HYDRAULIC SYSTEM COMMISSIONING PROCEDURES

Incorrect commissioning of hydraulic components during initial start-up can result in damage through inadequate lubrication, cavitation and aeration that may not manifest itself for hundreds or even thousands of service hours. To avoid damage to system components during initial start-up, the machine manufacturers’ commissioning procedures should be followed where available. The following are general procedures for commissioning hydraulic systems after components have been changed or other maintenance work carried out. The same procedures can also be applied when commissioning new systems.

WARNING! High-pressure fluid is present in operational hydraulic systems. Fluids under high pressure are dangerous and can cause serious injury or death. Do not make modifications, repairs or adjustments to any hydraulic system unless you are competent or working under competent supervision. If in doubt consult a qualified technician or engineer.

Pre-start

General

If the system is down as a result of a major component failure, such as a pump failure:

- drain and clean the reservoir to ensure that it is free from metallic debris and other contamination;
- change all filters; and
- change the fluid. On large systems where the cost of changing the fluid may be prohibitive, the fluid should be circulated through a 10 micron filter (without bypass) until sample particle counts indicate a cleanliness level of ISO 4406 18/13 or better. For further information on fluid filtration and cleanliness levels, refer to our Technical Library document titled Filters.

When fitting pumps and motors, check the drive coupling for fit on the pump or motor shaft. Loose fitting couplings will result in accelerated wear of the drive shaft and should be replaced.

On closed loop systems (hydrostatic transmissions), closely inspect the high-pressure hoses or pipes and replace any suspect lines. A blown hose or pipe while in service can result in the destruction of the pump and/or motor through cavitation.
Cylinders

After fitting each cylinder, where possible fill the cylinder with clean oil through its service ports before connecting service lines. This reduces the risk of air compression within the cylinder (the ‘diesel effect’) on start up, which will result in damage to the cylinder and its seals.

Motors

After fitting each motor and connecting service lines:

- On piston type motors, fill the motor case with clean oil through the uppermost case drain port and connect the case drain line. Failure to do so will result in damage to the motor on start-up.

Pumps

After fitting the pump(s) and connecting service lines:

- Open the suction line valve at the reservoir.
- Assuming the reservoir fluid level is higher than the pump, carefully crack the suction line fitting at the pump until all air is expelled and the suction line is full of oil. This step is not necessary with piston type pumps where the pump case is common to the suction line (see below).
- On piston type pumps fitted with an external case drain, fill the pump case with clean oil through the uppermost case drain port and connect the case drain line. Failure to do so will result in damage to the pump on start-up.
- On piston type pumps without an external case drain (pump case is common to suction line), carefully crack loose the uppermost plug in the pump case and bleed until all air is expelled and the case is full of oil. Failure to do so will result in damage to the pump on start-up.
- On closed loop pumps (hydrostatic transmissions) install a 900 psi / 60 bar gauge in the charge (boost) pressure gauge port.
Start-up

- Check all pipe and hose connections are tight.
- Confirm reservoir fluid level is above minimum.
- **CAUTION!** Confirm all controls are in neutral to ensure that the system will start unloaded. Take safety precautions to prevent machine movement in the event that the system is activated during initial start up.
- Where the prime mover is electric, momentarily start and then stop the motor to visually confirm that the direction of motor rotation is correct for the pump.
- Start the prime mover and run at the lowest possible RPM.
- On closed loop systems (hydrostatic transmissions) monitor the previously installed charge (boost) pressure gauge. If the manufacturer’s specified charge pressure (typically 110 - 360 psi / 8 - 25 bar) is not established within 20-30 seconds, shut down the prime mover and investigate the problem. Do not operate the system without adequate charge pressure - damage to the transmission pump and/or motor will result.
- On variable displacement pumps and motors with external, low pressure pilot lines, carefully crack the pilot line fitting at the pump or motor until all air is expelled and the pilot line is full of oil. **CAUTION! Do not bleed pilot lines carrying high-pressure fluid – personal injury may result. If in doubt - do not bleed pilot lines!**
- Allow the system to run at idle and unloaded for five minutes. Monitor pump for unusual noise or vibration, inspect system for leaks and observe reservoir fluid level.
- Function the system without load. Stroke cylinders slowly, taking care not to develop pressure at the end of stroke to avoid compression of trapped air, which will result in damage to the cylinder and seals through the ‘diesel effect’. Continue to function the system until all air is expelled and all actuators operate smoothly.
- With the system at operating temperature, check and, if necessary, adjust pressure settings according to manufacturers’ specifications.
- Function-test the system with load.
- Inspect system for leaks.
- Shut down prime mover, remove all gauges fitted during commissioning, check reservoir fluid level and top-up if necessary.
- Return machine to service.
- To ensure maximum operating efficiency and component longevity, refer to our Technical Library document titled Prevention of Premature Hydraulic Component Failures.

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