

CONSTANT POWER REGULATOR (LR) Figure 1

Pump discharge pressure acts on pin 1 transferring force through piston 2 to lever 3. Lever 3 is an integral part of the pump's stroking piston 4. The lever torque, $F_1 \times "a"$, is obtained by the adjustable power spring 5, acting on lever arm "a", for constant power. Lever balance occurs when piston 2 force acting on lever arm "b" results in the same torque.

With low pump discharge pressure acting on the small diameter side of stroking piston 4, spool 6 does not allow the flow of discharge pressure oil through the passage to the large diameter side of the stroking piston. Stroking piston 4 is in the right end position, fully stroked for full pump flow.

Increasing pump discharge pressure above the torque balance of lever 3 will move spool 6 further into the stroking piston 4, metering discharge pressure oil to the large diameter side of the stroking piston 4. The pump will destroke by shifting the stroking piston 4, including lever 3 such that the piston force 2 is acting on the reduced lever length "b" minus the destroked distance resulting in the same torque as spring 5 acting on lever arm "a".

POWER REGULATOR WITH HYDRAULIC STROKE LIMITER (LRH) Figure 2

This is based on the LR control but with a low pressure pilot signal connected at port 7 to destroke the pump on demand.

SUMMATED POWER REGULATOR (SLR) Figure 3

This is similar to the LR control, but for two pumps. The discharge pressure of the first pump acting on pin 1, the discharge pressure of the second pump acting on pin 2 through a separate high pressure connection. The summation of both pin forces are acting on piston 3 and through it on lever 4.

CONSTANT PRESSURE REGULATOR (DR) Figure 4

Pump discharge pressure acts on pin 1, which is part of spool 2, axially free floating. Drain pressure is connected to both ends of spool 2, balancing each other. Spring 3 is the only counterforce to the pump discharge pressure under pin 1, diameter "A". This spring force holds the pump at maximum displacement until a preset pressure is reached. Further increasing discharge pressure will then move spool 2 towards spring 3, connecting the discharge pressure to a passage leading to the large diameter side of stroking piston 4. Destroking will occur until the discharge pressure is reduced again to the value dictated by spring 3.

LOAD SENSING REGULATOR (LS) Figure 5

This control is similar to DR control but a ΔP of 20 bar between discharge pressure and load pressure is set by spring 3. The load pressure acts on both sides of spool 2 so that the only balancing forces on the spool are, pump discharge pressure acting on arear "A", against spring 3 load and load pressure. Hence, discharge pressure = spring load + load pressure. With spring 3 force set equivalent to 20 bar pressur, the pump discharge pressure regulates 20 bar higher than the load pressure.

START ASSIST (AH) Figure 6

This control is an aid to the prime mover during the initial start up such that the power needed to crank the pump is minimal. Two external parts, 1 and 2 are connected by energizing a customer supplied on/off valve to fully destroke the pump. A minimum of 14 bar system pressure must be applied to port 2 to stroke the pump back to neutral. This feature can be in combination with any other controls mentioned.

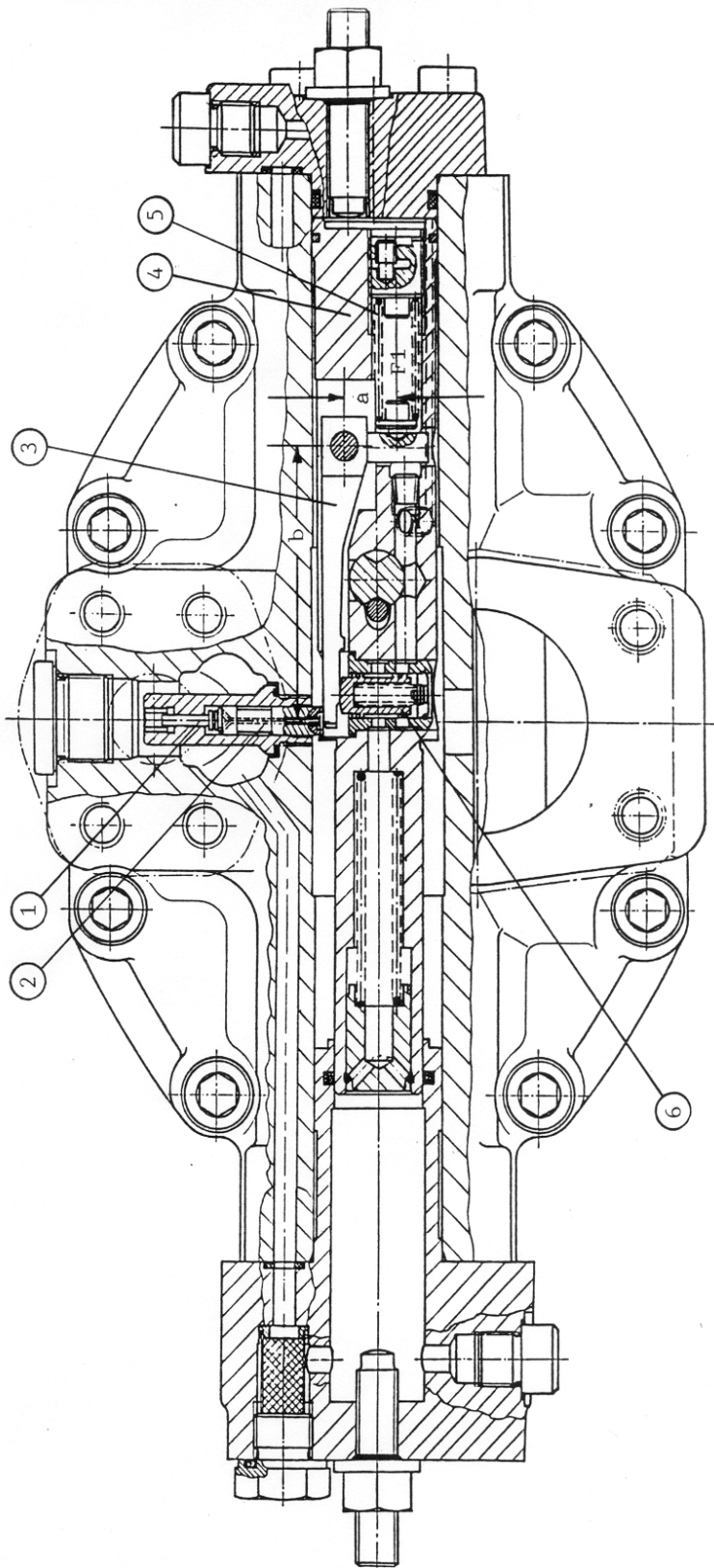
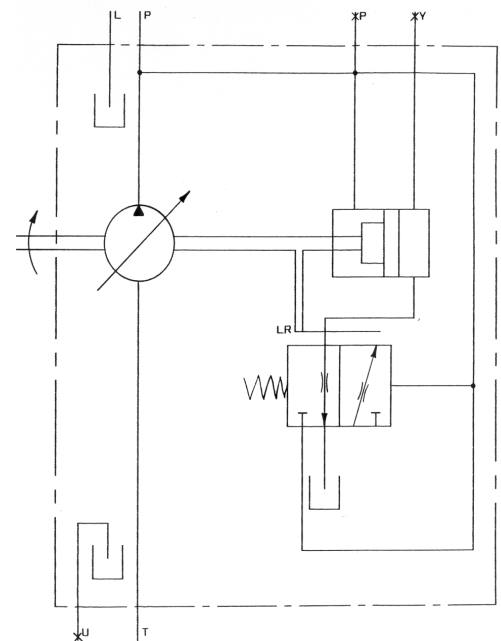


Figure 1



BPR Control - Constant Power Regulation with Hydraulic Stroke Limiter (LRH)

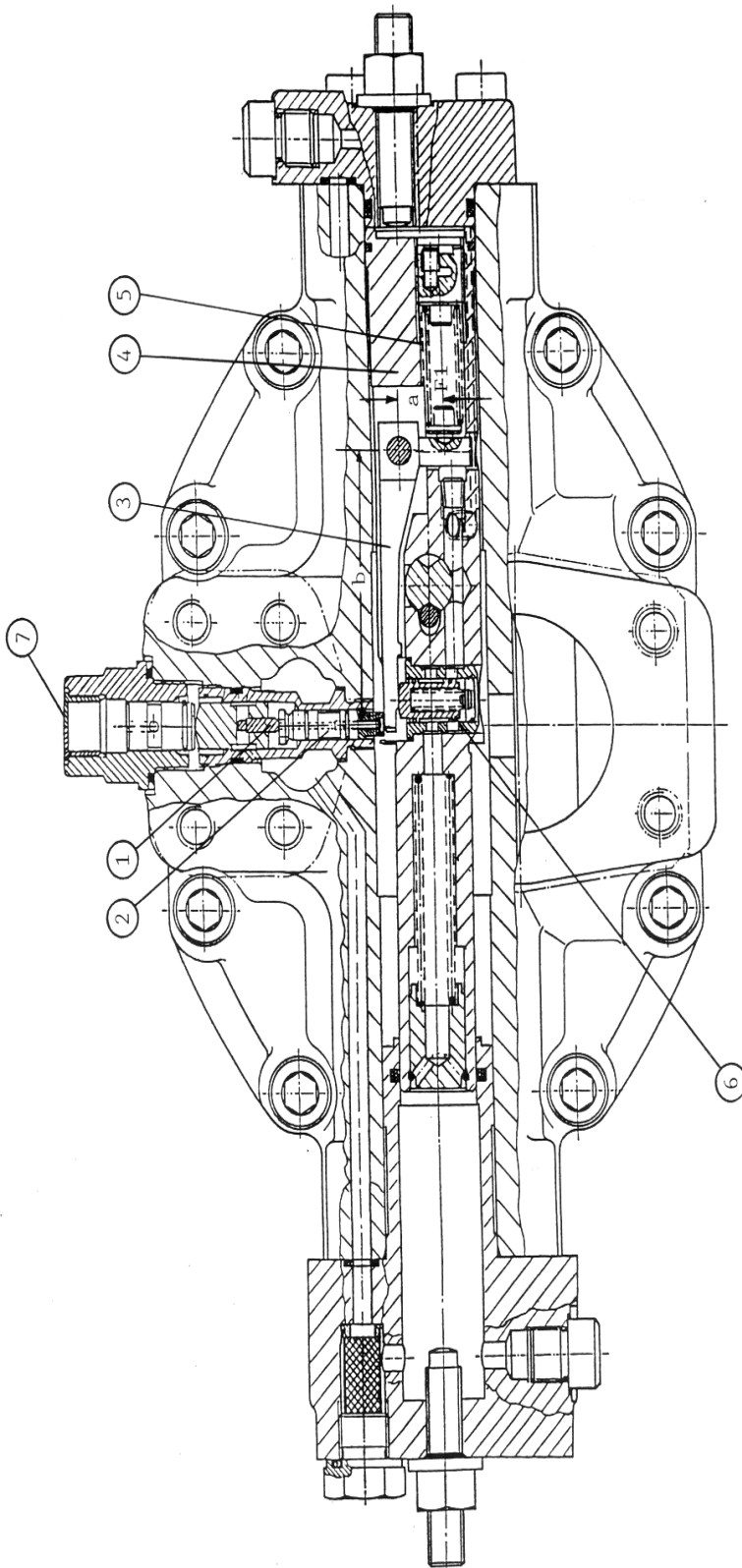
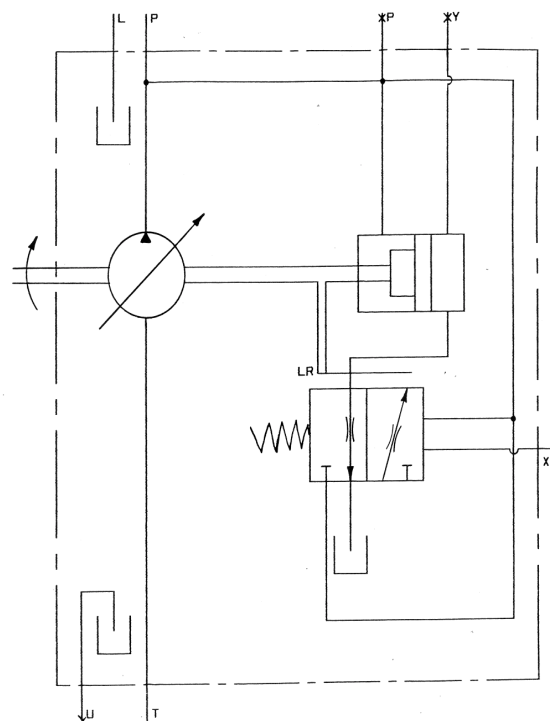


Figure 2



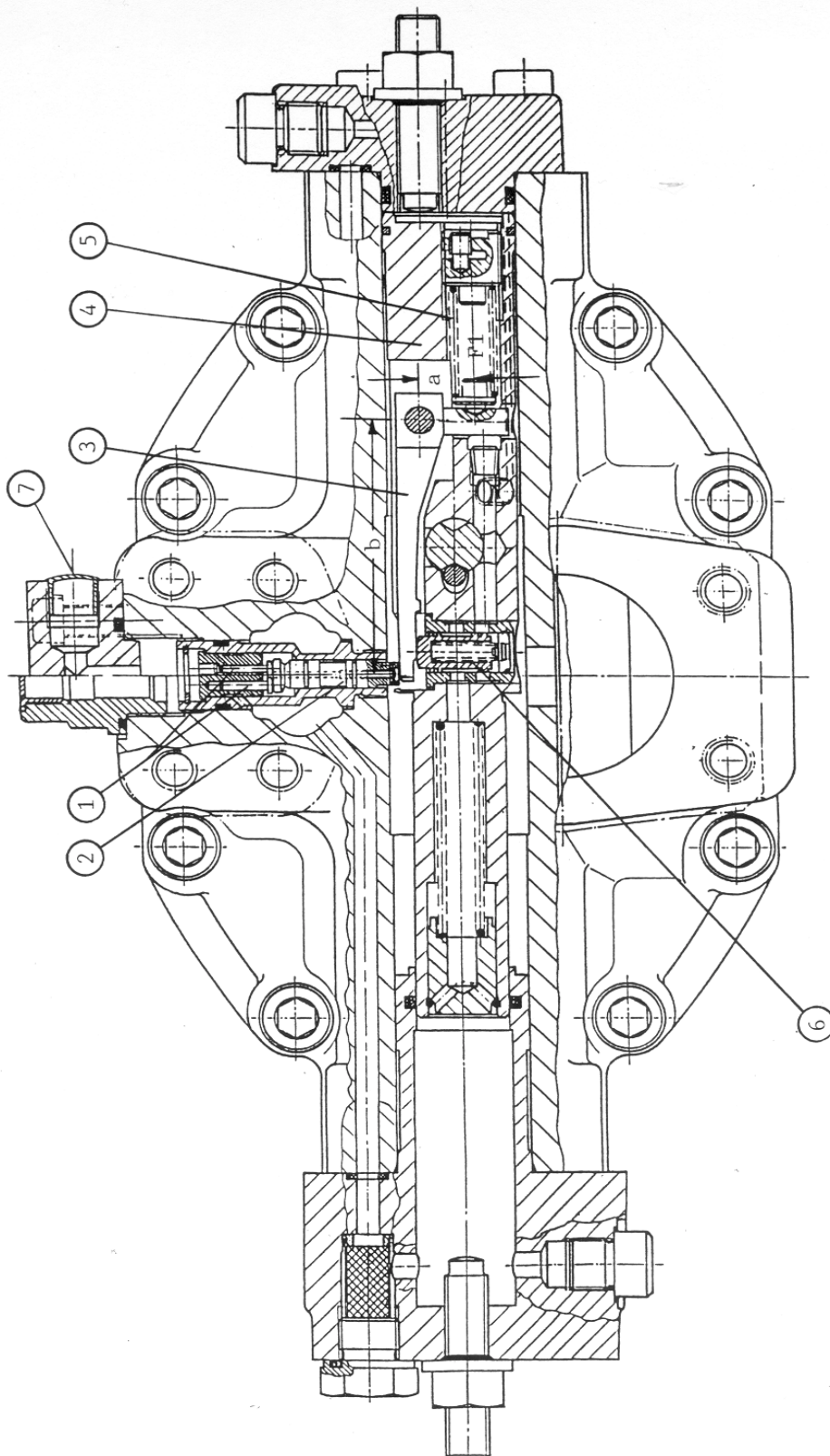


Figure 3

BPR Control - Summated Power Regulation (SLR)

BPR Control - Constant Pressure Regulator (DR)

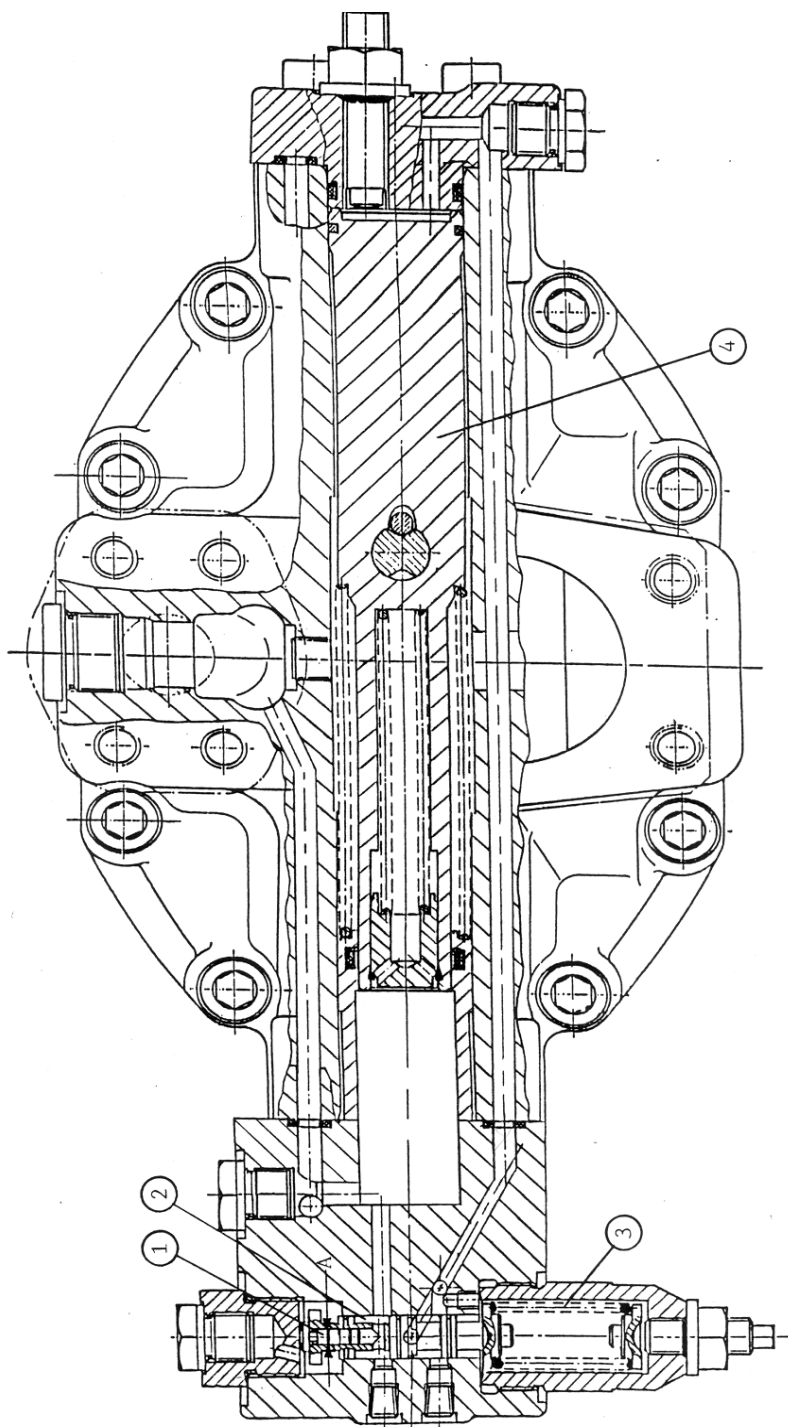
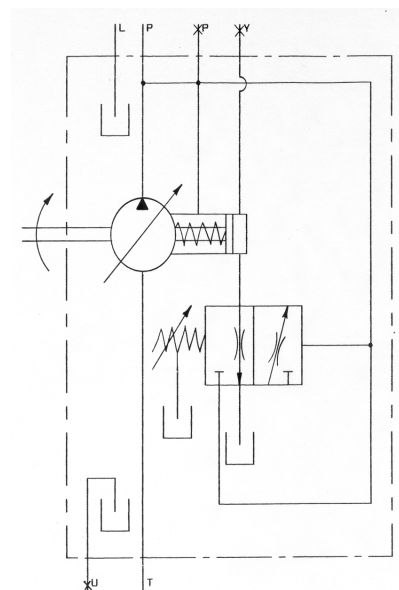


Figure 4



PR Control - Load Sensing (LS)

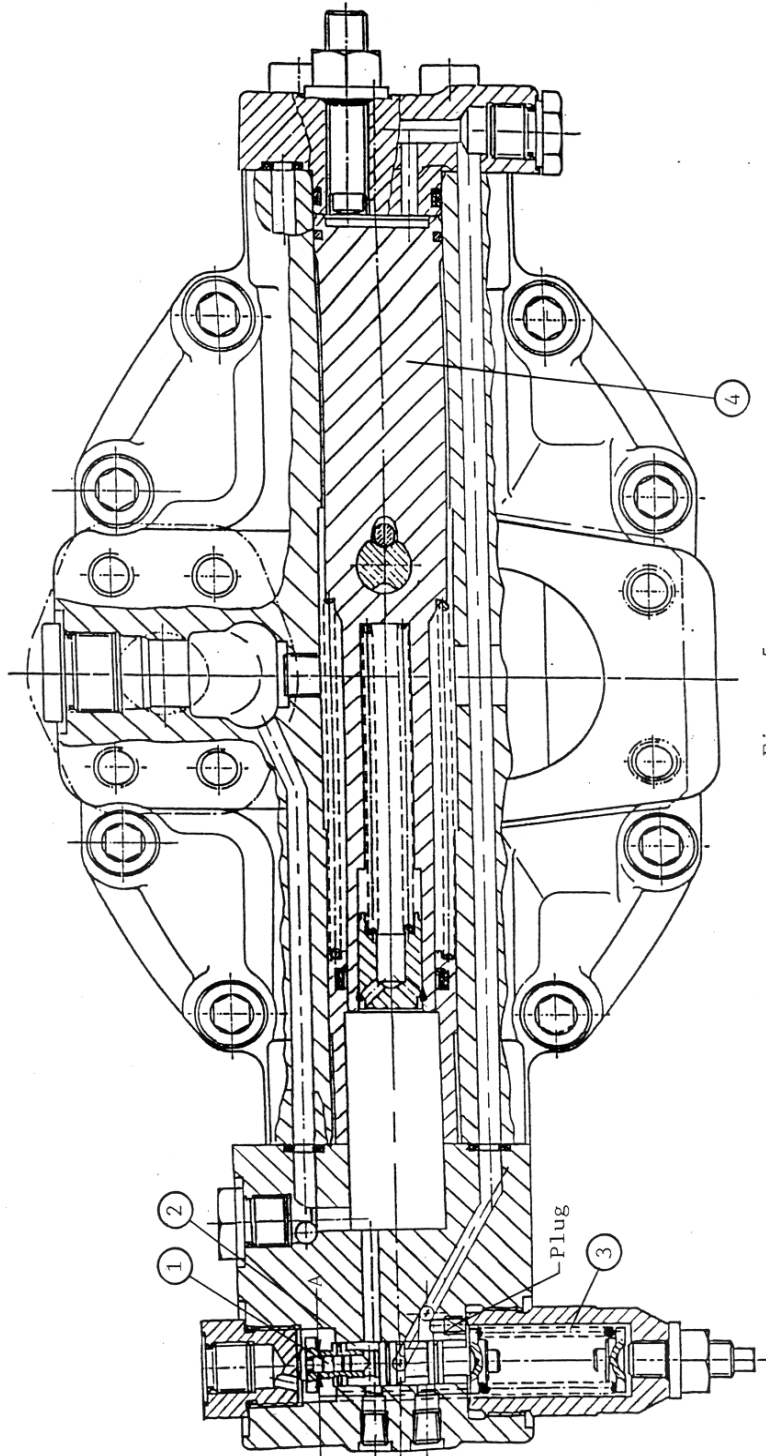
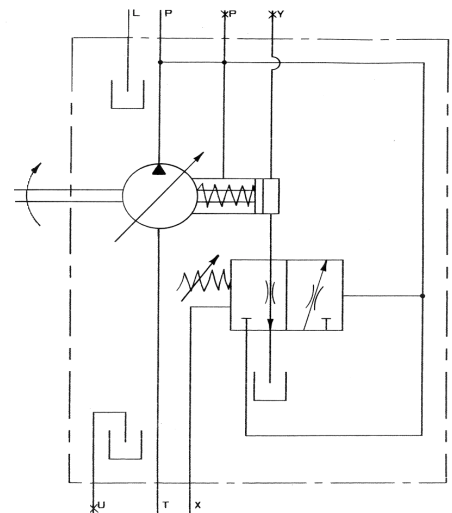


Figure 5



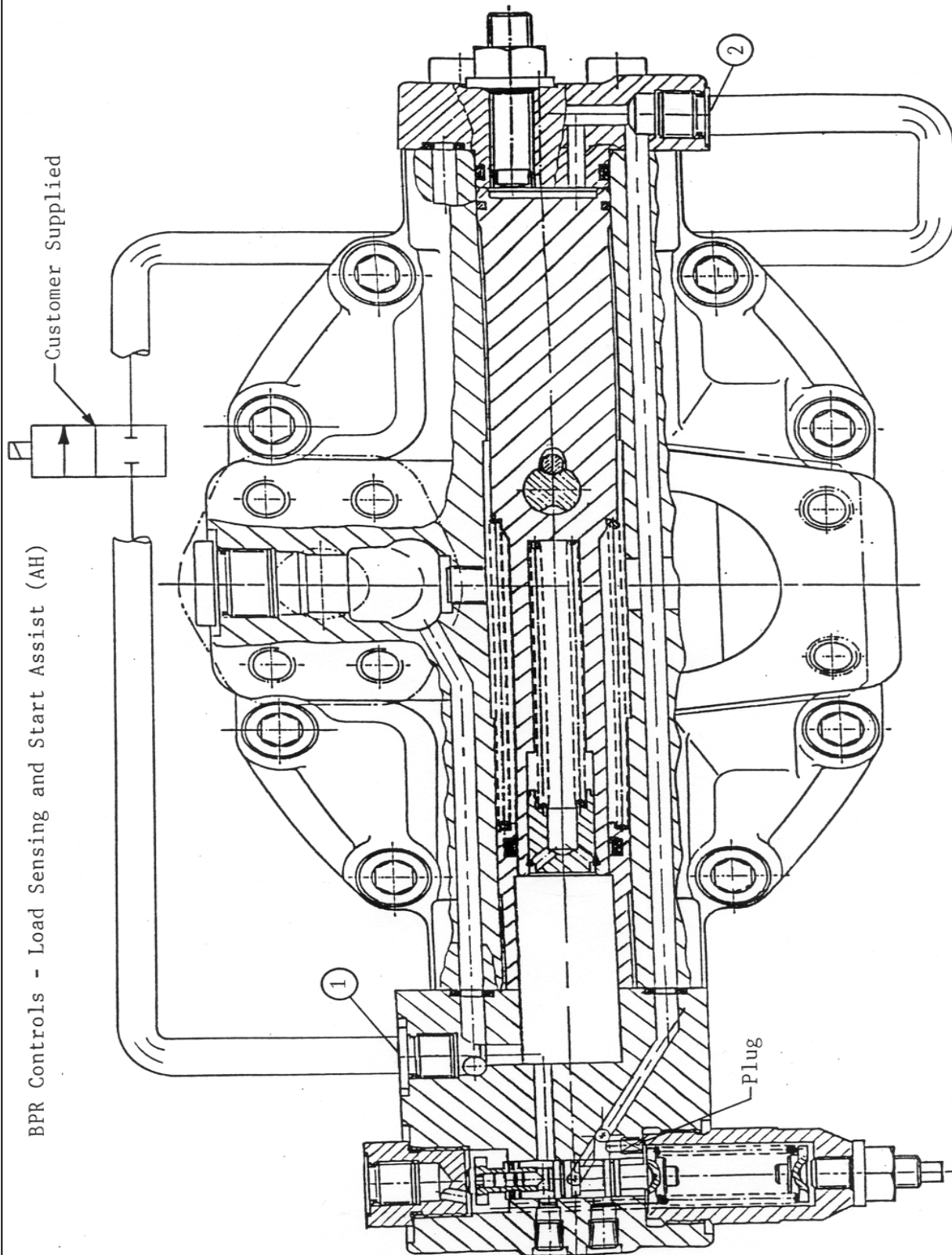


Figure 6