

# 4 - Capacitive proximity sensors OsiSense XT

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<b>Selection guide</b> .....	<b>page 4/2</b>
■ General .....	page 4/4
■ Metal case. Cylindrical type , flush mountable .....	page 4/8
■ Plastic case. Cylindrical type, non flush mountable. ....	page 4/12
■ Accessories .....	page 4/12
■ 40 x 40 x 117 format. Plastic case, plug-in .....	page 4/16

# Capacitive proximity sensors

## OsiSense XT

Detection of insulated or conductive materials

Applications: detection of any object irrespective of material or conductivity, for example: metals, minerals, wood, plastic, glass, cardboard, fluids, etc.

### Cylindrical sensors, flush mountable, metal case

Detection of insulated or conductive materials: presence, passage of paper, cardboard, glass, etc.



4

<b>Form</b>	Cylindrical	Threaded: M12 x 1	Threaded: M18 x 1	Threaded: M30 x 1.5	Plain: Ø 32
	Block, dimensions (w x h x d) in mm	-			
<b>Case</b>		Stainless steel	Nickel plated brass	Nickel plated brass	Nickel plated brass
<b>Sensing distance (Sn) in mm</b>	Flush mountable in metal sensors	2	5	10	15
	Non flush mountable in metal sensors	-			
<b>Degree of protection</b>		IP 67 IP 65 for sensors with connector			
<b>Supply</b>	---	•	•	•	-
	~	-	•	•	•
<b>Connection</b>	Pre-cabled	•			
	Connector	•	•	•	-
	Screw terminals	-			
<b>Type reference</b>		<b>XT1 12S1●</b>	<b>XT1 18B1●</b>	<b>XT1 30B1●</b>	<b>XT1 32B1●</b>
<b>Pages</b>		4/8			

<b>Cylindrical sensors, non flush mountable, plastic case</b>	<b>Block type sensors, flush mountable in support, plastic case</b>
Detection of insulated or conductive materials Liquid level control	Detection of insulated materials: presence, passage of paper, cardboard, glass, etc.



Threaded: M18 x 1	Threaded: M30 x 1.5	Plain: Ø 32	–
–	–	–	40 x 40 x 117 format
Plastic	–	–	Plastic, turret head
–	–	–	15
8	15	20	–
IP 67, double insulation			IP 67
•	•	–	•
•	–	–	•
•	–	–	–
•	•	–	–
–	–	–	•
<b>XT2 18A1●</b>	<b>XT2 30A1●</b>	<b>XT2 32A1●</b>	<b>XT7 C40●</b>
4/12	–	–	4/16

### Presentation

### Advantages

- No physical contact with the object to be detected.
- High operating rates.
- Solid-state product, no moving parts (service life not related to number of operating cycles).
- Detection of any object irrespective of material or conductivity, for example: metals, minerals, wood, plastic, glass, cardboard, leather, ceramic, fluids, etc.

### Operating principle

An electrical field is created between 2 electrodes on the front face of the sensor. These electrodes constitute a capacitor with a capacitance of:

$$C = \epsilon_0 * \epsilon_r * A/d \text{ where:}$$

$\epsilon_0 = 8.854 \cdot 10^{-12} \text{ F/m}$  (permittivity in free space)

$\epsilon_r$ : relative permittivity of the material present between the 2 electrodes

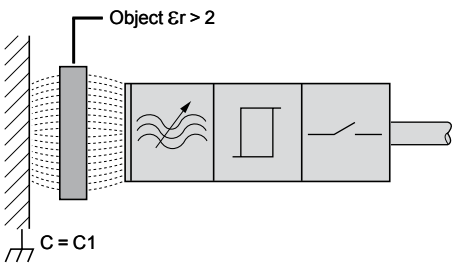
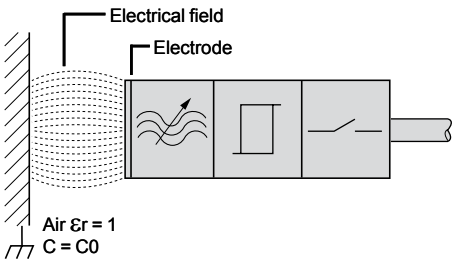
A: dimensions of electrodes

d: distance between electrodes

All materials where  $\epsilon_r > 2$  will be detected.

When an object of any material ( $\epsilon_r > 2$ ) passes the sensing face of the sensor, it modifies the coupling capacitance ( $C_1$ ).

This variation in capacitance ( $C_1 > C_0$ ) instigates the starting of the oscillator which, in turn, causes the output driver to operate and provides an output signal.



### Types of sensor

### Sensors flush mountable in support

The special feature of these versions is the shape of the electrical field which is rectilinear and confined within the dimensions of the product.

Cylindrical and block type models used for the detection of insulated materials (wood, plastic, cardboard, glass...), conductive materials (metal...) or liquid through an insulated partition (glass, plastic...) with a maximum thickness 4 mm:

These products are recommended for:

- comparatively short detection distances,
- applications requiring flush mounting of the sensor,
- detection through a partition (example: detection of glass through cardboard),
- side by side mounting.

### Sensors non flush mountable in support

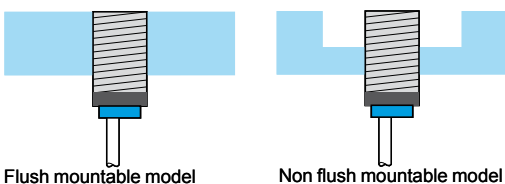
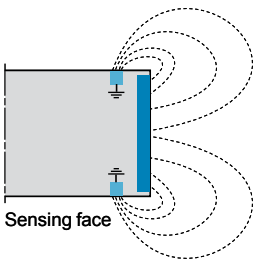
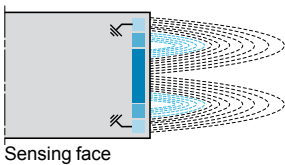
Cylindrical models (plastic case).

The spherical shape of the electrical field enables detection of any type of material whether it be solid, liquid, granular... (metal, water, oil, plastic pellets, powder, flour...). Detection can be achieved through a partition or by direct contact (immersion) of the active surface with the object to be detected.

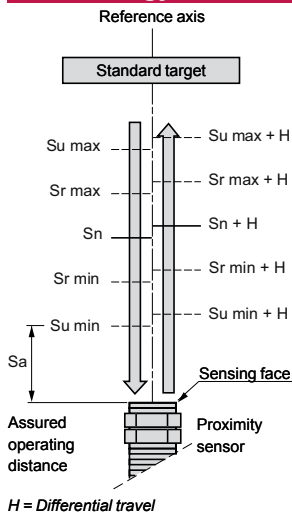
For distances to be adhered to around the sensing face, see page 4/15.

### Mounting precautions

Non flush mountable models cannot be flush mounted in their support. The non flush mountable models require a free zone around the active head. (See page 4/15).



### Terminology



### Definitions

In order to ensure that customers can make reliable product comparisons and selection, the standard IEC 60947-5-2 defines various sensing distances, such as:

#### Nominal sensing distance (Sn)

The rated operating distance for which the sensor is designed. It does not take into account any variations (manufacturing tolerances, temperature, voltage).

#### Effective sensing distance (Sr)

The effective sensing distance is measured at the rated voltage ( $U_n$ ) and the rated ambient temperature ( $23\text{ °C} \pm 5\text{ °C}$ ).

It must be between 90% and 110% of  $S_n$ .

#### Usable sensing distance (Su)

The usable sensing distance is measured at the limits of the permissible variations in the ambient temperature and at a supply voltage equal to 85% and 110% of the rated voltage.

It must be between 80% and 120% of  $S_r$ .

#### Assured operating distance (Sa)

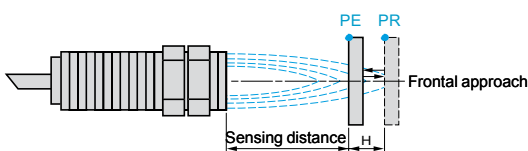
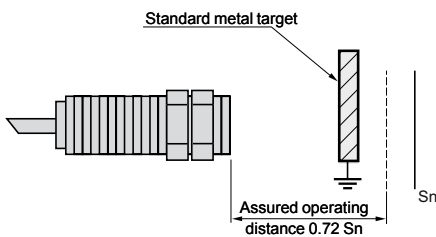
This is the operating zone of the sensor.

The assured operating distance is between 0 and 72% of  $S_n$ .

#### Standard metal target

The standard IEC 60947-5-2 defines the standard metal target as a square mild steel (Fe 360) plate, 1 mm thick.

The side dimension of the plate is either equal to the diameter of the circle engraved on the sensing face of the sensor or 3 times the nominal sensing distance ( $S_n$ ).



PE = pick-up point, the target is detected

PR = drop-out point, the target is no longer detected

#### Repeat accuracy

The repeat accuracy (R) is the repeatability of the sensing distance between successive operations. Readings are taken over a period of time whilst the sensor is subjected to voltage and temperature variations: 8 hours, 10 to 30 °C,  $U_n \pm 5\%$ .

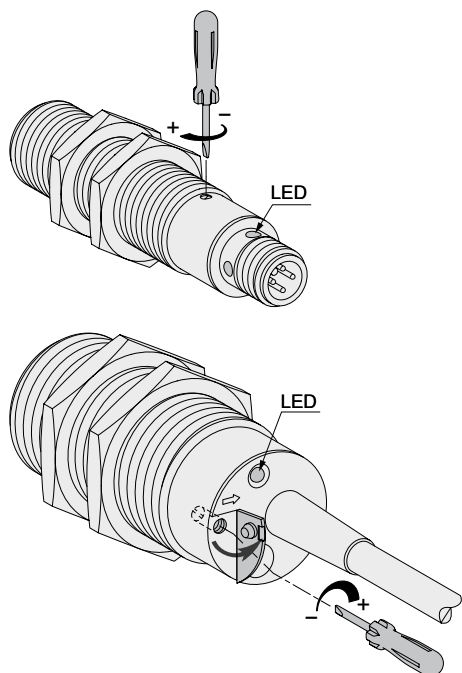
It is expressed as a percentage of the effective sensing distance  $S_r$ .

#### Differential travel

The differential travel (H) or hysteresis, is the distance between the operating point, as the standard metal target moves towards the sensor, and the release point, as it moves away.

This hysteresis is essential for the stable operation of the sensor.

**Terminology (continued)**



4

**Terminology (continued)**

**Sensitivity of the sensor**

All our sensors incorporate a sensitivity adjustment potentiometer. This enables the sensitivity of the sensor to be adjusted to suit the type of object to be detected.

Depending on the sensor version, the sensitivity adjustment potentiometer is either mounted on the side or the rear.

The sensors are factory preset for nominal sensitivity.

Depending on the application, adjustment of the sensitivity could be necessary as follows:

- increasing the sensitivity for objects which have a weak influence (low  $\epsilon_r$ ): paper, cardboard, glass, plastic,
- decreasing the sensitivity for objects which have a strong influence (strong  $\epsilon_r$ ): metals, liquids.

However, in the event of severe variations in the ambient conditions, do not increase the sensitivity of the sensor such that it is set to its maximum operating limits.

An increase in sensitivity causes an increase in the switching hysteresis.

**Operating distances**

The operating distance of the sensor is related to the dielectric constant ( $\epsilon_r$ ) of the object material to be detected.

The higher the value of  $\epsilon_r$ , the easier the detection of the object will be.

The assured operating distance depends on the object material:  $St = Sn \times Fc$   
 $St$  = assured operating distance,  
 $Sn$  = nominal sensing distance of the sensor,  
 $Fc$  = correction factor related to the object material.

Example: sensor XT1 30B1PAL2 used to detect a rubber object.

$Sn = 10 \text{ mm}$ ,  $Fc = 0.3$ .

Assured operating distance  $St = 10 \times 0.3 \text{ mm}$ .

The list below indicates the dielectric constant values of the most common object materials, together with their correction factors ( $Fc$ ) for the nominal sensing distance of the sensor.

Material	$\epsilon_r$	Fc	Material	$\epsilon_r$	Fc
Air	1	0	Petrol	2.2	0.2
Acetone	20	0.8	Plexiglass	3.2	0.3
Alcohol	24	0.85	Polyester resin	2.8...8	0.2...0.6
Ammonia	15...25	0.75...0.85	Polystyrene	3	0.3
Cement (powder)	4	0.35	Porcelain	5...7	0.4...0.5
Cereals	3...5	0.3...0.4	Powdered milk	3.5...4	0.3...0.4
Epoxy resin	4	0.36	Rubber	2.5...3	0.3
Ethylene glycol	38	0.95	Salt	6	0.5
Flour	2.5...3	0.2...0.3	Sand	3...5	0.3...0.4
Glass	3...10	0.3...0.7	Sugar	3	0.3
Marble	6...7	0.5...0.6	Teflon	2	0.2
Mica	6...7	0.5...0.6	Vaseline	2...3	0.2...0.3
Nylon	4...5	0.3...0.4	Water	80	1
Oil	2.2	0.2	Wood (damp)	10...30	0.7...0.9
Paper	2...4	0.2...0.3	Wood (dry)	2...7	0.2...0.6
Paraffin	2...2.5	0.2			

### Environment

#### ■ Electromagnetic interference

The sensors undergo electromagnetic interference testing in accordance with the recommendations of standard IEC 60947-5-2 (electrostatic discharges, radiated electromagnetic fields, fast transients, impulse voltages).

#### ■ Thermal influences

It is advisable to remain within the values stated on the characteristic pages so as to avoid sensing distance drift and possible incorrect operation of the sensor.

#### ■ Chemical agents

To ensure a long service life, it is essential that any chemicals coming into contact with the case of the sensor are non corrosive.

#### ■ Earthing

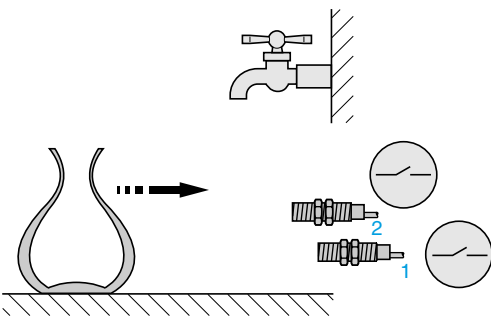
Earthing of an object that has high conductivity increases the sensing distance.

### Additional information relating to outputs

Refer to corresponding pages relating to inductive proximity sensors for:

- Terminology.
- Details and specific aspects of 2-wire and 3-wire type connection.
- Connecting several sensors in series or parallel.

### Application example: "Bottle filling"



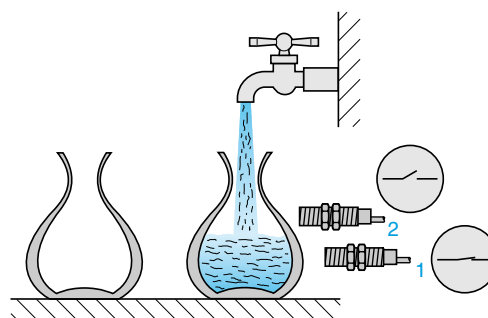
#### ■ Bottle arrival

Bottles are fed on a conveyor for filling.

Sensors 1 and 2 are in an unoperated state.

Adjustment:

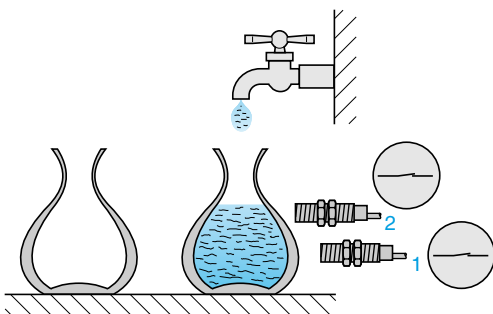
- sensor 1 is adjusted to detect the bottle,
- sensor 2 is adjusted to detect the water in the bottle.



#### ■ Bottle filling

As soon as the bottle enters the detection zone of sensor 1, the filling operation commences.

Sensor 2 remains in the unoperated state.



#### ■ Filling complete

Sensor 2 detects that the required level has been reached and stops further filling.

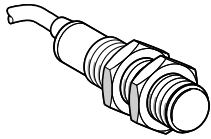
**Reminder: the wall of the container must be non metallic and its thickness  $\leq 4$  mm**

# Capacitive proximity sensors

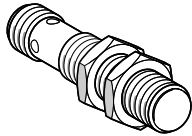
OsiSense XT

Cylindrical, flush mountable. Metal case

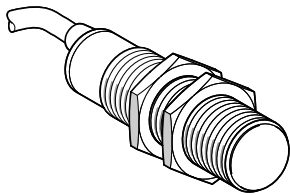
AC or DC supply



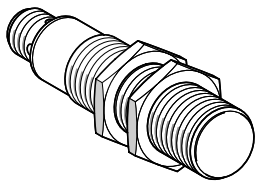
XT1 12S1●●L2



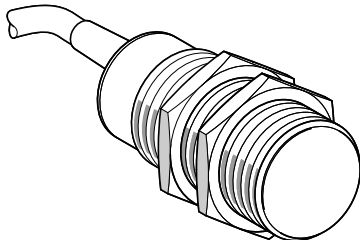
XT1 12S1PCM12



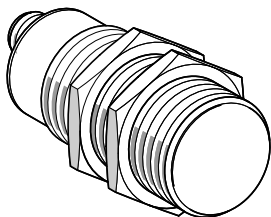
XT1 18B1●●L2



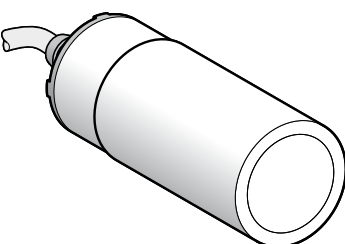
XT1 18B1PCM12



XT1 30B1●●L2



XT1 30B1PCM12



XT1 32B1●●L2

## Ø 12, threaded M12 x 1, stainless steel

Sensing distance (Sn) mm	Function	Output	Connection	Reference	Weight kg
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### Four-wire --- 24 V

2	NO/NC	PNP	Pre-cabled (L = 2 m)	XT1 12S1PCL2	0.070
			M12 connector	XT1 12S1PCM12	0.040

### Three-wire --- 24 V

2	NO	PNP	Pre-cabled (L = 2 m)	XT1 12S1PAL2	0.070
		NPN	Pre-cabled (L = 2 m)	XT1 12S1NAL2	0.070

## Ø 18, threaded M18 x 1, nickel plated brass

Sensing distance (Sn) mm	Function	Output	Connection	Reference	Weight kg
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### Four-wire --- 24 V

5	NO/NC	PNP	Pre-cabled (L = 2 m)	XT1 18B1PCL2	0.150
			M12 connector	XT1 18B1PCM12	0.075

### Three-wire --- 24 V

5	NO	PNP	Pre-cabled (L = 2 m)	XT1 18B1PAL2	0.150
		NPN	Pre-cabled (L = 2 m)	XT1 18B1NAL2	0.150

### Two-wire ~ 24-240 V

5	NO	-	Pre-cabled (L = 2 m)	XT1 18B1FAL2	0.150
	NC	-	Pre-cabled (L = 2 m)	XT1 18B1FBL2	0.150

## Ø 30, threaded M30 x 1.5, nickel plated brass

Sensing distance (Sn) mm	Function	Output	Connection	Reference	Weight kg
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### Four-wire --- 24 V

10	NO/NC	PNP	Pre-cabled (L = 2 m)	XT1 30B1PCL2	0.270
			M12 connector	XT1 30B1PCM12	0.150

### Three-wire --- 24 V

10	NO	PNP	Pre-cabled (L = 2 m)	XT1 30B1PAL2	0.270
		NPN	Pre-cabled (L = 2 m)	XT1 30B1NAL2	0.270

### Two-wire ~ 24-240 V

10	NO	-	Pre-cabled (L = 2 m)	XT1 30B1FAL2	0.270
	NC	-	Pre-cabled (L = 2 m)	XT1 30B1FBL2	0.270

## Ø 32, plain, nickel plated brass (1)

Sensing distance (Sn) mm	Function	Output	Connection	Reference	Weight kg
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### Two-wire ~ 24-240 V

15	NO	-	Pre-cabled (L = 2 m)	XT1 32B1FAL2	0.400
	NC	-	Pre-cabled (L = 2 m)	XT1 32B1FBL2	0.400

(1) Mounting accessory included with sensor.

## Accessories

For fixing and protection accessories, fuses and fuse terminal block, see page 4/12.



Characteristics							
Sensor type		M12 XT1 12●	M18 XT1 18●	M30 XT1 30●	Ø 32 XT1 32●		
		3-wire ⎓ 4-wire ⎓	3-wire ⎓ 4-wire ⎓	2-wire ~	3-wire ⎓ 4-wire ⎓	2-wire ~	2-wire ~
Product certifications		CE					
Conformity to standards		IEC 60947-5-2					
Connection	Pre-cabled, length 2 m	●	●	●	●	●	●
	Connector, M12	●	●	–	●	–	–
<b>Main characteristics</b>							
Nominal sensing distance Sn	Conforming to IEC 60947-5-2	mm	2	5	10		15
Assured operating distance Sa	Conforming to IEC 60947-5-2	mm	0...1.44	0...3.60	0...3.60	0...7.2	0...11
Adjustment zone		mm	0.5...5	1...8	1...5	2...20	2...15
Repeat accuracy			< 0.1 Sr				< 0.15 Sr
Differential travel			< 0.2 Sr				< 0.2 Sr
<b>Output characteristics</b>							
Output state indication		Yellow LED					
Switching capacity		mA	200	200	330	200	300
Maximum switching frequency		Hz	300	200	25	150	15
Protection against short-circuits			●	●	– (1)	●	– (1)
Voltage drop		V	≤ 2	≤ 2	≤ 6	≤ 2	≤ 10
Residual current, open state		mA	< 0.1	< 0.1	< 5	< 0.1	< 5
Delays	First-up	ms	≤ 30	≤ 30	≤ 100	≤ 30	≤ 200
	Response	ms	≤ 5	≤ 5	≤ 20	≤ 5	≤ 30
	Recovery	ms	≤ 5	≤ 5	≤ 20	≤ 5	≤ 30
<b>Supply</b>							
Rated supply voltage		V	⎓ 24	⎓ 24	~ 24 - 240 50/60 Hz	⎓ 24	~ 24 - 240 50/60 Hz
Voltage limits (including ripple)		V	⎓ 12 - 30	⎓ 12 - 30	~ 20 - 264 50/60 Hz	⎓ 12 - 30	~ 20 - 264 50/60 Hz
Current consumption, no-load		mA	< 15	< 15	< 3	< 15	< 4
Protection against reverse polarity			Yes	Yes	–	Yes	–
<b>Environment</b>							
Materials	Case		Stainless steel 303	Nickel plated brass			
	Cable		PVC				
	Number and c.s.a. of wires		3 x 0.14 mm <sup>2</sup> or 4 x 0.14 mm <sup>2</sup>	3 x 0.34 mm <sup>2</sup> or 4 x 0.34 mm <sup>2</sup>	3 x 0.34 mm <sup>2</sup>	3 x 0.75 mm <sup>2</sup> or 4 x 0.5 mm <sup>2</sup>	3 x 0.75 mm <sup>2</sup> 3 x 0.34 mm <sup>2</sup>
Degree of protection	Conforming to IEC 60529 and IEC 60947-5-2		IP 67 (2) IP 65 for sensors XT1 12S1PCM12 and XT1 18B1PCM12				IP 67
Storage and operating temperature		°C	- 25...+ 70				
Vibration resistance	Conforming to IEC 60068-2-6		10 gn, ± 1 mm (f = 10...55 Hz)				
Shock resistance	Conforming to IEC 60068-2-27		30 gn, 11 ms				
<b>Resistance to electromagnetic interference</b>							
Electrostatic discharges	Conforming to IEC 61000-4-2	kV	8 (air) / 4 (contact)				
Radiated electromagnetic fields	Conforming to IEC 61000-4-3	V/m	3				
Fast transients	Conforming to IEC 61000-4-4	kV	2				

(1) These sensors do not incorporate overload or short-circuit protection and therefore, it is essential to connect a "quick-blow" fuse in series with the load (see page 4/12).

(2) With adjustment potentiometer sealing screw.

# Capacitive proximity sensors

OsiSense XT

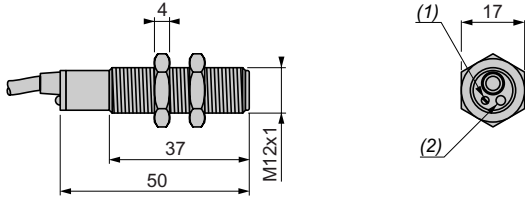
Cylindrical, flush mountable. Metal case

AC or DC supply

## Dimensions

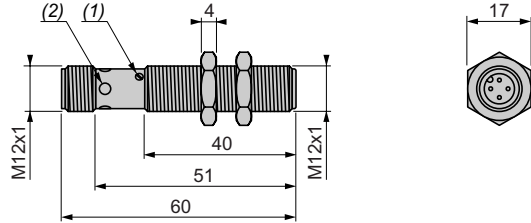
### M12, pre-cabled

XT1 12S1●●L2



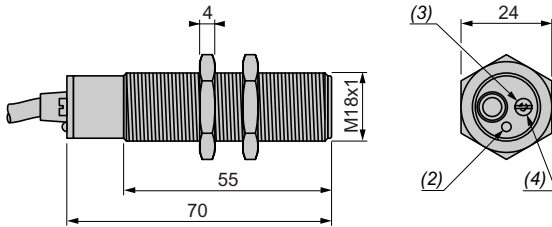
### M12, M12 connector

XT1 12S1PCM12



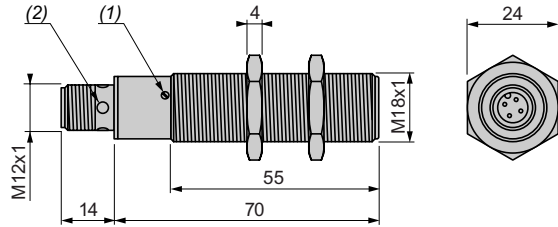
### M18, pre-cabled

XT1 18B1●●L2



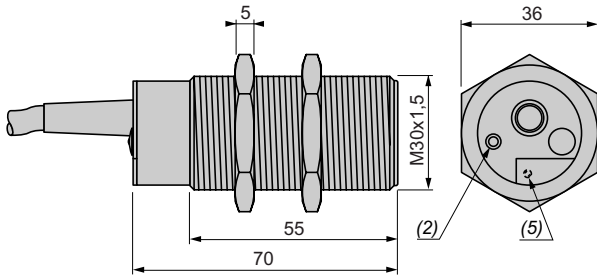
### M18, M12 connector

XT1 18B1PCM12



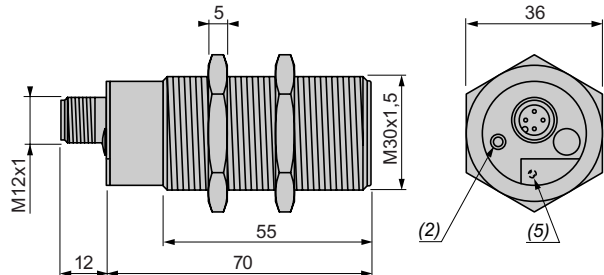
### M30, pre-cabled

XT1 30B1●●L2



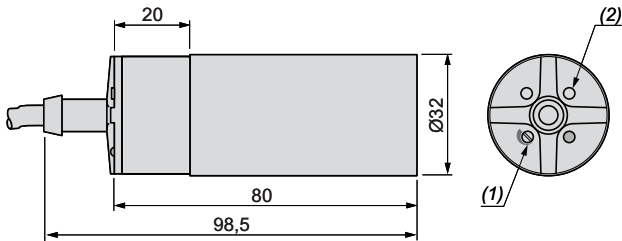
### M30, M12 connector

XT1 30B1PCM12

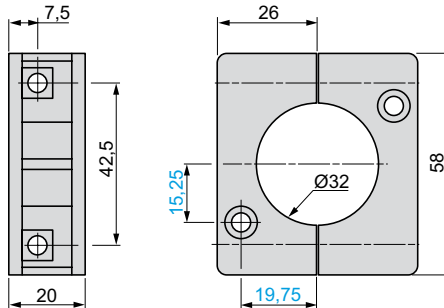


### Ø 32, plain, pre-cabled

XT1 32B1F●L2



### Mounting accessory (included with sensor XT1 32B1F●L2)



- (1) Adjustment potentiometer
- (2) LED
- (3) Sealing screw
- (4) Potentiometer beneath sealing screw
- (5) Potentiometer beneath protective flap

# Capacitive proximity sensors

OsiSense XT

Cylindrical, flush mountable. Metal case

AC or DC supply

## Wiring schemes

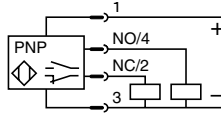
### Connector version

#### M12 connector



4-wire ~, PNP  
NO + NC output, M12

XT1 12/18/30●●●●M12

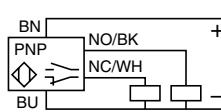


### Pre-cabled version

#### Cable

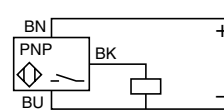
4-wire ~, PNP  
NO + NC output, pre-cabled

XT1 12/18/30PC●●L2



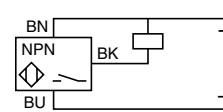
3-wire ~, PNP  
NO output, pre-cabled

XT1 12/18/30PA●●L2



3-wire ~, NPN  
NO output, pre-cabled

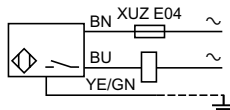
XT1 12/18/30NA●●L2



BU: Blue  
BN: Brown  
BK: Black  
WH: White  
YE/GN: Yellow/green

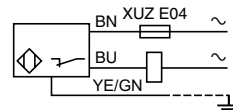
2-wire ~  
NO output

XT1 18/30/32B1FAL2



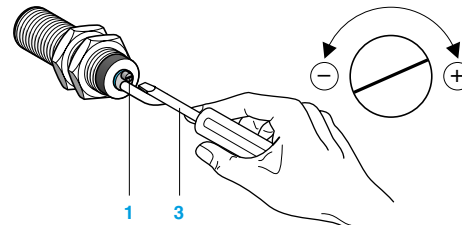
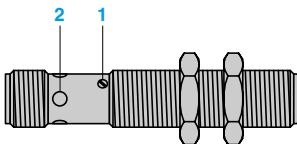
2-wire ~  
NC output

XT1 18/30/32B1FBL2



## Adjustment

### Sensitivity adjustment



- 1 Adjustment potentiometer
- 2 LED
- 3 Adjustment using suitable screwdriver (included with sensor)

Adjustment from the side for XT1 12●●●●M12  
XT1 18●●●●M12

Adjustment from the rear for XT1 ●●●●L2  
XT1 30●●●●M12

## Setting-up

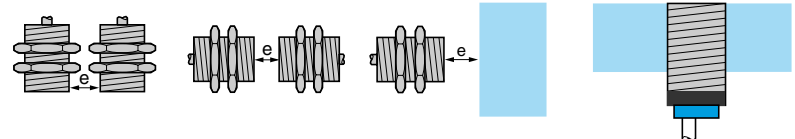
### Minimum mounting distances (mm)

#### Side by side

#### Face to face

#### Facing a metal object

#### Mounted in support



	Side by side	Face to face	Facing a metal object	Mounted in support
XT1 M12 flush mountable	$e \geq 0$	$e \geq 2.2 \times S_n$	$e \geq 2 \times S_n$	–
XT1 M18 flush mountable	$e \geq 0$	$e \geq 2.2 \times S_n$	$e \geq 2 \times S_n$	–
XT1 M30 flush mountable	$e \geq 0$	$e \geq 2.2 \times S_n$	$e \geq 2 \times S_n$	–

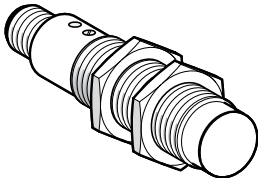
Fixing nut tightening torque: XT1 12: 10 N.m, XT1 18: 28 N.m, XT1 30: 40 N.m

# Capacitive proximity sensors

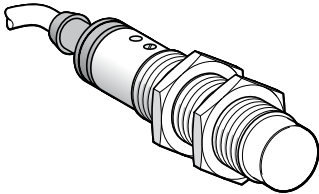
## OsiSense XT

Cylindrical, non flush mountable. Plastic case

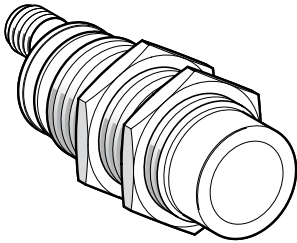
AC or DC supply



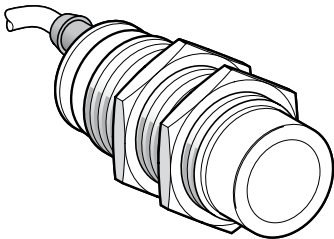
XT2 18A1PCM12



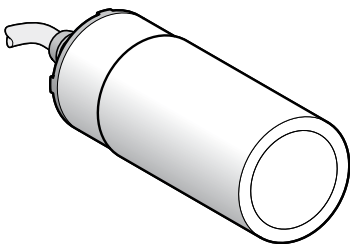
XT2 18A1AL2



XT2 30A1PCM12



XT2 30A1AL2



XT 32A1FAL2



XUZA118

### Ø 18, threaded M18 x 1

Sensing distance (Sn) mm	Function	Output	Connection	Reference	Weight kg
--------------------------	----------	--------	------------	-----------	-----------

#### Four-wire --- 12...24 V

8	NO/NC	PNP	M12 connector	XT2 18A1PCM12	0.060
---	-------	-----	---------------	---------------	-------

#### Three-wire --- 12...24 V

8	NO	PNP	Pre-cabled (L = 2 m)	XT2 18A1PAL2	0.140
		NPN	Pre-cabled (L = 2 m)	XT2 18A1NAL2	0.140

#### Two-wire ~ 24-240 V

8	NO	–	Pre-cabled (L = 2 m)	XT2 18A1FAL2	0.140
---	----	---	----------------------	--------------	-------

### Ø 30, threaded M30 x 1.5

Sensing distance (Sn) mm	Function	Output	Connection	Reference	Weight kg
--------------------------	----------	--------	------------	-----------	-----------

#### Four-wire --- 12...24 V

15	NO/NC	PNP	M12 connector	XT2 30A1PCM12	0.100
----	-------	-----	---------------	---------------	-------

#### Three-wire --- 12...24 V

15	NO	PNP	Pre-cabled (L = 2 m)	XT2 30A1PAL2	0.200
		NPN	Pre-cabled (L = 2 m)	XT2 30A1NAL2	0.200

#### Two-wire ~ 24-240 V

15	NO	–	Pre-cabled (L = 2 m)	XT2 30A1FAL2	0.200
	NC	–	Pre-cabled (L = 2 m)	XT2 30A1FBL2	0.200

### Ø 32, plain (1)

Sensing distance (Sn) mm	Function	Output	Connection	Reference	Weight kg
--------------------------	----------	--------	------------	-----------	-----------

#### Two-wire ~ 24-240 V

20	NO	–	Pre-cabled (L = 2 m)	XT2 32A1FAL2	0.350
	NC	–	Pre-cabled (L = 2 m)	XT2 32A1FBL2	0.350

(1) Mounting accessory included with sensor.

### Accessories for capacitive sensors XT1● and XT2●

#### Fixing accessories

Description	For use with sensor	Reference	Weight kg
90° fixing bracket	Ø 12	XXZ 12	0.025
	Ø 18	XUZ A118	0.045
	Ø 30	XXZ 30	0.115

#### Protection accessories

Description	For use with sensor	Reference	Weight kg
Threaded sleeve	Ø 30, threaded M30 x 1.5	XTA Z30	0.035

#### Fuses (for unprotected 2-wire ~ sensors)

Description	Type	Sold in lots of	Unit reference	Weight kg
Cartridge fuses 5 x 20	0.4 A "quick-blow"	10	XUZ E04	0.001
	0.63 A "quick-blow"	10	XUZ E06	0.001
	0.8 A "quick-blow"	10	XUZ E08	0.001

#### Fuse terminal block

Description	Sold in lots of	Unit reference	Weight kg
Fuse terminal block for 5 x 20 fuses, grey	50	AB1 FUSE435U5X	0.016

# Capacitive proximity sensors

## OsiSense XT

Cylindrical, non flush mountable. Plastic case

AC or DC supply

Characteristics									
Sensor type		M18			M30			Ø 32	
		XT2 18			XT2 30			XT2 32	
		4-wire ---	3-wire ---	2-wire ~	4-wire ---	3-wire ---	2-wire ~	2-wire ~	
<b>Product certifications</b>		CE							
<b>Conformity to standards</b>		IEC 60947-5-2							
<b>Connection</b>	Pre-cabled, length 2 m	-	•	•	-	•	•	•	
	Connector, M12	•	-	-	•	-	-	-	
<b>Main characteristics</b>									
<b>Nominal sensing distance Sn</b>	Conforming to IEC 60947-5-2	mm	8			15		20	
<b>Assured operating distance Sa</b>	Conforming to IEC 60947-5-2	mm	0...5.8			0...11		0...15	
<b>Adjustment zone</b>		mm	0...12			0...17		0...22	
<b>Repeat accuracy</b>			< 5% Sr						
<b>Differential travel</b>			< 1...20% Sr						
<b>Output characteristics</b>									
<b>Output state indication</b>			Yellow LED						
<b>Switching capacity</b>		mA	2 x 200	200	300	2 x 200	200	300	300
<b>Maximum switching frequency</b>		Hz	30	30	15	50	50	15	15
<b>Protection against short-circuits</b>			•	•	-(1)	•	•	-(1)	-(1)
<b>Voltage drop</b>		V	< 2.5	< 2.5	< 10	< 2.5	< 2.5	< 10	< 10
<b>Residual current, open state</b>		µA	≤ 100	≤ 100	-	≤ 100	≤ 100	-	-
<b>Delays</b>	First-up	ms	< 100	< 100	< 200	< 100	< 100	< 200	< 200
	Response	ms	< 15	< 15	< 30	< 15	< 10	< 30	< 30
	Recovery	ms	< 15	< 15	< 30	< 15	< 10	< 30	< 30
<b>Supply</b>									
<b>Rated supply voltage</b>		V	--- 12...24		~ 24...240 50/60 Hz	--- 12...24		~ 24...240 50/60 Hz	~ 24...240 50/60 Hz
<b>Voltage limits (including ripple)</b>		V	--- 10...30		~ 20...265	--- 10...30		~ 20...265	~ 20...265
<b>Current consumption, no-load</b>	24 V	mA	< 25	< 15	-	< 25	< 15	-	-
	240 V	mA	-	-	< 4	-	-	< 4	< 4
<b>Protection against reverse polarity</b>			Yes	Yes	-	Yes	Yes	-	-
<b>Environment</b>									
<b>Materials</b>	Case		Plastic						
	Cable		PVC						
	Number and c.s.a. of wires		-	3 x 0.34 mm <sup>2</sup>	2 x 0.5 mm <sup>2</sup>	-	3 x 0.34 mm <sup>2</sup>	2 x 0.5 mm <sup>2</sup>	2 x 0.5 mm <sup>2</sup>
<b>Degree of protection</b>	Conforming to IEC 60529		IP 67, double insulation ☐						
<b>Storage and operating temperature</b>		°C	- 10...+ 60						
<b>Vibration resistance</b>	Conforming to IEC 60068-2-6		10 gn, ± 1 mm (f = 10...55 Hz)						
<b>Shock resistance</b>	Conforming to IEC 60068-2-27		30 gn, 11 ms						
<b>Resistance to electromagnetic interference</b>									
	<b>Electrostatic discharges</b>	Conforming to IEC 61000-4-2	kV	8 (air) / 4 (contact)					
	<b>Radiated electromagnetic fields</b>	Conforming to IEC 61000-4-3	V/m	3					
	<b>Fast transients</b>	Conforming to IEC 61000-4-4	kV	2					

(1) These sensors do not incorporate overload or short-circuit protection and therefore, it is essential to connect a "quick-blow" fuse in series with the load (see page 4/12).

# Capacitive proximity sensors

OsiSense XT

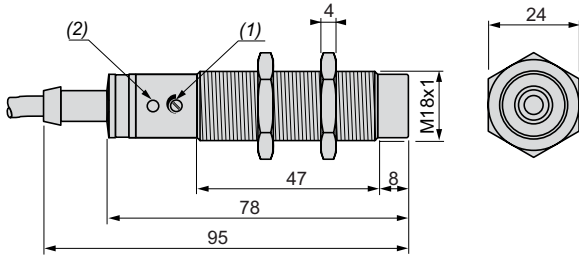
Cylindrical, non flush mountable. Plastic case

AC or DC supply

## Dimensions

### M18, pre-cabled

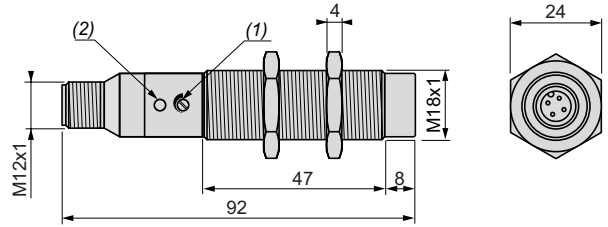
XT2 18A1●●L2



(1) Adjustment potentiometer  
(2) LED

### M18, M12 connector

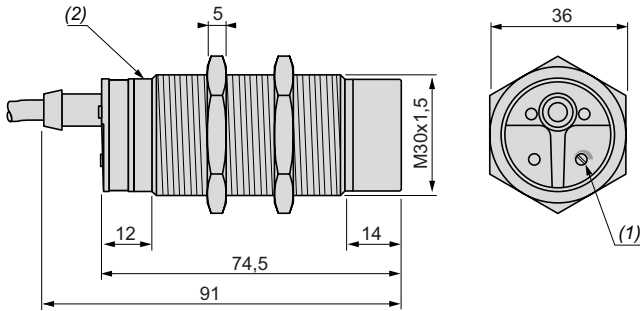
XT2 18A1PCM12



(1) Adjustment potentiometer  
(2) LED

### M30, pre-cabled

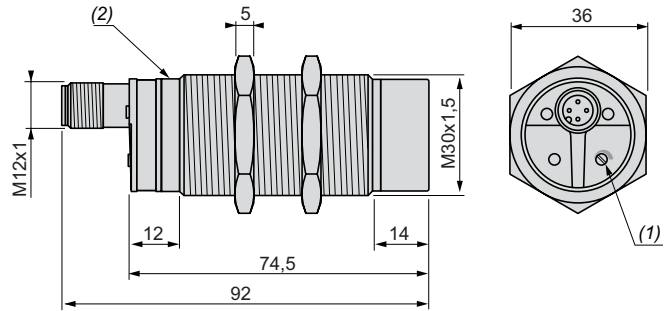
XT2 30A1●●L2



(1) Adjustment potentiometer  
(2) LED

### M30, M12 connector

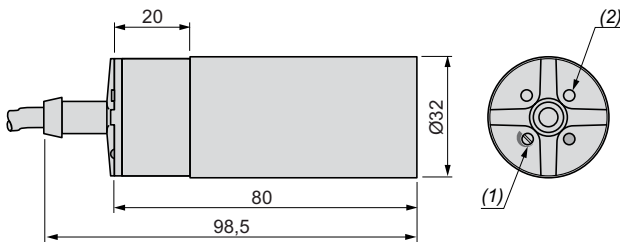
XT2 30A1PCM12



(1) Adjustment potentiometer  
(2) LED

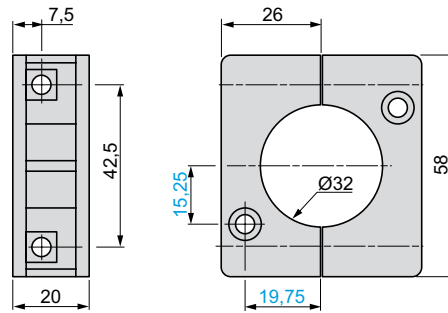
### Ø 32, plain, pre-cabled

XT2 32A1F●L2



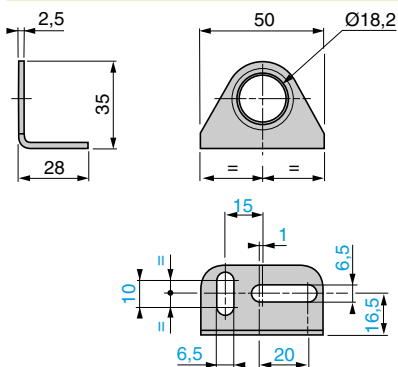
(1) Adjustment potentiometer  
(2) LED

### Mounting accessory (included with sensor XT2 32A1F●L2)

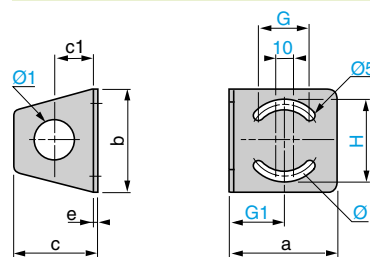


## Accessories

XUZ A118



XXZ 12, XXZ 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), schemes, adjustment, setting-up

## Capacitive proximity sensors

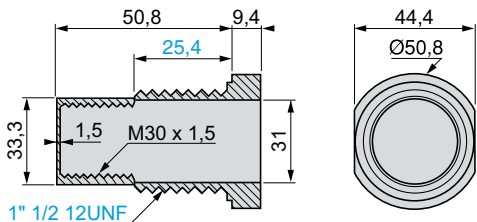
OsiSense XT

Cylindrical, non flush mountable. Plastic case

AC or DC supply

### Dimensions (continued)

XTA Z30



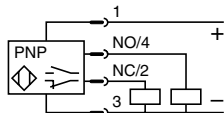
### Wiring schemes

#### Connector version

M12 connector

4-wire ~, PNP  
NO + NC output, M12

XT2 18/30●●●●M12

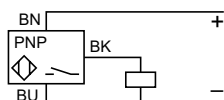


#### Pre-cabled version

Cable

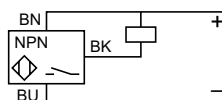
3-wire ~, PNP  
NO output

XT2 18/30A1PAL2



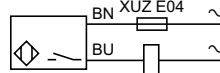
3-wire ~, NPN  
NO output

XT2 18/30A1NAL2



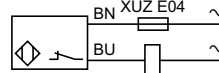
2-wire ~  
NO output

XT2 18/30/32A1FAL2



2-wire ~  
NC output

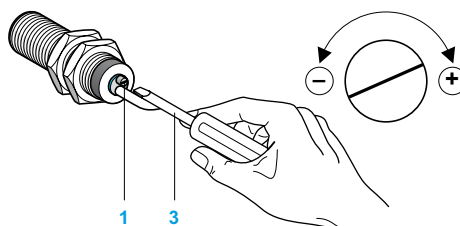
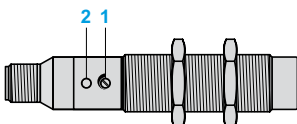
XT2 30/32A1FBL2



BU: Blue  
BN: Brown  
BK: Black  
WH: White

### Adjustment

#### Sensitivity adjustment



- 1 Adjustment potentiometer
- 2 LED
- 3 Adjustment using suitable screwdriver (included with sensor)

Adjustment from the side for **XT2 18A1**

Adjustment from the rear for **XT2 30A1**  
**XT2 32A1**

### Setting-up

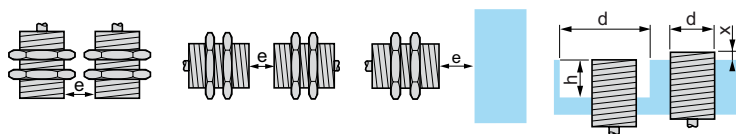
Minimum mounting distances (mm)

Side by side

Face to face

Facing a metal object

Mounted in support



XT2 M18 non flush mountable

$e \geq 40$

$e \geq 6$  Sn

$e \geq 3$  Sn

$d \geq 60$   $h \geq 20$

XT2 M30 non flush mountable

$e \geq 60$

$e \geq 6$  Sn

$e \geq 3$  Sn

$d \geq 90$   $h \geq 30$

XT2 Ø 32 non flush mountable

$e \geq 65$

$e \geq 6$  Sn

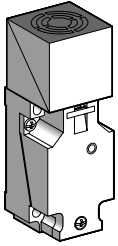
$e \geq 3$  Sn

$d \geq 100$   $h \geq 30$

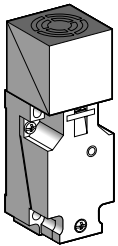
Fixing nut tightening torque: **XT2 18:** 3 N.m, **XT2 30:** 8 N.m

# Capacitive proximity sensors

OsiSense XT  
For detection of insulated materials  
40 x 40 x 117 format.  
Plastic case, plug-in. Turret head  
AC or DC supply



XT7 C40●C440



XT7 C40●●262

## Sensors flush mountable in support

### 3-wire $\sim$ 12...48 V flush mountable

Sensing distance (Sn) mm	Function	Output	Reference	Weight kg
15	NO + NC	PNP	XT7 C40PC440	0.220
		NPN	XT7 C40NC440	0.220

### 2-wire $\sim$ 24...240 V (50/60 Hz) flush mountable

Sensing distance (Sn) mm	Function	Reference	Weight kg
15	NO or NC via programming	XT7 C40FP262	0.220

## Accessories

### Fuses (for unprotected 2-wire $\sim$ sensors)

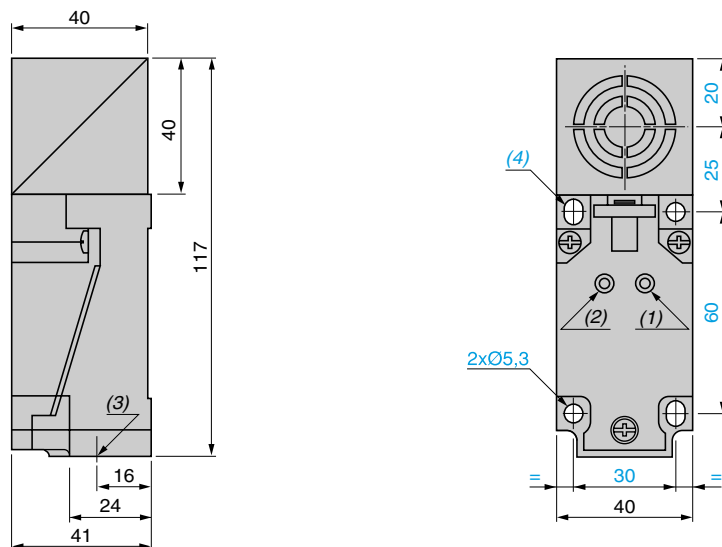
Description	Type	Sold in lots of	Unit reference	Weight kg
Cartridge fuses 5 x 20	0.4 A "quick-blow"	10	XUZ E04	0.001
	0.63 A "quick-blow"	10	XUZ E06	0.001
	0.8 A "quick-blow"	10	XUZ E08	0.001

### Fuse terminal block

Description	Sold in lots of	Unit reference	Weight kg
Fuse terminal block for 5 x 20 fuses, grey	50	AB1 FUSE435U5X	0.016

## Dimensions

### XT7 C40●●●●●



- (1) Output LED
- (2) Supply LED (depending on model)
- (3) 1 tapped entry for 13P cable gland
- (4) 2 elongated holes  $\varnothing$  5.3 x 7



# Capacitive proximity sensors

OsiSense XT  
For detection of insulated materials  
40 x 40 x 117 format.  
Plastic case, plug-in. Turret head  
AC or DC supply

Characteristics		XT7 C40●C440	XT7 C40FP262
Sensor type			
Connection		Screw terminals, clamping capacity 4 x 1.5 mm <sup>2</sup> (1)	Screw terminals, clamping capacity 3 x 1.5 mm <sup>2</sup> (1)
Degree of protection	Conforming to IEC 60529	IP 67	
Operating zone	mm	0...10.8	
Repeat accuracy		≤ 0.1 Sr	
Product certifications		UL, CSA, CE	
Differential travel		≤ 0.2 Sr	
Operating temperature	°C	-25...+70	
Output state indication		Yellow LED: output Green LED: supply	Yellow LED: output
Rated supply voltage	V	~ 12...48	~ 24...240 (50/60 Hz)
Voltage limits (including ripple)	V	~ 10...58	~ 20...264
Switching capacity	mA	0...200 with overload and short-circuit protection	5...350 (2 A inrush) (2)
Voltage drop, closed state	V	≤ 2	≤ 5.5
Residual current, open state	mA	–	≤ 1.5
Current consumption, no-load	mA	≤ 10	–
Maximum switching frequency	Hz	100	25
Delays	First-up	ms	≤ 30
	Response	ms	≤ 5
	Recovery	ms	≤ 5

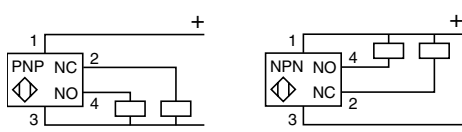
(1) Cable gland not included with sensor. For suitable 13P cable gland, see page 3/110.

(2) These sensors do not incorporate overload or short-circuit protection and therefore, it is essential to connect a "quick-blow" fuse in series with the load (see page 4/12).

## Wiring schemes

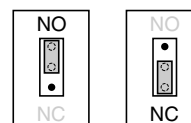
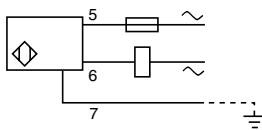
### 3-wire ~

NO + NC output



### 2-wire ~ programmable

NO or NC output, depending on position of link

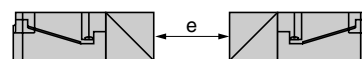
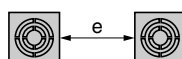


## Setting-up

Minimum mounting distances (mm)

Side by side

Face to face

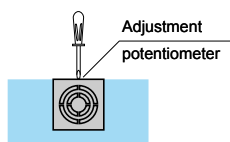


XT7 flush mountable

e ≥ 40

e ≥ 120

### Flush mounting



To avoid interference by the immediate surroundings, it may be necessary to reduce the sensitivity when flush mounting the sensor.