Ultrasonic sensors
XX range

Catalogue

Simply easy!™

Telemecanique
Sensors

Optimise detection with XX range

Detect objects in challenging applications with our XX ultrasonic sensors range. These ultrasonic sensors offer an efficient solution for reliable and high performance detection at distances of up to 8 m, on window mode*.

* The window mode enables suppression of the foreground and the background using the same sensor.

> A technology suited to your needs
Detect objects regardless lightning conditions or material reflectivity degree.

> 3 operating modes for efficient detection
Ideal for detecting irregular-shaped objects.

> Short or long distance detection
From 50 mm up to 8 m.

Contents

> A technology suited to your needs

Ultrasonic sensors enable non-contact detection of objects in many kinds of industrial environment, irrespective of :

• material (metal, plastic, wood, cardboard, etc.),
• nature (solid, liquid, powder, paste, etc.),
• colour,
• degree of transparency.

The ultrasonic sensors are simple to install; they feature integrated connectors, or cable versions in select models, and offer a wide range of cabling and mounting accessories for a seamless integration.

> 3 operating modes for efficient detection

Diffuse mode

An object reflects the ultrasonic wave back to the sensor which, in turn, changes the output state.
This operating mode is well suited for detecting objects with flat surfaces that are positioned perpendicularly to the direction of the ultrasonic beam.
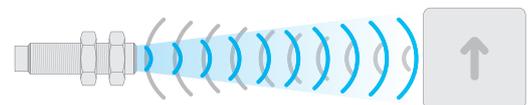
Reflex mode

The sensor is permanently detecting a fixed background (previously taught) on a machine or application. When another object breaks the ultrasonic beam, the output changes its state.

Well suited for detecting objects that absorb the ultrasonic waves (sponges, etc.) or that do not reflect the wave back to the sensor (non-flat surfaces, pointy or irregular-shaped objects).

Fixed background of machine
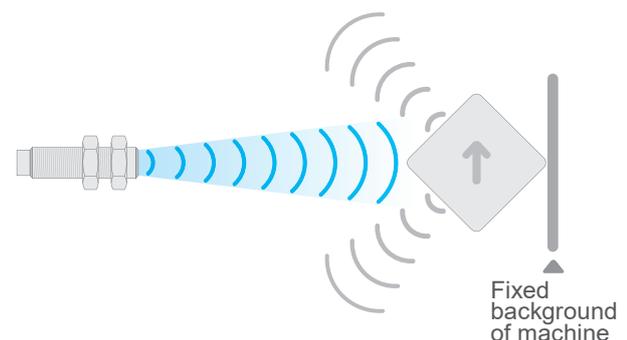
Thru-beam mode

The transmitter is constantly sending an ultrasonic wave to the receiver. When an object breaks the ultrasonic beam, the output changes its state.

Well suited for small object detection and applications where higher accuracy and faster response time are required.


Transmitter · Receiver

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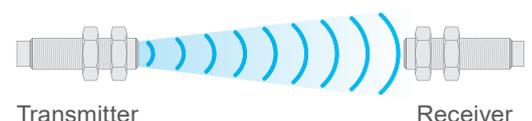
> Long distance proximity detection

Ultrasonic technology allows now for long distance proximity detection. The XXV Ø18 ultrasonic sensors enable detection from 0 to 50 mm (i.e. 2.5 times farther than standard inductive proximity sensors) with minimal environment constraints or object material and colour restrictions.

Sensors mounted too close to moving-metal parts are exposed to hits or impacts which can cause machine downtime. Being able to install sensors farther away from moving targets reduces the exposure to potential incidents.
You increase installation profitability!

x 2.5

detection distance than standard inductive proximity sensors

XXV Ø 18 sensor
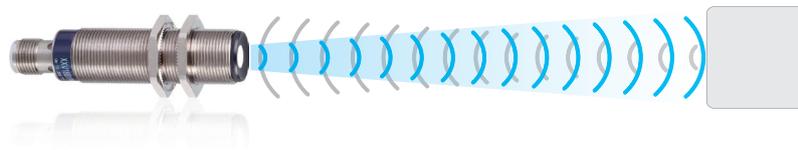
Standard inductive proximity sensor
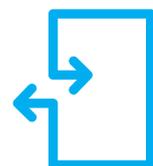
The XXV ultrasonic sensor is a "Plug and Play" solution with no adjustment or teaching required. Its solid-state output changes state when an object is less than 50 mm away from the sensor face.

Its accurate and well-defined transmission angle enables precise detection. Crosstalk with other sensors and object edge effects are mastered.
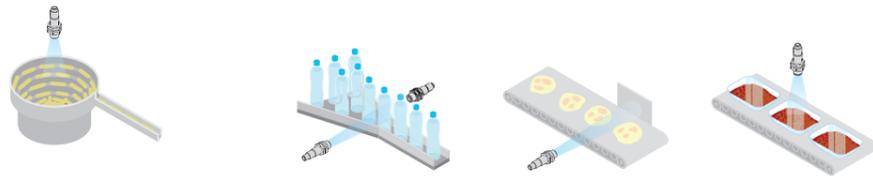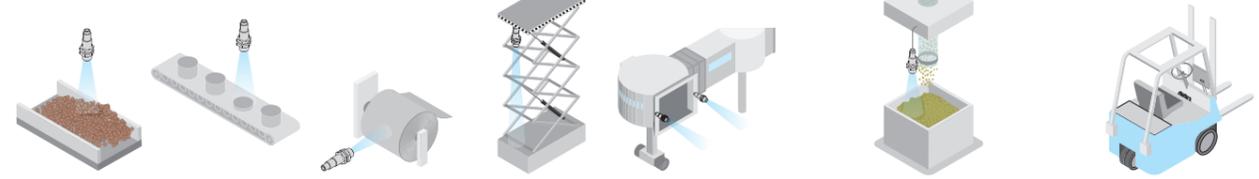
Plug & Play solution

100 %
Worldwide availability

Selection guide based on applications

Sensor type	Detection "Digital"							Regulation "Analogue output"					Level monitoring		Mobile equipment
	Assembly			Conveying			Packaging	Conveying	Packaging	Handling			Process		Handling
	Machine part	Vibrating bowl	Presence Absence	Transparent bottles	Jam	Flow	Transparent film	Material level	Height of part	Radius of strip roll	Height of elevating table	Aircraft boarding bridge	Monitoring 2 thresholds	Filling Emptying	Forklift
Ø 18 (M18x1)	●		●												
Ø 12 (M12x1)	●			○											
Ø 18 (M18x1)	●	●	●	○	■	■	●		●	●				●	●
Ø 30 (M30x1.5)	●				■	■		●	●	●	●	●	●	●	●
79x32.5+Ø 54												●			●
7.6x19x33			●			●	●								
16x30x74			●				●								
18x33x60 Ø 18 (M18x1)		●		●	■	■	●		●	●					
80x80x34					■	■		●			●	●			●

Legend

- ■ **Reflex mode**
- ○ **Thru-beam mode**
- ● **Diffuse mode**

Ultrasonic sensors
XX range
Cylindrical type

Applications
Non-contact detection of sound reflecting objects regardless their shape, material, colour, orientation, etc.

Sensors with solid-state digital output

Dimensions (mm)	Ø 12 (M12 x 1)			Ø 18 (M18 x 1)			Ø 18 (M18 x 1) (continued)	Ø 30 (M30 x 1.5)				Ø 18 (M18 x 1)	Ø 30 (M30 x 1.5)	
Sensing distance Sn — Diffuse	5 cm	10 cm	–	5 cm	15 cm	50 cm	–	1 m	1 m	2 m/4 m depending on model	8 m	50 cm	1 m/2 m depending on model	8 m
Reflex	–	–	–	–	–	50 cm	–	1 m	1 m	2 m/4 m depending on model	8 m depending on model	–	–	–
Thru-beam	–	–	20 cm	–	–	–	61 cm/1 m	–	–	–	–	–	–	–
Assured operating distance (mm)	6.4...51 fixed	6.4...102 fixed	–	2...50 fixed	25...152 fixed	Adjustable using teach mode	–	Adjustable using teach mode	Adjustable using teach mode			Adjustable using teach mode		
Power supply	12…24 V with protection against reverse polarity						12…24 V with protection against reverse polarity		12…24 V with protection against reverse polarity			12…24 V with protection against reverse polarity		
Type of output	PNP/NPN	NPN or PNP	PNP/NPN	PNP or NPN	PNP/NPN	NPN or PNP	PNP/NPN	PNP	PNP or NPN or PNP/NPN		PNP or NPN	PNP or NPN	PNP/NPN	PNP
Function	NO	NO	NO/NC	NO NC	NO	NO	NO NC	NO or NC (selectable)	NO or NC or NO+NC or NO+NO		NO + NC NO or NC (selectable)	NO	NO + NO	NO + NO
Degree of protection	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
Connection	M8 connector	M8 connector	M8 connector	M12 connector or pre-cabled	M12 connector	M12 connector or pre-cabled	M12 connector	M12 connector	M12 connector	M12 connector	M12 connector	M12 connector	M12 connector	M12 connector
Sensor type	XX512A1●	XX512A2●	XX●12A8●	XXV18B1●	XX518A1●	XX518A3●	XX●18A3● XX●18A4●	XX●18●1PM12	XX●30●●1PM12 XX6V3A1● XX630A1●	XX●30●●2PM12 XXS30●●4PM12 XX630A2●	XX630A3● XXS30P8PPM12 XXS30P8NNM12	XX218A3●	XX230A1● XX230A2●	XX230A3●
Page	22			22		26	26	30	36 and 42			40		(1)

Sensors with analogue output

Dimensions (mm)	Ø 18 (M12 x 1)		Ø 30 (M30 x 1.5)			
Sensing distance Sn	50 cm	1 m	1 m	2 m	4 m	8 m
Assured operating distance (mm)	Adjustable using teach mode	Adjustable using teach mode	Adjustable using teach mode			
Power supply	12…24 V with protection against reverse polarity	12…24 V or 24 V, depending on model, with protection against reverse polarity	12…24 V or 24 V, depending on model, with protection against reverse polarity			
Type of output	4-20 mA or 0-10 V	4-20 mA or 0-10 V	4-20 mA or 0-10 V			4-20 mA or 0-10 V PNP, NO or NC (selectable)
Degree of protection	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
Connection	M12 connector	M12 connector	M12 connector	M12 connector	M12 connector	M12 connector
Sensor type	XX918A3●	XX●18●1AM12 XX●18●1VM12	XX●30●1●M12 XX9V3A1● XX930A1●	XX●30●2●M12 XX930A2●	XXS30●4●M12	XX930A3● XXS30P8APM12 XXS30P8VPM12
Page	26	30	36	36	42	36 and 42

(1) Please visit our website: www.tesensors.com

Ultrasonic sensors
XX range
Flat format

Applications
Non-contact detection of sound reflecting objects regardless their shape, material, colour, orientation, etc.

Sensors with solid-state digital output
Flat format

Dimensions (mm)	7.6 x 19 x 33	16 x 30 x 74

Sensing distance Sn	Diffuse	10 cm	25 cm
	Reflex	–	–
	Thru-beam	–	–
Assured operating distance (mm)		6.4...100 fixed	51...250 fixed
Power supply		12...24 V ⎓ with protection against reverse polarity	
Type of output		NPN or PNP	PNP
Function		NO	NO
Degree of protection		IP 67	IP 67
Connection		M12 connector on flying lead	M12 connector
Sensor type		**XX7F1A2●**	**XX7K1A2PAM12**
Page		72	72

Sensors with solid-state digital output and analogue output
Format for mobile equipments

Dimensions (mm)	79 x 32.5 + Ø 54		

Sensing distance Sn	3 m		
Assured operating distance (mm)	0.425...3		
Power supply	⎓ 12...24 V with protection against reverse polarity		
Type of output	0.5 - 4.5 V + PNP or 4-20 mA + PNP or CAN J1939 (depending on model)		
Degree of protection	IP 65, IP 67, IP 69K	IP 65, IP 67	IP 65, IP 67, IP 69K
Connection	Deutsch DTM04 connector on flying lead (0.15 m)	M12 connector on flying lead (0.15 m)	Pre-cabled (0.5 m)
Sensor type	**XXW54P3●PL01DM6**	**XXW54P3●PL01DM12**	**XXW54P3●PL05**
Page	63	63	63

Sensors with solid-state digital output
Flat format

Dimensions (mm)	18 x 33 x 60 + Ø 18 (M18 x 1)	80 x 80 x 34

Sensing distance Sn	Diffuse	50 cm (adjustable)	1 m (adjustable)
	Reflex	50 cm (adjustable)	1 m (adjustable)
	Thru-beam	–	–
Assured operating distance (mm)		Adjustable using teach mode	
Power supply		12...24 V ⎓ with protection against reverse polarity	
Type of output		NPN or PNP	NPN or PNP
Function		NO	NO
Degree of protection		IP 67	IP 67
Connection		M12 connector	M12 connector
Sensor type		**XX7V1A1●AM12**	**XX8D1A1●AM12**
Page		72	72

Sensors with analogue output
Flat format

Dimensions (mm)	18 x 33 x 65 + Ø 18 (M18 x 1)		80 x 80 x 34	

Sensing distance Sn	50 cm (adjustable)		1 m (adjustable)	
Assured operating distance (mm)	Adjustable using teach mode		Adjustable using teach mode	
Power supply	12...24 V ⎓ with protection against reverse polarity	24 V ⎓ with protection against reverse polarity	12...24 V ⎓ with protection against reverse polarity	24 V ⎓ with protection against reverse polarity
Type of output	4-20 mA	0-10 V	4-20 mA	0-10 V
Degree of protection	IP 67	IP 67	IP 67	IP 67
Connection	M12 connector	M12 connector	M12 connector	M12 connector
Sensor type	**XX9V1A1C2M12**	**XX9V1A1F1M12**	**XX9D1A1C2M12**	**XX9D1A1F1M12**
Page	73		73	

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Feeder bowl supply control
XXS18, XXA18, XX7V1A1

Supply conveyor stops
when sensing parts
outside of
sensing window
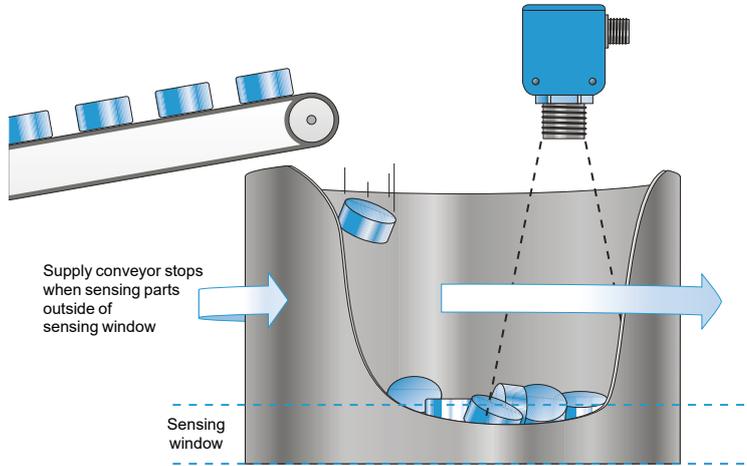
Sensing
window

Conveyor jam and backup detection
XXS18, XXA18, XXB18A3

Background
Target
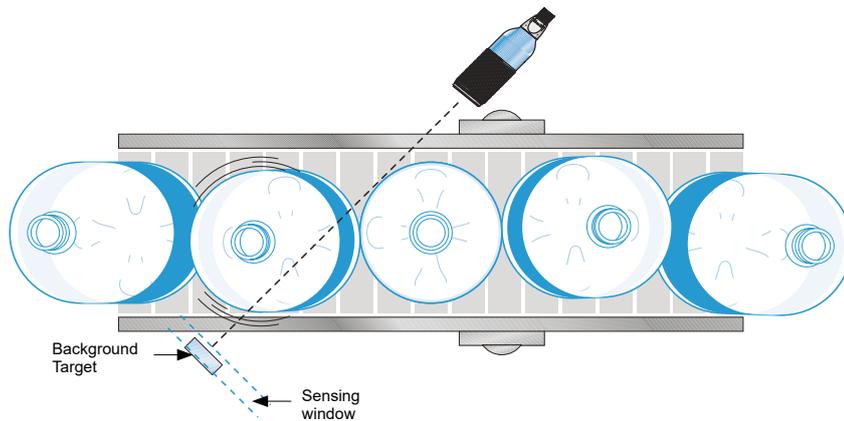
Sensing
window

Web process control sensing functions
XXS18, XXS30

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Sensors
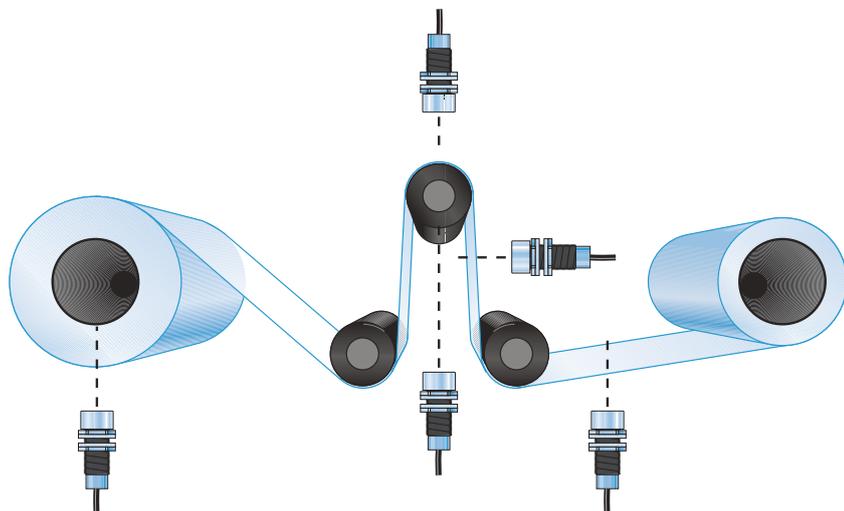
Dual level high-low latch control detection of liquids
XXS30P8, XX230A3

Alarm Level

High Limit
Level

Low Limit
Level
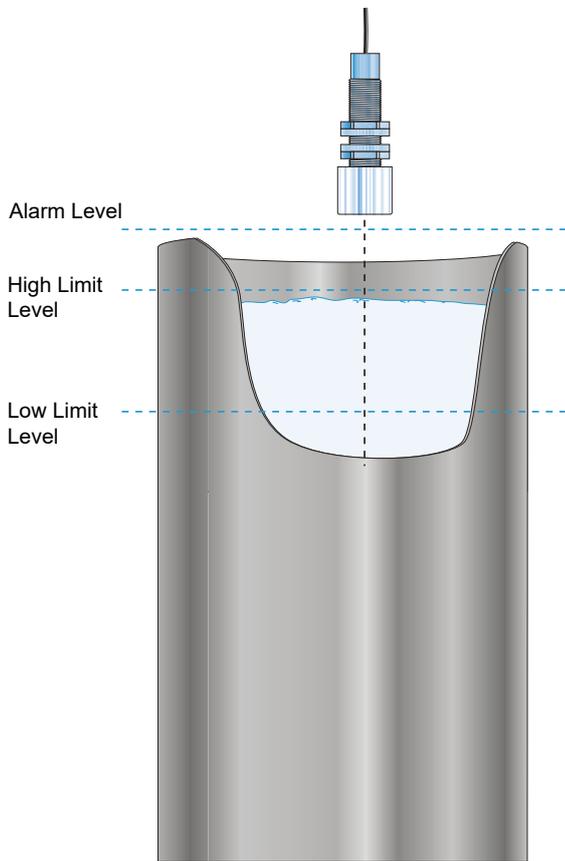
High level detection
XXS30P8, XX630A3

High Limit
Level

Low Limit
Level
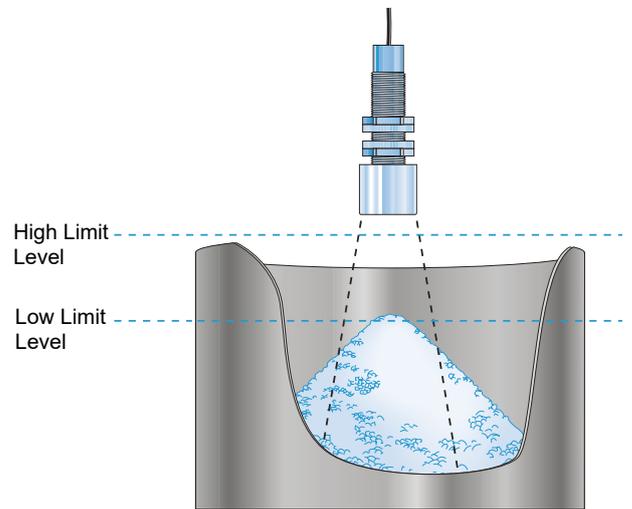
Accurate high speed counting of cylindrical clear objects
XXT18 + XXR18

Ultrasonic sensors
XX range
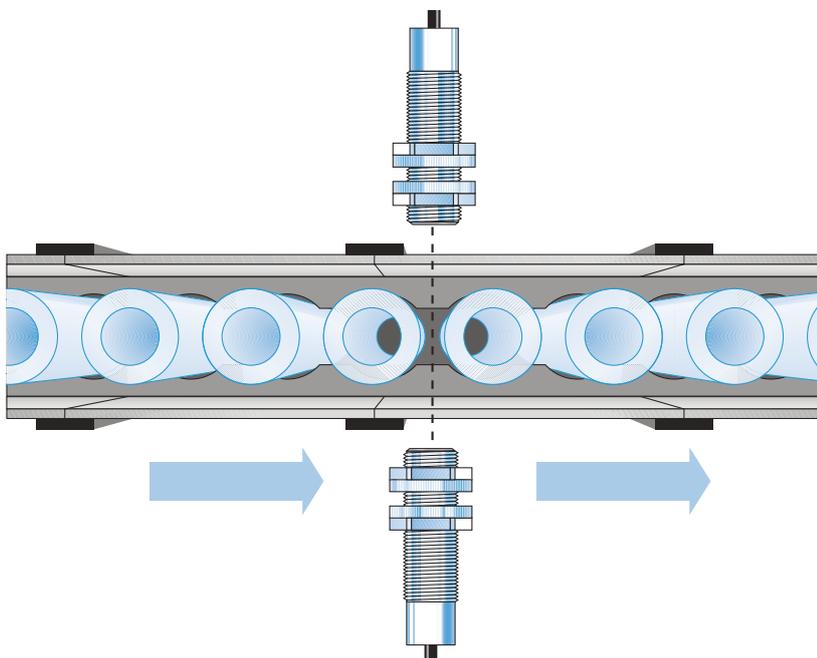
Glue bead detection
XXV18
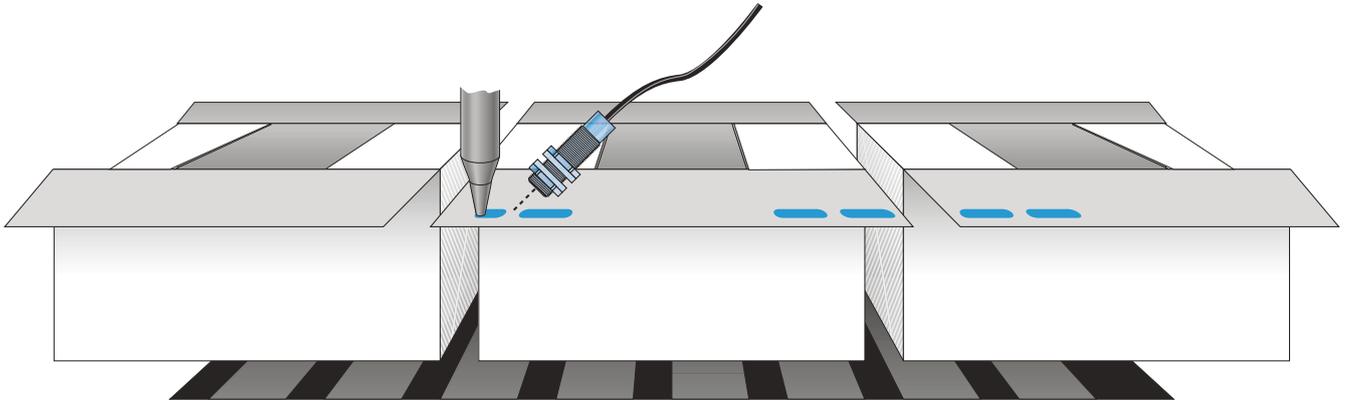
Label edge detection on carrier web
XX7K, XX7F (flat format)**, XX518A3** (M18)

Flat profile

18 mm
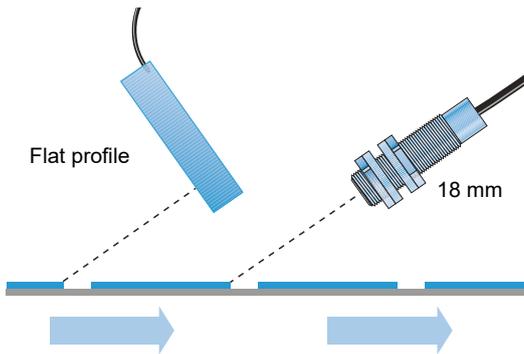
Clear bottle detection for sustainable environments
XXS18, XXA18, XXB18

Sensing window

Near limit

Far limit

Fixed Background Target

Broken wire/thread detection
XXV18

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Ultrasonic sensors
XX range
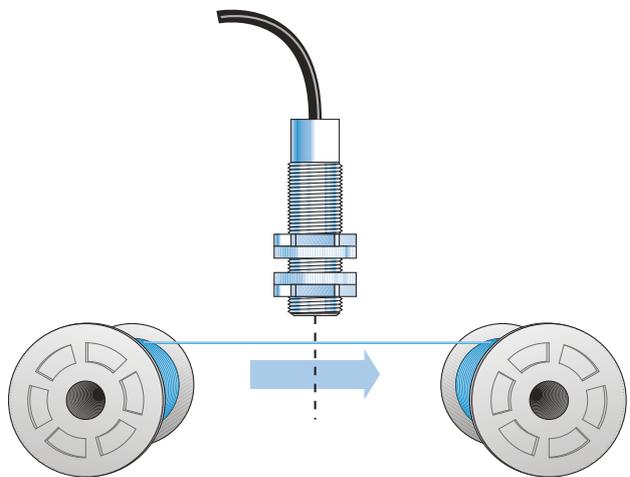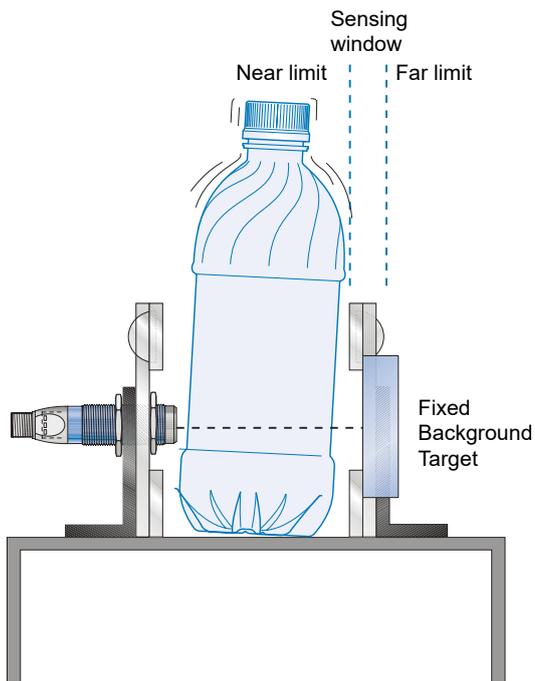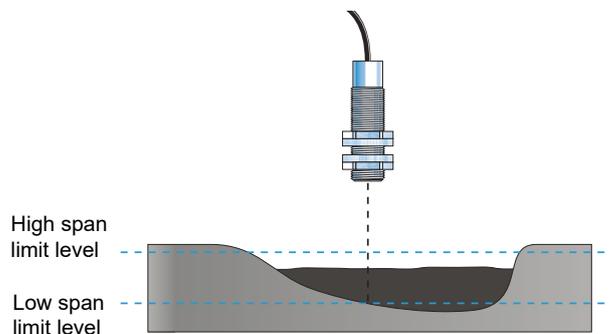
Missing cap detection low cap supply
Automatically stops filler and capper
XX512
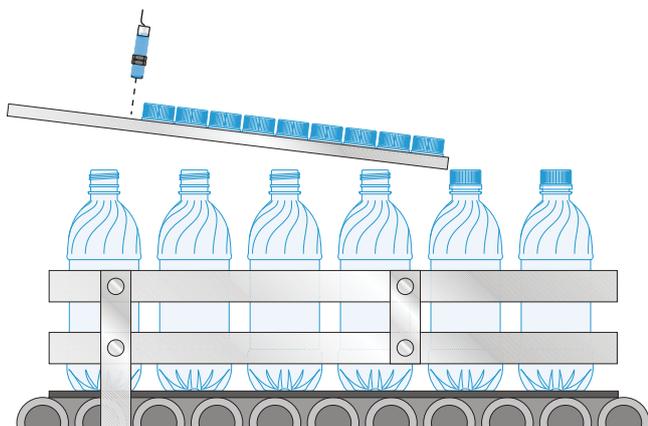
Continuous level monitoring
Analog output sensors
XXS18, XXS30, XX918, XX930

High span
limit level

Low span
limit level

Dual level high-low latch control detection
XXS30●●PM12, XX230

Limit Level
High Limit

Low Limit
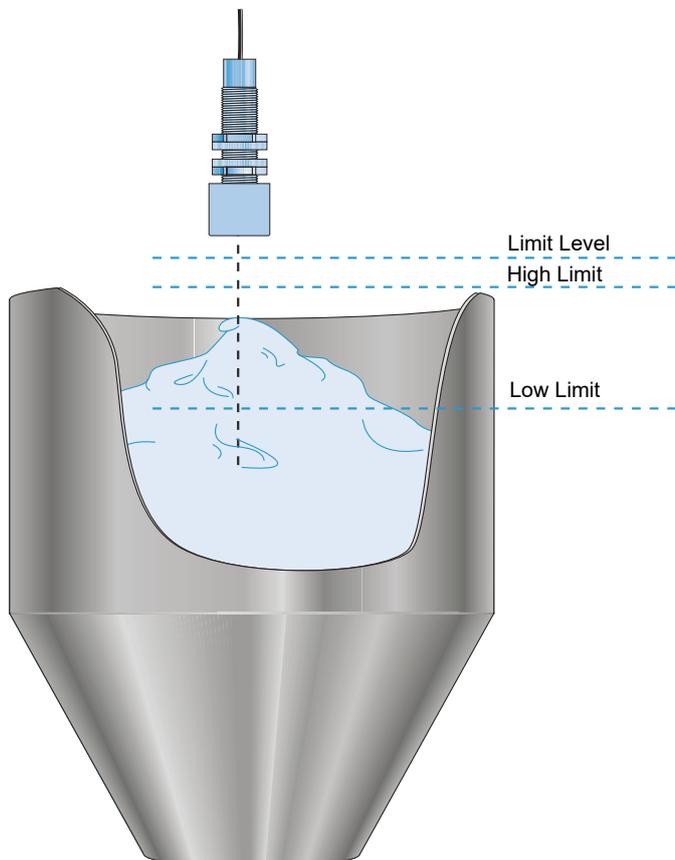
Lead edge or backup detection
XXT18 and XXR18
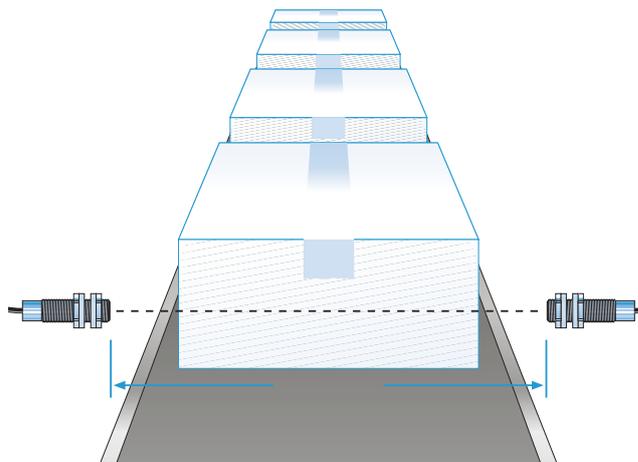
Clear bottle detection
XXT12 and XXR12
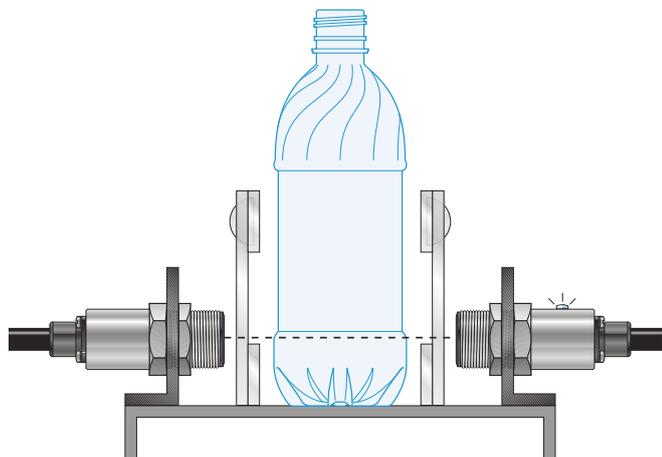
Container detection
XX7F1
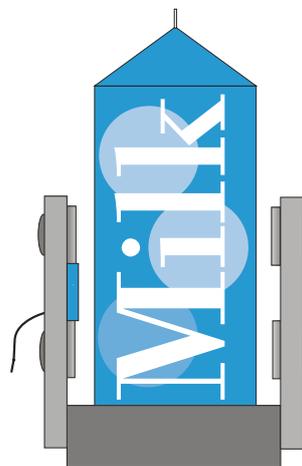
Metal material detection
XX512
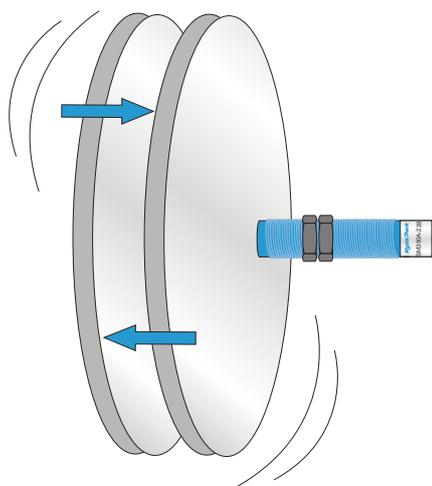
Missing cap detection
XX518
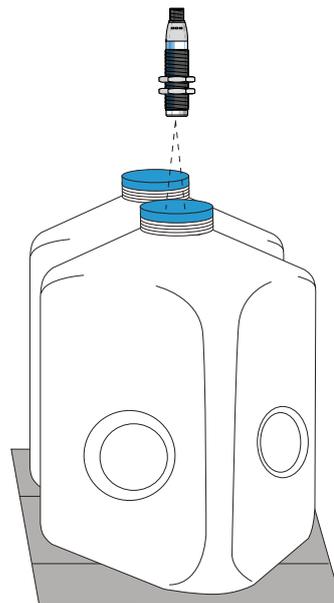
Clear web detection
XX512

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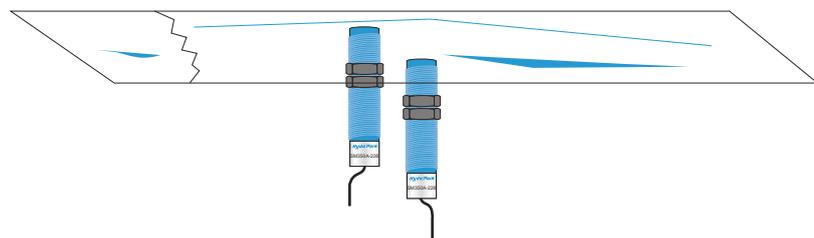
Container detection
XX7F1
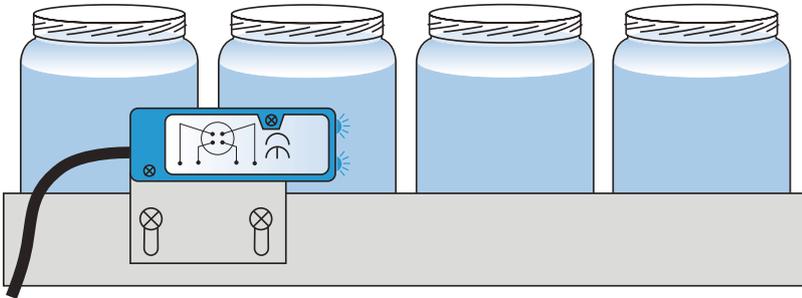
Clear cellophane panel detection
XX7F1A2

Cellophane Panel

Far limit
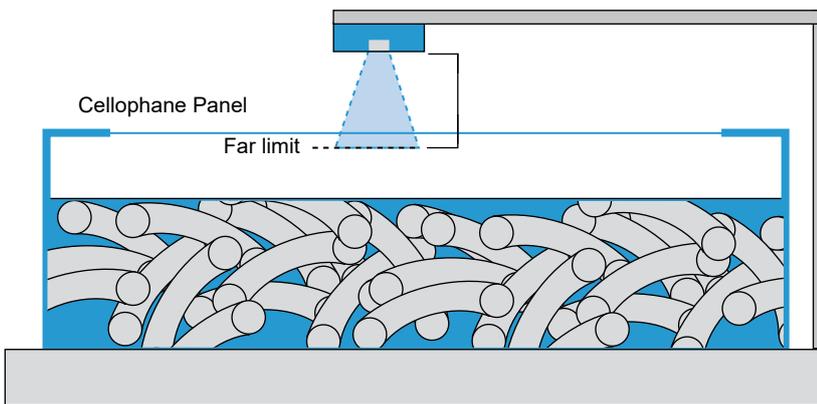
Single file jam protection
Dual level latch control sensor
XX218 and XX230

Container Stop

Far limit

Background Targets

Near limit

Container Flow
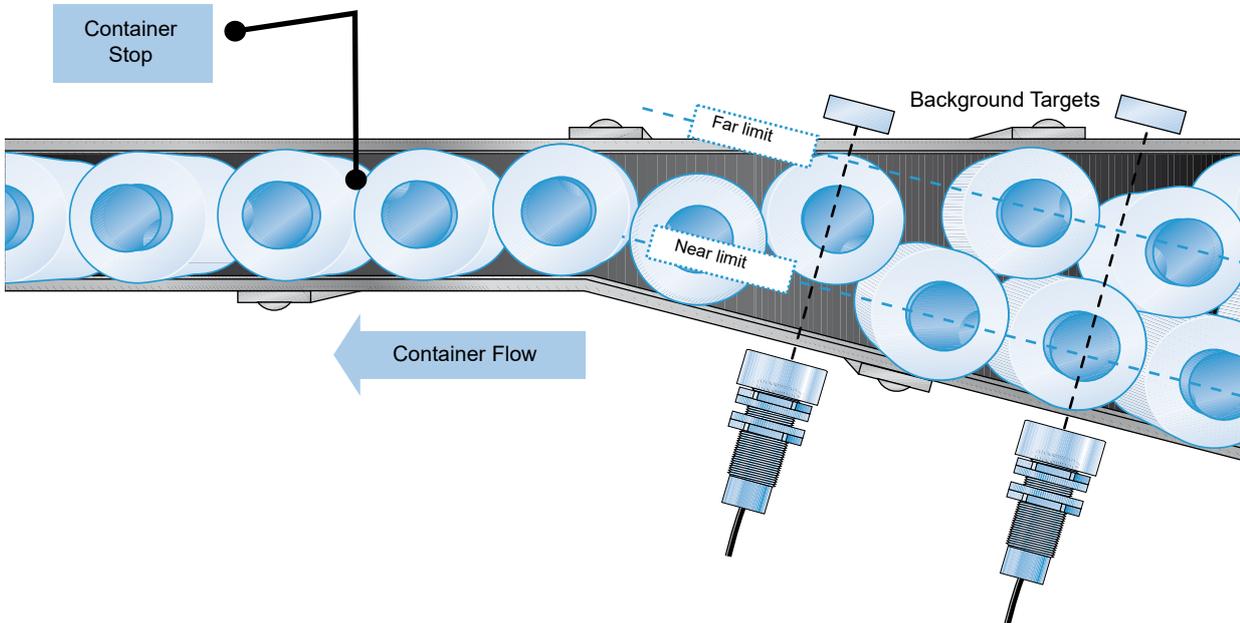
Ultrasonic sensors
XX range

Quality control

The XX ultrasonic sensors models are subjected to special precautions in order to guarantee their reliability in arduous industrial environments.

■ **Qualification**
A **qualification procedure** on the characteristics of XX range ultrasonic sensors is carried out in our laboratories.

■ **Production**
The electrical characteristics and the sensing distances at the ambient and operating temperatures are 100% verified.
Sensors are statistically selected during the course of production and subjected to **monitoring tests** on all qualified characteristics.

■ **Customer returns**
Returned ultrasonic sensors are subjected to systematic analysis and corrective actions are implemented to eliminate recurrence of the fault.

Conformity to standards

The XX ultrasonic sensors models conform to the standards IEC 60947-5-2.
Standards and characteristics: refer to pages 23, 27, 32, 38, 41, 45, 46, 50, 54 and 58.

Resistance to chemicals in the environment

To ensure lasting efficient operation, it is essential that any chemicals coming into contact with the ultrasonic sensors will not affect their casing and, in doing so, prevent their reliable operation.

Due to the materials used, the XX ultrasonic sensors models are very resistant to:

■ Chemical agents:
salts, aliphatic and aromatic oils,
petroleum, diluted bases and acids.
Depending on their nature and concentration, tests should be carried out beforehand for the following chemical agents:
alcohols, ketones and phenols.

■ Food and beverage industry products:
vegetable oils, animal fats,
fruit juices,
milk proteins, etc.

Resistance to the environment

■ **IP 65**: protection against water jets.
Tested in accordance with IEC 60529: the device is subjected to water sprayed from a Ø 6.3 mm nozzle, at a flow rate of 12.5 litres/min for 3 min at a distance of 3 m.
No deterioration in either operating or insulation characteristics is permitted.

■ **IP 67**: protection against the effects of immersion.
Tested in accordance with IEC 60529: the sensor is immersed for 30 minutes in 1 m of water.
No deterioration in either operating or insulation characteristics is permitted.

■ **IP 69K**: protection against the effects of high pressure cleaning. Adherence to standard DIN 40050 which stipulates that the product must withstand a water jet at a pressure of 90 bar and temperature of +80°C for 3 minutes.
No deterioration in either operating or insulation characteristics is permitted.

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Ultrasonic sensors
XX range

Recommendations

The ultrasonic sensors are designed for use in standard industrial applications involving presence detection.
Since these sensors do not incorporate a redundant electrical circuit, they are not suitable for use in safety applications.
For safety applications, please refer to our website www.tesensors.com

Principle of ultrasonic detection
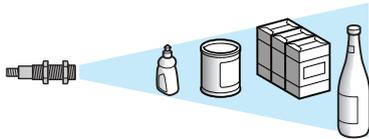
Presentation

Ultrasonic sensors enable detection, without contact, of objects irrespective of its:
■ material (metal, plastic, wood, cardboard, etc.),
■ nature (solid, liquid, powder, etc.),
■ colour,
■ degree of transparency.

They are used in industrial applications for detecting, for example:
■ the position of machine parts,
■ the presence of the windscreen during automobile assembly,
■ the flow of objects on a conveyor system: glass bottles, cardboard packages, cakes, etc.,
■ the level
- of different colour paints in pots,
- of plastic pellets in injection moulding machine feeders.

The ultrasonic sensors are simple to install due to their integral connector and availability of cabling and fixing accessories.


Operating principle

The principle of ultrasonic detection is based on measuring the time taken between transmission of an ultrasonic wave (pressure wave) and reception of its echo (return of transmitted wave).

The XX ultrasonic sensors models comprise:
1 a high voltage generator
2 a piezoelectric transducer (transmitter and receiver)
3 a signal processing stage
4 an output stage

Excited by the high voltage generator **1**, the transducer (transmitter-receiver) **2** generates a pulsed ultrasonic wave (200 to 500 kHz depending on the product) which travels through the ambient air at the speed of sound. When the wave strikes an object, it reflects (echo) and travels back towards the transducer. A micro controller **3** analyses the signal received and measures the time interval between the transmitted signal and the echo. By comparison with the preset or taught times, it determines and controls the output states **4**.
The output stage **4** controls a solid-state switch (PNP or NPN transistor) corresponding to a NO or NC contact (detection of object).
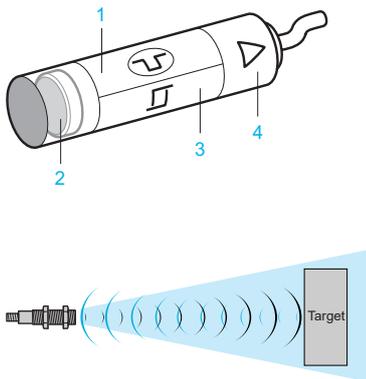
Advantages of ultrasonic detection

■ No physical contact with the object to be detected, therefore, no wear and detection possible of fragile and/or freshly painted objects, etc.
■ Detection of materials, irrespective of colour, at the same distance, without adjustment or correction factor.
■ Teach mode function, by simply pressing a button, for defining the effective detection zone. Teaching of the minimum and maximum sensing distances (very precise foreground and background suppression, ± 6 mm).
■ Very good resistance to industrial environments (robust products entirely encapsulated in resin).
■ Solid-state units: no moving parts in the sensor, therefore, service life independent of the number of operating cycles.
■ Various types of outputs to suit requirements:
- Digital output for level control or detection of any type of object
- Analogue output for controlling systems that require a signal that is proportional to the distance at which the object is detected.

Ultrasonic sensors
XX range

Terminology

Blind zone
Detection zone (Sd)
Overall beam angle
Standard metal target
Reference axis
90°
Minimum sensing distance
Assured operating distance (Sa)
Sn
Maximum sensing distance

PR PE
Frontal approach
Sensing distance
H
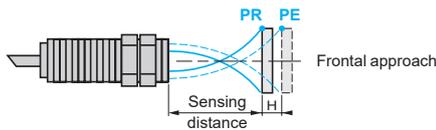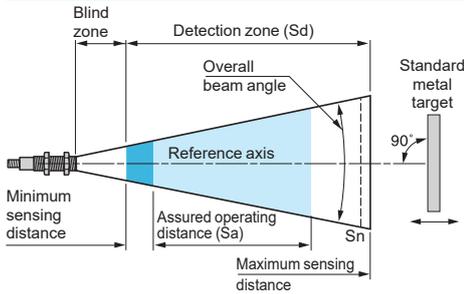
PR = drop-out point
PE = pick-up point

Ud
V

Power supply
Sensor output
1
2
t
1 2

Object to be detected
Sensor output
Ra
Rr
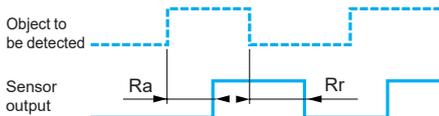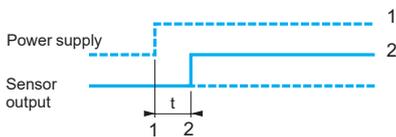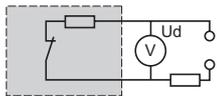
Definitions

The terms listed below are defined by the standard IEC 60947-5-2:

■ Nominal sensing distance (Sn)
Conventional value for indicating the sensing distance. It does not take into account manufacturing tolerances nor variations caused by external conditions such as voltage and temperature.

■ Detection zone (Sd)
Zone in which the sensor is sensitive to objects.

■ Minimum sensing distance
Lower limit of the specified detection zone.

■ Maximum sensing distance
Upper limit of the specified detection zone.

■ Assured operating distance (Sa)
This corresponds to the operating zone of the sensor (activation of outputs), and is included in the detection zone. It is also known as the "detection window".
Its limits are fixed:
- at the factory for fixed sensing distance sensors,
- when setting-up within the application for sensors with teach mode.

■ Blind zone: Zone located in front of the sensing face of the sensor.
For diffuse sensors, it is the zone in which the object will not be reliably detected.
For reflex sensors, it is the zone in which the target (fixed background of machine for example) will not be reliably detected, but the object can be in this zone.
For thru-beam sensors, there is no blind zone.

■ Differential travel
The differential travel (H) or hysteresis is the distance between the pick-up point as the standard metal target moves towards the sensor and the drop-out point as it moves away from the sensor.

■ Repeat accuracy
The repeat accuracy (R) is the precision of reproduction between two successive measurements of the sensing distance, made in identical conditions.

■ Overall beam angle
Fixed angle around the reference axis of an ultrasonic proximity sensor.

■ Standard metal target
The standard IEC 60947-5-2 defines the standard target as a square metal plate, 1 mm thick with rolled finish, placed perpendicularly to the reference axis.
Its side dimension depends on the detection zone:

Detection zone (mm)	Size of target (mm)
< 300	10 x 10
300 < d < 800	20 x 20
> 800	100 x 100

■ Voltage drop (Ud)
The voltage drop (Ud) corresponds to the voltage at the terminals of the sensor when in the closed state (value measured at the nominal current of the sensor).

■ First-up delay
Time required to ensure operation of the sensor's output signal following power-up.
1 Power-up
2 Output signal state (0 or 1)

■ Response time
Response time (Ra): time taken between the instant the object to be detected enters the active zone and the changing of the output signal state. This time limits the passing speed of the target in relation to its dimensions.
Recovery time (Rr): time taken between the object being detected leaving the active zone and the changing of the output signal state. This time limits the interval between 2 objects.

Telemecanique
Sensors

Ultrasonic sensors
XX range

Digital outputs

		NO output	NC output
No object present			
Diffuse mode	LED	⊗	☀
Thru-beam mode	Output state		
Reflex mode *(1)*			
Object present			
Diffuse mode *(2)*	LED	☀	⊗
Thru-beam mode	Output state		
Reflex mode *(1)*			
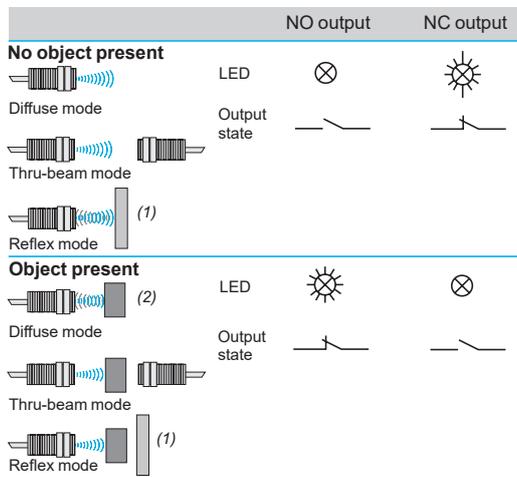
(1) Fixed background of machine
(2) Object

NO contact

NC contact

LED indicators

The majority of XX ultrasonic sensors models incorporate light-emitting diode output state indicators.

- Ø 12 sensor
  □ Green LED (power on)
  □ Yellow LED (object present)

- Ø 18 sensor, sensitivity 500 mm (except thru-beam versions XXT18 and XXR18)
  □ Yellow LED (object present) or green LED (power on) + user assistance when adjusting the detection zone

- Ø 30 sensor
  □ Multicolour LED for assisting the user when adjusting the detection distance
  □ Yellow LED (object present)
  □ Analogue version with LED (object present, with luminosity increasing as output signal increases)

- Parallelepiped format sensor
  □ XX●F: Dual colour yellow (object present) or green (power on) LED
  □ XX●V: Dual colour yellow (object present) or green (power on) LED + user assistance when adjusting the detection zone
  □ XX7K: Yellow LED (object present); green LED (power on)
  □ XXTK: Yellow LED (object present) only
  □ XX●D: Yellow LED (object present); green LED (power on)
  □ Analogue version with LED (object present, with luminosity increasing as output signal increases)
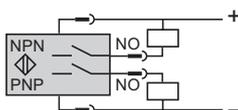
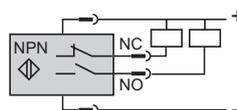## Sensors with digital switching
Output contact logic

- NO contact (normally open)
Corresponds to a sensor whose output changes to the closed state when an object is present in the detection window.
- NC contact (normally closed)
Corresponds to a sensor whose output changes to the open state when an object is present in the detection window.
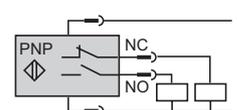
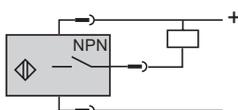### 4-wire technique ⎓

NO output/PNP and NPN	NO + NC output/NPN	NO + NC output/PNP

These sensors comprise 2 wires for the supply and 1 wire for each output signal

3-wire technique ⎓

NO output/NPN	NO output/PNP
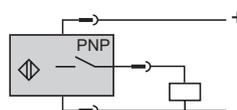
These sensors comprise 2 wires for the supply and 1 wire for the output signal,
PNP type: switching the positive side to the load.
NPN type: switching the negative side to the load.

Sensors with analogue output
Operation

The characteristic feature of these sensors is the output which delivers a signal (either current or voltage) that is proportional to the distance of the object being detected. Within the detection limits, which are adjustable using teach mode, the value of the output signal increases or decreases in relation to the distance of the object.
When an object is detected, an LED indicator (D) illuminates and its luminosity increases in relation to the value of the output signal. The slope of the signal can simply be changed by pressing the teach button

Detection limits (adjustable)

Blind zone

Object

LED

10 V / 20 mA

0 V / 4 mA

Output
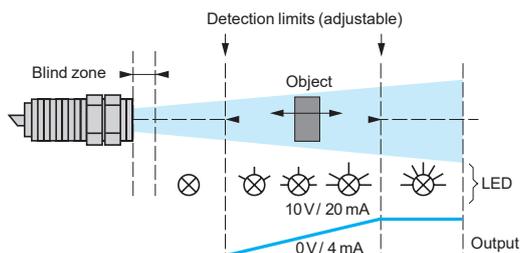
Advantages

- Visual information available relating to the sensor/object distance.
- Protection against reverse polarity.
- Protection against overloads and short-circuits.
- No residual current, low voltage drop.

Ultrasonic sensors
XX range

Sensors for DC circuits

- **DC source:** Check that the voltage limits of the sensor and the acceptable level of ripple, are compatible with the supply used.

- **AC source** (comprising transformer, rectifier, smoothing capacitor): The supply voltage must be within the operating limits specified for the sensor.

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

Example:
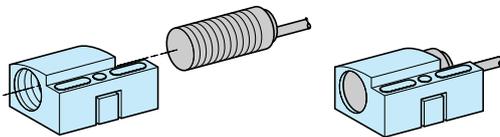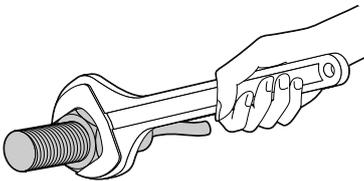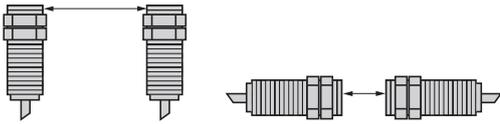18 V $\sim$ to obtain 24 V $\overline{\cdots}$,
36 V $\sim$ to obtain 48 V $\overline{\cdots}$.

Setting-up precautions

For diffuse sensors:

Mounting

Mounting distance between ultrasonic sensors

If 2 standard sensors are mounted too close to each other, the wave transmitted by one sensor is likely to interfere with the other and result in erratic operation.
In order to avoid this, it is necessary to adhere to the minimum distances between sensors. See setting-up precautions.

Maximum tightening torque

Cylindrical sensors	Diameter mm	Tightening torque		Flat sensors	Screw	Tightening Torque
XX●12●	Ø 12	0.7 N.m/ 0.52 lb-ft		XX●F●	M3	0.7 N.m/ 0.52 lb-ft
XX●18●	Ø 18	1 N.m/ 0.74 lb-ft		XX●K●	M4	1 N.m/ 0.74 lb-ft
XX●30●	Ø 30	1.35 N.m/ 1 lb-ft		XX●V●	M3	0.7 N.m/ 0.52 lb-ft
XX●V3●	Ø 30	1.35 N.m/ 1 lb-ft			Ø 18	1 N.m/ 0.74 lb-ft
XXS18*/ XXA18*	Ø 18 (Plastic)	2 N.m / 1.47 lb-ft				
	Ø 18 (Metal)	15 N.m / 11.06 lb-ft				

Interchangeability

Interchangeability is made easy by using **indexed** fixing clamps:
XSZB112 (Ø 12 mm),
XSZB118 (Ø 18 mm),
XSZB130 (Ø 30 mm),
XXZB118 (Ø 18 mm),

XSZB1●●

Cabling

Electrical connection

- **Connect the sensor before switching on the supply**

- **Length of cable**
No limitation up to 200 m or up to a line capacitance of < 0.1 μF.
It is, however, advisable to take into account the voltage drop on the line.

- **Separation of control and power cables**
The sensors are immune to electrical interference encountered in normal industrial conditions.
Where extreme conditions of electrical "noise" could occur (large motors, spot welders, etc.), it is advisable to protect against transients in the normal way:
- suppress interference at source,
- separate power and control wiring from each other,
- smooth the supply,
- limit the length of cable.

Telemecanique
Sensors

Setting-up precautions (continued)

Sensor 1

Sensor 2

Sensor 3

1

2

Fixed
background of
machine

3

45°

Target

4

45°

Fixed background
of machine

5

Transmitter   Receiver

: transmitted wave
: received wave
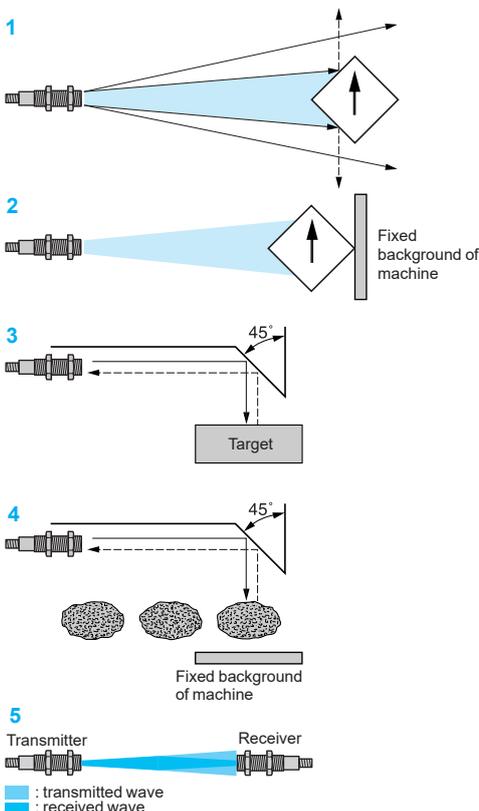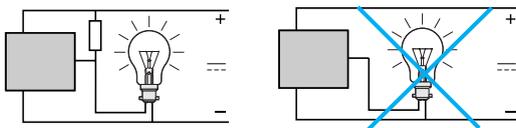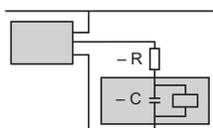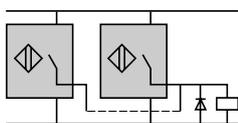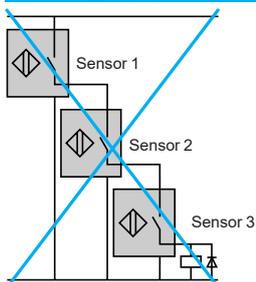
Connection in series

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:
Sensor 1 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, each sensor will produce a voltage drop and, therefore, the load voltage should be selected accordingly.
As sensor 1 closes, sensor 2 will not operate until a certain time "T" has elapsed (corresponding to the first-up delay) and likewise for the following sensors in the sequence.
"Flywheel" diodes should be used when the load being switched is inductive.

Sensors and units in series with an external mechanical contact
■ 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 will not operate until a certain time "T" has elapsed (corresponding to the first-up delay).

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

Capacitive load (C > 0.1 mF)
■ At switch-on, 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 calculation of R.

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

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

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

Detection

Influencing factors

The ultrasonic sensors are particularly suited for the detection of objects that are capable of reflecting an acoustic wave and, in general, having a flat surface perpendicular to the detection axis. However, the correct operation of the ultrasonic sensor can be disrupted by:
- air currents, which can accelerate or divert the acoustic wave transmitted by the sensor (ejection of part by air jet),
- high temperature gradients within the detection zone: an object emitting considerable heat can create zones of varying temperature that will modify the propagation time of the wave and thus prevent reliable operation,
- sound insulators: sound absorbing materials (cotton, fabrics, rubber, etc.),
- the angle between the face of the object to be detected and the reference axis of the sensor: when the angle is offset from 90°, the wave is no longer reflected back along the sensor axis and the operating distance is reduced. The greater the distance between the sensor and the target, the greater the effect. Detection is not possible when the angle exceeds ± 10°.
- the shape of the object to be detected: similar to the example above, an excessively angular object can be difficult to detect **1**. In this case, use reflex mode detection.

Detection systems

Diffuse mode
In this mode, it is the object itself that reflects the ultrasonic wave back to the sensor which, in turn, switches its output. It is the most widely used and the most simple mode. In this mode, the object will not be detected in the blind zone.

Reflex or beam break mode
The sensor is in a permanently detecting state on a fixed background of the machine and when the object to be detected breaks the acoustic beam the output switches state **2**. This mode is particularly recommended in cases where the shape of the object changes (irregular, angular, non perpendicular) and also for objects that absorb sound (see above). This mode can be achieved by using a diffuse mode sensor (with background teaching) or, more simply, by using a ready to use reflex mode sensor.
In cases where space is restricted, a reflector **3** and **4**, angled at 45°, can be used. This system can be used for both the diffuse and reflex modes. This reflector can be a flat part of the machine or a separate element. In this mode, the background of the machine must not be within the blind zone. But if the object is within this zone, it will be reliably detected.

Thru-beam mode
Detection is achieved using both a transmitter and receiver, with the transmitter permanently transmitting an acoustic wave to the receiver. The breaking of the beam by the presence of an object switches the output of the receiver. This mode provides long detection distances **5**.
In this mode there is no blind zone.

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal
DC supply, solid-state digital output

XX512A1KAM8

XX518A1KAM12

XXV18B1PAM12

Diffuse mode

Ø 12 sensors

Sensors	Sensing distance (Sn)	Function/output	Connection	Reference	Weight
	m				kg
Ø 12 Plastic	0.05	NO/PNP + NO/NPN	M8 connector	**XX512A1KAM8**	0.011
	0.1	NO/NPN	M8 connector	**XX512A2NAM8**	0.011
		NO/PNP	M8 connector	**XX512A2PAM8**	0.011

Ø 18 sensors

Sensors	Sensing distance (Sn)	Function/output	Connection	Reference	Weight
Ø 18 Plastic	0.15	NO/PNP + NO/NPN	M12 connector	**XX518A1KAM12**	0.033
Ø 18 Metal	0.05	NO/NPN	Pre-cabled (L = 2 m)	**XXV18B1NAL2**	0.110
			M12 connector	**XXV18B1NAM12**	0.050
		NO/PNP	Pre-cabled (L = 2 m)	**XXV18B1PAL2**	0.110
			Pre-cabled (L = 5 m)	**XXV18B1PAL5**	0.200
			M12 connector	**XXV18B1PAM12**	0.050
		NC/NPN	Pre-cabled (L = 5 m)	**XXV18B1NBL5**	0.200
		NC/PNP	Pre-cabled (L = 2 m)	**XXV18B1PBL2**	0.110
			M12 connector	**XXV18B1PBM12**	0.050

Thru-beam mode

Ø 12 sensors

	Sensing distance (Sn)	Function/output	Connection	Reference	Weight
Transmitter	0.2	–	M8 connector	**XXT12A8M8**	0.020
Receiver	0.2	NO/PNP + NO/NPN	M8 connector	**XXR12A8KAM8**	0.020

Telemecanique
Sensors

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal
DC supply, solid-state digital output

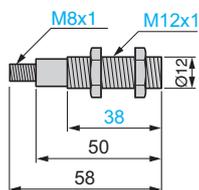| Sensor type			XX512A1●	XX512A2●	XX●12A8●	XXV18B1●	XX518A1●
General characteristics							
Conformity to standards			CE, IEC 60947-5-2				
Product certifications			UL	UL	UL	cULus	cULus
Nominal sensing distance (Sn)		m	0.05	0.1	0.2	0.05	0.15
Blind zone (in diffuse mode the object is not detected in this zone, in reflex mode the background is not detected in this zone)		mm	0…6.4	0…6.4	–	0...2	0... 19
Detection window			Fixed				Fixe
Detection system	Diffuse mode		●	●	–	●	●
	Reflex mode		–	–	–	–	–
	Thru-beam mode		–	–	●	–	–
Transmission frequency (transmitter resonance)		kHz	500			360	200
Differential travel		mm	< 0.7	< 0.7	–	< 3	–
Repeat accuracy		mm	± 0.7		± 0.79	± 1.5	± 0.79
Overall beam angle (see detection lobe)			11°	10°	10°	10°	20
Minimum size of object to be detected							
	Cylinder Ø (in mm), at distance (in mm)		Ø 2.5 at 38	Ø 2.5 at 50	Ø 12 at 200	Ø 2.5 at 20	Ø 1.6 at 63
Deviation angle from 90° of the object to be detected			± 10°	± 10°	–	± 8°	± 10°
Materials	Case		ULTEM®			Nickel plated brass	ULTEM®
			Stainless steel 303 for XX630AS1●●●●				
	Sensing face (1)		Epoxy			Epoxy	Silicone
Connection	Connector		M8, 4-pin	M8 3-pin	M8, 4-pin	M12, 4-pin	M12, 4-pin
	Pre-cabled (wire c.s.a.)		–	–	–	3 x 0.34 mm²/ AWG 22	–
Supply characteristics							
Rated supply voltage		V	12…24 V ⎓ with protection against reverse polarity				
Voltage limits (including ripple)		V	⎓ 10…28 V			⎓ 10…36 V	⎓ 10…28 V
Current consumption, no-load		mA	25		50	15	60
Output characteristics							
LED indicators	Output state		Yellow LED				–
	Power on		Green LED			–	–
	Setting-up assistance		–	–	–	–	–
Switching capacity (with overload and short-circuit protection)		mA	< 100			< 200	< 100
Voltage drop		V	< 1 (NPN), < 1.5 (PNP), 1.1 for XX●12A8, < 2 for XXV18B1●, 0.5 for XX630A2●				
Maximum switching frequency		Hz	125	125	125	80	80
Delays	First-up	ms	20	20	20	5	350
	Response	ms	2	3	0.4	4	3
	Recovery	ms	2	3	0.4	4	3
Environment characteristics							
Degree of protection	Conforming to IEC 60529 and IEC 60947-5-2		IP 67			IP 65 IP 67 or (2)	IP 67
Storage temperature		°C	- 40…+ 80				
Operating temperature		°C	- 20…+ 65			0…+ 60	0…+ 50
Vibration resistance	Conforming to IEC 60068-2-6		Amplitude ± 1 mm (f = 10…55 Hz); ± 2 mm for XXV18B1●				
Mechanical shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms, in all 3 axes 50 gn, duration 11 ms, in all 3 axes for XXV18B1●				
Resistance to electromagnetic interference			Conforming to IEC 60947-5-2				

(1) Silicone face for optimum chemical resistance.
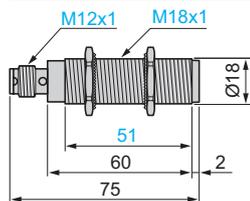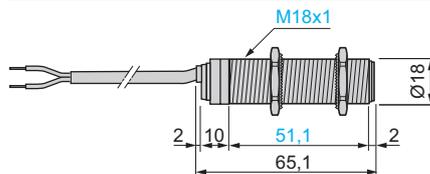*(2) Double insulation for pre-cabled sensors. IP 69K for sensors with M12 connector.*

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal
DC supply, solid-state digital output

Dimensions

XX●12A●●●M8

M8x1   M12x1   Ø12
38
50
58

**XX518A1KAM12
XXT18A●M12
XXR18A●●●●●**
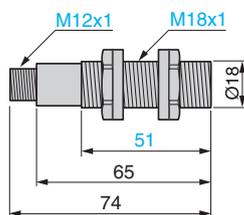
M12x1   M18x1   Ø18
51
65
74

XXV18B1●●●M12

M12x1   M18x1   Ø18
51
60   2
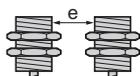75

XXV18B1●●L●

M18x1   Ø18
2   10   51,1   2
65,1

Setting-up precautions

Minimum mounting distances

Diffuse sensors, cylindrical type

Side by side

e

Face to face

e

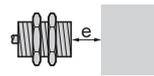e: respect the distances
indicated on the detection
curves

e ≥ 4 x Sn

XXV18●

e

e

e

e > 25 mm   e > 700 mm   e > 60 mm

Thru-beam sensors

α
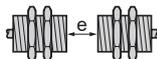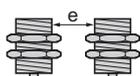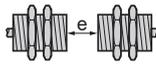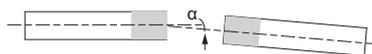
Sensors	α
XX●12●●/XX●F1●●	±5°
XX●18A4●●/XX●K1A4	±10°
XX●18A2●●/XX●K1A2	

Curves

XX512A1KAM8
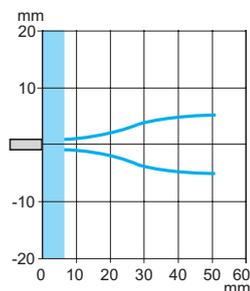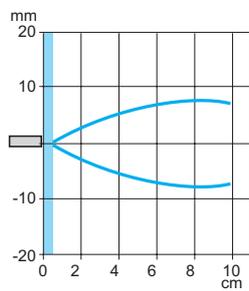
mm
20
10
-10
-20
0 10 20 30 40 50 60
mm

XX512A2●NAM8

mm
20
10
-10
-20
0   2   4   6   8   10
cm

XX518A1KAM12

mm
80
40
-40
-80
0   50   100   150   200
mm

Telemecanique
Sensors

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal
DC supply, solid-state digital output

Schemes

Digital output, Ø 12 sensor, M8 connector
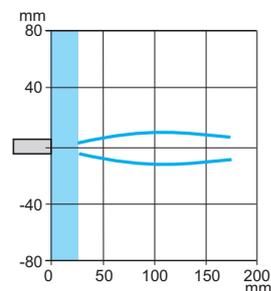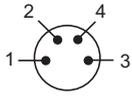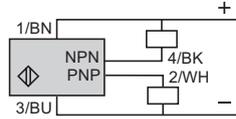
XX512A1KAM8

4-wire type   NO outputs, PNP and NPN

1 (+)   2 PNP output
3 (-)   4 NPN output

(-) BU (Blue)   (+) BN (Brown)
WH (White)   BK (Black)

XX512A2●

3-wire type   NO outputs, NPN   NO outputs, PNP

1 (+)   3 (-)
4 NPN or PNP output
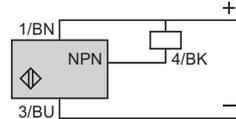
(-) BU (Blue)   (+) BN (Brown)
BK (Black)
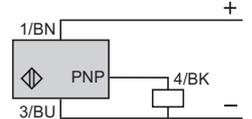
Digital output, Ø 18 sensor, M12 connector, Ø 30 (XX6V3●, XXBV3●)

XXV18B1●●●M12
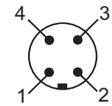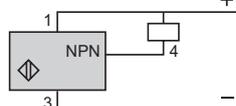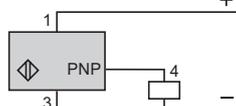
3-wire type   NO outputs, NPN   NO outputs, PNP   NC outputs, NPN   NC outputs, PNP

1 (+)
3 (-)
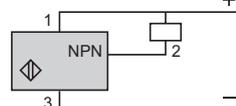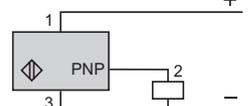
Digital output, Ø 18 sensor, pre-cabled

XXV18B1●● L●

3-wire type   **PNP/NO, NC**   **NPN/NO, NC**
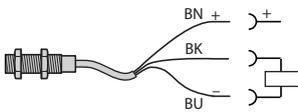
(-) BU (Blue)   (+) BN (Brown)   BK (Black)

XX518A3●● L2
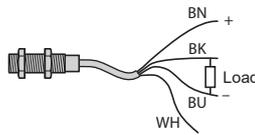
PNP output   **NPN output**
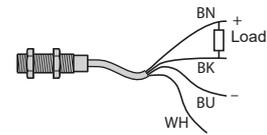
Thru-beam sensors: XXT12●/XXR12●, XXT18●/XXR18●, XXTF1●/XXRF1●

Transmitter

XXT12A8M8, XXT18A3M12
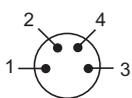
M8   1 (+)
3 (-)
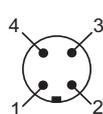
M12   1 (+)
3 (-)
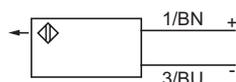
Receiver

XXR12A8KBM8
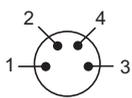
M8   1 (+)
2 (PNP)
3 (-)
4 (NPN)

NPN, PNP, NO
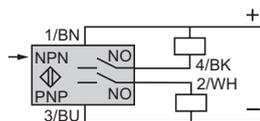
Ultrasonic sensors

XX range, General purpose
Cylindrical, plastic or metal
DC supply, solid-state digital or analog output

XX518A3NAL2

XX918A3C2M12

XXT18A3M12

XXZPB100

Diffuse mode

Ø 18 sensors, digital output

Sensors	Sensing distance (Sn)	Function/ output	Connection	Reference	Weight
	m				kg
Ø 18 Plastic	0.5 (adjustable)	NO/NPN	Pre-cabled (L = 2 m)	**XX518A3NAL2**	0.08
		NO/PNP	Pre-cabled (L = 2 m)	**XX518A3PAL2**	0.08
		NO/NPN	M12 connector	**XX518A3NAM12**	0.033
		NO/PNP	M12 connector	**XX518A3PAM12**	0.033

Ø 18 sensors, analog output

Sensors	Sensing distance (Sn)	Function/ output	Connection	Reference	Weight
Ø 18 Plastic	0.5	4-20 mA	M12 connector	**XX918A3C2M12**	0.033
		0-10 V	M12 connector	**XX918A3F1M12**	0.033

Thru-beam mode

Ø 18 sensors, digital output

| Sensors	Sensing distance (Sn)	Function/ output	Connection	Reference	Weight
Transmitter	0.61	–	M12 connector	**XXT18A3M12**	0.04
Receiver	0.61	NO/PNP + NO/NPN	M12 connector	**XXR18A3KAM12**	0.04
Transmitter	1	–	M12 connector	**XXT18A4M12**	0.04
Receiver	1	NO/PNP + NO/NPN	M12 connector	**XXR18A4KAM12**	0.04

Accessories

Teach pushbutton

Teach pushbutton	For use with sensors	Reference	Weight kg
Selection of detection window **Length of cable: 152 mm** **Input: M12 female connector** **Output: M12 male connector**	XX918A● XX9V3A● XX9D1A●	**XXZPB100**	0.035

Telemecanique
Sensors

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal
DC supply, solid-state digital or analog output

Sensor type			XX●18A3●	XX518A3●
General characteristics				
Conformity to standards			C€, IEC 60947-5-2	
Product certifications			UL	UL, cCSAus
Nominal sensing distance (Sn)		**m**	0.6	0.5
Blind zone (in diffuse mode the object is not detected in this zone, in reflex mode the background is not detected in this zone)		**mm**	–	0 ... 51 (XX518A3●)
Detection window			Fixed	Remotely adjustable or by using teach button
Detection system	Diffuse mode		–	●
	Reflex mode		–	●
	Thru-beam mode		●	–
Transmission frequency (transmitter resonance)		**kHz**	300	300
Differential travel		**mm**	< 2.5	< 2.5
Repeat accuracy		**mm**	± 1.27	± 1.27
Overall beam angle (see detection lobe)			6°	6°
Minimum size of object to be detected			–	
	Cylinder Ø (in mm), at distance (in mm)		Ø 38 to 600 Ø 114 to 1 000	Ø 2.5 to 150
Deviation angle from 90° of the object to be detected			–	± 7°
Materials	Case		ULTEM®	Valox®
	Sensing face (1)		Silicone	Epoxy
Connection	Connector		M12, 4-pin	M12, 4-pin
	Pre-cabled (wire c.s.a.)		–	4 x 0.08 mm² / AWG 28

(1) Silicone face for optimum chemical resistance.

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal

Dimensions

XX518A3●AM12, XXT18A●M12, XXR18A●KAM12
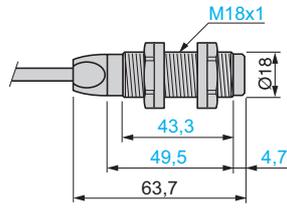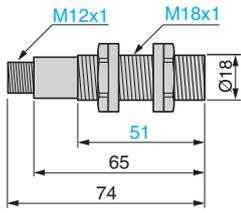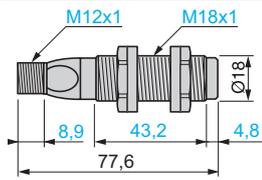
M12x1   M18x1   Ø18
51
65
74

XX518A3●AL2

M18x1   Ø18
43,3
49,5   4,7
63,7

XX918A3●●M12

M12x1   M18x1   Ø18
8,9   43,2   4,8
77,6

Telemecanique
Sensors

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal
DC supply, solid-state digital output

Setting-up precautions
Minimum mounting distances
Diffuse sensors, cylindrical type

Side by side
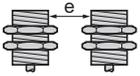
Face to face
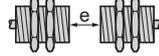
e: respect the distances
indicated on the detection
curves

e ≥ 4 x Sn

XXV18●
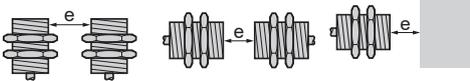
e > 25 mm   e > 700 mm   e > 60 mm

Thru-beam
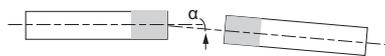
Sensors	α
XX●18A4●●/XX●K1A4	±10°

Curves
XX518A3●●L2,
XX518A3●AM12,
XX918A3●●M12
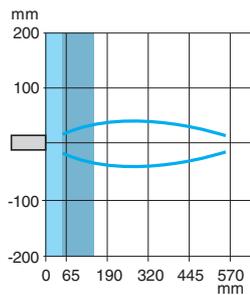
Blind zone for diffuse sensors.

Blind zone for reflex sensors.

Schemes
Digital output, Ø 18 sensor, M12 connector
XX518A3●

3-wire type
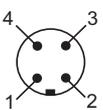
1 (+)   2 Teach input (WH)
3 (-)   4 NPN or PNP output
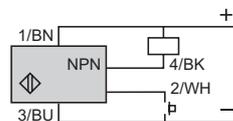
NO outputs, NPN

(-) BU (Blue)   (+) BN (Brown)
BK (Black)

NO outputs, PNP
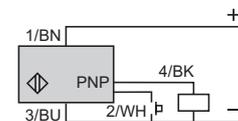
Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal, Ø 18 mm
Diffuse mode, solid-state digital or analog output
Configurable by software

XXA18P1●M12

XXS18P1●M12

XXA18B1●M12
XXA18S1●M12

XXS18B1●M12
XXS18S1●M12

XXZPB100

Diffuse mode

Sensors with solid-state digital output, M12 connector

Sensors	Sensing distance (Sn) Adjustable	Function/output	Sensing axis	Reference	Weight
	m				kg
Ø 18 Plastic	1	NO or NC (1)/ PNP	Straight	**XXS18P1PM12**	0.033
			90° angled	**XXA18P1PM12**	0.040
Ø 18 Nickel-plated brass	1	NO or NC (1)/ PNP	Straight	**XXS18B1PM12**	0.050
			90° angled	**XXA18B1PM12**	0.055
Ø 18 Stainless steel 316L	1	NO or NC (1)/ PNP	Straight	**XXS18S1PM12**	0.050
			90° angled	**XXA18S1PM12**	0.055

Sensors with analog output, M12 connector

Sensors	Sensing distance (Sn) Adjustable	Analog output (2)	Sensing axis	Reference	Weight
	m				kg
Ø 18 Plastic	1	4-20 mA	Straight	**XXS18P1AM12**	0.033
		0-10 V	Straight	**XXS18P1VM12**	0.033
		4-20 mA	90° angled	**XXA18P1AM12**	0.040
		0-10 V	90° angled	**XXA18P1VM12**	0.040
Ø 18 Nickel-plated brass	1	4-20 mA	Straight	**XXS18B1AM12**	0.050
		0-10 V	Straight	**XXS18B1VM12**	0.050
		4-20 mA	90° angled	**XXA18B1AM12**	0.055
		0-10 V	90° angled	**XXA18B1VM12**	0.055
Ø 18 Stainless steel 316L	1	4-20 mA	Straight	**XXS18S1AM12**	0.050
		0-10 V	Straight	**XXS18S1VM12**	0.050
		4-20 mA	90° angled	**XXA18S1AM12**	0.055
		0-10 V	90° angled	**XXA18S1VM12**	0.055

Accessories

| Description	For use with sensor	Reference	Weight kg
Teach pushbutton Input: M12 female connector Output: M12 male connector	XXS18●● XXA18●●	**XXZPB100**	0.035

Configuration interface and configuration kit for the synchronization function
See page 78.

(1) Output function (NO or NC) and mode (window, reflex, proximity, pump) are selectable using the **XXZPB100** remote teach pushbutton.
(2) Selectable using the **XXZPB100** remote teach pushbutton.

Telemecanique Sensors

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal, Ø 18 mm
Diffuse mode, solid-state digital or analog output
Configurable by software

XZCPV11V12L●●

XZCPV12V12L●●

XZCP1141L●

XZCP1241L●

XZCC12FDM50B

XZCC12FCM50B

XXZB118

Accessories				
Description	**Type**	**Length m**	**Reference**	**Weight kg**
Connection accessories for synchronization function				
Pre-wired connector 5-pin, 5-wire female M12 connector/ bare wires PVC cable	Straight	2	**XZCPV11V12L2**	0.090
		5	**XZCPV11V12L5**	0.201
		10	**XZCPV11V12L10**	0.360
	Elbowed	2	**XZCPV12V12L2**	0.090
		5	**XZCPV12V12L5**	0.201
		10	**XZCPV12V12L10**	0.360
Connection accessories without synchronization function				
Pre-wired connector 5-pin, 4-wire female M12 connector/ bare wires PVC cable	Straight	2	**XZCP1141L2**	0.090
		5	**XZCP1141L5**	0.190
		10	**XZCP1141L10**	0.370
	Elbowed	2	**XZCP1241L2**	0.090
		5	**XZCP1241L5**	0.190
		10	**XZCP1241L10**	0.370
Female M12 connector 5-pin, Pg 7 cable gland	Straight	–	**XZCC12FDM50B**	0.020
	Elbowed	–	**XZCC12FCM50B**	0.020

Mounting accessory			
Description	**For use with sensor**	**Reference**	**Weight kg**
Fixing clamp *(1)*	XXS18●● XXA18●●	**XXZB118**	0.010

(1) Recommended to use in applications below 0°C.

Ultrasonic sensors

XX range, General purpose
Cylindrical, plastic or metal, Ø 18 mm
Diffuse mode, solid-state digital or analog output
Configurable by software

Sensor type			XX●18●1PM12	XX●18●1AM12	XX●18●1VM12
General characteristics					
Conformity to standards			EN/IEC 60947-5-2, UL 508, and CSA C22.2 n°14		
Compliance with regulations			CE (based on EMC directive 2014/30/EU), NEC (ANSI/NFPA 70), CEC (CSA C22), UNECE R10		
Product certifications			cULus with class 2 power supply, E2, EAC, and RCM		
Nominal sensing distance (Sn)		m	1 (adjustable)		
Blind zone (in diffuse mode the object is not detected in this zone)		m	0.105		
Detection window			Remotely adjustable or by using external teachbutton **XXZPB100**		
Transmission frequency (transmitter resonance)		kHz	200		
Differential travel		mm	< 5	–	–
Repeat accuracy (repeatability)			0.1 %		
Minimum size of object to be detected			Cylinder Ø 1 mm up to sensing distance of 0.6 m		
Tilt angle with 100 x 100 mm target			± 7° at 1 m, ± 35° at 0.5 m, ±10° at 0.9 m		
Materials	Case		XX●18P●●: PBT XX●18B●●: Nickel-plated brass XX●18S●●: Stainless steel 316L		
	Sensing face		Epoxy, polyurethane, and butyl		
Connection			M12 connector - 5-pin		
Supply characteristics					
Rated supply voltage (Ue) with protection against reverse polarity		V	12…24 V ⎓		24 V ⎓
Voltage limits (including ripple)		V	10…30 V ⎓	10…30 V ⎓	14…30 V ⎓
Current consumption, no-load		mA	< 30	< 30	< 30
Output characteristics					
LED indicators	Output state		Yellow LED	Yellow LED	Yellow LED
	Echo state		Green LED	Green LED	Green LED
Switching capacity (with overload and short-circuit protection)			< 100 mA	–	–
Resistive load impedance		Ω	–	12 V ⎓, load ≤ 250 Ω 24 V ⎓, load ≤ 850 Ω	≥ 1 kΩ
Voltage drop		V	< 2	–	–
Internal temperature compensation			Yes	Yes	Yes
Maximum switching frequency		Hz	11	–	–
Delays	First-up	ms	120	180	180
	Response	ms	45	–	–
	Recovery	ms	45	100	100
Environment characteristics					
Degree of protection	Conforming to IEC 60529 and EN/IEC 60947-5-2		IP 65, IP 67		
Storage temperature		°C	- 40…+ 80		
Operating temperature		°C	- 25…+ 70 (1)		
Relative humidity			< 95%, without condensation		
Vibration resistance	Conforming to IEC 60068-2-6		Amplitude ± 1 mm (f = 10…55 Hz)		
Mechanical shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms, in all 3 axes		
Resistance to electromagnetic interference			Conforming to EN/IEC 60947-5-2 and UNECE R10-05		

*(1) For applications below 0°C, it is recommended to use the **XXZB118** fixing clamp (see page 31).*

Ⓣ Telemecanique
Sensors

Ultrasonic sensors
XX range, General purpose
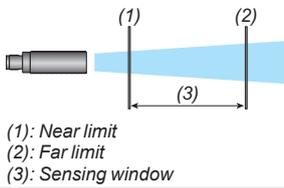Cylindrical, plastic or metal, Ø 18 mm
Diffuse mode, solid-state digital or analog output
Configurable by software

Operating diagrams for digital output sensors

Settings with teach procedure

Window mode

(1): Near limit
(2): Far limit
(3): Sensing window

Reflex mode

90% 100%

(2) (1) (3)

(1): Reflector
(2): Near limit
(3): Far limit

Proximity mode

(1)

(1) Switch point

Pump/Hysteresis mode

Emptying (stored in high threshold memory)   **Filling** (stored in low threshold memory)

Adjustable detection zone

Output activated   Output deactivated

NO output

Adjustable detection zone

Output deactivated   Output activated

NO output

Operating diagram for analog output sensors

Near and far limits setting with teach procedure

Blind zone   (1)   Sensing window   (2)   Sn max

10V / 20mA   Inverse
0V / 4mA   Direct

GN
YE

GN: Green LED
YE: Yellow LED

⊗ : OFF
☼ : ON

(1): Near limit
(2): Far limit

Diagram for the synchronization function (side by side application)

BN +
BK
WH
BU
GY
0 V

BN +
BK
WH
BU
GY
0 V

NB: *To enable synchronization between several sensors, all of the wires of pin no.5 (gray) must be electrically connected together.*
A maximum of 8 sensors can be synchronized. To enable "Multiplexer" function for the sensors, use the XX Configuration Software.
Without synchronization or multiplexing, the sensors must be at least 50 cm away from each other in order to avoid mutual interference.

Telemecanique
Sensors

33

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal, Ø 18 mm
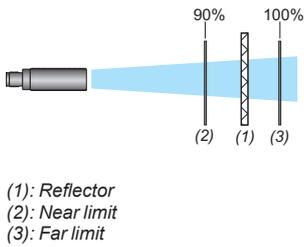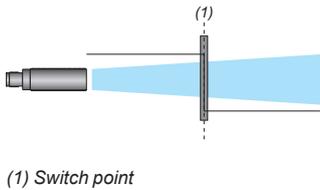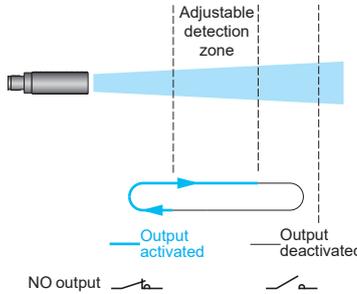Diffuse mode, solid-state digital or analog output
Configurable by software

Curves

Detection curve with 100 x 100 mm square target

Blind zone: 105 mm

Sn max.

Detection limit (mm)

150
100
50
0
-50
-100
-150

0   200   400   600   800   1000   1200 (mm)

Target distance

100 x 100 mm
stainless steel plate

Blind zone

Detection curve with round bar

Blind zone: 105 mm

Sn max.

Detection limit (mm)

150
100
50
0
-50
-100
-150

0   200   400   600   800   1000   1200 (mm)

Target distance

Ø 10 mm
stainless steel cylinder

Ø 25 mm
stainless steel cylinder

Blind zone

Dimensions

Plastic sensors, straight

XXS18P1●M12

64
52
M18x1
M12
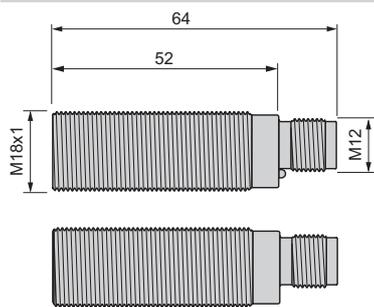
Plastic sensors, 90° angled

XXA18P1●M12

80
16,9   50,6
M18x1
11,5
M12
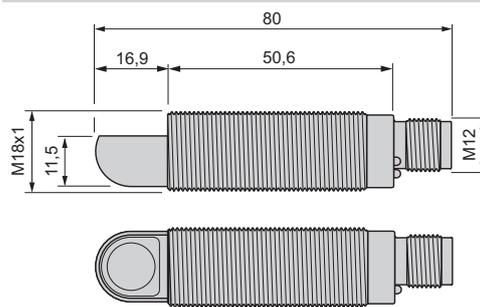
Nickel-plated brass and stainless steel sensors, straight

XXS18B1●M12 and XXS18S1●M12

64
51
M18x1
M12
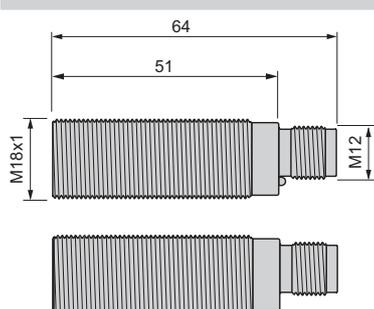
Nickel-plated brass and stainless steel sensors, 90° angled

XXA18B1●M12 and XXA18S1●M12

80,25
16,25   51
M18x1
11,5
M12

Telemecanique
Sensors

Ultrasonic sensors
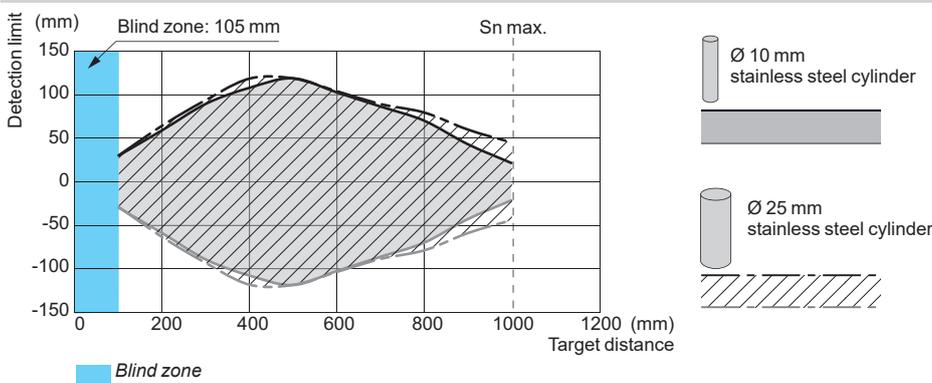XX range, General purpose
Cylindrical, plastic or metal, Ø 18 mm
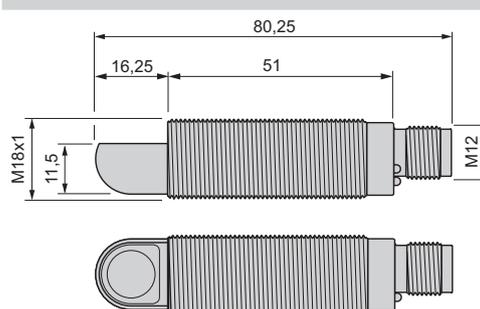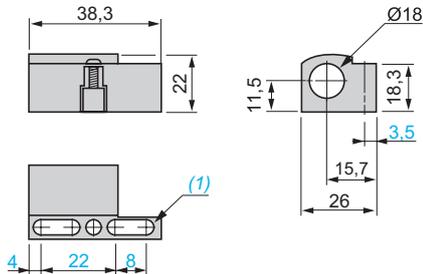Diffuse mode, solid-state digital or analog output
Configurable by software

Dimensions *(continued)*

Fixing clamp XXZB118

38,3
22
Ø18
11,5
18,3
3,5
15,7
26
(1)
4 22 8

(1) 2 elongated holes Ø 4 X 8 mm

Teach pushbutton XXZPB100

(1)
63
M12x1
20
14,5
16

(1) Cable length: 152 mm

Connections

Connector wiring

+
1/BN
5/GY *(1)*
4/BK
2/WH
PNP
3/BU
(2)
0 V
4 3
5
1 2

Pin number	Wire color	Digital output description	Analog output description	
			4-20 mA	0-10 V
1	BN: Brown	+12…24 V ⎓	+12…24 V ⎓	+14…24 V ⎓
2	WH: White	Input teach		
3	BU: Blue	0 V ⎓		
4	BK: Black	Output		
5	GY: Gray	Synchronization		

(1) Synchronization.
*(2) External setting pushbutton or **XXZPB100** remote teach pushbutton (see page 30).*

Wiring scheme (digital output NO or NC)
XXS18●1PM12 and XXA18●1PM12

BN
BK
WH
BU
GY

+ ⎓ 12...24 V
I
I_Max = 100 mA
⎓ 0 V
Synchronization
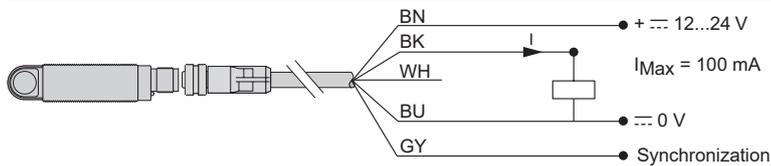
Wiring scheme (analog output 4-20 mA)
XXS18●1AM12 and XXA18●1AM12

BN
BK (4-20 mA)
WH
BU
GY

+ ⎓ 12…24 V
⎓ 0 V
Synchronization
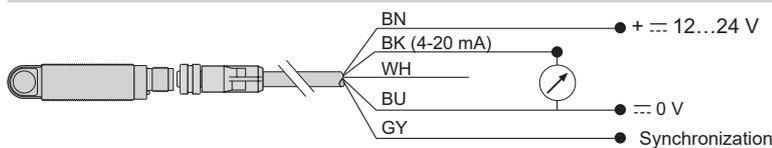
4-20 mA:
□ For 12 V ⎓, load ≤ 250 Ω
□ For 24 V ⎓, load ≤ 850 Ω

Wiring scheme (analog output 0-10 V)
XXS18●1VM12 and XXA18●1VM12
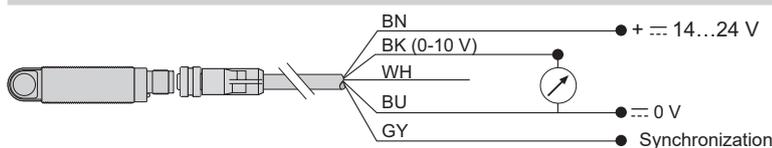
BN
BK (0-10 V)
WH
BU
GY

+ ⎓ 14…24 V
⎓ 0 V
Synchronization

0-10 V:
1 kΩ…∞

Ultrasonic sensors

XX range, General purpose
Cylindrical, plastic or metal
DC supply, solid-state digital or analog output

XX630A1KAM12

XX630S1NCM12

XX6V3A1NAM12

XX930A1A2M12

XX930A3A2M12

Diffuse mode

Solid-state digital output, M12 connector

Sensors	Sensing distance (Sn)	Function/output	Reference	Weight
	m			kg
Ø 30 Plastic	1 (adjustable)	NO/PNP + NO/NPN	**XX630A1KAM12**	0.09
		NO/NPN	**XX6V3A1NAM12**	0.09
		NO/PNP	**XX6V3A1PAM12**	0.09
		NO/NPN + NC/NPN	**XX630A1NCM12**	0.09
		NO/PNP + NC/PNP	**XX630A1PCM12**	0.09
	2 (adjustable)	NO/NPN + NC/NPN	**XX630A2NCM12**	0.09
		NO/PNP + NC/PNP	**XX630A2PCM12**	0.09
	8 (adjustable)	NO/NPN + NC/NPN	**XX630A3NCM12**	0.11
		NO/PNP + NC/PNP	**XX630A3PCM12**	0.11
Ø 30 Stainless steel 303	1 (adjustable)	NO/NPN + NC/NPN	**XX630S1NCM12**	0.09
		NO/PNP + NC/PNP	**XX630S1PCM12**	0.09

Standard analogue output, M12 connector

Sensors	Sensing distance (Sn)	Analogue output (Slope selection using teach button)	Reference	Weight
	m			kg
Ø 30 Plastic	1	4-20 mA	**XX930A1A2M12**	0.095
		0-10 V	**XX930A1A1M12**	0.095
		4-20 mA	**XX9V3A1C2M12**	0.090
		0-10 V	**XX9V3A1F1M12**	0.090
	2	4-20 mA	**XX930A2A2M12**	0.095
		0-10 V	**XX930A2A1M12**	0.095
	8	4-20 mA	**XX930A3A2M12**	0.115
		0-10 V	**XX930A3A1M12**	0.115
Ø 30 Stainless steel 303	1	4-20 mA	**XX930S1A2M12**	0.095
		0-10 V	**XX930S1A1M12**	0.095

250 ms delayed analogue output (for unstable object), M12 connector

Sensors				
Ø 30 Plastic	1	4-20 mA	**XX930A1A2230M12**	0.095
	2	4-20 mA	**XX930A2A2230M12**	0.095

Telemecanique
Sensors

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal
DC supply, solid-state digital output

Sensor type		XX6V3A1●	XX630A1● XX630A2● XX630S1●	XX630A3●	XX930A1● XX930A2● XX930S1●	XX930A3●	XX9V3A1●
General characteristics							
Conformity to standards		C€, IEC 60947-5-2			C€, IEC 60947-5-2		
Product certifications		UL, cCSAus *(1)*			UL, cCSAus		
Nominal sensing distance (Sn) **m**		1	1 or 2 *(2)*	8	1 or 2 *(3)*	8	1
Blind zone (in diffuse mode the object is not detected in this zone, in reflex mode the background is not detected in this zone) **mm**		0 ...100	0…51 (XX630●1) 0...120 (XX630A2●)	0…300	0…51 or 0…120 *(3)*	0…300	0…100
Detection window		Remotely adjustable or by using external teach button	Adjustable using teach button on sensor		Adjustable using teach button on sensor		Remotely adjustable or by using external teach button
Detection system	Diffuse	●	●	●	–	–	–
	Reflex	●	–	–	–	–	–
	Thru-beam	–	–	–	–	–	–
Transmission frequency (transmitter resonance) **kHz**		180	200	75	200	75	180
Differential travel **mm**		< 2.5	< 2.5	< 12.7			
Repeat accuracy **mm**		± 1.6	± 0.87	± 2.54	± 0.9	± 2.54	± 0.9 1.6mm
Overall beam angle (see detection lobe)		7°	10°	16°	10°	16°	7°
Minimum size of object to be detected		Cylinder Ø 50 mm at distance 1 m	Cylinder Ø 1.6 mm at distance 635 mm	Cylinder Ø 51 mm at distance 4732 mm	Cylinder Ø 1.6 mm up to a sensing distance of 635 mm	Cylinder Ø 51 mm up to a sensing distance of 4732 mm	Cylinder Ø 50 mm up to a sensing distance of 1 m
Deviation angle from 90° of the object to be detected		± 5°	± 7° or ± 10° *(2)*	± 5°	± 8°	± 5°	± 5°
Materials	Case	Valox®	ULTEM®	ULTEM®	ULTEM® : XX930A1● and XX930A2●	ULTEM®	Valox®
		Stainless steel 303 for XX630AS1●●●●			Stainless steel 303: XX930S1●	–	
	Sensing face *(4)*	Epoxy	Silicone	Epoxy	Silicone	Epoxy	
Connection		M12 connector, 4-pin					

(1) Only XX6V3A1●, XX630A1●, XX630A2●, XX630S1● and XX630A3● sensors are cCSAus certified.
(2) The first value is given for XX630A1● and XX630S1●, the second value for XX630A2●.
(3) The first value is given for XX930A1● and XX930S1●, the second value for XX930A2●.
(4) Silicone face for optimum chemical resistance.

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal
DC supply, solid-state digital output

Sensor type		XX6V3A1●	XX630A1● XX630A2● XX630S1●	XX630A3●	XX930A1● XX930A2● XX930S1●	XX930A3●	XX9V3A1●
Supply characteristics							
Rated supply voltage	V	12…24 V ⎓ with protection against reverse polarity			⎓ 15…24 V	⎓ 15…24 V	⎓ 15…24 V
Voltage limits (including ripple)	V	⎓ 10…28 V			⎓ 10…28 V	–	
Current consumption, no-load	mA	60	50 or 100 *(1)*	50	60 or 80 *(2)*	60	60
Output characteristics							
LED indicators	Output state	Yellow LED			Yellow LED	–	
	Power on	Green LED			Green LED	–	
	Setting-up assistance	Multicolour LED			Dual colour LED	–	
Slope type		–			Direct or inverse by using teach button **XXZPB100**		
Switching capacity (with overload and short-circuit protection)	mA	< 100			–	–	
Voltage drop	V	< 100			–	–	
Maximum switching frequency	Hz	70	10 or 16 *(1)*	2	–	–	
Delays	First-up	ms	75	720	800	720	1 200	75
	Response	ms	15	20 or 25 *(1)*	200			
	Recovery	ms	75	20	200	250 (delayed) 50 (standard)	250	180
Resistive load impedance	4-20 mA	Ω	–			10...500		10...350
	0-10 V	Ω	–			1 k...∞		2 k...∞
Environment characteristics							
Degree of protection	Conforming to IEC 60529 and IEC 60947-5-2	IP 67	IP 65 or IP 67 *(1)* IP67 for plastic versions. IP65 for stainless steel versions.	IP 67	IP 67	IP 67	IP 67
Storage temperature	°C	- 40…+ 80					
Operating temperature	°C	0…+ 70	0…+ 60 or 0…+ 50 *(1)*	- 20…+ 60	0…+ 50	- 20…+ 60	0…+ 70
Vibration resistance	Conforming to IEC 60068-2-6	Amplitude ± 1 mm (f = 10…55 Hz); ± 2 mm for XXV18B1●			Amplitude ± 1 mm (f = 10…55 Hz)		
Mechanical shock resistance	Conforming to IEC 60068-2-27	30 gn, duration 11 ms, in all 3 axes 50 gn, duration 11 ms, in all 3 axes for XXV18B1●			30 gn, duration 11 ms, in all 3 axes		
Resistance to electromagnetic interference		Conforming to IEC 60947-5-2					

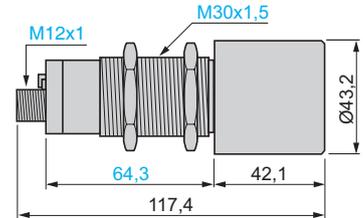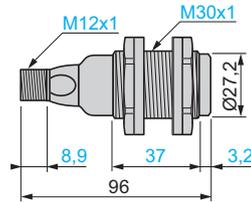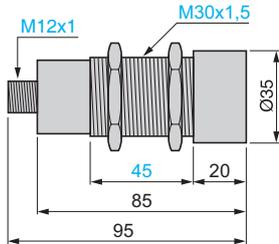*(1) The first value is given for XX630A1● and XX630S1●, the second value for XX630A2●.*
(2) The first value is given for XX930A1● and XX930S1●, the second value for XX930A2●.

Telemecanique
Sensors

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm
DC supply, solid-state digital output

Dimensions

XX630A1●●M12	XX6V3A1●AM12	XX630A3●●M12
XX630S1●●M12	XX9V3A1●●M12	XX930A3A●M12
XX630A2●●M12		
XX930A1A●M12		
XX230A1●●A00M12		
XX230A2●●A00M12		

M12x1 M30x1,5 Ø35 45 20 85 95

M12x1 M30x1 Ø27,2 8,9 37 3,2 96
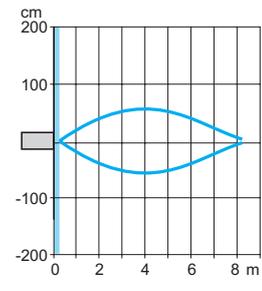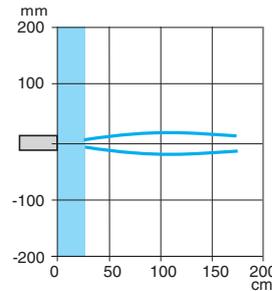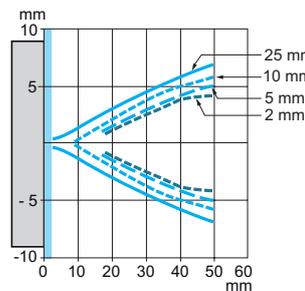
M12x1 M30x1,5 Ø43,2 64,3 42,1 117,4

Curves

XXV18B1●

Square object

Cylindrical object

25 mm
10 mm
5 mm
2 mm

XX630A2●CM12

XX630A3●CM12
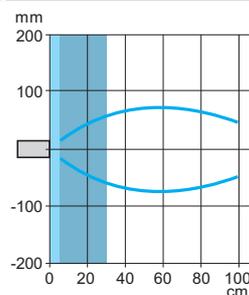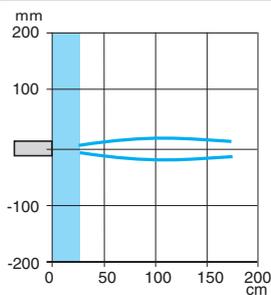### XX930A3●●M12
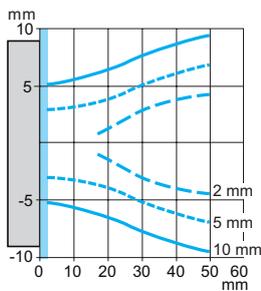
XX230A2●

XX230A1●, XX630A1●CM12, XX6V3A1●AM12, XX930A1●●M12, XX9V3A1●●M12, XX8D1A1●AM12, XXBD1A1●AM12

Blind zone for diffuse sensors

Blind zone for reflex sensors

Ultrasonic sensors
XX range, Application
Sensors for monitoring 2 levels
Cylindrical plastic case, M18 x 1 and M30 x 1.5
DC supply, solid-state digital output

XX218A3P●M12

XX230A12NA00M12

Sensors for monitoring 2 levels

Sensors	Sensing distance (Sn)	Function/output	Reference	Weight
	m			kg
Ø 18, threaded M18 x 1				
2 emptying levels	0.5 (adjustable)	NO/PNP	**XX218A3PHM12**	0.035
2 filling levels	0.5 (adjustable)	NO/PNP	**XX218A3PFM12**	0.035
Ø 30, threaded M30 x 1.5				
2 levels 2 independent outputs	1 (adjustable)	NO/NPN + NO/NPN	**XX230A12NA00M12**	0.090
		NO/PNP + NO/PNP	**XX230A12PA00M12**	0.090
	2 (adjustable)	NO/PNP + NO/PNP	**XX230A22PA00M12**	0.090
2 emptying levels	1 (adjustable)	NO/PNP + NO/PNP	**XX230A10PA00M12**	0.090
	2 (adjustable)	NO/PNP + NO/PNP	**XX230A20PA00M12**	0.090
2 filling levels	1 (adjustable)	NO/PNP + NO/PNP	**XX230A11PA00M12**	0.090
	2 (adjustable)	NO/PNP + NO/PNP	**XX230A21PA00M12**	0.090

Accessories
Teach pushbutton

Teach pushbutton	For use with sensors	Reference	Weight kg
Selection of detection window **Length of cable:** 152 mm **Input**: M12 female connector **Output**: M12 male connector	XX218A3●	**XXZPB100**	0.035

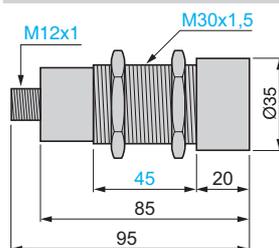**Other connection and fixing accessories**

See page 82.
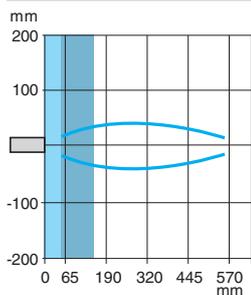
Dimensions
XX218A3P●M12
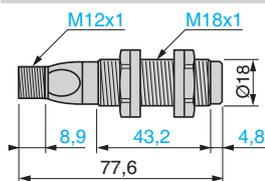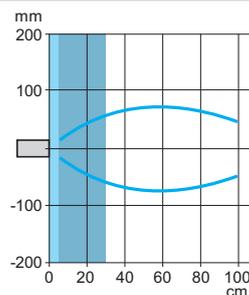
XX230A1●●A00M12
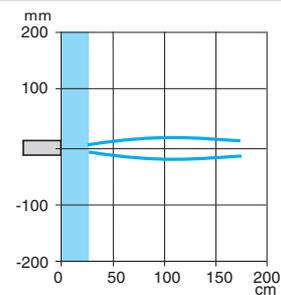**XX230A2●●A00M12**

Curves
XX218A3●●M12 **XX230A1●●●●●M12** **XX230A2●●●●●M12**

Blind zone for diffuse sensors.
Blind zone for reflex sensors.

Ultrasonic sensors

XX range, Application
Sensors for monitoring 2 levels
Cylindrical plastic case, M18 x 1 and M30 x 1.5
DC supply, solid-state digital output

Sensor type			XX218A3●●●●	XX230A1●●●●	XX230A2●●●●
General characteristics					
Conformity to standards			C€, IEC 60947-5-2		
Product certifications			UL, cCSAus	UL, cCSAus	UL, cCSAus
Nominal sensing distance (Sn)		m	0.50 (adjustable)	1 (adjustable)	2 (adjustable)
Blind zone (no object must pass through this zone whilst the sensor is operating)		mm	0…51	0…51	0…120
Detection window			Remotely adjustable or by using external teach button	Adjustable using teach button on sensor	
Transmission frequency		kHz	300	200	
Differential travel		mm	< 2.5	< 2.5	< 2.5
Repeat accuracy		mm	± 1.27	± 0.9	
Overall beam angle (see detection lobe)			6°	10°	10°
Minimum size of object to be detected			Cylinder Ø 2.5 mm up to a sensing distance of 150 mm	Cylinder Ø 1.6 mm up to a sensing distance of 305 mm	
Deviation angle from 90° of the object to be detected			± 7°	± 10° on 305 x 305 mm	
Materials	Case		Valox®	ULTEM®	
	Sensing face (1)		Epoxy	Silicone	
Connection	Connector		M12, 4-pin		
Supply characteristics					
Rated supply voltage		V	12…24 V ⎓ with protection against reverse polarity		
Voltage limits (including ripple)		V	10…28 V ⎓		
Current consumption, no-load		mA	40	100	
Output characteristics					
LED indicators	Output state		Yellow LED	Multicolour LED	
	Power on		Green LED	–	
	Setting-up assistance		Dual colour LED	Multicolour LED	
	Distance indication		–	Yellow LED	
Switching capacity		mA	< 100 (PNP and NPN) with overload and short-circuit protection		
Voltage drop		V	< 1 (PNP and NPN)		
Delays	First-up	ms	100	1000	1000
	Response	ms	15	150	150
	Recovery	ms	1000	1000	1000
Environment characteristics					
Degree of protection	Conforming to IEC 60529 and IEC 60947-5-2		IP 67	IP 65	
Storage temperature		°C	- 40…+ 80	- 10…+ 80	
Operating temperature		°C	- 20…+ 65	0…+ 50	
Vibration resistance	Conforming to IEC 60068-2-6		Amplitude ± 1 mm (f = 10…55 Hz)		
Mechanical shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms, in all 3 axes		
Resistance to electromagnetic interference			Conforming to IEC 60947-5-2		

(1) Silicone face for optimum chemical resistance.

Ultrasonic sensors

XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm
Diffuse mode, solid-state digital or analog output
Configurable by software

XXA30P1PM12

XXS30P1PM12

XXS30B2PM12

XXA30S2PM12

XXS30S4PM12

XXS30P8●●M12

XXS30P1AM12

XXS30P2AM12

Diffuse mode

Sensors with solid-state digital output, M12 connector

Sensors	Sensing distance output (Sn)	Function/ output	Sensing axis	Reference	Weight
	m				kg
Ø 30 Plastic	1	NO or NC (1)/PNP	Straight	**XXS30P1PM12**	0.047
			90° angled	**XXA30P1PM12**	0.100
	2	NO or NC (1)/PNP	Straight	**XXS30P2PM12**	0.095
			90° angled	**XXA30P2PM12**	0.100
	4	NO or NC (1)/PNP	Straight	**XXS30P4PM12**	0.115
	8	NO or NC (1)/PNP x 2	Straight	**XXS30P8PPM12**	0.210
		NO or NC (1)/NPN x2	Straight	**XXS30P8NNM12**	0.210
Ø 30 Nickel-plated brass	1	NO or NC (1)/PNP	Straight	**XXS30B1PM12**	0.165
			90° angled	**XXA30B1PM12**	0.175
	2	NO or NC (1)/PNP	Straight	**XXS30B2PM12**	0.165
			90° angled	**XXA30B2PM12**	0.175
	4	NO or NC (1)/PNP	Straight	**XXS30B4PM12**	0.195
Ø 30 Stainless steel 316L	1	NO or NC (1)/PNP	Straight	**XXS30S1PM12**	0.160
			90° angled	**XXA30S1PM12**	0.170
	2	NO or NC (1)/PNP	Straight	**XXS30S2PM12**	0.160
			90° angled	**XXA30S2PM12**	0.170
	4	NO or NC (1)/PNP	Straight	**XXS30S4PM12**	0.190

Sensors with analog output, adjustable sensing distance, M12 connector

Sensors	Sensing distance output (Sn)	Function/ output	Sensing axis	Reference	Weight
	m				kg
Ø 30 Plastic	1	4-20 mA	Straight	**XXS30P1AM12**	0.047
		0-10 V	Straight	**XXS30P1VM12**	0.047
		4-20 mA	90° angled	**XXA30P1AM12**	0.100
		0-10 V	90° angled	**XXA30P1VM12**	0.100
	2	4-20 mA	Straight	**XXS30P2AM12**	0.095
		0-10 V	Straight	**XXS30P2VM12**	0.095
		4-20 mA	90° angled	**XXA30P2AM12**	0.100
		0-10 V	90° angled	**XXA30P2VM12**	0.100
	4	4-20 mA	Straight	**XXS30P4AM12**	0.115
		0-10 V	Straight	**XXS30P4VM12**	0.115
	8	4-20 mA + PNP (2)	Straight	**XXS30P8APM12**	0.210
		0-10 V + PNP (2)	Straight	**XXS30P8VPM12**	0.210

(1) NO or NC: configurable by software (see page 78).
(2) One analogic output and one digital output with NO or NC configurable by software (see page 78).

Telemecanique
Sensors

Ultrasonic sensors

XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm
Diffuse mode, solid-state digital or analog output
Configurable by software

XXS30B1AM12   *XXA30B1AM12*

XXS30S2AM12   *XXA30B2AM12*

XXS30B4AM12   *XXA30S1AM12*

XXZPB100

Diffuse mode *(continued)*

Sensors with analog output, adjustable sensing distance, M12 connector

Sensors	Sensing distance (Sn)	Function/ output	Sensing axis	Reference	Weight
	m				**kg**
Ø 30 Nickel-plated brass	1	4-20 mA	Straight	**XXS30B1AM12**	0.165
		0-10 V	Straight	**XXS30B1VM12**	0.165
		4-20 mA	90° angled	**XXA30B1AM12**	0.175
		0-10 V	90° angled	**XXA30B1VM12**	0.175
	2	4-20 mA	Straight	**XXS30B2AM12**	0.165
		0-10 V	Straight	**XXS30B2VM12**	0.165
		4-20 mA	90° angled	**XXA30B2AM12**	0.175
		0-10 V	90° angled	**XXA30B2VM12**	0.175
	4	4-20 mA	Straight	**XXS30B4AM12**	0.195
		0-10 V	Straight	**XXS30B4VM12**	0.195
Ø 30 Stainless steel 316L	1	4-20 mA	Straight	**XXS30S1AM12**	0.160
		0-10 V	Straight	**XXS30S1VM12**	0.160
		4-20 mA	90° angled	**XXA30S1AM12**	0.170
		0-10 V	90° angled	**XXA30S1VM12**	0.170
	2	4-20 mA	Straight	**XXS30S2AM12**	0.160
		0-10 V	Straight	**XXS30S2VM12**	0.160
		4-20 mA	90° angled	**XXA30S2AM12**	0.170
		0-10 V	90° angled	**XXA30S2VM12**	0.170
	4	4-20 mA	Straight	**XXS30S4AM12**	0.190
		0-10 V	Straight	**XXS30S4VM12**	0.190

Accessories

Teach pushbutton	For use with sensors	Reference	Weight kg
Selection of detection window **Length of cable: 152 mm** **Input:** M12 female connector **Output:** M12 male connector	XXS30●● XXA30●●	**XXZPB100**	0.035

Configuration interface and configuration kit for the synchronization function

See page 78.

Ultrasonic sensors

XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm
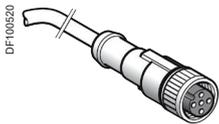Diffuse mode, solid-state digital or analog output
Configurable by software

XZCPV11V12L2

XZCPV12V12L2

XZCPV1164L10

XZCC12FDM50B

XXZB130

Accessories *(continued)*

Description	Type	Length	Reference	Weight kg
Pre-wired connector 5-pin, 5-wire female M12 connector/bare wires PVC cable	Straight	2	**XZCPV11V12L2**	0.090
		5	**XZCPV11V12L5**	0.201
		10	**XZCPV11V12L10**	0.360
	Elbowed	2	**XZCPV12V12L2**	0.090
		5	**XZCPV12V12L5**	0.201
		10	**XZCPV12V12L10**	0.360

Connection accessories without synchronization function

Description	Type	Length	Reference	Weight kg
Pre-wired connector 5-pin, 5-wire female M12 connector/bare wires PVC cable	Straight	2	**XZCPV1164L2**	0.090
		5	**XZCPV1164L5**	0.190
		10	**XZCPV1164L10**	0.370
	Elbowed	2	**XZCPV1264L2**	0.090
		5	**XZCPV1264L5**	0.201
		10	**XZCPV1264L10**	0.360
Female M12 connector 5-pin, Pg 7 cable gland	**Straight**	–	XZCC12FDM50B	0.020
			XZCC12FDM50B	0.020

Mounting accessory

Description	For use with sensor		Weight kg
Fixing clamp	XXS30●● XXA30●●	**XXZB130**	0.010

Configuration interface and configuration kit for the synchronization function

Telemecanique
Sensors

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 1 m sensing distance. Diffuse mode, solid-state digital or analog output. Configurable by software

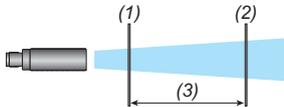| Sensor type			XXS30P1PM12	XXS30P1AM12	XXS30P1VM12
General characteristics					
Conformity to standards			EN/IEC 60947-5-2, UL 508, and CSA C22.2 n°14		
Compliance with regulations			CE (based on EMC directive 2014/30/EU), NEC (ANSI/NFPA 70), CEC (CSA C22), UNECE R10		
Product certifications			cULus with class 2 power supply, E2, EAC, RCM , and ECOLAB		
Nominal sensing distance (Sn)		m	1 (adjustable)		
Blind zone (in diffuse mode the object is not detected in this zone)		m	0.105		
Detection window			Remotely adjustable or by using external teachbutton **XXZPB100**		
Transmission frequency (transmitter resonance)		kHz	200		
Differential travel		mm	< 5	–	–
Repeat accuracy (repeatability)			0.1 %		
Minimum size of object to be detected			Cylinder Ø 1 mm up to sensing distance of 0.6m		
Tilt angle with 100 x 100 mm target			± 7° at 1 m, ± 10° at 0.9 m ± 35° at 0.5 m		
Materials	Case		XX●30P●: PBT		
	Sensing face		Epoxy, resin, and rubber		
Connection			M12 connector - 5-pin		
Supply characteristics					
Rated supply voltage (Ue) with protection against reverse polarity		V	⎓ 12…24 V	⎓ 12…24 V	⎓ 24 V
Voltage limits (including ripple)		V	⎓ 10…30 V	⎓ 10…30 V	⎓ 14…30 V
Current consumption, no-load		mA	< 30	< 30	< 30
Output characteristics					
LED indicators	Output state		Yellow LED	Yellow LED	Yellow LED
	Echo state		Green LED	Green LED	Green LED
Switching capacity (with overload and short-circuit protection)			< 100 mA	–	–
Resistive load impedance		Ω	–	⎓ 12 V, load ⩽ 250 Ω ⎓ 24 V, load ⩽ 850 Ω	⩾ 1 kΩ
Voltage drop		V	< 2	–	–
Internal temperature compensation			Yes	Yes	Yes
Maximum switching frequency		Hz	11	–	–
Delays	First-up	ms	120	180	180
	Response	ms	45	–	–
	Recovery	ms	45	100	100
Environment characteristics					
Degree of protection	Conforming to IEC 60529 and EN/IEC 60947-5-2		IP 65, IP 67		
Storage temperature		°C	- 40…+ 80		
Operating temperature		°C	- 25…+ 70		
Relative humidity			< 95%, without condensation		
Vibration resistance	Conforming to IEC 60068-2-6		Amplitude ± 1 mm (f = 10…55 Hz)		
Mechanical shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms, in all 3 axes		
Resistance to electromagnetic interference			Conforming to EN/IEC 60947-5-2 and UNECE R10-05		

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 1 m sensing distance. Diffuse mode, solid-state digital or analog output. Configurable by software

Sensor type		XXA30P1PM12 XX●30B1PM12 XX●30S1PM12	XXA30P1AM12 XX●30B1AM12 XX●30S1AM12	XXA30P1VM12 XX●30B1VM12 XX●30S1VM12
General characteristics				
Conformity to standards		EN/IEC 60947-5-2, UL 508, and CSA C22.2 n°14		
Compliance with regulations		CE (based on EMC directive 2014/30/EU), NEC (ANSI/NFPA 70), CEC (CSA C22), UNECE R10		
Product certifications		cULus with class 2 power supply, E2, EAC, RCM , and ECOLAB		
Nominal sensing distance (Sn)	m	1 (adjustable)		
Blind zone (in diffuse mode the object is not detected in this zone)	m	0.155		
Detection window		Remotely adjustable or by using external teachbutton **XXZPB100**		
Transmission frequency (transmitter resonance)	kHz	120		
Differential travel	mm	< 5	-	-
Repeat accuracy (repeatability)		0.1 %		
Minimum size of object to be detected		Cylinder Ø 1 mm up to sensing distance of 1m		
Tilt angle with 100 x 100 mm target		± 12° at 1 m, ± 15° at 0.9 m ± 45° at 0.5 m		
Materials	Case	XX●30P●: PBT XX●30B●: Nickel-plated brass XX●30S●: Stainless steel 316L		
	Sensing face	Epoxy, resin, and rubber		
Connection		M12 connector - 5-pin		
Supply characteristics				
Rated supply voltage (Ue) with protection against reverse polarity	V	12…24 V ⎓	12…24 V ⎓	24 V ⎓
Voltage limits (including ripple)	V	10…30 V ⎓	10…30 V ⎓	14…30 V ⎓
Current consumption, no-load	mA	< 65	< 65	< 65
Output characteristics				
LED indicators	Output state	Yellow LED	Yellow LED	Yellow LED
	Echo state	Green LED	Green LED	Green LED
Switching capacity (with overload and short-circuit protection)		< 100 mA	-	-
Resistive load impedance	Ω	-	⎓ 12 V, load ≤ 250 Ω ⎓ 24 V, load ≤ 850 Ω	≥ 1 kΩ
Voltage drop	V	< 2	-	-
Internal temperature compensation		Yes	Yes	Yes
Maximum switching frequency	Hz	11		
Delays	First-up	ms	120	180	180
	Response	ms	45	-	-
	Recovery	ms	45	100	100
Environment characteristics				
Degree of protection Conforming to IEC 60529 and EN/IEC 60947-5-2		IP 65, IP 67		
Storage temperature	°C	- 40…+ 80		
Operating temperature	°C	- 25…+ 70		
Relative humidity		< 95%, without condensation		
Vibration resistance Conforming to IEC 60068-2-6		Amplitude ± 1 mm (f = 10…55 Hz)		
Mechanical shock resistance Conforming to IEC 60068-2-27		30 gn, duration 11 ms, in all 3 axes		
Resistance to electromagnetic interference		Conforming to EN/IEC 60947-5-2 and UNECE R10-05		

Telemecanique
Sensors

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 1 m sensing distance. Diffuse mode, solid-state digital or analog output. Configurable by software

Operating diagrams for digital output sensors

Settings with teach procedure

Window mode

(1)   (2)

(3)

(1): Near limit
(2): Far limit
(3): Sensing window

Reflex mode

90%   100%

(2) (1) (3)
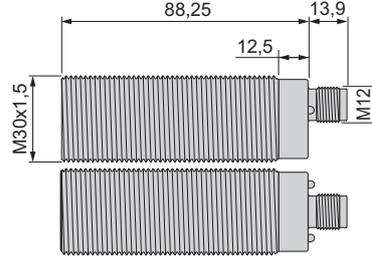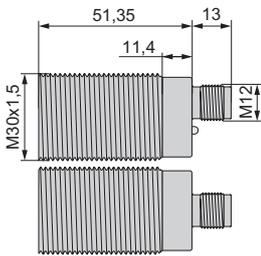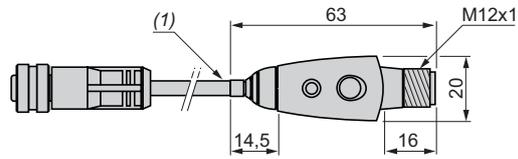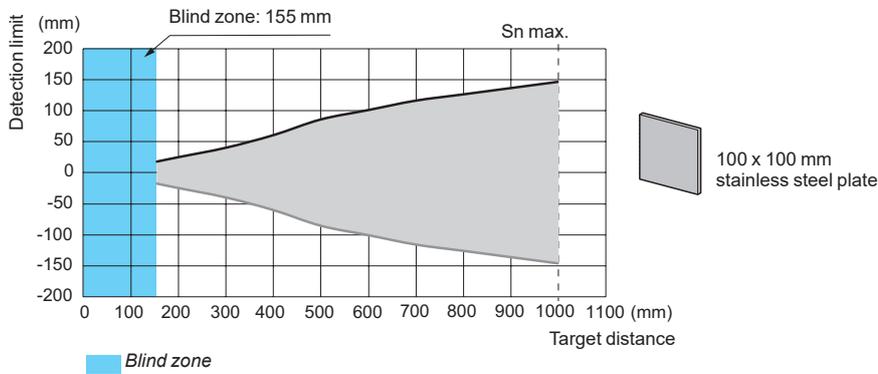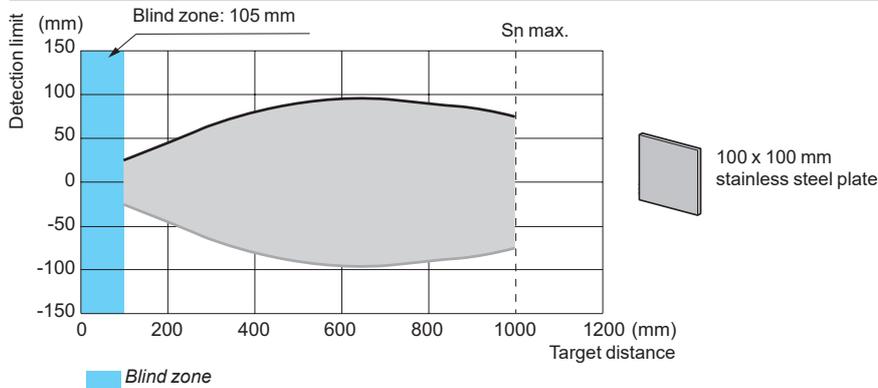
(1): Reflector
(2): Near limit
(3): Far limit

Proximity mode

(1)

(1) Switch point.

Pump/Hysteresis mode

Emptying (stored in high threshold memory)	Filling (stored in low threshold memory)

Adjustable detection zone

Output activated   Output deactivated

NO output

Adjustable detection zone

Output deactivated   Output activated

NO output

Operating diagram for analog output sensors

Near and far limits setting with teach procedure

Blind zone   (1)   (2)   Sn max

Sensing window

10V / 20mA   Inverse

0V / 4mA   Direct

GN

YE

GN: Green LED
YE: Yellow LED

⊗ : OFF

● : ON

(1): Near limit
(2): Far limit

Diagram for the synchronization function (side by side application)

BN   +
BK
WH
BU   0 V
GY   Synchronization

D1

BN   +
BK
WH
BU   0 V
GY   Synchronization

D1 = 1/8 Sn

NB: To enable synchronization between several sensors, all of the wires of pin no.5 (gray) must be electrically connected together.
A maximum of 8 sensors can be synchronized. To enable "Multiplexer" function for the sensors, use the XX Configuration Software.
Without synchronization or multiplexing, the sensors must be at least 50 cm away from each other in order to avoid mutual interference.

Telemecanique
Sensors

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 1 m sensing distance. Diffuse mode, solid-state digital or analog output. Configurable by software

Dimensions

XXA30●1●M12

115,7
28,5
12,5
13,9
M30x1,5
20,5
M12

XXS30B1●M12, XXS30S1●M12

88,25
12,5
13,9
M30x1,5
M12

XXS30P1PM12, XXS30P1AM12, XXS30P1VM12

51,35
11,4
13
M30x1,5
M12

Teach pushbutton XXZPB100

(1)
63
M12x1
14,5
16
20

(1) Cable length: 152 mm

Connections

Connector wiring

4 3
5
1 2
1/BN
5/GY *(1)*
4/BK
2/WH
3/BU
+
(2)
0 V

Pin number	Wire color	Digital output description	Analog output description	
			4-20 mA	**0-10 V**
1	BN: Brown	+12…24 V ⎓	+ ⎓ 12…24 V	+ ⎓ 14…24 V
2	WH: White	Input teach		
3	BU: Blue	0 V ⎓		
4	BK: Black	Output		
5	GY: Gray	Synchronization		

(1) Synchronization.
(2) External setting pushbutton or **XXZPB100** remote teach pushbutton (see page 43).

Wiring scheme (digital output NO or NC)
XXA30●●PM12/XXS30●●PM12
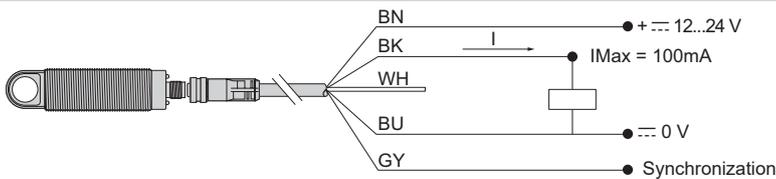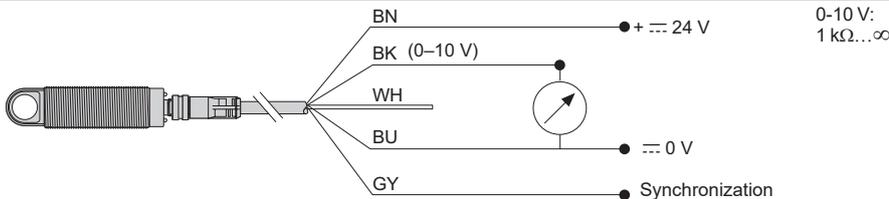
BN ———— + ⎓ 12...24 V
BK ——— I ——→ IMax = 100mA
WH
BU ———— ⎓ 0 V
GY ———— Synchronization

Wiring scheme (analog output 0-10V)
XX●30●●VM12

BN ———— + ⎓ 24 V
BK (0–10 V)
WH
BU ———— ⎓ 0 V
GY ———— Synchronization

0-10 V:
1 kΩ…∞

Wiring scheme (analog output 4-20 mA)
XX●30●●AM12

BN ———— + ⎓ 12...24 V
BK (4–20 mA)
WH
BU ———— ⎓ 0 V
GY ———— Synchronization

4-20 mA:
☐ For 12 V ⎓, load ≤ 250 Ω
☐ For 24 V ⎓, load ≤ 850 Ω
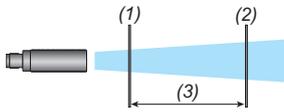
Telemecanique
Sensors
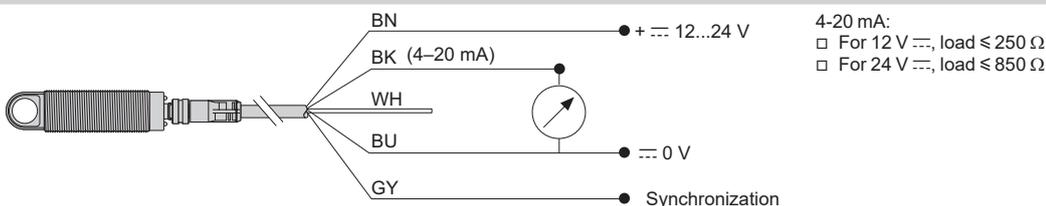
Ultrasonic sensors

XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 1 m sensing distance. Diffuse mode, solid-state digital or analog output. Configurable by software

Curves

Detection curve with 100 x 100 mm square target

XXA30●1●M12, XXS30B1●M12, XXS30S1●M12

Blind zone: 155 mm — Sn max.

100 x 100 mm stainless steel plate

Blind zone

XXS30P1PM12, XXS30P1AM12, XXS30P1VM12

Blind zone: 105 mm — Sn max.

100 x 100 mm stainless steel plate

Blind zone

Detection curve with round bar

XXA30●1●M12, XXS30B1●M12, XXS30S1●M12
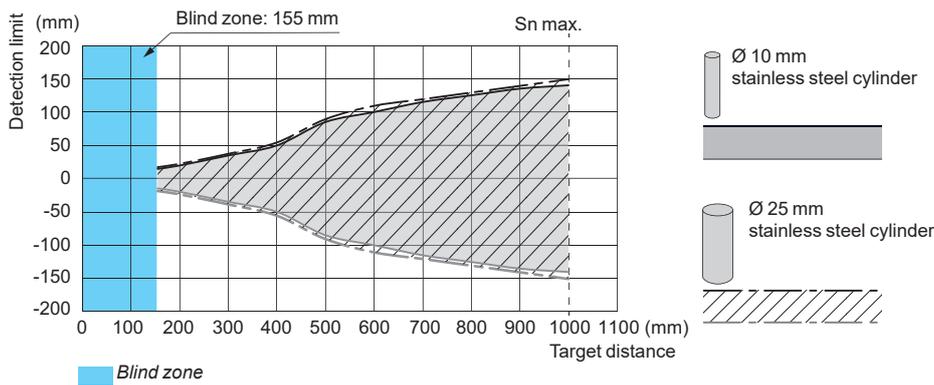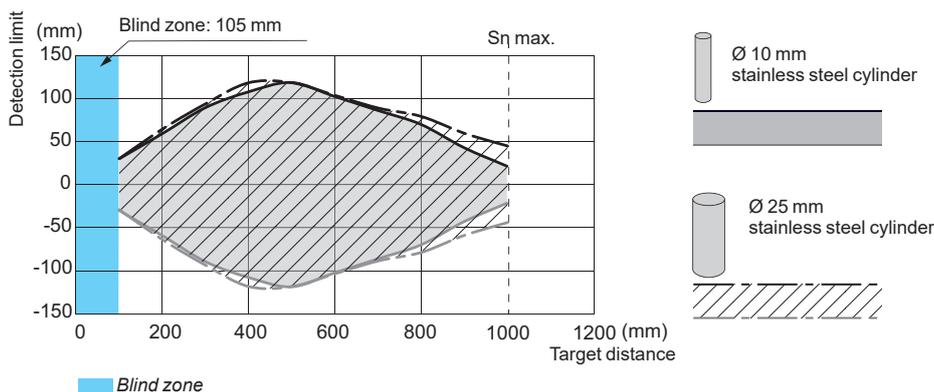
Blind zone: 155 mm — Sn max.

Ø 10 mm stainless steel cylinder

Ø 25 mm stainless steel cylinder

Blind zone

XXS30P1PM12, XXS30P1AM12, XXS30P1VM12

Blind zone: 105 mm — Sn max.

Ø 10 mm stainless steel cylinder

Ø 25 mm stainless steel cylinder

Blind zone

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 2 m sensing distance. Diffuse mode, solid-state digital or analog output. Configurable by software
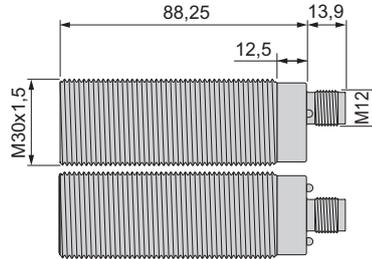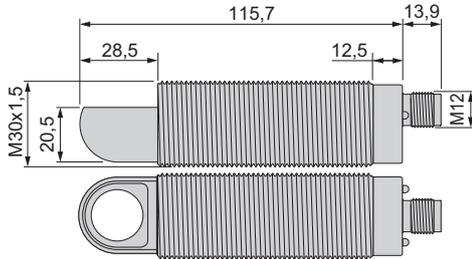
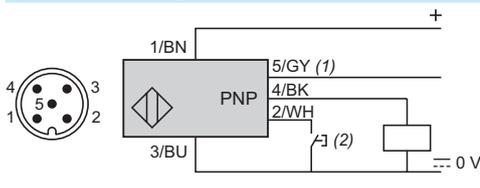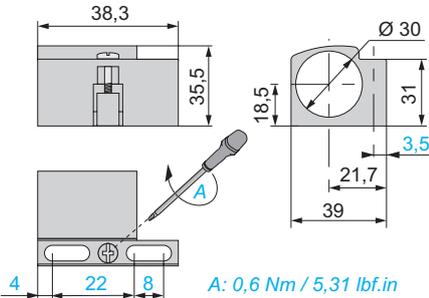| Sensor type			XX●30P2PM12 XX●30B2PM12 XX●30S2PM12	XX●30P2AM12 XX●30B2AM12 XX●30S2AM12	XX●30P2VM12 XX●30B2VM12 XX●30S2VM12
General characteristics					
Conformity to standards			EN/IEC 60947-5-2, UL 508, and CSA C22.2 n°14		
Compliance with regulations			CE (based on EMC directive 2014/30/EU), NEC (ANSI/NFPA 70), CEC (CSA C22), UNECE R10		
Product certifications			cULus with class 2 power supply, E2, EAC, RCM , and ECOLAB		
Nominal sensing distance (Sn)		m	2 (adjustable)		
Blind zone (in diffuse mode the object is not detected in this zone)		m	0.155		
Detection window			Remotely adjustable or by using external teachbutton XXZPB100		
Transmission frequency (transmitter resonance)		kHz	120		
Differential travel		mm	< 10	–	
Repeat accuracy (repeatability)			0.1 %		
Minimum size of object to be detected			Cylinder Ø 1 mm up to sensing distance of 1.4m		
Tilt angle with 100 x 100 mm target			± 10° at 2 m ,± 12° at 1.8 m ± 45° at 1m		
Materials	Case		XX●30P●: PBT XX●30B●: Nickel-plated brass XX●30S●: Stainless steel 316L		
	Sensing face		Epoxy, resin, and rubber		
Connection			M12 connector - 5-pin		
Supply characteristics					
Rated supply voltage (Ue) with protection against reverse polarity		V	12…24 V ⎓	12…24 V ⎓	24 V ⎓
Voltage limits (including ripple)		V	10…30 V ⎓	10…30 V ⎓	14…30 V ⎓
Current consumption, no-load		mA	< 65	< 65	< 65
Output characteristics					
LED indicators	Output state		Yellow LED	Yellow LED	Yellow LED
	Echo state		Green LED	Green LED	Green LED
Switching capacity (with overload and short-circuit protection)			< 100 mA	–	–
Resistive load impedance		Ω	–	⎓ 12 V, load ⩽ 250 Ω ⎓ 24 V, load ⩽ 850 Ω	⩾ 1 kΩ
Voltage drop		V	< 2	–	–
Internal temperature compensation			Yes	Yes	Yes
Maximum switching frequency		Hz	5.5		
Delays	First-up	ms	150	250	250
	Response	ms	90	–	–
	Recovery	ms	90	200	200
Environment characteristics					
Degree of protection	Conforming to IEC 60529 and EN/IEC 60947-5-2		IP 65, IP 67		
Storage temperature		°C	- 40…+ 80		
Operating temperature		°C	- 25…+ 70		
Relative humidity			< 95%, without condensation		
Vibration resistance	Conforming to IEC 60068-2-6		Amplitude ± 1 mm (f = 10…55 Hz)		
Mechanical shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms, in all 3 axes		
Resistance to electromagnetic interference			Conforming to EN/IEC 60947-5-2 and UNECE R10-05		

Telemecanique
Sensors

Ultrasonic sensors

XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 2 m sensing
distance. Diffuse mode, solid-state digital or analog
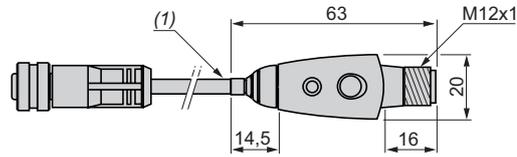output. Configurable by software

Operating diagrams for digital output sensors

Settings with teach procedure

Window mode

(1): Near limit
(2): Far limit
(3): Sensing window

Reflex mode

90%   100%

(1): Reflector
(2): Near limit
(3): Far limit

Proximity mode

(1) Switch point

Pump/Hysteresis mode

Emptying (stored in high threshold memory)

Adjustable
detection
zone

Output   Output
activated   deactivated

NO output

Filling (stored in low threshold memory)

Adjustable
detection
zone

Output   Output
deactivated   activated

NO output

Operating diagram for analog output sensors

Near and far limits setting with teach procedure

Blind zone (1)   (2) Sn max

Sensing window

10V / 20mA   Inverse

0V / 4mA   Direct

GN

YE

GN: Green LED
YE: Yellow LED

⊗ : OFF

: ON

(1): Near limit
(2): Far limit

Ultrasonic sensors

XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 2 m sensing distance. Diffuse mode, solid-state digital or analog output. Configurable by software

Dimensions

XX●30P2PM12, XX●30B2PM12, XX●30S2PM12

XX●30P2AM12, XX●30B2AM12, XX●30S2AM12
XX●30P2VM12, XX●30B2VM12, XX●30S2VM12

Connections

Connector wiring

Pin number	Wire color	Digital output description	Analog output description	
			4-20 mA	**0-10 V**
1	BN: Brown	+12…24 V ---	+12…24 V ---	+14…24 V ---
2	WH: White	Input teach		
3	BU: Blue	0 V ---		
4	BK: Black	Output		
5	GY: Gray	Synchronization		

(1) Synchronization.
*(2) External setting pushbutton or **XXZPB100** remote teach pushbutton (see page 43).*

Wiring scheme (digital output NO or NC)
XXS30●●PM12, XXA30●●PM12

Wiring scheme (analog output 0-10V)
XX●30●●VM12

0-10 V: 1 kΩ…∞

Wiring scheme (analog output 4-20 mA)
XX●30●●AM12

4-20 mA:
☐ For 12 V ---, load ≤ 250 Ω
☐ For 24 V ---, load ≤ 850 Ω

Diagram for the synchronization function (Side by side application)

D1

D1 = 1/8 Sn

NB: To enable synchronization between several sensors, all of the wires of pin no.5 (gray) must be electrically connected together.
A maximum of 8 sensors can be synchronized. To enable "Multiplexer" function for the sensors, use the XX Configuration Software.
Without synchronization or multiplexing, the sensors must be at least 50 cm away from each other in order to avoid mutual interference.

Telemecanique Sensors
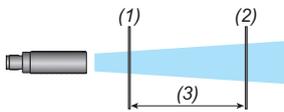
Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 2 m sensing distance. Diffuse mode, solid-state digital or analog output. Configurable by software

Dimensions *(continued)*

Fixing clamp XXZB130

38,3
35,5
Ø 30
18,5
31
3,5
21,7
39
4
22
8
A: 0,6 Nm / 5,31 lbf.in

Teach pushbutton XXZPB100

(1)
63
M12x1
20
14,5
16

(1) Cable length: 152 mm

Curves

Detection curve with 100 x 100 mm square target

Detection limit (mm)
Blind zone: 155 mm
Sn max.
200
150
100
50
0
-50
-100
-150
-200
0   200   400   600   800   1000   1200   1400   1600   1800   2000   2200 (mm)
Target distance

100 x 100 mm stainless steel plate

Blind zone

Detection curve with round bar

Detection limit (mm)
Blind zone: 155 mm
Sn max.
250
200
150
100
50
0
-50
-100
-150
-200
-250
0   200   400   600   800   1000   1200   1400   1600   1800   2000   2200 (mm)
Target distance

Ø 10 mm stainless steel cylinder

Ø 25 mm stainless steel cylinder

Blind zone

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 4 m sensing distance. Diffuse mode, solid-state digital or analog output. Configurable by software

Sensor type			XXS30●4PM12	XXS30●4AM12	XXS30●4VM12
General characteristics					
Conformity to standards			EN/IEC 60947-5-2, UL 508, and CSA C22.2 n°14		
Compliance with regulations			CE (based on EMC directive 2014/30/EU), NEC (ANSI/NFPA 70), CEC (CSA C22), UNECE R10		
Product certifications			cULus with class 2 power supply, E2, EAC, RCM , and ECOLAB		
Nominal sensing distance (Sn)		m	4 (adjustable)		
Blind zone (in diffuse mode the object is not detected in this zone)		m	0.420		
Detection window			Remotely adjustable or by using external teachbutton XXZPB100		
Transmission frequency (transmitter resonance)		kHz	80		
Differential travel		mm	< 20	–	
Repeat accuracy (repeatability)			0.1 %		
Minimum size of object to be detected			Cylinder Ø 1 mm up to sensing distance of 1.8m		
Tilt angle with 500 x 500 mm target			± 7° at 4 m, ± 10° at 3.6 m ± 40° at 2 m		
Materials	Case		XXS30P●: PBT XXS30B●: Nickel-plated brass XXS30S●: Stainless steel 316L		
	Sensing face		Epoxy, resin, and rubber		
Connection			M12 connector - 5-pin		
Supply characteristics					
Rated supply voltage (Ue) with protection against reverse polarity		V	12…24 V ⎓	12…24 V ⎓	24 V ⎓
Voltage limits (including ripple)		V	10…30 V ⎓	10…30 V ⎓	14…30 V ⎓
Current consumption, no-load		mA	< 65	< 65	< 65
Output characteristics					
LED indicators	Output state		Yellow LED	Yellow LED	Yellow LED
	Echo state		Green LED	Green LED	Green LED
Switching capacity (with overload and short-circuit protection)			< 100 mA	–	–
Resistive load impedance		Ω	–	12 V ⎓, load ≤ 250 Ω 24 V ⎓ , load ≤ 850 Ω	≥ 1 kΩ
Voltage drop		V	< 2	–	–
Internal temperature compensation			Yes	Yes	Yes
Maximum switching frequency		Hz	2.7	–	–
Delays	First-up	ms	250	500	500
	Response	ms	180	–	–
	Recovery	ms	180	400	400
Environment characteristics					
Degree of protection	Conforming to IEC 60529 and EN/IEC 60947-5-2		IP 65, IP 67		
Storage temperature		°C	- 40…+ 80		
Operating temperature		°C	- 25…+ 70 *(1)*		
Relative humidity			< 95%, without condensation		
Vibration resistance	Conforming to IEC 60068-2-6		Amplitude ± 1 mm (f = 10…55 Hz)		
Mechanical shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms, in all 3 axes		
Resistance to electromagnetic interference			Conforming to EN/IEC 60947-5-2 and UNECE R10-05		

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 4 m sensing distance. Diffuse mode, solid-state digital or analog output. Configurable by software

Operating diagrams for digital output sensors

Settings with teach procedure

Window mode

(1): Near limit
(2): Far limit
(3): Sensing window

Reflex mode

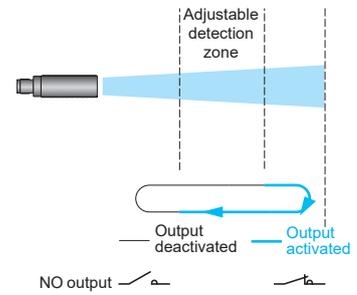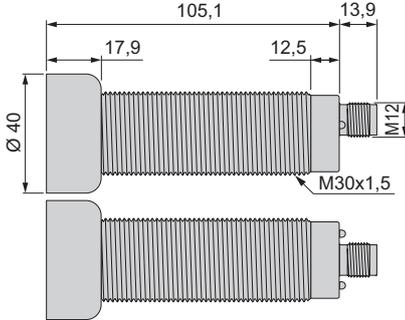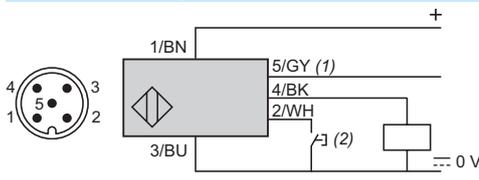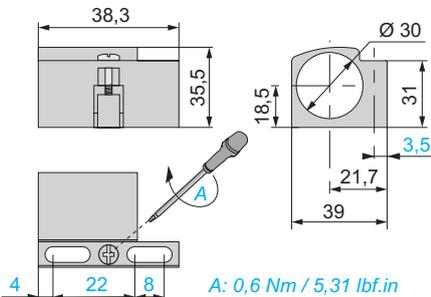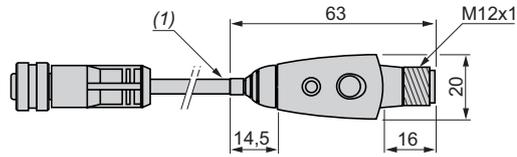(1): Reflector
(2): Near limit
(3): Far limit
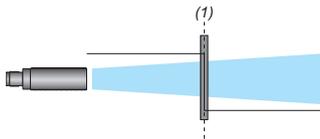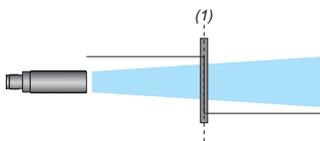
Proximity mode

(1) Switch point

Pump/Hysteresis mode

Emptying (stored in high threshold memory)
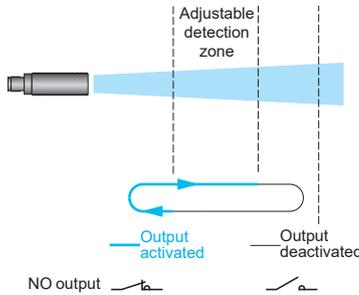
Filling (stored in low threshold memory)

Operating diagram for analog output sensors

Near and far limits setting with teach procedure

GN: Green LED
YE: Yellow LED

⊗ : OFF
● : ON
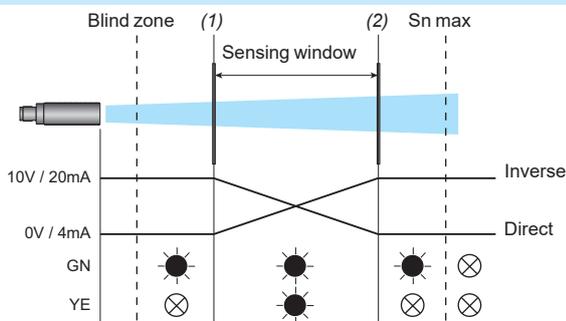
(1): Near limit
(2): Far limit

Ultrasonic sensors

XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 4 m sensing distance. Diffuse mode, solid-state digital or analog output. Configurable by software
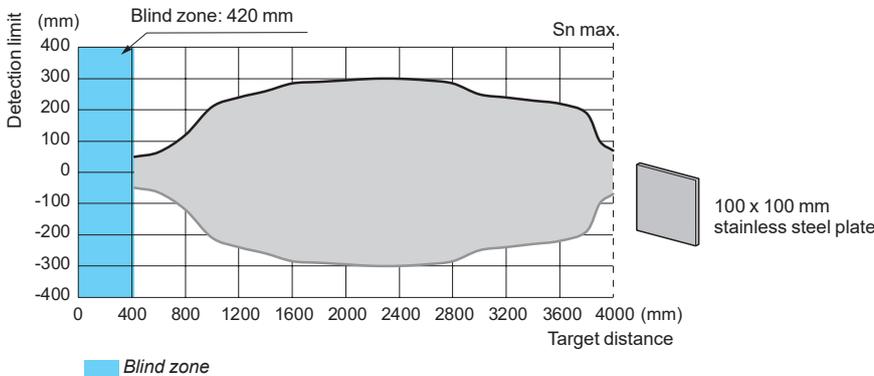
Dimensions

XXS30P4PM12, XXS30B4PM12, XXS30S4PM12

Connections

Connector wiring

Pin number	Wire color	Digital output description	Analog output description	
			4-20 mA	0-10 V
1	BN: Brown	+12…24 V ⎓	+12…24 V ⎓	+14…24 V ⎓
2	WH: White	Input teach		
3	BU: Blue	0 V ⎓		
4	BK: Black	Output		
5	GY: Gray	Synchronization		

(1) Synchronization.
*(2) External setting pushbutton or **XXZPB100** remote teach pushbutton (see page 43).*

Wiring scheme (digital output NO or NC)

XXS30●●PM12

Wiring scheme (analog output 0-10V)

XX●30●●VM12

0-10 V: 1 kΩ…∞

Wiring scheme (analog output 4-20 mA)

XX●30●●AM12

4-20 mA:
☐ For 12 V ⎓, load ≤ 250 Ω
☐ For 24 V ⎓, load ≤ 850 Ω

Diagram for the synchronization function (Side by side application)

D1 = 1/8 Sn

NB: *To enable synchronization between several sensors, all of the wires of pin no.5 (gray) must be electrically connected together.*
A maximum of 8 sensors can be synchronized. To enable "Multiplexer" function for the sensors, use the XX Configuration Software.
Without synchronization or multiplexing, the sensors must be at least 50 cm away from each other in order to avoid mutual interference.

Telemecanique
Sensors

Ultrasonic sensors

XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 4 m sensing distance. Diffuse mode, solid-state digital or analog output. Configurable by software

Dimensions (continued)

Fixing clamp XXZB130

A: 0,6 Nm / 5,31 lbf.in

Teach pushbutton XXZPB100

(1) Cable length: 152 mm

Curves

Detection curve with 100 x 100 mm square target

Blind zone: 420 mm

Sn max.

100 x 100 mm stainless steel plate

Blind zone

Detection curve with round bar

Blind zone: 420 mm

Sn max.   Sn max.

Ø 10 mm stainless steel cylinder

Ø 25 mm stainless steel cylinder

Blind zone
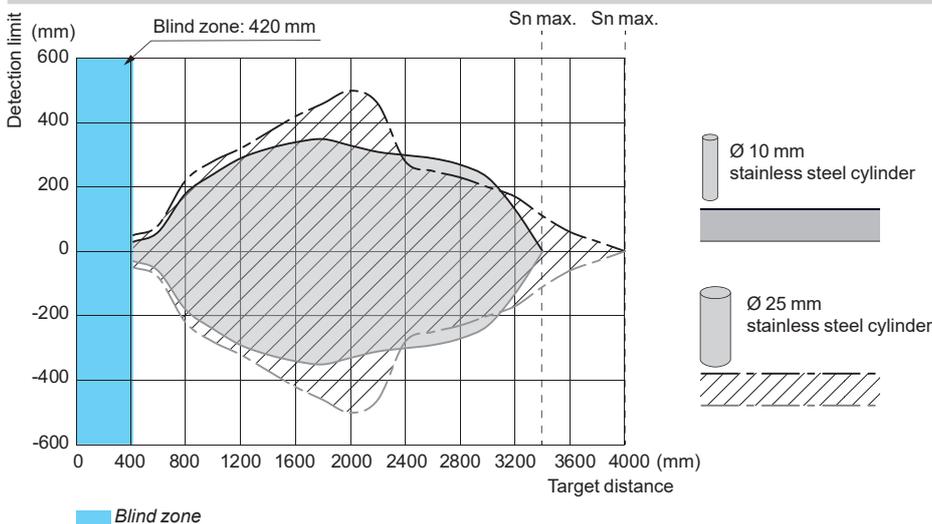
Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 8 m sensing distance. Diffuse mode, solid-state digital or analog output. Configurable by software

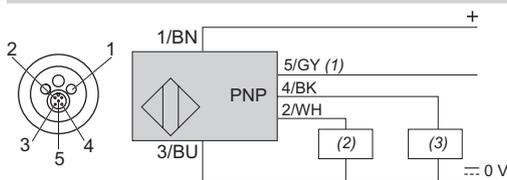| Sensor type			XXS30P8PPM12 XXS30P8NNM12	XXS30P8APM12	XXS30P8VPM12
General characteristics					
Conformity to standards			EN/IEC 60947-5-2, UL 508 and CSA C22.2 n° 14		
Compliance with regulations			CE (based on EMC directive 2014/30/EU), NEC (ANSI/NFPA 70), CEC (CSA C22), UNECE R10		
Product certifications			cULus with class 2 power supply, E2, EAC, RCM , and ECOLAB		
Nominal sensing distance (Sn)		m	8 (adjustable)		
Blind zone (in diffuse mode the object is not detected in this zone)		m	0.290		
Detection window			Remotely adjustable or by using external teachbutton **XXZPB100**		
Transmission frequency (transmitter resonance)		kHz	75		
Differential travel		mm	< 12.7	–	
Repeat accuracy (repeatability)			0.1 %		
Minimum size of object to be detected			Cylinder Ø 1 mm up to sensing distance of 1.8m		
Tilt angle with 500 x 500 mm target			± 4° at 8 m, ± 5° at 7.2 m ± 12° at 4 m		
Materials	Case		PBT		
	Sensing face		Epoxy, resin, and rubber		
Connection			M12 connector - 5-pin		
Supply characteristics					
Rated supply voltage (Ue) with protection against reverse polarity		V	--- 12…24 V	--- 12…24 V	--- 24 V
Voltage limits (including ripple)		V	--- 10…30 V	--- 10…30 V	--- 14…30 V
Current consumption, no-load		mA	< 50	< 50	< 50
Output characteristics					
LED indicators	Output state		1 dual colour LED (yellow/green) 1 three-colour LED (yellow/green/red)	1 dual colour LED (yellow/green) 1 three-colour LED (yellow/green/red)	1 dual colour LED (yellow/green) 1 three-colour LED (yellow/green/red)
	Echo state		Green LED	Green LED	Green LED
Switching capacity (with overload and short-circuit protection)			< 100 mA	–	–
Resistive load impedance		Ω	–	--- 12 V, load ≤ 250 Ω --- 24 V, load ≤ 850 Ω	≥ 1 kΩ
Voltage drop		V	< 2	–	–
Internal temperature compensation			Yes	Yes	Yes
Maximum switching frequency		Hz	2	–	–
Delays	First-up	ms	600	600	600
	Response	ms	300	–	–
	Recovery	ms	300	500	500
Environment characteristics					
Degree of protection	Conforming to IEC 60529 and EN/IEC 60947-5-2		IP 65, IP 67		
Storage temperature		°C	- 40…+ 85		
Operating temperature		°C	- 25…+ 70		
Relative humidity			< 95%, without condensation		
Vibration resistance	Conforming to IEC 60068-2-6		Amplitude ± 1 mm (f = 10…55 Hz)		
Mechanical shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms, in all 3 axes		
Resistance to electromagnetic interference			Conforming to EN/IEC 60947-5-2 and UNECE R10-05		

Telemecanique
Sensors

Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 8 m sensing distance. Diffuse mode, solid-state digital or analog output. Configurable by software

Dimensions

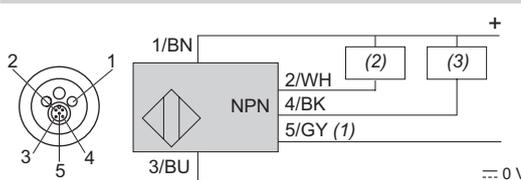**XXS30P8PPM12, XXS30P8NNM12, XXS30P8APM12, XXS30P8VPM12**
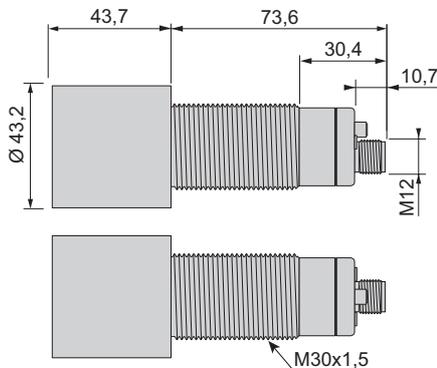
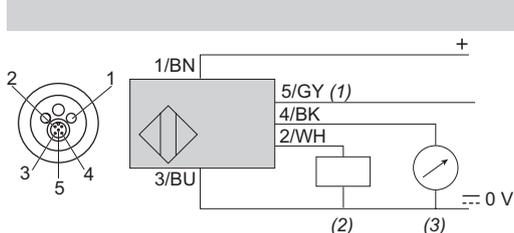## Connections

Connector wiring

XXS30P8PPM12

XXS30P8NNM12

XXS30P8APM12, XXS30P8VPM12

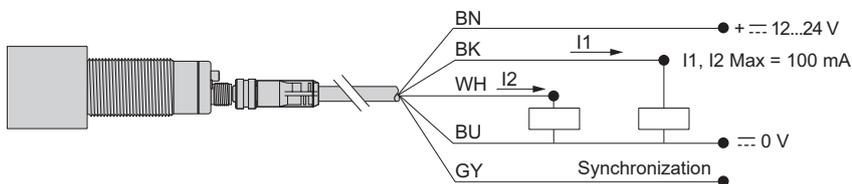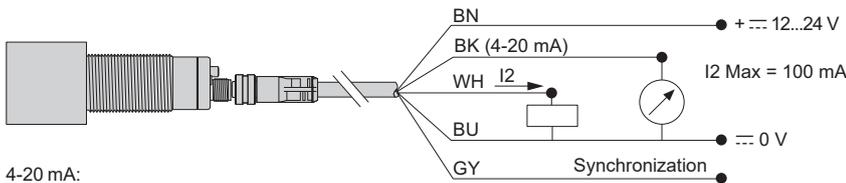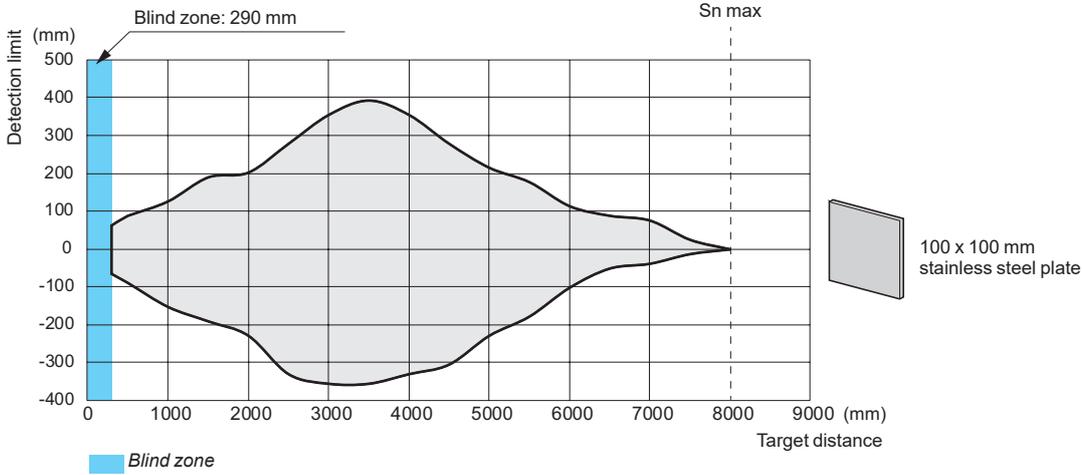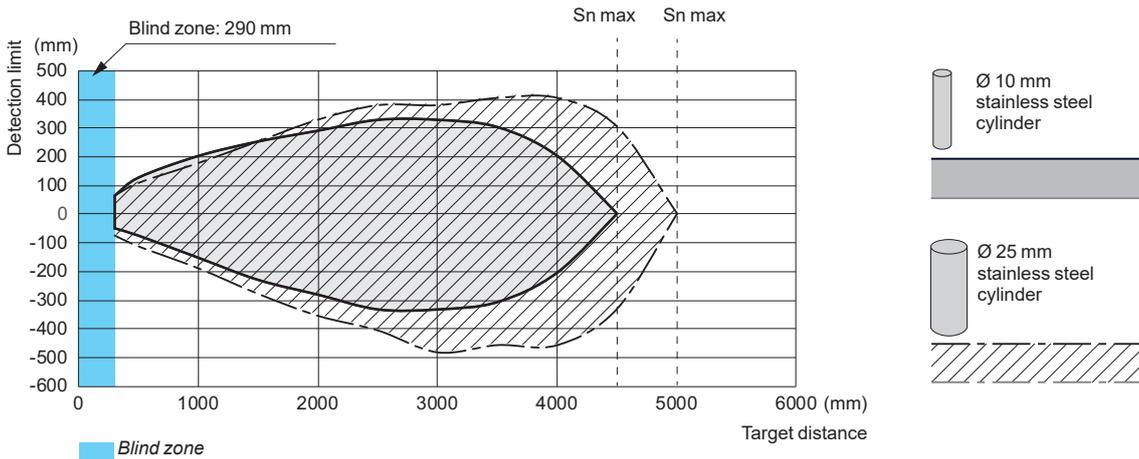| Pin number	Wire color	Digital output description	Analog output description	
			4-20 mA	**0-10 V**
1	BN: Brown	+12…24 V ⎓	+12…24 V ⎓	+24 V ⎓
2	WH: White	Output 2	PNP output	PNP output
3	BU: Blue	0 V ⎓	–	–
4	BK: Black	Output 1	4-20 mA output	0-10 V output
5	GY: Gray	Synchronization		

(1) Synchronization
(2) Output 2
(3) Output 1

Wiring scheme (digital output PNP, NO or NC)
XXS30P8PPM12

Wiring scheme (digital output NPN, NO or NC)
XXS30P8NNM12
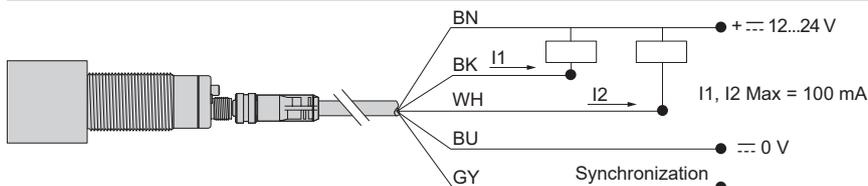
Telemecanique
Sensors

Ultrasonic sensors

XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 8 m sensing
distance. Diffuse mode, solid-state digital or analog
output. Configurable by software

Connections *(continued)*

Wiring scheme (analog output 0-10 V and PNP, NO or NC)

XXS30P8VPM12

BN — + $\overline{}$ 12...24 V
BK (0-10 V)
WH I2   I2 Max = 100 mA
BU — $\overline{}$ 0 V
GY   Synchronization

0-10 V: 1 kΩ…∞
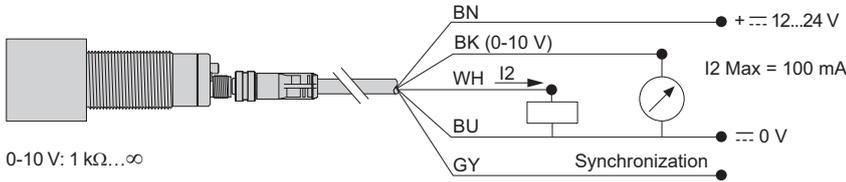
Wiring scheme (analog output 4-20 mA and PNP, NO or NC)

XXS30P8APM12

BN — + $\overline{}$ 12...24 V
BK (4-20 mA)
WH I2   I2 Max = 100 mA
BU — $\overline{}$ 0 V
GY   Synchronization

4-20 mA:
□ For 12 V $\overline{}$, load ≤ 250 Ω
□ For 24 V $\overline{}$, load ≤ 850 Ω

Diagram for the synchronization function (Side by side application)

BN — +
BK
WH
BU — $\overline{}$ 0 V
GY   Synchronization

D1

BN — +
BK
WH
BU — $\overline{}$ 0 V
GY   Synchronization

D1 = 1/8 Sn

*NB: To enable synchronization between several sensors, all of the wires of pin no. 5 (gray) must be electrically connected together.
A maximum of 8 sensors can be synchronized. To enable "Multiplexer" function for the sensors, use the XX Configuration Software.
Without synchronization or multiplexing, the sensors must be at least 50 cm away from each other in order to avoid mutual interference.*

Telemecanique
Sensors

Ultrasonic sensors

XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm, 8 m sensing
distance. Diffuse mode, solid-state digital or analog
output. Configurable by software

Curves

Detection curve with 100 x 100 mm square target

Blind zone: 290 mm

Sn max

100 x 100 mm
stainless steel plate

Detection limit (mm)

Target distance

Blind zone

Detection curve with round bar

Blind zone: 290 mm

Sn max   Sn max

Ø 10 mm
stainless steel
cylinder

Ø 25 mm
stainless steel
cylinder

Detection limit (mm)

Target distance

Blind zone

Operating diagram for analog output sensors

Near and far limits setting with teach procedure

Blind zone

(1)   Proximity limit   (2)   Sn max

Sensing window

10V / 20mA — Inverse

0V / 4mA — Direct

GN

YE

YE

GN: Green LED
YE: Yellow LED

⊗ : OFF

✷ : ON

(1): Near limit
(2): Far limit

Ultrasonic sensors
XX range, Wide Beam
Obstacle detection system for mobile equipment.
Configurable by software

Wide Beam ultrasonic sensors

Telemecanique Sensors has expanded its range of ultrasonic sensors with the "XX Wide Beam" offer to meet the specific needs of mobile equipment such as:
□ Lift trucks
□ Cherry pickers
□ Mobile elevating work platforms
□ Self-propelled ride-on handling trucks
□ Ground support equipment
□ Aircraft access platforms, etc.

These sensors are designed to detect the following kinds of obstacles when mobile equipment is lifting or rotating:
ceilings, beams, cables, scaffolding, other platforms or buckets, etc.

Compact and flush mountable in metal, these sensors are easy to install with:
□ A remote Deutsch DTM04 connector on a 0.15 m cable, or
□ A remote M12 connector on a 0.15 m cable, or
□ A 0.5 m cable
They operate silently and are also suitable for indoor use.

The XX configuration software makes these sensors easy to program.
The synchronization function is used to reduce interference between sensors, even when installed close to each other, thus helping to ensure objects are detected over a wide area.

***Important**: This device does not have a Performance Level or Safety Integrity Level or any other type of capability with regard to functional safety.
For safety applications, visit our website:* www.tesensors.com

Compact solution for detecting obstacles

Certified
> **E2** according to UN Regulation 10R-06
> **cULus**

Obstacle detection system

> **Wide detection area**: Fewer sensors are needed to cover a given area.
> Better tilt angle for enhanced detection of targets and surfaces, even those that are slightly reflective or curved

> **Rugged sensors suitable for use in harsh environments**
> Operation in temperatures as low as -40 °C with no adverse impact on detection capability
> Thermoplastic UV-resistant front face that can tolerate potential damage caused by building materials or bad weather
> IP69K rating for high-pressure washdown

> **Noise detection capability to assist the user**
> The sensor is equipped with a noise detection function that is enabled by default. When noise detection is enabled, the sensor's analog output emits 2 mA or 5 volts, depending on model (100 for CANJ by default), when it detects excessive environmental noise.
> Noise detection settings can be changed using the configuration interface and software (see page 78).

Telemecanique
Sensors

Ultrasonic sensors

XX range, Wide Beam
Obstacle detection system for mobile equipment.
Configurable by software

XXW54P3••L01DM6

XXW54P3•PL01M12

XXW54P3•PL05

XXZKITDM6

References

Description	Sensing distance (Sn)	Function/ output	Connections	Reference	Weight
	m				kg
Diffuse sensors with 0.5…4.5 V analog output and solid state digital output					
Ø 54 mm plastic sensor	3	0.5…4.5 V + PNP	0.15 m cable with remote Deutsch DTM04 6-pin connector	**XXW54P3HPL01DM6**	0.115
			0.15 m cable with remote M12, 5-pin connector	**XXW54P3HPL01M12**	0.115
			0.5 m cable	**XXW54P3HPL05**	0.115
Diffuse sensors with 4…20 mA analog output and solid state digital output					
Ø 54 mm plastic sensor	3	4…20 mA + PNP	0.15 m cable with remote Deutsch DTM04 6-pin connector	**XXW54P3APL01DM6**	0.115
			0.15 m cable with remote M12, 5-pin connector	**XXW54P3APL01M12**	0.115
			0.5 m cable	**XXW54P3APL05**	0.115
Diffuse sensors with CAN SAE J1939 communication					
Ø 54 mm plastic sensor	3	CANJ1939	0.15 m cable with remote Deutsch DTM04 6-pin connector	**XXW54P3JL01DM6**	0.115
			0.5 m cable	**XXW54P3JL05**	0.115

Connection accessory

Description	Connections	Reference	Weight kg
Configuration cable for sensors XXW54P3••L01DM6	1 m cable with ■ one female Deutsch DTM04 6-pin connector and ■ one male M12 4-pin connector	**XXZKITDM6**	0.050

Configuration software, interface, and kit for synchronization function

Telemecanique
Sensors

Ultrasonic sensors

XX range, Wide Beam
Obstacle detection system for mobile equipment.
Configurable by software

| Sensor type			XXW54P3HPL01DM6	XXW54P3APL01DM6	XXW54P3HPL05	XXW54P3APL05
General characteristics						
Conforming to standards			EN/IEC 60947-5-2, UL 60947-5-2 and CSA C22.2 n° 60947-5-2			
Compliance with regulations			CE (based on the EMC directive 2014/30/UE), NEC (ANSI/NFPA 70), CEC (CSA C22), UNECE R10			
Product certifications			UKCA, E2, cULus			
Nominal sensing distance (Sn)		m	0.425…3			
Blind zone		mm	425			
Detection window			Adjustable using XX configuration software, up to 4 m			
Transmission frequency (transmitter resonance)		kHz	48			
Differential travel		mm	< 20			
Repeat accuracy			0.1 %			
Sensor accuracy			2 %			
Minimum size of object to be detected			Cylinder Ø 10 mm up to a sensing distance of 3 m			
Tilt angle with 500 x 500 mm target			± 6° at 4 m, ± 10° at 3 m, ± 45° at 1.5 m			
Materials	Casing		PBT (Valox), UV resistant			
	Sensing face		PEI (ULTEM) with PUR coating, UV resistant			
Fixing method			Using 2 M4 screws (not provided). 2 x Ø 4.32 mm stainless steel inserts and silicone washers are provided with the sensor. Tightening torque ≤ 3 Nm (26.6 lb-in)			
Connection			By remote Deutsch DTM04 6-pin connector, on 0.15 m Ø 6 mm TPU cable		By 0.5 m Ø 6 mm TPU cable CSA: 5 x 0.34 mm^2	
Power supply characteristics						
Rated supply voltage (Ue) with protection against reverse polarity		V	12…24 V ⎓. Powered by a dedicated safety extra low voltage (SELV) or a protected extra low voltage (PELV)			
Voltage limits (including ripple)		V	⎓ 9…32			
Current consumption, no-load		mA	< 50			
Output characteristics						
Indicator lights	Output status		1 yellow LED			
	Power supply and echo status		1 two-tone LED (white and green). White: power on; green: echo status			
Switching capacity		mA	< 100 (with overload and short-circuit protection)			
Resistive load impedance			≥ 2 K Ω	≤ 250 Ω (12 V), ≤ 850 Ω (24 V)	≥ 2 K Ω	≤ 250 Ω (12 V), ≤ 850 Ω (24 V)
Voltage drop		V	< 2			
Internal temperature compensation			Yes			
Maximum switching frequency		Hz	1.6			
Delays	First-up	ms	400			
	Response	ms	300			
	Recovery	ms	300			
Environmental characteristics						
Degree of protection	Conforming to IEC 60529 and EN/IEC 60947-5-2		IP 65, IP 67, IP 69K			
Storage temperature		°C	- 40…+ 85			
Operating temperature		°C	- 40…+ 70			
Relative humidity			< 95%, non-condensing			
Vibration resistance	Conforming to IEC 60068-2-6		Amplitude ± 1 mm (f = 10…55 Hz)			
Mechanical shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms, in all 3 axes			
Immunity to electromagnetic interference			Conforming to EN/IEC 60947-5-2			

Telemecanique
Sensors

Ultrasonic sensors
XX range, Wide Beam
Obstacle detection system for mobile equipment.
Configurable by software

Sensor type			XXW54P3HPL01M12	XXW54P3APL01M12	XXW54P3JL01DM6	XXW54P3JL05
General characteristics						
Conforming to standards			EN/IEC 60947-5-2, UL 60947-5-2 and CSA C22.2 n° 60947-5-2			
Compliance with regulations			CE (based on the EMC directive 2014/30/UE), NEC (ANSI/NFPA 70), CEC (CSA C22), UNECE R10			
Product certifications			UKCA, E2, cULus			
Nominal sensing distance (Sn)		m	0.425…3			
Blind zone		mm	425			
Detection window			Adjustable using XX configuration software, up to 4 m			
Transmission frequency (transmitter resonance)		kHz	48			
Differential travel		mm	< 20			
Repeat accuracy			0.1 %			
Sensor accuracy			2 %			
Minimum size of object to be detected			Cylinder Ø 10 mm up to a sensing distance of 3 m			
Tilt angle with 500 x 500 mm target			± 6° at 4 m, ± 10° at 3 m, ± 45° at 1.5 m			
Materials	Casing		PBT (Valox), UV resistant			
	Sensing face		PEI (ULTEM) with PUR coating, UV resistant			
Fixing method			Using 2 M4 screws (not provided). 2 x Ø 4.32 mm stainless steel inserts and silicone washers are provided with the sensor. Tightening torque ≤ 3 Nm (26.6 lb-in)			
Connection			By remote M12 5-pin connector, on 0.15 m Ø 6 mm TPU cable		By remote Deutsch DTM04 6-pin connector, on 0.15 m Ø 6 mm TPU cable	
Power supply characteristics						
Rated supply voltage (Ue) with protection against reverse polarity		V	12…24 V ⎓. Powered by a dedicated safety extra low voltage (SELV) or a protected extra low voltage (PELV)			
Voltage limits (including ripple)		V	⎓ 9…32			
Current consumption, no-load		mA	< 50	< 50	< 101	< 101
Output characteristics						
Indicator lights	Output status		1 yellow LED			
	Power supply and echo status		1 two-tone LED (white and green). White: power on; green: echo status			
Switching capacity		mA	< 100 (with overload and short-circuit protection)			
Resistive load impedance			≥ 2 K Ω	≤ 250 Ω (12 V), ≤ 850 Ω (24 V)	–	
Voltage drop		V	< 2		–	
Internal temperature compensation			Yes		–	
Maximum switching frequency		Hz	1.6		–	
Delays	First-up	ms	400		–	
	Response	ms	300		–	
	Recovery	ms	300		–	
Environmental characteristics						
Degree of protection	Conforming to IEC 60529 and EN/IEC 60947-5-2		IP 65, IP 67		IP 65, IP 67, IP 69K	
Storage temperature		°C	- 40…+ 85			
Operating temperature		°C	- 40…+ 70			
Relative humidity			< 95%, non-condensing			
Vibration resistance	Conforming to IEC 60068-2-6		Amplitude ± 1 mm (f = 10…55 Hz)			
Mechanical shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms, in all 3 axes			
Immunity to electromagnetic interference			Conforming to EN/IEC 60947-5-2			
Sensor type			XXW54P3JL01DM6		XXW54P3JL05	
CANJ1939 characteristics						
CAN Standard			SAE J1939			
CAN interface			2-wire (5-pin or 6-pin), electro static discharge and transient protected			
Internal terminating resistor			102 Ω resistor, not supplied (purchase separately)			
CAN bus type			CAN 2.0B High speed			
CAN bus speed			250 k bits/s by default 500 k bits/s configurable			
J1939 frame emission rate		ms	50			
J1939 addressing mode			Configurable (dynamic addressing)			
CAN identifier length			29 bits			
Maximum network length		m	40			
Maximum number of sensors			Up to 30 sensors			

Ultrasonic sensors

XX range, Wide Beam
Obstacle detection system for mobile equipment.
Configurable by software

Dimensions

Sensors with remote Deutsch DTM04 connector

XXW54P3HPL01DM6, XXW54P3APL01DM6, XXW54P3JL01DM6
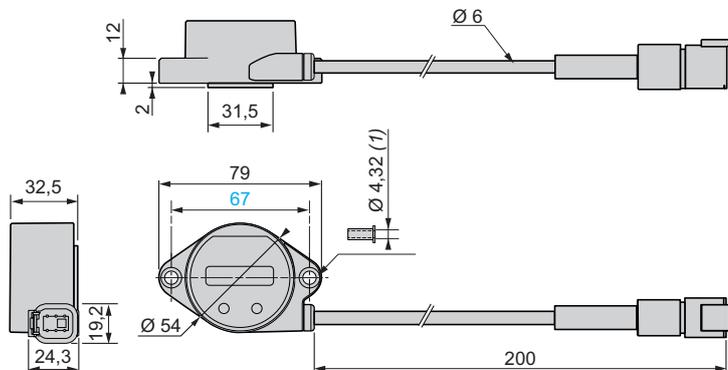
Sensors with remote M12 connector

XXW54P3HPL01M12, XXW54P3APL01M12
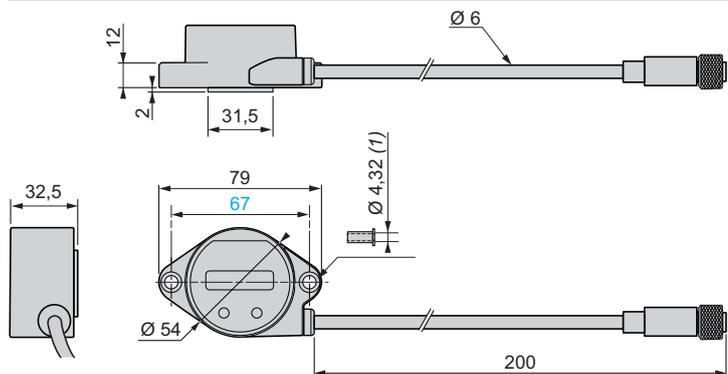
Pre-wired sensors

XXW54P3HPL05, XXW54P3APL05, XXW54P3JL05
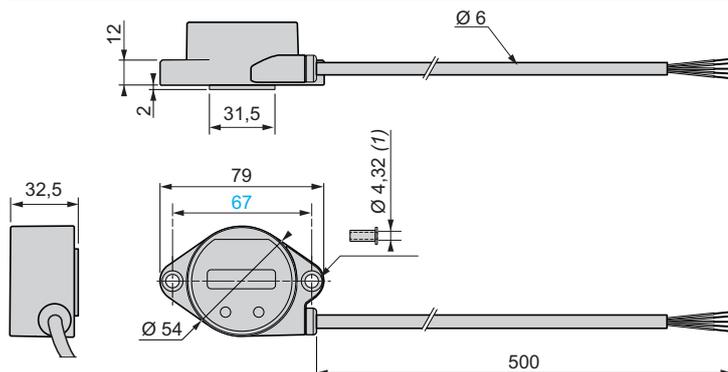
XXZKITDM6 cable with Deutsch DTM04 connector for sensor configuration
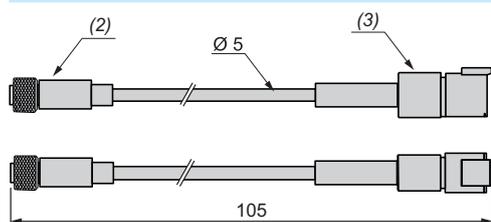
(1) The sensor is supplied with 2 stainless steel inserts Ø 4.32 mm and 2 silicone washers. M4 screws not provided.
(2) M12 connector.
(3) Deutsch DTM04 connector.

Telemecanique
Sensors

Ultrasonic sensors

XX range, Wide Beam
Obstacle detection system for mobile equipment.
Configurable by software

Connections *(continued)*
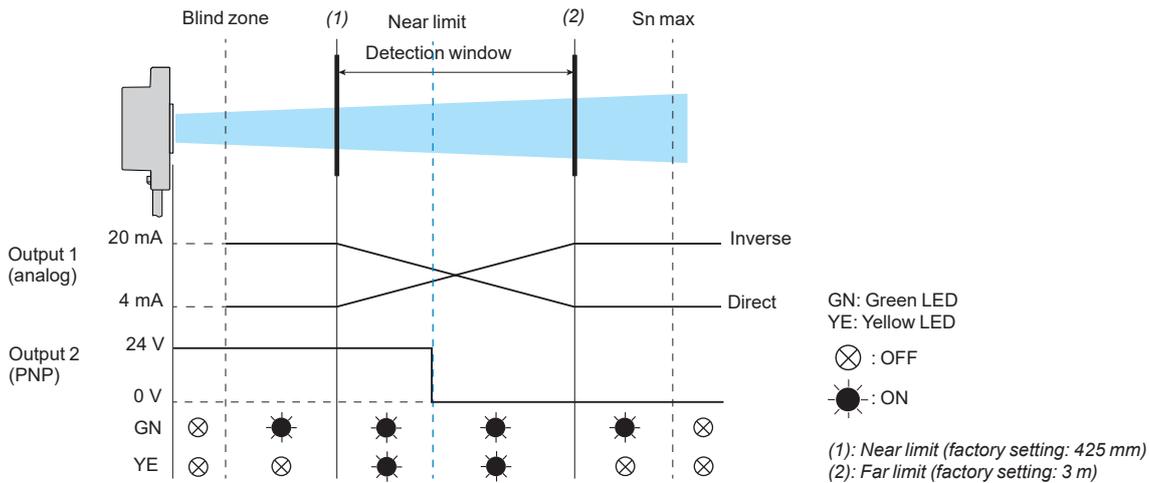
Sensors with remote Deutsch DTM04 connector
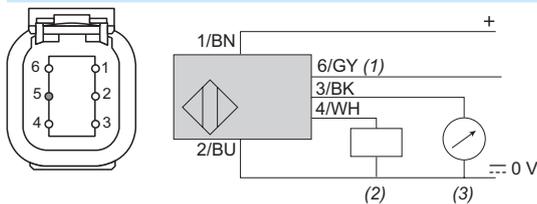
Pin number	Wire color	Description	
		XXW54P3HPL01DM6	**XXW54P3APL01DM6**
1	BN: Brown	+ 12…24 V ⎓	+ 12…24 V ⎓
2	BU: Blue	0 V ⎓	0 V ⎓
3	BK: Black	0.5…4.5 V analog output *(5)*	4…20 mA analog output *(6)*
4	WH: White	PNP solid-state output	PNP solid-state output
5 *(4)*	–	Not connected	Not connected
6	GY: Gray	Synchronization	Synchronization
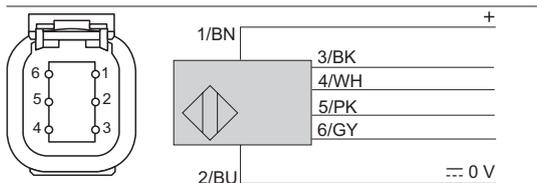
Pin number	Wire color	Description
		XXW54P3JL01DM6
1	BN: Brown	+ 12…24 V ⎓
2	BU: Blue	0 V ⎓
3	BK: Black	XXZBOX01 communication
4	WH: White	Synchronization
5	PK : Pink	CAN HIGH *(7)*
6	GY: Gray	CAN LOW *(7)*

Sensors with remote M12 connector
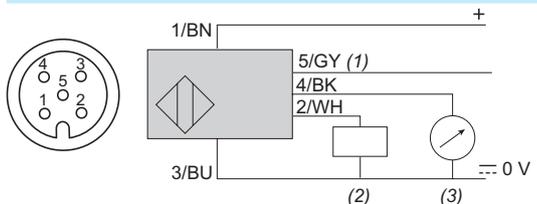
Pin number	Wire color	Description	
		XXW54P3HPL01M12	**XXW54P3APL01M12**
1	BN: Brown	+ 12…24 V ⎓	+ 12…24 V ⎓
2	WH: White	PNP solid-state output	PNP solid-state output
3	BU: Blue	0 V ⎓	0 V ⎓
4	BK: Black	0.5…4.5 V analog output *(5)*	4…20 mA analog output *(6)*
5	GY: Gray	Synchronization	Synchronization

XXZKITDM6 cable
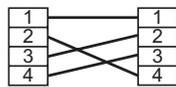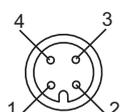
M12   **Deutsch**
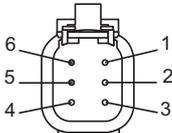
M12 connector

Pin number	Wire color	Description
1	BN: Brown	+ 24 V ⎓ , power to sensor
2	WH: White	Software communication
3	BU: Blue	0 V ⎓
4	BK: Black	Software communication

Deutsch connector

Pin number	Couleur des fils	Description
1	BN: Brown	+ 24 V ⎓ , power to sensor
2	BU: Blue	0 V ⎓
3	BK: Black	Software communication
4	WH: White	Software communication
5 *(8)*	–	Not connected
6 *(8)*	–	Not connected

Pre-wired sensors

XXW54P3HPL05
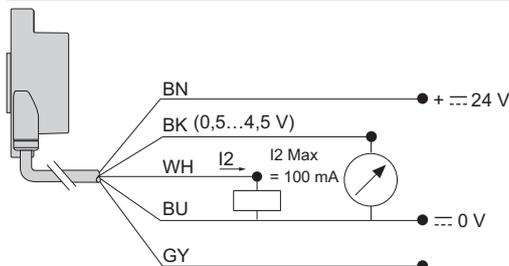
0.5…4.5 V: load 2 kΩ…∞

XXW54P3APL05
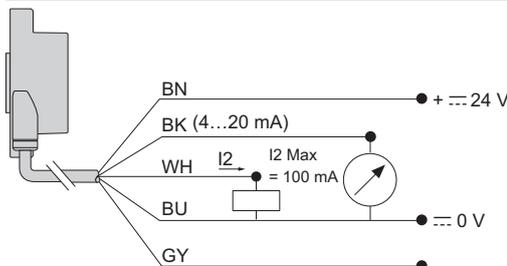
4…20 mA: load ≤ 250 Ω (⎓ 12 V), load ≤ 850 Ω (⎓ 24 V).

(1) Synchronization
(2) Output 2
(3) Output 1
(4) Contact not connected, equipped with a sealing plug (provided wit the sensor).
(5) The sensor's analog output emits 5 volts when it detects excessive environmental noise.
(6) The sensor's analog output emits 2 mA when it detects excessive environmental noise.
*(7) When noise detection is enabled, the sensor's CAN bus will output 100 by default*
    (configurable to 6400) when it detects excessive environmental noise.
*(8) Contact not connected, equipped with a sealing plug (provided wit the sensor).*

Ultrasonic sensors

XX range, Wide Beam
Obstacle detection system for mobile equipment.
Configurable by software

Connections *(continued)*

Pre-wired sensors *(1)*

XXW54P3JL05
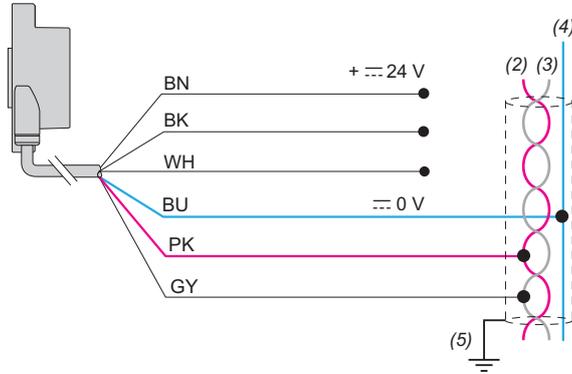
*(1) Connecting the detector to the **XXZBOX01** configuration interface with the **XZCC12MDM40B** connector: BN (Brown), WH (White), BU (Blue), BK (Black).*
(2) CAN HIGH
(3) CAN LOW
(4) GND
(5) EMC/GND

Synchronization function diagram (side-by-side application)

XXW54P3HPL01DM6, XXW54P3APL01DM6, XXW54P3HPL01M12, XXW54P3APL01M12, XXW54P3HPL05
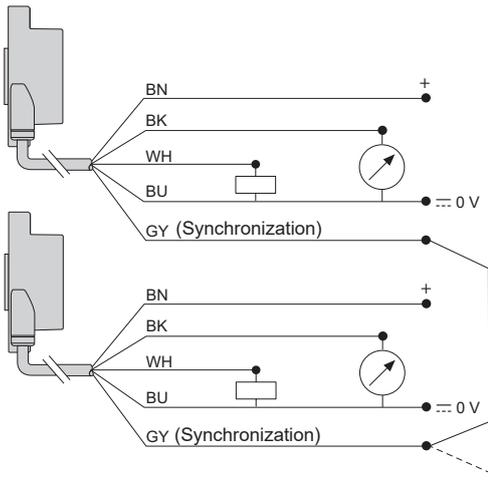
Note: *Synchronization is recommended if more than one sensor is used in the same direction in order to avoid any interference between sensors due to the width of their beam.*
Up to 8 sensors can be synchronized to operate side by side by electrically connecting all pin no. 6 (gray) wires together.
All sensors must be the same model and have the same cycle time setting.

XXW54P3JL01DM6, XXW54P3JL05
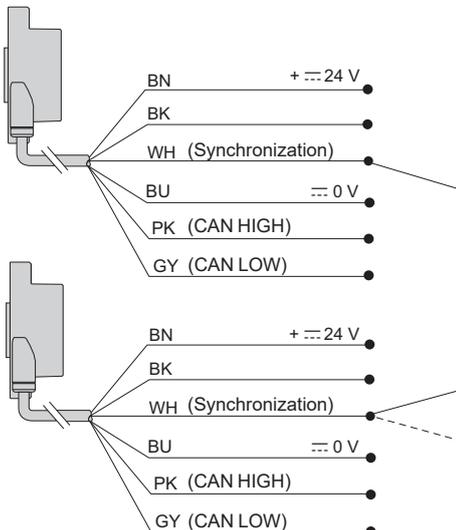
Note: *Synchronization is recommended if more than one sensor is used in the same direction in order to avoid any interference between sensors due to the width of their beam.*
Up to 8 sensors can be synchronized to operate side by side by electrically connecting all pin no. 4 (white) wires together.
All sensors must be the same model and have the same cycle time setting.

Telemecanique
Sensors

Ultrasonic sensors

XX range, Wide Beam
Obstacle detection system for mobile equipment.
Configurable by software

Connections *(continued)*

CANJ network topology
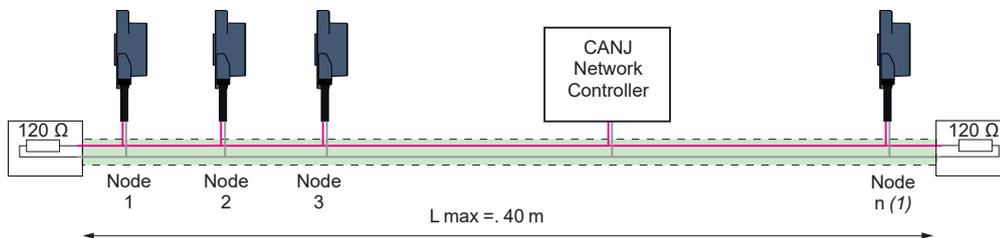
(1) Max. number: 30 sensors.

Curves

Detection curve with 100 x 100 mm square target
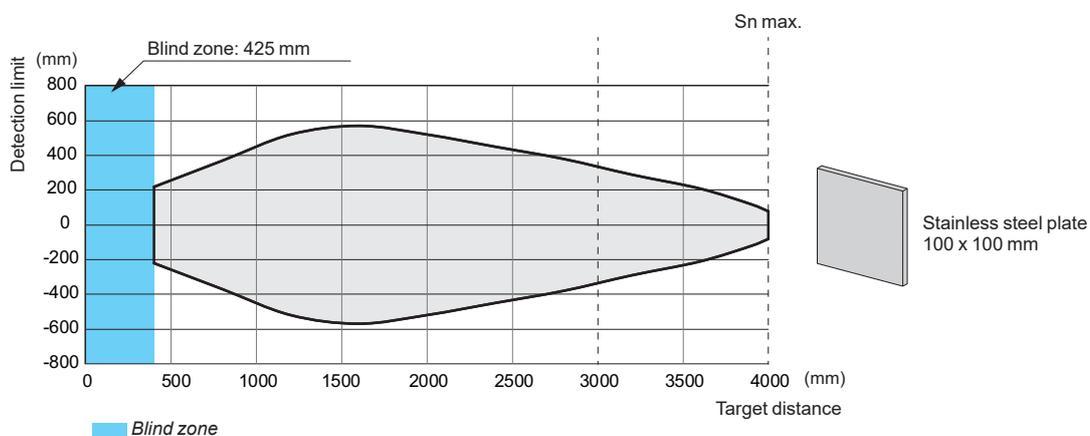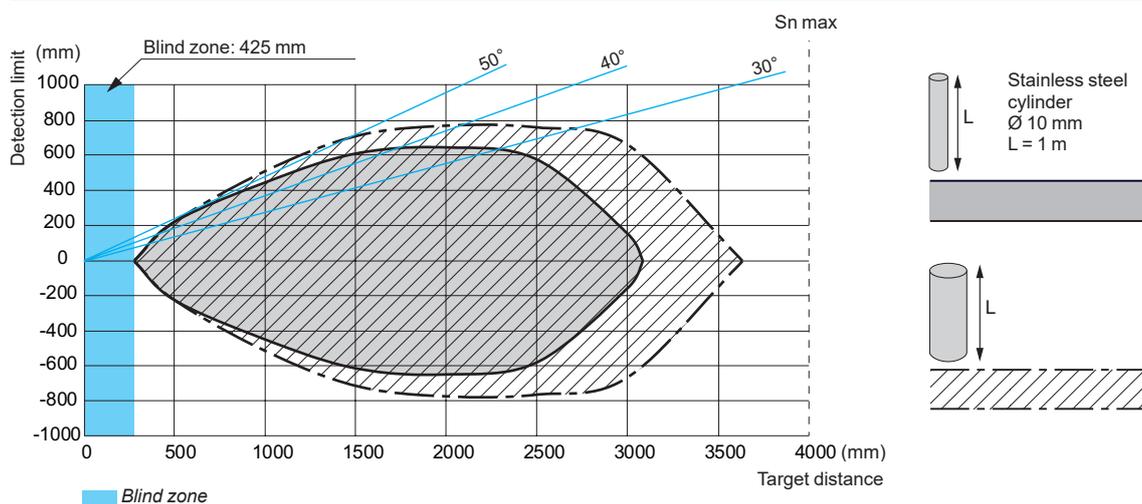
Blind zone: 425 mm
Sn max.

Detection limit (mm)

Stainless steel plate
100 x 100 mm

Target distance (mm)

Blind zone

Detection curve with round bar

Blind zone: 425 mm
Sn max

Detection limit (mm)

50° 40° 30°

Stainless steel
cylinder
Ø 10 mm
L = 1 m

Target distance (mm)

Blind zone

Ultrasonic sensors

XX range, Wide Beam
Obstacle detection system for mobile equipment.
Configurable by software

Operating diagram

Setting the near and far limits using the configuration software

XXW54P3HPL01DM6, XXW54P3HPL05, XXW54P3HPL01M12
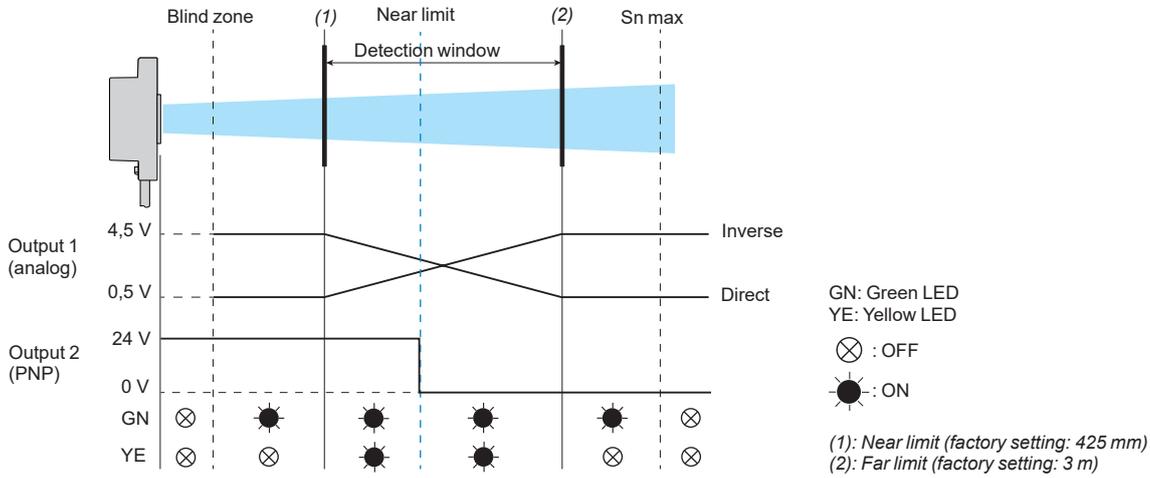
Blind zone (1) Near limit (2) Sn max

Detection window

Output 1 (analog)
4,5 V .... Inverse
0,5 V .... Direct

Output 2 (PNP)
24 V
0 V

GN: Green LED
YE: Yellow LED

⊗ : OFF

: ON

(1): Near limit (factory setting: 425 mm)
(2): Far limit (factory setting: 3 m)

Note: The sensor's analog output emits 5 volts when it detects excessive environmental noise.

XXW54P3APL01DM6, XXW54P3APL05, XXW54P3APL01M12

Blind zone (1) Near limit (2) Sn max

Detection window

Output 1 (analog)
20 mA .... Inverse
4 mA .... Direct

Output 2 (PNP)
24 V
0 V

GN: Green LED
YE: Yellow LED

⊗ : OFF

: ON

(1): Near limit (factory setting: 425 mm)
(2): Far limit (factory setting: 3 m)

Note: The sensor's analog output emits 2 mA when it detects excessive environmental noise.

Telemecanique
Sensors

Ultrasonic sensors
XX range, Wide Beam
Obstacle detection system for mobile equipment.
Configurable by software

Operating diagram *(continued)*

Setting the near and far limits using the configuration software

XXW54P3JL01DM6, XXW54P3JL05

Bind zone   (1)   Proximity limit   (2)   Sn max

Sensing window

GN
YE

GN: Green LED
YE: Yellow LED

⊗ : OFF

☀ : ON

(1): Near limit (factory setting: 425 mm)
(2): Far limit (factory setting: 3 m)
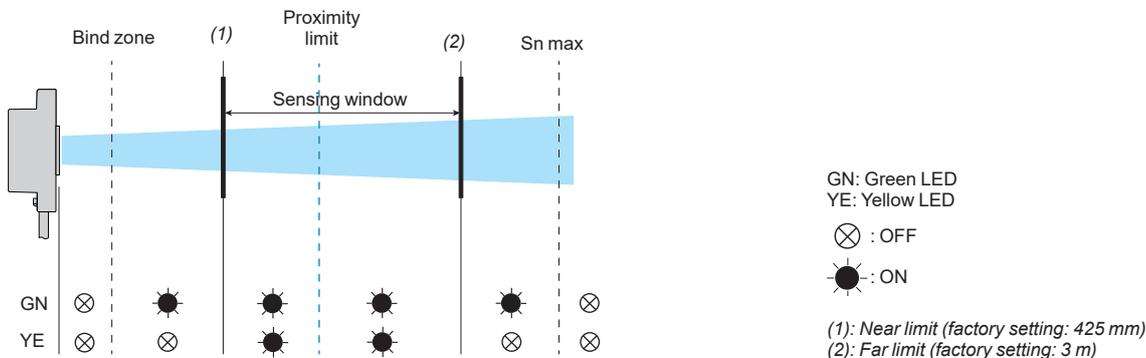
Note: When noise detection is enabled, the sensor's CAN bus will output 100 by default (configurable to 6400) when it detects excessive environmental noise.

Setting-up instructions

Mutual interference between two separate pieces of mobile equipment, side by side

(1)
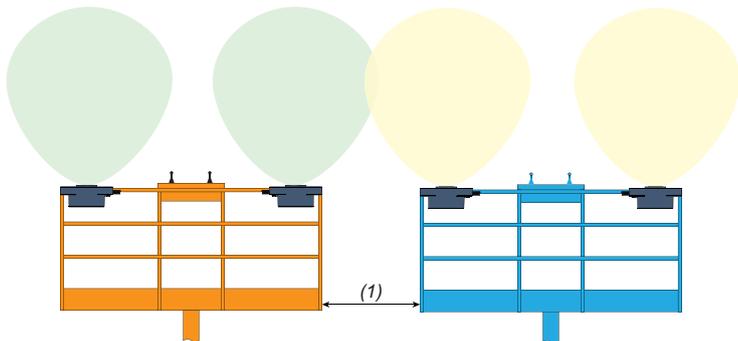
(1) Minimum distance: 2.5 m
Note: Sensors in the same mobile equipment must be synchronized, but sensors in two separate pieces of mobile equipment cannot be synchronized.

Mounting with inserts and washers

1 2
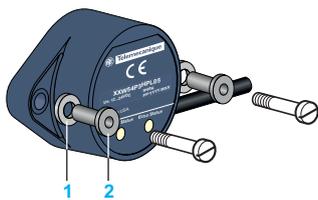
1 Silicone washer
2 Stainless steel insert
*Note: The sensor is supplied with 2 stainless steel inserts
Ø 4.32 mm and 2 silicone washers. M4 screws not provided*

Flush-mounting recommendations

(2)

(1)
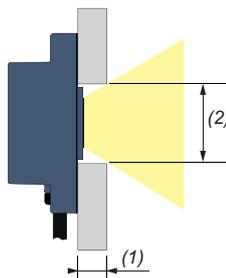
(1) Max. thickness = 10 mm
(2) Minimum Ø = 33 mm

Telemecanique
Sensors

Ultrasonic sensors
XX range
Flat format, plastic
DC supply, solid-state digital output

XX7F1A2NAL01M12

XX7K1A2PAM12

XX8D1A1NAM12

XXZPB100

Diffuse mode

Fixed sensing distance sensors

Sensors	Sensing distance (Sn)	Function/ output	Connection	Reference	Weight
mm	m				kg
7.6 x 19 x 33	0.10	NO/NPN	152 mm flying lead + M12 connector	**XX7F1A2NAL01M12**	0.040
		NO/PNP	152 mm flying lead + M12 connector	**XX7F1A2PAL01M12**	0.040
16 x 30 x 74	0.25	NO/PNP	M12 connector	**XX7K1A2PAM12**	0.050

Adjustable sensing distance sensors

18 x 33 x 60 + Ø 18	0.50 (adjustable)	NO/NPN	Connecteur M12	**XX7V1A1NAM12**	0.060
		NO/PNP	Connecteur M12	**XX7V1A1PAM12**	0.060
80 x 80 x 34	1 (adjustable)	NO/NPN	Connecteur M12	**XX8D1A1NAM12**	0.300
		NO/PNP	Connecteur M12	**XX8D1A1PAM12**	0.300

Accessories

Teach pushbutton

Description	For use with sensor	Reference	Weight kg
Selection of detection window **Length of cable:** 152 mm **Input:** M12 female connector **Output:** M12 male connector	XX7V1A1●AM12 XX8D1A1●AM12	**XXZPB100**	0.035

Other connection and fixing accessories

See page 82.

Telemecanique Sensors

Ultrasonic sensors

XX range
Flat format, plastic
Sensors with analogue output signal 0…10 V
or 4-20 mA

XX9V1A1C2M12

XX9D1A1●●M12

XXZPB100

Diffuse mode

Adjustable sensing distance sensors

Sensors	Sensing distance (Sn)	Analogue output (Slope selection using teach button)	Reference	Weight
mm	m			kg
18 x 33 x 65 + Ø 18	0.50 (adjustable)	4-20 mA	**XX9V1A1C2M12**	0.090
		0-10 V	**XX9V1A1F1M12**	0.060
80 x 80 x 34	1 (adjustable)	4-20 mA	**XX9D1A1C2M12**	0.300
		0-10 V	**XX9D1A1F1M12**	0.300

Accessories

Teach pushbutton

Description	For use with sensors	Reference	Weight kg
Selection of detection window **Length of cable: 152 mm** **Input:** M12 female connector **Output:** M12 male connector	XX9V1A1●●M12 XX9D1A1●●M12	**XXZPB100**	0.035

Other connection and fixing accessories

See page 82.

Ultrasonic sensors
XX range
Flat format, plastic

Sensor type		XX7F1A2●	XX7K1A2●	XX7V1A1●	XX8D1A1●	XX9V1A1●	XX9D1A1●
General characteristics							
Conformity to standards		CE, IEC 60947-5-2					
Product certifications		UL	UL	UL	UL	UL, cCSAus	
Nominal sensing distance (Sn)	m	0.1	0.25	0.5	1	0.5	1
Blind zone (in diffuse mode the object is not detected in this zone, in reflex mode the background is not detected in this zone)	mm	0…6.4	0…51	0 ... 51	0 ... 100	0…51	0…100
Detection window		Fixed		Remotely adjustable or by using teach button			
Detection system Diffuse mode		●	●	●	●	●	●
Transmission frequency	kHz	500	500	300	180	300	180
Differential travel	mm	< 0.7	< 0.35	< 2.5	< 2.5	–	–
Repeat accuracy	mm	± 0.7	± 0.7	± 1.27	± 1.6	1.27	± 1.6
Overall beam angle (see detection lobe)		14°	14°	12°	7°	6°	7°
Minimum size of object to be detected		Cylinder Ø 2.5 mm or flat bar 1 mm wide up to 50 mm	Cylinder Ø 1.6 mm up to 76 mm	Cylinder Ø 2.5 mm or flat bar 1 mm wide for a sensing distance of 150 mm	Cylinder Ø 50 mm up to 1 m	Cylinder Ø 2.5 mm or flat bar 1 mm wide for a sensing distance of 150 mm	Cylinder Ø 50 mm up to a sensing distance of 1 m
Deviation angle from 90° of the object to be detected		–				± 7°	± 5°
Materials Case		ULTEM®		Valox®			
Sensing face *(1)*		Epoxy	Silicone	Epoxy			
Connection Connector		M12, 4-pin, on 152 mm flying lead	M12, 4-pin				
Supply characteristics							
Rated supply voltage	V	⎓ 12…24 V				⎓ 15…24 V	
Voltage limits (including ripple)	V	⎓ 10…28 V					
Current consumption, no-load	mA	25	60	40	70	40	70

(1) Silicone face for optimum chemical resistance.

⊕ **Telemecanique**
Sensors

Sensor type			XX7F1A2●	XX7K1A2●	XX7V1A1●	XX8D1A1●	XX9V1A1●	XX9D1A1●
Output characteristics								
Slope type			Direct or inverse by using teach button (see page 72).					
LED indicators	Output state		Yellow LED					
	Power on		Green LED		Green LED			
	Setting-up assistance		–		Multicolour LED		Dual colour LED	
Delays	First-up	ms	–				100	75
Recovery time		ms	–				150	180
Resistive load impedance	4-20 mA	Ω	–				10...500	10...350
	0-10 V	Ω	–				1 k...∞	2 k fixed
Switching capacity	(PNP and NPN)	mA	< 100, NO or NC function			100		
Voltage drop	(PNP and NPN)	V	< 1	< 1	< 1	< 1		
Maximum switching frequency		Hz	100	80	40	72		
Delays	First-up	ms	20	350	100	75		
	Response	ms	4	5	10	15		
	Recovery	ms	4	5	10	75		
Environment characteristics								
Degree of protection	Conforming to IEC 60529 and IEC 60947-5-2		IP 67					
Storage temperature		°C	- 40…+ 80					
Operating temperature		°C	- 20…+ 65	0…+ 50	- 20…+ 65	0…+ 70	- 20…+ 65	0…+ 70
Vibration resistance	Conforming to IEC 60068-2-6		Amplitude ± 1 mm (f = 10…55 Hz)					
Mechanical shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms, in all 3 axes					
Resistance to electromagnetic interference			Conforming to IEC 60947-5-2					

Dimensions

XX7F1A2NAL01M12, XX7F1A2PAL01M12

(1) Cable, length: 152 mm.

XX7K1A2PAM12

XX7V1A1NAM12, XX7V1A1PAM12

XX9V1A1C2M12, XX9V1A1F1M12
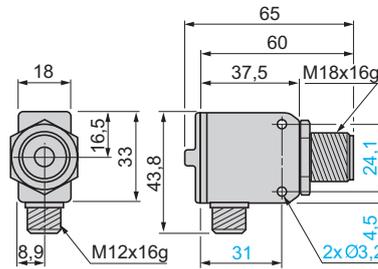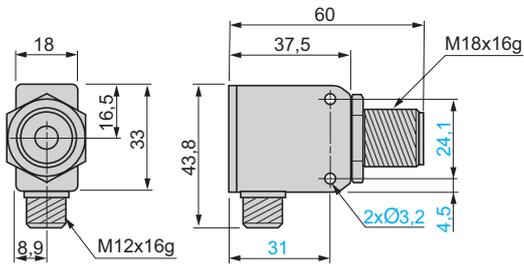
XX8D1A1NAM12, XX8D1A1PAM12, XX9D1A1C2AM12, XX9D1A1F1AM12
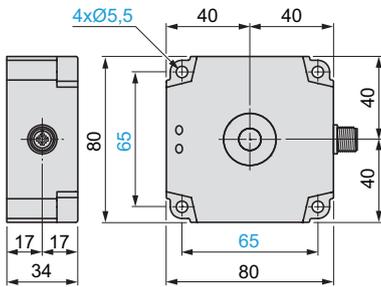
XXZPB100
Teach pushbutton

(1) Cable, length: 152 mm.

Ultrasonic sensors
XX range
Flat format, plastic
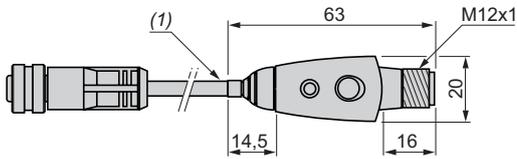
Setting-up precautions

Minimum mounting distances

Diffuse sensors, flat format

Side by side
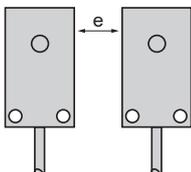
e: respect the distances indicated on the detection curves

Curves
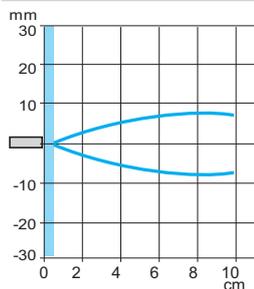
XX7F1A2NAL01M12, XX7F1A2PAL01M12	XX7K1A2PAM12	XX7V1A1NAM12, XX7V1A1PAM12, XX9V1A1C2M12, XX9V1A1F1M12	XX8D1A1NAM12, XX8D1A1PAM12, XX9D1A1C2AM12, XX9D1A1F1AM12
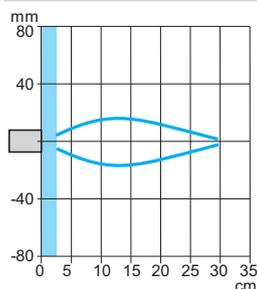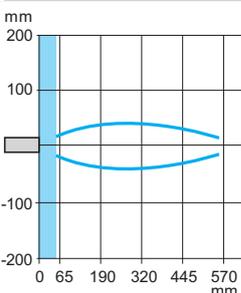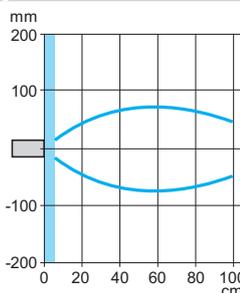
Blind zone

Schemes

M12 connector, solid-state digital output
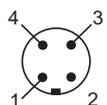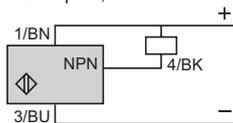
	XX7F1A2NAL01M12 *(1)*	**XX7F1A2PAL01M12** *(1)*, **XX7K1A2PAM12**

3-wire type

1 (+)
3 (-)
4 NPN or PNP output

NO outputs, NPN

NO outputs, PNP
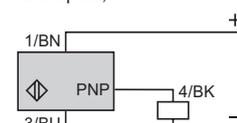
(-) BU (Blue)
(+) BN (Brown)
BK (Black)

(1) Remote connector on flying lead approximately 15 cm long.

M12 connector, analogue output

	XX7V1A1NAM12 XX8D1A1NAM12	**XX7V1A1PAM12 XX8D1A1PAM12**	**XX9V1A1C2M12, XX9V1A1F1M12, XX9D1A1C2AM12, XX9D1A1F1AM12**
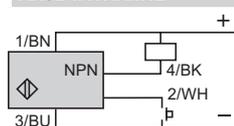
4-wire type

1 (+)
2 Return signal or teach
3 (-)
4 Output signal

BN (Brown)
WH (White)
BU (Blue)
BK (Black)
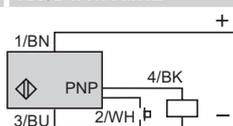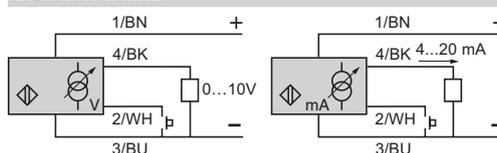
For impedance of resistive load refer to values on page 75.

Ultrasonic sensors
XX range
XX Configuration Software

XX Configuration Software

Telemecanique Sensors is now offering a solution for configuring ultrasonic XX range sensors. This software enables users to quickly find the optimal sensing solution for their applications. An interface unit connects the sensor to the PC via a USB connection.

> **Easy configuration to unique applications**
> The configuration software has more than 20 parameters that can be modified to suit the machine application. The parameters can be saved in PDF format for quick, easy reference.

> **Real-time sensor performance display**
> One of the best functions of the new software is the ability to troubleshoot and visualize the effects of the parameters on the configured sensor. The "echo display" function shows the exact position of any false echoes. The recording function can record the values of the echoes in an .xlsx or .xml file for extended periods of time.

> **Quick duplication of programmed settings**
> Optimal parameters set on one sensor can be saved and loaded on other units of the same reference. This function reduces time and effort.

> The interface can be used to configure specific configurable models of XX ultrasonic sensors (XXS●●, XXA●● & XXW54P3●●●).
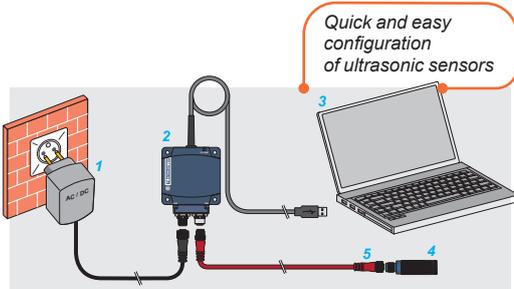
Quick and easy configuration of ultrasonic sensors

1: Power supply, provided with 4 adapters
*2: Configuration interface **XXZBOX01***
3: XX Configuration Software, installed on a PC
*4: Ultrasonic sensor **XXS●●**, **XXA●●** or **XXW54P3●●●**.*
5: M12-M12 cable or Deutsch DTM04-M12.

XX Configuration Software for ultrasonic sensors

> XX Configuration Software is available in English, French, German, Spanish, Italian, and Chinese. It can be downloaded directly from the website www.tesensors.com.

> Recommended PC performance:
> > Windows OS: 7 SP1 embedded standard(x86 & x64), 8.1 (x86 & x64), or 10 (x86 & x64)
> > Internet Explorer: 9.0 or higher
> > Disk space: 1 GB or higher
> > RAM memory: 2 GB or higher
> > Processor speed: 1 GHz or higher
> > Display resolution: 1360 x 768 or higher

Ultrasonic sensors configuration interface XXZBOX01

References

Description	Reference	Weight kg
Ultrasonic sensors configuration interface		
Configuration interface provided with:	**XXZBOX01**	0.400
■ 1 power supply *(1)*		
■ 1 UK adapter		
■ 1 SAA adapter		
■ 1 US adapter		
■ 1 EU adapter		
Ultrasonic sensors configuration kit		
Plastic case including:	**XXZKIT01**	1.200
■ 1 configuration interface XXZBOX01		
■ 1 power supply *(1)*		
■ 1 UK adapter		
■ 1 SAA adapter		
■ 1 US adapter		
■ 1 EU adapter		
■ 1 cable of 1 m, with M12 connectors (5-pin male/female)		

(1) Power supply: 24 V ⎓, 0.5 A min., with M12 connector.

Ultrasonic sensors configuration kit XXZKIT01

One of the most user-friendly ultrasonic sensor configuration software solutions

Telemecanique Sensors

Ultrasonic sensors
XX range
XX Configuration Software

Configuration software presentation

Principle

Configuration software, XX range

- **Customize:** configure the sensor to your unique application!
- **Analyze:** view the real time performance of your sensor!
- **Streamline:** use the same file to quickly configure multiple units!

For more information
Access more information about this product at www.tesensors.com or use this QR Code

1 Power Supply Adaptor

4 Ultrasonic Sensor

Configuration Set-up

2 Ultrasonic Sensor

4 Ultrasonic Sensor

Communication of parameters

Communication of parameters

3 XX Configuration Software on PC or Laptop

Simply easy!

Telemecanique Sensors

1: Power supply, provided with 4 adapters
2: Configuration interface **XXZBOX01**
3: XX Configuration Software, installed on a PC
4: Ultrasonic sensor **XXS••**, **XXA••** or **XXW54P3•••**.

Setting examples

Sensor selection

> This page is used to manually select or auto-download the XX reference sensor to be configured. Once a reference has been selected, the user can start the configuration process.

> There are **4** methods of selection.
The **Reset search** button can reinitialize the search, regardless of the method used.
1: Direct selection from the full reference list
2: Selection through reference
3: Manual search using criteria
4: Automatic sensor detection
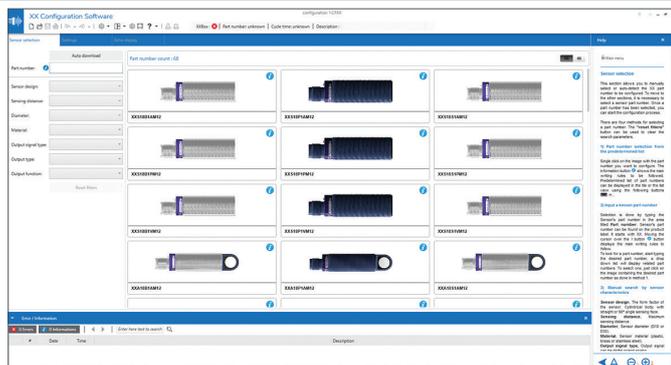
Detection settings

> This tab is used to configure the sensor detection settings.
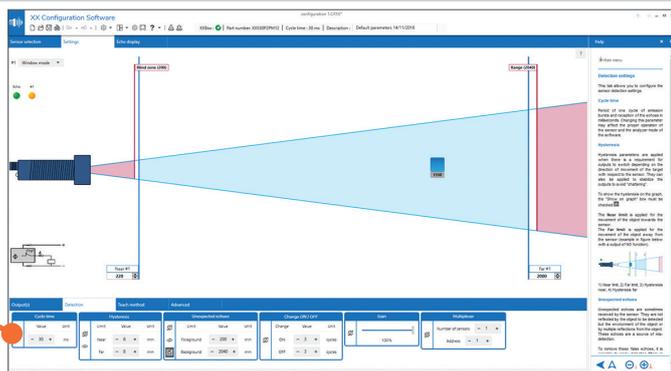
Output settings

> This page enables the configuration of sensor outputs. If the sensor has several outputs, they may be configured separately, unless specified otherwise.
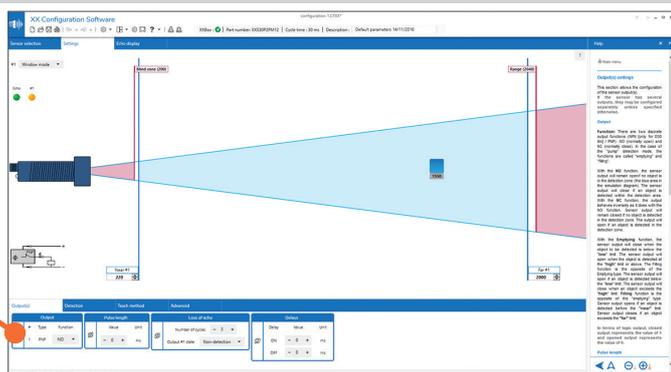
Configuration software presentation *(continued)*

Setting examples *(continued)*

Teach method settings

> This tab allows the configuration of the pushbutton for manual teaching. Depending on the sensor reference, the teach button is either integrated in the sensor or available through the teach pushbutton **XXZPB100** (see page 43).
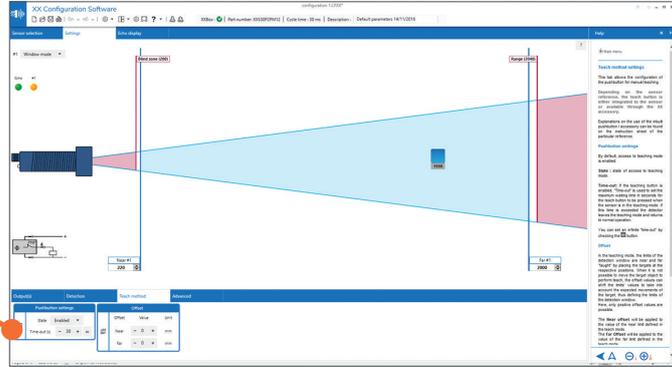
Echo display mode

> With the "echo display" mode, the user can visualize several echoes received by the sensor in the same cycle.

> The first valid echo is shown in blue and the others in gray. The blue echo is what the sensor considers as the detected object.

> It is also possible to record the data over extended periods of time using the "record" function.
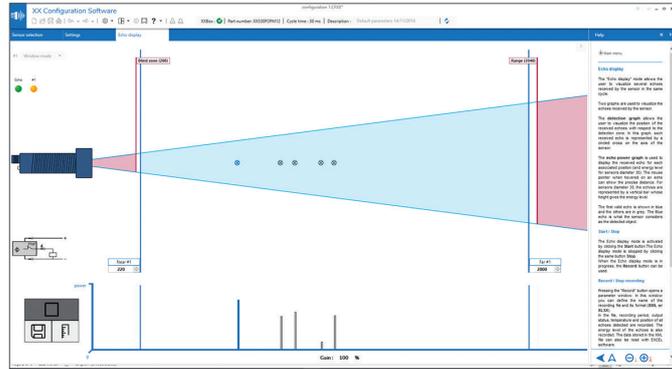
Measure mode

> The "measure" button opens a pop-up window giving a real-time numerical display of the position of the object in mm or inches.

Ultrasonic sensors
XX range
Configuration interface XXZBOX01
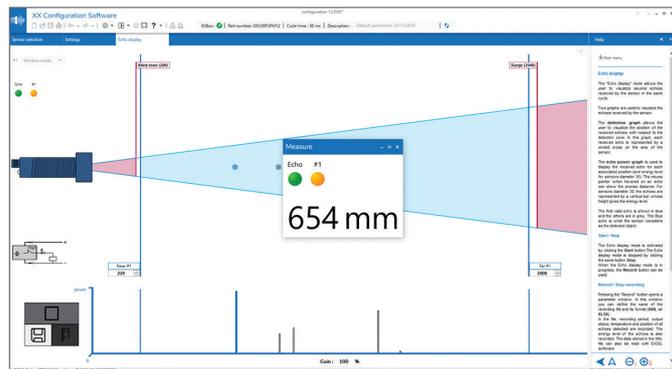
Characteristics

Supply characteristics

Rated supply voltage (Ue) with protection against reverse polarity	V	24 V ---
Voltage limits	V	14…30 V --- (ripple: 10% max)
Consumption	W	4 (consumption excluding sensor)

LED indicators

LED indicators	Power supply	Green LED
	PC communication	Orange LED
	Error	Red LED

Communication

Data communication baud rate	bps	19,200

Connection

Maximum cabling distance between sensor and interface	m	3
Electrical connection to sensor		M12 female connector
Connection to PC or laptop		0.5 m USB cable , A type connector

Environment characteristics

Compliance to regulations		CE
Degree of protection Conforming to IEC 60529		IP 40
Storage temperature	°C	-20…+45
Operating temperature	°C	0…+45
Relative humidity		< 95%, without condensation

Dimensions
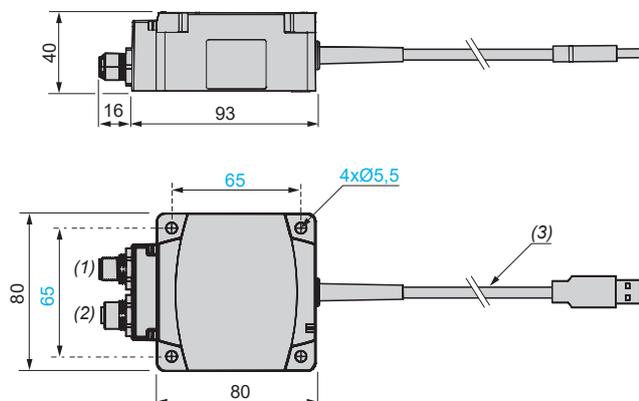
(1) Male M12 connector, 5-pin: power supply
(2) Female M12 connector, 5-pin: sensor
(3) Cable length: 0.5 m (USB cable A type connector): PC

Connections

Interface connector for power supply adapter (M12 male)

Pin number	Wire color	Description
1	BN: Brown	+14…30 V ---
2	WH: White	Output 2 (4) (5)
3	BU: Blue	0 V ---
4	BK: Black	Output 1 (4)
5	–	Not used (6)

Interface connector for sensor (M12 female)

Pin number	Description
1	Power out to sensor
2	Software communication
3	0 V ---
4	Software communication
5	Not used (6)

(4) Output is only active during the "echo display" mode and "measure" mode.
(5) Output 2 is not available on all sensors.
(6) The 5th pins of the M12 male and M12 female connectors are electrically connected to one another.

Ultrasonic sensors
XX range
Accessories

XZCC12FD●40B

XZCP1041L●

XSZB11●

XUZA118

XSZBD10

3D fixing kit example
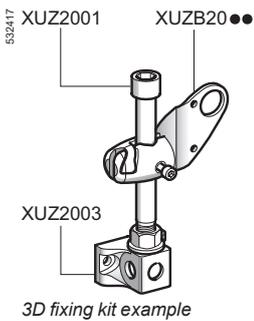
References of accessories

Cabling accessories

Connectors	For use with sensor	Type of connection		Reference	Weight kg
M8 3-pin	Ø 12	IDC (Insulation Displacement Connector)	Straight	**XZCC8FDM30V**	0.010
	XX512A2●		Elbowed	**XZCC8FCM30V**	0.010
M8 4-pin	XX512A1●		Straight	**XZCC8FDM40V**	0.010
	XX●12A8●		Elbowed	**XZCC8FCM40V**	0.010
M12	Ø 18, Ø 30	Screw terminals, metal clamping ring	Straight	**XZCC12FDM40B**	0.020
			Elbowed	**XZCC12FCM40B**	0.020
		Screw terminals, plastic clamping ring	Straight	**XZCC12FDP40B**	0.020
			Elbowed	**XZCC12FCP40B**	0.020

Pre-wired connectors	For use with sensor	Type	Cable length	Reference	Weight
			m		kg
M8 3-pin	Ø 12 XX512A2●	Straight	2	**XZCP0166L2** *(1)*	0.080
		Elbowed	2	**XZCP0266L2** *(1)*	0.080
M12	Ø 18, Ø 30	Straight	2	**XZCP1141L2** *(1)*	0.090
		Elbowed	2	**XZCP1241L2** *(1)*	0.090

Fixing accessories

Description	For use with sensor	Reference	Weight kg
Fixing clamps	Ø 12	**XSZB112**	0.006
	Ø 18	**XSZB118**	0.010
	Ø 30	**XSZB130**	0.020
Fixing clamps (mounting on 35 mm ⊔ rail)	XX●D●	**XSZBD10**	0.065
90° fixing bracket	Ø 12	**XXZ12**	0.025
	Ø 18	**XUZA118**	0.038
	Ø 30	**XXZ30**	0.115
3D fixing kit *(2)* M12 rod	Ø 12, Ø 18 and Ø 30	**XUZ2001**	0.050
Support for M12 rod	Ø 12, Ø 18 and Ø 30	**XUZ2003**	0.160
Ball-joint mounted fixing bracket	Ø 12	**XUZB2012**	0.175
	Ø 18	**XUZB2003**	0.175
	Ø 30	**XUZB2030**	0.160

*(1) For a 5 m long cable replace **L2** by **L5**, for a 10 m long cable replace **L2** by **L10**.*
(2) To obtain a 3D fixing kit, order:
*rod support **XUZ2003**, M12 rod **XUZ2001** and ball-joint mounted fixing bracket **XUZB20●●***

Telemecanique
Sensors

Ultrasonic sensors
XX range
Accessories

Dimensions of accessories

Fixing accessories

XUZA118

90° fixing bracket (Ø 18)
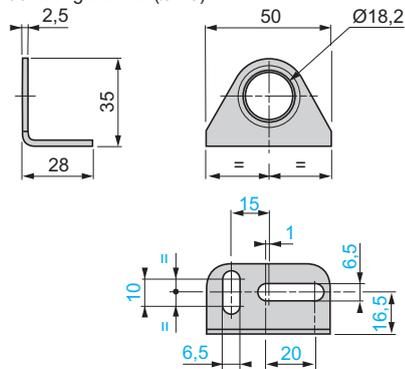
XXZ12, XXZ30

90° fixing bracket (Ø 12 and Ø 30)
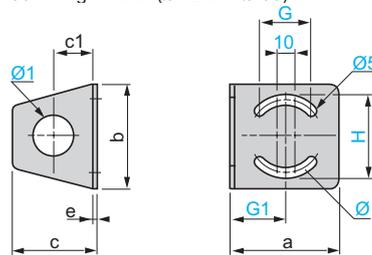
XXZ	a	b	c	c1	e	H	G	G1	Ø	Ø1
12	35	40	33	18	2	31	18	18	25	13
30	67	65	52	25	3	51	35	33	50	31

XSZB112, XSZB118

Fixing clamps (Ø 12, Ø 18 and Ø 30)
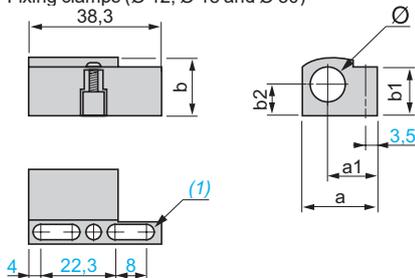
XSZ	a	a1	b	b1	b2	Ø
B112	21.9	14.5	16	15.5	8.5	12
B118	26	15.7	22.3	20.1	11.5	18
B130	39	21.7	35.5	31	18.5	30

(1) 2 elongated holes Ø 4 x 8.

XUZ2001

M12 rod
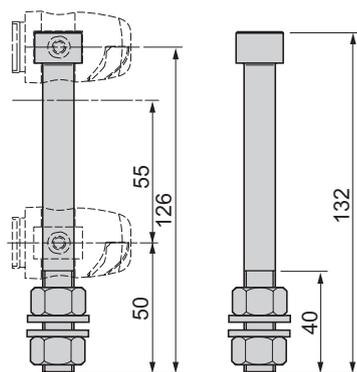
XUZ2003

Support for M12 rod
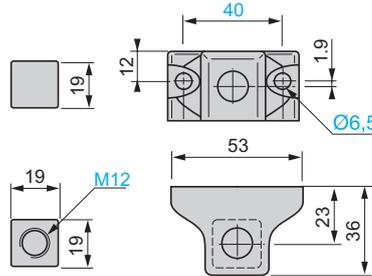
XSZBD10
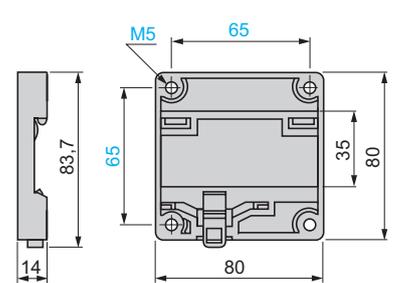
XUZB2012

Ball-joint mounted fixing bracket (Ø 12)
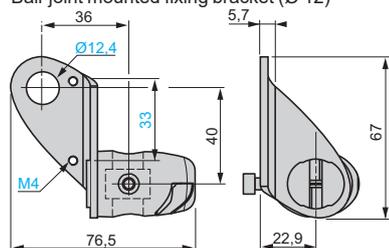
XUZB2003

Ball-joint mounted fixing bracket (Ø 18)
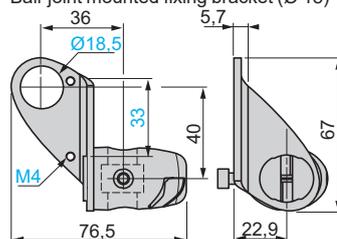
XUZB2030

Ball-joint mounted fixing bracket (Ø 30)

Telemecanique
Sensors

Telemecanique
Sensors