

Optoelectronic sensors



Optoelectronic sensors S00D, S00E

Key features and product range overview

Product range overview					
Version	S00D LED	S00D laser	S00E LED	S00E laser	→ Page/Internet
Diffuse sensor with background suppression	■	■	■	■	12, 24
Through-beam sensor	■	■	■	■	18, 28
Retro-reflective sensor	■	■	■	■	21, 32
Retro-reflective sensor for transparent objects	-	-	■	-	35
Diffuse sensor	-	-	■	-	38
Laser, contrast sensor	-	-	-	■	42
Laser, distance sensor	-	-	■	■	46

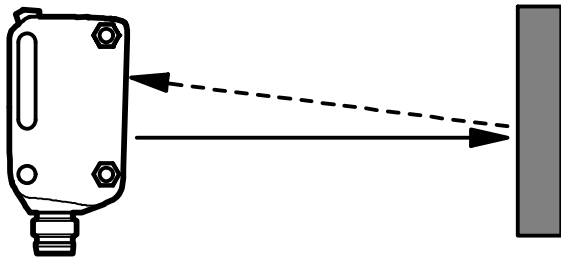
Detection method

Diffuse sensor S00E-DS

With these sensors, which are sometimes referred to as energetic sensors, the transmitter and the receiver are located in the same housing. The light beam transmitted is reflected directly onto the receiver by the object. The intensity of the reflected light is evaluated. The switching distance can be adjusted by changing the sensitivity of the receiver (using IO-Link®, potentiometer or the teach-in method). Diffuse sensors are one of the most cost-effective solutions and are very quick to install. However, these sensors are not suitable for some

applications, e.g. the detection of slightly reflective objects against a highly reflective background. In addition, objects with different surfaces (in terms of material, colour or surface) are detected at different distances because of the different reflective properties.

Benefits of diffuse sensors with intensity differentiation.



- Longer switching distance
- More economical
- More reliable for detecting slightly reflective objects

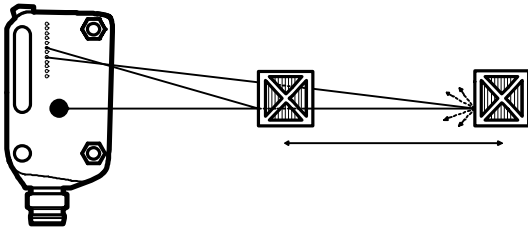
Optoelectronic sensors S00D, S00E

Key features

Diffuse sensors with background suppression

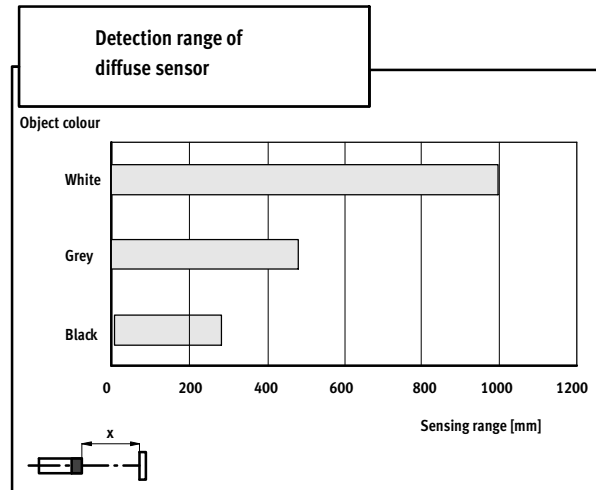
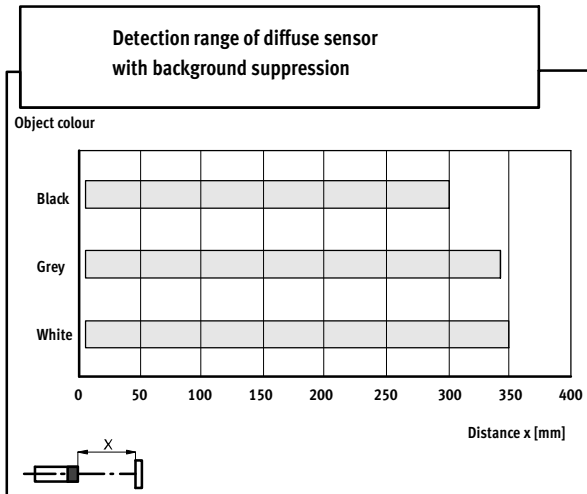
The switching distance is not set energetically, but using optical triangulation. The new and extremely precise multi-pixel technology (S00E) enables a lot of flexibility and setting via IO-Link®. The integrated receiver with signal pre-processing of 160 x 16 pixels is the key for precise detection and distance measurement. This receiver has a unique setting performance in the upper

detection range due to a high resolution and linearisation. Object detection is therefore virtually independent of other objects in the background as well as colour, size or surface. Only a very small diffuse remission is required for these devices.



Benefits of diffuse sensors with background suppression

- Switching distance practically independent of colour and surface
- Can also be used with a shiny or reflective background
- Detection of small differences in distance
- Easy adjustment



Retro-reflective sensors

With these sensors, the transmitter and the receiver are located in the same housing as well. The light transmitted is bounced back to the receiver by a reflector. An object located between the sensor and the reflector interrupts the light beam and is thus detected. All Festo retro-reflective sensors use polarised light to prevent problems from occurring with reflective objects.

There are two different types of retro-reflective sensor depending on the design:

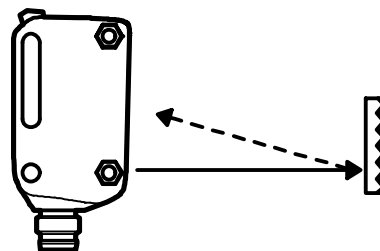
- Retro-reflective sensors with two lenses
- Retro-reflective sensors with autocollimation

Retro-reflective sensors with two lenses

The light is transmitted by the sensor through a lens. The reflected light is bounced back to the sensor through a second lens. The switching point can vary slightly depending on the distance. The following sensors are retro-reflective sensors with two lenses.

- S00D-RS
- S00E-RS

The retro-reflective sensors with two lenses are particularly economical.



Optoelectronic sensors S00D, S00E

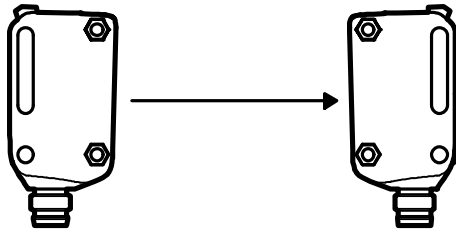
Key features

Retro-reflective sensors with autocollimation

With the principle of autocollimation, the optical axes of the transmitting and the receiving channel are identical. This is possible, since the light from one channel is deflected using a semi-transparent mirror. This principle allows very short distances between the sensor and the reflector to be chosen. Retro-reflective sensors with autocollimation are ideally suited to transparent objects. SOOE-RG are retro-reflective sensors with autocollimation. Further benefits of retro-reflective sensors with autocollimation:

- No blind zone
- High precision across the entire sensing range
- Radially symmetrical sensing range
- Good repeatability
- Low hysteresis
- Detection of transparent objects

Through-beam sensors



In the case of the through-beam sensor, the transmitter and receiver are located in different housings and must be installed opposite one another. Each object that interrupts the light beam between the transmitter and the receiver is detected. This is one of the most reliable principles in harsh environmental conditions. The disadvantage is that two separate components (transmitter and receiver) have to be wired and set up.

Distance sensors

Similarly to diffuse sensors with background suppression, which use multi-pixel technology, these sensors evaluate the distance and transmit the value through IO-Link®.

Distance sensors SOOE-MS have no analogue output. The switching output can be programmed as a window comparator.

Contrast sensor

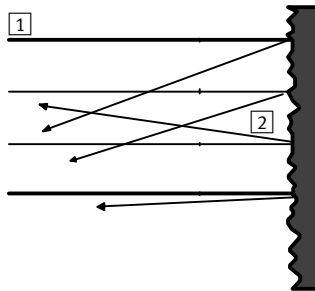
In principle, the laser contrast sensor SOOE-KS is a highly precise, energetic laser diffuse sensor. It detects small contrast differences at various grey levels, trigger marks, etc. within a working range up to 120 mm.

Optoelectronic sensors S00D, S00E

Key features

Types of reflection

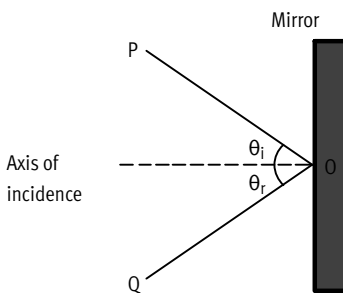
Diffuse reflection



Diffuse reflection is the reflection of light from an uneven or grained surface when an incident beam is reflected at many different angles. This type of reflection is in contrast to specular reflection (total reflection). If a surface is completely non-specular, the reflected light is distributed evenly over a hemispherical surface.

- 1 Incident light beams
- 2 Reflected light beams

Specular reflection (total reflection)



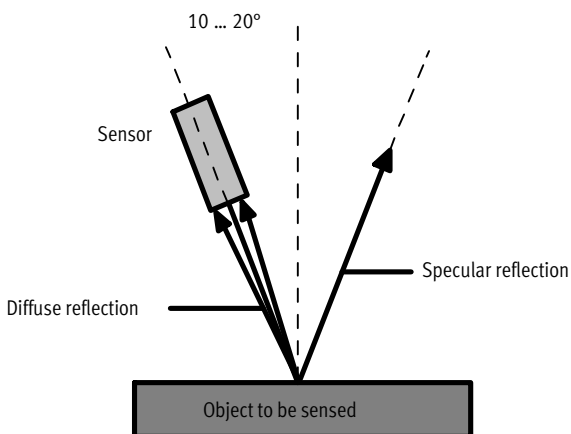
Specular reflection is the perfect reflection of light (or other kinds of wave) from a surface, when incident light from a single direction is reflected in a single direction. Such behaviour is described by the law of reflection. According to this law, the direction of the reflected light and the direction of the incident light form the same angle with respect to the axis of incidence; this is commonly expressed as $\theta_i = \theta_r$.

Retro-reflection

Retro-reflection is the reflection of light back in the direction of the light source irrespective of the angle of incidence. However, this is only true in the case of a mirror when the mirror is exactly perpendicular to the light beam.

This type of reflection can only be achieved using special reflectors (see: Reflectors).

Why are the types of reflection important when using optoelectronic sensors?



In the case of diffuse sensors with intensity differentiation, diffuse sensors with background suppression and distance and colour sensors, sensing is based on diffuse reflection. These sensors therefore require as much diffuse reflection as possible. Total reflection makes detection difficult and must therefore be avoided.

The type of reflection is not relevant for retro-reflective sensors and through-beam sensors.

In this case, the object must only interrupt the light beam. With retro-reflective sensors, polarising filters can be used to achieve perfect differentiation between the reflection from the object and the reflection from the reflector.

The sensors should not be mounted perpendicular to the surface of shiny objects in order to prevent total reflection on the receiver.

Optoelectronic sensors S00D, S00E

Key features

Glossary

Extraneous light limit

Extraneous light is the light radiation generated by external light sources. The illumination intensity is measured on the light entry surface. Use of modulated light makes the devices insensitive to extraneous light. There is, however, an upper limit to the permitted intensity of external light radiation. This limit is also referred to as the extraneous light limit. It is specified in the technical data for sunlight (unmodulated light) and for halogen lamps (with double the mains frequency for modulated light). If the illumination intensity is above the respective extraneous light limit, reliable operation of the devices can no longer be guaranteed.

Modulated light

The devices in this catalogue use modulated light, i.e. the phototransmitter is only switched on briefly and remains switched off for a much longer time (ratio of approx.1:25). With diffuse sensors and retro-reflective sensors, the receiver is only active during the light pulse. It is closed between the pulses. Operation with modulated light offers the following benefits:

- The devices are largely insensitive to extraneous light
- Greater switching distances are possible
- Small temperature rise of the transmitter diodes and therefore longer service life

Laser

S00D and S00E sensors correspond with laser safety class 1 to EN 60825-1:2007.

Devices of laser protection class 1 are safe due to their radiation level; these

devices cannot pose a threat to human life. Protective eyewear is not required when using these devices; the use of optical instruments for direct observation of the laser beam is also harmless.

Polarising filter

Natural light (and light from the transmitter diodes) is unpolarised. However, when light goes through a polarising filter, only the portion of the original light that moves in the polarising direction of the filter is still available. Polarisation is retained with reflection on reflective surfaces; only the polarising direction can change. On the other hand, diffuse reflection destroys polarisation. This difference is used for suppression of the interference effects on retro-reflective sensors caused by reflective surfaces.

Switching frequency

The maximum switching frequency is determined with the aid of a rotating slotted disc. The disc, which is positioned in the light beam, is designed to produce a bright/dark ratio of 1:1. The maximum switching frequency is achieved when no output signal pulses are lost.

Magnetic fields

Permanent magnetic fields and low-frequency alternating fields do not normally affect the function of optical sensors.

Temperature influence

The set switching distances are subject to a minor temperature influence. Most devices have temperature compensation, so that the influence is typically below 0.4%/K.

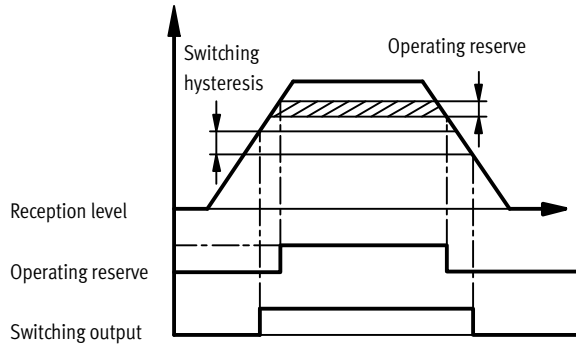
Optoelectronic sensors S00D, S00E

Key features

Operational reserve display

The display of the operating reserve detects the excess radiant energy that falls on the receiver and is processed by the photoreceiver. Operating reserve may diminish over a period of time due to contamination, changing reflection factor of the object to be scanned and ageing of the transmitter diode, so that reliable operation is no longer assured.

The sensors are therefore equipped with a second LED that indicates if less than approx. 80% of the available switching distance is used. In addition, S00E sensors emit a corresponding signal via IO-Link®. Conditions in which reliable operation is no longer guaranteed can therefore be recognised at an early stage.



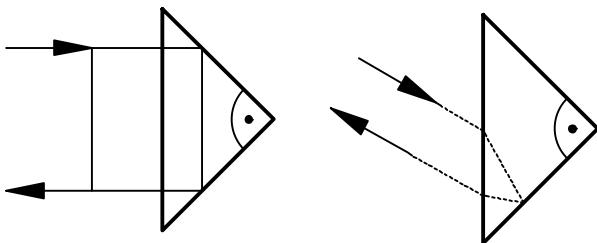
Reflectors

Retro-reflective sensors are equipped with polarising filters that ensure that they respond only to light returned by special reflectors. These reflectors function according to the principle of a corner cube. The choice of the right reflector for a specific application will be determined by the required switching distance and the available mounting facilities. The reflector should be installed perpendicular to the optical axis (tolerance $\pm 15^\circ$). SARA reflectors and reflective foils are available in various sizes and with different optical structures. The resolution of the structure approximately corresponds to the size of the corner cube.

- Structural width of reflector > 2 mm - standard
- Structural width of reflector 1 ... 2 mm - mini
- Structural width of reflector < 1 mm - micro

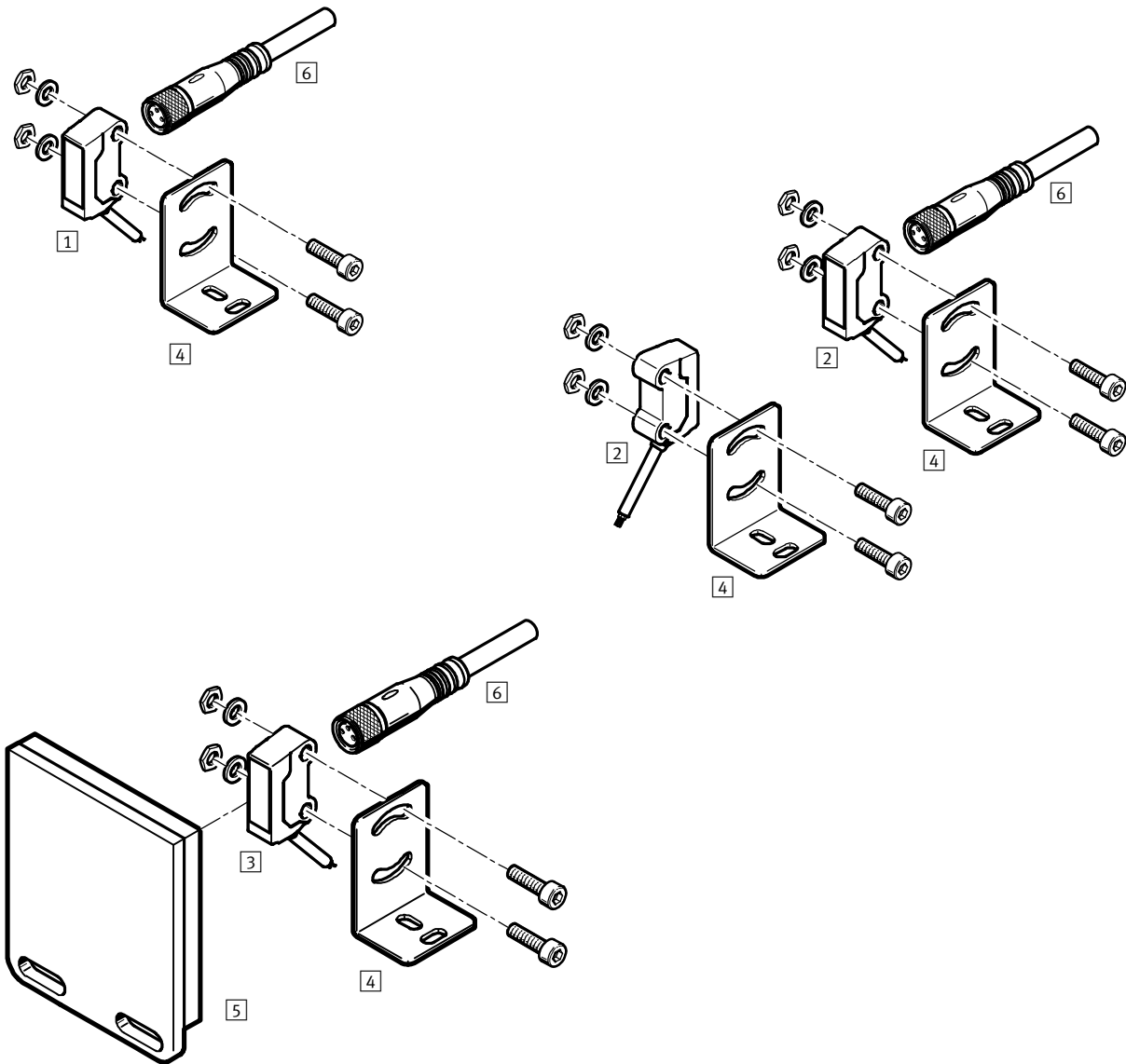
Small optical structures (mini/micro) are very well suited for laser sensors, but have the disadvantage that they reflect slightly less light and therefore have a smaller detection range.

Laser sensors should not be used at extremely short distances with reflectors having large optical structures (standard). For detailed information, see the operating instructions of the sensors on the Support Portal.



Optoelectronic sensors S00D

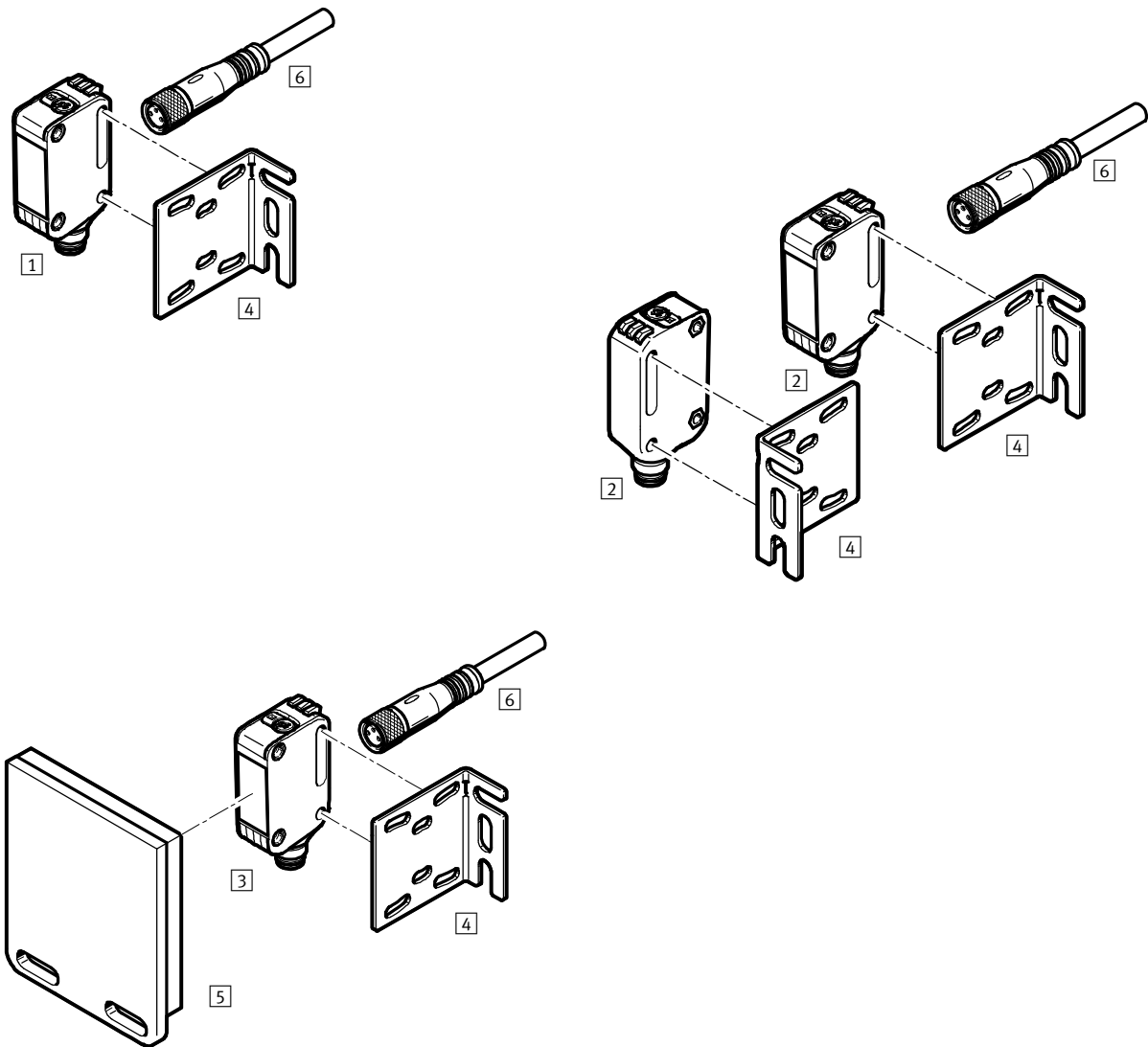
Peripherals overview



Accessories	Brief description	→ Page/Internet
1 S00D-B5-...	Laser diffuse sensor with background suppression	12
2 S00D-TB-...	Through-beam sensor	18
3 S00D-RS-...	Retro-reflective sensor	21
4 SAMH-L2-...	Mounting bracket	50
5 SARA-R-...	Reflector, reflective foil	54
6 NEBU-M8G3-...	Connecting cables M8x1	57

Optoelectronic sensors SOOE

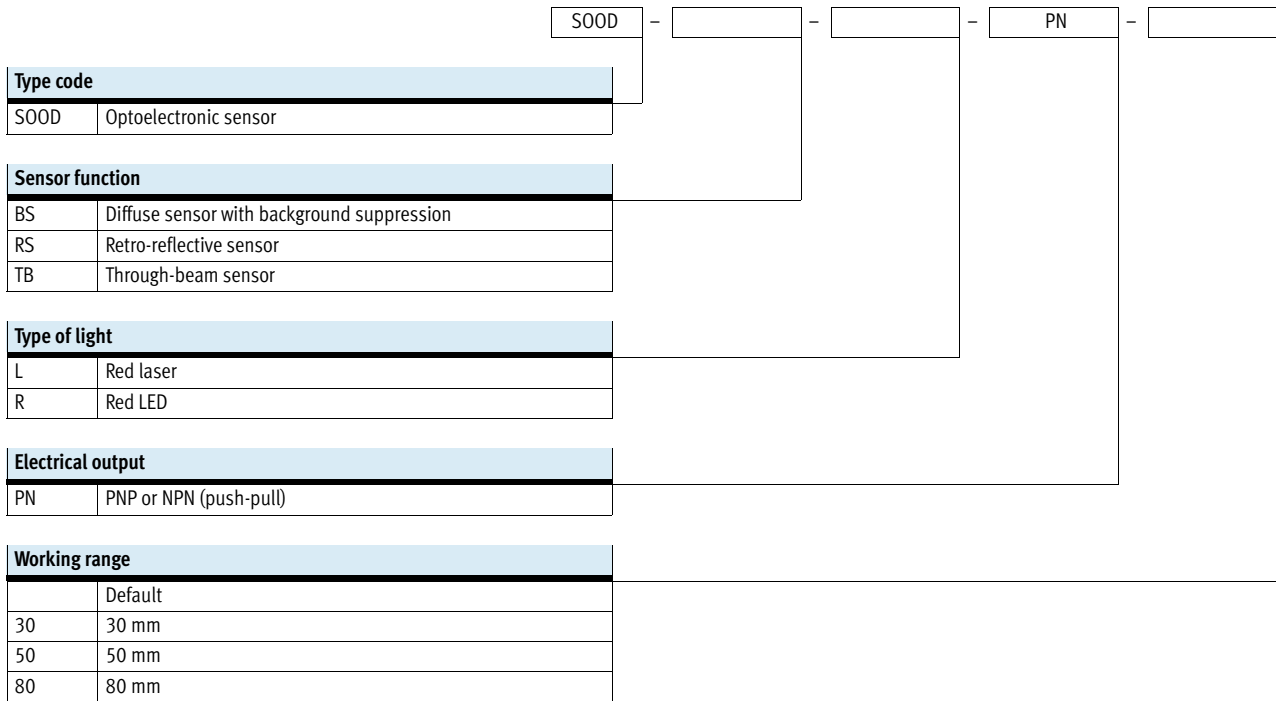
Peripherals overview



Accessories	Brief description	→ Page/Internet
1 SOOE-RS...	Retro-reflective sensor	32
2 SOOE-TB...	Through-beam sensor	28
3 SOOE-BS...	Retro-reflective sensor with background suppression	24
4 SAMH-L3...	Mounting bracket	52
5 SARA-R...	Reflector, reflective foil	54
6 NEBU-M8G3...	Connecting cables M8x1	57

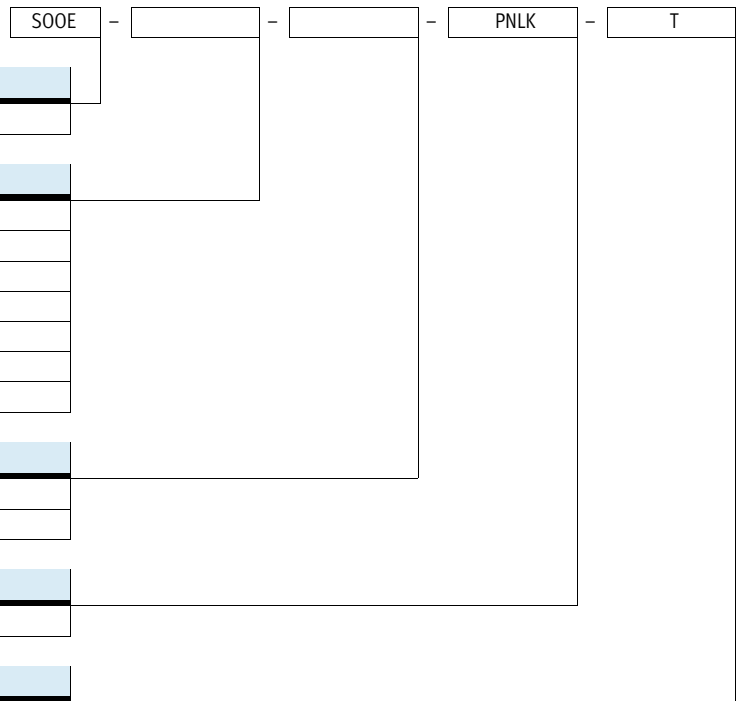
Optoelectronic sensors S00D

Type codes



Optoelectronic sensors S00E

Type codes



Type code

S00E	Optoelectronic sensor
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Sensor function

BS	Diffuse sensor with background suppression
DS	Diffuse sensor
KS	Contrast sensor
MS	Distance sensor
RG	Retro-reflective sensor for transparent objects
RS	Retro-reflective sensor
TB	Through-beam sensor

Type of light

L	Red laser
R	Red LED

Electrical output

PNLK	PNP or NPN or IO-Link®
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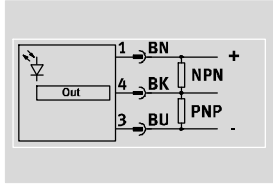
Setting options

T	Teach-in
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Diffuse sensors with background suppression SOOD

Technical data

Function
SOOD-BS-R-...



General technical data	
Design	Block design
Conforms to standard	EN 60947-5-2
Certification	RCM mark c UL us - Recognized (OL)
CE marking (see declaration of conformity)	To EU EMC Directive To EU RoHS Directive
Certificate issuing authority	UL E232949
Note on materials	RoHS-compliant

Input signal/measuring element	SOOD-BS-R-PN-30	SOOD-BS-R-PN-50	SOOD-BS-R-PN-80
Measuring principle	Optoelectronic		
Detection method	Diffuse sensor with background suppression		
Type of light	Red LED		
Max. light spot	2 mm at sensing range 30 mm	3.5 mm at sensing range 50 mm	5 mm at sensing range 80 mm
Minimum object diameter [mm]	2	3.5	5
Working range [mm]	1 ... 30	3 ... 50	15 ... 80
Ambient temperature [°C]	-25 ... 60		

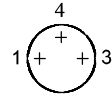
Signal processing	SOOD-BS-R-PN-30	SOOD-BS-R-PN-50	SOOD-BS-R-PN-80
Max. black-white difference [%]	7	15	20
Reference material	Standard white 90%, 100 x 100 mm		

Switching output	SOOD-BS-R-PN-30	SOOD-BS-R-PN-50	SOOD-BS-R-PN-80
Switching output	Push-pull		
Switching element function	PNP, light switching NPN, dark switching		
Hysteresis [mm]	0.3	0.5	2.4
Max. switching frequency [Hz]	800		
Max. output current [mA]	50		
Voltage drop [V]	0 ... 1.5		

Electronic system	
Operating voltage range [V]	10 ... 30
Residual ripple [%]	10
Idle current [mA]	10
Short circuit protection	Pulsed
Reverse polarity protection	For all electrical connections

Diffuse sensors with background suppression S00D

Technical data

Electromechanical components	
Electrical connection 1	
Connection pattern	
Connection type	Cable with plug
Connection technology	M8x1, A-coded to EN 61076-2-104
Number of poles/wires	3
Type of mounting	Screw-type lock
Material of pin contacts	Brass, gold-plated
Cable length [mm]	150
Cable property	Standard
Material of cable sheath	TPE-U(PUR)

Mechanical system	
Type of mounting	Via through-hole
Tightening torque [Nm]	0.5
Mounting position	Optional
Product weight [g]	10
Housing material	ABS
	PC
	TPE-U(PU)

Display/operation	
Ready status indication	Green LED
Switching status indication	Yellow LED

Immissions/emissions	
Degree of protection	IP65, IP67
Laser safety class	–
Insulation voltage [V]	500
Surge voltage resistance [kV]	1
Contamination level	3
Corrosion resistance class CRC ¹⁾	1

1) Corrosion resistance class CRC 1 to Festo standard FN 940070

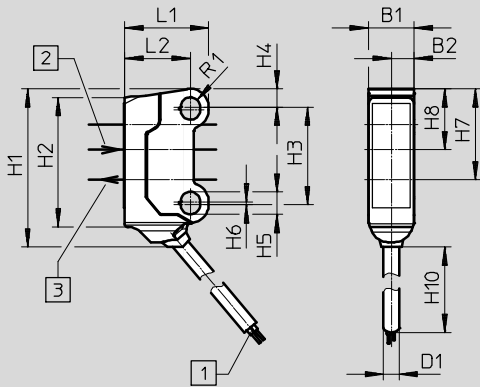
Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Diffuse sensors with background suppression SOOD

Technical data

Dimensions

Download CAD data → www.festo.com




- 1 Plug M8x1, 3-pin
- 2 Receiver
- 3 Transmitter

Type code	B1	B2	D1 Ø	H1	H2	H3	H4	H5
SOOD-BS-R-PN-30	7.5	3.8	2.6	26	21.2	16	3	3.7
SOOD-BS-R-PN-50								
SOOD-BS-R-PN-80								

Type code	H6	H7	H8	H10	L1	L2	R1
SOOD-BS-R-PN-30	0.5	14.9	10	150 (+20)	13.8	10.8	1.6
SOOD-BS-R-PN-50			10				
SOOD-BS-R-PN-80			5.9				

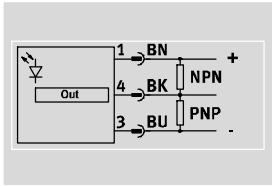
Ordering data

		Part no.	Type code
	Diffuse sensor with background suppression	8075653	SOOD-BS-R-PN-30
		8075654	SOOD-BS-R-PN-50
		8075655	SOOD-BS-R-PN-80

Laser diffuse sensors with background suppression SOOD

Technical data

Function
SOOD-BS-L-...



General technical data	
Design	Block design
Conforms to standard	EN 60947-5-2
Certification	RCM mark c UL us - Recognized (OL)
CE marking (see declaration of conformity)	To EU EMC Directive To EU RoHS Directive
Certificate issuing authority	UL E232949
Note on materials	RoHS-compliant

Input signal/measuring element	SOOD-BS-L-PN-30	SOOD-BS-L-PN-50	SOOD-BS-L-PN-80
Measuring principle	Optoelectronic		
Detection method	Diffuse sensor with background suppression		
Type of light	Red laser		
Max. light spot	1 mm at sensing range 30 mm	1.5 mm at sensing range 50 mm	2 mm at sensing range 80 mm
Minimum object diameter [mm]	1	1.5	2
Working range [mm]	7 ... 30	7 ... 50	20 ... 80
Ambient temperature [°C]	-20 ... 60		

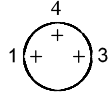
Signal processing	SOOD-BS-L-PN-30	SOOD-BS-L-PN-50	SOOD-BS-L-PN-80
Max. black-white difference [%]	8	13	15
Reference material	Standard white 90%, 100 x 100 mm		

Switching output	SOOD-BS-L-PN-30	SOOD-BS-L-PN-50	SOOD-BS-L-PN-80
Switching output	Push-pull		
Switching element function	PNP, light switching NPN, dark switching		
Hysteresis [mm]	0.3	1	2.4
Max. switching frequency [Hz]	2000		
Max. output current [mA]	50		
Voltage drop [V]	0 ... 1.5		

Electronic system	
Operating voltage range [V]	10 ... 30
Residual ripple [%]	10
Idle current [mA]	10
Short circuit protection	Pulsed
Reverse polarity protection	For all electrical connections

Laser diffuse sensors with background suppression S00D

Technical data

Electromechanical components	
Electrical connection 1	
Connection pattern	
Connection type	Cable with plug
Connection technology	M8x1, A-coded to EN 61076-2-104
Number of poles/wires	3
Type of mounting	Screw-type lock
Material of pin contacts	Brass, gold-plated
Cable length [mm]	150
Cable property	Standard
Material of cable sheath	TPE-U(PUR)

Mechanical system	
Type of mounting	Via through-hole
Tightening torque [Nm]	0.5
Mounting position	Optional
Product weight [g]	10
Housing material	ABS PC TPE-U(PU)

Display/operation	
Ready status indication	Green LED
Switching status indication	Yellow LED

Immissions/emissions	
Degree of protection	IP65, IP67
Laser safety class	1
Insulation voltage [V]	500
Surge voltage resistance [kV]	1
Contamination level	3
Corrosion resistance class CRC ¹⁾	1

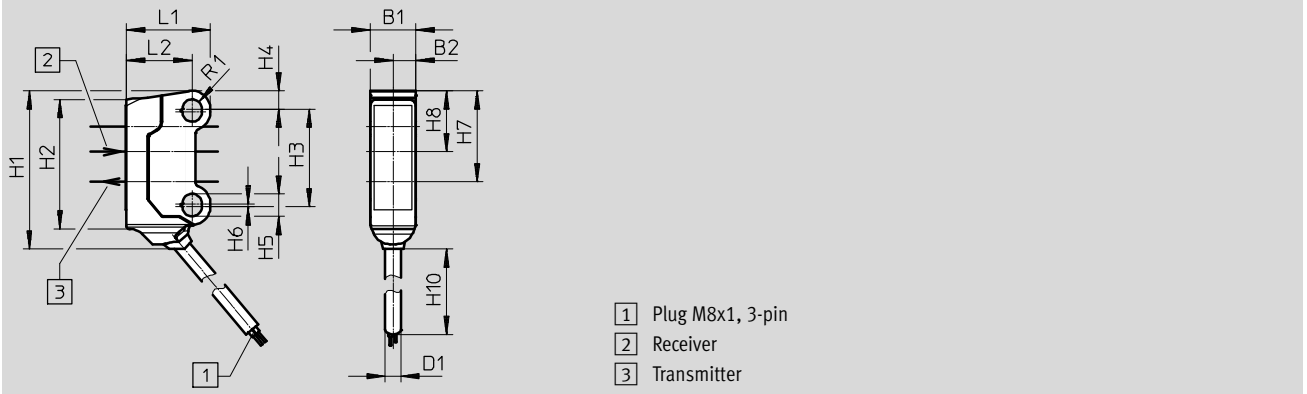
1) Corrosion resistance class CRC 1 to Festo standard FN 940070
Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Laser diffuse sensors with background suppression SOOD

Technical data

Dimensions


Download CAD data → www.festo.com



Type code	B1	B2	D1 Ø	H1	H2	H3	H4	H5
SOOD-BS-L-PN-30	7.5	3.8	2.6	26	21.2	16	3	3.7
SOOD-BS-L-PN-50								
SOOD-BS-L-PN-80								

Type code	H6	H7	H8	H10	L1	L2	R1
SOOD-BS-L-PN-30	0.5	14.9	10	150 (+20)	13.8	10.8	1.6
SOOD-BS-L-PN-50			10				
SOOD-BS-L-PN-80			5.9				

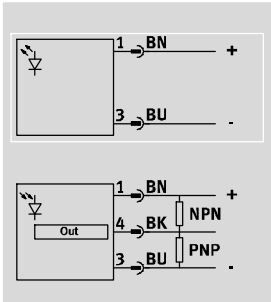
Ordering data

		Part no.	Type code
	Laser diffuse sensor with background suppression	8075658	SOOD-BS-L-PN-30
		8075659	SOOD-BS-L-PN-50
		8075660	SOOD-BS-L-PN-80

Through-beam sensors S00D

Technical data

Function
S00D-TB-...



General technical data	
Design	Block design
Conforms to standard	EN 60947-5-2
Certification	RCM mark c UL us - Recognized (OL)
CE marking (see declaration of conformity)	To EU EMC Directive To EU RoHS Directive
Certificate issuing authority	UL E232949
Note on materials	RoHS-compliant

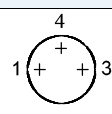
Input signal/measuring element	S00D-TB-R-PN	S00D-TB-L-PN
Measuring principle	Optoelectronic	
Detection method	Through-beam sensor	
	Transmitter	
	Receiver	
Type of light	Red LED	Red laser
Max. light spot	150 mm at 2000 mm	20 mm at 10000 mm
Working range [mm]	0 ... 2000	0 ... 10000
Ambient temperature [°C]	-25 ... 60	-20 ... 60

Switching output	S00D-TB-R-PN	S00D-TB-L-PN
Switching output	Push-pull	
Switching element function	PNP, dark switching	
	NPN, light switching	
Max. switching frequency [Hz]	800	2000
Max. output current [mA]	50	
Voltage drop [V]	0 ... 1.5	

Electronic system		
Operating voltage range [V]	10 ... 30	
Residual ripple [%]	10	
Idle current [mA]	11	
Short circuit protection	Pulsed	
Reverse polarity protection	For all electrical connections	

Through-beam sensors S00D

Technical data

Electromechanical components	
Electrical connection 1	
Connection pattern	
Connection type	Cable with plug
Connection technology	M8x1, A-coded to EN 61076-2-104
Number of poles/wires	3
Type of mounting	Screw-type lock
Material of pin contacts	Brass, gold-plated
Cable length [mm]	150
Cable property	Standard
Material of cable sheath	TPE-U(PUR)

Mechanical system	
Type of mounting	Via through-hole
Tightening torque [Nm]	0.5
Mounting position	Optional
Product weight [g]	20
Housing material	ABS
	PC
	TPE-U(PU)

Display/operation	
Ready status indication	Green LED
Switching status indication	Yellow LED
Function reserve indication	LED, flashing yellow

Immissions/emissions	S00D-TB-R-PN	S00D-TB-L-PN
Degree of protection	IP65, IP67	
Laser safety class	-	1
Insulation voltage [V]	500	
Surge voltage resistance [kV]	1	
Contamination level	3	
Corrosion resistance class CRC ¹⁾	1	

1) Corrosion resistance class CRC 1 to Festo standard FN 940070

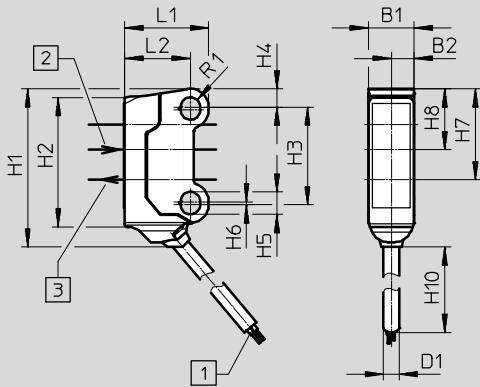
Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Through-beam sensors S00D

Technical data

Dimensions

Download CAD data → www.festo.com




- 1 Plug M8x1, 3-pin
- 2 Receiver
- 3 Transmitter

Type code	B1	B2	D1 Ø	H1	H2	H3	H4	H5
S00D-TB-R-PN	7.5	3.8	2.6	26	21.2	16	3	3.7
S00D-TB-L-PN								

Type code	H6	H7	H8	H10	L1	L2	R1
S00D-TB-R-PN	0.5	14.9	10	150 (+20)	13.8	10.8	1.6
S00D-TB-L-PN		10					

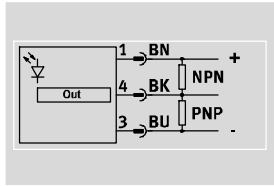
Ordering data

		Part no.	Type code
	Through-beam sensor (transmitter and receiver included in the delivery)	8075656	S00D-TB-R-PN
	Laser through-beam sensor (transmitter and receiver included in the delivery)	8075661	S00D-TB-L-PN

Retro-reflective sensors S00D

Technical data

Function
S00D-RS-...



General technical data	
Design	Block design
Conforms to standard	EN 60947-5-2
Certification	RCM mark c UL us - Recognized (OL)
CE marking (see declaration of conformity)	To EU EMC Directive To EU RoHS Directive
Certificate issuing authority	UL E232949
Note on materials	RoHS-compliant

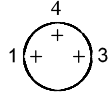
Input signal/measuring element	S00D-RS-R-PN	S00D-RS-L-PN
Measuring principle	Optoelectronic	
Detection method	Retro-reflective sensor	
Type of light	Red LED	Red laser
Max. light spot	60 mm at 800 mm	35 mm at 2000 mm
Working range [mm]	0 ... 1000	0 ... 2000
Reference material	Reference reflector (SARA-R-Q50-S)	
Ambient temperature [°C]	-25 ... 60	-20 ... 60

Switching output	S00D-RS-R-PN	S00D-RS-L-PN
Switching output	Push-pull	
Switching element function	PNP, dark switching NPN, light switching	
Max. switching frequency [Hz]	800	2000
Max. output current [mA]	50	
Voltage drop [V]	0 ... 1.5	

Electronic system		
Operating voltage range [V]	10 ... 30	
Residual ripple [%]	10	
Idle current [mA]	10	
Short circuit protection	Pulsed	
Reverse polarity protection	For all electrical connections	

Retro-reflective sensors S00D

Technical data

Electromechanical components	
Electrical connection 1	
Connection pattern	
Connection type	Cable with plug
Connection technology	M8x1, A-coded to EN 61076-2-104
Number of poles/wires	3
Type of mounting	Screw-type lock
Material of pin contacts	Brass, gold-plated
Cable length [mm]	150
Cable property	Standard
Material of cable sheath	TPE-U(PUR)

Mechanical system	
Type of mounting	Via through-hole
Tightening torque [Nm]	0.5
Mounting position	Optional
Product weight [g]	10
Housing material	ABS PC TPE-U(PU)

Display/operation	
Ready status indication	Green LED
Switching status indication	Yellow LED
Function reserve indication	LED, flashing yellow

Immissions/emissions	S00D-RS-R-PN	S00D-RS-L-PN
Degree of protection	IP65, IP67	
Laser safety class	–	1
Insulation voltage [V]	500	
Surge voltage resistance [kV]	1	
Contamination level	3	
Corrosion resistance class CRC ¹⁾	1	

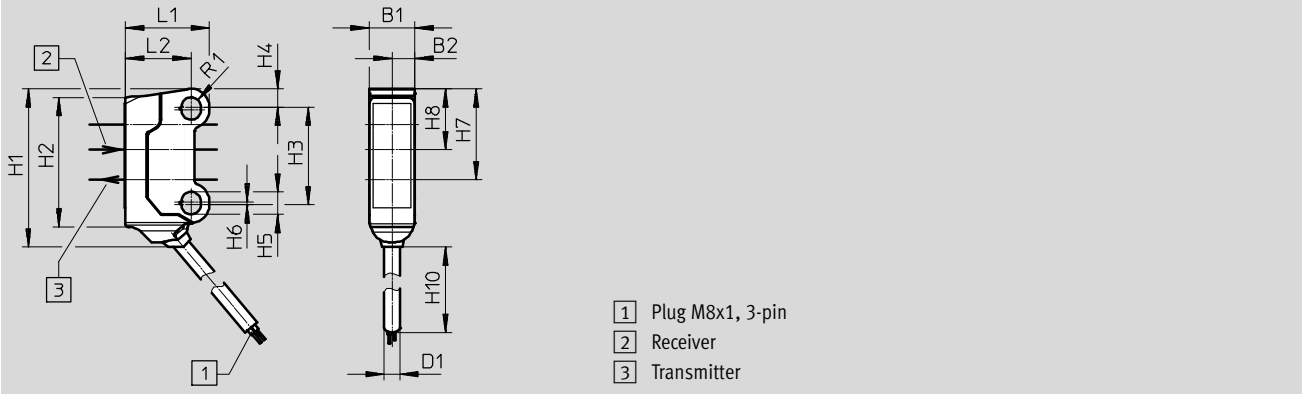
1) Corrosion resistance class CRC 1 to Festo standard FN 940070
 Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Retro-reflective sensors SOOD

Technical data

Dimensions


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Type code	B1	B2	D1 ∅	H1	H2	H3	H4	H5
SOOD-RS-R-PN	7.5	3.8	2.6	26	21.2	16	3	3.7
SOOD-RS-L-PN								

Type code	H6	H7	H8	H10	L1	L2	R1
SOOD-RS-R-PN	0.5	14.9	10	150 (+20)	13.8	10.8	1.6
SOOD-RS-L-PN							

Ordering data

		Part no.	Type code
	Retro-reflective sensor	8075657	SOOD-RS-R-PN
	Laser retro-reflective sensor	8075662	SOOD-RS-L-PN

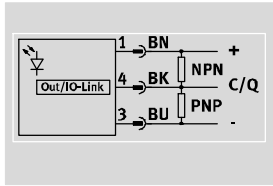
Accessories	Working range [mm]		Part no.	Type code
	SOOD-RS-R-PN	SOOD-RS-L-PN		
Reflector	40 ... 1000	100 ... 2000	8084159	SARA-R-Q50-S
Reflector	100 ... 1200	150 ... 1800	8084160	SARA-R-Q50-MC
Reflective foil	100 ... 800	250 ... 600	8084162	SARA-RF-Q100-S
Reflective foil	100 ... 2000	150 ... 2000	8084163	SARA-RF-Q100-MC
Reflector	40 ... 1000	200 ... 1500	8084164	SARA-R-Q20-S
Reflector	100 ... 800	150 ... 1500	8084165	SARA-R-Q20-MC
Reflector	100 ... 500	150 ... 1000	8084167	SARA-R-Q14-M
Reflector	100 ... 800	250 ... 1200	8084168	SARA-R-D20-M

Diffuse sensors with background suppression SOOE

Technical data

Function

SOOE-BS...



General technical data	
Design	Block design
Conforms to standard	EN 60947-5-2
Certification	RCM mark c UL us - Listed (OL)
CE marking (see declaration of conformity)	To EU EMC Directive To EU RoHS Directive
Certificate issuing authority	UL E232949
Note on materials	RoHS-compliant

Input signal/measuring element	SOOE-BS-R-PNLK-T	SOOE-BS-L-PNLK-T
Measuring principle	Optoelectronic	
Detection method	Diffuse sensor with background suppression	
Type of light	Red LED	Red laser
Max. light spot	20 mm at sensing range 350 mm	1 mm at sensing range 200 mm
Minimum object diameter [mm]	10	2
Working range [mm]	5 ... 350	7 ... 300
Ambient temperature [°C]	-40 ... 60	

Signal processing	SOOE-BS-R-PNLK-T	SOOE-BS-L-PNLK-T
Max. black-white difference [%]	15	45
Reference material	Standard white 90%, 100 x 100 mm	

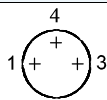
Switching output	SOOE-BS-R-PNLK-T	SOOE-BS-L-PNLK-T
Switching output	Push-pull	
Switching element function	PNP, light switching NPN, dark switching	
Hysteresis [mm]	21	18
Max. switching frequency [Hz]	500	1650
Max. output current [mA]	100	
Voltage drop [V]	0 ... 1.5	

Diffuse sensors with background suppression SOOE

Technical data

Communication interface	
Protocol	IO-Link®
IO-Link®, profile	Smart sensor profile
IO-Link®, function classes	Process data variable (PDV)
	Identification
	Diagnostics
	Teach-in channel
	Switching signal channel (SSC)
IO-Link®, protocol version	Device V 1.1
IO-Link®, communication mode	COM2 (38.4 kBaud)
IO-Link®, SIO mode support	Yes
IO-Link®, port class	A
IO-Link®, process data width OUT	2 bit
IO-Link®, process data content OUT	1 bit (emitter disable)
	1 bit (hold)
IO-Link®, process data width IN	1 bit
IO-Link®, process data content IN	1 bit SSC (switching signal)
IO-Link®, minimum cycle time [ms]	2.3
IO-Link®, data memory required	2 KB

Electronic system		
Operating voltage range	[V]	10 ... 30
Residual ripple	[%]	10
Idle current	[mA]	25
Timer function		Via IO-Link®
Short circuit protection		Pulsed
Reverse polarity protection		For all electrical connections

Electromechanical components	
Electrical connection 1	
Connection pattern	
Connection type	Plug
Connection technology	M8x1, A-coded to EN 61076-2-104
Number of poles/wires	3
Material of pin contacts	Brass, gold-plated

Diffuse sensors with background suppression SOOE

Technical data

Mechanical components		
Type of mounting		Screw-type lock with through-hole for screw M3
Tightening torque	[Nm]	0.8
Mounting position		Any
Product weight	[g]	10
Housing material		PMMA
		PC

Display/operation		SOOE-BS-R-PNLK-T	SOOE-BS-L-PNLK-T
Setting options		Teach-in	
		Potentiometer	
		IO-Link®	
Setting range, lower limit	[mm]	25	25
Setting range, upper limit	[mm]	350	300
Ready status indication		Green LED	
Switching status indication		Yellow LED	

Immissions/emissions		
Degree of protection		IP65, IP67, IP69K
Laser safety class		–
Insulation voltage	[V]	500
Surge voltage resistance	[kV]	1
Contamination level		3
Corrosion resistance class CRC ¹⁾		1

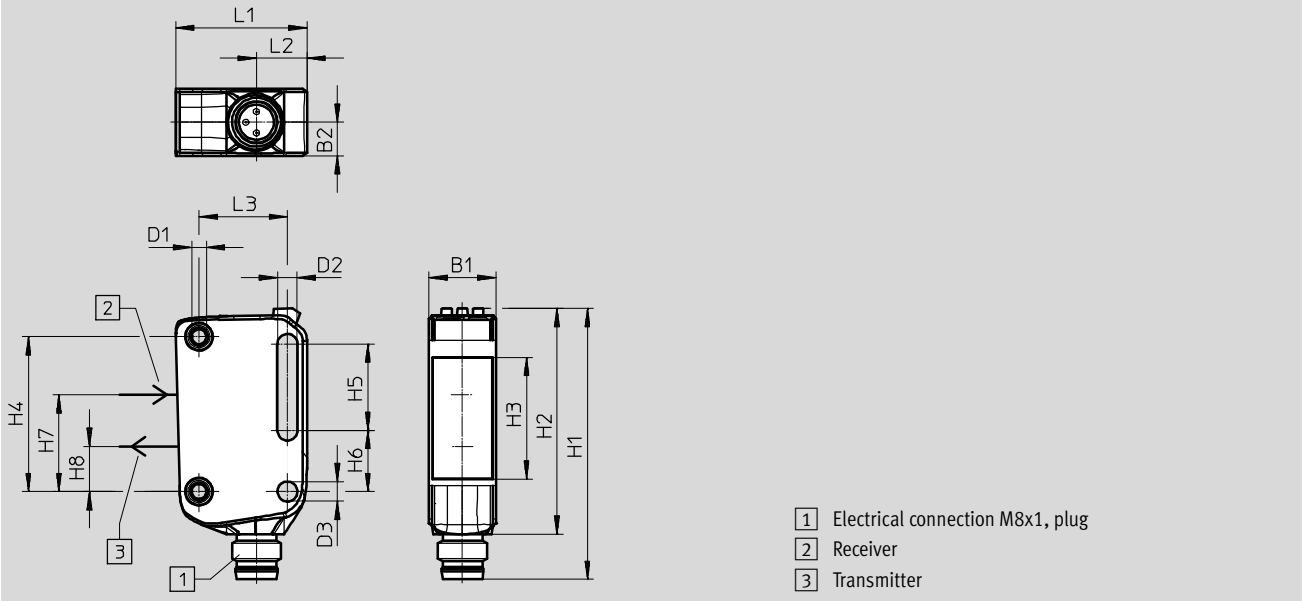
1) Corrosion resistance class CRC 1 to Festo standard FN 940070
 Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Diffuse sensors with background suppression SOOE

Technical data

Dimensions


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Type code	B1	B2	D1	D2	D3 ∅	H1	H2	H3
SOOE-BS-R-PNLK-T	11	5.5	M3	3.2	3.2	44.5	37.1	20
SOOE-BS-L-PNLK-T								

Type code	H4	H5	H6	H7	H8	L1	L2	L3
SOOE-BS-R-PNLK-T	25.4	14.2	10	15.9	7.4	21.5	8.3	14.5
SOOE-BS-L-PNLK-T								

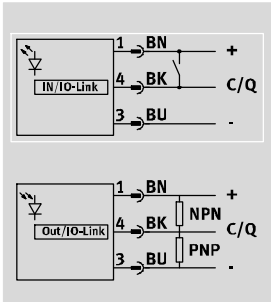
Ordering data

		Part no.	Type code
	Diffuse sensor with background suppression	8075664	SOOE-BS-R-PNLK-T
	Laser diffuse sensor with background suppression	8075670	SOOE-BS-L-PNLK-T

Through-beam sensors SOOE

Technical data

Function
SOOE-TB-...



General technical data	
Design	Block design
Conforms to standard	EN 60947-5-2
Certification	RCM mark
	c UL us - Listed (OL)
CE marking (see declaration of conformity)	To EU EMC Directive
	To EU RoHS Directive
Certificate issuing authority	UL E232949
Note on materials	RoHS-compliant

Input signal/measuring element	SOOE-TB-R-PNLK-T	SOOE-TB-L-PNLK-T
Measuring principle	Optoelectronic	
Detection method	Through-beam sensor	
	Transmitter	
	Receiver	
Type of light	Red LED	Red laser
Max. light spot	65 mm at 1000 mm	50 mm at 20000 mm
Working range [mm]	0 ... 12000	0 ... 20000
Ambient temperature [°C]	-40 ... 60	

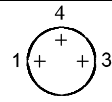
Switching output	SOOE-TB-R-PNLK-T	SOOE-TB-L-PNLK-T
Switching output	Push-pull	
Switching element function	PNP, dark switching	
	NPN, light switching	
Max. switching frequency [Hz]	1000	1250
Max. output current [mA]	100	
Voltage drop [V]	0 ... 1.5	

Through-beam sensors SOOE

Technical data

Communication interface	
Protocol	IO-Link®
IO-Link®, protocol version	Device V 1.1
IO-Link®, communication mode	COM2 (38.4 kBaud)
IO-Link®, SIO mode support	Yes
IO-Link®, port class	A
IO-Link®, process data width OUT	2 bit (receiver) 1 bit (emitter)
IO-Link®, process data content OUT	1 bit (emitter disable) 1 bit (hold)
IO-Link®, process data width IN	2 bit (receiver)
IO-Link®, process data content IN	1 bit (stability alarm) 1 bit SSC (switching signal)
IO-Link®, minimum cycle time [ms]	2.3
IO-Link®, data memory required	2 KB

Electronic system	
Operating voltage range [V]	10 ... 30
Residual ripple [%]	10
Idle current [mA]	14
Timer function	Via IO-Link®
Short circuit protection	Pulsed
Reverse polarity protection	For all electrical connections

Electromechanical system	
Electrical connection 1	
Connection pattern	
Connection type	Plug
Connection technology	M8x1, A-coded to EN 61076-2-104
Number of poles/wires	3
Material of pin contacts	Brass, gold-plated

Through-beam sensors SOOE

Technical data

Mechanical system	
Type of mounting	Screw-type lock with through-hole for screw M3
Tightening torque [Nm]	0.8
Mounting position	Optional
Product weight [g]	20
Housing material	PMMA
	PC

Display/operation	
Ready status indication	Green LED
Switching status indication	Yellow LED
Function reserve indication	LED, flashing yellow
Setting options	Teach-in
	Potentiometer
	IO-Link®

Immissions/emissions	SOOE-TB-R-PNLK-T	SOOE-TB-L-PNLK-T
Degree of protection	IP65, IP67, IP69K	
Laser safety class	–	1
Insulation voltage [V]	500	
Surge voltage resistance [kV]	1	
Contamination level	3	
Corrosion resistance class CRC ¹⁾	1	

1) Corrosion resistance class CRC 1 to Festo standard FN 940070

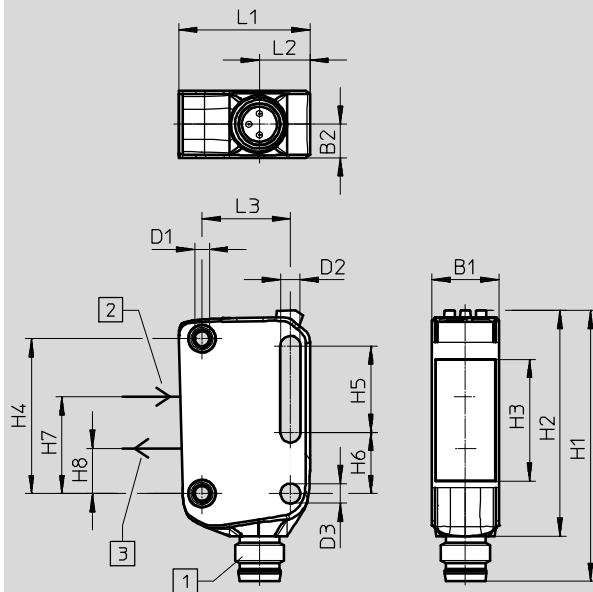
Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Through-beam sensors SOOE

Technical data

Dimensions

Download CAD data → www.festo.com




- 1 Electrical connection M8x1, plug
- 2 Receiver
- 3 Transmitter

Type code	B1	B2	D1	D2	D3 ∅	H1	H2	H3
SOOE-TB-R-PNLK-T	11	5.5	M3	3.2	3.2	44.5	37.1	20
SOOE-TB-L-PNLK-T								

Type code	H4	H5	H6	H7	H8	L1	L2	L3
SOOE-TB-R-PNLK-T	25.4	14.2	10	7.4	7.4	21.5	8.3	14.5
SOOE-TB-L-PNLK-T								

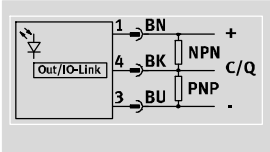
Ordering data

		Part no.	Type code
	Through-beam sensor (transmitter and receiver included in the delivery)	8075665	SOOE-TB-R-PNLK-T
	Laser through-beam sensor (transmitter and receiver included in the delivery)	8075671	SOOE-TB-L-PNLK-T

Retro-reflective sensors SOOE

Technical data

Function
SOOE-RS-...



General technical data	
Design	Block design
Conforms to standard	EN 60947-5-2
Certification	RCM mark
	c UL us - Recognized (OL)
CE marking (see declaration of conformity)	To EU EMC Directive
	To EU RoHS Directive
Certificate issuing authority	UL E232949
Note on materials	RoHS-compliant

Input signal/measuring element	SOOE-RS-R-PNLK-T	SOOE-RS-L-PNLK-T
Measuring principle	Optoelectronic	
Detection method	Retro-reflective sensor	
Type of light	Red LED	Red laser
Max. light spot	60 mm at 1000 mm	30 mm at 12000 mm
Working range [mm]	0 ... 6500	0 ... 12000
Reference material	Reference reflector SARA-R-Q50-S	
Ambient temperature [°C]	-40 ... 60	

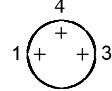
Switching output	SOOE-RS-R-PNLK-T	SOOE-RS-L-PNLK-T
Switching output	Push-pull	
Switching element function	PNP, dark switching	
	NPN, light switching	
Max. switching frequency [Hz]	1000	2000
Max. output current [mA]	100	
Voltage drop [V]	0 ... 1.5	0 ... 1.5

Communication interface	
Protocol	IO-Link®
IO-Link®, protocol version	Device V 1.1
IO-Link®, communication mode	COM2 (38.4 kBaud)
IO-Link®, SIO mode support	Yes
IO-Link®, port class	A
IO-Link®, process data width OUT	2 bit
IO-Link®, process data content OUT	1 bit (emitter disable)
	1 bit (hold)
IO-Link®, process data width IN	2 bit
IO-Link®, process data content IN	1 bit (stability alarm)
	1 bit SSC (switching signal)
IO-Link®, minimum cycle time [ms]	2.3
IO-Link®, data memory required	2 KB

Retro-reflective sensors SOOE

Technical data

Electronic system		
Operating voltage range	[V]	10 ... 30
Residual ripple	[%]	10
Idle current	[mA]	25
Timer function		Via IO-Link®
Short circuit protection		Pulsed
Reverse polarity protection		For all electrical connections

Electromechanical components	
Electrical connection 1	
Connection pattern	
Connection type	Plug
Connection technology	M8x1, A-coded to EN 61076-2-104
Number of poles/wires	3
Material of pin contacts	Brass, gold-plated

Mechanical system	
Type of mounting	Screw-type lock with through-hole for screw M3
Tightening torque	[Nm] 0.8
Mounting position	Optional
Product weight	[g] 10
Housing material	PMMA PC

Display/operation	
Setting options	Teach-in
	Potentiometer
	IO-Link®
Ready status indication	Green LED
Switching status indication	Yellow LED
Function reserve indication	LED, flashing yellow

Immissions/emissions	SOOE-RS-R-PNLK-T	SOOE-RS-L-PNLK-T
Degree of protection	IP65, IP67, IP69K	
Laser safety class	–	1
Insulation voltage	[V] 500	
Surge voltage resistance	[kV] 1	
Contamination level	3	
Corrosion resistance class CRC ¹⁾	1	

1) Corrosion resistance class CRC 1 to Festo standard FN 940070

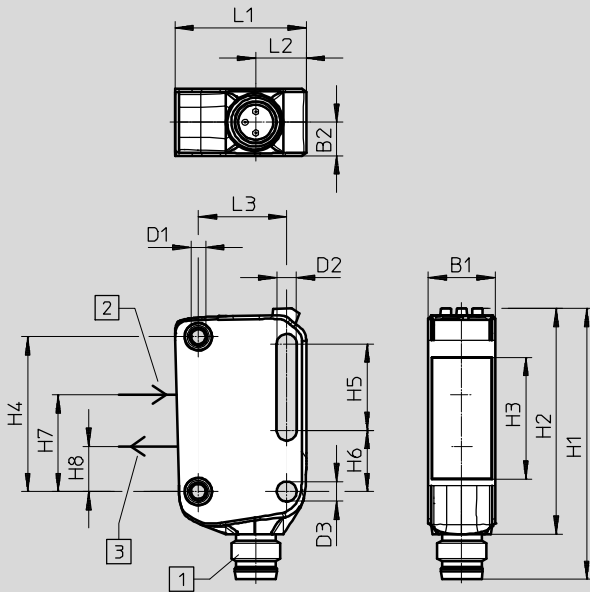
Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Retro-reflective sensors SOOE

Technical data

Dimensions

Download CAD data → www.festo.com




- 1 Electrical connection M8x1, plug
- 2 Receiver
- 3 Transmitter

Type code	B1	B2	D1	D2	D3 Ø	H1	H2	H3
SOOE-RS-R-PNLK-T	11	5.5	M3	3.2	3.2	44.5	37.1	20
SOOE-RS-L-PNLK-T								

Type code	H4	H5	H6	H7	H8	L1	L2	L3
SOOE-RS-R-PNLK-T	25.4	14.2	10	15.9	7.4	21.5	8.3	14.5
SOOE-RS-L-PNLK-T								

Ordering data

		Part no.	Type code
	Retro-reflective sensor	8075666	SOOE-RS-R-PNLK-T
	Laser retro-reflective sensor	8075672	SOOE-RS-L-PNLK-T

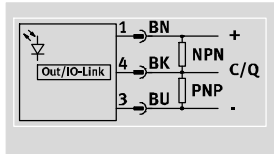
Accessories	Working range [mm]		Part no.	Type code
	SOOE-RS-R-PNLK-T	SOOE-RS-L-PNLK-T		
Reflector	40 ... 6500	300 ... 12000	8084159	SARA-R-Q50-S
Reflector	100 ... 4000	250 ... 10000	8084160	SARA-R-Q50-MC
Reflective foil	100 ... 2700	300 ... 2000	8084162	SARA-RF-Q100-S
Reflective foil	100 ... 6000	250 ... 10000	8084163	SARA-RF-Q100-MC
Reflector	40 ... 2500	300 ... 10000	8084164	SARA-R-Q20-S
Reflector	100 ... 2500	250 ... 10000	8084165	SARA-R-Q20-MC
Reflector	100 ... 1200	250 ... 8000	8084167	SARA-R-Q14-M
Reflector	100 ... 1600	300 ... 7500	8084168	SARA-R-D20-M

Retro-reflective sensors for transparent objects SOOE

Technical data

Function

SOOE-RG-R-PNLK-T



General technical data	
Design	Block design
Conforms to standard	EN 60947-5-2
Certification	RCM mark c UL us - Listed (OL)
CE marking (see declaration of conformity)	To EU EMC Directive To EU RoHS Directive
Certificate issuing authority	UL E232949
Note on materials	RoHS-compliant

Input signal/measuring element	
Measuring principle	Optoelectronic
Detection method	Retro-reflective sensor for transparent objects
Type of light	Red LED
Max. light spot	300 mm at 3500 mm
Working range [mm]	0 ... 3500
Reference material	Reference reflector SARA-R-Q50-S
Ambient temperature [°C]	-20 ... 60

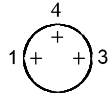
Switching output	
Switching output	Push-pull
Switching element function	PNP, dark switching NPN, light switching
Max. switching frequency [Hz]	500
Max. output current [mA]	100
Voltage drop [V]	0 ... 1.5

Communication interface	
Protocol	IO-Link®
IO-Link®, protocol version	Device V 1.1
IO-Link®, communication mode	COM2 (38.4 kBaud)
IO-Link®, SIO mode support	Yes
IO-Link®, port class	A
IO-Link®, process data width OUT	2 bit
IO-Link®, process data content OUT	1 bit (emitter disable) 1 bit (hold)
IO-Link®, process data width IN	2 bit
IO-Link®, process data content IN	1 bit (stability alarm) 1 bit SSC (switching signal)
IO-Link®, minimum cycle time [ms]	2.3
IO-Link®, data memory required	2 KB

Retro-reflective sensors for transparent objects S00E

Technical data

Electronic system		
Operating voltage range	[V]	10 ... 30
Residual ripple	[%]	10
Idle current	[mA]	25
Timer function		Via IO-Link®
Short circuit protection		Pulsed
Reverse polarity protection		For all electrical connections

Electromechanical components	
Electrical connection 1	
Connection pattern	
Connection type	Plug
Connection technology	M8x1, A-coded to EN 61076-2-104
Number of poles/wires	3
Material of pin contacts	Brass, gold-plated

Mechanical system	
Type of mounting	Screw-type lock with through-hole for screw M3
Tightening torque	[Nm] 0.8
Mounting position	Optional
Product weight	[g] 10
Housing material	PMMA PC

Display/operation	
Setting options	Teach-in
	Potentiometer
	IO-Link®
Ready status indication	Green LED
Switching status indication	Yellow LED
Function reserve indication	LED, flashing yellow

Immissions/emissions	
Degree of protection	IP65, IP67, IP69K
Laser safety class	–
Insulation voltage	[V] 500
Surge voltage resistance	[kV] 1
Contamination level	3
Corrosion resistance class CRC ¹⁾	1

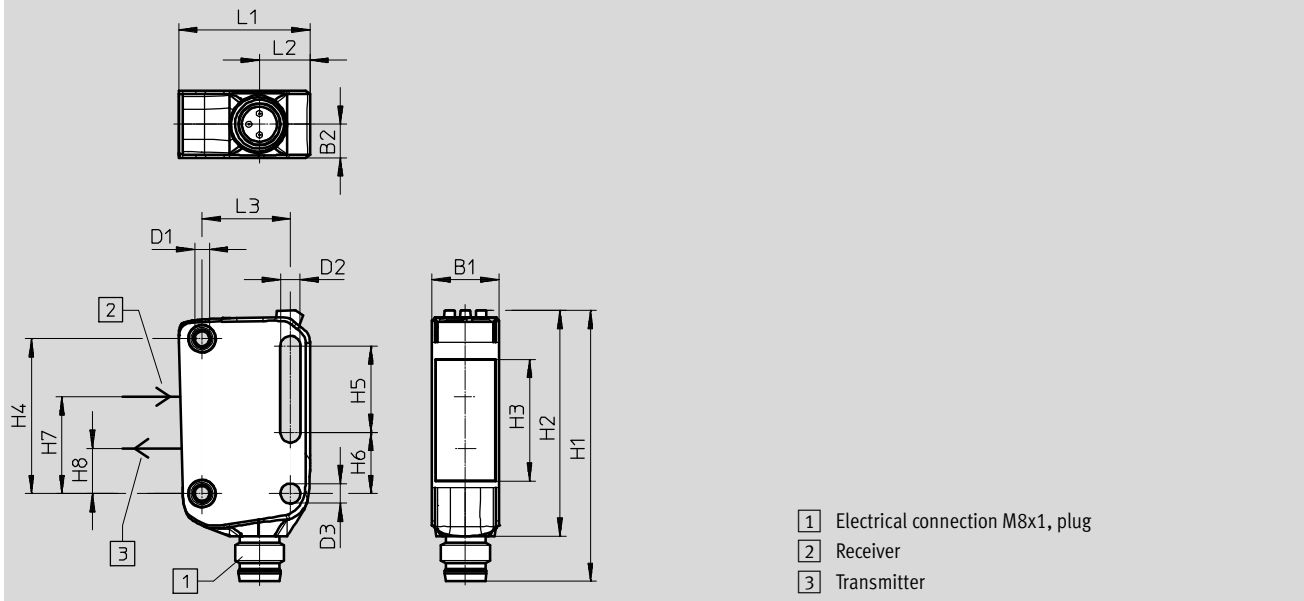
1) Corrosion resistance class CRC 1 to Festo standard FN 940070
Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Retro-reflective sensors for transparent objects SOOE

Technical data

Dimensions


Download CAD data → www.festo.com



Type code	B1	B2	D1	D2	D3 ∅	H1	H2	H3
SOOE-RG-R-PNLK-T	11	5.5	M3	3.2	3.2	44.5	37.1	20

Type code	H4	H5	H6	H7	H8	L1	L2	L3
SOOE-RG-R-PNLK-T	25.4	14.2	10	7.4	7.4	21.5	8.3	14.5

Ordering data

	Part no.	Type code
 Retro-reflective sensor for transparent objects	8075667	SOOE-RG-R-PNLK-T

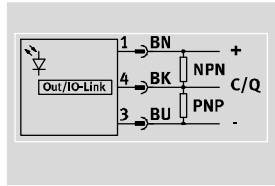
Accessories	Working range [mm]	Part no.	Type code
Reflector	1 ... 5000	8084159	SARA-R-Q50-S
Reflector	1 ... 2000	8084160	SARA-R-Q50-MC
Reflective foil	1 ... 1800	8084162	SARA-RF-Q100-S
Reflective foil	1 ... 3300	8084163	SARA-RF-Q100-MC
Reflector	1 ... 2000	8084164	SARA-R-Q20-S
Reflector	1 ... 1800	8084165	SARA-R-Q20-MC
Reflector	1 ... 1100	8084167	SARA-R-Q14-M
Reflector	1 ... 1400	8084168	SARA-R-D20-M

Diffuse sensors SOOE

Technical data

Function

SOOE-DS-R-PNLK-T



General technical data	
Design	Block design
Conforms to standard	EN 60947-5-2
Certification	RCM mark c UL us - Listed (OL)
CE marking (see declaration of conformity)	To EU EMC Directive To EU RoHS Directive
Certificate issuing authority	UL E232949
Note on materials	RoHS-compliant

Input signal/measuring element	
Measuring principle	Optoelectronic
Detection method	Diffuse sensor
Type of light	Red LED
Max. light spot	65 mm at sensing range 1000 mm
Minimum object diameter [mm]	10
Working range [mm]	2 ... 1000
Ambient temperature [°C]	-40 ... 60

Signal processing	
Max. black-white difference [%]	15
Reference material	Standard white 90%, 100 x 100 mm

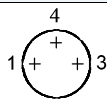
Switching output	
Switching output	Push-pull
Switching element function	PNP, light switching NPN, dark switching
Hysteresis [mm]	200
Max. switching frequency [Hz]	1000
Max. output current [mA]	100
Voltage drop [V]	0 ... 1.5

Diffuse sensors SOOE

Technical data

Communication interface	
Protocol	IO-Link®
IO-Link®, profile	Smart sensor profile
IO-Link®, function classes	Process data variable (PDV)
	Identification
	Diagnostics
	Teach-in channel
	Switching signal channel (SSC)
IO-Link®, protocol version	Device V 1.1
IO-Link®, communication mode	COM2 (38.4 kBaud)
IO-Link®, SIO mode support	Yes
IO-Link®, port class	A
IO-Link®, process data width OUT	2 bit
IO-Link®, process data content OUT	1 bit (emitter disable)
	1 bit (hold)
IO-Link®, process data width IN	1 bit
IO-Link®, process data content IN	1 bit SSC (switching signal)
IO-Link®, minimum cycle time [ms]	2.3
IO-Link®, data memory required	2 KB

Electronic system		
Operating voltage range	[V]	10 ... 30
Residual ripple	[%]	10
Idle current	[mA]	25
Timer function		Via IO-Link®
Short circuit protection		Pulsed
Reverse polarity protection		For all electrical connections

Electromechanical components	
Electrical connection 1	
Connection pattern	
Connection type	Plug
Connection technology	M8x1, A-coded to EN 61076-2-104
Number of poles/wires	3
Material of pin contacts	Brass, gold-plated

Diffuse sensors SOOE

Technical data

Mechanical system		
Type of mounting		Screw-type lock with through-hole for screw M3
Tightening torque	[Nm]	0.8
Mounting position		Optional
Product weight	[g]	10
Housing material		PMMA
		PC

Display/operation		
Setting options		Teach-in
		Potentiometer
		IO-Link®
Setting range, lower limit	[mm]	75
Setting range, upper limit	[mm]	1000
Ready status indication		Green LED
Switching status indication		Yellow LED

Immissions/emissions		
Degree of protection		IP65, IP67, IP69K
Laser safety class		–
Insulation voltage	[V]	500
Surge voltage resistance	[kV]	1
Contamination level		3
Corrosion resistance class CRC ¹⁾		1

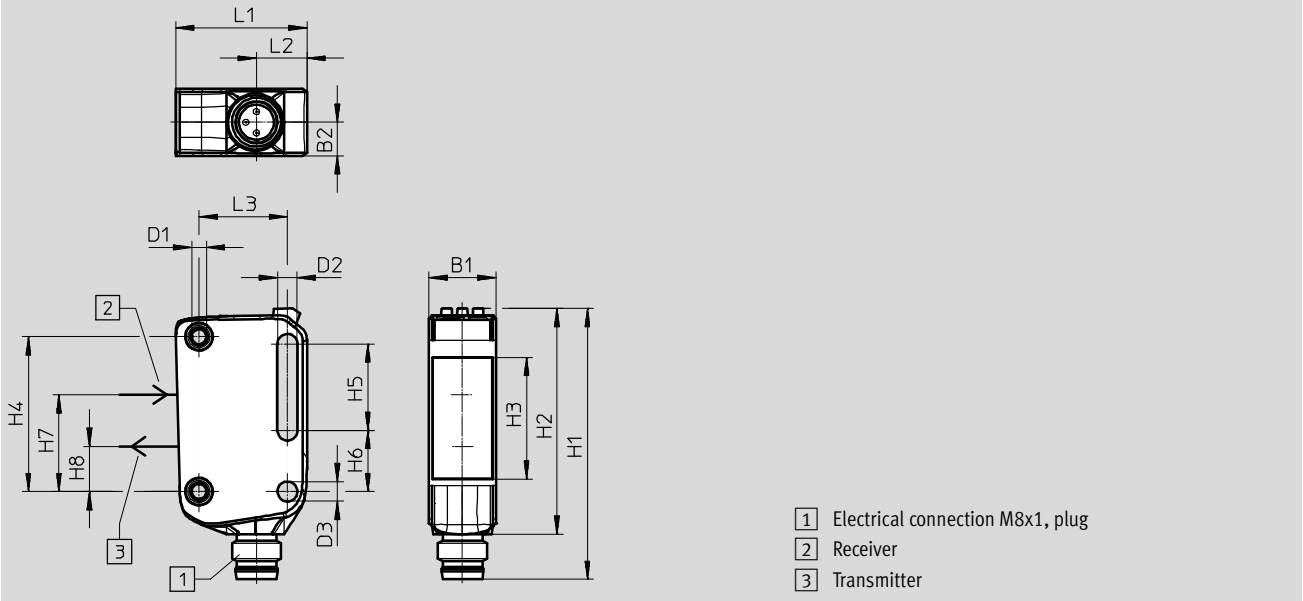
1) Corrosion resistance class CRC 1 to Festo standard FN 940070
 Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Diffuse sensors SOOE

Technical data

Dimensions


Download CAD data → www.festo.com



Type code	B1	B2	D1	D2	D3 ∅	H1	H2	H3
SOOE-DS-R-PNLK-T	11	5.5	M3	3.2	3.2	44.5	37.1	20

Type code	H4	H5	H6	H7	H8	L1	L2	L3
SOOE-DS-R-PNLK-T	25.4	14.2	10	15.9	7.4	21.5	8.3	14.5

Ordering data

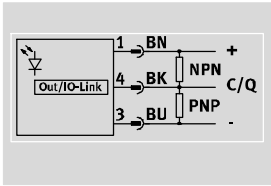
		Part no.	Type code
	Diffuse sensor	8075663	SOOE-DS-R-PNLK-T

Laser contrast sensors SOOE

Technical data

Function

SOOE-KS-L-PNLK-T



General technical data	
Design	Block design
Conforms to standard	EN 60947-5-2
Certification	RCM mark
	c UL us - Listed (OL)
CE marking (see declaration of conformity)	To EU EMC Directive
	To EU RoHS Directive
Certificate issuing authority	UL E232949
Note on materials	RoHS-compliant

Input signal/measuring element	
Measuring principle	Optoelectronic
Detection method	Laser contrast sensor
Type of light	Red laser
Max. light spot	1 mm at sensing range 60 mm
Minimum object diameter	[mm] 1
Working range	[mm] 25 ... 120
Ambient temperature	[°C] -40 ... 60

Signal processing	
Max. black-white difference	[%] 15
Reference material	Standard white 90%, 100 x 100 mm

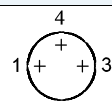
Switching output	
Switching output	Push-pull
Switching element function	PNP, light switching
	NPN, dark switching
Max. switching frequency	[Hz] 3300
Max. output current	[mA] 100
Voltage drop	[V] 0 ... 1.5

Laser contrast sensors S00E

Technical data

Communication interface	
Protocol	IO-Link®
IO-Link®, protocol version	Device V 1.1
IO-Link®, communication mode	COM2 (38.4 kBaud)
IO-Link®, SIO mode support	Yes
IO-Link®, port class	A
IO-Link®, process data width OUT	2 bit
IO-Link®, process data content OUT	1 bit (emitter disable) 1 bit (hold)
IO-Link®, process data width IN	1 bit
IO-Link®, process data content IN	1 bit SSC (switching signal)
IO-Link®, minimum cycle time [ms]	2.3
IO-Link®, data memory required	2 KB

Electronic system		
Operating voltage range	[V]	10 ... 30
Residual ripple	[%]	10
Idle current	[mA]	25
Timer function		Via IO-Link®
Short circuit protection		Pulsed
Reverse polarity protection		For all electrical connections

Electromechanical components	
Electrical connection 1	
Connection pattern	
Connection type	Plug
Connection technology	M8x1, A-coded to EN 61076-2-104
Number of poles/wires	3
Material of pin contacts	Brass, gold-plated

Laser contrast sensors S00E

Technical data

Mechanical system	
Type of mounting	Screw-type lock with through-hole for screw M3
Tightening torque [Nm]	0.8
Mounting position	Optional
Product weight [g]	10
Housing material	PMMA
	PC

Display/operation	
Setting options	Teach-in
	Potentiometer
	IO-Link®
Ready status indication	Green LED
Switching status indication	Yellow LED

Immissions/emissions	
Degree of protection	IP65, IP67, IP69K
Laser safety class	–
Insulation voltage [V]	500
Surge voltage resistance [kV]	1
Contamination level	3
Corrosion resistance class CRC ¹⁾	1

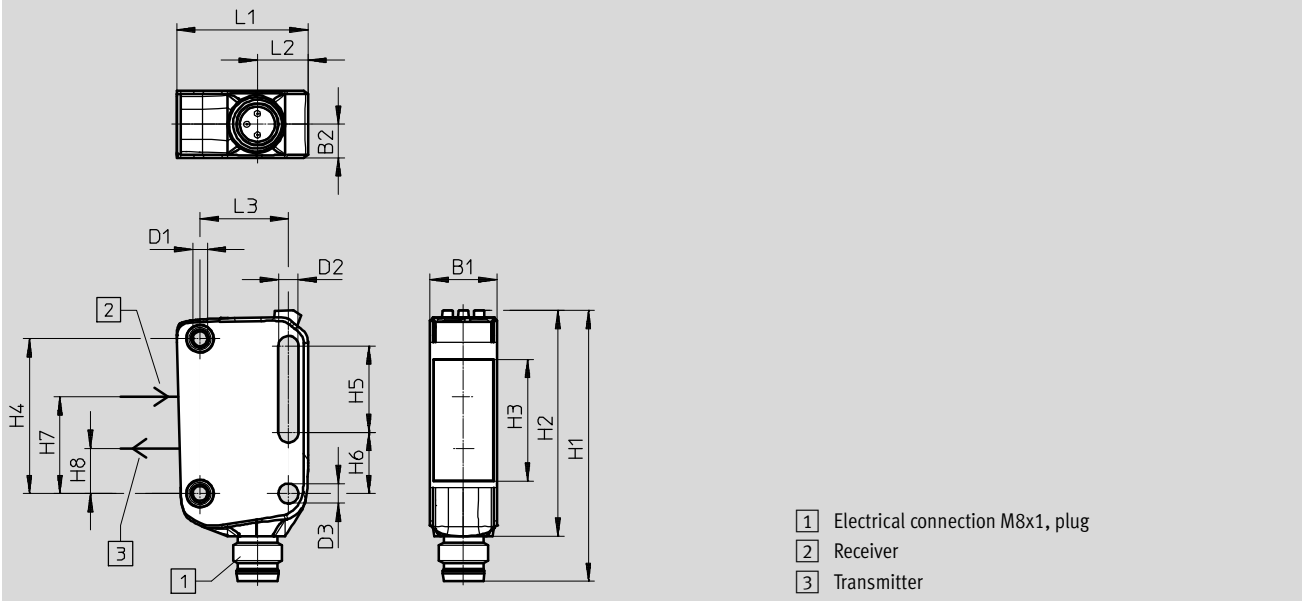
1) Corrosion resistance class CRC 1 to Festo standard FN 940070
 Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Laser contrast sensors SOOE

Technical data

Dimensions


Download CAD data → www.festo.com



Type code	B1	B2	D1	D2	D3 ∅	H1	H2	H3
SOOE-KS-L-PNLK-T	11	5.5	M3	3.2	3.2	44.5	37.1	20

Type code	H4	H5	H6	H7	H8	L1	L2	L3
SOOE-KS-L-PNLK-T	25.4	14.2	10	15.9	7.4	21.5	8.3	14.5

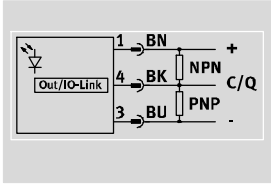
Ordering data

		Part no.	Type code
	Laser contrast sensor	8075669	SOOE-KS-L-PNLK-T

Distance sensors SOOE

Technical data

Function
SOOE-MS-...



The distance measured value is transferred via

 **IO-Link**

only.

The switching output can be programmed as a window comparator.



General technical data	
Design	Block design
Conforms to standard	EN 60947-5-2
Certification	RCM mark c UL us - Listed (OL)
CE marking (see declaration of conformity)	To EU EMC Directive To EU RoHS Directive
Certificate issuing authority	UL E232949
Note on materials	RoHS-compliant

Input signal/measuring element	SOOE-MS-R-PNLK-T	SOOE-MS-L-PNLK-T
Measuring principle	Optoelectronic	
Method of measurement	Distance sensor	
Type of light	Red LED	Red laser
Max. light spot	8 mm at sensing range 100 mm	3 mm at sensing range 100 mm
Position measuring range [mm]	40 ... 100	
Minimum object diameter [mm]	10	4
Ambient temperature [°C]	10 ... 60	

Signal processing	SOOE-MS-R-PNLK-T	SOOE-MS-L-PNLK-T
Reference material	Standard white 90%, 100 x 100 mm	
Path resolution [mm]	0.1	
Repetition accuracy [mm]	0.5	
Temperature coefficient [%/K]	0.03	

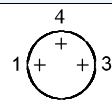
Switching output	SOOE-MS-R-PNLK-T	SOOE-MS-L-PNLK-T
Switching output	Push-pull	
Switching element function	PNP, light switching NPN, dark switching	
Max. switching frequency [Hz]	135	270
Max. output current [mA]	100	
Voltage drop [V]	0 ... 1.5	
Linearity error FS [%]	0.75	

Distance sensors S00E

Technical data

Communication interface	
Protocol	IO-Link®
IO-Link®, profile	Smart sensor profile
IO-Link®, function classes	Process data variable (PDV)
	Identification
	Diagnostics
	Teach-in channel
	Switching signal channel (SSC)
IO-Link®, protocol version	Device V 1.1
IO-Link®, communication mode	COM2 (38.4 kBaud)
IO-Link®, SIO mode support	Yes
IO-Link®, port class	A
IO-Link®, process data width OUT	2 bit
IO-Link®, process data content OUT	1 bit (emitter disable)
	1 bit (hold)
IO-Link®, process data width IN	3 bytes
IO-Link®, process data content IN	1 bit (signal quality indicator)
	2 bit SSC (switching signal)
	16 bit PDV (distance)
IO-Link®, minimum cycle time [ms]	3
IO-Link®, data memory required	2 KB

Electronic system		
Operating voltage range	[V]	10 ... 30
Residual ripple	[%]	10
Idle current	[mA]	25
Timer function		Via IO-Link®
Short circuit protection		Pulsed
Reverse polarity protection		For all electrical connections

Electromechanical components	
Electrical connection 1	
Connection pattern	
Connection type	Plug
Connection technology	M8x1, A-coded to EN 61076-2-104
Number of poles/wires	3
Material of pin contacts	Brass, gold-plated

Distance sensors S00E

Technical data

Mechanical system	
Type of mounting	Screw-type lock with through-hole for screw M3
Tightening torque [Nm]	0.8
Mounting position	Optional
Product weight [g]	10
Housing material	PMMA
	PC

Display/operation	
Setting options	Teach-in
	Potentiometer
	IO-Link®
Ready status indication	Green LED
Switching status indication	Yellow LED

Immissions/emissions	
Degree of protection	IP65, IP67, IP69K
Laser safety class	–
Insulation voltage [V]	500
Surge voltage resistance [kV]	1
Contamination level	3
Corrosion resistance class CRC ¹⁾	1

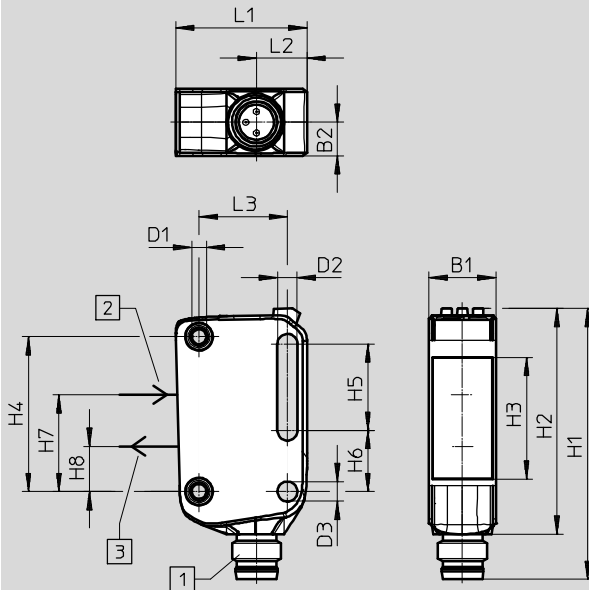
1) Corrosion resistance class CRC 1 to Festo standard FN 940070
 Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Distance sensors SOOE

Technical data

Dimensions

Download CAD data → www.festo.com




- 1 Electrical connection M8x1, plug
- 2 Receiver
- 3 Transmitter

Type code	B1	B2	D1	D2	D3 ∅	H1	H2	H3
SOOE-MS-R-PNLK-T	11	5.5	M3	3.2	3.2	44.5	37.1	20
SOOE-MS-L-PNLK-T								

Type code	H4	H5	H6	H7	H8	L1	L2	L3
SOOE-MS-R-PNLK-T	25.4	14.2	10	15.9	7.4	21.5	8.3	14.5
SOOE-MS-L-PNLK-T								

Ordering data

		Part no.	Type code
	Distance sensor	8075668	SOOE-MS-R-PNLK-T
	Laser distance sensor	8075673	SOOE-MS-L-PNLK-T

Optoelectronic sensors S00D, S00E

Accessories – Ordering data

Mounting bracket SAMH-L2-L-A

Mounting components for sensors S00D

Size: 22 x 31 x 17 mm

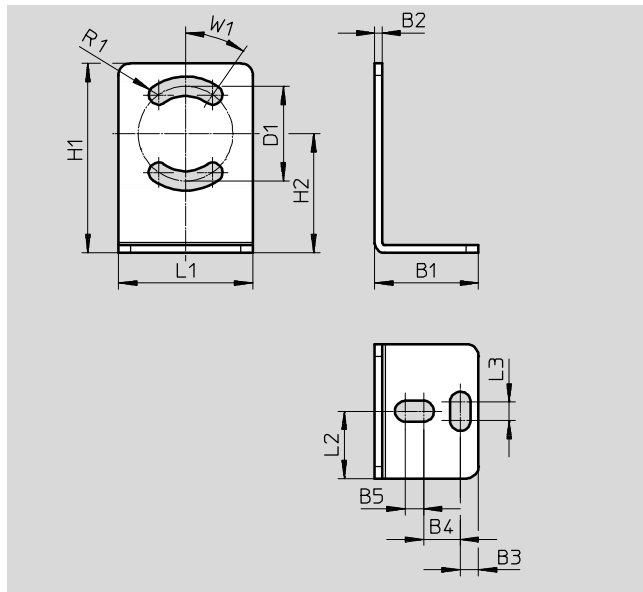
Material: High-alloy stainless steel

RoHS-compliant

Delivery: 2 screws M3x14 mm, 2 nuts

M3, 2 snap rings, 4 washers, 1 Allen

key



Dimensions and ordering data									
Type code	B1	B2	B3	B4	B5	D1 ∅	H1	H2	L1
SAMH-L2-L-A	17	1.2	3	6	3	15.5	31	19.5	22

Type code	L2	L3	R1	W1	CRC ¹⁾	Weight [g]	Part no.	Type code
SAMH-L2-L-A	11	3	1.6	35°	2	15	8077963	SAMH-L2-L-A

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
 Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

Optoelectronic sensors S00D, S00E

Accessories – Ordering data

Mounting bracket SAMH-L2-A

Mounting components for
sensors S00D

Size: 23 x 20 x 11.2 mm

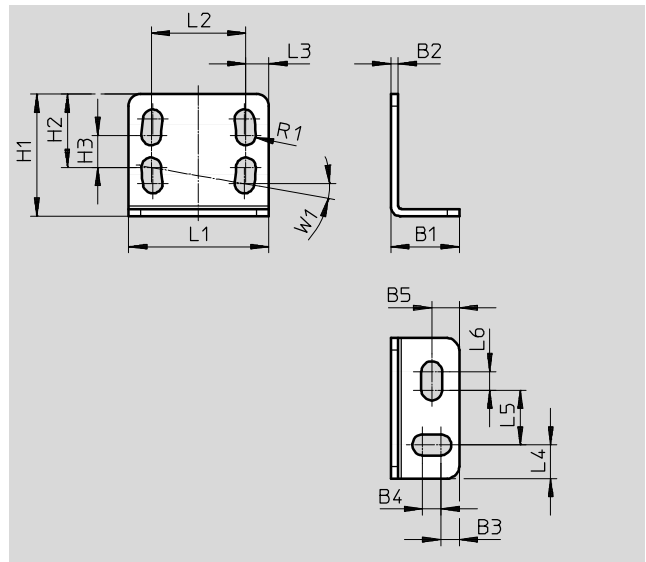
Material: High-alloy stainless steel

RoHS-compliant

Delivery: 2 screws M3x14 mm, 2 nuts

M3, 2 snap rings, 4 washers, 1 Allen

key



Dimensions and ordering data										
Type code	B1	B2	B3	B4	B5	H1	H2	H3	L1	L2
SAMH-L2-A	11.2	1.2	3	3	4.5	20	12	5.3	23	15.5

Type code	L3	L4	L5	L6	R1	W1	CRC ¹⁾	Weight [g]	Part no.	Type code
SAMH-L2-A	3.8	5.5	9	3	1.6	10°	2	15	8077964	SAMH-L2-A

1) Corrosion resistance class CRC 2 to Festo standard FN 940070

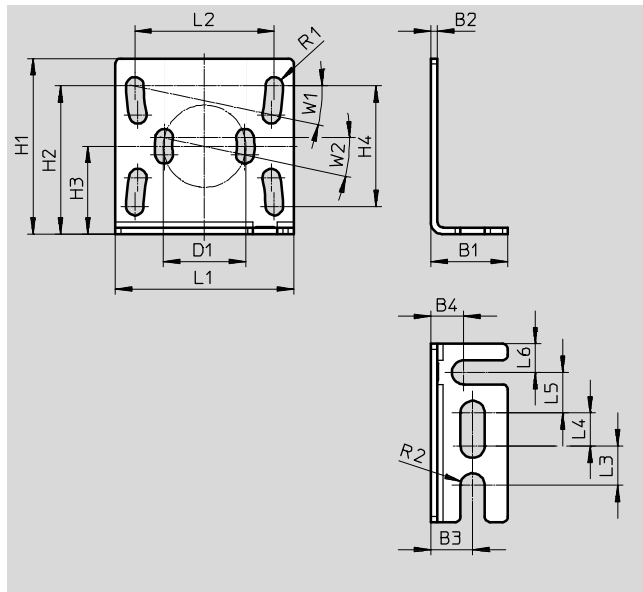
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

Optoelectronic sensors S00D, S00E

Accessories – Ordering data

Mounting bracket SAMH-L3-A

Mounting components for
sensors S00E
Size: 32 x 32, 5 x 14 mm
Material: High-alloy stainless steel
RoHS-compliant



Dimensions and ordering data												
Type code	B1	B2	B3	B4	D1 ∅	H1	H2	H3	H4	L1	L2	L3
SAMH-L3-A	14	1.2	7.6	6	15	32	27	16	22	32.5	25.4	7.2

Type code	L4	L5	L6	R1	R2	W1	W2	CRC ¹⁾	Weight [g]	Part no.	Type code
SAMH-L3-A	6	7.4	5.2	1.6	2.2	12°	12°	2	11	8077965	SAMH-L3-A

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

Optoelectronic sensors S00D, S00E

Accessories – Ordering data

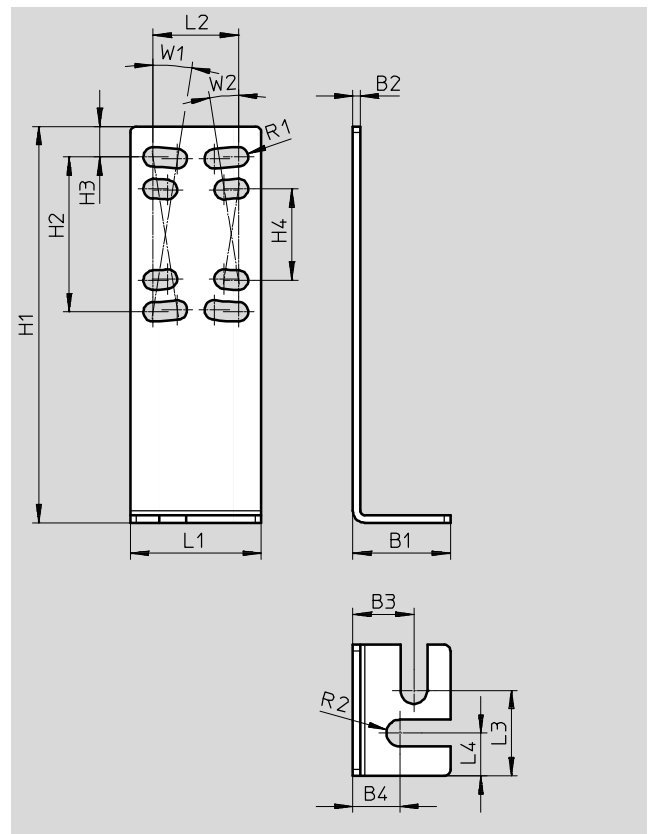
Mounting bracket SAMH-L3-L-A

Mounting components for sensors S00E

Size: 62 x 21, 5 x 16 mm

Material: High-alloy stainless steel

RoHS-compliant



Dimensions and ordering data										
Type code	B1	B2	B3	B4	H1	H2	H3	H4	L1	L2
SAMH-L3-L-A	16	1.2	10	7.7	65	25.4	5	15	21.5	14

Type code	L3	L4	R1	R2	W1	W2	CRC ¹⁾	Weight [g]	Part no.	Type code
SAMH-L3-L-A	14	7	1.6	2.2	9°	9°	2	14	8077966	SAMH-L3-L-A

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
 Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

Optoelectronic sensors S00D, S00E

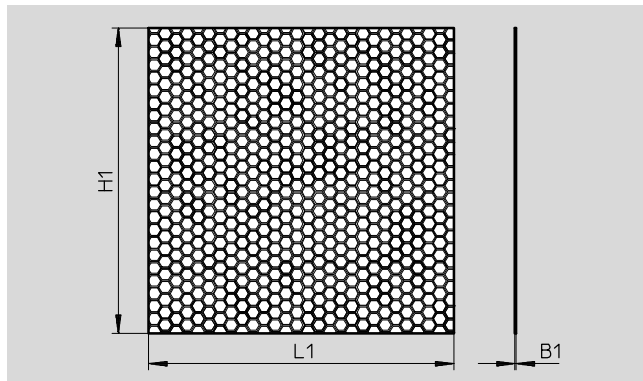
Accessories – Ordering data

Reflective foil

SARA-RF-Q100

Size: 22 x 31 x 17 mm
 Type of mounting: glued
 Material: PMMA foil
 RoHS-compliant

Reflective foil SARA-RF-Q-100-MC is suitable for laser sensors.



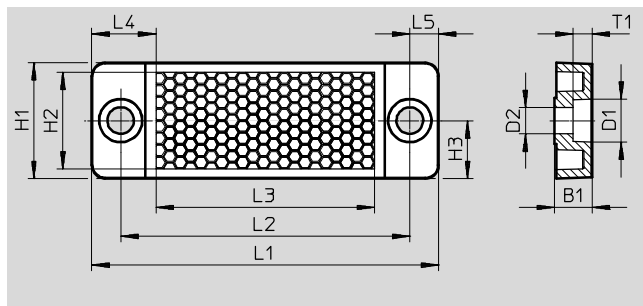
Dimensions and ordering data									
Type code	B1	H1	L1	Structural width of reflector	Ambient temperature	Weight [g]	Part no.	Type code	
SARA-RF-Q100-S	0.3	100	100	Standard	-40 ... 80 °C	4.4	8084162	SARA-RF-Q100-S	
SARA-RF-Q100-MC				Micro	-40 ... 70 °C	5.6	8084163	SARA-RF-Q100-MC	

Reflector

SARA-R-Q20

Type of mounting: screwed into place
 Housing material: PMMA
 RoHS-compliant

Reflector SARA-R-Q20-MC is suitable for laser sensors.



Dimensions and ordering data									
Type code	B1	D1	D2	H1	H2	H3	L1	L2	L3
SARA-R-Q20-S	±0.3	∅	∅	20	16.7	10	60	50	37.8
SARA-R-Q20-MC									

Type code	L4	L5	T1	Structural width of reflector	Ambient temperature	Weight [g]	Part no.	Type code	
SARA-R-Q20-S	11.1	5	3.4	Standard	-40 ... 65 °C	5.4	8084164	SARA-R-Q20-S	
SARA-R-Q20-MC				Micro		5.95	8084165	SARA-R-Q20-MC	

Optoelectronic sensors S00D, S00E

Accessories – Ordering data

Reflector

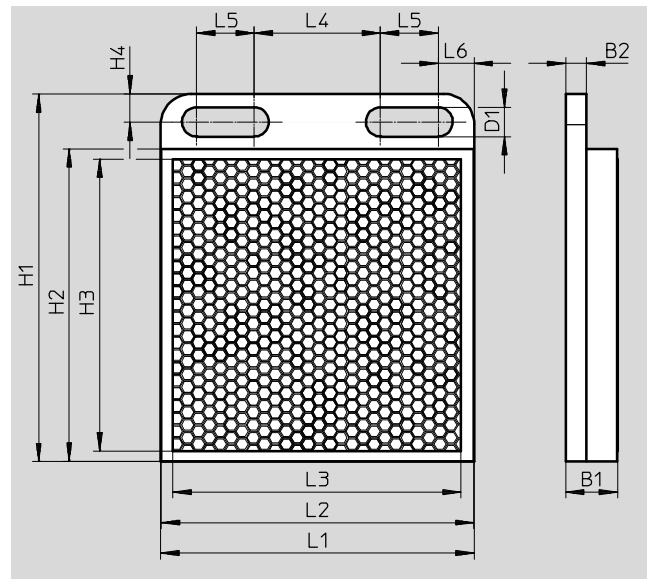
SARA-R-Q50

Type of mounting: screwed into place

Housing material: PMMA

RoHS-compliant

Reflector SARA-R-Q50-MC is suitable for laser sensors.



Dimensions and ordering data									
Type code	B1 ±0.5	B2	D1	H1	H2	H3	H4	L1	L2
SARA-R-Q50-S	8.5	3.4	4.8	60.3	51.3	47.9	4.6	51.4	51.3
SARA-R-Q50-MC	6.5								

Type code	L3	L4	L5	L6	Structural width of reflector	Ambient temperature	Weight [g]	Part no.	Type code
SARA-R-Q50-S	47.3	20.7	9.5	5.9	Standard	-40 ... 65 °C	10.35	8084159	SARA-R-Q50-S
SARA-R-Q50-MC					Micro		14.9		8084160

Optoelectronic sensors S00D, S00E

Accessories – Ordering data

Reflector

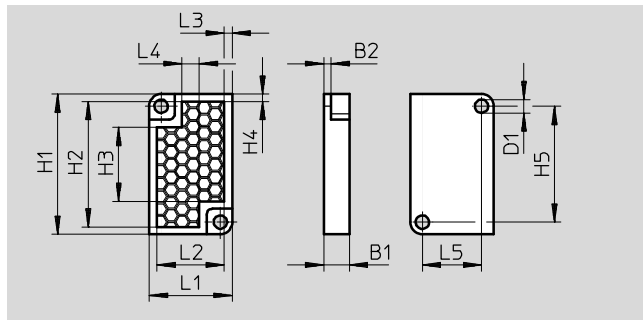
SARA-R-Q14-M

Type of mounting: screwed into place

Housing material: PMMA

RoHS-compliant

Reflector SARA-R-Q14-M is suitable for laser sensors.



Dimensions and ordering data									
Type code	B1 ±0.3	B2	D1 ∅	H1	H2	H3	H4	H5	L1
SARA-R-Q14-M	4.2	1.2	2.2	23	20.6	12.2	1.2	19	13.6

Type code	L2	L3	L4	L5	Structural width of reflector	Ambient temperature	Weight [g]	Part no.	Type code
SARA-R-Q14-M	11	1.3	2.8	9.7	Mini	-40 ... 65 °C	1.25	8084167	SARA-R-Q14-M

Reflector

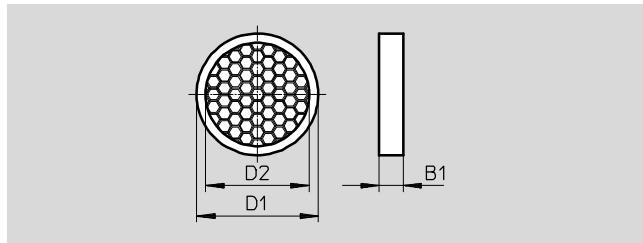
SARA-R-D20-M

Type of mounting: glued

Housing material: PMMA

RoHS-compliant




Reflector SARA-R-D20-M is suitable for laser sensors.



Dimensions and ordering data									
Type code	B1 ±0.3	D1 ∅	D2 ∅	Structural width of reflector	Ambient temperature	Weight [g]	Part no.	Type code	
SARA-R-D20-M	4	20	17	Mini	-40 ... 65 °C	1.1	8084168	SARA-R-D20-M	

Optoelectronic sensors S00D, S00E

Accessories – Ordering data

Ordering data – Connecting cables M8x1				
Type code	Number of wires	Cable length [m]	Part no.	Type code
Straight socket				
	3	2.5	541333	NEBU-M8G3-K-2,5-LE3
		5	541334	NEBU-M8G3-K-5-LE3
Angled socket				
	3	2.5	541338	NEBU-M8W3-K-2.5-LE3
		5	541341	NEBU-M8W3-K-5-LE3
Rotatable socket				
	3	2.5	8001660	NEBU-M8R3-K-2.5-LE3
		5	8001661	NEBU-M8R3-K-5-LE3