VDS SERIES SMALL VARIABLE VOLUME VANE PUMP

Features

1. High efficiency operation with minimal power loss
All the performance of the original new VDR series mechanisms combines with precision machining for a pump that minimizes power loss, especially at full cut-off.

2. Quiet operation
Journal bearings with a proven record on IP pumps plus new suction and discharge port configurations reduce operating noise and deliver quiet operation with minimal vibration, even in the high-pressure range.

3. Compact and simple design, easy operation
Compact and quiet, VDS Series variable vane pumps are economical and easy to handle. A simple design allows use in a wide range of hydraulic systems.

4. Precise characteristics, prompt response
Prompt response at both ON-OFF and OFF-ON ensures instantaneous, stable, high-precision operation.

5. Solidly built for high efficiency and long life
VDS Series pumps are built to last, with a design that incorporates years of NACHI experience and know-how. Specially selected materials and skilled workmanship provide outstanding durability along with stable, high-efficiency operation.

Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Capacity (cm³/rev)</th>
<th>No-load Discharge Rate (ℓ/min)</th>
<th>Pressure Adjustment Range (MPa (kgf/cm²))</th>
<th>Allowable Peak Pressure (MPa (kgf/cm²))</th>
<th>Revolution Speed min⁻¹</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDS-0A(B)-1A1-10</td>
<td>8.3</td>
<td>8</td>
<td>12.5</td>
<td>15</td>
<td>1 to 2 (10.2 to 20.4)</td>
<td>14 (143)</td>
</tr>
</tbody>
</table>

Handling

1. The direction of rotation for this pump is clockwise (rightward) when viewed from the shaft side.
2. Drain piping must be direct piping up to a point that is below the tank fluid level, and back pressure due to pipe resistance should not exceed 0.03MPa.
3. When adjusting pressure, pressure is increased by clockwise (rightward) rotation of the adjusting screw and decreased by counterclockwise (leftward) rotation.
4. When adjusting the flow rate, the flow rate is decreased by clockwise (rightward) rotation of the adjusting screw and increased by counterclockwise (leftward) rotation.

Thrust Screw
The thrust screw is precision adjusted at the factory during assembly. Never touch the thrust screw.

Initial Operation
Before operating the pump for the first time, put the pump discharge side into the no-load state and then repeatedly start and stop the motor to bleed all air from inside the pump and the suction piping. After confirming that the pump is discharging oil, continue the no-load operation for at least 10 minutes to discharge all the air from the circuit.

For the hydraulic operating fluid, use an R&O type and wear-resistant type of ISO VG32 to 68 or equivalent (viscosity index of at least 90). Use hydraulic operating fluid that provides kinematic viscosity during operation in the range of 20 to 150mm²/s.

The operating temperature range is 15 to 60°C. When the oil temperature at startup is 15°C or less, perform a warm-up operation at low pressure until the oil temperature reaches 15°C. Use the pump in an area where the temperature is within the range of 0 to 80°C.

(Continued on following page)
Suction pressure is -0.03 to +0.03 MPa (-0.3 to +0.3 kgf/cm²), and the suction port flow rate should be greater than 2 m/sec.

Avoid pulley, gear, and other drive systems that impart a radial or thrust load on the end of the pump shaft. Mount the pump so its pump shaft is oriented horizontally.

Provide a suction strainer with a filtering grade of about 100 µm (150 mesh). For the return line to the tank, use a 25 µm line filter.

Manage hydraulic operating fluid so contamination is maintained at class NAS10 or lower. Take care to avoid contamination with water or other foreign matter, and watch for discoloration. Whitish fluid indicates that air has contaminated the fluid, and brownish fluid indicates the fluid is dirty.

Contact your agent about using water- and glycol-based hydraulic operating fluids.

At startup, repeat the inching operation (start-stop) to bleed air from the pump and pipes.

Equip an air bleed valve in circuits where it is difficult to bleed air before startup. See page C-13 for more information.

To ensure proper lubrication of the pump’s rubbing surfaces, supply oil to the interior of the pump before starting operation.

When centering the pump shaft, eccentricity with the motor shaft should be no greater than 0.05 mm. The angle error should be no greater than 1°.

**Understanding Model Numbers**

<table>
<thead>
<tr>
<th>VDS - O <strong>-</strong> A <strong>-</strong> 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design number</td>
</tr>
<tr>
<td>Pressure adjustment range</td>
</tr>
<tr>
<td>1: 1 to 2 MPa (10.2 to 20.4 kgf/cm²)</td>
</tr>
<tr>
<td>2: 1.5 to 3.5 MPa (15.3 to 35.7 kgf/cm²)</td>
</tr>
<tr>
<td>3: 3 to 7 MPa (30.6 to 71.4 kgf/cm²)</td>
</tr>
<tr>
<td>Flow rate characteristics: A: Constant discharge rate type</td>
</tr>
<tr>
<td>Ring size: 1:15/min (1800 min⁻¹ no load)</td>
</tr>
<tr>
<td>Mounting method</td>
</tr>
<tr>
<td>A: Foot type mounting</td>
</tr>
<tr>
<td>B: Flange type mounting</td>
</tr>
<tr>
<td>Pump size: 0</td>
</tr>
<tr>
<td>Pump Type: VDS Series Compact Variable Vane Pump</td>
</tr>
</tbody>
</table>

**Installation Dimension Drawings**

VDS-0A-1A**-**10

Foot Mounting Type

![Installation Dimension Drawings](image-url)
Performance Curves

Typical characteristics at hydraulic operating fluid kinematic viscosity of 32 mm²/s

Power Loss Curve — At Full Cutoff

Noise Characteristics

Measurement Position: 1 meter behind pump
List of Sealing Parts

Seal Kit: VBAS-100B00
Applicable Pump Model: VDS-0A/B-1A*-10

Part No. | Part Name | Part Number | Q'ty
--- | --- | --- | ---
18 | O-ring | AS568-032 | 1
19 | O-ring | AS568-023 | 1
20 | O-ring | S71 (NOK) | 1
21 | O-ring | 1A-P20 | 1
22 | O-ring | 1A-P10 | 2
27 | Oil seal | TC-17358 | 1

Note:
1. Oil seals are manufactured by Nippon Oil Seal Industry Co. Ltd. (NOK).
2. O-ring 1A/B-** refers to JIS B2401-1A.

Uni-pump Specifications

Understanding Model Numbers

USV - OA - A3 - 1.5 - 4 - 13

Design number 12: 0.4kW
Number of motor poles: 4 (P)
Motor output (kW) 0.4, 0.75, 1.5
Pressure adjustment range
1: 1.0 to 2.0MPa
(10.2 to 20.4kgf/cm²)
2: 1.5 to 3.5MPa
(15.3 to 35.7kgf/cm²)
3: 2.0 to 7.0MPa
(20.4 to 71.4kgf/cm²)
Flow characteristics A: Constant discharge type
Motor mounting method A: Foot type mounting
Pump size 0: VDS-OB
Pump Type: VDS Series Uni-pump

Specifications

<table>
<thead>
<tr>
<th>Maximum Working Pressure MPa [kgf/cm²]</th>
<th>Maximum Flow Rate l/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>50Hz</td>
<td>60Hz</td>
</tr>
<tr>
<td>7(71.4)</td>
<td>12.5</td>
</tr>
</tbody>
</table>
How to select a motor

The area under a motor output curve in the graph to the left is the operating range for that motor under the rated output for that motor.

Example:

To find the motor that can produce pressure of 3.5 MPa and a discharge rate of 12.5 l/min.

Selection Process

Since the intersection of the two broken lines from a pressure of 3.5 MPa and discharge rate of 12.5 l/min intersect in the area under the 1.5 kW curve, it means that a 1.5 kW motor should be used.

Installation Dimension Drawings

USV-0A-A1-0.4-4-12

USV-0A-A2-0.75-4-13

USV-0A-A*-0.75-4-13

Motor Dimensions mm

<table>
<thead>
<tr>
<th>Uni-pump</th>
<th>Motor Dimensions mm</th>
<th>Frame No.</th>
<th>Output kW</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>USV-0A-A1-0.75-4-13</td>
<td>124 107.5 80 160 62.5 50 10 160 34 231.5 155 135 11x15</td>
<td>102</td>
<td>16.5</td>
<td>80M 0.75 16.5</td>
</tr>
<tr>
<td>USV-0A-A2-0.75-4-13</td>
<td>142.5 118.5 90 179 70 62.5 10 179 35 261 170 155 11x15</td>
<td>102</td>
<td>18</td>
<td>50L 1.5 20.5</td>
</tr>
<tr>
<td>USV-0A-A3-0.75-4-13</td>
<td>142.5 118.5 90 179 70 62.5 10 179 35 261 170 155 11x15</td>
<td>102</td>
<td>18</td>
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</table>

- Areas 50Hz: Areas 60Hz