Technical Catalog 2001

Sensors

Proximity
Photoelectric
Ultrasonic

Sensors from ABB...

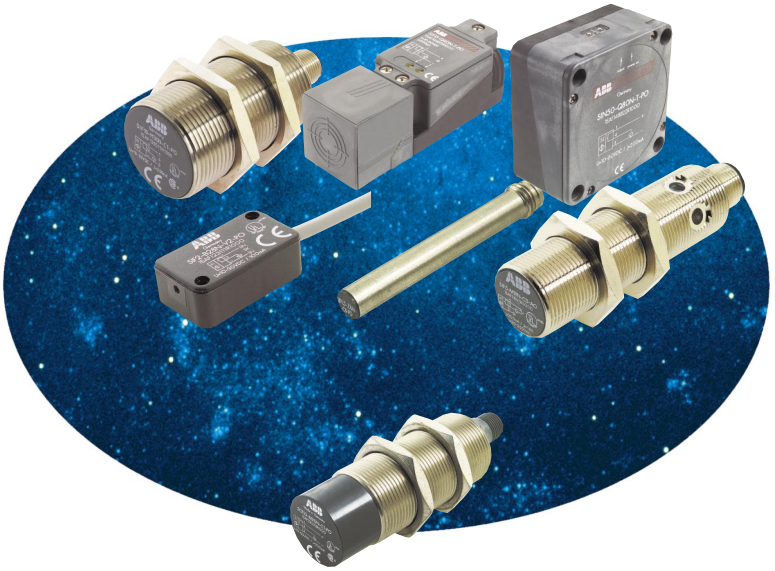
Proximity sensors

Inductive

Inductive sensors detect metallic objects at an operating distance of up to 50mm. They are insensitive to external influences and are durable for all applications. They offer high speed, no contact sensing with an extremely long life.

Capacitive

Capacitive sensors detect virtually any material (paper, cardboard, plastic, etc.) at any operating distance up to 10mm. They are also suitable for detection of metallic or fluid objects. They offer high speed, no contact sensing with an extremely long life.



Photoelectric sensors

Photoelectric sensors "see" light-reflecting or opaque objects at an operating distance of 5 meters and more. They can also be used with fiber-optic cable for detection of extremely small objects.

Ultrasonic sensors

Ultrasonic sensors detect the position of objects with a sound-reflecting surface. They may be used at an operating distance of up to 6 meters. They are resistant to dust and operate independently in regards to the colour of the object to be detected.

Type Codes for ABB Position Sensors

The characteristic features of the sensors have been coded in 5 steps, to make it easier to choose the device you need. The coding, comprised of combinations of letters and numbers, ensures the clear and uncomplicated identification of individual sensors.

SI	F2	M12N	V2	PO

Sensor Types:

SI = Inductive
SC = Capacitive
SO = Photoelectric
SU = Ultrasonic

Installation Method and Detection Range:

Inductive
Capacitive
F0.8 ... F40 = flush installation, operating distances: 0.8 to 40 mm (Capactive sensors can be adjusted up to 10 mm)
N2 ... N50 = non-flush installation, operating distances: 2 to 50 mm

Photoelectric
R2000 ... R5000 = Retro-reflective, operating distances: 2000 to 5000 mm
D200 ... D800 = Diffuse-reflective, operating distances: 200 to 800 mm
L15 ... L150 = Fibre-optic waveguide basic unit, operating distances: 15 to 150 mm as through beam photoelectric sensor LT or as diffuse reflective sensor LD. LX refers to fibre-optic sensor
T20M = Through-beam, operating distances: up to 20 m

Ultrasonic
D500 ... D6000 = Ultrasonic reflection principle, operating distances: 500 to 6000 mm

Types of Housing:

Inductive
Z4 = Smooth cylindrical, ø 4 mm
Z6 = Smooth cylindrical, ø 6.5 mm
M8 = Thread M8 x 1
M12 = Thread M12 x 1
M18 = Thread M18 x 1
M30 = Thread M30 x 1.5
Q30 = Block with square front face 30 x 30 mm
Q40 = Block with 40 x 40 mm
Q80 = Block with 80 x 80 mm
B28 = Block 28 x 16 x 9 mm
B45 = Block 45 x 30 x 12 mm

Capacitive
M30 = Thread M30 x 1.5

Photoelectric
M18 = Thread M18 x 1
B26 = Block 26 x 24 x 12 mm
B40 = Block 40 x 40 x 13 mm
B45 = Block 45 x 50 x 18 mm
B75 = Block 75 x 64 x 25 mm

Ultrasonic
M30 = Thread M30 x 1.5

Version:
N = Normal type of construction/length
S = Short type of construction
T = Other short type of construction
W = Weld Immune
E = Stainless Steel

Connections:

V2 = PVC cable, 2 m in length
U2 = PUR cable, 2 m in length
C1 = M12 connector
C3 = M12 connector, AC only
C8 = M8 connector with 3 pins
T = Terminal connection (larger sensors)

Output Signals:

PO = DC 3-wire PNP Normally open (NO)
PC = DC 3-wire PNP Normally closed (NC)
PK = DC 4-wire PNP NO/NC combination
NO = DC 3-wire NPN Normally open (NO)
NK = DC 4-wire NPN NO/NC combination
DO = DC 2-wire Normally open (NO)
AO = AC 2-wire Normally open (NO)
AC = AC 2-wire Normally closed (NC)
AK = AC 4-wire NO/NC combination
KK = AC/DC Relay
M = Analogue

Position Sensors

Summary

Index

Proximity Sensors

Type:	Inductive		Inductive			
						
Diameter:	4 mm	6 mm	8 mm	12 mm	18 mm	30 mm
Housing:	Cylindrical		Cylindrical			
Sensing Distance:	0.8 mm	1.5 mm	1.5 - 2 - 3 mm	2 - 4 - 6 mm	5 - 8 - 12 mm	10 - 15
Flush:	SIFx-Z4N-xx-xxx	SIFx-Z6N-xx-xxx	SIFx-M8x-xx-xxx	SIFx-M12x-xx-xxx	SIFx-M18x-xx-xxx	SIFx-M30x-xx-xxx
Non Flush:			SINx-M8x-xx-xxx	SINx-M12x-xx-xxx	SINx-M18x-xx-xxx	SINx-M30x-xx-xxx
Page:	**1**.4	**1**.4	**1**.5 – **1**.8	**1**.9 – **1**.15	**1**.16 – **1**.20	**1**.21– **1**.24

Type:	Inductive		Inductive			Capacitive
						
Size:	B 28	B 45	Q30	Q40	Q80	30 MM
Housing:	Sqare Block		Sqare Block			Cylindrical
Sensing Distance:	2 mm	6 mm	15 mm	15 - 20 - 30 mm	40 - 50 mm	10 mm
Flush:	SIFx-B28N-xx-xxx	SIFx-B45N-xx-xxx		SIFx-Q40N-xx-xxx		SCFx-M30N-xx-xxx
Non Flush:			SINx-Q30N-xx-xxx	SINx-Q40N-xx-xxx	SINx-Q80N-xx-xxx	
Page:	**1**.25	**1**.25	**1**.25	**1**.26 – **1**.28	**1**.29	**2**.4

x = Sensing Distance xx = Connectors xxx = Outputs

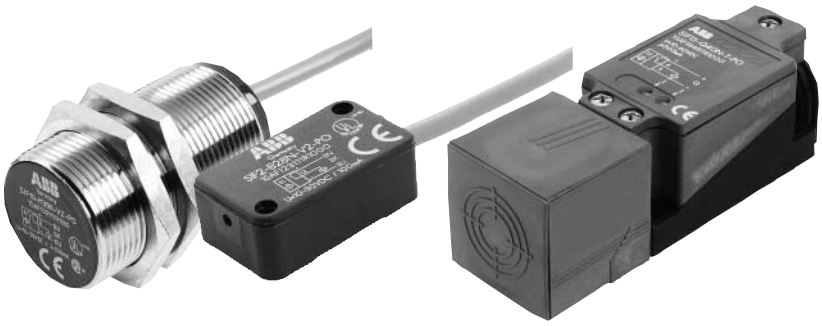
Photoelectric & Ultrasonic Sensors

Type:	Photoelectric		Photoelectric			
						
Diameter:	18 mm	B 26	B 40	B 45	B 75	B 50
Housing:	Cylindrical	Block	Block			
Sensing Distance:	200 - 3000 mm	400 - 2000 mm	300 - 2000 mm	500 mm - 15 m	800 mm - 20 m	15 - 250 mm
Diffuse:	SODx-M18N-xx-xxx	SODx-B26N-xx-xxx	SODx-B40N-xx-xxx	SODx-B45N-xx-xxx	SODx-B75N-xx-xxx	
Retro-Reflechtive:	SORx-M18N-xx-xxx	SORx-B26N-xx-xxx	SORx-B40N-xx-xxx	SORx-B45N-xx-xxx	SORx-B75N-xx-xxx	
Through-Beam:				SOTx-B45N-xx-xxx	SOTx-B75N-xx-xxx	
Fibre Optic:	SOLX-M18N-C1-PO					SOLX-B50N-U2-POS
Page:	**3**.8, **3**.13, **3**.19	**3**.9, **3**.13	**3**.10, **3**.14	**3**.11, **3**.12, **3**.16, **3**.18	**3**.9, **3**.10, **3**.14, **3**.15, **3**.17	**3**.20

Type:	Ultrasonic		Ultrasonic	
				
Size:	30 mm	30 mm	30 mm	30 mm
Housing:	Cylindrical		Cylindrical	
Sensing Distance:	500 mm	2000 mm	4000 mm	6000 mm
Diffuse:	SUD500-M30N-xx-xxx	SUD2000-M30N-xx-xxx	SUD4000-M30N-xx-xxx	SUD6000-M30N-xx-xxx
Page:	**4**.6, **4**.8	**4**.6, **4**.8	**4**.7, **4**.9	**4**.7, **4**.9

x = Sensing Distance xx = Connectors xxx = Outputs

Proximity Sensors
Inductive



General information

- Non-contact sensing
- Extremely long life
- High speed switching frequency
- Short circuit protection
- AC & DC models
- Metallic objects only
- Sensing distances from 0.8 to 50 mm
- Large selection of 2 wire, 3 wire and 4 wire models
- Choice of quick disconnect, cable or terminal connection
- Stainless steel, Nickel-plated brass or Crastin housings

Inductive Sensors

Inductive Sensors
Description

Applications

Inductive Sensors are standardised and easy to use owing to their clearly defined characteristics and operating conditions. They detect metallic objects and feature a precisely outlined sensing range. They are not impaired by light, noise or non-conductive dust or fluids such as oil, operating reliably and detecting precisely without the need for adjustement. Inductive sensors also offer largely standardised parameters.

Description

The Inductive sensors are available in 4 differents housing :

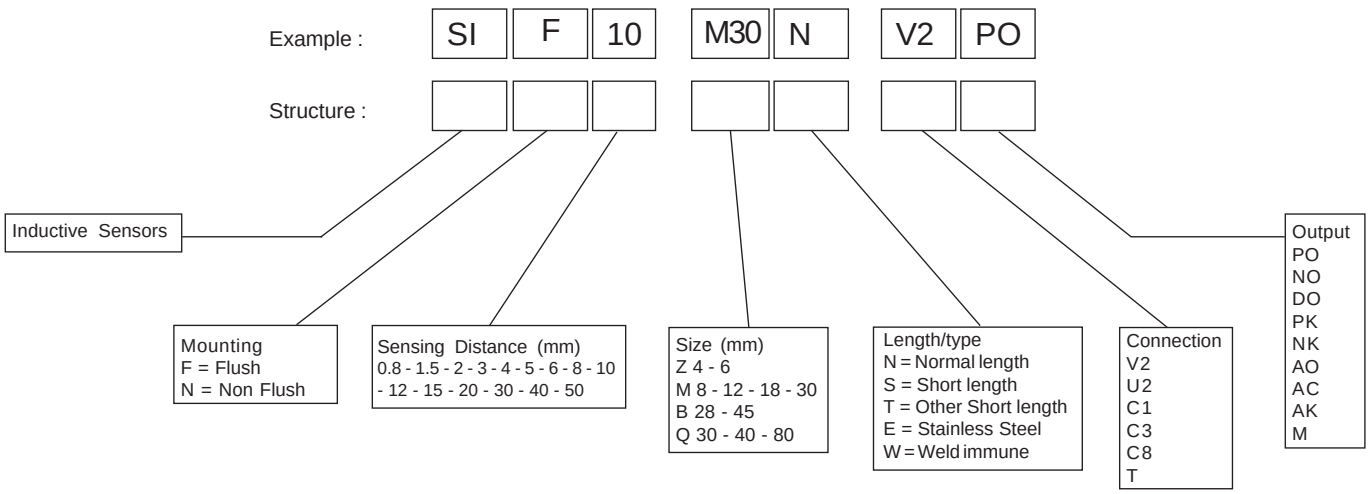
Block Housing
B 28 - B 45 Series

Cylindrical Housing
∅ 4 - 6 - 8 - 12 - 18 - 30 mm

Square Block Housing
Q 80 Series

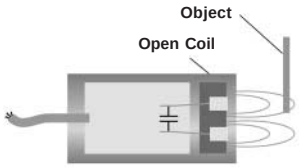
Square block Housing
Q 30 - Q 40 Series

Part N° Structure



Basic Mode of Operation

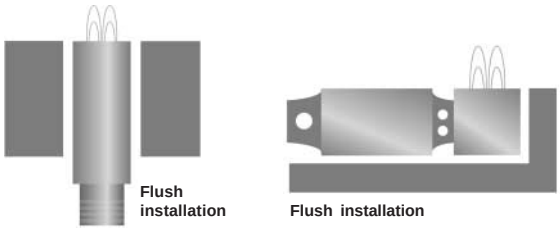
The essential component of the inductive sensors is its oscillator with open coil. When a metallic object approaches the sensor, the oscillation is initially attenued and ultimately interrupted. This effect is detected by a trigger circuit and is forwarded as an output signal.



Installation Options

Either flush or non-flush inductive sensors may be fitted, depending on local conditions.

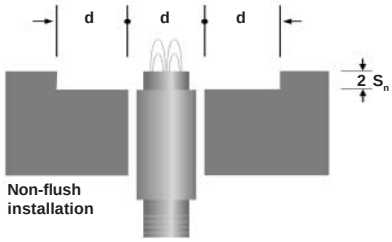
Flush sensors are shielded and can thus be fitted easily with no major requirements. Flush installation also protects the sensor .



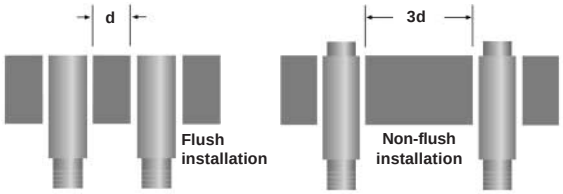
Non-flush sensors offer maximum possible operating distance. A minimum recess is required in the surrounding material. The following applies :

Lateral clearance = sensor diameter

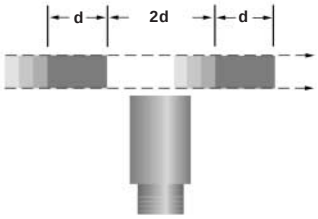
Depth = twice nominal operating distance



Sensors fitted too close together have a mutual influence on each other. Consequently, minimum clearences must be observed, in particular in the case of the non-flush sensor type.

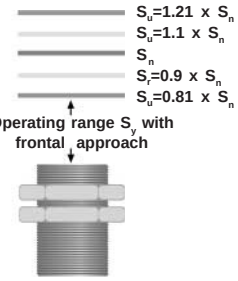


The higher switching frequency is one of the most important advantage of sensors by comparison with mechanical limit switches. Certain lug sizes and clearences must be observed in order to achieve the values specified in the ABB catalogue.



Operating Distance

The distance between the sensor and the object plays a crucial role in achieving reliable results. The operating distance is differentiated and follows in order to allow for various operating conditions :



Nominal distance Sn :

Typical operating distance under the measurement conditions defined in the Standard. This involves a defined target made of steel ST37 with a minimum thickness of 1 mm and a minimum size approaching the sensor. The following apply :

Diameter of target = diameter of sensor front face or

Diameter of target = three times nominal operating distance

The higher value counts.

Examples of target size :

Sensor	SIF5-M18N-V2-PO	SIN6-M12N-V2-PO
Nomial op. distance :	5 mm	6 mm
Sensor diameter :	18 mm	12 mm
Target diameter :	18 mm	18 mm
	(= Sensor diameter)	(= x nominal operating distance)

Effective Operating Distance Sr :

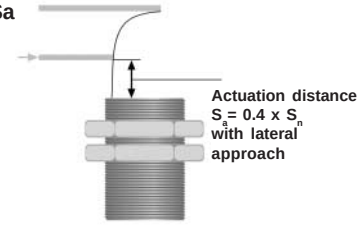
This allows for manufacturing tollerances of individual sensors and may be up to 10% above or below the nominal operating distance.

Usable Operating Distance Su :

This includes influences resulting from operating voltage tolerances and temperature range and lies a further 10% above or below the effective operating distance, i.e. at 81% to 121% of the nominal operating distance.

Recommanded Actuation Distance Sa

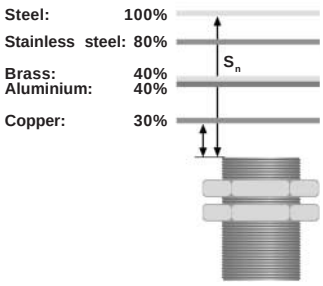
This is less than 81% of the nominal operating distance in the case of frontal approach to the object. The distance should be around 40% of the nominal operating distance in the case of lateral approach.



Sensors Distance with Various Material

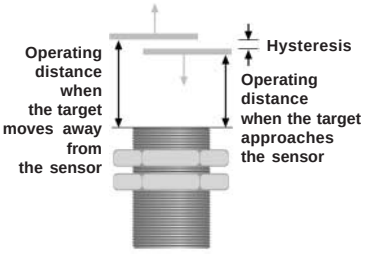
If materials other than steel are used, the operating distances are almost always less. For instance :

Metal foils and special target versions require test measurements.



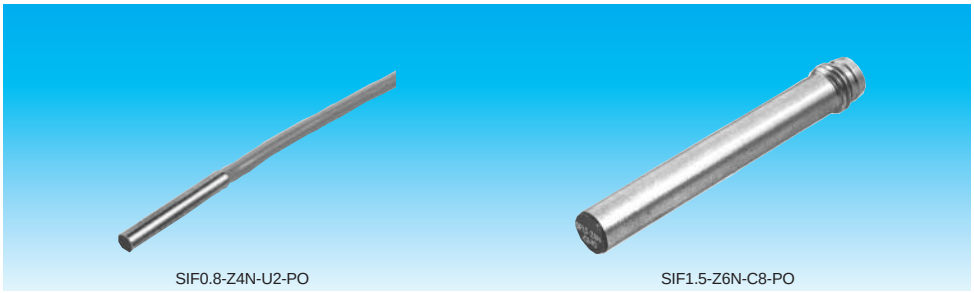
Hysteresis

A hysteresis is required for all switching-type sensors in order to avoid electrical chattering of the outputs. In the case of inductive proximity switches, the hysteresis results from the difference between the operating distances when the target is approaching and when the target is moving away and is approx. 5% of the nominal operating distance.



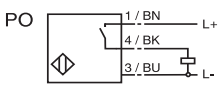
Inductive Proximity Sensors
Cylindrical ⌀4, 6.5 mm
Technical Data

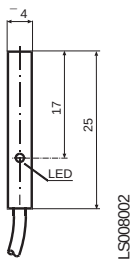
Size

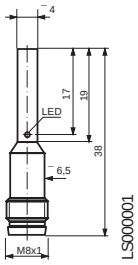


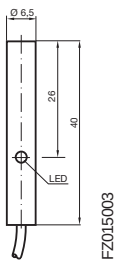
Operating dist. S_n, mounting			0.8 mm embeddable	0.8 mm embeddable	1.5 mm embeddable	1.5 mm embeddable
PNP	Normally open		SIF0.8-Z4N-U2-PO	SIF0.8-Z4N-C8-PO	SIF1.5-Z6N-U2-PO	SIF1.5-Z6N-C8-PO
	Normally closed					
	NO/NC					
NPN	Normally open					
	NO/NC					
DC 2-wire	Normally open					
AC	Normally open					
	Normally closed					
	NO/NC					
Assured operat. dist. Sa		[mm]	0 ... 0.648	0 ... 0.648	0 ... 1.215	0 ... 1.215
Reduction factor		r_{V2A}	0.85	0.85	0.7	0.7
		r_{AL}	0.45	0.4	0.25	0.25
		r_{Cu}	0.4	0.3	0.2	0.2
Operating voltage		[V]	10 ... 30	10 ... 30	10 ... 60	10 ... 60
Operating current		[mA]	200	200	100	100
Switching frequency		[Hz]	3000	3000	500	500
No load supply current		[mA]	10	10	15	15
Voltage drop U_d		[V]	2	2	3	3
Short polarity protection			pulsing	pulsing	pulsing	pulsing
Reverse polarity protection			yes	yes	yes	yes
Indication		Output	LED yellow	LED yellow	LED yellow	-
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN60947-5-2	EN60947-5-2	EN60947-5-2	EN60947-5-2
Protection to DIN 40050			IP67	IP67	IP67	IP67
Connection			2 m, PVC-cable	Connector M8	2 m, PUR-cable	Connector M8
Conductor cross section			0.14 mm²	-	0.14 mm²	-
Housing material			High grade steel	High grade steel	High grade steel	High grade steel
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			LS008002	LS000001	FZ015003	FZ015004

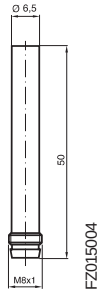
Wiring diagram











Inductive Proximity Sensors
Cylindrical ∅8 mm
Technical Data

NEW

Size

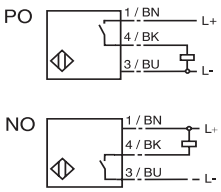
M8x1

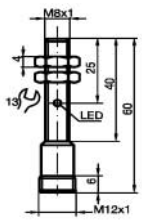
SIF1.5-M8E-C1-PO

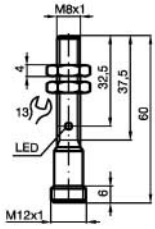
SIN2-M8E-C1-PO

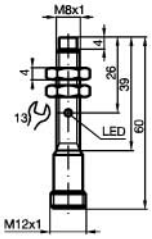
Operating dist. S_n, mounting			**1.5 mm embeddable**	**1.5 mm embeddable**	**2 mm non embedd.**	
PNP	Normally open		SIF1.5-M8E-C1-PO		SIN2-M8E-C1-PO	
	Normally closed					
	NO/NC					
NPN	Normally open			SIF1.5-M8E-C1-NO		
	NO/NC					
DC 2-wire	Normally open					
AC	Normally open					
	Normally closed					
	NO/NC					
Assured operat. dist. Sa (mm)		[mm]	0 ... 1.215	0 ... 1.215	0 ... 1.62	
Reduction factor		r_{V2A}	0.7	0.67	0.7	
		r_{AL}	0.25	0.24	0.4	
		r_{Cu}	0.2	0.21	0.35	
Operating voltage		[V]	10 ... 60	10 ... 60	10 ... 60	
Operating current IL		[mA]	100	100	100	
Switching frequency		[Hz]	500	5000	400	
No load supply current		[mA]	15	10	15	
Voltage drop U_d		[V]	3	2.6	3	
Short polarity protection			pulsing	pulsing	pulsing	
Reverse polarity protection			yes	yes	yes	
Indication		Output	LED yellow	LED yellow	LED yellow	
		Voltage	-	-	-	
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	
In compliance with			EN60947-5-2	EN60947-5-2	EN60947-5-2	
Protection to DIN 40050			IP67	IP67	IP67	
Connection			Connector M12	Connector M12	Connector M12	
Conductor cross section			-	-	-	
Housing material			High grade steel	High grade steel	High grade steel	
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	

Wiring diagrams





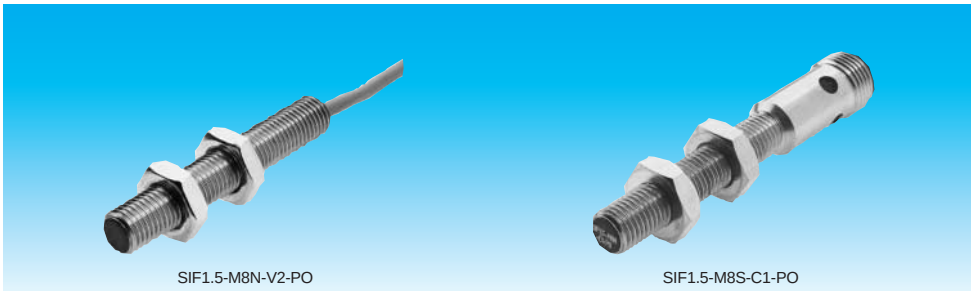




Inductive Proximity Sensors
Cylindrical ∅8 mm
Technical Data

Size

M8x1

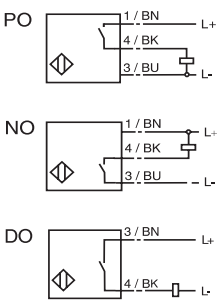


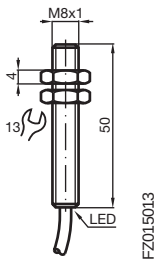
SIF1.5-M8N-V2-PO

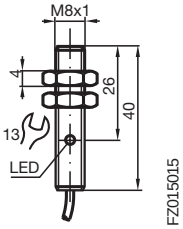
SIF1.5-M8S-C1-PO

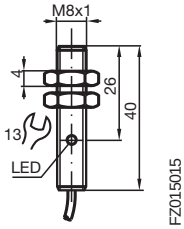
Operating dist. S_n, mounting			1.5 mm embeddable	1.5 mm embeddable	1.5 mm embeddable	1.5 mm embeddable
PNP	Normally open		SIF1.5-M8N-V2-PO		SIF1.5-M8S-U2-PO	SIF1.5-M8S-C1-PO
	Normally closed					
	NO/NC					
NPN	Normally open		SIF1.5-M8N-V2-NO			SIF1.5-M8S-C1-NO
	NO/NC					
DC 2-wire	Normally open			SIF1.5-M8N-V2-DO		
AC	Normally open					
	Normally closed					
	NO/NC					
Assured operat. dist. Sa (mm)		[mm]	0 ... 1.215	0 ... 1.21	0 ... 1.215	0 ... 1.215
Reduction factor		r_{V2A}	0.75	0.8	0.7	0.75
		r_{AL}	0.45	0.4	0.25	0.45
		r_{Cu}	0.35	0.35	0.2	0.35
Operating voltage		[V]	10 ... 30	6 ... 60	10 ... 60	10 ... 30
Operating current IL		[mA]	100	4 ... 100	100	100
Switching frequency		[Hz]	1500	2000	500	1500
No load supply current		[mA]	15	0.7	15	15
Voltage drop U_d		[V]	3	6	3	3
Short polarity protection			pulsing	no	pulsing	pulsing
Reverse polarity protection			yes	yes	yes	yes
Indication		Output	LED yellow	LED yellow	LED yellow	ring LED yellow
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN60947-5-2	EN60947-5-2	EN60947-5-2	EN60947-5-2
Protection to DIN 40050			IP67	IP67	IP67	IP67
Connection			2 m, PVC-cable	2 m, PVC-cable	2 m, PUR-Kabel	Connector M12
Conductor cross section			0.14 mm²	0.14 mm²	0.14 mm²	-
Housing material			Nickel plated brass	Nickel plated brass	Highgrade steel	Nickel plated brass
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			FZ015013	FZ015015	FZ015015	FZ015009

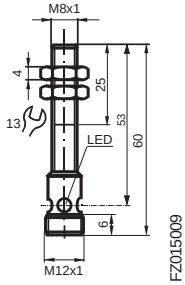
Wiring diagrams











Inductive Proximity Sensors
Cylindrical ∅8 mm
Technical Data

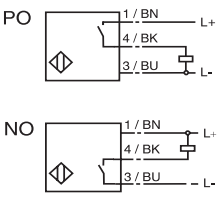
Size

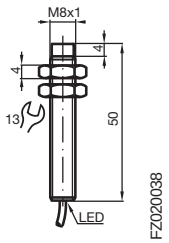
M8x1

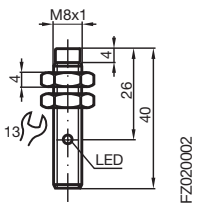
SIN2-M8N-C1-PO

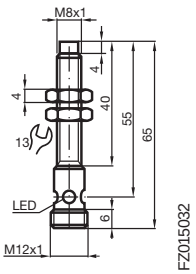
Operating dist. S_n, mounting			2 mm non embedd.	2 mm non embedd.	2 mm non embedd.	3 mm non embedd.
PNP	Normally open		SIN2-M8N-V2-PO	SIN2-M8S-U2-PO	SIN2-M8N-C1-PO	SIN3-M8N-V2-PO
	Normally closed					
	NO/NC					
NPN	Normally open		SIN2-M8N-V2-NO		SIN2-M8N-C1-NO	
	NO/NC					
DC 2-wire	Normally open					
AC	Normally open					
	Normally closed					
	NO/NC					
Assured operat. dist. Sa (mm)		[mm]	0 ... 1.62	0 ... 1.62	0 ... 1.62	0 ... 2.43
Reduction factor		r_{V2A}	0.75	0.7	0.75	0.77
		r_{AL}	0.45	0.4	0.45	0.36
		r_{Cu}	0.35	0.35	0.35	0.27
Operating voltage		[V]	10 ...30	10...60	10 ... 30	10 ... 30
Operating current IL		[mA]	100	100	100	200
Switching frequency		[Hz]	1500	400	1500	1000
No load supply current		[mA]	15	15	15	10
Voltage drop U_d		[V]	3	3	3	2
Short polarity protection			pulsing	pulsing	pulsing	no
Reverse polarity protection			yes	yes	yes	yes
Indication		Output	LED yellow	LED yellow	ring LED yellow	LED yellow
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN60947-5-2	EN60947-5-2	EN60947-5-2	EN60947-5-2
Protection to DIN 40050			IP67	IP67	IP67	IP67
Connection			2 m, PVC-cable	2 m, PUR-Kabel	Connector M12	2 m, PUR-cable
Conductor cross section			0.14 mm²	0.14 mm²	-	0.14 mm²
Housing material			Nickel plated brass	Highgrade steel	Nickel plated brass	chrom plated brass
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			FZ020038	LS020002	FZ015032	FZ030001

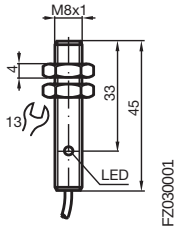
Wiring diagrams











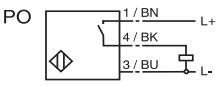
Inductive Proximity Sensors
Cylindrical ∅8 mm
Technical Data

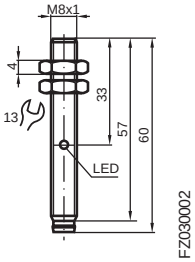
Size

M8x1

Operating dist. Sn, mounting			**3 mm non embedd.**			
PNP	Normally open		SIN3-M8N-C8-PO			
	Normally closed					
	NO/NC					
NPN	Normally open					
	NO/NC					
DC 2-wire	Normally open					
AC	Normally open					
	Normally closed					
	NO/NC					
Assured operat. dist. Sa (mm)		[mm]	0 ... 2.43			
Reduction factor		r_{V2A}	0.77			
		r_{AL}	0.36			
		r_{Cu}	0.27			
Operating voltage			[V] 10 ... 30			
Operating current IL		[mA]	200			
Switching frequency		[Hz]	1000			
No load supply current		[mA]	10			
Voltage drop U_d		[V]	2			
Short polarity protection			no			
Reverse polarity protection			yes			
		Output	LED yellow			
		Voltage	-			
Operating temperature		[°C]	-25 ... 70			
In compliance with			EN60947-5-2			
Protection to DIN 40050			IP67			
Connection			Connector M8			
Conductor cross section			-			
Housing material			chrom plated brass			
Sensing face			PBT (Crastin)			
Drawing No.			FZ030002			

Wiring diagram





Inductive Position Sensors
Cylindrical ∅12 mm
Technical Data

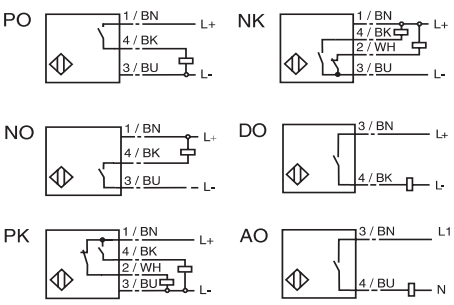
Size

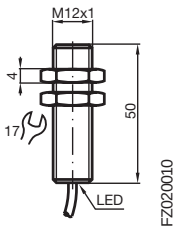
M12x1

SIF2-M12N-V2-PO

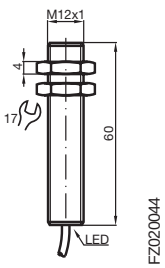
Operating dist. S_n, mounting			2 mm embeddable	2 mm embeddable	2 mm embeddable	2 mm embeddable
PNP	Normally open		SIF2-M12N-V2-PO			
	Normally closed					
	NO/NC			SIF2-M12N-V2-PK		
NPN	Normally open		SIF2-M12N-V2-NO			
	NO/NC			SIF2-M12N-V2-NK		
DC 2-wire	Normally open				SIF2-M12N-V2-DO	
AC	Normally open					SIF2-M12N-V2-AO
	Normally closed					
	NO/NC					
Assured operat. dist. Sa (mm)		[mm]	0 ... 1.62	0 ... 1.62	0 ... 1.62	0 ... 1.62
Reduction factor		r_{V2A}	0.7	0.66	0.67	0.65
		r_{AL}	0.3	0.25	0.18	0.15
		r_{Cu}	0.2	0.15	0.12	0.1
Operating voltage		[V]	10 ... 30	10 ... 30	10 ... 30	6 ... 60 20 ... 253
Operating current IL		[mA]	200	200	4 ... 100	5 ... 200
Switching frequency		[Hz]	1500	1000	2000	25
No load supply current		[mA]	17	20	0.7	0.8
Voltage drop U_d		[V]	3	3	6	5
Short polarity protection			pulsing	pulsing	no	no
Reverse polarity protection			yes	yes	yes	no
Indication		Output	LED yellow	LED yellow	LED yellow	LED red
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN60947-5-2	EN60947-5-2	EN60947-5-2	EN60947-5-2
Protection to DIN 40050			IP67	IP67	IP67	IP67
Connection			2 m, PVC-cable	2 m, PVC-cable	2 m, PVC-cable	2 m, PVC-cable
Conductor cross section			0.14 mm²	0.14 mm²	0.14 mm²	0.34 mm²
Housing material			Nickel plated brass	Nickel plated brass	Nickel plated brass	Highgrade steel
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			FZ020010	FZ020044	FZ020020	FZ020017

Wiring diagrams

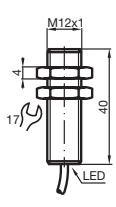




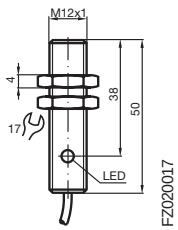
FZ020010



FZ020044



FZ020020



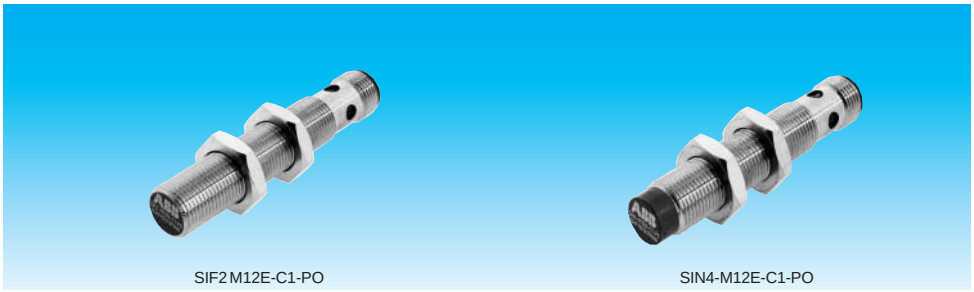
FZ020017

NEW

Inductive Position Sensors
Cylindrical ∅ 12 mm
Technical Data

Size

M12x1

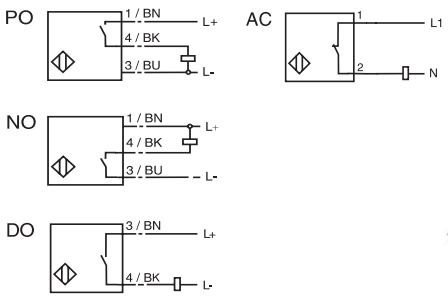


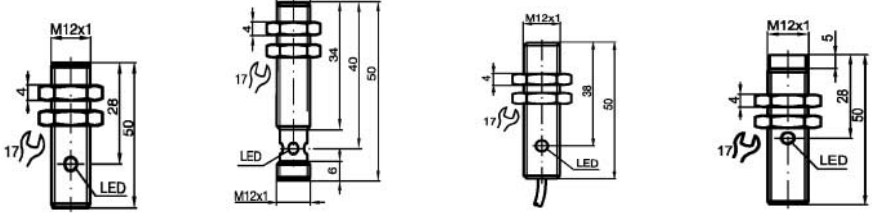
SIF2 M12E-C1-PO

SIN4-M12E-C1-PO

Operating dist. S_n, mounting			2 mm embeddable	2 mm embeddable	2 mm embeddable	4 mm non embedd.
PNP	Normally open		SIF2-M12E-C1-PO			SIN4-M12E-C1-PO
	Normally closed					
	NO/NC					
NPN	Normally open		SIF2-M12E-C1-NO			SIN4-M12E-C1-NO
	NO/NC					
DC 2-wire	Normally open			SIF2-M12E-C1-DO		
AC	Normally open					
	Normally closed				SIF2-M12E-V2-AC	
	NO/NC					
Assured operat. dist. Sa (mm)		[mm]	0 ... 1.62	0 ... 1.62	0 ... 1.62	0 ... 3.24
Reduction factor		r_{V2A}	0.7	0.7	0.65	0.74
		r_{AL}	0.23	0.23	0.15	0.37
		r_{Cu}	0.21	0.21	0.1	0.36
Operating voltage		[V]	10 ... 60	5 ... 60	20 ... 253	10 ... 60
Operating current IL		[mA]	200	100	200	200
Switching frequency		[Hz]	3000	2000	25	2000
No load supply current		[mA]	11	0.7	0.8	11
Voltage drop U_d		[V]	3	5	5	3
Short polarity protection			pulsing	pulsing	no	pulsing
Reverse polarity protection			yes	yes	no	yes
Indication		Output	LED yellow	LED yellow	LED red	LED yellow
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN60947-5-2	EN60947-5-2	EN60947-5-2	EN60947-5-2
Protection to DIN 40050			IP67	IP67	IP67	IP67
Connection			Connector M12	Connector M12	2 m, PVC-cable	Connector M12
Conductor cross section			-	-	0.34 mm²	-
Housing material			High grade steel	High grade steel	High grade steel	High grade steel
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)

Wiring diagrams





Inductive Proximity Sensors
Cylindrical ∅12 mm
Technical Data

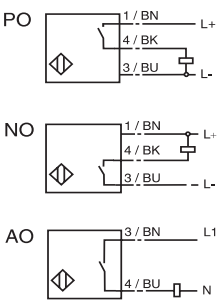
Size

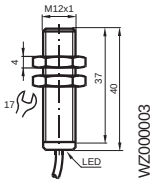
M12x1

SIF2-M12N-C1-PO

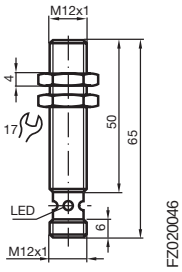
Operating dist. S_n, mounting			**2 mm embeddable**	**2 mm embeddable**	**2 mm embeddable**	**2 mm embeddable**
PNP	Normally open		SIF2-M12S-U2-PO	SIF2-M12N-C1-PO	SIF2-M12S-C1-PO	
	Normally closed					
	NO/NC					
NPN	Normally open			SIF2-M12N-C1-NO		
	NO/NC					
DC 2-wire	Normally open					
AC	Normally open					SIF2-M12N-C3-AO
	Normally closed					
	NO/NC					
Assured operat. dist. Sa (mm)		[mm]	0 ... 1.62	0 ... 1.62	0 ... 1.62	0 ... 1.62
Reduction factor		r_{V2A}	0.7	0.7	0.6	0.65
		r_{AL}	0.3	0.3	0.15	0.15
		r_{Cu}	0.2	0.2	0.1	0.1
Operating voltage		[V]	10 ...30	10 ...30	10...30 20 ... 253	
Operating current IL		[mA]	100	200	200	5 ... 200
Switching frequency		[Hz]	1000	1500	1000	25
No load supply current		[mA]	15	17	15	0.8
Voltage drop U_d		[V]	3	3	3	3
Short polarity protection			pulsing	pulsing	pulsing	no
Reverse polarity protection			yes	yes	yes	no
Indication		Output	LED yellow	ring LED yellow	LED yellow	LED red
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN60947-5-2	EN60947-5-2	EN60947-5-2	EN60947-5-2
Protection to DIN 40050			IP67	IP67	IP67	IP67
Connection			2 m, PVC-cable	Connector M12	Connector M12	Connector M12
Conductor cross section			0.14 mm²	-	-	-
Housing material			Nickel plated brass	Nickel plated brass	Nickel plated brass	Highgrade steel
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			WZ000003	FZ020046	WZ060002	LS000003

Wiring diagrams

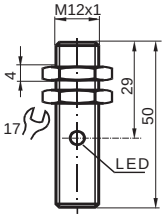




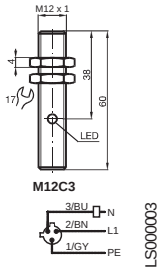
WZ000003



FZ020046



WZ0060002



LS000003

Inductive Position Sensors
Cylindrical ∅12 mm
Technical Data

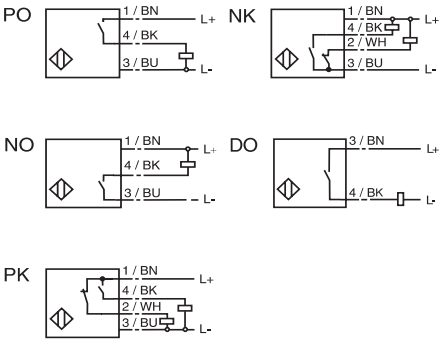
Size

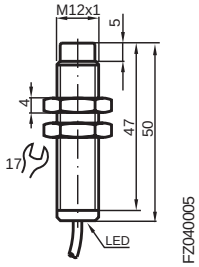
M12x1

SIN4-M12N-V2-PO

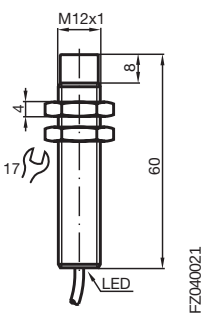
Operating dist. S_n, mounting			4 mm non embedd.	4 mm non embedd.	4 mm non embedd.	4 mm non embedd.
PNP	Normally open		SIN4-M12N-V2-PO			SIN4-M12S-U2-PO
	Normally closed					
	NO/NC			SIN4-M12N-V2-PK		
NPN	Normally open		SIN4-M12N-V2-NO			
	NO/NC			SIN4-M12N-V2-NK		
DC 2-wire	Normally open				SIN4-M12N-V2-DO	
AC	Normally open					
	Normally closed					
	NO/NC					
Assured operat. dist. Sa (mm)		[mm]	0 ... 3.24	0 ... 3.24	0 ... 3.24	0 ... 3.24
Reduction factor		r_{V2A}	0.8	0.75	0.74	0.75
		r_{AL}	0.5	0.45	0.37	0.45
		r_{Cu}	0.4	0.4	0.36	0.4
Operating voltage		[V]	10 ... 30	10 ... 30	10 ... 30	6 ... 60 10 ... 30
Operating current IL		[mA]	200	200	4 ... 100	100
Switching frequency		[Hz]	1200	1000	2000	800
No load supply current		[mA]	17	20	0.7	15
Voltage drop U_d		[V]	3	3	6	3
Short polarity protection			pulsing	pulsing	no	pulsing
Reverse polarity protection			yes	yes	yes	yes
Indication		Output	LED yellow	LED yellow	LED yellow	LED yellow
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN60947-5-2	EN60947-5-2	EN60947-5-2	EN60947-5-2
Protection to DIN 40050			IP67	IP67	IP67	IP67
Connection			2 m, PVC-cable	2 m, PVC-cable	2 m, PVC-cable	2 m, PUR-cable
Conductor cross section			0.14 mm²	0.14 mm²	0.14 mm²	0.14 mm²
Housing material			Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			FZ040005	FZ040021	FZ040013	WZ000002

Wiring diagrams





FZ040005



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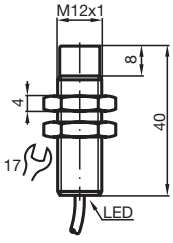

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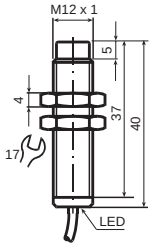


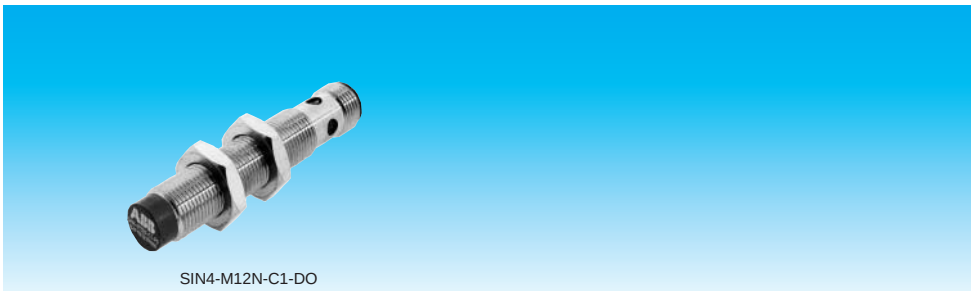
WZ000002

Inductive Proximity Sensors
Cylindrical ∅12 mm
Technical Data

NEW

Size

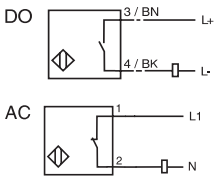
M12x1

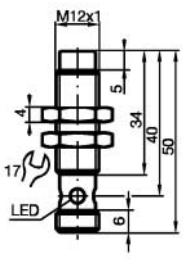


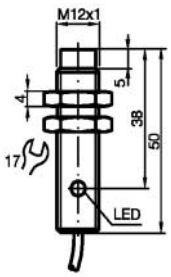
SIN4-M12N-C1-DO

Operating dist. S_n, mounting			**4 mm non embedd.**	**4 mm non embedd.**		
PNP	Normally open					
	Normally closed					
	NO/NC					
NPN	Normally open					
	NO/NC					
DC 2-wire	Normally open		SIN4-M12E-C1-DO			
AC	Normally open					
	Normally closed			SIN4-M12E-V2-AC		
	NO/NC					
Assured operat. dist. Sa (mm)		[mm]	0 ... 3.24	0 ... 3.24		
Reduction factor		r_{V2A}	0.74	0.8		
		r_{AL}	0.37	0.45		
		r_{Cu}	0.36	0.4		
Operating voltage		[V]	5 ...60	20 ...253		
Operating current IL		[mA]	100	200		
Switching frequency		[Hz]	2000	25		
No load supply current		[mA]	0.7	0.8		
Voltage drop U_d		[V]	5	5		
Short polarity protection			pulsing	no		
Reverse polarity protection			yes	no		
Indication		Output	LED yellow	LED red		
		Voltage	-	-		
Operating temperature		[°C]	-25 ... 70	-25 ... 70		
In compliance with			EN60947-5-2	EN60947-5-2		
Protection to DIN 40050			IP67	IP67		
Connection			Connector M12	2 m, PVC-cable		
Conductor cross section			-	0.34 mm²		
Housing material			High grade steel	High grade steel		
Sensing face			PBT (Crastin)	PBT (Crastin)		

Wiring diagrams







Inductive Proximity Sensors
Cylindrical ∅12 mm
Technical Data

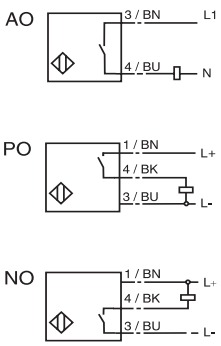
Size

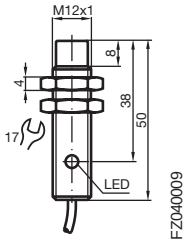
M12x1

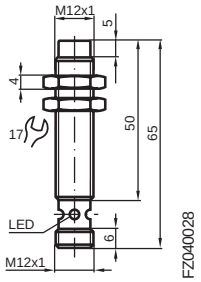
SIN4-M12N-C1-PO

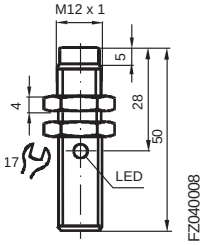
Operating dist. S_n, mounting			4 mm non embedd.	4 mm non embedd.	4 mm non embedd.	4 mm non embedd.
PNP	Normally open			SIN4-M12N-C1-PO	SIN4-M12S-C1-PO	
	Normally closed					
	NO/NC					
NPN	Normally open			SIN4-M12N-C1-NO		
	NO/NC					
DC 2-wire	Normally open					
AC	Normally open		SIN4-M12N-V2-AO			SIN4-M12N-C3-AO
	Normally closed					
	NO/NC					
Assured operat. dist. Sa (mm)		[mm]	0 ... 3.24	0 ... 3.24	0 ... 3.24	0 ... 3.24
Reduction factor		r_{V2A}	0.8	0.8	0.75	0.8
		r_{AL}	0.45	0.5	0.45	0.45
		r_{Cu}	0.4	0.4	0.4	0.4
Operating voltage		[V]	20 ... 253	10 ... 30	10 ... 30 20 ... 253	
Operating current IL		[mA]	5 ... 200	200	200	5 ... 200
Switching frequency		[Hz]	25	1200	1000	25
No load supply current		[mA]	0.8	17	15	0.8
Voltage drop U_d		[V]	5	3	3	5
Short polarity protection			no	pulsing	pulsing	no
Reverse polarity protection			no	yes	yes	no
Indication		Output	LED red	ring LED yellow	LED yellow	LED red
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN60947-5-2	EN60947-5-2	EN60947-5-2	EN60947-5-2
Protection to DIN 40050			IP67	IP67	IP67	IP67
Connection			2 m, PVC-cable	Connector M12	Connector M12	Connector M12
Conductor cross section			0.34 mm²	-	-	-
Housing material			Highgrade steel	Nickel plated brass	Nickel plated brass	Highgrade steel
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			FZ040009	FZ040028	FZ040008	WZ000001

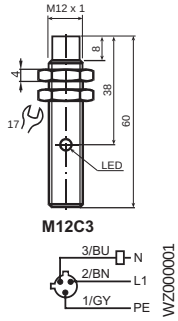
Wiring diagrams







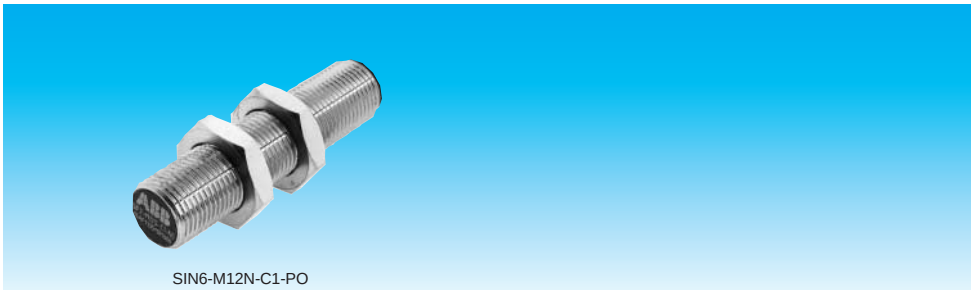




Inductive Proximity Sensors
Cylindrical ⌀12 mm
Technical Data

Size

M12x1

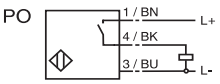


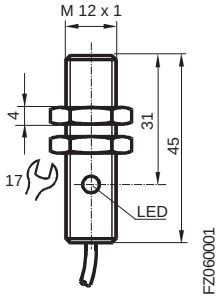
SIN6-M12N-C1-PO

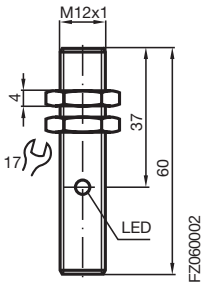
Operating dist. S_n, mounting			**6 mm non embedd.**	**6 mm non embedd.**		
PNP	Normally open		SIN6-M12N-V2-PO	SIN6-M12N-C1-PO		
	Normally closed					
	NO/NC					
NPN	Normally open					
	NO/NC					
DC 2-wire	Normally open					
AC	Normally open					
	Normally closed					
	NO/NC					
Assured operat. dist. Sa		[mm]	0 ... 4,86	0 ... 4,86		
Reduction factor		r_{V2A}	0.67	0.67		
		r_{AL}	0.28	0.28		
		r_{Cu}	0.2	0.2		
Operating voltage		[V]	10 ... 30	10 ... 30		
Operating current		[mA]	200	200		
Switching frequency		[Hz]	800	800		
No load supply current		[mA]	10	10		
Voltage drop U_d		[V]	2	2		
Short polarity protection			no	no		
Reverse polarity protection			yes	yes		
Indication		Output	LED yellow	LED yellow		
		Voltage	-	-		
Operating temperature		[°C]	-25 ... 70	-25 ... 70		
In compliance with			EN 60947-5-2	EN 60947-5-2		
Protection to DIN 40050			IP 67	IP 67		
Connection			2 m, PVC-cable	Connector M12		
Conductor cross section			0.34 mm²	-		
Housing material			Chrom plated brass	Chrom plated brass		
Sensing face			PBT (Crastin)	PBT (Crastin)		
Drawing No.			FZ060001	FZ060002		

Wiring diagram

PO







Inductive Proximity Sensors
Cylindrical ∅18 mm
Technical Data

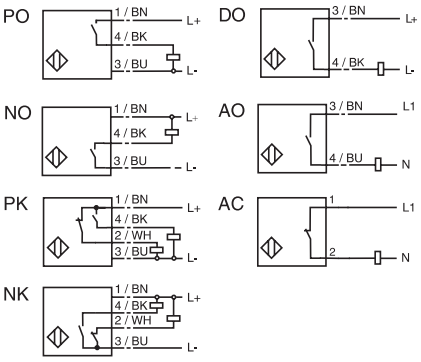
Size

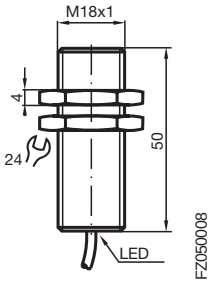
M18x1

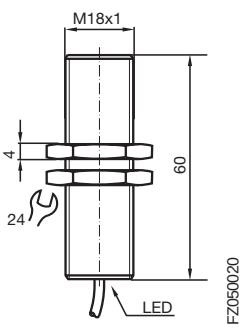
SIN5-M18N-V2-AO

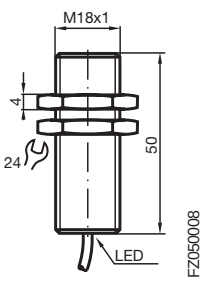
Operating dist. S_n, mounting			5 mm embeddable	5 mm embeddable	5 mm embeddable	5 mm embeddable
PNP	Normally open		SIF5-M18N-V2-PO			
	Normally closed					
	NO/NC			SIF5-M18N-V2-PK		
NPN	Normally open		SIF5-M18N-V2-NO			
	NO/NC			SIF5-M18N-V2-NK		
DC 2-wire	Normally open				SIF5-M18N-V2-DO	
AC	Normally open					SIF5-M18N-V2-AO
	Normally closed					SIF5-M18N-V2-AC
	NO/NC					
Assured operat. dist. Sa		[mm]	0 ... 4.05	0 ... 4.05	0 ... 4.05	0 ... 4.05
Reduction factor		r_{V2A}	0.7	0.66	0.72	0.62
		r_{AL}	0.3	0.25	0.34	0.2
		r_{Cu}	0.3	0.15	0.31	0.15
Operating voltage		[V]	10 ... 30	10 ... 30	10 ... 30	6 ... 60 20 ... 253
Operating current		[mA]	200	200	200	4 ...100 200
Switching frequency		[Hz]	800	800	1500	20
No load supply current		[mA]	20	20	0.7 (off-state current)	1.7 (off-state current)
Voltage drop U_d		[V]	3	3	6	8
Short polarity protection			pulsing	pulsing	no	no
Reverse polarity protection			yes	yes	yes	no
Indication		Output	LED yellow	LED yellow	LED yellow	LED yellow
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Protection to DIN 40050			IP 67	IP 67	IP 67	IP 67
Connection			2 m, PVC-cable	2 m, PVC-cable	2 m, PVC-cable	2 m, PVC-cable
Conductor cross section			0.34 mm²	0.34 mm²	0.34 mm²	0.34 mm²
Housing material			Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			FZ050008	FZ050020	FZ050008	FZ050020

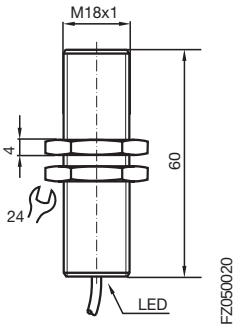
Wiring diagrams







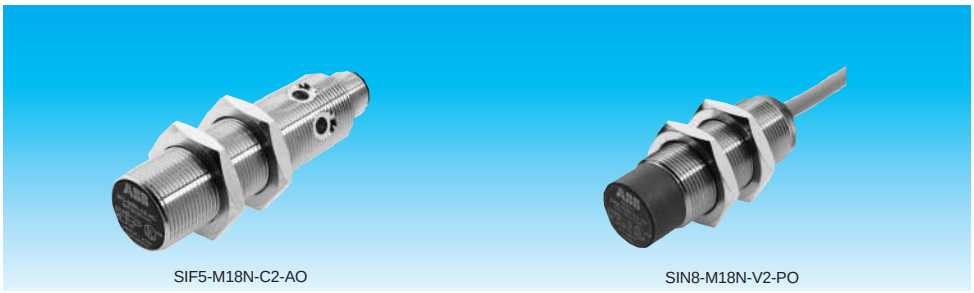




Inductive Proximity Sensors
Cylindrical ⌀18 mm
Technical Data

Size

M18x1

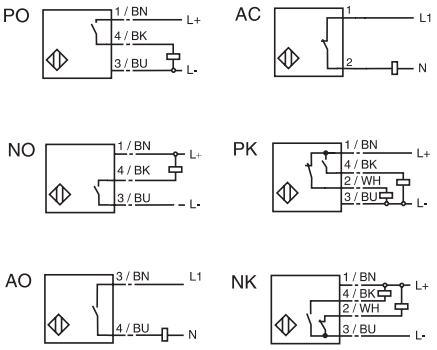


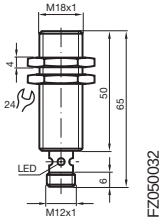
SIF5-M18N-C2-AO

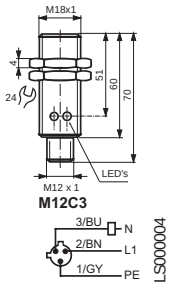
SIN8-M18N-V2-PO

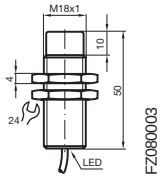
Operating dist. S_n, mounting			5 mm embeddable	5 mm embeddable	8 mm non embedd.	8 mm non embedd.
PNP	Normally open		SIF5-M18N-C1-PO		SIN8-M18N-V2-PO	
	Normally closed					
	NO/NC					SIN8-M18N-V2-PK
NPN	Normally open		SIF5-M18N-C1-NO		SIN8-M18N-V2-NO	
	NO/NC					SIN8-M18N-V2-NK
DC 2-wire	Normally open					
AC	Normally open			SIF5-M18N-C3-AO		
	Normally closed			SIF5-M18N-C3-AC		
	NO/NC					
Assured operat. dist. Sa		[mm]	0 ... 4,05	0 ... 4,05	0 ... 6,48	0 ... 6,48
Reduction factor		r_{V2A}	0.7	0.62	0.7	0.75
		r_{AL}	0.3	0.2	0.5	0.45
		r_{Cu}	0.3	0.15	0.4	0.4
Operating voltage		[V]	10 ... 30	20 ... 253	10 ... 30	10 ... 30
Operating current		[mA]	200	200	200	200
Switching frequency		[Hz]	800	20	500	700
No load supply current		[mA]	20	1.7 (off-state current)	18	20
Voltage drop U_d		[V]	3	5	3	3
Short polarity protection			pulsing	no	pulsing	pulsing
Reverse polarity protection			yes	no	yes	yes
Indication		Output	ring-LED yellow	LED yellow	LED yellow	LED yellow
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Protection to DIN 40050			IP 67	IP 67	IP 67	IP 67
Connection			Connector M12	Connector M12	2m, PVC-cable	2m, PVC-cable
Conductor cross section			-	-	0.34 mm²	0.34 mm²
Housing material			Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			FZ050032	LS000004	FZ080003	FZ080013

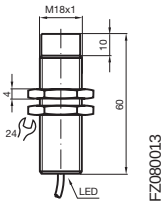
Wiring diagrams









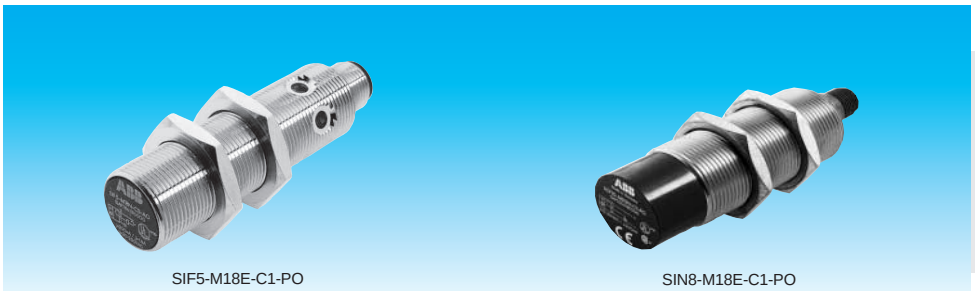


NEW

Inductive Proximity Sensors
Cylindrical ⌀18 mm
Technical Data

Size

M18x1

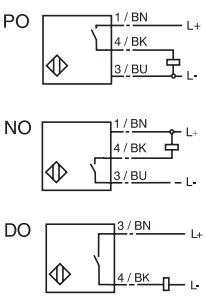


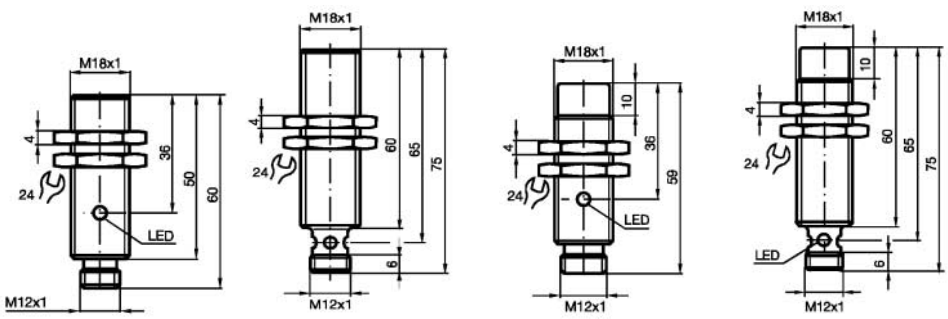
SIF5-M18E-C1-PO

SIN8-M18E-C1-PO

Operating dist. S_n, mounting			5 mm embeddable	5 mm embeddable	8 mm non embedd.	8 mm non embedd.
PNP	Normally open		SIF5-M18E-C1-PO		SIN8-M18E-C1-PO	
	Normally closed					
	NO/NC					
NPN	Normally open		SIF5-M18E-C1-NO			
	NO/NC					
DC 2-wire	Normally open			SIF5-M18E-C1-DO		SIN8-M18E-C1-DO
AC	Normally open					
	Normally closed					
	NO/NC					
Assured operat. dist. Sa		[mm]	0 ... 4.05	0 ... 4.05	0 ... 6.48	0 ... 6.48
Reduction factor		r_{V2A}	0.62	0.62	0.72	0.72
		r_{AL}	0.2	0.2	0.42	0.42
		r_{Cu}	0.15	0.15	0.4	0.4
Operating voltage		[V]	10 ... 60	5 ... 60	10 ... 60	5 ... 60
Operating current		[mA]	200	100	200	100
Switching frequency		[Hz]	1500	500	1000	500
No load supply current		[mA]	8.5	0.7	8.5	0.7
Voltage drop U_d		[V]	3	5	3	5
Short polarity protection			pulsing	pulsing	pulsing	pulsing
Reverse polarity protection			yes	yes	yes	yes
Indication		Output	LED yellow	LED yellow	LED yellow	LED yellow
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Protection to DIN 40050			IP 67	IP 67	IP 67	IP 67
Connection			Connector M12	Connector M12	Connector M12	Connector M12
Conductor cross section			-	-	-	-
Housing material			High grade steel	High grade steel	High grade steel	High grade steel
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)

Wiring diagrams

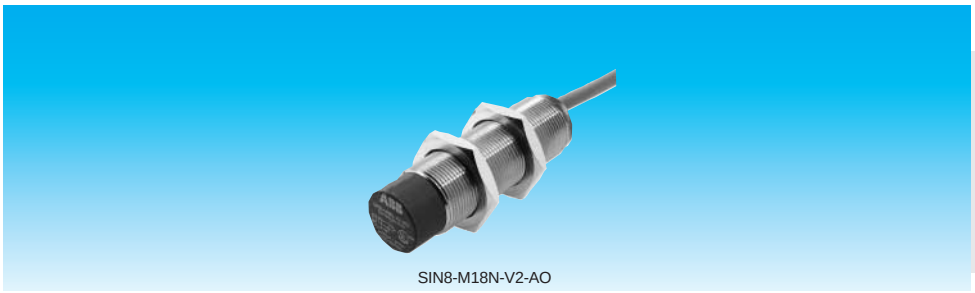




Inductive Proximity Sensors
Cylindrical ⌀18 mm
Technical Data

Size

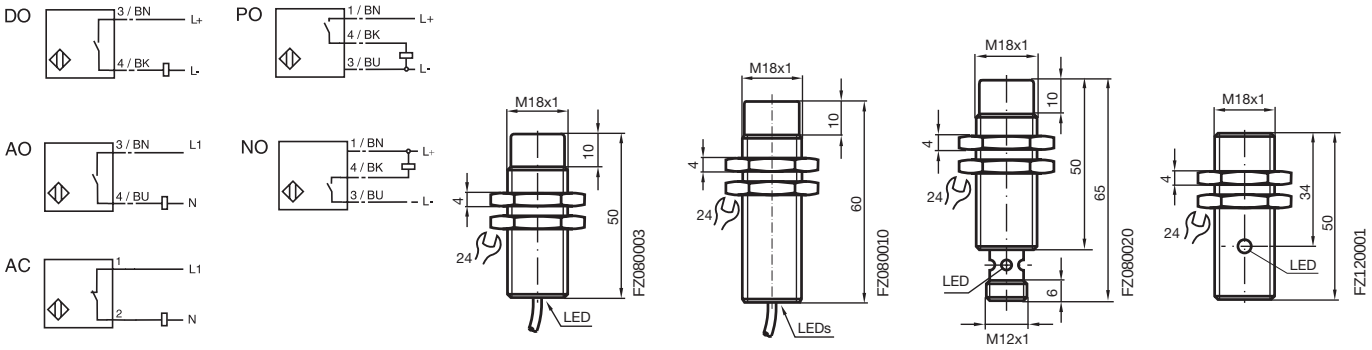
M18x1



SIN8-M18N-V2-AO

Operating dist. S_n, mounting			8 mm non embedd.	8 mm non embedd.	8 mm non embedd.	12 mm non embedd.
PNP	Normally open				SIN8-M18N-C1-PO	SIN12-M18N-V2-PO
	Normally closed					
	NO/NC					
NPN	Normally open				SIN8-M18N-C1-NO	
	NO/NC					
DC 2-wire	Normally open		SIN8-M18N-V2-DO			
AC	Normally open			SIN8-M18N-V2-AO		
	Normally closed			SIN8-M18N-V2-AC		
	NO/NC					
Assured operat. dist. Sa		[mm]	0 ... 6.5	0 ... 6.5	0 ... 6.48	0 ... 9.72
Reduction factor		r_{V2A}	0.73	0.72	0.7	0.63
		r_{AL}	0.43	0.42	0.5	0.26
		r_{Cu}	0.42	0.4	0.4	0.2
Operating voltage		[V]	6 ... 60	20 ... 253	10 ... 30	10 ... 30
Operating current		[mA]	4 ... 100	200	200	200
Switching frequency		[Hz]	1000	20	500	500
No load supply current		[mA]	0.7 (off-state current)	1.7 (off-state current)	18	10
Voltage drop U_d		[V]	6	8	3	2
Short polarity protection			no	no	pulsing	no
Reverse polarity protection			yes	no	yes	yes
Indication		Output	LED yellow	LED yellow	ring LED yellow	LED yellow
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Protection to DIN 40050			IP 67	IP 67	IP 67	IP 67
Connection			2 m, PVC-cable	2 m, PVC-cable	Connector M12	2 m, PVC-cable
Conductor cross section			0.34 mm²	0.34 mm²	-	0.5 mm²
Housing material			Nickel plated brass	Nickel plated brass	Nickel plated brass	Chrom plated brass
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			FZ080003	FZ080010	FZ080020	FZ120001

Wiring diagrams



Inductive Proximity Sensors
Cylindrical ⌀18 mm
Technical Data

Size

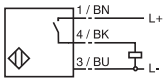
M18x1

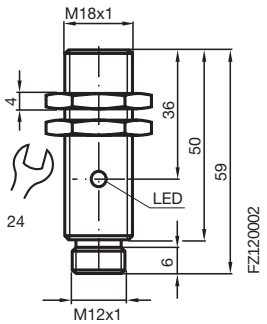
SIN12-M18N-C1-PO

Operating dist. S_n, mounting			**12 mm non embedd.**			
PNP	Normally open		SIN12-M18N-C1-PO			
	Normally closed					
	NO/NC					
NPN	Normally open					
	NO/NC					
DC 2-wire	Normally open					
AC	Normally open					
	Normally closed					
	NO/NC					
Assured operat. dist. Sa		[mm]	0 ... 9.72			
Reduction factor		r_{V2A}	0.63			
		r_{AL}	0.26			
		r_{Cu}	0.2			
Operating voltage			[V] 10 ... 30			
Operating current			[mA] 200			
Switching frequency		[Hz]	500			
No load supply current		[mA]	10			
Voltage drop U_d		[V]	2			
Short polarity protection			no			
Reverse polarity protection			yes			
Indication		Output	LED yellow			
		Voltage	-			
Operating temperature		[°C]	-25 ... 70			
In compliance with			EN 60947-5-2			
Protection to DIN 40050			IP 67			
Connection			Connector M12			
Conductor cross section			-			
Housing material			Chrom plated brass			
Sensing face			PBT (Crastin)			
Drawing No.			FZ120002			

Wiring diagram

PO





Inductive Proximity Sensors
Cylindrical ⌀30 mm
Technical Data

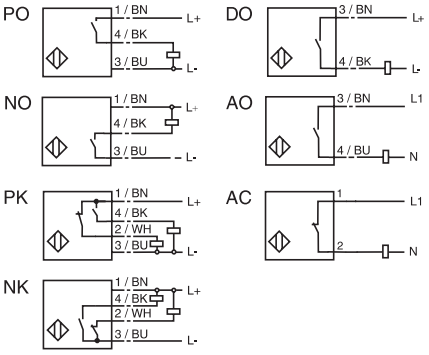
Size

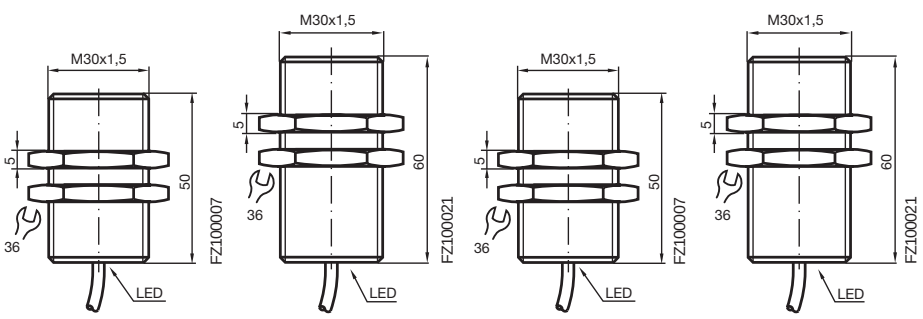
M30x1.5

SIF10-M30N-V2-DO

Operating dist. S_n, mounting			10 mm embeddable	10 mm embeddable	10 mm embeddable	10 mm embeddable
PNP	Normally open		SIF10-M30N-V2-PO			
	Normally closed					
	NO/NC			SIF10-M30N-V2-PK		
NPN	Normally open		SIF10-M30N-V2-NO			
	NO/NC			SIF10-M30N-V2-NK		
DC 2-wire	Normally open				SIF10-M30N-V2-DO	
AC	Normally open					SIF10-M30N-V2-AO
	Normally closed					SIF10-M30N-V2-AC
	NO/NC					
Assured operat. dist. Sa		[mm]	0 ... 8.1	0 ... 8.1	0 ... 8.1	0 ... 8.1
Reduction factor		r_{V2A}	0.8	0.66	0.7	0.71
		r_{AL}	0.3	0.25	0.3	0.29
		r_{Cu}	0.3	0.15	0.25	0.26
Operating voltage		[V]	10 ... 30	10 ... 30	10 ... 30	6 ... 60 20 ... 253
Operating current		[mA]	200	200	200	4 ...100 5 ... 200
Switching frequency		[Hz]	200	200	700	20
No load supply current		[mA]	20	20	0.7 (off-state current)	1.7 (off-state current)
Voltage drop U_d		[V]	3	3	6	8
Short polarity protection			pulsing	pulsing	no	no
Reverse polarity protection			yes	yes	yes	no
Indication		Output	LED yellow	LED yellow	LED yellow	LED yellow
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Protection to DIN 40050			IP 67	IP 67	IP 67	IP 67
Connection			2 m, PVC-cable	2 m, PVC-cable	2 m, PVC-cable	2 m, PVC-cable
Conductor cross section			0.34 mm²	0.34 mm²	0.34 mm²	0.34 mm²
Housing material			Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			FZ100007	FZ100021	FZ100007	FZ100021

Wiring diagrams





Inductive Proximity Sensors
Cylindrical ⌀30 mm
Technical Data

Size

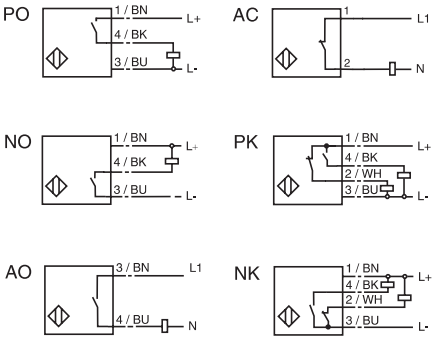
M30x1.5

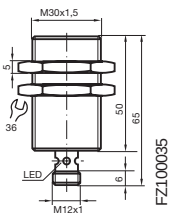
SIF10-M30N-C1-PO

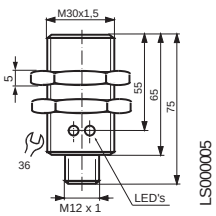
SIN15-M30N-V2-PO

Operating dist. S_n, mounting			10 mm embeddable	10 mm embeddable	15 mm non embedd.	15 mm non embedd.
PNP	Normally open		SIF10-M30N-C1-PO		SIN15-M30N-V2-PO	
	Normally closed					
	NO/NC					SIN15-M30N-V2-PK
NPN	Normally open		SIF10-M30N-C1-NO		SIN15-M30N-V2-NO	
	NO/NC					SIN15-M30N-V2-NK
DC 2-wire	Normally open					
AC	Normally open			SIF10-M30N-C3-AO		
	Normally closed			SIF10-M30N-C3-AC		
	NO/NC					
Assured operat. dist. Sa		[mm]	0 ... 8.1	0 ... 8.1	0 ... 12.15	0 ... 12.15
Reduction factor		r_{V2A}	0.8	0.7	0.8	0.75
		r_{AL}	0.3	0.3	0.5	0.45
		r_{Cu}	0.3	0.25	0.4	0.4
Operating voltage		[V]	10 ... 30	20 ... 253	10 ... 30	10 ... 30
Operating current			[mA]	200	200	200 200
Switching frequency		[Hz]	200	25	200	200
No load supply current		[mA]	20	1.7 (off-state current)	15	20
Voltage drop U_d		[V]	3	8	3	3
Short polarity protection			pulsing	no	pulsing	pulsing
Reverse polarity protection			yes	no	yes	yes
Indication		Output	Ring LED yellow	LED yellow	LED yellow	LED yellow
		Voltage	-	LED green	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Protection to DIN 40050			IP 67	IP 67	IP 67	IP 67
Connection			Connector M12	Connector M12	2m, PVC-cable	2m, PVC-cable
Conductor cross section			-	-	0.34 mm²	0.34 mm²
Housing material			Teflon coated brass	Nickel plated brass	Teflon coated brass	Teflon coated brass
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			FZ100035	LS000005	FZ150003	FZ150014

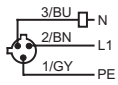
Wiring diagrams

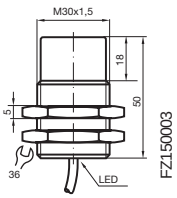


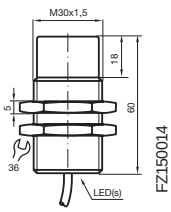




M12C3







Inductive Proximity Sensors
Cylindrical ∅30 mm
Technical Data

NEW

Size

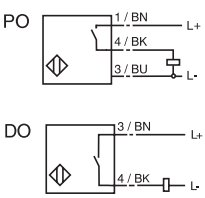
M30x1.5

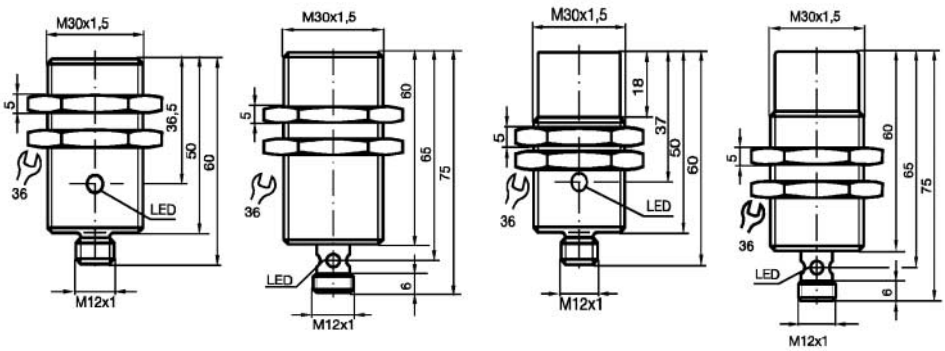
SIF10-M30E-C1-PO

SIN15-M30E-C1-PO

Operating dist. S_n, mounting			10 mm embeddable	10 mm embeddable	15 mm non embedd.	15 mm non embedd.
PNP	Normally open		SIF10-M30E-C1-PO		SIN15-M30E-C1-PO	
	Normally closed					
	NO/NC					
NPN	Normally open					
	NO/NC					
DC 2-wire	Normally open			SIF10-M30E-C1-DO		SIN15-M30E-C1-DO
AC	Normally open					
	Normally closed					
	NO/NC					
Assured operat. dist. Sa		[mm]	0 ... 8.1	0 ... 8.1	0 ... 12.15	0 ... 12.15
Reduction factor		r_{V2A}	0.72	0.72	0.71	0.7
		r_{AL}	0.34	0.34	0.4	0.43
		r_{Cu}	0.32	0.32	0.38	0.36
Operating voltage		[V]	10 ... 60	5 ... 60	10 ... 60	5 ... 60
Operating current		[mA]	200	100	200	100
Switching frequency		[Hz]	650	500	500	50
No load supply current		[mA]	9	0.7	12	0.7
Voltage drop U_d		[V]	2.8	5	2.8	5
Short polarity protection			pulsing	pulsing	pulsing	pulsing
Reverse polarity protection			yes	yes	yes	yes
Indication		Output	LED yellow	ring LED yellow	LED yellow	ring LED yellow
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Protection to DIN 40050			IP 67	IP 67	IP 67	IP 67
Connection			Connector M12	Connector M12	Connector M12	Connector M12
Conductor cross section			-	-	-	-
Housing material			High grade steel	High grade steel	High grade steel	High grade steel
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)

Wiring diagrams





Inductive Proximity Sensors
Cylindrical ∅30 mm
Technical Data

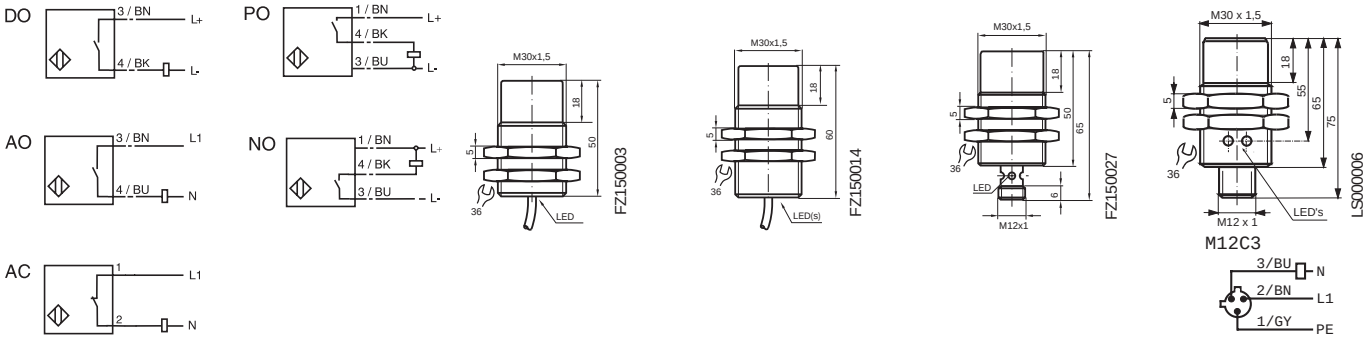
Size

M30x1.5

SIN15-M30N-V2-AO

Operating dist. S_n, mounting			15 mm non embedd.	15 mm non embedd.	15 mm non embedd.	15 mm non embedd.
PNP	Normally open				SIN15-M30N-C1-PO	
	Normally closed					
	NO/NC					
NPN	Normally open				SIN15-M30N-C1-NO	
	NO/NC					
DC 2-wire	Normally open		SIN15-M30N-V2-DO			
AC	Normally open			SIN15-M30N-V2-AO		SIN15-M30N-C3-AO
	Normally closed			SIN15-M30N-V2-AC		SIN15-M30N-C3-AC
	NO/NC					
Assured operat. dist. Sa		[mm]	0 ... 12.2	0 ... 12.2	0 ... 12.15	0 ... 12.2
Reduction factor		r_{V2A}	0.7	0.82	0.8	0.8
		r_{AL}	0.4	0.43	0.5	0.45
		r_{Cu}	0.35	0.41	0.4	0.4
Operating voltage		[V]	6 ... 60	20 ... 253	10 ... 30	20 ... 253
Operating current		[mA]	4 ... 100	5 ... 200	200 200	
Switching frequency		[Hz]	500	20	200	25
No load supply current		[mA]	0.7 (off-state current)	1.7 (off-state current)	20	1.7 (off-state current)
Voltage drop U_d		[V]	6	8	3	8
Short polarity protection			no	no	pulsing	no
Reverse polarity protection			yes	no	yes	no
Indication		Output	LED yellow	LED yellow	ring LED yellow	LED yellow
		Voltage	-	-	-	LED grün
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Protection to DIN 40050			P 67	IP 67	IP 67	IP 67
Connection			2 m, PVC-cable	2 m, PVC-cable	Connector M12	Connector M12
Conductor cross section			0.34 mm²	0.34 mm²	-	-
Housing material			Nickel plated brass	Nickel plated brass	Teflon coated brass	Nickel plated brass
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			FZ 150003	FZ 150014	FZ 150027	LS000006

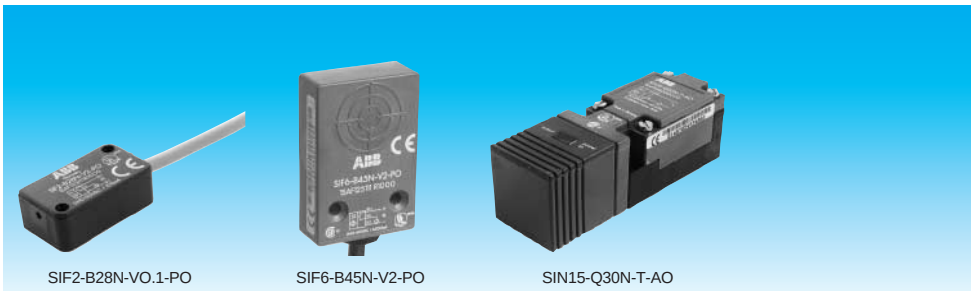
Wiring diagrams



Inductive Proximity Sensors
Square Block ∅28 - 30 - 45 mm
Technical Data

Size

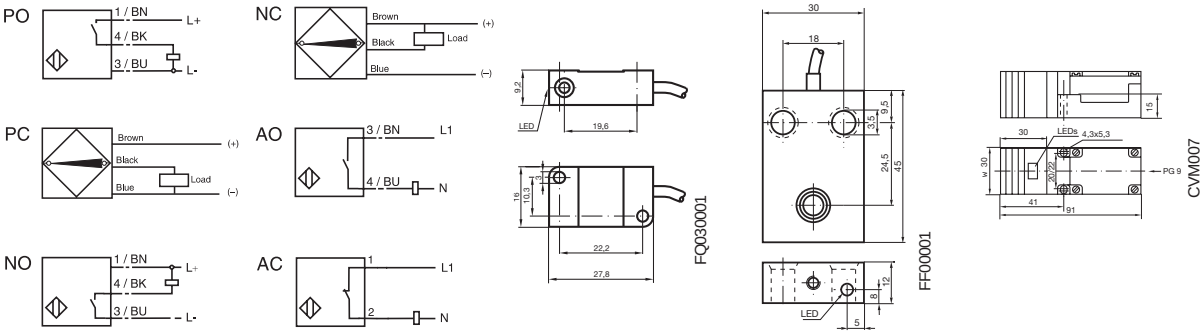
B28	B45	Q30



SIF2-B28N-VO.1-PO | SIF6-B45N-V2-PO | SIN15-Q30N-T-AO

Operating dist. S_n, mounting		2 mm embeddable	6 mm embeddable	15 mm non embedd.	
PNP	Normally open	SIF2-B28N-V0.1-PO	SIF6-B45N-V2-PO		
	Normally closed	SIF2-B28N-V0.1-PC			
	NO/NC				
NPN	Normally open	SIF2-B28N-V0.1-NO			
	Normally closed	SIF2-B28N-V0.1-NC			
DC 2-wire	Normally open				
AC	Normally open			SIN15-Q30N-T-AO	
	Normally closed			SIN15-Q30N-T-AC	
	NO/NC				
Assured operat. dist. Sa [mm]		0 ... 1.62	0 ... 4.8	0 ... 12.15	
Reduction factor	r_{V2A}	0.7	0.7	0.82	
	r_{AL}	0.35	0.22	0.43	
	r_{Cu}	0.2	0.2	0.41	
Operating voltage [V]		10 ... 30	10 ... 30	10 ... 60 20 ... 253	
Operating current [mA]		0 ... 100	0 ... 100	200 5 ... 400	
Switching frequency [Hz]		1000	500	20	
No load supply current [mA]		15	20	1.7 (off-state current)	
Voltage drop U_d [V]		3	3	8	
Short polarity protection		pulsing	pulsing	no	
Reverse polarity protection		yes	yes	no	
Indication	Output	LED yellow	LED yellow	LED yellow	
	Voltage	-	-	-	
Operating temperature [°C]		-25 ... 70	-25 ... 70	-25 ... 70	
In compliance with		EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	
Protection to DIN 40050		IP 67	IP 67	IP 67	
Connection		0.1 m, PVC-cable	2 m, PUR-cable	Terminal compartment	
Conductor cross section		0.14 mm²	0.34 mm²	up to 2.5 mm²	
Housing material		PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	
Sensing face		PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	
Drawing No.		FQ030001	FF00001	CVM007	

Wiring diagrams



Inductive Proximity Sensors
Square Block ⌀40 mm
Technical Data

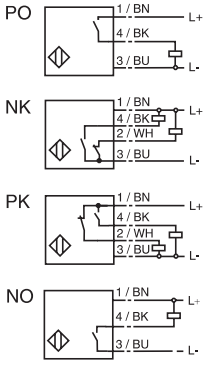
Size

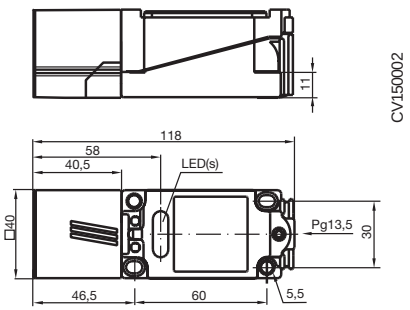
Q40

SIF15-Q40N-T-PO

Operating dist. S_n, mounting			15 mm embeddable	15 mm embeddable	20 mm embeddable	20 mm non embedd.
PNP	Normally open		SIF15-Q40N-T-PO		SIF20-Q40N-T-PO	
	Normally closed					
	NO/NC		SIF15-Q40N-T-PK		SIF20-Q40N-T-PK	
NPN	Normally open		SIF15-Q40N-T-NO			
	NO/NC		SIF15-Q40N-T-NK		SIF20-Q40N-T-NK	
DC 2-wire	Normally open					
AC	Normally open					
	Normally closed					
	NO/NC			SIF15-Q40N-T-AK		SIN20-Q40N-T-AK
Assured operat. dist. Sa		[mm]	0 ... 12.15	0 ... 12.15	0 ... 16.2	0 ... 16.2
Reduction factor		r_{V2A}	0.75	0.75	0.8	0.8
		r_{AL}	0.3	0.3	0.3	0.35
		r_{Cu}	0.25	0.25	0.3	0.35
Operating voltage		[V]	10 ... 60	20 ... 253	10 ... 60	20 ...2 53
Operating current		[mA]	200	8 ... 500	200	8 ... 500
Switching frequency		[Hz]	150	20	150	20
No load supply current		[mA]	10	-	20	-
Voltage drop U_d		[V]	2.8	12	3	12
Short polarity protection			pulsing	no	pulsing	no
Reverse polarity protection			yes	no	yes	no
Indication		Output	LED yellow	LED yellow	LED yellow	LED yellow
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Protection to DIN 40050			IP 67	IP 67	IP 67	IP 67
Connection			Terminal compartment	Terminal compartment	Terminal compartment	Terminal compartment
Conductor cross section			up to 2.5 mm²	up to 2.5 mm²	up to 2.5 mm²	up to 2.5 mm²
Housing material			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			CV150002	CV150002	CV150002	CV150002

Wiring diagrams





Inductive Proximity Sensors
Square Block ∅40 mm
Technical Data

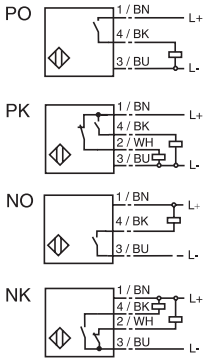
Size

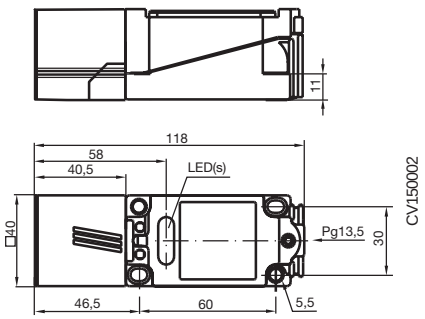
Q40

SIN30-Q40N-T-PO

Operating dist. S_n, mounting			30 mm non embedd.	30 mm non embedd.		
PNP	Normally open		SIN30-Q40N-T-PO			
	Normally closed					
	NO/NC		SIN30-Q40N-T-PK			
NPN	Normally open		SIN30-Q40N-T-NO			
	NO/NC		SIN30-Q40N-T-NK			
DC 2-wire	Normally open					
AC	Normally open					
	Normally closed					
	NO/NC			SIN30-Q40N-T-AK		
Assured operat. dist. Sa		[mm]	0 ... 24.3	0 ... 24.3		
Reduction factor		r_{V2A}	0.8	0.8		
		r_{AL}	0.45	0.45		
		r_{Cu}	0.4	0.4		
Operating voltage		[V]	10 ... 60	20 ... 253		
Operating current		[mA]	200	8 ... 500		
Switching frequency		[Hz]	100	20		
No load supply current		[mA]	10	-		
Voltage drop U_d		[V]	2.8	12		
Short polarity protection			pulsing	no		
Reverse polarity protection			yes	no		
Indication		Output	LED yellow	LED yellow		
		Voltage	-	-		
Operating temperature		[°C]	-25 ... 70	-25 ... 70		
In compliance with			EN 60947-5-2	EN 60947-5-2		
Protection to DIN 40050			IP 67	IP 67		
Connection			Terminal compartment	Terminal compartment		
Conductor cross section			up to 2.5 mm²	up to 2.5 mm²		
Housing material			PBT (Crastin)	PBT (Crastin)		
Sensing face			PBT (Crastin)	PBT (Crastin)		
Drawing No.			CV150002	CV150002		

Wiring diagrams





Inductive Proximity Sensors
Square Block ⌀40 mm
Technical Data

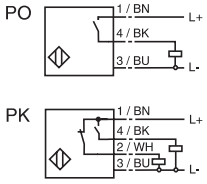
Size

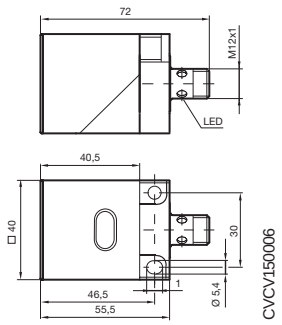
Q40

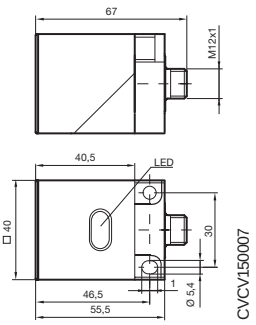
SIF20-Q40T-C1-PO

Operating dist. S_n, mounting			20 mm, embeddable	30 mm, non embedd.	20 mm, embeddable	30 mm non embedd.
PNP	Normally open		SIF20-Q40S-C1-PO	SIN30-Q40S-C1-PO	SIF20-Q40T-C1-PO	
	Normally closed					
	NO/NC				SIF20-Q40T-C1-PK	SIN30-Q40T-C1-PK
NPN	Normally open					
	NO/NC					
DC 2-wire	Normally open					
AC	Normally open					
	Normally closed					
	NO/NC					
Assured operat. dist. Sa		[mm]	0 ... 16.2	0 ... 24.3	0 ... 16.2	0 ... 24.3
Reduction factor		r_{V2A}	0.85	0.85	0.85	0.85
		r_{AL}	0.4	0.5	0.4	0.5
		r_{Cu}	0.35	0.45	0.35	0.45
Operating voltage		[V]	10 ... 30	10 ... 30	10 ... 30	10 ... 30
Operating current		[mA]	200	200	200	200
Switching frequency		[Hz]	150	150	150	150
No load supply current		[mA]	20	20	20	20
Voltage drop U_d		[V]	3	3	3	3
Short polarity protection			pulsing	pulsing	pulsing	pulsing
Reverse polarity protection			yes	yes	yes	yes
Indication		Output	ring LED yellow	ring LED yellow	LED yellow	LED yellow
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Protection to DIN 40050			IP 67	IP 67	IP 67	IP 67
Connection			Connector M12	Connector M12	Connector M12	Connector M12
Conductor cross section			-	-	-	-
Housing material			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			CV150006	CV150006	CV150007	CV150007

Wiring diagrams







Inductive Proximity Sensors
Square Block ∅ 80 mm
Technical Data

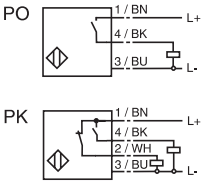
Size

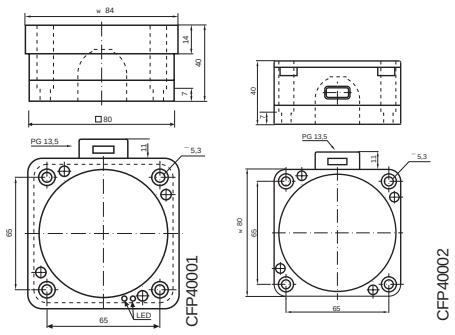
Q80	Q80

SIF40-Q80N-T-PK SIN50-Q80N-T-PO

Operating dist. S_n, mounting		40 mm embeddable	50 mm non embedd.		
PNP	Normally open		SIN50-Q80N-T-PO		
	Normally closed				
	NO/NC	SIF40-Q80N-T-PK	SIN50-Q80N-T-PK		
NPN	Normally open				
	NO/NC				
DC 2-wire	Normally open				
AC	Normally open				
	Normally closed				
	NO/NC				
Assured operat. dist. Sa	[mm]	0 ... 32.4	0 ... 40.5		
Reduction factor	r_{V2A}	0.83	0.85		
	r_{AL}	0.38	0.4		
	r_{Cu}	0.38	0.3		
Operating voltage	[V]	10 ... 60	10 ... 60		
Operating current	[mA]	0 ... 200	0 ... 200		
Switching frequency	[Hz]	100	100		
No load supply current	[mA]	20	20		
Voltage drop U_d	[V]	3	3		
Short polarity protection		pulsing	pulsing		
Reverse polarity protection		yes	yes		
Indication	Output	LED yellow	LED yellow		
	Voltage	LED green	LED green		
Operating temperature	[°C]	-25 ... 70	-25 ... 70		
In compliance with		EN 60947-5-2	EN 60947-5-2		
Protection to DIN 40050		IP 67	IP 67		
Connection		Terminal compartment	Terminal compartment		
Conductor cross section		up to 2.5 mm²	up to 2.5 mm²		
Housing material		PBT (Crastin)	PBT (Crastin)		
Sensing face		PBT (Crastin)	PBT (Crastin)		
Drawing No.		CFP40001	CFP40002		

Wiring diagrams





Special Inductive Proximity Sensors, Analogue output
Cylindrical ∅ 18 mm
Technical Data

Size

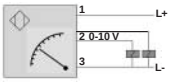
M18x1

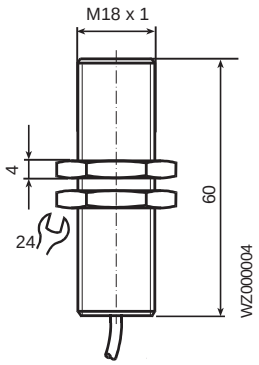
SIF5-M18N-V2-M

Sensing range	**2 mm ... 5 mm**			
Type	SIF5-M18N-V2-M			
Operating voltage	[V]	15 ... 30		
Zero tolerance [%]	±2			
Limit frequency (3 db) [Hz]	appr. 110			
Repeatability [µm]	6			
Output signal [mA]	0 ... 20			
Load resistance [Ω]	0 ... 500			
Residual ripple output	appr.±0.15%			
Short polarity protection	yes			
Temperature drift		appr.±0.1%/K		
No load supply current [mA]	8			
Operating temperature [°C]	-10 ... 70			
In compliance with	EN 60947-5-2			
Protection to IEC 60529	IP 67			
Connection	2 m PVC-cable			
Conductor cross section	0.5 mm²			
Housing material	Nickel plated brass			
Sensing face	PBT (Crastin)			
Drawing No.	WZ000004			

Wiring diagram

M





Special Inductive Proximity Sensors, Weld Immune
Cylindrical ⌀12, 18 mm
Technical Data

Size

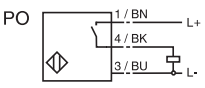
M12x1 M18x1

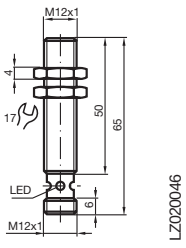
SIN4-M12W-C1-PO

Operating dist. S_n, mounting			2 mm embeddable	4 mm not embedd.	5 mm embeddable	8 mm not embedd.
PNP	Normally open		SIF2-M12W-C1-PO	SIN4-M12W-C1-PO	SIF5-M18W-C1-PO	SIN8-M18W-C1-PO
	Normally closed					
	NO/NC					
NPN	Normally open					
	NO/NC					
DC 2-wire	Normally open					
AC	Normally open					
	Normally closed					
	NO/NC					
Assured operat. dist. Sa		[mm]	0 ... 1.62	0 ... 3.24	0 ... 4.05	0 ... 6.48
Reduction factor		r_{V2A}	0.7	0.7	0.6	0.6
		r_{AL}	0.3	0.4	0.3	0.3
		r_{Cu}	0.2	0.3	0.2	0.2
Operating voltage		[V]	10 ... 30	10 ... 30	10 ... 30	10 ... 30
Operating current		[mA]	200	200	200	200 200
Switching frequency		[Hz]	1500	1200	800	500
No load supply current		[mA]	15	15	15	15
Voltage drop U_d		[V]	3	3	3	3
Constant magn. field		[mT]	200	200	150	150
Alternating magn. field		[mT]	200	200	150	150
Short polarity protection			pulsing	pulsing	pulsing	pulsing
Reverse polarity protection			yes	yes	yes	yes
Indication		Output	ring LED yellow	ring LED yellow	ring LED yellow	ring LED yellow
		Voltage	-	-	-	-
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with			EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Protection to DIN 40050			IP 67	IP 67	IP 67	IP 67
Connection			Connector M12	Connector M12	Connector M12	Connector M12
Conductor cross section			-	-	-	-
Housing material			Chrom plated brass	Chrom plated brass	Chrom plated brass	Chrom plated brass
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	PBT (Crastin)
Drawing No.			FZ020046	FZ040028	FZ050032	FZ080020

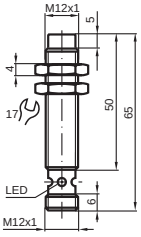
Wiring diagram

PO

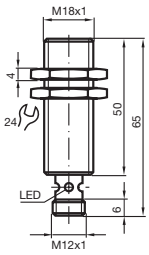




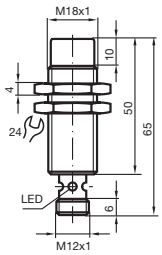
LZ020046



LZ040028



LZ050032

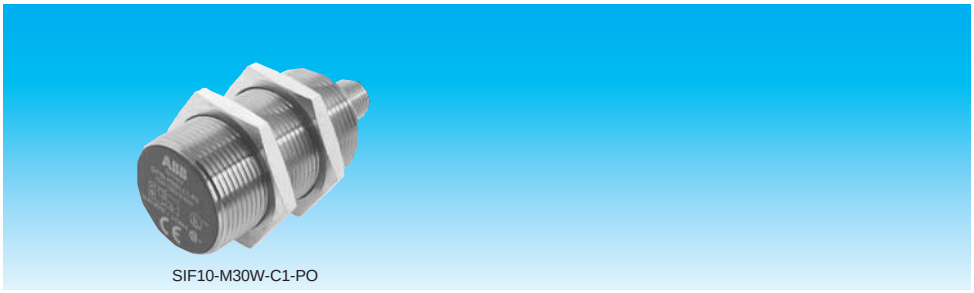


LZ080020

Special Inductive Proximity Sensors, Weld Immune
Cylindrical ∅ 30 mm
Technical Data

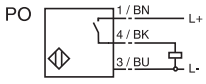
Size

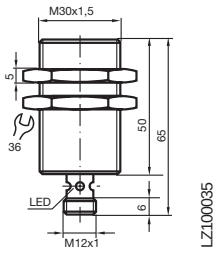
M30x1.5


SIF10-M30W-C1-PO

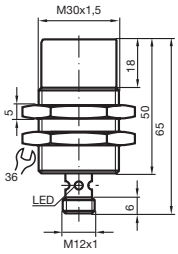
Operating dist. S_n, mounting			**10 mm embeddable**	**15 mm not embedd.**		
PNP	Normally open		SIF10-M30W-C1-PO	SIN15-M30W-C1-PO		
	Normally closed					
	NO/NC					
NPN	Normally open					
	NO/NC					
DC 2-wire	Normally open					
AC	Normally open					
	Normally closed					
	NO/NC					
Assured operat. dist. Sa		[mm]	0 ... 8.1	0 ... 12.5		
Reduction factor		r_{V2A}	0.6	0.6		
		r_{AL}	0.3	0.3		
		r_{Cu}	0.2	0.2		
Operating voltage		[V]	10 ... 30	10 ... 30		
Operating current		[mA]	200	200		
Switching frequency		[Hz]	10	10		
No load supply current		[mA]	15	15		
Voltage drop U_d		[V]	3	3		
Constant magn. field		[mT]	100	100		
Alternating magn. field		[mT]	100	100		
Short polarity protection			pulsing	pulsing		
Reverse polarity protection			yes	yes		
Indication		Output	ring LED yellow	ring LED yellow		
		Voltage	-	-		
Operating temperature		[°C]	-25 ... 70	-25 ... 70		
In compliance with			EN 60947-5-2	EN 60947-5-2		
Protection to DIN 40050			IP 67	IP 67		
Connection			Connector M12	Connector M12		
Conductor cross section			-	-		
Housing material			Chrom plated brass	Chrom plated brass		
Sensing face			PBT (Crastin)	PBT (Crastin)		
Drawing No.			FZ100035	FZ150027		

Wiring diagram



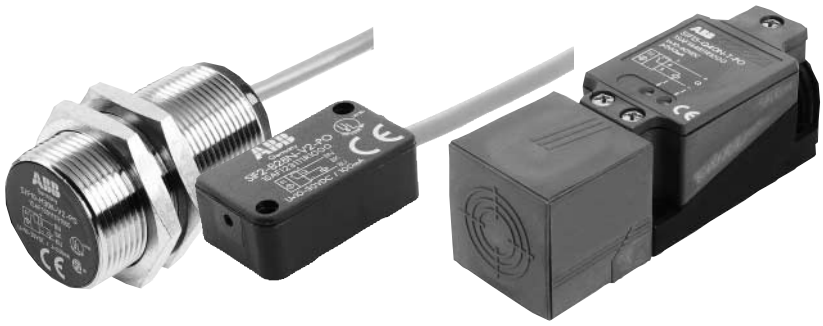


LZ100035



LZ150027

Proximity Sensors
Capacitive



General information

- Non-contact sensing
- Extremely long life
- High speed switching frequency
- Short circuit protection
- AC & DC models
- Nonmetallic objects (paper, cardboard, plastic, etc.)
- Fluids & metallic objects
- 10mm sensing range
- Objects may be sensed through glass or plastic
- Choice of quick disconnect or cable
- Stainless steel housing

Capacitive Sensors

Applications

Capacitive sensors detect an extremly wide variety of materials, primarily non metallic materials, at close range.

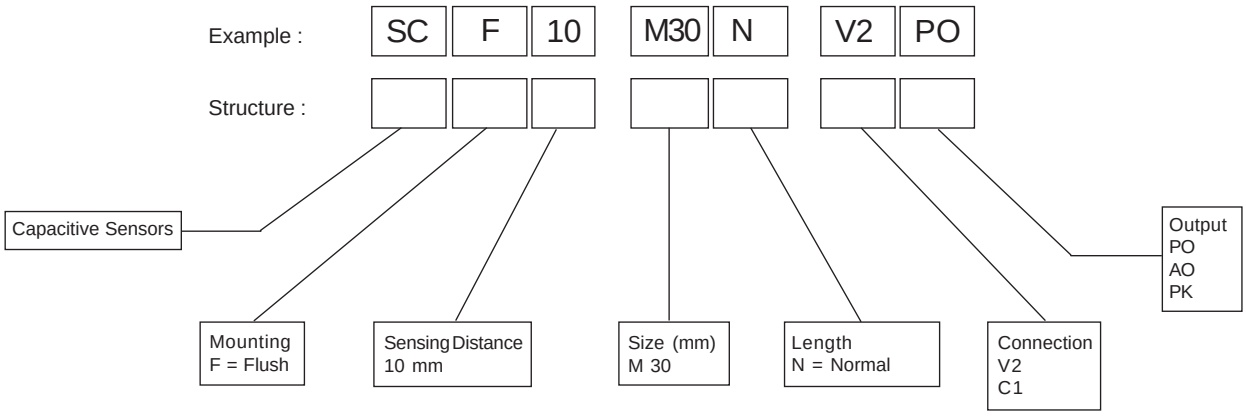
They detect metallic and non-metallic objects
They detect fluids in non-metallic containers
They operate reliably in clean environments
They can be adapted to a wide variety of conditions of the various object materials by adjustment
They achieve maximum functionality at low switching frequency

Description

The Capacitive sensors are available in 1 housing :

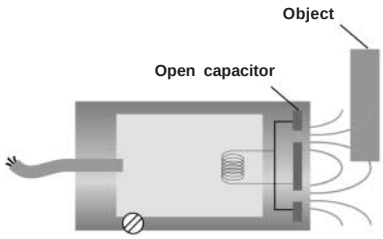
Cylindrical Housing
∅ 30 mm

Part N° Structure



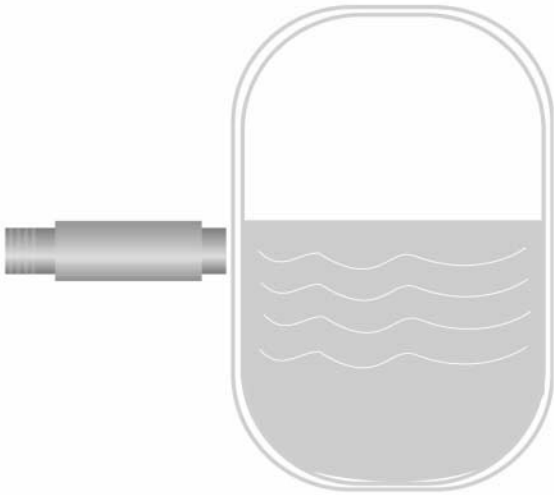
Basic Mode of Operation

The heart of the capacitive sensor is an oscillator with open capacitor which generates an electrostatic field. The oscillator does not oscillate if there is no object in the vicinity.



If the metallic or non-metallic object to be detected approaches, the capacitance increase and oscillation starts. A trigger circuit detects this change and trips the output signal.

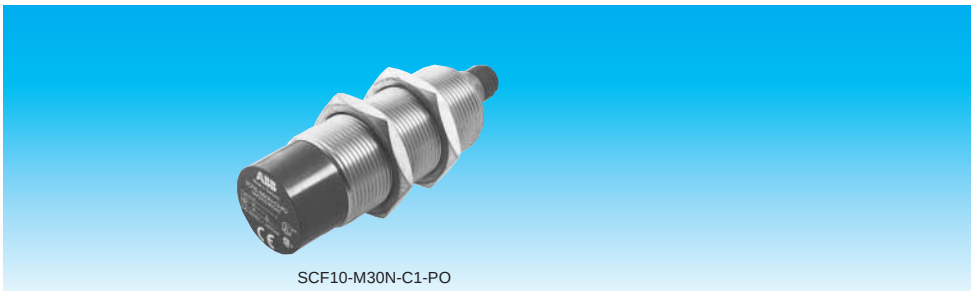
Since different materials influence the electrostatic field differently, the capacitive sensors should be adjusted accordingly during installation in order to achieve optimum operability.
One typical application of capacitive sensors is the detection of fluids in non-metallic containers, e.g. in plastic tanks. Sensors adjustement supresses any influences resulting from the tank wall.



Capacitive Sensors
Cylindrical ⌀30 mm
Technical Data

Size

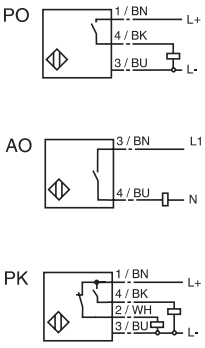
M30x1.5

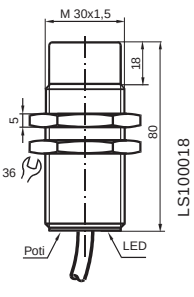


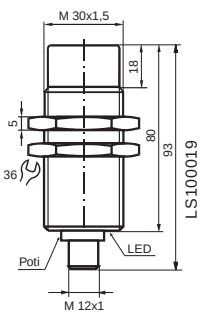
SCF10-M30N-C1-PO

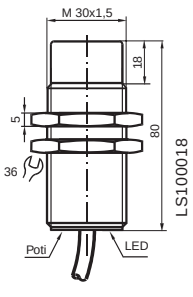
Operating dist. S_n, mounting			10 mm embeddable	10 mm embeddable	10 mm embeddable	
PNP	Normally open		SCF10-M30N-V2-PO	SCF10-M30N-C1-PO		
	Normally closed					
	NO/NC		SCF10-M30N-V2-PK	SCF10-M30N-C1-PK		
NPN	Normally open					
	NO/NC					
DC 2-wire	Normally open					
AC	Normally open				SCF10-M30N-V2-AO	
	Normally closed					
	NO/NC					
Assured operat. dist. Sa		[mm]	0 ... 10	0 ... 10	0 ... 10	
Reduction factor		r_{V2A}	-	-	-	
		r_{AL}	-	-	-	
		r_{Cu}	-	-	-	
Operating voltage		[V]	10 ... 60	10 ... 60	10 ... 60 20 ... 253	
Operating current		[mA]	0 ... 200	0 ... 200	0 ... 200 5 ... 200	
Switching frequency		[Hz]	10	10	10	
No load supply current		[mA]	20	20	-	
Voltage drop U_d		[V]	2.8	2.8	8	
Short polarity protection			pulsing	pulsing	no	
Reverse polarity protection			yes	yes	yes	
Indication		Output	LED yellow	LED yellow	LED yellow	
		Voltage	-	-	-	
Operating temperature		[°C]	-25 ... 70	-25 ... 70	-25 ... 70	
In compliance with			EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	
Protection to DIN 40050			IP 65	IP 65	IP 65	
Connection			2 m, PVC-cable	Connector M12	2 m, PVC-cable	
Conductor cross section			0.75 mm²	-	0.75 mm²	
Housing material			Highgrade steel	Highgrade steel	Highgrade steel	
Sensing face			PBT (Crastin)	PBT (Crastin)	PBT (Crastin)	
Drawing No.			LS100018	LS100019	LS100018	

Wiring diagrams









Photoelectric Sensors
Diffused
Retro-reflective
Through-beam
Fibre-optic

General information

Diffused mode
- Sensing distances up to 800 mm
- Subcompact, compact and cylindrical models
- Choice of quick disconnect, cable or terminal connection
- Light on or dark on operation

Retro-reflective mode
- Sensing distances up to 5 m
- Subcompact, compact and cylindrical models
- Choice of quick disconnect, cable or terminal connection
- Light on or dark on operation

Through-beam mode
- Sensing distances up to 20 m
- Compact models
- Terminal connection
- Light on or dark on operation
- Two different housings (Emitter / Receiver)

Fibre-optic cable for use with small objects
- Retro-reflective and through-beam

New B45 series
- Setting sensor parameters via software Opus
- Sensing distances up to 15 m

Photoelectric Sensors

Applications

Photoeletric sensors cover a broad range of applications owing to three operating principles :

1. Diffuse reflective sensors detect light-reflecting objects.
2. Retro-reflective sensors with reflector detect opaque objects as the result of an obstruction in the light beam.
3. Through beam photoelectric sensors detect opaque objects, in a similar way as retro-reflective photoelectric sensors.

Accessories extend the scope of possible applications. Fibre-optic waveguides, as an add-on, detect extremely small objects and operate at high ambient temperature or under cramped installation conditions. Depending on design, they operate as diffuse reflective sensors or as through-beam photoelectric sensors. A dust-free, clean environment ensures reliable operating of the sensors.

Description

The Photoelectric sensors are available in 5 different housings :

Block Housing
B 26

Cylindrical Housing
Ø 18 mm

Block Housing
B 40

Block Housing
B 45

Block Housing
B 75

Fibre Optic Sensors

Part N° Structure

Example : SO | D | 200 | M18 | N | C1 | PO

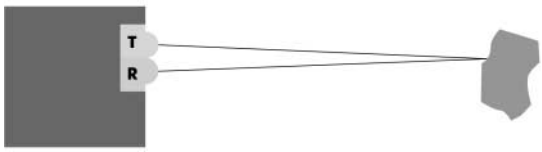
Structure : | | | | | | |

- Photoelectric Sensors
- Operating modes
  D = Diffuse
  R = Retro-reflective
  L = Fibre optic
  T = Thru-beam
- Sensing Distance (mm)
  15 - 50 - 150 - 200 - 300 - 400 - 500 - 800 - 2000 - 3000 - 5000 - 6000 - 15000 - 20000
- Size (mm)
  M 18
  B 26
  B 40 (phased out in 2001)
  B 45
  B 50
  B 75
- Length
  N = Normal
- Connection
  U2
  V2
  C1
  C8
  T
- Output
  PO
  POS
  KK
  PKS
  NKS

Basic Mode of Operation

Diffuse Reflective Sensors

These receive the light reflected back from the object. If a defined quantity of light is detected, the output signal is tripped. The nominal operating distances extend up to 2000 mm, depending on type. The achievable sensing distance depends on the size of the object to be detect, its colour and its condition, such as surface roughness.

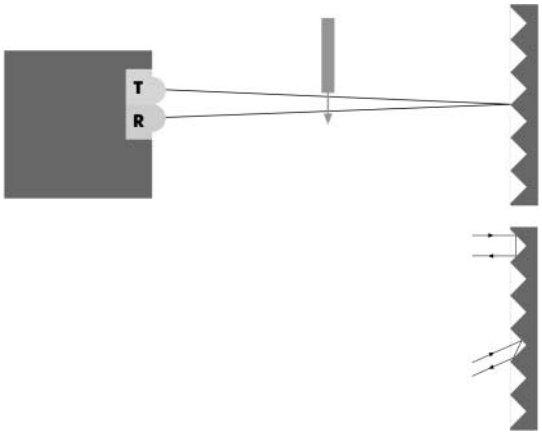


Example of reflection factors on level, aligned surfaces :

Standard white test card	90%
Standard grey test card	18%
White paper	80%
Wooden boards	20%
Beer froth	70%
Transparent plastic bottles	40%
Car tyres	1.5%
Alluminium, bare	140%
Aluminium, black anoised	115%

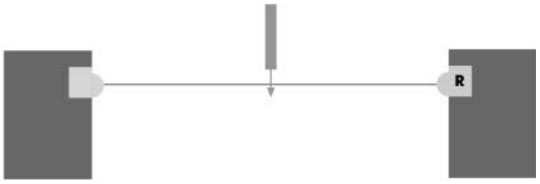
Retro-Reflective Sensors

These are used for larger distances to be monitored. The emitted light beam is reflected by a reflector positioned on the other side of the object. If the light path is interrupted, the signal is tripped. The design of the reflector ensure reliable operating even if the object is imprecisely aligned. The sensor distances extend up to 5000 mm, depending on type.



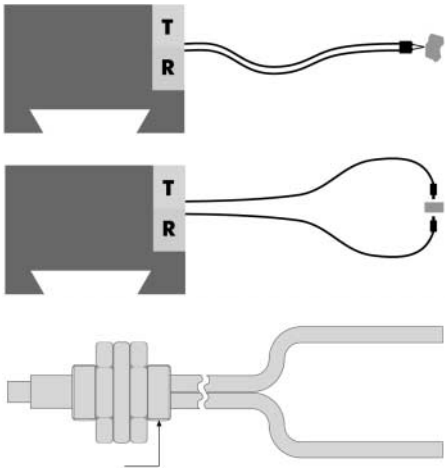
Through-Beam Photoelectric Sensors

These sensors have a separate light source and receiver.



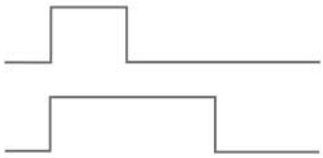
Fibre-optic Waveguides

These extend the range of possible applications of photoelectric sensors with important additional fields of application. The upstream fibre-optic waveguides defines whether the sensor is to operate as a through beam photoelectric sensor or as a diffuse reflective photoelectric sensor. Sensors with fibre-optic waveguides are used, primarily, to detect small objects, even under cramped conditions. Depending on design of the fibre-optic waveguide and fibre head, it is also possible to use these systems at high temperatures. Plastic fibre-optic waveguides can be shortened by the user to appropriate length with the supplied tools.



Pulse Prolongation

This allows even very quickly moving objects to be detected and, e.g., an adequately long signal to be sent to a downstream control.



Safety Reserve and Optical Failure Warning Indicator

These are used primarily to ensure the long-term, trouble-free operating of the sensor and to detect measurement failures at an early stage. Owing to the environments in which photoelectric sensors are used, contamination of the lenses may occur over the course of time so that the light detected by the receiver is reduced. The optical failure warning indicator allows the user to set the receive level with an adequate safety reserve during installation. If the light receive level drops to the optical failure warning range, the sensor does, admittedly, still operate but the user is informed that reliable operating is no longer guaranteed in the long term.

Photoelectric Sensors Series B45
Programming sensor parameters with programming software OPUS

Sensor parameters

Outputs

The two outputs are selectable:

- Antivalent - dual switch outputs, N.O./N.C. (default)
- *N.O. + failure* – one switch output, N.O. and the failure warning output (Alarm)
- *N.C. + failure* – one switch output, N.C. and the failure warning output (Alarm)

Weak signal indicator (Optical failure control)

The weak signal indicator provides a signal (flashing red LED) to indicate the receiver is picking up less light than intended. The cause of this could be a dirty lens or misalignment.

If N.O. + failure or N.C. + failure mode is selected, the failure warning output will also switch along with the LED. The failure warning output always operates as an N.O. function.

The sensor can be programmed for either static or dynamic (default) failure indication.

Static – This mode should be chosen for applications that have a fixed sensing distance and position. The static failure warning indicator can also be used as an adjustment aid for the sensor.

Dynamic – This mode should be chosen for use with targets that have variable sensing distances or high switching frequencies.

Operating frequency

The switching frequency can be set to one of five options: 1kHz (default), 500 Hz, 250 Hz, 100 Hz, 50 Hz and 25 Hz. The switching frequency influences the interference signal filter. Lower switching frequencies increase the amount of filtering. With greater filtering, a larger numer of interference pulses are suppressed.

Hysteresis

The sensor can be programmed for one of three settings: small, standard (default) and large to optimize the sensor to the application. If the target object has positional tolerances close to the switch point (e.g. movement of a liquid surface), a large hysteresis setting will prevent continuous switching back and forth of the output.

Timer function

The sensor operates with four timer functions: one ON delay and three OFF delay functions.

Timer function 1

- Switch-on delay
  The ON delay requires a sensing event to last for at least the ON delay time period (0.1 – 25.5 sec) before the output will energize.

Timer function 2

- Switch-off delay
  The OFF delay function holds the output for a preset time (0.1 – 25.5 sec) after the input signal is removed.
- Pulse lengthening (pulse expansion)
  The status of the output remains constant for at least a time period (0.1 – 255 ms) regardless of what the sensor detects during this time period.
- One-shot function
  The output is activated for a fixed time period (1 – 255 ms) regardless of how long the sensor detects its target.

The default setting for both timer functions is none.

Input functions

There is a choice of four input functions that can be set on the sensor:

Selft-test

- N.O./N.C. switch-over
- AND logic operation
- OR logic operation
- XOR logic operation

The input function can be also be inverted, which means the function is active when the input signal is < 2 VDC. On the thru-beam model the emitter also has a control input which, when set high, turns the emitter off.

During the self-test, the sensor´s transmitting LED is turned off. The sensor checks for proper operation of the internal circuitry.

If the N.O./N.C. Switch-over option is active, the switch outputs reverse their functions: N.O. becomes N.C. and N.C. becomes N.O. The weak signal indicator output cannot change its function, it is always N.O.

If the logic operations are active, the switch output is as follows:

AND *The sensor changes state when the input function is active **and** the sensor detects an object.*

OR *The sensor changes state when the input function is active **or** the sensor detects an object.*

Sensor parameters (continued)

XOR The sensor changes state under two circumstances:

The input function is active and the sensor does not detect an object.

or

The input function is not active and the sensor detects an object.

The default setting for the input function is None.

Tamper protection (parameterization disable)

This feature prevents the sensor´s parameters from being accidentally changed. Once the disable has been activated, it can only be removed by resetting the sensor to its default settings. During this resetting sequence, the sensor runs a self-test where it emits a light beam and looks for its return. Therefore, the diffused mode sensor requires that a target be placed in front of it. The retro-reflective sensor requires that a reflector be placed in front of it. The thru-beam sensor requires that the emitter/receiver pair are properly aligned.

In order to reset the sensor:

- Turn power off.
- Depress and hold the push buttons (+/-) simultaneously.
- While holding push buttons down, turn power back on. If the self-test fails, the sensor will respond with a flashing red LED. If the red LED is flashing, switch power on and off again to reset.

Pulse frequency

The pulse frequency at which the sensor transmits light can be selected for one of three frequencies (Frequency 1 is the default) to prevent mutual interference between closely spaced sensors.

Keypad lock

This function allows the sensor push buttons to be locked. There are three options for this function:

- Off
- Automatic (default)
- Constant

The default setting is Automatic. In this mode, the pushbuttons lock four minutes after the last button is pushed. To unlock, press both pushbuttons (+/-) simultaneously and hold for five seconds. The green LED will flash briefly when the sensor is unlocked.

Setting sensor switch point

There are three ways to set the switch point of the sensor:

- Manual mode
- Automatic mode (Static operation)
- Automatic mode (Dynamic operation)

Manual setting

1. If sensor pushbuttons are locked (usually when sensor is first powered up), simultaneously press "+" and "-" for five seconds (until green LED flashes once). The sensor is now unlocked.
NOTE: If green LED is flashing continuously, the sensor is in the automatic "teach" mode. Press either "+" or "-" to reset sensor to manual setting mode.

2. Place the target at the required distance within the sensing range. Use the "+" and "-" buttons to set the switch point. The red LED will flash every time a button is pushed. The push buttons can be held down for repeated actuation. The yellow LED indicates switch status.
NOTE: If the red LED does not flash when a button is pushed, the end of the adjustable range has been reached or the keypad is locked. If pressing either the "+" or "-" button doesn´t cause the red LED to flash, the keypad is locked. Go to Step 1.

Automatic Setting – Static Mode (for stationary targets)

1. If sensor push buttons are locked (usually when sensor is powered up), simultaneously press "+" and "-" for five seconds (until green LED flashes once). The sensor is now unlocked.
NOTE: If the green LED is flashing continuously, sensor is already "teach" mode. Go to Step 3.

2. Press "+" and "-" simultaneously for one second, until the red LED turns off. The green LED will be flashing at 2 Hz which indicates the sensor is in "teach" mode.

3. Place the target at the desired sensing distance. The green LED will flash briefly at a higher frequency (4 Hz).* Once the green LED flashes at 2 Hz again the sensor is out of "teach" mode.

4. Press either one of the push buttons to store the switch point. The green LED will be lit continuously and the yellow LED will indicate switch status.
NOTE: If the red LED is lit, there is an error. Go to Step 2.

* The time the green LED is flashing at a higher frequency may be too short to be observed.

Automatic Setting – Dynamic Mode (for moving targets)

1. If sensor push buttons are locked (usually when sensor is powered up), simultaneously press "+" and "-" for five seconds (until green LED flashes onc briefly). The sensor is now unlocked.
NOTE: If the green LED is flashing continuously, sensor is already "teach" mode. Go to Step 3.

2. Press "+" and "-" simultaneously for one second, until the red LED turns off. The green LED will be flashing at 2 Hz which indicates the sensor is in "teach" mode.

3. Move the target perpendicularly past the sensor at the desired sensing distance. The green LED will flash briefly at a higher frequency (4 Hz).* Once the green LED flashes at 2 Hz again, the sensor is out of "teach" mode.

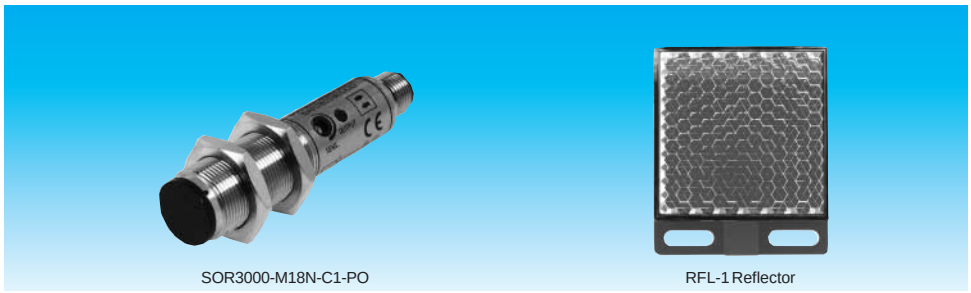
4. Press either one of the push buttons to store the switch point. The green LED will be lit continuously and the yellow LED will indicate switch status.
NOTE: If the red LED is lit, there is an error. Go to Step 2.

* The time the green LED is flashing at a higher frequency may be too short to be observed.

Photoelectric Sensors: Retro Reflective Mode
Cylindrical ∅18 mm
Technical Data

Size

M18 x 1

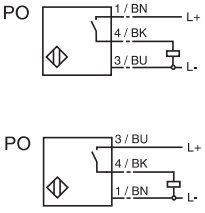


SOR3000-M18N-C1-PO

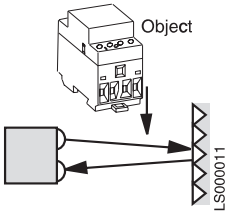
RFL-1 Reflector

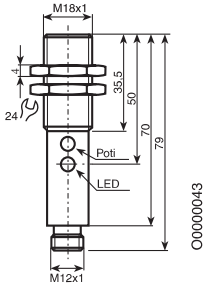
Model	SOR1500-M18N-C1-PO (RFL-1 reflector included)	SOR3000-M18N-C1-PO (RFL-1 reflector included)
Sensing Range	**1 500 mm**	**3 000 mm**
Output	**DC, PNP**	**DC, PNP**
Operating Specifications		
Polarized	yes	no
Reference	Reflector 50mm x 50mm, RFL-1	Reflector 50mm x 50mm, RFL-1
Range setting	with potentiometer	with potentiometer
Switching frequency (1:1)/Response time	300 Hz / ≤ 1.5 ms	300 Hz / ≤ 1.5 ms
Readiness delay	≤ 50 ms	≤ 50 ms
Range hysteresis	-	-
Detectable object	opaque, mirror object	opaque
Operating Specifications	Light ON/dark ON, selectable by wiring	Light ON/dark ON, selectable by wiring
LED yellow	Output status	Output status
LED red	-	-
Type of light	IR light 660 nm	IR light 880 nm
Ambient light limit		
Daylight / halogen light	≤ 10 000 Lux / ≤ 3 000 Lux	≤ 10 000 Lux / ≤ 3 000 Lux
Operating temperature	-25°C ... +55°C	-25°C ... +55°C
Storage temperature	-40°C ... +70°C	-40°C ... +70°C
Electrical ratings		
Supply Voltage	10 VDC ... 30 VDC, ripple 10%$_{pp}$	10 VDC ... 30 VDC, ripple 10%$_{pp}$
No load supply current	≤ 20 mA	≤ 20 mA
Switch output	Normally closed/Normally open	Normally closed/Normally open
Rated operational current	100 mA	100 mA
Voltage drop	≤ 2,5 V	≤ 2,5 V
Stability control output	-	-
Rated operational current	-	-
Short circuit and overload protection	yes	yes
Reverse polarity protection	yes	yes
Mechanical data		
Protection class to EN / IEC	IP 67	IP 67
Optical	PMMA lens	Polycarbonate lens
Permissible shock	Shock b ≤ 30 g, T ≤ 11 ms	Shock b ≤ 30 g, T ≤ 11 ms
and vibration loading	Vibration f ≤ 55 Hz, a ≤ 1mm	Vibration f ≤ 55 Hz, a ≤ 1mm
Connection	Connector M12	Connector M12
Housing material	Nickel plated brass	Nickel plated brass
Weight	45 g	45 g
In compliance with	EN 60 947-5-2	EN 60 947-5-2
Drawing No.	O0000043	CO000001

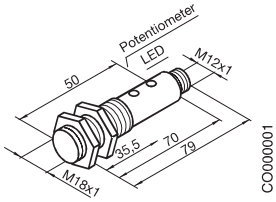
Wiring diagrams



Retro Reflective



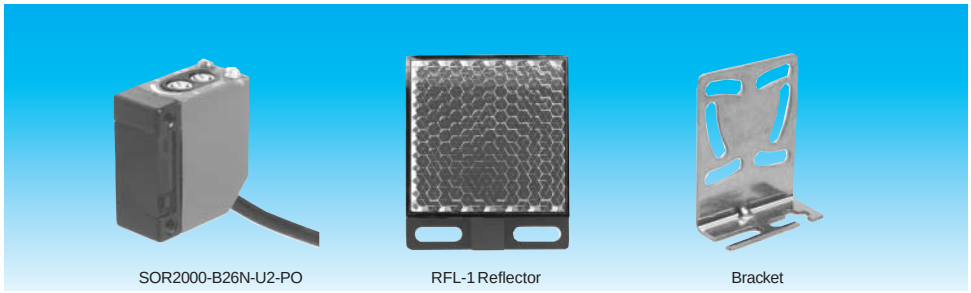




Photoelectric Sensors: Retro Reflective Mode
Block ∅26 mm, 75 mm
Technical Data

Size

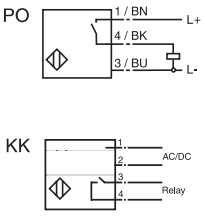
B26	B75



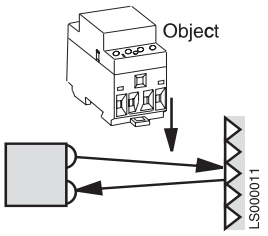
SOR2000-B26N-U2-PO | RFL-1 Reflector | Bracket

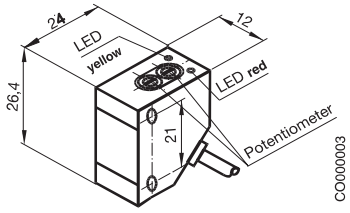
Model	**SOR2000-B26N-U2-PO** (RFL-1 reflector and bracket included)	**SOR5000-B75N-T-KK** (RFL-1 reflector and bracket included)
Sensing Range	**2 000 mm**	**5 000 mm**
Output	**DC, PNP**	**AC/DC, Relay**
Operating Specifications		
Polarized	no	yes
Reference	Reflector 50mm x 50mm, RFL-1	Reflector 50mm x 50mm, RFL-1
Range setting	with potentiometer	with potentiometer
Switching frequency (1:1)/Response time	500 Hz / ≤ 1 ms	25 Hz / ≤ 20 ms
Readiness delay	≤ 30 ms	≤ 50 ms
Range hysteresis	-	-
Detectable object	opaque	opaque
Operating Specifications	Light ON/dark ON, selectable by potentiom.	Light ON/dark ON, selectable by potentiom.
LED yellow	Output status	Output status
LED red	Weak signal indication	Weak signal indication
Type of light	IR light 950 nm	IR light 660 nm
Ambient light limit		
Daylight / halogen light	≤ 20 000 Lux / ≤ 5 000 Lux	≤ 10 000 Lux / ≤ 7 500 Lux
Operating temperature	-25°C ... +70°C	-25°C ... +55°C
Storage temperature	-25°C ... +70°C	-40°C ... +55°C
Electrical ratings		
Supply Voltage	10 VDC ... 30 VDC, ripple 10%$_{pp}$	12 VDC ... 240 VDC, ripple ±10%$_{pp}$ 24 VAC ... 240 VAC, ripple ±10%$_{pp}$
No load supply current	≤ 30 mA	-
Switch output	Normally closed/Normally open	Normally closed/Normally open
Rated operat. current/*Output Relay*	200 mA	*240VAC max. 3 A*
Voltage drop / *Output Relay*	≤ 2.5 V	*30VDC max. 3 A*
Stability control output	-	-
Rated operational current	-	-
Short circuit and overload protection	yes	yes
Reverse polarity protection	yes	yes
Mechanical data		
Protection class to EN / IEC	IP67	IP66
Optical	Polycarbonate lens	PMMA lens
Permissible shock	Shock b ≤ 30 g, T ≤ 11 ms	Shock b ≤ 30 g, T ≤ 11 ms
and vibration loading	Vibration f ≤ 55 Hz, a ≤ 1mm	Vibration f ≤ 55 Hz, a ≤ 1mm
Connection	2 m cable, 3 x 0.14mm², PUR black	Terminal compartment (cable max. ∅ 10 mm)
Housing material	PBT (Crastin)	PBT (Crastin)
Weight	20 g	110 g
In compliance with	EN 60 947-5-2	EN 60 947-5-2
Drawing No.	CO000003	CO000006

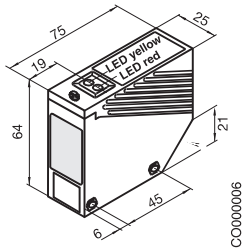
Wiring diagrams



Retro Reflective







Photoelectric Sensors: Retro Reflective Mode
Block ∅75 mm, 40 mm
Technical Data

Size

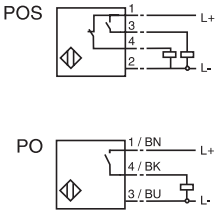
B75	B40

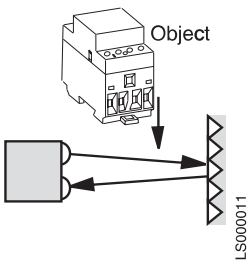
SOR5000-B75N-T-POS | Bracket | RFL-1 Reflector

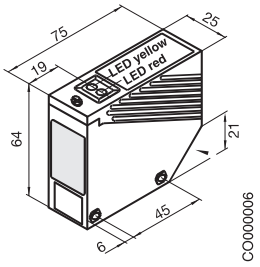
Model	SOR5000-B75N-T-POS (RFL-1 reflector and bracket included)	SOR2000-B40N-V2-PO SOR2000-B40N-C8-PO (RFL-1 reflector and bracket included, phased out in 2001)
Sensing Range	**5 000 mm**	**2 000 mm**
Output	**DC, PNP**	**DC, PNP**
Operating Specifications		
Polarized	yes	no
Reference	Reflector 50mm x 50mm, RFL-1	Reflector 50mm x 50mm, RFL-1
Range setting	with potentiometer	with potentiometer
Switching frequency (1:1)/Response time	300 Hz / ≤ 15 ms	200 Hz / ≤ 2.5 ms
Readiness delay	≤ 50 ms	≤ 20 ms
Range hysteresis	-	-
Detectable object	opaque and mirror object	opaque
Operating Specifications	Light ON/dark ON, selectable by potentiom.	dark ON
LED yellow	Output status	Output status
LED red	Weak signal indication	Weak signal indication
Type of light	Red light 660 nm	IR light 950 nm
Ambient light limit		
Daylight / halogen light	≤ 10 000 Lux / ≤ 7 500 Lux	≤ 20 000 Lux / ≤ 5 000 Lux
Operating temperature	-25°C ... +55°C	-25°C ... +70°C
Storage temperature	-40°C ... +55°C	-40°C ... +80°C
Electrical ratings		
Supply Voltage	10 VDC ... 30 VDC, ripple 10%$_{pp}$	10 VDC ... 30 VDC, ripple 10%$_{pp}$
No load supply current	≤ 35 mA	≤ 25 mA
Switch output	Normally closed/Normally open	Normally open
Rated operational current	200 mA	200 mA
Voltage drop	≤ 3 V	≤ 1.5 V
Stability control output	Normally open	-
Rated operational current	200 mA	-
Short circuit and overload protection	yes	yes
Reverse polarity protection	yes	yes
Mechanical data		
Protection class to EN / IEC	IP 66	IP 67
Optical	PMMA lens,	2-lens-System glass
Permissible shock	Shock b ≤ 30 g, T ≤ 11 ms	Shock b ≤ 30 g, T ≤ 11 ms
and vibration loading	Vibration f ≤ 55 Hz, a ≤ 1mm	Vibration f ≤ 55 Hz, a ≤ 1 mm
Connection	Terminal compartment, cable ø 10 mm	2m cable, 3 x 0.14 mm² PVC grey Connector M8
Housing material	PBT (Crastin)	PBT (Crastin)
Weight	100 g	55 g
In compliance with	EN 60 947-5-2	EN 60 947-5-2
Drawing No.	CO000006	CO000004

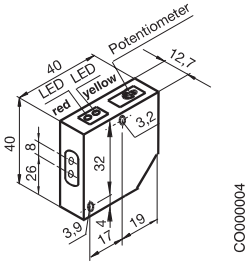
Wiring diagrams

Retro Reflective









Photoelectric Sensors: Retro Reflective Mode
Block ⌀45 mm
Technical Data

NEW

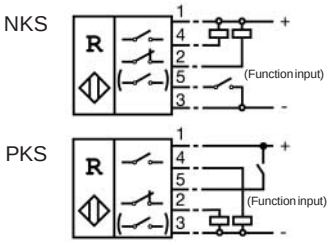
Size

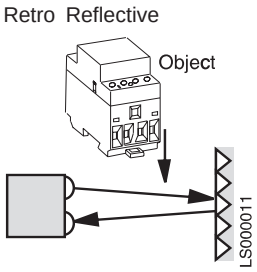
B45

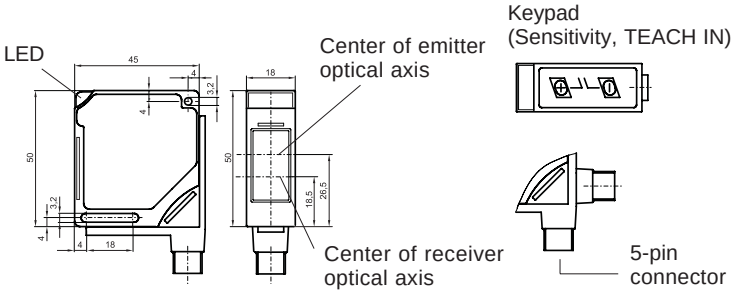
SOR6000-B45N-C1-PKS

Model	**SOR6000-B45N-C1-PKS** (Bracket and reflector RFL-1 included)	**SOR6000-B45N-C1-NKS** (Bracket and reflector RFL-1 included)
Sensing Range **Output**	**0 mm ... 4000 mm with RFL-1** **DC, PNP**	**0 mm ... 4000 mm with RFL-1** **DC, NPN**
Operating Specifications Reference Sensitivity adjustment Switching frequency (1:1) Readiness delay Range hysteresis Min. ON delay	 Reflector 50 mm x 50 mm, RFL-1 - stepwise „+“ or „-“ buttons - automatic via „Teach in“ 1 kHz ≤ 80 ms, with activation standardization programmable ≤ 3 ms	 Reflector 50 mm x 50 mm, RFL-1 - stepwise „+“ or „-“ buttons - automatic via „Teach in“ 1 kHz ≤ 80 ms, with activation standardization programmable ≤ 3 ms
LED yellow LED red LED green Type of light Ambient light limit Daylight / halogen light	Switch status Pre-fault indicator flashing at 2 Hz Keystroke response 65 ms Error display in teach mode 1.5 s Power-ON indicator Indicator in teach mode flashing at 2 Hz or 4 Hz Visible red light 660 nm ≤ 10 000 Lux / ≤ 7 500 Lux	Switch status Pre-fault indicator flashing at 2 Hz Keystroke response 65 ms Error display in teach mode 1.5 s Power-ON indicator Indicator in teach mode flashing at 2 Hz or 4 Hz Visible red light 660 nm ≤ 10 000 Lux / ≤ 7 500 Lux
Operating temperature Storage temperature	-25°C ... +70°C -40°C ... +75°C	-25°C ... +70°C -40°C ... +75°C
Electrical ratings Supply Voltage Current consumption Switch output Rated operational current Voltage drop Control / test input ON / OFF delay Internal resistance Short circuit and overload protection Reverse polarity protection	 10 VDC ... 30 VDC, ripple 10%$_{pp}$ ≤ 25 mA PNP, programmable: - antivalent - Switch output (NO/NC) and pre-fault indicator 200 mA ≤ 2,5 V Inactive ≤ 2 V, active ≥ 7 V < 3 ms > 12 kΩ yes yes	 10 VDC ... 30 VDC, ripple 10%$_{pp}$ ≤ 25 mA NPN, programmable: - antivalent - Switch output (NO/NC) and pre-fault indicator 200 mA ≤ 2,5 V Inactive ≤ 2 V, active ≥ 7 V < 3 ms > 12 kΩ yes yes
Mechanical data Protection class to IEC 60 529 Optical Permissible shock and vibration loading Connection Material front lens Housing material Weight In compliance with	 IP 67 PMMA 2 lens system Shock b ≤ 30 g, T ≤ 11 ms Vibration f ≤ 55 Hz, a ≤ 1mm Connector M12, 5-pin, adjustable to 90° Scratch resistant plastic lens PBT 60 g EN 60 947-5-2	 IP 67 PMMA 2 lens system Shock b ≤ 30 g, T ≤ 11 ms Vibration f ≤ 55 Hz, a ≤ 1mm Connector M12, 5-pin, adjustable to 90° Scratch resistant plastic lens PBT 60 g EN 60 947-5-2

Wiring diagrams







NEW

Photoelectric Sensors: Retro Reflective Mode
Block ⌀45 mm
Technical Data

Size

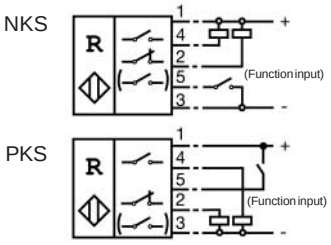
B45

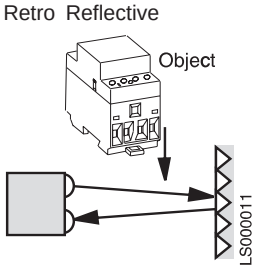
"Clear glass detection"

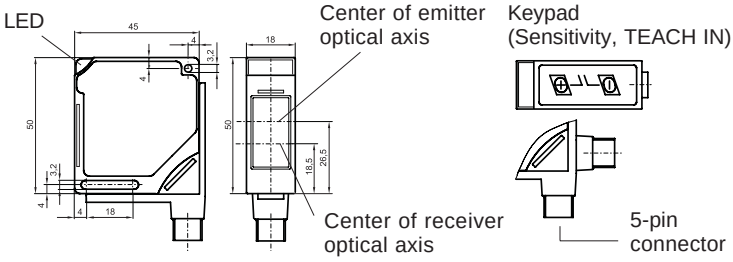
SORG2000-B45N-C1-PKS

Model	SORG2000-B45N-C1-PKS (Bracket included)	SORG2000-B45N-C1-NKS (Bracket included)
Sensing Range **Output**	**0 mm ... 2 000 mm with RFL-1** **DC, PNP**	**0 mm ... 2 000 mm with RFL-1** **DC, NPN**
Operating Specifications		
Polarized	yes	yes
Reference	Reflector 50 mm x 50 mm, RFL-1	Reflector 50 mm x 50 mm, RFL-1
Sensitivity adjustment	- stepwise „+“ or „-“ buttons - automatic via „Teach in“	- stepwise „+“ or „-“ buttons - automatic via „Teach in“
Switching frequency (1:1)	1 kHz	1 kHz
Readiness delay	≤ 80 ms, with activation standardization	≤ 80 ms, with activation standardization
Range hysteresis	programmable	programmable
Min. ON delay	≤ 3 ms	≤ 3 ms
LED yellow	Switch status	Switch status
LED red	Pre-fault indicator flashing at 2 Hz Keystroke response 65 ms Error display in teach mode 1.5 s	Pre-fault indicator flashing at 2 Hz Keystroke response 65 ms Error display in teach mode 1.5 s
LED green	Power-ON indicator Indicator in teach mode flashing at 2 Hz or 4 Hz	Power-ON indicator Indicator in teach mode flashing at 2 Hz or 4 Hz
Type of light	Visible red light 660 nm	Visible red light 660 nm
Ambient light limit Daylight / halogen light	≤ 10 000 Lux / ≤ 7 500 Lux	≤ 10 000 Lux / ≤ 7 500 Lux
Operating temperature	-25°C ... +70°C	-25°C ... +70°C
Storage temperature	-40°C ... +75°C	-40°C ... +75°C
Electrical ratings		
Supply Voltage	10 VDC ... 30 VDC, ripple 10%$_{pp}$	10 VDC ... 30 VDC, ripple 10%$_{pp}$
Current consumption	≤ 25 mA	≤ 25 mA
Switch output	PNP, programmable: - antivalent - Switch output (NO/NC) and pre-fault indicator	NPN, programmable: - antivalent - Switch output (NO/NC) and pre-fault indicator
Rated operational current	200 mA	200 mA
Voltage drop	≤ 2,5 V	≤ 2,5 V
Control / test input	Inactive ≤ 2 V, active ≥ 7 V	Inactive ≤ 2 V, active ≥ 7 V
ON / OFF delay	< 3 ms	< 3 ms
Internal resistance	> 12 kΩ	> 12 kΩ
Short circuit and overload protection	yes	yes
Reverse polarity protection	yes	yes
Mechanical data		
Protection class to IEC 60 529	IP 67	IP 67
Optical	PMMA 2 lens system	PMMA 2 lens system
Permissible shock and vibration loading	Shock b ≤ 30 g, T ≤ 11 ms Vibration f ≤ 55 Hz, a ≤ 1mm	Shock b ≤ 30 g, T ≤ 11 ms Vibration f ≤ 55 Hz, a ≤ 1mm
Connection	Connector M12, 5-pin, adjustable to 90°	Connector M12, 5-pin, adjustable to 90°
Material front lens	Scratch resistant plastic lens	Scratch resistant plastic lens
Housing material	PBT	PBT
Weight	60 g	60 g
In compliance with	EN 60 947-5-2	EN 60 947-5-2

Wiring diagrams

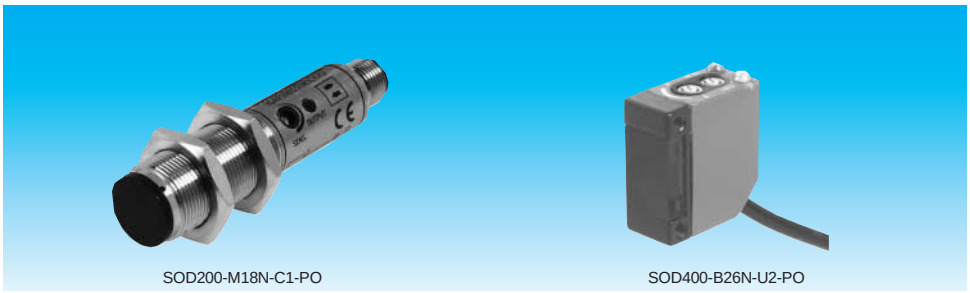






Photoelectric Sensors: Diffused Mode
Cylindrical ∅18 mm, Block ∅ 26 mm
Technical Data

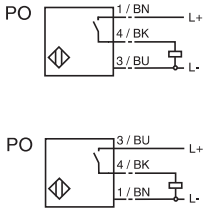
Size

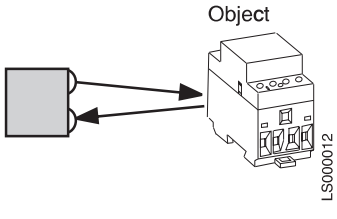
M18 x 1	B26
	
SOD200-M18N-C1-PO	SOD400-B26N-U2-PO

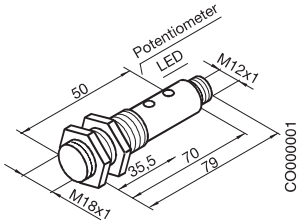
Model	SOD200-M18N-C1-PO	SOD400-B26N-U2-PO (Bracket included)
Sensing Range	**200 mm**	**400 mm**
Output	**DC, PNP**	**DC, PNP**
Operating Specifications		
Polarized	no	no
Reference	white 200mm x 200mm	white 100mm x 100mm
Range setting	with potentiometer	with potentiometer
Switching frequency (1:1)/Response time	300 Hz / ≤ 1.5 ms	500 Hz / ≤ 1 ms
Readiness delay	≤ 50 ms	≤ 30 ms
Range hysteresis	≤ 15 %	≤ 15 %
Detectable object	opaque	opaque, mirror object
Operating Specifications	Light ON/dark ON, selectable by wiring	Light ON/dark ON, selectable by potentiom.
LED yellow	Output status	Output status
LED red	-	Weak signal indication
Type of light	IR light 940 nm	IR light 950 nm
Ambient light limit		
Daylight / halogen light	≤ 10 000 Lux / ≤ 3 000 Lux	≤ 20 000 Lux / ≤ 5 000 Lux
Operating temperature	-25°C ... +55°C	-25°C ... +70°C
Storage temperature	-40°C ... +70°C	-25°C ... +70°C
Electrical ratings		
Supply Voltage	10 VDC ... 30 VDC, ripple 10%$_{pp}$	10 VDC ... 30 VDC, ripple 10%$_{pp}$
No load supply current	≤ 20 mA	≤ 30 mA
Switch output	Normally open/Normally closed	Normally closed/Normally open
Rated operational current	100 mA	200 mA
Voltage drop	≤ 2.5 V	≤ 2.5 V
Stability control output	-	-
Rated operational current	-	-
Short circuit and overload protection	yes	yes
Reverse polarity protection	yes	yes
Mechanical data		
Protection class to EN / IEC	IP 67	IP 67
Optical	Polycarbonate lens	Polycarbonate lens
Permissible shock	Shock b ≤ 30 g, T ≤ 11 ms	Shock b ≤ 30 g, T ≤ 11 ms
and vibration loading	Vibration f ≤ 55 Hz, a ≤ 1 mm	Vibration f ≤ 55 Hz, a ≤ 1 mm
Connection	Connector M12	2m cable PUR black, 3 x 0.14 mm^2
Housing material	Nickel plated brass	PBT (Crastin)
Weight	45 g	20 g
In compliance with	EN 60 947-5-2	EN 60 947-5-2
Drawing No.	CO000001	CO000003

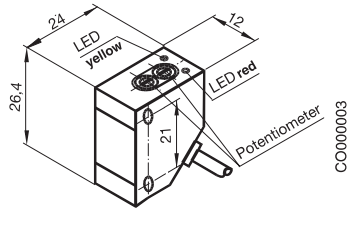
Wiring diagrams

Diffused







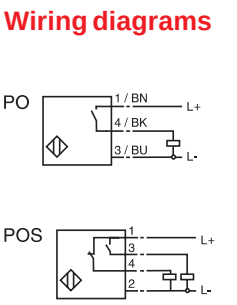


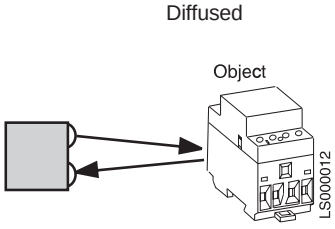
Photoelectric Sensors: Diffused Mode
Block ∅40 mm, 75 mm
Technical Data

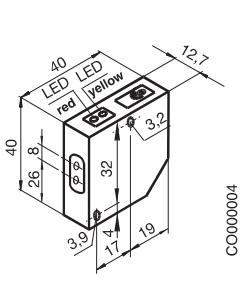
Size

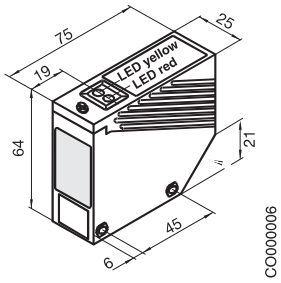
Model	SOD300-B40N-V2-PO (Bracket included, SOD300-B40N-C8-PO phased out in 2001)	SOD800-B75N-T-POS (Bracket included)
Sensing Range	**300 mm**	**800 mm**
Output	**DC, PNP**	**DC, PNP**
Operating Specifications		
Polarized	no	no
Reference	white 100mm x 100mm	white 200mm x 200mm
Range setting	with potentiometer	with potentiometer
Switching frequency (1:1)/Response time	200 Hz / ≤ 2.5 ms	300 Hz / ≤ 15 ms
Readiness delay	≤ 20 ms	≤ 50 ms
Range hysteresis	≤ 15 %	≤ 15 %
Detectable object:	opaque, mirror object	opaque, mirror object
Operating Specifications	Light ON	Light ON/dark ON, selectable by potentiom.
LED yellow	Output status	Output status
LED red	Weak signal indication	Weak signal indication
Type of light	IR light 950 nm	Red light 940 nm
Ambient light limit		
Daylight / halogen light	≤ 20 000 Lux / ≤ 5 000 Lux	≤ 10 000 Lux / ≤ 7 500 Lux
Operating temperature	-25°C ... +70°C	-25°C ... +55°C
Storage temperature	-40°C ... +80°C	-40°C ... +55°C
Electrical ratings		
Supply Voltage	10 VDC ... 30 VDC, ripple 10%$_{pp}$	10 VDC ... 30 VDC, ripple 10%$_{pp}$
No load supply current	≤ 25 mA	≤ 35 mA
Switch output	Normally open	Normally closed/Normally open
Rated operational current	200 mA	200 mA
Voltage drop	≤ 1.5 V	≤ 3 V
Stability control output	-	Normally open
Rated operational current	-	10 mA
Short circuit and overload protection	yes	yes
Reverse polarity protection	yes	yes
Mechanical data		
Protection class to EN / IEC	IP 67	IP 66
Optical	2-lens-System glass	PMMA lens
Permissible shock	Shock b ≤ 30 g, T ≤ 11 ms	Shock b ≤ 30 ≤, T ≤ 11 ms
and vibration loading	Vibration f ≤ 55 Hz, a ≤ 1mm	Vibration f ≤ 55 Hz, a ≤ 1mm
Connection	2m, 3 x 0.14mm². PVC cable Connector M8	Terminal compartment, cable ø 10 mm
Housing material	PBT (Crastin)	PBT (Crastin)
Weight	55 g	100 g
In compliance with	EN 60 947-5-2	EN 60 947-5-2
Drawing No.	CO000004	CO000006

Wiring diagrams





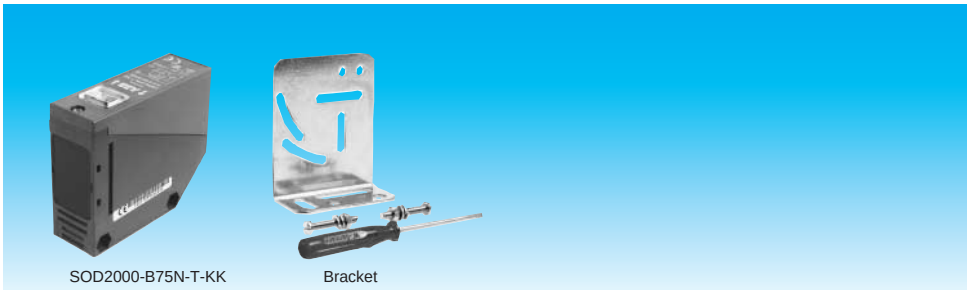




Photoelectric Sensors: Diffused Mode
Block ∅75 mm
Technical Data

Size

B75

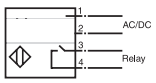


SOD2000-B75N-T-KK Bracket

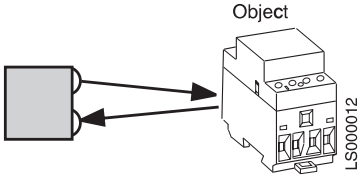
Model	**SOD2000-B75N-T-KK** (Bracket included)	
Sensing Range **Output**	**2 000 mm** **AC/DC, Relay**	
Operating Specifications Polarized Reference Range setting Switching frequency (1:1)/Response time Readiness delay Range hysteresis Detectable object:	 no white 200mm x 200mm with potentiometer 300 Hz / ≤ 1.5 ms ≤ 50 ms ≤ 15 % opaque, mirror object	
Operating Specifications LED yellow LED red Type of light Ambient light limit Daylight / halogen light	Light ON/dark ON, selectable by potentiom. Output status Weak signal indication IR light 940 nm ≤ 10 000 Lux / ≤ 7 500 Lux	
Operating temperature Storage temperature	-25°C ... +55°C -40°C ... +55°C	
Electrical ratings Supply Voltage No load supply current Switch output Output Relay Stability control output Rated operational current Short circuit and overload protection Reverse polarity protection	 12 VDC ... 240 VDC, ripple ±10%$_{pp}$ 24 VAC ... 240 VAC, ripple ±10%$_{pp}$ - Normally closed/Normally open 240 V AC max. 3 A 30 V DC max. 3 A - 200 mA yes yes	
Mechanical data Protection class to EN / IEC Optical Permissible shock and vibration loading Connection Housing material Weight In compliance with Drawing No.	 IP 66 PMMA lens Shock b ≤ 30 g, T ≤ 11 ms Vibration f ≤ 55 Hz, a ≤ 1mm Terminal compartment, cable max. ø 10 mm PBT (Crastin) 110 g EN 60 947-5-2 CO000006	

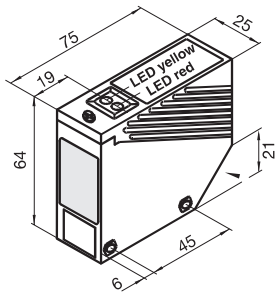
Wiring diagram

KK



Diffused





NEW

Photoelectric Sensors: Diffused Mode
Block ⌀ 45 mm
Technical Data

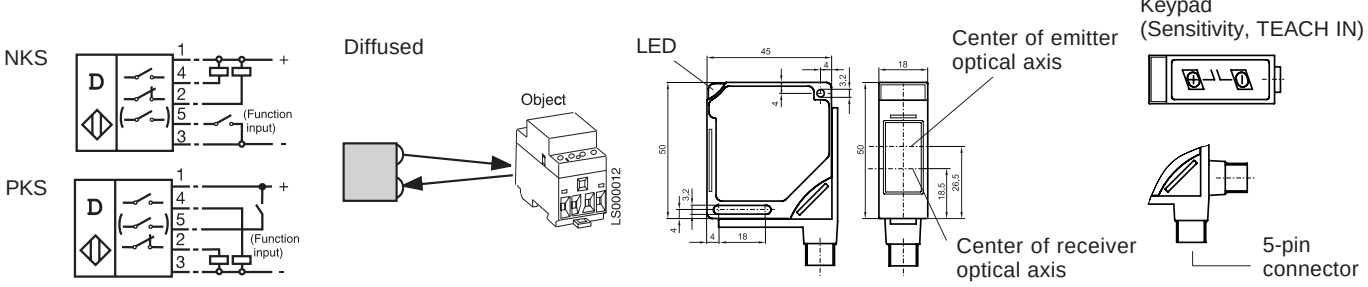
Size

B45

SOD500-B45N-C1-PKS

Model	SOD500-B45N-C1-PKS (Bracket included)	SOD500-B45N-C1-NKS (Bracket included)
Sensing Range	**0 mm ... 500 mm**	**0 mm ... 500 mm**
Output	**DC, PNP**	**DC, NPN**
Operating Specifications		
Reference	Standard white card 100 mm x 100 mm	Standard white card 100 mm x 100 mm
Sensitivity adjustment	- stepwise „+“ or „-“ buttons - automatic via „Teach in“	- stepwise „+“ or „-“ buttons - automatic via „Teach in“
Switching frequency (1:1)	1 k Hz	1 k Hz
Readiness delay	< 80 ms, with activation standardization	< 80 ms, with activation standardization
Distance hysteresis	programmable	programmable
Min. ON delay	≤ 3 ms	≤ 3 ms
LED yellow	Switch status	Switch status
LED red	Pre-fault indicator flashing at 2 Hz Keystroke response 65 ms Error display in teach mode 1.5 s	Pre-fault indicator flashing at 2 Hz Keystroke response 65 ms Error display in teach mode 1.5 s
LED green	Power-ON Indicator in teach mode flashing at 2 Hz or 4 Hz	Power-ON Indicator in teach mode flashing at 2 Hz or 4 Hz
Type of light	Visible red light	Visible red light
Ambient light limit Daylight / halogen light	≤ 10.000 Lux / ≤ 7.500 Lux	≤ 10.000 Lux / ≤ 7.500 Lux
Operating temperature	-25°C ... +70°C	-25°C ... +70°C
Storage temperature	-40°C ... +75°C	-40°C ... +75°C
Electrical ratings		
Supply Voltage	10 VDC ... 30 VDC, ripple ±10%	10 VDC ... 30 VDC, ripple ±10%
Current consumption	≤ 25 mA	≤ 25 mA
Switch output	PNP, programmable: - antivalent - Switch output (NO/NC) and pre-fault indicator	NPN, programmable: - antivalent - Switch output (NO/NC) and pre-fault indicator
Rated operational current	200 mA	200 mA
Voltage drop	≤ 2.5 V	≤ 2.5 V
Control / test input	Inactive ≤ 2 V, active ≥ 7 V	Inactive ≤ 2 V, active ≥ 7 V
Internal resistance	> 12 kΩ	> 12 kΩ
ON / OFF delay	< 3 ms	< 3 ms
Short circuit and overload protection	yes	yes
Reverse polarity protection	yes	yes
Mechanical data		
Protection class to IEC 60 529	IP 67	IP 67
Optical	PMMA 2 lens system	PMMA 2 lens system
Permissible shock and vibration loading	b ≤ 30 g, T ≤ 11 ms f ≤ 55 Hz, a ≤ 1 mm	b ≤ 30 g, T ≤ 11 ms f ≤ 55 Hz, a ≤ 1 mm
Connection	C1-connector, 5-pin, adjustable to 90°	C1-connector, 5-pin, adjustable to 90°
Material front lens	Scratch resistant plastic lens	Scratch resistant plastic lens
Housing material	PBT	PBT
Weight	60 g	60 g
In compliance with	EN 60 947-5-2	EN 60 947-5-2

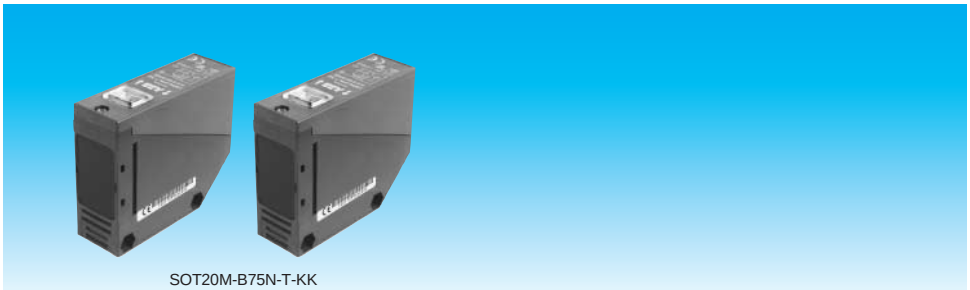
Wiring diagrams



Photoelectric Sensors: Through-Beam Mode
Block ∅75 mm
Technical Data

Size

B75

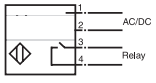


SOT20M-B75N-T-KK

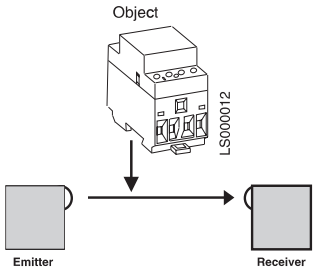
Model	**SOT20M-B75N-T-KK** (Bracket included)	
Sensing Range **Output**	**0 ... 20 m** **AC/DC, Relay**	
Operating Specifications Polarized Reference Range setting Switching frequency (1:1)/Response time Readiness delay Range hysteresis Detectable object:	 no Thru-beam, Receiver with potentiometer 25 Hz / ≤ 20 ms ≤ 50 ms – opaque, mirror object	
Operating Specifications LED yellow (Receiver) LED red (Receiver) / (Emitter) Type of light Ambient light limit Daylight / halogen light	Light ON/dark ON, selectable by potentiom. Output status Weak signal indication IR light 940 nm ≤ 10 000 Lux / ≤ 7 500 Lux	
Operating temperature Storage temperature	-25°C ... +55°C -40°C ... +55°C	
Electrical ratings Supply Voltage No load supply current Switch output Output Relay Stability control output Rated operational current Short circuit and overload protection Reverse polarity protection	 12 VDC ... 240 VDC, ripple ±10%$_{pp}$ 24 VAC ... 240 VAC, ripple ±10%$_{pp}$ - Normally closed/Normally open 240 V AC max. 3 A 30 V DC max. 3 A - 200 mA yes yes	
Mechanical data Protection class to EN / IEC Optical Permissible shock and vibration loading Connection Housing material Weight In compliance with Drawing No.	 IP 66 PMMA lens Shock b ≤ 30 g, T ≤ 11 ms Vibration f ≤ 55 Hz, a ≤ 1mm Terminal compartment, cable max. ø 10 mm DBT (Crastin) 90 g (Emitter), 100 g (Receiver) EN 60 947-5-2 CO000006	

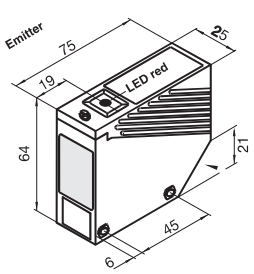
Wiring diagram

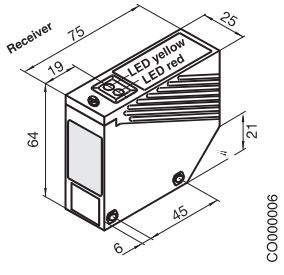
KK



Through-Beam







CO000006

NEW

Photoelectric Sensors: Through-Beam Mode
Block ⌀ 45 mm
Technical Data

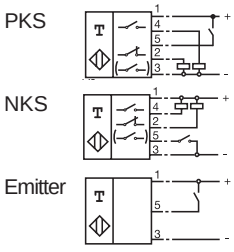
Size

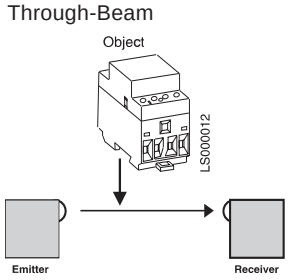
B45

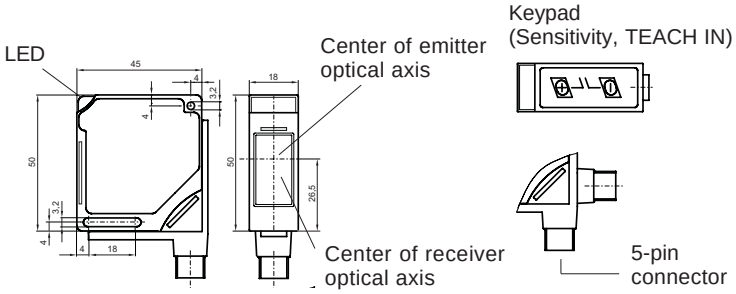
SOT15M-B45N-C1-PKS

Model	SOT15M-B45N-C1-PKS (Bracket included)	SOT15M-B45N-C1-NKS (Bracket included)
Sensing Range	**2 m ... 15 m**	**2 m ... 15 m**
Output	**DC, PNP**	**DC, NPN**
Operating Specifications		
Light spot diameter	500 mm at a distance of 15 m	500 mm at a distance of 15 m
Reference	Standard white card 100 mm x 100 mm	Standard white card 100 mm x 100 mm
Sensitivity adjustment	- stepwise „+“ or „-“ buttons - automatic via „Teach in“	- stepwise „+“ or „-“ buttons - automatic via „Teach in“
Switching frequency (1:1)	1 k Hz	1 k Hz
Readiness delay	< 400 ms, with activation standardization	< 400 ms, with activation standardization
Max. ON delay	≤ 3 ms	≤ 3 ms
LED yellow	Switch status	Switch status
LED red	Pre-fault indicator flashing at 2 Hz Keystroke response 65 ms	Pre-fault indicator flashing at 2 Hz Keystroke response 65 ms
LED green	Power-ON-Indicator (only Emitter) Indicator in teach mode flashing at 2 Hz or 4 Hz	Power-ON-Indicator (only Emitter) Indicator in teach mode flashing at 2 Hz or 4 Hz
Type of light	Visible red light 660 nm	Visible red light 660 nm
Ambient light limit		
Daylight / halogen light	≤ 10.000 Lux / ≤ 7.500 Lux	≤ 10.000 Lux / ≤ 7.500 Lux
Operating temperature	-25°C ... +70°C	-25°C ... +70°C
Storage temperature	-40°C ... +75°C	-40°C ... +75°C
Electrical ratings		
Supply Voltage	10 VDC ... 30 VDC, ripple ±10%	10 VDC ... 30 VDC, ripple ±10%
Current consumption	≤ 25 mA each	≤ 25 mA each
Switch output	PNP, programmable: - antivalent - Switch output (NO/NC) and pre-fault indicator	NPN, programmable: - antivalent - Switch output (NO/NC) and pre-fault indicator
Rated operational current	200 mA	200 mA
Voltage drop	≤ 2.5 V	≤ 2.5 V
Control / test input	Inactive ≤ 2 V, active ≥ 7 V	Inactive ≤ 2 V, active ≥ 7 V
Internal resistance	> 12 kΩ	> 12 kΩ
ON / OFF delay	< 3 ms	< 3 ms
Short circuit and overload protection	yes	yes
Reverse polarity protection	yes	yes
Mechanical data		
Protection class to IEC 60 529	IP 67	IP 67
Optical	PMMA 2 lens system	PMMA 2 lens system
Permissible shock and vibration loading	b ≤ 30 g, T ≤ 11 ms f ≤ 55 Hz, a ≤ 1 mm	b ≤ 30 g, T ≤ 11 ms f ≤ 55 Hz, a ≤ 1 mm
Connection	C1-connector, 5-pin, adjustable to 90°	C1-connector, 5-pin, adjustable to 90°
Material front lens	Scratch resistant plastic lens	Scratch resistant plastic lens
Housing material	PBT	PBT
Weight	60 g each housing	60 g each housing
In compliance with	EN 60 947-5-2	EN 60 947-5-2

Wiring diagrams







Photoelectric sensors: Fibre-optic
For use with glass fibre-optic cables
Technical Data

Size

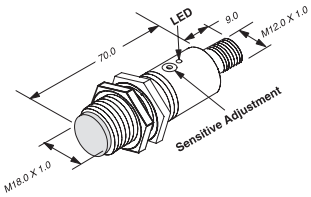
M12 x 1

SOLX-M18N-C1-PO

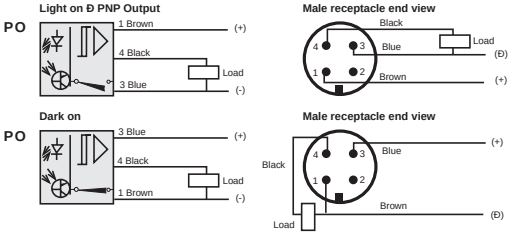
Model		SOLX-M18N-C1-PO
Sensing range		
Diffuse Models		
SOLD45-M18N-GMM8	mm	45
SOLD100-M18N-GVM8	mm	100
Through-beam Models		
SOLT700-M18N-GMM8	mm	250
SOLT700-M18N-GVM8	mm	250
Output		PNP, Sourcing
Range adjustment		With potentiometer
Switching frequency	Hz	300
Response time	ms	1.5
Readiness delay	ms	50
Operating mode		Light On/Dark On
LED		
Yellow		Output status
Type of light	nm	IR LED 940
Ambient light limit		
Daylight	Lux	10.000
Halogen light	Lux	3000
Electrical ratings		
Supply voltage	VDC	10 – 30
Current consumption	mA	40
Load current	mA	100
Voltage drop	VDC	1.0
Short circuit		
and overload protection		yes
Reverse polarity protection		yes
Mechanical data		
Protection IEC		IP66
Housing		Nickel-plated brass
Housing diameter	mm	18
Operating temperature	°C	-25 … +55
Storage temperature	°C	-40 … +70
Weight	g	45
Connection		Connector M12
In compliance with		EN60947-5-2

Diffused

Through-beam

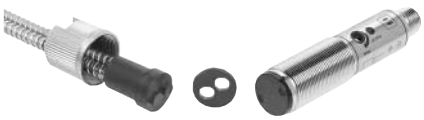


Wiring diagrams



Attaching fibre-optic glass cable

1. Position mounting plate on sensor such that the alignment tabs fit into the lens holes.



2. With the fibre-optic cable pulled through the metal capnut opening, position the cable on the mounting plate.

3. Hand tighten the metal capnut on sensor.

Photoelectric sensors: Fibre-optic
For use with glass fibre-optic cables
Technical Data

Size

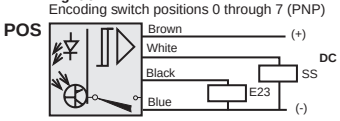
B50

SOLX-B50N-U2-POS

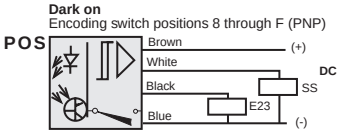
Model		**SOLX-B50N-U2-POS**
Sensing range		
Diffuse Models		
SOLD15-B50N-PVM3	mm	15
SOLD50-B50N-PVM6	mm	50
Through-beam Models		
SOLT150-B50N-PVM3	mm	150
SOLT150-B50N-PVM4	mm	150
Output		PNP, Sourcing
Range adjustment		With potentiometer
Switching frequency	Hz	200 Hz/1500
Response time	ms	2.5 ms/0.3
Readiness delay	ms	20
Operating mode		Light On/Dark On
LED		
Yellow		Output status
Red		Weak signal
Green		Power
Type of light	nm	Red LED 660
Ambient light limit		
Daylight	Lux	40.000
Halogen light	Lux	30.000
Electrical ratings		
Supply voltage	VDC	10 – 30
Current consumption	mA	35
Load current	mA	150
Voltage drop	VDC	2.5
Short circuit		
and overload protection		yes
Reverse polarity protection		yes
Mechanical data		
Protection IEC		IP63
Housing		Crastin
Operating temperature		
Amplifier	°C	-25 … +70
Fibre-optic cable	°C	-40 … +80
Storage temperature	°C	-40 … +80
Mounting		35mm DIN Rail
Weight	g	80
Connection		2m cable, PUR
In compliance with		EN60947-5-2

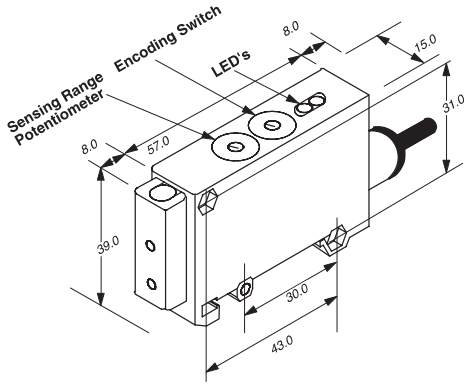
Wiring diagrams

Light on
Encoding switch positions 0 through 7 (PNP)



Dark on
Encoding switch positions 8 through F (PNP)





Programmable via encoding switch

Switch output: norm.open/norm.closed

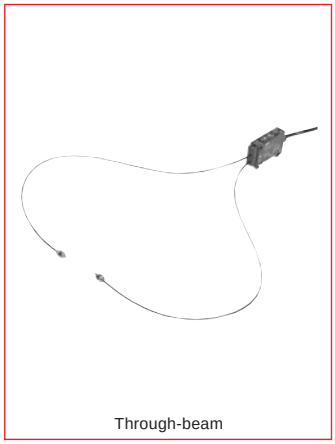
Pulse frequency: Freq.1/Freq.2

Pulse prolongation: 0 ms/20 ms

Switching rate: 200 Hz/1.5 kHz

Code switch	Signal on when	Pulse frequency	Pulse frequency	Switching rate
0	light	1	0 ms	200 Hz
1	light	1	0 ms	1.5 kHz
2	light	1	20 ms	200 Hz
3	light	1	20 ms	1.5 kHz
4	light	2	0 ms	200 Hz
5	light	2	0 ms	1.5 kHz
6	light	2	20 ms	200 Hz
7	light	2	20 ms	1.5 kHz
8	dark	1	0 ms	200 Hz
9	dark	1	0 ms	1.5 kHz
A	dark	1	20 ms	200 Hz
B	dark	1	20 ms	1.5 kHz
C	dark	2	0 ms	200 Hz
D	dark	2	0 ms	1.5 kHz
E	dark	2	20 ms	200 Hz
F	dark	2	20 ms	1.5 kHz

Diffused



Through-beam

Fibre-optic cable for type B50N: Plastic

Fibre-optic cables come standard in 2m lengths. A cutting tool is included with each cable to cut the cable to desired length.

Fibre-optic cable — Diffuse mode:

SOLD50-B50N-PVM6

Nominal distance 50mm

Typical distance: 90mm

Reference: 50mm x 50mm white target

SOLD15-B50N-PVM3

Nominal distance 15mm

Fibre-optic cable — Through-beam mode:

SOLT150-B50N-PVM4

Nominal distance 150mm

SOLT150-B50N-PVM3

Nominal distance 150mm

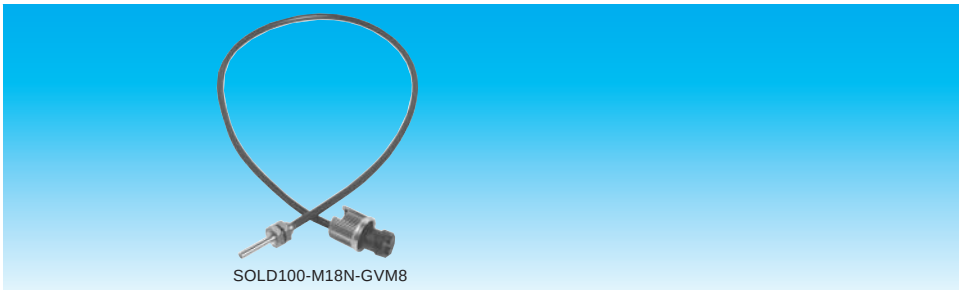
Mounting instructions

The 35mm DIN mounting rail provides an easy method for mounting ABB sensing amplifiers.

1. Latch the amplifier unit onto DIN rail

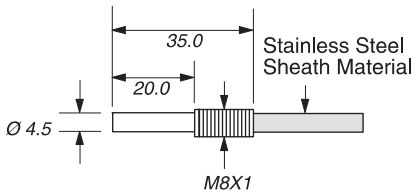
2. Push the amplifier downwards until it secures

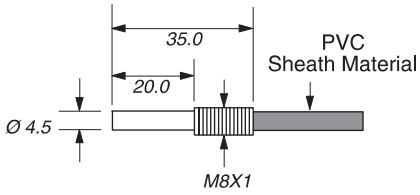
Size

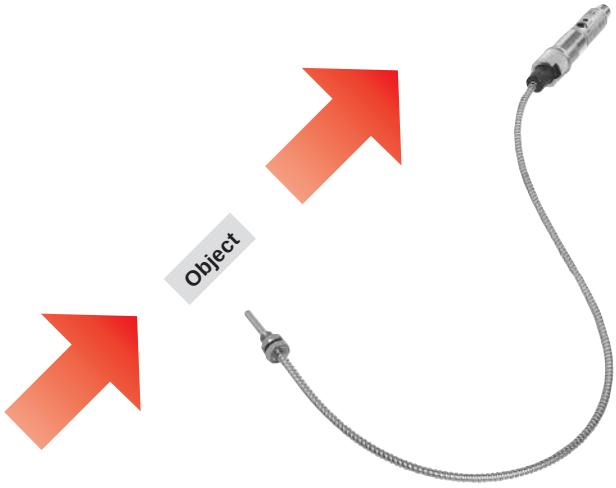

SOLD100-M18N-GVM8

Model		SOLD45-M18N-GMM8	SOLD100-M18N-GVM8
Sensing range		**45mm**	**100mm**
Mode		Diffused	Diffused
Cable length	mm	500	500
Sheath material		Stainless steel	PVC
Temperature	°C	-58 ... +572	-58 ... +248
Bending radius	mm	>20	>30
Protection IEC		IP40	IP67

These glass Fibre-optic cables are used with model SOLX-M18N-V2-PO





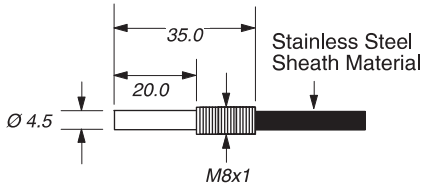


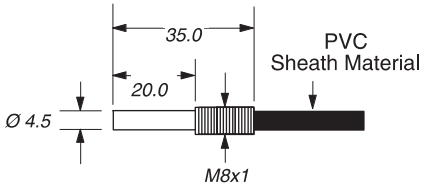
Diffused

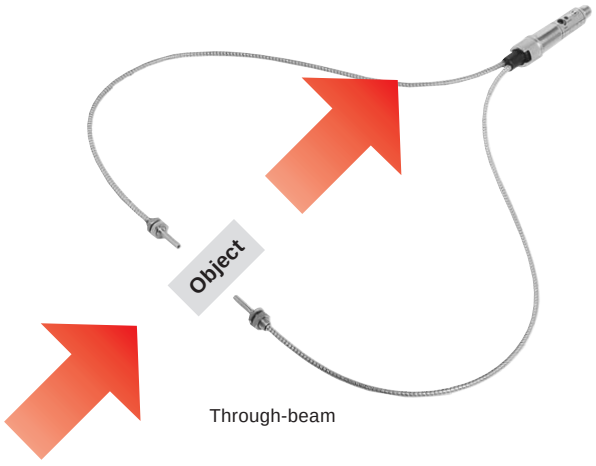
SOLT700-M18N-GVM8

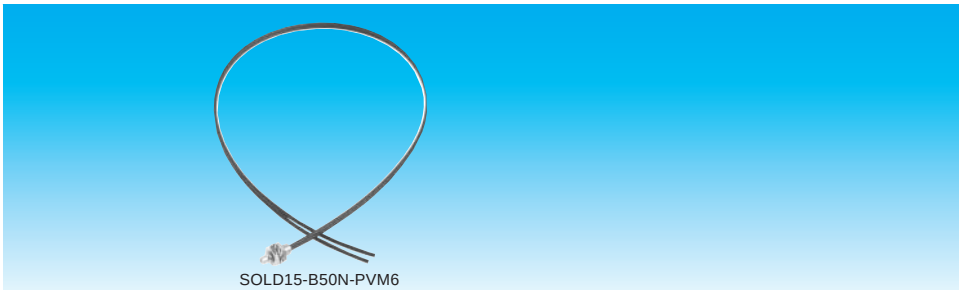
Model		SOLT700-M18N-GMM8	SOLT700-M18N-GVM8
Sensing range		**700mm**	**700mm**
Mode		Through-beam	Through-beam
Cable length	mm	500	500
Sheath material		Stainless steel	PVC
Temperature	°C	-58 … +572	-58 … +248
Bending radius	mm	>20	>30
Protection IEC		IP40	IP67

These glass Fibre-optic cables are used with model SOLX-M18N-V2-PO





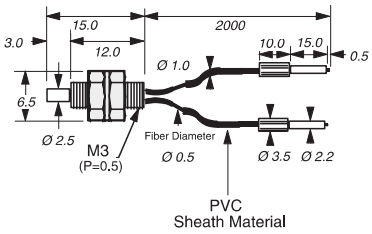


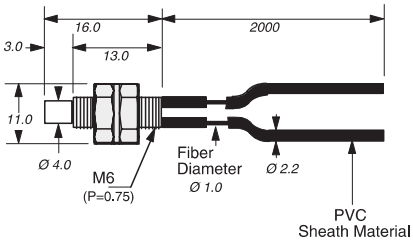


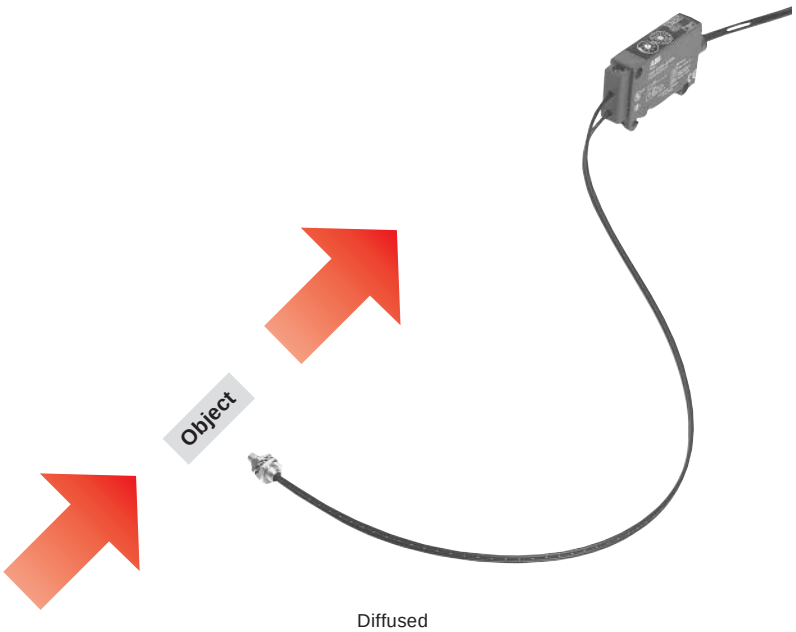
SOLD15-B50N-PVM6

Model		SOLD15-B50N-PVM3	SOLD50-B50N-PVM6
Sensing range		**15mm**	**50mm**
Mode		Diffused	Diffused
Cable length	m	2①	2①
Temperature	°C	-40 … +158	-40 … +158
Smallest detectable target	mm	.5 x .5	1 x 1

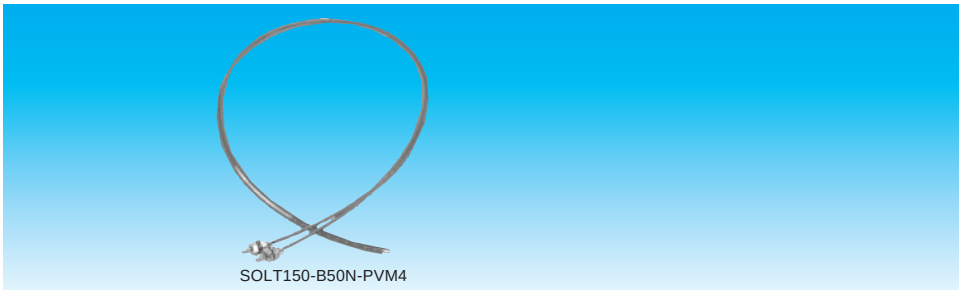
These plastic Fibre-optic cables are used with model SOLX-B50N-U2-POS







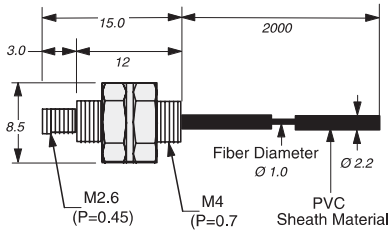
Diffused

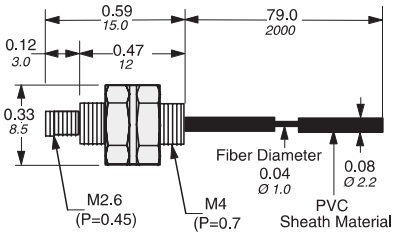


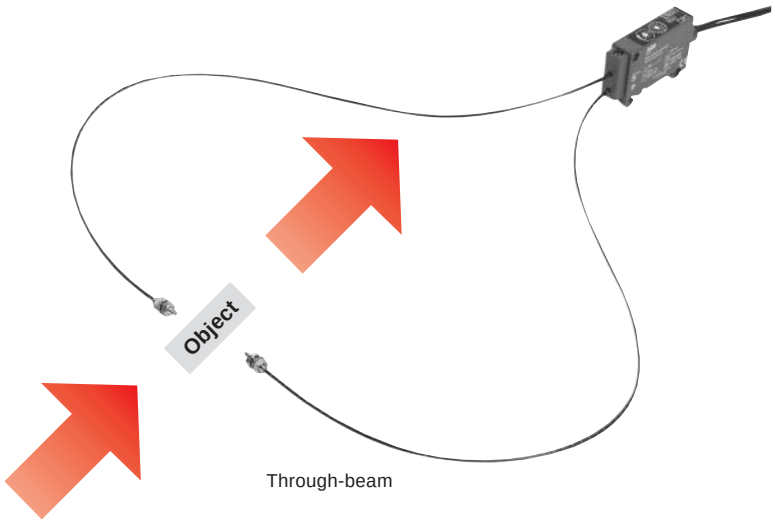
SOLT150-B50N-PVM4

Model		SOLT150-B50N-PVM4	SOLT150-B50N-PVM3	
Sensing range		**150mm**	**150mm**	
Mode		Through-beam	Through-beam	
Cable length	m	2①	2①	
Temperature	°C	-40 ... +158	-40 ... +158	
Smallest detectable target	mm	1x 1	1 x 1	

These plastic Fibre-optic cables are used with model SOLX-B50N-U2-POS

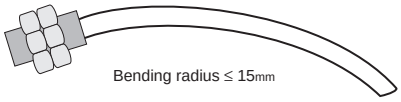




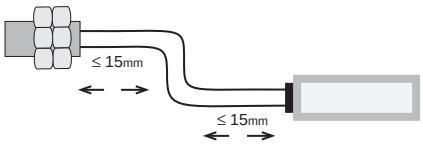


Mounting and adjustment

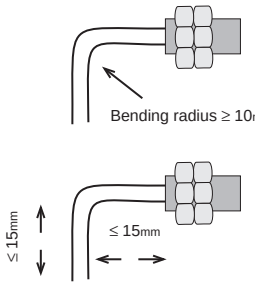
When laying and routing plastic Fibre-optic cables, the minimum bending radius of 15mm must be unconditionally maintained.



There must not be any bends for a distance of 15mm from both the sensor and the Fibre-optic cable head. Should it be necessary to bend the stainless steel head ferrule, a minimum bending radius of 10mm must be strictly adhered to.

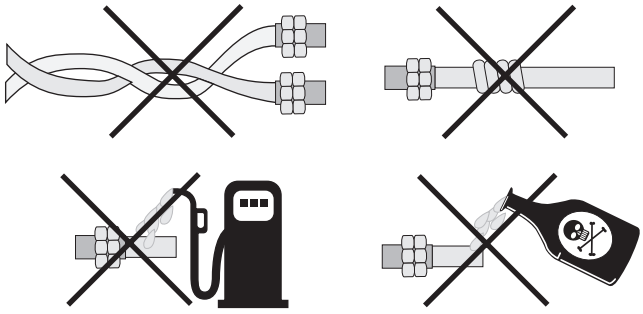


The Fibre-optic cable should not be bent within 15mm of the end of the covering and the head. Damage to the Fibre-optic cable may result if this is not observed.



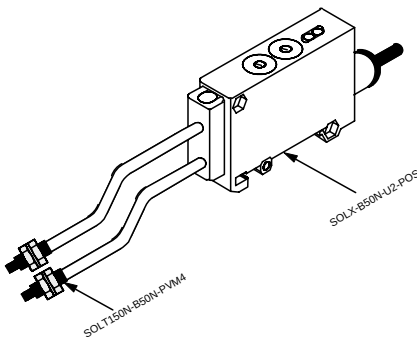
Caution!

Fibre-optic cables must not be twisted or kinked and excessive tensile loads will lead to destruction. Contact with gasoline or organic solvents must be prevented.

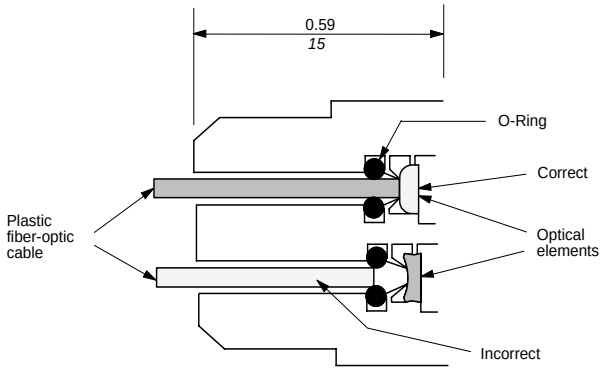


Connection to photoelectric sensor SOLX-B50N-U2-POS

Insert the Fibre-optic cable into the opening in the sensor until some resistance is felt (O-ring). Push the Fibre-optic cable further into the sensor until the end is up against the optical element. Tighten the screw to fix the Fibre-optic cable in position. The sensor/cable assembly is now ready for use.



Dimensions are approximate

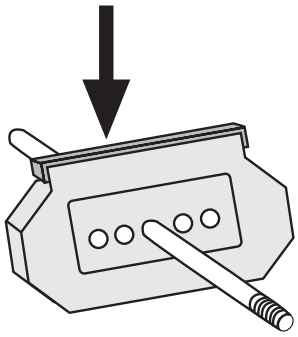


Connection to photoelectric sensor

Cutting to length

Plastic Fibre-optic cables can be cropped to any desired length using the supplied disposable cutter.

Important: Each cutting position can be used once only.



Cutter

Ultrasonic Sensors
Discrete output
Analogue output

General information

- Switch or analogue outputs
- Sensing distances up to 6m
- Stainless steel housing
- Quick disconnect

Ultrasonic Sensors

Ultrasonic sensors
Description

Applications

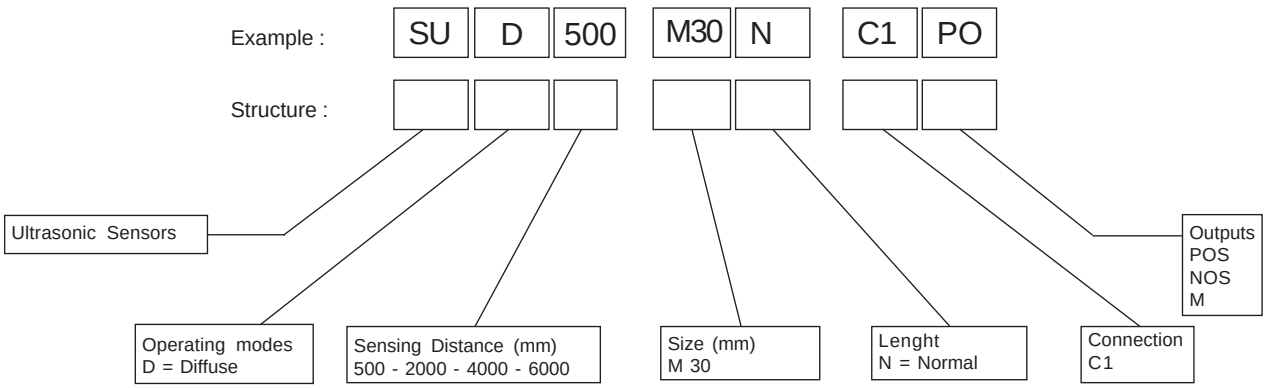
Ultrasonic sensors, with their special characteristics, provide the possiblity for new appications in the field of position detection. They detect objects independently of their colour, in particular if these objects are aligned perpendicularly with respect to the sensor axis or have a rough surface. They clean themselves if deposits occur on the measuring head, and operate with temperature compensation in order to compensate for the differing speed of sound at varying temperature. They can also be used to detect objects not easily accessible because the ultrasonic signal can be deflected accordingly with a reflector.

Description

The Ultrasonic sensors are available in 1 housing :

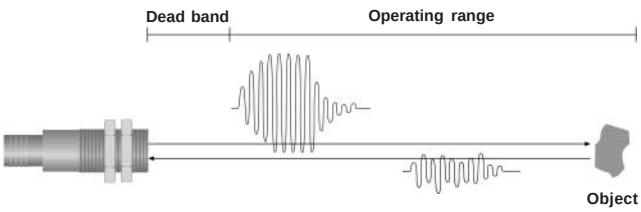
Cylindrical Housing Ø 30
Different heads depending on the sensing distance

Part Nº Structure



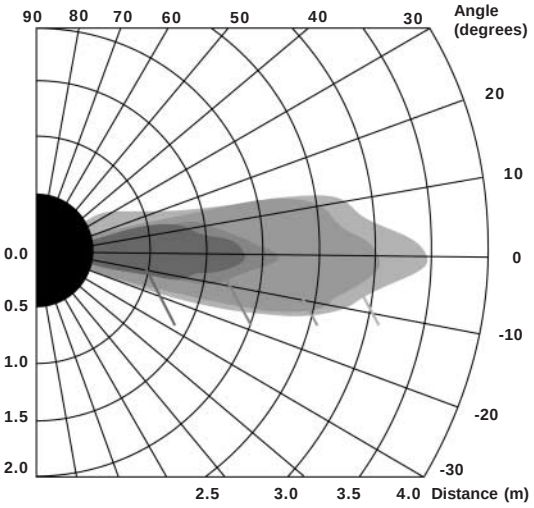
Basic Mode of Operation

Ultrasonic sensors operate in diffuse mode. An ultrasonic transducer summits and receives the ultrasonic signals. Within a stipulated distance range, the incoming echo is checked, the time taken for the sound to travel the distance is determined and a corresponding output signal is emitted. If the distance between sensorand object is too small, the echo arrives before the ultrasonic transducer has reached steady state and is ready to receive. Objects in this dead band cannot be detected reliably.



Sound cone and response curve

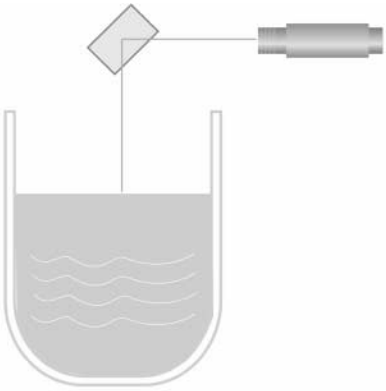
Objects may be moved towards the ultrasonic sensor either frontally or from the side. If it has a smooth surface, the objectmust enter the sensor's range perpendiculary with respected to the sensor axis. If its position deviates from this axis, the results in a so-called sound cone as a function of response distance to angle. The minimum size of the object also determines its nature and surface. This means that different sound cones result for different objects and sensors with a longer range require larger objects.



Response curve of the sensor
SUD2000-M30N-C1-POS for :
A: Level target, 700 x 700 mm
B: Level target, 100 x 100 mm
C: Felt tube ∅ 16 mm
D: Round bar smooth ∅ 25 mm

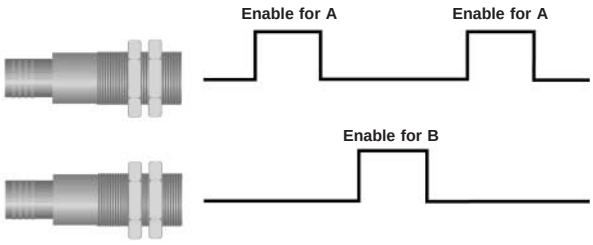
Deflecting and Beaming

One special aspect of the ultrasonic technique is the capability of deflecting sound with smooth reflectors. This allows the level of an agressive fluid to be measured for instance. By contrast, meauring errors occur if the sound is to be beamed r deflected with smooth tubes for instance.



Mutual interaction

Neighbouring ultrasonic sensors influence each other mutually, and the extent of this influence can generally be determined only experimentally. The sync. Input with which the measurement operation can be disabled alternately offers one advantageous solution.the disable times must be selected depending on the times taken for the sound to travel the distance.



To set the switching points:

The ultrasonic sensor is provided with a switching output with two teachable switch points. These are set up by applying the supply voltage $-U_B$ or $+U_B$ to the teaching input. The supply voltage should be applied to the teaching input for at least 1 s. During the teaching process the LED's indicate whether the sensor has recognised the target. The switch points A1 and A2 are taught by voltage $-U_B$ and $+U_B$ respectively

Five functions can be set:

1. Window mode, normally open function
2. Window mode, normally closed function
3. One switch point, normally open function
4. One switch point, norm. closed function
5. Detection of presence of object

1. Teach window operation, normally open function

- Set target at near switch point
- Teach switch point A1 with $-U_B$
- Set target at far switch point
- Teach switch point A2 with $+U_B$

2. Teach window operation, normally closed function

- Set target at near switch point
- Teach switch point A2 with $+U_B$
- Set target at far switch point
- Teach switch point A1 with $-U_B$

3. Teach one switch point, normally open function

- Set target at near switch point
- Teach switch point A2 with $+U_B$
- Cover sensor with the palm of the hand, or remove all objects from the detection range of sensor.
- Teach switch point A1 with $-U_B$

4. Teach one switch point, normally closed function

- Set target at near switch point
- Teach switch point A1 with $-U_B$
- Cover sensor with the palm of the hand, or remove all objects from the detection range of sensor.
- Teach switch point A2 with $+U_B$

5. Teach detection of presence of object

- Cover sensor with the palm of the hand, or remove all objects from the detection range of sensor.
- Teach switch point A1 with $-U_B$
- Teach switch point A2 with $+U_B$

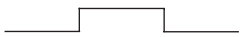
Presetting of the switch points:

A1: Near range
A2: Nominal range
Note: A programming unit SZP > PROG is obtainable for the basic setting of the switch points and output functions.

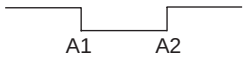
Operating condition-Indications	LED green	LED red	LED yellow
Switch point teaching			
Object detected	flashing	off	off
No object detected	flashing	off	on
Object uncertain (teaching invalid)	off	flashing	off
Normal operation	on	off	switch condition
Interference (e.g. comp. air)	off	flashing	last condition

Programmed switching output function

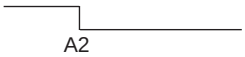
Window operation, normally open function
A1 < A2:



Window operation, normally closed function
A2 < A1:



One switch point, normally open function
A1 – i :



One switch point, normally closed function
A2 – i :

Synchronisation:

In order to suppress mutual interference, the sensor operates via one sychronised input. If the input is unswitched, the sensor operates at an internally generated pulse rate. The sensor can be synchronised by the super position of the square-shaped voltage. One synchronising pulse at the synchronisation input enables one measuring cycle to be completed. The pulse width must be greater than 100 µs. The measuring cycle compences with the descending flank. The state of the switching output changes after the switching threshold has been exceeded five times, as determined internally by five measurements. A low level ≥ 1 s, or an open synchronisation input results in normal operation of the sensor. Synchronisation cannot take place during teaching and vice versa.

Two operating modes are possible:

1. Multiple sensors are controlled with the same synchronising signal. The sensors operate on the same pulse.
2. The synchronising pulses are fed cyclically to only one sensor at a time. The sensor operate in multiplex mode. A high level at the synchronisation input deactivates the sensor.

To set the function

These ultrasonic sensors are equipped with a four pin temperature / programming plug which can be inserted in 4 directions

that have the following function:

A1	Program evaluation limit A1
A2	Program evaluation limit A2
E2/E3	Changeover between falling / rising slope
T	Temperature compensation (Normal operation)

Programming

Only possible under following conditions:
- The programming plug is not inserted
- Less than 5 min after power on. After this time the sensor works without temperature compensation.

Programming procedure:
- Switch power supply off
- Switch power supply on (Reset)

Evaluation limit A1 or A2
- Position target at A1 or A2
- Insert programming plug at position A1 or A2 respective
- Green LED flashes when targed is recognized
- Remove programming plug (saving of the target position)

Output function
- Insert programming plug in position E2 / E3: Changes output from falling to rising edge or vice versa
- The yellow LEDs indicate the output function: E2: Falling slope E3: Rising slope
- Remove programming plug

Temperature compensation

Insert programming plug in position T.

***) Resolution:**

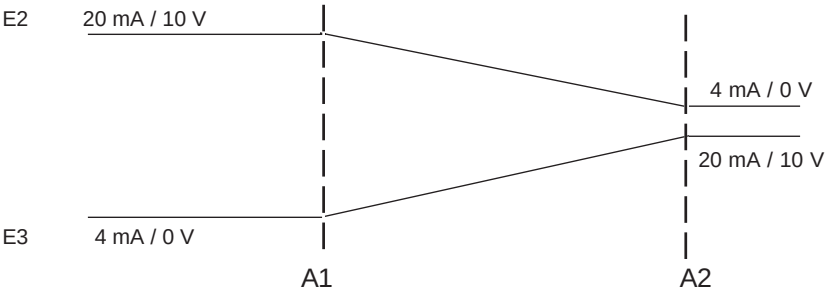
The propagation time is measured within the sensors with a resolution of 1 µs (corresp. to approx. 0.172 mm).
The highest resolution is 0.172 mm is achieved when the difference between evaluation limits A1 and A2 is less than 705 mm (4096x0.172 mm).
For larger ranges the resolution is (A2-A1) / 4096 (A2, A1 in mm).

LED-Indicators

Displays depending upon programming plug position	DuaL LED Green	Dual LED Red	Yellow LED A1	Yellow LED A2
Program evaluation limit 1				
Object detected	Flashing	Off	Flashing	Off
Object not detected	Off	Flashing	Flashing	Off
Program evaluation limit 2				
Object detected	Flashing	Off	Off	Flashing
Object not detected	Off	Flashing	Off	Flashing
Program fslope				
Falling slope	ON	OFF	Flashing	OFF
Rising slope	ON	OFF	OFF	Flashing
Normal operation with Temperature compensation	ON	OFF	ON/OFF 1)	ON/OFF 1)
Programming plug removed or shortet out	OFF	ON	ON/OFF 1)	ON/OFF 1)
Disturbance (e.g. compressed air)	OFF	Flashing	Last status	Last status

1) ON: Object in evaluation range, OFF: No object in evaluation range

Analog output in accordance with E2/E3 programming:



near distance of evaluation — far distance of evaluation

Ultrasonic Sensors: Discrete Output
Cylindrical ∅30 mm
Technical Data

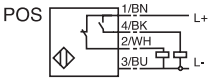
Size

M30 x 1.5

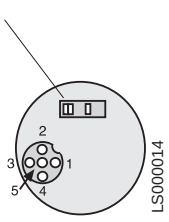
SUD500-M30N-C1-POS

Model	SUD500-M30N-C1-POS	... NOS	SUD2000-M30N-C1-POS	... NOS
Sensing range **Output**	**60 mm ...500 mm** **PNP, programmable**	**... NPN**	**200 mm ...2000 mm** **PNP, programmable**	**... NPN**
Operating specifications				
Standard test target (min.flat surface) Beam divergence angle Transducer frequency	100 mm x 100 mm approx. 5° at -3 dB approx. 375 kHz		100 mm x 100 mm approx. 5° at -3 dB approx. 175 kHz	
Response time Hysteresis Reproducibility Temperature drift	approx. 38 ms ≤ 1 % of the set operating distance ≤ 1 % 0.2 % / K		approx. 145 ms ≤ 1 % of the set operating distance ≤ 1 % 0.2 % / K	
Electrical specifications				
Supply voltage U_B / ripple Reverse polarity protection Current consumption Switch output (PNP)	20 ... 30 VDC / +/- 10 % $_{pp}$ yes ≤ 60 mA 200 mA, U_B -3V circuit / overload proof		20 ... 30 VDC / +/- 10 % $_{pp}$ yes ≤ 60 mA 200 mA, U_B -3V circuit / overload proof	
Teaching input (2): Near switch point Far switch point	-U_B Near switch point +U_B Far switch point		-U_B Near switch point +U_B Far switch point	
Synchronisation input (5) for continuous measuring	≥ 1s low or not connected		≥ 1s low or not connected	
Synchronisation (used if 2 or more sensors) Measuring time / repetition rate Each sensor needs to change output signal Synchronisation pules / pause length Synchronisation levels (5) / Impedance	Starts with falling edge of the sync. input approx. 6.5 ms/ ≤ 13Hz 5 pulses / ≥ 60 ms ≥ 100 µs / ≥ 100 ms Low P. 0...1 V, High P. 5V ...+U_B approx. 27 kΩ		Starts with falling edge of the sync. input ≥ 25 ms / ≤ 3.4 Hz 5 pulses / ≥ 150 ms ≥ 100 µs / ≥ 100 ms Low P. 0...1 V, High P. 5V ...+U_B approx. 27 kΩ	
Indicators: LED green LED red LED yellow	"Power on", teaching funct., object detected "Fault", object uncertain Switching condition indicator teaching function, no object detected		"Power on", teaching funct., object detected "Fault", object uncertain Switching condition indicator teaching function, no object detected	
Mechanical Specifications				
Operating temperature range Storage temperature range Protection class to EN / IEC	-25°C ... +70°C -40°C ... +85°C IP 65		-25°C ... +70°C -40°C ... +85°C IP 65	
Housing material	303 Nickel plated brass		303 Nickel plated brass	
Transducer material	Epoxy resin / silica composite Polyurethane foam		Epoxy resin / silica composite Polyurethane foam	
Cover and head	PBT (Crastin)		PBT (Crastin)	
Permissible shock and vibration loading	b ≤ 30 g, T ≤ 11 ms f ≤ 55 Hz, a ≤ 1 mm		b ≤ 30 g, T ≤ 11 ms f ≤ 55 Hz, a ≤ 1mm	
Connection In compliance with Drawing No.	Connector M12 EN 60974-5-2 CU000001		Connector M12 EN 60974-5-2 CU000001	

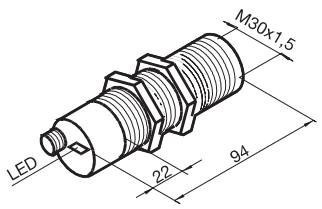
Wiring diagrams



Connector side of the sensor
LEDs: green / red / yellow



LS000014



CU000001

Ultrasonic Sensors: Discrete Output
Cylindrical ∅30 mm
Technical Data

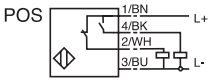
Size

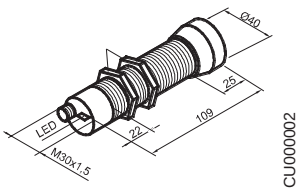
M30 x 1.5

SUD4000-M30N-C1-POS

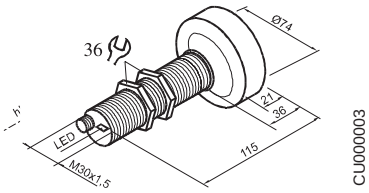
Model	SUD4000-M30N-C1-POS	...NOS	SUD6000-M30N-C1-POS	...NOS
Sensing range **Output**	**500 mm ... 4000 mm** **PNP, programmable**	**...NPN**	**800 mm ... 6000 mm** **PNP, programmable**	**...NPN**
Operating specifications				
Standard test target (min. flat surface) Beam divergence angle Transducer frequency	100 mm x 100 mm approx. 5 ° at -3 dB approx. 85 kHz		100 mm x 100 mm approx. 5° at -3 dB approx. 65 kHz	
Response time Hysteresis Reproducibility Temperature drift	approx. 280 ms ≤ 1 % of the set operating distance ≤ 1 % 0.2 % / K		approx. 480 ms ≤ 1 % of the set operating distance ≤ 1 % 0.2 % / K	
Electrical specifications				
Supply voltage U_B / ripple Reverse polarity protection Current consumption Switch output (PNP)	20 ... 30 VDC / +/- 10 % $_{pp}$ yes ≤ 60 mA 200 mA, U_B -3V short-circuit / overload proof		20 ... 30 VDC / +/- 10 % $_{pp}$ yes ≤ 60 mA 200 mA, U_B -3V short-circuit / overload proof	
Teaching input (2): Near switch point Far switch point	-U_B Near switch point +U_B Far switch point		-U_B Near switch point +U_B Far switch point	
Synchronisation input (5) for continuous measuring	≥ 1s low or not connected		≥ 1s low or not connected	
Synchronisation (used if 2 or more sensors) Measuring time / repetition rate Each sensor needs to change output signal Synchronisation pules / pause length Synchronisation levels (5) / Impedance	Starts with falling edge of the sync. input approx. 48 ms / ≤ 1.7 Hz 5 pulses / ≥265 ms ≥ 100 µs / ≥ 100 µs Low P. 0...1 V, High P. 5V ...+U_B approx. 27 kΩ		Starts with falling edge of the sync. input approx. 66 ms / ≤ 1.2 Hz 5 pulses / ≥ 355 ms ≥ 100 µs / ≥100 µs Low P. 0...1 V, High P. 5V ...+U_B approx. 27 kΩ	
Indicators: LED green LED red LED gelb	"Power on", teaching funct., object detected "Fault", object uncertain Switching condition indicator teaching function, no object detected		"Power on", teaching funct., object detected "Fault", object uncertain Switching condition indicator teaching function, no object detected	
Mechanical Specifications				
Operating temperature range Storage temperature range Protection class to EN / IEC	-25°C ... +70°C -40°C ... +85°C IP 65		-25°C ... +70°C -40°C ... +85°C IP 65	
Housing material	303 Nickel plated brass		303 Nickel plated brass	
Transducer material	Epoxy resin / silica composite Polyurethane foam		Epoxy resin / silica composite Polyurethane foam	
Cover and head	PBT (Crastin)		PBT (Crastin)	
Permissible shock Schwingbeanspruchung	b ≤ 30g, T ≤ 11 ms f ≤ 55Hz, a ≤ 1mm		b ≤ 30g, T ≤ 11 ms f ≤ 55Hz, a ≤ 1mm	
Connection In compliance with	Connector M12 EN 60974-5-2		Connector M12 EN 60974-5-2	
Drawing No.	CU000002		CU000003	

Wiring diagrams





CU000002



CU000003

Ultrasonic Sensors: Analogue Output
Cylindrical ∅30 mm
Technical Data

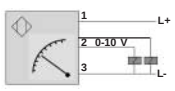
Size

M30 x 1.5

SUD2000-M30N-C1-M

Model	SUD500-M30N-C1-M	SUD2000-M30N-C1-M
Sensing range	**60 mm ...500 mm**	**200 mm ...2000 mm**
Output	**Analogue**	**Analogue**
Operating specifications		
Standard test target (min. flat surface)	100 mm x 100 mm	100 mm x 100 mm
Beam divergence angle	approx. 5° at -3 dB	approx. 5° at -3 dB
Transducer frequency	approx. 380 kHz	approx. 175 kHz
Response time	≤ 35 ms	≤ 100 ms
Resolution		
- Evaluation range < 705 mm	0.172 mm	0.172 mm
- Evaluation range □≥ 705 mm	Evaluation range (mm)/ 4096	Evaluation range (mm)/ 4096
Reproducibility	≤ 0.1 % of full scale	≤ 0.1 % of full scale
Linearity	≤ 0.1 % of full scale	≤ 0.1 % of full scale
Temperature drift	compensated (0.2 % / K without temp. compensation)	compensated (0.2 % / K without temp. compensation)
Electrical specifications		
Supply voltage U_B / ripple	10 ... 30 VDC / +/- 10 % $_{pp}$	10 ... 30 VDC / +/- 10 % $_{pp}$
Reverse polarity protection	yes	yes
Off-load power input P_L	≤ 800 mW	≤ 800 mW
Current output	4 mA ... 20 mA, R_L ≤ 500 Ω	4 mA ... 20 mA, R_L ≤ 500 Ω
Voltage output	0 V... 10 V, R_L ≥ 1000 Ω	0 V... 10 V, R_L ≥1000 Ω
Temperature / Memorising insert	Evaluation limits and output function (Falling, rising slope) are memorised by means of the temperture / memorising insert In normal operation, memorising insert must be in pos. T	Evaluation limits and output function (Falling, rising slope) are memorised by means of the temperture / memorising insert In normal operation, memorising insert must be in pos. T
Indicators:		
Dual-LED green	"Power on", teaching funct., object detected	Power on, teaching funct., object detected
red	"Fault", teaching funct., no object detected	"Fault", teaching funct., no object detected
LED yellow	Evaluation limit A1, falling slope	Evaluation limit A1, falling slope
LED yellow	Evaluation limit A2, rising slope	Evaluation limit A2, rising slope
Mechanical Specifications		
Operating temperature range	-25°C ... +70°C	-25°C ... +70°C
Storage temperature range	-40°C ... +85°C	-40°C ... +85°C
Protection class to EN / IEC	IP 65	IP 65
Housing material	Stainless steel	Stainless steel
Transducer material	Epoxy resin / hollow glass sphere mixture Polyurethane foam	Epoxy resin / hollow glass sphere mixture Polyurethane foam
Cover and head	PBT (Crastin)	PBT (Crastin)
Permissible shock and vibration loading	b ≤ 30 g, T ≤ 11 ms f ≤ 55 Hz, a ≤ 1mm	b ≤ 30 g, T ≤ 11 ms f ≤ 55 Hz, a ≤ 1mm
Connection	Connector M12	Connector M12
In compliance with	EN 60974-5-2	EN 60974-5-2
Drawing No.	CU000004	CU000004

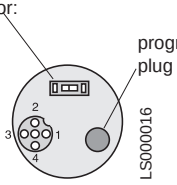
Wiring diagram

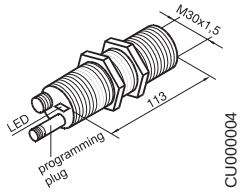


Connector side of the sensor:

LED's from left:

yellow:	limit A1
green:	power on
red:	disturbance
yellow:	limit A2





Ultrasonic Sensors: Analogue Output
Cylindrical ∅30 mm
Technical Data

Size

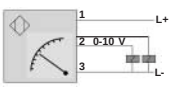
M30 x 1.5

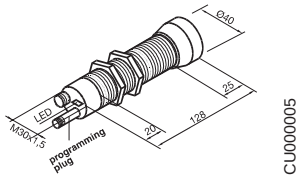
SUD4000-M30N-C1-M

Model	SUD4000-M30N-C1-M	SUD6000-M30N-C1-M
Sensing range **Output**	**500 mm ... 4000 mm** **Analogue**	**800 mm ...6000 mm** **Analogue**
Operating specifications		
Standard test target (min. flat surface)	100 mm x 100 mm	100 mm x 100 mm
Beam divergence angle	approx. 5° at -3 dB	approx. 5° at -3 dB
Transducer frequency	approx. 85 kHz	approx. 65 kHz
Response time	≤ 300 ms	≤ 500 ms
Resolution		
- Evaluation range ≤ 705 mm	0.172 mm	0.172 mm
- Evaluation range ≥ 705 mm	Evaluation range [mm] / 4096	Evaluation range [mm] / 4096
Reproducibility	≤ 0.1 % of full scale	≤ 0.1 % of full scale
Linearity	≤ 0.1 % of full scale	≤ 0.1 % of full scale
Temperature drift	compensated (0.2 % / K without temp. compensation)	compensated (0.2 % / K without temp. compensation)
Electrical specifications		
Supply voltage U_B / ripple	10 ... 30 VDC / +/- 10 % $_{SS}$	10 ... 30 VDC / +/- 10 % $_{SS}$
Reverse polarity protection	yes	yes
Off-load power input P_L	≤ 800 mW	≤ 800 mW
Current output	4 mA ... 20 mA, R_L ≤ 500 Ω	4 mA ... 20 mA, R_L ≤ 500 Ω
Voltage output	0 V... 10 V, R_L ≥ 1000 Ω	0 V... 10 V, R_L ≥ 1000 Ω
Temperature / Memorising insert	Evaluation limits and output function (Falling, rising slope) are memorised by means of the temperture / memorising insert In normal operation, memorising insert must be in pos. T	Evaluation limits and output function (Falling, rising slope) are memorised by means of the temperture / memorising insert In normal operation, memorising insert must be in pos. T
Indicators:		
Dual-LED green	"Power on", teaching funct., object detected	Power on, teaching funct., object detected
red	"Fault", teaching funct., no object detected	"Fault", teaching funct., no object detected
LED yellow	Evaluation limit A1, falling slope	Evaluation limit A1, falling slope
LED yellow	Evaluation limit A2, rising slope	Evaluation limit A2, rising slope
Mechanical Specifications		
Operating temperature range	-25°C ... +70 °C	-25°C ... + 70 °C
Storage temperature range	-40°C ... +85 °C	-40°C ... + 85 °C
Protection class to EN / IEC	IP 65	IP 65
Housing material	Stainless steel	Stainless steel
Transducer material	Epoxy resin / hollow glass sphere mixture Polyurethane foam	Epoxy resin / hollow glass sphere mixture Polyurethane foam
Cover and head	PBT (Crastin)	PBT (Crastin)
Permissible shock and vibration loading	b ≤ 30 g, T ≤ 11 ms f ≤ 55 Hz, a ≤ 1 mm	b ≤ 30 g, T ≤ 11 ms f ≤ 55 Hz, a ≤ 1mm
Connection	connector M12	connector M12
In compliance with	EN 60974-5-2	EN 60974-5-2
Drawing No.	CU000005	CU000006

Wiring diagram

M





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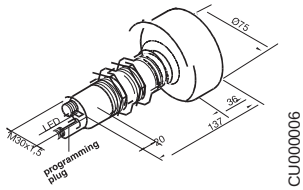
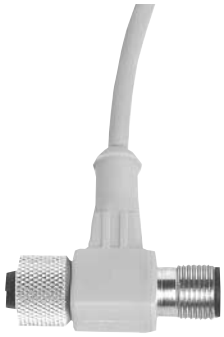
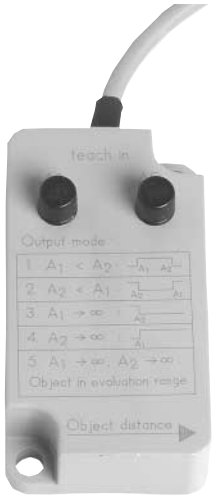


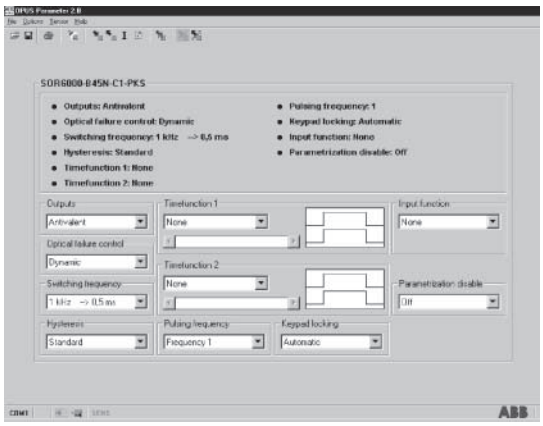
CU000006

Notes

Accessories

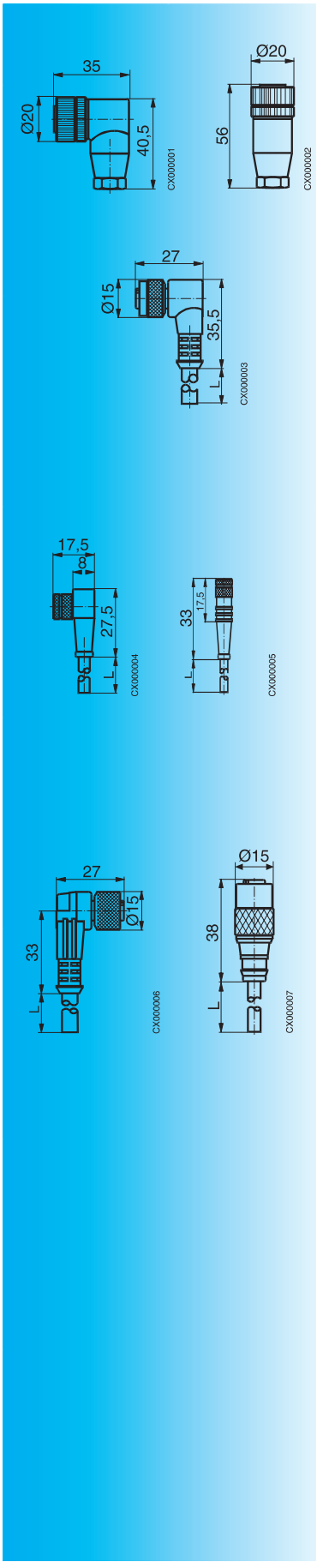


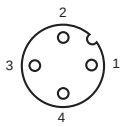
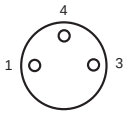




Accessories

Accessories
Connectors
Technical Data

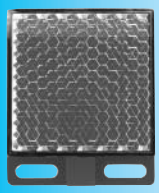


Model	Description	
SZC1>4POL-0	Connector M12 angled 4 poles	PIN Arrangement on Sensor
SZC1/4POL-0	Connector M12 straight 4 poles	 (not usable for ultrasonic sensors)
SZC1>U5-3POL-LED0	Cable Connector M12 angled cable 5 m, PUR, 3 poles LED 1 – 3 LED 4 – 3	PIN Arrangement 1 - BN 3 - BU 4 - BK (not available: 2–WH) (not available: 5–GR)
SZC8>U5-3POL-LED0	Cable Connector M8 angled cable 5 m, PUR, 3 poles LED 1 – 3 LED 4 – 3	PIN Arrangement on Sensor 1 - BN 3 - BU 4 - BK
SZC8/U5-3POL-LED0	Cable Connector M8 straight cable 5 m, PUR, 3 poles LED 1 – 3 LED 4 – 3	
SZC1>V5-4POL-0	Cable Connector M12 angled cable 5 m, PVC	PIN Arrangement 1 - BN 2 - WH
SZC1/V5-4POL-0	Cable Connector M12 straight cable 5 m, PVC	3 - BU 4 - BK

Accessories
Mounting bracket, Testing device, Reflector
Description

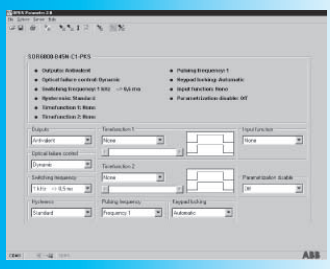
MB-5 Kit

ST-1



RFL-1

SZP-Programmer



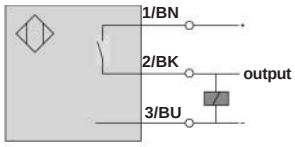
Model	Description
MB-5 Kit	For mounting cylindrical proximity, photoelectric and ultrasonic sensors. Kit includes interchangeable attachments to handle standard sensor sizes from 5 mm to 30 mm in diameter  MB-5 Kit (assembled)
ST-1	Compact testing device provides quick testing of 2, 3 or 4 wire DC powered proximity, photoelectric or ultrasonic sensors. Features include: - Visual indication of output switched PNP sensors NPN sensors - Audio annunciation of output switched sensors - Quick-connect terminals
RFL-1	Corner-cube reflector - Screw mounting - 50 x 50 mm (RFL-1 is included with retro-reflective photoelectric sensors)
SZP-Programmer (only for ultrasonic sensors with switching output)	The programming unit SZP-Programmer is available for optional programming sensor parameters on Ultrasonic sensors. Switch point location is controlled by pressing push buttons A1 and A2. No external switch load is required when using the programming unit.
OPUS-Software-Set	The OPUS-Software is a German-English user interface to easily program the parameters of the B45-series of photoelectrical sensors. The sensors communicate with the PC via an optical interface. The set contains: • Two 3.5" discs • One B45 combi clip • One interface converter • One instruction manual

Notes

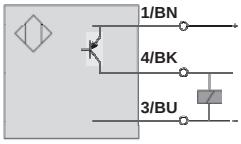
Technical Informations
Ordering Details
Approvals

The various types of sensors offer different output signals in order to achieve flexible and rapid processing of the information detected by the sensors.
The “3-wire PNP normally open” DC output with designation “-PO” is used as a reference for all types of sensors since it allows optimum drive of the inputs of programmable logic controlers.
The output signals switched by PNP transistors were originally referred to as “PNP”. Today, these outputs are protected against short circuit and reversal polarity.

PO

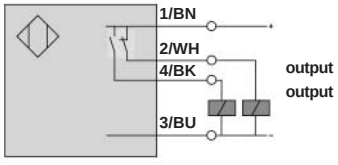


PC

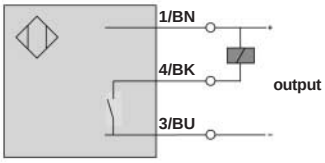


The proximity sensors also offer further DC output types :
- 4-wire PNP normally open /normally closed combination, “PK”
- 3-wire NPN normally open, “NO”
- 4-wire NPN normally open / normally closed combination “NK”
- 2-wire normally open “DO”

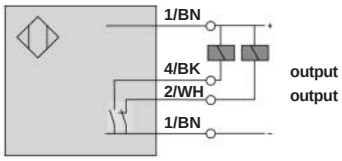
PK



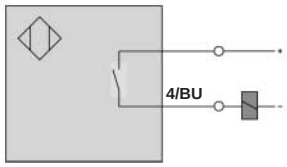
NO



NK

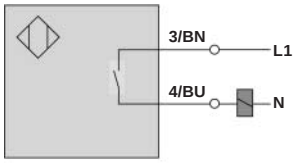


DO

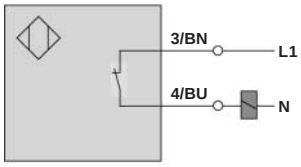


Outputs up to 250 V AC are available for looping into AC circuits. The flexibility required for use in various applications is achieved by the following output types :
- AC normally open, “AO”
- AC normally closed, “AC”
- AC normally open / normally closed combination, “AK”

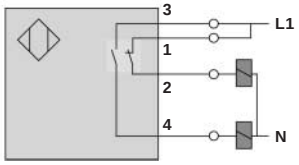
AO



AC

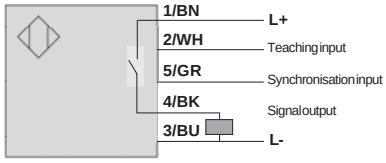


AK



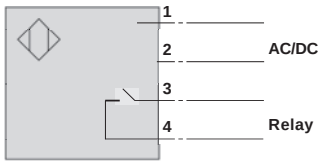
Photoelectric sensors and ultrasonic sensors feature special outputs with additional terminals which can be used, for instance, for adjusting the function and for synchronisation of measurement operations.
PNP, normally open, "POS"
NPN, normally open, "NOS"

POS



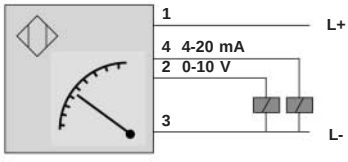
To reach maximum flexibility, photoelectric sensors are also available with the special output "KK" for looping into AC/DC circuits with Relay output.

KK

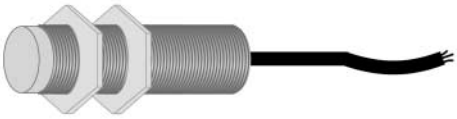


The analogue output with designation "M" allows direct measurement of the distance and supply a 4 mA to 20 mA and a 0V to 10V signal for this purpose.The user can choose between a falling and rising slope.

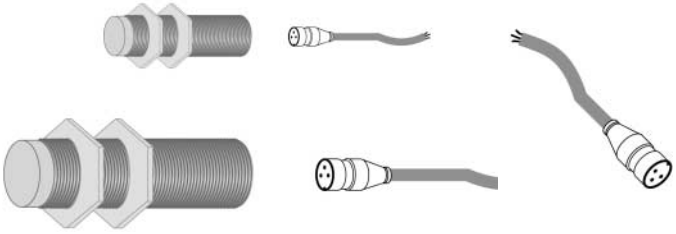
M



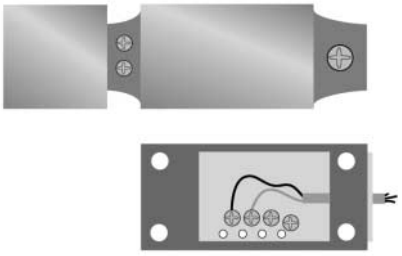
All ABB sensors feature a permanent connection cable as standard and at low cost. The lenght of the cable is 2 m. You can opt between versions PVC and PUR versions.



The range of ABB sensors also includes M8 and M12 connectors as accessories. These connection types offer the advantage of rapid exchange and maintenance work, in particular in cases in which the sensors are subject to greater risk of damage owing to extreme ambient conditions.



A terminal connection offering maximum possibile flexibility as regards cable length and cable type is available for large sensors.



Tightening Torques of the nuts

The following maximum values apply to the threaded versions

Thread	Tightening torque	
diameter	Brass	tainless steel
M8	3 Nm	10 Nm
M12	10 Nm	15 Nm
M18	20 Nm	30 Nm
M30	40 Nm	60 Nm

The IP rating is the recognised numbering system which identifies the protection afforded against the ingress of both bodies and water by th enclosure provided.
The IP rating is presented in the format "IPXY", where x can range from 0–6 and indicates the level of protection against the ingress of foreign bodies, and Y can range from 0–8 and indicates the level of pro-tection against the ingress of water.

FIRST FIGURE -

Levels of protection against the ingress of foreign bodies

0- No protection
No protection against the touching of live voltage or moving parts. No protection against the penetration of foreign bodies.

1- Protection against large foreign bodies
Protection against casual contact with live or moving parts. No protection against intentional access to those parts.

2- Protection against middle/large foreign bodies
Protection against touching with fingers any live or moving parts. Protected against the penetration of solid objects with a diameter greater than 12 mm.

3- Protection against small foreign bodies
Protection against touching live or moving parts with tools, wiring etc., of a diameter greater than 2.5 mm. Protection against foreign bodies with a diameter greater than 2.5 mm.

4- Protection against granular sized particles
Protection against touching live or moving parts with tools, wiring, etc., of a diameter greater than 1 mm. Protection against foreign bodies with a diameter greater than 1 mm.

5- Protection against dust deposits
Complete protection against touching live or moving parts. Dust particles cannot enter the equipment in such quantities as to influence the working conditions.

6- Protection against dust intrusion
Compete protection against touching live or moving parts. Complete protection against the ingress of dust.

SECOND FIGURE -

Levels of protection against the ingress of water

0- No protection
No special protection.

1- Protection against dripping water falling vertically
Vertically dripping water must have no damaging effect.

2- Protection against diagonally dripping water
Water which falls diagonally up to an angle of 15 degrees must have no damaging effect.

3- Protection against sprayed water falling diagonally
Water which falls diagonally up to an angle of 60 degrees must have no damaging effect.

4- Protection against sprinkled water
Sprinkled water from any direction must have no damaging effect.

5- Protection against flash water
Water from a broken pipe which flashes against the equipment from any direction must have no damaging effect.

6- Protection against over flooding
Water due to temporary flooding i.e. heavy seas, must have no damaging effect.

7- Protection against submersion
Water must not enter in damaging quantities if the equipment is sub-merged under 1 metre of water for short periods of time.

8- Special protection
The equipment must conform to special criteria specified by the user.

Analogue Output:
A linear output (voltage or current) that varies dependant upon the proximity of the target.

Beam Divergence Angle:
The angle of emitted sound from the ultrasonic transmitter.

Capacitive:
A sensing technique using the capacitance of the target to switch an output.

Complementary:
The sensor is a four wire device. Two wires are required for the power supply, the remaining two are either N/O or N/C at the users discretion.

Correction Factor:
A target properties that effect the sensing distance. The figure is used to multiply the sensing distance to find the true figure for that particular material.

Diffuse:
A sensing method using the target to return the sensors output back to the receiving element.

Digital Output:
A two state device indicating the proximity of the target within the adjusted range.

Emitter:
The component within an ultrasonic or photoelectric sensor that emits a signal.

Fibre-optics:
Optical cables used to transmit and receive light remotely from the amplifier.

Embeddable Mount:
A shielded body for an inductive sensor. The sensor is unaffected by a metal surround when mounted flush with the surface.

Hysteresis:
A percentage of the sensing distance used to define the difference between the switch on and switch off points of a sensor to avoid "electrical chattering".

Inductive:
A sensing principle used to detect metals by the targets absorption of an electromagnetic field produced by the sensor.

Linear Output:
See analogue.

Maximum Operating Frequency:
The figure used to show the amount of electrical switchings possible per second.

Normally Closed:
The switched state of the sensor is closed during normal conditions, i.e. no target present.

Non Embeddable Mount:
An unshielded body for in inductive sensor. The sensor is affected by a metal surround hence must be mounted proud of this surface.

Normally Opened:
The switched state of the sensor is open during normal conditions i.e. no target present.

NPN:
Current sinking, an output that provides an electrical supply to ground.

Output:
A change in an electrical signal either two state or analogue used for control purposes.

Photoelectric:
A sensing principle using light as the emitted and received medium.

PNP:
Current sourcing, an output that provides an electrical supply to positive.

Polarised:
Light is only recognised if travelling in one defined plane, hence secure activation of a sensor is achieved due to stray light being filtered out.

Receiver:
The component within an ultrasonic or photoelectric sensor that receives the emitted signal.

Repeatability:
The figure used to judge sensing distance variation with identical target approached.

Resolution:
The smallest movement required to cause an output change.

Retro-reflective:
A sensing method where emitted light or sound is returned by a fixed reflector back to the same housing. Any significant reduction in returned signal due to the proximity of a target causes an output change.

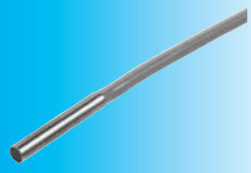
Reverse Polarity Protection:
A feature designed to protect the internal circuitry if the load is bypassed for a short period.

Synchronisation:
A safety feature reducing possible interference of one ultrsonic to another when used in close proximity to each other.

Through-beam:
A sensing method where emitted light or sound is transmitted/received by separate housing.

Ultrasonic:
A sensing principle using sound as the emitted and received medium

Inductive Proximity Sensors – Cylindrical
Ordering Details



SIF0.8-Z4N-U2-P0

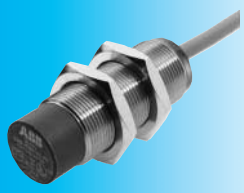
SIF1.5-M8N-V2-P0

SIN6-M12N-V2-P0

Inductive Proximity Sensors

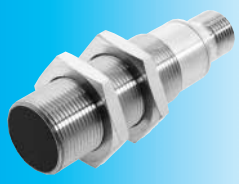
Sensing Distance Sn (mm)	Size (mm)	Outputs	Type	Order Number	Price
0.8	4	DC PNP NO	SIF0,8-Z4N-C8-PO	1SAF104411R1000	
0.8	4	DC PNP NO	SIF0,8-Z4N-U2-PO	1SAF104211R1000	
1.5	6	DC PNP NO	SIF1.5-Z6N-C8-PO	1SAF106411R1000	
1.5	6	DC PNP NO	SIF1.5-Z6N-U2-PO	1SAF106211R1000	
1.5	8	DC NO 2 Wire	SIF1.5-M8N-V2-DO	1SAF108111R5000	
1.5	8	DC NPN NO	SIF1.5-M8N-V2-NO	1SAF108111R3000	
1.5	8	DC PNP NO	SIF1.5-M8N-V2-PO	1SAF108111R1000	
1.5	8	DC NPN NO	SIF1.5-M8S-C1-NO	1SAF108511R3000	
1.5	8	DC PNP NO	SIF1.5-M8S-C1-PO	1SAF108511R1000	
1.5	8	DC PNP NO	SIF1.5-M8S-U2-PO	1SAF109211R1000	
1.5	8	DC PNP NO	SIF1.5-M8E-C1-PO	1SAF108511R1001	
1.5	8	DC NPN NO	SIF1.5-M8E-C1-NO	1SAF108511R3001	
2	12	DC NPN NO	SIF2-M12N-C1-NO	1SAF112511R3000	
2	12	DC PNP NO	SIF2-M12N-C1-PO	1SAF112511R1000	
2	12	AC NO 2 Wire	SIF2-M12N-C2-AO	1SAF112611R6001	
2	12	AC NO 2 Wire	SIF2-M12N-C3-AO	1SAF112611R6000	
2	12	DC NO 2 Wire	SIF2-M12N-U2-DO	1SAF112111R5100	
2	12	AC NO 2 Wire	SIF2-M12N-V2-AO	1SAF112111R6000	
2	12	DC NO 2 Wire	SIF2-M12N-V2-DO	1SAF112111R5000	
2	12	DC NPN NO/NC	SIF2-M12N-V2-NK	1SAF112111R3200	
2	12	DC NPN NO	SIF2-M12N-V2-NO	1SAF112111R3000	
2	12	DC PNP NO/NC	SIF2-M12N-V2-PK	1SAF112111R1200	
2	12	DC PNP NO	SIF2-M12N-V2-PO	1SAF112111R1000	
2	12	DC PNP NO	SIF2-M12S-C1-PO	1SAF113511R1000	
2	12	DC PNP NO	SIF2-M12S-U2-PO	1SAF113211R1000	
2	12	DC PNP NO	SIF2-M12E-C1-PO	1SAF112511R1001	
2	12	DC NPN NO	SIF2-M12E-C1-NO	1SAF112511R3001	
2	12	DC NO 2 Wire	SIF2-M12E-C1-DO	1SAF112511R5000	
2	12	AC NC 2 Wire	SIF2-M12E-C1-AC	1SAF112111R6100	
2	8	DC NPN NO	SIN2-M8N-C1-NO	1SAF108522R3000	
2	8	DC PNP NO	SIN2-M8N-C1-PO	1SAF108522R1000	
2	8	DC NPN NO	SIN2-M8N-V2-NO	1SAF108122R3000	
2	8	DC PNP NO	SIN2-M8N-V2-PO	1SAF108122R1000	
2	8	DC PNP NO	SIN2-M8S-U2-PO	1SAF109222R1000	
2	8	DC PNP NO	SIN2-M8E-C1-PO	1SAF108522R1001	
3	8	DC PNP NO	SIN3-M8N-C8-PO	1SAF108423R1000	
3	8	DC PNP NO	SIN3-M8N-V2-PO	1SAF108123R1000	
4	12	DC NPN NO	SIN4-M12N-C1-NO	1SAF112522R3000	
4	12	DC PNP NO	SIN4-M12N-C1-PO	1SAF112522R1000	
4	12	AC NO 2 Wire	SIN4-M12N-V2-AO	1SAF112122R6000	
4	12	DC NO 2 Wire	SIN4-M12N-V2-DO	1SAF112122R5000	
4	12	DC NPN NO/NC	SIN4-M12N-V2-NK	1SAF112122R3200	
4	12	DC NPN NO	SIN4-M12N-V2-NO	1SAF112122R3000	
4	12	DC PNP NO/NC	SIN4-M12N-V2-PK	1SAF112122R1200	
4	12	DC PNP NO	SIN4-M12N-V2-PO	1SAF112122R1000	
4	12	DC PNP NO	SIN4-M12S-C1-PO	1SAF113522R1000	
4	12	DC PNP NO	SIN4-M12S-U2-PO	1SAF113122R1000	
4	12	DC PNP NO	SIN4-M12E-C1-PO	1SAF112512R1001	
4	12	DC NPN NO	SIN4-M12E-C1-NO	1SAF112512R3001	
4	12	DC NO 2 Wire	SIN4-M12E-C1-DO	1SAF112522R5000	
4	12	AC NC 2 Wire	SIN4-M12E-C1-AC	1SAF112112R6100	
5	18	DC NPN NO	SIF5-M18N-C1-NO	1SAF118511R3000	
5	18	DC PNP NO	SIF5-M18N-C1-PO	1SAF118511R1000	
5	18	AC NC 2 Wire	SIF5-M18N-C3-AC	1SAF118611R6100	
5	18	AC NO 2 Wire	SIF5-M18N-C3-AO	1SAF118611R6000	
5	18	AC NC 2 Wire	SIF5-M18N-V2-AC	1SAF118111R6100	

Inductive Proximity Sensors – Cylindrical
Ordering Details



SIN8-M18N-V2-P0

SIF10-M30N-V2-P0

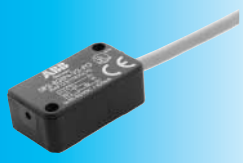


SIN12-M18N-C1-P0

Inductive Proximity Sensors

Sensing Distance Sn (mm)	Size (mm)	Outputs	Type	Order Number	Price
5	18	AC NC 2 Wire	SIF5-M18N-V2-AC	1SAF118111R6100	
5	18	AC NO 2 Wire	SIF5-M18N-V2-AO	1SAF118111R6000	
5	18	DC NO 2 Wire	SIF5-M18N-V2-DO	1SAF118111R5000	
5	18	DC NPN NO/NC	SIF5-M18N-V2-NK	1SAF118111R3200	
5	18	DC NPN NO	SIF5-M18N-V2-NO	1SAF118111R3000	
5	18	DC PNP NO/NC	SIF5-M18N-V2-PK	1SAF118111R1200	
5	18	DC PNP NO	SIF5-M18N-V2-PO	1SAF118111R1000	
5	18	DC PNP NO	SIF5-M18E-C1-PO	1SAF118511R1001	
5	18	DC NPN NO	SIF5-M18E-C1-NO	1SAF118511R3001	
5	18	DC NO 2 Wire	SIF5-M18E-C1-DO	1SAF118513R5000	
6	12	DC PNP NO	SIN6-M12N-C1-PO	1SAF112523R1000	
6	12	DC PNP NO	SIN6-M12N-V2-PO	1SAF112123R1000	
8	18	DC NPN NO	SIN8-M18N-C1-NO	1SAF118522R3000	
8	18	DC PNP NO	SIN8-M18N-C1-PO	1SAF118522R1000	
8	18	AC NC 2 Wire	SIN8-M18N-V2-AC	1SAF118122R6100	
8	18	AC NO 2 Wire	SIN8-M18N-V2-AO	1SAF118122R6000	
8	18	DC NO 2 Wire	SIN8-M18N-V2-DO	1SAF118122R5000	
8	18	DC NPN NO/NC	SIN8-M18N-V2-NK	1SAF118522R3200	
8	18	DC NPN NO/NC	SIN8-M18N-V2-NO	1SAF118122R3000	
8	18	DC PNP NO/NC	SIN8-M18N-V2-PK	1SAF118122R1200	
8	18	DC PNP NO	SIN8-M18N-V2-PO	1SAF118122R1000	
8	18	DC PNP NO	SIN8-M18E-C1-PO	1SAF118522R1001	
8	18	DC NO 2 Wire	SIN8-M18E-C1-DO	1SAF118523R5000	
10	30	DC NPN NO	SIF10-M30N-C1-NO	1SAF130511R3000	
10	30	DC PNP NO	SIF10-M30N-C1-PO	1SAF130511R1000	
10	30	AC NC 2 Wire	SIF10-M30N-C3-AC	1SAF130611R6100	
10	30	AC NO 2 Wire	SIF10-M30N-C3-AO	1SAF130611R6000	
10	30	AC NC 2 Wire	SIF10-M30N-V2-AC	1SAF130111R6100	
10	30	AC NO 2 Wire	SIF10-M30N-V2-AO	1SAF130111R6000	
10	30	DC NO 2 Wire	SIF10-M30N-V2-DO	1SAF130111R5000	
10	30	DC NPN NO/NC	SIF10-M30N-V2-NK	1SAF130111R3200	
10	30	DC NPN NO	SIF10-M30N-V2-NO	1SAF130111R3000	
10	30	DC PNP NO/NC	SIF10-M30N-V2-PK	1SAF130111R1200	
10	30	DC PNP NO	SIF10-M30N-V2-PO	1SAF130111R1000	
10	30	DC PNP NO	SIF10-M30E-C1-PO	1SAF130511R1001	
10	30	DC NO 2 Wire	SIF10-M30E-C1-DO	1SAF130513R5000	
12	30	DC PNP NO	SIN12-M18N-C1-PO	1SAF118523R1000	
12	30	DC PNP NO	SIN12-M18N-V2-PO	1SAF118123R1000	
15	30	DC NPN NO	SIN15-M30N-C1-NO	1SAF130522R3000	
15	30	DC PNP NO	SIN15-M30N-C1-PO	1SAF130522R1000	
15	30	AC NC 2 Wire	SIN15-M30N-C3-AC	1SAF130622R6100	
15	30	AC NO 2 Wire	SIN15-M30N-C3-AO	1SAF130622R6000	
15	30	AC NC 2 Wire	SIN15-M30N-V2-AC	1SAF130122R6100	
15	30	AC NO 2 Wire	SIN15-M30N-V2-AO	1SAF130122R6000	
15	30	DC NO 2 Wire	SIN15-M30N-V2-DO	1SAF130122R5000	
15	30	DC NPN NO/NC	SIN15-M30N-V2-NK	1SAF130122R3200	
15	30	DC NPN NO	SIN15-M30N-V2-NO	1SAF130122R3000	
15	30	DC PNP NO/NC	SIN15-M30N-V2-PK	1SAF130122R1200	
15	30	DC PNP NO	SIN15-M30N-V2-PO	1SAF130122R1000	
15	30	DC PNP NO	SIN15-M30E-C1-PO	1SAF130522R1001	
15	30	DC NO 2 Wire	SIN15-M30E-C1-DO	1SAF130514R5000	

Inductive Proximity Sensors – Square block
Ordering Details



SIF2-B28N-V0.1-P0

SIF6-B45N-V2-P0

SIF20-Q40N-T-P0

Inductive Proximity Sensors

Sensing Distance Sn (mm)	Size (mm)	Outputs	Type	Order Number	Price
2	28	DC NPN NC	SIF2-B28N-V2-NC	1SAF123111R3100	
2	28	DC NPN NO	SIF2-B28N-V2-NO	1SAF123111R3000	
2	28	DC PNP NO	SIF2-B28N-V2-PC	1SAF123111R1100	
2	28	DC PNP NO	SIF2-B28N-V2-PO	1SAF123111R1000	
6	45	DC PNP NO	SIF6-B45N-V2-PO	1SAF125111R1000	
15	40	DC PNP NO	SIF15-Q40N-C1-PO	1SAF144511R1000	
15	40	AC 4 Wire NO/NC	SIF15-Q40N-T-AK	1SAF145811R6200	
15	40	DC NPN NO/NC	SIF15-Q40N-T-NK	1SAF144811R3200	
15	40	DC NPN NO	SIF15-Q40N-T-NO	1SAF144811R3000	
15	40	DC PNP NO/NC	SIF15-Q40N-T-PK	1SAF144811R1200	
15	40	DC PNP NO	SIF15-Q40N-T-PO	1SAF144811R1000	
15	30	AC 2 Wire NC	SIN15-Q30N-T-AC	1SAF143822R6100	
15	30	AC 2 Wire NO	SIN15-Q30N-T-AO	1SAF143822R6000	
20	40	DC PNP NO	SIF20-Q40N-C1-PO	1SAF144522R1000	
20	40	DC NPN NO/NC	SIF20-Q40N-T-NK	1SAF144822R3200	
20	40	DC PNP NO/NC	SIF20-Q40N-T-PK	1SAF144822R1200	
20	40	DC PNP NO	SIF20-Q40N-T-PO	1SAF144822R1000	
20	40	DC PNP NO	SIF20-Q40S-C1-PO	1SAF145812R1000	
20	40	DC PNP NO/NC	SIF20-Q40T-C1-PK	1SAF146812R1200	
20	40	DC PNP NO	SIF20-Q40T-C1-PO	1SAF146812R1000	
20	40	AC 4 Wire NO/NC	SIN20-Q40N-T-AK	1SAF144822R6200	
20	40	AC 4 Wire NO/NC	SIN20-Q40U-T-AK	1SAF144822R6201	
30	40	AC 4 Wire NO/NC	SIN30-Q40N-T-AK	1SAF144823R6200	
30	40	DC NPN NO/NC	SIN30-Q40N-T-NK	1SAF144823R3200	
30	40	DC NPN NO	SIN30-Q40N-T-NO	1SAF144823R3000	
30	40	DC PNP NO/NC	SIN30-Q40N-T-PK	1SAF144823R1200	
30	40	DC PNP NO	SIN30-Q40N-T-PO	1SAF144823R1000	
30	40	DC PNP NO	SIN30-Q40S-C1-PO	1SAF145823R1000	
30	40	DC PNP NO/NC	SIN30-Q40T-C1-PK	1SAF146823R1200	
40	80	DC PNP NO/NC	SIF40-Q80N-T-PK	1SAF148811R1200	
50	80	DC PNP NO/NC	SIN50-Q80N-T-PK	1SAF148822R1200	
50	80	DC PNP NO	SIN50-Q80N-T-PO	1SAF148822R1000	

Special Inductive Proximity Sensors – Cylindrical
Ordering Details

SIF10-M30W-C1-P0

Weld Immune

Sensing Distance Sn (mm)	Size (mm)	Outputs	Type	Order Number	Price
2	12	DC PNP NO	SIF2-M12W-C1-PO	1SAF112511R1005	
4	12	DC PNP NO	SIN4-M12W-C1-PO	1SAF112522R1005	
5	18	DC PNP NO	SIF5-M18W-C1-PO	1SAF118511R1005	
8	18	DC PNP NO	SIN8-M18W-C1-PO	1SAF118522R1005	
10	30	DC PNP NO	SIF10-M30W-C1-PO	1SAF130511R1005	
15	30	DC PNP NO	SIN15-M30W-C1-PO	1SAF130522R1005	

Analogue

5	18	Analogue	SIF5-M18M-U2-M	15AF118112R8000	

Capacitive Proximity Sensors – Cylindrical
Ordering Details

SCF10-M30N-V2-P0

Capacitive Proximity Sensors

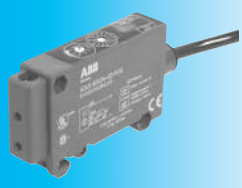
Sensing Distance Sn (mm)	Size (mm)	Outputs	Type	Order Number	Price
10	30	DC PNP NO	SCF10-M30N-V2-PO	1SAF230111R1000	
10	30	DC PNP NO	SCF10-M30N-C1-PO	1SAF230511R1000	
10	30	AC 2 Wire NO	SCF10-M30N-V2-PO	1SAF230111R6000	
10	30	DC PNP NO/NC	SCF10-M30N-V2-PK	1SAF230111R1200	
10	30	DC PNP NO/NC	SCF10-M30N-C1-PK	1SAF230511R1200	

Photoelectric Sensors
Ordering Details

SOD200-M18N-C1-P0

SOR2000-B40N-C8-P0

SOLX-M18N-V2-P0



SOLX-B50N-U2-POS

Photoelectric Sensors

Sensing Distance Sn (mm)	Size (mm)	Outputs	Type	Order Number	Price
Cylindrical					
Diffuse					
200	18	DC PNP NO	SOD200-M18N-C1-PO	1SAF318553R1000	
Retro-reflective					
1500	18	DC PNP NO	SOR1500-M18N-C1-PO	1SAF318542R1001	
3000	18	DC PNP NO	SOR3000-M18N-C1-PO	1SAF318542R1000	
Block					
Diffuse					
300	40	DC PNP NO	SOD300-B40N-C8-PO	1SAF324453R1000	
300	40	DC PNP NO	SOD300-B40N-V2-PO	1SAF324153R1000	
400	26	DC PNP NO	SOD400-B26N-U2-PO	1SAF323253R1000	
500	45	DC PNP NO/NC	SOD500-B45N-C1-PKS	1SAF325553R1210	
500	45	DC NPN NO/NC	SOD500-B45N-C1-NKS	1SAF325553R3210	
800	75	DC PNP NO/NC	SOD800-B75N-T-POS	1SAF328853R1000	
2000	75	AC/DC Relay	SOD2000-B75N-T-KK	1SAF328853R1100	
Retro-reflective					
2000	26	DC PNP NO	SOR2000-B26N-U2-PO	1SAF323242R1000	
2000	40	DC PNP NO	SOR2000-B40N-C8-PO	1SAF324442R1000	
2000	40	DC PNP NO	SOR2000-B40N-V2-PO	1SAF324142R1000	
2000	45	DC PNP NO/NC	SORG2000-B45N-C1-PKS	1SAF325543R1210	
2000	45	DC NPN NO/NC	SORG2000-B45N-C1-NKS	1SAF325543R3210	
5000	75	DC PNP NO/NC	SOR5000-B75N-T-POS	1SAF328842R1000	
5000	75	AC/DC Relay	SOR5000-B75N-T-KK	1SAF328842R1100	
6000	45	DC PNP NO/NC	SOR6000-B45N-C1-PKS	1SAF325545R1210	
6000	45	DC NPN NO/NC	SOR6000-B45N-C1-NKS	1SAF325545R3210	
Through Beam					
15 000	45	DC PNP NO/NC	SOT15M-B45N-C1-PKS	1SAF325586R1210	
15 000	45	DC NPN NO/NC	SOT15M-B45N-C1-NKS	1SAF325586R3210	
20 000	75	AC/DC Relay	SOT20M-B75N-T-KK	1SAF320750R1100	

Fibre optic Sensors

Sensing Distance Sn (mm)	Size (mm)	Outputs	Type	Order Number	Price
Cylindrical for use with glass fibre optic light guides					
Amplifier	18	DC PNP NO	SOLX-M18N-C1-PO	1SAF318160R1000	on request
Diffuse					
45	18	Glass fibre	SOLD45-M18N-GMM8	1SAF318352R0001	on request
100	18	Glass fibre	SOLD100-M18N-GVM8	1SAF318152R0001	on request
Through Beam					
250	18	Glass fibre	SOLT700-M18N-GMM8	1SAF318363R0001	on request
250	18	Glass fibre	SOLT700-M18N-GVM8	1SAF318163R0001	on request
Block for use with plastic fibre optic light guides					
Amplifier	50	DC PCP NO	SOLX-B50N-U2-POS	1SAF325160R1000	
Diffuse					
15	3	Plastic	SOLD15-B50N-PVM3	1SAF325151R0001	
50	6	Plastic	SOLD50-B50N-PVM6	1SAF325152R0001	
Through-Beam					
150	3	Plastic	SOLT150-B50N-PVM3	1SAF325163R0002	
150	4	Plastic	SOLT150-B50N-PVM4	1SAF325163R0001	

Ultrasonic Sensors – Cylindrical
Ordering Details

SUD500-M30N-C1-POS

SUD6000-M30N-C1-POS

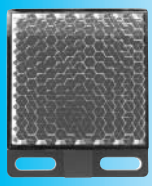
Ultrasonic Sensors – Diffuse

Sensing Distance Sn (mm)	Size (mm)	Outputs	Type	Order Number	Price
Discrete Output					
500	30	DC PNP, Programmable	SUD500-M30N-C1-POS	1SAF430651R1000	
500	30	DC NPN, Programmable	SUD500-M30N-C1-NOS	1SAF430651R3000	
2000	30	DC PNP, Programmable	SUD2000-M30N-C1-POS	1SAF430653R1000	
2000	30	DC NPN, Programmable	SUD2000-M30N-C1-NOS	1SAF430653R3000	
4000	30	DC PNP, Programmable	SUD4000-M30N-C1-POS	1SAF430654R1000	
4000	30	DC NPN, Programmable	SUD4000-M30N-C1-NOS	1SAF430654R3000	
6000	30	DC PNP, Programmable	SUD6000-M30N-C1-POS	1SAF430655R1000	
6000	30	DC NPN, Programmable	SUD6000-M30N-C1-NOS	1SAF430655R3000	
Analogue Output					
500	30	Analogue	SUD500-M30N-C1-M	1SAF430551R8000	
2000	30	Analogue	SUD2000-M30N-C1-M	1SAF430553R8000	
4000	30	Analogue	SUD4000-M30N-C1-M	1SAF430554R8000	
6000	30	Analogue	SUD6000-M30N-C1-M	1SAF430555R8000	

Accessories
Ordering Details

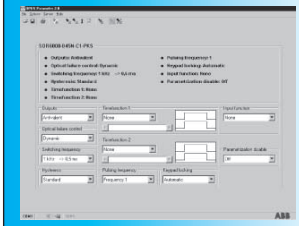
MB-5-Kit

ST-1



RFL-1 Reflector

SZP Programmer



OPUS SOFTWARE

Description	Type	Order Number	Price
Connectors			
M12, angled, 4 poles	SZC1>4POL-0	1SAF912020R4000	
M12, straight, 4 poles	SZC1/4POL-0	1SAF912010R4000	
M12, angled, 3 poles, PUR	SZC1>U5-3POL-LED0	1SAF912225R3100	
M8, angled, 3 poles, PUR	SZC8>U5-3POL-LED0	1SAF908225R3100	
M8, straight, 3 poles, PUR	SZC8/U5-3POL-LED0	1SAF908215R3000	
M12, angled, 4 poles, PVC	SZC1>V5-4POL-0	1SAF912125R4000	
M12, straight, 4 poles, PVC	SZC1/V5-4POL-0	1SAF912115R4000	
Mounting bracket kit			
For mounting all cylindrical sensors	MB-5	1SAF950988R9403	
Testing device			
Compact testing device	ST-1	1SAF950988R9401	
Reflector			
Corner-cube reflector 50 x 50 mm	RFL-1	1SAF950988R9402	
Programming unit			
Programming unit	SZP>Programmer	1SAF912030R7000	
Software OPUS			
Software Set OPUS	OPUS-Set	1SAF950988R9404	

Notes

Approvals

The extensive range of ABB sensor equipment offers diverse possible applications for various operating conditions.

The ABB position sensors have been granted a whole number of national an international approvals, such as the following, in order to allow this broad field of application to also be used internationally:

CE mark

Bureau veritas (BV)
France

UL
USA

CSA
Canada

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With the complements of
Avec nos meilleurs compliments