Whisper™ Pumps
VPV Vane Pumps
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Introduction

This catalog provides details on the Rexroth VPV series variable vane pump, including performance, dimensional, and technical specifications. Please consult the factory if further details are required.

The pumps are designed to meet the requirements of the machine tool, general machinery, and other markets where low noise, high performance and competitive pricing are needed.

The design of the VPV series of vane pumps utilizes 30 years of field and manufacturing experience from the current Rexroth vane pump line. State-of-the-art technologies and materials were utilized while retaining the superior features of the existing designs. Additional goals were to create a pump with the international market in mind and to incorporate the extremely high quality standards the Rexroth name has come to exemplify.

Keeping in mind market expectations, Bosch Rexroth Corporation developed a pump with the following improvements and features:

- High reliability with fewer parts.
- Significant advances in noise reduction.
- High volumetric and overall efficiency.
- Excellent durability.
- Modern appearance.
- Improved ring and vane wear technology.
- Very good response and recovery times.
- Generally reduced envelope size.
- Redesigned controls with shock clipper.
- Conforms to the latest SAE, ISO, NFPA, and ANSI standards.
- Combination capability - full horsepower may be transferred to pump 2. Combinations of construction of multiple pumps may be required to be de-rated.

Benefits

- LOW COST - Competitively priced with other manufacturers of vane pumps and economy axial piston pumps.
- EXCEPTIONALLY QUIET - Helps machinery builders meet government and purchased sound level requirements.
- CONTINUOUS DUTY RATING - @ 3,000 PSI - High performance and long life design for 10,000 plus hours.
- HIGHLY EFFICIENT FAST RESPONSE & RECOVERY - Exceptional reaction time for critical system demands.
- PRESSURE COMPENSATED - Controls pump delivery to circuit demand thereby conserving energy.
- HIGH STRENGTH - Computer optimized casting design.
- HYDRODYNAMIC JOURNAL BEARINGS - Provides long life and quiet operation.
- NO PREFILL REQUIREMENTS - Pump case prefill not required for initial start-ups.
- REPAIRABLE - Repair kits and parts available from local distribution centers or the factory.
- CONTROL OPTIONS - Single stage; two-stage, remote control; solenoid multi-pressure, and load sensing.
- SHOCK CLIPPER - Reduces shock pressure by up to 50% increasing system component life and system stability. Must be plumbed on VPV 16, 25, & 32. The shock clipper is integrated into VPV 45, 63, 80, 100, 130, & 164 and drains to the case drain. See page 86.
### Specifications

<table>
<thead>
<tr>
<th>General</th>
<th>VPV 16</th>
<th>VPV 25</th>
<th>VPV 32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displacement (Nominal)</td>
<td>1 in³/rev (16 cm³/rev)</td>
<td>1.5 in³/rev (25 cm³/rev)</td>
<td>2 in³/rev (32 cm³/rev)</td>
</tr>
<tr>
<td>Displacement (Actual)</td>
<td>1.06 in³/rev (17.37 cm³/rev)</td>
<td>1.66 in³/rev (27.20 cm³/rev)</td>
<td>2.05 in³/rev (33.59 cm³/rev)</td>
</tr>
<tr>
<td>Flow at 1750 RPM¹</td>
<td>7.57 GPM (28.6 L/min)</td>
<td>11.36 GPM (43.0 L/min)</td>
<td>15.15 GPM (57.3 L/min)</td>
</tr>
<tr>
<td>Maximum continuous pressure²</td>
<td>3000 psi (210 bar)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure compensating range</td>
<td>Single stage</td>
<td>200-3000 psi (14-210 bar) Minimum pressure of 190 PSI</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Two stage</td>
<td>300-3000 psi (20-210 bar) Minimum pressure of 290 PSI</td>
<td></td>
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<tr>
<td>Max. transient spike pressure</td>
<td></td>
<td>3800 psi (260 bar)</td>
<td>4000 psi (280 bar)</td>
</tr>
<tr>
<td>Maximum case pressure</td>
<td></td>
<td></td>
<td>10 psi (0.7 bar)</td>
</tr>
<tr>
<td>Speed range</td>
<td></td>
<td>900-1800 RPM</td>
<td></td>
</tr>
<tr>
<td>Direction of rotation (viewed from shaft end)</td>
<td></td>
<td>Right hand (clockwise)</td>
<td></td>
</tr>
<tr>
<td>Case drain flow while compensating @ 1800 RPM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000 psi (70 bar)</td>
<td>0.6 GPM (2.3 L/min)</td>
<td>0.6 GPM (2.3 L/min)</td>
<td></td>
</tr>
<tr>
<td>2000 psi (140 bar)</td>
<td>0.9 GPM (3.4 L/min)</td>
<td>1.1 GPM (4.2 L/min)</td>
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</tr>
<tr>
<td>3000 psi (210 bar)</td>
<td>1.26 GPM (4.8 L/min)</td>
<td>1.4 GPM (5.3 L/min)</td>
<td></td>
</tr>
<tr>
<td>Maximum inlet vacuum at sea level</td>
<td></td>
<td>6 in. HG (152 mm HG)</td>
<td></td>
</tr>
<tr>
<td>Mounting Position</td>
<td>Unrestricted</td>
<td></td>
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<tr>
<td>Port sizes</td>
<td>Inlet</td>
<td>#16 S.A.E.</td>
<td>#24 S.A.E.</td>
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<tr>
<td></td>
<td>Outlet</td>
<td>#12 S.A.E.</td>
<td>#16 S.A.E.</td>
</tr>
<tr>
<td></td>
<td>Case drain</td>
<td>#8 S.A.E.</td>
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</tr>
<tr>
<td></td>
<td>Clipper control drain (opt.)</td>
<td>#6 S.A.E.</td>
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</tr>
<tr>
<td></td>
<td>Remote control (opt.)</td>
<td>#4 S.A.E.</td>
<td></td>
</tr>
<tr>
<td>Drive</td>
<td>Pump to be connected to prime mover by means of a flexible coupling that is aligned to a maximum of 0.006” (.152mm) total indicator reading. No overhung or side loads permitted. Alignments greater than 0.006” indicator reading could cause increased noise and vibration as well as premature shaft seal wear resulting in leakage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid recommendations</td>
<td>A premium quality hydraulic oil with anti-wear additives is recommended, but not required. Refer to publication 9 535 233 456 “Petroleum Hydraulic Fluids” for a list of fluids which meet or exceed the necessary lubrication requirements. Consult factory for use with water base fire resistant fluids.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid viscosity at operating temperature</td>
<td>Minimum</td>
<td>100 SUS (21 cSt)</td>
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<tr>
<td></td>
<td>Maximum</td>
<td>1000 SUS (216 cSt)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Optimum</td>
<td>150-250 SUS (32-54 cSt)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Max. start-up</td>
<td>4000 SUS (864 cSt)</td>
<td></td>
</tr>
<tr>
<td>Fluid temperature</td>
<td>Normal inlet fluid temperature should not exceed 140°F (60° C). Always select a fluid for optimum viscosity at operating temperature. Consult factory for applications assistance when inlet fluid temperatures over 140°F (60° C) are expected.</td>
<td></td>
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</tr>
<tr>
<td>Seals</td>
<td>Fluorocarbon Standard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filtration</td>
<td>Fluid cleanliness per ISO 4406 Std. For pressures up to 2000 psi, 18/16/13 ISO code is required. For 2000 to 3000 psi operation, 17/15/12 ISO is required.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response time (circuit dependent)</td>
<td>Full flow to min. flow</td>
<td>20-35 ms</td>
<td>20-35 ms</td>
</tr>
<tr>
<td>Recovery time (circuit dependent)</td>
<td>Min. flow to full flow</td>
<td>50-135 ms – single stage compensator</td>
<td>70-185 ms – single stage compensator</td>
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<tr>
<td>Weight</td>
<td>Single stage</td>
<td>34 lbs. (16.5 kg)</td>
<td>61 lbs. (28 kg)</td>
</tr>
<tr>
<td></td>
<td>Two stage</td>
<td>38 lbs. (17.3 kg)</td>
<td>65 lbs. (28.5 kg)</td>
</tr>
</tbody>
</table>

¹ Flows are actual. Volumetric efficiencies shown in technical data taken into account.
² For new applications exceeding 2500 psi (172 bar) system pressure, please consult factory.
³ Metric 4-bolt flange available (ISO 3019/2) available. Please consult factory.
## Specifications

<table>
<thead>
<tr>
<th>General</th>
<th>VPV 45</th>
<th>VPV 63</th>
<th>VPV 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displacement (Nominal)</td>
<td>2.75 in³/rev (45 cm³/rev)</td>
<td>3.84 in³/rev (63 cm³/rev)</td>
<td>4.88 in³/rev (80 cm³/rev)</td>
</tr>
<tr>
<td>Displacement (Actual)</td>
<td>2.98 in³/rev (48.83 cm³/rev)</td>
<td>4.03 in³/rev (66.04 cm³/rev)</td>
<td>5.06 in³/rev (82.92 cm³/rev)</td>
</tr>
<tr>
<td>Flow at 1750 RPM</td>
<td>20.83 GPM (72.84 L/min)</td>
<td>29.10 GPM (110.1 L/min)</td>
<td>36.97 GPM (139.9 L/min)</td>
</tr>
<tr>
<td>Maximum continuous pressure</td>
<td>3000 psi (210 bar)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure compensating range</td>
<td>Two stage</td>
<td>350-3000 psi (24-210 bar) Minimum pressure of 300 PSI</td>
<td></td>
</tr>
<tr>
<td>Max. transient spike pressure</td>
<td>4000 psi (280 bar)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum case pressure</td>
<td>10 psi (0.7 bar)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed range</td>
<td>900-1800 RPM</td>
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<td></td>
</tr>
<tr>
<td>Direction of rotation (viewed from shaft end)</td>
<td>Right hand (clockwise)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case drain flow while compensating @ 1800 RPM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000 psi (70 bar)</td>
<td>1.5 GPM (5.7 L/min)</td>
<td>1.4 GPM (5.3 L/min)</td>
<td>1.4 GPM (5.3 L/min)</td>
</tr>
<tr>
<td>2000 psi (140 bar)</td>
<td>1.9 GPM (7.2 L/min)</td>
<td>1.8 GPM (6.8 L/min)</td>
<td>1.8 GPM (6.8 L/min)</td>
</tr>
<tr>
<td>3000 psi (210 bar)</td>
<td>2.5 GPM (9.5 L/min)</td>
<td>2.4 GPM (9.1 L/min)</td>
<td>2.3 GPM (8.7 L/min)</td>
</tr>
<tr>
<td>Maximum inlet vacuum at sea level</td>
<td>6 in. HG (152 mm HG)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting – SAE 2-bolt flange (ISO 3019/1)</td>
<td>S.A.E. 'C' 2-bolt flange</td>
<td></td>
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</tr>
<tr>
<td>Mounting Position</td>
<td>Unrestricted</td>
<td></td>
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</tr>
<tr>
<td>Port sizes</td>
<td>Inlet</td>
<td>2&quot; S.A.E.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Outlet</td>
<td>1 1/4&quot; S.A.E.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Case drain</td>
<td>#8 S.A.E.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Remote control (opt.)</td>
<td>#4 S.A.E.</td>
<td></td>
</tr>
<tr>
<td>Drive</td>
<td>Pump to be connected to prime mover by means of a flexible coupling that is aligned to a maximum of 0.006&quot; (.152mm) total indicator reading. No overhung or side loads permitted. Alignments greater than 0.006&quot; indicator reading could cause increased noise and vibration as well as premature shaft seal wear resulting in leakage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid recommendations</td>
<td>A premium quality hydraulic oil with anti-wear additives is recommended, but not required. Refer to publication 9 535 233 456 “Petroleum Hydraulic Fluids” for a list of fluids which meet or exceed the necessary lubrication requirements. Consult factory for use with water base fire resistant fluids.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid viscosity at operating temperature</td>
<td>Minimum</td>
<td>150 SUS (32 cSt)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>1000 SUS (216 cSt)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Optimum</td>
<td>200-300 SUS (42-65 cSt)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Max. start-up</td>
<td>4000 SUS (864 cSt)</td>
<td></td>
</tr>
<tr>
<td>Fluid temperature</td>
<td>Normal inlet fluid temperature should not exceed 140°F (60° C). Always select a fluid for optimum viscosity at operating temperature. Consult factory for applications assistance when inlet fluid temperatures over 140° F (60° C) are expected.</td>
<td></td>
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<tr>
<td>Seals</td>
<td>Fluorocarbon Standard</td>
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</tr>
<tr>
<td>Filtration</td>
<td>Fluid cleanliness per ISO 4406 Std. For pressures up to 2000 psi, 18/16/13 ISO code is required. For 2000 to 3000 psi operation, 17/15/12 ISO is required.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response time (circuit dependent)</td>
<td>Full flow to min. flow</td>
<td>20-40 ms</td>
<td></td>
</tr>
<tr>
<td>Recovery time (circuit dependent)</td>
<td>Min. flow to full flow</td>
<td>100-200 ms – two stage compensator</td>
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</tr>
<tr>
<td>Weight</td>
<td>Single stage</td>
<td>120 lbs. (55 kg)</td>
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<tr>
<td></td>
<td>Two stage</td>
<td>128 lbs. (58 kg)</td>
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</tr>
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</table>

1) Flows are actual. Volumetric efficiencies shown in technical data taken into account.
2) For new applications exceeding 2500 psi (172 bar) system pressure, please consult factory.
3) Metric 4-bolt flange available (ISO 3019/2) available. Please consult factory.
## Specifications

<table>
<thead>
<tr>
<th>General</th>
<th>VPV 100</th>
<th>VPV 130</th>
<th>VPV 164</th>
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<tbody>
<tr>
<td>Displacement (Nominal)</td>
<td>6.1 in³/rev (100 cm³/rev)</td>
<td>7.9 in³/rev (130 cm³/rev)</td>
<td>10.0 in³/rev (164 cm³/rev)</td>
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<tr>
<td>Displacement (Actual)</td>
<td>6.49 in³/rev (106.35 cm³/rev)</td>
<td>8.25 in³/rev (135.19 cm³/rev)</td>
<td>10.33 in³/rev (169.28 cm³/rev)</td>
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<td>Flow at 1750 RPM¹</td>
<td>45.4 GPM (171.8 L/min)</td>
<td>59.85 GPM (226.5 L/min)</td>
<td>75.76 GPM (286.7 L/min)</td>
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<tr>
<td>Maximum continuous pressure²</td>
<td>3000 psi (210 bar)</td>
<td>350-3000 psi (24-210 bar)</td>
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<tr>
<td>Pressure compensating range</td>
<td>Two stage</td>
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<tr>
<td>Max. transient spike pressure</td>
<td>4000 psi (280 bar)</td>
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<tr>
<td>Maximum case pressure</td>
<td>10 psi (0.7 bar)</td>
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<tr>
<td>Speed range</td>
<td>900-1800 RPM</td>
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<tr>
<td>Direction of rotation (viewed from shaft end)</td>
<td>Right hand (clockwise)</td>
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<tr>
<td>Case drain flow while compensating @ 1800 RPM</td>
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<tr>
<td>1000 psi (70 bar)</td>
<td>1.5 GPM (5.7 L/min)</td>
<td>1.6 GPM (6.0 L/min)</td>
<td>1.7 GPM (6.4 L/min)</td>
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<tr>
<td>2000 psi (140 bar)</td>
<td>2.0 GPM (7.6 L/min)</td>
<td>2.2 GPM (8.3 L/min)</td>
<td>2.3 GPM (8.7 L/min)</td>
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<tr>
<td>3000 psi (210 bar)</td>
<td>2.5 GPM (9.5 L/min)</td>
<td>3.0 GPM (11.3 L/min)</td>
<td>3.1 GPM (11.7 L/min)</td>
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<tr>
<td>Maximum inlet vacuum at sea level</td>
<td>6 in. HG (152 mm HG)</td>
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<tr>
<td>Mounting³ – SAE 2-bolt flange (ISO 3019/1)</td>
<td>S.A.E. ‘D’ 2-bolt flange</td>
<td></td>
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<tr>
<td>Mounting Position</td>
<td>Unrestricted</td>
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<tr>
<td>Port sizes</td>
<td>Inlet</td>
<td>2 1/2&quot; S.A.E.</td>
<td></td>
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<tr>
<td></td>
<td>Outlet</td>
<td>1 1/2&quot; S.A.E.</td>
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<tr>
<td></td>
<td>Case drain</td>
<td>#8 S.A.E.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Remote control (opt.)</td>
<td>#4 S.A.E.</td>
<td></td>
</tr>
<tr>
<td>Drive</td>
<td>Pump to be connected to prime mover by means of a flexible coupling that is aligned to a maximum of 0.006&quot; (.152mm) total indicator reading. No overhung or side loads permitted. Alignments greater than 0.006&quot; indicator reading could cause increased noise and vibration as well as premature shaft seal wear resulting in leakage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid recommendations</td>
<td>A premium quality hydraulic oil with anti-wear additives is recommended, but not required. Refer to publication 9 535 233 456 “Petroleum Hydraulic Fluids” for a list of fluids which meet or exceed the necessary lubrication requirements. Consult factory for use with water base fire resistant fluids.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid viscosity at operating temperature</td>
<td>Minimum</td>
<td>150 SUS (32 cSt)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>1000 SUS (216 cSt)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Optimum</td>
<td>200-300 SUS (42-65 cSt)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Max. start-up</td>
<td>4000 SUS (864 cSt)</td>
<td></td>
</tr>
<tr>
<td>Fluid temperature</td>
<td>Normal inlet fluid temperature should not exceed 140°F (60° C). Always select a fluid for optimum viscosity at operating temperature. Consult factory for applications assistance when inlet fluid temperatures over 140°F (60° C) are expected.</td>
<td></td>
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<tr>
<td>Seals</td>
<td>Fluorocarbon Standard</td>
<td></td>
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<tr>
<td>Filtration</td>
<td>Fluid cleanliness per ISO 4406 Std. For pressures up to 2000 psi, 18/16/13 ISO code is required. For 2000 to 3000 psi operation, 17/15/12 ISO is required.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response time (circuit dependent)</td>
<td>Full flow to min. flow</td>
<td>20-50 ms</td>
<td></td>
</tr>
<tr>
<td>Recovery time (circuit dependent)</td>
<td>Min. flow to full flow</td>
<td>180-280 ms</td>
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<tr>
<td>Weight</td>
<td>Single stage</td>
<td>240 lbs. (109 kg)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Two stage</td>
<td>248 lbs. (112.7 kg)</td>
<td></td>
</tr>
</tbody>
</table>

1) Flows are actual. Volumetric efficiencies shown in technical data taken into account.
2) For new applications exceeding 2500 psi (172 bar) system pressure, please consult factory.
3) Metric 4-bolt flange available (ISO 3019/2) available. Please consult factory.
The alpha-numeric ordering code system enables any particular type of pump to be specified. Preferred type are also identified by a 10-digit part number for computerized ordering.

### Ordering details

<table>
<thead>
<tr>
<th>Item No.</th>
<th>01</th>
<th>02</th>
<th>03</th>
<th>04</th>
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<tr>
<td>Pump 1</td>
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<td></td>
<td>0513</td>
<td></td>
<td>V</td>
<td>P</td>
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<tr>
<td>Pump 2(^1)</td>
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<td>V</td>
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<td>V</td>
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</tr>
<tr>
<td>Pump 3 (Gear Pump)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AZ</td>
<td>P</td>
<td>F</td>
<td></td>
<td>R</td>
<td>R</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Vane Pump, stand alone version single pump or combination
2. Direction of rotation, clockwise, viewed from shaft end
3. Calibrated speed, 1200 rpm
4. Key to DIN 6885
5. Key to SAE Standard
6. Spline to ANSI B92.1
7. Operation, Vane type
8. Variable displacement pump (open circuit)
9. Displacement
10. Housing 210 bar = 3000 PSI

- **Speed**
  - Calibrated speed, 1200 rpm
  - Calibrated speed, 1500 rpm
  - Calibrated speed, 1800 rpm
  - VPV pumps can be operated over the entire speed range as defined in the specifications pages, independent of the calibrated speed.

- **Drive Shaft**
  - Key to DIN 6885
  - Key to SAE Standard
  - Spline to ANSI B92.1

- **Bearing Arrangement / Mounting Flange**
  - Standard bearing arrangement, mounting flange to SAE standards
  - Standard bearing arrangement, mounting flange to DIN ISO 3019/2

- **Displacement**
  - 16 cc/rev = 1.00 cu in/rev
  - 25 cc/rev = 1.50 cu in/rev
  - 32 cc/rev = 2.00 cu in/rev
  - 45 cc/rev = 2.75 cu in/rev
  - 63 cc/rev = 3.84 cu in/rev
  - 80 cc/rev = 4.88 cu in/rev
  - 100 cc/rev = 6.10 cu in/rev
  - 130 cc/rev = 7.90 cu in/rev
  - 164 cc/rev = 10.00 cu in/rev

---

\(^1\) When trailing pump is another VPV pump, it can be coded by selecting items 6 through 15 for the alpha-numeric description. Consult factory for other models and descriptions of trailing pumps.

**Price and Part Numbers**

**Product Literature Disclaimer**
Specifications and/or dimensions are subject to change without prior notice. Please consult factory.
### Ordering details (continued)

| Item No. | 01  | 02  | 03  | 04  | 05  | 06  | 07  | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pump 1   | 0513 | R   | V   | P   | V   | S   |     |     |     |     |     |     |     |     |     |
| Pump 2   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Pumpkin (Gear Pump) |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 11       |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | Water glycol (*this option is PHASED OUT*) | C   |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | Mineral oil and ester (*provides viton/FKM elastomer material*) | M   |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Operating Pressure |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 12       | Maximum operating pressure; e.g. 14 = 140 bar = 2000 psi | 14  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 21 = 210 bar = 3000 psi | 21  |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Control / Regulator |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 13       | Pressure regulator - single stage | F   |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | Pressure regulator - single stage - lockable 16/25/32cc only | G   |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | Pressure regulator - two stage - with remote option | H   |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | Combined pressure/flow compensator (load sense) | J   |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | Torque limiter | S   |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | Proportional P/Q (PHASED OUT 2002) | T   |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | Solenoid Operated Two Press. Norm. (Normally open)/Normally Low Pressure/Energize to High |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 115V N.O. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | XA  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 220V N.O. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | XB  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 12V N.O. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | XC  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 24V N.O. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | XD  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 115V N.O. w/flying leads | XE  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 220V N.O. w/flying leads | XF  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 12V N.O. w/flying leads | XG  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 24V N.O. w/flying leads | XH  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | Solenoid Operated Two Press. Normally Closed (Normally High Pressure/Energize to Low) |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 115V N.C. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | YA  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 220V N.C. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | YB  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 12V N.C. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | YC  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 24V N.C. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | YD  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 115V N.C. w/flying leads | YE  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 220V N.C. w/flying leads | YF  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 12V N.C. w/flying leads | YG  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 24V N.C. w/flying leads | YH  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | Solenoid Operated Vent Two Press. Normally Open (Normally Vented/Energize to Pressure) |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 115V N.O. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | ZA  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 220V N.O. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | ZB  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 12V N.O. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | ZC  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 24V N.O. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | ZD  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 115V N.O. w/flying leads | ZE  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 220V N.O. w/flying leads | ZF  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 12V N.O. w/flying leads | ZG  |     |     |     |     |     |     |     |     |     |     |     |     |     |
|          | 24V N.O. w/flying leads | ZH  |     |     |     |     |     |     |     |     |     |     |     |     |     |
## Ordering details (continued)

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<tr>
<th>Item No.</th>
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<td>V</td>
<td>P</td>
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<tr>
<td>Pump 3 (Gear Pump)</td>
<td>AZ</td>
<td>P</td>
<td>F</td>
<td>R</td>
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<td>12</td>
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</table>

### Control / Regulator (continued)

13 **Solenoid Operated Vented Norm. High Normally closed (Normally at Pressure/Energize to Vent)**

- 115V N.C. w/DIN 43650 & quick connect (compression fitting) w/sentinel light
- 220V N.C. w/DIN 43650 & quick connect (compression fitting) w/sentinel light
- 12V N.C. w/DIN 43650 & quick connect (compression fitting) w/sentinel light
- 24V N.C. w/DIN 43650 & quick connect (compression fitting) w/sentinel light

| 115V N.C. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | WA |
| 220V N.C. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | WB |
| 12V N.C. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | WC |
| 24V N.C. w/DIN 43650 & quick connect (compression fitting) w/sentinel light | WD |

### Accessories

14 **Special (Consult Factory)**

- Maximum delivery limiter
- No other accessories

| Maximum delivery limiter | Y |
| No other accessories | Z |

### Design Series

15 **Pump 1 of a quick combination unit (adapter kit & coupling required to create a combination, see page 81)**

| Pump 1 of a quick combination unit (adapter kit & coupling required to create a combination, see page 81) | P1 |
## Ordering details (continued)

### Gear Pump Guide

<table>
<thead>
<tr>
<th>Item No.</th>
<th>01</th>
<th>02</th>
<th>03</th>
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<tr>
<td>Pump 2(^1)</td>
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<tr>
<td>Pump 3 (Gear Pump)</td>
<td>AZ</td>
<td>P</td>
<td>F</td>
<td>R</td>
<td>R</td>
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06  Principle of operation, Hydraulic gear

07  Function, Pump

### Size range

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<tr>
<th>08</th>
<th>F Series</th>
<th>4 cc to 28 cc</th>
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<tr>
<td></td>
<td>G Series</td>
<td>22 cc to 56 cc</td>
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### Displacement

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<tr>
<th>09</th>
<th>4 cc/rev = .24 cu in/rev</th>
<th>25 cc/rev = 1.53 cu in/rev</th>
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<tbody>
<tr>
<td></td>
<td>5.5 cc/rev = .34 cu in/rev</td>
<td>28 cc/rev = 1.71 cu in/rev</td>
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<tr>
<td></td>
<td>8 cc/rev = .49 cu in/rev</td>
<td>32 cc/rev = 1.95 cu in/rev</td>
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<tr>
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<td>11 cc/rev = .67 cu in/rev</td>
<td>38 cc/rev = 2.32 cu in/rev</td>
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<tr>
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<td>14 cc/rev = .85 cu in/rev</td>
<td>45 cc/rev = 2.75 cu in/rev</td>
<td>14</td>
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<tr>
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<td>16 cc/rev = .98 cu in/rev</td>
<td>56 cc/rev = 3.42 cu in/rev</td>
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<td>19 cc/rev = 1.16 cu in/rev</td>
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<tr>
<td></td>
<td>22.5 cc/rev = 1.37 cu in/rev</td>
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</table>

10  Direction of rotation, right hand (clockwise)

### Shaft type

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<tr>
<th>11</th>
<th>9T Spline shaft</th>
<th>R</th>
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<tbody>
<tr>
<td></td>
<td>5/8&quot; diameter keyed shaft</td>
<td>Q</td>
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</table>

12  Mounting shaft, SAE A pilot (3.25")

13  Port type, SAE thread (O-ring boss)

### Seals

<table>
<thead>
<tr>
<th>14</th>
<th>Buna</th>
<th>M</th>
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<td>Viton</td>
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### End cover

<table>
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<tr>
<th>15</th>
<th>Standard, side ports</th>
<th>B</th>
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<tr>
<td></td>
<td>Optional rear ports</td>
<td>A</td>
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</table>
Performance characteristics – VPV 16 to 3000 PSI (210 Bar)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anchoic chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.
Performance characteristics – VPV 16 to 3000 PSI (210 Bar) (continued)

Data plotted: with oil at 120°F (49°C) Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anchoic chamber w/microphone placed 1 meter away at discrete locations. Sound pressure levels are spatially and time-weighted averaged.
Performance characteristics – VPV 25 to 3000 PSI (210 Bar)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anchoic chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.
Performance characteristics – VPV 25 to 3000 PSI (210 Bar) (continued)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anchoic chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.
Performance characteristics – VPV 32 to 3000 PSI (210 Bar)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anechoic chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.
Performance characteristics – VPV 32 to 3000 PSI (210 Bar) (continued)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anchoic chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.
Performance characteristics – VPV 45 to 3000 PSI (210 Bar)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120°F = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anchoric chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.
Performance characteristics – VPV 45 to 3000 PSI (210 Bar) (continued)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-echoic chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.
Performance characteristics – VPV 63 to 3000 PSI (210 Bar)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anchoic chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.
Performance characteristics – VPV 63 to 3000 PSI (210 Bar) (continued)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anochoic chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.
Performance characteristics – VPV 80 to 3000 PSI (210 Bar)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anechoic chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.
Performance characteristics – VPV 80 to 3000 PSI (210 Bar) (continued)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anchioic chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.
Performance characteristics – VPV 100 to 3000 PSI (210 Bar)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anchoic chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.
Data plotted: with oil at 120°F (49°C)  Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anchoic chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.
Performance characteristics – VPV 130 to 3000 PSI (210 Bar)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anchoic chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.
Performance characteristics – VPV 130 to 3000 PSI (210 Bar) (continued)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anchoic chamber w/microphone placed 1 meter away at discrete locations. Sound pressure levels are spacially and time-weighted averaged.
Performance characteristics – VPV 164 to 3000 PSI (210 Bar)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120°F = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anchoic chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.

Bosch Rexroth Corp., 9 535 233 724, Edition: 01-2014
Performance characteristics – VPV 164 to 3000 PSI (210 Bar) (continued)

Data plotted: with oil at 120°F (49°C)  Viscosity at 120° = 140 SUS (29.6 cSt)

Sound pressure levels measured in a hemi-anchoic chamber w/microphone placed 1 meter away at discrete locations.
Sound pressure levels are spacially and time-weighted averaged.
VPV 16, Single pump, S.A.E. ‘A’ flange, RH rotation

Optional combination capable pump with end cover

Optional volume control (CW rotation reduces flow)

Compensator adjusting knob (CW rotation increases pressure standard single stage compensator)

Pump centerline

Optional 2-stage compensator

Spline (See data)

Load sense port #4 SAE

Optional 2-stage with load compensator

Centerline pump control

Centerline pump control mounting datum "T"

Remote control port #4 SAE

Case drain port, #8 S.A.E.

Manual override pushpin

DIN 43650 connector w/ 1/2” NPT compression fitting and sentinel light (Optional)

Inches (millimeters)

30° Involute Spline Data
Flat root side fit .... Class 5
Pitch .................. 16/32
Pressure angle ...... 30°
Number of teeth ... 9
Base diameter ...... 0.487193 in. ref.
Form diameter ...... 0.504 in. ref.
Pitch diameter ...... 0.625-0.022 in. ref.
VPV 25/32, Single pump, S.A.E. ‘B’ flange, RH rotation

**Inches (millimeters)**

**30° Involute Spline Data**
- Flat root side fit: Class 5
- Pitch: 16/32
- Pressure angle: 30°
- Number of teeth: 13
- Base diameter: 0.703645 in. ref.
- Form diameter: 0.749 in. ref.
- Major diameter: 0.875+0.000 in. ref.

**Optional combination capable pump with end cover**

**Optional volume control (CW rotation reduces flow)**

**Outlet port #16 S.A.E.**

**Pump control mounting datum ‘T’**

**Optional 2-stage compensator**
- 2-stage compensator adjusting knob (CW rotation increases pressure setting)

**Centerline pump control**

**Optional 2-stage load compensator**

**Compensator adjusting knob (CW rotation increases pressure setting)**

**Rotation arrows cast into body**

**Square key**

**S.A.E. "B" mounting flange**

**SCALE: 2X**
VPV 25/32, Single pump, metric flange, RH rotation

Optional combination capable pump with end cover

Inches (millimeters)

Optional 2 pressure (vent) solenoid operated compensator

Pump centerline

Optional single-stage compensator with locking device

Centerline of pump control

Optional 2-stage compensator

2-stage compensator adjusting knob (CW rotation increases pressure setting)

Optional 2-stage load compensator

Centerline of pump control

Pump centerline

DIN 43650 connector w/ 1/2" NPT compression fitting and sentinal light (Optional)

Manual override pushpin

VPV 25/32, Single pump, metric flange, RH rotation

Optional 2 pressure solenoid operated compensator

Mounting flange

Rotation arrows cast into body ø4.92 (ø125.0)

 ø3.936 (ø99.97)

 ø0.98 (ø25.0)

 0.31 (8.0)

 ø0.27

 ø0.27

 ø0.98 (ø25.0)

 0.31 (8.0)

 ø0.27

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 ø0.98 (ø25.0)

 0.31 (8.0)

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 0.31 (8.0)

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 ø0.98 (ø25.0)

 0.31 (8.0)

 ø0.27

 ø0.27
VPV 45/63/80, Single pump, S.A.E. ‘C’ flange, RH rotation

Optional 2 stage with load compensator
Load sense port #4 S.A.E.
Compensator adjusting knob (CW rotation increases pressure setting)
Optional 2 stage with load compensator
DIN 43650 connector w/ 1/2" NPT compression fitting and sentinel light (Optional)
Manual override pushpin
Remote control port 7/16 – 20 UNF, 0.45 deep
SAE "C" mounting flange

SCALE: 2X
VPV 45/63/80, Single pump, S.A.E. ‘C’ flange, RH rotation (continued)

Optional combination capable pump with end cover (P1 Version)

Optional volume control (CW rotation reduces flow)

Support (Lift) point
M10 X 1.5-6H X 11.25 deep TH'D

Pump centerline
7.44 (189.0)
6.61 (168.0) max.
5.96 (151.4)

Pump control mounting Datum "T"

Std. SAE 1-1/4" pad pressure 1.25 (31.8)

7/16 - 14 UNC - 2B TH'D 4 holes

Inches (millimeters)
VPV 45/63/80, Single pump, metric flange, RH rotation

**SCALE: 2X**

**SINGLE STAGE CONTROL**

*NOT AVAILABLE ON VPV 45-164*

- Optional eye bolt
- Centerline pump control
- Rotation arrows cast into body
- Optional 2 stage with load compensator
- 1/4 - 19 BSPP
- 0.39 X 0.31 (10.0 X 8.0) rectangular key
- 0.126 (ø3.20) keyway
- DIN 43650 connector w/ 1/2" NPT compression fitting and sentinel light
- Optional 2 pressure solenoid operated vent compensator
- Compensator adjusting knob (CW rotation increases pressure setting)
- Manual override pushpin
- Remote control port 1/4 - 19 BSPP, 0.48 deep
VPV 45/63/80, Single pump, metric flange, RH rotation (continued)

Optional combination capable pump with end cover (P1 Version)

Support (Lift) point: M10 x 1.5-6H x 11.25 deep TH'D

Support (Lift) point: M10 x 1.5-6H x 11.25 deep TH'D

Pump control mounting Datum "T"

Optional volume control (CW rotation reduces flow)

Std. SAE 1-1/4" pad pressure 1.25 dia.

M12 x 1.75 -6H TH'D 4 holes

Inches (millimeters)
VPV 100/130/164, Single pump, S.A.E. ‘D’ flange, RH rotation
VPV 100/130/164, Single pump, S.A.E. ‘D’ flange, RH rotation (continued)
VPV 100/130/164, Single pump, metric flange, RH rotation

SINGLE STAGE CONTROL
NOT AVAILABLE ON VPV 45-164

Centerline of pump control
Rotation arrows cast into body

Optional 2 pressure solenoid operated compensator
Compensator adjusting knob (CW rotation increases pressure setting)
Manual override pushpin
Remote control port 1/4 - 19 BSPP, 0.48 deep
2 stage compensator
Optional 2 pressure solenoid operated vent compensator

Case drain port 3/8 - 19 BSPP
M12 x 1.75, 28 deep 4 holes
Std SAE 2-1/2” pad suction
1/2” conduit connector
DIN 43650 connector w/ 1/2” NPT compression fitting and sentinel light

Mounting flange

Dimensions:
Centerline of pump control: 12.11 \( (307.6) \) inches
Rotation arrows cast into body: 11.63 \( (292.9) \) inches

Optional 2 stage with load compensator

SCALE: 2X
VPV 100/130/164, Single pump, metric flange, RH rotation (continued)
VPV 16, Combination pump, S.A.E. ‘A’ flange, RH rotation

Optional volume control (CW rotation reduces flow)

Optional vertical supports for combination pumps when rotated 90°

Support (Lift) point 3/8”-16UNC-2B X 22.0mm deep

#6 S.A.E. Shock clipper port. Should be plumbed to tank to activate shock clipper function (See page 97).

Inlet port, #16 S.A.E.
Case drain port, #8 S.A.E.

Remote control #4 S.A.E.

Standard single stage compensator

Compensator adjusting knob (CW rotation increases pressure setting)

2-stage compensator adjusting knob (CW rotation increases pressure setting)

Optional 2-stage compensator (now in modular design)

Support (Lift) point 3/8”-16UNC-2B X 22.0mm deep

#16 S.A.E. Case drain port, #8 S.A.E.

Inlet port, #16 S.A.E.

Case drain port, #8 S.A.E.

S.A.E. “A” 2-bolt mounting flange

0.188 square key (4.8)

ø748 (ø19.0) shaft dia.

Bosch Rexroth Corp., 9 535 233 724, Edition: 01-2014
VPV 25/32, Combination pump, S.A.E. ‘B’ flange, RH rotation

VIEW A-A

Compensator adjusting knob (CW rotation increases pressure setting)

Standard single stage compensator

Optional vertical supports for combination pumps when rotated 90°

Optional volume control (CW rotation reduces flow)

Support (Lift) point
3/8" - 16UNC-2B X 22.0mm deep

Outlet port, #16 S.A.E.

Inlet port, #24 S.A.E.

Case drain port, #8 S.A.E.

#6 S.A.E. Shock clipper port. Should be plumbed to tank to activate shock clipper function (See page 97).

Optional 2-stage compensator (now in modular design)

#6 S.A.E. Shock clipper port. Should be plumbed to tank to activate shock clipper function (See page 97).

Support (Lift) point
3/8" = 16UNC-2B X 22.0mm deep

Support (Lift) point
3/8" = 16UNC-2B X 22.0mm deep

Inlet port,
#24 S.A.E.

Remote control
#4 S.A.E.

Case drain port,
#8 S.A.E.

Outlet port,
#16 S.A.E.

Inlet port,
#24 S.A.E.

Case drain port,
#8 S.A.E.

VIEW A-A

Compensator adjusting knob (CW rotation increases pressure setting)

Standard single stage compensator

Optional vertical supports for combination pumps when rotated 90°

Optional volume control (CW rotation reduces flow)

Support (Lift) point
3/8" - 16UNC-2B X 22.0mm deep

Outlet port, #16 S.A.E.

Inlet port, #24 S.A.E.

Case drain port, #8 S.A.E.

#6 S.A.E. Shock clipper port. Should be plumbed to tank to activate shock clipper function (See page 97).

Optional 2-stage compensator (now in modular design)

Support (Lift) point
3/8" = 16UNC-2B X 22.0mm deep

Support (Lift) point
3/8" = 16UNC-2B X 22.0mm deep

Inlet port,
#24 S.A.E.

Remote control
#4 S.A.E.

Case drain port,
#8 S.A.E.

Outlet port,
#16 S.A.E.

Inlet port,
#24 S.A.E.

Case drain port,
#8 S.A.E.

VIEW A-A

Compensator adjusting knob (CW rotation increases pressure setting)

Standard single stage compensator

Optional vertical supports for combination pumps when rotated 90°

Optional volume control (CW rotation reduces flow)

Support (Lift) point
3/8" - 16UNC-2B X 22.0mm deep

Outlet port, #16 S.A.E.

Inlet port, #24 S.A.E.

Case drain port, #8 S.A.E.

#6 S.A.E. Shock clipper port. Should be plumbed to tank to activate shock clipper function (See page 97).

Optional 2-stage compensator (now in modular design)

Support (Lift) point
3/8" = 16UNC-2B X 22.0mm deep

Support (Lift) point
3/8" = 16UNC-2B X 22.0mm deep

Inlet port,
#24 S.A.E.

Remote control
#4 S.A.E.

Case drain port,
#8 S.A.E.

Outlet port,
#16 S.A.E.

Inlet port,
#24 S.A.E.

Case drain port,
#8 S.A.E.
**VPV 32/16, Combination pump, S.A.E. ‘B’ flange, RH rotation**

**VIEW B-B**

- Standard single stage compensator
- Compensator adjusting knob (CW rotation increases pressure rating)
- Optional vertical supports for combination pumps when rotated 90°
- Optional volume control (CW rotation reduces flow)

**VIEW A-A**

- Support (Lift) point 3/8"-16UNC-2B X 22.0mm deep
- Outlet port, #12 S.A.E.
- Inlet port, #16 S.A.E.
- Remote control port, #4 S.A.E.
- Case drain port, #8 S.A.E.

**Key & Shaft Detail**

- S.A.E. "B" 2-bolt mounting flange
- Key & Shaft dia.

---

Optional two-stage compensator (flow in modular design)

Optional volume control (CW rotation reduces flow)

Optional vertical supports for combination pumps when rotated 90°
VPV 32/25, Combination pump, S.A.E. to ‘F’ gear, RH rotation

### Gear Pump Theoretical Displacement

<table>
<thead>
<tr>
<th>Displacement</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total Weight (Vane Pump + Gear Pump)</th>
</tr>
</thead>
<tbody>
<tr>
<td>in³/rev (cc/rev)</td>
<td>in (mm)</td>
<td>in (mm)</td>
<td>in (mm)</td>
<td>in (mm)</td>
<td>lbs. (Kg)</td>
</tr>
<tr>
<td>0.2</td>
<td>(4)</td>
<td>1.571</td>
<td>3.346</td>
<td>10.46</td>
<td>12.24</td>
</tr>
<tr>
<td>0.3</td>
<td>(5.5)</td>
<td>1.618</td>
<td>3.445</td>
<td>10.51</td>
<td>12.34</td>
</tr>
<tr>
<td>0.49</td>
<td>(8)</td>
<td>1.697</td>
<td>3.606</td>
<td>10.59</td>
<td>12.50</td>
</tr>
<tr>
<td>0.67</td>
<td>(11)</td>
<td>1.850</td>
<td>3.803</td>
<td>10.74</td>
<td>12.70</td>
</tr>
<tr>
<td>0.85</td>
<td>(14)</td>
<td>1.870</td>
<td>4.0</td>
<td>10.76</td>
<td>12.90</td>
</tr>
<tr>
<td>0.98</td>
<td>(16)</td>
<td>1.870</td>
<td>4.134</td>
<td>10.76</td>
<td>13.03</td>
</tr>
<tr>
<td>1.16</td>
<td>(19)</td>
<td>1.870</td>
<td>4.330</td>
<td>10.76</td>
<td>13.23</td>
</tr>
<tr>
<td>1.37</td>
<td>(22.5)</td>
<td>2.169</td>
<td>4.543</td>
<td>11.06</td>
<td>13.44</td>
</tr>
</tbody>
</table>

---

**Optional volume control (CW rotation reduces flow)**

**Support (Lift) point 3/8"-16UNC-2B X 15 deep**

**Optional 2-stage compensator (now in modular design)**

**Remote control port, #4 S.A.E.**

**Outlet port, #16 S.A.E.**

**Centerline pump control mounting datum “T”**

**Compensator adjusting knob (CW rotation increases pressure setting)**

**S.A.E. “B” mounting flange**

**Key & Shaft Detail**

---

**View A-A**

- Pump centerline
- Support (Lift) point 3/8"-16UNC-2B X 15 deep
- Outlet port, #16 S.A.E.
- Remote control port, #4 S.A.E.
- Inlet port, #24 S.A.E.
- Case drain port, #8 S.A.E.
- Rotation arrow cast into body

---

**Inches (millimeters)**

<table>
<thead>
<tr>
<th>Feature</th>
<th>In</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outlet port</td>
<td>1.65 (41.9)</td>
<td>4.16 (105.7)</td>
</tr>
<tr>
<td>Support (Lift) point</td>
<td>4.88 (123.9)</td>
<td>121.5 (308.6)</td>
</tr>
<tr>
<td>Remote control port</td>
<td>6.63 (168.63)</td>
<td>169.3 (429.9)</td>
</tr>
<tr>
<td>Case drain port</td>
<td>1.57 (40.0)</td>
<td>39.6 (99.7)</td>
</tr>
<tr>
<td>Centerline pump control</td>
<td>3.33 (84.6)</td>
<td>82.6 (210.0)</td>
</tr>
<tr>
<td>Optional 2-stage compensator (now in modular design)</td>
<td>3.75 (95.3)</td>
<td>95.2 (241.9)</td>
</tr>
<tr>
<td>Optional volume control (CW rotation reduces flow)</td>
<td>5.26 (133.7) max.</td>
<td>130.1 (330.4)</td>
</tr>
<tr>
<td>Standard single stage compensator</td>
<td>6.63 (168.63)</td>
<td>168.6 (428.8)</td>
</tr>
<tr>
<td>S.A.E. “B” mounting flange</td>
<td>ø12.0 thru support holes</td>
<td>304.8 (772.2)</td>
</tr>
</tbody>
</table>

---

**Gear Pump**

- **Theoretical Displacement**
- **Dimension**
- **Total Weight (Vane Pump + Gear Pump)**
VPV 45/63/80 to VPV 16, S.A.E. & metric combination

**Inches (millimeters)**

---

**SAE**

- **Inlet port**
  - "SAE" #16 S.A.E.
  - "METRIC" 1-11 BSPP
- **Case drain port**
  - "SAE" #8 S.A.E.
  - "METRIC" 3/8-19 BSPP

**METRIC**

- **Support point**
  - "SAE" 3/8"-16 UNC-2B THD
  - "METRIC" M10 X 1.5-6H THD
- **Case drain port**
  - "SAE" #8 S.A.E.
  - "METRIC" 3/8-19 BSPP

---

**SINGLE STAGE CONTROL**

**NOT AVAILABLE ON VPV 45-164**

**SAE**

- **SAE "C" 2-bolt mounting flange** per ISO 3019/1

**METRIC**

- **METRIC 4-bolt mounting flange** per ISO 3019/2

---

**DETAIL SAE-SAE**

**DETAIL METRIC-METRIC**
VPV 45/63/80 to VPV 16, S.A.E. & metric combination (continued)
VPV 45/63/80 to VPV 16, S.A.E. & metric combination (continued)

VIEW A – A

Centerline pump control

2-stage compensator adjusting knob (CW rotation increases pressure setting)

#6 S.A.E. Shock Clipper port. Should be plumbed to tank to activate shock clipper function (See page 97).

Optional 2-stage compensator

Remote control

Inlet

2-stage compensator

Inlet

4.94 (125.5)

15.31 (389.0)

16.78 (426.4)

7.30 (185.5)

8.00 (203.1)

4.21 (106.9)

6.93 (176.0)

6.32 (158.4)

1.08 (27.5)

1.08 (27.5)

4.88 (123.9)
VPV 45/63/80 to VPV 25/32, S.A.E. & metric combination

SINGLE STAGE CONTROL
NOT AVAILABLE ON VPV 45-164

Optional eye bolt

Support point
"SAE" #8 S.A.E.
"METRIC" M12 X 1.75-6H TH'D (29.0)
4 holes

Case drain port
"SAE" #8 S.A.E.
"METRIC" 3/8-19 BSPP

Inlet port
"SAE" #24 S.A.E.
"METRIC" 1 1/2-11 BSPP

Compensator adjusting knob
(CW rotation increases pressure setting)

Inlet port std. SAE 2" pad
ø2.00 (ø50.8)

SAE "C" 2-bolt mounting flange per ISO 3019/1

Single stage control

CASE DRAIN PORT
"SAE" #8 S.A.E.
"METRIC" 3/8-19 BSPP

Support point
"SAE" 3/8"-16UNC-2B TH'D (12.0) thru support hole
"METRIC" M10 X 1.5-6H TH'D (22.0)

Compensator adjusting knob
(CW rotation increases pressure setting)

Support point
"SAE" 3/8"-16UNC-2B TH'D (12.0) thru support hole
"METRIC" M10 X 1.5-6H TH'D (22.0)

Case drain port
"SAE" #8 S.A.E.
"METRIC" 3/8-19 BSPP

Inlet port
"SAE" #24 S.A.E.
"METRIC" 1 1/2-11 BSPP

Compensator adjusting knob
(CW rotation increases pressure setting)

Support point
"SAE" 3/8"-16UNC-2B TH'D (12.0) thru support hole
"METRIC" M10 X 1.5-6H TH'D (22.0)

Compensator adjusting knob
(CW rotation increases pressure setting)

Support point
"SAE" 3/8"-16UNC-2B TH'D (12.0) thru support hole
"METRIC" M10 X 1.5-6H TH'D (22.0)
VPV 45/63/80 to VPV 25/32, S.A.E. & metric combination (continued)

Optional VPV25/32 single stage compensator with locking device

Support point  "SAE" #16 S.A.E.  "METRIC" 1-11 BSPP

Outlet port  "SAE" 3/8"-16UNC-2B TH'D  "METRIC" M10 X 1.5-6H TH'D  X .87 (22.0) deep

Suport (Lift) point  "SAE & METRIC" M10 X 1.5-6H TH'D  X .44 (11.2) deep

Optional volume control  (CW rotation reduces flow)

Outlet port  Std. SAE 1-1/4" pad  ø1.26 (ø31.8)

"SAE" 7/16-14UNC-2B TH'D  X 1.14 (29.0) deep typ

"METRIC" M12 X 1.75-6H TH'D  (29.0) deep

4 holes

VIEW A-A  
(SK1 @ N-4)

VIEW B-B  
(SK1 @ H-2)

"SAE" #6 S.A.E.  "METRIC" 3/8-19 BSPP

Shock clipper drain

 optional VPV25/32 single stage compensator with locking device

Inches (millimeters)

See detail "SAE1/METRIC1"
VPV 45/63/80 to VPV 25/32, S.A.E. & metric combination (continued)

VIEW A – A

Centerline pump control

2-stage compensator adjusting knob
(CW rotation increases pressure setting)

#6 S.A.E. Shock Clipper port. Should be plumbed to tank to activate shock clipper function (See page 97).

Optional 2-stage compensator

Remote control

Inlet

2-stage compensator

VPV 45/63/80 to VPV 25/32, S.A.E. & metric combination (continued)
VPV 45/63/80 to an ‘F’ gear pump, S.A.E. & metric combination

Compensator adjusting knob (CW rotation increases pressure setting)

Remote control port 7/16 – 20 UNF, 0.45/(11.4) deep

Optional 2 stage compensator

Support point

"SAE" 3/8-16UNC-2B THD x 0.59 deep
"METRIC" M10 X 1.5 THD (15.0)

Suction

Inlet port std. SAE 2" pad ø2.00 (ø50.8)

Compensator adjusting knob (CW rotation increases pressure setting)

Remote control port 1/4 – 19 BSPP, 0.48/(12.2) deep

Optional eye bolt

45 typ

"SAE" 1/2-13UNC-2B THD X 1.14 deep typ
"METRIC" M12 X 1.75-6H THD (29.0)

4 holes

Inches (millimeters)

SAE/METRIC

SAE/METRIC

SAE "C" 2-bolt mounting flange per ISO 3019/1

SAE "C" 2-bolt mounting flange per ISO 3019/1

DETAIL SAE-SAE

DETAIL METRIC-METRIC

A

B

C

D

 uncompensated flow

SAE "C" 2-bolt mounting flange per ISO 3019/1

METRIC 4-bolt mounting flange per ISO 3019/2

Bosch Rexroth Corp., 9 535 233 724, Edition: 01-2014
VPV 45/63/80 to an ‘F’ gear pump, S.A.E. & metric combination (continued)

### Installation drawings

#### Whisper™ VPV Vane Pump Catalog

**Inches (millimeters)**

<table>
<thead>
<tr>
<th>View</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-B</td>
<td><img src="image" alt="VIEW B-B" /></td>
</tr>
<tr>
<td>A-A</td>
<td><img src="image" alt="VIEW A-A" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Support point</th>
<th>&quot;SAE&quot; 3/8&quot;-16UNC-2B THD x 0.59 in (15.0) deep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support (Lift) point</td>
<td>&quot;SAE &amp; METRIC&quot; M10 x 1.5 THD x 0.44 in (11.2) deep</td>
</tr>
</tbody>
</table>

** Optional volume control (CW rotation reduces flow)**

**Pressure outlet port**

- S.A.E. 1-1/4" pad ø1.25 (ø31.8)

**See detail "SAE1/METRIC1"**

**VIEW B-B** (SH.1 @ H-2)

**VIEW A-A** (SH.1 @ N-4)

---

### Gear Pump Theoretical Displacement

<table>
<thead>
<tr>
<th>Gear Pump Theoretical Displacement</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>Total Weight (Vane Pump + Gear Pump)</th>
</tr>
</thead>
<tbody>
<tr>
<td>in3/rev (cc/rev)</td>
<td>in (mm)</td>
<td>in (mm)</td>
<td>in (mm)</td>
<td>in (mm)</td>
<td>in (mm)</td>
<td>in (mm)</td>
<td>lbs. (Kg)</td>
</tr>
<tr>
<td>0.24 (4)</td>
<td>1.571</td>
<td>3.348</td>
<td>13.30</td>
<td>15.08</td>
<td>13.56</td>
<td>15.35</td>
<td>135 (61.2)</td>
</tr>
<tr>
<td>0.34 (5.5)</td>
<td>1.618</td>
<td>3.445</td>
<td>13.35</td>
<td>15.19</td>
<td>13.62</td>
<td>15.45</td>
<td>135.2 (61.3)</td>
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<tr>
<td>0.49 (8)</td>
<td>1.697</td>
<td>3.606</td>
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<td>15.34</td>
<td>13.70</td>
<td>15.61</td>
<td>135.4 (61.4)</td>
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<tr>
<td>0.67 (11)</td>
<td>1.850</td>
<td>3.803</td>
<td>13.58</td>
<td>15.49</td>
<td>13.85</td>
<td>15.76</td>
<td>135.6 (61.5)</td>
</tr>
<tr>
<td>0.85 (14)</td>
<td>1.870</td>
<td>4.000</td>
<td>13.60</td>
<td>15.69</td>
<td>13.97</td>
<td>15.96</td>
<td>135.8 (61.6)</td>
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<tr>
<td>0.98 (16)</td>
<td>1.870</td>
<td>4.134</td>
<td>13.60</td>
<td>15.86</td>
<td>13.97</td>
<td>16.13</td>
<td>135.9 (61.6)</td>
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<tr>
<td>1.16 (19)</td>
<td>1.870</td>
<td>4.330</td>
<td>13.60</td>
<td>16.06</td>
<td>13.86</td>
<td>16.33</td>
<td>136.1 (61.7)</td>
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<tr>
<td>1.37 (22.5)</td>
<td>2.169</td>
<td>4.543</td>
<td>13.90</td>
<td>16.27</td>
<td>14.17</td>
<td>16.54</td>
<td>136.4 (61.9)</td>
</tr>
</tbody>
</table>
VPV 45/63/80 to an ‘F’ gear pump, S.A.E. & metric combination (continued)

Outlet port / Inlet port opposite sides

Compensator adjusting knob (CW rotation increases pressure setting)

METRIC 4-bolt mounting flange per ISO 3019/2

0.39 X 0.31 rectangular key (10.0 X 8.0)

Inches (millimeters)
VPV 45/63/80 to a ‘G’ gear pump, S.A.E. & metric combination

Inches (millimeters)

SAE/METRIC

SAE/METRIC

Remote control port
7/16 – 20 UNF, 0.45/(11.4) deep

Standard
2 stage compensator

Compensator adjusting knob
(CW rotation increases pressure setting)

SAE "C" 2-bolt
mounting flange
per ISO 3019/1

Detail SAE-SAE

Optional
2 stage compensator

Case drain port
"METRIC" 3/8-19 BSPP
"SAE" #8 S.A.E.

"SAE" 1/2"-13UNC-2B THD
"METRIC" M12 X 1.75-6H THD
4 holes

0.31 square key

0.39 X 0.31 rectangular key

Support point
"SAE" 3/8"-16UNC-2B TH'D
"METRIC" M10 X 1.50-6H TH'D

Optional
eye bolt

Compensator adjusting knob
(CW rotation increases pressure setting)

Inlet: 1.031
Outlet: 0.875

4.73
(119.3)

4.37
(108.4)

1.47 thru support hole

Suction
Inlet port
std. SAE 2" pad

Optional
2 stage compensator

Rotation arrows
cast into body

Support point
"METRIC" M10 X 1.50-6H TH'D
"SAE" 1/2"-13UNC-2B TH'D

1.91
(48.4)

3.89
(99.2)

1.37
(34.9)

6.87
(174.5)

1.53
(38.9)

1.25
(31.8)

1.39
(35.2)

2.08
(52.8)

1.39
(35.2)

2.08
(52.8)

1.26
(32.0)

5.91
(150.0)

5.91
(150.0)

5.96
(151.4)

5.96
(151.4)

6.61
(168.0)

6.61
(168.0)

9.31
(236.5)

9.31
(236.5)

6.30
(160.0)

9.31
(236.5)

5.76
(146.2)

10.13
(257.2)

3.89
(98.9)

4.37
(111.0)

8.74
(222.0)

1.91
(48.4)

1.39
(35.2)

2.08
(52.8)

1.39
(35.2)

2.08
(52.8)

1.26
(32.0)

5.91
(150.0)

5.91
(150.0)

5.96
(151.4)

5.96
(151.4)

6.61
(168.0)

6.61
(168.0)

9.31
(236.5)

9.31
(236.5)

6.30
(160.0)

9.31
(236.5)

5.76
(146.2)

10.13
(257.2)

3.89
(98.9)

4.37
(111.0)

8.74
(222.0)

1.91
(48.4)

1.39
(35.2)

2.08
(52.8)

1.39
(35.2)

2.08
(52.8)

1.26
(32.0)
VPV 45/63/80 to a ‘G’ gear pump, S.A.E. & metric combination (continued)

See detail "SAE1/METRIC1"

"SAE" 7/16-14UNC-2B TH'D X 1.14 deep typ
"METRIC" M12 X 1.75-6H TH'D X 11.4 deep

Support (Lift) point
"SAE & METRIC" M10 X 1.5-6H TH'D X 0.44 (11.2) deep

SAE "G" gear pump

Pressure outlet port
std. S.A.E. 1-1/4" pad
ø1.25 (ø31.8)

Inches (millimeters)

Optional volume control
(CW rotation reduces flow)

Support (Lift) point
"SAE & METRIC" M10 X 1.5-6H TH'D X 0.44 (11.2) deep

4 holes

SAE "G" gear pump

VIEW B-B
(SH.1 @ H-2)

Pump centerline

VIEW A-A
(SH.1 @ N-4)

Gear Pump Theoretical Displacement | Dimension | Total Weight (Vane Pump + Gear Pump)
--- | --- | ---
| A | B | C | D | lbs. |
| in3/rev | in | (mm) | in | (mm) | in | (mm) | in | (mm) | Kg |
| 1.37 | 2.40 | (61.0) | 5.07 | (128.5) | 14.6 | (370.8) | 17.26 | (438.6) | 271.4 | (123.1) |
| (22.5) | | | | | | | | | |
| 1.71 | 2.48 | (63.0) | 5.26 | (134.7) | 14.68 | (372.8) | 17.45 | (443.2) | 271.8 | (123.3) |
| (26) | | | | | | | | | |
| 1.95 | 2.54 | (64.5) | 5.40 | (137.2) | 14.74 | (374.4) | 17.59 | (446.8) | 272.3 | (123.5) |
| (32) | | | | | | | | | |
| 2.32 | 2.62 | (66.5) | 5.62 | (142.6) | 14.82 | (376.4) | 17.81 | (452.3) | 272.6 | (123.6) |
| (38) | | | | | | | | | |
| 2.75 | 2.74 | (69.5) | 5.87 | (149.2) | 14.94 | (379.4) | 18.06 | (458.7) | 273.1 | (123.9) |
| (45) | | | | | | | | | |
| 3.42 | 2.95 | (75.2) | 6.31 | (160.2) | 15.15 | (384.8) | 18.5 | (469.9) | 274.1 | (124.3) |
| (56) | | | | | | | | | |
VPV 45/63/80 to VPV 45/63/80, S.A.E. & metric combination

Inlet port
- SAE: 1/2"-13 UNC THD X 1.14 deep
- Metric: M12 x 1.75-6H THD (29.0) x 4 holes

Case drain port
- SAE: #8 S.A.E. typ
- Metric: 3/8-19 BSPP typ

Compensator adjusting knob
- SAE: CW rotation increases pressure setting
- Metric: CW rotation increases pressure setting

Optional eye bolt

Support (Lift) point
- S.A.E. "C" 2-bolt mounting flange per ISO 3019/1
- Metric 4-bolt mounting flange per ISO 3019/2

Remote control port
- S.A.E. "C" 2-bolt mounting flange per ISO 3019/1
- Metric 4-bolt mounting flange per ISO 3019/2

Optional 2 stage compensator

Standard 2 stage compensator

45 typ
- SAE: 1/2"-13 UNC THD X 1.14 deep
- Metric: M12 x 1.75-6H THD (29.0) x 4 holes

1 stage compensator

Compensator adjusting knob (CW rotation increases pressure setting)

2.08 (52.8)

4.37 (110.0)

18.38 (466.8)

9.31 (236.5)

5.91 (150.0)

2.08 (52.8)

4.37 (110.0)

18.38 (466.8)

9.31 (236.5)

5.91 (150.0)
VPV 45/63/80 to VPV 45/63/80, S.A.E. & metric combination (continued)

Inches (millimeters)

Detail SAE1

Detail METRIC1

View A-A

View B-B

"SAE" 7/16"-14 UNC-2B TH'D
"METRIC" M12 X 1.75-6H TH'D
4 holes

Support (Lift) point
"SAE & METRIC"
M10 X 1.5-6H TH'D X .44 deep typ

Optional volume control
(CW rotation reduces flow)

Outlet port
Std. S.A.E. 1-1/4" pad
ø1.25 typ (ø31.8)

Support point
"SAE" 5/8"-11 UNC-2b TH'D
"METRIC" M16 x 2-6H TH'D X 1.30 deep typ
VPV 45/63/80 to VPV 45/63/80, S.A.E. & metric combination (continued)
VPV 45/63/80 to VPV 45/63/80, S.A.E. & metric combination (continued)
VPV 100/130/164 to VPV 100/130/164, S.A.E. & metric combination

**Optional 2 pressure solenoid operated vent compensator**

**Optional 2 stage with load sense compensator**

**Load sense port**
- "S.A.E." #4 SAE
- "Metric" 1/4-19 BSPP

**Compensator adjusting knob**
- (CW rotation increases pressure setting)

**Remote control port**
- 7/16 – 20 UNF, 0.45/ (11.4) deep

**Remote control port**
- 1/19-20 BSPP, 0.45/ (11.4) deep

**S.A.E. “D” 2-bolt mounting flange**
- per ISO 3019/1

**METRIC 4-bolt mounting flange**
- per ISO 3019/2

**DIN 43650 connector**
- w/ 1/2" NPT compression fitting and sentinel light (Optional)

**1/2" conduit connector**

**DIN 43650 connector**
- w/ 1/2" NPT compression fitting and sentinel light (Optional)

**Manual override pushpin**

**Rectangular key**
- 0.47 x 0.31 (12.0 x 8.0)

**Square key**
- .44 (11.1)
VPV 100/130/164 to VPV 100/130/164, S.A.E. & metric combination (continued)
VPV 100/130/164 to VPV 16, S.A.E. & metric combination

**Inches (millimeters)**

**SAE/METRIC**

- **Compensator adjusting knob**
  - CW rotation increases pressure setting

- **Case drain**
  - "SAE" #8 S.A.E.
  - "METRIC" 3/8-19 BSPP

- **Inlet port**
  - Std. S.A.E. 2 1/2" pad
  - "SAE" #16 S.A.E.
  - "METRIC" 1-11 BSPP

- **Support point**
  - "SAE" 3/8"-16 UNC-2B TH'D
  - "METRIC" M10 X 1.5 TH'D

**METRIC**

- **Compensator adjusting knob**
  - CW rotation increases pressure setting

- **Case drain**
  - "SAE" #8 S.A.E.
  - "METRIC" 3/8-19 BSPP

- **Inlet port**
  - Std. S.A.E. 2 1/2" pad
  - "SAE" 1/2-13 UNC-2B TH'D
  - "METRIC" M12 X 1.75-6H TH'D

- **Support point**
  - "SAE" 3/8"-16 UNC-2B TH'D
  - "METRIC" M10 X 1.5 TH'D

**SAE/METRIC**

- **Compensator adjusting knob**
  - CW rotation increases pressure setting

- **Case drain**
  - "SAE" #8 S.A.E.
  - "METRIC" 3/8-19 BSPP

- **Inlet port**
  - Std. S.A.E. 2 1/2" pad
  - "SAE" #16 S.A.E.
  - "METRIC" 1-11 BSPP

- **Support point**
  - "SAE" 3/8"-16 UNC-2B TH'D
  - "METRIC" M10 X 1.5 TH'D
VPV 100/130/164 to VPV 16, S.A.E. & metric combination (continued)
VPV 100/130/164 to VPV 16, S.A.E. & metric combination (continued)
VPV 100/130/164 to VPV 25/32, S.A.E. & metric combination

Details:
- **Inches (millimeters):**
  - Support point: SAE #8 S.A.E. "METRIC" M10 X 1.5-6H THD X (28.0) deep
  - "SAE" 1/2-13 UNC-2B TH'D X 1.10 deep
  - "METRIC" M10X1.5-6H TH'D X (28.0) deep
- **Case drain:**
  - "SAE" #8 S.A.E. "METRIC" 3/8-19 BSPP
- **Compensator adjusting knob:**
  - (CW rotation increases pressure setting)
- **Inlet port:**
  - Std. S.A.E. 2 1/2" pad
  - "SAE" 1/2-13 UNC-2B TH'D X 1.10 deep
  - "METRIC" M10X1.5-6H TH'D X (28.0) deep

**S.A.E.-METRIC SINGLE STAGE CONTROL NOT AVAILABLE ON VPV 45-164**

**DETAL METRIC-METRIC**
- 0.47 x 0.31 (12.0 x 8.0) rectangular key
- ø1.57 (ø40.0)
- ø7.87 (ø200.0)
- ø7.87 (ø200.0)
- ø1.76 (ø44.42)

**DETAL SAE-SAE**
- ø1.76 (ø44.42)
- ø12.80 (ø325.0)
- ø12.80 (ø325.0)
- ø1.75 (ø44.5)
- ø1.75 (ø44.5)
- ø16.08 (ø408.5)

Bosch Rexroth Corp., 9 535 233 724, Edition: 01-2014
VPV 100/130/164 to VPV 25/32, S.A.E. & metric combination (continued)
VPV 100/130/164 to VPV 25/32, S.A.E. & metric combination (continued)
VPV 100/130/164 to VPV 45/63/80, S.A.E. & metric combination (continued)
VPV 100/130/164 to VPV 45/63/80, S.A.E. & metric combination (continued)
**VPV 100/130/164 to an ‘F’ gear pump, S.A.E. & metric combination**

**Installation drawings**

- **Outlet port**
  - Inlet port - opposite side
  - Case drain: "SAE" #8 S.A.E., "METRIC" 3/8-19 BSPP
  - Inlet port Std. S.A.E. 2 1/2" pad
    - SAE: 1/2-13UNC-2B TH'D X 1.10 (28.0) deep
    - METRIC: M12 X 1.75-6H TH'D X 1.91 (48.8) deep

- **Compensator adjusting knob**
  - (CW rotation increases pressure setting)

- **Remote control port**
  - 1/4 – 19 BSPP TH'D 0.48 (12.2) deep
  - 7/16-20 UNF TH'D 0.45 (11.4) deep

- **Support point**
  - "SAE" 3/8"-16UNC-2B TH'D X 0.59 (15.0) deep
  - "METRIC" M10 X 1.5-6H TH'D X 1.29 (32.6) deep

- **Compensator adjusting knob**
  - (CW rotation increases pressure setting)

- **Optional 2 stage compensator**

**Dimensions (inches and millimeters):**

- **Case drain**
  - SAE: 1/2-13UNC-2B TH'D X 1.10 (28.0) deep
  - METRIC: M12 X 1.75-6H TH'D X 1.91 (48.8) deep

- **Support point**
  - SAE: 3/8"-16UNC-2B TH'D X 0.59 (15.0) deep
  - METRIC: M10 X 1.5-6H TH'D X 1.29 (32.6) deep

**Support point**

- "SAE" 3/8"-16UNC-2B TH'D X 0.59 (15.0) deep
- "METRIC" M10 X 1.5-6H TH'D X 1.29 (32.6) deep

**Additional features:**

- **METRIC 4-bolt mounting flange per ISO 3019/2**
- **SAE “D” 2-bolt mounting flange per ISO 3019/1**
VPV 100/130/164 to an ‘F’ gear pump, S.A.E. & metric combination (continued)

**View B-B**
(SH.1 @ G-1)

**View A-A**
(SH.1 @ P-1)

<table>
<thead>
<tr>
<th>Gear Pump Theoretical Displacement</th>
<th>Dimension</th>
<th>Total Weight (Vane Pump + Gear Pump)</th>
</tr>
</thead>
<tbody>
<tr>
<td>in³/rev</td>
<td>in (mm)</td>
<td>in (mm)</td>
</tr>
<tr>
<td>0.24</td>
<td>1.571</td>
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<td>1.618</td>
<td>3.445</td>
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<td>1.697</td>
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<td>0.67</td>
<td>1.850</td>
<td>3.803</td>
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<td>0.85</td>
<td>1.870</td>
<td>4.0</td>
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<tr>
<td>0.98</td>
<td>1.870</td>
<td>4.134</td>
</tr>
<tr>
<td>1.16</td>
<td>1.870</td>
<td>4.330</td>
</tr>
<tr>
<td>1.37</td>
<td>2.169</td>
<td>4.543</td>
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</tbody>
</table>
VPV 100/130/164 to an ‘F’ gear pump, S.A.E. & metric combination (continued)
VPV 100/130/164 to an ‘F’ gear pump, S.A.E. & metric combination (continued)

**View B-B**

- SAE "G" gear pump
- Support point
  - "SAE" 3/8"-16 UNC-2B TH'D X .87 deep
  - "METRIC" M10 x 1.5-6H TH'D X .87 deep

- Support point
  - "SAE" 3/8"-16 UNC-2B TH'D X .87 deep
  - "METRIC" M10 x 1.5-6H TH'D X .87 deep

- Optional volume control
  (CW rotation reduces flow)

**View A-A**

- "SAE" 1/2"-13UNC-2B TH'D X 1.10 deep
- "METRIC" M12 X 1.75-6H TH'D X .87 deep

- Outlet port
  - Std. S.A.E. 1-1/2" pad
  - ø1.46 (37.1)

- "SAE1/METRIC1" See detail

**Gear Pump Theoretical Displacement**

<table>
<thead>
<tr>
<th>Gear Pump Theoretical Displacement</th>
<th>A (in³/rev) (cc/rev)</th>
<th>B (in) (mm)</th>
<th>C (in) (mm)</th>
<th>D (in) (mm)</th>
<th>Total Weight (Vane Pump + Gear Pump)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>in (mm)</td>
<td>in (mm)</td>
<td>in (mm)</td>
<td>in (mm)</td>
<td>lbs. (Kg)</td>
</tr>
<tr>
<td>1.37</td>
<td>2.37 (60.2)</td>
<td>5.07 (128.5)</td>
<td>17.0 (430.8)</td>
<td>19.60 (498.4)</td>
<td>271.4 (123.1)</td>
</tr>
<tr>
<td>1.71</td>
<td>2.48 (63.0)</td>
<td>5.26 (133.7)</td>
<td>17.04 (432.8)</td>
<td>19.80 (503.0)</td>
<td>271.8 (123.3)</td>
</tr>
<tr>
<td>1.95</td>
<td>2.54 (65.1)</td>
<td>5.40 (137.2)</td>
<td>17.10 (434.4)</td>
<td>19.90 (506.6)</td>
<td>272.3 (123.5)</td>
</tr>
<tr>
<td>2.32</td>
<td>2.62 (66.5)</td>
<td>5.62 (142.6)</td>
<td>17.18 (436.4)</td>
<td>20.16 (512.1)</td>
<td>272.6 (123.6)</td>
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<tr>
<td>2.75</td>
<td>2.74 (69.5)</td>
<td>5.87 (149.2)</td>
<td>17.30 (439.4)</td>
<td>20.40 (518.5)</td>
<td>273.1 (123.9)</td>
</tr>
<tr>
<td>3.42</td>
<td>2.95 (75.2)</td>
<td>6.31 (160.2)</td>
<td>17.51 (444.8)</td>
<td>20.85 (529.7)</td>
<td>274.1 (124.3)</td>
</tr>
</tbody>
</table>
**VPV Controls**

Schematics shown illustrate VPV 45–164 controls with shock clipper integrated and no exterior plumbing required. The case drain shows an integrated check valve not present in VPV 16, 25 and 32. All controls leave the factory pre-set at 500 PSI.

**Single Stage Compensator**

The single stage control for normal pressure compensation is a good choice where speed is important and remote capability is not required. This control available on VPV 16, 25 and 32.

**Two Stage Compensator**

The two stage pressure compensators are the platform for most VPV controls. A remote port is standard and may, or may not be enabled according to the circuit design. This is the smoothest of the standard pressure controls, and is the standard pressure compensator for VPV 45–164.

**Load Sense Compensator**

Load sense allows the user to maintain constant flow regardless of changes in load or in pump shaft rotational speed. The Whisper™ Pump load sense accomplishes this by using an external orifice and continually senses a pressure drop of 100 PSI across this orifice. The minimum ΔP is 100 PSI, however the pressure drop can be adjusted to meet circuit requirements. Consult factory.
VPV Controls (continued)

**Two Pressure Compensator**

Solenoid two-pressure compensators are available in normally open (normally low, energize to high) and normally closed (normally high, energize to low) versions. These two-pressure controls can greatly reduce horsepower demand and heat generation during periods of idle cycle time, or when the machine operating cycle does not require maximum pressure.

**Solenoid Vent Compensator**

Solenoid vented compensators are similar to the two-pressure controls, except that there is no adjustment possible. By venting the compensator the pump will go to minimum deadhead.
## Comparison of sound levels

<table>
<thead>
<tr>
<th>Source of Sound</th>
<th>Intensity (dB)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Rustling leaves</td>
<td>10</td>
<td>Barely audible</td>
</tr>
<tr>
<td>Broadcast studio</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Typical bedroom at night</td>
<td>30</td>
<td>Very quiet</td>
</tr>
<tr>
<td>Typical living room</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Office, classroom</td>
<td>50</td>
<td>VPV16 @ 1200 rpm &amp; 500 psi, deadhead (49 dB)</td>
</tr>
<tr>
<td>Normal conversation</td>
<td>60</td>
<td>Moderate</td>
</tr>
<tr>
<td>Automobile interior</td>
<td>70</td>
<td>VPV130 @ 1800 rpm &amp; 3000 psi, full flow (76 dB)</td>
</tr>
<tr>
<td>Urban street</td>
<td>80</td>
<td>Noisy</td>
</tr>
<tr>
<td>Heavy truck (15 m)</td>
<td>90</td>
<td>Very noisy</td>
</tr>
<tr>
<td>Shout (1.5 m)</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Construction site</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>Loud rock music</td>
<td>120</td>
<td>Threshold of pain</td>
</tr>
<tr>
<td>Jet airplane</td>
<td>150</td>
<td>Intolerable</td>
</tr>
<tr>
<td>Rocket engine</td>
<td>180</td>
<td></td>
</tr>
</tbody>
</table>
# Troubleshooting for VPV Whisper Pumps™

Some of the most common difficulties that could be experienced in the field are listed here with potential causes and their remedies.

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Potential Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Excessive pump noise</strong></td>
<td>1) Coupling misalignment.</td>
<td>1) Align the pump and motor shaft to within .006 of an inch total indicator reading. The tighter the alignment, the quieter the pump will be.</td>
</tr>
<tr>
<td></td>
<td>2) The continuous pressure is significantly below 200 psi for 140 bar pumps, or 300 psi for 210 bar pumps.</td>
<td>2) The pumps have been sound tuned at rated pressure. Consult factory or raise minimum pressure 200 psi for single stage compensators in 2000 psi rated pumps, or 300 psi for 3000psi rated pumps.</td>
</tr>
<tr>
<td></td>
<td>3) Fluid in the reservoir is low and the pump is sucking air.</td>
<td>3) Fill the reservoir so that the fluid level is well above the end of the suction line during all of the working cycle.</td>
</tr>
<tr>
<td></td>
<td>4) Restricted inlet.</td>
<td>4) If a suction strainer is used, check it for obstructions or dirt. We do not recommend the use of strainers as they tend to be a leading cause of cavitation which manifests as excessive noise. Check also for shop rags left in the reservoir.</td>
</tr>
<tr>
<td></td>
<td>5) Air leak in the suction line.</td>
<td>5) Tighten all fittings. If it still leaks, smear grease over the joints to locate the leak.</td>
</tr>
<tr>
<td></td>
<td>6) Suction line has too many elbows, or is too long.</td>
<td>6) The suction line should be as short and as straight as possible to reduce the resistance to flow.</td>
</tr>
<tr>
<td></td>
<td>7) Air in the fluid.</td>
<td>7) The return line should terminate below the fluid level to prevent splashing.</td>
</tr>
<tr>
<td></td>
<td>8) Suction line is too small.</td>
<td>8) Suction line should always be equal in size to the suction port. Never reduce it.</td>
</tr>
<tr>
<td></td>
<td>9) Vane does not move freely.</td>
<td>9) Contamination in the fluid or a burr in the vane slot can cause a vane to bind up. Proper filtration and/or deburring of the vane slots is required.</td>
</tr>
<tr>
<td></td>
<td>10) Vane is installed incorrectly.</td>
<td>10) VPV pumps with B0x design utilize vanes with offset tip geometry. Vane orientation is extremely important and if installed improperly, can cause premature wear and reduced operating life. The leading edge is identified as the low side of the vane taper. Please refer to catalog page 85 for further illustration.</td>
</tr>
<tr>
<td></td>
<td>11) A vane is missing.</td>
<td>11) Make sure all vane slots have a vane in them.</td>
</tr>
<tr>
<td></td>
<td>12) Port plates installed incorrectly.</td>
<td>12) Port plates must be installed properly or excessive noise or reduced performance may occur. Plates must be installed with the directional arrows on the plates matching the intended rotation indicated on the pump housing. VPV pumps are RH (CW) only as viewed from the drive shaft end of the pump.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Potential Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pump will not prime</strong></td>
<td>1) Shaft rotation in the wrong direction.</td>
<td>1) When installing a pump, always jog the electric motor to check for proper shaft rotation. Rotation should only be clockwise (right hand) for VPV pumps.</td>
</tr>
<tr>
<td></td>
<td>2) Air leak in the suction line.</td>
<td>2) Make sure all fittings are tight.</td>
</tr>
</tbody>
</table>

*continued on next page*
## Troubleshooting for VPV Whisper Pumps™ (continued)

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Potential Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pump will not prime (cont.)</strong></td>
<td>3) Pump is air bound.</td>
<td>3) Use an air bleed valve to void the pump and suction line of air.</td>
</tr>
<tr>
<td></td>
<td>4) Fluid level in the reservoir is too low.</td>
<td>4) Fill the reservoir so that the fluid level is well above the end of the suction line.</td>
</tr>
<tr>
<td></td>
<td>5) Stroke limiter is turned in too far.</td>
<td>5) Flow should not be reduced more than 50% of maximum. Turn CW to restrict flow, (see page 83).</td>
</tr>
<tr>
<td></td>
<td>6) Suction port dust plug left in place.</td>
<td>6) Remove plug.</td>
</tr>
<tr>
<td><strong>Pump is unstable</strong></td>
<td>1) Contamination in the compensator.</td>
<td>1) Thoroughly clean the control orifices and check filtration.</td>
</tr>
<tr>
<td></td>
<td>2) Pressure ring is not moving properly.</td>
<td>2) Control piston should be checked for freedom of movement.</td>
</tr>
<tr>
<td><strong>Pump is too hot</strong></td>
<td>1) Case drain line is installed too close to the pump inlet line.</td>
<td>1) The case drain and pump inlet should be separated by a baffle in the reservoir.</td>
</tr>
<tr>
<td></td>
<td>2) Reservoir is undersized. Rule of thumb is a minimum of 3 to 5 times max. pump output flow.</td>
<td>2) Add a cooler.</td>
</tr>
</tbody>
</table>


Adapter kits for VPV combinations using ‘P1’ pumps

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>Coupling half, spline</td>
</tr>
<tr>
<td>33</td>
<td>Coupling disc</td>
</tr>
<tr>
<td>34</td>
<td>Retaining ring</td>
</tr>
<tr>
<td>35</td>
<td>Coupling half, combo</td>
</tr>
<tr>
<td>36</td>
<td>Set screw</td>
</tr>
<tr>
<td>37</td>
<td>Roll pin</td>
</tr>
<tr>
<td>38</td>
<td>Adapter</td>
</tr>
<tr>
<td>39</td>
<td>Washer</td>
</tr>
<tr>
<td>40</td>
<td>Hex head cap screw</td>
</tr>
<tr>
<td>41</td>
<td>Jam nut</td>
</tr>
</tbody>
</table>

ADAPTER KITS – Consult factory for other possible pump combinations

<table>
<thead>
<tr>
<th>List Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 511 230 520</td>
<td>VPV 16 to VPV 16 Metric</td>
</tr>
<tr>
<td>9 511 230 518</td>
<td>VPV 16 to VPV 16 SAE</td>
</tr>
<tr>
<td>R978711779</td>
<td>VPV 16 to “F” Gear SAE Key</td>
</tr>
<tr>
<td>9 511 230 673</td>
<td>VPV 16 to “F” Gear SAE Spline</td>
</tr>
<tr>
<td>9 511 230 522</td>
<td>VPV 25/32 to VPV 25/32 Metric</td>
</tr>
<tr>
<td>9 511 230 523</td>
<td>VPV 25/32 to VPV 25/32 SAE</td>
</tr>
<tr>
<td>9 511 230 524</td>
<td>VPV 25/32 to VPV 16 Metric</td>
</tr>
<tr>
<td>9 511 230 525</td>
<td>VPV 25/32 to VPV 16 SAE</td>
</tr>
<tr>
<td>R978711780</td>
<td>VPV 25/32 to “F” Gear SAE Key</td>
</tr>
<tr>
<td>9 511 230 674</td>
<td>VPV 25/32 to “F” Gear SAE Spline</td>
</tr>
<tr>
<td>R978711792</td>
<td>VPV 25/32 to “G” Gear SAE Key</td>
</tr>
<tr>
<td>9 511 230 531</td>
<td>VPV 45/63/80 to VPV 16 Metric</td>
</tr>
<tr>
<td>9 511 230 532</td>
<td>VPV 45/63/80 to VPV 16 SAE</td>
</tr>
<tr>
<td>9 511 230 529</td>
<td>VPV 45/63/80 to VPV 25/32 Metric</td>
</tr>
<tr>
<td>9 511 230 530</td>
<td>VPV 45/63/80 to VPV 25/32 SAE</td>
</tr>
<tr>
<td>9 511 230 527</td>
<td>VPV 45/63/80 to VPV 45/63/80 Metric</td>
</tr>
<tr>
<td>9 511 230 528</td>
<td>VPV 45/63/80 to VPV 45/63/80 SAE</td>
</tr>
<tr>
<td>R978711781</td>
<td>VPV 45/63/80 to “F” Gear SAE Key</td>
</tr>
<tr>
<td>9 511 230 675</td>
<td>VPV 45/63/80 to “F” Gear SAE Spline</td>
</tr>
<tr>
<td>R978711782</td>
<td>VPV 45/63/80 to “G” Gear SAE Key</td>
</tr>
<tr>
<td>R978711833</td>
<td>VPV 45/63/80 to SAE “B” Spline</td>
</tr>
<tr>
<td>9 511 230 541</td>
<td>VPV 100/130/164 to VPV 16 Metric</td>
</tr>
<tr>
<td>9 511 230 542</td>
<td>VPV 100/130/164 to VPV 16 SAE</td>
</tr>
<tr>
<td>9 511 230 539</td>
<td>VPV 100/130/164 to VPV 25/32 Metric</td>
</tr>
</tbody>
</table>

Torque Note #1
Torque to 2000 lb/in (225 Nm) “VPV 100/130/164”
Torque to 1800 lb/in (204 Nm) “VPV 45/63/80”
Torque to 1050 lb/in (119 Nm) “VPV 25/32”
Torque to 780 lb/in (88 Nm) “VPV 16” & Type ‘G’ gear pump
Torque to 550 lb/in (62 Nm) Type ‘F’ gear pump

Torque Note #2
Torque to 2300 lb/in (260 Nm) “VPV 100/130/164”
Torque to 850 lb/in (96 Nm) “VPV 45/63/80”
Torque to 550 lb/in (62 Nm) “VPV 25/32” & Type ‘G’ gear pump
Torque to 400 lb/in (46 Nm) “VPV 16” & Type ‘F’ gear pump

Torque Note #3
Torque to 800 lb/in (90 Nm) “VPV 100/130/164”
Torque to 330 lb/in (37 Nm) “VPV 45/63/80”
Torque to 280 lb/in (31.5 Nm) “VPV 25/32” & Type ‘G’ gear pump
Torque to 200 lb/in (22.5 Nm) Type ‘F’ gear pump
Through drive horsepower limitations

The VPV pumps can be coupled with other VPV pumps, Bosch Rexroth gear pumps or other pumps with standard SAE or metric mounting patterns. (VPV pumps can be coupled without losing use of stroke limiter.) VPV combination pumps are rated to carry the load of an additional pump(s) equal to the maximum load the lead VPV pump can generate (see chart).

<table>
<thead>
<tr>
<th>Pump</th>
<th>Flow @ 1750 RPM (gpm)</th>
<th>Maximum pressure (psig)</th>
<th>Pump #1 input horsepower (hp)</th>
<th>Maximum input power for other pumps (hp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPV 16</td>
<td>8.03</td>
<td>3000</td>
<td>17.6</td>
<td>17.6</td>
</tr>
<tr>
<td>VPV 25</td>
<td>12.6</td>
<td>3000</td>
<td>25.3</td>
<td>25.3</td>
</tr>
<tr>
<td>VPV 32</td>
<td>15.4</td>
<td>3000</td>
<td>30.7</td>
<td>30.7</td>
</tr>
<tr>
<td>VPV 45</td>
<td>21.8</td>
<td>3000</td>
<td>43.3</td>
<td>43.3</td>
</tr>
<tr>
<td>VPV 63</td>
<td>29.6</td>
<td>3000</td>
<td>58.5</td>
<td>58.5</td>
</tr>
<tr>
<td>VPV 80</td>
<td>37.2</td>
<td>3000</td>
<td>74.6</td>
<td>74.6</td>
</tr>
<tr>
<td>VPV 100</td>
<td>46.2</td>
<td>3000</td>
<td>88.8</td>
<td>88.8</td>
</tr>
<tr>
<td>VPV 130</td>
<td>60.0</td>
<td>3000</td>
<td>117.6</td>
<td>117.6</td>
</tr>
<tr>
<td>VPV 164</td>
<td>75.8</td>
<td>3000</td>
<td>156.5</td>
<td>156.5</td>
</tr>
</tbody>
</table>

Examples:

VPV 100 @ 3045 psig + VPV 63 @ 3045 psig + VPV 25 @ 3045 psig
88.8 hp ≥ 58.5 hp + 23.3 hp

VPV 116 @ 3045 psig + VPV 16 @ 1500 psig + VPV 16 @ 1500 psig
17.6 hp ≥ 8.7 hp + 8.7 hp
VPV stroke limiter adjustment

- During initial start-up, volume should be at least 50% of maximum flow.
- Only make adjustments to volume control with pump running at full flow and low pressure while observing output flow.

<table>
<thead>
<tr>
<th>Pump model</th>
<th>Nominal stroke</th>
<th>Decrease in flow per turn</th>
<th>Minimum flow attainable</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPV 16</td>
<td>1.9 mm (0.075&quot;)</td>
<td>53%</td>
<td>&lt;0%</td>
</tr>
<tr>
<td>VPV 25</td>
<td>2.0 mm (0.080&quot;)</td>
<td>50%</td>
<td>0%</td>
</tr>
<tr>
<td>VPV 32</td>
<td>2.5 mm (0.099&quot;)</td>
<td>40%</td>
<td>20%</td>
</tr>
<tr>
<td>VPV 45</td>
<td>1.9 mm (0.077&quot;)</td>
<td>80%</td>
<td>&lt;0%</td>
</tr>
<tr>
<td>VPV 63</td>
<td>2.7 mm (0.106&quot;)</td>
<td>56%</td>
<td>8%</td>
</tr>
<tr>
<td>VPV 80</td>
<td>3.4 mm (0.132&quot;)</td>
<td>44%</td>
<td>26%</td>
</tr>
<tr>
<td>VPV 100</td>
<td>3.0 mm (0.117&quot;)</td>
<td>50%</td>
<td>17%</td>
</tr>
<tr>
<td>VPV 130</td>
<td>3.8 mm (0.150&quot;)</td>
<td>40%</td>
<td>34%</td>
</tr>
<tr>
<td>VPV 164</td>
<td>4.7 mm (0.186&quot;)</td>
<td>32%</td>
<td>47%</td>
</tr>
</tbody>
</table>
3000 PSI cutaway – VPV 45–164

TYPE “P1” VANE PUMP
COMBO CAPABLE

Torque to 350 lb/in
(Torque to 39.5 Nm)

VPV 45/63/80 Torque to 1800 lb/in
(Torque to 204 Nm)

VPV 100/130/164 Torque to 4970 lb/in
(Torque to 562 Nm)

Torque to 850 lb/in
(Torque to 96 Nm)

Torque to 12 lb/in
(Torque to 1.4 Nm)

Torque to 850 lb/in
(Torque to 96 Nm)
Vane tip orientation

Orient vanes as shown when servicing VPV Whisper™ Pumps.

Orientation of vane tips are critical

Looking into pump body from cover side
Reaction characteristics and shock clipper function

- **MAX. PEAK PRESSURE**
- **MAX. RATE OF PRESSURE RISE**
- **SHOCK PRESSURE**
- **RECOVERY TIME**
- **RESPONSE TIME**
- **RESPONSE UNDERSHOOT**
- **MAX. RATE OF PRESSURE DROP**
- **PRESSURE RIPPLE**
- **DEADHEAD PRESSURE** 3000 PSI
- 75% OF DEADHEAD PRESSURE

### VPV 16, Single stage compensator, plot with shock clipper inactive.
(Response overshoot of 950 PSI, response undershoot of 700 PSI)

### VPV 16, Single stage compensator, plot with shock clipper active.
(Response overshoot of 500 PSI, response undershoot of 450 PSI)