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OsiSense XU

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Photo-electric sensors
OsiSense XU General purpose
Single mode or multimode function

Format			Design 18	
			Metal	Plastic
Single mode function				
Sensing distance (m) related to system	Diffuse with adjustable sensitivity			
	Diffuse		Type: XUB 5B — Sensing distance (m): 0.6	Type: XUB 5A — Sensing distance (m): 0.6
	Polarised reflex		XUB 4B — 0.1	XUB 4A — 0.1
	Reflex		XUB 9B — 2	XUB 9A — 2
	Thru-beam		XUB 1B — 4	XUB 1A — 4
			XUB 2B — 15	XUB 2A — 15
Type reference			**XUB ●B** *(1)*	**XUB ●A** *(1)*
Pages			5/26	5/28
Multimode function				
Sensing distance (m) related to system	Diffuse with background suppression		Type: XUB 0B — Sensing distance (m): 0.12	Type: XUB 0A — Sensing distance (m): 0.12
	Diffuse		0.30	0.30
	Polarised reflex		2	2
	Thru-beam		15	15
Type reference			**XUB 0B** *(1)*	**XUB 0A** *(1)*
Pages			5/30	5/30
High performance diffuse with adjustable background suppression			Type: – — Sensing distance (m):	Type: – — Sensing distance (m):
Type reference			–	–
Pages			–	–
Characteristics				
Dimensions (w x h x d) in mm			Ø 18, threaded M18 x 1. XUB●A/XUB●B: length 46 (62 for XUB 5 and connector version) XUB 0A/XUB 0B: length 62 (pre-cabled version) or length 78 (connector version)	
Case	Materials	Plastic, PBT	–	●
		Nickel plated brass	●	–
		Stainless steel	● (XUB 0S: see page 5/86)	–
Degree of protection			IP 65, IP 67 IP 69K (XUB 0S, stainless steel case, see page 5/86)	IP 65, IP 67
Supply	⎓ 3-wire (PNP/NPN)		●	●
	≂ 5-wire, relay output		(2-wire XU● M18, see page 5/150)	–
Function	NO		●	●
	NC		●	●
	NO/NC		–	–
	NO + NC		–	–
Connection	Pre-cabled (L = 2 m) *(2)*		●	●
	Connector	M8 (4-pin) ⎓ 3-wire	–	–
		M12	●	●
	Screw terminals		–	–
	Remote connector		M8 and M12 remote connectors available: please consult our Customer Care Centre.	

(1) Sensors also available with line of sight 90° to case axis.
(2) Cable lengths of 5 and 10 m also available, depending on model.

Photo-electric sensors
OsiSense XU General purpose
Single mode or multimode function

Miniature design	*Compact design, 50 x 50*	*Compact design, 92 x 71*
Plastic	**Plastic**	**Plastic**

Type	**Sensing distance** (m)
XUM 5A	1 (with adjustable sensitivity)
–	
XUM 9A	5 (with adjustable sensitivity)
–	
XUM 2A	15 (with adjustable sensitivity)
XUM ●A	
5/32	

Type	**Sensing distance** (m)
XUK 5A	1 (with adjustable sensitivity)
–	
XUK 9A	5
XUK 1A	7
XUK 2A	30
XUK ●A	
5/38	

Type	**Sensing distance** (m)
XUX 5A	2 (with adjustable sensitivity)
–	
XUX 9A	11 (with adjustable sensitivity)
XUX 1A	14 (with adjustable sensitivity)
XUX 2A	40 (with adjustable sensitivity)
XUX ●A	
5/44	

Type	**Sensing distance** (m)
XUM 0A	0.10
	0.4
	3
	10
XUM 0A	
5/36	

Type	**Sensing distance** (m)
XUK 0A	0.28
	0.8
	4
	30
XUK 0A	
5/40	

Type	**Sensing distance** (m)
XUX 0A	1.3
	2
	11
	40
XUX 0A	
5/46	

Type	**Sensing distance** (m)
–	
–	
–	

Type	**Sensing distance** (m)
XUK 8	1 m
XUK 8	
5/42	

Type	**Sensing distance** (m)
XUX 8	2 m
XUX 8	
5/48	

XUM ● A: 11 x 34 x 20 (pre-cabled) or 11 x 43 x 20 (M8) XUM 0A: 12 x 34 x 20 (pre-cabled) or 12 x 45 x 20 (M8)	18 x 50 x 50	31 x 92 x 77
●	●	●
–	–	–
–	–	–
IP 65, IP 67	IP 65	IP 65, IP 67
●	●	●
–	●	●
–	●	●
–	●	●
● configurable using switch and by programming (XUM 0A)	● by programming (XUK 0A and XUK 8)	● by programming (XUX 0A and XUX 8)
–	● relay output	● relay output
●	●	–
●	–	–
–	●	●
–	–	●

M8 and M12 remote connectors available: please consult our Customer Care Centre.

Photo-electric sensors
OsiSense XU Application
Fork and frame form

Recommended applications		Detection of objects on small conveyors	Detection of labels on strip. Detection of sheet feed on printing machine	Detection on vibrating rail. Detection of transparent objects
Format		Optical fork	Optical fork	Laser optical fork
Dimensions (w x h x d) in mm		Passageway: 30 to 180 Depth: 30, 60, 95	Passageway: 2 to 120 Depth: 42, 59, 95	
Case		Metal	Metal	Metal
Sensing distance (mm) related to system	Diffuse with background suppression	–	–	–
	Diffuse	–	–	–
	Polarised reflex	–	–	–
	Reflex	–	–	–
	Thru-beam	2...180 *(2)*	2... 120 *(1)* *(2)*	2... 120 *(1)* *(2)*
Degree of protection		IP 65, IP 67	IP 65	IP 65
Supply	⎓	●	●	●
	~	–	–	–
	≂	–	–	–
Output		PNP/NPN NO/NC	PNP/NPN *(3)* NO/NC *(4)*	PNP/NPN *(3)* NO/NC *(4)*
Connection	Pre-cabled	●	–	–
	Connector	●	●	●
	Screw terminals	–	–	–
Type reference		**XUV R● XUV A●**	**XUY FNEP● XUY FANEP●**	**XUY FLNEP● XUY FALNEP●**
Pages		5/50	5/52	5/54

(1) With or without teach mode, depending on model.
(2) Depending on model.
(3) Depending on wiring.
(4) By programming.

5

Photo-electric sensors
OsiSense XU Application
Fork and frame form

Detection of transparent labels	**Detection of opaque labels, of different colours**	**Detection of opaque labels**	**Detection of flags in lifts and transtockers. Integrated amplifier**	**Material handling: detection and counting of objects being fed to or exiting a machine**
Ultrasonic fork	Optical fork	Optical fork	Optical fork	Frame design
16 x 47.3 x 90.5	20 x 90 x 26	12 x 37.5 x 80	14 x 58 x 68	15 x 50 x 108 15 x 86 x 131 25 x 230 x 205/265/335
Metal	Metal	Metal	Plastic	Metal
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
3	2	3 or 5 *(2)*	3	3, 6, 12,18, 25 *(2)*
IP 65	IP 65	IP 65	IP 54	IP 65
●	●	●	●	●
–	–	–	–	–
–	–	–	–	–
PNP and NPN NO/NC *(4)*	PNP and NPN NO/NC *(4)*	PNP and NPN NO/NC *(4)*	Solid-state (PNP or NPN NO	PNP and NPN NO/NC *(3)*
–	–	–	●	–
●	●	●	–	●
–	–	–	–	–
XUV U06	**XUV K**	**XUY FA98●**	**XUV H** **XUV J**	**XUV F**
5/56	5/58	5/60	5/62	5/64

Photo-electric sensors
OsiSense XU Application

Recommended applications	Packaging				
	Colour mark readers Detection of reference marks, contrasting colours and markings on packaging, printing, labelling machines, etc.	**Colour mark readers** Detection of reference marks on packaging paper, tubes	**Colour mark readers** Detection of reference marks, contrasting colours and markings on packaging, printing, labelling machines, etc.	**Lumines-cence sensors** Detection of invisible reference marks, markings, adhesives, varnishes, etc. Sensitive to the bluing agents generally present in inks, adhesives, varnishes, etc.	**Illumination sensors** Verifying operation of indicator lights

Format		Compact design	Fibre design	Compact design	Design 18	Fibre design
Dimensions (w x h x d) in mm		50 x 50 x 15	13 x 72 x 30	31 x 81 x 58	Ø 18, threaded, M18 x 1 L: 82	13 x 76.7 x 30
Case		Plastic	Plastic	Metal		Plastic
Sensing distance (m) related to system	Diffuse with background suppression	–	–	–	–	Sensing distance depending on fibre used
	Diffuse	0.019	●	0.009	0.02	
	Polarised reflex	–	–	–	–	
	Reflex	–	–	–	–	
	Thru-beam	–	–	–	–	
Degree of protection		IP 65	IP 65	IP 67	IP 67	IP 65
Supply	⎓	●	●	●	●	●
	∿	–	–	–	–	–
	≂	–	–	–	–	–
Output		Solid-state (PNP or NPN)			Solid-state (PNP)	PNP/NPN NO/NC programmable
Connection	Pre-cabled	–	–	–	–	–
	Connector	●	●	●	●	●
	Screw terminals	–	–	–	–	–
Type reference		**XUK R**	**XUY DCF ●●966S**	**XUR K**	**XU5 M**	**XUY AFL ●●966S**
Pages		5/66	5/68	5/70	5/72	5/74

Photo-electric sensors
OsiSense XU Application

Packaging					Food and beverage processing	
Detection of any transparent object Bottle, flask, containers, film, etc.		**For detection of colours, sorting** Recognises colours for sorting or checking parts		**Detection of water and aqueous liquids** Level in opaque flasks etc.	**STAINLESS STEEL cylindrical sensor (grade 304 CU)** For use in vicinity of food or beverage processing machines	
Design 18	Compact design, 50 x 50	Compact design	Compact design or fibre design	Compact design	Design 18	Design 18
Ø 18, threaded, M18 x 1 L: 64, 78 or 92	18 x 50 x 50	50 x 50 x 25	30 x 80 x 57 25 x 92 x 54	13 x 47 x 23	Ø 18, threaded, M18 x 1 L: 64...92	Ø 18, threaded, M18 x 1 L: 62...88
Plastic or stainless steel *(2)*	Plastic	Plastic	Metal	Plastic	Stainless steel	Stainless steel
–	–	–	–	–	0.12	–
–	–	0.020	0.040…0.060 0.040…0.250 *(1)*	–	0.3	0.10
0...10.4 (with reflector)	–	–	–	–	2	2
–	1.5	–		–	–	4
–	–	–	–	50	15	15
IP 65 IP 67	IP 65	IP 65	IP 65 *(2)* IP 67 *(2)*	IP 65	IP 67, IP 69K	IP 67
●	●	●	●	●	●	●
–	–	–	–	–	–	–
–	–	–	–	–	–	–
Solid-state (PNP or NPN)				Solid-state (PNP or NPN)	Solid-state (PNP and NPN)	Solid-state (PNP and NPN)
●	●	–	●	●	●	●
●	●	●	–	–	●	●
–	–	–	–	–	–	–
XUB T	**XUK T**	**XUK C**	**XUR C**	**XUM W**	**XUB 0S●**	**XU● N18**
5/76	5/78	5/80	5/82	5/84	5/86	5/88

(1) Depending on fibres used.
(2) Depending on model.

Photo-electric sensors
OsiSense XU Application

Recommended applications	Assembly	Conveying	Assembly and machine tools	Conveying and assembly
	Diameter 8 metal range	Detection of objects on conveyor and access control	Miniature, metal	Miniature, laser with teach mode
Format	Design 8	Miniature design	Miniature design	Miniature design
Dimensions (w x h x d) in mm	Ø 8, threaded, M8 x 1 L: 40	20 x 32 x 13 10 x 40 x 13.5	16.2 x 41.15 x 29.5	12 x 32 x 20
Case	Metal	Plastic	Metal	Plastic
Sensing distance (m) related to system – Diffuse with background suppression	–	●	–	●
Diffuse	0.05	●	●	–
Polarised reflex	–	●	●	●
Reflex	–	–	–	–
Thru-beam	2	●	●	–
Degree of protection	IP 65 *(2)* IP 67 *(2)*	IP 65 and IP 67	IP 65 IP 67 IP 69K	IP 67
Supply ⎓	●	●	●	●
∿	–	–	–	–
⎓/∿	–	–	–	–
Output	Solid-state (PNP or NPN)	PNP or NPN NO/NC *(1)*	PNP or NPN NO/NC	PNP
Connection – Pre-cabled	●	●	●	●
Connector	●	●	–	●
Screw terminals	–	–	–	–
Type reference	**XUA**	**XUY●●989**	**XUM●B**	**XUY●●●929**
Pages	5/92	5/94	5/96	5/100

(1) Depending on wiring.
(2) Depending on model.

Photo-electric sensors
OsiSense XU Application

Material handling						
Laser	**Diffuse with analogue output** Measurement, servo control, position control, eccentricity monitoring, concentricity monitoring, etc.	**Thru-beam with high excess gain** Detection of objects in difficult environments (smoke, dust, mist, etc.). Measuring opacity	**Laser transmission** Monitoring dimensions in series, monitoring roundness of a wheel	**Diffuse with background suppression, laser transmission** High precision, detection of any dark or shiny object, including small sized	**Diffuse with 2 channels using triangulation, with background suppression**
Design 18	Compact design	Design 18	Design 18	Compact design, 50 x 50	Compact design	Compact design
Ø 18, threaded M18 x 1	27 x 85 x 61	Ø 18, threaded M18 x 1 L: 82	Ø 18, threaded M18 x 1 L: 82	17 x 50 x 50	18 x 60 x 60	18 x 60 x 60
Plastic or brass *(2)*	Plastic	Metal	Metal	Plastic	Plastic	Plastic
–	–	–	–	–	Adjustable from 50 to 300 mm	Adjustable from 50 to 600 mm
–	0.20…0.80	0.05…0.4	–	●	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
0...100 with teach mode	–	–	50	–	–	–
IP 67	IP 67	IP 67	IP 67	IP 67	IP 65	IP 65
●	●	●	●	●	●	●
–	–	–	–	–	–	–
–	–	–	–	–	–	–
PNP, NPN NO/NC by programming	Analogue (PNP)		Solid-state (PNP) + analogue	Solid-state (PNP) + analogue	PNP and NPN NO/NC depending on wiring	PNP and NPN NO/NC programmable
●	–	–	–	–	–	●
●	–	●	●	●	●	●
–	●	–	–	–	–	–
XUB L	**XUJ**	**XU5 M**	**XU2 M**	**XUY P●●925**	**XUY PS1●**	**XUY PS2●**
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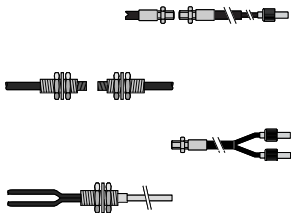
Photo-electric sensors
OsiSense XU Application

Recommended applications	Amplifier and fibre optics				
	Amplifier, teach mode	**"Plastic" fibre optics with end fittings**	**"Glass" fibre optics with end fittings**	**Ecofibre concept** Bare fibre optics and end fittings supplied separately for customer assembly	**Amplifier, teach mode or potentiometer**
					
Format	Fibre design	–	–	–	Fibre design
Dimensions (w x h x d) in mm	10 x 40 x 65 (amplifier)	Length *(1)* : 1 m, 2 m or 10 m	Length *(1)* : 0.60 m, 1 m, 1.5 m or 2 m	Length *(1)* : 1 m, 10 m or 50 m	13 x 72.2 x 30 13 x 76.7 x 30
Case	Plastic	Plastic	Glass	Plastic	Plastic
Sensing distance (m) related to system – Diffuse with background suppression	–	–	–	Sensing distance: 70 mm to 4000 mm *(1)*	Sensing distance depending on fibre used
Diffuse	0.006 to 0.095 *(2)*	6 to 95 *(1)*	80		
Polarised reflex	–	–	–		
Reflex	–	–	–		
Thru-beam	0.050 to 2 *(2)*	30 to 2500 *(1)*	80 or 200 *(1)*		
Degree of protection	IP 65 (amplifier) IP 64 (fibres)	IP 64, IP 641 *(1)* IP 65, IP 651 *(1)*	–	–	IP 65
Supply ⎓	●	–	–	–	●
∼	–	–	–	–	–
⎓/∼	–	–	–	–	–
Output	Solid-state (PNP or NPN) *(3)* NO or NC (programmable)	–	–	–	PNP/NPN NO/NC dpg. on wiring or programmable dpg. on model
Connection Pre-cabled	●	–	–	–	●
Connector	●	–	–	–	●
Screw terminals	–	–	–	–	–
Type reference	**XUD A**	**XUF**	**XUY FV●**	**XUY A●** **XUY FP●**	**XUY AF●966** **AF●946**
Pages	5/116	5/118	5/128	5/134	5/136

(1) Depending on model.
(2) Depending on fibre.
(3) Depending on wiring.

Photo-electric sensors
OsiSense XU Application

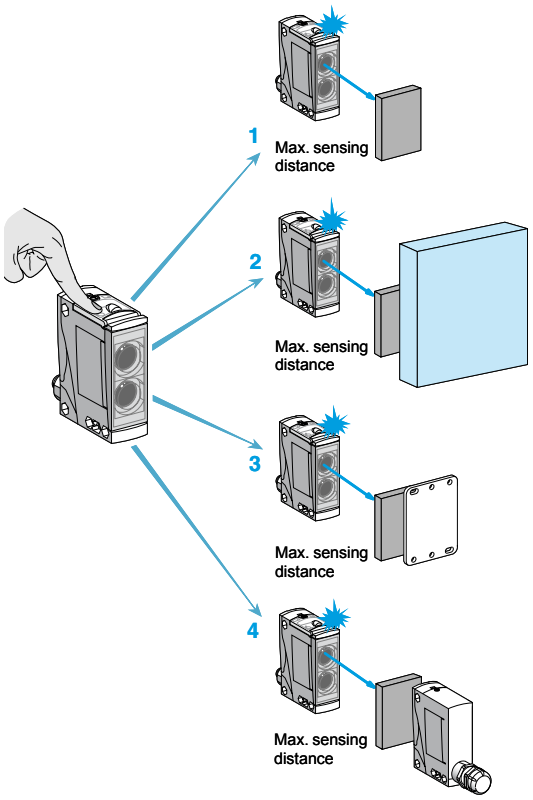
Other formats			Ø 18 AC/DC	Building, tertiary sectors	Accessories
With stability LED. With alarm output (for XUC ●AK only)	**Conveying**	**Conveying**	**2-wire AC or DC supply**	**Monitoring of movement, relay output With audible signalling (buzzer)** *(1)*	**Reflectors, fixing clamps, mounting and adjustment accessories, etc.**
Compact design	Compact design	–	Design 18	Compact design	Accessories
45 x 95 x 44	18 x 70 x 35	29 x 95 x 60	Ø 18, threaded M18 x 1 L: 82...110	18 x 50 x 50 (XUK 1AR) 18 x 70 x 45 (XUL) 27 x 85 x 61 (XUJ B)	–
Plastic	Plastic	Plastic	Metal	Plastic	–
1.2	–	–	0.12	–	–
–	0.7	1.5 or 4 *(2)*	0.4	–	–
6	4 (with Ø 80 mm reflector)	6 or 10 *(2)*	2	–	–
–	6 (with Ø 80 mm reflector)	–	–	7 with 50 x 50 reflector (XUK 1AR) 6 (XUL and XUJ B)	–
50	8	●	15	–	–
IP 67 and NEMA 4X	IP 67	IP 65 and IP 67	IP 67	IP 65 (XUK 1AR) IP 67 (XUL) IP 40 (XUJ B)	–
●	●	●	–	–	–
–	●	●	–	–	–
●	–	–	●	●	–
Solid-state - PNP or NPN (XUC ●AK) 1 CO relay (XUC ●AR)	Solid-state PNP or NPN	PNP/NPN Relay NO/NC programmable	Solid-state	1 NO/NC programmable relay (XUK 1AR and XUL) 1 NO relay (XUJ B)	–
●	●	–	●	● (XUK 1AR and XUL)	–
●	●	–	●	–	–
–	–	●	–	● (XUJ B)	–
XUC	**XUL**	**XUY ● 952/954**	**XU● M18**	**XUK 1AR, XUL, XUJ B** *(1)*	**XUZ●**
5/138	5/142	5/148	5/150	5/152, 5/154, 5/156	5/158

*(1) With audible signalling (buzzer): reference **XUJ B**, see page 5/156.*
(2) Depending on model.

Photo-electric sensors

OsiSense XU

Multimode: Simplicity through innovation



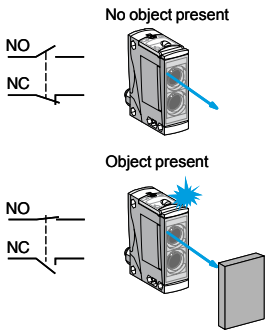
Principle

In proposing multimode products, Schneider Electric offers simplicity through innovation.

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

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

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

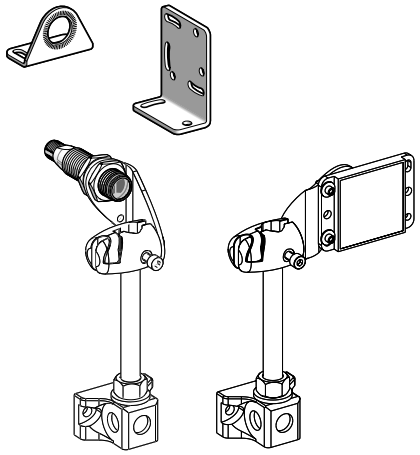


Straightforward NO or NC output

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

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

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



Fixing accessories

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

Photo-electric sensors

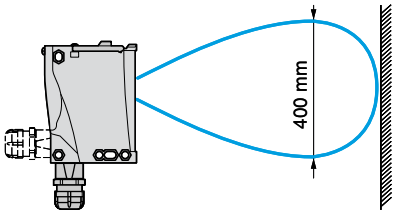
OsiSense XU

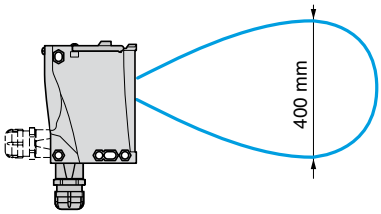
Multimode: Simplicity through innovation

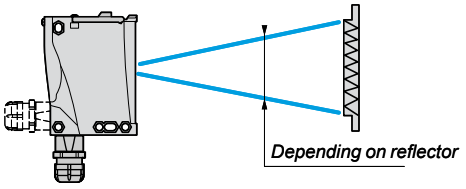
Design

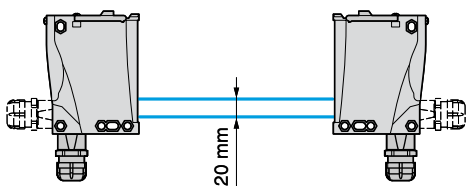
		Cylindrical 18	Miniature	Compact 50 x 50	Compact 92 x 77
Dimensions (w x h x d) in mm		M18 x 64	12 x 34 x 20	18 x 50 x 50	30 x 92 x 77
Maximum sensing distance in m	Without accessory with background suppression	0.12	0.10	0.28	1.3
	Without accessory	0.4	0.55	1.2	3
	With polarised reflector	3	4	5.7	15
	With thru-beam accessory	20	14	35	60
Supply	⎓ Solid-state output	■	■	■	■
	∿ Relay output	–	–	■	■
Connection	Pre-cabled	■	■	■	–
	Connector	■	■	■	■
	Screw terminals	–	–	–	■
Sensor type		**XUB 0**	**XUM 0**	**XUK 0**	**XUX 0**
Pages		5/30	5/36	5/40	5/46

Sensing distances (see table above)









Sensing distance without accessory with background suppression

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

Sensing distance without accessory

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

Sensing distance with polarised reflector

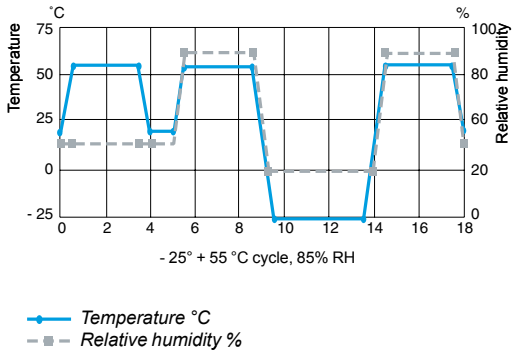
- By installing a reflector opposite, the same multimode sensor detects objects irrespective of their shininess and colour.
- The size of the reflector must be smaller than that of the object to be detected.
- The larger the area of the reflector the longer the sensing distance.

Sensing distance with thru-beam transmitter accessory

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

Photo-electric sensors
OsiSense XU

Standards and certifications
Parameters related to the environment



Recommendation

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

Quality control

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

■ **Qualification**

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

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

■ **Production**

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

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

■ **Customer returns**

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

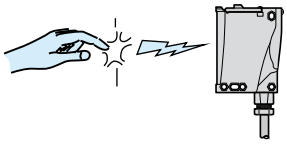
Immunity to ambient light

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

Resistance to electromagnetic interference

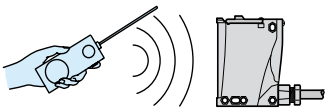
The photo-electric sensors are tested in accordance with the recommendations of the standard IEC 60947-5-2

■ Electrostatic discharges



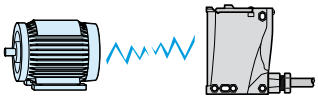
IEC/EN 61000-4-2
≂ 15 kV version, level 4
⎓ 8 kV version, level 3

■ Radiated electromagnetic fields (electromagnetic waves)



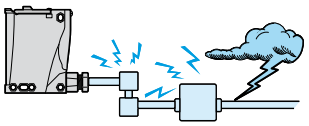
IEC/EN 61000-4-3
10 V/metre, level 3

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



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

■ Impulse voltages, lightning



IEC 60947-5-2
≂ 2.5 kV version
⎓ 1 kV version

Mechanical shock resistance

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

Vibration resistance

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

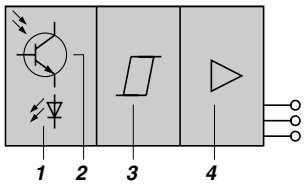
Resistance to chemicals in the environment

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

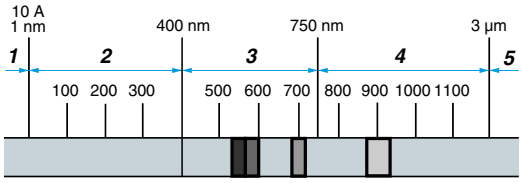
■ To ensure lasting efficient operation, it is essential that any chemicals coming into contact with the sensors will not affect their casing and, in doing so, prevent their reliable operation (please refer to the characteristics pages for the various sensors).
In all cases, the materials selected (see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

Photo-electric sensors
OsiSense XU

Principle of optical detection

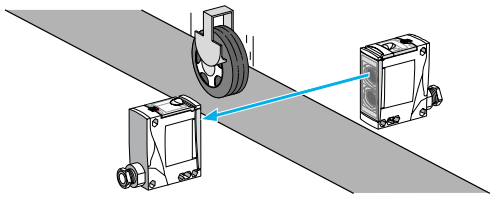


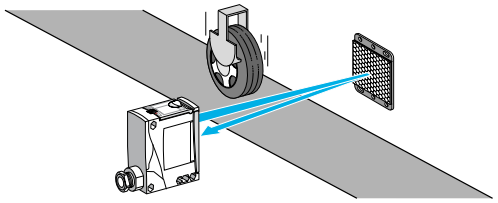
1 *Light beam transmitter*
2 *Light beam receiver*
3 *Signal processing stage*
4 *Output stage*

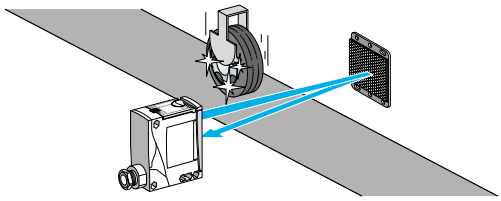


***1** X rays, **2** Ultraviolet, **3** Visible light,*
***4** Near infrared, **5** Far infrared*

Detection systems







Composition of a photo-electric sensor

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

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

Light spectrum

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

Modulation

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

Thru-beam system or multimode with thru-beam accessory

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

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

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

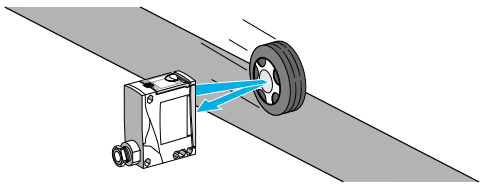
Polarised reflex system or multimode with reflector accessory

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

■ **Operating precautions**
□ When several sensors are used, they must be aligned in such a manner that no sensor is disrupted by another sensor.
□ For short distance detection use a reflector with large trihedrons, type XUZ C24.
□ For long distance detection use a reflector XUZ C50 or XUZ C80.
□ To increase the sensing distance use reflector XUZ C100.
□ If reflective tape is used, use rolls of tape XUZ B1 or XUZ B15 which are specially adapted for polarised reflex systems.

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

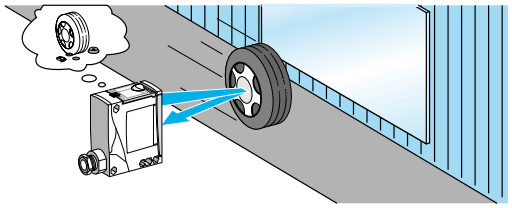
Detection systems *(continued)*



Diffuse system or multimode

■ **Advantage**
□ Only one unit to be wired.
■ **Drawbacks**
□ Short sensing distance.
□ Sensitivity to object or background colour differences.
□ Object sighting line difficult since the sensor transmits in the infrared range (invisible).
■ **Operating precautions**
□ When several sensors are used, they must be aligned in such a manner that no sensor is disrupted by another sensor.
■ **Advantages of a multimode sensor**
□ Easy alignment:
- the sensor transmits in the visible red range during the alignment phase,
- 3 LEDs providing setting-up assistance,
- the anti-interference function enables 2 sensors to be used without specific alignment precautions.

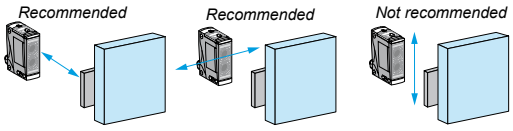
□ Refined detection: the position of the object can be detected using the teach mode.



Diffuse, with or without background suppression, system or multimode

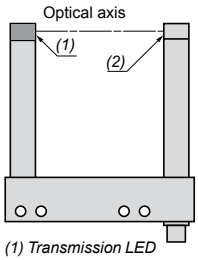
■ **Advantages**
□ Only one unit to be wired.
□ Detection not affected by colour of object or background.
■ **Drawbacks**
□ Short sensing distance.
□ Object sighting line difficult since the sensor transmits in the infrared range (invisible).
■ **Operating precautions**
□ Detection can be affected by the object's direction of movement. To overcome this phenomenon (the hat effect), it is recommended that the sensor is mounted so that the object simultaneously breaks the beam of both lenses.
□ When several sensors are used, they must be aligned in such a manner that no sensor is disrupted by another sensor.
■ **Advantages of a multimode sensor**
□ Easy alignment:
- the sensor transmits in the visible red range during the alignment phase,
- 3 LEDs providing setting-up assistance,
- the anti-interference function enables 2 sensors to be used without specific alignment precautions,
- the hat effect is minimised using the background teach mode.

□ Refined detection: the position of the object can be detected using the teach mode.



Positioning recommendations for sensor with background suppression

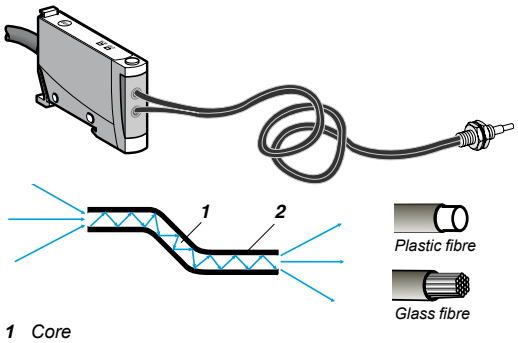
Specific systems



(1) Transmission LED
(2) Output LED

Optical forks

■ Constructed from metal, the optical fork is a robust sensor that is particularly suited to conveying and packaging applications and detection of labels.
■ Rugged optical detection device **not requiring alignment** in thru-beam mode.
■ The beam from the transmitter limb is transmitted to the receiver limb. Due to its construction, **only one connection** is required as opposed to two for a traditional thru-beam function.
■ The transmission sources are LEDs of various technologies:
□ Red for much improved efficiency during adjustment and maintenance
□ Red laser for detection of transparent materials or very small parts
□ Infrared, particularly for optical frames
□ Ultrasonic for detection of transparent labels (clear on clear)
■ The beam is adjustable or fixed depending on the version. Adjustment enables the sensitivity to be altered and, therefore, detection of small parts down to dimensions of less than tenths of millimetres (minimum size of detectable object: 0.05 mm).
■ The high switching frequency (from 4 kHz up to 25 kHz) is very useful in industrial applications involving high operating rates.



1 *Core*
2 *Sheath*

Fibre optics

■ The fibre acts as a light conductor. Light rays entering the fibre at a certain angle are conveyed to the required location, with minimum loss.
■ Separate amplifier.
□ Size kept to minimum.
□ This system enables detection of very small objects (approximately 1 mm).
□ And, detection is very precise.

Plastic fibres
The core of the fibre is flexible plastic (PMMA). In general, there is only a single fibre of diameter 0.25 to 1 mm, depending on the model.
□ Fibres are used with amplifiers transmitting red light.
□ Minimum bend radius:
- 10 mm for fibres with 0.25 mm diameter core,
- 25 mm for fibres with 1 mm diameter core.

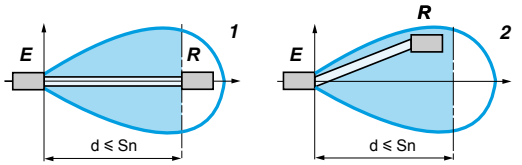
■ Advantages: fibres can be cut to the required length.

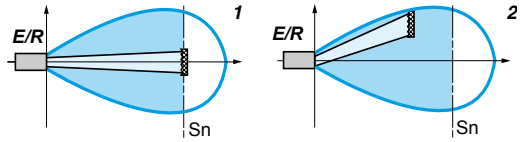
Glass fibres
□ The core of the fibre is silica. For maximum flexibility, each fibre comprises numerous strands that are approximately 50 µ in diameter.
□ Fibres are used with amplifiers transmitting infrared or red light.
□ Minimum bend radius:
- 10 mm with plastic sheath,
- 90 mm with stainless steel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

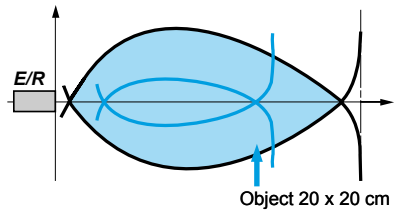
■ **Advantages**
□ Fibres suitable for use at high temperatures (250 °C).
□ Fibres with stainless steel sheath provide protection against mechanical impact and crushing.

Photo-electric sensors
OsiSense XU

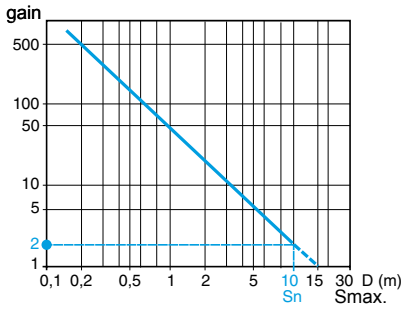
Detection curves



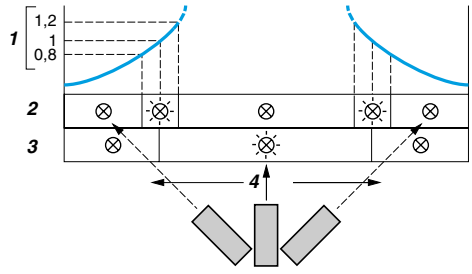




Excess gain



Optical alignment aid



Detection distance using reflector

Thru-beam system

■ The ▭ zone indicates the positioning tolerance of the receiver.
■ The ▭ zone represents the usable sensing zone of the system. Any opaque object entering this zone breaks the beam and causes the sensor's output to change state.
1 *Ideal detection*
2 *Acceptable detection*
T *= transmitter*
R *= receiver*

Polarised reflex system

■ The ▭ zone indicates the positioning tolerance of the reflector.
■ The ▭ zone represents the usable sensing zone of the system. Any opaque object entering this zone breaks the beam and causes the sensor's output to change state.
1 *Ideal detection*
2 *Acceptable detection*
T *= transmitter*
R *= receiver*

Diffuse, with or without background suppression, system

■ The ▭ zone represents the sensor's sensitivity zone.
All of this zone is usable: any object that is adequately reflective entering this zone, in the direction of the arrow, will cause the sensor's output to change state. The black line corresponds to a light colour surface and the blue line to a darker colour surface.
■ A test using the object to be detected will determine the zone of sensitivity in relation to its reflection coefficient.
——— White 90% object
——— Grey 18% object
For specific aspects of diffuse systems see page 5/16.
T *= transmitter*
R *= receiver*

Operating margin

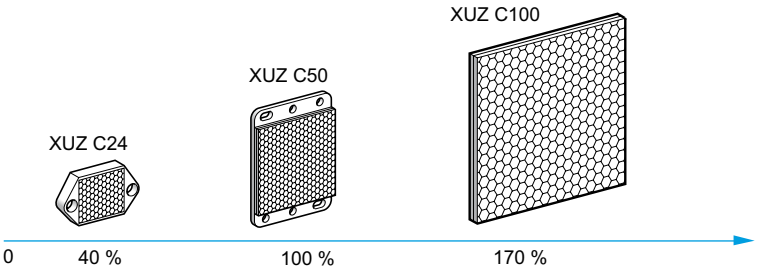
To ensure correct operation of a sensor in spite of environmental constraints, the sensors feature an operating margin.
This margin can be expressed in terms of excess gain, which is the ratio:
Excess gain = Signal level received/Signal required for switching.

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

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

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

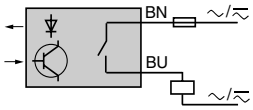
A red LED assists setting-up by illuminating when optimum alignment of the sensor is achieved.
1 *Signal level*
2 *Red LED, on ⊗, off ⊗*
3 *Green LED, on ⊗, off ⊗*
4 *Optimum alignment*



Detection distance depending on reflector size.

Photo-electric sensors
OsiSense XU

Outputs



2-wire technique ∿ or ⎓

■ **Specific aspects**

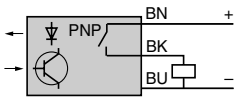
These sensors are wired in series with the load to be switched.
As a consequence, they are subject to:
□ A residual current in the open state (current flowing through the sensor in the “open” state),
□ A voltage drop in the closed state (voltage drop across the sensor’s terminals in the “closed” state).

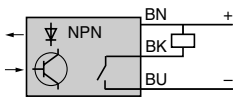
■ **Advantages**

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

■ **Operating precautions**

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





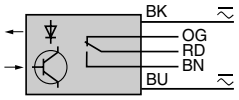
3-wire technique ⎓

■ **Specific aspects**

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

■ **Advantages**

□ No residual current, low voltage drop.



5-wire technique ∿ or ⎓, relay output

■ **Specific aspects**

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

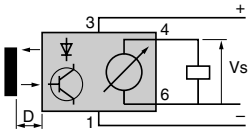
■ **Advantages**

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

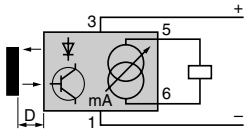
■ **Operating precautions**

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

1



2



Analogue technique

■ **Specific aspects**

There are two output configurations:
□ Voltage output: the output voltage varies in proportion to the distance between the sensor and the object to be detected.
□ Current output: the output current varies in proportion to the distance between the sensor and the object to be detected.

■ **Advantage**

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

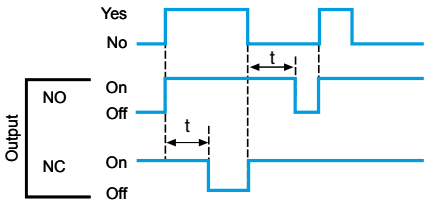
■ **Operating precautions**

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

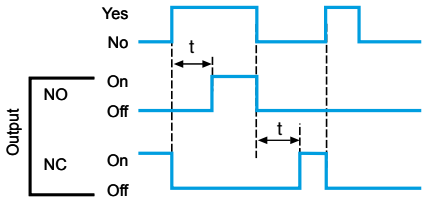
1 *Voltage output*
2 *Current output*

Photo-electric sensors
OsiSense XU

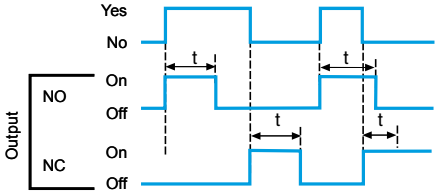
Outputs *(continued)*



Time delay on beam break



Monostable



Output functions

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

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

■ **Advantages**

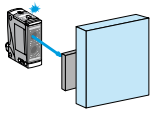
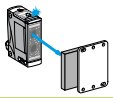
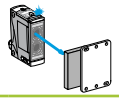
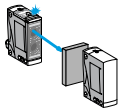
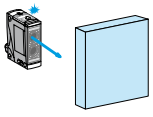
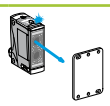
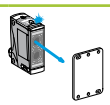
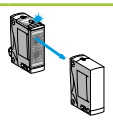
□ NO output (or NO programming for multimode sensors): irrespective of the detection mode, the output of the sensor is activated when the object to be detected is present.

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

■ **Advantages of multimode sensors**

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

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

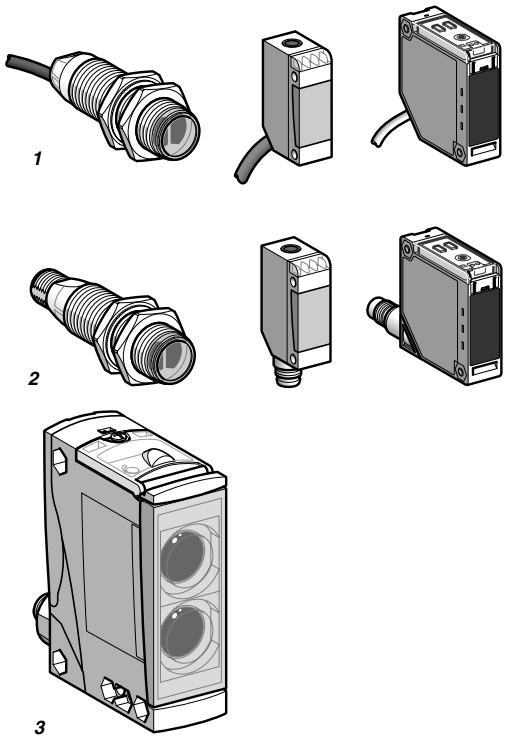
System		NO output or NO programming	Yellow LED	NC output or NC programming	Yellow LED
	Object present				
Diffuse		Activated	On ☼	Not activated	Off ⊗
Diffuse with background suppression		Activated	On ☼	Not activated	Off ⊗
Reflex		Activated	On ☼	Not activated	Off ⊗
Polarised reflex		Activated	On ☼	Not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

Output signal time delay

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

5

Connections



All our sensors are available either in pre-cabled version (except XUX; screw terminal with cable gland version) or connector version.
The connectors used are:

M12 (4-pin)

M8 (4-pin)

1/2" 20UNF (3-pin)

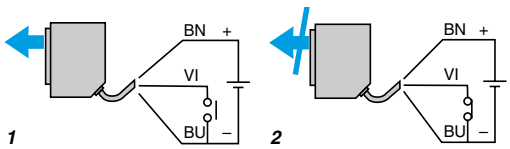
■ **Types of connection**
1 *Factory fitted moulded cable: good protection against splashing liquids.*
2 *Connector: easy installation and maintenance.*
3 *Screw terminals: flexibility, cable runs to required length.*

■ **Wiring advice**
□ Length of cable: no limitation up to 200 m or up to a line capacitance of < 0.1 µF (characteristics of sensors remain unaffected). In this case, it is important to take into account the voltage drop on the line.
□ Separation of control and power circuit wiring: the sensors are immune to electrical interference encountered in normal industrial conditions. Where extreme conditions of electrical "noise" could occur (motors etc.), it is advisable to protect against transients in the normal way:
- suppress interference at source and filter the power supply,
- separate power and control wiring from each other,
- ensure the HF equipotentiality of the site,
- limit the length of cable,
- connect the sensor with supply switched off.

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

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

Complementary functions



Diagnostics, beam break test

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

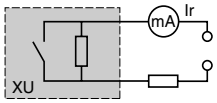
1 *Beam made*
2 *Beam broken*
VI: test input for breaking transmitted beam.

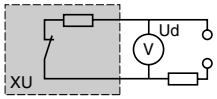
Verification of correct operation

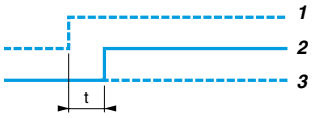
In the event of dirty lenses (reflectors), an excessively polluted atmosphere or a slight disturbance of optical alignment (mechanical impact on support), the level of light energy received by the sensor will decrease until it ceases to operate.
To overcome this problem, all our products incorporate: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

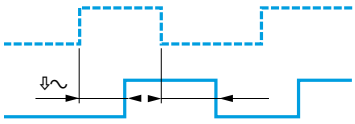
Photo-electric sensors
OsiSense XU

Specific aspects of electronic sensors









Terminology

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

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

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

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

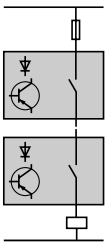
Power supplies

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

Sensors for DC circuits (⎓ models)
■ DC source: check that the voltage limits of the sensor and the acceptable level of ripple are compatible with the supply used.
■ AC source (comprising transformer, rectifier, smoothing capacitor): the supply voltage must be within the operating limits specified for the sensor.
□ Where the voltage is derived from a single-phase AC supply, the voltage must be rectified and smoothed to ensure that:
- the peak voltage of the DC supply is lower than the maximum voltage rating of the sensor. Peak voltage = nominal voltage x $\sqrt{2}$
- the minimum voltage of the supply is greater than the minimum voltage rating of the sensor, given that:
$\Delta V = (I \times t)/C$
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. Fit a smoothing capacitor of 400 µF minimum per sensor, or 2000 µF minimum per Ampere required.

Setting-up



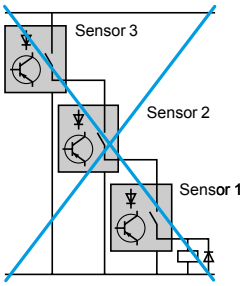
Connection in series

2-wire type sensors

■ The following points should be taken into account:
□ Series wiring is only possible using sensors with wide voltage limits.
Based on the assumption that each sensor has the same residual current value, each sensor, in the open state, will share the supply voltage, i.e.

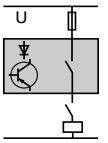
$$U\ sensor = \frac{U\ supply}{n\ sensors}$$

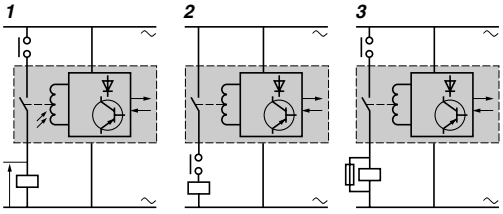
U sensor and U supply must remain within the sensor's voltage limits.
□ If only one sensor in the circuit is in the open state, it will be supplied at a voltage almost equal to the supply voltage.
□ When in the closed state, a small voltage drop is present across each sensor. The resultant loss of voltage at the load will be the sum of the individual voltage drops and therefore, the load voltage should be selected accordingly.



3-wire type sensors
This connection method is not recommended.

■ Correct operation of the sensors cannot be assured and, if this method is used, tests should be made before installation.
■ The following points should be taken into account:
□ The first sensor carries the load current in addition to the no-load current consumption values of the other sensors connected in series. For certain models, this connection method is not possible unless a current limiting resistor is used.
□ When in the closed state, a small voltage drop is present across each sensor. The load should therefore be selected accordingly.
□ As sensor 1 closes, sensor 2 does not operate until a certain time (t) has elapsed (corresponding to the first-up delay) and likewise for the following sensors in the sequence.
□ The use of "flywheel" diodes is recommended when an inductive load is being switched.

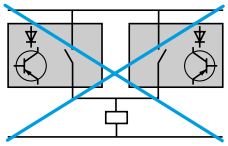




Wiring sensors to devices with mechanical contact
2 and 3-wire type sensors

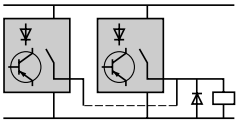
■ The following points should be taken into account:
□ When the mechanical contact is open, the sensor is not supplied.
□ When the contact closes, the sensor does not operate until a certain time (t) has elapsed (corresponding to the first-up delay).
■ In scheme ***1***, as the external contact opens, the voltage transient caused by the breaking of the inductive load will appear inside the sensor and, if greater than the recommended max. insulation voltage, may cause a "flashover" within the sensor.
□ The return path of this voltage will be back to one line of the supply, through the sensor, and should "flashover" occur anywhere on the printed circuit board, severe damage could occur.
□ It is therefore recommended to use schemes ***2*** or ***3***.

Connection in parallel



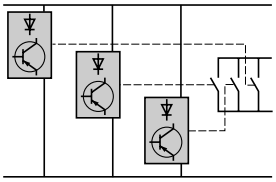
2-wire type sensors
This connection method is not recommended.

■ Should one of the sensors be in the closed state, the sensor in parallel will be "shorted-out" and no longer supplied. As the first sensor passes into the open state, the second sensor will become energised and will be subject to its first-up delay.
■ This configuration is only permissible where the sensors will be working alternately.
■ This method of connection can lead to irreversible damage of the units.



3-wire type sensors

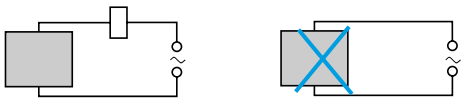
■ No specific restrictions. The use of "flywheel" diodes is recommended when an inductive load (relay) is being switched.



Wiring sensors to devices with mechanical contact
2 and 3-wire type sensors

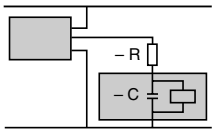
■ No specific restrictions.
□ For these sensors, the supply and output circuits are electrically separate.
□ The sensor/relay contact galvanic isolation is 1500 to 2500 V, depending on the model.
□ The maximum voltage, depending on the model, across each contact is ∼ 250 V.

Setting-up precautions *(continued)*



AC supply

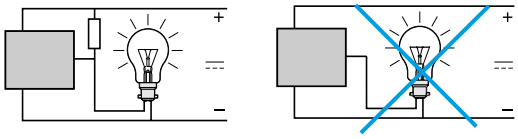
■ **2-wire type sensors cannot be connected directly to an AC supply.**
□ This would result in immediate destruction of the sensor and considerable danger to the user.
□ An appropriate load (refer to the instruction sheet supplied with the sensor) must always be connected in series with the sensor.



Capacitive load (C > 0.1 µF)

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

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



Load comprising an incandescent lamp

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

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

5

Photo-electric sensors
OsiSense XU

Fast trouble shooting guide

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

Fast troubleshooting guide *(continued)*

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

Note:

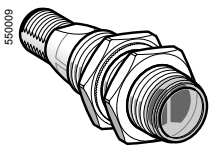
■ **Sensors with a test input** enable automatic verification of their correct operation.
■ **Sensors with an alarm output** enable the operator to be informed, for preventive maintenance purposes, that the operating limits of sensors have been reached (dirty etc.).

Photo-electric sensors

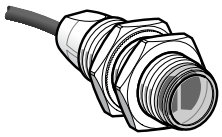
OsiSense XU, single mode function

Design 18, plastic

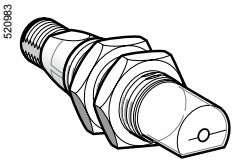
Three-wire DC, solid-state output



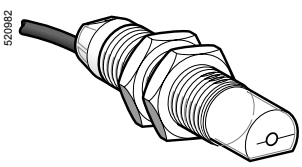
XUB ●A●●NM12



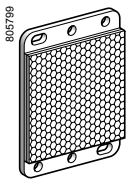
XUB ●A●●NL2



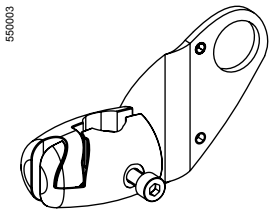
XUB ●A●●WM12



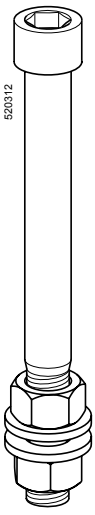
XUB ●A●●WL2



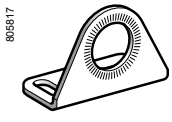
XUZ C50



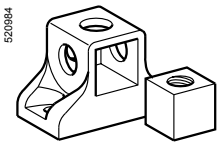
XUZ B2003



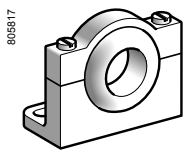
XUZ 2001



XUZ A118



XUZ 2003



XUZ A218

Connector

Sensing distance (Sn) m	Function	Output	Line of sight	Reference	Weight kg
Diffuse system					
0.1	NO	PNP	Along case axis	**XUB 4APANM12**	0.040
			90° to case axis	**XUB 4APAWM12**	0.040
		NPN	Along case axis	**XUB 4ANANM12**	0.040
			90° to case axis	**XUB 4ANAWM12**	0.040
	NC	PNP	Along case axis	**XUB 4APBNM12**	0.040
			90° to case axis	**XUB 4APBWM12**	0.040
		NPN	Along case axis	**XUB 4ANBNM12**	0.040
			90° to case axis	**XUB 4ANBWM12**	0.040
Diffuse system with adjustable sensitivity					
0.6	NO	PNP	Along case axis	**XUB 5APANM12**	0.045
			90° to case axis	**XUB 5APAWM12**	0.050
		NPN	Along case axis	**XUB 5ANANM12**	0.045
			90° to case axis	**XUB 5ANAWM12**	0.050
	NC	PNP	Along case axis	**XUB 5APBNM12**	0.045
			90° to case axis	**XUB 5APBWM12**	0.050
		NPN	Along case axis	**XUB 5ANBNM12**	0.045
			90° to case axis	**XUB 5ANBWM12**	0.050
Polarised reflex system					
2	NO	PNP	Along case axis	**XUB 9APANM12**	0.040
			90° to case axis	**XUB 9APAWM12**	0.040
		NPN	Along case axis	**XUB 9ANANM12**	0.040
			90° to case axis	**XUB 9ANAWM12**	0.040
	NC	PNP	Along case axis	**XUB 9APBNM12**	0.040
			90° to case axis	**XUB 9APBWM12**	0.040
		NPN	Along case axis	**XUB 9ANBNM12**	0.040
			90° to case axis	**XUB 9ANBWM12**	0.040
Reflector 50 x 50 mm	–	–	–	**XUZ C50**	0.020
Reflex system					
4	NO	PNP	Along case axis	**XUB 1APANM12**	0.040
			90° to case axis	**XUB 1APAWM12**	0.040
		NPN	Along case axis	**XUB 1ANANM12**	0.040
			90° to case axis	**XUB 1ANAWM12**	0.040
	NC	PNP	Along case axis	**XUB 1APBNM12**	0.040
			90° to case axis	**XUB 1APBWM12**	0.040
		NPN	Along case axis	**XUB 1ANBNM12**	0.040
			90° to case axis	**XUB 1ANBWM12**	0.040
Reflector 50 x 50 mm	–	–	–	**XUZ C50**	0.020
Thru-beam system					
Transmitter 15	–	–	Along case axis	**XUB 2AKSNM12T**	0.040
			90° to case axis	**XUB 2AKSWM12T**	0.040
Receiver 15	NO	PNP	Along case axis	**XUB 2APANM12R**	0.040
			90° to case axis	**XUB 2APAWM12R**	0.040
		NPN	Along case axis	**XUB 2ANANM12R**	0.040
			90° to case axis	**XUB 2ANAWM12R**	0.040
	NC	PNP	Along case axis	**XUB 2APBNM12R**	0.040
			90° to case axis	**XUB 2APBWM12R**	0.040
		NPN	Along case axis	**XUB 2ANBNM12R**	0.040
			90° to case axis	**XUB 2ANBWM12R**	0.040

Fixing accessories *(1)*

Description	Reference	Weight kg
3D fixing kit for use on M12 rod, for XUB or XUZ C50	**XUZ B2003**	0.170
M12 rod	**XUZ 2001**	0.050
Support for M12 rod	**XUZ 2003**	0.150
Stainless steel fixing bracket	**XUZ A118**	0.045
Plastic fixing bracket with adjustable ball-joint	**XUZ A218**	0.035

Pre-cabled

For a pre-cabled sensor, replace **M12** by **L2** for a 2 m long cable, or by **L5** for a 5 m long cable.
Example: **XUB 1APANM12** becomes **XUB 1APANL2** for a 2 m long cable and **XUB 1APANL5** for a 5 m long cable.
For availability, please consult our Customer Care Centre.

(1) For further information, see page 5/158.

Photo-electric sensors

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

Characteristics

Sensor type			XUB 1, XUB 2, XUB 4, XUB 5, XUB 9	XUB 1, XUB 2, XUB 4, XUB 5, XUB 9
Product certifications			UL, CSA, CE	
Connection	Connector		M12	–
	Pre-cabled		–	Length: 2 m
Sensing distance nominal Sn / maximum (excess gain = 1) (excess gain = 2)		m	**0.1 / 0.15 diffuse**	
		m	**0.6 / 0.8 diffuse with adjustable sensitivity**	
		m	**2 / 3 polarised reflex**	
		m	**4 / 5.5 reflex**	
		m	**15 / 20 thru-beam**	
Type of transmission			Infrared, except polarised reflex (red)	
Degree of protection	Conforming to IEC 60529		IP 65, IP 67, double insulation ⧈	
Storage temperature		°C	- 40…+ 70	
Operating temperature		°C	- 25…+ 55	
Materials	Case		PBT	
	Lens		PMMA	
	Cable		–	PvR
Vibration resistance	Conforming to IEC 60068-2-6		7 gn, amplitude ± 1.5 mm (f = 10 to 55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms	
Indicator lights	Output state		Yellow LED (except for **XUB 2●●●●●●T**)	
	Supply on		Green LED (only for **XUB 2●●●●●●T**)	
Rated supply voltage		V	⎓ 12…24 with protection against reverse polarity	
Voltage limits (including ripple)		V	⎓ 10…36	
Current consumption, no-load		mA	35	
Switching capacity		mA	⩽ 100 with overload and short-circuit protection	
Voltage drop, closed state		V	1.5	
Maximum switching frequency		Hz	500	
Delays	First-up	ms	< 15	
	Response	ms	< 1	
	Recovery	ms	< 1	

Wiring schemes

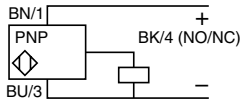
M12 connector

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

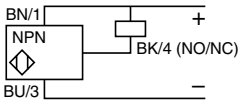
Pre-cabled

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

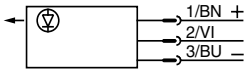
PNP



NPN



Transmitter

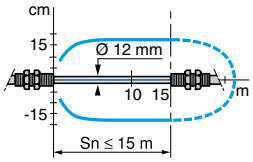


Input 2/VI:
- not connected: *beam made*
- connected to –: *beam broken*

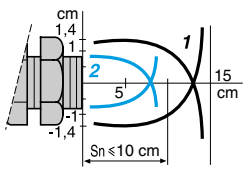
See connection on page 9/44

Detection curves

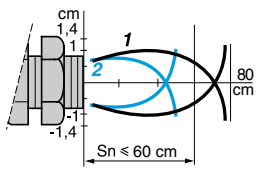
Thru-beam system



Diffuse system

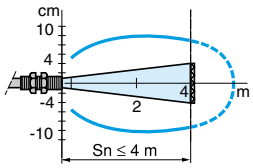


Diffuse system with adjustable sensitivity



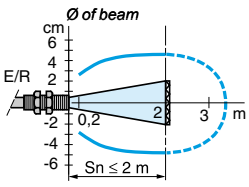
*Object 10 x 10 cm; **1** White 90%; **2** Grey 18%*

Reflex system



With reflector XUZ C50

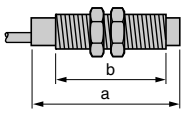
Polarised reflex system



With reflector XUZ C50

Dimensions

XUB



	Pre-cabled (mm)		Connector (mm)	
	a	b	a	b
Ø 18, line of sight along case axis	46 (2)	28	60 *(1)*	28
Ø 18, line of sight 90° to case axis	62	28	76	28
Ø 18, line of sight along case axis **XUB 5**	62	44	76	44
Ø 18, line of sight 90° to case axis **XUB 5**	78	44	92	44

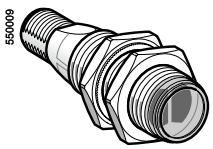
(1) Beam break input on thru-beam transmitter only.
*(2) For **XUB 9●●●●●●** (polarised reflex) 46 becomes 48 mm and 60 becomes 62 mm.*

Photo-electric sensors

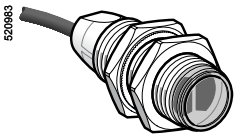
OsiSense XU, single mode function

Design 18, metal

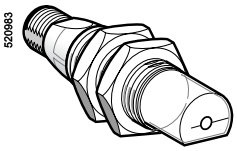
Three-wire DC, solid-state output



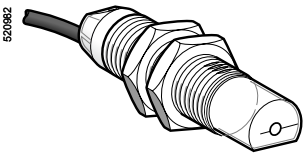
XUB ●B●●NM12



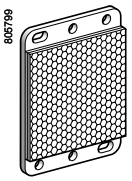
XUB ●B●●NL2



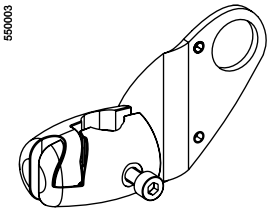
XUB ●B●●WM12



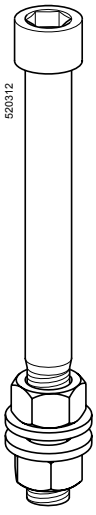
XUB ●B●●WL2



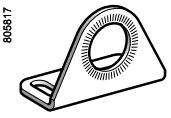
XUZ C50



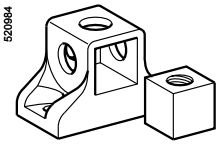
XUZ B2003



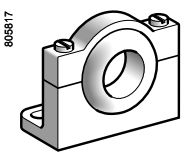
XUZ 2001



XUZ A118



XUZ 2003



XUZ A218

Connector

Sensing distance (Sn) m	Function	Output	Line of sight	Reference	Weight kg
Diffuse system					
0.1	NO	PNP	Along case axis	**XUB 4BPANM12**	0.050
			90° to case axis	**XUB 4BPAWM12**	0.050
		NPN	Along case axis	**XUB 4BNANM12**	0.050
			90° to case axis	**XUB 4BNAWM12**	0.050
	NC	PNP	Along case axis	**XUB 4BPBNM12**	0.050
			90° to case axis	**XUB 4BPBWM12**	0.050
		NPN	Along case axis	**XUB 4BNBNM12**	0.050
			90° to case axis	**XUB 4BNBWM12**	0.050
Diffuse system with adjustable sensitivity					
0.6	NO	PNP	Along case axis	**XUB 5BPANM12**	0.055
			90° to case axis	**XUB 5BPAWM12**	0.060
		NPN	Along case axis	**XUB 5BNANM12**	0.055
			90° to case axis	**XUB 5BNAWM12**	0.060
	NC	PNP	Along case axis	**XUB 5BPBNM12**	0.055
			90° to case axis	**XUB 5BPBWM12**	0.060
		NPN	Along case axis	**XUB 5BNBNM12**	0.055
			90° to case axis	**XUB 5BNBWM12**	0.060
Polarised reflex system					
2	NO	PNP	Along case axis	**XUB 9BPANM12**	0.050
			90° to case axis	**XUB 9BPAWM12**	0.050
		NPN	Along case axis	**XUB 9BNANM12**	0.050
			90° to case axis	**XUB 9BNAWM12**	0.050
	NC	PNP	Along case axis	**XUB 9BPBNM12**	0.050
			90° to case axis	**XUB 9BPBWM12**	0.050
		NPN	Along case axis	**XUB 9BNBNM12**	0.050
			90° to case axis	**XUB 9BNBWM12**	0.050
Reflector 50 x 50 mm	–	–	–	**XUZ C50**	0.020
Reflex system					
4	NO	PNP	Along case axis	**XUB 1BPANM12**	0.050
			90° to case axis	**XUB 1BPAWM12**	0.050
		NPN	Along case axis	**XUB 1BNANM12**	0.050
			90° to case axis	**XUB 1BNAWM12**	0.050
	NC	PNP	Along case axis	**XUB 1BPBNM12**	0.050
			90° to case axis	**XUB 1BPBWM12**	0.050
		NPN	Along case axis	**XUB 1BNBNM12**	0.050
			90° to case axis	**XUB 1BNBWM12**	0.050
Reflector 50 x 50 mm	–	–	–	**XUZ C50**	0.020
Thru-beam system					
Transmitter 15	–	–	Along case axis	**XUB 2BKSNM12T**	0.050
			90° to case axis	**XUB 2BKSWM12T**	0.050
Receiver 15	NO	PNP	Along case axis	**XUB 2BPANM12R**	0.050
			90° to case axis	**XUB 2BPAWM12R**	0.050
		NPN	Along case axis	**XUB 2BNANM12R**	0.050
			90° to case axis	**XUB 2BNAWM12R**	0.050
	NC	PNP	Along case axis	**XUB 2BPBNM12R**	0.050
			90° to case axis	**XUB 2BPBWM12R**	0.050
		NPN	Along case axis	**XUB 2BNBNM12R**	0.050
			90° to case axis	**XUB 2BNBWM12R**	0.050

Fixing accessories *(1)*

Description	Reference	Weight kg
3D fixing kit for use on M12 rod, for XUB or XUZ C50	**XUZ B2003**	0.170
M12 rod	**XUZ 2001**	0.050
Support for M12 rod	**XUZ 2003**	0.150
Stainless steel fixing bracket	**XUZ A118**	0.045
Plastic fixing bracket with adjustable ball-joint	**XUZ A218**	0.035

Pre-cabled

For a pre-cabled sensor, replace **M12** by **L2** for a 2 m long cable, or by **L5** for a 5 m long cable.
Example: **XUB 1BPANM12** becomes **XUB 1BPANL2** for a 2 m long cable and **XUB 1BPANL5** for a 5 m long cable.
For availability, please consult our Customer Care Centre.

(1) For further information, see page 5/158.

Photo-electric sensors

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

Characteristics

Sensor type			XUB 1, XUB 2, XUB 4, XUB 5, XUB 9	XUB 1, XUB 2, XUB 4, XUB 5, XUB 9
Product certifications			UL, CSA, CE	
Connection	Connector		M12	–
	Pre-cabled		–	Length: 2 m
Sensing distance nominal Sn / maximum (excess gain = 2) (excess gain = 1)		m	**0.1 / 0.15 diffuse**	
		m	**0.6 / 0.8 diffuse with adjustable sensitivity**	
		m	**2 / 3 polarised reflex**	
		m	**4 / 5.5 reflex**	
		m	**15 / 20 thru-beam**	
Type of transmission			Infrared, except polarised reflex (red)	
Degree of protection	Conforming to IEC 60529		IP 65, IP 67, double insulation ⧈	
Storage temperature		°C	- 40…+ 70	
Operating temperature		°C	- 25…+ 55	
Materials	Case		Nickel plated brass	
	Lens		PMMA	
	Cable		–	PvR
Vibration resistance	Conforming to IEC 60068-2-6		7 gn, amplitude ± 1.5 mm (f = 10 to 55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms	
Indicator lights	Output state		Yellow LED (except for **XUB 2●●●●●●T**)	
	Supply on		Green LED (only for **XUB 2●●●●●●T**)	
Rated supply voltage		V	⎓ 12…24 with protection against reverse polarity	
Voltage limits (including ripple)		V	⎓ 10…36	
Current consumption, no-load		mA	35	
Switching capacity		mA	⩽ 100 with overload and short-circuit protection	
Voltage drop, closed state		V	1.5	
Maximum switching frequency		Hz	500	
Delays	First-up	ms	< 15	
	Response	ms	< 1	
	Recovery	ms	< 1	

Wiring schemes

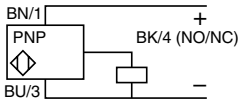
M12 connector

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

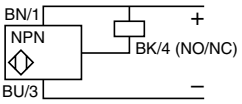
Pre-cabled

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

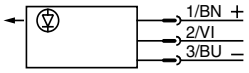
PNP



NPN



Transmitter

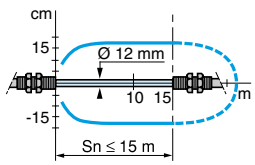


Input 2/VI:
- not connected: *beam made*
- connected to –: *beam broken*

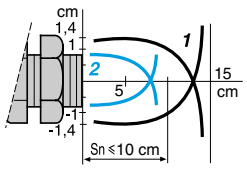
See connection on page 9/44

Detection curves

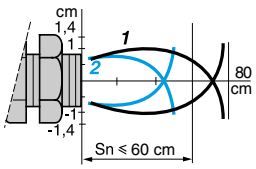
Thru-beam system



Diffuse system

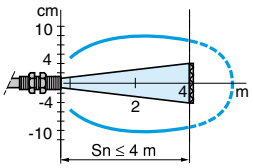


Diffuse system with adjustable sensitivity



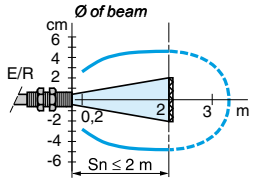
*Object 10 x 10 cm; **1** White 90%; **2** Grey 18%*

Reflex system



With reflector XUZ C50

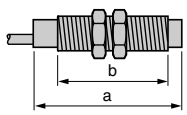
Polarised reflex system



With reflector XUZ C50

Dimensions

XUB



	Pre-cabled (mm)		Connector (mm)	
	a	b	a	b
Ø 18, line of sight along case axis	46 (2)	28	60 *(1)*	28
Ø 18, line of sight 90° to case axis	62	28	76	28
Ø 18, line of sight along case axis **XUB 5**	62	44	76	44
Ø 18, line of sight 90° to case axis **XUB 5**	78	44	92	44

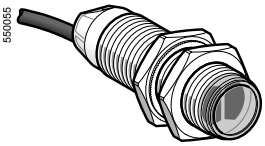
(1) Beam break input on thru-beam transmitter only.
*(2) For **XUB 9●●●●●●** (polarised reflex) 46 becomes 48 mm and 60 becomes 62 mm.*

Photo-electric sensors

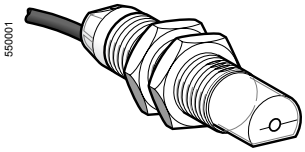
OsiSense XU multimode

Design 18, metal or plastic

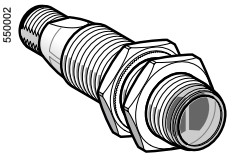
Three-wire DC, solid-state output



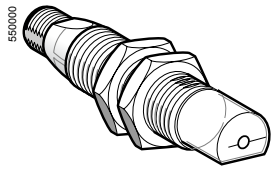
XUB 0●●●NL2



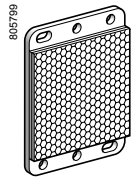
XUB 0●●●WL2



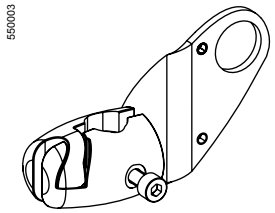
XUB 0●●●NM12



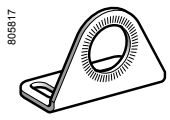
XUB 0●●●WM12



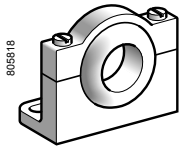
XUZ C50



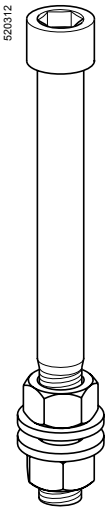
XUZ B2003



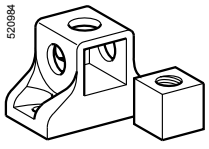
XUZ A118



XUZ A218



XUZ 2001



XUZ 2003

Ø 18 metal

Pre-cabled *(1)*

Sensing distance (Sn) *(2)* m	Function	Output	Line of sight	Reference	Weight kg
0…15 depending on whether accessories are used	NO or NC, by programming	PNP	Along case axis	**XUB 0BPSNL2**	0.105
			90° to case axis	**XUB 0BPSWL2** *(3)*	0.110
		NPN	Along case axis	**XUB 0BNSNL2**	0.105
			90° to case axis	**XUB 0BNSWL2** *(3)*	0.110

M12 connector

0…15 depending on whether accessories are used	NO or NC, by programming	PNP	Along case axis	**XUB 0BPSNM12**	0.055
			90° to case axis	**XUB 0BPSWM12** *(3)*	0.060
		NPN	Along case axis	**XUB 0BNSNM12**	0.055
			90° to case axis	**XUB 0BNSWM12** *(3)*	0.060

Accessories

Description	Connection	Line of sight	Reference	Weight kg
Thru-beam transmitter	Pre-cabled *(1)*	Along case axis	**XUB 0BKSNL2T**	0.105
		90° to case axis	**XUB 0BKSWL2T** *(3)*	0.110
	M12 connector	Along case axis	**XUB 0BKSNM12T**	0.055
		90° to case axis	**XUB 0BKSWM12T** *(3)*	0.060
Reflector 50 x 50 mm	–	–	**XUZ C50**	0.020

Ø 18 plastic

Pre-cabled *(1)*

Sensing distance (Sn) (3) m	Function	Output	Line of sight	Reference	Weight kg
0…15 depending on whether accessories are used	NO or NC, by programming	PNP	Along case axis	**XUB 0APSNL2**	0.095
			90° to case axis	**XUB 0APSWL2** *(3)*	0.100
		NPN	Along case axis	**XUB 0ANSNL2**	0.095
			90° to case axis	**XUB 0ANSWL2** *(3)*	0.100

M12 connector

0…15 depending on whether accessories are used	NO or NC, by programming	PNP	Along case axis	**XUB 0APSNM12**	0.045
			90° to case axis	**XUB 0APSWM12** *(3)*	0.050
		NPN	Along case axis	**XUB 0ANSNM12**	0.045
			90° to case axis	**XUB 0ANSWM12** *(3)*	0.050

Accessories

Description	Connection	Line of sight	Reference	Weight kg
Thru-beam transmitter	Pre-cabled *(1)*	Along case axis	**XUB 0AKSNL2T**	0.095
		90° to case axis	**XUB 0AKSWL2T** *(3)*	0.100
	M12 connector	Along case axis	**XUB 0AKSNM12T**	0.045
		90° to case axis	**XUB 0AKSWM12T** *(3)*	0.050
Reflector 50 x 50 mm	–	–	**XUZ C50**	0.020

Fixing accessories *(4)*

Description	Reference	Weight kg
3D fixing kit for use on M12 rod, for XUB or XUZ C50	**XUZ B2003**	0.170
M12 rod	**XUZ 2001**	0.050
Support for M12 rod	**XUZ 2003**	0.150
Stainless steel fixing bracket	**XUZ A118**	0.045
Plastic fixing bracket with adjustable ball-joint	**XUZ A218**	0.035

*(1) For a 5 m long cable, replace L2 by **L5**.*
*Example: XUB 0BPSNL2 becomes **XUB 0BPSNL5**.*
For availability, please consult our Customer Care Centre.
(2) For further information, see page 5/31.
(3) For line of sight 90° to case axis versions, see sensing distances on page5/31.
(4) For further information, see page 5/158.

Photo-electric sensors

OsiSense XU multimode

Design 18, metal or plastic

Three-wire DC, solid-state output

Characteristics

Sensor type			XUB 0●●●●M12, XUB 0●●●●M12T		XUB 0●●●●L2, XUB 0●●●●L2T
Product certifications			UL, CSA, CE		
Connection	Connector		M12		–
	Pre-cabled		–		Length: 2 m
Sensing distance nominal Sn / (excess gain = 2)	**maximum** (excess gain = 1)		**Line of sight along case axis**	**Line of sight 90° to case axis**	**Accessory**
		m	**0.12 / 0.12**	**0.11 / 0.11**	**Without (diffuse with background suppression)**
		m	**0.3 / 0.4**	**0.2 / 0.3**	**Without (diffuse)**
		m	**2 / 3**	**1.5 / 2**	**With reflector (polarised reflex)**
		m	**15 / 20**	**7 / 10**	**With thru-beam transmitter (thru-beam)**
Type of transmission			Infrared, except for polarised reflex (red)		
Degree of protection	Conforming to IEC 60529		IP 65, IP 67, double insulation ⧈		
Storage temperature		°C	- 40…+ 70		
Operating temperature		°C	- 25…+ 55		
Materials			Case: nickel plated brass for XUB 0B or PBT for XUB 0A; Lens: PMMA; Cable: PvR		
Vibration resistance	Conforming to IEC 60068-2-6		7 gn, amplitude ± 1.5 mm (f = 10 to 55 Hz)		
Shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms		
Indicator lights	Output state		Yellow LED (transmission present for **XUB 0●●●●●●T**)		
	Supply on		Green LED		
	Optical alignment aid/dirty		Red LED (except for **XUB 0●●●●●●T**)		
Rated supply voltage		V	⎓ 12…24 with protection against reverse polarity		
Voltage limits (including ripple)		V	⎓ 10…36		
Current consumption, no-load		mA	35 (20 for **XUB 0●●●●●●T**)		
Switching capacity		mA	≤ 100 with overload and short-circuit protection		
Voltage drop, closed state		V	< 1.5		
Maximum switching frequency		Hz	250 (200 for diffuse with background suppression)		
Delays	First-up	ms	< 200		
	Response	ms	< 2 (< 2.5 for diffuse with background suppression)		
	Recovery	ms	< 2 (< 2.5 for diffuse with background suppression)		

Wiring schemes

M12 connector

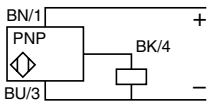
3 (-)
1 (+)
4 OUT/Output
2 Beam break input *(1)*

See connection on page 9/44.

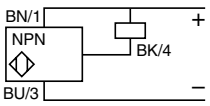
Pre-cabled

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

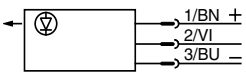
Receiver, PNP output



Receiver, NPN output



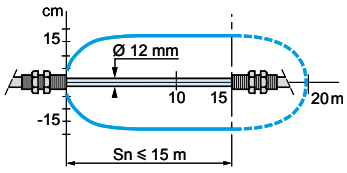
Thru-beam transmitter



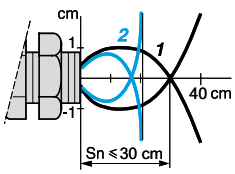
Input 2/VI:
- not connected: *beam made*
- connected to –: *beam broken*

Detection curves (line of sight along case axis)

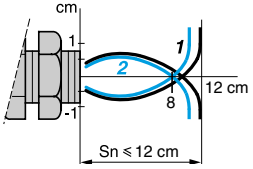
With thru-beam accessory (thru-beam)



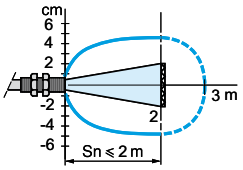
Without accessory (diffuse)



Without accessory (diffuse with background suppression)



With reflector (polarised reflex)

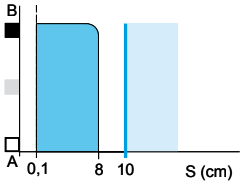


*Object: 10 x 10 cm, **1**: white 90%, **2**: grey 18%*

With reflector XUZ C50

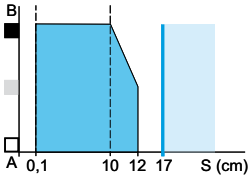
Variation of usable sensing distance Su (without accessory, with adjustable background suppression)

Teach mode at minimum.



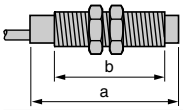
A-B: *object reflection coefficient*
- *Black 6%*
- *Grey 18%*
- *White 90%*
- *Sensing range*
- *Non sensing zone (matt surfaces)*

Teach mode at maximum.



Dimensions

XUB

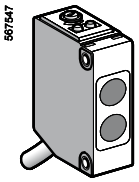


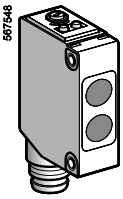
	Pre-cabled (mm)		Connector (mm)	
	a	b	a	b
Ø 18, line of sight along case axis	64 *(2)*	44	78 *(2)*	44
Ø 18, line of sight 90° to case axis	78	44	92	44

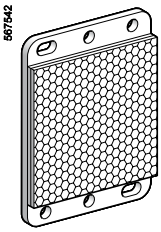
(1) Beam break input on thru-beam transmitter only.
*(2) For **XUB 0●●●●●●T**, 64 becomes 62 mm and 78 becomes 76 mm.*

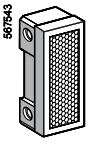
Photo-electric sensors

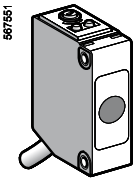
OsiSense XU, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
NO/NC configuration switch

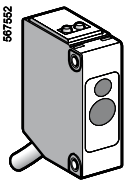

XUM 5A●CNL2


XUM 5A●CNM8

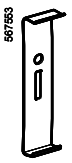

XUZ C50

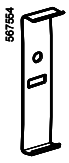

XUZ C08

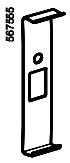

XUM 2AKCNL2T


XUM 2A●CNL2R

Sensing distance (Sn)	Function	Output	Connection	Reference	Weight kg
Diffuse system with adjustable sensitivity					
1 m	NO/NC, configuration by switch	PNP	Pre-cabled (L = 2 m)	**XUM 5APCNL2**	0.063
			M8 connector	**XUM 5APCNM8**	0.010
		NPN	Pre-cabled (L = 2 m)	**XUM 5ANCNL2**	0.063
			M8 connector	**XUM 5ANCNM8**	0.010
Polarised reflex system with adjustable sensitivity					
5 m with reflector XUZ C50 **2 m** with reflector XUZ C08	NO/NC, configuration by switch	PNP	Pre-cabled (L = 2 m)	**XUM 9APCNL2**	0.063
			M8 connector	**XUM 9APCNM8**	0.010
	NO/NC, configuration by switch	NPN	Pre-cabled (L = 2 m)	**XUM 9ANCNL2**	0.063
			M8 connector	**XUM 9ANCNM8**	0.010
Reflectors					
Universal reflector 50 x 50 mm		–	–	**XUZ C50**	0.020
Lateral reflector 8.6 x 29.5 mm		–	–	**XUZ C08**	0.006
Thru-beam system (transmitter + receiver) with adjustable sensitivity					
15 m	NO/NC, configuration by switch	PNP	Pre-cabled (L = 2 m)	**XUM 2APCNL2**	0.119
			M8 connector	**XUM 2APCNM8**	0.019
		NPN	Pre-cabled (L = 2 m)	**XUM 2ANCNL2**	0.119
			M8 connector	**XUM 2ANCNM8**	0.019
Transmitter only					
15 m			Pre-cabled (L = 2 m)	**XUM 2AKCNL2T**	0.063
			M8 connector	**XUM 2AKCNM8T**	0.010
Receiver only					
15 m	NO/NC, configuration by switch	PNP	Pre-cabled (L = 2 m)	**XUM 2APCNL2R**	0.063
			M8 connector	**XUM 2APCNM8R**	0.010
		NPN	Pre-cabled (L = 2 m)	**XUM 2ANCNL2R**	0.063
			M8 connector	**XUM 2ANCNM8R**	0.010

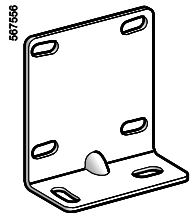

XUZMSV●●

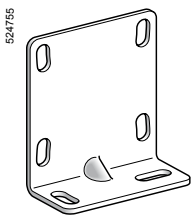

XUZ MSH●●


XUZ MU01

Accessories for thru-beam system

Description	Dimensions mm	Sensing distance m	Reference	Weight kg
Vertical diaphragm Sold in lots of 2	0.5 x 6.4	1.2	**XUZ MSV05**	0.002
	1 x 6.4	3	**XUZ MSV10**	0.002
	1.5 x 6.4	4	**XUZ MSV15**	0.002
	2 x 6.4	5	**XUZ MSV20**	0.002
Horizontal diaphragm Sold in lots of 2	0.5 x 6.4	1.2	**XUZ MSH05**	0.002
	1 x 6.4	3	**XUZ MSH10**	0.002
	1.5 x 6.4	4	**XUZ MSH15**	0.002
	2 x 6.4	5	**XUZ MSH20**	0.002
Anti-interference filter Sold in lots of 4	–	7	**XUZ MU01**	0.006

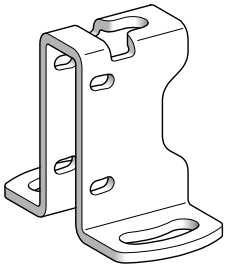

XUZ AM01


XUZ AM04

Fixing accessories

Description	Reference	Weight kg
Base mounting fixing bracket	**XUZ AM01**	0.017
Side mounting fixing bracket	**XUZ AM04**	0.026
Vertical fixing bracket with protective cover *(1)*	**XUZ AM02**	0.062
Horizontal fixing bracket with protective cover *(1)*	**XUZ AM03**	0.026

(1) For pre-cabled version


XUZ AM02

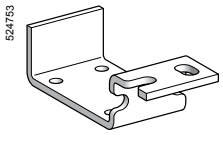

XUZ AM03

Photo-electric sensors

OsiSense XU, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
NO/NC configuration switch

Characteristics

Sensor type			XUM ●A●●●M8	XUM ●A●●●L2
Product certifications			CE, cULus, CTick	
Connection	Connector		M8	–
	Pre-cabled		–	Length: 2 m
Nominal sensing distance Sn (excess gain = 2)		**m**	**1 diffuse with adjustable sensitivity**	
		m	**5 polarised reflex with adjustable sensitivity**	
		m	**15 thru-beam with adjustable sensitivity**	
Type of transmission			Red, except diffuse system (Infrared)	
Degree of protection	Conforming to IEC 60529		IP 65, IP 67	
Storage temperature		**°C**	- 40…+ 70	
Operating temperature		**°C**	- 30…+ 60	
Materials	Case		PBT	
	Lens		PMMA	
	Cable		–	PVC (black for transmitter, grey for other versions)
Vibration resistance	Conforming to IEC 60068-2-6		10 to 55 Hz, amplitude ± 1.5 mm, 2 hours in each direction X, Y and Z	
Shock resistance	Conforming to IEC 60068-2-27		500 m/s² 10 x in each direction X, Y and Z	
Indicator lights	Output state		Orange LED (excluding transmitter)	
	Stability		Green LED	
	Transmitter		Orange LED: supply on	
	Receiver		Red LED: light received; green LED: supply on	
Rated supply voltage		**V**	⎓ 12...24 with protection against reverse polarity	
Voltage limits (including ripple)		**V**	⎓ 10…30	
Current consumption, no-load		**mA**	16 for **XUM 5**; 13 for **XUM 9**; 11 for transmitter **XUM 2**; 13 for receiver **XUM 2**	
Switching capacity		**mA**	≤ 100 with overload and short-circuit protection	
Voltage drop, closed state		**V**	≤ 3	
Maximum switching frequency		**Hz**	1000	
Delays	First-up	**ms**	< 100	
	Response	**ms**	0.5	
	Recovery	**ms**	0.5	

Wiring schemes

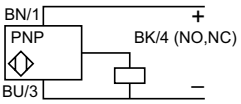
M8 connector

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

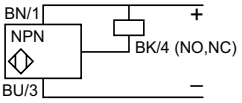
Pre-cabled

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

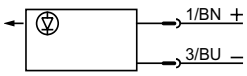
PNP



NPN



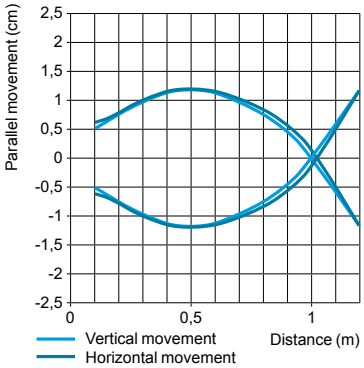
Transmitter ⎓



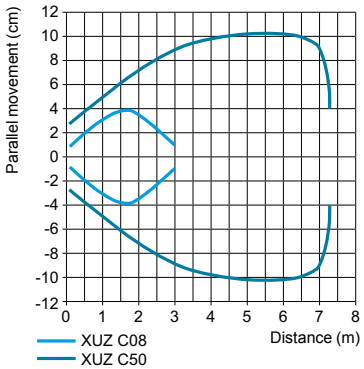
See connection on page 9/44.

Curves

Diffuse



Polarised reflex



Thru-beam

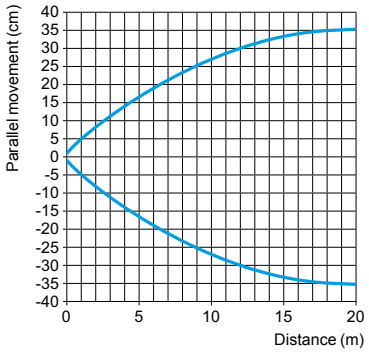


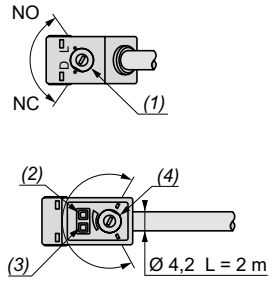
Photo-electric sensors

OsiSense XU, general purpose, single mode function
Miniature design, plastic
Three-wire DC, solid-state output
NO/NC configuration switch

Diffuse system, polarised reflex system

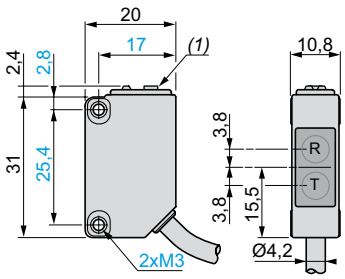
Pre-cabled version

Description - XUM 5A●CNL2, XUM 9A●CNL2



(1) Configuration switch.
(2) Output state LED.
(3) Stability and power on LED.
(4) Adjustment potentiometer.

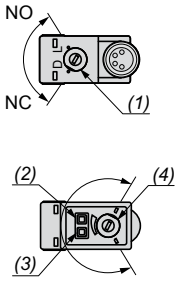
Dimensions - XUM 5A●CNL2, XUM 9A●CNL2



R: Reception, T: Transmission.
(1) Potentiometer.

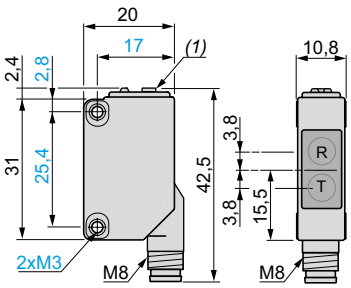
Connector version

Description - XUM 5A●CNM8, XUM 9A●CNM8



(1) Configuration switch.
(2) Output state LED.
(3) Stability and power on LED.
(4) Adjustment potentiometer.

Dimensions - XUM 5A●CNM8, XUM 9A●CNM8

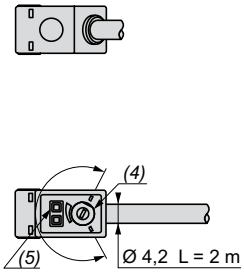


R: Reception, T: Transmission.
(1) Potentiometer.

Thru-beam system

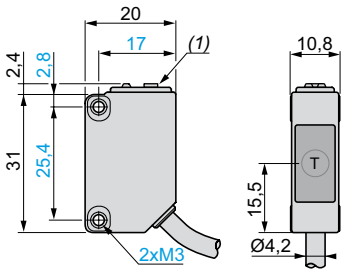
Pre-cabled version

Description - XUM 2AKCNL2T



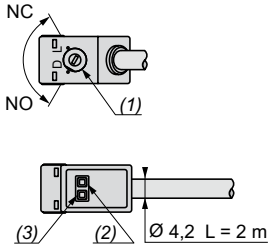
(4) Adjustment potentiometer.
(5) Power on LED.

Dimensions - XUM 2AKCNL2T



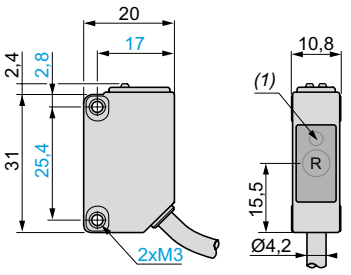
T: Transmission.
(1) Potentiometer.

Description - XUM 2A●CNL2R



(1) Configuration switch.
(2) Output state LED.
(3) Stability and power on LED.

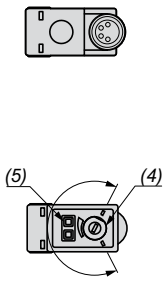
Dimensions - XUM 2A●CNL2R



R: Reception.
(1) Output state LED on front face.

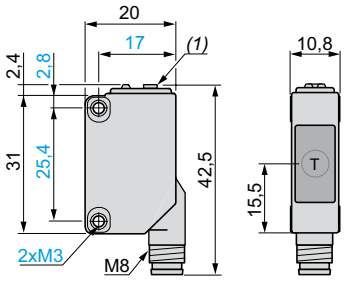
Connector version

Description - XUM 2AKCNM8T



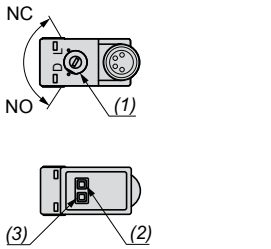
(4) Adjustment potentiometer.
(5) Power on LED.

Dimensions - XUM 2AKCNM8T



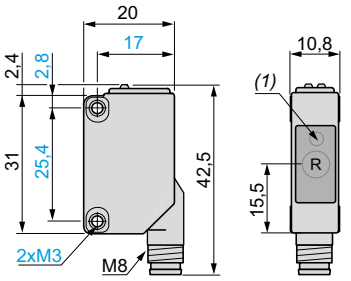
T: Transmission.
(1) Potentiometer.

Description - XUM 2A●CNM8R



(1) Configuration switch.
(2) Output state LED.
(3) Stability and power on LED.

Dimensions - XUM 2A●CNM8R



R: Reception.
(1) Output state LED on front face.

Photo-electric sensors

OsiSense XU, general purpose, single mode function

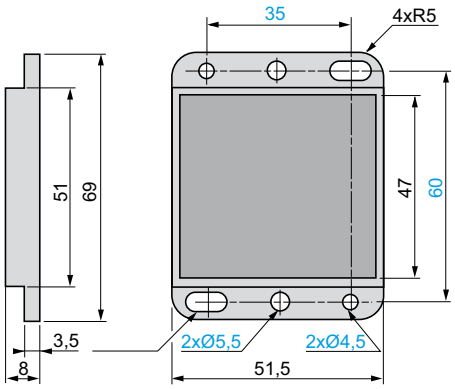
Miniature design, plastic

Three-wire DC, solid-state output

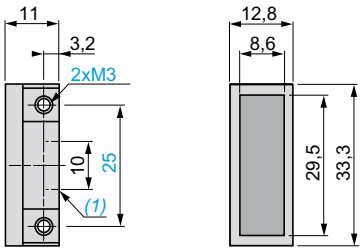
Accessories

Reflectors

XUZ C50



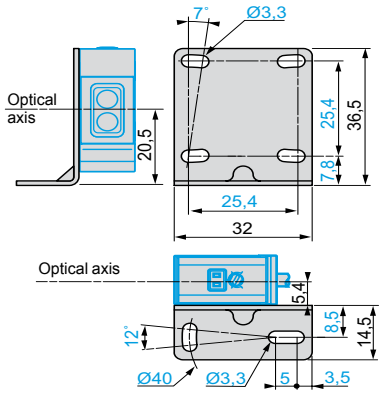
XUZ C08



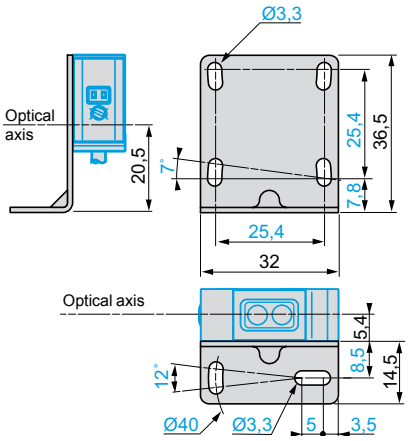
1) 2 x M3

Fixing brackets

XUZ AM01

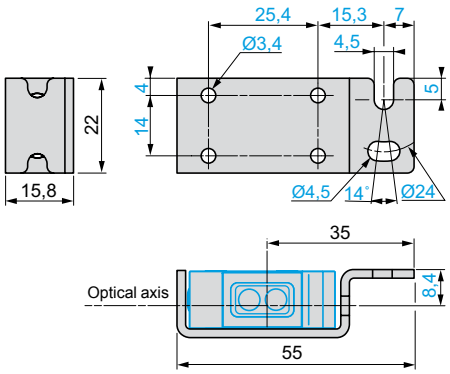


XUZ AM04

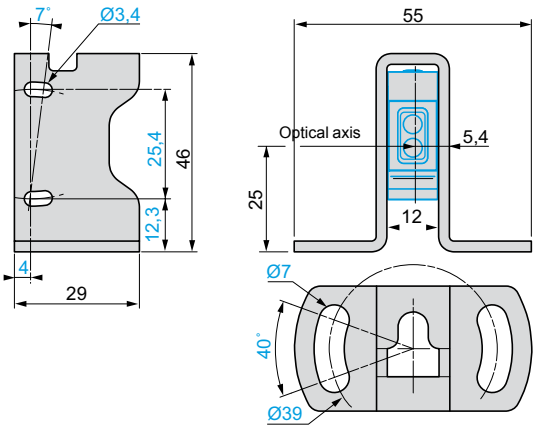


Fixing bracket with protective cover

XUZ AM03

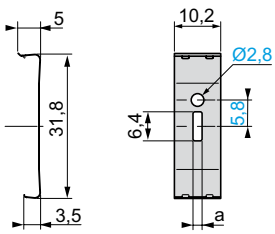


XUZ AM02

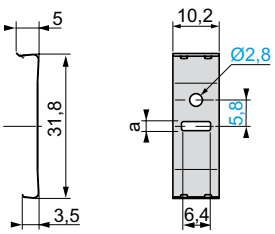


Diaphragms

XUZ MSV••



XUZ MSH••



XUZ	a
MSV05	0.5
MSV10	1
MSV15	1.5
MSV20	2
MSH05	0.5
MSH10	1
MSH15	1.5
MSH20	2

Filter

XUZ MU01

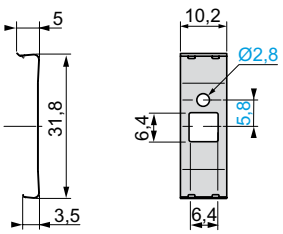
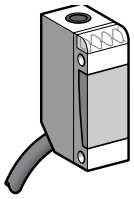
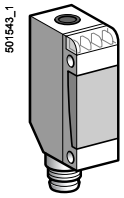


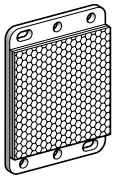
Photo-electric sensors
OsiSense XU, general purpose
Multimode function
Miniature design
Three-wire DC, solid-state output

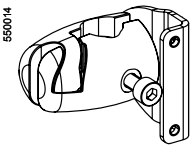


XUM 0A●●●L2

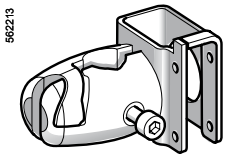


XUM 0A●●●M8

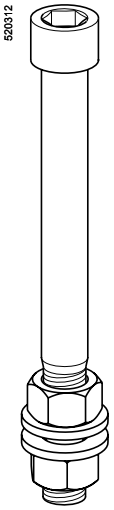

XUZ C50



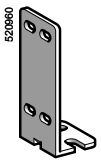
XUZ M2003



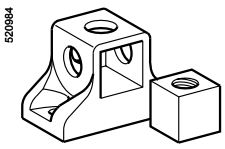
XUZ M2004



XUZ 2001



XUZ A50



XUZ 2003

Miniature design, DC

Sensing distance (Sn) m	Function	Output	Connection	Reference	Weight kg
0…10 depending on whether accessories are used	NO or NC, by programming	PNP	Pre-cabled (L = 2 m) *(1)*	**XUM 0APSAL2**	0.050
			M8 connector	**XUM 0APSAM8**	0.035
		NPN	Pre-cabled (L = 2 m) *(1)*	**XUM 0ANSAL2**	0.050
			M8 connector	**XUM 0ANSAM8**	0.035

Accessories

Description	Connection	Reference	Weight kg
Thru-beam transmitter	Pre-cabled (L = 2 m) *(1)*	**XUM 0AKSAL2T**	0.050
	M8 connector	**XUM 0AKSAM8T**	0.035
Reflector 50 x 50 mm	–	**XUZ C50**	0.020

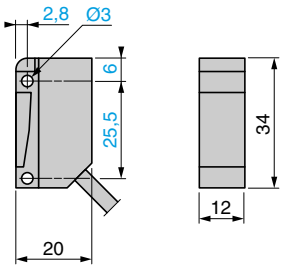
Fixing accessories *(2)*

Description	Reference	Weight kg
3D fixing kit for use on M12 rod, for XUM or XUZ C50	**XUZ M2003**	0.140
3D fixing kit for use on M12 rod and with protective cover for XUM	**XUZ M2004**	0.155
M12 rod	**XUZ 2001**	0.050
Support for M12 rod	**XUZ 2003**	0.150
Fixing bracket	**XUZ A50**	0.015

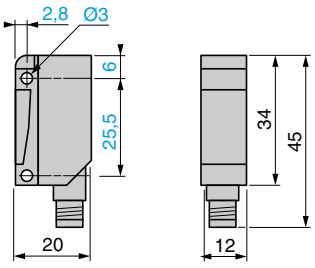
*(1) For a 5 m long cable, replace L2 by **L5**.*
*Example: XUM 0APSAL2 becomes **XUM 0APSAL5**.*
(2) For further information, see page 5/158.

Dimensions (mm)

XUM 0A●●●L2



XUM 0A●●●M8



Possible orientation of elbowed connector

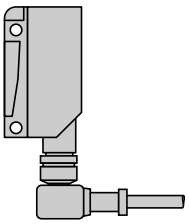


Photo-electric sensors
OsiSense XU, general purpose
Multimode function
Miniature design
Three-wire DC, solid-state output

Characteristics

Sensor type			XUM ●●●●●M8	XUM ●●●●●L2
Product certifications			UL, CSA, CE	
Connection	Connector		M8	–
	Pre-cabled		–	Length: 2 m
Nominal sensing distance Sn (excess gain = 2)		m	**0.11 / 0.11 without accessory (diffuse with background suppression)**	
		m	**0.4 / 0.55 without accessory (diffuse)**	
		m	**3 / 4 with reflector (polarised reflex)**	
		m	**10 / 14 with transmitter for thru-beam function (thru-beam)**	
Type of transmission			Infrared, except polarised reflex (red)	
Degree of protection	Conforming to IEC 60529		IP 65, IP 67	IP 65, IP 67, double insulation ⧈
Storage temperature		°C	- 40…+ 70	
Operating temperature		°C	- 25…+ 55	
Materials	Case		PBT	
	Lens		PMMA	
	Cable		–	PvR
Vibration resistance	Conforming to IEC 60068-2-6		7 gn, amplitude ± 1.5 mm (f = 10 to 55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms	
Indicator lights	Output state		Yellow LED (transmission present for **XUM 0●●●●●●T**)	
	Supply on		Green LED	
	Optical alignment aid/dirty		Red LED (except for **XUM 0●●●●●●T**)	
Rated supply voltage		V	⎓ 12…24 with protection against reverse polarity	
Voltage limits (including ripple)		V	⎓ 10…30	
Current consumption, no-load		mA	35 (20 for **XUM 0●●●●●●T**)	
Switching capacity		mA	⩽ 100 with overload and short-circuit protection	
Voltage drop, closed state		V	⩽ 1.5	
Maximum switching frequency		Hz	250 (200 for diffuse with background suppression)	
Delays	First-up	ms	< 200	
	Response	ms	< 2 (< 2.5 for diffuse with background suppression)	
	Recovery	ms	< 2 (< 2.5 for diffuse with background suppression)	

Wiring schemes

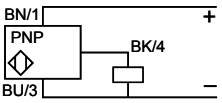
M8 connector

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

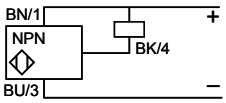
Pre-cabled

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

Receiver, PNP output

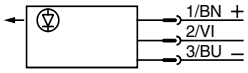


Receiver, NPN output



Thru-beam function transmitter

Transmitter

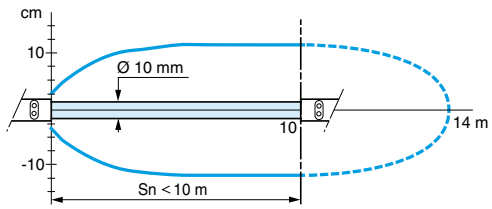


Input 2/VI:
- not connected: *beam made*
- connected to –: *beam broken*

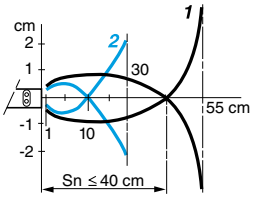
See connection on page 9/44.

Detection curves

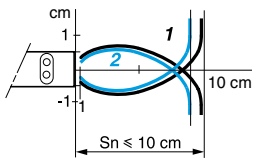
With thru-beam accessory (thru-beam)



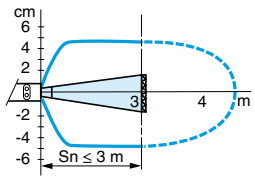
Without accessory (diffuse)



Without accessory (diffuse with background suppression)



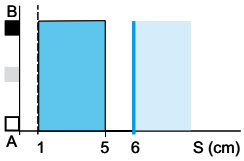
With reflector (polarised reflex)



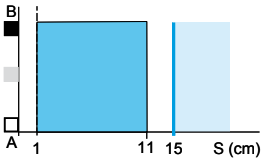
*Object: 10 x 10 cm, **1**: white 90%, 2: grey 18%*

Variation of usable sensing distance Su (without accessory, with adjustable background suppression)

Teach mode at minimum.



Teach mode at maximum.

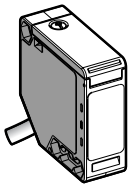


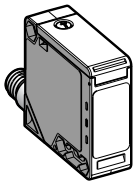
A-B: *object reflection coefficient*
- *Black 6%*
- *Grey 18%*
- *White 90%*
- *Sensing range*
- *Non sensing zone (matt surfaces)*

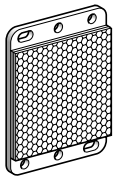
(1) Beam break input on thru-beam transmitter only.

Photo-electric sensors

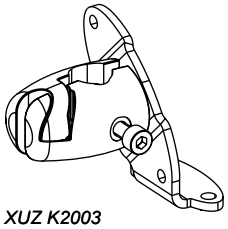
OsiSense XU, general purpose, single mode function
Compact design, 50 x 50
Five-wire AC or DC, 1 CO relay output
Three-wire DC, solid-state output

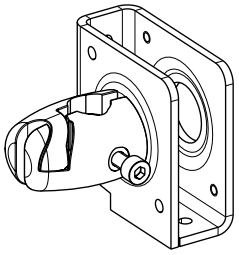

XUK ●A●●●L2

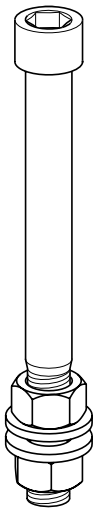

XUK ●A●●●M12

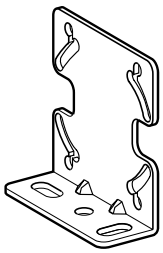

XUZ C50

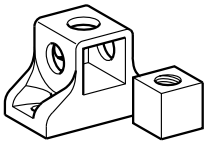
Sensing distance (Sn) m	Function	Output	Connection	Reference	Weight kg
Diffuse system with adjustable sensitivity					
DC					
1	NO	PNP	Pre-cabled (L = 2 m) *(1)*	**XUK 5APANL2**	0.190
			M12 connector	**XUK 5APANM12**	0.070
		NPN	Pre-cabled (L = 2 m) *(1)*	**XUK 5ANANL2**	0.190
			M12 connector	**XUK 5ANANM12**	0.070
	NC	PNP	Pre-cabled (L = 2 m) *(1)*	**XUK 5APBNL2**	0.190
			M12 connector	**XUK 5APBNM12**	0.070
		NPN	Pre-cabled (L = 2 m) *(1)*	**XUK 5ANBNL2**	0.190
			M12 connector	**XUK 5ANBNM12**	0.070
AC or DC					
1	NO + NC	Relay	Pre-cabled (L = 2 m) *(1)*	**XUK 5ARCNL2**	0.190
Polarised reflex system					
DC					
5	NO	PNP	Pre-cabled (L = 2 m) *(1)*	**XUK 9APANL2**	0.190
			M12 connector	**XUK 9APANM12**	0.070
		NPN	Pre-cabled (L = 2 m) *(1)*	**XUK 9ANANL2**	0.190
			M12 connector	**XUK 9ANANM12**	0.070
	NC	PNP	Pre-cabled (L = 2 m) *(1)*	**XUK 9APBNL2**	0.190
			M12 connector	**XUK 9APBNM12**	0.070
		NPN	Pre-cabled (L = 2 m) *(1)*	**XUK 9ANBNL2**	0.190
			M12 connector	**XUK 9ANBNM12**	0.070
DC or **AC**					
5	NO + NC	Relay	Pre-cabled (L = 2 m) *(1)*	**XUK 9ARCNL2**	0.190
Reflector 50 x 50 mm *(2)*		–	–	**XUZ C50**	0.020
Reflex system					
DC					
7	NO	PNP	Pre-cabled (L = 2 m) *(1)*	**XUK 1APANL2**	0.070
			M12 connector	**XUK 1APANM12**	0.070
		NPN	Pre-cabled (L = 2 m) *(1)*	**XUK 1ANANL2**	0.070
			M12 connector	**XUK 1ANANM12**	0.070
	NC	PNP	Pre-cabled (L = 2 m) *(1)*	**XUK 1APBNL2**	0.070
			M12 connector	**XUK 1APBNM12**	0.070
		NPN	Pre-cabled (L = 2 m) *(1)*	**XUK 1ANBNL2**	0.070
			M12 connector	**XUK 1ANBNM12**	0.070
AC or DC					
7	NO + NC	Relay	Pre-cabled (L = 2 m) *(1)*	**XUK 1ARCNL2**	0.175
Reflector 50 x 50 mm *(2)*		–	–	**XUZ C50**	0.020
Thru-beam system					
DC					
Transmitter 30	–	–	Pre-cabled (L = 2 m) *(1)*	**XUK 2AKSNL2T**	0.190
	–	–	M12 connector	**XUK 2AKSNM12T**	0.070
Receiver 30	NO	PNP	Pre-cabled (L = 2 m) *(1)*	**XUK 2APANL2R**	0.140
			M12 connector	**XUK 2APANM12R**	0.075
		NPN	Pre-cabled (L = 2 m) *(1)*	**XUK 2ANANL2R**	0.140
			M12 connector	**XUK 2ANANM12R**	0.075
	NC	PNP	Pre-cabled (L = 2 m) *(1)*	**XUK 2APBNL2R**	0.140
			M12 connector	**XUK 2APBNM12R**	0.075
		NPN	Pre-cabled (L = 2 m) *(1)*	**XUK 2ANBNL2R**	0.140
			M12 connector	**XUK 2ANBNM12R**	0.075
AC or DC					
Transmitter, 30	–	–	Pre-cabled (L = 2 m) *(1)*	**XUK 2ARCNL2T**	0.140
Receiver, 30	NO + NC	Relay	Pre-cabled (L = 2 m) *(1)*	**XUK 2ARCNL2R**	0.070


XUZ K2003


XUZ K2004


XUZ 2001


XUZ A51


XUZ 2003

Fixing accessories *(2)*

Description	Reference	Weight kg
3D fixing kit for use on M12 rod, for XUK or XUZ C50	**XUZ K2003**	0.170
3D fixing kit for use on M12 rod, with protective cover for XUK	**XUZ K2004**	0.270
M12 rod	**XUZ 2001**	0.050
Support for M12 rod	**XUZ 2003**	0.150
Fixing bracket	**XUZ A51**	0.050

*(1) For a 5 m long cable replace L2 by **L5**; for a 10 m long cable replace L2 by **L10**. Example: XUK 5APANL2 becomes **XUK 5APANL5** or **XUK 5APANL10.***
For availability, please consult our Customer Care Centre.
(2) For further information, see page 5/158.

Photo-electric sensors

OsiSense XU, general purpose, single mode function
Compact design, 50 x 50
Five-wire AC or DC, 1 CO relay output
Three-wire DC, solid-state output

Characteristics

Sensor type			XUK ●●●●●M12	XUK ●●●●●L2
Product certifications			UL, CSA, CE	
Connection			M12 connector	Pre-cabled, length: 2 m
Sensing distance **nominal Sn / maximum** (excess gain = 2) (excess gain = 1)		**m**	PNP/NPN or relay output **1 / 1.5 diffuse**	
		m	PNP/NPN or relay output **5 / 8 polarised reflex**	
		m	PNP/NPN or relay output **7 / 10 reflex**	
		m	PNP/NPN or relay output **30 / 45 thru-beam**	
Type of transmission			Infrared, except polarised reflex (red)	
Degree of protection	Conforming to IEC 60529		IP 65, double insulation ⧈	
Storage temperature		**°C**	- 40…+ 70	
Operating temperature		**°C**	- 25…+ 55	
Materials	Case		PBT	
	Lens		PMMA	
	Cable		–	PVC
Vibration resistance	Conforming to IEC 60068-2-6		7 gn, amplitude ± 1.5 mm (f = 10 to 55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms	
Indicator lights	Output state		Yellow LED (except for **XUK 2●●●●●●T**)	
	Supply on		Green LED (only for **XUK 2●●●●●●T)**	
Rated supply voltage	PNP/NPN	**V**	12…24 with protection against reverse polarity	
	Relay output	**V**	–	≂ 24…240
Voltage limits (including ripple)	PNP/NPN	**V**	⎓ 10…36	
	Relay output	**V**	–	≂ 20…264
Current consumption, no-load	PNP/NPN	**mA**	⩽ 35	
Power consumption	Relay output	**W**	–	≂ 2
Switching capacity	PNP/NPN	**mA**	⩽ 100 with overload and short-circuit protection	
	Relay output	**A**	–	≂ 3
Voltage drop, closed state		**V**	⩽ 1.5	
Maximum switching frequency	PNP/NPN	**Hz**	250	
	Relay output	**Hz**	–	20
Delays	First-up	**ms**	< 15 (PNP/NPN); < 60 (relay output)	
	Response	**ms**	< 2 (PNP/NPN); < 25 (relay output)	
	Recovery	**ms**	< 2 (PNP/NPN); < 25 (relay output)	

Wiring schemes

M12 connector

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

See connection on page 9/44.

(1) Beam break input on thru-beam transmitter only.

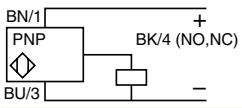
Pre-cabled, PNP/NPN

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

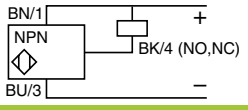
Pre-cabled, relay output

(≂) BU (Blue), (≂) BN (Brown)
Relay common/GY (Grey)
NO BK (Black)
NC WH (White)

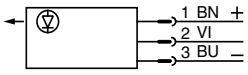
Receiver, PNP output



Receiver, NPN output

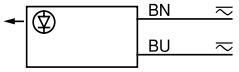


Thru-beam transmitter ⎓

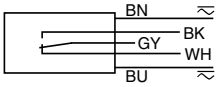


Input 2/VI:
- not connected: *beam made*
- connected to –: *beam broken*

Thru-beam transmitter ≂

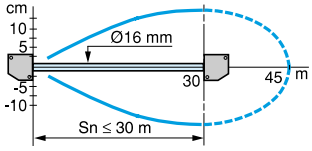


Relay output



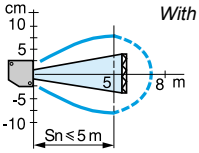
Detection curves

Thru-beam system



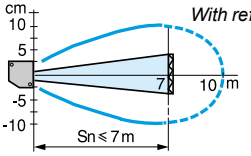
Polarised reflex system

With reflector XUZ C50

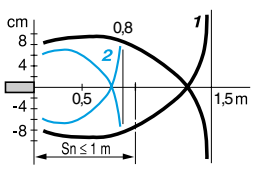


Reflex system

With reflector XUZ C50



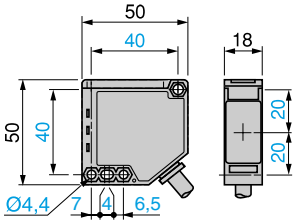
Diffuse system



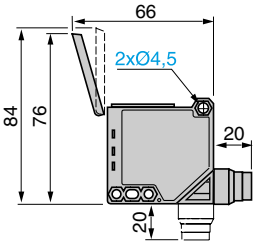
Object: 10 x 10 cm,
***1**: white 90%, **2**: grey 18%*

Dimensions

XUK ●●●●●L2



XUK ●●●●●M12



Possible orientation of elbowed connector

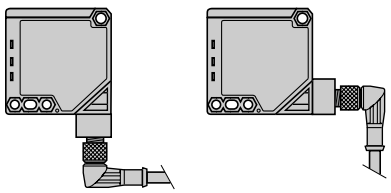
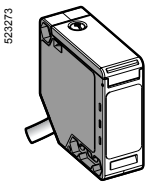


Photo-electric sensors

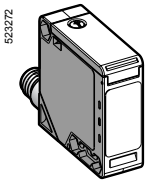
OsiSense XU, general purpose, multimode function

Compact design 50 x 50

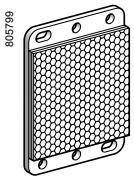
5-wire AC or DC, 1 CO relay output



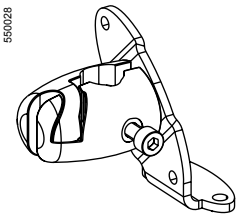
XUK 0AKSAL2



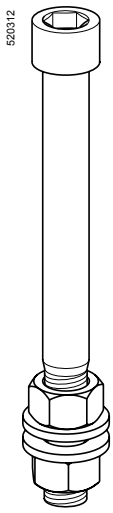
XUK 0AKSAM12



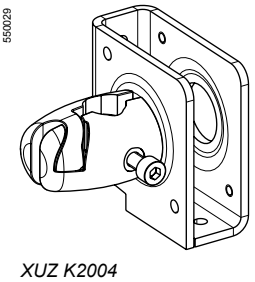
XUZ C50



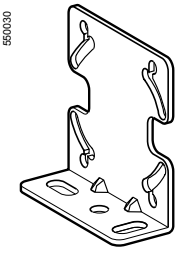
XUZ K2003



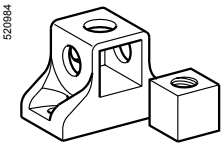
XUZ 2001



XUZ K2004



XUZ A51



XUZ 2003

References

DC

Sensing distance (Sn) m	Function	Output	Connection	Reference	Weight kg
0…30 depending on whether accessories are used	NO or NC, by programming	PNP/NPN	Pre-cabled (L = 2 m) *(1)*	**XUK 0AKSAL2**	0.175
			M12 connector	**XUK 0AKSAM12**	0.090

Accessories

Description	Connection	Reference	Weight kg
Transmitter for thru-beam function	Pre-cabled (L = 2 m) *(1)*	**XUK 0AKSAL2T**	0.140
	M12 connector	**XUK 0AKSAM12T**	0.090
Reflector 50 x 50 mm	–	**XUZ C50**	0.020

AC or DC

Sensing distance (Sn) m	Function	Output	Connection	Reference	Weight kg
0…30 depending on whether accessories are used	NO or NC, by programming	Time delay relay	Pre-cabled (L = 2 m) *(1)*	**XUK 0ARCTL2**	0.175

Accessories

Description	Connection	Reference	Weight kg
Transmitter for thru-beam function	Pre-cabled (L = 2 m) *(1)*	**XUK 0ARCTL2T**	0.140
Reflector 50 x 50 mm	–	**XUZ C50**	0.020

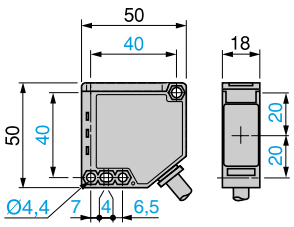
Fixing accessories *(2)*

Description	Reference	Weight kg
3D fixing kit for use on M12 rod, for XUK or XUZ C50	**XUZ K2003**	0.170
3D fixing kit for use on M12 rod, with protective cover for XUK	**XUZ K2004**	0.270
M12 rod	**XUZ 2001**	0.050
Support for M12 rod	**XUZ 2003**	0.150
Fixing bracket	**XUZ A51**	0.050

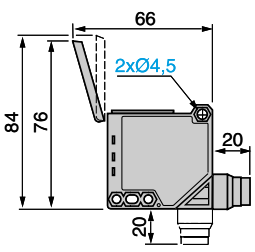
*(1) For a 5 m long cable replace L2 by **L5**; for a 10 m long cable replace L2 by **L10**.*
*Example: XUK 0AKSAL2 becomes **XUK 0AKSAL5** or **XUK 0AKSAL10.***
(2) For further information, see page 5/158.

Dimensions (mm)

XUK 0A●●●L2



XUK 0A●●●M12



Possible orientation of elbowed connector

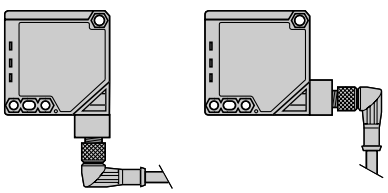


Photo-electric sensors

OsiSense XU, general purpose, multimode function

Compact design 50 x 50
5-wire AC or DC, 1 CO relay output

Characteristics

Sensor type			XUK ●●●●●M12	XUK ●●●●●L2
Product certifications			UL, CSA, CE	
Connection			M12 connector	Pre-cabled, length: 2 m
Sensing distance nominal Sn / maximum (excess gain = 2) (excess gain = 1)		m	**0.28 / 0.28 without accessory (diffuse with background suppression)**	
		m	**0.8 / 1.2 without accessory (diffuse)**	
		m	**4 / 5.7 with reflector (polarised reflex)**	
		m	**30 / 35 with transmitter for thru-beam function (thru-beam)**	
Type of transmission			Infrared, except polarised reflex (red)	
Degree of protection	Conforming to IEC 60529		IP 65, double insulation ⧈	
Storage temperature		°C	- 40…+ 70	
Operating temperature		°C	- 25…+ 55	
Materials	Case		PBT	
	Lens		PMMA	
	Cable		–	PvR
Vibration resistance	Conforming to IEC 60068-2-6		7 gn, amplitude ± 1.5 mm (f = 10 to 55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms	
Indicator lights	Output state		Yellow LED (transmission present for **XUK 0●●●●●●T**)	
	Supply on		Green LED	
	Optical alignment aid/dirty		Red LED (except for **XUK 0●●●●●●T**)	
Alarm output		mA	⩽ 50 with overload and short-circuit protection (except XUK 0ARCT●)	
Rated supply voltage	PNP/NPN	V	12…24 ⎓ with protection against reverse polarity	
	Relay output	V	–	≂ 24…240
Voltage limits (including ripple)	PNP/NPN	V	10…36 ⎓	
	Relay output	V	–	≂ 20…264
Current consumption, no-load	PNP/NPN	mA	⩽ 35; 20 for **XUK 0AK●●●●T**	
Power consumption	Relay output	W	–	3 ∿ or ⎓
Switching capacity	PNP/NPN	mA	⩽ 100 with overload and short-circuit protection	
	Relay output	A	–	3 ∿ or ⎓
Voltage drop, closed state		V	⩽ 1.5	
Time delay	Relay output	s	0…10 on-delay, off-delay, monostable	
Maximum switching frequency	PNP/NPN	Hz	250 (200 for diffuse with background suppression)	
	Relay output	Hz	–	20
Delays	First-up	ms	< 200 (PNP/NPN); < 300 (relay output)	
	Response	ms	< 2 (PNP/NPN); < 25 (relay output) (< 2.5 for diffuse with background suppression)	
	Recovery	ms	< 2 (PNP/NPN); < 25 (relay output) (< 2.5 for diffuse with background suppression)	

Wiring schemes

M12 connector

3 (-)
1 (+)
4 OUT/Output
2 Alarm or beam break input *(1)*

See connection on page 9/44

(1) Beam break input on thru-beam transmitter only.

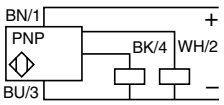
Pre-cabled

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

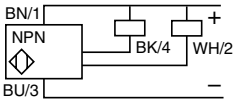
Pre-cabled, relay output

(≂) BU (Blue)
(≂) BN (Brown)
Relay common/GY (Grey)
NO BK (Black)
NC WH (White)

Receiver, PNP output

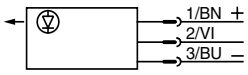


Receiver, NPN output



Thru-beam transmitter ⎓

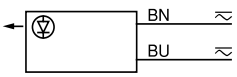
Transmitter



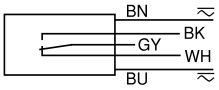
Input 2/VI:
- not connected: *beam made*
- connected to –: *beam broken*

Thru-beam transmitter ∿

Transmitter

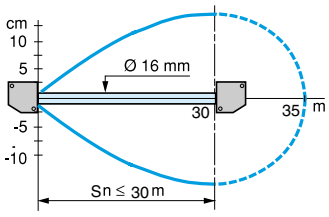


Relay output

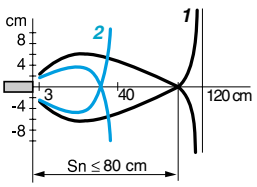


Detection curves

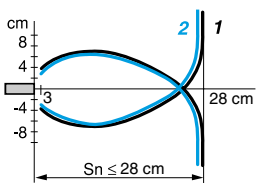
With thru-beam accessory (thru-beam)



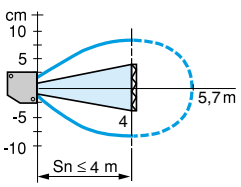
Without accessory (diffuse)



Without accessory (diffuse with background suppression)



With reflector (polarised reflex)

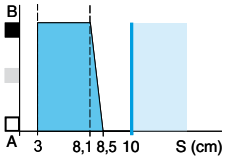


*Object 10 x 10 cm; **1** White 90%; **2** Grey 18%*

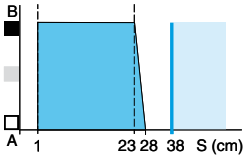
With reflector XUZ C50

Variation of usable sensing distance Su (without accessory, with adjustable background suppression)

Teach mode at minimum



Teach mode at maximum



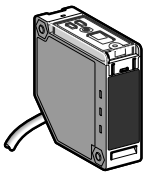
A-B: *object reflection coefficient*
Black 6%
Grey 18%
White 90%
Sensing range
Non sensing zone (matt surfaces)

Photo-electric sensors

OsiSense XU, general purpose

With adjustable background suppression
Mechanical display of setting
DC supply. Solid-state output

Compact design



System		**Diffuse with adjustable background suppression, long sensing distance with high accuracy**	
Type of transmission		Infrared	
Nominal sensing distance (Sn)		**1 m**	

References

3-wire, PNP or NPN programmable	NO or NC programmable function	**XUK 8AKSNL2**	**XUK 8AKSNM12**
Weight (kg)		0.190	0.070

Characteristics

Product certifications		CE, UL, CSA	
Ambient air temperature		For operation: - 25…+ 55 °C. For storage: - 30…+ 70 °C	
Vibration resistance	Conforming to IEC 60068-2-6	7 gn (f = 10…55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27	10 gn, duration 11 ms	
Degree of protection	Conforming to IEC 60529	IP 65 (IP 30 with cover open). NEMA 4X indoor use, 12 and 13 double insulation	
Materials		Case: PC, lenses: PMMA, cable: PVC	
Connection *(1)*		Pre-cabled, diameter 6 mm, length 2 m, wire c.s.a.: 5 x 0.34 mm^2	M12 male connector, 4-pin, can be set at 2 positions (suitable female connectors, including pre-wired versions, see page 9/44)
Rated supply voltage		**⎓ 12…24 V with protection against reverse polarity**	
Voltage limits		⎓ 10…36 V (including ripple)	
Switching capacity (sealed)		**⩽ 100 mA with overload and short-circuit protection**	
Voltage drop, closed state		⩽ 1.5 V	
Current consumption, no-load		35 mA	
Maximum switching frequency		250 Hz	
Delays		First-up: ⩽ 80 ms; response: ⩽ 2 ms; recovery: ⩽ 2 ms	

Function table	**Function**	**Diffuse system**	
		No object present in the beam	**Object present in the beam**
Output state (PNP or NPN) indicator: yellow LED (illuminated when sensor output is ON)	NO		
	NC		

*(1) For a 5 m long cable replace L2 by **L10**.*

Photo-electric sensors

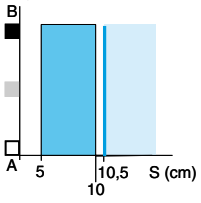
OsiSense XU, general purpose

With adjustable background suppression
Mechanical display of setting
DC supply. Solid-state output

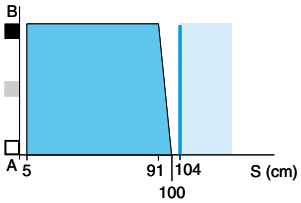
Detection curves

Variation of usable sensing distance Su

Adjustment at 10 cm



Adjustment at 1 m

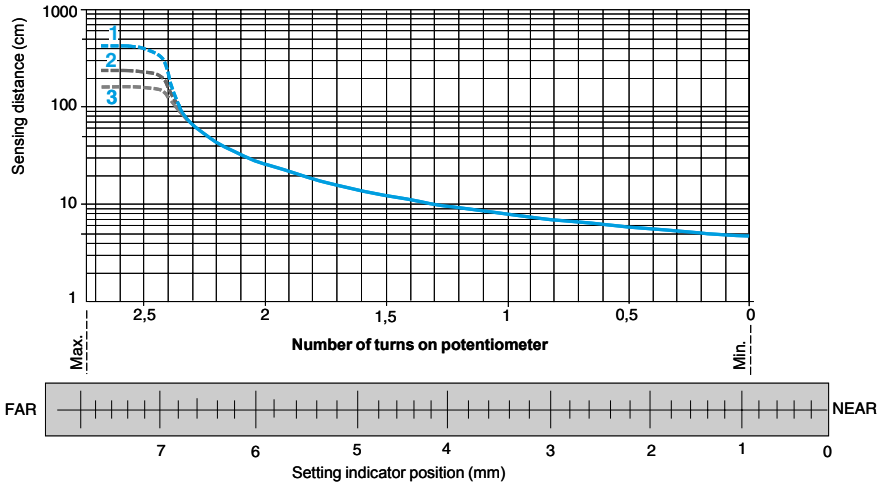


A-B: Object reflection coefficient

- Black 6%
- Grey 18%
- White 90%

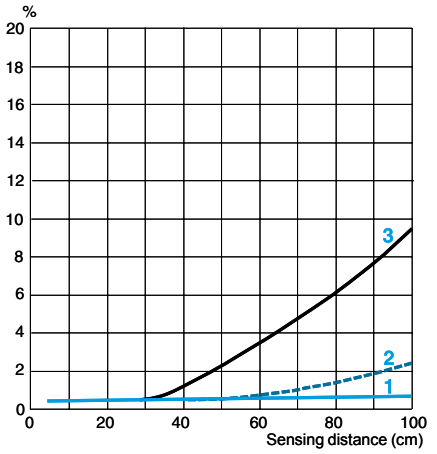
- Sensing range
- Non sensing zone (Matt surfaces)

Sensing distance adjustment



1 White 90%
2 Grey 18%
3 Black 6%

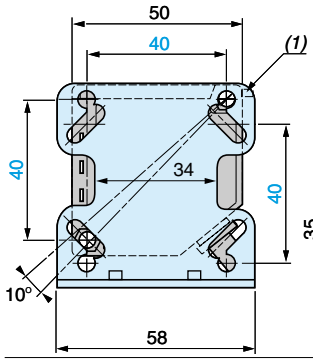
Relative difference in sensing distances according to object colour



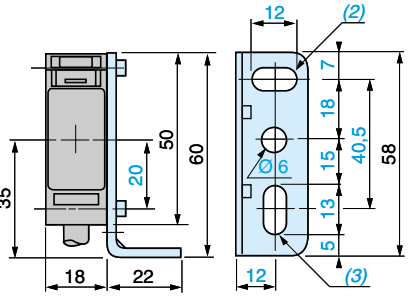
1 White 90%
2 Grey 18%
3 Black 6%

Dimensions

XUK 8AKSNL2

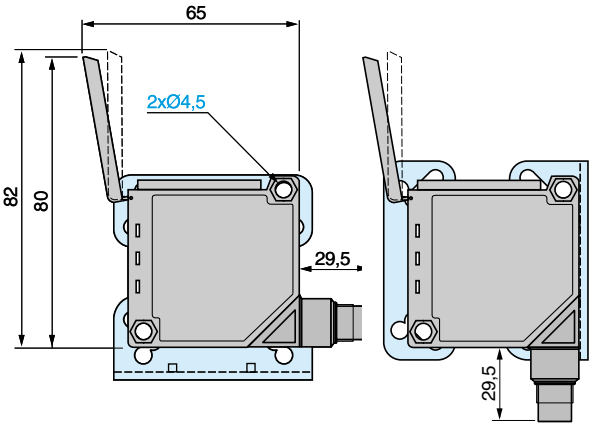


Bracket fixing

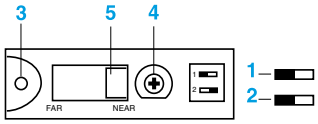


(1) Cover locking tongue.
(2) 1 elongated hole Ø 6 x 12.
(3) 1 elongated hole Ø 6 x 13.

XUK 8AKSNM12 with cover raised



Functions

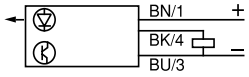


Switches
1 NO/NC programming
2 PNP or NPN output
LED
3 Yellow LED, output
Potentiometer
4 Sensing distance adjustment
Setting indicator
5 Potentiometer setting indication

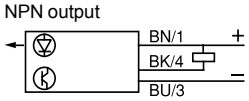
Wiring schemes (3-wire ⎓)

NO/NC programming

PNP output



NPN output



NO: detection of object presence
NC: detection of object absence

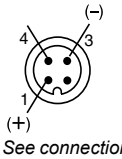
Cable connections

XUK 8AKSNL2

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

Connector scheme

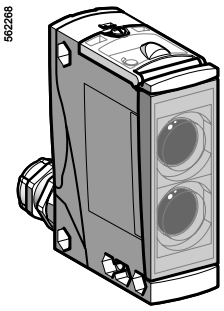
XUK 8AKSNM12



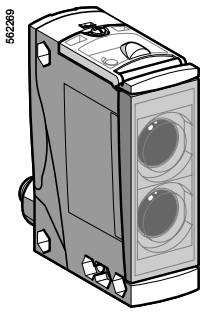
See connection on page 9/44.

Photo-electric sensors

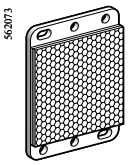
OsiSense XU, general purpose, single mode function
Compact design
Five-wire AC or DC, 1 CO relay output
Three-wire DC, solid-state output



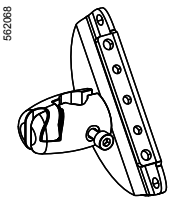
XUX ●A●●●T16



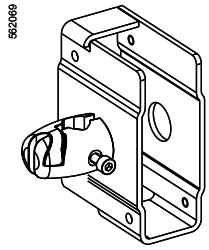
XUX ●A●●●M12



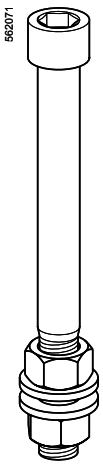
XUZ C50



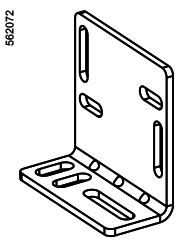
XUZ X2003



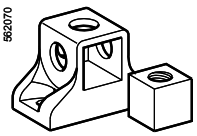
XUZ X2004



XUZ 2001



XUZ X2000



XUZ 2003

Sensing distance (Sn) m	Function	Output	Connection	Reference	Weight kg
Diffuse system *(1)*					
DC					
2.1	NO	PNP	Screw terminals *(3)*	**XUX 5APANT16**	0.200
			M12 connector	**XUX 5APANM12**	0.200
		NPN	Screw terminals *(3)*	**XUX 5ANANT16**	0.200
			M12 connector	**XUX 5ANANM12**	0.200
	NC	PNP	Screw terminals *(3)*	**XUX 5APBNT16**	0.200
			M12 connector	**XUX 5APBNM12**	0.200
		NPN	Screw terminals *(3)*	**XUX 5ANBNT16**	0.200
			M12 connector	**XUX 5ANBNM12**	0.200
AC or DC					
2.1	NO + NC	Relay	Screw terminals *(3)*	**XUX 5ARCNT16**	0.200
Polarised reflex system *(1)*					
DC					
11	NO	PNP	Screw terminals *(3)*	**XUX 9APANT16**	0.200
			M12 connector	**XUX 9APANM12**	0.200
		NPN	Screw terminals *(3)*	**XUX 9ANANT16**	0.200
			M12 connector	**XUX 9ANANM12**	0.200
	NC	PNP	Screw terminals *(3)*	**XUX 9APBNT16**	0.200
			M12 connector	**XUX 9APBNM12**	0.200
		NPN	Screw terminals *(3)*	**XUX 9ANBNT16**	0.200
			M12 connector	**XUX 9ANBNM12**	0.200
AC or DC					
11	NO + NC	Relay	Screw terminals *(3)*	**XUX 9ARCNT16**	0.200
Reflector 50 x 50 mm *(2)*		–	–	**XUZ C50**	0.020
Reflex system *(1)*					
DC					
14	NO	PNP	Screw terminals *(3)*	**XUX 1APANT16**	0.200
			M12 connector	**XUX 1APANM12**	0.200
		NPN	Screw terminals *(3)*	**XUX 1ANANT16**	0.200
			M12 connector	**XUX 1ANANM12**	0.200
	NC	PNP	Screw terminals *(3)*	**XUX 1APBNT16**	0.200
			M12 connector	**XUX 1APBNM12**	0.200
		NPN	Screw terminals *(3)*	**XUX 1ANBNT16**	0.200
			M12 connector	**XUX 1ANBNM12**	0.200
AC or DC					
14	NO + NC	Relay	Screw terminals *(3)*	**XUX 1ARCNT16**	0.200
Reflector 50 x 50 mm *(2)*		–	–	**XUZ C50**	0.020
Thru-beam system *(1)*					
DC					
Transmitter 40			Screw terminals *(3)*	**XUX 0AKSAT16T**	0.200
			M12 connector	**XUX 0AKSAM12T**	0.200
Receiver 40	NO	PNP	Screw terminals *(3)*	**XUX 2APANT16R**	0.200
			M12 connector	**XUX 2APANM12R**	0.200
		NPN	Screw terminals *(3)*	**XUX 2ANANT16R**	0.200
			M12 connector	**XUX 2ANANM12R**	0.200
	NC	PNP	Screw terminals *(3)*	**XUX 2APBNT16R**	0.200
			M12 connector	**XUX 2APBNM12R**	0.200
		NPN	Screw terminals *(3)*	**XUX 2ANBNT16R**	0.200
			M12 connector	**XUX 2ANBNM12R**	0.200
AC or DC					
Transmitter 40			Screw terminals *(3)*	**XUX 0ARCTT16T**	0.200
Receiver 40	NO + NC	Relay	Screw terminals *(3)*	**XUX 2ARCNT16R**	0.200

Fixing accessories *(2)*		
Description	**Reference**	**Weight kg**
3D fixing kit for use on M12 rod, for XUX or XUZ C50	**XUZ X2003**	0.220
3D fixing kit for use on M12 rod, with protective cover for XUX	**XUZ X2004**	0.420
M12 rod	**XUZ 2001**	0.050
Support for M12 rod	**XUZ 2003**	0.150
Fixing bracket	**XUZ X2000**	0.120

(1) With adjustable sensitivity.
(2) For further information, see page 5/158.
(3) Screw terminals with ISO 16 cable gland for cable Ø 7 to 10 mm.

Photo-electric sensors

OsiSense XU, general purpose, single mode function
Compact design
Five-wire AC or DC, 1 CO relay output
Three-wire DC, solid-state output

Characteristics

Sensor type			XUX●●●●●M12	XUX ●AN●NT16, ●AP●NT16	XUX●ARC●T16
Product certifications			UL, CSA, CE		
Connection			M12 connector	Screw terminals, ISO 16 cable gland	
Sensing distance nominal Sn / maximum (excess gain = 2) (excess gain = 1)		**m**	**2.1 / 3 diffuse with adjustable sensitivity**		
		m	**11 / 15 polarised reflex with adjustable sensitivity**		
		m	**14 / 20 reflex with adjustable sensitivity**		
		m	**40 / 60 thru-beam with adjustable sensitivity**		
Type of transmission			Infrared, except polarised reflex (red)		
Degree of protection	Conforming to IEC 60529		IP 65, IP 67, double insulation ⧈		
Storage temperature		**°C**	- 40…+ 70		
Operating temperature		**°C**	- 25…+ 55		
Materials	Case		PBT		
	Lens		PMMA		
Vibration resistance	Conforming to IEC 60068-2-6		7 gn, amplitude ± 1.5 mm (f = 10 to 55 Hz)		
Shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms		
Indicator lights	Output state		Yellow LED (transmission present for **XUX 0●●●●●●●T** c)		
	Supply on		Green LED		
Rated supply voltage	PNP/NPN	**V**	12…24 with protection against reverse polarity		
	Relay output	**V**	–		24…240 ∼ or ⎓
Voltage limits (including ripple)	PNP/NPN	**V**	⎓ 10...36		
	Relay output	**V**	–		20…264 ∼ or ⎓
Current consumption, no-load	PNP/NPN	**mA**	≤ 35 (20 for **XUX 0●●●●●●●T**)		
Power consumption	Relay output	**W**	–		2 ∼ or ⎓
Switching capacity	PNP/NPN	**mA**	≤ 100 with overload and short-circuit protection		
	Relay output	**A**	–		500 000 operating cycles 3 A: cos φ = 1/0.5 A: cos φ = 0.4
Voltage drop, closed state		**V**	≤ 1.5		
Maximum switching frequency	PNP/NPN	**Hz**	250		
	Relay output	**Hz**	–		20
Delays	First-up	**ms**	< 15 (PNP/NPN); < 60 (relay output)		
	Response	**ms**	< 2 (PNP/NPN); < 25 (relay output)		
	Recovery	**ms**	< 2 (PNP/NPN); < 25 (relay output)		

Wiring schemes

M12 connector

See connection on page 9/44.

Relay output ∼

Terminals	
1	∼
2	∼
3	NO
4	Relay common
5	NC

PNP/NPN ⎓

M12		Terminals	
1	●	1	+
3	●	2	-
4	●	3	Output

Transmitter ⎓

M12		Terminals	
1	●	1	+
3	●	2	-
2	●	3	Beam break input *(1)*

(1) Input not connected: beam made.
Input connected to –: beam broken.

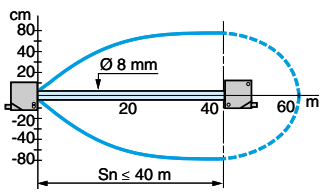
Transmitter ∼

Terminals	
1	∼
2	∼

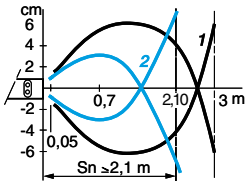
Maximum permissible conductor c.s.a.: 1 x 1.5 mm² or 1 x 0.75 mm² with cable end.

Detection curves

Thru-beam system

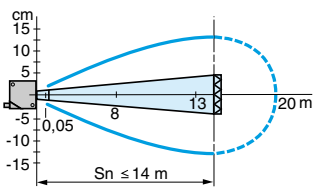


Diffuse system



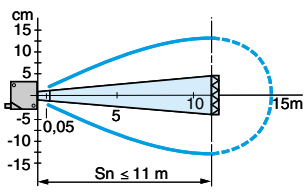
*Object 10 x 10 cm; **1** White 90%; **2** Grey 18%*

Reflex system



With reflector XUZ C50

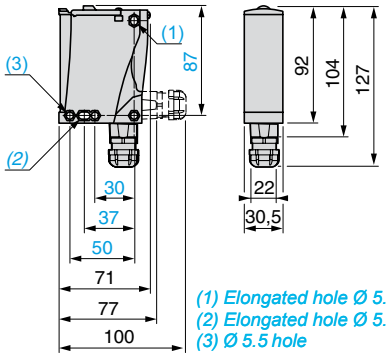
Polarised reflex system



With reflector XUZ C50

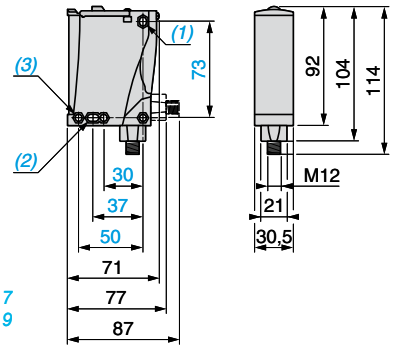
Dimensions

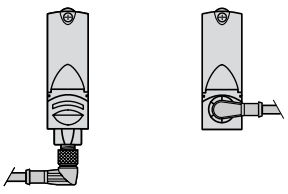
XUX●●●●●T16



(1) Elongated hole Ø 5.5 x 7
(2) Elongated hole Ø 5.5 x 9
(3) Ø 5.5 hole

XUX●●●●●M12

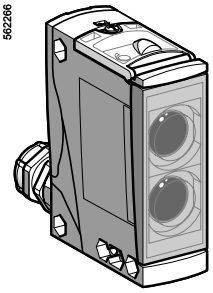




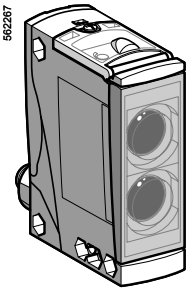
Possible orientation of elbowed connector
(rear view)

Photo-electric sensors

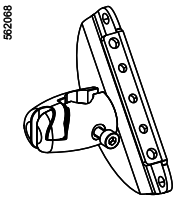
OsiSense XU, general purpose, multimode function *(1)*
Compact design
Five-wire AC or DC, 1 CO relay output
Three-wire DC, solid-state output



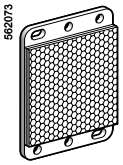
XUX 0ARCTT16



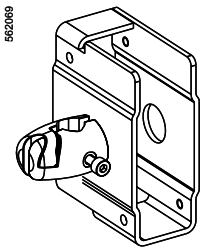
XUX 0AKSAM12



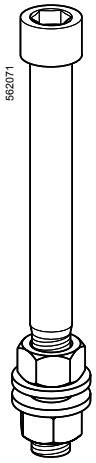
XUZ X2003



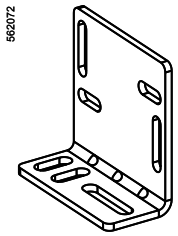
XUZ C50



XUZ X2004

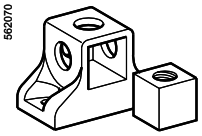


XUZ 2001



XUZ X2000

XUZ X2001



XUZ 2003

References

DC

Sensing distance (Sn) m	Function	Output	Connection	Reference	Weight kg
0…40 depending on whether accessories are used	NO or NC, by programming	PNP/NPN	Screw terminals, ISO 16 cable gland *(3)*	**XUX 0AKSAT16**	0.200
			M12 connector	**XUX 0AKSAM12**	0.200

Accessories

Description	Connection	Reference	Weight kg
Transmitter for thru-beam function	Screw terminals, ISO 16 cable gland *(3)*	**XUX 0AKSAT16T**	0.200
	M12 connector	**XUX 0AKSAM12T**	0.200
Reflector 50 x 50 mm	–	**XUZ C50**	0.020

AC or DC

Sensing distance (Sn) m	Function	Output	Connection	Reference	Weight kg
0…40 depending on whether accessories are used	NO or NC, by programming	Time delay relay	Screw terminals, ISO 16 cable gland *(3)*	**XUX 0ARCTT16**	0.200

Accessories

Description	Connection	Reference	Weight kg
Transmitter for thru-beam function	Screw terminals, ISO 16 cable gland *(3)*	**XUX 0ARCTT16T**	0.200
Reflector 50 x 50 mm		**XUZ C50**	0.020

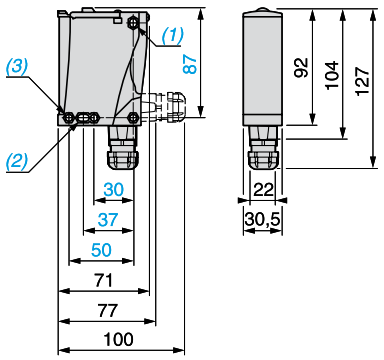
Fixing accessories *(2)*

Description	Reference	Weight kg
3D fixing kit for use on M12 rod, for XUX or XUZ C50	**XUZ X2003**	0.220
3D fixing kit for use on M12 rod, with protective cover for XUX	**XUZ X2004**	0.420
M12 rod	**XUZ 2001**	0.050
Support for M12 rod	**XUZ 2003**	0.150
Fixing bracket	**XUZ X2000**	0.120
Adaptor, ISO 16 - 1/2" NPT	**XUZ X2001**	0.050
Adaptor, ISO 16 - ISO 20	**XUZ X2002**	0.050

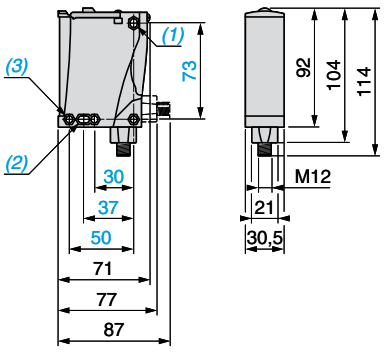
*(1) For further information on **the multimode function**, see page 5/12*
(2) For further information, see page 5/158.
(3) For Ø 7 to 10 mm cable.

Dimensions

XUX●●●●●T16



XUX●●●●●M12



Possible orientation of elbowed connector (rear view)

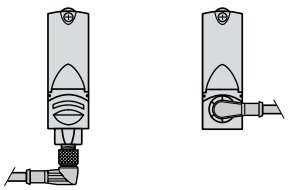


Photo-electric sensors

OsiSense XU, general purpose, multimode function
Compact design
Five-wire AC or DC, 1 CO relay output
Three-wire DC, solid-state output

Characteristics

Sensor type			XUX●●●●●M12	XUX●●●●●T16
Product certifications			UL, CSA, CE	
Connection			M12 connector	Screw terminals, ISO 16 cable gland
Sensing distance		m	**1.3 / 1.3 without accessory (diffuse with background suppression)**	
nominal Sn / maximum		m	**2 / 3 without accessory (diffuse)**	
(excess gain = 2) (excess gain = 1)		m	**11 / 15 with reflector (polarised reflex)**	
		m	**40 / 60 with transmitter for thru-beam function (thru-beam)**	
Type of transmission			Infrared, except for polarised reflex (red)	
Degree of protection	Conforming to IEC 60529		IP 65, IP 67, double insulation ⧈	
Storage temperature		°C	- 40…+ 70	
Operating temperature		°C	- 25…+ 55	
Materials	Case		PBT	
	Lens		PMMA	
Vibration resistance	Conforming to IEC 60068-2-6		7 gn, amplitude ± 1.5 mm (f = 10 to 55 Hz)	
Shock resistance	Conforming to IEC 60067-2-27		30 gn, duration 11 ms	
Indicator lights	Output state		Yellow LED (transmission present for **XUX 0●●●●●●●T**)	
	Supply on		Green LED	
	Stability		Red LED (except for **XUX 0●●●●●●●T**)	
Rated supply voltage	PNP/NPN	V	⎓ 12…24 with protection against reverse polarity	
	Relay output	V	–	24…240 ∿ or ⎓
Voltage limits (including ripple)	PNP/NPN	V	⎓ 10...36	
	Relay output	V	–	20…264 ∿ or ⎓
Current consumption, no-load	PNP/NPN	mA	≤ 35 (20 for **XUX 0●●●●●●●T**)	
Power consumption	Relay output	W	–	2 ∿ or ⎓
Alarm output		mA	≤ 100 with overload and short-circuit protection	
Switching capacity	PNP/NPN	mA	≤ 100 with overload and short-circuit protection	
	Relay output	A	–	500 000 operating cycles 3 A: cos φ = 1/0.5 A: cos φ = 0.4
Voltage drop, closed state		V	≤ 1.5	
Maximum switching frequency	PNP/NPN	Hz	240	
	Relay output	Hz	–	20
Time delay	Relay output	s	–	0.02…15 on-delay, off-delay, monostable
Delays	First-up	ms	< 200	
	Response	ms	< 2 (PNP/NPN); < 25 (relay output)	
	Recovery	ms	< 2 (PNP/NPN); < 25 (relay output)	

Wiring schemes

M12 connector

See connection on page 9/44.

Relay output ∿

Terminals	
1	⊘ ∿
2	⊘ ∿
3	⊘ NO
4	⊘ Relay common
5	⊘ NC

PNP/NPN ⎓

M12		Terminals	
1	●	1 ⊘	+
3	●	2 ⊘	-
4	●	3 ⊘	Output
2	●	4 ⊘	Alarm

Transmitter ⎓

M12		Terminals	
1	●	1 ⊘	+
3	●	2 ⊘	-
2	●	3 ⊘	Beam break input *(1)*

(1) Input not connected: beam made.
Input connected to –: beam broken.

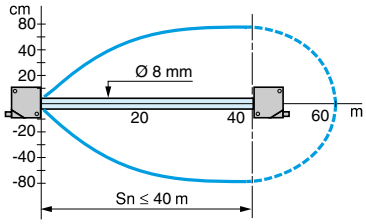
Transmitter ∿

Terminals	
1	⊘ ∿
2	⊘ ∿

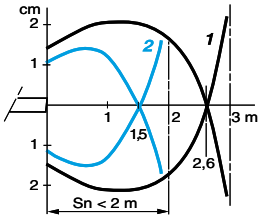
Maximum permissible conductor c.s.a.: 1 x 1.5 mm² or 1 x 0.75 mm² with cable end.

Detection curves

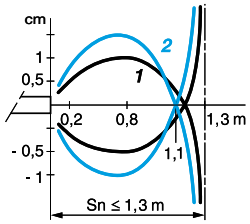
With thru-beam accessory (thru-beam)



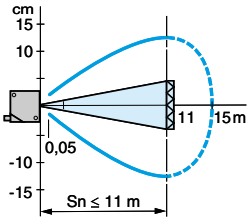
Without accessory (diffuse)



Without accessory(diffuse with background suppression)



With reflector (polarised reflex)

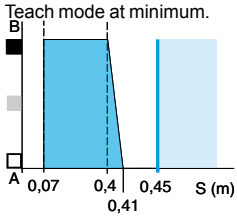


*Object: 10 x 10 cm, **1**: white 90%, **2**: grey 18%*

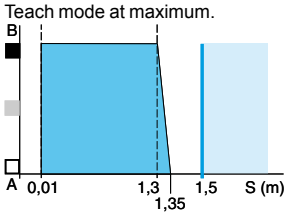
With reflector XUZ C50

Variation of usable sensing distance Su (without accessory, with adjustable background suppression)

Teach mode at minimum.



Teach mode at maximum.



A-B: *object reflection coefficient*
- *Black 6%*
- *Grey 18%*
- *White 90%*
- *Sensing range*
- *Non sensing zone (matt surfaces)*

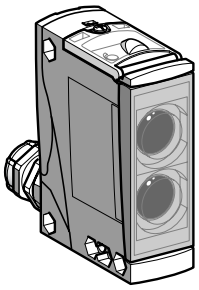
5

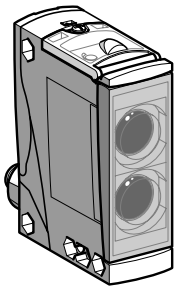
Photo-electric sensors

OsiSense XU, general purpose

With adjustable background suppression
Five-wire AC or DC, 1 CO relay output
Three-wire DC, solid-state output

Compact design





System		**Diffuse with adjustable background suppression, long sensing distance with high accuracy**		
Type of transmission		Infrared		
Nominal sensing distance (Sn)		**2 m**		
References				
5-wire, AC/DC with terminal connections and ISO 16 cable gland	NO or NC programmable function	**XUX 8ARCTT16**	**–**	
3-wire, PNP or NPN programmable	NO or NC programmable function	**–**	**XUX 8AKSAT16**	**XUX 8AKSAM12**
Weight (kg)		0.200	0.200	0.200
Characteristics				
Product certifications		CE, UL, CSA		
Ambient air temperature		For operation: - 25…+ 55 °C. For storage: - 40…+ 70 °C		
Vibration resistance	Conforming to IEC 60068-2-6	7 gn (f = 10…55 Hz)		
Shock resistance	Conforming to IEC 60068-2-27	10 gn, duration 11 ms		
Degree of protection	Conforming to IEC 60529	IP 65, IP 67, double insulation (IP 30 with cover open)		
Materials		Case: PC, lenses: PMMA		
Connection		Terminal connections via ISO 16 cable gland (7 to 10 mm cable)		M12 male connector, 4-pin, can be set at 2 positions
Rated supply voltage		**~ or ⎓ 24…240 V**	**⎓ 12…24 V with protection against reverse polarity**	
Voltage limits		~ or ⎓ 20…264 V (including ripple)	⎓ 10…0.36V (including ripple)	
Switching capacity (sealed)	Relay output	500 000 operating cycles; 3A Cos φ = 1; 0.5 A Cos φ = 0.4		
	PNP/NPN	–	⩽ 100 mA with overload and short-circuit protection	
Indicator light	Output state	Yellow LED		
	Supply on	Green LED		
		Red LED		
Voltage drop, closed state		⩽ 1.5 V		
Current consumption, no-load		35 mA		
Maximum switching frequency	Relay output	20 Hz	–	
	PNP/NPN	–	150 Hz	
Time delay	Relay output	0.02...15 s monostable, on delay or off-delay		
Delays	Relay output	First-up: ⩽ 200 ms; response: ⩽ 25 ms; recovery: ⩽ 25 ms		
	PNP/NPN	–		First-up: ⩽ 200 ms; response: ⩽ 3.5 ms; recovery: ⩽ 2.5 ms

Function table	**Function**	**Diffuse system**	
		No object present in the beam	**Object present in the beam**
Output state (PNP or NPN) indicator: yellow LED (illuminated when sensor output is ON)	NO		
	NC		

Photo-electric sensors

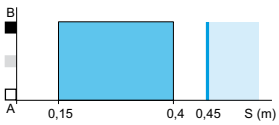
OsiSense XU, general purpose

With adjustable background suppression
Five-wire AC or DC, 1 CO relay output
Three-wire DC, solid-state output

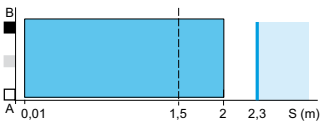
Detection curves

Variation of usable sensing distance Su

Teach mode at minimum



Teach mode at maximum



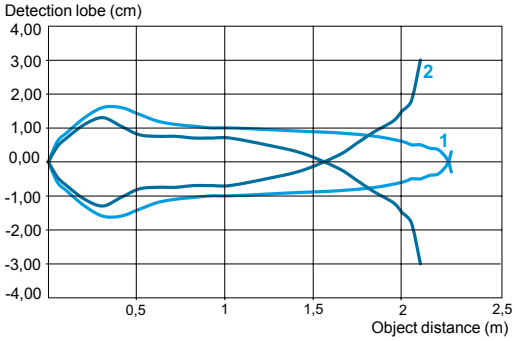
A-B: Object reflection coefficient

Black 6%
Grey 18%
White 90%

Sensing range
Non sensing zone
(Matt surfaces)

Detection curves

Detection lobe (cm)

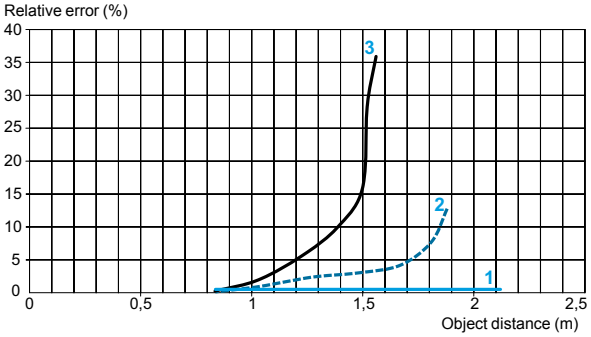


Object: 10 x 10 cm

1 white 90%
2 grey 18%

Relative difference in sensing distances according to object colour

Relative error (%)

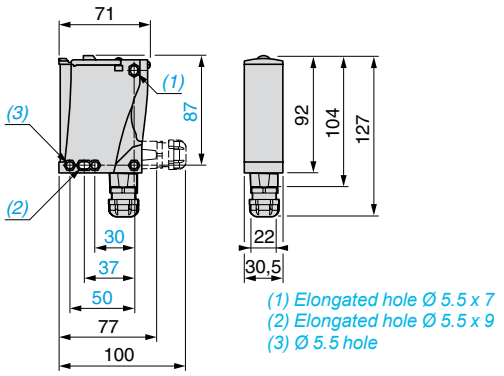


Object: 10 x 10 cm

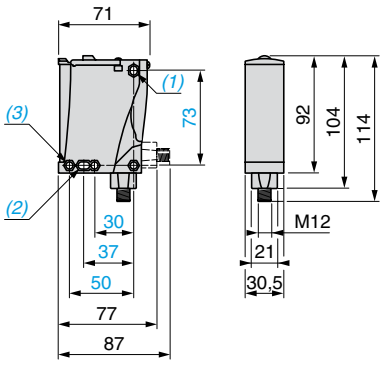
1 white 90%
2 grey 18%
3 black 6%

Dimensions

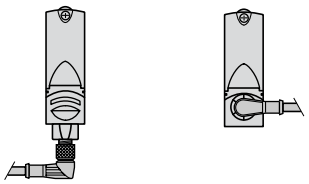
XUX●●●●●T16



XUX●●●●●M12



Possible orientation of elbowed connector (rear view)



Wiring schemes

M12 connector

See connection on page 9/44.

Relay output ≂

Terminals		
1	⊘	≂
2	⊘	≂
3	⊘	NO
4	⊘	Relay common
5	⊘	NC

PNP/NPN ⎓

M12	Terminals		
1	1	⊘	+
3	2	⊘	-
4	3	⊘	Output
2	4	⊘	Alarm inactive

Maximum permissible conductor c.s.a.: 1 x 1.5 mm² or 1 x 0.75 mm² with cable end.

Typical application

Wrapping system/outer wrapping

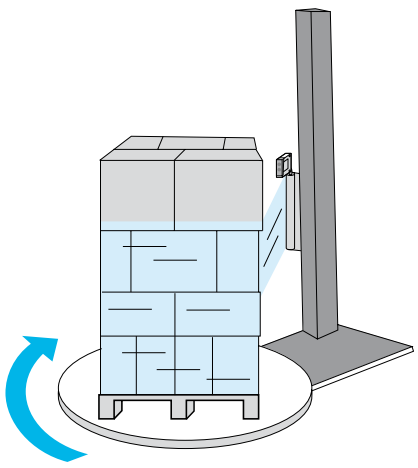
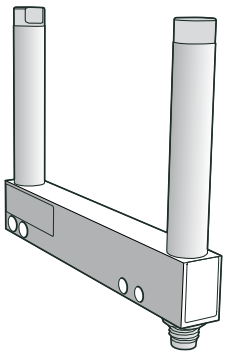


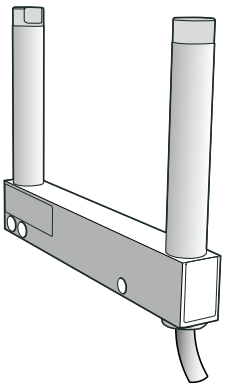
Photo-electric sensors
OsiSense XU
Optical fork without adjustment
DC supply. Solid-state output

Optical fork without adjustment

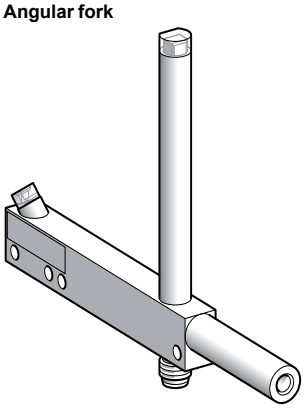
Connector



Pre-cabled



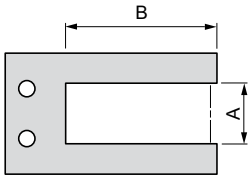
Angular fork



System	**Thru-beam**		
Type of transmission	Red LED, modulated		
Nominal sensing distance (Sn)	**2…180 mm**		
Minimum size of object detected	Passageway 2…120 mm	**0.8 mm**	**1.2 mm**
	Passageway ≥ 150 mm	**1 mm**	**1.5 mm**
Fork type		**XUV R●**	**XUV A●**

References of forks type XUV R●

3-wire
NO or NC function
PNP or NPN output



A = Passageway
B = Depth

Passageway (A)	Function	Output	Pre-cabled, length 2 m. Depth (B): 30 mm
30 mm	NO	PNP	**XUV R0303PANL2**

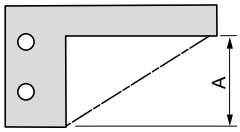
Passageway (A)	Function	Output	M8 connector, 3-pin. Depth (B): 60 mm
50 mm	NO	PNP	**XUV R0605PANM8**
		NPN	**XUV R0605NANM8**
	NC	PNP	**XUV R0605PBNM8**
		NPN	**XUV R0605NBNM8**
80 mm	NO	PNP	**XUV R0608PANM8**
		NPN	**XUV R0608NANM8**
	NC	PNP	**XUV R0608PBNM8**
		NPN	**XUV R0608NBNM8**

Passageway (A)	Function	Output	M8 connector, 3-pin. Depth (B): 120 mm
120 mm	NO	PNP	**XUV R1212PANM8**
		NPN	**XUV R1212NANM8**
	NC	PNP	**XUV R1212PBNM8**
		NPN	**XUV R1212NBNM8**
180 mm	NO	PNP	**XUV R1218PANM8**
		NPN	**XUV R1218NANM8**
	NC	PNP	**XUV R1218PBNM8**
		NPN	**XUV R1218NBNM8**

Weight (kg)	0.080 to 0.190 depending on model

References of forks type XUV A●

3-wire
NO function, PNP output



A = Passageway

Type	Function	Output	M8 connector, 3-pin
50 mm	NO	PNP	**XUV A0505PANM8**
80 mm	NO	PNP	**XUV A0808PANM8**
120 mm	NO	PNP	**XUV A1212PANM8**
150 mm	NO	PNP	**XUV A1515PANM8**

Weight (kg)	0.100 to 0.195 depending on model

Other versions: please consult our Customer Care Centre.

Applications: detection on conveyor, detection on vibrating rail.

Accessories

Description	Details	Length of cable (m)	Reference	Weight kg
Pre-wired M8 connector	Straight	2	**XZC P0566L2**	0.060
	Elbowed (90°)	2	**XZC P0666L2**	0.060
	Straight	5	**XZC P0566L5**	0.120
	Elbowed (90°)	5	**XZC P0666L5**	0.120

Photo-electric sensors

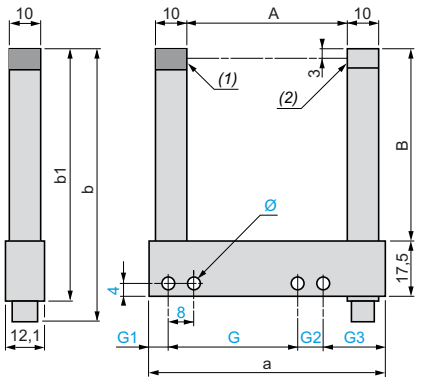
OsiSense XU

Optical fork without adjustment
DC supply. Solid-state output

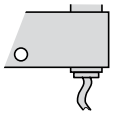
Characteristics		XUV R●	XUV A
Product certifications		CE, UL, CSA	CE
Ambient air temperature	For operation	- 10…+ 60 °C	
	For storage	- 40…+ 80 °C	
Degree of protection	Conforming to IEC 60529	IP 65 and IP 67	
Vibration resistance	Conforming to IEC 60068-2-6	7 gn, amplitude ± 0.75 mm (f = 10 to 55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27	30 gn, duration 11 ms	
Materials	Case	Painted aluminium and polyamide	
Rated supply voltage		⎓ **12…24 V with protection against reverse polarity**	
Voltage limits (including ripple)		⎓ **10…30 V**	
Immunity to ambient light	Natural light	10 000 lux	
	Incandescent bulb	5000 lux	
Switching capacity		**100 mA with overload and short-circuit protection**	
Voltage drop, closed state		< 1.5 V	
Current consumption, no-load		< 20 mA	
Maximum switching frequency		**4000 Hz**	
Delays	First-up	140 ms max.	
	Stability	± 15 µs	
Indicator lights	Yellow LED	Output signal	

Dimensions

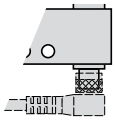
XUV R●



XUV R0303● (pre-cabled version detail)



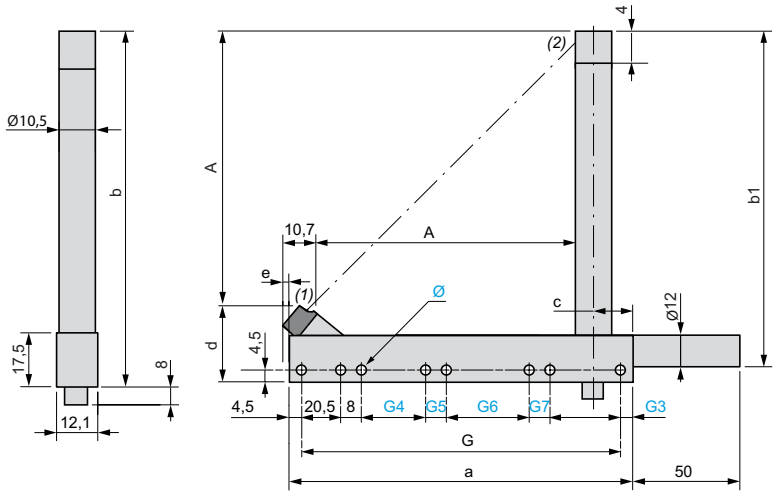
Orientation of elbowed connector



(1) Transmission LED - (2) Yellow LED: output signal

Type XUV R	Passageway A	Depth B	a	b	b1	G	G1	G2	G3	Ø
XUV R0303●●●●●	30	40	54	65.7	57.5	30	17	–	–	4 x 4.3
XUV R0605●●●●●	50	60	74	85.7	77.5	40	6.5	8	19.5	4 x 4.3
XUV R0608●●●●●	80	60	104	85.7	77.5	70	6.5	8	19.5	4 x 4.3
XUV R01212●●●●●	120	124.3	144	150.2	142	100	17	10	17	4 x 4.3
XUV R01218●●●●●	180	124.3	204	150.2	142	152	22	8	22	4 x 4.3

XUV A●

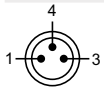


(1) Transmission LED - (2) Yellow LED: output signal

Type XUV A	Type	Depth A	a	b	b1	G	G1	G2	G3	Ø	G4	G5	G6	G7	c	d	e
XUV A0505●●●●●	50	44.3	75	83	75	66	–	–	4.5	4 x 4.3	–	–	–	–	14.75	26.41	0
XUV A0808●●●●●	80	74.3	105	113	105	96	–	–	4.5	4 x 4.3	–	–	–	–	14.75	26.41	0
XUV A1212●●●●●	120	112.3	145	154	146	136	–	–	4.5	4 x 4.3	–	–	–	–	19.75	29.24	3
XUV A1515●●●●●	150	142.3	175	184	176	166	–	–	4.5	8 x 4.3	24	8	60	8	19.75	29.24	3

Wiring schemes

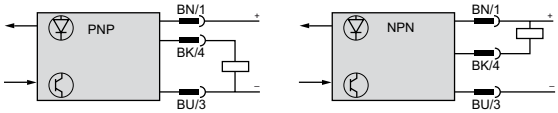
M8 connector



Pin n° - colour

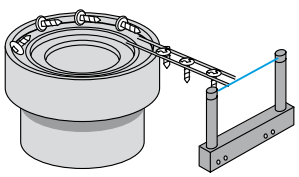
1 BN
3 BU
4 BK

Cabling

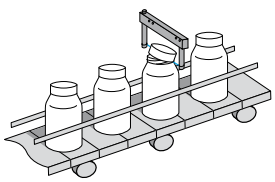


Application examples

Vibrating bowl



Monitoring height of objects passing on a conveyor



Detecting position of object on a conveyor

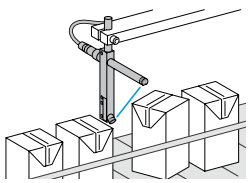


Photo-electric sensors

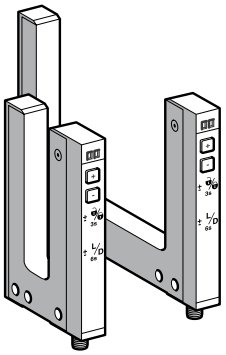
OsiSense XU Application

Optical fork with teach mode

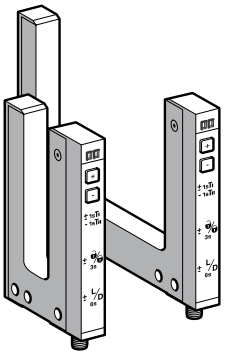
DC supply. Solid-state output

Optical fork with teach mode

+/- numeric potentiometer mode
Green keypad



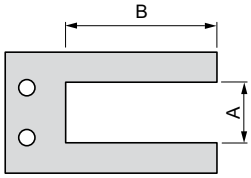
Teach mode
Yellow keypad



System		**Thru-beam**	
Type of transmission		Infrared LED, modulated	
Nominal sensing distance (Sn)		**2…120 mm**	
Minimum size of object detected	Passageway 2…120 mm	**0.2 mm**	
Fork type		**XUY FNEP●**	**XUY FANEP●**

References

4-wire, PNP/NPN independent outputs — NO/NC function, selectable



A = Passageway
B = Depth

Passageway (A)	Depth (B)			Depth (B)		
mm	42	59	95	42	59	95
2	**XUY FNEP40002**	**XUY FNEP60002**	**XUY FNEP100002**	**XUY FANEP40002**	**XUY FANEP60002**	**XUY FANEP100002**
5	**XUY FNEP40005**	**XUY FNEP60005**	**XUY FNEP100005**	**XUY FANEP40005**	**XUY FANEP60005**	**XUY FANEP100005**
15	**XUY FNEP40015**	**XUY FNEP60015**	**XUY FNEP100015**	**XUY FANEP40015**	**XUY FANEP60015**	**XUY FANEP100015**
30	**XUY FNEP40030**	**XUY FNEP60030**	**XUY FNEP100030**	**XUY FANEP40030**	**XUY FANEP60030**	**XUY FANEP100030**
50	**XUY FNEP40050**	**XUY FNEP60050**	**XUY FNEP100050**	**XUY FANEP40050**	**XUY FANEP60050**	**XUY FANEP100050**
80	**XUY FNEP40080**	**XUY FNEP60080**	**XUY FNEP100080**	**XUY FANEP40080**	**XUY FANEP60080**	**XUY FANEP100080**
120	**XUY FNEP40120**	**XUY FNEP60120**	**XUY FNEP100120**	**XUY FANEP40120**	**XUY FANEP60120**	**XUY FANEP100120**

Weight (kg)		0.055 to 0.128 depending on model

Characteristics

Product certifications		CE, cULus. This product is UL Listed if supplied by a class II or isolated supply delivering ⎓ 30 V max. (isolated transformer for example) and protected by a UL fuse rated at 3 A max.
Ambient air temperature	For operation	- 20…+ 60 °C
	For storage	- 30…+ 80 °C
Degree of protection	Conforming to IEC 60529	IP 65
Connection		M8, 4-pin male connector (for 3-pin version please consult our Customer Care Centre)
Vibration resistance	Conforming to IEC 60068-2-6	7 gn, amplitude ± 0.75 mm (f = 10 to 55 Hz)
Shock resistance	Conforming to IEC 60068-2-27	30 gn, duration 11 ms
Materials	Case	Painted aluminium and polyamide/glass
Rated supply voltage		⎓ **12…24 V with protection against reverse polarity**
Voltage limits (including ripple)		⎓ **10…30 V**
Immunity to ambient light	Natural light	10 000 lux
	Incandescent bulb	5000 lux
Outputs	PNP and NPN	By independent wire
	NO/NC	By programming
Switching capacity		**100 mA with overload and short-circuit protection**
Voltage drop, closed state		< 2 V
Current consumption, no-load		40 mA
Permissible capacitive load		330 nF
Maximum switching frequency		**10 kHz**
Response time	Stability	+/- 20 µs
Indicator lights	Yellow LED	Output signal
	Red LED	Adjustment mode and keypad locking

Application: Detection of labels, detection of double sheet, detection of reference marks, detection on conveyor, detection on vibrating rail.

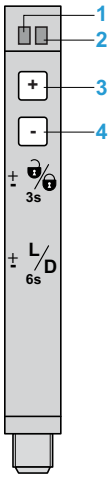
Accessories

Description	Details	Length of cable (m)	References	Weight kg
Pre-wired M8 connector	Straight	2	**XZC P0941L2**	0.080
	Elbowed (90°)	2	**XZC P1041L2**	0.080
	Straight	5	**XZC P0941L5**	0.180
	Elbowed (90°)	5	**XZC P1041L5**	0.180

Photo-electric sensors
OsiSense XU Application
Optical fork with teach mode
DC supply. Solid-state output

Presentation

XUY FNEP●●●



1 Yellow LED "ON": Output activated

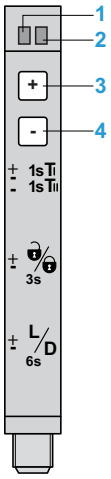
2 Red LED "ON": Adjustments and keypad locking

3, 4 Sensitivity adjustment

3 + 4 Keypad locking (3 s ⩽ press time < 6 s)

3 + 4 NO/NC (press time ⩾ 6 s)

XUY FANEP●●●



1 Yellow LED "ON": Output activated

2 Red LED "ON": Adjustments and keypad locking

3, 4 Sensitivity adjustment

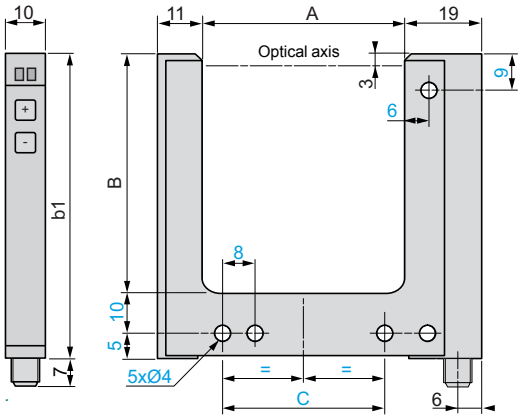
3 + 4 Teach mode and automatic adjustment of sensitivity (press time < 3 seconds)

3 + 4 Keypad locking (3 s ⩽ press time < 6 s)

3 + 4 NO/NC (press time ⩾ 6 s)

Dimensions

XUY FNEP●●● / XUY FANEP●●●



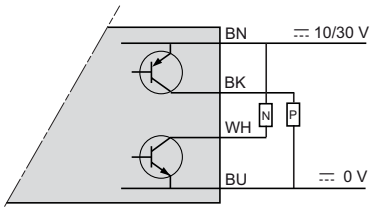
XUY	Passageway	Depth		
	A	B	b1	C
FNEP/FANEP●002	2	42, 59, 95	57, 74, 110	14
FNEP/FANEP●005	5	42, 59, 95	57, 74, 110	14
FNEP/FANEP●015	15	42, 59, 95	57, 74, 110	27
FNEP/FANEP●030	30	42, 59, 95	57, 74, 110	42
FNEP/FANEP●050	50	42, 59, 95	57, 74, 110	40
FNEP/FANEP●080	80	42, 59, 95	57, 74, 110	70
FNEP/FANEP●120	120	42, 59, 95	57, 74, 110	110

Wiring schemes

Cabling

Pin n° - colour
1 BN: Brown
2 WH: White
3 BU: Blue
4 BK: Black

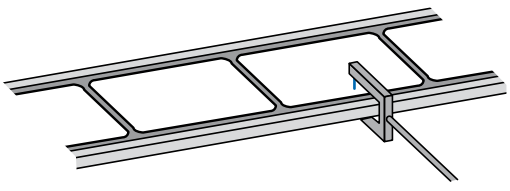
M8 connector



Application examples

Green keypad: Potentiometer mode

Detection of labels on belt



Yellow keypad: Teach mode

Detection of sheet feed on printing machine

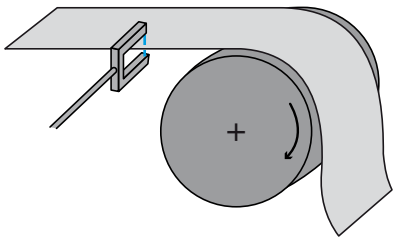
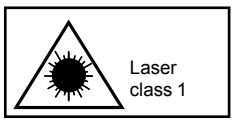


Photo-electric sensors

OsiSense XU Application

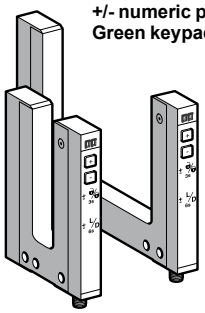
Optical fork with laser transmission, with teach mode
DC supply. Solid-state output

High sensitivity fork range

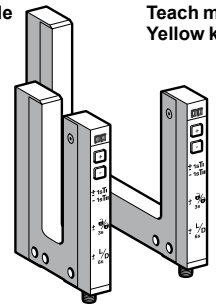


Laser class 1, conforming to IEC 825-1

+/- numeric potentiometer mode
Green keypad



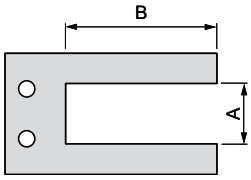
Teach mode
Yellow keypad



System	**Thru-beam**	
Type of transmission	**Red laser, modulated, class 1,** wavelength: 670 m	
Nominal sensing distance (Sn)	**2...120 mm**	
Minimum size of object detected Passageway 2…120 mm	**0.05 mm** (repeat accuracy 0.01 mm)	
Fork type	**XUY FLNEP●**	**XUY FALNEP●**

References

4-wire, PNP/NPN independent outputs NO/NC function, selectable



A = Passageway
B = Depth

Passageway (A)	Depth (B)			Depth (B)		
mm	42	59	95	42	59	95
2	**XUY FLNEP40002**	**XUY FLNEP60002**	**XUY FLNEP100002**	**XUY FALNEP40002**	**XUY FALNEP60002**	**XUY FALNEP100002**
5	**XUY FLNEP40005**	**XUY FLNEP60005**	**XUY FLNEP100005**	**XUY FALNEP40005**	**XUY FALNEP60005**	**XUY FALNEP100005**
15	**XUY FLNEP40015**	**XUY FLNEP60015**	**XUY FLNEP100015**	**XUY FALNEP40015**	**XUY FALNEP60015**	**XUY FALNEP100015**
30	**XUY FLNEP40030**	**XUY FLNEP60030**	**XUY FLNEP100030**	**XUY FALNEP40030**	**XUY FALNEP60030**	**XUY FALNEP100030**
50	**XUY FLNEP40050**	**XUY FLNEP60050**	**XUY FLNEP100050**	**XUY FALNEP40050**	**XUY FALNEP60050**	**XUY FALNEP100050**
80	**XUY FLNEP40080**	**XUY FLNEP60080**	**XUY FLNEP100080**	**XUY FALNEP40080**	**XUY FALNEP60080**	**XUY FALNEP100080**
120	**XUY FLNEP40120**	**XUY FLNEP60120**	**XUY FLNEP100120**	**XUY FALNEP40120**	**XUY FALNEP60120**	**XUY FALNEP100120**

Weight (kg)	0.055 to 0.128 depending on model

Characteristics

Product certifications		CE,cULus. This product is UL Listed if supplied by a class II or isolated supply delivering ⎓ 30 V max. (isolated transformer for example) and protected by a UL fuse rated at 3 A max.
Ambient air temperature	For operation	- 20…+ 50 °C
	For storage	- 30…+ 80 °C
Degree of protection	Conforming to IEC 60529	IP 65
Connection		M8, 4-pin male connector
Vibration resistance	Conforming to IEC 60068-2-6	7 gn, amplitude ± 0.75 mm (f = 10 to 55 Hz)
Shock resistance	Conforming to IEC 60068-2-27	30 gn, duration 11 ms
Materials	Case	Painted aluminium and polyamide/glass
Rated supply voltage		⎓ **12…24 V with protection against reverse polarity**
Voltage limits (including ripple)		⎓ **10…30 V**
Immunity to ambient light	Natural light	10 000 lux
	Incandescent bulb	5000 lux
Outputs	PNP/NPN	By wiring
	NO/NC	Using teach mode
Switching capacity		**100 mA with overload and short-circuit protection**
Voltage drop, closed state		< 2 V
Current consumption, no-load		< 40 mA
Permissible capacitive load		330 nF
Maximum switching frequency		**10 kHz**
Response time		+/- 20 µs
Indicator lights		Yellow LED: output signal; red LED: keypad locking and adjustments

■ Applications: Detection of reference marks, detection on conveyor, detection on vibrating rail, detection of transparent object.

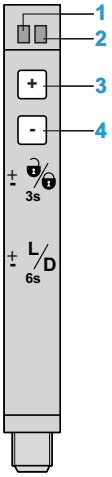
Accessories

Description	Details	Length of cable (m)	References	Weight kg
Pre-wired M8 connector	Straight	2	**XZC P0941L2**	0.080
	Elbowed (90°)	2	**XZC P1041L2**	0.080
	Straight	5	**XZC P0941L5**	0.180
	Elbowed (90°)	5	**XZC P1041L5**	0.180

Photo-electric sensors
OsiSense XU Application
Optical fork with laser transmission, with teach mode
DC supply. Solid-state output

Presentation

XUY FLNEP●



1 Yellow LED "ON": Output activated

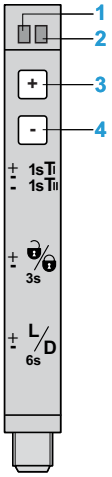
2 Red LED "ON": Adjustments and keypad locking

3, 4 Sensitivity adjustment

3 + 4 Keypad locking (3 s ≤ press time < 6 s)

3 + 4 NO/NC (press time ≥ 6 s)

XUY FALNEP●



1 Yellow LED "ON": Output activated

2 Red LED "ON": Adjustments and keypad locking

3, 4 Sensitivity adjustment

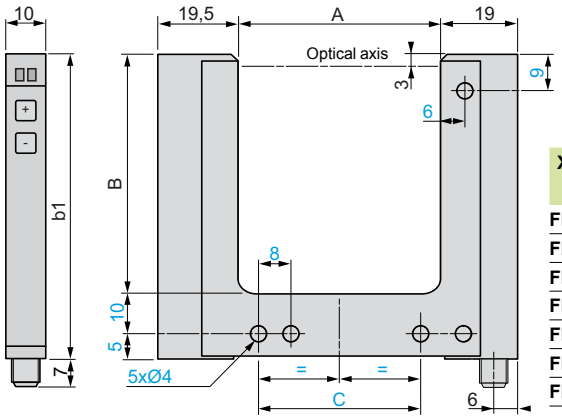
3 + 4 Teach mode and automatic adjustment of sensitivity (press time < 3 seconds)

3 + 4 Keypad locking (3 s ≤ press time < 6 s)

3 + 4 NO/NC (press time ≥ 6 s)

Dimensions

XUY FLNEP●/XUY FALNEP●



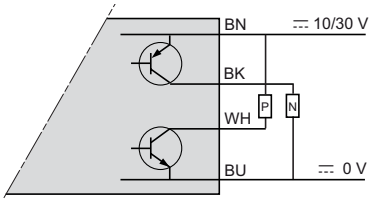
XUY	Passageway A	Depth B	b1	C
FLNEP/FALNEP●2	2	42, 59, 95	57, 74, 110	14
FLNEP/FALNEP●5	5	42, 59, 95	57, 74, 110	14
FLNEP/FALNEP●15	15	42, 59, 95	57, 74, 110	27
FLNEP/FALNEP●30	30	42, 59, 95	57, 74, 110	42
FLNEP/FALNEP●50	50	42, 59, 95	57, 74, 110	40
FLNEP/FALNEP●80	80	42, 59, 95	57, 74, 110	70
FLNEP/FALNEP●120	120	42, 59, 95	57, 74, 110	110

Wiring schemes

Cabling

Pin n° - colour
1 BN: Brown
2 WH: White
3 BU: Blue
4 BK: Black

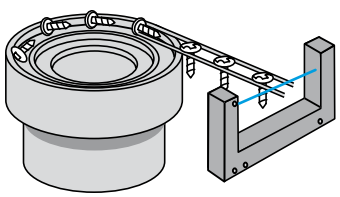
M8 connector



Application examples

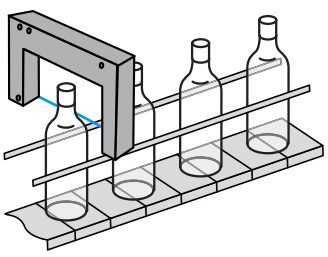
Green keypad: Potentiometer mode

Detection of an object exiting a vibrating bowl



Yellow keypad: Teach mode

Detection of transparent bottles (glass, PET…)

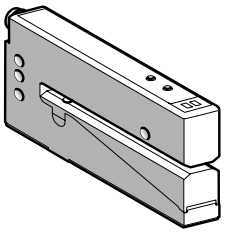


Ultrasonic sensor

OsiSense XU Application, packaging series

For detection of transparent labels
DC supply. Solid-state output

Fork design



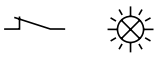
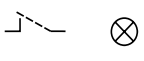
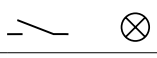
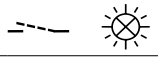
System		Thru-beam
Type of transmission		Ultrasonic
Nominal sensing distance (Sn)		3 mm

References

4-wire, PNP and NPN	NO or NC programmable function	**XUV U06M3KCNM8**
Adjustment		By numerical potentiometer (+/- buttons) and red LED
Protection of settings		By locking keypad
Weight (kg)		0.130

Characteristics

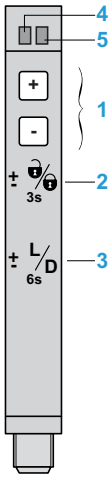
Product certifications		CE, IEC 60947-5-2
Materials		Aluminium case
Connection		M8, 4-pin connector
Detection performance	Minimum length of label	2 mm
	Minimum distance between 2 labels	2 mm
	Maximum flow rate	120 m/min
	Detection accuracy	+/- 0.16mm at 60m/min +/- 0.30mm at 120m/min
Supply	Rated supply voltage	⎓ **12…24 V with protection against reverse polarity**
	Voltage limits	⎓ **10…30 V (including ripple)**
	Current consumption, no-load	40 mA
	Residual voltage	
	At 100 mA	< 2 V
	At 10 mA	< 1 V
Output	Maximum rated current	100 mA with overload and short-circuit protection
	Maximum switching frequency	**500 Hz**
	Indicator lights	
	Output state	Yellow LED
Delay		On and Off: 500 µs
Environment	Operating temperature	+ 5….+ 55 °C
	Storage temperature	- 20 °C....+ 70 °C
	Degree of protection	IP 65

Function table	**Function**	**Thru-beam system**	
		No label present in the beam (output inactive)	**Label present in the beam (output active)**
Output state (PNP or NPN) indicator: yellow LED (illuminated when sensor output is ON)	NC		
	NO		

Ultrasonic sensor

OsiSense XU Application, packaging series
For detection of transparent labels
DC supply. Solid-state output

Presentation (adjustment and display)



1 Tripping threshold adjustment using +/- buttons

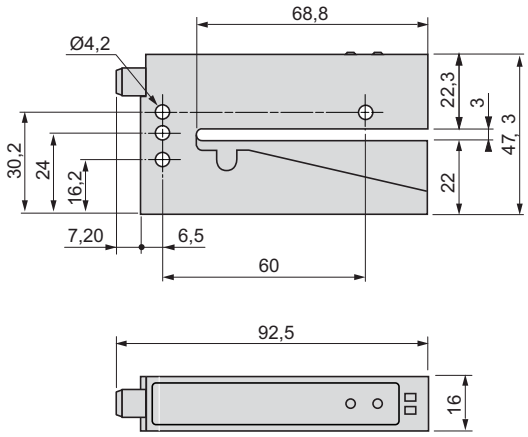
2 Locking of keypad by simultaneously pressing ± buttons and holding down for 3 s

3 Selection of output type (NO or NC) by simultaneously pressing ± buttons and holding down for 6 s

4 Yellow LED: ON when outputs active (current established)
Yellow LED: flashes slowly in event of output short-circuit

5 Red LED: ON each time the +/- buttons are pressed
Red LED: Permanently ON when keypad locked
Red LED: OFF when keypad unlocked

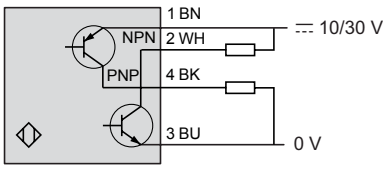
Dimensions



Wiring schemes (sensor connector pin view)

Connector

1	Brown	⎓ + 10... 30 V
2	White	NPN output
3	Blue	⎓ 0 V
4	Black	PNP output



Application examples

Detection of transparent labels transparent on opaque strip

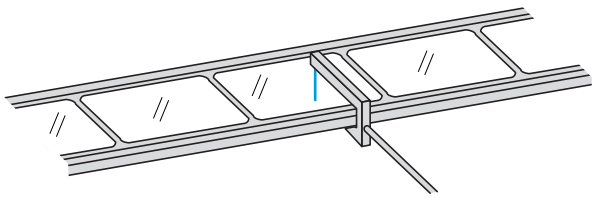
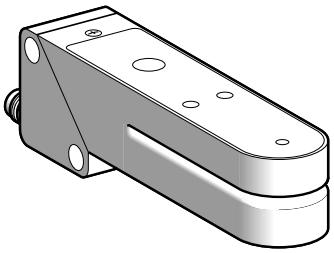


Photo-electric sensors

OsiSense XU Application, packaging series

For detection of labels *(1)*
DC supply. Solid-state output

Fork design



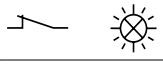
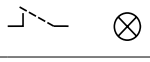
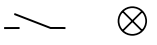
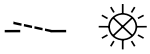
System		Thru-beam	
Type of transmission		Infrared	Red/green
Nominal sensing distance (Sn)		2 mm	

References

3-wire, PNP and NPN	NO or NC programmable function *(2)*	**XUV K0252S**	**XUV K0252VS**
Weight (kg)		0.120	

Characteristics

Product certifications		CE
Ambient air temperature		For operation: 0…+ 55 °C. For storage: - 20…+ 70 °C
Vibration resistance	Conforming to IEC 60068-2-6	Amplitude ±1.5 mm up to 55 Hz, 7 gn (f = 10…55 Hz)
Shock resistance	Conforming to IEC 60068-2-27	30 gn, duration 11 ms
Degree of protection	Conforming to IEC 60529	IP 65
Connection		M8 connector (suitable female connectors, see page 9/44)
Materials		Case: zinc alloy; lenses: glass
Rated supply voltage		⎓ **12…24 V with protection against reverse polarity**
Voltage limits		⎓ 10…30 V (including ripple)
Switching capacity (sealed)		⩽ **100 mA with overload and short-circuit protection**
Voltage drop, closed state		⩽ 1.5 V
Output clamping resistor		10 kΩ
Current consumption, no-load		⩽ 50 mA
Maximum switching frequency		25 kHz
Delays		First-up: ⩽ 30 ms; response < 100 µs; recovery < 100 µs
Indicator lights	Output state	Yellow LED
	Sensor ready	Green LED
	Read error	Red LED

Function table	**Function**	**Thru-beam system**	
		No label present in the beam	**Label present in the beam**
Output state (PNP or NPN) indicator: yellow LED (illuminated when sensor output is ON)	NC		
	NO		

*(1) Applications: the infrared transmission beam sensor **XUV K0252S** is suitable for the detection of all types of opaque labels; the red/green transmission sensor **XUV K0252VS** is suitable for the detection of all types of labels of different colours.*
(2) This sensor is adjustable using teach mode: the NC or NO function is selected when performing the first stage of teaching for setting-up the sensor (see programming using teach mode, page 5/59).

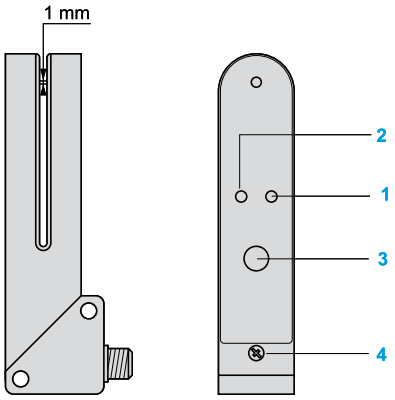
Photo-electric sensors

OsiSense XU Application, packaging series

For detection of labels

DC supply. Solid-state output

Presentation



Programming using teach mode

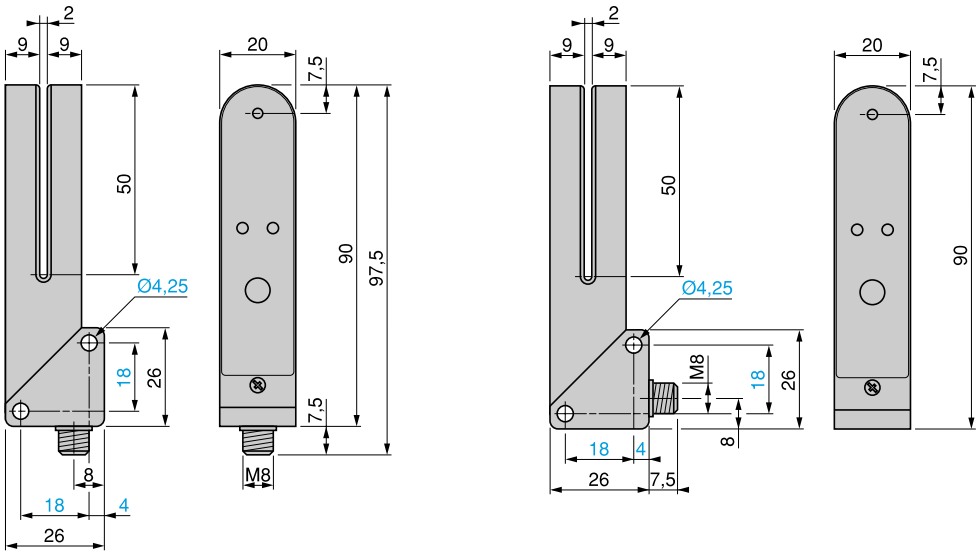
■ Place the label to be detected in the beam of the optical fork. Press the SET button and hold down until the green LED 2 goes out,

■ When the green LED 2 flashes, the detector has “learnt” the label. Following this, place the backing to which the label is affixed in the beam of the optical fork. Press the SET button and hold down until the green LED 2 goes out,

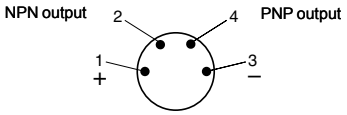
■ When the green LED 2 illuminates as a steady light teaching is completed and the sensor is ready for operation.

1 Yellow LED, output state indicator
2 Dual colour green/red LED, Ready/Error
3 Teach mode programming SET button
4 Locking screw

Dimensions



Connector scheme (sensor connector pin view)



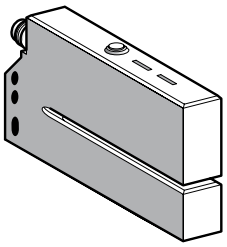
See connection on page 9/44.

Photo-electric sensors

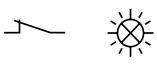
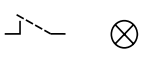
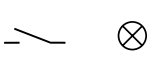
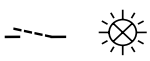
OsiSense XU Application, packaging series

Optical fork with teach mode
For detection of labels
DC supply. Solid-state output

Fork design



System		Thru-beam	
Type of transmission		Infrared, continuous	
Nominal sensing distance (Sn)	(Passageway)	3 mm	5 mm
References			
4-wire, PNP and NPN	NO or NC programmable function *(1)* Automatic adjustment using teach mode	**XUY FA983003COS**	**XUY FA983005COS**
Weight (kg)		0.07	0.07
Characteristics			
Product certifications		CE, cULus	
Ambient air temperature	For operation	- 20…+ 60 °C	
	For storage	- 30…+ 80 °C	
Degree of protection	Conforming to IEC 60529	IP 65	
Connection		M8, 4-pin connector (for pre-cabled version please consult our Customer Care Centre)	
Materials		Anodised aluminium	
Rated supply voltage		**⎓ 12…24 V with protection against reverse polarity**	
Voltage limits (including ripple)		**⎓ 10…30 V**	
Switching capacity (sealed)		**≤ 100 mA with overload and short-circuit protection**	
Immunity to ambient light	Natural light	3000 lux	
	Incandescent bulb	3000 lux	
Voltage drop, closed state		< 2 V	
Current consumption, no-load		40 mA	
Maximum switching frequency		**10 kHz**	
Delays		Response: 50 µs; recovery: 50 µs	
Indicator lights		Green LED: no object present Red LED: keypad locking and adjustments.	

Function table	**Function**	**Thru-beam system**	
		No label present in the beam	**Label present in the beam**
Output state (PNP or NPN) indicator: green LED (illuminated when sensor output is ON)	NC		
	NO		

(1) By reversing supply connections.

5

Photo-electric sensors

OsiSense XU Application, packaging series
Optical fork with teach mode
For detection of labels
DC supply. Solid-state output

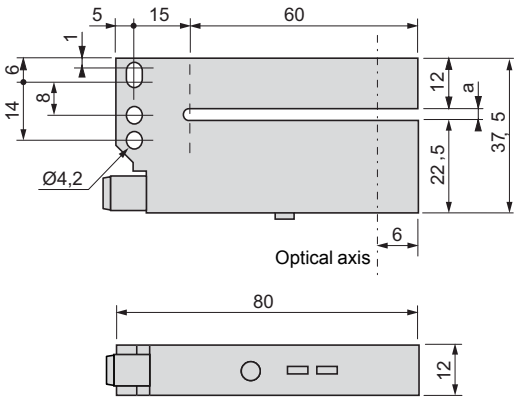
Presentation (adjustment and indicators)

Teaching is performed on the item to which the label is affixed

1 Teach mode button
- 1 press: standard teaching (red LED flashes for 2 s)
- 2 presses: fine teaching (green LED flashes for 2 s)
- 1 prolonged press: keypad locking (red LED on)

2 Red LED and green LED flash: short-circuit or object too opaque.

Dimensions



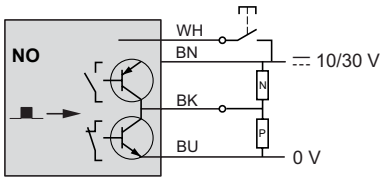
XUY	a (passageway)
FA98●●●3COS	2
FA98●●●5COS	5

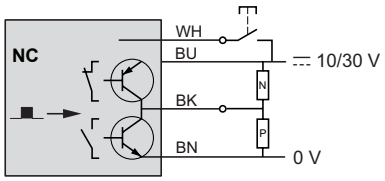
Wiring schemes (sensor connector pin view)

Connector

Pin n° - colour

1 BN: Brown
2 WH: White (input)
3 BU: Blue
4 BK: Black (PNP and NPN outputs)

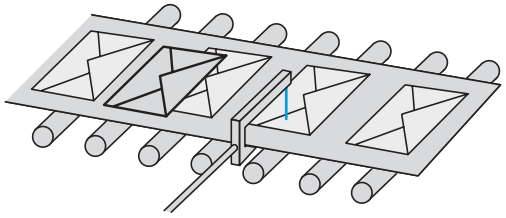




Object detected
If the white wire is not used, connect to 0 V.

Application examples

Detection of overlapping envelopes



Detection of labels on belt

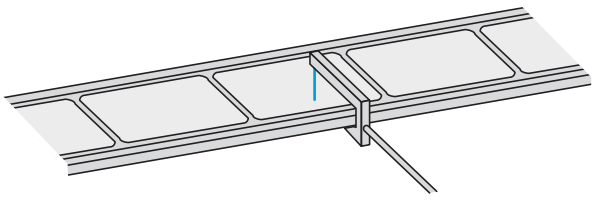
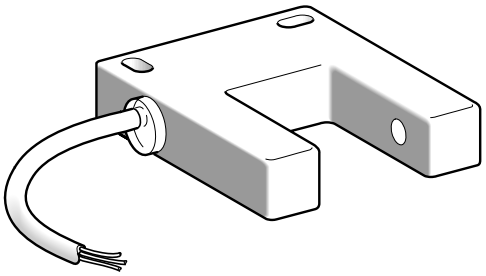


Photo-electric sensors

OsiSense XU Application, material handling series

Optical fork with integrated amplifier
DC supply. Solid-state output

Fork design



System		**Thru-beam**
Type of transmission		Infrared
Nominal sensing distance (Sn)		**30 mm**

References

3-wire, PNP	NO function	**XUV H0312**
3-wire, NPN	NO function	**XUV J0312**
Weight (kg)		0.130

Characteristics

Product certifications		CE
Ambient air temperature	For operation	- 5…+ 55 °C
	For storage	- 20…+ 70 °C
Vibration resistance	Conforming to IEC 60068-2-6	Amplitude ±1 mm up to 42 Hz, 7 gn (f = 10…42 Hz)
Shock resistance	Conforming to IEC 60068-2-27	30 gn, duration 11 ms
Degree of protection	Conforming to IEC 60529	IP 54
Connection		Pre-cabled: diameter 5 mm, length 2 m, wire c.s.a.: 3 x 0.34 mm²
Materials	Case	PC/ABS
	Lenses	PMMA
	Cable	PvR
Rated supply voltage		⎓ **24 V with protection against reverse polarity**
Voltage limits		⎓ 19…38 V (including ripple)
Switching capacity (sealed)		≤**150 mA with overload and short-circuit protection**
Voltage drop, closed state		≤ 1.5 V
Current consumption, no-load		≤ 20 mA
Maximum switching frequency		1000 Hz
Delays	First-up	≤ 30 ms
	Response	500 µs
	Recovery	500 µs

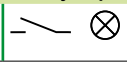
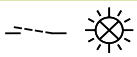
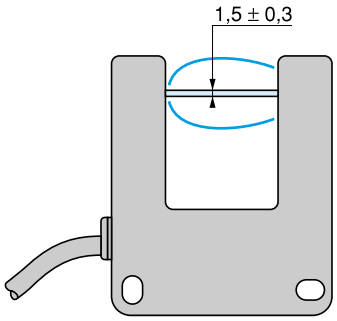
Function table	**Function**	**Thru-beam system**	
NO function		**No object present in the beam**	**Object present in the beam**
Output state (PNP or NPN) indicator: red LED (illuminated when sensor output is ON)	NO		

Photo-electric sensors

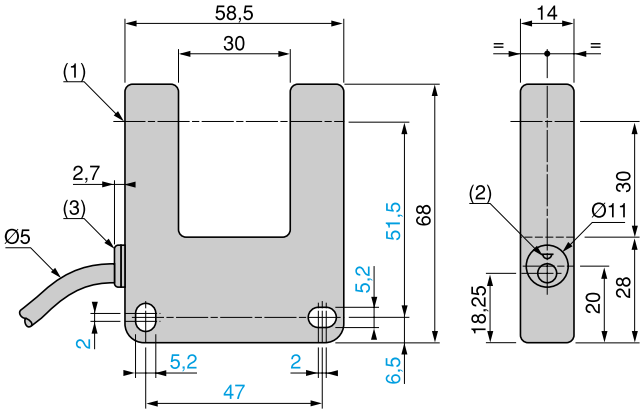
OsiSense XU Application, material handling series

Optical fork with integrated amplifier
DC supply. Solid-state output

Detection curve



Dimensions

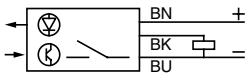


(1) Optical axis
(2) Red LED
(3) Diffuser
Max. tightening torque of fixing screws: 3 N.m

Wiring schemes (3-wire ⎓)

NO function

PNP output



NPN output

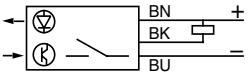
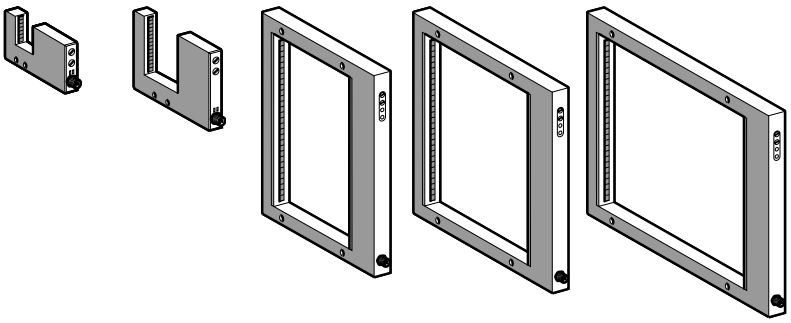


Photo-electric sensors

OsiSense XU Application, conveying series

Dynamic detection of passage of objects *(1)*
For counting parts
DC supply. Solid-state output



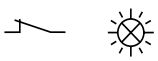
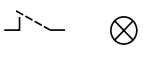
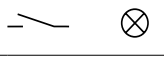
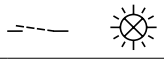
System		**Thru-beam**				
Type of transmission		**Infrared**				
Passageway dimensions		**30 x 30 mm**	**60 x 60 mm**	**200 x 120 mm**	**200 x 180 mm**	**200 x 250 mm**
Minimum size of object detected		Ø 2 mm		Ø 4 or 10 mm depending on model		
References						
4-wire, PNP and NPN NO or NC programmable function	Minimum size of object detected	–	–	–	–	–
	Ø 2 mm	**XUV F30M8**	**XUV F60M8**	–	–	–
	Ø 4 mm	–	–	**XUV F120M12**	**XUV F180M12**	**XUV F250M12**
	Ø 10 mm	–	–	**XUY FRS120S**	**XUY FRS180S**	**XUY FRS250S**
Weight (kg)		0.080	0.140	1.060	1.200	1.320

References of U shape frames

Open (U shape) frames for sizes 120, 180 and 250 mm are also available.
To order an open frame, add the letter **U** to the end of the reference. Example: XUV F120M12 becomes **XUV F120M12U**.

Characteristics

Product certifications		CE, cULus	
Ambient air temperature		For operation: 0…+ 60 °C. For storage: - 20…+ 80 °C	
Vibration resistance		25 gn, amplitude ± 2 mm (f = 10…55 Hz), conforming to IEC 60068-2-6	
Shock resistance		30 gn, duration 11 ms, conforming to IEC 60068-2-27	
Degree of protection	Conforming to IEC 60529	IP 65	
Connection		M8 connector (suitable female connectors, including pre-wired versions, see page 9/44)	M12 connector (suitable female connectors, including pre-wired versions, see page 9/44)
Materials	Case	Painted aluminium	
	Lenses	Polycarbonate	Altuglass
Immunity to ambient light		Sunlight: 4000 lux max., incandescent light: 400 lux max.	
Passing speed of object		Min.: 10 cm/s, max.: 15 m/s (Ø 2 mm object)	Min.: 10 cm/s, max.: 15 m/s (Ø 4 mm object)
Rated supply voltage		**⎓ 24 V with protection against reverse polarity**	
Voltage limits		⎓ 18…30 V (including ripple)	
Switching capacity (sealed)		**⩽ 100 mA with overload and short-circuit protection**	
Voltage drop, closed state		< 2 V	
Current consumption, no-load		⩽ 120 mA	⩽ 400 mA
Maximum switching frequency		500 Hz	
Delays		Response: < 1 ms; recovery: < 1 ms	
Time delay		Off-delay (reset): adjustable between 0 and 5 seconds	

Function table	**Function**	**Thru-beam system**	
		No object present in the beam	**Passage of object through the beam**
Output state (PNP or NPN) indicator: green LED (illuminated when sensor output is ON)	NC		
	NO		

(1) Sensors XUV F are suitable for detecting the passage of all types of objects (both metal and plastic, of any shape and colour) providing the flow is dynamic. Applications: counting parts, flow control of injection machine parts, etc.

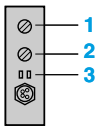
Photo-electric sensors

OsiSense XU Application, conveying series

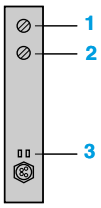
Dynamic detection of passage of objects
For counting parts
DC supply. Solid-state output

Presentation

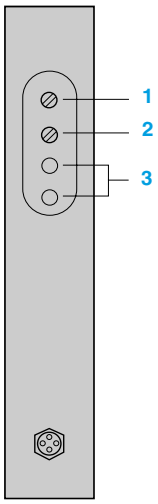
XUV F30M8



XUV F60M8



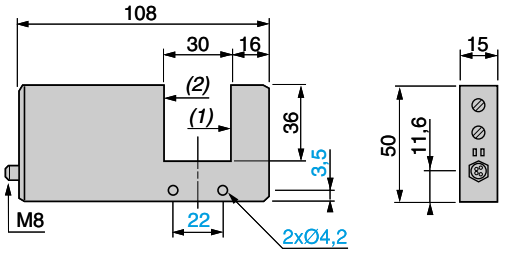
XUV F••0M12, XUY FRS••0S



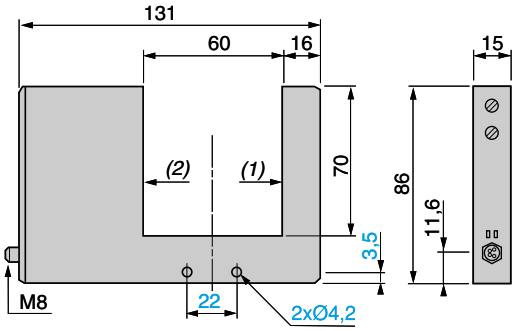
1 Sensitivity adjustment potentiometer.
2 Time delay adjustment potentiometer (XUV only)
Indicators:
3 Green LED: output
Red LED: becoming dirty (XUV only)
Notes:
- in the event of a supply malfunction, the red LED flashes,
- in the event of a short-circuit on the output, both the red and green LEDs flash.

Dimensions

XUV F30M8

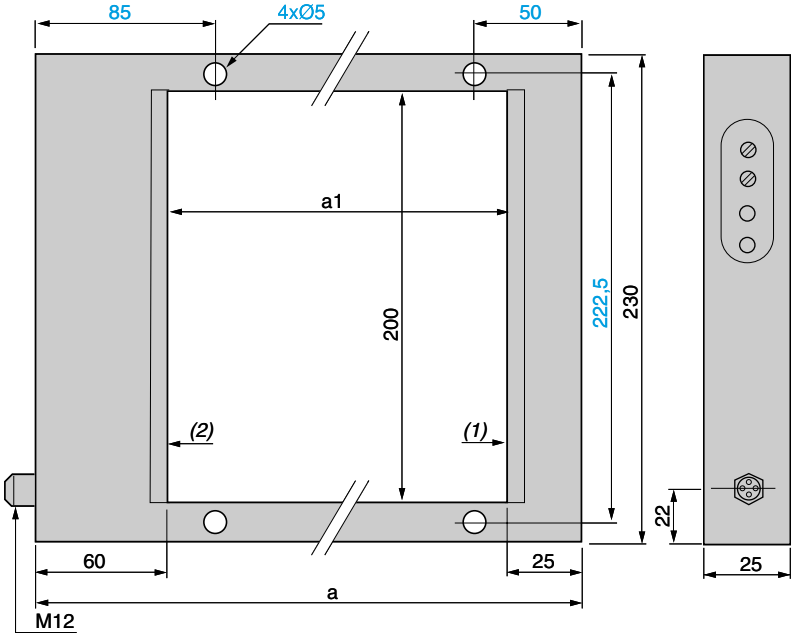


XUV F60M8



(1) Transmitting face
(2) Reception face

XUV F••0M12, XUY FRS••0S

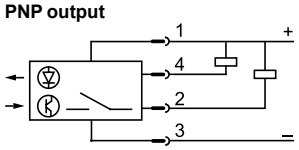


XUV	XUY	a	a1
F120M12	FRS120S	205	120
F180M12	FRS180S	265	180
F250M12	FRS250S	335	250

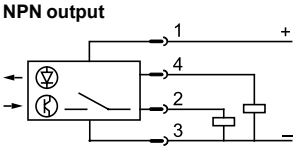
Schemes

Wiring schemes (4-wire ⎓)
NO output programmed *(1)*

PNP output

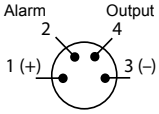


NPN output

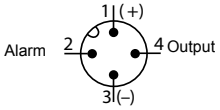


Connector scheme (sensor connector pin view)
NO output programmed *(1)*

XUV F•0M8



XUV F••0M12, XUY FRS••0S



See connection on page 9/44.

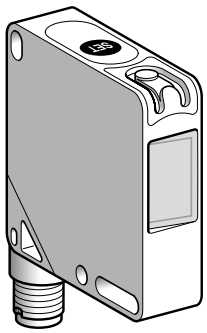
Note: *the alarm (2) triggers in the event of an object stopping within the beam.*

(1) To program the sensor for NC output, connect contact 3 to (+) and contact 1 to (–).

Photo-electric sensors

OsiSense XU Application, packaging series
Compact design, 50 x 50
Colour mark readers *(1)*
DC supply. Solid-state output

Compact design, 50 x 50



System		**Diffuse**
Type of transmission		White LED (400-700 nm)
Nominal sensing distance (Sn)		**19 mm**

References

Description		**Reference**
3-wire, PNP or NPN	PNP output	**XUK R1PSMM12**
	NPN output	**XUK R1NSMM12**
Weight (kg)		0.045

Characteristics

Product certifications		CE, cULus
Ambient air temperature	For operation	- 10…+ 55 °C
	For storage	- 20…+ 70 °C
Vibration resistance	Conforming to IEC 60068-2-6	Amplitude ± 0.5 mm, f = 10...55 Hz for each axis
Shock resistance	Conforming to IEC 60068-2-27	30 gn, duration 11 ms, 6 shocks on each axis
Degree of protection	Conforming to IEC 60529	IP 65
Connection		M12, 4-pin connector; can be set at 90°
Materials	Case	ABS
	Lenses	Glass (window tilted, anti-reflective glass)
Spot diameter		At 19 mm: Ø 3.5 mm
Resolution		0.5 mm
Depth of field		± 2 mm
Adjustment		Teach mode using button or remotely using “remote” wire
Indicator lights	Output	Yellow LED
	Stability	Green LED: Ready Flashing green/red: error
Rated supply voltage		⎓ **12…24 V**
Voltage limits		⎓ 10…30 V (including ripple)
Switching capacity (sealed)		≤ **100 mA with protection against reverse polarity, overload and short-circuit**
Voltage drop, closed state (saturation voltage)		≤ 2 V
Current consumption, no-load		≤ 30 mA
Maximum linear speed of mark		2.5 m/s for 1 mm wide mark
Maximum switching frequency		5 kHz
Delay		100 µs for response and recovery
Time delay	Time delay function	Minimum time output active: 20 ms
	Auxiliary functions	Remote teaching via “remote” wire; teach mode button locking
	Operating mode	Standard teaching: output activated on dark mark

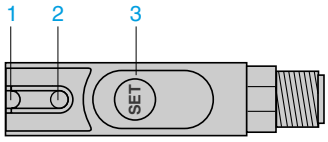
(1) Applications: detection of contrasting colours on reflective, matt or embossed surfaces. Colour mark and index mark reading function on automated packaging and filling systems and on labelling, heat sealing, thermo-forming and printing machines, etc.

Photo-electric sensors

OsiSense XU Application, packaging series
Compact design, 50 x 50
Colour mark readers
DC supply. Solid-state output

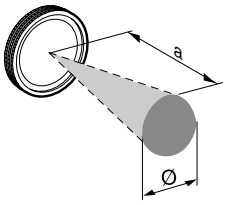
Presentation

Description



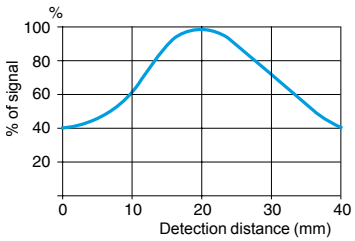
1 Output LED
2 Dual colour stability LED
3 SET button

Detection zone and spot size



	a (mm)	Ø (mm)
XUK R1●SMM12	19	3.5

Detection curve

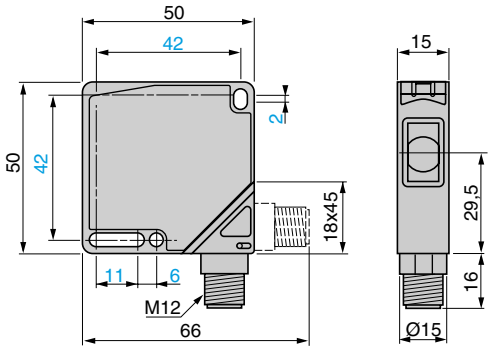


Fixing accessory

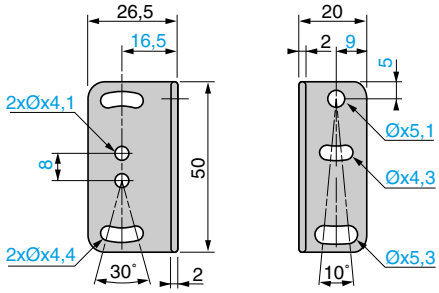
Description	Reference	Weight kg
Fixing bracket (2 screws, 2 nuts and 2 washers included)	**XUZ K2000**	0.040

Dimensions

XUK R1●SMM12



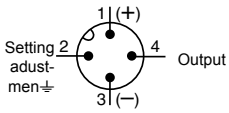
Fixing bracket XUZ K2000



Schemes

Connector scheme

Sensor connector pin view



See connection on page 9/44.

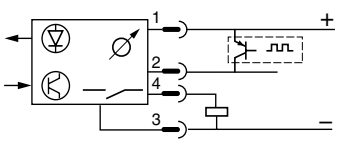
Pin N°	Type	Colour
1	⎓ 10...30 V	Brown
2	Adjustment input *(1)*	White
3	0 V	Blue
4	Output	Black

(1) Connecting the "Remote" adjustment input to + V DC is equivalent to pressing the SET button.

Wiring schemes

Automatic NC or NO selection depending on chronological order of teaching for the mark and the background.

PNP output



NPN output

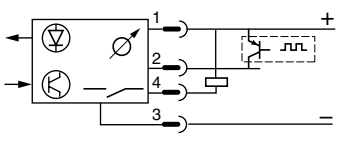


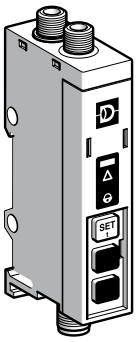
Photo-electric sensors

OsiSense XU Application, packaging series

Colour mark readers
With teach mode
DC supply. Solid-state output

Colour mark reading using plastic fibre optic

Remote reading by coaxial fibre optic



System		**Diffuse**
Type of transmission		White LED (450 - 650 nm)
Nominal sensing distance (Sn)		**18 mm with fibre optic XUY FPDC61/101** **4 mm with fibre optic XUY FPDCM861/M8101**

References

4-wire, PNP/NPN output	NO/NC function	**XUY DCFCO966S** *(1)*
Weight (kg)		0.047

Characteristics

Product certifications		CE
Ambient air temperature	For operation	0…+ 40 °C
	For storage	- 20…+ 80 °C
Degree of protection	Conforming to IEC 60529	IP 65
Connection		M8 male connector
Materials	Case	Polyamide
	Lens	Polyamide
Rated supply voltage		⎓ **24 V**
Spot diameter		1.5 mm
Modulation frequency		40 kHz
Depth of field		FPDC: + 7/- 5 mm Black/White, + 1/- 3 mm Grey/White FPDCM8: ± 1 mm
Adjustment		By teaching background and mark
Voltage limits (including ripple)		⎓ **10…30 V with protection against reverse polarity**
Immunity to ambient light	Incandescent bulb	10 000 lux
	Natural light	20 000 lux
Switching capacity		**100 mA with overload and short-circuit protection**
Voltage drop, closed state		< 2 V
Current consumption, no-load		50 mA
Maximum switching frequency		**20 kHz**
Delays	Response and recovery	25 µs
Output state indication		LED

Accessories

(1) Sensor XUY DCFCO966S only operates with fibres XUY FPDC●●●● and XUY FPDCM8●●●, to be ordered separately.

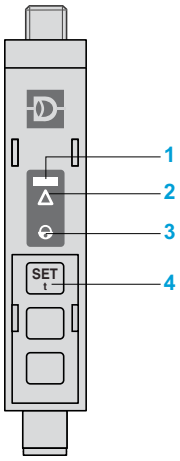
Description	Details	Length of fibre	Length of cable	References	Weight
		mm	m		kg
Integrated fibre optic *to be ordered at the same time as the amplifier*	M18	600	–	**XUY FPDC61**	0.100
		1000	–	**XUY FPDC101**	0.115
	M8	600	–	**XUY FPDCM861**	0.060
		1000	–	**XUY FPDCM8101**	0.075
Pre-wired M8 connector	Straight	–	2	**XZC P0941L2**	0.080
	Elbowed (90°)	–	2	**XZC P1041L2**	0.080
	Straight	–	5	**XZC P0941L5**	0.180
	Elbowed (90°)	–	5	**XZC P1041L5**	0.180

Photo-electric sensors

OsiSense XU Application, packaging series

Colour mark readers
With teach mode
DC supply. Solid-state output

Presentation



1 Detection of the lightest shade

2 Programming assistance

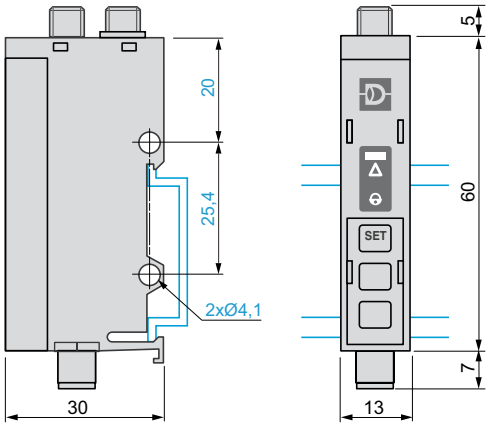
3 Alarm/press button

4 Programming button

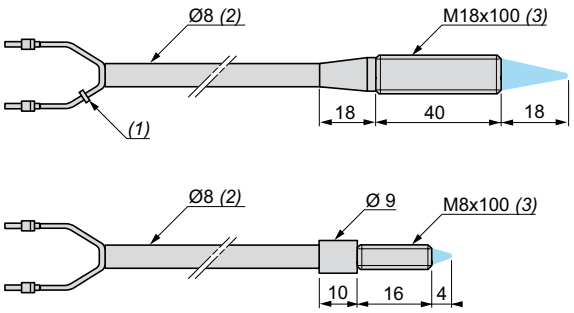
Dimensions

XUY DCFCO966S

Mounting on 35 mm ⊔ rail



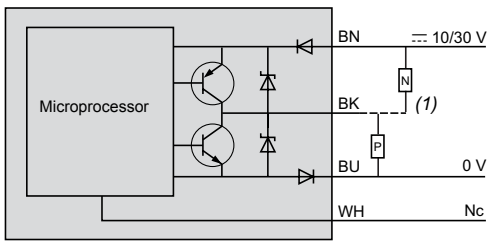
XUY FPDC●●●●●



(1) The ring indicates that the fibre is transmitting.
(2) Bend radius: 15 mm.
(3) 2 nuts included with fibre optic.

Wiring schemes

Cabling



(1) High level on first shade "taught".
Nc: Not connected

M8 connector

Pin n° - colour
1 BN: Brown
2 WH: White
3 BU: Blue
4 BK: Black

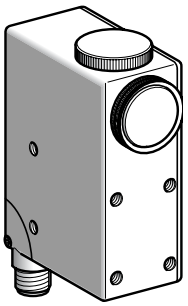
Photo-electric sensors

OsiSense XU Application, packaging series

Colour mark readers *(1)*

DC supply. Solid-state output

Compact design



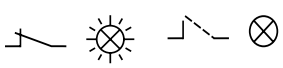
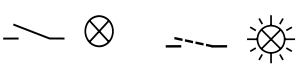
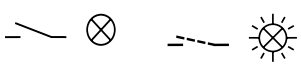
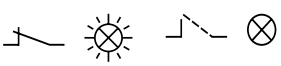
System	**Diffuse**
Type of transmission (line of sight along case axis or at 90° depending on position of lens)	Red or green, automatically selected when using teach mode
Nominal sensing distance (Sn)	**9 mm (7 mm with XUR Z02 or 18 mm with XUR Z01)** *(2)*
Sensitivity adjustment	Automatic when using teach mode

References

3-wire, PNP or NPN programmable	NO or NC programmable function *(3)*	**XUR K1KSMM12**
Weight (kg)		0.550

Characteristics

Product certifications		CE
Ambient air temperature		For operation: - 10…+ 55 °C. For storage: - 20…+ 70 °C
Vibration resistance	Conforming to IEC 60068-2-6	7 gn, amplitude ± 0.6 mm (f = 10…55 Hz)
Shock resistance	Conforming to IEC 60068-2-27	30 gn, duration 11 ms
Degree of protection	Conforming to IEC 60529	IP 67
Connection		M12 connector, can be set at 3 positions
		(suitable female connectors, including pre-wired versions, see page 9/44)
Materials		Case: zinc alloy; lenses: glass
Spot dimensions		At 9 mm: 1.5 x 5 mm (with lens **XUR Z0●** see table on page 5/71)
Minimum detectable width of mark		0.5 mm
Maximum vertical inclination of reader		20°
Maximum linear speed of mark		10 m/s (for 1 mm wide mark)
Rated supply voltage		⎓ **12…24 V with protection against reverse polarity**
Voltage limits		⎓ 10…30 V (including ripple)
Switching capacity (sealed)		≤ **200 mA with overload and short-circuit protection**
Voltage drop, closed state		≤ 1 V (NPN); ≤ 2 V (PNP)
Current consumption, no-load		≤ 80 mA
Maximum switching frequency		10 kHz
Delays		First-up: ≤ 100 ms; response: ≤ 50 µs; recovery: ≤ 50 µs
Time delay		"OFF delay": 20 ms, activated/deactivated by internal switch
Analogue output		⎓ 0…5.5 V (voltage proportional to light reflected by the object)

Function table	**Function**	**Detection of dark mark on light background**		**Function**	**Detection of light mark on dark background**	
		No mark present in the beam	**Mark present in the beam**		**No mark present in the beam**	**Mark present in the beam**
Output state (PNP or NPN) indicator: red LED (illuminated when sensor output is ON)	NC			NO		
	NO			NC		

(1) Applications: detection of contrasting colours on reflective, matt or embossed surfaces. Colour mark and index mark reading function on automated packaging and filling systems and on labelling, heat sealing, thermo-forming and printing machines, etc.

(2) Lenses for reduction or magnification of spot (see page 5/158 and spot size table on page5/71).

(3) Automatic programming depending on chronological order of teaching for the mark and the background.

Accessories:
page 5/158

Photo-electric sensors

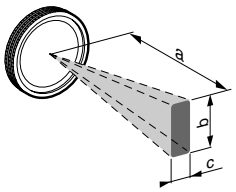
OsiSense XU Application, packaging series

Colour mark readers

DC supply. Solid-state output

XUR K1KSMM12

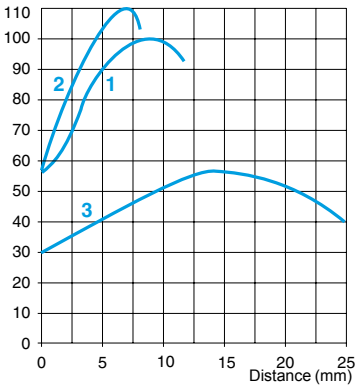
Detection zone and spot size (mm)



XUR	a	b	c
K●●●●●●●	9	5	1.5
K●●●●●●● + XUR Z01	18	7	2
K●●●●●●● + XUR Z02	7	4	1

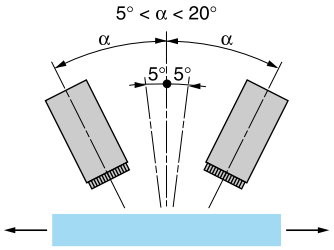
Lenses **XUR Z0●**, see page 5/158

Detection curve



1 **XUR K●●●●●●●**
2 **XUR K●●●●●●● + XUR Z02**
3 **XUR K●●●●●●● + XUR Z01**

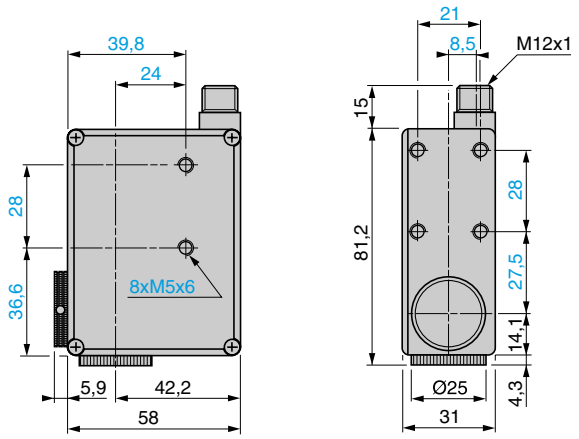
Vertical inclination



An angle of 5 to 10° from vertical is recommended for reflective or transparent surfaces.
Maximum vertical inclination: 20°.

Dimensions

XUR K1KSMM12

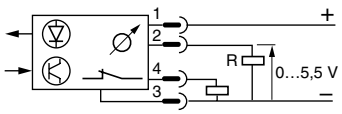


Wiring schemes (3-wire ⎓)

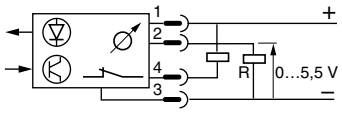
XUR K1KSMM12

Automatic NC or NO selection depending on chronological order of teaching for the mark and the background

PNP output



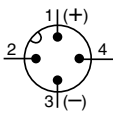
NPN output



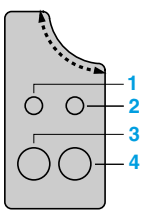
R = 2.2 kΩ

Connector scheme

(sensor connector pin view)



Functions



1 Green LED, sensor in teach mode
2 Red LED, output state
3 Teach mode button for mark
4 Teach mode button for background

PNP/NPN programming and time delay by internal switches

See connection on page 9/44.

Accessories:
page 5/158

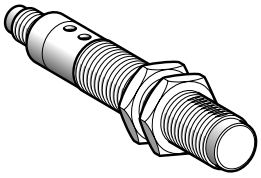
Photo-electric sensors

OsiSense XU Application, packaging series

Luminescence sensor *(1)*

DC supply. Solid-state output

Design 18



System		**Diffuse**
Type of transmission		Ultraviolet (370 nm)
Nominal sensing distance (Sn)		**20 mm** for colour mark reading, **0...80 mm** in diffuse mode
Sensitivity adjustment		By potentiometer

References

3-wire, PNP	NO function *(2)*	**XU5 M18U1D**
Weight (kg)		0.075

Characteristics

Product certifications		CE, CSA, UL
Ambient air temperature	For operation	- 25…+ 55 °C
	For storage	- 40…+ 70 °C
Vibration resistance	Conforming to IEC 60068-2-6	7 gn, amplitude ± 0.6 mm (f = 10…55 Hz)
Shock resistance	Conforming to IEC 60068-2-27	30 gn, duration 11 ms
Degree of protection	Conforming to IEC 60529	IP 67
Connection		M12 connector (suitable female connectors, including pre-wired versions, see page 9/44)
Materials	Case	Nickel plated brass
	Lenses	PMMA
Spot diameter		At 20 mm: Ø 3 x 1 mm
Auxiliary functions		External synchronisation, locking
Indicator lights	Output state	Green LED
	Teach mode	–
Rated supply voltage		⎓ **12…24 V with protection against reverse polarity**
Voltage limits		⎓ 10…30 V (including ripple)
Switching capacity (sealed)		≤ **100 mA** **with protection against reverse polarity, overload and short-circuit**
Voltage drop, closed state		≤ 1.5 V (PNP)
Current consumption, no-load		≤ 20 mA
Maximum switching frequency		1 kHz
Delays	First-up	≤ 100 ms
	Response	≤ 500 µs
	Recovery	≤ 500 µs
Time delay		"OFF delay": 20 ms, activated/deactivated by cabling method

(1) Applications: detection of invisible reference marks, markings, glues or varnishes containing bluing agents.
(2) Output activated when a blued mark on a non blued background is present.

Accessories :
page 5/158

Photo-electric sensors

OsiSense XU Application, packaging series

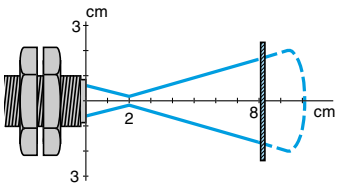
Luminescence sensor *(1)*

DC supply. Solid-state output

Curves

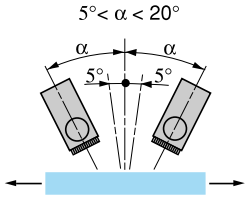
XU5 M18U1D

Detection curves



Object 5 x 5 cm, white 90%
Spot size at 20 mm: oval, Ø 3 x 1 mm

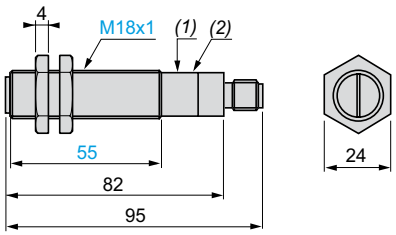
Vertical inclination



An angle of 5 to 10° from vertical is recommended for reflective or transparent surfaces
Maximum vertical inclination: 20°

Dimensions

XU5 M18U1D



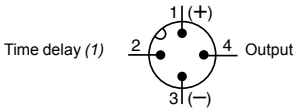
(1) Potentiometer
(2) Green LED
Fixing nut tightening torque: 15 N.m.

Wiring schemes

XU5 M18U1D

Connector scheme

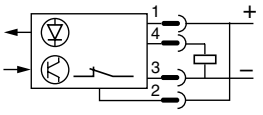
(Sensor connector pin view)



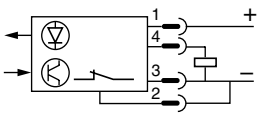
See connection on page 9/44

Wiring schemes (3-wire ⎓)

PNP output
Without output signal time delay



With output signal time delay (20 ms)



(1) "OFF delay" of output signal:
- no time delay: connect contact 2 to (+)
- 20 ms time delay: connect contact 2 to (-)

Accessories :
page 5/158

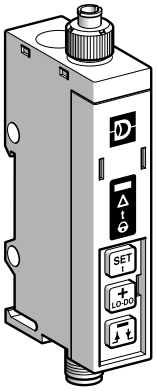
Photo-electric sensors

OsiSense XU Application, packaging series

Detection of illumination using plastic fibre optic and teach mode

Four-wire DC. Solid-state output

Fibre design



Nominal sensing distance (Sn)		**Depending on fibre optic used**

References

4-wire, PNP/NPN output	NO/NC programmable function	**XUY AFLCO966S**
Weight (kg)		0.054

Characteristics

Product certifications		CE
Ambient air temperature	For operation	0…+ 60 °C
	For storage	- 20…+ 80 °C
Degree of protection	Conforming to IEC 60529	IP 65
Connection		M8, 4-pin male connector
Materials	Case	Polycarbonate
Rated supply voltage		**⎓ 12…24 V with protection against reverse polarity**
Voltage limits (including ripple)		**⎓ 10…30 V**
Switching capacity		**100 mA with overload and short-circuit protection**
Voltage drop, closed state		2 V
Current consumption, no-load		< 40 mA
Maximum switching frequency		**< 5 Hz**
External input	Active	< 1.4 V
	Inactive	> 3 V
Delays	Response and recovery	< 100 ms
Output time delay	Range	0…5 s in 11 adjustment increments
	Duration of each increment	First increment 40 ms then 500 ms for each press
Indicator lights	Output signal	Green LED
	Limit of detection	Red LED
	Time delay active	Red LED
Sensitivity adjustment		Using teach (fine mode or standard mode) Adjustment possible using +/- button Remote teaching using external input (fine mode)

■ Applications

□ Verifying operation of indicator lights on electrical appliances

□ Testing car headlights on production line

Accessories

Description	Details	Length of cable	References	Weight
		m		kg
Plastic fibre optic *(1)*	Ø 2.2 mm	1	**XUY A005**	0.007
Pre-wired M8 connector	Straight	2	**XZC P0941L2**	0.080
	Elbowed (90°)	2	**XZC P1041L2**	0.080
	Straight	5	**XZC P0941L5**	0.180
	Elbowed (90°)	5	**XZC P1041L5**	0.180

(1) End fitting, see page 5/134.

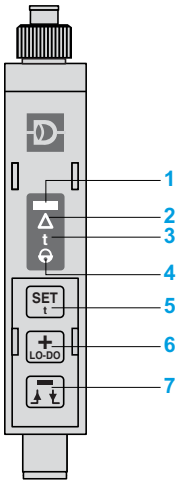
Photo-electric sensors

OsiSense XU Application, packaging series

Detection of illumination using plastic fibre optic and teach mode

Four-wire DC. Solid-state output

Presentation



1 Output signal

2 Limit of detection
Positioning assistance

3 Time delay active

4 Action keypad
Keypad locking

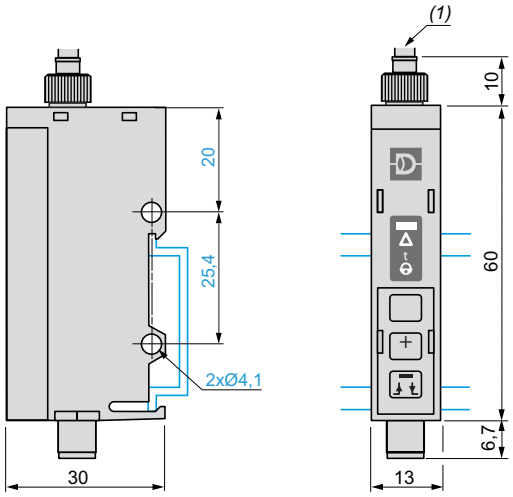
5 Automatic adjustment of threshold
Access to special functions

6 Sensitivity increase
NO/NC output
Time delay increase

7 Sensitivity decrease
On-delay, Off-delay inversion
Time delay decrease

Dimensions

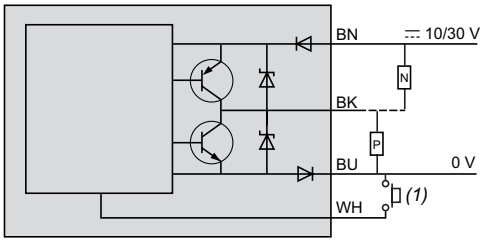
Mounting on 35 mm ⊔ rail



(1) Ø 2.2 mm plastic fibre optic.

Wiring schemes

Scheme



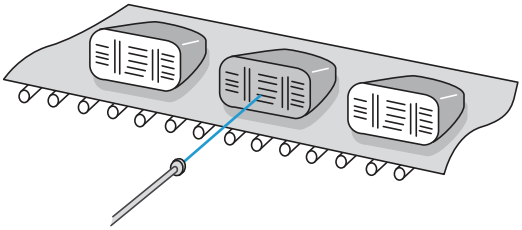
(1) Remote teaching. If not used: connect to +.

M8 connector

Pin n° - colour
1 BN: Brown
2 WH: White
3 BU: Blue
4 BK: Black

Application examples

Verifying operation of car headlights on an assembly line



Verifying operation of indicator lights on electrical appliances

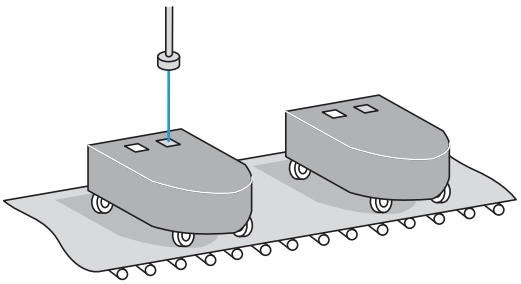
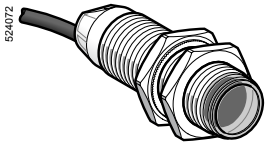


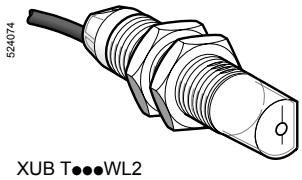
Photo-electric sensors

OsiSense XU Application, packaging series

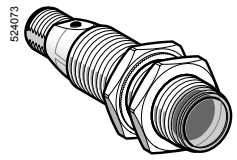
For detection of transparent materials
Design 18, plastic or stainless steel
Three-wire DC, solid-state output



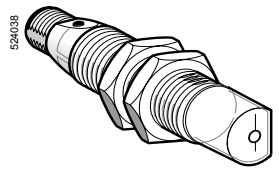
XUB T●●●NL2



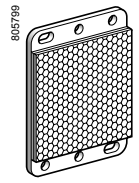
XUB T●●●WL2



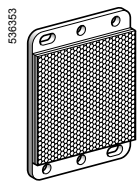
XUB T●●●NM12



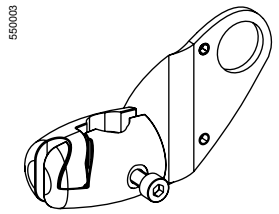
XUB T●●●WM12



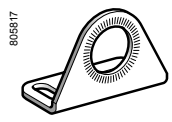
XUZ C50



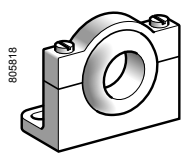
XUZ C50HP



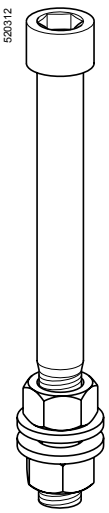
XUZ B2003



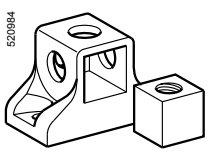
XUZ A118



XUZ A218



XUZ 2001



XUZ 2003

Ø 18 plastic, coaxial polarised reflex with teach mode

Sensing distance (Sn) m	Function	Line of sight	Output	Reference	Weight kg
Pre-cabled *(2)*					
0…1.4 With reflector XUZ C50/C50HP	NO or NC, by programming	Along case axis	PNP	**XUB TAPSNL2** *(1)*	0.110
			NPN	**XUB TANSNL2** *(1)*	0.110
0…0.8 With reflector XUZ C50/C50HP	NO or NC, by programming	90° to case axis	PNP	**XUB TAPSWL2** *(1)*	0.113
			NPN	**XUB TANSWL2** *(1)*	0.113
M12 connector					
0…1.4 With reflector XUZ C50/C50HP	NO or NC, by programming	Along case axis	PNP	**XUB TAPSNM12** *(1)*	0.045
			NPN	**XUB TANSNM12** *(1)*	0.045
0...0.8 With reflector XUZ C50/C50HP	NO or NC, by programming	90° to case axis	PNP	**XUB TAPSWM12** *(1)*	0.048
			NPN	**XUB TANSWM12** *(1)*	0.048

Ø 18 stainless steel, coaxial polarised reflex with teach mode

Sensing distance (Sn) m	Function	Line of sight	Output	Reference	Weight kg
Pre-cabled *(2)*					
0…1.4 With reflector XUZ C50/C50HP	NO or NC, by programming	Along case axis	PNP	**XUB TSPSNL2** *(1)*	0.135
			NPN	**XUB TSNSNL2** *(1)*	0.135
0...0.8 With reflector XUZ C50/C50HP	NO or NC, by programming	90° to case axis	PNP	**XUB TSPSWL2** *(1)*	0.138
			NPN	**XUB TSNSWL2** *(1)*	0.138
M12 connector					
0…1.4 With reflector XUZ C50/C50HP	NO or NC, by programming	Along case axis	PNP	**XUB TSPSNM12** *(1)*	0.070
			NPN	**XUB TSNSNM12** *(1)*	0.070
0...0.8 With reflector XUZ C50/C50HP	NO or NC, by programming	90° to case axis	PNP	**XUB TSPSWM12** *(1)*	0.073
			NPN	**XUB TSNSWM12** *(1)*	0.073

Ø 18 plastic, reflex with teach mode

Sensing distance (Sn) m	Function	Line of sight	Output	Reference	Weight kg
Pre-cabled *(2)*					
0.1…0.8 With reflector XUZ C50	NO or NC, by programming	Along case axis	PNP	**XUB T1PSNL2**	0.103
			NPN	**XUB T1NSNL2**	0.103
M12 connector					
0.1…0.8 With reflector XUZ C50	NO or NC, by programming	Along case axis	PNP	**XUB T1PSNM12**	0.045
			NPN	**XUB T1NSNM12**	0.045

Accessories for XUB T●●●●● *(3)*

Description	Dimensions	Reference	Weight kg
Universal reflector	50 x 50 mm	**XUZ C50**	0.020
Application reflector (accuracy, detection sensitivity)	50 x 50 mm	**XUZ C50HP**	0.020

Fixing accessories *(4)*

Description	Reference	Weight kg
3D fixing kit for use on M12 rod, for XUB T or XUZ C50/C50HP	**XUZ B2003**	0.170
M12 rod	**XUZ 2001**	0.050
Support for M12 rod	**XUZ 2003**	0.150
Stainless steel fixing bracket	**XUZ A118**	0.045
Plastic fixing bracket with adjustable ball-joint	**XUZ A218**	0.035

(1) ***Application reflector XUZ C50HP included with sensor.***
(2) For a 5 m long cable, replace L2 by ***L5****.*
Example: XUB TAPSNL2 becomes ***XUB TAPSNL5****.*
(3) For further information, see page 5/159
(4) For further information, see page 5/158.

Photo-electric sensors

OsiSense XU Application, packaging series

For detection of transparent materials
Design 18, plastic or stainless steel
Three-wire DC, solid-state output

Characteristics

Sensor type			XUB T●●●●M12/ XUB T●●●●L2	XUB T1●●●●M12/ XUB T1●●●●L2
Product certifications			UL, CSA, CE	
Connection	Connector		M12 (male)	
	Pre-cabled		Length: 2 m, wire c.s.a.: 3 x .034 mm²	
Nominal sensing distance Sn	Line of sight along case axis	**m**	0 to 1.4 with reflector XUZ C50/C50HP	0.1 to 0.8 with reflector XUZ C50
	Line of sight 90° to case axis	**m**	0 to 0.8 with reflector XUZ C50/C50HP	–
Beam divergence			1.5° (Ø 37mm spot at 1.4 m)	
Blind zone		**m**	0	0.1
Preferred object approach direction			Any	Lenses on horizontal plane for horizontal passage of object
Type of transmission			Coaxial polarised red	Dual lens red
Degree of protection	Conforming to IEC 60529		IP 65, IP 67, double insulation ⧈ IP 69K for **XUB TS●●●●●**	
Temperature	Storage	**°C**	- 40…+ 70	
	Operation	**°C**	0…+ 55	
Materials	Case		**XUB TA and XUB T1 ●●●●●**: plastic PBT **XUB TS●●●●●**: stainless steel (grade 304Cu)	
	Lens		PMMA	
	Cable		PvR	
Vibration resistance	Conforming to IEC 60068-2-6		7 gn, amplitude ± 1 mm (f = 10 to 55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27		30 gn, duration 11 ms	
Indicator lights	Output state		Yellow LED	
	Supply on		Green LED	
	Stability		Red LED	Red LED for alignment only
Rated supply voltage		**V**	⎓ 12…24 with protection against reverse polarity	
Voltage limits (including ripple)		**V**	⎓ 10…32	
Current consumption, no-load		**mA**	45	30
Switching capacity		**mA**	≤ 100 with overload and short-circuit protection	
Voltage drop, closed state		**V**	≤ 1.5	
Maximum switching frequency		**Hz**	1000	250
Delays	First-up	**ms**	< 200	< 2000
	Response and recovery	**µs**	< 500	< 2000

Wiring schemes

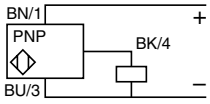
M12 connector

3 (-)
1 (+)
4 OUT/Output
2 Not connected

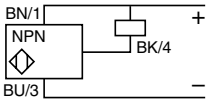
Pre-cabled

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

PNP



NPN

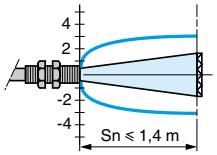


See connection on page 9/44.

Detection curves

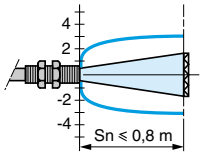
With reflector XUZ C50●●

Line of sight along case axis



Sn ≤ 1.4 m (**XUBT**)
Sn ≤ 0.8 m (**XUBT1**)

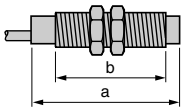
Line of sight 90° to case axis



Sn ≤ 0.8 m (**XUBT** only)

Dimensions

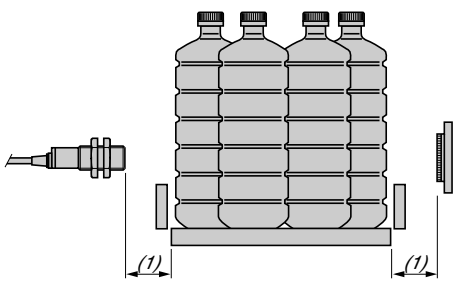
XUB T●●●●



	Pre-cabled (mm)		Connector (mm)	
	a	**b**	**a**	**b**
Ø 18, line of sight along case axis	64	44	78	44
Ø 18, line of sight 90° to case axis	78	44	92	44

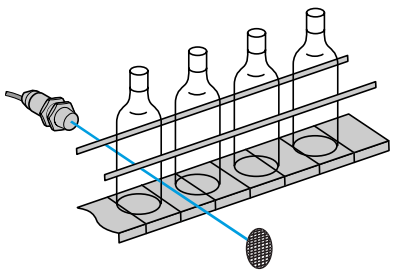
Setting-up

Recommended distances and application restraints

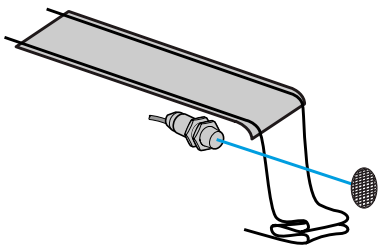


(1) Blind zone

Application examples



Detection of transparent bottles



Detection of plastic film

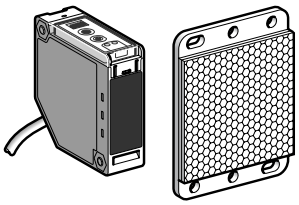
For precise detection or magnifying glass effect cases, it is advisable to use XUBT●●●●M12/L2.

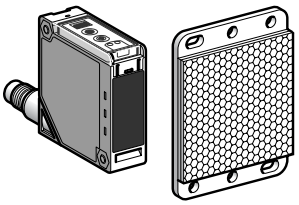
Photo-electric sensors

OsiSense XU Application, packaging series

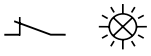
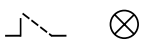
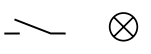
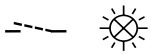
For detection of transparent materials, with teach mode and automatic compensation for accumulation of dirt *(1)*
Solid-state output

Compact design





System		**Reflex**	
Type of transmission		Red	
Nominal sensing distance (Sn)		**1.5 m** (with 50 x 50 mm reflector)	
References			
3-wire, PNP or NPN	NO or NC programmable function	**XUK T1KSML2** *(2)*	**XUK T1KSMM12** *(2)*
Weight (kg)		0.280	0.120
Characteristics			
Product certifications		CE, UL, CSA	
Ambient air temperature	For operation	- 25…+ 55 °C	
	For storage	- 30…+ 70 °C	
Vibration resistance	Conforming to IEC 60068-2-6	7 gn (f = 10…55 Hz)	
Shock resistance	Conforming to IEC 60068-2-27	10 gn, duration 11 ms	
Degree of protection	Conforming to IEC 60529	IP 65	
Materials	Case	PC	
	Lenses	PMMA	
	Cable	PVC	
Connection		Pre-cabled, diameter 6 mm, length 2 m, wire c.s.a.: 4 x 0.34 mm^2	M12 male connector, can be set at 2 positions (suitable female connectors, including pre-wired versions, see page 9/44)
Rated supply voltage		⎓ **12…24 V with protection against reverse polarity**	
Voltage limits		⎓ 10…30 V (including ripple)	
Switching capacity (sealed)		≤ **100 mA with overload and short-circuit protection**	
Voltage drop, closed state		≤ 2 V	
Current consumption, no-load		≤ 35 mA	
Maximum switching frequency		1500 Hz	
Delays	First-up	≤ 80 ms	
	Response	≤ 0.3 ms	
	Recovery	≤ 0.3 ms	
Time delay		Monostable, on-delay or off-delay (programmable) adjustable from 0.1 to 5 seconds	

Function table	**Function**	**Reflex system**	**Reflex system**
		No object present in the beam	**Object present in the beam**
Output state (PNP or NPN) indicator: yellow LED (illuminated when sensor output is ON)	NC		
	NO		

(1) Sensor memorises, in teach mode, the environmental conditions in which the object is to be detected and adapts to any variations.
*(2) 50 x 50 mm reflector **XUZ C50** included with the sensor.*

Accessories:
page 5/158

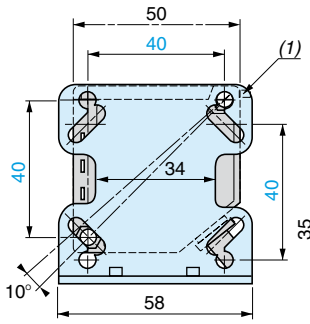
Photo-electric sensors

OsiSense XU Application, packaging series

For detection of transparent materials, with teach mode and automatic compensation for accumulation of dirt
Solid-state output

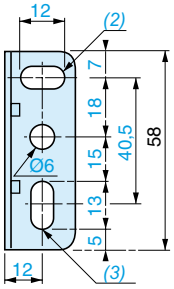
Dimensions

XUK T1KSML2



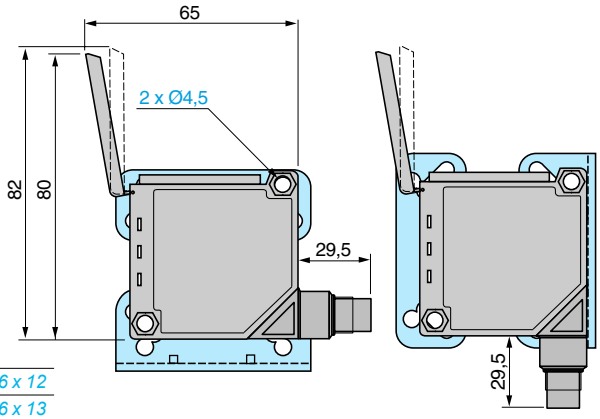
(1) Cover locking tongue

Bracket fixing



(2) 1 elongated hole Ø 6 x 12
(3) 1 elongated hole Ø 6 x 13

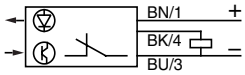
XUK T1KSMM12 with cover raised
Fixing bracket mounting according to position of connector



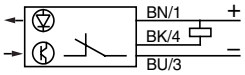
Wiring schemes (3-wire ⎓)

NC programmed

PNP programmed output

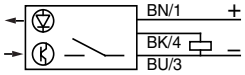


NPN programmed output

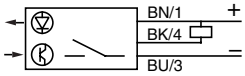


NO programmed

PNP programmed output

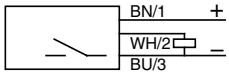


NPN programmed output

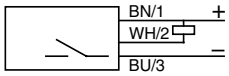


Alarm output

PNP programmed



NPN programmed



Connection

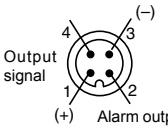
Cable connections

XUK T1KSML2

(–)	BU	(Blue)
(+)	BN	(Brown)
(OUT)	BK	(Black)
Alarm	WH	(White)

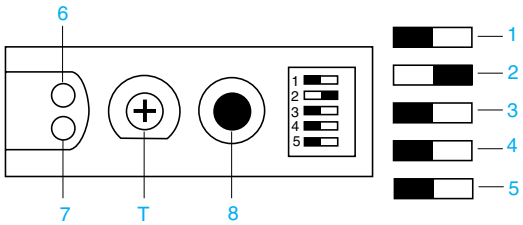
Connector scheme

XUK T1KSMM12



See connection on page 9/44

Functions



Switches

1 NC/NO programming
2 Time delay activated or deactivated
3 Normal time delay or monostable
4 Normal time delay “On-delay” or “Off-delay”
5 PNP or NPN output

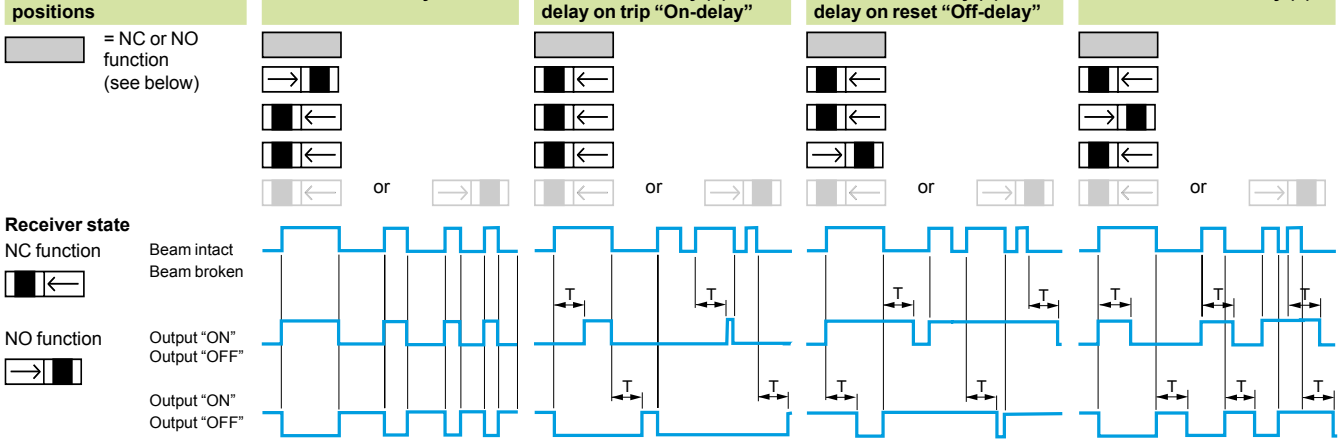
LED

6 Yellow LED: output and teach mode aid
7 Red LED: alignment aid and alarm indicator

Potentiometer and button

T Time delay adjustment
8 Teach mode button

Time delays



Accessories:
page 5/158

Photo-electric sensors

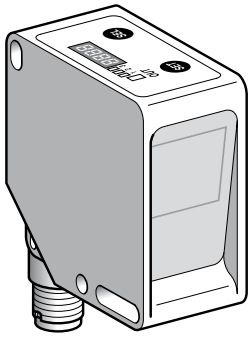
OsiSense XU Application, packaging series

Compact design, 50 x 50

For colour detection *(1)*

DC supply. Solid-state output

Compact design, 50 x 50



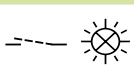
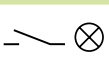
System		**Diffuse**
Type of transmission		White LED (400-700 nm)
Type of colour processing		RGB
Nominal sensing distance (Sn)		**20 mm** (Operational distance, see curve on page 5/81)

References

3-wire, PNP + 1 synchro input	NO function	**XUK C1PSMM12**
3-wire, NPN + 1 synchro input	NO function	**XUK C1NSMM12**
Weight (kg)		0.085

Characteristics

Product certifications		CE, cULus
Ambient air temperature	For operation	- 10…+ 55 °C
	For storage	- 20…+ 70 °C
Vibration resistance	Conforming to IEC 60068-2-6	Amplitude ± 0.5 mm, f = 10...55 Hz for each axis
Shock resistance	Conforming to IEC 60068-2-27	30 gn, duration 11 ms, 6 shocks on each axis
Degree of protection	Conforming to IEC 60529	IP 65
Connection		M12, 8-pin connector; can be set at 90°
Materials	Case	ABS
	Lenses	Glass (window tilted, anti-reflective glass)
Spot diameter		At 20 mm: Ø 4 mm
Adjustment	Teach mode	Teaching using SET (adjustment) and SEL (Selection) buttons
	Operating mode	C (colour) or C+I (colour + intensity), independent for each channel
	Tolerance level	Selectable tolerance for varying shades of colour from TOL 0 to TOL 9
Auxiliary functions		External synchronisation, locking
Indicator lights and display	Display	4-digit
	Output active	3 green LEDs: output 1, 2 or 3
	Output state "OUT"	Yellow LED if one output (1, 2 or 3) activated
Rated supply voltage		⎓ **12…24 V**
Voltage limits		⎓ 10…30 V (including ripple)
Switching capacity (sealed)		≤ **100 mA with protection against reverse polarity, overload and short-circuit**
Voltage drop, closed state		≤ 2 V
Current consumption, no-load		≤ 60 mA
Maximum switching frequency		1.5 kHz
Delay		335 µs for response and recovery
Time delay		Selectable (5, 10, 20, 30 or 40 ms)

Function table for each channel (3 channels) NO function	**Colour recognised by sensor**	**Colour not recognised by sensor**
Output state (PNP or NPN) indicator (illuminated when sensor output is ON)		

(1) Applications: OsiSense XU "Full colour" is a colour sensor that can recognise up to 3 colours. It can be used to sort objects by colour or to monitor colours, and is insensitive to surface finishes (matt or reflective), as well as ambient lighting. The sensor is suitable for use in many industrial sectors, such as packaging machines, printing machines, etc.