# Controller SBRD-Q

**FESTO**

# Key features

### Functional principle

The images taken by the remote camera heads are sent to the electronic evaluation unit. Here, different inspection features are calculated, such as length, height, area, centre of mass, grey or colour value and roundness, depending on the application task.

By scanning various sample parts when setting up the camera, tolerance ranges for good parts are determined for each inspection feature. During operation, the camera computes characteristic values for the part to be inspected. Depending on whether these are within or outside the programmed tolerance range, the part is identified as good or bad. The results from the calculation of the characteristics can also be transmitted to a PLC via Ethernet, PROFINET, Telnet or EtherNet/IP. Up to 256 inspection programs can be stored on the camera.

The characteristics calculated by the camera are not dependent on the angular orientation and position of the inspection part; they are determined relative to the position of the inspection part and so any tilting and/or movement of the inspection part in the field of view is irrelevant for the inspection process. The behaviour of the camera during inspection is determined by what is called the evaluation mode. There are two different modes.

- Triggered: single image recording and inspection with each trigger signal (image evaluation is triggered by an external signal)
- Free run: continuous image recording and inspection (without fixed frame rate) as long as there is a trigger signal.
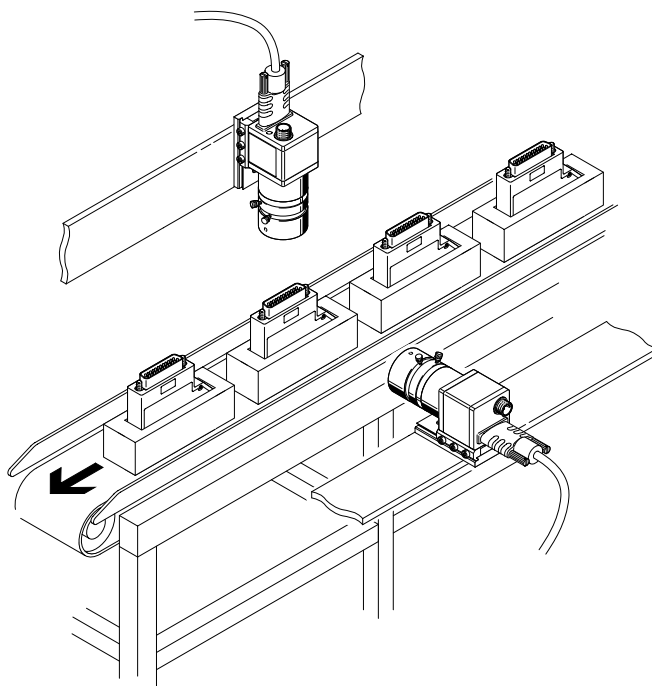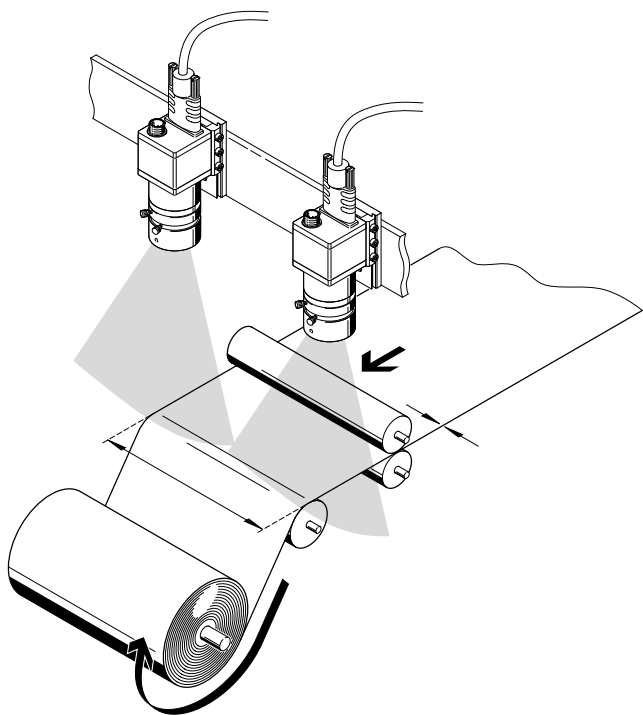
### Areas of application

- Detecting the position and rotary orientation of parts
- Pick & place
- Quality inspection
- Measurement
- Reading of barcodes and data matrix codes (1D and 2D codes)
- Reading plain text (OCR)
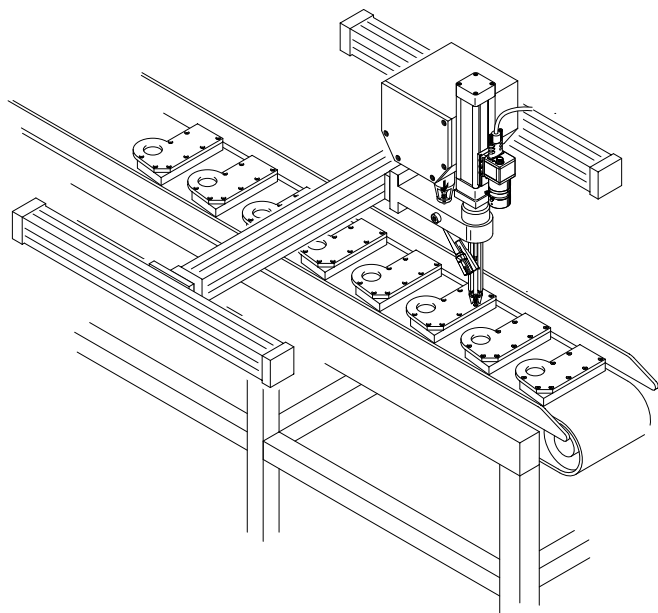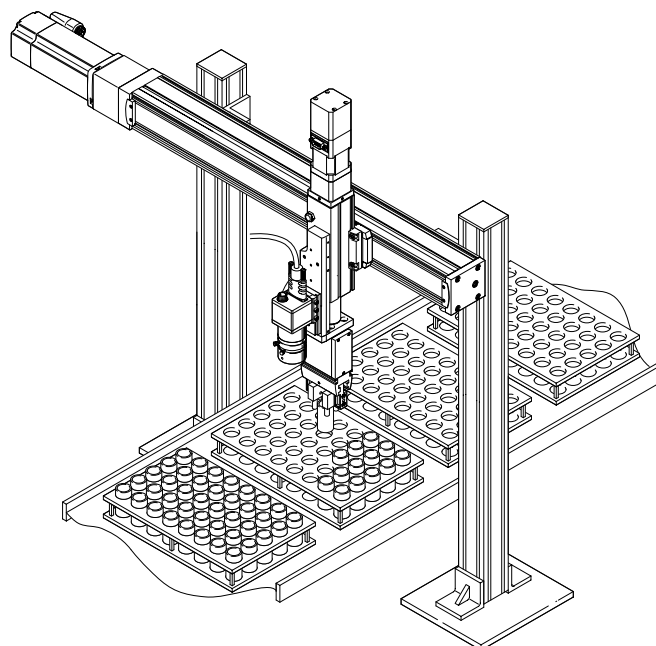
### Application examples

Roller alignment

Measuring
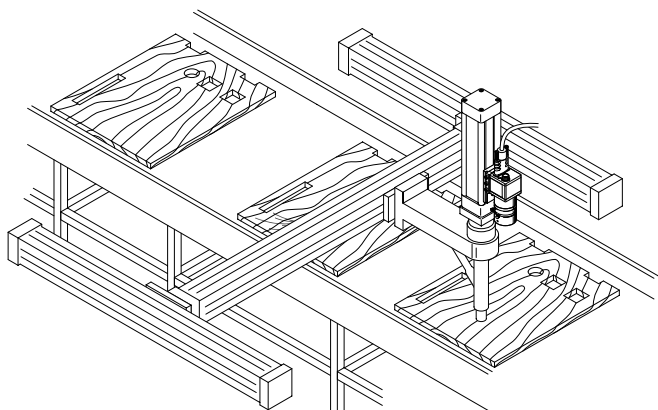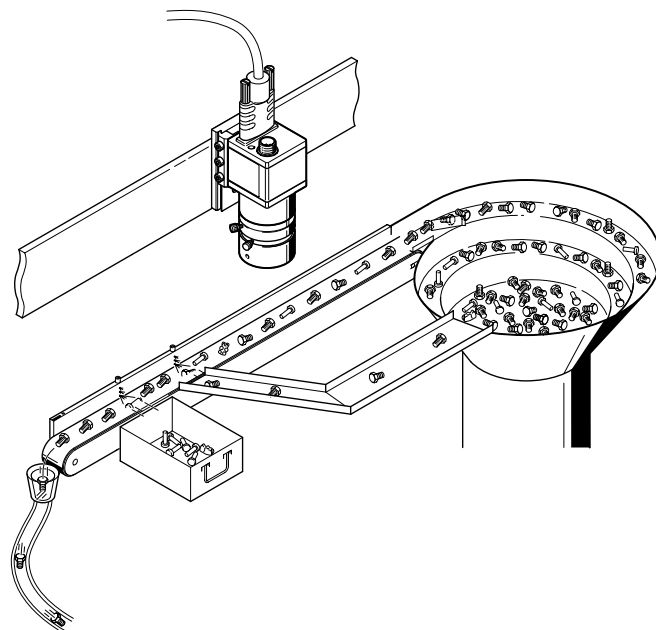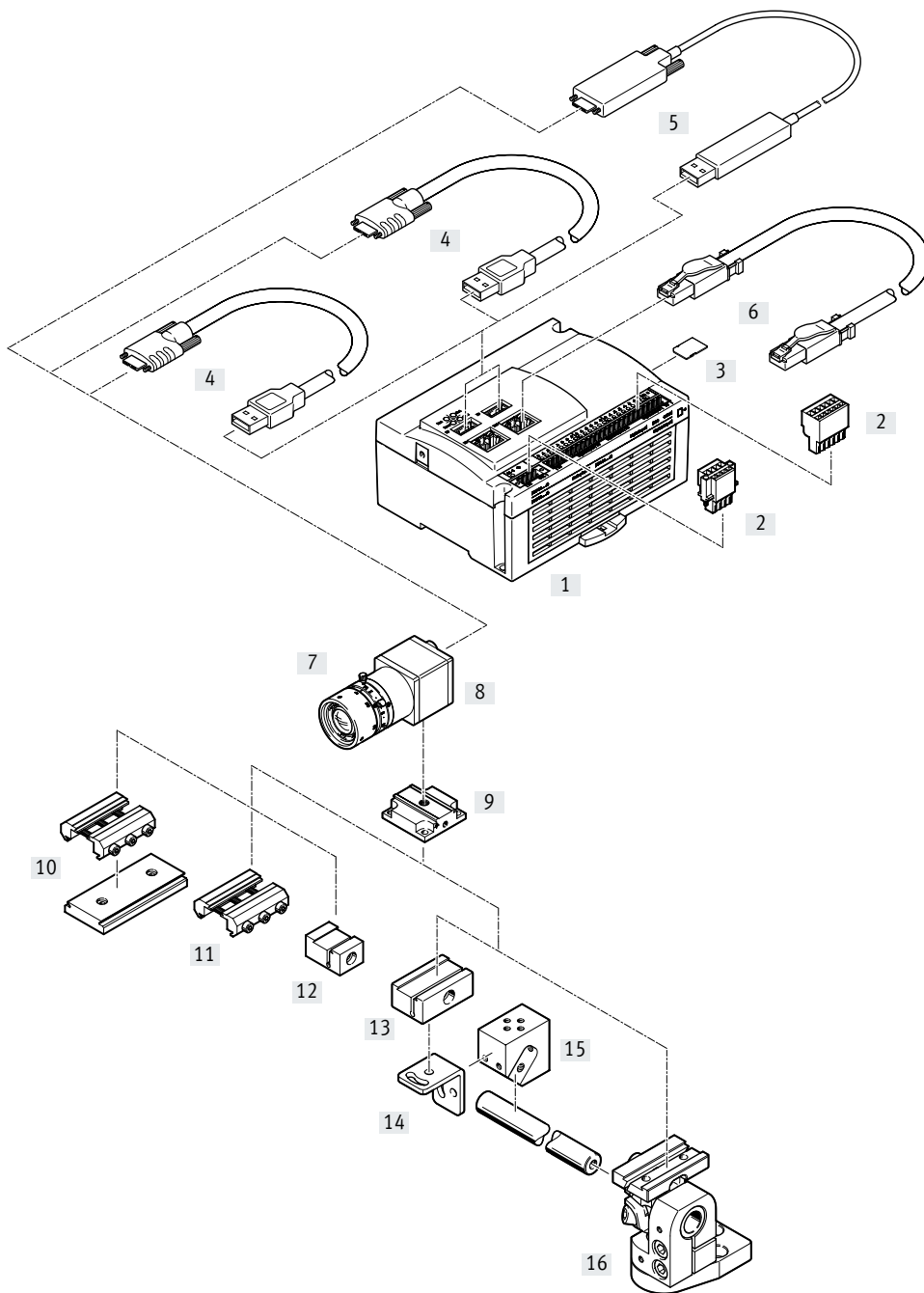
# Key features

**Application examples**

Screws



Pick & place



Bonding



Sorting screws

## Peripherals overview



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| [2] | Plug NECC-L2G… | 17 |
| [3] | Memory card CAMC-M-MS-G32 | 17 |
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| [5] | Connecting cable NEBC-U7G10-EH-…-N-S-U5G9 | 17 |
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| Accessories | | → Page |
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**→ Internet: www.festo.com/catalogue/…**

## Type codes – Controller

| 001 | Series | |
|------|--------|---|
| **SBRD** | Controller | |

| 002 | Function | |
|------|----------|---|
| **Q** | Quality test | |

## Type codes – Camera head

| 001 | Series | |
|------|--------|--|
| **SBPB** | Camera head | |

| 002 | Resolution | |
|------|------------|--|
| **R2** | 1280x1024 | |
| **R5** | 1600x1200 | |
| **R9** | 2456x2054 | |

| 003 | Image sensor | |
|------|--------------|--|
| **B** | Monochrome | |
| **C** | Colour | |

| 004 | Communication interface | |
|------|------------------------|--|
| **U3** | USB 3.0 | |

| 005 | Digital inputs | |
|------|----------------|--|
| **1E** | 1 input | |

| 006 | Digital outputs | |
|------|-----------------|--|
| **1A** | 1 output | |

| 007 | Lens connection | |
|------|-----------------|--|
| **C** | C mount | |
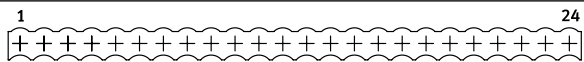
# Data sheet
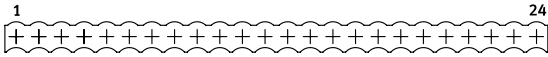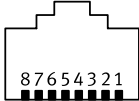
- ▐ - Temperature range
−5 ... 50°C

### General technical data

| | | |
|---|---|---|
| Dimensions W x H x L | [mm] | 130 x 106 x 60 |
| Type of mounting | | Via through-hole for M4 screw |
| | | With H-rail |
| Product weight | [g] | 315 |
| CE marking (see declaration of conformity) | | To EU EMC Directive |
| KC mark | | KC EMC |
| Protection against direct and indirect contact | | PELV |
| Nominal operating voltage DC | [V] | 24 |
| Permissible voltage fluctuations | [%] | ±10 |
| Power consumption 24 V | [W] | 20 |

### Input/output interface

| | | |
|---|---|---|
| Function | | 10x digital input |
| | | 2x digital input with pull-up resistor |
| | | 8x digital output |
| | | Ground |
| | | Power supply |
| Connection type | | Plug |
| Connection technology | [mm] | Board connector, contact spacing 3.5 mm |
| Number of pins/wires | | 24 |
| Plug pattern | | |
| Number of inputs | | 12 |
| Note on inputs | | 2 of the 12 inputs with integrated pull-up resistor |
| Switching level | [V] | Signal 1: ≥ 10 |
| | | Signal 0: ≤ 1 |
| Note on the switching level | [V] | Signal 0: ≤ 1 |
| | | Signal 1: ≥ 8 |
| | | For integrated pull-up resistor |
| Switching logic at inputs | | PNP (positive switching) |
| Number of outputs | | 8 |
| Digital outputs, output current | [mA] | 450 |
| Max. output current | [mA] | 1510 |
| Switching logic at outputs | | PNP (positive switching) |

# Data sheet

**Power supply**

| Function | | Electronics |
|---|---|---|
| Connection type | | Plug |
| Connection technology | [mm] | Board connector, contact spacing 3.5 mm |
| Number of pins/wires | | 4 |
| Plug pattern | |  |

**Camera interface**

| Function | Communication with camera only |
|---|---|
| Connection type | 2x socket |
| Connection technology | USB 3.0 type A |
| Number of pins/wires | 9 |
| Note on the camera interface | Only use the cables explicitly identified by Festo as accessories |
| Plug pattern |  |

**Fieldbus interface**

| Function | No function |
|---|---|

**Card slot**

| Storage medium | microSD |
|---|---|
| Storage capacity | ≤ 32 GB |

**Immission/emission**

| Storage temperature | [°C] | −20 ... +70 |
|---|---|---|
| Degree of protection | | IP20 |
| Ambient temperature | [°C] | −5 ... +50 |
| Relative humidity | [%] | 95 |
| | | Non-condensing |

**Ethernet interface**

| Protocol | | TCP/IP |
|---|---|---|
| Function | | Diagnostics |
| | | Programming |
| Connection type | | Socket |
| Connection technology | | RJ45 |
| Number of pins/wires | | 8 |
| Transmission rate | [Mbps] | 10 |
| | [Mbps] | 100 |
| | [Mbps] | 1000 |
| Plug pattern | |  |

**Operating and environmental conditions**

| Housing material | Reinforced PA |
|---|---|
| Note on materials | RoHS-compliant |

# Data sheet
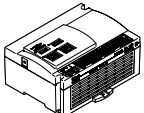
**Dimensions**  Download CAD data ➔ www.festo.com
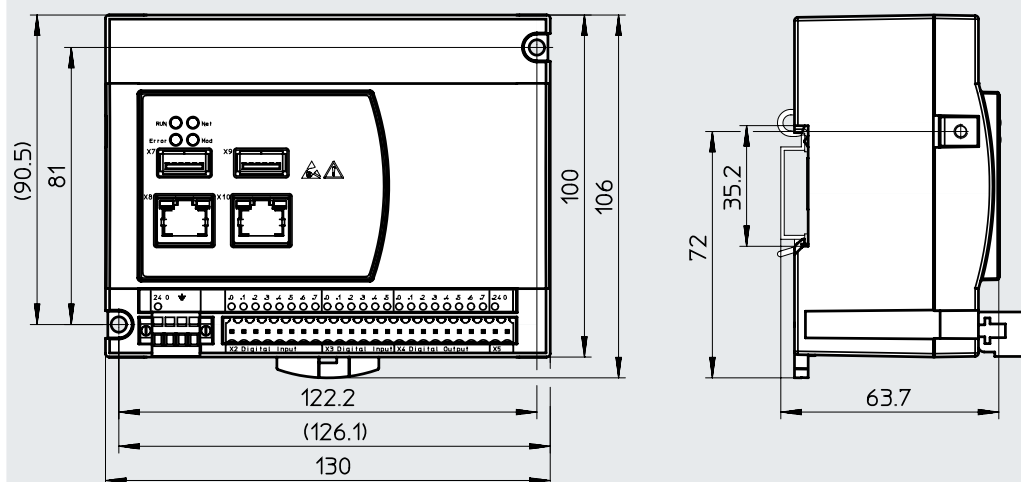


| Type | B1 | D1 Ø | H1 | H2 | H3 | H4 | H5 | H6 | L1 | L2 | L3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SBRD-Q | 63.7 | 4.5 | 106 | 100 | 90.5 | 81 | 72 | 35.2 | 130 | 126.1 | 122.2 |

**Ordering data**

| Controller | | Part no. | Type |
|---|---|---|---|
| | | **8067301** | **SBRD-Q** |

## Accessories – Ordering data

⌐ Voltage
5 V

⌐ Temperature range
0 ... 40°C

**General technical data**

| Sensor resolution | -R2 | | 1280 x 1024 pixels (SXGA) |
|---|---|---|---|
| | -R5 | | 1600 x 1200 pixels (UXGA) |
| | -R9 | | 2456 x 2054 pixels (5MPix) |
| Sensor type | -B | | Monochrome |
| | -C | | Colour |
| Lens mounting | | | C mount |
| Field of view | | [mm] | Depends on the lens chosen |
| Width | | [mm] | 29 |
| Height | | [mm] | 29 |
| Length | | [mm] | 49 |
| Type of mounting | | | Via through-hole for M3 screw |
| Product weight | | [g] | 52 |
| CE marking (see declaration of conformity) | | | To EU EMC Directive |

**USB interface**

| Function | | | Power supply |
|---|---|---|---|
| | | | Communication |
| Connection type | | | Socket |
| Connection technology | | | USB 3.0 type B micro |
| Number of pins/wires | | | 10 |
| Nominal operating voltage DC | | [V] | 5 |
| Permissible voltage fluctuations | | [%] | +/- 5 |
| Electrical power consumption | -R2 | [W] | 1.3 ... 1.5 |
| | -R5 | [W] | 1.3 ... 1.5 |
| | -R9 | [W] | 2.3 ... 3 |

**Input/output interface**

| Function | No function |
|---|---|

**Immission/emission**

| Degree of protection | | IP30 in assembled status |
|---|---|---|
| Storage temperature | [°C] | −20 ... +60 |
| Ambient temperature | [°C] | 0 ... +40 |

**Electronics**

| Working distance | | [mm] | Depends on the lens chosen |
|---|---|---|---|
| Exposure time | -R2 | | 9 µs - 2000 ms |
| | -R5 | | 20 µs - 10000 ms |
| | -R9 | | 27 µs - 999 ms |

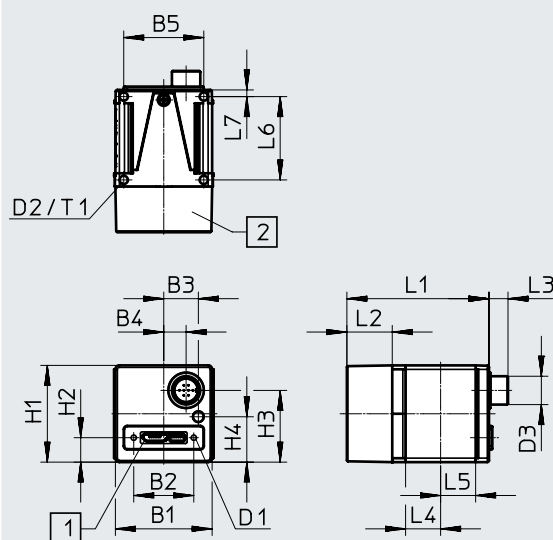## Accessories – Ordering data

**Operating and environmental conditions**

| Ambient conditions | | Screened from extreme external light sources |
|---|---|---|
| | | Cleanest possible ambient air |
| | | Dry |
| Relative humidity | [%] | 20 … 80 |
| Housing material | | Anodised wrought aluminium alloy |
| Note on materials | | RoHS-compliant |

**Dimensions**  Download CAD data ➔ www.festo.com

SBPB-R...-U3-1E1A-C



[1]   USB 3.0 micro connection

[2]   Protective cap

| Type | B1 | B2 | B3 | B4 | B5 | D1 | D2 | D3 ⌀ | H1 | H2 |
|---|---|---|---|---|---|---|---|---|---|---|
| SBPB-R … -U3-1E1A-C | 29 | 18 | 10.4 | 6.7 | 24 | M2x4 | M3 | 8.5 | 29 | 7.3 |

| Type | H3 | H4 | L1 | L2 | L3 | L4 | L5 | L6 | L7 | T1 |
|---|---|---|---|---|---|---|---|---|---|---|
| SBPB-R … -U3-1E1A-C | 21.5 | 13.6 | 42.6 | 13.6 | 5.7 | 10.5 | 10.5 | 25 | 2 | 3.5 |

**Ordering data – Camera head**

| | Sensor resolution | Exposure time | Frame rate (full image) [fps] | Part no. | Type |
|---|---|---|---|---|---|
| | 1280 x 1024 pixels (SXGA) | 9 µs - 2000 ms | 60 | 8066466 | SBPB-R2B-U3-1E1A-C |
| | | | 60 | 8066467 | SBPB-R2C-U3-1E1A-C |
| | 1600 x 1200 pixels (UXGA) | 20 µs - 10000 ms | 60 | 8066468 | SBPB-R5B-U3-1E1A-C |
| | | | 60 | 8066469 | SBPB-R5C-U3-1E1A-C |
| | 2456 x 2054 pixels (5MPix) | 27 µs - 999 ms | 36 | 8066470 | SBPB-R9B-U3-1E1A-C |
| | | | 36 | 8066471 | SBPB-R9C-U3-1E1A-C |

## Accessories – Ordering data

| Ordering data – Lenses | | | | | Data sheets → Internet: sasf-c |
|---|---|---|---|---|---|
| | Format [inch] | Working distance [mm] | Focal length [mm] | Part no. | Type |
| | 1/2 | ≥250 | 12 | **572911** | **SASF-C-L-F12** |
| | 2/3 | ≥350 | 35 | **572914** | **SASF-C-L-F35** |

**Mounting SBAM-C11-CP**
Type of mounting: Clamped with thread
Material: Anodised wrought aluminium alloy

Note on materials:
RoHS-compliant
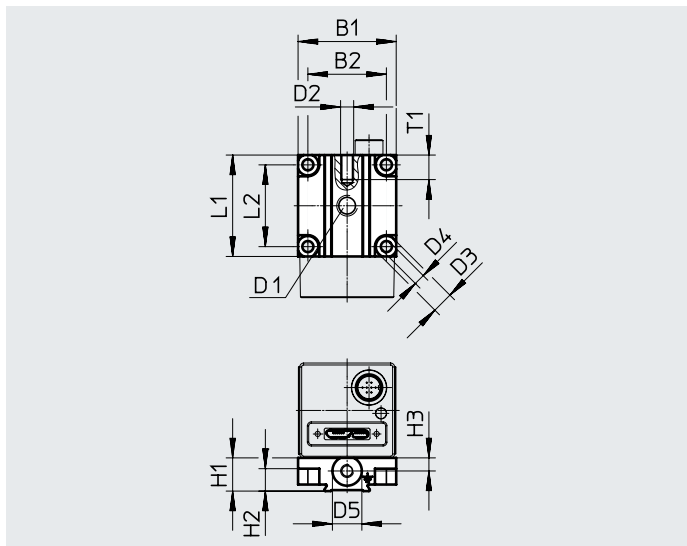
| Type | B1 | B2 | D1 | D2 | D3 Ø | D4 Ø | D5 Ø | H1 −0.2 | H2 | H3 | L1 | L2 | T1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SBAM-C11-CP | 30 | 24 | 1/4-20 UNC | M4 | 6.5 | 3.4 | 9 | 10.2 | 6.9 | 4 | 31 | 25 | 7.5 |

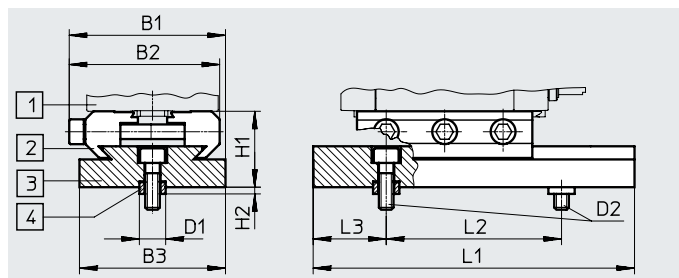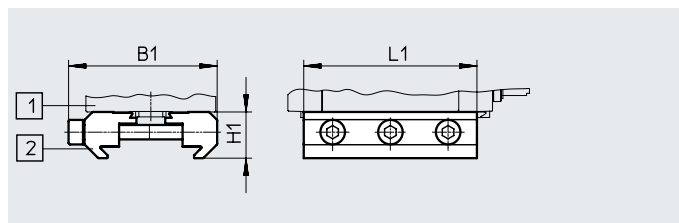| Ordering data | | Weight [g] | Part no. | Type |
|---|---|---|---|---|
| Mounting | | | | |
| | | 19 | **8066474** | **SBAM-C11-CP** |

# Accessories – Ordering data

**Adapter kit**
**SBOA-HMSV-39**
With screw-on adapter plate

Material:
Anodised wrought aluminium alloy

[1]   Compact vision system         [3]   Adapter plate
[2]   Clamping element              [4]   Centring sleeve ZBH 9

| Ordering data | Part no. | Type |
|---|---|---|
| Adapter kit | 541599 | SBOA-HMSV-39 |

**Adapter kit**
**SBOA-HMSV-40**
Without screw-on adapter plate

Material:
Anodised wrought aluminium alloy

[1]   Compact vision system
[2]   Clamping element

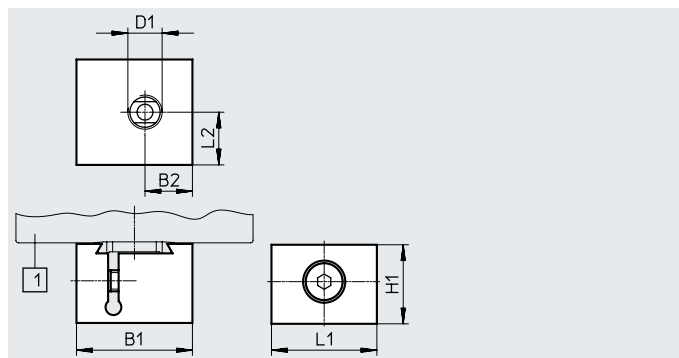| Ordering data | Part no. | Type |
|---|---|---|
| Adapter kit | 541600 | SBOA-HMSV-40 |

**Adapter kit**
**SBOA-HMSV-41**
With female thread G1/4 for mounting
on commercially available tripods

Material:
Anodised wrought aluminium alloy

[1]   Compact vision system

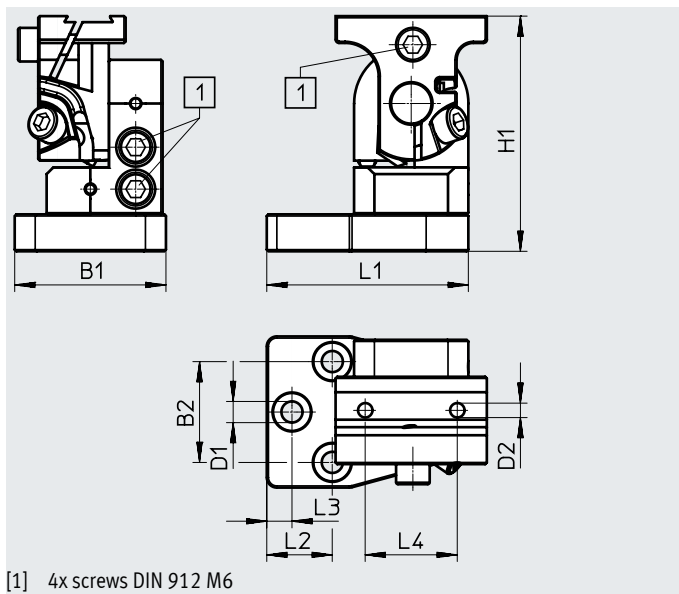| Ordering data | Part no. | Type |
|---|---|---|
| Adapter kit | 542140 | SBOA-HMSV-41 |

# Accessories – Ordering data

**Swivel mounting**
**SBAM-C6-...**

Type of mounting: With dovetail slot,
with through-hole
Information on materials: Anodised
wrought aluminium alloy
Note on materials: RoHS-compliant

[1]  4x screws DIN 912 M6

**Dimensions [mm] and ordering data**

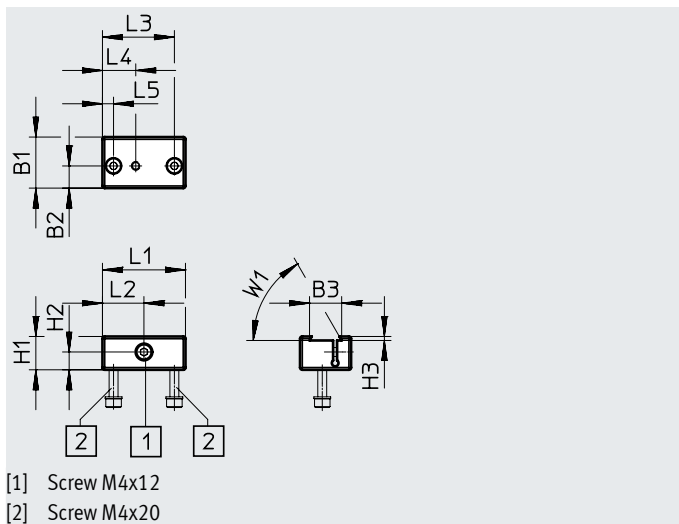| B1 | B2 | D1 ∅ | D2 ∅ | H1 | L1 | L2 | L3 | L4 | Weight [g] | Part no. | Type |
|----|----|----|----|----|----|----|----|----|----|----|----|
| 45 | 30 | 6.3 | 4.3 | 70 | 65.5 | 19.5 | 7.5 | 27.4 | 209 | **8058739** | **SBAM-C6-A2-AF** |
|    |    |    |    |    |    |    |    |    | 28 | **8058740** | **SBAM-C6-CP-AF** |

**Mounting**
**SBAM-C6-CP**

Type of mounting: With dovetail slot,
with thread
Information on materials: Anodised
aluminium
Note on materials: RoHS-compliant

[1]  Screw M4x12
[2]  Screw M4x20

**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 can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.
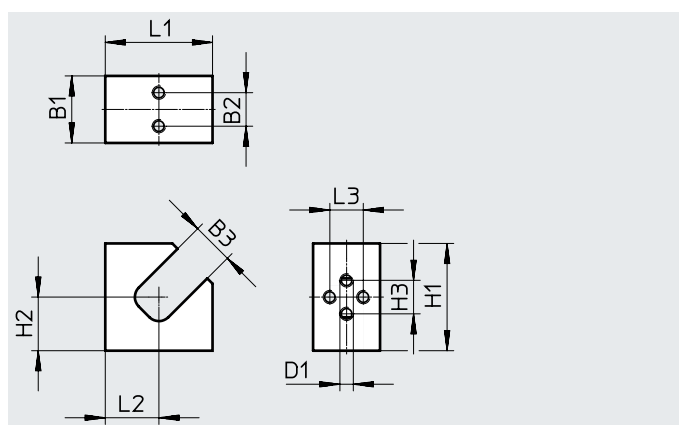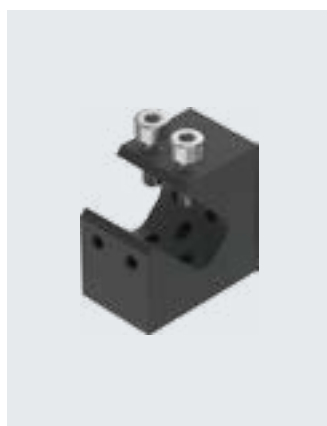
# Accessories – Ordering data

**Mounting**

**SBAM-C6-CP-AF**

Type of mounting: With thread, clamped

Information on materials: Anodised wrought aluminium alloy

Note on materials: RoHS-compliant
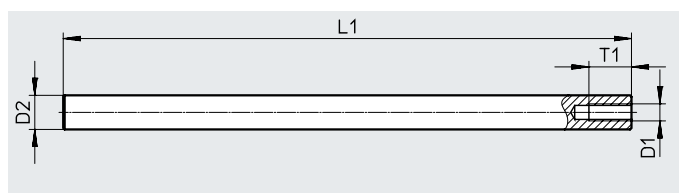


### Dimensions [mm] and ordering data

| B1 | B2 | B3 | D1 | H1 | H2 | H3 | L1 | L2 | L3 | Weight [g] | Part no. | Type |
|----|----|----|----|----|----|----|----|----|----|------------|----------|------|
| 20 | 10 | 12.5 | M4 | 32 | 16 | 10 | 32 | 16 | 10 | 28 | 8058740 | SBAM-C6-CP-AF |

**Mounting**

Type of mounting: With thread, clamped

Information on materials: High-alloy steel

Note on materials: RoHS-compliant



### Dimensions [mm] and ordering data

| D1 | D2 ∅ | L1 | T1 | Corrosion resistance class [CRC[1]] | Weight [g] | Part no. | Type |
|----|------|----|----|----|----|----|----|
| M6 | 12 | 200 | 15 | 2 | 178 | 8058741 | SBAM-C6-MR-200 |
| | | 300 | | | 265 | 8058742 | SBAM-C6-MR-300 |

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

Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.
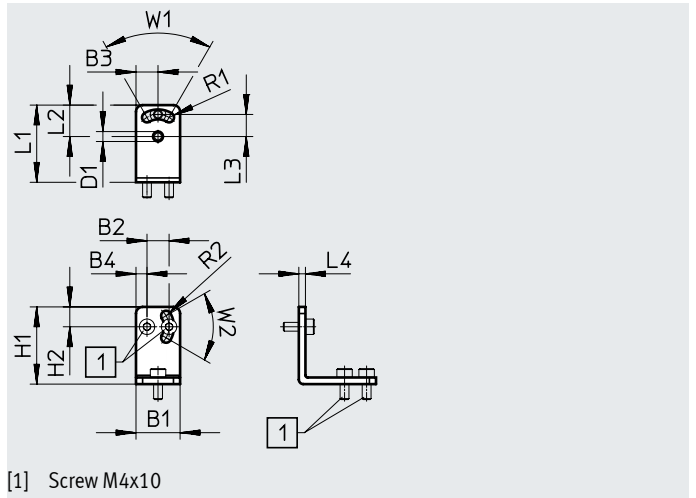
# Accessories – Ordering data

**Mounting bracket**
**SBAM-C6-A**
Type of mounting: With through-hole
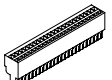Information on materials: High-alloy steel
Note on materials: RoHS-compliant

[1]  Screw M4x10

### Dimensions [mm] and ordering data

| B1 | B2 | B3 | B4 | D1 ∅ | H1 | H2 | L1 | L2 | L3 |
|----|----|----|----|------|----|----|----|----|----|
| 20 | 10 | 10 | 5 | 4.5 | 35 | 9 | 35 | 14.3 | 10 |

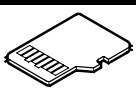| L4 | R1 | R2 | W1 | W2 | Weight [g] | CRC[1] | Part no. | Type |
|----|----|----|----|----|-----------|--------|----------|------|
| 3 | 2.3 | 2.3 | 60° | 60° | 27 | 2 | **8031377** | **SBAM-C6-A** |

1)  Corrosion resistance class CRC 2 to Festo standard FN 940070
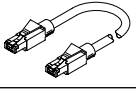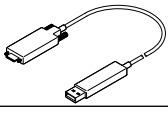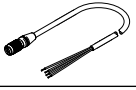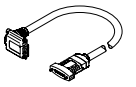Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.
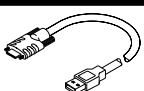
# Accessories – Ordering data

**Ordering data – Plugs**

| | Description | PU[1] | Part no. | Type |
|---|---|---|---|---|
| | Plugs for self-assembly | 1 | **575303** | **NECC-L2G4-C1-M** |
| | Plugs for self-assembly, 2-pin | 1 | **575302** | **NECC-L2G2-C1** |
| | Plugs for self-assembly, 4-pin | 1 | **8024782** | **NECC-L2G4-C1** |
| | Plugs for self-assembly, 5-pin | 1 | **575304** | **NECC-L2G5-C1** |
| | Plugs for self-assembly, 6-pin | 1 | **575305** | **NECC-L2G6-C1** |
| | Plugs for self-assembly, 8-pin | 1 | **575306** | **NECC-L2G8-C1** |
| | Plugs for self-assembly, 24-pin | 1 | **575307** | **NECC-L2G24-C1** |

1) Packaging unit

**Ordering data – Memory card**

| | Storage capacity [GB] | Speed class | Max. read speed [MB/s] | Part no. | Type |
|---|---|---|---|---|---|
| | 32 | Class 10 | 20 | **8094425** | **CAMC-M-MS-G32-G2** |

**Ordering data – Connecting cable**

| | Electrical connection 1 | Electrical connection 2 | Cable length [m] | Weight [g] | Part no. | Type |
|---|---|---|---|---|---|---|
| | Straight plug USB 3.0 type B micro | Straight plug USB 3.0 type A | 5 | 282 | **8072582** | **NEBC-U7G10-KS-5-N-S-U5G9** |
| | Straight plug, RJ45 | Straight plug, RJ45 | 1 | 87 | **8040455** | **NEBC-R3G4-ES-1-S-R3G4-ET** |
| | Straight plug USB 3.0 type B micro | Straight plug USB 3.0 type A | 15 | 444 | **8093271** | **NEBC-U7G10-EH-15-N-S-U5G9** |
| | Straight plug USB 3.0 type B micro | Straight plug USB 3.0 type A | 30 | 530 | **8093272** | **NEBC-U7G10-EH-30-N-S-U5G9** |
| | Straight socket | Open end | 5 | 160 | **8132476** | **NEBC-H25G8-ES-5-N-B-LE4** |
| | Angled socket | Straight socket USB 3.0 type B micro | 0.45 | 35 | **8093270** | **NEBC-U7W10-KS-0.5-N-SB-U7G10** |