Piston Pumps

PVS Series Variable Volume 8.0 to 45.0 cm³/rev
Piston Pumps

- Design No. 30 is applied on PVS-0B to make the pump more compact and lighter, and reduce noise.
- Production of PVS-3B has been discontinued. Use PZS-3B.
- Pressure adjustment 3 type has been added to PVS-1B-22 and PVS-2B-45. (Design No. 20 is applied only on PVS-2B-45°.)

**Features**

Energy-saving Type with Drastically Reduced Loss

A NACHI-proprietary semi-circular barrel swash plate that receives pressure on its surface ensures a stable discharge volume at all times. This eliminates excess discharge volume, and enables the effective use of power corresponding to the load cycle.

This "energy-saving type" conserves energy, reduces power loss, and helps to reduce hydraulic costs.

Silent Type That Demonstrates Its Power Quietly

Proprietary low-noise mechanisms are incorporated on the shoe, swash plate, valve plate, and other locations to ensure silent operation. In particular, a semi-circular barrel swash plate stabilizes operation characteristics to ensure silent operation.

### Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Volume cm³/rev</th>
<th>Discharge volume at no-load ℓ/min</th>
<th>Pressure adjustment range MPa (kgf/cm²)</th>
<th>Permitted peak pressure MPa (kgf/cm²)</th>
<th>Rotating speed min⁻¹</th>
<th>Mass kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1000min⁻¹</td>
<td>1200min⁻¹</td>
<td>1500min⁻¹</td>
<td>1800min⁻¹</td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>PVS-0B-80°-30</td>
<td>8.0</td>
<td>9.6</td>
<td>12.0</td>
<td>14.4</td>
<td>2 to 3.5</td>
<td>(20.4 to 35.7)</td>
</tr>
<tr>
<td></td>
<td>(3.0 to 8.0)</td>
<td>8.0</td>
<td></td>
<td></td>
<td>2 to 7</td>
<td>(20.4 to 71.4)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>3 to 14</td>
<td>(30.6 to 143)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>3 to 21</td>
<td>(30.6 to 214)</td>
</tr>
<tr>
<td>PVS-1B-16°-0°-12</td>
<td>16.5</td>
<td>19.8</td>
<td>24.7</td>
<td>29.7</td>
<td>2 to 3.5</td>
<td>(20.4 to 35.7)</td>
</tr>
<tr>
<td></td>
<td>(5.0 to 16.5)</td>
<td>16.5</td>
<td></td>
<td></td>
<td>2 to 7</td>
<td>(20.4 to 71.4)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>3 to 14</td>
<td>(30.6 to 143)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>3 to 21</td>
<td>(30.6 to 214)</td>
</tr>
<tr>
<td>PVS-1B-22°-0°-12</td>
<td>22.0</td>
<td>26.4</td>
<td>33.0</td>
<td>39.6</td>
<td>2 to 3.5</td>
<td>(20.4 to 35.7)</td>
</tr>
<tr>
<td></td>
<td>(7.0 to 22.0)</td>
<td>22.0</td>
<td></td>
<td></td>
<td>2 to 7</td>
<td>(20.4 to 71.4)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>3 to 14</td>
<td>(30.6 to 143)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>3 to 21</td>
<td>(30.6 to 214)</td>
</tr>
<tr>
<td>PVS-2B-35°-0°-12</td>
<td>35.0</td>
<td>42.0</td>
<td>52.5</td>
<td>63.0</td>
<td>2 to 3.5</td>
<td>(20.4 to 35.7)</td>
</tr>
<tr>
<td></td>
<td>(8.0 to 35.0)</td>
<td>35.0</td>
<td></td>
<td></td>
<td>2 to 7</td>
<td>(20.4 to 71.4)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>3 to 14</td>
<td>(30.6 to 143)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>3 to 21</td>
<td>(30.6 to 214)</td>
</tr>
</tbody>
</table>

Note: Direction of rotation is clockwise when viewed from the shaft end.

- **Handling**
- **Cautions during Pump Installation and Piping**
  1. Use flexible couplings for connecting the pump shaft to the drive shaft, and prevent a radial or thrust load from being applied on the pump shaft.
  2. For centering of the pump shaft, limit the eccentricity between the drive shaft and hydraulic pump shaft to 0.05 mm, and keep the angle error within 1°.
  3. Set the length of insertion between coupling and hydraulic pump shafts so that it is within at least 2/3 or more of the coupling width.
  4. Use a sufficiently rigid pump mounting base.
  5. Set the pressure on the pump suction side to -0.03 MPa or more (suction port flow velocity within 2 m/sec).
  6. Raise part of the drain piping to above the topmost part of the pump body, and insert the return section of the drain piping into the hydraulic fluid. Also, observe the values in the following table to limit the drain back pressure to 0.1 MPa.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>PVS-0B</th>
<th>PVS-1B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe joint size</td>
<td>3/8&quot; or more</td>
<td>1/2&quot; or more</td>
</tr>
<tr>
<td>Pipe ID</td>
<td>φ7.8 dia ormore</td>
<td>φ12 dia ormore</td>
</tr>
<tr>
<td>Pipe length</td>
<td>1m or less</td>
<td>1m or less</td>
</tr>
</tbody>
</table>

- **Management of Hydraulic Operating Fluid**
  1. Use good-quality hydraulic operating fluid, and use within a kinematic viscosity range of 20 to 200 mm²/sec during operation. Use an R&O type and anti-wear hydraulic fluid of ISO-VG32 to 68. The optimum kinematic viscosity during operation is 20 to 50 mm²/sec.

- The operating temperature range is 5 to 60°C. When the oil temperature at startup is 5°C or less, warm up the hydraulic pump by low-pressure, low-operation speed operation until the oil temperature reaches 5°C.

- Provide a suction strainer with a filtering grade of about 100μm (150 mesh). Besure to provide a return line filter of grade 20μm or less on the return line to the tank. (When the hydraulic pump is used at high pressure of 14 MPa or more, we recommend providing a filter of 10μm or less.

- Manage the hydraulic operating fluid so that contamination is maintained at class NAS10 or lower.

- Use hydraulic operating fluid within an operating ambient temperature of 0 to 60°C.

(continued on following page)
Piston Pumps

■ 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.

■ Cautions at Startup
1. Before you start pump operation, fill the pump body with clean hydraulic fluid via the lubrication port.
2. An unload is required when the motor is started under condition λ < Δ. Consult your agent regarding the circuit.

■ How to Set Pressure and Discharge Volume
For the factory default pump discharge volume is set to "maximum" and discharge pressure is set to "minimum". Change the discharge volume and discharge pressure settings according to your particular operating conditions.

### Explanation of model No.

**PVS – 1 B – 16 N 2 – (*) – 12**

Design No.30: PVS-0
12: PVS-1*, PVS-2*
20: PVS-2~45N3 only

Auxiliary symbol
None: Side port type
Z: Axial port type
(PVS-1*, PVS-2*)

Pressure adjustment range [Note] Reference

Variable control mechanism [Note] Reference

Max. pump capacity (cm³/rev)
Nominal 8, 16, 22, 35, 45

Mounting method
B: Mounting flange type
A: Mounting foot type

Pump size
0, 1, 2

PVS series variable piston pump

**[Example 1]**
N*: Pressure compensation type (manual mode)
PVS-1B-16N2

**[Example 2]**
P*: Pressure compensation type (remote control mode)
PVS-1B-16P2

**[Example 3]**
N*: Pressure compensation type (remote control mode) PVS-1B-16N2Q1

**[Example 4]**
R*: Solenoid cutoff control PVS-1B-16RQ2S1

**[Example 5]**
W*: 2-pressure, 2-flow rate control w/ solenoid cutoff PVS-1B-16W2S1

**[Example 6]**
C*: 2-cutoff control PVS-1B-16PQ2S1 SS-G01

**[Example 7]**
G*: Pressure compensation type (remote control mode) PVS-1B-16H2Q1

### Note
- For details regarding the relationship between flow rate adjustment length l and pump capacity q, see the tables provided in the installation dimension drawings for each of the pumps.
- Firmly tighten the lock nuts after you have finished adjustments.

### Pressure adjustment
Turning the pressure adjusting screw CW increases the pressure.

### Discharge volume adjustment
Turning the flow rate adjusting screw CCW decreases the discharge volume.

- NQ, RS, WS, RQS and CS types are not available for the PVS-0B-8.
- NQ, ROS and CS types are not available for the PVS-1B-16-Z and PVS-2B-35-Z.
## Variable Control Mechanisms

### Standard type

<table>
<thead>
<tr>
<th>Symbol</th>
<th>External View</th>
<th>Characteristics</th>
<th>Hydraulic Circuit</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| N      | ![Diagram](image1.png) | ![Diagram](image2.png) | ![Diagram](image3.png) | Pressure compensation type (manual system)  
When the discharge pressure reaches the preset pressure set by the pressure compensator, the discharge rate is automatically reduced to hold the pressure at the set pressure (full cutoff pressure). |

### Option type

<table>
<thead>
<tr>
<th>Symbol</th>
<th>External View</th>
<th>Characteristics</th>
<th>Hydraulic Circuit</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| P      | ![Diagram](image4.png) | ![Diagram](image5.png) | ![Diagram](image6.png) | Pressure compensation type (remote control mode)  
This mode demonstrates the same characteristics as the manual mode. The full cutoff pressure can be adjusted by external pilot pressure. The discharge rate can be adjusted manually. Note 2) |
| NQ     | ![Diagram](image7.png) | ![Diagram](image8.png) | ![Diagram](image9.png) | 2-pressure, 2-flow rate control type  
The discharge volume changes in two stages by the pump’s built-in sequence valve. This allows conventional high/low pressure control to be performed on a single pump unit, and save energy in the hydraulic circuit. |
| RS (RA)| ![Diagram](image10.png) | ![Diagram](image11.png) | ![Diagram](image12.png) | Solenoid cutoff control type  
A solenoid valve for unload is integrated into the pressure compensation type to minimize energy loss when pump output is not required. Only a slight amount of heat is generated. |
| WS (WA)| ![Diagram](image13.png) | ![Diagram](image14.png) | ![Diagram](image15.png) | 2-pressure control type  
Two pressure compensation types can be obtained by switching the solenoid valve ON/OFF. Two types of pressure control are possible with the actuator set to a constant speed. |
| RQS (RQA)| ![Diagram](image16.png) | ![Diagram](image17.png) | ![Diagram](image18.png) | 2-pressure, 2-flow rate control type w/solenoid cutoff  
The discharge volume can be changed in two stages by the sequencer valve and solenoid valve for unload mounted on the pump, and unloading is possible when pressure oil is not required. |
| CS (CA)| ![Diagram](image19.png) | ![Diagram](image20.png) | ![Diagram](image21.png) | 2-cutoff control type  
Two types of pressure - flow rate characteristics can be obtained by the solenoid valve and cylinder mounted on the pump. |

---

**Note 1:** Many other variable control mechanism are also available in addition to those in the above table. Please consult your agent for details.

**Note 2:** We recommend ZR-T02-“-5895” as the remote control valve. For details, consult your agent. The pipe volume up to the remote control valve should be less than 150cm³.
**Pressure Compensation Type**

**Piston Pumps**

**Installation Dimension Drawing**

**Cross-sectional Drawing**

**Performance Curves**

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

**List of Sealing Parts (Kit Model Number PSCS-100000)**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part Name</th>
<th>Q’ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Packing</td>
<td>1</td>
<td>PSC46-100000 3 Bond</td>
</tr>
<tr>
<td>23</td>
<td>Oil seal</td>
<td>1</td>
<td>TCV-254511-V N.O.K</td>
</tr>
<tr>
<td>27</td>
<td>O-ring</td>
<td>1</td>
<td>NBR-90 P9 JIS B 2401</td>
</tr>
<tr>
<td>28</td>
<td>O-ring</td>
<td>1</td>
<td>NBR-90 P11 JIS B 2401</td>
</tr>
</tbody>
</table>

Parts marked by an asterisk "*" are not available on the market. Consult your agent.
### Installation Dimension Drawings

**PVS-1B**

(side port type)

(axial port type)

### Cross-sectional Drawing

#### List of Sealing Parts (Kit Model Number PSS-101000-2A)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part Name</th>
<th>Q’ty</th>
<th>Size</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Gasket</td>
<td>1</td>
<td>NPSG6-101000</td>
<td>Nihon Gasket</td>
</tr>
<tr>
<td>24</td>
<td>Oil seal</td>
<td>1</td>
<td>NPC-25451-V</td>
<td>N.O.K.</td>
</tr>
<tr>
<td>28</td>
<td>O-ring</td>
<td>1</td>
<td>NBR-90 G55</td>
<td>JIS B 2401</td>
</tr>
<tr>
<td>29</td>
<td>O-ring</td>
<td>1</td>
<td>NBR-90 P9</td>
<td>JIS B 2401</td>
</tr>
<tr>
<td>30</td>
<td>O-ring</td>
<td>1</td>
<td>NBR-90 P14</td>
<td>JIS B 2401</td>
</tr>
</tbody>
</table>

Parts marked by an asterisk **are not available on the market. Consult your agent.
Typical characteristics at hydraulic fluid kinematic viscosity of 32 mm²/s

Piston Pumps

**Performance Curves**

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

PVS-2B-35N*-(Z)-12

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

Performance Curves

PVS-2B-45N*-(Z)-12(20)

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

Model No. | Response Time (s) | Surge Pressure MPa(kgf/cm²) |
--- | --- | --- |
PVS-0B-8 | 0.03 to 0.04 | 2 to 4(20.4 to 40.8) |
PVS-1B-16 | 0.05 to 0.06 | 4 to 7(40.8 to 71.4) |
PVS-1B-22 | 0.05 to 0.06 | 5 to 8(51 to 81.6) |
PVS-2B-35 | 0.05 to 0.06 | 6 to 9(61.2 to 91.8) |
PVS-2B-45 | 0.05 to 0.06 | 6 to 9(61.2 to 91.8) |

Response performance changes according to pipe volume and size. Use an anti-surge valve to prevent surge voltage.

Pressure Compensator

List of Sealing Parts

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Name</th>
<th>Q’ty</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>O-ring</td>
<td>1</td>
<td>NBR-70-1 P14</td>
</tr>
<tr>
<td>10</td>
<td>O-ring</td>
<td>3</td>
<td>NBR-90 P6</td>
</tr>
<tr>
<td>11</td>
<td>O-ring</td>
<td>1</td>
<td>NBR-90 P10</td>
</tr>
</tbody>
</table>

Note) The materials and hardness of the O-ring conform with JIS B2401.
The ZR-T02-"-5895" is the recommended remote control valve. Provide piping to the remote control valve at a pipe volume of 150 cm³ or less.

### Installation Dimension Drawings

#### PVS-0B-8P*-30

- **Pilot port**
- **Drain port**
- **Flow rate adjusting screw**
- **Key width**

![Diagram of PVS-0B-8P*-30]

#### PVS-1B-16P*-12

- **Pilot port**
- **Drain port**
- **Differential pressure adjusting screw** (adjustment forbidden)
- **Flow rate adjusting screw**

![Diagram of PVS-1B-16P*-12]

#### PVS-2B-35P*-12(20)

- **Pilot port**
- **Drain port**
- **Differential pressure adjusting screw** (adjustment forbidden)
- **Flow rate adjusting screw**

![Diagram of PVS-2B-35P*-12(20)]

### Pressure Compensation Type

**(remote control mode)**

**Explanation of model No.: PVS – 0 B – 8 P* – 30**

- **Design No.:**
  - 30: PVS-0
  - 12: PVS-1”, PVS-2”
  - 20: PVS-2”-45P3 only

- **Pressure adjustment range**
  - 0: 2- 3.5MPa (20.4- 35.7kgf/cm²)
  - 1: 2- 7MPa (20.4- 71.4kgf/cm²)
  - 2: 3-14MPa (30.6-143kgf/cm²)
  - 3: 3-21MPa (30.6-214kgf/cm²)

- **P: Pressure compensation type (remote control mode)**

- **Pump size 0, 1, 2**

### P-Q Characteristics

- **Set by remote control V**
- **Discharge pressure P MPa**
- **Max. pump capacity (cm³/rev)**

#### Pressure Compensation Type

**Explanation of model No.:**

- **PVS – 0 B – 8 P* – 30**
**2-pressure, 2-flow Rate Control Type**

**Explanation of model No.: PVS – 1 B – 16 N 3 Q 1 – 12**

Design No.
12: PVS-1*, PVS-2*
20: PVS-2*-45N3Q*

- **Pressure adjustment range**
  - N*: High-pressure adjustment range, P2 (Set to lowest pressure before shipping)
  - Q*: Low-pressure adjustment range, P1 (Set to 3.5 MPa before shipping)
- **Max. pump capacity (cm³/rev) Nominal** 16, 22, 35, 45
- **Pump size** 1, 2

**P-Q Characteristics**

<table>
<thead>
<tr>
<th>Pump Model No.</th>
<th>q1 Adjustment Range (cm³/rev)</th>
<th>Default q1, Setting cm³/rev</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVS-1B-16</td>
<td>2 to 10</td>
<td>3.3</td>
</tr>
<tr>
<td>PVS-1B-22</td>
<td>2 to 13</td>
<td>4.4</td>
</tr>
<tr>
<td>PVS-2B-35</td>
<td>2 to 19</td>
<td>7</td>
</tr>
<tr>
<td>PVS-2B-45</td>
<td>3 to 24</td>
<td>9</td>
</tr>
</tbody>
</table>

**Installation Dimension Drawings**

**PVS-1B-16 N*Q*-12**

**PVS-2B-35 N*Q*-12(20)**

**Note 1)** The setting range of maximum pump capacity q1 varies according to the setting of q2.

**Note 2)** Overall efficiency at a low flow rate is lower than at the maximum flow rate. Pay attention to this when selecting the motor capacity for the drive.
Solenoid Cutoff Control Type

Explanation of model No.: PVS – 1 B – 16 R 2 S 1 – 12

- Solenoid power supply: 1: AC100V, 2: AC200V, 3: DC12V, 4: DC24V
- Solenoid specifications: A: SA-G01, S: SS-G01

Pressure adjustment range:
- 0: 2-3.5MPa (20.4-35.7kgf/cm²)
- 1: 2-7MPa (20.4-71.4kgf/cm²)
- 2: 3-14MPa (30.6-143kgf/cm²)
- 3: 3-21MPa (30.6-214kgf/cm²)

R*: Solenoid cutoff control

Max. pump capacity (cm³/rev)
- Nominal 16, 22, 35, 45

Installation Dimension Drawings

PVS-1B-16 R* A

PVS-2B-35 R* A

- Do not touch the surface of the coil directly with your hands.

The coil surface temperature increases if this pump is kept continuously energized.
2-pressure Control Type

Explanation of model No.: PVS – 1 B – 16 W 2 S 1 – 12

Solenoid power supply 1: AC100V
2: AC200V
3: DC12V
4: DC24V

Solenoid specifications A: SA-G01
B: SS-G01

Pressure adjustment range
0: 2- 3.5MPa (20.4- 35.7kgf/cm²)
1: 2- 7MPa (20.4- 71.4kgf/cm²)
2: 3-14MPa (30.6-143kgf/cm²)
3: 3-21MPa (30.6-214kgf/cm²)

W_A: 2-pressure control
Max. pump capacity (cm³/rev) Nominal 16, 22, 35, 45

Installation Dimension Drawings

PVS-1B-16 w_A-S-12

PVS-2B-35 w_A-S-12(20)

■ The coil surface temperature increases if this pump is kept continuously energized.
Do not touch the surface of the coil directly with your hands.
Piston Pumps

2-pressure, 2-flow rate Control Type w/ Solenoid Cutoff

Explanation of model No.:  
PVS – 1 B – 16 RQ 2 S 1 – 12

- Solenoid power supply:  
  1: AC100V  
  2: AC200V  
  3: DC12V  
  4: DC24V

- Solenoid specifications:  
  A: SA-G01  
  S: SS-G01

- Pressure adjustment range:  
  0: 2-7MPa (20.4-71.4kgf/cm²)  
  1: 2-7MPa (20.4-71.4kgf/cm²)  
  2: 3-14MPa (30.6-143kgf/cm²)  
  3: 3-21MPa (30.6-214kgf/cm²)

- P-Q Characteristics

Pump size 1, 2
Max. pump capacity (cm³/rev)  
Nominal 16, 22, 35, 45

Installation Dimension Drawings

PVS-1B-16RQ_A^*-12

PVS-2B-35RQ_A^*-12(20)

- The coil surface temperature increases if this pump is kept continuously energized.  
  Do not touch the surface of the coil directly with your hands.
2-cutoff Control Type

Explanation of model No.: PVS – 1 B – 16 C 2 S 1 – 12

Solenoid power supply:
1: AC100V
2: AC200V
3: DC12V
4: DC24V

Solenoid specifications:
A: SA-G01
S: SS-G01

Pressure adjustment range:
0: 2–3.5 MPa (20.4–35.7 kgf/cm²)
1: 2–7 MPa (20.4–71.4 kgf/cm²)
2: 3–14 MPa (30.6–143 kgf/cm²)
3: 3–21 MPa (30.6–214 kgf/cm²)

P-S: 2-cutoff control

Max. pump capacity (cm³/rev) Nominal 16, 22, 35, 45

Installation Dimension Drawings

PVS-1B-16

PVS-2B-35

P-VS-45

The coil surface temperature increases if this pump is kept continuously energized.
Do not touch the surface of the coil directly with your hands.
### Foot Mounting Kit

<table>
<thead>
<tr>
<th>Kit Model No.</th>
<th>Applicable Pump Model No.</th>
<th>Accessories</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Bolt Q'ty</td>
<td>Washer Q'ty</td>
</tr>
<tr>
<td>IHM-2-10</td>
<td>PVS-0B</td>
<td>TB-10×30</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>PVS-1B</td>
<td>TB-12×30</td>
<td>2</td>
</tr>
</tbody>
</table>

When only the mounting feet are required, the pump mounting bolts, washers and other parts are sold together as the Foot Mounting Kit.

### Coupling kit

**Kit for PVS-0B: PSCF-100000**

### Piping Flange Kit

**For PVS-1B, 2B**

<table>
<thead>
<tr>
<th>Applicable Pump Model No.</th>
<th>PVS-1B-16, 22</th>
<th>PSF-100000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plunger Kit model No.</td>
<td>Suction port</td>
<td>Discharge port</td>
</tr>
<tr>
<td>A</td>
<td>70</td>
<td>65</td>
</tr>
<tr>
<td>B</td>
<td>59</td>
<td>52</td>
</tr>
<tr>
<td>C</td>
<td>52.4</td>
<td>47.5</td>
</tr>
<tr>
<td>D</td>
<td>26.2</td>
<td>22.0</td>
</tr>
<tr>
<td>T</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>φ d1</td>
<td>φ 11</td>
<td>φ 11</td>
</tr>
<tr>
<td>φ d2</td>
<td>φ 28</td>
<td>φ 22</td>
</tr>
<tr>
<td>X</td>
<td>1</td>
<td>3/4</td>
</tr>
<tr>
<td>Mounting bolt</td>
<td>TH-10×40</td>
<td>TH-10×40</td>
</tr>
<tr>
<td>Washer</td>
<td>WS-B-10</td>
<td>WS-B-10</td>
</tr>
<tr>
<td>O-ring</td>
<td>NBR-90 G35</td>
<td>NBR-90 G35</td>
</tr>
<tr>
<td>Weight kgf</td>
<td>0.6</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Notes**
1. The piping flange is on sale in the Flange Kit which includes mounting bolts, washers and O-rings.
2. The materials and hardness of the O-ring conform with JIS B2401.
3. For details on tightening torque, see page C-11.
Uni-pump Specifications

Explanation of model No.

UPV - 1 A - 16 N 1 - 1.5 * - 4 * - * - 30(50)

- Design No. 30: PVS-1B 0.75-5.5kW
  - PVS-2B 3.7-7.5kW
  - 50: PVS-0B 0.75-3.7kW
- Auxiliary symbol
  - None: Side port type
  - Z: Axial port type (PVS-1B, 2B)
- Number of motor poles: 4 poles
- Motor terminal: None: Right side viewed from pump side
  - A: Left side viewed from pump side
- Motor output
  - 0.7: 0.75kW
  - 1.5: 1.5kW
  - 2.2: 2.2kW
- Pressure adjustment range
  - 0: 2 - 3.5MPa (20.4 - 35.7kgf/cm²)
  - 1: 2 - 7MPa (20.4 - 71.4kgf/cm²)
  - 2: 3-14MPa (30.6-143kgf/cm²)
  - 3: 3-21MPa (30.6-214kgf/cm²) (Note) Not available at 45 cm/rev

- Variable control mechanism
  - N: pressure compensation type
- Max. pump capacity (cm³/rev)
  - Nominal 8, 16, 22, 35, 45

Motor selection curves

- How to select the motor
  - The lower side of the output curves for each of the motors shown above indicates the operating range under rated output for that motor.
  - * 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.

Motor Abnormal Voltage Specification list

<table>
<thead>
<tr>
<th>Abnormal Voltage symbol</th>
<th>Voltage - Frequency</th>
<th>Abnormal Voltage symbol</th>
<th>Voltage - Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>AC 200V-50/60Hz, AC 220V-60Hz</td>
<td>M</td>
<td>AC 230V - 60Hz</td>
</tr>
<tr>
<td>D</td>
<td>AC 380V - 50Hz</td>
<td>N</td>
<td>AC 230V - 50Hz</td>
</tr>
<tr>
<td>E</td>
<td>AC 415V - 50Hz</td>
<td>R</td>
<td>AC 400V - 50Hz</td>
</tr>
<tr>
<td>F</td>
<td>AC 440V - 60Hz</td>
<td>S</td>
<td>AC 440V - 50Hz</td>
</tr>
<tr>
<td>G</td>
<td>AC 460V - 60Hz</td>
<td>U</td>
<td>AC 380V - 60Hz</td>
</tr>
<tr>
<td>H</td>
<td>AC 480V - 60Hz</td>
<td>V</td>
<td>AC 400V - 60Hz</td>
</tr>
<tr>
<td>L</td>
<td>AC 220V - 50Hz</td>
<td>W</td>
<td>AC 420V - 50HZ</td>
</tr>
</tbody>
</table>
1. Drive motor is fully enclosed fan cooled, 0.75 to 3.7 kW is E type, and 5.5 to 7.5 kW is B type.
2. Standard voltage for drive motor is 200 VAC, 50/60 Hz or 220 VAC, 60 Hz.
3. Viewed from the pump side, suction port is on the left and discharge port is on the right.
4. Broken lines indicate instances for the A terminal. Broken lines pass through to the other side of the pump along its center.
5. See page (A-21) for the dimension table and characteristics of drive motor.
Piston Pumps

Characteristics of drive motor for unipump (domestic standard 3 rating)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.4</td>
<td>4</td>
<td>VBEA-</td>
<td>200</td>
<td>50</td>
<td>2.20</td>
<td>1420</td>
<td>E</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(VDS series only)</td>
<td>200</td>
<td>60</td>
<td>1.90</td>
<td>1710</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>220</td>
<td>60</td>
<td>1.91</td>
<td>1720</td>
<td></td>
</tr>
<tr>
<td>0.75</td>
<td>4</td>
<td>V*EA-<em>A4</em>07</td>
<td>200</td>
<td>50</td>
<td>3.5</td>
<td>1430</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>200</td>
<td>60</td>
<td>3.2</td>
<td>1720</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>220</td>
<td>60</td>
<td>3.1</td>
<td>1730</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>4</td>
<td>V*EA-<em>A4</em>15</td>
<td>200</td>
<td>50</td>
<td>6.9</td>
<td>1450</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>200</td>
<td>60</td>
<td>6.2</td>
<td>1740</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>220</td>
<td>60</td>
<td>6.0</td>
<td>1750</td>
<td></td>
</tr>
<tr>
<td>2.2</td>
<td>4</td>
<td>V*EA-<em>A4</em>22</td>
<td>200</td>
<td>50</td>
<td>9.5</td>
<td>1460</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>200</td>
<td>60</td>
<td>8.8</td>
<td>1750</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>220</td>
<td>60</td>
<td>8.5</td>
<td>1760</td>
<td></td>
</tr>
<tr>
<td>3.7</td>
<td>4</td>
<td>V*EA-<em>A4</em>37</td>
<td>200</td>
<td>50</td>
<td>15.4</td>
<td>1460</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>200</td>
<td>60</td>
<td>14.3</td>
<td>1760</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>220</td>
<td>60</td>
<td>13.5</td>
<td>1760</td>
<td></td>
</tr>
<tr>
<td>5.5</td>
<td>4</td>
<td>V*EA-<em>A4</em>55</td>
<td>200</td>
<td>50</td>
<td>23.0</td>
<td>1470</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>200</td>
<td>60</td>
<td>21.0</td>
<td>1760</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>220</td>
<td>60</td>
<td>19.9</td>
<td>1770</td>
<td></td>
</tr>
<tr>
<td>7.5</td>
<td>4</td>
<td>V*EA-<em>A4</em>75</td>
<td>200</td>
<td>50</td>
<td>30.0</td>
<td>1460</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>200</td>
<td>60</td>
<td>27.0</td>
<td>1760</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>220</td>
<td>60</td>
<td>26.0</td>
<td>1770</td>
<td></td>
</tr>
</tbody>
</table>

1. The asterisks * indicate variations in the hydraulic pump series, size, and position of terminal box. Check the ratings sticker on the side of the drive motor (terminal box side).
2. Contact us for variations in voltage.
3. The allowable fluctuating range of the voltage value is ±5%.
4. Paint Color: Nachi standard color Mancel No. 5B6/3