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 cutoff.

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>10</td>
<td>12.5</td>
<td>15</td>
<td>1 to 2 (10.2 to 20.4)</td>
<td>14</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. The graph on the right provides general guidelines for the relationship between the rotation angle of the flow rate adjusting screw and the no-load discharge rate.

5. **Factory Default P-Q Settings (Standard Model)**
   - Flow Rate Setting = Maximum flow rate for model as indicated in the catalog
   - Pressure Setting = Pressure shown in table below

### Factory Default Pressure Settings MPa(kgf/cm²)

1. 2.0 (20.4)
2. 3.5 (35.7)
3. 7.0 (71.4)

### Flow Adjustment Rotation-Angle (θ) and Pump Capacity (q)

However: \( Q = q \times n \times 10^{-3} \)

\( Q \) : No-load Discharge Rate (ℓ/min)

\( q \) : Capacity (cm³/rev)

\( N \) : Revolution Speed min⁻¹

### Thrust Screw

The thrust screw is precisely adjusted at the factory during assembly. Never touch the thrust screw. See callout 9 in the cross-section diagram on page B-4.

### 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 60°C.

(Continued on following page)
### Explanation of model No.

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

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

### Installation Dimension Drawings

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

Foot Mounting Type

- **Pressure adjusting screw**
- **Flow rate adjusting screw**

Note: Foot Mounting Kit: IHM-2-10

- **Inverter Drive Precautions**
  1. Set the revolution speed within the range of the pump specification revolution speed.
  2. Changing the revolution speed may also affect the pump performance curves.

Before using the inverter, check if the pressure and motor load factor are within the range of use.
**Performance Curves**

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

**Axial Input At Full Cutoff**

**Noise Characteristics**

Measurement Position: 1 meter behind pump
### Vane Pumps

**Cross-sectional Drawings**

VDS-0B-1A'-10

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**Uni-pump Specifications**

(CE mark standard compliant)

#### Understanding Model Numbers

**USV – 0A – A3 – 1.5 – 4 – 30**

- **Design number**
  - 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: 3.0 to 7.0MPa (30.6 to 71.4kgf/cm²)
  - Flow characteristics: A: Constant discharge type
  - Motor mounting method: A: Foot type mounting
  - Pump size: 0: VDS–0B
  - Pump Type: VDS Series Uni-pump

#### Sealing Parts

**Seal Kit:** VBAS-100B00

**Applicable Pump Model:** VDS-0A/B-1A'-10

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part Name</th>
<th>Part Number</th>
<th>Q’ty</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>O-ring</td>
<td>AS568-023(NBR-90)</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>O-ring</td>
<td>AS568-032(NBR-90)</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>O-ring</td>
<td>S-71</td>
<td>1</td>
</tr>
<tr>
<td>21</td>
<td>O-ring</td>
<td>NBR-70-1 P20</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>O-ring</td>
<td>NBR-70-1 P10</td>
<td>2</td>
</tr>
<tr>
<td>27</td>
<td>Oil seal</td>
<td>TC-17358-V</td>
<td>1</td>
</tr>
</tbody>
</table>

**Note:**
1. Oil seals are manufactured by Nippon Oil Seal Industry Co. Ltd. (NOK).
2. The materials and hardness of the O-ring conform with JIS B2410.

---

**Maximum Working Pressure**

<table>
<thead>
<tr>
<th>Maximum Working Pressure</th>
<th>Maximum Flow Rate ℓ/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPa {kgf/cm²}</td>
<td>50Hz</td>
</tr>
<tr>
<td>7</td>
<td>12.5</td>
</tr>
</tbody>
</table>

---

1. Standard drive motor is the fully enclosed fan-cooled E type (0.4kW) and F type (0.75, 1.5kW).
2. Standard voltage for drive motor is 200 VAC, 50/60 Hz or 220 VAC, 60 Hz.
3. Standard terminal box is B terminal (right side viewed from pump).
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.

* Select a uni-pump that has a pressure and flow rate that is within the range of the drive so that the drive will not overload.
* When the startup current of the uni-pump becomes higher for the IE1 motor, breakers may need to be changed. 0.4 kW is not changed from IE 1.

### Installation Dimension Drawings

**USV-0A-A*- 0.4 -4-30**

- **Pressure adjusting screw M10**
- **Discharge port Rc3/8**
- **Terminal box**
- **B terminal**
- **Motor rating plate**
- **Rotation direction plate**
- **Hanging bolt**
- **Uni-pump (name sticker)**
- **Name plate**
- **Flow rate adjusting screw M12**
- **Discharge model**
- **Drain port Rc1/4**
- **Suction port Rc1/2**
- **Flow rate adjusting screw M12**
- **Discharge model**
- **Drain port Rc1/4**
- **Suction port Rc1/2**

**USV-0A-A* -1.5 -4-30**

- **Pressure adjusting screw M10**
- **Discharge port Rc3/8**
- **Terminal box**
- **B terminal**
- **Motor rating plate**
- **Rotation direction plate**
- **Hanging bolt**
- **Uni-pump (name sticker)**
- **Name plate**
- **Flow rate adjusting screw M12**
- **Discharge model**
- **Drain port Rc1/4**
- **Suction port Rc1/2**
- **Flow rate adjusting screw M12**
- **Discharge model**
- **Drain port Rc1/4**
- **Suction port Rc1/2**

### 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-A1-0.4-4-30</td>
<td>A 113 107.5 71 139.5 56 45 4 141 –</td>
<td>IL 42 220.5 150 115 20 7</td>
<td>L M 27 132</td>
<td>N 43.5 71M 0.4 15.5</td>
</tr>
<tr>
<td>USV-0A-A2-0.4-4-30</td>
<td>A 137 107.5 80 152 62.5 50 4.5 160 193 47.5</td>
<td>IL 244.5 165 130 25 10</td>
<td>L M 27 137</td>
<td>N 65 80M 0.75 23.5</td>
</tr>
<tr>
<td>USV-0A-A3-0.75-4-30</td>
<td>A 160.5 118.5 90 183 70 62.5 4.4 183 204 22</td>
<td>IL 279 165 152.5 16 10</td>
<td>L M 27 142</td>
<td>N 68 90L 1.5 26.5</td>
</tr>
</tbody>
</table>

* See page A-21 for the characteristics of the drive motor for the unipump (domestic standard 3 rating).
* The 0.4kW drive motor does not have hanging bolts.