

# Optoelectronic sensor S00D

**FESTO**



## Characteristics

### At a glance

The optoelectronic sensors S00D are the perfect solution for a wide variety of object detection tasks, even in very confined application environments. They are faster and more cost-effective than ever thanks to an integrated concept with standardised sensor functions and reusable mounting configurations.

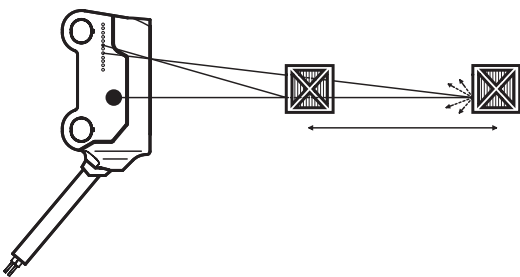
### Additional documents

[Link](#) [sood](#)



### Sensor function

[BS] Diffuse sensor with background suppression

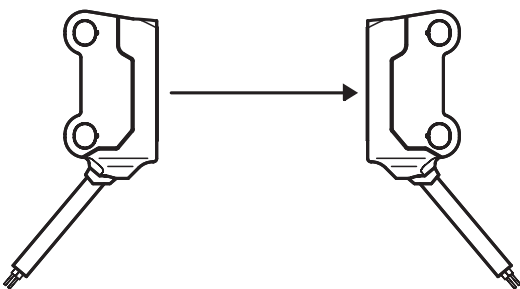


Sensing is done via optical triangulation. Object detection is therefore virtually independent of other objects in the background as well as colour, size or surface. Only minimal remission is required for these sensors.

Advantages of diffuse reflection sensors with background suppression:

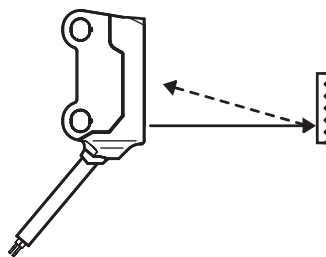
- Switching distance, virtually independent of colour and surface
- Can also be used with a shiny or reflective background

[TB] Through-beam sensor, transmitter/receiver



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

[RS] Retro-reflective sensor



The light transmitted is bounced back to the receiver by a reflector. Objects located between the sensor and the reflector interrupt the light beam and are therefore detected. All Festo retro-reflective sensors use polarised light to prevent problems from occurring with reflective objects.

## Characteristics

### Type of light

[L] Laser red

[R] Red

S00D sensors comply with laser safety class 1 according to EN 60825-1:2007. Devices from laser safety class 1 are safe due to their radiation level; these devices do not pose a threat to humans. Eye protection is not required when handling these devices.

### Electrical output 1

[S] PNP or NPN

### Working range

[30] 30 mm

[50] 50 mm

[80] 80 mm

Type code

001	Series
S00D	Optoelectronic sensor

002	Sensor function
BS	Diffuse sensor with background suppression
RS	Retro-reflective sensor
TB	Through-beam sensor, transmitter/receiver

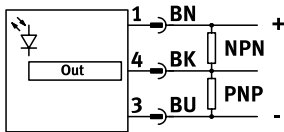
003	Type of light
L	Laser red
R	Red

004	Electrical output 1
PN	PNP/NPN

005	Working range
	Standard
30	30 mm
50	50 mm
80	80 mm

## Datasheet

### General technical data – Diffuse sensor with background suppression, laser HGA



Design	Block design
Conforms to standard	EN 60947-5-2
Approval	RCM trademark, c UL us - Recognized (OL)
CE mark (see declaration of conformity)	To EU EMC Directive, In accordance with EU RoHS Directive
UKCA marking (see declaration of conformity)	To UK instructions for EMC, To UK RoHS instructions
Certificate issuing authority	UL E232949
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

### Input signal, measuring element diffuse sensor with background suppression

Operating distance	15 ... 80 mm	1 ... 30 mm	3 ... 50 mm
Min. object diameter	5 mm	2 mm	3.5 mm
Max. light spot	5 mm at a sensing range of 80 mm	2 mm at a sensing range of 30 mm	3.5 mm at a sensing range of 50 mm
Max. black-white difference	20%	7%	15%
Hysteresis	2.4 mm	0.3 mm	0.5 mm
Reference material	Standard white 90%, 100x100 mm		
Detection method	Diffuse sensor with background clipping		
Measuring principle	Optoelectronic		
Type of light	Red, LED		
Ambient temperature	-25 ... 60°C		

### Switching output diffuse sensor with background suppression

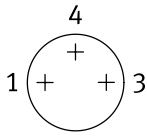
Switching output	Push-pull
Switching element function	PNP, light switching, NPN, dark switching
Max. switching frequency	800 Hz
Max. output current	50 mA
Voltage drop	0 ... 1.5 V

### Electronics – Diffuse sensor with background suppression

Operational voltage range DC	10 V, 30 V
Residual ripple	10%
No-load supply current	10 mA
Reverse polarity protection	For all electrical connections
Short circuit current rating	Pulsed

## Datasheet

### Electromechanics – Diffuse sensor with background suppression



Electrical connection 1, function	Switching output, Power supply
Electrical connection 1, connection type	Cable with plug
Electrical connection 1, connector system	M8x1, A-coded, to EN 61076-2-104
Electrical connection 1, number of connections/cores	3
Electrical connection 1, type of mounting	Screw-type lock, size 9 mm A/F, Rotatable
Electrical connection 1, compatible type of mounting	Compatible with rotatable/non-rotatable screw-type lock
Material electrical contact	Gold-plated brass
Cable length	150 mm
Cable characteristic	Standard
Material cable sheath	TPE-U(PUR)

### Mechanics – Diffuse sensor with background suppression

Type of mounting	With through-hole
Tightening torque	0.5 Nm
Mounting position	optional
Product weight	10 g
Material housing	ABS, PC, TPE-U(PU)

### Display, operation diffuse sensor with background suppression

Ready status indication	Green LED
Switching status indication	Yellow LED

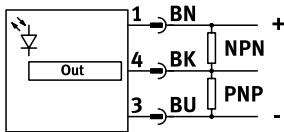
### Immission, emission diffuse sensor with background suppression

Insulation voltage	500 V
Immunity to surge	1 kV
Corrosion resistance class CRC <sup>1)</sup>	1 - Low corrosion stress
Pollution degree	3

1) More information [www.festo.com/x/topic/kbk](http://www.festo.com/x/topic/kbk)

## Datasheet

## General technical data – Laser diffuse sensor with background suppression



Design	Block design
Conforms to standard	EN 60947-5-2
Approval	RCM trademark, c UL us - Recognized (OL)
CE mark (see declaration of conformity)	To EU EMC Directive, In accordance with EU RoHS Directive
UKCA marking (see declaration of conformity)	To UK instructions for EMC, To UK RoHS instructions
Certificate issuing authority	UL E232949
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

## Input signal, measuring element laser diffuse sensor with background suppression

Operating distance	7 ... 50 mm	20 ... 80 mm	7 ... 30 mm
Min. object diameter	1.5 mm	2 mm	1 mm
Max. light spot	1.5 mm at a sensing range of 50 mm	2 mm at a sensing range of 80 mm	1 mm at a sensing range of 30 mm
Max. black-white difference	13%	15%	8%
Hysteresis	1 mm	2.4 mm	0.3 mm
Reference material	Standard white 90%, 100x100 mm		
Detection method	Diffuse sensor with background clipping		
Measuring principle	Optoelectronic		
Type of light	Laser, Red		
Ambient temperature	-20 ... 60°C		

## Switching output laser diffuse sensor with background suppression

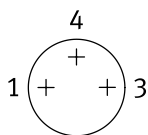
Switching output	Push-pull
Switching element function	PNP, light switching, NPN, dark switching
Max. switching frequency	2,000 Hz
Max. output current	50 mA
Voltage drop	0 ... 1.5 V

## Electronics – Laser diffuse sensor with background suppression

Operational voltage range DC	10 V, 30 V
Residual ripple	10%
No-load supply current	10 mA
Reverse polarity protection	For all electrical connections
Short circuit current rating	Pulsed

## Datasheet

### Electromechanics – Laser diffuse sensor with background suppression



Electrical connection 1, function	Switching output, Power supply
Electrical connection 1, connection type	Cable with plug
Electrical connection 1, connector system	M8x1, A-coded, to EN 61076-2-104
Electrical connection 1, number of connections/cores	3
Electrical connection 1, type of mounting	Screw-type lock, size 9 mm A/F
Material electrical contact	Gold-plated brass
Cable length	150 mm
Cable characteristic	Standard
Material cable sheath	TPE-U(PUR)

### Mechanics – Laser diffuse sensor with background suppression

Type of mounting	With through-hole
Tightening torque	0.5 Nm
Mounting position	optional
Product weight	10 g
Material housing	ABS, PC, TPE-U(PU)

### Display, operation laser diffuse sensor with background suppression

Ready status indication	Green LED
Switching status indication	Yellow LED

### Immision, emission laser diffuse sensor with background suppression

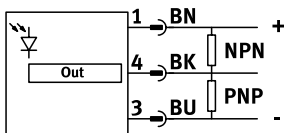
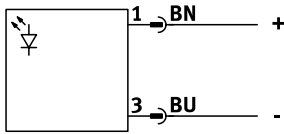
Insulation voltage	500 V
Immunity to surge	1 kV
Corrosion resistance class CRC <sup>1)</sup>	1 - Low corrosion stress
Laser safety class	1
Pollution degree	3

1) More information [www.festo.com/x/topic/kbk](http://www.festo.com/x/topic/kbk)



## Datasheet

### General technical data – Through-beam sensor



Design	Block design
Conforms to standard	EN 60947-5-2
Approval	RCM trademark, c UL us - Recognized (OL)
CE mark (see declaration of conformity)	To EU EMC Directive, In accordance with EU RoHS Directive
UKCA marking (see declaration of conformity)	To UK instructions for EMC, To UK RoHS instructions
Certificate issuing authority	UL E232949
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

### Input signal, measuring element through-beam sensor

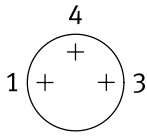
Type of light	Laser, Red	Red, LED
Operating distance	0 ... 10,000 mm	0 ... 2,000 mm
Max. light spot	20 mm with 10000 mm	150 mm with 2000 mm
Detection method	Through-beam sensor, Transmitter, Receiver	
Measuring principle	Optoelectronic	
Ambient temperature	-20 ... 60°C	-25 ... 60°C

### Electronics – Through-beam sensor

Operational voltage range DC	10 V, 30 V
Residual ripple	10%
No-load supply current	11 mA
Reverse polarity protection	For all electrical connections
Short circuit current rating	Pulsed

## Datasheet

### Electromechanics – Through-beam sensor



Electrical connection 1, function	Switching output, Power supply
Electrical connection 1, connection type	Cable with plug
Electrical connection 1, connector system	M8x1, A-coded, to EN 61076-2-104
Electrical connection 1, number of connections/cores	3
Electrical connection 1, type of mounting	Screw-type lock, size 9 mm A/F
Material electrical contact	Gold-plated brass
Cable length	150 mm
Cable characteristic	Standard
Material cable sheath	TPE-U(PUR)

### Mechanics – Through-beam sensor

Type of mounting	With through-hole
Tightening torque	0.5 Nm
Mounting position	optional
Product weight	20 g
Material housing	ABS, PC, TPE-U(PU)

### Display, operation through-beam sensor

Ready status indication	Green LED
Switching status indication	Yellow LED
Function reserve indication	Flashing yellow LED

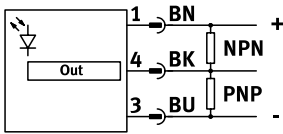
### Immission, emission through-beam sensor

Insulation voltage	500 V
Immunity to surge	1 kV
Corrosion resistance class CRC <sup>1)</sup>	1 - Low corrosion stress
Laser safety class	1
Pollution degree	3

1) More information [www.festo.com/x/topic/kbk](http://www.festo.com/x/topic/kbk)

# Datasheet

## General technical data – Retro-reflective sensor



Design	Block design
Conforms to standard	EN 60947-5-2
Approval	RCM trademark, c UL us - Recognized (OL)
CE mark (see declaration of conformity)	To EU EMC Directive, In accordance with EU RoHS Directive
UKCA marking (see declaration of conformity)	To UK instructions for EMC, To UK RoHS instructions
Certificate issuing authority	UL E232949
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

## Input signal, measuring element retro-reflective sensor

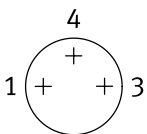
Type of light	Laser, Red	Red, LED
Reference material	Reference reflector	
Operating distance <sup>1)</sup>	0 ... 2,000 mm	0 ... 1,000 mm
Max. light spot	35 mm with 2000 mm	60 mm with 800 mm
Detection method	Retro-reflective sensor	
Measuring principle	Optoelectronic	
Ambient temperature	-20 ... 60°C	-25 ... 60°C

1) See additional document S00D\_S00E\_ADD

## Electronics – Retro-reflective sensor

Operational voltage range DC	10 V, 30 V
Residual ripple	10%
No-load supply current	10 mA
Reverse polarity protection	For all electrical connections
Short circuit current rating	Pulsed

## Electromechanics – Retro-reflective sensor



Electrical connection 1, function	Switching output, Power supply
Electrical connection 1, connection type	Cable with plug
Electrical connection 1, connector system	M8x1, A-coded, to EN 61076-2-104
Electrical connection 1, number of connections/cores	3
Electrical connection 1, type of mounting	Screw-type lock, size 9 mm A/F
Material electrical contact	Gold-plated brass
Cable length	150 mm
Cable characteristic	Standard
Material cable sheath	TPE-U(PUR)

## Datasheet

### Mechanics – Retro-reflective sensor

Type of mounting	With through-hole
Tightening torque	0.5 Nm
Mounting position	optional
Product weight	10 g
Material housing	ABS, PC, TPE-U(PU)

### Display, operation retro-reflective sensor

Ready status indication	Green LED
Switching status indication	Yellow LED
Function reserve indication	Flashing yellow LED

### Immission, emission retro-reflective sensor

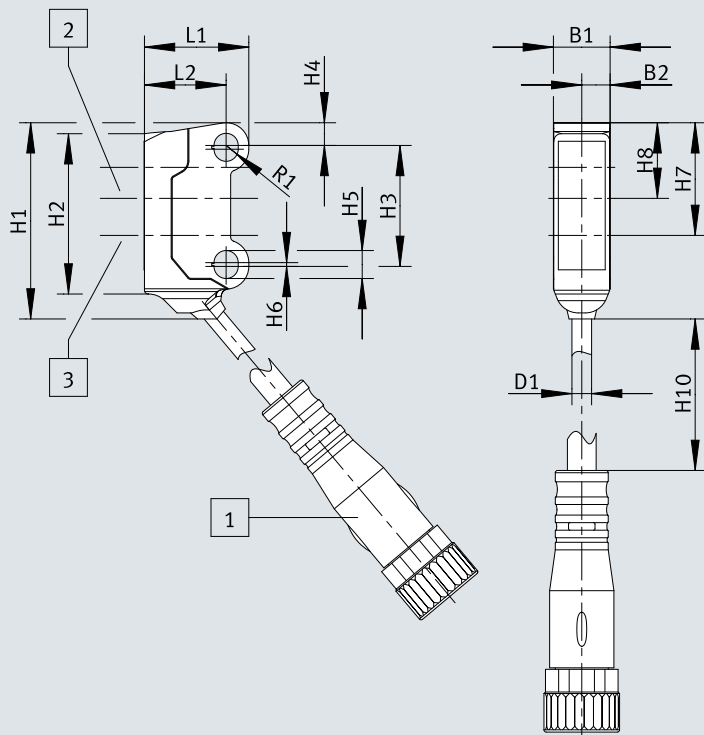
Insulation voltage	500 V
Immunity to surge	1 kV
Corrosion resistance class CRC <sup>1)</sup>	1 - Low corrosion stress
Laser safety class	1
Pollution degree	3

1) More information [www.festo.com/x/topic/kbk](http://www.festo.com/x/topic/kbk)

## Dimensions

Dimensions – S00D-...

Download CAD data [www.festo.com](http://www.festo.com)



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

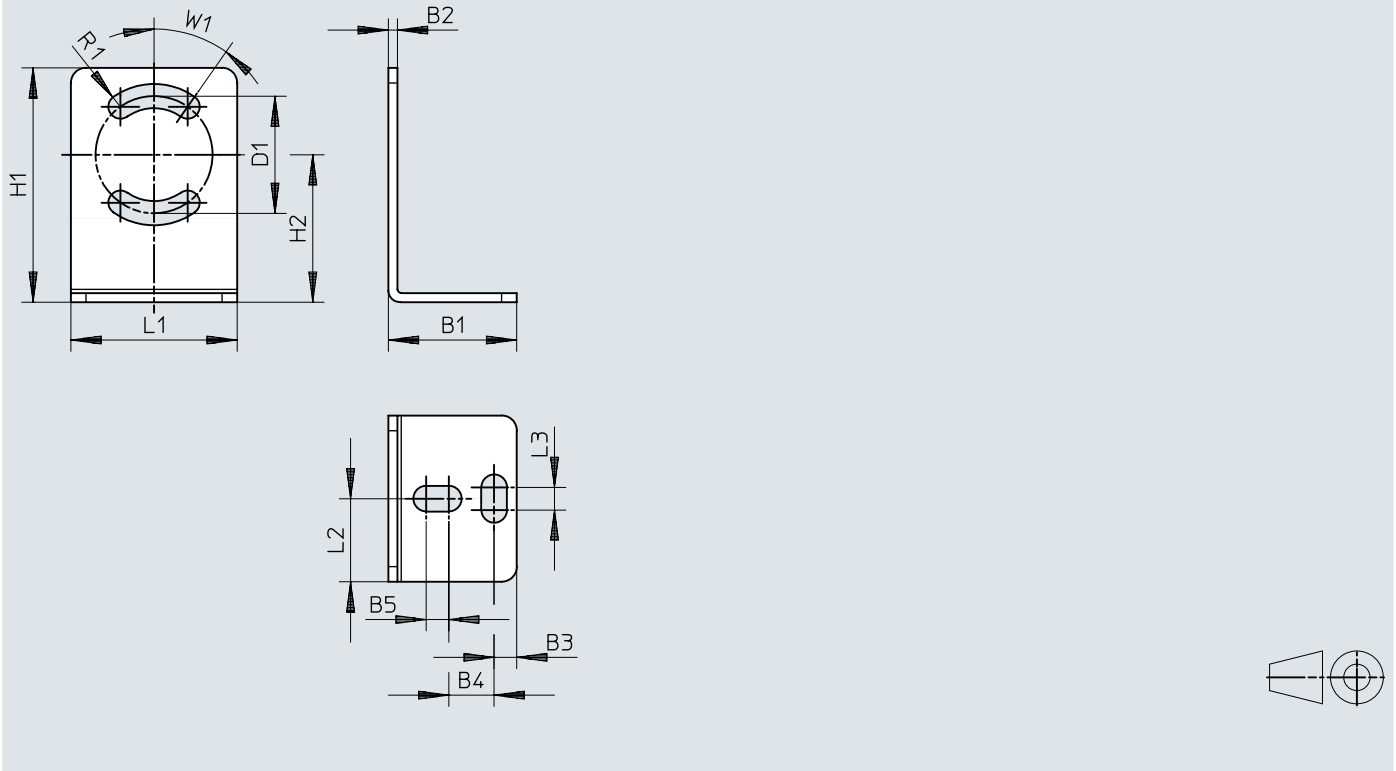
	B1	B2	D1 ∅	H1	H2	H3	H4	H5
S00D-BS-R-PN-30	7,5	3,8	2,6	26	21,2	16	3	3,7
S00D-BS-R-PN-50								
S00D-BS-R-PN-80								
S00D-BS-L-PN-30								
S00D-BS-L-PN-50								
S00D-BS-L-PN-80								
S00D-TB-R-PN								
S00D-TB-L-PN								
S00D-RS-R-PN								
S00D-RS-L-PN								

	H6	H7	H8	H10	L1	L2	R1
S00D-BS-R-PN-30	0,5	14,9	10	150 (+20)	13,8	10,8	1,6
S00D-BS-R-PN-50			5,9				
S00D-BS-R-PN-80			10				
S00D-BS-L-PN-30			5,9				
S00D-BS-L-PN-50			10				
S00D-BS-L-PN-80			10				
S00D-TB-R-PN		10	10				
S00D-TB-L-PN		14,9					
S00D-RS-R-PN							
S00D-RS-L-PN							

## Dimensions

Dimensions – Mounting bracket SAMH-L2-L-A

Download CAD data [www.festo.com](http://www.festo.com)

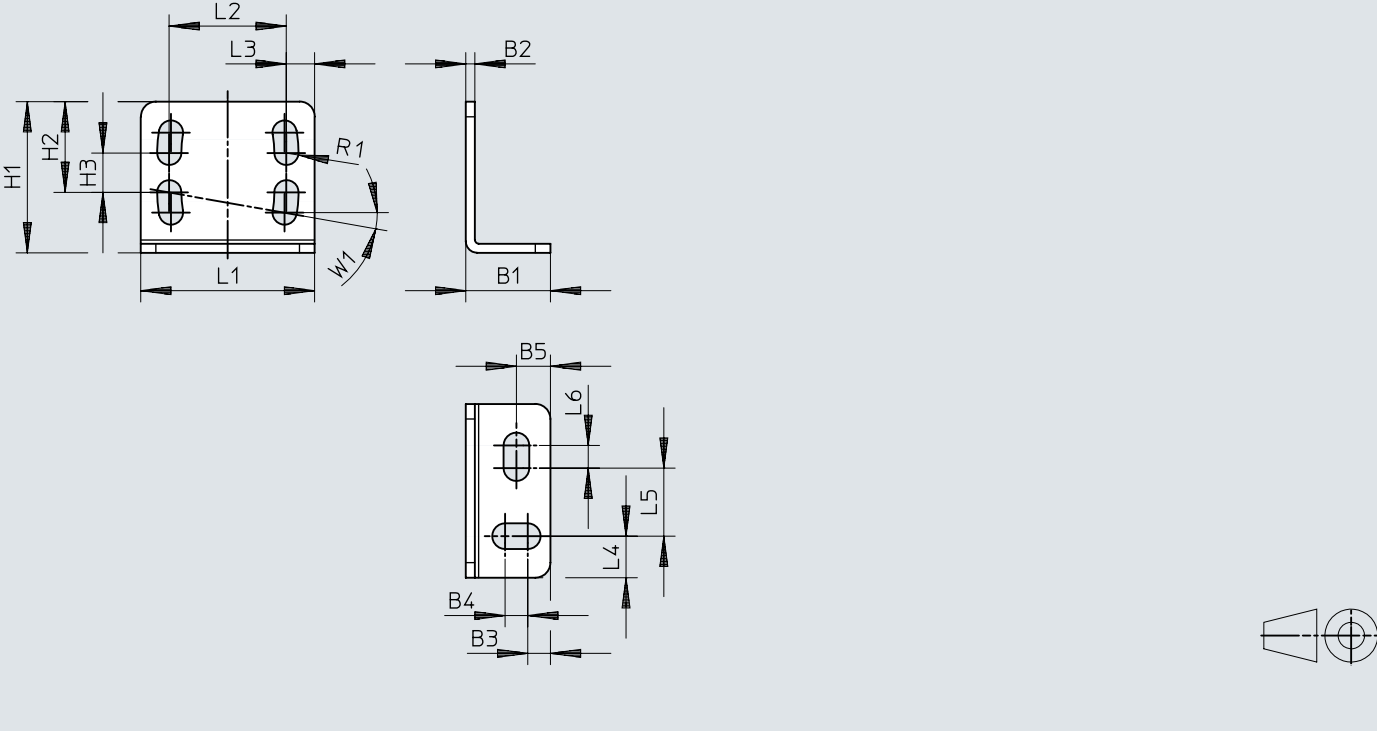


	B1	B2	B3	B4	B5	D1 ∅	H1	H2	L1	L2	L3	R1	W1
SAMH-L2-L-A	17	1,2	3	6	3	15,5	31	19,5	22	11	3	1,6	35°

Dimensions

Dimensions – Mounting bracket SAMH-L2-A

Download CAD data [www.festo.com](http://www.festo.com)

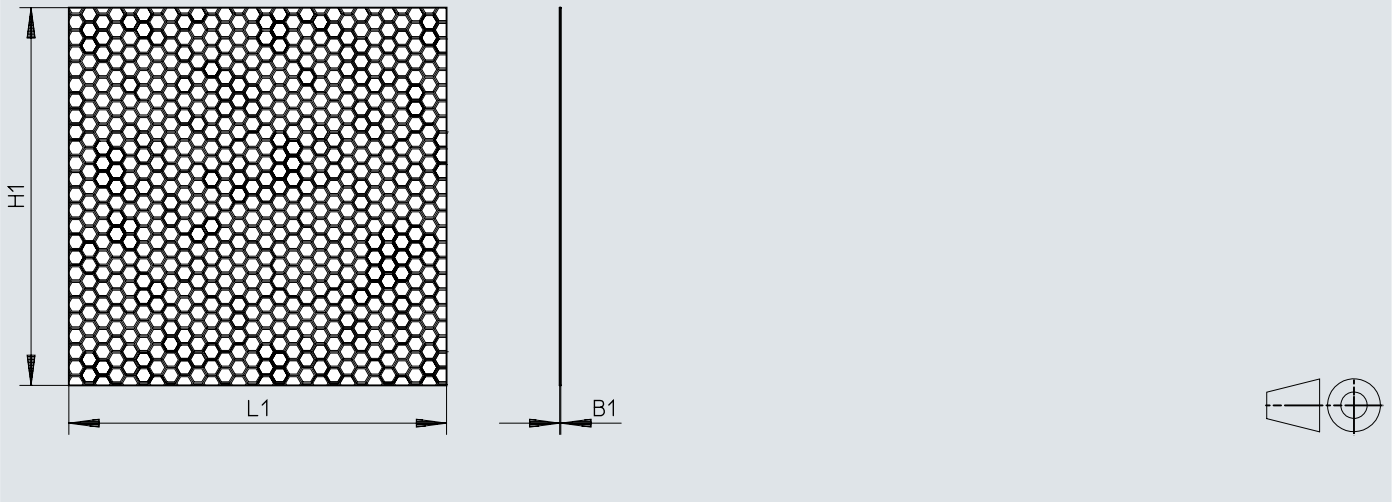


	B1	B2	B3	B4	B5	H1	H2	H3	L1	L2	L3	L4	L5	L6	R1	W1
SAMH-L2-A	11,2	1,2	3	3	4,5	20	12	5,3	23	15,5	3,8	5,5	9	3	1,6	10°

## Dimensions

Dimensions – Reflector foil SARA-RF-Q100

Download CAD data [www.festo.com](http://www.festo.com)



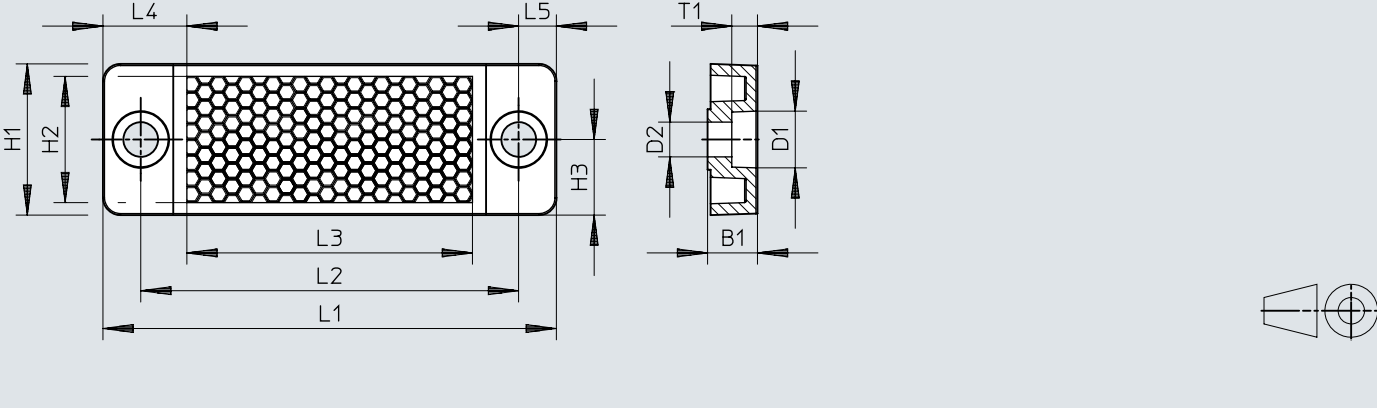
	B1	H1	L1
SARA-RF-Q100-S	0,3	100	100
SARA-RF-Q100-MC			



Dimensions

Dimensions – Reflector SARA-R-Q20

Download CAD data [www.festo.com](http://www.festo.com)

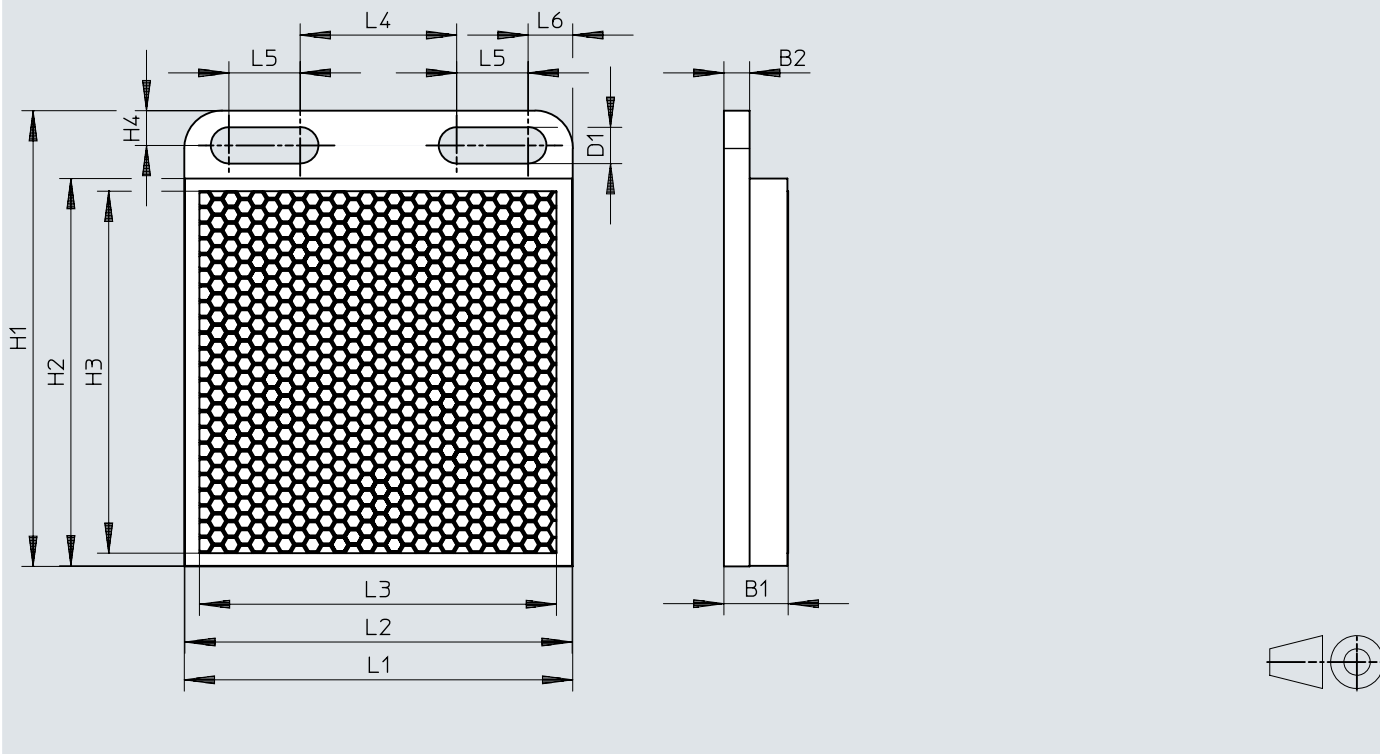


	B1	D1 ∅	D2 ∅	H1	H2	H3	L1	L2	L3	L4	L5	T1
	±0,3											
SARA-R-Q20-S	6,6	7,5	4,6	20	16,7	10	60	50	37,8	11,1	5	3,4
SARA-R-Q20-MC												

## Dimensions

### Dimensions – Reflector SARA-R-Q50

Download CAD data [www.festo.com](http://www.festo.com)

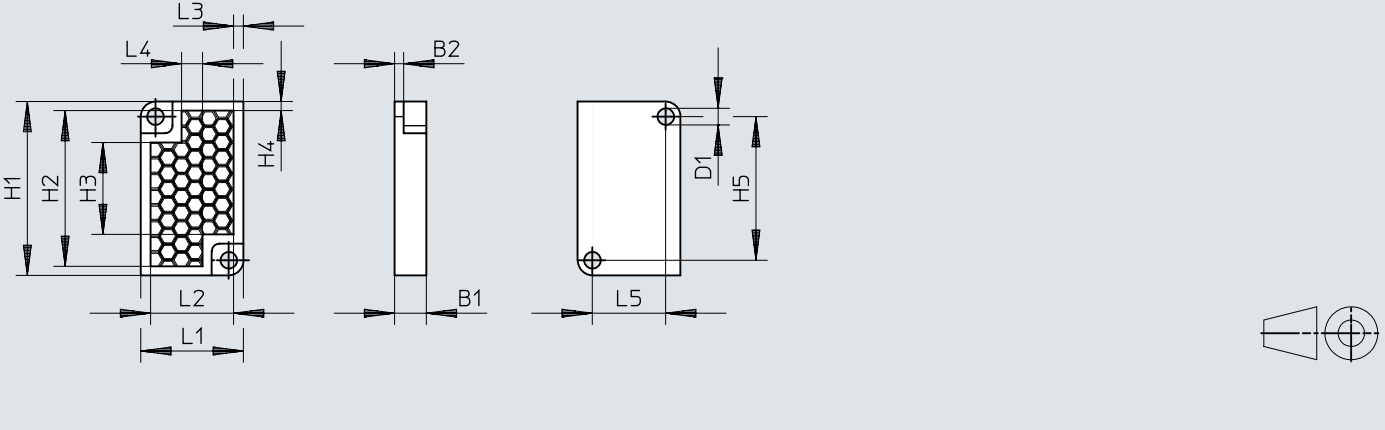


	B1 ±0,5	B2	D1	H1	H2	H3	H4	L1	L2	L3	L4	L5	L6
SARA-R-Q50-S	8,5	3,4	4,8	60,3	51,3	47,9	4,6	51,4	51,3	47,3	20,7	9,5	5,9
SARA-R-Q50-MC	6,5												

Dimensions

Dimensions – Reflector SARA-R-Q14-M

Download CAD data [www.festo.com](http://www.festo.com)

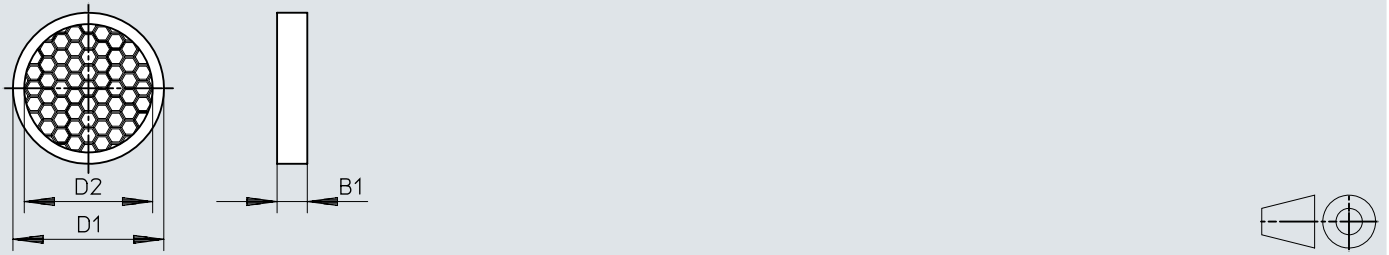


	B1 ±0,3	B2	D1 ∅	H1	H2	H3	H4	H5	L1	L2	L3	L4	L5
SARA-R-Q14-M	4,2	1,2	2,2	23	20,6	12,2	1,2	19	13,6	11	1,3	2,8	9,7

## Dimensions

### Dimensions – Reflector SARA-R-D20-M

Download CAD data [www.festo.com](http://www.festo.com)



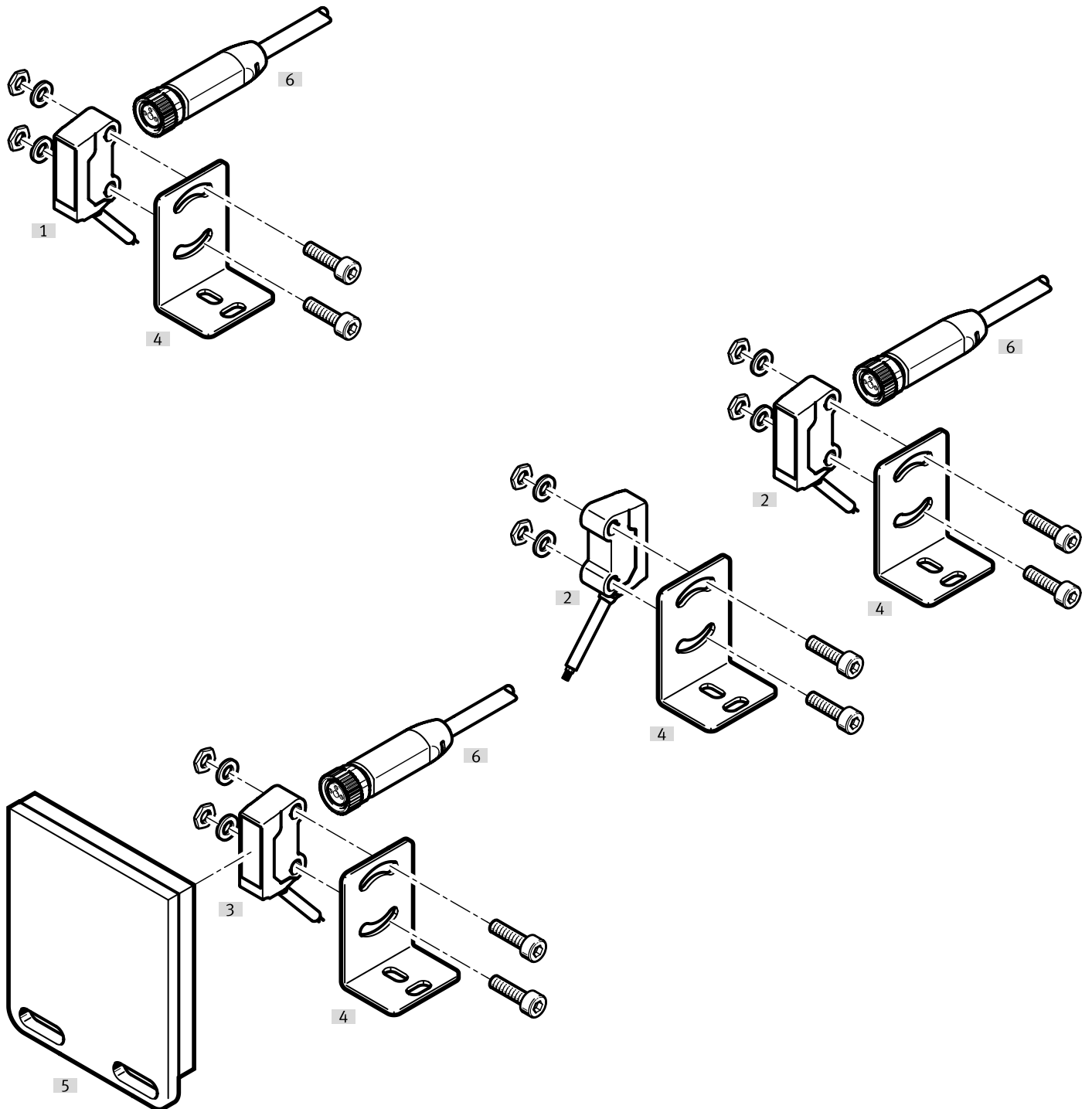
	B1 ±0,3	D1 ∅	D2 ∅
SARA-R-D20-M	4	20	17

## Ordering data

<b>S00D, diffuse sensors with background suppression</b>				
Detection method	Type of light	Operating distance	Part no.	Type
Retro-reflective sensor	Laser, Red	0 ... 2000 mm	<b>8075662</b>	<b>S00D-RS-L-PN</b>
	Red, LED	0 ... 1000 mm	<b>8075657</b>	<b>S00D-RS-R-PN</b>
Through-beam sensor, Transmitter, Receiver	Laser, Red	0 ... 10000 mm	<b>8075661</b>	<b>S00D-TB-L-PN</b>
	Red, LED	0 ... 2000 mm	<b>8075656</b>	<b>S00D-TB-R-PN</b>
Diffuse sensor with background clipping	Laser, Red	7 ... 30 mm	<b>8075658</b>	<b>S00D-BS-L-PN-30</b>
		7 ... 50 mm	<b>8075659</b>	<b>S00D-BS-L-PN-50</b>
		20 ... 80 mm	<b>8075660</b>	<b>S00D-BS-L-PN-80</b>
	Red, LED	1 ... 30 mm	<b>8075653</b>	<b>S00D-BS-R-PN-30</b>
		3 ... 50 mm	<b>8075654</b>	<b>S00D-BS-R-PN-50</b>
		15 ... 80 mm	<b>8075655</b>	<b>S00D-BS-R-PN-80</b>


## Peripherals


### Peripherals overview




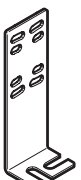
Accessories		→ Link
Type/order code	Description	
[1] S00D-BS-...	Laser diffuse sensor with background suppression	<a href="#">s00d</a>
[2] S00D-TB-...	Through-beam sensor	<a href="#">s00d</a>
[3] S00D-RS-...	Retro-reflective sensor	<a href="#">s00d</a>
[4] SAMH-L2-...	Mounting bracket	<a href="#">23</a>
[5] SARA-R-...	Reflector, reflector foil	<a href="#">23</a>
[6] NEBA-M8G3-...	Connecting cables M8x1	<a href="#">24</a>


## Accessories

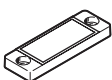
Mounting bracket SAMH-L2-L-A					
	Size	Corrosion resistance class CRC	Product weight	Part no.	Type
	22x31x17 mm	2 - Moderate corrosion stress	15 g	<b>8077963</b>	<b>SAMH-L2-L-A</b>

Mounting bracket SAMH-L2-A					
	Size	Corrosion resistance class CRC	Product weight	Part no.	Type
	23x20x11.2 mm	2 - Moderate corrosion stress	15 g	<b>8077964</b>	<b>SAMH-L2-A</b>

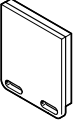
Mounting bracket SAMH-L3-L-A					
	Size	Corrosion resistance class CRC	Product weight	Part no.	Type
	65x21.5x16 mm	2 - Moderate corrosion stress	14 g	<b>8077966</b>	<b>SAMH-L3-L-A</b>


Mounting bracket SAMH-L3-A					
	Size	Corrosion resistance class CRC	Product weight	Part no.	Type
	32x32.5x14 mm	2 - Moderate corrosion stress	11 g	<b>8077965</b>	<b>SAMH-L3-A</b>


Reflector foil SARA-RF-Q100					
	Structural width of reflector	Ambient temperature	Product weight	Part no.	Type
	Standard	-40 ... 80 °C	4.4 g	<b>8084162</b>	<b>SARA-RF-Q100-S</b>
	Micro	-40 ... 70 °C	5.6 g	<b>8084163</b>	<b>SARA-RF-Q100-MC</b>

Reflector SARA-R-Q20					
	Structural width of reflector	Ambient temperature	Product weight	Part no.	Type
	Standard	-40 ... 65 °C	5.4 g	<b>8084164</b>	<b>SARA-R-Q20-S</b>
	Micro		5.95 g	<b>8084165</b>	<b>SARA-R-Q20-MC</b>

## Accessories

Reflector SARA-R-Q50					
	Structural width of reflector	Ambient temperature	Product weight	Part no.	Type
	Standard	-40 ... 65 °C	10.35 g	8084159	SARA-R-Q50-S
	Micro		14.9 g	8084160	SARA-R-Q50-MC

Reflector SARA-R-Q14-M					
	Structural width of reflector	Ambient temperature	Product weight	Part no.	Type
	Mini	-40 ... 65 °C	1.25 g	8084167	SARA-R-Q14-M

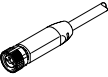
Reflector SARA-R-D20-M					
	Structural width of reflector	Ambient temperature	Product weight	Part no.	Type
	Mini	-40 ... 65 °C	1.1 g	8084168	SARA-R-D20-M

### Distance sensor retro-reflective sensor, S00D-RS-R-PN

100 ... 2000 mm SARA-R-Q50-S  
 150 ... 1500 mm SARA-R-Q14-M  
 150 ... 1500 mm SARA-R-Q20-MC  
 150 ... 1800 mm SARA-R-Q50-MC  
 150 ... 2000 mm SARA-RF-Q100-MC  
 200 ... 1500 mm SARA-R-Q20-S  
 250 ... 1200 mm SARA-R-D20-M  
 250 ... 600 mm SARA-RF-Q100-S

### Distance sensor retro-reflective sensor, S00D-RS-R-PN

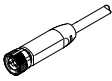
40 ... 1000 mm SARA-R-Q20-S  
 40 ... 1000 mm SARA-R-Q50-S  
 100 ... 500 mm SARA-R-Q14-M  
 100 ... 800 mm SARA-R-D20-M  
 100 ... 800 mm SARA-R-Q20-MC  
 100 ... 800 mm SARA-RF-Q100-S  
 100 ... 1200 mm SARA-R-Q50-M  
 100 ... 2000 mm SARA-RF-Q100-MC

Connecting cables M8x1, straight socket					
	Electrical connection 1, connection type	Electrical connection 1, connector system	Cable length	Part no.	Type
	Socket	M8x1, A-coded, to EN 61076-2-104	0.5 m	8078282	NEBA-M8G3-U-0.5-N-M8G3
			1 m	8078278	NEBA-M8G3-U-0.5-N-M12G3
				8078222	NEBA-M8G3-U-1-N-LE3
				8078279	NEBA-M8G3-U-1-N-M12G3
				8078283	NEBA-M8G3-U-1-N-M8G3
			1.5 m	8078284	NEBA-M8G3-U-1.5-N-M8G3



## Accessories

### Connecting cables M8x1, straight socket

	Electrical connection 1, connection type	Electrical connection 1, connector system	Cable length	Part no.	Type
	Socket	M8x1, A-coded, to EN 61076-2-104	2 m	8078285	NEBA-M8G3-U-2-N-M8G3
			2.5 m	8078280	NEBA-M8G3-U-2.5-N-M12G3
				8078223	NEBA-M8G3-U-2.5-N-LE3
				8078286	NEBA-M8G3-U-2.5-N-M8G3
			5 m	8078287	NEBA-M8G3-U-5-N-M8G3
				8078281	NEBA-M8G3-U-5-N-M12G3
				8078224	NEBA-M8G3-U-5-N-LE3
			10 m	8078288	NEBA-M8G3-U-10-N-M8G3
				8078225	NEBA-M8G3-U-10-N-LE3
			20 m	8078226	NEBA-M8G3-U-20-N-LE3