Installation:

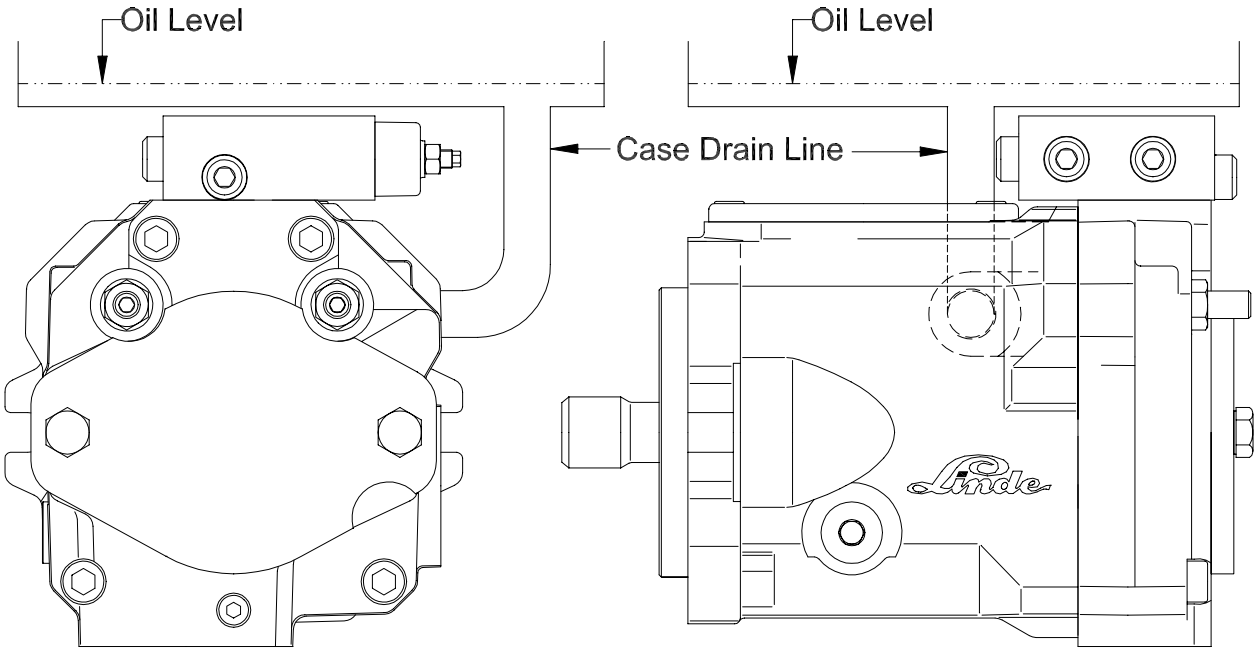
- Installation must be carried out in accordance with the circuit or piping diagram.
- Always cover or cap all HPR-02 case drain, control, and high pressure hydraulic lines during the installation of a new or replacement HPR-02 pump.
- Always insure that all connections to the HPR-02 replacement pump are capped or covered during the initial installation.
- Connect and tighten each hydraulic line one at a time removing caps or covers just before each connection is made.
- It is recommended that the HPR-02 pumps be mounted with the control facing upward or facing either side. Avoid mounting the pump with the pump control facing down - Any contaminants in the oil will eventually settle into the control.
- During the intial start-up, additional care must be taken to vent entrapped air from the pump control via the highest located control port.

Suction/Inlet Line:

- The suction/inlet line must be mounted continuously rising towards the reservoir.
- A flooded suction or pressurized inlet should be of adequate supply as to guard against cavitation. A pressurized inlet should be limited to a maximum pressure of 20 psig.

Venting (Case Drain):

- Positive venting is vital for the correct operation of the hydraulic system.
- All case drain lines must be mounted continuously rising towards the reservoir. This allows any entrapped air to escape freely from the pump housing.
- The highest case drain port of the pump housing must be connected to the reservoir and should be below the oil level in the reservoir, as illustrated on the next page.
- The case drain line has to be sized and the reservoir has to be installed in such a way as to limit the maximum case pressure to 30 psig.



Piping:

- Pipe work should be seamless drawn precision steel tube or hoses of suitable pressure rating.

- During installation, attention should be paid to cleanliness. The pipes must be deburred, washed and blown through.

- Scaled or rusted pipes must be scoured and then neutralized - Hoses must be brushed and flushed through when contaminated.

  IMPORTANT: The cleanliness of the circuit **before** commissioning has a crucial influence on the operation and life expectancy of the hydraulic components.

Filling the Hydrostatic Transmission:

- The initial filling of the system must be carried out in such a way that all of the air can escape from the high pressure circuit and from the pump/motor housings before the hydraulic units are operated.

- Manually fill the HPR-02 pump housing at the most accessible case drain port with filtered oil. Manually fill the high pressure line with filtered oil. Fill the oil reservoir to the maximum level with filtered oil and fill all motor housings to the maximum level via the most accessible case drain port with filtered oil.

Initial Start-Up:

1. Start the prime mover (leave at low idle) and allow the HPR-02 to rotate for 10 seconds.
2. Stop the prime mover and wait 1 minute.
3. Repeat steps #1 and #2 four more times.
4. Start the prime mover and set it to low idle, then slowly actuate a function 3 times to allow the HPR-02 to increase to maximum displacement. Leave the function fully actuated for 30 seconds each time.
5. Warm the system up by steadily increasing the prime mover speed and pressure so as to allow any air to be purged from the fluid.
6. Check the HPR-02 stand-by pressure, load sense margin pressure, pressure compensator setting (if applicable), VD3 performance valve setting (if applicable), and maximum flow setting when the hydraulic oil reaches its normal operating temperature.
7. Check the oil level in the reservoir and fill with filtered oil if necessary before delivery of the machine.

Routine Maintenance:

- Maintenance of the hydraulic system is limited to changing the hydraulic fluid and system filtration.
- In order to gaurantee the proper function and efficiency of the HPR-02, the purity of the hydraulic oil over the entire operating period must comply to at least class 18/13 according to ISO 4406.
- With modern filtration technology, however, much better values can be achieved which contributes significantly to extending the life and durability of the HPR-02 and the complete system.

Changing the Filters:

- It is recommended that the filters be changed after the initial start-up or at least 100 hours from the initial operation. Additional filter changes should be made after 500 hours of operation from the previous filter change.

Note:
These recommendations are provided for guidance to insure long service life and proper operation of the HPR-02 pump. However, depending on the operating conditions of the HPR-02, it may not be necessary to adhere to these recommendations as long as the oil cleanliness level and oil vicosity specifications are strictly adhered to.

Changing the Hydraulic Fluid:

- Oil changes are carried out by first draining the reservoir, cooler, pump, and motor housings. The high-pressure fluid must be changed after 1000-2000 hours of operation, according to the application.

- High working temperatures and frequent cooling-down phases with low temperatures condense water and will shorten the life of the hydraulic fluid.

- The oil remaining in the high-pressure circuit itself need not be changed. The instructions regarding initial filling must be adhered to when changing the hydraulic fluid. In some applications, a complete oil change may not be necessary. The oil lost during each filter change must be replaced by fresh filtered oil.

Cleaning:

- Cleaning of the hydraulic system when changing oil is normally not necessary. If the system becomes contaminated due to unusual circumstances (defect, etc.), then it must be thoroughly cleaned before recommissioning. Housings and pipelines must be flushed. If necessary, the pipelines and hydraulic units must be disassembled.

Service:

- Maintenance and repairs should be undertaken only by skilled personnel who are familiar and trained with the equipment. Linde offers an excellent after-sales service capable of carrying out the work of repair and overhaul if required.

- Only spare parts specified in the Linde spare parts catalogs should be used. The serial number stamped on the unit name tag is relevant to the configuration of the unit. Therefore, the serial number should be quoted when ordering spare parts.

Oil Selection and Viscosity Recommendations:

Suitable hydraulic oils are:

- Mineral oil HLP to DIN 51524
- Biodegradeable fluids upon request
- Other pressure fluids upon request

Linde recommends only using hydraulic oils which are confirmed by the producer as suitable for use in high pressure hydraulic installations. For the correct choice of suitable hydraulic oils, it is necessary to know the working temperature in the hydraulic circuit. The hydraulic oil chosen must allow the working viscosity to be within the optimum viscosity range (as shown below).

Attention: Due to pressure and speed influences, the temperature of the leakage fluid is always higher than the circuit temperature. The temperature must not exceed 194°F (90°C) in any part of the system. Under special circumstances, if the stated conditions cannot be observed then please consult Linde.

- Recommended viscosity range for optimum performance: 15 cSt to 30 cSt
- Maximum allowable working viscosity range: 10 cSt to 80 cSt
- Viscosity limitations: 6 cSt minimum viscosity
  1000 cSt maximum viscosity (**Intermittent** for cold starts)
- Oil temperature limitations: (-68)°F to 194°F
  (-20) °C to 90°C

Guidelines for Using HPR-02 Pumps Without Suction Screens:

- Provided that proper contamination control is designed into the system and practiced during operation, a suction screen is NOT required for the application of the HPR-02 pumps. Proper contamination control guidelines are considered to be:

  a. Oil cleanliness control and proper flushing during system manufacturing must be exercised.

  b. Assurance that no contaminants are present in the reservoir or lines upon initial start-up is essential.

  c. The HPR-02 must be protected from system contaminants during operation, either by incorporating return-line filtration or off-line filtration with return-line screens.

  d. Discipline must be exercised during operational maintenance to insure contaminants are not introduced into the system or pump.