PVH98/106 Variable Displacement Piston Pump - 11 Design
NOTE
Right hand rotation shown. View is opposite for left hand rotation.
Please refer to Overhaul Manual M-2210-S.

**NOTE**
For satisfactory service life of these components in industrial applications, use full flow filtration to provide fluid which meets cleanliness code 16/14/12 or cleaner.

**NOTE**
Complete replacement via rotating group kits is recommended.

<table>
<thead>
<tr>
<th>Housing</th>
<th>Flange/Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>513645</td>
<td>-C-*S</td>
</tr>
<tr>
<td>864341</td>
<td>-C-*D</td>
</tr>
<tr>
<td>913253</td>
<td>-C2-*S</td>
</tr>
<tr>
<td>860681</td>
<td>-C2-*D</td>
</tr>
<tr>
<td>864311</td>
<td>-C3-*S</td>
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</tbody>
</table>

**Valve Plate Table**

<table>
<thead>
<tr>
<th>Pump Type</th>
<th>RH</th>
<th>LH</th>
</tr>
</thead>
<tbody>
<tr>
<td>98</td>
<td>627371</td>
<td>584540</td>
</tr>
<tr>
<td>98QI</td>
<td>514122</td>
<td>514120</td>
</tr>
<tr>
<td>98QP</td>
<td>913742</td>
<td>N/A</td>
</tr>
<tr>
<td>106</td>
<td>688219</td>
<td>688220</td>
</tr>
<tr>
<td>106QI</td>
<td>934319</td>
<td>934318</td>
</tr>
<tr>
<td>106QP</td>
<td>934317</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Shaft | Type | Key**

<table>
<thead>
<tr>
<th>Shaft</th>
<th>Type</th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>527167</td>
<td>1 – Straight keyed</td>
<td>114516</td>
</tr>
<tr>
<td>513627</td>
<td>2 – Splined</td>
<td>–</td>
</tr>
<tr>
<td>864453</td>
<td>3 – Splined (thru)</td>
<td>–</td>
</tr>
<tr>
<td>860679</td>
<td>2 – Splined (thru-036)</td>
<td>–</td>
</tr>
<tr>
<td>864454</td>
<td>13 – Str. keyed (thru)</td>
<td>140282</td>
</tr>
</tbody>
</table>

| 388154 Bearing S/A |
| 513912 Saddle bearing |
| 513911 Saddle bearing |
| 690339 Screw (2 Req'd) |

**Shaft (See table)**

- ● 513626 Limiter (2 Req'd)
- ● Piston & Shoe S/A (See table)
- ▲ 262355 O-Ring
- ▬ 526628 Control rod
  - Torque 82-91 N.m. (60-67 lb. ft.)
  - Grade RC30 compound
- ▬ 526627 Control piston
- ▲ 262355 O-Ring
- ● 513600 Bias rod
  - Torque 82-91 N.m. (60-67 lb. ft.)
  - Grade RC30 compound
- ▬ 526686 Spring
- ● 526689 Bias piston

**Note**
Available in PVH98 rotating group kit.
• Available in PVH106 rotating group kit.

**Housing (See table)**

- ▲ 396102 O-Ring
- ▬ 513602 Plug
  - Torque 97-106 N.m. (71-78 lb. ft.)
- ▬ 396100 O-Ring
- ▲ 181792 Plug
  - Torque 75-83 N.m. (40-43 lb. ft.)

**Model Designation | Piston & Shoe S/A (9 req’d) | Cylinder Block | Shoe Cage | Rotating Group Kit**

- ● 98 Size | 02-152400 | 680627 | 584539 | ●877422
- ○ 106 Size | 02-306365 | 688218 | 688217 | ○02-159812

**Shaft Type| Key**

<table>
<thead>
<tr>
<th>Shaft Type</th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>38154 Bearing S/A</td>
<td></td>
</tr>
<tr>
<td>513912 Saddle bearing</td>
<td></td>
</tr>
<tr>
<td>513911 Saddle bearing</td>
<td></td>
</tr>
<tr>
<td>690339 Screw (2 Req'd)</td>
<td></td>
</tr>
</tbody>
</table>

**Shaft**

- ● 513629 Yoke S/A
- ● 513625 Spacer (2 Req'd)
- ● Shoe cage (See table)
- ● Rotating group kit (See table)
- ● 473764 Screw (4 Req’d)
  - Torque 31-37 N.m. (23-27 lb. ft.)

**Shaft Type**

- ● 513626 Limiter (2 Req’d)
- ● Piston & Shoe S/A (See table)
- ▲ 262355 O-Ring
- ▬ 526628 Control rod
  - Torque 82-91 N.m. (60-67 lb. ft.)
  - Grade RC30 compound
- ▬ 526627 Control piston
- ▲ 262355 O-Ring
- ● 513600 Bias rod
  - Torque 82-91 N.m. (60-67 lb. ft.)
  - Grade RC30 compound
- ▬ 526686 Spring
- ● 526689 Bias piston

**Non-torque control models**

- ▲ Available in double shaft seal kit 02-102264
- ▬ Available in bearing kit 877425
- ● Available in bearing/yoke kit 02-334837

**Shaft Type**

- ● Available in PVH98 rotating group kit.
- ○ Available in PVH106 rotating group kit.
Load Sensing & Pressure Compensator Control C(M)*V

All parts shown are included in control kit.
Pressures must be set by user to circuit requirements.

Control Type | Control Kit | Pressure range | Spring | Body | Orifice Plug
---|---|---|---|---|---
CV | 02–125161 | 140–280 Bar | 857681 | 857733 | –
CVB | 02–160591 | 140–280 Bar | 857681 | 928442 | 433543
CMV | 02–306056 | 35–140 Bar | 857675 | 857733 | –

Pressure Compensator Control C & CM

Control spring (See table)

All parts shown are included in control kit.
Pressures must be set by user to circuit requirements.
Industrial Control (IC)

473769 Screw (2 Req'd)
Torque 31-37 N.m. (23-28 lb. ft.)
407533 Plug
Torque 12.1-12.4 N.m. (8.9-9.1 lb. ft.)

396093 O-Ring
396092 O-Ring (3 Req'd)

627391 Plug (3 Req'd)
Torque 9.8-10.2 N.m. (7.2-7.5 lb. ft.)
Body (see table)
857688 Spring
857679 Pin spring stop
857674 Spring guide (2 Req'd)

396100 O-Ring

860747 Nut
Torque 14-20 N.m. (10-14 lb. ft.)
860750 Adj. screw
860748 Plug
Torque 75-83 N.m. (55-60 lb. ft.)

All parts shown are included in control kit. Pressures must be set by user to circuit requirements.

Torque Limiter – T Option

860749 Plug
Torque 75-83 N.m (102-112 lb. ft.)
860750 Adjusting Screw
860747 Nut
Torque 8-10 N.m (11-14 lb. ft.)

932716 Retainer Ring (Screw into bottom of thread)

Control Kit Threads Body
02–151904 inch 883386
02–151905 metric 860628

IC kits pre-set to 20-30 bar differential pressure with all orifices/plugs in place. Reference Vickers Overhaul Manual M-2210-S for proper orifice/plug configuration in various circuits prior to control installation.

Model designation Control Kit
C**T**S-31 02–314944
C**T**S-31 02–335254

Diamond "NOTE" 

Model designation Control Kit
C**T**S-31 02–314944
C**T**S-31 02–335254
**A** Thru–drive

Valve block (See table)

514573 Screw (4 Req’d)
Torque 83-102 N.m. (61-75 lb. ft.)

**“A” Thru–drive**

<table>
<thead>
<tr>
<th>Model designation</th>
<th>Valve block w/ SAE “A” Pad</th>
<th>O-Ring</th>
<th>Coupling Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAF–11–C*</td>
<td>928710</td>
<td>576601</td>
<td>877039</td>
</tr>
<tr>
<td>LAM–11–C*</td>
<td>928711</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAF–11–C*</td>
<td>928734</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAM–11–C*</td>
<td>928735</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAF–11–CT</td>
<td>860841</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAM–11–CT</td>
<td>860842</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAF–11–CT</td>
<td>860832</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAM–11–CT</td>
<td>860833</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**“B” & “C” Thru–drive Adapter**

<table>
<thead>
<tr>
<th>Model Designation</th>
<th>Adapter Pad Kit</th>
<th>Adapter Flange</th>
<th>O-Ring</th>
<th>Coupling Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>“–BF–11–”</td>
<td>876390</td>
<td>526670</td>
<td>401525</td>
<td>877040 SAE B - 13 tooth</td>
</tr>
<tr>
<td>“–BM–11–”</td>
<td>876394</td>
<td>876393</td>
<td></td>
<td>877044 SAE BB - 15 tooth</td>
</tr>
<tr>
<td>“–CF–11–”</td>
<td>876389</td>
<td>692934</td>
<td>353264</td>
<td>877045 SAE C - 14 tooth</td>
</tr>
<tr>
<td>“–CM–11–”</td>
<td>876392</td>
<td>876391</td>
<td></td>
<td>877046 SAE CC - 17 tooth</td>
</tr>
</tbody>
</table>

**Notes:**
1. “F” type equal SAE threads
2. “M” type equal metric threads
3. “B” and “C” thru-drives created from “A” thru-drive pump with “B” or “C” thru-drive adapter kit installed.
4. All screws/O-rings are included with each “kit” to convert from “A” to “B” or “C” thru-drive unit.

*AF Units use Screw 170177 (2 req’d)
**AM Units use Screw 470837 (2 req’d)
**Pump Startup**

Make sure the reservoir and circuit are clean and free of dirt and debris prior to filling with hydraulic fluid.

Fill the reservoir with filtered oil to a level sufficient to prevent vortexing at suction connection to pump inlet. It is good practice to clean the system by flushing and filtering using an external slave pump.

Before starting the pump, fill with fluid through one of the ports. This is particularly important if the pump is above the fluid level of the reservoir.

When initially starting the pump, remove all trapped air from the system. This can be accomplished by loosening the pump outlet fittings or connections before starting the pump, or by using an air bleed valve. All inlet connections must be tight to prevent air leaks.

Once the pump is started, it should prime within a few seconds. If the pump does not prime, check to make sure that there are no air leaks in the inlet line and connections. Also check to make sure that trapped air can escape at the pump outlet.

After the pump is primed, tighten the loose outlet connections, then operate for five to ten minutes (unloaded) to remove all trapped air from the circuit. If reservoir has a sight gage, make sure the fluid is clear—not milky.

Add fluid to the reservoir up to the proper fill level.

---

**Note**
Parts are shown as installed for right hand rotation. For left hand rotation, install control rod and control piston in valve block port #2. Install bias rod, bias piston and spring in valve block port #2.
### Model Code

The model code for the piston pump is structured as follows:

<table>
<thead>
<tr>
<th>Column</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Piston pump, variable displacement</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Maximum geometric displacement</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Application style</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mounting flange, prime mover end</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Shaft rotation, viewed at prime mover end</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Configuration</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Main ports</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Shaft-end type, at prime mover end</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Shaft seal, prime mover end</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Pump design number</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Pressure control type</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Factory compensator pressure setting</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Optional pressure control functions</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Torque limiting control pressure setting</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Torque limiting control summation</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Control design number</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Special feature suffix</td>
<td></td>
</tr>
</tbody>
</table>

### Model Code Structure

- **PVH**: Base model code
- **Q**: Optional pressure control functions
- **M**: Main ports
- **C**: Shaft-end type
- **S**: Shaft seal
- **P**: Pump design number
- **F**: Pressure control type
- **B**: Factory compensator pressure setting
- **Blank**: Application style
- **C**: Configuration

#### Spaces
- **11**: Optional pressure control functions
- **15**: Torque limiting control pressure setting
- **16**: Control design number
- **17**: Special feature suffix

### Key Points

1. **Main ports**
   - **F**: SAE 4-bolt flange ports (standard)
   - **M**: SAE 4-bolt pads with metric mounting bolt threads

2. **Shaft-end type, at prime mover end**
   - **1**: SAE C straight key
   - **2**: SAE C 14 tooth spline
   - **3**: SAE CC 17 tooth spline
   - **13**: SAE CC straight key

3. **Shaft seal, prime mover end**
   - **S**: Single, one-way
   - **D**: Double, two-way

4. **Pump design number**
   - **11**: (Subject to change. Installation dimensions unaltered for design numbers 10 to 19 inclusive.)

5. **Pressure control type**
   - **C**: Compensator, 140-280 bar (2000-4000 psi)
   - **CM**: Compensator, 35-140 bar (500-2000 psi)
   - **IC**: CETOP 3 interface compensator, 20 bar factory ‘’differential’’ pressure setting (QI and QP models only)

6. **Factory compensator pressure setting**
   - **Blank**: Leave blank if no torque limiting control is used
   - **4**: Standard minimum 40 bar setting of ‘’T’’ torque control option

7. **Torque limiting control summation**
   - **Blank**: Standard torque control
   - **S**: Optional torque control with summation feature

8. **Control design number**
   - **31**: All control options

9. **Special feature suffix**
   - **031**: Mounting with SAE-A, 2-bolt cover plate
   - **036**: #2 “C” spline shaft in thru-drive pumps

---

### Notes

- **CAUTION**: Maximum shaft input torque must not exceed 5660 lb-in.