100HP DUAL STROKE BALANCING

TSB-1009: STROKE BALANCING SETUP PROCEDURE

The Advantage 100HP Dual pump is designed in such a way as to allow independent control of each intensifier. This allows the software to fine-tune each pump and intensifier combination to maintain equal stroke rates and pressure. By doing this, it keeps one intensifier from “working” harder than the other, and helps both intensifiers wear at the same rate.

The PLC automatically controls the stroke balancing, and in normal circumstance the customer will never need to adjust the parameters. In some situations, it may be necessary to fine-tune the parameters to obtain optimal results.

If you need to install the latest stroke balancing software, see TSB-1002 Memory Module Installation and TSB-1004 Red Lion Software Installation. Please note the latest stroke balancing software is only available on the Red Lion Touchscreens.

Compensator Adjustment:

1. Remove the 2 Proportional Valve Coils. This will ensure there is no current affecting the proportional valve. **See Figure 1.**
2. Ensure that the pump is running at low pressure (10,000 psi on the touch screen). Deadhead the pump by turning off the cutting nozzle, so that the pump is not shifting.
3. Locate Pump 1, which is the hydraulic pump closes to the Electric Motor.
4. The low pressure compensator is located at the base of the hydraulic pump, and is the upper screw. **See Figure 2.**
5. Remove the protective cap from the upper compensator and loosen the locking nut.
6. Using an Allen Wrench, adjust the compensator screw by turning clockwise to increase pressure, CCW to decrease pressure as needed in turns of 10° or less until the gauge reads exactly 300 psi. Allow the pressure to adjust for 5 seconds between turns.
7. Once the pressure reads 300 psi, tighten the locknut while holding the screw with the Allen wrench to prevent movement of the adjustment. **See Figure 2.**
8. Reinstall the Proportional Valve Coil on the pump you are working on.
9. Plug the controller into the proportional valve as shown. **See Figure 1.**
10. Turn the controller on by pressing the I/O button.
11. Press the red lock button.
12. Using the controller, press the down arrow until you get to “MINIMUM OUTPUT.” Press the unlock button. Press the up/down buttons to adjust the mA value until exactly 500psi is achieved on the hydraulic gauge. The mA value on the controller should be between 35-50 mA. Press the lock button to lock the value. **See Figure 3.**
13. Anytime you adjust the “MINIMUM OUTPUT”, the “MAXIMUM OUTPUT” will need to be re-adjusted to ensure safe operation.

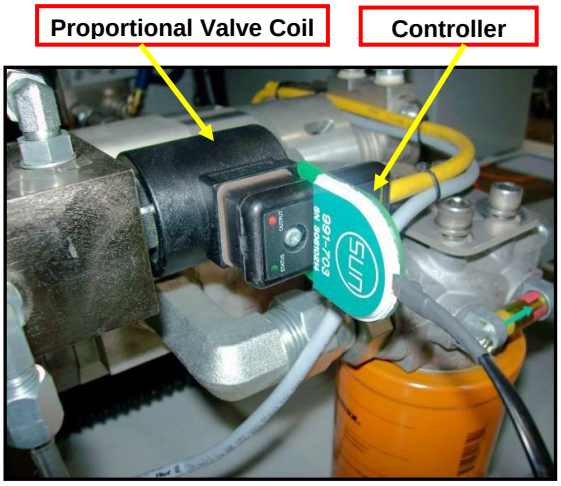

FIGURE 1

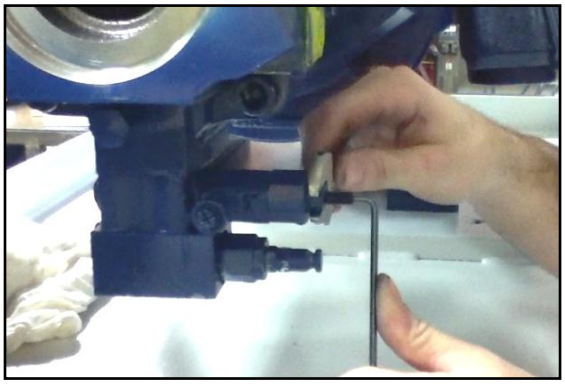

FIGURE 2

FIGURE 3

Press the down arrow until you get to “MAXIMUM OUTPUT.” Press the unlock button, and then use the down arrow to adjust the mA value to 300mA. This ensures that the pump will not over-pressurize in the next step. Press the Lock button to lock in the value.

14. Repeat steps 4 through 13 on the second pump, Pump 2.
15. Enter 60,000psi on the touchscreen. The hydraulic gauge will still read very low. Keep the controller connected to the proportional valve on Pump 2. Under “MAXIMUM OUTPUT”, press the unlock button. Use the up arrow to slowly increase the mA value until the hydraulic gauge reads exactly 3000psi. Press the lock button to lock the value.
16. Remove the controller from pump. Repeat steps 15 with the other proportional valve connected to Pump 1.
17. The pump can now be returned to routine operation.

Advanced Software Adjustment:

The software in the touchscreen allows the advanced user the ability to adjust the speed at which the software adjusts each pump. The values entered are compensation factors that the PLC uses to adjust each intensifiers hydraulic pressure. The PLC monitors the stroke rate of each intensifier, and then adjusts the output pressure of the hydraulic pump every 2 seconds if one intensifier is faster than the other. If both intensifiers are shifting at the same speed, no adjustments are made. When adjustments are needed, the PLC adds the compensation factor value to the slow intensifier, and subtracts the compensation factor value to the fast intensifier.

Through testing we have found that a “10” in each register is ideal for keeping the intensifiers even. If too large a value is used, the PLC will overcompensate and the intensifiers will always be switching speeds. For example, if 100 is used for the values and the front intensifier is slow, the PLC adds 100 to the front and subtracts 100 from the rear. Now the front will increase in pressure drastically, shifting possibly 3 times faster than the rear. Next the PLC sees the front is now faster and adds 100 to the rear and subtracts 100 from the front. This makes the rear speed up too much, and now it will be doing more strokes than the front. At the end of the day stroke overall stroke counts will be the same, but the intensifiers have been running erratically to get there.

It is critical to have a value in each of these 4 registers. If we do not put a value in the subtract registers, the pressure output will gradually climb to max pressure (60Kpsi). If no value is put into the add registers, the output pressure will gradually fall to minimum pressure (10Kpsi).

The compensation factor values correlate to hydraulic pressure at a 10:1 ratio. So a 10 compensation factor equals a 1 psi hydraulic pressure change.

Front intensifier stroke count > Rear stroke count

Add 10 (1psi hyd) to rear, Subtract 10 (1psi hyd) from front, for a total of 2 psi change.

Rear intensifier stroke count > Front stroke count

Add 10 (1psi hyd) to front, Subtract 10 (1psi hyd) from rear, for a total of 2 psi change.

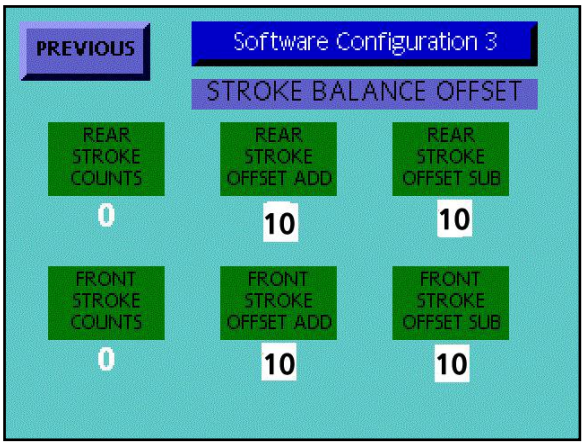

FIGURE 4

Compensation Factor Adjustment:

The default register values are set at 10 from the factory, and should work for a wide variety of pumps. It is not recommended that these values be changed, and to contact H2O Jet directly if you feel any changes are necessary.

1. To access the stroke balancing parameters, you must first login as a supervisor. From the main screen, press the “SETUP” button. Next press the “LOG IN” button and enter “setup” and hit enter. Enter the password “32179” and press enter. Press the “GO TO SUPERVISOR MENU”.
2. Press the “SOFTWARE CONFIG” button on the Supervisor Menu Page. Press the “SOFTWARE CONFIG 2” button followed by the ”SOFTWARE CONFIG 3” button.
3. As the pump is stroking, the Front and Rear Stroke Counts are shown in the boxes on the left. These numbers automatically clear every 20 seconds.
4. The screen has 4 parameters that are editable. The OFFSET ADD and OFFSET SUB parameters control the rate at which the software adjusts each intensifier. Too high a value will cause the software to overcompensate, and balance will never be achieved. Too low and it will take too long for the intensifier to balance. The default values are set at 10 from the factory. It is critical that a value be added to each of the registers.