## AH Series Variable Displacement Piston Pump

### AH28-F-R-01-K-S-10

- **Geometric Displacement (cm³/rev)**: AH28
- **Max. Operating Press. (MPa) {kgf/cm²}**: 30.9 (315)
- **Page**: A-40

### AH45-F-R-01-K-S-10

- **Geometric Displacement (cm³/rev)**: AH28

### AH71-F-R-01-K-S-10

- **Geometric Displacement (cm³/rev)**: AH28

### AH100-F-R-01-K-S-10

- **Geometric Displacement (cm³/rev)**: AH28

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### Table

<table>
<thead>
<tr>
<th>Series</th>
<th>KS Graphic Symbol</th>
<th>Geometric Displacement (cm³/rev)</th>
<th>Max. Operating Press. (MPa) {kgf/cm²}</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>AH45-F-R-01-K-S-10</td>
<td>AH28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AH71-F-R-01-K-S-10</td>
<td>AH28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AH100-F-R-01-K-S-10</td>
<td>AH28</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Hydraulic Fluids for A series Variable Displacement Piston Pump

1. Hydraulic Fluids

Equivalent to ISO VG32 or VG46 clean petroleum-based hydraulic fluid viscosity 20 ~ 400 mm²/s (cSt) and use oil to meet the temperature range of 0°C ~ 60°C.

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 μm mesh reservoir type filter and the return line must have a filter of under 10 μm.

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

1. Mounting

Equivalent to ISO VG32 or VG46 clean petroleum-based hydraulic fluid viscosity 20 ~ 400 mm²/s (cSt) and use oil to meet the temperature range of 0°C ~ 60°C.

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 mis-angle 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 diameter 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.

[Drain Piping Size]

<table>
<thead>
<tr>
<th>Model</th>
<th>Fitting Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>AH28</td>
<td>M18 X P1.5</td>
</tr>
<tr>
<td>AH45</td>
<td>M22 X P1.5</td>
</tr>
<tr>
<td>AH71</td>
<td>M22 X P1.5</td>
</tr>
<tr>
<td>AH100</td>
<td>M27 X P2.0</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 (Model No. ST1004-※-10※) 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 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>Adjustable pressure with each full turn of the adjustment screw MPa (kgf/cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AH28</td>
<td>2.6</td>
</tr>
<tr>
<td>AH45</td>
<td>3.5</td>
</tr>
<tr>
<td>AH71</td>
<td>5.2</td>
</tr>
<tr>
<td>AH100</td>
<td>6.4</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 adjustment flow cm³/rev</th>
</tr>
</thead>
<tbody>
<tr>
<td>AH28</td>
<td>2.6</td>
<td>13.1</td>
</tr>
<tr>
<td>AH45</td>
<td>3.5</td>
<td>21.5</td>
</tr>
<tr>
<td>AH71</td>
<td>5.2</td>
<td>33.8</td>
</tr>
<tr>
<td>AH100</td>
<td>6.4</td>
<td>50</td>
</tr>
</tbody>
</table>
**AH Series Variable Displacement Piston Pump**

**Feature**

- **High Pressure**
  - Nominal Pressure: 27.5 MPa (280 kgf/cm²)
  - Max Pressure: 30.9 MPa (315 kgf/cm²)
  - Peak Pressure: 34.3 MPa (350 kgf/cm²)

In time, the percentage of load within 5 seconds 30.9 MPa (315 kgf/cm²) can be applied to the areas.

- **Return Guide**
  - Inflow discharge pressure control returns to the guide structure has been improved.

- **High Rotation**
  - Max. 3000 r/min (rpm) (AH28)
  - Max. 2600 r/min (rpm) (AH45)
  - Max. 2200 r/min (rpm) (AH71)
  - Max. 2000 r/min (rpm) (AH100)

- **Yoke Support High Power Journal Bearing**
  - Compared to the conventional swash plate bearing support system increases the rigidity of the housing and at the same time be significantly reduced by the noise.
  - With the use of high-strength brass was gay and abrasion resistance is improved.

- **Pressure Compensator Valve**
  - Orifice pressure compensated control valve mounted in the circuit change and a full cut-off time has been improved durability by minimizing Shock.
- Single Pump, Pressure Compensator Type

### Ratings

<table>
<thead>
<tr>
<th>Model Numbers</th>
<th>Geometric Displacement cm³/rev</th>
<th>Minimum Adj. Flow cm³/rev</th>
<th>Operating Pres. MPa (kgf/cm²)</th>
<th>Shaft Speed Range r/min (rpm)</th>
<th>Mass. kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>AH28-F-R-01-K-S-10</td>
<td>28</td>
<td>13.1</td>
<td>27.5 (280)</td>
<td>1500</td>
<td>18</td>
</tr>
<tr>
<td>AH45-F-R-01-K-S-10</td>
<td>45</td>
<td>21.5</td>
<td>27.5 (280)</td>
<td>1500</td>
<td>23</td>
</tr>
<tr>
<td>AH71-F-R-01-K-S-10</td>
<td>71</td>
<td>33.3</td>
<td>27.5 (280)</td>
<td>1500</td>
<td>35</td>
</tr>
<tr>
<td>AH100-F-R-01-K-S-10</td>
<td>100.3</td>
<td>50</td>
<td>27.5 (280)</td>
<td>1500</td>
<td>49</td>
</tr>
</tbody>
</table>

**1.** When you use beyond the rated pressure is limited to the terms of use. In time, the percentage of load within 5 seconds 30.9 MPa (315 kgf/cm²) can be applied to the areas to. This condition is different depending on the environment of use, please contact SMC for details.

**2.** Speed up to the suction port pressure 0 kPa (0 kgf/cm²) revolutions is one of the.

### Model Number Designation

<table>
<thead>
<tr>
<th>Model Numbers</th>
<th>Series Number</th>
<th>Mounting</th>
<th>Direction of Rotation</th>
<th>Control Type</th>
<th>Pres. Adj. Range MPa (kgf/cm²)</th>
<th>Direction of Piping</th>
<th>Design Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>AH28-F-R-01-K-S-10</td>
<td>AH28(28cm³/rev)</td>
<td>F : Flange Mtg.</td>
<td>(Viewed from Shaft End)</td>
<td>01 : Pressure Compensator</td>
<td>K : 7 ~ 30.9 (71.4 ~ 315)</td>
<td>S : Side Port</td>
<td>10</td>
</tr>
<tr>
<td>AH45-F-R-01-K-S-10</td>
<td>AH45(45cm³/rev)</td>
<td>F : Flange Mtg.</td>
<td>(Viewed from Shaft End)</td>
<td>01 : Pressure Compensator</td>
<td>K : 7 ~ 30.9 (71.4 ~ 315)</td>
<td>S : Side Port</td>
<td>10</td>
</tr>
<tr>
<td>AH71-F-R-01-K-S-10</td>
<td>AH71(71cm³/rev)</td>
<td>F : Flange Mtg.</td>
<td>(Viewed from Shaft End)</td>
<td>01 : Pressure Compensator</td>
<td>K : 7 ~ 30.9 (71.4 ~ 315)</td>
<td>S : Side Port</td>
<td>10</td>
</tr>
<tr>
<td>AH100-F-R-01-K-S-10</td>
<td>AH100(100.3cm³/rev)</td>
<td>F : Flange Mtg.</td>
<td>(Viewed from Shaft End)</td>
<td>01 : Pressure Compensator</td>
<td>K : 7 ~ 30.9 (71.4 ~ 315)</td>
<td>S : Side Port</td>
<td>10</td>
</tr>
</tbody>
</table>

**1.** Available to supply pump with anti-clockwise rotation. Consult Sewon for details.

### Pipe Flange Kits

This pump does not include the port flange. When using the flange if you need to produce a separate table below.

<table>
<thead>
<tr>
<th>Pump Model Numbers</th>
<th>Name of Port</th>
<th>Port Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>AH28-F-R-01-K-S-10</td>
<td>Suction</td>
<td>SAE 1 1/4</td>
</tr>
<tr>
<td></td>
<td>Discharge</td>
<td>SAE 3/4</td>
</tr>
<tr>
<td>AH45-F-R-01-K-S-10</td>
<td>Suction</td>
<td>SAE 1 1/2</td>
</tr>
<tr>
<td></td>
<td>Discharge</td>
<td>SAE 1</td>
</tr>
<tr>
<td>AH71-F-R-01-K-S-10</td>
<td>Suction</td>
<td>SAE 2</td>
</tr>
<tr>
<td></td>
<td>Discharge</td>
<td>SAE 1 , SAE 1 1/4</td>
</tr>
<tr>
<td>AH100-F-R-01-K-S-10</td>
<td>Suction</td>
<td>SAE 2 1/2</td>
</tr>
<tr>
<td></td>
<td>Discharge</td>
<td>SAE 1 1/4</td>
</tr>
</tbody>
</table>
**Response Characteristics**

Response Characteristics Change in Accordance with Circuits and Operating Conditions.

### Test Circuit and Conditions

- **Circuit**

![Circuit Diagram]

- **Conditions**
  - Drive Speed: 1500 r/min (rpm)
  - Hydraulic Fluid: ISO VG 32 oil
  - Temperature: 40°C (Viscosity 32 mm²/s {cSt})

### Result of Measurement

<table>
<thead>
<tr>
<th>Model</th>
<th>Response Time ms</th>
<th>Overshoot Pressure Ps</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t1</td>
<td>t2</td>
</tr>
<tr>
<td>AH28</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>AH45</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>AH71</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>AH100</td>
<td>300</td>
<td>400</td>
</tr>
</tbody>
</table>
AH 28 Characteristics

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

- **Output Flow**
- **Input Power**
- **Noise Level**
- **Drain**

![Graphs showing output flow, input power, noise level, and drain characteristics against pressure for AH 28 pumps.](image-url)
AH 45 Characteristics

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

- **Output Flow**
- **Input Power**
- **Noise Level**
- **Drain**

### Output Flow Graph

- **Y-axis (Output Flow [lpm])**
  - 0 to 120
- **X-axis (Pressure [MPa (kgf/cm²)]), 0 to 28 (286)**

### Input Power Graph

- **Y-axis (Input Power [kW])**
  - 0 to 60
- **X-axis (Pressure [MPa (kgf/cm²)]), 0 to 28 (286)**

### Noise Level Graph

- **Y-axis (Noise Level [dB])**
  - 0 to 100
- **X-axis (Pressure [MPa (kgf/cm²)]), 0 to 28 (286)**

### Drain Graph

- **Y-axis (Drain [lpm])**
  - 0 to 13
- **X-axis (Pressure [MPa (kgf/cm²)]), 0 to 28 (286)**
AH 71 Characteristics

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

- **Output Flow**
- **Input Power**
- **Noise Level**
- **Drain**
AH 100 Characteristics

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

- **Output Flow**
  - Graph showing output flow vs. pressure (MPa) for different pressures.

- **Input Power**
  - Graph showing input power vs. pressure (MPa) for different pressures.

- **Noise Level**
  - Graph showing noise level (dB) vs. pressure (MPa) for different pressures.

- **Drain**
  - Graph showing drain flow (lpm) vs. pressure (MPa) for different pressures.
PISTON PUMPS

**AH Series Variable Displacement Piston Pumps**

*Single Pump, Pressure Compensator Type*

**AH28-F-R-01-K-S-10 (Flange Mtg.)**

**AH45-F-R-01-K-S-10 (Flange Mtg.)**

**AH71-F-R-01-K-S-10 (Flange Mtg.)**
### List of Seals & Bearings

#### AH28/45/71-F-R-01-K-S-10

- **No.**
- **Part List**
- **Part Numbers**
  - **AH28**
  - **AH45**
  - **AH71**
  - **AH100**
- **Qty.**

1. Seal Washer
2. O-Ring
3. O-Ring
4. O-Ring
5. Back-up Ring
6. O-Ring
7. O-Ring
8. O-Ring
9. O-Ring
10. O-Ring
11. O-Ring
12. Back-up Ring
13. Bearing
14. Oil-Seal
15. Bearing
16. O-Ring
17. O-Ring

#### AH100-F-R-01-K-S-10

- **No.**
- **Part List**
- **Part Numbers**
  - **AH28**
  - **AH45**
  - **AH71**
  - **AH100**
- **Qty.**

1. Seal Washer
2. O-Ring
3. O-Ring
4. O-Ring
5. Back-up Ring
6. O-Ring
7. O-Ring
8. O-Ring
9. O-Ring
10. O-Ring
11. O-Ring
12. Back-up Ring
13. Bearing
14. Oil-Seal
15. Bearing
16. O-Ring
17. O-Ring

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**CAUTION**

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