

# Датчики, конечные выключатели и реле давления Easy

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## Limit switches

■ Selection guide	4
■ General	5
□ General	5
□ Applications examples	5
□ Contact block operation	6
□ Contact ratings	7
□ Setting up and mounting advice	8
■ European standards	9
□ Degrees of protection provided by enclosures	9
■ American standards	10
□ Degrees of protection provided by enclosures	10
■ Selection considerations	11
□ Operating heads	11
■ For light to medium duty applications, XCJ	12
□ Presentation, general characteristics	12
□ References, characteristics, dimensions	13
□ References, characteristics	14
□ Dimensions	15
■ For medium duty applications, XCE	16
□ Presentation, general characteristics	16
□ References, characteristics, dimensions	17
□ References, characteristics	18
□ Dimensions	20
■ Compact design, plastic, XCKN	22
□ References, characteristics	22
□ Dimensions	24

## Inductive proximity sensors

■ Selection guide	26
■ General presentation	28
■ References	29
■ Characteristics, connections, setting-up	30
■ Dimensions, curves	31
■ References	32
□ Three-wire DC, solid-state output	32
□ Accessories	34
■ Characteristics, schemes	35
■ Setting-up, dimensions	36
■ Curves	37

**Photo-electric sensors**

- **General** **38**
- **Presentation** **39**
- **Miniature design, plastic, Three-wire DC, solid-state output** **52**
  - References 52
  - Characteristics 56
  - Schemes 57
  - Curves 58
  - Description, dimensions 62
- **Design 18, plastic, Three-wire DC, solid-state output** **66**
  - References 66
  - Characteristics, schemes, curves, dimensions 67
- **Design 18, metal, Three-wire DC, solid-state output** **68**
  - References 68
  - Characteristics, schemes, curves, dimensions 69

**Electronic pressure sensors**

- **Presentation** **70**
- **Functions** **71**
- **References** **72**
  - Compact metal body, 316L stainless steel fluid entry  
With analogue output. Sizes in bar 72
  - Separate parts 85

**Electromechanical pressure switches**

- **Presentation** **86**
- **Characteristics** **81**
- **References, characteristics** **88**
  - For power circuits, FTG Range 88
  - For power circuits, FSG Range 89
  - For power circuits, FYG Range 90
- **Dimensions** **91**

**Safety detection solutions**

■ <b>XCSPA and XCSTA</b>	<b>92</b>
□ General presentation	92
□ References	93
□ Dimensions	94
□ Setting-up, schemes	96
■ <b>XY2C</b>	<b>97</b>
□ Presentation	97
□ General	98
□ Characteristics	99
■ <b>References</b>	<b>101</b>
□ XY2CJ range	101
□ XY2C range	102
■ <b>Dimensions</b>	<b>104</b>

# Limit switches

## XC range

**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



<b>Enclosure (body)</b>	
<b>Conforming to standards</b>	
<b>Conformities</b>	
<b>Body dimensions in mm (w x h x d)</b>	
<b>Head</b>	
<b>Contact blocks</b>	
<b>Degree of protection</b>	
<b>Operating temperature</b>	
<b>Cabling</b>	
<b>Type references</b>	
<b>Pages</b>	

Zinc alloy (cover: plastic)
IEC 60947-5-1
CE, CCC
28 x 64 x 25
Linear, rotary or multi-directional
–
•
–
–
–
–
–
IP 65
–
Flexible rubber cable gland suitable for cable Ø 6...9 mm
–
–
–
<b>XCE</b>
17 to 19

Plastic (cover: zinc alloy)
IEC 60947-5-1
CE, CCC
54 x 42 x 21
Linear
•
–
–
–
–
–
IP 40, IK 04
–
Flexible rubber cable gland suitable for cable Ø 8.5...10.5 mm
–
–
–
<b>XCJ</b>
13 to 14

Plastic, double insulated
CENELEC EN 50047
UL, CSA, CCC, EAC
31 x 65 x 30
Linear movement (plunger)
Rotary movement (lever)
Rotary movement, multidirectional
–
–
•
•
•
•
IP 65, IK 04
- 25 °C... + 70 °C
1 entry for ISO M20 or Pg 11 cable gland
Other cable entries: ISO M16 x 1.5 or PF 1/2 (G1/2)
–
–
<b>XCKN</b>
23 to 24

### 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

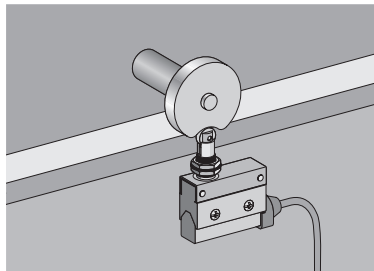
- **From an electrical viewpoint:**
  - galvanic separation of circuits,
  - models suitable for low power switching, combined with good electrical durability,
  - very good short-circuit withstand in coordination with appropriate fuses,
  - total immunity to electromagnetic interference,
  - high rated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

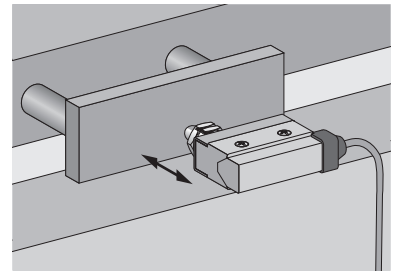
- **Major factors affecting the mechanical endurance of a limit switch:**
  - operating speed and frequency,
  - operating travel (percentage of total travel),
  - cam angle,
  - environment (presence of abrasive dust, corrosive substances, etc).

### Applications examples

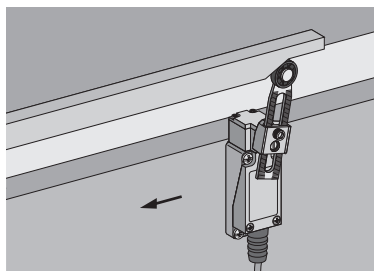
Roller plunger



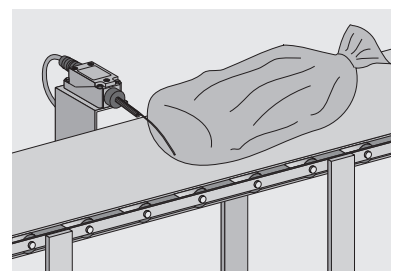
End plunger



Rotary style head



Multidirectional head



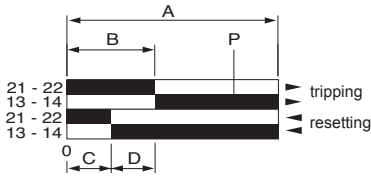
# Limit switches

## XC range

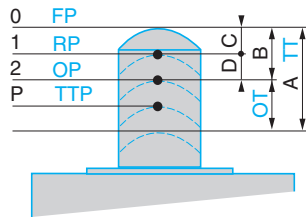
### Contact block operation

#### Contact blocks operation

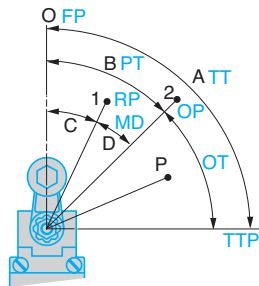
Example : 1 N/C + 1 N/O



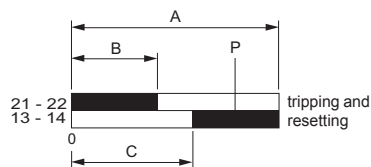
Linear movement (plunger)



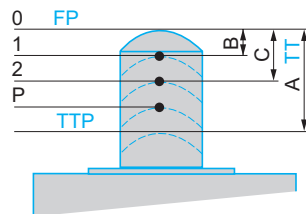
Rotary movement



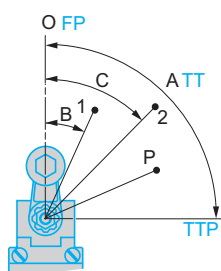
Example : 1 N/C + 1 N/O break before make



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 $\varphi$ (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 ( $\leq 72$ 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

Designation	Utilization category	Conventional therm. current	Rated operational current $I_e$ at rated operating voltage $U_e$					
			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	–	–	–	–	–

Designation	Utilization category	Conventional therm. current	Rated operational current $I_e$ at rated operating voltage $U_e$				
			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	–	–	–



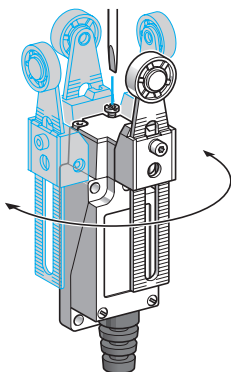
# Limit switches

XC range

Setting up and mounting advice

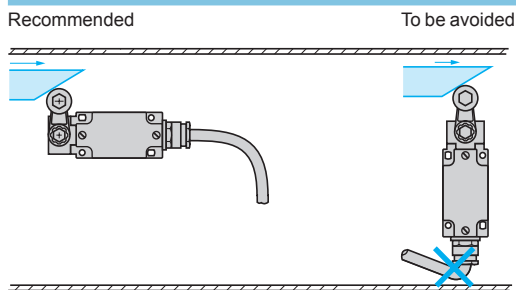
## Setting up

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

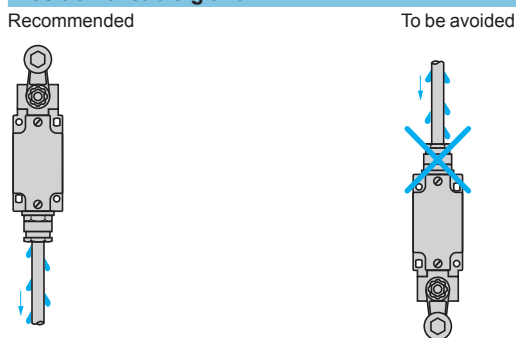


## Mounting advice

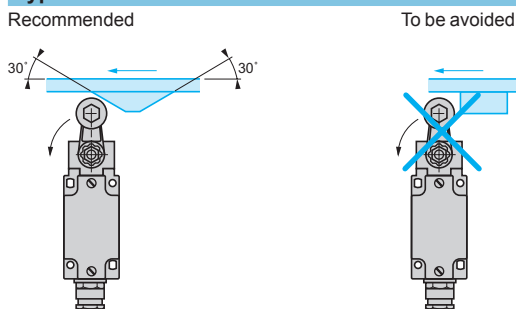
### Sweep of connecting cable



### Position of cable-gland



### Type of cam



### Mounting and fixing of limit switches

XCJ110C, XCJ102C and XCJ103C



# Limit switches

XC range

Degrees of protection provided by enclosures




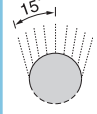

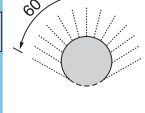

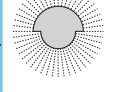
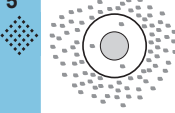
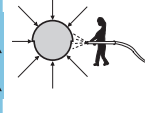
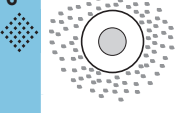
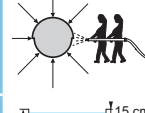
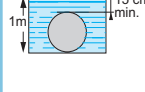
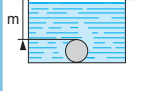
European standards

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)

1 <sup>st</sup> characteristic numeral: corresponds to protection of the equipment against penetration of solid objects and protection of personnel against direct contact with live parts.			2 <sup>nd</sup> characteristic numeral: corresponds to protection of the equipment against penetration of water with harmful effects.		
	Protection of the equipment	Protection of personnel			
0	Non-protected	Non-protected	0	Non-protected	
1	 <p>Protected against the penetration of solid objects having a diameter greater than or equal to 50 mm.</p>	Protected against direct contact with the back of the hand (accidental contacts).	1	 <p>Protected against vertical dripping water, (condensation)</p>	
2	 <p>Protected against the penetration of solid objects having a diameter greater than or equal to 12.5 mm.</p>	Protected against direct finger contact.	2	 <p>Protected against dripping water at an angle of up to 15°.</p>	
3	 <p>Protected against the penetration of solid objects having a diameter greater than or equal to 2.5 mm.</p>	Protected against direct contact with a Ø 2.5 mm tool.	3	 <p>Protected against rain at an angle of up to 60°.</p>	
4	 <p>Protected against the penetration of solid objects having a diameter &gt; 1 mm.</p>	Protected against direct contact with a Ø 1 mm wire.	4	 <p>Protected against splashing water in all directions.</p>	
5	 <p>Dust protected (no harmful deposits).</p>	Protected against direct contact with a Ø 1 mm wire.	5	 <p>Protected against water jets in all directions.</p>	
6	 <p>Dust tight.</p>	Protected against direct contact with a Ø 1 mm wire.	6	 <p>Protected against powerful jets of water and waves.</p>	
			7	 <p>Protected against the effects of temporary immersion.</p>	
			8	 <p>Protected against the effects of prolonged immersion under specified conditions.</p>	

# 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 objects and fluids.

Type	Intended use and description
<b>1</b>	Indoor use primarily to provide a degree of protection against limited amounts of falling dirt.
<b>2</b>	Indoor use primarily to provide a degree of protection against limited amounts of falling water and dirt.
<b>3</b>	Outdoor use primarily to provide a degree of protection against rain, sleet, wind blown dust and damage from external ice formation.
<b>3R</b>	Outdoor use primarily to provide a degree of protection against rain, sleet, and damage from external ice formation.
<b>3S</b>	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.
<b>4</b>	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.
<b>4X</b>	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.
<b>5</b>	Indoor use primarily to provide a degree of protection against settling airborne dust, falling dirt, and dripping noncorrosive liquids.
<b>6</b>	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.
<b>6P</b>	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.
<b>12, 12K</b>	Indoor use primarily to provide a degree of protection against limited circulation dust, falling dirt, and dripping noncorrosive liquids.
<b>13</b>	Indoor use primarily to provide a degree of protection against dust, spraying of water, oil and noncorrosive coolant.





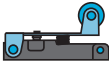

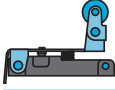









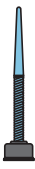



# Limit switches

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
<b>Plunger style</b>				
	0.5 m/s	Yes	Very high	
	0.85 m/s	Yes	High	
<b>Lever and roller lever plunger style</b>				
	0.85 m/s	Yes	Medium	
	0.85 m/s	Yes	Medium	
	0.5 m/s	No	High	
<b>Rotary style</b>				
	1 m/s	Yes (with non flexible levers only)	Low	
	1 m/s	Yes (with non flexible levers only)	Low	
	1 m/s	Yes (with non flexible levers only)	Low	
<b>Multidirectional style</b>				
	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.

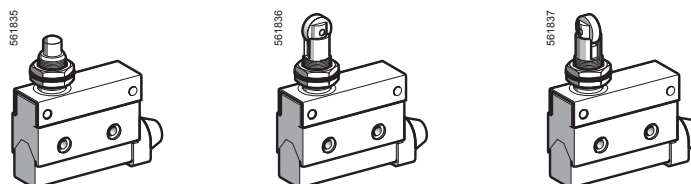
# Limit switches

XC range

For light to medium duty applications, XCJ

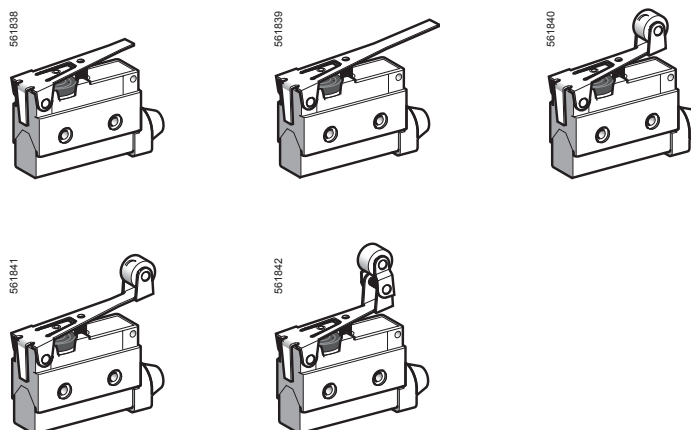
## XCJ (single-pole contact 1 C/O form C)

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



Page 13

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



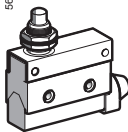
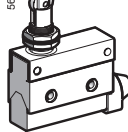
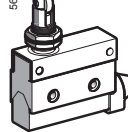

Page 14



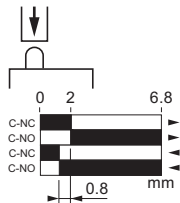
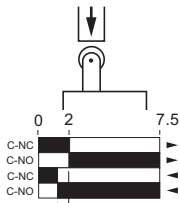
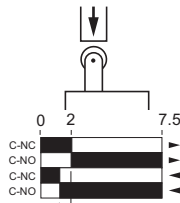
Environnement	
Conforming to standards	IEC 60947-5-1
Certifications	CE, CCC
Ambient air temperature	For operation: -25...+70 °C, for storage: -40...+70 °C
Vibration resistance	Conforming to IEC 60068-2-6 10...55 Hz XCJ110, XCJ102 and XCJ103C: 3.0 mm double amplitude XCJ125, XCJ126 and XCJ127C: 1.5 mm 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 <b>IP 40</b> <b>IK 04</b>
Materials	Body: plastic, head: metal
Mechanical durability	<b>10 x 10<sup>6</sup> operations</b>
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 (U <sub>e</sub> = 240 V, I <sub>e</sub> = 10 A), I <sub>th</sub> = 10 A --- DC (U <sub>e</sub> = 220 V, I <sub>e</sub> = 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 <sup>5</sup> 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

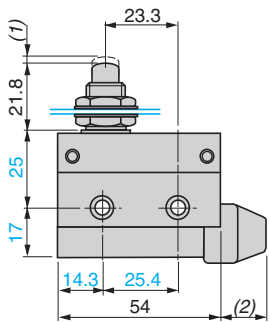
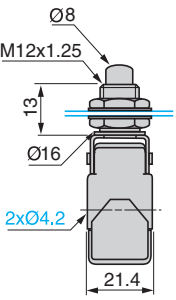
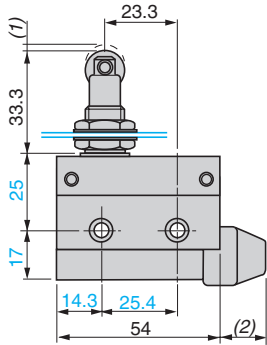
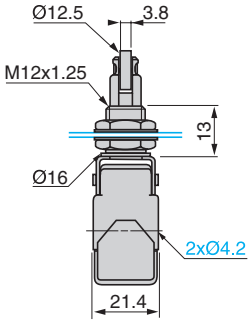
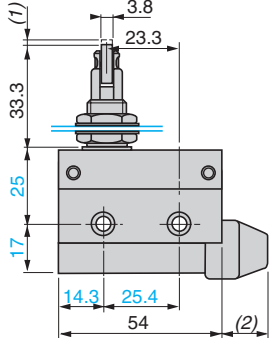
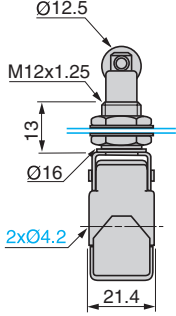
# Limit switches

XC range

For light to medium duty applications, XCJ

Type of operating head			
	Plunger (fixing by head or body)		
			
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
Weight (kg)	0.081	0.086	0.088
<b>Complementary characteristics</b> 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 <sup>6</sup> 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		XCJ102C	
			
(1) 2 max. (2) 16.5 max.		(1) 2 max. (2) 16.5 max.	
XCJ103C			
		(1) 2 max. (2) 16.5 max.	

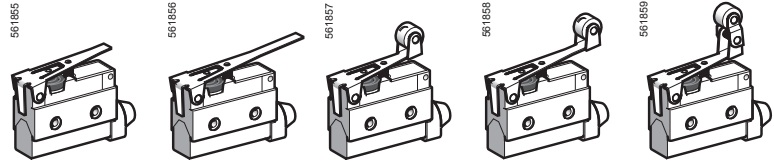
# Limit switches

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
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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
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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
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Operating frequency

120 operations per minute

Actuation speed

0.01 mm/s...50 cm/s (at pin plunger)

Mechanical durability

10 x 10<sup>6</sup> 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

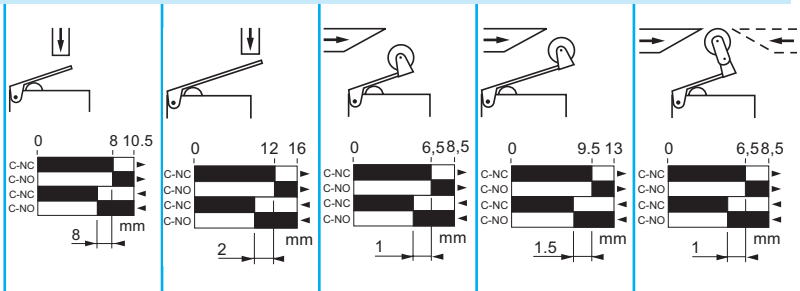
Operating diagrams

Type of actuation

Operating diagrams

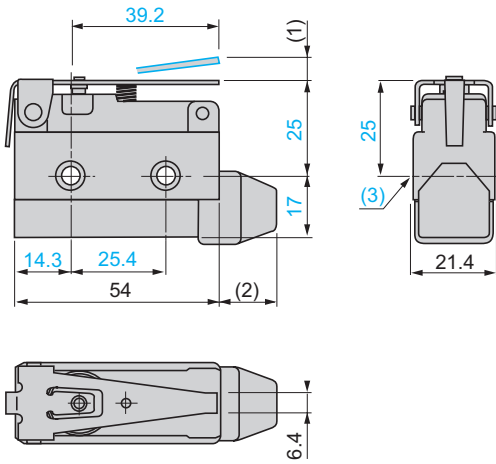
Contact operation

■ contact closed  
□ contact open



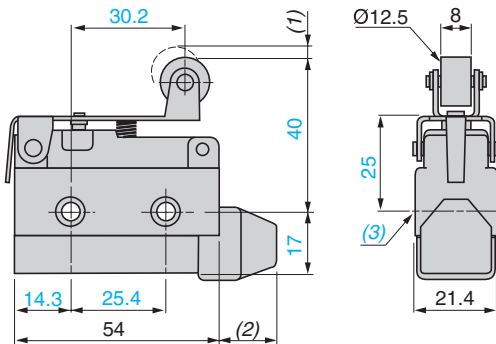
### Dimensions in mm

**XCJ125C**



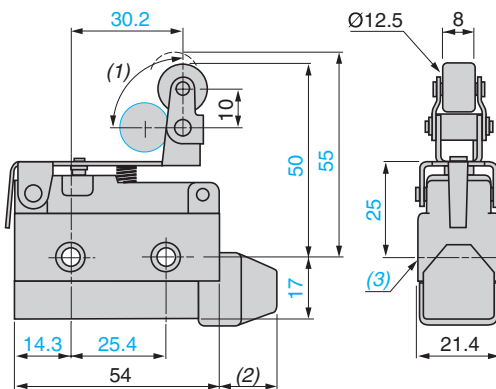
- (1) 8.5 max.
- (2) 16.5 max.
- (3) 2 x Ø 4.2

**XCJ127C**



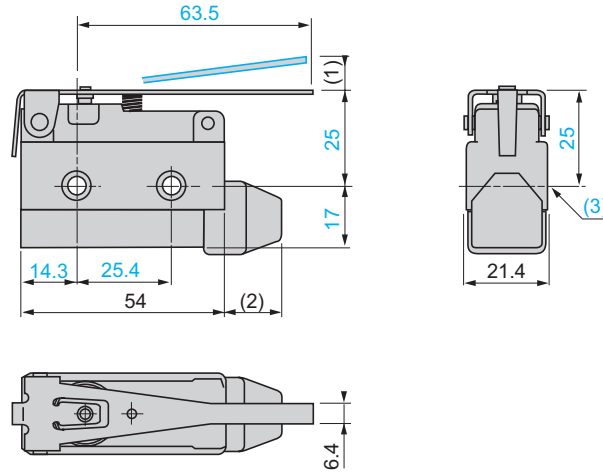
- (1) 6.5 max.
- (2) 16.5 max.
- (3) 2 x Ø 4.2

**XCJ121C**



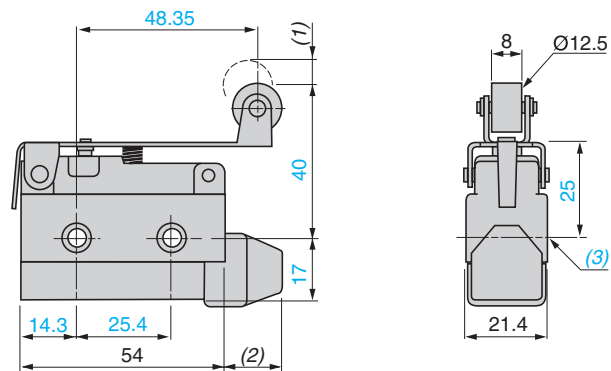
- (1) 90° max.
- (2) 16.5 max.
- (3) 2 x Ø 4.2

**XCJ126C**



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

**XCJ128C**



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



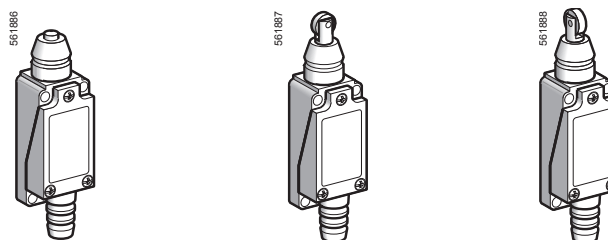
# Limit switches

XC range

For medium duty applications, XCE

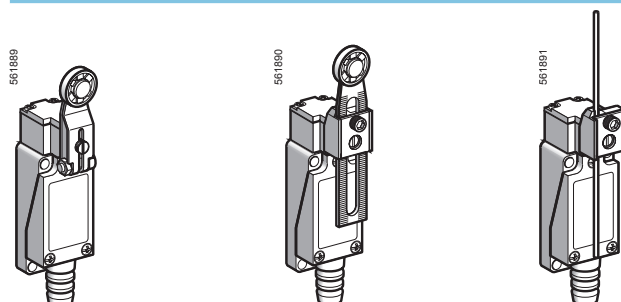
## XCE (1 NO + 1 NC form Za)

### With head for linear movement (plunger) operators



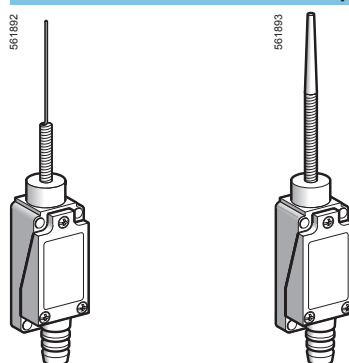
Page 17

### With head for rotary movement (lever) operators



Page 18

### With head for multi-directional operators



Page 19

## 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 <b>IP 65</b>
Materials	Body and head: metal, cover: plastic
Mechanical durability	<b>10 x 10<sup>5</sup> operations</b>
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

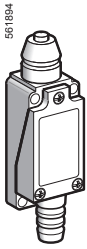


## Contact block characteristics

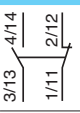
Rated operational characteristics	~ AC (Ue = 240 V, Ie = 3 A, Ith = 10 A); --- DC (Ue = 220 V, Ie = 0.3 A)
Rated insulation voltage	Ui=300V, pollution degree 3 complies with IEC 60947
Insulation resistance	> 100 mΩ at 500 V
Operating frequency	120 operations per minute
Electrical endurance	8 x 10 <sup>5</sup> 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 <sup>2</sup> per terminal

# Limit switches

XC range

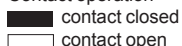
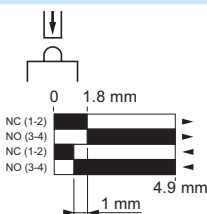
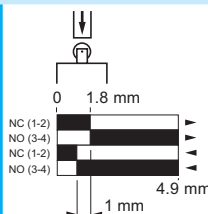
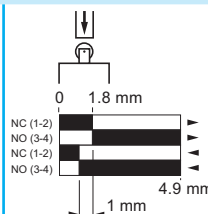
For medium duty applications, XCE

Type of operating head			
Plunger			
			
Type of operator	Steel end plunger	Steel roller plunger for lateral cam movement	Steel roller plunger for traverse cam movement

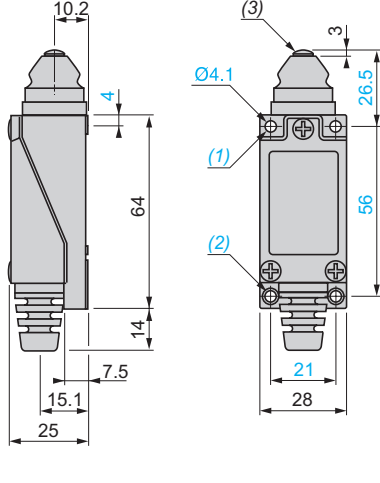
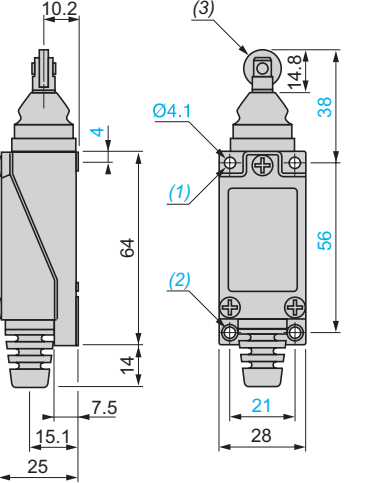
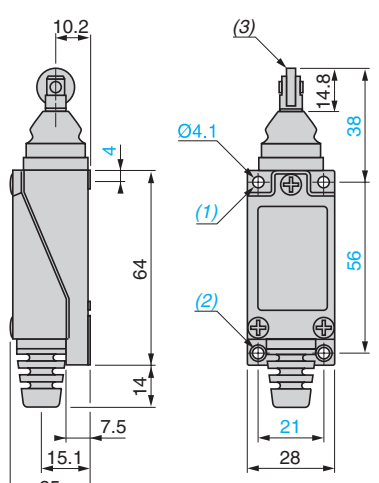
References (1)			
1 NO + 1 NC (form Za)		XCE110C	XCE102C
Weight (kg)		0.110	0.126

(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 10 <sup>6</sup> 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			
			
			

## Dimensions in mm

XCE110C	XCE102C	XCE103C
		

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

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

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

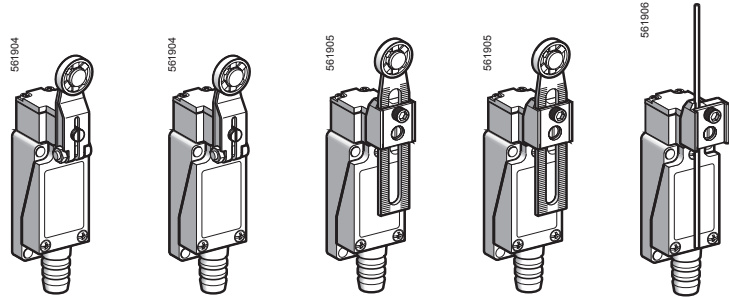
# Limit switches

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
<b>References (1)</b>					
1 NO + 1 NC (form Za)	XCE118C	XCE119C	XCE145C	XCE146C	XCE154C
Weight (kg)	0.152	0.159	0.175	0.181	0.164



**Complementary characteristics** not shown under general characteristics (page 16)

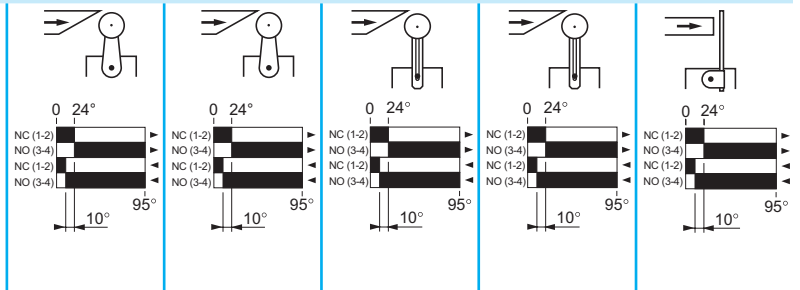
Switch actuation	By 30° cam	By any moving part
Operating force (maxi.)	7.5 N	
Release force (mini.)	0.5 N	
Operating frequency	120 operations per minute	
Maximum actuation speed	1 m/s	
Minimum actuation speed	9 mm/s for rotary type 5 mm/s for multi-directional type	
Mechanical durability	10 x 10 <sup>6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

**Operating diagrams**

Type of actuation

Operating diagrams

Contact operation  
 contact closed  
 contact open



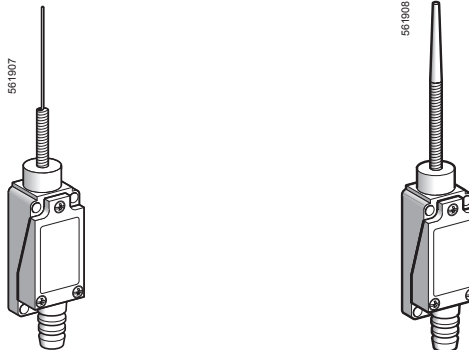
(1) All products are supplied in individual packaging. They are also available in a bulk pack of 10 products. To order the bulk packed versions, add the suffix **TQ** at the end of product reference. Example **XCE118CTQ**. Obviously the indivisible order quantity for this version is 10.

# Limit switches

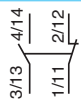
XC range

For medium duty applications, XCE

**Type of operating head**  
Multi-directional

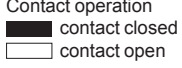
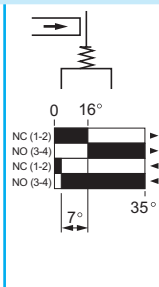
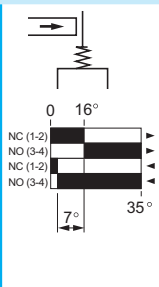


Type of operator	“Cat’s whisker”	Spring rod lever with thermoplastic end
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References (1)		
1 NO + 1 NC (form Za)		XCE106C
Weight (kg)	0.109	XCE181C

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 <sup>6</sup> operations
Cabling	Flexible rubber cable gland suitable for cable Ø 6...9 mm Maximum clamping capacity 1.5 mm <sup>2</sup> per terminal

**Operating diagrams**  
Type of actuation

Operating diagrams	
Contact operation	
	

(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

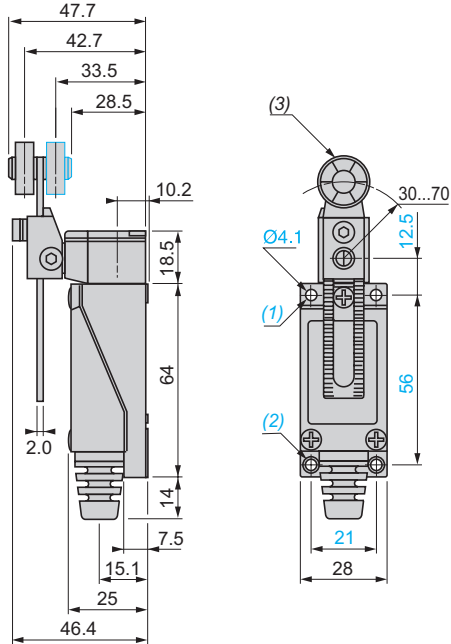
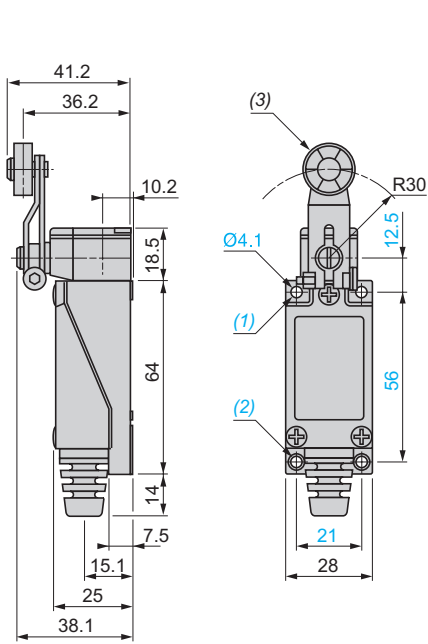
XC range

For medium duty applications, XCE

## Dimensions in mm

XCE118C, XCE119C

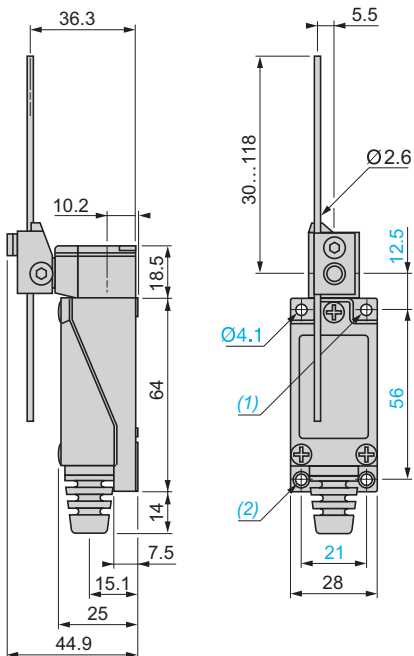
XCE145C, XCE146C



- (1) 2 holes M5 tapped 7 in depth.
- (2) 2 M5 tapped holes.
- (3) Nylon roller  $\varnothing 8 \times 7$  (roller can be rotated and locked in any position through  $360^\circ$ ).

- (1) 2 holes M5 tapped 7 in depth.
- (2) 2 M5 tapped holes.
- (3) Nylon roller  $\varnothing 8 \times 7$ .

XCE154C

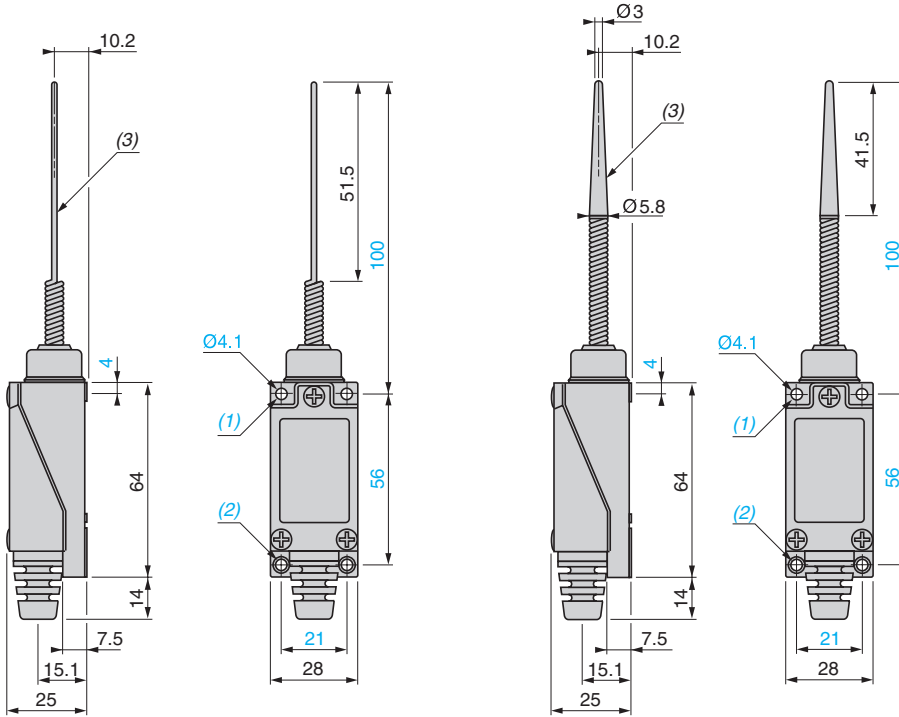


- (1) 2 holes M5 tapped 7 in depth.
- (2) 2 M5 tapped holes.

### Dimensions in mm

XCE106C

XCE181C



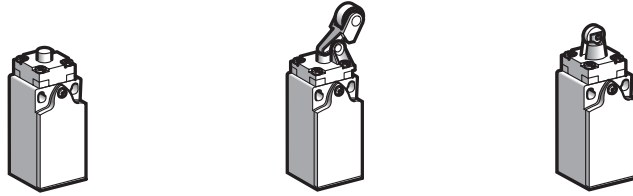
- (1) 2 holes M5 tapped 7 in depth.
- (2) 2 M5 tapped holes.
- (3) Stainless steel wire Ø 1.2.

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

## XCKN

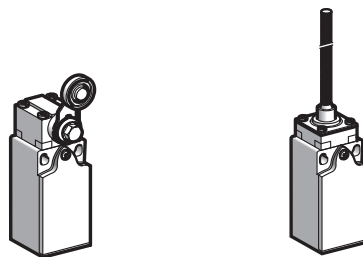
with 1 cable entry  
Conforming to CENELEC EN 50047)

### With head for linear movement (plunger)



Page 23

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



Page 24

## Environment characteristics

<b>Conformity to standards</b>	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
<b>Product certifications</b>		UL, CSA, CCC
<b>Protective treatment</b>	Version	Standard: "TC"
<b>Ambient air temperature</b>	For operation	- 25...+ 70°C
	For storage	- 40...+ 70°C
<b>Vibration resistance</b>	Conforming to IEC 60068-2-6	25 gn (10...500 Hz) except XCKN●●08: 10 gn, XCKN●●39 and XCKN●●49: 15 gn
<b>Shock resistance</b>	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
<b>Electric shock protection</b>		Class II conforming to IEC 61140 and NF C 20030
<b>Degree of protection</b>		IP 65 conforming to IEC 60529; IK 04 conforming to IEC 62262
<b>Cable entry</b>		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)
<b>Materials</b>	Bodies	Plastic
	Heads	Plastic

## Contact block characteristics

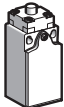
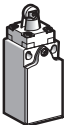



<b>Rated operational characteristics</b>		~ AC-15; A300 (Ue = 240 V, Ie = 3 A); Ithe = 10 A --- DC-13; R300 (Ue = 250 V, Ie = 0.1 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1
<b>Rated insulation voltage</b>	2-pole contact	Ui = 500 V degree of pollution 3 conforming to IEC 60947-1 Ui = 300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

# Limit switches

XC Basic range

Compact design, plastic, XCKN


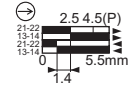
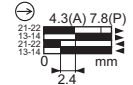
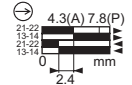
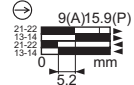
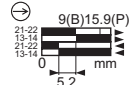

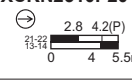
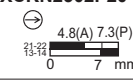
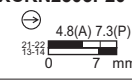
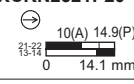
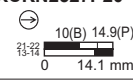




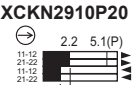
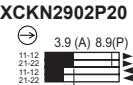
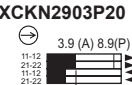
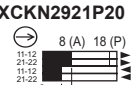



Complete switches with 1 cable entry

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
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Sold and packed in lots of	20	20	20	20	20
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### References of complete switches with 1 ISO M20 x 1.5 cable entry

	2-pole NC + NO snap action	<b>XCKN2110P20</b> 	<b>XCKN2102P20</b> 	<b>XCKN2103P20</b> 	<b>XCKN2121P20</b> 	<b>XCKN2127P20</b> 
	2-pole NC + NO break before make, slow break	<b>XCKN2510P20</b> 	<b>XCKN2502P20</b> 	<b>XCKN2503P20</b> 	<b>XCKN2521P20</b> 	<b>XCKN2527P20</b> 
	2-pole NC + NC simultaneous, slow break	<b>XCKN2710P20</b> 	-	-	<b>XCKN2721P20</b> 	-
	2-pole NC + NC snap action	<b>XCKN2910P20</b> 	<b>XCKN2902P20</b> 	<b>XCKN2903P20</b> 	<b>XCKN2921P20</b> 	-
<b>Weight (kg)</b>		0.065	0.065	0.065	0.070	0.070
<b>Contact operation</b>		 closed  open	(A) (B) = cam displacement (P) = positive opening point		 NC contact with positive opening operation	

### Characteristics

<b>Switch actuation</b>	On end	By 30° cam	
<b>Type of actuation</b>			 
<b>Maximum actuation speed</b>	0.5 m/s	0.3 m/s	1 m/s
<b>Mechanical durability</b> (in millions of operating cycles)	10		
<b>Minimum force or torque</b>	For tripping	15 N	12 N
	For positive opening	30 N	20 N
<b>Cable entry</b>	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							
	<b>2-pole NC + NO snap action</b>	<b>XCKN2118P20</b> 	<b>XCKN2145P20</b> 	<b>XCKN2139P20</b> 	<b>XCKN2149P20</b> 	<b>XCKN2108P20</b> 	<b>XCKN2106P20</b> 
	<b>2-pole NC + NO break before make, slow break</b>	<b>XCKN2518P20</b> 	<b>XCKN2545P20</b> 	<b>XCKN2539P20</b> 	<b>XCKN2549P20</b> 	-	-
	<b>2-pole NC + NC simultaneous, slow break</b>	<b>XCKN2718P20</b> 	-	-	-	-	-
	<b>2-pole NC + NC snap action</b>	<b>XCKN2918P20</b> 	<b>XCKN2945P20</b> 	-	<b>XCKN2949P20</b> 	-	-
<b>Weight (kg)</b>		0.085	0.090	0.110	0.115	0.085	0.075
<b>Contact operation</b>	closed open				(A) (B) = cam displacement (P) = positive opening point	NC contact with positive opening operation	

Characteristics		
<b>Switch actuation</b>	By 30° cam	By any moving part
<b>Type of actuation</b>		
<b>Maximum actuation speed</b>	1.5 m/s	1 m/s (any direction)
<b>Mechanical durability</b>	10 million operating cycles	5 million operating cycles
<b>Minimum force or torque</b>	For tripping: 0.1 N.m For positive opening: 0.15 N.m	0.13 N.m
<b>Cable entry</b>	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

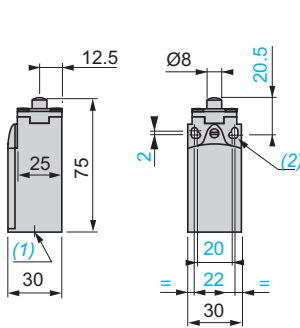
XC Basic range

Compact design, plastic, XCKN

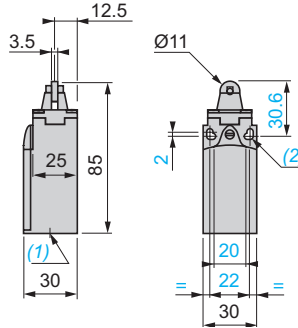
Complete switches with 1 cable entry

### Dimensions

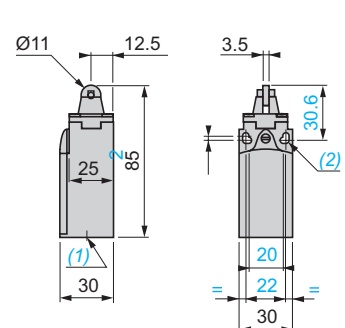
XCKN2●10P20



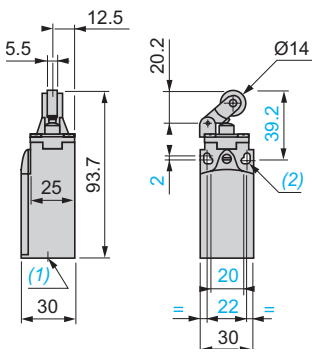
XCKN2●02P20



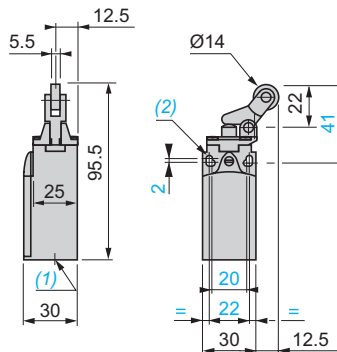
XCKN2●03P20



XCKN2●21P20

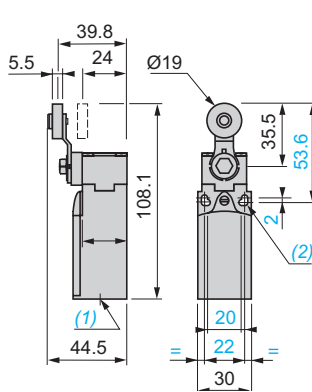


XCKN2●27P20

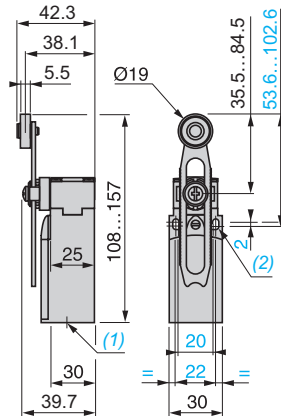


(1) 1 tapped entry for ISOM20 x 1.5 or Pg 11 cable gland.  
(2) Ø: 2 elongated holes Ø 4.3 x 6.3 on 22 mm centres, 2 holes Ø 4.3 on 20 mm centres.

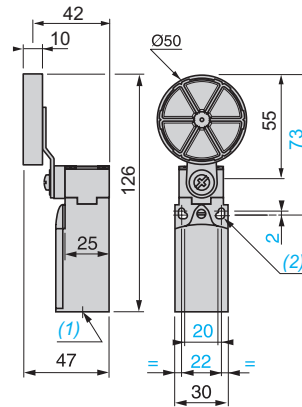
XCKN2●18P20



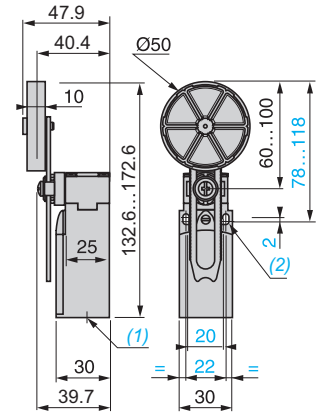
XCKN2●45P20



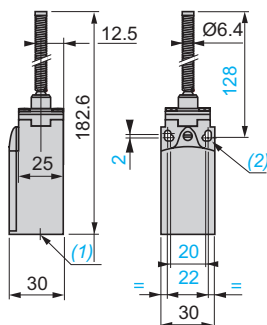
XCKN2●39P20



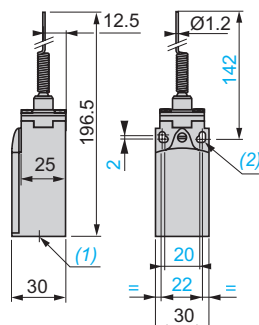
XCKN2●49P20



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  $S_n$  (mm)

Diameter

Power supply

Function

Output

Length (mm) for pre-cabled versions

Connection

Pre-cabled (L = 2 m) (2)

M8 connector, 3-pin

M12 connector, 4-pin

Operating temperature

Degree of protection

Type reference

Pages

2.5

M8

— 3-wire, 12...24 V

NO or NC

PNP or NPN

42

•

•

•

-25...+70 °C

IP 65 and IP 67

XS108BH●●●

29

4

M12

49

•

—

•

XS112BH●●●

8

M18

53

•

—

•

XS118BH●●●

15

M30

57

•

—

•

XS130BH●●●

(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			
<b>XS108BL●●●</b>	<b>XS112BL●●●</b>	<b>XS118BL●●●</b>	<b>XS130BL●●●</b>	<b>XS208BL●●●</b>	<b>XS212BL●●●</b>	<b>XS218BL●●●</b>	<b>XS230BL●●●</b>
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.



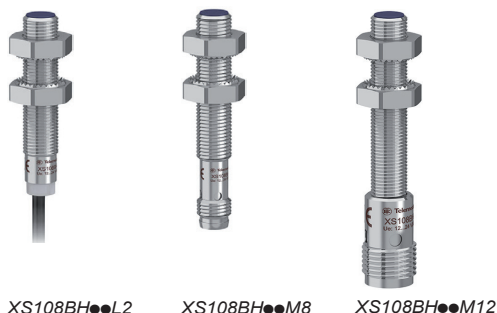
 Cost-effective sensors with no compromise on quality

# Inductive proximity sensors

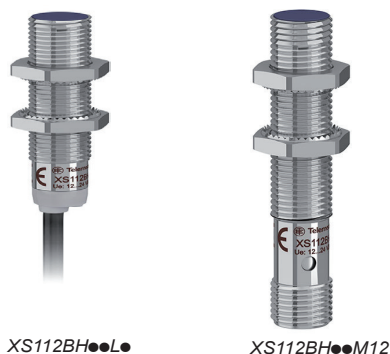
## XS range

Basic, cylindrical, increased range, flush mountable

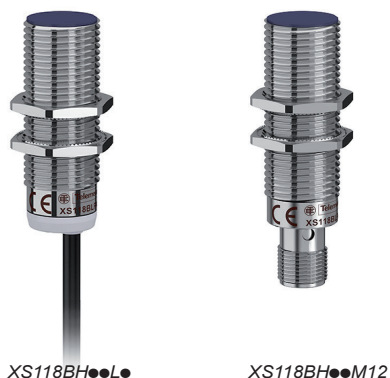
Three-wire DC, solid-state output



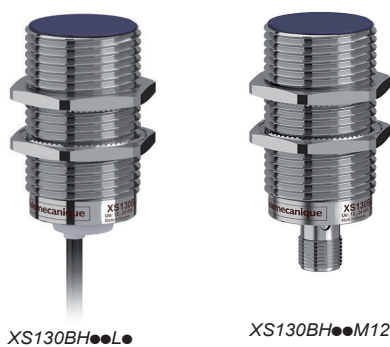
XS108BH●●L2    XS108BH●●M8    XS108BH●●M12



XS112BH●●L    XS112BH●●M12



XS118BH●●L    XS118BH●●M12



XS130BH●●L    XS130BH●●M12



XSZB1●●    XZCPV●●

### Sensors, 3-wire $\bar{\bar{}}$ 12...24 V

Sensing distance (Sn) mm	Function	Output	Connection	Reference	Weight kg
<b>Ø 8, threaded M8 x 1</b>					
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	
		M12 connector	XS108BHPBM12	0.050	
N/C	PNP	Pre-cabled (L = 2 m)	XS108BHPBL2	0.070	
		M8 connector	XS108BHPBM8	0.030	
		M12 connector	XS108BHPBM12	0.050	
<b>Ø 12, threaded M12 x 1</b>					
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
M12 connector	XS112BHPBM12			0.025	
NPN	Pre-cabled (L = 2 m)			XS112BHNBL2	0.080
	M12 connector	XS112BHNBM12	0.025		
	<b>Ø 18, threaded M18 x 1</b>				
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
M12 connector	XS118BHNBM12	0.035			
<b>Ø 30, threaded M30 x 1.5</b>					
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
	M12 connector			XS130BHPBM12	0.075
	NPN			Pre-cabled (L = 2 m)	XS130BHNBL2
		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	5	XZCPV1141L5	0.210
	10	XZCPV1141L10	0.390
Pre-wired, straight, female connectors M8 connectors	5	XZCPV0566L5	0.210
	10	XZCPV0566L10	0.390

(1) For other connection accessories, visit our website:

# 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, C E			
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 mm <sup>2</sup> )			
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	Pre-cabled	PNP	NPN
M8	BU: Blue BN: Brown BK: Black		
M12			

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.

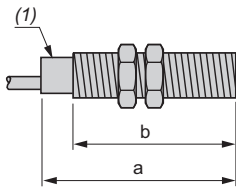
## Inductive proximity sensors

XS range

Basic, cylindrical, increased range, flush mountable

Three-wire DC, solid-state output

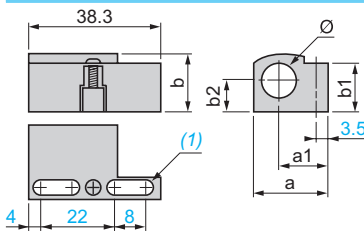
### Sensor dimensions XS1●●BH●●



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

(1) LED

### Fixing clamp dimensions XSZB108, XSZBB112, XSZBB118 and XSZBB130

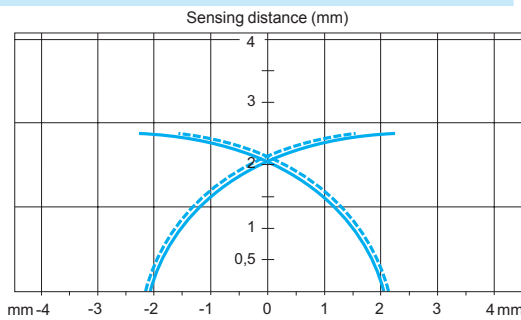


		a	a1	b	b1	b2	Ø
Ø 8	<b>XSZB108</b>	19.9	14.5	14	12.5	7.5	8
Ø 12	<b>XSZB112</b>	21.9	14.5	16	15.5	8.5	12
Ø 18	<b>XSZB118</b>	26	15.7	22.3	20.1	11.5	18
Ø 30	<b>XSZB130</b>	39	21.7	35.5	31	18.5	30

(1) 2 elongated holes Ø 4 x 8 mm

### Detection curves

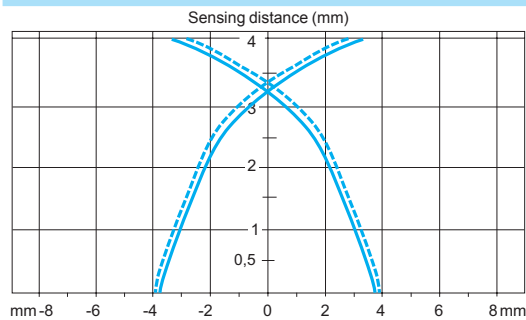
#### Sensors Ø 8



Standard metal target (mm): 8 x 8 x 1

Operating zone (mm): 0...2

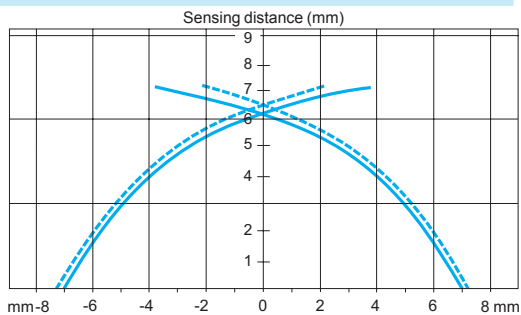
#### Sensors Ø 12



Standard metal target (mm): 12 x 12 x 1

Operating zone (mm): 0...3.2

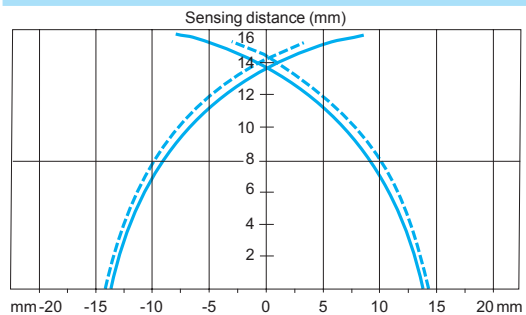
#### Sensors Ø 18



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



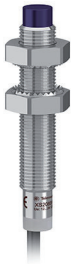
XS108BL●●L●



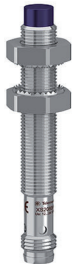
XS108BL●●M8



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			
<b>Ø 8, threaded M8 x 1</b>								
<b>Three-wire 12-24 V, flush mountable</b>								
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			
	NPN	PNP	M12 connector	XS108BLPAM12	0.015			
			Pre-cabled (L = 2 m)	XS108BLNAL2	0.035			
			M12 connector	XS108BLNAM12	0.015			
<b>Three-wire 12-24 V, non flush mountable</b>								
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			
	NPN	PNP	M12 connector	XS208BLPAM12	0.015			
			Pre-cabled (L = 2 m)	XS208BLNAL2	0.035			
<b>Ø 12, threaded M12 x 1</b>								
<b>Three-wire 12-24 V, flush mountable</b>								
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	PNP	Pre-cabled (L = 2 m)	XS112BLNAL2	0.070	
					M12 connector	XS112BLNAM12	0.015	
	NC	PNP	PNP	Pre-cabled (L = 2 m)	XS112BLPBL2	0.070		
				M12 connector	XS112BLPBM12	0.015		
<b>Three-wire 12-24 V, non flush mountable</b>								
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	PNP	Pre-cabled (L = 2 m)	XS212BLNAL2	0.070	
					Pre-cabled (L = 7 m)	XS212BLNAL7	0.185	
			NC	PNP	PNP	M12 connector	XS212BLNAM12	0.015
	Pre-cabled (L = 2 m)	XS212BLPBL2				0.070		
	Pre-cabled (L = 5 m)	XS212BLPBL5				0.140		
	NPN	PNP				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●



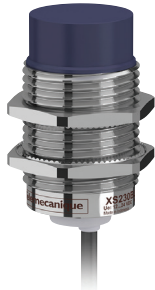
XS218BL●●M12



XS130BL●●L●



XS130BL●●M12



XS230BL●●L●



XS230BL●●M12

Sensing distance (Sn)	Function	Output	Connection	Reference	Masse
mm					kg
<b>Ø 18, threaded M18 x 1</b>					
<b>Three-wire --- 12-24 V, flush mountable</b>					
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	PNP	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	
<b>Three-wire --- 12-24 V, non flush mountable</b>					
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	PNP	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	PNP	M12 connector	XS218BLNAM12	0.035
			Pre-cabled (L = 2 m)	XS218BLPBL2	0.105
			NPN	Pre-cabled (L = 2 m)	XS218BLNBL2
<b>Ø 30, threaded M30 x 1.5</b>					
<b>Three-wire --- 12-24 V, flush mountable</b>					
10	NO	PNP	Pre-cabled (L = 2 m)	XS130BLPAL2	0.165
			M12 connector	XS130BLPAM12	0.075
			NPN	Pre-cabled (L = 2 m)	XS130BLNAL2
	Pre-cabled (L = 3 m)	PNP	Pre-cabled (L = 3 m)	XS130BLNAL3	0.190
			M12 connector	XS130BLNAM12	0.075
			NC	Pre-cabled (L = 2 m)	XS130BLPBL2
M12 connector	XS130BLPBM12	0.075			
<b>Three-wire --- 12-24 V, non flush mountable</b>					
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	PNP	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:

# Inductive proximity sensors

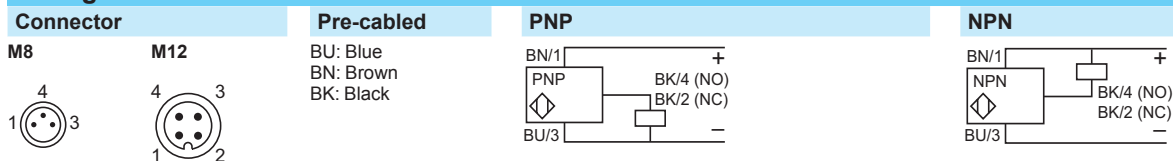
XS range, general purpose

Basic, cylindrical, metal, flush and non flush mountable

Three-wire DC, solid-state output

Characteristics			XS1●●BLP●L● XS1●●BLN●L●	XS1●●BLP●M● XS1●●BLN●M●	XS2●●BLP●L XS2●●BLN●L	XS2●●BLP●M● XS2●●BLN●M●
Sensor type			UL, CSA, C€			
Product certifications	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	
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 mm <sup>2</sup> except Ø 8: 3 x 0.11 mm <sup>2</sup>		PVC 3 x 0.14 mm <sup>2</sup> except Ø 8: 3 x 0.11 mm <sup>2</sup>	
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	
	Response	Ø 8	ms		≤ 0.3	
		Ø 12	ms		≤ 0.1	
		Ø 18	ms		≤ 0.1	
		Ø 30	ms		≤ 0.1	
	Recovery	Ø 8	ms		≤ 0.3	
		Ø 12	ms		≤ 0.15	
		Ø 18	ms		≤ 0.3	
Ø 30		ms		≤ 1		

## Wiring schemes



For M8 connectors, NO and NC outputs on terminal 4

(1) Detection curves, see page 37.

# Inductive proximity sensors

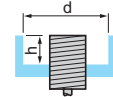
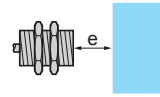
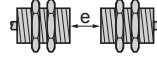
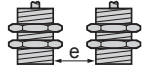
XS range, general purpose

Basic, cylindrical, metal, flush and non flush mountable

Three-wire DC, solid-state output

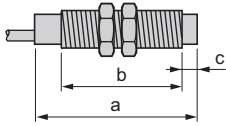
## Setting-up

### 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	$e \geq 3$	$e \geq 18$	$e \geq 4,5$	$d \geq 8$ $h \geq 0$
Ø 8 non flush mountable	XS208BL	$e \geq 10$	$e \geq 30$	$e \geq 7,5$	$d \geq 24$ $h \geq 5$
Ø 12 flush mountable	XS112BL	$e \geq 4$	$e \geq 24$	$e \geq 6$	$d \geq 12$ $h \geq 0$
Ø 12 non flush mountable	XS212BL	$e \geq 16$	$e \geq 48$	$e \geq 12$	$d \geq 36$ $h \geq 8$
Ø 18 flush mountable	XS118BL	$e \geq 10$	$e \geq 60$	$e \geq 15$	$d \geq 18$ $h \geq 0$
Ø 18 non flush mountable	XS218BL	$e \geq 16$	$e \geq 96$	$e \geq 24$	$d \geq 54$ $h \geq 16$
Ø 30 flush mountable	XS130BL	$e \geq 20$	$e \geq 120$	$e \geq 30$	$d \geq 30$ $h \geq 0$
Ø 30 non flush mountable	XS230BL	$e \geq 60$	$e \geq 180$	$e \geq 45$	$d \geq 90$ $h \geq 30$

## 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

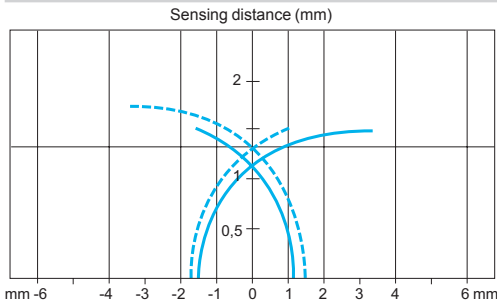
Basic, cylindrical, metal, flush and non flush mountable

Three-wire DC, solid-state output

## Detection curves

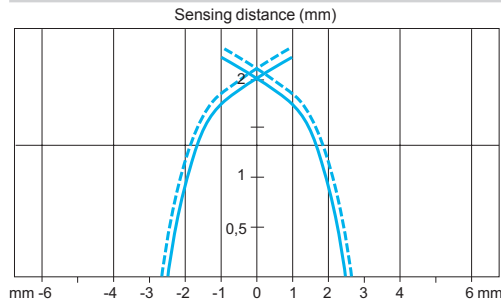
### Ø 8 sensors

#### Flush mountable in metal



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

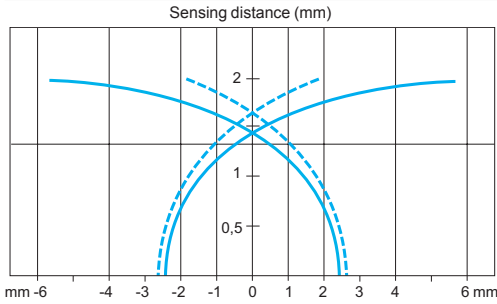
#### Non flush mountable in metal



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

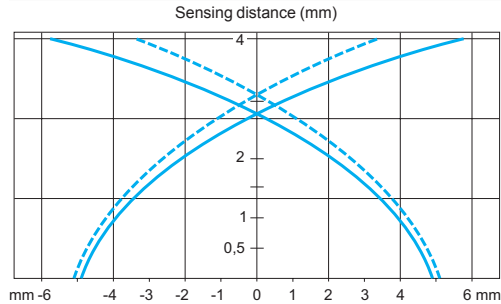
### Ø 12 sensors

#### Flush mountable in metal



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

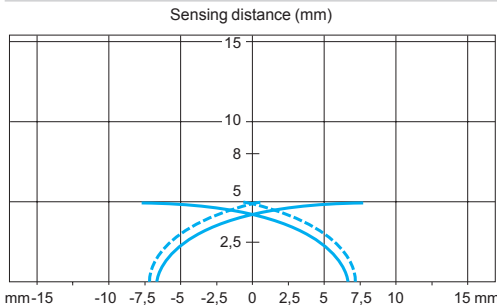
#### Non flush mountable in metal



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

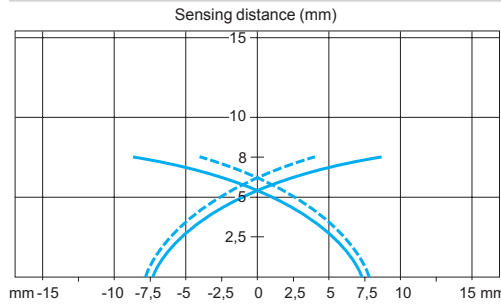
### Ø 18 sensors

#### Flush mountable in metal



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

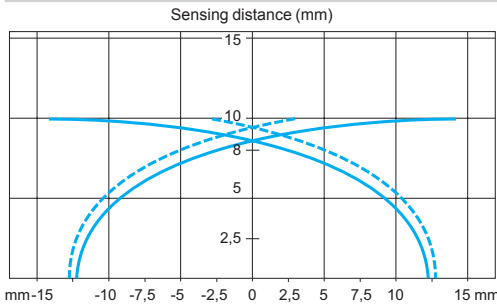
#### Non flush mountable in metal



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

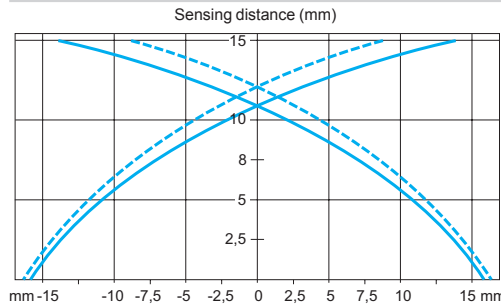
### Ø 30 sensors

#### 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

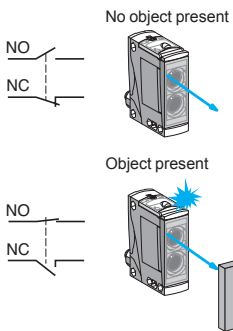
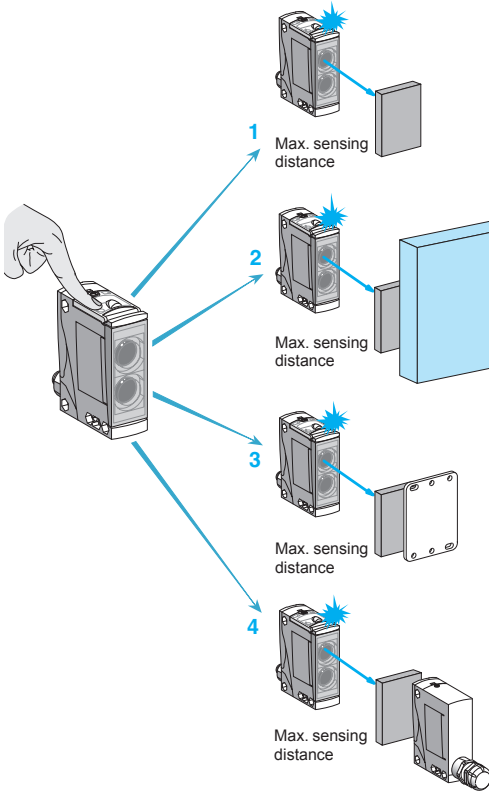
In proposing multimode products, Telemecanique Sensors offers simplicity through innovation.

■ 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

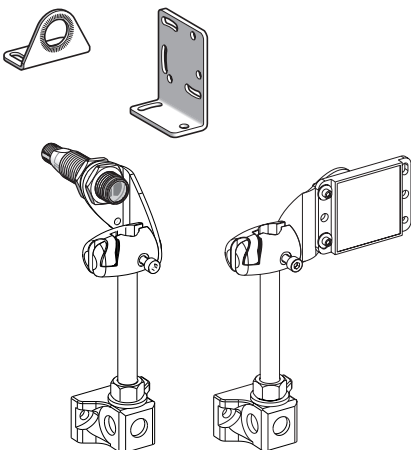
■ Irrespective of the detection mode used (diffuse, reflex, thru-beam, etc.), the outputs become either NO or NC (1).

■ 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



#### Design

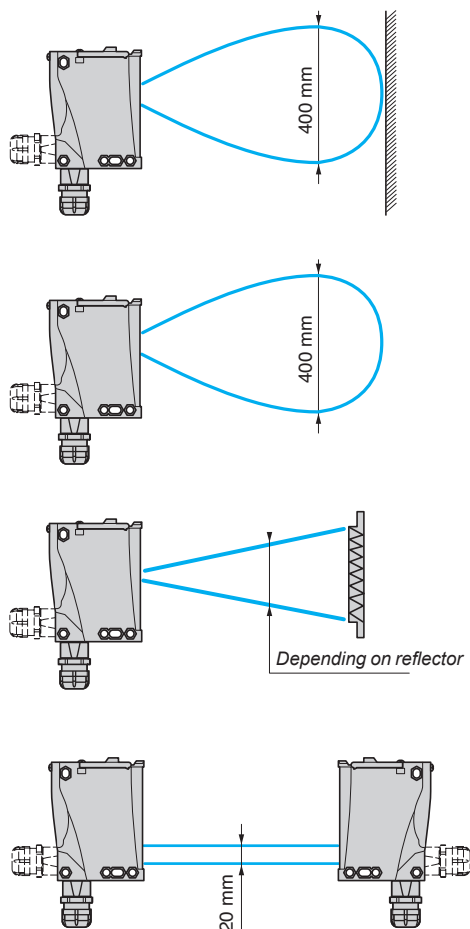
#### Cylindrical 18

#### Miniature



<b>Dimensions (w x h x d) in mm</b>	M18 x 64	12 x 34 x 20
<b>Maximum sensing distance in m</b>	Without accessory with background suppression	0.12
	Without accessory	0.4
	With polarised reflector	3
	With thru-beam accessory	20
<b>Supply</b>	☐ Solid-state output	■
	⌚ Relay output	—
<b>Connection</b>	Pre-cabled	■
	Connector	■
	Screw terminals	—
<b>Sensor type</b>	<b>XUB0</b>	<b>XUM0</b>
<b>Pages</b>	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.

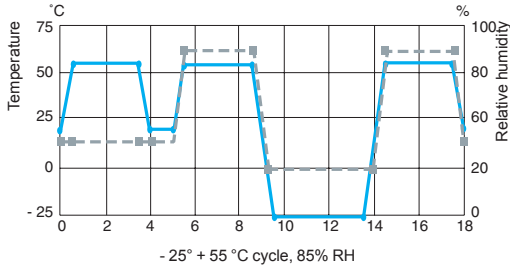
#### Sensing distance with thru-beam transmitter accessory

- 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.



### Standards and certifications

#### Parameters related to the environment



— Temperature °C  
 - - - Relative humidity %

### 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)

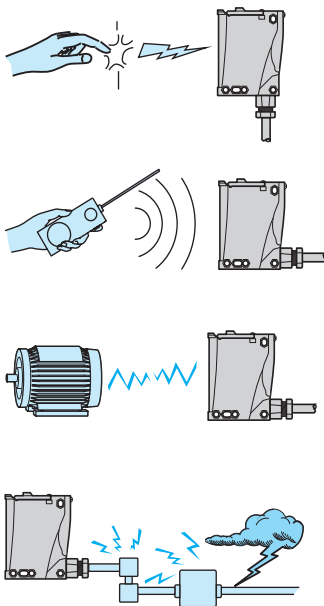
**IEC/EN 61000-4-4**

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.

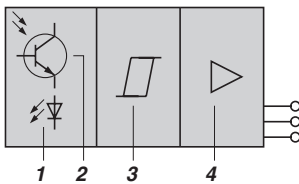
### Vibration resistance

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

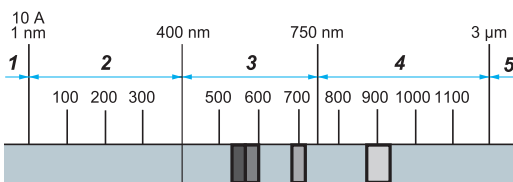
### Resistance to chemicals in the environment

■ 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

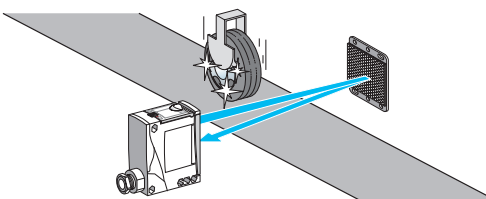
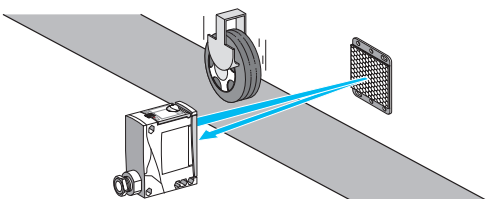
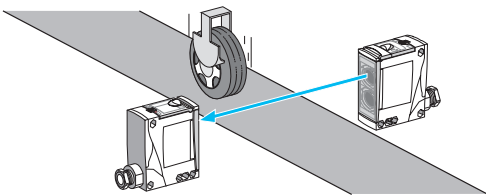


- 1 Light beam transmitter
- 2 Light beam receiver
- 3 Signal processing stage
- 4 Output stage



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

### Detection systems



### 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.

### 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.

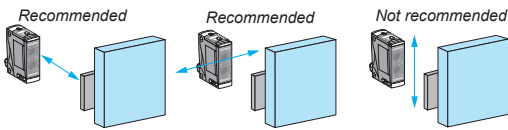
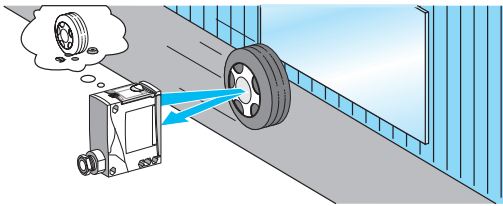
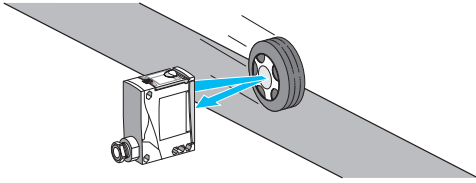
#### Operating precautions

- 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

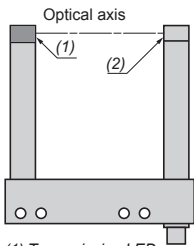
- Easy alignment
- 3 LEDs providing setting-up assistance.
- The anti-interference function enables 2 sensors to be used without specific alignment precautions.
- Semi-transparent objects can be detected by using the teach mode function.

## Detection systems (continued)

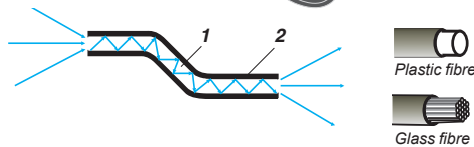


Positioning recommendations for sensor with background suppression

## Specific systems



(1) Transmission LED  
(2) Output LED



1 Core  
2 Sheath

## 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.

## 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.

## 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.

## 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.

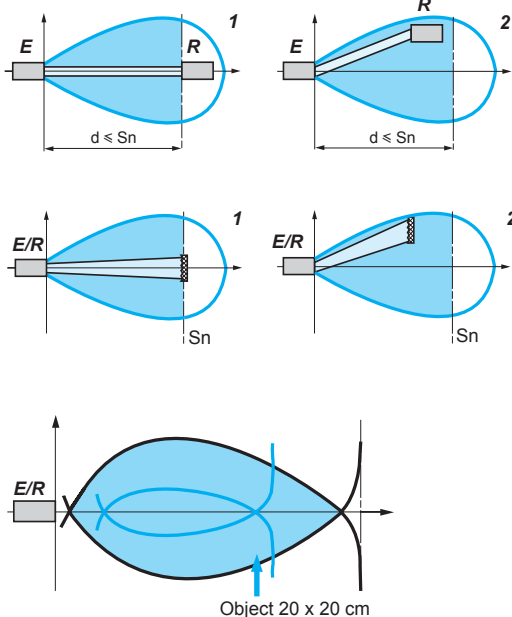
### Plastic fibres

- 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

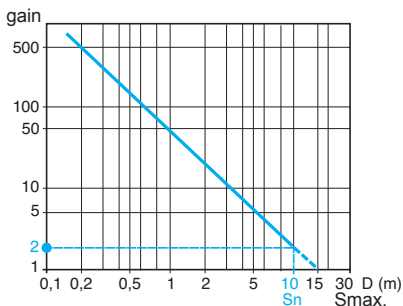
### Polarised reflex system

- 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

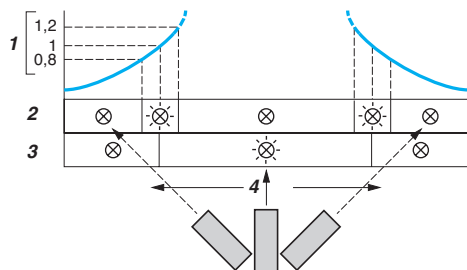
- The **nominal sensing distance  $S_n$**  is defined as the sensing distance with an **excess gain of 2**, i.e. the sensing distance for which the sensor receives twice as much light energy as it strictly needs to switch it.
- The **maximum sensing distance** is defined as the sensing distance with 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  $S_n$ ,
- slightly polluted environment: work at sensing distance  $S_n/2$ ,
- moderately polluted environment: work at sensing distance  $S_n/4$ ,
- heavily polluted environment: preferably use multimode sensors with thru-beam accessory (or the thru-beam system) with a sensing distance  $S_n/10$ .

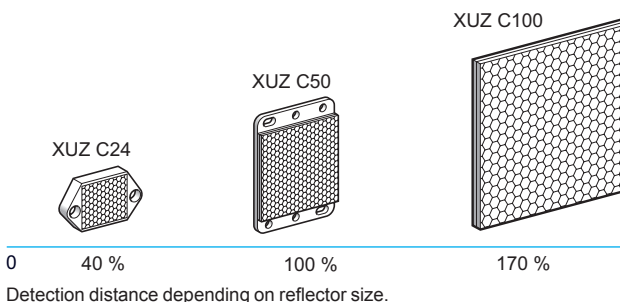
### Optical alignment aid



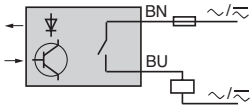
A red LED assists setting-up by illuminating when optimum alignment of the sensor is achieved.

- 1 Signal level
- 2 Red LED, on off
- 3 Green LED, on off
- 4 Optimum alignment

### Detection distance using reflector



## 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:

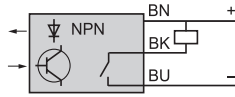
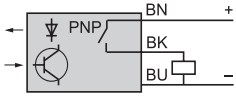
- A residual current in the open state (current flowing through the sensor in the “open” state),
- A voltage drop in the closed state (voltage drop across the sensor’s terminals in the “closed” state).

■ **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  $\sim$ , 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.



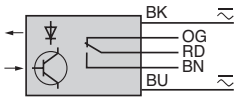
### 3-wire technique $\sim$

■ **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**

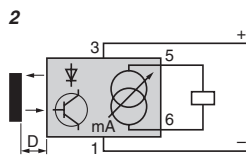
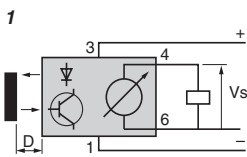
- Sensors incorporating output relay. The supply and output circuits are electrically separate.

■ **Advantages**

- $\sim$  or  $\sim$  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.



### 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).**


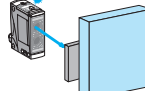
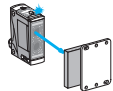
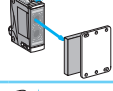
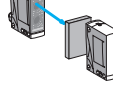


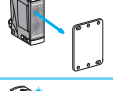
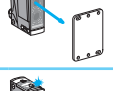
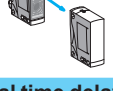
■ **Advantages**

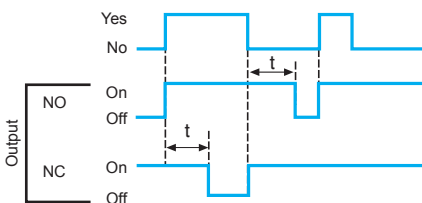
- NO output (or NO programming for multimode sensors): irrespective of the detection mode, the output of the sensor is activated when the object to be detected is present.
- NC output (or NC programming for multimode sensors): irrespective of the detection mode, the output of the sensor is activated when the object to be detected is not present.

■ **Advantages of multimode sensors**

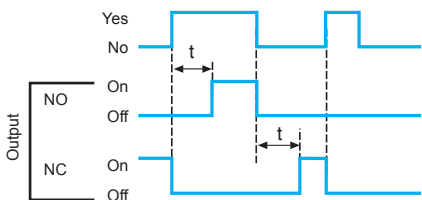
By default, the output is NO programmed, i.e. the output of the sensor is activated when the object to be detected is present.

- 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.

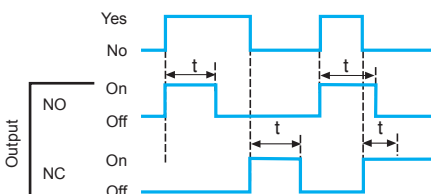
System	NO output or NO programming	Yellow LED	NC output or NC programming	Yellow LED
<b>Object present</b>				
Diffuse 	Activated	On ☀	Not activated	Off ⊗
Diffuse with background suppression 	Activated	On ☀	Not activated	Off ⊗
Reflex 	Activated	On ☀	Not activated	Off ⊗
Polarised reflex 	Activated	On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



**Time delay on beam break**



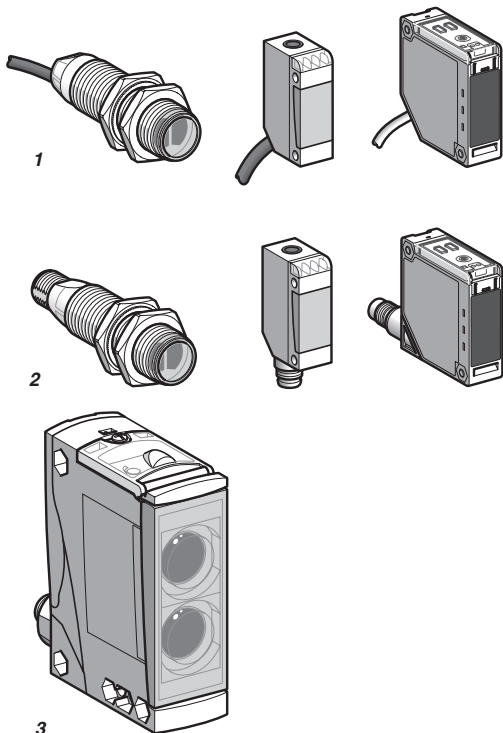
**Monostable**



### 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).

### Connections



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

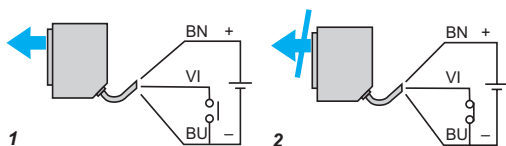
- 1 Factory fitted moulded cable: good protection against splashing liquids.
- 2 Connector: easy installation and maintenance.
- 3 Screw terminals: flexibility, cable runs to required length.

#### Wiring advice

- Length of cable: no limitation up to 200 m or up to a line capacitance of <math>< 0.1 \mu\text{F}</math> (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



#### 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.

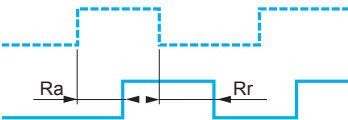
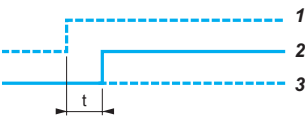
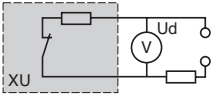
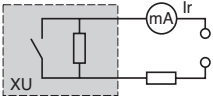
#### Verification of correct operation

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).

### 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.

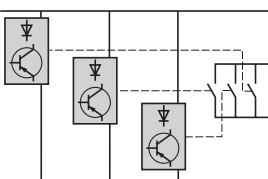
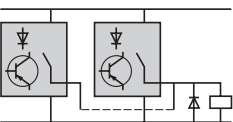
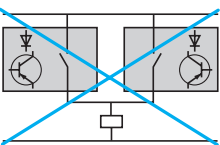
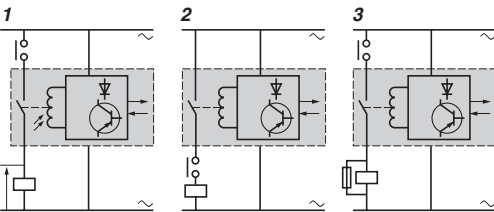
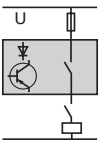
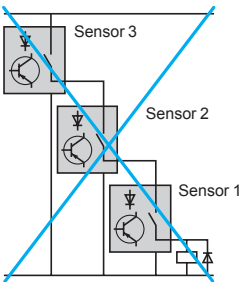
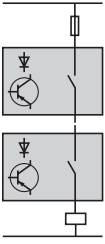
#### Sensors for DC circuits (= models)

- 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  $\times \sqrt{2}$
    - the minimum voltage of the supply is greater than the minimum voltage rating of the sensor, given that:  
 $\Delta V = (I \times t) / C$   
 $\Delta V = \text{max. ripple: } 10\% (V)$   
 $I = \text{anticipated load current (mA)}$   
 $t = \text{period of 1 cycle (10 ms full-wave rectified for a 50 Hz supply frequency)}$   
 $C = \text{capacitance } (\mu F)$
  - 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  $\mu F$  minimum per sensor, or 2000  $\mu F$  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.

$$U_{\text{sensor}} = \frac{U_{\text{supply}}}{n \text{ sensors}}$$

$U_{\text{sensor}}$  and  $U_{\text{supply}}$  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

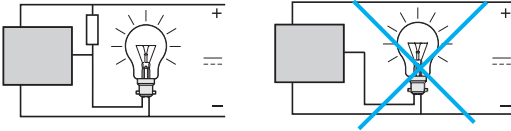
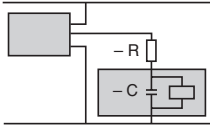
- No specific restrictions.

- 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.

### 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 ( $C > 0.1 \mu\text{F}$ )

- 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.

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

### 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)	<ul style="list-style-type: none"> <li>■ Use the detection mode display option. After a RESET, follow the environment teach mode procedure.</li> </ul>	
	Output stage faulty or complete failure of the sensor (in either case, the sensor must be replaced), or the short-circuit protection has tripped.	<ul style="list-style-type: none"> <li>■ Check that the sensor is compatible with the supply being used.</li> <li>■ Check the load current characteristics:                             <ul style="list-style-type: none"> <li>□ if load current <math>I \geq</math> maximum switching capacity, an auxiliary relay, of the CAD N type for example, should be interposed between the sensor and the load.</li> <li>□ if <math>I \leq</math> maximum switching capacity, check or wiring faults (short-circuit).</li> </ul> </li> <li>■ In all cases, a 0.4 A "quick-blow" fuse should be fitted in series with the sensor.</li> </ul>	
	Wiring error	<ul style="list-style-type: none"> <li>■ Check that the wiring conforms to the wiring shown on the sensor label or instruction sheet.</li> </ul>	
	Supply fault	<ul style="list-style-type: none"> <li>■ Check that the sensor is compatible with the supply (<math>\sim</math> or <math>\overline{\text{---}}</math>).</li> <li>■ Check that the supply voltage is within the voltage limits of the sensor. Remember that with a rectified, smoothed supply,</li> <li>■ (<math>U_{\text{peak}} = U_{\text{nominal}} \times \sqrt{2}</math> with a ripple voltage of <math>\leq 10\%</math>).</li> </ul>	
	With a reflex system: incorrect use or poor state of reflector	<ul style="list-style-type: none"> <li>■ 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.</li> <li>■ Replace the reflector if it has been damaged.</li> <li>■ Clean the reflector and sensor lenses.</li> </ul>	
	Influence of ambient light	<ul style="list-style-type: none"> <li>■ Make sure that the sensor is not dazzled by stray light (neon, sun, oven, etc.).</li> <li>■ Fit a lens hood or turn the sensor.</li> </ul>	
	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)	<ul style="list-style-type: none"> <li>■ Use the detection mode display option. After a RESET, follow the environment teach mode procedure.</li> </ul>
		Influence of background or surface condition of the object to be detected (stray reflections)	<ul style="list-style-type: none"> <li>■ Refer to the instruction sheet supplied with the sensor. For sensors with adjustable sensitivity, reduce or increase the sensing distance.</li> </ul>
Operating distance poorly defined for the reflector or object to be detected		<ul style="list-style-type: none"> <li>■ Apply the correction coefficients.</li> <li>■ Realign the system.</li> <li>■ Clean the sensor lenses and reflector, or, if damaged, replace it.</li> </ul>	
Influence of immediate environment		<ul style="list-style-type: none"> <li>■ Check the cleanliness of the lenses and reflector.</li> <li>■ Fit a lens hood, where required.</li> </ul>	
Influence of transient interference on the supply lines		<ul style="list-style-type: none"> <li>■ Ensure that any DC supplies, when derived from rectified AC, are correctly smoothed (<math>C &gt; 400 \mu\text{F}</math>).</li> <li>■ Separate AC power cables from low-level DC cables (<math>\overline{\text{---}}</math> 24 V low level).</li> <li>■ Where very long distances are involved, use suitable cable: screened and twisted pairs of the correct cross-sectional area.</li> </ul>	
Equipment prone to emitting electromagnetic interference		<ul style="list-style-type: none"> <li>■ Position the sensors as far away as possible from any sources of interference.</li> </ul>	
Response time of the sensor too slow for the particular object being detected		<ul style="list-style-type: none"> <li>■ Check the suitability of the sensor for the position or shape of the object to be detected.</li> <li>■ If necessary, select a sensor with a higher switching frequency.</li> </ul>	
Influence of high temperature		<ul style="list-style-type: none"> <li>■ Eliminate sources of radiated heat or protect the sensor casing with a heat shield.</li> <li>■ Realign, having adjusted the temperature around the fixing support.</li> </ul>	
Influence of ambient light	<ul style="list-style-type: none"> <li>■ Make sure that the sensor is not disrupted by a intermittent source of light (flashing light, rotating mirror beacon, hinged mirror, reflective door, etc.).</li> <li>■ Fit a lens hood or turn the sensor.</li> </ul>		

### Fast troubleshooting guide *(continued)*

Problem	Possible causes	Remedy
No detection following a period of service	Vibration, shock	<ul style="list-style-type: none"> <li>■ Realign the system</li> <li>■ Replace the support or protect the sensor.</li> </ul>
	Deterioration of relay contact	<ul style="list-style-type: none"> <li>■ On an inductive load, use an RC suppressor connected in parallel with the load.</li> <li>■ To eliminate contact contamination, the minimum current recommended is 15 mA.</li> <li>■ 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.</li> </ul>
	Dusty atmosphere	<ul style="list-style-type: none"> <li>■ Clean the lenses and reflector with a soft cloth.</li> </ul>

#### 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



XUM2A●XBL2



XUM2A●XBM8

### Thru-beam system with adjustable sensitivity

Max./operating sensing distance (Sn)	Function	Output	Connection	Reference	Weight kg
<b>Transmitter + receiver</b>					
30 m/24 m	Light ON (NC)/ Dark ON (NO) configuration by potentiometer	PNP	Pre-cabled (L = 2 m)	<b>XUM2APXBL2</b>	0.096
			M8 connector (4-pin)	<b>XUM2APXBM8</b>	0.026
		NPN	Pre-cabled (L = 2 m)	<b>XUM2ANXBL2</b>	0.096
			M8 connector (4-pin)	<b>XUM2ANXBM8</b>	0.026

### Transmitter only (1)

30 m/24 m			Pre-cabled (L = 2 m)	<b>XUM2AKXBL2T</b>	0.063
			M8 connector (4-pin)	<b>XUM2AKXBM8T</b>	0.010

### Receiver only (1)

30 m/24 m	Light ON (NC)/ Dark ON (NO) configuration by potentiometer	PNP	Pre-cabled (L = 2 m)	<b>XUM2APXBL2R</b>	0.630
			M8 connector (4-pin)	<b>XUM2APXBM8R</b>	0.010
		NPN	Pre-cabled (L = 2 m)	<b>XUM2ANXBL2R</b>	0.063
			M8 connector (4-pin)	<b>XUM2ANXBM8R</b>	0.010

### Accessories for thru-beam system

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

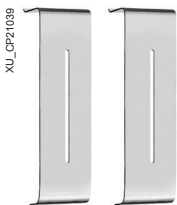
### Fixing accessories

See page 53.

### Cabling accessories

See "Cabling accessories XZ" catalogue.

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



XUZDVM●●



XUZDHM●●



XUZDRM●●

# Photo-electric sensors

XUM, general purpose, single mode function

Miniature design, plastic

Three-wire DC, solid-state output

Potentiometer setting for NO/NC, sensitivity



XUM9A●XBL2



XUM9A●XBM8



XUZC50



XUZC39



XUZC60S11



XUM8A●XBL2



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)	<b>XUM9APXBL2</b>	0.063
			M8 connector (4-pin)	<b>XUM9APXBM8</b>	0.010
		NPN	Pre-cabled (L = 2 m)	<b>XUM9ANXBL2</b>	0.063
			M8 connector (4-pin)	<b>XUM9ANXBM8</b>	0.010

### Reflectors

Description	Size	Fixing mode	Reference	Weight kg
Rigid square reflectors	100 mm x 100 mm	2 brackets (not provided)	<b>XUZC100</b>	0.035
	51.5 mm x 69 mm	6 holes	<b>XUZC50</b>	0.020
Rigid rectangle reflectors	45 mm x 29 mm	2 holes	<b>XUZC24</b>	0.010
	40 mm x 60 mm	2 holes	<b>XUZC60S11</b>	0.022
Rigid circular reflectors	Ø 39 mm	Adhesive	<b>XUZC39</b>	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)	<b>XUM8APXBL2</b>	0.063
			M8 connector (4-pin)	<b>XUM8APXBM8</b>	0.010
		NPN	Pre-cabled (L = 2 m)	<b>XUM8ANXBL2</b>	0.063
			M8 connector (4-pin)	<b>XUM8ANXBM8</b>	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



XUM4A●XBL2



XUM4A●XBM8



XUM6A●XBL2



XUM6A●XBM8



XUM5A●XBL2



XUM5A●XBM8

### Diffuse system with adjustable sensitivity

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



XUZASM04



XUZASM03



XUZASM02



XUZA50



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	<b>XUZASM04</b>	0.030
Wrap around vertical mounting bracket, for pre-cabled sensors Supplied with 2 M3 screws	XUM●A●XBL2	<b>XUZASM03</b>	0.062
Wrap around horizontal mounting bracket, for pre-cabled sensors Supplied with 2 M3 screws	XUM●A●XBL2	<b>XUZASM02</b>	0.030
Metal fixing bracket Supplied with 2 M3 screws	XUM●A●XBL2 XUM●A●XBM8	<b>XUZA50</b>	0.025

### Setting-up accessory

<b>Air blower mounting block (1)</b> for cleaning the sensitive face of the sensor, using compressed air.	XUM●A●XBL2 XUM●A●XBM8	<b>XUZASM05</b>	0.030
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Supplied with 2 mounting screws (M3 x 20),  
1 air supply port plugging screw for the  
unused port (of 2 available) and 1 gasket.

### 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

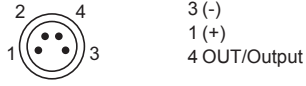
Three-wire DC, solid-state output

Potentiometer setting for NO/NC, sensitivity

## Wiring schemes

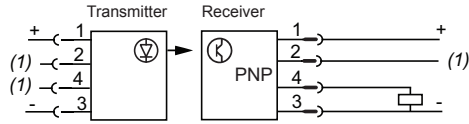
### Thru-beam system

#### M8 connector - 4 pins



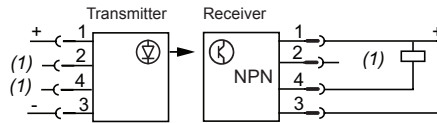
#### PNP

##### XUM2APXBM8



#### NPN

##### XUM2ANXBM8

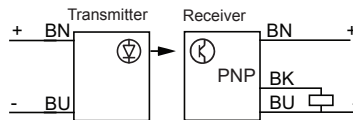


#### Pre-cabled - 3 wires

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

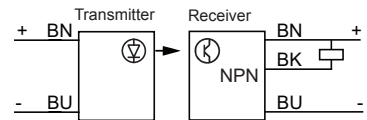
#### PNP

##### XUM2APXBL2



#### NPN

##### XUM2ANXBL2



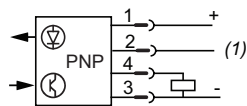
### Polarised reflex, background suppression and diffuse systems

#### M8 connector - 4 pins



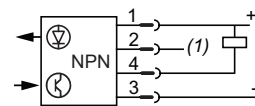
#### PNP

##### XUM●APXBM8



#### NPN

##### XUM●ANXBM8

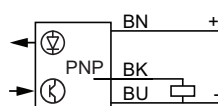


#### Pre-cabled - 3 wires

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

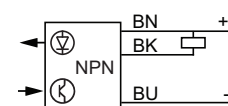
#### PNP

##### XUM●APXBL2



#### NPN

##### XUM●ANXBL2



(1): Not connected.

# Photo-electric sensors

XUM, general purpose, single mode function

Miniature design, plastic

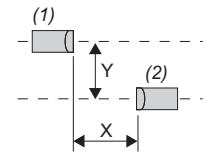
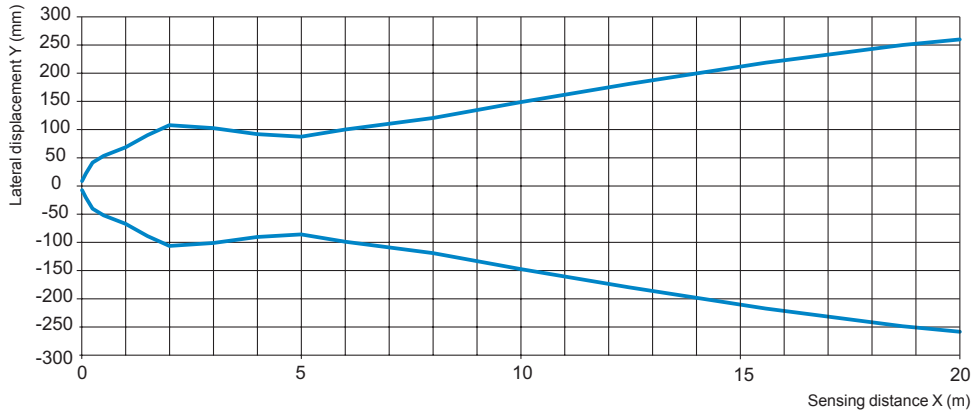
Three-wire DC, solid-state output

Potentiometer setting for NO/NC, sensitivity

## Detection curves

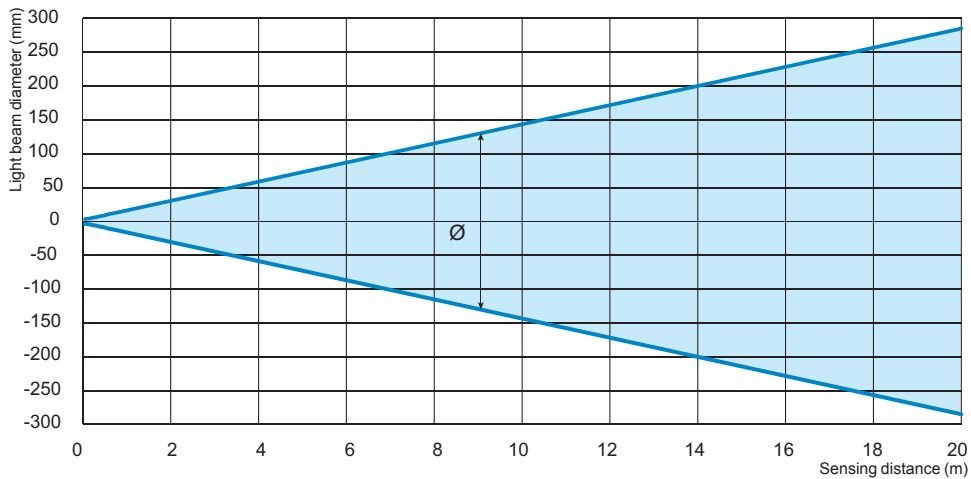
Thru-beam system: XUM2

Lateral displacement

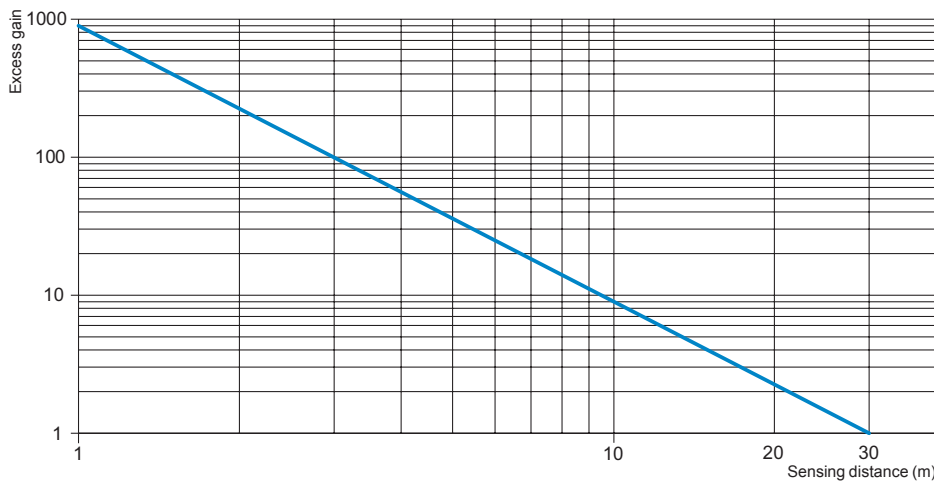


(1): Transmitter  
(2): Receiver

## Light beam diameter



## Excess gain



# Photo-electric sensors

XUM, general purpose, single mode function

Miniature design, plastic

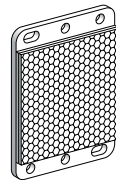
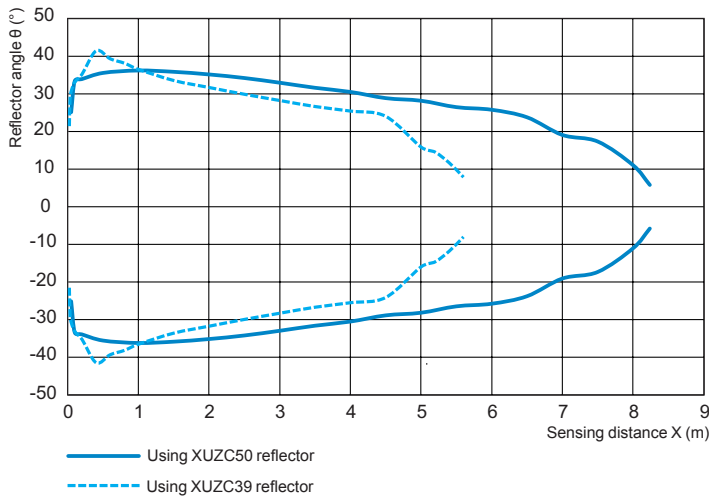
Three-wire DC, solid-state output

Potentiometer setting for NO/NC, sensitivity

## Detection curves

Polarised reflex system: XUM9

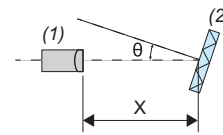
Reflector angle



XUZC50

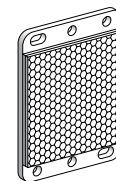
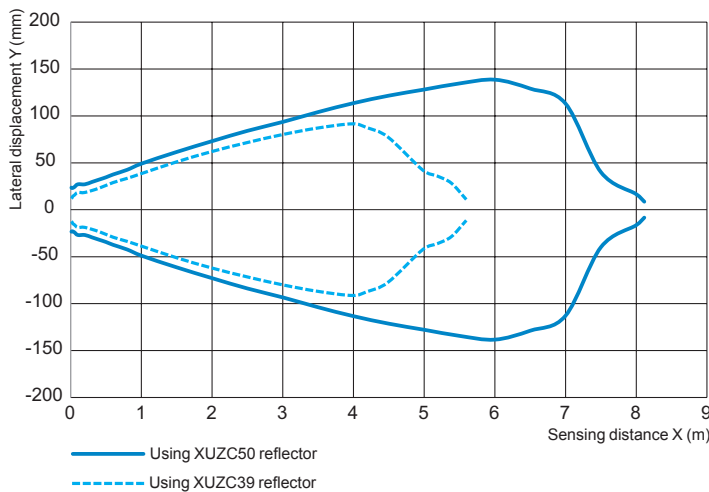


XUZC39



(1): Sensor  
(2): Reflector  
 $\theta$ : Reflector angle (°)  
X: Sensing distance (m)

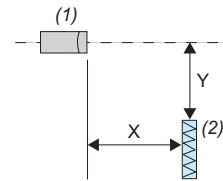
## Lateral displacement



XUZC50

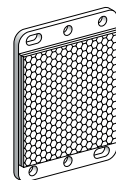
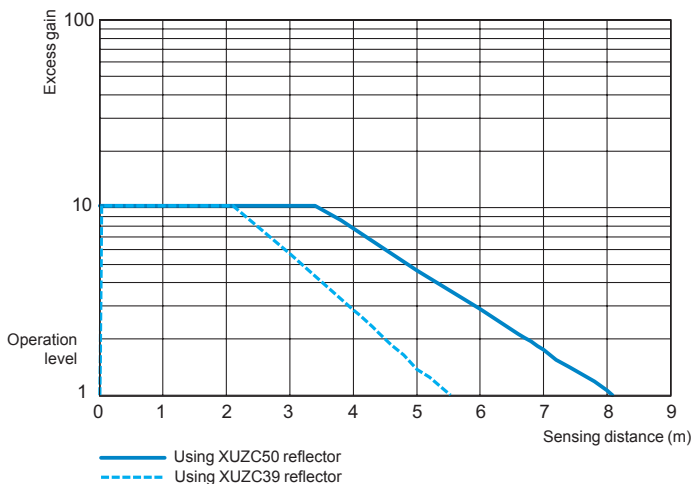


XUZC39



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

## Excess gain



XUZC50



XUZC39

# Photo-electric sensors

XUM, general purpose, single mode function

Miniature design, plastic

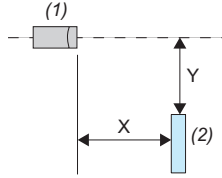
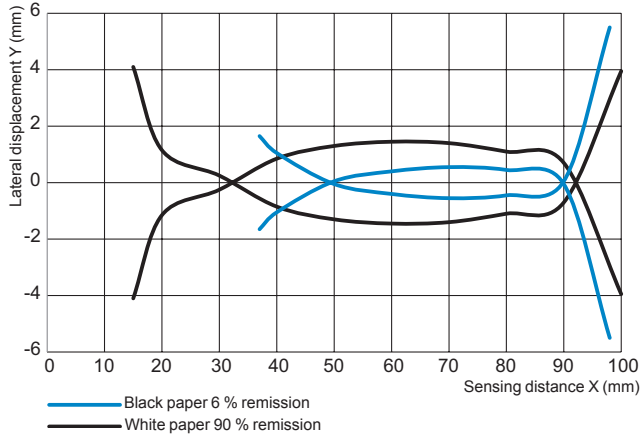
Three-wire DC, solid-state output

Potentiometer setting for NO/NC, sensitivity

## Detection curves (continued)

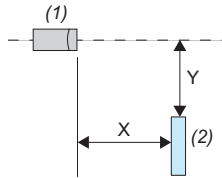
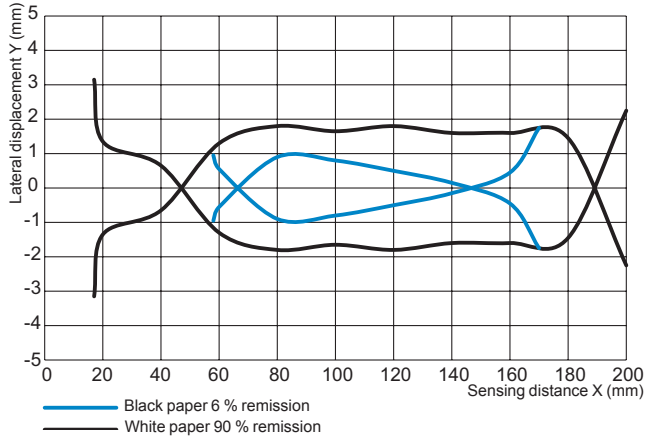
Background suppression system: XUM8

Lateral displacement (preset 100 mm)



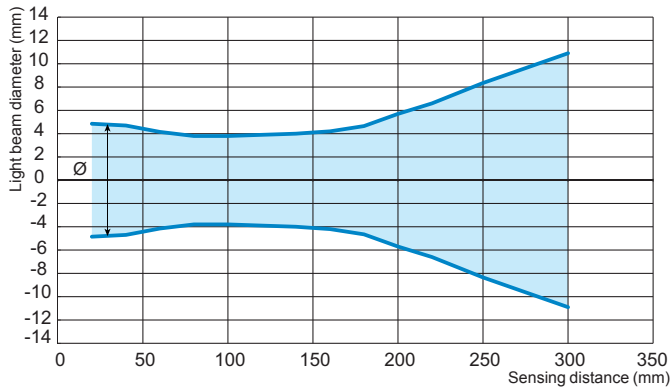
(1): Sensor  
(2): Object (200 mm square white and black mat paper)  
X: Sensing distance (mm)  
Y: Lateral displacement (mm)

Lateral displacement (preset 200 mm)

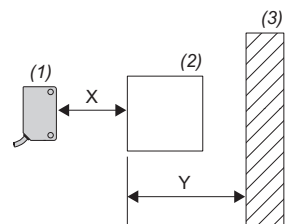
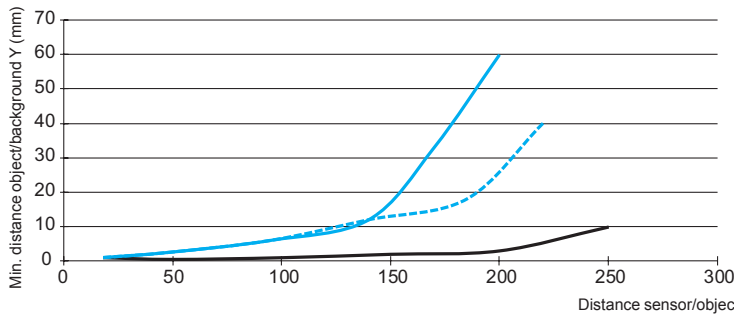


(1): Sensor  
(2): Object (200 mm square white and black mat paper)  
X: Sensing distance (mm)  
Y: Lateral displacement (mm)

## Light beam diameter



## Minimum distance between the object to detect and white background



(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

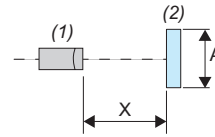
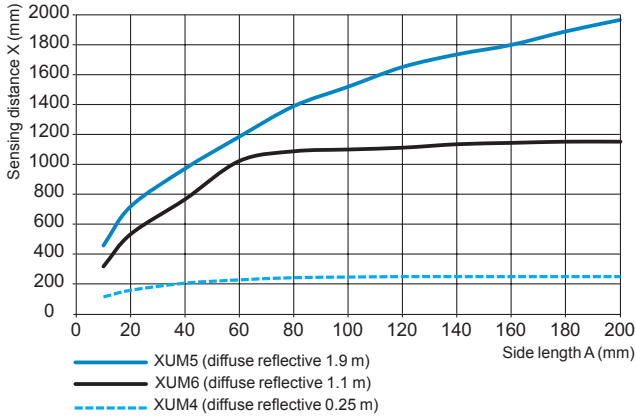
Three-wire DC, solid-state output

Potentiometer setting for NO/NC, sensitivity

## Detection curves (continued)

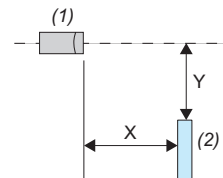
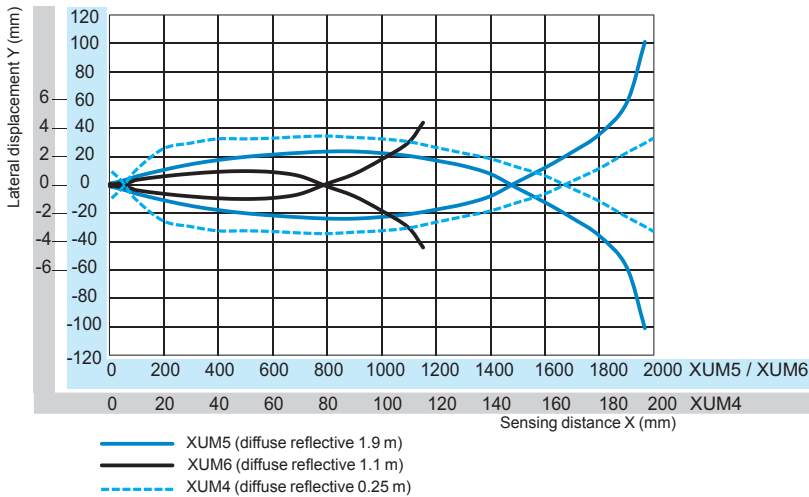
Diffuse system: XUM4, XUM5 and XUM6

Object size/sensing distance



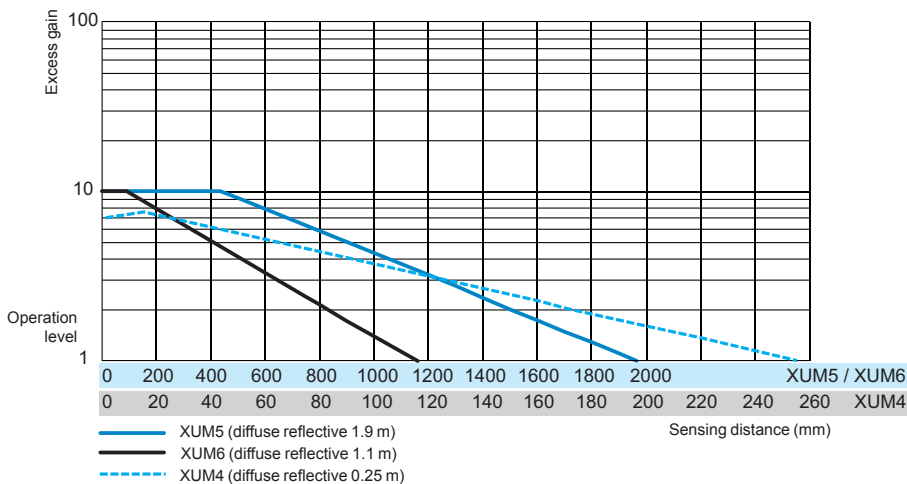
(1): Sensor  
 (2): Object (white mat paper of A mm square)  
 A: Side length (mm)  
 X: Sensing distance (mm)

## 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

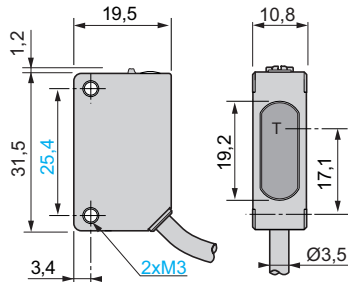
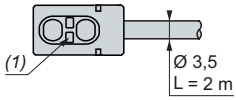
## Thru-beam system

### Pre-cabled version

#### Transmitter

Description - XUM2A●XBL2

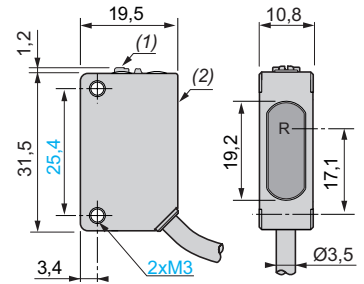
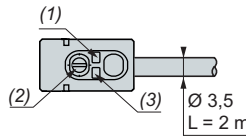
Dimensions - XUM2A●XBL2



#### Receiver

Description - XUM2A●XBL2

Dimensions - XUM2A●XBL2

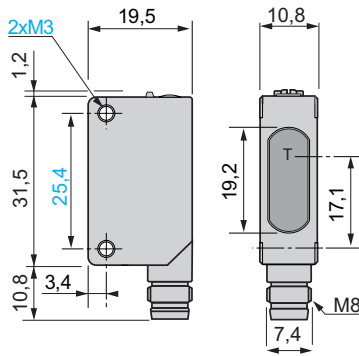
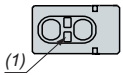


### M8 connector version

#### Transmitter

Description - XUM2A●XBM8

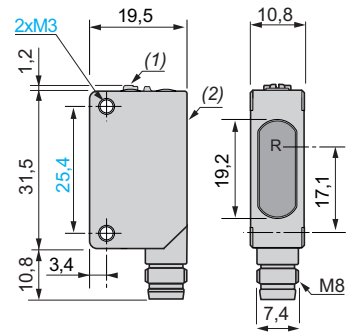
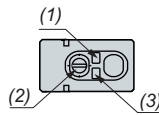
Dimensions - XUM2A●XBM8



#### 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

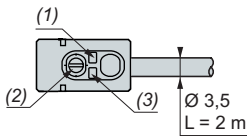
Three-wire DC, solid-state output

Potentiometer setting for NO/NC, sensitivity

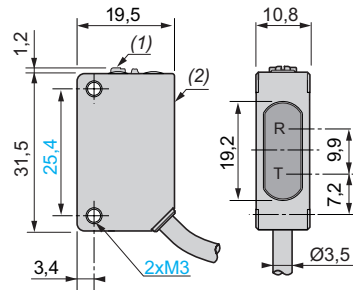
## Polarised reflex system

### Pre-cabled version

#### Description - XUM9A●XBL2

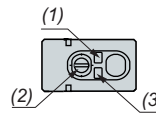


#### Dimensions - XUM9A●XBL2

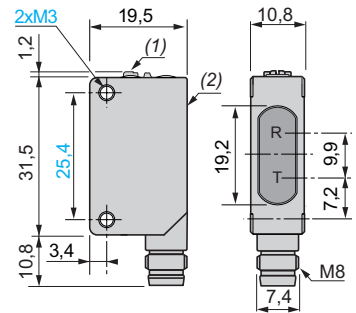


### M8 connector version

#### Description - XUM9A●XBM8

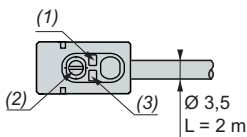


#### Dimensions - XUM9A●XBM8

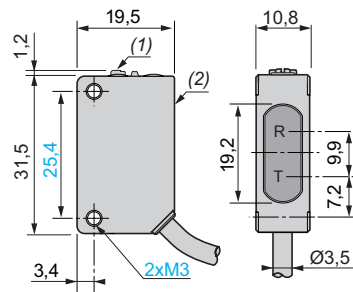


## Background suppression system

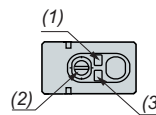
### Description - XUM8A●XBL2



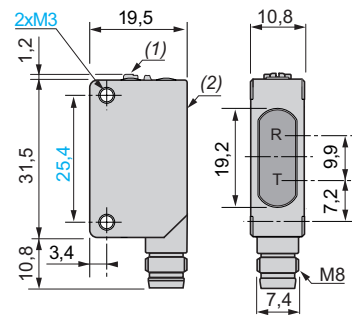
### Dimensions - XUM8A●XBL2



### Description - XUM8A●XBM8

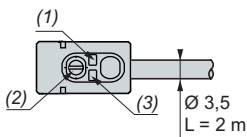


### Dimensions - XUM8A●XBM8

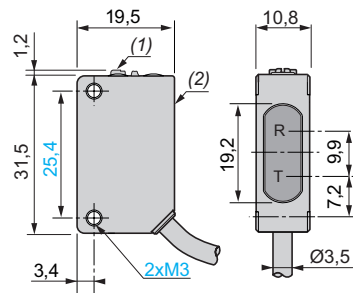


## Diffuse system

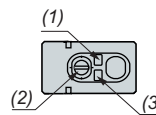
### Description - XUM5A●XBL2, XUM6A●XBL2, XUM4A●XBL2



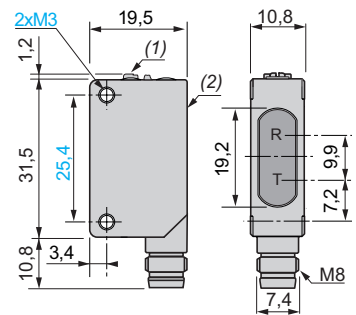
### Dimensions - XUM5A●XBL2, XUM6A●XBL2, XUM4A●XBL2



### 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

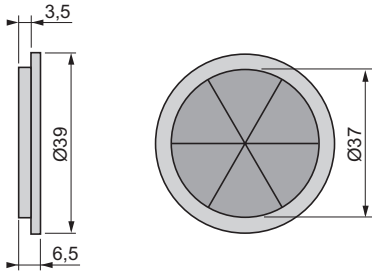
Miniature design, plastic

Accessories

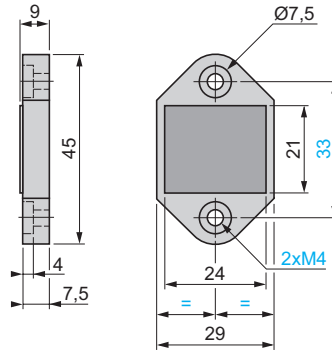
## Accessories

### Reflectors

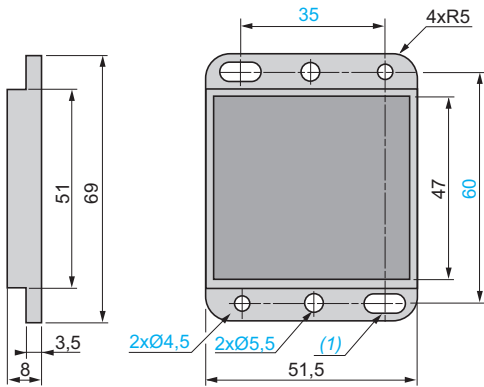
#### XUZC39



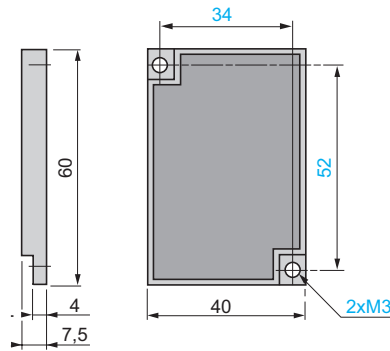
#### XUZC24



#### XUZC50

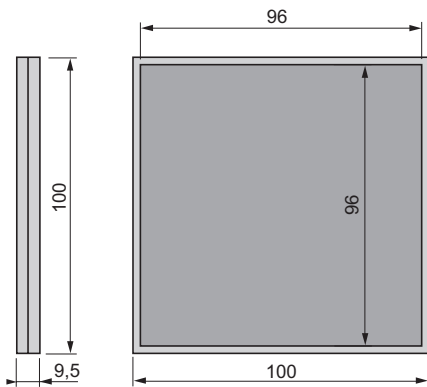


#### XUZC60S11



(1) 2 elongated holes Ø 4.5 x 8

#### XUZC100



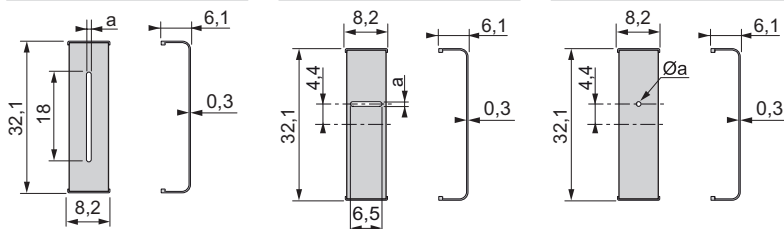
### Diaphragms

#### XUZDVM●●

#### XUZDHM●●

#### XUZDRM●●

Reference a (mm)



XUZDVM05 0.5

XUZDVM10 1

XUZDVM20 2

XUZDHM05 0.5

XUZDHM10 1

XUZDHM20 2

XUZDRM05 Ø 0.5

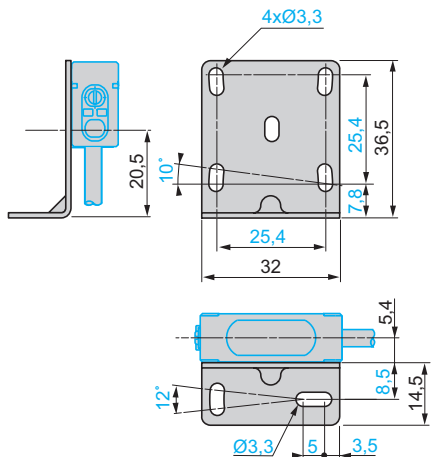
XUZDRM10 Ø 1

XUZDRM20 Ø 2

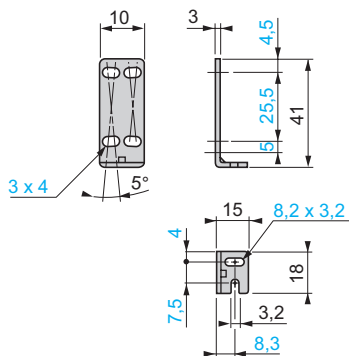
## Accessories (continued)

### Fixing brackets

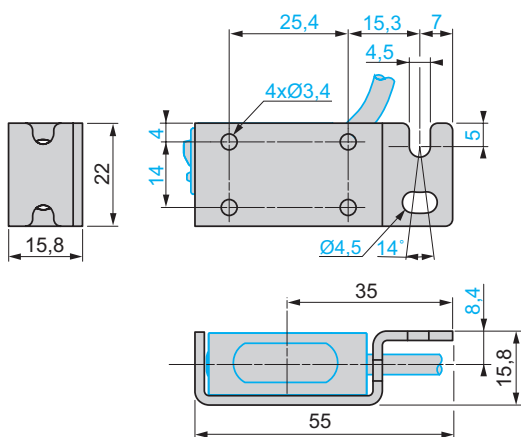
XUZASM04



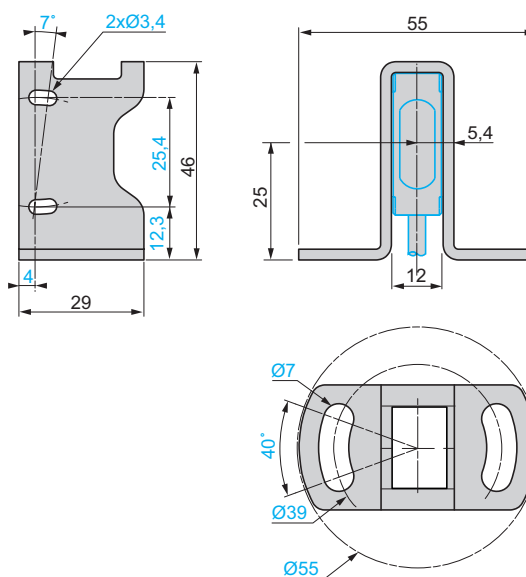
XUZA50



XUZASM02

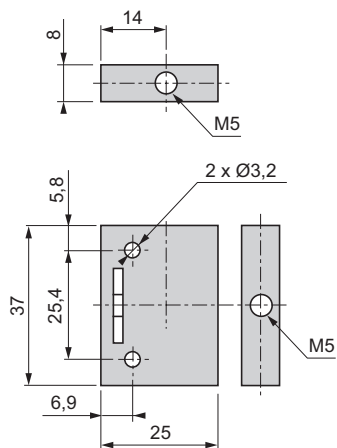


XUZASM03



### Air blower mounting block

XUZASM05

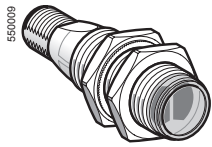


# Photo-electric sensors

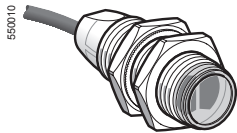
## XU range, single mode function

### Design 18, plastic

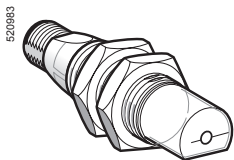
### Three-wire DC, solid-state output



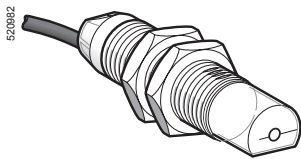
XUB●A●●NM12



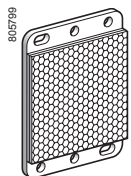
XUB●A●●NL2



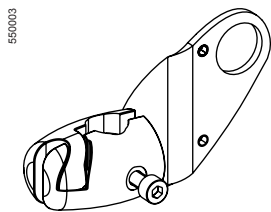
XUB●A●●WM12



XUB●A●●WL2



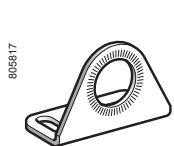
XUZC50



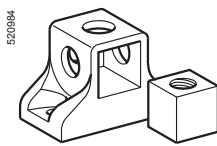
XUZB2003



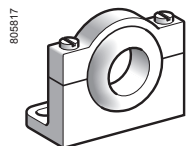
XUZ2001



XUZA118



XUZ2003



XUZA218

#### Connector

Sensing distance (Sn) m	Function	Output	Line of sight	Reference	Weight kg
<b>Diffuse system</b>					
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
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#### 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
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#### 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.


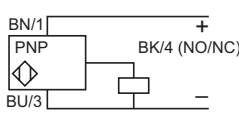
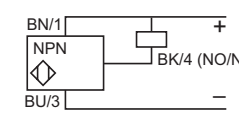
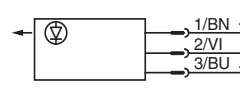
For availability, please consult our Customer Care Centre.

(1) For further information, see page 667.

**Characteristics**

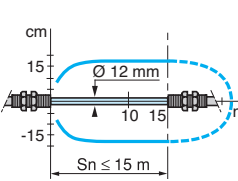
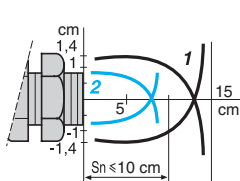
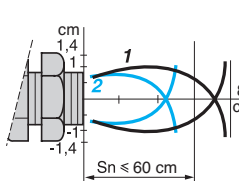
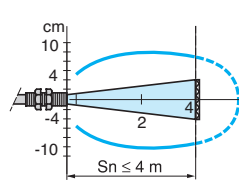
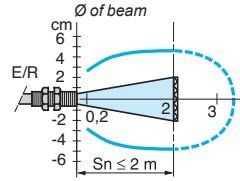
<b>Sensor type</b>		<b>XUB1, XUB2, XUB4, XUB5, XUB9</b>	<b>XUB1, XUB2, XUB4, XUB5, XUB9</b>
<b>Product certifications</b>		UL, CSA, cE	
<b>Connection</b>	Connector	M12	–
	Pre-cabled	–	Length: 2 m
<b>Sensing distance</b> nominal Sn / maximum (excess gain = 1) (excess gain = 2)	<b>m</b>	<b>0.1 / 0.15 diffuse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

**Wiring schemes**

M12 connector	Pre-cabled	PNP	NPN	Transmitter
 <p>3 (-) 1 (+) 4 OUT/Output 2 Beam break input (1)</p>	<p>(-) BU (Blue) (+) BN (Brown) (OUT/Output) BK (Black) Beam break input (1) VI (Violet)</p>	 <p>BN/1 + BK/4 (NO/NC) BU/3 -</p>	 <p>BN/1 + BK/4 (NO/NC) BU/3 -</p>	 <p>1/BN + 2/VI 3/BU =</p> <p>Input 2/VI: - not connected: beam made - connected to -: beam broken</p>

Please refer to our "Cabling accessories XZ" catalogue.

**Detection curves**

Thru-beam system	Diffuse system	Diffuse system with adjustable sensitivity	Reflex system	Polarised reflex system
 <p>∅ 12 mm Sn ≤ 15 m</p>	 <p>Sn ≤ 10 cm</p>	 <p>Sn ≤ 60 cm</p>	 <p>Sn ≤ 4 m</p>	 <p>∅ of beam Sn ≤ 2 m</p>
	Object 10 x 10 cm; 1 White 90%; 2 Grey 18%		With reflector XUZC50	With reflector XUZC50

**Dimensions**

**XUB**

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

(1) Beam break input on thru-beam transmitter only.

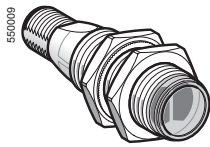
(2) For **XUB9●●●●●** (polarised reflex) 46 becomes 48 mm and 60 becomes 62 mm.

# Photo-electric sensors

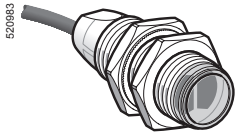
## XU range, single mode function

### Design 18, metal

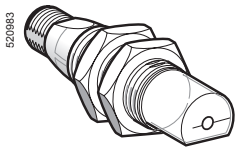
### Three-wire DC, solid-state output



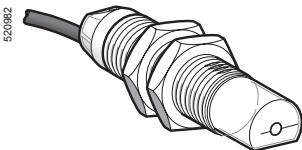
XUB●B●●NM12



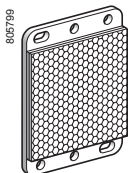
XUB●B●●NL2



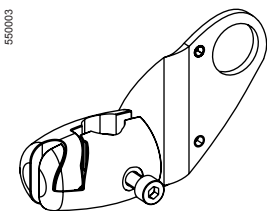
XUB●B●●WM12



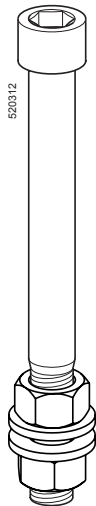
XUB●B●●WL2



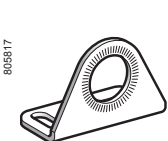
XUZC50



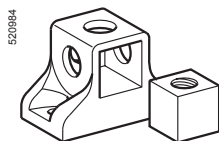
XUZB2003



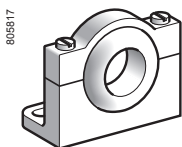
XUZ2001



XUZA118



XUZ2003



XUZA218

#### Connector

Sensing distance (Sn) m	Function	Output	Line of sight	Reference	Weight kg
<b>Diffuse system</b>					
0.1	NO	PNP	Along case axis	XUB4BPANM12	0.050
			90° to case axis	XUB4BPAWM12	0.050
	NPN	PNP	Along case axis	XUB4BNANM12	0.050
			90° to case axis	XUB4BNAWM12	0.050
	NC	PNP	Along case axis	XUB4BPBWM12	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	PNP	Along case axis	XUB5BNANM12	0.055
			90° to case axis	XUB5BNAWM12	0.060
	NC	PNP	Along case axis	XUB5BPBWM12	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	PNP	Along case axis	XUB9BNANM12	0.050
			90° to case axis	XUB9BNAWM12	0.050
	NC	PNP	Along case axis	XUB9BPBWM12	0.050
			90° to case axis	XUB9BNBWM12	0.050

Reflector 50 x 50 mm	–	–	–	XUZC50	0.020
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#### Reflex system

4	NO	PNP	Along case axis	XUB1BPANM12	0.050
			90° to case axis	XUB1BPAWM12	0.050
	NPN	PNP	Along case axis	XUB1BNANM12	0.050
			90° to case axis	XUB1BNAWM12	0.050
	NC	PNP	Along case axis	XUB1BPBWM12	0.050
			90° to case axis	XUB1BNBWM12	0.050

Reflector 50 x 50 mm	–	–	–	XUZC50	0.020
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#### 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	PNP	Along case axis	XUB2BNANM12R	0.050
			90° to case axis	XUB2BNAWM12R	0.050
	NC	PNP	Along case axis	XUB2BPBWM12R	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


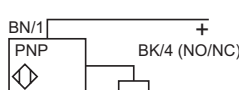
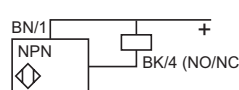
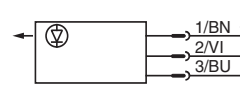
For a pre-cabled sensor, replace **M12** by **L2** for a 2 m long cable, or by **L5** for a 5 m long cable. Example: XUB1BPANM12 becomes XUB1BPANL2 for a 2 m long cable and XUB1BPANL5 for a 5 m long cable.

For availability, please consult our Customer Care Centre.

(1) For further information, see page 69.

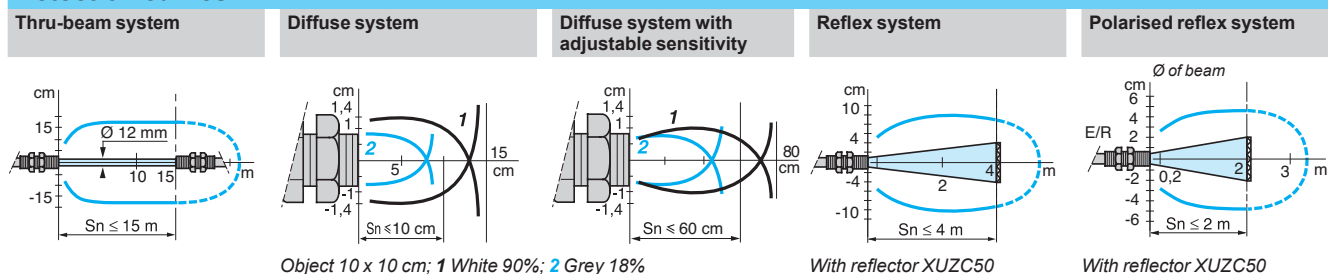
Characteristics		XUB1, XUB2, XUB4, XUB5, XUB9	XUB1, XUB2, XUB4, XUB5, XUB9
Sensor type		UL, CSA, c €	
Product certifications		UL, CSA, c €	
Connection	Connector	M12	–
	Pre-cabled	–	Length: 2 m
Sensing distance nominal $S_n$ / maximum (excess gain = 2) (excess gain = 1)	m	0.1 / 0.15 diffuse	
	m	0.6 / 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 $\pm 1.5$ 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 $\approx 12...24$ with protection against reverse polarity	
Voltage limits (including ripple)		V $\approx 10...36$	
Current consumption, no-load		mA 35	
Switching capacity		mA $\leq 100$ 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	Pre-cabled	PNP	NPN	Transmitter
 <p>3 (-) 1 (+) 4 OUT/Output 2 Beam break input (1)</p>	<p>(-) BU (Blue) (+) BN (Brown) (OUT/Output) BK (Black) Beam break input (1) VI (Violet)</p>	 <p>BN/1 BK/4 (NO/NC) BU/3</p>	 <p>BN/1 BK/4 (NO/NC) BU/3</p>	 <p>1/BN + 2/VI 3/BU -</p>

Please refer to our "Cabling accessories XZ" catalogue.

**Detection curves**



**Dimensions**

XUB	Pre-cabled (mm)		Connector (mm)	
	a	b	a	b
$\varnothing 18$ , line of sight along case axis	46 (2)	28	60 (1)	28
$\varnothing 18$ , line of sight 90° to case axis	62	28	76	28
$\varnothing 18$ , line of sight along case axis XUB5	62	44	76	44
$\varnothing 18$ , 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

#### 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 to 120 °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.



XMLP pressure transmitters  
AISI 316L stainless steel casing

# 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



XMLP000GD01F



XMLP000GC01F



XMLP000GL01F

#### -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
<b>G 1/4 A DIN 3852-E (male) fluid connection</b>			
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
<b>G 1/4 A DIN 3852-E (male) fluid connection</b>			
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
<b>G 1/4 A DIN 3852-E (male) fluid connection</b>			
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

**- 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
<b>G 1/4 A DIN 3852-E (male) fluid connection</b>			
4...20 mA	M12	<b>XMLPM09BD21F (1)</b>	0.090
	EN 175301-803-A	<b>XMLPM09BC21F</b>	0.106
0...10 V	M12	<b>XMLPM09BD71F (1)</b>	0.090
	EN 175301-803-A	<b>XMLPM09BC71F</b>	0.106

XM-EX\_522\_CPMFS17001



XMLPM●●BC●1F

**- 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
<b>G 1/4 A DIN 3852-E (male) fluid connection</b>			
4...20 mA	M12	<b>XMLPM25BD21F</b>	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



XMLP●●●●D●1F



XMLP●●●●C●1F



XMLP001GL●1F



XMLP001GC●BF



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
<b>G 1/4 A DIN 3852-E (male) fluid connection</b>			
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
<b>G 1/4 A DIN 3852-E (male) fluid connection</b>			
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
<b>G 1/4 A DIN 3852-E (male) fluid connection</b>			
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



XMLP000D01F



XMLP000C01F



XMLP000GL01F

## 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
<b>G 1/4 A DIN 3852-E (male) fluid connection</b>			
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
<b>G 1/4 A DIN 3852-E (male) fluid connection</b>			
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
<b>G 1/4 A DIN 3852-E (male) fluid connection</b>			
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
<b>G 1/4 A DIN 3852-E (male) fluid connection</b>			
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
<b>G 1/4 A DIN 3852-E (male) fluid connection</b>			
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



XMLP000BC01F



XMLP000BD01F



XMLP000BC270



XMLP000BD270



XMLP000BC090



XMLP000BD090

### 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
<b>G 1/4 A DIN 3852-E (male) fluid connection</b>			
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
<b>G 1/4 A DIN 3852-E (male) fluid connection</b>			
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



XMLP060BC1F



XMLP060BD1F



XMLP060BD270



XMLP060BC290



XMLP060BD90

#### 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
<b>G 1/4 A DIN 3852-A (male) fluid connection</b>			
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
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#### 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
<b>G 1/4 A DIN 3852-A (male) fluid connection</b>			
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

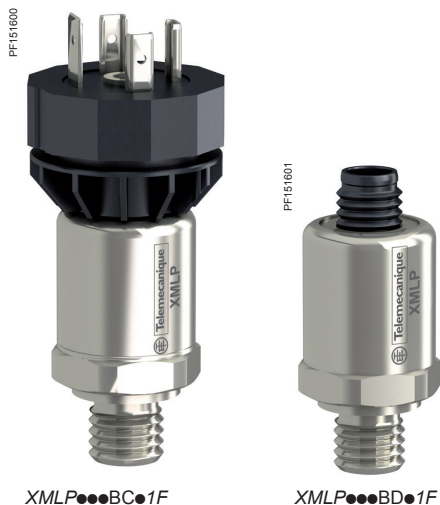
(1) Sold in lots of 25: add the letter Q to the end of the selected reference. For example, XMLP060BD21F becomes XMLP060BD21FQ.

## Electronic pressure sensors

## XM Range

## XMLP pressure transmitters

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

**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
<b>G 1/4 A DIN 3852-A (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP160BD21F</b>	0.094
	EN 175301-803-A	<b>XMLP160BC21F</b>	0.110
0...10 V	M12	<b>XMLP160BD71F</b>	0.094
	EN 175301-803-A	<b>XMLP160BC71F</b>	0.110
0.5...4.5 V ratiometric	M12	<b>XMLP160BD11F</b>	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
<b>G 1/4 A DIN 3852-A (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP250BD21F (1)</b>	0.094
	EN 175301-803-A	<b>XMLP250BC21F</b>	0.110
0...10 V	M12	<b>XMLP250BD71F (1)</b>	0.094
	EN 175301-803-A	<b>XMLP250BC71F (1)</b>	0.110
0.5...4.5 V ratiometric	M12	<b>XMLP250BD11F</b>	0.094
	EN 175301-803-A	<b>XMLP250BC11F</b>	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
<b>G 1/4 A DIN 3852-A (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP400BD21F (1)</b>	0.094
	EN 175301-803-A	<b>XMLP400BC21F (1)</b>	0.110
0...10 V	M12	<b>XMLP400BD71F</b>	0.094
	EN 175301-803-A	<b>XMLP400BC71F (1)</b>	0.110
0.5...4.5 V ratiometric	M12	<b>XMLP400BD11F</b>	0.094
	EN 175301-803-A	<b>XMLP400BC11F</b>	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
<b>G 1/4 A DIN 3852-A (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP600BD21F</b>	0.094
	EN 175301-803-A	<b>XMLP600BC21F</b>	0.110
0...10 V	M12	<b>XMLP600BD71F</b>	0.094
	EN 175301-803-A	<b>XMLP600BC71F</b>	0.110
0.5...4.5 V ratiometric	M12	<b>XMLP600BD11F</b>	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



XMLP000RD03F



XMLP000RC03F



XMLP000RP03F

#### -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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLPM00RD23F (1)</b>	0.078
	EN 175301-803-A	<b>XMLPM00RC23F</b>	0.094
	Packard Metri-Pack 150	<b>XMLPM00RP23F</b>	0.080
0...10 V	M12	<b>XMLPM00RD73F (1)</b>	0.078
	EN 175301-803-A	<b>XMLPM00RC73F</b>	0.094
	Packard Metri-Pack 150	<b>XMLPM00RP73F</b>	0.080
0.5...4.5 V ratiometric	M12	<b>XMLPM00RD13F</b>	0.078
	EN 175301-803-A	<b>XMLPM00RC13F</b>	0.094
	Packard Metri-Pack 150	<b>XMLPM00RP13F</b>	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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLPM15RD23F (1)</b>	0.078
	EN 175301-803-A	<b>XMLPM15RC23F</b>	0.094
	Packard Metri-Pack 150	<b>XMLPM15RP23F (1)</b>	0.080
0...10 V	M12	<b>XMLPM15RD73F (1)</b>	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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLPM60RD23F (1)</b>	0.078
	EN 175301-803-A	<b>XMLPM60RC23F</b>	0.094
	Packard Metri-Pack 150	<b>XMLPM60RP23F</b>	0.080
0...10 V	M12	<b>XMLPM60RD73F (1)</b>	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



XMLP000RD03F



XMLP000RC03F



XMLP000RP03F

## 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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP015RD23F (1)</b>	0.078
	EN 175301-803-A	<b>XMLP015RC23F</b>	0.094
	Packard Metri-Pack 150	<b>XMLP015RP23F</b>	0.080
0...10 V	M12	<b>XMLP015RD73F (1)</b>	0.078
	EN 175301-803-A	<b>XMLP015RC73F</b>	0.094
	Packard Metri-Pack 150	<b>XMLP015RP73F</b>	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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP030RD23F (1)</b>	0.078
	EN 175301-803-A	<b>XMLP030RC23F</b>	0.094
	Packard Metri-Pack 150	<b>XMLP030RP23F</b>	0.080
0...10 V	M12	<b>XMLP030RD73F (1)</b>	0.078
	EN 175301-803-A	<b>XMLP030RC73F</b>	0.094
	Packard Metri-Pack 150	<b>XMLP030RP73F</b>	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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP050RD23F (1)</b>	0.078
	EN 175301-803-A	<b>XMLP050RC23F</b>	0.094
	Packard Metri-Pack 150	<b>XMLP050RP23F</b>	0.080
0...10 V	M12	<b>XMLP050RD73F (1)</b>	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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP100RD23F</b>	0.078
0...10 V	M12	<b>XMLP100RD73F</b>	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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP100PD230 (1)</b>	0.088
	Packard Metri-Pack 150	<b>XMLP100PP230 (1)</b>	0.090
0...10 V	M12	<b>XMLP100PD730</b>	0.088
	Packard Metri-Pack 150	<b>XMLP100PP730</b>	0.090
0.5...4.5 V ratiometric	M12	<b>XMLP100PD130</b>	0.088
	Packard Metri-Pack 150	<b>XMLP100PP130</b>	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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP150PD230 (1)</b>	0.088
	Packard Metri-Pack 150	<b>XMLP150PP230</b>	0.090
0...10 V	M12	<b>XMLP150PD730</b>	0.088
	Packard Metri-Pack 150	<b>XMLP150PP730</b>	0.090
0.5...4.5 V ratiometric	M12	<b>XMLP150PD130</b>	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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP200PD230 (1)</b>	0.088
	Packard Metri-Pack 150	<b>XMLP200PP230</b>	0.090
0...10 V	M12	<b>XMLP200PD730</b>	0.088
	Packard Metri-Pack 150	<b>XMLP200PP730</b>	0.090
0.5...4.5 V ratiometric	M12	<b>XMLP200PD130</b>	0.088

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

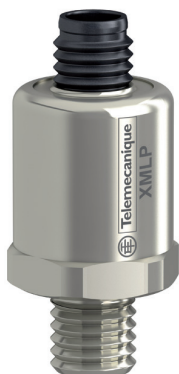
## Electronic pressure sensors

## 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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP300PD230 (1)</b>	0.088
	Packard Metri-Pack 150	<b>XMLP300PP230</b>	0.090
0...10 V	M12	<b>XMLP300PD730</b>	0.088
	Packard Metri-Pack 150	<b>XMLP300PP730</b>	0.090
0.5...4.5 V ratiometric	M12	<b>XMLP300PD130</b>	0.088
	Packard Metri-Pack 150	<b>XMLP300PP130</b>	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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP600PD230</b>	0.088
	Packard Metri-Pack 150	<b>XMLP600PP230 (1)</b>	0.090
0...10 V	M12	<b>XMLP600PD730</b>	0.088
	Packard Metri-Pack 150	<b>XMLP600PP730</b>	0.090
0.5...4.5 V ratiometric	M12	<b>XMLP600PD130</b>	0.088
	Packard Metri-Pack 150	<b>XMLP600PP130</b>	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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP1K0PD230</b>	0.088
	Packard Metri-Pack 150	<b>XMLP1K0PP230</b>	0.090
0...10 V	M12	<b>XMLP1K0PD730</b>	0.088
	Packard Metri-Pack 150	<b>XMLP1K0PP730</b>	0.090
0.5...4.5 V ratiometric	M12	<b>XMLP1K0PD130</b>	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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP2K0PD230</b>	0.092
0...10 V	M12	<b>XMLP2K0PD730</b>	0.092
0.5...4.5 V ratiometric	M12	<b>XMLP2K0PD130</b>	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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP3K0PD230</b>	0.092
	Packard Metri-Pack 150	<b>XMLP3K0PP230</b>	0.094
0...10 V	M12	<b>XMLP3K0PD730 (1)</b>	0.092
	Packard Metri-Pack 150	<b>XMLP3K0PP730</b>	0.094
0.5...4.5 V ratiometric	M12	<b>XMLP3K0PD130</b>	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
<b>1/4" - 18NPT (male) fluid connection</b>			
4...20 mA	M12	<b>XMLP6K0PD230</b>	0.092
	Packard Metri-Pack 150	<b>XMLP6K0PP230</b>	0.094
0...10 V	M12	<b>XMLP6K0PD730</b>	0.092
	Packard Metri-Pack 150	<b>XMLP6K0PP730</b>	0.094
0.5...4.5 V ratiometric	M12	<b>XMLP6K0PD130</b>	0.092
	Packard Metri-Pack 150	<b>XMLP6K0PP130 (1)</b>	0.094

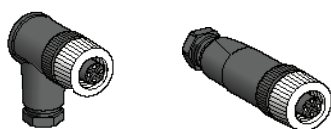
(1) Sold in lots of 25: add the letter Q to the end of the selected reference. For example, XMLP6K0PP130 becomes XMLP6K0PP130Q.

# Electronic pressure sensors

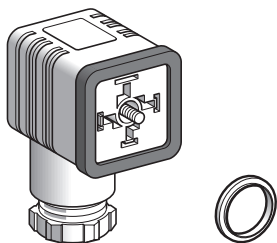
XM Range  
XMLP pressure transmitters  
Separate parts



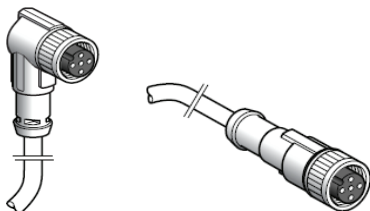
ZMLPA1●2SH



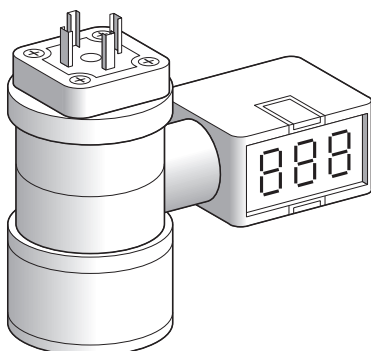
XZCC12FCM40B XZCC12FDM40B



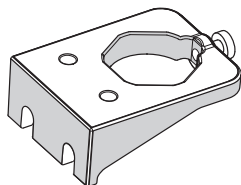
XZCC43FCP40B XMLZL016



XZCP1241L5 XZCP1141L10



XMLEZ●●●



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](http://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.

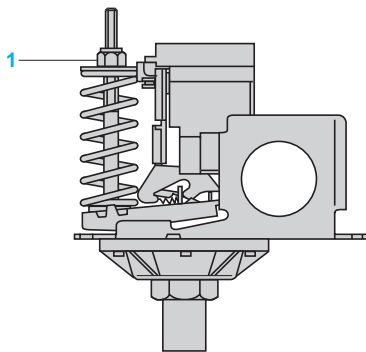
##### Switching point on rising pressure

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)

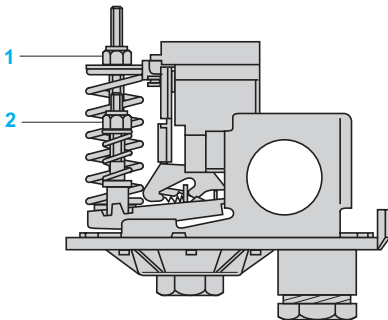
When setting the pressure switch, adjust the switching point on rising pressure (PH) first and then the switching point on falling pressure (PB).

##### 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**.



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

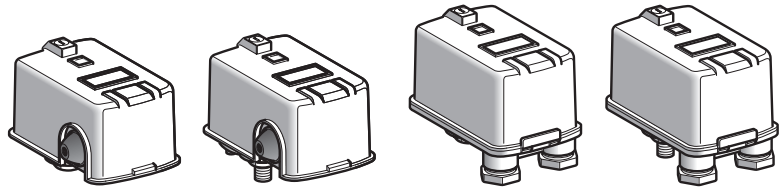
## XM Range

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				

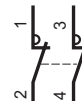
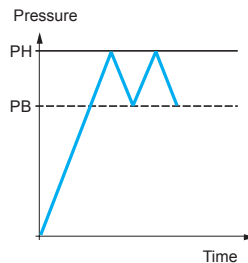
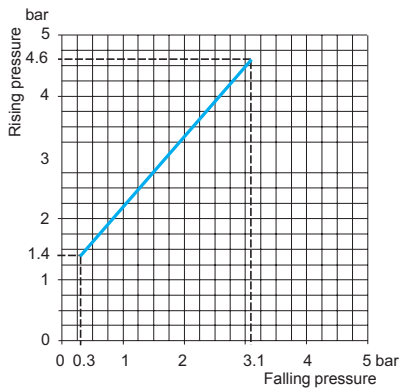
### Complementary characteristics not shown under general characteristics (page 87)

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 <sup>5</sup> 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

### Connections



— Adjustable value  
---- Non adjustable value

# Electromechanical pressure switches

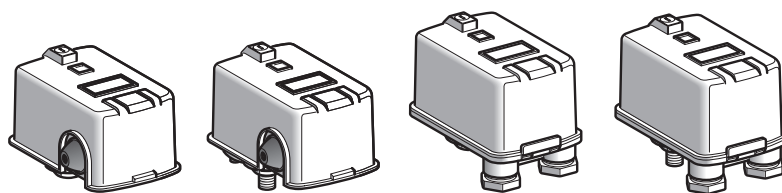
## XM Range

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)			
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Degree of protection conforming to IEC/EN 60529	IP 20		IP 65	
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### References

Fluids controlled	Fresh water, sea water, from 0°C to +70°C (1)	FSG2	FSG9	FSG2NE (2)	FSG9NE
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Weight (kg)	0.340			
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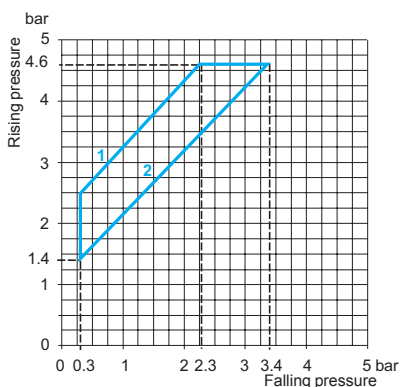
### Complementary characteristics not shown under general characteristics (page 87)

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 <sup>6</sup> 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	

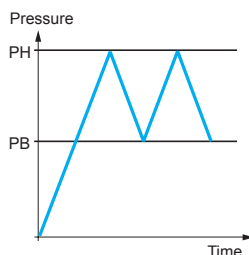
(1) Component materials of units in contact with the fluid, see page 87.

(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

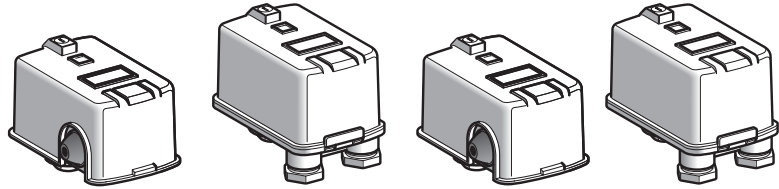
# Electromechanical pressure switches

## 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

<b>Fluid connection</b>	<b>G 1/4 (female)</b>
-------------------------	-----------------------



<b>Adjustable range of switching point (PH)</b> (Rising pressure)	2.8...7 bar (40.6...101.5 psi)		5.6...10.5 bar (81.2...152.3 psi)	
<b>Degree of protection</b> conforming to EN/IEC 60529	IP 20	IP 65	IP 20	IP 65

### References

<b>Fluids controlled</b>	Fresh water, sea water, from 0°C to +70°C (1)	<b>FYG22 (2)</b>	<b>FYG22NE</b>	<b>FYG32 (3)</b>	<b>FYG32NE</b>
<b>Weight (kg)</b>	0.340				

### Complementary characteristics not shown under general characteristics (page 87)

<b>Possible differential</b> (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)
<b>Maximum permissible pressure</b>	Per cycle	8.75 bar (126.9 psi)	13 bar (188.5 psi)
	Accidental	15 bar (217.5 psi)	15 bar (217.5 psi)
<b>Destruction pressure</b>		20 bar (290 psi)	20 bar (290 psi)
<b>Mechanical life</b>	1 x 10 <sup>6</sup> operating cycles		
<b>Cable entry</b>	2 cable entries, with grommet		
<b>Pressure switch type</b>	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**.

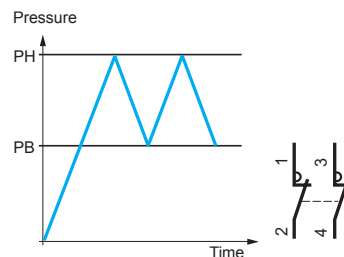
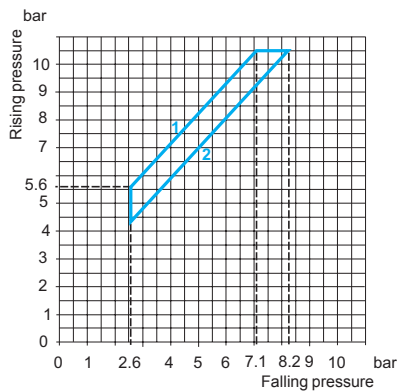
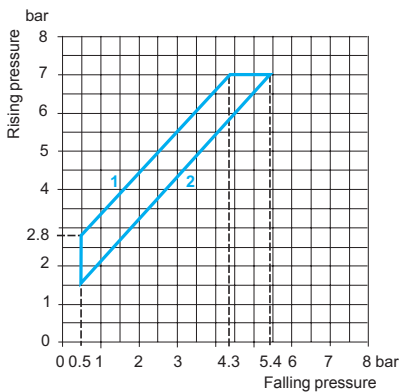
(3) Variant: for a 5.6 to 10.5 bar, IP 20, pressure switch with R 1/4 (male) fluid entry, select the **FYG39**.

### Operating curves

### Connections

**FYG22**

**FYG32**



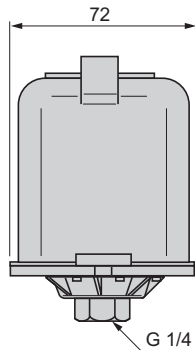
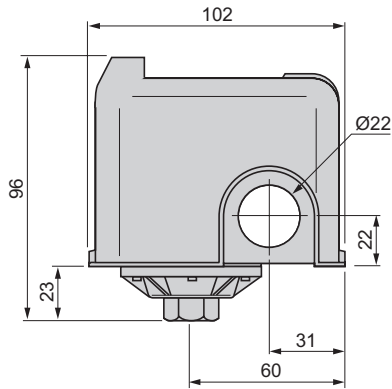
- 1 Maximum differential
- 2 Minimum differential

- 1 Maximum differential
- 2 Minimum differential

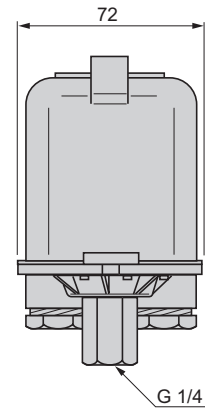
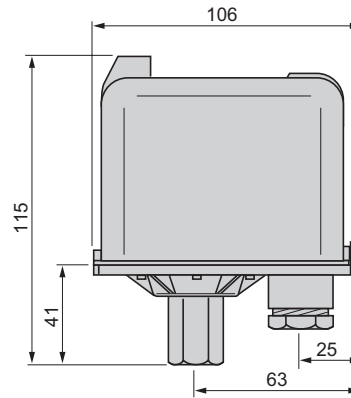
— Adjustable value

### Dimensions

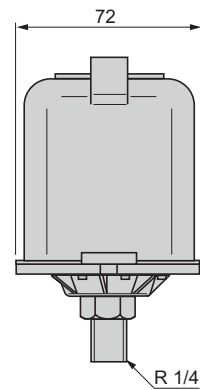
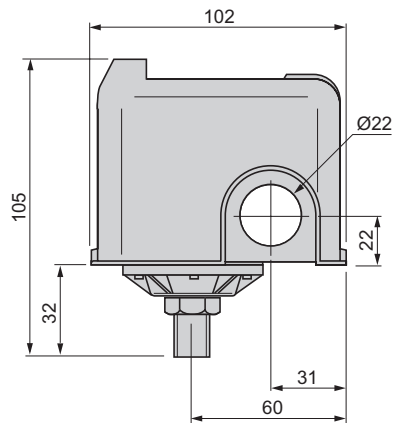
#### FTG2, FSG2



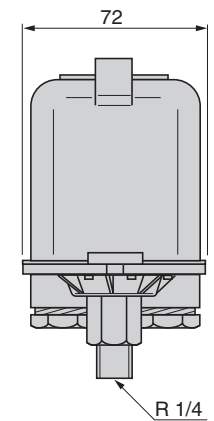
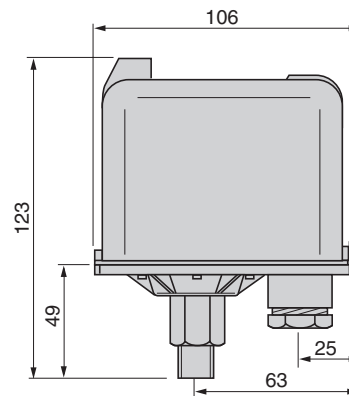
#### FTG2NE, FSG2NE



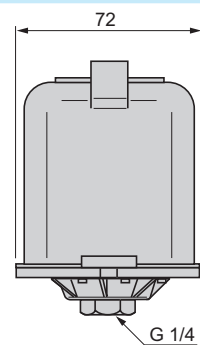
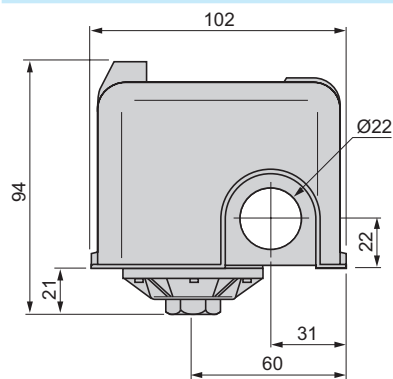
#### FTG9, FSG9



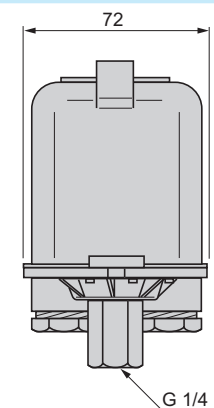
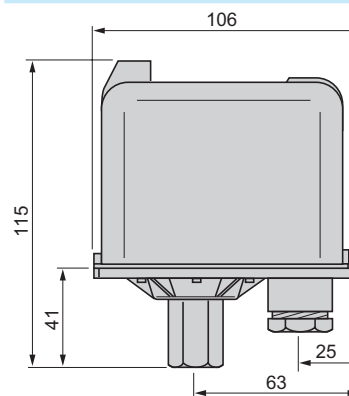
#### FTG9NE, FSG9NE



#### FYG22, FYG32



#### FYG22NE, FYG32NE



**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**

	Description	For use with	Unit reference	Weight kg
 XCSTA91	Blanking plugs for operating head slot <i>(Sold in lots of 10)</i>	XCSPA, XCSTA	XCSZ28	0.050
 XCSTA91	Padlocking device to help prevent insertion of actuating key, for up to 3 padlocks (padlocks not included)	XCSPA, XCSTA	XCSZ91	0.053
 XCSTA200	Actuating key centering device (3) <i>(Fixing screws included)</i>	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

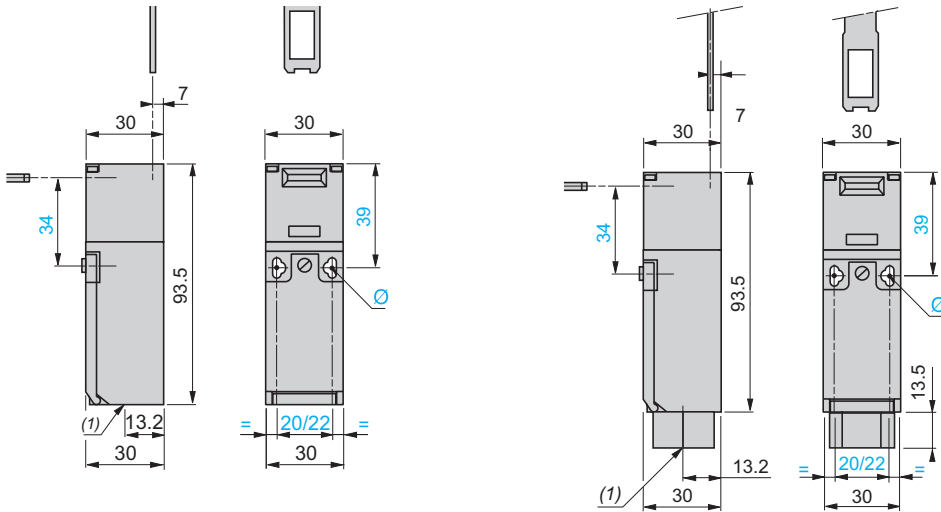
(1) 2 actuating key lengths, XCSZ12: L = 40 mm, XCSZ15: L = 29 mm.

(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

XCSPA●93



(1) 1 tapped entry for cable gland

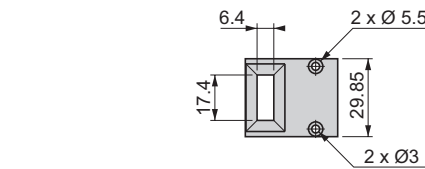
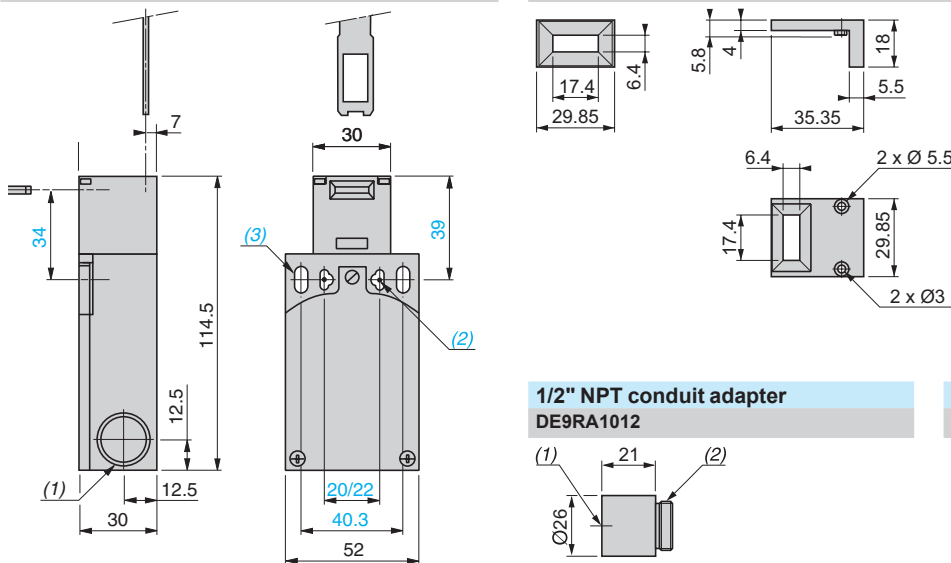
Ø: 2 elongated holes Ø 4.3 x 8.3 on 22 centers, 2 holes Ø 4.3 on 20 centers

(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

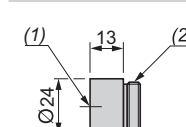
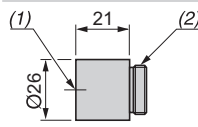
XCSTA●9●

XCSZ200 actuating key centering device



1/2" NPT conduit adapter  
DE9RA1012

M16 x 1.5 adapter  
DE9RA1016



(1) 2 tapped entries for cable gland or 1/2" NPT conduit adapter

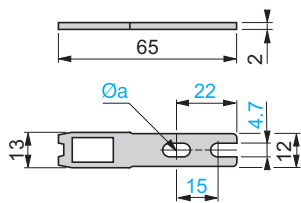
(2) 2 elongated holes Ø 4.3 x 8.3 on 22 centers,  
2 holes Ø 4.3 on 20 centers  
(3) 2 elongated holes Ø 5.3 x 13.3

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

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

### Dimensions (continued)

XCSZ11

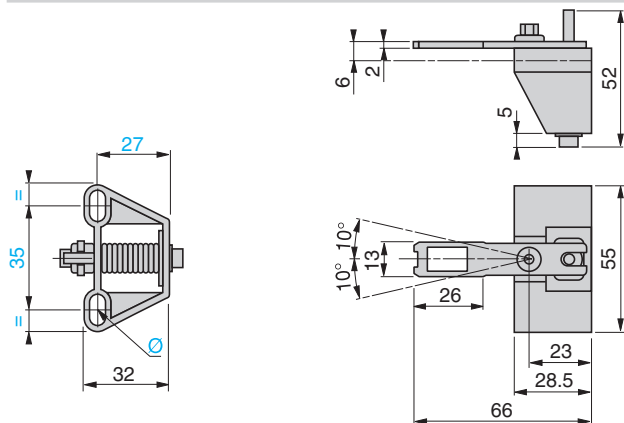


(1) Adapter (included with XCSZ11 actuating key) for replacing, without drilling an additional fixing hole, a legacy XCKP/T key-operated switch with XCKY01 actuating key by an XCSTA key-operated switch with XCSZ11 actuating key.

Ø a: 2 elongated holes Ø 4.7 x 10

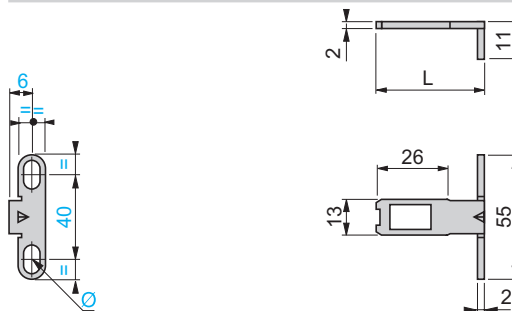
Ø b: 1 elongated hole for M4 or M4.5 screw

XCSZ13



Ø: 2 elongated holes Ø 4.7 x 10

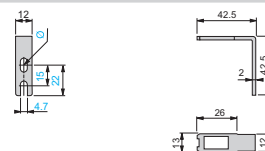
XCSZ12, XCSZ15



Ø: 2 elongated holes Ø 4.7 x 10

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

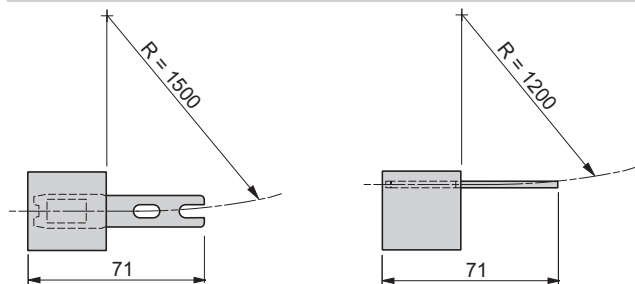
XCSZ14



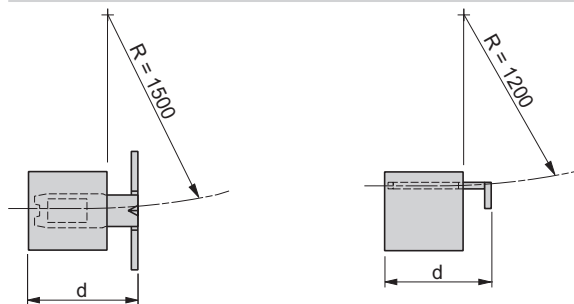
Ø: 1 elongated hole Ø 4.7 x 10

### Operating radius required for actuating key

XCSZ11

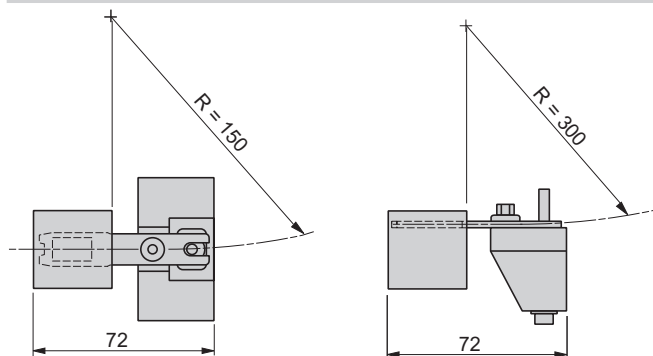


XCSZ12, XCSZ15

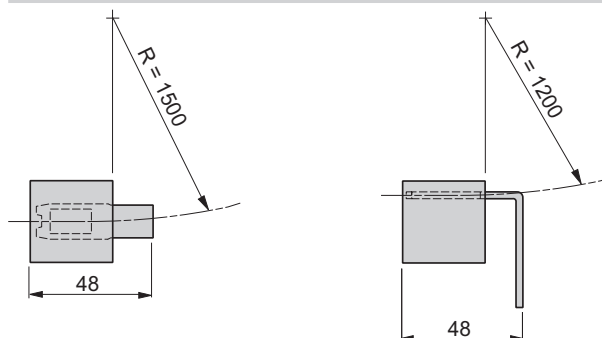


d = 46 mm (XCSZ12) or 35 mm (XCSZ15)

XCSZ13



XCSZ14



R = minimum radius



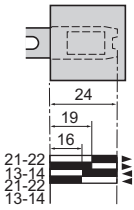
# Safety detection solutions

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

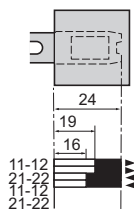
## Setting-up

### Functional diagrams

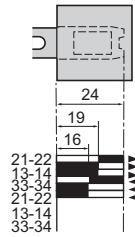
XCSPA1●●



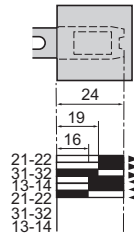
XCSPA2●●



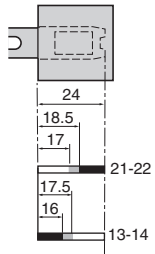
XCSPA3●●



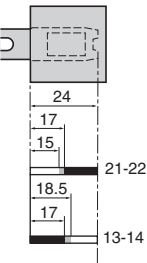
XCSPA4●●



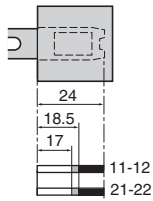
XCSPA5●●, XCSTE5●●●



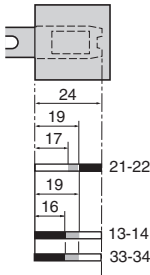
XCSPA6●●, XCSTE6●●●



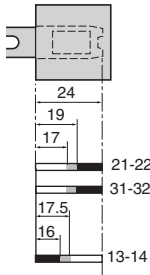
XCSPA7●●, XCSTE7●●●



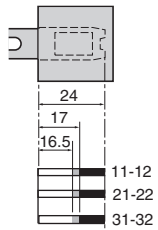
XCSTA5●●, XCSPA8●●



XCSTA7●●, XCSPA9●●



XCSTA8●●



Contact operation

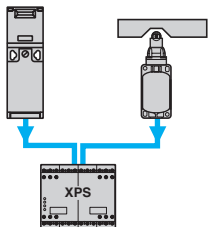
■ Closed □ Open ■ Transient state

### 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)

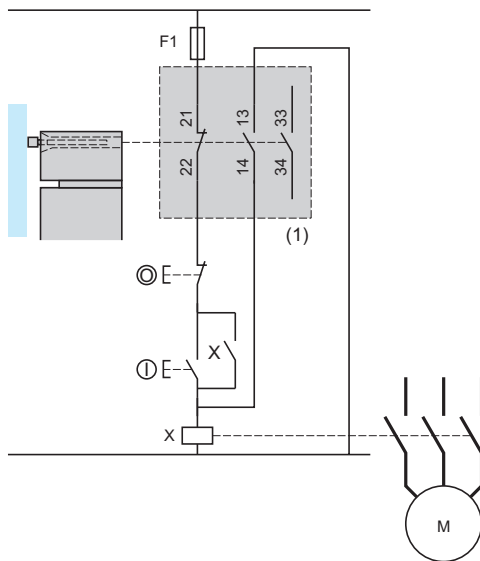
Method for machines with quick rundown time (low inertia)



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**

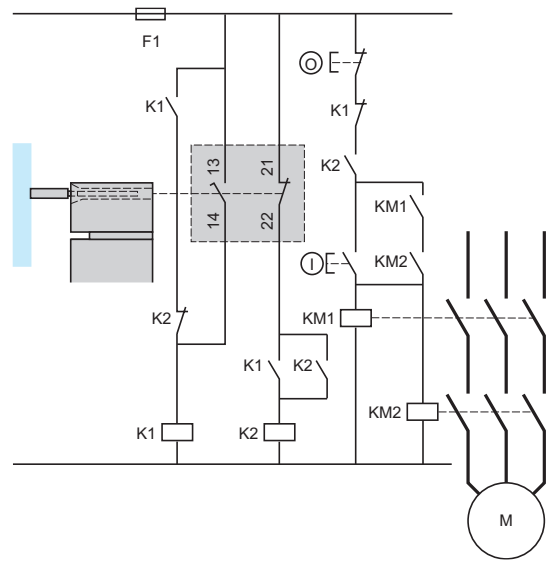
Example with 3-pole 1 NC + 2 NO contact and protection fuse to help prevent shunting of the NC contact, due to either cable damage or tampering.



(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

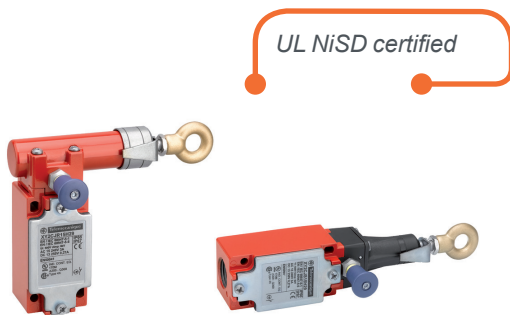
#### Emergency stop rope pull switches

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.



XY2CJ compact range



+ Certified, rugged safety devices that are easy to install

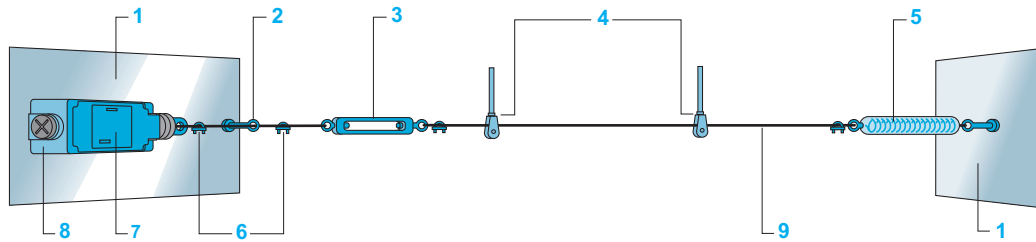
# Safety detection solutions

## Emergency stop rope pull switches

### XY2C range

#### Installation

#### Description of a typical installation for XY2CJ

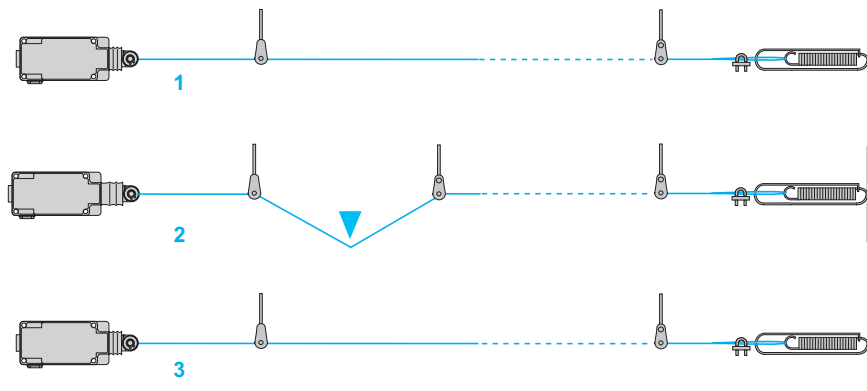


- |                       |                               |                     |
|-----------------------|-------------------------------|---------------------|
| 1 Mounting support    | 4 Pulleys and pulley supports | 7 Switch adjustment |
| 2 First cable support | 5 End spring                  | 8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



<b>Positive operation:</b> running condition	1 The switches incorporate positive opening operation contacts, the tripping of the switch being made with positive action.
<b>Latching:</b> 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.
<b>Resetting:</b> 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.

Environment		
<b>Conforming to standards</b>	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
<b>Product certifications</b>		<b>XY2CJ:</b> UL (NISD) - CSA, CCC, EAC
<b>Maximum safety level (1)</b>		PL e, category 4 conforming to EN/ISO 13849-1 and SIL CL3 conforming to EN/IEC 62061
<b>Reliability data B<sub>10d</sub></b>		<b>XY2CJ:</b> 500,000 (Values given for a service life of 20 years but may be limited by contact and mechanical wear)
<b>Ambient air temperature</b>	For operation	- 25...+ 70 °C
	For storage	- 40...+ 70 °C
<b>Vibration resistance</b>		<b>XY2CJ:</b> 10 gn (10...150 Hz)
<b>Shock resistance</b>		<b>XY2CJ:</b> 50 gn (duration 11 ms) conforming to EN/IEC 60068-2-27
<b>Electric shock protection</b>		Class I conforming to IEC 61140
<b>Degree of protection</b>		<b>XY2CJ:</b> IP 66 and IP 67 conforming to IEC 60529
<b>Materials</b>		<b>XY2CJS:</b> Zamak body, polyamide head, zinc-plated steel cover <b>XY2CJL, XY2CJR:</b> Zamak body and head, zinc-plated steel cover
<b>Mechanical life (no. of operating cycles)</b>		<b>XY2CJ:</b> 100,000
<b>Length of protected zone</b>		<b>XY2CJS:</b> ≤ 20 m <b>XY2CJR and XY2CJL:</b> ≤ 30 m
<b>Distance between cable supports</b>		<b>XY2CJ:</b> 5 m
<b>Cable entries</b>		<b>XY2CJ:</b> 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

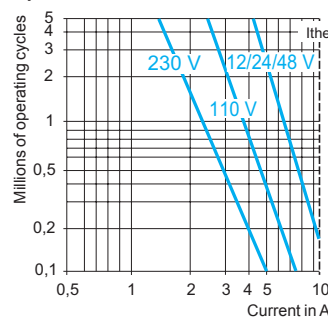
### XY2CJ range

Contact block characteristics		
Rated operational characteristics	2-pole contact block	<b>XY2CJ:</b> 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	<b>XY2CJ:</b> 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	<b>XY2CJ:</b> 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	<b>XY2CJ:</b> 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	<b>XY2CJ:</b> Uimp = 6 kV conforming to EN/IEC 60947-1
	3-pole contact block	<b>XY2CJ:</b> 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	<b>XY2CJ:</b> 10 A cartridge fuse type gG (gl) conforming to EN/IEC 60269
	3-pole contact block	<b>XY2CJ:</b> 6 A cartridge fuse type gG (gl) conforming to EN/IEC 60269

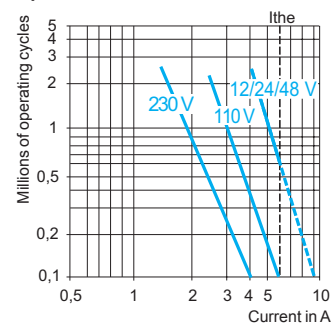
**Rated operational power** (Electrical durability) **XY2CJ**  
Conforming to EN/IEC 60947-5-1 Appendix C. Utilization categories AC-15 and DC-13  
Frequency: 3,600 operating cycles/hour. Load factor: 0.5

**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



	Voltage V	24	48	120	Voltage V	24	48	120
Inductive circuit	W	13	9	7	W	4	3	2

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

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

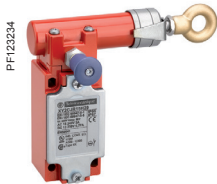
Turnbuckle or quick tensioner, cable and end spring to be ordered separately (1)

#### Without pilot light

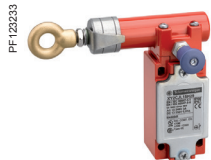
Cable length	Colors and materials	Reset	Supply voltage	Contact type	Cable anchor point	Reference	Weight kg
≤ 20 m	Polyamide head Zamak red RAL 3000 body Treated steel cover	By pull button	-		RH side or LH side	XY2CJS15 (2)	0.455
						XY2CJS17 (2)	0.455
						XY2CJS19 (2) (3)	0.455
≤ 30 m	Zamak red RAL 3000 head and body Treated steel cover	By pull button	-		RH side	XY2CJR15 (2)	0.669
						XY2CJR17 (2)	0.669
						XY2CJR19 (2) (3)	0.669
					LH side	XY2CJL15 (2)	0.669
						XY2CJL17 (2)	0.669
						XY2CJL19 (2) (3)	0.669



XY2CJS15



XY2CJR15



XY2CJL15

(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\_CP00A2016016



XY2CZ30●●

#### 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

PF 123239



XY2CZ210

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

PF 123256

XY2CZ402  
XY2CZ404

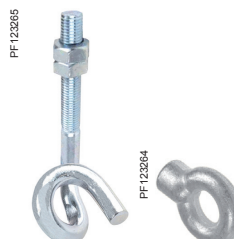


XY2C\_620\_CP0DA2016006

XY2CZ503  
XY2CZ513

XY2C\_620\_CP0DA2016007

XY2CZ523

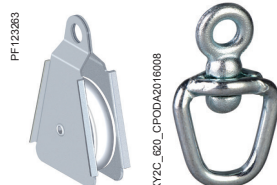


PF123265

PF123264

XY2CZ705

XY2CZ601



PF123283

XY2C\_620\_CP0DA2016008

XY2CZ708

XY2CZ602



XY2C\_620\_CP0DA2016004

XY2CZ701



PF123288

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 kg
		mm	m		
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



# Safety detection solutions

## Emergency stop rope pull switches

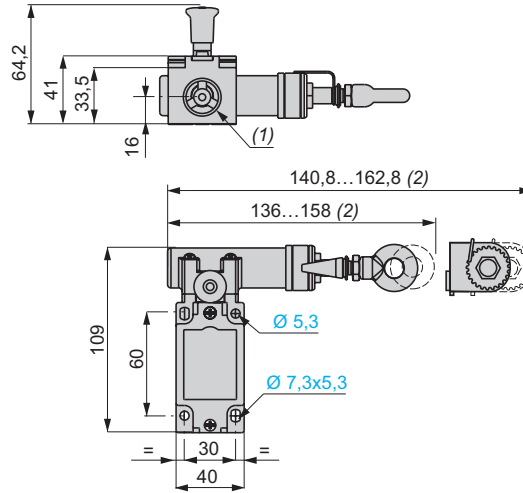
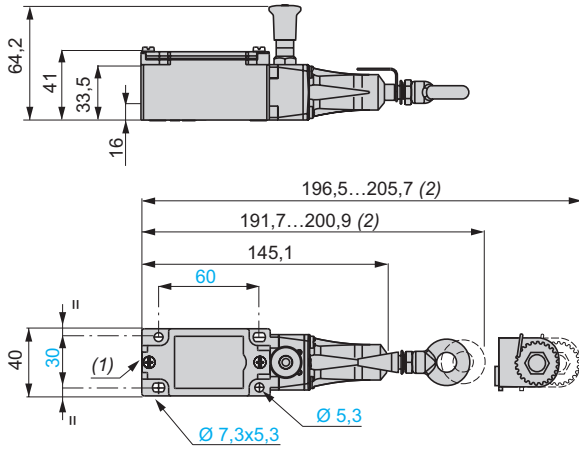
### XY2C range

#### 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)

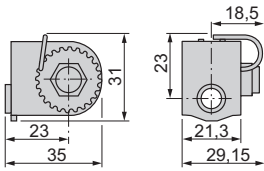


(1) Tapped entries for no. 13 cable gland (Pg 13.5). For ISO M20, the reference becomes XY2CJ●●H29. For 1/2" NPT, the reference becomes XY2CJ●●H7.  
 Ø: 4 elongated holes Ø 6 mm.

### Accessories

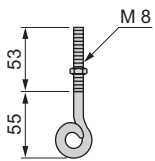
#### Quick tensioners

##### XY2CZ210

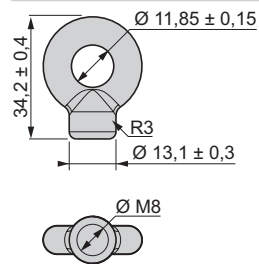


#### Cable and pulley supports

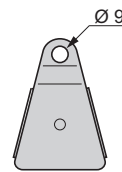
##### XY2CZ705



##### 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.

<b>XC</b>					
XCE110C	17	XS108BLNAM12	29	XS208BLPAM12	32
XCE102C	17	XS108BLPAL2	29	XS212BLNAL2	32
XCE103C	17	XS108BLPAL5	29	XS212BLNAL7	32
XCE118C	18	XS108BLPAM8	29	XS212BLNAM12	32
XCE119C	18	XS108BLPAL12	29	XS212BLNBL2	32
XCE145C	18	XS112BHNAL2	29	XS212BLPAL2	32
XCE146C	18	XS112BHNAM12	29	XS212BLPAL5	32
XCE154C	18	XS112BHNBL2	29	XS212BLPAM12	32
XCE106C	19	XS112BHNBM12	29	XS212BLPBL2	32
XCE181C	19	XS112BHPAL2	29	XS212BLPBL5	32
XCJ110C	13	XS112BHPAL5	29	XS218BLNAL2	33
XCJ102C	13	XS112BHPAM12	29	XS218BLNAL5	33
XCJ103C	13	XS112BHPBL2	29	XS218BLNAL7	33
XCJ125C	14	XS112BHPBM12	29	XS218BLNAM12	33
XCJ126C	14	XS112BLNAL2	32	XS218BLNBL2	33
XCJ127C	14	XS112BLNAM12	32	XS218BLPAL2	33
XCJ128C	14	XS112BLPAL2	32	XS218BLPAL5	33
XCJ121C	14	XS112BLPAL3	32	XS218BLPAM12	33
XCKN2110P20	23	XS112BLPAL5	32	XS218BLPBL2	33
XCKN2102P20	23	XS112BLPAM12	32	XS230BLNAL2	33
XCKN2103P20	23	XS112BLPBL2	32	XS230BLNAL7	33
XCKN2121P20	23	XS112BLPBM12	32	XS230BLNAM12	33
XCKN2127P20	23	XS118BHNAL2	29	XS230BLPAL2	33
XCKN2510P20	23	XS118BHNAL5	29	XS230BLPAL5	33
XCKN2502P20	23	XS118BHNAM12	29	XS230BLPAM12	33
XCKN2503P20	23	XS118BHNBL2	29	XS230BLPBL2	33
XCKN2521P20	23	XS118BHNBM12	29	XSZB108	29
XCKN2527P20	23	XS118BHPAL2	29		34
XCKN2710P20	23	XS118BHPAL5	29	XSZB112	29
XCKN2721P20	23	XS118BHPAM12	29		34
XCKN2910P20	23	XS118BHPBL2	29	XSZB118	29
XCKN2902P20	23	XS118BHPBM12	29		34
XCKN2903P20	23	XS118BLNAL2	33	XSZB130	29
XCKN2921P20	23	XS118BLNAL5	33		34
XCKN2118P20	24	XS118BLNAM12	33	XZCPV0566L5	29
XCKN2145P20	24	XS118BLPAL2	33		34
XCKN2139P20	24	XS118BLPAL5	33	XZCPV0566L10	29
XCKN2149P20	24	XS118BLPAM12	33		34
XCKN2108P20	24	XS118BLPBL2	33	XZCPV1141L5	29
XCKN2106P20	24	XS118BLPBM12	33		34
XCKN2518P20	24	XS130BHNAL2	29	XZCPV1141L10	29
XCKN2545P20	24	XS130BHNAM12	29		34
XCKN2539P20	24	XS130BHNBL2	29	<b>XU</b>	
XCKN2549P20	24	XS130BHNBM12	29	XUB4APANM12	66
XCKN2718P20	24	XS130BHPAL2	29	XUB4APAWM12	66
XCKN2918P20	24	XS130BHPAL5	29	XUB4ANANM12	66
XCKN2945P20	24	XS130BHPAM12	29	XUB4ANAWM12	66
XCKN2949P20	24	XS130BHPBL2	29	XUB4APBMM12	66
		XS130BHPBM12	29	XUB4APBWM12	66
		XS130BLNAL2	33	XUB4ANBMM12	66
		XS130BLNAL3	33	XUB4ANBWM12	66
<b>XS</b>		XS130BLNAM12	33	XUB5APANM12	66
XS108BHNAL2	29	XS130BLPAL2	33	XUB5APAWM12	66
XS108BHNAM8	29	XS130BLPAM12	33	XUB5ANANM12	66
XS108BHPAL2	29	XS130BLPAM12	33	XUB5ANAWM12	66
XS108BHPAM8	29	XS130BLPBL2	33	XUB5APBMM12	66
XS108BHPAM12	29	XS130BLPBL5	33	XUB5APBWM12	66
XS108BHPBL2	29	XS208BLNAL2	32	XUB5APBMM12	66
XS108BHPBM8	29	XS208BLPAL2	32	XUB5ANANM12	66
XS108BHPBM12	29	XS208BLPAL5	32	XUB5ANAWM12	66
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				XUB5ANANM12	66
				XUB5ANAWM12	66
				XUB5APBMM12	66
				XUB5APBWM12	66
				XUB5ANANM12	66
				XUB5ANAWM12	66
				XUB5APBMM12	66
				XUB5APBWM12	66
				XUB5ANANM12	66
				XUB5ANAWM12	66
				XUB5APBMM12	66
				XUB5APBWM12	66
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				XUB5APBWM12	66
				XUB5ANANM12	66
				XUB5ANAWM12	66
				XUB5APBMM12	66
				XUB5APBWM12	66
				XUB5ANANM12	66
				XUB5ANAWM12	66
				XUB5APBMM12	66
				XUB5APBWM12	66
				XUB5ANANM12	66
				XUB5ANAWM12	66
				XUB5APBMM12	66
				XUB5APBWM12	66
				XUB5ANANM12	66
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				XUB5APBMM12	66
				XUB5APBWM12	66
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				XUB5APBWM12	66
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				XUB5APBWM12	66
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				XUB5APBMM12	66
				XUB5APBWM12	66
				XUB5ANANM12	66
				XUB5ANAWM12	66
				XUB5APBMM12	66
				XUB5APBWM12	66
				XUB5ANANM	



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FSG9	89
FSG2NE	89
FSG9NE	89
FYG22	90
FYG22NE	90
FYG32	90
FYG32NE	90

**XY**

XY2CJS15	101
XY2CJS17	101
XY2CJS19	101
XY2CJR15	101
XY2CJR17	101
XY2CJR19	101
XY2CJL15	101
XY2CJL17	101
XY2CJL19	101
XY2CZ301	102
XY2CZ3015	102
XY2CZ3020	102
XY2CZ302	102
XY2CZ303	102
XY2CZ210	102
XY2CZ402	102
XY2CZ404	102
XY2CZ503	103
XY2CZ513	103
XY2CZ523	103
XY2CZ524	103
XY2CZ601	103
XY2CZ611	103
XY2CZ602	103
XY2CZ705	103
XY2CZ715	103
XY2CZ708	103
XY2CZ718	103
XY2CZ701	103
XY2CZ704	103
XY2CZ703	103
XY2CZ9310	103
XY2CZ9315	103
XY2CZ9320	103
XY2CZ9330	103
XY2CZ9425	103

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