Industrial Hydraulics

Variable Volume Vane Pumps, Flange Mounted

Model SV-40
Model TV-40

Quick Reference Chart

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</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-40 (four cubic inch displacement) and a variation of it which is dimensionally the same.

TWINVANE PUMP — The TV-40 (TWINVANE) pump is a standard pump with internal changes which allow it to operate on either high water content fluids (HWCF) or petroleum fluids. It provides an equivalent life on HWCF with only a slight reduction in volumetric and overall efficiency when compared to operation with petroleum oil at the same pressure and rpm.

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<th>Pump Model</th>
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For repair parts, refer to the service bulletin listed in the table.
Standard Pump

PRESSURE RATING -
SV-40 - 2000 psi (140 bar)

PRESSURE COMPENSATING RANGE -
SV-40 - 250-2000 psi (17-138 bar)

FLOW AT 1800 rpm -
SV-40 - 30 gpm (136/min) at 1900 psi

THEORETICAL DISPLACEMENT -
SV-40 - 4 in³/rev (65.6 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 a 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 baffle in relation to
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.
300 in³/min (4.9 l/min) at 1000 psi (68 bar)
400 in³/min (6.6 l/min) at 2000 psi (138 bar)

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

MOUNTING -
SAE C 2-Bolt Flange, side or rear ported.

ROTATION -
Right hand and left hand rotation is available.
Rotation is always determined when viewing the shaft end.

SEALS -
(Buna N seals are no longer available. Viton seals are
the new standard) Buna N seals are compatible with petroleum
oil, water glycol and water-in-oil emulsion. When using phosphate
ester, viton seals must be specified. Viton is compatible with all of
the fluids mentioned.

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 the 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 or the surface area increased
to reduce the pressure drop.

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 Dept. for applications with overhung
load.

FLUID RECOMMENDATIONS -
A premium quality hydraulic oil
with zinc complex anti-wear additives is highly recommended.
Refer to BOSCH REXROTH publication 9 535 233 456,
“Petroleum Hydraulic Fluids Recommendations” 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>200-300 SUS (43-65 cSt)</th>
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<tr>
<td>Minimum Operating Viscosity</td>
<td>150 SUS (32 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>
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</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 and rpm 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>1000 psi 750 psi</td>
</tr>
<tr>
<td>Maximum RPM</td>
<td>1800 psi 1200 psi</td>
</tr>
</tbody>
</table>

Refer to BOSCH REXROTH 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 oil
at higher temperatures provided the viscosity of the fluid 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 30% of the
maximum pump flow.

SV-40 – 1/4 turn (90°) clockwise will reduce the flow
approximately 4 gpm (15.1 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 - Pump should be mounted with the shaft horizontal. Caution must be exercised to prevent end thrust from being applied to the 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 line 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 (refer to Bulletin J-34).

CONTROL OPTIONS - Many energy saving controls are available in addition to the standard two-stage pressure compensator. Refer to Bulletin A-11 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 Bulletin A-14 for horsepower limitations, adapters available, dimensional data, and How-To-Order.

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WEIGHT (Approximate) -
Flange Mounted Pump ............... 105 lbs. (47.2 Kg)
Add for Screw Volume Control ........... 1 lbs. (0.5 Kg)

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

TWINVANE Pump

PRESSURE RATING -
TV-40 - 1000 psi (69 bar)

PRESSURE COMPENSATING RANGE -
TV-40 - 260-1000 psi (18-69 bar)

FLOW -
23 gpm (100 l/min) at 1200 rpm and 100 psi (7 bar)
28.5 gpm (110 l/min) at 1500 rpm and 100 psi (7 bar)

Because of the low viscosity of HWCF, the internal leakage is greater and will result in a slight reduction in flow in comparison to petroleum oil. Refer to the performance characteristics on page 5.

THEORETICAL DISPLACEMENT -
TV-40 - 4.4 in³/rev (72 ml/rev)

MAXIMUM INLET VACUUM AT SEA LEVEL -
When using high water content fluids, a positive head is beneficial but not necessary. The TV-40 can be used up to 12 inches (30 cm) above the fluid level at altitudes to 2000 feet (610 m) above sea level.

CASE DRAIN FLOW - The value listed below is the average flow which will occur when the pump is compensating at 1000 psi. When the pump is not compensating, the flow is much lower.
2.5 gpm (11.3 l/min) at 1200 rpm (HWCF)

DRIVE SPEED RANGE - 750-1500 rpm

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

SEALS - Viton seals are standard.

SCREW VOLUME CONTROL - The screw volume control is standard.

FLUID RECOMMENDATIONS - If a high water content fluid is used, please consult the factory Applications Dept. during the fluid selection process for current list of approved fluids. This pump is not compatible with phosphate ester fluids.
Performance Characteristics

Standard Pump

SV-40 @ 1200 rpm

SV-40 @ 1800 rpm

TWINVANE Pump

Data plotted with oil at 120°F (49°C)
viscosity @ 120°F = 140 SUS (29.6 cSt)
Bosch Rexroth
Engineering Data
Variable Volume Vane Pumps Models SV-40 and TV-40

LH Flange Mounted
Side Ported

LEFT HAND ROTATION PUMPS ARE NO LONGER AVAILABLE

INCHES
(MILLIMETRES)

NOTE:
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE NOMINAL.
LEFT HAND ROTATION PUMPS ARE NO LONGER AVAILABLE

OUTLET PORT 1-1/4" SAE 4-BOLT PAD

INLET PORT 2" SAE 4-BOLT PAD

CASE DRAIN PORT #10 SAE

PUMP CONTROL MOUNTING DATUM "T"

REMOTE CONTROL PORT #4 SAE

3.96 (100.5)

1.25 (31.8)

4.31 (109.5)

3.81 (96.8)

5.98 (177.3)

8.80 MAX. (220.2)

175.3

3.1 SQ. KEY (7.9)

3.1 R-16-18, 44 (11.18) DEEP

OPTIMAL VOLUME CONTROL (CW ROTATION REDUCES FLOW)

ROTATION ARROWS CAST INTO BODY

THREADED FOR LIFTING RING

MOUNTING FLANGE SAE TYPE 'C'

PUMP CENTER LINE

COMPENSATOR ADJUSTING SCREW (CW ROTATION INCREASES PRESSURE SETTING)

PORTS

# 4 SAE 7/16-20 STRAIGHT THREAD
#10 SAE 7/8-14 STRAIGHT THREAD

INCHES (MILLIMETRES)

NOTE: UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE NOMINAL.
Bolt kit B-113 is included to mount the pump to the foot bracket. Consists of 2 each 5/8–11 x 2 1/4 hex head cap screw and washer. The center height of the shaft of an electric motor can be determined by dividing the first two numbers of the motor frame by four.

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### How to Order

#### Foot Bracket

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

**Example:**

(1) PSV-PNCO-40HRM-62 Pump
(1) PSV-40-10B Foot Bracket

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### Flange Kits

Flanges are not included with the pump and must be specified in addition to the pump.

**Example:**

(1) PSV-PNCO-40HRM-62 Pump
(1) PSV-40-20F-60 Flange Kit
Standard Pump

### 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.

### Volume Control
- **N** - No Volume Control
- **S** - Screw Volume Control

### Seals
- **O** - Buna N (Not available)
- **F** - Viton

### Mounting
- **C** - Flange, Side Ported (4-Bolt Flange Connections)
- **R** - Flange, Rear Ported (4-Bolt Flange Connections)

### Rotation (viewing shaft end)
- **R** - Right Hand (Clockwise)
- **L** - Left Hand (Counterclockwise) *(Left Hand not available)*

### Pressure Rating
- **H** - 2000 PSI

### Flow @ 1800 RPM
- 40 - 30 GPM @ 900 PSI

### Design Digit
- **66**

### Shaft
- **M** - Keyed Shaft Medium Length

### Solenoid Voltages 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

To order the lock for the compensator adjusting screw, specify "LOCK" at the end of the code.
TWINVANE Pump

PTV - PSCH - 40ERM - 62

- Seals
  H - High Water Content Fluid

- Mounting
  C - Flange, Side Ported
    (4-Bolt Flange Connections)

- Volume Control
  S - Screw Volume Control

- Design Digit
  - 62

- Shaft
  M - Keyed Shaft Medium Length

- Rotation (viewing shaft end)
  R - Right Hand (Clockwise)

- Pressure Rating
  E - 1000 PSI

- Flow @ 1200 RPM
  40 - 22 GPM @ 900 PSI

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

* Indicate the desired solenoid voltage and frequency at the end of the pump code.

Solenoid Voltages Available

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>110/115 VAC 50/60 Hz</td>
<td>Dual Frequency</td>
</tr>
<tr>
<td>220/230 VAC 50/60 Hz</td>
<td>Dual Frequency</td>
</tr>
<tr>
<td>12 VDC</td>
<td></td>
</tr>
<tr>
<td>24 VDC</td>
<td></td>
</tr>
</tbody>
</table>

For Solenoids with Quick Connect
(Hirschmann Type) Consult Factory

To order the lock for the compensator adjusting screw, specify "LOCK" at the end of the code.

VOID PRODUCT NO LONGER AVAILABLE
For more information, you may contact your nearest Bosch Rexroth distributor: