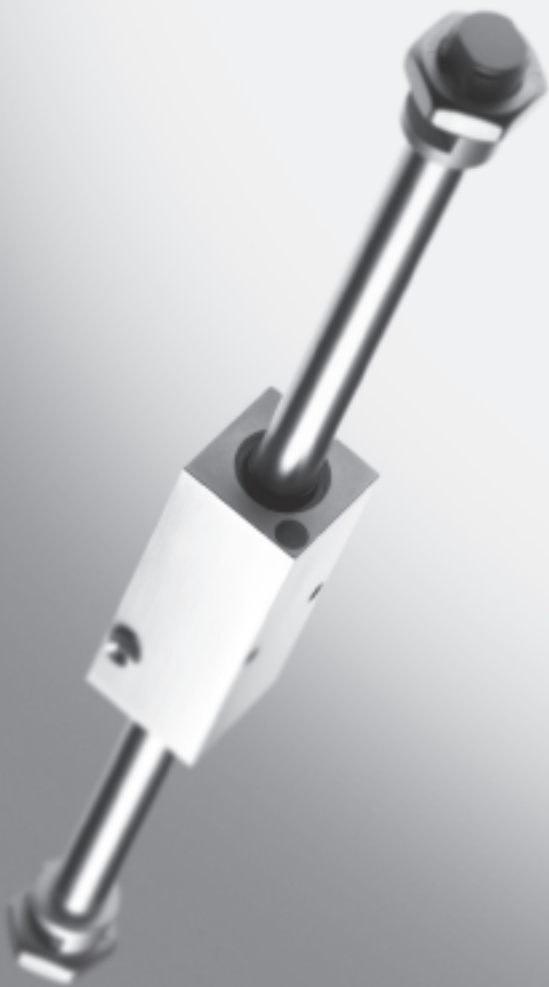




- Magnetically coupled without mechanical connections
- Pressure tight and leak-free system
- Dirt and dust cannot enter
- Space-saving installation with long strokes

# Linear drive units DGO

Features

FESTO



## General information

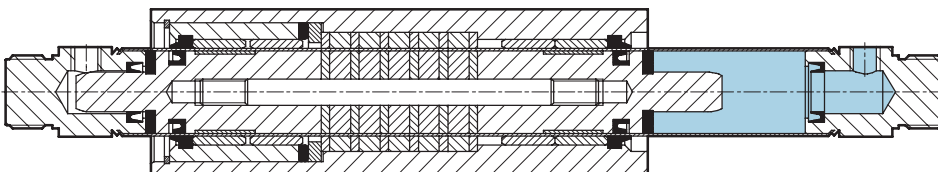
- Double-acting
- Magnetically coupled without mechanical connections
- Piston chamber and slide are pressure tight
- Pressure tight and leak-free system
- Dirt and dust cannot enter
- Space-saving installation with long strokes
- For contactless position sensing
- With adjustable end-position cushioning at both ends (not for piston  $\varnothing$  of 12 mm)

## The technology in detail

Motion is transmitted via the force locking of the magnetic coupling on the moveable outer slide.

This means that there is no advancing piston rod; the installation space required is less than for conventional pneumatic cylinders.

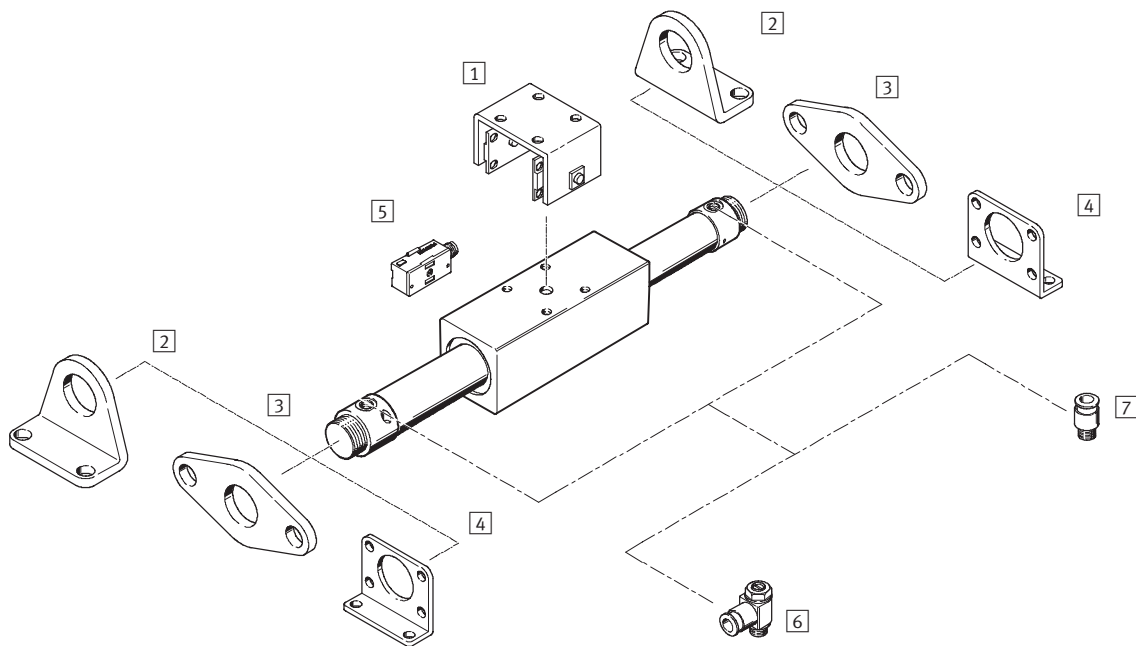
The cylinder chamber is hermetically sealed against the outer slide as there is no mechanical connection. This prevents any leakage loss.



# Linear drive units DGO

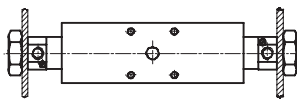
Peripherals overview

FESTO



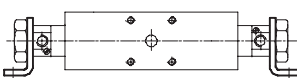
## Mounting options

With hexagonal nuts (included in scope of delivery)

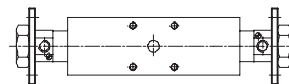
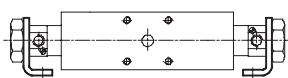


## With mounting attachments

Foot mounting HBN



Flange mounting  
FBN



| Mounting attachments and accessories      |                                                                           |                 |
|-------------------------------------------|---------------------------------------------------------------------------|-----------------|
|                                           | Brief description                                                         | → Page/Internet |
| 1 Moment compensator<br>FKG               | To compensate misalignments and eliminate tilting moments                 | 10              |
| 2 Foot mounting<br>HBN                    | On end caps for piston $\varnothing 12 \dots 25 \text{ mm}$               | 10              |
| 3 Flange mounting<br>FBN                  | On end caps for piston $\varnothing 12 \dots 25 \text{ mm}$               | 11              |
| 4 Flange mounting<br>FBN                  | On end caps for piston $\varnothing 32 \dots 40 \text{ mm}$               | 11              |
| 5 Proximity sensors<br>SMEO-/SMTO-/SMPO-1 | For contactless position sensing, mountable externally via a mounting kit | 12              |
| 6 One-way flow control valve<br>GRLA      | To regulate speed                                                         | 12              |
| 7 Push-in fitting<br>QS                   | For connecting compressed air tubing with standard external diameters     | quick star      |

# Linear drive units DGO

Type codes

FESTO

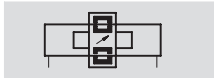
|                         |                                               |   |    |   |      |   |     |   |   |   |   |
|-------------------------|-----------------------------------------------|---|----|---|------|---|-----|---|---|---|---|
|                         | DGO                                           | – | 25 | – | 3000 | – | PPV | – | A | – | B |
| <b>Type</b>             |                                               |   |    |   |      |   |     |   |   |   |   |
| Double-acting           |                                               |   |    |   |      |   |     |   |   |   |   |
| DGO                     | Linear drive unit                             |   |    |   |      |   |     |   |   |   |   |
| <b>Piston Ø [mm]</b>    |                                               |   |    |   |      |   |     |   |   |   |   |
| <b>Stroke [mm]</b>      |                                               |   |    |   |      |   |     |   |   |   |   |
| <b>Cushioning</b>       |                                               |   |    |   |      |   |     |   |   |   |   |
| P                       | Flexible cushioning rings/plates at both ends |   |    |   |      |   |     |   |   |   |   |
| PPV                     | Pneumatic cushioning adjustable at both ends  |   |    |   |      |   |     |   |   |   |   |
| <b>Position sensing</b> |                                               |   |    |   |      |   |     |   |   |   |   |
| A                       | For proximity sensing                         |   |    |   |      |   |     |   |   |   |   |
| <b>Generation</b>       |                                               |   |    |   |      |   |     |   |   |   |   |
| B                       | B series                                      |   |    |   |      |   |     |   |   |   |   |

# Linear drive units DGO

Technical data

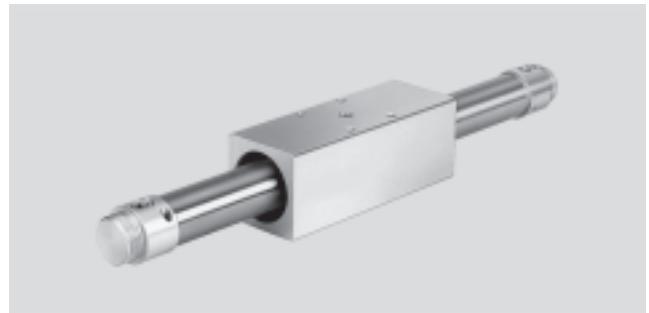
FESTO

## Function



- Ø - Diameter  
12 ... 40 mm

- | - Stroke length  
10 ... 4,000 mm



| General technical data |                                                                                |                                              |              |              |    |              |
|------------------------|--------------------------------------------------------------------------------|----------------------------------------------|--------------|--------------|----|--------------|
| Piston Ø               | 12                                                                             | 16                                           | 20           | 25           | 32 | 40           |
| Stroke [mm]            | 10 ... 1,200                                                                   | 10 ... 2,500                                 | 10 ... 3,000 | 10 ... 3,500 |    | 10 ... 4,000 |
| Pneumatic connection   | M5                                                                             |                                              | G1/8         |              |    | G1/4         |
| Operating medium       | Filtered compressed air, lubricated or unlubricated, other media upon request. |                                              |              |              |    |              |
| Design                 | Rodless                                                                        |                                              |              |              |    |              |
| Driver principle       | Force-locking (magnetic)                                                       |                                              |              |              |    |              |
| Cushioning             | Flexible cushioning rings/plates at both ends                                  | Pneumatic cushioning adjustable at both ends |              |              |    |              |
| Cushioning length [mm] | –                                                                              | 14                                           | 17           | 19           | 20 | 23           |
| Position sensing       | For proximity sensing                                                          |                                              |              |              |    |              |
| Type of mounting       | With hexagonal nuts                                                            |                                              |              |              |    |              |
|                        | With accessories                                                               |                                              |              |              |    |              |
| Fitting position       | Any                                                                            |                                              |              |              |    |              |

| Operating and environmental conditions |             |           |           |           |           |           |
|----------------------------------------|-------------|-----------|-----------|-----------|-----------|-----------|
| Piston Ø                               | 12          | 16        | 20        | 25        | 32        | 40        |
| Operating pressure [bar]               | 2 ... 7     | 1.7 ... 7 | 1.6 ... 7 | 1.5 ... 7 | 1.4 ... 7 | 1.3 ... 7 |
| Temperature range <sup>1)</sup> [°C]   | –20 ... +60 |           |           |           |           |           |

1) Note operating range of proximity sensors

| Forces [N]                               |     |     |     |     |     |       |
|------------------------------------------|-----|-----|-----|-----|-----|-------|
| Piston Ø                                 | 12  | 16  | 20  | 25  | 32  | 40    |
| Theoretical force at 6 bar               | 68  | 121 | 188 | 295 | 483 | 754   |
| Breakaway force of the magnetic coupling | 100 | 160 | 270 | 400 | 680 | 1,050 |

| Weights [g]                        |     |     |       |       |       |       |
|------------------------------------|-----|-----|-------|-------|-------|-------|
| Piston Ø                           | 12  | 16  | 20    | 25    | 32    | 40    |
| Product weight with 0 mm stroke    | 320 | 620 | 1,000 | 1,340 | 2,400 | 3,920 |
| Additional weight per 10 mm stroke | 2   | 3   | 4     | 4.8   | 6     | 8     |

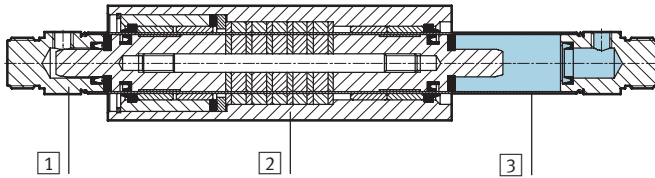
# Linear drive units DGO

Technical data

FESTO

## Materials

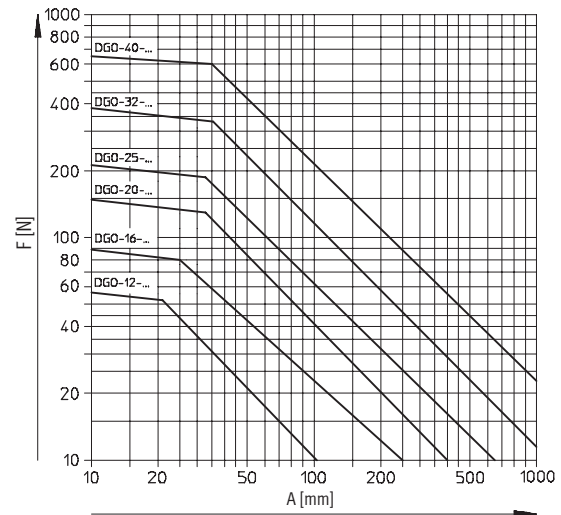
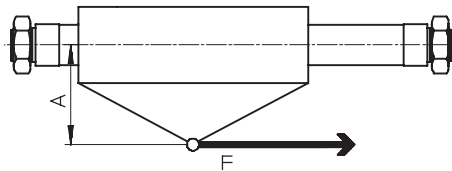
Sectional view



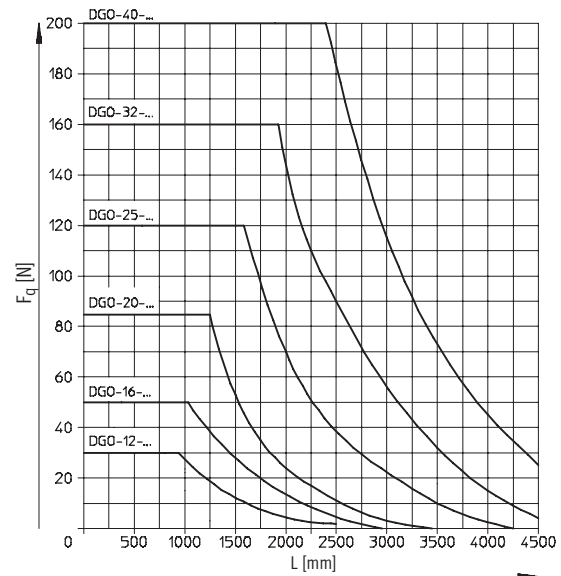
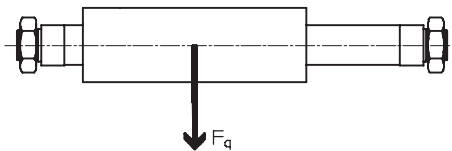
## Linear drive unit

|   |                 |                              |
|---|-----------------|------------------------------|
| 1 | End cap         | Anodised aluminium           |
| 2 | Outer slide     | Anodised aluminium           |
| 3 | Cylinder barrel | High-alloy steel             |
| - | Seals           | Nitrile rubber, polyurethane |

## Permissible axial force $F$ dependent on lever arm $A$



## Permissible lateral force $F_q$ dependent on stroke length $L$



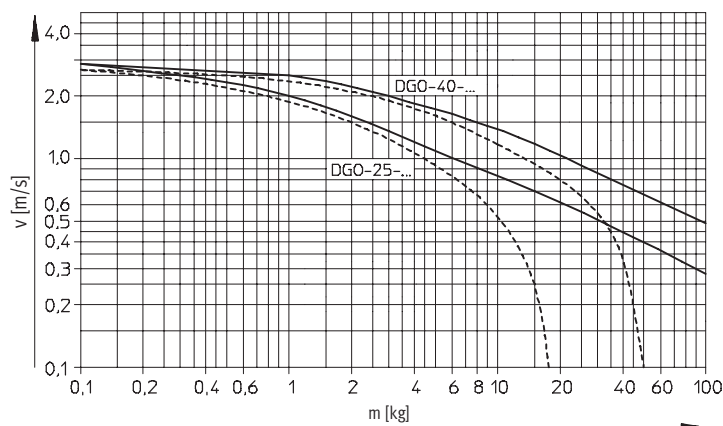
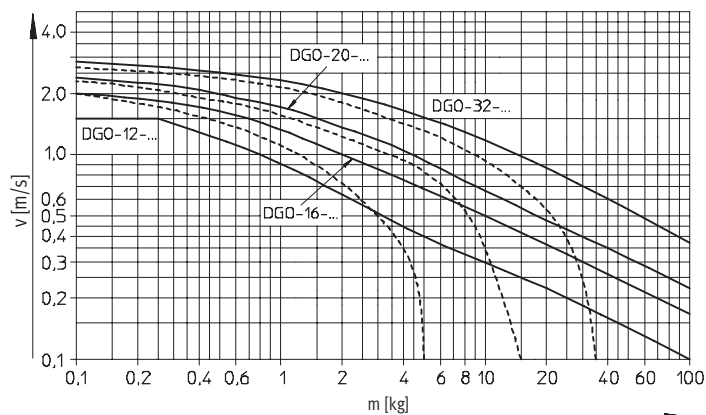
# Linear drive units DGO

Technical data

FESTO

## Max. piston speed $v$ dependent on the moving mass $m$

If the operating conditions are outside the permissible range, the moving mass must be externally cushioned using suitable equipment (shock absorbers or stops).

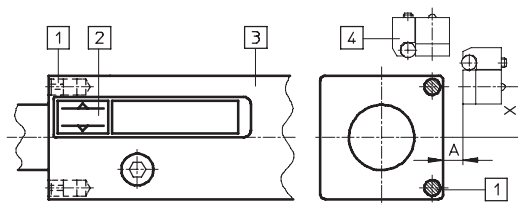


— Horizontal mounting position  
- - - - - Vertical mounting position

## Contactless position sensing

Mounting the proximity sensors SMEO-/SMT0-/SMPO-1

The proximity sensors are fitted by the user near the linear drive unit (e.g. on a  $\varnothing 6$  mm rod). Contactless position sensing is only possible in the area shown. Too small a distance  $A$  can cause multiple switching.



- 1 Switching magnet for proximity sensor
- 2 Switching range
- 3 Outer slide 360° rotatable
- 4 Proximity sensor with mounting kit SMB-1

## Switching distances, switching travel and hysteresis [mm]

| Proximity sensors | A           | X          |            |            |            |            |            | Switching travel | Hysteresis  |
|-------------------|-------------|------------|------------|------------|------------|------------|------------|------------------|-------------|
|                   |             | DGO-12-... | DGO-18-... | DGO-20-... | DGO-25-... | DGO-32-... | DGO-40-... |                  |             |
| SMEO-1, SMT0-1    | 6.0 ... 8.0 | 10 ... 11  | 13 ... 14  | 16 ... 17  | 20 ... 21  | 25 ... 26  | 32 ... 33  | 7.5 ... 13       | 1.0 ... 4.5 |
| SMPO-1-H-B        | 5.0 ... 6.0 |            |            |            |            |            |            | 7.0 ... 15       | 0.4 ... 2.5 |

# Linear drive units DGO

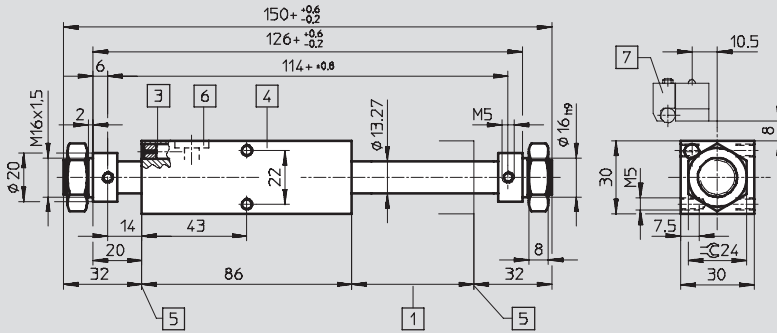
Technical data

FESTO

## Dimensions

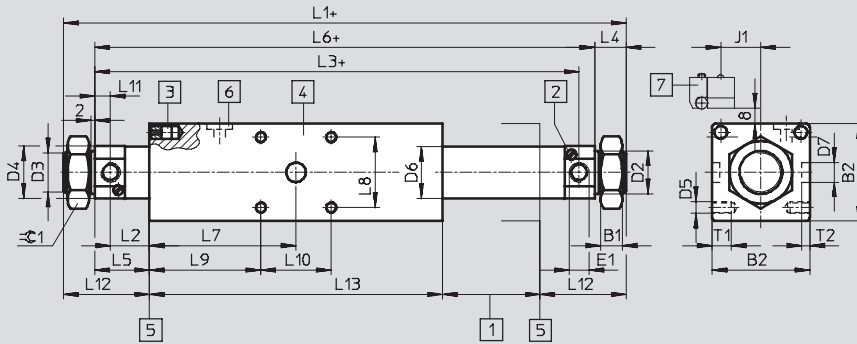
Download CAD data → [www.festo.com](http://www.festo.com)

Piston Ø12 mm



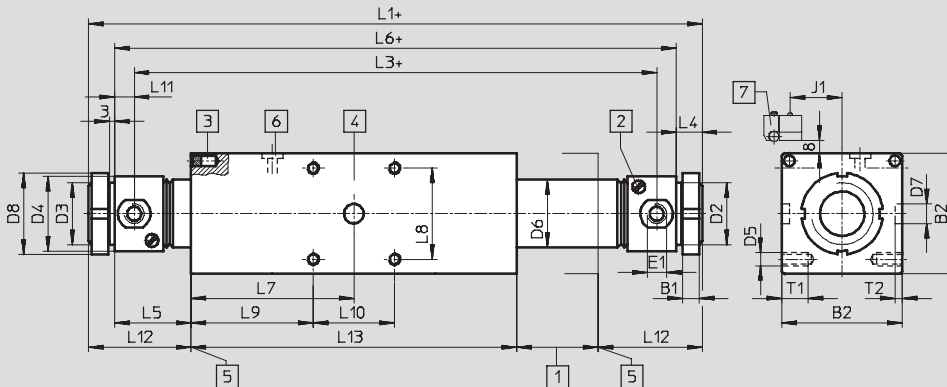
- 1 Stroke length
- 3 Switching magnet for proximity sensor
- 4 Outer slide 360° rotatable
- 5 End-position
- 6 Lubrication nipple
- 7 Mounting kit for proximity sensor
- + = plus stroke length

Piston Ø16... 25 mm



- 1 Stroke length
- 2 Regulating screw for adjustable end-position cushioning
- 3 Switching magnet for proximity sensor
- 4 Outer slide 360° rotatable
- 5 End-position
- 6 Lubrication nipple
- 7 Mounting kit for proximity sensor
- + = plus stroke length

Piston Ø32... 40 mm



- 1 Stroke length
- 2 Regulating screw for adjustable end-position cushioning
- 3 Switching magnet for proximity sensor
- 4 Outer slide 360° rotatable
- 5 End-position
- 6 Lubrication nipple
- 7 Mounting kit for proximity sensor
- + = plus stroke length



# Linear drive units DGO

Technical data

**FESTO**

| Dimensions |    |    |               |         |         |    |         |               |         |
|------------|----|----|---------------|---------|---------|----|---------|---------------|---------|
| Ø          | B1 | B2 | D2<br>Ø<br>h9 | D3      | D4<br>Ø | D5 | D6<br>Ø | D7<br>Ø<br>h8 | D8<br>Ø |
| [mm]       |    |    |               |         |         |    |         |               |         |
| 16         | 8  | 36 | 16            | M16x1.5 | 20      | M5 | 17.5    | 8             | –       |
| 20         | 11 | 42 | 22            | M22x1.5 | 27      | M5 | 21.3    | 8             | –       |
| 25         | 11 | 50 | 22            | M22x1.5 | 27      | M6 | 26.5    | 10            | –       |
| 32         | 8  | 60 | 30            | M30x1.5 | 38      | M6 | 33.6    | 10            | 42      |
| 40         | 10 | 74 | 38            | M38x1.5 | 46      | M8 | 42.6    | 12            | 50      |

| Ø    | E1                 | J1   | L1            | L2   | L3            | L4 | L5   | L6            | L7   |
|------|--------------------|------|---------------|------|---------------|----|------|---------------|------|
| [mm] |                    |      |               |      |               |    |      |               |      |
| 16   | M5                 | 13.5 | 205 +1/-0.5   | 12   | 149 +1/-0.5   | 12 | 28   | 181 ±0.6      | 62.5 |
| 20   | G1/8               | 16.5 | 217 +0.8/-0.6 | 16.5 | 169 +1/-0.8   | 16 | 24.5 | 185 +0.8/-0.6 | 67.5 |
| 25   | G1/8 <sup>1)</sup> | 20.5 | 238 +1.3/-0.7 | 20   | 190 +1.5/-0.9 | 16 | 28   | 206 +1.3/-0.7 | 75   |
| 32   | G1/8               | 25.5 | 270 +0.8/-0.6 | 23.6 | 218 +0.8/-0.6 | 16 | 33.6 | 238 +0.8/-0.6 | 85   |
| 40   | G1/4               | 32   | 327 +1.3/-0.7 | 35   | 271 +1.5/-0.9 | 16 | 47   | 295 +1.3/-0.7 | 100  |

| Ø    | L8 | L9   | L10 | L11 | L12  | L13 | T1   | T2  | ≈G1 |
|------|----|------|-----|-----|------|-----|------|-----|-----|
| [mm] |    |      |     |     |      |     |      |     |     |
| 16   | 26 | 49.5 | 26  | 16  | 40   | 125 | 8    | 4   | 24  |
| 20   | 32 | 51.5 | 32  | 8   | 40.5 | 135 | 10   | 3   | 32  |
| 25   | 36 | 57   | 36  | 8   | 44   | 150 | 10   | 4   | 32  |
| 32   | 48 | 61   | 48  | 10  | 49.5 | 170 | 12.5 | 4   | –   |
| 40   | 56 | 75   | 50  | 12  | 63   | 200 | 16   | 4.5 | –   |

1) Max. screw-in depth 7 mm. Use screws supplied by Festo: → [www.festo.com](http://www.festo.com)

| Ordering data |              |          |                    |
|---------------|--------------|----------|--------------------|
| Ø             | Stroke       | Part No. | Type               |
| [mm]          | [mm]         |          |                    |
| 12            | 10 ... 1,200 | 15 221   | DGO-12-...-P-A-B   |
| 16            | 10 ... 2,500 | 15 222   | DGO-16-...-PPV-A-B |
| 20            | 10 ... 3,000 | 15 223   | DGO-20-...-PPV-A-B |
| 25            | 10 ... 3,500 | 15 224   | DGO-25-...-PPV-A-B |
| 32            | 10 ... 3,500 | 15 225   | DGO-32-...-PPV-A-B |
| 40            | 10 ... 4,000 | 15 226   | DGO-40-...-PPV-A-B |

# Linear drive units DGO

Accessories

FESTO

## Moment compensator FKG

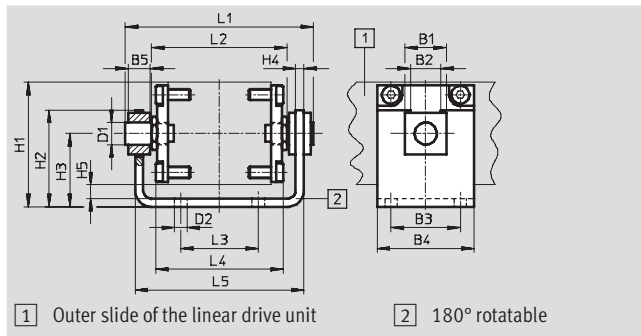
for piston Ø 16 ... 40 mm

Maximum permissible misalignment  
of parallel guide in longitudinal axis  
of cylinder = 1 mm.

Scope of delivery: 1 moment  
compensator and 8 mounting screws

Material:

Galvanised steel



| Dimensions and ordering data |    |    |    |    |    |         |         |    |    |    |    |    |     |    |    |    |     |                   |               |          |          |
|------------------------------|----|----|----|----|----|---------|---------|----|----|----|----|----|-----|----|----|----|-----|-------------------|---------------|----------|----------|
| For Ø                        | B1 | B2 | B3 | B4 | B5 | D1<br>Ø | D2<br>Ø | H1 | H2 | H3 | H4 | H5 | L1  | L2 | L3 | L4 | L5  | CRC <sup>1)</sup> | Weight<br>[g] | Part No. | Type     |
| 16                           | 18 | 14 | 26 | 40 | 8  | 10      | 5.5     | 47 | 40 | 29 | 4  | 7  | 74  | 54 | 26 | 49 | 68  | 2                 | 257           | 15 233   | FKG-16-B |
| 20                           | 18 | 14 | 32 | 42 | 8  | 10      | 5.5     | 53 | 43 | 32 | 4  | 7  | 82  | 62 | 32 | 57 | 76  | 2                 | 302           | 33 339   | FKG-20-B |
| 25                           | 22 | 16 | 36 | 50 | 12 | 12      | 6.6     | 63 | 50 | 38 | 5  | 8  | 98  | 70 | 36 | 64 | 89  | 2                 | 511           | 15 234   | FKG-25-B |
| 32                           | 22 | 16 | 48 | 60 | 12 | 12      | 6.6     | 73 | 55 | 43 | 5  | 8  | 108 | 80 | 48 | 74 | 99  | 2                 | 677           | 33 340   | FKG-32-B |
| 40                           | 30 | 22 | 50 | 70 | 16 | 16      | 9       | 90 | 70 | 53 | 6  | 10 | 134 | 98 | 56 | 92 | 122 | 2                 | 1,277         | 15 235   | FKG-40-B |

1) Corrosion resistance class 2 according to Festo standard 940 070

Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

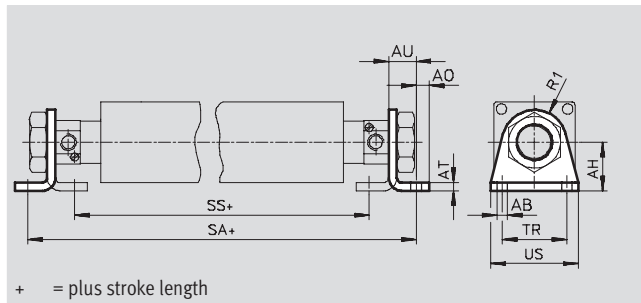
## Foot mounting HBN

for piston Ø 12 ... 25 mm

Material:

Galvanised steel

Free of copper, PTFE and silicone



| Dimensions and ordering data |         |    |    |    |    |    |     |     |    |    |                   |               |
|------------------------------|---------|----|----|----|----|----|-----|-----|----|----|-------------------|---------------|
| For Ø                        | AB<br>Ø | AH | AO | AT | AU | R1 | SA  | SS  | TR | US | CRC <sup>1)</sup> | Weight<br>[g] |
| 12                           | 5.5     | 20 | 6  | 4  | 14 | 13 | 153 | 105 | 32 | 42 | 2                 | 40            |
| 16                           | 5.5     | 27 | 6  | 4  | 14 | 13 | 209 | 161 | 32 | 42 | 2                 | 50            |
| 20                           | 6.6     | 30 | 8  | 5  | 17 | 20 | 219 | 161 | 40 | 54 | 2                 | 100           |
| 25                           | 6.6     | 30 | 8  | 5  | 17 | 20 | 240 | 182 | 40 | 54 | 2                 | 100           |

1) Corrosion resistance class 2 according to Festo standard 940 070

Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

# Linear drive units DGO

Accessories

**FESTO**

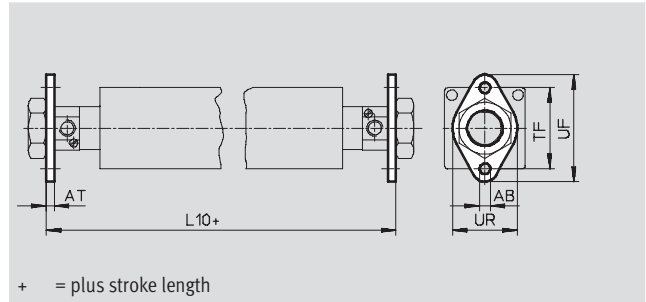
## Flange mounting FBN

for piston Ø 12 ... 25 mm

Material:

Galvanised steel

Free of copper, PTFE and silicone



| Dimensions and ordering data |         |    |     |    |    |    |    |                   |               |              |                  |
|------------------------------|---------|----|-----|----|----|----|----|-------------------|---------------|--------------|------------------|
| For Ø                        | AB<br>Ø | AT | L10 | TF | UF | UR | US | CRC <sup>1)</sup> | Weight<br>[g] | Part No.     | Type             |
| 12                           | 5.5     | 4  | 133 | 40 | 53 | 30 | 42 | 2                 | 25            | <b>5 130</b> | <b>FBN-12/16</b> |
| 16                           | 5.5     | 4  | 189 | 40 | 53 | 30 | 42 | 2                 | 25            | <b>5 130</b> | <b>FBN-12/16</b> |
| 20                           | 6.6     | 5  | 189 | 50 | 66 | 40 | 54 | 2                 | 45            | <b>5 131</b> | <b>FBN-20/25</b> |
| 25                           | 6.6     | 5  | 216 | 50 | 66 | 40 | 54 | 2                 | 45            | <b>5 131</b> | <b>FBN-20/25</b> |

1) Corrosion resistance class 2 according to Festo standard 940 070

Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

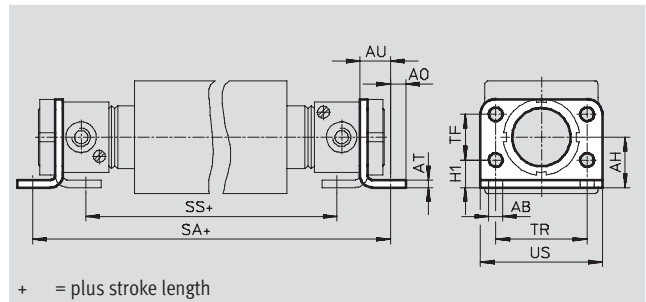
## Flange mounting FBN

for piston Ø 32 ... 40 mm

Material:

Galvanised steel

Free of copper, PTFE and silicone



| Dimensions and ordering data |         |    |    |    |    |    |     |     |    |    |    |                   |               |
|------------------------------|---------|----|----|----|----|----|-----|-----|----|----|----|-------------------|---------------|
| For Ø                        | AB<br>Ø | AH | AO | AT | AU | H1 | SA  | SS  | TF | TR | US | CRC <sup>1)</sup> | Weight<br>[g] |
| 32                           | 7       | 28 | 7  | 4  | 14 | 14 | 266 | 218 | 28 | 52 | 66 | 2                 | 102           |
| 40                           | 9       | 33 | 10 | 5  | 19 | 18 | 335 | 265 | 30 | 60 | 80 | 2                 | 190           |

1) Corrosion resistance class 2 according to Festo standard 940 070

Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

# Linear drive units DGO

Accessories

**FESTO**

| Ordering data – Rectangular proximity sensors, magneto-resistive                  |                  |               |                       |         |                  | Technical data → Internet: smto |                      |
|-----------------------------------------------------------------------------------|------------------|---------------|-----------------------|---------|------------------|---------------------------------|----------------------|
|                                                                                   | Mounting         | Switch output | Electrical connection |         | Cable length [m] | Part No.                        | Type                 |
|                                                                                   |                  |               | Cable                 | M8 plug |                  |                                 |                      |
| NO contact                                                                        |                  |               |                       |         |                  |                                 |                      |
|  | With accessories | PNP           | 3-wire                | –       | 2.5              | 151 683                         | SMTO-1-PS-K-LED-24-C |
|                                                                                   |                  |               | –                     | 3-pin   | –                | 151 685                         | SMTO-1-PS-S-LED-24-C |
|                                                                                   |                  | NPN           | 3-wire                | –       | 2.5              | 151 684                         | SMTO-1-NS-K-LED-24-C |
|                                                                                   |                  |               | –                     | 3-pin   | –                | 151 686                         | SMTO-1-NS-S-LED-24-C |

| Ordering data – Rectangular proximity sensors, magnetic reed                      |                  |                       |         |                     |          | Technical data → Internet: smeo |  |
|-----------------------------------------------------------------------------------|------------------|-----------------------|---------|---------------------|----------|---------------------------------|--|
|                                                                                   | Mounting         | Electrical connection |         | Cable length<br>[m] | Part No. | Type                            |  |
|                                                                                   |                  | Cable                 | M8 plug |                     |          |                                 |  |
| NO contact                                                                        |                  |                       |         |                     |          |                                 |  |
|  | With accessories | 3-wire                | –       | 2.5                 | 30 459   | SMEO-1-LED-24-B                 |  |
|                                                                                   |                  | 3-wire                | –       | 5.0                 | 151 672  | SMEO-1-LED-24-K5-B              |  |
|                                                                                   |                  | –                     | 3-pin   | –                   | 150 848  | SMEO-1-S-LED-24-B               |  |

| Ordering data – Rectangular proximity sensors, pneumatic                           |                  |                                   |          | Technical data → Internet: smpo |  |
|------------------------------------------------------------------------------------|------------------|-----------------------------------|----------|---------------------------------|--|
|                                                                                    | Mounting         | Pneumatic connection              | Part No. | Type                            |  |
| 3/2-way valve, normally closed                                                     |                  |                                   |          |                                 |  |
|  | With accessories | Barbed fitting for 3 mm tubing ID | 31 008   | SMPO-1-H-B                      |  |

| Ordering data – Mounting kit                                                        |                                                               |  | Technical data → Internet: smb |       |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------|--|--------------------------------|-------|
|                                                                                     | Mounting                                                      |  | Part No.                       | Type  |
|  | For cylinder with tie rod Ø 6 mm or DUO rail mounting profile |  | 11 886                         | SMB-1 |

| Ordering data – Connecting cables                                                   |                              |  |                              | Technical data → Internet: nebu |                             |
|-------------------------------------------------------------------------------------|------------------------------|--|------------------------------|---------------------------------|-----------------------------|
|                                                                                     | Electrical connection, left  |  | Electrical connection, right | Cable length [m]                | Part No. Type               |
|  | Straight socket, M8x1, 3-pin |  | Cable, open end, 3-wire      | 2.5                             | 541 333 NEBU-M8G3-K-2.5-LE3 |
|                                                                                     |                              |  |                              | 5                               | 541 334 NEBU-M8G3-K-5-LE3   |
|  | Angled socket, M8x1, 3-pin   |  | Cable, open end, 3-wire      | 2.5                             | 541 338 NEBU-M8W3-K-2.5-LE3 |
|                                                                                     |                              |  |                              | 5                               | 541 341 NEBU-M8W3-K-5-LE3   |

| Ordering data – One-way flow control valves                                         |            |               |              | Technical data → Internet: grla |                 |
|-------------------------------------------------------------------------------------|------------|---------------|--------------|---------------------------------|-----------------|
|                                                                                     | Connection |               | Material     | Part No.                        | Type            |
|                                                                                     | Thread     | For tubing OD |              |                                 |                 |
|  | M5         | 3             | Metal design | 193 137                         | GRLA-M5-QS-3-D  |
|                                                                                     |            | 4             |              | 193 138                         | GRLA-M5-QS-4-D  |
|                                                                                     | G1/8       | 4             |              | 193 143                         | GRLA-1/8-QS-4-D |
|                                                                                     |            | 6             |              | 193 144                         | GRLA-1/8-QS-6-D |
|                                                                                     | G1/4       | 6             |              | 193 146                         | GRLA-1/4-QS-6-D |
|                                                                                     |            | 8             |              | 193 147                         | GRLA-1/4-QS-8-D |
|                                                                                     |            |               |              |                                 |                 |