Sensors, limit switches and pressure switches
Easy Series

Catalogue

Simply easy!™

Telemecanique
Sensors

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Sensors Easy Series

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Electronic pressure sensors

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Safety detection solutions

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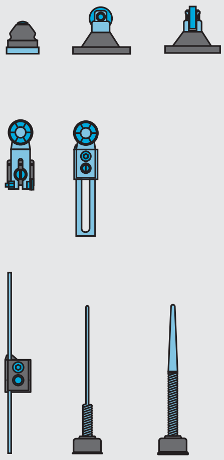
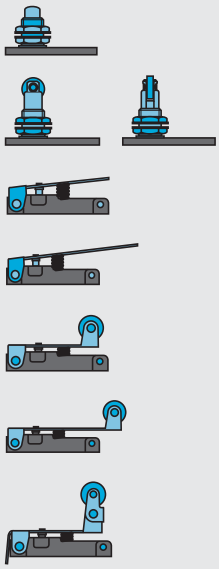
Applications	Medium duty: small compactors, wood working, metal working, food processing…	Light duty: injection moulding, assembly, metal working, packaging…	Compact format EN 50047 Plastic, 1 cable entry
			
Enclosure (body)	Zinc alloy (cover: plastic)	Plastic (cover: zinc alloy)	Plastic, double insulated
Conforming to standards	IEC 60947-5-1	IEC 60947-5-1	CENELEC EN 50047
Conformities	CE, CCC	CE, CCC	UL, CSA, CCC, EAC
Body dimensions in mm (w x h x d)	28 x 64 x 25	54 x 42 x 21	31 x 65 x 30
Head	Linear, rotary or multi-directional 	Linear 	Linear movement (plunger) Rotary movement (lever) Rotary movement, multidirectional
Contact blocks 1 C/O snap action - Form C	–	●	–
1 NO + 1NC snap action - Form Za	●	–	–
2 electrically separate contacts, snap action with positive opening operation	–	–	●
2 electrically separate contacts, slow break with positive opening operation	–	–	●
3 electrically separate contacts, snap action with positive opening operation	–	–	●
3 electrically separate contacts, slow break with positive opening operation	–	–	●
Degree of protection	IP 65	IP 40, IK 04	IP 65, IK 04
Operating temperature	–	–	- 25 °C... + 70 °C
Cabling Screw terminal	Flexible rubber cable gland suitable for cable Ø 6…9 mm	Flexible rubber cable gland suitable for cable Ø 8.5…10.5 mm	1 entry for ISO M20 or Pg 11 cable gland Other cable entries: ISO M16 x 1.5 or PF 1/2 (G1/2)
Pre-cabled	–	–	–
Connector	–	–	–
Type references	**XCE**	**XCJ**	**XCKN**
Pages	17 to 19	13 to 14	23 to 24

Limit switches
XC range

General

Electromechanical detection

Limit switches are used in all automated installations and also in a wide variety of applications, due to the numerous advantages inherent to their technology.
They transmit data to the logic processing system regarding:
- **presence/absence,**
- **passage,**
- **positioning,**
- **end of travel.**

Simple to install switches, offering many advantages

- **From an electrical viewpoint:**
  - galvanic separation of circuits,
  - models suitable for low power switching, combined with good electrical durability,
  - very good short-circuit withstand in coordination with appropriate fuses,
  - total immunity to electromagnetic interference,
  - high rated operational voltage.

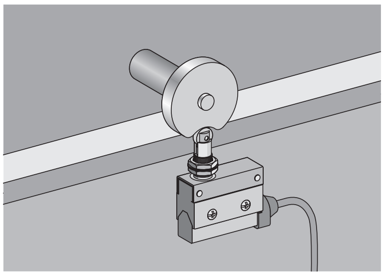
- **From a mechanical viewpoint:**
  - N/C contacts with positive opening operation,
  - high resistance to the different ambient conditions encountered in industry,
  - high repeat accuracy, up to 0.01 mm on the tripping points,
  - simple visible operation.

Mechanical endurance

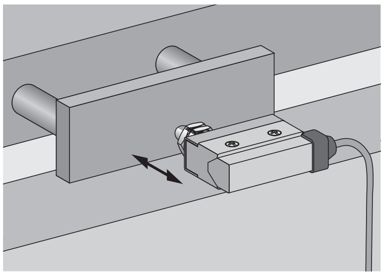
- **Major factors affecting the mechanical endurance of a limit switch:**
  - operating speed and frequency,
  - operating travel (percentage of total travel),
  - cam angle,
  - environnment (presence of abrasive dust, corrosive substances, etc).

Applications examples

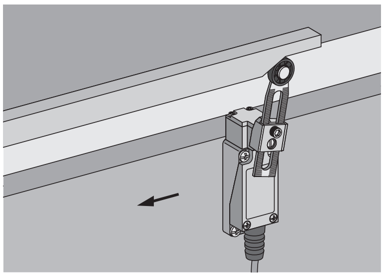
Roller plunger



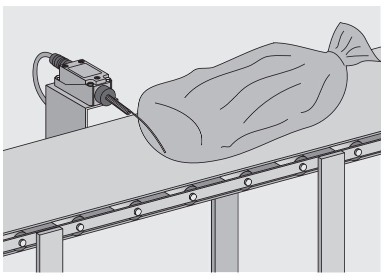
End plunger



Rotary style head



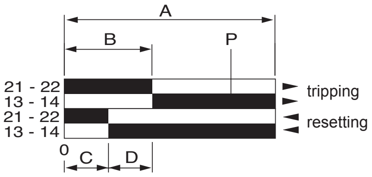
Multidirectional head



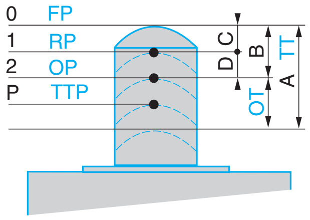
Limit switches
XC range
Contact block operation

Contact blocks operation

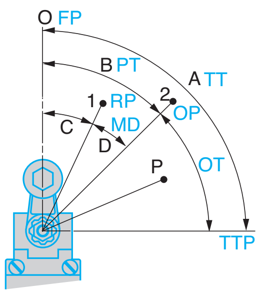
Example : 1 N/C + 1 N/O



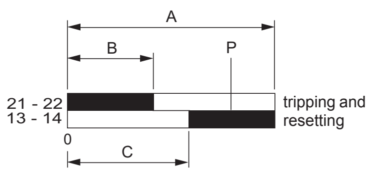
Linear movement (plunger)



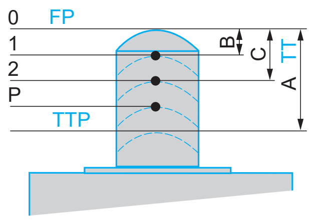
Rotary movement



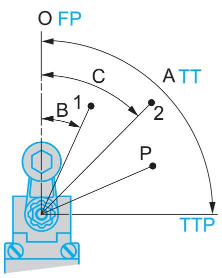
Example : 1 N/C + 1 N/O break before make



Linear movement (plunger)



Rotary movement



Snap action contacts

■ **Linear movement (plunger)**

European terminology		Terminology according to JIS C 4508	
A	Maximum travel	**TT**	Total travel
B	Tripping travel	–	
C	Resetting travel	–	
D	Differential travel	–	
P	Point from which positive opening is assured	–	
A-B	No specific term	**OT**	Over Travel
1	Resetting point	**RP**	Release Position
2	Tripping point	**OP**	Operation Position
0	No specific term	**FP**	Free Position
–	No specific term	**TTP**	Total Travel Position

■ **Rotary movement**

European terminology		Terminology according to JIS C 4508	
A	Maximum travel	**TT**	Total travel
B	Tripping travel	**PT**	Pre-Travel
C	Resetting travel	–	
D	Differential travel	**MD**	Movement Differential
P	Point from which positive opening is assured	–	
A-B	No specific term	**OT**	Over Travel
1	Resetting point	**RP**	Release Position
2	Tripping point	**OP**	Operation Position
0	No specific term	**FP**	Free Position
–	No specific term	**TTP**	Total Travel Position

Slow break contacts

■ **Linear movement (plunger)**

European terminology		Terminology according to JIS C 4508	
A	Maximum travel	**TT**	Total travel
B	Tripping and Resetting travel of N/C contact	–	
C	Tripping and Resetting travel of N/O contact	–	
P	Point from which positive opening is assured	–	
1	Tripping and Resetting point of N/C contact	–	
2	Tripping and Resetting point of N/O contact	–	
0	No specific term	**FP**	Free Position
–	No specific term	**TTP**	Total Travel Position

■ **Rotary movement**

European terminology		Terminology according to JIS C 4508	
A	Maximum travel	**TT**	Total travel
B	Tripping and Resetting travel of N/C contact	–	
C	Tripping and Resetting travel of N/O contact	–	
P	Point from which positive opening is assured	–	
1	Tripping and Resetting point of N/C contact	–	
2	Tripping and Resetting point of N/O contact	–	
0	No specific term	**FP**	Free Position
–	No specific term	**TTP**	Total Travel Position

Limit switches

XC range

Contact ratings

Utilization categories IEC 60947-5-1

Kind of current	Category	Typical application	$T_{0,95}$ (DC) *(1)* cos φ (AC)
Alternating current	AC-12	Control of resistive loads and solid state loads with isolation by opto couplers	0.9
	AC-13	Control of solid state loads with transformer isolation	0.65
	AC-14	Control of small electromagnetic loads (⩽ 72 VA)	0.3
	AC-15	Control of electromagnetic loads (> 72 VA)	0.3
Direct current	DC-12	Control of resistive loads and solid state loads with isolation by opto couplers	1 ms
	DC-13	Control of electromagnets	300 ms maximum
	DC-14	Control of electromagnetic loads having economy resistors in circuit	15 ms

(1) $T_{0,95}$ = time to reach 95 % of the steady state current.

Contact rating designation IEC 60947-5-1

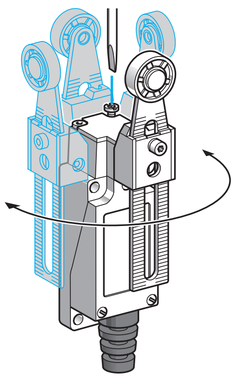
Designa-tion	Utilization category	Conventional therm. current	Rated operational current Ie at rated operating voltage Ue					
			120 V	**240 V**	**380 V**	**480 V**	**500 V**	**600 V**
A150	AC-15	10 A	6 A	–	–	–	–	–
A300	AC-15	10 A	6 A	3 A	–	–	–	–
A600	AC-15	10 A	6 A	3 A	1.9 A	1.5 A	1.4 A	1.2 A
B150	AC-15	5 A	3 A	–	–	–	–	–
B300	AC-15	5 A	3 A	1.5 A	–	–	–	–
B600	AC-15	5 A	3 A	1.5 A	0.95 A	0.75 A	0.72 A	0.6 A
C150	AC-15	2.5 A	1.5 A	–	–	–	–	–
C300	AC-15	2.5 A	1.5 A	0.75 A	–	–	–	–
C600	AC-15	2.5 A	1.5 A	0.75 A	0.47 A	0.375 A	0.35 A	0.3 A
D150	AC-14	1.0 A	0.6 A	–	–	–	–	–
D300	AC-14	1.0 A	0.6 A	0.3 A	–	–	–	–
E150	AC-14	0.5 A	0.3 A	–	–	–	–	–

Designa-tion	Utilization category	Conventional therm. current	Rated operational current Ie at rated operating voltage Ue				
			125 V	**250 V**	**440 V**	**500 V**	**600 V**
N150	DC-13	10 A	2.2 A	–	–	–	–
N300	DC-13	10 A	2.2 A	1.1 A	–	–	–
N600	DC-13	10 A	2.2 A	1.1 A	0.63 A	0.55 A	0.4 A
P150	DC-13	5 A	1.1 A	–	–	–	–
P300	DC-13	5 A	1.1 A	0.55 A	–	–	–
P600	DC-13	5 A	1.1 A	0.55 A	0.31 A	0.27 A	0.2 A
Q150	DC-13	2.5 A	0.55 A	–	–	–	–
Q300	DC-13	2.5 A	0.55 A	0.27 A	–	–	–
Q600	DC-13	2.5 A	0.55 A	0.27 A	0.15 A	0.13 A	0.1 A
R150	DC-13	1.0 A	0.22 A	–	–	–	–
R300	DC-13	1.0 A	0.22 A	0.1 A	–	–	–

Limit switches
XC range
Setting up and mounting advice

Setting up

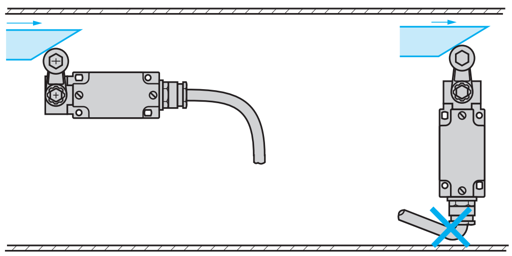
Reverse mounting of the operating lever (for limit switches XCE)



Mounting advice

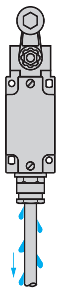
Sweep of connecting cable

Recommended | To be avoided

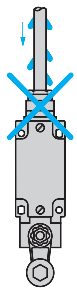


Position of cable-gland

Recommended

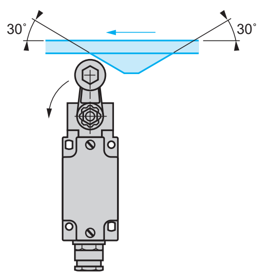


To be avoided

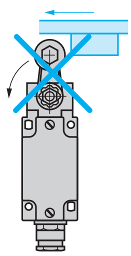


Type of cam

Recommended



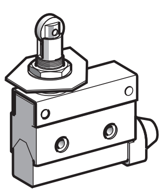
To be avoided



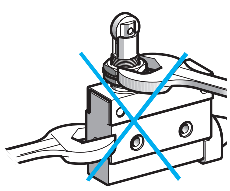
Mounting and fixing of limit switches

XCJ110C, XCJ102C and XCJ103C

Recommended



To be avoided



Limit switches
XC range
Degrees of protection provided by enclosures

European standards

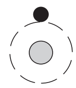
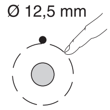
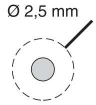
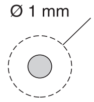
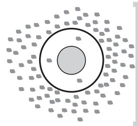
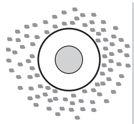
Degrees of protection against the penetration of solid bodies, water and personnel access to live parts

The European standard EN 60529 dated October 1991, IEC publication 529 (2nd edition - November 1989), defines a coding system (IP code) for indicating the degree of protection provided by electrical equipment enclosures against accidental direct contact with live parts and against the ingress of solid foreign objects or water.
This standard does not apply to protection against the risk of explosion or conditions such as humidity, corrosive gasses, fungi or vermin.

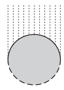
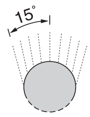
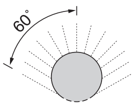
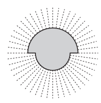
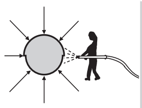
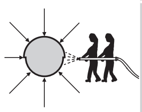
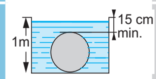
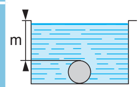
IP●● code

- The IP code comprises **2 characteristic numerals** (e.g. **IP 55)**
- Any characteristic numeral which is unspecified is replaced by an X (e.g. IP XX)

1st characteristic numeral: corresponds to **protection of the equipment against penetration of solid objects** and **protection of personnel against direct contact with live parts.**

	Protection of the equipment		Protection of personnel
0	Non-protected		Non-protected
1	Ø 50 mm 	Protected against the penetration of solid objects having a diame- ter greater than or equal to 50 mm.	Protected against direct contact with the back of the hand (accidental contacts).
2	Ø 12,5 mm 	Protected against the pe- netration of solid objects having a diameter greater than or equal to 12.5 mm.	Protected against direct finger contact.
3	Ø 2,5 mm 	Protected against the penetration of solid objects having a diame-ter greater than or equal to 2.5 mm.	Protected against direct contact with a Ø 2.5 mm tool.
4	Ø 1 mm 	Protected against the penetration of solid objects having a diame- ter > 1 mm.	Protected against direct contact with a Ø 1 mm wire.
5		Dust protected (no harmful deposits).	Protected against direct contact with a Ø 1 mm wire.
6		Dust tight.	Protected against direct contact with a Ø 1 mm wire.

2nd characteristic numeral: corresponds to **protection of the equipment against penetration of water with harmful effects.**

0	Non-protected	
1		Protected against vertical dripping water, (condensation)
2		Protected against dripping water at an angle of up to 15°.
3		Protected against rain at an angle of up to 60°.
4		Protected against splashing water in all directions.
5		Protected against water jets in all di- rections.
6		Protected against powerful jets of water and waves.
7		Protected against the effects of temporary immersion.
8		Protected against the effects of prolonged immersion under speci-fied conditions.

Limit switches
XC range
Degrees of protection provided by enclosures

American standards

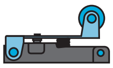
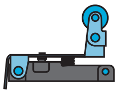
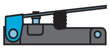
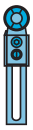
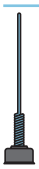
Standard UL 50 - Table 6.1 - Enclosures types, defines a coding system for indicating the protection provided by electrical equipment enclosures against the ingress of solid foreign objets and fluids.

Type	Intended use and description
1	Indoor use primarily to provide a degree of protection against limited amounts of falling dirt.
2	Indoor use primarily to provide a degree of protection against limited amounts of falling water and dirt.
3	Outdoor use primarily to provide a degree of protection against rain, sleet, wind blown dust and damage from external ice formation.
3R	Outdoor use primarily to provide a degree of protection against rain, sleet, and damage from external ice formation.
3S	Outdoor use primarily to provide a degree of protection against rain, sleet, wind blown dust and provide for operation of external mechanisms when ice laden.
4	Indoor or outdoor use primarily to provide a degree of protection against rain, sleet, wind blown dust and provide for operation of external mechanisms when ice laden.
4X	Indoor or outdoor use primarily to provide a degree of protection against corrosion, wind blown dust and rain, splashing water, hose-directed water, and damage from external ice formation.
5	Indoor use primarily to provide a degree of protection against setting airbone dust, falling dirt, and dripping noncorrosive liquids.
6	Indoor or outdoor use primarily to provide a degree of protection against hose-directed water, and the entry of water during occasional temporary submersion at a limited depth and damage from external ice formation.
6P	Indoor or outdoor use primarily to provide a degree of protection against hose-directed water, the entry of water during prolonged submersion at a limited depth and damage from external ice formation.
12, 12K	Indoor use primarily to provide a degree of protection against limited circulation dust, falling dirt, and dripping noncorrosive liquids.
13	Indoor use primarily to provide a degree of protection against dust, spraying of water, oil and noncorrosive coolant.

Limit switches
XC range
Operating heads

Operating heads selection

5 points to consider…

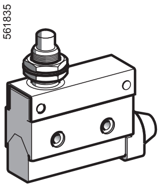
	Direction of operation	Operating speed *(1)*	Positivity *(2)*	Risk of overtravel damage	Target type
Plunger style					
		0.5 m/s	Yes	Very high	
		0.85 m/s	Yes	High	30°
Lever and roller lever plunger style					
		0.85 m/s	Yes	Medium	30°
		0.85 m/s	Yes	Medium	30°
	or	0.5 m/s	No	High	30°
Rotary style					
	CW & CCW (3)	1 m/s	Yes (with non flexible levers only)	Low	30°
	CW & CCW (3)	1 m/s	Yes (with non flexible levers only)	Low	30°
	CW & CCW (3)	1 m/s	Yes (with non flexible levers only)	Low	
Multidirectional style					
		0.5…1 m/s	No	Lowest	
		0.5…1 m/s	No	Lowest	

(1) These values are indicative only. For precise information relating to a particular device, refer to the appropriate technical characteristics.
(2) Only when combined with a positive opening contact.
(3) CW = clockwise, CCW = counter clockwise.

Limit switches
XC range
For light to medium duty applications, XCJ

XCJ (single-pole contact 1 C/O form C)

With head for linear movement (plunger) operators, fixing by head or body

561835

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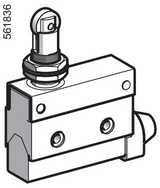
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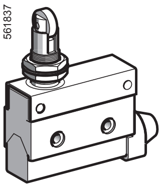

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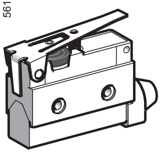
With head for linear movement (lever plunger) operators, fixing by body

561838

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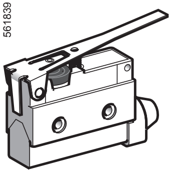
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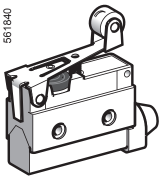
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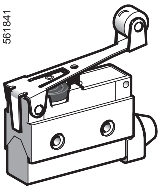
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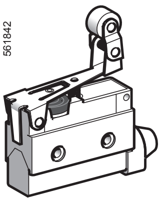

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Environnement

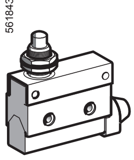
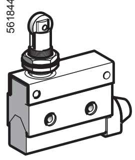
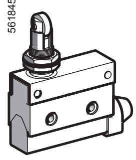
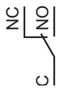
Conforming to standards		IEC 60947-5-1
Certifications		CE, CCC
Ambient air temperature		For operation: - 25…+ 70 °C, for storage: - 40…+ 70 °C
Vibration resistance	Conforming to IEC 60068-2-6	10…55 Hz XCJ110, XCJ102 and XCJ103C: 3.0 mm double amplitude XCJ125, XCJ126 and XCJ127C: 1.5 mm double amplitude XCJ121 and XCJ128C: 0.7 mm double amplitude
Shock resistance	Conforming to IEC 60068-2-27	10 gn, 11 ms, in the free position
Degree of protection	Conforming to IEC 60529	**IP 40** **IK 04**
Materials		Body: plastic, head: metal
Mechanical durability		**10 x 10^6 operations**
Cable entry		Flexible rubber cable gland suitable for cable Ø 8.5...10.5 mm
Head mounting		Torque range for XCE110C, XCJ102C and XCJ103C: 2.9...4.9 N.m / *25.66...43.66 lb-in*
Body mounting		Mounting torque range (M4 screws): 1.2...1.5 N.m / *10.62...13.27 N.m*

Contact block characteristics

Rated operational characteristics	**∿ AC (Ue = 240 V, Ie = 10 A) , Ith = 10 A** **⎓ DC (Ue = 220 V, Ie = 0.3 A)**
Insulation resistance	> 100 mΩ at ⎓ 500 V
Dielectric withstand voltage	∿ 1000 V, 50/60 Hz for 1 minute between non-continuous terminals ∿ 2000 V, 50/60 Hz between current carrying and non-current carrying parts and between each terminal and ground. Double isolation, CE Class II conforming to IEC 60947-5-1
Operating frequency	120 operations per minute
Electrical endurance	> 8 x 10^5 operations (∿ 220 V, 10 A, P.F. = 1)
Contact resistance	⩽ 25 mΩ
Cabling	M3.5 screw terminals (use cable lug with flexible cable) Torque range: 0.8...1.2 N.m / *7.08...10.62 lb-in*

Limit switches

XC range
For light to medium duty applications, XCJ

Type of operating head			
	Plunger (fixing by head or body)		
	561843 	561844 	561845 
Type of operator	**Steel end plunger**	**Steel roller plunger for lateral cam movement**	**Steel roller plunger for traverse cam movement**
References			
Single pole 1 C/O (form C) 	**XCJ110C**	**XCJ102C**	**XCJ103C**
Weight (kg)	0.081	0.086	0.088

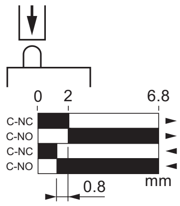
Complementary characteristics not shown under general characteristics (page 12)

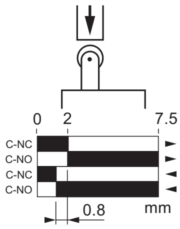
Switch actuation	On end
Operating force (max.)	4 N
Release force (min.)	0.98 N
Operating frequency	120 operations per minute
Actuation speed	0.01 mm/s…50 cm/s (at pin plunger)
Mechanical durability	**10 x 10^6 operations** (for XCJ102C and XCJ103C, actuation by 30° cam: 4 million operations)
Cabling	M3.5 screw terminals (use cable lug with flexible cable) Torque range: 0.8...1.2 N.m / *7.08...10.62 lb-in*

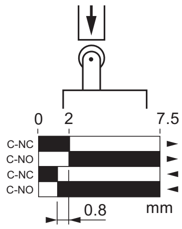
Operating diagrams

Type of actuation

Operating diagrams
Contact operation
contact closed
contact open

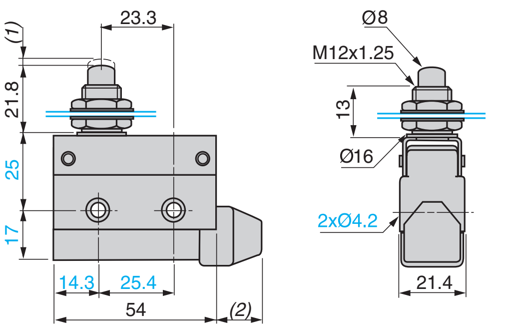






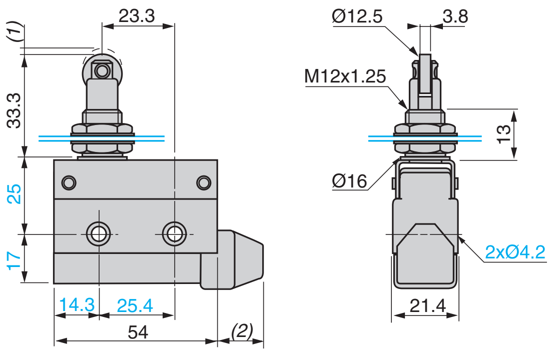
Dimensions in mm

XCJ110C



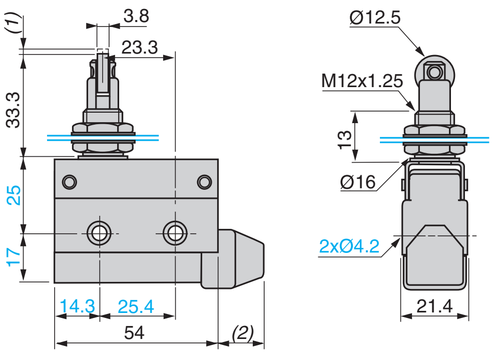
(1) 2 max.
(2) 16.5 max.

XCJ102C



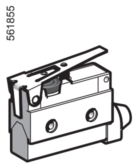
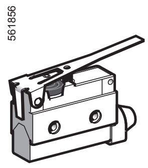
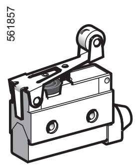
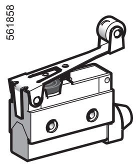
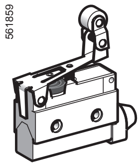
(1) 2 max.
(2)16.5 max.

XCJ103C



(1) 2 max.
(2) 16.5 max.

Limit switches
XC range
For light to medium duty applications, XCJ

Type of operating head	Plunger (fixing by body)				
					
Type of operator	**Short flat lever plunger**	**Long flat lever plunger**	**Short flat roller lever plunger**	**Long flat roller lever plunger**	**Short flat roller lever plunger, one way operation**

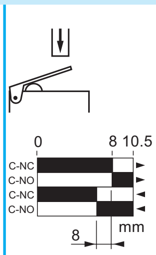
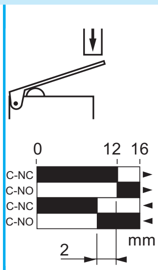
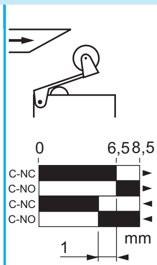
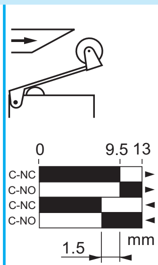
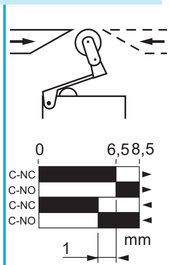
References

Single pole 1 C/O (form C) 	**XCJ125C**	**XCJ126C**	**XCJ127C**	**XCJ128C**	**XCJ121C**
Weight (kg)	0.052	0.053	0.057	0.057	0.059

Complementary characteristics not shown under general characteristics (page 12)

Switch actuation	On end		By 30° cam		
Operating force (maxi.)	1.9 N	1.3 N	2.3 N	1.6 N	2.4 N
Release force (mini.)	0.59 N	0.39 N	0.78 N	0.49 N	0.98 N
Operating frequency	120 operations per minute				
Actuation speed	0.01 mm/s…50 cm/s (at pin plunger)				
Mechanical durability	**10 x 10^6 operations**				
Cabling	M3.5 screw terminals (use cable lug with flexible cable) Torque range: 0.8...1.2 N.m / *7.08...10.62 lb-in*				

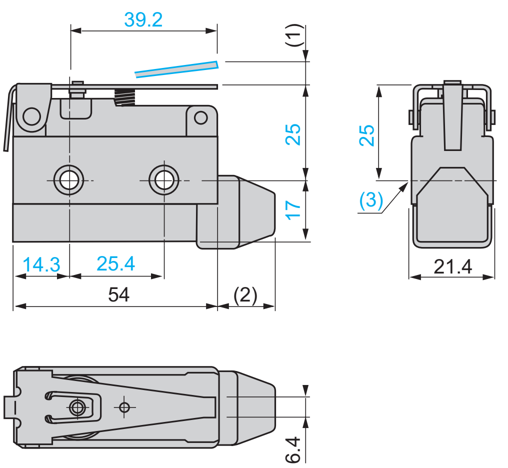
Operating diagrams
Type of actuation

Operating diagrams Contact operation ■ contact closed contact open					

Limit switches
XC range
For light to medium duty applications, XCJ

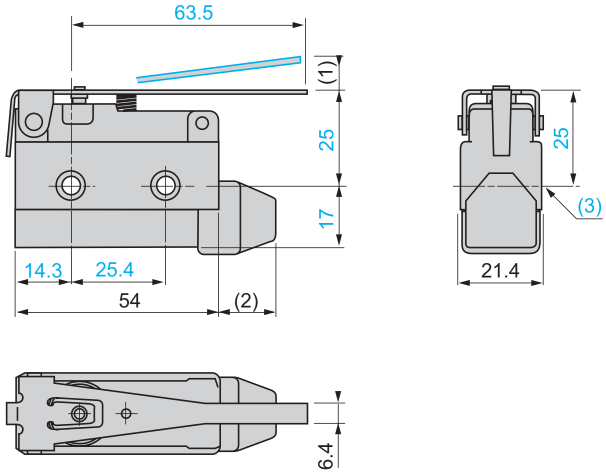
Dimensions in mm

XCJ125C



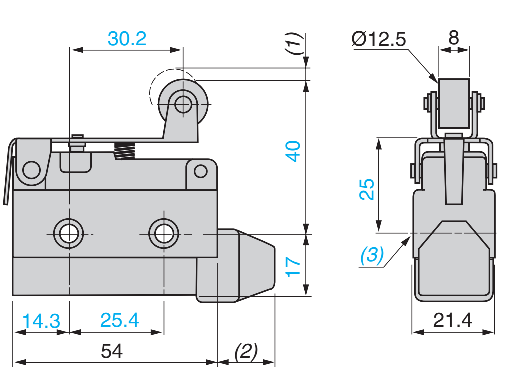
(1) 8.5 max.
(2) 16.5 max.
(3) 2 x Ø 4.2

XCJ126C



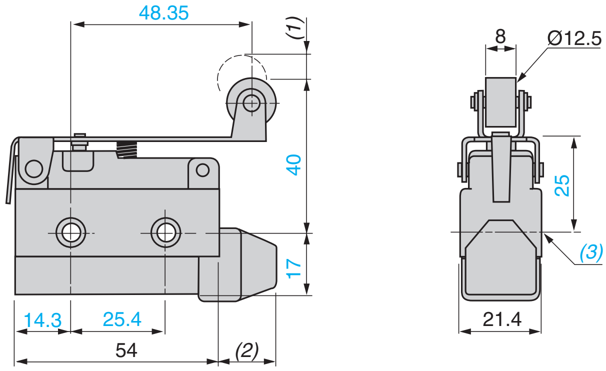
(1) 13.5 max.
(2) 16.5 max.
(3) 2 x Ø 4.2

XCJ127C



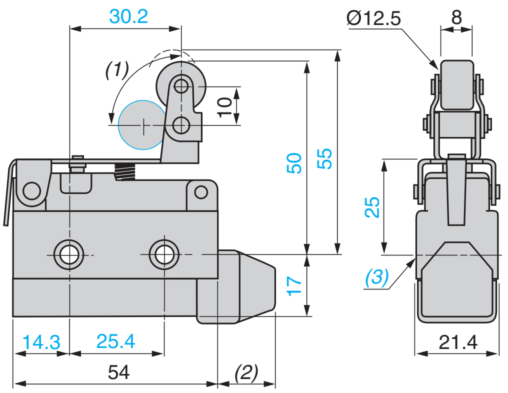
(1) 6.5 max.
(2) 16.5 max.
(3) 2 x Ø 4.2

XCJ128C



(1) 11 max.
(2) 16.5 max.
(3) 2 x Ø 4.2

XCJ121C



(1) 90° max.
(2) 16.5 max.
(3) 2 x Ø 4.2

Limit switches
XC range
For medium duty applications, XCE

XCE (1 NO + 1 NC form Za)

With head for linear movement (plunger) operators

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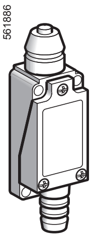
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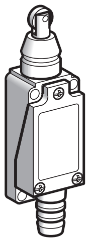
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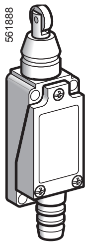

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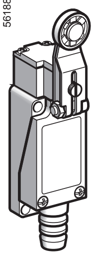
With head for rotary movement (lever) operators

561889

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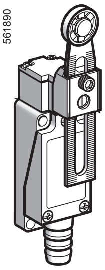
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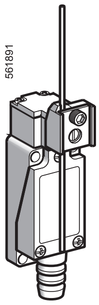

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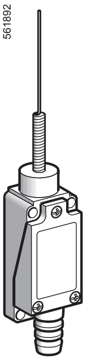
With head for multi-directional operators

561892

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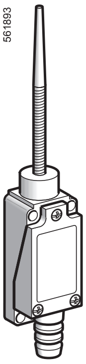

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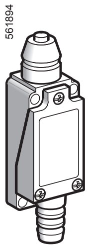
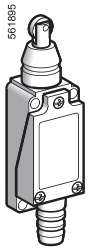
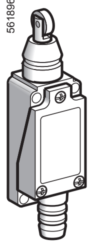
Environment

Conforming to standards		IEC 60947-5-1
Certifications		CE, CCC
Ambient air temperature		For operation : - 25…+ 70 °C, for storage: -40…+ 70 °C
Vibration resistance	Conforming to IEC 60068-2-6	10...55 Hz, 3 mm double amplitude
Shock resistance	Conforming to IEC 60068-2-27	30 gn, 11 ms, in the free position
Degree of protection	Conforming to IEC 60529	**IP 65**
Materials		Body and head: metal, cover: plastic
Mechanical durability		**10 x 10^6 operations**
Cable entry		Flexible rubber cable gland suitable for cable Ø 6…9 mm
Tightening torques	Body (M4 screws)	2.4...3.0 N.m / *21.24...26.55 lb-in*
	Cover	0.5...0.6 N.m / *4.42...5.31 lb-in*
	Head (rotary type)	0.3...0.4 N.m / *2.65...3.54 lb-in*
	Roller lever (rotary type)	2.4...3.0 N.m / *21.24...26.55 lb-in*

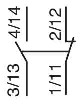
Contact block characteristics

Rated operational characteristics	**~ AC (Ue = 240 V, Ie = 3 A, Ith = 10 A); ⎓ DC (Ue = 220 V, Ie = 0.3 A)**
Rated insulation voltage	Ui=300V, pollution degree 3 complies with IEC 60947
Insulation resistance	> 100 mΩ at 500 V
Operating frequency	120 operations per minute
Electrical endurance	8 x 10^5 operations
Contact resistance	≤ 25 mΩ
Cabling	Screw terminals, torque range 0.6...*1.1 N.m / 5.31...8.85 lb-in* Maximum clamping capacity 0.75…1.5 mm^2 per terminal

Type of operating head

	Plunger		
	561894 	561895 	561896 
Type of operator	**Steel end plunger**	**Steel roller plunger for lateral cam movement**	**Steel roller plunger for traverse cam movement**

References *(1)*

1 NO + 1 NC (form Za) 	**XCE110C**	**XCE102C**	**XCE103C**
Weigth (kg)	0.110	0.126	0.126

*(1) All products are supplied in individual packaging. They are also available in a bulk pack of 10 products. To order the bulk packed versions, add the suffix **TQ** at the end of product reference. Example **XCE110CTQ**.*
Obviously the indivisible order quantity for this version is 10.

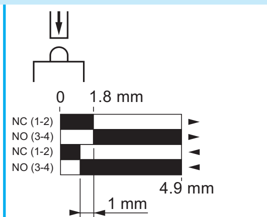
Complementary characteristics not shown under general characteristics (page 16)

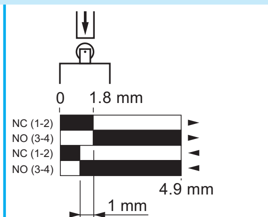
Switch actuation	On end
Operating force (maxi.)	9 N
Release force (mini.)	1.5 N
Operating frequency	120 operations per minute
Maximum actuation speed	0.5 m/s
Minimum actuation speed	5 mm/s
Mechanical durability	**10 x 10⁶ operations** (For XCE102C and XCE103C, actuation by 30° cam: 1 million operations)
Cabling	Flexible rubber cable gland suitable for cable Ø 6…9 mm

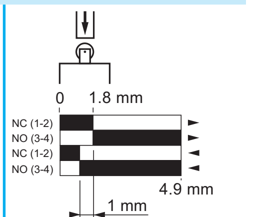
Operating diagrams

Type of actuation

Operating diagrams
Contact operation
contact closed
contact open

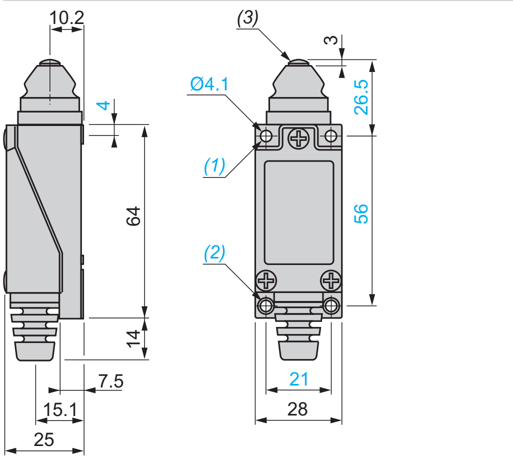






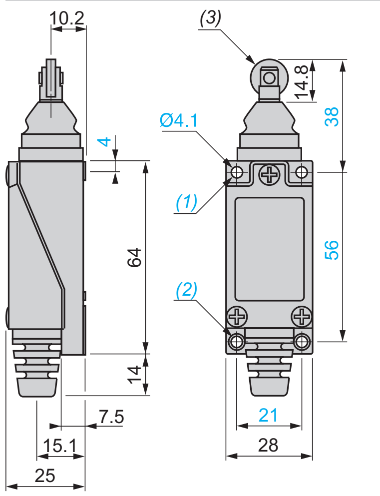
Dimensions in mm

XCE110C



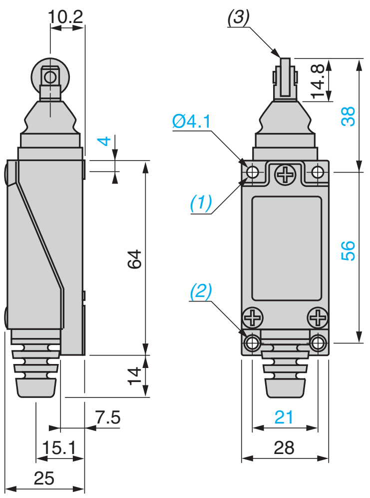
(1) 2 holes M5 tapped 7 in depth.
(2) 2 M5 tapped holes.
(3) Stainless steel plunger Ø 7.

XCE102C



(1) 2 holes M5 tapped 7 in depth.
(2) 2 M5 tapped holes.
(3) Stainless steel roller Ø 12.5 x 3.8.

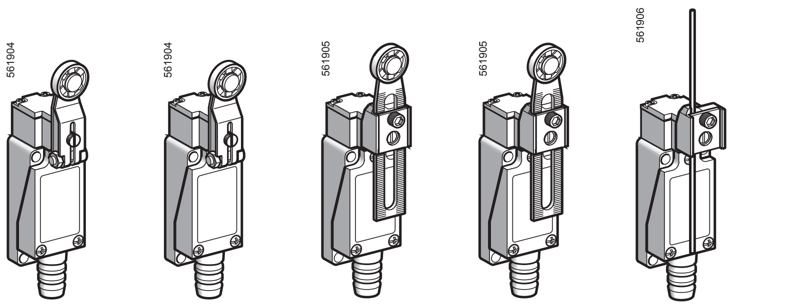
XCE103C

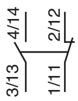


(1) 2 holes M5 tapped 7 in depth.
(2) 2 M5 tapped holes.
(3) Stainless steel roller Ø 12.5 x 3.8.

Limit switches
XC range
For medium duty applications, XCE

Type of operating head
Rotary



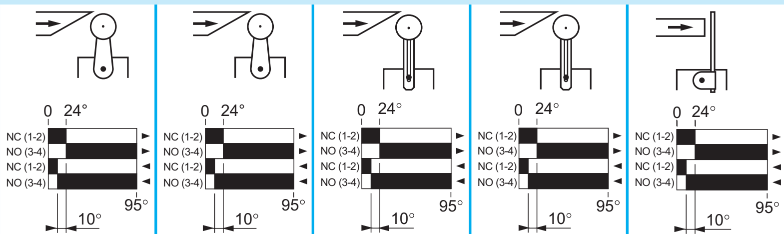
Type of operator		Thermoplastic roller lever	Steel roller lever	Variable length thermoplastic roller lever	Variable length steel roller lever	Round rod Ø 3 mm steel rod
References *(1)*						
1 NO + 1 NC (form Za)		**XCE118C**	**XCE119C**	**XCE145C**	**XCE146C**	**XCE154C**
Weigth (kg)		0.152	0.159	0.175	0.181	0.164

Complementary characteristics not shown under general characteristics (page 16)

Switch actuation	By 30° cam	By any moving part
Operating force (maxi.)	7.5 N	
Release force (mini.)	0.5 N	
Operating frequency	120 operations per minute	
Maximum actuation speed	1 m/s	
Minimum actuation speed	9 mm/s for rotary type 5 mm/s for multi-directional type	
Mechanical durability	**10 x 10^6 operations**	
Cabling	Flexible rubber cable gland suitable for cable Ø 6…9 mm Maximum clamping capacity 0.75…1.5 mm^2 per terminal	

Operating diagrams
Type of actuation

Operating diagrams
Contact operation
contact closed
contact open

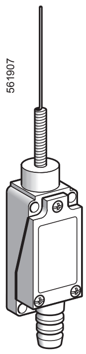
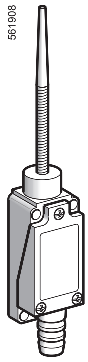
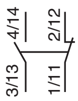


(1) *All products are supplied in individual packaging. They are also available in a bulk pack of 10 products. To order the bulk packed versions, add the suffix* ***TQ*** *at the end of product reference. Example* ***XCE118CTQ****.*
Obviously the indivisible order quantity for this version is 10.

Limit switches

XC range

For medium duty applications, XCE

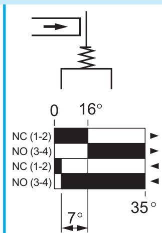
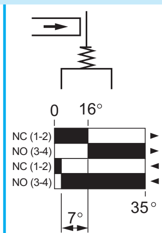
Type of operating head		
Multi-directional		
		
Type of operator	**"Cat's whisker"**	**Spring rod lever with thermoplastic end**
References *(1)*		
1 NO + 1 NC (form Za) 	**XCE106C**	**XCE181C**
Weigth (kg)	0.109	0.108

Complementary characteristics not shown under general characteristics (page 16)

Switch actuation	By any moving part
Operating force (maxi.)	1.5 N
Release force (mini.)	0.04 N
Operating frequency	120 operations per minute
Maximum actuation speed	1 m/s
Mechanical durability	**4 x 10^6 operations**
Cabling	Flexible rubber cable gland suitable for cable Ø 6…9 mm Maximum clamping capacity 1.5 mm^2 per terminal

Operating diagrams

Type of actuation

Operating diagrams Contact operation ■ contact closed □ contact open		

*(1) All products are supplied in individual packaging. They are also available in a bulk pack of 10 products. To order the bulk packed versions, add the suffix **TQ** at the end of product reference. Example **XCE181CTQ**.*
Obviously the indivisible order quantity for this version is 10.

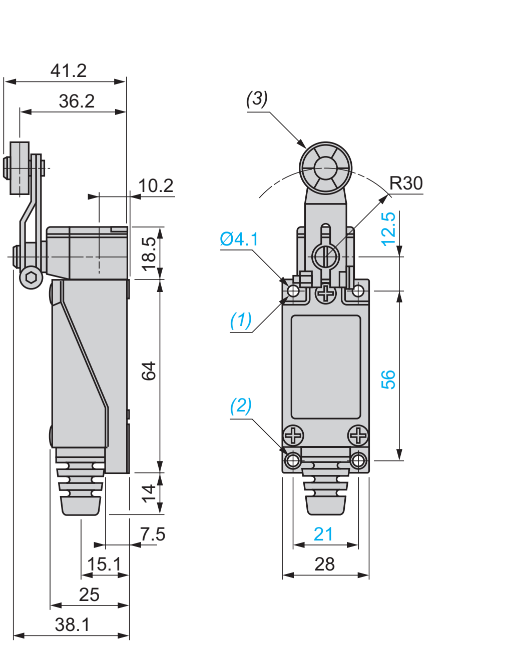
Limit switches

XC range

For medium duty applications, XCE

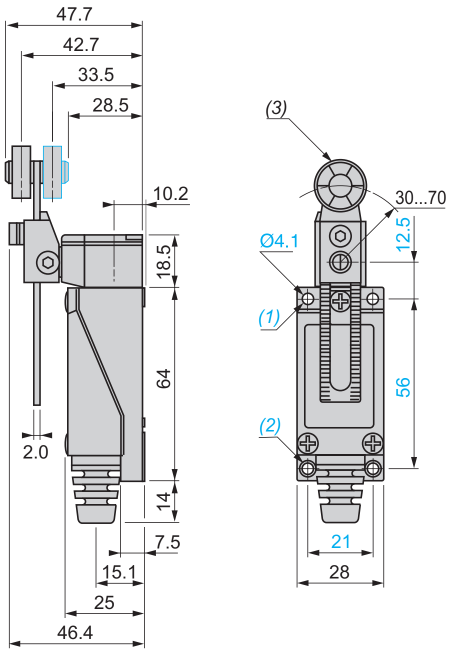
Dimensions in mm

XCE118C, XCE119C



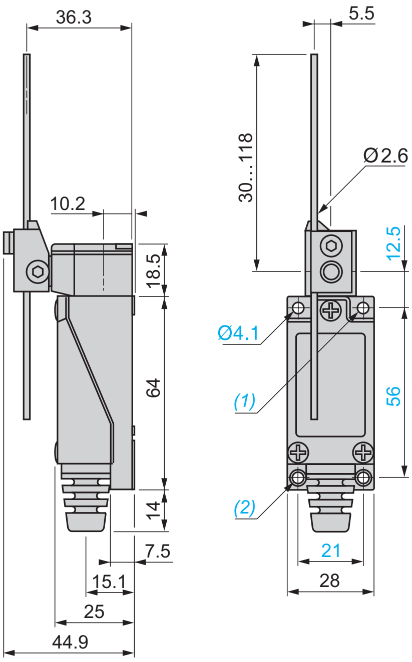
(1) 2 holes M5 tapped 7 in depth.
(2) 2 M5 tapped holes.
(3) Nylon roller Ø 8 x 7 (roller can be rotated and locked in any position through 360°).

XCE145C, XCE146C



(1) 2 holes M5 tapped 7 in depth.
(2) 2 M5 tapped holes.
(3) Nylon roller Ø 8 x 7.

XCE154C

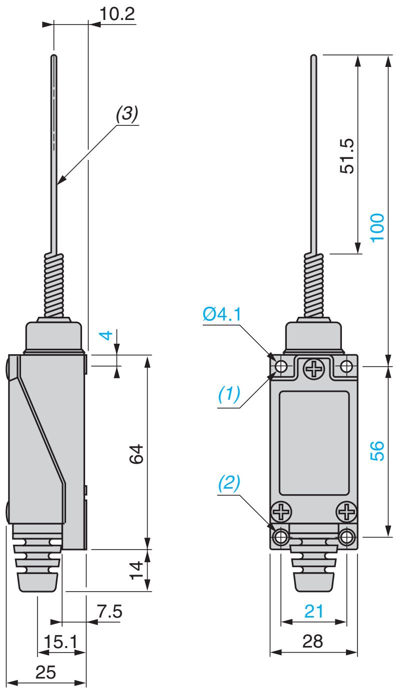


(1) 2 holes M5 tapped 7 in depth.
(2) 2 M5 tapped holes.

Limit switches
XC range
For medium duty applications, XCE

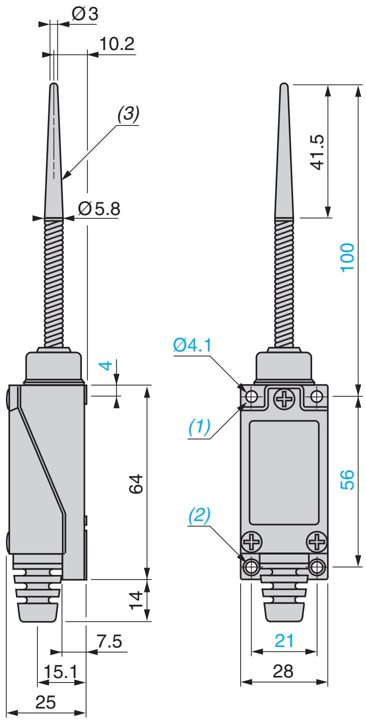
Dimensions in mm

XCE106C



(1) 2 holes M5 tapped 7 in depth.
(2) 2 M5 tapped holes.
(3) Stainless steel wire Ø 1.2.

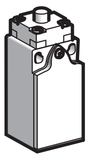
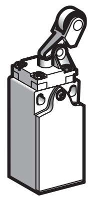
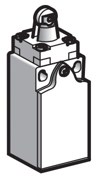
XCE181C



(1) 2 holes M5 tapped 7 in depth.
(2) 2 M5 tapped holes.
(3) Nylon rod.

XCKN
with 1 cable entry
Conforming to CENELEC EN 50047)

With head for linear movement (plunger)

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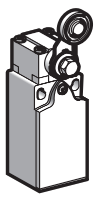
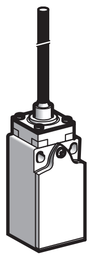
With head for rotary movement (lever) or multi-directional

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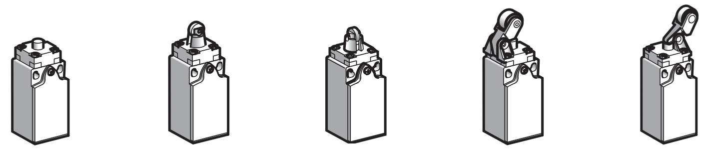
Environment characteristics

Conformity to standards	Products	IEC 60947-5-1, EN 60947-5-1, UL 508, CSA C22-2 n° 14, EAC
	Machine assemblies	IEC 60204-1, EN 60204-1
Product certifications		UL, CSA, CCC
Protective treatment	Version	Standard: “TC”
Ambient air temperature	For operation	- 25…+ 70°C
	For storage	- 40…+ 70°C
Vibration resistance	Conforming to IEC 60068-2-6	25 gn (10…500 Hz) except XCKN●●08: 10 gn, XCKN●●39 and XCKN●●49: 15 gn
Shock resistance	Conforming to IEC 60068-2-27	50 gn (11 ms) except XCKN2●49●● and XCKN●●39: 15 gn, XCKN2p08●●: 20 gn and XCKN2●45●●: 35 gn
Electric shock protection		Class II conforming to IEC 61140 and NF C 20030
Degree of protection		IP 65 conforming to IEC 60529; IK 04 conforming to IEC 62262
Cable entry		Depending on model: tapped entry for ISO M20 x 1.5 or Pg 11 cable gland, ISO M 16 x 1.5 cable gland or PF 1/2 (G 1/2)
Materials	Bodies	Plastic
	Heads	Plastic

Contact block characteristics

Rated operational characteristics		∿ AC-15; A300 (Ue = 240 V, Ie = 3 A); Ithe = 10 A
		⎓ DC-13; R300 (Ue = 250 V, Ie = 0.1 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1
Rated insulation voltage	2-pole contact	Ui = 500 V degree of pollution 3 conforming to IEC 60947-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14
Rated impulse withstand voltage	2-pole contact	U imp = 6 kV conforming to IEC 60947-1, IEC 60664
Positive operation		NC contacts with positive opening operation conforming to IEC 60947-5-1 Appendix K, EN 60947-5-1
Short-circuit protection		10 A cartridge fuse type gG (gl)
Connection	Screw clamp terminals	Clamping capacity, min: 1 x 0.34 mm2, max: 2 x 1.5 mm²

Limit switches
XC Basic range
Compact design, plastic, XCKN
Complete switches with 1 cable entry

Type of head	Plunger (fixing by the body)				
					
Type of operator	Metal end plunger	Plastic roller plunger for lateral cam approach	Plastic roller plunger for traverse cam approach	Thermoplastic roller lever plunger, horizontal actuation in 1 direction	Thermoplastic roller lever plunger, vertical actuation in 1 direction
Sold and packed in lots of	20	20	20	20	20
References of complete switches with 1 ISO M20 x 1.5 cable entry					
2-pole NC + NO snap action	**XCKN2110P20** 2.5 4.5(P) 0 1.4 5.5mm	**XCKN2102P20** 4.3(A) 7.8(P) 0 2.4 mm	**XCKN2103P20** 4.3(A) 7.8(P) 0 2.4 mm	**XCKN2121P20** 9(A)15.9(P) 0 5.2 mm	**XCKN2127P20** 9(B)15.9(P) 0 5.2 mm
2-pole NC + NO break before make, slow break	**XCKN2510P20** 2.8 4.2(P) 0 4 5.5mm	**XCKN2502P20** 4.8(A) 7.3(P) 0 7 mm	**XCKN2503P20** 4.8(A) 7.3(P) 0 7 mm	**XCKN2521P20** 10(A) 14.9(P) 0 14.1 mm	**XCKN2527P20** 10(B) 14.9(P) 0 14.1 mm
2-pole NC + NC simultaneous, slow break	**XCKN2710P20** 2.8 4.2(P) 0 5mm	-	-	**XCKN2721P20** 10 14.9(P) 0 mm	-
2-pole NC + NC snap action	**XCKN2910P20** 2.2 5.1(P) 0 0.8 5.9 mm	**XCKN2902P20** 3.9 (A) 8.9(P) 0 1.4 mm	**XCKN2903P20** 3.9 (A) 8.9(P) 0 1.4 mm	**XCKN2921P20** 8 (A) 18 (P) 0 2.9 mm	-
Weight (kg)	0.065	0.065	0.065	0.070	0.070
Contact operation	*closed* *open*	*(A) (B) = cam displacement* *(P) = positive opening point*		*NC contact with positive opening operation*	
Characteristics					
Switch actuation	On end	By 30° cam			
Type of actuation					
Maximum actuation speed	0.5 m/s	0.3 m/s		1 m/s	
Mechanical durability (in millions of operating cycles)	10				
Minimum force or torque For tripping	15 N	12 N		6 N	
For positive opening	30 N	20 N		10 N	
Cable entry	1 entry tapped M20 x 1.5 mm for ISO cable gland, clamping capacity 7 to 13 mm				

References of complete switches with 1 Pg 11 cable entry
For complete switches with 1 Pg 11 cable entry replace P20 by **G11**.
Example: XCKN2110P20 becomes **XCKN2110G11**.

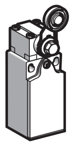
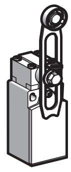
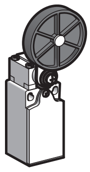
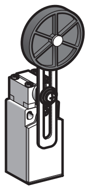
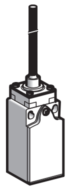
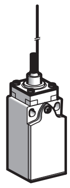
Other cable entries
For complete switches with ISO M16 x 1.5 or PF 1/2 (G 1/2) cable entry, please consult our Customer Care Centre.

Other contacts
For complete switches with 2-pole contacts:
NO + NC make before break, slow break,
NO + NO simultaneous, slow break, please consult our Customer Care Centre.

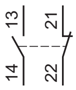
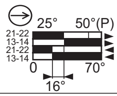
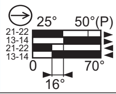
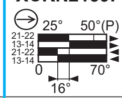
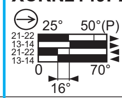
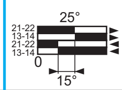
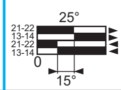
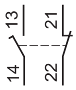
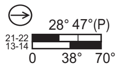
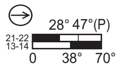
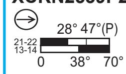
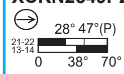
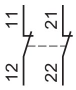
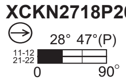
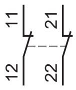
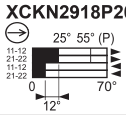
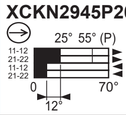
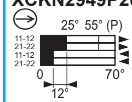
For complete switches with 3-pole contacts:
NC + NO + NO snap action,
NC + NC + NO snap action,
NC + NC + NO break before make, slow break,
NC + NO + NO break before make, slow break, please consult our Customer Care Centre.

Limit switches

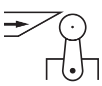
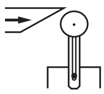
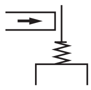
XC Basic range
Compact design, plastic, XCKN
Complete switches with 1 cable entry

Type of head	Rotary (fixing by the body)				Multi-directional	
						
Type of operator	Thermoplastic roller lever	Variable length thermoplastic roller lever	Thermoplastic roller lever, Ø 50 mm	Variable length thermoplastic roller lever, Ø 50 mm	Spring rod	"Cat's whisker"
Sold and packed in lots of	20	20	20	20	20	20

References of complete switches with 1 ISO M20 x 1.5 cable entry

 **2-pole NC + NO snap action**	**XCKN2118P20** 	**XCKN2145P20** 	**XCKN2139P20** 	**XCKN2149P20** 	**XCKN2108P20** 	**XCKN2106P20** 
 **2-pole NC + NO break before make, slow break**	**XCKN2518P20** 	**XCKN2545P20** 	**XCKN2539P20** 	**XCKN2549P20** 	-	-
 **2-pole NC + NC simultaneous, slow break**	**XCKN2718P20** 	-	-	-	-	-
 **2-pole NC + NC snap action**	**XCKN2918P20** 	**XCKN2945P20** 	-	**XCKN2949P20** 	-	-
Weight (kg)	0.085	0.090	0.110	0.115	0.085	0.075
Contact operation	closed open		*(A) (B) = cam displacement* *(P) = positive opening point*		*NC contact with positive opening operation*	

Characteristics

Switch actuation		By 30° cam	By any moving part
Type of actuation		 	
Maximum actuation speed		1.5 m/s	1 m/s (any direction)
Mechanical durability		10 million operating cycles	5 million operating cycles
Minimum force or torque	For tripping	0.1 N.m	0.13 N.m
	For positive opening	0.15 N.m	–
Cable entry		1 entry tapped M20 x 1.5 mm for ISO cable gland, clamping capacity 7 to 13 mm	

References of complete switches with 1 Pg 11 cable entry

For complete switches with 1 Pg 11 cable entry replace P20 by **G11**.
Example: XCKN2118P20 becomes **XCKN2118G11**.

Other cable entries

For complete switches with ISO M16 x 1.5 or PF 1/2 (G 1/2) cable entry, please consult our Customer Care Centre.

Other contacts

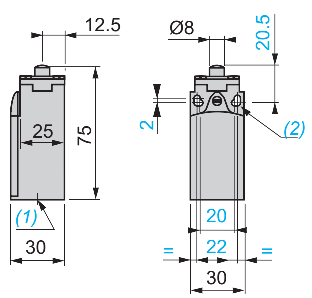
For complete switches with 2-pole contacts:
NO + NC make before break, slow break,
NO + NO simultaneous, slow break, please consult our Customer Care Centre.

For complete switches with 3-pole contacts:
NC + NO + NO snap action,
NC + NC + NO snap action,
NC + NC + NO break before make, slow break,
NC + NO + NO break before make, slow break, please consult our Customer Care Centre.

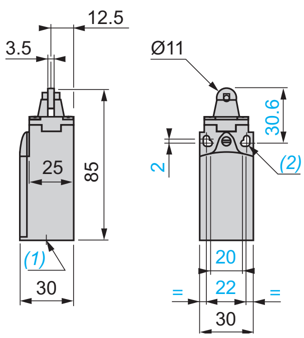
Limit switches
XC Basic range
Compact design, plastic, XCKN
Complete switches with 1 cable entry

Dimensions

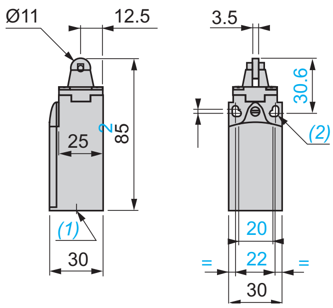
XCKN2●10P20



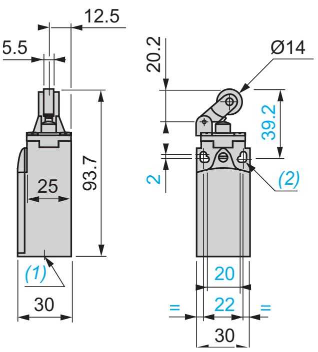
XCKN2●02P20



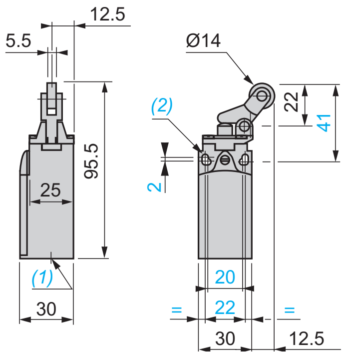
XCKN2●03P20



XCKN2●21P20

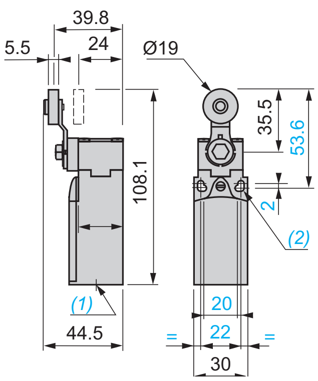


XCKN2●27P20

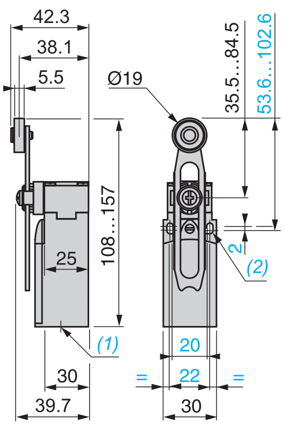


(1) 1 tapped entry for ISOM20 x 1.5 or Pg 11 cable gland.
(2) Ø: 2 elongated holes Ø 4.3 x 6.3 on 22 mm centres, 2 holes Ø 4.3 on 20 mm centres.

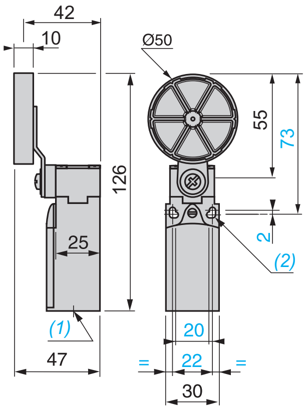
XCKN2●18P20



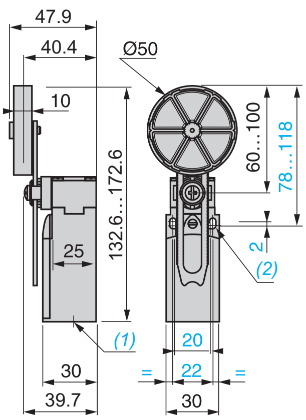
XCKN2●45P20



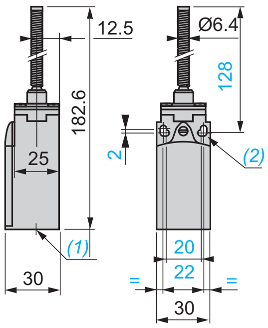
XCKN2●39P20



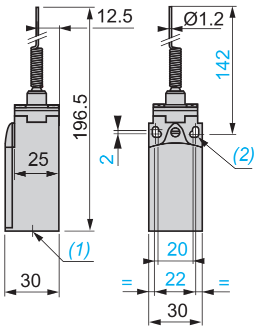
XCKN2●49P20



XCKN2●08P20



XCKN2●06P20



(1) 1 tapped entry for ISOM20 x 1.5 or Pg 11 cable gland.
(2) Ø: 2 elongated holes Ø 4.3 x 6.3 on 22 mm centres, 2 holes Ø 4.3 on 20 mm centres.

Inductive proximity sensors
XS range
Basic

Cylindrical, metal	**Increased range** *(1)*			
	Flush mountable			

Sensing distance Sn (mm)		**2.5**	**4**	**8**	**15**
Diameter		M8	M12	M18	M30
Power supply		⎓ 3-wire, 12…24 V			
Function		NO or NC			
Output		PNP or NPN			
Length (mm) for pre-cabled versions		42	49	53	57
Connection	Pre-cabled (L = 2 m) *(2)*	●	●	●	●
	M8 connector, 3-pin	●	–	–	–
	M12 connector, 4-pin	●	●	●	●
Operating temperature		-25…+70 °C			
Degree of protection		IP 65 and IP 67			
Type reference		**XS108BH●●●**	**XS112BH●●●**	**XS118BH●●●**	**XS130BH●●●**
Pages		29			

(1) Sensors with an increased range are sold individually or are available in bulk packs on request. Please contact our Customer Care Centre.

(2) Available in lengths of 3, 5 and 7 m, depending on model. Please contact our Customer Care Centre.

Standard range

Flush mountable				Non flush mountable			
1.5	**2**	**5**	**10**	**2.5**	**4**	**8**	**15**
M8	M12	M18	M30	M8	M12	M18	M30
⎓ 3-wire, 12…24 V				⎓ 3-wire, 12…24 V			
NO or NC				NO or NC			
PNP or NPN				PNP or NPN			
42	44	53	57	42	44	53	57
●	●	●	●	●	●	●	●
●	–	–	–	●	–	–	–
●	●	●	●	●	●	●	●
-25…+70 °C				-25…+70 °C			
IP 65 and IP 67				IP 65 and IP 67			
XS108BL●●●	**XS112BL●●●**	**XS118BL●●●**	**XS130BL●●●**	**XS208BL●●●**	**XS212BL●●●**	**XS218BL●●●**	**XS230BL●●●**
32 and 33				32 and 33			

Inductive proximity sensors

XS range
Basic, cylindrical, increased range, flush mountable
Three-wire DC, solid-state output

**XS range
Basic
increased range**

Rugged, compact sensors suitable for a variety of applications

XS range Basic inductive proximity sensors are used to detect metal objects without physical contact.
They are flush mountable as standard and suitable for all metal environments since they ensure a maximum sensing distance, even if there is a metal background.

These sensors are rugged and compact making them suitable for a variety of applications, including:
- Material handling
- Mobile equipment
- Packing
- Machine tools
- Escalators

They are available with the following connections:
- Pre-cabled, with 2 or 5 m cable, depending on the model
- M8 or M12 connector, for easy installation and maintenance

Excellent resistance to electromagnetic interference

> Sensors compliant with standard IEC 60947-5-2
> Tested for use in very harsh environments, beyond standard requirements
> Specifically, application tests conducted in an environment prone to interference, in the vicinity of variable speed drives or motors, demonstrated very good EMC immunity

3-wire ⎓ technology with NO or NC, PNP or NPN output

Advantages of 3-wire technology

These sensors comprise 2 wires for the DC supply and a third wire for the output signal.
> PNP output: switching on the positive voltage load
> NPN output: switching on the negative voltage load

> Protection against reverse polarity, overloads and short circuits
> No residual current
> Low voltage drop

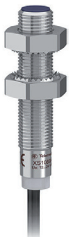
Sold in lots

Depending on the model, XS range Basic sensors are sold:
> Individually
> In various bulk quantities for ease of unpacking and less waste *(1)*

(1) Please contact our Customer Care Centre.

Cost-effective sensors with no compromise on quality

Inductive proximity sensors
XS range
Basic, cylindrical, increased range, flush mountable
Three-wire DC, solid-state output


XS108BH●●L2


XS108BH●●M8


XS108BH●●M12


XS112BH●●L●


XS112BH●●M12


XS118BH●●L●


XS118BH●●M12


XS130BH●●L●


XS130BH●●M12


XSZB1●●


XZCPV●●

Sensors, 3-wire ⎓ 12…24 V

Sensing distance (Sn) mm	Function	Output	Connection	Reference	Weight kg
Ø 8, threaded M8 x 1					
2.5	NO	PNP	Pre-cabled (L = 2 m)	**XS108BHPAL2**	0.070
			M8 connector	**XS108BHPAM8**	0.030
			M12 connector	**XS108BHPAM12**	0.050
		NPN	Pre-cabled (L = 2 m)	**XS108BHNAL2**	0.070
			M8 connector	**XS108BHNAM8**	0.030
	N/C	PNP	Pre-cabled (L = 2 m)	**XS108BHPBL2**	0.070
			M8 connector	**XS108BHPBM8**	0.030
			M12 connector	**XS108BHPBM12**	0.050
Ø 12, threaded M12 x 1					
4	NO	PNP	Pre-cabled (L = 2 m)	**XS112BHPAL2**	0.080
			Pre-cabled (L = 5 m)	**XS112BHPAL5**	0.150
			M12 connector	**XS112BHPAM12**	0.025
		NPN	Pre-cabled (L = 2 m)	**XS112BHNAL2**	0.080
			M12 connector	**XS112BHNAM12**	0.025
	N/C	PNP	Pre-cabled (L = 2 m)	**XS112BHPBL2**	0.080
			M12 connector	**XS112BHPBM12**	0.025
		NPN	Pre-cabled (L = 2 m)	**XS112BHNBL2**	0.080
			M12 connector	**XS112BHNBM12**	0.025
Ø 18, threaded M18 x 1					
8	NO	PNP	Pre-cabled (L = 2 m)	**XS118BHPAL2**	0.105
			Pre-cabled (L = 5 m)	**XS118BHPAL5**	0.175
			M12 connector	**XS118BHPAM12**	0.035
		NPN	Pre-cabled (L = 2 m)	**XS118BHNAL2**	0.105
			Pre-cabled (L = 5 m)	**XS118BHNAL5**	0.175
			M12 connector	**XS118BHNAM12**	0.035
	N/C	PNP	Pre-cabled (L = 2 m)	**XS118BHPBL2**	0.105
			M12 connector	**XS118BHPBM12**	0.035
		NPN	Pre-cabled (L = 2 m)	**XS118BHNBL2**	0.105
			M12 connector	**XS118BHNBM12**	0.035
Ø 30, threaded M30 x 1.5					
15	NO	PNP	Pre-cabled (L = 2 m)	**XS130BHPAL2**	0.165
			Pre-cabled (L = 5 m)	**XS130BHPAL5**	0.235
			M12 connector	**XS130BHPAM12**	0.075
		NPN	Pre-cabled (L = 2 m)	**XS130BHNAL2**	0.165
			M12 connector	**XS130BHNAM12**	0.075
	N/C	PNP	Pre-cabled (L = 2 m)	**XS130BHPBL2**	0.165
			M12 connector	**XS130BHPBM12**	0.075
		NPN	Pre-cabled (L = 2 m)	**XS130BHNBL2**	0.165
			M12 connector	**XS130BHNBM12**	0.075

Fixing accessories

Description	For use with sensors	Reference	Weight kg
Fixing clamps	Ø 8	**XSZB108**	0.006
	Ø 12	**XSZB112**	0.006
	Ø 18	**XSZB118**	0.010
	Ø 30	**XSZB130**	0.020

Connection accessories *(1)*

Description	Cable length m	Reference	Weight kg
Pre-wired, straight, female connectors M12 connectors 4-pin, PVC cable	5	**XZCPV1141L5**	0.210
	10	**XZCPV1141L10**	0.390
Pre-wired, straight, female connectors M8 connectors 3-pin, PVC cable	5	**XZCPV0566L5**	0.210
	10	**XZCPV0566L10**	0.390

(1) For other connection accessories, visit our website: www.tesensors.com

Inductive proximity sensors

XS range
Basic, cylindrical, increased range, flush mountable
Three-wire DC, solid-state output

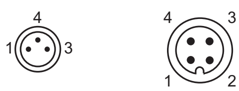
Characteristics

Sensor type			XS1●●BHP●L● XS1●●BHN●L●	XS1●●BHP●M● XS1●●BHN●M●
Product certifications			UL, CSA, CE	
Connection	Pre-cabled		Cable length: 2 or 5 m, depending on model	–
	Connector		–	M8 or M12 connector, depending on model
Operating zone *(1)*	Ø 8	**mm**	**0…2**	
	Ø 12	**mm**	**0…3.2**	
	Ø 18	**mm**	**0…6.4**	
	Ø 30	**mm**	**0…12**	
Differential travel		**%**	1…15 of effective sensing distance (Sr)	
Degree of protection	Conforming to IEC 60529		IP 65 and IP 67	
Storage temperature		**°C**	-40…+85	
Operating temperature		**°C**	-25…+70	
Materials	Case		Nickel plated brass	
	Cable		PVC (number and c.s.a. of wires: 3 x 0.14 mm²)	
Vibration resistance	Conforming to IEC 60068-2-6		25 gn, amplitude ± 2 mm (f = 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, 2 viewing ports at 180°
Rated supply voltage		**V**	⎓ 12…24 with protection against reverse polarity	
Voltage limits (including ripple)		**V**	⎓ 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	Ø 8	**Hz**	2500	
	Ø 12	**Hz**	950	
	Ø 18	**Hz**	700	
	Ø 30	**Hz**	200	
Delays	First-up	**ms**	⩽ 15	
	Response	**ms**	⩽ 0.3	
	Recovery	**ms**	⩽ 0.3	

Connections

Connector

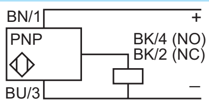
M8 M12



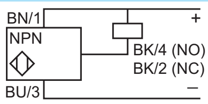
Pre-cabled

BU: Blue
BN: Brown
BK: Black

PNP



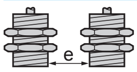
NPN

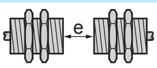


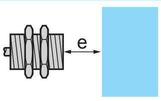
For M8 connectors, NO and NC outputs on terminal 4

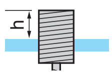
Setting-up precautions

Minimum mounting distances (mm)









Sensors		Side by side	Face to face	Facing a metal object	Mounted in a metal support
Ø 8	**XS108BH**	e ⩾ 5	e ⩾ 30	e ⩾ 8	–
Ø 12	**XS112BH**	e ⩾ 8	e ⩾ 50	e ⩾ 12	–
Ø 18	**XS118BH**	e ⩾ 16	e ⩾ 100	e ⩾ 25	–
Ø 30	**XS130BH**	e ⩾ 30	e ⩾ 180	e ⩾ 30	h ⩾ 2

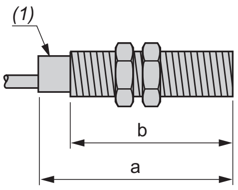
(1) See detection curves on next page.

Inductive proximity sensors

XS range

Basic, cylindrical, increased range, flush mountable
Three-wire DC, solid-state output

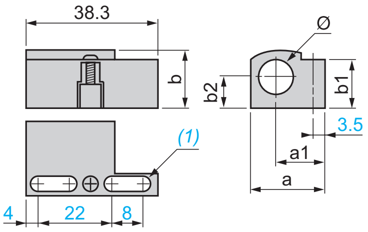
Sensor dimensions XS1●●BH●●



		Pre-cabled (mm)		**M8 connector** (mm)		**M12 connector** (mm)	
		a	**b**	**a**	**b**	**a**	**b**
Ø 8	**XS108BH●●**	42	33	51	34	61	40
Ø 12	**XS112BH●●**	49	36	–	–	61	39
Ø 18	**XS118BH●●**	53	41	–	–	64	43
Ø 30	**XS130BH●●**	57	44	–	–	68	47

(1) LED

Fixing clamp dimensions XSZB108, XSZBB112, XSZBB118 and XSZBB130

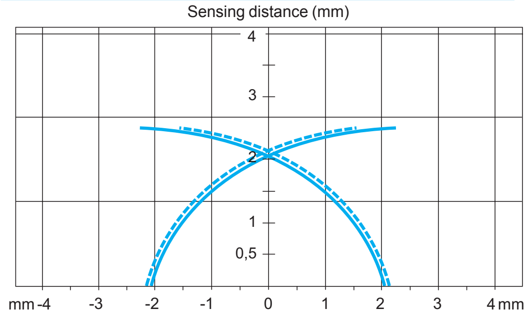


		a	**a1**	**b**	**b1**	**b2**	**Ø**
Ø 8	**XSZB108**	19.9	14.5	14	12.5	7.5	8
Ø 12	**XSZB112**	21.9	14.5	16	15.5	8.5	12
Ø 18	**XSZB118**	26	15.7	22.3	20.1	11.5	18
Ø 30	**XSZB130**	39	21.7	35.5	31	18.5	30

(1) 2 elongated holes Ø 4 x 8 mm

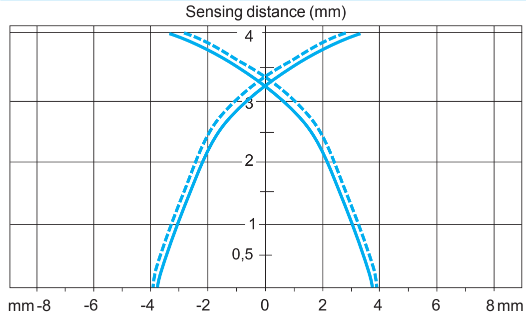
Detection curves

Sensors Ø 8



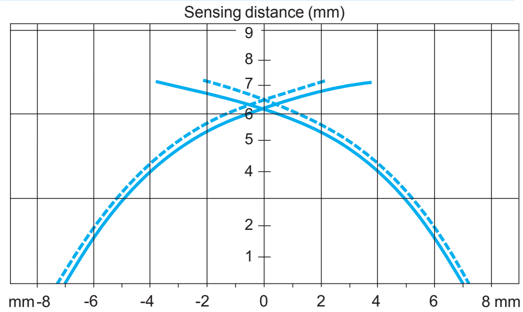
Standard metal target (mm): 8 x 8 x 1
Operating zone (mm): 0…2

Sensors Ø 12



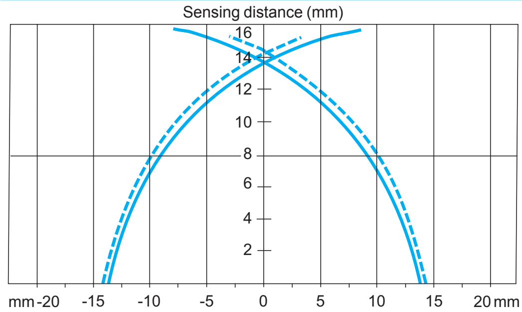
Standard metal target (mm): 12 x 12 x 1
Operating zone (mm): 0…3.2

Sensors Ø 18



Standard metal target (mm): 24 x 24 x 1
Operating zone (mm): 0…6.4

Sensors Ø 30

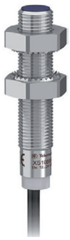


Standard metal target (mm): 45 x 45 x 1
Operating zone (mm): 0…12

——— *pick-up points*
– – – – *drop-out points (object approaching from the side)*

Inductive proximity sensors

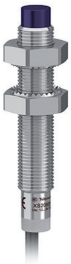
XS range, general purpose
Basic, cylindrical, metal, flush and non flush mountable
Three-wire DC, solid-state output



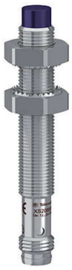
XS108BL●●L●

XS108BL●●M8

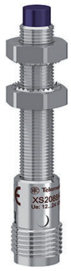
XS108BL●●M12



XS208BL●●L●



XS208BL●●M8



XS208BL●●M12

XS112BL●●L●

XS112BL●●M12

XS212BL●●L●

XS212BL●●M12

Sensing distance (Sn)	Function	Output	Connection	Reference	Weight
mm					kg
Ø 8, threaded M8 x 1					
Three-wire ⎓ 12-24 V, flush mountable					
1.5	NO	PNP	Pre-cabled (L = 2 m)	**XS108BLPAL2**	0.035
			Pre-cabled (L = 5 m)	**XS108BLPAL5**	0.105
			M8 connector	**XS108BLPAM8**	0.008
			M12 connector	**XS108BLPAM12**	0.015
		NPN	Pre-cabled (L = 2 m)	**XS108BLNAL2**	0.035
			M12 connector	**XS108BLNAM12**	0.015
Three-wire ⎓ 12-24 V, non flush mountable					
2.5	NO	PNP	Pre-cabled (L = 2 m)	**XS208BLPAL2**	0.035
			Pre-cabled (L = 5 m)	**XS208BLPAL5**	0.105
			M8 connector	**XS208BLPAM8**	0.008
			M12 connector	**XS208BLPAM12**	0.015
		NPN	Pre-cabled (L = 2 m)	**XS208BLNAL2**	0.035
Ø 12, threaded M12 x 1					
Three-wire ⎓ 12-24 V, flush mountable					
2	NO	PNP	Pre-cabled (L = 2 m)	**XS112BLPAL2**	0.070
			Pre-cabled (L = 3 m)	**XS112BLPAL3**	0.095
			Pre-cabled (L = 5 m)	**XS112BLPAL5**	0.140
			M12 connector	**XS112BLPAM12**	0.015
		NPN	Pre-cabled (L = 2 m)	**XS112BLNAL2**	0.070
			M12 connector	**XS112BLNAM12**	0.015
	NC	PNP	Pre-cabled (L = 2 m)	**XS112BLPBL2**	0.070
			M12 connector	**XS112BLPBM12**	0.015
Three-wire ⎓ 12-24 V, non flush mountable					
4	NO	PNP	Pre-cabled (L = 2 m)	**XS212BLPAL2**	0.070
			Pre-cabled (L = 5 m)	**XS212BLPAL5**	0.140
			M12 connector	**XS212BLPAM12**	0.015
		NPN	Pre-cabled (L = 2 m)	**XS212BLNAL2**	0.070
			Pre-cabled (L = 7 m)	**XS212BLNAL7**	0.185
			M12 connector	**XS212BLNAM12**	0.015
	NC	PNP	Pre-cabled (L = 2 m)	**XS212BLPBL2**	0.070
			Pre-cabled (L = 5 m)	**XS212BLPBL5**	0.140
		NPN	Pre-cabled (L = 2 m)	**XS212BLNBL2**	0.070

Inductive proximity sensors
XS range, general purpose
Basic, cylindrical, metal, flush and non flush mountable
Three-wire DC, solid-state output


XS118BL●●L●

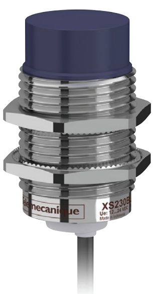

XS118BL●●M12


XS218BL●●L●


XS218BL●●M12


XS130BL●●L●


XS130BL●●M12


XS230BL●●L●


XS230BL●●M12

Sensing distance (Sn)	Function	Output	Connection	Reference	Masse
mm					kg
Ø 18, threaded M18 x 1					
Three-wire ⎓ 12-24 V, flush mountable					
5	NO	PNP	Pre-cabled (L = 2 m)	**XS118BLPAL2**	0.105
			Pre-cabled (L = 5 m)	**XS118BLPAL5**	0.175
			M12 connector	**XS118BLPAM12**	0.035
		NPN	Pre-cabled (L = 2 m)	**XS118BLNAL2**	0.105
			Pre-cabled (L = 5 m)	**XS118BLNAL5**	0.175
			M12 connector	**XS118BLNAM12**	0.035
	NC	PNP	Pre-cabled (L = 2 m)	**XS118BLPBL2**	0.105
			M12 connector	**XS118BLPBM12**	0.035
Three-wire ⎓ 12-24 V, non flush mountable					
8	NO	PNP	Pre-cabled (L = 2 m)	**XS218BLPAL2**	0.105
			Pre-cabled (L = 5 m)	**XS218BLPAL5**	0.175
			M12 connector	**XS218BLPAM12**	0.035
		NPN	Pre-cabled (L = 2 m)	**XS218BLNAL2**	0.105
			Pre-cabled (L = 5 m)	**XS218BLNAL5**	0.175
			Pre-cabled (L = 7 m)	**XS218BLNAL7**	0.220
			M12 connector	**XS218BLNAM12**	0.035
	NC	PNP	Pre-cabled (L = 2 m)	**XS218BLPBL2**	0.105
		NPN	Pre-cabled (L = 2 m)	**XS218BLNBL2**	0.105
Ø 30, threaded M30 x 1.5					
Three-wire ⎓ 12-24 V, flush mountable					
10	NO	PNP	Pre-cabled (L = 2 m)	**XS130BLPAL2**	0.165
			M12 connector	**XS130BLPAM12**	0.075
		NPN	Pre-cabled (L = 2 m)	**XS130BLNAL2**	0.165
			Pre-cabled (L = 3 m)	**XS130BLNAL3**	0.190
			M12 connector	**XS130BLNAM12**	0.075
	NC	PNP	Pre-cabled (L = 2 m)	**XS130BLPBL2**	0.165
			M12 connector	**XS130BLPBM12**	0.075
Three-wire ⎓ 12-24 V, non flush mountable					
15	NO	PNP	Pre-cabled (L = 2 m)	**XS230BLPAL2**	0.155
			Pre-cabled (L = 5 m)	**XS230BLPAL5**	0.225
			M12 connector	**XS230BLPAM12**	0.085
		NPN	Pre-cabled (L = 2 m)	**XS230BLNAL2**	0.155
			Pre-cabled (L = 7 m)	**XS230BLNAL7**	0.225
			M12 connector	**XS230BLNAM12**	0.085
	NC	PNP	Pre-cabled (L = 2 m)	**XS230BLPBL2**	0.155

Inductive proximity sensors

XS range, general purpose
Basic, cylindrical, metal, flush and non flush mountable
Three-wire DC, solid-state output
Accessories

XSZB1●●

XZCPV1141L●

Fixing accessories *(1)*

Description	For use with sensors	Reference	Weight kg
Fixing clamps	Ø 8	**XSZB108**	0.006
	Ø 12	**XSZB112**	0.006
	Ø 18	**XSZB118**	0.010
	Ø 30	**XSZB130**	0.020

Cabling accessories *(2)*

Description	Length of cable	Reference	Weight kg
Pre-wired, straight, female connectors M12 connectors, 4 pins PVC cable	5	**XZCPV1141L5**	0.210
	10	**XZCPV1141L10**	0.390
Pre-wired, straight, female connectors M8 connectors, 3 pins PVC cable	5	**XZCPV0566L5**	0.210
	10	**XZCPV0566L10**	0.390

(1) See dimensions on page 31.
(2) For other connection accessories, visit our website: www.tesensors.com

Inductive proximity sensors

XS range, general purpose

Basic, cylindrical, metal, flush and non flush mountable
Three-wire DC, solid-state output

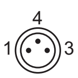
Characteristics

Sensor type			XS1●●BLP●L● XS1●●BLN●L●	XS1●●BLP●M● XS1●●BLN●M●	XS2●●BLP●L XS2●●BLN●L	XS2●●BLP●M● XS2●●BLN●M●
Product certifications			UL, CSA, CE			
Connection	Pre-cabled		Length 2, 3 or 5 m, depending on model	–	Length 2, 5 or 7 m, depending on model	–
	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 8	**mm**	**0…1.2**		**0…2**	
	Ø 12	**mm**	**0…1.6**		**0…3.2**	
	Ø 18	**mm**	**0…4**		**0…6.4**	
	Ø 30	**mm**	**0…8**		**0…12**	
Differential travel		**%**	1...15 of effective sensing distance (Sr)			
Degree of protection	Conforming to IEC 60529		IP 65 and IP 67			
Storage temperature		**°C**	- 40…+ 85			
Operating temperature		**°C**	- 25…+ 70			
Materials	Case		Nickel plated brass			
	Cable		PVC 3 x 0.14 mm² except Ø 8: 3 x 0.11 mm²	–	PVC 3 x 0.14 mm² except Ø 8: 3 x 0.11 mm²	–
Vibration resistance	Conforming to IEC 60068-2-6		25 gn, amplitude ± 2 mm (f = 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: 2 viewing ports at 180°	Yellow LED, on rear	Yellow LED: 2 viewing ports at 180°
Rated supply voltage		**V**	⎓ 12…24 with protection against reverse polarity			
Voltage limits (including ripple)		**V**	⎓ 10…36			
Switching capacity		**mA**	⩽ 200 with overload and short-circuit protection			
Voltage drop, closed state		**V**	⩽ 2			
Current consumption, no-load		**mA**	⩽ 10			
Residual current, open state		**mA**	–			
Maximum switching frequency	Ø 8	**Hz**	2500		2500	
	Ø 12	**Hz**	2500		1200	
	Ø 18	**Hz**	1200		500	
	Ø 30	**Hz**	500		300	
Delays	First-up	**ms**	⩽ 15		⩽ 15	
	Response Ø 8	**ms**	⩽ 0.3		⩽ 0.3	
	Ø 12	**ms**	⩽ 0.1		⩽ 0.1	
	Ø 18	**ms**	⩽ 0.1		⩽ 0.1	
	Ø 30	**ms**	⩽ 0.1		⩽ 0.2	
	Recovery Ø 8	**ms**	⩽ 0.3		⩽ 0.3	
	Ø 12	**ms**	⩽ 0.15		⩽ 0.4	
	Ø 18	**ms**	⩽ 0.3		⩽ 1	
	Ø 30	**ms**	⩽ 1		⩽ 1.4	

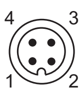
Wiring schemes

Connector

M8



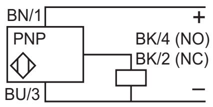
M12



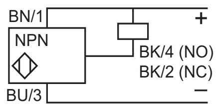
Pre-cabled

BU: Blue
BN: Brown
BK: Black

PNP



NPN



For M8 connectors, NO and NC outputs on terminal 4

(1) Detection curves, see page 37.

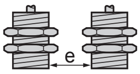
Inductive proximity sensors

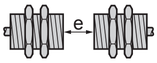
XS range, general purpose

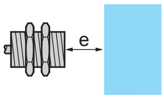
Basic, cylindrical, metal, flush and non flush mountable
Three-wire DC, solid-state output

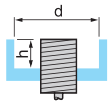
Setting-up

Minimum mounting distances (mm)



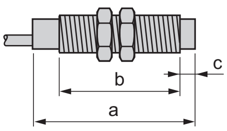






Sensors		Side by side	Face to face	Facing a metal object	Mounted in a metal support
Ø 8 flush mountable	**XS108BL**	e ≥ 3	e ≥ 18	e ≥ 4,5	d ≥ 8 h ≥ 0
Ø 8 non flush mountable	**XS208BL**	e ≥ 10	e ≥ 30	e ≥ 7,5	d ≥ 24 h ≥ 5
Ø 12 flush mountable	**XS112BL**	e ≥ 4	e ≥ 24	e ≥ 6	d ≥ 12 h ≥ 0
Ø 12 non flush mountable	**XS212BL**	e ≥ 16	e ≥ 48	e ≥ 12	d ≥ 36 h ≥ 8
Ø 18 flush mountable	**XS118BL**	e ≥ 10	e ≥ 60	e ≥ 15	d ≥ 18 h ≥ 0
Ø 18 non flush mountable	**XS218BL**	e ≥ 16	e ≥ 96	e ≥ 24	d ≥ 54 h ≥ 16
Ø 30 flush mountable	**XS130BL**	e ≥ 20	e ≥ 120	e ≥ 30	d ≥ 30 h ≥ 0
Ø 30 non flush mountable	**XS230BL**	e ≥ 60	e ≥ 180	e ≥ 45	d ≥ 90 h ≥ 30

Dimensions



Flush mountable in metal

Sensors		Pre-cabled (mm)		M8 connector (mm)		M12 connector (mm)	
		a	b	a	b	a	b
Ø 8	**XS108BL**	42	33	50	34	61	40
Ø 12	**XS112BL**	44	31	–	–	55	34
Ø 18	**XS118BL**	53	41	–	–	64	43
Ø 30	**XS130BL**	57	44	–	–	68	47

Non flush mountable in metal

Sensors		Pre-cabled (mm)			M8 connector (mm)			M12 connector (mm)		
		a	b	c	a	b	c	a	b	c
Ø 8	**XS208BL**	44	31	4	50	31	4	61	36	4
Ø 12	**XS212BL**	44	26	5	–	–	–	55	29	5
Ø 18	**XS218BL**	53	33	8	–	–	–	64	35	8
Ø 30	**XS230BL**	57	32	13	–	–	–	68	34	13

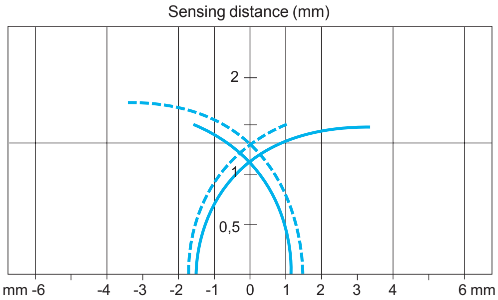
Inductive proximity sensors

XS range, general purpose
Basic, cylindrical, metal, flush and non flush mountable
Three-wire DC, solid-state output

Detection curves

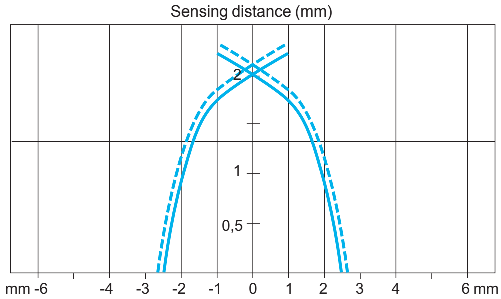
Ø 8 sensors

Flush mountable in metal



Standard steel target (mm): 8 x 8 x 1
Operating zone (mm): 0…1.2

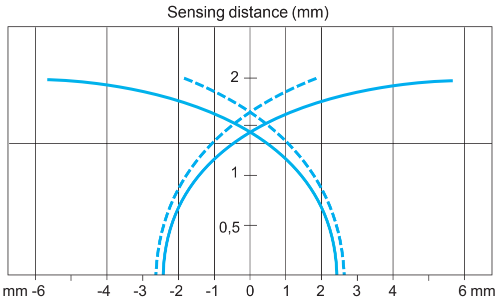
Non flush mountable in metal



Standard steel target (mm): 8 x 8 x 1
Operating zone (mm): 0…2

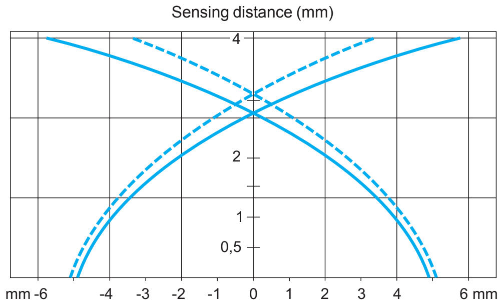
Ø 12 sensors

Flush mountable in metal



Standard steel target (mm): 12 x 12 x 1
Operating zone (mm): 0…1.6

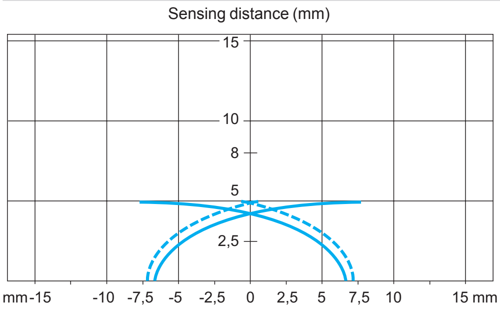
Non flush mountable in metal



Standard steel target (mm): 12 x 12 x 1
Operating zone (mm): 0…3.2

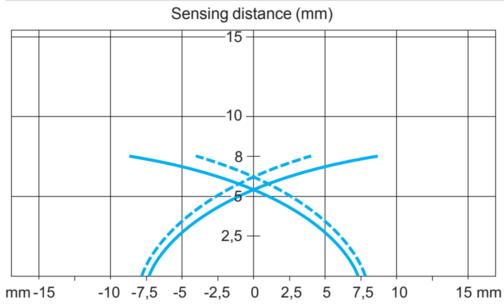
Ø 18 sensors

Flush mountable in metal



Standard steel target (mm): 18 x 18 x 1
Operating zone (mm): 0…4

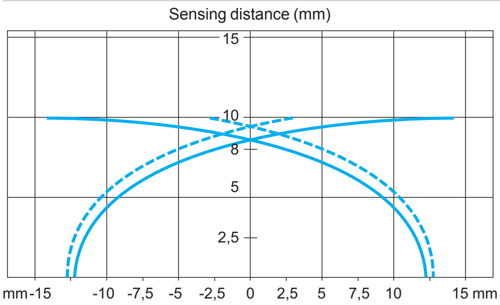
Non flush mountable in metal



Standard steel target (mm): 24 x 24 x 1
Operating zone (mm): 0…6.4

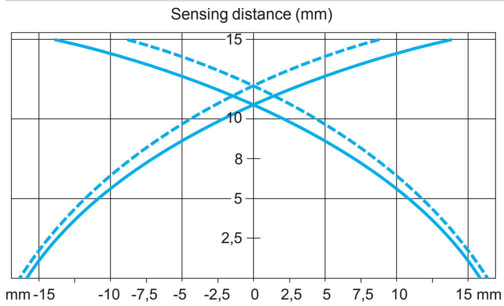
Ø 30 sensors

Flush mountable in metal



Standard steel target (mm): 30 x 30 x 1
Operating zone (mm): 0…8

Non flush mountable in metal



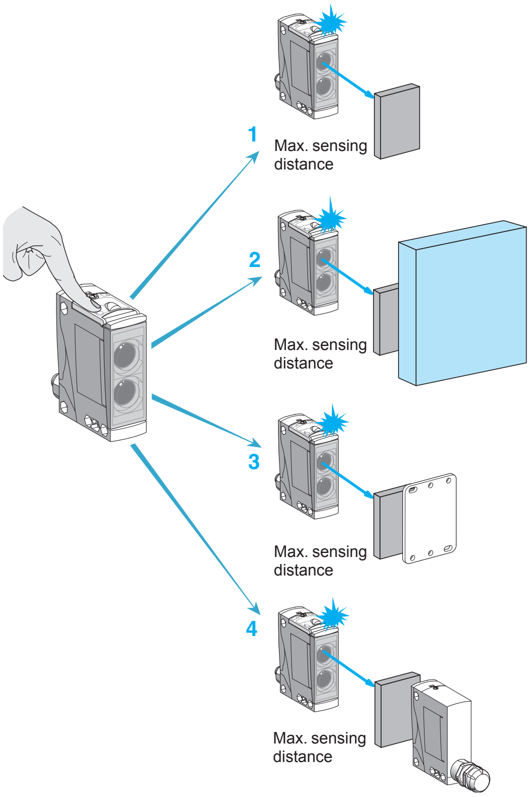
Standard steel target (mm): 45 x 45 x 1
Operating zone (mm): 0…12

——— *pick-up points*
– – – *drop-out points (object approaching from the side)*

Photo-electric sensors

XU range

Multimode: Simplicity through innovation



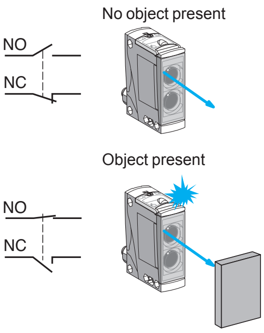
Principle

In proposing multimode products, Telemecanique Sensors offers simplicity through innovation.

■ With the multimode function, a single product meets all the requirements for optical detection.
Effectively, by simply pressing the “Teach mode” button, the sensor automatically acquires optimum configuration for the application requirements

1 Diffuse system detection of object.
2 Diffuse system, with background suppression, detection of object.
3 Reflex system (reflector accessory) detection of object.
4 Thru-beam system, on optical receiver (transmitter accessory for thru-beam use), detection of object.

■ In addition to this, a multimode sensors also means:
□ improved performance:
maximum sensing distance guaranteed and optimised for each application,
□ simplified use:
intuitive setting-up plus less and easier maintenance,
□ lower costs:
the number of references is divided by 10 and, consequently, selection and supply is simplified and storage costs significantly reduced,
□ guaranteed maximum productivity.

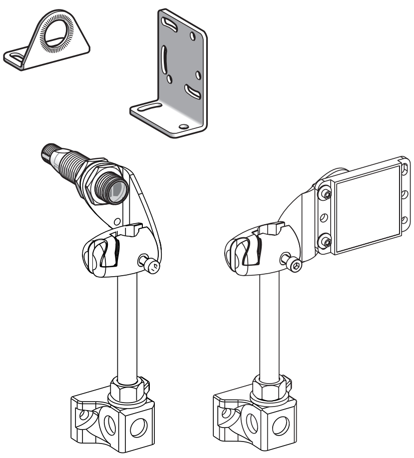


Straightforward NO or NC output

■ Irrespective of the detection mode used (diffuse, reflex, thru-beam, etc.), the outputs become either NO or NC *(1)*.

■ A multimode sensor means immediate and intuitive setting-up that is accessible to all.

(1) The sensor is supplied in NO configuration. NO or NC selection is performed by simply pressing the Teach mode button.



Fixing accessories

A complete range of inexpensive mounting accessories (clamps, traditional or 3D brackets, etc.) is available that provides solutions for all installation and adjustment problems

Photo-electric sensors

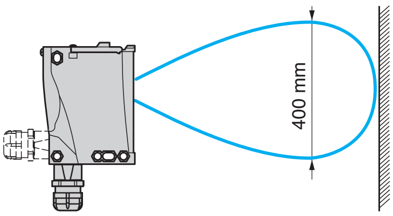
XU range

Multimode: Simplicity through innovation

Design

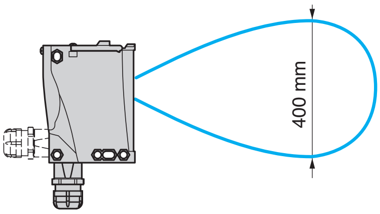
Design		Cylindrical 18	Miniature
			
Dimensions (w x h x d) in mm		M18 x 64	12 x 34 x 20
Maximum sensing distance in m	Without accessory with background suppression	0.12	0.10
	Without accessory	0.4	0.55
	With polarised reflector	3	4
	With thru-beam accessory	20	14
Supply	⎓ Solid-state output	■	■
	∿ Relay output	–	–
Connection	Pre-cabled	■	■
	Connector	■	■
	Screw terminals	–	–
Sensor type		**XUB0**	**XUM0**
Pages		66 to 69	52 to 55

Sensing distances (see table above)



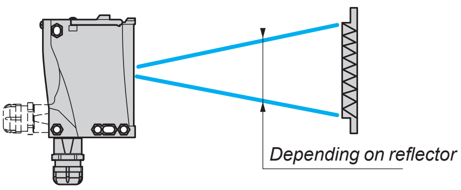
Sensing distance without accessory with background suppression

■ Without accessory, the multimode sensor detects objects irrespective of their colour or background.
■ A clean environment is recommended



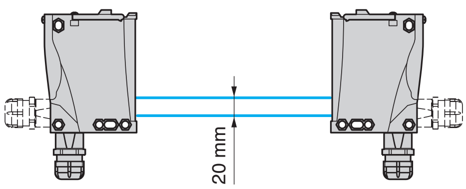
Sensing distance without accessory

■ Beyond the sensing distance with background suppression, the same multimode sensor without accessory detects objects but may be influenced by the backgrounds and colour of the objects to be detected.



Sensing distance with polarised reflector

■ By installing a reflector opposite, the same multimode sensor detects objects irrespective of their shininess and colour.
■ The size of the reflector must be smaller than that of the object to be detected.
■ The larger the area of the reflector the longer the sensing distance.

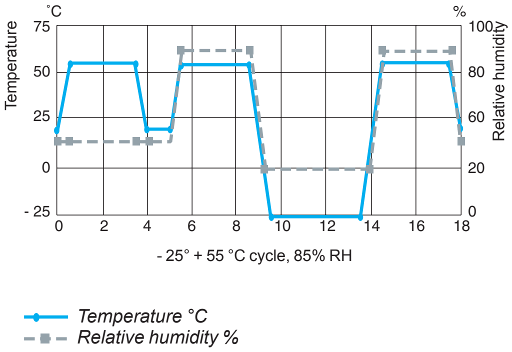


Sensing distance with thru-beam transmitter accessory

■ After setting-up and connecting a thru-beam transmitter accessory opposite, the same multimode sensor detects objects irrespective of their shininess, colour or background.
■ The detection distance is a maximum.
■ The sensor and the thru-beam transmitter must be carefully aligned.
■ Good resistance to accumulation of dirt and dust.

Photo-electric sensors
XU range

Standards and certifications
Parameters related to the environment

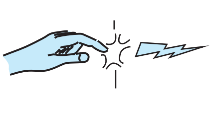


Recommendation
The sensors detailed in this catalogue are designed for use in standard industrial applications relating to presence detection.
These sensors do not incorporate the required redundant electrical circuit enabling their usage in safety applications.
For safety applications, please refer to our “Safety solutions using Preventa” catalogue.

Quality control
Our photo-electric sensors are subject to special precautions in order to guarantee their reliability in the most arduous industrial environments.
■ **Qualification**
□ The product characteristics stated in this catalogue are subject to a **qualification procedure** carried out in our laboratories.
□ In particular, the products are subjected to **climatic cycle** tests for 3000 hours whilst powered-up to verify their ability to maintain their characteristics over time.
■ **Production**
□ The electrical characteristics and sensing distances at both ambient temperature and extreme temperatures are 100% checked.
□ Products are randomly selected during the course of production and subjected to **monitoring tests** relating to all their characteristics.
■ **Customer returns**
□ If, in spite of all these precautions, defective products are returned to us, they are subject to **systematic analysis** and **corrective actions** are implemented to eliminate the risks of the fault recurring.

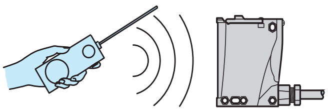
Immunity to ambient light
■ XU photo-electric sensors use the pulsed light principle. This provides a high degree of immunity to spurious light that conforms to standard **IEC 60947-5-2**.

Resistance to electromagnetic interference
The photo-electric sensors are tested in accordance with the recommendations of the standard IEC 60947-5-2



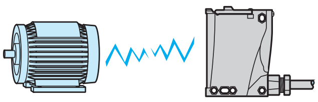
■ Electrostatic discharges

IEC/EN 61000-4-2
∼ 15 kV version, level 4
⎓ 8 kV version, level 3



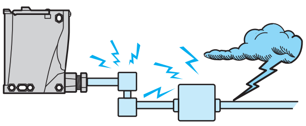
■ Radiated electromagnetic fields (electromagnetic waves)

IEC/EN 61000-4-3
10 V/metre, level 3



■ Fast transients in salvos (motor start/stop interference)

IEC/EN 61000-4-4
2 kV, level 4



■ Impulse voltages, lightning

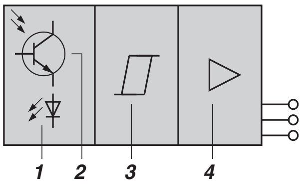
IEC 60947-5-2
∼ 2.5 kV version
⎓ 1 kV version

Mechanical shock resistance
The sensors are tested in accordance with standard IEC 60068-2-27, 30 gn, duration 11 ms.

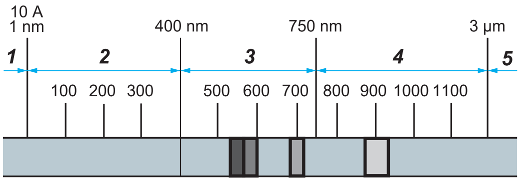
Vibration resistance
The sensors are tested in accordance with standard IEC 60068-2-6,
7 gn, amplitude ± 1.5 mm, f = 10…55 Hz.

Resistance to chemicals in the environment
■ Owing to the very wide range of chemicals encountered in industry, it is very difficult to give general guidelines common to all sensors.
■ To ensure lasting efficient operation, it is essential that any chemicals coming into contact with the sensors will not affect their casing and, in doing so, prevent their reliable operation (please refer to the characteristics pages for the various sensors).
In all cases, the materials selected (see product characteristics) provide satisfactory compatibility in most industrial environments (for further information, please consult our Customer Care Centre).

Principle of optical detection



1 Light beam transmitter
2 Light beam receiver
3 Signal processing stage
4 Output stage



1 *X rays,* ***2*** *Ultraviolet,* ***3*** *Visible light,*
4 *Near infrared,* ***5*** *Far infrared*

Composition of a photo-electric sensor

A photo-electric sensor basically comprises a light beam transmitter (light-emitting diode) and a light-sensitive receiver (photo-transistor).
A light-emitting diode is an electronic semi-conductor component that emits light when an electric current flows through it. This light can be visible or invisible, depending on the transmission wavelength.

Detection occurs when an object enters the transmitted light beam and, in so doing, affects the intensity of the light at the receiver. As the light intensity at the receiver decreases a point is reached whereby the output of the sensor changes state.

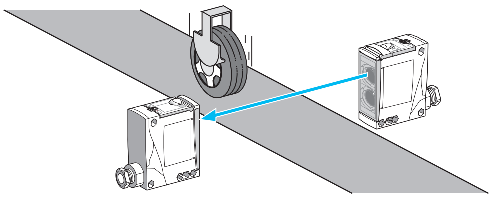
Light spectrum

Depending on the model and application requirements, the transmission beam is either non visible infrared (most common case) or ultraviolet (detection of luminescent materials). It may also be visible red or green (colour mark reading etc.) and laser red (long sensing distance and short focal length).

Modulation

The advantage of LEDs is their very fast response. To render the system insensitive to ambient light, the current flowing through the LED is modulated so as to produce a pulsed light transmission.
Only the pulsed signal will be used by the photo-transistor and processed to control the load.

Detection systems

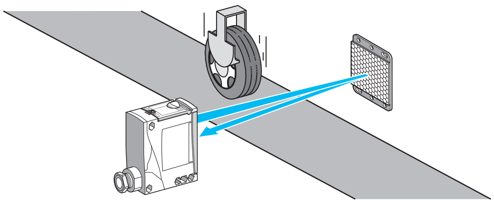


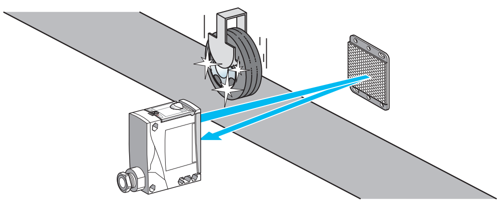
Thru-beam system or multimode with thru-beam accessory

■ **Advantages**
□ Long sensing distance(up to 60 m).
□ Very precise detection, high repeat accuracy.
□ Detection not affected by colour of object.
□ Good resistance to difficult environments (dust, grime, etc.).
■ **Drawbacks**
□ 2 units to be wired.
□ The object to be detected must be opaque.
□ Precise alignment required, which can be difficult since the sensor transmits in the infrared range (invisible).

■ **Operating precautions**
□ When several sensors are used, care must be taken to ensure that no sensor is disrupted by another sensor (e.g. alternate mounting of transmitter/receiver etc.).

Advantages of multimode sensor with thru-beam accessory
■ Easy alignment
□ The sensor transmits in the visible red range during the alignment phase.
□ 3 LEDs providing setting-up assistance.





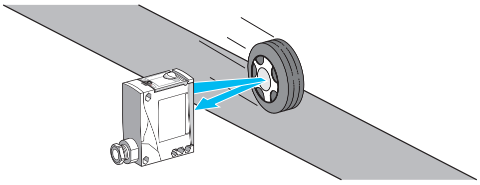
Polarised reflex system or multimode with reflector accessory

■ **Advantages**
□ Medium sensing distance (up to 15 m).
□ Precise detection.
□ Only one unit to be wired.
□ Detection not affected by colour of object.
□ Visible red beam transmission.
■ **Drawbacks**
□ Precise alignment required.
□ The object to be detected must be opaque and larger than the reflector.

■ **Operating precautions**
□ When several sensors are used, they must be aligned in such a manner that no sensor is disrupted by another sensor.
□ For short distance detection use a reflector with large trihedrons, type XUZC24.
□ For long distance detection use a reflector XUZC50 or XUZC80.
□ To increase the sensing distance use reflector XUZC100.
□ If reflective tape is used, use rolls of tape XUZB1 or XUZB15 which are specially adapted for polarised reflex systems.

Advantages of multimode sensor with reflector accessory
■ Easy alignment
□ 3 LEDs providing setting-up assistance.
□ The anti-interference function enables 2 sensors to be used without specific alignment precautions.
■ Semi-transparent objects can be detected by using the teach mode function.

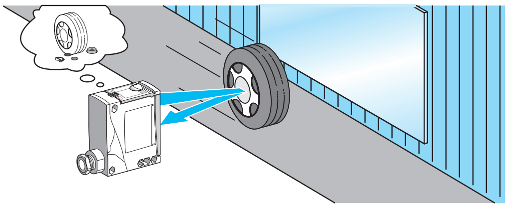
Detection systems (continued)

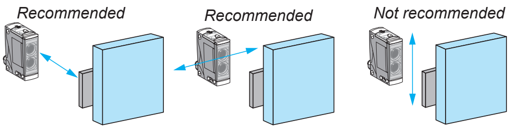


Diffuse system or multimode

■ **Advantage**
□ Only one unit to be wired.
■ **Drawbacks**
□ Short sensing distance.
□ Sensitivity to object or background colour differences.
□ Object sighting line difficult since the sensor transmits in the infrared range (invisible).
■ **Operating precautions**
□ When several sensors are used, they must be aligned in such a manner that no sensor is disrupted by another sensor.
■ **Advantages of a multimode sensor**
□ Easy alignment:
- the sensor transmits in the visible red range during the alignment phase,
- 3 LEDs providing setting-up assistance,
- the anti-interference function enables 2 sensors to be used without specific alignment precautions.

□ Refined detection: the position of the object can be detected using the teach mode.





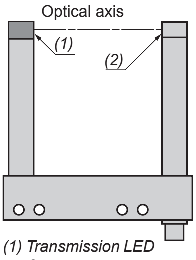
Positioning recommendations for sensor with background suppression

Diffuse, with or without background suppression, system or multimode

■ **Advantages**
□ Only one unit to be wired.
□ Detection not affected by colour of object or background.
■ **Drawbacks**
□ Short sensing distance.
□ Object sighting line difficult since the sensor transmits in the infrared range (invisible).
■ **Operating precautions**
□ Detection can be affected by the object’s direction of movement. To overcome this phenomenon (the hat effect), it is recommended that the sensor is mounted so that the object simultaneously breaks the beam of both lenses.
□ When several sensors are used, they must be aligned in such a manner that no sensor is disrupted by another sensor.
■ **Advantages of a multimode sensor**
□ Easy alignment:
- the sensor transmits in the visible red range during the alignment phase,
- 3 LEDs providing setting-up assistance,
- the anti-interference function enables 2 sensors to be used without specific alignment precautions,
- the hat effect is minimised using the background teach mode.

□ Refined detection: the position of the object can be detected using the teach mode.

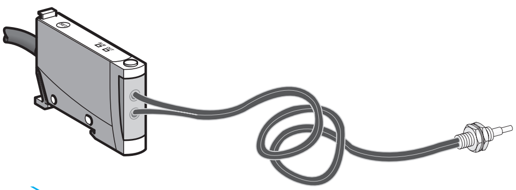
Specific systems

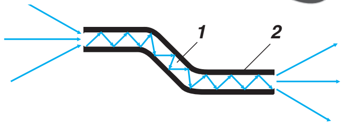


(1) Transmission LED
(2) Output LED

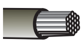
Optical forks

■ Constructed from metal, the optical fork is a robust sensor that is particularly suited to conveying and packaging applications and detection of labels.
■ Rugged optical detection device **not requiring alignment** in thru-beam mode.
■ The beam from the transmitter limb is transmitted to the receiver limb. Due to its construction, **only one connection** is required as opposed to two for a traditional thru-beam function.
■ The transmission sources are LEDs of various technologies:
□ Red for much improved efficiency during adjustment and maintenance
□ Red laser for detection of transparent materials or very small parts
□ Infrared, particularly for optical frames
□ Ultrasonic for detection of transparent labels (clear on clear)
■ The beam is adjustable or fixed depending on the version. Adjustment enables the sensitivity to be altered and, therefore, detection of small parts down to dimensions of less than tenths of millimetres (minimum size of detectable object: 0.05 mm).
■ The high switching frequency (from 4 kHz up to 25 kHz) is very useful in industrial applications involving high operating rates.






Plastic fibre


Glass fibre

1 Core
2 Sheath

Fibre optics

■ The fibre acts as a light conductor. Light rays entering the fibre at a certain angle are conveyed to the required location, with minimum loss.
■ Separate amplifier.
□ Size kept to minimum.
□ This system enables detection of very small objects (approximately 1 mm).
□ And, detection is very precise.

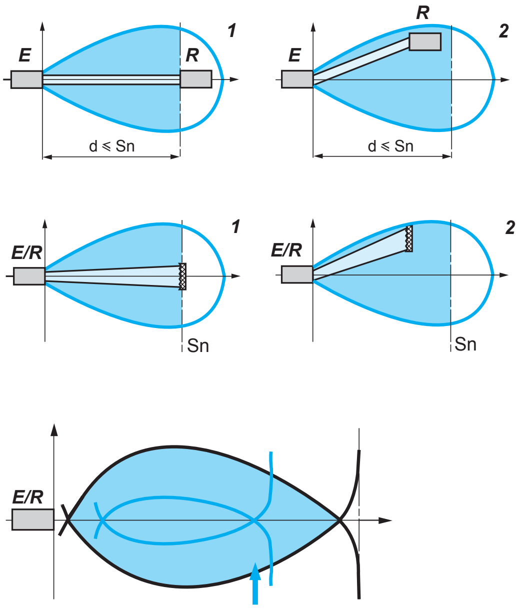
Plastic fibres
The core of the fibre is flexible plastic (PMMA). In general, there is only a single fibre of diameter 0.25 to 1 mm, depending on the model.
□ Fibres are used with amplifiers transmitting red light.
□ Minimum bend radius:
- 10 mm for fibres with 0.25 mm diameter core,
- 25 mm for fibres with 1 mm diameter core.

■ Advantages: fibres can be cut to the required length.

Glass fibres
□ The core of the fibre is silica. For maximum flexibility, each fibre comprises numerous strands that are approximately 50 μ in diameter.
□ Fibres are used with amplifiers transmitting infrared or red light.
□ Minimum bend radius:
- 10 mm with plastic sheath,
- 90 mm with stainless steel sheath.

■ **Advantages**
□ Fibres suitable for use at high temperatures (250 °C).
□ Fibres with stainless steel sheath provide protection against mechanical impact and crushing.

Detection curves



Thru-beam system

- The ▭ zone indicates the positioning tolerance of the receiver.
- The ▭ zone represents the usable sensing zone of the system. Any opaque object entering this zone breaks the beam and causes the sensor's output to change state.

1 Ideal detection
2 Acceptable detection
***T** = transmitter*
***R** = receiver*

Polarised reflex system

- The ▭ zone indicates the positioning tolerance of the reflector.
- The ▭ zone represents the usable sensing zone of the system. Any opaque object entering this zone breaks the beam and causes the sensor's output to change state.

1 Ideal detection
2 Acceptable detection
***T** = transmitter*
***R** = receiver*

Diffuse, with or without background suppression, system

- The ▬ zone represents the sensor's sensitivity zone.

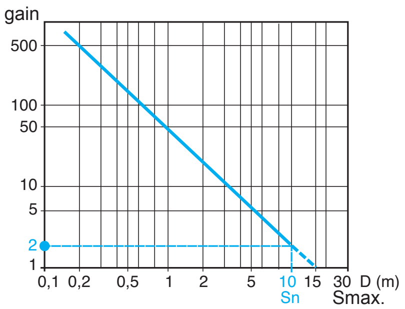
All of this zone is usable: any object that is adequately reflective entering this zone, in the direction of the arrow, will cause the sensor's output to change state. The black line corresponds to a light colour surface and the blue line to a darker colour surface.

- A test using the object to be detected will determine the zone of sensitivity in relation to its reflection coefficient.

—— White 90% object
—— Grey 18% object

For specific aspects of diffuse systems see page 42.
***T** = transmitter*
***R** = receiver*

Excess gain



Operating margin

To ensure correct operation of a sensor in spite of environmental constraints, the sensors feature an operating margin.
This margin can be expressed in terms of excess gain, which is the ratio:
Excess gain = Signal level received/Signal required for switching.

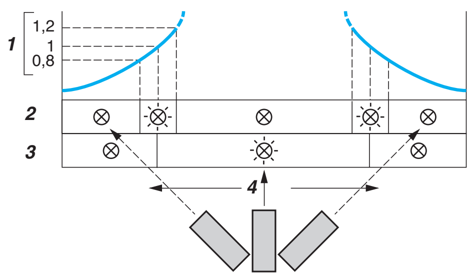
For all XU range sensors

- The **nominal sensing distance Sn** is defined as the sensing distance with an **excess gain of 2**, i.e. the sensing distance for which the sensor receives twice as much light energy as it strictly needs to switch it.
- The **maximum sensing distance** is defined as the sensing distance with an **excess gain of 1**. It corresponds to the maximum detection value.

The use of the sensor at the nominal sensing distance ensures the sensor's correct operation in normal operating conditions.

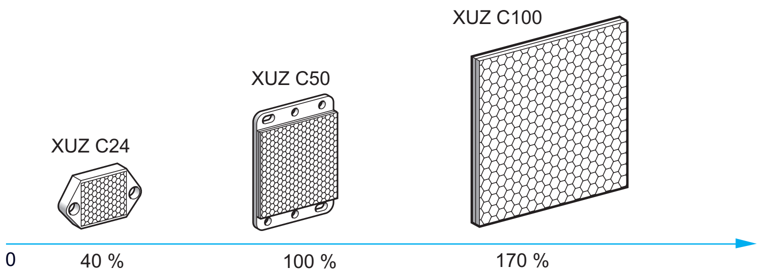
In extreme conditions, refer to the following setting-up recommendations:
- clean environment: work at nominal sensing distance Sn,
- slightly polluted environment: work at sensing distance Sn/2,
- moderately polluted environment: work at sensing distance Sn/4,
- heavily polluted environment: preferably use multimode sensors with thru-beam accessory (or the thru-beam system) with a sensing distance Sn/10.

Optical alignment aid



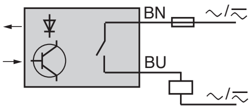
A red LED assists setting-up by illuminating when optimum alignment of the sensor is achieved.
1 Signal level
2 Red LED, on ⊗, off ⊗
3 Green LED, on ⊗, off ⊗
4 Optimum alignment

Detection distance using reflector



Detection distance depending on reflector size.

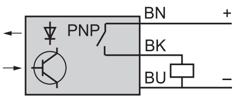
Outputs

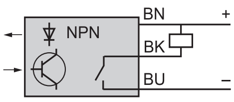


2-wire technique ∼ or ≂

■ **Specific aspects**
These sensors are wired in series with the load to be switched.
As a consequence, they are subject to:
□ A residual current in the open state (current flowing through the sensor in the “open” state),
□ A voltage drop in the closed state (voltage drop across the sensor’s terminals in the “closed” state).
■ **Advantages**
□ Only 2 wires to be connected. They can be wired in series in the same way as mechanical limit switches.
□ For use on 2-wire ⎓, they can be connected to either positive (PNP) or negative (NPN) logic PLC inputs.
□ No risk of incorrect connections.

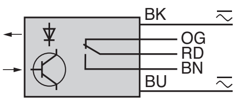
■ **Operating precautions**
□ Check the possible effects of residual current and voltage drop on the actuator or input connected.
□ These sensors do not incorporate overload or short-circuit protection and therefore, it is essential to connect a 0.4 A “quick-blow” fuse in series with the load.





3-wire technique ⎓

■ **Specific aspects**
□ These sensors comprise 2 wires for the DC supply and a 3rd wire for the output signal.
□ PNP type: switching the positive side to the load.
□ NPN type: switching the negative side to the load.
■ **Advantages**
□ No residual current, low voltage drop.

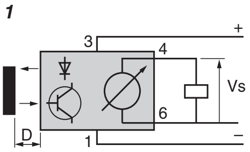


5-wire technique ∼ or ≂, relay output

■ **Specific aspects**
□ Sensors incorporating output relay. The supply and output circuits are electrically separate.
■ **Advantages**
□ ∼ or ⎓ supply with a wide voltage range.
□ High breaking capacity (approximately 3 A).
□ Direct control of a simple automation system.
□ Availability of a NC (normally closed) contact and a NO (normally open) contact.
□ The sensor/relay contact galvanic isolation is 1500 to 2500 V, depending on the model.

■ **Operating precautions**
□ Low switching frequency. Check that it is suitable for the application.
□ Limited service life of relay. Check that it is suitable for the application.

1



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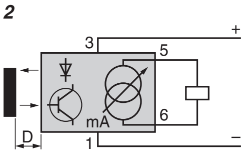


Analogue technique

■ **Specific aspects**
There are two output configurations:
□ Voltage output: the output voltage varies in proportion to the distance between the sensor and the object to be detected.
□ Current output: the output current varies in proportion to the distance between the sensor and the object to be detected.
■ **Advantage**
□ Availability of a physical item of data proportional to the distance between the sensor and the object to be detected.

■ **Operating precautions**
□ Refer to the detailed descriptions of the sensor to assess the relative influence of the colour of the object to be detected.

1 Voltage output
2 Current output

Outputs *(continued)*

Output functions

In the past, the output functions of photo-electric sensors were always governed by the “light/dark” principle, i.e. the output would be activated on light being received for “light” switching and the output would be activated on light not being received for “dark” switching.
This called for fastidious programming specific to each detection mode.

Now, the output functions of the XU range range of photo-electric sensors are in phase with the language of the automation system engineer, i.e. NO (normally open) or NC (normally closed).

■ **Advantages**

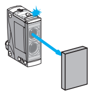
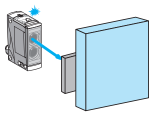
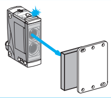
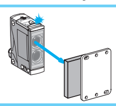
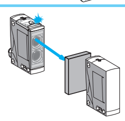
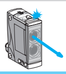
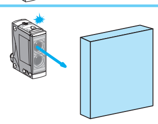
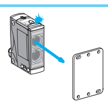
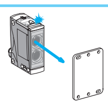
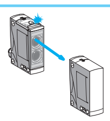
□ NO output (or NO programming for multimode sensors): irrespective of the detection mode, the output of the sensor is activated when the object to be detected is present.

□ NC output (or NC programming for multimode sensors): irrespective of the detection mode, the output of the sensor is activated when the object to be detected is not present.

■ **Advantages of multimode sensors**

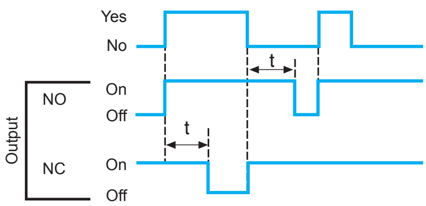
By default, the output is NO programmed, i.e. the output of the sensor is activated when the object to be detected is present.

□ By pressing the teach button, the output can programmed to NC, i.e. the output of the sensor is activated when the object to be detected is not present.

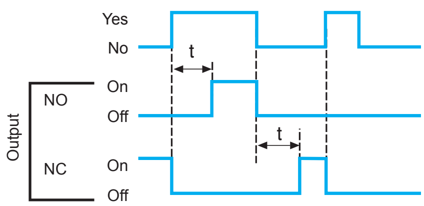
System		NO output or NO programming	Yellow LED	NC output or NC programming	Yellow LED
	Object present				
Diffuse		Activated	On	Not activated	Off
Diffuse with background suppression		Activated	On	Not activated	Off
Reflex		Activated	On	Not activated	Off
Polarised reflex		Activated	On	Not activated	Off
Thru-beam		Activated	On	Not activated	Off
	No object present				
Diffuse		Not activated	Off	Activated	On
Diffuse with background suppression		Not activated	Off	Activated	On
Reflex		Not activated	Off	Activated	On
Polarised reflex		Not activated	Off	Activated	On
Thru-beam		Not activated	Off	Activated	On

Output signal time delay

■ Certain sensor models (XUK, XUX and XUD) incorporate a time delay output.
■ These time delays enable simple automation systems to be established.
■ There are three types of time delay:
□ Time delay on beam make (ON delay).
□ Time delay on beam break (OFF delay).
□ Monostable (one shot).



Time delay on beam break



Monostable

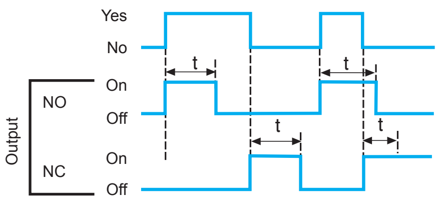
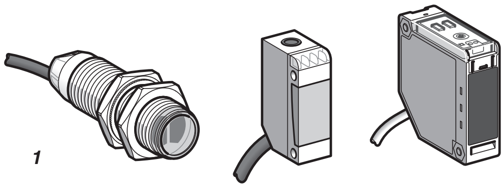


Photo-electric sensors
XU range

Connections



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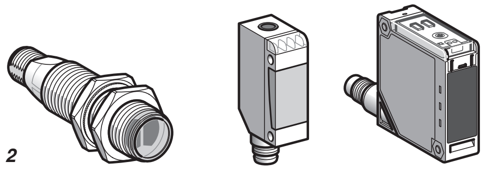

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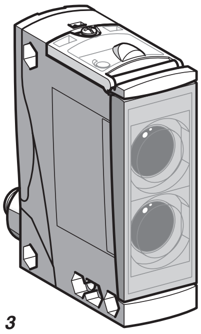
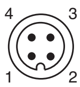


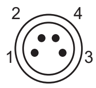
3

All our sensors are available either in pre-cabled version (except XUX; screw terminal with cable gland version) or connector version.
The connectors used are:

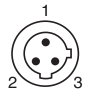
M12 (4-pin)



M8 (4-pin)



1/2" 20UNF (3-pin)



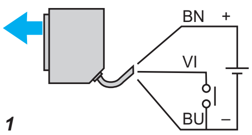
■ **Types of connection**
1 Factory fitted moulded cable: good protection against splashing liquids.
2 Connector: easy installation and maintenance.
3 Screw terminals: flexibility, cable runs to required length.

■ **Wiring advice**
□ Length of cable: no limitation up to 200 m or up to a line capacitance of < 0.1 µF (characteristics of sensors remain unaffected). In this case, it is important to take into account the voltage drop on the line.
□ Separation of control and power circuit wiring: the sensors are immune to electrical interference encountered in normal industrial conditions. Where extreme conditions of electrical "noise" could occur (motors etc.), it is advisable to protect against transients in the normal way:
- suppress interference at source and filter the power supply,
- separate power and control wiring from each other,
- ensure the HF equipotentiality of the site,
- limit the length of cable,
- connect the sensor with supply switched off.

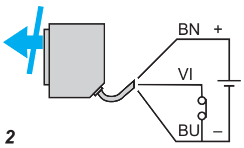
□ Dust and damp protection of connections: the level of dust and damp protection depends on how carefully the cable glands or connectors are tightened. To efficiently protect the sensors from dust and damp, select the correct diameter cable for the cable gland used.

Cable gland	Diameter of cable	
	Minimum	Maximum
9P	6	8
11P	8	10
13P	10	12
ISO 16	7	10
ISO 20	10	12

Complementary functions



1



2

Diagnostics, beam break test

A test input enables the transmitted beam to be broken in order to verify that the output of the sensor changes state.
Fault diagnostics regarding correct operation of the sensor can therefore be carried out.

1 Beam made
2 Beam broken
VI: test input for breaking transmitted beam.

Verification of correct operation

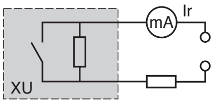
In the event of dirty lenses (reflectors), an excessively polluted atmosphere or a slight disturbance of optical alignment (mechanical impact on support), the level of light energy received by the sensor will decrease until it ceases to operate.
To overcome this problem, all our products incorporate:
- a red alarm LED,
- an alarm output, for connection in the automation system, to warn the operator that the operation of the sensor is stable but close to its limits (applies to sensors XUK, XUX, XUD).

Photo-electric sensors

XU range

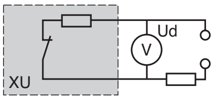
Specific aspects of electronic sensors

Terminology



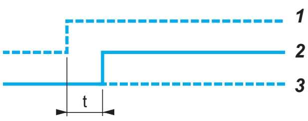
Residual current (Ir)

□ The residual current (Ir) corresponds to the current flowing through the sensor when in the “open” state.
□ Characteristic of 2-wire type sensors.



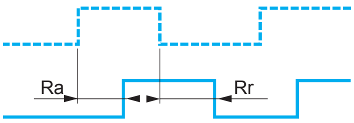
Voltage drop (Ud)

□ The voltage drop (Ud) corresponds to the voltage drop at the sensor’s terminals when in the “closed” state (value measured at nominal current rating of sensor).
□ Characteristic of 2-wire type proximity sensors.



First-up delay

The first-up delay corresponds to the time (t) between the connection of the power supply to the sensor and its fully operational state.
1 *Supply voltage U on*
2 *Sensor operational at state 1*
3 *Sensor at state 0*



Response time

□ Response time (Ra): the time delay between the object to be detected entering the sensor’s operating zone and the subsequent change of output state. This parameter limits the speed and size of the object.
□ Recovery time (Rr): the time delay between an object to be detected leaving the sensor’s operating zone and the subsequent change of output state. This parameter limits the interval between successive objects.

Power supplies

Sensors for AC circuits (~ and ≂ models)

Check that the voltage limits of the sensor are compatible with the nominal voltage of the AC supply used.

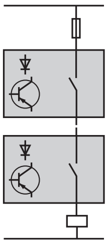
Sensors for DC circuits (⎓ models)

■ DC source: check that the voltage limits of the sensor and the acceptable level of ripple are compatible with the supply used.
■ AC source (comprising transformer, rectifier, smoothing capacitor): the supply voltage must be within the operating limits specified for the sensor.
□ Where the voltage is derived from a single-phase AC supply, the voltage must be rectified and smoothed to ensure that:
- the peak voltage of the DC supply is lower than the maximum voltage rating of the sensor.
Peak voltage = nominal voltage x $\sqrt{2}$
- the minimum voltage of the supply is greater than the minimum voltage rating of the sensor, given that:
$\Delta V = (I \times t)/C$
ΔV = max. ripple: 10% (V),
I = anticipated load current (mA),
t = period of 1 cycle (10 ms full-wave rectified for a 50 Hz supply frequency),
C = capacitance (µF).
□ As a general rule, use a transformer with a lower secondary voltage (Ue) than the required DC voltage (U).

Example: ~ 18 V to obtain ⎓ 24 V, ~ 36 V to obtain ⎓ 48 V. Fit a smoothing capacitor of 400 µF minimum per sensor, or 2000 µF minimum per Ampere required.

Setting-up

Connection in series



2-wire type sensors

■ The following points should be taken into account:

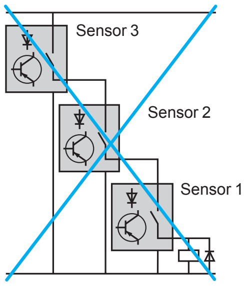
□ Series wiring is only possible using sensors with wide voltage limits.
Based on the assumption that each sensor has the same residual current value, each sensor, in the open state, will share the supply voltage, i.e.

$$U\ sensor = \frac{U\ supply}{n\ sensors}$$

U sensor and U supply must remain within the sensor's voltage limits.

□ If only one sensor in the circuit is in the open state, it will be supplied at a voltage almost equal to the supply voltage.

□ When in the closed state, 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 and therefore, the load voltage should be selected accordingly.



3-wire type sensors

This connection method is not recommended.

■ Correct operation of the sensors cannot be assured and, if this method is used, tests should be made before installation.

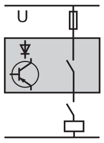
■ The following points should be taken into account:

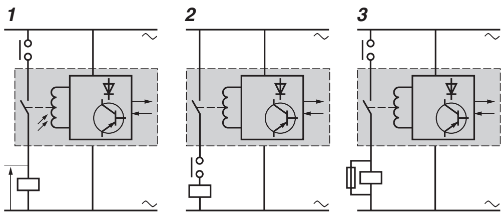
□ The first sensor carries the load current in addition to the no-load current consumption values of the other sensors connected in series. For certain models, this connection method is not possible unless a current limiting resistor is used.

□ When in the closed state, a small voltage drop is present across each sensor. The load should therefore be selected accordingly.

□ As sensor 1 closes, sensor 2 does not operate until a certain time (t) has elapsed (corresponding to the first-up delay) and likewise for the following sensors in the sequence.

□ The use of "flywheel" diodes is recommended when an inductive load is being switched.





Wiring sensors to devices with mechanical contact

2 and 3-wire type sensors

■ The following points should be taken into account:

□ When the mechanical contact is open, the sensor is not supplied.

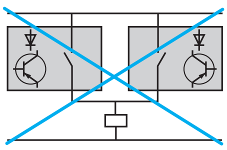
□ When the contact closes, the sensor does not operate until a certain time (t) has elapsed (corresponding to the first-up delay).

■ In scheme ***1***, as the external contact opens, the voltage transient caused by the breaking of the inductive load will appear inside the sensor and, if greater than the recommended max. insulation voltage, may cause a "flashover" within the sensor.

□ The return path of this voltage will be back to one line of the supply, through the sensor, and should "flashover" occur anywhere on the printed circuit board, severe damage could occur.

□ It is therefore recommended to use schemes ***2*** or ***3***.

Connection in parallel



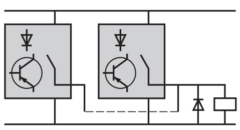
2-wire type sensors

This connection method is not recommended.

■ Should one of the sensors be in the closed state, the sensor in parallel will be "shorted-out" and no longer supplied. As the first sensor passes into the open state, the second sensor will become energised and will be subject to its first-up delay.

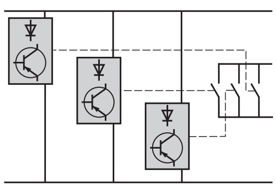
■ This configuration is only permissible where the sensors will be working alternately.

■ This method of connection can lead to irreversible damage of the units.



3-wire type sensors

■ No specific restrictions. The use of "flywheel" diodes is recommended when an inductive load (relay) is being switched.



Wiring sensors to devices with mechanical contact

2 and 3-wire type sensors

■ No specific restrictions.

□ For these sensors, the supply and output circuits are electrically separate.

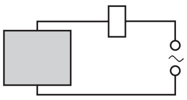
□ The sensor/relay contact galvanic isolation is 1500 to 2500 V, depending on the model.

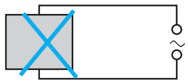
□ The maximum voltage, depending on the model, across each contact is ∿ 250 V.

Photo-electric sensors
XU range

Setting-up precautions *(continued)*

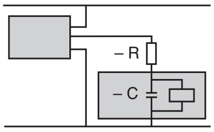
AC supply





- **2-wire type sensors cannot be connected directly to an AC supply.**
- This would result in immediate destruction of the sensor and considerable danger to the user.
- An appropriate load (refer to the instruction sheet supplied with the sensor) must always be connected in series with the sensor.

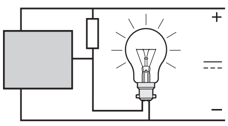
Capacitive load (C > 0.1 µF)

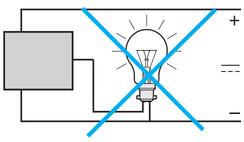


- On power-up, it is necessary to limit (by resistor) the charging current of the capacitive load C.
- The voltage drop in the sensor can also be taken into account by subtracting it from the supply voltage for the calculation of R.

$$R = \frac{U \text{ (supply)}}{I \text{ max. (sensor)}}$$

Load comprising an incandescent lamp





- If the load comprises an incandescent lamp, the cold state resistance can be 10 times lower than the hot state resistance. This can cause very high current levels on switching. Fit a pre-heat resistor in parallel with the sensor.

$R = \frac{U^2}{P} \times 10$, U = supply voltage and P = lamp power

Photo-electric sensors
XU range

Fast trouble shooting guide

Problem	Possible causes	Remedy
The sensor's output will not change state when an object enters the operating zone	On multimode sensor: setting-up error (detection mode programming)	■ Use the detection mode display option. After a RESET, follow the environment teach mode procedure.
	Output stage faulty or complete failure of the sensor (in either case, the sensor must be replaced), or the short-circuit protection has tripped.	■ Check that the sensor is compatible with the supply being used. ■ Check the load current characteristics: □ if load current I ⩾ maximum switching capacity, an auxiliary relay, of the CAD N type for example, should be interposed between the sensor and the load. □ if I ⩽ maximum switching capacity, check or wiring faults (short-circuit). ■ In all cases, a 0.4 A "quick-blow" fuse should be fitted in series with the sensor.
	Wiring error	■ Check that the wiring conforms to the wiring shown on the sensor label or instruction sheet.
	Supply fault	■ Check that the sensor is compatible with the supply (∼ or ⎓). ■ Check that the supply voltage is within the voltage limits of the sensor. Remember that with a rectified, smoothed supply, ■ (U peak = U nominal x √2 with a ripple voltage of ⩽ 10%).
	With a reflex system: incorrect use or poor state of reflector	■ The reflex system must operate in conjunction with a reflector. Adhere to the operating distances and check the alignment between the sensor and the reflector. ■ Replace the reflector if it has been damaged. ■ Clean the reflector and sensor lenses.
	Influence of ambient light	■ Make sure that the sensor is not dazzled by stray light (neon, sun, oven, etc.). ■ Fit a lens hood or turn the sensor.
False or erratic operation, with or without the presence of an object in the operating zone	On multimode sensor: setting-up error (detection mode programming)	■ Use the detection mode display option. After a RESET, follow the environment teach mode procedure.
	Influence of background or surface condition of the object to be detected (stray reflections)	■ Refer to the instruction sheet supplied with the sensor. For sensors with adjustable sensitivity, reduce or increase the sensing distance.
	Operating distance poorly defined for the reflector or object to be detected	■ Apply the correction coefficients. ■ Realign the system. ■ Clean the sensor lenses and reflector, or, if damaged, replace it.
	Influence of immediate environment	■ Check the cleanliness of the lenses and reflector. ■ Fit a lens hood, where required.
	Influence of transient interference on the supply lines	■ Ensure that any DC supplies, when derived from rectified AC, are correctly smoothed (C > 400 µF). ■ Separate AC power cables from low-level DC cables (⎓ 24 V low level). ■ Where very long distances are involved, use suitable cable: screened and twisted pairs of the correct cross-sectional area.
	Equipment prone to emitting electromagnetic interference	■ Position the sensors as far away as possible from any sources of interference.
	Response time of the sensor too slow for the particular object being detected	■ Check the suitability of the sensor for the position or shape of the object to be detected. ■ If necessary, select a sensor with a higher switching frequency.
	Influence of high temperature	■ Eliminate sources of radiated heat or protect the sensor casing with a heat shield. ■ Realign, having adjusted the temperature around the fixing support.
	Influence of ambient light	■ Make sure that the sensor is not disrupted by a intermittent source of light (flashing light, rotating mirror beacon, hinged mirror, reflective door, etc.). ■ Fit a lens hood or turn the sensor.

Photo-electric sensors
XU range

Fast troubleshooting guide *(continued)*

Problem	Possible causes	Remedy
No detection following a period of service	Vibration, shock	■ Realign the system ■ Replace the support or protect the sensor.
	Deterioration of relay contact	■ On an inductive load, use an RC suppressor connected in parallel with the load. ■ To eliminate contact contamination, the minimum current recommended is 15 mA. ■ Relay output models are not recommended for fast counting of objects since their service life is too short. Use models with a solid-state output.
	Dusty atmosphere	■ Clean the lenses and reflector with a soft cloth.

Notes:

■ **Sensors with a test input** enable automatic verification of their correct operation.
■ **Sensors with an alarm output** enable the operator to be informed, for preventive maintenance purposes, that the operating limits of sensors have been reached (dirty etc.).

Photo-electric sensors

XUM, general purpose, single mode function

Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

XU_CP21047

XUM2A●XBL2

XU_CP21048

XUM2A●XBM8

Thru-beam system with adjustable sensitivity

Max./operating sensing distance (Sn)	Function	Output	Connection	Reference	Weight kg
Transmitter + receiver					
30 m/24 m	Light ON (NC)/ Dark ON (NO) configuration by potentiometer	PNP	Pre-cabled (L = 2 m)	**XUM2APXBL2**	0.096
			M8 connector (4-pin)	**XUM2APXBM8**	0.026
		NPN	Pre-cabled (L = 2 m)	**XUM2ANXBL2**	0.096
			M8 connector (4-pin)	**XUM2ANXBM8**	0.026
Transmitter only *(1)*					
30 m/24 m			Pre-cabled (L = 2 m)	**XUM2AKXBL2T**	0.063
			M8 connector (4-pin)	**XUM2AKXBM8T**	0.010
Receiver only *(1)*					
30 m/24 m	Light ON (NC)/ Dark ON (NO) configuration by potentiometer	PNP	Pre-cabled (L = 2 m)	**XUM2APXBL2R**	0.630
			M8 connector (4-pin)	**XUM2APXBM8R**	0.010
		NPN	Pre-cabled (L = 2 m)	**XUM2ANXBL2R**	0.063
			M8 connector (4-pin)	**XUM2ANXBM8R**	0.010

XU_CP21039

XUZDVM●●

XU_CP21040

XUZDHM●●

XU_CP21041

XUZDRM●●

Accessories for thru-beam system

Description	Dimensions	Sensing distance	Reference	Weight
	mm	m		kg
Vertical diaphragm Sold in lots of 2	0.5 x 6.4	1	**XUZDVM05**	0.003
	1 x 6.4	1.5	**XUZDVM10**	0.003
	2 x 6.4	3.5	**XUZDVM20**	0.003
Horizontal diaphragm Sold in lots of 2	0.5 x 6.4	0.7	**XUZDHM05**	0.003
	1 x 6.4	1.5	**XUZDHM10**	0.003
	2 x 6.4	3	**XUZDHM20**	0.003
Round diaphragm Sold in lots of 2	0.5 x 6.4	0.08	**XUZDRM05**	0.003
	1 x 6.4	0.3	**XUZDRM10**	0.003
	2 x 6.4	1.2	**XUZDRM20**	0.003

Fixing accessories

See page 53.

Cabling accessories

See *"Cabling accessories XZ"* catalogue.

(1) To order these references, please consult our Customer Care Centre.

Photo-electric sensors

XUM, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

XU_CP21005

XUM9A●XBL2

XU_CP21004

XUM9A●XBM8

XUZC50_30

XUZC50

XU_511_PFJR18005

XUZC39

XU_511_PFJR18019

XUZC60S11

XU_CP21042

XUM8A●XBL2

XU_CP20113

XUM8A●XBM8

Polarised reflex system with adjustable sensitivity

Sensors

Max./operating sensing distance (Sn)	Function	Output	Connection	Reference	Weight kg
8 m/6.7 m with reflector XUZC50	Light ON (NC)/ Dark ON (NO) configuration by potentiometer	PNP	Pre-cabled (L = 2 m)	**XUM9APXBL2**	0.063
			M8 connector (4-pin)	**XUM9APXBM8**	0.010
		NPN	Pre-cabled (L = 2 m)	**XUM9ANXBL2**	0.063
			M8 connector (4-pin)	**XUM9ANXBM8**	0.010

Reflectors

Description	Size	Fixing mode	Reference	Weight kg
Rigid square reflectors	100 mm x 100 mm	2 brackets (not provided)	**XUZC100**	0.035
	51.5 mm x 69 mm	6 holes	**XUZC50**	0.020
Rigid rectangle reflectors	45 mm x 29 mm	2 holes	**XUZC24**	0.010
	40 mm x 60 mm	2 holes	**XUZC60S11**	0.022
Rigid circular reflectors	Ø 39 mm	Adhesive	**XUZC39**	0.008

Note*: All reflectors are IP 67 and IP 69K.*

Background suppression system with adjustable sensitivity

Max./operating sensing distance (Sn)	Function	Output	Connection	Reference	Weight kg
300 mm/200 mm (white object or paper)	Light ON (NO)/ Dark ON (NC) configuration by potentiometer	PNP	Pre-cabled (L = 2 m)	**XUM8APXBL2**	0.063
			M8 connector (4-pin)	**XUM8APXBM8**	0.010
		NPN	Pre-cabled (L = 2 m)	**XUM8ANXBL2**	0.063
			M8 connector (4-pin)	**XUM8ANXBM8**	0.010

Accessories

Fixing accessories

See page 53

Cabling accessories

See *“Cabling accessories XZ” catalogue.*

Photo-electric sensors

XUM, general purpose, single mode function

Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

XU_CP21042

XUM4A●XBL2

XU_CP20113

XUM4A●XBM8

XU_CP21042

XUM6A●XBL2

XU_CP20113

XUM6A●XBM8

XU_CP21042

XUM5A●XBL2

XU_CP20113

XUM5A●XBM8

Diffuse system with adjustable sensitivity

Max./operating sensing distance (Sn)	Function	Output	Connection	Reference	Weight kg
Diffuse short range					
0.25 m/0.17 m	Light ON (NO)/ Dark ON (NC) configuration by potentiometer	PNP	Pre-cabled (L = 2 m)	**XUM4APXBL2**	0.063
			M8 connector (4-pin)	**XUM4APXBM8**	0.010
		NPN	Pre-cabled (L = 2 m)	**XUM4ANXBL2**	0.063
			M8 connector (4-pin)	**XUM4ANXBM8**	0.010
Diffuse medium range					
1.1 m/0.8 m	Light ON (NO)/ Dark ON (NC) configuration by potentiometer	PNP	Pre-cabled (L = 2 m)	**XUM6APXBL2**	0.063
			M8 connector (4-pin)	**XUM6APXBM8**	0.010
		NPN	Pre-cabled (L = 2 m)	**XUM6ANXBL2**	0.063
			M8 connector (4-pin)	**XUM6ANXBM8**	0.010
Diffuse long range					
1.9 m/1.5 m	Light ON (NO)/ Dark ON (NC) configuration by potentiometer	PNP	Pre-cabled (L = 2 m)	**XUM5APXBL2**	0.063
			M8 connector (4-pin)	**XUM5APXBM8**	0.010
		NPN	Pre-cabled (L = 2 m)	**XUM5ANXBL2**	0.063
			M8 connector (4-pin)	**XUM5ANXBM8**	0.010

Photo-electric sensors
XUM, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

XU_511_CPSCT16014

XUZASM04

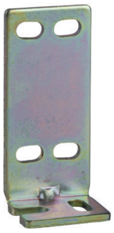
XU_511_CPSCT16017

XUZASM03

XU_511_CPSCT16016

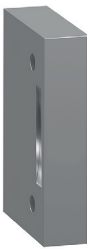
XUZASM02

XU_511_CPODA2016062



XUZA50

XU_CP21045



XUZASM05

Accessories for all XUM miniature sensors

Fixing accessories

Description	For use with sensors	Reference	Weight kg
Rear mounting bracket Supplied with 2 M3 screws	XUM●A●XBL2 XUM●A●XBM8	**XUZASM04**	0.030
Wrap around vertical mounting bracket, for pre-cabled sensors Supplied with 2 M3 screws	XUM●A●XBL2	**XUZASM03**	0.062
Wrap around horizontal mounting bracket, for pre-cabled sensors Supplied with 2 M3 screws	XUM●A●XBL2	**XUZASM02**	0.030
Metal fixing bracket Supplied with 2 M3 screws	XUM●A●XBL2 XUM●A●XBM8	**XUZA50**	0.025
Setting-up accessory			
Air blower mounting block *(1)* for cleaning the sensitive face of the sensor, using compressed air. Supplied with 2 mounting screws (M3 x 20), 1 air supply port plugging screw for the unused port (of 2 available) and 1 gasket.	XUM●A●XBL2 XUM●A●XBM8	**XUZASM05**	0.030

Cabling accessories

See *"Cabling accessories XZ" catalogue.*

(1) The air tube is not provided.

Photo-electric sensors

XUM, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

Characteristics

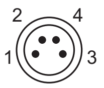
Sensor type				XUM●A●XBM8	XUM●A●XBL2
Product certifications				CE, UKCA, cULus EAC, RCM *(pending)*	
Connection	Connector			M8	–
	Pre-cabled			–	Length: 2 m
Nominal sensing distance Sn	Système barrage	XUM2	**m**	30 (with excess gain = 1) 24 (with excess gain = 2)	
	Polarised reflex system (using a 50 x 50 mm reflector XUZC50)	XUM9	**m**	0.05...8 (with excess gain = 1) 0.05...6.7 (with excess gain = 2)	
	Background suppression system	XUM8	**mm**	4 mm...300 mm: White paper or object. Sn (90%) 5 mm...265 mm: Grey object. Sn (18%) 8 mm...200 mm: Black object. Sn (6%)	
	Diffuse system (using a white paper 200 x 200 mm)	XUM4	**m**	0.25 (with excess gain = 1) 0.17 (with excess gain = 2)	
		XUM5	**m**	1.9 (with excess gain = 1) 1.5 (with excess gain = 2)	
		XUM6	**m**	1.1 (with excess gain = 1) 0.8 (with excess gain = 2)	
Hysteresis				2 % < H < 20 % at Sn	
Type of transmission	Red			Thru-beam system XUM2 Polarised reflex system XUM9 Background suppression system XUM8 Diffuse system XUM6	
	Infrared			Diffuse system XUM4 and XUM5	
Degree of protection	Conforming to IEC 60529			IP 65, IP 67	
Storage temperature			**°C**	- 40…+ 70	
Operating temperature			**°C**	- 30…+ 55	
Materials	Case			PBT	
	Lens			PMMA	
	Display			PC	
	Cable			–	PVC
Vibration resistance	Conforming to IEC 60068-2-6			Frequency range: 10 to 500 Hz Acceleration: 9 gn	
Shock resistance	Conforming to IEC 60068-2-27			Peak acceleration: 100 gn Duration of the pulse: 11 ms	
Indicator lights	Output state			Yellow LED	
	Stability			Green LED (XUM4, XUM5, XUM6, XUM8, XUM9)	
	Power on			Green LED (XUM2)	
Rated supply voltage			**V**	⎓ 12...24 with protection against reverse polarity	
Voltage limits (including ripple)			**V**	⎓ 12...24	
Current consumption, no-load			**mA**	< 20 max.	
Switching capacity			**mA**	100	
Voltage drop, closed state			**V**	⩽ 2	
Maximum switching frequency			**Hz**	1000	
Delays	First-up		**ms**	< 100	
	Response		**ms**	0.5	
	Recovery		**ms**	0.5	

Photo-electric sensors
XUM, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

Wiring schemes

Thru-beam system

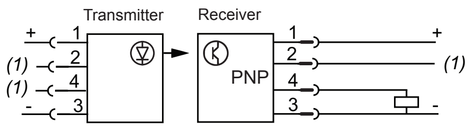
M8 connector - 4 pins



3 (-)
1 (+)
4 OUT/Output

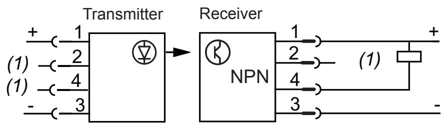
PNP

XUM2APXBM8



NPN

XUM2ANXBM8

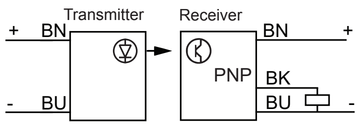


Pre-cabled - 3 wires

(-) BU (Blue)
(+) BN (Brown)
OUT/Output BK (Black)

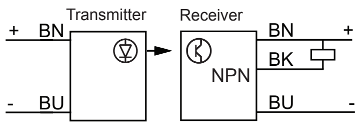
PNP

XUM2APXBL2



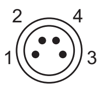
NPN

XUM2ANXBL2



Polarised reflex, background suppression and diffuse systems

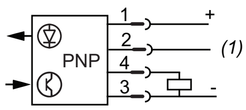
M8 connector - 4 pins



3 (-)
1 (+)
4 OUT/Output

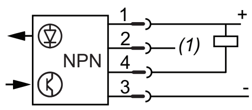
PNP

XUM●APXBM8



NPN

XUM●ANXBM8

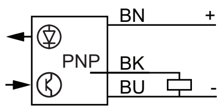


Pre-cabled - 3 wires

(-) BU (Blue)
(+) BN (Brown)
OUT/Output BK (Black)

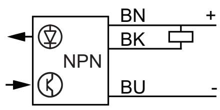
PNP

XUM●APXBL2



NPN

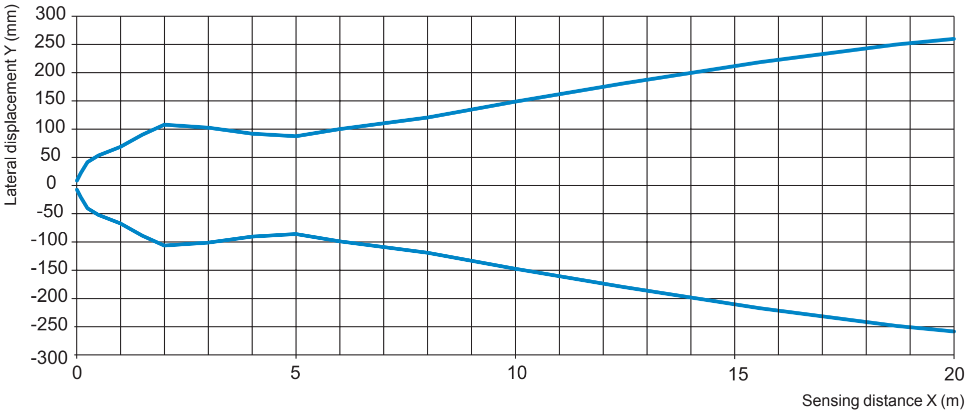
XUM●ANXBL2

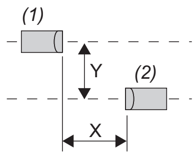


(1): Not connected.

Photo-electric sensors
XUM, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

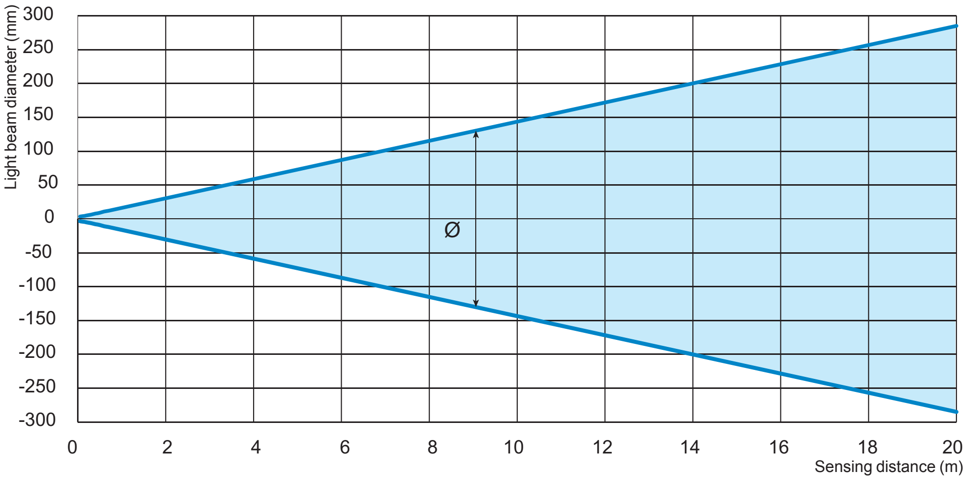
Detection curves
Thru-beam system: XUM2
Lateral displacement





(1): Transmitter
(2): Receiver

Light beam diameter



Excess gain

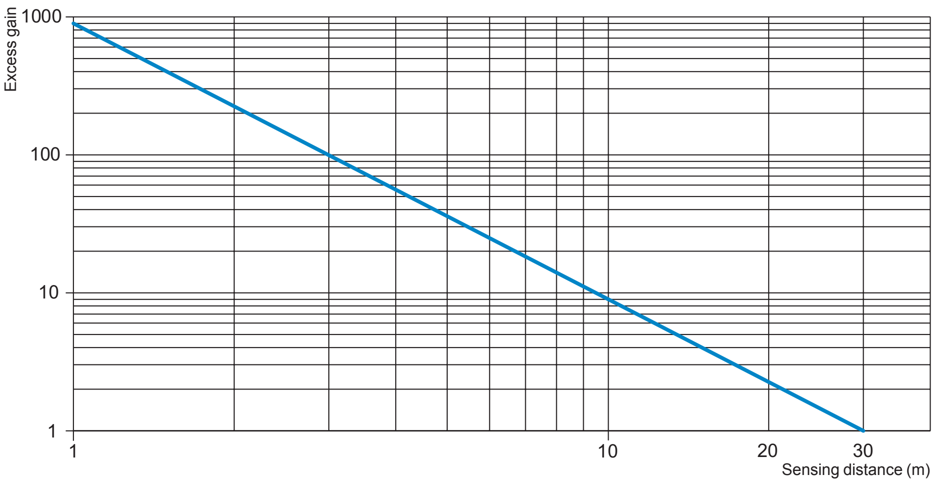


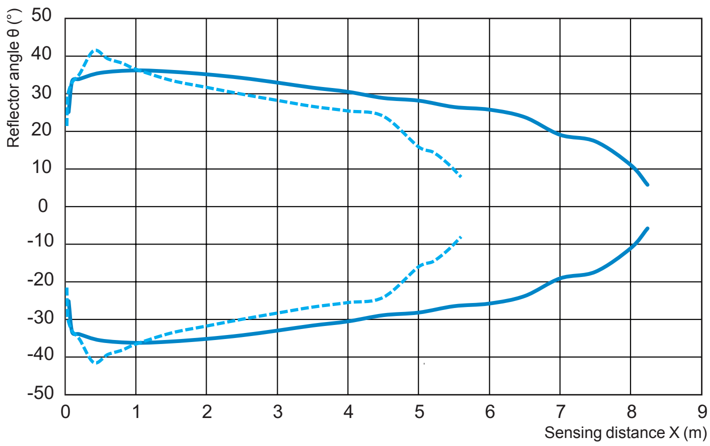
Photo-electric sensors

XUM, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

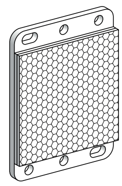
Detection curves

Polarised reflex system: XUM9

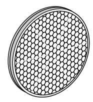
Reflector angle



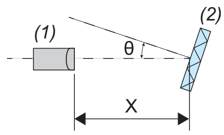
Using XUZC50 reflector
Using XUZC39 reflector



XUZC50

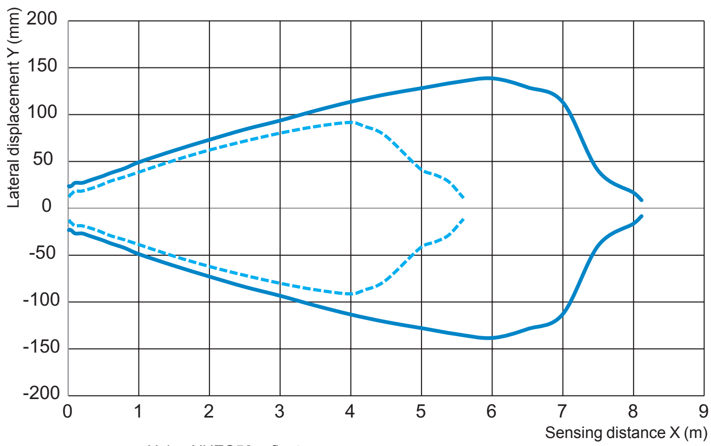


XUZC39

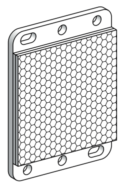


(1): Sensor
(2): Reflector
θ: Reflector angle (°)
X: Sensing distance (m)

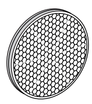
Lateral displacement



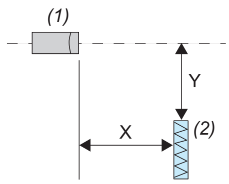
Using XUZC50 reflector
Using XUZC39 reflector



XUZC50

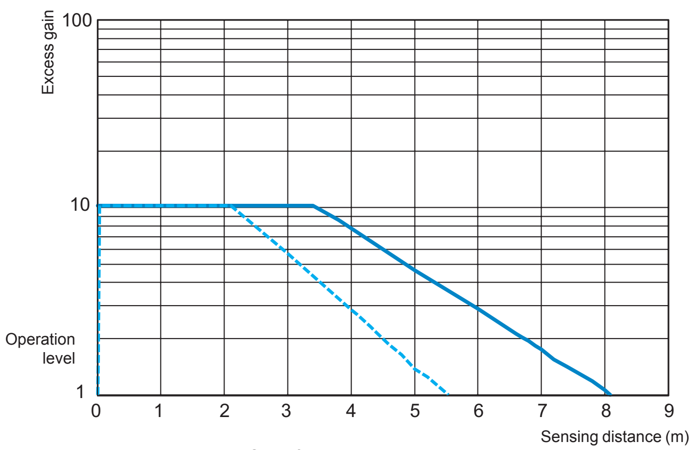


XUZC39

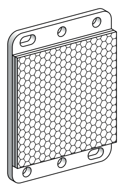


(1): Sensor
(2): Reflector
Y: Lateral displacement (mm)
X: Sensing distance (m)

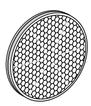
Excess gain



Using XUZC50 reflector
Using XUZC39 reflector



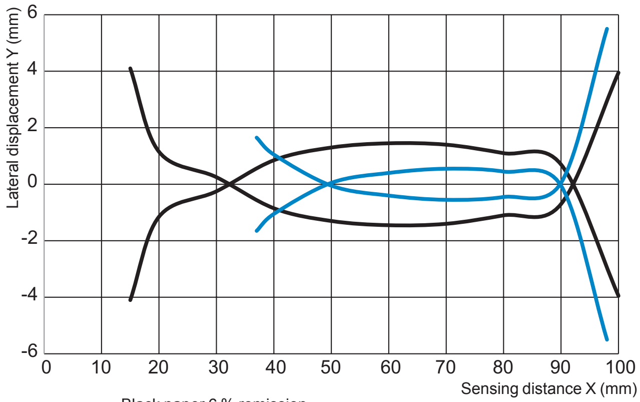
XUZC50



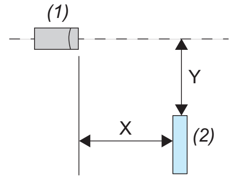
XUZC39

Photo-electric sensors
XUM, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

Detection curves (continued)
Background suppression system: XUM8
Lateral displacement (preset 100 mm)

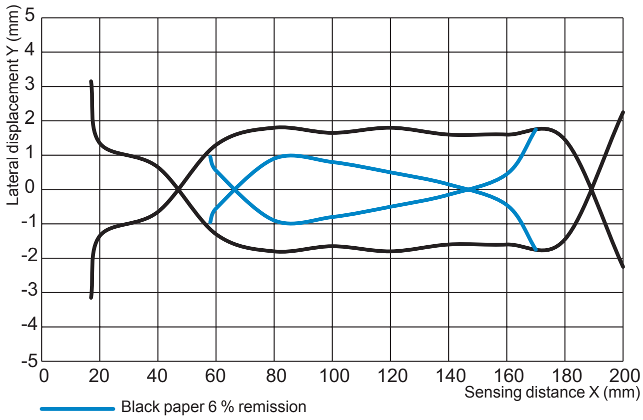


Black paper 6 % remission
White paper 90 % remission

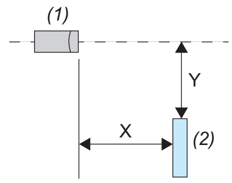


(1): Sensor
(2): Object (200 mm square white and black mat paper)
X: Sensing distance (mm)
Y: Lateral displacement (mm)

Lateral displacement (preset 200 mm)

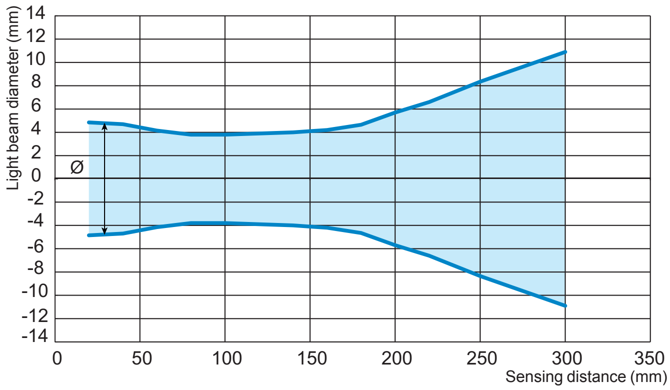


Black paper 6 % remission
White paper 90 % remission

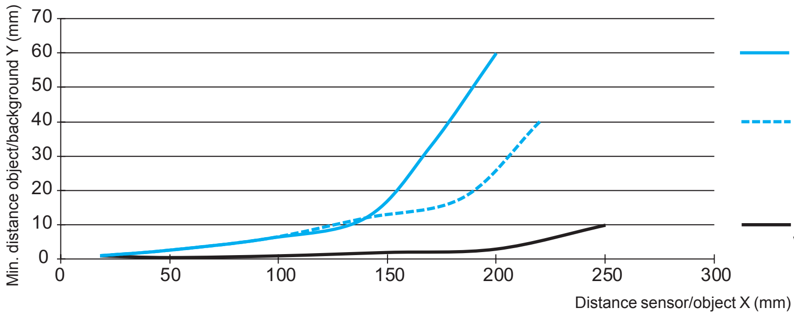


(1): Sensor
(2): Object (200 mm square white and black mat paper)
X: Sensing distance (mm)
Y: Lateral displacement (mm)

Light beam diameter



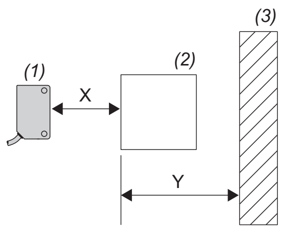
Minimum distance between the object to detect and white background



Min distance black object (6%)/ white background (90%) (mm)

Min. distance grey object (18%)/ white background (90%) (mm)

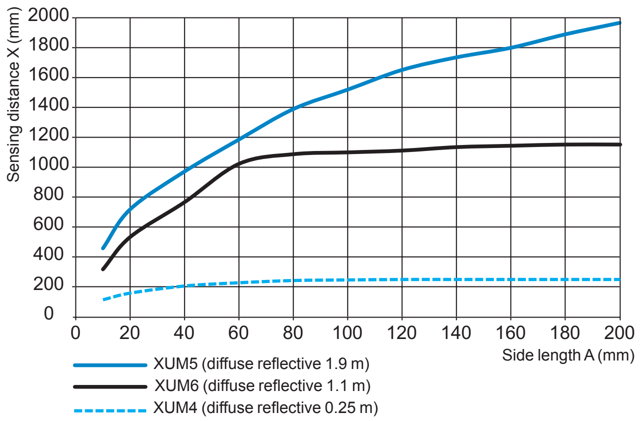
Min. distance white object (90%)/ white background (90%) (mm)

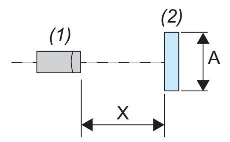


(1): Sensor
(2): Object
(3): Background
X: Distance sensor/object (mm)
Y: Min. distance object/ background (mm)

Photo-electric sensors
XUM, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

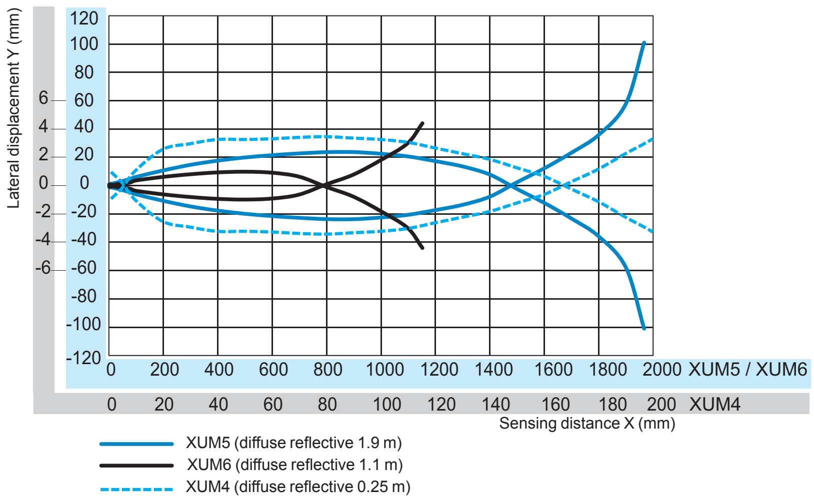
Detection curves (continued)
Diffuse system: XUM4, XUM5 and XUM6
Object size/sensing distance

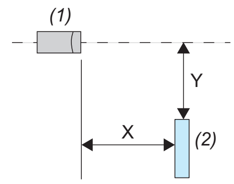




(1): Sensor
(2): Object (white mat paper of A mm square)
A: Side length (mm)
X: Sensing distance (mm)

Lateral displacement





(1): Sensor
(2): Object (200 x 200 mm square white paper)
X: Sensing distance (mm)
Y: Lateral displacement (mm)

Excess gain

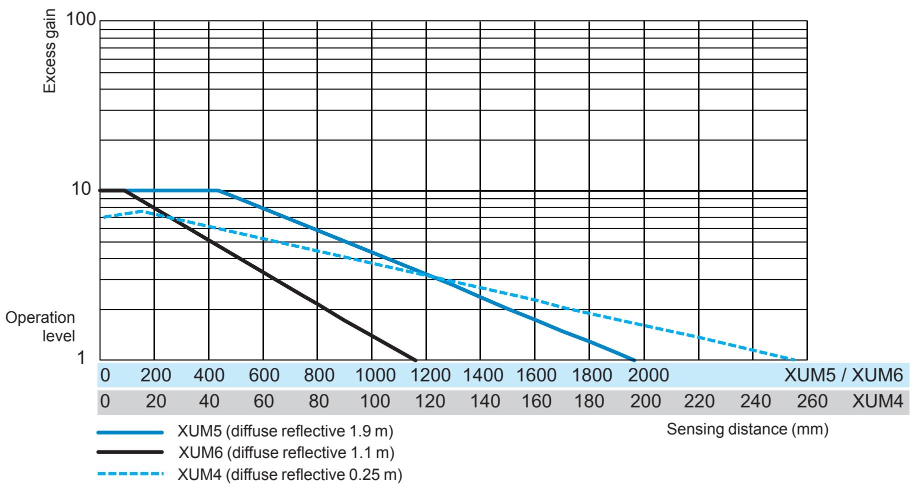


Photo-electric sensors

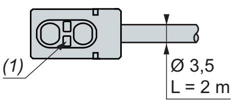
XUM, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

Thru-beam system

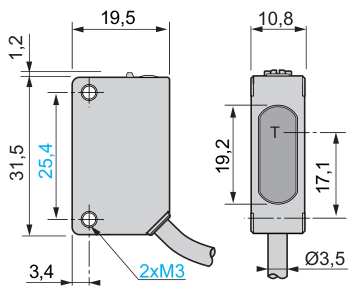
Pre-cabled version

Transmitter

Description - XUM2A●XBL2

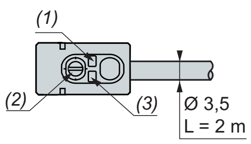


Dimensions - XUM2A●XBL2

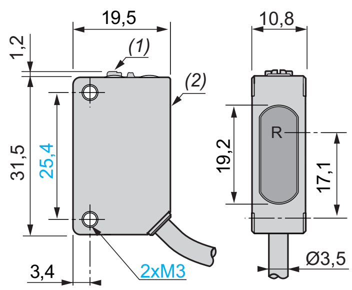


Receiver

Description - XUM2A●XBL2



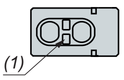
Dimensions - XUM2A●XBL2



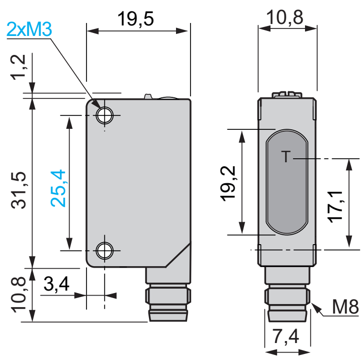
M8 connector version

Transmitter

Description - XUM2A●XBM8

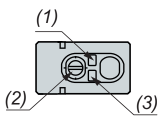


Dimensions - XUM2A●XBM8

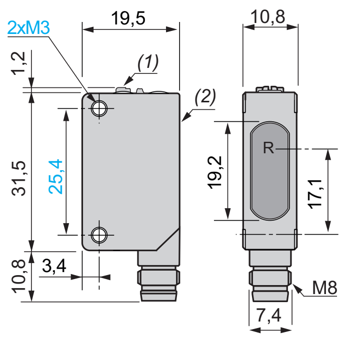


Receiver

Description - XUM2A●XBM8



Dimensions - XUM2A●XBM8



(1) Power ON indicator (green).

T: Transmission.

(1) Output indicator (yellow)
(2) Setting potentiometer (sensitivity).
(3) Power ON indicator (green).

R: Reception.
(1) Setting potentiometer (sensitivity).
(2) Setting potentiometer (output).

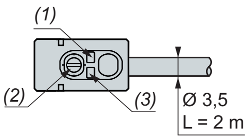
Photo-electric sensors

XUM, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

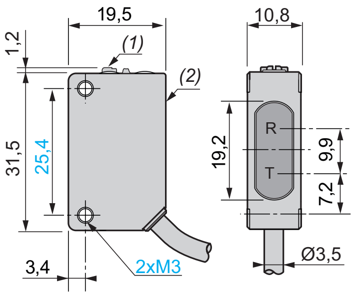
Polarised reflex system

Pre-cabled version

Description - XUM9A●XBL2

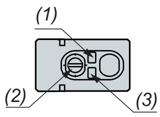


Dimensions - XUM9A●XBL2

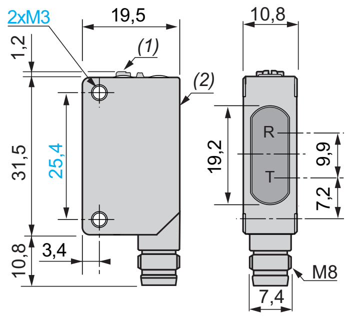


M8 connector version

Description - XUM9A●XBM8

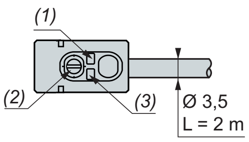


Dimensions - XUM9A●XBM8

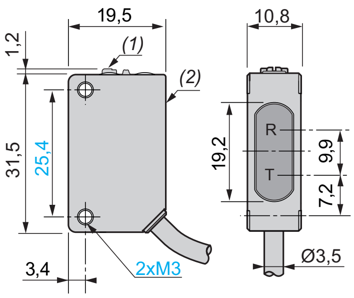


Background suppression system

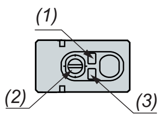
Description - XUM8A●XBL2



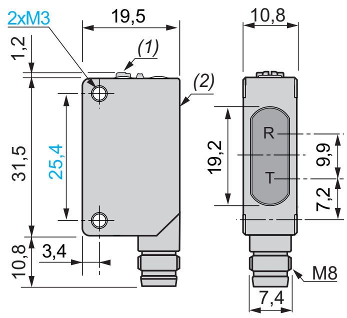
Dimensions - XUM8A●XBL2



Description - XUM8A●XBM8

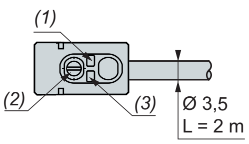


Dimensions - XUM8A●XBM8

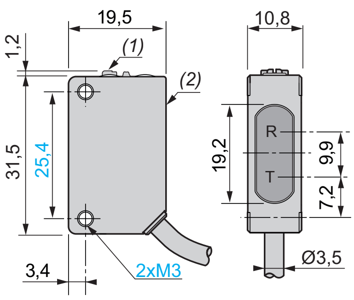


Diffuse system

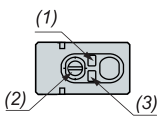
Description - XUM5A●XBL2, XUM6A●XBL2, XUM4A●XBL2



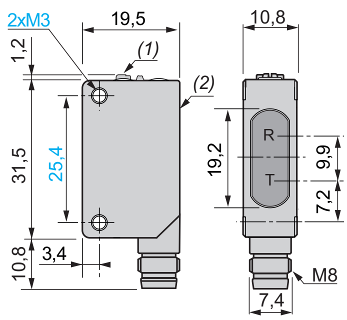
Dimensions - XUM5A●XBL2, XUM6A●XBL2, XUM4A●XBL2



Description - XUM5A●XBM8, XUM6A●XBM8, XUM4A●XBM8



Dimensions - XUM5A●XBM8, XUM6A●XBM8, XUM4A●XBM8



(1) Output indicator (yellow)
(2) Setting potentiometer (sensitivity
(3) Stability indicator (green).

R: Reception.
T: Transmission.
(1) Setting potentiometer (sensitivity).
(2) Setting potentiometer (output).

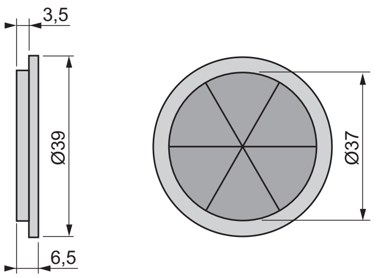
(1) Output indicator (yellow)
(2) Setting potentiometer (sensitivity
(3) Stability indicator (green).

R: Reception.
T: Transmission.
(1) Setting potentiometer (sensitivity).
(2) Setting potentiometer (output).

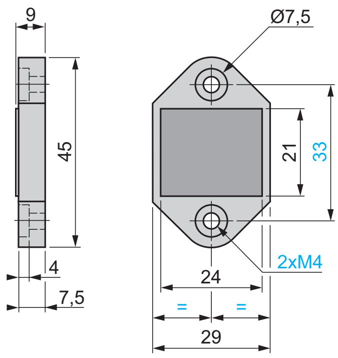
Photo-electric sensors
XUM, general purpose, single mode function
Miniature design, plastic
Accessories

Accessories
Reflectors

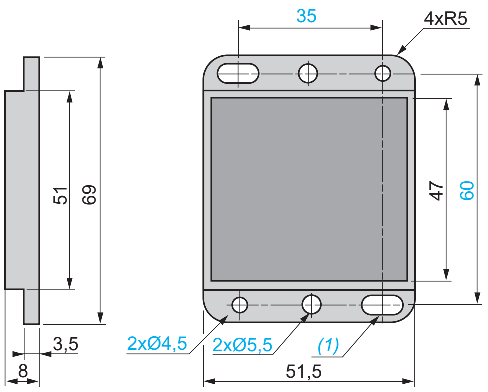
XUZC39



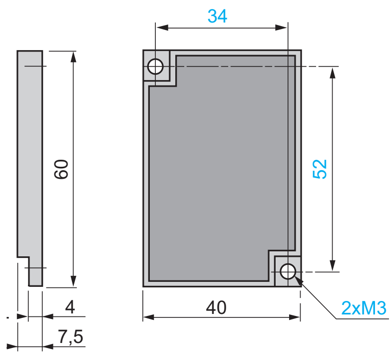
XUZC24



XUZC50

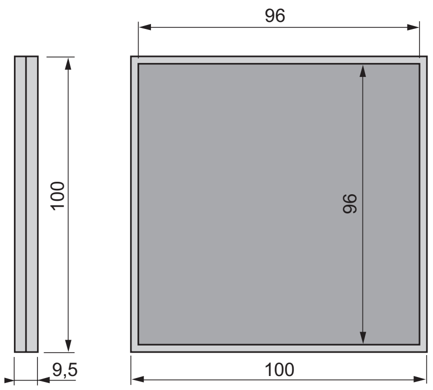


XUZC60S11



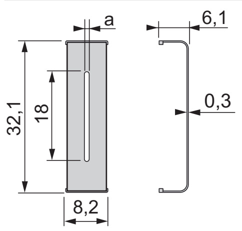
(1) 2 elongated holes Ø 4.5 x 8

XUZC100

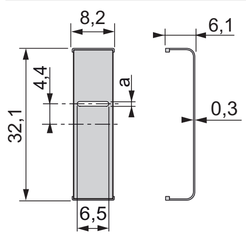


Diaphragms

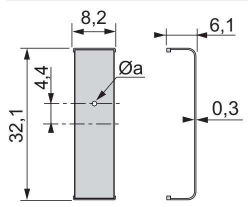
XUZDVM●●



XUZDHM●●



XUZDRM●●



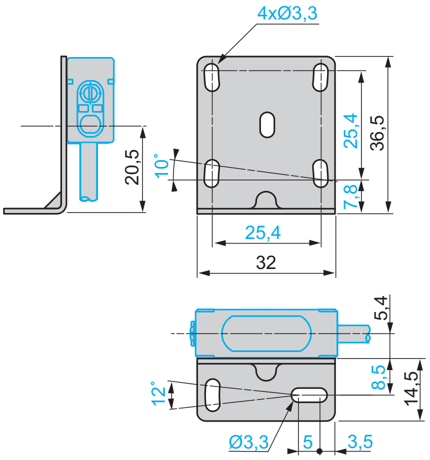
Reference	a (mm)
XUZDVM05	0.5
XUZDVM10	1
XUZDVM20	2
XUZDHM05	0.5
XUZDHM10	1
XUZDHM20	2
XUZDRM05	Ø 0.5
XUZDRM10	Ø 1
XUZDRM20	Ø 2

Photo-electric sensors
XUM, general purpose, single mode function
Miniature design, plastic
Accessories

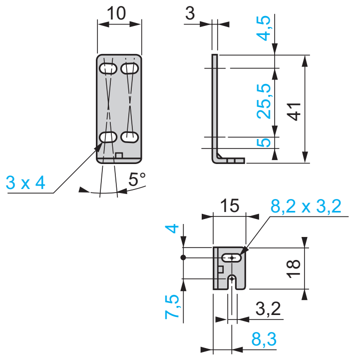
Accessories *(continued)*

Fixing brackets

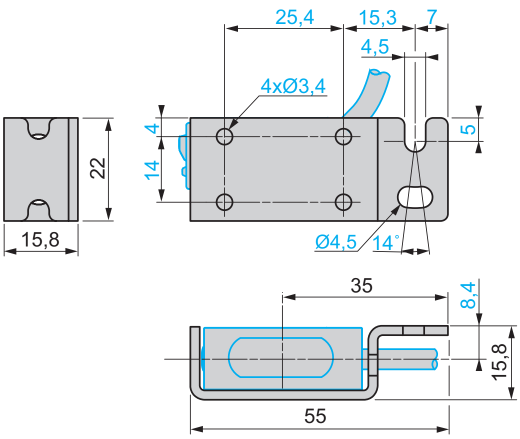
XUZASM04



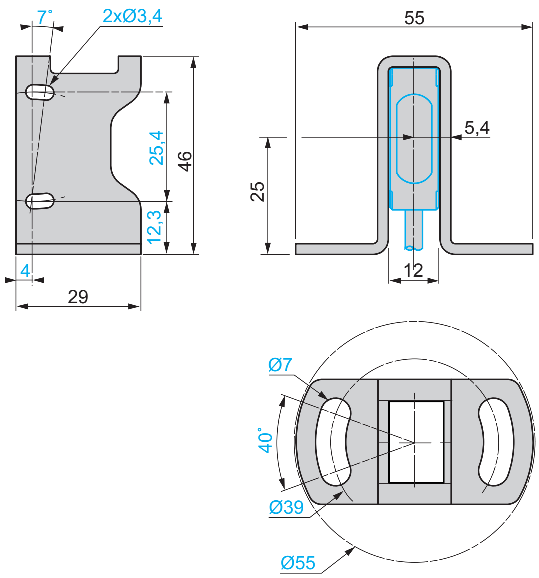
XUZA50



XUZASM02



XUZASM03



Air blower mounting block

XUZASM05

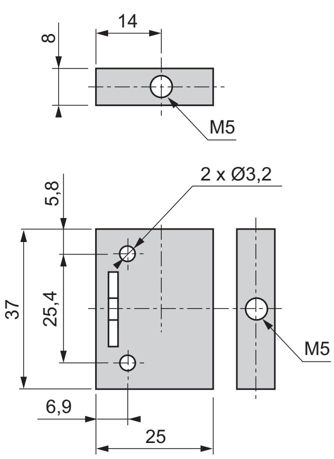
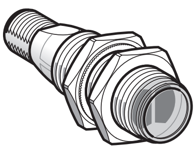
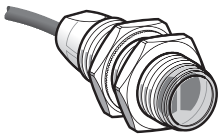
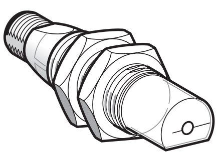


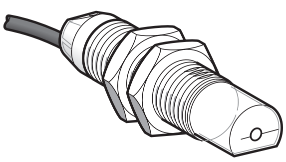
Photo-electric sensors

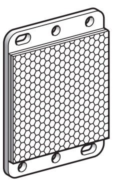
XU range, single mode function
Design 18, plastic
Three-wire DC, solid-state output

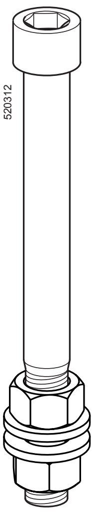

XUB●A●●NM12

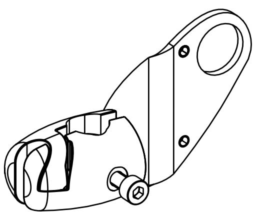

XUB●A●●NL2

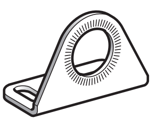

XUB●A●●WM12

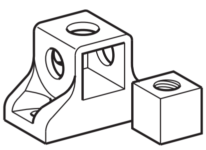

XUB●A●●WL2

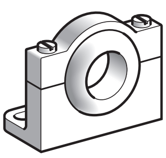

XUZC50


XUZ2001


XUZB2003


XUZA118


XUZ2003


XUZA218

Connector

Sensing distance (Sn) m	Function	Output	Line of sight	Reference	Weight kg
Diffuse system					
0.1	NO	PNP	Along case axis	**XUB4APANM12**	0.040
			90° to case axis	**XUB4APAWM12**	0.040
		NPN	Along case axis	**XUB4ANANM12**	0.040
			90° to case axis	**XUB4ANAWM12**	0.040
	NC	PNP	Along case axis	**XUB4APBNM12**	0.040
			90° to case axis	**XUB4APBWM12**	0.040
		NPN	Along case axis	**XUB4ANBNM12**	0.040
			90° to case axis	**XUB4ANBWM12**	0.040
Diffuse system with adjustable sensitivity					
0.6	NO	PNP	Along case axis	**XUB5APANM12**	0.045
			90° to case axis	**XUB5APAWM12**	0.050
		NPN	Along case axis	**XUB5ANANM12**	0.045
			90° to case axis	**XUB5ANAWM12**	0.050
	NC	PNP	Along case axis	**XUB5APBNM12**	0.045
			90° to case axis	**XUB5APBWM12**	0.050
		NPN	Along case axis	**XUB5ANBNM12**	0.045
			90° to case axis	**XUB5ANBWM12**	0.050
Polarised reflex system					
2	NO	PNP	Along case axis	**XUB9APANM12**	0.040
			90° to case axis	**XUB9APAWM12**	0.040
		NPN	Along case axis	**XUB9ANANM12**	0.040
			90° to case axis	**XUB9ANAWM12**	0.040
	NC	PNP	Along case axis	**XUB9APBNM12**	0.040
			90° to case axis	**XUB9APBWM12**	0.040
		NPN	Along case axis	**XUB9ANBNM12**	0.040
			90° to case axis	**XUB9ANBWM12**	0.040
Reflector 50 x 50 mm	–	–	–	**XUZC50**	0.020
Reflex system					
4	NO	PNP	Along case axis	**XUB1APANM12**	0.040
			90° to case axis	**XUB1APAWM12**	0.040
		NPN	Along case axis	**XUB1ANANM12**	0.040
			90° to case axis	**XUB1ANAWM12**	0.040
	NC	PNP	Along case axis	**XUB1APBNM12**	0.040
			90° to case axis	**XUB1APBWM12**	0.040
		NPN	Along case axis	**XUB1ANBNM12**	0.040
			90° to case axis	**XUB1ANBWM12**	0.040
Reflector 50 x 50 mm	–	–	–	**XUZC50**	0.020
Thru-beam system					
Transmitter 15	–	–	Along case axis	**XUB2AKSNM12T**	0.040
			90° to case axis	**XUB2AKSWM12T**	0.040
Receiver 15	NO	PNP	Along case axis	**XUB2APANM12R**	0.040
			90° to case axis	**XUB2APAWM12R**	0.040
		NPN	Along case axis	**XUB2ANANM12R**	0.040
			90° to case axis	**XUB2ANAWM12R**	0.040
	NC	PNP	Along case axis	**XUB2APBNM12R**	0.040
			90° to case axis	**XUB2APBWM12R**	0.040
		NPN	Along case axis	**XUB2ANBNM12R**	0.040
			90° to case axis	**XUB2ANBWM12R**	0.040

Fixing accessories *(1)*

Description	Reference	Weight kg
3D fixing kit for use on M12 rod, for XUB or XUZC50	**XUZB2003**	0.170
M12 rod	**XUZ2001**	0.050
Support for M12 rod	**XUZ2003**	0.150
Stainless steel fixing bracket	**XUZA118**	0.045
Plastic fixing bracket with adjustable ball-joint	**XUZA218**	0.035

Pre-cabled

For a pre-cabled sensor, replace **M12** by **L2** for a 2 m long cable, or by **L5** for a 5 m long cable.
Example: **XUB1APANM12** becomes **XUB1APANL2** for a 2 m long cable and **XUB1APANL5** for a 5 m long cable.
For availability, please consult our Customer Care Centre.

(1) For further information, *see page 667.*

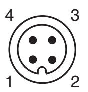
Photo-electric sensors
XU range, single mode function
Design 18, plastic
Three-wire DC, solid-state output

Characteristics

Sensor type			XUB1, XUB2, XUB4, XUB5, XUB9	XUB1, XUB2, XUB4, XUB5, XUB9
Product certifications			UL, CSA, CE	
Connection	Connector		M12	–
	Pre-cabled		–	Length: 2 m
Sensing distance nominal Sn / maximum (excess gain = 2) / (excess gain = 1)		m	**0.1 / 0.15 diffuse**	
		m	**0.6 / 0.8 diffuse with adjustable sensitivity**	
		m	**2 / 3 polarised reflex**	
		m	**4 / 5.5 reflex**	
		m	**15 / 20 thru-beam**	
Type of transmission			Infrared, except polarised reflex (red)	
Degree of protection	Conforming to IEC 60529		IP 65, IP 67, double insulation ⧈	
	Conforming to DIN 40050		IP 69K for connector versions	
Storage temperature		°C	- 40…+ 70	
Operating temperature		°C	- 25…+ 55	
Materials	Case		PBT	
	Lens		PMMA	
	Cable		–	PvR
Vibration resistance	Conforming to IEC 60068-2-6		7 gn, amplitude ± 1.5 mm (f = 10 to 55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms	
Indicator lights	Output state		Yellow LED (except for **XUB2●●●●●●T**)	
	Supply on		Green LED (only for **XUB2●●●●●●T**)	
Rated supply voltage		V	⎓ 12…24 with protection against reverse polarity	
Voltage limits (including ripple)		V	⎓ 10…36	
Current consumption, no-load		mA	35	
Switching capacity		mA	⩽ 100 with overload and short-circuit protection	
Voltage drop, closed state		V	1.5	
Maximum switching frequency		Hz	500	
Delays	First-up	ms	< 15	
	Response	ms	< 1	
	Recovery	ms	< 1	

Wiring schemes

M12 connector

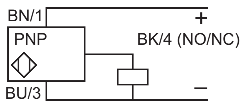


3 (-)
1 (+)
4 OUT/Output
2 Beam break input *(1)*

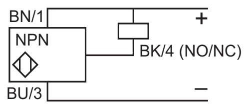
Pre-cabled

(-) BU (Blue)
(+) BN (Brown)
(OUT/Output) BK (Black)
Beam break input *(1)*
VI (Violet)

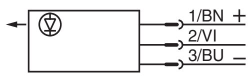
PNP



NPN



Transmitter

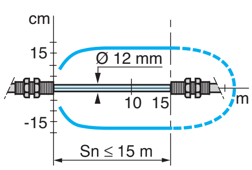


Input 2/VI:
- not connected: *beam made*
- connected to –: *beam broken*

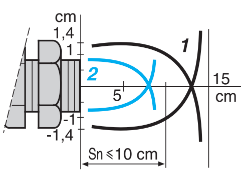
Please refer to our "Cabling accessories XZ" catalogue.

Detection curves

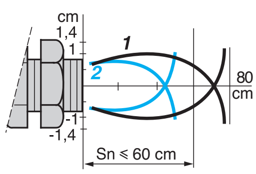
Thru-beam system



Diffuse system

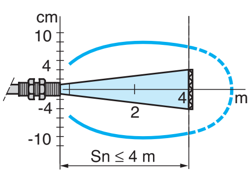


Diffuse system with adjustable sensitivity



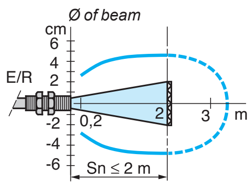
*Object 10 x 10 cm; **1** White 90%; **2** Grey 18%*

Reflex system



With reflector XUZC50

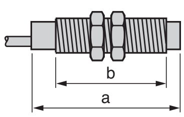
Polarised reflex system



With reflector XUZC50

Dimensions

XUB

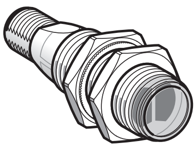


	Pre-cabled (mm) a	Pre-cabled (mm) b	Connector (mm) a	Connector (mm) b
Ø 18, line of sight along case axis	46 (2)	28	60 *(1)*	28
Ø 18, line of sight 90° to case axis	62	28	76	28
Ø 18, line of sight along case axis **XUB5**	62	44	76	44
Ø 18, line of sight 90° to case axis **XUB5**	78	44	92	44

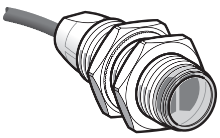
(1) Beam break input on thru-beam transmitter only.
*(2) For **XUB9●●●●●●** (polarised reflex) 46 becomes 48 mm and 60 becomes 62 mm.*

Photo-electric sensors

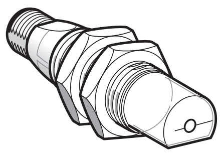
XU range, single mode function
Design 18, metal
Three-wire DC, solid-state output



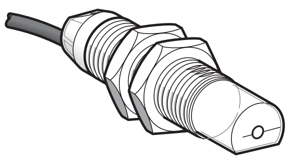
XUB●B●●NM12



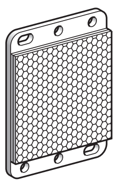
XUB●B●●NL2



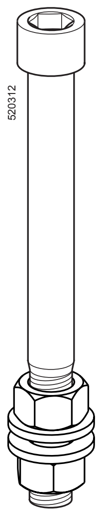
XUB●B●●WM12



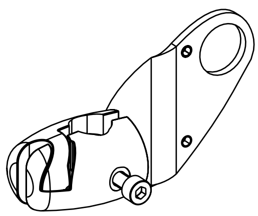
XUB●B●●WL2



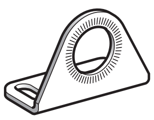
XUZC50



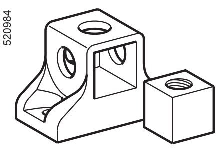
XUZ2001



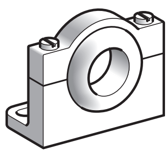
XUZB2003



XUZA118



XUZ2003



XUZA218

Connector

Sensing distance (Sn) m	Function	Output	Line of sight	Reference	Weight kg
Diffuse system					
0.1	NO	PNP	Along case axis	**XUB4BPANM12**	0.050
			90° to case axis	**XUB4BPAWM12**	0.050
		NPN	Along case axis	**XUB4BNANM12**	0.050
			90° to case axis	**XUB4BNAWM12**	0.050
	NC	PNP	Along case axis	**XUB4BPBNM12**	0.050
			90° to case axis	**XUB4BPBWM12**	0.050
		NPN	Along case axis	**XUB4BNBNM12**	0.050
			90° to case axis	**XUB4BNBWM12**	0.050
Diffuse system with adjustable sensitivity					
0.6	NO	PNP	Along case axis	**XUB5BPANM12**	0.055
			90° to case axis	**XUB5BPAWM12**	0.060
		NPN	Along case axis	**XUB5BNANM12**	0.055
			90° to case axis	**XUB5BNAWM12**	0.060
	NC	PNP	Along case axis	**XUB5BPBNM12**	0.055
			90° to case axis	**XUB5BPBWM12**	0.060
		NPN	Along case axis	**XUB5BNBNM12**	0.055
			90° to case axis	**XUB5BNBWM12**	0.060
Polarised reflex system					
2	NO	PNP	Along case axis	**XUB9BPANM12**	0.050
			90° to case axis	**XUB9BPAWM12**	0.050
		NPN	Along case axis	**XUB9BNANM12**	0.050
			90° to case axis	**XUB9BNAWM12**	0.050
	NC	PNP	Along case axis	**XUB9BPBNM12**	0.050
			90° to case axis	**XUB9BPBWM12**	0.050
		NPN	Along case axis	**XUB9BNBNM12**	0.050
			90° to case axis	**XUB9BNBWM12**	0.050
Reflector 50 x 50 mm	–	–	–	**XUZC50**	0.020
Reflex system					
4	NO	PNP	Along case axis	**XUB1BPANM12**	0.050
			90° to case axis	**XUB1BPAWM12**	0.050
		NPN	Along case axis	**XUB1BNANM12**	0.050
			90° to case axis	**XUB1BNAWM12**	0.050
	NC	PNP	Along case axis	**XUB1BPBNM12**	0.050
			90° to case axis	**XUB1BPBWM12**	0.050
		NPN	Along case axis	**XUB1BNBNM12**	0.050
			90° to case axis	**XUB1BNBWM12**	0.050
Reflector 50 x 50 mm	–	–	–	**XUZC50**	0.020
Thru-beam system					
Transmitter 15	–	–	Along case axis	**XUB2BKSNM12T**	0.050
			90° to case axis	**XUB2BKSWM12T**	0.050
Receiver 15	NO	PNP	Along case axis	**XUB2BPANM12R**	0.050
			90° to case axis	**XUB2BPAWM12R**	0.050
		NPN	Along case axis	**XUB2BNANM12R**	0.050
			90° to case axis	**XUB2BNAWM12R**	0.050
	NC	PNP	Along case axis	**XUB2BPBNM12R**	0.050
			90° to case axis	**XUB2BPBWM12R**	0.050
		NPN	Along case axis	**XUB2BNBNM12R**	0.050
			90° to case axis	**XUB2BNBWM12R**	0.050

Fixing accessories *(1)*

Description	Reference	Weight kg
3D fixing kit for use on M12 rod, for XUB or XUZC50	**XUZB2003**	0.170
M12 rod	**XUZ2001**	0.050
Support for M12 rod	**XUZ2003**	0.150
Stainless steel fixing bracket	**XUZA118**	0.045
Plastic fixing bracket with adjustable ball-joint	**XUZA218**	0.035

Pre-cabled

For a pre-cabled sensor, replace **M12** by **L2** for a 2 m long cable, or by **L5** for a 5 m long cable.
Example: **XUB1BPANM12** becomes **XUB1BPANL2** for a 2 m long cable and **XUB1BPANL5** for a 5 m long cable.
For availability, please consult our Customer Care Centre.

(1) For further information, see page 69.

Photo-electric sensors

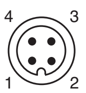
XU range, single mode function
Design 18, metal
Three-wire DC, solid-state output

Characteristics

Sensor type			XUB1, XUB2, XUB4, XUB5, XUB9	XUB1, XUB2, XUB4, XUB5, XUB9
Product certifications			UL, CSA, CE	
Connection	Connector		M12	–
	Pre-cabled		–	Length: 2 m
Sensing distance nominal Sn / maximum (excess gain = 2) (excess gain = 1)		m	**0.1 / 0.15 diffuse**	
		m	**0.6 / 0.8 diffuse with adjustable sensitivity**	
		m	**2 / 3 polarised reflex**	
		m	**4 / 5.5 reflex**	
		m	**15 / 20 thru-beam**	
Type of transmission			Infrared, except polarised reflex (red)	
Degree of protection	Conforming to IEC 60529		IP 65, IP 67, double insulation ⧈	
	Conforming to DIN 40050		IP 69K for connector versions	
Storage temperature		°C	- 40…+ 70	
Operating temperature		°C	- 25…+ 55	
Materials	Case		Nickel plated brass	
	Lens		PMMA	
	Cable		–	PvR
Vibration resistance	Conforming to IEC 60068-2-6		7 gn, amplitude ± 1.5 mm (f = 10 to 55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms	
Indicator lights	Output state		Yellow LED (except for **XUB2●●●●●●T**)	
	Supply on		Green LED (only for **XUB2●●●●●●T**)	
Rated supply voltage		V	⎓ 12…24 with protection against reverse polarity	
Voltage limits (including ripple)		V	⎓ 10…36	
Current consumption, no-load		mA	35	
Switching capacity		mA	⩽ 100 with overload and short-circuit protection	
Voltage drop, closed state		V	1.5	
Maximum switching frequency		Hz	500	
Delays	First-up	ms	< 15	
	Response	ms	< 1	
	Recovery	ms	< 1	

Wiring schemes

M12 connector

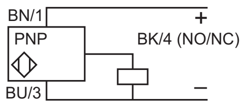


3 (-)
1 (+)
4 OUT/Output
2 Beam break input *(1)*

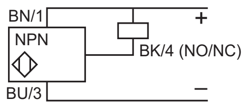
Pre-cabled

(-) BU (Blue)
(+) BN (Brown)
(OUT/Output) BK (Black)
Beam break input *(1)*
VI (Violet)

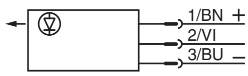
PNP



NPN



Transmitter

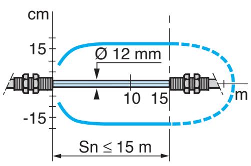


Input 2/VI:
- not connected: *beam made*
- connected to –: *beam broken*

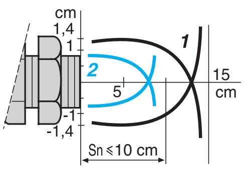
Please refer to our "Cabling accessories XZ" catalogue.

Detection curves

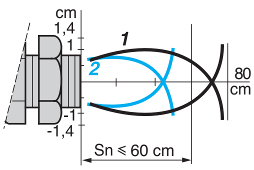
Thru-beam system



Diffuse system

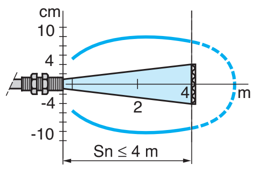


Diffuse system with adjustable sensitivity



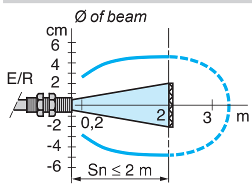
Object 10 x 10 cm; ***1*** *White 90%;* ***2*** *Grey 18%*

Reflex system



With reflector XUZC50

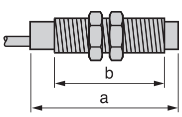
Polarised reflex system



With reflector XUZC50

Dimensions

XUB



	Pre-cabled (mm)		Connector (mm)	
	a	b	a	b
Ø 18, line of sight along case axis	46 (2)	28	60 *(1)*	28
Ø 18, line of sight 90° to case axis	62	28	76	28
Ø 18, line of sight along case axis **XUB5**	62	44	76	44
Ø 18, line of sight 90° to case axis **XUB5**	78	44	92	44

(1) Beam break input on thru-beam transmitter only.
(2) For ***XUB9●●●●●●*** *(polarised reflex) 46 becomes 48 mm and 60 becomes 62 mm.*

Electronic pressure sensors

XM Range
XMLP pressure transmitters
Compact metal body, stainless steel fluid entry
With analogue output

XMLP pressure transmitters
AISI 316L stainless steel casing

Presentation

XMLP pressure transmitters rated at less than 9 bar or 100 psi

These transmitters integrate a ceramic pressure measuring cell. Ceramic technology has been used successfully for many years and offers a high level of sensitivity that is particularly suitable for measuring low pressures.

Ceramic also provides good resistance to abrasive fluids.
An internal fluorocarbon rubber gasket provides the seal between the ceramic measuring cell and the AISI 316L stainless steel casing.

Pressure transmitters can be used to measure the following types of pressure:
- air
- fresh water
- the majority of hydraulic oils

It is important, however, to ensure that the gasket is compatible with the fluid being controlled.

These transmitters can control fluids ranging in temperature from -15 to 125 °C.

Their power supply *(1)* depends on the type of analogue output:
- 5 V +/- 10% for the 0.5…4.5 V ratiometric output
- 12 or 24 V (nominal), operating from 7 to 33 V for the 4…20 mA output
- 24 V (nominal), operating from 12 to 33 V for the 0…10 V output

XMLP pressure transmitters rated greater than or equal to 9 bar or 100 psi

These transmitters integrate a metal pressure measuring cell.
This measuring cell, which is welded directly onto the AISI 316L stainless steel transmitter body, offers the following advantages:
- An all-metal pressure chamber, with no elastomer gasket in contact with the fluid
- Compatibility with a large number of fluids:
  - air
  - fresh water
  - hydraulic oils
  - refrigeration fluids
  - all fluids or gases compatible with AISI 316L stainless steel

XMLP pressure transmitters can control fluids ranging in temperature from -30 to120 °C.

Their power supply *(1)* depends on the type of analogue output:
- 5 V +/- 10% for the 0.5…4.5 V ratiometric output
- 12 or 24 V (nominal), operating from 7 to 33 V for the 4…20 mA output
- 24 V (nominal), operating from 12 to 33 V for the 0…10 V output

General characteristics

Made of stainless steel, XMLP pressure transmitters are compact and rugged.
Their degree of protection varies according to the type of connector:
- IP 65 for EN 175301-803-A connector versions
- IP 65 and IP 67 for Packard Metri-Pack connector versions
- IP 65, IP 67 and IP 69K for M12 connector versions

With typical precision better than 0.5% of the rating, these transmitters are particularly suitable for industrial applications such as:
- machine tools
- moulding presses
- stamping presses
- lifting gear
- HVAC systems (for ratings greater than or equal to 9 bar or 100 psi only)

(1) Use Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV) power supply.

Electronic pressure sensors

XM Range
XMLP pressure transmitters
Compact metal body, stainless steel fluid entry
With analogue output.

Functions

XMLP pressure transmitters have an analogue output which delivers a signal proportional to the measured pressure.
This output can be one of the following types:
- 4…20 mA
- 0…10 V
- 0.5…4.5 V ratiometric

The pressure ranges available are:
- vacuum measuring
  - -1…0 bar
  - -14.5…0 psi
- pressure measuring
  - 0…600 bar
  - 0…6,000 psi
- combined pressure measuring (vacuum and pressure)
  - -1…25 bar
  - -14.5…60 psi

The XMLP offer is available with four types of electrical connection:
- M12, 4-pin connector
- EN 175301-803-A (ex DIN 43650) connector
- Packard Metri-Pack 150 connector
- 2 m PVC cable

Several types of fluid connection are available:
- G1/4 A male
- 1/4”-18NPT male
- SAE 7/16-20UNF-2A male
- SAE 7/16-20UNF-2B female (with or without Schrader pin depending on the model)

Depending on the model, XMLP transmitters are sold:
- individually
- in lots of 25

Electronic pressure sensors

XM Range
XMLP pressure transmitters
Compact metal body, 316L stainless steel fluid entry
With analogue output. Sizes in bar

PF151601

XMLP●●●GD●1F

PF151600

XMLP●●●GC●1F

PF151602

XMLP●●●GL●1F

-1 to 0 bar (-14.5 to 0 psi)
Maximum permissible accidental pressure: 3 bar, destruction pressure: 5 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-E (male) fluid connection			
4…20 mA	M12	**XMLPM00GD21F** *(1)*	0.080
	EN 175301-803-A	**XMLPM00GC21F** *(1)*	0.096
	2 m cable	**XMLPM00GL21F**	0.197
0…10 V	M12	**XMLPM00GD71F** *(1)*	0.080
	EN 175301-803-A	**XMLPM00GC71F** *(1)*	0.096
	2 m cable	**XMLPM00GL71F**	0.197
0.5…4.5 V ratiometric	M12	**XMLPM00GD11F**	0.080
	EN 175301-803-A	**XMLPM00GC11F**	0.096
SAE 7/16-20UNF-2B (female) fluid connection			
4…20 mA	M12	**XMLPM00GD2BF**	0.080
	EN 175301-803-A	**XMLPM00GC2BF**	0.096
0…10 V	M12	**XMLPM00GD7BF**	0.080
	EN 175301-803-A	**XMLPM00GC7BF**	0.096

-1 to 1 bar (-14.5 to 14.5 psi)
Maximum permissible accidental pressure: 3 bar, destruction pressure: 5 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-E (male) fluid connection			
4…20 mA	M12	**XMLPM01GD21F** *(1)*	0.080
	EN 175301-803-A	**XMLPM01GC21F** *(1)*	0.096
0…10 V	M12	**XMLPM01GD71F**	0.080
	EN 175301-803-A	**XMLPM01GC71F**	0.096

-1 to 5 bar (-14.5 to 72.6 psi)
Maximum permissible accidental pressure: 18 bar, destruction pressure: 24 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-E (male) fluid connection			
4…20 mA	M12	**XMLPM05GD21F** *(1)*	0.080
	EN 175301-803-A	**XMLPM05GC21F** *(1)*	0.096
0…10 V	M12	**XMLPM05GD71F**	0.080
	EN 175301-803-A	**XMLPM05GC71F**	0.096

(1) Sold in lots of 25: add the letter Q to the end of the selected reference.
*For example, **XMLPM00GD21F** becomes **XMLPM00GD21FQ**.*

Electronic pressure sensors

XM Range

XMLP pressure transmitters
Compact metal body, 316L stainless steel fluid entry
With analogue output. Sizes in bar

PF151601

XMLPM●●BD●1F

XM-EX_522_CPMFS17001

XMLPM●●BC●1F

- 1 to 9 bar (- 14.5 to 130 psi)

Maximum permissible accidental pressure: 30 bar, destruction pressure: 60 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-E (male) fluid connection			
4…20 mA	M12	**XMLPM09BD21F** *(1)*	0.090
	EN 175301-803-A	**XMLPM09BC21F**	0.106
0…10 V	M12	**XMLPM09BD71F** *(1)*	0.090
	EN 175301-803-A	**XMLPM09BC71F**	0.106
0.5…4.5 V ratiometric	M12	**XMLPM09BD11F**	0.090

- 1 to 25 bar (- 14.5 to 362.5 psi)

Maximum permissible accidental pressure: 75 bar, destruction pressure: 150 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-E (male) fluid connection			
4…20 mA	M12	**XMLPM25BD21F**	0.090

(1) Sold in lots of 25: add the letter Q to the end of the selected reference.
*For example, **XMLPM09BD21F** becomes **XMLPM09BD21FQ**.*

Electronic pressure sensors

XM Range
XMLP pressure transmitters
Compact metal body, 316L stainless steel fluid entry
With analogue output. Sizes in bar

PF151601

XMLP●●●●D●1F

PF151600

XMLP●●●●C●1F

PF151602

XMLP001GL●1F

PF151603

XMLP001GC●BF

PF151604

XMLP001GD●BF

0 to 0.25 bar (0 to 3.63 psi)
Maximum permissible accidental pressure: 3 bar, destruction pressure: 5 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-E (male) fluid connection			
4…20 mA	M12	**XMLP250MD21F** *(1)*	0.080
	EN 175301-803-A	**XMLP250MC21F** *(1)*	0.096
0…10 V	M12	**XMLP250MD71F** *(1)*	0.080
	EN 175301-803-A	**XMLP250MC71F** *(1)*	0.096
0.5…4.5 V ratiometric	M12	**XMLP250MD11F**	0.080
	EN 175301-803-A	**XMLP250MC11F**	0.096

0 to 0.5 bar (0 to 7.26 psi)
Maximum permissible accidental pressure: 3 bar, destruction pressure: 5 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-E (male) fluid connection			
4…20 mA	M12	**XMLP500MD21F** *(1)*	0.080
	EN 175301-803-A	**XMLP500MC21F** *(1)*	0.096
0…10 V	M12	**XMLP500MD71F** *(1)*	0.080
	EN 175301-803-A	**XMLP500MC71F** *(1)*	0.096
0.5…4.5 V ratiometric	M12	**XMLP500MD11F**	0.080
	EN 175301-803-A	**XMLP500MC11F**	0.096

0 to 1 bar (0 to 14.5 psi)
Maximum permissible accidental pressure: 3 bar, destruction pressure: 5 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-E (male) fluid connection			
4…20 mA	M12	**XMLP001GD21F** *(1)*	0.080
	EN 175301-803-A	**XMLP001GC21F** *(1)*	0.096
	2 m cable	**XMLP001GL21F**	0.197
0…10 V	M12	**XMLP001GD71F** *(1)*	0.080
	EN 175301-803-A	**XMLP001GC71F** *(1)*	0.096
	2 m cable	**XMLP001GL71F**	0.197
0.5…4.5 V ratiometric	M12	**XMLP001GD11F** *(1)*	0.080
	EN 175301-803-A	**XMLP001GC11F**	0.096
SAE 7/16-20UNF-2B (female) fluid connection			
4…20 mA	M12	**XMLP001GD2BF**	0.080
	EN 175301-803-A	**XMLP001GC2BF**	0.096
0…10 V	M12	**XMLP001GD7BF**	0.080
	EN 175301-803-A	**XMLP001GC7BF**	0.096

(1) Sold in lots of 25: add the letter Q to the end of the selected reference.
*For example, **XMLP250MD21F** becomes **XMLP250MD21FQ**.*

Electronic pressure sensors

XM Range
XMLP pressure transmitters
Compact metal body, 316L stainless steel fluid entry
With analogue output. Sizes in bar

PF151601

XMLP●●●●D●1F

PF151600

XMLP●●●●C●1F

PF151602

XMLP●●●GL●1F

0 to 2.5 bar (0 to 36.3 psi)

Maximum permissible accidental pressure: 7.5 bar, destruction pressure: 10 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-E (male) fluid connection			
4…20 mA	M12	**XMLP2D5GD21F** *(1)*	0.080
	EN 175301-803-A	**XMLP2D5GC21F** *(1)*	0.096
	2 m cable	**XMLP2D5GL21F**	0.197
0…10 V	M12	**XMLP2D5GD71F** *(1)*	0.080
	EN 175301-803-A	**XMLP2D5GC71F** *(1)*	0.096
	2 m cable	**XMLP2D5GL71F**	0.197
0.5…4.5 V ratiometric	M12	**XMLP2D5GD11F**	0.080
	EN 175301-803-A	**XMLP2D5GC11F**	0.096

0 to 4 bar (0 to 58 psi)

Maximum permissible accidental pressure: 12 bar, destruction pressure: 16 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-E (male) fluid connection			
4…20 mA	M12	**XMLP004GD21F** *(1)*	0.080
	EN 175301-803-A	**XMLP004GC21F** *(1)*	0.096
0…10 V	M12	**XMLP004GD71F** *(1)*	0.080
	EN 175301-803-A	**XMLP004GC71F** *(1)*	0.096
0.5…4.5 V ratiometric	M12	**XMLP004GD11F**	0.080
	EN 175301-803-A	**XMLP004GC11F**	0.096

0 to 6 bar (0 to 87 psi)

Maximum permissible accidental pressure: 18 bar, destruction pressure: 24 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-E (male) fluid connection			
4…20 mA	M12	**XMLP006GD21F** *(1)*	0.080
	EN 175301-803-A	**XMLP006GC21F** *(1)*	0.096
	2 m cable	**XMLP006GL21F**	0.197
0…10 V	M12	**XMLP006GD71F** *(1)*	0.080
	EN 175301-803-A	**XMLP006GC71F** *(1)*	0.096
	2 m cable	**XMLP006GL71F**	0.197
0.5…4.5 V ratiometric	M12	**XMLP006GD11F** *(1)*	0.080
	EN 175301-803-A	**XMLP006GC11F**	0.096

(1) Sold in lots of 25: add the letter Q to the end of the selected reference.
*For example, **XMLP004GD71F** becomes **XMLP004GD71FQ**.*

Electronic pressure sensors
XM Range
XMLP pressure transmitters
Compact metal body, 316L stainless steel fluid entry
With analogue output. Sizes in bar


XMLP01●BC●1F


XMLP01●BD●1F


XMLP01●BC270


XMLP01●BD270


XMLP01●BC●90


XMLP01●BD●90

0 to 10 bar (0 to 145 psi)

Maximum permissible accidental pressure: 30 bar, destruction pressure: 60 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-E (male) fluid connection			
4…20 mA	M12	**XMLP010BD21F** (1)	0.090
	EN 175301-803-A	**XMLP010BC21F** (1)	0.106
0…10 V	M12	**XMLP010BD71F** (1)	0.090
	EN 175301-803-A	**XMLP010BC71F** (1)	0.106
0.5…4.5 V ratiometric	M12	**XMLP010BD11F**	0.090
	EN 175301-803-A	**XMLP010BC11F**	0.106
SAE 7/16-20UNF-2A (male) fluid connection			
4…20 mA	M12	**XMLP010BD270**	0.087
	EN 175301-803-A	**XMLP010BC270**	0.103
SAE 7/16-20UNF-2B (female with Schrader pin) fluid connection			
4…20 mA	M12	**XMLP010BD290** (1)	0.100
	EN 175301-803-A	**XMLP010BC290**	0.116
0…10 V	M12	**XMLP010BD790**	0.100
	EN 175301-803-A	**XMLP010BC790**	0.116
0.5…4.5 V ratiometric	M12	**XMLP010BD190**	0.100

0 to 16 bar (0 to 232 psi)

Maximum permissible accidental pressure: 48 bar, destruction pressure: 96 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-E (male) fluid connection			
4…20 mA	M12	**XMLP016BD21F** (1)	0.090
	EN 175301-803-A	**XMLP016BC21F** (1)	0.106
0…10 V	M12	**XMLP016BD71F** (1)	0.090
	EN 175301-803-A	**XMLP016BC71F** (1)	0.106
0.5…4.5 V ratiometric	M12	**XMLP016BD11F**	0.090
	EN 175301-803-A	**XMLP016BC11F**	0.106
SAE 7/16-20UNF-2A (male) fluid connection			
4…20 mA	M12	**XMLP016BD270**	0.087
	EN 175301-803-A	**XMLP016BC270**	0.103
SAE 7/16-20UNF-2B (female with Schrader pin) fluid connection			
4…20 mA	M12	**XMLP016BD290**	0.100
	EN 175301-803-A	**XMLP016BC290**	0.116
0…10 V	M12	**XMLP016BD790**	0.100
0.5…4.5 V ratiometric	M12	**XMLP016BD190**	0.100

(1) Sold in lots of 25: add the letter Q to the end of the selected reference.
*For example, **XMLP016BD21F** becomes **XMLP016BD21FQ**.*

Electronic pressure sensors

XM Range
XMLP pressure transmitters
Compact metal body, 316L stainless steel fluid entry
With analogue output. Sizes in bar

PF151600

PF151601

XMLP0●●BC●1F *XMLP0●●BD●1F*

XM-EX_522_CPMFS17002

XM-EX_522_CPMFS17004

XMLP0●●BC270 *XMLP0●●BD270*

XM-EX_522_CPMFS17003

XM-EX_522_CPMFS17005

XMLP0●●BC●90 *XMLP0●●BD●90*

0 to 25 bar (0 to 362.5 psi)

Maximum permissible accidental pressure: 75 bar, destruction pressure: 150 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-E (male) fluid connection			
4…20 mA	M12	**XMLP025BD21F**	0.090
	EN 175301-803-A	**XMLP025BC21F**	0.106
0…10 V	M12	**XMLP025BD71F** *(1)*	0.090
	EN 175301-803-A	**XMLP025BC71F**	0.106
0.5…4.5 V ratiometric	M12	**XMLP025BD11F**	0.090
	EN 175301-803-A	**XMLP025BC11F**	0.106
SAE 7/16-20UNF-2A (male) fluid connection			
4…20 mA	M12	**XMLP025BD270**	0.087
	EN 175301-803-A	**XMLP025BC270**	0.103
0…10 V	M12	**XMLP025BD770**	0.087
SAE 7/16-20UNF-2B (female with Schrader pin) fluid connection			
4…20 mA	M12	**XMLP025BD290**	0.100
	EN 175301-803-A	**XMLP025BC290**	0.116
0…10 V	M12	**XMLP025BD790**	0.100

0 to 40 bar (0 to 580 psi)

Maximum permissible accidental pressure: 120 bar, destruction pressure: 240 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-E (male) fluid connection			
4…20 mA	M12	**XMLP040BD21F** *(1)*	0.090
	EN 175301-803-A	**XMLP040BC21F**	0.106
0…10 V	M12	**XMLP040BD71F**	0.090
	EN 175301-803-A	**XMLP040BC71F**	0.106
0.5…4.5 V ratiometric	M12	**XMLP040BD11F**	0.090
	EN 175301-803-A	**XMLP040BC11F**	0.106
SAE 7/16-20UNF-2A (male) fluid connection			
4…20 mA	M12	**XMLP040BD270**	0.087
	EN 175301-803-A	**XMLP040BC270**	0.103
SAE 7/16-20UNF-2B (female with Schrader pin) fluid connection			
4…20 mA	M12	**XMLP040BD290** *(1)*	0.100
	EN 175301-803-A	**XMLP040BC290** *(1)*	0.116
0…10 V	M12	**XMLP040BD790**	0.100
0.5…4.5 V ratiometric	M12	**XMLP040BD190**	0.100

(1) Sold in lots of 25: add the letter Q to the end of the selected reference.
*For example, **XMLP040BD21F** becomes **XMLP040BD21FQ**.*

Electronic pressure sensors

XM Range
XMLP pressure transmitters
Compact metal body, 316L stainless steel fluid entry
With analogue output. Sizes in bar

PF151600

XMLP●●●BC●1F

PF151601

XMLP●●●BD●1F

XM-EX_522_CPMFS17004

XMLP060BD270

XM-EX_522_CPMFS17003

XMLP060BC290

XM-EX_522_CPMFS17005

XMLP060BD●90

0 to 60 bar (0 to 870 psi)
Maximum permissible accidental pressure: 180 bar, destruction pressure: 360 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-A (male) fluid connection			
4…20 mA	M12	**XMLP060BD21F** *(1)*	0.090
	EN 175301-803-A	**XMLP060BC21F**	0.106
0…10 V	M12	**XMLP060BD71F** *(1)*	0.090
	EN 175301-803-A	**XMLP060BC71F** *(1)*	0.106
0.5…4.5 V ratiometric	M12	**XMLP060BD11F**	0.090
	EN 175301-803-A	**XMLP060BC11F**	0.106
SAE 7/16-20UNF-2A (male) fluid connection			
4…20 mA	M12	**XMLP060BD270**	0.087
SAE 7/16-20UNF-2B (female with Schrader pin) fluid connection			
4…20 mA	M12	**XMLP060BD290**	0.100
	EN 175301-803-A	**XMLP060BC290**	0.116
0…10 V	M12	**XMLP060BD790**	0.100

0 to 100 bar (0 to 1450 psi)
Maximum permissible accidental pressure: 300 bar, destruction pressure: 600 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-A (male) fluid connection			
4…20 mA	M12	**XMLP100BD21F** *(1)*	0.094
	EN 175301-803-A	**XMLP100BC21F**	0.110
0…10 V	M12	**XMLP100BD71F** *(1)*	0.094
	EN 175301-803-A	**XMLP100BC71F**	0.110
0.5…4.5 V ratiometric	M12	**XMLP100BD11F**	0.094
	EN 175301-803-A	**XMLP100BC11F**	0.110

(1) Sold in lots of 25: add the letter Q to the end of the selected reference.
For example, ***XMLP060BD21F*** *becomes* ***XMLP060BD21FQ****.*

Electronic pressure sensors

XM Range

XMLP pressure transmitters
Compact metal body, 316L stainless steel fluid entry
With analogue output. Sizes in bar

PF151600

XMLP●●●BC●1F

PF151601

XMLP●●●BD●1F

0 to 160 bar (0 to 2320 psi)

Maximum permissible accidental pressure: 480 bar, destruction pressure: 960 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-A (male) fluid connection			
4…20 mA	M12	**XMLP160BD21F**	0.094
	EN 175301-803-A	**XMLP160BC21F**	0.110
0…10 V	M12	**XMLP160BD71F**	0.094
	EN 175301-803-A	**XMLP160BC71F**	0.110
0.5…4.5 V ratiometric	M12	**XMLP160BD11F**	0.094

0 to 250 bar (0 to 3625 psi)

Maximum permissible accidental pressure: 750 bar, destruction pressure: 1500 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-A (male) fluid connection			
4…20 mA	M12	**XMLP250BD21F** *(1)*	0.094
	EN 175301-803-A	**XMLP250BC21F**	0.110
0…10 V	M12	**XMLP250BD71F** *(1)*	0.094
	EN 175301-803-A	**XMLP250BC71F** *(1)*	0.110
0.5…4.5 V ratiometric	M12	**XMLP250BD11F**	0.094
	EN 175301-803-A	**XMLP250BC11F**	0.110

0 to 400 bar (0 to 5800 psi)

Maximum permissible accidental pressure: 1200 bar, destruction pressure: 2400 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-A (male) fluid connection			
4…20 mA	M12	**XMLP400BD21F** *(1)*	0.094
	EN 175301-803-A	**XMLP400BC21F** *(1)*	0.110
0…10 V	M12	**XMLP400BD71F**	0.094
	EN 175301-803-A	**XMLP400BC71F** *(1)*	0.110
0.5…4.5 V ratiometric	M12	**XMLP400BD11F**	0.094
	EN 175301-803-A	**XMLP400BC11F**	0.110

0 to 600 bar (0 to 8700 psi)

Maximum permissible accidental pressure: 1500 bar, destruction pressure: 2400 bar

Analogue output type	Electrical connection	Reference	Weight kg
G 1/4 A DIN 3852-A (male) fluid connection			
4…20 mA	M12	**XMLP600BD21F**	0.094
	EN 175301-803-A	**XMLP600BC21F**	0.110
0…10 V	M12	**XMLP600BD71F**	0.094
	EN 175301-803-A	**XMLP600BC71F**	0.110
0.5…4.5 V ratiometric	M12	**XMLP600BD11F**	0.094

(1) Sold in lots of 25: add the letter Q to the end of the selected reference.
*For example, **XMLP250BD21F** becomes **XMLP250BD21FQ**.*

Electronic pressure sensors

XM Range

XMLP pressure transmitters
Compact metal body, 316L stainless steel fluid entry
With analogue output. Sizes in psi

PF151605

XMLP●●●RD●3F

PF151606

XMLP●●●RC●3F

PF151607

XMLP●●●RP●3F

-14.5 to 0 psi (-1 to 0 bar)

Maximum permissible accidental pressure: 44 psi, destruction pressure: 73 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4" - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLPM00RD23F** *(1)*	0.078
	EN 175301-803-A	**XMLPM00RC23F**	0.094
	Packard Metri-Pack 150	**XMLPM00RP23F**	0.080
0…10 V	M12	**XMLPM00RD73F** *(1)*	0.078
	EN 175301-803-A	**XMLPM00RC73F**	0.094
	Packard Metri-Pack 150	**XMLPM00RP73F**	0.080
0.5…4.5 V ratiometric	M12	**XMLPM00RD13F**	0.078
	EN 175301-803-A	**XMLPM00RC13F**	0.094
	Packard Metri-Pack 150	**XMLPM00RP13F**	0.080

-14.5 to 15 psi (-1 to 1.03 bar)

Maximum permissible accidental pressure: 44 psi, destruction pressure: 73 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4" - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLPM15RD23F** *(1)*	0.078
	EN 175301-803-A	**XMLPM15RC23F**	0.094
	Packard Metri-Pack 150	**XMLPM15RP23F** *(1)*	0.080
0…10 V	M12	**XMLPM15RD73F** *(1)*	0.078

-14.5 to 60 psi (-1 to 4.14 bar)

Maximum permissible accidental pressure: 260 psi, destruction pressure: 350 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4" - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLPM60RD23F** *(1)*	0.078
	EN 175301-803-A	**XMLPM60RC23F**	0.094
	Packard Metri-Pack 150	**XMLPM60RP23F**	0.080
0…10 V	M12	**XMLPM60RD73F** *(1)*	0.078

(1) Sold in lots of 25: add the letter Q to the end of the selected reference.
*For example, **XMLPM00RD23F** becomes **XMLPM00RD23FQ**.*

Electronic pressure sensors

XM Range
XMLP pressure transmitters
Compact metal body, 316L stainless steel fluid entry
With analogue output. Sizes in psi

PF151605

XMLP●●●RD●3F

PF151606

XMLP●●●RC●3F

PF151607

XMLP●●●RP●3F

0 to 15 psi (0 to 1.03 bar)

Maximum permissible accidental pressure: 44 psi, destruction pressure: 73 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4" - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLP015RD23F** *(1)*	0.078
	EN 175301-803-A	**XMLP015RC23F**	0.094
	Packard Metri-Pack 150	**XMLP015RP23F**	0.080
0…10 V	M12	**XMLP015RD73F** *(1)*	0.078
	EN 175301-803-A	**XMLP015RC73F**	0.094
	Packard Metri-Pack 150	**XMLP015RP73F**	0.080

0 to 30 psi (0 to 2.07 bar)

Maximum permissible accidental pressure: 109 psi, destruction pressure: 145 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4" - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLP030RD23F** *(1)*	0.078
	EN 175301-803-A	**XMLP030RC23F**	0.094
	Packard Metri-Pack 150	**XMLP030RP23F**	0.080
0…10 V	M12	**XMLP030RD73F** *(1)*	0.078
	EN 175301-803-A	**XMLP030RC73F**	0.094
	Packard Metri-Pack 150	**XMLP030RP73F**	0.080

0 to 50 psi (0 to 3.45 bar)

Maximum permissible accidental pressure: 174 psi, destruction pressure: 232 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4" - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLP050RD23F** *(1)*	0.078
	EN 175301-803-A	**XMLP050RC23F**	0.094
	Packard Metri-Pack 150	**XMLP050RP23F**	0.080
0…10 V	M12	**XMLP050RD73F** *(1)*	0.078

0 to 100 psi (0 to 6.9 bar)

Maximum permissible accidental pressure: 260 psi, destruction pressure: 340 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4" - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLP100RD23F**	0.078
0…10 V	M12	**XMLP100RD73F**	0.078

(1) Sold in lots of 25: add the letter Q to the end of the selected reference.
For example, ***XMLP030RD73F*** *becomes* ***XMLP030RD73FQ****.*

Electronic pressure sensors

XM Range

XMLP pressure transmitters
Compact metal body, 316L stainless steel fluid entry
With analogue output. Sizes in psi

PF151605

XMLP●●0PD●30

PF151607

XMLP●●0PP●30

0 to 100 psi (0 to 6.9 bar)

Maximum permissible accidental pressure: 300 psi, destruction pressure: 900 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4” - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLP100PD230** *(1)*	0.088
	Packard Metri-Pack 150	**XMLP100PP230** *(1)*	0.090
0…10 V	M12	**XMLP100PD730**	0.088
	Packard Metri-Pack 150	**XMLP100PP730**	0.090
0.5…4.5 V ratiometric	M12	**XMLP100PD130**	0.088
	Packard Metri-Pack 150	**XMLP100PP130**	0.090

0 to 150 psi (0 to 10.3 bar)

Maximum permissible accidental pressure: 450 psi, destruction pressure: 900 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4” - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLP150PD230** *(1)*	0.088
	Packard Metri-Pack 150	**XMLP150PP230**	0.090
0…10 V	M12	**XMLP150PD730**	0.088
	Packard Metri-Pack 150	**XMLP150PP730**	0.090
0.5…4.5 V ratiometric	M12	**XMLP150PD130**	0.088

0 to 200 psi (0 to 13.8 bar)

Maximum permissible accidental pressure: 600 psi, destruction pressure: 1400 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4” - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLP200PD230** *(1)*	0.088
	Packard Metri-Pack 150	**XMLP200PP230**	0.090
0…10 V	M12	**XMLP200PD730**	0.088
	Packard Metri-Pack 150	**XMLP200PP730**	0.090
0.5…4.5 V ratiometric	M12	**XMLP200PD130**	0.088

(1) Sold in lots of 25: add the letter Q to the end of the selected reference.
*For example, **XMLP100PD230** becomes **XMLP100PD230Q**.*

Electronic pressure sensors
XM Range
XMLP pressure transmitters
Compact metal body, 316L stainless steel fluid entry
With analogue output. Sizes in psi

PF151605

XMLP●●0PD●30

PF151607

XMLP●●0PP●30

0 to 300 psi (0 to 20.7 bar)

Maximum permissible accidental pressure: 900 psi, destruction pressure: 2200 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4" - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLP300PD230** (1)	0.088
	Packard Metri-Pack 150	**XMLP300PP230**	0.090
0…10 V	M12	**XMLP300PD730**	0.088
	Packard Metri-Pack 150	**XMLP300PP730**	0.090
0.5…4.5 V ratiometric	M12	**XMLP300PD130**	0.088
	Packard Metri-Pack 150	**XMLP300PP130**	0.090

0 to 600 psi (0 to 41.4 bar)

Maximum permissible accidental pressure: 1800 psi, destruction pressure: 3600 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4" - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLP600PD230**	0.088
	Packard Metri-Pack 150	**XMLP600PP230** (1)	0.090
0…10 V	M12	**XMLP600PD730**	0.088
	Packard Metri-Pack 150	**XMLP600PP730**	0.090
0.5…4.5 V ratiometric	M12	**XMLP600PD130**	0.088
	Packard Metri-Pack 150	**XMLP600PP130**	0.090

0 to 1000 psi (0 to 69 bar)

Maximum permissible accidental pressure: 3000 psi, destruction pressure: 6000 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4" - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLP1K0PD230**	0.088
	Packard Metri-Pack 150	**XMLP1K0PP230**	0.090
0…10 V	M12	**XMLP1K0PD730**	0.088
	Packard Metri-Pack 150	**XMLP1K0PP730**	0.090
0.5…4.5 V ratiometric	M12	**XMLP1K0PD130**	0.088

(1) Sold in lots of 25: add the letter Q to the end of the selected reference.
*For example, **XMLP600PP230** becomes **XMLP600PP230Q**.*

Electronic pressure sensors

XM Range
XMLP pressure transmitters
Compact metal body, 316L stainless steel fluid entry
With analogue output. Sizes in psi

PF151605

XMLP●K0PD●30

PF151607

XMLP●K0PP●30

0 to 2000 psi (0 to 138 bar)
Maximum permissible accidental pressure: 6000 psi, destruction pressure: 12 000 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4" - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLP2K0PD230**	0.092
0…10 V	M12	**XMLP2K0PD730**	0.092
0.5…4.5 V ratiometric	M12	**XMLP2K0PD130**	0.092

0 to 3000 psi (0 to 207 bar)
Maximum permissible accidental pressure: 9000 psi, destruction pressure: 18 000 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4" - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLP3K0PD230**	0.092
	Packard Metri-Pack 150	**XMLP3K0PP230**	0.094
0…10 V	M12	**XMLP3K0PD730** *(1)*	0.092
	Packard Metri-Pack 150	**XMLP3K0PP730**	0.094
0.5…4.5 V ratiometric	M12	**XMLP3K0PD130**	0.092

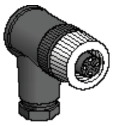
0 to 6000 psi (0 to 414 bar)
Maximum permissible accidental pressure: 18 000 psi, destruction pressure: 36 000 psi

Analogue output type	Electrical connection	Reference	Weight kg
1/4" - 18NPT (male) fluid connection			
4…20 mA	M12	**XMLP6K0PD230**	0.092
0…10 V	M12	**XMLP6K0PD730**	0.092
	Packard Metri-Pack 150	**XMLP6K0PP730**	0.094
0.5…4.5 V ratiometric	M12	**XMLP6K0PD130**	0.092
	Packard Metri-Pack 150	**XMLP6K0PP130** *(1)*	0.094

(1) Sold in lots of 25: add the letter Q to the end of the selected reference.
*For example, **XMLP6K0PP130** becomes **XMLP6K0PP130Q**.*

Electronic pressure sensors
XM Range
XMLP pressure transmitters
Separate parts

ZMLPA1●2SH



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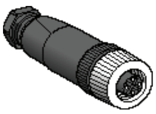

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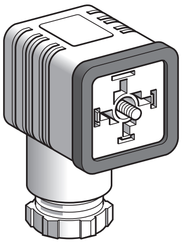

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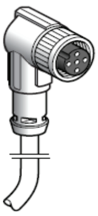
XMLZL016



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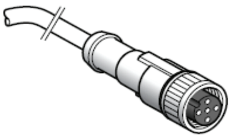

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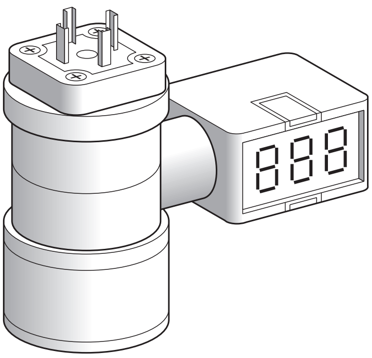

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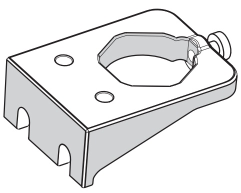


XMLZL017

Switches with display for XMLP●●●●D2●● pressure transmitters *(1)*

Analogue output type	Solid-state output type	Switching mode	Reference	Weight kg
4…20 mA	1 x PNP	Hysteresis	**ZMLPA1P2SH**	0.104
		Window	**ZMLPA1P2SW**	0.104
	1 x NPN	Hysteresis	**ZMLPA1N2SH**	0.104
		Window	**ZMLPA1N2SW**	0.104
–	2 x PNP	Hysteresis	**ZMLPA2P0SH**	0.104
–	2 x NPN	Hysteresis	**ZMLPA2N0SH**	0.104

Accessories

Description	Type	Reference	Weight kg
Sealing gasket (Pack of 10 gaskets)	–	**XMLZL016**	0.025
M12 female connector metal clamping ring *(2)*	Straight	**XZCC12FDM40B**	0.020
	Elbowed	**XZCC12FCM40B**	0.020
EN 175301-803-A female connector *(2)*	–	**XZCC43FCP40B**	0.035

Description	Cable length	Cable material	Reference	Weight kg
Pre-wired M12, straight, female connectors	2 m	PUR	**XZCP1141L2**	0.090
		PVC	**XZCPV1141L2**	0.110
	5 m	PUR	**XZCP1141L5**	0.190
		PVC	**XZCPV1141L5**	0.210
	10 m	PUR	**XZCP1141L10**	0.370
		PVC	**XZCPV1141L10**	0.390
Pre-wired M12, elbowed, female connectors	2 m	PUR	**XZCP1241L2**	0.090
		PVC	**XZCPV1241L2**	0.110
	5 m	PUR	**XZCP1241L5**	0.190
		PVC	**XZCPV1241L5**	0.210
	10 m	PUR	**XZCP1241L10**	0.370
		PVC	**XZCPV1241L10**	0.390

Description	For use with	Size of transmitter bar	Reference	Weight kg
Digital displays for pressure transmitters	XMLPM00GC2●●	- 1…0	**XMLEZM01**	0.100
	XMLP001GC2●●	0…1	**XMLEZ001**	0.100
	XMLP010BC2●●	0…10	**XMLEZ010**	0.100
	XMLP025BC2●●	0…25	**XMLEZ025**	0.100
	XMLP060BC2●●	0…60	**XMLEZ060**	0.100
	XMLP100BC2●●	0…100	**XMLEZ100**	0.100
	XMLP250BC2●●	0…250	**XMLEZ250**	0.100
	XMLP600BC2●●	0…600	**XMLEZ600**	0.100
Fixing bracket (aluminium)	XMLP●●●M●●● XMLP●●●G●●● XMLP●●●R●●●	–	**XMLZL017**	0.029

(1) ZMLP switches are compatible with pressure transmitters with 4…20 mA analogue output and M12 connector (see pages 87 and 88).
(2) Connector with screw terminal connections.

***Note**: For other connection accessories, visit our website www.tesensors.com.*

Electromechanical pressure switches

XM Range

For power circuits, FTG, FSG and FYG Range

Presentation

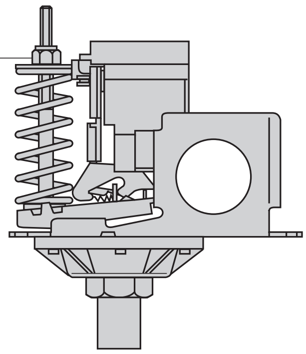
Pressure switches FTG, FSG and FYG are switches for power circuits.
They are used to control the pressure of water, up to 10.5 bar.

2 types of product are available:
- pressure switches FTG with fixed differential, for detection of a single threshold,
- pressure switches FSG and FYG with an adjustable differential, for regulation between 2 thresholds.

For specific needs, these 2 types of product can be supplied in IP 65 versions, thus ensuring a higher degree of protection. They feature 2 cable entries, fitted with cable gland, and are referenced **F●G●NE**.

Setting

Pressure switches with fixed differential (FTG)

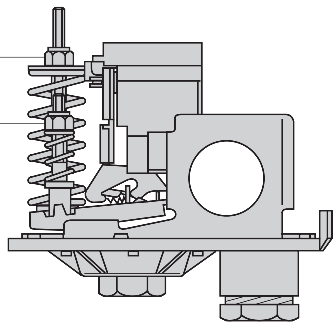


Only the switching point on rising pressure is adjustable.

Switching point on rising pressure
The switching point on rising pressure (PH) is set by adjusting screw-nut 1.

Switching point on falling pressure
The switching point on falling pressure (PB) is not adjustable.
The difference between the tripping and resetting points of the contact is the natural differential of the switch (contact differential, friction, etc.).

Pressure switches with adjustable differential (FSG and FYG)



When setting the pressure switch, adjust the switching point on rising pressure (PH) first and then the switching point on falling pressure (PB).

Switching point on rising pressure
The switching point on rising pressure (PH) is set by adjusting screw-nut 1.

Switching point on falling pressure
The switching point on falling pressure (PB) is set by adjusting screw-nut 2.

Electromechanical pressure switches
XM Range
For power circuits, FTG, FSG and FYG Range

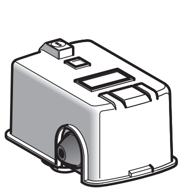
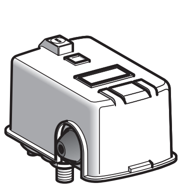
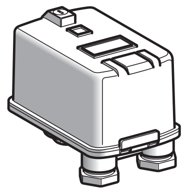
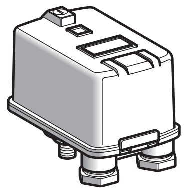
Environment characteristics

Pressure switch type			FTG● FTG●NE	FSG● and FYG● FSG●NE and FYG●NE
Conformity to standards			CE, IEC/EN 60730	
Protective treatment			Standard version: "TC"	
Ambient air temperature		°C	For operation: 0...+ 45. For storage: - 30...+ 80	
Fluids controlled			Fresh water, sea water (0…+ 70°C)	
Materials			Case: polystyrene, resistant to mechanical impact Component materials in contact with fluid: nylon 6/6, zinc plated steel, nitrile	
Operating position			All positions	
Electric shock protection			Class I conforming to IEC 536	
Degree of protection conforming to IEC/EN 60529	FTG●, FSG● and FYG●		IP 20	
	FTG●NE, FSG●NE and FYG●NE		IP 65	
Operating rate		Op. cycles/h	600	
Repeat accuracy			< 2%	
Fluid connection	F●G 2, FYG●2		G 1/4 (BSP female) conforming to NF E 03-005, ISO 228	
	F●G 9		R 1/4 (BSP male) conforming to NF E 03-004, ISO 7	
Electrical connection	FTG●, FSG● and FYG●		Terminals. 2 cable entries, with grommet	
	FTG●NE, FSG●NE and FYG●NE		Terminals. 2 entries incorporating 13P cable gland (DIN Pg 13.5)	

Contact block characteristics

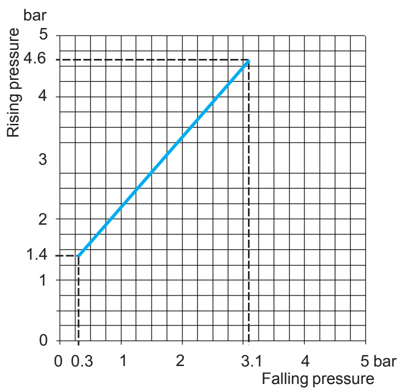
Rated operational characteristics			Ie = 10 A, Ue = ∿ 250 V conforming to EN 60730-1			
Power ratings of controlled motors	Voltage		∿ 2-pole 1-phase	∿ 2-pole 3-phase	∿ 2-pole 1-phase	∿ 2-pole 3-phase
	110 V		0.75 kW (1 HP)	1.1 kW (1.5 HP)	0.75 kW (1 HP)	1.1 kW (1.5 HP)
	230 V		1.1 kW (1.5 HP)	1.5 kW (2 HP)	1.5 kW (2 HP)	2.2 kW (3 HP)
	400 V		1.5 kW (2 HP)	1.5 kW (2 HP)	1.5 kW (2 HP)	2.2 kW (3 HP)
Rated insulation voltage conforming to IEC/EN 60947-1		V	Ui = 500			
Rated impulse withstand voltage conforming to IEC/EN 60947-1		kV	U imp = 6			
Type of contacts			1 2-pole 2 NC (4 terminal) contact, snap action			
Short-circuit protection			20 A cartridge fuse type gG			
Connection			Screw clamp terminals. Minimum clamping capacity: 1 x 1 mm², max: 2 x 2 mm²			
Electrical durability at an operating rate of 600 operating cycles/hour		Op. cycles	40 000		100 000	

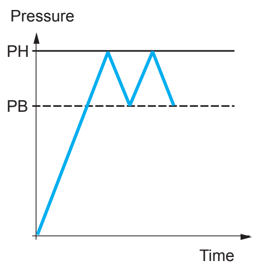
Electromechanical pressure switches
XM Range
For power circuits, FTG Range
Size 4.6 bar (66.7 psi), fixed differential, for detection of a single threshold. Switches with 2-pole 2 NC contact.
Degree of protection IP 20 or IP 65

Fluid connection		**G 1/4 (female)**	**R 1/4 (male)**	**G 1/4 (female)**	**R 1/4 (male)**
					
Adjustable range of switching point (PH) (Rising pressure)		**1.4…4.6 bar (20.3…66.7 psi)**			
Degree of protection conforming to IEC/EN 60529		**IP 20**		**IP 65**	
References					
Fluids controlled	Fresh water, sea water, from 0°C to + 70°C *(1)*	**FTG2**	**FTG9**	**FTG2NE**	**FTG9NE**
Weight (kg)		0.340			
Complementary characteristics not shown under general characteristics (page 87)					
Natural differential (subtract from PH to give PB)	At low setting	1.1 bar (15.95 psi)			
	At middle setting	1.3 bar (18.85 psi)			
	At high setting	1.5 bar (21.75 psi)			
Maximum permissible pressure	Per cycle	5.75 bar (83.38 psi)			
	Accidental	8 bar (116 psi)			
Destruction pressure		20 bar (290 psi)			
Mechanical life		4 x 10^5 operating cycles			
Cable entry		2 cable entries, with grommet		2 entries with 13P cable gland (DIN Pg 13.5)	
Clamping capacity		–		9 to 13 mm	
Pressure switch type		Diaphragm			

(1) Component materials of units in contact with the fluid, see page 87.

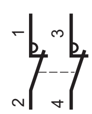
Operating curves





— Adjustable value
---- Non adjustable value

Connections



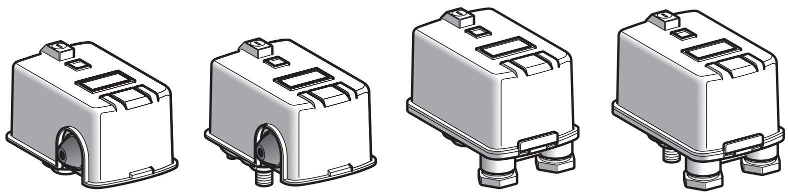
Electromechanical pressure switches

XM Range

For power circuits, FSG Range

Size 4.6 bar (66.7 psi), adjustable differential, for regulation between 2 thresholds. Switches with 2-pole 2 NC contact.

Degree protection IP 20 or IP 65

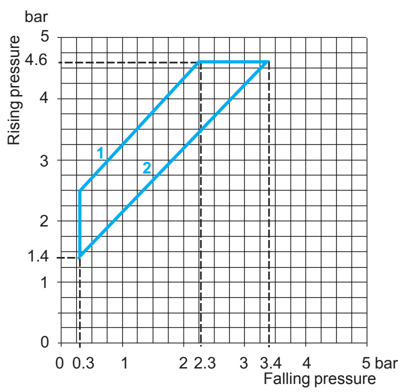
Fluid connection		G 1/4 (female)	R 1/4 (male)	G 1/4 (female)	R 1/4 (male)
					
Adjustable range of switching point (PH) (Rising pressure)		**1.4…4.6 bar (20.3…66.7 psi)**			
Degree of protection conforming to IEC/EN 60529		**IP 20**		**IP 65**	
References					
Fluids controlled	Fresh water, sea water, from 0°C to + 70°C *(1)*	**FSG2**	**FSG9**	**FSG2NE** *(2)*	**FSG9NE**
Weight (kg)		0.340			

Complementary characteristics not shown under general characteristics (page 87)

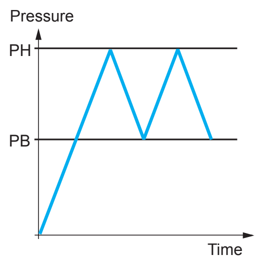
Possible differential (subtract from PH to give PB)	Max. at low setting	2.1 bar (30.45 psi)	
	Max. at middle setting	2.2 bar (31.9 psi)	
	Max. at high setting	2.3 bar (33.35 psi)	
	Min. at low setting	1 bar (14.5 psi)	
	Min. at middle setting	1.1 bar (15.95 psi)	
	Min. at high setting	1.2 bar (17.4 psi)	
Maximum permissible pressure	Per cycle	5.75 bar (83.38 psi)	
	Accidental	8 bar (116 psi)	
Destruction pressure		20 bar (290 psi)	
Mechanical life		1 x 10^6 operating cycles	
Cable entry		2 cable entries, with grommet	2 entries with 13P cable gland (DIN Pg 13.5)
Clamping capacity		–	9 to 13 mm
Pressure switch type		Diaphragm	

(1) Component materials of units in contact with the fluid, see page 87.
(2) Variant: for a G 3/8 female fluid entry that pivots throughout 360°, select the ***FSG2NEG****.*

Operating curves

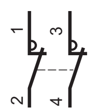


1 Maximum differential
2 Minimum differential



— Adjustable value

Connections

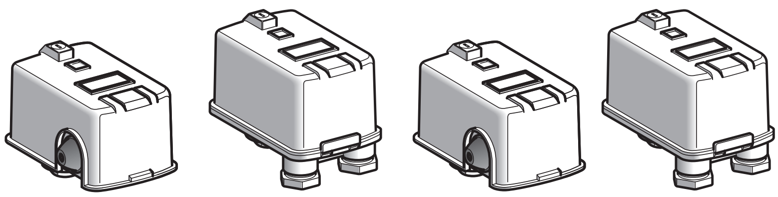


Electromechanical pressure switches

XM Range

For power circuits, FYG Range
Sizes 7 and 10.5 bar (101.5 and 152.3 psi), adjustable differential, for regulation between 2 thresholds. Switches with 2-pole 2 NC contact. Degree of protection IP 20 or IP 65

Fluid connection		**G 1/4 (female)**			



Adjustable range of switching point (PH) (Rising pressure)		**2.8…7 bar (40.6…101.5 psi)**		**5.6…10.5 bar (81.2…152.3 psi)**	
Degree of protection conforming to EN/IEC 60529		**IP 20**	**IP 65**	**IP 20**	**IP 65**
References					
Fluids controlled	Fresh water, sea water, from 0°C to + 70°C *(1)*	**FYG22** *(2)*	**FYG22NE**	**FYG32** *(3)*	**FYG32NE**
Weight (kg)		0.340			

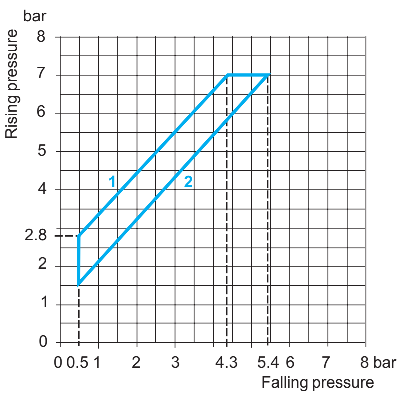
Complementary characteristics not shown under general characteristics (page 87)

Possible differential (subtract from PH to give PB)	Max. at low setting	2.3 bar (33.35 psi)	3 bar (43.5 psi)
	Max. at middle setting	2.5 bar (36.25 psi)	3.2 bar (46.4 psi)
	Max. at high setting	2.7 bar (39.15 psi)	3.4 bar (49.3 psi)
	Min. at low setting	1.2 bar (17.4 psi)	1.9 bar (27.55 psi)
	Min. at middle setting	1.4 bar (20.3 psi)	2.1 bar (30.45 psi)
	Min. at high setting	1.6 bar (23.2 psi)	2.3 bar (33.35 psi)
Maximum permissible pressure	Per cycle	8.75 bar (126.9 psi)	13 bar (188.5 psi)
	Accidental	15 bar (217.5 psi)	15 bar (217.5 psi)
Destruction pressure		20 bar (290 psi)	20 bar (290 psi)
Mechanical life		1 x 10^6 operating cycles	
Cable entry		2 cable entries, with grommet	
Pressure switch type		Diaphragm	

(1) Component materials of units in contact with the fluid, see page 87.
(2) Variant: for a 2.8 to 7 bar, IP 20, pressure switch with R 1/4 (male) fluid entry, select the ***FYG29.***
(3) Variant: for a 5.6 to 10.5 bar, IP 20, pressure switch with R 1/4 (male) fluid entry, select the ***FYG39.***

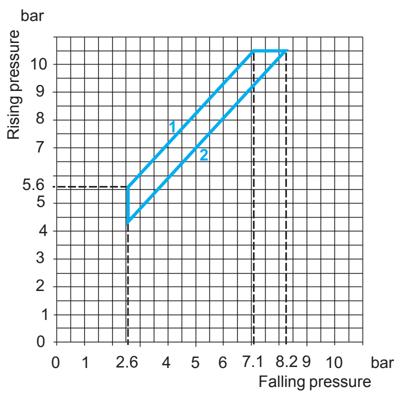
Operating curves

FYG22

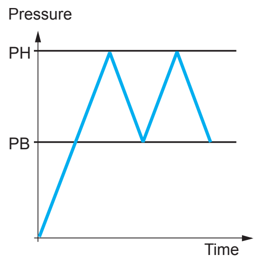


1 Maximum differential
2 Minimum differential

FYG32

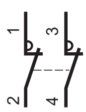


1 Maximum differential
2 Minimum differential



— Adjustable value

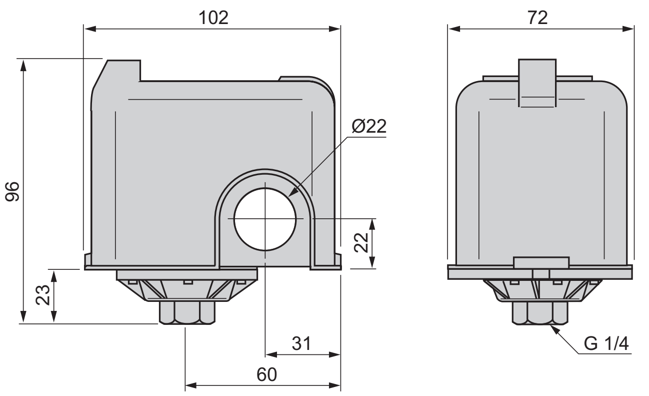
Connections



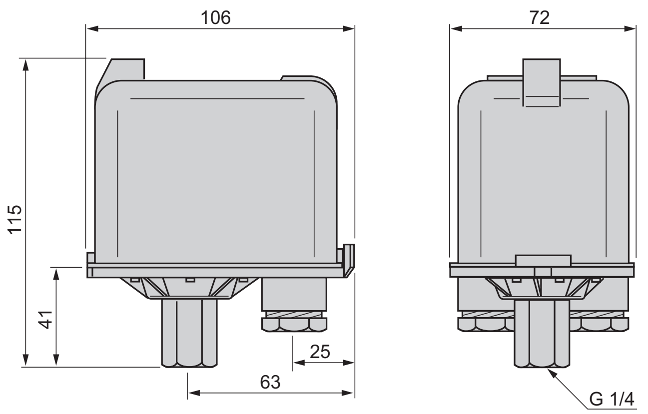
Electromechanical pressure switches
XM Range
For power circuits, FTG, FSG and FYG Range

Dimensions

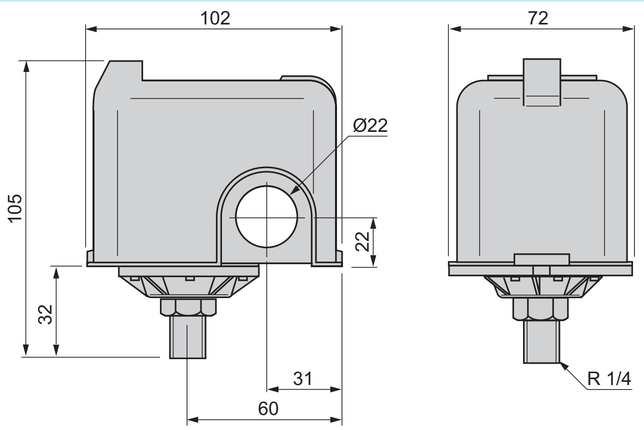
FTG2, FSG2



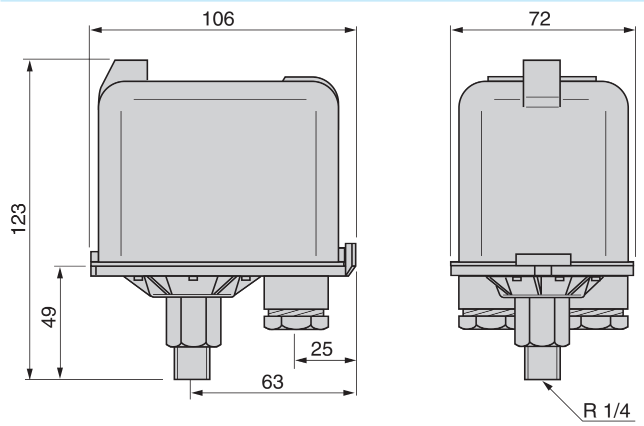
FTG2NE, FSG2NE



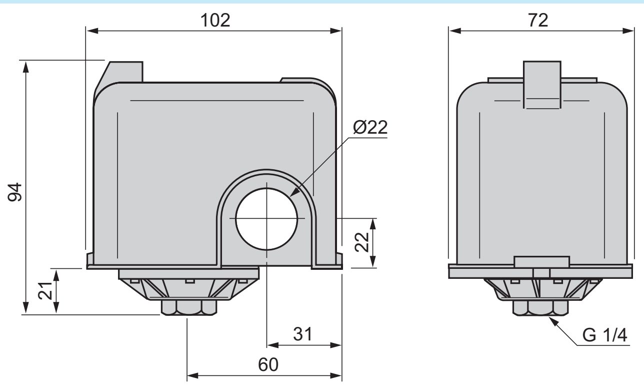
FTG9, FSG9



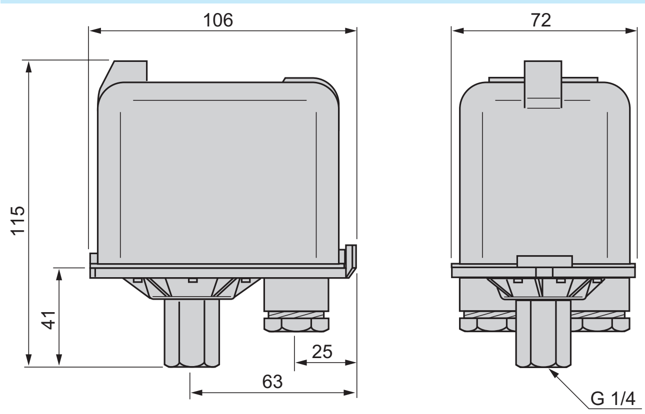
FTG9NE, FSG9NE



FYG22, FYG32



FYG22NE, FYG32NE



Safety detection solutions

Key-operated safety switches

Refer to standards EN/ISO 12100 and EN/ISO 14119 IEC/ISO 13852 and EN/IEC 60204-1

Telemecanique Sensors XCS safety detection solutions conform to EN/ISO 12100 and EN/ISO 14119 standards regarding potentially hazardous machine functions.
They meet more specifically the following requirements:

- Removable or movable protective guards must be used in conjunction with locking or interlocking devices,
- For high inertia machines (i.e. with long rundown time), an interlocking device must be used. With a long rundown time, the rundown time is greater than the time it takes for a person to reach the hazardous zone. The interlocking device helps ensure that the guard remains locked until the potentially hazardous movement has stopped.

Safety interlock switches

As required by EN/ISO 12100 and EN/ISO 14119, safety interlock switches which are specifically designed for machine guarding applications provide an ideal solution for the locking or interlocking of movable guards associated with industrial machinery.
They also meet the requirements of IEC/ISO 13852 and EN/IEC 60204-1.
They contribute to the protection of operators working on potentially hazardous machines by breaking the start control circuit of the machine when a protective guard is opened or removed, using **positive opening operation contacts**, thus stopping the hazardous movement of the machine.
Removal/opening of the guard (after the hazardous movement has stopped) can either be:

- at the time the machine is switched off for low inertia machines (machines where the rundown time is less than the time it takes for the operator to access the hazardous zone), or
- delayed for high inertia machines (machines where the rundown time is greater than the time it takes for the operator to access the hazardous zone).

Control circuit categories

If used with a Schneider Electric safety control unit, the safety interlock switch enables designers to achieve PL=e, category 4 control systems with reference to EN/ISO 13849-1 and SIL CL3 with conformity to EN/IEC 62061. When used on their own or combined with another switch, they can achieve up to category 1, 2 or 3 control circuits (except for RFID XCSR standalone models which can reach PLe-Cat. 4/SIL3 without safety control unit).
Safety related parts of control systems shall be developed taking into account the results of an appropriate Risk Assessment.

Safety of personnel

The start command for the machine can only be initiated following correct operation of the safety interlock switch.
On its release, the NC safety contacts are opened by **positive action** or, for coded magnetic switches, change state (**this should be monitored using a Schneider Electric safety control unit)**. RFID XCSR safety switches have 2 OSSDs (Output Signal Switching Devices) which are NC when the guard is closed.

Safety of operation

The safety interlock switches incorporate slow break or snap action contacts with **positive opening operation** (except for coded magnetic switches where this is not possible). For mechanical safety interlock switches, on closing of the guard the actuating key fitted to it enters the head of the switch, operates the multiple interlock device and closes the NC contacts. For coded magnetic switches, the presence of the magnet causes the contacts to change state. For RFID XCSR safety switches, the 2 OSSDs change from ON to OFF state when the guard is being opened.

Safety in use

In order to compensate for mechanical clearance, vibration, etc., all safety interlock switches are designed to accept a few millimeters of misalignment between the actuating key and the switch, or between the magnet and the sensor part for coded magnetic switches, or between the transponder and the reader for RFID XCSR safety switches.

Design to minimize defeat

Mechanically, magnetically or RFID-actuated safety interlock switches are designed to be operated by specific actuating keys so that they cannot be defeated in a simple manner using common tools (rods, metal plates, simple magnets, etc.). When loosening the fixing screws for re-orientation of the turret head on safety interlock switches, the head itself remains attached to the switch body and the contact states remain unchanged.
All safety interlock switches and safety limit switches are designed to avoid any adjustments in the head setting, removal of the actuating key or access to the safety contacts without using the appropriate tool.
There are various methods for obtaining a higher level of tamperproofing, for example:

- using a cage device to help prevent the insertion of a spare actuating key or magnet, or any other foreign body
- fixing the actuating key or coded magnet to the guard by means that make it very difficult to remove (riveting or welding)
- using RFID unique coding XCSR safety switches

Safety detection solutions

Key-operated safety switches
XCSPA and XCSTA plastic, turret head
1 or 2 cable entries

Type of switch	Without locking of actuating key	
	 XCSPA	 XCSTA
References of switches without actuating key *(4)* (⊖ NC contact with positive opening operation) with 1 or 2 cable entries tapped ISO M16 x 1.5		
2-pole 1 NC + 1 NO *(2)* break before make, slow break	**XCSPA592** ⊖	–
2-pole 1 NC + 1 NO *(2)* snap action	**XCSPA192** ⊖	
2-pole 1 NO + 1 NC *(2)* make before break, slow break	**XCSPA692** ⊖	–
2-pole 2 NC *(2)* slow break	**XCSPA792** ⊖	–
2-pole 2 NC *(2)* snap action	**XCSPA292** ⊖	
3-pole 1 NC + 2 NO *(2)* break before make, slow break	**XCSPA892** ⊖	**XCSTA592** ⊖
3-pole 2 NC + 1 NO *(2)* break before make, slow break	**XCSPA992** ⊖	**XCSTA792** ⊖
3-pole 2 NC + 1 NO *(2)* snap action	**XCSPA492** ⊖	–
3-pole 3 NC *(2)* slow break	–	**XCSTA892** ⊖
Weight (kg)	0.110	0.160

References of switches without actuating key *(4)* (⊖ NC contact with positive opening operation) with 1 or 2 cable entries tapped Pg 11 or 1/2" NPT

To order a switch with 1 or 2 cable entries for Pg 11 cable gland (clamping capacity 7 to 10 mm), replace the last number **(2)** with **1** in the selected reference. Example: XCSPA592 becomes **XCSPA591** (some Pg 11 references may not be available)**.**
To order a switch with 1 or 2 cable entries for 1/2" NPT conduit (one Pg 11 tapped entry fitted with DE9RA1012 metal adapter), replace the last number **(2)** with **3** in the selected reference. Example: XCSTA592 becomes **XCSTA593** (some 1/2" NPT references may not be available).

Complementary characteristics not shown under general characteristics (page 92)

Actuation speed	Maximum: 0.5 m/s, minimum: 0.01 m/s
Resistance to forcible withdrawal of actuating key	**XCSPA, XCSTA:** 10 N (50 N using actuating keys **XCSZ12** or **XCSZ13** together with guard retaining device **XCSZ21**)
Mechanical durability	**XCSPA, XCSTA: > 1 million operating cycles**
Maximum operating rate	For maximum durability: 600 operating cycles per hour
Minimum force for positive opening	⩾ 15 N
Cable entry	**XCSPA:** 1 entry tapped M16 x 1.5 for ISO cable gland. **XCSTA:** 2 entries tapped M16 x 1.5 for ISO cable gland.
Materials	Body and head: polyamide PA66, fibreglass impregnated

References of accessories

103047

XCSZ91

PIO0008910

XCSZ200

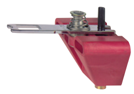
Description	For use with	Unit reference	Weight kg
Blanking plugs for operating head slot (Sold in lots of 10)	XCSPA, XCSTA	**XCSZ28**	0.050
Padlocking device to help prevent insertion of actuating key, for up to 3 padlocks (padlocks not included)	XCSPA, XCSTA	**XCSZ91**	0.053
Actuating key centering device *(3)* (Fixing screws included)	XCSPA, XCSTA	**XCSZ200**	0.022

(1) Head adjustable in 90° steps through 360°. Blanking plug for operating head slot included with switch.
(2) Schematic diagrams shown represent the contact states while the actuating key is inserted in the head of the switch.
(3) Not for use with XCSZ91.
(4) Actuating keys to be ordered separately (see page 94).
Other versions: please consult our Customer Care Center.

Safety detection solutions
Key-operated safety switches
XCSPA and XCSTA plastic, turret head *(1)*
1 or 2 cable entries

References of actuating keys and guard retaining device



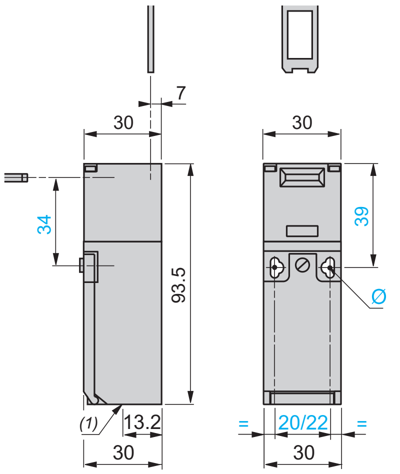


Description	Straight actuating key	Actuating key with wide fixing *(1)*		Pivoting actuating key	Right-angled actuating key	Guard retaining device *(2)*
For XCSPA and XCSTA key-operated safety switches	**XCSZ11**	**XCSZ12**	**XCSZ15**	**XCSZ13**	**XCSZ14**	**XCSZ21**
Weight (kg)	0.015	0.015	0.012	0.085	0.025	0.080

(1) 2 actuating key lengths, XCSZ12: L = 40 mm, XCSZ15: L = 29 mm.
(2) Only for use with XCSPA and XCSTA key-operated switches (without XCSZ200 actuating key centering device) used in conjunction with XCSZ12, XCSZ13 or XCSZ15 actuating keys.

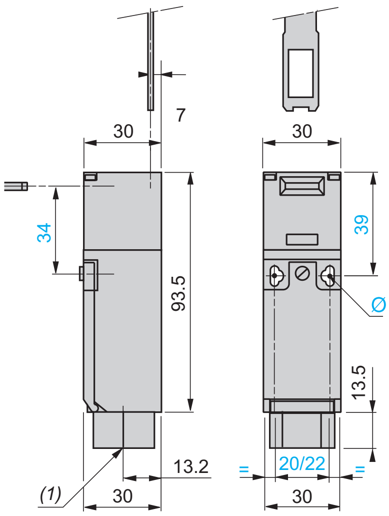
Dimensions

XCSPA●91, XCSPA●92



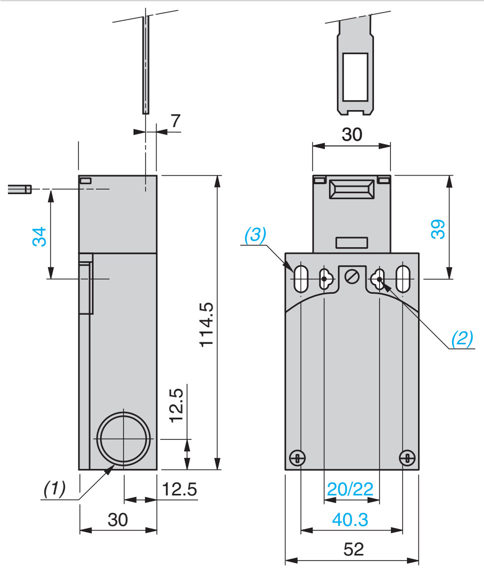
(1) 1 tapped entry for cable gland
Ø: 2 elongated holes Ø 4.3 x 8.3 on 22 centers, 2 holes Ø 4.3 on 20 centers

XCSPA●93



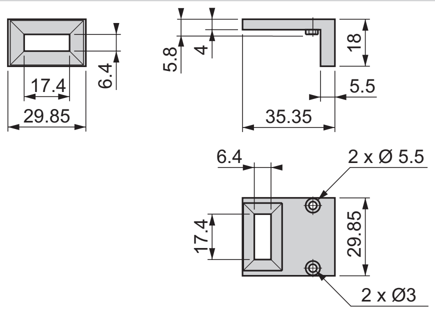
(1) 1 tapped entry for 1/2" NPT conduit
Ø: 2 elongated holes Ø 4.3 x 8.3 on 22 centers, 2 holes Ø 4.3 on 20 centers

XCSTA●9●

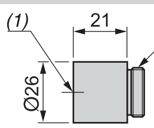


(1) 2 tapped entries for cable gland or 1/2" NPT conduit adapter
(2) 2 elongated holes Ø 4.3 x 8.3 on 22 centers, 2 holes Ø 4.3 on 20 centers
(3) 2 elongated holes Ø 5.3 x 13.3

XCSZ200 actuating key centering device

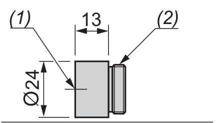


1/2" NPT conduit adapter
DE9RA1012



(1) Tapped entry for 1/2" NPT conduit
(2) Pg 11 threaded shank

M16 x 1.5 adapter
DE9RA1016

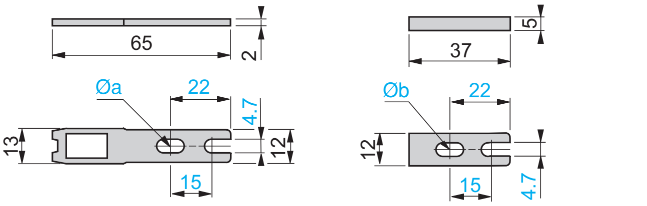


(1) M16 x 1.5 tapped entry
(2) Pg 11 threaded shank

Safety detection solutions
Key-operated safety switches
XCSPA and XCSTA plastic, turret head
1 or 2 cable entries

Dimensions (continued)

XCSZ11

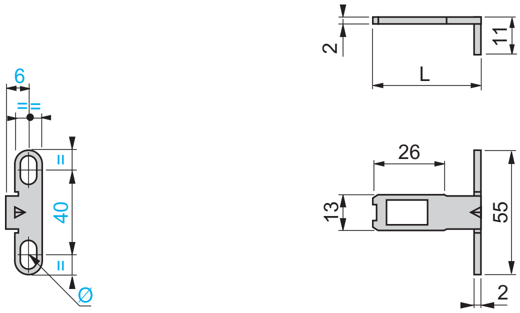


(1) Adapter (included with XCSZ11 actuating key) for replacing, without drilling an additional fixing hole, a legacy XCKP/T key-operated switch with XCKY01 actuating key by an XCSTA key-operated switch with XCSZ11 actuating key.

Ø a: 2 elongated holes Ø 4.7 x 10

Ø b: 1 elongated hole for M4 or M4.5 screw

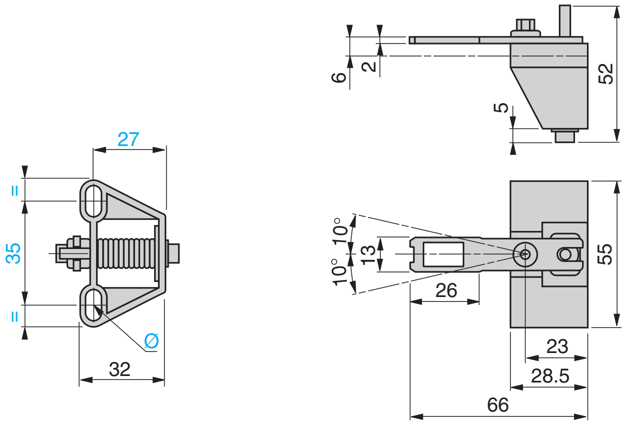
XCSZ12, XCSZ15



Ø: 2 elongated holes Ø 4.7 x 10

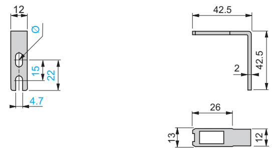
L = 40 mm (XCSZ12) or 29 mm (XCSZ15)

XCSZ13



Ø: 2 elongated holes Ø 4.7 x 10

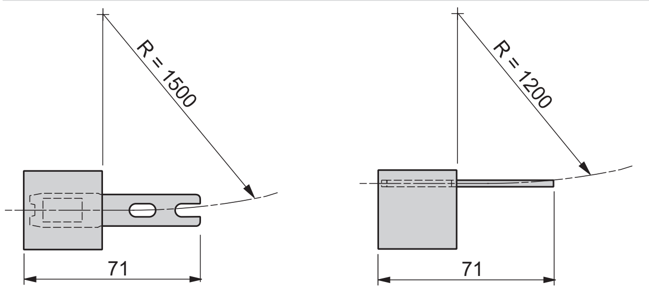
XCSZ14



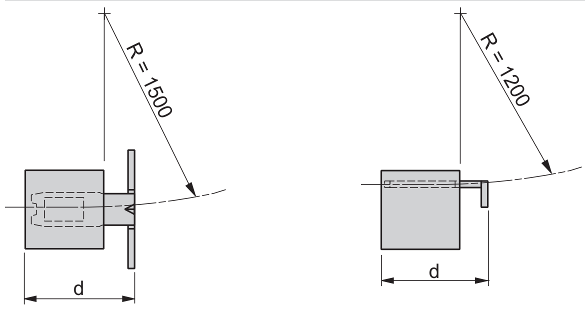
Ø: 1 elongated hole Ø 4.7 x 10

Operating radius required for actuating key

XCSZ11

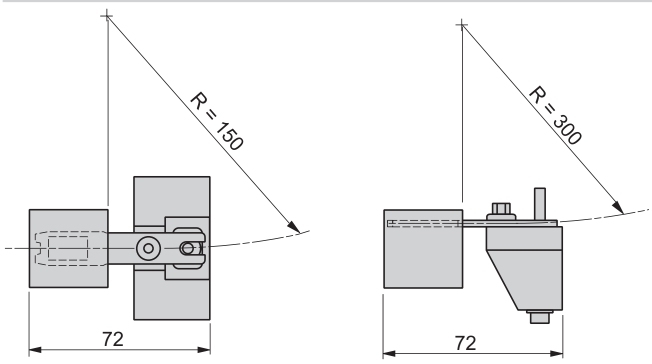


XCSZ12, XCSZ15

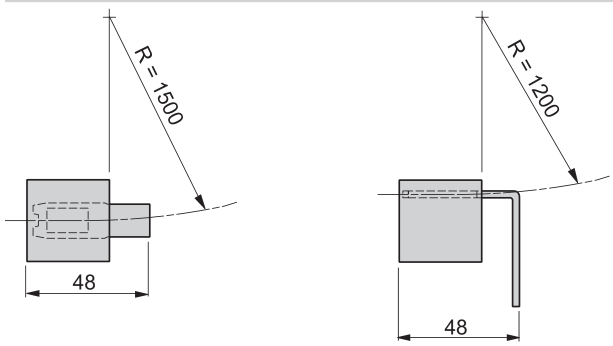


d = 46 mm (XCSZ12) or 35 mm (XCSZ15)

XCSZ13



XCSZ14



R = minimum radius

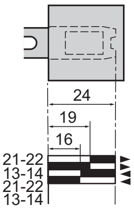
Safety detection solutions

Key-operated safety switches
XCSPA and XCSTA plastic, turret head
1 or 2 cable entries

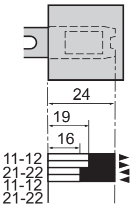
Setting-up

Functional diagrams

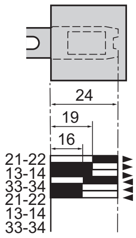
XCSPA1●●



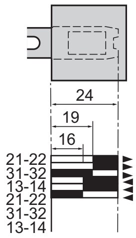
XCSPA2●●



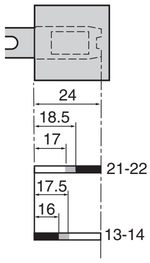
XCSPA3●●



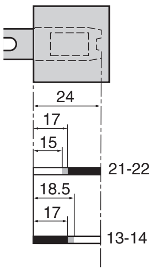
XCSPA4●●



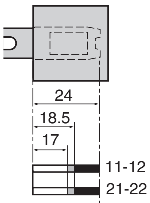
XCSPA5●●, XCSTE5●●●



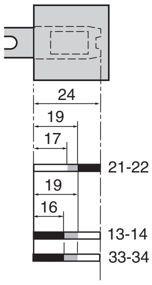
XCSPA6●●, XCSTE6●●●



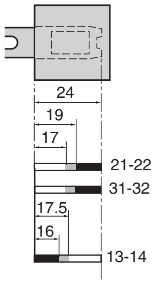
XCSPA7●●, XCSTE7●●●



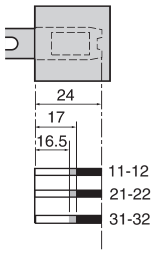
XCSTA5●●, XCSPA8●●



XCSTA7●●, XCSPA9●●



XCSTA8●●



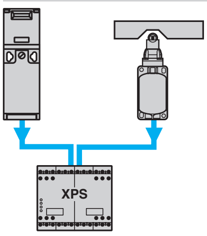
Contact operation
■ Closed □ Open ▭ Transient state

Schemes
Note: These schemes are given as examples only, the designer should refer to the relevant safety standards for guidance.

Wiring to PL=e, category 4 conforming to EN/ISO 13849-1 and SIL CL3 conforming to EN/IEC 62061 Wiring method used in conjunction with a safety control unit

(The key-operated switch should be used in conjunction with a safety limit switch to give electrical/mechanical redundancy)

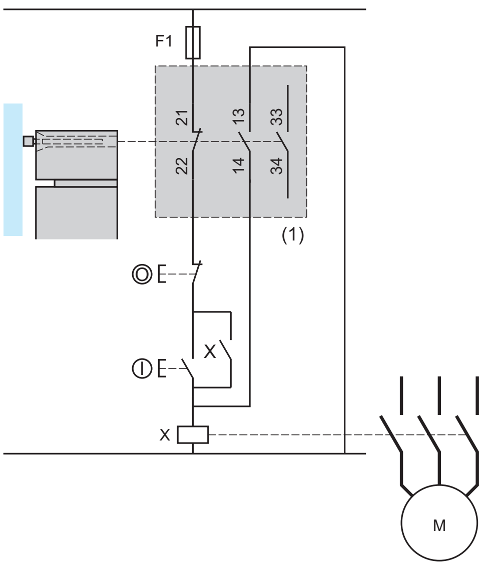
Method for machines with quick rundown time (low inertia)



Locking of actuating key and operation in positive mode associated with a safety control unit.

Wiring to PL=b, category 1 conforming to EN/ISO 13849-1

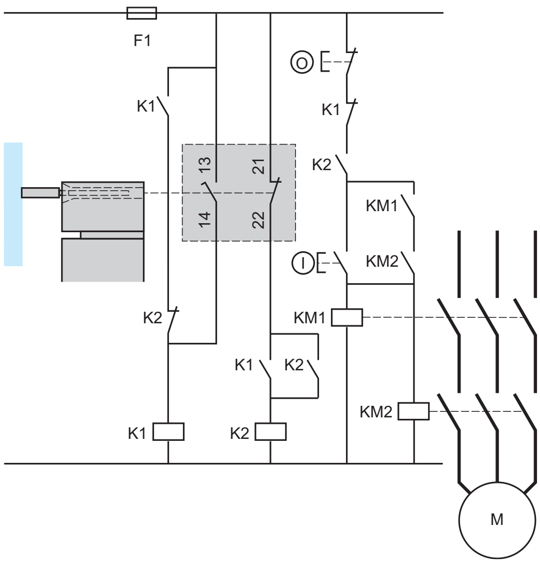
Example with 3-pole 1 NC + 2 NO contact and protection fuse to help prevent shunting of the NC contact, due to either cable damage or tampering.



(1) Signaling contact.

Wiring to PL=d, category 3 conforming to EN/ISO 13849-1

Example with 2-pole 1 NC + 1 NO contact with mixed redundancy of the contacts and the associated control relays. To activate K1, it is necessary to remove and re-insert the actuating key when the supply is switched on.



Safety detection solutions
Emergency stop rope pull switches
XY2C range

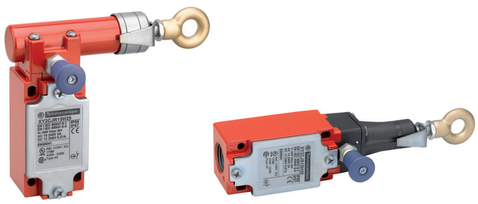
Emergency stop rope pull switches

Emergency stop rope pull switches are designed to:
- avert hazards (dangerous phenomena) at the earliest possible moment, or to reduce risks which could cause injury to persons or damage either to machines or work in progress
- be tripped by a single human action when a normal emergency stop function is not available
- trip in the event of the rope pull breaking

Emergency stop rope pull switches are essential in premises and on machines that are potentially dangerous when operating. The operator must be able to trigger the stop instruction at any point within their working area.

Application examples: woodworking machines, shears, conveyor systems, printing machines, textile machines, rolling mills, test laboratories, paint shops, surface treatment works, etc.

UL NiSD certified



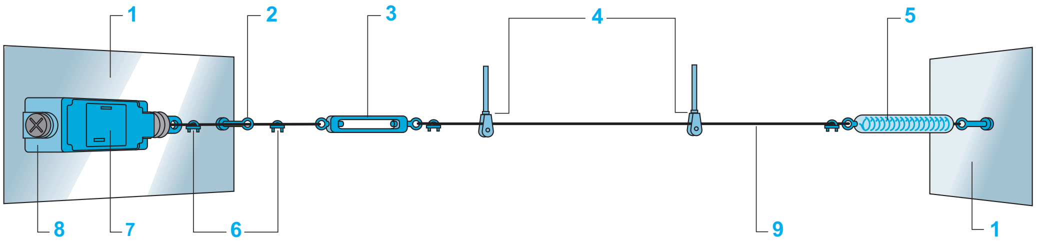
XY2CJ compact range

Certified, rugged safety devices that are easy to install

Safety detection solutions
Emergency stop rope pull switches
XY2C range

Installation

Description of a typical installation for XY2CJ



1 Mounting support
2 First cable support
3 Turnbuckle
4 Pulleys and pulley supports
5 End spring
6 Cable grips
7 Switch adjustment
8 Emergency stop
9 Cable

Notes regarding installation

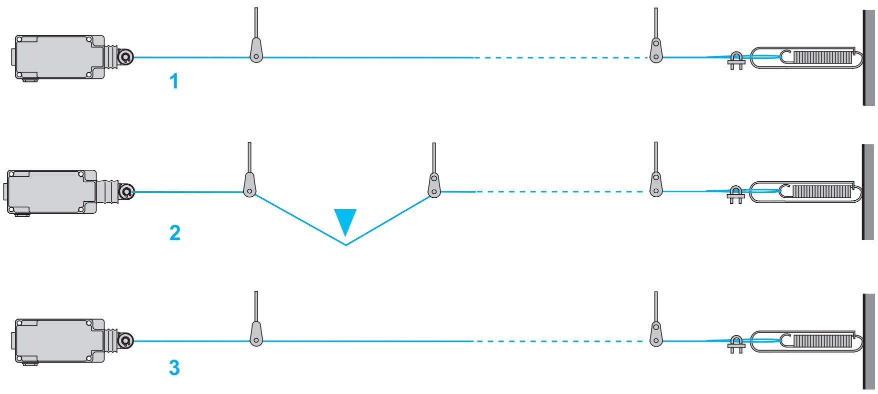
■ XY2CJ emergency stop rope pull switches can be fitted with trip indicators (mechanical indicators for XY2CJ).

■ The cable tension can be adjusted using:
□ a turnbuckle to be ordered separately (see page 102)
□ a quick tensioner optional for XY2CJ

■ The use of an end spring is mandatory for conveyor system applications to allow operation of the emergency stop in the event of the cable being pulled towards the switch.

■ It is essential that pulleys be used with cables that deviate from a straight run (within the permissible angles. Refer to the mounting instructions).

Basic principles



Positive operation: running condition	1	The switches incorporate positive opening operation contacts, the tripping of the switch being made with positive action.
Latching: stop instruction given (tripped)	2	The switch latches in the tripped position (NC safety contact(s) open). The function of the NO contact is purely for signaling.
Resetting: stop condition (awaiting reset/restart)	3	The switches incorporate a reset button, which re-closes the safety contact. The machine must only be restarted by manual operation of a control device within the machine start circuit, remote to the emergency stop.

Safety detection solutions
Emergency stop rope pull switches
XY2CJ range

Environment		
Conforming to standards	Products	EN/IEC 60947-5-5, EN/ISO 13850, UL 508 and CSA C 22-2 no. 14
	Machine assemblies	EN/IEC 60204-1, Machinery directive: 2006/42/EC Work equipment directive: 2009/104/EC
Product certifications		**XY2CJ**: UL (NISD) - CSA, CCC, EAC
Maximum safety level *(1)*		PL e, category 4 conforming to EN/ISO 13849-1 and SIL CL3 conforming to EN/IEC 62061
Reliability data B_{10d}		**XY2CJ**: 500,000 (Values given for a service life of 20 years but may be limited by contact and mechanical wear)
Ambient air temperature	For operation	- 25…+ 70 °C
	For storage	- 40…+ 70 °C
Vibration resistance		**XY2CJ**: 10 gn (10…150 Hz)
Shock resistance		**XY2CJ:** 50 gn (duration 11 ms) conforming to EN/IEC 60068-2-27
Electric shock protection		Class I conforming to IEC 61140
Degree of protection		**XY2CJ**: IP 66 and IP 67 conforming to IEC 60529
Materials		**XY2CJS**: Zamak body, polyamide head, zinc-plated steel cover **XY2CJL, XY2CJR**: Zamak body and head, zinc-plated steel cover
Mechanical life (no. of operating cycles)		**XY2CJ**: 100,000
Length of protected zone		**XY2CJS**: ⩽ 20 m **XY2CJR and XY2CJL**: ⩽ 30 m
Distance between cable supports		**XY2CJ:** 5 m
Cable entries		**XY2CJ**: Tapped entries for ISO M20, Pg 13.5 or 1/2” NPT cable gland See dimensions on page 104.

(1) When the emergency stop rope pull switch is used with an appropriate and correctly connected control system. Only models with 2 NC contacts can be used with an emergency stop monitoring safety relay.

Safety detection solutions
Emergency stop rope pull switches
XY2CJ range

Contact block characteristics

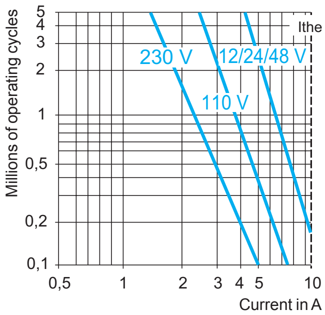
Rated operational characteristics	2-pole contact block	**XY2CJ**: AC-15: A300 or Ue = 240 V, Ie = 3 A DC-13: Q300 or Ue = 250 V, Ie = 0.27 A, conforming to EN/IEC 60947-5-1 Appendix A
	3-pole contact block	**XY2CJ**: AC-15: B300 or Ue = 240 V, Ie = 1.5 A DC-13: R300 or Ue = 250 V, Ie = 0.1 A, conforming to EN/IEC 60947-5-1 Appendix A
Nominal thermal current	2-pole contact block	10 A
	3-pole contact block	6 A
Rated insulation voltage	2-pole contact block	**XY2CJ**: Ui = 500 V degree of pollution 3 conforming to EN/IEC 60947-1, Ui = 300 V conforming to UL 508, CSA C22-2 no. 14
	3-pole contact block	**XY2CJ**: Ui = 400 V degree of pollution 3 conforming to EN/IEC 60947-1, Ui = 300 V conforming to UL 508, CSA C22-2 no. 14
Rated impulse withstand voltage	2-pole contact block	**XY2CJ**: Uimp = 6 kV conforming to EN/IEC 60947-1
	3-pole contact block	**XY2CJ**: Uimp = 4 kV conforming to EN/IEC 60947-1
Positive operation		NC contact with positive opening operation conforming to EN/IEC 60947-5-1 Section 3
Resistance across terminals		⩽ 25 mΩ conforming to NF C 93-050 method A or EN/IEC 60255-7 category 3
Terminal referencing		Conforming to CENELEC EN 50013
Short-circuit protection	2-pole contact block	**XY2CJ**: 10 A cartridge fuse type gG (gl) conforming to EN/IEC 60269
	3-pole contact block	**XY2CJ**: 6 A cartridge fuse type gG (gl) conforming to EN/IEC 60269

Rated operational power
(Electrical durability)

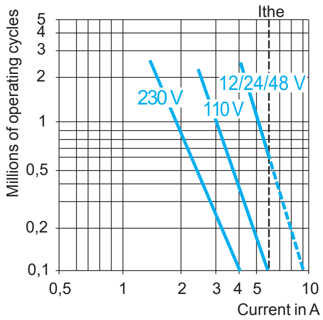
XY2CJ
Conforming to EN/IEC 60947-5-1 Appendix C. Utilization categories AC-15 and DC-13
Frequency: 3,600 operating cycles/hour. Load factor: 0.5

AC supply ∼ 50/60 Hz
Inductive circuit

2-pole contact block



3-pole contact block



DC supply ⎓
Breaking current
for 1 million operating cycles.
Inductive circuit

2-pole contact block:

Voltage	V	24	48	120
Inductive	W	13	9	7

3-pole contact block:

Voltage	V	24	48	120
Inductive	W	4	3	2

Contact connection	Screw clamp terminals **2 contacts**: clamping capacity, min. 1 x 0.5 mm²/AWG 20, max. 2 x 1.5 mm²/AWG 16 **3 contacts:** clamping capacity, min. 1 x 0.34 mm²/AWG 22, max. 1 x 1 mm²/AWG 18 or 2 x 0.75 mm²/AWG 20 Minimum tightening torque: 0.8 N.m/7.1 lb-in. Maximum tightening torque: 1.2 N.m/10.6 lb-in.

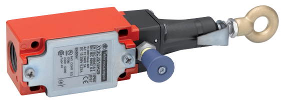
Safety detection solutions
Emergency stop rope pull switches
XY2CJ range

Emergency stop rope pull switches with single anchor point ISO M20, Pg 13.5 and 1/2" NPT

Turnbuckle or quick tensioner, cable and end spring to be ordered separately *(1)*

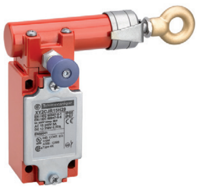
Without pilot light

PF123235



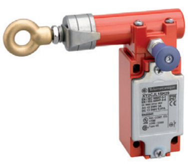
XY2CJS15

PF123234



XY2CJR15

PF123233



XY2CJL15

Cable length	Colors and materials	Reset	Supply voltage	Contact type			Cable anchor point	Reference	Weight kg
⩽ **20 m**	Polyamide head Zamak red RAL 3000 body Treated steel cover	By pull button	–	1	1	NC + NO slow break	RH side or LH side	**XY2CJS15** *(2)*	0.455
				2	–	NC + NC slow break	RH side or LH side	**XY2CJS17** *(2)*	0.455
				2	1	2 NC + 1 NO slow break	RH side or LH side	**XY2CJS19** *(2) (3)*	0.455
⩽ **30 m**	Zamak red RAL 3000 head and body Treated steel cover	By pull button	–	1	1	NC + NO slow break	RH side	**XY2CJR15** *(2)*	0.669
				2	–	NC + NC slow break	RH side	**XY2CJR17** *(2)*	0.669
				2	1	2 NC + 1 NO slow break	RH side	**XY2CJR19** *(2) (3)*	0.669
				1	1	NC + NO slow break	LH side	**XY2CJL15** *(2)*	0.669
				2	–	NC + NC slow break	LH side	**XY2CJL17** *(2)*	0.669
				2	1	2 NC + 1 NO slow break	LH side	**XY2CJL19** *(2) (3)*	0.669

(1) See separate parts on page 102.
(2) For ISO M20 tapped cable entry version, add H29 to the end of the selected reference.
*For example: **XY2CJS15** becomes **XY2CJS15H29**.*
(3) For 1/2" NPT tapped cable entry version, add H7 to the end of the selected reference.
*For example: **XY2CJS19** becomes **XY2CJS19H7**.*

Safety detection solutions

Emergency stop rope pull switches
XY2C range

XY2C_620_CPODA2016018

XY2CZ30●●

PF123239

XY2CZ210

PF123258

XY2CZ402
XY2CZ404

Separate parts

Description	Diameter mm	For use with	Length m	Reference	Weight kg
Galvanized cables with red sheath	3.2	XY2CJ	10.5	**XY2CZ301**	0.280
			15.5	**XY2CZ3015**	0.410
			20.5	**XY2CZ3020**	0.550
			25.5	**XY2CZ302**	0.690
			30.5	**XY2CZ303**	0.830

Description	Type	For use with	Unit reference	Weight kg
Quick tensioner	–	XY2CJ	**XY2CZ210**	0.051
Turnbuckle	M6 x 60 + locknut	XY2CJ	**XY2CZ402**	0.060
	M8 x 70 + locknut	XY2CJ	**XY2CZ404**	0.100

Safety detection solutions
Emergency stop rope pull switches
XY2C range

XY2C_620_CPODA2016006

XY2CZ503
XY2CZ513

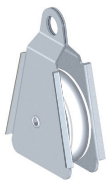
XY2C_620_CPODA2016007

XY2CZ523

PF123265

PF123264

XY2CZ705 *XY2CZ601*

PF123263

XY2C_620_CPODA2016008

XY2CZ708 *XY2CZ602*

XY2C_620_CPODA2016004

XY2CZ701

PF123268

XY2CZ703

Separate parts *(continued)*

Description	Type	For use with	Unit reference	Weight kg
Set of 10 cable grips	Single	Cable Ø 3.2 mm	**XY2CZ503**	0.007
	Double	Cable Ø 3.2 mm	**XY2CZ513**	0.016
	Clamp	Cable Ø 3.2 mm	**XY2CZ523**	0.050
		Cable Ø 5 mm	**XY2CZ524**	0.080
Cable support	Fixed	All models	**XY2CZ601**	0.030
Set of 10 cable supports	Fixed	All models	**XY2CZ611**	0.032
Swiveling	–	All models	**XY2CZ602**	0.130
Pulley support	–	All models	**XY2CZ705**	0.060
Set of 10 pulley supports	–	All models	**XY2CZ715**	0.650
Pulley	Cable Ø 5 mm max.	All models	**XY2CZ708**	0.056
Set of 10 pulleys	Cable Ø 5 mm max.	All models	**XY2CZ718**	0.550
Set of 10 cable end protectors	–	Cable Ø 3.2 mm	**XY2CZ701**	0.002
		Cable Ø 5 mm	**XY2CZ704**	0.010
End spring	–	XY2CJ	**XY2CZ703**	0.035

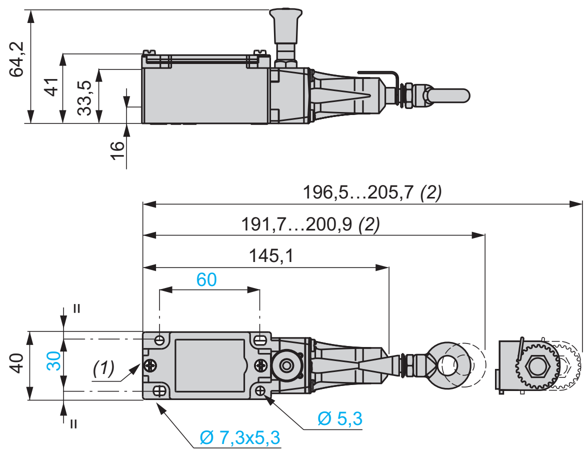
Mounting kits

Kit contents	For use with	Cable diameter	Cable length	Reference	Weight
		mm	m		kg
1 galvanized cable + 1 clamp cable grip + 1 end spring **XY2CZ703**	XY2CJ	3.2	10.5	**XY2CZ9310**	0.444
			15.5	**XY2CZ9315**	0.581
			20.5	**XY2CZ9320**	0.635
			30.5	**XY2CZ9330**	1.055
1 galvanized cable + 1 clamp cable grip + 1 tensioner **XY2CZ210** + 12 cable supports **XY2CZ601** + 1 end spring **XY2CZ703**	XY2CJ	3.2	30.5	**XY2CZ9425**	2.045

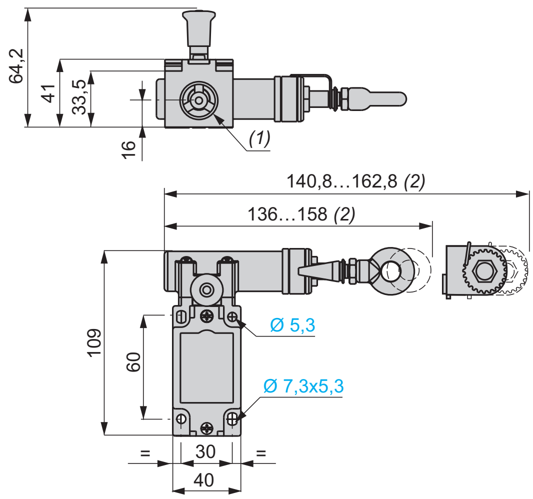
Emergency stop rope pull switches with single anchor point

XY2CJ

XY2CJS●●



XY2CJR●● and **XY2CJL●●** (same dimensions with anchor point on RH side or LH side)



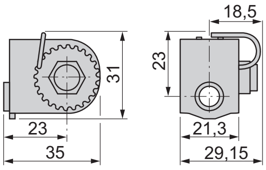
(1) Tapped entries for no. 13 cable gland (Pg 13.5). For ISO M20, the reference becomes ***XY2CJ●●●H29.*** *For 1/2" NPT, the reference becomes* ***XY2CJ●●●H7****.*
Ø: 4 elongated holes Ø 6 mm.

Safety detection solutions
Emergency stop rope pull switches
XY2C range

Accessories

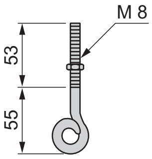
Quick tensioners

XY2CZ210

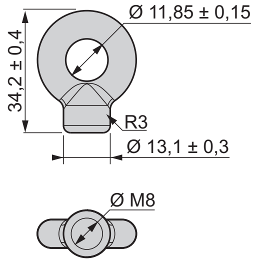


Cable and pulley supports

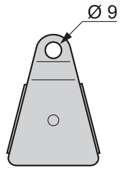
XY2CZ705



XY2CZ601



XY2CZ708



*(1) 3 untapped holes for no. 13 (Pg 13.5) or ISO M20 cable gland. For 1/2" NPT, the reference becomes **XY2CE●●●H7** or **XY2CED●●●H7**.*

Product reference index

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