



## Bleeding and Trouble Shooting For Hydropneumatic Closed loop System

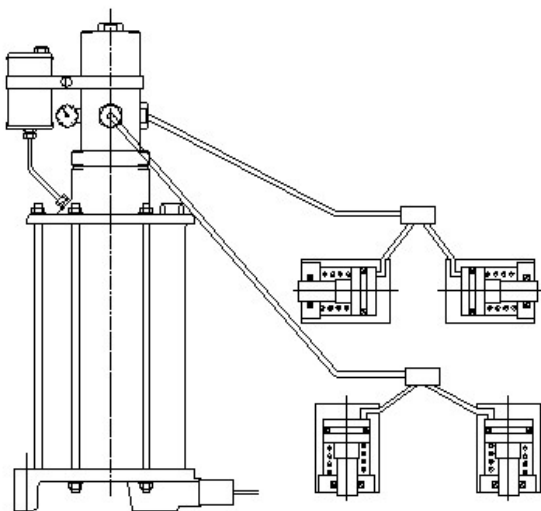
### A - Bleeding:

Bleeding means removing air, trapped in the hydraulic circuit, i.e. oil side of the intensifier, hydraulic hoses or piping and cylinders. Bleeding is necessary, first at the time of installation and later when air gets trapped in the system. If air is not bled properly, full pressure may not be achieved. Also a jerky motion of the cylinders may be observed. It is recommended to bleed the system from the highest point. It is always better to have this highest point as an intensifier.

#### 1. For circuit shown in Fig. 1

With intensifier at the highest point, and all pipelines slanting downwards, fill up oil in the top port of the intensifier. Close the port. Operate the system a few times. Automatically, air gets accumulated in the top portion of the intensifier. Open the top port. Top up oil in the Intensifier. Repeat the same procedure till oil level in the intensifier is maintained up to the top port. Advantage of this circuit is, no other connection is required to be opened for bleeding.

FIGURE 1



#### 2. For Circuit shown in Fig. 2

Intensifier is at the highest point but there are loops in the hydraulic lines. Open the top port of the intensifier and top up oil. Remove the end plug of the hydraulic line. Allow oil to flow freely. Hold a tray to collect the dripping oil. Top up oil continuously in the Intensifier till smooth and bubble-less oil flow is observed from the end port. Close the end port of the hydraulic line and top port of the Intensifier.

FIGURE 2

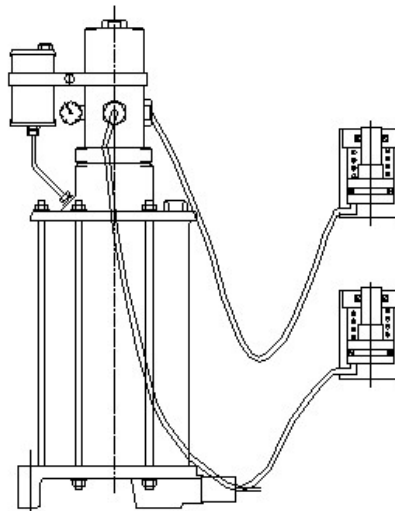
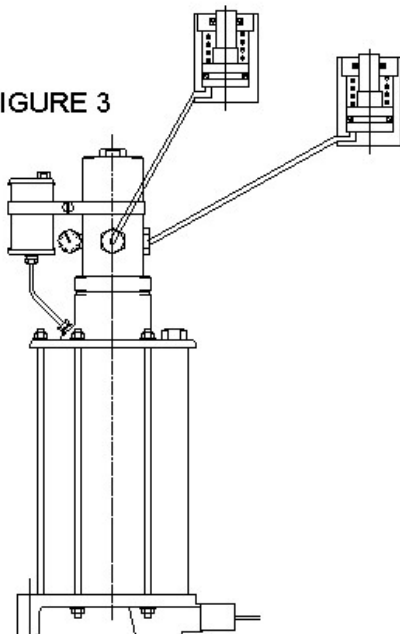


FIGURE 3

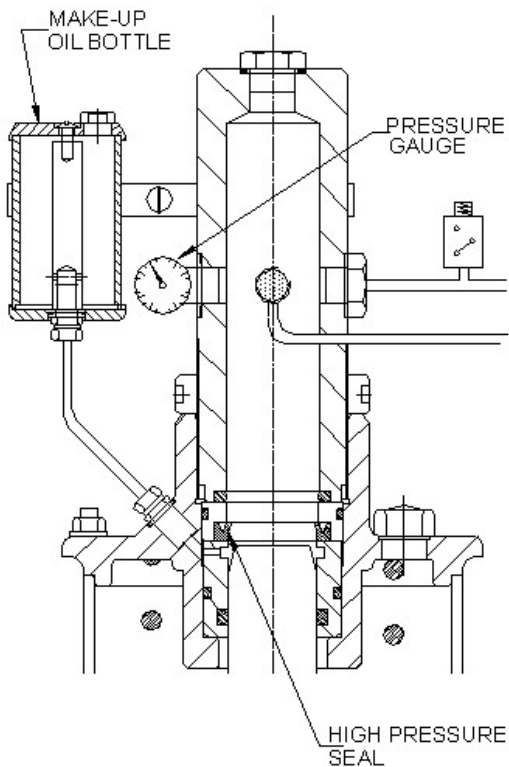


#### 3. For Circuit shown in Fig. 3

Intensifier is at lower level than the cylinders. Fill oil from the top port of the Intensifier. Close the top port. Restrict piston stroke by putting the job. Fill oil in the bottle provided for the make-up oil system. Apply pneumatic pressure to the system. Loosen the bleed port of hydraulic line cautiously. Pressurized air-oil mixture will leak out. Close the end port and then release the air pressure. Leaked-out volume will be made up by the make-up oil system. Fill oil in the make-up oil system if necessary. Repeat the procedure till no air bubbles are observed from the bleed port.

## B - Trouble shooting

The intensifier will continue to work without any problem unless there is any leakage in the system or there is air in the system. Leakage in the system can be detected from the oil level in the make-up oil bottle. This level should remain constant.



1. **Symptom - No oil pressure from intensifier.**  
**Cause** - There is air in the system.  
**Remedy** - Bleed the system to remove air. See bleeding procedure.
2. **Symptom - Oil level always decreases.**  
**Cause** - Oil is sucked into the system through the make-up oil system, indicating leakages in the high pressure line. Leakages may be in the connections or through seals of cylinders.  
**Remedy** - Stop leakages, change cylinder seals, if necessary.
3. **Symptom - Oil level increases in pressurized mode.**  
**Cause** - In pressurized mode, make-up oil system is cut-off from the high pressure side. A rise in the oil level in the pressurized mode indicates that the high pressure seal of the intensifier is leaking.  
**Remedy** - Change the high pressure seal of the intensifier.
4. **Symptom - Oil level increases in unpressurised mode.**  
**Cause** - There is air in the system. Due to the compressibility of air, the trapped air gets compressed in pressurized mode. In unpressurised mode, it expands and pushes the oil to the make-up oil system. Hence the oil level rises in the unpressurised mode.  
**Remedy** - Bleed the system to remove air. See bleeding procedure.