Clamping-unit cylinders, standard port pattern
Clamping-unit cylinders, standard port pattern

Key features

At a glance

Clamping units are generally used for the friction locking of longitudinally variable rods at any position. The attachment of a clamping unit to a pneumatic cylinder allows the piston rod to be clamped. This clamping unit is designed to lock the piston rod securely so that the application of external force on the piston rod does not produce any relative motion. The locking of the piston rod can take place at any position in the stroke, in the end positions as well as the intermediate positions.

- Clamping force is released when compressed air is fed to the clamping unit
- Static holding force of up to 8000 N
- The cylinders comply with ISO 15552, (DIN ISO 6431), except where length is concerned.

Selection aid

Clamping-unit cylinder DNCKE

- For use as holding device (static application):
  - Holding and clamping in the event of a power failure
  - Protection against pressure failure and pressure drop
  - Securing of the piston rod during intermediate stops for process operations

- Wide selection of mounting options

Cylinder with clamping unit DNCKE-S, for safety-related applications

- Pneumatic braking/holding device for use in safety-related parts of control systems.
  The clamping unit is not a complete safety solution. It can be used as part of a solution.

- Certified by the Institute for Occupational Safety and Health of the German Social Accident Insurance. Testing and Certification Bodies in DGUV Test. Pneumatic braking/holding device with safety function.

- Use as a holding device (static application):
  - Holding and clamping in the event of power failure
  - Protection against pressure failure and pressure drop
  - Holding the piston rod during intermediate stops, for operative procedures in a process

- For use as a braking device (dynamic application):
  - Braking or stopping a movement
  - Interrupting a movement if a danger area is entered

- Holding force of the clamp is larger than the cylinder’s max. permissible feed force

- Suitable for use in safety-related parts of control systems belonging to category 1 to EN ISO 13849-1 (reliable component). Additional control measures are required for use in higher categories.

- When used as a braking device, the overtravel must be checked regularly

- Products intended for use in safety-related applications must be selected, sized and arranged in accordance with the valid standards and regulations.
### Clamping-unit cylinders, standard port pattern

**Type codes**

<table>
<thead>
<tr>
<th>Type</th>
<th>Double-acting</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNCKE</td>
<td>Clamping-unit cylinder</td>
</tr>
</tbody>
</table>

| Piston Ø [mm] | |
| Stroke [mm]   | |
| Cushioning    | PPV Adjustable at both ends |
| Position sensing | A For proximity sensing |
| Certification  | S Certified by the Institute for Occupational Safety and Health of the German Social Accident Insurance. Testing and Certification Bodies in DGUV Test. Pneumatic braking/holding device with safety function. |

| Type codes | DNCKE | 63 | 100 | PPV | A | S |

Internet: www.festo.com/catalogue/...
Clamping-unit cylinders, standard port pattern

Peripherals overview
### Clamping-unit cylinders, standard port pattern

**Peripherals overview**

<table>
<thead>
<tr>
<th>Mounting attachments and accessories</th>
<th>Description</th>
<th>DNCKE</th>
<th>DNCKE-S</th>
<th>Page/Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Foot mounting</td>
<td>For bearing or end cap</td>
<td>■</td>
<td>■</td>
<td>13</td>
</tr>
<tr>
<td>2 Flange mounting</td>
<td>For bearing or end cap</td>
<td>■</td>
<td>■</td>
<td>13</td>
</tr>
<tr>
<td>3 Trunnion flange</td>
<td>For bearing or end cap</td>
<td>■</td>
<td>–</td>
<td>14</td>
</tr>
<tr>
<td>4 Trunnion support</td>
<td>For trunnion flange ZNCF</td>
<td>■</td>
<td>–</td>
<td>15</td>
</tr>
<tr>
<td>5 Swivel flange</td>
<td>For end cap</td>
<td>■</td>
<td>–</td>
<td>15</td>
</tr>
<tr>
<td>6 Clevis foot</td>
<td>With spherical bearing</td>
<td>■</td>
<td>–</td>
<td>17</td>
</tr>
<tr>
<td>7 Clevis foot</td>
<td>Weld-on, with spherical bearing</td>
<td>■</td>
<td>–</td>
<td>17</td>
</tr>
<tr>
<td>8 Swivel flange</td>
<td>With spherical bearing for end cap</td>
<td>■</td>
<td>–</td>
<td>16</td>
</tr>
<tr>
<td>9 Clevis foot</td>
<td>For swivel flange SNCS</td>
<td>■</td>
<td>–</td>
<td>17</td>
</tr>
<tr>
<td>10 Swivel flange</td>
<td>For end cap</td>
<td>■</td>
<td>–</td>
<td>17</td>
</tr>
<tr>
<td>11 Swivel flange</td>
<td>For end cap</td>
<td>■</td>
<td>–</td>
<td>16</td>
</tr>
<tr>
<td>12 Clevis foot</td>
<td>For swivel flange SNCB</td>
<td>■</td>
<td>–</td>
<td>17</td>
</tr>
<tr>
<td>13 Clevis foot</td>
<td>With spherical bearing</td>
<td>■</td>
<td>–</td>
<td>17</td>
</tr>
<tr>
<td>14 Trunnion mounting kit</td>
<td>For mounting anywhere along the cylinder profile barrel</td>
<td>■</td>
<td>–</td>
<td>14</td>
</tr>
<tr>
<td>15 Rod eye</td>
<td>With spherical bearing</td>
<td>■</td>
<td>–</td>
<td>18</td>
</tr>
<tr>
<td>16 Right-angle clevis foot</td>
<td>For rod eye SGS</td>
<td>■</td>
<td>–</td>
<td>17</td>
</tr>
<tr>
<td>17 Rod clevis</td>
<td>With male thread</td>
<td>■</td>
<td>–</td>
<td>18</td>
</tr>
<tr>
<td>18 Coupling piece</td>
<td>For compensating radial deviations</td>
<td>■</td>
<td>–</td>
<td>18</td>
</tr>
<tr>
<td>19 Rod clevis</td>
<td>Permits a swivelling movement of the cylinder in one plane</td>
<td>■</td>
<td>–</td>
<td>18</td>
</tr>
<tr>
<td>20 Self-aligning rod coupler FK</td>
<td>For compensating radial and angular deviations</td>
<td>■</td>
<td>–</td>
<td>18</td>
</tr>
<tr>
<td>21 Guide unit</td>
<td>For protecting standard cylinders from torsion at high torque loads</td>
<td>■</td>
<td>■</td>
<td>18</td>
</tr>
<tr>
<td>22 Proximity sensor</td>
<td>Can be integrated in the cylinder profile barrel</td>
<td>■</td>
<td>■</td>
<td>19</td>
</tr>
<tr>
<td>23 Slot cover</td>
<td>To protect the sensor cable and keep dirt out of the sensor slots</td>
<td>■</td>
<td>■</td>
<td>20</td>
</tr>
<tr>
<td>24 Sensor mounting kit</td>
<td>For proximity sensor SMT-8 when attaching to cylinders in combination with guide unit FENG</td>
<td>■</td>
<td>■</td>
<td>19</td>
</tr>
<tr>
<td>25 One-way flow control valve</td>
<td>For speed regulation</td>
<td>■</td>
<td>■</td>
<td>20</td>
</tr>
<tr>
<td>26 Push-in fitting</td>
<td>For connecting compressed air tubing with standard external diameters</td>
<td>■</td>
<td>■</td>
<td>qs</td>
</tr>
</tbody>
</table>
Clamping unit cylinders DNCKE, standard port pattern

Technical data

Function

- Ø Diameter
  40, 63, 100 mm
- · Stroke length
  10 … 2000 mm

Note

Additional measures are required for use in safety-related control systems; in Europe, for example, the standards listed under the EC Machinery Directive must be observed. Without additional measures in accordance with statutory minimum requirements, the product is not suitable for use in safety-related sections of control systems.

General technical data

<table>
<thead>
<tr>
<th>Piston Ø</th>
<th>40</th>
<th>63</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumatic connection</td>
<td>Cylinder</td>
<td>G1/4</td>
<td>G3/8</td>
</tr>
<tr>
<td></td>
<td>Clamping unit</td>
<td>G1/8</td>
<td>G1/4</td>
</tr>
<tr>
<td>Piston rod thread</td>
<td>M12x1.25</td>
<td>M16x1.5</td>
<td>M20x1.5</td>
</tr>
<tr>
<td>Design</td>
<td>Piston</td>
<td>Piston rod</td>
<td>Cylinder barrel</td>
</tr>
<tr>
<td>Cushioning</td>
<td>Adjustable at both ends</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cushioning length [mm]</td>
<td>20</td>
<td>22</td>
<td>32</td>
</tr>
<tr>
<td>Position sensing</td>
<td>For proximity sensing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of mounting</td>
<td>Via female thread</td>
<td>With accessories</td>
<td></td>
</tr>
<tr>
<td>Clamping type with effective direction</td>
<td>At both ends</td>
<td>Clamping via spring force, air to release</td>
<td></td>
</tr>
<tr>
<td>Assembly position</td>
<td>Any</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: This product conforms to ISO 1179-1 and to ISO 228-1

Operating and environmental conditions

<table>
<thead>
<tr>
<th>Piston Ø</th>
<th>40</th>
<th>63</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating medium</td>
<td>Compressed air in accordance with ISO 8573-1:2010 [7:4:4]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note on operating/pilot medium</td>
<td>Operation with lubricated medium possible (in which case lubricated operation will always be required)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating pressure [bar]</td>
<td>0.6 … 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. release pressure [bar]</td>
<td>3.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>–20 … +80</td>
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<tr>
<td>ATEX</td>
<td>Specified types ➤ <a href="http://www.festo.com">www.festo.com</a></td>
<td></td>
<td></td>
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</table>

1) Note operating range of proximity sensors

Weights [g]

<table>
<thead>
<tr>
<th>Piston Ø</th>
<th>40</th>
<th>63</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic weight with 0 mm stroke</td>
<td>2340</td>
<td>5485</td>
<td>18160</td>
</tr>
<tr>
<td>Additional weight per 10 mm stroke</td>
<td>45</td>
<td>73</td>
<td>110</td>
</tr>
<tr>
<td>Moving load with 0 mm stroke</td>
<td>500</td>
<td>935</td>
<td>2150</td>
</tr>
<tr>
<td>Additional load per 10 mm stroke</td>
<td>16</td>
<td>25</td>
<td>40</td>
</tr>
</tbody>
</table>

Subject to change – 2018/02
Clamping unit cylinders DNCKE, standard port pattern

Technical data

### Forces [N]

<table>
<thead>
<tr>
<th>Forces</th>
<th>Piston Ø</th>
<th>40</th>
<th>63</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical force at 6 bar, advancing</td>
<td>754</td>
<td>1870</td>
<td>4712</td>
<td></td>
</tr>
<tr>
<td>Theoretical force at 6 bar, retracting</td>
<td>633</td>
<td>1682</td>
<td>4418</td>
<td></td>
</tr>
<tr>
<td>Static holding force</td>
<td>1300</td>
<td>3200</td>
<td>8000</td>
<td></td>
</tr>
</tbody>
</table>

**Note**: The specified holding force refers to a static load. If this value is exceeded, slippage may occur. Dynamic forces occurring during operation must not exceed the static holding force if slippage is to be avoided. The clamping unit is backlash-free in the clamped condition when varying loads are applied to the piston rod. Lateral loads and bending moments on the round material can impair the function. (Make sure that the load on the round material is only in the direction of movement.)

Actuation: The clamping unit may only be released when the forces on the piston have reached an equilibrium. Otherwise the sudden movement of the piston rod could cause an accident. Blocking off the air supply at both ends (e.g. with a 5/3-way valve) does not provide any safety.

### Impact energy [J]

<table>
<thead>
<tr>
<th>Forces</th>
<th>Piston Ø</th>
<th>40</th>
<th>63</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. impact energy at end positions</td>
<td>0.7</td>
<td>1.3</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Permissible impact velocity: \( v_{\text{perm.}} = \sqrt{\frac{2 \times E_{\text{perm.}}}{m_{\text{dead}} + m_{\text{load}}}} \)

Maximum permissible load: \( m_{\text{load}} = \frac{2 \times E_{\text{perm.}}}{v^2} - m_{\text{dead}} \)

**Note**: These specifications represent the maximum values which can be reached. Note the maximum permitted impact energy.

### Materials

#### Sectional view

- Cylinder
  - Housing: Wrought aluminium alloy
  - Bearing cap: Wrought aluminium alloy
  - Connector cap: Wrought aluminium alloy
  - End cap: Die-cast aluminium
  - Piston rod: Tempered steel
  - Flange screws: Tempered steel
  - Seals: TPE-U(PU), NBR
Clamping unit cylinders DNCKE, standard port pattern

Technical data

Dimensions

1. Socket head screw with female thread for mounting components
2. Regulating screw for adjustable end-position cushioning
3. Sensor slot for proximity sensor
4. Connection to release clamping function
5. Locking screw

<table>
<thead>
<tr>
<th>Ø [mm]</th>
<th>AM</th>
<th>B ( \varnothing ) d11</th>
<th>BG</th>
<th>BG1</th>
<th>E</th>
<th>EE</th>
<th>E1</th>
<th>G</th>
<th>G2</th>
<th>G3</th>
<th>J1</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>24</td>
<td>35</td>
<td>16</td>
<td>15</td>
<td>54</td>
<td>G1/4</td>
<td>G1/8</td>
<td>28.8</td>
<td>22</td>
<td>49.6</td>
<td>2</td>
</tr>
<tr>
<td>63</td>
<td>32</td>
<td>45</td>
<td>17</td>
<td>17</td>
<td>80</td>
<td>G3/8</td>
<td>G1/4</td>
<td>34.3</td>
<td>29.5</td>
<td>47.9</td>
<td>7</td>
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<tr>
<td>100</td>
<td>42</td>
<td>55</td>
<td>17</td>
<td>17</td>
<td>126</td>
<td>G1/2</td>
<td>G3/8</td>
<td>38</td>
<td>32.5</td>
<td>46.7</td>
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</table>

<table>
<thead>
<tr>
<th>Ø [mm]</th>
<th>J2</th>
<th>J3</th>
<th>J4</th>
<th>KX</th>
<th>L1</th>
<th>L2</th>
<th>L7</th>
<th>MM ( \varnothing )</th>
<th>PL</th>
<th>PL1</th>
<th>PL2</th>
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<tr>
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<td>8</td>
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<td>0</td>
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<td>114.5</td>
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<td>14</td>
<td>21.3</td>
<td>9</td>
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<td>63</td>
<td>12.4</td>
<td>10</td>
<td>7</td>
<td>M16x1.5</td>
<td>22.1</td>
<td>121.5</td>
<td>6.6</td>
<td>20</td>
<td>17</td>
<td>14.6</td>
<td>11.8</td>
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<tr>
<td>100</td>
<td>12</td>
<td>10</td>
<td>10</td>
<td>M20x1.5</td>
<td>29.2</td>
<td>131.5</td>
<td>8</td>
<td>25</td>
<td>18.8</td>
<td>16.4</td>
<td>14.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ø [mm]</th>
<th>RT</th>
<th>TG</th>
<th>VA</th>
<th>WH</th>
<th>Z1</th>
<th>=&lt;( \varnothing 1 )</th>
<th>=&lt;( \varnothing 2 )</th>
<th>=&lt;( \varnothing 3 )</th>
<th>=&lt;( \varnothing 4 )</th>
<th>=&lt;( \varnothing 5 )</th>
<th>=&lt;( \varnothing 6 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>M6</td>
<td>38</td>
<td>4</td>
<td>30</td>
<td>277</td>
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<td>19</td>
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<td>6</td>
<td>30</td>
<td>8</td>
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<tr>
<td>63</td>
<td>M8</td>
<td>56.5</td>
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<td>37</td>
<td>315</td>
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Note: This product conforms to ISO 1179-1 and to ISO 228-1

Ordering data

<table>
<thead>
<tr>
<th>Piston Ø [mm]</th>
<th>Stroke [mm]</th>
<th>Part No.</th>
<th>Type</th>
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<tbody>
<tr>
<td>40</td>
<td>10...2000</td>
<td>526482</td>
<td>DNCKE-40-...-PPV-A</td>
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<tr>
<td>63</td>
<td>10...2000</td>
<td>526483</td>
<td>DNCKE-63-...-PPV-A</td>
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<tr>
<td>100</td>
<td>10...2000</td>
<td>526484</td>
<td>DNCKE-100-...-PPV-A</td>
</tr>
</tbody>
</table>

Subject to change – 2018/02
Clamping unit cylinders DNCKE-S, standard port pattern

Technical data

Function

- Diameter
  40, 63, 100 mm
- Stroke length
  10 … 2000 mm

General technical data

<table>
<thead>
<tr>
<th>function</th>
<th>40</th>
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<th>100</th>
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</thead>
<tbody>
<tr>
<td>Pneumatic connection</td>
<td>G1/4</td>
<td>G3/8</td>
<td>G1/2</td>
</tr>
<tr>
<td>Cylinder</td>
<td>G1/4</td>
<td>G3/8</td>
<td>G1/2</td>
</tr>
<tr>
<td>Clamping unit</td>
<td>G1/8</td>
<td>G1/4</td>
<td>G3/8</td>
</tr>
<tr>
<td>Piston rod thread</td>
<td>M12x1.25</td>
<td>M16x1.5</td>
<td>M20x1.5</td>
</tr>
<tr>
<td>Design</td>
<td>Piston</td>
<td>Piston</td>
<td>Piston</td>
</tr>
<tr>
<td></td>
<td>rod</td>
<td>rod</td>
<td>rod</td>
</tr>
<tr>
<td></td>
<td>cylinder</td>
<td>cylinder</td>
<td>cylinder</td>
</tr>
<tr>
<td>Cushioning</td>
<td>Adjustable at both ends</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cushioning length [mm]</td>
<td>20</td>
<td>22</td>
<td>32</td>
</tr>
<tr>
<td>Position sensing</td>
<td>For proximity sensing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of mounting</td>
<td>Via female thread</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>With accessories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping type with effective direction</td>
<td>At both ends</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assembly position</td>
<td>Any</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Single-channel to EN ISO 13849-1, category 1</td>
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<td></td>
</tr>
<tr>
<td>Safety function</td>
<td>Holding and stopping a movement</td>
<td></td>
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</tr>
<tr>
<td>Certification</td>
<td>BIA (Berufsgenossenschaftliches Institut für Arbeitsschutz – BG-Institute for Occupational Safety and Health)</td>
<td></td>
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</tr>
</tbody>
</table>

Note: This product conforms to ISO 1179-1 and to ISO 228-1

Operating and environmental conditions

<table>
<thead>
<tr>
<th>function</th>
<th>40</th>
<th>63</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating medium</td>
<td>Compressed air in accordance with ISO 8573-1:2010 [7:4:6]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating pressure [bar]</td>
<td>0.6 … 8</td>
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<td></td>
</tr>
<tr>
<td>Min. release pressure [bar]</td>
<td>3.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. permissible test pressure [bar]</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature °C</td>
<td>–10 … +60</td>
<td></td>
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</tbody>
</table>

Note operating range of proximity sensors

Weights [g]

<table>
<thead>
<tr>
<th>function</th>
<th>40</th>
<th>63</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic weight with 0 mm stroke</td>
<td>2340</td>
<td>5485</td>
<td>18160</td>
</tr>
<tr>
<td>Additional weight per 10 mm stroke</td>
<td>45</td>
<td>73</td>
<td>110</td>
</tr>
<tr>
<td>Moving load with 0 mm stroke</td>
<td>500</td>
<td>935</td>
<td>2150</td>
</tr>
<tr>
<td>Additional load per 10 mm stroke</td>
<td>16</td>
<td>25</td>
<td>40</td>
</tr>
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</table>
Clamping unit cylinders DNCKE-S, standard port pattern

Technical data

Forces [N]

<table>
<thead>
<tr>
<th>Piston Ø</th>
<th>40</th>
<th>63</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical force at 6 bar, advancing</td>
<td>754</td>
<td>1870</td>
<td>4712</td>
</tr>
<tr>
<td>Theoretical force at 6 bar, retracting</td>
<td>633</td>
<td>1682</td>
<td>4418</td>
</tr>
<tr>
<td>Static holding force</td>
<td>1300</td>
<td>3200</td>
<td>8000</td>
</tr>
</tbody>
</table>

Note

The specified holding force refers to a static load. If this value is exceeded, slippage may occur. Dynamic forces occurring during operation must not exceed the static holding force if slippage is to be avoided. The clamping unit is backlash-free in the clamped condition when varying loads are applied to the piston rod. Lateral loads and bending moments on the round material can impair the function. (Make sure that the load on the round material is only in the direction of movement.)

Actuation:
The clamping unit may only be released when the forces on the piston have reached an equilibrium. Otherwise the sudden movement of the piston rod could cause an accident. Blocking off the air supply at both ends (e.g., with a 5/3-way valve) does not provide any safety.

Theoretical overtravel s as a function of the piston speed v in a vertical assembly position

The overtravel is the distance that the piston rod covers between exhausting of the clamping unit and coming to a standstill. It must be determined by the customer when the machine is set up. When the clamping unit is used as a braking device, an increase in the overtravel as a function of the load and the frequency of braking (wear) must be expected. The clamping unit DNCKE-S can be used in safety-related parts of control systems belonging to category 1 (reliable component) as defined by EN ISO 13849-1. For use in higher categories than category 1 to EN ISO 13849-1, the overtravel must be achieved even in the event of faults. It is dependent on the environmental conditions and stress, e.g.:

- Operating pressure
- Nominal size of switching valve
- Cable length
- Diameter of the connecting cable to the clamping unit
- Load and speed

The overtravel can be reduced by attaching a quick exhaust valve to the supply port of the clamping unit.

<table>
<thead>
<tr>
<th>Ø 40</th>
</tr>
</thead>
</table>
| ![Graph](image1)

<table>
<thead>
<tr>
<th>Ø 63</th>
</tr>
</thead>
</table>
| ![Graph](image2)

<table>
<thead>
<tr>
<th>Ø 100</th>
</tr>
</thead>
</table>
| ![Graph](image3)
Clamping unit cylinders DNKE-S, standard port pattern

Technical data

<table>
<thead>
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<th>Impact energy [J]</th>
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<th>100</th>
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</thead>
<tbody>
<tr>
<td>Piston Ø</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. impact energy at end positions</td>
<td>0.7</td>
<td>1.3</td>
<td>3</td>
</tr>
</tbody>
</table>

Permissible impact velocity:

\[ \nu_{\text{perm.}} = \sqrt{\frac{2 \times E_{\text{perm.}}}{m_{\text{dead}} + m_{\text{load}}}} \]

Maximum permissible load:

\[ m_{\text{load}} = \frac{2 \times E_{\text{perm.}}}{\nu^2} - m_{\text{dead}} \]

Permissible impact velocity:

- \( E_{\text{perm.}} \): Max. impact energy
- \( m_{\text{dead}} \): Moving load (drive)
- \( m_{\text{load}} \): Moving work load

Materials

**Sectional view**

<table>
<thead>
<tr>
<th>Cylinder</th>
<th>Wrought aluminium alloy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Body</td>
<td></td>
</tr>
<tr>
<td>2 Bearing cap</td>
<td>Wrought aluminium alloy</td>
</tr>
<tr>
<td>3 Connector cap</td>
<td>Wrought aluminium alloy</td>
</tr>
<tr>
<td>4 End cap</td>
<td>Die-cast aluminium</td>
</tr>
<tr>
<td>5 Piston rod</td>
<td>Tempered steel</td>
</tr>
<tr>
<td>6 Flange screws</td>
<td>Tempered steel</td>
</tr>
<tr>
<td>– Seals</td>
<td>TPE-U(PU), NBR</td>
</tr>
</tbody>
</table>

Recommendation for mounting

- As holding device, horizontal installation
- As braking device, vertical installation

With foot mounting HNC

With flange mounting FNC (note braking direction)

- Braking direction

Note

These specifications represent the maximum values which can be reached. Note the maximum permitted impact energy.
Clamping unit cylinders DNCKE-S, standard port pattern

Technical data

Dimensions

<table>
<thead>
<tr>
<th>Ø [mm]</th>
<th>AM</th>
<th>B Ø d11</th>
<th>BG</th>
<th>BG1</th>
<th>E</th>
<th>EE</th>
<th>E1</th>
<th>G</th>
<th>G2</th>
<th>G3</th>
<th>J1</th>
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</thead>
<tbody>
<tr>
<td>40</td>
<td>24</td>
<td>35</td>
<td>16</td>
<td>15</td>
<td>54</td>
<td>G1/4</td>
<td>G1/8</td>
<td>28.8</td>
<td>22</td>
<td>49.6</td>
<td>2</td>
</tr>
<tr>
<td>63</td>
<td>32</td>
<td>45</td>
<td>17</td>
<td>17</td>
<td>80</td>
<td>G3/8</td>
<td>G1/4</td>
<td>34.3</td>
<td>29.5</td>
<td>47.9</td>
<td>7</td>
</tr>
<tr>
<td>100</td>
<td>42</td>
<td>55</td>
<td>17</td>
<td>17</td>
<td>126</td>
<td>G1/2</td>
<td>G3/8</td>
<td>38</td>
<td>32.5</td>
<td>46.7</td>
<td>15</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Ø [mm]</th>
<th>J2</th>
<th>J3</th>
<th>J4</th>
<th>KX</th>
<th>L1</th>
<th>L2</th>
<th>L7</th>
<th>MM Ø</th>
<th>PL</th>
<th>PL1</th>
<th>PL2</th>
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<tr>
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<td>0</td>
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<td>63</td>
<td>12.4</td>
<td>10</td>
<td>7</td>
<td>M16x1.5</td>
<td>22.1</td>
<td>121.5</td>
<td>6.6</td>
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<td>17</td>
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<td>11.8</td>
</tr>
<tr>
<td>100</td>
<td>12</td>
<td>10</td>
<td>10</td>
<td>M20x1.5</td>
<td>29.2</td>
<td>131.5</td>
<td>8</td>
<td>25</td>
<td>18.8</td>
<td>16.4</td>
<td>14.4</td>
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<table>
<thead>
<tr>
<th>Ø [mm]</th>
<th>RT</th>
<th>TG</th>
<th>VA</th>
<th>WH</th>
<th>ZJ</th>
<th>=C1</th>
<th>=C2</th>
<th>=C3</th>
<th>=C4</th>
<th>=C5</th>
<th>=C6</th>
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<tbody>
<tr>
<td>40</td>
<td>M6</td>
<td>38</td>
<td>4</td>
<td>30</td>
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<td>13</td>
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<td>8</td>
</tr>
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<td>63</td>
<td>M8</td>
<td>56.5</td>
<td>4</td>
<td>37</td>
<td>315</td>
<td>17</td>
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<td>8</td>
<td>8</td>
<td>36</td>
<td>10</td>
</tr>
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<td>100</td>
<td>M10</td>
<td>89</td>
<td>4</td>
<td>51</td>
<td>408</td>
<td>22</td>
<td>30</td>
<td>6</td>
<td>10</td>
<td>41</td>
<td>13</td>
</tr>
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</table>

Note: This product conforms to ISO 1179-1 and to ISO 228-1

Ordering data

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<thead>
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<th>Piston Ø [mm]</th>
<th>Stroke [mm]</th>
<th>Part No.</th>
<th>Type</th>
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<tbody>
<tr>
<td>40</td>
<td>10 ... 2000</td>
<td>538239</td>
<td>DNCKE-40-...-PPV-A-S</td>
</tr>
<tr>
<td>63</td>
<td>10 ... 2000</td>
<td>538240</td>
<td>DNCKE-63-...-PPV-A-S</td>
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<td>100</td>
<td>10 ... 2000</td>
<td>538241</td>
<td>DNCKE-100-...-PPV-A-S</td>
</tr>
</tbody>
</table>
Clamping-unit cylinders, standard port pattern

Foot mounting HNC

Material:
Galvanised steel
Free of copper and PTFE

Dimensions and ordering data

<table>
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<tr>
<th>[mm]</th>
<th>(\varnothing)</th>
<th>(\varnothing)</th>
<th>(\varnothing)</th>
<th>(\varnothing)</th>
<th>(\varnothing)</th>
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<th>(\varnothing)</th>
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<th>Weight</th>
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<th>Type</th>
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<td>305</td>
<td>53</td>
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<td>12.5</td>
<td>5</td>
<td>32</td>
<td>342</td>
<td>50</td>
<td>75</td>
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<td>436</td>
<td>174372 HNC-63</td>
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<td>17.5</td>
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<td>41</td>
<td>439</td>
<td>75</td>
<td>110</td>
<td>449</td>
<td>86</td>
<td>2</td>
<td>1009</td>
<td>174374 HNC-100</td>
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</tbody>
</table>

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.

Flange mounting FNC

Material:
Galvanised steel
Free of copper and PTFE
RoHS-compliant

Dimensions and ordering data

<table>
<thead>
<tr>
<th>[mm]</th>
<th>E</th>
<th>FB</th>
<th>(\varnothing)</th>
<th>MF</th>
<th>R</th>
<th>TF</th>
<th>UF</th>
<th>W</th>
<th>ZF</th>
<th>CRC(1)</th>
<th>Weight</th>
<th>Part No.</th>
<th>Type</th>
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<tbody>
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<td>50</td>
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<td>174379 FNC-63</td>
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<tr>
<td>100</td>
<td>110</td>
<td>14</td>
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<td>75</td>
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<td>424</td>
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<td>174381 FNC-100</td>
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</table>

1) Corrosion resistance class CRC 1 to Festo standard FN 940070
Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive muntions).
Clamping-unit cylinders, standard port pattern

Accessories

Trunnion flange ZNCF

Material:
- Special steel casting
- Free of copper and PTFE
- RoHS-compliant

Dimensions and ordering data

<table>
<thead>
<tr>
<th>For ( \varnothing )</th>
<th>C2</th>
<th>C3</th>
<th>TD ( \varnothing ) ( e_9 )</th>
<th>TK</th>
<th>TL</th>
<th>TM</th>
<th>US</th>
<th>XH</th>
<th>XL</th>
<th>CRC1)</th>
<th>Weight</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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<td>687</td>
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<td>ZNCF-63</td>
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<tr>
<td>100</td>
<td>164</td>
<td>189</td>
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<td>110</td>
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<td>427</td>
<td>2</td>
<td>2254</td>
<td>174416</td>
<td>ZNCF-100</td>
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</table>

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.

Trunnion mounting kit DAMT

The mounting kit can be attached at any position along the profile barrel of a cylinder.

Material:
- Tempered steel
- Free of copper and PTFE
- RoHS-compliant

Dimensions and ordering data

<table>
<thead>
<tr>
<th>For ( \varnothing )</th>
<th>B1</th>
<th>C2</th>
<th>C3</th>
<th>TD ( \varnothing ) ( e_9 )</th>
<th>TL</th>
<th>TM</th>
<th>UW</th>
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</thead>
<tbody>
<tr>
<td>[mm]</td>
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<td></td>
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<td></td>
<td></td>
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<td>25</td>
<td>132</td>
<td>145</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>For ( \varnothing )</th>
<th>XG</th>
<th>XI</th>
<th>XV</th>
<th>Max. tightening torque ([ \text{Nm} ])</th>
<th>CRC1)</th>
<th>Weight</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
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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.

Internet: www.festo.com/catalogue/...
Clamping-unit cylinders, standard port pattern

Accessories

Trunnion support LNZG

Material:
Trunnion support:
Anodised aluminium
Plain bearing:
Plastic
Free of copper and PTFE
RoHS-compliant

<table>
<thead>
<tr>
<th>Dimensions and ordering data</th>
</tr>
</thead>
<tbody>
<tr>
<td>For [mm]</td>
</tr>
<tr>
<td>[mm]</td>
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<tr>
<td>40</td>
</tr>
<tr>
<td>63</td>
</tr>
<tr>
<td>100</td>
</tr>
</tbody>
</table>

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 flange SNC

Material:
Die-cast aluminium
Free of copper and PTFE
RoHS-compliant

<table>
<thead>
<tr>
<th>Dimensions and ordering data</th>
</tr>
</thead>
<tbody>
<tr>
<td>For [mm]</td>
</tr>
<tr>
<td>[mm]</td>
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1) Corrosion resistance class CRC 1 to Festo standard FN 940107
   Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).
Clamping-unit cylinders, standard port pattern

Accessories

Swivel flange SNCB

Material:
Die-cast aluminium
Free of copper and PTFE
RoHS-compliant

Dimensions and ordering data

<table>
<thead>
<tr>
<th>For ø</th>
<th>CB</th>
<th>EK</th>
<th>FL</th>
<th>L</th>
<th>ML</th>
<th>MR</th>
<th>UB</th>
<th>XC</th>
<th>CRC1)</th>
<th>Weight</th>
<th>Part No.</th>
<th>Type</th>
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</thead>
<tbody>
<tr>
<td>[mm]</td>
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<td>[g]</td>
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<td>174395</td>
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</table>

1) Corrosion resistance class CRC 1 to Festo standard FN 940070
   Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Swivel flange SNCS

Material:
SNCS 40:
Die-cast aluminium
SNCS 63 … 100:
Wrought aluminium alloy
Free of copper and PTFE
RoHS-compliant

Dimensions and ordering data

<table>
<thead>
<tr>
<th>For ø</th>
<th>CN</th>
<th>E</th>
<th>EP</th>
<th>EX</th>
<th>FL</th>
<th>LT</th>
<th>MS</th>
<th>RA</th>
<th>TG</th>
<th>XC</th>
<th>CRC1)</th>
<th>Weight</th>
<th>Part No.</th>
<th>Type</th>
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</thead>
<tbody>
<tr>
<td>[mm]</td>
<td></td>
<td></td>
<td>±0.2</td>
<td>±0.2</td>
<td>+1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[g]</td>
<td></td>
<td></td>
</tr>
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<td>40</td>
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<td>12</td>
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1) Corrosion resistance class CRC 1 to Festo standard FN 940070
   Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

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.
Clamping-unit cylinders, standard port pattern

**Swivel flange SNCL**

**Material:**
- Die-cast aluminium
- Free of copper and PTFE
- RoHS-compliant

**Dimensions and ordering data**

<table>
<thead>
<tr>
<th>For Ø [mm]</th>
<th>CD Ø H9</th>
<th>EW −0.2/0.6</th>
<th>FL ±0.2</th>
<th>L</th>
<th>MR</th>
<th>XC</th>
<th>CRC1)</th>
<th>Weight [g]</th>
<th>Part No.</th>
<th>Type</th>
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<tbody>
<tr>
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1) Corrosion resistance class CRC 1 to Festo standard FN 940070

Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

**Ordering data – Mounting attachments**

<table>
<thead>
<tr>
<th>Designation</th>
<th>For Ø</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clevis foot LNG</td>
<td>40</td>
<td>33891</td>
<td>LNG-40</td>
</tr>
<tr>
<td></td>
<td>63</td>
<td>33893</td>
<td>LNG-63</td>
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<tr>
<td></td>
<td>100</td>
<td>33895</td>
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<td>Clevis foot LSNG</td>
<td>40</td>
<td>31741</td>
<td>LSNG-40</td>
</tr>
<tr>
<td></td>
<td>63</td>
<td>31743</td>
<td>LSNG-63</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>31745</td>
<td>LSNG-100</td>
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<tr>
<td>Clevis foot LBG</td>
<td>40</td>
<td>31762</td>
<td>LBG-40</td>
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<tr>
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<td>63</td>
<td>31764</td>
<td>LBG-63</td>
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<tr>
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<td>100</td>
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<td>LBG-100</td>
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</table>
Clamping-unit cylinders, standard port pattern

### Piston rod attachments

<table>
<thead>
<tr>
<th>Designation</th>
<th>For Ø</th>
<th>Part No.</th>
<th>Type</th>
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</thead>
<tbody>
<tr>
<td>Rod eye SGS</td>
<td>40</td>
<td>9262</td>
<td>SGS-M12x1,25</td>
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<tr>
<td></td>
<td>63</td>
<td>9263</td>
<td>SGS-M16x1,5</td>
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<tr>
<td></td>
<td>100</td>
<td>9264</td>
<td>SGS-M20x1,5</td>
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<tr>
<td>Rod clevis SGA</td>
<td>40</td>
<td>10767</td>
<td>SGA-M12x1,25</td>
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<td>63</td>
<td>10768</td>
<td>SGA-M16x1,5</td>
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<tr>
<td></td>
<td>100</td>
<td>10769</td>
<td>SGA-M20x1,5</td>
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<td>Rod clevis SGS</td>
<td>40</td>
<td>6145</td>
<td>SG-M12x1,25</td>
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<td>63</td>
<td>6146</td>
<td>SG-M16x1,5</td>
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<tr>
<td></td>
<td>100</td>
<td>6147</td>
<td>SG-M20x1,5</td>
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<td>Coupling piece KSG</td>
<td>40</td>
<td>32964</td>
<td>KSG-M12x1,25</td>
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<td>63</td>
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<td>KSG-M16x1,5</td>
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<td>KSG-M20x1,5</td>
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### Guide units for fixed strokes (recirculating ball bearing guide only)

<table>
<thead>
<tr>
<th>Stroke [mm]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 ... 50</td>
<td>34499</td>
<td>FENG-40-50-KF</td>
</tr>
<tr>
<td>10 ... 100</td>
<td>34500</td>
<td>FENG-40-100-KF</td>
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<tr>
<td>10 ... 160</td>
<td>34501</td>
<td>FENG-40-160-KF</td>
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<tr>
<td>10 ... 200</td>
<td>34502</td>
<td>FENG-40-200-KF</td>
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<tr>
<td>10 ... 250</td>
<td>34503</td>
<td>FENG-40-250-KF</td>
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<tr>
<td>10 ... 320</td>
<td>34504</td>
<td>FENG-40-320-KF</td>
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<tr>
<td>10 ... 400</td>
<td>150291</td>
<td>FENG-40-400-KF</td>
</tr>
<tr>
<td>10 ... 500</td>
<td>34505</td>
<td>FENG-40-500-KF</td>
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<tr>
<td>For Ø 100 mm</td>
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<tr>
<td>10 ... 50</td>
<td>34529</td>
<td>FENG-100-50-KF</td>
</tr>
<tr>
<td>10 ... 100</td>
<td>34530</td>
<td>FENG-100-100-KF</td>
</tr>
<tr>
<td>10 ... 160</td>
<td>34531</td>
<td>FENG-100-160-KF</td>
</tr>
<tr>
<td>10 ... 200</td>
<td>34532</td>
<td>FENG-100-200-KF</td>
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<tr>
<td>10 ... 250</td>
<td>34533</td>
<td>FENG-100-250-KF</td>
</tr>
<tr>
<td>10 ... 320</td>
<td>34534</td>
<td>FENG-100-320-KF</td>
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<tr>
<td>10 ... 400</td>
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<td>FENG-100-400-KF</td>
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<tr>
<td>10 ... 500</td>
<td>34536</td>
<td>FENG-100-500-KF</td>
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### Guide units for variable strokes

<table>
<thead>
<tr>
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<th>Type</th>
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<tbody>
<tr>
<td>40</td>
<td>34488</td>
<td>FENG-40-...-KF</td>
</tr>
<tr>
<td>63</td>
<td>34490</td>
<td>FENG-63-...-KF</td>
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<tr>
<td>100</td>
<td>34492</td>
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### Guide units for variable strokes (plain bearing guide)

<table>
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<th>Part No.</th>
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<tr>
<td>34482</td>
<td>FENG-40-...-GF</td>
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<td>34484</td>
<td>FENG-63-...-GF</td>
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<td>34486</td>
<td>FENG-100-...-GF</td>
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</table>
### Clamping-unit cylinders, standard port pattern

**Accessories**

#### Ordering data – Mounting kits for proximity sensors SMT-8

<table>
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<th>For ( \Theta ) [mm]</th>
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<td>40</td>
<td>175705</td>
<td>SMB-8-FENG-32/40</td>
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<tr>
<td>63</td>
<td>175706</td>
<td>SMB-8-FENG-50/63</td>
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<td>100</td>
<td>175707</td>
<td>SMB-8-FENG-80/100</td>
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#### Technical data – Internet: smb

#### Ordering data – Proximity sensors for T-slot, magneto-resistive

<table>
<thead>
<tr>
<th>Type of mounting</th>
<th>Switch output</th>
<th>Electrical connection</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O contact</td>
<td>PNP</td>
<td>Cable, 3-wire</td>
<td>2.5</td>
<td>574335</td>
<td>SMT-8M-A-PS-24V-E-2,5-OE</td>
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<tr>
<td></td>
<td></td>
<td>Plug M8x1, 3-pin</td>
<td>0.3</td>
<td>574334</td>
<td>SMT-8M-A-PS-24V-E-0,3-M8D</td>
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<tr>
<td></td>
<td></td>
<td>Plug M12x1, 3-pin</td>
<td>0.3</td>
<td>574337</td>
<td>SMT-8M-A-PS-24V-E-0,3-M12</td>
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<tr>
<td></td>
<td>NPN</td>
<td>Cable, 3-wire</td>
<td>2.5</td>
<td>574338</td>
<td>SMT-8M-A-NS-24V-E-2,5-OE</td>
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<tr>
<td></td>
<td></td>
<td>Plug M8x1, 3-pin</td>
<td>0.3</td>
<td>574339</td>
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<tr>
<td>N/C contact</td>
<td>PNP</td>
<td>Cable, 3-wire</td>
<td>7.5</td>
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#### Ordering data – Proximity sensors for T-slot, magnetic reed

<table>
<thead>
<tr>
<th>Type of mounting</th>
<th>Switch output</th>
<th>Electrical connection</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/O contact</td>
<td>Contacting</td>
<td>Cable, 3-wire</td>
<td>2.5</td>
<td>543862</td>
<td>SME-8M-DS-24V-K-2,5-OE</td>
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<td></td>
<td>Cable, 2-wire</td>
<td>2.5</td>
<td>543872</td>
<td>SME-8M-ZS-24V-K-2,5-OE</td>
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<td>Plug M8x1, 3-pin</td>
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<td>543861</td>
<td>SME-8M-DS-24V-K-0,3-M8D</td>
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<tr>
<td></td>
<td>Contacting</td>
<td>Cable, 3-wire</td>
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<td>SME-8K-LED-24</td>
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<td></td>
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<td>Plug M8x1, 3-pin</td>
<td>0.3</td>
<td>150857</td>
<td>SME-8S-LED-24</td>
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<tr>
<td>N/C contact</td>
<td>Contacting</td>
<td>Cable, 3-wire</td>
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<td>SME-8-O-K-LED-24</td>
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## Ordering data – Connecting cables

<table>
<thead>
<tr>
<th>Electrical connection, left</th>
<th>Electrical connection, right</th>
<th>Cable length [m]</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight socket, M8x1, 3-pin</td>
<td>Cable, open end, 3-wire</td>
<td>2.5</td>
<td>541333</td>
<td>NEBU-M8G3-K-2.5-LE3</td>
</tr>
<tr>
<td>Straight socket, M12x1, 5-pin</td>
<td>Cable, open end, 3-wire</td>
<td>2.5</td>
<td>541363</td>
<td>NEBU-M12G5-K-2.5-LE3</td>
</tr>
<tr>
<td>Angled socket, M8x1, 3-pin</td>
<td>Cable, open end, 3-wire</td>
<td>2.5</td>
<td>541338</td>
<td>NEBU-M8W3-K-2.5-LE3</td>
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<tr>
<td>Angled socket, M12x1, 5-pin</td>
<td>Cable, open end, 3-wire</td>
<td>2.5</td>
<td>541367</td>
<td>NEBU-M12W5-K-2.5-LE3</td>
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## Ordering data – Slot cover for T-slot

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Length [m]</th>
<th>Part No.</th>
<th>Type</th>
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<tr>
<td>Insertable from above</td>
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<td>ABP-S-5</td>
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## Ordering data – One-way flow control valves

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<th>Material</th>
<th>Part No.</th>
<th>Type</th>
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<td>G1/8</td>
<td>3</td>
<td>193142</td>
<td>GRLA-1/8-QS-3-D</td>
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<tr>
<td></td>
<td>4</td>
<td>193143</td>
<td>GRLA-1/8-QS-4-D</td>
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<td>6</td>
<td>193144</td>
<td>GRLA-1/8-QS-6-D</td>
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<tr>
<td></td>
<td>8</td>
<td>193145</td>
<td>GRLA-1/8-QS-8-D</td>
</tr>
<tr>
<td>G1/4</td>
<td>6</td>
<td>193146</td>
<td>GRLA-1/4-QS-6-D</td>
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<tr>
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<td>8</td>
<td>193147</td>
<td>GRLA-1/4-QS-8-D</td>
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<td>10</td>
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<td>GRLA-1/4-QS-10-D</td>
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<tr>
<td>G3/8</td>
<td>6</td>
<td>193149</td>
<td>GRLA-3/8-QS-6-D</td>
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<td>10</td>
<td>193151</td>
<td>GRLA-3/8-QS-10-D</td>
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<tr>
<td>G1/2</td>
<td>12</td>
<td>193152</td>
<td>GRLA-1/2-QS-12-D</td>
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</table>