## Technical features

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

**Operation:**
Double acting rotary vane with buffer

**Principle:**
.../IE single vane
.../TE double vane

**Operating pressure:**
2 ... 7 bar (29 ... 101 psi)
M/60281/IE, M/60282/IE
2 ... 10 bar (29 ... 145 psi)
M/60283/IE, M/60284/IE, .../TE

**Air connections:**
M5 – M/60281/IE, M/60282/IE, M/60283/IE
G1/8 – M/60284/IE, .../TE

**Rotation angle:**
-9° ... +6° – M/60281/IE, M/60282/IE, M/60283/IE
-9° ... +3° – M/60284/IE, .../TE
(adjustable from 30° ... 180°)

**Rotation tolerance:**
±3° (fine adjustment, rotation reference point)

**Operating temperature:**
-5°C ... 60°C (+23 ... +140°F)
Air supply must be dry enough to avoid ice formation at temperatures below +2°C (+35°F)

**Materials:**
- Housing: aluminium
- Shaft: steel
- Shaft bearings: sintered bronze, Seals: NBR

**Other features:**
Featherkeys supplied as standard parts

## Technical data, standard

<table>
<thead>
<tr>
<th>Port size</th>
<th>Theoretical torque at 6 bar (Nm)</th>
<th>Permissible forces *1)</th>
<th>Permissible rotation energy *2)</th>
<th>Maximum frequency *3) (l/m)</th>
<th>Air consumption (cm³)</th>
<th>Weight (kg)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>M5</td>
<td>0.38</td>
<td>4</td>
<td>40</td>
<td>1,0 x 10^-3</td>
<td>180 (at 180°)</td>
<td>4</td>
<td>0.09</td>
</tr>
<tr>
<td>M5</td>
<td>1.2</td>
<td>4</td>
<td>50</td>
<td>2.0 x 10^-3</td>
<td>150 (at 180°)</td>
<td>12</td>
<td>0.17</td>
</tr>
<tr>
<td>M5</td>
<td>2.1</td>
<td>25</td>
<td>300</td>
<td>3.0 x 10^-3</td>
<td>120 (at 180°)</td>
<td>21</td>
<td>0.28</td>
</tr>
<tr>
<td>G 1/8</td>
<td>4.1</td>
<td>30</td>
<td>400</td>
<td>7.0 x 10^-3</td>
<td>60 (at 270°)</td>
<td>43</td>
<td>0.51</td>
</tr>
<tr>
<td>G 1/8</td>
<td>9.5</td>
<td>30</td>
<td>400</td>
<td>7.0 x 10^-3</td>
<td>180 (at 90°)</td>
<td>34</td>
<td>0.53</td>
</tr>
</tbody>
</table>

*1) Permissible load on rotary vane shaft

*2) Permissible rotational energy in Nm which may be applied to shaft. It can be calculated as follows: Permissible rotational energy ≥1/2 IXX^2, I=Angular moment, \(XX^2\)= Mean angular velocity

*3) Maximum frequency at 5 bar pressure, no load

## Mini rotary vane actuators models with fixed or adjustable rotation angles

<table>
<thead>
<tr>
<th>Rotation angle</th>
<th>Double vane</th>
<th>Single vane</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>90°</td>
<td>+1)</td>
<td>+2)</td>
<td>M/60281/IE</td>
</tr>
<tr>
<td>180°</td>
<td>+1)</td>
<td>+2)</td>
<td>M/60282/IE</td>
</tr>
<tr>
<td>270°</td>
<td>+1)</td>
<td>+2)</td>
<td>M/60283/IE</td>
</tr>
</tbody>
</table>

*1) Adjustable from 30° ... 180°

*2) Adjustable from 30° ... 270°

*3) Adjustable from 30° ... 90°
Option selector

<table>
<thead>
<tr>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3, 4</td>
</tr>
</tbody>
</table>

Rotation

<table>
<thead>
<tr>
<th>Substitute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard only</td>
</tr>
</tbody>
</table>

Variants

<table>
<thead>
<tr>
<th>Substitute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single vane, adjustable: IE</td>
</tr>
<tr>
<td>Double vane, adjustable: TE</td>
</tr>
</tbody>
</table>

Note: Disregard option positions not used

Mountings

Dimensions

Model B, G C

<table>
<thead>
<tr>
<th>Page 6</th>
<th>Page 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>M/60281/IE QM/60281/22 QM/60281/21</td>
<td></td>
</tr>
<tr>
<td>M/60282/IE QM/60282/12 QM/60282/21</td>
<td></td>
</tr>
<tr>
<td>M/60283/IE QM/60283/22 QM/60283/21</td>
<td></td>
</tr>
<tr>
<td>M/60284/IE, 22 QM/60284/22 QM/60284/21</td>
<td></td>
</tr>
</tbody>
</table>

Rotation start point

Dimensions in mm

- Projection/First angle
- Rotation angle 180° + 4°
- Rotation start point
- Rotation angle fine adjustment
- Angle setting stop
- Angle of rotation setting range 15°

Note: Disregard option positions not used

Our policy is one of continued research and development. We therefore reserve the right to amend, without notice, the specifications given in this document. (1995 - 1267e) © 2015 Norgren GmbH
MINI-Rotary vane actuators, double acting

M/60282/IE

Dimensions in mm

Projection/First angle

1. Rotation start point
2. Rotation angle 180° + 4°
3. Rotation start point
4. Rotation angle fine adjustment
5. Angle setting stop
6. Angle of rotation setting range 15°
7. 6 deep
8. Rotation angle 30° min
9. Featherkey situation

M/60283/IE

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Dimensions
M/60284/IE and M/60284/TE

Rotation start point
M/60284/IE

M/60284/TE

6 deep
Rotation angle 180° + 4°
Rotation start point
Rotation angle fine adjustment
Angle setting stop
Angle of rotation setting range 15°
8 deep
Rotation angle 30° min
Featherkey situation
Our policy is one of continued research and development. We therefore reserve the right to amend, without notice, the specifications given in this document. (1995 - 1267e) © 2015 Norgren GmbH

**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 NORGREN.

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.

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**Mountings**

Rear flange B, Front flange G

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>Ø C</th>
<th>F</th>
<th>Hole pattern</th>
<th>Rotation angle</th>
<th>kg</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>30</td>
<td>3,4</td>
<td>2,5</td>
<td>2</td>
<td>120°</td>
<td>0,07</td>
<td>QM/60281/21</td>
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<tr>
<td>42</td>
<td>34</td>
<td>3,5</td>
<td>3</td>
<td>2</td>
<td>120°</td>
<td>0,14</td>
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<tr>
<td>50</td>
<td>41</td>
<td>5,5</td>
<td>3,5</td>
<td>3</td>
<td>90°</td>
<td>0,36</td>
<td>QM/60283/22</td>
</tr>
<tr>
<td>64</td>
<td>52</td>
<td>5,5</td>
<td>3,5</td>
<td>3</td>
<td>90°</td>
<td>0,47</td>
<td>QM/60284/22</td>
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</tbody>
</table>

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**Foot C**

Dimensions in mm

<table>
<thead>
<tr>
<th>K</th>
<th>M</th>
<th>O</th>
<th>S</th>
<th>Ø T</th>
<th>U</th>
<th>W</th>
<th>X</th>
<th>Hole pattern</th>
<th>Rotation angle</th>
<th>kg</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,5</td>
<td>11</td>
<td>7</td>
<td>26</td>
<td>4,8</td>
<td>36</td>
<td>25</td>
<td>43</td>
<td>2</td>
<td>60°</td>
<td>0,05</td>
<td>QM/60281/21</td>
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<tr>
<td>3</td>
<td>12</td>
<td>8</td>
<td>30</td>
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<td>42</td>
<td>30</td>
<td>51</td>
<td>3</td>
<td>60°</td>
<td>0,09</td>
<td>QM/60282/21</td>
</tr>
<tr>
<td>3,5</td>
<td>15</td>
<td>10</td>
<td>36</td>
<td>7</td>
<td>49</td>
<td>34</td>
<td>58,5</td>
<td>4</td>
<td>90°</td>
<td>0,2</td>
<td>QM/60283/21</td>
</tr>
<tr>
<td>4,5</td>
<td>18</td>
<td>12</td>
<td>48</td>
<td>6,5</td>
<td>66</td>
<td>42</td>
<td>75</td>
<td>4</td>
<td>90°</td>
<td>0,2</td>
<td>QM/60284/21</td>
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</tbody>
</table>