> Ø 32 ... 125 mm
> Torques from 1.2 ... 510 Nm
> Rotation angles 90°, 180°, 270°, 360°
> Reed or solid state switches can be mounted flush with the profile barrel

> ISO 1552 pitch to use standard mountings
> High performance adaptive cushioning system “ACS”

**Technical features**

Medium:
Compressed air, filtered, lubricated or non-lubricated

Operation:
M/162000/M: Double acting, magnetic piston, adjustable cushioning

**Operating pressure:**
1 ... 10 bar (14.5 ... 145 psi)

**Rotation angles:**
90, 180, 270, 360°
Fixed up to +8°
Adjustable +5°
Additional angles on request

**Operating temperature:**
-5° ... 80°C (+23° ... +176°F)
Air supply must be dry enough to avoid ice formation at temperatures below +2°C (+35°F)

**Materials:**
Profile barrel: anodized aluminium
End covers: pressure diecast aluminium
Central body: anodized aluminium
Rack: normalized steel
Pinion: surface hardened high strength steel
Pinion bearings: ball bearings (Ø 32 PTFE bronze bearings)
Rack guide shoe: acetal resin
Piston seals: PUR
O-rings: NBR

**Technical data, standard**

<table>
<thead>
<tr>
<th>Cylinder Ø (mm)</th>
<th>32</th>
<th>40</th>
<th>50</th>
<th>63</th>
<th>80</th>
<th>100</th>
<th>125</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical torque (Nm) at 6 bar</td>
<td>7.2</td>
<td>13.8</td>
<td>23.4</td>
<td>43.8</td>
<td>94.2</td>
<td>157.8</td>
<td>306</td>
</tr>
<tr>
<td>Cushion length (mm)</td>
<td>19</td>
<td>22</td>
<td>24</td>
<td>24</td>
<td>27</td>
<td>34</td>
<td>41</td>
</tr>
<tr>
<td>Initial cushion volume (cm³)</td>
<td>12.3</td>
<td>20.7</td>
<td>36</td>
<td>64</td>
<td>11</td>
<td>24</td>
<td>45</td>
</tr>
</tbody>
</table>

**Rotation angle***

<table>
<thead>
<tr>
<th>Ø</th>
<th>90°</th>
<th>180°</th>
<th>270°</th>
<th>360°</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>40</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>50</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>63</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>80</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>100</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>125</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>
* other angles of rotation on request

**The function**
The new “ACS” Adaptive Cushioning System provides a high performance pneumatic damping function. The system will automatically cushion for a wide range of general applications as delivered. Manual adjustment is still possible for extreme applications.

Operating area of the “ACS” Adaptive Cushioning System Adjustment in this zone not necessary.
Cylinder variants

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Model with magnetic piston</th>
<th>Description</th>
<th>Dimensions</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>M/162000/M</td>
<td></td>
<td>Rotary cylinders with fixed angle (+8°) and male pinion</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>M/162000/MX</td>
<td></td>
<td>Rotary cylinders with fixed angle (+8°) and female pinion</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>M/162000/ME</td>
<td></td>
<td>Rotary cylinders with adjustable angle (±5°) and male pinion</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>M/162000/MEX</td>
<td></td>
<td>Rotary cylinders with adjustable angle (±5°) and female pinion</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Cylinder diameters (mm)  Substitute
32  032
40  040
50  050
63  063
80  080
100 100
125 125

Standard rotation angle  Substitute
90°  90
180° 180
270° 270
360° 360

Pinion variants  Substitute
Male pinion  None
Female pinion  X

Tolerances of rotation angle  Substitute
Adjustable ± 5°  E
Fixed up to +8°  I

Note: If option is not required, disregard option position within part number eg. M/162100/ME/90 This options selector explains only the cylinder variants. Additional variants/options are not possible

Mountings
### Dimensions

**M/162000/M** - Rotary cylinders with fixed angle (up to +8°)

#### Dimensions in mm

**Projection/First angle**

**Rotary cylinders with female pinion**

---

| 32 | 30 | 16 | 71.5 | 50 | 33 | 18 | 81 | 46.5 | 25 | M5 | 25 | 30 | 16 | 16.3 | M6 | 10 | 14 | 14 | 50 | G/1/8 | 29 | 4 | 6.6 | M/162032/.
| 40 | 35 | 16 | 82 | 60 | 40 | 22 | 91 | 54.5 | 25 | M5 | 30 | 30 | 16 | 16.3 | M6 | 10 | 14 | 14 | 60 | G/1/4 | 34.5 | 4 | 5.6 | M/162040/.
| 50 | 40 | 16 | 94 | 70 | 50 | 25 | 106 | 60.5 | 30 | M6 | 32.5 | 40 | 21.5 | 21.8 | M8 | 13 | 19 | 19 | 65 | G/1/4 | 33 | 5 | 1.6 | M/162050/.
| 63 | 45 | 16 | 110 | 75 | 60 | 35 | 116 | 71 | 30 | M8 | 37 | 40 | 27 | 21.8 | M8 | 13 | 24 | 19 | 75 | G/3/8 | 36.5 | 5 | 3.6 | M/162063/.
| 80 | 45 | 17 | 142 | 99 | 80 | 50 | 150 | 93.5 | 45 | M8 | 50 | 50 | 31 | 27.3 | M10 | 16 | 28 | 24 | 99 | G/3/8 | 42 | - | 1.8 | M/162080/.
| 100 | 55 | 17 | 156.5 | 115 | 80 | 60 | 166 | 99 | 50 | M10 | 54 | 50 | 41 | 31.3 | M10 | 16 | 38 | 28 | 115 | G/1/2 | 42 | - | 3.8 | M/162100/.
| 125 | 60 | 20 | 188 | 125 | 90 | 70 | 191 | 118 | 60 | M10 | 60 | 50 | 41 | 31.3 | M12 | 20 | 38 | 28 | 140 | G/1/2 | 54 | - | 1.8 | M/162125/.

#### Dimensions (key according to Form A)

- **Ø**
- **ØB[1]**
- **BG**
- **CA**
- **CB**
- **CC**
- **CD**
- **CE**
- **CF**
- **ØCH**
- **CJ**
- **CR**
- **CV**
- **CW**
- **CW1**
- **CX**
- **CY**
- **ØD[2]**
- **ØD[3]**
- **E**
- **G**
- **L3**
- **L7**
- **Model**

---

**Rotary cylinders with female pinion**

---

<table>
<thead>
<tr>
<th>Ø</th>
<th>PL</th>
<th>RT</th>
<th>SW</th>
<th>TG</th>
<th>U5</th>
<th>U2</th>
<th>VA</th>
<th>Z</th>
<th>Z1</th>
<th>Model</th>
</tr>
</thead>
</table>
| 32 | 15 | M6 | 15 | 32.5 | 4.6 | 6.3 | 3.5 | 5 | 5 | M/162032/.
| 40 | 21.5 | M6 | 17 | 38 | 5.8 | 9.2 | 3.5 | 5 | 5 | M/162042/.
| 50 | 22.7 | M8 | 22 | 46.5 | 8.7 | 10.8 | 3.5 | 6 | 6 | M/162050/.
| 63 | 24.2 | M8 | 22 | 56.5 | 10 | 12.8 | 3.5 | 8 | 8 | M/162063/.
| 80 | 29.7 | M10 | 24 | 72 | 12 | 14.5 | 3.5 | 8 | 8 | M/162080/.
| 100 | 27.7 | M10 | 24 | 89 | 9 | 14.5 | 3.5 | 10 | 10 | M/162100/.
| 125 | 39.7 | M12 | 27 | 110 | 12 | 17 | 5.5 | 10 | 8 | M/162125/.

---

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en 1.7.011.03
Dimensions
M/162000/ME* - Rotary cylinders with adjustable angle (±5°)

Dimensions in mm

Projection/First angle

ØB  BG  CA  CB  CC  CD  CE  CF  Ø  CH  CJ  CR  CV  CW  CW1  CX  CY  ØD  ØD1  E  EE  G  KV  KW  L2  L3  L7  Model
32 30 16 71,5 50 33 18 81 46,5 25  M5  25 30 16 16,3  M6  10 14 14 50  G 1/8  29  SW30 10 19,5 4 6,6  M162032/.
40 35 16 82 60 40 22 91 54,5 25  M5  30 30 16 16,3  M6  10 14 14 60  G 1/4  34,5  SW32 11 22 4 5,6  M162040/.
50 40 16 94 70 50 25 106 60,5 30  M6  32,5 40 21,5 21,8  M8  13 19 19 65  G 1/4  33  SW41 13,5 25 5 1,6  M162050/.
63 45 16 110 75 60 35 116 71 30  M8  37 40 27 21,8  M8  13 24 19 75  G 3/8  36,5  SW41 13,5 25 5 3,6  M162063/.
80 45 17 142 99 80 50 150 93,5 45  M8  50 50 31 27,3  M10  16 28 24 99  G 3/4  46  SW46 15 33  1,8  M162080/.
100 55 17 156,5 115 80 60 166 99 50  M10  54 40 21,5 21,8  M8  13 19 19 75  G 1/2  46  SW46 15 33  1,8  M162100/.
125 60 20 188 125 90 70 191 118 60  M10  54 40 21,5 21,8  M8  13 19 19 75  G 1/2  54  SW55 18 44  1,8  M162125/.

ZH max.

Ø  RT  SW  TG  U1  U2  VD  Z  Z1  90°  180°  270°  360°  Model
32 15  M6  15 32,5 4,6 6,3 6 5 5 305,8  353  400  447,2  M162032/.
40 21,5  M6  17 38 5,8 9,2 6 5 5 353,4  410  466,8  523,4  M162040/.
50 22,7  M8  22 46,5 8,7 10,8 6 6 6 375  438  501  564  M162050/.
63 24,2  M8  22 56,5 10 12,8 6 8 6 424,9  499,5  574,3  648,9  M162063/.
80 29,7  M10  24 72 12 14,5 6 8 8 514  613  712  811  M162080/.
100 27,7  M10  24 89 9 14,5 6 10 8 538,2  645  752  858,8  M162100/.
125 39,7  M12  27 110 12 17 8 10 8 631,2  763  895  1027  M162125/.

Switzerland-Swiss Standardization Body (SIS)
Mountings
Front or rear stud mounting A

![Mounting Diagram]

Front flange B, G
Conforms to ISO 15552, type MF1 and MF2

![Flange Diagram]

Foot mounting C
Conforms to ISO 15552, type MS1

![Foot Mounting Diagram]

Groove key M/P72816
Weight: 0.01 (kg)

![Groove Key Diagram]
M162000/M, Rotary cylinders (Rack & pinion version)
Magnetic piston, double acting

> Magnetically operated reed switch - Round style
> Suitable for all cylinder ranges with magnetic piston
> Switches can be mounted flush with the delivered special adaptor

**Technical features**

**Operation:**
M/50/LSU Normally open with LED (yellow)

**Switching voltage (Ub):**
10 ... 240 VAC/170 VDC

**Switching voltage output:**
Ub - 2,7 V

**Switching current**
(see graph overleaf):
0,18 A max.

**Switching power:**
10 W/10 VA max.

**Contact resistance:**
150 mΩ

**Response time:**
1,8 ms

**Operating temperature:**
-25 ... +80 °C (-13 ... +176 °F)

**High temperature version:**
+150 °C max. (+302 °F)

**Protection rating (EN 60529):**
IP66

**LED indicator on LSU models**

**Shocking resistance:**
50 g (during 11 ms)

**Technical data - Reed switches - additional information see data sheet en 4.3.005**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage (VAC)</th>
<th>Voltage (VDC)</th>
<th>Current maximum (mA)</th>
<th>Function</th>
<th>Operating temperature (°C)</th>
<th>LED</th>
<th>Protection class</th>
<th>Plug</th>
<th>Cable length (m)</th>
<th>Cable type</th>
<th>Weight (g)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>BN</td>
<td>10 ... 240</td>
<td>10 ... 170</td>
<td>180</td>
<td>Normally open</td>
<td>-25 ... +80</td>
<td></td>
<td>IP 66</td>
<td>—</td>
<td>2, 5 or 10</td>
<td>PVC 2 x 0,25</td>
<td>37</td>
<td>M50/LSU*V</td>
</tr>
<tr>
<td>BN</td>
<td>10 ... 240</td>
<td>10 ... 170</td>
<td>180</td>
<td>Normally open</td>
<td>-25 ... +80</td>
<td></td>
<td>IP 66</td>
<td>—</td>
<td>5</td>
<td>PUR 2 x 0,25</td>
<td>37</td>
<td>M50/LSU5U</td>
</tr>
<tr>
<td>BU</td>
<td>10 ... 240</td>
<td>10 ... 170</td>
<td>180</td>
<td>Normally open</td>
<td>-25 ... +150</td>
<td></td>
<td>IP 66</td>
<td>—</td>
<td>2</td>
<td>Silicon 2 x 0,25</td>
<td>37</td>
<td>TM/50/RU/2S</td>
</tr>
<tr>
<td>BU</td>
<td>10 ... 240</td>
<td>10 ... 170</td>
<td>180</td>
<td>Changeover</td>
<td>-25 ... +80</td>
<td></td>
<td>IP 66</td>
<td>—</td>
<td>5</td>
<td>PVC 3 x 0,25</td>
<td>37</td>
<td>M50/RAC/5V</td>
</tr>
<tr>
<td>BN</td>
<td>10 ... 60</td>
<td>10 ... 60</td>
<td>180</td>
<td>Normally open</td>
<td>-25 ... +80</td>
<td></td>
<td>IP 66</td>
<td>M8 x 1</td>
<td>0,3</td>
<td>PVC 3 x 0,25</td>
<td>16</td>
<td>M50/LSUCC *1</td>
</tr>
<tr>
<td>BN</td>
<td>10 ... 60</td>
<td>10 ... 60</td>
<td>180</td>
<td>Normally open</td>
<td>-25 ... +80</td>
<td></td>
<td>IP 66</td>
<td>M12 x 1</td>
<td>0,3</td>
<td>PVC 3 x 0,25</td>
<td>16</td>
<td>M50/LSUCC *1</td>
</tr>
</tbody>
</table>

* Insert cable length; *1) Plug-in connector see page 39

---

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en 1.7.011.06
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**Dimensions**

M/50/LSU/V, M/50/LSU/SU,
TM/50/RAU/2S
Cable length L = 2, 5 or 10 m

**M/50/RAC/SV**
Cable length L = 5 m

**M/50/LSU/CP**
M/50/LSU/CC

---

![Diagram](image)

**Accessories**

Plug-in connector cable with nut

<table>
<thead>
<tr>
<th>Outer cover</th>
<th>Cable length (m)</th>
<th>Weight (kg)</th>
<th>Connector</th>
<th>Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC 3 x 0.25</td>
<td>5</td>
<td>0.18</td>
<td>M8 x 1</td>
<td>MP73001/5</td>
</tr>
<tr>
<td>PUR 3 x 0.25</td>
<td>5</td>
<td>0.18</td>
<td>M8 x 1</td>
<td>MP73002/5</td>
</tr>
<tr>
<td>PUR 3 x 0.34</td>
<td>5</td>
<td>0.21</td>
<td>M12 x 1</td>
<td>MP34694/5</td>
</tr>
</tbody>
</table>

Fixing screw

+ BN = brown; - BU = blue (output)

BK = black; + BN = brown; - BU = blue

Version CP: Plug M8 x 1, color code: BK = +; BN = -; BU = output

Version CC: Plug M12 x 1, color code: BK = +; BN = -; BU = output
M162000/M, Rotary cylinders (Rack & pinion version)
Magnetic piston, double acting

> Magnetically operated solid state switch - round style
> IO-Link version available
> Suitable for all cylinder ranges with magnetic piston
> Switches can be mounted flush in all profile cylinders
> Reliable switching with a very fast response time

Technical features

Operation:
M/50/EAP (PNP) open collector output with LED (yellow)
M/50/EAN (NPN) grounded emitter output with LED (yellow)
M/50/IOP (PNP) Easy IO-Link open collector output with LED (yellow)

Switching voltage (Ub):
10 ... 30 VDC

Switching voltage output:
Ub - 2 V

Inducted voltage:
0,5 V

Switching current (see graph overleaf):
100 mA max.

Switching power:
3,0 W max.

Response time:
< 0,5 ms for EAP switch
< = 1 ms for IOP switch

Operating frequency:
1 kHz

Protection rating (EN 60529):
IP67 (standard)
IP68 for type: M/50/EAP/5U

Operating temperature:
-40 ... +80 °C (-40 ... 176 °F)

Cable type:
PVC 3 x 0,12 (standard)
PUR 3 x 0,14 (M/50/EAP/5U)

Cable length:
2, 5 and 10 m

Electromagnetic compatibility
according to:
EN 60947-5-2

Materials:
Body: plastic
Cable: see table below

Technical data - Solid state

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage (VDC)</th>
<th>Current maximum (mA)</th>
<th>Function</th>
<th>IO-Link *2)</th>
<th>Operating temperature (°C)</th>
<th>LED</th>
<th>Protection class</th>
<th>Plug</th>
<th>Cable length (m)</th>
<th>Cable type</th>
<th>Weight (g)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>BN BU BK</td>
<td>10 ... 30 100</td>
<td>PNP</td>
<td>-40 ... +80</td>
<td></td>
<td>P67</td>
<td>—</td>
<td>2, 5 or 10</td>
<td>PVC 3 x 0,12</td>
<td>37</td>
<td>M/50/EAP/V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BN BU BK</td>
<td>10 ... 30 100</td>
<td>PNP</td>
<td>-40 ... +80</td>
<td></td>
<td>P67</td>
<td>—</td>
<td>5</td>
<td>PVC 3 x 0,12</td>
<td>37</td>
<td>M/50/IOP/V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BN BU BK</td>
<td>10 ... 30 100</td>
<td>PNP</td>
<td>-40 ... +80</td>
<td></td>
<td>P67</td>
<td>—</td>
<td>5</td>
<td>PVC 3 x 0,12</td>
<td>37</td>
<td>M/50/EAP/U</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BN BU BK</td>
<td>10 ... 30 100</td>
<td>PNP</td>
<td>-40 ... +80</td>
<td></td>
<td>P67</td>
<td>—</td>
<td>5</td>
<td>PVC 3 x 0,14</td>
<td>16</td>
<td>M/50/EAP/CP *1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BN BU BK</td>
<td>10 ... 30 100</td>
<td>PNP</td>
<td>-40 ... +80</td>
<td></td>
<td>P67</td>
<td>M8 x 1</td>
<td>0,3</td>
<td>PVC 3 x 0,14</td>
<td>16</td>
<td>M/50/EAP/CP *1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BN BU BK</td>
<td>10 ... 30 100</td>
<td>NPN</td>
<td>-40 ... +80</td>
<td></td>
<td>P67</td>
<td>—</td>
<td>2, 5 or 10</td>
<td>PVC 3 x 0,12</td>
<td>37</td>
<td>M/50/IOP/V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Insert cable length; *1) Plug-in connector below; Color code: BK = black, BN = brown, BU = blue

IO-Link function *2)
- Visual installation aid
- Counter
- Temperature diagnostic
- Power LED

Switching current and switching voltage

![Graph of switching current and switching voltage](image-url)
**Dimensions**

M/50/EAP/*V,
M/50/EAN/*V
M/50/IOP/SV

Cable length L = 2, 5 or 10 m

---

**Accessories**

Plug-in connector cable with nut

<table>
<thead>
<tr>
<th>Outer cover</th>
<th>Cable length (m)</th>
<th>Weight (kg)</th>
<th>Connector</th>
<th>Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC 3 x 0,25</td>
<td>5</td>
<td>0,18</td>
<td>M8 x 1</td>
<td>M/P73001/5*1)</td>
</tr>
<tr>
<td>PUR 3 x 0,25</td>
<td>5</td>
<td>0,18</td>
<td>M8 x 1</td>
<td>M/P73002/5*1)</td>
</tr>
<tr>
<td>PVC 3 x 0,25</td>
<td>5</td>
<td>0,18</td>
<td>M8 x 1</td>
<td>M/P34815/5*2)</td>
</tr>
<tr>
<td>PUR 3 x 0,25</td>
<td>5</td>
<td>0,18</td>
<td>M8 x 1</td>
<td>M/P34596/5*2)</td>
</tr>
<tr>
<td>PUR 3 x 0,34</td>
<td>5</td>
<td>0,21</td>
<td>M12 x 1</td>
<td>M/P34594/5*1)</td>
</tr>
</tbody>
</table>

*1) Straight connector
*2) 90° Connector

---

**Warning**

These products are intended for use in industrial compressed air systems only. Do not use these products where pressures and temperatures can exceed those listed under "Technical features/data".

Before using these products with fluids other than those specified, for non-industrial applications, life-support systems or other applications not within published specifications, consult IMI Precision Engineering, Norgren GmbH.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes. The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.

System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.

System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products.