8.2.6 Actuator VP4008P Series

8.2.6.1 Technical Data VP4008P01, VP4008P0301

<table>
<thead>
<tr>
<th>Valve pin operation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation medium</td>
<td>pneumatic</td>
</tr>
<tr>
<td>Pressure range</td>
<td>6 - 10 bar (87 - 145 psi)</td>
</tr>
<tr>
<td>Pressure max.</td>
<td>11 bar (160 psi)</td>
</tr>
<tr>
<td>Valve pin stroke</td>
<td>8 mm</td>
</tr>
<tr>
<td>Adjustment</td>
<td>By machining the adjustment plug</td>
</tr>
<tr>
<td>Opening force</td>
<td>754 N / 6 bar (87 psi)</td>
</tr>
<tr>
<td>Closing force</td>
<td>686 N / 6 bar (87 psi)</td>
</tr>
<tr>
<td>Flow rate Instantaneous</td>
<td>1.5 l/min / 6 bar (87 psi)</td>
</tr>
<tr>
<td>Valve pin response time</td>
<td>~0.5 s / 6 bar (87 psi)</td>
</tr>
</tbody>
</table>

| Connections | 1/8 NPT or M 10x1 (Goodridge 6-L / Parker 8-L) Connecting in clamping plate |

<table>
<thead>
<tr>
<th>Cooling</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>Clamping Plate Cooling (max. 100°C / 210 °F) Cooling lines are required in clamping plate.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Valve pin</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve pin diameter</td>
<td>Ø 3.8 mm (VP4008P01)</td>
</tr>
<tr>
<td></td>
<td>Ø 3.0 mm (VP4008P0301)</td>
</tr>
<tr>
<td>Attachment</td>
<td>Valve pin head within the piston</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Miscellaneous Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum clamping plate thickness</td>
<td>32 mm</td>
</tr>
<tr>
<td>Minimum pitch of the actuators</td>
<td>55 mm</td>
</tr>
<tr>
<td>Maximum distance from center support</td>
<td>650 mm</td>
</tr>
</tbody>
</table>

NOTICE

To ensure long life and continued, flawless operation, the use of filtered, dry, lubricated air is required. The coolant used should be properly modified, e.g. filtered water with an anti-corrosion and frost-proof agent. After switch off the hot runner heater, the cooling for the actuator have to be turned on for at least 15 minutes, to avoid damages of the actuator sealing.
8.2.6.2 Explosion view of the VP4008P Series

VP4008P01 - for valve pin Ø 3,8 mm
VP4008P0301 - for valve pin Ø 3,0 mm

This section describes the disassembly and assembly process of the actuator to replace seals.

In this section the actuator parts are identified with the numbers indicated in the following figure, which shows the components.

**NOTICE**

Always tighten the screws to the torques specified in the respective table, see section 13.

<table>
<thead>
<tr>
<th>No.</th>
<th>Qty.</th>
<th>Description</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>1</td>
<td>Valve pin coupling (for valve pin Ø 3,8 mm)</td>
<td>VP4008PC01</td>
</tr>
<tr>
<td>(1)</td>
<td>1</td>
<td>Valve pin coupling (for valve pin Ø 3 mm)</td>
<td>VP4008PC0301</td>
</tr>
<tr>
<td>(2)</td>
<td>1</td>
<td>Retainer</td>
<td>VP4008RT01</td>
</tr>
<tr>
<td>(3)</td>
<td>1</td>
<td>Piston</td>
<td>VP4008PI01</td>
</tr>
<tr>
<td>(4)</td>
<td>1</td>
<td>Adjustment plug</td>
<td>VP4008AP01</td>
</tr>
<tr>
<td>(5)</td>
<td>1</td>
<td>Cross pin</td>
<td>VP4008CP01</td>
</tr>
<tr>
<td>(6)</td>
<td>1</td>
<td>Cylinder cap</td>
<td>VP4008CC01</td>
</tr>
<tr>
<td>(7)</td>
<td>1</td>
<td>Snap ring</td>
<td>VP4008C-K-01</td>
</tr>
<tr>
<td>(8)</td>
<td>2</td>
<td>Viton O-ring</td>
<td>VIOR-41.28X1.8-FPM-75-BR</td>
</tr>
<tr>
<td>(9)</td>
<td>1</td>
<td>Viton O-ring</td>
<td>VIOR-20.64X1.8-FPM-75-BR</td>
</tr>
<tr>
<td>(10)</td>
<td>1</td>
<td>Viton O-ring</td>
<td>VIOR-9.13X1.0-FPM-75-BR</td>
</tr>
<tr>
<td>(11)</td>
<td>1</td>
<td>Viton O-ring</td>
<td>VIOR-5.15X1.0-FPM-75-BR</td>
</tr>
<tr>
<td>(12)</td>
<td>1</td>
<td>Viton quad ring</td>
<td>VIQR-20.64X2.6-FPM-75-BL</td>
</tr>
<tr>
<td>(13)</td>
<td>1</td>
<td>Viton quad ring</td>
<td>VIQR-33.34X3.5-FPM-75-BL</td>
</tr>
<tr>
<td>(14)</td>
<td>4</td>
<td>Countersunk head screw</td>
<td>DIN7991-M4x8-10.9</td>
</tr>
<tr>
<td>(15)</td>
<td>1</td>
<td>Retainer</td>
<td>VP4008RT02</td>
</tr>
<tr>
<td>(16)</td>
<td>4</td>
<td>Countersunk head screw</td>
<td>DIN7991-M3x6-10.9</td>
</tr>
</tbody>
</table>
8.2.6.3 Basic Dimensions in Mold

Minimum Distance between Manifold and Clamping plate
The gap between the top of the manifold and the bottom of the top clamp plate should be 18 mm.
(see Doc003739.png)
This gap may be smaller due to customer plate thickness which will require a 35 diameter counterbore in the bottom of the top clamp plate to achieve the 18 mm gap.
(see Doc003516.png)

Valve pin length Calculation
The length of the valve pin in the cold condition is calculated with the formula:
\[(LM + 6.5 + \text{Valve Pin Protrusion}) / 1.002\]
“LM” is the distance between “0” extension of the gate to the top of the top air gap.
“P” is the Valve Pin Protrusion.

(see Doc003743.png)
## WARNING

### Danger by Pneumatic

**Personal injury can result from connecting or disconnecting pneumatic hoses.**

Pneumatic works must be carried out by qualified persons.

Use protective goggles or face protection or protective goggles, hearing protection (PPE)

### Heavy Weight Hazard

Transport and lifting equipment should be operated only by trained personnel.

Use personal protective equipment, such as head gear, safety shoes and work gloves.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

**Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.**

### Hot Surfaces Hazard

**Contact between the skin and hot surfaces could result in burns.**

Use personal protective equipment, such as work gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.
8.2.6.4 First mounting of Actuator VP4008P

**NOTICE**
After disassembly of the sealing elements the original seals should be replaced.

1) Lubricate the VITON O-ring (10) with hydraulic oil or white grease.
2) Install the VITON O-ring (10) into the valve pin coupling (1) seal groove.
3) Lead the valve pin (VP) into the valve pin coupling (1).

**NOTICE**
When you lead the valve pin (VP) into the valve pin guide - the valve pin coupling (1) is settling down on the valve pin guide.

4) Install the VITON O-ring (11) into the adjustment plug (4) seal groove.
5) Place the adjustment plug (4) into the valve pin coupling (1).
6) Secure the adjustment plug (4) with the cross pin (5) in the valve pin coupling (1).

**NOTICE**
After disassembly of the sealing elements the original seals should be replaced.

7) Install the VITON quad ring (12) into the clamping plate (a) seal groove.
8) Install the retainer (15) with 4 screws (16) into the clamping plate (a).

**NOTICE**
Apply Loctite 272 on the thread of the 4 socket counter sunk head cap screws (20).

**WARNING**
Heavy Weight Hazard

9) Place the clamping plate (a) on the destined position on the mold.
10) Install the VITON quad ring (13) into the piston (3) seal groove.
11) Install the VITON O-ring (9) into the piston (3) seal groove.
12) Place the piston (3) into the cutout in the clamping plate.

**NOTICE**
The piston (3) will be placed on the flange of the valve pin coupling (1).
13) Place the retainer (2) on the piston.
14) Secure the retainer (2) with the snap ring (7) at the valve pin coupling (1).

15) Install the two VITON O-rings (8) into the cylinder cap (6) seal grooves.
16) Place the cylinder cap (6) on the piston (3).
17) Lubricate the thread of the countersunk head screws (14) with high-temperature assembly paste (anti-seize compound).

**NOTICE**
This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

18) Attach the cylinder cap (6) at the clamping plate with the four countersunk head screws (14).

**NOTICE**
Tighten the countersunk head screws (14) in an X pattern (a, d, c, b).
Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

For valve pin height adjustment of the actuator VP4008P see section 8.2.6.6
8.2.6.5 Dismounting the Actuator VP4008P

1) Unscrew and remove the four countersunk head screw (14).
2) Remove the cylinder cap (6).
3) Remove the O-ring seals (8) out of the cylinder cap (6) seal grooves.

4) Remove the snap ring (7).
5) Remove the retainer (2).
**WARNING**

Heavy Weight Hazard

6) Lift the clamping plate (a) from the mold.

**NOTICE**

During lifting the clamping plate (a) from the mold, the piston (3) will be elevated up from the valve pin coupling (1) flange.

7) Remove the retainer (15) with 4 screws (16) out of the clamping plate.
8) Remove the VITON quad ring (12) out of the clamping plate (a) seal groove.
9) Remove the VITON quad ring (13) out of the piston (3) seal groove.
10) Remove the O-ring (9) out of the piston (3) seal groove.

11) Remove the cross pin (5) out of the valve pin coupling (1) and the adjustment plug (4).
12) Remove the adjustment plug (4).
13) Remove the O-ring (11) out of the adjustment plug (4) seal groove.
14) Lift the valve pin coupling (1) from the valve pin guide.

**NOTICE**

During lifting the valve pin coupling (1) the valve pin (VP) will be pulled out of the valve pin guide.

15) Remove the O-ring seal (10) out of the valve pin coupling (1) seal groove.
8.2.6.6 Valve Pin Height Adjustment VP4008P Series

Precondition for the following steps are to be performed with the actuator installed in the mold.

For optimal gate performance and appearance, this dimension must be established fully assembled, at operating temperatures and at each location.

⚠️ WARNING

**Heavy Weight Hazard**

Transport and lifting equipment should be operated only by trained personnel.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

For first aid contact your medical / safety representing

**Hot Surfaces Hazard**

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment such as gloves, apron, sleeves and face protection to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing

⚠️ NOTICE

**Hazard of Material Damage**

The following steps are to be performed with the actuator installed in the mold, and the system at operating temperature.

Clamping plate cooling (max. 100 °C / 210 °F) must be on to prevent damage to the actuator seals.

After switch off the hot runner heater, the cooling for the cylinder have to be turned on for at least 15 minutes, to avoid damages of the actuator sealing.
Thermal Expansion Calculation

**In Cold Condition**
the following parts are off center from the cylinder cap (6) and piston (3).
- Valve gate pin (VP)
- Valve pin coupling (1)
- Adjustment plug (4)
- Cross pin (5)
- Retainer (2)
- Snap ring (7)

**At operating temperature of the hot runner system**
the following parts are centric to cylinder cap (6) and piston (3).
- Valve gate pin (VP)
- Valve pin coupling (1)
- Adjustment plug (4)
- Cross pin (5)
- Retainer (2)
- Snap ring (7)

The hot runner system has been developed so that the valve gate pin is centered below the piston at operating temperature.
Height Adjustment of Cylindrical shut-off Valve pin

Valve pin height adjustment of cylindrical shut-off valve pins, found by machining the adjustment plug (4). This dimension is a function of the build-up of tolerances of many parts.

In this section the actuator parts are identified with the numbers indicated in the following figure, which shows the components.

### Actuator parts VP4008P

<table>
<thead>
<tr>
<th>No.</th>
<th>Qty.</th>
<th>Description</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>1</td>
<td>Valve pin coupling</td>
<td>VP4008PC01</td>
</tr>
<tr>
<td>(1)</td>
<td>1</td>
<td>Valve pin coupling</td>
<td>VP4008PC0301</td>
</tr>
<tr>
<td>(2)</td>
<td>1</td>
<td>Retainer</td>
<td>VP4008RT01</td>
</tr>
<tr>
<td>(3)</td>
<td>1</td>
<td>Piston</td>
<td>VP4008PI01</td>
</tr>
<tr>
<td>(4)</td>
<td>1</td>
<td>Adjustment plug</td>
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</tr>
<tr>
<td>(5)</td>
<td>1</td>
<td>Cross pin</td>
<td>VP4008CP01</td>
</tr>
<tr>
<td>(6)</td>
<td>1</td>
<td>Cylinder cap</td>
<td>VP4008CC01</td>
</tr>
<tr>
<td>(7)</td>
<td>1</td>
<td>Snap ring</td>
<td>VP4008C-K-01</td>
</tr>
<tr>
<td>(8)</td>
<td>2</td>
<td>Viton O-ring</td>
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</tr>
<tr>
<td>(9)</td>
<td>1</td>
<td>Viton O-ring</td>
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</tr>
<tr>
<td>(10)</td>
<td>1</td>
<td>Viton O-ring</td>
<td>VIOR-9.13X1.0-FPM-75-BR</td>
</tr>
<tr>
<td>(11)</td>
<td>1</td>
<td>Viton O-ring</td>
<td>VIOR-5.15X1.0-FPM-75-BR</td>
</tr>
<tr>
<td>(12)</td>
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<td>Viton quad ring</td>
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</tr>
<tr>
<td>(13)</td>
<td>1</td>
<td>Viton quad ring</td>
<td>VQR-33.34X3.5-FPM-75-BL</td>
</tr>
<tr>
<td>(14)</td>
<td>4</td>
<td>Countersunk head screw</td>
<td>DIN7991-M4x8-10.9</td>
</tr>
<tr>
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<td>1</td>
<td>Retainer</td>
<td>VP4008RT02</td>
</tr>
<tr>
<td>(16)</td>
<td>4</td>
<td>Countersunk head screw</td>
<td>DIN7991-M3x6-10.9</td>
</tr>
</tbody>
</table>

1) Bring system to operating temperature and allow to soak for 60 minutes.

2) Loosen and remove:
   - Countersunk head screw (14)
   - Cylinder cap (6)
   - Cross pin (5)
   - Adjustment plug (4)

⚠️ **WARNING**

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.
3) Place a spacer block (b) over the valve pin coupling (1).

4) Measure dimension “A” with a micrometer (a) and record data.

**NOTICE**

Note contact (c) between valve gate pin (VP) / valve pin coupling (1) and piston (3) / retainer (15).

5) Install the adjustment plug (4) and cross pin (5).

6) Place the spacer block (b) over the valve pin coupling (1) again.

7) Provide a means of holding the Valve Pin flush with the surrounding gate area.

**NOTICE**

Any required valve pin protrusion will be added via calculation.

**NOTICE**

Note contact (c) between valve pin (VP) / valve pin coupling (1) and a gap (d) between piston (3) / retainer (15).

8) Measure dimension “B” with a micrometer (a) and record data.

**NOTICE**

The required machining to the adjustment plug (4) can now be calculated.
NOTICE

“C” is the length of material to be removed from the adjustment plug (as shown in Doc003521.png)

“A” and “B” are the dimensions recorded from the previous steps.

“P” is the protrusion of the Valve Pin. The protrusion is typically 0.13 mm (.005”).

9) The quantity of material “C” to be removed from the adjustment plug (4) is given by the equation:

   “C” = (“A” – “B”) – “P”

10) Remove the cross pin (5).
11) Take the adjustment plug (4) out of the valve pin coupling (1).
12) Mark on the adjustment plug (4) the position “C”.
13) Machine “C” from the valve pin head adapter (4).

NOTICE

The quantity “C” was determined in the preceding step.

14) Remove any burrs that may alter the adjustment.
15) Install the machined adjustment plug (4) in the corresponding location.
16) Install the cross pin (5).

17) Have an assistant press down (x) on the valve pin coupling (1).

NOTICE

Do not press down on the adjustment plug (4).
Taking care to not damage the surface of the valve pin (VP).

18) Apply pressure (x) to the gate end of the valve pin (VP) to take up any play in the system.
19) Check the protrusion (P) of the valve gate pin (VP) at the valve gate.

NOTICE

The protrusion is typically 0.13 mm (.005”).

20) Assemble the piston (3), retainer (2), snap ring (7) and cylinder cap (6) as described in section 8.2.6.4.
Height Adjustment of Conical shut-off Valve pin

Valve Pin adjustment is found by machining the adjustment plug (4). This dimension is a function of the build-up of tolerances of many parts.

For optimal gate performance and appearance, this dimension must be established fully assembled, at operating temperatures and at each location.

In this section the actuator parts are identified with the numbers indicated in the following figure, which shows the components.

⚠️ WARNING

**Hot Surfaces Hazard**

Contact between the skin and hot surfaces could result in burns.

1) Bring system to operating temperature and allow to soak for 60 minutes.
2) Loosen and remove:
   - Countersunk head screw (14)
   - Cylinder cap (6)
   - Cross pin (5)
   - Adjustment plug (4)

3) Place a spacer block (b) over the valve pin coupling (1).

**NOTICE**

Note a gap (d) between valve pin (VP) / valve pin coupling (1) and contact (c) between piston (3) / retainer (15).

4) Measure dimension “A” with a micrometer (a) and record data.
5) Install the adjustment plug (4) and cross pin (5).

6) Place the spacer block (b) over the valve pin coupling (1) again.

**NOTICE**
The valve pin will rest in the tapered gate (f).

**NOTICE**
Note contact (c) between valve pin (VP) / valve pin coupling (1) and a gap (d) between piston (3) / retainer (15).

7) Measure dimension “B” with a micrometer (a) and record data.

**NOTICE**
The required machining to the adjustment plug (4) can now be calculated.

**NOTICE**
“C” is the length of material to be removed from the adjustment plug (as shown in Doc003521.png)
“A” and “B” are the dimensions recorded from the previous steps.
“P” is the protrusion of the Valve Pin. The protrusion is typically 0,13 mm (.005”).

8) The quantity of material “C” to be removed from the adjustment plug (4) is given by the equation:

“C” = (“A” – “B”) – “P”
9) Remove the cross pin (5).
10) Take the adjustment plug (4) out of the valve pin coupling (1).
11) Mark on the adjustment plug (4) the position "C*"
12) Machine "C*" from the adjustment plug (4).

**NOTICE**
The quantity "C" was determined in the preceding step.

13) Remove any burrs that may alter the adjustment.
14) Install the machined adjustment plug (4) in the corresponding location.
15) Install the cross pin (5).

16) Apply pressure (x) to the valve pin coupling (1).

**NOTICE**
Do not press down on the adjustment plug (4).

**NOTICE**
Note a gap (d) between pin head (VP) / valve pin coupling (1) and contact (c) between piston (3) / retainer (15).

17) Check the contact between valve gate pin (VP) and valve gate (f).
18) Check the protrusion (P) of the valve gate pin (VP) at the valve gate.

**NOTICE**
The protrusion is typically 0.13 mm (.005").

19) Assemble the piston (3), retainer (2), snap ring (7) and cylinder cap (6) as described in section 8.2.6.4.