# Sensors, limit switches and pressure switches
# Easy Series

## Catalogue

Simply easy!™

Telemecanique
Sensors

# Limit switches



# Inductive proximity sensors

## Photo-electric sensors



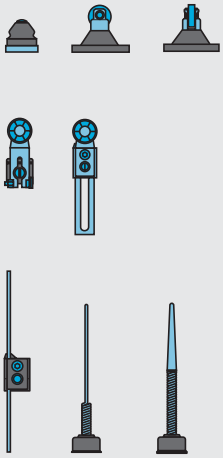
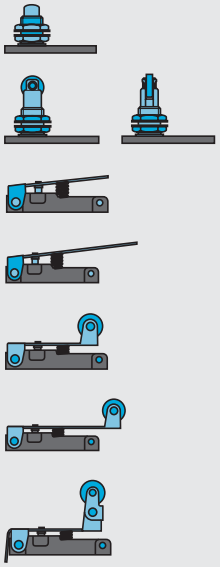
## Electronic pressure sensors



## Electromechanical pressure switches

## Safety detection solutions

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

# Limit switches
XC range

## General

### Electromechanical detection

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

### Simple to install switches, offering many advantages

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

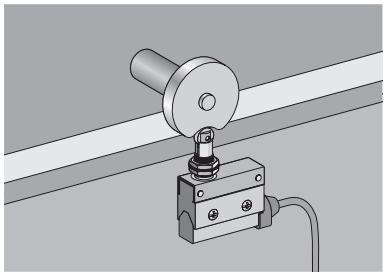
- **From a mechanical viewpoint:**
  - N/C contacts with positive opening operation,
  - high resistance to the different ambient conditions encountered in industry,
  - high repeat accuracy, up to 0.01 mm on the tripping points,
  - simple visible operation.

### Mechanical endurance

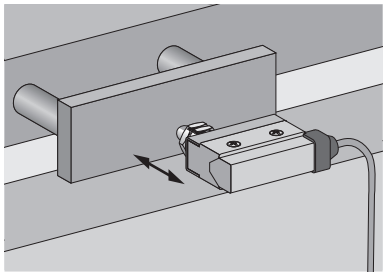
- **Major factors affecting the mechanical endurance of a limit switch:**
  - operating speed and frequency,
  - operating travel (percentage of total travel),
  - cam angle,
  - environnment (presence of abrasive dust, corrosive substances, etc).

## Applications examples

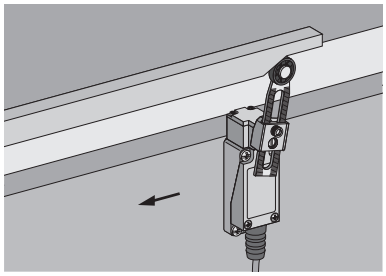
**Roller plunger**



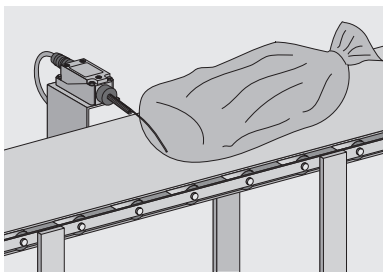
**End plunger**



**Rotary style head**



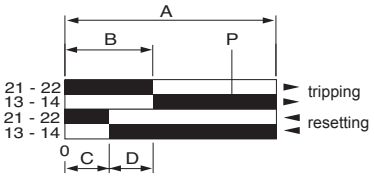
**Multidirectional head**



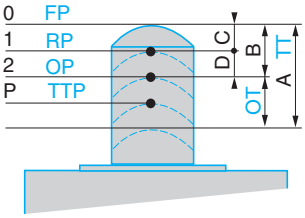
# Limit switches
XC range
Contact block operation

## Contact blocks operation

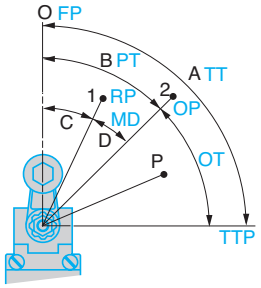
*Example : 1 N/C + 1 N/O*



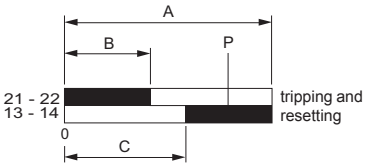

*Linear movement (plunger)*



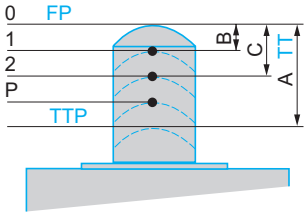

*Rotary movement*



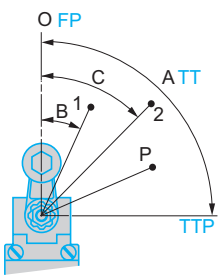

*Example : 1 N/C + 1 N/O break before make*




*Linear movement (plunger)*




*Rotary movement*




## Snap action contacts

■ **Linear movement (plunger)**

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

■ **Rotary movement**

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

## Slow break contacts

■ **Linear movement (plunger)**

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

■ **Rotary movement**

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

# Limit switches
## XC range
## Contact ratings

### Utilization categories IEC 60947-5-1

| Kind of current | Category | Typical application | $T_{0,95}$ (DC) *(1)* $\cos \varphi$ (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 (≤ 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

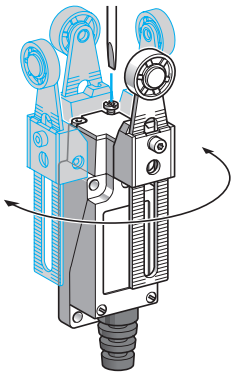
| Designation | Utilization category | Conventional therm. current | Rated operational current Ie at rated operating voltage Ue | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 120 V | 240 V | 380 V | 480 V | 500 V | 600 V |
| A150 | AC-15 | 10 A | 6 A | – | – | – | – | – |
| A300 | AC-15 |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

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

# Limit switches
XC range
Setting up and mounting advice

## Setting up

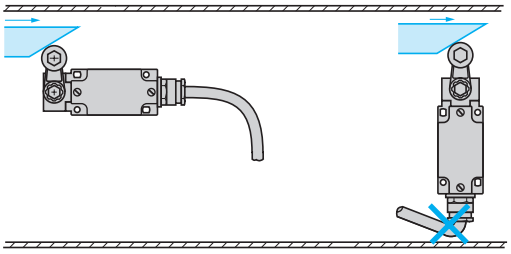
### Reverse mounting of the operating lever (for limit switches XCE)



## Mounting advice

### Sweep of connecting cable

Recommended | To be avoided

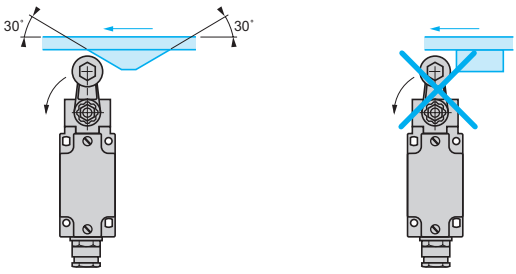


### Position of cable-gland

Recommended | To be avoided

### Type of cam

Recommended | To be avoided




### Mounting and fixing of limit switches

**XCJ110C, XCJ102C and XCJ103C**

Recommended | To be avoided

# Limit switches
XC range
Degrees of protection provided by enclosures

## European standards

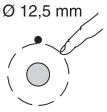
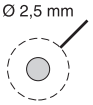
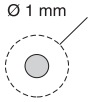
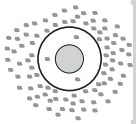
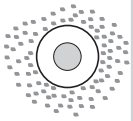
**Degrees of protection against the penetration of solid bodies, water and personnel access to live parts**

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

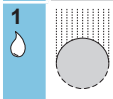
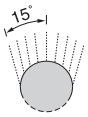
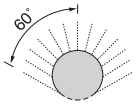
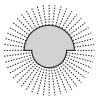
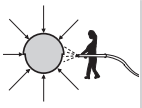
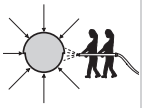
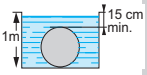
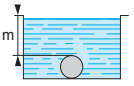
### IP●● code

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

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

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

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

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

# Limit switches
XC range
Degrees of protection provided by enclosures

## American standards

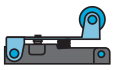
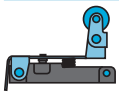
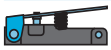
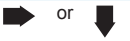
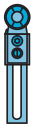
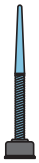
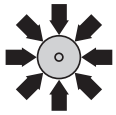
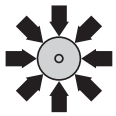
Standard UL 50 - Table 6.1 - Enclosures types, defines a coding system for indicating the protection provided by electrical equipment enclosures against the ingress of solid foreign objets and fluids.

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

# Limit switches
XC range
Operating heads

## Operating heads selection

### 5 points to consider…

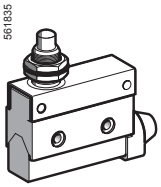
| | Direction of operation | Operating speed (1) | Positivity (2) ⊖ | Risk of overtravel damage | Target type |
|---|---|---|---|---|---|
| **Plunger style** | | | | | |
|  |  | 0.5 m/s | Yes | Very high |  |
|  |  | 0.85 m/s | Yes | High |  |
| **Lever and roller lever plunger style** | | | | | |
|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

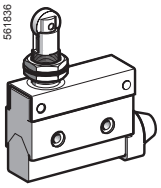
*(1) These values are indicative only. For precise information relating to a particular device, refer to the appropriate technical characteristics.*
*(2) Only when combined with a positive opening contact.*
*(3) CW = clockwise, CCW = counter clockwise.*

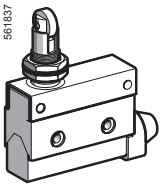
# Limit switches
XC range
For light to medium duty applications, XCJ

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

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





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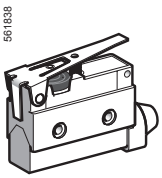
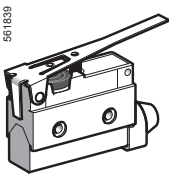
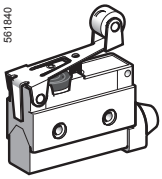
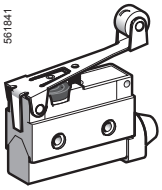
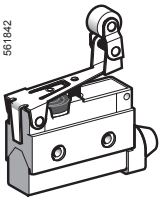
### With head for linear movement (lever plunger) operators, fixing by body









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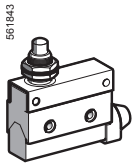
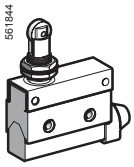
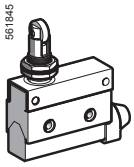
## Environnement

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

## Contact block characteristics

| | |
|---|---|
| **Rated operational characteristics** | ∼ **AC (Ue = 240 V, Ie = 10 A) , Ith = 10 A**<br>⎓ **DC (Ue = 220 V, Ie = 0.3 A)** |
| **Insulation resistance** | > 100 mΩ at ⎓ 500 V |
| **Dielectric withstand voltage** | ∼ 1000 V, 50/60 Hz for 1 minute between non-continuous terminals<br>∼ 2000 V, 50/60 Hz between current carrying and non-current carrying parts and between each terminal and ground.<br>Double isolation, CE Class II conforming to IEC 60947-5-1 |
| **Operating frequency** | 120 operations per minute |
| **Electrical endurance** | > 8 x $10^5$ operations (∼ 220 V, 10 A, P.F. = 1) |
| **Contact resistance** | ⩽ 25 mΩ |
| **Cabling** | M3.5 screw terminals (use cable lug with flexible cable)<br>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** | **XCJ103C** |
| **Weight (kg)** | 0.081 | 0.086 | 0.088 |

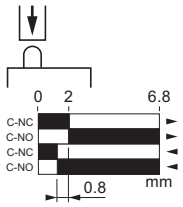
## Complementary characteristics not shown under general characteristics (page 12)

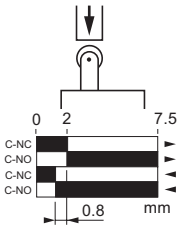
| | |
|---|---|
| **Switch actuation** | On end |
| **Operating force (max.)** | 4 N |
| **Release force (min.)** | 0.98 N |
| **Operating frequency** | 120 operations per minute |
| **Actuation speed** | 0.01 mm/s…50 cm/s (at pin plunger) |
| **Mechanical durability** | **10 x 10⁶ operations** (for XCJ102C and XCJ103C, actuation by 30° cam: 4 million operations) |
| **Cabling** | M3.5 screw terminals (use cable lug with flexible cable)<br>Torque range: 0.8...1.2 N.m / *7.08...10.62 lb-in* |

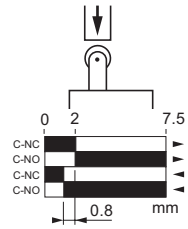
## Operating diagrams

**Type of actuation**

**Operating diagrams**
Contact operation
■ contact closed
□ contact open

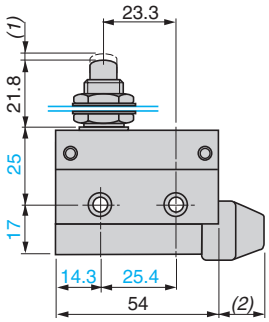


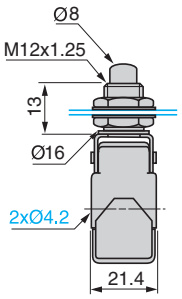




## Dimensions in mm

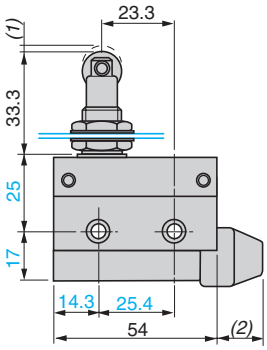
**XCJ110C**

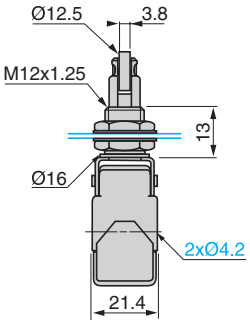



*(1) 2 max.*
*(2) 16.5 max.*

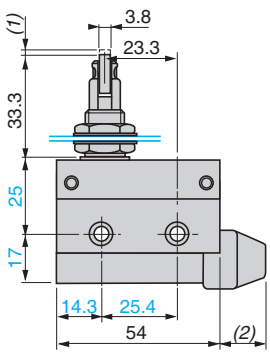
**XCJ102C**

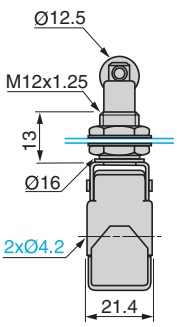



*(1) 2 max.*
*(2)16.5 max.*

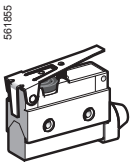
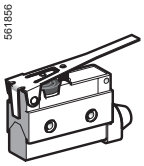
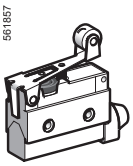
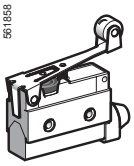
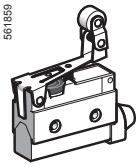
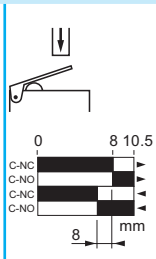
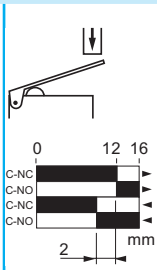
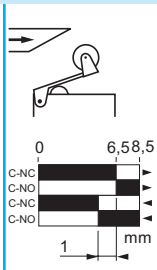
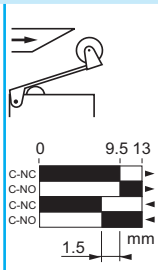
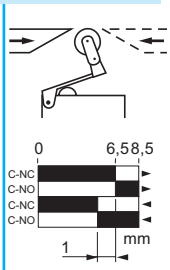
**XCJ103C**




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

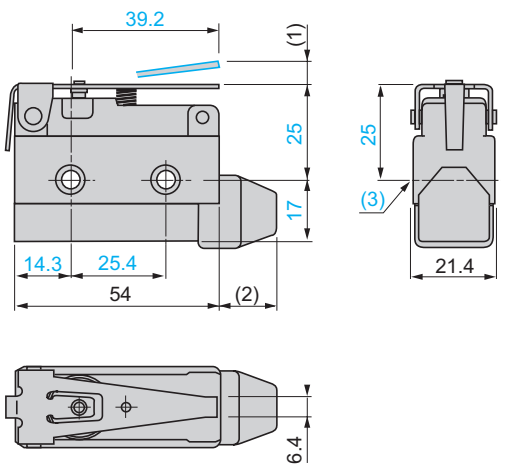
# Limit switches
XC range
For light to medium duty applications, XCJ

| Type of operating head | | | | | |
|---|---|---|---|---|---|
| | Plunger (fixing by body) | | | | |
| |  561855 |  561856 |  561857 |  561858 |  561859 |
| **Type of operator** | **Short flat lever plunger** | **Long flat lever plunger** | **Short flat roller lever plunger** | **Long flat roller lever plunger** | **Short flat roller lever plunger, one way operation** |
| **References** | | | | | |
| **Single pole 1 C/O** (form C)   | **XCJ125C** | **XCJ126C** | **XCJ127C** | **XCJ128C** | **XCJ121C** |
| **Weight (kg)** | 0.052 | 0.053 | 0.057 | 0.057 | 0.059 |
| **Complementary characteristics** not shown under general characteristics (page 12) | | | | | |
| **Switch actuation** | On end | | By 30° cam | | |
| **Operating force (maxi.)** | 1.9 N | 1.3 N | 2.3 N | 1.6 N | 2.4 N |
| **Release force (mini.)** | 0.59 N | 0.39 N | 0.78 N | 0.49 N | 0.98 N |
| **Operating frequency** | 120 operations per minute | | | | |
| **Actuation speed** | 0.01 mm/s…50 cm/s (at pin plunger) | | | | |
| **Mechanical durability** | **10 x $10^6$ operations** | | | | |
| **Cabling** | M3.5 screw terminals (use cable lug with flexible cable)<br>Torque range: 0.8...1.2 N.m / *7.08...10.62 lb-in* | | | | |
| **Operating diagrams** | | | | | |
| **Type of actuation** | | | | | |
| **Operating diagrams**<br>Contact operation<br>■ contact closed<br>contact open |   |   |   |   |   |

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

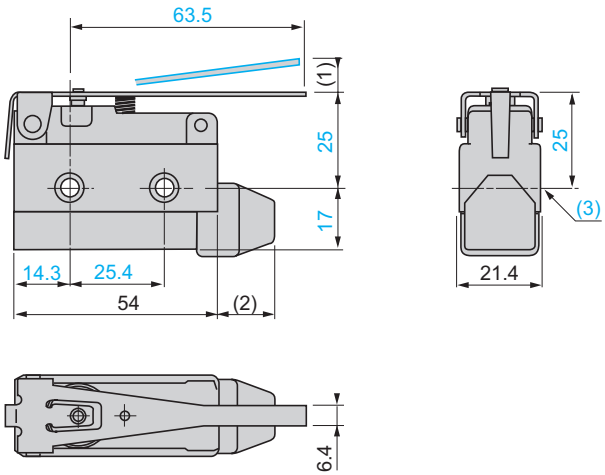
## Dimensions in mm

### XCJ125C



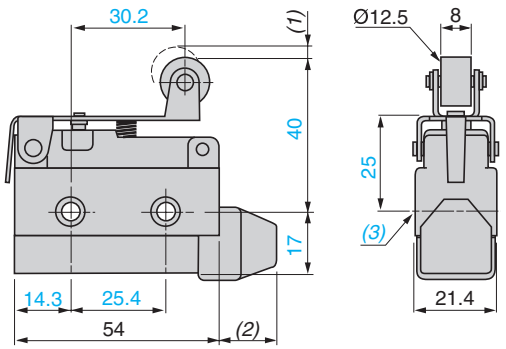

*(1) 8.5 max.*
*(2) 16.5 max.*
*(3) 2 x Ø 4.2*

### XCJ126C



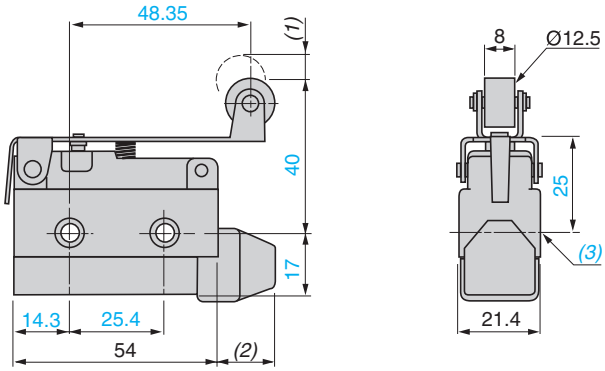

*(1) 13.5 max.*
*(2) 16.5 max.*
*(3) 2 x Ø 4.2*

### XCJ127C



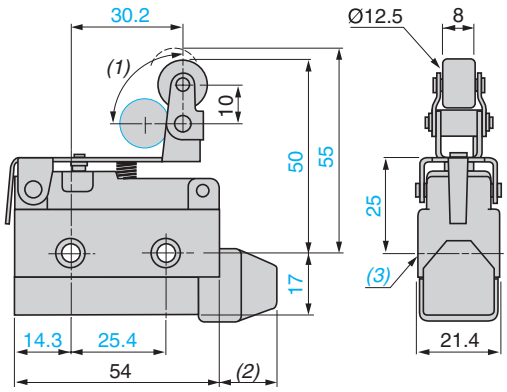

*(1) 6.5 max.*
*(2) 16.5 max.*
*(3) 2 x Ø 4.2*

### XCJ128C




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

### XCJ121C

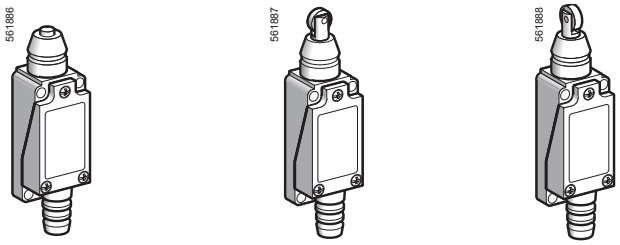



*(1) 90° max.*
*(2) 16.5 max.*
*(3) 2 x Ø 4.2*

# Limit switches
XC range
For medium duty applications, XCE

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

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

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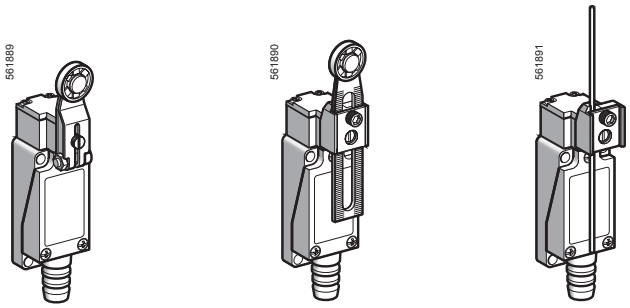
### With head for rotary movement (lever) operators

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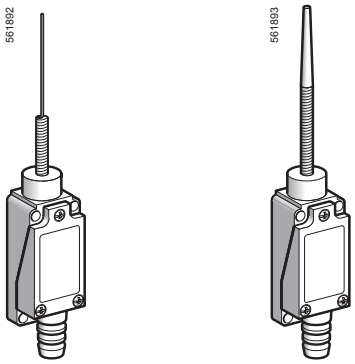
### With head for multi-directional operators

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## Environment

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

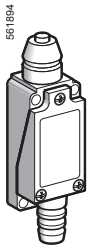
## Contact block characteristics

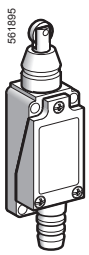
| | |
|---|---|
| **Rated operational characteristics** | **~ AC (Ue = 240 V, Ie = 3 A, Ith = 10 A); ⎓ DC (Ue = 220 V, Ie = 0.3 A)** |
| **Rated insulation voltage** | Ui=300V, pollution degree 3 complies with IEC 60947 |
| **Insulation resistance** | > 100 mΩ at 500 V |
| **Operating frequency** | 120 operations per minute |
| **Electrical endurance** | 8 x $10^5$ operations |
| **Contact resistance** | ≤ 25 mΩ |
| **Cabling** | Screw terminals, torque range 0.6...*1.1 N.m / 5.31...8.85 lb-in*<br>Maximum clamping capacity 0.75…1.5 $mm^2$ 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** | **XCE103C** |
| **Weigth (kg)** | 0.110 | 0.126 | 0.126 |

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

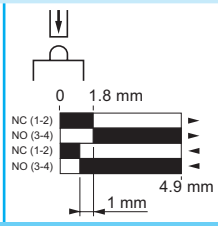
### Complementary characteristics not shown under general characteristics (page 16)

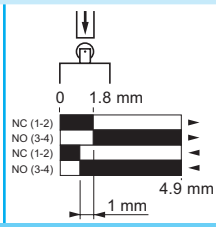
| | |
|---|---|
| **Switch actuation** | On end |
| **Operating force (maxi.)** | 9 N |
| **Release force (mini.)** | 1.5 N |
| **Operating frequency** | 120 operations per minute |
| **Maximum actuation speed** | 0.5 m/s |
| **Minimum actuation speed** | 5 mm/s |
| **Mechanical durability** | **10 x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

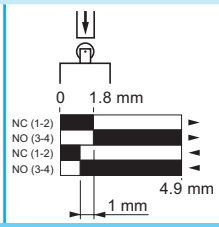
### Operating diagrams

**Type of actuation**

**Operating diagrams**
Contact operation
■ contact closed
□ contact open

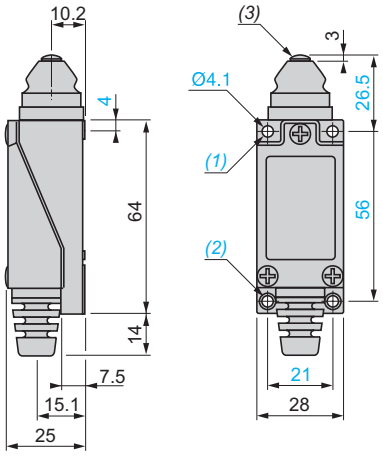


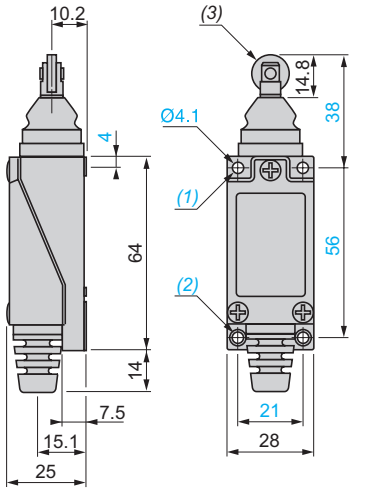

### Dimensions in mm

**XCE110C**



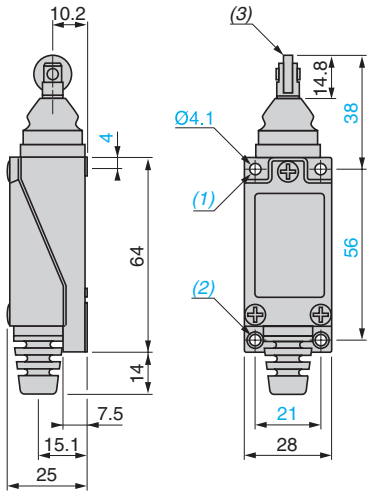

*(1) 2 holes M5 tapped 7 in depth.*
*(2) 2 M5 tapped holes.*
(3) Stainless steel plunger Ø 7.

**XCE102C**




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

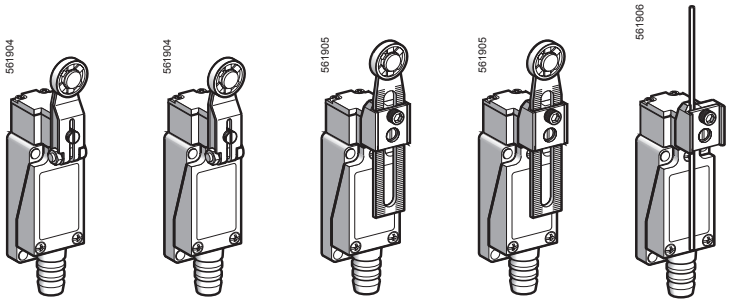
**XCE103C**

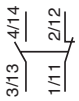



*(1) 2 holes M5 tapped 7 in depth.*
*(2)* 2 M5 tapped holes.
*(3)* Stainless steel roller Ø 12.5 x 3.8.

# Limit switches
XC range
For medium duty applications, XCE

## Type of operating head
**Rotary**



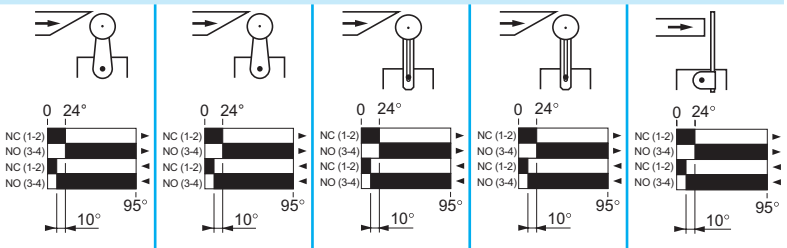

| Type of operator | Thermoplastic roller lever | Steel roller lever | Variable length thermoplastic roller lever | Variable length steel roller lever | Round rod Ø 3 mm steel rod |
|---|---|---|---|---|---|
| **References** *(1)* | | | | | |
| **1 NO + 1 NC** (form Za)   | **XCE118C** | **XCE119C**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

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

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

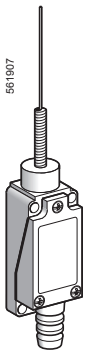
## Operating diagrams
### Type of actuation

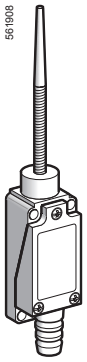
**Operating diagrams**
Contact operation
■ contact closed
□ contact open




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

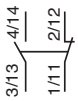
## Type of operating head
**Multi-directional**




| | | |
|---|---|---|
| **Type of operator** | **"Cat's whisker"** | **Spring rod lever with thermoplastic end** |

## References *(1)*

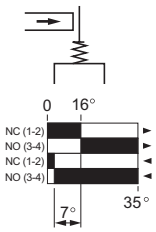
| | | | |
|---|---|---|---|
| **1 NO + 1 NC**<br>(form Za) |  | **XCE106C** | **XCE181C** |
| **Weigth (kg)** | | 0.109 | 0.108 |

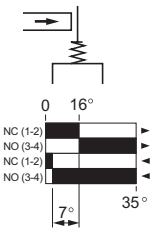
## Complementary characteristics not shown under general characteristics (page 16)

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

## Operating diagrams
### Type of actuation

**Operating diagrams**
Contact operation
contact closed
contact open



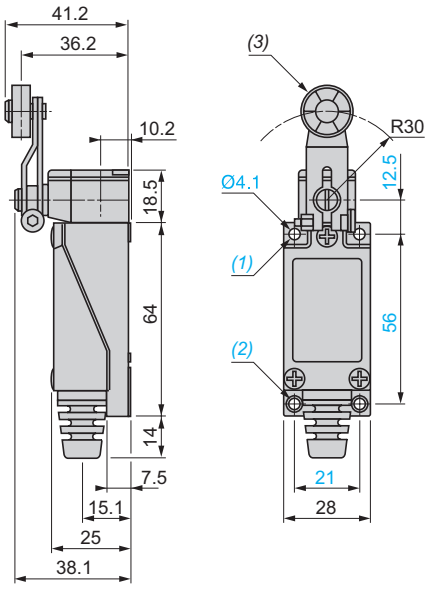




*(1) All products are supplied in individual packaging. They are also available in a bulk pack of 10 products. To order the bulk packed versions, add the suffix **TQ** at the end of product reference. Example **XCE181CTQ**.*
*Obviously the indivisible order quantity for this version is 10.*

# Limit switches
XC range
For medium duty applications, XCE

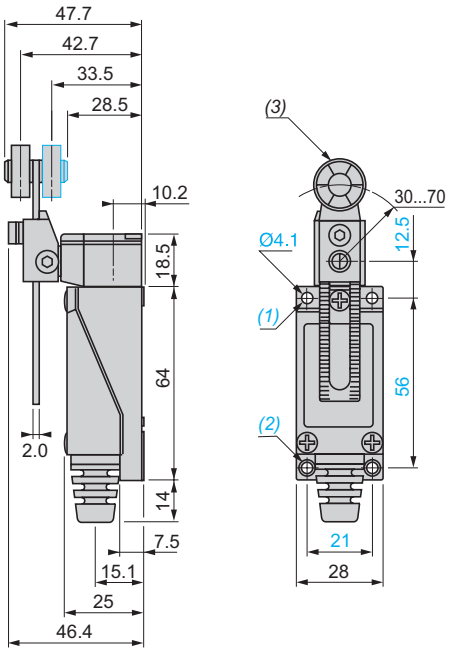
## Dimensions in mm

### XCE118C, XCE119C



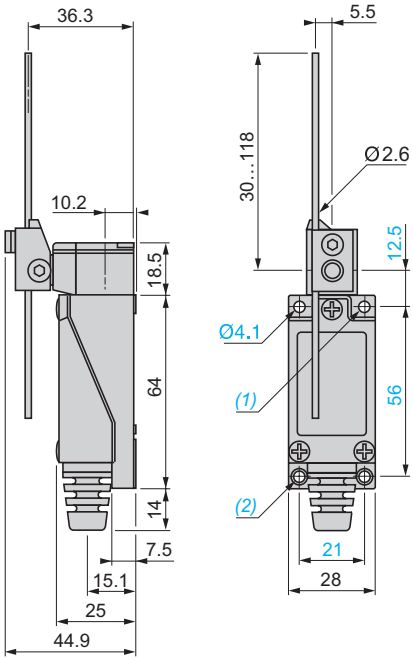

(1) 2 holes M5 tapped 7 in depth.
(2) 2 M5 tapped holes.
(3) Nylon roller Ø 8 x 7 (roller can be rotated and locked in any position through 360°).

### XCE145C, XCE146C




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

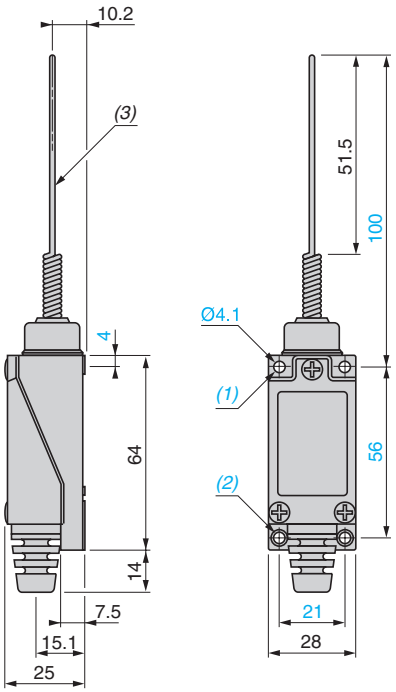
### XCE154C




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

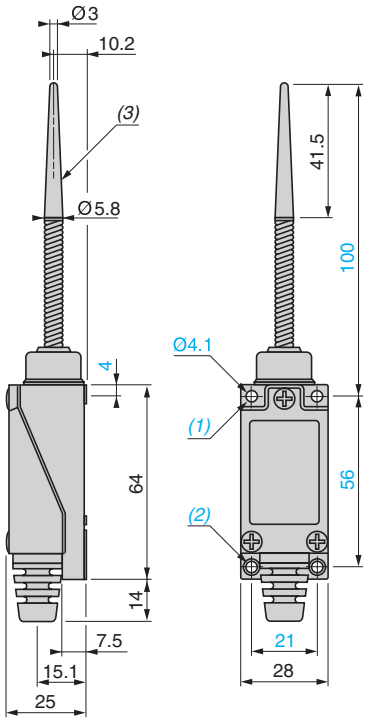
## Dimensions in mm

### XCE106C




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

### XCE181C

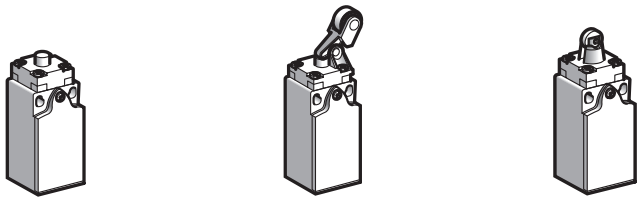



*(1) 2 holes M5 tapped 7 in depth.*
*(2) 2 M5 tapped holes.*
*(3) Nylon rod.*

# Limit switches
## XC Basic range
## Compact design, plastic, XCKN

**XCKN**
**with 1 cable entry**
**Conforming to CENELEC EN 50047)**

**With head for linear movement (plunger)**



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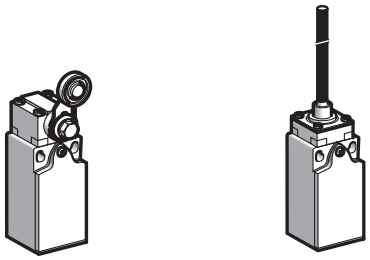
**With head for rotary movement (lever) or multi-directional**



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## Environment characteristics

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

## Contact block characteristics

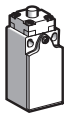
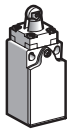
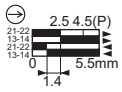
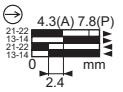
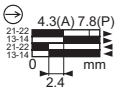
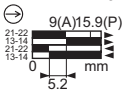
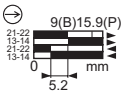
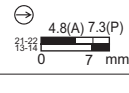
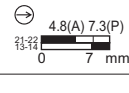
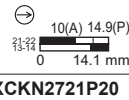
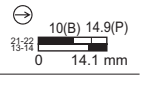
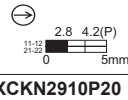
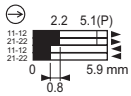
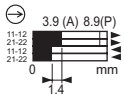
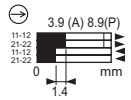
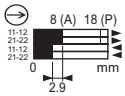
| | | |
|---|---|---|
| **Rated operational characteristics** | | ~ AC-15; A300 (Ue = 240 V, Ie = 3 A); Ithe = 10 A |
| | | ⎓ DC-13; R300 (Ue = 250 V, Ie = 0.1 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1 |
| **Rated insulation voltage** | 2-pole contact | Ui = 500 V degree of pollution 3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

# Limit switches

## XC Basic range

### Compact design, plastic, XCKN

### Complete switches with 1 cable entry

| **Type of head** | **Plunger (fixing by the body)** | | | | |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Type of operator** | Metal end plunger | Plastic roller plunger for lateral cam approach | Plastic roller plunger for traverse cam approach | Thermoplastic roller lever plunger, horizontal actuation in 1 direction | Thermoplastic roller lever plunger, vertical actuation in 1 direction |
| Sold and packed in lots of | 20 | 20 | 20 | 20 | 20 |
| **References of complete switches with 1 ISO M20 x 1.5 cable entry** | | | | | |
|  **2-pole NC + NO snap action** | **XCKN2110P20**  | **XCKN2102P20**  | **XCKN2103P20**  | **XCKN2121P20**  | **XCKN2127P20**  |
|  **2-pole NC + NO break before make, slow break** | **XCKN2510P20**  | **XCKN2502P20**  | **XCKN2503P20**  | **XCKN2521P20**  | **XCKN2527P20**  |
|  **2-pole NC + NC simultaneous, slow break** | **XCKN2710P20**  | - | - | **XCKN2721P20**  | - |
|  **2-pole NC + NC snap action** | **XCKN2910P20**  | **XCKN2902P20**  | **XCKN2903P20**  | **XCKN2921P20**  | - |
| **Weight (kg)** | 0.065 | 0.065 | 0.065 | 0.070 | 0.070 |
| **Contact operation** | ■ *closed* □ *open* | *(A) (B) = cam displacement (P) = positive opening point* | | *⊖ NC contact with positive opening operation* | |

## Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Switch actuation** | | On end | By 30° cam | | |
| **Type of actuation** | |  |  |  |  |
| **Maximum actuation speed** | | 0.5 m/s | 0.3 m/s | 1 m/s | |
| **Mechanical durability** (in millions of operating cycles) | | 10 | | | |
| **Minimum force or torque** | For tripping | 15 N | 12 N | 6 N | |
| | For positive opening | 30 N | 20 N | 10 N | |
| **Cable entry** | | 1 entry tapped M20 x 1.5 mm for ISO cable gland, clamping capacity 7 to 13 mm | | | |

## References of complete switches with 1 Pg 11 cable entry

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

## Other cable entries

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

## Other contacts

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

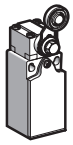
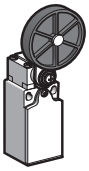
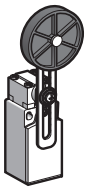
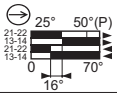
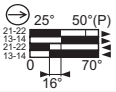
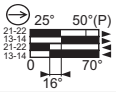
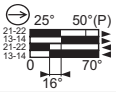
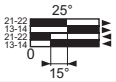
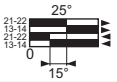
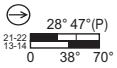
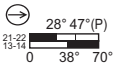
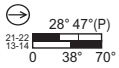
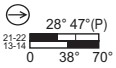
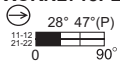
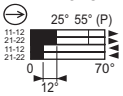
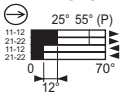
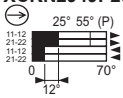
For complete switches with 3-pole contacts:
NC + NO + NO snap action,
NC + NC + NO snap action,
NC + NC + NO break before make, slow break,
NC + NO + NO break before make, slow break, please consult our Customer Care Centre.

# Limit switches

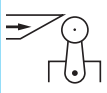
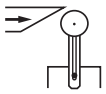
## XC Basic range

Compact design, plastic, XCKN

Complete switches with 1 cable entry

| Type of head | Rotary (fixing by the body) | | | | Multi-directional | |
|---|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| **Type of operator** | Thermoplastic roller lever | Variable length thermoplastic roller lever | Thermoplastic roller lever, Ø 50 mm | Variable length thermoplastic roller lever, Ø 50 mm | Spring rod | "Cat's whisker" |
| Sold and packed in lots of | 20 | 20 | 20 | 20 | 20 | 20 |
| **References of complete switches with 1 ISO M20 x 1.5 cable entry** | | | | | | |
|  **2-pole NC + NO snap action** | **XCKN2118P20**  | **XCKN2145P20**  | **XCKN2139P20**  | **XCKN2149P20**  | **XCKN2108P20**  | **XCKN2106P20**  |
|  **2-pole NC + NO break before make, slow break** | **XCKN2518P20**  | **XCKN2545P20**  | **XCKN2539P20**  | **XCKN2549P20**  | - | - |
|  **2-pole NC + NC simultaneous, slow break** | **XCKN2718P20**  | - | - | - | - | - |
|  **2-pole NC + NC snap action** | **XCKN2918P20**  | **XCKN2945P20**  | - | **XCKN2949P20**  | - | - |
| **Weight (kg)** | 0.085 | 0.090 | 0.110 | 0.115 | 0.085 | 0.075 |
| **Contact operation** | ■ *closed* □ *open* | | *(A) (B) = cam displacement (P) = positive opening point* | | *⊖ NC contact with positive opening operation* | |

## Characteristics

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

## References of complete switches with 1 Pg 11 cable entry

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

## Other cable entries

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

## Other contacts

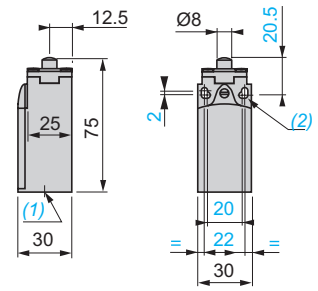
For complete switches with 2-pole contacts:
NO + NC make before break, slow break,
NO + NO simultaneous, slow break, please consult our Customer Care Centre.

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

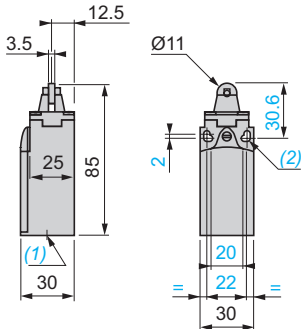
# Limit switches
## XC Basic range
Compact design, plastic, XCKN
Complete switches with 1 cable entry

## Dimensions

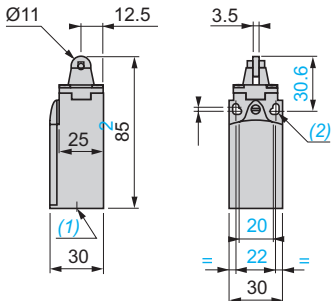
### XCKN2●10P20



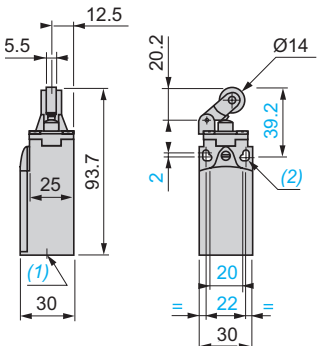

### XCKN2●02P20



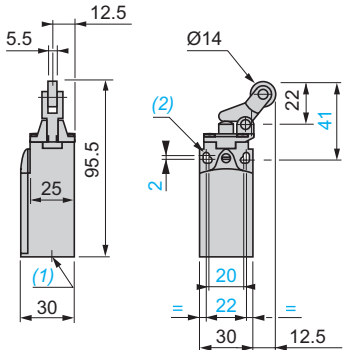

### XCKN2●03P20




### XCKN2●21P20

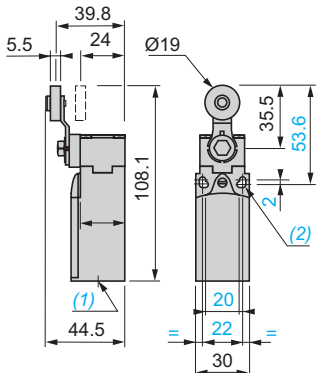



### XCKN2●27P20

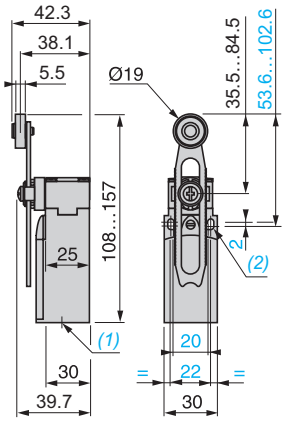



*(1) 1 tapped entry for ISOM20 x 1.5 or Pg 11 cable gland.*
*(2) Ø: 2 elongated holes Ø 4.3 x 6.3 on 22 mm centres, 2 holes Ø 4.3 on 20 mm centres.*

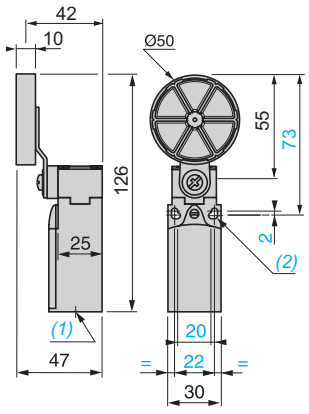
### XCKN2●18P20



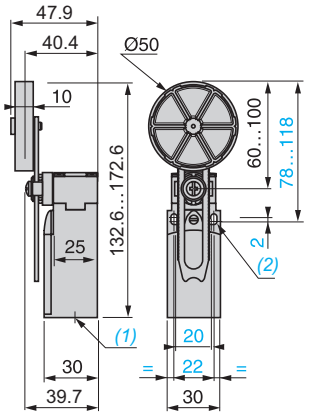

### XCKN2●45P20



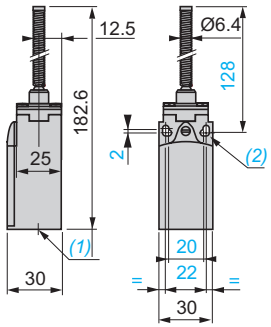

### XCKN2●39P20



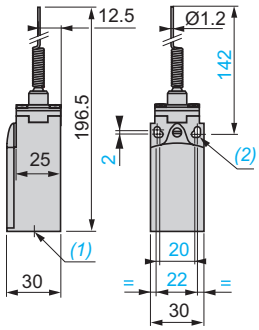

### XCKN2●49P20




### XCKN2●08P20




### XCKN2●06P20




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

# Inductive proximity sensors
XS range
Basic

| **Cylindrical, metal** | | **Increased range** *(1)* | | | |
|---|---|---|---|---|---|
| | | Flush mountable | | | |
| | |  | | | |
| **Sensing distance Sn** (mm) | | **2.5** | **4** | **8** | **15** |
| **Diameter** | | M8 | M12 | M18 | M30 |
| **Power supply** | | ⎓ 3-wire, 12…24 V | | | |
| **Function** | | NO or NC | | | |
| **Output** | | PNP or NPN | | | |
| **Length (mm)** for pre-cabled versions | | 42 | 49 | 53 | 57 |
| **Connection** | Pre-cabled (L = 2 m) *(2)* | ● | ● | ● | ● |
| | M8 connector, 3-pin | ● | – | – | – |
| | M12 connector, 4-pin | ● | ● | ● | ● |
| **Operating temperature** | | -25…+70 °C | | | |
| **Degree of protection** | | IP 65 and IP 67 | | | |
| **Type reference** | | **XS108BH●●●** | **XS112BH●●●** | **XS118BH●●●** | **XS130BH●●●** |
| **Pages** | | 29 | | | |

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

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

## Standard range

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

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

**XS range**
**Basic**
**increased range**

*Rugged, compact sensors suitable for a variety of applications*

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

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

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

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

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

#### Advantages of 3-wire technology
These sensors comprise 2 wires for the DC supply and a third wire for the output signal.
> PNP output: switching on the positive voltage load
> NPN output: switching on the negative voltage load

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

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

*(1) Please contact our Customer Care Centre.*

**+** Cost-effective sensors with no compromise on quality

# Inductive proximity sensors

## XS range

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

XS108BH●●L2

XS108BH●●M8

XS108BH●●M12

XS112BH●●L●

XS112BH●●M12

XS118BH●●L●

XS118BH●●M12

XS130BH●●L●

XS130BH●●M12

XSZB1●●

XZCPV●●

## Sensors, 3-wire ⎓ 12…24 V

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

## Fixing accessories

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

## Connection accessories *(1)*

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

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

# Inductive proximity sensors

## XS range

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

## Characteristics

| Sensor type | | | XS1●●BHP●L● XS1●●BHN●L● | XS1●●BHP●M● XS1●●BHN●M● |
|---|---|---|---|---|
| **Product certifications** | | | UL, CSA, CE | |
| **Connection** | Pre-cabled | | Cable length: 2 or 5 m, depending on model | – |
| | Connector | | – | M8 or M12 connector, depending on model |
| **Operating zone** *(1)* | Ø 8 | mm | **0…2** | |
| | Ø 12 | mm | **0…3.2** | |
| | Ø 18 | mm | **0…6.4** | |
| | Ø 30 | mm | **0…12** | |
| **Differential travel** | | % | 1...15 of effective sensing distance (Sr) | |
| **Degree of protection** | Conforming to IEC 60529 | | IP 65 and IP 67 | |
| **Storage temperature** | | °C | -40…+85 | |
| **Operating temperature** | | °C | -25…+70 | |
| **Materials** | Case | | Nickel plated brass | |
| | Cable | | PVC (number and c.s.a. of wires: 3 x 0.14 $mm^2$) | |
| **Vibration resistance** | Conforming to IEC 60068-2-6 | | 25 gn, amplitude ± 2 mm (f = 10 to 55 Hz) | |
| **Shock resistance** | Conforming to IEC 60068-2-27 | | 50 gn, duration 11 ms | |
| **Output state indication** | | | Yellow LED, on rear | Yellow LED, 2 viewing ports at 180° |
| **Rated supply voltage** | | V | ⎓ 12…24 with protection against reverse polarity | |
| **Voltage limits (including ripple)** | | V | ⎓ 10…36 | |
| **Switching capacity** | | mA | ≤ 200 with overload and short-circuit protection | |
| **Voltage drop, closed state** | | V | ≤ 2 | |
| **Current consumption, no-load** | | mA | ≤ 10 | |
| **Maximum switching frequency** | Ø 8 | Hz | 2500 | |
| | Ø 12 | Hz | 950 | |
| | Ø 18 | Hz | 700 | |
| | Ø 30 | Hz | 200 | |
| **Delays** | First-up | ms | ≤ 15 | |
| | Response | ms | ≤ 0.3 | |
| | Recovery | ms | ≤ 0.3 | |

## Connections

### Connector

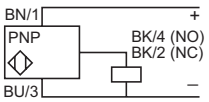
M8


M12

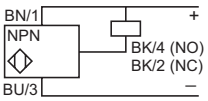

### Pre-cabled

BU: Blue
BN: Brown
BK: Black

### PNP



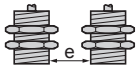

### NPN

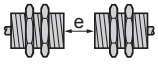


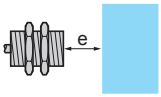

*For M8 connectors, NO and NC outputs on terminal 4*

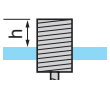
## Setting-up precautions

### Minimum mounting distances (mm)



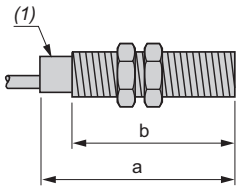




| Sensors | | Side by side | Face to face | Facing a metal object | Mounted in a metal support |
|---|---|---|---|---|---|
| **Ø 8** | **XS108BH** | e ≥ 5 | e ≥ 30 | e ≥ 8 | – |
| **Ø 12** | **XS112BH** | e ≥ 8 | e ≥ 50 | e ≥ 12 | – |
| **Ø 18** | **XS118BH** | e ≥ 16 | e ≥ 100 | e ≥ 25 | – |
| **Ø 30**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

*(1) See detection curves on next page.*

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

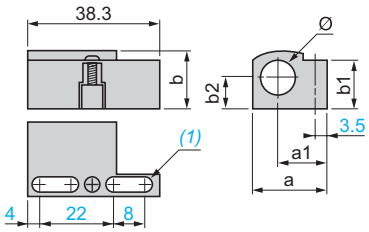
## Sensor dimensions XS1●●BH●●




*(1) LED*

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

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

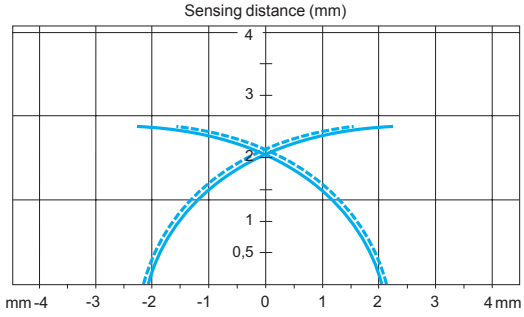



| | | a | a1 | b | b1 | b2 | Ø |
|---|---|---|---|---|---|---|---|
| Ø 8 | XSZB108 | 19.9 | 14.5 | 14 | 12.5 | 7.5 | 8 |
| Ø 12 | XSZB112 | 21.9 | 14.5 | 16 | 15.5 | 8.5 | 12 |
| Ø 18 | XSZB118 | 26 | 15.7 | 22.3 | 20.1 | 11.5 | 18 |
| Ø 30 | XSZB130 | 39 | 21.7 | 35.5 | 31 | 18.5 | 30 |

*(1) 2 elongated holes Ø 4 x 8 mm*

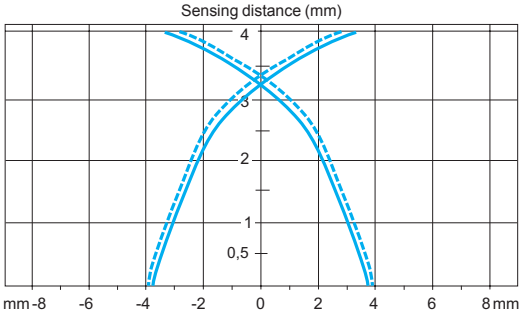
## Detection curves

### Sensors Ø 8



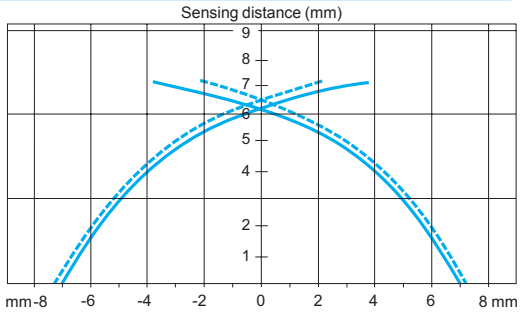

*Standard metal target (mm): 8 x 8 x 1*
*Operating zone (mm): 0…2*

### Sensors Ø 12



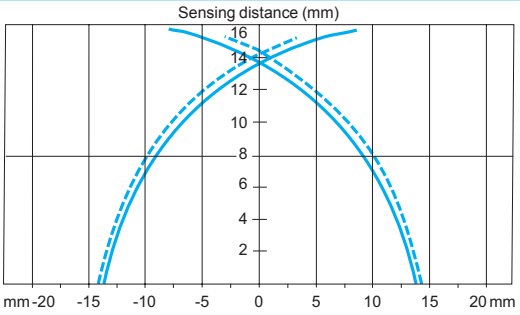

*Standard metal target (mm): 12 x 12 x 1*
*Operating zone (mm): 0…3.2*

### Sensors Ø 18




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

### Sensors Ø 30




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

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

# Inductive proximity sensors

## XS range, general purpose

Basic, cylindrical, metal, flush and non flush mountable

Three-wire DC, solid-state output

XS108BL●●L●

XS108BL●●M8

XS108BL●●M12

XS208BL●●L●

XS208BL●●M8

XS208BL●●M12

XS112BL●●L●

XS112BL●●M12

XS212BL●●L●

XS212BL●●M12

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

# Inductive proximity sensors

## XS range, general purpose

Basic, cylindrical, metal, flush and non flush mountable

Three-wire DC, solid-state output

*XS118BL●●L●*

*XS118BL●●M12*

*XS218BL●●L●*

*XS218BL●●M12*

*XS130BL●●L●*

*XS130BL●●M12*

*XS230BL●●L●*

*XS230BL●●M12*

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

# Inductive proximity sensors

## XS range, general purpose

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

*XSZB1●●*

*XZCPV1141L●*

### Fixing accessories *(1)*

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

### Cabling accessories *(2)*

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

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

# Inductive proximity sensors

## XS range, general purpose

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

## Characteristics

| Sensor type | | | XS1●●BLP●L● XS1●●BLN●L● | XS1●●BLP●M● XS1●●BLN●M● | XS2●●BLP●L XS2●●BLN●L | XS2●●BLP●M● XS2●●BLN●M● |
|---|---|---|---|---|---|---|
| **Product certifications** | | | UL, CSA, CE | | | |
| **Connection** | Pre-cabled | | Length 2, 3 or 5 m, depending on model | – | Length 2, 5 or 7 m, depending on model | – |
| | Connector | | – | M8 on Ø 8<br>M12 on Ø 8, Ø 12, Ø 18 and Ø 30 | – | M8 on Ø 8<br>M12 on Ø 8, Ø 12, Ø 18 and Ø 30 |
| **Operating zone** *(1)* | Ø 8 | mm | **0…1.2** | | **0…2** | |
| | Ø 12 | mm | **0…1.6** | | **0…3.2** | |
| | Ø 18 | mm | **0…4** | | **0…6.4** | |
| | Ø 30 | mm | **0…8** | | **0…12** | |
| **Differential travel** | | % | 1...15 of effective sensing distance (Sr) | | | |
| **Degree of protection** | Conforming to IEC 60529 | | IP 65 and IP 67 | | | |
| **Storage temperature** | | °C | - 40…+ 85 | | | |
| **Operating temperature** | | °C | - 25…+ 70 | | | |
| **Materials** | Case | | Nickel plated brass | | | |
| | Cable | | PVC 3 x 0.14 mm² except Ø 8: 3 x 0.11 mm² | – | PVC 3 x 0.14 mm² except Ø 8: 3 x 0.11 mm² | – |
| **Vibration resistance** | Conforming to IEC 60068-2-6 | | 25 gn, amplitude ± 2 mm (f = 10 to 55 Hz) | | | |
| **Shock resistance** | Conforming to IEC 60068-2-27 | | 50 gn, duration 11 ms | | | |
| **Output state indication** | | | Yellow LED, on rear | Yellow LED: 2 viewing ports at 180° | Yellow LED, on rear | Yellow LED: 2 viewing ports at 180° |
| **Rated supply voltage** | | V | ⎓ 12…24 with protection against reverse polarity | | | |
| **Voltage limits (including ripple)** | | V | ⎓ 10…36 | | | |
| **Switching capacity** | | mA | ≤ 200 with overload and short-circuit protection | | | |
| **Voltage drop, closed state** | | V | ≤ 2 | | | |
| **Current consumption, no-load** | | mA | ≤ 10 | | | |
| **Residual current, open state** | | mA | – | | | |
| **Maximum switching frequency** | Ø 8 | Hz | 2500 | | 2500 | |
| | Ø 12 | Hz | 2500 | | 1200 | |
| | Ø 18 | Hz | 1200 | | 500 | |
| | Ø 30 | Hz | 500 | | 300 | |
| **Delays** | First-up | ms | ≤ 15 | | ≤ 15 | |
| | Response Ø 8 | ms | ≤ 0.3 | | ≤ 0.3 | |
| | Response Ø 12 | ms | ≤ 0.1 | | ≤ 0.1 | |
| | Response Ø 18 | ms | ≤ 0.1 | | ≤ 0.1 | |
| | Response Ø 30 | ms | ≤ 0.1 | | ≤ 0.2 | |
| | Recovery Ø 8 | ms | ≤ 0.3 | | ≤ 0.3 | |
| | Recovery Ø 12 | ms | ≤ 0.15 | | ≤ 0.4 | |
| | Recovery Ø 18 | ms | ≤ 0.3 | | ≤ 1 | |
| | Recovery Ø 30 | ms | ≤ 1 | | ≤ 1.4 | |

## Wiring schemes

**Connector**

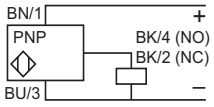
**M8**


**M12**

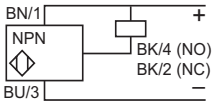

**Pre-cabled**

BU: Blue
BN: Brown
BK: Black

**PNP**




**NPN**




*For M8 connectors, NO and NC outputs on terminal 4*

*(1) Detection curves, see page 37.*

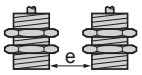
# Inductive proximity sensors

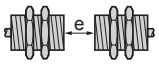
## XS range, general purpose

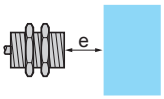
Basic, cylindrical, metal, flush and non flush mountable
Three-wire DC, solid-state output

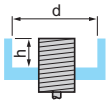
## Setting-up

### Minimum mounting distances (mm)



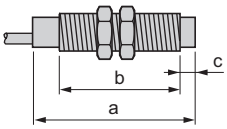




| Sensors | | Side by side | Face to face | Facing a metal object | Mounted in a metal support |
|---|---|---|---|---|---|
| **Ø 8 flush mountable** | **XS108BL** | e ≥ 3 | e ≥ 18 | e ≥ 4,5 | d ≥ 8 h ≥ 0 |
| **Ø 8 non flush mountable** | **XS208BL** | e ≥ 10 | e ≥ 30 | e ≥ 7,5 | d ≥ 24 h ≥ 5 |
| **Ø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

## Dimensions




### Flush mountable in metal

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

### Non flush mountable in metal

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

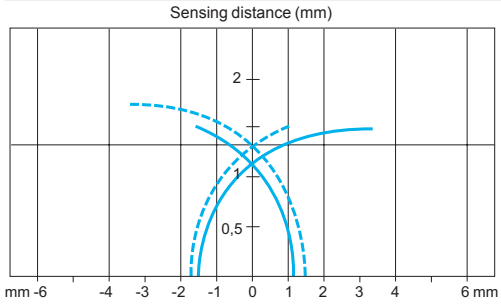
# Inductive proximity sensors

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

## Detection curves

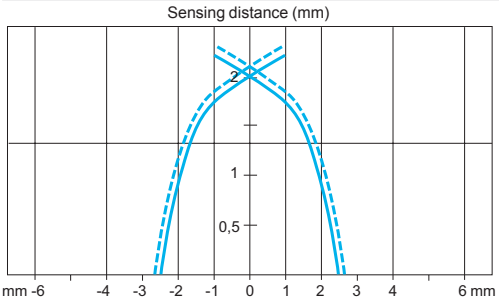
### Ø 8 sensors

**Flush mountable in metal**




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

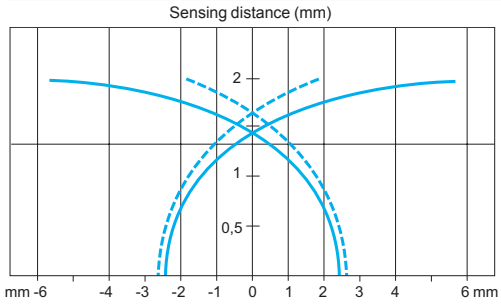
**Non flush mountable in metal**




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

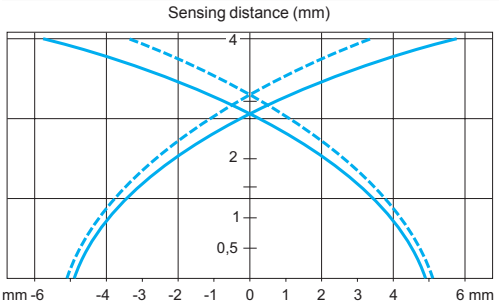
### Ø 12 sensors

**Flush mountable in metal**




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

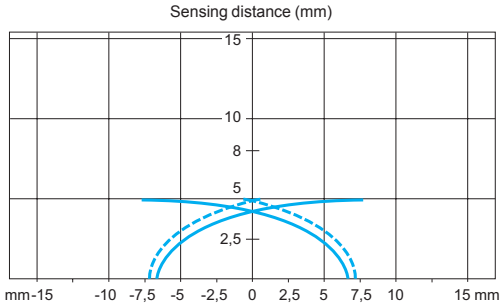
**Non flush mountable in metal**




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

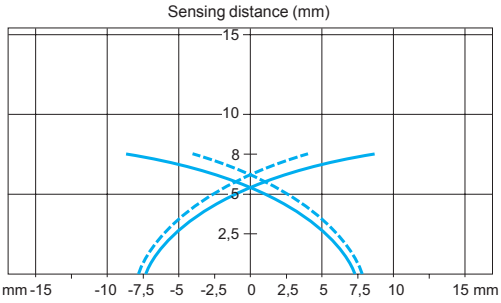
### Ø 18 sensors

**Flush mountable in metal**




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

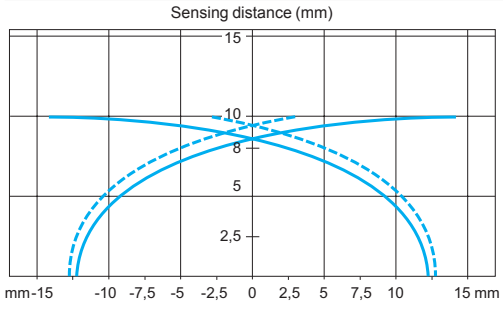
**Non flush mountable in metal**




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

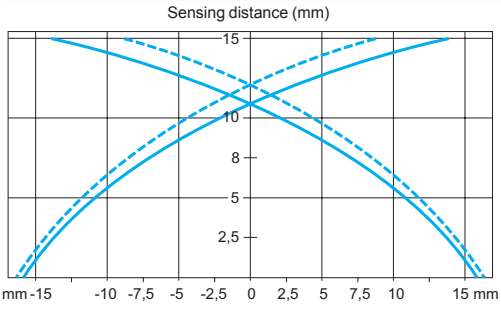
### Ø 30 sensors

**Flush mountable in metal**




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

**Non flush mountable in metal**



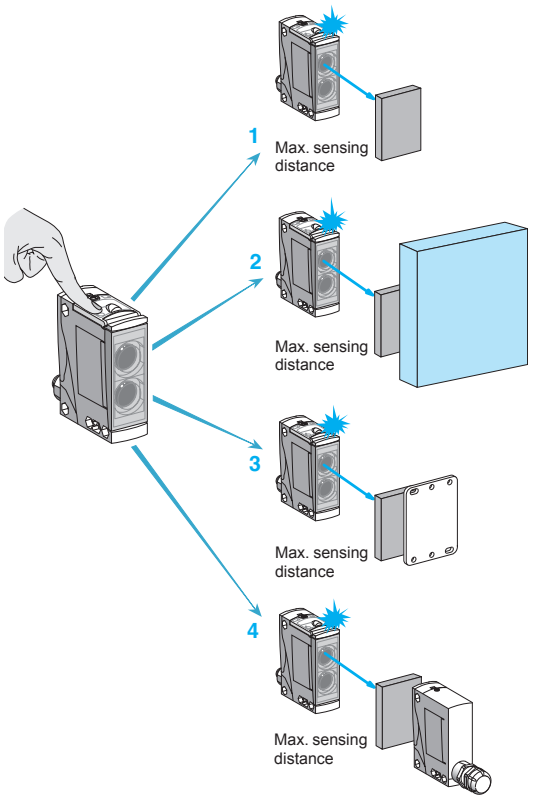

*Standard steel target (mm): 45 x 45 x 1*
*Operating zone (mm): 0…12*

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

# Photo-electric sensors

## XU range

**Multimode**: Simplicity through innovation



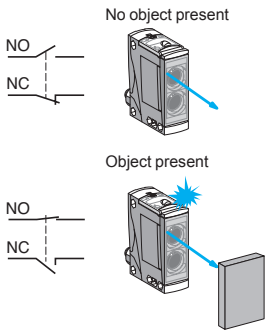

## Principle

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

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

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

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

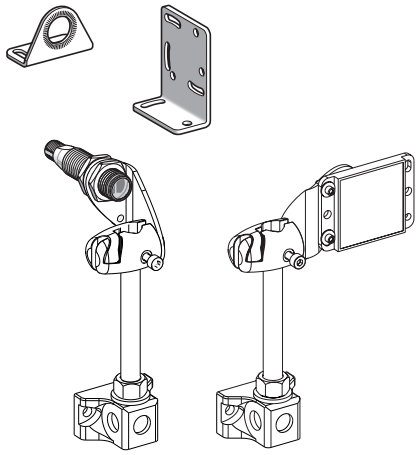



## Straightforward NO or NC output

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

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

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



## Fixing accessories

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

# Photo-electric sensors

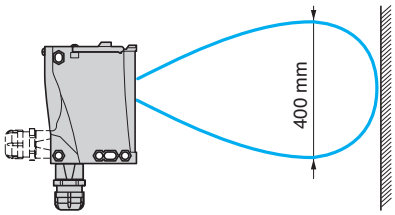
## XU range

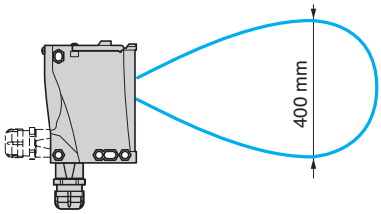
**Multimode**: Simplicity through innovation

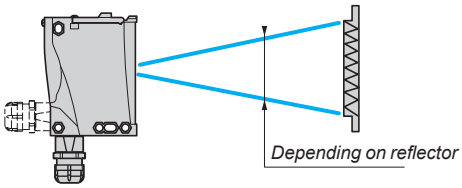
## Design

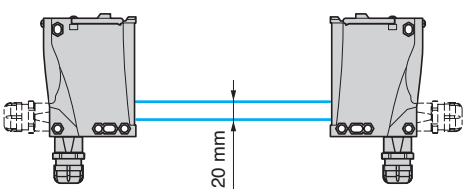
| | | Cylindrical 18 | Miniature |
|---|---|---|---|
| | |  |  |
| **Dimensions (w x h x d) in mm** | | M18 x 64 | 12 x 34 x 20 |
| **Maximum sensing distance in m** | Without accessory with background suppression | 0.12 | 0.10 |
| | Without accessory | 0.4 | 0.55 |
| | With polarised reflector | 3 |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

## Sensing distances (see table above)




### Sensing distance without accessory with background suppression

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

### Sensing distance without accessory

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

### Sensing distance with polarised reflector

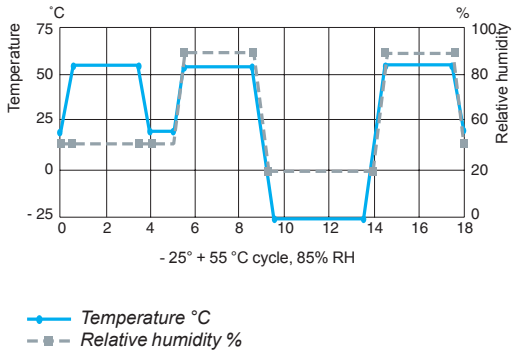
- By installing a reflector opposite, the same multimode sensor detects objects irrespective of their shininess and colour.
- The size of the reflector must be smaller than that of the object to be detected.
- The larger the area of the reflector the longer the sensing distance.

### Sensing distance with thru-beam transmitter accessory

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

# Photo-electric sensors
XU range

## Standards and certifications
## Parameters related to the environment




### Recommendation

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

### Quality control

**Our photo-electric sensors are subject to special precautions in order to guarantee their reliability in the most arduous industrial environments.**

■ **Qualification**

□ The product characteristics stated in this catalogue are subject to a **qualification procedure** carried out in our laboratories.

□ In particular, the products are subjected to **climatic cycle** tests for 3000 hours whilst powered-up to verify their ability to maintain their characteristics over time.

■ **Production**

□ The electrical characteristics and sensing distances at both ambient temperature and extreme temperatures are 100% checked.

□ Products are randomly selected during the course of production and subjected to **monitoring tests** relating to all their characteristics.

■ **Customer returns**

□ If, in spite of all these precautions, defective products are returned to us, they are subject to **systematic analysis** and **corrective actions** are implemented to eliminate the risks of the fault recurring.

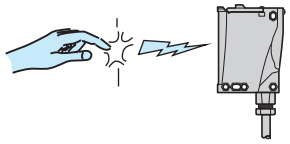
### Immunity to ambient light

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

### Resistance to electromagnetic interference

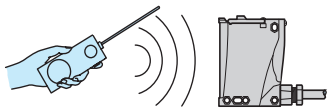
**The photo-electric sensors are tested in accordance with the recommendations of the standard IEC 60947-5-2**

■ Electrostatic discharges



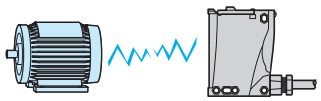
**IEC/EN 61000-4-2**
~ 15 kV version, level 4
⎓ 8 kV version, level 3

■ Radiated electromagnetic fields (electromagnetic waves)



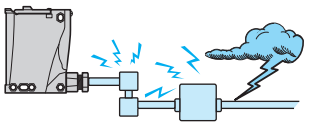
**IEC/EN 61000-4-3**
10 V/metre, level 3

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



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

■ Impulse voltages, lightning



**IEC 60947-5-2**
~ 2.5 kV version
⎓ 1 kV version

### Mechanical shock resistance

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

### Vibration resistance

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

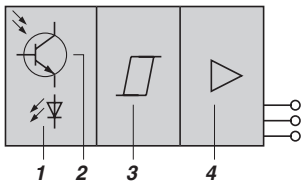
### Resistance to chemicals in the environment

■ Owing to the very wide range of chemicals encountered in industry, it is very difficult to give general guidelines common to all sensors.

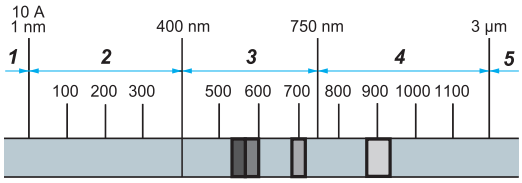
■ To ensure lasting efficient operation, it is essential that any chemicals coming into contact with the sensors will not affect their casing and, in doing so, prevent their reliable operation (please refer to the characteristics pages for the various sensors).
In all cases, the materials selected (see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

# Photo-electric sensors
XU range

## Principle of optical detection




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




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

## Composition of a photo-electric sensor

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

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

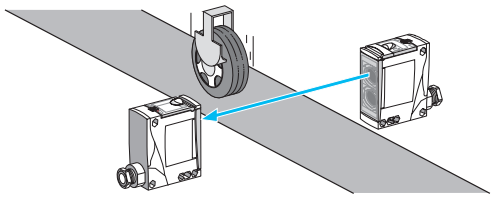
## Light spectrum

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

## Modulation

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

## Detection systems

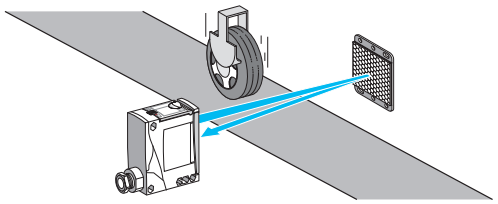


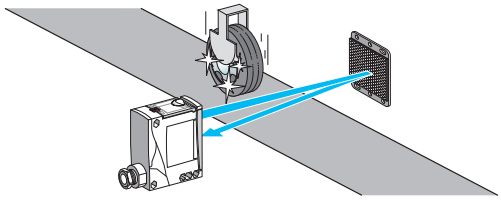
### Thru-beam system or multimode with thru-beam accessory

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

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

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





### Polarised reflex system or multimode with reflector accessory

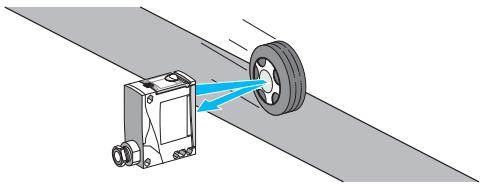
■ **Advantages**
□ Medium sensing distance (up to 15 m).
□ Precise detection.
□ Only one unit to be wired.
□ Detection not affected by colour of object.
□ Visible red beam transmission.
■ **Drawbacks**
□ Precise alignment required.
□ The object to be detected must be opaque and larger than the reflector.

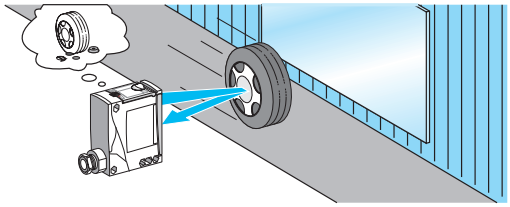
■ **Operating precautions**
□ When several sensors are used, they must be aligned in such a manner that no sensor is disrupted by another sensor.
□ For short distance detection use a reflector with large trihedrons, type XUZC24.
□ For long distance detection use a reflector XUZC50 or XUZC80.
□ To increase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

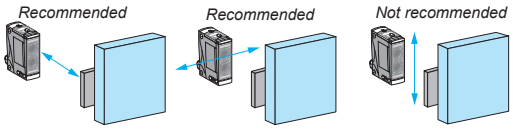
**Advantages of multimode sensor with reflector accessory**
■ Easy alignment
□ 3 LEDs providing setting-up assistance.
□ The anti-interference function enables 2 sensors to be used without specific alignment precautions.
■ Semi-transparent objects can be detected by using the teach mode function.

# Photo-electric sensors
XU range

## Detection systems (continued)

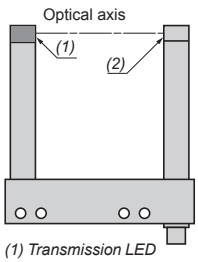




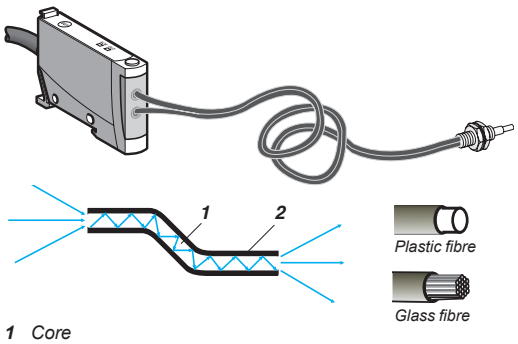



Positioning recommendations for sensor with background suppression

## 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.

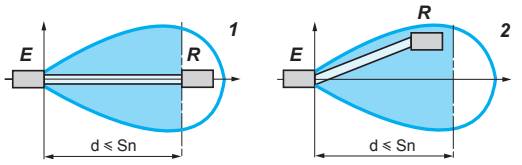
■ Advantages: fibres can be cut to the required length.

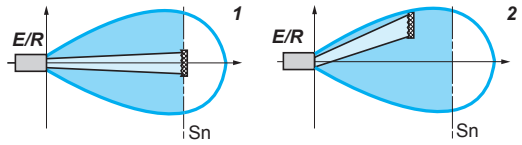
**Glass fibres**
□ The core of the fibre is silica. For maximum flexibility, each fibre comprises numerous strands that are approximately 50 µ in diameter.
□ Fibres are used with amplifiers transmitting infrared or red light.
□ Minimum bend radius:
- 10 mm with plastic sheath,
- 90 mm with stainless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

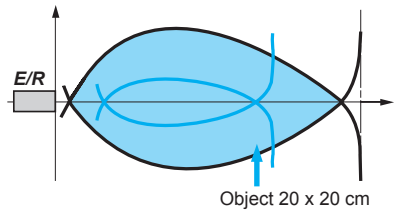
■ **Advantages**
□ Fibres suitable for use at high temperatures (250 °C).
□ Fibres with stainless steel sheath provide protection against mechanical impact and crushing.

# Photo-electric sensors
XU range

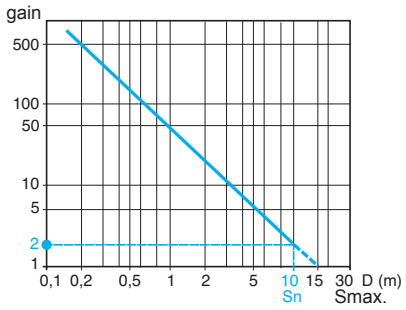
## Detection curves



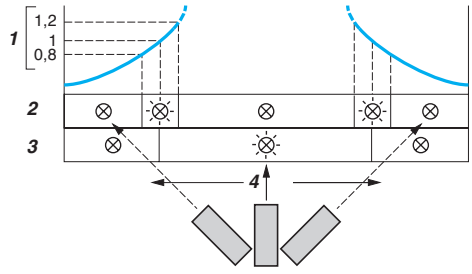




## Excess gain




## Optical alignment aid




## Detection distance using reflector

## 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*

## Operating margin

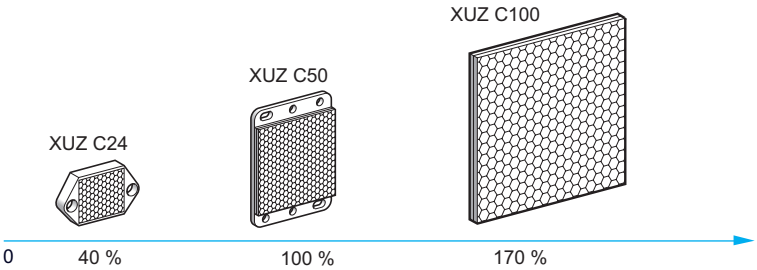
To ensure correct operation of a sensor in spite of environmental constraints, the sensors feature an operating margin.
This margin can be expressed in terms of excess gain, which is the ratio:
Excess gain = Signal level received/Signal required for switching.

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

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

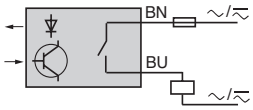
In extreme conditions, refer to the following setting-up recommendations:
- clean environment: work at nominal sensing distance Sn,
- slightly polluted environment: work at sensing distance Sn/2,
- moderately polluted environment: work at sensing distance Sn/4,
- heavily polluted environment: preferably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

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 depending on reflector size.

## Outputs




### 2-wire technique ∿ or ⎓

■ **Specific aspects**

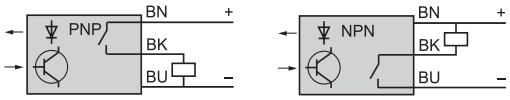
These sensors are wired in series with the load to be switched.
As a consequence, they are subject to:
□ A residual current in the open state (current flowing through the sensor in the “open” state),
□ A voltage drop in the closed state (voltage drop across the sensor’s terminals in the “closed” state).

■ **Advantages**

□ Only 2 wires to be connected. They can be wired in series in the same way as mechanical limit switches.
□ For use on 2-wire ⎓, they can be connected to either positive (PNP) or negative (NPN) logic PLC inputs.
□ No risk of incorrect connections.

■ **Operating precautions**

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



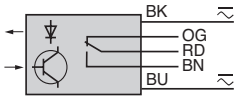

### 3-wire technique ⎓

■ **Specific aspects**

□ These sensors comprise 2 wires for the DC supply and a 3rd wire for the output signal.
□ PNP type: switching the positive side to the load.
□ NPN type: switching the negative side to the load.

■ **Advantages**

□ No residual current, low voltage drop.




### 5-wire technique ∿ or ⎓, relay output

■ **Specific aspects**

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

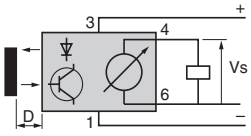
■ **Advantages**

□ ∿ or ⎓ supply with a wide voltage range.
□ High breaking capacity (approximately 3 A).
□ Direct control of a simple automation system.
□ Availability of a NC (normally closed) contact and a NO (normally open) contact.
□ The sensor/relay contact galvanic isolation is 1500 to 2500 V, depending on the model.

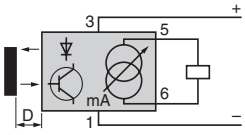
■ **Operating precautions**

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

***1***




***2***




### 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**

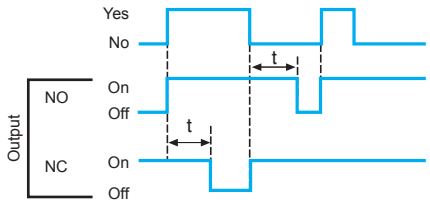
□ Availability of a physical item of data proportional to the distance between the sensor and the object to be detected.

■ **Operating precautions**

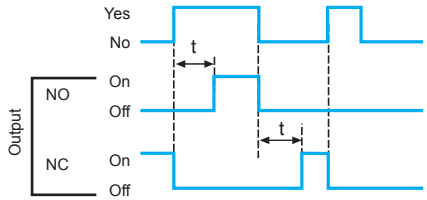
□ Refer to the detailed descriptions of the sensor to assess the relative influence of the colour of the object to be detected.

***1*** *Voltage output*
***2*** *Current output*

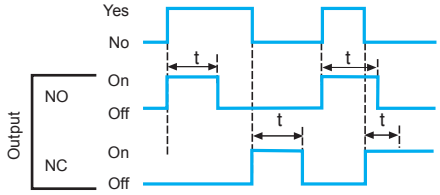
## Outputs *(continued)*




**Time delay on beam break**




**Monostable**




### Output functions

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

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

■ **Advantages**

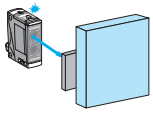
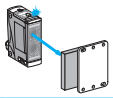
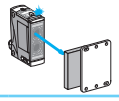
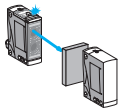
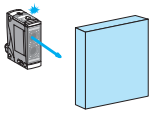
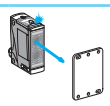
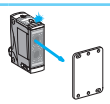
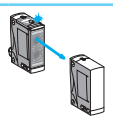
□ NO output (or NO programming for multimode sensors): irrespective of the detection mode, the output of the sensor is activated when the object to be detected is present.

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

■ **Advantages of multimode sensors**

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

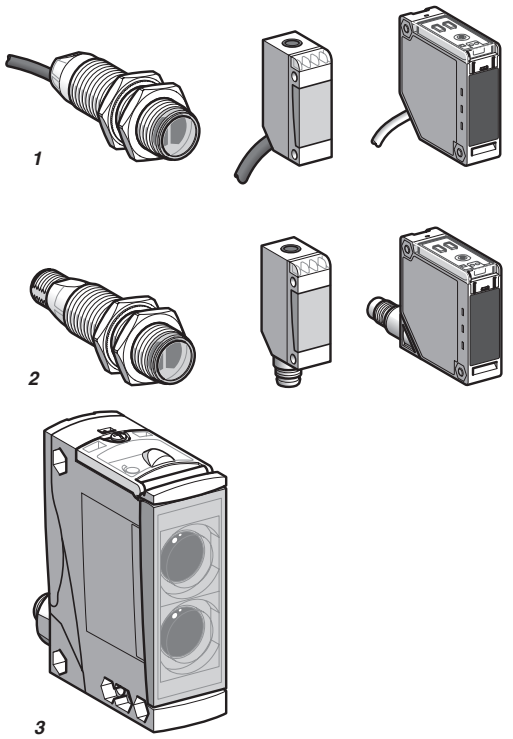
□ By pressing the teach button, the output can programmed to NC, i.e. the output of the sensor is activated when the object to be detected is not present.

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

### Output signal time delay

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

## 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**

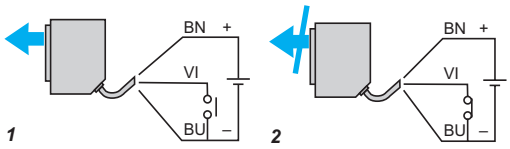
□ Length of cable: no limitation up to 200 m or up to a line capacitance of < 0.1 µF (characteristics of sensors remain unaffected). In this case, it is important to take into account the voltage drop on the line.

□ Separation of control and power circuit wiring: the sensors are immune to electrical interference encountered in normal industrial conditions. Where extreme conditions of electrical "noise" could occur (motors etc.), it is advisable to protect against transients in the normal way:
- suppress interference at source and filter the power supply,
- separate power and control wiring from each other,
- ensure the HF equipotentiality of the site,
- limit the length of cable,
- connect the sensor with supply switched off.

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

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

## Complementary functions




### Diagnostics, beam break test

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

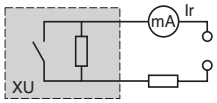
***1*** *Beam made*
***2*** *Beam broken*
VI: test input for breaking transmitted beam.

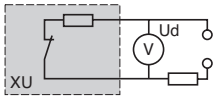
### Verification of correct operation

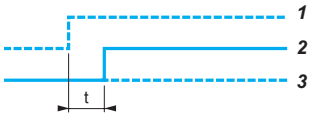
In the event of dirty lenses (reflectors), an excessively polluted atmosphere or a slight disturbance of optical alignment (mechanical impact on support), the level of light energy received by the sensor will decrease until it ceases to operate.
To overcome this problem, all our products incorporate: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

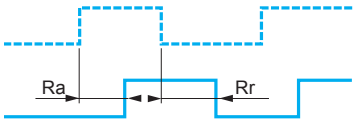
# Photo-electric sensors
XU range

## Specific aspects of electronic sensors




## Terminology

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

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

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

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

## Power supplies

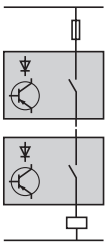
**Sensors for AC circuits (~ and ≂ models )**
Check that the voltage limits of the sensor are compatible with the nominal voltage of the AC supply used.

**Sensors for DC circuits (⎓ models)**
■ DC source: check that the voltage limits of the sensor and the acceptable level of ripple are compatible with the supply used.
■ AC source (comprising transformer, rectifier, smoothing capacitor): the supply voltage must be within the operating limits specified for the sensor.
□ Where the voltage is derived from a single-phase AC supply, the voltage must be rectified and smoothed to ensure that:
- the peak voltage of the DC supply is lower than the maximum voltage rating of the sensor. Peak voltage = nominal voltage x $\sqrt{2}$
- the minimum voltage of the supply is greater than the minimum voltage rating of the sensor, given that:

$\Delta V = (I \times t)/C$
$\Delta V$ = max. ripple: 10% (V),
I = anticipated load current (mA),
t = period of 1 cycle (10 ms full-wave rectified for a 50 Hz supply frequency),
C = capacitance (µF).
□ As a general rule, use a transformer with a lower secondary voltage (Ue) than the required DC voltage (U).

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

## Setting-up



### Connection in series

**2-wire type sensors**

■ The following points should be taken into account:

□ Series wiring is only possible using sensors with wide voltage limits.

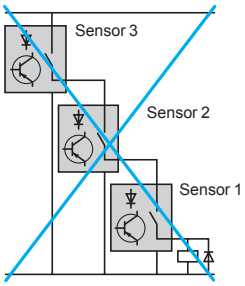
Based on the assumption that each sensor has the same residual current value, each sensor, in the open state, will share the supply voltage, i.e.

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

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

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

□ When in the closed state, a small voltage drop is present across each sensor. The resultant loss of voltage at the load will be the sum of the individual voltage drops and therefore, the load voltage should be selected accordingly.




**3-wire type sensors**

**This connection method is not recommended.**

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

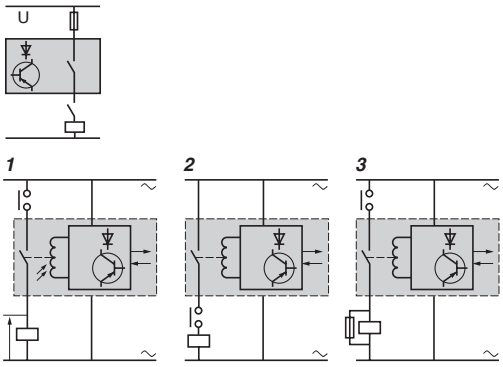
■ The following points should be taken into account:

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

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

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

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




**Wiring sensors to devices with mechanical contact**

**2 and 3-wire type sensors**

■ The following points should be taken into account:

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

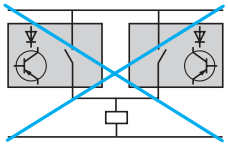
□ When the contact closes, the sensor does not operate until a certain time (t) has elapsed (corresponding to the first-up delay).

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

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

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

### Connection in parallel



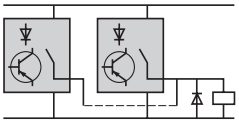
**2-wire type sensors**

**This connection method is not recommended.**

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

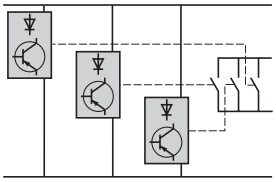
■ This configuration is only permissible where the sensors will be working alternately.

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



**3-wire type sensors**

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



**Wiring sensors to devices with mechanical contact**

**2 and 3-wire type sensors**

■ No specific restrictions.

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

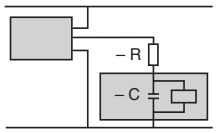
□ The sensor/relay contact galvanic isolation is 1500 to 2500 V, depending on the model.

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

## Setting-up precautions (continued)

### AC supply

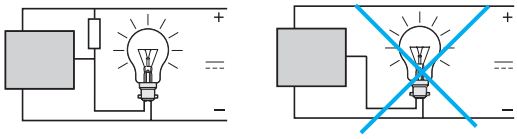
■ **2-wire type sensors cannot be connected directly to an AC supply.**
□ This would result in immediate destruction of the sensor and considerable danger to the user.
□ An appropriate load (refer to the instruction sheet supplied with the sensor) must always be connected in series with the sensor.




### Capacitive load (C > 0.1 µF)

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

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




### Load comprising an incandescent lamp

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

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

# Photo-electric sensors
XU range

## Fast trouble shooting guide

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

# Photo-electric sensors
XU range

## Fast troubleshooting guide *(continued)*

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

***Notes:***

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

# Photo-electric sensors

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

XU_CP21047

*XUM2A●XBL2*

XU_CP21048

*XUM2A●XBM8*

### Thru-beam system with adjustable sensitivity

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

XU_CP21039

*XUZDVM●●*

XU_CP21040

*XUZDHM●●*

XU_CP21041

*XUZDRM●●*

### Accessories for thru-beam system

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

### Fixing accessories

See page 53.

### Cabling accessories

See *"Cabling accessories XZ" catalogue.*

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

# Photo-electric sensors

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

XU_CP21005

*XUM9A●XBL2*

XU_CP21004

*XUM9A●XBM8*

### Polarised reflex system with adjustable sensitivity

**Sensors**

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

XUZC50_30

*XUZC50*

**Reflectors**

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

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

XU_511_PFJR18005

*XUZC39*

XU_511_PFJR18019

*XUZC60S11*

### Background suppression system with adjustable sensitivity

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

XU_CP21042

*XUM8A●XBL2*

XU_CP20113

*XUM8A●XBM8*

### 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 |
|---|---|---|---|---|---|
| **Diffuse short range** | | | | | |
| **0.25 m/0.17 m** | Light ON (NO)/ Dark ON (NC) configuration by potentiometer | PNP | Pre-cabled (L = 2 m) | **XUM4APXBL2** | 0.063 |
| | | | M8 connector (4-pin) | **XUM4APXBM8** | 0.010 |
| | | NPN | Pre-cabled (L = 2 m) | **XUM4ANXBL2** | 0.063 |
| | | | M8 connector (4-pin) | **XUM4ANXBM8** | 0.010 |
| **Diffuse medium range** | | | | | |
| **1.1 m/0.8 m** | Light ON (NO)/ Dark ON (NC) configuration by potentiometer | PNP | Pre-cabled (L = 2 m) | **XUM6APXBL2** | 0.063 |
| | | | M8 connector (4-pin) | **XUM6APXBM8** | 0.010 |
| | | NPN | Pre-cabled (L = 2 m) | **XUM6ANXBL2** | 0.063 |
| | | | M8 connector (4-pin) | **XUM6ANXBM8** | 0.010 |
| **Diffuse long range** | | | | | |
| **1.9 m/1.5 m** | Light ON (NO)/ Dark ON (NC) configuration by potentiometer | PNP | Pre-cabled (L = 2 m) | **XUM5APXBL2** | 0.063 |
| | | | M8 connector (4-pin) | **XUM5APXBM8** | 0.010 |
| | | NPN | Pre-cabled (L = 2 m) | **XUM5ANXBL2** | 0.063 |
| | | | M8 connector (4-pin) | **XUM5ANXBM8** | 0.010 |

# Photo-electric sensors

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

XU_511_CPSCT16014

*XUZASM04*

XU_511_CPSCT16017

*XUZASM03*

XU_511_CPSCT16016

*XUZASM02*

XU_511_CPODA2016062

*XUZA50*

XU_CP21045

*XUZASM05*

## Accessories for all XUM miniature sensors

### Fixing accessories

| Description | For use with sensors | Reference | Weight kg |
|---|---|---|---|
| Rear mounting bracket<br>Supplied with 2 M3 screws | XUM●A●XBL2<br>XUM●A●XBM8 | **XUZASM04** | 0.030 |
| Wrap around vertical mounting bracket, for pre-cabled sensors<br>Supplied with 2 M3 screws | XUM●A●XBL2 | **XUZASM03** | 0.062 |
| Wrap around horizontal mounting bracket, for pre-cabled sensors<br>Supplied with 2 M3 screws | XUM●A●XBL2 | **XUZASM02** | 0.030 |
| Metal fixing bracket<br>Supplied with 2 M3 screws | XUM●A●XBL2<br>XUM●A●XBM8 | **XUZA50** | 0.025 |

### Setting-up accessory

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

### Cabling accessories

See *"Cabling accessories XZ" catalogue.*

*(1) The air tube is not provided.*

# Photo-electric sensors

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

## Characteristics

| Sensor type | | | | XUM●A●XBM8 | XUM●A●XBL2 |
|---|---|---|---|---|---|
| **Product certifications** | | | | CE, UKCA, cULus<br>EAC, RCM *(pending)* | |
| **Connection** | Connector | | | M8 | – |
| | Pre-cabled | | | – | Length: 2 m |
| **Nominal sensing distance Sn** | Système barrage | XUM2 | **m** | 30 (with excess gain = 1)<br>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)<br>0.05...6.7 (with excess gain = 2) | |
| | Background suppression system | XUM8 | **mm** | 4 mm...300 mm: White paper or object. Sn (90%)<br>5 mm...265 mm: Grey object. Sn (18%)<br>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)<br>0.17 (with excess gain = 2) | |
| | | XUM5 | **m** | 1.9 (with excess gain = 1)<br>1.5 (with excess gain = 2) | |
| | | XUM6 | **m** | 1.1 (with excess gain = 1)<br>0.8 (with excess gain = 2) | |
| **Hysteresis** | | | | 2 % < H < 20 % at Sn | |
| **Type of transmission** | Red | | | Thru-beam system XUM2<br>Polarised reflex system XUM9<br>Background suppression system XUM8<br>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<br>Acceleration: 9 gn | |
| **Shock resistance** | Conforming to IEC 60068-2-27 | | | Peak acceleration: 100 gn<br>Duration of the pulse: 11 ms | |
| **Indicator lights** | Output state | | | Yellow LED | |
| | Stability | | | Green LED (XUM4, XUM5, XUM6, XUM8, XUM9) | |
| | Power on | | | Green LED (XUM2) | |
| **Rated supply voltage** | | | **V** | ⎓ 12...24 with protection against reverse polarity | |
| **Voltage limits (including ripple)** | | | **V** | ⎓ 12...24 | |
| **Current consumption, no-load** | | | **mA** | < 20 max. | |
| **Switching capacity** | | | **mA** | 100 | |
| **Voltage drop, closed state** | | | **V** | ⩽ 2 | |
| **Maximum switching frequency** | | | **Hz** | 1000 | |
| **Delays** | First-up | | **ms** | < 100 | |
| | Response | | **ms** | 0.5 | |
| | Recovery | | **ms** | 0.5 | |

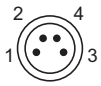
# Photo-electric sensors

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

## Wiring schemes

### Thru-beam system

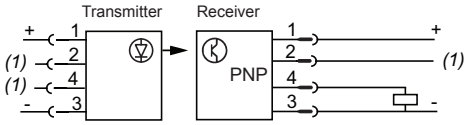
#### M8 connector - 4 pins




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

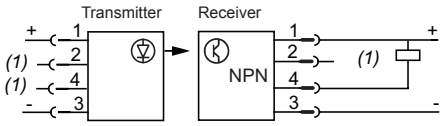
**PNP**

**XUM2APXBM8**




**NPN**

**XUM2ANXBM8**

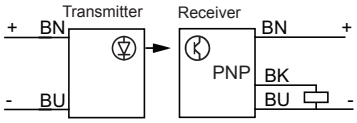



#### Pre-cabled - 3 wires

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

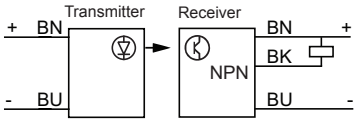
**PNP**

**XUM2APXBL2**



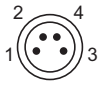

**NPN**

**XUM2ANXBL2**




### Polarised reflex, background suppression and diffuse systems

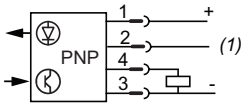
#### M8 connector - 4 pins




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

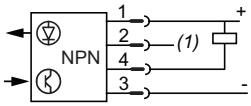
**PNP**

**XUM●APXBM8**




**NPN**

**XUM●ANXBM8**

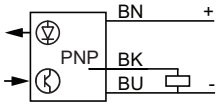



#### Pre-cabled - 3 wires

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

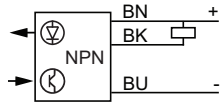
**PNP**

**XUM●APXBL2**




**NPN**

**XUM●ANXBL2**




*(1): Not connected.*

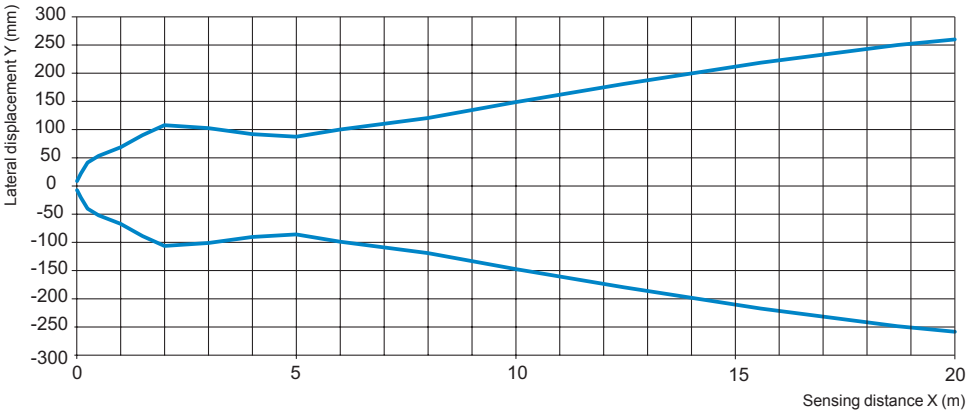
# Photo-electric sensors

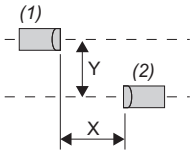
XUM, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

## Detection curves

### Thru-beam system: XUM2

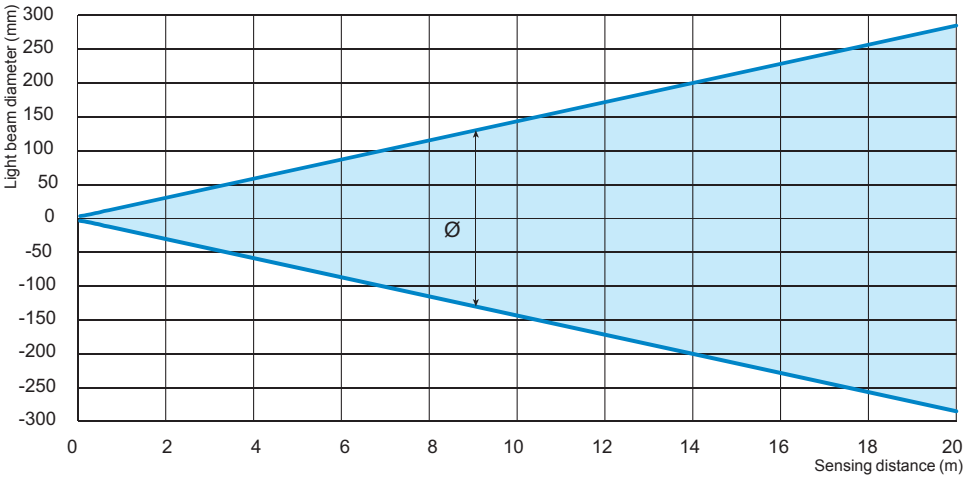
#### Lateral displacement



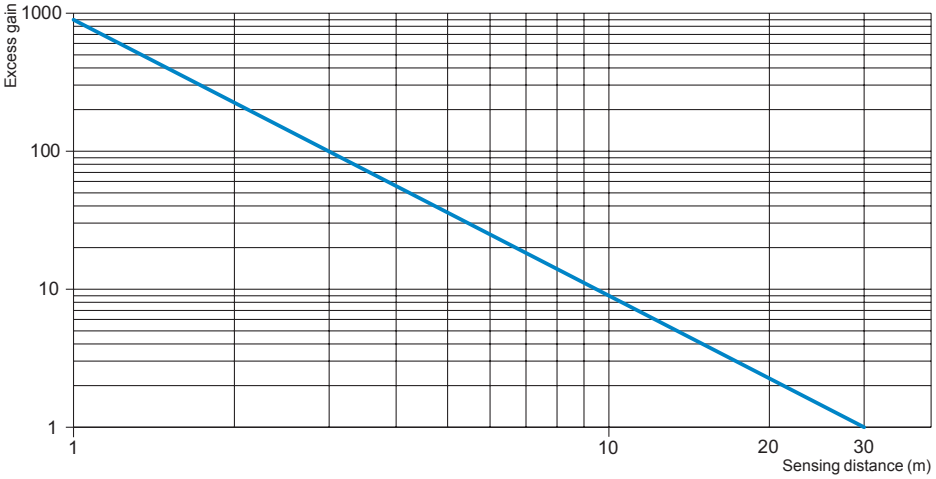




*(1): Transmitter*
*(2): Receiver*

#### Light beam diameter




#### Excess gain



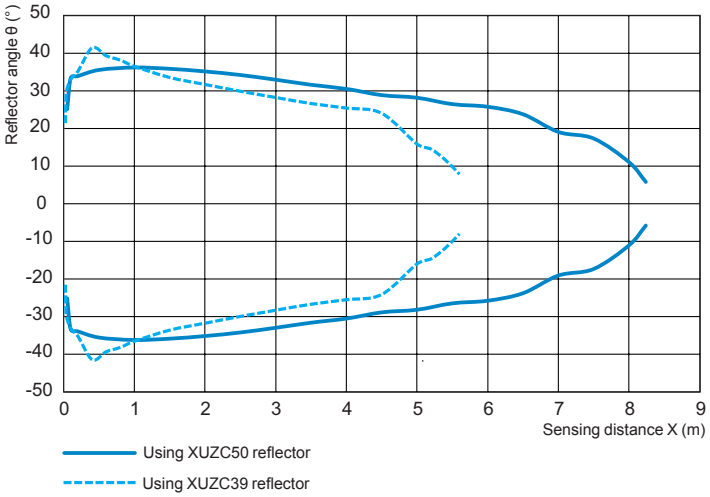
# Photo-electric sensors

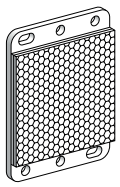
XUM, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

## Detection curves

### Polarised reflex system: XUM9

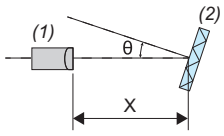
#### Reflector angle



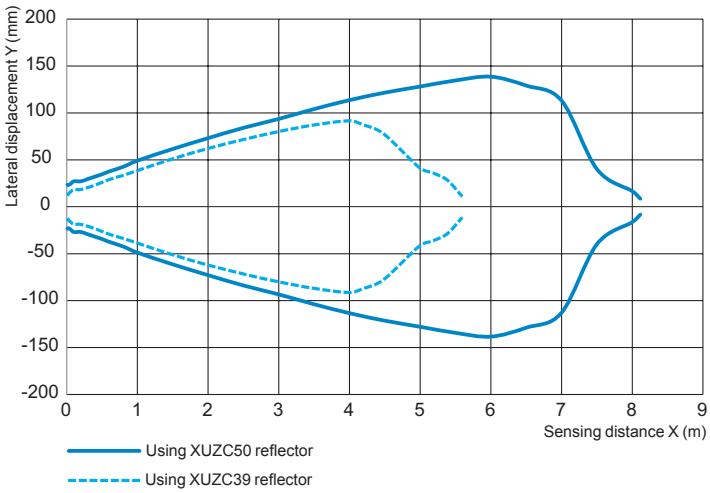
XUZC50

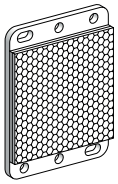
XUZC39




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

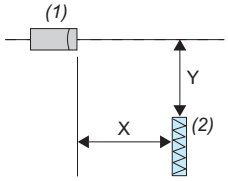
#### Lateral displacement



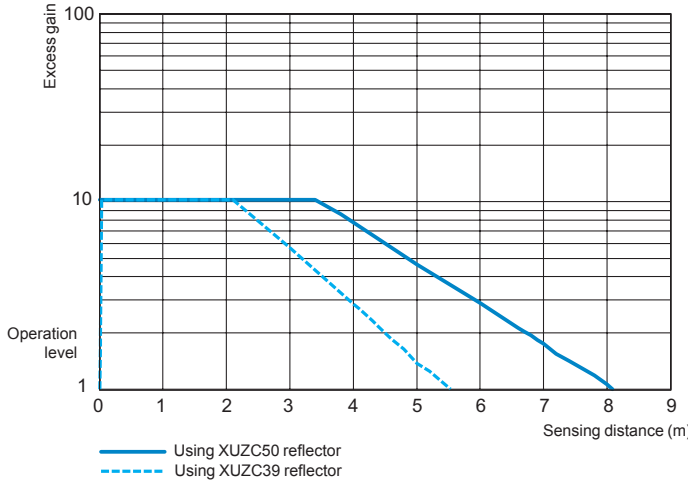
XUZC50

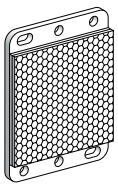
XUZC39




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

#### Excess gain



XUZC50

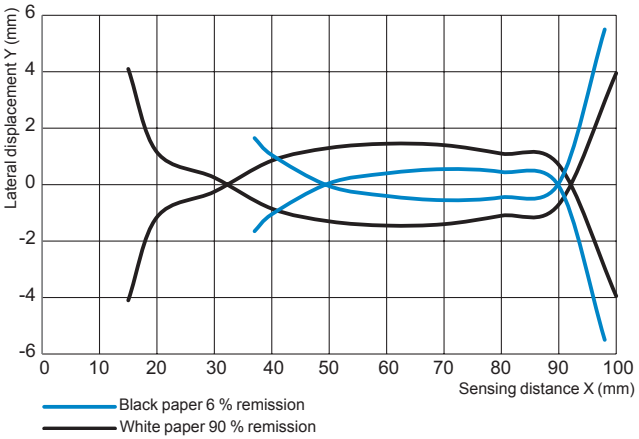
XUZC39

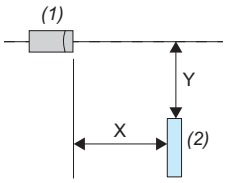
# Photo-electric sensors
XUM, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

## Detection curves (continued)

### Background suppression system: XUM8

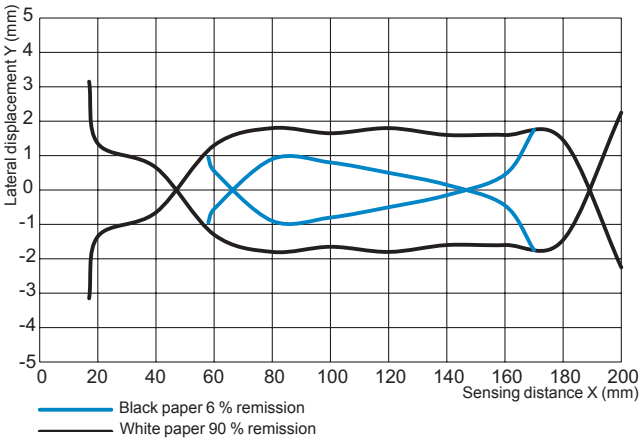
#### Lateral displacement (preset 100 mm)

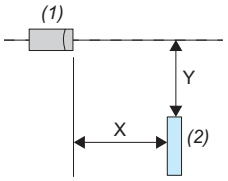



*(1): Sensor*
*(2): Object (200 mm square white and black mat paper)*
*X: Sensing distance (mm)*
*Y: Lateral displacement (mm)*

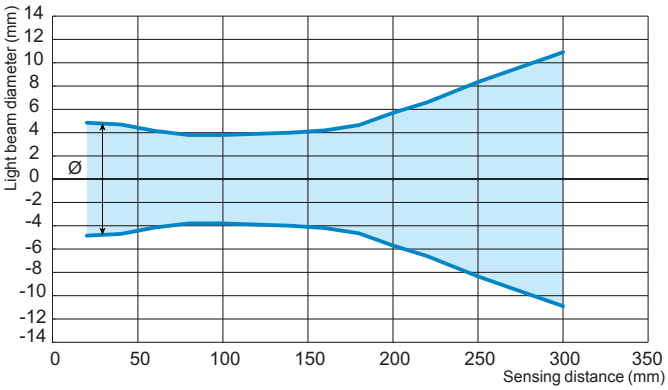
#### Lateral displacement (preset 200 mm)



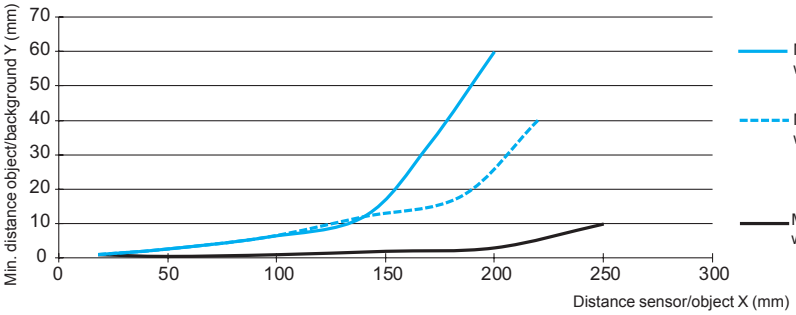



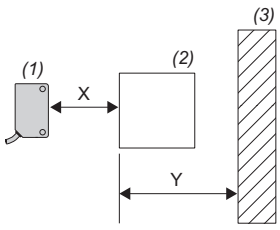

*(1): Sensor*
*(2): Object (200 mm square white and black mat paper)*
*X: Sensing distance (mm)*
*Y: Lateral displacement (mm)*

#### Light beam diameter




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



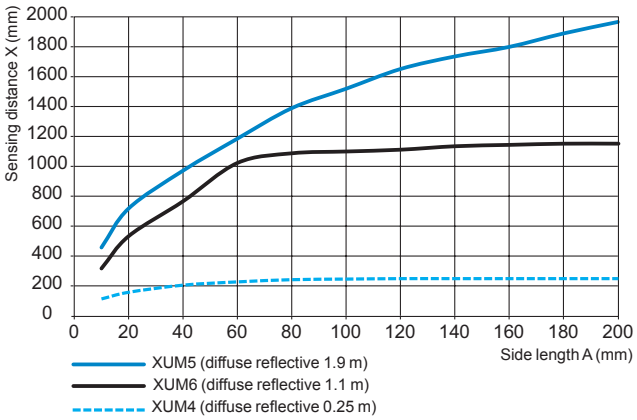

*(1): Sensor*
*(2): Object*
*(3): Background*
*X: Distance sensor/object (mm)*
*Y:* Min. distance object/ background (mm)

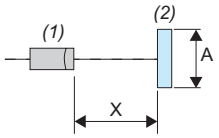
# Photo-electric sensors
XUM, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

## Detection curves (continued)

### Diffuse system: XUM4, XUM5 and XUM6

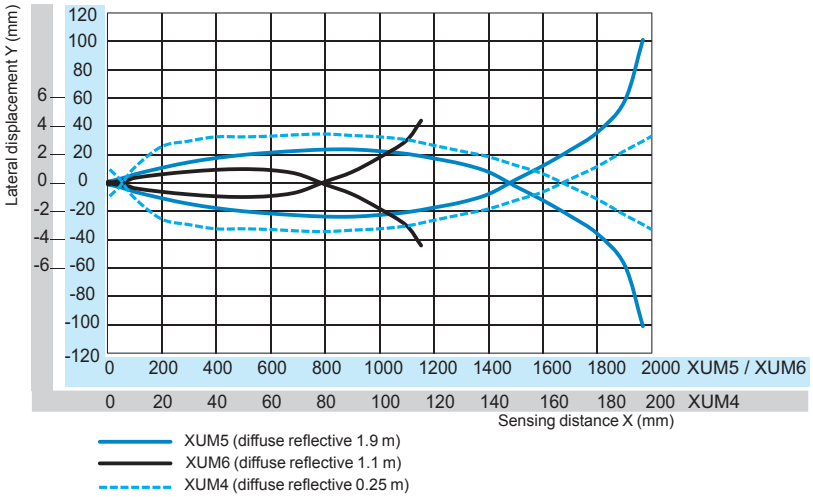
#### Object size/sensing distance

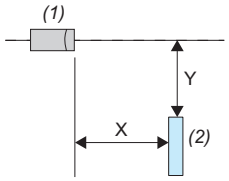



*(1): Sensor*
*(2): Object (white mat paper of A mm square)*
*A: Side length (mm)*
*X: Sensing distance (mm)*

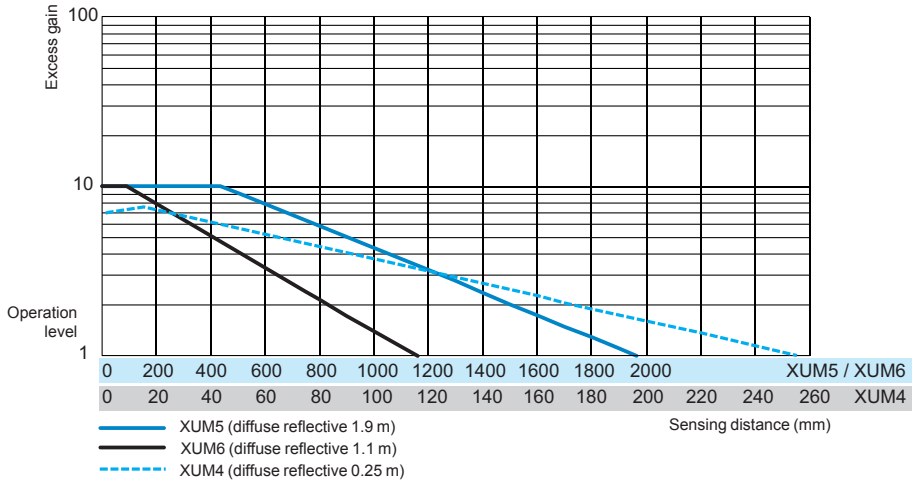
#### Lateral displacement




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

#### Excess gain



# Photo-electric sensors

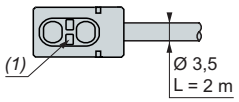
XUM, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
Potentiometer setting for NO/NC, sensitivity

## Thru-beam system

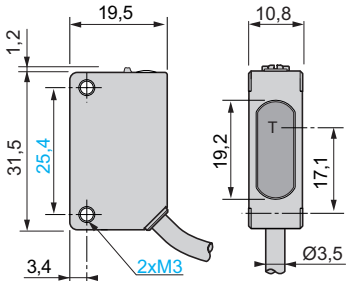
### Pre-cabled version

**Transmitter**

**Description - XUM2A●XBL2**

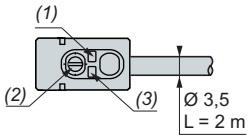



**Dimensions - XUM2A●XBL2**

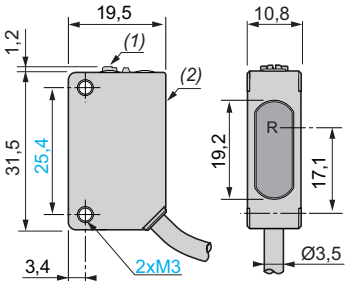



**Receiver**

**Description - XUM2A●XBL2**



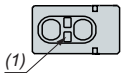

**Dimensions - XUM2A●XBL2**



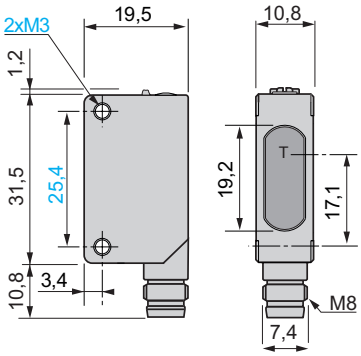

### M8 connector version

**Transmitter**

**Description - XUM2A●XBM8**

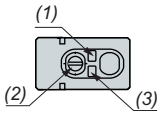



**Dimensions - XUM2A●XBM8**

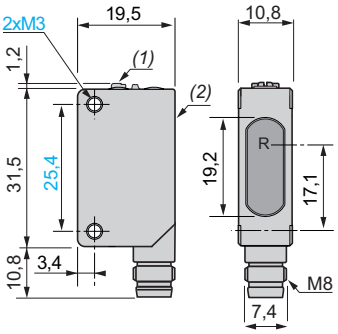



**Receiver**

**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).*

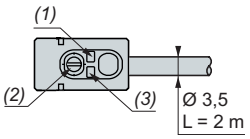
# Photo-electric sensors

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

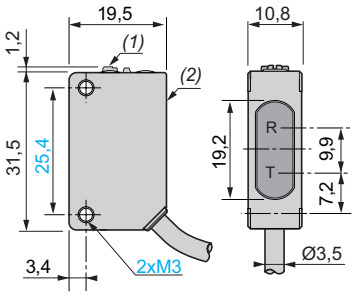
## Polarised reflex system

### Pre-cabled version

**Description - XUM9A●XBL2**

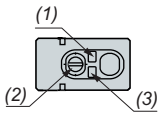



**Dimensions - XUM9A●XBL2**

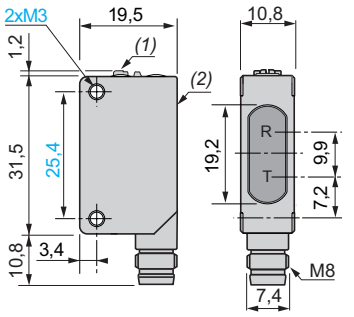



### M8 connector version

**Description - XUM9A●XBM8**




**Dimensions - XUM9A●XBM8**

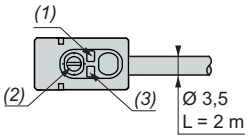



*(1) Output indicator (yellow)*
*(2) Setting potentiometer (sensitivity*
*(3) Stability indicator (green).*

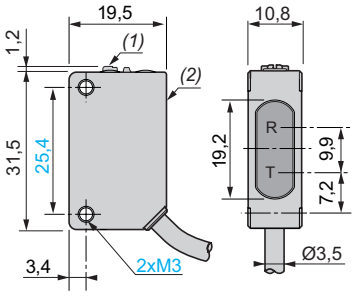
*R: Reception.*
*T: Transmission.*
*(1) Setting potentiometer (sensitivity).*
*(2) Setting potentiometer (output).*

## Background suppression system

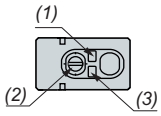
**Description - XUM8A●XBL2**



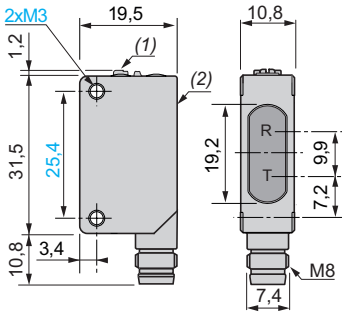

**Dimensions - XUM8A●XBL2**




**Description - XUM8A●XBM8**




**Dimensions - XUM8A●XBM8**

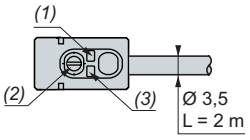



*(1) Output indicator (yellow)*
*(2) Setting potentiometer (sensitivity*
*(3) Stability indicator (green).*

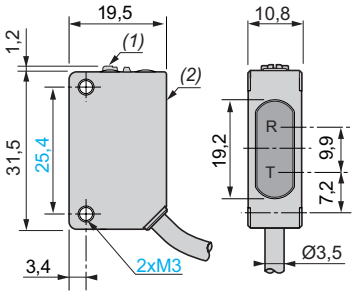
*R: Reception.*
*T: Transmission.*
*(1) Setting potentiometer (sensitivity).*
*(2) Setting potentiometer (output).*

## Diffuse system

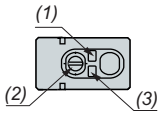
**Description - XUM5A●XBL2, XUM6A●XBL2, XUM4A●XBL2**



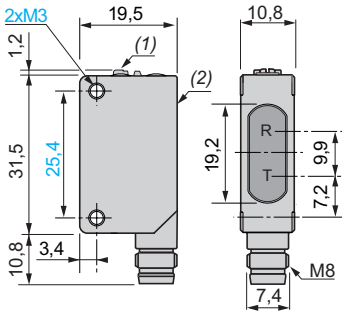

**Dimensions - XUM5A●XBL2, XUM6A●XBL2, XUM4A●XBL2**




**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).*

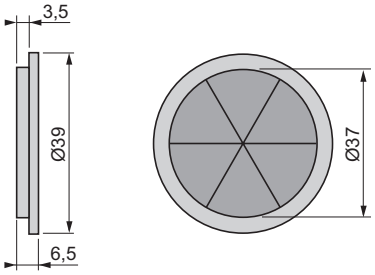
*R: Reception.*
*T: Transmission.*
*(1) Setting potentiometer (sensitivity).*
*(2) Setting potentiometer (output).*

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

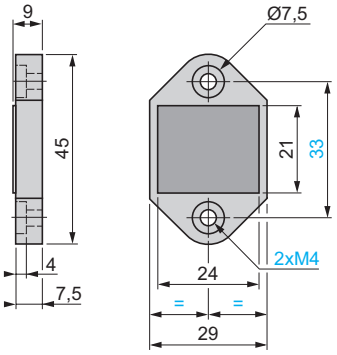
## Accessories

### Reflectors

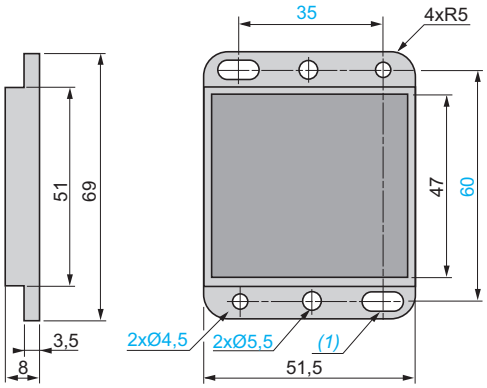
#### XUZC39



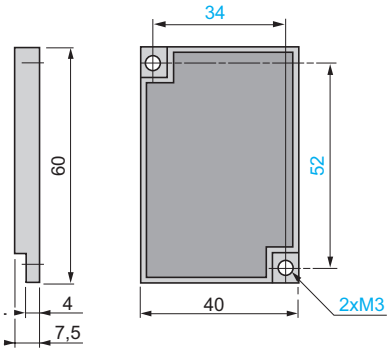

#### XUZC24




#### XUZC50

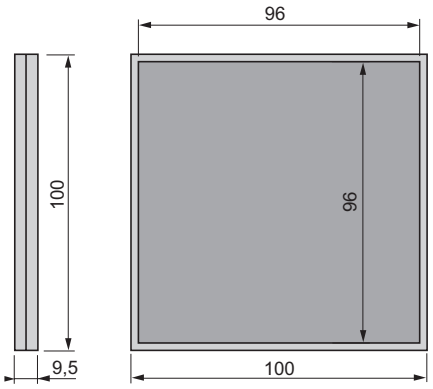



#### XUZC60S11



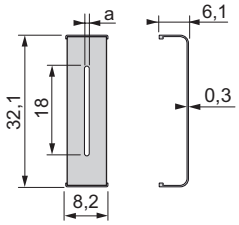

*(1)* 2 elongated holes Ø 4.5 x 8

#### XUZC100

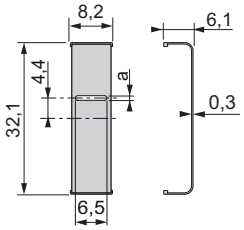



### Diaphragms

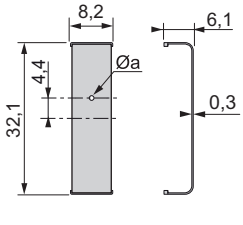
#### XUZDVM●●




#### XUZDHM●●




#### XUZDRM●●

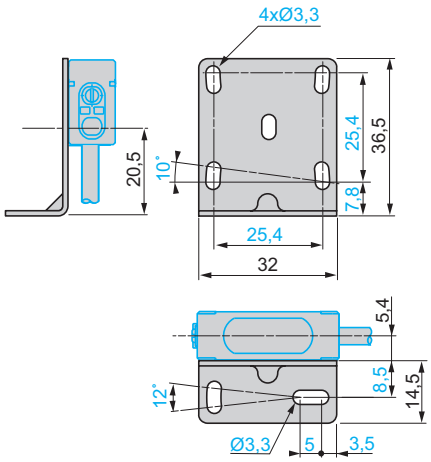



| Reference | a (mm) |
|---|---|
| XUZDVM05 | 0.5 |
| XUZDVM10 | 1 |
| XUZDVM20 | 2 |
| XUZDHM05 | 0.5 |
| XUZDHM10 | 1 |
| XUZDHM20 | 2 |
| XUZDRM05 | Ø 0.5 |
| XUZDRM10 | Ø 1 |
| XUZDRM20 | Ø 2 |

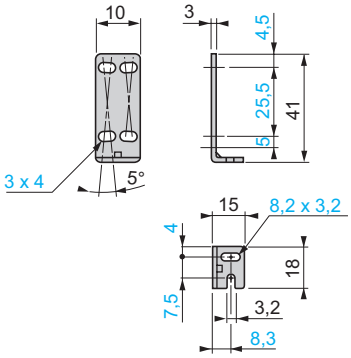
## Accessories *(continued)*

### Fixing brackets

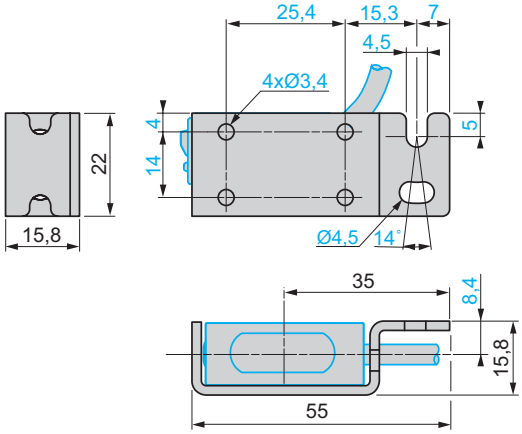
**XUZASM04**



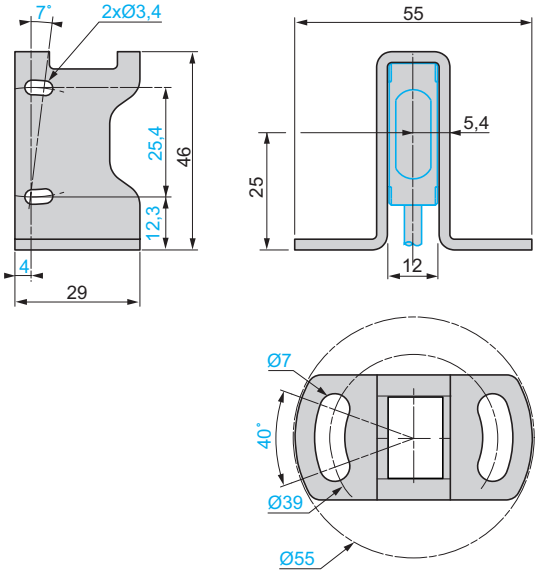

**XUZA50**




**XUZASM02**

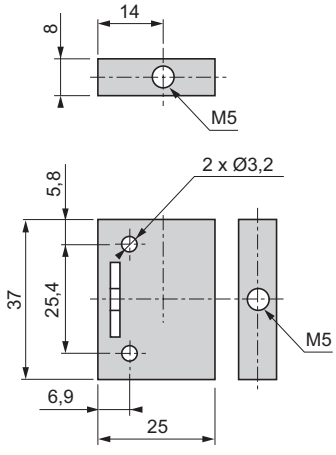



**XUZASM03**




### Air blower mounting block

**XUZASM05**

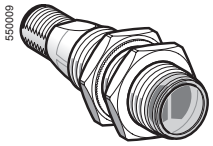


# Photo-electric sensors

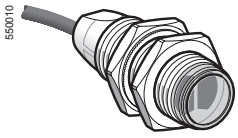
## XU range, single mode function

### Design 18, plastic

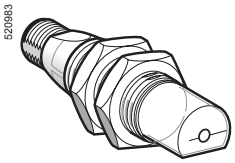
### Three-wire DC, solid-state output



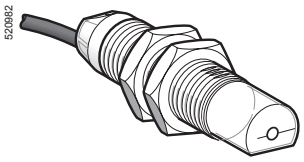

*XUB●A●●NM12*



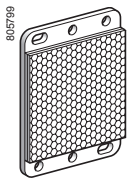

*XUB●A●●NL2*



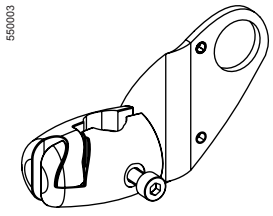

*XUB●A●●WM12*



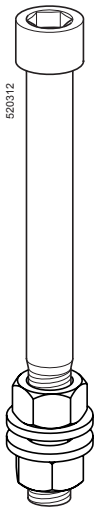

*XUB●A●●WL2*




*XUZC50*

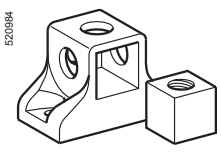



*XUZB2003*

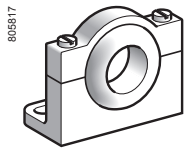



*XUZ2001*


*XUZA118*




*XUZ2003*




*XUZA218*

## Connector

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

## Fixing accessories *(1)*

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

## Pre-cabled

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

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

# Photo-electric sensors

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

## Characteristics

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

## Wiring schemes

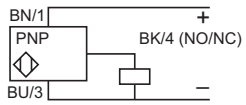
### M12 connector


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

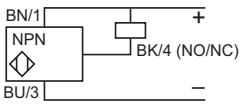
### Pre-cabled

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

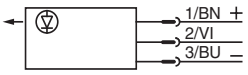
### PNP




### NPN




### Transmitter

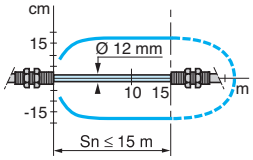



Input 2/VI:
- not connected: *beam made*
- connected to –: *beam broken*

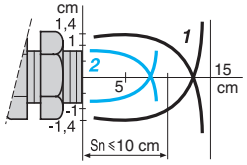
*Please refer to our "Cabling accessories XZ" catalogue.*

## Detection curves

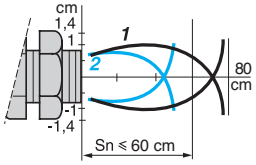
### Thru-beam system




### Diffuse system

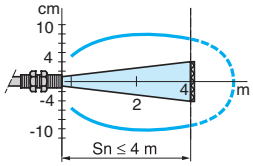



### Diffuse system with adjustable sensitivity



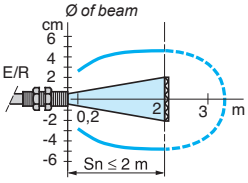

*Object 10 x 10 cm; **1** White 90%; **2** Grey 18%*

### Reflex system




*With reflector XUZC50*

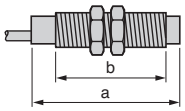
### Polarised reflex system




*With reflector XUZC50*

## Dimensions

### XUB




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

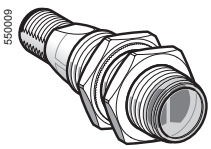
*(1) Beam break input on thru-beam transmitter only.*
*(2) For **XUB9●●●●●●** (polarised reflex) 46 becomes 48 mm and 60 becomes 62 mm.*

# Photo-electric sensors

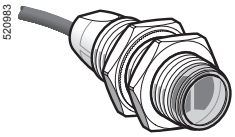
## XU range, single mode function

### Design 18, metal

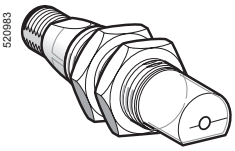
### Three-wire DC, solid-state output



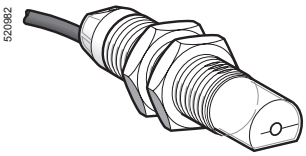

*XUB●B●●NM12*



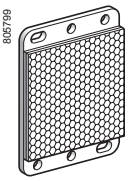

*XUB●B●●NL2*



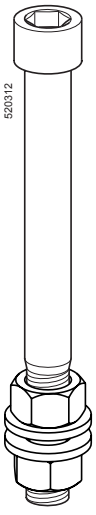

*XUB●B●●WM12*



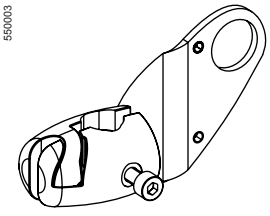

*XUB●B●●WL2*



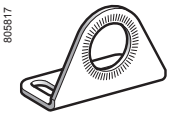

*XUZC50*



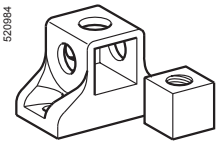

*XUZ2001*



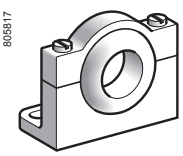

*XUZB2003*




*XUZA118*




*XUZ2003*




*XUZA218*

## Connector

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

## Fixing accessories *(1)*

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

## Pre-cabled

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

*(1) For further information, see page 69.*

# Photo-electric sensors

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

## Characteristics

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

## Wiring schemes

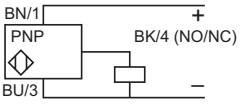
### M12 connector


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

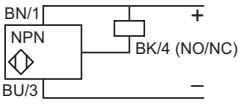
### Pre-cabled

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

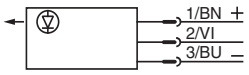
### PNP




### NPN




### Transmitter

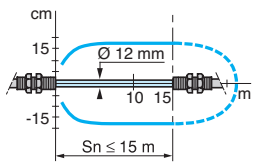



Input 2/VI:
- not connected: *beam made*
- connected to –: *beam broken*

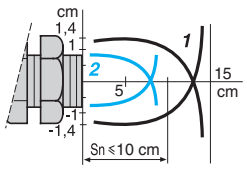
*Please refer to our "Cabling accessories XZ" catalogue.*

## Detection curves

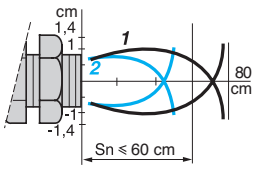
### Thru-beam system




### Diffuse system

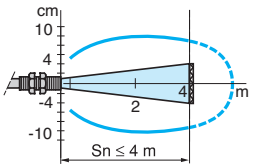



### Diffuse system with adjustable sensitivity



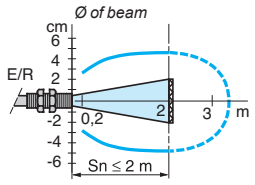

*Object 10 x 10 cm; **1** White 90%; **2** Grey 18%*

### Reflex system




*With reflector XUZC50*

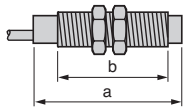
### Polarised reflex system




*With reflector XUZC50*

## Dimensions

### XUB




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

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

# Electronic pressure sensors

## XM Range

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


*XMLP pressure transmitters*
*AISI 316L stainless steel casing*

### Presentation

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

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

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

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

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

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

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

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

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

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

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

**General characteristics**

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

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

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

# Electronic pressure sensors

## XM Range

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

### Functions

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

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

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

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

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

# Electronic pressure sensors

## XM Range

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

PF151601

*XMLP●●●GD●1F*

PF151600

*XMLP●●●GC●1F*

PF151602

*XMLP●●●GL●1F*

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

**Maximum permissible accidental pressure: 3 bar, destruction pressure: 5 bar**

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

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

**Maximum permissible accidental pressure: 3 bar, destruction pressure: 5 bar**

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

### -1 to 5 bar (-14.5 to 72.6 psi)

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

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

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

# Electronic pressure sensors

## XM Range

### XMLP pressure transmitters

### Compact metal body, 316L stainless steel fluid entry

### With analogue output. Sizes in bar

PF151601


*XMLPM●●BD●1F*

XM-EX_522_CPMFS17001


*XMLPM●●BC●1F*

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

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

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

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

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

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

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

# Electronic pressure sensors

## XM Range

### XMLP pressure transmitters

Compact metal body, 316L stainless steel fluid entry

With analogue output. Sizes in bar

PF151601

*XMLP●●●●D●1F*

PF151600

*XMLP●●●●C●1F*

PF151602

*XMLP001GL●1F*

PF151603

*XMLP001GC●BF*

PF151604

*XMLP001GD●BF*

#### 0 to 0.25 bar (0 to 3.63 psi)

**Maximum permissible accidental pressure: 3 bar, destruction pressure: 5 bar**

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

#### 0 to 0.5 bar (0 to 7.26 psi)

**Maximum permissible accidental pressure: 3 bar, destruction pressure: 5 bar**

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

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

**Maximum permissible accidental pressure: 3 bar, destruction pressure: 5 bar**

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

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

# Electronic pressure sensors

## XM Range

## XMLP pressure transmitters

## Compact metal body, 316L stainless steel fluid entry

## With analogue output. Sizes in bar

PF151601


*XMLP●●●●D●1F*

PF151600


*XMLP●●●●C●1F*

PF151602


*XMLP●●●GL●1F*

### 0 to 2.5 bar (0 to 36.3 psi)

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

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

### 0 to 4 bar (0 to 58 psi)

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

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

### 0 to 6 bar (0 to 87 psi)

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

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

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

# Electronic pressure sensors

## XM Range

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

PF151600

*XMLP01●BC●1F*

PF151601

*XMLP01●BD●1F*

XM-EX_522_CPMFS17002

*XMLP01●BC270*

XM-EX_522_CPMFS17004

*XMLP01●BD270*

XM-EX_522_CPMFS17003

*XMLP01●BC●90*

XM-EX_522_CPMFS17005

*XMLP01●BD●90*

### 0 to 10 bar (0 to 145 psi)

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

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

### 0 to 16 bar (0 to 232 psi)

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

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

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

# Electronic pressure sensors

## XM Range

### XMLP pressure transmitters

### Compact metal body, 316L stainless steel fluid entry

### With analogue output. Sizes in bar

PF151600

*XMLP0●●BC●1F*

PF151601

*XMLP0●●BD●1F*

XM-EX_522_CPMFS17002

*XMLP0●●BC270*

XM-EX_522_CPMFS17004

*XMLP0●●BD270*

XM-EX_522_CPMFS17003

*XMLP0●●BC●90*

XM-EX_522_CPMFS17005

*XMLP0●●BD●90*

## 0 to 25 bar (0 to 362.5 psi)

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

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

## 0 to 40 bar (0 to 580 psi)

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

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

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

# Electronic pressure sensors

## XM Range

## XMLP pressure transmitters

## Compact metal body, 316L stainless steel fluid entry

## With analogue output. Sizes in bar

PF151600

*XMLP●●●BC●1F*

PF151601

*XMLP●●●BD●1F*

XM-EX_522_CPMFS17004

*XMLP*060BD270

XM-EX_522_CPMFS17003

*XMLP*060BC290

XM-EX_522_CPMFS17005

*XMLP*060BD●90

### 0 to 60 bar (0 to 870 psi)

**Maximum permissible accidental pressure: 180 bar, destruction pressure: 360 bar**

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

### 0 to 100 bar (0 to 1450 psi)

**Maximum permissible accidental pressure: 300 bar, destruction pressure: 600 bar**

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

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

# Electronic pressure sensors

## XM Range

### XMLP pressure transmitters

### Compact metal body, 316L stainless steel fluid entry

### With analogue output. Sizes in bar

PF151600


*XMLP●●●BC●1F*

PF151601


*XMLP●●●BD●1F*

### 0 to 160 bar (0 to 2320 psi)

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

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

### 0 to 250 bar (0 to 3625 psi)

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

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

### 0 to 400 bar (0 to 5800 psi)

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

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

### 0 to 600 bar (0 to 8700 psi)

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

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

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

# Electronic pressure sensors

## XM Range

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

PF151605


*XMLP●●●RD●3F*

PF151606


*XMLP●●●RC●3F*

PF151607


*XMLP●●●RP●3F*

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

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

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

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

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

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

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

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

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

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

# Electronic pressure sensors

## XM Range

### XMLP pressure transmitters

### Compact metal body, 316L stainless steel fluid entry

### With analogue output. Sizes in psi

PF151605

*XMLP●●●RD●3F*

PF151606

*XMLP●●●RC●3F*

PF151607

*XMLP●●●RP●3F*

**0 to 15 psi (0 to 1.03 bar)**

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

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

**0 to 30 psi (0 to 2.07 bar)**

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

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

**0 to 50 psi (0 to 3.45 bar)**

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

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

**0 to 100 psi (0 to 6.9 bar)**

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

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

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

# Electronic pressure sensors

## XM Range

### XMLP pressure transmitters

### Compact metal body, 316L stainless steel fluid entry

### With analogue output. Sizes in psi

PF151605


*XMLP●●0PD●30*

PF151607


*XMLP●●0PP●30*

**0 to 100 psi (0 to 6.9 bar)**

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

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

**0 to 150 psi (0 to 10.3 bar)**

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

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

**0 to 200 psi (0 to 13.8 bar)**

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

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

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

# Electronic pressure sensors

## XM Range

## XMLP pressure transmitters

## Compact metal body, 316L stainless steel fluid entry

## With analogue output. Sizes in psi

PF151605


*XMLP●●0PD●30*

PF151607


*XMLP●●0PP●30*

### 0 to 300 psi (0 to 20.7 bar)

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

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

### 0 to 600 psi (0 to 41.4 bar)

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

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

### 0 to 1000 psi (0 to 69 bar)

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

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

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

# Electronic pressure sensors

## XM Range

### XMLP pressure transmitters

### Compact metal body, 316L stainless steel fluid entry

### With analogue output. Sizes in psi

PF151605


*XMLP●K0PD●30*

PF151607


*XMLP●K0PP●30*

**0 to 2000 psi (0 to 138 bar)**

**Maximum permissible accidental pressure: 6000 psi, destruction pressure: 12 000 psi**

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

**0 to 3000 psi (0 to 207 bar)**

**Maximum permissible accidental pressure: 9000 psi, destruction pressure: 18 000 psi**

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

**0 to 6000 psi (0 to 414 bar)**

**Maximum permissible accidental pressure: 18 000 psi, destruction pressure: 36 000 psi**

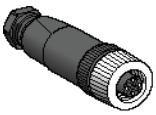
| Analogue output type | Electrical connection | Reference | Weight kg |
|---|---|---|---|
| **1/4" - 18NPT (male) fluid connection** | | | |
| 4…20 mA | M12 | **XMLP6K0PD230** | 0.092 |
| 0…10 V | M12 | **XMLP6K0PD730** | 0.092 |
| | Packard Metri-Pack 150 | **XMLP6K0PP730** | 0.094 |
| 0.5…4.5 V ratiometric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

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

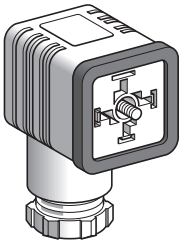
# Electronic pressure sensors
## XM Range
## XMLP pressure transmitters
## Separate parts


*ZMLPA1●2SH*

*XZCC12FCM40B*



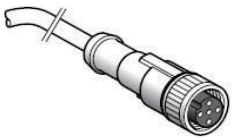
*XZCC12FDM40B*



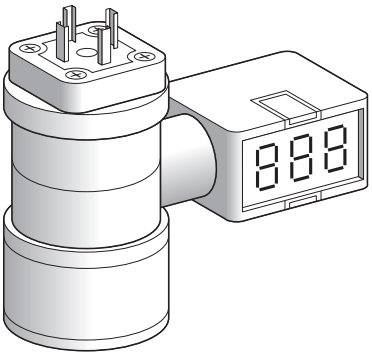
*XZCC43FCP40B*

*XMLZL016*

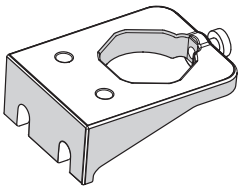
*XZCP1241L5*



*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●●●<br>XMLP●●●G●●●<br>XMLP●●●R●●● | – | **XMLZL017** | 0.029 |

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

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

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

## Presentation

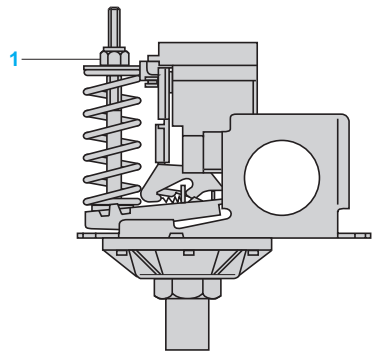
Pressure switches FTG, FSG and FYG are switches for power circuits.
They are used to control the pressure of water, up to 10.5 bar.

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

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

## Setting

### Pressure switches with fixed differential (FTG)

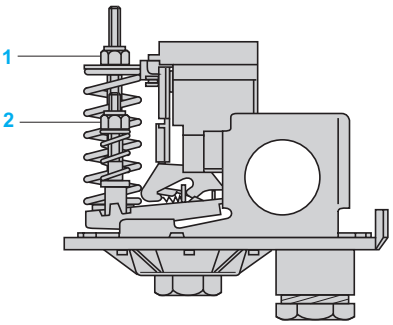



Only the switching point on rising pressure is adjustable.

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

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

### Pressure switches with adjustable differential (FSG and FYG)




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

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

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

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

## Environment characteristics

| Pressure switch type | | | FTG● FTG●NE | FSG● and FYG● FSG●NE and FYG●NE |
|---|---|---|---|---|
| **Conformity to standards** | | | CE, IEC/EN 60730 | |
| **Protective treatment** | | | Standard version: "TC" | |
| **Ambient air temperature** | | **°C** | For operation: 0...+ 45. For storage: - 30...+ 80 | |
| **Fluids controlled** | | | Fresh water, sea water (0…+ 70°C) | |
| **Materials** | | | Case: polystyrene, resistant to mechanical impact<br>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) | |

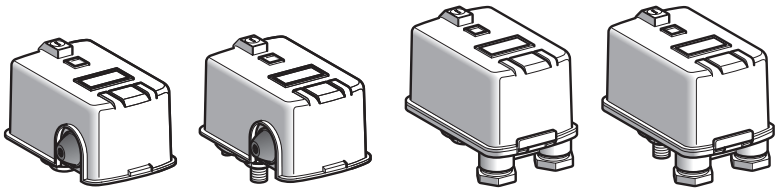
## Contact block characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| **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.<br>Minimum clamping capacity: 1 x 1 mm², max: 2 x 2 mm² | | | |
| **Electrical durability** at an operating rate of 600 operating cycles/hour | | **Op. cycles** | 40 000 | | 100 000 | |

# Electromechanical pressure switches

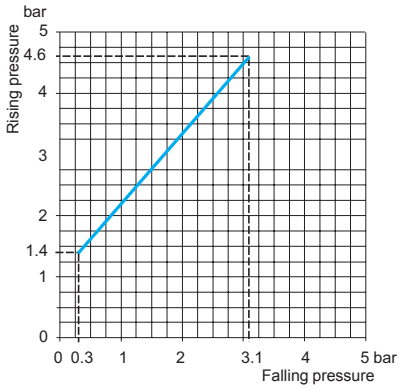
## XM Range

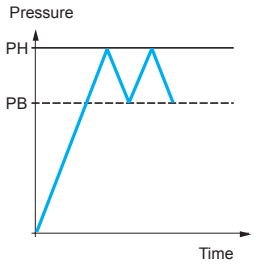
For power circuits, FTG Range
Size 4.6 bar (66.7 psi), fixed differential, for detection of a single threshold. Switches with 2-pole 2 NC contact.
Degree of protection IP 20 or IP 65

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

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

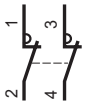
## Operating curves




— Adjustable value
---- Non adjustable value

## Connections



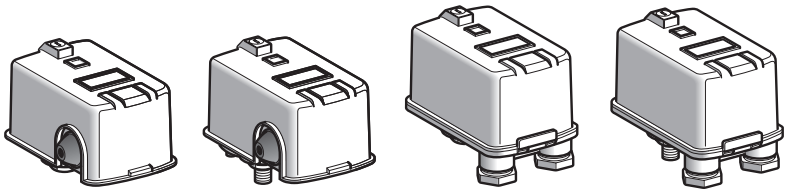
# Electromechanical pressure switches

## XM Range

For power circuits, FSG Range

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

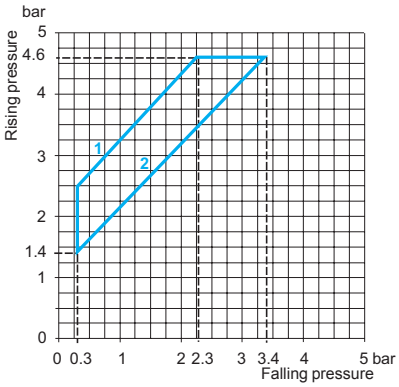
Degree protection IP 20 or IP 65

| **Fluid connection** | | **G 1/4 (female)** | **R 1/4 (male)** | **G 1/4 (female)** | **R 1/4 (male)** |
|---|---|---|---|---|---|
| | |  | | | |
| **Adjustable range of switching point (PH)** (Rising pressure) | | **1.4…4.6 bar (20.3…66.7 psi)** | | | |
| **Degree of protection** conforming to IEC/EN 60529 | | **IP 20** | | **IP 65** | |
| **References** | | | | | |
| **Fluids controlled** | Fresh water, sea water, from 0°C to + 70°C *(1)* | **FSG2** | **FSG9** | **FSG2NE** *(2)* | **FSG9NE** |
| **Weight (kg)** | | 0.340 | | | |
| **Complementary characteristics not shown under general characteristics** (page 87) | | | | | |
| **Possible differential** (subtract from PH to give PB) | Max. at low setting | 2.1 bar (30.45 psi) | | | |
| | Max. at middle setting | 2.2 bar (31.9 psi) | | | |
| | Max. at high setting | 2.3 bar (33.35 psi) | | | |
| | Min. at low setting | 1 bar (14.5 psi) | | | |
| | Min. at middle setting | 1.1 bar (15.95 psi) | | | |
| | Min. at high setting | 1.2 bar (17.4 psi) | | | |
| **Maximum permissible pressure** | Per cycle | 5.75 bar (83.38 psi) | | | |
| | Accidental | 8 bar (116 psi) | | | |
| **Destruction pressure** | | 20 bar (290 psi) | | | |
| **Mechanical life** | | 1 x $10^6$ operating cycles | | | |
| **Cable entry** | | 2 cable entries, with grommet | | 2 entries with 13P cable gland (DIN Pg 13.5) | |
| **Clamping capacity** | | – | | 9 to 13 mm | |
| **Pressure switch type** | | Diaphragm | | | |

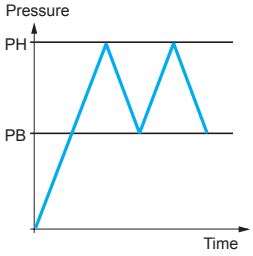
*(1) Component materials of units in contact with the fluid, see page 87.*

*(2) Variant: for a G 3/8 female fluid entry that pivots throughout 360°, select the **FSG2NEG**.*

## Operating curves

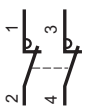



1 Maximum differential
2 Minimum differential




— Adjustable value

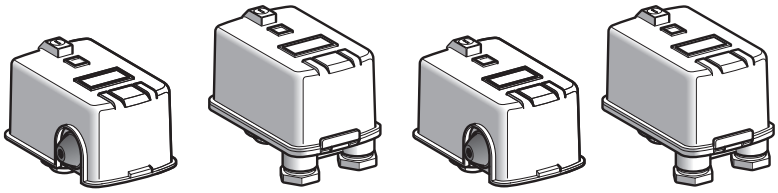
## Connections



# Electromechanical pressure switches

## XM Range

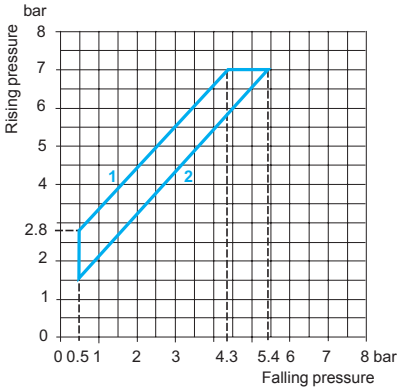
For power circuits, FYG Range
Sizes 7 and 10.5 bar (101.5 and 152.3 psi), adjustable differential, for regulation between 2 thresholds. Switches with 2-pole 2 NC contact. Degree of protection IP 20 or IP 65

| | | | | | |
|---|---|---|---|---|---|
| **Fluid connection** | | **G 1/4 (female)** | | | |
| | |  | | | |
| **Adjustable range of switching point (PH)** (Rising pressure) | | **2.8…7 bar (40.6…101.5 psi)** | | **5.6…10.5 bar (81.2…152.3 psi)** | |
| **Degree of protection** conforming to EN/IEC 60529 | | **IP 20** | **IP 65** | **IP 20** | **IP 65** |
| **References** | | | | | |
| **Fluids controlled** | Fresh water, sea water, from 0°C to + 70°C *(1)* | **FYG22** *(2)* | **FYG22NE** | **FYG32** *(3)* | **FYG32NE** |
| **Weight (kg)** | | 0.340 | | | |
| **Complementary characteristics not shown under general characteristics** (page 87) | | | | | |
| **Possible differential** (subtract from PH to give PB) | Max. at low setting | 2.3 bar (33.35 psi) | | 3 bar (43.5 psi) | |
| | Max. at middle setting | 2.5 bar (36.25 psi) | | 3.2 bar (46.4 psi) | |
| | Max. at high setting | 2.7 bar (39.15 psi) | | 3.4 bar (49.3 psi) | |
| | Min. at low setting | 1.2 bar (17.4 psi) | | 1.9 bar (27.55 psi) | |
| | Min. at middle setting | 1.4 bar (20.3 psi) | | 2.1 bar (30.45 psi) | |
| | Min. at high setting | 1.6 bar (23.2 psi) | | 2.3 bar (33.35 psi) | |
| **Maximum permissible pressure** | Per cycle | 8.75 bar (126.9 psi) | | 13 bar (188.5 psi) | |
| | Accidental | 15 bar (217.5 psi) | | 15 bar (217.5 psi) | |
| **Destruction pressure** | | 20 bar (290 psi) | | 20 bar (290 psi) | |
| **Mechanical life** | | 1 x $10^6$ operating cycles | | | |
| **Cable entry** | | 2 cable entries, with grommet | | | |
| **Pressure switch type** | | Diaphragm | | | |

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

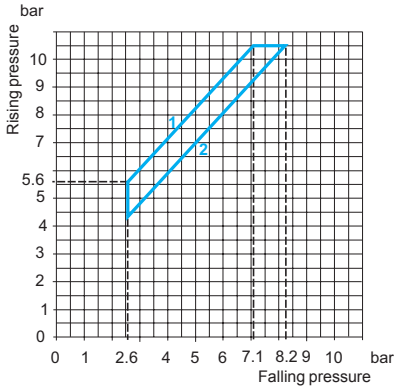
## Operating curves

### FYG22



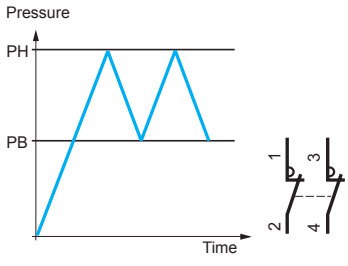

1 Maximum differential
2 Minimum differential

### FYG32




1 Maximum differential
2 Minimum differential

## Connections

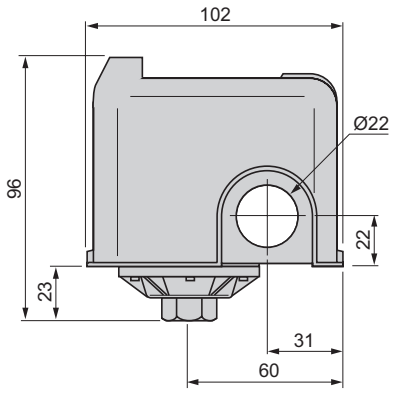



— Adjustable value

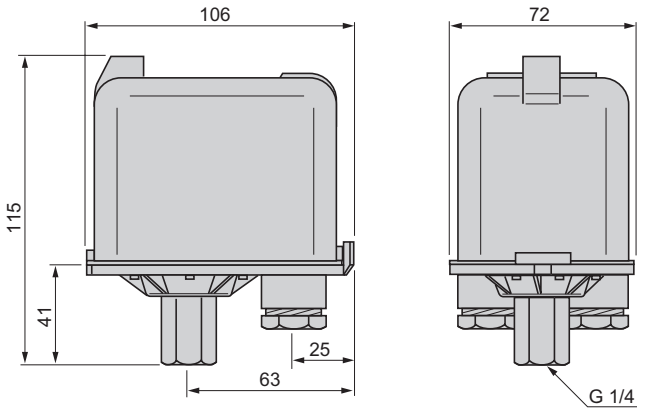
# Electromechanical pressure switches
XM Range
For power circuits, FTG, FSG and FYG Range

## Dimensions

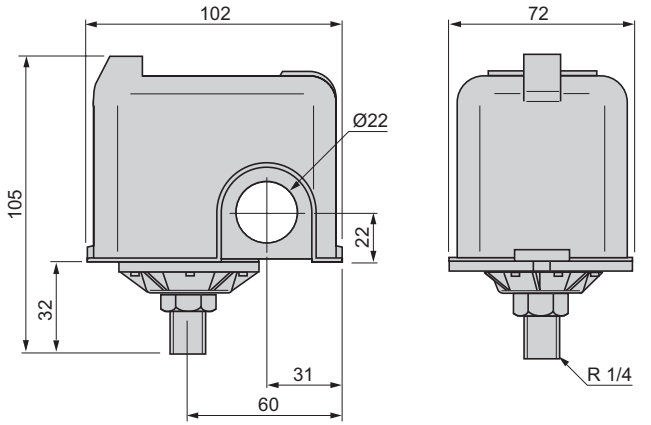
### FTG2, FSG2



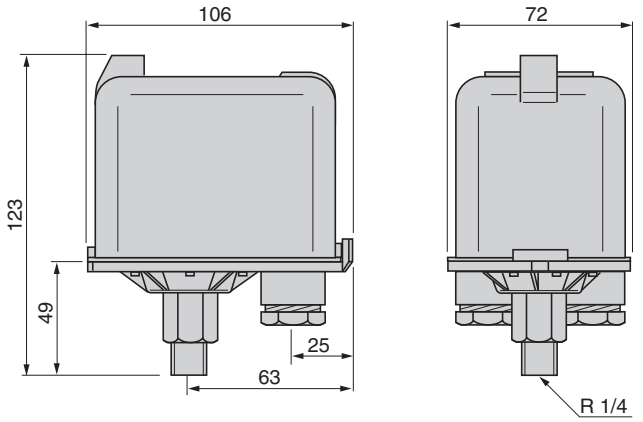

### FTG2NE, FSG2NE



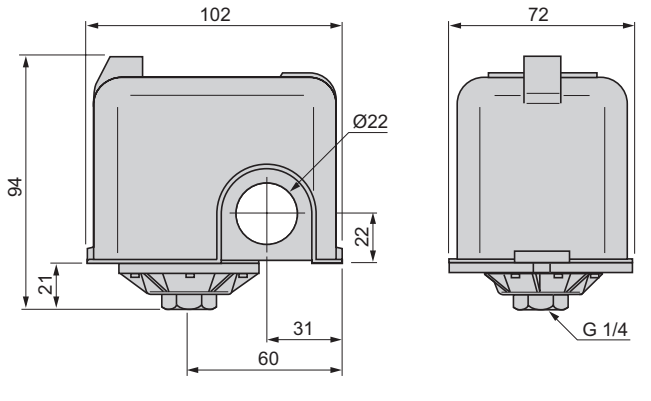

### FTG9, FSG9



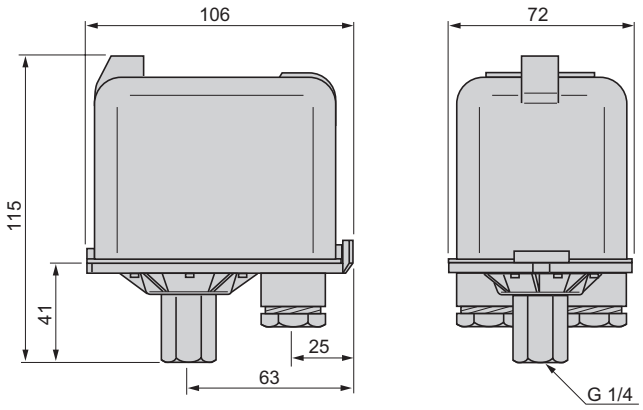

### FTG9NE, FSG9NE




### FYG22, FYG32




### FYG22NE, FYG32NE



# Safety detection solutions
## Key-operated safety switches

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

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

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

### Safety interlock switches

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

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

### Control circuit categories

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

### Safety of personnel

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

### Safety of operation

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

### Safety in use

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

### Design to minimize defeat

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

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

# Safety detection solutions

## Key-operated safety switches

XCSPA and XCSTA plastic, turret head
1 or 2 cable entries

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

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

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

**Complementary characteristics not shown under general characteristics (page 92)**

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

**References of accessories**

XCSZ91

XCSZ200

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

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

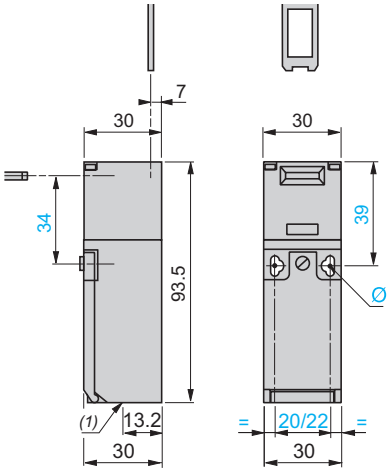
## References of actuating keys and guard retaining device

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

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

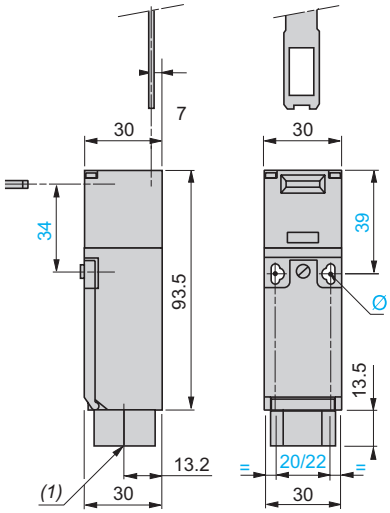
## Dimensions

### XCSPA●91, XCSPA●92



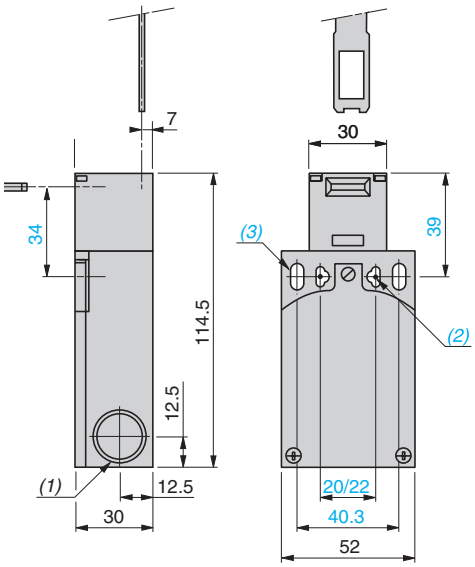

*(1) 1 tapped entry for cable gland*
Ø: 2 elongated holes Ø 4.3 x 8.3 on 22 centers, 2 holes Ø 4.3 on 20 centers

### XCSPA●93



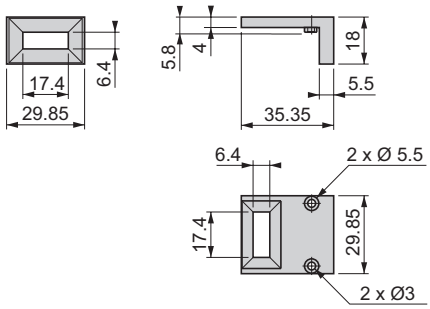

*(1) 1 tapped entry for 1/2" NPT conduit*
Ø: 2 elongated holes Ø 4.3 x 8.3 on 22 centers, 2 holes Ø 4.3 on 20 centers

### XCSTA●9●

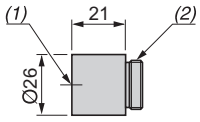



*(1) 2 tapped entries for cable gland or 1/2" NPT conduit adapter*
*(2) 2 elongated holes Ø 4.3 x 8.3 on 22 centers, 2 holes Ø 4.3 on 20 centers*
*(3) 2 elongated holes Ø 5.3 x 13.3*

### XCSZ200 actuating key centering device

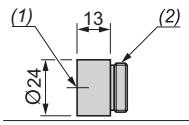



### 1/2" NPT conduit adapter
**DE9RA1012**




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

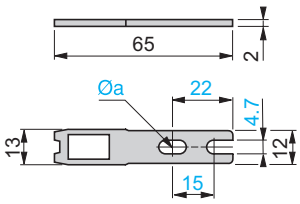
### M16 x 1.5 adapter
**DE9RA1016**




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

## Dimensions (continued)

### XCSZ11

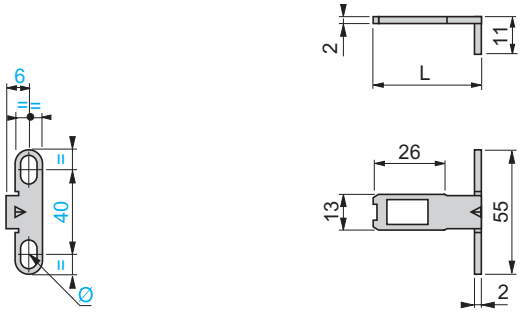



*(1) Adapter (included with XCSZ11 actuating key) for replacing, without drilling an additional fixing hole, a legacy XCKP/T key-operated switch with XCKY01 actuating key by an XCSTA key-operated switch with XCSZ11 actuating key.*

Ø a: 2 elongated holes Ø 4.7 x 10

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

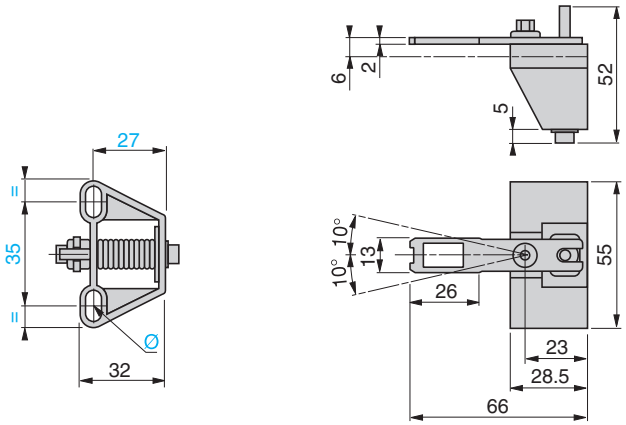
### XCSZ12, XCSZ15




Ø: 2 elongated holes Ø 4.7 x 10

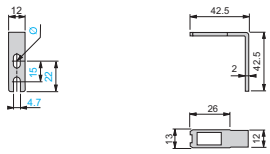
L = 40 mm (XCSZ12) or 29 mm (XCSZ15)

### XCSZ13




Ø: 2 elongated holes Ø 4.7 x 10

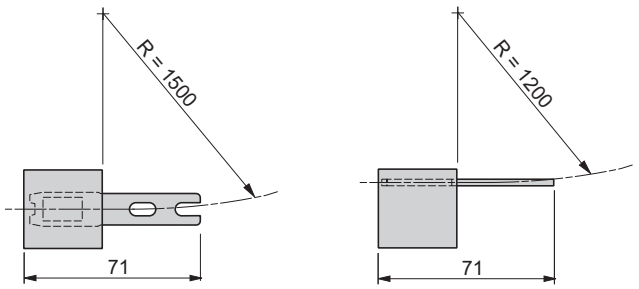
### XCSZ14



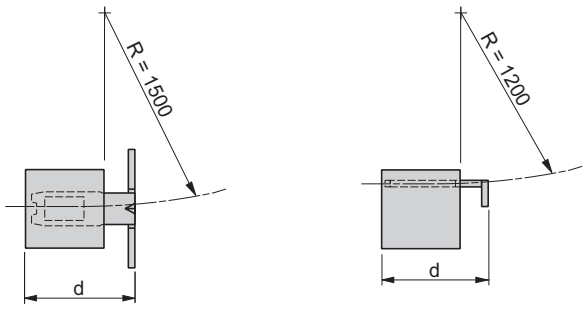

Ø: 1 elongated hole Ø 4.7 x 10

## Operating radius required for actuating key

### XCSZ11

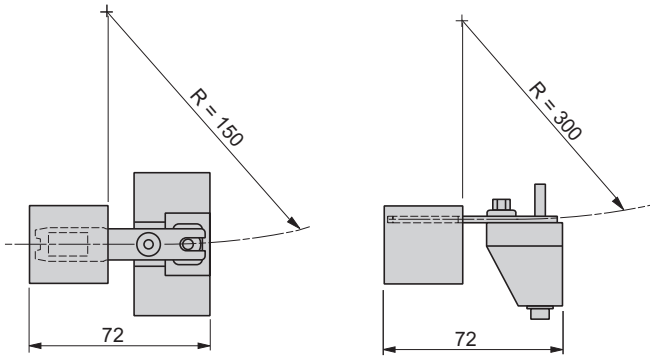



### XCSZ12, XCSZ15

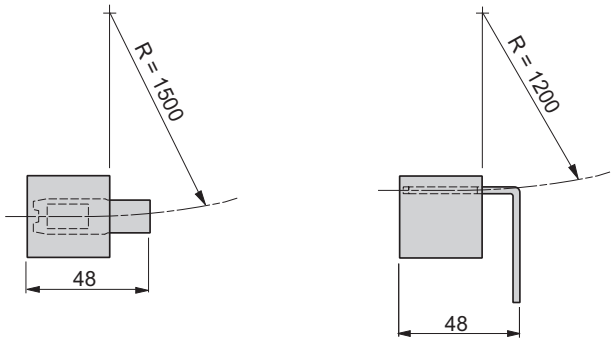



d = 46 mm (XCSZ12) or 35 mm (XCSZ15)

### XCSZ13




### XCSZ14




R = minimum radius

# Safety detection solutions

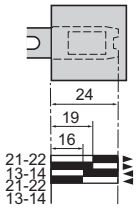
## Key-operated safety switches

XCSPA and XCSTA plastic, turret head
1 or 2 cable entries

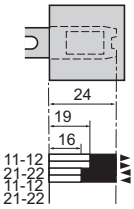
## Setting-up

### Functional diagrams

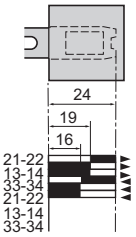
**XCSPA1●●**



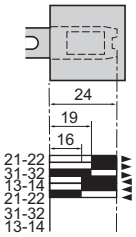

**XCSPA2●●**



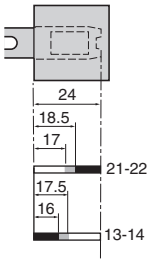

**XCSPA3●●**



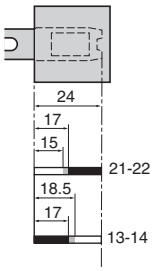

**XCSPA4●●**



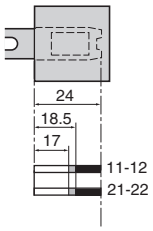

**XCSPA5●●, XCSTE5●●●**



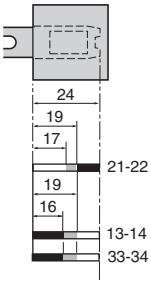

**XCSPA6●●, XCSTE6●●●**



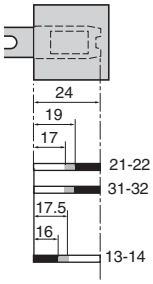

**XCSPA7●●, XCSTE7●●●**



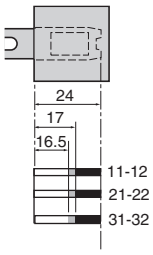

**XCSTA5●●, XCSPA8●●**




**XCSTA7●●, XCSPA9●●**




**XCSTA8●●**




Contact operation

■ Closed □ Open ▭ Transient state

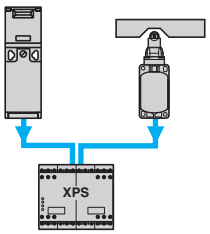
## Schemes

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

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

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

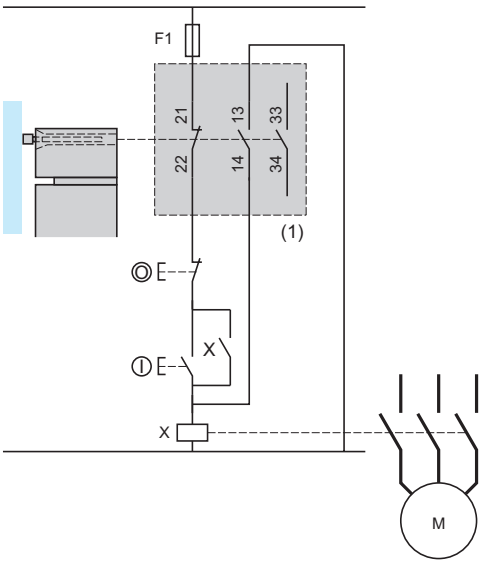
**Method for machines with quick rundown time (low inertia)**




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

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

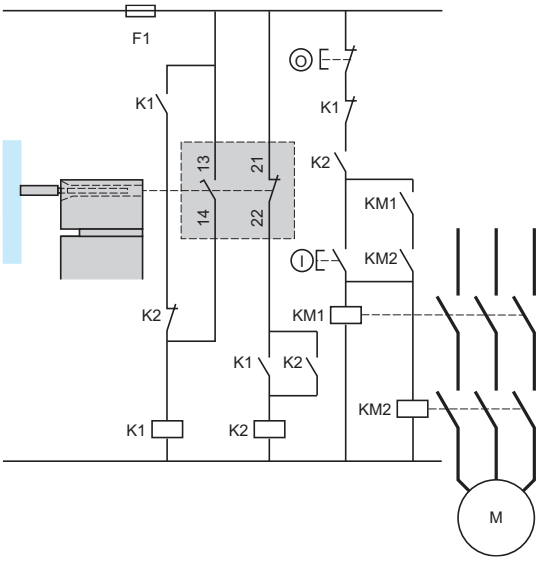
Example with 3-pole 1 NC + 2 NO contact and protection fuse to help prevent shunting of the NC contact, due to either cable damage or tampering.




*(1) Signaling contact.*

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

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



# Safety detection solutions
## Emergency stop rope pull switches
## XY2C range

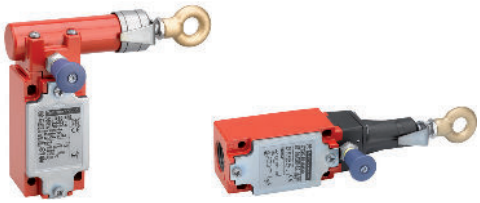
## Emergency stop rope pull switches

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

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

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

*UL NiSD certified*



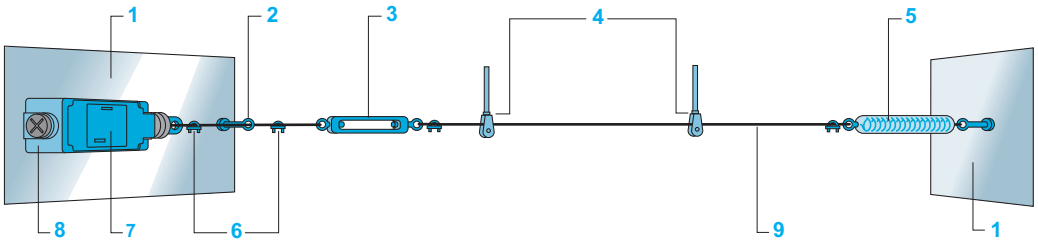
*XY2CJ compact range*

**+ Certified, rugged safety devices that are easy to install**

# Safety detection solutions
## Emergency stop rope pull switches
## XY2C range

## Installation

**Description of a typical installation for XY2CJ**




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

**Notes regarding installation**

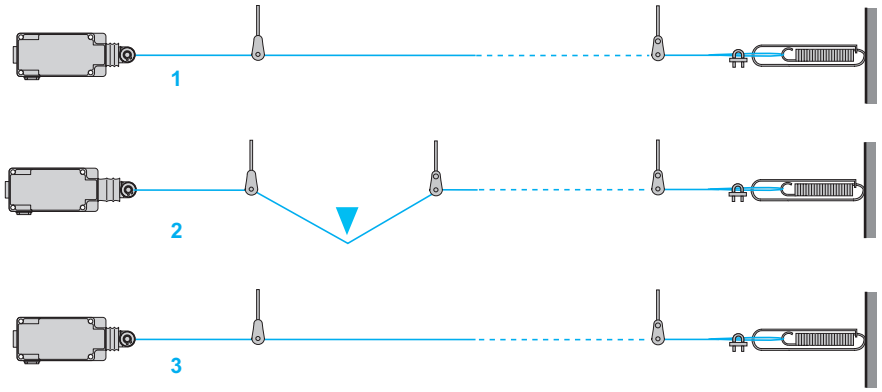
■ XY2CJ emergency stop rope pull switches can be fitted with trip indicators (mechanical indicators for XY2CJ).

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

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

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

## Basic principles




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

# Safety detection solutions
## Emergency stop rope pull switches
## XY2CJ range

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

## Contact block characteristics

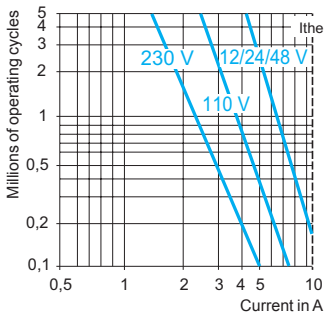
| | | |
|---|---|---|
| **Rated operational characteristics** | 2-pole contact block | **XY2CJ**:<br>AC-15: A300 or Ue = 240 V, Ie = 3 A<br>DC-13: Q300 or Ue = 250 V, Ie = 0.27 A, conforming to EN/IEC 60947-5-1 Appendix A |
| | 3-pole contact block | **XY2CJ**:<br>AC-15: B300 or Ue = 240 V, Ie = 1.5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

**Rated operational power**
(Electrical durability)

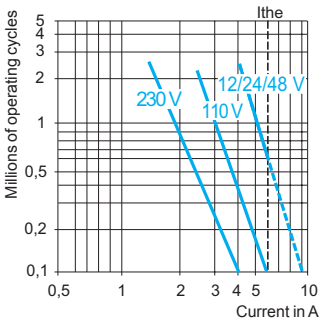
**XY2CJ**
Conforming to EN/IEC 60947-5-1 Appendix C. Utilization categories AC-15 and DC-13
Frequency: 3,600 operating cycles/hour. Load factor: 0.5

**AC supply** ∿ 50/60 Hz
⎓ Inductive circuit

**2-pole contact block**




**3-pole contact block**




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

| Voltage | V | **24** | **48** | **120** |
|---|---|---|---|---|
| ⎓ | W | 13 | 9 | 7 |

| Voltage | V | **24** | **48** | **120** |
|---|---|---|---|---|
| ⎓ | W | 4 | 3 | 2 |

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

# Safety detection solutions
## Emergency stop rope pull switches
## XY2CJ range

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

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

**Without pilot light**

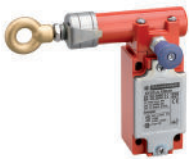
| Cable length | Colors and materials | Reset | Supply voltage | Contact type | | | Cable anchor point | Reference | Weight kg |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 | 1 | | | | |
| ⩽ **20 m** | Polyamide head Zamak red RAL 3000 body Treated steel cover | By pull button | – | 1 | 1 |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

PF123235

*XY2CJS15*

PF123234

*XY2CJR15*

PF122233

*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**.*

XY2C_620_CPODA2016018

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 |

PF123239

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 |

PF123258

XY2CZ402
XY2CZ404

# Safety detection solutions
## Emergency stop rope pull switches
## XY2C range

XY2C_620_CPODA2016006

*XY2CZ503*
*XY2CZ513*

XY2C_620_CPODA2016007

*XY2CZ523*

PF123265

*XY2CZ705*

PF123264

*XY2CZ601*

PF123283

*XY2CZ708*

XY2C_620_CPODA2016008

*XY2CZ602*

XY2C_620_CPODA2016004

*XY2CZ701*

PF123268

*XY2CZ703*

## Separate parts *(continued)*

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

## Mounting kits

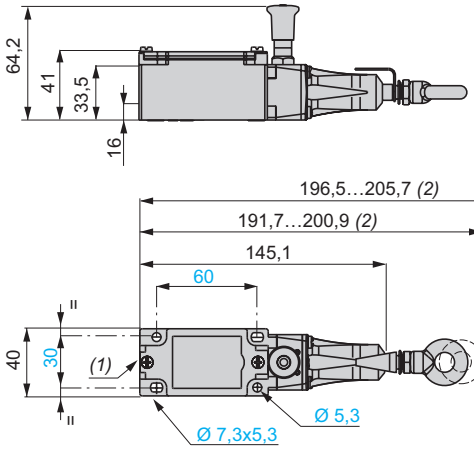
| Kit contents | For use with | Cable diameter | Cable length | Reference | Weight |
|---|---|---|---|---|---|
| | | mm | m | | kg |
| 1 galvanized cable<br>+ 1 clamp cable grip<br>+ 1 end spring **XY2CZ703** | XY2CJ | 3.2 | 10.5 | **XY2CZ9310** | 0.444 |
| | | | 15.5 | **XY2CZ9315** | 0.581 |
| | |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

# Safety detection solutions
## Emergency stop rope pull switches
## XY2C range

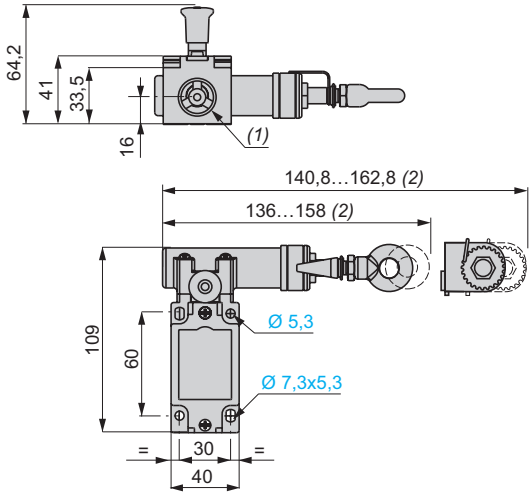
### Emergency stop rope pull switches with single anchor point

**XY2CJ**

**XY2CJS●●**




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

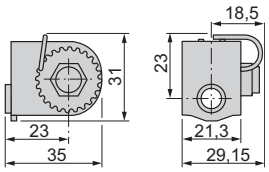



*(1) Tapped entries for no. 13 cable gland (Pg 13.5). For ISO M20, the reference becomes **XY2CJ●●●H29.** For 1/2" NPT, the reference becomes **XY2CJ●●●H7**.*
*Ø: 4 elongated holes Ø 6 mm.*

## Accessories

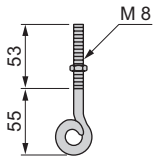
### Quick tensioners

**XY2CZ210**

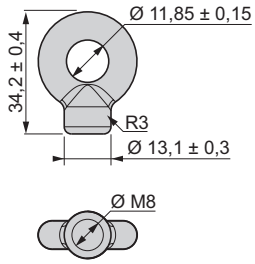



### Cable and pulley supports

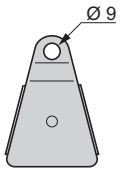
**XY2CZ705**




**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**.*

# Product reference index

# Product reference index

# Product reference index

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**TMSS France SAS**
Share capital: 366 931 214 €
Tour Eqho, 2 avenue Gambetta
92 400 Courbevoie – France
908 125 255 RCS Nanterre

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