

"P-2NN" DUAL PRESSURE COMPENSATOR CONTROL

(with 4-way pilot control valve)

Operation for a typical pump driven clockwise (right hand) is described. Cut-a-way diagrams are a representation of typical pumps with this control. **Actual coupling** of control to pump control pin and swashblock **varies** from pump type to pump type. But, **functionally**, the **swashblock** (and resultant delivery) is **positioned** by **two** opposite (acting) **control pistons** (although, in some cases, the [two] pistons may actually be a single [one] piece).

See individual control parts drawings for actual configuration and location of part assemblies, orifices, connections and ports.

I. PRINCIPLE OF OPERATION

A. STARTING (See Figure 1 & 4).

The bias control piston spring positions the control and connected pump swashblock so the pump will deliver **maximum volume** to raise pressure in the system.

B. RAISING PRESSURE

Pump delivery (and resultant pressure) is fed back to the control through **Port "OP1"** (in some cases, an orifice may be installed in this port). The **four-way pilot control valve** is held in the "open" position by a **pilot control valve spring**. Flow (and resultant pressure) is transmitted through the pilot control valve spool to the area behind the **bias control piston** and through orifice **Port OP2**. Therefore, pressure acting on either end of the pilot control valve is equal, the **spool** is balanced and held in the open position by the **pilot control valve spring**. Flow (and resultant pressure) is also transmitted through **Port OP3** and **Port OP4** as well as **Port OP8** and **Port OP10** to the **adjustable control higher or lower pressure relief** (unloading) valves which block further flow in the control (and pressure transmittal).

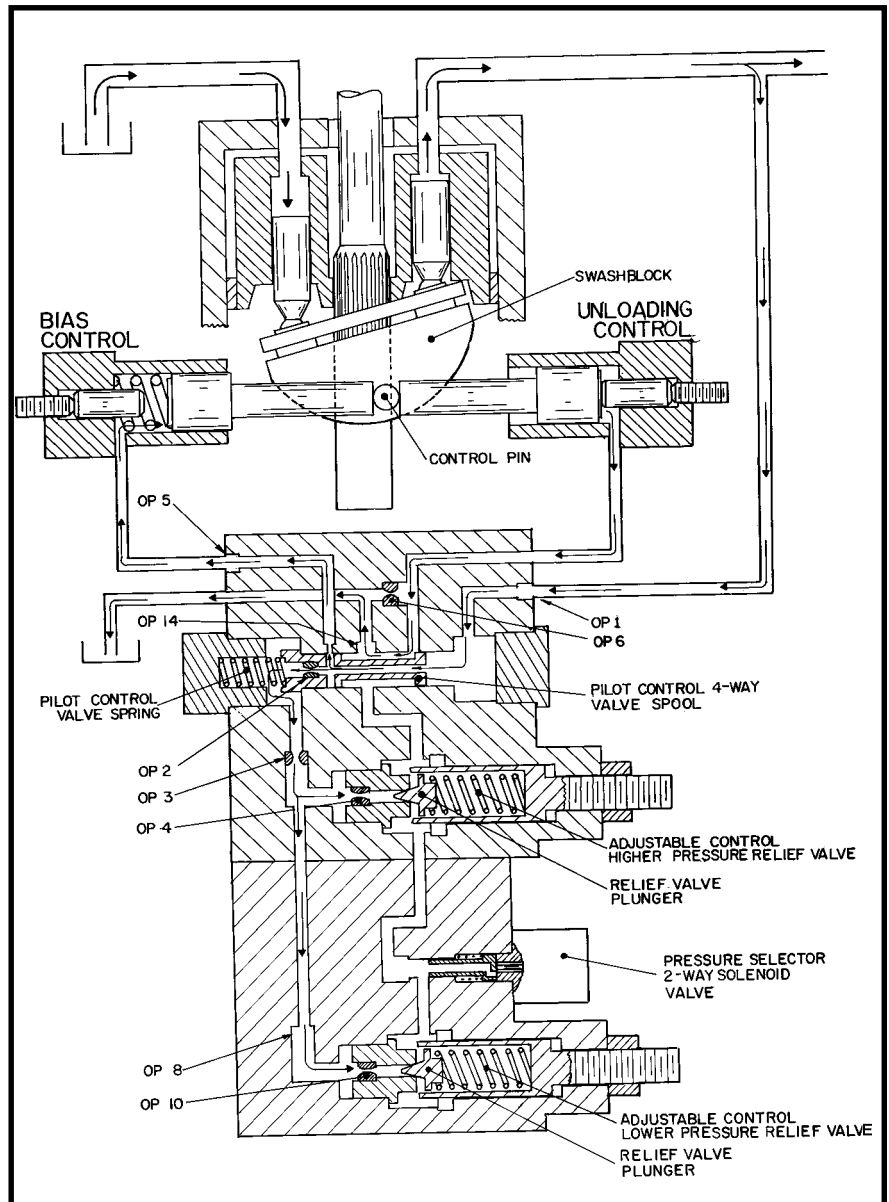


Figure 1. Raising Pump Pressure (5V-12128-L sh. 1).

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C. COMPENSATING (pump unloading) AT LOWER PRESSURE
(See figures 2 & 5).

Screws are used to set the tension or force of the relief valve springs. One relief valve is set to open at a lower pressure than the other. When pressure acts on the cone shaped plunger of the lower set pressure relief valve, the cone shaped plunger moves off its seat and allows flow through the valve, through drain line to pump case and case drain. Now, the pressure is no longer acting on the spring end of the pilot control valve spool. Due to the orifice in **Port OP2**, there is still pressure on the other end of the pilot control valve spool. This differential pressure forces the pilot control valve spool to shift and compress the pilot control valve spring. The pilot control valve spool now allows pump delivery (and resultant pressure) to flow to the **unloading control piston**. The pilot control valve spool simultaneously drains the fluid from behind the **bias control piston**.

The control piston now moves the **control pin** and shifts the **swashblock** to a position towards neutral where the pump (is unloaded) delivers "just enough" volume to maintain (making up for component slip losses or leakage) system pressure as regulated by the adjustable lower pressure relief valve.

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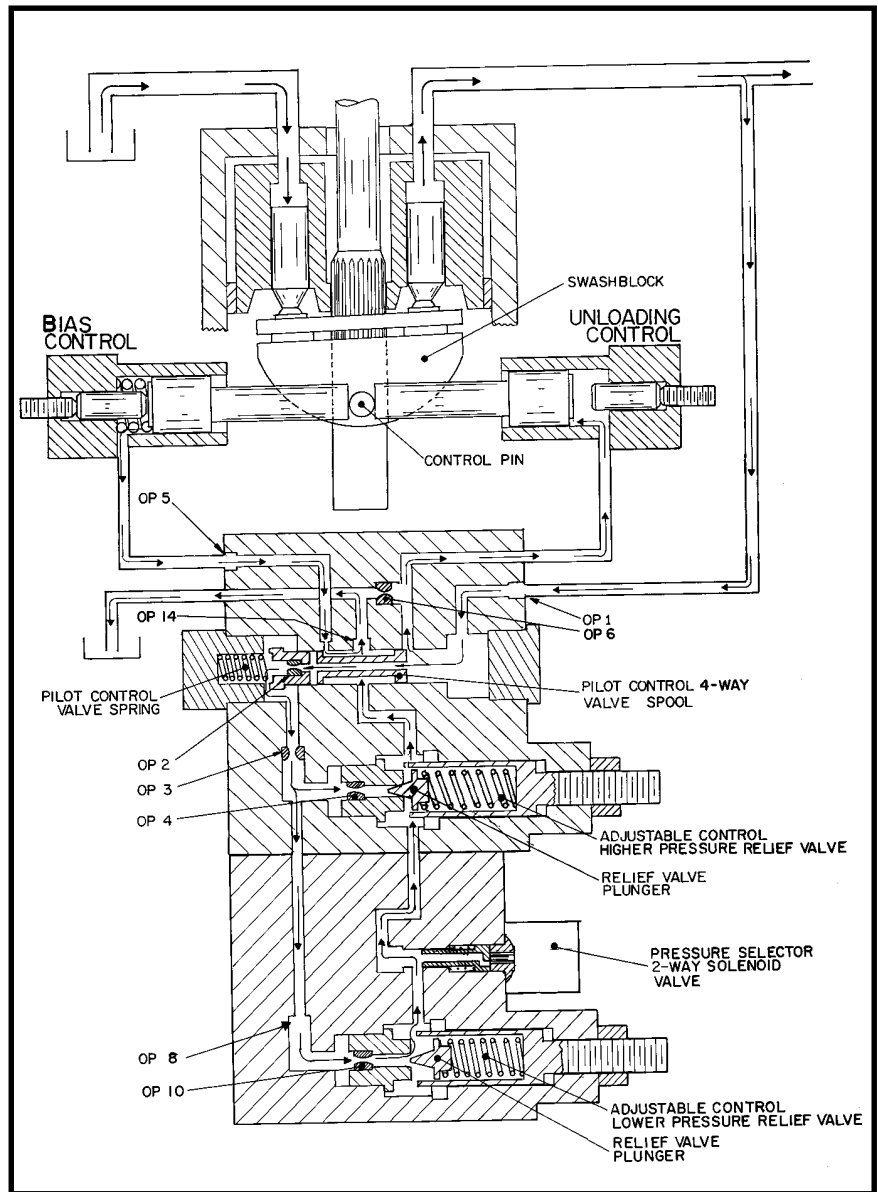


Figure 2. Compensating Pump Delivery at Lower Pressure
(5V-12128-L sh. 2)

D. HOLDING PRESSURE (See Figures 1 & 4).

If the system pressure drops below preset compensating pressure (in the event of increased leakage of system components and/or opening of system valves etc.), the control relief valve conical plunger seats (stopping flow to drain) pressure (and force) on pilot control valve spool is (again) balanced, pilot control valve spring returns spool to original position (as shown in figures 1 and 4), swashblock position shifts, and pump is "stroked" for increased (towards full) delivery until the control relief valve preset pressure is reached again.

E. COMPENSATING (pump unloading) AT HIGHER PRESSURE (See Figures 3 & 6).

Energizing the **pressure selector** two-way solenoid **valve** blocks flow from the lower pressure relief valve (effectively closing or seating its plunger) and pressure rises as in section B and figure 1. When the pressure on the cone shaped plunger of the **higher set pressure relief valve** (See figures 3 and 6), the cone shaped plunger moves off its seat and allows flow through that valve, through drain line to pump case and drain. Again, the pressure is no longer acting on the spring end of the pilot control valve spool. Due to the orifice in **Port OP2**, there is still pressure on the other end of the pilot control valve spool. This differential pressure forces the pilot control spool to shift and compress the pilot control valve spring. The pilot control valve spool now allows pump delivery (and resultant pressure) to flow to the unloading control piston. The pilot control valve spool simultaneously drains the fluid from behind the bias control piston.

The control piston now moves the control pin and shifts the swashblock to a position towards neutral where the pump (is unloaded) delivers "just enough" volume to maintain (making up for component slip losses or leakage system pressure as regulated by the higher pressure relief valve).

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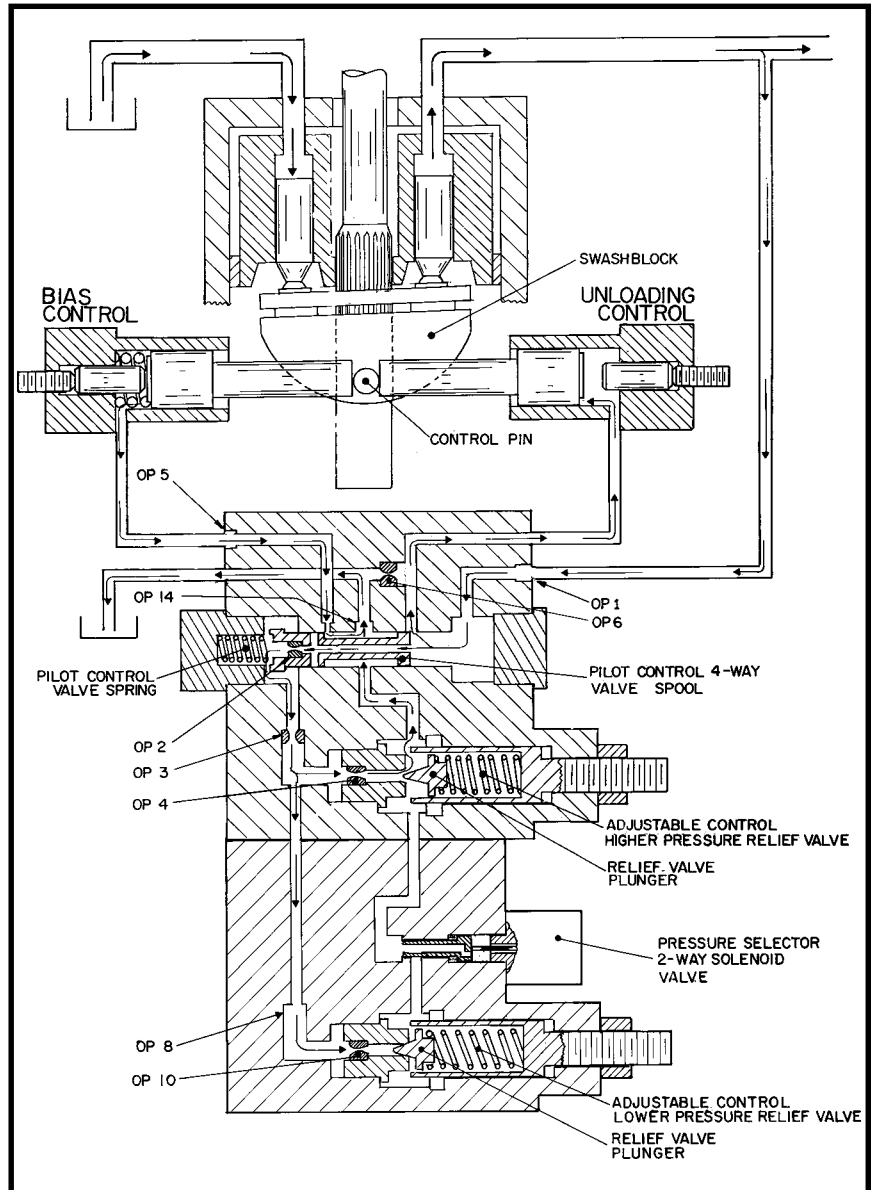


Figure 3. Compensating Pump Delivery at Higher Pressure (5V-12128-L).

II. ORIFICE FUNCTIONS

Orifice No.	Decreasing Orifice Diameter will Result In:—(Increasing Diameter will Do the Opposite)
OP1	Overall slowing of control response *
OP2	Do not change size of orifice**
OP3	Do not change - increased stability
OP4	Do not change - increased stability
OP5	Slowing of "off stroke" time ##
OP6	Increased instability #
OP8	Do not change - increased stability *
OP10	Do not change - increased stability
OP14	Slowing down of "on stroke" time. Do not go smaller than 0.060"

* Orifice not used (standard)

** If this orifice becomes plugged, the control will hold pump on minimum stroke. Be sure orifice is not plugged.

Plugged on "PVK" pumps

Not used on "PVG" Pumps

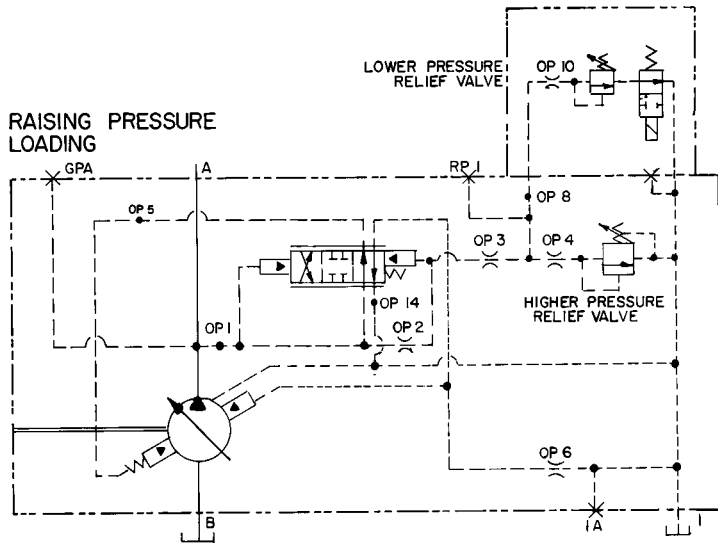


Figure 4. Raising Pump Pressure (5V-12128-L sh. 4).

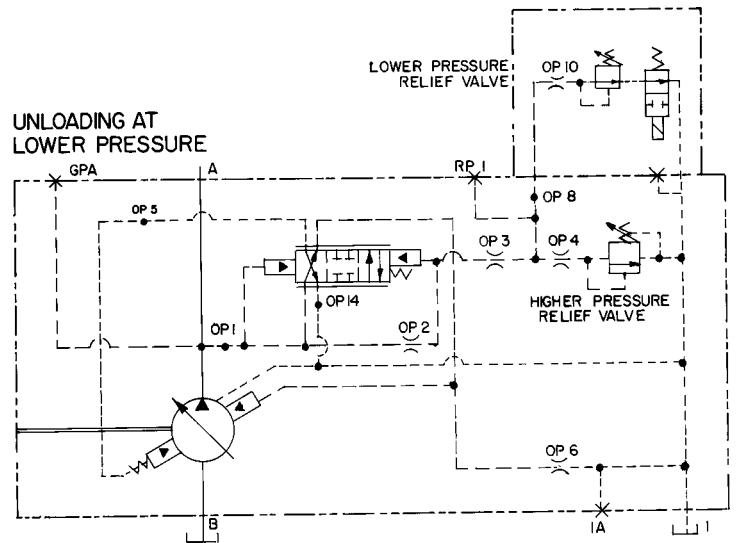


Figure 5. Compensating Pump Delivery at Lower Pressure (5V-12128-L sh. 4).

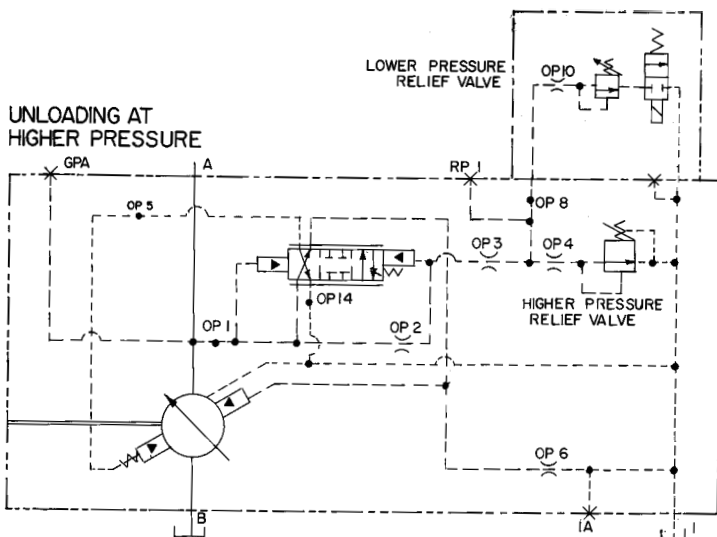


Figure 6. Compensating Pump Delivery at Higher Pressure (5V-12128-L sh. 5).