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 8m, 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 upto 8m

Contents

A technology suited to your needs

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

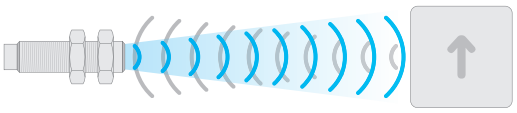
- material (metal, plastic, wood, cardboard, etc.),
- nature (solid, liquid, powder, paste, etc.),
- colour,
- degree of transparency.

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

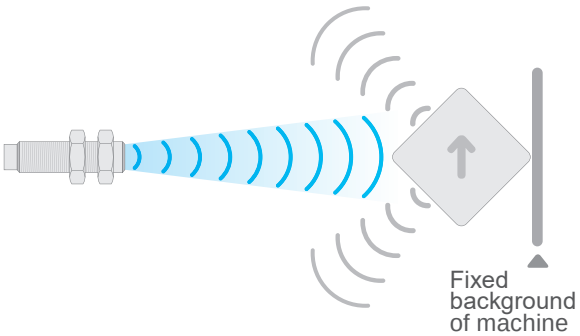
An object reflects the ultrasonic wave back to the sensor which, in turn, changes the output state.
This operating mode is well suited for detecting objects with flat surfaces that are positioned perpendicularly to the direction of the ultrasonic beam.



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.

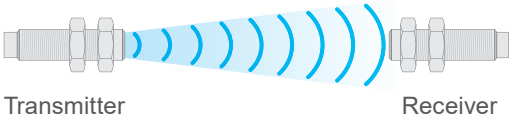
Well suited for detecting objects that absorb the ultrasonic waves (sponges, etc.) or that do not reflect the wave back to the sensor (non-flat surfaces, pointy or irregular-shaped objects).



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.



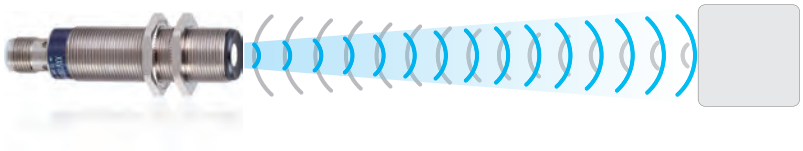
Long distance proximity detection

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.

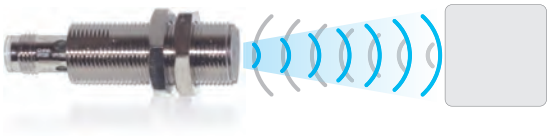
Sensors mounted too close to moving-metal parts are exposed to hits or impacts which can cause machine downtime. Being able to install sensors farther away from moving targets reduces the exposure to potential incidents.
You increase installation profitability!

x 2,5
detection distance than standard inductive proximity sensors

XXV Ø18



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.

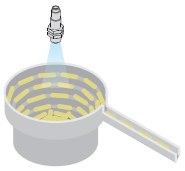
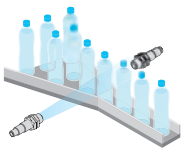
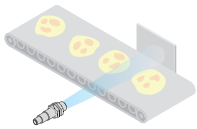
Its accurate and well-defined transmission angle enables precise detection. Crosstalk with other sensors and object edge effects are mastered.

Plug & Play solution

100%
Worldwide availability

Selection guide based on application

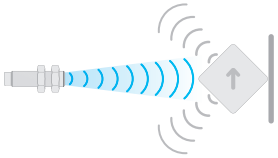
Type of detection	Detection “Digital”

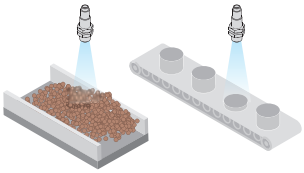
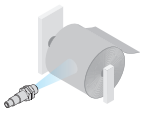
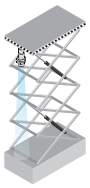
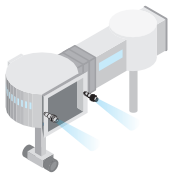
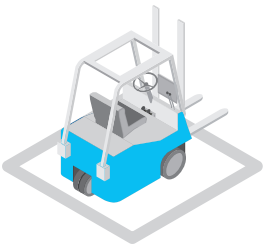
Sensor type	Assembly			Conveying			Pac
	Machine part	Vibrating bowl	Presence Absence	Transparent bottles	Jam	Flow	Tran
Ø18 (M18x1)							
Ø12 (M12x1)							
Ø18 (M18x1)							
Ø30 (M30x1,5)							
7,6x19x33							
16x30x74							
18x33x60 Ø18 (M18x1)							
80X80X34							

Diffuse mode

Reflex mode



Thru-beam mode

	Regulation “Analogue output”				Level monitoring	Mobile Eqiuipment
						
ckaging	Conveying		Packaging	Handling	Handling	Process	Forklift
nsparent film	Material level	Height of part	Radius of strip roll	Height of elevating table	Aircraft boarding bridge	Monitoring 2 thresholds	Filling Emptying	Filling Emptying

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

Cylindrical type

Dimensions (mm)			**Ø 12** (M12 x 1)			**Ø 18** (M18 x 1)	
							
Sensing distance Sn	**Diffuse**		**5 cm**	**10 cm**	–	**5 cm**	**15 cm**	**50 cm**
	Reflex		–	–	–	–	–	**50 cm**
	Thru-beam		–	–	**20 cm**	–	–	–
Assured operating distance (mm)			6.4...51 fixed	6.4...102 fixed	–	2...50 fixed	25...152 fixed	Adjustable using teach mode
Power supply			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
Function			NO	NO	NO/NC	NO NC	NO	NO
Degree of protection			IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
Connection			M8	M8	M8	M12 or pre-cabled	M12	M12 or pre-cabled *(1)*
Sensor type			**XX512A1●**	**XX512A2●**	**XX●12A8●**	**XXV18B1●**	**XX518A1●**	**XX518A3●** **XXB18A3●**
Page			*(2)*					

Sensors with analogue output

Cylindrical type

Dimensions (mm)		**Ø 18** (M12 x 1)	
			
Sensing distance Sn		**50 cm**	**1 m**
Assured operating distance (mm)		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,
Type of output		4-20 mA or 0-10 V	4-20 mA or 0-10 V
Degree of protection		IP 67	IP 67
Connection		M12	M12
Sensor type		**XX918A3●**	**XX●18●1AM12** **XX●18●1VM12**
Page		*(2)*	31

(1) XXB18A3●: M12 connector only.
(2) Please refer to our catalogue "Ultrasonic sensors XX range" .

Cylindrical type

Application, monitoring 2 levels

Ø 18 (M18 x 1) *(continued)*		**Ø 30** (M30 x 1.5)			**Ø 18** (M18 x 1)	**Ø 30** (M30 x 1.5)	
							
–	**1 m**	**1 m**	**2 m/4 m** depending on model	**8 m**	**50 cm**	**1 m/2 m** depending on model	**8 m**
–	–	**1 m**	–	–	–	–	–
61 cm/1 m	–	–	–	–	–	–	–
–	Adjustable using teach mode	Adjustable using teach mode			Adjustable using teach mode		
12...24 V ⎓ with protection against reverse polarity		12...24 V ⎓ with protection against reverse polarity			12...24 V ⎓ with protection against reverse polarity		
PNP/NPN	PNP	PNP or NPN or PNP/NPN		PNP or NPN	PNP or NPN	PNP/NPN	PNP
NO NC	NO or NC (selectable)	NO or NC or NO+NC or NO+NO		NO + NC	NO	NO + NO	NO + NO
IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
M12	M12	M12	M12	M12	M12	M12	M12
XX●18A3● **XX●18A4●**	**XX●18●1PM12**	**XX●30●●1PM12** **XX6V3A1●** **XXBV3A1●** **XX630A1●**	**XX●30●●2PM12** **XXS30●●4PM12** **XX630A2●**	**XX630A3●**	**XX218A3●**	**XX230A1●** **XX230A2●**	**XX230A3●**
(2)	31	*(2)*					

Ø 18 (M12 x 1) *(continued)*	**Ø 30** (M30 x 1.5)		
			
1 m	**2 m**	**4 m**	**8 m**
Adjustable using teach mode			
12...24 V ⎓ or 24 V ⎓, depending on model, with protection against reverse polarity			
4-20 mA or 0-10 V			
IP 67	IP 67	IP 67	IP 67
M12	M12	M12	M12
XX●30●1●M12 **XX9V3A1●** **XX930A1●**	**XX●30●2●M12** **XX930A2●**	**XXS30●4●M12**	**XX930A3●**
(2)			

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		–	**20 cm**	–	**61 cm/1 m**
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	NPN/PNP	NPN or PNP	NPN/PNP
Function			NO	NO NC	NO	NO + NO NC + NC
Degree of protection			IP 67	IP 67	IP 67	IP 67
Connection			M12 connector on flying lead	M12 connector on flying lead	M12	M12
Sensor type			**XX7F1A2●**	**XX●F1A8●**	**XX7K1A2●**	**XX●K1A3●** **XX● K1A4●**
Page			Please refer to our catalogue “Ultrasonic sensors XX range”			

Sensors with analogue output

Flat format

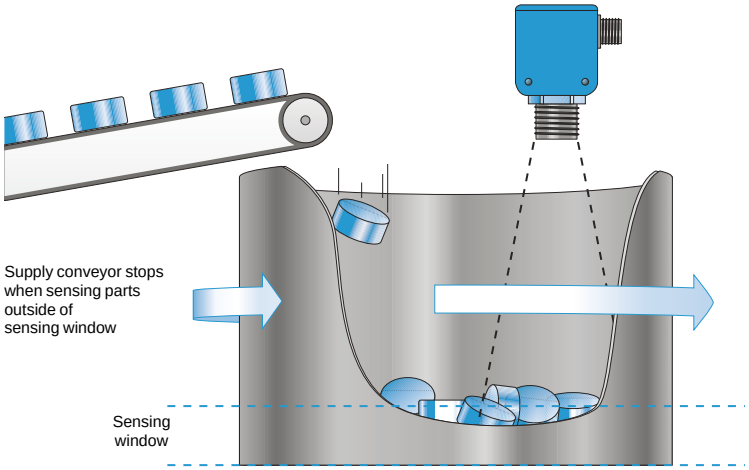
Dimensions (mm)		**18 x 33 x 65 + Ø 18** (M18 x 1)	
			
Sensing distance Sn		**50 cm (adjustable)**	
Assured operating distance (mm)		Adjustable using teach mode	
Power supply		12...24 V ⎓ with protection against reverse polarity	24 V ⎓ with protection against reverse polarity
Type of output		4-20 mA	0-10 V
Degree of protection		IP 67	
Connection		M12	
Sensor type		**XX9V1A1C2M12**	**XX9V1AF1M12**
Page		Please refer to our catalogue “Ultrasonic sensors XX range”	

18 x 33 x 60 + Ø 18 (M18 x 1)	**80 x 80 x 34**
	
50 cm (adjustable)	**1 m (adjustable)**
50 cm (adjustable)	**1 m (adjustable)**
–	–
Adjustable using teach mode	
12...24 V ⎓ with protection against reverse polarity	
NPN or PNP	NPN or PNP
NO	NO
IP 67	IP 67
M12	M12
XX7V1A1●AM12 **XXBV1A1PAM12**	**–**
Please refer to our catalogue “Ultrasonic sensors XX range”	

80 x 80 x 34	
	
1 m (adjustable)	
Adjustable using teach mode	
12...24 V ⎓ with protection against reverse polarity	24 V ⎓ with protection against reverse polarity
4-20 mA	0-10 V
IP 67	
M12	
XX9D1A1C2M12	**XX9D1A1F1M12**
Please refer to our catalogue “Ultrasonic sensors XX range”	

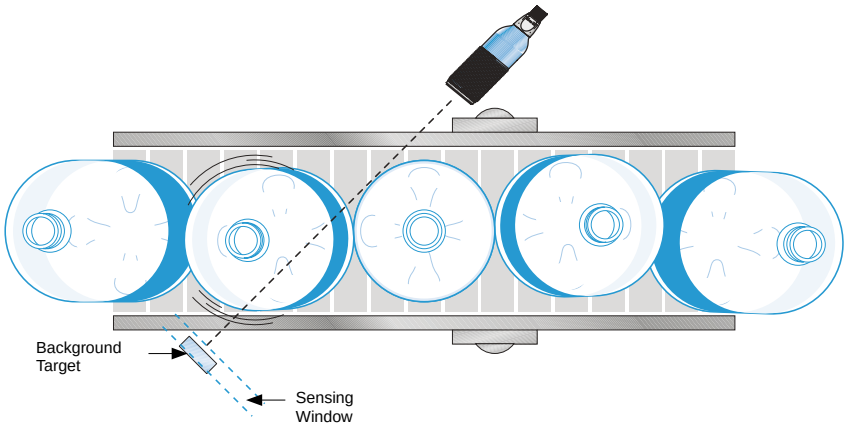
Feeder bowl supply control

XX7V1A1

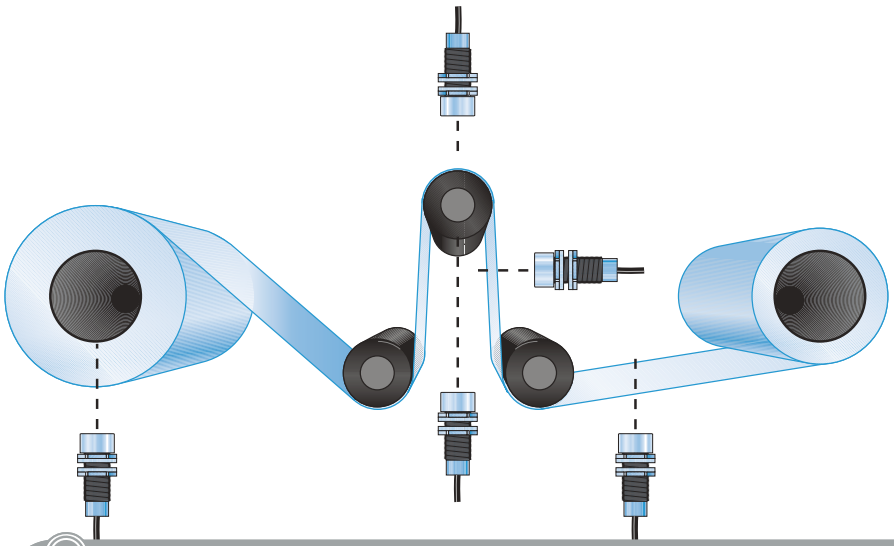


Conveyor jam & backup detection

XXB18A3

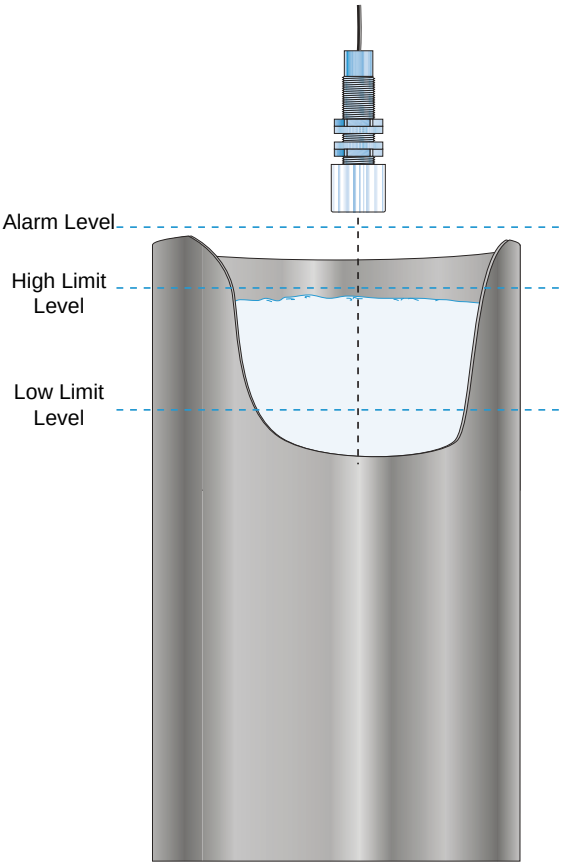


Web process control sensing functions



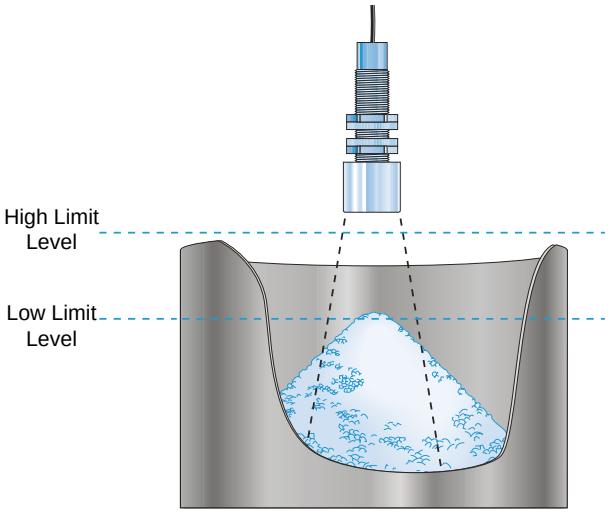
Dual level high-low latch control detection of liquids

XX230A3



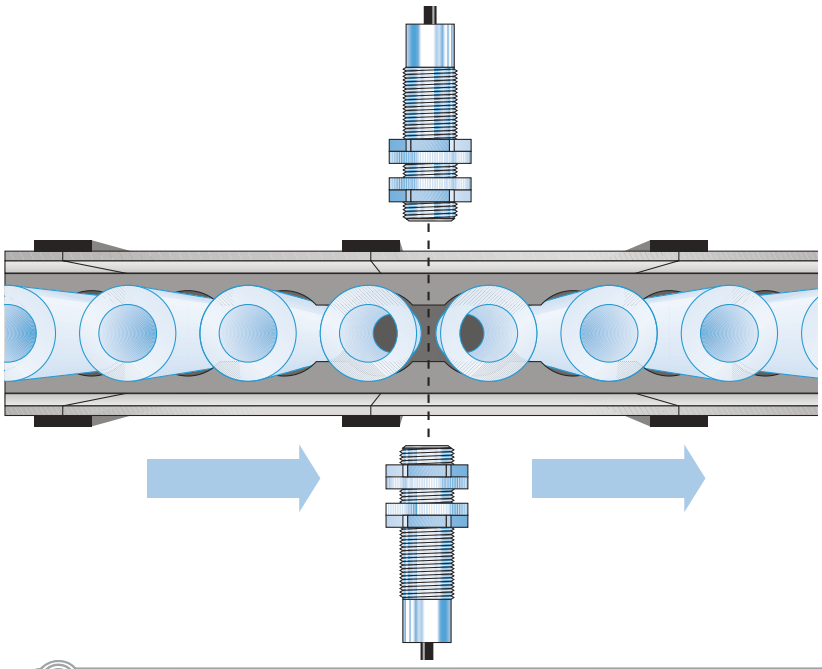
High level detection

XX630A3



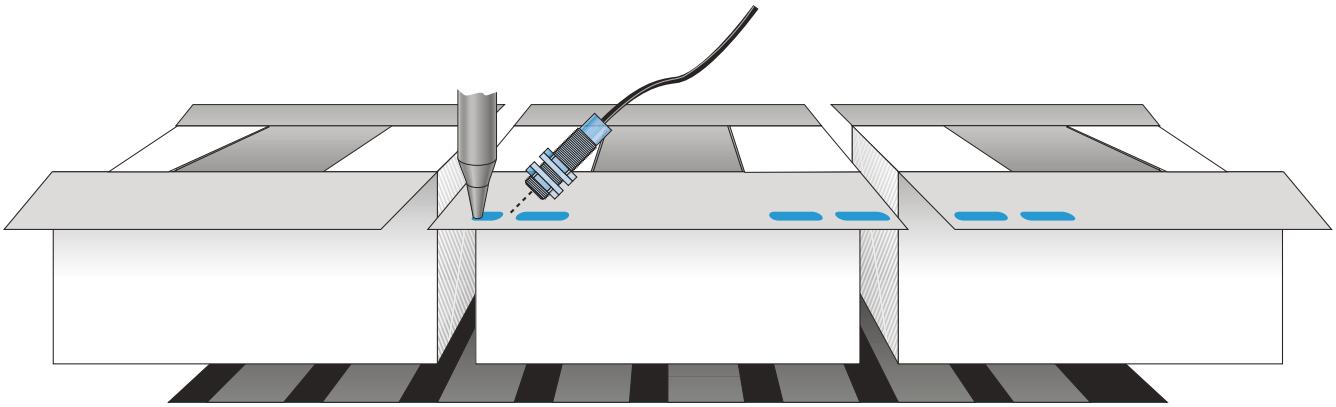
Accurate high speed counting of cylindrical clear objects

XXT18 + XXR18

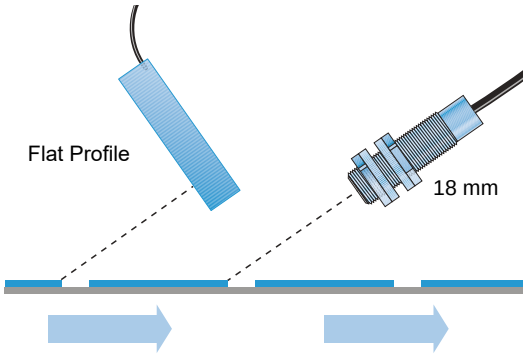


Glue bead detection

XXV18

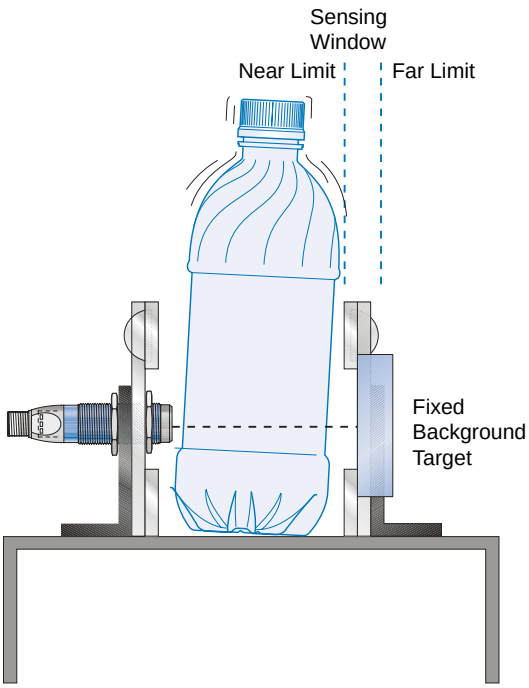


Label edge detection on carrier web



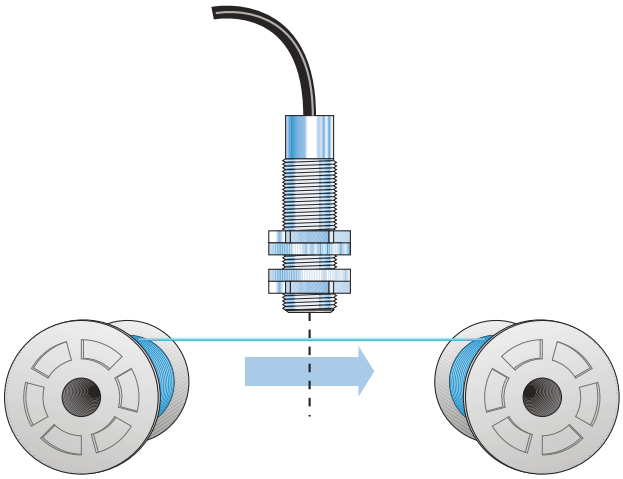
Clear bottle detection for sustainable environments

XXB18



Broken wire/thread detection

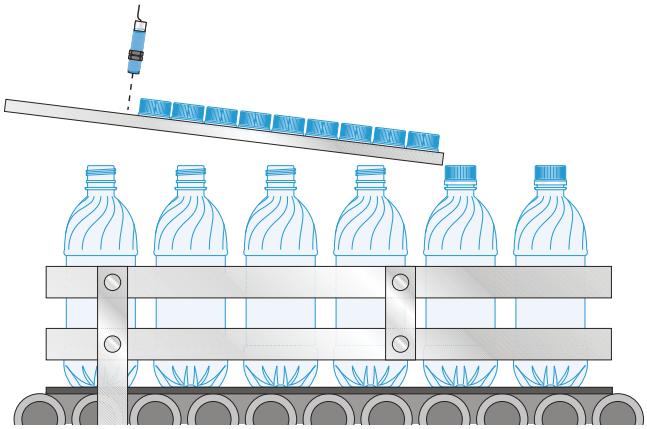
XXV18



Missing cap detection low cap supply

XX512

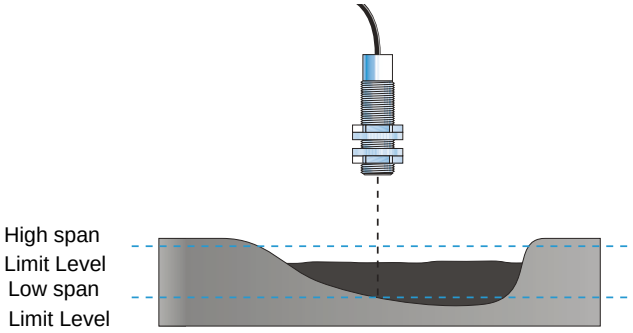
Automatically stops filler and capper



Continuous level monitoring

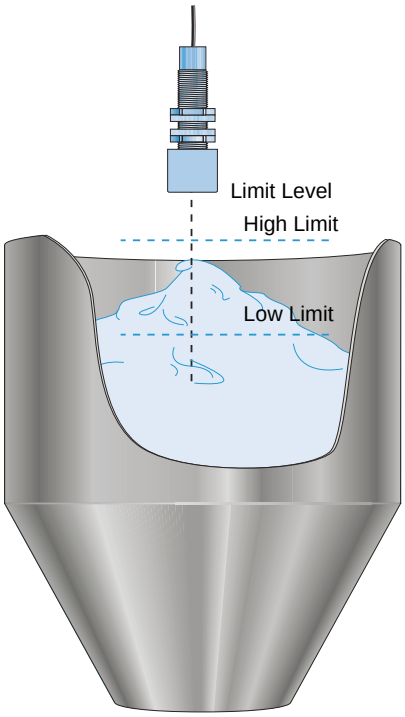
XX918 & XX930

Analog Output Sensor



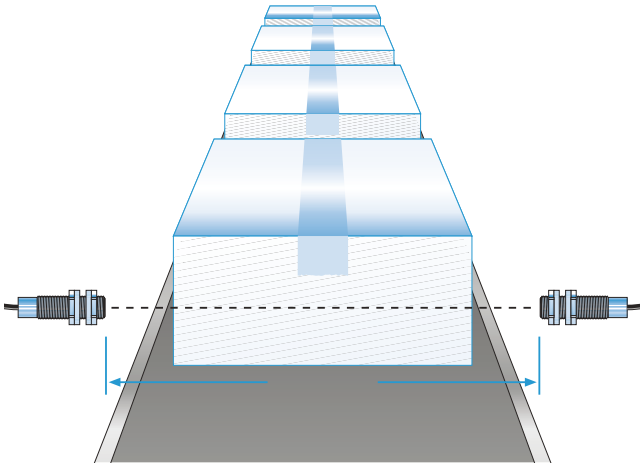
Dual level high-low latch control detection

XX230

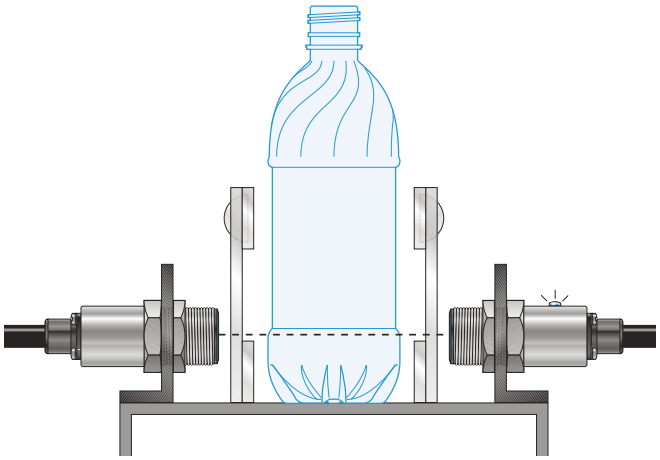


Lead edge or backup detection

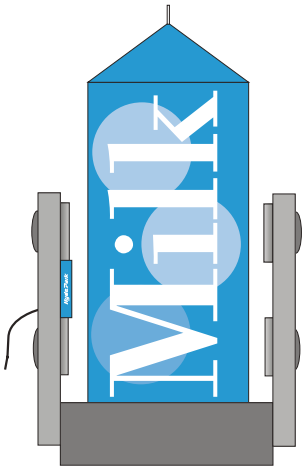
XXT18 & XXR18



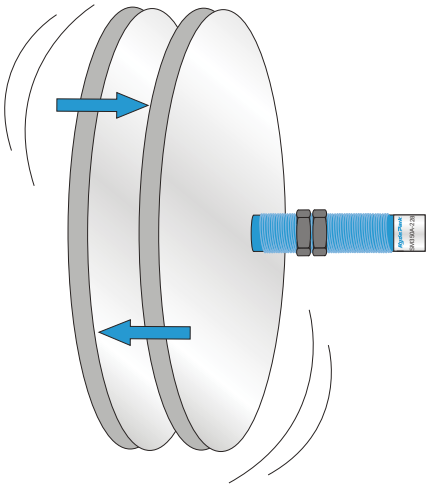
Clear bottle detection
XXT12 & XXR12



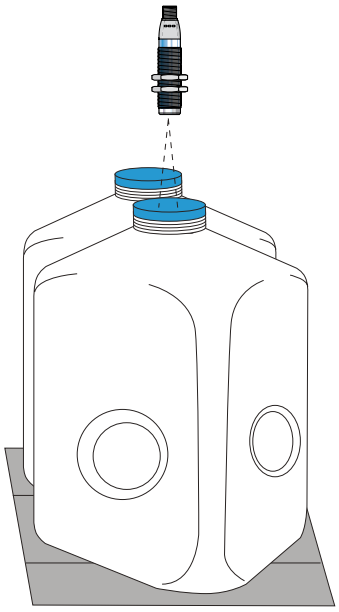
Container detection
XX7F1



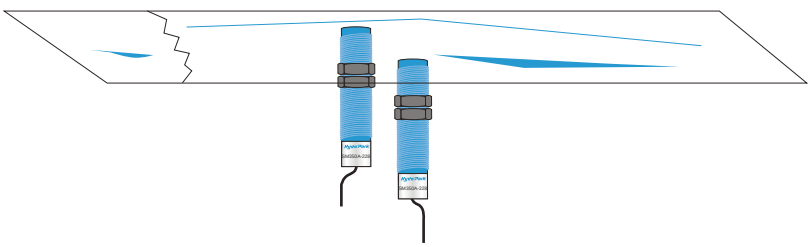
Metal material detection
XX512



Missing cap detection
XX518

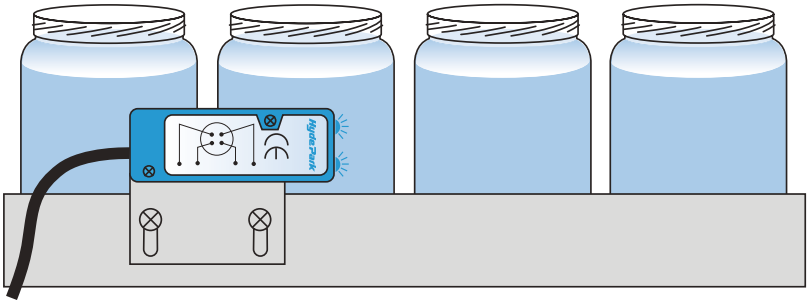


Clear web detection
XX512



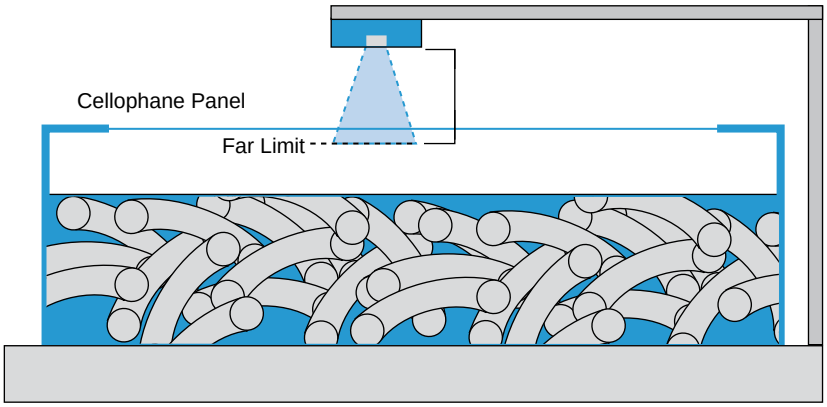
Container detection

XX7F1



Clear cellophane panel detection

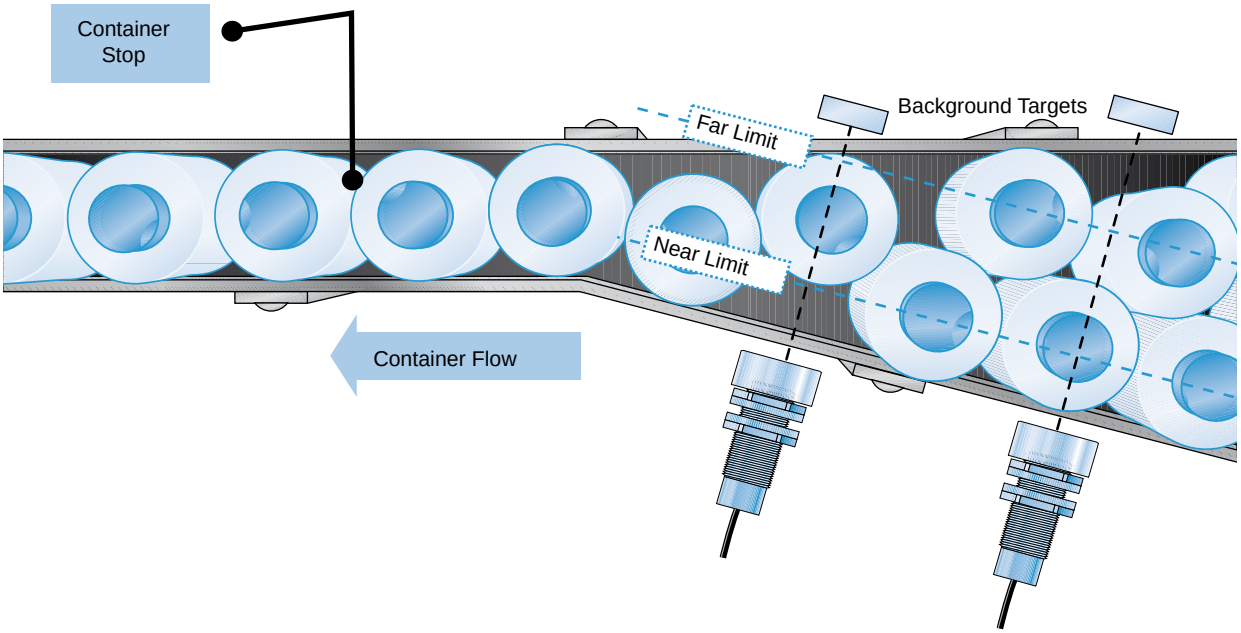
XX7F1A2



Single file jam protection

XX218 & XX230

Dual level latch control sensor



Ultrasonic sensors
XX range

Quality, standards and certifications

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, 28, 33, 38, 39, 42, 46, 54, 55, 62 and 66.

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.

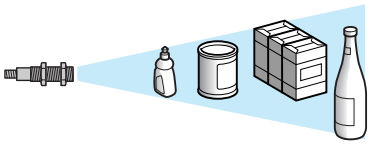
■ IP 69K: protection against the effects of high pressure cleaning. Adherence to standard DIN 40050 which stipulates that the product must withstand a water jet at a pressure of 90 bar and temperature of +80°C for 3 minutes.
No deterioration in either operating or insulation characteristics is permitted.

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 “Safety functions and solutions using Preventa” catalogue.

Principle of ultrasonic detection

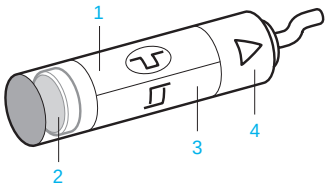


Presentation

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.

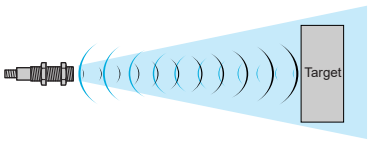
The ultrasonic sensors are simple to install due to their integral connector and availability of cabling and fixing accessories.



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*

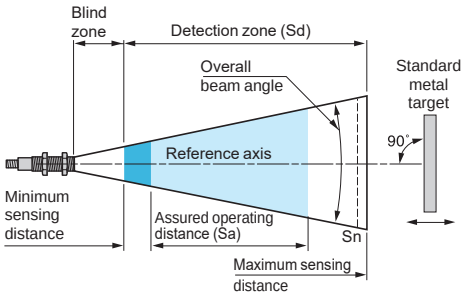


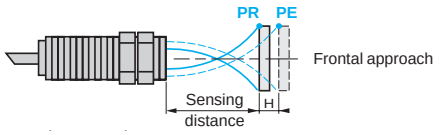
Excited by the high voltage generator 1, the transducer (transmitter-receiver) 2 generates a pulsed ultrasonic wave (200 to 500 kHz depending on the product) which travels through the ambient air at the speed of sound. When the wave strikes an object, it reflects (echo) and travels back towards the transducer. 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

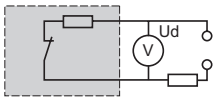
- No physical contact with the object to be detected, therefore, no wear and detection possible of fragile and/or freshly painted objects, etc.
- Detection of materials, irrespective of colour, at the same distance, without adjustment or correction factor.
- Teach mode function, by simply pressing a 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.

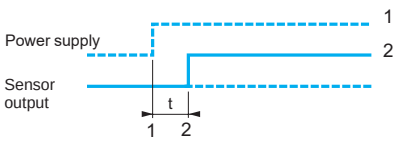
Terminology

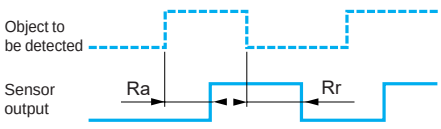




PR = drop-out point
PE = pick-up point







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

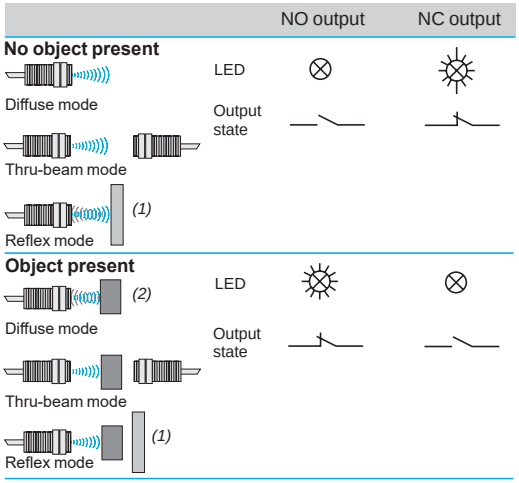
■ Voltage drop (Ud)
The voltage drop (Ud) corresponds to the voltage at the terminals of the sensor when in the closed state (value measured at the nominal current of the sensor).

■ 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)*

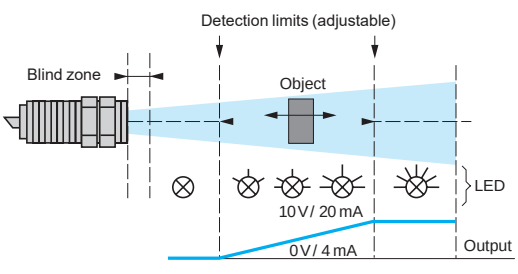
■ Response time
Response time (Ra): time taken between the instant the object to be detected enters the active zone and the changing of the output signal state. This time limits the passing speed of the target in relation to its dimensions.
Recovery time (Rr): time taken between the object being detected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

Ultrasonic sensors
XX range

Digital outputs



(1) Fixed background of machine
(2) Object



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, XXRK: 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)

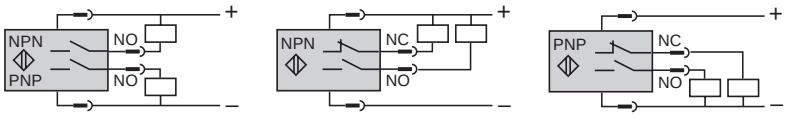
Corresponds to a sensor whose output changes to the closed state when an object is present in the detection window.

- 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 ⎓

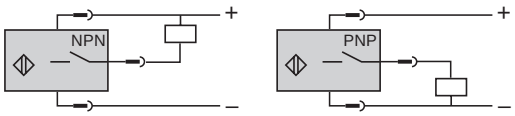
NO output/PNP and NPN | **NO + NC output/NPN** | **NO + NC output/PNP**



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

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

Power supply

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.

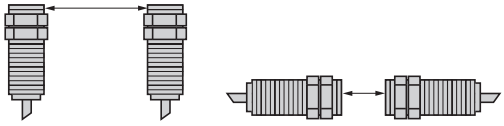
■ **AC source** (comprising transformer, rectifier, smoothing capacitor): The supply voltage must be within the operating limits specified for the sensor.

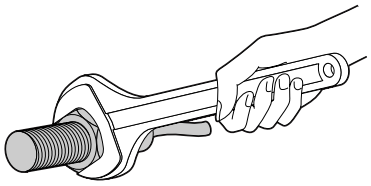
Where the voltage is derived from a single phase AC supply, the voltage must be rectified and smoothed to ensure that:
- the peak voltage of the DC supply is lower than the maximum voltage rating of the sensor.
Peak voltage = nominal voltage x √2
- the minimum voltage of the supply is greater than the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

Example:
18 V ∼ to obtain 24 V ⎓,
36 V ∼ to obtain 48 V ⎓.

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 on page 25.

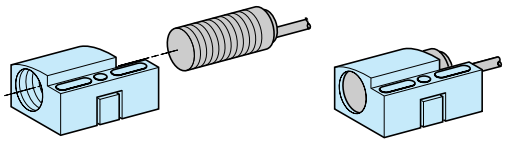
Maximum tightening torque

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

Flat sensors	Screw	Tightening Torque
XX●F●	M3	0.7 N.m/ 0.52 lb-ft
XX●K●	M4	1 N.m/ 0.74 lb-ft
XX●V●	M3	0.7 N.m/ 0.52 lb-ft
	Ø 18	1 N.m/ 0.74 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

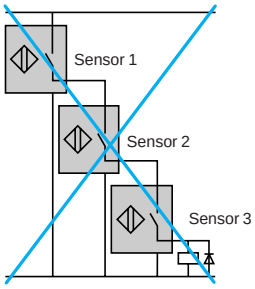
Electrical connection

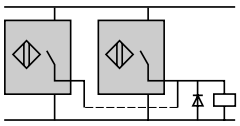
■ **Connect the sensor before switching on the supply**

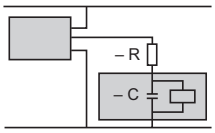
■ **Length of cable**
No limitation up to 200 m or up to a line capacitance of < 0.1 µF.
It is, however, advisable to take into account the voltage drop on the line.

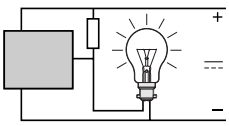
■ **Separation of control and power cables**
The sensors are immune to electrical interference encountered in normal industrial conditions. Where extreme conditions of electrical "noise" could occur (large motors, spot welders, etc.), it is advisable to protect against transients in the normal way:
-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

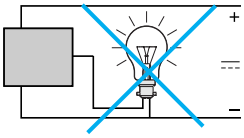
Setting-up precautions (continued)

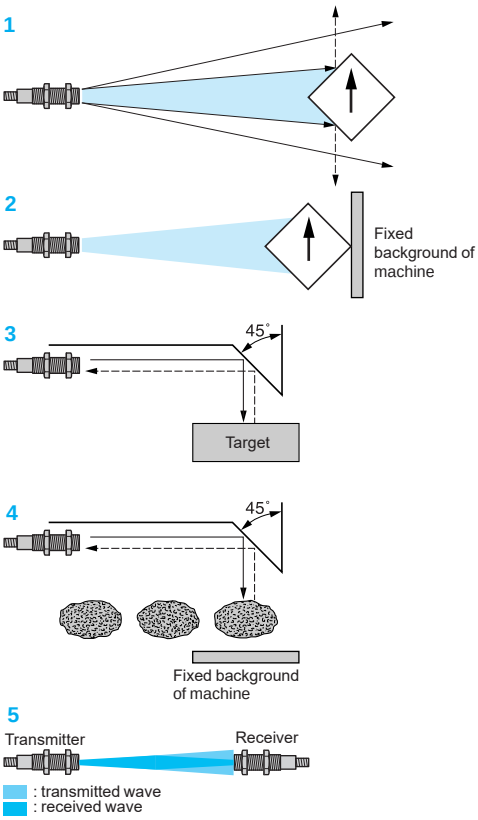












Connection in series

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.

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

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 = supply voltage and P = 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 output

121363

XX512A1KAM8

PF131112

XX518A1KAM12

PF511482

XXV18B1PAM12

121359

XX7F1A2NAL01M12

Diffuse system

M12 sensors (digital sensors – Diffuse, Thru-beam) and M18 sensors (digital sensors which are less than 0.5m – all Diffuse)

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

Thru-beam system

M12 sensors (digital sensors – Diffuse, Thru-beam) and M18 sensors (digital sensors which are less than 0.5m – all Diffuse)

Transmitter	0.2		M8 connector	**XXT12A8M8**	0.020
Receiver	0.2	NO/PNP + NO/NPN NC/PNP + NC/NPN	M8 connector	**XXR12A8KAM8**	0.020
			M8 connector	**XXR12A8KBM8**	0.020

M18 sensors (digital sensors which are less than 0.5m – all Diffuse)

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
			Pre-cabled (L = 5 m)	**XXV18B1NAL5**	0.200
			Pre-cabled (L = 10 m)	**XXV18B1NAL10**	0.340
			M12 connector	**XXV18B1NAM12**	0.050
		NO/PNP	Pre-cabled (L = 2 m)	**XXV18B1PAL2**	0.110
			Pre-cabled (L = 5 m)	**XXV18B1PAL5**	0.200
			Pre-cabled (L = 10 m)	**XXV18B1PAL10**	0.340
			M12 connector	**XXV18B1PAM12**	0.050
		NC/NPN	Pre-cabled (L = 2 m)	**XXV18B1NBL2**	0.110
			Pre-cabled (L = 5 m)	**XXV18B1NBL5**	0.200
			Pre-cabled (L = 10 m)	**XXV18B1NBL10**	0.340
			M12 connector	**XXV18B1NBM12**	0.050
		NC/PNP	Pre-cabled (L = 2 m)	**XXV18B1PBL2**	0.110
			Pre-cabled (L = 5 m)	**XXV18B1PBL5**	0.200
			Pre-cabled (L = 10 m)	**XXV18B1PBL10**	0.340
			M12 connector	**XXV18B1PBM12**	0.050

Fixed sensing distance sensors

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/NPN	M12 connector	**XX7K1A2NAM12**	0.050
		NO/PNP	M12 connector	**XX7K1A2PAM12**	0.050

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

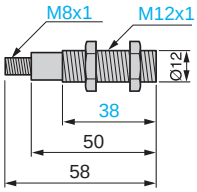
Sensor type			XX512A1●	XX512A2●	XX●12A8●	XXV18B1●	XXTF● XXRF●	XX518A1●
General characteristics								
Conformity to standards			CE,IEC 60947-5-2					
Product certifications			UL	UL	UL	cULus	UL	cULus
Nominal sensing distance (Sn)		**m**	0.05	0.1	0.2	0.05	0.2	0.15
Blind zone (in diffuse mode the object 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		**mm**	Fixed				Fixed	
Detection system	Diffuse		●	●	–	●	–	●
	Reflex		–	–	–	–	–	–
	Thru-beam		–	–	●	–	●	–
Transmission frequency (transmitter resonance)		**kHz**	500			360	500	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°	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 12.2 at 200	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 *(5)*		Epoxy			Epoxy	Epoxy	Silicone
Connection	Connector		M8, 4-pin	M8, 3-pin	M8, 4-pin	M12, 4-pin	M12, 4-pin, on 152 mm flying lead	M12, 4-pin
	Pre-cabled (wire c.s.a.)		–	–	–	3 x 0.34 mm2/ AWG 22	–	–
Sensor type			**XX512A1●**	**XX512A2●**	**XX●12A8●**	**XXV18B1●**	**XX518A1●**	
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 *(6)*	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) Only XX518A3● sensors are cCSAus certified.
(2) Only XX6V3A1●, XX630A1●, XX630A2●, XX630S1● and XX630A3● sensors are cCSAus certified.
(3) The first value is given for XX●18A3●, the second value for XX●18A4●.
(4) The first value is given for XX630A1● and XX630S1●, the second value for XX630A2●.
(5) Silicone face for optimum chemical resistance.
(6) Double insulation for pre-cabled sensors. IP 69K for sensors with M12 connector.

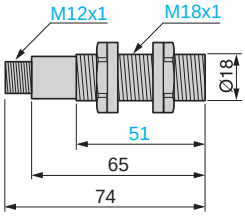
Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal
DC supply, solid-state output

Dimensions

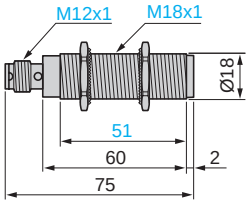
XX●12A●●●M8



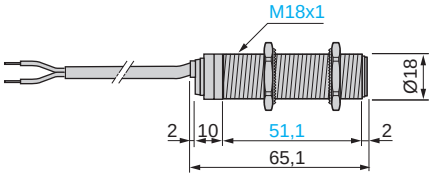
XX518A1KAM12
XXT18A●M12
XXR18A●●●●●



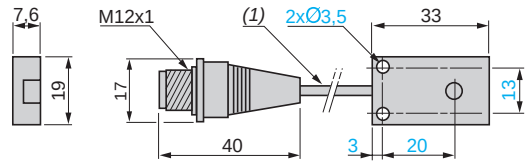
XXV18B1●●●M12



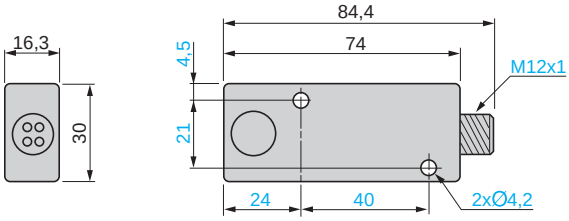
XXV18B1●●L●



XX7F1A2●AL01M12
XXTF1A8●/XXR F1A8●



XX7K1A2●AM12
XXTK1A3●/A4●, XXRK1A3●/A4●



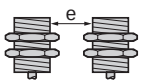
(1) Cable, length: 152 mm.

Setting-up precautions

Minimum mounting distances

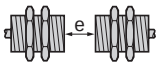
Diffuse sensors, cylindrical type

Side by side



e: respect the distances indicated on the detection curves

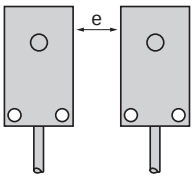
Face to face



e ≥ 4 x Sn

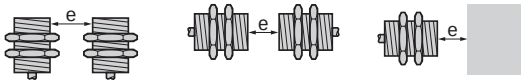
Diffuse sensors, flat format

Side by side



e: respect the distances indicated on the detection curves

XXV18●

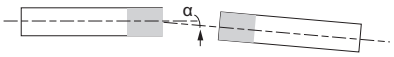


e > 25 mm

e > 700 mm

e > 60 mm

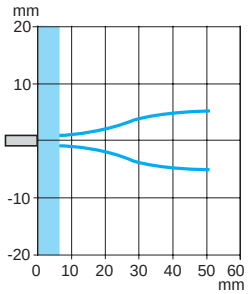
Thru-beam sensors



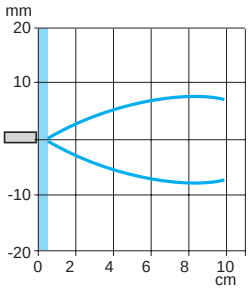
Sensors	α
XX●12●●/XX●F1●●	±5°
XX●18A3●●/XX●K1A3●●●	±8°
XX●18A4●●/XX●K1A4 XX●18A2●●/XX●K1A2	±10°

Curves

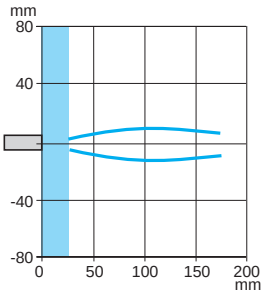
XX512A1KAM8



XX512A2●NAM8



XX518A1KAM12



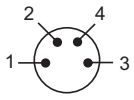
Ultrasonic sensors
XX range

Schemes

Digital output, Ø 12 sensor, M8 connector

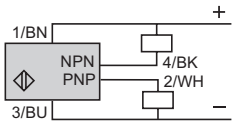
XX512A1KAM8

4-wire type



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

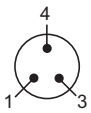
NO outputs, PNP and NPN



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

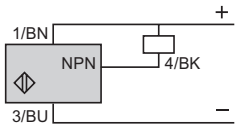
XX512A2●

3-wire type



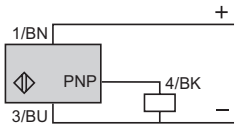
1 (+) 3 (-)
4 NPN or PNP output

NO outputs, NPN



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

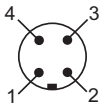
NO outputs, PNP



Digital output, Ø 18 sensor, M12 connector, Ø 30 (XX6V3●, XXBV3●)

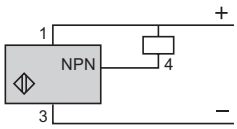
XXV18B1●●●M12

3-wire type

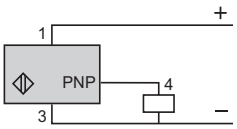


1 (+)
3 (-)

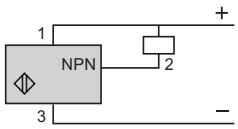
NO outputs, NPN



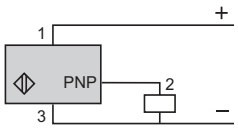
NO outputs, PNP



NC outputs, NPN



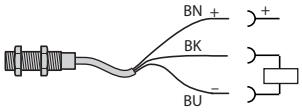
NC outputs, PNP

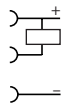


Digital output, Ø 18 sensor, pre-cabled

XXV18B1●● L●

3-wire type **PNP/NO, NC** **NPN/NO, NC**

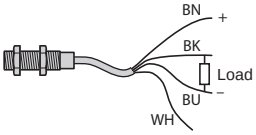




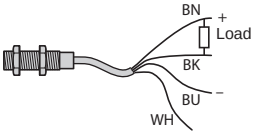
(-) BU (Blue) (+) BN (Brown) BK (Black)

XX518A3●● L2

PNP output



NPN output

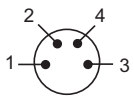


Thru-beam sensors: XXT12●/XXR12●, XXT18●/XXR18●, XXTF1●/XXRF1●, XXTK1●/XXRK1●

Transmitter

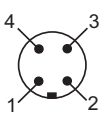
XXT12A8M8, XXT18A3M12, XXTF1A8M12L, XXTK1A●M12

M8

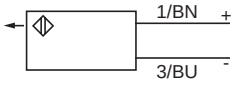


1 (+)
3 (-)

M12



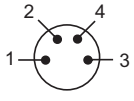
1 (+)
3 (-)



Receiver

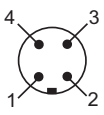
XXR12A8K●M8, XXRF1A8●K●M12L, XXRK1A●K●M12

M8



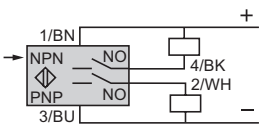
1 (+)
2 (PNP)
3 (-)
4 (NPN)

M12

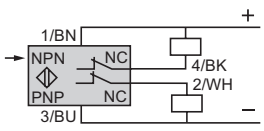


1 (+)
2 (PNP)
3 (-)
4 (NPN)

NPN, PNP, NO



NPN, PNP, NC



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

XX518A3NAL2

XX8D1A1NAM12

XX918A3C2M12

XXT18A3M12

XX7V1A1NAM12

XXZPB100

Diffuse system

M18 sensors (digital (Diffuse) and analog sensors – 0.5 m) and Thru-beam (digital sensors 61 cm and 1m)

Sensors	Sensing distance (Sn)	Function/ output	Connection	Reference	Weight
	m				kg
Ø 18 Plastic	0.50 (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
Standard analogue output					
Ø 18	0.5	4-20 mA		**XX918A3C2M12**	0.033
		0-10 V		**XX918A3F1M12**	0.033
Adjustable sensing distance sensors					
18 x 33 x 60 + Ø 18	0.5 (adjustable)	NO/NPN	M12 connector	**XX7V1A1NAM12**	0.06
		NO/PNP	M12 connector	**XX7V1A1PAM12**	0.06
80 x 80 x 34	1 (adjustable)	NO/NPN	M12 connector	**XX8D1A1NAM12**	0.3
		NO/PNP	M12 connector	**XX8D1A1PAM12**	0.3

Thru-beam (digital sensors 61 cm & 1m)

Ø 18					
Transmitter	0.61		M12 connector	**XXT18A3M12**	0.04
Receiver	0.61	NO/PNP + NO/NPN	M12 connector	**XXR18A3KAM12**	0.04
		NC/PNP + NC/NPN	M12 connector	**XXR18A3KBM12**	0.04
Transmitter	1		M12 connector	**XXT18A4M12**	0.04
Receiver	1	NO/PNP + NO/NPN	M12 connector	**XXR18A4KAM12**	0.04
		NC/PNP + NC/NPN	M12 connector	**XXR18A4KBM12**	0.04
16 x 30 x 74					
Transmitter	0.61		M12 connector	**XXTK1A3M12**	0.06
Receiver	0.61	NO/PNP + NO/NPN	M12 connector	**XXRK1A3KAM12**	0.06
		NC/PNP + NC/NPN	M12 connector	**XXRK1A3KBM12**	0.06
Transmitter	1		M12 connector	**XXTK1A4M12**	0.06
Receiver	1	NO/PNP + NO/NPN	M12 connector	**XXRK1A4KAM12**	0.06
		NC/PNP + NC/NPN	M12 connector	**XXRK1A4KBM12**	0.06

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

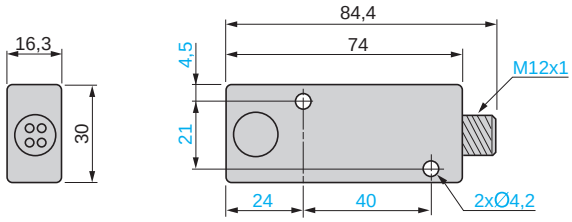
Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal
DC supply, solid-state output

Sensor type			XX●18A3● XX18A4●	XX518A3● XXB18A3●	XXTK● XXRK●	XX7V● XXBV1●	XX8D● XXBD●
General characteristics							
Conformity to standards			CE,IEC 60947-5-2				
Product certifications			UL	UL, cCSAus *(1)*	UL	UL, cCSAus *(1)*	UL, cCSAus *(1)*
Nominal sensing distance (Sn)		**m**	0.60 or 1 *(3)*	0.50	0.6 (XX●K1A3) 1 (XX●K1A4)	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 ... 51 (XX518A3●) 0 ... 165 (XXB18A3●)	–	0 ... 51 (XX7V1●) 0 ... 165 (XXBV1●)	0 ... 100 (XX8D●) 0 ... 315 (XXBD●)
Detection window		**mm**	Fixed	Remotely adjustable or by using external teach button	Fixed	Remotely adjustable or by using teach button	
Detection system	Diffuse		–	●	–	●	●
	Reflex		–	●	–	●	●
	Thru-beam		●	–	●	–	–
Transmission frequency (transmitter resonance)		**kHz**	300	300	200	300	180
Differential travel		**mm**	< 2.5	< 2.5	–	< 2.5	< 2.5
Repeat accuracy		**mm**	± 1.27	± 1.27	± 0.79	± 1.27	± 1.6
Overall beam angle (see detection lobe)			6°	6°	20°	12°	7°
Minimum size of object to be detected			–		XX●K1A3: Cylinder Ø 38 mm at a sensing distance of 600 mm XX●K1A4: Cylinder Ø 114 mm at a distance of 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 1 m
	Cylinder Ø (in mm), at distance (in mm)		Ø 38 at 600 Ø 114 at 1000	Ø 2.5 at 150	–		
Deviation angle from 90° of the object to be detected			–	± 7°	–		
Materials	Case		ULTEM®	Valox®	ULTEM®	Valox®	Valox®
			Stainless steel 303 for XX630AS1●●●●		–		
	Sensing face *(5)*		Silicone	Epoxy	Silicone	Epoxy	Epoxy
Connection	Connector		M12, 4-pin	M12, 4-pin	M12, 4-pin	M12, 4-pin	M12, 4-pin
	Pre-cabled (wire c.s.a.)		–	4 x 0.08 mm 2/AWG 28			

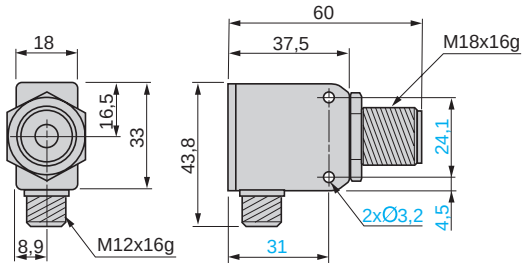
(1) Only XX518A3● sensors are cCSAus certified.
(2) Only XX6V3A1●, XX630A1●, XX630A2●, XX630S1● and XX630A3● sensors are cCSAus certified.
(3) The first value is given for XX●18A3●, the second value for XX●18A4●.
(4) The first value is given for XX630A1● and XX630S1●, the second value for XX630A2●.
(5) Silicone face for optimum chemical resistance.

Dimensions

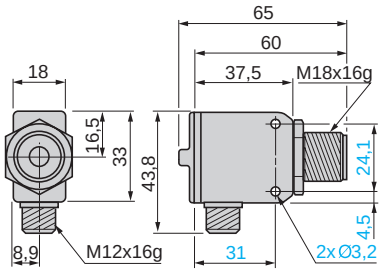
XX7K1A2●AM12
XXTK1A3●/A4●, XXRK1A3●/A4●



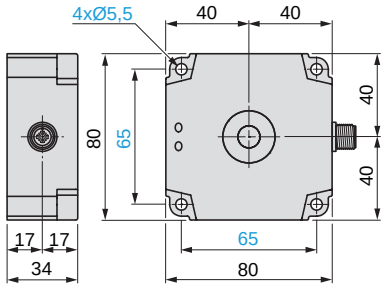
XX7V1A1●AM12
XXBV1A1●AM12



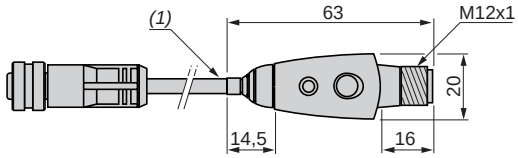
XX9V1A1●●M12



XX8D1A1●AM12
XXBD1A1●AM12
XX9D1A1●●AM12



XXZPB100



(1) Cable, length: 152 mm.

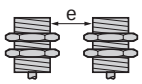
Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal
DC supply, solid-state output

Setting-up precautions

Minimum mounting distances

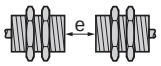
Diffuse sensors, cylindrical type

Side by side



e: respect the distances indicated on the detection curves

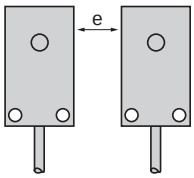
Face to face



e ≥ 4 x Sn

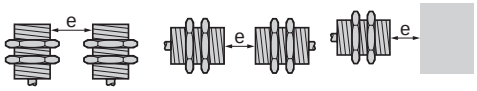
Diffuse sensors, flat format

Side by side



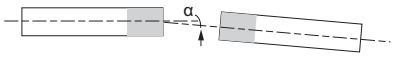
e: respect the distances indicated on the detection curves

XXV18●



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

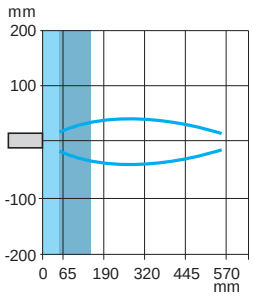
Thru-beam sensors



Sensors	α
XX●12●●/XX●F1●●	±5°
XX●18A3●●/XX●K1A3●●●	±8°
XX●18A4●●/XX●K1A4 XX●18A2●●/XX●K1A2	±10°

Curves

XX218A3●●M12, XX518A3●●L2, XXB18A3●AM12, XX518A3●AM12
XX7V1A1●AM12, XXBV1A1●AM12
XX918A3●●M12, XX9V1A1●●M12



Blind zone for diffuse sensors.

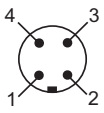
Blind zone for reflex sensors.

Schemes

Digital output, Ø 18 sensor, M12 connector, Ø 30 (XX6V3●, XXBV3●)

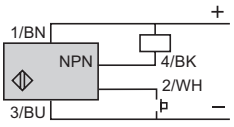
XX518A3●, XXB18A3●, XX6V3●, XXBV3●, XX218A3●, XX7V1●, XXBV1●, XX8D1●, XXBD1●

3-wire type



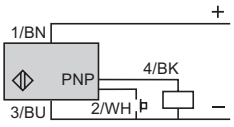
1 (+) 2 Teach input (WH)
3 (-) 4 NPN or PNP output

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 system, solid-state digital or analog output
Configurable by software

XXA18P1●M12

XXS18P1●M12

XXA18B1●M12
XXA18S1●M12

XXS18B1●M12
XXS18S1●M12

XXZPB100

Ultrasonic sensors

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 34.

*(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.*

Ultrasonic sensors

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

PF120213

XZCPV11V12L●●

PF120214

XZCPV12V12L●●

XZ_524_CPMFS17008

XZCP1141L●

XZ_524_CPMFS17006

XZCP1241L●

PF152522

XZCC12FDM50B

XZCC12FCM50B

XZCC12FCM50B

XX_519_CPF_JR16005

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 system, 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		

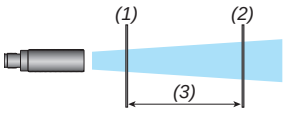
*(1) For applications below 0°C, it is recommended to use the **XXZB118** fixing clamp (see page 36).*

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

Operating diagrams for digital output sensors

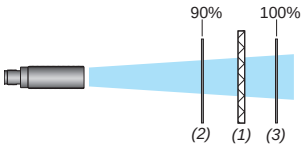
Settings with teach procedure

Window mode



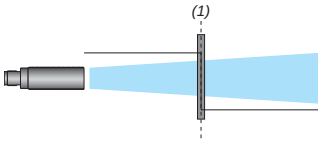
(1): Near limit
(2): Far limit
(3): Sensing window

Reflex mode



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

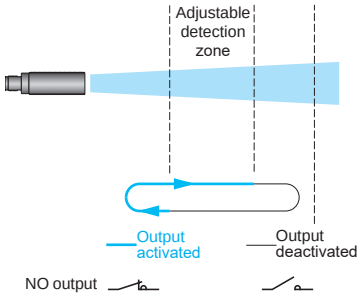
Proximity mode



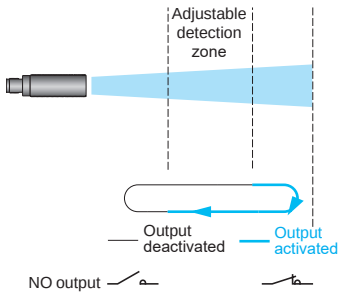
(1) Switch point

Pump/Hysteresis mode

Emptying (stored in high threshold memory)

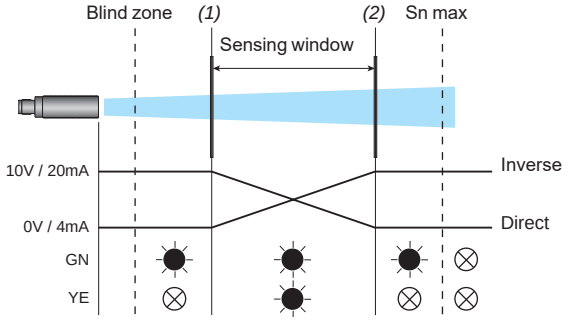


Filling (stored in low threshold memory)



Operating diagram for analog output sensors

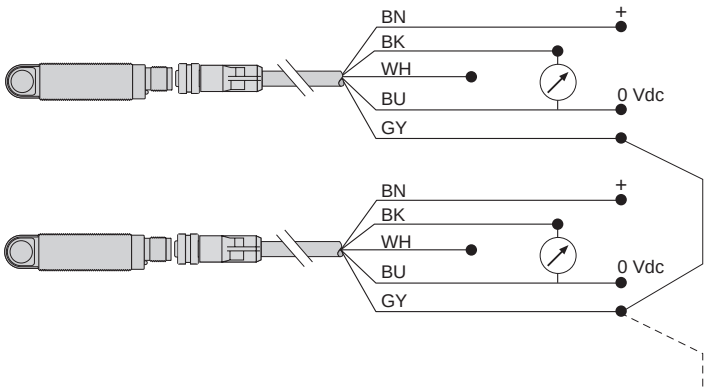
Near and far limits setting with teach procedure



GN: Green LED
YE: Yellow LED
⊗ : OFF
● : ON

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

Diagram for the synchronization function (side by side application)



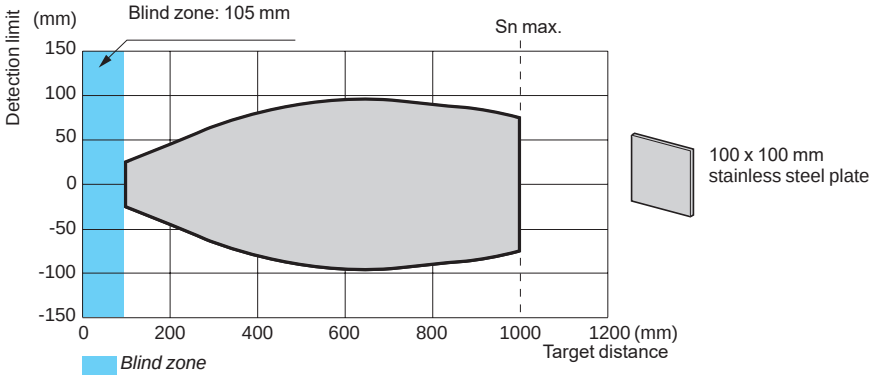
***NB**: To enable synchronization between several sensors, all of the wires of pin no.5 (gray) must be electrically connected together.*
A maximum of 8 sensors can be synchronized. To enable "Multiplexer" function for the sensors, use the XX Configuration Software.
Without synchronization or multiplexing,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

Ultrasonic sensors

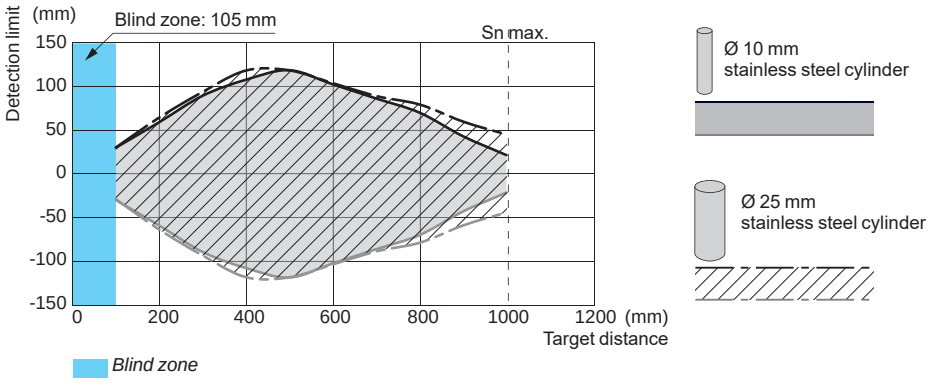
XX range, General purpose
Cylindrical, plastic or metal, Ø 18 mm
Diffuse system, solid-state digital or analog output
Configurable by software

Curves

Detection curve with 100 x 100 mm square target



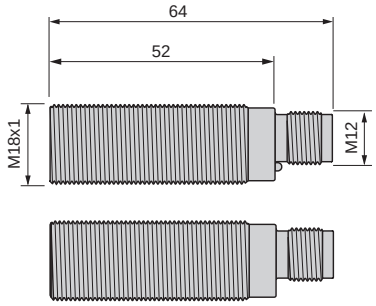
Detection curve with round bar



Dimensions

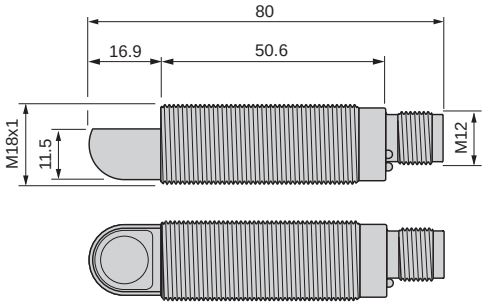
Plastic sensors, straight

XXS18P1●M12



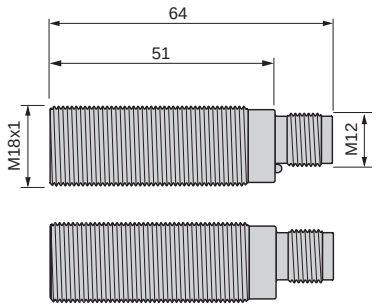
Plastic sensors, 90° angled

XXA18P1●M12



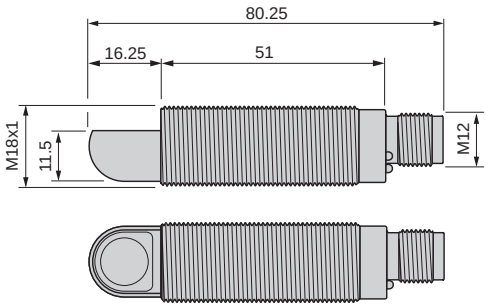
Nickel-plated brass and stainless steel sensors, straight

XXS18B1●M12 and XXS18S1●M12



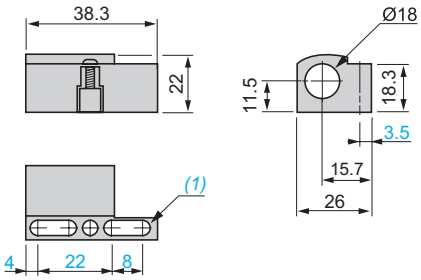
Nickel-plated brass and stainless steel sensors, 90° angled

XXA18B1●M12 and XXA18S1●M12



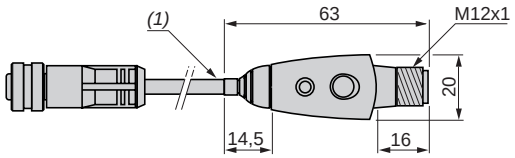
Dimensions (continued)

Fixing clamp XXZB118



(1) 2 elongated holes Ø 4 X 8 mm

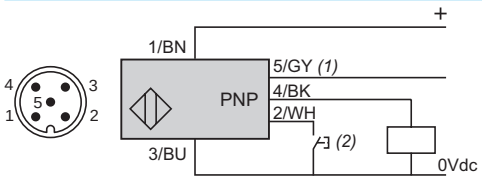
Teach pushbutton XXZPB100



(1) Cable length: 152 mm

Connections

Connector wiring

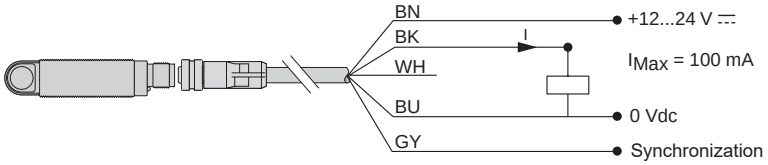


Pin number	Wire color	Digital output description	Analog output description	
			4-20 mA	0-10 V
1	BN: Brown	+12…24 V ⎓	+12…24 V ⎓	+14…24 V ⎓
2	WH: White	Input teach		
3	BU: Blue	0 V ⎓		
4	BK: Black	Output		
5	GY: Gray	Synchronization		

(1) Synchronization.
*(2) External setting pushbutton or **XXZPB100** remote teach pushbutton (see page 36).*

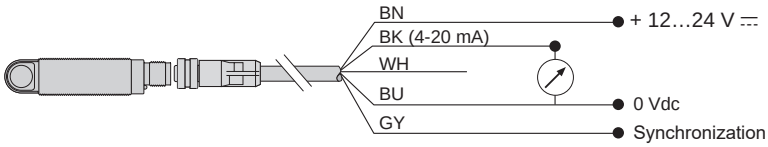
Wiring scheme (digital output NO or NC)

XXS18●1PM12 and XXA18●1PM12



Wiring scheme (analog output 4-20 mA)

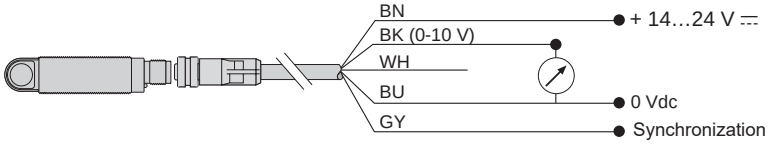
XXS18●1AM12 and XXA18●1AM12



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



0-10 V:
1 kΩ…∞

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

PF150035A

XX630A1KAM12

108064

XX6V3A1NAM12

XX_519_CPODA2016001

XXBV3A1PAM12

PF150033A

XX930A3A2M12

XX_519_CPODA2016005

XX930A1A2M12

Diffuse system

M30 sensors (digital & analog sensors – 1m, 2m, 8m) – Diffuse, Reflex

Sensors	Sensing distance (Sn)	Function/ output	Connection	Reference	Weight
	m				kg
Ø 30 Plastic	1 (adjustable)	NO/PNP + NO/NPN	M12 connector	**XX630A1KAM12**	0.09
		NO/NPN	M12 connector	**XX6V3A1NAM12**	0.09
		NO/PNP	M12 connector	**XX6V3A1PAM12**	0.09
		NO/NPN + NC/NPN	M12 connector	**XX630A1NCM12**	0.09
			M12 connector	**XX630S1NCM12** *(1)*	0.09
		NO/PNP + NC/PNP	M12 connector	**XX630A1PCM12**	0.09
			M12 connector	**XX630S1PCM12** *(1)*	0.09
	2 (adjustable)	NO/NPN + NC/NPN	M12 connector	**XX630A2NCM12**	0.09
		NO/PNP + NC/PNP	M12 connector	**XX630A2PCM12**	0.09
	8 (adjustable)	NO/NPN + NC/NPN	M12 connector	**XX630A3NCM12**	0.11
		NO/PNP + NC/PNP	M12 connector	**XX630A3PCM12**	0.11

Reflex system

Ø 30 Plastic	1 (adjustable)	NO/PNP	M12 connector	**XXBV3A1PAM12**	0.09

Standard analogue output

Sensors	Sensing distance (Sn)	Analogue output (Slope selection using teach button)	Reference	Weight
	m			kg
Ø 30	1	4-20 mA	**XX930A1A2M12**	0.095
			XX930S1A2M12 *(1)*	0.095
		0-10 V	**XX930A1A1M12**	0.095
			XX930S1A1M12 *(1)*	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

250 ms delayed analogue output (for unstable object)

Ø 30	1	4-20 mA	**XX930A1A2230M12**	0.095
		0-10 V	**XX930A1A1230M12**	0.095
	2	4-20 mA	**XX930A2A2230M12**	0.095
		0-10 V	**XX930A2A1230M12**	0.095

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

Sensor type			XX6V3A1● XXBV3A1●	XX630A1● XX630A2● XX630S1●	XX630A3●	XX930A1● XX930A2● XX930S1●	XX930A3●	XX9V3A1●
General characteristics								
Conformity to standards			CE,IEC 60947-5-2			CE, IEC 60947-5-2		
Product certifications			UL, cCSAus *(2)*			UL, cCSAus		
Nominal sensing distance (Sn)		**m**	1	1 or 2 *(4)*	8	1 or 2 *(6)*	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 (XX6V3A1●) 0 ... 315 (XXBV3A1●)	0…51 (XX630●1) 0...120 (XX630A2●)	0…300	0…51 or 0...120 *(6)*	0…300	0…100
Detection window		**mm**	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 at distance 1000mm	Cylinder Ø 1.6 at distance 635mm	Cylinder Ø 51 at distance 4732mm	Cylinder Ø 1.6 mm up to a sensing distance of 635 mm	Cylinder Ø 50.68 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° *(4)*	± 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 *(5)*		Epoxy	Silicone	Epoxy	Silicone	Epoxy	
Connection	Connector		M12, 4-pin					
	Pre-cabled (wire c.s.a.)		–					

(1) Only XX518A3● sensors are cCSAus certified.
(2) Only XX6V3A1●, XX630A1●, XX630A2●, XX630S1● and XX630A3● sensors are cCSAus certified.
(3) The first value is given for XX●18A3●, the second value for XX●18A4●.
(4) The first value is given for XX630A1● and XX630S1●, the second value for XX630A2●.
(5) Silicone face for optimum chemical resistance.
(6) The first value is given for XX930A1● and XX930S1●, the second value for XX930A2●.

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

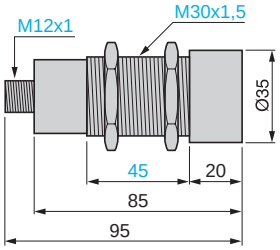
Sensor type			XX6V3A1● XXBV3A1●	XX630A1● XX630A2● XX630S1●	XX630A3●	XX930A1● XX930A2● XX930S1●	XX930A3●	XX9V3A1●
Supply characteristics								
Rated supply voltage		V	12…24 V ⎓ with protection against reverse polarity			15…24 V ⎓	15…24 V ⎓	15…24 V ⎓
Voltage limits (including ripple)		V	10…28 V ⎓			10…28 V ⎓	–	
Current consumption, no-load		mA	60	50 or 100 *(1)*	50	60 or 80 *(3)*	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, see page 36.		
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	1200	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) Double insulation for pre-cabled sensors. IP 69K for sensors with M12 connector.
(3) The first value is given for XX930A1● and XX930S1●, the second value for XX930A2●.

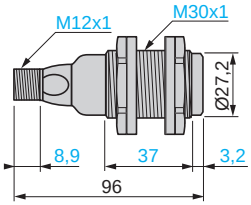
Ultrasonic sensors
XX range, General purpose
Cylindrical, plastic or metal
DC supply, solid-state output

Dimensions

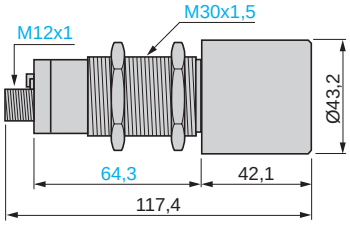
XX630A1●●M12
XX630S1●●M12
XX630A2●●M12
XX930A1A●M12
XX230A1●●A00M12
XX230A2●●A00M12



XX6V3A1●AM12
XXBV3A1●AM12
XX9V3A1●●M12



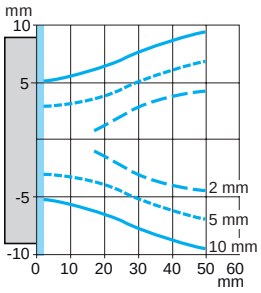
XX630A3●●M12
XX930A3A●M12



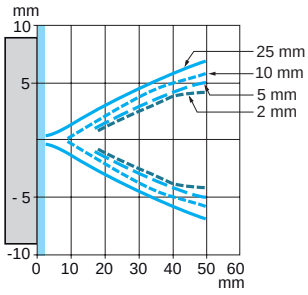
Curves

XXV18B1●

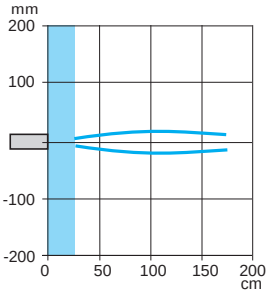
Square object



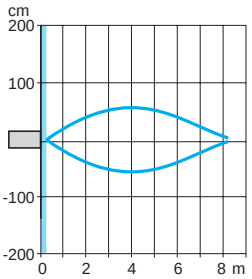
Cylindrical object



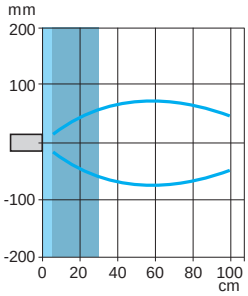
XX630A2●CM12



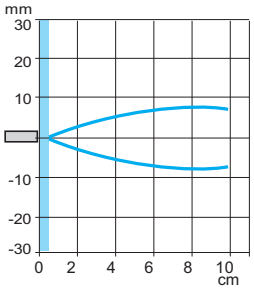
XX630A3●CM12
XX930A3●●M12



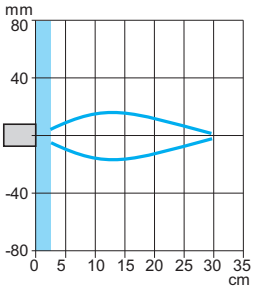
XX230A1●, XX630A1●CM12, XX6V3A1●AM12, XXBV3A1●AM12, XX930A1●●M12, XX9V3A1●●M12, XX8D1A1●AM12, XXBD1A1●AM12



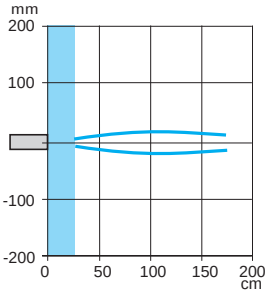
XX7F1A2● AL01M12



XX7K1A2● AM12



XX230A2●



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 output

121364

XX218A3NHM12

121366

XX230A12NA00M12

Application - 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/NPN	**XX218A3NHM12**	0.035
		NO/PNP	**XX218A3PHM12**	0.035
2 filling levels	0.5 (adjustable)	NO/NPN	**XX218A3NFM12**	0.035
		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/NPN + NO/NPN	**XX230A22NA00M12**	0.090
		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 48.

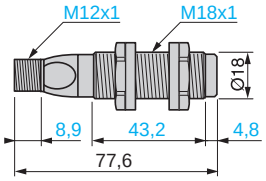
Ultrasonic sensors
XX range

Sensor type			XX218A3●●●●	XX230A1●●●●	XX230A2●●●●
General characteristics					
Conformity to standards			CE, 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		

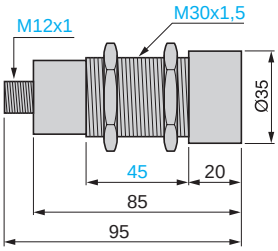
(1) Silicone face for optimum chemical resistance.

Dimensions

XX518A3●AM12
XXB18A3●AM12
XX918A3●AM12
XX218A3●●M12



XX630A1●●M12
XX630S1●●M12
XX630A2●●M12
XX930A1A●M12
XX230A1●●A00M12
XX230A2●●A00M12

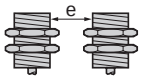


Setting-up precautions

Minimum mounting distances

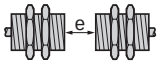
Diffuse sensors, cylindrical type

Side by side



e: respect the distances indicated on the detection curves

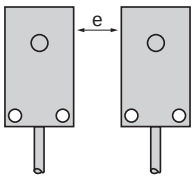
Face to face



e ⩾ 4 x Sn

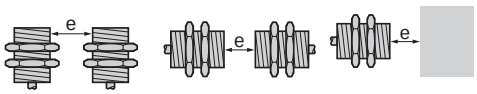
Diffuse sensors, flat format

Side by side



e: respect the distances indicated on the detection curves

XXV18●

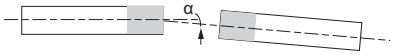


e > 25 mm

e > 700 mm

e > 60 mm

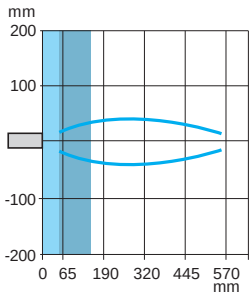
Thru-beam sensors



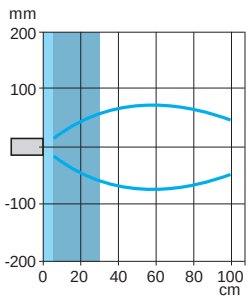
Sensors	α
XX●12●●/XX●F1●●	±5°
XX●18A3●●/XX●K1A3●●●	±8°
XX●18A4●●/XX●K1A4 XX●18A2●●/XX●K1A2	±10°

Curves

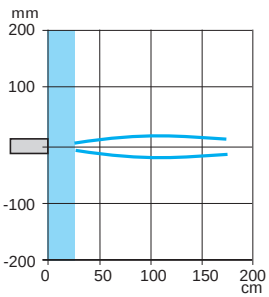
XX218A3●●M12, XX518A3●●L2, XXB18A3●AM12, XX518A3●AM12
XX7V1A1●AM12, XXBV1A1●AM12
XX918A3●●M12, XX9V1A1●●M12



XX230A1●, XX630A1●CM12,
XX6V3A1●AM12, XXBV3A1●AM12, XX930A1●●M12, XX9V3A1●●M12,
XX8D1A1●AM12, XXBD1A1●AM12



XX230A2●



Blind zone for diffuse sensors.

Blind zone for reflex sensors.

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

108068

XX7V1A1NAM12

121359

XX7F1A2NAL01M12

121360

XX7K1A2NAM12

121368

XXZPB100

Diffuse system

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/NPN	M12 connector	**XX7K1A2NAM12**	0.050
		NO/PNP	M12 connector	**XX7K1A2PAM12**	0.050

Adjustable sensing distance sensors

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

Reflex system

Adjustable sensing distance sensors

Sensors	Sensing distance (Sn)	Function/ output	Connection	Reference	Weight
mm	m				kg
18 x 33 x 60 + Ø 18	0.50 (adjustable)	NO/PNP	M12 connector	**XXBV1A1PAM12**	0.060
80 x 80 x 34	1 (adjustable)	NO/PNP	M12 connector	**XXBD1A1PAM12**	0.300

Thru-beam system

Sensors	Sensing distance (Sn)	Function/ output	Connection	Reference	Weight
mm	m				kg
7.6 x 19 x 33					
Transmitter	0.20	–	152 mm flying lead + M12 connector	**XXTF1A8M12L**	0.030
Receiver	0.20	NO/PNP + NO/NPN	152 mm flying lead + M12 connector	**XXRF1A8KAM12L**	0.030
		NC/PNP + NC/NPN	152 mm flying lead + M12 connector	**XXRF1A8KBM12L**	0.030
16 x 30 x 74					
Transmitter	0.61		M12 connector	**XXTK1A3M12**	0.060
Receiver	0.61	NO/PNP + NO/NPN	M12 connector	**XXRK1A3KAM12**	0.060
		NC/PNP + NC/NPN	M12 connector	**XXRK1A3KBM12**	0.060
Transmitter	1	–	M12 connector	**XXTK1A4M12**	0.060
Receiver	1	NO/PNP + NO/NPN	M12 connector	**XXRK1A4KAM12**	0.060
		NC/PNP + NC/NPN	M12 connector	**XXRK1A4KBM12**	0.060

Accessories

Description	For use with sensor	Reference	Weight kg
Teach pushbutton Selection of detection window **Length of cable:** 152 mm **Input:** M12 female connector **Output:** M12 male connector	XX7V1A1●AM12, XX8D1A1●AM12, XXBV1A1●AM12 and XXBD1A1●AM12	**XXZPB100**	0.035

Other connection and fixing accessories

See page 48.

Ultrasonic sensors

XX range, Application

Plastic case, cylindrical type and flat format
Sensors with analogue output signal 0…10 V or 4-20 mA

DF537726

XX9V1A1C2M12

121368

XXZPB100

Flat format sensors

Sensors	Sensing distance (Sn) (adjustable)	Analogue output (Slope selection using teach button)	Reference	Weight
mm	m			kg
18 x 33 x 65 + Ø 18	0.5	4-20 mA	**XX9V1A1C2M12**	0.090
		0-10 V	**XX9V1A1F1M12**	0.060
80 x 80 x 34	1	4-20 mA	**XX9D1A1C2M12**	0.300
		0-10 V	**XX9D1A1F1M12**	0.300

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

Other connection and fixing accessories

See page 48.

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

Sensor type			XX7F●	XXTF● XXRF●	XX7K●	XXTK● XXRK●	XX7V● XXBV1●	XX8D● XXBD●	XX9V1A1●	XX9D1A1●
General characteristics										
Conformity to standards			CE, IEC 60947-5-2							
Product certifications			UL, cCSAus	UL	cCSAus	UL	UL, cCSAus *(1)*	UL, cCSAus *(1)*	UL, cCSAus	
Nominal sensing distance (Sn)		**m**	0.1	0.2	0.25	0.6 (XX●K1A3) 1 (XX●K1A4)	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 (XX7V1●) 0 ... 165 (XXBV1●)	0 ... 100 (XX8D●) 0 ... 315 (XXBD●)	0…51	0…100
Detection window			Fixed				Remotely adjustable or by using teach button			
Detection system	Diffuse		●	–	●	–	●	●	–	–
	Reflex		–	–	–	–	●	●	–	–
	Thru-beam		–	●	–	●	–	–	–	–
Transmission frequency		**kHz**	500	500	500	200	300	180	300	180
Differential travel		**mm**	< 0.7	–	< 0.35	–	< 2.5	< 2.5	–	–
Repeat accuracy		**mm**	± 0.7	± 0.79	± 0.7	± 0.79	± 1.27	± 1.6	1.27	± 1.6
Overall beam angle (see detection lobe)			14°	10°	14°	20°	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 12.2 mm at a distance of 200 mm	Cylinder Ø 1.6 mm up to 76 mm	XX●K1A3: Cylinder Ø 38 mm at a sensing distance of 600 mm XX●K1A4: Cylinder Ø 114 mm at a distance of 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 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 *(2)*		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	50	60	XX●K1A3: 60 XX●K1A4: 100	40	70	40	70

(1) Only XX7V● and XX8D● sensors are cCSAus certified.
(2) Silicone face for optimum chemical resistance.

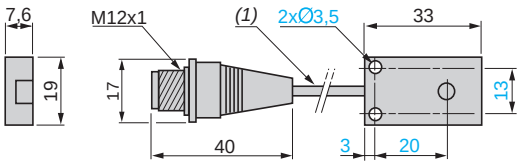
Ultrasonic sensors
XX range, General purpose
Flat format, plastic
DC supply, solid-state output

Sensor type			XX7F●	XXTF● XXRF●	XX7K●	XXTK● XXRK●	XX7V● XXBV1●	XX8D● XXBD●	XX9V1A1●	XX9D1A1●
Output characteristics										
Slope type			Direct or inverse by using teach button, See page 48.							
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	< 1	< 1	< 1		
Maximum switching frequency		**Hz**	100	125	80	125	40	72		
Delays	First-up	**ms**	20	20	350	200	100	75		
	Response	**ms**	4	4	5	5	10	15		
	Recovery	**ms**	4	4	5	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	- 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							

Ultrasonic sensors
XX range
Flat format sensors

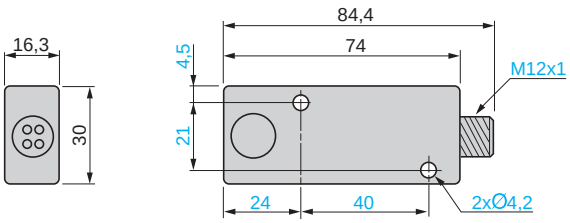
Dimensions

XX7F1A2●AL01M12
XXTF1A8●/XXR F1A8●

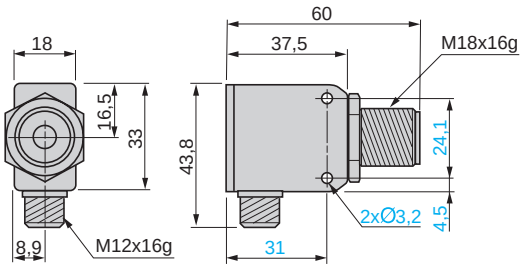


(1) Cable, length: 152 mm.

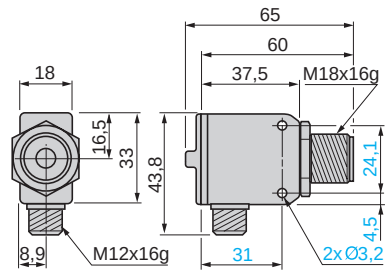
XX7K1A2●AM12
XXTK1A3●/A4●, XXRK1A3●/A4●



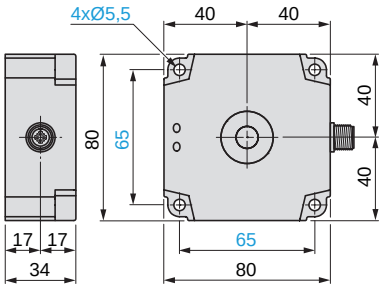
XX7V1A1●AM12
XXBV1A1●AM12



XX9V1A1●●M12

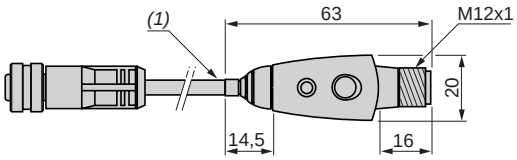


XX8D1A1●AM12
XXBD1A1●AM12
XX9D1A1●●AM12



XXZPB100

Teach pushbutton



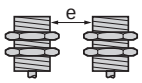
(1) Cable, length: 152 mm.

Setting-up precautions

Minimum mounting distances

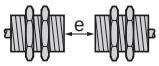
Diffuse sensors, cylindrical type

Side by side



e: respect the distances indicated on the detection curves

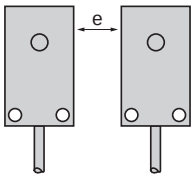
Face to face



e ≥ 4 x Sn

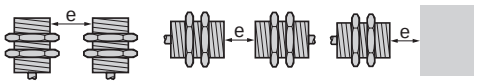
Diffuse sensors, flat format

Side by side



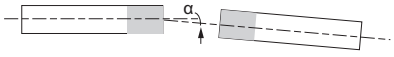
e: respect the distances indicated on the detection curves

XXV18●



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

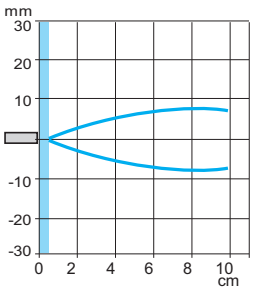
Thru-beam sensors



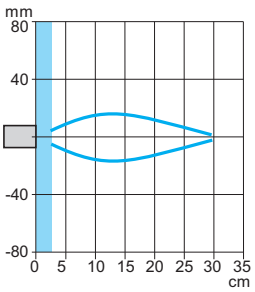
Sensors	α
XX●12●●/XX●F1●●	±5°
XX●18A3●●/XX●K1A3●●●	±8°
XX●18A4●●/XX●K1A4 XX●18A2●●/XX●K1A2	±10°

Curves

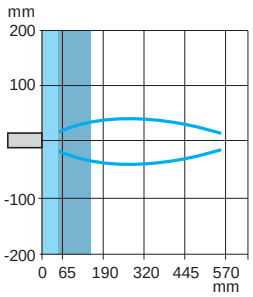
XX7F1A2● A L01M12



XX7K1A2● AM12



XX218A3●●M12, XX518A3●●L2, XXB18A3●AM12, XX518A3●AM12 XX7V1A1●AM12, XXBV1A1●AM12 XX918A3●●M12, XX9V1A1●●M12



Blind zone for diffuse sensors.

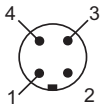
Blind zone for reflex sensors.

Ultrasonic sensors
XX range

Schemes

M12 connector, digital output (XXF●, XXK●)

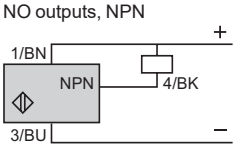
3-wire type



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

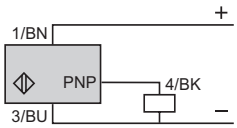
XX7F1A2NAL01M12 *(1)*, XX7K1A2NAM12

NO outputs, NPN



XX7F1A2PAL01M12 *(1)*, XX7K1A2PAM12,

NO outputs, PNP

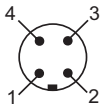


(-) BU (Blue)
(+) BN (Brown)
BK (Black)

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

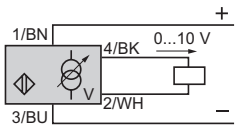
M12 connector, analogue output

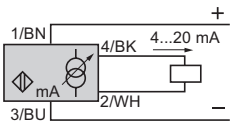
4-wire type



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

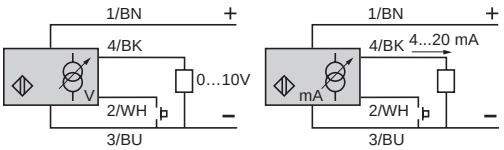
XX930A●/XX930S●





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

XX918A●/XX9V1A●/XX9V3A●/XX9D1●



For impedance of resistive load refer to values on page 47.

Ultrasonic sensors

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

XXA30P1PM12
XXS30P1PM12

XXS30B2PM12
XXA30S2PM12

XXS30S4PM12

XXS30P1AM12 *XXS30P2AM12*

Ultrasonic sensors

Sensors with solid-state digital output, M12 connector

Sensors	Sensing distance (Sn)	Function/ output	Axis	Reference	Weight
	m				kg
Ø 30 Plastic	1	NO or NC *(1)*/PNP	Straight	**XXS30P1PM12**	0.047
			90° angled	**XXA30P1PM12**	0.100
	2		Straight	**XXS30P2PM12**	0.095
			90° angled	**XXA30P2PM12**	0.100
	4		Straight	**XXS30P4PM12**	0.115
Ø 30 Nickel-plated brass	1	NO or NC *(1)*/PNP	Straight	**XXS30B1PM12**	0.165
			90° angled	**XXA30B1PM12**	0.175
	2		Straight	**XXS30B2PM12**	0.165
			90° angled	**XXA30B2PM12**	0.175
	4		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		Straight	**XXS30S2PM12**	0.160
			90° angled	**XXA30S2PM12**	0.170
	4		Straight	**XXS30S4PM12**	0.190

Adjustable sensing distance sensors

Sensors	Sensing distance (Sn)	Function/ output	Connection	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

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

XXS30B1AM12
XXA30B1AM12

XXS30S2AM12
XXA30B2AM12

XXS30B4AM12 *XXS30S1AM12*

XXZPB100

Ultrasonic sensors (continued)

Adjustable sensing distance sensors

Sensors	Sensing distance (Sn)	Function/ output	Connection	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

Description	For use with sensor	Reference	Weight kg
Teach pushbutton **Input: M12 female connector** **Output: M12 male connector**	XXS30●● XXA30●●	**XXZPB100**	0.035

Configuration interface and kit for the synchronization function

See page 57

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

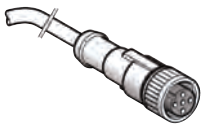
PF121334

XZCPV11V12L2

PF111910

XZCPV12V12L2

DF100520



XZCP1141L10

PF152522A

XZCC12FDM50B

PF152522A

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

Pre-wired connector 5-pin, 5-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**	0.201
		10	**XZCP1241L10**	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 *(1)*	XXS30●● XXA30●●	**XXZB130**	0.010

Configuration interface and kit for the synchronization function

See page 57

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

Ultrasonic sensors

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

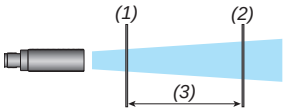
Sensor type			XXA30P1PM12 XX●30B1PM12 XX●30S1PM12	XXA30P1AM12 XX●30B1AM12 XX●30S1AM12	XXA30P1VM12 XX●30B1VM12 XX●30S1VM12
General characteristics					
Conformity to standards			EN/IEC 60947-5-2, UL 508, and CSA C22.2 n°14		
Compliance with regulations			CE (based on EMC directive 2014/30/EU), NEC (ANSI/NFPA 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		

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

Operating diagrams for digital output sensors

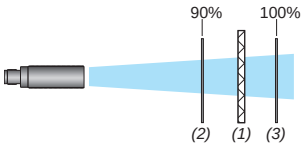
Settings with teach procedure

Window mode



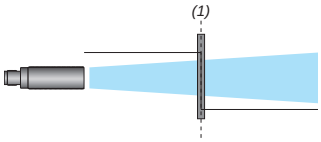
(1): Near limit
(2): Far limit
(3): Sensing window

Reflex mode



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

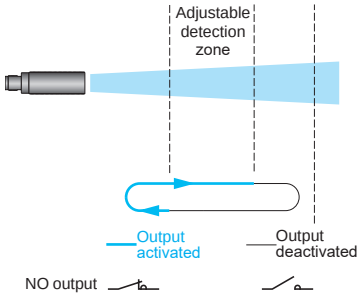
Proximity mode



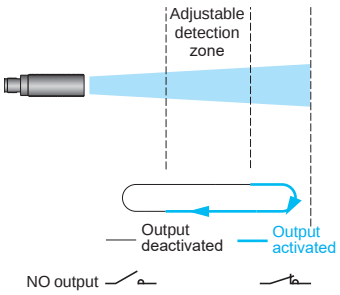
(1) Switch point

Pump/Hysteresis mode

Emptying (stored in high threshold memory)



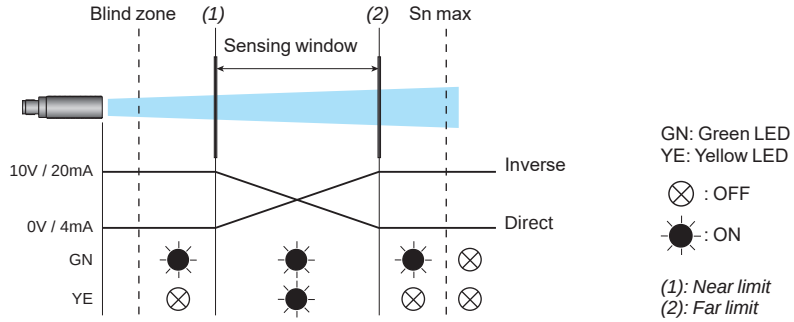
Filling (stored in low threshold memory)



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

Operating diagram for analog output sensors

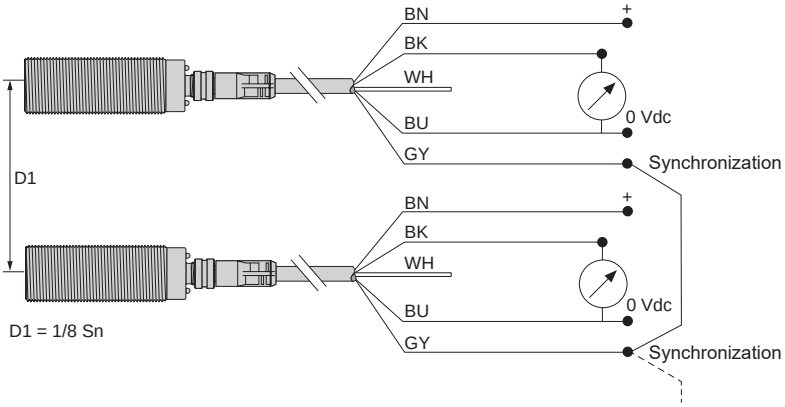
Near and far limits setting with teach procedure



GN: Green LED
YE: Yellow LED
⊗ : OFF
✳ : ON

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

Diagram for the synchronization function (side by side application)



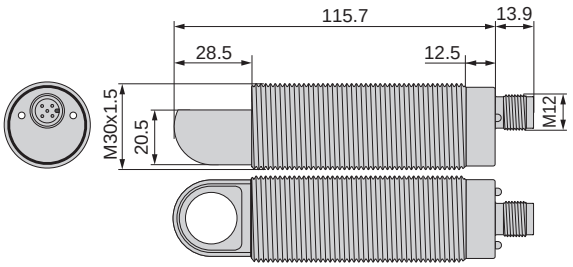
***NB**: To enable synchronization between several sensors, all of the wires of pin no.5 (gray) must be electrically connected together.*
A maximum of 8 sensors can be synchronized. To enable "Multiplexer" function for the sensors, use the XX Configuration Software.
Without synchronization or multiplexing,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

Ultrasonic sensors

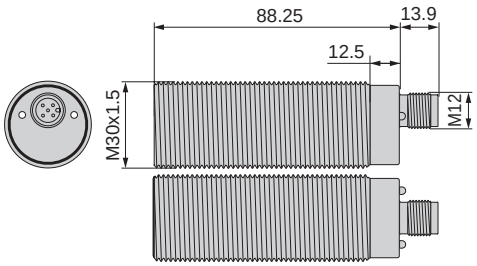
XX range, General purpose
Cylindrical, plastic or metal, Ø 30 mm
Diffuse system, solid-state digital or analog output
Configurable by software

Dimensions

XXA30B1●M12
XXA30S1●M12
XXA30P1●M12

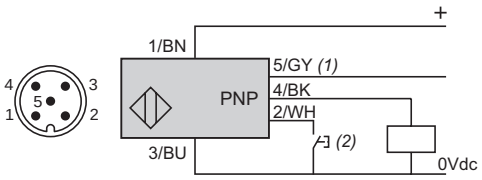


XXS30B1●M12
XXS30S1●M12



Connections

Connector wiring

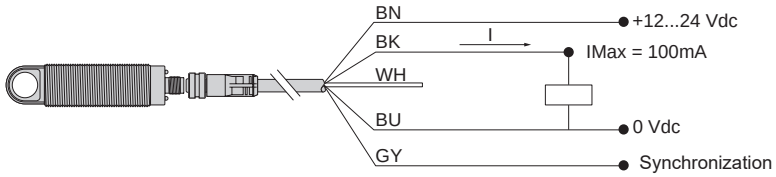


Pin number	Wire color	Digital output description	Analog output description	
			4-20 mA	0-10 V
1	BN: Brown	+12…24 V ⎓	+12…24 V ⎓	+14…24 V ⎓
2	WH: White	Input teach		
3	BU: Blue	0 V ⎓		
4	BK: Black	Output		
5	GY: Gray	Synchronization		

(1) Synchronization.
*(2) External setting pushbutton or **XXZPB100** remote teach pushbutton (see page 59).*

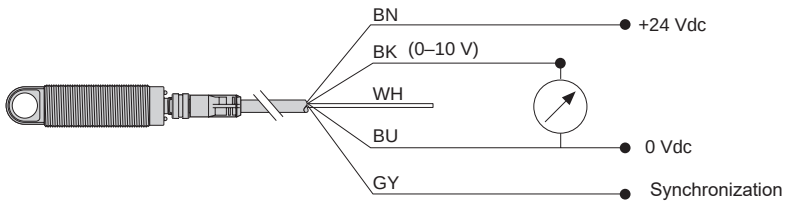
Wiring scheme (digital output NO or NC)

XXA30●●PM12/XXS30●●PM12



Wiring scheme (analog output 0-10V)

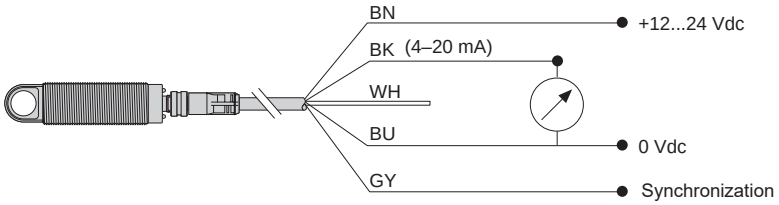
XX●30●●VM12



0-10 V:
1 kΩ…∞

Wiring scheme (analog output 4-20 mA)

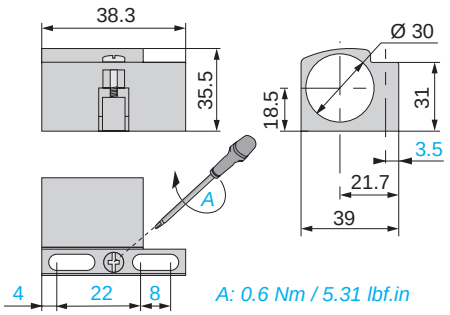
XX●30●●AM12



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

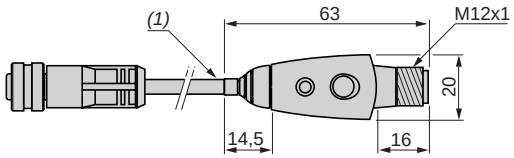
Dimensions (continued)

Fixing clamp XXZB130



A: 0.6 Nm / 5.31 lbf.in

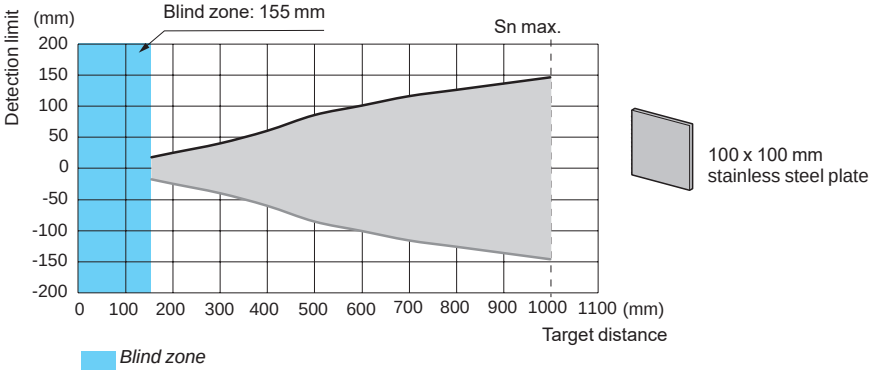
Teach pushbutton XXZPB100



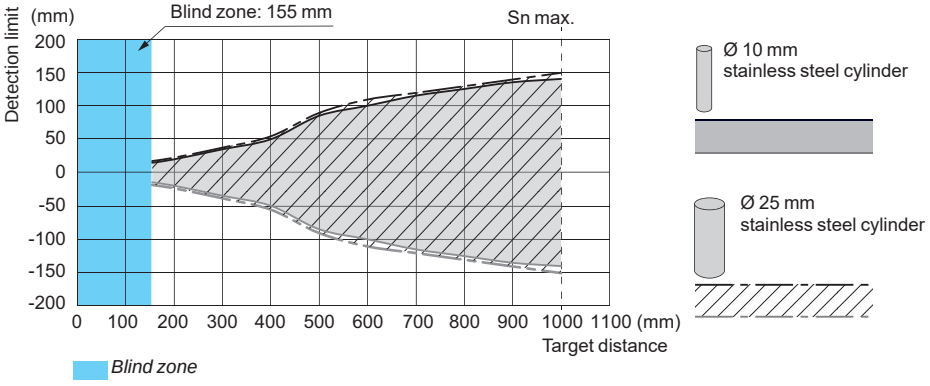
(1) Cable length: 152 mm

Curves

Detection curve with 100 x 100 mm square target



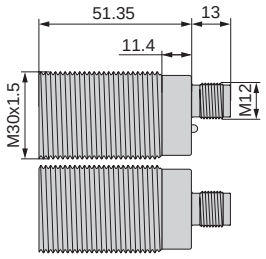
Detection curve with round bar



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

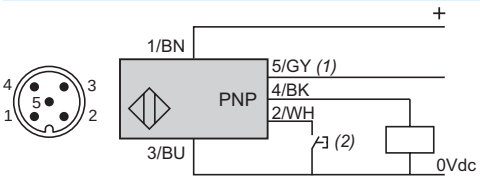
Dimensions

XXS30P1PM12
XXS30P1AM12
XXS30P1VM12



Connections

Connector wiring

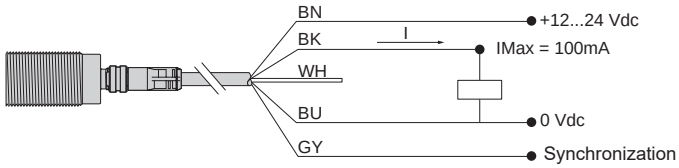


Pin number	Wire color	Digital output description	Analog output description	
			4-20 mA	0-10 V
1	BN: Brown	+12…24 V ⎓	+12…24 V ⎓	+14…24 V ⎓
2	WH: White	Input teach		
3	BU: Blue	0 V ⎓		
4	BK: Black	Output		
5	GY: Gray	Synchronization		

(1) Synchronization.
*(2) External setting pushbutton or **XXZPB100** remote teach pushbutton (see page 61).*

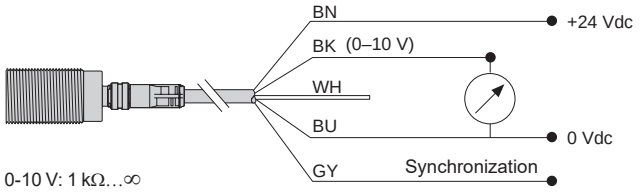
Wiring scheme (digital output NO or NC)

XXS30●●PM12



Wiring scheme (analog output 0-10V)

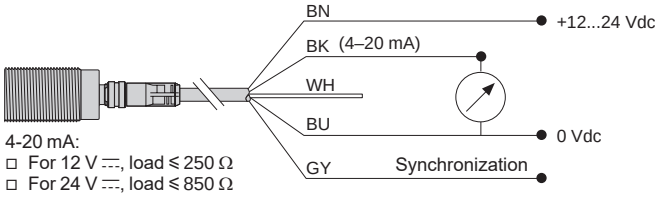
XX●30●●VM12



0-10 V: 1 kΩ…∞

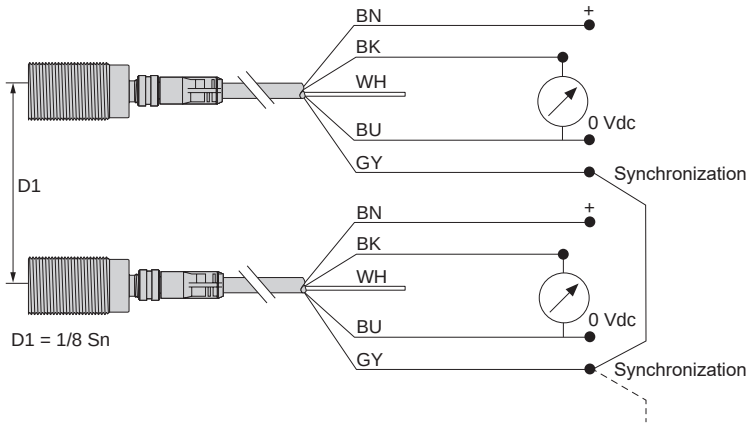
Wiring scheme (analog output 4-20 mA)

XX●30●●AM12



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

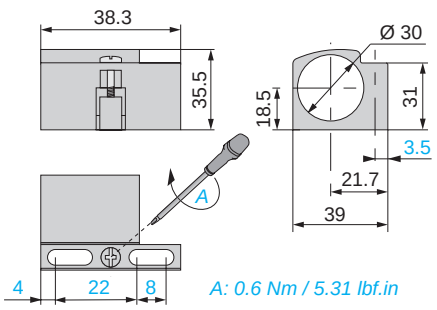
Diagram for the synchronization function (Side by side application)



***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.

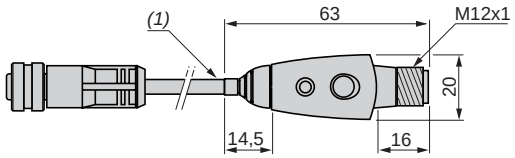
Dimensions (continued)

Fixing clamp XXZB130



A: 0.6 Nm / 5.31 lbf.in

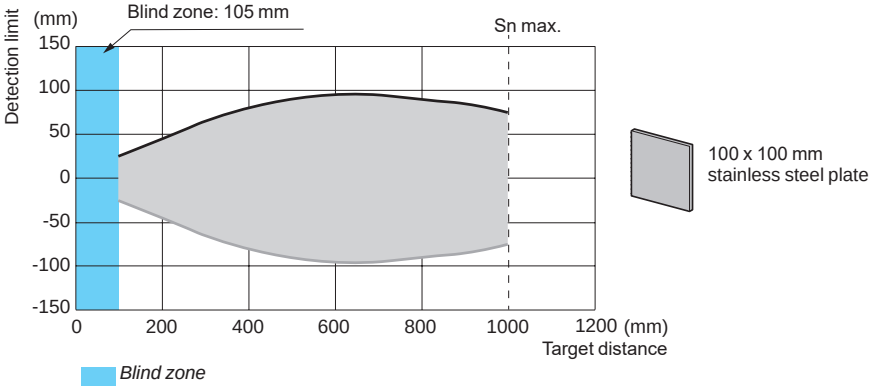
Teach pushbutton XXZPB100



(1) Cable length: 152 mm

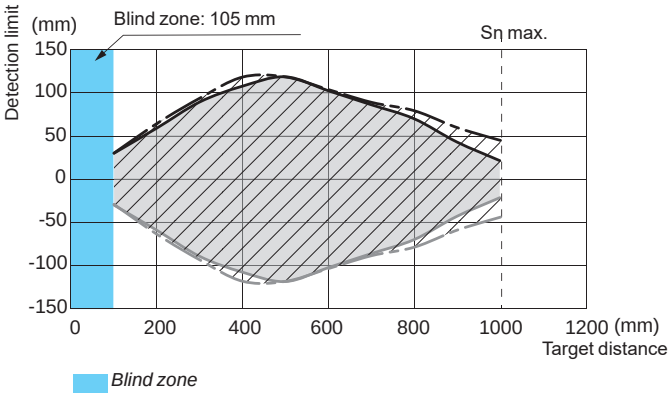
Curves

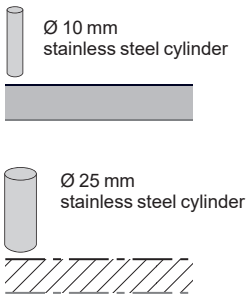
Detection curve with 100 x 100 mm square target



100 x 100 mm
stainless steel plate

Detection curve with round bar





Ø 10 mm
stainless steel cylinder

Ø 25 mm
stainless steel cylinder

Ultrasonic sensors

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

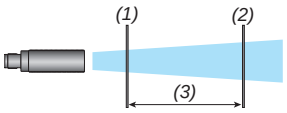
Sensor type			XX●30P2PM12 XX●30B2PM12 XX●30S2PM12	XX●30P2AM12 XX●30B2AM12 XX●30S2AM12	XX●30P2VM12 XX●30B2VM12 XX●30S2VM12
General characteristics					
Conformity to standards			EN/IEC 60947-5-2, UL 508, and CSA C22.2 n°14		
Compliance with regulations			CE (based on EMC directive 2014/30/EU), NEC (ANSI/NFPA 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 *(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
Diffuse system, solid-state digital or analog output
Configurable by software

Operating diagrams for digital output sensors

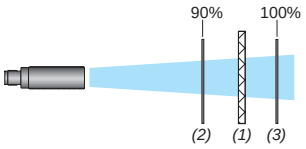
Settings with teach procedure

Window mode



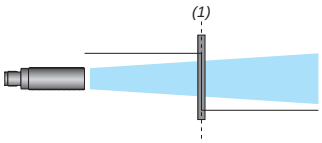
(1): Near limit
(2): Far limit
(3): Sensing window

Reflex mode



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

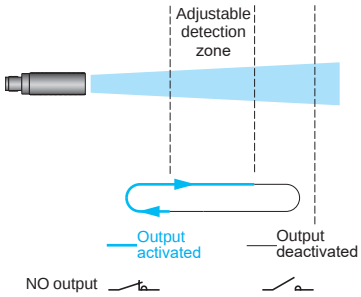
Proximity mode



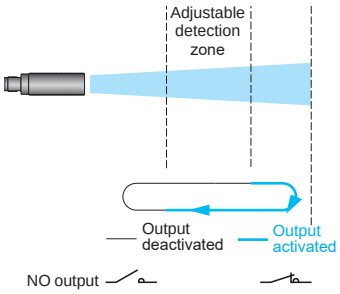
(1) Switch point

Pump/Hysteresis mode

Emptying (stored in high threshold memory)

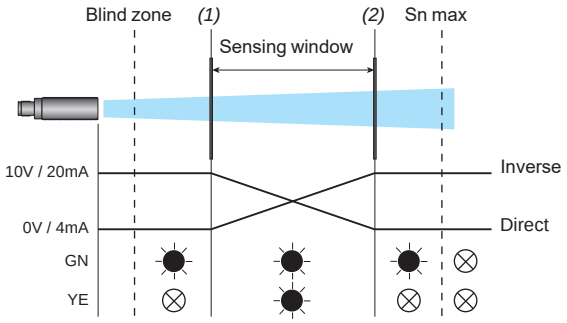


Filling (stored in low threshold memory)



Operating diagram for analog output sensors

Near and far limits setting with teach procedure



GN: Green LED
YE: Yellow LED

: OFF

: ON

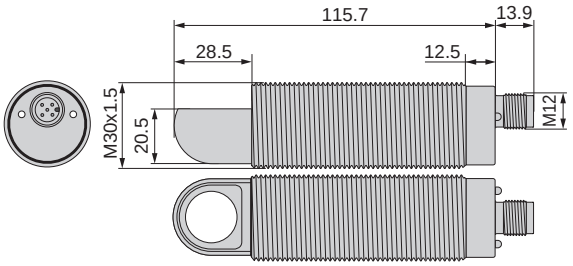
(1): Near limit
(2): Far limit

Ultrasonic sensors

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

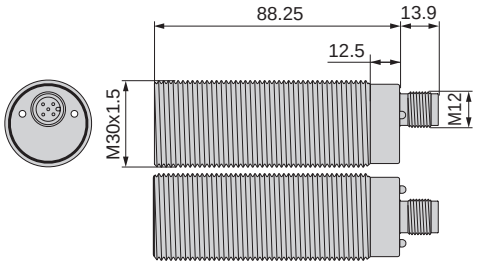
Dimensions

XX●30P2PM12
XX●30B2PM12
XX●30S2PM12



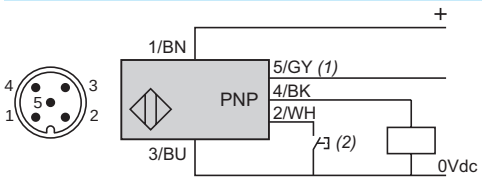
XX●30P2AM12
XX●30B2AM12
XX●30S2AM12

XX●30P2VM12
XX●30B2VM12
XX●30S2VM12



Connections

Connector wiring

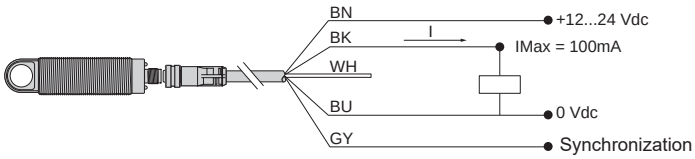


Pin number	Wire color	Digital output description	Analog output description	
			4-20 mA	0-10 V
1	BN: Brown	+12…24 V ⎓	+12…24 V ⎓	+14…24 V ⎓
2	WH: White	Input teach		
3	BU: Blue	0 V ⎓		
4	BK: Black	Output		
5	GY: Gray	Synchronization		

(1) Synchronization.
*(2) External setting pushbutton or **XXZPB100** remote teach pushbutton (see page 65).*

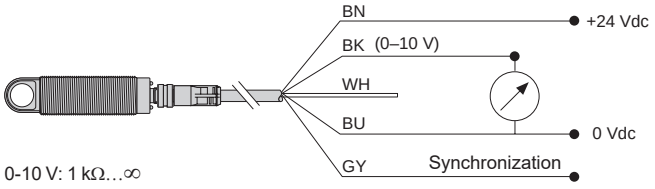
Wiring scheme (digital output NO or NC)

XXS30●●PM12 and XXA30●●PM12



Wiring scheme (analog output 0-10V)

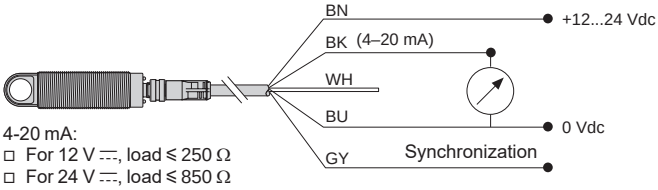
XX●30●●VM12



0-10 V: 1 kΩ…∞

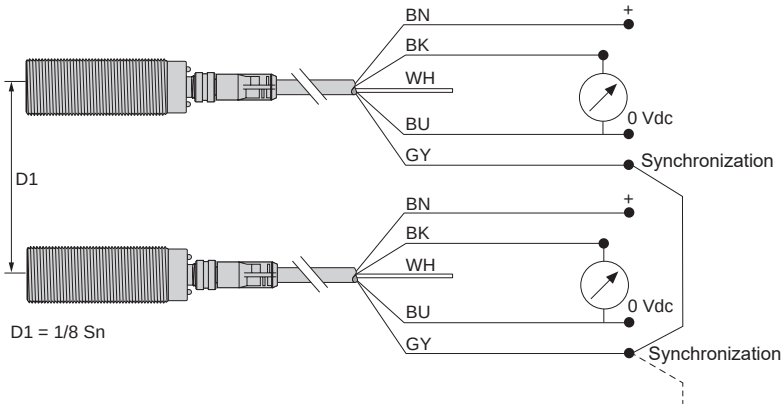
Wiring scheme (analog output 4-20 mA)

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)

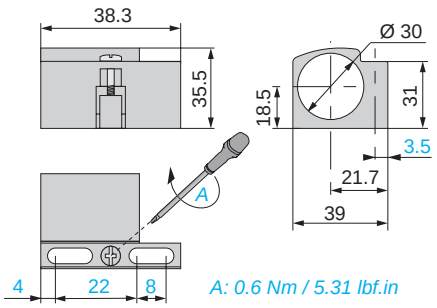


***NB**: To enable synchronization between several sensors, all of the wires of pin no.5 (gray) must be electrically connected together.*
A maximum of 8 sensors can be synchronized. To enable "Multiplexer" function for the sensors, use the XX Configuration Software.
Without synchronization or multiplexing,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

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

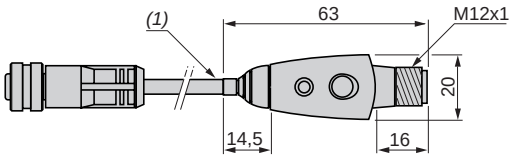
Dimensions (continued)

Fixing clamp XXZB130



A: 0.6 Nm / 5.31 lbf.in

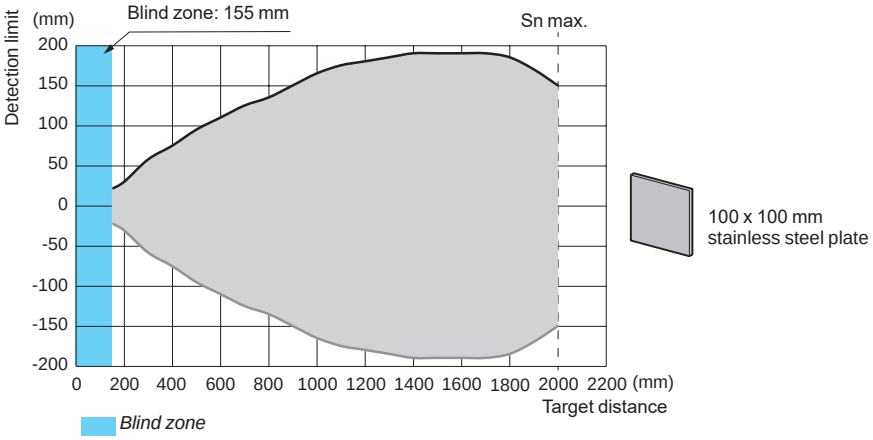
Teach pushbutton XXZPB100



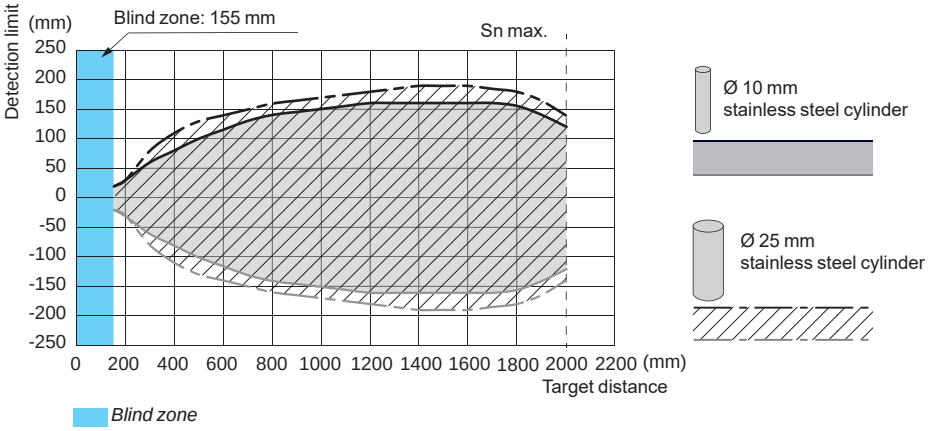
(1) Cable length: 152 mm

Curves

Detection curve with 100 x 100 mm square target



Detection curve with round bar



Ultrasonic sensors

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

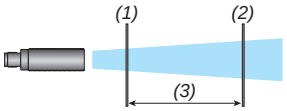
Sensor type			XXS30●4PM12	XXS30●4AM12	XXS30●4VM12
General characteristics					
Conformity to standards			EN/IEC 60947-5-2, UL 508, and CSA C22.2 n°14		
Compliance with regulations			CE (based on EMC directive 2014/30/EU), NEC (ANSI/NFPA 70), CEC (CSA C22), UNECE R10		
Product certifications			cULus with 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
Diffuse system, solid-state digital or analog output
Configurable by software

Operating diagrams for digital output sensors

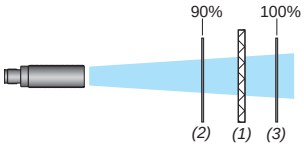
Settings with teach procedure

Window mode



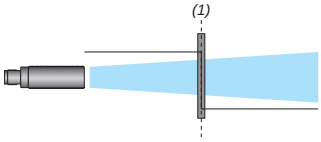
(1): Near limit
(2): Far limit
(3): Sensing window

Reflex mode



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

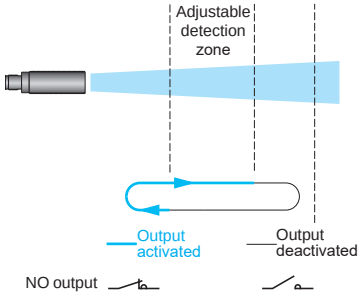
Proximity mode



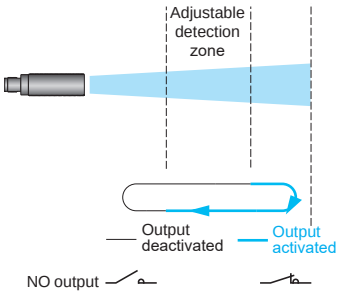
(1) Switch point

Pump/Hysteresis mode

Emptying (stored in high threshold memory)

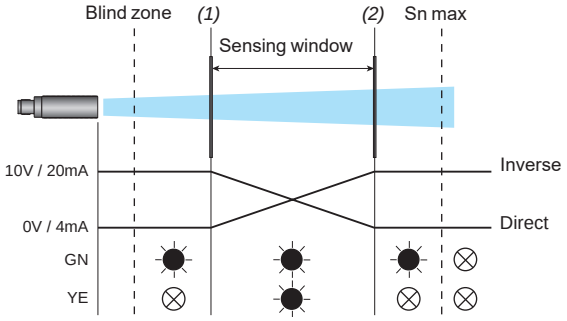


Filling (stored in low threshold memory)



Operating diagram for analog output sensors

Near and far limits setting with teach procedure



GN: Green LED
YE: Yellow LED

: OFF

: ON

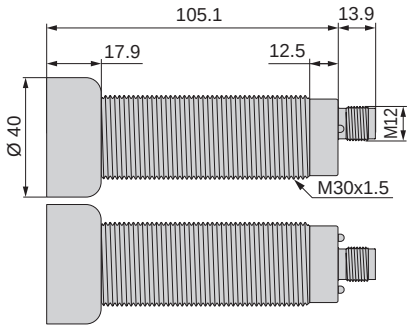
(1): Near limit
(2): Far limit

Ultrasonic sensors

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

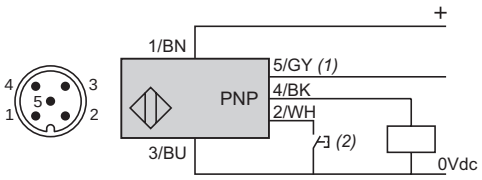
Dimensions

XXS30P4PM12 XXS30B4PM12 XXS30S4PM12	XXS30P4AM12 XXS30B4AM12 XXS30S4AM12	XXS30P4VM12 XXS30B4VM12 XXS30S4VM12



Connections

Connector wiring

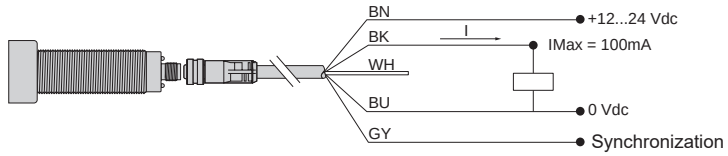


Pin number	Wire color	Digital output description	Analog output description	
			4-20 mA	0-10 V
1	BN: Brown	+12…24 V ⎓	+12…24 V ⎓	+14…24 V ⎓
2	WH: White	Input teach		
3	BU: Blue	0 V ⎓		
4	BK: Black	Output		
5	GY: Gray	Synchronization		

(1) Synchronization.
*(2) External setting pushbutton or **XXZPB100** remote teach pushbutton (see page 69).*

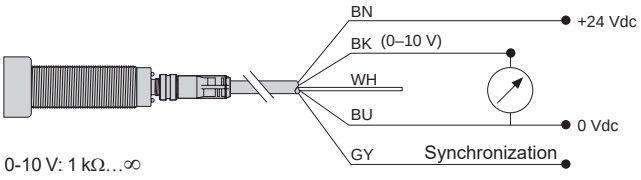
Wiring scheme (digital output NO or NC)

XXS30●●PM12



Wiring scheme (analog output 0-10V)

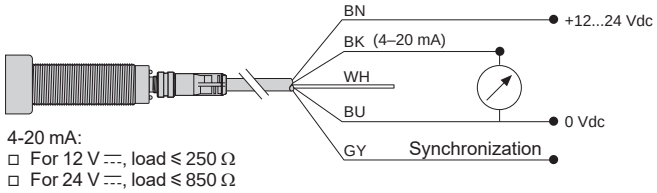
XX●30●●VM12



0-10 V: 1 kΩ…∞

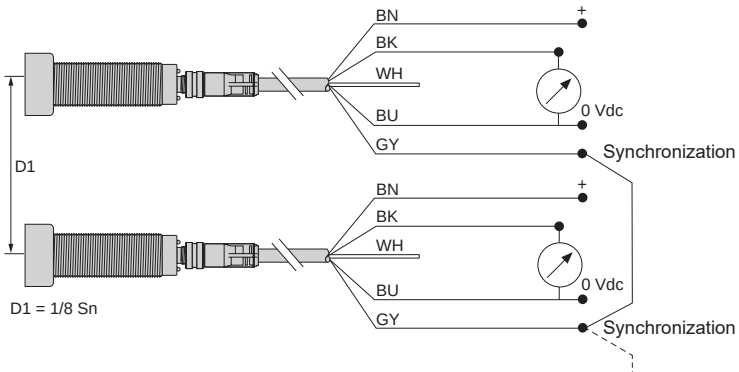
Wiring scheme (analog output 4-20 mA)

XX●30●●AM12



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

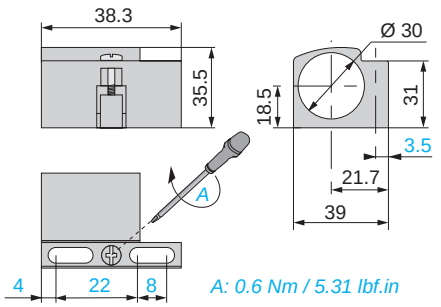
Diagram for the synchronization function (Side by side application)



***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.

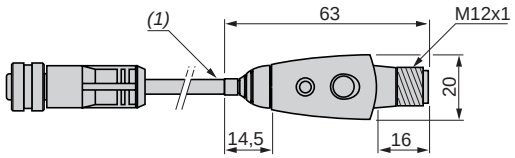
Dimensions (continued)

Fixing clamp XXZB130



A: 0.6 Nm / 5.31 lbf.in

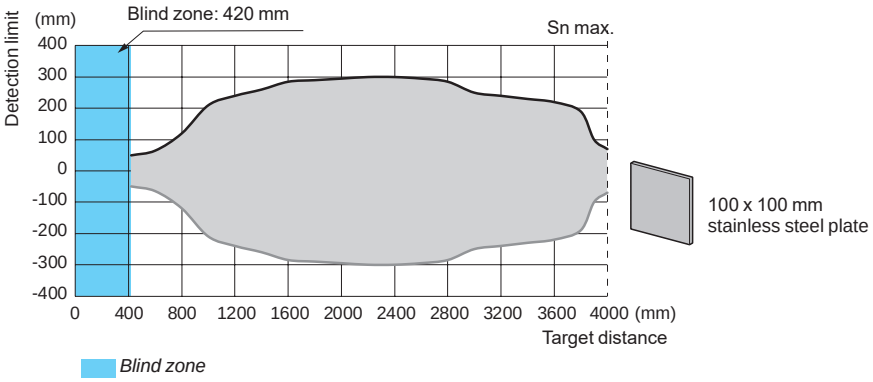
Teach pushbutton XXZPB100



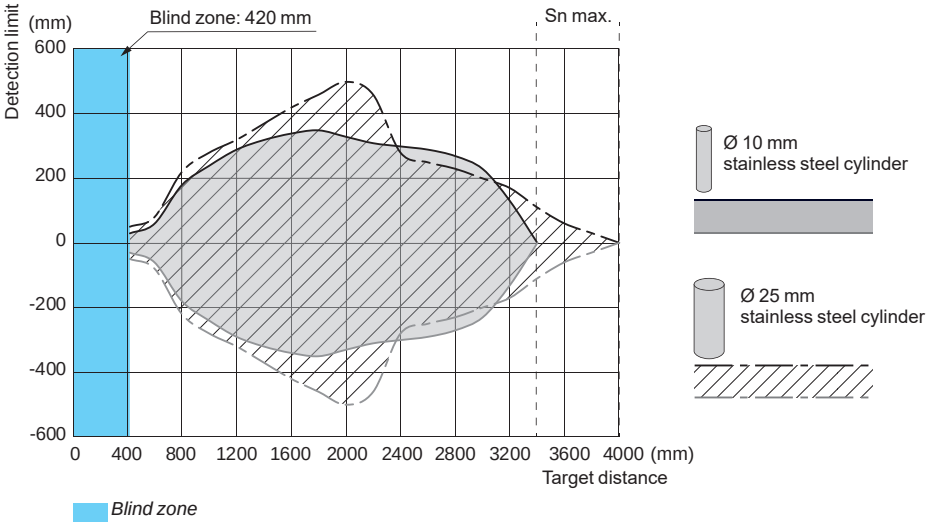
(1) Cable length: 152 mm

Curves

Detection curve with 100 x 100 mm square target

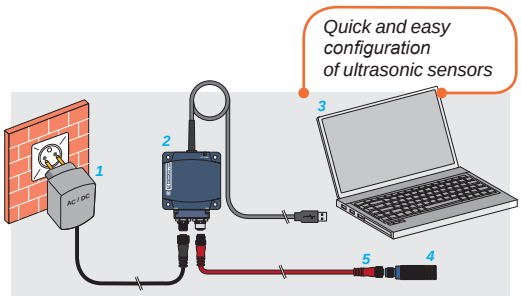


Detection curve with round bar



Ultrasonic sensors
XX range
XX Configuration Software

XX Configuration Software



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

Telemecanique Sensors is now offering a new 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 models (XXS●● & XXA●●).

XX Configuration Software for ultrasonic sensors

> XX Configuration Software is available in English, French, German, Spanish, Italian, and Chinese. It can be installed using the setup file in the USB key provided with the configuration kit or 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

Ultrasonic sensors configuration kit XXZKIT01

Part number

Description	Reference	Weight kg
Ultrasonic sensors configuration interface		
Configuration interface provided with: 1 power supply *(1)* 1 UK adapter 1 SAA adapter 1 US adapter 1 EU adapter	**XXZBOX01**	0.400
Ultrasonic sensors configuration kit		
Plastic case including: 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 USB Flash Drive/USB key, including: the setup file for XX Configuration Software, ReadMe file, instruction sheet, tutorial, and the XX range catalog.	**XXZKIT01**	1.200

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

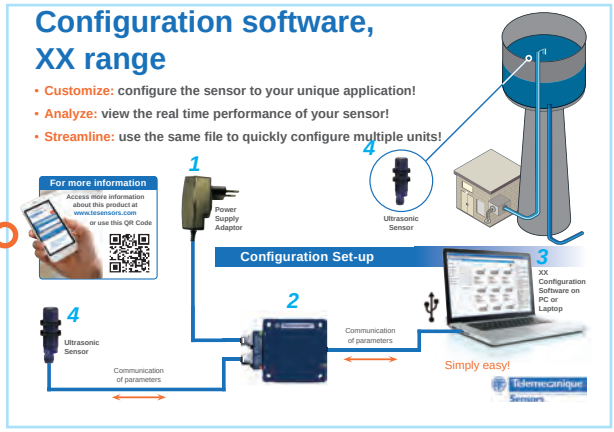
+ One of the most user-friendly ultrasonic sensor configuration software solutions

Ultrasonic sensors
XX range
XX Configuration Software

Configuration software presentation

Principle

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

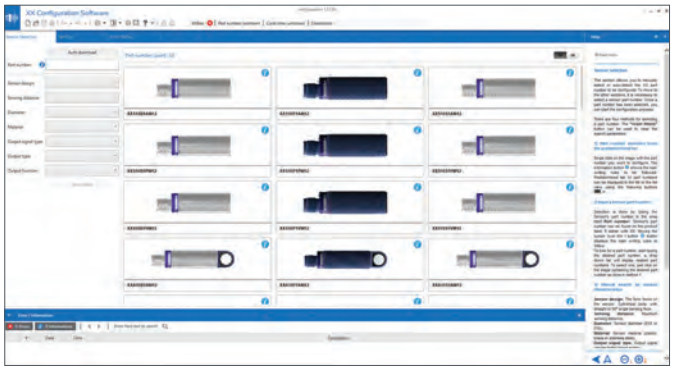


Setting examples

Sensor selection

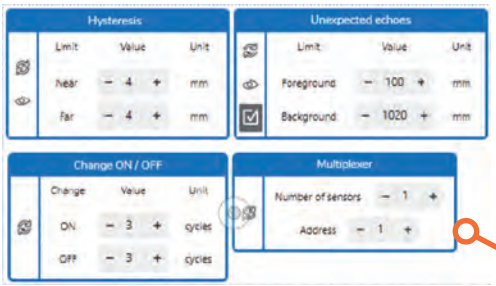
> This page is used to manually select or auto-download the XX reference sensor to be configured. Once a reference has been selected, the user can start the configuration process.

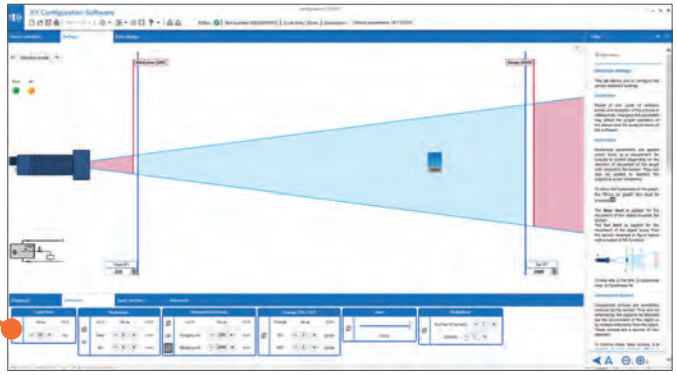
> There are **4** methods of selection.
The **Reset search** button can reinitialize the search, regardless of the method used.
1: Direct selection from the full reference list
2: Selection through reference
3: Manual search using criteria
4: Automatic sensor detection



Detection settings

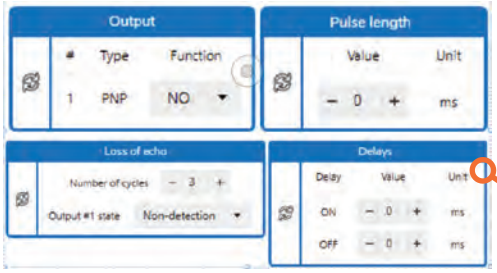
> This tab is used to configure the sensor detection settings.

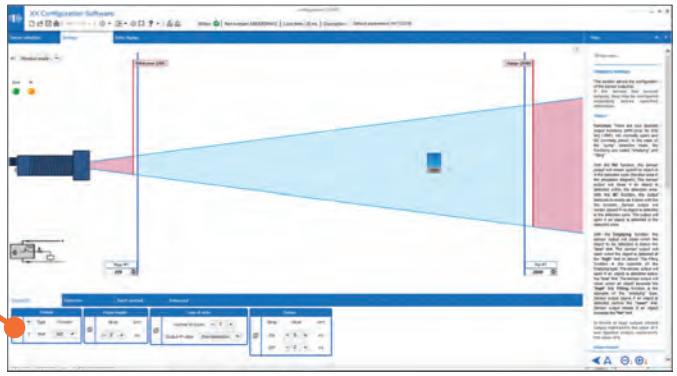




Output settings

> This page enables the configuration of sensor outputs. If the sensor has several outputs, they may be configured separately, unless specified otherwise.



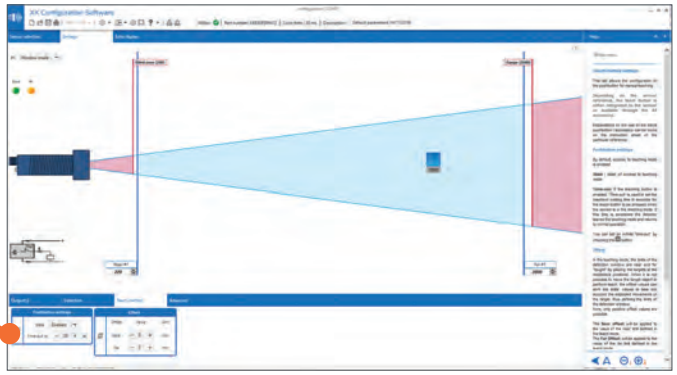


Configuration software presentation (continued)

Setting examples (continued)

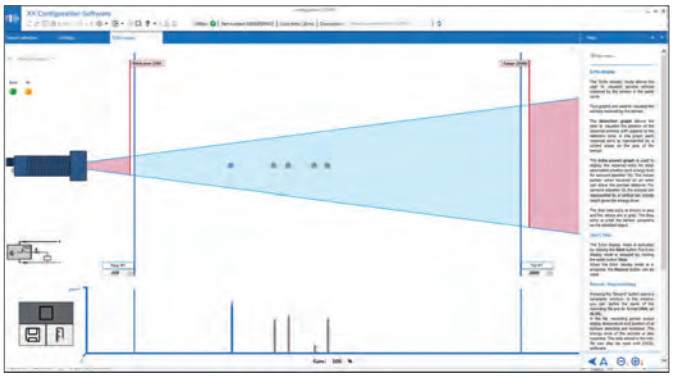
Teach method settings

> 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 69).



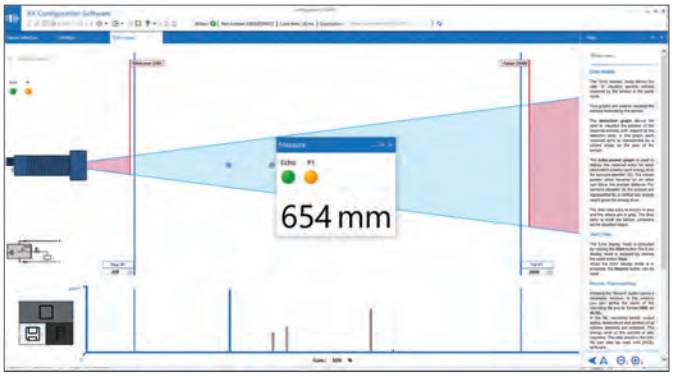
Echo display mode

> 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.

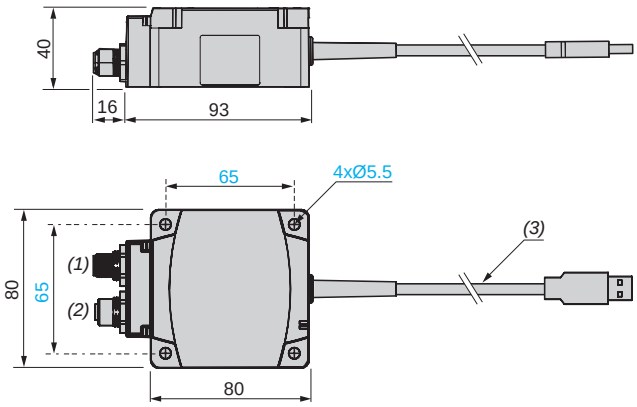


Ultrasonic sensors
XX range
Configuration interface XXZBOX01

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

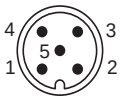
Dimensions



(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

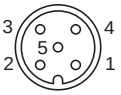
Connections

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

XZ_524_CPODA2016030

XZCC12FD●40B

564534

XZCP1041L●

564535

XSZB11●

XX_CP19001

XUZA118

562271

XSZBD10

564542

XXZ1933

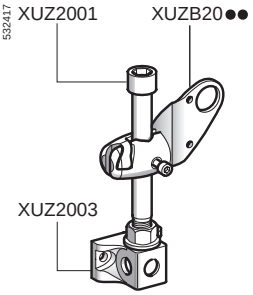
532249

XXZ3074F

532250

XXZ3074S

532417



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
	XX7F	**XXZ1933**	0.025
Flat mounting plate	XX7K	**XXZ3074F**	0.025
Cranked mounting plate	XX7K	**XXZ3074S**	0.075
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

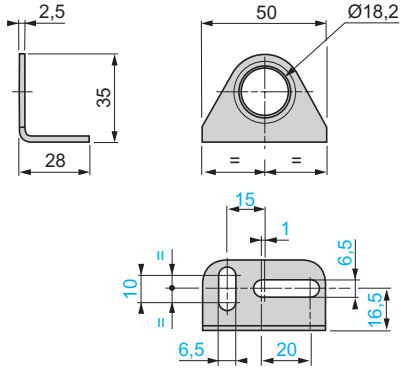
*(1) For a 5 m long cable replace **L2** by **L5**, for a 10 m long cable replace **L2** by **L10**.*
(2) To obtain a 3D fixing kit, order:
*rod support **XUZ2003**, M12 rod **XUZ2001** and ball-joint mounted fixing bracket **XUZB20●●***

Dimensions

Fixing accessories

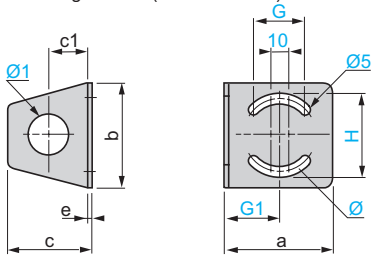
XUZA118

90° fixing bracket (Ø 18)



XXZ12, XXZ30

90° fixing bracket (Ø 12 and Ø 30)



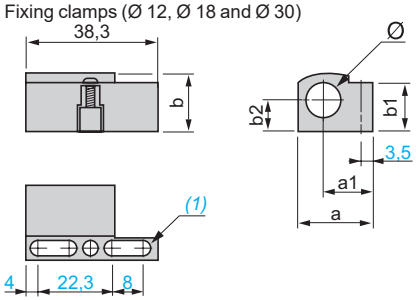
XXZ	a	b	c	c1	e	H	G	G1	Ø	Ø1
12	35	40	33	18	2	31	18	18	25	13
30	67	65	52	25	3	51	35	33	50	31

Dimensions (continued)

Fixing accessories (continued)

XSZB112, XSZB118

Fixing clamps (Ø 12, Ø 18 and Ø 30)

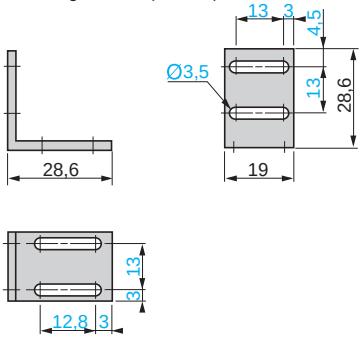


XSZ	a	a1	b	b1	b2	Ø
B112	21.9	14.5	16	15.5	8.5	12
B118	26	15.7	22.3	20.1	11.5	18
B130	39	21.7	35.5	31	18.5	30

(1) 2 elongated holes Ø 4 x 8.

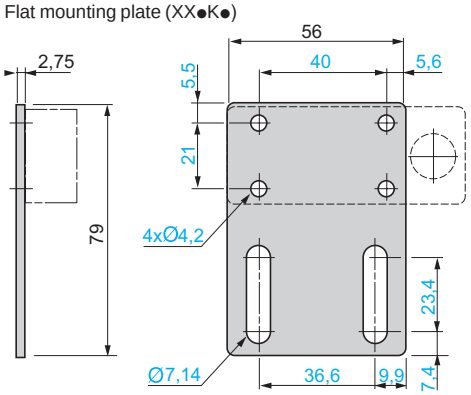
XXZ1933

90° fixing bracket (XX●F●)



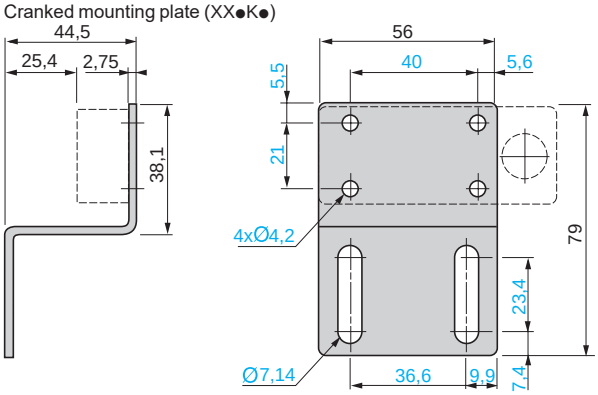
XXZ3074F

Flat mounting plate (XX●K●)



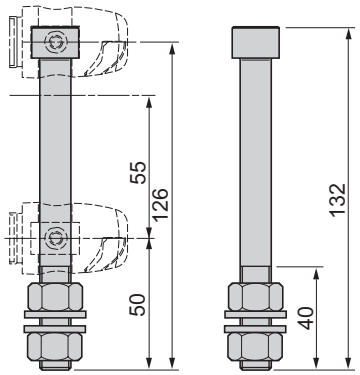
XXZ3074S

Cranked mounting plate (XX●K●)



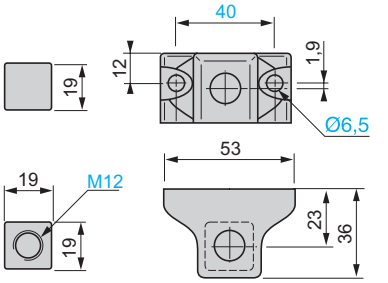
XUZ2001

M12 rod

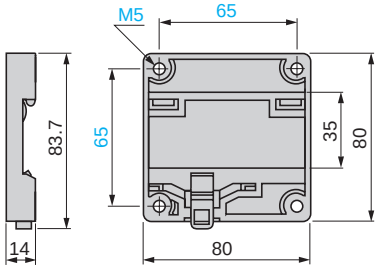


XUZ2003

Support for M12 rod

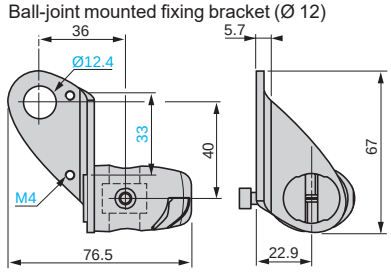


XSZBD10



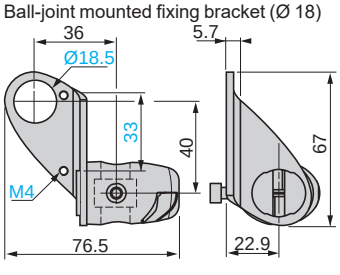
XUZB2012

Ball-joint mounted fixing bracket (Ø 12)



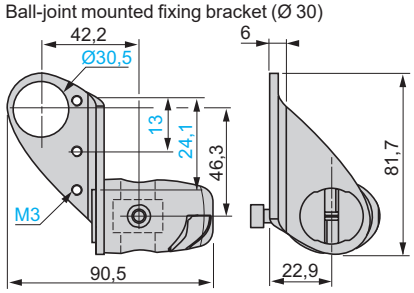
XUZB2003

Ball-joint mounted fixing bracket (Ø 18)



XUZB2030

Ball-joint mounted fixing bracket (Ø 30)



Product reference index

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