# OsiSense

## Choose the best sensing solution
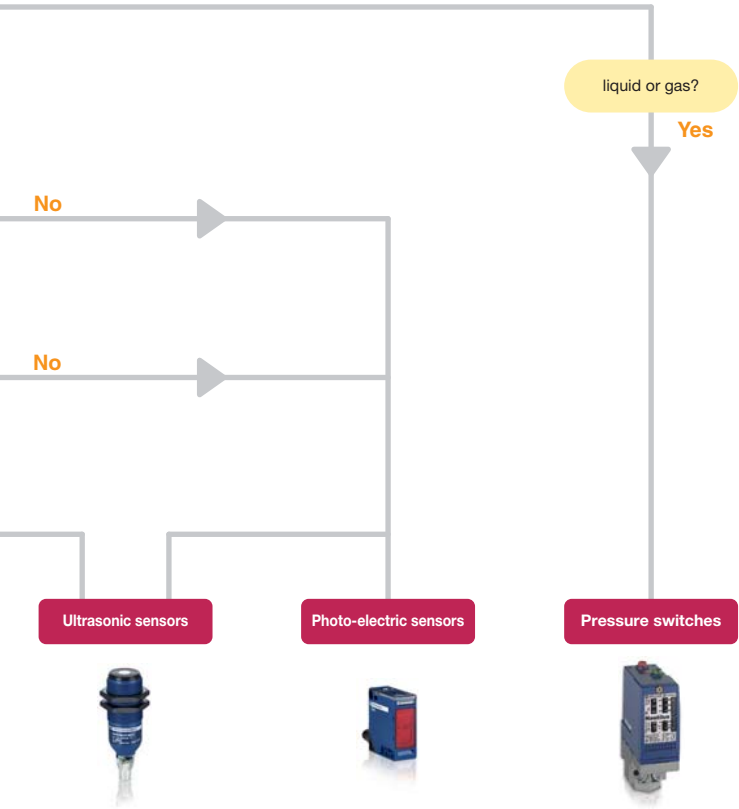
> Choose & Use*

**Schneider Electric**

# Choose the best sensing solution

```
┌──────────────────────┐
│  Object to be        │
│  detected            │
└──────────────────────┘

┌──────────────────────┐         No
│      solid?          │ ────────────────────►
└──────────────────────┘
           │ Yes

┌──────────────────────┐         No
│  contact with sensor │ ────────────────────►
│  is possible?        │
└──────────────────────┘                              ┌──────────────────────┐
           │ Yes                                       │     metallic?        │
                                                       └──────────────────────┘
┌──────────────────────┐         No                               │ Yes
│   mass > 500 g       │ ────────────────►
└──────────────────────┘
           │ Yes                                       ┌──────────────────────┐
                                                       │ distance object to   │
┌──────────────────────┐         No                   │ sensor ≤ 50 mm?      │
│ actuation speed      │ ────────────────►             └──────────────────────┘
│ < 1.5 m/s?           │                                          │ Yes
└──────────────────────┘
           │ Yes

┌──────────────────────┐         No
│ Operating rate       │ ────────────────►
│ < 1 Hz?              │
└──────────────────────┘
           │ Yes

        ┌──────────────────────┐        ┌──────────────────────┐
        │   Limit switches     │        │ Inductive proximity  │
        │                      │        │ sensors              │
        └──────────────────────┘        └──────────────────────┘
```

liquid or gas?

**Yes**

No

No

**Ultrasonic sensors**



**Photo-electric sensors**



**Pressure switches**
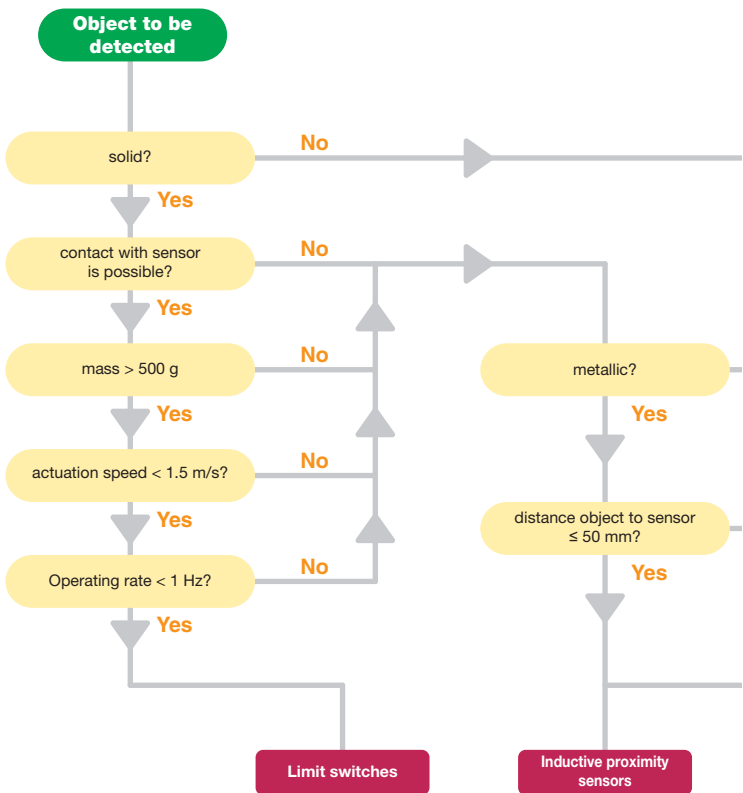
# Sectors

| | XC | XS |
|---|---|---|
| Machine tools | Recommended | Recommended |
| Food & beverage | Possible | Recommended |
| Packaging | Recommended | Recommended |
| Hoisting | Recommended | Possible |
| Conveying | Recommended | Recommended |
| Assembly | Recommended | Recommended |
| Wood industry | Recommended | Recommended |
| Automotive industry | Recommended | Recommended |
| Paper industry | Possible | Possible |
| Mines and minerals | Recommended | Possible |
| Pumping and water treatment | Possible | Possible |
| Railroad and embedded vehicules | Recommended | Recommended |
| Lifts & Escalators | Recommended | Recommended |
| Service industry & building | Recommended | Possible |

Recommended  Possible  Unsuitable

| XX | | | XU | | | XM | | |
|---|---|---|---|---|---|---|---|---|
| | | ☁️ | | | ☁️ | ☀️ | | |
| | 🌤️ | | | 🌤️ | | ☀️ | | |
| ☀️ | | | ☀️ | | | ☀️ | | |
| | 🌤️ | | | 🌤️ | | ☀️ | | |
| | 🌤️ | | ☀️ | | | ☀️ | | |
| | 🌤️ | | ☀️ | | | ☀️ | | |
| ☀️ | | | | | ☁️ | ☀️ | | |
| ☀️ | | | | 🌤️ | | ☀️ | | |
| ☀️ | | | ☀️ | | | ☀️ | | |
| | 🌤️ | | | 🌤️ | | ☀️ | | |
| ☀️ | | | | | ☁️ | ☀️ | | |
| | | ☁️ | | | ☁️ | ☀️ | | |
| | | ☁️ | ☀️ | | | ☀️ | | |
| | | ☁️ | ☀️ | | | ☀️ | | |

# XC Limit switches

## Technologies



**+**
Detection of all solid object by contact
Intuitive and easy to install
Dry contact and positive opening contact.

**−**
Head could be blocked with external materials (chips, sawdust,..)
Slow actuation speed (<1.5m/s)
Low operating rates due to mechanical contact (~1Hz)
wear of contact

## Choice criteria

### 1 - Choose the body

according to the environment:
location  to install and requested duty
Choose size of product and material of body.



90x40x40

XCKT
XCKP
XCKD
XCKM
XCKL
XCMD
XCKJ

Plastic
**Metal**

50x30x16

light duty          Environement - Application          High duty
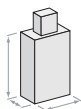
### 2 - Choose a head

according to the «object» to be detected
Detection movement type:
 linear, rotary, multidirectional
Plunger, lever, spring rod or cat whiskers

### 3 - Choose the contact

according to the automation function to achieve
Snap action or slow break , 2, 3 or 4 contacts; NO, NC…
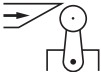
Snap
recommended

### 4 - Choose the electrical connection

according to facility standards or machine requirements…
M12onnector or screw clamp terminal with different tapped cable entries

# XC Limit switches

## Details

| | | | |
|---|---|---|---|
|  | presence of target for mechanical stop | Detection of machine internal pieces (cams, end stop..) | <br>end plunger |
|  | Cam by 30°<br>precise guidance < 1mm<br>Linear movment | | <br>roller plunger or roller lever |
|  | Cam by 30°<br>medium guidance ~5mm | | <br>roller lever |
|  | Plan face or cylindrical target<br>Linear or angular movment<br>Not precise guidance ~10mm | Direct detection of objects (in manufacturing or material handling process) | <br>rod lever |
|  | Any moving part<br>Multi-directional movment<br>Guidance > 10mm | | <br>"Cat's whiskers" |

# XS Proximity sensors

## Technologies



**＋** Detection of all metals (Fe, Al, Cu, …) without contacts (no touch)
High operating rates, fast response time and no wear, due to solid state technology for output
Excellent resistance to industrial environments

**－** Detects only metal objects
Short sensing distance -> 60mm

## Choice criteria

### 1 - Choose the body size
####  and the sensing distance

Ø x L

**XS1, 2, 4, 5, 6**

W x H x D

**XS7, 8**

according to the environment:
location to install and requested sensing distance
Size of product (diameter and lenght) and sensing distance.
The diameter is expressed in metric units-threaded like a screw
(Example: M8 for a diameter of 8mm...)

💡 choose a sensing distance double than distance object sensor

### 2 - Choose the output type

according to the load compatibility (contactor, PLC…)
DC3 wires 24V PNP, NPN, DC or AC/DC 2 wires 24-240V…

**DC3  24 V**   **AC/DC  24...240 V**   **DC2  24 V**

PNP

NPN

💡 48VDC possible refer to web or essential

### 3 - Choose the electrical connection

according to facility standards or machine requirements…
Cable, connector (M8, M12 in DC, 1/2» in AC/DC), screw clamp terminals.

### 4 - Choose the output signal & function.
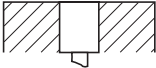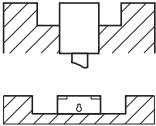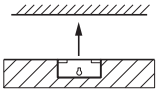
according to the automation function to achieve
Discrete (NO, NC, NO+NC)…

# XS Proximity sensors

**Details**

| | | | |
|---|---|---|---|
| (Metal)  | Distance sensor / target 0 to 20mm | Detection of machine internal pieces (cams, end stop..) | <br>XS cylindrical |
| (Metal)  | Distance sensor / target 0 to 60mm | Detection link to material handling (trolley, wagon,…) Direct detection of objects (metallic: engine block, can…) | <br>XS square or flat |

| | |
|---|---|
|  | Sensors suitable for flush mounting in metal:<br>No clearance required<br><br>The classical choice |
|  | Sensors not suitable for flush mounting in metal:<br>Side clearance required.<br>Sensing distance greater than that for a standard flush mountable model |
|  | Sensors suitable for flush mounting by teaching<br>The maximum sensing distance according to the environnement. Background suppression possible. |

# XX Ultrasonic sensors

## Technologies

Detection of any materials without contact (no touch)
Insensitive to color, transparency and coefficient of reflection
Very good resistance to industrial environments.

Sensitive to important changes of temperature, air flow, humidity
Sound-absorptive materials and oddly-shaped objects are difficults to detect.

## Choice criteria

### 1 - Choose the body size

### and the sensing distance

Ø x L

according to the environment:
location to install and requested sensing distance
Size of product (cylindrical or flat) and sensing distance
Material of body.

W x H x D

– Plastic
– Metal

### 2 Choose the output signal & function

according to the automation function to achieve
Discrete (NO, NC, NO+NC)…..or analog (0-10V, 4-20mA)

**DC3 24 V NO**

**DC4 24 V**
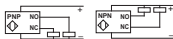
### 3 Choose the output type
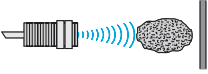
according to the load compatibility (contactor, PLC…)
DC3 wires PNP, NPN, DC or AC/DC 2 wires…Analogue 3/4 wires

### 4 Choose the electrical connection

according to facility standards or machine requirements…
Cable, connector (M8 or M12)

# XX Ultrasonic sensors

## Details

| | | |
|---|---|---|
| | Detection of hard object with flat surface perpendicular to the detection axis up to 8m. | Diffuse (proximity) mode |
| | Detection of pointy object: according to angle of reflection, sound could be reflected outside sensors receiver.<br>In this case use the sensor in a reflex (reflective) mode.<br>NO product becomes a NC product. | retroreflective mode |
| | Detection of sound absorbing object use the sensor in a reflex (reflective) mode.<br>NO product becomes a NC product. | retroreflective mode |

# XU photo-electric sensors

## Technologies

**+**

Detection of any objects without contact (no touch), opaque, shiny or transparent. Direct detection of objects(cases, pallet…), persons, vehicles (trolley, wagon,…)
Long ranges detection -> 60m
High operating rate. Available with background suppression

**–**

Not suitable for harsh environments: dirty, dusty
Temperature range limitations
Risk of interference between photocell themselves

## Choice criteria

### 1 - Choose the body / the system

### and the sensing distance

according to the environment and requested accuracy of detection
Balance between location to install, access to the object one or two sides, type of objet, sensing distance and acuracy of detection desired.
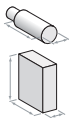
| Size (mm) | | XUB | XUM | XUK | XUX | |
|---|---|---|---|---|---|---|
| Size (mm) | ØxL | Ø18x46 | – | – | – | |
| Size (mm) | LxHxP | – | 11x33x20 | 18x50x50 | 30x92x71 | |
| Sensing range | | 15 m | 15 m | 30 m | 40 m | Thru beam |
| | | 4 m | 5 m | 7 m | 14 m | Reflex |
| | | 0,6 m | 1 m | 1 m | 2,1 m | Diffuse |

### 2 - Choose the output type

according to the load compatibility (contactor, PLC…)
DC3 wires 24V PNP, NPN, AC/DC 5 wires relay 24-240V…

**DC3  24 V**            **AC/DC Relay  24…240 V**
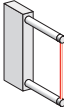
### 3 - Choose the electrical connection
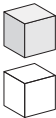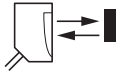
according to facility standards or machine requirements…
Cable, connector (M8, M12), screw clamp terminals (XUX).

### 4 - Choose the output signal & function

according to the automation function to achieve
Discrete (NO, NC, NO+NC)…

# XU photo-electric sensors

**Details**

| | | | |
|---|---|---|---|
| | Opaque target<br>accuracy ~1 mm<br>Long range (up to 40m)<br>(but necessary to install 2 parts<br>1 emmiter & receiver) | Thru beam or multimode<br>+ emitter | |
| | Opaque and non shiny target<br>accuracy ~10 mm<br>medium range (up to 15m)<br>clean environment | Reflex or multimode + reflector | |
| | Same with shiny target | Polarised reflex or multimode<br>+ reflector | |
| | Target with sufficient reflective<br>properties<br>short range (up to 2m depend<br>on target colour)<br>clean environment | Diffuse or multimode | |
| | Same but short range independent<br>of colour and/or with background<br>suppression | Diffuse with background sup-<br>pression or multimode | |
| | Very small target<br>Limited available space<br>High accuracy (< mm) | XU Fork | |

# XM Pressure switches and transmitters

## Technologies

Detection of any industrial fluids with contact (air, water, hydraulics oils, corrosive fluids...) from -1 to 600 bars ( -14.5 to 8000 Psi).
Discrete or analog output to measure a pressure, control or monitor tresholds.

## Choice criteria

**1 - Choose the family**

**Choose the fluid, fluid pressure and temperature**

according to the application
Need to manage threshold without constraint of response time

Electromechanical pressure switch with contact.

Need to manage threshold with quick response time or need to mesaure a pressure

Electronic pressure sensor solid state output and/or analogue.

**2 - Choose the output type**

according to the load compatibility (contactor, PLC…)
Contact  C/0, DC3 wires PNP, NPN,DC NO or NC...
Analog 3/4 wires

**3 - Choose the electrical connection**

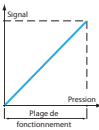Connector M12, DIN43650A or screw clamp terminals and tapped cable entry
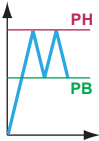
**4 - Choose the hydraulic connection**

according to facility standards or machine requirements…
G1/4A male,G1/4 female…

# XM Pressure switches and transmitters
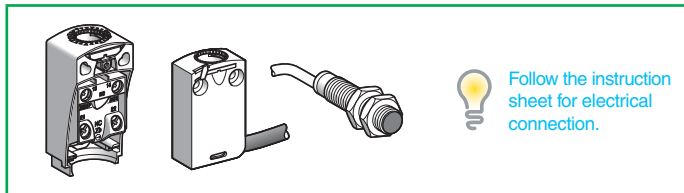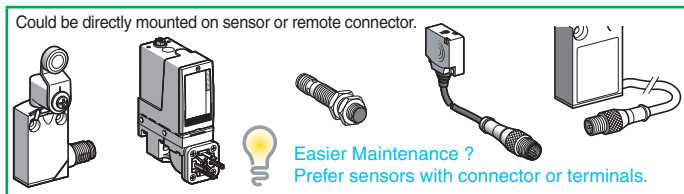
**Details**

| | | | |
|---|---|---|---|
|  | Detection of thresholds without constraints of response time<br>Fixed or adjustable differential<br>-1 to 500 Bars (-14.5 to 7250 Psi) | **XMLA/B** |  |
| | Detection of thresholds with quick response time<br>Adjustable differential<br>-1 to 600 Bars ( -14.5 to 8000 Psi) | **XMLF** |  |
|  | Transmission of continuous pressure variation<br>with adjustment<br>-1 to 600 Bars ( -14.5 to 8000 Psi) | | |
| | same<br>without adjustment | **XMLG** |  |

# Electrical connections

## sensors with cable / sensors with terminals



Follow the instruction sheet for electrical connection.

## Sensors with connector (Male on sensor)

Could be directly mounted on sensor or remote connector.



Easier Maintenance ?
Prefer sensors with connector or terminals.

## Connector type

Different type of connector exist. They are function of, number of wires to connect, size of sensor, facility standards or machine requirements…

| | |
|---|---|
| **M8**<br>3 or 4 pins in DC |  |
| **M12**<br>4 or 5 pins in DC |  |
| **1/2"**<br>3 pins in AC or AC/DC |  |
| **DIN**<br>connector in hydraulic |  |
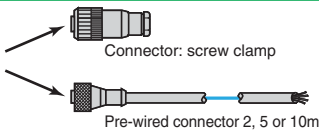
# Electrical connections

**Choose of female connector or female pre-wired connector**

| Selected sensors | Choose in table | |
|---|---|---|
| **For limit switches and pressure switches** | | |
| M12 4P | M12 4pin | female → Connector: screw clamp |
| M12 5P | M12 5pin | |
| DIN connector | DIN connector | → Pre-wired connector 2, 5 or 10m |
| **For inductives sensors** | | |
| XS…M8 | M8 3pin | |
| XS…M12 | M12 4pin | |
| XS…U20 | 1/2" 3pin | |
| **For photo-electric sensors** | | |
| XU…M8 | M8 4pin | |
| XU…M12 | M12 4pin | |
| XUR...M8 | M8 3pin | |
| **For ultrasonic sensors** | | |
| M8 3 pin | M8 3 pin | |
| M8 4 pin | M8 4 pin | |
| M12 4 pin | M12 4 pin | |

Follow the instruction sheet for electrical connection.

# Applications

For more complex sensing needs, refer to **www.schneider-electric.com,**
refer to Essential Guide of Detection or the Detection General Catalog for all information
relative to sensors described below.

## XC for special applications

| | |
|---|---|
| The most comprehensive offer of specials limits switches dedicated to severe environment and heavy duty service. Mainly for: hoisting handling, mining minerals metals and all others strong environmental constraints (foundry, welding automotive industries etc…) | |
| Severe duty for hoisting and materials handling applications | |
| Very well designed products for belt shift monitoring | |
| Cross Limit Switch. Dedicated products for overhead cranes and block hoists for end of travel control. | |
| Rotary Limit Switch | |

## Safety detection

| | |
|---|---|
| One of the most comprehensive offering of industrial safety switches on the market, complemented by a range of safety light curtains and safety mats for all the dangerous machines of all industrials sectors. Example: packaging, handling, robotics, machines tools, presses, automotive sector. | |
| Detection of gates or covers opening | |
| Guard switches with mechanical actuator | |
| Rotary lever and spindle operated guards switches for hinges guards | |
| Coded magnetic guard switches | |
| Detection of operators in free access zone | |
| Safety light curtains | |
| Safety mats | |

# Applications

## XS for special applications

| | |
|---|---|
| One of the most comprehensive catalogue of inductive sensors for general purpose plus for assembly machines, robotics, machine-tools, machining, packaging, materials handling, conveying..., and food and beverage industry. | |
| Rotation control, ferrous/non-ferrous discrimination, etc... | |
| Plastic case sensors for double insulation and chemicals environment compliance | |
| Miniature cylindrical format Plain 4 and 6.5mm or M5 for assembly applications… | |
| Stainless steel and plastic bodies for dedicated food & beverage applications | |
| Capacitive sensors XT range for detection of any object irrespective of material or conductivity | |

## XU for special applications

| | |
|---|---|
| An important choice of "applicative" products, mainly for dedicated offer for packaging, handling, assembly, conveying, food & beverage, complete the general purpose offer. | |
| Detection of transparencies materials | |
| Mark readers, luminescence sensors, color sensors | |
| Labels detection | |
| Aqueous liquid detection | |
| Laser technology sensors… | |

# Applications

## XCC rotary encoders

A range of innovate rotary encoders that are open to field BUS and makes it much more simple to parameter the resolution. Mainly for Industry, packaging, cutting machines, robots, cranes, materials handling, automatic dispensers, printing shops, continuous processes, conveyor systems…

| | |
|---|---|
| Incremental encoders, single turn or multiturns absolutes encoders | |
| Communicating absolute multiturn encoders | |

## XG RFID inductive identification system

With OsiSense XG, discover the RFID system, the most opened for a free choice of electronic tags and networks, and the simpler to install, connect and configure. Mainly for the conveying, material handling, logistic and building sectors… for various functions: flexible production workshops, traceability, access control…

| | |
|---|---|
| Compact stations with integrated controller and antenna | |
| 13.56MHz electronic tags | |
| Portable RFID terminal and network connection boxes | |