



TIM'S TECH TIPS



Dual-Pump Flow & Summating Excavator Circuits

Preparing an excavator prior to attachment delivery makes installation safer and easier. It also requires an understanding of pump flow and excavator circuits.

An excavator typically has two hydraulic pumps that supply oil to its main control valve, which is usually separated into two halves. Combining the flow from both halves of the control valve is called summating, thus achieving dual-pump flow to operate one circuit.



Summating is the preferred method of achieving maximum speed to an attachment. However, interchanging the stick and bucket circuits may also substantially increase speed.

A bucket circuit is usually single-pump flow while a stick circuit is dual-pump flow. At times, adding an auxiliary circuit spool to the stick circuit helps reduce back pressure in the system and speed up jaw open and close.

In certain cases, the bucket and auxiliary circuits can be summated to achieve dual-pump flow, depending on whether the bucket and auxiliary are on separate sides of the main valve and whether the auxiliary circuit can be proportionally controlled by teeing into the bucket pilot control circuit.

The auxiliary circuit must also be capable of proportionally controlling pump initiation on the auxiliary side of the circuit. On many excavators, the auxiliary circuit is controlled by the flow percentage set in the operating system. Because attachments take all the flow the pumps can give them, when this percentage is reached, the pump will instantly turn on or off instead of gradually increasing or decreasing, which can cause sharp, damaging spikes in the hydraulic circuit.

If excavator circuits are electronically controlled, it may be necessary to reduce the spool shift and pump initiation in the excavator software to take spiking out of the circuit when changing attachment cylinder direction from full extend or full retract.

On excavators with full hydraulic spool piloting, install a flow control into the pilot lines between the joystick and spools. The flow control can then be adjusted to slow the pilot oil flow to the spool, which in turn slows how the spool shifts and the pumps stroke up.

The stick and bucket circuits are oriented as to rod and bore sides of their respective cylinders. Be sure to connect rod-to-rod and bore-to-bore when connecting a circuit to the attachment. When these are reversed, extra pressure is needed to open the jaw, which pulls down the engine, de-strokes the pumps, increases jaw cycle time, creates high oil temperature and burns more fuel.

It's always a good idea to obtain an excavator's hydraulic schematic prior to making any modifications and contact the OEM if you have questions. We're also here to help. Contact Tim at 218-349-5755, talseth@genesisattachments.com