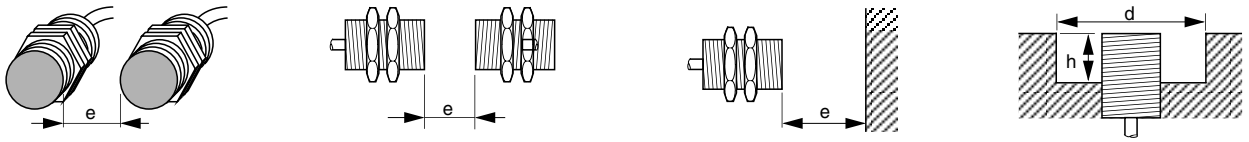
Features

- Faster troubleshooting aided by high-visibility, 360° indicators
- Rugged metal or plastic cases designed for aggressive environments—cutting oils, grease, etc.
- Worry free replacement: standard length, extended temperature and supply voltage range, improved enclosure ratings (IP68), AC/DC power supply
- Significant savings in replacement time using the patented plastic mounting bracket (no gauging) or connectors
- Metal locking nuts for metal or plastic mounting nuts for plastic housings included
- Normally closed (N.C.) output available on versions marked ★
- **UL Listed, CSA Certified, and CE Marked**

Nominal Sensing Distance	AC or AC/DC	Output Mode ★	Voltage Range AC	Voltage Range DC	Operating Frequency AC	Operating Frequency DC	SCP	Indicator LED (see page 219)	Mating Connector Style (see page 626)	Catalog Number
Nickel-plated brass case										
Shielded, 2 m (6.6 ft) cable										
2 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	4,000 Hz	no	A	—	**XS1M12MA230**
2 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	4,000 Hz	yes	A	—	**XS1M12MA250**
Shielded, micro-style connector AC										
2 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	4,000 Hz	no	B	17, 18	**XS1M12MA230K**
Non-shielded, 2 m (6.6 ft) cable										
4 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	3,000 Hz	no	A	—	**XS2M12MA230**
4 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	3,000 Hz	yes	A	—	**XS2M12MA250**
Non-shielded, micro-style connector AC										
4 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	3,000 Hz	no	B	17, 18	**XS2M12MA230K**
Plastic case										
Non-shielded, 2 m (6.6 ft) cable										
4 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	4,000 Hz	no	A	—	**XS4P12MA230**
Non-shielded, micro-style connector										
4 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	3,000 Hz	no	A	17, 18	**XS4P12MA230K**

★ To order a normally closed (N.C.) version, change the **A** to **B**. Example: XS1M12P**A**260 to XS1M12P**B**260.

Minimum Mounting Clearances, mm (in.)



	Side by side	Face to face	Facing a metal object	Mounting in a metal support
XS1 Shielded	e: 4 (0.16)	e: 24 (0.94)	e: 6 (0.24)	D: 12 (0.47); H: 0
XS2/XS4 Non-shielded	e: 16 (0.63)	e: 48 (1.89)	e: 12 (0.47)	D: 36 (1.42); H: 8 (0.31)

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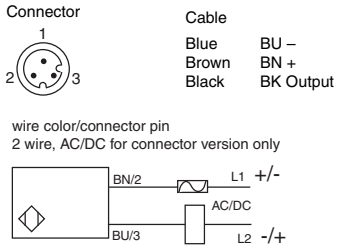
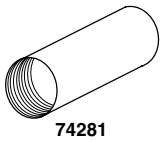
Proximity Sensors
XS Tubular, Inductive Sensors
12 mm Diameter, AC/DC; Universal Standard Length

Wiring



Specifications

Mechanical			
Usable sensing range★	Shielded		0 to 1.6 mm
	Non-shielded		0 to 3.2 mm
Standard temperature range			-25 to +80 °C (-13 to +176 °F)
Enclosure rating—cable (for connector, see page 626)	NEMA Type		3, 4X, 6P, 12, 13
	IEC		IP68
Enclosure material	Nickel-plated brass	Case	Nickel-plated brass
		Sensing face	PBT
	Plastic case		PBT
Tightening torque (maximum)	Nickel-plated brass		15 N•m (11 lb-ft)
	Plastic		2 N•m (1.5 lb-ft)
Vibration resistance	(IEC 60068.2.6)		25 G, ±2 mm amplitude, 10–55 Hz
Shock resistance	(IEC 60068.2.27)		50 G, 11 ms duration
Standard target size (steel)			12 x 12 mm (0.47 x 0.47 in.)
Differential (% of Sr)			15%
Repeatability (% of Sr)			3%
LED indicator type	A		360° ring LED shows output status
	B		One LED visible from 4 quadrants shows output status
Cable	2-wire		22 AWG (0.34 mm^2), PvR
Electrical			
Voltage range			24 to 240 Vac (50/60 Hz), 24 to 210 Vdc
Voltage limit (including ripple)			20 to 264 Vac/Vdc
Maximum voltage drop (across switch), closed state			5.5 V
Inrush current (inductive @ 20 ms)			2 A
Minimum load current			5 mA
Maximum load current			200 mA 20 ≤ Vdc ≤ 58 IEC 60947-5-2 Utilization category DC-13 Vdc > 58 IEC 60947-5-2 Utilization category DC-12
Residual (leakage) current, open state			0.6 mA
On delay (maximum)			0.2 ms
Off delay (maximum)			0.2 ms
Power-up delay (maximum)	Without SCP		40 ms
	With SCP		70 ms
Protective circuitry	Short circuit protection		Optional▲
	Overload		Yes
	Radio frequency immunity (RFI)		IEC 61000-4-3 Level 3
	Electrostatic; transients; impulse (L—level number)		IEC 61000-4-2 L4; IEC 61000-4-4 L4; 60947.5.2 L3
Agency listings	E164869 CCN NRKH	CR 44087 Class 3211 03	CE



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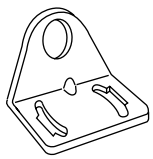

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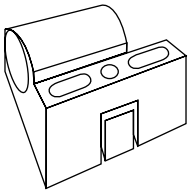
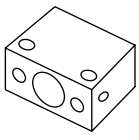


XSZB1●●



8316●●

Options

Description		Suffix
Extended temperature range (cable type only)	Down to -40° C (-40° F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

Accessories

Description		Catalog Number
Plastic mounting nuts		**XSZE212**
Metal mounting nuts and lockwashers		**XSZE112**
Steel mounting bracket, 90°		**9006PA12**
Plastic mounting bracket		**XSZB112**
Diecast zinc mounting bracket		**831612**
0.5 in. (12.7 mm) NPT conduit adapter, length 2 in. (50.8 mm)	Aluminum	**74281**

Connector Cables (U20 or K suffix)

XSZCK101Y	Micro-style, 3-pin, 2 m, straight
XSZCK111Y	Micro-style, 3-pin, 2 m, 90°

Additional cable options and lengths. . . . page 626
Accessories . . . . . page 284, 280

★ Refer to page 327 for target material correction coefficient Km.

▲ For devices without SCP, see page 284 for protective fuses.

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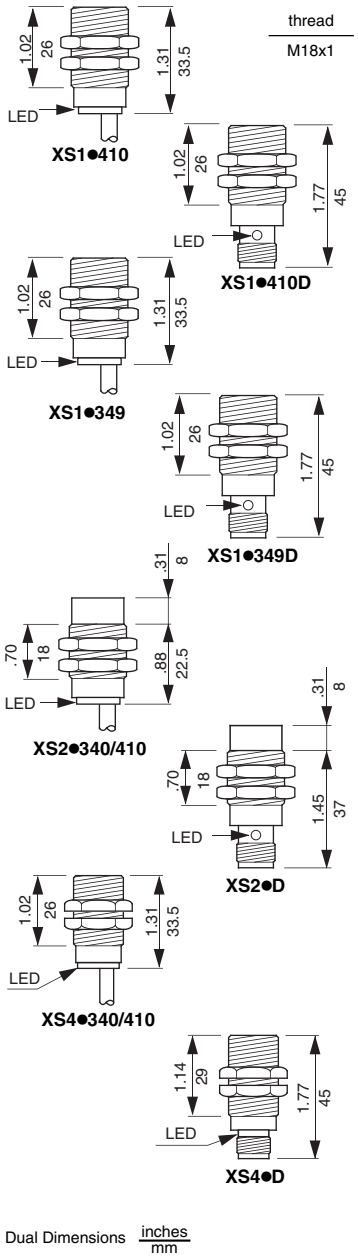
Proximity Sensors
XS Tubular, Inductive Sensors
18 mm Diameter, DC; Economy Short Length



Dual Dimensions inches / mm

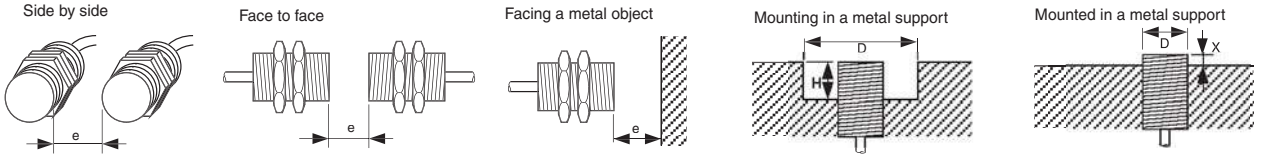
Features

- 360° LED indicators
- Extended range models
- Complementary N.O. + N.C. models
- Rugged metal or plastic cases
- Patented plastic mounting bracket
- Connector options
- Extensive protective circuitry
- Works with an unregulated DC supply powered by a 24 V secondary transformer
- Metal locknuts or plastic mounting nuts included
- Normally closed (N.C.) output available on versions marked ★
- UL Listed, CSA Certified, and CE Marked

Nominal Sensing Distance	Circuit Type	Voltage Range	Output Mode	Operating Frequency	Indicator LED (see page 221)	Mating Connector Style (see page 626)	Catalog Number
Nickel-plated brass case							
Shielded, 2 m (6.6 ft) cable							
5 mm	PNP	10–38 V	N.O. + N.C.	2,000 Hz	A	—	**XS1N18PC410**
5 mm	NPN	10–38 V	N.O. + N.C.	2,000 Hz	A	—	**XS1N18NC410**
Shielded, micro-style connector DC							
5 mm	PNP	10–38 V	N.O. + N.C.	2,000 Hz	B	11, 12, 13, 15, 16	**XS1N18PC410D**
5 mm	NPN	10–38 V	N.O. + N.C.	2,000 Hz	B	11, 12, 14, 15, 16	**XS1N18NC410D**
Shielded◆, Extended Range, 2 m (6.6 ft) cable							
10 mm	PNP	10–38 V	N.O. ★	1,000 Hz	A	—	**XS1N18PA349**
10 mm	NPN	10–38 V	N.O. ★	1,000 Hz	A	—	**XS1N18NA349**
Shielded◆, Extended Range, micro-style connector							
10 mm	PNP	10–38 V	N.O. ★	1,000 Hz	B	11, 12, 13, 15, 16	**XS1N18PA349D**
10 mm	NPN	10–38 V	N.O. ★	1,000 Hz	B	11, 12, 14, 15, 16	**XS1N18NA349D**
Non-shielded, 2 m (6.6 ft) cable							
8 mm	PNP	10–38 V	N.O. + N.C.	2,000 Hz	A	—	**XS2N18PC410**
8 mm	NPN	10–38 V	N.O. + N.C.	2,000 Hz	A	—	**XS2N18NC410**
Non-shielded, micro-style connector							
8 mm	PNP	10–38 V	N.O. + N.C.	2,000 Hz	B	11, 12, 13, 15, 16	**XS2N18PC410D**
8 mm	NPN	10–38 V	N.O. + N.C.	2,000 Hz	B	11, 12, 14, 15, 16	**XS2N18NC410D**
Plastic case							
Non-shielded, 2 m (6.6 ft) cable							
8 mm	PNP	10–38 V	N.O. ★	2,000 Hz	A	—	**XS4P18PA340**
8 mm	NPN	10–38 V	N.O. ★	2,000 Hz	A	—	**XS4P18NA340**
8 mm	PNP	10–38 V	N.O. + N.C.	2,000 Hz	A	—	**XS4P18PC410**
8 mm	NPN	10–38 V	N.O. + N.C.	2,000 Hz	A	—	**XS4P18NC410**
Non-shielded, micro-style connector							
8 mm	PNP	10–38 V	N.O. ★	2,000 Hz	A	11, 12, 13, 15, 16	**XS4P18PA340D**
8 mm	NPN	10–38 V	N.O. ★	2,000 Hz	A	11, 12, 14, 15, 16	**XS4P18NA340D**
8 mm	PNP	10–38 V	N.O. + N.C.	2,000 Hz	A	11, 12, 13, 15, 16	**XS4P18PC410D**
8 mm	NPN	10–38 V	N.O. + N.C.	2,000 Hz	A	11, 12, 14, 15, 16	**XS4P18NC410D**

★ To order a normally closed (N.C.) version, change the **A** to **B**. Example: XS1N18P**A**349 to XS1N18P**B**349.
◆ See dimension X below.

Minimum Mounting Clearances, mm (in.)



	Side by side	Face to face	Facing a metal object	Mounting in a metal support	Mounted in a metal support
XS1 Shielded	e: 10 (0.39)	e: 60 (2.36)	e: 15 (0.59)	D: 18 (0.71); H: 0	D: 18 (0.71)
XS1 Extended range	e: 20 (0.79)	e: 96 (3.78)	e: 24 (0.94)		D: 18 (0.71); X: 3.6 (0.14)
XS2/XS4 Non-shielded	e: 16 (0.63)	e: 96 (3.78)	e: 24 (0.94)	D: 54 (2.13); H: 16 (0.63)	

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Proximity Sensors
XS Tubular, Inductive Sensors
18 mm Diameter, DC; Economy Short Length

Wiring

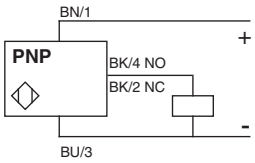
Connector

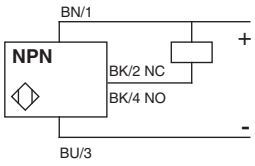


Cable

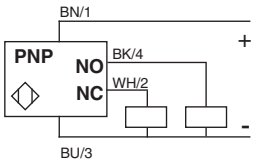
Blue	BU –
Brown	BN +
Black	BK Output

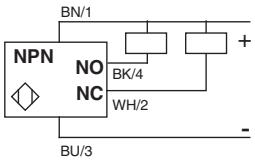
Wire color/connector pin
3 wire NO or NC

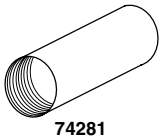




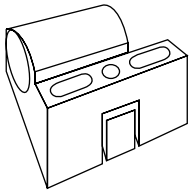
4 wire NO + NC







74281



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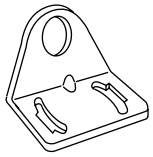

9006PA●●

Connector Cables (M12 or D suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths. . . . page 626
Accessories . . . . . page 284, 280

Specifications

Mechanical			
Usable sensing range★	Shielded	Standard sensing range	0 to 4 mm
		Extended sensing range	0 to 8 mm
	Non-shielded		0 to 6.4 mm
Temperature range	Standard sensing range	Nickel-plated brass	-25 to +70 °C (-13 to +158 °F)
		Plastic	-25 to +80 °C (-13 to +176 °F)
	Extended sensing range		-25 to +50 °C (-13 to +122 °F)
Enclosure rating—cable for connector, see page 626	Nickel-plated brass	NEMA Type	3, 4X, 6P, 12, 13
		IEC	IP67
	Plastic	NEMA Type	3, 4X, 6P, 12, 13
		IEC	IP68
Enclosure material	Nickel-plated brass	Case	Nickel-plated brass
		Sensing face	PBT
	Plastic	Case	PBT
		Sensing face	PBT
Tightening torque (maximum)	Nickel-plated brass		15 N•m (11 lb-ft)
	Plastic		5 N•m (3.7 lb-ft)
Vibration resistance	(IEC 60068.2.6)		25 G, ±2 mm amplitude, 10–55 Hz
Shock resistance	(IEC 60068.2.27)		50 G, 11 ms duration
Standard target size (steel)	Shielded	Standard sensing range	18 x 18 mm (0.71 x 0.71 in.)
		Extended sensing range	30 x 30 mm (1.18 x 1.18 in.)
	Non-shielded		24 x 24 mm (0.94 x 0.94 in.)
Differential (% of Sr)			15%
Repeatability (% of Sr)			3%
LED indicator type	A		360° ring LED shows output status
	B		One LED visible from 4 quadrants shows output status
Cable	3- or 4-wire		22 AWG (0.34 mm^2), PvR
Electrical			
Voltage range—nominal			12–24 Vdc
Voltage limit (including ripple)			10–38 Vdc
Voltage drop (across switch), closed state			2 V
Maximum load current			200 mA
Current consumption (no load)			10 mA
On delay (maximum)			0.15 ms
Off delay (maximum)			0.35 ms
Power-up delay (maximum)			5 ms
Protective circuitry	Short circuit protection		Yes
	Overload		Yes
	Radio frequency immunity (RFI)		IEC 61000-4-3 Level 3
	Electrostatic; transients; impulse		IEC 61000-4-2 L2; IEC 61000-4-4 L3; 60947.5.2 L3 Extended sensing range: IEC 61000-4-4 L3
	Reverse polarity protection		Yes
Agency listings	UL E 164869 CCN NRKH	CSA CR 44087 Class 3211 03	CE

Options

Description		Suffix
Extended temperature range (cable type and standard sensing distance only)	Down to -40° C (-40° F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

Accessories

Description		Catalog Number
Plastic mounting nuts		**XSZE218**
Metal mounting nuts and lockwasher		**XSZE118**
Steel mounting bracket, 90°		**9006PA18**
Plastic mounting bracket, long length		**XSZB118**
0.5 in. (12.7 mm) NPT conduit adapter, length 2 in. (50.8 mm)	Aluminum	**7428**
	Stainless	**74282**

★ Refer to page 327 for target material correction coefficient Km.

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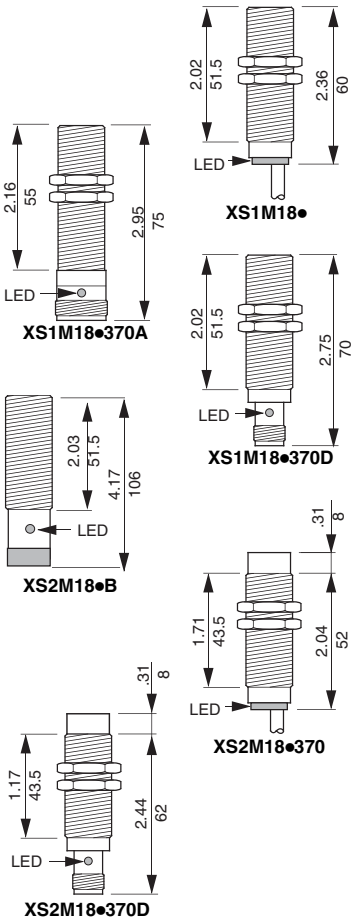
Proximity Sensors
XS Tubular, Inductive Sensors
18 mm Diameter, DC; Universal Standard Length



Dual Dimensions $\frac{\text{inches}}{\text{mm}}$ $\frac{\text{thread}}{\text{M18x1}}$

Features

- Faster troubleshooting aided by high-visibility, 360° indicators
- Rugged case designed for aggressive industrial environments
- Worry free replacement: standard length, extended temperature and supply voltage range, improved enclosure ratings (IP68), 3-wire complementary PNP + NPN with selectable N.O./N.C. output circuit
- Significant savings in replacement time using the patented plastic mounting bracket (no gauging) or connectors
- Trouble free operation ensured by extensive protective circuitry
- Works with unfiltered rectified power supply
- Pigtail connector version (0.8 m / 2.6 ft cable) provides cutting oil ratings (IP68) and connection for aggressive environments. Screw terminals models for wiring special cables.
- Metal mounting locknuts included
- Normally closed (N.C.) output available on versions marked ★
- UL Listed, CSA Certified, and CE Marked

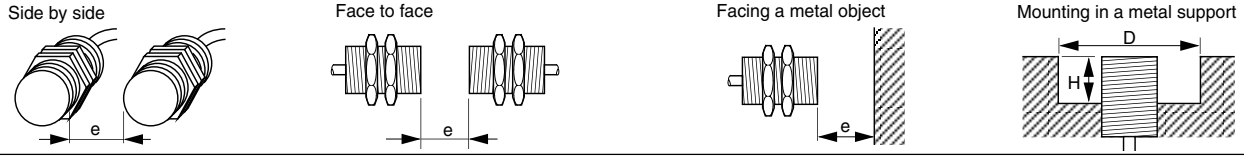
Nickel-plated brass case

Nominal Sensing Distance	Circuit Type	Voltage Range	Output Mode	Maximum Load	Operating Frequency	Indicator LED ①	Mating Connector Style (see page 626)	Catalog Number
Shielded, 2 m (6.6 ft) cable								
5 mm	PNP	12–48 V	N.O. ★	200 mA	2,000 Hz	A	—	**XS1M18PA370**
5 mm	NPN	12–48 V	N.O. ★	200 mA	2,000 Hz	A	—	**XS1M18NA370**
5 mm	PNP + NPN	12–24 V	N.O./N.C.	200 mA	2,000 Hz	A	—	**XS1M18KP340**
Shielded, micro-style connector, DC								
5 mm	PNP	12–48 V	N.O. ★	200 mA	2,000 Hz	B	11, 12, 13, 15, 16	**XS1M18PA370D**
5 mm	NPN	12–48 V	N.O. ★	200 mA	2,000 Hz	B	11, 12, 14, 15, 16	**XS1M18NA370D**
5 mm	PNP + NPN	12–24 V	N.O./N.C.	200 mA	2,000 Hz	B	11, 12, 15, 16	**XS1M18KP340D**
Shielded, mini-style connector, 3-pin								
5 mm	PNP	12–48 V	N.O. ★	200 mA	2,000 Hz	B	21, 22	**XS1M18PA370A**
5 mm	NPN	12–48 V	N.O. ★	200 mA	2,000 Hz	B	21, 22	**XS1M18NA370A**
Shielded, screw terminal connection								
5 mm	PNP	12–48 V	N.O. ★	200 mA	2,000 Hz	B	—	**XS1M18PA370B**
5 mm	NPN	12–48 V	N.O. ★	200 mA	2,000 Hz	B	—	**XS1M18NA370B**
Non-shielded, 2 m (6.6 ft) cable								
8 mm	PNP	12–48 V	N.O. ★	200 mA	2,000 Hz	A	—	**XS2M18PA370**
8 mm	NPN	12–48 V	N.O. ★	200 mA	2,000 Hz	A	—	**XS2M18NA370**
8 mm	PNP + NPN	12–24 V	N.O./N.C.	200 mA	2,000 Hz	A	—	**XS2M18KP340**
Non-shielded, micro-style connector								
8 mm	PNP	12–48 V	N.O. ★	200 mA	2,000 Hz	B	11, 12, 13, 15, 16	**XS2M18PA370D**
8 mm	NPN	12–48 V	N.O. ★	200 mA	2,000 Hz	B	11, 12, 14, 15, 16	**XS2M18NA370D**
8 mm	PNP + NPN	12–24 V	N.O./N.C.	200 mA	2,000 Hz	B	11, 12, 15, 16	**XS2M18KP340D**

★ To order a normally closed (N.C.) version, change the **A** to **B**. Example: XS1M18P**A**370 to XS1M18P**B**370.

① See page 223 under specifications for LED function.

Minimum Mounting Clearances, mm (in.)



	Side by side	Face to face	Facing a metal object	Mounting in a metal support
XS1 Shielded	e: 10 (0.39)	e: 60 (2.36)	e: 15 (0.59)	D: 18 (0.71); H: 0
XS2 Non-shielded	e: 16 (0.63)	e: 96 (3.78)	e: 24 (0.94)	D: 54 (2.13); H: 8 (0.31)

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Proximity Sensors
XS Tubular, Inductive Sensors
18 mm Diameter, DC; Universal Standard Length

Wiring

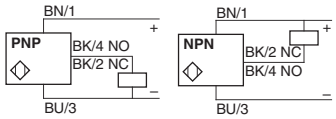
Connector



Cable

Blue	BU –
Brown	BN +
Black	BK Output

Wire color/connector pin
3 wire NO or NC



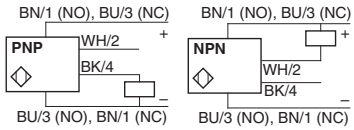
Connector

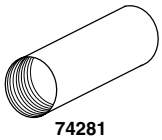


Cable

Blue	BU –
Brown	BN +
Black	BK Output

4 wire, programmable, NO or NC output





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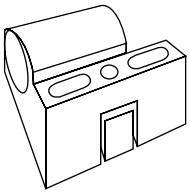
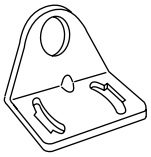


XSZB1●●



9006PA●●

Connector Cables
(M12 or D suffix; U78 or A suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°
XSZCA101Y	Micro-style, 3-pin, 2 m, straight
XSZCA111Y	Micro-style, 3-pin, 2 m, 90°

Additional cable options and lengths . . . page 626
Accessories . . . . . page 284, 280

Specifications

Mechanical			
Usable sensing range ★	Shielded	0 to 4 mm	
	Non-shielded	0 to 6.4 mm	
Standard temperature range		-25 to +80 °C (-13 to +176 °F)	
Enclosure rating—cable	NEMA Type	3, 4X, 6P, 12, 13	
(for connector, see page 626)	IEC	IP68—cutting oil proof; IP67 for B screw terminal	
Enclosure material	Nickel-plated brass	Case: Nickel-plated brass	
		Sensing face: PBT	
Tightening torque (maximum)	Nickel-plated brass	35 N•m (26 lb-ft)	
Vibration resistance	(IEC 60068.2.6)	25 G, ±2 mm amplitude, 10–55 Hz	
Shock resistance	(IEC 60068.2.27)	50 G, 11 ms duration	
Standard target size (steel)	Shielded	18 x 18 mm (0.71 x 0.71 in.)	
	Non-shielded	24 x 24 mm (0.94 x 0.94 in.)	
Differential (% of Sr)		15%	
Repeatability (% of Sr)		3%	
LED indicator type	A	360° ring LED shows output status	
	B	One LED visible from 4 quadrants shows output status	
Cable	3-wire	22 AWG (0.34 mm^2), PvR	

Electrical		**Standard**	**KP Models**
Voltage range—nominal		12–48 Vdc	12–24 Vdc
Voltage limit (including ripple)		10–58 Vdc	10–38 Vdc
Voltage drop (across switch), closed state	3-wire	2 V	2.6 V
Maximum load current	3-wire	200 mA	
Current consumption (no load)	3-wire	10 mA	
On delay (maximum)	3-wire	0.15 ms	
Off delay (maximum)	3-wire	0.35 ms	
Power-up delay (maximum)		5 ms	
Protective circuitry	Short circuit protection	Yes	
	Overload	Yes	
	Radio frequency immunity (RFI)	IEC 61000-4-3 Level 3	
	Electrostatic; transients; impulse (L—indicates level number)	3-wire: IEC 61000-4-2 L2; IEC 61000-4-4 L3; 60947.5.2 L3	
	Reverse polarity protection	Yes	
Agency listings	UL E 164869 CCN NRKH	CSA CR 44087 Class 3211 03	CE

Options

Description		**Suffix**
Extended temperature range (cable type only)	Down to -40° C (-40° F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

Accessories

Description		**Catalog Number**
Plastic mounting nuts		**XSZE218**
Metal mounting nuts and lockwashers		**XSZE118**
Steel mounting bracket, 90°		**9006PA18**
Plastic mounting bracket		**XSZB118**
0.5 in. (12.7 mm) NPT conduit adapter, length 2 in. (50.8 mm)	Aluminum	**7428**
	Stainless	**74282**

★ Refer to page 327 for target material correction coefficient Km.

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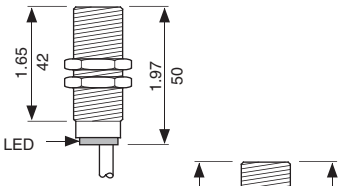
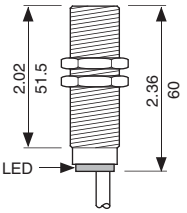
Proximity Sensors
XS Tubular, Inductive Sensors
18 mm Diameter, DC; Universal Standard Length, Non-Corrosive



XS1M18DA211



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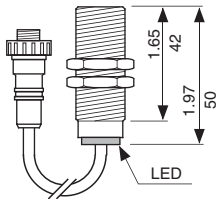

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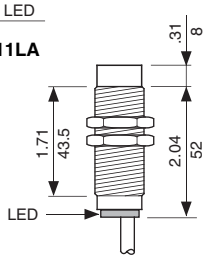

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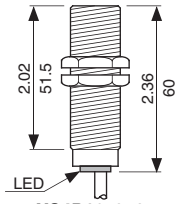
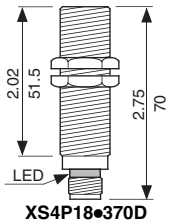


XS4P18•370



XS4P18•370D

Dual Dimensions inches / mm

thread M18x1

Features

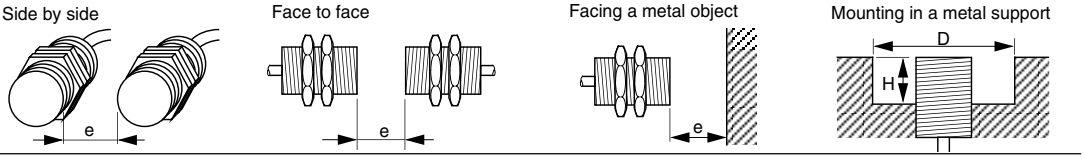
- Faster troubleshooting aided by high-visibility, 360° indicators
- 2-wire versions simplify wiring
- High-impact stainless steel and plastic cases for aggressive environments—cutting oils, grease, solvents, etc.
- Worry free replacement: standard length, extended temperature and supply voltage range, improved enclosure ratings (IP68)
- Pigtail connector version (0.8 m / 2.6 ft cable) provides cutting oil ratings (IP68) and connection for aggressive environments.
- Significant savings in replacement time using the patented plastic mounting bracket (no gauging) or connectors
- Trouble free operation ensured by extensive protective circuitry
- Works with unfiltered rectified power supply
- Stainless steel locknuts for metal or plastic mounting nuts for plastic housings included
- Normally closed (N.C.) output available on versions marked ★
- UL Listed, CSA Certified, and CE Marked

Nominal Sensing Distance	Circuit Type	Voltage Range	Output Mode	Maximum Load	Operating Frequency	Indicator LED ①	Mating Connector Style (see page 626)	Catalog Number
Stainless steel case								
Shielded, 2 m (6.6 ft) cable								
5 mm	2-wire	12–48 V	N.O. ★	1.5–100 mA	3,000 Hz	A	—	**XS1M18DA211**
5 mm	PNP	12–48 V	N.O.	200 mA	2,000 Hz	A	—	**XS1M18PA371**
5 mm	NPN	12–48 V	N.O.	200 mA	2,000 Hz	A	—	**XS1M18NA371**
Shielded, mini-style connector—0.8 m (2.6 ft) pigtail								
5 mm	2-wire	12–48 V	N.O. ★	1.5–100 mA	3,000 Hz	A	21, 22	**XS1M18DA211LA**
Non-shielded, 2 m (6.6 ft) cable								
8 mm	PNP	12–48 V	N.O.	200 mA	2,000 Hz	A	—	**XS2M18PA371**
8 mm	NPN	12–48 V	N.O.	200 mA	2,000 Hz	A	—	**XS2M18NA371**
Plastic case								
Non-shielded, 2 m (6.6 ft) cable								
8 mm	PNP	12–48 V	N.O. ★	200 mA	2,000 Hz	A	—	**XS4P18PA370**
8 mm	NPN	12–48 V	N.O. ★	200 mA	2,000 Hz	A	—	**XS4P18NA370**
8 mm	PNP + NPN	12–24 V	N.O./N.C.	200 mA	2,000 Hz	A	—	**XS4P18KP340**
Non-shielded, micro-style connector								
8 mm	PNP	12–48 V	N.O. ★	200 mA	2,000 Hz	A	11, 12, 13, 15, 16	**XS4P18PA370D**
8 mm	NPN	12–48 V	N.O. ★	200 mA	2,000 Hz	A	11, 12, 14, 15, 16	**XS4P18NA370D**
8 mm	PNP + NPN	12–24 V	N.O./N.C.	200 mA	2,000 Hz	A	11, 12, 15, 16	**XS4P18KP340D**
Non-shielded, screw terminal connector								
8 mm	PNP	12–48 V	N.O.	200 mA	2,000 Hz	A	—	**XS4P18PA370B**
8 mm	NPN	12–48 V	N.O.	200 mA	2,000 Hz	A	—	**XS4P18NA370B**

★ To order a normally closed (N.C.) version, change the **A** to **B**. Example: XS1M12P**A**371 to XS1M12P**B**371.

① See page 225 under specifications for LED function.

Minimum Mounting Clearances, mm (in.)



	Side by side	Face to face	Facing a metal object	Mounting in a metal support
XS1 Shielded	e: 10 (0.39)	e: 60 (2.36)	e: 15 (0.59)	D: 18 (0.71); H: 0
XS2/XS4 Non-shielded	e: 16 (0.63)	e: 96 (3.78)	e: 24 (0.94)	D: 54 (2.13); H: 8 (0.31)

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Proximity Sensors
XS Tubular, Inductive Sensors
18 mm Diameter, DC; Universal Standard Length, Non-Corrosive

Wiring

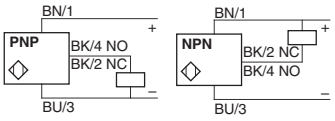
Connector



Cable

Blue	BU –
Brown	BN +
Black	BK Output

Wire color/connector pin
3 wire NO or NC



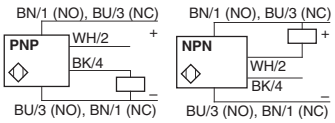
Connector



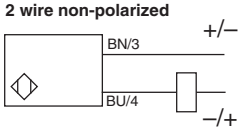
Cable

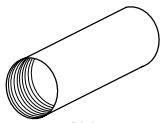
Blue	BU –
Brown	BN +
Black	BK Output

4 wire, programmable, NO or NC output



2 wire non-polarized





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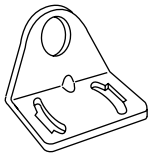

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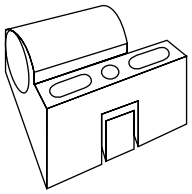

XSZB1●●

Connector Cables
(M12 or D suffix; U78 or A suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°
XSZCA101Y	Micro-style, 3-pin, 2 m, straight
XSZCA111Y	Micro-style, 3-pin, 2 m, 90°

Additional cable options and lengths . . . page 626
Accessories . . . . . page 284, 280

Specifications

Mechanical				
Usable sensing range★	Shielded		0 to 4 mm	
	Non-shielded		0 to 6.4 mm	
Standard temperature range			-25 to +80 °C (-13 to +176 °F)	
Enclosure rating—cable (for connector, see page 626)	NEMA Type		3, 4X, 6P, 12, 13	
	IEC		IP68	
Enclosure material	Stainless steel	Case	#303 stainless steel	
		Sensing face	PBT	
	Plastic		PBT	
Tightening torque (maximum)	Stainless steel		50 N•m (37 lb-ft)	
	Plastic		5 N•m (3.7 lb-ft)	
Vibration resistance	(IEC 60068.2.6)		25 G, ±2 mm amplitude, 10–55 Hz	
Shock resistance	(IEC 60068.2.27)		50 G, 11 ms duration	
Standard target size (steel)	Shielded		18 x 18 mm (0.71 x 0.71 in.)	
	Non-shielded		24 x 24 mm (0.94 x 0.94 in.)	
Differential (% of Sr)			15%	
Repeatability (% of Sr)			3%	
LED indicator type	A		360° ring LED shows output status	
Cable	2-wire		20 AWG (0.5 mm^2), PvR	
	3-wire		22 AWG (0.34 mm^2), PvR	
Electrical			**Standard**	**KP Models**
Voltage range			12–48 Vdc	12–24 Vdc
Voltage limit (including ripple)			10–58 Vdc	10–38 Vdc
Voltage drop (across switch), closed state	Nickel-plated brass or stainless	2-wire	4 V	—
		3-wire	2 V	—
		4-wire	—	2.6
	Plastic	3-wire	2 V	
Minimum load current	2-wire		1.5 mA	
Maximum load current	2-wire		100 mA	
	3-wire		200 mA	
Residual (leakage) current, open state	2-wire		0.6 mA	
On delay (maximum)			0.15 ms	
Off delay (maximum)			0.35 ms	
Power-up delay (maximum)			5 ms	
Protective circuitry	Short circuit protection		Yes	
	Overload		Yes	
	Radio frequency immunity (RFI)		IEC 61000-4-3 Level 3	
	Electrostatic; transients; impulse (L—indicates level number)		2-wire: IEC 61000-4-2 L3; IEC 61000-4-4 L3; 60947.5.2 L3	
			3-wire: IEC 6000-4-2 L2; IEC 61000-4-4 L3; 60947.5.2 L3	
	Reverse polarity protection		Yes	
Agency listings	UL E 164869 CCN NRKH	CSA CR 44087 Class 3211 03	CE	

Options

Description		**Suffix**
Extended temperature range (cable type only)	Down to -40° C (-40° F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

Accessories

Description		**Catalog Number**
Plastic mounting nuts		**XSZE218**
Stainless steel mounting nuts		**XSZE318**
Stainless steel locknut washers		**XSZE918**
Steel mounting bracket, 90°		**9006PA18**
Plastic mounting bracket		**XSZB118**
0.5 in. (12.7 mm) NPT conduit adapter, length 2 in. (50.8 mm)	Aluminum	**7428**
	Stainless	**74282**

★ Refer to page 327 for target material correction coefficient Km.

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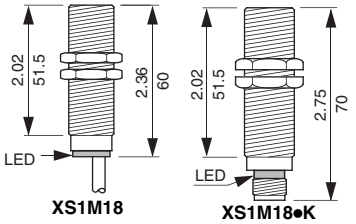
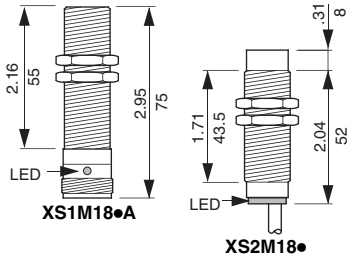
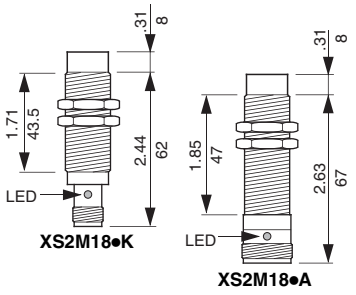
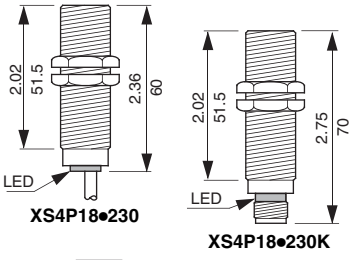
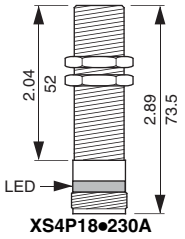
Proximity Sensors
XS Tubular, Inductive Sensors
18 mm Diameter, AC/DC; Universal Standard Length











Dual Dimensions $\frac{\text{inches}}{\text{mm}}$ $\frac{\text{thread}}{\text{M18x1}}$

Features

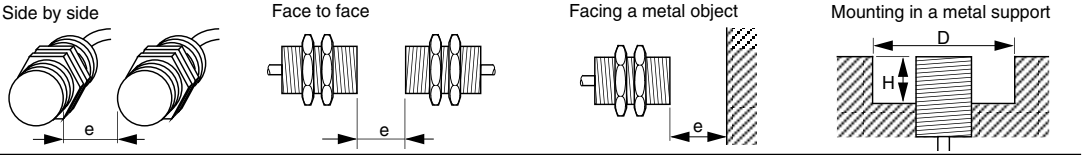
- 360° LED indicators
- Extended temperature range
- Extended supply voltage range
- IP68 AC/DC power supply
- Patented plastic mounting bracket
- Connector options
- Extensive protective circuitry
- Metal locknuts for metal or plastic mounting nuts for plastic housings included
- Normally closed (N.C.) output available on versions marked ★
- **UL Listed, CSA Certified, and CE Marked**

Nominal Sensing Distance	AC or AC/DC	Output Mode	Voltage Range AC	Voltage Range DC	Operating Frequencies AC	Operating Frequencies DC	SCP	Indicator LED ①	Mating Connector Style (see page 626)	Catalog Number
Nickel-plated brass case										
Shielded, 2 m (6.6 ft) cable										
5 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	3,000 Hz	no	A	—	**XS1M18MA230**
5 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	3,000 Hz	yes	C	—	**XS1M18MA250**
Shielded, micro-style connector AC										
5 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	3,000 Hz	no	B	17, 18	**XS1M18MA230K**
5 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	3,000 Hz	yes	B	17, 18	**XS1M18MA250K**
Shielded, mini-style connector										
5 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	3,000 Hz	no	B	23, 24	**XS1M18MA230A**
5 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	3,000 Hz	yes	C	23, 24	**XS1M18MA250A**
Shielded, screw terminal connection										
5 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	3,000 Hz	no	B	—	**XS1M18MA230B**
Non-shielded, 2 m (6.6 ft) cable										
8 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	2,000 Hz	no	A	—	**XS2M18MA230**
8 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	2,000 Hz	yes	C	—	**XS2M18MA250**
Non-shielded, micro-style connector AC										
8 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	2,000 Hz	no	B	17, 18	**XS2M18MA230K**
8 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	2,000 Hz	yes	B	23, 24	**XS2M18MA250K**
Non-shielded, mini-style connector										
8 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	2,000 Hz	no	B	22	**XS2M18MA230A**
8 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	2,000 Hz	yes	C	22	**XS2M18MA250A**
Plastic case										
Non-shielded, 2 m (6.6 ft) cable										
8 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	2,000 Hz	no	A	—	**XS4P18MA230**
Non-shielded, micro-style connector										
8 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	2,000 Hz	no	A	17, 18	**XS4P18MA230K**
Non-shielded, mini-style connector										
8 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	2,000 Hz	no	A	23, 24	**XS4P18MA230A**
Shielded, screw terminal connection										
8 mm	AC/DC	N.O. ★	24–240 V	24–210 V	25 Hz	2,000 Hz	no	B	—	**XS4P18MA230B**

★ To order a normally closed (N.C.) version, change the **A** to **B**. Example: XS1M12P**A**260 to XS1M12P**B**260.

① See page 227 under specifications for LED function.

Minimum Mounting Clearances, mm (in.)



	Side by side	Face to face	Facing a metal object	Mounting in a metal support
XS1 Shielded	e: 10 (0.39)	e: 60 (2.36)	e: 15 (0.59)	D: 18 (0.71); H: 0
XS2/XS4 Non-shielded	e: 16 (0.63)	e: 96 (3.78)	e: 24 (0.94)	D: 54 (2.13); H: 8 (0.31)

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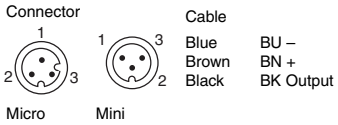
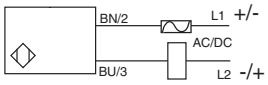
Wiring

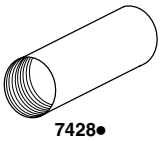


Wire color/connector pin
2 wire, AC/DC or AC



Specifications

Mechanical			
Usable sensing range★	Shielded		0 to 4 mm
	Non-shielded		0 to 6.4 mm
Standard temperature range			-25 to +80 °C (-13 to +176 °F)
Enclosure rating—cable (for connector, see page 626)	NEMA Type		4X, 6P, 12, 13
	IEC		IP68
Enclosure material	Nickel-plated brass	Case	Nickel-plated brass
		Sensing face	PBT
	Plastic		PBT
Tightening torque (maximum)	Nickel-plated brass		35 N•m (26 lb-ft)
	Plastic		5 N•m (3.7 lb-ft)
Vibration resistance	(IEC 60068.2.6)		25 G, ±2 mm amplitude, 10–55 Hz
Shock resistance	(IEC 60068.2.27)		50 G, 11 ms duration
Standard target size (steel)	Shielded		18 x 18 mm (0.71 x 0.71 in.)
	Non-shielded		24 x 24 mm (0.94 x 0.94 in.)
Differential (% of Sr)			15%
Repeatability (% of Sr)			3%
LED indicator type	A		360° ring LED shows output status
	B		One LED visible from 4 quadrants shows output status
	C		2 LED indicators: red shows output status; green shows normal operation (SCP only)
Cable	2-wire		20 AWG (0.5 mm^2), PvR
	3-wire		22 AWG (0.34 mm^2), PvR
Electrical			
Voltage range			24 to 240 Vac, 24–210 Vdc
Voltage limit (including ripple)			20 to 264 Vac/Vdc
Voltage drop (across switch), closed state (maximum)			5.5 V
Inrush current			2 A
Minimum load current			5 mA
Maximum load current			200 mA 20 ≤ Vdc ≤ 58 IEC 60947-5-2 Utilization category DC-13 Vdc > 58 IEC 60947-5-2 Utilization category DC-12
Residual (leakage) current, open state	without SCP		0.6 mA
	with SCP		1.5 mA
On delay (maximum)	without SCP		0.2 ms
	with SCP		2 ms
Off delay (maximum)	without SCP		0.2 ms
	with SCP		4 ms
Power-up delay (maximum)	without SCP		40 ms
	with SCP		70 ms
Protective circuitry	Short circuit protection		Optional▲
	Radio frequency immunity (RFI)		IEC 61000-4-3 Level 3
	Electrostatic; transients; impulse		IEC 61000-4-2 L4; IEC 61000-4-4 L4; 60947.5.2 L3
Agency listings	E 164869 CCN NRKH	CR 44087 Class 3211 03	CE



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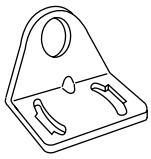

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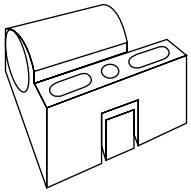

XSZB1●●

Options

Description		Suffix
Extended temperature range (cable type only)	Down to -40° C (-40° F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

Accessories

Description		Catalog Number
Plastic mounting nuts		**XSZE218**
Metal mounting nuts and lockwashers		**XSZE118**
Steel mounting bracket, 90°		**9006PA18**
Plastic mounting bracket		**XSZB118**
0.5 in. (12.7 mm) NPT conduit adapter, length 2 in. (50.8 mm)	Aluminum	**7428**
	Stainless	**74282**

Connector Cables
(U20 or K suffix; U78 or A suffix)

XSZCK101Y	Micro-style, 3-pin, 2 m, straight
XSZCK111Y	Micro-style, 3-pin, 2 m, 90°
XSZCA101Y	Micro-style, 3-pin, 2 m, straight
XSZCA111Y	Micro-style, 3-pin, 2 m, 90°

Additional cable options and lengths. . . . page 626
Accessories . . . . . page 284, 280

★ Refer to page 327 for target material correction coefficient Km.
▲ For devices without SCP, see page 284 for protective fuses.

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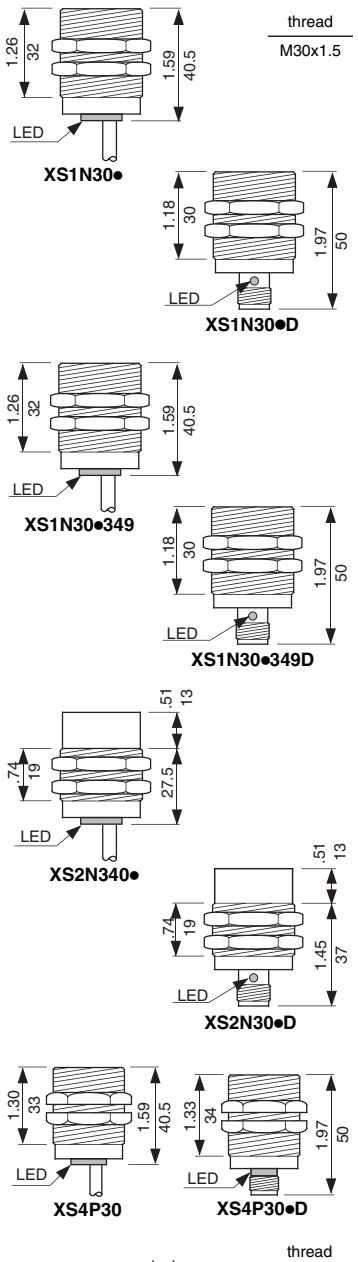
Proximity Sensors
XS Tubular, Inductive Sensors
30 mm Diameter, DC; Economy Short Length



Features

- 360° LED indicators
- Extended range models
- Complementary N.O. + N.C. models
- Rugged metal or plastic cases
- Patented plastic mounting bracket
- Connector options
- Extensive protective circuitry
- Works with an unregulated DC supply powered by a 24 V secondary transformer
- Metal locknuts for metal or plastic mounting nuts for plastic housing included
- Normally closed (N.C.) output available on versions mode marked ★
- UL Listed, CSA Certified, and CE Marked

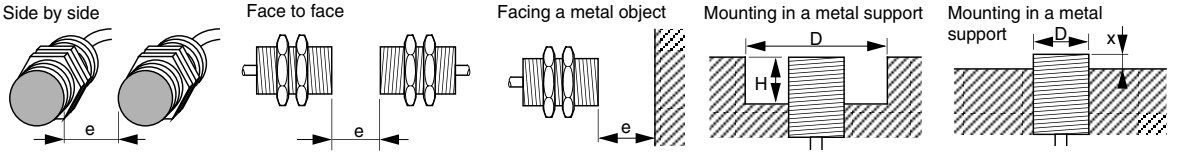
Nominal Sensing Distance	Circuit Type	Voltage Range	Output Mode	Operating Frequency	Indicator LED ①	Mating Connector Style (see page 626)	Catalog Number
Nickel-plated brass case							
Shielded, 2 m (6.6 ft) cable							
10 mm	PNP	12–24 V	N.O. + N.C.	1,000 Hz	A	—	**XS1N30PC410**
10 mm	NPN	12–24 V	N.O. + N.C.	1,000 Hz	A	—	**XS1N30NC410**
Shielded◆, micro-style connector							
10 mm	PNP	12–24 V	N.O. + N.C.	1,000 Hz	B	11, 12, 13, 15, 16	**XS1N30PC410D**
10 mm	NPN	12–24 V	N.O. + N.C.	1,000 Hz	B	11, 12, 14, 15, 16	**XS1N30NC410D**
Shielded◆, Extended Range, 2 m (6.6 ft) cable							
20 mm	PNP	12–24 V	N.O.★	500 Hz	A	—	**XS1N30PA349**
20 mm	NPN	12–24 V	N.O.★	500 Hz	A	—	**XS1N30NA349**
Shielded, Extended Range, micro-style connector							
20 mm	PNP	12–24 V	N.O.★	500 Hz	B	11, 12, 13, 15, 16	**XS1N30PA349D**
20 mm	NPN	12–24 V	N.O.★	500 Hz	B	11, 12, 14, 15, 16	**XS1N30NA349D**
Non-shielded, 2 m (6.6 ft) cable							
15 mm	PNP	12–24 V	N.O. + N.C.	1,000 Hz	A	—	**XS2N30PC410**
15 mm	NPN	12–24 V	N.O. + N.C.	1,000 Hz	A	—	**XS2N30NC410**
Non-shielded, micro-style connector							
15 mm	PNP	12–24 V	N.O. + N.C.	1,000 Hz	B	11, 12, 13, 15, 16	**XS2N30PC410D**
15 mm	NPN	12–24 V	N.O. + N.C.	1,000 Hz	B	11, 12, 14, 15, 16	**XS2N30NC410D**
Plastic case							
Non-shielded, 2 m (6.6 ft) cable							
15 mm	PNP	12–24 V	N.O.	1,000 Hz	A	—	**XS4P30PA340**
15 mm	NPN	12–24 V	N.O.	1,000 Hz	A	—	**XS4P30NA340**
15 mm	PNP	12–24 V	N.O. + N.C.	1,000 Hz	A	—	**XS4P30PC410**
15 mm	NPN	12–24 V	N.O. + N.C.	1,000 Hz	A	—	**XS4P30NC410**
Non-shielded, micro-style connector							
15 mm	PNP	12–24 V	N.O.	1,000 Hz	A	11, 12, 13, 15, 16	**XS4P30PA340D**
15 mm	NPN	12–24 V	N.O.	1,000 Hz	A	11, 12, 14, 15, 16	**XS4P30NA340D**
15 mm	PNP	12–24 V	N.O. + N.C.	1,000 Hz	A	11, 12, 13, 15, 16	**XS4P30PC410D**
15 mm	NPN	12–24 V	N.O. + N.C.	1,000 Hz	A	11, 12, 14, 15, 16	**XS4P30NC410D**

★ To order a normally closed (N.C.) version, change the **A** to **B**. Example: XS1N30P**A**349 to XS1N30P**B**349.

① See next page under specifications for LED function.

◆ See dimension X below.

Minimum Mounting Clearances, mm (in.)



	Side by side	Face to face	Facing a metal object	Mounting in a metal support	Mounting in a metal support
XS1 Shielded	e: 20 (0.79)	e: 120 (4.72)	e: 30 (1.18)	D: 30 (1.18); H: 0	x: 0
XS1 Extended range	e: 40 (1.57)	e: 240 (9.45)	e: 60 (2.36)	—	x: 6 (0.24)
XS2/XS4 Non-shielded	e: 60 (2.36)	e: 180 (7.09)	e: 45 (1.77)	D: 90 (3.54); H: 30 (1.18)	—

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Proximity Sensors
XS Tubular, Inductive Sensors
30 mm Diameter, DC; Economy Short Length

Wiring

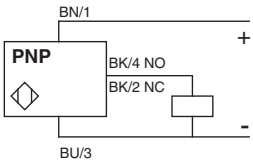
Connector

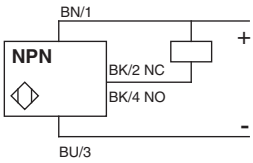


Cable

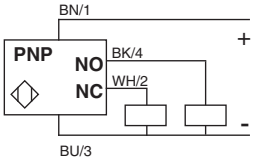
Blue	BU –
Brown	BN +
Black	BK Output

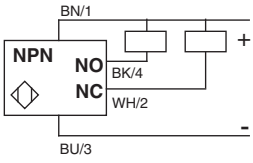
Wire color/connector pin
3 wire NO or NC

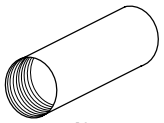




4 wire NO + NC







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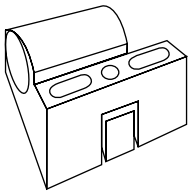
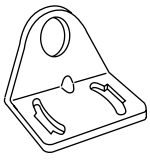


XSZB1●●



9006PA●●

Connector Cables (M12 or D suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths. . . .page 626
Accessories . . . . . .page 284, 280

Specifications

Mechanical			
Usable sensing range★	Shielded	Standard sensing range	0 to 8 mm
		Extended sensing range	0 to 16 mm
	Non-shielded		0 to 12 mm
Temperature range	Standard sensing range	Nickel-plated brass	-25 to +70 °C (-13 to +158 °F)
		Plastic	-25 to +80 °C (-13 to +176 °F)
	Extended sensing range		-25 to 50 °C (-13 to +122 °F)
Enclosure rating—cable (for connector, see page 626)	Nickel-plated brass	NEMA Type	3, 4X, 6P, 12, 13
		IEC	IP67
	Plastic	NEMA Type	3, 4X, 6P, 12, 13
		IEC	IP68
Enclosure material	Nickel-plated brass	Case	Nickel-plated brass
		Sensing face	PBT
	Plastic	Case	PBT
		Sensing face	PBT
Tightening torque (maximum)	Nickel-plated brass		40 N•m (29.5 lb-ft)
	Plastic		20 N•m (15 lb-ft)
Vibration resistance	(IEC 60068.2.6)		25 G, ±2 mm amplitude, 10–55 Hz
Shock resistance	(IEC 60068.2.27)		50 G, 11 ms duration
Standard target size (steel)	Shielded	Standard sensing range	30 x 30 mm (1.18 x 1.18 in.)
		Extended sensing range	48 x 48 mm (1.88 x 1.88 in.)
	Non-shielded		36 x 36 mm (1.41 x 1.41 in.)
Differential (% of Sr)			15%
Repeatability (% of Sr)			3%
LED indicator type	A		360° ring LED shows output status
	B		One LED visible from 4 quadrants shows output status
Cable	3 or 4-wire		22 AWG (0.34 mm^2), PvR
Electrical			
Voltage range			12–24 Vdc
Voltage limit (including ripple)			10–38 Vdc
Voltage drop (across switch), closed state			2 V
Maximum load current			200 mA
Current consumption (no load)			10 mA
On delay (maximum)	Shielded	Standard sensing range	0.3 ms
		Extended sensing range	0.6 ms
	Non-shielded		0.3 ms
Off delay (maximum)	Shielded	Standard sensing range	0.7 ms
		Extended sensing range	1.4 ms
	Non-shielded		0.7 ms
Power-up delay			5 ms
Protective circuitry	Short circuit protection		Yes
	Overload		Yes
	Radio frequency immunity (RFI)		IEC 61000-4-3 Level 3
	Electrostatic; transients; impulse (L—indicates level number)		3-wire: IEC 61000-4-2 L3; IEC 61000-4-4L3; 60947.5.2 L3 Extended sensing range: IEC 61000-4-4 L3
	Reverse polarity protection		Yes
Agency listings	UL E 164869 CCN NRKH	CSA CR 44087 Class 3211 03	CE

Options

Description		Suffix
Extended temperature range (cable type and standard sensing distance only)	Down to -40° C (-40° F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

Accessories

Description		Catalog Number
Plastic mounting nuts		**XSZE230**
Metal mounting nuts and locknuts		**XSZE130**
Steel mounting bracket, 90°		**9006PA30**
Plastic mounting bracket, long length		**XSZB130**
0.5 in. (12.7 mm) NPT conduit adapter, length 2 in. (50.8 mm)	Aluminum	**7427**

★ Refer to page 327 for target material correction coefficient Km.

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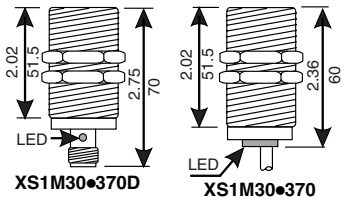
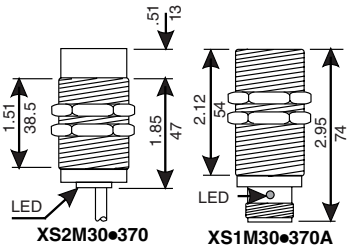
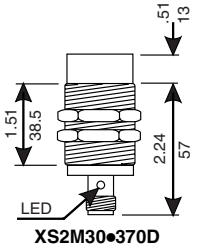
Proximity Sensors
XS Tubular, Inductive Sensors
30 mm Diameter, DC; Universal Standard Length





thread
M30x1.5



thread
M30x1.5

Dual Dimensions inches / mm

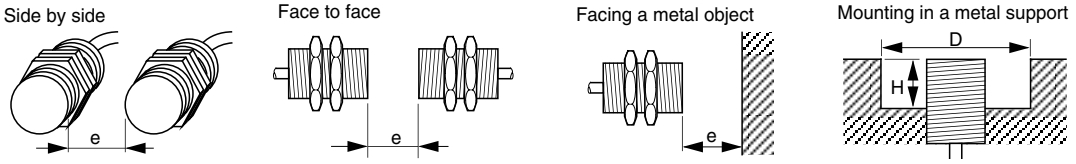
Features

- Faster troubleshooting aided by high-visibility, 360° indicators
- Rugged case designed for aggressive industrial environments
- Worry free replacement: standard length, extended temperature and supply voltage range, improved enclosure ratings (IP68), 3-wire complementary PNP + NPN with selectable N.O./N.C. output circuit
- Pigtail connector version (0.8 m / 2.6 ft cable) provides cutting oil ratings (IP68) and connection for aggressive environments.
- Significant savings in replacement time using the patented plastic mounting bracket (no gauging) or connectors
- Trouble free operation ensured by extensive protective circuitry
- Works with unfiltered rectified power supply
- Metal mounting locknuts included
- Normally closed (N.C.) output available on versions marked ★
- UL Listed, CSA Certified, and CE Marked

Nominal Sensing Distance	Circuit Type	Voltage Range	Output Mode	Maximum Load	Operating Frequency	Indicator LED ①	Mating Connector Style (see page 626)	Catalog Number
Nickel-plated brass case								
Shielded, 2 m (6.6 ft) cable								
10 mm	PNP	12–48 V	N.O.★	200 mA	1,000 Hz	A	—	**XS1M30PA370**
10 mm	NPN	12–48 V	N.O.★	200 mA	1,000 Hz	A	—	**XS1M30NA370**
10 mm	PNP + NPN	12–24 V	N.O./N.C.	200 mA	1,000 Hz	A	—	**XS1M30KP340**
Shielded, micro-style connector DC								
10 mm	PNP	12–48 V	N.O.★	200 mA	1,000 Hz	B	11, 12, 13, 15, 16	**XS1M30PA370D**
10 mm	NPN	12–48 V	N.O.★	200 mA	1,000 Hz	B	11, 12, 14, 15, 16	**XS1M30NA370D**
10 mm	PNP + NPN	12–24 V	N.O./N.C.	200 mA	1,000 Hz	B	11, 12, 15, 16	**XS1M30KP340D**
Shielded, mini-style connector								
10 mm	PNP	12–48 V	N.O.	200 mA	1,000 Hz	B	21, 22	**XS1M30PA370A**
10 mm	NPN	12–48 V	N.O.	200 mA	1,000 Hz	B	21, 22	**XS1M30NA370A**
Shielded, connector—screw terminal connection								
10 mm	PNP	12–48 V	N.O.★	200 mA	1,000 Hz	B	—	**XS1M30PA370B**
10 mm	NPN	12–48 V	N.O.★	200 mA	1,000 Hz	B	—	**XS1M30NA370B**
Non-shielded, 2 m (6.6 ft) cable								
15 mm	PNP	12–48 V	N.O.★	200 mA	1,000 Hz	A	—	**XS2M30PA370**
15 mm	NPN	12–48 V	N.O.★	200 mA	1,000 Hz	A	—	**XS2M30NA370**
15 mm	PNP + NPN	12–24 V	N.O./N.C.	200 mA	1,000 Hz	A	—	**XS2M30KP340**
Non-shielded, micro-style connector								
15 mm	PNP	12–48 V	N.O.★	200 mA	1,000 Hz	B	11, 12, 13, 15, 16	**XS2M30PA370D**
15 mm	NPN	12–48 V	N.O.★	200 mA	1,000 Hz	B	11, 12, 14, 15, 16	**XS2M30NA370D**
15 mm	PNP + NPN	12–24 V	N.O./N.C.	200 mA	1,000 Hz	B	11, 12, 15, 16	**XS2M30KP340D**

★ To order a normally closed (N.C.) version, change the **A** to **B**. Example: XS1M12P**A**370 to XS1M12P**B**370.
① See next page under specifications for LED function.

Minimum Mounting Clearances, mm (in.)



	Side by side	Face to face	Facing a metal object	Mounting in a metal support
XS1 Shielded	e: 20 (0.79)	e: 120 (4.72)	e: 30 (1.18)	D: 30 (1.18); H: 0
XS2 Non-shielded	e: 60 (2.36)	e: 180 (7.09)	e: 45 (1.77)	D: 90 (3.54); H: 30 (1.18)

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Proximity Sensors
XS Tubular, Inductive Sensors
30 mm Diameter, DC; Universal Standard Length

Wiring

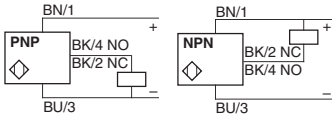
Connector



Cable

Blue	BU –
Brown	BN +
Black	BK Output

Wire color/connector pin
3 wire NO or NC



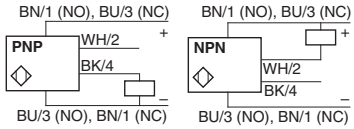
Connector



Cable

Blue	BU –
Brown	BN +
Black	BK Output

4 wire, programmable, NO or NC output



Specifications

Mechanical			
Usable sensing range★	Shielded	0 to 8 mm	
	Non-shielded	0 to 12 mm	
Standard temperature range		-25 to +80 °C (-13 to +176 °F)	
Enclosure rating—cable (for connector, see page 626)	NEMA Type	3, 4X, 6P, 12, 13	
	IEC	IP68—cutting oil proof, IP67 for B screw terminals	
Enclosure material	Nickel-plated brass	Case: Nickel-plated brass	
		Sensing face: PBT	
Tightening torque (maximum)	Nickel-plated brass	50 N•m (37 lb-ft)	
Vibration resistance	(IEC 60068.2.6)	25 G, ±2 mm amplitude, 10–55 Hz	
Shock resistance	(IEC 60068.2.27)	50 G, 11 ms duration	
Standard target size (steel)	Shielded	30 x 30 mm (1.18 x 1.18 in.)	
	Non-shielded	36 x 36 mm (1.41 x 1.41 in.)	
Differential (% of Sr)		15%	
Repeatability (% of Sr)		3%	
LED indicator type	A	360° ring LED shows output status	
	B	One LED visible from 4 quadrants shows output status	
Cable	3-wire	22 AWG (0.34 mm^2), PvR	

Electrical		**Standard**	**KP Models**
Voltage range—nominal		12–48 Vdc	12–24 Vdc
Voltage limit (including ripple)		10–58 Vdc	10–38 Vdc
Voltage drop (across switch), closed state	3-wire	2 V	2.6 V
Maximum load current	3-wire	200 mA	
Current consumption (no load)	3-wire	10 mA	
On delay (maximum)	3-wire	0.3 ms	
Off delay (maximum)	3-wire	0.7 ms	
Power-up delay (maximum)		5 ms	
Protective circuitry	Short circuit protection	Yes	
	Overload	Yes	
	Radio frequency immunity (RFI)	IEC 61000-4-3 Level 3	
	Electrostatic; transients; impulse (L—indicates level number)	3-wire IEC 61000-4-2 L3; IEC 61000-4-4 L2; 60947.5.2 L3	
	Reverse polarity protection	Yes	
Agency listings	UL E 164869 CCN NRKH	CSA CR 44087 Class 3211 03	CE

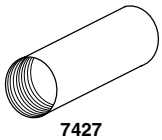
Options

Description		**Suffix**
Extended temperature range (cable type only)	Down to -40°+ C (-40°+ F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

Accessories

Description		**Catalog Number**
Metal mounting locknuts		**XSZE130**
Steel mounting bracket, 90°, and lockwashers		**9006PA30**
Plastic mounting bracket		**XSZB130**
0.5 in. (12.7 mm) NPT conduit adapter, length 2 in. (50.8 mm)	Aluminum	**7427**

★ Refer to page 327 for target material correction coefficient Km.



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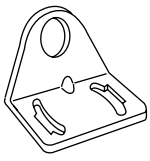
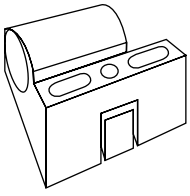


9006PA••



XSZB1••

Connector Cables
(M12 or D suffix; U78 or A suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°
XSZCA101Y	Micro-style, 3-pin, 2 m, straight
XSZCA111Y	Micro-style, 3-pin, 2 m, 90°

Additional cable options and lengths . . . page 626
Accessories . . . . . page 284, 280

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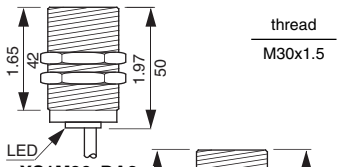
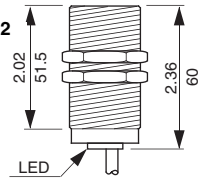
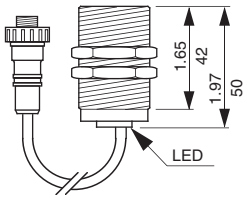
Proximity Sensors
XS Tubular, Inductive Sensors
30 mm Diameter, DC; Universal Standard Length, Non-Corrosive



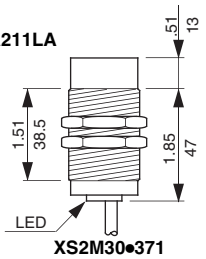
XS1M30•DA2



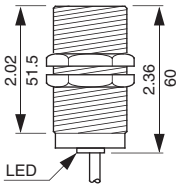
XS1M30•371



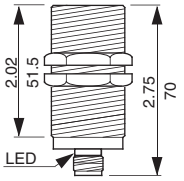
XS1M30DA211LA



XS2M30•371



XS4P30•370



XS4P30•370D

Dual Dimensions inches / mm

Features

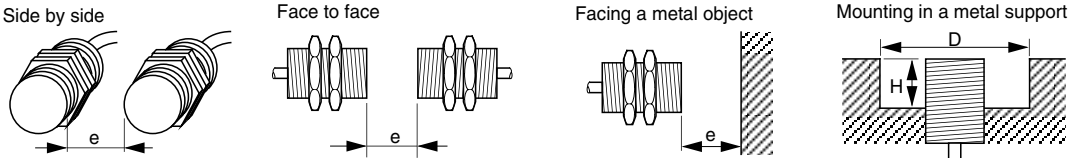
- Faster troubleshooting aided by high-visibility, 360° indicators
- 2-wire versions simplify wiring
- High-impact stainless steel and plastic cases for aggressive environments—cutting oils, grease, solvents, etc.
- Worry free replacement: standard length, extended temperature and supply voltage range, improved enclosure ratings (IP68), 3-wire complementary PNP + NPN with selectable N.O./N.C. output circuit
- Significant savings in replacement time using the patented plastic mounting bracket (no gauging) or connectors
- Pigtail connector version (0.8 m / 2.6 ft cable) provides cutting oil ratings (IP68) and connection for aggressive environments.
- Trouble free operation ensured by extensive protective circuitry
- Works with unfiltered rectified power supply
- Stainless steel or plastic mounting nuts included
- Normally closed (N.C.) output available on versions marked ★
- UL Listed, CSA Certified, and CE Marked

Nominal Sensing Distance	Circuit Type	Voltage Range	Output Mode	Maximum Load	Operating Frequency	Indicator LED ①	Mating Connector Style (see page 626)	Catalog Number
Stainless steel case								
Shielded, 2 m (6.6 ft) cable								
10 mm	2-wire	12–48 V	N.O. ★	1.5–100 mA	2,000 Hz	A	—	**XS1M30DA211**
10 mm	PNP	12–48 V	N.O.	200 mA	1,000 Hz	A	—	**XS1M30PA371**
10 mm	NPN	12–48 V	N.O.	200 mA	1,000 Hz	A	—	**XS1M30NA371**
Shielded, micro-style connector—0.8 m (2.6 ft) pigtail								
10 mm	2-wire	12–48 V	N.O. ★	1.5–100 mA	2,000 Hz	A	11, 12, 15, 16	**XS1M30DA211LD**
Shielded, mini-style connector—0.8 m (2.6 ft) pigtail								
10 mm	2-wire	12–48 V	N.O. ★	1.5–100 mA	2,000 Hz	A	21, 22	**XS1M30DA211LA**
Non-shielded, 2 m (6.6 ft) cable								
15 mm	PNP	12–48 V	N.O.	200 mA	1,000 Hz	A	—	**XS2M30PA371**
15 mm	NPN	12–48 V	N.O.	200 mA	1,000 Hz	A	—	**XS2M30NA371**
Plastic case								
Non-shielded, 2 m (6.6 ft) cable								
15 mm	PNP	12–48 V	N.O.★	200 mA	1,000 Hz	A	—	**XS4P30PA370**
15 mm	NPN	12–48 V	N.O.★	200 mA	1,000 Hz	A	—	**XS4P30NA370**
15 mm	PNP/NPN	12–24 V	N.O./N.C.	200 mA	1,000 Hz	A	—	**XS4P30KP340**
Non-shielded, micro-style connector DC								
15 mm	PNP	12–48 V	N.O.★	200 mA	1,000 Hz	A	11, 12, 13, 15, 16	**XS4P30PA370D**
15 mm	NPN	12–48 V	N.O.★	200 mA	1,000 Hz	A	11, 12, 14, 15, 16	**XS4P30NA370D**
15 mm	PNP/NPN	12–24 V	N.O/.N.C.	200 mA	1,000 Hz	A	11, 12, 15, 16	**XS4P30KP340D**

★ To order a normally closed (N.C.) version, change the **A** to **B**. Example: XS1M12P**A**371 to XS1M12P**B**371.

① See next page under specifications for LED function.

Minimum Mounting Clearances, mm (in.)



	Side by side	Face to face	Facing a metal object	Mounting in a metal support
XS1 Shielded	e: 20 (0.79)	e: 120 (4.72)	e: 30 (1.18)	D: 30 (1.18); H: 0
XS2/XS4 Non-shielded	e: 60 (2.36)	e: 180 (7.09)	e: 45 (1.77)	D: 90 (3.54); H: 30 (1.18)

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Proximity Sensors
XS Tubular, Inductive Sensors
30 mm Diameter, DC; Universal Standard Length, Non-Corrosive

Wiring

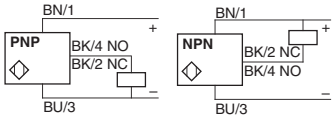
Connector



Cable

Blue	BU –
Brown	BN +
Black	BK Output

Wire color/connector pin
3 wire NO or NC



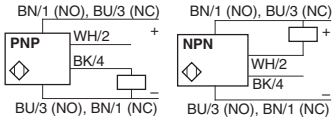
Connector



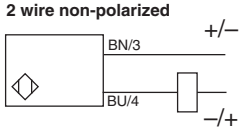
Cable

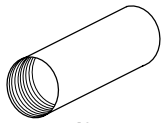
Blue	BU –
Brown	BN +
Black	BK Output

4 wire, programmable, NO or NC output

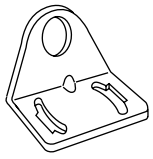


2 wire non-polarized

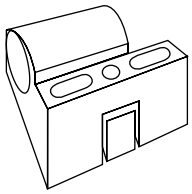




7427



9006PA●●



XSZB1●●

Connector Cables
(M12 or D suffix; U78 or A suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°
XSZCA101Y	Micro-style, 3-pin, 2 m, straight
XSZCA111Y	Micro-style, 3-pin, 2 m, 90°

Additional cable options and lengths . . . page 626
Accessories . . . . . page 284, 280

Specifications

Mechanical				
Usable sensing range★	Shielded		0 to 8 mm	
	Non-shielded		0 to 12 mm	
Standard temperature range			-25 to +80 °C (-13 to +176 °F)	
Enclosure rating cable (for connector, see page 626)	NEMA Type		3, 4X, 6P, 12, 13	
	IEC		IP68	
Enclosure material	Stainless steel	Case	#303 stainless steel	
		Sensing face	PBT	
	Plastic		PBT	
Tightening torque (maximum)	Stainless steel		100 N•m (74 lb-ft)	
	Plastic		20 N•m (15 lb-ft)	
Vibration resistance	(IEC 60068.2.6)		25 G, ±2 mm amplitude, 10–55 Hz	
Shock resistance	(IEC 60068.2.27)		50 G, 11 ms duration	
Standard target size (steel)	Shielded		30 x 30 mm (1.18 x 1.18 in.)	
	Non-shielded		36 x 36 mm (1.41 x 1.41 in.)	
Differential (% of Sr)			15%	
Repeatability (% of Sr)			3%	
LED indicator type	A		360° ring LED shows output status	
Cable	2-wire		20 AWG (0.5 mm^2), PvR	
	3-wire		22 AWG (0.34 mm^2), PvR	

Electrical		**Standard**	**KP Models**
Voltage range—nominal		12–48 Vdc	12–24 Vdc
Voltage limit (including ripple)		10–58 Vdc	10–38 Vdc
Voltage drop (across switch), closed state	2-wire	4 V	
	3-wire	2 V	
	4-wire	—	2.6 V
Minimum load current	2-wire	1.5 mA	
Maximum load current	2-wire	100 mA	
	3-wire	200 mA	
Current consumption (on load)	3-wire	10 mA	
Residual (leakage) current, open state	2-wire	0.5 mA	
On delay (maximum)	2-wire	0.2 ms	
	3-wire	0.3 ms	
Off delay (maximum)	2-wire	0.3 ms	
	3-wire	0.7 ms	
Power-up delay (maximum)		5 ms	
Protective circuitry	Short circuit protection	Yes	
	Overload	Yes	
	Radio frequency immunity (RFI)	IEC 61000-4-3 Level 3	
	Electrostatic; transients; impulse (L—indicates level number)	2-wire: IEC 61000-4-2 L3; IEC 61000-4-4 L3; 60947.5.2 L3	
		3-wire: IEC 61000-4-2 L2; IEC 61000-4-4 L3; 60947.5.2 L4	
	Reverse polarity protection	Yes	
Agency listings	E 164869 CCN NRKH	CR 44087 Class 3211 03	CE

Options

Description		**Suffix**
Extended temperature range, cable type only	Down to -40° C (-40° F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

Accessories

Description		**Catalog Number**
Plastic mounting nuts		**XSZE230**
Stainless steel mounting nuts		**XSZE330**
Stainless steel locknut washers		**XSZE930**
Steel mounting bracket, 90°		**9006PA30**
Plastic mounting bracket		**XSZB130**
0.5 in. (12.7 mm) NPT conduit adapter, length 2 in. (50.8 mm)	Aluminum	**7427**

★ Refer to page 327 for target material correction coefficient Km.

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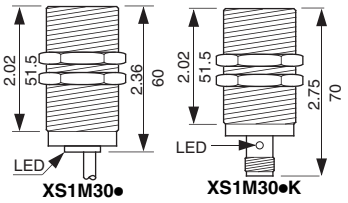
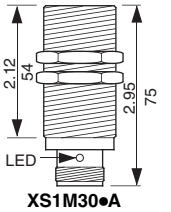
Proximity Sensors
XS Tubular, Inductive Sensors
30 mm Diameter, AC/DC; Universal Standard Length

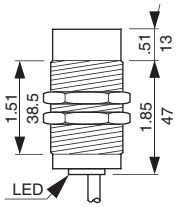


XS1M30●

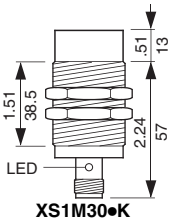
XS1M30●K



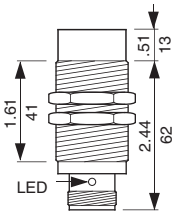
XS1M30●A



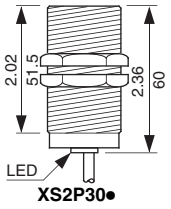
XS2M30●



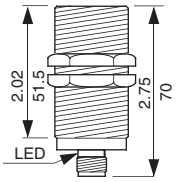
XS1M30●K



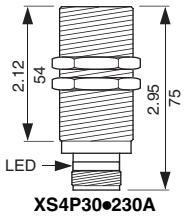
XS2M30●A



XS2P30●



XS4P30●230K



XS4P30●230A

Dual Dimensions $\frac{\text{inches}}{\text{mm}}$ $\frac{\text{thread}}{\text{M30x1.5}}$

Features

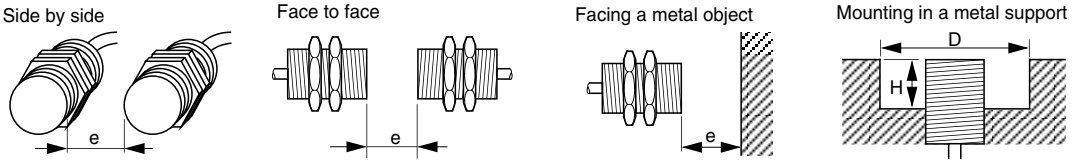
- 360° LED indicators
- Extended temperature range
- Extended supply voltage range
- IP68 rating
- AC/DC power supply
- Patented plastic mounting bracket
- Connector options
- Extensive protective circuitry
- Metal locknuts for metal or plastic mounting nuts for plastic housing and lockwashers included
- Normally closed (N.C.) output available on versions marked ★
- UL Listed, CSA Certified, and CE Marked

Nominal Sensing Distance	AC or AC/DC	Output Mode★	Voltage Range AC	Voltage Range DC	Operating Frequency AC	Operating Frequency DC	SCP	Indicator LED ①	Mating Connector Style (see page 626)	Catalog Number
Nickel-plated brass case										
Shielded, 2 m (6.6 ft) cable										
10 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	2,000 Hz	no	A	—	**XS1M30MA230**
10 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	2,000 Hz	yes	C	—	**XS1M30MA250**
Shielded, micro-style connector AC										
10 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	2,000 Hz	no	B	13, 14	**XS1M30MA230K**
10 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	2,000 Hz	yes	B	13, 14	**XS1M30MA250K**
Shielded, mini-style connector										
10 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	2,000 Hz	no	B	17, 20	**XS1M30MA230A**
10 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	2,000 Hz	yes	C	18, 20	**XS1M30MA250A**
Shielded, screw terminal connection										
10 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	2,000 Hz	no	B	—	**XS1M30MA230B**
Non-shielded, 2 m (6.6 ft) cable										
15 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	1,000 Hz	no	A	—	**XS2M30MA230**
15 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	1,000 Hz	yes	C	—	**XS2M30MA250**
Non-shielded, micro-style connector AC										
15 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	1,000 Hz	no	B	13, 14	**XS2M30MA230K**
15 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	1,000 Hz	yes	B	13, 14	**XS2M30MA250K**
Non-shielded, mini-style connector										
15 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	1,000 Hz	no	B	18, 19	**XS2M30MA230A**
15 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	1,000 Hz	yes	C	18, 19	**XS2M30MA250A**
Plastic case										
Non-shielded, 2 m (6.6 ft) cable										
15 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	1,000 Hz	no	A	—	**XS4P30MA230**
Non-shielded, micro-style connector										
15 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	1,000 Hz	no	A	13, 14	**XS4P30MA230K**
Non-shielded, mini-style connector										
15 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	1,000 Hz	no	A	18, 20	**XS4P30MA230A**
Non-shielded, screw terminal connector										
15 mm	AC/DC	N.O.★	24–240 V	24–210 V	25 Hz	1,000 Hz	no	B	—	**XS4P30MA230B**

★ To order a normally closed (N.C.) version, change the **A** to **B**. Example: XS1M30P**A**260 to XS1M12P**B**260.

① See next page under specifications for LED function.

Minimum Mounting Clearances, mm (in.)



	Side by side	Face to face	Facing a metal object	Mounting in a metal support
XS1 Shielded	e: 20 (0.79)	e: 120 (4.72)	e: 30 (1.18)	D: 30 (1.18); H: 0
XS2/XS4 Non-shielded	e: 60 (2.36)	e: 180 (7.09)	e: 45 (1.77)	D: 90 (3.54); H: 30 (1.18)

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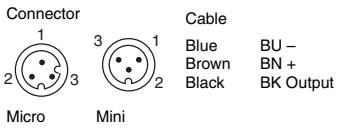
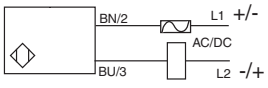
Proximity Sensors
XS Tubular, Inductive Sensors
30 mm Diameter, AC/DC; Universal Standard Length

Wiring



Wire color/connector pin
2 wire, AC/DC or AC



Specifications

Mechanical			
Usable sensing range★	Shielded		0 to 8 mm
	Non-shielded		0 to 12 mm
Standard temperature range			-25 to +80 °C (-13 to +176 °F)
Enclosure rating—cable (connector, see page 626)	NEMA Type		3, 4X, 6P, 12, 13
	IEC		IP68; IP67 for B screw terminals
Enclosure material	Nickel-plated brass	Case	Nickel-plated brass
		Sensing face	PBT
	Plastic		PBT
Tightening torque (maximum)	Nickel-plated brass		50 N•m (37 lb-ft)
	Plastic		20 N•m (15 lb-ft)
Vibration resistance	(IEC 60068.2.6)		25 G, ±2 mm amplitude, 10–55 Hz
Shock resistance	(IEC 60068.2.27)		50 G, 11 ms duration
Standard target size (steel)	Shielded		30 x 30 mm (1.18 x 1.18 in.)
	Non-shielded		36 x 36 mm (1.41 x 1.41 in.)
Differential (% of Sr)			15%
Repeatability (% of Sr)			3%
LED indicator type	A		360° ring LED shows output status
	B		One LED visible from 4 quadrants shows output status
	C		2 LED indicators: red shows output status; green shows normal operation (SCP only)
Cable	2-wire		22 AWG (0.5 mm^2), PvR
Electrical			
Voltage range—nominal			24 to 240 Vac (50/60 Hz), 24 to 210 Vdc
Voltage limit (including ripple)			20 to 264 Vac/Vdc
Voltage drop (across switch), closed state			5.5 V
Inrush current			2 A
Minimum load current			5 mA
Maximum load current	AC		300 mA
	DC		200 mA 20 ≤ Vdc ≤ 58 IEC 60947-5-2 Utilization category DC-13 Vdc > 58 IEC 60947-5-2 Utilization category DC-12
Residual (leakage) current, open state	Without SCP		0.6 mA
	With SCP		1.5 mA
On delay (maximum)	Without SCP		0.2 ms
	With SCP		2 ms
Off delay (maximum)	Without SCP		0.3 ms
	With SCP		5 ms
	Without SCP		40 ms
	With SCP		70 ms
Power-up delay (maximum)	Without SCP		40 ms
	With SCP		70 ms
Protective circuitry	Short circuit protection		Optional▲
	Radio frequency immunity (RFI)		IEC 61000-4-3 Level 3
	Electrostatic; transients; impulse		IEC 61000-4-2 L4; IEC 61000-4-4 L4; 60947.5.2 L3
Agency listings	UL E 164869 CCN NRKH	CE	CSA CR 44087 Class 3211 03

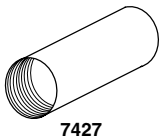
Options

Description		Suffix
Extended temperature range, cable type only	Down to -40° C (-40° F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

Accessories

Description		Catalog Number
Plastic mounting nuts		**XSZE230**
Metal mounting nuts and lockwashers		**XSZE130**
Steel mounting bracket, 90°		**9006PA30**
Plastic mounting bracket		**XSZB130**
0.5 in. (12.7 mm) NPT conduit adapter, length 2 in. (50.8 mm)	Aluminum	**7427**

★ Refer to page 327 for target material correction coefficient Km.
▲ For devices without SCP, see page 284 for protective fuses.



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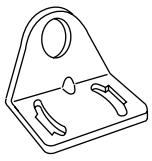

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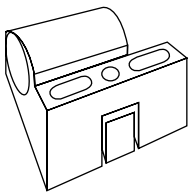

XSZB1••

Connector Cables
(U20 or K suffix; U78 or A suffix)

XSZCK101Y	Micro-style, 3-pin, 2 m, straight
XSZCK111Y	Micro-style, 3-pin, 2 m, 90°
XSZCA101Y	Mini-style, 3-pin, 2 m, straight
XSZCA111Y	Mini-style, 3-pin, 2 m, 90°

Additional cable options and lengths. . . . page 626
Accessories . . . . . page 284, 280

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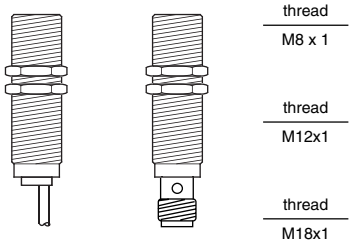
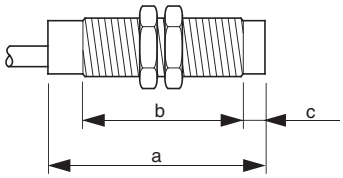
Proximity Sensors
XS Tubular, Inductive Sensors
Economy D Series—DC, AC



a = Overall Length (mm)
b = Threaded Section (mm)
c = for Non-shielded Sensors (mm)



Features

Entire family of proximity sensors dedicated to OEMs and “just enough” applications.

- DC tubular body style ranging from 6.5 mm to 30 mm diameter, in 3-wire, N.O. output
- AC tubular body style ranging from 12 mm to 30 mm diameter, in 2-wire, N.O. output
- Brass metal case with either 2 m cable or connector options
- Shielded and non-shielded versions available
- Mounting nuts included
- Sold in multiples of ten easy-open bags

Circuit Type	Output Mode	Voltage Range	Voltage Drop Maximum	Load Current Maximum	Operating Frequency Maximum	Catalog Number
6.5 mm, Shielded, DC—2 m (6.6 ft) Cable—Nominal Sensing Distance—1.5 mm						
PNP	N.O.	12–24 Vdc	3 V	50 mA	3,000 Hz	**XS1L06PA140**
NPN	N.O.	12–24 Vdc	3 V	50 mA	3,000 Hz	**XS1L06NA140**
Agency Listings			E 164869 CCN NRKH		CR 44087 Class 3211 03	CE

Dimensions

		a		b		c	
		in.	mm	in.	mm	in.	mm
6.5 mm	Cable	1.65	42.0	—	—	—	—
	Connector	—	—	—	—	—	—

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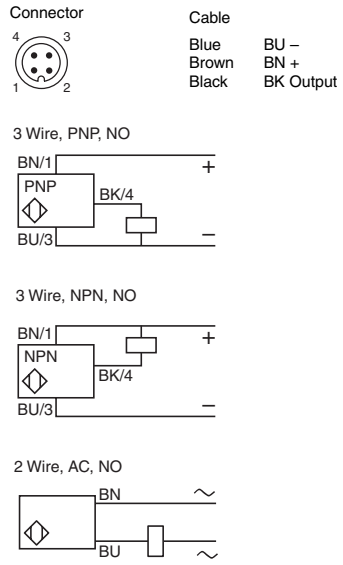
Wiring



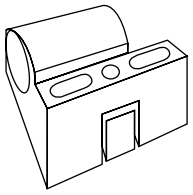
Specifications

Mechanical		DC
Diameter		6.5 mm (0.26 in.)
Usable Sensing Range ★	Shielded	1.2 mm (0.04 in.)
	Non-Shielded	—
Temperature Range		-13 to +158° F (-25 to +70° C)
Enclosure Rating	NEMA Type	1
	CENELEC	IP66 (connector style is IP65)
Vibration		25 G, ±2 mm amplitude, 10–55 Hz
Shock Resistance		50 G for 11 ms
Maximum Differential (% of Sr)		15%
Maximum Repeatability (% of Sr)		3%
LED Indicator Type		One, mounted at rear (connector style is 4 viewing ports at 90°)
Enclosure Material		Brass
Wiring		3 x 0.34 mm^2 (8 mm = 3 x 0.11 mm^2)
Electrical		
Voltage Range		12–24 Vdc
Voltage Limit (Including Ripple)		10–30 Vdc
Current Consumption (Maximum) (No Load)		10 mA
Maximum Leakage (Residual) Current—Open State		—
Voltage Drop (Closed State)		3 V
Power-up Delay (Maximum)		5 ms
On Delay (Maximum)		0.5 ms
Off Delay (Maximum)		1 ms
Protective Circuitry	Short Circuit Protection	Yes
	Overload Protection	Yes
Agency Listings		E 164869 CCN NRKH; CR 44087 Class 3211 03; CE

★ Refer to page 327 for target material correction coefficient Km.

Accessories

Description	For Sensor Diameter	Catalog Number
Mounting Brackets, Plastic	6.5 mm (0.25 in.)	**XSZB165**



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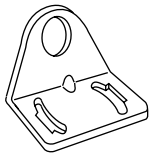
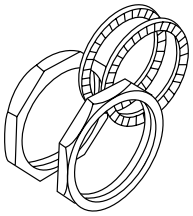
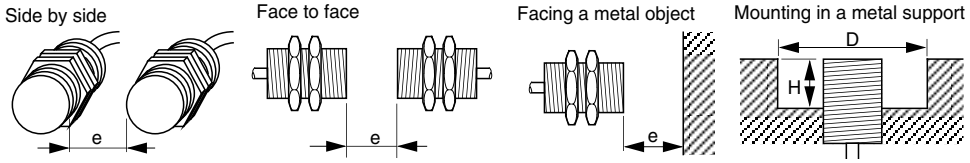


9006PA••



XSZE•••

Minimum Mounting Clearances



	e		e		e		d		h	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
XS1L06	0.12	3	0.71	18	0.18	4.5	0.31	8	0	0
XS1D08	0.12	3	0.71	18	0.18	4.5	0.31	8	0	0
XS1D/M12	0.16	4	0.94	24	0.24	6.0	0.47	12	0	0
XS2D12	0.63	16	1.89	48	0.47	12.0	1.42	36	0.31	8
XS1D/M18	0.39	10	2.36	60	0.59	15.0	0.59	15	0	0
XS1D/M30	0.79	20	4.72	120	1.18	30.0	1.18	30	0	0

Connector Cables (M12 or D suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths. . . . page 626
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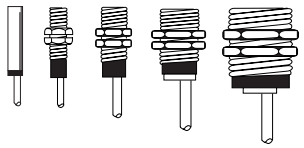
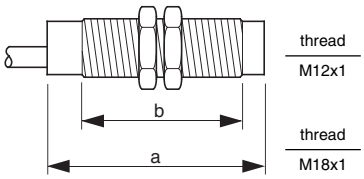
Proximity Sensors
XS Tubular, Inductive Sensors
Extended Range—AC/DC, DC



a = Overall Length (mm)
b = Threaded Section (mm)



a		AC/DC mm	AC/DC in.	DC mm	DC in.
6.5 mm	Cabled version	—	—	33	1.29
	Nano-connector	—	—	42	1.65
	Micro-connector	—	—	45	1.77
8 mm	Cabled version	—	—	33	1.29
	Nano-connector	—	—	42	1.65
	Micro-connector	—	—	45	1.77
12 mm	Cabled version	50	1.96	33	1.29
	Micro-connector	61	2.40	48	1.88
18 mm	Cabled version	60	2.36	33.5	1.31
	Micro-connector	70	2.75	48	1.88
	Mini-Connector	—	—	—	—
30 mm	Cabled version	60	2.36	40.5	1.59
	Micro-connector	70	2.75	50	1.96

b ♦		AC/DC mm	AC/DC in.	DC mm	DC in.
6.5 mm	Cabled version	—	—	30	1.18
	Nano-connector	—	—	34	1.33
	Micro-connector	—	—	24	0.94
8 mm	Cabled version	—	—	26	1.02
	Nano-connector	—	—	26	1.02
	Micro-connector	—	—	24	0.94
12 mm	Cabled version	42	1.65	26	1.02
	Micro-connector	40	1.57	25	0.98
18 mm	Cabled version	51.5	2.02	26	1.02
	Micro-connector	51.5	2.02	26	1.02
	Mini-Connector	—	—	—	—
30 mm	Cabled version	51.5	2.02	32	1.25
	Micro-connector	51.5	2.02	32	1.25

♦ For 6.5 mm diameter, b = smooth length

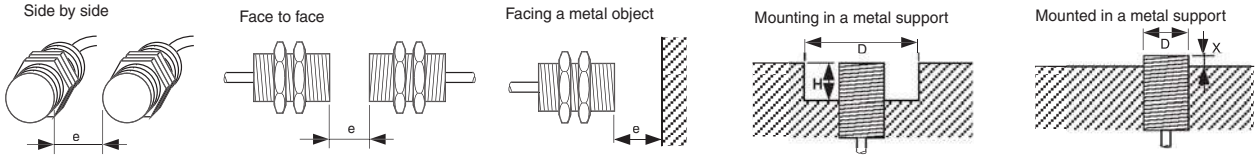
Features

- Extended range feature available in Universal AC/DC, or DC only sensors, where previously only available in DC
- AC/DC has same extended sensing range as in DC only sensors
- Available in molded cable or connector versions
- Rugged IP68 nickel-plated brass casing
- 360° LED for complete visibility
- Metal locknuts included in carton

Circuit Type	Output Mode	Voltage Range	Voltage Drop Maximum	Load Current Maximum	Operating Frequency Maximum	Connection ★	Catalog Number
6.5 mm Diameter, DC, Shielded—Nominal Sensing Distance—2 mm							
PNP	N.O.	12–24 Vdc	2.6 V	200 mA	2,500 Hz	2 m (6.6 ft) cable	**XS1L06PA349**
NPN	N.O.	12–24 Vdc	2.6 V	200 mA	2,500 Hz	2 m (6.6 ft) cable	**XS1L06NA349**
PNP	N.O.	12–24 Vdc	2.6 V	200 mA	2,500 Hz	Nano-style connector	**XS1L06PA349S**
NPN	N.O.	12–24 Vdc	2.6 V	200 mA	2,500 Hz	Nano-style connector	**XS1L06NA349S**
PNP	N.O.	12–24 Vdc	2.6 V	200 mA	2,500 Hz	Micro-style connector	**XS1L06PA349D**
NPN	N.O.	12–24 Vdc	2.6 V	200 mA	2,500 Hz	Micro-style connector	**XS1L06NA349D**
8 mm Diameter, DC, Shielded—Nominal Sensing Distance—2.5 mm							
PNP	N.O.	12–24 Vdc	2.6 V	200 mA	2,500 Hz	2 m (6.6 ft) cable	**XS1N08PA349**
NPN	N.O.	12–24 Vdc	2.6 V	200 mA	2,500 Hz	2 m (6.6 ft) cable	**XS1N08NA349**
PNP	N.O.	12–24 Vdc	2.6 V	200 mA	2,500 Hz	Nano-style connector	**XS1N08PA349S**
NPN	N.O.	12–24 Vdc	2.6 V	200 mA	2,500 Hz	Nano-style connector	**XS1N08NA349S**
PNP	N.O.	12–24 Vdc	2.6 V	200 mA	2,500 Hz	Micro-style connector	**XS1N08PA349D**
NPN	N.O.	12–24 Vdc	2.6 V	200 mA	2,500 Hz	Micro-style connector	**XS1N08NA349D**
12 mm Diameter, DC, Shielded—Nominal Sensing Distance—4 mm							
PNP	N.O.	12–24 Vdc	2 V	200 mA	2,500 Hz	2 m (6.6 ft) cable	**XS1N12PA349**
NPN	N.O.	12–24 Vdc	2 V	200 mA	2,500 Hz	2 m (6.6 ft) cable	**XS1N12NA349**
PNP	N.O.	12–24 Vdc	2 V	200 mA	2,500 Hz	Micro-style connector	**XS1N12PA349D**
NPN	N.O.	12–24 Vdc	2 V	200 mA	2,500 Hz	Micro-style connector	**XS1N12NA349D**
12 mm Diameter, Universal AC/DC, Shielded—Nominal Sensing Distance—4 mm							
2-wire	N.O.	12–24 Vdc	5.5 V	200 mA	25 Hz /1,000 Hz	2 m (6.6 ft) cable	**XS1M12MA239**
2-wire	N.O.	12–24 Vdc	5.5 V	200 mA	25 Hz /1,000 Hz	Micro-style connector	**XS1M12MA239K**
18 mm Diameter, DC, Shielded—Nominal Sensing Distance—10 mm							
PNP	N.O.	12–24 Vdc	2 V	200 mA	1,000 Hz	2 m (6.6 ft) cable	**XS1N18PA349**
NPN	N.O.	12–24 Vdc	2 V	200 mA	1,000 Hz	2 m (6.6 ft) cable	**XS1N18NA349**
PNP	N.O.	12–24 Vdc	2 V	200 mA	1,000 Hz	Micro-style connector	**XS1N18PA349D**
NPN	N.O.	12–24 Vdc	2 V	200 mA	1,000 Hz	Micro-style connector	**XS1N18NA349D**
18 mm Diameter, Universal AC/DC, Shielded—Nominal Sensing Distance—10 mm							
2-wire	N.O.	12–24 Vdc	5.5 V	200 mA	25 Hz /1,000 Hz	2 m (6.6 ft) cable	**XS1M18MA239**
2-wire	N.O.	12–24 Vdc	5.5 V	200 mA	25 Hz /1,000 Hz	Micro-style connector	**XS1M18MA239K**
30 mm Diameter, DC, Shielded—Nominal Sensing Distance—20 mm							
PNP	N.O.	12–24 Vdc	2 V	200 mA	500 Hz	2 m (6.6 ft) cable	**XS1N30PA349**
NPN	N.O.	12–24 Vdc	2 V	200 mA	500 Hz	2 m (6.6 ft) cable	**XS1N30NA349**
PNP	N.O.	12–24 Vdc	2 V	200 mA	500 Hz	Micro-style connector	**XS1N30PA349D**
NPN	N.O.	12–24 Vdc	2 V	200 mA	500 Hz	Micro-style connector	**XS1N30NA349D**
30 mm Diameter, Universal AC/DC, Shielded—Nominal Sensing Distance—20 mm							
2-wire	N.O.	24 to 240 V	5.5 V	200 mA	25 Hz /1,000 Hz	2 m (6.6 ft) cable	**XS1M30MA239**

★ See page 626 for matching connector cables.

Minimum Mounting Clearances, mm (in.)



6.5 mm	5 (0.196)	30 (1.18)	7.5 (0.29)	d = 10 (0.393)	h = 1.6 (0.062)	d = 6.5 (0.255)	x = 1.3 (0.051)
8 mm	5 (0.196)	30 (1.19)	7.5 (0.29)	d = 10 (0.393)	h = 1.6 (0.062)	d = 8 (0.314)	x = 1.6 (0.062)
12 mm	8 (0.314)	48 (1.88)	12 (0.47)	d = 14 (0.551)	h = 2.4 (0.094)	d = 12 (0.472)	x = 1.6 (0.062)
12 mm (AC/DC)	8 (0.314)	48 (1.88)	12 (0.47)	d = 14 (0.551)	h = 1.2 (0.047)	d = 12 (0.472)	x = 1.6 (0.062)
18 mm	20 (0.787)	96 (3.77)	30 (1.18)	d = 28 (1.10)	h = 3.6 (0.141)	d = 18 (0.708)	x = 3.6 (0.141)
18 mm (AC/DC)	20 (0.787)	96 (3.77)	30 (1.18)	d = 28 (1.10)	h = 1.8 (0.070)	d = 18 (0.708)	x = 1.8 (0.070)
30 mm	40 (1.57)	240 (9.44)	60 (2.36)	d = 50 (1.96)	h = 6 (0.236)	d = 30 (1.18)	x = 6 (0.236)

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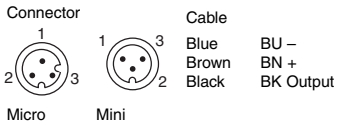
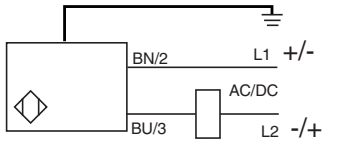
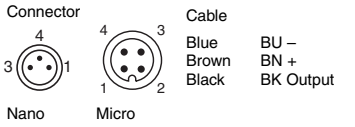
Proximity Sensors
XS Tubular, Inductive Sensors
Extended Range—AC/DC, DC

Wiring

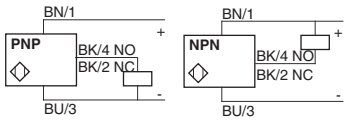


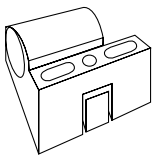
wire color/connector pin
2 wire, AC/DC for connector version only





3 wire, DC, NO or NC





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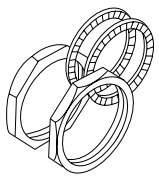

XSZE●●●

Specifications

Mechanical		**6.5 mm**	**8 mm**	**12 mm**	**18 mm**	**30 mm**
Usable sensing range ★		0 to 2 mm (0 to 0.08 in.)	0 to 2 mm (0 to 0.08 in.)	0 to 3.2 mm (0 to 0.12 in.)	0 to 8 mm (0 to 0.31 in.)	0 to 16 mm (0 to 0.62 in.)
Temperature range		-13 to + 25 °F (-25 to +70 °C)				
Enclosure rating	NEMA Type	3, 4X, 6P, 12, 13				
	IEC	IP68 (except connectors)				
Maximum tightening torque		—	5 N•m (3.7 lb-ft)	6 N•m (4.4 lb-ft)	15 N•m (11 lb-ft)	40 N•m (29.5 lb-ft)
Vibration		25 G, ±2 mm amplitude, 10–55 Hz				
Shock resistance		50 G, 11 ms duration				
Standard target size (steel) (mm)		6.5 x 6.5 x 1	8 x 8 x 1	12 x 12 x 1	18 x 18 x 1	30 x 30 x 1
Maximum differential (% of Sr)		15%				
Maximum repeatability (% of Sr)		3%				
LED indicator type	Cable	360° ring LED, visible from all quadrants				
	Connector	One LED, visible from 4 quadrants				
Enclosure material		Nickel-plated brass				
Wiring		27 AWG	27 AWG	22 AWG	22 AWG	22 AWG
Cable material		PvR	PvR	PvR	PvR	PvR
Electrical		**DC**	**DC**	**AC / DC**	**AC / DC**	**AC / DC**
Voltage range		24–240 Vac/Vdc, 12–24 Vdc				
Voltage limit (including ripple)		20–264 Vac/Vdc, 10–38 Vdc				
Voltage drop (maximum)		2.6 V	2.6 V	5.5 V / 2.6 V	5.5 V / 2 V	5.5 V / 2 V
Maximum leakage (residual) current—open state, AC		—	—	0.8 mA	0.8 mA	0.8 mA
Current consumption (no load)		10 mA				
Power-up delay (maximum)		5 ms	5 ms	20 ms / 5 ms	25 ms / 5 ms	25 ms / 5 ms
On delay (maximum)		0.2 ms	0.2 ms	0.5 ms / 0.2 ms	0.5 ms 0.3 ms	0.5 ms / 0.6 ms
Off delay (maximum)		0.2 ms	0.2 ms	0.2 ms	0.5 ms / 0.7 ms	2 ms / 1.4 ms
Protective circuitry	Short circuit protection	yes				
	Overload protection	yes				
	Reverse polarity protection	yes				
	Radio frequency immunity (RFI)	IEC 61000-4-3 Level 3				
	Electrostatic, Transients, Impulse	IEC 61000-4-2 Level 3; IEC 61000-4-4 Level 3; 60947.5.2 Level 3				
Agency listings		UL CE				

★ Refer to page 327 for target material correction coefficient Km.

Options

Description	**Suffix**
5 m (16.4 ft) cable	**L2**
10 m (32.8 ft) cable	**L5**

Accessories

Description	**For Sensor Diameter**	**Catalog Number**
Mounting Brackets, Plastic	6.5 mm (0.25 in.)	**XSZB165**
	8 mm (0.31 in.)	**XSZB108**
	12 mm (0.47 in.)	**XSZB112**
	18 mm (0.71 in.)	**XSZB118**
	30 mm (1.18 in.)	**XSZB130**
Mounting Brackets, Metal	12 mm (0.47 in.)	**9006PA12**
	18 mm (0.71 in.)	**9006PA18**
	30 mm (1.18 in.)	**9006PA30**
Mounting Nuts	8 mm (0.31 in.)	**XSZE108**
	12 mm (0.47 in.)	**XSZE112**
	18 mm (0.71 in.)	**XSZE118**
	30 mm (1.18 in.)	**XSZE130**

Connector Cables
(M8 or S suffix; M12 or D suffix; U20 or K suffix; U78 or A suffix)

XSZCS101	Nano-style, 3-pin, 2 m, straight
XSZCS111	Nano-style, 3-pin, 2 m, 90°
XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°
XSZCK101Y	Micro-style, 3-pin, 2 m, straight
XSZCK111Y	Micro-style, 3-pin, 2 m, 90°
XSZCA901Y	Mini-style, 3-pin, 2 m, straight
XSZCA911Y	Mini-style, 3-pin, 2 m, 90°

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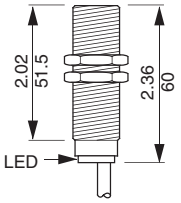
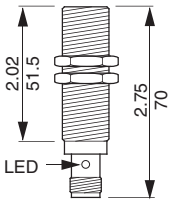
Proximity Sensors
XS Inductive Sensors
18 mm, Ferrous Only—DC



XS1M18PAS40



XS1M18PAS40D

Dual Dimensions inches / mm

thread
M18x1

Features

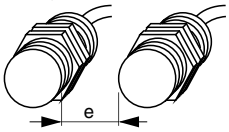
- Ideal for machining, sorting applications
- Responds only to ferrous metals, ignoring non-ferrous metals such as aluminum
- Stainless steel body
- Cable and micro-style connector versions offered ∗

Circuit Type	Output Mode	Voltage Range	Load Current Maximum	Operating Frequency Maximum	Catalog Number
Shielded—2 m (6.6 ft) cable—Nominal Sensing Distance—5 mm					
PNP	N.O.	12–24 Vdc	200 mA	1,000 Hz	**XS1M18PAS40**
Shielded—micro-style connector ∗—Nominal Sensing Distance—5 mm					
PNP	N.O.	12–24 Vdc	200 mA	1,000 Hz	**XS1M18PAS40D**

∗ See page 626 for matching connector cables

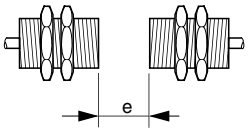
Minimum Mounting Clearances, mm (in.)

Side by side



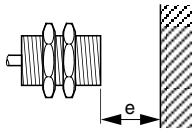
e: 10 (0.39)

Face to face



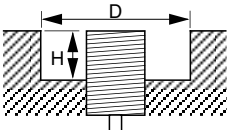
e: 60 (2.36)

Facing a metal object



e: 15 (0.59)

Mounting in a metal support



D: 18 (0.71); H: 0

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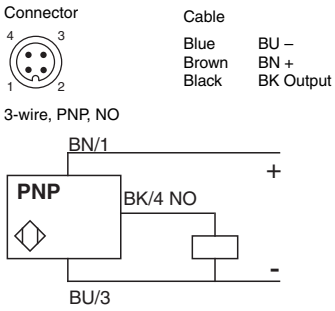
Wiring



Specifications

Mechanical		
Usable sensing range ★		0–4 mm (0–0.16 in.)
Temperature range		-13° to 158° F (-25° to 70° C)
Enclosure rating	IEC	IP68 (except connector version)
Tightening torque (maximum)		50 N•m (37 lb-ft)
Standard target size (steel)		18 x 18 x 1
Differential (% of Sr)		15%
Repeatability (% of Sr)		3%
LED indicator type	Cable version	360° ring LED
	Connector version	4 LED windows at 90°
Enclosure material		Stainless steel
Wiring		22 AWG (0.34 mm^2), PvR cable
Electrical		
Voltage range		12–24 Vdc
Voltage limit (including ripple)		10–38 Vdc
Voltage drop (across switch, closed state)		2.6 V
Current consumption (no load)		15 mA
Maximum load current		200 mA
Power-up delay (maximum)		5 ms
On delay (maximum)		0.3 ms
Off delay (maximum)		0.7 ms
Protective circuitry	Short circuit protection	Yes
	Overload protection	Yes
	Reverse polarity protection	Yes
	Radio frequency immunity (RFI)	Yes
	Electrostatic discharges	Yes
	Fast transients (motor start/stop interference)	Yes
	Impulse voltages (lightning, etc.)	Yes
Agency listings	E 164869 CCN NRKH; CR 44087 Class 3211 03; CE	

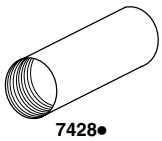
Options

Description		Suffix
Extended temperature range (cable type only)	Down to -40+ C (-40+ F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

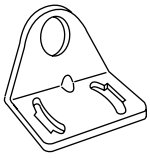
Accessories

Description		Catalog Number
Stainless steel mounting nuts		**XSZE318**
Steel mounting bracket, 90°		**9006PA18**
Plastic mounting bracket		**XSZB118**
0.5 in. (12.7 mm) NPT conduit adapter, length 2 in. (50.8 mm)	Aluminum	**7428**
	Stainless	**74282**

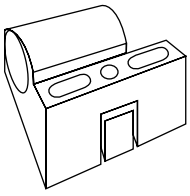
★ Refer to page 327 for target material correction coefficient Km



7428●



9006PA●●



XSZB1●●

Connector Cables (M12 or D suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths. . . . page 626
Accessories . . . . . .page 284, 280

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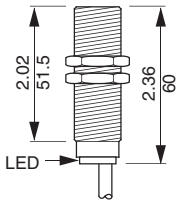
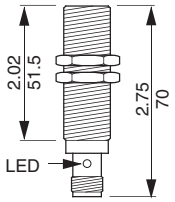
Proximity Sensors
XS Inductive Sensors
18 mm, Non-Ferrous Only—DC



XS1M18PAS20



XS1M18PAS20D

Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

thread
M18x1

Features

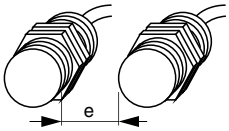
- Response to non-ferrous metals only, such as aluminum, ignoring ferrous material such as steel
- Ideal for mounting in areas where metal is close
- Stainless steel body
- Cable and micro-style connector versions offered ∗

Circuit Type	Output Mode	Voltage Range	Load Current Maximum	Operating Frequency Maximum	Catalog Number
Shielded—2 m (6.6 ft) Cable—Nominal Sensing Distance—5 mm					
PNP	N.O.	12–24 Vdc	200 mA	1,000 Hz	**XS1M18PAS20**
Shielded—Micro-style Connector ∗—Nominal Sensing Distance—5 mm					
PNP	N.O.	12–24 Vdc	200 mA	1,000 Hz	**XS1M18PAS20D**

∗ See p.626 for matching connector cables

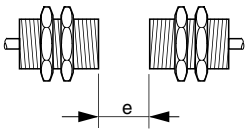
Minimum Mounting Clearances mm (in.)

Side by side



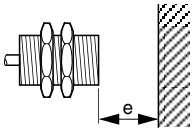
e: 10 (0.39)

Face to face



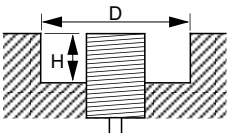
e: 60 (2.36)

Facing a metal object



e: 15 (0.59)

Mounting in a metal support



D: 18 (0.71); H: 0

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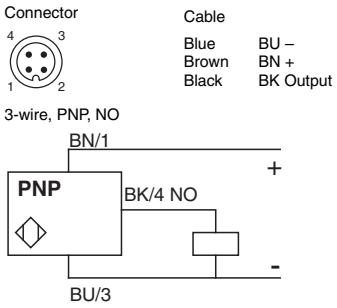
Wiring



Specifications

Mechanical		
Usable sensing range ★		0–4 mm (0.16 in.)
Temperature range		-13° to 158° F (-25° to 70° C)
Enclosure rating	IEC	IP68 (except connector version)
Tightening torque (maximum)		50 N•m (37 lb-ft)
Standard target size (aluminum)		18 x 18 x 1
Differential (% of Sr)		15%
Repeatability (% of Sr)		3%
LED indicator type	Cable version	360° ring LED
	Connector version	4 LED windows at 90°
Enclosure material		Metal
Wiring		22 AWG (0.34 mm^2), PvR cable
Electrical		
Voltage range		12–24 Vdc
Voltage limit (including ripple)		10–38 Vdc
Voltage drop (across switch, closed state)		2.6 V
Current consumption (no load)		15 mA
Maximum load current		200 mA
Power-up delay (maximum)		5 ms
On delay (maximum)		0.3 ms
Off delay (maximum)		0.7 ms
Protective circuitry	Short circuit protection	Yes
	Overload protection	Yes
	Reverse polarity protection	Yes
	Radio frequency immunity (RFI)	Yes
	Electrostatic discharges	Yes
	Fast transients (motor start/stop interference)	Yes
	Impulse voltages (lightning, etc.)	Yes
Agency listings	E 164869 CCN NRKH; CR 44087 Class 3211 03; CE	

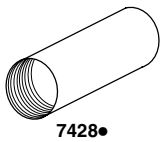
Options

Description		Suffix
Extended temperature range (cable type only)	Down to -40° C (-40° F)	**TF**
Extended cable length	5 m (16.4 ft) cable	**L1**
	10 m (32.8 ft) cable	**L2**

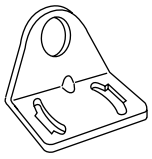
Accessories

Description		Catalog Number
Stainless steel mounting nuts		**XSZE318**
Steel mounting bracket, 90°		**9006PA18**
Plastic mounting bracket		**XSZB118**
0.5 in. (12.7 mm) NPT conduit adapter, length 2 in. (50.8 mm)	Aluminum	**7428**
	Stainless	**74282**

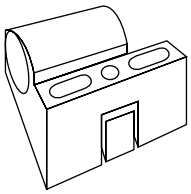
★ Refer to page 327 for target material correction coefficient Km



7428●



9006PA●●



XSZB1●●

Connector Cables (M12 or D suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths . . . page 626
Accessories . . . . . page 284, 280

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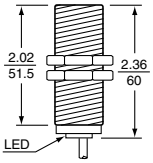
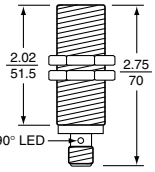
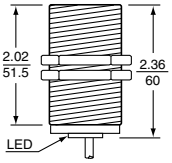
Proximity Sensors
XS Inductive Sensors
Ferrous/Non-Ferrous; Universal, DC



XS1M18KPM40



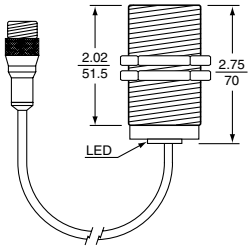
XS1M18KPM40D



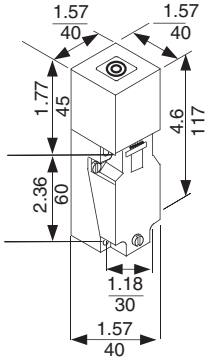
XS1M30KPM40

thread
M18x1

thread
M30x1.5



XS1M30KPM40LD



(1) Output LED (Yellow)
(2) 0.5 in. (12.7 mm) NPT conduit opening
(3) Oblong mounting hole:
0.21 x 0.28 in. (5.3 x 7 mm)

Dual Dimensions inches / mm

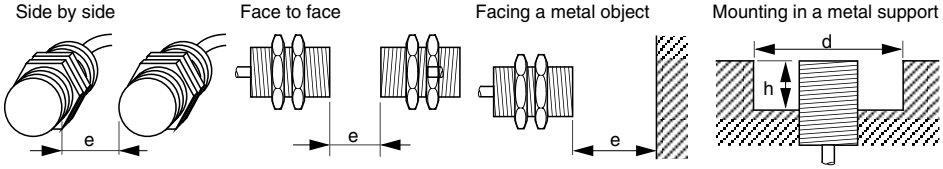
Features

- Detects all types of metals at the same sensing distance, whereas metals such as aluminum and copper require a standard sensor to be closer (see chart on next page).
- Body types include 18 mm nickel-plated brass housing, 30 mm stainless steel housing, and limit switch style in plastic housing.
- All are suitable for flush mounting in metal.
- Ideal for drop-in replacements for tubular and limit switch style standard sensors.
- Universal selectable output: PNP, NPN, N.O. and N.C.
- Available with 2 m cable, micro-style connector or 2.6 ft pigtail with micro-connector for very aggressive chemical environments.
- Tubular bodies have 360° visibility LED (four LED windows at 90° for connector version).
- Metal mounting nuts included with tubular versions.
- UL Listed, CSA Certified, and CE Marked.

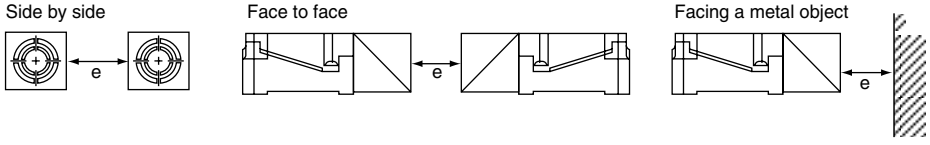
Sensing Distance	Circuit Type	Output Mode	Voltage Range	Connection	Load Current Maximum	Operating Frequency	Catalog Number
Shielded, 18 mm Diameter							
5 mm	PNP/NPN	N.O./N.C.	12–24 Vdc	2 m (6.6 ft) cable	200 mA	1,000 Hz	**XS1M18KPM40**
5 mm	PNP/NPN	N.O./N.C.	12–24 Vdc	Micro-style DC connector ∗	200 mA	1,000 Hz	**XS1M18KPM40D**
Shielded, 30 mm Diameter							
10 mm	PNP/NPN	N.O./N.C.	12–24 Vdc	2 m (6.6 ft) cable	200 mA	1,000 Hz	**XS1M30KPM40**
10 mm	PNP/NPN	N.O./N.C.	12–24 Vdc	Micro-style DC connector, 0.8 m (2.6 ft) pigtail ∗	200 mA	1,000 Hz	**XS1M30KPM40LD**
Shielded, Limit Switch Style Body							
15 mm	PNP/NPN	N.O./N.C.	12–24 Vdc	Screw Terminal	200 mA	1,000 Hz	**XS7C40KPM40**

∗ See page 626 for matching connector cables

Minimum Mounting Clearances



	Side by side	Face to face	Facing a metal object	Mounting in a metal support
XS1M18	e = 0.40 in. (10 mm)	e = 2.36 in. (60 mm)	e = 0.59 in. (15 mm)	d = 0.71 in. (18 mm), h = 0
XS1M30	e = 0.79 in. (20 mm)	e = 4.72 in. (120 mm)	e = 1.18 in. (30 mm	d = 1.18 in. (30 mm), h = 0



	Side by side	Face to face	Facing a metal object
XS7C40KPM40	e = 1.57 in. (40 mm)	e = 4.72 in. (120 mm)	e = 1.77 in. (45 mm)

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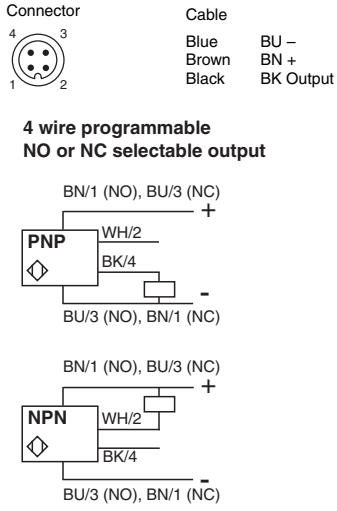
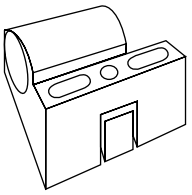
Wiring



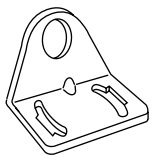
Specifications

Mechanical			
Standard temperature range		32° to 122° F (0° to 50° C)	
Enclosure rating	NEMA Type	Tubular, cable Tubular, connector Limit switch body	3, 4X, 6P, 12, 13 See connector rating 4, 6P, 12
	IEC	Tubular, cable Tubular, connector Limit switch body	IP68 See connector rating IP67
Enclosure material	Case	XS1M18 XS1M30 XS7	Nickel-plated brass Stainless steel ABS plastic
Tightening torque (maximum)		XS1M18 XS1M30	35 N•m 50 N•m
Vibration resistance	(IEC 60068-2-6)	7 gn, amplitude ±1 mm (10 Hz to 42 Hz)	
Shock resistance	(IEC 60068-2-27)	30 gn, 11 ms duration	
Standard target size	18 mm (0.71 in.) 30 mm (1.18 in.) Limit switch	18 x 18 mm (0.71 x 0.71 in.) 30 x 30 mm (1.18 x 1.18 in.) 45 x 45 mm (1.77 x 1.77 in.)	
Differential (maximum)	(% of Sr.)	15%	
Repeatability (maximum)	(% of Sr.)	3%	
LED indicator type	Tubular, cable Tubular, connector Tubular, pigtail Limit switch body	360° ring LED 4 LED windows at 90° 360° ring LED LED power On	
Connection	18 mm (0.71 in.), cable 18 mm (0.71 in.), connector 30 mm (1.18 in.), cable 30 mm (1.18 in.), pigtail Limit switch body	4-wire #22 AWG (0.34 mm^2), PvR 4-pin micro-style DC 4-wire #22 AWG (0.34 mm^2), PvR 4-pin micro-style DC, 0.8 m (2.6 ft) pigtail, PvR #14 AWG screw terminals	

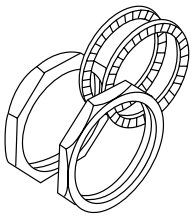
Electrical			
Voltage range		12–24 Vdc	
Voltage limit (including ripple)		10–38 Vdc	
Voltage drop (across switch) closed state (maximum)		2.6 V	
Current consumption (no load) (maximum)		15 mA	
Load current (maximum)		200 mA	
Operating frequency (maximum)		1,000 Hz	
On delay (maximum)		0.3 ms	
Off delay (maximum)		0.7 ms	
Power-up delay (maximum)		5 ms	
Short circuit protection		Yes	
Overload protection		Yes	
Reverse polarity protection		Yes	
Protective circuitry	Radio frequency immunity (RFI) Electrostatic, transients, impulse	IEC 60947-5-2 and NEMA ICS 5, Part 4	
Agency listings	E 164869 CCN NRKH	CR 44087 Class 3211 03	CE



XSZB1●●



9006PA●●



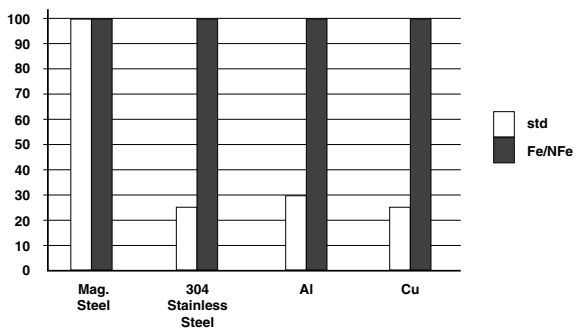
XSZE●●●

Accessories

Size	Description	Catalog Number
18 mm	Metal mounting nuts	**XSZE118**
	Metal mounting bracket	**9006PA18**
	Plastic mounting bracket	**XSZB118**
30 mm	Stainless steel mounting nuts	**XSZE330**
	Metal mounting bracket	**9006PA30**
	Plastic mounting bracket	**XSZB130**

Standard sensor technology requires an adjustment of up to 70% of the sensing distance to detect various metals. Because the ferrous/non-ferrous sensor detects all metals at the same distance, compensation is no longer needed. A smaller device can now perform at a range comparable to a larger sized or non-shielded device.

Standard vs. Ferrous/NonFerrous Proximity Sensing Range (%)



Connector Cables (M12 or D suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths . . . page 626
Accessories . . . . . page 284, 280

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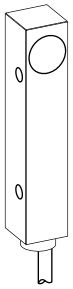
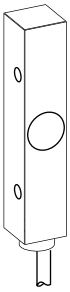
Proximity Sensors
XS5L8 Inductive Sensors
Miniature, Rectangular, DC



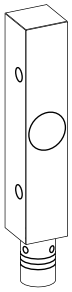
XS5L81



XS5L81•••S



XS5L82



XS5L82•••S

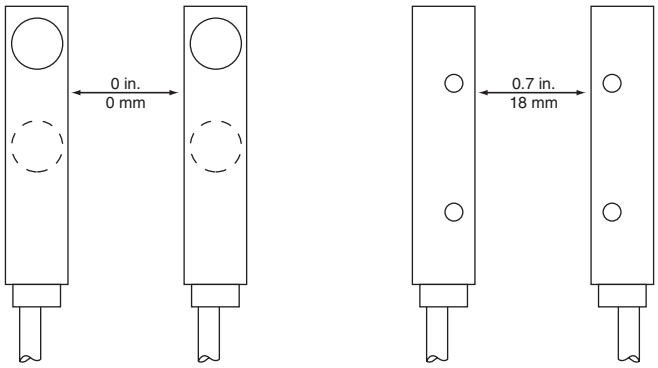
Features

- 90° sensing for mounting in restricted spaces with face at end or center
- PNP/NPN, N.O. Output
- 360° ring or LED indicator visible from 4 quadrants
- Small, 8 x 8 x 43 mm (0.13 x 0.13 x 1.7 in.) square metal housing
- Mount side by side with no interference
- UL Listed and CSA Certified

Sensing Face	Circuit Type	Output Mode	Voltage Range Maximum	Load Current Maximum	Operating Frequency Maximum	Catalog Number
1.5 mm Nominal Sensing Distance, 2 m (6.6 ft) cable						
Top	PNP	N.O.	10–30 Vdc	100 mA	2,500 Hz	**XS5L81PA140**
Top	NPN	N.O.	10–30 Vdc	100 mA	2,500 Hz	**XS5L81NA140**
1.5 mm Sensing Distance, Nano-Style Connector ∗						
Top	PNP	N.O.	10–30 Vdc	100 mA	2,500 Hz	**XS5L81PA140S**
Top	NPN	N.O.	10–30 Vdc	100 mA	2,500 Hz	**XS5L81NA140S**
1.5 mm Nominal Sensing Distance, 2 m (6.6 ft) cable						
Center	PNP	N.O.	10–30 Vdc	100 mA	2,500 Hz	**XS5L82PA140**
Center	NPN	N.O.	10–30 Vdc	100 mA	2,500 Hz	**XS5L82NA140**
1.5 mm Sensing Distance, Nano-Style Connector ∗						
Center	PNP	N.O.	10–30 Vdc	100 mA	2,500 Hz	**XS5L82PA140S**
Center	NPN	N.O.	10–30 Vdc	100 mA	2,500 Hz	**XS5L82NA140S**

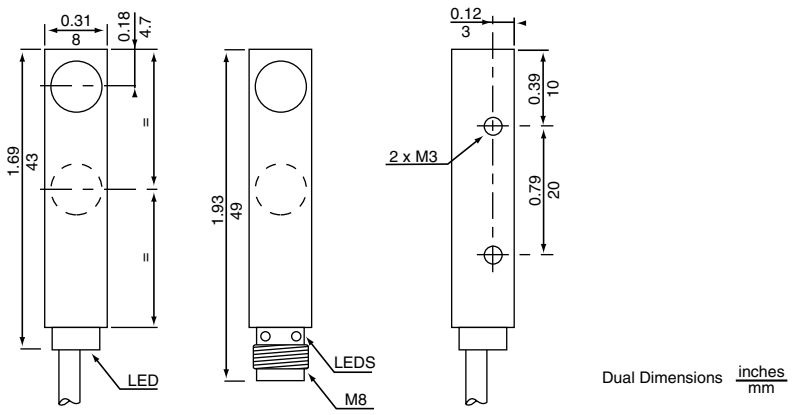
∗ See page 626 for matching connector cables

Minimum Mounting Clearances



Dimensions

XS5L81/82 **XS5 L81/82•••**



Dual Dimensions inches / mm

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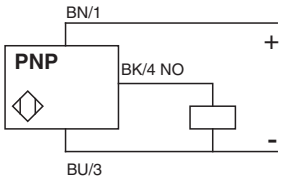
Wiring

Connector

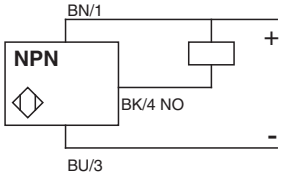


Cable	
Blue	BU –
Brown	BN +
Black	BK Output

3 Wire, PNP, NO



3 Wire, NPN, NO



Specifications

Mechanical		
Usable sensing range ★		1.2 mm
Temperature range		-13° to 158° F (-25° to 70° C)
Enclosure rating	IEC	IP67 (connector version depends on connector)
Differential (% of Sr)		20%
Repeatability (% of Sr)		3%
LED indicator	Cable Type	360° ring
	Connector type	90°, or visible from 4 quadrants
Enclosure material		Metal
Wiring		27 AWG (0.11 mm^2), PvR cable
Electrical		
Voltage range		12–24 Vdc
Voltage limit (including ripple)		10–30 Vdc
Voltage drop (across switch, closed state)		2.6 V
Maximum load current		100 mA
Current consumption (maximum) (no load)		10 mA
Residual (leakage) current, open state		0.1 mA
Power-up delay (maximum)		5 ms
On delay (maximum)		0.5 ms
Off delay (maximum)		1 ms
Physical characteristics		
Protective circuitry	Short circuit protection	yes
	Overload protection	yes
	Reverse polarity protection	yes
Agency listings	E 164869 CCN NRKH; CR 44087 Class 3211 03; CE	

Options

Description	Suffix
5 m (16.4 ft) cable	**L1**
10 m (32.8 ft) cable	**L2**

★ Refer to page 327 for target material correction coefficient Km

Connector Cables (M8 or S suffix)

XSZCS101	Nano-style, 3-pin, 2 m, straight
XSZCS111	Nano-style, 3-pin, 2 m, 90°

Additional cable options and lengths . . . page 626

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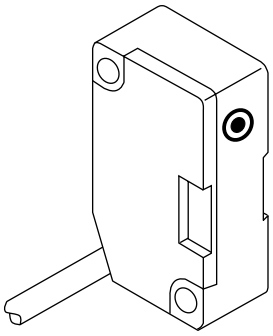
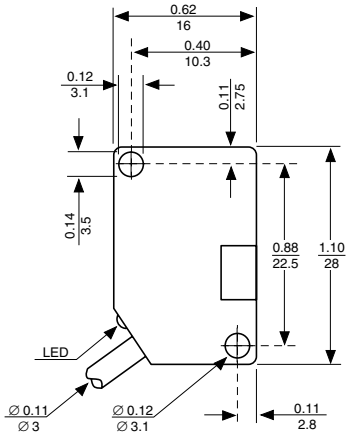
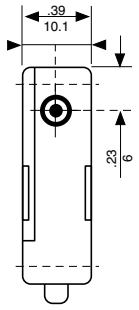
Proximity Sensors
XS7H, XS8H Miniature Inductive Sensor
Subcompact Block Style, DC







Front View

Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

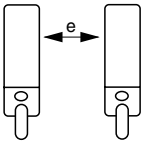
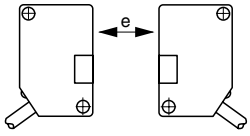
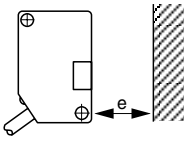
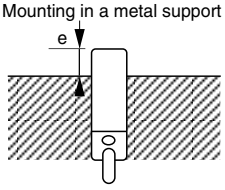
Miniature microswitch type inductive proximity sensor for industrial applications.

Features

- Very fast response time
- Rugged plastic housing
- Extremely small for mounting in difficult-to-access locations
- Easy replacement of mechanical microswitches with matching footprint (V3)
- Longer life and substantially faster speed than mechanical switches
- High levels of radio frequency immunity (RFI): electrostatic discharge, fast transients and impulse voltage protected
- UL Listed, CSA Certified, and CE Marked

Circuit type	Output mode	Voltage range	Load current (maximum)	Operating frequency	Catalog Number
2 mm (0.078 in.) Sensing Range—Shielded					
DC models, 3-wire 2 m (6.6 ft) cable					
PNP	N.O.	10–30 Vdc	200 mA	5,000 Hz	**XS7H10PA340**
NPN	N.O.	10–30 Vdc	200 mA	5,000 Hz	**XS7H10NA340**
3 mm (0.118 in.) Sensing Range—Non-Shielded					
DC models, 3-wire 2 m (6.6 ft) cable					
PNP	N.O.	10–30 Vdc	200 mA	5,000 Hz	**XS8H10PA340**
NPN	N.O.	10–30 Vdc	200 mA	5,000 Hz	**XS8H10NA340**

Minimum Mounting Clearances, mm (in.)

	Side by side	Face to face	Facing a metal object	Mounting in a metal support
				
XS7 Shielded	e: 7 (0.27)	e: 30 (1.18)	e: 7 (0.27)	e: 0
XS8 Non-shielded	e: 10 (0.39)	e: 40 (1.57)	e: 10 (0.39)	e: 5 (0.19)

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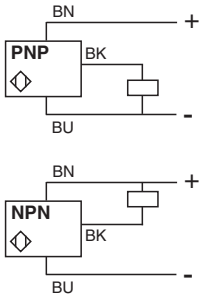
Wiring

3 wire, N.O.



Specifications

Mechanical		
Usable sensing range	Shielded	0–1.6 mm (0.06 in.)
	Non-shielded	0–2.4 mm (0.19 in.)
Standard temperature range	Shielded	-13 to +158 °F (-25 to +70 °C)
	Non-shielded	+14 to +122 °F (-10 to +50 °C)
Enclosure rating	IEC	IP67
Vibration resistance		25 G, ±2 mm amplitude, 10–55 Hz
Standard target size (steel)	Shielded	2 x 2 x 1 mm (0.08 x 0.08 x 0.04 in.)
	Non-shielded	3 x 3 x 1 mm (0.12 x 0.12 x 0.04 in.)
Repeatability (% of Sr)		3%
Cable		22 AWG, PvR
Electrical		
Differential (% of Sr)		Maximum 15%
Voltage drop (across switch)		2 V
Current consumption (no load)		10 mA
On and off delay (maximum)		0.1 ms
Power-up delay		5 ms
Reverse polarity protection		Standard
Protective circuitry	Radio frequency immunity (RFI)	IEC 61000-4-3 Level 3
	Electrostatic: transients: impulse	IEC 61000-4-2 Level 2: IEC 61000-4-4 Level 4: IEC 60947.5.2
Agency listings	E 164869 CCN NRKH / CR 44087 Class 3211 03	CE

Note: Refer to page 327 for target material correction coefficient Km.

Options

Description	Suffix
5 m (16.4 ft) cable	**L1**
10 m (32.8 ft) cable	**L2**

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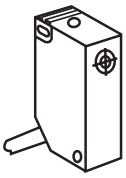
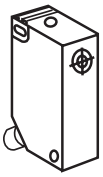
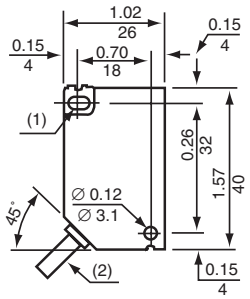
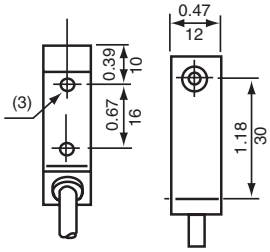
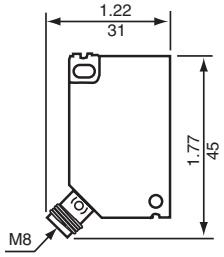
Proximity Sensors
XS7G/XS8G Inductive Sensors
Compact Block Style











XS•G12•A140S
Side view

(1) 1 elongated hole, 3.1 x 5.1 mm (0.12 x 0.20 in.)

(2) Cable, 2 m (6.6 ft)

(3) 2 holes, 3 x 5 mm (0.12 x 0.20 in.)

Features

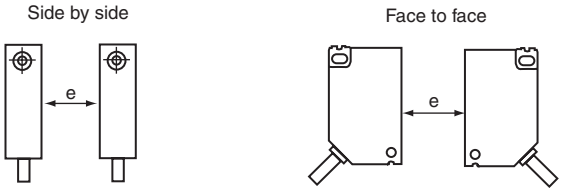
- Universal AC/DC and DC only models available
- Selectable PNP/NPN, N.O. and N.C. output
- Compact 12 x 26 x 40 mm (0.47 x 1.02 x 1.57 in.) body style, for tight mounting spaces
- PLC compatible
- Rugged plastic housing
- Very high radio frequency immunity
- Cable or nano-style connector versions offered ∗
- UL Listed, CSA Certified, and CE Marked

Circuit Type	Output Mode	Voltage Range Maximum	Voltage Drop Maximum	Load Current Maximum	Operating Frequency Maximum	Catalog Number
Universal AC/DC, Shielded—2 m (6.6 ft) cable, Nominal Sensing Distance—2 mm						
2-wire	N.O.	20–264 Vac/Vdc	5.5 V	5 to 200 mA ■	25 Hz AC/350 Hz DC	**XS7G12MA230**
2-wire	N.C.	20–264 Vac/Vdc	5.5 V	5 to 200 mA ■	25 Hz AC/350 Hz DC	**XS7G12MB230**
DC, Shielded—2 m (6.6 ft) cable, Nominal Sensing Distance—2 mm						
PNP	N.O.	10–30 Vdc	1.8 V	100 mA	2,000 Hz	**XS7G12PA140**
NPN	N.O.	10–30 Vdc	1.8 V	100 mA	2,000 Hz	**XS7G12NA140**
PNP	N.O.+N.C.	10–58 Vdc	2.6 V	200 mA	2,000 Hz	**XS7G12PC440**
NPN	N.O.+N.C.	10–58 Vdc	2.6 V	200 mA	2,000 Hz	**XS7G12NC440**
DC, Shielded—Nano-Connector, Nominal Sensing Distance—2 mm ∗						
PNP	N.O.	10–30 Vdc	1.8 V	100 mA	2,000 Hz	**XS7G12PA140S**
NPN	N.O.	10–30 Vdc	1.8 V	100 mA	2,000 Hz	**XS7G12NA140S**
Universal AC/DC, Non-shielded—2 m (6.6 ft) cable, Nominal Sensing Distance—4 mm						
2-wire	N.O.	20–264 Vac/Vdc	5.5 V	5 to 200 mA ■	25 Hz AC/350 Hz DC	**XS8G12MA230**
2-wire	N.C.	20–264 Vac/Vdc	5.5 V	5 to 200 mA ■	25 Hz AC/350 Hz DC	**XS8G12MB230**
DC, Non-shielded—2 m (6.6 ft) cable, Nominal Sensing Distance—4 mm						
PNP	N.O.	10–30 Vdc	1.8 V	100 mA	1,000 Hz	**XS8G12PA140**
NPN	N.O.	10–30 Vdc	1.8 V	100 mA	1,000 Hz	**XS8G12NA140**
PNP	N.O.+N.C.	10–58 Vdc	2.6 V	200 mA	1,000 Hz	**XS8G12PC440**
NPN	N.O.+N.C.	10–58 Vdc	2.6 V	200 mA	1,000 Hz	**XS8G12NC440**
DC, Shielded—Nano-Connector, Nominal Sensing Distance—4 mm ∗						
PNP	N.O.	10–30 Vdc	1.8 V	100 mA	1,000 Hz	**XS8G12PA140S**
NPN	N.O.	10–30 Vdc	1.8 V	100 mA	1,000 Hz	**XS8G12NA140S**

■ 0.6 A fuse is recommended for devices without short circuit protection. See accessories on page 284.

∗ See page 626 for matching connector cables

Minimum Mounting Clearances



XS7G Shielded	e: 0 mm (0 in.)	e: 15 mm (0.6 in.)
XS8G Non-shielded	e: 10 mm (0.4 in.)	e: 60 mm (2.4 in.)

Dual Dimensions inches / mm

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Wiring

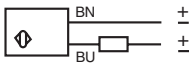
Connector



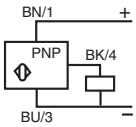
Cable

Blue	BU –
Brown	BN +
Black	BK Output

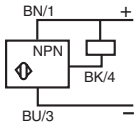
2-wire AC or DC NO or NC
XS•G12M•230



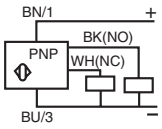
3-wire DC NO
XS•G12PA140
XS•G12PA140S



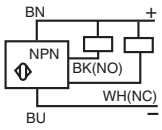
XS•G12NA140
XS•G12NA140S



4-wire DC NO + NC
XS•G12PC440



XS•G12NC440



Specifications

Mechanical			
Usable sensing range ★	Shielded	0–1.6 mm (0.06 in.)	
	Non-shielded	0–3.2 mm (0.13 in.)	
Temperature range		-13° to 158° F (-25° to 70° C)	
Enclosure rating	IEC	IP67 (except connector style)	
Vibration (conforming to IED 68-2-6)		25 G, ±2 mm amplitude, 10–55 Hz	
Shock resistance		50 G for 11 ms (conforming to IEC 60068-2-7)	
Standard target size (steel)		12 x 12 mm (0.47 x 0.47 in.)	
Differential (% of Sr)		20%	
Repeatability (% of Sr)		10%	
LED indicator		Located on top of sensor	
Enclosure material		Plastic	
Wiring		22 AWG (0.34 mm^2), PvR cable	
Electrical		**AC/DC models**	**DC models**
Voltage range		24 to 240 Vac	12–24 Vdc
		24 to 210 Vdc	—
Voltage limit (including ripple)		20 to 264 Vac/Vdc	10–30 Vdc
Current consumption (maximum) (no load)		—	10 mA
Maximum leakage (residual) current—open state		0.8 mA at 24 V, 1.5 mA at 120 V	0.1 mA
Power-up delay (maximum)		40 ms	4 ms
On delay (maximum)		1 ms	0.5 ms
Off delay (maximum)		2 ms	1 ms
Protective circuitry	Short circuit protection	No	Yes
	Overload protection	No	Yes
Agency listings	UL E 164869 CCN NRKH	CSA CR 44087 Class 3211 03	CE

Options

Description		**Suffix**
Extended temperature range	to +185° F (+85° C)	**TT**
	to -40° F (-40° C)	**TF**
5 m (16.4 ft) cable length		**L1**
10 m (32.8) cable length		**L2**

★ Refer to page 327 for target material correction coefficient Km.

Connector Cables (M8 or S suffix)

XSZCS101	Nano-style, 3-pin, 2 m, straight
XSZCS111	Nano-style, 3-pin, 2 m, 90°

Additional cable options and lengths. . . . page 626

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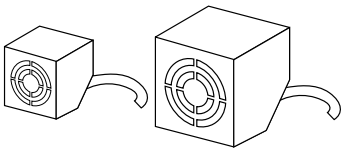
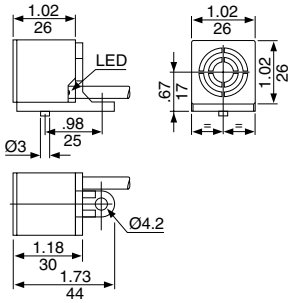
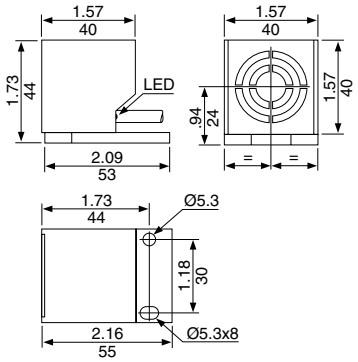
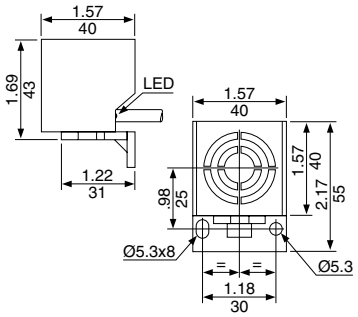
Proximity Sensors
XS7T/XS8T Inductive Sensors, Cubic Block Style
26 x 26 mm and 40 x 40 mm Square, DC









Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

Features

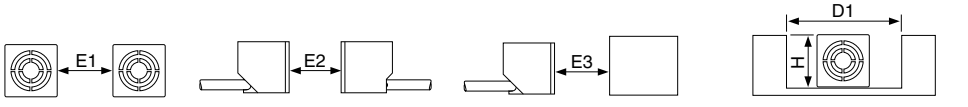
- Compact cubic body style in rugged PBT plastic
- Flush and non-flush mountable
- Comparable sensing distance to limit switch style in half the body size
- Mounting bracket included with each sensor
- Elbow bracket provides interchangeability with limit switch style sensor, and enables multiple positioning of sensing face
- Molded cable, or molded cable with micro-connector pigtail 0.8 or 0.15 m (31.5 or 5.9 in.)

Circuit Type	Output Mode	Voltage Range	Voltage Drop Maximum	Load Current Maximum	Operating Frequency Maximum	Catalog Number
26 mm x 26 mm						
DC, Flush Mountable, Nominal Sensing Distance—10 mm						
2 m (6.6 ft) Cable ▲						
2-wire	N.O.	12–48 Vdc	5.2 V	100 mA	100 Hz	**XS7T2DA210**
PNP	N.O. + N.C.	12–48 Vdc	2 V	200 mA	1,000 Hz	**XS7T2PC440**
NPN	N.O. + N.C.	12–48 Vdc	2 V	200 mA	1,000 Hz	**XS7T2NC440**
0.8 m (31.5 in.) Pigtail with 4-Pin Micro-Connector ▲						
2-wire	N.O.	12–48 Vdc	5.2 V	100 mA	100 Hz	**XS7T2DA214LD**
PNP	N.O. + N.C.	12–48 Vdc	2 V	200 mA	1,000 Hz	**XS7T2PC440LD**
NPN	N.O. + N.C.	12–48 Vdc	2 V	200 mA	1,000 Hz	**XS7T2NC440LD**
0.15 m (5.9 in.) Pigtail with 4-Pin Micro-Connector ▲						
2-wire	N.O.	12–48 Vdc	5.2 V	100 mA	100 Hz	**XS7T2DA214LD01**
DC, Non-Flush Mountable, Nominal Sensing Distance—15 mm						
2 m (6.6 ft) Cable ▲						
PNP	N.O. + N.C.	12–48 Vdc	2 V	200 mA	500 Hz	**XS8T2PC440**
NPN	N.O. + N.C.	12–48 Vdc	2 V	200 mA	500 Hz	**XS8T2NC440**
0.8 m (2.6 ft) Pigtail with 4-Pin Micro-Connector ▲						
PNP	N.O. + N.C.	12–48 Vdc	2 V	200 mA	500 Hz	**XS8T2PC440LD**
NPN	N.O. + N.C.	12–48 Vdc	2 V	200 mA	500 Hz	**XS8T2NC440LD**
40 mm x 40 mm						
DC, Flush Mountable, Nominal Sensing Distance—15 mm						
2 m (6.6 ft) Cable ▲						
2-wire	N.O.	12–48 Vdc	5.2 V	100 mA	150 Hz	**XS7T4DA210**
PNP	N.O. + N.C.	12–48 Vdc	2 V	200 mA	1,000 Hz	**XS7T4PC440**
NPN	N.O. + N.C.	12–48 Vdc	2 V	200 mA	1,000 Hz	**XS7T4NC440**
0.8 m (31.5 in.) Pigtail with 4-Pin Micro-Connector ▲						
2-wire	N.O.	12–48 Vdc	5.2 V	100 mA	150 Hz	**XS7T4DA214LD**
PNP	N.O. + N.C.	12–48 Vdc	2 V	200 mA	1,000 Hz	**XS7T4PC440LD**
NPN	N.O. + N.C.	12–48 Vdc	2 V	200 mA	1,000 Hz	**XS7T4NC440LD**
0.15 m (5.9 in.) Pigtail with 4-Pin Micro-Connector ▲						
2-wire	N.O.	12–48 Vdc	5.2 V	100 mA	150 Hz	**XS7T4DA214LD01**
DC, Non-Flush Mountable, Nominal Sensing Distance—20 mm						
2 m (6.6 ft) Cable ▲						
PNP	N.O. + N.C.	12–48 Vdc	2 V	200 mA	1,000 Hz	**XS8T4PC440**
NPN	N.O. + N.C.	12–48 Vdc	2 V	200 mA	1,000 Hz	**XS8T4NC440**
0.8 m (31.5 in.) Pigtail with 4-Pin Micro-Connector ▲						
PNP	N.O. + N.C.	12–48 Vdc	2 V	200 mA	1,000 Hz	**XS8T4PC440LD**
NPN	N.O. + N.C.	12–48 Vdc	2 V	200 mA	1,000 Hz	**XS8T4NC440LD**

▲ See page 626 for matching connector cables

Minimum Mounting Clearances

	E1		E2		E3		D1		H	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
XS7T2 Shielded	0.98	25	4.32	110	1.18	30	1.02	26	0	0
XS7T4 Non-shielded	1.57	40	4.71	120	1.77	45	1.57	40	0	0
XS7T4 Shielded	1.49	38	4.72	120	1.77	45	3.07	78	1.02	26
XS8T4 Non-shielded	2.36	60	6.29	160	2.36	60	4.72	120	1.57	40



Side by Side | Face to Face | Facing a Metal Object | Mounted in a Metal Support

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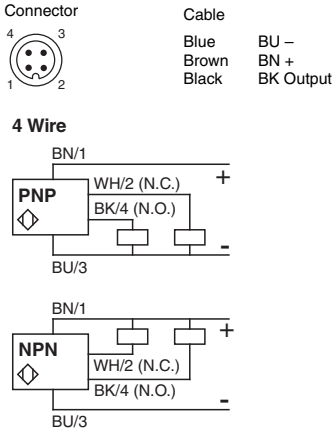
Wiring



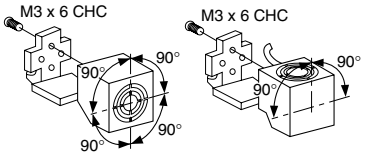
Specifications

Mechanical				
Usable Sensing Range ★	XS7T2	0–8 mm (0.32 in.)		
	XS8T2	0–12 mm (0.47 in.)		
Temperature Range		-13° to 158° F (-25° to 70° C)		
Enclosure Rating	NEMA Type	1, 4X, 12		
	IEC	IP67 (connector version: depends on connector)		
Vibration		25 G, ±2 mm amplitude, 10–55 Hz		
Shock Resistance		50 G for 11 ms		
Differential (% of Sr)		20%		
Repeatability (% of Sr)		3%		
LED Indicator Type		Yes, located at cable		
Enclosure Material		Plastic		
Wiring		20 AWG (0.5 mm^2), PvR cable		
Electrical		**2-wire**	**3-wire**	**4-wire**
Voltage Range		12–48 Vdc	12–48 Vdc	12–48 Vdc
Voltage Limit (Including Ripple)		10–58 Vdc	10–58 Vdc	10–58 Vdc
Voltage Drop		5.2 V	2 V	5.2 V
Maximum Leakage (Residual) Current—Open State		0.7 mA	0.1 mA	0.1 mA
Current Consumption		10 mA	10 mA	10 mA
Power-up Delay (maximum)		5 ms	5 ms	7 ms
On Delay (maximum)		2 ms	0.3 ms	0.3 ms
Off Delay (maximum)		5 ms	0.7 ms	0.7 ms
Protective Circuitry	Short Circuit Protection	Yes	Yes	Yes
	Overload Protection	Yes	Yes	Yes
Agency Listings	E 164869 CCN NRKH	CR 44087 Class 3211 03	CE	

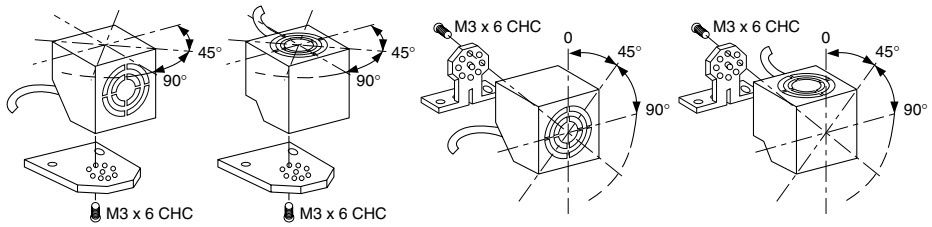
★ Refer to page 327 for target material correction coefficient Km.

Mounting options

XS7/8T2



XS7/8T4



Connector Cables (M12 or D suffix)

XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths. . . . page 626

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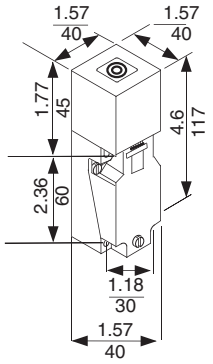
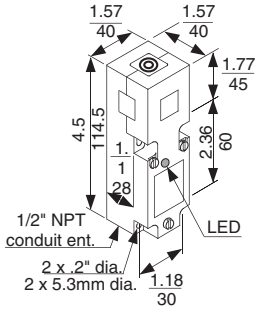
Proximity Sensors
XS7C/XS8C Limit Switch Type, Inductive Sensors
5-Position Turret Head, Plastic AC/DC, DC or AC

Sensing head turns to accommodate 5 different sensing positions



XS7/8



XSCT

Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

Standard limit switch housing inductive proximity sensors for industrial applications

Features

- PBT plastic body with stainless steel screws for corrosive environments
- Plug-in design for ease in replacement
- 5-position turret head for reduced inventory
- 0.5 in. (12.7 mm) NPT conduit entrance with many wiring and connecting options
- Radio frequency immunity (RFI) standard
- PLC compatible
- 2-LED system on selected models indicates on/off, power on
- DC versions work with unfiltered power supply
- Noise and transient protection
- Reverse polarity protection (DC models)
- Excellent resistance to aggressive environments (dripping corrosive fluids, submersion in water)
- Universal AC/DC 2-wire
- Longest extended range using the standard dimensions
- UL Listed, CSA Certified, and CE Marked

Circuit Type	Output Mode	Voltage Range AC	Voltage Range DC	Maximum Load Current ■	Residual (leakage) current	Operating Frequency	LED	SCP★	Catalog Number
Shielded									
15 mm (0.59 in.) sensing range universal, AC/DC									
2-wire	N.O./N.C.	24–240 V	24–210 V	300 mA/200 mA	0.5 mA at 24 V 1.5 mA at 120 V	25/50 Hz	Yes	No	**XS7C40MP230**
15 mm (0.59 in.) sensing range, DC									
2-wire	N.O.	—	12–48 V	100 mA	0.5 mA	1,500 Hz	Yes	Yes	**XS7C40DA210**
2-wire	N.O./N.C.	—	12–48 V	100 mA	0.5 mA	1,500 Hz	Yes	Yes	**XS7C40DP210**
PNP	N.O. + N.C.	—	12–48 V	200 mA	—	1,000 Hz	2	Yes	**XS7C40PC440**
NPN	N.O. + N.C.	—	12–48 V	200 mA	—	1,000 Hz	2	Yes	**XS7C40NC440**
20 mm (0.79 in.) extended range, DC 3-wire									
PNP	N.O. + N.C.	—	12–48 V	200 mA	—	1,000 Hz	2	Yes	**XS7C40PC449**
NPN	N.O. + N.C.	—	12–48 V	200 mA	—	1,000 Hz	2	Yes	**XS7C40NC449**
15 mm (0.59 in.) sensing range, AC									
2-wire	N.O./N.C.	24–240 V	—	500 mA	1.5 mA	25 Hz	Yes	No	**XS7C40FP260**
Non-Shielded									
20 mm (0.79 in.) sensing range universal, AC/DC									
2-wire	N.O./N.C.	24–240 V	24–210 V	300 mA/200 mA	0.5 mA at 24 V 1.5 mA at 120 V	25/50 Hz	Yes	No	**XS8C40MP230**
20 mm (0.79 in.) sensing range, DC									
2-wire	N.O.	—	12–48 V	100 mA	0.6 mA	150 Hz	Yes	No	**XS8C40DA210**
2-wire	N.O./N.C.	—	12–48 V	100 mA	0.6 mA	150 Hz	Yes	No	**XS8C40DP210**
PNP	N.O. + N.C.	—	12–48 V	200 mA	—	1,000 Hz	2	Yes	**XS8C40PC440**
NPN	N.O. + N.C.	—	12–48 V	200 mA	—	1,000 Hz	2	Yes	**XS8C40NC440**
40 mm (1.6 in.) extended range, DC 3-wire									
PNP	N.O. + N.C.	—	12–48 V	200 mA	—	500 Hz	2	Yes	**XS8C40PC449**
NPN	N.O. + N.C.	—	12–48 V	200 mA	—	500 Hz	2	Yes	**XS8C40NC449**
20 mm (0.79 in.) sensing range, AC									
2-wire	N.O./N.C.	24–240 V	—	500 mA	1.5 mA	25 Hz	Yes	No	**XS8C40FP260**
20 mm (0.79 in.) sensing range, AC Model with Timer (1–20s)									
2-wire	N.O./N.C.	24–240 V	—	350 mA	2.0 mA (R)	13 Hz	Yes	No	**XSCT023319**

★ For devices without SCP, a 0.8 A quick-blow fuse wired in series is recommended. See page 284 for protective fuses.

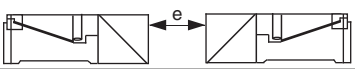
■ 20 ≤ Vdc 58 IEC 60947-5-2 Utilization category DC-13; Vdc > IEC 60947-5-2 Utilization category DC-12

Minimum Mounting Clearances, mm (in.)

Side by Side



Face to Face



	Side by Side	Face to Face
XS7 Shielded	e: 40 (1.57)	e: 120 (4.72)
XS8 Non-shielded	e: 80 (3.15)	e: 160 (6.30)

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Proximity Sensors
XS7C/XS8C Limit Switch Type, Inductive Sensors
5-Position Turret Head, Plastic AC/DC, DC or AC

Wiring

Connector

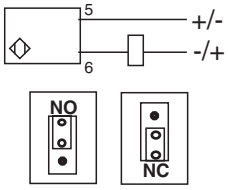


K30/K31 R30/R31 R5

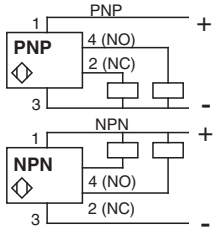
Cable

Blue	BU –
Brown	BN +
Black	BK Output

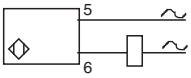
2 wire DC Non Polarized



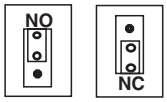
4 wire DC NO/NC



2 wire AC



NO/NC Selector Jumper



Specifications

Mechanical		
Usable sensing range ✱	Shielded	0–12 mm (0.47 in.)
	Non-shielded	0–16 mm (0.63 in.)
Standard temperature range		-13 to +158 °F (-25 to +70 °C)
Enclosure rating	NEMA Type	4, 6P, 12 (UL test pending)
	CENELEC	IP67
Enclosure material	Body and sensing face	PBT
	Screws	Stainless steel
Vibration resistance	IEC 60068.2.6	25 G, amplitude at 55 Hz, frequency = 10–55 Hz
Shock resistance	IEC 60068.2.27	50 G, 11 ms duration
Standard target size (steel)	Shielded	45 x 45 mm (1.8 x 1.8 in.)
	Non-shielded	60 x 60 mm (2.4 x 2.4 in.)
Differential		Maximum 20%
Repeatability		Maximum 3%
Radio frequency immunity (RFI)		Standard
Cable		Screw terminals

Electrical	AC Models	DC Models		AC/DC Models
		2-wire	4-wire	
Voltage range	24–240 V 50/60 Hz	12–48 V	12–48 V	24–240 Vac 50/60 Hz 24–210 Vdc
Voltage limit (including ripple)	20–264 V 50/60 Hz	10–58 V	10–58 V	20–264 Vac/Vdc
Voltage drop (across switch) closed state	5.5 V	4 V	2 V	5.5 V
Minimum load current	5 mA	1.5 mA	—	5 mA
Maximum load current	500 mA	100 mA	100 mA	300 mA/200 mA
Inrush	2 A★	—	—	2 A★
Current consumption (no load)	—	—	10 mA	—
On delay (maximum)	30 ms	2 ms	0.3 ms	30 ms
Offdelay(maximum) Shielded	20 ms	5 ms	0.7 ms	20 ms
Offdelay(maximum) Non-shielded	20 ms	7 ms	0.7 ms	20 ms
Power-up delay (maximum)	120 ms	5 ms	5 ms	120 ms

Protective circuitry	
Short circuit protection	Optional ★
Overload protection	Yes
Radio frequency immunity (RFI)	IEC 61000-4-3 Level 3
Electrostatic; transients; impulse	IEC 61000-4-2 Level 4; IEC 61000-4-3 Level 3; IEC 60947.5.2 Level 3
Reverse polarity protection DC Versions	Yes
Agency listings	E 164869 CCN NRKH; CR 44087 Class 3211 03; CE

✱ See page 327 for target material corrective coefficient km.

★ Without overload or SCP, a 0.8 A quick-blow fuse wired in series is recommended. See page 284 for protective fuses.

Options

Description		Suffix
Extended temperature range	+185° F (+85 °C)	**TT**
	-40° F (-40 °C)	**TF**
3-pin mini-style connector	Normally open	**R30**
	Normally closed	**R31**
5-pin mini-style connector		**R5**
3-pin micro-style connector	AC only, wired normally open	**K30**
	AC only, wired normally closed	**K31**

Connector Cables (R3, R5, or K suffix)

XSZCK101Y	Micro-style, 3-pin, 2 m, straight
XSZCK111Y	Micro-style, 3-pin, 2 m, 90°
XSZCA901Y	Mini-style, 3-pin, 2 m, straight
XSZCA911Y	Mini-style, 3-pin, 2 m, 90°
XSZCA1501Y	Mini-style, 5-pin, 2 m, straight
XSZCA1511Y	Mini-style, 5-pin, 2 m, 90°

Additional cable options and lengths. . . . page 626

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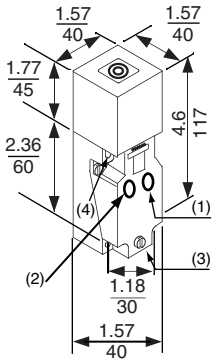


(1) Output LED (Yellow)
(2) Power/Teach LED (Green)
(3) 1/2" NPT conduit opening
(4) Two elongated mounting holes: 0.21" x 0.28" (5.3 mm x 7 mm)

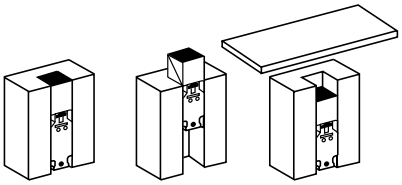
Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

Features

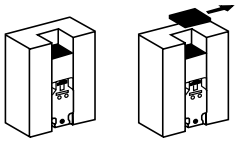
Microprocessor based, self-teaching proximity switch adjusts to its environment on command, suppressing any metal background, then detecting the target it was taught to identify (*see illustration*).

- Can be recess mounted in metal without interfering with the sensing field
- Long range sensing 0.98 in. (25 mm)
- Plastic limit switch plug-in body style with 5-position turret head
- Two LEDs: (1) power supply and terminal mode (flashes in learning mode when sensor is learning its environment), (2) output
- 24 Vdc, complementary PNP- and NPN-type output
- UL Listed, CSA Certified, CE Marked

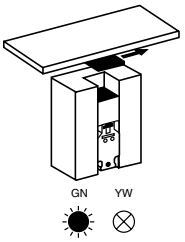
Illustrations:



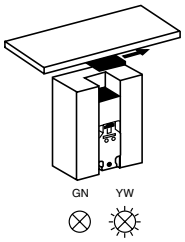
1. The sensor can be flush mounted, non-flush mounted, or recess mounted. A metal background can be placed in immediate proximity to the sensor.



2. For setup, the teach mode is activated. When no target is present, the sensor learns the environment. Then, the target is passed in front of the sensor in the usual way.



3. The green LED flashes while the sensor is learning its environment and target, then becomes steady when the sensor is set.

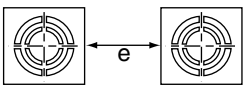


4. The newly programmed sensor recognizes the target and provides output.

Sensing Distance	Circuit Type	Output Mode	Connection	Catalog Number
25 mm	PNP	N.O.	Screw Terminal	**XS8C40PAA40**
25 mm	NPN	N.O.	Screw Terminal	**XS8C40NAA40**

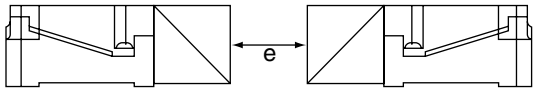
Minimum Mounting Clearances, mm (in.)

Side by side



XSC8C40•AA40 e: 80 (3.15)

Face to face



e: 9.45 (240)

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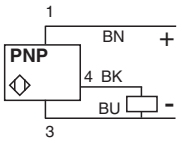
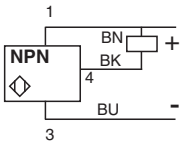
Wiring

3-wire DC, NO output





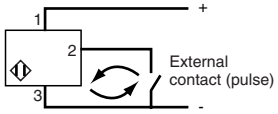
XS8C40●AA40

Specifications

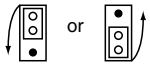
Mechanical		
Temperature range	Operating Storage	-13 to 158 °F (-25 to 70 °C) -13 to 158 °F (-25 to 70 °C)
Enclosure rating	NEMA Type	4, 4X, 6, 6P, 12,
	IEC	IEC IP67 per IEC 60529
Enclosure material	Case	PBT
Vibration resistance	(IEC 60068-2-6)	25 G, amplitude at 55 Hz, 10–55 Hz
Shock resistance	(IEC 60068-2-27)	50 G, 11 ms duration
Differential (maximum)	(% of Sr.)	15%
Repeatability (maximum)	(% of Sr.)	3%
LED indicator type		Power/Teach (green)
		Output (yellow)
Connection		Screw Terminal
Electrical		
Voltage limit (including ripple)		19–30 Vdc
Voltage drop (across switch) closed state (maximum)		2 V
Current consumption (no load) (maximum)		20 mA
Load current (maximum)		200 mA
Operating frequency (maximum)		600 Hz
On delay (maximum)		1 ms
Off delay (maximum)		1 ms
Power-up delay (maximum)		250 ms
Short circuit protection		Yes
Overload protection		Yes
Reverse polarity protection		Yes
Agency listings	E 164869 CCN NRKH	CR 44087 Class 3211 03

Activating self-teaching mode

Option 1
by external contact



Option 2
internally (repositioning of jumper)



When in the self-teaching mode, the green LED (status) flashes rapidly.

As objects pass through the detection zone, the sensor memorizes the two opposing thresholds in relation to its environment. When the self-teaching setup is complete, the green LED ceases to flash and maintains a steady light. The yellow LED indicates output.

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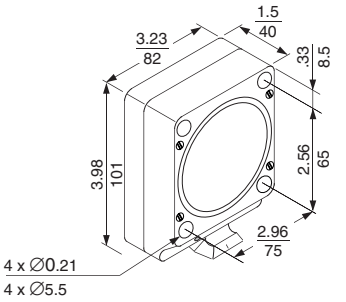
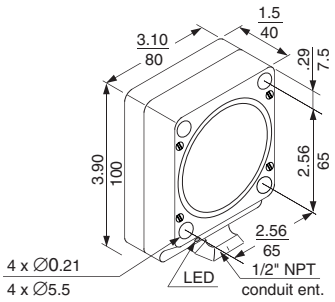
Proximity Sensors
XSD Rectangular, Inductive Sensors
Long Range Block, AC and DC—Plug-in

Shielded



Unshielded



Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

Features

Rectangular low-profile switch, 3.5 in. square by 1.63 in. high (88.4 x 41.4 mm) designed for very demanding industrial applications.

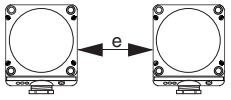
- Housings: Plastic (thermoplastic polyester)
- LED indicators: target sensed, power on and short circuit (selected models)
- Timer model available for jamming applications
- Plug-in modular design
- Radio frequency immunity (RFI)
- Short circuit protection (SCP) (selected models)
- Alternate frequency models for side by side mounting (selected models)
- DC models: complementary outputs (PNP or NPN)
- AC models: selectable normally open (N.O.) or normally closed (N.C.)
- UL Listed, CSA Certified, and CE marked

Circuit Type	Output Mode	Voltage Range ▲	Maximum Load	Residual (Leakage) Current	Operating Frequency Maximum	LED	SCP★	Catalog Number
40 mm (1.57 in.) Sensing Range, Shielded								
DC Model, Screw Terminals								
2-wire	N.O.	12–48 V	100 mA	0.5 mA	180 Hz	Yes	Yes	**XSDC407138**
40 mm (1.57 in.) Sensing Range, Non-Shielded								
DC Model, Screw Terminals								
2-wire	N.O.	12–48 V	100 mA	0.5 mA	180 Hz	Yes	Yes	**XSDC407139**
PNP	N.O. + N.C.	12–48 V	200 mA	—	50 Hz	Yes	Yes	**XSDH407339†**
NPN	N.O. + N.C.	12–48 V	200 mA	—	50 Hz	Yes	Yes	**XSDJ407339†**
AC Model, Screw Terminals								
2-wire	N.O./N.C.	24–240 V	500 mA	1.5 mA (P) ■	10 Hz	Yes	No	**XSDA400519†**
2-wire	N.O./N.C.	24–240 V	500 mA	1.5 mA (P) ■	10 Hz	3 ♦	Yes	**XSDA405539†**
AC Model Mini-Style Connector, 3-Pin ◑								
2-wire	N.O./N.C.	24–240 V	500 mA	1.5 mA (P) ■	10 Hz	Yes	No	**XSDA400519R3†**
2-wire	N.O./N.C.	24–240 V	500 mA	1.5 mA (P) ■	10 Hz	3 ♦	Yes	**XSDA405539R3†**
AC Model with Timer								
2-wire	N.O./N.C.	24–240 V	500 mA	3.5 mA (R) ■	10 Hz	Yes	No	**XSDT023319**
50 mm (2 in.) Sensing Range, Shielded								
AC/DC Model, Screw Terminals								
2-wire	N.O./N.C.	24–240 V	5–100 mA DC 5–500 mA AC	1.7 mA at 120 V 3 mA at 240 V ●	10 Hz	3 ♦	Yes	**XSDM500538**
50 mm (2 in.) Sensing Range, Non-Shielded								
DC Model, Screw Terminals								
2-wire	N.O.	12–48 V	100 mA	0.5 mA	180 Hz	Yes	Yes	**XSDC507139**
AC Model, Screw Terminals								
2-wire	N.O./N.C.	24–240 V	500 mA	1.5 mA	10 Hz	Yes	No	**XSDA500519**
2-wire	N.O./N.C.	24–240 V	500 mA	1.5 mA	10 Hz	3 ♦	Yes	**XSDA505539**
AC Model Mini-Style Connector, 3-Pin ◑								
2-wire	N.O/.N.C.	24–240 V	500 mA	1.5 mA	10 Hz	Yes	No	**XSDA500519R†**
2-wire	N.O./N.C.	24–240 V	500 mA	1.5 mA	10 Hz	3 ♦	Yes	**XSDA505539R†**

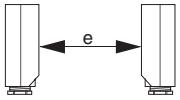
● 100 mA for DC.
■ PLC applications: P= PLC compatible. R= Bleeder resistor needed.
† Also available with alternate frequency. Add F to catalog number. No additional charge.
♦ 1 LED for Power On, 1 LED for Output On, 1 LED for SCP triggered.
◑ Mating connector, see page 626.
★ For devices without SCP, see page 284 for protective fuses.

Minimum Mounting Clearances (Except XSDM500538), mm (in.)

Side by side



Face to face



XSD40	e: 200 (7.9)	e: 400 (15.7)
XSD50	e: 250 (10)	e: 500 (20)

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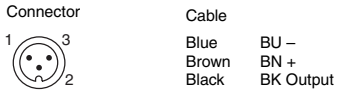
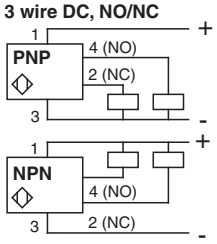
Proximity Sensors
XSD Rectangular, Inductive Sensors
Long Range Block, AC and DC—Plug-in

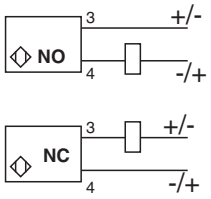
Wiring



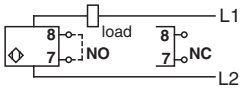
3 wire DC, NO/NC



2 wire DC, non polarized



2 wire AC and AC/DC, programmable NO/NC



Connector Cables (A or R3 suffix)

XSZCA901Y	Mini-style, 3-pin, 2 m, straight
XSZCA911Y	Mini-style, 3-pin, 2 m, 90°

Additional cable options and lengths . . . page 626

Specifications

Mechanical		
Usable Sensing Range★		24–48 mm (0.94–1.89 in.)
Standard Temperature Range		-13 to +158 °F (-25 to +70 °C)
Enclosure Rating	NEMA Type	3, 4X (indoor), 12, 13
	IEC	IP67
Vibration Resistance		25 G, ±2 mm amplitude, 10–55 Hz
Shock Resistance		50 G for 11 ms
Standard Target Size (Mild Steel)		120 x 120 mm (4.7 x 4.7 in.)
Differential		Maximum 20%
Repeatability		Maximum 5%
Cable, PVC		Screw terminals, #16 AWG

Electrical	AC Models	DC Models		AC/DC Models
		2-wire	4-wire	
Voltage Range, Maximum (Including Ripple)	20–264 V	10–58 V	10–58 V	20–264 V
Voltage Drop (Across Switch)	5.5 V★	4 V	1.8 V	6 V
Inrush Current (Inductive @ 20 ms)	2 A	—	—	2 A
Minimum Load Current	5 mA	1.5 mA	—	5 mA
Current Consumption (No Load)	—	—	10 mA	—
On Delay (Maximum)	30 ms	0.2 ms	10 ms	40 ms
Off Delay (Maximum)	20 ms	3 ms	10 ms	60 ms
Power-up Delay (Maximum)	120 ms	5 ms	10 ms	100 ms
Reverse Polarity Protection	—	Standard	Standard	—
Radio Frequency Immunity (RFI)	4 cm (1.6 in.) minimum from antenna			
Agency Listings	E 164353 ■ CCN NRKH	LR 44087 ★ Class 3211 03	FM: J.I. OROH9.AX (3610, 3611)	CE

★ Timer model voltage drop is 4.5 V.

Options

Description		Suffix
Extended Temperature Range	to +185 °F (85 °C) (▼ Not Available on AC Models with SCP)	TT
	to -40 °F (-40 °C)	TF

Ex: XSD605539 TTR3

Replacement Modules

Description	Catalog Number
DC 2-Wire	
Base Receptacle, N.O. Contact	**ZSDZ03**
N.O. Contact Switch	**ZSDC607139**
Base Receptacle, N.O./N.C.	**ZSDZ02**
N.O./N.C. Contact Switch	**ZSDC607319**
DC 3-Wire	
Base Receptacle	**ZSDZ02**
PNP Switch	**ZSDH607339**
NPN Switch	**ZSDJ607339**
AC 2-Wire	
Base Receptacle	**ZSDZ01**
1 LED, N.O. SCP Switch	**ZSDA600519**
3 LED, SCP Switch	**ZSDA605539**
AC/DC	**ZSDM600539**

▼ Refer to page 327 for target material correction coefficient Km.

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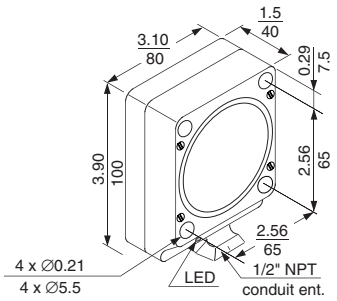
Proximity Sensors
XSD Rectangular, Inductive Sensors
Long Range Block, AC and DC; Adjustable Sensing Range



Dual Dimensions inches / mm

Features

Rectangular, low-profile switch 3.5 in. square by 1.63 in. high (88.4 x 41.4 mm) designed for very demanding industrial applications. Especially recommended for long-sensing-range applications with metal in the background.

- Housings: plastic (thermoplastic polyester)
- Adjustable sensing range (30 to 60 mm); sensitivity can be decreased below the maximum usable sensing distance (48 mm) to cancel the metal background influence (20-turn potentiometer under the front plastic cap). For fixed long sensing distance, see page 258.
- LED indicators: target sensed, power on and short circuit (selected models)
- Plug-in modular design
- AC/DC model available
- Radio frequency immunity (RFI)
- Short circuit protection (SCP) (selected models)
- 1/2 in. NPT conduit entrance
- Protected, captive saddle-clamp terminals in ready-to-wire position
- DC models: complementary outputs PNP or NPN
- AC models: programmable output N.O./N.C.
- UL Listed and CSA Certified

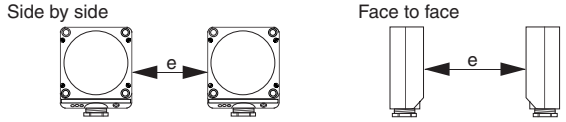
NOTE: Sensors are factory adjusted for the maximum sensing distance.
Do not attempt to increase the sensing distance above the factory setting; sensor behavior becomes unpredictable.

30–60 mm (2.36 in.) Sensing Range, Non-Shielded

Circuit Type	Output Mode	Voltage Range	Maximum Load	Residual (Leakage) Current Maximum	Operating Frequency Maximum	LED	SCP★	Catalog Number
DC model, 2- and 3-wire screw terminals								
2-wire	N.O.	12–48 V	100 mA	0.8 mA	20 Hz	Yes	Yes	**XSDC607139**
2-wire	N.O., N.C.	12–48 V	100 mA	0.8 mA	20 Hz	Yes	No	**XSDC607319**
PNP	N.O., N.C.	12–48 V	200 mA	—	50 Hz	Yes	Yes	**XSDH607339**
NPN	N.O., N.C.	12–48 V	200 mA	—	50 Hz	Yes	Yes	**XSDJ607339**
AC model, screw terminals								
2-wire	N.O./N.C.	24–240 V	500 mA	1.7 mA ②	10 Hz	Yes	No	**XSDA600519**
2-wire	N.O./N.C.	43–132 V	500 mA	1.7 mA ②	10 Hz	3③	Yes	**XSDA605539**
AC and DC models, screw terminals								
2-wire	N.O./N.C.	24–240 Vac	500 mA	1.7 mA @ 120 V ② ■	—	—	—	—
		24–210 Vdc	100 mA	115 V	10 Hz	3③	Yes	**XSDM600539**
AC and AC/DC models, mini-style receptacle, 3-pins								
2-wire	N.O./N.C.	24–240 V	500 mA	1.7 mA ②	10 Hz	Yes	No	**XSDA600519R3**
2-wire	N.O./N.C.	93–132 V	500 mA	1.7 mA ②	10 Hz	3③	Yes	**XSDA605539R3**
2-wire	N.O./N.C.	24–240 Vac	500 mA	1.7 mA ②	—	—	—	—
		24–210 Vdc	100 mA	1.7 mA @ 120 V ② ■	10 Hz	3③	Yes	**XSDM600539R3**

② PLC compatible.
③ 1 LED for Power Out and 1 LED for Output On, 1 LED for SCP triggered.
■ < 1 mA @ 24 V, < 3 mA @ 240 V
★ For devices without SCP, see page 284 for protective fuses.

Minimum Mounting Clearances, mm (in.)



XSD30-60	e: 300 (12)	e: not recommended

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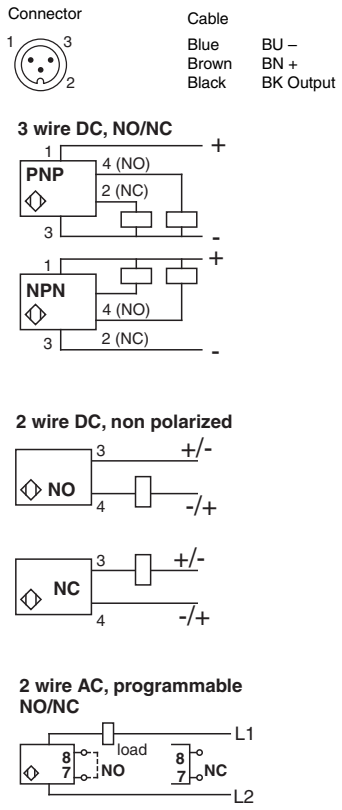
Proximity Sensors
XSD Rectangular, Inductive Sensors
Long Range Block, AC and DC; Adjustable Sensing Range

Wiring



Specifications

Mechanical		
Usable sensing range ★		24–48 mm (0.94–1.89 in.)
Standard temperature range		-13 to +158° F (-25 to +70° C)
Enclosure rating	NEMA Type	3, 4, 6, 12, 13
	IEC	IP67
Vibration resistance		25 G, ±2 mm amplitude, 10–55 Hz
Shock resistance		50 G for 11 ms
Standard target size (mild steel)		120 x 120 mm (4.7 x 4.7 in.)
Differential		Maximum 20%
Repeatability		Maximum 5%
Cable, PVC		Screw terminals, #16 AWG

Electrical	AC Models	DC Models			AC/DC Models
		2-wire, N.O.	2-wire, N.O./N.C.	4-wire	
Voltage range (including ripple)	20–264 V	10–58 V	10–58 V	10–58 V	20–264 V
Voltage drop (across switch)	4.5 V	4 V	7 V	1.8 V	6 V
Inrush current (inductive @ 20 ms)	2 A	—	—	—	2 A
Minimum load current	5 mA	—	1.5 V	—	5 mA
Current consumption (no load)	—	10 mA	—	10 mA	—
On delay (maximum)	30 ms	5 ms	5 ms	10 ms	40 ms
Off delay (maximum)	20 ms	40 ms	25 ms	10 ms	60 ms
Power-up delay (maximum)	120 ms	75 ms	30 ms	10 ms	100 ms
Reverse polarity protection	—	Standard	Standard	Standard	—
Radio frequency immunity (RFI)	40 mm (1.6 in.) minimum from antenna				
Agency listings	E 164353 ■ CCN NRKH	LR 44087 ★ Class 3211 03	FM: J.I. OROH9.AX (3610, 3611)		CE

Options

Extended temperature range (Not available on AC models with SCP)	Suffix
to +185° F (85° C)	TT
to -40° F (-40° C)	TF

Ex: XSD605539 TTR3

Replacement modules

Description	Catalog Number
DC 2-wire	
Base receptacle, N.O. contact	**ZSDZ03**
N.O. contact switch	**ZSDC607139**
Base receptacle, N.O./N.C.	**ZSDZ02**
N.O./N.C. contact switch	**ZSDC607319**
DC 3-wire	
Base receptacle	**ZSDZ02**
PNP switch	**ZSDH607339**
NPN switch	**ZSDJ607339**
AC 2-wire	
Base receptacle	**ZSDZ01**
1 LED, N.O. SCP switch	**ZSDA600519**
3 LED, SCP switch	**ZSDA605539**
AC/DC	**ZSDM600539**

★ Refer to page 327 for target material correction coefficient Km.

Connector Cables (A or R3 suffix)

XSZCA901Y	Mini-style, 3-pin, 2 m, straight
XSZCA911Y	Mini-style, 3-pin, 2 m, 90°

Additional cable options and lengths . . . page 626

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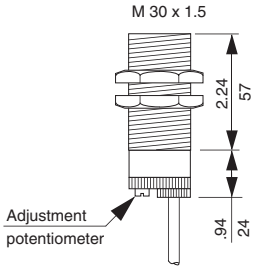
Proximity Sensors
XSAV Tubular, Inductive Sensors
30 mm Diameter, Motion Detection, DC or AC/DC



Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

The XSAV is a self-contained device used to detect and send output alarms for machinery underspeed or zero-speed conditions, as well as early jamming detection. Early detection of an underspeed condition helps reduce downtime due to jamming or transmission failure, especially for medium and large motors.

The zero speed condition is used extensively for safety interlocking applications, including: conveyors, pumps, mixers, centrifugal separators, elevators, saws, and crushers.

As long as the speed (pulses/minute) is above the threshold level—adjustable via a 25-turn potentiometer within the threshold range—the output circuit assumes its closed state. When the actual speed falls below the threshold level, the output circuit assumes its open state. To preserve the startup delay, the switch should be reset by recycling power.

When the line voltage is initially applied, the output automatically assumes its closed state for the duration of the startup delay. This allows the mechanical assembly to overcome inertia and reach its nominal speed, greatly simplifying the interlocking circuit. After the startup delay, the switch performs as described above.

Take care to avoid exceeding the maximum frequency rating. Above this level, the sensor cannot detect the target and assumes zero-speed condition.

Features

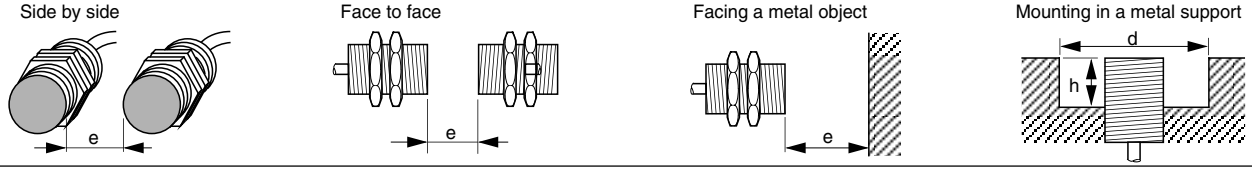
- Universal AC/DC versions
- AC/DC models are PLC compatible
- Linear speed threshold adjustment
- Two adjustment ranges: 6–150 pulses/minute for zero-speed, 120–3000 pulses/minute for jamming detection
- Built-in fixed power-up delay to overcome startup inertia
- Radio frequency immunity (RFI)
- Reverse polarity protection on DC models
- Noise and transient protection
- Overload and short circuit protection (SCP) on DC models
- LED indicators for switch in closed state
- 25-turn potentiometer provides fine adjustment of the underspeed threshold

Circuit Type	Maximum Load	Residual (Leakage) Current	Threshold Range (Pulse/Min.)	Maximum Frequency (Pulse/Min.)	Startup Delay ③	LED	SCP ▲	Catalog Number
30 mm Diameter, 10 mm Sensing Range, Shielded, 2 m (6.6 ft) Cable								
DC models, 10–58 Vdc (including ripple)								
PNP	200 mA	0	6–150	6,000	9 s	Yes	Yes	**XSAV11373**
PNP	200 mA	0	6–150	6,000	3 s	Yes	Yes	**XSAV31373**
PNP	200 mA	0	120–3,000	48,000	9 s	Yes	Yes	**XSAV12373**
PNP	200 mA	0	120–3,000	48,000	3 s	Yes	Yes	**XSAV32373**
AC/DC models, 20–264 Vac/Vdc								
2-wire	0.35 A Vac/0.2 A Vdc	1.5 mA (P)★	6–150	6,000	9 s	Yes	No	**XSAV11801**
2-wire	0.35 A Vac/0.2 A Vdc	1.5 mA (P)★	6–150	6,000	0 s	Yes	No	**XSAV01801**
2-wire	0.35 A Vac/0.2 A Vdc	1.5 mA (P)★	120–3,000	48,000	9 s	Yes	No	**XSAV12801**
2-wire	0.35 A Vac/0.2 A Vdc	1.5 mA (P)★	120–3,000	48,000	0 s	Yes	No	**XSAV02801**

★ (P)—PLC Compatible, (R)—Bleeder resistor required for PLC applications

▲ For devices without SCP, see page 284 for protective fuses.

Minimum Mounting Clearances, mm (in.)



30 mm	e: 20 (0.79)	e: 120 (4.7)	e: 30 (1.2)	D: 30 (1.2); H: 0

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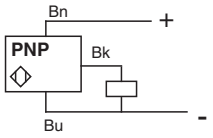
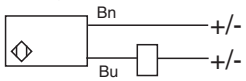
Wiring

3 wire, DC



2 wire, AC/DC

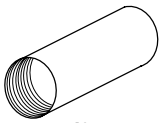


Specifications

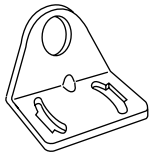
Mechanical			
Usable sensing range★	0.71 in. (18 mm)	0–0.15 in. (0–4 mm)	
	1.18 in. (30 mm)	0–0.31 in. (0–8 mm)	
Standard temperature range		-13 to +158 °C (-25 to +70 °F)	
Enclosure rating	NEMA Type	1, 3, 4, 6, 12, 13	
	IEC	IP67	
Vibration resistance		25 G, ±2 mm amplitude, 10–55 Hz	
Shock resistance		50 G, 11 ms duration	
Standard target size (steel)	0.71 in. (18 mm) diameter	18 x 18 mm (0.71 x 0.71 in.)	
	1.18 in. (30 mm) diameter	30 x 30 mm (1.18 x 1.18 in.)	
Repeatability (% of Sr)		3%	
Differential (hysteresis)		5–15% of pre-set frequency	
Cable	PvR	20 AWG	
Electrical		**AC/DC**	**DC**
Voltage drop (across switch) maximum		5.7 V	1.8 Vdc
Inrush current (inductive @ 20 ms)		2 A	—
Minimum load current		5 mA	—
Current consumption (no load)		—	15 mA
Startup delay (maximum)	XSAV1 models	9 s ±20% + 1/Fr ①	
	XSAV3 models	3 s ±20% + 1/Fr ①	
	XSAV0 models	0 s	
Agency listings	CE		

① 1/Fr in the startup delay formula is the actual preset frequency adjusted via potentiometer. (1/Fr is not significant if threshold is above 60 pulses/minute).

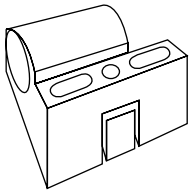
★ Refer to page 327 for target material correction coefficient Km.



7427



9006PA30



XSZB130

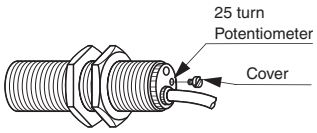
Options

Description		Suffix
Extended temperature range	to +185° F (+85° C)	**TT**
(only one option per device)	to -40° F (-40° C)	**TF**
5 m (16.4 ft) cable length		**L05**
10 m (32.8 ft) cable length		**L10**

Ex: XSAV11373 TT L05

Accessories

Description	Catalog Number
Metal locknuts (1 pair included)	**XSZE130**
Steel mounting bracket, 90°	**9006PA30**
Plastic mounting bracket	**XSZB130**
0.5 in. (12.7 mm) NPT conduit adapter	**7427**



Application Notes:

The number of targets is determined knowing that the actual number of pulses per minute n, is n=mN where m is the number of targets and N the speed in rpm.

This number (n) should be within the operating frequency range given in the selection table. For reasons of mechanical balance, even numbers are recommended (2, 4, 6 etc.).

Frequency threshold adjustment:
As long as the speed (number of pulses/minute) is above the threshold level—adjustable within the threshold range via the 25-turn potentiometer—the output circuit assumes its closed state. When the actual speed falls below the threshold level, the output circuit assumes its open state. To preserve the startup delay, the switch should be reset by removing and reapplying the power supply.

When the line voltage is initially applied, the output automatically assumes its closed state for the duration of the startup delay. This allows the mechanical assembly to overcome inertia and reach its nominal speed, greatly simplifying the interlocking circuit. After the startup delay, the switch will perform as described above.

Care should be taken not to exceed the maximum frequency rating above which the sensor cannot detect the target, therefore, assuming zero speed condition.

Accessories. . . . . page 284

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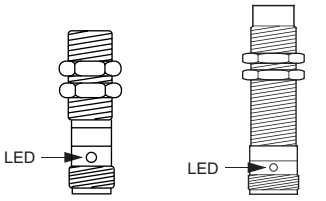
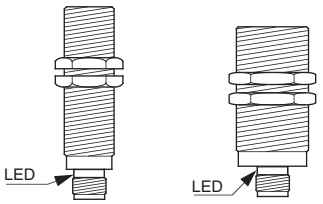


XS1M12 XS2M12



XS1M18 XS1M30

Features

Industrial welding processes create fields of electromagnetic noise that can interfere with the magnetic fields of inductive proximity sensors. Standard proximity sensors can be falsely triggered when near to these fields. WFI sensors allow uninterrupted performance when placed extremely close to the conductor carrying the welding current.

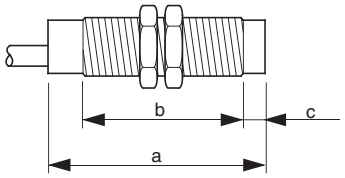
- The body styles are tubular in 12, 18, and 30 mm (0.47, 0.71, and 1.18 in.) diameters.
- Enclosure material is brass, coated in Teflon® to prevent slag (molten bits of metal) from sticking to the sensing face, reducing the possibility of false triggering.
- Micro-connector versions are available.★
- Mounting nuts are included.

Circuit Type	Output Mode	Voltage Range	Voltage Drop Maximum	Load Current Maximum	Operating Frequency Maximum	Catalog Number
12 mm Shielded, DC with Micro-Connector ★, Nominal Sensing Distance—2 mm						
PNP	N.O.	10–36 Vdc	2.5 V	250 mA	1,000 Hz	**XS1M12PAW01D**
12 mm Non-Shielded, DC with Micro-Connector ★, Nominal Sensing Distance—4 mm						
PNP	N.O.	10–36 Vdc	2.5 V	250 mA	1,000 Hz	**XS2M12PAW01D**
18 mm Shielded, DC with Micro-Connector ★, Nominal Sensing Distance—5 mm						
PNP	N.O.	10–36 Vdc	2.5 V	250 mA	500 Hz	**XS1M18PAW01D**
30 mm Shielded, DC with Micro-Connector ★, Nominal Sensing Distance—10 mm						
PNP	N.O.	10–36 Vdc	2.5 V	250 mA	250 Hz	**XS1M30PAW01D**

★ See page 626 for matching connector cables.

Dimensions

a = Overall Length (mm)
b = Threaded Section (mm)
c = for Non-shielded Sensors (mm)



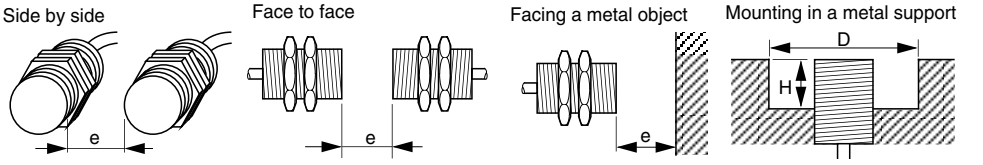
	a	b	c
XS1M12	2.3 in. (60)	1.6 in. (40)	0
XS2M12	2.3 in. (60)	1.5 in. (38)	0.16 in. (4)
XS1M18	2.3 in. (60)	1.6 in. (40)	0
XS1M30	2.3 in. (60)	1.6 in. (40)	0

The formula below shows the relationship between distance (r [mm]) and electromagnetic flux density (B [mT]).

$$B\,[mT] = \frac{0.2 \times I\,[A]}{r\,[mm]}$$

B [mT] = Electromagnetic Flux Density
I [A] = Welding Current
r [mm] = Distance

Minimum Mounting Clearances



	Side by Side		Face to Face		Facing a Metal Object		Mounted in Metal			
	e		e		e		d		h	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
XS1M12	0	0	0.27	7	0.24	6	0.47	12	0	0
XS2M12	0.59	15	0.27	7	0.43	11	1.42	36	0.31	8
XS1M18	0	0	0.63	16	0.35	9	0.71	18	0	0
XS1M30	0	0	0.79	20	0.79	20	1.18	30	0	0

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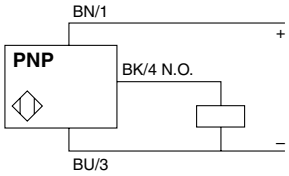
Proximity Sensors
XS Inductive Sensors, Weld Field Immune, DC
Tubular

Wiring





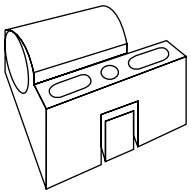
Specifications

Mechanical		XS1M12	XS2M12	XS1M18	XS1M30
Usable Sensing Range ★		1.6 mm	3.2 mm	4 mm	8 mm
Temperature Range		13 to +158 °F (-25 to +70 °C)			
Enclosure Rating	NEMA Type	3, 4, 6, 12, 13, 4X Indoor			
	IEC	IP67 (or depending on connector)			
Tightening torque (maximum)		15 N•m (11.1 lb-ft)	15 N•m (11.1 lb-ft)	35 N•m (26 lb-ft)	50 N•m (37 lb-ft)
Vibration		25 G, ±2 mm amplitude, 10–55 Hz			
Shock Resistance		50 G for 11 ms			
Differential (% of Sr)		20%			
Repeatability (% of Sr)		3%			
LED Indicator Type		4 LED windows at 90°			
Enclosure Material		Brass with Teflon® coating			
Electrical					
Voltage Range		12–24 Vdc			
Voltage Limit (Including Ripple)		10–36 Vdc			
Current Consumption (Maximum) (No Load)		15 mA			
Maximum Leakage (Residual) Current—Open State		—			
Power-up Delay (Maximum)		10 ms	10 ms	10 ms	10 ms
On Delay (Maximum)		0.1 ms	0.2 ms	0.2 ms	0.7 ms
Off Delay (Maximum)		0.4 ms	0.4 ms	0.6 ms	5 ms
Protective Circuitry	Short Circuit Protection	Yes			
	Overload Protection	Yes			
	Reverse Polarity Protection	Yes			
Agency Listings		E 164869 CCN NRKH	LR 702985 Class 3211 03	CE	

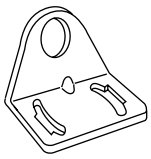
★ Refer to page 327 for target material correction coefficient Km.

Accessories

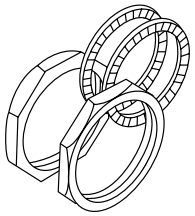
Description	For Sensor Diameter	Catalog Number
Mounting Bracket, Plastic	12 mm (0.47 in.)	**XSZB112**
	18 mm (0.71 in.)	**XSZB118**
	30 mm (1.18 in.)	**XSZB130**
Mounting Bracket, Metal	12 mm (0.47 in.)	**9006PA12**
	18 mm (0.71 in.)	**9006PA18**
	30 mm (1.18 in.)	**9006PA30**
Mounting Nuts	12 mm (0.47 in.)	**XSZE112**
	18 mm (0.71 in.)	**XSZE118**
	30 mm (1.18 in.)	**XSZE130**



XSZB1



9006PA



XSZE

Connector Cables (M12 or D suffix)	
XSZCD101Y	Micro-style, 4-pin, 2 m, straight
XSZCD111Y	Micro-style, 4-pin, 2 m, 90°

Additional cable options and lengths . . . page 626
Accessories . . . . . page 284, 280

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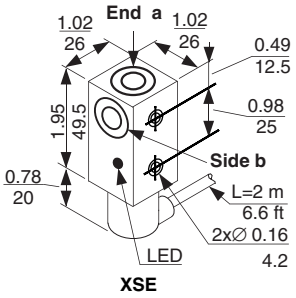

XSE

Dual Dimensions inches / mm

Features

Compact rectangular inductive proximity sensors for demanding applications including welding and machine tools.

- **Housings—XSE: Plastic (fiberglass-reinforced polyamide);** screw terminal models are also offered in slag-resistant thermoset plastic
- XSE models can be flush mounted in metal • Screw terminals, PVC cable, mini-style receptacle connections depending on the model • **Weld Field Immunity (WFI) on most models** • Radio frequency immunity (RFI)
- Noise and transient protection • Reverse polarity protection (DC models) • Selected models are offered with **short circuit protection (SCP)** and overload protection • **UL Recognized and CSA Certified • Factory Mutual approved for non-incendive application**

Output Mode/ Sensing Face (XSE)	Voltage Range	Maximum Load Current	Residual (leakage) Current	Operating Frequency	Housing	LED	SCP★	WFI	Catalog Number
XSE 10 mm (0.393 in.) sensing range, Shielded, DC models, 2-wire, N.O.									
2 m (6.6 ft) cable									
End	12–48 V	100 mA	0.5 mA	1,000 Hz	Polyamide	Yes	Yes	Yes	**XSEC1071300**
Side	12–48 V	100 mA	0.5 mA	1,000 Hz	Polyamide	Yes	Yes	Yes	**XSEC1071330**
Screw terminals									
End	12–48 V	100 mA	0.5 mA	1,000 Hz	Polyamide	Yes	Yes	Yes	**XSEC107130**
Side	12–48 V	100 mA	0.5 mA	1,000 Hz	Polyamide	Yes	Yes	Yes	**XSEC107133**
Sealed cable, 0.8 m (2.6 ft), with pig-tailed mini-style connector									
End	12–48 V	100 mA	0.5 mA	1,000 Hz	Polyamide	Yes	Yes	Yes	**XSEC1071302**
Side	12–48 V	100 mA	0.5 mA	1,000 Hz	Polyamide	Yes	Yes	Yes	**XSEC1071332**
End	12–48 V	100 mA	0.5 mA	1,000 Hz	Polyamide	Yes	Yes	Yes	**XSEC1072301**
Side	12–48 V	100 mA	0.5 mA	1,000 Hz	Polyamide	Yes	Yes	Yes	**XSEC1072331**
Sealed cable, 0.8 m (2.6 ft), with pig-tailed micro-style connector									
End	12–48 V	100 mA	0.5 mA	1,000 Hz	Polyamide	Yes	Yes	Yes	**XSEC1071301**
Side	12–48 V	100 mA	0.5 mA	1,000 Hz	Polyamide	Yes	Yes	Yes	**XSEC1071331**

∗ For side sensing, change last numeric digit as follows; Front: 1; Right: 3; Left: 4. Ex: XSB A105114C for left sensing.

① PLC Applications:
R = Bleeder resistor needed.
P = PLC compatible.

★ For devices without SCP, see page 284 for protective fuses.

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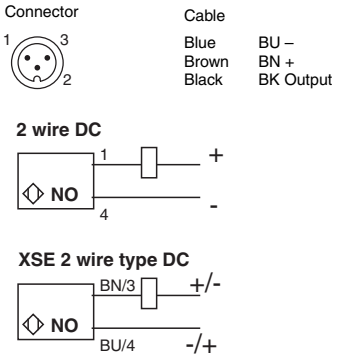
Wiring



Specifications

Mechanical		
Usable sensing range ✱		0–8 mm (0.31 in.) for XSE
Standard temperature range		-13 to +158 °F (-25 to +70 °C)
Enclosure rating	NEMA Type	3, 4, 6, 12, 13
	IEC	IP67
Vibration resistance		25 G, ±2 mm amplitude, 10–55 Hz
Shock resistance		50 G for 11 ms
Standard target size (steel)		30 x 30 mm (1.18 x 1.18 in.) for XSE
Differential		Maximum 20%
Repeatability		Maximum 5%
Radio frequency immunity (RFI)		Standard
Cable		Screw terminals, #16 AWG
		PvR, #20 AWG
Electrical		**DC Models—XSE**
Voltage drop (across switch)		4 V
Minimum load current		1.5 mA
On delay (maximum)		12 ms
Off delay (maximum)		3 ms
Power-up delay (maximum)		16 ms
Reverse polarity protection		Standard
Agency listings	E 164353 ■ CCN NRKH	LR 44087 Class 3211 03 FM: J.I. OROH9.AX (3610, 3611) CE

✱ Refer to page 327 for target material correction coefficient Km.

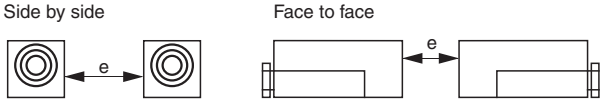
Options

Description		Suffix
Extended temperature range	to +185° F(+85° C)	**TT**
	to -40° F(-40° C)	**TF**
5 m (16.4 ft) cable length		**L05**

Accessories

XSE mounting brackets	Catalog Number
Flat	**XSEZ01**
90°	**XSEZ02**

Minimum Mounting Clearances, mm (in.)



XSE.15	e: 38 (1.5)	e: 97 (3.8)
XSB.20	e: 80 (3.1)	e: 160 (6.3)

Connector Cables (A or R3 suffix)

XSZCA901Y	Mini-style, 3-pin, 2 m, straight
XSZCA911Y	Mini-style, 3-pin, 2 m, 90°

Additional cable options and lengths . . . page 626

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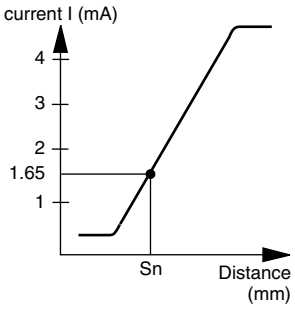


Principle of operation

2-wire Factory Mutual proximity sensors are characterized by a change in current consumption when a metal object is present within the sensing zone.

They differ from standard sensors by the absence of an output circuit. All processing is carried out by the associated amplifier or solid-state system to which they are connected.

The mode of operation is analogous to an N.C. contact:

- no object present: sensor is in the conducting state
- object present: sensor is in the non-conducting state

Factory Mutual System

Approved for Div I, II hazardous location with NY2 safe barrier relay.

Tubular type

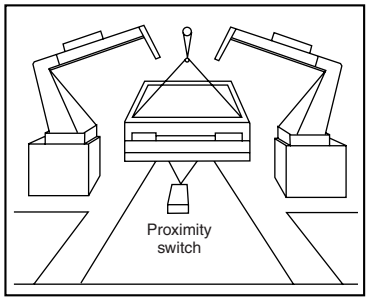
Barrel Diameter	Barrel Type	Nominal Sensing Distance ∗	Operating Zone	Operating Frequency	Catalog Number
Nickel-plated brass case					
Shielded, 2 m (6.6 ft) cable					
4 mm	smooth	0.03 in. (0.8 mm)	0–0.02 in. (0–0.6 mm)	1,500 Hz	**XSLN08122**
5 mm	threaded	0.03 in. (0.8 mm)	0–0.02 in. (0–0.6 mm)	1,500 Hz	**XSMN08122**
6.5 mm	smooth	0.04 in. (1 mm)	0–0.03 in. (0–0.8 mm)	1,500 Hz	**XSLN01122**
8 mm	threaded	0.06 in. (1.5 mm)	0–0.03 in. (0–0.8 mm)	1,500 Hz	**XSAN01122**
Plastic case					
Shielded, 2 m (6.6 ft) cable					
8 mm	threaded	0.06 in. (1.5 mm)	0–0.05 in. (0–1.2 mm)	1,000 Hz	**XSPN01122**
12 mm	threaded	0.08 in. (2 mm)	0–0.06 in. (0–1.6 mm)	800 Hz	**XSPN02122**
18 mm	threaded	0.2 in. (5 mm)	0–0.16 in. (0–4.0 mm)	500 Hz	**XSPN05122**
30 mm	threaded	0.4 in. (10 mm)	0–0.31 in. (0–8.0 mm)	300 Hz	**XSPN10122**
Non-shielded, 2 m (6.6 ft) cable					
12 mm	threaded	0.16 in. (4 mm)	0–0.12 in. (0– 3.2 mm)	400 Hz	**XSPN04122**
18 mm	threaded	0.31 in. (8 mm)	0–0.25 in. (0– 6.4 mm)	300 Hz	**XSPN08122**
30 mm	threaded	0.6 in. (15 mm)	0–0.47 in. (0–12.0 mm)	200 Hz	**XSPN15122**

Plastic block type

Enclosure Style	Nominal Sensing Distance ∗	Operating Zone	Operating Frequency	Catalog Number
Shielded, terminal connections				
Limit switch style	0.6 in. (15 mm)	0–0.47 in. (0–12.0 mm)	100 Hz	**XSCN151229**

Applications
Intrinsically safe applications (hazardous area).

When used in these applications, it is imperative that (Factory Mutual) sensors be used only with an NY2 intrinsically safe relay/amplifier, or a suitably approved, compatible solid-state system. Example: Painting line in car assembly plant.



∗ Refer to page 327 for target material correction coefficient Km.

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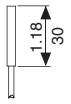
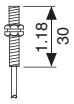
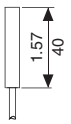
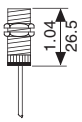
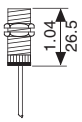
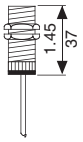
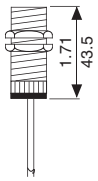
Proximity Sensors
Inductive Sensors for Use in Hazardous Locations
Factory Mutual, 2 Wire DC

Specifications

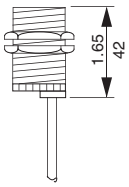
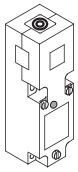
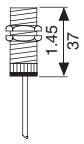
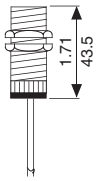
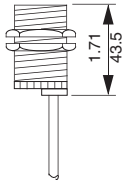
Mechanical			
Standard temperature range		Operation	-25 to +70 °C (-13 to +158 °F)
		Storage	-40 to +80 °C (-40 to +176 °F)
Enclosure rating	NEMA Types	4 mm and 5 mm	1, 3, 4, 13
		All others	3, 4, 6, 12, 13
	IEC	4 mm and 5 mm	IP64
		All others	IP67
Repeatability (% of Sr)			5% or less
Cable		2-wire	22 AWG (0.11 mm^2), PvR
Electrical			
Voltage range			7–12 Vdc
Current consumption from supply 8.2 V (internal resistance: about 1 KΩ)			Sensor activated (target present) = 1 mA or less; Sensor not activated (target absent) = 3 mA or more; Switching point defined for usable sensing distance and standard metal target: 1.65 mA
Maximum line resistance			Between sensor and amplifier: 50 ohms
Apparent sensing capacitance ∗			280 nF maximum
Apparent sensing inductance ∗			220 µH maximum
Agency listings	CE	LR 15996 Class 3218 06	FM: J.I. OROH9.AX (3610, 3611)

∗ Consider for intrinsically safe systems.

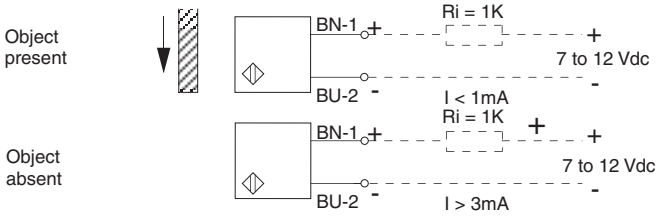
Factory Mutual Sensors
DC 2-wire, N.C.
M: Metal case; P: Plastic case

4 mm unthreaded	M5 x 0.5	6.5 mm unthreaded	M8 x 1	M8 x 1	M12 x 1	M18 x 1
						
Metal	Metal	Metal	Metal	Plastic	Plastic	Plastic
XSLN08122	**XSMN08122**	**XSLN01122**	**XSAN01122**	**XSPN01122**	**XSPN02122**	**XSPN05122**

Sensors not suitable for flush mounting in metal

M30 x 1.5	Dimensions page 270	M12 x 1	M18 x 1	M30 x 1.5
				
Plastic	Plastic	Plastic	Plastic	Plastic
XSPN10122	**XSCN151229**	**XSPN04122**	**XSPN08122**	**XSPN15122**

Non-intrinsically safe applications (normal safe zone).
connected to a solid state input (e.g.: TSX PLC input card, TSX DET 466)



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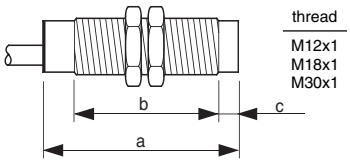
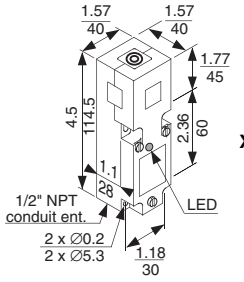
Proximity Sensors
XS Inductive Sensors
Analog Output, DC

Dimensions:
a = overall length (mm)
b = threaded section (mm)
c = for non-shielded sensors (mm)

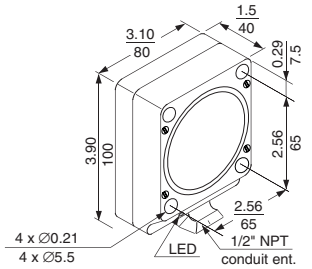


Tubular Style dimensions, in. (mm)

		a	b	c
12	Metal	1.9 (50)	1.6 (42)	0
mm	Plastic	1.9 (50)	1.6 (42)	0
18	Metal	1.9 (50)	1.6 (42)	0
mm	Plastic	1.6 (40.6)	1.0 (26)	0.3 (8)
30	Metal	1.9 (50)	1.6 (42)	0
mm	Plastic	2.07 (52.6)	1.2 (32)	0.5 (13)



XSC



XSD

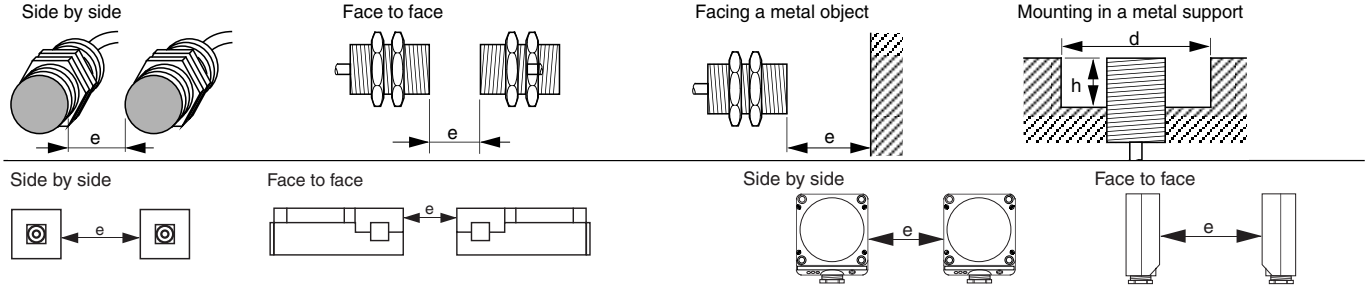
Dual Dimensions inches / mm

Features

- DC output current directly proportional to the target distance
- Three body styles: tubular, limit switch style (with 5-position turret head), block style
- Both metal and plastic enclosures available
- Two types of output: 3-wire: 0–10 mA, 0–16 mA
  2-wire: 4–20 mA, 4–14 mA

Nominal Sensing Distance	Enclosure Style	Enclosure Material	Voltage Range Max.	Circuit Type	Output Current	Operating Frequency Max.	Catalog Number
12 mm Diameter—2 m cable							
0.2–2 mm	Shielded	Metal	24 Vdc	2-wire	4–20 mA	1,500 Hz	**XS1M12AB120**
				3-wire	0–16 mA		
0.4–4 mm	Non-Shielded	Plastic	24 Vdc	2-wire	4–20 mA	1,500 Hz	**XS4P12AB120**
				3-wire	0–16 mA		
0.4–4 mm	Non-Shielded	Plastic	24–48 Vdc	2-wire	4–14 mA	1,500 Hz	**XS4P12AB110**
				3-wire	0–10 mA		
18 mm Diameter—2 m (6.6 ft) cable							
0.5–5 mm	Shielded	Metal	24 Vdc	2-wire	4–20 mA	500 Hz	**XS1M18AB120**
				3-wire	0–16 mA		
0.8–8 mm	Non-Shielded	Plastic	24 Vdc	2-wire	4–20 mA	500 Hz	**XS4P18AB120**
				3-wire	0–16 mA		
0.8–8 mm	Non-Shielded	Plastic	24–48 Vdc	2-wire	4–14 mA	500 Hz	**XS4P18AB110**
				3-wire	0–10 mA		
30 mm Diameter—2 m (6.6 ft) cable							
1–10 mm	Shielded	Metal	24 Vdc	2-wire	4–20 mA	300 Hz	**XS1M30AB120**
				3-wire	0–16 mA		
1.5–15 mm	Non-Shielded	Plastic	24 Vdc	2-wire	4–20 mA	300 Hz	**XS4P30AB120**
				3-wire	0–16 mA		
1.5–15 mm	Non-Shielded	Plastic	24–48 Vdc	2-wire	4–14 mA	300 Hz	**XS4P30AB110**
				3-wire	0–10 mA		
Limit Switch Style—2 m (6.6 ft) cable							
2–20 mm	Non-Shielded	Plastic	24–48 Vdc	2-wire	4–14 mA	60 Hz	**XSCH207629**
				3-wire	0–10 mA		
2–20 mm	Non-Shielded	Plastic	24 Vdc	2-wire	4–20 mA	60 Hz	**XSCH203629**
				3-wire	0–16 mA		
Block Style—2 m (6.6 ft) cable							
6–60 mm	Non-Shielded	Plastic	24–48 Vdc	2-wire	4–14 mA	50 Hz	**XSDH607629**
				3-wire	0–10 mA		
6–60 mm	Non-Shielded	Plastic	24 Vdc	2-wire	4–20 mA	50 Hz	**XSDH603629**
				3-wire	0–16 mA		

Minimum Mounting Clearances, mm (in.)



	Side by side	Face to face	Facing a metal object	Mounted in metal	
12 mm Shielded	e: 4 mm (0.16 in.)	e: 24 mm (0.94 in.)	e: 6 mm (0.24 in.)	d: 12 mm (0.47 in.)	h: 0 mm (0 in.)
12 mm Non-shielded, 24 V	e: 16 mm (0.63 in.)	e: 48 mm (1.89 in.)	e: 12 mm (0.47 in.)	d: 36 mm (1.42 in.)	h: 8 mm (0.31 in.)
12 mm Non-shielded, 48 V	e: 16 mm (0.63 in.)	e: 48 mm (1.89 in.)	e: 12 mm (0.47 in.)	d: 36 mm (1.42 in.)	h: 8 mm (0.31 in.)
18 mm Shielded	e: 10 mm (0.39 in.)	e: 60 mm (2.36 in.)	e: 15 mm (0.59 in.)	d: 18 mm (0.71 in.)	h: 0 mm (0 in.)
18 mm Non-shielded, 24 V	e: 32 mm (1.26 in.)	e: 96 mm (3.78 in.)	e: 24 mm (0.94 in.)	d: 54 mm (2.12 in.)	h: 16 mm (0.63 in.)
18 mm Non-shielded, 48 V	e: 32 mm (1.26 in.)	e: 96 mm (3.78 in.)	e: 24 mm (0.94 in.)	d: 54 mm (2.12 in.)	h: 16 mm (0.63 in.)
30 mm Shielded	e: 20 mm (0.79 in.)	e: 120 mm (4.72 in.)	e: 30 mm (1.18 in.)	d: 30 mm (1.18 in.)	h: 0 mm (0 in.)
30 mm Non-shielded, 24 V	e: 60 mm (2.36 in.)	e: 180 mm (7.08 in.)	e: 45 mm (1.77 in.)	d: 90 mm (3.54 in.)	h: 30 mm (1.18 in.)
30 mm Non-shielded, 48 V	e: 60 mm (2.36 in.)	e: 180 mm (7.08 in.)	e: 45 mm (1.77 in.)	d: 90 mm (3.54 in.)	h: 30 mm (1.18 in.)
Limit switch style	e: 80 mm (3.15 in.)	e: 160 mm (6.30 in.)	—	—	—
Block style	e: 300 mm (11.81 in.)	not recommended	—	—	—

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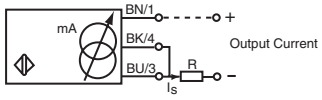
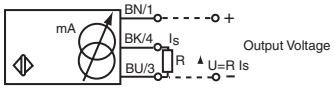
Wiring

2-wire



3-wire



Output current		Value of R (R = load impedance)
24 V	0 to 10 mA	≤ 1800 Ω
	0 to 16 mA	≤ 1125 Ω
48 V	0 to 10 mA	≤ 4200 Ω

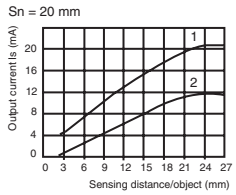
Ensure a minimum of 5 V between the + and sensor output

Specifications

Mechanical			
Temperature range		-13 to +158 °F (-25 to +70 °C)	
Enclosure rating	IEC	Type IP67	
Enclosure material		**Metal**	**Plastic**
Tightening torque (maximum)	12 mm	6 N•m (4.5 lb-ft)	2 N•m (1.5 lb-ft)
	18 mm	15 N•m (11.1 lb-ft)	5 N•m (3.7 lb-ft)
	30 mm	40 N•m (29.5 lb-ft)	20 N•m (14.7 lb-ft)
Wiring	Tubular	22 AWG (0.34 mm^2), PvR	
	Limit Switch/Block style	Screw term. 16 AWG(1.5 mm^2)	
Electrical			
Voltage limit (including ripple)		XS1••••120, XS4••••120: 15–38 Vdc	
		XS1•••110, XS4•••110: 15–58 Vdc	
		XSCH207•••, XSDH607•••: 19–58 Vdc	
		XSCH203•••, XSDH603•••: 19–30 Vdc	
Current consumption (no load)		4 mA	
Maximum output current drift with the rated operating temperature		10%	
Power supply current (no load)		4 mA	
Repeat accuracy		±1%	
Linearity error		±4%	
Protective circuitry	Short circuit protection	yes	
	Overload protection	yes	
	Reverse polarity protection	yes	
Agency listings		(XS1, XS4) E 164869 CCN NRKH (XSC, XSD) E 164353 CCN NKCR	LR 44087 Class 3211 03

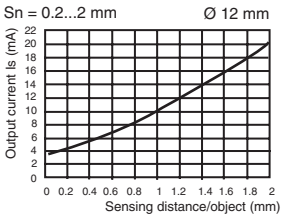
Output Curves 4 to 20 mA, 2-wire connection (tubular models)

XSCH20●629

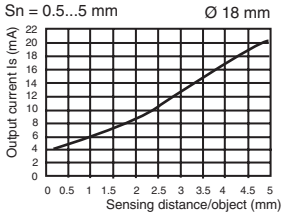


1 XSCH203629 2 XSCH207629

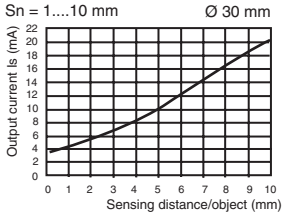
XS1M12AB120



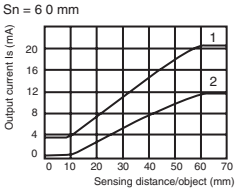
XS1M18AB120



XS1M30AB120

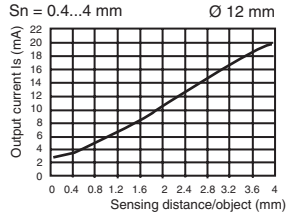


XSDH20●629



1 XSDH603629 2 XSDH607629

XS4P12AB120



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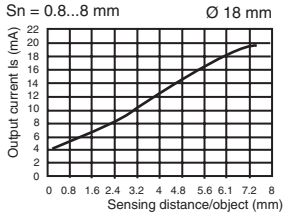

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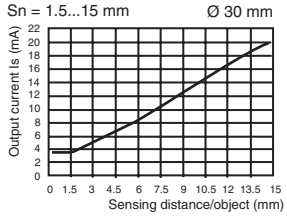
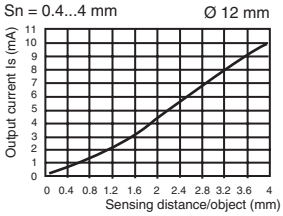


Output Curves 0 to 10 mA, 3-wire connection, (tubular models)

XS4P12AB110



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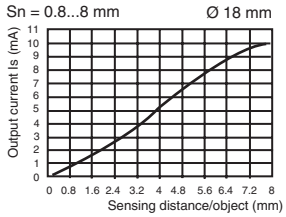

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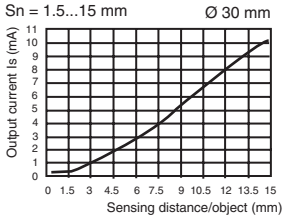

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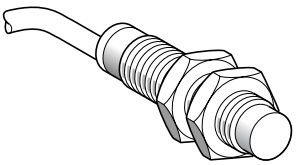
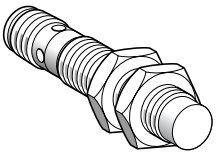
Proximity Sensors
XS Inductive Sensors, Osiprox® Food and Beverage Processing
Cylindrical, Stainless Steel, Non-Flush-Mountable, Three-Wire DC, Solid-State Output

DF532016



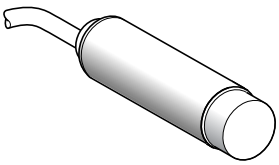
XS2••SA••L2

DF532015



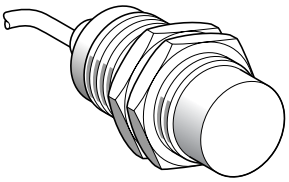
XS2••SA••M12

534440



XS2L2SA••L2

822116



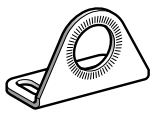
XS230SA••L2

523363



XSZBS12

805817



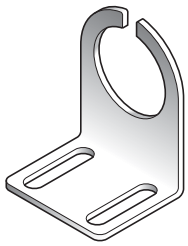
XUZA118

503663



XUZB2005

503663



XSZBS30

Ø 12, threaded M12 x 1

Sensing distance (Sn), mm (in.)	Function	Output	Connection	Catalog Number	Weight kg (lb)
7 (0.28)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS212SAPAL2**	0.075 (0.165)
			M12 connector	**XS212SAPAM12**	0.035 (0.077)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS212SANAL2**	0.075 (0.165)
			M12 connector	**XS212SANAM12**	0.035 (0.077)

Ø 18, threaded M18 x 1

Sensing distance (Sn), mm (in.)	Function	Output	Connection	Catalog Number	Weight kg (lb)
12 (0.47)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS218SAPAL2**	0.120 (0.265)
			M12 connector	**XS218SAPAM12**	0.060 (0.132)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS218SANAL2**	0.120 (0.265)
			M12 connector	**XS218SANAM12**	0.060 (0.132)

Ø 18, plain

Sensing distance (Sn), mm (in.)	Function	Output	Connection	Catalog Number	Weight kg (lb)
12 (0.47)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS2L2SAPAL2**	0.120 (0.265)
			M12 connector	**XS2L2SAPAM12**	0.060 (0.132)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS2L2SANAL2**	0.120 (0.265)
			M12 connector	**XS2L2SANAM12**	0.060 (0.132)

Ø 30, threaded M30 x 1.5

Sensing distance (Sn,) mm (in.)	Function	Output	Connection	Catalog Number	Weight kg (lb)
22 (0.87)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS230SAPAL2**	0.205 (0.452)
			M12 connector	**XS230SAPAM12**	0.145 (0.320)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS230SANAL2**	0.205 (0.452)
			M12 connector	**XS230SANAM12**	0.145 (0.320)

Accessories *(2)*

Description	For use with	Catalog Number	Weight kg (lb)
Plastic fixing clamp, 24.1 mm (0.95 in.) centers, with locking screw	Ø 18 sensor, plain case	**XUZB2005**	0.007 (0.015)
Stainless steel fixing bracket	Ø 12 sensor	**XSZBS12**	0.060 (0.132)
	Ø 18 sensor	**XUZA118**	0.045 (0.099)
	Ø 30 sensor	**XSZBS30**	0.080 (0.176)

Connecting cables

Description	Type	Cable length, m (ft)	Catalog Number	Weight kg (lb)
Pre-wired M12 connectors Female, 4-pin, stainless steel clamping ring	Straight	2 (6.6)	**XZCPA1141L2**	0.090 (0.198)
		5 (16.4)	**XZCPA1141L5**	0.210 (0.463)
		10 (32.8)	**XZCPA1141L10**	0.410 (0.904)
	Elbowed	2 (6.6)	**XZCPA1241L2**	0.090 (0.198)
		5 (16.4)	**XZCPA1241L5**	0.210 (0.463)
		10 (32.8)	**XZCPA1241L10**	0.410 (0.904)
M12 jumper cable Male, 3-pin, stainless steel clamping ring	Straight	2 (6.6)	**XZCRA151140A2**	0.095 (0.209)
		5 (16.4)	**XZCRA151140A5**	0.200 (0.441)

1. For a 5 m (16.4) cable replace L2 with **L5**; for a 10 m (32.8) cable replace L2 with **L10**.
   Example: **XS212SAPAL2** becomes **XS212SAPAL5** with a 5 m cable.
2. For further information, see page 284.

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Proximity Sensors
XS Inductive Sensors, Osiprox® Food and Beverage Processing
Cylindrical, Stainless Steel, Non-Flush-Mountable, Three-Wire DC, Solid-State Output

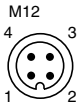
Specifications

Sensor type			XS2••SA••M12	XS2••SA••L2
Product certifications/approvals			UL, CSA, CE	
Connection	Connector		M12	—
	Pre-cabled		—	Length: 2 m (6.6 ft)
Operating zone	Ø 12	**mm (in.)**	0–5.6 (0–0.22)	
	Ø 18	**mm (in.)**	0–9.6 (0–0.38)	
	Ø 30	**mm (in.)**	0–17.6 (0–0.69)	
Differential travel		**%**	1–15 of real sensing distance (Sr)	
Degree of protection	Conforming to IEC 60529		IP67	IP68, double insulation ⧈
	DIN 40050		IP69 K	
Storage temperature		**°C (°F)**	-40 to +85 (-40 to +185) *(1)*	
Operating temperature		**°C (°F)**	-25 to +85 (-13 to +185)	
Materials	Case		Stainless steel, grade 316 L	
	Cable		—	Non-poisonous PVC, 3 x 0.34 mm^2
Vibration resistance	Conforming to IEC 60068-2-6		25 gn, amplitude ± 2 mm (@10 to 55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27		50 gn, duration 11 ms	
Output state indication			Yellow LED: 4 viewing ports at 90°	Yellow LED: annular
Rated supply voltage		**Vdc**	12–24 with protection against reverse polarity	
Voltage limits (including ripple)		**Vdc**	10–36	
Switching capacity		**mA**	⩽200 with overload and short-circuit protection	
Voltage drop, closed state		**V**	⩽2	
Current consumption, no-load		**mA**	⩽10	
Maximum switching frequency	**XS212SA••••**	**Hz**	2500	
	XS218SA•••• and **XS2L2••••**	**Hz**	1000	
	XS230SA••••	**Hz**	500	
Delays	First-up	**ms**	⩽10	
	Response	**ms**	⩽0.2 for Ø 12, ⩽0.3 for Ø 18, ⩽0.6 for Ø 30	
	Recovery	**ms**	⩽0.2 for Ø 12, ⩽0.7 for Ø 18, ⩽1.4 for Ø 30	

1. + 100 °C (+ 212 °F) for cleaning and sterilization phases while not in service.

Wiring diagrams

Connector

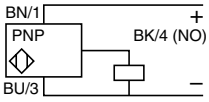


Pre-cabled

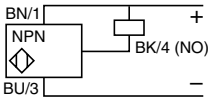
BU: Blue
BN: Brown
BK: Black

For connection information, refer to the Cabling section beginning on page 625.

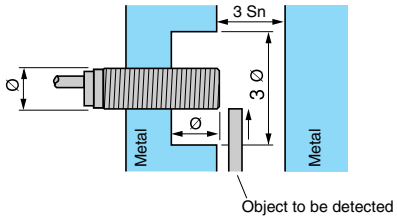
PNP



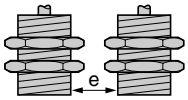
NPN

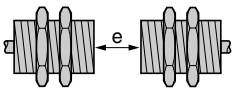


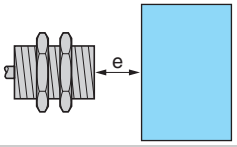
Setup



Minimum mounting distances, mm (in.)



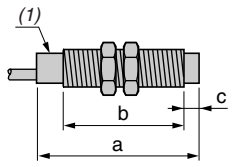




	Side by side	Face to face	Facing a metal object
Ø 12	e ⩾ 48 (1.89)	e ⩾ 84 (3.31)	e ⩾ 21 (0.83)
Ø 18	e ⩾ 72 (2.83)	e ⩾ 144 (5.67)	e ⩾ 36 (1.42)
Ø 30	e ⩾ 120 (4.72)	e ⩾ 264 (10.39)	e ⩾ 66 (2.60)

Dimensions

XS2

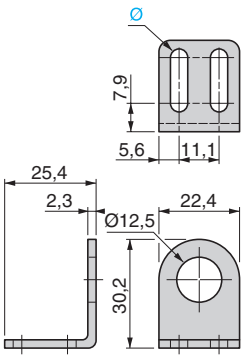


Ø: 2 elongated holes, 7.14 x 29.36 mm (0.28 x 1.16 in.)

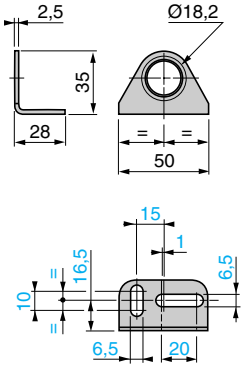
1. LED

Dia.	Pre-cabled, mm (in.)		Connector, mm (in.)		
	a	b	a	b	c
Ø 12	54.5 (2.15)	38 (1.50)	61 (2.40)	37 (1.46)	5 (0.20)
Ø 18	60 (2.36)	40 (1.57)	70 (2.76)	42 (1.65)	8 (0.31)
Ø 30	62.5 (2.46)	41 (1.61)	70 (2.76)	36 (1.42)	13 (0.51)

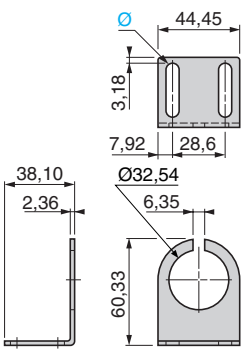
XSZBS12



XUZA118



XSZBS30



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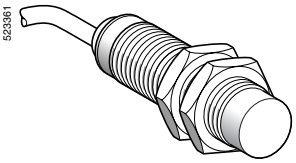
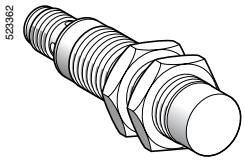
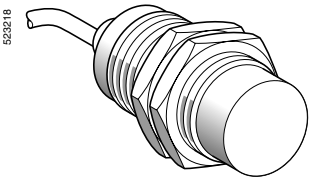
Proximity Sensors
XS Inductive Sensors, Osiprox® Food and Beverage Processing
Cylindrical, Stainless Steel, Non-Flush-Mountable, Two-Wire AC or DC



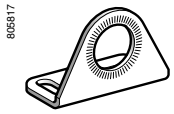
XS218SAM•L2



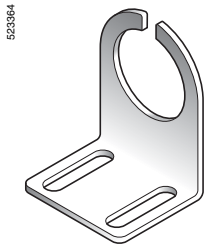
XS218SAM•U20



XS230SAM•L2



XUZA118



XSZBS30

Ø 18, threaded M18 x 1

Sensing distance (Sn), mm (in.)	Function	Connection	Catalog Number	Weight, kg
12 (0.47)	NO	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS218SAMAL2**	0.120 (0.265)
		1/2"-20UNF connector	**XS218SAMAU20**	0.060 (0.132)

Ø 30, threaded M30 x 1.5

Sensing distance (Sn), mm (in.)	Function	Connection	Catalog Number	Weight, kg
22 (0.87)	NO	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS230SAMAL2**	0.205 (0.452)
		1/2"-20UNF connector	**XS230SAMAU20**	0.145 (0.320)

Connecting cables *(2)*

Description	Type	Cable length, m	Catalog Number	Weight, kg
Pre-wired connectors 1/2"-20UNF 3-pin female, stainless steel clamping ring	Straight	5 (16.4)	**XZCPA1865L5**	0.210 (0.463)
		10 (32.8)	**XZCPA1865L10**	0.410 (0.904)
	Elbowed	5 (16.4)	**XZCPA1965L5**	0.250 (0.551)
		10 (32.8)	**XZCPA1965L10**	0.485 (1.069)

Accessories

Description	For use with	Catalog Number	Weight, kg
Stainless steel fixing bracket	Ø 18 sensor	**XUZA118**	0.045 (0.099)
	Ø 30 sensor	**XSZBS30**	0.080 (0.176)

1. For a 5 m (16.4 ft) cable, replace L2 with **L5**; for a 10 m (32.8 ft) cable, replace L2 with **L10**.
   Example: **XS218SAMAL2** becomes **XS218SAMAL5** with a 5 m cable.
2. For further information, see page 284.

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Proximity Sensors
XS Inductive Sensors, Osiprox® Food and Beverage Processing
Cylindrical, Stainless Steel, Non-Flush-Mountable, Two-Wire AC or DC

Specifications

Sensor type			XS2••SAM•U20	XS2••SAM•L2
Product certifications/approvals			UL, CSA, CE	
Connection	Connector		1/2"- 20UNF	—
	Pre-cabled		—	Length: 2 m (6.6 ft)
Operating zone	Ø 18	**mm (in.)**	0–9.6 (0–0.38)	
	Ø 30	**mm (in.)**	0–17.6 (0–0.69)	
Differential travel		**%**	1–15 of real sensing distance (Sr)	
Degree of protection	Conforming to IEC 60529		IP67	IP68, double insulation ⧈
	DIN 40050		IP69 K	
Storage temperature		**°C (°F)**	- 40 to + 85 (-40 to +185) *(1)*	
Operating temperature		**°C (°F)**	- 25 to + 85 (-13 to +185)	
Materials	Case		Stainless steel, grade 316 L	
	Cable		—	Non-poisonous PVC, 2 x 0.34 mm^2
Vibration resistance	Conforming to IEC 60068-2-6		25 gn, amplitude ± 2 mm (@10 to 55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27		50 gn, duration 11 ms	
Output state indication			Yellow LED: 4 viewing ports at 90°	Yellow LED: annular
Rated supply voltage		**Vac / Vdc**	24–240 (AC: 50/60 Hz)	
Voltage limits (including ripple)		**Vac / Vdc**	20–264	
Switching capacity		**mA**	AC: 5–300; DC: 5–200 *(2)*	
Voltage drop, closed state		**V**	≤5.5	
Residual current, open state		**mA**	≤0.8	
Maximum switching frequency	**XS218SAM•••**	**Hz**	AC: 25; DC: 1000	
	XS230SAM•••	**Hz**	AC: 25; DC: 300	
Delays	First-up	**ms**	≤30	
	Response	**ms**	≤0.5	
	Recovery	**ms**	≤0.5 for **XS218SAM•••**, ≤2 for **XS230SAM•••**	

1. + 100 °C for cleaning and sterilization phases while not in service.
2. It is essential to connect a 0.4 A quick-blow fuse in series with the load.

Wiring diagrams

Connector

1/2"- 20UNF



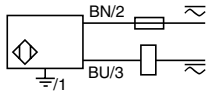
AC/DC: 2
⏚: 1
AC/DC: 3

Pre-cabled

BU: Blue
BN: Brown

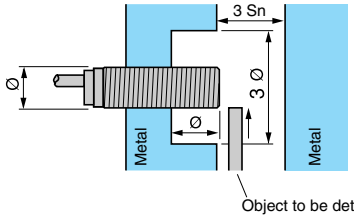
For connection information, refer to the Cabling section beginning on page 625.

2-wire ∿ or ⎓
NO output

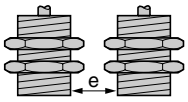


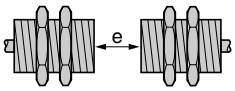
⏚: on connector models only

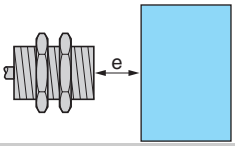
Setup



Minimum mounting distances, mm (in.)



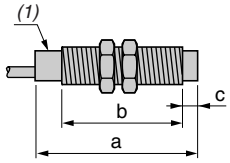




	Side by side	Face to face	Facing a metal object
Ø 18	e ≥ 72 (2.83)	e ≥ 144 (5.67)	e ≥ 36 (1.42)
Ø 30	e ≥ 120 (4.72)	e ≥ 264 (10.39)	e ≥ 66 (2.60)

Dimensions

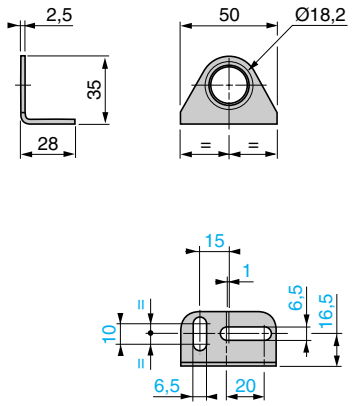
XS2



1. *LED*

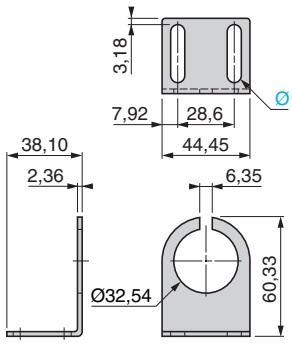
Dia.	Pre-cabled (mm)		Connector (mm)		
	a	b	a	b	c
Ø 18	60 (2.36)	40 (1.57)	72 (2.83)	44 (1.73)	8 (0.31)
Ø 30	62.5 (2.46)	41 (1.61)	74 (2.91)	40 (1.57)	13 (0.51)

XSZA118



XSZBS30

Ø: 2 elongated holes,
7.14 x 29.36 mm (0.28 x 1.16 in.)



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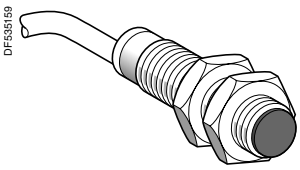
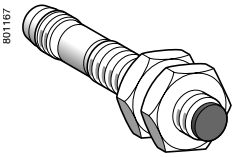
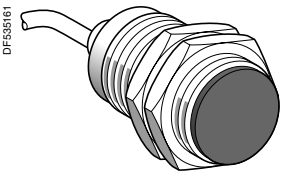
Proximity Sensors
XS Inductive Sensors, Osiprox® Food and Beverage Processing
Cylindrical, Plastic, Non-Flush-Mountable, Three-Wire DC, Solid-State Output



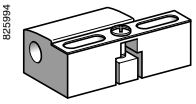
XS2••AA••L2



XS2••AA••M12



XS230AA••L2



XSZB•••

Ø 12, threaded M12 x 1

Sensing distance (Sn), mm (in.)	Function	Output	Connection	Catalog Number	Weight, kg (lb)
7 (0.28)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS212AAPAL2**	0.065 (0.143)
			M12 connector	**XS212AAPAM12**	0.030 (0.066)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS212AANAL2**	0.065 (0.143)
			M12 connector	**XS212AANAM12**	0.030 (0.066)

Ø 18, threaded M18 x 1

Sensing distance (Sn), mm (in.)	Function	Output	Connection	Catalog Number	Weight, kg (lb)
12 (0.47)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS218AAPAL2**	0.100 (0.220)
			M12 connector	**XS218AAPAM12**	0.040 (0.088)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS218AANAL2**	0.100 (0.220)
			M12 connector	**XS218AANAM12**	0.040 (0.088)

Ø 30, threaded M30 x 1.5

Sensing distance (Sn), mm (in.)	Function	Output	Connection	Catalog Number	Weight, kg (lb)
22 (0.87)	NO	PNP	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS230AAPAL2**	0.140 (0.309)
			M12 connector	**XS230AAPAM12**	0.080 (0.176)
		NPN	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS230AANAL2**	0.140 (0.309)
			M12 connector	**XS230AANAM12**	0.080 (0.176)

Accessories *(2)*

Description		Catalog Number	Weight, kg (lb)
Fixing clamps	Ø 12	**XSZB112**	0.006 (0.013)
	Ø 18	**XSZB118**	0.010 (0.022)
	Ø 30	**XSZB130**	0.020 (0.044)

Connecting cables

Description	Type	Cable length, m (ft)	Catalog Number	Weight, kg (lb)
Pre-wired M12 connectors Female, 4-pin, stainless steel clamping ring	Straight	2 (6.6)	**XZCPA1141L2**	0.090 (0.198)
		5 (16.4)	**XZCPA1141L5**	0.190 (0.419)
		10 (32.8)	**XZCPA1141L10**	0.370 (0.816)
	Elbowed	2 (6.6)	**XZCPA1241L2**	0.090 (0.198)
		5 (16.4)	**XZCPA1241L5**	0.190 (0.419)
		10 (32.8)	**XZCPA1241L10**	0.370 (0.816)
M12 jumper cable Male, 3-pin, stainless steel clamping ring	Straight	2 (6.6)	**XZCRA151140A2**	0.090 (0.198)
		5 (16.4)	**XZCRA151140A5**	0.190 (0.419)

1. For a 5 m (16.4 ft) cable, replace L2 with **L5**; for a 10 m (32.8 ft) cable, replace L2 with **L10**.
   Example: **XS212AAPAL2** becomes **XS212AAPAL5** with a 5 m cable.
2. For further information, see page 284.

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Proximity Sensors
XS Inductive Sensors, Osiprox® Food and Beverage Processing
Cylindrical, Plastic, Non-Flush-Mountable, Three-Wire DC, Solid-State Output

Specifications

Sensor type			XS2••AA••M12	XS2••AA••L2
Product certifications/approvals			UL, CSA, CE	
Connection	Connector		M12	—
	Pre-cabled		—	Length: 2 m (6.6 ft)
Operating zone	Ø 12	**mm (in.)**	0–5.6 (0–0.22)	
	Ø 18	**mm (in.)**	0–9.6 (0–0.38)	
	Ø 30	**mm (in.)**	0–17.6 (0–0.69)	
Differential travel		**%**	1–15 of real sensing distance (Sr)	
Degree of protection	Conforming to IEC 60529		IP67	IP68, double insulation ⧈
	DIN 40050		IP69 K	
Storage temperature		**°C (°F)**	-40 to +85 (-40 to +185)	
Operating temperature		**°C (°F)**	-25 to +85 (-13 to +185)	
Materials	Case		PPS	
	Cable		—	PvR and 3 x 0.34 mm^2
Vibration resistance	Conforming to IEC 60068-2-6		25 gn, amplitude ± 2 mm (@10 to 55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27		50 gn, duration 11 ms	
Output state indication			Yellow LED: annular	
Rated supply voltage		**Vdc**	12–48 at -25 to +70 °C (-13 to +158 °F)	
		Vdc	12–24 at +70 to +85 °C (158 to +185 °F)	
Voltage limits (including ripple)		**Vdc**	10–58 at -25 to +70 °C (-13 to +158 °F)	
		Vdc	10–36 at +70 to +85 °C (158 to +185 °F)	
Switching capacity		**mA**	⩽200 with overload and short-circuit protection	
Voltage drop, closed state		**V**	⩽2	
Current consumption, no-load		**mA**	⩽10	
Maximum switching frequency	**XS212AA••••**	**Hz**	2500	
	XS218AA••••	**Hz**	1000	
	XS230AA••••	**Hz**	500	
Delays	First-up	**ms**	⩽10	
	Response	**ms**	⩽0.2 for Ø 12; ⩽0.3 for Ø 18; ⩽0.6 for Ø 30	
	Recovery	**ms**	⩽0.2 for Ø 12; ⩽0.7 for Ø 18; ⩽1.4 for Ø 30	

Wiring diagrams

Connector

M12

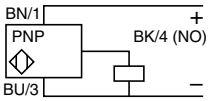


For connection information, refer to the Cabling section beginning on page 625.

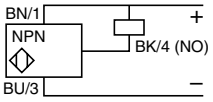
Pre-cabled

BU: Blue
BN: Brown
BK: Black

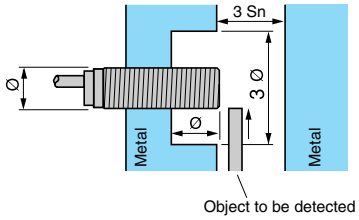
PNP



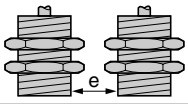
NPN



Setup

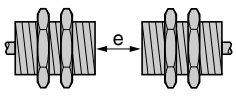


Minimum mounting distances, mm (in.)



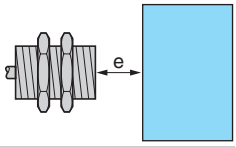
Side by side

Ø 12	e ⩾ 48 (1.89)
Ø 18	e ⩾ 72 (2.83)
Ø 30	e ⩾ 120 (4.72)



Face to face

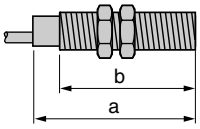
e ⩾ 84 (3.31)
e ⩾ 144 (5.67)
e ⩾ 264 (10.39)



Facing a metal object

e ⩾ 21 (0.83)
e ⩾ 36 (1.42)
e ⩾ 66 (2.60)

Dimensions



XS2

Diameter	Pre-cabled, mm (in.)		Connector, mm (in.)	
	a	b	a	b
Ø 12	50 (1.97)	42 (1.65)	61 (2.40)	43 (1.69)
Ø 18	60 (2.36)	51 (2.01)	70 (2.76)	52 (2.05)
Ø 30	60 (2.36)	51 (2.01)	70 (2.76)	52 (2.05)

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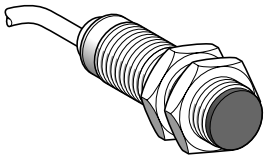
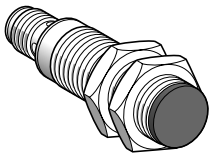
Proximity Sensors
XS Inductive Sensors, Osiprox® Food and Beverage Processing
Cylindrical, Plastic, Non-Flush-Mountable, Two-Wire AC or DC

535156



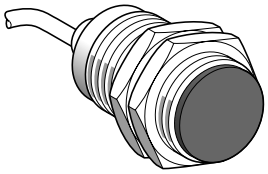
XS2••AAM•L2

523382



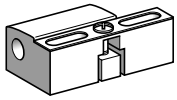
XS2••AAM•U20

535158



XS230AAM•L2

825994



XSZB1••

Ø 18, threaded M18 x 1

Sensing distance (Sn), mm (in.)	Function	Connection	Catalog Number	Weight, kg (lb)
12 (0.47)	NO	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS218AAMAL2**	0.100 (0.220)
		1/2"-20UNF connector	**XS218AAMAU20**	0.040 (0.088)

Ø 30, threaded M30 x 1.5

Sensing distance (Sn), mm (in.)	Function	Connection	Catalog Number	Weight, kg (lb)
22 (0.87)	NO	Pre-cabled, 2 m (6.6 ft) *(1)*	**XS230AAMAL2**	0.140 (0.309)
		1/2"-20UNF connector	**XS230AAMAU20**	0.080 (0.176)

Accessories *(2)*

Description		Catalog Number	Weight, kg (lb)
Fixing clamps	Ø 18	**XSZB118**	0.010 (0.022)
	Ø 30	**XSZB130**	0.020 (0.044)

Connecting cables

Description	Type	Cable length, m (ft)	Catalog Number	Weight, kg (lb)
Pre-wired connectors 1/2"-20UNF 3-pin female, stainless steel 316 L clamping ring	Straight	5 (16.4)	**XZCPA1865L5**	0.180 (0.40)
		10 (32.8)	**XZCPA1865L10**	0.350 (0.77)
	Elbowed	5 (16.4)	**XZCPA1965L5**	0.180 (0.40)
		10 (32.8)	**XZCPA1965L10**	0.350 (0.77)

1. For a 5 m (16.4 ft) cable replace, L2 with **L5**; for a 10 m (32.8 ft) cable, replace L2 with **L10**.
   Example: **XS218AAMAL2** becomes **XS218AAMAL5** with a 5 m cable.
2. For further information, see page 284.

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Proximity Sensors
XS Inductive Sensors, Osiprox® Food and Beverage Processing
Cylindrical, Plastic, Non-Flush-Mountable, Two-Wire AC or DC

Specifications

Sensor type			XS2••AAM•U20	XS2••AAM•L2
Product certifications/approvals			UL, CSA, CE	
Connection	Connector		1/2"-20UNF	—
	Pre-cabled		—	Length: 2 m (6.6 ft)
Operating zone	Ø 18	**mm**	0–9.6	
	Ø 30	**mm**	0–17.6	
Differential travel		**%**	1–15 of real sensing distance (Sr)	
Degree of protection	Conforming to IEC 60529		IP67	IP68, double insulation ⧈
	DIN 40050		IP69K	
Storage temperature		**°C (°F)**	-40 to +85 (-40 to +185)	
Operating temperature		**°C (°F)**	-25 to +85 (-13 to +185)	
Materials	Case		PPS	
	Cable		—	PvR and 2 x 0.34 mm^2
Vibration resistance	Conforming to IEC 60068-2-6		25 gn, amplitude ± 2 mm (@ 10 to 55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27		50 gn, duration 11 ms	
Output state indication			Yellow LED: annular	
Rated supply voltage		**Vac Vdc**	24–240 (AC: 50/60 Hz)	
Voltage limits (including ripple)		**Vac Vdc**	20–264	
Switching capacity		**mA**	AC: 5–300; DC: 5–200 *(1)*	
Voltage drop, closed state		**V**	⩽ 5.5	
Residual current, open state		**mA**	⩽ 0.8	
Maximum switching frequency	XS218AAM•••	**Hz**	AC: 25; DC: 1000	
	XS230AAM•••	**Hz**	AC: 25; DC: 300	
Delays	First-up	**ms**	⩽ 30	
	Response	**ms**	⩽ 0.5	
	Recovery	**ms**	⩽ 0.5 **XS218AAM•••**, ⩽ 2 **XS230AAM•••**	

1. It is essential to connect a 0.4 A quick-blow fuse in series with the load.

Wiring diagrams

Connector

1/2"-20UNF



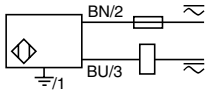
AC/DC: 2
⏚: 1
AC/DC: 3

Pre-cabled

BU: Blue
BN: Brown

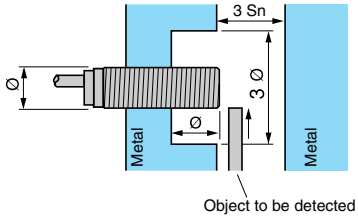
For connection information, refer to the Cabling section beginning on page 625.

2-wire ∿ or ⎓ NO output

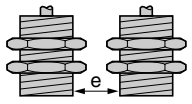


⏚: *on connector models only*

Setup

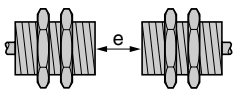


Minimum mounting distances, mm (in.)



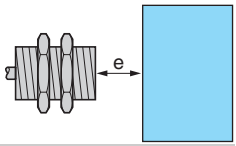
Side by side

Ø 18	e ⩾ 72 (2.83)
Ø 30	e ⩾ 120 (4.72)



Face to face

e ⩾ 144 (5.67)
e ⩾ 264 (10.39)

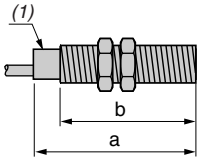


Facing a metal object

e ⩾ 36 (1.42)
e ⩾ 66 (2.60)

Dimensions

XS2



1. *LED*

Diameter	Pre-cabled, mm (in.)		Connector, mm (in.)	
	a	b	a	b
Ø 18	60 (2.36)	51 (2.01)	70 (2.76)	52 (2.05)
Ø 30	60 (2.36)	51 (2.01)	70 (2.76)	52 (2.05)

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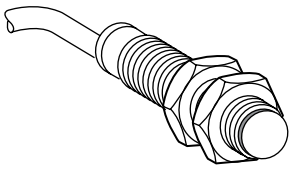
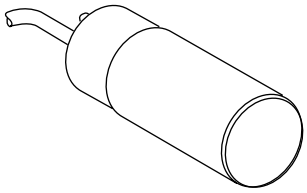
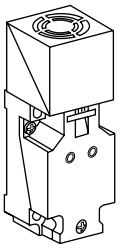
Proximity Sensors
XT Capacitive Sensors
12 mm, 18 mm, 30 mm, 32 mm and Limit Switch Style; AC and DC



XT1/4 Threaded



XT1/4 Smooth

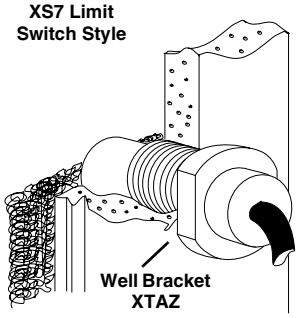


thread M12x1

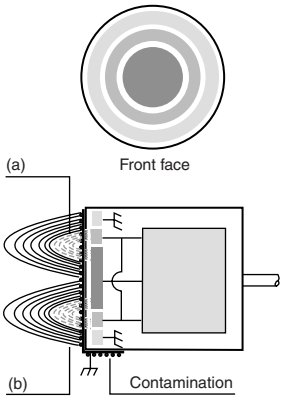
thread M18x1

thread M30x1.5

XS7 Limit Switch Style



Level Detection



(a) : compensation field (suppression of external contamination)

(b) : main electric field

Features

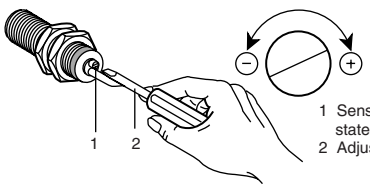
Capacitive proximity sensors are ideal for sensing non-metal objects or for level control of fluids and granular material. A special wall-mounting bracket has been designed to replace thick or metal walls that the sensor cannot penetrate. The actual sensing range varies widely depending on the target material and environmental conditions (humidity, dust, etc.).

An internal compensation electrode is incorporated to suppress the effects of material deposits on the sensor's face. The threshold level is adjustable via a 20-turn potentiometer (except 12 mm) located at the rear of the switch. This adjustment can be used to zero out the presence of a plastic tube allowing the switch to sense through a bulk material or liquid level.

Other features include: metal housing (nickel-plated brass) or plastic housing (PBT); flush mountable in metal (except XT4); LED indication for output in closed state; mounting nuts included for threaded models; mounting bracket included for non-threaded versions, well-mounting brackets optional; sensitivity adjustment tool included; UL and CSA; CE mark.

Nominal Sensing Distance	AC or DC	Output Mode	Circuit Type	Voltage Range	Operating Frequency	Catalog Number
12 mm diameter, 2 m (6.6 ft) cable, Non-Adjustment						
Flush Mountable—Threaded Metal Case						
2 mm	DC	N.O.	PNP	12–24 V	100 Hz	**XT1M12PA372**
2 mm	DC	N.C.	PNP	12–24 V	100 Hz	**XT1M12PB372**
2 mm	DC	N.O.	NPN	12–24 V	100 Hz	**XT1M12NA372**
18 mm diameter, 2 m (6.6 ft) cable, with Sensitivity Adjustment						
Flush Mountable—Threaded Metal Case						
5 mm	AC	N.O.	2-wire	24–240 V	25 Hz	**XT1M18FA262**
5 mm	AC	N.C.	2-wire	24–240 V	25 Hz	**XT1M18FB262**
5 mm	DC	N.O.	PNP	12–24V	100 Hz	**XT1M18PA372**
5 mm	DC	N.C.	PNP	12–24V	100 Hz	**XT1M18PB372**
5 mm	DC	N.O.	NPN	12–24V	100 Hz	**XT1M18NA372**
Non-Flush Mountable—Threaded Plastic Case						
8 mm	AC	N.O.	2-wire	24–240 V	25 Hz	**XT4P18FA262**
8 mm	DC	N.O.	PNP	12–24V	100 Hz	**XT4P18PA372**
8 mm	DC	N.O.	NPN	12–24V	100 Hz	**XT4P18NA372**
30 mm diameter, 2 m (6.6 ft) cable, with Sensitivity Adjustment						
Flush Mountable—Threaded Metal Case						
10 mm	AC	N.O.	2-wire	24–240 V	25 Hz	**XT1M30FA262**
10 mm	AC	N.C.	2-wire	24–240 V	25 Hz	**XT1M30FB262**
10 mm	DC	N.O.	PNP	12–24V	100 Hz	**XT1M30PA372**
10 mm	DC	N.C.	PNP	12–24V	100 Hz	**XT1M30PB372**
10 mm	DC	N.O.	NPN	12–24V	100 Hz	**XT1M30NA372**
Non-Flush Mountable—Threaded Plastic Case						
15 mm	AC	N.O.	2-wire	24–240 V	25 Hz	**XT4P30FA262**
15 mm	AC	N.C.	2-wire	24–240 V	25 Hz	**XT4P30FB262**
15 mm	DC	N.O.	PNP	12–24V	100 Hz	**XT4P30PA372**
15 mm	DC	N.O.	NPN	12–24V	100 Hz	**XT4P30NA372**
32 mm diameter, 2 m (6.6 ft) cable, with Sensitivity Adjustment						
Flush Mountable—Smooth Plastic Case						
15 mm	AC	N.O.	2-wire	110–220 V	10 Hz	**XT1L32FA262**
15 mm	AC	N.C.	2-wire	110–220 V	10 Hz	**XT1L32FB262**
Non-Flush Mountable—Smooth Plastic Case						
20 mm	AC	N.O.	2-wire	110–220 V	10 Hz	**XT4L32FA262**
20 mm	AC	N.C.	2-wire	110–220 V	10 Hz	**XT4L32FB262**
Limit Switch Style, 0.5 in. (12.7 mm) NPT, with Sensitivity Adjustment						
Flush Mountable—Plastic Case						
15 mm	AC	N.O. or N.C.	2-wire	24–240 V	25 Hz	**XT7C40FP262**
15 mm	DC	N.O. / N.C.	PNP	12–24V	100 Hz	**XT7C40PC440**
15 mm	DC	N.O. / N.C.	NPN	12–24V	100 Hz	**XT7C40NC440**

Sensitivity Adjustment



1 Sensitivity adjustment potentiometer and output state indicator (yellow LED)
2 Adjustment using screwdriver

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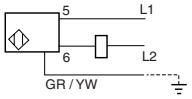
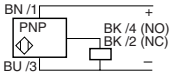
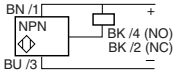
Wiring

2-wire AC, N.O. or N.C. output
XT1L32F●262, XT4L32F●262

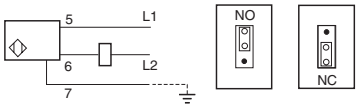


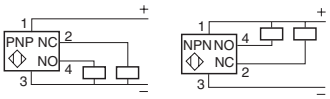
3-wire DC, N.O. or N.C. output
XT1M12F●A372, XT1M12PB372





2-wire AC, programmable
N.O. or N.C. output depending on position of jumper XT7C40FP262





Specifications

Mechanical				
Standard Temperature Range	-13 to +158 °F (-25 to +70 °C)			
Enclosure Rating	NEMA Type	4, 4X, 6, 6P, 12, 13 (Except Smooth Case 4, 4X, 6, 12)		
	IEC	IP67 (Except Smooth Case—IP63)		
Differential (%of Sr.)	20%			
Repeatability (% of Sr.)	10%			
Electrical		**AC Models (All)**	**Smooth**	**DC Models**
Voltage Range		24–240 V	110–220 V	12–24 V
Voltage Limit		20–264 V	90–250 V	10–38 V
Voltage Drop (Across Switch) Closed State		5.5 V	9 V	2 V
Minimum Load Current		5 mA	15 mA	0 mA
Maximum Load Current	Tubular	300 mA	250 mA (Ue=110 V∗)	300 mA
	Limit Switch	350 mA	—	200 mA
Current Consumption (No Load)		—	—	10 mA
Residual Leakage Current		1.5 mA at 120 V	7 mA	—
On Delay Maximum	Tubular	50 ms	50 ms	5 ms
	Limit Switch	20 ms	—	5 ms
Off Delay Maximum	Tubular	50 ms	15 ms	5 ms
	Limit Switch	30 ms	—	5 ms
Power-up Delay Maximum	Tubular	300 ms	300 ms	30 ms
	Limit Switch	150 ms	—	30 ms
Protective Circuitry	Electrostatic Discharges	IEC 60947-5-2 and NEMA ICS 5, Part 4		
	Radio Magnetic Fields			
	Fast Transients			
	Impulse Voltage			
Agency Listings	E 164869 CCN NRKH		LR 44087 Class 3211 03	

∗ Maximum load current 150 mA when Ue=220 V.

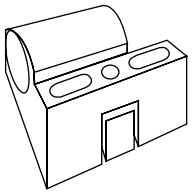
The operating distance of the sensor is related to the dielectric constant ($\varepsilon\Upsilon$) of the object material to be detected. The higher the value of $\varepsilon\Upsilon$, the easier it will be for the object to be detected.

NOTE: Do not use this product in an environment with dew or condensation.

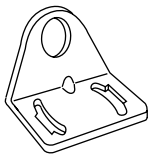
The usable sensing distance depends on the object material: *Su = Sn × Fc*
Su = usable sensing distance; **Sn** = nominal sensing distance; **Fc** = correction coefficient for the object material

Example: Sensor XT1M30PA372 used to detect a rubber object: Sn = 10 mm, Fc = 0.3
Su = 10 mm × 0.3 = 3 mm

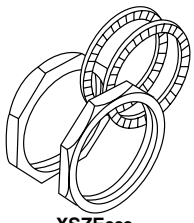
Material	$\varepsilon\Upsilon$	Fc	Material	$\varepsilon\Upsilon$	Fc	Material	$\varepsilon\Upsilon$	Fc
Acetone	20	0.8	Glass	3–10	0.3–0.7	Polystyrene	3	0.3
Air	1	0	Marble	6–7	0.5–0.6	Porcelain	5–7	0.4–0.5
Alcohol	24	0.85	Mica	6–7	0.5–0.6	Powered Milk	3.5–4	0.3–0.4
Ammonia	15–25	0.75–0.85	Nylon	4–5	0.3–0.4	Rubber	2.5–3	0.3
Cement (powder)	4	0.35	Oil	2.2	0.2	Salt	6	0.5
Cereals	3–5	0.3–0.4	Paper	2–4	0.2–0.3	Sand	3–5	0.3–0.4
Damp wood	10–30	0.7–0.9	Paraffin	2–2.5	0.2	Sugar	3	0.3
Dry wood	2–7	0.2–0.6	Petrol	2.2	0.2	Teflon®	2	0.2
Ethylene glycol	38	0.95	Plexiglass	3.2	0.3	Vaseline	2–3	0.2–0.3
Epoxy resin	4	0.36	Polyester resin	2.8–8	0.2–0.6	Water	80	1
Flour	2.5–3	0.2–0.3						



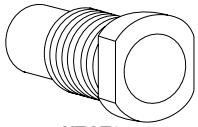
XSZB1●●



9006PA●●



XSZE●●●



XTAZ3●
Well mounting bracket

Accessories

Size	Description		Catalog Number
18 mm	Mounting nuts	Plastic	**XSZE218**
		Metal	**XSZE118**
	Mounting bracket	Plastic	**XSZB118**
		Metal	**9006PA18**
30 mm	Mounting nuts	Plastic	**XSZE230**
		Metal	**XSZE130**
	Mounting bracket	Plastic	**XSZB130**
		Metal	**9006PA30**
		Well	**XTAZ30**
32 mm	Mounting bracket	Well	**XTAZ32**
32 mm		Surface	**XUZB32**

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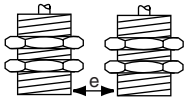
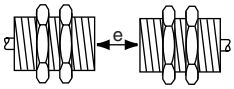
Minimum Mounting Clearances

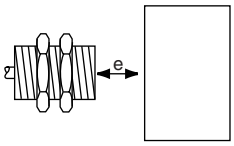
Side by side



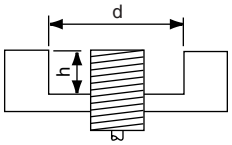
Face to face



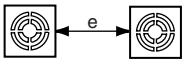
Facing a metal object



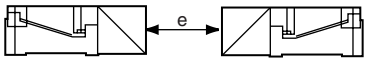
Mounted in metal



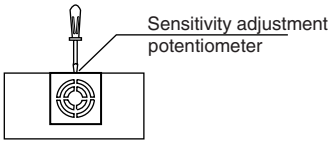
Side by side



Face to face



Flush mounting



To avoid influence of the immediate surroundings it maybe necessary to reduce the sensitivity when flush mounting the sensor.

Minimum Mounting Clearances		Side by Side mm (in.)	Face to Face mm (in.)	Facing a Metal Object mm (in.)	Mounting in Metal mm (in.)
XT1 Flush Mountable	18 mm	e: 0	e: 30 (1.18)	e: 30 (1.18)	d: 18 (0.71) h: 0
	30 mm	e: 0	e: 60 (2.36)	e: 60 (2.36)	d: 30 (1.18) h:0
	32 mm	e: 0	e: 100 (3.94)	e: 100 (3.94)	d: 32 (1.26) h:0 x: 2 (0.07)
XT4 Non-Flush Mountable	18 mm	e: 40 (1.57)	e: 50 (1.97)	e: 80 (3.15)	d: 18 (0.71) h: 0
	30 mm	e: 60 (2.36)	e: 80 (3.15)	e: 100 (3.94)	d: 90 (3.54) h: 20 (0.79)
	32 mm	e: 60 (2.36)	e: 100 (3.94)	e: 100 (3.94)	d: 96 (3.78) h: 25 (0.98)
XT7 Limit Switch Style		e: 40 (1.57)	e: 120 (4.72)		

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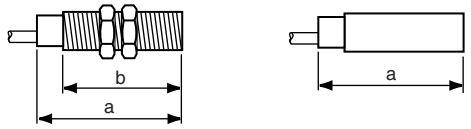
Dimensions, mm (in.)

XT1/4

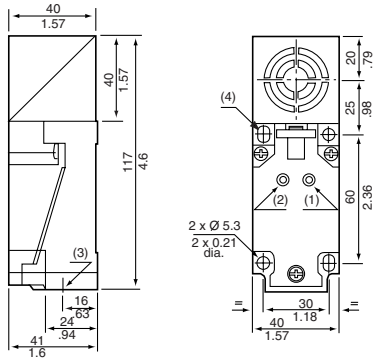


Dimensions, mm (in.)	a	b
XT●M18	60 (2.36)	51 (2.03)
XT●M30	60 (2.36)	51 (2.03)
XT●M32	80 (3.15)	n/a

a = Overall
b = Threaded Section

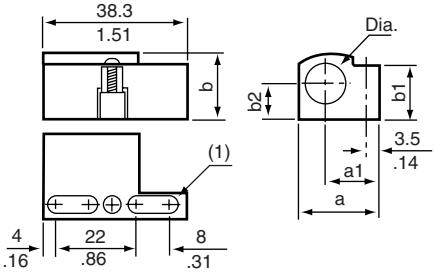
(1) Output LED
(2) Supply LED (depending on model)
(3) 1 entry threaded for 0.5 NPT
(4) 2 elongated holes 5.3 x 7 mm (0.21 x 0.28 in.)

XT7



Accessories Dimensions (mm/in.)

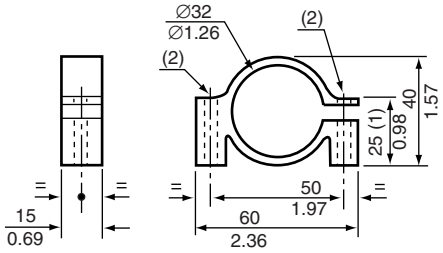
XSZB112, B118, B130



XSZ	a	a1	b	b1	b2	Dia.
B112	21.9 0.86	14.5 0.57	16 0.63	15.5 0.61	8.5 0.33	12
B118	26 1.02	15.7 0.62	22 0.87	20.1 0.80	11.5 0.45	18
B130	39 1.53	21.7 0.85	35.5 1.40	31 1.22	18.5 0.73	30

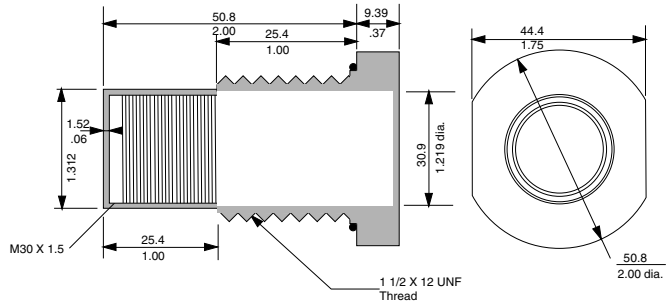
(1) 2 elongated holes 4 x 8 mm (0.16 x 0.31 in)

XUZB32

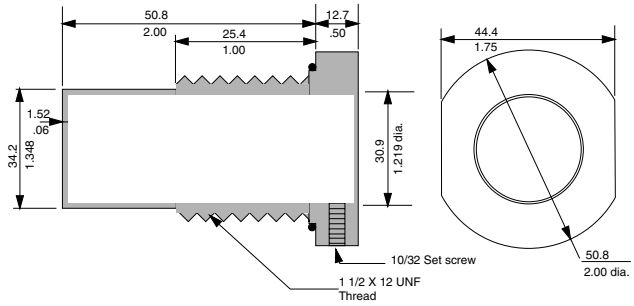


(1) maximum value
(2) 2 holes Ø 5.5 mm (0.22 in)
Clamp supplied with two M5 screws. HM head

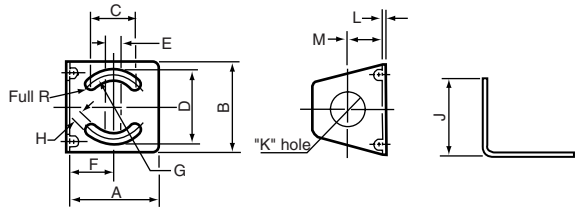
XTAZ30



XTAZ32



9006PA••



Type	A		B		C		D		E		F		G		H		J		K		L		M	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
PA30	2.54	67	2.56	65	1.39	35	1.99	51	0.39	10	1.28	33	1.97	50	0.21	5	2.05	52	1.20	31	0.08	2	0.98	25
PA18	2.05	52	1.97	50	0.98	25	1.60	41	0.39	10	0.98	25	1.38	35	0.21	5	1.65	42	0.73	19	0.08	2	0.79	20
PA12	1.38	35	1.57	40	069	18	1.20	31	0.39	10	069	18	0.98	25	0.21	5	1.28	33	0.49	13	0.08	2	0.71	18

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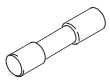
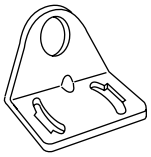
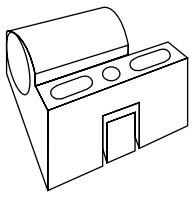


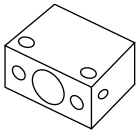
XUZE08



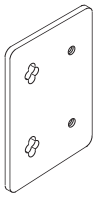
9006PA••



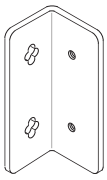
XSZB1••



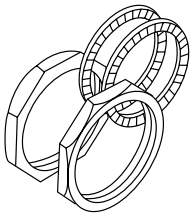
8316••



XSEZ01



XSEZ02



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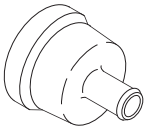

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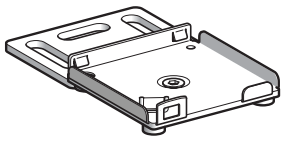

XSZB•00

Protective fuses

For AC and AC/DC proximity sensors that do not incorporate overload and short circuit protection, using a quick-blow fuse connected in series with the sensor is recommended.

Description	Quantity	Catalog Number
0.6 A quick-blow cartridge fuse (5 x 20) (XSB proximity sensors) (Use with Class 9080 Type FB, IEC 5 x 20 fuseholder—see Digest)	Sold in lots of 10	**XUZE06**
0.8 A quick-blow cartridge fuse (5 x 20) (XS dia. 8, 12, 18, 30, and XSD proximity sensors) (Use with Class 9080 Type FB, IEC 5 x 20 fuseholder—see Digest)	Sold in lots of 10	**XUZE08**

Mounting brackets

Description	Sensor Diameter	For use with	Catalog Number
Plastic mounting bracket for tubular inductive proximity sensors	4 unthreaded	XS1L04	**XSZB104**
	5 (M5 x 0.5)	XS1N05	**XSZB105**
	6.5 unthreaded	XS1L06, XS2L06	**XSZB165**
	8 (M8 x 1)	XS1, XS2, XS4	**XSZB108**
	12 (M12 x 1)	XS1, XS2, XS4	**XSZB112**
	18 (M18 x 1)	XS1, XS2, XS4	**XSZB118**
	30 (M30 x 1.5)	XS1, XS2, XS4	**XSZB130**
Steel mounting bracket, 90° for tubular inductive proximity sensors	12 (M12 x 1)	XS1, XS2, XS4	**9006PA12**
	18 (M18 x 1)	XS1, XS2, XS4	**9006PA18**
	30 (M30 x 1.5)	XS1, XS2, XS4	**9006PA30**
Diecast zinc mounting bracket for tubular sensors, 4–12 mm dia.	4 mm	XS1L04	**831604**
	5 mm	XS1L05	**831605**
	6 mm	XS1L06, XS2L06	**831606**
	8 mm	XS1, XS2, XS4	**831608**
	12 mm	XS1, XS2, XS4	**831612**
Metal plate bracket for XSE sensors	Straight	XSE	**XSEZ01**
	Right angled	XSE	**XSEZ02**

Mounting nuts

Description	Sensor Diameter	For use with	Catalog Number
2 Zamac nuts, nickel and chromium plated, with 2 lockwashers	5 (M5 x 0.5)	XS1N05	**XSZE105**
	8 (M8 x 1)	XS1, XS2	**XSZE108**
	12 (M12 x1)	XS1, XS2	**XSZE112**
	18 (M18 x 1)	XS1, XS2	**XSZE118**
	30 (M30 x 1.5)	XS1, XS2	**XSZE130**
2 plastic nuts	8 (M8 x 1)	XS4	**XSZE208**
	12 (M12 x1)	XS4	**XSZE212**
	18 (M18 x 1)	XS4	**XSZE218**
	30 (M30 x 1.5)	XS4	**XSZE230**
Stainless steel mounting nuts	12 (M12 x1)	XS1, XS2	**XSZE312**
	18 (M18 x 1)	XS1, XS2	**XSZE318**
	30 (M30 x 1.5)	XS1, XS2	**XSZE330**
Stainless steel locknut washers	8 (M8 x 1)	XS1, XS2	**XSZE908**
	12 (M12 x1)	XS1, XS2	**XSZE912**
	18 (M18 x 1)	XS1, XS2	**XSZE918**
	30 (M30 x 1.5)	XS1, XS2	**XSZE930**
Protective cable end, (CNOMO type)	12	XS1, XS2, XS4	**XSZP112**
	18	XS1, XS2, XS4	**XSZP118**
	30	XS1, XS2, XS4	**XSZP130**
Flat mounting plate	—	XS•J	**XSZBJ00**
	—	XS•F	**XSZBF00**
	—	XS•E	**XSZBE00**
	—	XS•C	**XSZBC00**
	—	XS•D	**XSZBD00**
90° angle flat mounting plate	—	XS•J	**XSZBJ90**
	—	XS•F	**XSZBF90**
	—	XS•E	**XSZBE90**
	—	XS•C	**XSZBC90**
	—	XS•D	**XSZBD90**
Substitution mounting bracket	—	XS•E	**XSZBE10**
	—	XS•C	**XSZBC10**
	—	XS•D	**XSZBD10**
Protective cover	—	XS•E	**XSZEE10**
	—	XS•C	**XSZEC10**
	—	XS•D	**XSZED10**

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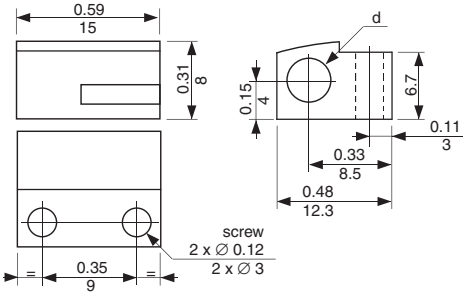
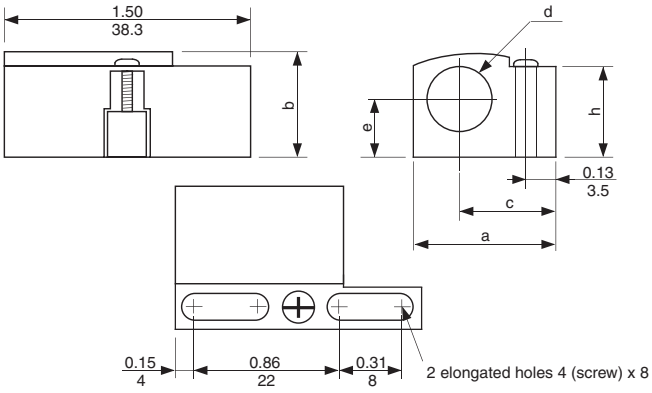
Mounting brackets

XSZB104/105



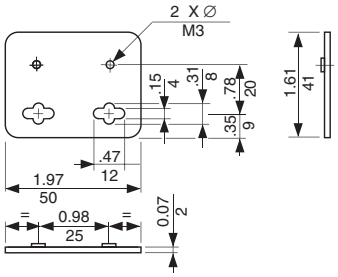
See the table below for additional dimensions.

XSZB165/108/112/118/130



Sensors	Brackets	a		b		c		d		e		h	
		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
4 mm Unthreaded	**XSZB104**	—	—	—	—	—	—	0.15	4.0	—	—	—	—
5 mm	**XSZB105**	—	—	—	—	—	—	0.19	5.0	—	—	—	—
6.5 mm Unthreaded	**XSZB165**	0.78	19.9	0.55	14.0	0.57	14.5	0.25	6.5	0.29	7.5	0.49	12.5
8 mm	**XSZB108**	0.78	19.9	0.55	14.0	0.57	14.5	0.31	8.0	0.29	7.5	0.49	12.5
12 mm	**XSZB112**	0.86	21.9	0.63	16.0	0.57	14.5	0.47	12.0	0.33	8.5	0.21	15.5
18 mm	**XSZB118**	1.00	26.0	0.86	22.0	0.61	15.7	0.70	18.0	0.45	11.5	0.79	20.1
30 mm	**XSZB130**	1.53	39.0	1.40	35.5	0.85	21.7	1.18	30.0	0.72	18.5	1.20	31.0

XSEZ01



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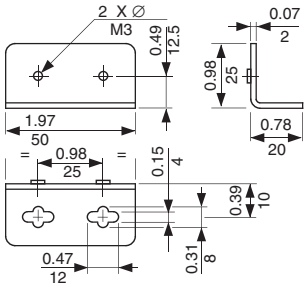
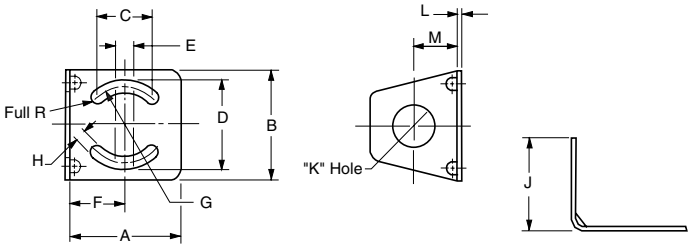


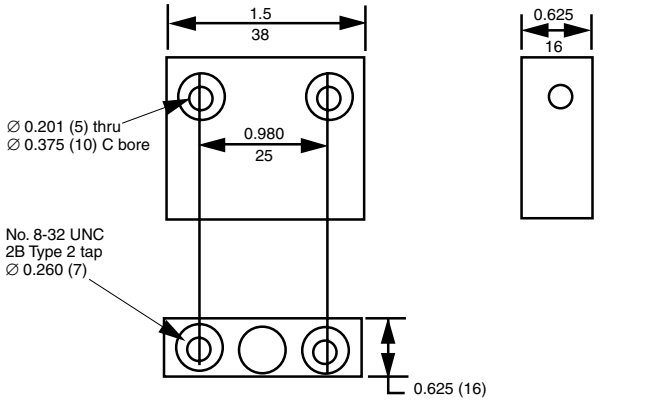
Approximate Dimensions

9006PA••



Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

8316 Bracket



Type	A		B		C		D		E		F		G		H		J		K		L		M	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
PA30	2.64	67	2.56	65	1.39	35	1.99	51	0.39	10	1.28	33	1.97	50	0.21	5	2.05	52	1.20	31	0.08	2	0.98	25
PA18	2.05	52	1.97	50	0.97	25	1.60	41	0.39	10	0.98	25	1.38	35	0.21	5	1.65	42	0.73	19	0.08	2	0.79	20
PA12	1.38	35	1.57	40	0.69	18	1.20	31	0.39	10	0.69	18	0.98	25	0.21	5	1.28	33	0.49	13	0.08	3	0.71	18

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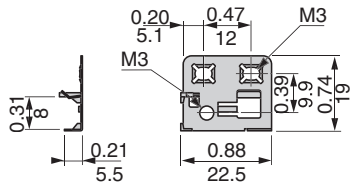
XSZBJ00



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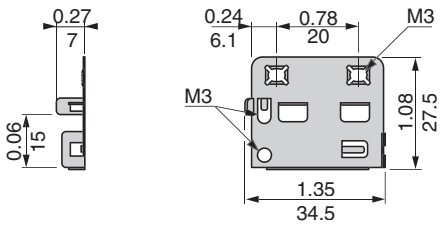

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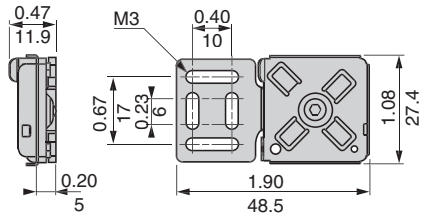

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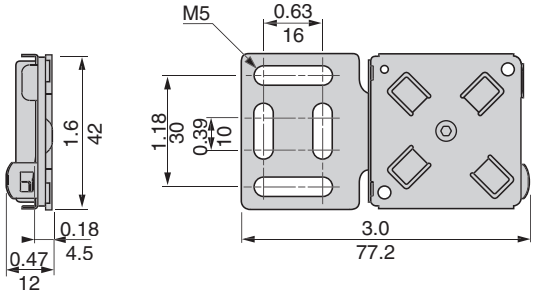

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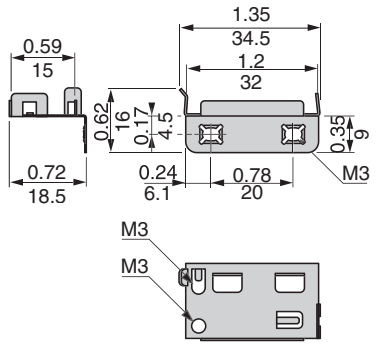

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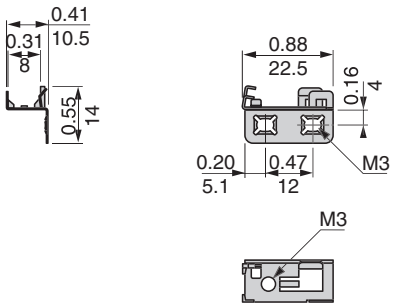

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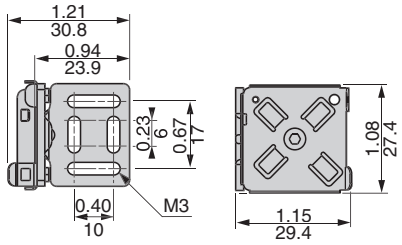

Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

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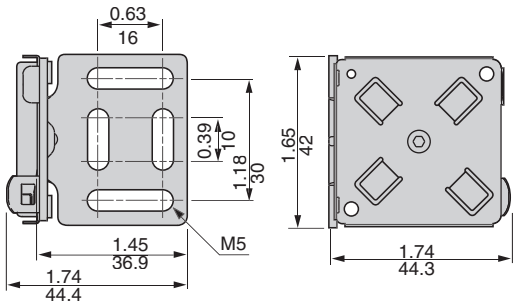
XSZBC90



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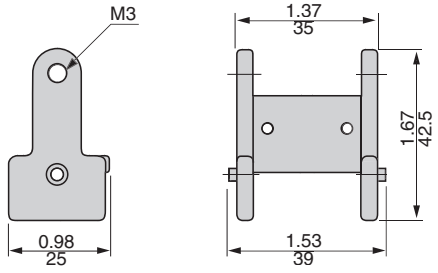

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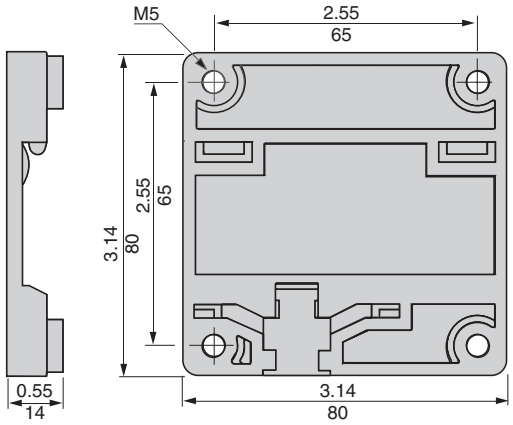

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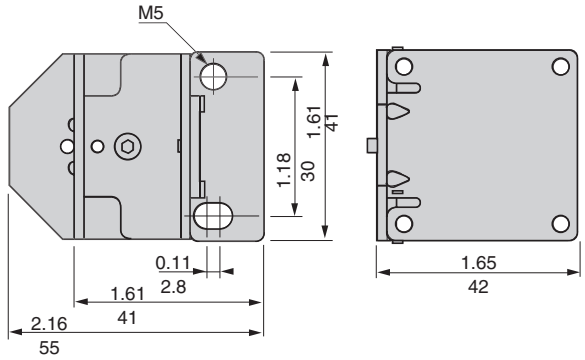

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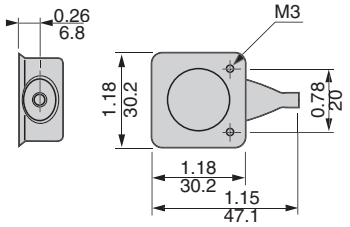
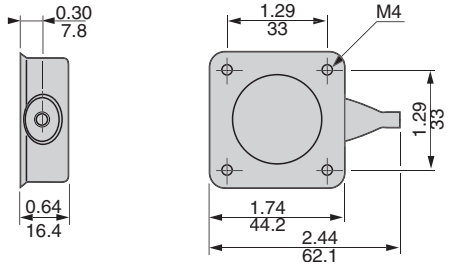


XSZEC10



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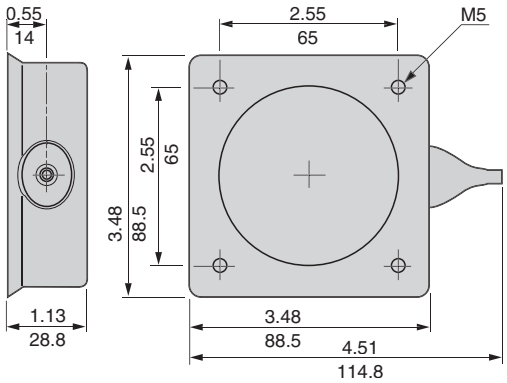

Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

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Proximity Sensors
SG Magnet Actuated Sensors
Surface Mounted Style



Surface-mounted, magnet-actuated sensors for industrial applications

- Sensing is independent of magnet polarity.
- Typical applications: security systems (gate interlocks), high-speed rotational counting, identification of metal bins with magnet-coded labels, sensing through non-magnetic walls.

Features

- Housing: aluminum; plastic (PBT) for SG08168 and SG28195
- Completely encapsulated in epoxy
- Very fast response time (reed output only)
- PLC-compatible AC models (triac output)
- High transients protection (AC models)
- No bouncing

Magnet-actuated proximity sensors

Circuit Type	AC ratings VA (max.)	Voltage †	Current (max.)	DC ratings VA (max.)	Voltage (max.)	Current (max.)	Leakage (mA)	Dim. Figure	Wiring Figure	Catalog Number
Reed output—DC only										
N.O.	—	—	—	10	200	0.5 A	0	1	A	**SGA8016**
N.O.	—	—	—	10	200	0.5 A	0	2	A	**SGA8031**
Reed output—DC only—Built-in resistor protection										
N.O.	—	—	—	10	200	0.5 A	0	1	A	**SGA8182**
Reed output—DC only—High temperature -40 to 300 °F										
N.O.	—	—	—	10	200	0.5 A	0	1	A	**SGA8053**
Reed output—AC and DC—Built-in RC protection										
N.C.	3	130	0.25 A	3	100	0.25 A	6 (R) ①	2	B	**SGB8175**
N.O.	10	130	0.5 A	10	200	0.5 A	6 (R) ①	2	A	**SGA8176**
N.O.	10	130	0.5 A	10	200	0.5 A	6 (R) ①	1	A	**SGA8177**
Triac output—AC only (inductive PLC)										
N.O.	240	120	2.0 A	—	—	—	1.7 (P) ①	3	A	**SG08168 ★**
N.O./N.C.	50	240	0.5 A	—	—	—	1.7 (P) ①	3	C	**SG28195 ★**
N.O.	50	130	0.5 A	—	—	—	1.7 (P) ①	1	A	**SG08239**

① PLC applications:
P = PLC compatible.
R = Bleeder resistor required.

† For reed output: maximum voltage. For triac output: nominal voltage.

★ UL Recognized

Magnet actuators

Description		Sensing distance All ③	Sensing distance SG2 8195	Catalog Number
Tubular		1.3 in. (33 mm)	1 in. (25.4 mm)	**7046**
Flat bracket, center	South pole	0.7 in. (17.7 mm)	0.4 in. (10 mm)	**7093**
Flat bracket, side	South pole	0.5 in. (12.7 mm)	0.2 in. (5 mm)	**7063**
90° bracket	South pole	0.5 in. (12.7 mm)	0.2 in. (5 mm)	**7062**
Block type		0.5 in. (12.7 mm)	0.2 in. (5 mm)	**7099**
Flexible tape, 1 ft (305 mm) long		0.3 in. (7.6 mm)	0.2 in. (5 mm)	**7096**

③ All block sensors except SG28195.

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Wiring

Figure A (N/O)



Figure B (N/C)

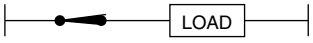

Figure C (N/O or N/C)



Specifications

Mechanical		
Standard temperature range	-40 to +140 °F (-40 to +60 °C); to 300 °F (149 °C) for SGA8053	
Enclosure ratings	NEMA Types 1, 4, 13	
Vibration resistance	20 G (10 to 2,000 Hz)	
Shock resistance	50 G for 11 ms	
Differential	Maximum 75%	
Repeatability	0.003 in.	
Electrical	**AC (triac)**	**DC**
Voltage drop (across switch)	2 V	0 V (IR for SGA8182) ①
Minimum load current	15 mA	—
On delay (ms)	1 ms	0.75 ms
Off delay (ms)	8 ms	0.75 ms
Cable, 3 ft (0.9 m)	#22 AWG vinyl, except: #16 AWG SJTO for **SGO8168;** 2 individual Teflon® #22 AWG for **SGA8053**	
Agency listings	E 42259 CCN NKCR2 (SGO8168 and SG28195 only)	

① Voltage drop = IR, where I= load current, R = 150 Ω

Options

Description	Cable Type	Suffix
2 m (6.6 ft) of individual wires	Teflon (SGA8053)	**L02**
5 m (16.4 ft) of individual wires	Teflon (SGA8053)	**L05**
5 m (16.4 ft) of cable	Vinyl	**L05**
	SJTO (SGO8168)	**L05**
10 m (32.8 ft) of cable for triac and models with built-in resistor	Vinyl	**L10**
	SJTO (SGO8168)	**L10**

Ex: SGO8168L05

Dimensions

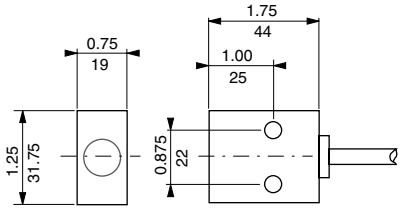

Figure 1

SGA8016
SGA8177
SGA8182
SGA8053
SGO8239

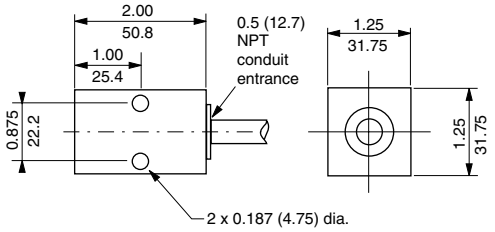

Figure 2

SGA8031
SGA8175
SGA8176

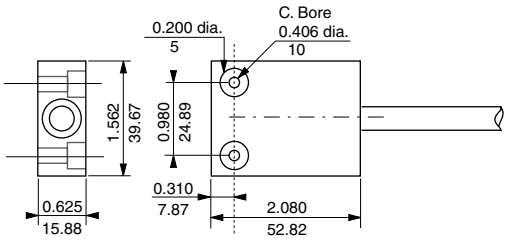

Figure 3

SGO8168
SG28195

Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

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Proximity Sensors
SG Magnet Actuated Sensors
Limit Switch Style



Non-plug-in

Limit-switch style, magnet-actuated proximity sensors for heavy-duty industrial applications

- Sensing independent of magnet polarity
- Typical applications: security systems (gate interlocks), high-speed rotational countings, identification

Features

- Diecast zinc housing
- Completely encapsulated in epoxy
- Plug-in models for fast replacement
- Very fast response time (reed output only)
- PLC-compatible AC models
- High transient protection
- Overload and short protection (transistor models)
- No bouncing
- 0.5 in. (12.7 mm) NPT conduit entrance
- UL recognized (except where indicated)

Circuit Type	AC ratings (inductive or resistive)			VA (max.)	DC ratings (resistive only)		Leakage (mA)	Dim. Figure	Wiring Figure	Catalog Number
	VA (max.)	Voltage (nom.)	Current (max.)		Voltage (max.)	Current (max.)				
AC triac output, non-plug-in										
N.O.	360	120	3.0 A	—	—	—	1.7 (P) ▲	1	A	**SG08003**
N.C.	360	120	3.0 A	—	—	—	1.7 (P) ▲	1	B	**SG18004**
Non-plug-in with light indicator										
N.O.	360	120	3.0 A	—	—	—	1.7 (P) ▲	1	A	**SG0L8003**
N.C.	360	120	3.0 A	—	—	—	1.7 (P) ▲	1	B	**SG1L8004**
DC, transistor output, non-plug-in										
N.O.	—	—	—	7.5	30	0.25 A	0	1	D	**SG08079**
N.C.	—	—	—	7.5	30	0.25 A	0	1	E	**SG18056**
Reed output, non-plug-in (AC model has built-in surge RC protection)										
N.O.	—	—	—	10	200	0.5 A	0	1	A	**SGA8005**
N.O.	15	120	1.0 A	15	250	1.0 A	6 (R) ▲	1	A	**SGA8040**
N.O./N.C.	—	—	—	3	200	0.25 A	0	1	C	**SGC8027**
N.O./N.C.	—	—	—	20	500	1.5 A	0	3	C	**SGC8025**

▲ (P)=PLC compatible. (R) Bleeder resistor required for PLC compatibility.

Magnet actuators, in. (mm)

Description		Sensing distance					Catalog Number
		8079	8040	8027	8025	All others	
Tubular		1.2 (30.5)	0.8 (20.3)	0.9 (23)	1.0 (25.4)	1.3 (33)	**7046**
Flat bracket, center	South pole	0.5 (12.7)	0.4 (10.1)	0.4 (10.1)	0.4 (10.1)	0.7 (17.7)	**7093**
Flat bracket, side	South pole	0.4 (10.0)	0.2 (5.1)	0.2 (5.1)	0.2 (5.1)	0.5 (12.7)	**7063**
90° bracket	South pole	0.4 (10.1)	0.2 (5.1)	0.2 (5.1)	0.2 (5.1)	0.5 (12.7)	**7062**
Block type		0.2 (5.1)	0.2 (5.1)	0.3 (7.6)	0.2 (5.1)	0.5 (12.7)	**7099**
Flexible type—1 ft (305 mm) long		0.1 (2.5)	—	0.2 (5.1)	0.1 (2.5)	0.3 (7.6)	**7096**

For more information, see page 276.

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Wiring

Figure A

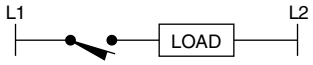


Figure B

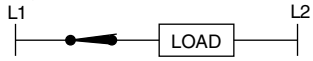
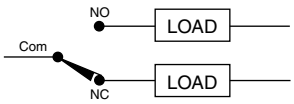
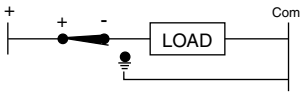


Figure C



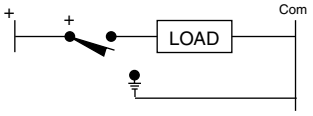
Terminal strip marked: NO-COM-NC

Figure D



SG18056 is normally closed. Connect the red terminal (+) to the power source. Connect the minus terminal (-) to the load. The housing must be connected to minus.

Figure E



Specifications

General characteristics						
Temperature range	-40 to 140 °F (-40 to 60 °C)					
	-40 to 125 °F (-40 to 52 °C) for transistor models					
Enclosure ratings	NEMA Types 1, 4, 13					
Vibration resistance	20 G (10 to 2,000 Hz)					
Shock resistance	50 G for 11 ms					
Differential	Maximum 75%					
Repeatability	0.003 in.					
	AC triac	**Transistor**	**Reed**			
Voltage drop (across switch)	2 V	—	—			
Minimum load current (maximum)	15 mA	—	—			
			SGA8005	**SGA8040**	**SGS8027**	**SGC8025**
On delay (maximum)	1 ms	0.75 ms	0.75	2 ms	1 ms N.O./ 1.5 ms N.C.	2 ms N.O./ 4 ms N.C.
Off delay (maximum)	—	0.75 ms	0.75	2 ms	11 ms N.O./ 1.5 ms N.C.	2 msN.O./ 4 ms N.C.
Cable—screw terminals	#16 AWG	—				
Agency listings except where noted	E 42259 CCN NKCR2					

Options—triac models only

Description	Figure	Suffix adder
3 ft (0.9 m) 16-3 SJTO vinyl cable, epoxy sealed	A, B	**320**
3 ft (0.9 m) 16-3 SJTO vinyl cable, cord connector	A, B	**321**
3 ft (0.9 m) 16-4 SJTO vinyl cable, epoxy sealed	C, D, E	**420**
3-pin mini-style receptacle ①	—	**347**

① See page 626 for matching connector cables.

Dimensions

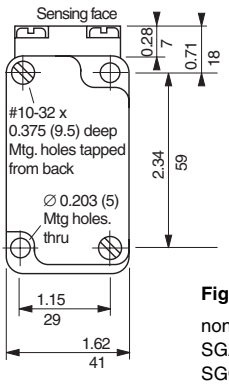
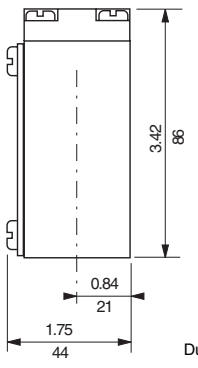


Figure 1

non-plug-in
SGA8005
SGO8003
SGC8027
SGI8056
SGO8056
SGI8004
SGO8040
SGO8079



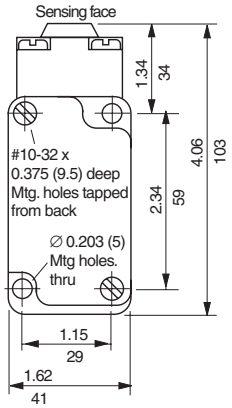
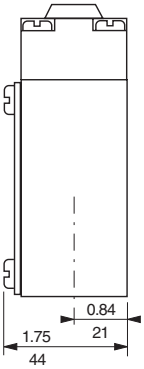


Figure 2

Style C
SGC8025



Dual Dimensions inches / mm

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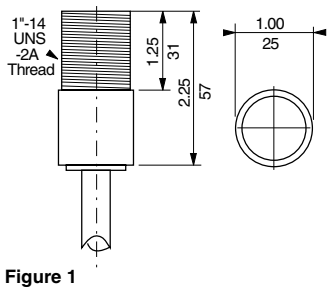

Figure 1

SGA8057
(Aluminum)
SGC8058 (PVC)
SGA8072 (PVC)
SGA8189 (Brass)

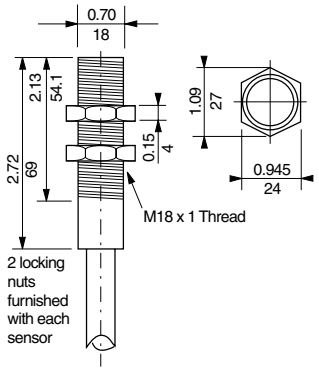

Figure 2

SGA8179
SGA8180
SGC8181

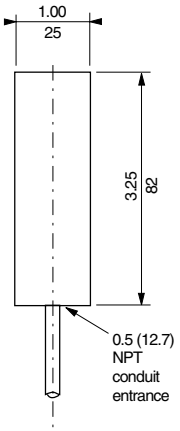

Figure 3

SGA8038

Tubular, magnet-actuated proximity sensors for heavy-duty applications such as:

- High-speed rotational counting
- Identification of metal bins with magnet-coded labels
- Sensing through non-magnetic walls

Sensing is independent of magnet polarity.

Features

- Housings: aluminum for SGA8057; plastic (PVC) for SGC8058, SGA8072, SGA8039; polymide for SGA8179, SGA8180, SGA8181
- Completely encapsulated in epoxy
- High transient protection
- Threaded and smooth housings
- High voltage versions
- SPST and SPDT models
- No bouncing
- UL recognized (except where noted with ★).

Circuit type	AC ratings (inductive or resistive)			DC ratings (resistive only)			Leakage (mA)	Dim. Figure	Wiring Figure	Catalog Number
	VA (max.)	Voltage nominal	Current (max.)	VA (max.)	Voltage (max.)	Current (max.)				
Reed output AC and DC switching (built-in RC protection), threaded										
N.O.	15	120	1.0 A	12	48	0.25 A	6 ②	1	A	**SGA8057**
N.O./N.C.	15	120	1.0 A	15	100	1.0 A	6 ②	1	C	**SGC8058**
N.O.	15	120	1.0 A	15	250	1.0 A	6 ②	1	A	**SGA8072**
N.O.	25	480	1.0 A	25	480	1.0 A	.16	2	A	**SGA8179 ★**
Reed output—DC, threaded, resistor built-in for long cable runs ③										
N.O.	—	—	—	10	200	0.5 A	0	2	A	**SGA8180 ★**
N.O./N.C.	—	—	—	3	100	0.25 A	0	2	C	**SGC8181 ★**
Reed output—AC and DC (built-in RC protection), smooth										
1 N.O.	15	120	1.0 A	15	250	1.0 A	6 ②	3	A	**SGA8038 ★**

② Bleeder resistor required for PLC AC switching compatibility.
③ 150 Ω for SGA8180 and 470 Ω for SGC8181.
★ Not UL

Magnet actuators, in. (mm)

Description		Sensing distance		Catalog Number
		SGA8180	All Others	
Tubular		1.3 (33)	0.8 (20.3)	**7046**
Flat bracket, center	South pole	0.7 (17.8)	0.4 (10.1)	**7093**
Flat bracket, side	South pole	0.2 (5.1)	0.2 (5.1)	**7063**
90° bracket	South pole	0.2 (5.1)	0.2 (5.1)	**7062**
Block type		0.2 (5.1)	0.2 (5.1)	**7099**
Flexible tape—1 ft (305 mm) long		0.1 (2.5)	0.1 (2.5)	**7096**

For more information, see page 276.

Dual Dimensions inches / mm

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Wiring

Figure A

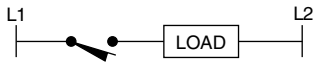
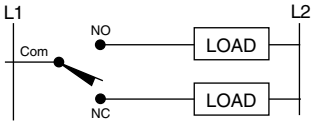


Figure C

SGC8058 and SGC8181
Black—Com
Blue—N.O.
Brown—N.C.



Specifications

General characteristics			
Temperature range	-40 to 140 °F (-40 to 60 °C)		
Enclosure ratings	NEMA Types 1, 4, 13		
Vibration resistance	20 G (10 to 1000 Hz)		
Shock resistance	50 G for 11 ms		
Differential	Maximum 75% (except SGA8179 = 1.06 in. maximum)		
Repeatability	Maximum 0.003 in.		
	Reed AC and DC	**SGA8180 Built-in resistor (DC)**	**SGC8181 Built-in resistor (DC)**
Voltage drop ①	25 mV	IR	IR
On delay (maximum)	2 ms	0.75 ms	2.5 ms N.O. 3.5 ms N.C.
Cable, 3 ft (0.9 m)	22-2 vinyl: SGA8038, 8180; 23-2 vinyl SGC 8181;		
	16-2 SJTO: SGA8057, 8072. SO cable for SGA8179		
Agency listings except where noted	E 42259 CCN NKCR2		

① Voltage drop = IR, where I is the load current and R the built-in resistor.

Options

Description		Suffix
5 m (16.4 ft) of cable	Vinyl	**L05**
	SJTO (8057, 8072, 8179)	**L05**
10 m (32.8 ft) of cable	Vinyl	**L10**
(for models with built-in resistor)	SJTO (8057, 8072, 8179)	**L10**

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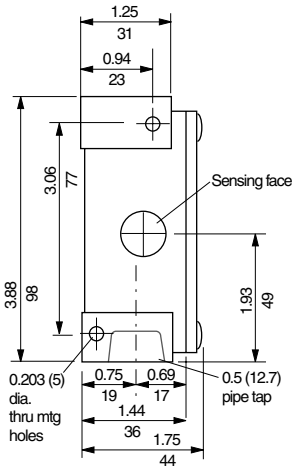

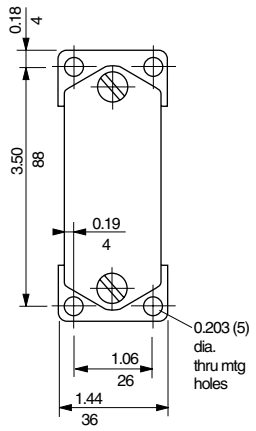

Figure 1

SGA8018
SGO8026
SGO8110
SGO8141

Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

Maintained contact model—A highly reliable, magnet-actuated proximity limit switch designed to maintain contact for high-speed stacker cranes, slow-down, and memory applications. Eliminates the camming required for mechanically operated limit switches. **Maintains the information even if power is down**.

Features

- Diecast zinc housing
- PLC compatibility
- High transient protection
- No bouncing
- 0.5 in. (12.7 mm) NPT conduit entrance
- UL recognized and CSA certified

When the north or south pole of a magnet actuator moves past the blue-dot sensitive area within the specified range along the switch, the contact position changes from open to closed. Once latched, the movement of the same magnetic pole in the opposite direction—or the movement of the opposite magnetic pole in the same direction—unlatches the switch.

NOTE: If during this procedure the switch closes and then opens again (pulses), reverse the polarity of the magnet and repeat the above procedure. If the desired direction of operation is opposite to that established above, reverse the polarity of the magnet.

Circuit Type	AC ratings (inductive or resistive)			DC ratings (resistive only)			Leakage (mA)	Wiring Figure	Catalog Number
	VA (max.)	Voltage (nom.)	Current (max.)	VA (max.)	Voltage (max.)	Current (max.)			
Reed, DC									
1 N.O.	—	—	—	15	250	1.0 A	0	A	**SGA8018**
Triac, AC									
1 N.O.	360	120	3.0 A	—	—	—	1.7	A	**SGO8026**
Triac, AC low temperature: -30 to 85° F									
1 N.O.	360	120	3.0 A	—	—	—	1.7	B	**SGO8110**

Magnet actuators, in. (mm)

Description		Sensing Distance	Catalog Number
Tubular		1.3 (33)	**7046**
Flat bracket, center	South pole	1.0 (25)	**7093**
	North pole	1.0 (25)	**7547**
Flat bracket, side	South pole	0.7 (18)	**7063**
	North pole	0.7 (18)	**70631**
90° bracket	South pole	0.7 (18)	**7062**
	North pole	0.7 (18)	**70621**
Block type		0.5 (13)	**7099**
Flexible tape—1 ft (305 mm) long		0.5 (13)	**7096**

For more information, see page 276.

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Wiring

Figure A

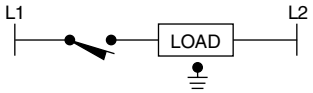
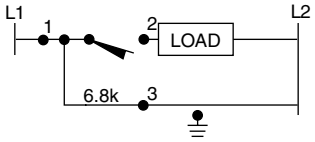


Figure B



Connect terminal 3 (heater) to line (L2) for operation below +32 °F.

Specifications

Mechanical		
Temperature range	+32 to 140 °F (0 to 60 °C)	
	+30 to 85 °F (-35 to 30 °C) for SGO8110	
Enclosure ratings	NEMA Types 1, 4, 13	
Vibration resistance	20 G (10 to 2,000 Hz)	
Shock resistance	50 G @ 11 ms	
Differential	Maximum 50%	
Repeatability	Maximum 0.003 in.	
Electrical	**Reed**	**Triac**
Voltage drop	—	3 V
Minimum load current	—	15 mA
On delay	2 ms	2 ms
Off delay	2 ms	2 ms
Cable—screw terminals	—	#16 AWG
Agency Listings	E 42259 CCN NKCR2	LR 25490 Class 3211 03

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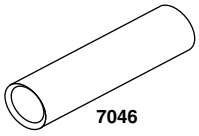
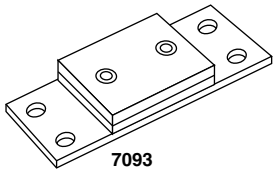
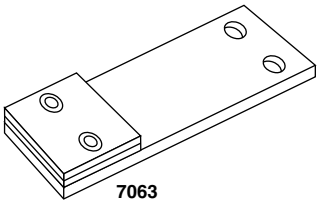
Proximity Sensors
SG Magnet Actuated Sensors
Magnet Actuators



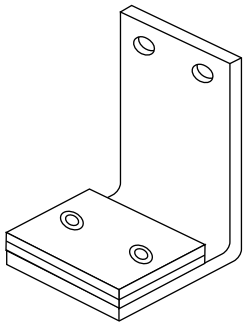
7046



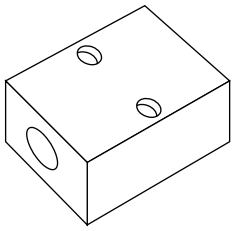
7093



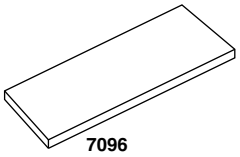
7063



7062



7099



7096

Features

- Industrial grade magnet is recommended for magnet-actuated proximity sensors.
- Alnico is used as magnet material for all rigid models.
- Kevlar is used for the flexible magnetic tape.
- The rigid models come mounted on one of several types of standard brackets for convenience (except the tubular high-power version).
- Both south and north poles are accessible and marked. *The **south pole** version is the standard.* North pole versions may be required in conjunction with the maintained magnetic switch (see page 294).
- For comparison, an average magnetic strength rating is listed below. Measurements were made with a Gaussmeter at 0.13 in. from the sensing surface.

Description		Magnetic Strength	Catalog Number
Tubular		700 Gauss	**7046**
Flat bracket, center	South pole	330 Gauss	**7093**
	North pole	330 Gauss	**7547**
Flat bracket, side	South pole	240 Gauss	**7063**
	North pole	240 Gauss	**70631**
90° bracket	South pole	260 Gauss	**7062**
	North pole	260 Gauss	**70621**
Block type		340 Gauss	**7099**
Flexible tape	1 ft long	180 Gauss	**7096** ∗

∗ For longer tape, specify the total length in feet. Example: 70966 = 6 ft.

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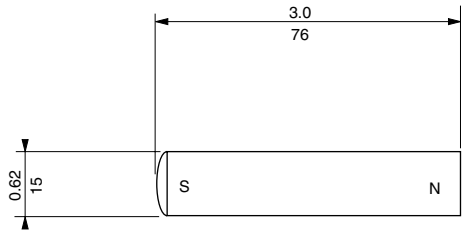
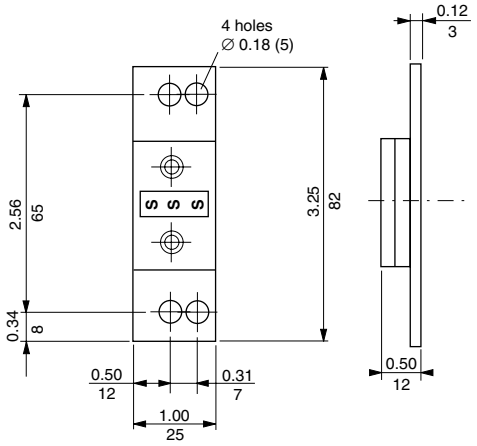
Magnet actuator dimensions

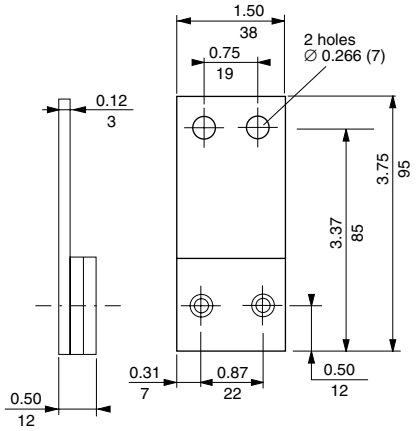
Tubular magnet actuator 7046



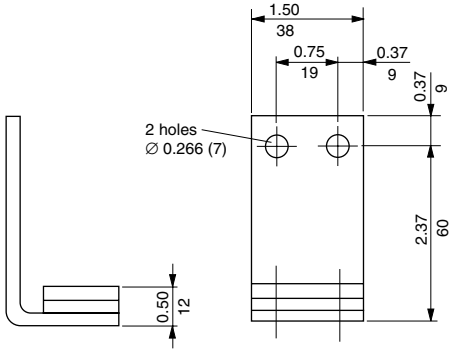
Magnet actuator 7093 (south pole)
Magnet actuator 7597 (north pole)



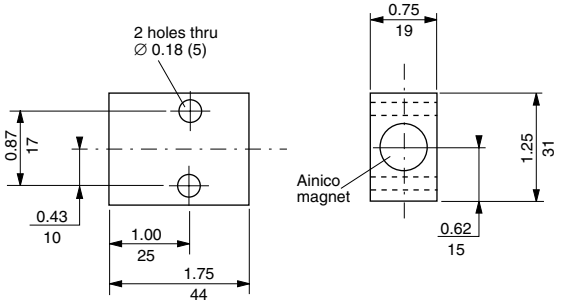
Magnetic actuator 7063 (south pole)
Magnet actuator 70631 (north pole)



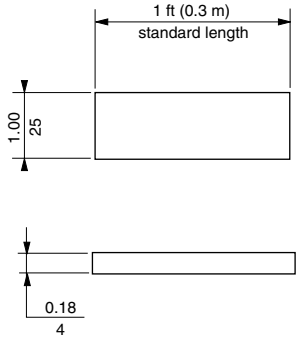
Magnet actuator 7062 (south pole)
Magnet actuator 70621 (north pole)



Block type magnet actuator 7099



Flexible magnetic tape 7096 1 foot



Dual Dimensions inches / mm

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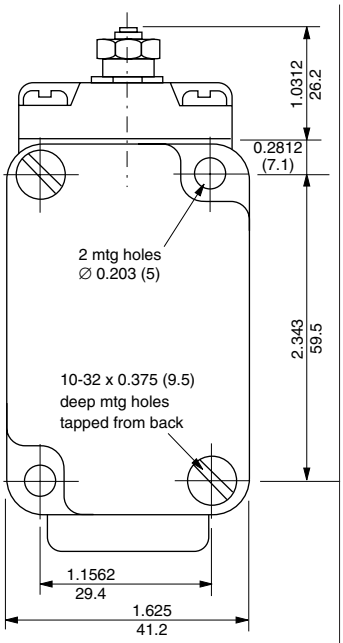

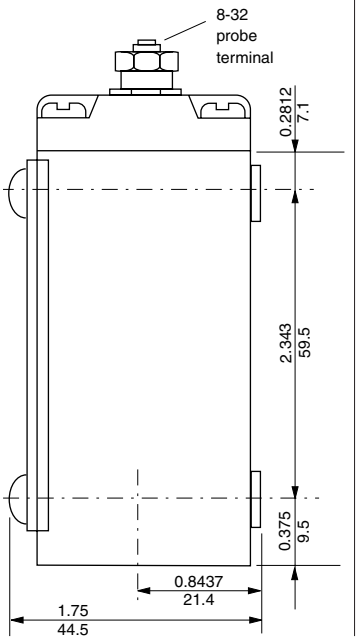

The touch switch is a highly reliable AC solid-state presence sensor designed for precise conductivity sensing. Applications include high temperature, light conductive, aggressive mechanical, and chemical environments that target positive end-point sensing. All models have a visible neon pilot light to indicate operation of the switch.

Features

- Diecast zinc housing
- Solid state—no moving parts
- 115 Vac, completely self-contained
- Probes up to 10 ft (3 m) long
- High current output—no relay required for most applications
- Fast response—no warm-up time
- 0.5 in. (12.7 mm) NPT conduit entrance
- UL Recognized

Operation

The switch is actuated when a conductive path is established between the probe terminal and ground (1 MΩ or less). The electrical contact to ground operates the switching thyristor. Internal RC snubber and varistor provide effective protection from typical transients. Normal open models have a 10 ms (maximum) turn on time. Different off-delay times are offered to permit compensation for relay chatter when the probe is subjected to bounce from irregular contact with the grounded metal point of contact.

NOTE: For isolated circuits where the ground is not common, the ground terminal of the switch should be connected to the neutral. The metal target to be detected by the probe should also then be wired to the neutral.

Probe characteristics

The probe terminal is an 8-32 stud protruding from the center of the head. *Extensions may be any electrically conductive wire or material suitably insulated from grounded surface and limited in length to 10 ft (3 m) or less.*

- Open voltage: 12 Vdc
- Peak current: 1 mA

Switch models

Circuit type	Voltage (nominal)	Current load (maximum)	Leakage current (maximum)	On delay	Off delay	Catalog Number
Terminal screws						
N.O.	120 Vac	3 A	1.7 mA	10 ms	100 ms	**STO8164**
N.C.	120 Vac	3 A	1.7 mA	100 ms	30 m s	**ST18165**
N.O.	120 Vac	3 A	1.7 mA	10 ms	400 ms	**STO8166**
N.O.	120 Vac	3 A	1.7 mA	10 ms	20 ms	**STO8167**
Pre-wired with 3 ft (0.9 m) of cable						
N.O.	120 Vac	3 A	1.7 mA	10 ms	100 ms	**STO8001**
N.C.	120 Vac	3 A	1.7 mA	100 ms	30 ms	**ST18002**
N.O.	120 Vac	3 A	1.7 mA	10 ms	400 ms	**STO8036**
N.O.	120 Vac	3 A	1.7 mA	10 ms	20 ms	**STO8042**

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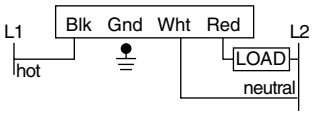
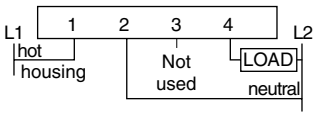
Wiring

Cable wiring



Target connected to ground

Terminal strip wiring



Target connected to ground. Housing must be grounded for proper operation.

Model ST switches may be wired in series or parallel. Connect the red lead to the black lead of other switch (terminal 4 to terminal 1 of the other switch) for series operation. The voltage drop across each switch (in the closed state) does not exceed 2 Vac.

Specifications

General characteristics	
Temperature range	-40 to 158 °F (-40 to 70 °C)
Enclosure ratings	NEMA Types 1, 4, 13
Voltage drop	2 V
Maximum inrush current	10 A
Minimum load current	15 mA
Power supply current (no load)	30 mA
Cable	3 ft (0.9 m) 16-4 SJTO or terminal screws #16 AWG

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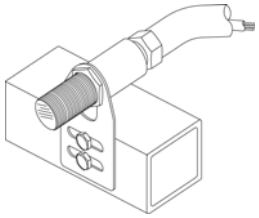
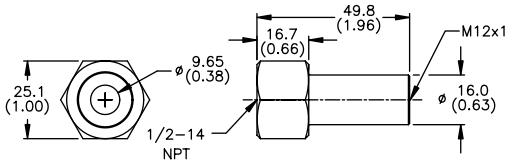
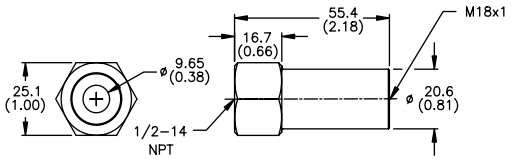
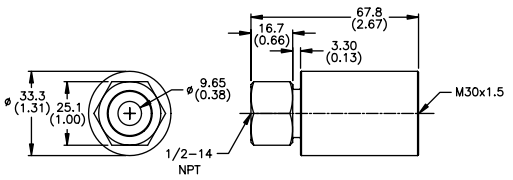
Conduit Adapters for Tubular Sensors



XSZCAR••

Features

- Available for 12, 18, and 30 mm tubular sensors
- 1/2 in.—14 NPT inside thread
- Nickel-plated brass

Tube Diameter	Tube Thread Size	Dimensions, mm (in.)	Catalog Number
12 mm (0.47 in.)	M12 x 1		XSZCAR12
18 mm (0.71 in.)	M18 x 1		XSZCAR18
30 mm (1.18)	M30 x 1.5		XSZCAR30

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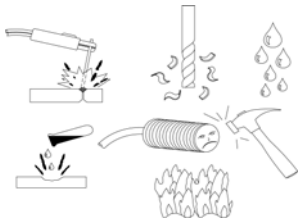
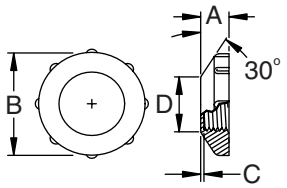


Features

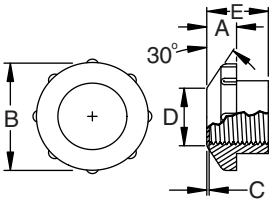
- Shielded and non-shielded caps available
- Different versions available (beveled or non-beveled)
- Provides sensor face protection with no effect on operation

Description

Protection in harsh applications, helps to prevent abrasions, cracks, and other possible damage to the sensor face. Available in several different materials: Ceramic, Delrin® acetal resin, and Teflon® material. Provides the sensor with protection and a longer life without the additional charge of a stainless steel face option.



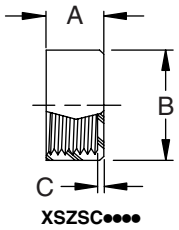
XSZEN••



XSZENN••

Beveled caps (30° chamfer), mm (in.)

A	B	C	D	E	Catalog Number
8 mm diameter shielded					
5.1 (0.20)	15.1 (0.59)	0.38 (0.15)	7.00 (0.28)	—	**XSZEN08**
12 mm diameter shielded					
6.2 (0.26)	24.1 (0.95)	0.76 (0.03)	12.2 (0.48)	—	**XSZEN12**
18 mm diameter shielded					
8.2 (0.32)	31.2 (1.23)	0.76 (0.03)	17.0 (0.67)	—	**XSZEN18**
30 mm diameter shielded					
7.6 (0.30)	44.5 (1.75)	1.01 (0.04)	29.0 (1.19)	—	**XSZEN30**
8 mm diameter non-shielded					
5.1 (0.20)	14.1 (0.56)	0.38 (0.15)	7.00 (2.76)	9.60 (0.37)	**XSZENN08**
12 mm diameter non-shielded					
6.5 (0.26)	22.9 (0.90)	0.76 (0.03)	12.9 (0.51)	17.3 (0.68)	**XSZENN12**
18 mm diameter non-shielded					
8.2 (0.32)	34.0 (1.34)	0.76 (0.03)	16.6 (0.65)	17.8 (0.70)	**XSZENN18**
30 mm diameter non-shielded					
7.5 (0.30)	44.5 (1.75)	1.01 (0.04)	30.0 (1.18)	22.8 (0.90)	**XSZENN30**



XSZSC••••

Non-beveled caps, mm (in.)

A	B	C	Catalog Number
12 mm diameter shielded			
8.90 (0.35)	16.1 (0.63)	1.26 (0.05)	**XSZSC12C**
8.90 (0.35)	16.1 (0.63)	0.76 (0.03)	**XSZSC12D**
8.90 (0.35)	16.1 (0.63)	0.76 (0.03)	**XSZSC12T**
18 mm diameter shielded			
8.80 (0.35)	24.4 (0.96)	1.27 (0.05)	**XSZSC18D**
8.80 (0.35)	24.4 (0.96)	1.27 (0.05)	**XSZSC18T**
12 mm diameter non-shielded			
15.2 (0.60)	16.1 (0.63)	0.76 (0.03)	**XSZSC12ND**
15.2 (0.60)	16.1 (0.63)	0.76 (0.03)	**XSZSC12NT**
18 mm diameter non-shielded			
18.0 (0.59)	24.4 (0.96)	1.27 (0.05)	**XSZSC18ND**
18.0 (0.59)	24.4 (0.96)	1.27 (0.05)	**XSZSC18NT**

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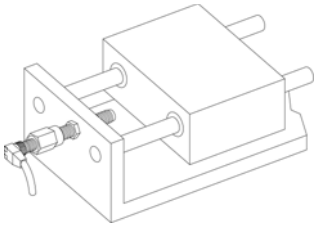


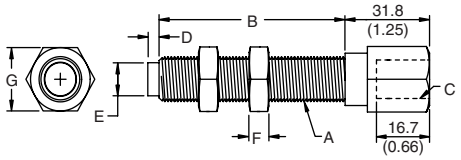
Features

- Accepts 8, 12, or 18 mm shielded sensor
- Heat-treated alloy steel construction
- Rugged stop with solid-state output

Description

Plunger screw adapters allow a shielded inductive proximity sensor to be used as a mechanical stop switch in applications requiring a precise end-of-travel signal or a hard stop. The spring requires a force of 252 g (9 oz) to actuate the sensor.

A	B	C	D	E (dia.)	F	G	Impact Force (Maximum)	Catalog Number
8 mm diameter shielded sensors								
M8x1	25 (1)	M8x1	3.16 (0.12)	5.84 (0.23)	6.26 (0.24)	11.0 (0.43)	2,000 N (450 lbf)	**XSZB0825**
M8x1	50 (2)	M8x1	3.16 (0.12)	5.84 (0.23)	6.26 (0.24)	11.0 (0.43)	2,000 N (450 lbf)	**XSZB0850**
12 mm diameter shielded sensors								
M12x1	25 (1)	M12x1	4.32 (0.17)	9.40 (0.37)	4.22 (0.17)	15.7 (0.62)	20,500 N (4,609 lbf)	**XSZB1225**
M12x1	50 (2)	M12x1	4.32 (0.17)	9.40 (0.37)	4.22 (0.17)	15.7 (0.62)	20,500 N (4,609 lbf)	**XSZB1250**
M12x1	75 (3)	M12x1	4.32 (0.17)	9.40 (0.37)	4.22 (0.17)	15.7 (0.62)	20,500 N (4,609 lbf)	**XSZB1275**
M12x1	100 (4)	M12x1	4.32 (0.17)	9.40 (0.37)	4.22 (0.17)	15.7 (0.62)	20,500 N (4,609 lbf)	**XSZB1210**
18 mm diameter shielded sensors								
M18x1	25 (1)	M18x1	4.32 (0.17)	14.2 (0.56)	4.22 (0.17)	22.1 (0.87)	45,000 N (10,116 lbf)	**XSZB1825**
M18x1	50 (2)	M18x1	4.32 (0.17)	14.2 (0.56)	4.22 (0.17)	22.1 (0.87)	45,000 N (10,116 lbf)	**XSZB1850**
M18x1	75 (3)	M18x1	4.32 (0.17)	14.2 (0.56)	4.22 (0.17)	22.1 (0.87)	45,000 N (10,116 lbf)	**XSZB1875**
M18x1	100 (4)	M18x1	4.32 (0.17)	14.2 (0.56)	4.22 (0.17)	22.1 (0.87)	45,000 N (10,116 lbf)	**XSZB1810**



XSZB●●●●

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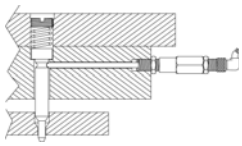


Features

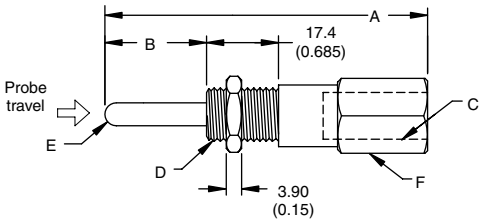
- Accepts any 8 or 12 mm shielded sensor
- Accurate and compact switching in confined areas
- Large variety of stand probe lengths and diameters

Description

Proximity probes are spring-loaded actuators designed to work with 8 mm or 12 mm tubular inductive proximity sensors. The probe and sensor combination offers increased flexibility in applications that require tight positioning.

Dimensions: mm (in.)

A	B	C	D	E (Dia.)	F	Catalog Number
8 mm Diameter Shielded Sensor						
75.6 (2.98)	25.0 (1.00)	M8 x 1 to depth of 21.8 (0.86)	M8 x 1	3.18 (0.125)	11.1 (0.436)	**XSZPP0825**
99.6 (3.92)	50.0 (2.00)	M8 x 1 to depth of 21.8 (0.86)	M8 x 1	3.18 (0.125)	11.1 (0.436)	**XSZPP0850**
126 (4.96)	75.0 (3.00)	M8 x 1 to depth of 21.8 (0.86)	M8 x 1	3.18 (0.125)	11.1 (0.436)	**XSZPP0875**
150 (5.91)	100 (4.00)	M8 x 1 to depth of 21.8 (0.86)	M8 x 1	3.18 (0.125)	11.1 (0.436)	**XSZPP0810**
12 mm Diameter Shielded Sensor						
75.6 (2.98)	25.0(1.00)	M12 x 1 to depth of 18.0 (0.71)	M12 x 1	6.35 (0.25)	15.8 (0.623)	**XSZPP1225**
99.6 (3.92)	50.0 (2.00)	M12 x 1 to depth of 18.0 (0.71)	M12 x 1	6.35 (0.25)	15.8 (0.623)	**XSZPP1250**
126 (4.96)	75.0 (3.00)	M12 x 1 to depth of 18.0 (0.71)	M12 x 1	6.35 (0.25)	15.8 (0.623)	**XSZPP1275**
150 (5.91)	100 (4.00)	M12 x 1 to depth of 18.0 (0.71)	M12 x 1	6.35 (0.25)	15.8 (0.623)	**XSZPP1210**



XSZPP●●●●

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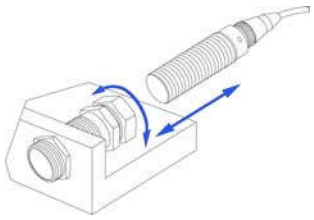
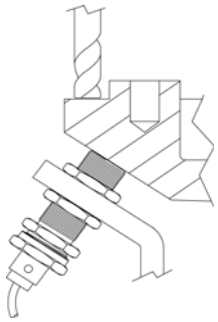


Features

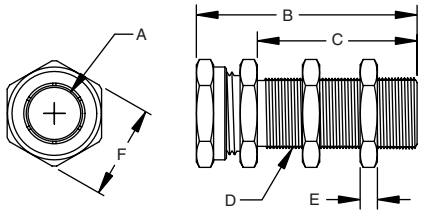
- Quick change mounting available for 8, 12, 18, and 30 mm sensors
- Short and long barrel lengths available
- One-time adjustment simplifies sensor replacement
- Protection to sensor from impact and damage
- Teflon® caps available for quick change mounts (shown below)



Description

The quick change mounting tube reduces sensor maintenance and helps prevent downtime. An internal shoulder stop and collet-style locknut precisely hold the sensor in place—helping maintain a precise sensing distance and simplifying sensor installation.

A	B	C	D	E	F	Catalog Number
8 mm diameter shielded sensors						
8.18 (0.32)	32.4 (1.28)	17.5 (0.69)	M12x1	3.85 (0.15)	16.9 (0.67)	**XSZQT08**
8.18 (0.32)	48.0 (1.90)	34.0 (1.34)	M12x1	3.85 (0.15)	16.9 (0.67)	**XSZQTL08**
12 mm diameter shielded sensors						
12.1 (0.48)	33.7 (1.34)	19.5 (0.77)	M16.5x1.5	4.01 (0.16)	21.8 (0.86)	**XSZQT12**
12.1 (0.48)	44.8 (1.76)	30.0 (1.18)	M16.5x1.5	4.01 (0.16)	21.8 (0.86)	**XSZQTL12**
18 mm diameter shielded sensor						
18.1 (0.71)	38.5 (1.52)	20.0 (0.79)	M24 x 1.5	4.95 (0.19)	30.0 (1.18)	**XSZQT18**
18.1 (0.71)	58.0 (2.28)	40.0 (1.57)	M24 x 1.5	4.95 (0.19)	30.0 (1.18)	**XSZQTL18**
30 mm diameter shielded sensors						
30.1 (1.19)	35.0 (1.50)	20.0 (0.79)	M36 x 1.5	6.13 (0.24)	41.0 (1.61)	**XSZQT30**
30.1 (1.19)	58.0 (2.28	40.0 (1.57)	M36 x 1.5	6.13 (0.24)	41.0 (1.61)	**XSZQTL30**

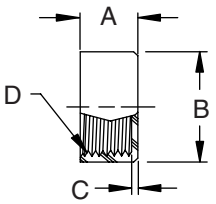


XSZQT●●●

Teflon caps for quick change mounting tubes

Dimensions: mm (in.)

A	B	C	D	Catalog Number
8.84 (0.35)	14.8 (0.59)	0.76 (0.03)	M12x1	**XSZQTC08**
7.24 (0.29)	19.9 (0.75)	0.76 (0.03	M16x1	**XSZQTC12**
9.00 (0.35)	28.7 (1.13)	0.76 (0.03	M24x1.5	**XSZQTC18**
9.00 (0.35)	41.4 (1.63)	1.26 (0.05)	M36x1.5	**XSZQTC30**



XSZQTC●●

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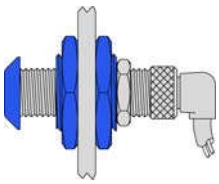
Spring-loaded Tubular Sensor Mount



Features

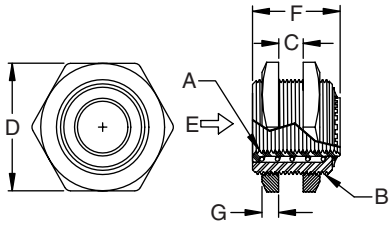
- Accepts 8, 12, 18, and 30 mm shielded or non-shielded sensors
- Sensors become unaffected by accidental impact
- Shielded and non-shielded caps available (see page 301)

Description

Spring-loaded sensor mount for tubular body styles provides impact protection for the sensor against target overtravel. The mount is designed to be threaded onto a tubular sensor and held in place with one of the mounting nuts provided with the sensor. Caps are available to help protect the face of the sensor from lateral and axial impacts (see page 301).

Dimensions: mm (in.)

A Inside Thread	B Outside Thread	C Maximum	D Across Flats	E Maximum Overtravel	F	G	Catalog Number
8 mm Diameter Sensors							
M8 x 1	M16 x 1.5	12.2 (0.481)	22.2 (0.875)	9.22 (0.363)	22.0 (0.867)	3.10 (0.155)	**XSZSN08**
12 mm Diameter Sensors							
M12 x 1	M18 x 1	10.0 (0.394)	23.9 (0.943)	12.1 (0.476)	21.3 (0.840)	3.94 (0.156)	**XSZSN12LP**
M12 x 1	M22 x 1.5	11.5 (0.454)	28.4 (1.12)	10.5 (0.413)	22.1 (0.871)	3.88 (0.153)	**XSZSN12**
18 mm Diameter Sensors							
M18 x 1	M30 x 1.5	16.1 (0.634)	34.8 (1.37)	13.3 (0.523)	29.7 (1.17)	5.08 (0.20)	**XSZSN18**
30 mm Diameter Sensors							
M30 x 1.5	M47 x 1.5	24.6 (0.972)	50.8 (2.00)	15.6 (0.615)	37.0 (1.37)	4.98 (0.196)	**XSZSN30**



XSZSN••

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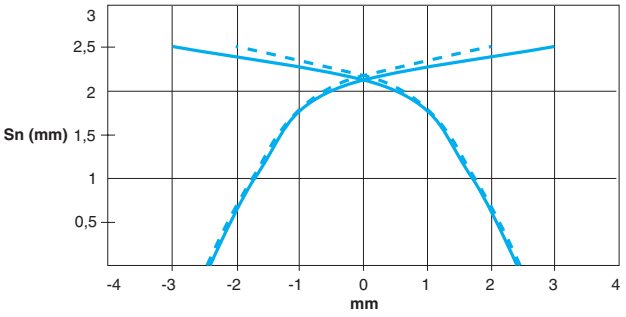
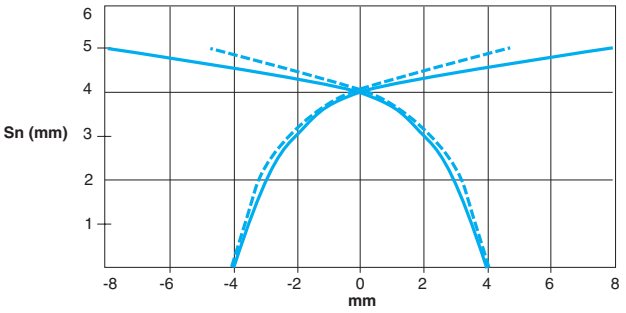
Proximity Sensors
Sensing Curves
Flat Inductive

Shielded



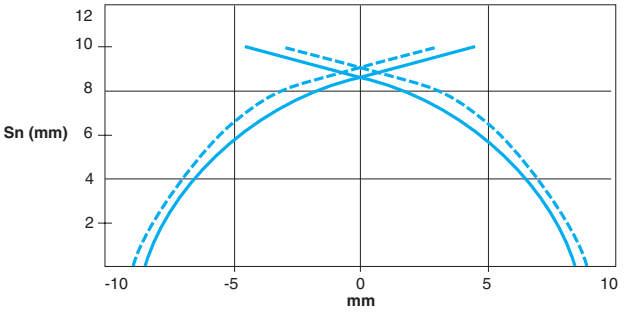
	Target size (mm)	Usable range (mm)
XS7J1A1D	5 x 5 x 1	0–2

_____ pick up points
- - - - - - - drop out points



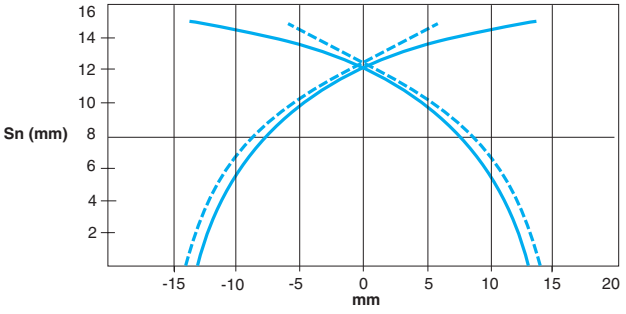
	Target size (mm)	Usable range (mm)
XS7F1A1D	5 x 5 x 1	0–4

_____ pick up points
- - - - - - - drop out points



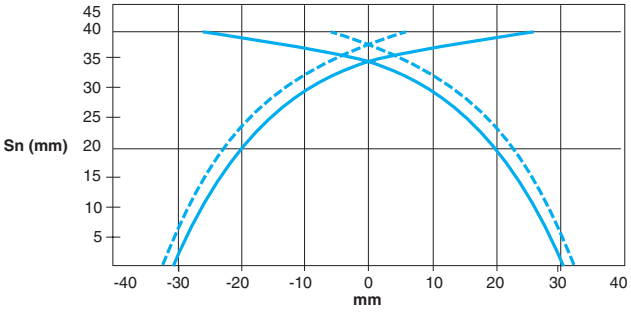
	Target size (mm)	Usable range (mm)
XS7E1A1D	8 x 8 x 1	0–8
XS7E1A1C	8 x 8 x 1	0–8

_____ pick up points
- - - - - - - drop out points



	Target size (mm)	Usable range (mm)
XS7C1A1D	18 x 18 x 1	0–12
XS7C1A1C	18 x 18 x 1	0–12

_____ pick up points
- - - - - - - drop out points



	Target size (mm)	Usable range (mm)
XS7D1A1D	30 x 30 x 1	0–32
XS7D1A1C	30 x 30 x 1	0–32

_____ pick up points
- - - - - - - drop out points

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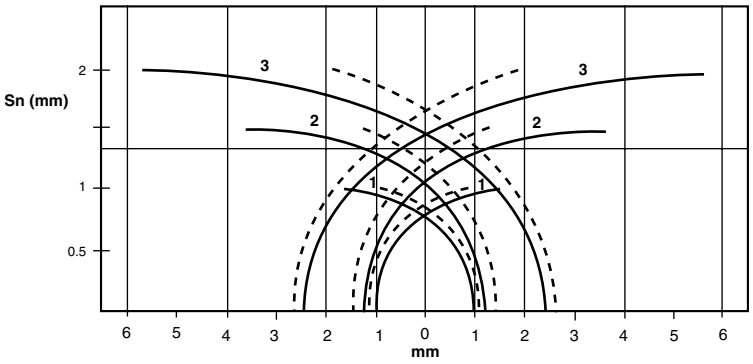
Shielded

1 ∅ 4 XS1
∅ 5 (M5x0.5) XS1

2 ∅ 6.5 XS1
∅ 8 (M8x1) XS1, XS3

3 ∅ 12 (M12x1)
XS1, XS3

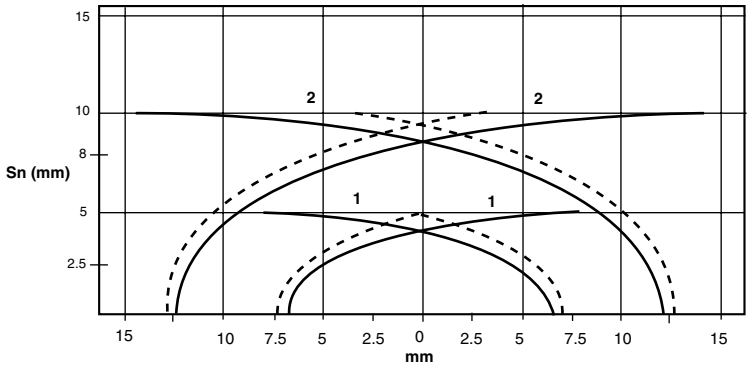


Standard targets	Size (mm)	Usable range (mm)
4	5 x 5 x 1	0–0.8
5	5 x 5 x 1	0–0.8
6.5	8 x 8 x 1	0–1.2
8	8 x 8 x 1	0–1.2
12	12 x 12 x 1	0–1.6

_____ pick up points
- - - - - - - drop out points

1 ∅ 18 (M18x1)
XS1, XS3

2 ∅ 30 (M30x1.5)
XS1, XS3



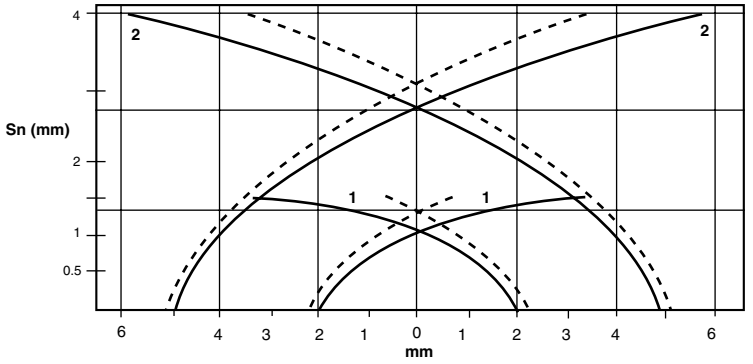
Standard targets	Size (mm)	Usable range (mm)
18	18 x 18 x 1	0–4
30	30 x 30 x 1	0–8

_____ pick up points
- - - - - - - drop out points

Non-Shielded and Extended Range

1 ∅ 8 (M8x1)
XS1, XS2, XS4

2 ∅ 12 (M12x1)
XS1, XS2, XS4

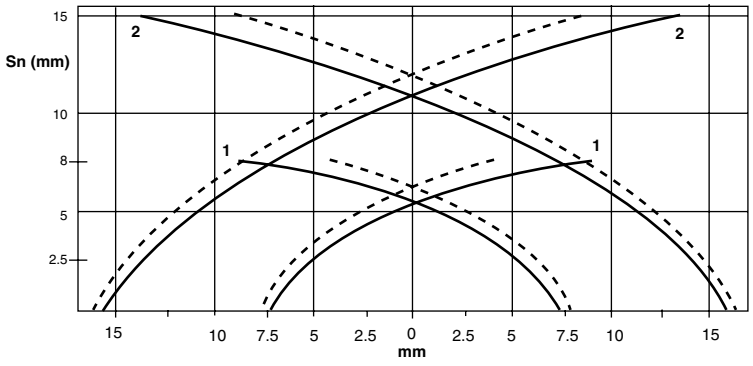


Standard targets	Size (mm)	Usable range (mm)
8	8 x 8 x 1	0–2
12	12 x 12 x 1	0–3.2

_____ pick up points
- - - - - - - drop out points

1 ∅ 18 (M18x1) XS1,
XS2, XS4

2 ∅ 30 (M30x1.5) XS1,
XS2, XS4



Standard targets	Size (mm)	Usable range (mm)
18	24 x 24 x 1	0–6.4
30	45 x 45 x 1	0–12

_____ pick up points
- - - - - - - drop out points

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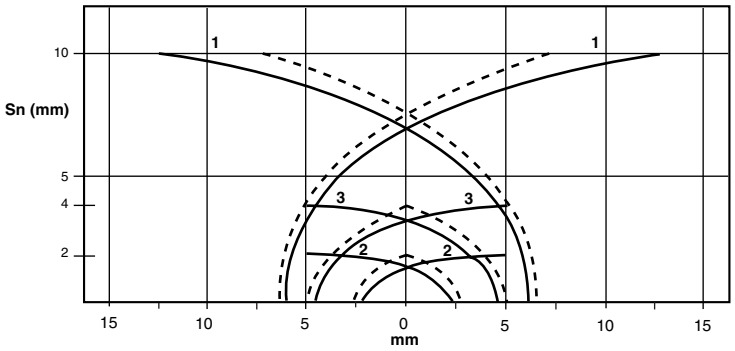
Proximity Sensors
Sensing Curves
Block Type Inductive

1 shielded, XSEC10

2 shielded, XSG•02

3 non-shielded, XSG•04

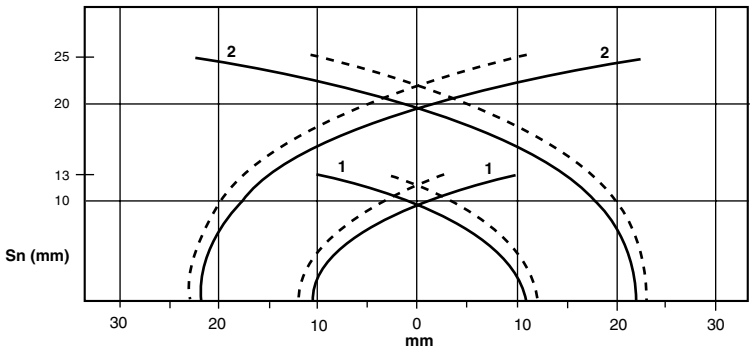


Standard targets	Size (mm)	Usable range (mm)
XSEC10	30 x 30 x 1	0–8
XSG•02	12 x 12 x 1	0–1.6
XSG•04	12 x 12 x 1	0–3.2

_____ pick up points
- - - - - - - drop out points

1 XSB•10

2 XSB•25

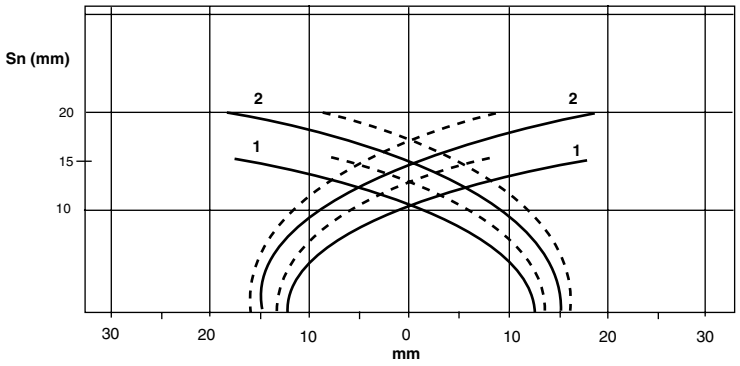


Standard targets	Size (mm)	Usable range (mm)
XSB•10	40 x 40 x 1	0–9
XSB•25	75 x 75 x 1	0–20

_____ pick up points
- - - - - - - drop out points

1 shielded, XS7

2 non-shielded, XS8

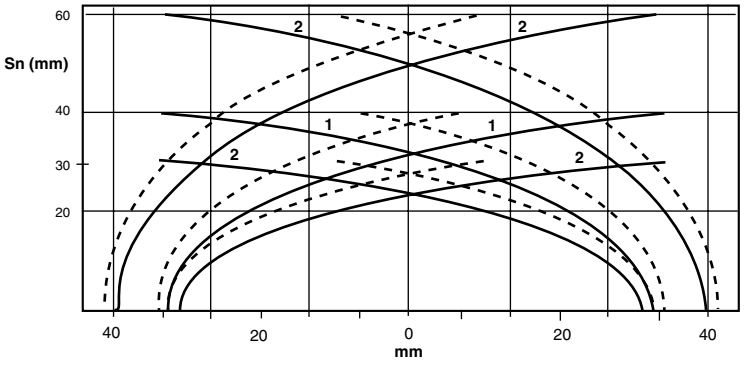


Standard targets	Size (mm)	Usable range (mm)
XSC/XS7	45 x 45 x 1	0–12
XSC/XS8	60 x 60 x 1	0–16

_____ pick up points
- - - - - - - drop out points

1 fixed sensing distance, XSD•40

2 adjustable sensing distance, XSD•60



Standard targets	Size (mm)	Usable range (mm)
XSD•40	120 x 120 x 1	0–32
XSD•60	180 x 180 x 1	0–48

_____ pick up points
- - - - - - - drop out points

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A proximity sensor is an important component in an automation control system.

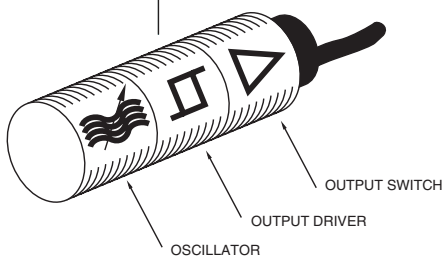
It transmits information to the logic processing system about the operating conditions of a machine:

- Presence, passage, flow of parts
- End of travel
- Rotation and counting

Essentially, it is a **non-contact part presence** sensor.

Composition

Detection stage / Output stage



Detection stage
- *type of mounting (cylindrical, rectangular)*
- *detection characteristics (sensing distance, hysteresis)*

Output stage
- *type of supply (DC, AC, AC/DC)*
- *electrical characteristics (current and voltage)*

Application	Advantages
no physical contact with the target	*no wear, ability to detect fragile or freshly painted objects*
high operating rate	*perfect compatibility with electronic, automated systems*
high approach speeds	*fast response*
rugged, fully encapsulated	*excellent resistance to industrial environments*
solid state, no moving parts	*life of the device is independent of the number of operations*

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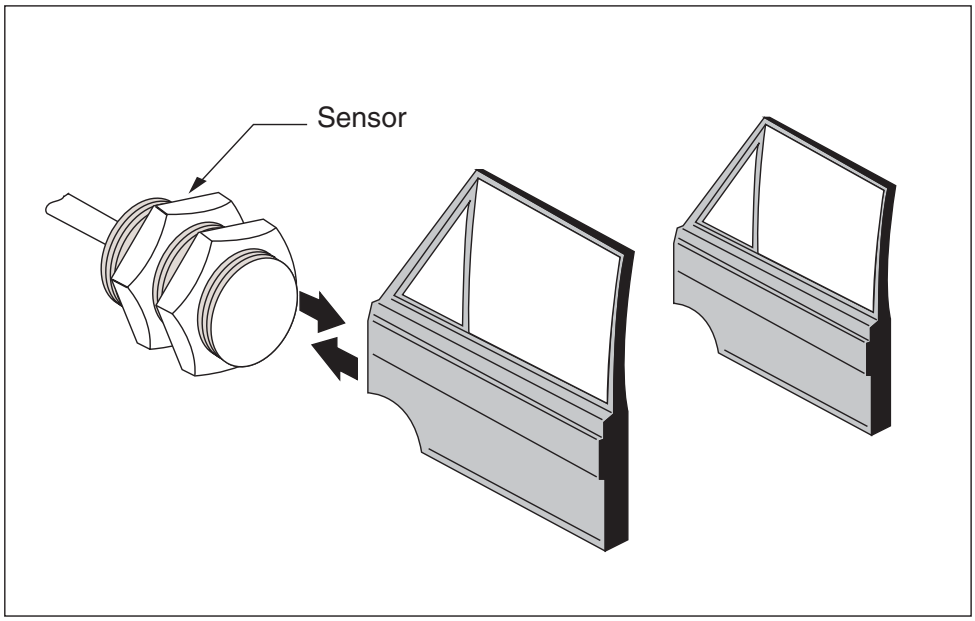
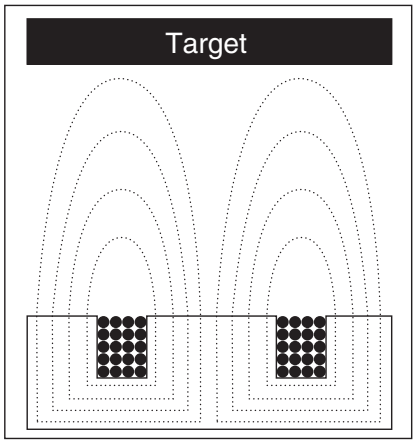
Inductive

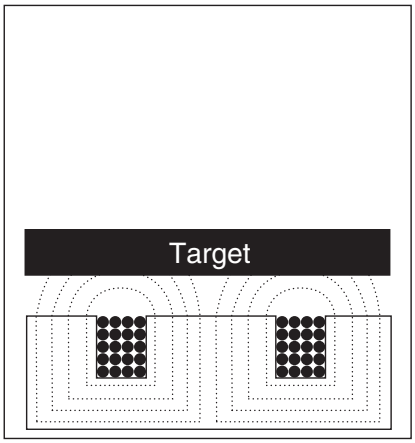
- **Identifies** only **metal** targets
- **Predictable** sensing technology—few variables
- **Reliable** industrial technology

Suitable for the detection of metal objects



Principle of operation





An inductive proximity sensor essentially comprises an oscillator whose windings constitute the sensing face. An electromagnetic field is generated in front of these windings.

When a metal object is placed within this field, the resulting currents induced into the target form an additional load, and the oscillations cease.

This causes the output driver to operate, producing an On or Off output signal.

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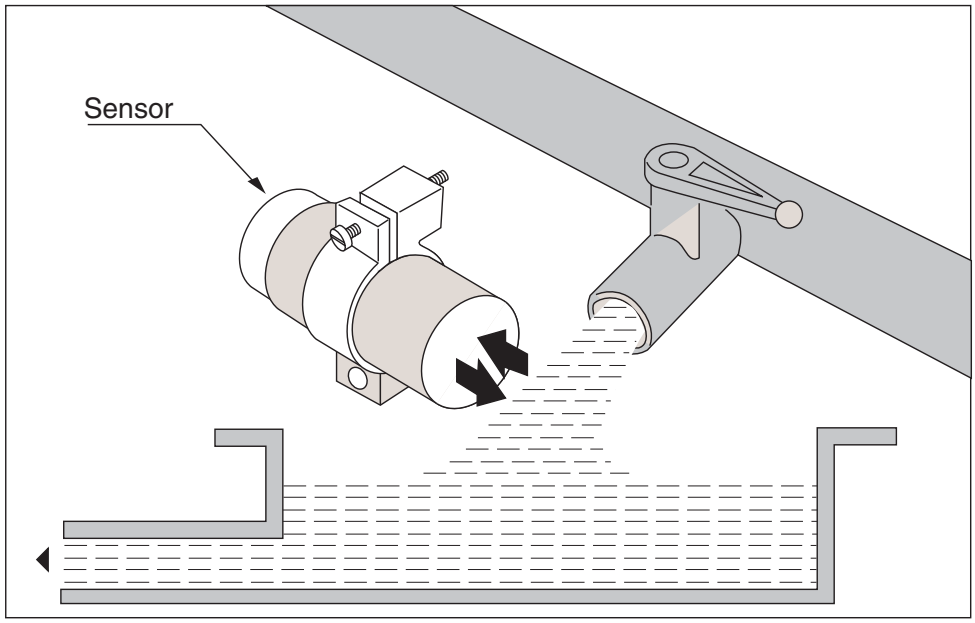
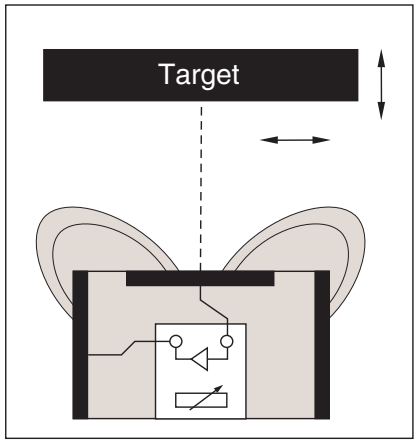
Capacitive

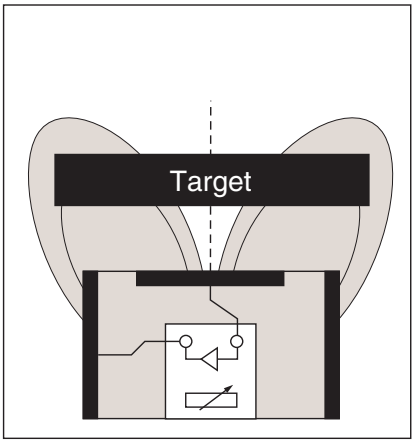
Suitable for the detection of non-conductive targets, liquids and powders



- Detects **any material**
- Affected by environment: humidity, dust, etc.
- Best for:
  - — bulk material
  - — liquids
  - — targets behind a separation wall

Principle of operation





A capacitive proximity sensor basically comprises an oscillator whose capacitors constitute the sensing face.

When a conducting or insulating material with a permittivity greater than air is placed within this field, it modifies the coupling capacitance and causes oscillations.

This actuates the output driver, and depending on the model, an On or Off output signal is produced.

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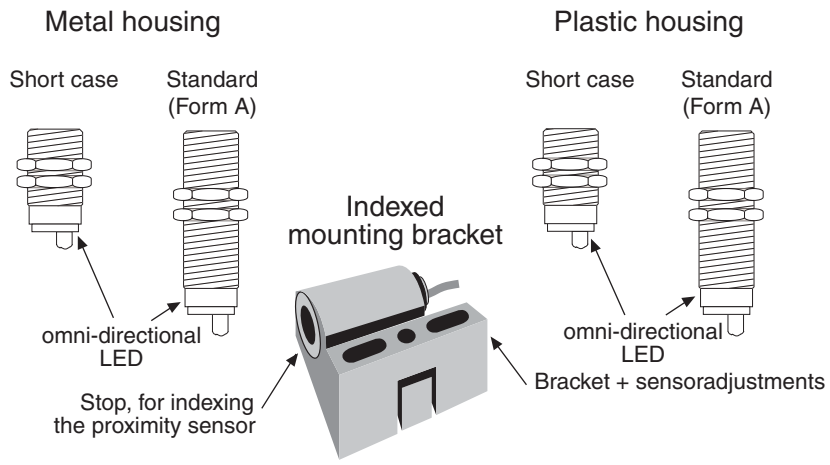
Housing types

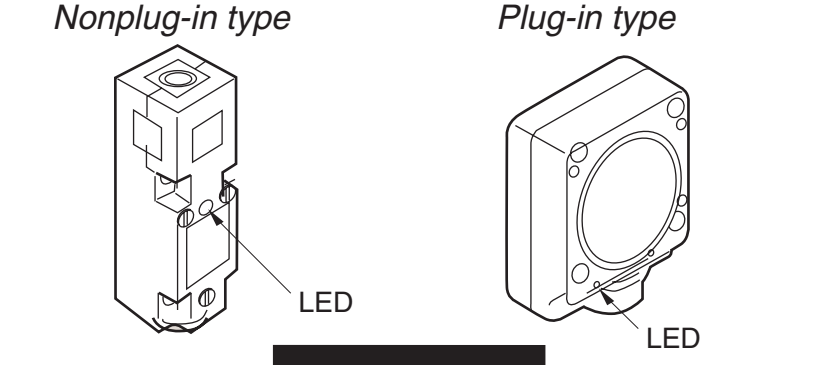
Tubular type



Advantages

- Simple installation and set-up: pre-wired or connector models
- Excellent environmental protection:
  - encapsulated
  - metal housing (plated brass)
  - plastic or stainless steel housing (food, pharmaceuticals)
- Two choices:
  - very short for restricted access areas
  - standard length (form A) for ease of replacement
- No-adjustment replacement using a patented indexing mounting bracket

Block type



Advantages

- Direct interchangeability, no need for readjustment
- Flexibility of connections: screw terminals or connector
- Long sensing distance

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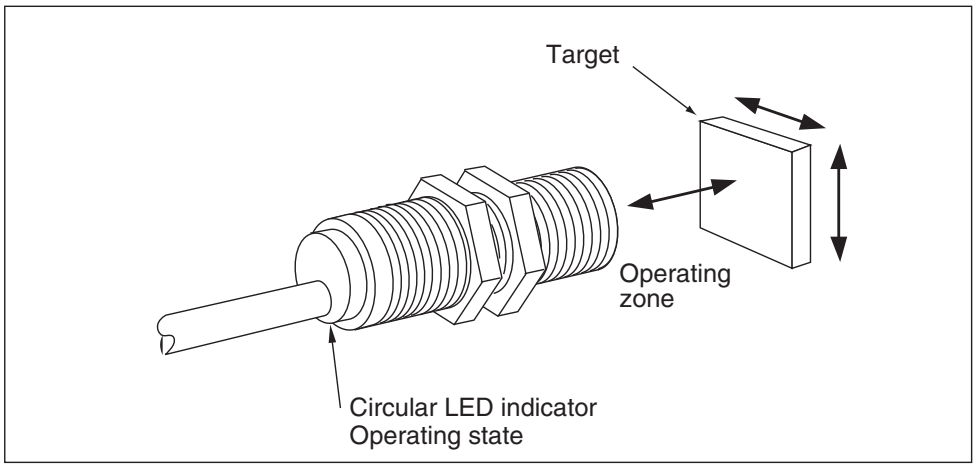
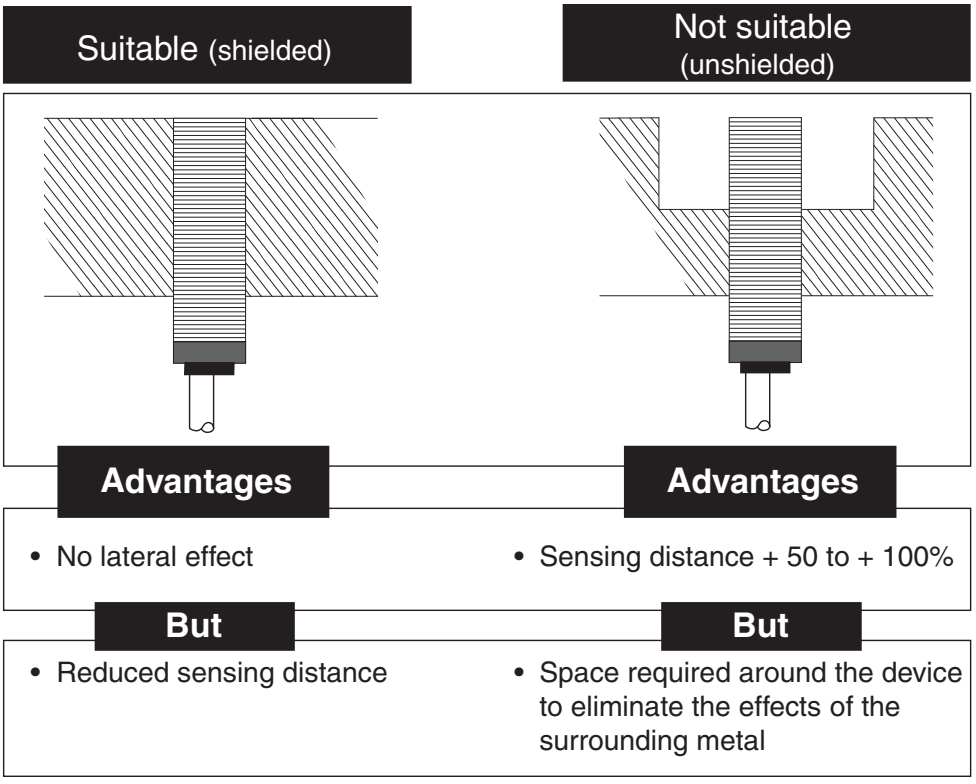
Operating zone



The targets are generally of steel, and of a size equivalent to the sensing face of the sensor. To ensure detection, the target should pass at a distance less than or equal to the usable sensing distance given in the data sheet of the sensor selected.

Suitabiliy for flush mounting in metal



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Power supply

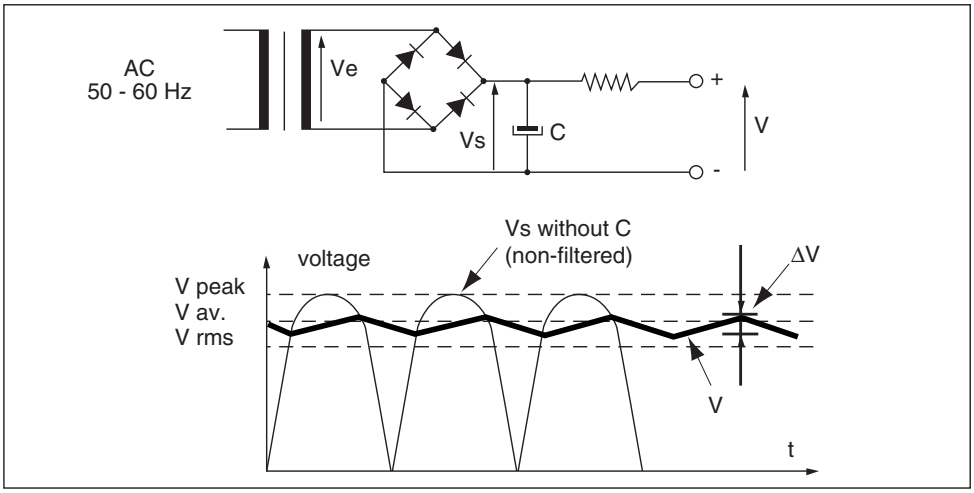
AC or AC/DC sensors for AC circuits

Check that the power supply range limits of the proximity sensor are compatible with the nominal voltage of the AC supply used.

Sensors for DC circuits

Where a DC supply is available, check that the voltage limits of the sensor, including ripple, are compatible with the supply used.

If an AC supply is available, a suitable DC power supply must be selected. A simple one has a transformer, a rectifier, and a smoothing capacitor.



Where voltage is derived from a single-phase AC supply, *it must be rectified and filtered* to ensure that:

- The peak voltage of the DC supply is lower than the maximum operating voltage of the sensor, $peak\ voltage = rated\ voltage\ Ve \times \sqrt{2}$.
- The minimum voltage of the DC supply is greater than the minimum voltage rating of the sensor, given that $\Delta V = (I \times t)^3 C$, where:

  ΔV = maximum ripple: 10% (V)
  I = anticipated load current (mA)
  t = period of 1 cycle (8.8 ms full wave rectified, 60 Hz frequency voltage)
  C = capacitance (μF)

As a general rule, use a transformer with a lower secondary voltage (Ue) than the required DC voltage (U).

Example: 18 Vac to obtain 24 Vdc
35 Vac to obtain 48 Vdc

Mount a filtering capacitor of minimum 400 μF per sensor or 2,000 μF for each ampere of load current required.

NOTE: Tubular 3-wire DC universal models (10–58 V), 3-wire DC XSF models, and all AC/DC models can be supplied from full-wave rectified non-filtered power supplies (no capacitor C in the diagram above).

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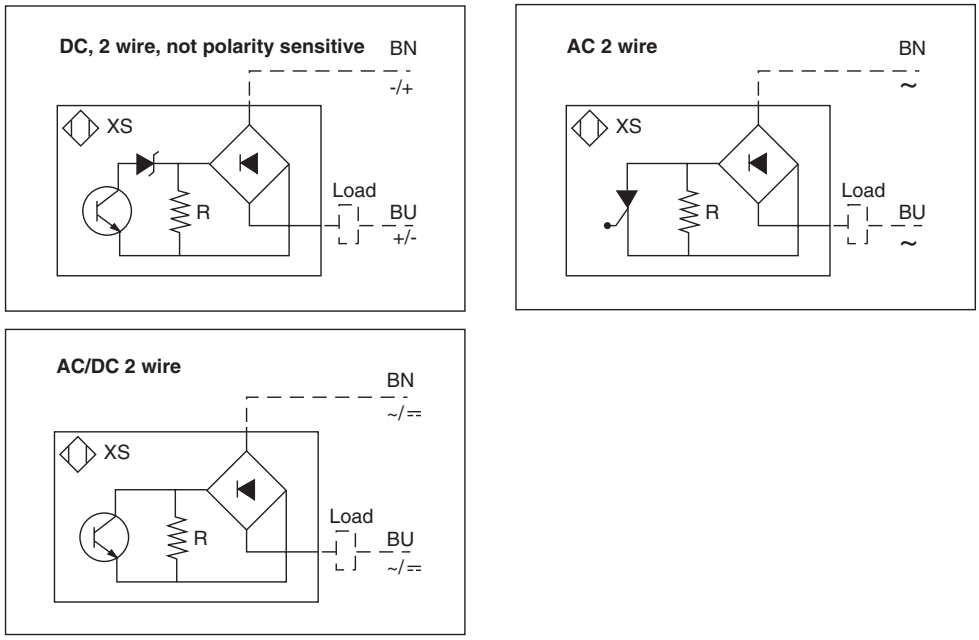
Output signal

2 Wire type



2-wire sensors are wired in series with the load to be switched.

They are subject to:

- a residual current (leakage current)—in the open state
- a voltage drop—in the closed state

For the AC and AC/DC versions, certain models are protected against short-circuits. Refer to the product characteristics.

Advantages

- *They can be wired in the same way as mechanical limit switches.*
- *For the DC and AC/DC versions, they can be connected to either positive (PNP) or negative (NPN) logic inputs.*
- *Polarity insensitive versions, no risk of incorrect connection.*
- *AC/DC versions, reduces stock requirements*

But

Check the possible effects of residual current and voltage drop on the input device controlled (pick-up and drop-out thresholds).

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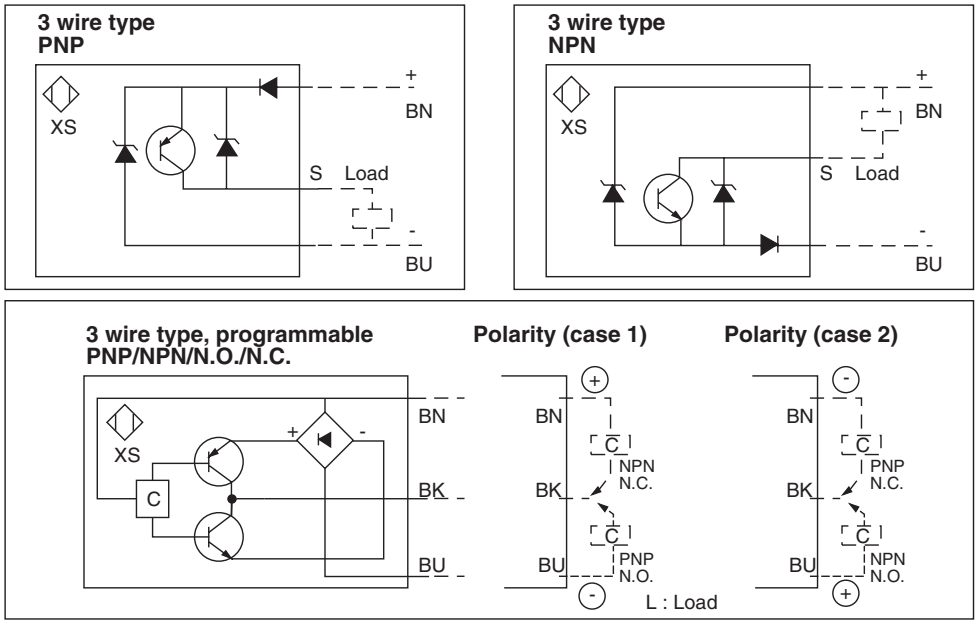
Output signal

3 Wire type



The sensors in this category have:

- 2 wires for the power supply
- 1 wire for the output signal

NOTE: Some models include an additional wire for a complementary output 4-wire type, N.O. + N.C. The technology is still 3 wire.

They are protected against reverse supply polarity and against overloads and short-circuit of the load. For the DC version, there are two types of sensor:

- Basic sensor
  - — PNP model, switching the positive side to the load (sourcing)
  - — NPN model, switching the negative side to the load (sinking)
- Universal DC sensors

A single universal sensor, depending on the wiring connections can perform any of the following 4 functions: PNP/N.O., PNP/N.C., NPN/N.O., NPN/N.C.

Advantages

- *Best switching characteristics: no residual current, low voltage drop, fast*
- *N.O. + N.C. versions*
- *Universal versions, reduces stock requirements*

But

Requires the use of a specialized sensor (PNP or NPN, function of the load connection to negative or positive, respectively) or a selectable universal type.

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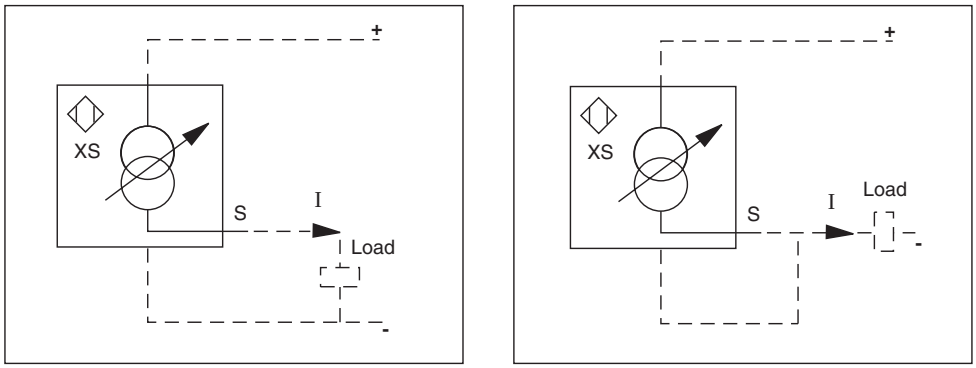
Output signal

Analog type



3-wire type **2-wire type**

These proximity sensors convert the approach of a metal target towards the sensing face into a current output signal that is proportional to the distance between the target and the sensing face.

Two models:

Dual Voltage:	24/48 Vdc
Output:	0–10 mA with 3-wire connection
	4–14 mA with 2-wire connection
Single Voltage:	24 Vdc
Output:	0–16 mA with 3-wire connection
	4–20 mA with 2-wire connection

Advantages

- *Output signal proportional to the distance.*
- *Two- or three-wire connection using the same device.*

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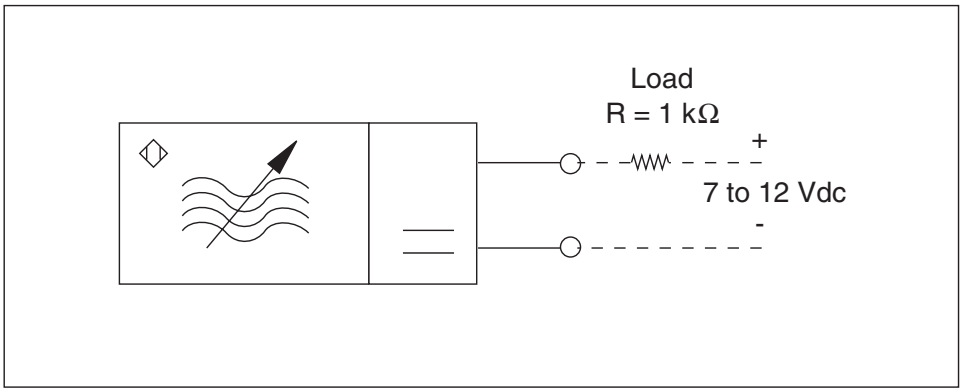
Output signal

Namur type



Namur type proximity sensors (DIN 19234) are electronic sensors in which the current consumption varies when a metal object approaches.

Their operating principle and compact size make them suitable for a large number of applications:

- Intrinsically safe (for hazardous environments, i.e. explosive). Sensors are used with an NY2 intrinsically safe relay/amplifier, or an equivalent, approved intrinsically safe solid-state input.
- Non-intrinsically safe (for a normal, safe zone). NAMUR sensors associated with a power supply and amplifier unit, or an equivalent solid-state input.

Advantages

• Can work in hazardous environments.
• Basic product, without amplifier.
• Compact size.

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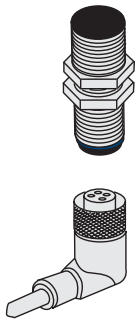
Connection method

Cable	*Connector*	*Screw Terminals*
		
Features	**Features**	**Features**
Pre-wired sealed cable, excellent resistance to splashing liquid (IP67) or cutting oils (IP68).	*Ease of installation and replacement.*	*Flexibility: user selects type and length of cable.*

Note

In practice, the preceding information facilitates the selection and installation of a proximity sensor for applications having normal operating conditions. The following pages contain details for applications needing more specific information.

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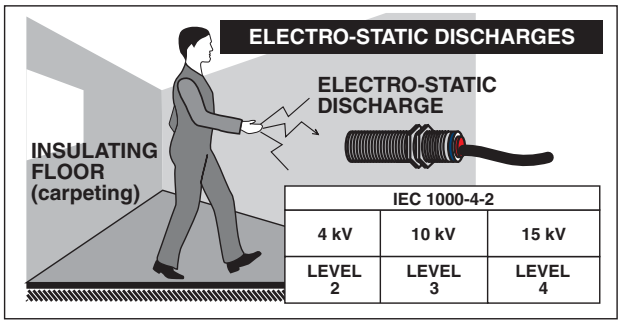
Electromagnetic interference

The XS sensors are tested according to IEC 60947.5.2 standard (similar to the proposed new NEMA ICS 5-4-2005x standard).



DC versions

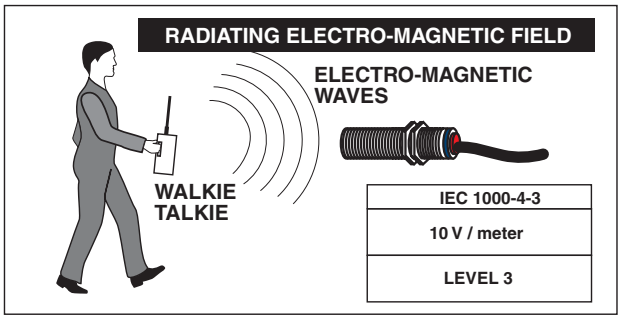
- level 2 immunity (3-wire type)
- level 3 immunity (2-wire type)

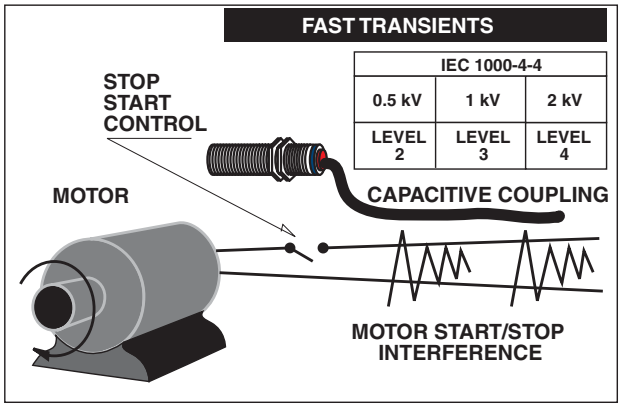
AC/DC versions

- level 4 immunity

DC and AC/DC versions

- level 3 immunity (RFI: radio frequency immunity)





DC versions

- level 3 immunity

AC/DC versions

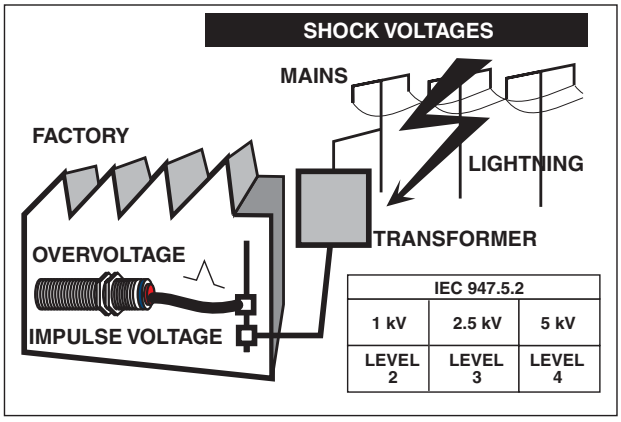
- level 4 immunity

Extended range DC

- level 3 immunity

DC and AC/DC versions

- level 3 immunity (over 8 mm diameter)
- level 2 immunity (tubular 8 mm and smaller)



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Temperature and Chemicals

Temperature: where sensors are used outside the ranges shown, reliable operation cannot be assured and permanent damage could result.

Standard length tubular sensors have a very large temperature range: -25 to 80 °C (-13 to 176 °F).

NOTE: For extended temperature range, consult the factory.

Chemicals: Due to the very wide range of chemicals found in modern industry, it is very difficult to give general guidelines on sensor applications.

To ensure lasting efficient operation, it is essential that the chemicals coming in contact with the sensors will not affect their housings and, in doing so, prevent their reliable operation.

The XS1/XS2 M series is particularly well adapted to severe environments, such as machine tool applications.

NOTE: The cables used conform to standard NFC 32 206 and to recommendations CNOMO E03-40-150 N. They are UL Listed and CSA Certified.

The series XS4P plastic tubular proximity sensors and the stainless steel XS1/XS2 sensors exhibit excellent overall resistance to:

- **Chemical products** such as salts, halophytic and aromatic oils, petrols, acids, and diluted bases. For acids, ketones, and phenols, preliminary test should be made according to the nature and concentration of the liquid.
- **Agriculture and food industry products** such as animal- and vegetable-based food products (vegetable oils, animal fat, fruit juice, dairy proteins, etc.).

NOTE: For specific details, please consult the factory. Have the following information available when making the inquiry:

- *type of substance*
- *concentration*
- *maximum temperature*
- *specific sensor part numbers considered for the application*

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Shock – Vibration

Shock

- The sensors are tested according to IEC 60068.2.27, 50 g, 11 ms duration.

Vibration

- The sensors are tested according to IEC 60068.2.6, ±2 mm amplitude, 10–55 Hz, 25 g to 55 Hz.

Degrees of protection

- IP67: protection against the effects of immersion, tested according to IEC 60529. Sensor immersed for 30 minutes in 1 m of water.
- UL Listed: typical NEMA Types 4X, 6P, 12. No deterioration in either operating or insulation characteristics.
- IP68: protection against effects of prolonged immersion: the test conditions are subject to agreement between the manufacturer and user.
  Telemecanique® brand selected machine tool applications or other machines frequently drenched in cutting fluids. **IP68 means,** in this case, **cutting oil proof**, a degree of protection requiring a superior encapsulation technology. Extensive testing is performed—1,500 hours immersion in fluid at 70 °C.

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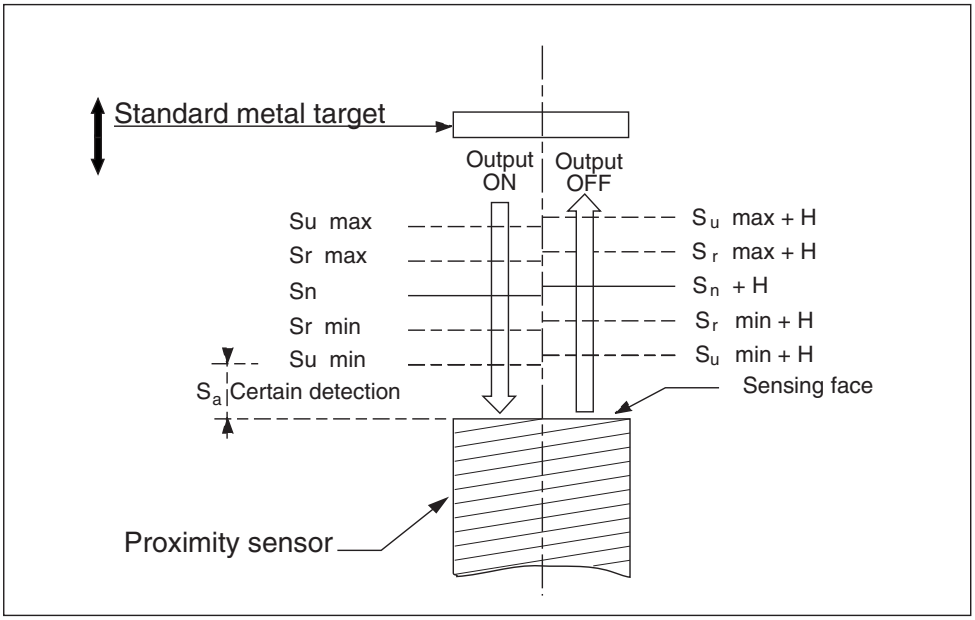
Definition of sensing distances



Nominal (or rated) sensing distance Sn:

The rated operating distance for which the sensor is designed. It does not account for manufacturing tolerances, or any change in supply voltage, temperature, etc. during operation. Used for selection and the base for exact calculations.

Real sensing distance Sr:

The real sensing distance is measured at rated voltage (Un) and at the rated ambient temperature (Tn). It must be between 90% and 110% of the nominal sensing distance: $0.9Sn \leq Sr \leq 1.1Sn$.

Usable sensing distance Su:

The usable sensing distance is measured at the limits of the permissible variations of the ambient temperature (Ta) and the supply voltage (Ub). It must be between 90% and 110% of the real sensing distance: $0.9Sr \leq Su \leq 1.1Sr$.

Operating zone Sa (usable sensing range):

The operating zone is between **0 and 81%** of the nominal sensing distance Sn:

$0 \leq Sa \leq 0.81Sn$

This is the operating zone of the sensor and corresponds to the area within which detection of the *standard metal target is certain* whatever the variations in voltage or temperature.

This is the *maximum sensing distance that the designer should consider* for all applications. Correction factors should be considered only when conditions preclude using the standard target in the operating temperature and voltage range.

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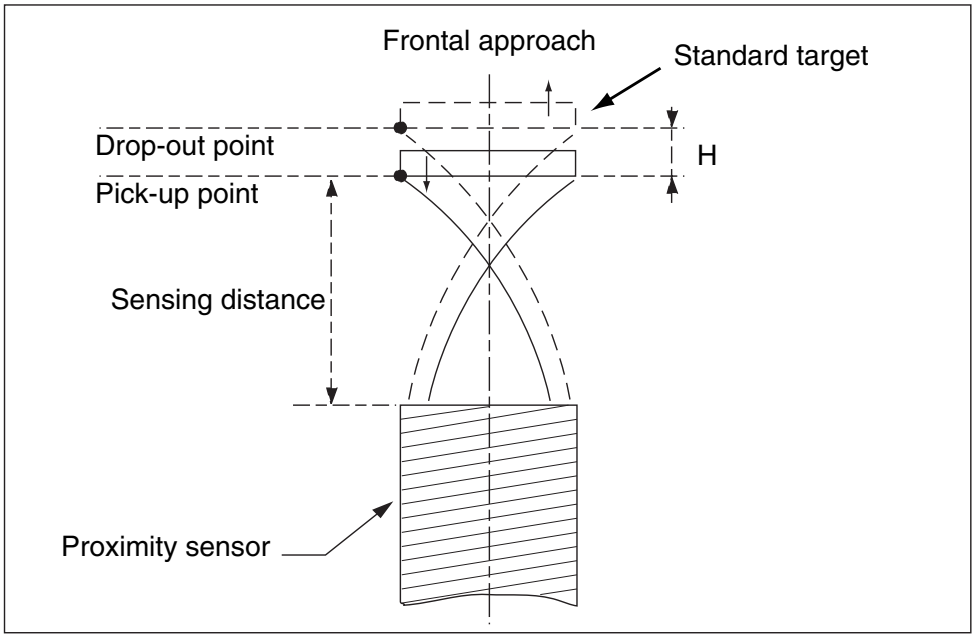
Standard metal target

Standard metal target:

1 mm thick, square mild cold rolled steel, type FE 360. The side of the square is either equal to the diameter of the sensor or of the circle engraved on the active face of the sensing face or is 3 times the nominal sensing distance (Sn). The higher of these values is used.

Differential travel



Differential travel: (hysteresis) H:

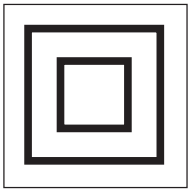
The distance between the pick-up point as the standard metal target frontally approaches the sensor, and the drop-out point as it moves away. Expressed as a percentage of the real sensing distance Sr.

Repeat accuracty (Repeatability)

Repeat accuracy (repeatability) R:

The repeatability of the sensing distance between successive operations. Readings are taken over a period of time while the sensor is subjected to environmental extremes, e.g., an 8-hour cycle between 10 and 30 °C, with supply voltage variation ±5% of nominal. Expressed as a percentage of the real sensing distance Sr. Important parameter for positioning applications.

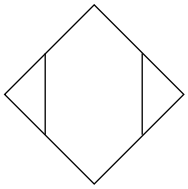
Class 2 material Double isolation



Class 2 material—Double isolation

The symbol represents electrical insulation conforming to IEC 60536 class 2. It means that all live parts are isolated inside the housing and touching any exterior exposed metal is harmless. No groundings required.

Symbol



International symbol for proximity switches.

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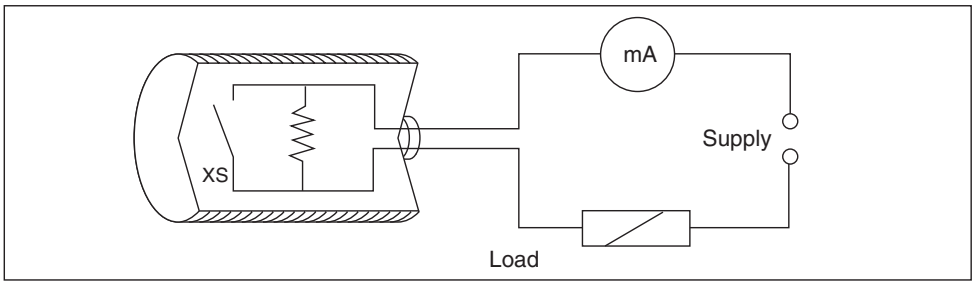
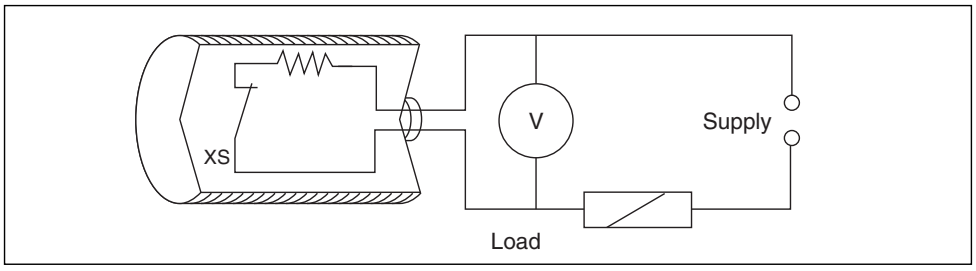
Leakage or Residual current (Ir)



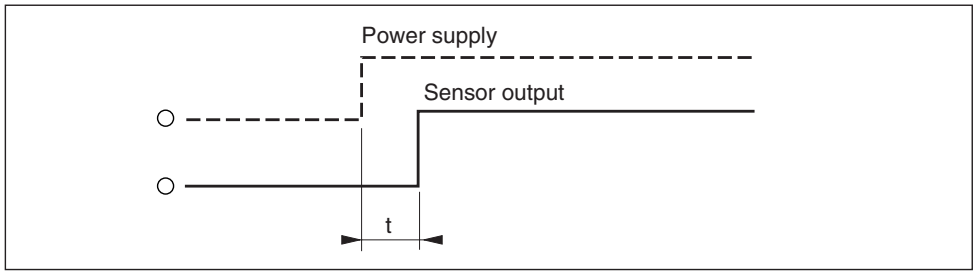
The leakage or residual current corresponds to the current flowing through the sensor in the off or open state. Important for 2-wire proximity sensors.

Voltage drop (Ud)



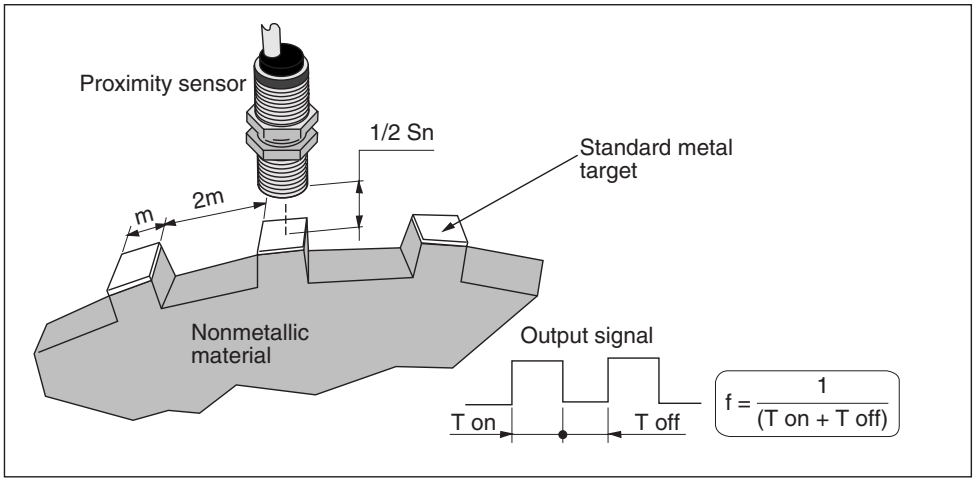
The voltage drop corresponds to the voltage at the proximity sensor's terminals in the on or closed state. Especially important for 2-wire proximity sensors.

Response Time power-up delay



The period of time between energizing the sensor and its fully operational condition. Also known as warm-up or first-up delay.

Maximum operating frequency



The maximum number of targets a proximity sensor can detect in a second, under standard test conditions (standard EN50018, IEC 60947.5.2). Do not use for selection or design purposes unless the geometry of the application is identical with the one in the picture.

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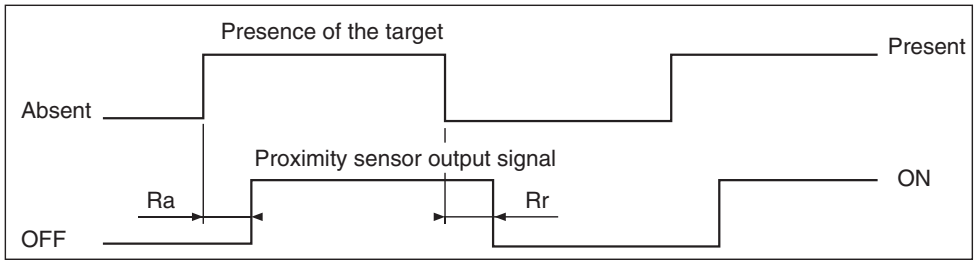
Response time



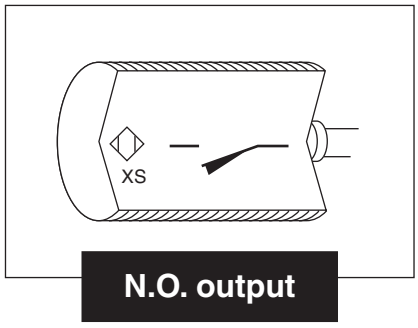
On delay Ra:

The period between the detection of the target and the subsequent change in its output state. This design parameter determines the relationship between the speed of travel and the size of the target.

Off delay Rr:

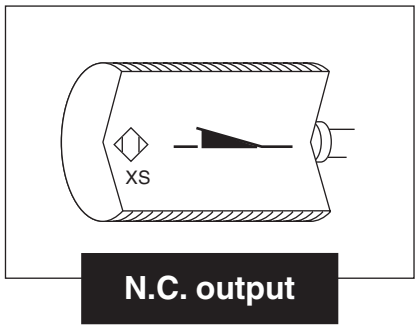
The period between the exit of the target from the sensor's operating zone and the subsequent change in its output state. This design parameter limits the interval between successive targets.

Output signal



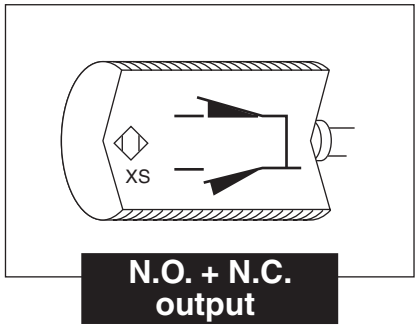
N.O. (Normally open)

The output circuit turns **on** the output current when a target is present.



N.C. (Normally closed)

The output circuit turns **off** the output current when a target is present.



N.O. + N.C.

Complementary outputs: proximity sensor with two outputs—one opens, the other closes when a target is present.

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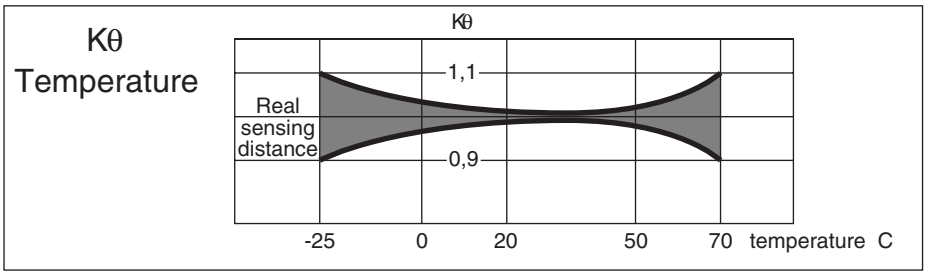
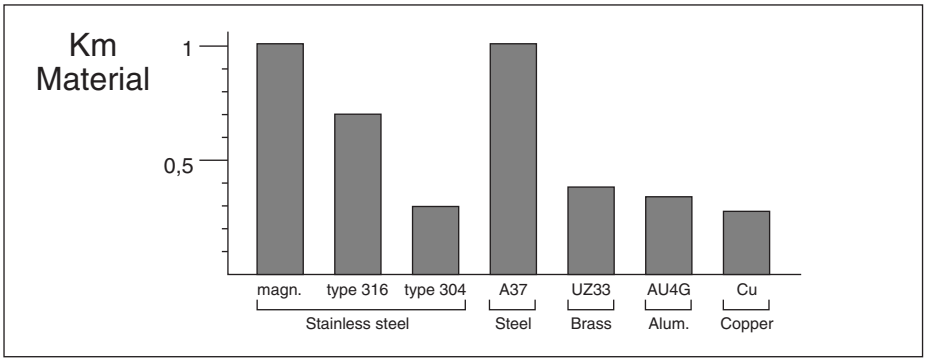
Theoretical calculation

In practice, most targets are made of steel and are of a size equal to or greater than the sensing face of the sensor. Where this is the case, use the sensing distance values given in the characteristics for the particular sensor. To calculate the precise sensing distance for specific applications, consider the following parameters, which affect the sensing distance.



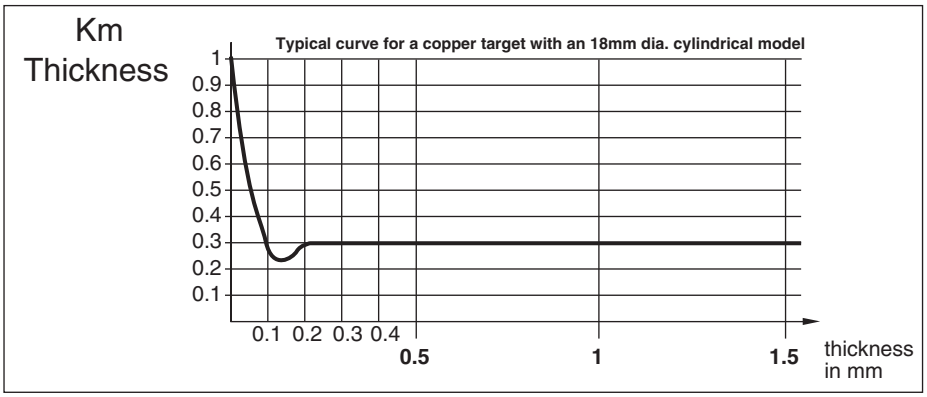
Apply a correction factor Kθ to be determined using the curve above.



Target material correction coefficient Km

Target Material	Stainless Steel			Mild Steel	Brass	Aluminum	Copper
	Magn.	**Type 316**	**Type 304**	**A37**	**UZ33**	**AU4G**	**CU**
Km	1.00	0.70	0.30	1.00	0.37	0.35	0.30

Apply a correction factor Km to be determined using the graph above.



Special case of a very thin target object made of non-ferrous material.

Application tip: Aluminum foil on a nonmetallic surface makes an excellent target.

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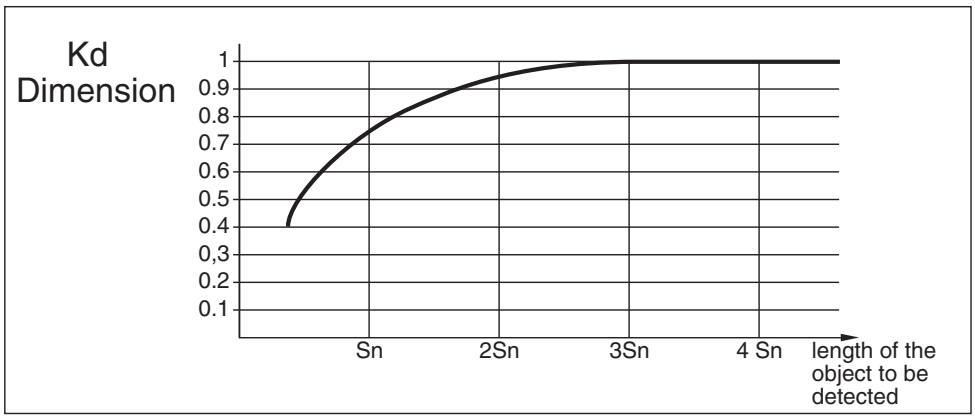

Apply a correction factor Kd to be determined using the curve above.

Usable sensing distance

For all situations, use the general correction factor Kt = 0.9 for power supply variations within the entire voltage range.

Sa = Sn x KΘ x Km x Kd x Kt
Where Sa = usable sensing distance
Sn = nominal sensing distance

Calculation example

Proximity sensor XS7C40MP230 with nominal sensing distance Sn = 15 mm.
Ambient temperature variation 0 to + 20 °C.
Target characteristics:
material: Steel
dimensions: 45 mm x 45 mm x 1 mm

The operating zone, Sa can be found using the formula:
Sa = Sn x KΘ x Km x Kd x Kt
Sa = 15 x 0.98 x 1 x 0.95 x 0.9
Sa = 12.5 mm

General rule

For standard targets, the general rule is:
Sa = 0.8 Sn

Always test!

Note

The above curves are typical curves only. They are given as a guide to the approximate usable sensing distance of a proximity sensor for a given application

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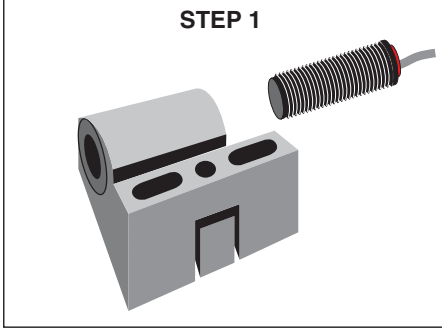
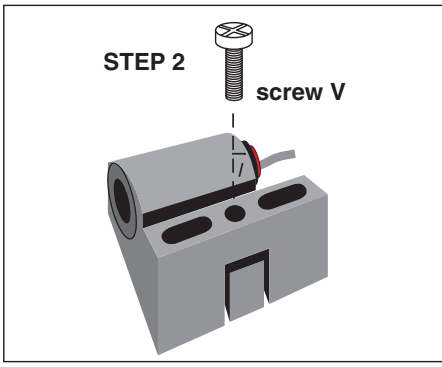
- Patented design
- Replacement without re-adjustment

Indexed mounting bracket XSZB

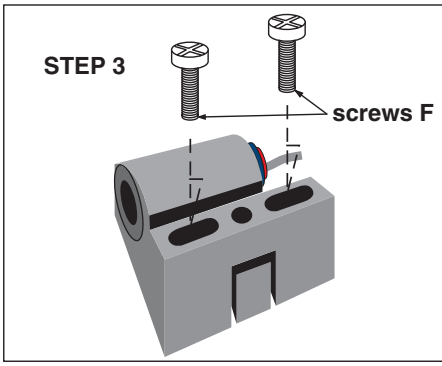
Mounting



- Insert the sensor in the bracket until it butts against the stop.



- Secure the sensor using screw (V).



- Adjust the sensor/bracket combination to ensure detection.
- Secure the combination using two screws (F).

If for any reason adjustment or replacement is necessary:

- Unscrew screw V.
- Butt the new sensor against the stop. Once screw V has been tightened, the new sensor will be indexed in the same position as the old one. No adjustment is necessary.

Note: these functions are similar to those of a block type sensor.

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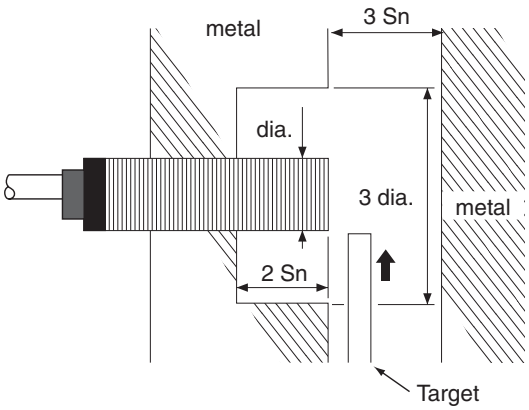
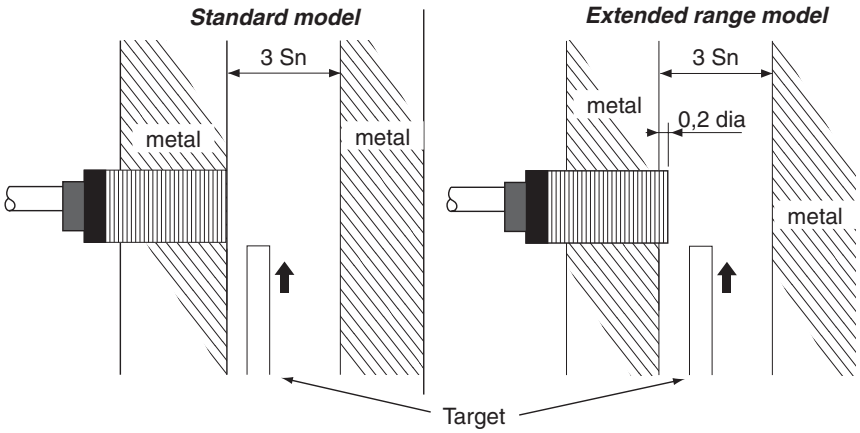
Clearing distances

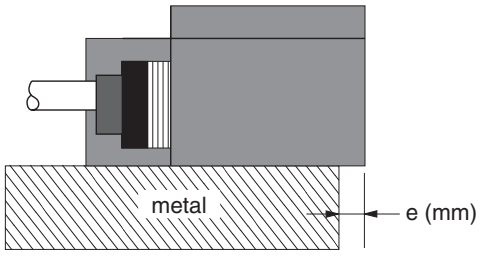
Tubular proximity sensor



Versions not suitable for flush mounting in metal (non-shielded)



Versions suitable for flush mounting in metal (shielded)



- Versions suitable for flush mounting in metal
  e (min): 0
- Versions not suitable for flush mounting in metal
  M8: e (min) = 5 mm
  M12: e (min) = 8 mm
  M18: e (min) = 16 mm
  M30: e (min) = 30 mm

Mounting with XSZB mounting bracket

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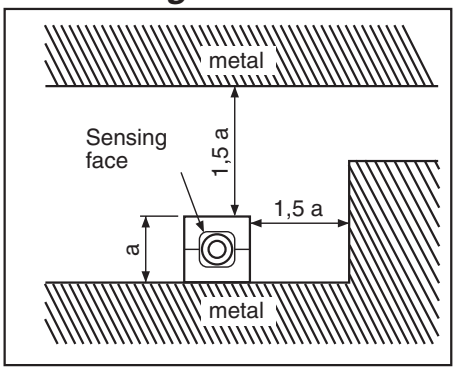
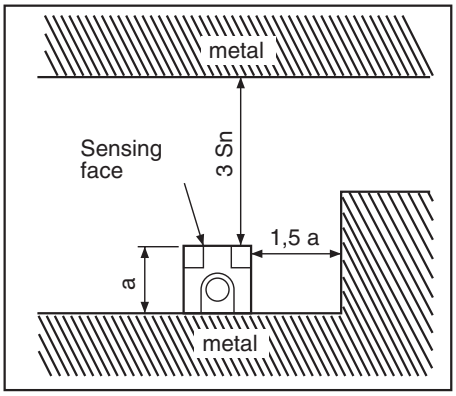
Block type proximity sensors not suitable for mounting in metal

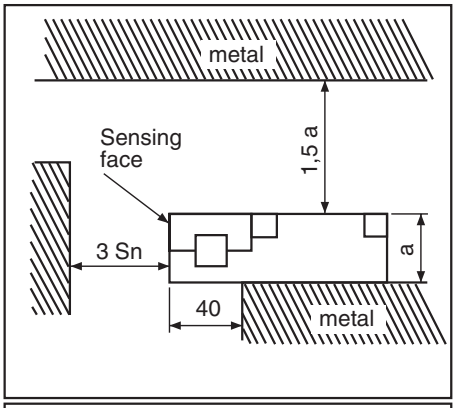
Non-shielded

Clearing distances

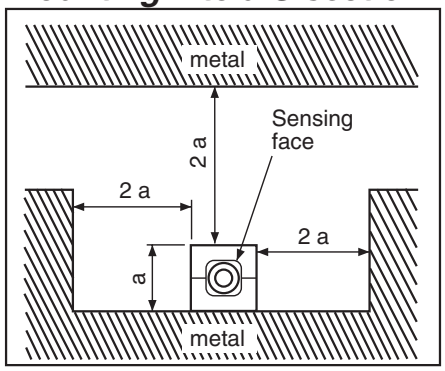
Mounting into a T section

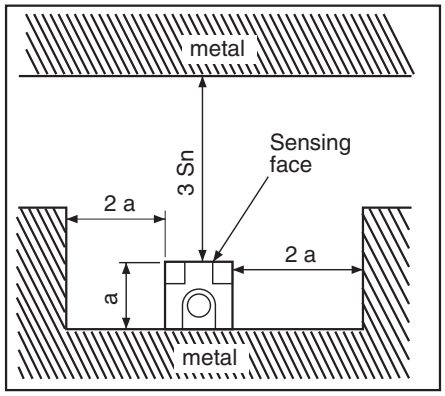


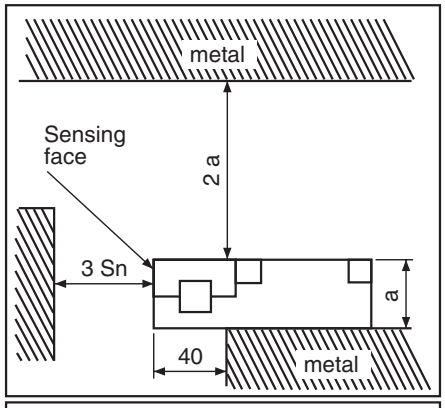




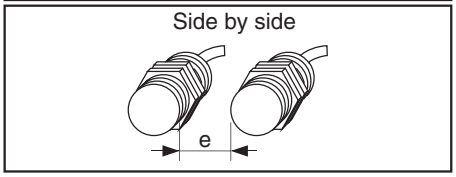
Mounting into a U section

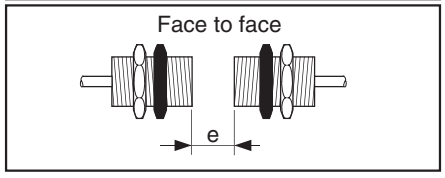






Side by side Face to face





NOTE: For shorter distances, ***alternate frequency*** *models are required. Consult the factory for availability.*

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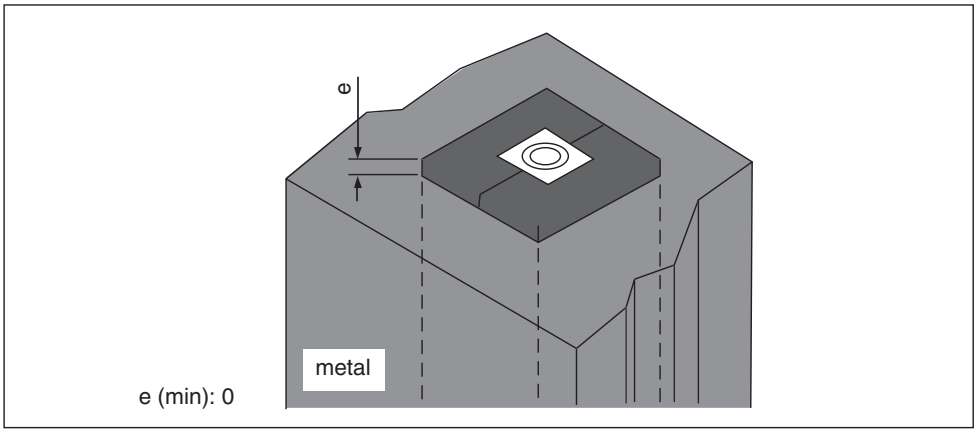
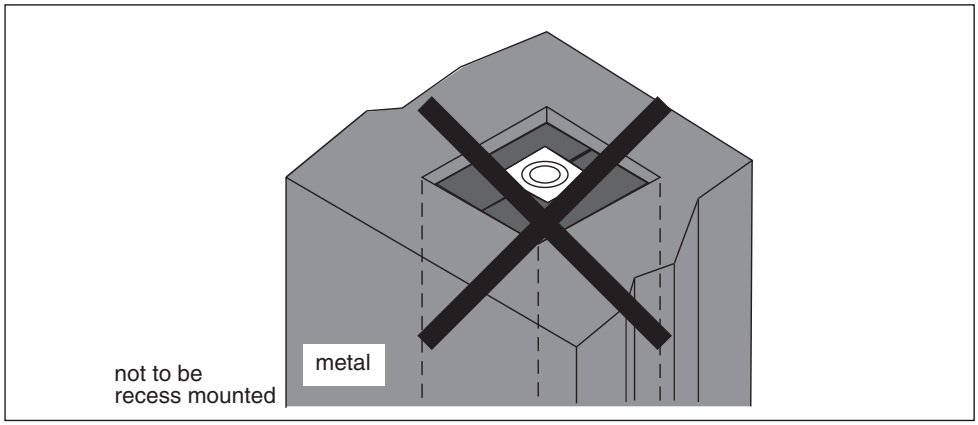
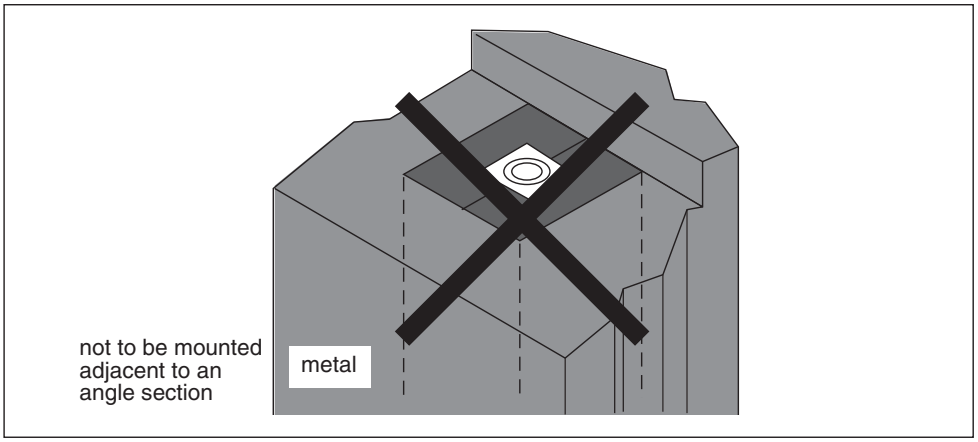
Suitable for flush mounting in metal

Shielded
Mounting with metal on one or more sides simultaneously







Any metal within the immediate vicinity of a proximity sensor distorts the magnetic field around the sensing face. The clearance distances shown above are given for a simplified installation arrangement and would result in the increase of the sensing distance of less than 5%.

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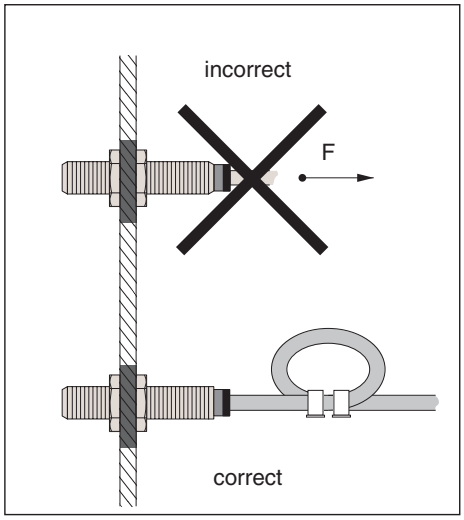
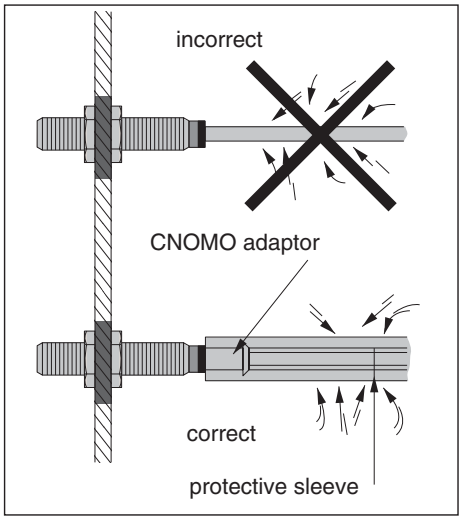
Cable Protection

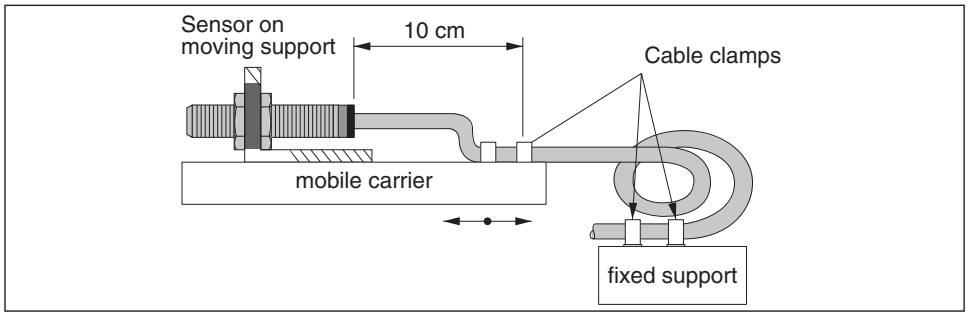
Protection of the cable



Do not exert a pulling force of over 4.4 lb on the sensor cable.

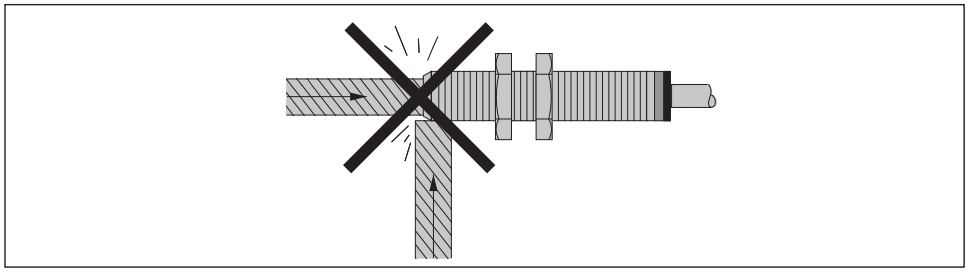


Consider using a protective sleeve or rigid conduit, where necessary.



Avoid repetitive flexing movement between the cable and the sensor.

Protection of the sensing face



The sensor must never be used as a mechanical stop as this may cause irreparable damage.

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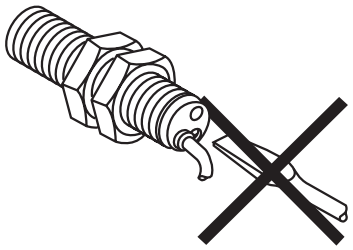
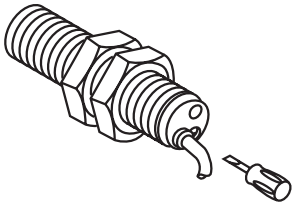
Use of tools for adjustment of the proximity sensor



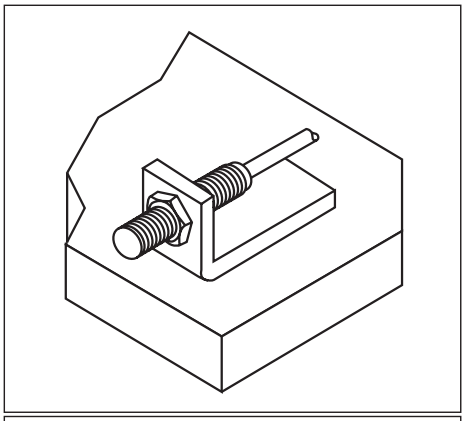
Incorrect



Correct

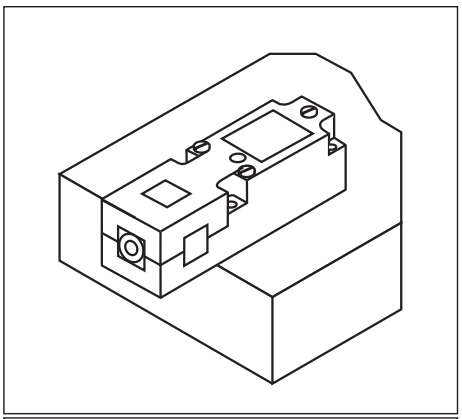
Mounting

Tubular sensor



Ensure a rigid mounting
the mounting must be sufficiently rigid and thick to resist shock and vibrations

Block type sensor



Ensure a rigid mounting
the mounting area must be large enough to support the sensor correctly

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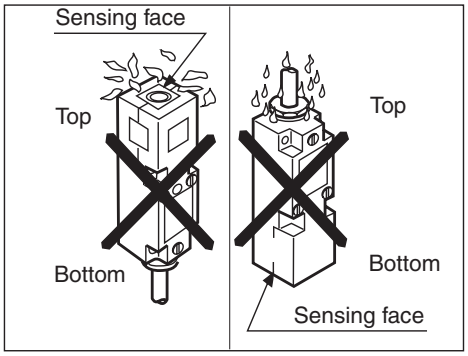
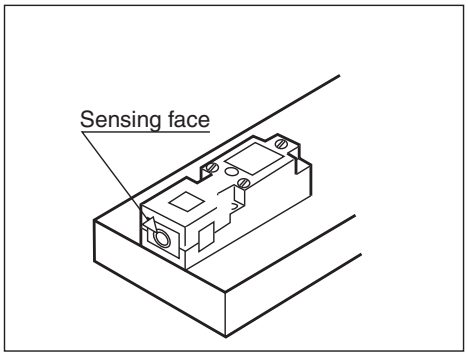
Sensor Positioning

Positioning



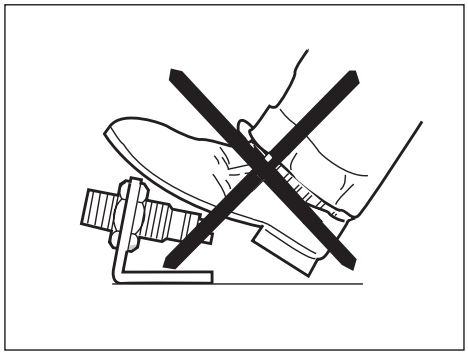
Incorrect

- *possibility of debris collecting on the sensor sensing face*
- *possibility of liquid entry if the cable gland is mounted improperly*

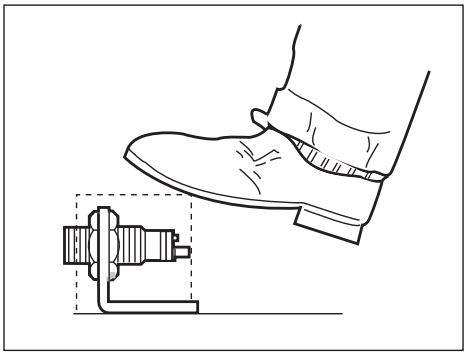


Correct

Mechanical protection



A proximity sensor should never be used as a footrest.



Where the possibility of this type of misuse exists, a protective cover should be fitted over the sensor.

Remember: For proper installation, the sensor must be mounted solidly to its support.

Depending on the application, the operating distance is adjusted by either:

- moving the mounting bracket
- adjusting the target

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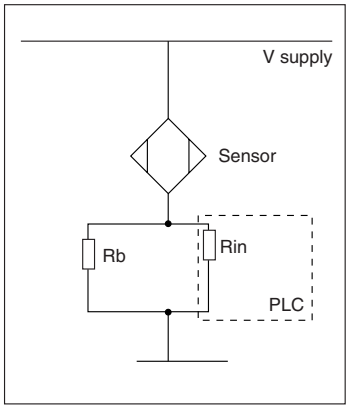

For a solid-state, 2-wire, AC sensor to be directly compatible with a PLC, two conditions must be met:

1. Leakage current: (I off) **less than 1.7 mA** (Off state)

2. Load current: greater than the sensor minimum load current (On state). Typical PLC input currents (load current, I load) are 12–16 mA. Typical values for PLC input resistance (Rin) are 7.5–10 kΩ.

If the sensor does not meet both requirements, a bleeder resistor (Rb) must be wired in parallel with the load. Calculate the bleeder resistor parameters as shown below. **The smaller value should be selected for the application.**

$$1.\ Rb = \frac{Rin \times Vo\ max.}{I\ off\ (Rin) - Vo\ max.} \quad \text{※} \quad Pb = \frac{Vs^2}{Rb}$$

Where: *Vo max.* *= PLC input maximum Off voltage (20–40 Vac)*
Rin *= PLC input resistance*
Vs *= Line voltage*
Pb *= Minimum bleeder resistor power rating*

Example:

I off *= 3.5 mA*
Vo max. *= 20 V*
Rin *= 6.5 kΩ*

Typical examples for Telemecanique® TSX DET input modules:

	TSX DET 1604	***TSX DET 0804***
For I off = 3.5 mA	*47 kΩ/0.5 W*	*—*
For I off = 7 mA	*4.7 kΩ/3 W*	*12 kΩ/1.5 W*

$$2.\ Rb = \frac{Rin \times Vo\ max.}{I\ off\ (Rin) - Vo\ max.} \quad \text{※} \quad Pb = \frac{Vs^2}{Rb}$$

Example:

I min *= 30 mA*
Vs *= 120 V*
Rin *= 7 kΩ*

Typical examples using TSX programmable controllers:

	TSX DET 1604	***TSX DET 0804***
For I min = 20 mA	*64 kΩ/0.5 W*	*24 kΩ/1 W*
For I min = 30 mA	*8.7 kΩ/2 W*	*8.7 kΩ/2 W*

NOTE: All DC 3-wire sensors are PLC compatible.

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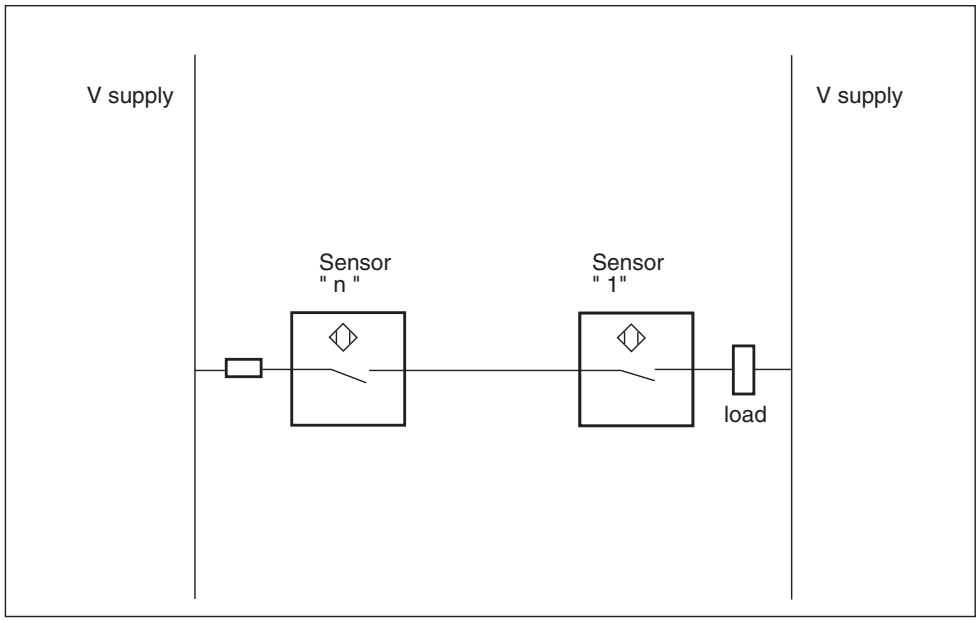
Wiring in series

Wiring two or more sensors in series 2 wire type



Consider the following points:

1. When in the open state, each sensor will share the supply voltage:

$$\textit{Voltage across the sensor} = \frac{\textit{Vsupply}}{\textit{number of proximity sensors}}$$

   Vsensor and Vsupply must fall within the sensor's voltage range.

2. If a sensor is off, it will be supplied with nearly all the supply voltage.
3. When all sensors are on, a small voltage drop is present across each sensor; the resultant loss of voltage at the load will be the sum of the individual voltage drops. Select the load voltage accordingly.
4. Series connection is only possible for sensors with a wide voltage range.

   Example: *Four sensors rated at 24–240 Vac can be wired in series at 120 V because even at 90%, V supply = 108 V. When all sensors are off, each will see 108/4 = 27 V, which is higher than the minimum voltage rating of the switch (24 V).*

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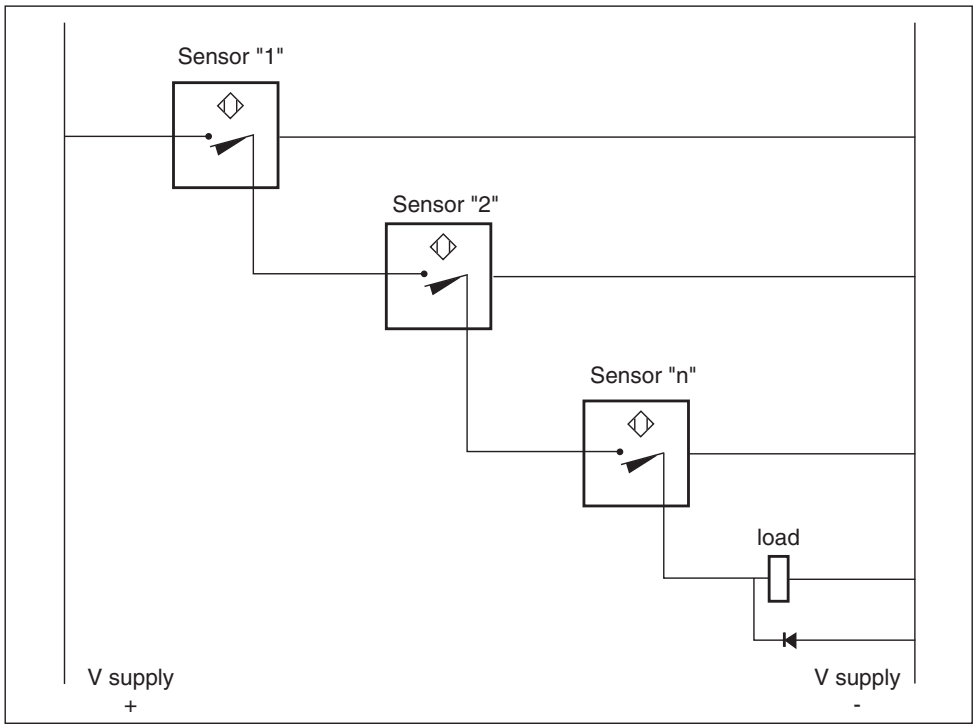
Wiring two or more sensors in series 3 wire type



Consider the following points:

1. Sensor 1, when conducting its load current, also carries the leakage currents of all other sensors.
2. Each sensor, when conducting, produces a voltage drop of 2.6 V maximum. Select the load voltage accordingly.
3. Sensor 2 is powered only when Sensor 1 turns on. Only after its power-up delay can Sensor 2 function properly. Consider this delay when speed is a factor.
4. Use of flywheel diodes is recommended where an inductive load is being switched.

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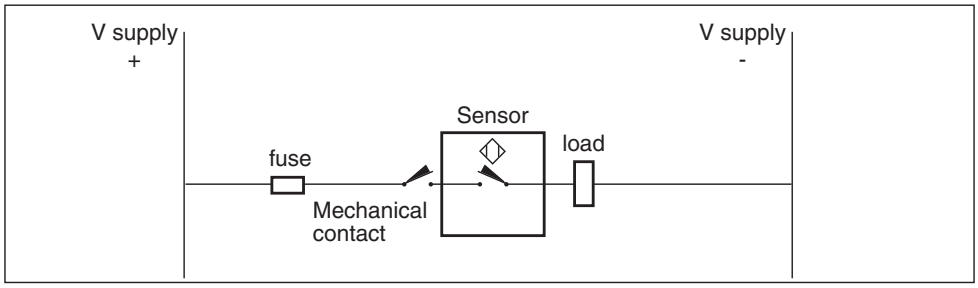
Wiring in series

Wiring proximity sensors in series with mechanical contact devices



Consider the following points:

1. When the mechanical contact is open, the sensor is not supplied.
2. When the contact closes, the proximity sensor does not operate until a certain time T has elapsed, corresponding to the **power-up delay**. Please refer to the individual sensor characteristics.

Wiring several sensors in parallel 2 wire type

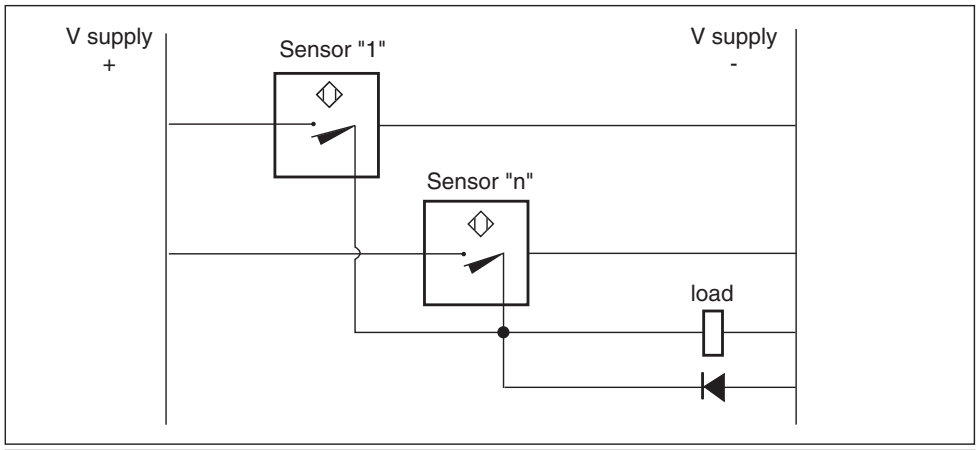
Using proximity sensors wired in parallel either to each other or to mechanical contacts is not recommended.

When one of the sensors is in the On state, the sensor in parallel is shorted out and thus no longer supplied.

As the first unit passes into the Off state, the second sensor becomes energized and is subject to its power-up delay. This configuration is used where the sensors work alternately.

When the sensors are Off, the sum of the leakage currents must be less than the holding current of the load.

3 wire type



No restriction

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Cable Routing

Cable length

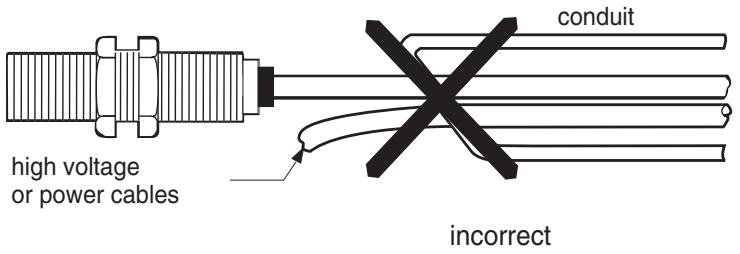
No restrictions up to 660 ft (200 m) or up to a line capacitance of 0.1 µF. It is important to account for voltage drop on the line over 660 ft (200 m).

The XS models can withstand the electrical interference encountered in normal industrial conditions.

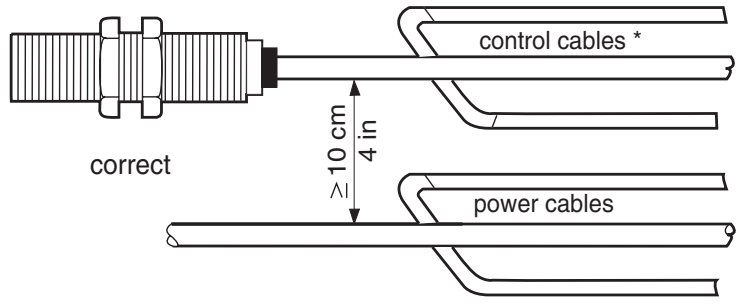
Where extreme electrical noise conditions could occur (large motors, spot welders, etc.), it is advisable to protect against transients in the following ways:

- Suppress interference at the source
- Limit the length of the cables
- Separate power and control wiring
- Ensure that the logic systems contain input transient suppression means
- Use twisted pair and shielded cables

Separation of power and control wiring



Incorrect



Correct

* Use of individual cables is recommended if long lengths are involved.

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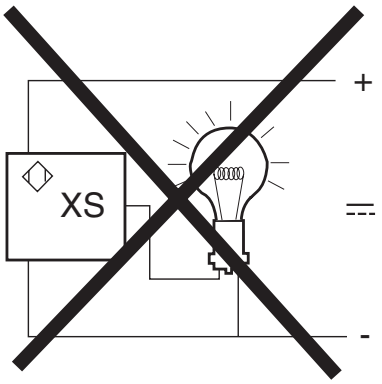
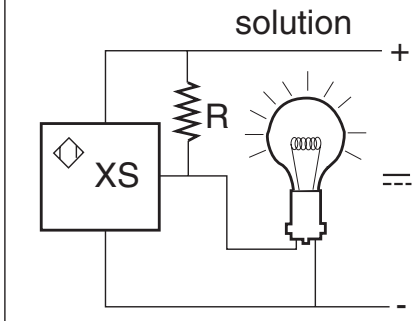
Electrical connections

Proper Loads



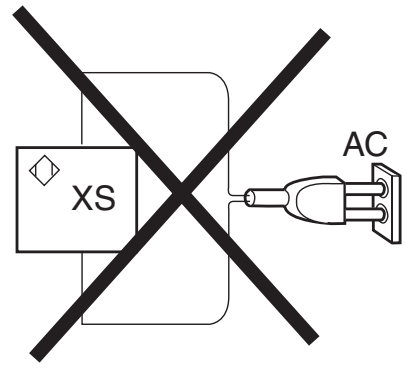
If the load consists of an incandescent lamp, the cold state resistance can be one-tenth the hot state resistance. This can cause very high current levels on switching.



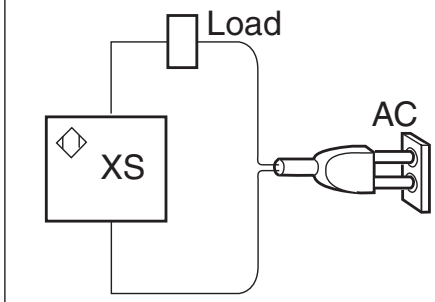
Install a pre-heat resistance in parallel with the proximity sensor.

$$R = \frac{V^2}{P} \times 10$$

V= supply voltage
P= power of lamp



***Do not** connect an XS proximity sensor directly to an AC supply source.*



Connect a suitable load (see product data) in series with the proximity sensor.

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Troubleshooting

	Possible cause	Remedial action
The sensor's output does not change state when a metal target is moved within its operating zone.	*Output failure, or the short circuit protection has operated.*	*• Check that the sensor is correct for the supply being used.* *• Check the load current.* *Characteristics:* *- If load current is greater than the max. rated current, a relay should be interposed between the sensor and the load.* *- If load current is lower than the nominal rated current, check for wiring faults which could have caused a short circuit. In any case, a fast-blow fuse should be wired in series with the sensor (AC).* *- For a tubular sensor, if the sensor is brand new, check the mounting torque.*
	Wiring error *Supply problems*	*• Check the wiring.* *• Check voltage range.* *• Check that the supply voltage falls within the operating limits of the sensor in question. Remember that with a rectified supply: Vpeak = Vrms x $\sqrt{2}$*
	Transients	*• Install transient suppressors across potential sources (coils, arcing contactors)*
	Influence of surrounding metal	*• Refer to the instruction sheet supplied with the sensor.*
False or erratic operation with or without the presence of the target object.	*Effect of interference on the supply lines*	*• Ensure that any DC supplies, when derived from rectified AC, are correctly filtered ($C \geq 400\ \mu f$)* *• Ensure that AC power cables are run separately from low level DC cables.* *• Where very long distances are involved, use suitable cable:* *- shielded and/or twisted pair* *- suitable wire gauge* *• Position the sensor as far as possible from any source of interference.*
	Response time of the sensor is too long for the particular target.	*• Check suitability of the sensor for the target; choose a sensor with a faster response time, or use a longer target.*
	Effects of high temperature	*• Eliminate sources of radiated heat, or protect the housing with a heat shield.*

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Cenelec standards

Cylindrical		Block type	
Form A		**Form C**	**Form D**
EN 50008 (NFC 63-076) DC 3 or 4 terminals EN 50040 (NFC 63-071) DC 2 terminals EN 50036 (NFC 63-081) AC terminals		EN 50025 (NFC 63-077) DC 3 or 4 terminals EN 50037 (NFC 63-082) AC 2 terminals	EN 50026 (NFC 63-078) DC 3 or 4 terminals EN 50038 (NFC 63-083) AC 2 terminals

EN 50010 (NFC 63-075)	*Determination of sensing distance and operating frequencies*
EN 50032 (NFC 63-079)	*Definitions, classification, description*
EN 50040 (NFC 63-074)	*Connection identification*

Series XS1N/XS2N, XS1M/XS2M, and XS4P also conform to the requirements of IEC 60947.5.2 standard. (ISO 9000 Self-Certification, NEMA project ICS 5-4-2002X)

Approvals

- File LR46094 + LR44087 class 321103
- File E39291 guide NKCR2
- File E39281 guide NKCR
- ● Standard version approved
- ○ pending
- ▲ Special North American version (1/2" NPT cable entry, UL label, etc.)
- FM Intrinsically safe applications

	CSA		UL	CE	USSR
XS1 / XS2 L/N	●	—	●	●	—
XS1 / XS2 M	●	—	●	●	—
XS4P	●	—	●	●	—
XSB	▲	—	▲	●	●
XS7 / 8	▲	—	▲	●	—
XSD	▲	—	▲	●	—
XSE	▲	—	▲	●	●
XSG	▲	▲	—	—	—
XS5	▲	—	●	●	—
XS6	▲	—	●	●	—
XS7	▲	—	●	●	—
XS8	▲	—	●	●	—
XS9	▲	—	●	●	—

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Proximity Sensors
Catalog Number Cross-References
Old Design to New Design

Old Design	New Design	Old Design	New Design	Old Design	New Design
8 mm Tubular ⎓		XS1N08PA349L2	**XS608B1PAL10**	XS1M12KP340D	**XS508B1NBM8**
XS1M08DA210	**XS508B1DAL2**	XS1N08PA349S	**XS608B1PAM12**	XS1M12KP340L1	**XS508B1PAL5**
XS1M08DA210D	**XS508B1DAM12**	XS1N08PB340	**XS508B1PBL2**	XS1M12KP340L1	**XS508B1PBL5**
XS1M08DA210L1	**XS508B1DAL5**	XS1N08PB340D	**XS508B1PBM8**	XS1M12KP340L1	**XS508B1NAL5**
XS1M08DA210L2	**XS508B1DAL10**	XS1N08PB340L1	**XS508B1PBL5**	XS1M12KP340L1	**XS508B1NBL5**
XS1M08DA210LD	**XS508B1DAL08M12**	XS1N08PB340S	**XS508B1PBM8**	XS1M12KP340L2	**XS508B1PAL10**
XS1M08DB210	**XS508B1DBL2**	XS1N08PB349	**XS608B1PBL2**	XS1M12KP340L2	**XS508B1PBL10**
XS1M08DB210D	**XS508B1DBM12**	XS1N08PB349D	**XS608B1PBM12**	XS1M12KP340L2	**XS508B1NAL10**
XS1M08DB210L1	**XS508B1DBL5**	XS1N08PB349L1	**XS608B1PBL5**	XS1M12KP340L2	**XS508B1NBL10**
XS1M08NA370	**XS608B1NAL2**	XS1N08PB349L2	**XS608B1PBL10**	XS1M12NA370	**XS612B1NAL2**
XS1M08NA370D	**XS608B1NAM12**	XS1N08PB349S	**XS608B1PBM12**	XS1M12NA370D	**XS612B1NAM12**
XS1M08NA370L1	**XS608B1NAL5**	XS2M08NA340	**XS608B1NAL2**	XS1M12NA370L1	**XS612B1NAL5**
XS1M08NB370	**XS608B1NBL2**	XS2M08NC410	**XS608B1NAL2**	XS1M12NA370L2	**XS612B1NAL10**
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XS1M08NC410	**XS508B1NBL2**	XS2M08NC410D	**XS608B1NBM12**	XS1M12NB370D	**XS612B1NBM12**
XS1M08NC410D	**XS508B1NAM8**	XS2M08PC410	**XS608B1PAL2**	XS1M12PA370	**XS612B1PAL2**
XS1M08NC410D	**XS508B1NBM8**	XS2M08PC410	**XS608B1PBL2**	XS1M12PA370D	**XS612B1PAM12**
XS1M08PA370	**XS608B1PAL2**	XS2M08PC410D	**XS608B1PAM12**	XS1M12PA370L1	**XS612B1PAL5**
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XS1M08PA370L2	**XS608B1PAL10**	XS2N08NA340D	**XS608B1NAM8**	XS1M12PB370D	**XS612B1PBM12**
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XS1N08NB340	**XS508B1NBL2**	**12 mm Tubular ⎓**		XS1N12NC410L1	**XS512B1NBL5**
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Proximity Sensors
Catalog Number Cross-References
Old Design to New Design

Old Design	New Design	Old Design	New Design	Old Design	New Design
XS1N12PB349L1	**XS612B1PBL5**	XS2N12PA340	**XS612B1PAL2**	XS1M18NA370C	**XS618B1NAM12**
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XS2M12KP340L1	**XS612B1PBL5**	**18 mm Tubular ⎓**		XS1M18PB370C	**XS618B1PBM12**
XS2M12KP340L1	**XS612B1NAL5**	XS1M18DA210	**XS518B1DAL2**	XS1M18PB370D	**XS618B1PBM12**
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XS2M12KP340L2	**XS612B1PBL10**	XS1M18DA210D	**XS518B1DAM12**	XS1M18PB370L2	**XS618B1PAL10**
XS2M12KP340L2	**XS612B1NAL10**	XS1M18DA210G	**XS518B1DAM12**	XS1N18NA340	**XS518B1NAL2**
XS2M12KP340L2	**XS612B1NBL10**	XS1M18DA210L1	**XS518B1DAL5**	XS1N18NA340D	**XS518B1NAM12**
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XS2N12NA340L2	**XS612B1NAL10**	XS1M18KP340L1	**XS518B1NAL5**	XS1N18PA340L1	**XS518B1PAL5**
XS2N12NB340	**XS612B1NBL2**	XS1M18KP340L1	**XS518B1NBL5**	XS1N18PA340L2	**XS518B1PAL10**
XS2N12NB340D	**XS612B1NBM12**	XS1M18KP340L2	**XS518B1PAL10**	XS1N18PA349	**XS618B1PAL2**
XS2N12NC410	**XS612B1NAL2**	XS1M18KP340L2	**XS518B1PBL10**	XS1N18PA349D	**XS618B1PAM12**
XS2N12NC410	**XS612B1NBL2**	XS1M18KP340L2	**XS518B1NAL10**	XS1N18PA349L1	**XS618B1PAL5**
XS2N12NC410D	**XS612B1NAM12**	XS1M18KP340L2	**XS518B1NBL10**	XS1N18PA349L2	**XS618B1PAL10**
XS2N12NC410D	**XS612B1NBM12**	XS1M18NA370	**XS618B1NAL2**	XS1N18PA349S	**XS618B1PAM12**
XS2N12NC410L1	**XS612B1NAL5**	XS1M18NA370A	**XS618B1NAM12**	XS1N18PB340	**XS518B1PBL2**
XS2N12NC410L1	**XS612B1NBL5**	XS1M18NA370B	**XS618B1NAM12**	XS1N18PB340D	**XS518B1PBM12**

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XS1N18PB340L2	**XS518B1PBL10**	XS2N18NC410	**XS618B1NBL2**	XS1M30NA370	**XS630B1NAL2**
XS1N18PB349	**XS618B1PBL2**	XS2N18NC410D	**XS618B1NAM12**	XS1M30NA370B	**XS630B1NAM12**
XS1N18PB349D	**XS618B1PBM12**	XS2N18NC410D	**XS618B1NBM12**	XS1M30NA370C	**XS630B1NAM12**
XS1N18PB349L1	**XS618B1PBL5**	XS2N18PA340	**XS618B1PAL2**	XS1M30NA370D	**XS630B1NAM12**
XS1N18PB349L2	**XS618B1PBL10**	XS2N18PA340D	**XS618B1PAM12**	XS1M30NA370G	**XS630B1NAM12**
XS1N18PB349S	**XS618B1PBM12**	XS2N18PA340L1	**XS618B1PAL5**	XS1M30NA370L1	**XS630B1NAL5**
XS1N18PC410	**XS518B1PAL2**	XS2N18PA340L2	**XS618B1PAL10**	XS1M30NA370L2	**XS630B1NAL10**
XS1N18PC410	**XS518B1PBL2**	XS2N18PB340	**XS618B1PBL2**	XS1M30NA370T	**XS630B1NAL2T**
XS1N18PC410D	**XS518B1PAM12**	XS2N18PB340D	**XS618B1PBM12**	XS1M30NB370	**XS630B1NBL2**
XS1N18PC410D	**XS518B1PBM12**	XS2N18PC410	**XS618B1PAL2**	XS1M30NB370B	**XS630B1NBM12**
XS1N18PC410L1	**XS518B1PAL5**	XS2N18PC410	**XS618B1PBL2**	XS1M30NB370D	**XS630B1NBM12**
XS1N18PC410L1	**XS518B1PBL5**	XS2N18PC410D	**XS618B1PAM12**	XS1M30PA349C	**XS630B1PAM12**
XS1N18PC410P	**XS518B1PAL10**	XS2N18PC410D	**XS618B1PBM12**	XS1M30PA349D	**XS630B1PAM12**
XS1N18PC410P	**XS518B1PBL10**	XS2N18PC410L1	**XS618B1PAL5**	XS1M30PA370	**XS630B1PAL2**
XS2M18KP340	**XS618B1PAL2**	XS2N18PC410L1	**XS618B1PBL5**	XS1M30PA370A	**XS630B1PAM12**
XS2M18KP340	**XS618B1PBL2**	XS3P18NA340	**XS518B1NAL2**	XS1M30PA370B	**XS630B1PAM12**
XS2M18KP340	**XS618B1NAL2**	XS3P18NA340D	**XS518B1NAM12**	XS1M30PA370C	**XS630B1PAM12**
XS2M18KP340	**XS618B1NBL2**	XS3P18NA370	**XS618B1NAL2**	XS1M30PA370D	**XS630B1PAM12**
XS2M18KP340D	**XS618B1PAM12**	XS3P18PA340	**XS518B1PAL2**	XS1M30PA370G	**XS630B1PAM12**
XS2M18KP340D	**XS618B1PBM12**	XS3P18PA340D	**XS518B1PAM12**	XS1M30PA370L1	**XS630B1PAL5**
XS2M18KP340D	**XS618B1NAM12**	XS3P18PA340L1	**XS518B1PAL5**	XS1M30PA370L2	**XS630B1PAL10**
XS2M18KP340D	**XS618B1NBM12**	XS3P18PA370	**XS618B1PAL2**	XS1M30PA370T	**XS630B1PAL2T**
XS2M18KP340L1	**XS618B1PAL5**	**30 mm Tubular ⎓**		XS1M30PB370	**XS630B1PBL2**
XS2M18KP340L1	**XS618B1PBL5**	XS1M30DA210	**XS530B1DAL2**	XS1M30PB370B	**XS630B1PBM12**
XS2M18KP340L1	**XS618B1NAL5**	XS1M30DA210B	**XS530B1DAM12**	XS1M30PB370C	**XS630B1PBM12**
XS2M18KP340L1	**XS618B1NBL5**	XS1M30DA210C	**XS530B1DAM12**	XS1M30PB370D	**XS630B1PBM12**
XS2M18KP340L2	**XS618B1PAL10**	XS1M30DA210D	**XS530B1DAM12**	XS1M30PB370G	**XS630B1PBM12**
XS2M18KP340L2	**XS618B1PBL10**	XS1M30DA210G	**XS530B1DAM12**	XS1M30PB370L1	**XS630B1PBL5**
XS2M18KP340L2	**XS618B1NAL10**	XS1M30DA210L1	**XS530B1DAL5**	XS1M30PB370L2	**XS630B1PBL10**
XS2M18KP340L2	**XS618B1NBL10**	XS1M30DA210L2	**XS530B1DAL10**	XS1N30NA340	**XS530B1NAL2**
XS2M18NA370	**XS618B1NAL2**	XS1M30DA210LA	**XS530B1DAM12**	XS1N30NA340D	**XS530B1NAM12**
XS2M18NA370C	**XS618B1NAM12**	XS1M30DA210LD	**XS530B1DAM12**	XS1N30NA349	**XS630B1NAL2**
XS2M18NA370D	**XS618B1NAM12**	XS1M30DB210	**XS530B1DBL2**	XS1N30NA349D	**XS630B1NAM12**
XS2M18NA370L1	**XS618B1NAL5**	XS1M30DB210B	**XS530B1DBM12**	XS1N30NA349L1	**XS630B1NAL5**
XS2M18NA370L2	**XS618B1NAL10**	XS1M30DB210D	**XS530B1DBM12**	XS1N30NA349L2	**XS630B1NAL10**
XS2M18NA370T	**XS618B1NAM12T**	XS1M30KP340	**XS530B1PAL2**	XS1N30NB340	**XS530B1NBL2**
XS2M18NB370	**XS618B1NBL2**	XS1M30KP340	**XS530B1PBL2**	XS1N30NB349	**XS630B1NBL2**
XS2M18NB370D	**XS618B1NBM12**	XS1M30KP340	**XS530B1NAL2**	XS1N30NB349D	**XS630B1NBM12**
XS2M18PA370	**XS618B1PAL2**	XS1M30KP340	**XS530B1NBL2**	XS1N30NC410	**XS530B1NAL2**
XS2M18PA370C	**XS618B1PAM12**	XS1M30KP340D	**XS530B1PAM12**	XS1N30NC410	**XS530B1NBL2**
XS2M18PA370D	**XS618B1PAM12**	XS1M30KP340D	**XS308B1PBM12**	XS1N30NC410D	**XS530B1NAM12**
XS2M18PA370G	**XS618B1PAM12**	XS1M30KP340D	**XS530B1NAM12**	XS1N30NC410D	**XS530B1NBM12**
XS2M18PA370L1	**XS618B1PAL5**	XS1M30KP340D	**XS530B1NBM12**	XS1N30PA340	**XS530B1PAL2**
XS2M18PA370L2	**XS618B1PAL10**	XS1M30KP340L1	**XS530B1PAL5**	XS1N30PA340D	**XS530B1PAM12**
XS2M18PA370T	**XS618B1PAL2T**	XS1M30KP340L1	**XS530B1PBL5**	XS1N30PA340L1	**XS530B1PAL5**
XS2M18PB370	**XS618B1PBL2**	XS1M30KP340L1	**XS530B1NAL5**	XS1N30PA340L2	**XS530B1PAL10**
XS2M18PB370C	**XS618B1PBM12**	XS1M30KP340L1	**XS530B1NBL6**	XS1N30PA349	**XS630B1PAL2**
XS2M18PB370D	**XS618B1PBM12**	XS1M30KP340L2	**XS530B1PAL10**	XS1N30PA349D	**XS630B1PAM12**
XS2M18PB370G	**XS618B1PBM12**	XS1M30KP340L2	**XS530B1PBL10**	XS1N30PA349L1	**XS630B1PAL5**
XS2M18PB370L1	**XS618B1PBL5**	XS1M30KP340L2	**XS530B1NAL10**	XS1N30PA349L2	**XS630B1PAL10**
XS2M18PB370L2	**XS618B1PBL10**	XS1M30KP340L2	**XS530B1NBL10**	XS1N30PA349S	**XS630B1PAM12**
XS2N18NA340	**XS618B1NAL2**	XS1M30KP370	**XS630B1PAL2**	XS1N30PB340	**XS530B1PBL2**
XS2N18NA340D	**XS618B1NAM12**	XS1M30KP370	**XS630B1PBL2**	XS1N30PB340D	**XS530B1PBM12**
XS2N18NA340L1	**XS618B1NAL5**	XS1M30KP370	**XS630B1NAL2**	XS1N30PB349	**XS630B1PBL2**
XS2N18NC410	**XS618B1NAL2**	XS1M30KP370	**XS630B1NBL2**	XS1N30PB349D	**XS630B1PBM12**

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XS1N30PB349L1	**XS630B1PBL5**	XS2N30PB340D	**XS630B1PBM12**	XS1M18MA230B	**XS618B1MAU20**
XS1N30PB349L2	**XS630B1PBL10**	XS2N30PC410	**XS630B1PAL2**	XS1M18MA230C	**XS618B1MAU20**
XS1N30PC410	**XS530B1PAL2**	XS2N30PC410	**XS630B1PBL2**	XS1M18MA230G	**XS618B1MAU20**
XS1N30PC410	**XS530B1PBL2**	XS2N30PC410D	**XS630B1PAM12**	XS1M18MA230K	**XS618B1MAU20**
XS1N30PC410D	**XS530B1PAM12**	XS2N30PC410D	**XS630B1PBM12**	XS1M18MA230L1	**XS618B1MAL5**
XS1N30PC410D	**XS530B1PBM12**	XS2N30PC410L1	**XS630B1PAL5**	XS1M18MA230L2	**XS618B1MAL10**
XS1N30PC410L1	**XS530B1PAL5**	XS2N30PC410L1	**XS630B1PBL5**	XS1M18MA230T	**XS618B1MAL2T**
XS1N30PC410L1	**XS530B1PBL5**	XS3P30NA340	**XS530B1NAL2**	XS1M18MA239	**XS618B1MAL2**
XS1N30PC410L2	**XS530B1PAL10**	XS3P30NA340D	**XS530B1NAM12**	XS1M18MA239A	**XS618B1MAU20**
XS1N30PC410L2	**XS530B1PBL10**	XS3P30NA370	**XS630B1NAL2**	XS1M18MA239K	**XS618B1MAU20**
XS2M30KP340	**XS630B1PAL2**	XS3P30PA340	**XS530B1PAL2**	XS1M18MA250	**XS618B1MAL2**
XS2M30KP340	**XS630B1PAL2**	XS3P30PA340D	**XS530B1PAM12**	XS1M18MA250A	**XS618B1MAU20**
XS2M30KP340	**XS630B1PAL2**	XS3P30PA340L1	**XS530B1PAL5**	XS1M18MA250H4	**XS618B1MAL2**
XS2M30KP340	**XS630B1PAL2**	XS3P30PA340L2	**XS530B1PAL10**	XS1M18MA250K	**XS618B1MAU20**
XS2M30KP340D	**XS630B1PAM12**	XS3P30PA370	**XS630B1PAL2**	XS1M18MA250KH4	**XS618B1MAU20**
XS2M30KP340D	**XS630B1PAM12**	XS3P30PA370L1	**XS630B1PAL5**	XS1M18MA250L1	**XS618B1MAL5**
XS2M30KP340D	**XS630B1PAM12**	XS3P30PA370L2	**XS630B1PAL10**	XS1M18MA250L2	**XS618B1MAL10**
XS2M30KP340D	**XS630B1PAM12**	**12 mm Tubular ⏦**		XS1M18MB230	**XS618B1MBL2**
XS2M30KP340L1	**XS630B1PAL5**	XS1M12MA230	**XS612B1MAL2**	XS1M18MB230A	**XS618B1MBU20**
XS2M30KP340L1	**XS630B1PAL5**	XS1M12MA230K	**XS612B1MAU20**	XS1M18MB230B	**XS618B1MBU20**
XS2M30KP340L1	**XS630B1PAL5**	XS1M12MA230L1	**XS612B1MAL5**	XS1M18MB230C	**XS618B1MBU20**
XS2M30KP340L1	**XS630B1PAL5**	XS1M12MA230L2	**XS612B1MAL10**	XS1M18MB230G	**XS618B1MBU20**
XS2M30KP340L2	**XS630B1PAL10**	XS1M12MA239	**XS612B1MAL2**	XS1M18MB230K	**XS618B1MBU20**
XS2M30KP340L2	**XS630B1PAL10**	XS1M12MA239K	**XS612B1MAU20**	XS1M18MB230L1	**XS618B1MBL5**
XS2M30KP340L2	**XS630B1PAL10**	XS1M12MA250	**XS612B1MAL2**	XS1M18MB230L2	**XS618B1MBL10**
XS2M30KP340L2	**XS630B1PAL10**	XS1M12MA250K	**XS612B1MAU20**	XS1M18MB250	**XS618B1MBL2**
XS2M30NA370	**XS630B1NAL2**	XS1M12MA250L1	**XS612B1MAL5**	XS1M18MB250A	**XS618B1MBU20**
XS2M30NA370D	**XS630B1NAM12**	XS1M12MA250L2	**XS612B1MAL10**	XS1M18MB250K	**XS618B1MBU20**
XS2M30NA370L1	**XS630B1NAL5**	XS1M12MB230	**XS612B1MBL2**	XS1M18MB250L1	**XS618B1MBL5**
XS2M30NB370	**XS630B1NBL2**	XS1M12MB230K	**XS612B1MBU20**	XS1M18MB250L2	**XS618B1MBL10**
XS2M30NB370D	**XS630B1NBM12**	XS1M12MB230L1	**XS612B1MBL5**	XS2M18DA210L2	**XS612B1MAL10**
XS2M30PA370	**XS630B1PAL2**	XS1M12MB230L2	**XS612B1MBL10**	XS2M18MA230	**XS618B1MAL2**
XS2M30PA370C	**XS630B1PAM12**	XS1M12MB250	**XS612B1MBL2**	XS2M18MA230A	**XS618B1MAU20**
XS2M30PA370D	**XS630B1PAM12**	XS2M12MA230	**XS612B1MAL2**	XS2M18MA230C	**XS618B1MAU20**
XS2M30PA370G	**XS630B1PAM12**	XS2M12MA230K	**XS612B1MAU20**	XS2M18MA230G	**XS618B1MAU20**
XS2M30PA370L1	**XS630B1PAL5**	XS2M12MA230L1	**XS612B1MAL5**	XS2M18MA230K	**XS618B1MAU20**
XS2M30PA370L2	**XS630B1PAL10**	XS2M12MA230L2	**XS612B1MAL10**	XS2M18MA230L1	**XS618B1MAL5**
XS2M30PA370T	**XS630B1PAL2T**	XS2M12MA250	**XS612B1MAL2**	XS2M18MA230L2	**XS618B1MAL10**
XS2M30PB370	**XS630B1PBL2**	XS2M12MA250K	**XS612B1MAU20**	XS2M18MA230T	**XS618B1MAL2T**
XS2M30PB370C	**XS630B1PBM12**	XS2M12MA250L1	**XS612B1MAL5**	XS2M18MA250	**XS618B1MAL2**
XS2M30PB370D	**XS630B1PBM12**	XS2M12MA250L2	**XS612B1MAL10**	XS2M18MA250A	**XS618B1MAU20**
XS2M30PB370L1	**XS630B1PBL5**	XS2M12MB230	**XS612B1MBL2**	XS2M18MA250K	**XS618B1MAU20**
XS2M30PB370L2	**XS630B1PBL10**	XS2M12MB230K	**XS612B1MBU20**	XS2M18MA250L1	**XS618B1MAL5**
XS2N30NA340	**XS630B1NAL2**	XS2M12MB230L1	**XS612B1MBL5**	XS2M18MA250L2	**XS618B1MAL10**
XS2N30NA340D	**XS630B1NAM12**	XS2M12MB230L2	**XS612B1MBL10**	XS2M18MB230	**XS618B1MBL2**
XS2N30NB340	**XS630B1NBL2**	XS2M12MB250	**XS612B1MBL2**	XS2M18MB230A	**XS618B1MBU20**
XS2N30NC410	**XS630B1NAL2**	XS2M12MB250L1	**XS612B1MBL5**	XS2M18MB230C	**XS618B1MBU20**
XS2N30NC410	**XS630B1NBL2**	XS2M12MB250L2	**XS612B1MBL10**	XS2M18MB230G	**XS618B1MBU20**
XS2N30NC410D	**XS630B1NAM12**	XS3P12MA230	**XS612B1MAL2**	XS2M18MB230K	**XS618B1MBU20**
XS2N30NC410D	**XS630B1NBM12**	XS3P12MA230K	**XS612B1MAU20**	XS2M18MB230L1	**XS618B1MBL5**
XS2N30PA340	**XS630B1PAL2**	XS3P12MA230L1	**XS612B1MAL5**	XS2M18MB230L2	**XS618B1MBL10**
XS2N30PA340D	**XS630B1PAM12**	XS3P12MB230	**XS612B1MBL2**	XS2M18MB250	**XS618B1MBL2**
XS2N30PA340L1	**XS630B1PAL5**	**18 mm Tubular ⏦**		XS2M18MB250A	**XS618B1MBU20**
XS2N30PA340L2	**XS630B1PAL10**	XS1M18MA230	**XS618B1MAL2**	XS2M18MB250K	**XS618B1MBU20**
XS2N30PB340	**XS630B1PBL2**	XS1M18MA230A	**XS618B1MAU20**	XS2M18MB250L1	**XS618B1MBL5**

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XS2M18MB250L2	**XS618B1MBL10**	XS2M30MB230	**XS630B1MBL2**	XS7C40DP210TF	**XS7C1A1DAM8 + XSZBC10**
XS3P18MA230	**XS618B1MAL2**	XS2M30MB230A	**XS630B1MBU20**	XS7C40DP210TF	**XS7C1A1DBM8 + XSZBC10**
XS3P18MA230A	**XS618B1MAU20**	XS2M30MB230C	**XS630B1MBU20**	XS7C40KPM40	**XS9C11MPAM8 + XSZBC10**
XS3P18MA230K	**XS618B1MAU20**	XS2M30MB230G	**XS630B1MBU20**	XS7C40KPM40	**XS9C11MPBM8 + XSZBC10**
XS3P18MA230L1	**XS618B1MAL5**	XS2M30MB230K	**XS630B1MBU20**	XS7C40KPM40	**XS9C11MNAM8 + XSZBC10**
XS3P18MA230L2	**XS618B1MAL10**	XS2M30MB230L1	**XS630B1MBL5**	XS7C40KPM40	**XS9C11MPBM8 + XSZBC10**
XS3P18MB230	**XS618B1MBL2**	XS2M30MB230L2	**XS630B1MBL10**	XS7C40KPM40H29	**XS9C11MPAM8 + XSZBC10**
XS3P18MB230A	**XS618B1MBU20**	XS2M30MB250	**XS630B1MBL2**	XS7C40KPM40H29	**XS9C11MPBM8 + XSZBC10**
XS3P18MB230K	**XS618B1MBU20**	XS2M30MB250K	**XS630B1MBU20**	XS7C40KPM40H29	**XS9C11MNAM8 + XSZBC10**
XS3P18MB230L1	**XS618B1MBL5**	XS2M30MB250L1	**XS630B1MBL5**	XS7C40KPM40H29	**XS9C11MPBM8 + XSZBC10**
30 mm Tubular ∼		XS3P30MA230	**XS630B1MAL2**	XS7C40KPM40H7	**XS9C11MPAM8 + XSZBC10**
XS1M30MA230	**XS630B1MAL2**	XS3P30MA230A	**XS630B1MAU20**	XS7C40KPM40H7	**XS9C11MPBM8 + XSZBC10**
XS1M30MA230A	**XS630B1MAU20**	XS3P30MA230K	**XS630B1MAU20**	XS7C40KPM40H7	**XS9C11MNAM8 + XSZBC10**
XS1M30MA230B	**XS630B1MAU20**	XS3P30MA230L1	**XS630B1MAL5**	XS7C40KPM40H7	**XS9C11MPBM8 + XSZBC10**
XS1M30MA230C	**XS630B1MAU20**	XS3P30MA230L2	**XS630B1MAL10**	XS7C40NC440	**XS7C1A1NAM8 + XSZBC10**
XS1M30MA230G	**XS630B1MAU20**	XS3P30MB230	**XS630B1MBL2**	XS7C40NC440	**XS7C1A1NBM8 + XSZBC10**
XS1M30MA230K	**XS630B1MAU20**	XS3P30MB230A	**XS630B1MBU20**	XS7C40NC440D	**XS7C1A1NAM8 + XSZBC10**
XS1M30MA230L1	**XS630B1MAL5**	XS3P30MB230K	**XS630B1MBU20**	XS7C40NC440D	**XS7C1A1NBM8 + XSZBC10**
XS1M30MA230L2	**XS630B1MAL10**	XS3P30MB230L1	**XS630B1MBL5**	XS7C40NC440H29	**XS7C1A1NAM8 + XSZBC10**
XS1M30MA230T	**XS630B1MAL2T**	**XSC Rectangular ∼**		XS7C40NC440H29	**XS7C1A1NBM8 + XSZBC10**
XS1M30MA239	**XS630B1MAL2**	XSCA150549	**XS8C1A1MAL01U20 + XSZBC10**	XS7C40NC449	**XS8C1A1NAM8 + XSZBC10**
XS1M30MA239A	**XS630B1MAU20**	XSCA150549	**XS8C1A1MBL01U20 + XSZBC10**	XS7C40NC449	**XS8C1A1NBM8 + XSZBC10**
XS1M30MA250	**XS630B1MAL2**	**XSD Rectangular ∼**		XS7C40NC449H29	**XS8C1A1NAM8 + XSZBC10**
XS1M30MA250A	**XS630B1MAU20**	XSDA400519	**XS8D1A1MAU20 + XSZBD10**	XS7C40NC449H29	**XS8C1A1NBM8 + XSZBC10**
XS1M30MA250AH4	**XS630B1MAU20**	XSDA400519	**XS8D1A1MBU20 + XSZBD10**	XS7C40PC440	**XS7C1A1PAM8 + XSZBC10**
XS1M30MA250H4	**XS630B1MAL2**	XSDA400519H7	**XS8D1A1MAU20 + XSZBD10**	XS7C40PC440	**XS7C1A1PBM8 + XSZBC10**
XS1M30MA250K	**XS630B1MAU20**	XSDA400519H7	**XS8D1A1MBU20 + XSZBD10**	XS7C40PC440D	**XS7C1A1PAM8 + XSZBC10**
XS1M30MA250KH4	**XS630B1MAU20**	XSDA500519	**XS8D1A1MAU20 + XSZBD10**	XS7C40PC440D	**XS7C1A1PBM8 + XSZBC10**
XS1M30MA250L1	**XS630B1MAL5**	XSDA500519	**XS8D1A1MBU20 + XSZBD10**	XS7C40PC440H29	**XS7C1A1PAM8 + XSZBC10**
XS1M30MA250L2	**XS630B1MAL10**	XSDA500519H7	**XS8D1A1MAU20 + XSZBD10**	XS7C40PC440H29	**XS7C1A1PBM8 + XSZBC10**
XS1M30MB230	**XS630B1MBL2**	XSDA500519H7	**XS8D1A1MBU20 + XSZBD10**	XS7C40PC440H7	**XS7C1A1PAM8 + XSZBC10**
XS1M30MB230A	**XS630B1MBU20**	XSDA505539H4	**XS8D1A1MAU20 + XSZBD10**	XS7C40PC440H7	**XS7C1A1PBM8 + XSZBC10**
XS1M30MB230B	**XS630B1MBU20**	XSDA505539H4	**XS8D1A1MBU20 + XSZBD10**	XS7C40PC449	**XS8C1A1PAM8 + XSZBC10**
XS1M30MB230C	**XS630B1MBU20**	XSDA600519	**XS8D1A1MAU20 + XSZBD10**	XS7C40PC449	**XS8C1A1PBM8 + XSZBC10**
XS1M30MB230G	**XS630B1MBU20**	XSDA600519	**XS8D1A1MBU20 + XSZBD10**	XS7C40PC449H29	**XS8C1A1PAM8 + XSZBC10**
XS1M30MB230K	**XS630B1MBU20**	XSDA600519H7	**XS8D1A1MAU20 + XSZBD10**	XS7C40PC449H29	**XS8C1A1PBM8 + XSZBC10**
XS1M30MB230L1	**XS630B1MBL5**	XSDA600519H7	**XS8D1A1MBU20 + XSZBD10**	XS7C40PC449H7	**XS8C1A1PAM8 + XSZBC10**
XS1M30MB230L2	**XS630B1MBL10**	XSDM500538	**XS8D1A1MAU20 + XSZBD10**	XS7C40PC449H7	**XS8C1A1PBM8 + XSZBC10**
XS1M30MB250	**XS630B1MBL2**	XSDM500538	**XS8D1A1MBU20 + XSZBD10**	XS7T2DA210	**XS7E1A1DAL2 + XSZBE10**
XS1M30MB250A	**XS630B1MBU20**	XSDM600539	**XS8D1A1MAU20 + XSZBD10**	XS7T2DA214LD	**XS7E1A1CAL08M12 + XSZBE10**
XS1M30MB250K	**XS630B1MBU20**	XSDM600539	**XS8D1A1MBU20 + XSZBD10**	XS7T2DA214LD01	**XS7E1A1CAL01M12 + XSZBE10**
XS1M30MB250L1	**XS630B1MBL5**	XSDM600539H7	**XS8D1A1MAU20 + XSZBD10**	XS7T2NC440	**XS7E1A1NAL2 + XSZBE10**
XS1M30MB250L2	**XS630B1MBL10**	XSDM600539H7	**XS8D1A1MBU20 + XSZBD10**	XS7T2NC440	**XS7E1A1NBL2 + XSZBE10**
XS2M30MA230	**XS630B1MAL2**	**XS7 Rectangular ⎓**		XS7T2NC440LD	**XS7E1A1NAL01M12 + XSZBE10**
XS2M30MA230A	**XS630B1MAU20**	XS7C40DA210	**XS7C1A1DAM8 + XSZBC10**	XS7T2NC440LD	**XS7E1A1NBL01M12 + XSZBE10**
XS2M30MA230C	**XS630B1MAU20**	XS7C40DA210A	**XS7C1A1DAM8 + XSZBC10**	XS7T2PC440	**XS7E1A1PAL2 + XSZBE10**
XS2M30MA230G	**XS630B1MAU20**	XS7C40DA214D	**XS7C1A1CAL08M12 + XSZBC10**	XS7T2PC440	**XS7E1A1PBL2 + XSZBE10**
XS2M30MA230K	**XS630B1MAU20**	XS7C40DP210	**XS7C1A1DAM8 + XSZBC10**	XS7T2PC440LD	**XS7E1A1PAL08M12 + XSZBE10**
XS2M30MA230L1	**XS630B1MAL5**	XS7C40DP210	**XS7C1A1DBM8 + XSZBC10**	XS7T2PC440LD	**XS7E1A1PBL08M12 + XSZBE10**
XS2M30MA230L2	**XS630B1MAL10**	XS7C40DP210H29	**XS7C1A1DAM8 + XSZBC10**	XS7T4DA210	**XS7C1A1DAL2 + XSZBC10**
XS2M30MA230T	**XS630B1MAL2T**	XS7C40DP210H29	**XS7C1A1DBM8 + XSZBC10**	XS7T4DA214LD	**XS7C1A1CAL08M12 + XSZBC10**
XS2M30MA250	**XS630B1MAL2**	XS7C40DP210H7	**XS7C1A1DAM8 + XSZBC10**	XS7T4DA214LD01	**XS7C1A1CAL01M12 + XSZBC10**
XS2M30MA250K	**XS630B1MAU20**	XS7C40DP210H7	**XS7C1A1DBM8 + XSZBC10**	XS7T4NC440	**XS7C1A1NAL2 + XSZBC10**
XS2M30MA250L1	**XS630B1MAL5**	XS7C40DP210TT	**XS7C1A1DAM8 + XSZBC10**	XS7T4NC440	**XS7C1A1NBL2 + XSZBC10**
XS2M30MA250L2	**XS630B1MAL10**	XS7C40DP210TT	**XS7C1A1DBM8 + XSZBC10**	XS7T4NC440LD	**XS7C1A1NAL01M12 + XSZBC10**

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Proximity Sensors
Catalog Number Cross-References
Old Design to New Design

Old Design	New Design	Old Design	New Design	Old Design	New Design
XS7T4NC440LD	**XS7C1A1NBL01M12 + XSZBC10**	**XS7 Rectangular ∿**		XS8C40MP230H7	**XS8C1A1MAL01U20 + XSZBC10**
XS7T4PC440	**XS7C1A1PAL2 + XSZBC10**	XS7C40DA210	**XS8C1A1MAL01U20 + XSZBC10**	XS8C40MP230H7	**XS8C1A1MBL01U20 + XSZBC10**
XS7T4PC440	**XS7C1A1PBL2 + XSZBC10**	XS7C40DA210A	**XS8C1A1MAL01U20 + XSZBC10**	**XSD Rectangular ⎓**	
XS7T4PC440LD	**XS7C1A1PAL01M12 + XSZBC10**	XS7C40DP210	**XS8C1A1MAL01U20 + XSZBC10**	XSDC407138	**XS7D1A1DAM12 + XSZBD10**
XS7T4PC440LD	**XS7C1A1PBL01M12 + XSZBC10**	XS7C40DP210	**XS8C1A1MBL01U20 + XSZBC10**	XSDC407139	**XS7D1A1DAM12 + XSZBD10**
XS8 Rectangular ⎓		XS7C40DP210H29	**XS8C1A1MAL01U20 + XSZBC10**	XSDC407139D4	**XS7D1A1DAM12 + XSZBD10**
XS8C40DA210	**XS7C1A1DAL01M12 + XSZBC10**	XS7C40DP210H29	**XS8C1A1MBL01U20 + XSZBC10**	XSDC407139H7	**XS7D1A1DAM12 + XSZBD10**
XS8C40DP210	**XS8C1A1DAM8 + XSZBC10**	XS7C40DP210H7	**XS8C1A1MAL01U20 + XSZBC10**	XSDC407139LD	**XS7D1A1DAM12 + XSZBD10**
XS8C40DP210	**XS8C1A1DBM8 + XSZBC10**	XS7C40DP210H7	**XS8C1A1MBL01U20 + XSZBC10**	XSDC407139LD01	**XS7D1A1DAM12 + XSZBD10**
XS8C40DP210H29	**XS8C1A1DAM8 + XSZBC10**	XS7C40DP210TT	**XS8C1A1MAL01U20 + XSZBC10**	XSDC507139	**XS7D1A1DAM12 + XSZBD10**
XS8C40DP210H29	**XS8C1A1DBM8 + XSZBC10**	XS7C40DP210TT	**XS8C1A1MBL01U20 + XSZBC10**	XSDC607139	**XS7D1A1DAM12 + XSZBD10**
XS8C40DP210H7	**XS8C1A1DAM8 + XSZBC10**	XS7C40DP210TF	**XS8C1A1MAL01U20 + XSZBC10**	XSDC607139H7	**XS7D1A1DAM12 + XSZBD10**
XS8C40DP210H7	**XS8C1A1DBM8 + XSZBC10**	XS7C40DP210TF	**XS8C1A1MBL01U20 + XSZBC10**	XSDC607139LD	**XS7D1A1DAM12 + XSZBD10**
XS8C40NC440	**XS8C1A1NAM8 + XSZBC10**	XS7C40FP260	**XS8C1A1MAL01U20 + XSZBC10**	XSDC607139LD01	**XS7D1A1DAM12 + XSZBD10**
XS8C40NC440	**XS8C1A1NBM8 + XSZBC10**	XS7C40FP260	**XS8C1A1MBL01U20 + XSZBC10**	XSDC607319	**XS7D1A1DAM12 + XSZBD10**
XS8C40NC440H29	**XS8C1A1NAM8 + XSZBC10**	XS7C40FP260A	**XS8C1A1MAL01U20 + XSZBC10**	XSDC607319	**XS7D1A1DBM12 + XSZBD10**
XS8C40NC440H29	**XS8C1A1NBM8 + XSZBC10**	XS7C40FP260A	**XS8C1A1MBL01U20 + XSZBC10**	XSDH407339	**XS8D1A1PAM12 + XSZBD10**
XS8C40NC449	**XS8C1A1NAM8 + XSZBC10**	XS7C40FP260H29	**XS8C1A1MAL01U20 + XSZBC10**	XSDH407339	**XS8D1A1PBM12 + XSZBD10**
XS8C40NC449	**XS8C1A1NBM8 + XSZBC10**	XS7C40FP260H29	**XS8C1A1MBL01U20 + XSZBC10**	XSDH407339H7	**XS8D1A1PAM12 + XSZBD10**
XS8C40NC449H29	**XS8C1A1NAM8 + XSZBC10**	XS7C40FP260H7	**XS8C1A1MAL01U20 + XSZBC10**	XSDH407339H7	**XS8D1A1PBM12 + XSZBD10**
XS8C40NC449H29	**XS8C1A1NBM8 + XSZBC10**	XS7C40FP260H7	**XS8C1A1MBL01U20 + XSZBC10**	XSDH607339	**XS8D1A1PAM12 + XSZBD10**
XS8C40NC449H7	**XS8C1A1NAM8 + XSZBC10**	XS7C40FP260TF	**XS8C1A1MAL01U20 + XSZBC10**	XSDH607339	**XS8D1A1PBM12 + XSZBD10**
XS8C40NC449H7	**XS8C1A1NBM8 + XSZBC10**	XS7C40FP260TF	**XS8C1A1MBL01U20 + XSZBC10**	XSDH607339H7	**XS8D1A1PAM12 + XSZBD10**
XS8C40PC440	**XS8C1A1PAM8 + XSZBC10**	XS7C40FP260TT	**XS8C1A1MAL01U20 + XSZBC10**	XSDH607339H7	**XS8D1A1PBM12 + XSZBD10**
XS8C40PC440	**XS8C1A1PBM8 + XSZBC10**	XS7C40FP260TT	**XS8C1A1MBL01U20 + XSZBC10**	XSDH607339TF	**XS8D1A1PAM12 + XSZBD10**
XS8C40PC440D	**XS8C1A1PAL01M12 + XSZBC10**	XS7C40MP230	**XS8C1A1MAL01U20 + XSZBC10**	XSDH607339TF	**XS8D1A1PBM12 + XSZBD10**
XS8C40PC440D	**XS8C1A1PAL01M12 + XSZBC10**	XS7C40MP230	**XS8C1A1MBL01U20 + XSZBC10**	XSDJ407339	**XS8D1A1NAM12 + XSZBD10**
XS8C40PC440H29	**XS8C1A1PAM8 + XSZBC10**	XS7C40MP230A	**XS8C1A1MAL01U20 + XSZBC10**	XSDJ407339	**XS8D1A1NBM12 + XSZBD10**
XS8C40PC440H29	**XS8C1A1PBM8 + XSZBC10**	XS7C40MP230A	**XS8C1A1MBL01U20 + XSZBC10**	XSDJ407339H7	**XS8D1A1NAM12 + XSZBD10**
XS8C40PC440H7	**XS8C1A1PAM8 + XSZBC10**	XS7C40MP230H29	**XS8C1A1MAL01U20 + XSZBC10**	XSDJ407339H7	**XS8D1A1NBM12 + XSZBD10**
XS8C40PC440H7	**XS8C1A1PBM8 + XSZBC10**	XS7C40MP230H29	**XS8C1A1MBL01U20 + XSZBC10**	XSDJ607339	**XS8D1A1NAM12 + XSZBD10**
XS8C40PC449	**XS8C1A1PAM8 + XSZBC10**	XS7C40MP230H7	**XS8C1A1MAL01U20 + XSZBC10**	XSDJ607339	**XS8D1A1NBM12 + XSZBD10**
XS8C40PC449	**XS8C1A1PBM8 + XSZBC10**	XS7C40MP230H7	**XS8C1A1MBL01U20 + XSZBC10**	XSDJ607339H7	**XS8D1A1NAM12 + XSZBD10**
XS8C40PC449D	**XS8C1A1PAL01M12 + XSZBC10**	XS7C40MP230TF	**XS8C1A1MAL01U20 + XSZBC10**	XSDJ607339H7	**XS8D1A1NBM12 + XSZBD10**
XS8C40PC449D	**XS8C1A1PAL01M12 + XSZBC10**	XS7C40MP230TF	**XS8C1A1MBL01U20 + XSZBC10**	**XSE Rectangular ⎓**	
XS8C40PC449H29	**XS8C1A1PAM8 + XSZBC10**	XS7C40MP230TT	**XS8C1A1MAL01U20 + XSZBC10**	XSEC107130	**XS7E1A1DAL01M12 + XSZBE10**
XS8C40PC449H29	**XS8C1A1PBM8 + XSZBC10**	XS7C40MP230TT	**XS8C1A1MBL01U20 + XSZBC10**	XSEC1071300	**XS7E1A1DAL2 + XSZBE10**
XS8C40PC449H7	**XS8C1A1PAM8 + XSZBC10**	**XS8 Rectangular ∿**		XSEC1071300L05	**XS7E1A1DAL01M12 + XSZBE10**
XS8C40PC449H7	**XS8C1A1PBM8 + XSZBC10**	XS8C40DA210	**XS8C1A1MAL01U20 + XSZBC10**	XSEC1071301	**XS7E1A1DAL01M12 + XSZBE10**
XS8T2NC440	**XS8E1A1NAL2 + XSZBE10**	XS8C40DP210	**XS8C1A1MAL01U20 + XSZBC10**	XSEC1071302	**XS7E1A1DAL01M12 + XSZBE10**
XS8T2NC440	**XS8E1A1NBL2 + XSZBE10**	XS8C40DP210	**XS8C1A1MBL01U20 + XSZBC10**	XSEC1071304	**XS7E1A1DAL01M12 + XSZBE10**
XS8T2NC440LD	**XS8E1A1NAL01M12 + XSZBE10**	XS8C40DP210H29	**XS8C1A1MAL01U20 + XSZBC10**	XSEC107130D4	**XS7E1A1DAL01M12 + XSZBE10**
XS8T2NC440LD	**XS8E1A1NBL01M12 + XSZBE10**	XS8C40DP210H29	**XS8C1A1MBL01U20 + XSZBC10**	XSEC107130H7	**XS7E1A1DAL01M12 + XSZBE10**
XS8T2PC440	**XS8E1A1PAL2 + XSZBE10**	XS8C40DP210H7	**XS8C1A1MAL01U20 + XSZBC10**	XSEC107133	**XS7E1A1DAL01M12 + XSZBE10**
XS8T2PC440	**XS8E1A1PBL2 + XSZBE10**	XS8C40DP210H7	**XS8C1A1MBL01U20 + XSZBC10**	XSEC1071330	**XS7E1A1DAL2 + XSZBE10**
XS8T2PC440LD	**XS8E1A1PAL01M12 + XSZBE10**	XS8C40FP260	**XS8C1A1MAL01U20 + XSZBC10**	XSEC1071331	**XS7E1A1DAL01M12 + XSZBE10**
XS8T2PC440LD	**XS8E1A1PBL01M12 + XSZBE10**	XS8C40FP260	**XS8C1A1MBL01U20 + XSZBC10**	XSEC1071332	**XS7E1A1DAL01M12 + XSZBE10**
XS8T4NC440	**XS8C1A1NAL2 + XSZBC10**	XS8C40FP260H29	**XS8C1A1MAL01U20 + XSZBC10**	XSEC1071334	**XS7E1A1DAL01M12 + XSZBE10**
XS8T4NC440	**XS8C1A1NBL2 + XSZBC10**	XS8C40FP260H29	**XS8C1A1MBL01U20 + XSZBC10**	XSEC107133D4	**XS7E1A1DAL01M12 + XSZBE10**
XS8T4NC440LD	**XS8C1A1NAL01M12 + XSZBC10**	XS8C40MP230	**XS8C1A1MAL01U20 + XSZBC10**	XSEC107230	**XS7E1A1DBM12 + XSZBE10**
XS8T4NC440LD	**XS8C1A1NBL01M12 + XSZBC10**	XS8C40MP230	**XS8C1A1MBL01U20 + XSZBC10**	XSEC1072301	**XS7E1A1DBL01M12 + XSZBE10**
XS8T4PC440	**XS8C1A1PAL2 + XSZBC10**	XS8C40MP230	**XS8C1A1MAL01U20 + XSZBC10**	XSEC107233	**XS7E1A1DBM12 + XSZBE10**
XS8T4PC440	**XS8C1A1PBL2 + XSZBC10**	XS8C40MP230	**XS8C1A1MAL01U20 + XSZBC10**	XSEC1072331	**XS7E1A1DBL08M12 + XSZBE10**
XS8T4PC440LD	**XS8C1A1PAL01M12 + XSZBC10**	XS8C40MP230H29	**XS8C1A1MAL01U20 + XSZBC10**	XSEC1571300	**XS7E1A1DAL2 + XSZBE10**
XS8T4PC440LD	**XS8C1A1PBL01M12 + XSZBC10**	XS8C40MP230H29	**XS8C1A1MBL01U20 + XSZBC10**	XSEC1571330	**XS7E1A1DAL2 + XSZBE10**

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Old Design	New Design
XSC Rectangular ∿	
XSCA150549	**XS8C1A1MAL01U20 + XSZBC10**
XSCA150549	**XS8C1A1MBL01U20 + XSZBC10**
XSD Rectangular ∿	
XSDA400519	**XS8D1A1MAU20 + XSZBD10**
XSDA400519	**XS8D1A1MBU20 + XSZBD10**
XSDA400519H7	**XS8D1A1MAU20 + XSZBD10**
XSDA400519H7	**XS8D1A1MBU20 + XSZBD10**
XSDA500519	**XS8D1A1MAU20 + XSZBD10**
XSDA500519	**XS8D1A1MBU20 + XSZBD10**
XSDA500519H7	**XS8D1A1MAU20 + XSZBD10**
XSDA500519H7	**XS8D1A1MBU20 + XSZBD10**
XSDA505539H4	**XS8D1A1MAU20 + XSZBD10**
XSDA505539H4	**XS8D1A1MBU20 + XSZBD10**
XSDA600519	**XS8D1A1MAU20 + XSZBD10**
XSDA600519	**XS8D1A1MBU20 + XSZBD10**
XSDA600519H7	**XS8D1A1MAU20 + XSZBD10**
XSDA600519H7	**XS8D1A1MBU20 + XSZBD10**
XSDM500538	**XS8D1A1MAU20 + XSZBD10**
XSDM500538	**XS8D1A1MBU20 + XSZBD10**
XSDM600539	**XS8D1A1MAU20 + XSZBD10**
XSDM600539	**XS8D1A1MBU20 + XSZBD10**
XSDM600539H7	**XS8D1A1MAU20 + XSZBD10**
XSDM600539H7	**XS8D1A1MBU20 + XSZBD10**

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Obsolete Part Number AC	Replaced by Part Number AC/DC
XS1M12FA260	**XS1M12MA230**
XS1M12FA260K	**XS1M12MA230K**
XS1M12FB260	**XS1M12MB230**
XS1M12FB260K	**XS1M12MB230K**
XS1M18FA260	**XS1M18MA230**
XS1M18FA260A	**XS1M18MA230A**
XS1M18FA260K	**XS1M18MA230K**
XS1M18FB260	**XS1M18MB230**
XS1M18FB260A	**XS1M18MB230A**
XS1M18FB260K	**XS1M18MB230K**
XS1M30FA260	**XS1M30MA230**
XS1M30FA260A	**XS1M30MA230A**
XS1M30FA260K	**XS1M30MA230K**
XS1M30FB260	**XS1M30MB230**
XS1M30FB260A	**XS1M30MB230A**
XS1M30FB260K	**XS1M30MB230K**
XS2M12FA260	**XS2M12MA230**
XS2M12FA260K	**XS2M12MA230K**
XS2M12FB260	**XS2M12MB230**
XS2M12FB260K	**XS2M12MB230K**
XS2M18FA260	**XS2M18MA230**
XS2M18FA260A	**XS2M18MA230A**
XS2M18FA260K	**XS2M18MA230K**
XS2M18FB260	**XS2M18MB230**
XS2M18FB260A	**XS2M18MB230A**
XS2M18FB260K	**XS2M18MB230K**
XS2M30FA260	**XS2M30MA230**
XS2M30FA260A	**XS2M30MA230A**
XS2M30FA260K	**XS2M30MA230K**
XS2M30FB260	**XS2M30MB230**
XS2M30FB260A	**XS2M30MB230A**
XS2M30FB260K	**XS2M30MB230K**
XS3P12FA260	**XS3P12MA230**
XS3P12FA260K	**XS3P12MA230K**
XS3P12FB260	**XS3P12MB230**
XS3P12FB260K	**XS3P12MB230K**
XS3P18FA260	**XS3P18MA230**
XS3P18FA260A	**XS3P18MA230A**
XS3P18FA260K	**XS3P18MA230K**
XS3P18FB260	**XS3P18MB230**
XS3P18FB260A	**XS3P18MB230A**
XS3P18FB260K	**XS3P18MB230K**
XS3P30FA260	**XS3P30MA230**
XS3P30FA260A	**XS3P30MA230A**
XS3P30FA260K	**XS3P30MA230K**
XS3P30FB260	**XS3P30MB230**
XS3P30FB260A	**XS3P30MB230A**
XS3P30FB260K	**XS3P30MB230K**
XS4P12FA260	**XS4P12MA230**
XS4P12FA260K	**XS4P12MA230K**
XS4P12FB260	**XS4P12MB230**
XS4P12FB260K	**XS4P12MB230K**
XS4P18FA260	**XS4P18MA230**
XS4P18FA260A	**XS4P18MA230A**
XS4P18FA260K	**XS4P18MA230K**
XS4P18FB260	**XS4P18MB230**
XS4P18FB260A	**XS4P18MB230A**
XS4P18FB260K	**XS4P18MB230K**
XS4P30FA260	**XS4P30MA230**
XS4P30FA260A	**XS4P30MA230A**
XS4P30FA260K	**XS4P30MA230K**
XS4P30FB260	**XS4P30MB230**
XS4P30FB260A	**XS4P30MB230A**
XS4P30FB260K	**XS4P30MB230K**

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