SEWON Variable Displacement Piston Pump is low noise level & high efficient. We have various series inclined type piston pumps. So, We can correspond to needs of clients.

AR Series Variable Displacement Piston Pumps

A Series Variable Displacement Piston Pumps
**AR Series Variable Displacement Piston Pumps**

<table>
<thead>
<tr>
<th>Pump Type</th>
<th>KS Graphic Symbol</th>
<th>Geometric Displacement cm³/rev</th>
<th>Maximum Operation Pressure MPa {kgf/cm²}</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR Series Piston Pumps</td>
<td>![KS Graphic Symbol]</td>
<td>AR16</td>
<td>16 {163}</td>
<td>A-6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AR22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Hydraulic Fluids for AR series Variable Displacement Piston Pump

1. Hydraulic Fluids
Use petroleum base oils such as anti-wear type hydraulic oils or R & O (Rust and Oxidation inhibitor) type hydraulic oils equivalent to ISO VG-32 or 46. The recommended 2 viscosity range is from 20 to 400 mm²/s (98 to 1800 SSU) and temperature range is from 0 to 60 (32 to 140) both of which have to be satisfied for the use of the above hydraulic oils.

2. Control of Contamination
Due caution must be paid to maintaining control contamination of the operating oil which can otherwise to breakdowns and shorten the life of the unit. Please maintain the degree of contamination within NAS Grade 10. The suction port must be equipped with at least a 100 $\mu$m mesh) reservoir type filter and the return line must have a filter of under 10 $\mu$m.

Please take notice that when use the AR series Variable Displacement Piston Pump

1. Mounting
When installing the pump the filling port should be positioned upwards.

2. Alignment of Shaft
Employ a flexible coupling whenever possible, and avoid any stress from bending or thrust. Maximum permissible misalignment is less than 0.1 mm TIR and maximum permissible misangular is less than 0.2°

3. Suction Pressure
Permissible suction pressure at inlet port of the pump is between -16 and +50 kPa. For piping to the suction port, use the pipes of the same diametre as that of the specified pipe flange to be used. Make sure that the height of the pump suction port is within one metre from the oil level in the reservoir.

4. Hints on Piping
When using steel pipes for the suction or discharge ports, excessive load from the piping to the pump generates excessive noise. Whenever there is fear of excessive load, please use rubber hoses.

5. Suction Piping
In case the pump is installed above the oil level, the suction piping and suction line filter should be located lower than the pump position to prevent air in the suction line.

6. Drain Piping
Install drain piping according to the chart and ensure that pressure within the pump housing should be maintained at a normal pressure of less than 0.1 MPa and surge pressure of less than 0.5 Mpa. Length of piping should be less than 1 m, and the pipe end should be submerged in oil. In case AR16 and AR22 pump, a screw-in torque of fitting is 40 to 50 Nm. Do not apply bending and thrust torque to the fitting.

[Recommended Drain Piping Size]

<table>
<thead>
<tr>
<th>Model</th>
<th>Fitting Size</th>
<th>Inside Dia. of Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR16, AR22</td>
<td>3/8 (Inside Dia. 8.5mm more)</td>
<td>More Dia.10</td>
</tr>
</tbody>
</table>
7. Bleeding Air

It may be necessary to bleed air from pump case and outlet line to remove causes of vibration. An air bleed valve is recommended for this purpose.

8. Starting

Before first starting, fill pump case with clean operating oil via the fill port. In order to avoid air blockage when first starting, adjust the control valves so that the discharged oil from the pump is returned direct to the tank or the actuator moves in a free load.

9. Setting Discharge Pressure and Delivery

At the time of shipment, the unit has been preset to maximum delivery and minimum discharge pressure. Adjust the preset delivery and pressure to meet your system requirements.

### Adjustment of Discharge Pressure

Turning the adjustment screw clockwise, increases pressure. Volume adjusted by each full turn of the pressure adjustment screw.

### Volume Adjusted by each full turn of the pressure adjustment screw

<table>
<thead>
<tr>
<th>Model Numbers</th>
<th>Adjustment Volume MPa{kgf/cm²}</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR16/AR22-FR01B</td>
<td>2.9{29.6}</td>
</tr>
<tr>
<td>AR16/AR22-FR01C</td>
<td>5.4{55.1}</td>
</tr>
</tbody>
</table>

### Adjustment of Delivery

Turning the delivery adjustment screw clockwise, decreases delivery. The minimum adjustable flow and adjustable volume of each full turn of the delivery adjustment screw.

### The minimum adjustable flow and adjustable volume of each full turn of the delivery adjustment screw

<table>
<thead>
<tr>
<th>Model Numbers</th>
<th>Adjustable volume with each full turn of the adjustment screw cm³/rev</th>
<th>Minimum adjustable flow cm³/rev</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR16</td>
<td>1.5</td>
<td>6</td>
</tr>
<tr>
<td>AR22</td>
<td>2.1</td>
<td>8.5</td>
</tr>
</tbody>
</table>
**Feature**

- **Smaller in Size and Lighter in Mass**
  As indicated in the dimensional comparison presented below, the AR16 is smaller than the A16 (32 design). Also, the mass of AR16 is substantially lighter than the A16.

[Comparison of AR16 with A16]

- **Low Noise**
  The noise level of AR16 has been reduced by 1-2 dB(A) at full flow and full cut-off compared with than of the excellent A16 quite pump.

[AR Type noise level characteristics]

- **High Reliability**
  The main internal components of AR Series are having high reliability as it is using A16/A22 type having accumulated accomplishment.
# PISTON PUMPS

## AR Series Variable Displacement Piston Pumps

- Single Pump, Pressure Compensator Type

### KS Graphic Symbol

![KS Graphic Symbol](image)

### Ratings

<table>
<thead>
<tr>
<th>Model Numbers</th>
<th>Geometric Displacement cm(^3)/rev</th>
<th>Operating Pres. MPa [kgf/cm(^2)]</th>
<th>Shaft Speed Range r/min [rpm]</th>
<th>Approx. Mass kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rated</td>
<td>Intermittent ★</td>
<td>Max.</td>
<td>Min.</td>
</tr>
<tr>
<td>AR16-FR01※-20</td>
<td>15.8</td>
<td>6</td>
<td>16 (163)</td>
<td>1800</td>
</tr>
<tr>
<td>AR22-FR01※-20</td>
<td>22.2</td>
<td>8.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

★ 1. When setting the pressure, make sure the full cut-off pressure never exceeds the maximum intermittent pressure.

### Model Number Designation

<table>
<thead>
<tr>
<th>AR16</th>
<th>-F</th>
<th>R</th>
<th>01</th>
<th>B</th>
<th>-20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series Number</td>
<td>Mounting</td>
<td>Direction of Rotation</td>
<td>Control Type</td>
<td>Pres. Adj.Range MPa [kgf/cm(^2)]</td>
<td>Design Number</td>
</tr>
<tr>
<td>AR16 (15.8 cm(^3)/rev)</td>
<td>F: Flange Mtg.</td>
<td>[Viewed from Shaft End]</td>
<td>01: Pressure Compensator Type</td>
<td>B: 1.2<del>7 (12.2</del>71.4)</td>
<td>20</td>
</tr>
<tr>
<td>AR22 (22.2 cm(^3)/rev)</td>
<td>R: Clockwise (Normal)</td>
<td></td>
<td></td>
<td>C: 2.0<del>16 (20.4</del>163)</td>
<td>20</td>
</tr>
</tbody>
</table>

★ 1. Available to supply pump with anti-clockwise rotation. Consult Sewon for details.
Pipe Flange Kits

This pumps is not included Pipe Flange Kits. When ordering, specify the kit number from the table below.

<table>
<thead>
<tr>
<th>Pump Model Numbers</th>
<th>Name of Port</th>
<th>Pipe Flange Kit Numbers</th>
<th>Threaded Connection</th>
<th>Socket Welding</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR16-FR01</td>
<td>Suction Port</td>
<td>F5-06-A-10</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>F5-06-B-10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AR22-FR01</td>
<td>Discharge Port</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

★ Dichange port is available for the threaded connections.

Pipe Flange Kit for Suction Port: F5-06-A-10

Mounting Bracket

Mounting bracket available on separate order.

<table>
<thead>
<tr>
<th>Pump Model Numbers</th>
<th>Mtg. Bracket Kit Numbers</th>
<th>Composition Components</th>
<th>Mass Kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR16-FR01</td>
<td>LP-1A-10</td>
<td>Mtg. Bracket: 190-PK210616-9 (1Pcs)</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plain Washer: JIS B 1256-10×21×2 (2Pcs)</td>
<td></td>
</tr>
</tbody>
</table>

Mounting Bracket Kits: LP-1A-10
AR16 Characteristics

Typical performance characteristics at viscosity 32 mm²/s (ISO VG 32 Oil, 50°C)

- **Performance Characteristic Curve**

  - Volumetric Efficiency
  - Overall Efficiency
  - Output Flow
  - Input Power

  ![Graphs showing performance characteristics](image)

- **Input Power**

  - N = 1500 r/min (rpm)
  - Input Power vs. Output Flow

  ![Graph showing input power](image)

- **Full Cut-off Power**

  - Full Cut-off Pressure
  - Efficiency %
  - Output Flow
  - Input Power

  ![Graph showing full cut-off power](image)

- **Drain**

  - Drain vs. Pressure
  - Full Flow vs. Pressure
  - Full Cut-off vs. Pressure

  ![Graph showing drain characteristics](image)

- **Noise Level**

  - [One metre horizontally away from pump head cover]
  - Full Flow vs. Pressure
  - Full Cut-off vs. Pressure

  ![Graph showing noise level characteristics](image)
AR22 Characteristics

Typical performance characteristics at viscosity 32mm²/s (ISO VG 32 Oil, 50°C)

- **Performance Characteristic Curve**
  - Volumetric Efficiency
  - Overall Efficiency
  - Output Flow
  - Input Power

- **Input Power**
  - N = 1500 rpm
  - N = 1800 rpm
  - Pressure MPa (k gf/cm²)
  - Output Flow L/min

- **Full Cut-off Power**
  - Full Cut-off Pressure MPa (k gf/cm²)
  - Full Cut-off Power kW

- **Drain**
  - Drain L/min

- **Noise Level**
  - [One metre horizontally away from pump head cover]
Response Characteristics: Response characteristics change in accordance with circuits and operating conditions.

Test Circuit and Conditions

Circuit

Hydraulic High Pressure Hose 3/4" x 1000mm

Conditions
Drive Speed: 1500 r/min (rpm)
Hydraulic Fluid: ISO VG32 oil
Oil Temperature: 50°C
Viscosity: 20mm²/s (cSt)

Result of Measurement

<table>
<thead>
<tr>
<th>Model</th>
<th>Full Cut-off Pressure $P_1$ MPa [kgf/cm²]</th>
<th>Response Time $t_1$ ms</th>
<th>Outshoot Pressure $P_2$ MPa [kgf/cm²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR16</td>
<td>16 [163]</td>
<td>60</td>
<td>5.6 [57]</td>
</tr>
<tr>
<td>AR22</td>
<td>16 [163]</td>
<td>70</td>
<td>7.3 [74]</td>
</tr>
</tbody>
</table>

Installation Drawing

1. Install the pump so that the filling port is at the top.
2. A screw-in torque of fitting is 40–50 Nm.
   Do not apply bending and thrust torque to the fitting.
## List of Seals and Bearing

### AR16-FR01
### AR22-FR01

<table>
<thead>
<tr>
<th>Item</th>
<th>Name of Parts</th>
<th>Part Numbers</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Gasket</td>
<td>1302-PK312891-5</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>Bearing</td>
<td>6305</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>Bearing</td>
<td>HMK 1715 V2</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>Oil Seal</td>
<td>TCN 254511</td>
<td>1</td>
</tr>
<tr>
<td>30</td>
<td>O-Ring</td>
<td>JIS B 2401-1B-P9</td>
<td>3</td>
</tr>
<tr>
<td>31</td>
<td>O-Ring</td>
<td>JIS B 2401-1A-P8</td>
<td>1</td>
</tr>
<tr>
<td>32</td>
<td>O-Ring</td>
<td>JIS B 2401-1B-P14</td>
<td>1</td>
</tr>
<tr>
<td>54</td>
<td>O-Ring</td>
<td>AS 568-018(NBR, Hs70)</td>
<td>1</td>
</tr>
<tr>
<td>62</td>
<td>O-Ring</td>
<td>JIS B 2401-1B-P10</td>
<td>1</td>
</tr>
</tbody>
</table>

![Section Z-Z](image_url)

**CAUTION**
When making replacement of seals or bearing, please do it carefully after reading through the relevant instructions in the Operator's Manual.