

Pressure Testing (Hydraulic Piping)

Pressure testing is a process which is done to check for any errors in the installation or defects in the piping components. Basically the erected system is proof tested using the working fluid to something known as test pressure (usually 1.5 times the working pressure) and checked for leakages or pressure drop. A system is deemed to be pressure tested if the system can hold the test pressure for a said amount of time.

1.1 Process

A hydraulic pressure testing circuit mainly consists of the following components:-

- a. Hydraulic Power Unit
- b. Hydraulic Power Pack
- c. Pressure Testing Materials

The Hydraulic Power Unit (HPU) which drives the hydraulic system is used to fill the oil in the system. The Hydraulic Power Pack is normally a portable power pack which pressurizes the oil in the system to the test pressure. The Pressure Testing materials include gauges, manifold, valves, blank flanges which are required for pressure testing.

1.2. Testing Circuit

The pressure test circuit consists of the piping system connected to the HPU as shown below in Fig 1.0. The pressure line is interconnected to the return and drain line by a tee through the hoses. Return and Drain line check valves at the HPU are interchanged to ball valves (they can also be blanked alternatively). The Hydraulic Power Pack is connected to the pressure line through a pressure test manifold. The manifold has a drain valve and pressure gauge. A pressure gauge is mounted at the end of the pressure line. Normally every pressure testing circuit will have a pressure gauge at the start of pressure input and at the extreme end of the line.

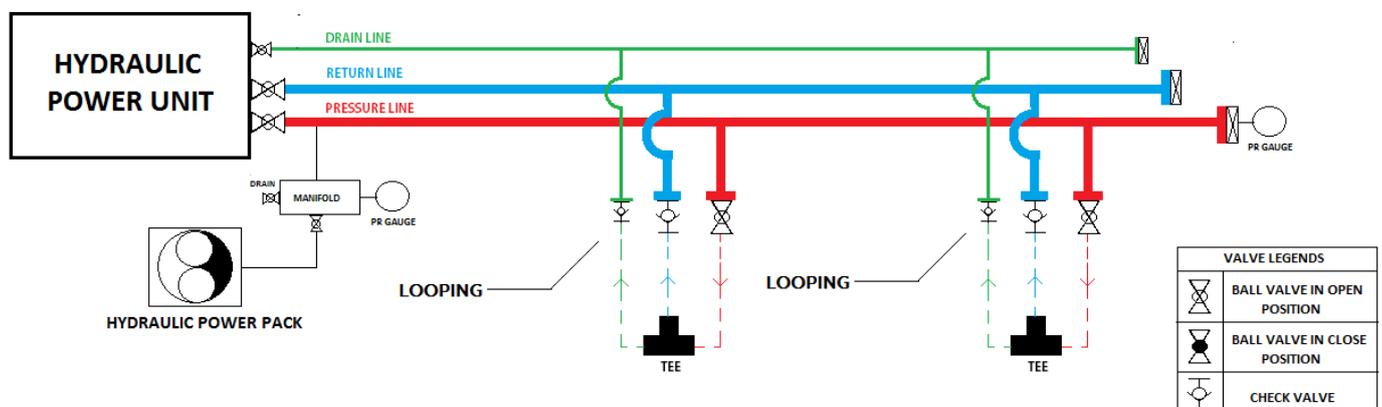


Fig 1.0 Pressure Test Circuit

Pressure Testing of a hydraulic system involves a sequence which is as follows:-

- a) Filling the circuit with working fluid.
- b) Pressurizing the pressure line to the pressure line test pressure.
- c) Releasing the Pressure of the pressure line.
- d) Pressurizing the return and drain line to their respective test pressures.

The HPU of the hydraulic system is used to fill the system with oil as shown in Fig.1.1.

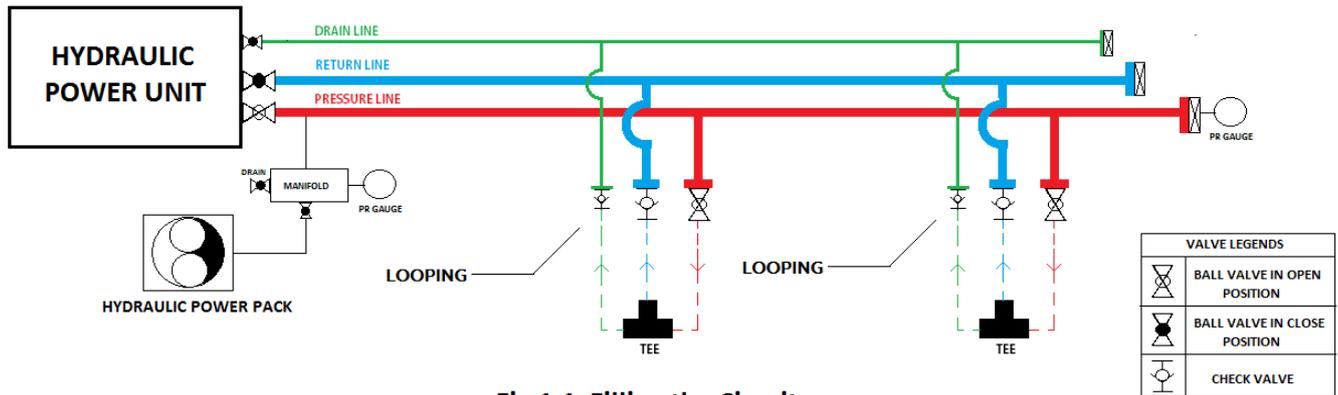


Fig 1.1. Filling the Circuit

Since the pressure line pressure will be very high as compared to the return and drain line, the pressure line is tested first by isolating the return and drain line. Once the pressure line is tested, the pressure test of return and drain line is done.

After the system is filled with oil, the return and drain lines are isolated along with the HPU. The Hydraulic Power Pack is used to increase the pressure of the system and the pressure of the pressure line is gradually increased as shown in the Fig.1.2 below.

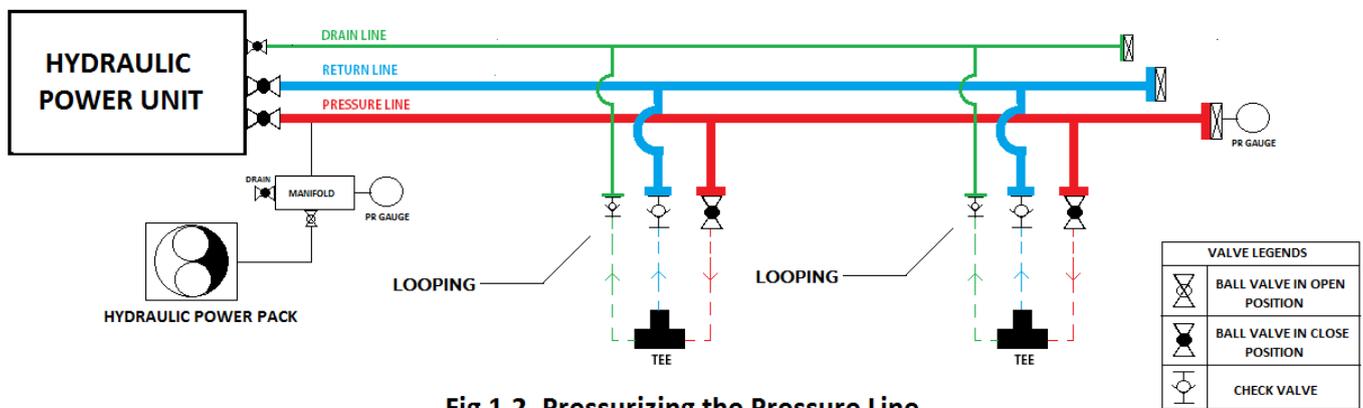


Fig 1.2. Pressurizing the Pressure Line

The pressure is increased until the line attains the test pressure. The pressure is then held in the line for 15 mins (or based on the customers requirement) and checked for leakages.

- For a hydraulic pressure test there are mainly two methods of checking the leakages at the joints.
- Visual check of the joints (flanges, fittings) to spot any leakages.
 - Visual Check on the pressure gauge to spot any pressure loss.

If the line clears the above checks it has then successfully been pressure tested. The pressure of the pressure line is released using the drain valve as shown in the Fig 1.3 below

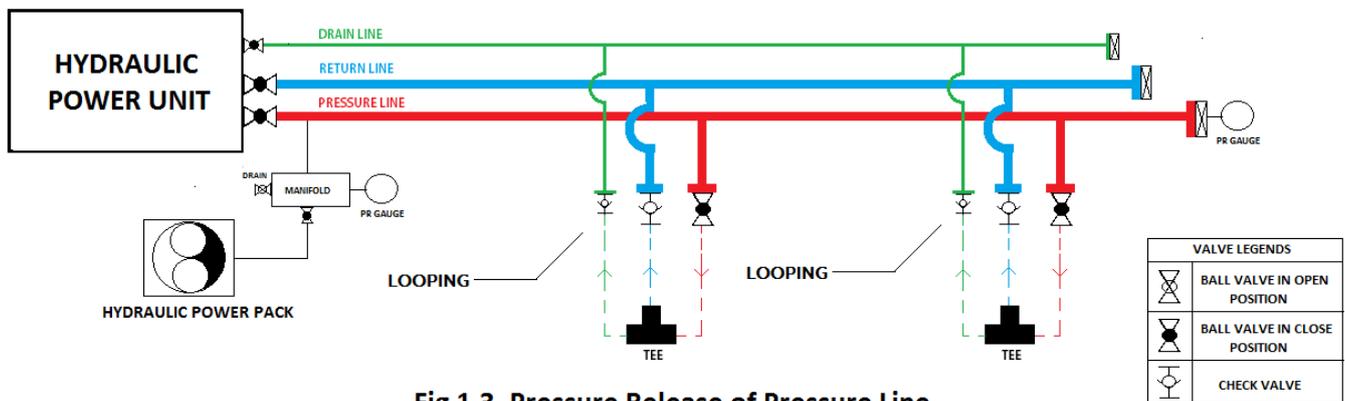


Fig 1.3. Pressure Release of Pressure Line

After the pressure line pressure release, the return and drain lines are pressurized through the pressure line by opening the valves as shown in the Fig 1.4 below

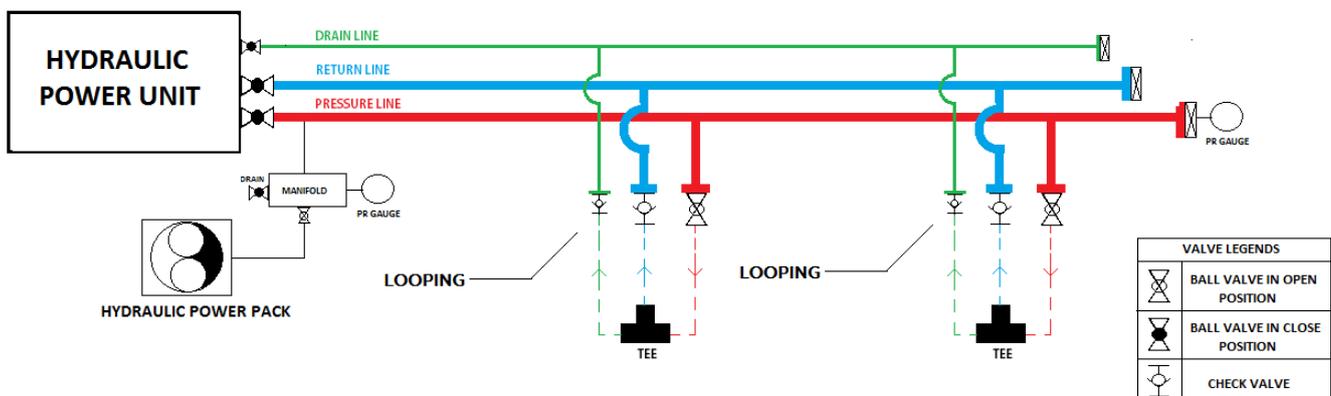


Fig 1.4. Pressurizing the Return and Drain Line

The pressure of return and drain is checked through the gauges at the manifold and the extreme end of the pressure line. This is because since the pressure line is connected to the return and drain line, they together act as a unit. So the reading at the pressure line gauge will be the same as that of the pressure on the return line. Once the check is okay the system is successfully pressure tested. The line pressure is then drained through the drain valve.