**ENGINEERING DATA**

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

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**Quick Reference Chart**

<table>
<thead>
<tr>
<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.

**PRODUCT INFORMATION**

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 (76 mm 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.

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>Maximum Pressure</th>
<th>Water Glycol</th>
<th>Water-in-Oil Emulsion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500 psi</td>
<td>1000 psi</td>
<td></td>
</tr>
<tr>
<td>1800 psi</td>
<td>1200 psi</td>
<td></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:

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

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.

NOTE: All of the specifications for the standard pump also pertain to the low pressure pump except those listed below.

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-20 @ 1800 rpm

SV-25 @ 1200 rpm

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

(No longer available)
Dimensional Data - RH Flange Mounted, Side Ported
Dimensional Data - RH Flange Mounted, Rear 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.

<table>
<thead>
<tr>
<th>INCHES (MILLIMETERS)</th>
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</tr>
<tr>
<td>ALL DIMENSIONS ARE NOMINAL.</td>
</tr>
</tbody>
</table>

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 7/16-14 x 1 1/4 socket head cap screws.

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</tr>
</tbody>
</table>
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

ROTATION (Viewing Shaft End)
R - Right Hand (Clockwise)

PRESSURE RATING
D - 750 PSI

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

SEALS
F - Viton Seals

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.

CONTROL OPTIONS
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)

MOUNTING

CONTROL
S - Screw Volume Control

VOLUME CONTROL
S - Screw Volume Control

P - Standard Pressure Compensator
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-20HRM-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-20HRM-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>
<tbody>
<tr>
<td>PSV-20-20F-60 P/N 953638</td>
<td>1 Ea - 1½&quot; NPT Flange (Inlet)</td>
</tr>
<tr>
<td></td>
<td>4 Ea - ½-13 x 1.75 Socket Head Cap Screw</td>
</tr>
<tr>
<td></td>
<td>1 Ea - ½ x 1⅛ x 2⅝ O-ring</td>
</tr>
<tr>
<td></td>
<td>1 Ea - 1&quot; NPT Flange (Outlet)</td>
</tr>
<tr>
<td></td>
<td>4 Ea - ⅝-16 x 1.5 Socket Head Cap Screw</td>
</tr>
<tr>
<td></td>
<td>1 Ea - ⅝ x 1⅜ x 1⅞ O-ring</td>
</tr>
</tbody>
</table>

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-20HRM-66 Pump
(1) PSV-20-20F-60 Flange Kit
For more information, you may contact your nearest Bosch Rexroth distributor:

- Bosch Rexroth Corporation
  Industrial Hydraulics Division
  2315 City Line Road
  Bethlehem, PA 18017
  Phone (610) 694-8300
  Fax (610) 694-8467
  www.boschrexroth-us.com

- Bosch Rexroth Corporation
  Pneumatics
  P.O. Box 13597
  1953 Mercer Road
  Lexington, KY 40511-1021
  Phone (859) 254-8032
  Fax (859) 254-4188
  (800) 489-4188
  Email: customer.pneumatics@boschrexroth-us.com
  www.boschrexroth-us.com

- Bosch Rexroth Corporation
  Electric Drives and Controls
  5150 Prairie Stone Parkway
  Hoffman Estates, IL 60192-3707
  Phone (847) 645-3600
  Fax (847) 645-6201
  Email: info@indramat.com
  www.boschrexroth-us.com

- Bosch Rexroth Corporation
  Linear Motion and Assembly Technologies
  816 East Third Street
  Buchanan, MI 49107
  Phone (616) 695-0151
  Fax (616) 695-5363
  www.boschrexroth-us.com

- Bosch Rexroth Corporation
  Mobile Hydraulics Division
  P.O. Box 395
  1700 Old Mansfield Road
  Wooster, OH 44691-0394
  Phone (330) 263-3300
  Fax (330) 263-3333
  Email: info@rexroth.com
  www.boschrexroth-us.com

- Bosch Rexroth AG
  Zum Eisengiesser 1
  D-97816 Lohram Main
  Telefon +49 (0) 93 52/18-11
  Fax +49 (0) 93 52/18-11
  Email: pr@rexroth.de
  www.boschrexroth.de

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