Variable Volume Vane Pumps
Models SV-20 & SV-25
Flange & Subplate Mounted

Quick Reference Chart

<table>
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<th>MODEL</th>
<th>GPM @ 100 PSI &amp; 1800 RPM</th>
<th>MAXIMUM PRESSURE (PSI)</th>
<th>MAXIMUM RPM</th>
<th>PRESSURE COMPENSATING RANGE (PSI)</th>
<th>THEORETICAL DISPLACEMENT RANGE (PSI)</th>
<th>INPUT HP @ MAX PSI &amp; 1800 RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard SV-20</td>
<td>15</td>
<td>2000</td>
<td>1800</td>
<td>375-2000</td>
<td>1.9</td>
<td>20</td>
</tr>
<tr>
<td>Standard SV-25</td>
<td>20</td>
<td>1000</td>
<td>1800</td>
<td>300-1000</td>
<td>2.56</td>
<td>20.3</td>
</tr>
<tr>
<td>Low Pressure SV-20</td>
<td>15</td>
<td>750</td>
<td>1800</td>
<td>175-750</td>
<td>1.9</td>
<td>7.25</td>
</tr>
<tr>
<td>Low Pressure SV-25</td>
<td>20</td>
<td>750</td>
<td>1800</td>
<td>175-750</td>
<td>2.56</td>
<td>9.75</td>
</tr>
</tbody>
</table>

STANDARD PUMP - The SV pump is a pressure compensated vane pump and is available in four basic displacements; one, two, four and eight cubic inches. This bulletin covers the Model SV-20 (two cubic inch displacement) and variations of it all of which are dimensionally the same. The SV-25 is a modified SV-20 which uses a different ring to allow the ring to shift further and increase the displacement. By increasing the ring stroke, the vanes extend further and requires the maximum pressure rating to be reduced. Increasing the flow of the basic pump allows the design engineer to reduce circuit costs by using a smaller pump instead of selecting the next larger size provided the reduced pressure rating is adequate.

LOW PRESSURE PUMP - On some applications, such as grinders, the pump must compensate at very low pressures which are not within the normal compensating range of the standard pump. By making internal modifications to the standard pump, the compensating range can be reduced to create a “low pressure” pump for this kind of application.

For repair parts, refer to the service bulletin listed in the table.

Product Literature Disclaimer: Specifications and/or dimensions are subject to change without prior notice. Please consult factory.
Standard Pump

**PRESSURE RATING** -
- SV-20 - 2000 psi (138 bar)
- SV-25 - 1000 psi (69 bar)

**PRESSURE COMPENSATING RANGE** -
- SV-20 - 375-2000 psi (26-138 bar) two stage compensator
- 300-2000 psi (21-138 bar) single stage compensator
- SV-25 - 300-1000 psi (21-69 bar) two stage compensator
- 280-1000 psi (19-69 bar) single stage compensator

**FLOW @ 1800 RPM** -
- SV-20 - 15 gpm (56.8 l/min) @ 1900 psi
- SV-25 - 20.25 gpm (75.7 l/min) @ 900 psi

**THEORETICAL DISPLACEMENT** -
- SV-20 - 2 in³/rev (32.8 ml/rev)
- SV-25 - 2.6 in³/rev (42.6 ml/rev)

**MAXIMUM INLET VACUUM AT SEA LEVEL** -
- 6 in. Hg (152 mm Hg)
- 3 in. Hg (76mm HG) with fluids containing water

**MAXIMUM CASE PRESSURE** - 10 psi (0.7 bar)
Case drain line should be full intended size (not reduced down).
Case pressure spikes can be minimized by using as straight and
direct path to tank as possible. Other drain lines should not be
connected to the pump drain line. Always terminate the drain line
below the fluid level in the reservoir. Failure to do so will result in
loss of pump prime approximately 30 minutes after it is shut down
and possible introduction of air into the circuit. Case drain line
should be routed to the opposite side of the baffle in relation to
the suction line.

**CASE DRAIN FLOW** - The values listed below are the average
flows which occur only when the pump is compensating. When
the pump is not compensating, the values are much lower.

- 100 in³/min (1.6 l/min) @ 1000 psi (69 bar)
- 150 in³/min (2.5 l/min) @ 1500 psi (103 bar)
- 200 in³/min (3.3 l/min) @ 2000 psi (138 bar)

**DRIVE SPEED RANGE** - 750-1800 rpm
(Consult factory Applications department for higher speeds.)

**MOUNTING** - Available in the following:
- Subplate
- SAE 2-bolt Flange, side or rear ported (SAE straight thread of 4-
bolt Flange Connection.)

**ROTATION** - Rotation is always determined when viewing the
shaft end. Rotational arrows are cast into the body of all pumps.
Right hand rotation is standard. Left hand rotation pumps are no
longer available.

**SEALS** - Viton seals are standard. Buna seals are no longer available.

**FILTRATION** - A 10 micrometer return line filter is recommended
for increased pump life. If a suction strainer is used, it should not
be finer than 100 mesh (149 micrometer) when using petroleum
fluids. The higher specific gravity of fire resistant fluids and the
higher vapor pressure of water containing fluids will aggravate the
pump inlet conditions. If a suction strainer is used with these
fluids, the mesh must be coarser (60 mesh or 238 micrometer)
than what is used with petroleum oil of the surface area increased
to reduce the pressure drop. Bosch Rexroth does not
recommend the use of inlet suction strainers.

**OVERHUNG LOAD** - Radial and axial forces on the shaft are not
recommended. Pump and prime mover should be mounted with
shafts inline (coaxial) and connected with a flexible coupling. Consult
factory Applications department for applications with overhung load.

**MAXIMUM ADDITIONAL HP ON THRU SHAFT** -
- 20 HP (15 Kw) @ 1800 rpm
- 13.25 Hp (10 Kw) @ 1200 rpm

**FLUID RECOMMENDATIONS** - A premium quality hydraulic oil
with zinc complex anti-wear additives is highly recommended.
Refer to Bosch Rexroth Group publication 9 535 233 456,
"Petroleum Hydraulic Fluids" for a list of fluids which meet or
exceed the Bosch Rexroth lubrication requirements.

<table>
<thead>
<tr>
<th>Optimum Viscosity at Operating Temperature</th>
<th>150-250 SUS (32-54 cSt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Operating Viscosity</td>
<td>100 SUS (21 cSt)</td>
</tr>
<tr>
<td>Maximum Operating Viscosity</td>
<td>1000 SUS (215 cSt)</td>
</tr>
<tr>
<td>Maximum Start-up Viscosity</td>
<td>4000 SUS (864 cSt)</td>
</tr>
</tbody>
</table>

To compensate for the reduced lubrication values of even the
premium quality water containing fluids (glycols and water-in-oil
emulsions), it is necessary to limit system pressure to the values
listed in the table below for an equivalent life.

<table>
<thead>
<tr>
<th>Water Glycol</th>
<th>Water-in-Oil Emulsion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Pressure</td>
<td>1500 psi</td>
</tr>
<tr>
<td>Maximum RPM</td>
<td>1800 rpm</td>
</tr>
</tbody>
</table>

Refer to Bosch Rexroth Group publication 9 535 233 457, "Fire
Resistant Fluids", for further details on fluid selection. Fluid
suppliers should be consulted regarding proper fluid maintenance
when using fire resistant fluids containing water.

**TEMPERATURE** - The temperature of the fluid in the reservoir
should not exceed 130°F (54°C). The pump will operate with fluid
at higher temperatures provided the viscosity is within the
recommended range, under no circumstances should the oil
temperature exceed 160°F (71°C). When using fire resistant fluids
containing water, the fluid temperature should not exceed 120°F
(49°C) to prevent an excessive rate of water evaporation.
**SCREW VOLUME CONTROL** - The screw volume control is an adjustable stop which is used to reduce the maximum pump flow and is optional. Turning clockwise will reduce the flow in direct proportion to the displacement of the adjusting screw. During initial start-up, the flow setting should be at least 50% of the maximum pump flow.

- SV-20 – 1/4 turn (90°) clockwise will reduce the flow approximately 2.2 gpm (8.3 l/min) when the pump is driven at 1800 rpm.
- SV-25 – 1/4 turn (90°) clockwise will reduce the flow approximately 2.9 gpm (11 l/min) when the pump is driven at 1800 rpm.

When a volume control is used to reduce the maximum flow of the pump, the horsepower required to drive the pump is also reduced. To determine the input HP, use the following formula:

\[
\text{Input HP} = \frac{\text{gpm} \times \text{psi}}{1714} + \text{Deadhead HP at the compensator setting}
\]

**MOUNTING POSITION** - Unrestricted. Caution must be exercised with vertical mounting to prevent the weight or end thrust of the prime mover from being applied to the pump shaft.

**SHAFT ALIGNMENT** - Shaft alignment should be within 0.003″ total indicator reading. If the shafts are not properly aligned, increased mechanical noise from the unit will result.

**START-UP** - To insure priming on initial start-up, air in the pump and inlet must be allowed to escape. If the pump outlet is normally blocked, it must be temporarily vented. This can be accomplished by opening the valve, temporarily cracking a fitting, or installing an air bleed valve.

**CONTROL OPTIONS** - Many energy saving controls are available in addition to the standard two-stage pressure compensator. Refer to Bosch Rexroth publication 9 535 233 092 for performance and dimensional data.

**COMBINATION MOUNTING** - To simplify multi-pump circuits, adapter kits are available to mount additional pumps in combination on the rear cover of the flange mounted (side ported) pumps. Refer to Bosch Rexroth publication 9 535 233 094 for horsepower limitations, adapters available, dimensional data and How-To-Order.

**WEIGHT (Approximate)** -
- Subplate Mounted Pump .................. .65 lbs. (29.5 Kg)
- Flange Mounted Pump .................... .70 lbs. (31.8 Kg)
- Add for Screw Volume Control ........... .1 lb. (0.5 Kg)
- Add for Thru Shaft ........................... .1 lb. (0.5 Kg)

**PRESSURE RATING** -
- SV-20 – 750 psi (52 bar)
- SV-25 – 750 psi (52 bar)

**PRESSURE COMPENSATING RANGE** -
- SV-20 – 175-750 psi (12-52 bar)
- SV-25 – 175-750 psi (12-52 bar)

**FLOW @ 1800 RPM** -
- SV-20 – 15 gpm (56.8 l/min) @ 650 psi (45 bar)
- SV-25 – 20 gpm (75.7 l/min) @ 650 psi (45 bar)

**CASE DRAIN FLOW** - 210 in³/min (3.4 l/min) is the average flow which will occur only when the pump is compensating at 750 psi (52 bar). When the pump is not compensating, the values are much lower.

**ROTATION** - Right hand only. Clockwise when viewing shaft end.

**SEALS** - Viton seals are standard.

**SCREW VOLUME CONTROL** - The screw volume control is standard.
Performance Characteristics - Standard Pump

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

SV-20 @ 1200 rpm

SV-20 @ 1800 rpm

SV-25 @ 1200 rpm

SV-25 @ 1800 rpm

Pressure spikes limited to 2500 PSI
Performance Characteristics - Low Pressure Pump

DATA PLOTTED WITH OIL AT 120°F (49°C) 
VISCOITY @ 120°F = 140 SUS (29.6 cSt)

SV-20 @ 1200 rpm

SV-25 @ 1200 rpm

SV-20 @ 1800 rpm

SV-25 @ 1800 rpm
Dimensional Data - RH Subplate Mounted

<table>
<thead>
<tr>
<th>PORTS</th>
<th>7/16-20 STRAIGHT THREAD</th>
<th>3/8-16 STRAIGHT THREAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUMP CENTER LINE</td>
<td>4.32 (109.8)</td>
<td>6.00 (152.4)</td>
</tr>
<tr>
<td>PUMP CENTER LINE</td>
<td>3.18 (80.8)</td>
<td>2.00 (50.8)</td>
</tr>
<tr>
<td>INLET</td>
<td>2.00 (50.8)</td>
<td>2.00 (50.8)</td>
</tr>
<tr>
<td>DRAW</td>
<td>2.00 (50.8)</td>
<td>2.00 (50.8)</td>
</tr>
<tr>
<td>VOLUME CONTROL (CWM)</td>
<td>0.00 (0)</td>
<td>0.00 (0)</td>
</tr>
<tr>
<td>VOLUME CONTROL (CWM)</td>
<td>0.00 (0)</td>
<td>0.00 (0)</td>
</tr>
<tr>
<td>COMPENSATOR ADJUSTING SCREW (CWM)</td>
<td>0.00 (0)</td>
<td>0.00 (0)</td>
</tr>
<tr>
<td>COMPENSATOR ADJUSTING SCREW (CWM)</td>
<td>0.00 (0)</td>
<td>0.00 (0)</td>
</tr>
<tr>
<td>CENTER LINE</td>
<td>3.18 (80.8)</td>
<td>3.18 (80.8)</td>
</tr>
<tr>
<td>CENTER LINE</td>
<td>3.18 (80.8)</td>
<td>3.18 (80.8)</td>
</tr>
</tbody>
</table>

NOTE: UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS.
PORTS
#4 SAE = 7/16-20 STRAIGHT THREAD
#8 SAE = 3/4-16 STRAIGHT THREAD

COMPENSATOR ADJUSTING SCREW
(CW ROTATION INCREASES PRESSURE SETTING)

PUMP CENTER LINE

6.00
(152.4)

6.67 MAX.
(169.4)

VOLUME CONTROL
(CW ROTATION REDUCES FLOW)

2S SQUARE KEY
(6.4)

.88 DIA.
(22.4)

.88 DIA.
(22.4)

PUMP CENTER LINE

PUMP CONTROL MOUNTING
MEDIUM LENGTH SHAFT

3.81
(96.8)

4.87
(123.7)

MEDIUM LENGTH THRU SHAFT
(289.2)

.96
(24.4)

.38
(9.6)

.12
(3.1)

11.78 MEDIUM LENGTH THRU SHAFT

2.89
(73.4)

1.82
(46.2)

2.00
(50.8)

.986 (25)
.979 (24.9)

PUMP CONTROL MOUNTING DATUM "S"

.46 DIA., 4-MOUNTING HOLES
(11.6)

PUMP CONTROL MOUNTING DATUM "T"

INCHES
(MILLIMETRES)
NOTE: UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE NOMINAL.
Dimensional Data - RH Flange Mounted, Side Ported
Dimensional Data - LH Flange Mounted, Side Ported

(No longer available)
Dimensional Data - LH Flange Mounted, Rear Ported

(No longer available)
Dimensional Data - Foot Bracket, (PSV-20-70B)

Bolt kit B-90 is included to mount the pump to the foot bracket. Consists of 2 each 1/2-13 x 1 1/4 hex head screw.

The center line height of the shaft of an electric motor can be determined by dividing the first two numbers of the motor frame size by four.

**INCHES (MILLIMETERS)**

NOTE:
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE NOMINAL.

Dimensional Data - Subplate, (PSV-20-20S-10)

The height of the pump shaft center line is 6.25 inches (158.8 mm) when the pump is mounted to the subplate.

When subplate is not used, a machined pad as shown by clear area must be provided for mounting. Pad must be flat within 0.0003 in/in with a surface finish of 63 RMS.

Bolt kit B-16 is included to mount the pump to the subplate. Consists of 4 each \( \frac{7}{16} \times 1 1/4 \) socket head cap screws.

**INCHES (MILLIMETERS)**

NOTE:
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE NOMINAL.
How to Order - Standard Pump

PSV - PNSF - 20HRM - 56

DESIGN DIGIT
- 56 (Subplate Mounted only)
- 66 (Flange Mounted only)

SHAFT
M - Keyed Shaft Medium Length
D - Thru Shaft Medium Length
(Subplate Mounted only)

ROTATION (Viewing Shaft End)
R - Right Hand (Clockwise)
L - Left Hand (Counterclockwise)

PRESSURE RATING
H - 2000 PSI
E - 1000 PSI (SV-25 only)

FLOW
20 - 15 GPM @ 1800 RPM
25 - 20 GPM @ 1800 RPM

SEALS
F - Viton Seals

SOLENOID VOLTAGE AVAILABLE
- 110/115 VAC 50/60 Hz (Dual frequency)
- 220/230 VAC 50/60 Hz (Dual frequency)
- 12 VDC
- 24 VDC
For Solenoids with quick connect (Hirschmann type) consult factory

How to Order - Low Pressure Pump

PSV - PSSF - 20DRM - 56

DESIGN DIGIT
- 56 (Subplate Mounted only)
- 66 (Flange Mounted only)

SHAFT
M - Keyed Shaft Medium Length

VOLUME CONTROL
S - Screw Volume Control

FLOW
20 - 15 GPM @ 1800 RPM
25 - 20 GPM @ 1800 RPM

SEALS
F - Viton Seals

MOUNTING
S - Subplate
A - Flange, Side Ported
  (SAE Straight Thread)
B - Flange, Rear Ported
  (SAE Straight Thread)
C - Flange, Side Ported
  (4 Bolt Flanged Connections)
R - Flange, Rear Ported
  (4 Bolt Flanged Connections)

CONTROL OPTIONS
P - Standard Pressure Compensator
*S - Solenoid Two-Pressure (Normally Low, Energize for High Pressure)
*H - Solenoid Two-Pressure (Normally High, Energize for Low Pressure)
*V - Solenoid Two-Pressure (Normally Vented, Energize for High Pressure)
J - Hydraulic Two-Pressure (Normally Low, Energize for High Pressure)
L - Load Sensing
T - Torque Limiting
K - Single Stage Compensator

*Indicate the desired solenoid voltage and frequency at the end of the pump code.
To order the lock for the compensator adjusting screw, specify “LOCK” at the end of the code.
How to Order

Subplate

<table>
<thead>
<tr>
<th>* Subplate Model Number</th>
<th>Height of Pump Center Line When Mounted to Subplate</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSV-20-20S-10 P/N 725309</td>
<td>6.25 (158.8 mm)</td>
</tr>
</tbody>
</table>

Subplate and mounting bolts are not included with subplate mounted pumps and must be specified in addition to the pump.

Example: (1) PSV-PNSO-20H RM-56 Pump  
(1) PSV-20-20S-10 Subplate

* Includes bolt kit B-16 to mount pump to subplate.

Foot Bracket

<table>
<thead>
<tr>
<th>* Bracket Model Number</th>
<th>Height of Pump Center Line When Mounted to Subplate</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSV-20-70B P/N 959770</td>
<td>7.00 (177.8 mm)</td>
</tr>
</tbody>
</table>

Foot bracket and mounting bolts are not included with flange mounted pumps and must be specified in addition to the pump.

Example: (1) PSV-PSCO-20H RM-66 Pump  
(1) PSV-20-70B Bracket

* Includes bolt kit B-90 to mount pump to bracket.

Flange Kit

<table>
<thead>
<tr>
<th>Flange Kit No.</th>
<th>Consists of:</th>
</tr>
</thead>
</table>
| PSV-20-20F-60 P/N 953638 | 1 Ea - 1\(\frac{1}{2}\)" NPT Flange (Inlet)  
4 Ea - \(\frac{1}{2}\)-13 x 1.75 Socket Head Cap Screw  
1 Ea - \(\frac{1}{8}\) x 1\(\frac{1}{16}\) x 2\(\frac{1}{8}\) O-ring  
1 Ea - 1" NPT Flange (Outlet)  
4 Ea - \(\frac{3}{8}\)-16 x 1.5 Socket Head Cap Screw  
1 Ea - \(\frac{1}{8}\) x 1\(\frac{15}{16}\) x 1\(\frac{3}{16}\) O-ring |

Flanges are not included with pumps which have 4 bolt flange ports and must be specified in addition to the pump.

Example: (1) PSV-PSCO-20H RM-66 Pump  
(1) PSV-20-20F-60 Flange Kit