When extremely high forces are required, the limits of pneumatic cylinders are quickly reached. However, most applications are subject to the same requirement: force is only required in dead-centre position, i.e., the last millimeters of stroke!

The new TUNKERS multi-force cylinder achieves this requirement profile through a straightforward pneumatic-mechanical solution. Its conventional pneumatic cylinder operates a toggle-joint mechanism in the dead-centre position and generates a power enhancement of 1:8. Alternatively, this unit is available with constant force or toggle lock, safeguarding a secure end position even in the event of pressure loss. The series 40 to 80 are equipped with flat cylinders and therefore principally antirotating.

With press forces of up to 6 t (60 KN), multi-force cylinders are suitable for a multitude of tasks, such as linear positioning, clamping, embossing, clinching, punching, bending, nut piercing etc. This leaves room for applications which until currently were reserved for hydraulic systems owing to the required installation space and power requirements.
Operating Principle Multi-Force Cylinder

Pre-stroke

Power stroke

Adaptor for tools

Connection for C-frame

Toggle-wedge mechanism

generator (1:8)

power transmission of press forces of

up to 60 kN

Operational function

and force as with

conventional pneumatic cylinders

Force / Path Diagram

Subject to technical modifications without notice.
Multiple Applications

For instance: Clamping

Positioning of linear actuated fixture groups with toggle-lock – replacement of entire toggle-joint constructions.

For instance: Embossing

Embossing of day, month, shift and number in steel plate.

For instance: Clinching

Multi-force cylinder MZ140 in flat design for clinching operations.

For instance: Nut Piercing

Multi-force cylinder MZ140 with C-frame system for pressing of pierced nuts on the inside of doors.

For instance:

Stamping, bending, cutting, welding, lifting, seaming, flanging – simple anywhere, where power is of importance in the end!

Subject to technical modifications without notice.
Pneumatic cylinder with mechanical power transmission in round design
- Round steel housing with integrated toggle joint transmission
- Round pneumatic cylinder
- Strokes from 50 to 300 mm

Subject to technical modifications without notice.

<table>
<thead>
<tr>
<th>Type</th>
<th>Design</th>
<th>Stroke</th>
<th>Power stroke</th>
<th>Fast stroke</th>
<th>Corresp. to</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>MZR 40</td>
<td>D1</td>
<td>40</td>
<td>6</td>
<td>0.7 kN</td>
<td>40</td>
<td>1.8 kg</td>
</tr>
<tr>
<td>MZR 63</td>
<td>D1</td>
<td>63</td>
<td>6</td>
<td>1.75 kN</td>
<td>63</td>
<td>5 kg</td>
</tr>
</tbody>
</table>

Order example:
MZ R B 40 50/L50522/L50522/L50522/L50522/L50522/L50522/L50478
Piston Ø
Design B (with fitted borehole); Design G (with thread)
Round cylinder

Standard fast strokes: 50; 100; 150 mm (power strokes of 0 mm not included)
Further special strokes up to a maximum of 300 mm upon request
Multi-Force Cylinder MZ 40-80

Pneumatic cylinder with mechanical power transmission in flat design
- Flat housing with high-strength aluminium
- Toggle joint transmission to amplify force on power stroke
- Driven by pneumatic flat cylinder
- Strokes from 50-150 mm
- Option position sensing

Subject to technical modifications without notice.

Order example:
MZ F 40 V 120 A12 T02 /L50522/L50522/L50522/L50522 /L50522/L50522/L50522 /L50522/L50522 /L50478

Multi-Force Cylinder MZ 40-80

<table>
<thead>
<tr>
<th>Type</th>
<th>Min. fast stroke of 15 mm standard</th>
<th>Fast strokes: 50; 100; 150 mm (power stroke of 6 mm not included)</th>
<th>Further special strokes up to a maximum of 300 mm upon request</th>
</tr>
</thead>
<tbody>
<tr>
<td>MZ 40</td>
<td>10</td>
<td>9</td>
<td>75</td>
</tr>
<tr>
<td>MZ 63</td>
<td>20</td>
<td>9</td>
<td>175</td>
</tr>
<tr>
<td>MZ 80</td>
<td>20</td>
<td>9</td>
<td>250</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Min. fast stroke of 15 mm standard</th>
<th>Fast strokes: 50; 100; 150 mm (power stroke of 6 mm not included)</th>
<th>Further special strokes up to a maximum of 300 mm upon request</th>
</tr>
</thead>
<tbody>
<tr>
<td>MZ 40</td>
<td>10</td>
<td>9</td>
<td>75</td>
</tr>
<tr>
<td>MZ 63</td>
<td>20</td>
<td>9</td>
<td>175</td>
</tr>
<tr>
<td>MZ 80</td>
<td>20</td>
<td>9</td>
<td>250</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Min. fast stroke of 15 mm standard</th>
<th>Fast strokes: 50; 100; 150 mm (power stroke of 6 mm not included)</th>
<th>Further special strokes up to a maximum of 300 mm upon request</th>
</tr>
</thead>
<tbody>
<tr>
<td>MZ 40</td>
<td>10</td>
<td>9</td>
<td>75</td>
</tr>
<tr>
<td>MZ 63</td>
<td>20</td>
<td>9</td>
<td>175</td>
</tr>
<tr>
<td>MZ 80</td>
<td>20</td>
<td>9</td>
<td>250</td>
</tr>
</tbody>
</table>
Multi-Force Cylinder MZ 100/140

Pneumatic cylinder with mechanical power transmission

- Housing of high-strength aluminium
- Toggle joint transmission to amplify cylinder force on power stroke
- Driven by pneumatic round cylinder
- Strokes from 50-150 mm
- Option position sensing

Multi-Force Cylinder MZ 100/140

<table>
<thead>
<tr>
<th>Type</th>
<th>Designation</th>
<th>Stroke (mm)</th>
<th>Piston Ø (mm)</th>
<th>Fast stroke force (kN)</th>
<th>Power stroke (kN)</th>
<th>Piston Ø (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MZ 100</td>
<td>B1</td>
<td>75</td>
<td>15</td>
<td>140</td>
<td>42</td>
<td>180</td>
</tr>
<tr>
<td>MZ 120</td>
<td>B2</td>
<td>100</td>
<td>22,5</td>
<td>160</td>
<td>42</td>
<td>200</td>
</tr>
<tr>
<td>MZ 140</td>
<td>B3</td>
<td>120</td>
<td>22,5</td>
<td>180</td>
<td>42</td>
<td>250</td>
</tr>
</tbody>
</table>

Subject to technical modifications without notice.
Linear Cylinders
TÜNKERS linear cylinders combine the pneumatic drive, an utmost precision, partially double-supported guide rod and the electric sensor in a housing of compact design. In addition, the V series types feature mechanic toggle locks.

Construction Principle

Standard Version

High precision:
- very good guidance proportion due to wide support of piston rods
- manually fitted zero-clearance bronze bushings provide for precision guidance

Guide rod:
- Piston rod allows for compact dimensions
- Metal scraper protects guide rod against soiling, e.g. splatter
- Inductive switch for end-position sensing in cartridge design

Version with mechanic toggle lock

Robust toggle-joint mechanism with roller supported in needle bearings
- Double-guided push rod with optimal guidance proportions bronze bushings
- Pneumatic cylinder Ø 40 mm
- Sensing in cartridge design
- Mechanic anti-rotating safeguard with additional roller guide