

# Handling Precautions

## 1. Operating Fluid and Temperature Range

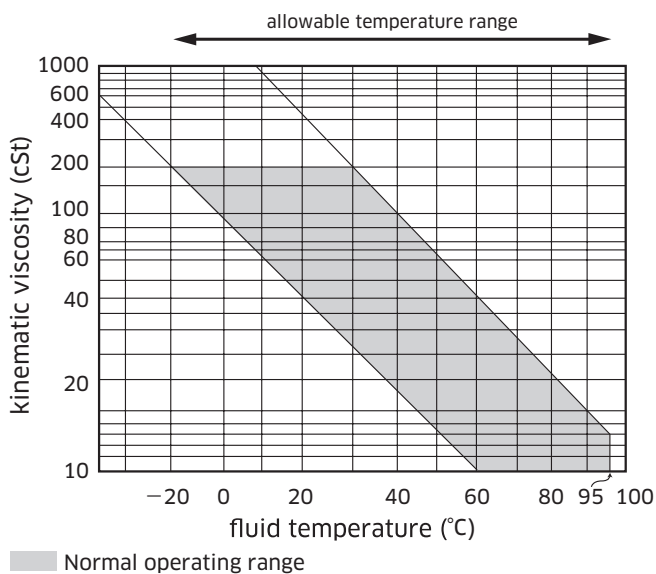
### 1) Operating Fluid

Values shown in this catalog are based upon using mineral oil based anti-wear hydraulic fluid. To ensure optimal performance use of mineral oil based anti-wear hydraulic fluid is recommended.

### 2) Viscosity and temperature range

To minimize both oil and seal deterioration, a maximum operating temperature of 60°C should be considered. Please note that the regulator may become slow to respond when operating at low temperatures (below 20°C) in extreme cold environments. At such low temperature it is strongly suggested that a warm up cycle is introduced until an operating temperature of 20°C is achieved.

	Normal operating range	Allowable range
Viscosity [mm <sup>2</sup> /s(cSt)]	10 to 200	10 to 1,000
Fluid temperature [°C (°F)]	-20 to +95 (-4 to +203)	



## 2. Filtration and Contamination Control

### 1) Filtration of working oil

The most important means to prevent premature damage to the pump and associated equipment and to extend its working life, is to ensure that hydraulic fluid contamination control of the system is working effectively.

This begins by ensuring that at the time of installation that all piping, tanks etc. are rigorously cleaned in a sanitary way. Flushing should be provided using an off line filtration system and after flushing the filter elements should be replaced.

A full flow return line filter of 10 micron nominal should be utilised to prevent contaminant ingress from the external environment, a 5 to 10 micron filter with the tank's breather is also recommended.

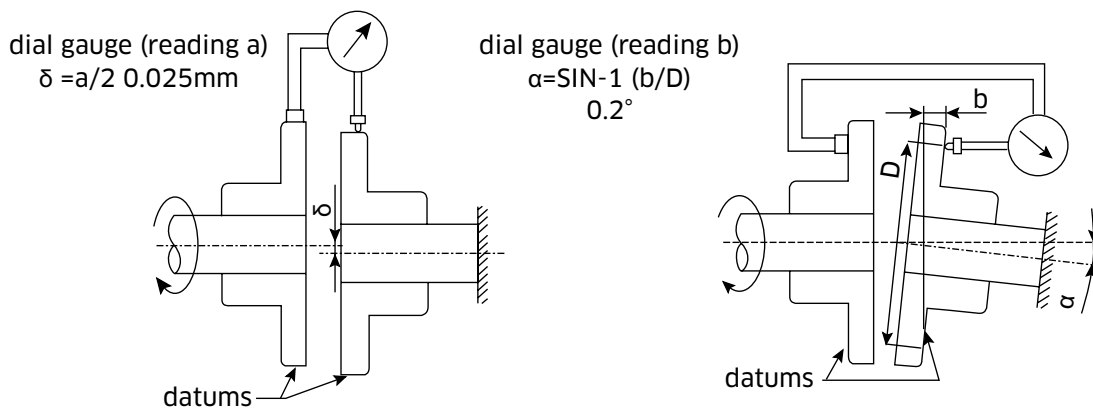
### 2) Suggested acceptable contamination level

The relationship between contamination level and pump life is very difficult to predict as it depends on the type and nature of the contaminant present in the system. Sand or Silica in particular, due to its abrasive nature, does significantly reduce the expected life of a pump. Based on the precondition that there is no significant presence of Silica type substances then a minimum Cleanliness level of -/18/15 ISO 4406 or SAE AS 4059E Table 1 Class 9 (NAS 1638 Class 9).

### 3. Drive Shaft Coupling

Alignment between the prime mover and the pump shaft should be within 0.05 mm TIR\*. In case the pump is directly coupled to the engine flywheel, use a flexible coupling.

\*TIR = Total Indicator Reading



### 4. Oil Filling and Air Bleeding

#### 1) Pump case filling

Be sure to fill the pump casing with oil through the drain port, filling only the suction line with oil is totally insufficient. The pump contains bearings and high-speed sliding parts including pistons with shoes and a spherical bush that need to be continuously lubricated. Part seizure or total premature failure will occur very quickly if this procedure is not rigidly followed.

#### 2) Air bleeding

Run the pump unloaded for a period to ensure that all residual air within the system is released.

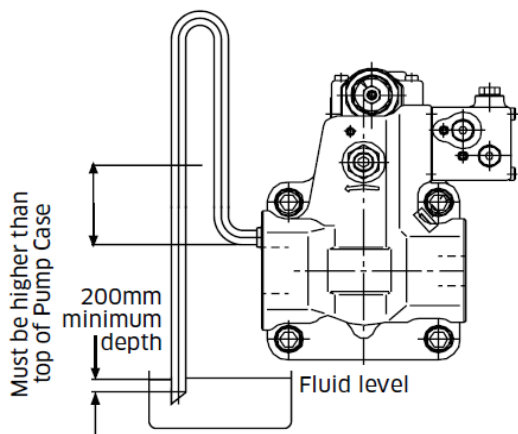
#### 3) Long term out of usage

It is undesirable to leave the pump out of use for a long period e.g. a year or more. In such a situation it is recommended that the pump is run for a short period on a more frequent basis even if it is just unloaded. With regard to a pump held in storage then rotating the shaft on a frequent basis is sufficient. If the pump is left out for more than the suggested time it will require a service inspection.

## 5. Drain Piping

### 1) Installation of drain line

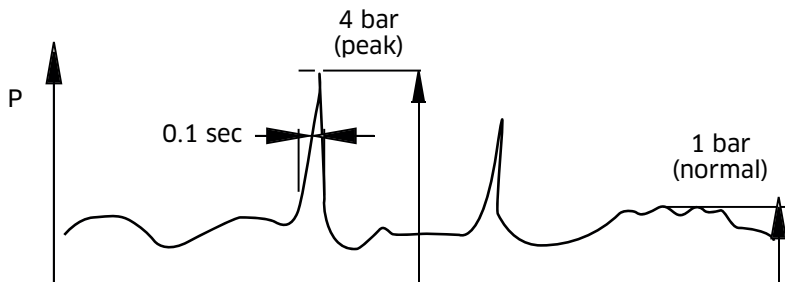
It is the preferred option to mount the pump with the case drain piping initially rising above the pump before continuing to the tank. Do not connect the drain line to the inlet line.



### Cautions

- A) Inlet and drain pipes must be immersed by 200 mm minimum from the lowest level under operating conditions.
- B) Height from the oil level to the centre of the shaft must be within 1 meter maximum.
- C) The oil in the pump case must be refilled when the pump has not been operated for one month or longer.

The uppermost drain port should be used and the drain piping must be larger in size than the drain port to minimise pressure in the pump case. The pump case pressure must not exceed 1 bar as shown in the illustration below. (Peak pressure must never exceed 4 bar.)

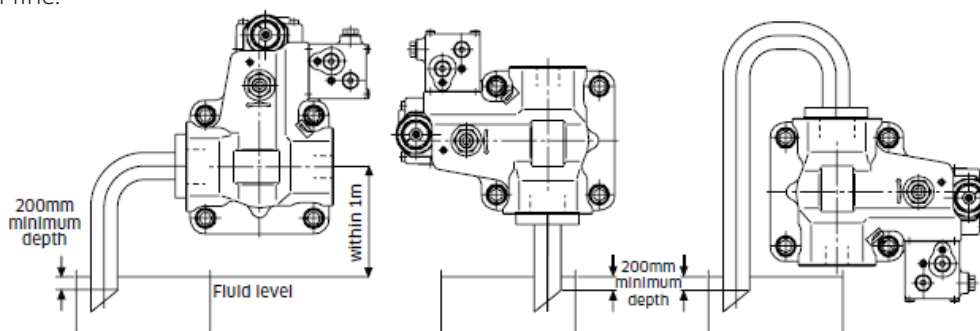


### 2) Size of drain hose or drain pipe

The internal bore size of the drain hose or drain pipe must be larger than that of the drain port. Arrange the drain line as short as possible.

## 6. Mounting the Pump Above the Tank

Suction line.



## 7. Mounting the Pump Vertically (shaft up)

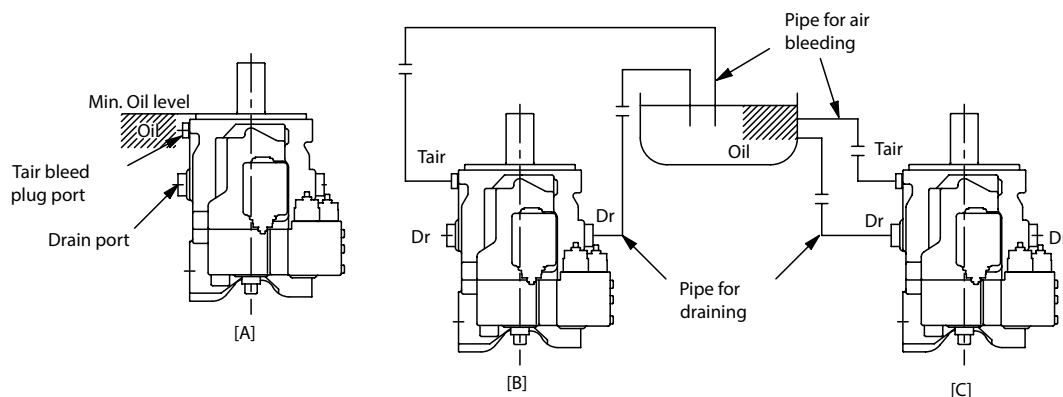
*Note:* Both the Tair and one case drain port must be used.

For applications requiring vertical installation (shaft up) please remove the Tair bleed plug and connect piping as shown in the illustration below.

When installing the pump in the tank and submerged in the oil, open the drain port and Tair bleed port to provide adequate lubrication to the internal components. See illustration [A].

The oil level in the tank should be higher than the pump-mounting flange as shown in illustration [A] below. If the oil level in the tank is lower than the pump mounting flange then forced lubrication is required through the Tair bleed port 1 ~ 2 l/min.

If the drain or Tair bleed piping rise above the level of oil (see illustration [B]). Fill the lines with oil before operation, then confirm pump case pressure is within specification during commissioning. When installing the pump outside the tank, run piping for the drain and Tair bleed ports to tank (see illustration [C])



## 8. Shaft Loading and Bearing Life

Although K3VL pumps are equipped with bearings that can accept some external thrust and radial forces, application of such loads will affect bearing life. Depending on the load magnitude, the load position, and the load orientation, bearing life may be significantly reduced.