Danfoss APP 0.6-1.0 Axial Piston Pump

Danfoss APP 0.6-1.0 Axial Piston Pump Instructions

Contents

Danfoss APP 0.6-1.0 Axial Piston Pump

Product Information

Specifications:

- **Model:** APP pump
- **Available versions:** APP 0.6-1.0, APP 1.5-2.5, and APP 3.0-3.5

Product Usage Instructions

Identification
The APP pump is available in different versions: APP 0.6-1.0, APP 1.5-2.5, and APP 3.0-3.5. Please make sure to identify the correct model before proceeding with the installation and usage.

System Design
The design of the system must ensure that self-emptying of the pump during a standstill is avoided. Additionally, the inlet pressure should never exceed the outlet pressure to prevent any damage to the pump.

Open-ended systems with water supply from a tank
If your system is designed with a water supply from a tank, follow these guidelines:

1. Place the tank above the pump to avoid cavitation. The water level in the tank should always be above the pump.
2. Install the inlet filter before the tank.
3. Dimension the inlet line to minimize pressure loss by ensuring a large flow area, minimum pipe length, minimum number of bends/connections, and fittings with small pressure losses.

Open-ended systems with direct water supply
If your system is designed with a direct water supply from a booster pump, take the following precautions:

- The water pressure must not exceed 5 bar (72.5 psig).
- Install a pre-stressed check valve or a pressure switch in the pump inlet to avoid exceeding the maximum pressure.
- The opening pressure of the check valve must be equal to or greater than the inlet pressure.

Problems with Reversing Pumps
If the pump is exposed to high pressure in the outlet while the electric motor is not energized, the pumps may start spinning backwards. To prevent this, consider the following:

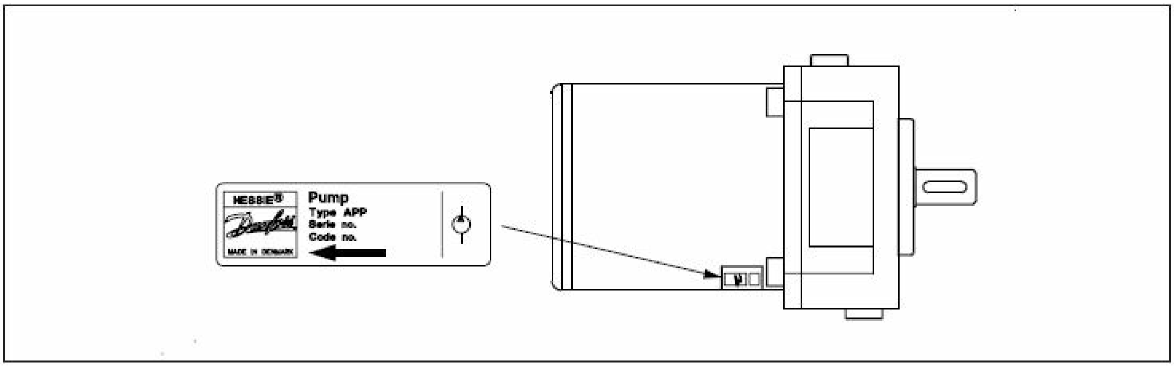
- If a non-return valve is mounted in the inlet line, a low-pressure relief valve is also required.
- Alternatively, a high-pressure check valve can be mounted in the pump discharge line to prevent the pump from reversing.

General Guidelines for Calculation of Pressure Losses
To avoid the risk of cavitation, ensure that the inlet pressure at the pump is per the specifications mentioned in the Datasheet (521B1331). Additionally, make sure to properly tighten the inlet line connection to prevent any air entrance that may cause cavitation. The suction conditions can be optimized following the provided guidelines.

FAQ (Frequently Asked Questions)

- **Q: What are the available versions of the APP pump?**
  A: The available versions are APP 0.6-1.0, APP 1.5-2.5, and APP 3.0-3.5.
- **Q: What should I do if the water pressure exceeds 5 bar (72.5 psig) in an open-ended system with a direct water supply?**
  A: To avoid exceeding the maximum pressure, it is recommended to install a pre-stressed check valve or a pressure switch in the pump inlet. The opening pressure of the check valve must be equal to or greater than the inlet pressure.
- **Q: How can I prevent the pumps from reversing?**
  A: If a non-return valve is mounted in the inlet line, a low-pressure relief valve is required. Alternatively, a high-pressure check valve can be mounted in the pump discharge line to prevent the pump from reversing.

Identification



System Design

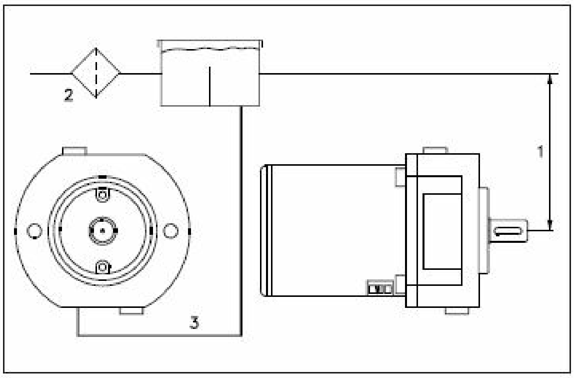
- The design of the system must ensure that self-emptying of the pump during a standstill is avoided.
- The inlet pressure of the pump must never exceed the outlet pressure. This may typically occur in boosted or

open-ended systems with direct water supply.

- To avoid this it is recommended to install a pre-stressed check valve or a pressure switch in the pump inlet.
- The opening pressure of the check valve must be bigger or equal to the inlet pressure.

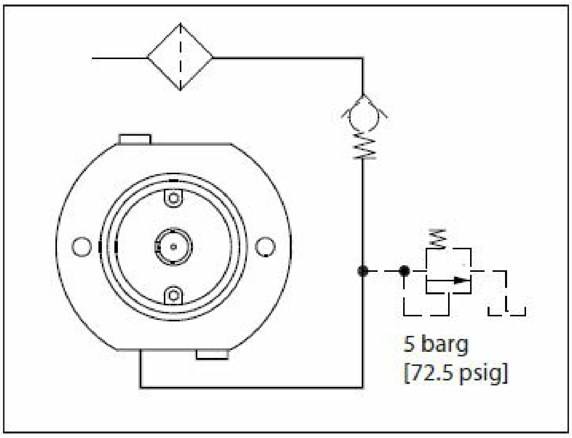
Open-ended systems with water supply from a tank
(The numbers 1-3 refer to the drawing below.) To eliminate the risk of cavitation, observe the following guidelines:

1. Place the tank above the pump (the water level in the tank should always be above the pump).
2. Place the inlet filter before the tank.
3. Dimension the inlet line to obtain mini- mum pressure loss (large flow area, minimum pipe length, minimum number of bends/connections, fittings with small pressure losses).



Open-ended systems with direct water supply

- The pump is supplied with water directly from a booster pump.
- The water pressure must not exceed 5 bar (72.5 psig).

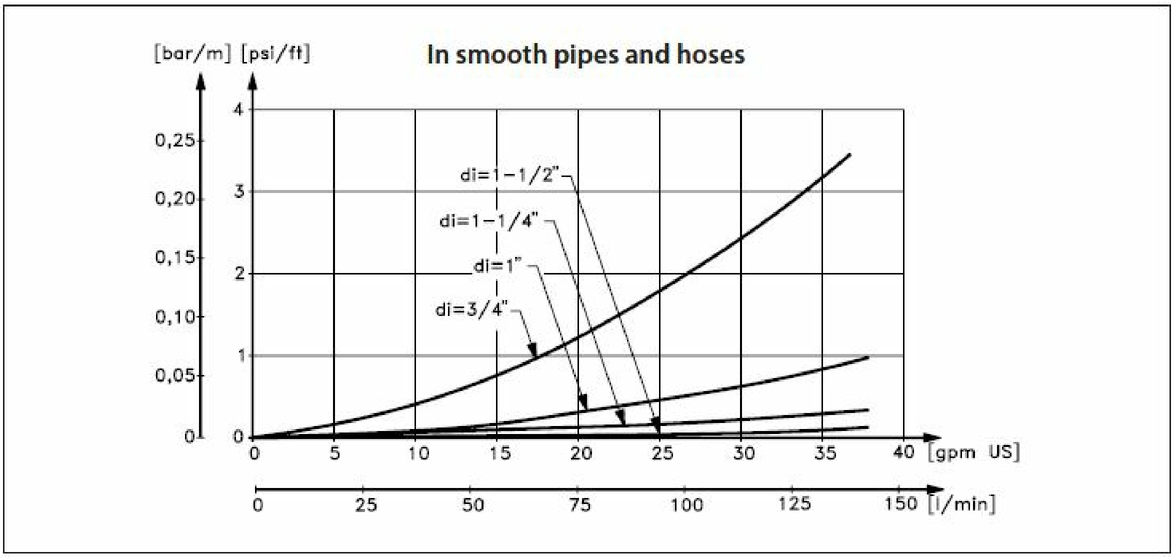


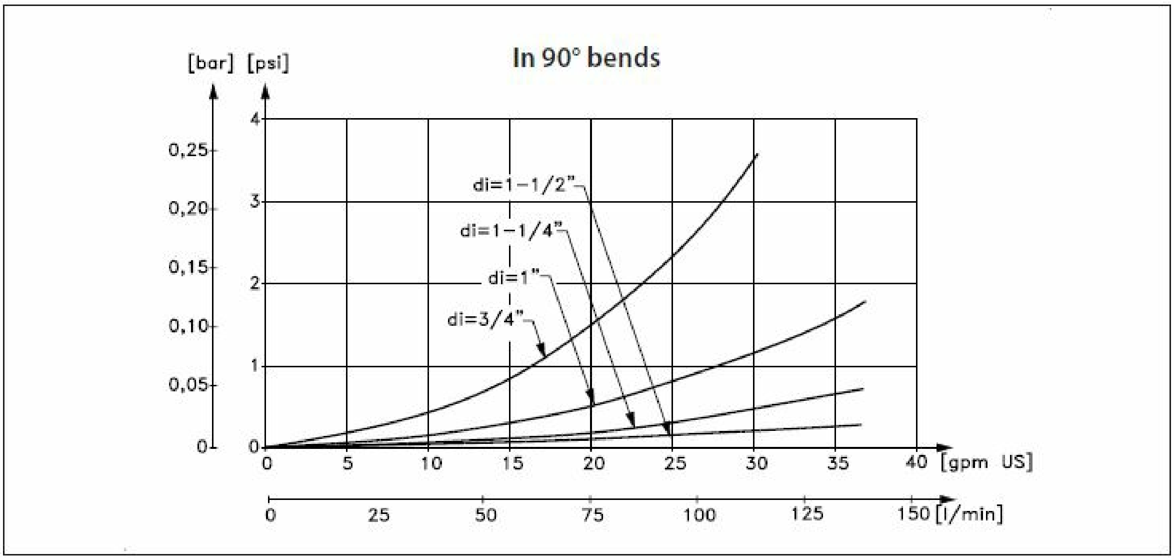
Problems with reversing pumps

- If exposed to high pressure in the outlet while the electric motor is not energized, the pumps will start spinning backwards. This will not harm the pumps as long as the pressure in the inlet does not exceed the max. the pressure of 5 bar.
- If a non-return valve is mounted in the inlet line, a low-pressure relief valve will also be required. Alternatively, a high-pressure check valve could be mounted in the pump discharge line to prevent the pump from reversing.
- The dotted setup ensures that the inlet pressure does not exceed 5 barg when a non-return valve is mounted in the inlet.

General guidelines for calculation of pressure losses

- To avoid the risk of cavitation, the inlet pressure at the pump must be by the specifications mentioned in Datasheet (521B1331).
- The inlet line connection must be properly tightened, as the possible entrance of air will cause cavitation.
- The suction conditions can be optimized according to the below guidelines.





General comments on

Filtration

- A good filtration is vital to ensure a long and trouble-free life of the pump.
- When selecting a filter or strainer, please note that filter materials should be compatible with water, i.e. should neither corrode nor dissolve. Also, be aware of the electrochemical series of the applied materials.
- The main filter must have a fineness of 10 µm abs. ß10 ≥ 5000. The pressure loss across the filter should be monitored.

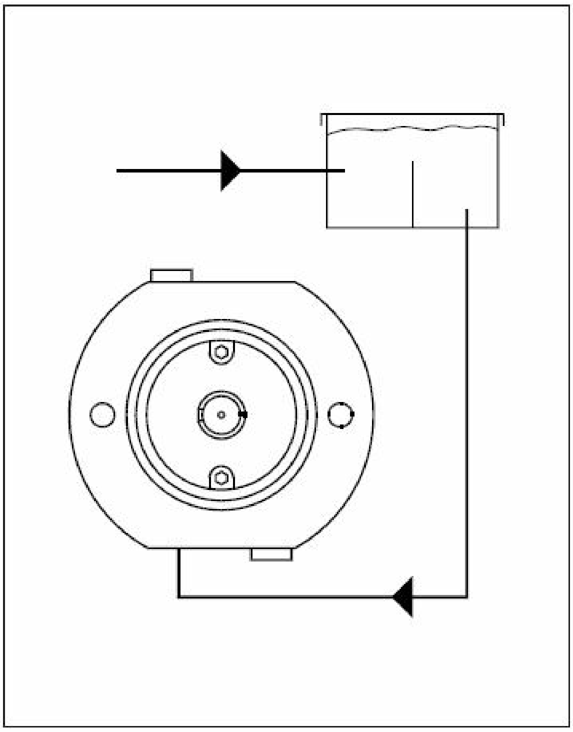
Water tank

Must be made of corrosion-proof material such as stainless steel or plastic and must be sealed to prevent the entrance of impurities from the environ-ment.

- Automatic pressure equalization between the tank and surroundings must be ensured.
- Inlet from the water supply and inlet to the pump should be placed in opposite ends of the tank to calm and deaerate the water, and to ensure optimum opportunity for particles to settle.
- The pump suction line should be placed relatively high above the tank bottom to prevent settled particles from being led into the pump.
- We recommend a separation (“wall”) to separate the inlet from the outlet end of the tank.

Monitoring
It is recommended to continuously monitor the following conditions:

- Water level in the tank
- Filter contamination
- Pressure (inlet- and outlet side of the pump)



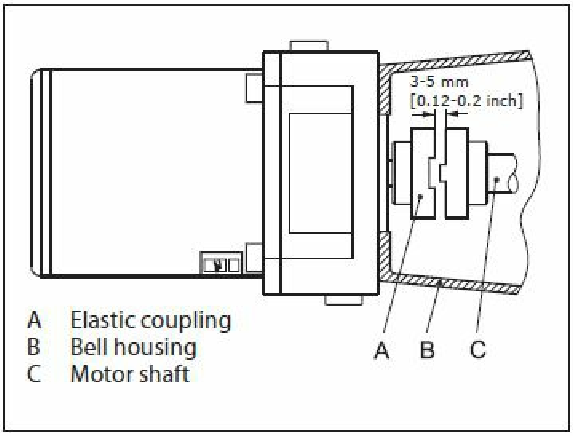
Building up the pump unit

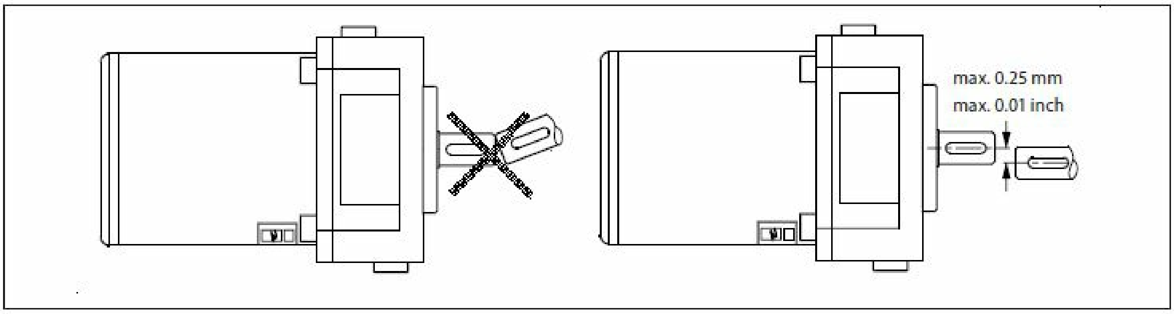
Mounting

(Please also see hints in “Right and Wrong”)

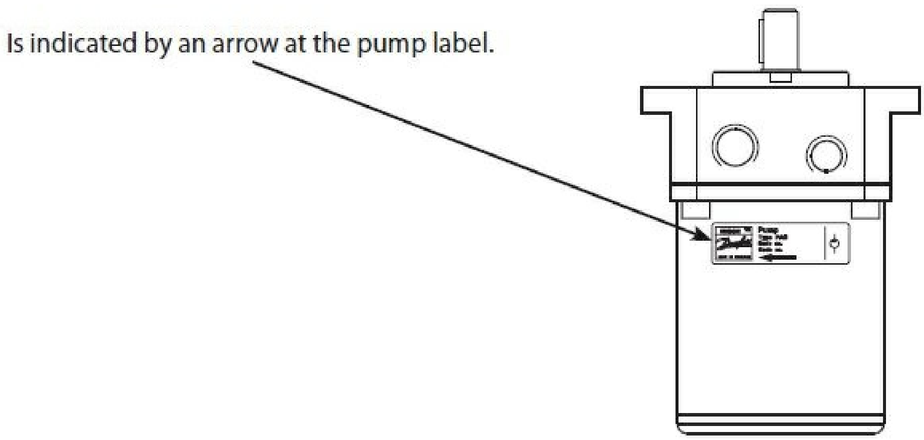
- If alternative mounting is desired, please contact the Danfoss High Pressure Pumps.
- Choose proper tolerances to ensure an easy mounting of the elastic coupling without use of tools.
- Please take care to observe the recommended length tolerances of the chosen coupling, as an axial force on the pump will damage the pump.

1. **A.** Elastic coupling
2. **B.** Bell housing
3. **C.** Motor shaft





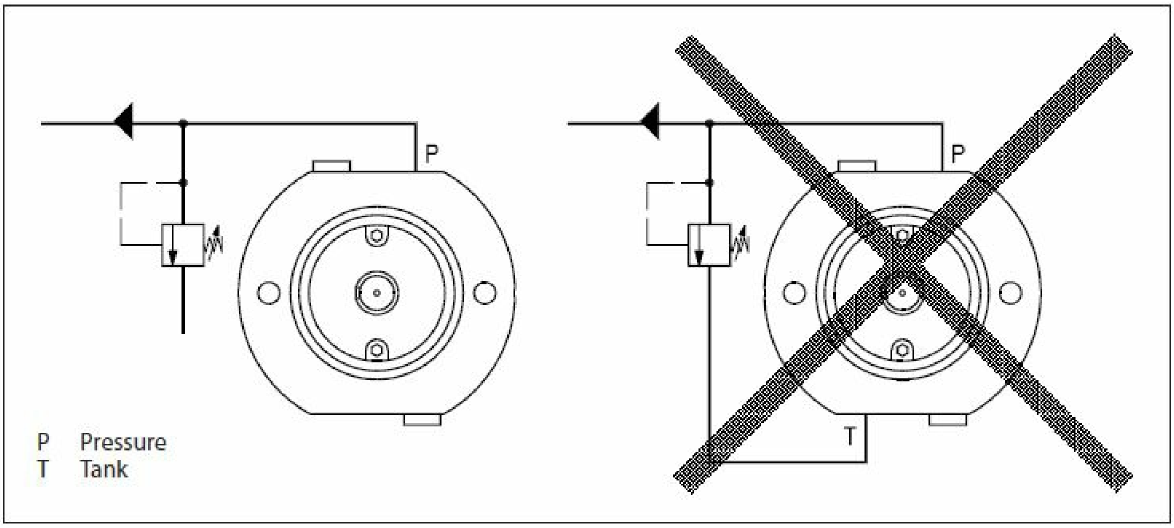
Direction of rotation
Is indicated by an arrow at the pump label.



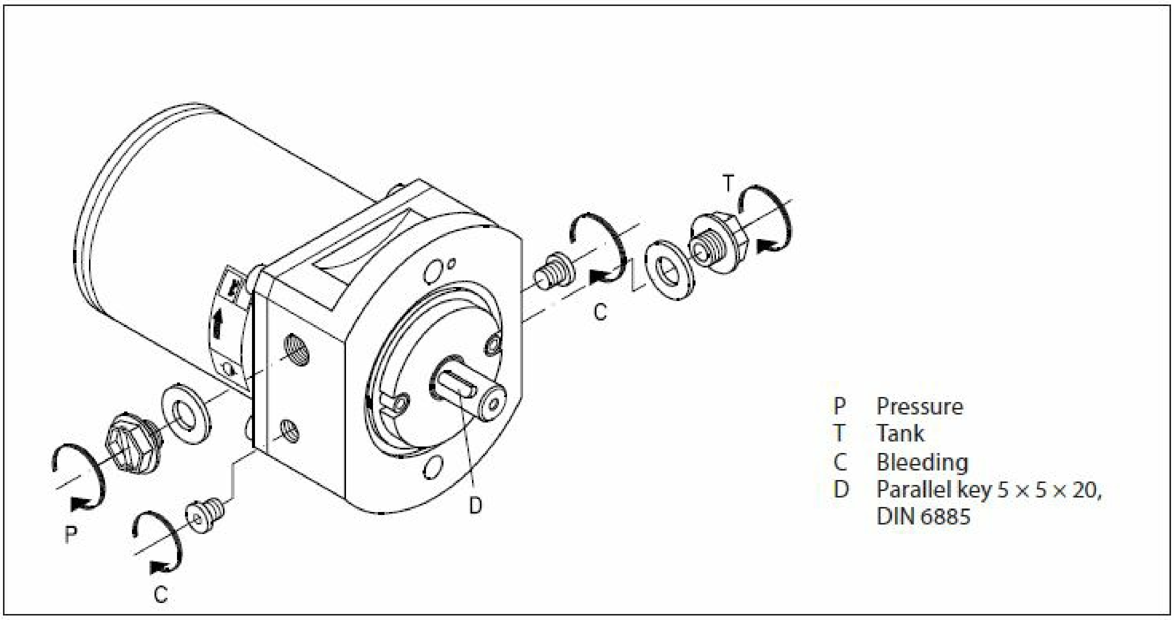
Orientation
The pump can be mounted/oriented in any horizontal direction. Vertically only with the shaft pointing upwards.

Protection from too-high pressures
The pump should be protected against too high pressure by employing a pressure relief valve or a bypass/unloading valve placed on the pressure side.

- The valve should be placed as close to the pump as possible. The opening characteristics of the valve must not result in peak pressures higher than 200 bar (2900 psig).
- The valve outlet must not be connected directly to the pump suction line. It shall be connected directly to the tank.



Connections



	APP 0.6-1.0			APP 1.5-2.5 and APP 3.0-3.5		
	P	**T**	**C**	**P**	**T**	**C**
Thread size	G 1/2 × 15	G 1/2 × 15	M6 Hexagon NV 4	G 1/2 × 15	G 3/4 × 17	G 1/4, NV 6 14 deep
Max tighten t orque	25 Nm 18 (lbf ft)	25 Nm 18 (lbf ft)	5 Nm 3.5 (lbf ft)	25 Nm 18 (lbf ft)	25 Nm 18 (lbf ft)	15 Nm 11 (lbf ft)

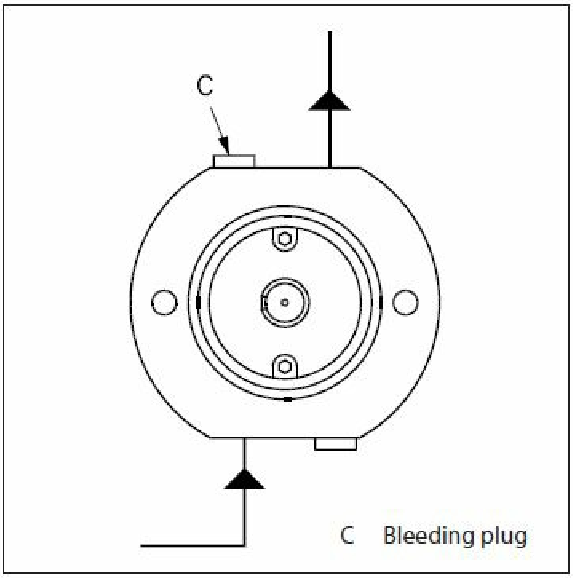
Recommended torque values refer to steel washers containing a rubber sealing element.

Initial start-up

- Before start-up, loosen the top bleeding plug “C”. When water appears from the bleeding plug, retighten the plug. With its inlet line connected to the water supply or the tank, the pump is now started with an open outlet port.

- At the initial start of the system, the pump should be run without pressure for about 5 minutes, thus removing possible impurities from pipes, hoses, etc. However, the system should be flushed before start-up – without the connected pump.

WARNING:
Make sure that the direction of rotation of the electric motor corresponds to the direction of rotation of the pump. Otherwise, the pump will be damaged if a check valve is placed between the pump and the tank.



Operation

Temperature

- **Fluid temperature:**
  - **Min.** +2° C to max. +50° C
  - **Min.** +35.6° F to max. +122° F
- **Ambient temperature:**
  - **Min.** +2° C to max. +50° C
  - **Min.** +35.6° F to max. +122° F

In case of lower operating temperatures, please contact Danfoss High Pressure Pumps.

Pressure

- The inlet pressure must be min. 0.5 barg (7.25 psig) and max. 5 barg (72.5 psig). At lower pressures the pump will cavitate, resulting in damage to the pump.
- Max. pressure on the pump's outlet line should be limited at 80 barg (1160 psig) continuously. Short-term pressure peaks (e.g. in connection with the closing of a valve) of up to 100 barg (1450 psig) are acceptable.

NB:
The pump unit should include a pressure gauge on the high-pressure side.

- **Dry running**
  - When running, the pump must always be connected to the water supply to avoid damage if it should run dry.
  - In systems with water tanks, it is recommended to build a level gauge in the tank to avoid the risk of running dry.
- **Disconnection**
  If the inlet line is disconnected from the water supply, the pump will be emptied of water through the disconnected inlet line.

When starting up again, follow the bleeding procedure described under section 4: Initial start up.

Storage

Storage temperature:

- **Min.** -40° C to max. +70° C
- **Min.** -40° F to max. +158° F

When preparing the pump for long-term storage or for temperatures below the freezing point, flush the pump with an anti-freeze medium-type monopropylene glycol to prevent internal corrosion or frost in the pump.

For further information on anti-freeze media, please contact Danfoss High Pressure Pumps.

Recommended procedure:

Open-ended systems with water supply from tank

1. Empty the tank of water and empty the pump housing through the lower bleeding plug. When the pump is empty, retighten the plug.
2. Through the upper bleeding plug, fill the pump housing with the anti-freeze medium. Pour the anti-freeze medium into the tank. Connect a hose to the outlet of the pump and lead the other end of the hose back to tank.
3. Quickly start and stop the pump. Make sure that the pump does not run dry. The pump is now protected against internal corrosion and frost.

Open-ended systems with direct water supply

1. Disconnect the water supply to the pump.
2. Through the lower bleeding plug, empty the pump housing of water and close it again.
3. Connect the pump to a tank of e.g. 25 litres (6 gal.) of anti-freeze additive. Connect a hose to the inlet port of the pump and via another hose return the flow from the outlet port to the tank with anti-freeze additives.
4. Quickly start and stop the pump. Make sure that the pump does not run dry. The pump is now protected against internal corrosion and frost.

Service

Periodic maintenance

- The APP pump is designed so that lubrication follows from the water itself and there is thus no oil in the pump.
- The pump requires no periodic replacements of seals and valve parts.

Repair
In case of irregular function in the pump, please contact Danfoss High-Pressure Pumps.

Danfoss A/S
High Pressure Pumps DK-6430 Nordborg Denmark.

ro-solutions.com.

Documents / Resources

	Danfoss APP 0.6-1.0 Axial Piston Pump [pdf] Instructions APP 0.6-1.0 Axial Piston Pump, APP 0.6-1.0, Axial Piston Pump, Piston Pump, Pump

References

- Manual-Hub.com - Free PDF manuals!
- Sustainable Desalination with SWRO Technology | Danfoss
- Manual-Hub.com - Free PDF manuals!
- User Manual