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Maintenance Minute

Standard Plumbing Practices
Komatsu

Summating Jaw Open/Close

When installing a shear or other attachment that requires 2 pump flow onto a Komatsu excavator, the bucket circuit and auxiliary circuit are typically summated to achieve 2 pump flow, and dual excavator control valves lessen the back-pressure on jaw open/cylinder retract. The bucket circuit must be oriented so the rod/retract side of the bucket circuit goes to the rod/retract side of the shear cylinder.

If this orientation is not followed, there will be excessive back-pressure while opening the jaw, because the shear bore side oil is close to double that going into the cylinder rod side to retract it. The restricted cut in the excavator rod spool will cause a restriction to the large volume of oil trying to push through from the bore side of the shear cylinder.

Measuring oil pressure at the GB port of the regen valve will show pressures in the 2000-3000 psi range while the jaw is opening if the circuit orientation is not correct. When orientation is correct, this pressure will usually be in the 1000-1500 psi range.

The bucket and auxiliary port reliefs on the excavator control should be individually set to 100-200 psi above main system pressure. In some cases, it may be necessary to install high-pressure port reliefs in the auxiliary circuit, as some only have mid-range port reliefs that cannot be set to accommodate full system pressure.

The corresponding auxiliary lines on the boom need to have their pilot lines teed into the bucket pilot lines so the bucket and auxiliary circuit flow as one. If there is an issue with spiking when flow is reversed while the cylinder is dead-headed in either direction, you may need to install a simple adjustable inline flow control in the bucket pilot lines to slow the excavator spool shift and pump initiation.

Slowly reduce the flow through the flow control, just until the spiking is eliminated from the circuit. Single line plumbing can be custom installed if the two spools/circuits are manifolded together at the base of the boom. If single lines are used, they must be at least -20 on machines 300 class and lower (150 gpm and less) and -24 on 400 class machines (over 150 gpm).

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On PC-11 machines, there are two-stage back pressure valves that increase system make-up pressure. In many cases, the increase in make-up pressure will cause the PTC valves in the regen to open, and the attachment jaw will slowly close while the track drives are being operated. If you experience this issue, a higher spring tension PTC valve can be purchased from the Genesis Parts Department that will mask the issue caused by high system make-up pressure.

Rotation Plumbing

Rotation plumbing can easily be added by stacking an additional 1/2 or 1 pump flow auxiliary valve to the valve bank. Spool stops can be used as well as inline pressure reducers to limit the flow to the desired range. This valve should be a motor spool type valve.

Check pressure and flows at the end of the boom or stick lines per settings called out in the manual. Do not use the bucket circuit or cylinder spools to run the rotate circuit. We have seen motors grenade when using them. The restricted cut in the rod side of the spool does not open or allow the same flow rate as the bore side of the spool. This can cause a momentary hydro static lock in the circuit and the motors will come apart.

Case Drain

Attachments requiring a case drain need to be run through their own 12 gpm, 10-micron filter and directly into the suction side of the excavator hydraulic tank. Do not run it to any location that is returning oil through the excavator return filters in the tank.

For complete details about case drains, see Tim's Tech Tip - Rotation Circuits Requiring a Case Drain.

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