Vision sensors SBSI

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Vision sensors SBSI

Key features

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Vision sensors SBSI

The vision sensors SBSI are an easy first step into a vision system and can be used to read 1D/2D codes or for quality inspection, depending on the model. Their impressive features include intuitive software for easy parameterisation, even with no expert knowledge, and powerful, fast

detection algorithms. The lighting and lens are already integrated into the compact IP67 housing, designed for use in harsh industrial environments. If necessary, external lights, SBAL, can be connected directly to the vision sensor.

- All-in-one device with integrated lens, lighting, evaluation and communication
- Simple user interface, just 3 or 4 steps to a solution
- Powerful and fast software tools

- External lights SBAL can be connected directly, Festo plug & work

Code reader SBSI-B → Page 6

The range of code readers SBSI-B is designed especially for reading 1D barcodes and 2D matrix codes. The powerful algorithms have no problem with even hard-to-read, directly-

marked codes (e.g. dot-peened or laser-machined onto metal). Where multiple codes are included in the image, up to 10 codes can be read at a time.

- Reading 1D bar codes: EAN, code 39, code 128, …
- Reading 2D matrix codes: DMC ECC200, QR code, PDF 417
- Reading directly marked codes

- Multi-code: reading up to 10 codes at once

Object sensor SBSI-Q → Page 9

With the range of object sensors SBSI-Q, checking product quality is child's play. It is very easy to inspect an item for alignment/orientation and check it is complete/present, for example. If the parts are not being
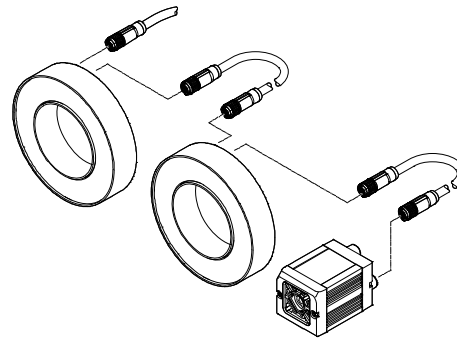
fed in the correct position, a powerful tracking algorithm is available which flexibly detects the position and 360° rotary orientation of the parts and automatically aligns the other detection tools.

- Easy quality inspection
- 360° position tracking
- Fast and powerful detection algorithms

Connection of external area lights SBAL-C6-A to the vision sensor SBSI.
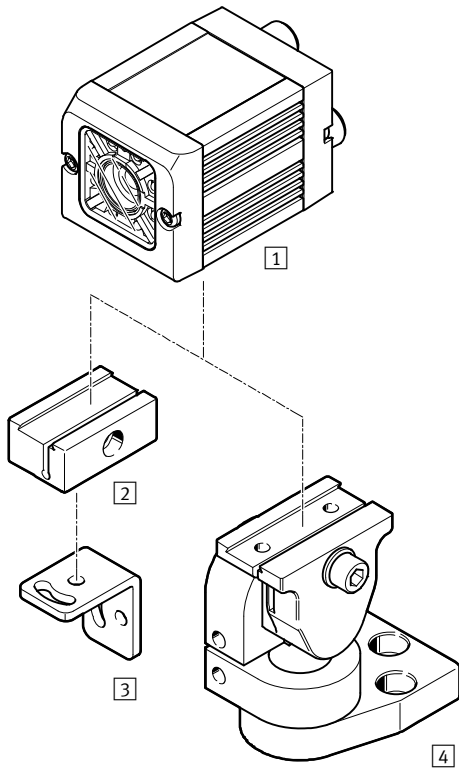Up to 4 area lights can be connected directly to the SBSI.
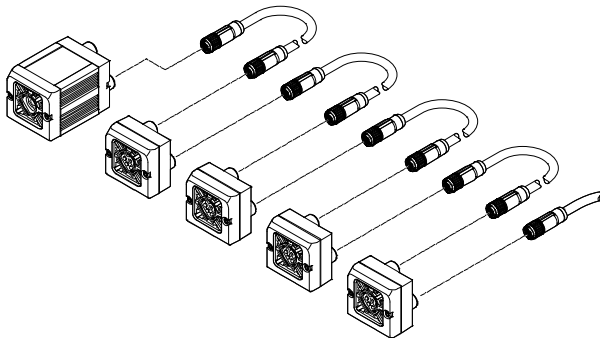
Connection of external ring lights SBAL-C6-R to the vision sensor SBSI.
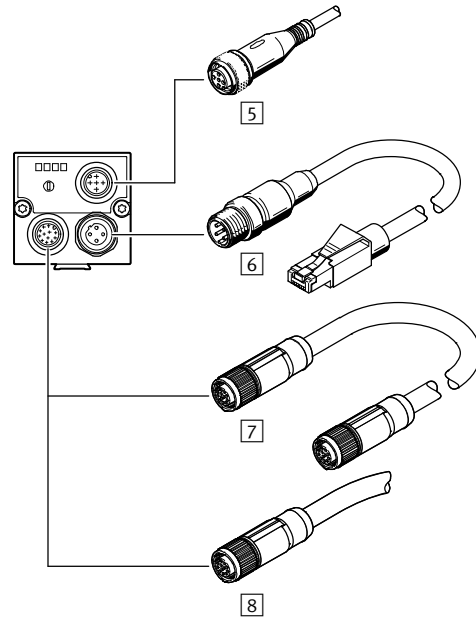Up to 2 ring lights can be connected directly to the SBSI.

Vision sensors SBSI

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Peripherals overview

Mechanical connection options
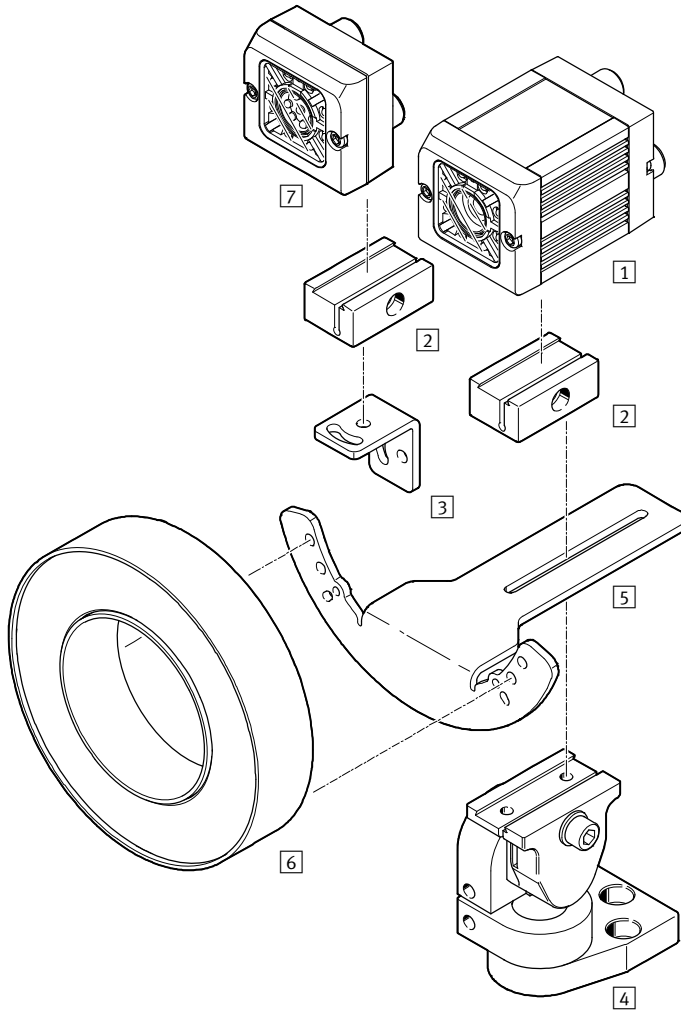

Electrical connection options

Mounting components and connecting cables			
		Brief description	**→ Page**
1	Vision sensor SBSI-...	Vision sensor SBSI with integrated lens and lighting in code reader SBSI-B-... or object sensor SBSI-Q-... versions	6, 9
2	Mounting SBAM-C6-CP	Clamp fitting with dovetail slot	18
3	Mounting bracket SBAM-C6-A	Mounting bracket 90°. Adjustment option with 2 levels	18
4	Swivel mounting SBAM-C6-A2	Clamp fitting with dovetail slot. Can be turned and rotated around 2 axes	19
5	Connecting cable NEBS-M12G5-KS-...-LE12	Serial data cable (M12, 5-pin on open end); length 5 m or 10 m (code reader only)	20
6	Connecting cable NEBC-D12G4-KS-...-R3G4	Ethernet cable (M12, 4-pin on RJ45); length 3 m or 10 m	20
7	Connecting cable NEBS-M12G12-KS-...-SM12G12	Cable for connecting the external lights SBAL (M12, 12-pin on M12, 12-pin); length 0.5 m or 2 m	20
8	Connecting cable NEBS-M12G12-KS-...-LE12	Cable for power supply and digital I/Os (M12, 12-pin on open end); length 5 m or 10 m	20

Vision sensors SBSI

Peripherals overview

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Mechanical connection options with external lighting

| Mounting components and accessories			
		Brief description	**➜ Page**
1	Vision sensor SBSI-...	Vision sensor SBSI with integrated lens and lighting in code reader SBSI-B-... or object sensor SBSI-Q-... versions	6, 9
2	Mounting SBAM-C6-CP	Clamp fitting with dovetail slot	18
3	Mounting bracket SBAM-C6-A	Mounting bracket 90°. Adjustment option with 2 levels	18
4	Swivel mounting SBAM-C6-A2	Clamp fitting with dovetail slot. Can be turned and rotated around 2 axes	19
5	Retainer SBAM-C7-A	For ring light SBAL-C6-R-...-D	19
6	Ring light SBAL-C6-R-...-D	Type of light: LED, diffuse. Colours white, red and infrared	16
7	Area light SBAL-C6-A-...	Type of light: LED, clear. Colours white, red and infrared	14

Vision sensors SBSI
Type codes

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SBSI

SBSI — ☐ — R3 B — ☐ — ☐ — ☐

Basic version	
SBSI	Vision sensor with integrated lighting/lens

Function	
B	Code reader
Q	Object sensor

Image sensor – Resolution	
R3	736 x 480 pixels (Wide VGA)

Image sensor – Monochrome/colour	
B	Monochrome

Integrated lens – Focal length	
F6	6 mm
F12	12 mm

Integrated lighting – Colour	
W	White
R	Red
NR	Infrared

Additional features	
	Without
D	Increased depth of field

Vision sensors SBSI
Technical data – Code reader SBSI-B

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- Voltage
  19.2 ... 30 V DC

- Temperature range
  0 ... +55 °C
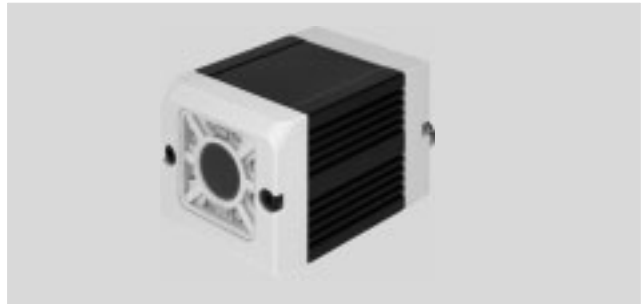
General technical data			
Type		SBSI-B-R3B-F6-...	SBSI-B-R3B-F12-...
Sensor resolution		736 x 480 pixels (Wide VGA)	
Sensor type		Monochrome	
Focus setting		With adjusting screw	
Lens mounting		Integrated lens	
Lighting type		Integrated	
Frame rate (full image)	[fps]	50	
Max. number of test programs/jobs		8	
Focal length	[mm]	6	12
Field of view	[mm]	Min. 5 x 4	Min. 8 x 6
Working distance	[mm]	6 - infinite	30 - infinite
Max. number of test criteria/detectors		2	
Function of detectors/characteristics		2/5 Industrial	
		2/5 Interleaved	
		Codabar	
		Code 128	
		Code 39	
		Code 93	
		EAN	
		ECC200	
		GS1	
		PDF 417	
		Pharmacode	
		QR code	
		RSS	
		UPC	
Typical cycle time	[ms]	1D barcode: 30	
		2D code: 40	
Dimensions W x L x H	[mm]	45 x 45 x 76.7	
Product weight	[g]	160	
Information on housing materials		Anodised aluminium	
Information on cover materials		ABS reinforced	
Note on materials		RoHS compliant	

Vision sensors SBSI

Technical data – Code reader SBSI-B

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Ethernet interface	
Information on Ethernet, connection technology	M12 socket, 4-pin
Ethernet, transmission speed	100 Mbit/s
Ethernet, supported protocols	TCP/IP, Ethernet/IP, FTP, SMB

Serial interface	
Serial interface, connection technology	Plug connector, M12, 5-pin
Type of serial interface	RS232/RS422

Digital inputs, outputs and power supply		
Electrical connection		Plug connector, M12, 12-pin
Number of digital inputs		2
Number of digital outputs		4
Number of selectable digital inputs/outputs		2
Switching input		PNP/NPN (switchable)
Switching level	[V]	Signal 0: <= 3
		Signal 1: >= UB −1
Switching output		PNP/NPN, switchable
Max. output current	[mA]	50
Protection against short circuit		For all electrical connections
Nominal operating voltage	[V DC]	24
Permissible voltage fluctuations	[%]	−25 ... +10
Max. current consumption	[mA]	550
Current consumption with load-free outputs	[mA]	200

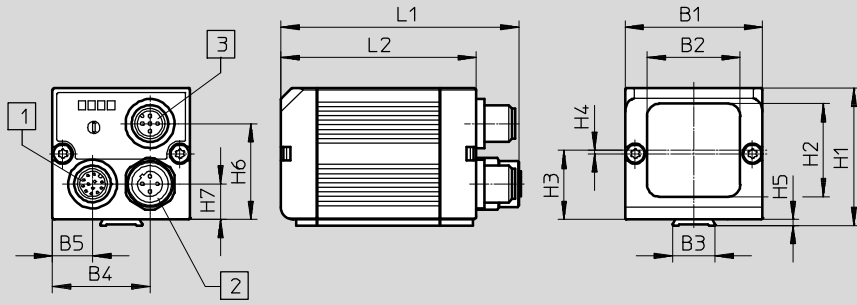| Operating and environmental conditions		
Ambient temperature	[°C]	0 ... +50
Storage temperature	[°C]	−20 ... +60
Degree of protection		IP67
Vibration resistance		DIN EN 60947-5-2
Resistance to shocks		DIN EN 60947-5-2
CE marking (see declaration of conformity)		To EU EMC Directive[2]
Certification		c UL us - listed (OL)
		RCM trademark

2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ User documentation.
   If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Vision sensors SBSI

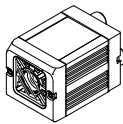Technical data – Code reader SBSI-B

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Dimensions

Download CAD data ➔ **www.festo.com**

1 Plug connector M12, 12-pin
2 Socket M12, 4-pin
3 Plug connector M12, 5-pin

| Type	B1	B2	B3	B4	B5	H1	H2	H3	H4	H5	H6	H7	L1	L2
SBSI-B-R3B-F- …	45	30.5	14	31.9	13.1	45	30.5	22.7	1.2	2	31.4	11.6	76.7	64

Ordering data

Code reader	Integrated lens – Focal length [mm]	Additional features	Type of light: LED	Part No.	Type
	6	–	White	**2930232**	**SBSI-B-R3B-F6-W**
	12	–	White	**2930233**	**SBSI-B-R3B-F12-W**
	6	Increased depth of field	White	**2930242**	**SBSI-B-R3B-F6-W-D**
	12	Increased depth of field	White	**2930243**	**SBSI-B-R3B-F12-W-D**
	6	–	Red	**2930234**	**SBSI-B-R3B-F6-R**
	12	–	Red	**2930235**	**SBSI-B-R3B-F12-R**
	6	Increased depth of field	Red	**2930236**	**SBSI-B-R3B-F6-R-D**
	12	Increased depth of field	Red	**2930237**	**SBSI-B-R3B-F12-R-D**
	6	–	Infrared	**2930238**	**SBSI-B-R3B-F6-NR**
	12	–	Infrared	**2930239**	**SBSI-B-R3B-F12-NR**
	6	Increased depth of field	Infrared	**2930240**	**SBSI-B-R3B-F6-NR-D**
	12	Increased depth of field	Infrared	**2930241**	**SBSI-B-R3B-F12-NR-D**

Vision sensors SBSI

Technical data – Object sensor SBSI-Q

Voltage
19.2 … 30 V DC

Temperature range
0 … +55 °C
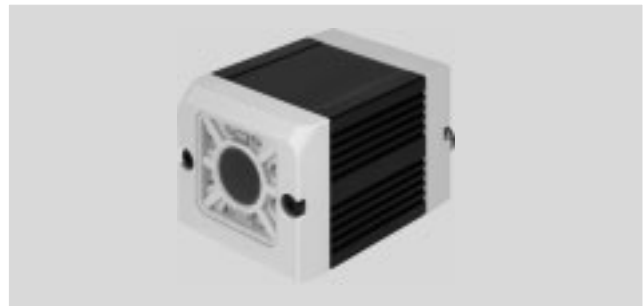
General technical data			
Type		SBSI-Q-R3B-F6-…	SBSI-Q-R3B-F12-…
Sensor resolution		736 x 480 pixels (Wide VGA)	
Sensor type		Monochrome	
Focus setting		With adjusting screw	
Lens mounting		Integrated lens	
Lighting type		Integrated	
Frame rate (full image)	[fps]	50	
Max. number of test programs/jobs		8	
Focal length	[mm]	6	12
Field of view	[mm]	Min. 5 x 4	Min. 8 x 6
Working distance	[mm]	6 - infinite	30 - infinite
Max. number of test criteria/detectors		32	
Function of detectors/characteristics		Grey value threshold	
		Brightness	
		Contrast	
		Contour matching	
		Position tracking via contour	
		Pattern matching	
Typical cycle time			
Grey value threshold	[ms]	4	
Brightness	[ms]	2	
Contrast	[ms]	4	
Contour matching	[ms]	30	
Position tracking	[ms]	30	
Pattern matching	[ms]	20	
Dimensions W x L x H	[mm]	45 x 45 x 76.7	
Product weight	[g]	160	
Information on housing materials		Anodised aluminium	
Information on cover materials		ABS reinforced	
Note on materials		RoHS compliant	

Vision sensors SBSI

Technical data – Object sensor SBSI-Q

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Ethernet interface	
Information on Ethernet, connection technology	M12 socket, 4-pin
Ethernet, transmission speed	100 Mbit/s
Ethernet, supported protocols	TCP/IP, Ethernet/IP, FTP, SMB

Digital inputs/outputs and power supply		
Electrical connection		Plug connector, M12, 12-pin
Number of digital inputs		2
Number of digital outputs		4
Number of selectable digital inputs/outputs		2
Switching input		PNP/NPN (switchable)
Switching level	[V]	Signal 0: <= 3
		Signal 1: >= UB −1
Switching output		PNP/NPN, switchable
Max. output current	[mA]	50
Protection against short circuit		For all electrical connections
Nominal operating voltage	[V DC]	24
Permissible voltage fluctuations	[%]	−25 ... +10
Max. current consumption	[mA]	550
Current consumption with load-free outputs	[mA]	200

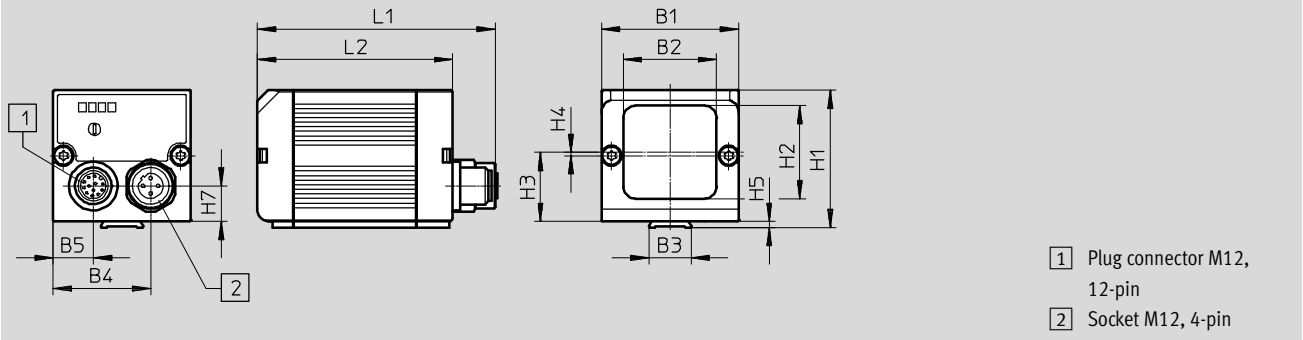| **Operating and environmental conditions**		
Ambient temperature	[°C]	0 ... +50
Storage temperature	[°C]	−20 ... +60
Degree of protection		IP67
Vibration resistance		DIN EN 60947-5-2
Resistance to shocks		DIN EN 60947-5-2
CE marking (see declaration of conformity)		To EU EMC Directive[2]
Certification		c UL us - listed (OL)
		RCM trademark

2)   For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ User documentation.
     If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Vision sensors SBSI

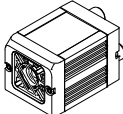Technical data – Object sensor SBSI-Q

FESTO

Dimensions

Download CAD data ➔ **www.festo.com**

| 1 | Plug connector M12, 12-pin |
| 2 | Socket M12, 4-pin |

| Type	B1	B2	B3	B4	B5	H1	H2	H3	H4	H5	H7	L1	L2
SBSI-Q-R3B-F- …	45	30.5	14	31.9	13.1	45	30.5	22.7	1.2	2	11.6	76.7	64

Ordering data

|	Focal length [mm]	Type of light: LED	Part No.	Type
	6	White	**2942261**	**SBSI-Q-R3B-F6-W**
	12	White	**2942262**	**SBSI-Q-R3B-F12-W**
	6	Infrared	**2942265**	**SBSI-Q-R3B-F6-NR**
	12	Infrared	**2942266**	**SBSI-Q-R3B-F12-NR**

Vision sensors SBSI

Technical data

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Integrated lenses – Fields of view

Field of view (6 mm focal length)

d = 150 mm

x = 120 mm   **y = 78 mm**
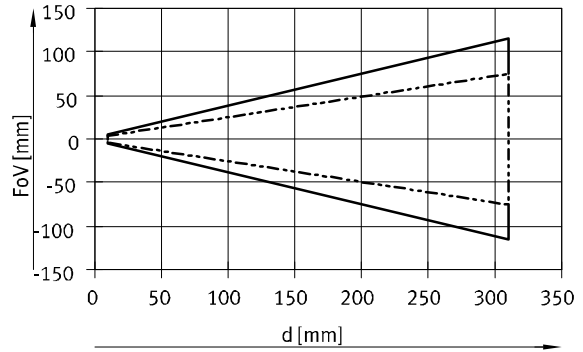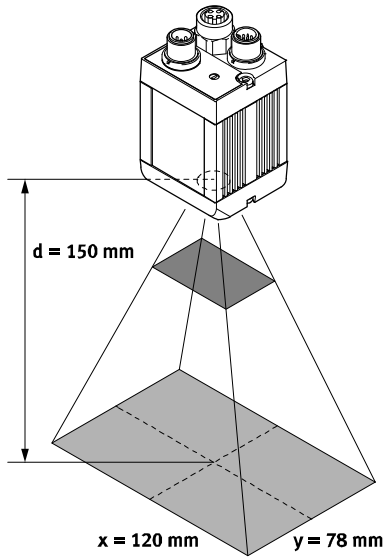
―――――― X-axis

―·―·―·― Y-axis

d = Working distance

FoV = Field of view

Field of view (12 mm focal length)

d = 150 mm

x = 57 mm   **y = 37 mm**
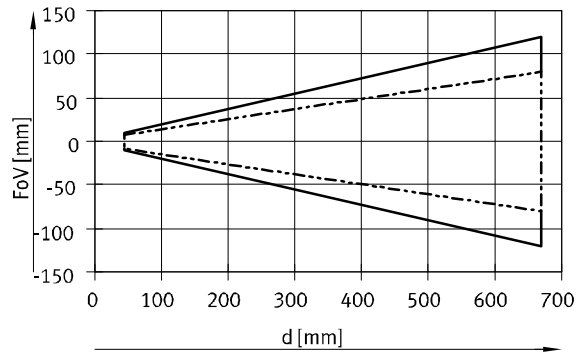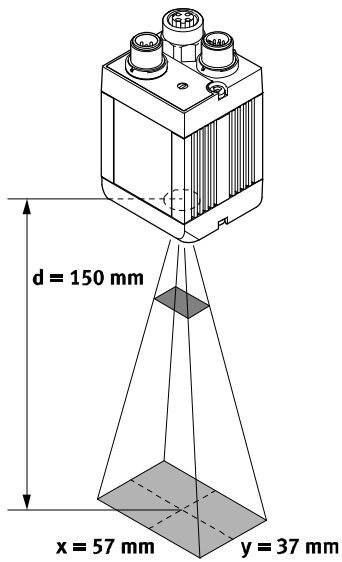
―――――― X-axis

―·―·―·― Y-axis

d = Working distance

FoV = Field of view

Vision sensors SBSI
Technical data

Approximate reading areas with respect to module size/bar width of codes
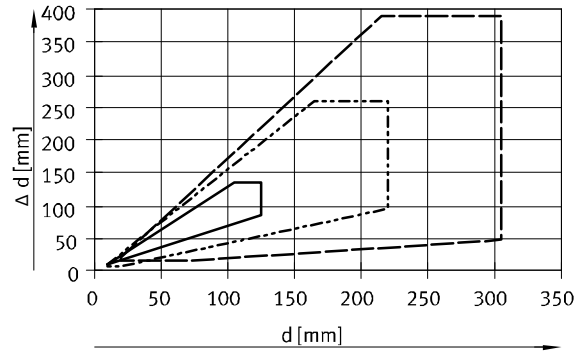
Normal depth of field (6 mm)
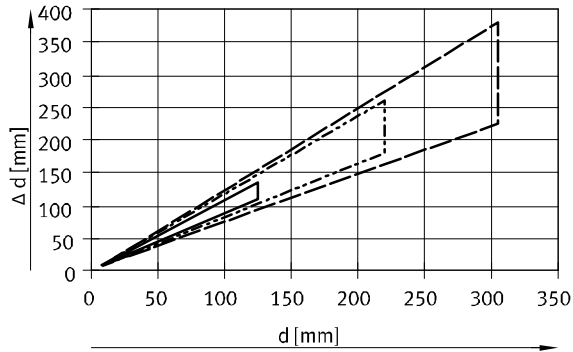
Module size/bar width of code:

————	0.25 mm
—·—··—	0.50 mm
— — —·	0.75 mm

d = Working distance

Δ d = Depth of field

Increased depth of field (6 mm)

Module size/bar width of code:

————	0.25 mm
—·—··—	0.50 mm
— — —·	0.75 mm

d = Working distance

Δ d = Depth of field

Normal depth of field (12 mm)
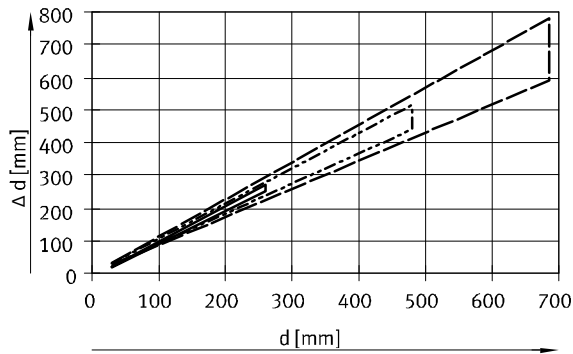
Module size/bar width of code:

————	0.25 mm
—·—··—	0.50 mm
— — —·	0.75 mm

d = Working distance

Δ d = Depth of field

Increased depth of field (12 mm)
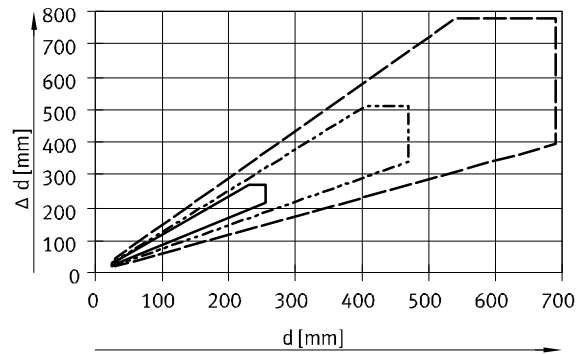
Module size/bar width of code:

————	0.25 mm
—·—··—	0.50 mm
— — —·	0.75 mm

d = Working distance

Δ d = Depth of field

Vision sensors SBSI

Accessories

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- Voltage
  24 V DC

- Temperature range
  0 ... +50 °C

General technical data				
Area light		SBAL-C6-A-W	SBAL-C6-A-R	SBAL-C6-A-NR
Lighting type		Area light		
Type of light		LED, clear		
		White	Red	Infrared
Type of mounting		Clamped in dovetail slot		
		Via accessories		
Working distance	[mm]	100 ... 300		
Electrical connection		2 x M12, plug connector 12-pin		
Maximum number of devices connectable in series (diagram)		4		
Reverse polarity protection		For all electrical connections		
Product weight	[g]	60		
Information on housing materials		ABS reinforced		
Note on materials		RoHS compliant		
RoHS status		RoHS compliant in accordance with EU Directive		

Electrical data		SBAL-C6-A-W	SBAL-C6-A-R	SBAL-C6-A-NR
Nominal operating voltage	[V DC]	24		
Permissible voltage fluctuations	[%]	±10		
Trigger level		Level 10 V ... UB		
Residual ripple	[%]	10		
Current consumption during continuous operation	[mA]	80	80	90
Current consumption during flash operation	[mA]	200	250	100

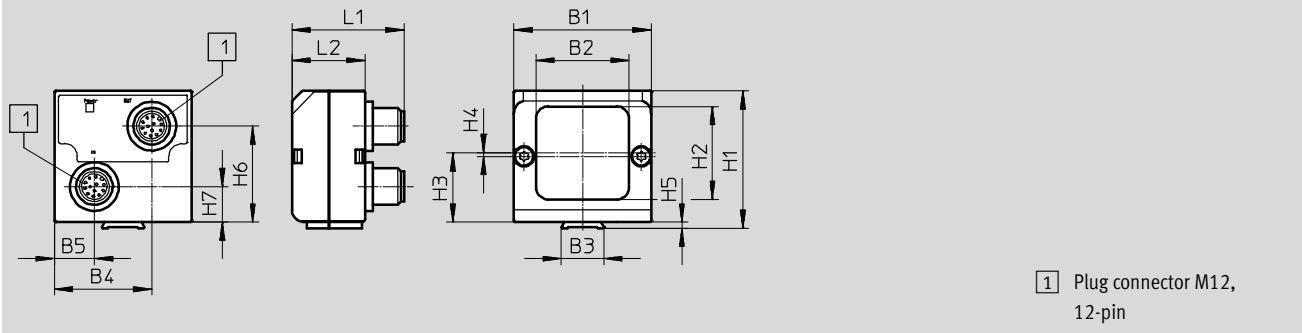| Operating and environmental conditions				
		SBAL-C6-A-W	SBAL-C6-A-R	SBAL-C6-A-NR
CE marking (see declaration of conformity)		To EU EMC Directive[2]		
Ambient temperature during continuous operation	[°C]	0 ... +50		
Ambient temperature during flash operation	[°C]	0 ... +50		
Storage temperature	[°C]	−20 ... +60		
Degree of protection		IP67		
Approval certificate		RCM trademark		

2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➜ User documentation.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Vision sensors SBSI

Accessories

FESTO

Dimensions

Download CAD data ➔ **www.festo.com**

1 Plug connector M12, 12-pin

Type	B1	B2	B3	B4	B5	H1	H2	H3	H4	H5	H6	H7	L1	L2
SBAL-C6-A-W	45	30.5	14	31.9	13.1	45	30.5	22.7	1.2	2	31.4	11.6	36.7	24
SBAL-C6-A-R														
SBAL-C6-A-NR														

Ordering data

	Type of light: LED, clear	Part No.	Type
	White	**8031158**	**SBAL-C6-A-W**
	Red	**8031159**	**SBAL-C6-A-R**
	Infrared	**8031160**	**SBAL-C6-A-NR**

Vision sensors SBSI

Accessories

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- Voltage
  24 V DC

- Temperature range
  0 ... +50 °C

General technical data				
Ring light		SBAL-C6-R-W-D	SBAL-C6-R-R-D	SBAL-C6-R-NR-D
Lighting type		Ring light		
Type of light		LED, diffuse		
		White	Red	Infrared
Type of mounting		Via mounting bracket		
Working distance	[mm]	100 ... 300		
Electrical connection		2 x M12, plug connector 12-pin		
Maximum number of devices connectable in series (diagram)		2		
Reverse polarity protection		For all electrical connections		
Product weight	[g]	150		
Information on housing materials		Anodised aluminium		
Note on materials		RoHS compliant		
RoHS status		RoHS compliant in accordance with EU Directive		

Electrical data		SBAL-C6-R-W-D	SBAL-C6-R-R-D	SBAL-C6-R-NR-D
Nominal operating voltage	[V DC]	24		
Permissible voltage fluctuations	[%]	±5		
Trigger level		Level 18 V ... UB		
Residual ripple	[%]	5		
Current consumption during continuous operation	[mA]	390	290	390
Current consumption during flash operation	[mA]	390	290	390

| Operating and environmental conditions				
		SBAL-C6-R-W-D	SBAL-C6-R-R-D	SBAL-C6-R-NR-D
CE marking (see declaration of conformity)		To EU EMC Directive[2]		
Ambient temperature during continuous operation	[°C]	0 ... +35		
Ambient temperature during flash operation	[°C]	0 ... +50		
Storage temperature	[°C]	−20 ... +60		
Degree of protection		IP67		
Approval certificate		RCM trademark		

2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ User documentation.
   If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Vision sensors SBSI

Accessories

Dimensions

Download CAD data → **www.festo.com**
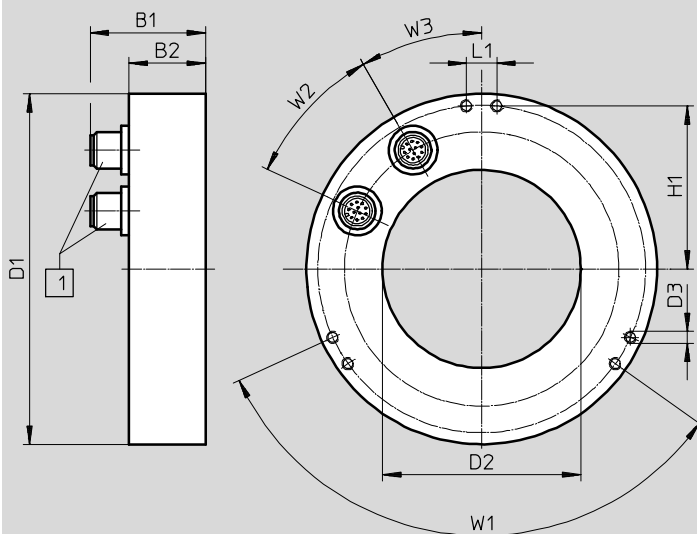
1 Plug connector M12, 12-pin

Type	B1	B2	D1 ⌀	D2 ⌀	D3	H1	L1	W1	W2	W3
SBAL-C6-R-...	37.7	25	115	65	M4	53.5	10	120°	35°	30°

Ordering data

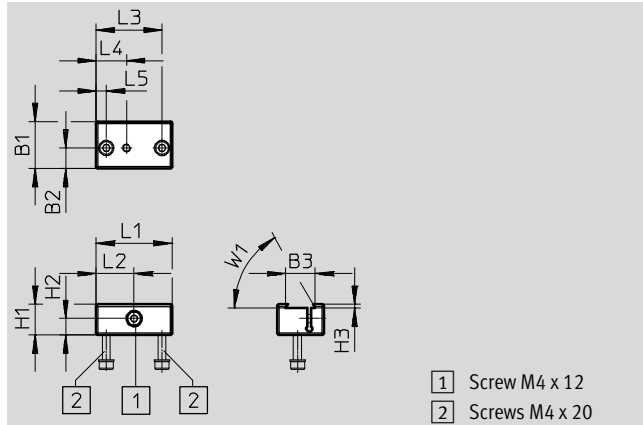|	Type of light: LED, diffuse	Part No.	Type
	White	**8031161**	**SBAL-C6-R-W-D**
	Red	**8031162**	**SBAL-C6-R-R-D**
	Infrared	**8031163**	**SBAL-C6-R-NR-D**

Vision sensors SBSI

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Mounting

Type of mounting: with dovetail slot, with thread

Information on materials: anodised aluminium

Note on materials: RoHS compliant

| 1 | Screw M4 x 12 |
| 2 | Screws M4 x 20 |

Dimensions [mm] and ordering data

| B1	B2	B3	H1	H2	H3	L1	L2	L3	L4	L5	W1	Weight [g]	CRC[1]	Part No.	Type
23	10	14.5	15	8	1.8	37.4	18.7	32.4	15	5	60°	28	2	**8031376**	SBAM-C6-CP

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.

Mounting bracket

Type of mounting: with through-hole

Information on materials: high-alloy steel

Note on materials: RoHS compliant

| 1 | Screw M4 x 10 |
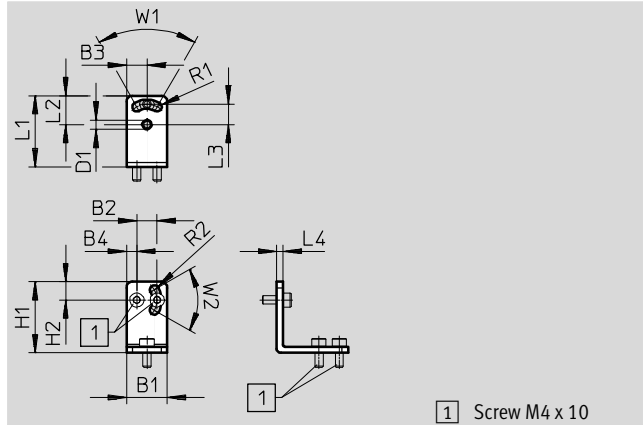
Dimensions [mm] and ordering data

| B1	B2	B3	B4	D1 ⌀	H1	H2	L1	L2	L3	L4	R1	R2	W1	W2	Weight [g]	CRC[1]	Part No.	Type
20	10	10	5	4.5	35	9	35	14.3	10	3	2.3	2.3	60°	60°	27	2	**8031377**	SBAM-C6-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.

Vision sensors SBSI
Accessories

Mounting bracket

Type of mounting: with through-hole

Information on materials: high-alloy steel

Note on materials: RoHS compliant

1 Holes for screws M4 x 10
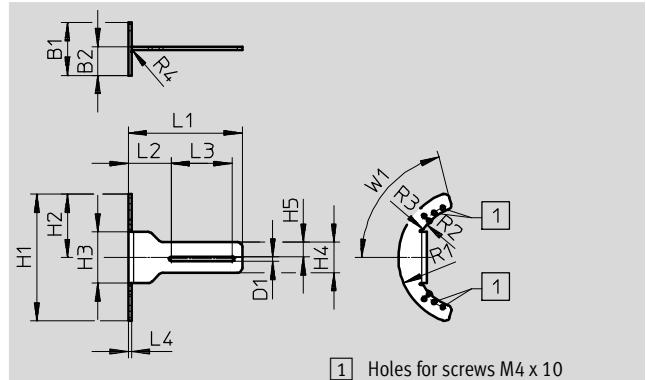
Dimensions [mm] and ordering data										
B1	B2	D1 ∅	H1	H2	H3	H4	H5	L1	L2	L3
52	28.2	4.2	124.9	62.4	50	30	14.4	112	42.1	60

L4	R1	R2	R3	R4	W1	Weight [g]	CRC[1]	Part No.	Type
3	66	50	2	2	75°	147	2	**8031379**	**SBAM-C7-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.

Swivel mounting

Type of mounting: with dove-tail slot, with through-hole

Information on materials: anodised aluminium

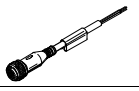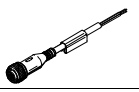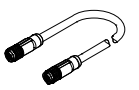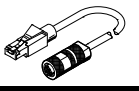Note on materials: RoHS compliant

1 Screws M6
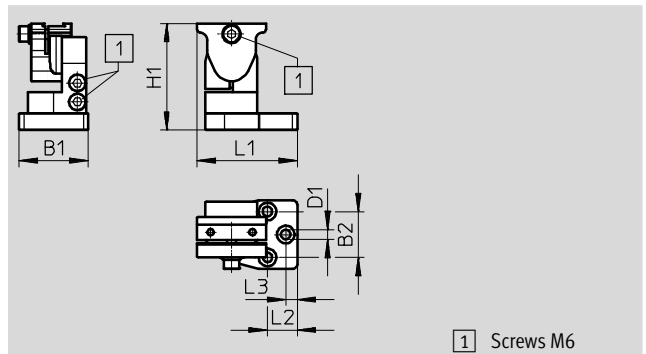
Dimensions [mm] and ordering data										
B1	B2	D1 ∅	H1	L1	L2	L3	Weight [g]	CRC[1]	Part No.	Type
45	30	6.3	70	65.5	19.5	7.5	215	2	**8031378**	**SBAM-C6-A2**

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.

Vision sensors SBSI

Accessories

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Ordering data			
	Description	Part No.	Type
Connecting cable			Technical data ➜ Internet: nebs
	Cable for power supply and digital I/Os (M12, 12-pin on open end); length 5 m or 10 m	**3058614**	**NEBS-M12G12-KS-5-LE12**
		2912452	**NEBS-M12G12-KS-10-LE12**
	Serial data cable (M12, 5-pin on open end); length 5 m or 10 m	**8030962**	**NEBS-M12G5-KS-5-LE5**
		8030963	**NEBS-M12G5-KS-10-LE5**
	Cable for connecting the external lights SBAL (M12, 12-pin on M12, 12-pin); length 0.5 m or 2 m	**3056124**	**NEBS-M12G12-KS-0.5-SM12G12**
		3058527	**NEBS-M12G12-KS-2-SM12G12**
Connecting cable			Technical data ➜ Internet: nebc
	Ethernet cable (M12, 4-pin on RJ45); length 3 m or 10 m	**8031121**	**NEBC-D12G4-KS-3-R3G4**
		8031122	**NEBC-D12G4-KS-10-R3G4**