

# Fibre-optic units SOE4

Product overview



- High precision fibre-optic units
- Switching frequencies up to 8000 Hz
- Working ranges up to 2000 mm
- Variants with LED display, switching and analogue outputs
- Setting via teach-in
- Comprehensive range of fibre-optic cables

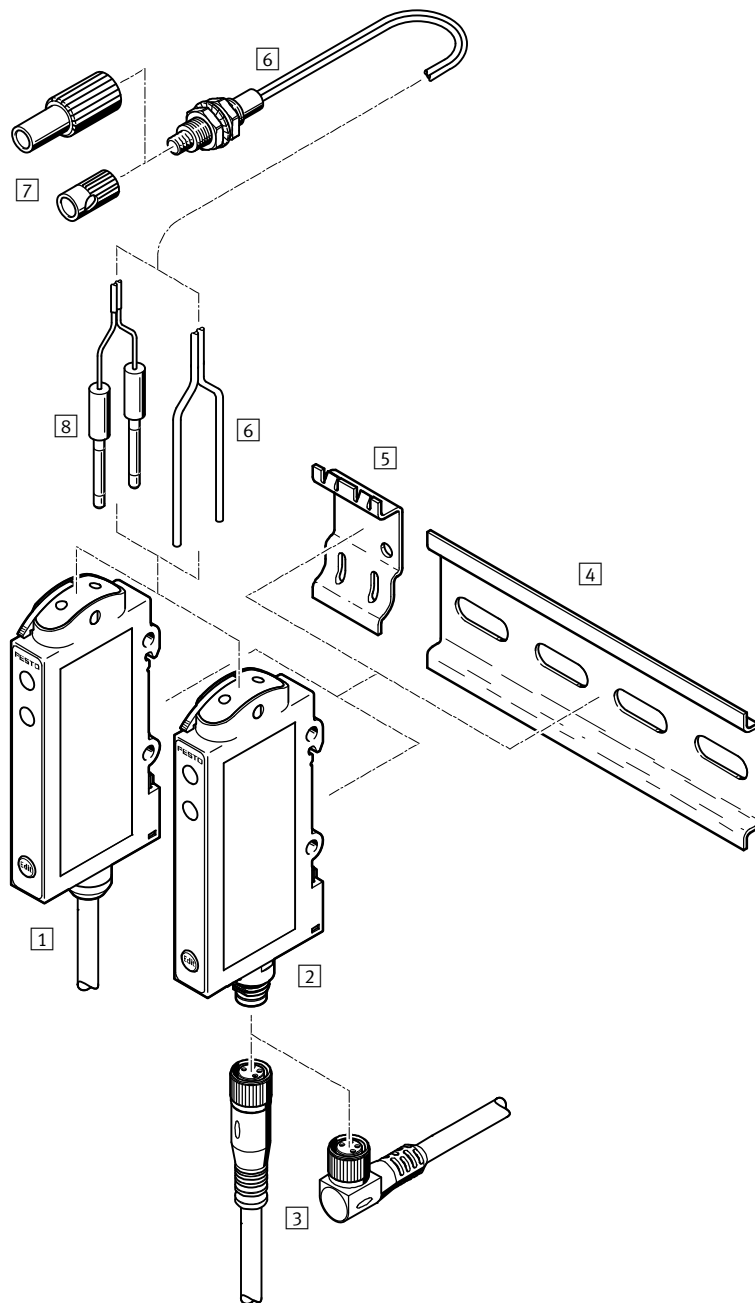
Detailed product information

➔ [www.festo.com/catalogue/soe4](http://www.festo.com/catalogue/soe4)

| Product overview |           |                 |                |                  |                 |                 |
|------------------|-----------|-----------------|----------------|------------------|-----------------|-----------------|
| Version          | Type      | Type of display | Timer function | Switching output | Analogue output | ➔ Page/Internet |
| Fibre-optic unit | SOE4-FO-L | LED             | –              | PNP<br>NPN       | –               | 4               |
|                  | SOE4-FO-D | LED display     | 1 ... 2000 ms  | PNP<br>NPN       | –               | 4               |
|                  | SOE4-FO-D | LED display     | 1 ... 2000 ms  | PNP<br>NPN       | 0 ... 10 V      | 4               |

# Fibre-optic units SOE4

Peripherals overview



| Accessories | Brief description  | → Page/Internet |
|-------------|--|-----------------|
| 1           | Fibre-optic unit SOE4-...-K<br>With cable  | 4               |
| 2           | Fibre-optic unit SOE4-...-M8<br>With plug M8x1, 4-pin  | 4               |
| 3           | Connecting cable<br>With socket M8x1, 4-pin  | 8               |
| 4           | Mounting rail to DIN EN 60715<br>For wall mounting of more than 2 fibre-optic units                    | -               |
| 5           | Adapter plate SXE3-W<br>For wall mounting of max. 2 fibre-optic units                                  | 8               |
| 6           | Fibre-optic cable<br>As diffuse sensor, through-beam sensor, fixed focus or series designs             | 5               |
| 7           | Ancillary lens<br>For adapting the optical characteristics of fibre-optic cables                       | 7               |
| 8           | Adapter<br>For fibre-optic cables with O.D. 1.0 and 1.25 ... 1.3 mm                                    | 7               |
| -           | Fibre-optic cutter<br>For fibre-optic cables made from plastic with O.D. 1.0 and 1.3 as well as 2.2 mm | 7               |

# Fibre-optic units SOE4

Type codes

SOE4 - FO - D - H F2 - 1PU - K

**Type**

|      |                  |
|------|------------------|
| SOE4 | Fibre-optic unit |
|------|------------------|

**Input**

|    |                   |
|----|-------------------|
| FO | Fibre-optic cable |
|----|-------------------|

**Type of display**

|   |             |
|---|-------------|
| L | LED         |
| D | LED display |

**Type of mounting**

|   |                                      |
|---|--------------------------------------|
| H | H-rail mounting or via through-holes |
|---|--------------------------------------|

**Fibre-optic cable connection**

|    |                          |
|----|--------------------------|
| F2 | Fibre-optic cable Ø 2 mm |
|----|--------------------------|

**Electrical output**

|     |  |
|-----|--|
| 1P  | 1 switching output PNP                         |
| 1N  | 1 switching output NPN                         |
| 1PU | 1 switching output PNP and 0 ... 10 V analogue |
| 1NU | 1 switching output NPN and 0 ... 10 V analogue |

**Electrical connection**

|    |                 |
|----|-----------------|
| K  | Cable, 2 m long |
| M8 | Plug M8x1       |

# Fibre-optic units SOE4

Technical data

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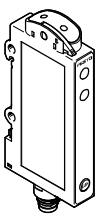
| General technical data |  |   |
|------------------------|--|---|
| Type of display        | LED  | LED display   |
| Working range          | Depends on the measuring mode and fibre-optic cables,<br>value tables → 5, 6 | Depends on the measuring mode and fibre-optic cables,<br>value tables for standard mode → 5, 6<br>Standard mode: 100%<br>Fine mode: approx. 40%<br>Fast mode: approx. 40%<br>High-distance mode: approx. 190% |
| Mutual interference    | –  | Protected against interference with up to four devices mounted directly next to one another   |
| Light type             | Red  |   |
| Setting options        | Teach-in<br>Teach-in via electrical connection                               |   |

| Electrical data                      |                       |   |
|--------------------------------------|-----------------------|---|
| Type of display                      | LED                   | LED display   |
| Max. switching frequency [Hz]        | 1500                  | Standard mode: 1000<br>Fine mode: 125<br>Fast mode: 8000<br>High-distance mode: 125 |
| Timer function [ms]                  | –                     | 1 ... 2000  |
| Operating voltage range [V DC]       | 10 ... 30             |   |
| Max. output current [mA]             | 100                   |   |
| Protection against short circuit     | Pulsed                |   |
| Protection against polarity reversal | For operating voltage |   |
| Protection class                     | IP64                  |   |

| Operating and environmental conditions                    |   |  |
|---|---|--|
| Ambient temperature [°C]                                  | –20 ... +60                                       |  |
| Ambient temperature with flexible cable installation [°C] | –5 ... +60  |  |
| CE symbol (see declaration of conformity)                 | In accordance with EU EMC directive <sup>1)</sup> |  |
| Certification   | C-UL-US listed (OL)<br>C tick                     |  |

- 1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: [www.festo.com/sp](http://www.festo.com/sp) → Certificates.  
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.

| Materials    |                           |
|--------------|---------------------------|
| Housing      | Acrylic butadiene styrene |
| Cable sheath | TPE-U (PUR)               |

| Ordering data   |                 |                                      |                  |                       |                     |                     |
|---|-----------------|--------------------------------------|------------------|-----------------------|---------------------|---------------------|
| Version   | Type of display | Switching output, switching function | Analogue output  | Electrical connection | Part No.            | Type                |
|  | LED             | PNP, switchable                      | –                | Cable, 4-wire         | 552795              | SOE4-FO-L-HF2-1P-K  |
|   |                 | NPN, switchable                      | –                | Cable, 4-wire         | 552796              | SOE4-FO-L-HF2-1P-M8 |
|   |                 |                                      |                  |                       | 552797              | SOE4-FO-L-HF2-1N-K  |
|   |                 | Plug M8x1, 4-pin                     | 552798           | SOE4-FO-L-HF2-1N-M8   |                     |                     |
|   | LED display     |                                      | PNP, switchable  | –                     | Plug M8x1, 4-pin    | 552799              |
|   | NPN, switchable | –                                    | Plug M8x1, 4-pin | 552800                | SOE4-FO-D-HF2-1N-M8 |                     |
| PNP, switchable   | 0 ... 10 V      | Cable, 5-wire                        | 552801           | SOE4-FO-D-HF2-1PU-K   |                     |                     |
| NPN, switchable   | 0 ... 10 V      | Cable, 5-wire                        | 552802           | SOE4-FO-D-HF2-1NU-K   |                     |                     |

# Fibre-optic units SOE4

Accessories

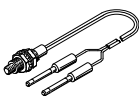
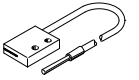
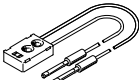
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| Technical data – Fibre-optic cable (diffuse sensor) |                   |                            |                     |                     |                            |
|---|-------------------|----------------------------|---------------------|---------------------|----------------------------|
| Special feature of fibre-optic cable                |                   | Standard                   | Coaxial             | Large working range | Flexible                   |
| Working range <sup>1)</sup>                         | [mm]              | 140                        | 75                  | 200                 | 130                        |
| Min. object diameter <sup>2)</sup>                  | [mm]              | 0.1                        | 0.1                 | 0.1                 | 0.1                        |
| Min. bending radius                                 | [mm]              | 25                         | 15                  | 40                  | 2                          |
| Outer Ø   | [mm]              | 2.2                        | 1.25                | 2.2                 | 1.3                        |
| Head size   |                   | M6                         | M4                  | M6                  | M4                         |
| Protection class                                    |                   | IP66                       |                     |                     |                            |
| Ambient temperature                                 | [°C]              | -55 ... +70                |                     |                     | -40 ... +70                |
| Material  | Housing           | High-alloy stainless steel | Nickel-plated brass | Nickel-plated brass | High-alloy stainless steel |
|   | Fibre-optic cable | Polyethylene               |                     |                     |                            |

- 1) With SOE4-FO-L and SOE4-FO-D in standard mode  
 2) An attempt was made to obtain a signal at 10% of the range using a copper wire. The smallest wire diameter that was still detected corresponds to the diameter of the smallest detectable object.

| Technical data – Fibre-optic cable (diffuse sensor) |                   |                            |             |      |                     |                           |
|---|-------------------|----------------------------|-------------|------|---------------------|---------------------------|
| Special feature of fibre-optic cable                |                   | High temperature           | Precision   |      | Series              | Fixed focus               |
| Working range <sup>1)</sup>                         | [mm]              | 150                        | 12          | 65   | 130                 | 2 ... 10                  |
| Min. object diameter <sup>2)</sup>                  | [mm]              | 0.1                        | 0.05        | 0.1  | 0.15                | 0.1                       |
| Min. bending radius                                 | [mm]              | 25                         | 10          | 15   | 25                  | 25                        |
| Outer Ø   | [mm]              | 2.2                        | 1.0         | 1.25 | 2.2                 | 2.2                       |
| Head size   |                   | M6                         | M3          | M4   | 19x25x6 mm          | 13x19.6x5 mm              |
| Protection class                                    |                   | IP66                       |             |      |                     |                           |
| Ambient temperature                                 | [°C]              | -55 ... +115               | -55 ... +70 |      |                     |                           |
| Material  | Housing           | High-alloy stainless steel |             |      | Nickel-plated brass | Acrylic butadiene styrene |
|   | Fibre-optic cable | Polyethylene               |             |      |                     |                           |

- 1) With SOE4-FO-L and SOE4-FO-D in standard mode  
 2) An attempt was made to obtain a signal at 10% of the range using a copper wire. The smallest wire diameter that was still detected corresponds to the diameter of the smallest detectable object.

| Ordering data – Fibre-optic cable (diffuse sensor)                                  |                                      |                               |                       |                          |                     |                       |                     |
|---|--------------------------------------|-------------------------------|-----------------------|--------------------------|---------------------|-----------------------|---------------------|
| Measuring method  | Special feature of fibre-optic cable | Outer Ø <sup>1)</sup><br>[mm] | Sleeve length<br>[mm] | Fibre-optic cable length |                     |                       |                     |
|   |                                      |                               |                       | 1 m                      |                     | 2 m                   |                     |
|   |                                      |                               |                       | Part No.                 | Type                | Part No.              | Type                |
|  | Standard                             | 2.2                           | -                     | 552838                   | SOOC-DS-M6-1-R25    | 552836                | SOOC-DS-M6-2-R25    |
|   |                                      |                               | 40                    | 552839                   | SOOC-DS-M6-1-R25-S4 | 552837                | SOOC-DS-M6-2-R25-S4 |
|   | Coaxial                              | 1.25                          | -                     | -                        | 552842              | SOOC-DS-C-M4-2-R15    |                     |
|   | Large working range                  | 2.2                           | -                     | 552841                   | SOOC-DS-H-M6-1-R40  | 552840                | SOOC-DS-H-M6-2-R40  |
|   | Flexible                             | 1.3                           | -                     | -                        | 552843              | SOOC-DS-F-M4-2-R2     |                     |
|   | High temperature                     | 2.2                           | -                     | -                        | 552809              | SOOC-DS-M6-2-R25-T1   |                     |
|   | Precision                            | 1.25                          | -                     | 552804                   | SOOC-DS-P-M3-1-R10  | 552844                | SOOC-DS-P-M3-2-R10  |
|   |                                      |                               | 40                    | -                        | 552803              | SOOC-DS-P-M3-2-R10-S4 |                     |
| 1   |                                      | -                             | 552807                | SOOC-DS-P-M4-1-R15       | 552805              | SOOC-DS-P-M4-2-R15    |                     |
|   |                                      | 40                            | 552808                | SOOC-DS-P-M4-1-R15-S4    | 552806              | SOOC-DS-P-M4-2-R15-S4 |                     |
|  | Series                               | 2.2                           | -                     | -                        |                     | 552810                | SOOC-DS-M-A11-2-R25 |
|  | Fixed focus                          | 2.2                           | -                     | -                        |                     | 552811                | SOOC-DS-Q-2-R25     |

- 1) The scope of delivery for fibre-optic cables with fibre-optic cable Ø < 2.2 mm includes an adapter SASA

# Fibre-optic units SOE4

Accessories

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| Technical data – Fibre-optic cable (through-beam sensor) |                   |                            |                     |                     |                            |
|--|-------------------|----------------------------|---------------------|---------------------|----------------------------|
| Special feature of fibre-optic cable                     |                   | Standard                   | Large working range | Flexible            | High temperature           |
| Working range <sup>1)</sup>                              | [mm]              | 400                        | 650                 | 300                 | 400                        |
| Min. object diameter <sup>2)</sup>                       | [mm]              | 0.35                       | 0.2                 | 0.15                | 0.35                       |
| Min. bending radius                                      | [mm]              | 25                         | 40                  | 2                   | 25                         |
| Outer Ø  | [mm]              | 2.2                        |                     |                     |                            |
| Head size  |                   | M4                         |                     |                     |                            |
| Protection class   |                   | IP66                       |                     |                     |                            |
| Ambient temperature                                      | [°C]              | -55 ... +70                |                     | -40 ... +70         | -55 ... +115               |
| Material   | Housing           | High-alloy stainless steel |                     | Nickel-plated brass | High-alloy stainless steel |
|  | Fibre-optic cable | Polyethylene               |                     |                     |                            |

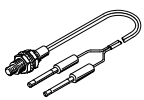
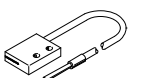
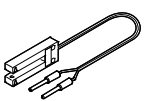
1) With SOE4-FO-L and SOE4-FO-D in standard mode

2) An attempt was made to obtain a signal at 10% of the range using a copper wire. The smallest wire diameter that was still detected corresponds to the diameter of the smallest detectable object.

| Technical data – Fibre-optic cable (through-beam sensor) |                   |                            |     |                     |                           |
|--|-------------------|----------------------------|-----|---------------------|---------------------------|
| Special feature of fibre-optic cable                     |                   | Precision                  |     | Series              | Fork light barrier        |
| Working range <sup>1)</sup>                              | [mm]              | 30                         | 120 | 250                 | 5                         |
| Min. object diameter <sup>2)</sup>                       | [mm]              | 0.05                       | 0.2 | 0.1                 | 0.2                       |
| Min. bending radius                                      | [mm]              | 10                         | 15  | 25                  | 10                        |
| Outer Ø  | [mm]              | 1.0                        | 2.2 | 2.2                 | 1.25                      |
| Head size  |                   | M3                         | M4  | 10x10x5 mm          | 41x15x7 mm                |
| Fork pit size  |                   | -                          |     |                     | 5x29 mm                   |
| Protection class   |                   | IP66                       |     |                     |                           |
| Ambient temperature                                      | [°C]              | -55 ... +70                |     |                     |                           |
| Material   | Housing           | High-alloy stainless steel |     | Nickel-plated brass | Acrylic butadiene styrene |
|  | Fibre-optic cable | Polyethylene               |     |                     |                           |

1) With SOE4-FO-L and SOE4-FO-D in standard mode

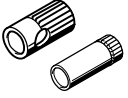
2) An attempt was made to obtain a signal at 10% of the range using a copper wire. The smallest wire diameter that was still detected corresponds to the diameter of the smallest detectable object.

| Ordering data – Fibre-optic cable (through-beam sensor)                             |                                      |                               |                       |                          |                            |                              |                              |                           |
|---|--------------------------------------|-------------------------------|-----------------------|--------------------------|----------------------------|------------------------------|------------------------------|---------------------------|
| Measuring method  | Special feature of fibre-optic cable | Outer Ø <sup>1)</sup><br>[mm] | Sleeve length<br>[mm] | Fibre-optic cable length |                            |                              |                              |                           |
|   |                                      |                               |                       | 1 m                      |                            | 2 m                          |                              |                           |
|   |                                      |                               |                       | Part No.                 | Type                       | Part No.                     | Type                         |                           |
| <b>Through-beam sensor</b>  |                                      |                               |                       |                          |                            |                              |                              |                           |
|  | Standard                             | 2.2                           | -                     | <b>552814</b>            | <b>SOOC-TB-M4-1-R25</b>    | <b>552812</b>                | <b>SOOC-TB-M4-2-R25</b>      |                           |
|   |                                      |                               | 40                    | <b>552815</b>            | <b>SOOC-TB-M4-1-R25-S4</b> | <b>552813</b>                | <b>SOOC-TB-M4-2-R25-S4</b>   |                           |
|   | Large working range                  | 2.2                           | -                     | <b>552817</b>            | <b>SOOC-TB-H-M4-1-R40</b>  | <b>552816</b>                | <b>SOOC-TB-H-M4-2-R40</b>    |                           |
|   | Flexible                             | 2.2                           | -                     | -                        | -                          | <b>552818</b>                | <b>SOOC-TB-F-M4-2-R2</b>     |                           |
|   | Precision                            | 1                             | -                     | -                        | <b>552821</b>              | <b>SOOC-TB-P-M3-1-R10</b>    | <b>552819</b>                | <b>SOOC-TB-P-M3-2-R10</b> |
|   |                                      |                               |                       | 40                       | <b>552822</b>              | <b>SOOC-TB-P-M3-1-R10-S4</b> | -                            | -                         |
| 2.2   |                                      |                               |                       | -                        | <b>552825</b>              | <b>SOOC-TB-P-M4-1-R15</b>    | <b>552823</b>                | <b>SOOC-TB-P-M4-2-R15</b> |
|   |                                      |                               | 40                    | -                        | -                          | <b>552824</b>                | <b>SOOC-TB-P-M4-2-R15-S4</b> |                           |
|  | Series                               | 2.2                           | -                     | -                        | -                          | <b>552827</b>                | <b>SOOC-TB-M-A5-2-R25</b>    |                           |
|   |                                      |                               |                       |                          |                            |                              |                              |                           |
|  | Fork light barrier                   | 1.25                          | -                     | -                        | -                          | <b>552828</b>                | <b>SOOC-TB-P-C5-2-R10</b>    |                           |
|   |                                      |                               |                       |                          |                            |                              |                              |                           |

1) The scope of delivery for fibre-optic cables with fibre-optic cable Ø < 2.2 mm includes an adapter SASA

# Fibre-optic units SOE4


Accessories

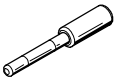
| Technical data and order codes – Ancillary lenses |   |                             |                    |                             |                     |          |      |
|---|---|-----------------------------|--------------------|-----------------------------|---------------------|----------|------|
|   | Lens function   |                             | Protection class   | Ambient temperature<br>[°C] | Material<br>Housing | Part No. | Type |
|   |  | Increasing<br>working range |                    |                             |                     |          |      |
| Factor 8 <sup>1)</sup>                            | Anodised aluminium  |                             | 552832             | SASF-L1-LD-M4               |                     |          |      |
| Light exit 90°                                    | Nickel-plated brass   | 552830                      | SASF-L1-LA-M2      |                             |                     |          |      |
| Focussing <sup>2)</sup>                           |   |                             | Anodised aluminium | 552831                      | SASF-L1-LS2-M4      |          |      |

1) Depending on the fibre-optic cable

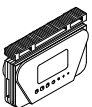
2) Light spot diameter 0.7 mm at a distance of 10 mm, depending on the fibre-optic cable

| Compatibility table – Ancillary lenses |               |               |               |                |                 |  |
|--|---------------|---------------|---------------|----------------|-----------------|--|
| Fibre-optic cable                      | SASF-L1-LD-M2 | SASF-L1-LD-M4 | SASF-L1-LA-M2 | SASF-L1-LS2-M4 | → Page/Internet |  |
| Diffuse sensor                         |               |               |               |                |                 |  |
| SOOC-DS-P-M4-2-R15                     | ■             | –             | –             | ■              | 5               |  |
| SOOC-DS-P-M4-1-R15                     | ■             | –             | –             | ■              |                 |  |
| SOOC-DS-C-M4-2-R15                     | ■             | –             | –             | ■              |                 |  |
| Through-beam sensor                    |               |               |               |                |                 |  |
| SOOC-TB-M4-2-R25                       | ■             | ■             | ■             | ■              | 6               |  |
| SOOC-TB-M4-1-R25                       | ■             | ■             | ■             | ■              |                 |  |
| SOOC-TB-H-M4-2-R40                     | ■             | ■             | ■             | ■              |                 |  |
| SOOC-TB-H-M4-1-R40                     | ■             | ■             | ■             | ■              |                 |  |
| SOOC-TB-F-M4-2-R2                      | ■             | ■             | ■             | ■              |                 |  |
| SOOC-TB-P-M4-2-R15                     | ■             | ■             | ■             | ■              |                 |  |
| SOOC-TB-P-M4-1-R15                     | ■             | ■             | ■             | ■              |                 |  |
| SOOC-TB-M4-2-R25-T1                    | ■             | ■             | ■             | ■              |                 |  |

 Note  
Only the fibre-optic cables listed here are suitable for combination with an ancillary lens.

| Technical data and order codes – Adapter <sup>1)</sup>                              |         |                                  |                  |                             |                           |          |            |
|---|---------|----------------------------------|------------------|-----------------------------|---------------------------|----------|------------|
|   | Outer Ø | Suitable for fibre-optic cable Ø | Protection class | Ambient temperature<br>[°C] | Material<br>Housing       | Part No. | Type       |
|   | [mm]    | [mm]                             |                  |                             |                           |          |            |
|  | 2.2     | 1.0                              | IP64             | -20 ... +60                 | Acrylic butadiene styrene | 552834   | SASA-L1-10 |
|   |         | 1.25 ... 1.3                     |                  |                             |                           |          | 552833     |

1) Included in the scope of delivery for fibre-optic cables SOOC with fibre-optic cable Ø < 2.2 mm



| Technical data and order codes – Fibre-optic cable cutter                           |                                |                                  |                                      |                     |                                       |          |           |
|---|--------------------------------|----------------------------------|--------------------------------------|---------------------|---------------------------------------|----------|-----------|
|   | Use                            | Suitable for fibre-optic cable Ø | Radius of bending tool <sup>1)</sup> | Ambient temperature | Material                              | Part No. | Type      |
|   |                                | [mm]                             | [mm]                                 | [°C]                | Housing                               |          |           |
|  | For polymer fibre-optic cables | 1.0<br>1.3<br>2.2                | 5, 8, 10                             | 10 ... 60           | Acrylic butadiene styrene, reinforced | 552835   | SATC-L1-C |


1) Bending tool for fibre-optic cable sleeves

# Fibre-optic units SOE4

Accessories



| Ordering data – Connecting cables   |                 |                  |          | Technical data → Internet: nebu |  |
|---|-----------------|------------------|----------|---------------------------------|--|
|   | Number of wires | Cable length [m] | Part No. | Type                            |  |
| M8x1, straight socket   |                 |                  |          |                                 |  |
|  | 4               | 2.5              | 541342   | NEBU-M8G4-K-2.5-LE4             |  |
|   |                 | 5                | 541343   | NEBU-M8G4-K-5-LE4               |  |
| M8x1, angled socket   |                 |                  |          |                                 |  |
|  | 4               | 2.5              | 541344   | NEBU-M8W4-K-2.5-LE4             |  |
|   |                 | 5                | 541345   | NEBU-M8W4-K-5-LE4               |  |

| Ordering data – Adapter plate   |          |        |
|---|----------|--------|
|   | Part No. | Type   |
|  | 540214   | SXE3-W |