

Pump Compensator Adjustment Procedure

Submitted by: Gerald Manley CFPE – HTE Hydraulic System Engineer

One of the most common technical support questions that we receive concerns the proper adjustment procedure for setting the compensator on a pressure compensated pump. An improperly adjusted pump compensator can result in extreme system overheating and/or excessive pressures, leading to component failure, machine damage, and fire. A thorough understanding of the purpose and operation of the pump compensator makes the adjustment procedure much easier:

1. The pump compensator is utilized to set the maximum system **operating** pressure. Problems occur when the pump compensator adjustment is set above the system safety relief valve.
2. The pump compensator “destrokes” the pump whenever the set pressure is reached; thus, limiting the system operating pressure to the set value.
3. If the compensator is set above the safety relief valve setting, the pump never compensates; thus, the full pump flow is directed across the system safety relief valve. The system temperature then sky rockets!
4. The system safety relief valve is utilized as a **safety** device, to limit the system pressure in the event of a pressure spike or pump compensator failure.
5. The safety relief valve is always set **at least 250 to 300 psi above** the desired operating pressure.

Setting the compensator and relief valve for proper operation is pretty straight forward, and can be achieved as follows:

- A. First, familiarize yourself with the pump compensator and find the compensator adjustment screw. (If the pump also has a load sense and/or torque limiting control, make sure that you identify the proper adjustment point.)
- B. Next, find the system safety relief valve. Relief valves can be plumbed inline, included in manifold assemblies, or gasket mounted on a separate sub-plate.
- C. Consult the system documentation and/or schematics, to determine the proper system operating pressure.
- D. Confirm that the pump will not be vented to tank during the compensator adjustment procedure. It is not possible to set the compensator or pressure controls with a vented pump.
- E. Make sure that the system is shut-off, and that all safety procedures for the machine and personnel have been implemented.**
- F. Adjust the pump compensator to its **maximum** pressure setting...(normally fully clockwise).
- G. Adjust the system relief valve to its **minimum** pressure setting...(normally fully clockwise...but can be fully counter-clockwise for some cartridge valve manufacturers.)
- H. Start the system. (Full pump flow will be flowing across the relief valve at this point.)
- I. Slowly increase the setting of the safety relief valve to **approximately 250-300 psi above** the desired system operating pressure...as indicated on the pressure gauge. (There will likely be a high pitched squeal or noise from the relief valve. This is normal.)
- J. Lock the safety relief valve in place, utilizing the jam nut.
- K. Decrease the pump compensator adjustment (counter-clockwise), and watch the pressure gauge reading decrease. (As the pressure reaches a point below the safety relief setting, the high pitched squealing noise will subside.)
- L. Once the pressure is lowered to the **desired operating pressure**, lock the compensator adjustment in place. (Some people prefer to drop the pressure approximately 500 – 1000 psi below the desired operating pressure setting, and then bring the pressure back up to the desired point. This is perfectly acceptable, should you prefer to take this approach.)

And that's it....You're done!