Variable Displacement Axial Piston Pumps:

Installation Manual

- MEDIUM HEAVY DUTY SERIES
  > PPV100S16
  > PPV100S37
  > PPV100S56
  > PPV100S71
  > PPV100S100
  > PPV100S145
  > PPV100S180

- MEDIUM HEAVY DUTY SERIES
  > PPV100-16
  > PPV100-37
  > PPV100-56
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- MEDIUM HEAVY DUTY SERIES
  > PPV101-45
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HEAVY DUTY SERIES
- PPV102-63
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LIGHT DUTY SERIES
- PPV103-10
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- PPV103-37
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- PPV103-70
- PPV103-90
- PPV103-145
To prevent serious accidents, equipment damage, and other property damage, please observe the following precautions, as well as all related regulations regarding safety.

Before using the product, make sure you read and understand all the instructions in the Operator's Manual entirely.

In this catalogue, safety precautions are classified under three headings: DANGER, WARNING, and CAUTION. These words are defined as follows:

**DANGER**
Indicates an imminent danger that is very likely to cause death or severe injury unless the situation is avoided.

**WARNING**
Indicates a potential danger that may cause death or severe injury unless the situation is avoided.

**CAUTION**
Indicates a potential danger that may cause a minor or moderate injury or that may result in property damage.

**INFORMATION**
Indicates useful hints and system tips. They are necessary for correct installation and safe use of the product.

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### PRECAUTIONS FOR USE

**CAUTION**
1. To avoid possible injury when handling the products, wear protective safety equipment in accordance with the instructions in the Operator's Manual.

**CAUTION**
2. Failure to support the weight of the product or lifting the product with improper posture may result in injury to the hands or back. Be sure to follow the instructions in the Operator's Manual.

**CAUTION**
3. Do not climb on, strike, drop or exert unnecessary force on the product. This may lead to injury or fire due to incorrect operation, damage, or oil leakage.

**CAUTION**
4. Oil on the product or floor must be cleaned up thoroughly. Oil could cause you to drop the product or slip on the floor.

### PRECAUTIONS FOR INSTALLATION, REMOVAL, AND MAINTENANCE

**WARNING**
1. All installation, removal, maintenance, piping or wiring work should be carried out by properly trained personnel.

**WARNING**
2. Before beginning any installation, removal, maintenance, piping or wiring work, the following procedures must be carried out. Failure to carry out these procedures may cause the equipment to move suddenly or oil to spill during the work, which may result in serious accidents.
   - Shut off the power supply to the equipment and make sure that all the electrical motors or machines cannot restart unintentionally.
   - Secure the cylinder rods before installing/removing the cylinder.
   - Reduce the pressure in the pipes and cylinders in the hydraulic system to zero pressure.

**WARNING**
3. Before working on any electrical wiring, be sure to shut off the power supply. Failure to do this may cause an electric shock.

**CAUTION**
4. Keep all installation holes and surfaces clean. Failure to do this may cause insufficient tightening of the bolts which may lead to a fire due to oil leakage.

**CAUTION**
5. Before commissioning the device, make sure that all bolts are tightened to the specified torque. Failure to do so may result in incorrect operation, damage, oil leakage, etc.
PRECAUTIONS FOR OPERATION

DANGER
1. Never operate any device in an environment where there is danger of explosion or fire, unless the device is fully protected. This may lead to major and serious accidents including explosion or fire.

WARNING
2. Do not approach the pumps or motors when in operation. Hands or clothes can be caught up and wound into the pumps and motors which can lead to serious injury.

WARNING
3. In event of abnormal operation (unusual sounds, oil leakage, smoke, etc.), immediately stop operation and take appropriate corrective measures.

WARNING
4. Completely discharge air from the cylinder at low pressure. Failure to do so may result in unexpected movement of the cylinder, which in turn may cause injury.

WARNING
5. To adjust the damping, gradually increase the cylinder speed from a low speed (50 mm/s or less). Rapidly accelerating the cylinder may produce an abnormal pressure surge, resulting in damage to the cylinder or the machinery and causing a serious accident.

WARNING
6. Before operating this device for the first time, check that hydraulic and electrical circuits are properly connected and that adjoining surfaces are tightly aligned.

WARNING
7. Do not use the product outside of the specifications described in the catalogue, related data sheets, drawings, etc. Failure to adhere to them may cause incorrect operation, damage or injury.

WARNING
8. During operation, high temperatures may occur in the hydraulic system or solenoid valves. Protective gloves and suits must be worn when in the vicinity of these devices.

WARNING
9. Always operate the device with clean oil, and within established ranges for temperature, viscosity and cleanliness. Failure to adhere to specified limits may result in incorrect operation or fire due to oil leakage.

GENERAL PRECAUTIONS

WARNING
1. Never modify the equipment. If any alterations are made, unexpected machine movement may cause injury.

CAUTION
2. Do not disassemble the products without prior consent of the manufacturer. Failure to adhere to this can cause the products to operate incorrectly which can lead to accidents or damage.

CAUTION
3. For transportation / storage of the product, pay attention to environmental conditions, such as ambient temperature and humidity, and implement anti-dust / anti-corrosion measures.

CAUTION
4. The seals may need to be replaced if the product is used after long-term storage.

CAUTION
5. Read the manual thoroughly and ensure that the seals are replaced properly.

RELATED REGULATIONS

CAUTION
To ensure that this product is used in a safe manner, it is essential to observe the above precautions, as well as all related regulations regarding safety.
MEDIUM HEAVY DUTY SERIES

Technical specifications

<table>
<thead>
<tr>
<th>Series</th>
<th>Geometric displacement [cm³/rev]</th>
<th>Operating pressure</th>
<th>Drive speed [rpm]</th>
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<tbody>
<tr>
<td>PPV100S16</td>
<td>16.3</td>
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</table>

Documentation

Check the product’s model code and compare it with your paper work.

Delivery note and / or sales acknowledgement.

Direction of rotation

Check the direction of rotation of the shaft and compare it to the drive unit.

Clockwise shaft rotation.
Viewed from (front) end of shaft.
Ports
Suction, discharge, drain and filling ports

Minimum pump suction pressure under static and dynamic load:
\[ p_{in\,Min} = 0.833 \text{ bar absolute} \]

Maximum pump inlet pressure:
\[ p_{in\,Max} = 1.500 \text{ bar absolute} \]

Pump arrangement

Suction line

Drain line
Must be higher than top of pump case

Drain line

Oil

Min. oil level

Oil

Drain port

Oil

Drain line

Oil

Discharge port “DR”

Drain port “DR”

Filling port

Suction, discharge, drain and filling ports

Drain port

Ports

Suction, discharge, drain and filling ports

Drain port “DR”

Filling port

Discharge port “DR”

Suction line

200 mm minimum depth

Drain line

200 mm minimum depth

Oil

Min. oil level

Drain port

Drain line

Oil

200 mm minimum depth
Piping

Drain line
Do not combine drain lines.
Always run drain lines separately, not longer than 1 m and the pipe end must be immersed in oil.
Do not restrict drain lines.
A restricted drain line (cooler, filter, valve etc.) can damage the pump.
Do not reduce drain line internal diameter.
The drain line internal diameter must always correspond to the drain hole size on the pump case.

Suction line
Do not restrict suction lines.
A restricted suction line (filter, valve etc.) can generate excessive noise and damage the pump.
Do not reduce the suction line internal diameter.
The suction line internal diameter must always correspond to the flange size on the pump case.

General
Use rubber hoses to reduce noise and excessive load on the pump.
Use high pressure hoses and pipes only at the outlet (discharge port) of the pump.

Commissioning
Prior to commissioning, the pump case must be filled with hydraulic fluid (use filling port). Initial commissioning should be at zero pressure with an open circuit to enable the pump to prime.
Pressure should only be increased once the pump has been fully primed.

Hydraulic fluid
- Normal mineral oil (H, HL)
- Premium hydraulic fluid (HLP)
- Phosphate ester (HFD-R)
- Polyolester (HEES, HFD-U)
- Water glycol (HFC)

Note: For operating restrictions, please contact HYDAC.

Filtration
For maximum pump and system component life time, the system should be protected from contamination by effective filtration.
Cleanliness class to NAS 1638 Class 10 (21/19/16 ISO 4406:1999) or cleaner.

Viscosity and temperature
Normal operating viscosity range is 20 – 400 cSt (mm²/s).
Normal operating temperature range is -20 to +95 °C.

Note: The highest fluid temperature will be at the drain port of the pump, up to 20 °C higher than in the reservoir.
MEDIUM HEAVY DUTY SERIES

Technical specifications

<table>
<thead>
<tr>
<th>Series</th>
<th>Geometric displacement [cm³/rev]</th>
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</table>

Documentation

Check the product’s model code and compare it with your paperwork.

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Direction of rotation

Check the direction of rotation of the shaft and compare it to the drive unit.

Clockwise shaft rotation. Viewed from (front) end of shaft.
## Ports

Suction, discharge, drain and filling ports

- **Inlet** (suction port)
- **Outlet** (discharge port)
- **Drain port**
- **Filling port**

Minimum pump suction pressure under static and dynamic load:

\[ p_{in_{\text{Min}}} = 0.833 \text{ bar absolute} \]

Maximum pump inlet pressure:

\[ p_{in_{\text{Max}}} = 1.500 \text{ bar absolute} \]

### Pump arrangement

- **Standard arrangement:** pump above reservoir.
- **Preferred arrangement** for best suction characteristics and low noise level pump operation. Pump below reservoir.
**Piping**

**Drain line**
- Do not combine drain lines.
- Always run drain lines separately, not longer than 1 m and the pipe end must be immersed in oil.
- Do not restrict drain lines.
- A restricted drain line (cooler, filter, valve etc.) can damage the pump.
- Do not reduce drain line internal diameter.
- The drain line internal diameter must always correspond to the drain hole size on the pump case.

**Suction line**
- Do not restrict suction lines.
- A restricted suction line (filter, valve etc.) can generate excessive noise and damage the pump.
- Do not reduce the suction line internal diameter.
- The suction line internal diameter must always correspond to the flange size on the pump case.

**General**
- Use rubber hoses to reduce noise and excessive load on the pump.
- Use high pressure hoses and pipes only at the outlet (discharge port) of the pump.

**Commissioning**
- Prior to commissioning, the pump case must be filled with hydraulic fluid (use filling port). Initial commissioning should be at zero pressure with an open circuit to enable the pump to prime.
- Pressure should only be increased once the pump has been fully primed.

**Hydraulic fluid**
- Normal mineral oil (H, HL)
- Premium hydraulic fluid (HLP)
- Phosphate ester (HFD-R)
- Polyolester (HEES, HFD-U)
- Water glycol (HFC)

**Note:**
For operating restrictions, please contact HYDAC.

**Filtration**
- For maximum pump and system component life time, the system should be protected from contamination by effective filtration.
- Cleanliness class to NAS 1638 Class 10 (21/19/16 ISO 4406:1999) or cleaner.

**Viscosity and temperature**
- Normal operating viscosity range is 20 – 400 cSt (mm²/s).
- Normal operating temperature range is -20 to +95 °C.

**Note:**
- The highest fluid temperature will be at the drain port of the pump, up to 20 °C higher than in the reservoir.
MEDIUM HEAVY DUTY SERIES

Technical specifications

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</tbody>
</table>

Documentation

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Direction of rotation

Check the direction of rotation of the shaft and compare it to the drive unit.

Clockwise shaft rotation. Viewed from (front) end of shaft.

Anti-clockwise shaft rotation. Viewed from (front) end of shaft.

For further details, please contact HYDAC.
**Ports**
Suction, discharge, drain and venting port

Minimum pump suction pressure under static and dynamic load:
\[ p_{in\,Min} = 1.0 \text{ bar absolute} \]
Maximum pump inlet pressure:
\[ p_{in\,Max} = 4.5 \text{ bar absolute} \]

**Pump arrangement**

Standard arrangement: pump above reservoir.

Vertical pump installation
### Piping

**Drain line**
- Do not combine drain lines.
  - Always run drain lines separately, not longer than 1 m and the pipe end must be immersed in oil.
- Do not restrict drain lines.
  - A restricted drain line (cooler, filter, valve etc.) can damage the pump.
- Do not reduce drain line internal diameter.
  - The drain line internal diameter must always correspond to the drain hole size on the pump case.

**Suction line**
- Do not restrict suction lines.
  - A restricted suction line (filter, valve etc.) can generate excessive noise and damage the pump.
- Do not reduce the suction line internal diameter.
  - The suction line internal diameter must always correspond to the flange size on the pump case.

### General
- Use rubber hoses to reduce noise and excessive load on the pump.
- Use high pressure hoses and pipes only at the outlet (discharge port) of the pump.

### Commissioning
- Prior to commissioning, the pump case must be filled with hydraulic fluid (use filling port). Initial commissioning should be at zero pressure with an open circuit to enable the pump to prime.
- Pressure should only be increased once the pump has been fully primed.

### Hydraulic fluid
- Normal mineral oil (H, HL)
- Premium hydraulic fluid (HLP)

**Note:**
For operating restrictions, please contact HYDAC.

### Filtration
- For maximum pump and system component life time, the system should be protected from contamination by effective filtration.
  - Cleanliness class to NAS 1638 Class 9 (21/18/15 ISO 4406:1999) or cleaner.

### Viscosity and temperature
- Normal operating viscosity range is 10 – 200 cSt (mm²/s).
- Normal operating temperature range is -20 to +95 °C.

**Note:**
- The highest fluid temperature will be at the drain port of the pump, up to 20 °C higher than in the reservoir.
HEAVY DUTY SERIES

Technical specifications

<table>
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Direction of rotation

Check the direction of rotation of the shaft and compare it to the drive unit.

Clockwise shaft rotation. Viewed from (front) end of shaft.

For further details, please contact HYDAC.

Anti-clockwise shaft rotation. Viewed from (front) end of shaft.
**Ports**

Suction, discharge, drain and venting port

Minimum pump suction pressure under static and dynamic load: \( p_{\text{in Min}} = 0.9 \text{ bar absolute} \)

Maximum pump inlet pressure: \( p_{\text{in Max}} = 4.5 \text{ bar absolute} \)

**Pump arrangement**

Standard arrangement: pump above reservoir.

Vertical pump installation
Piping

Drain line
Do not combine drain lines. Always run drain lines separately, not longer than 1 m and the pipe end must be immersed in oil. Do not restrict drain lines. A restricted drain line (cooler, filter, valve etc.) can damage the pump. Do not reduce drain line internal diameter. The drain line internal diameter must always correspond to the drain hole size on the pump case.

Suction line
Do not restrict suction lines. A restricted suction line (filter, valve etc.) can generate excessive noise and damage the pump. Do not reduce the suction line internal diameter. The suction line internal diameter must always correspond to the flange size on the pump case.

General
Use rubber hoses to reduce noise and excessive load on the pump. Use high pressure hoses and pipes only at the outlet (discharge port) of the pump.

Commissioning
Prior to commissioning, the pump case must be filled with hydraulic fluid (use filling port). Initial commissioning should be at zero pressure with an open circuit to enable the pump to prime. Pressure should only be increased once the pump has been fully primed.

Hydraulic fluid
- Normal mineral oil (H, HL)
- Premium hydraulic fluid (HLP)

Note:
For operating restrictions, please contact HYDAC.

Filtration
For maximum pump and system component lifetime, the system should be protected from contamination by effective filtration. Cleanliness class to NAS 1638 Class 9 (20/18/15 ISO 4406:1999) or cleaner.

Viscosity and temperature
Normal operating viscosity range is 10 – 200 cSt (mm²/s). Normal operating temperature range is -20 to +95 °C.

Note:
The highest fluid temperature will be at the drain port of the pump, up to 20 °C higher than in the reservoir.
LIGHT DUTY SERIES

Technical specifications

<table>
<thead>
<tr>
<th>Series</th>
<th>Geometric displacement [cm³/rev]</th>
<th>Operating pressure</th>
<th>Drive speed [rpm]</th>
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Direction of rotation

Check the direction of rotation of the shaft and compare it to the drive unit.

Clockwise shaft rotation. Viewed from (front) end of shaft.
Ports
Suction, discharge, drain and filling ports

Minimum pump suction pressure under static and dynamic load: $p_{in\, Min} = 0.833$ bar absolute
Maximum pump inlet pressure: $p_{in\, Max} = 1.500$ bar absolute

Pump arrangement

Standard arrangement: pump above reservoir.

Preferred arrangement for best suction characteristics and low noise level pump operation. Pump below reservoir.
Piping

Drain line
Do not combine drain lines.
Always run drain lines separately, not longer than 1 m and the pipe end must be immersed in oil.
Do not restrict drain lines.
A restricted drain line (cooler, filter, valve etc.) can damage the pump.
Do not reduce drain line internal diameter.
The drain line internal diameter must always correspond to the drain hole size on the pump case.

Suction line
Do not restrict suction lines.
A restricted suction line (filter, valve etc.) can generate excessive noise and damage the pump.
Do not reduce the suction line internal diameter.
The suction line internal diameter must always correspond to the flange size on the pump case.

General
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Use high pressure hoses and pipes only at the outlet (discharge port) of the pump.

Commissioning
Prior to commissioning, the pump case must be filled with hydraulic fluid (use filling port). Initial commissioning should be at zero pressure with an open circuit to enable the pump to prime.
Pressure should only be increased once the pump has been fully primed.

Hydraulic fluid
- Normal mineral oil (H, HL)
- Premium hydraulic fluid (HLP)
- Phosphate ester (HFD-R)
- Polyolester (HEES, HFD-U)
- Water glycol (HFC)

Note: For operating restrictions, please contact HYDAC.

Filtration
For maximum pump and system component life time, the system should be protected from contamination by effective filtration.
Cleanliness class to NAS 1638 Class 10 (21/19/16 ISO 4406:1999) or cleaner.

Viscosity and temperature
Normal operating viscosity range is 20 – 400 cSt (mm²/s).
Normal operating temperature range is -20 to +95 °C.

Note: The highest fluid temperature will be at the drain port of the pump, up to 20 °C higher than in the reservoir.