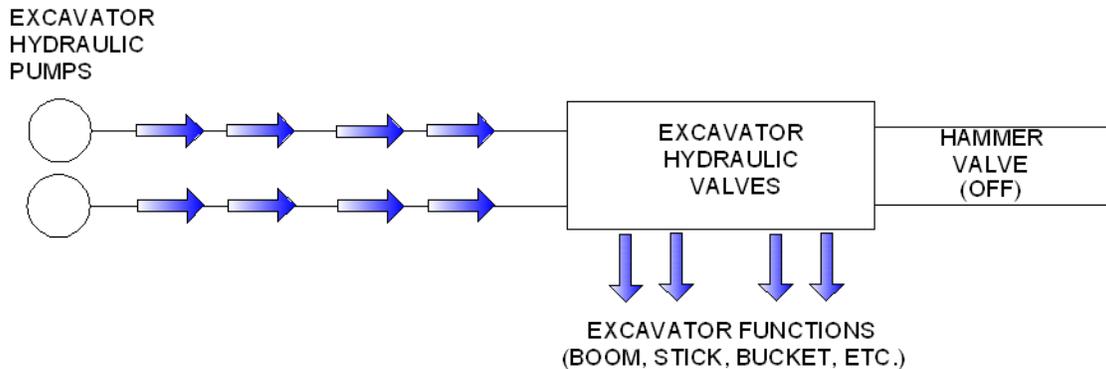


Priority Flow Valves and Why They're Needed

Many excavators under 40 tons require the use of priority flow valves in order to operate cutter heads and other rotary equipment. This is a brief discussion of priority flow valves and their use.

Why do I need a priority flow valve?

Most excavators are set up with an auxiliary valve that can be used to run a hammer. This valve is usually placed on the end of the excavator valve bank. (See figure 1)



(Figure 1)

When you activate the hammer valve a majority of the oil goes to the hammer valve circuit (with the excavator controls not moving). (See Figure 2) OEM's do this because they know that during hammer operations very little or no movement of the excavator is required (i.e. you place the hammer, turn it on, and when you're done, you turn it off and locate it in the next position, then activate it again). This maximizes the production of the hammer while the machine is not moving.

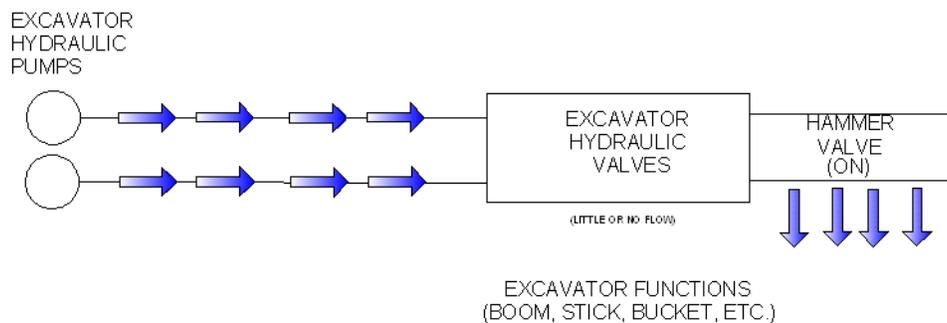


Figure 2

When you activate any control on the excavator with the hammer circuit on, this oil is sent to the function (boom, stick, bucket crowd, etc) before it can get to the hammer circuit robbing it of oil flow. This means that all of the excavator functions have “priority” over the hammer valve. If the cutter head were connected to the hammer circuit at this time, it would begin slowing as flow is taken for machine functions from the hammer circuit. (see figure 3) When the excavator stops moving (i.e. taking flow from the hammer circuit) the cutter head speeds back up. Considering that the only feed mechanism for the cutter head is moving it into what you are grinding, this speed up, speed down scenario would occur all the time.

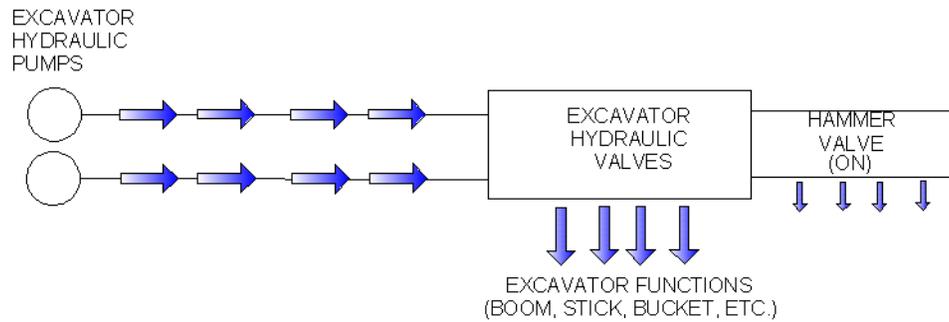


Figure 3

The priority flow valve is placed between the pumps and the valve bank. (See figure 4). Priority flow valves, when not activated, allow full unrestricted oil flow to the excavator valves as before.

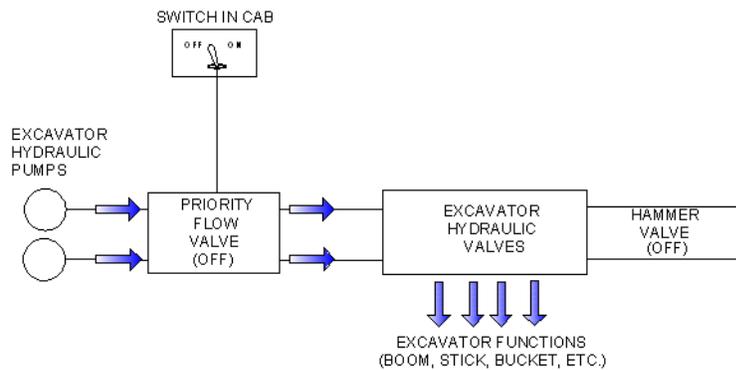


Figure 4

When activated, priority flow valves take oil before the excavator valves (thus “it’s got priority”). The amount of oil taken can be from 0 to 85% of the total output of the excavator hydraulics and is adjustable. Once set, the amount of oil diverted remains constant, thus insuring proper operation of the cutter head. (See figure 5)

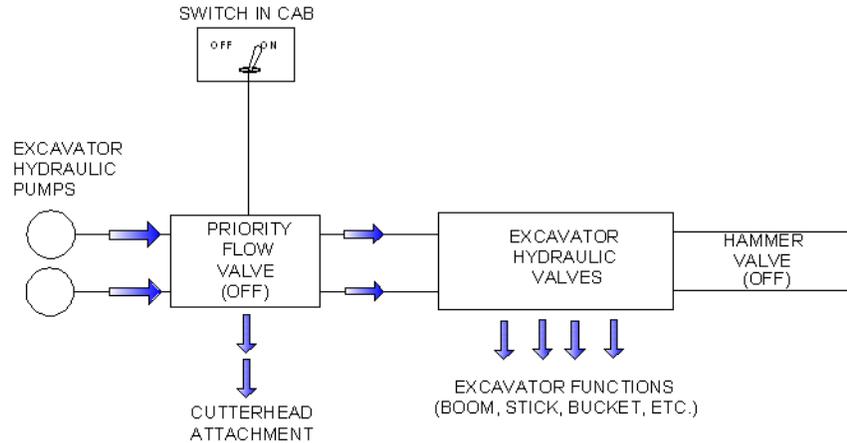


Figure 5

How are priority valves set?

Because flow can vary between machines, the priority valve must be “dialed in” for a specific machine. Once the cutter head is attached to the machine, we activate the priority valve with minimum diversion (flow to the cutter head). With the cutter head spinning, we begin moving the boom up and down (one of the highest draw functions during cutter operation). We then begin slowly bringing the diversion percentage of oil to the cutter head up until the boom lift speed begins to slow. At this point we are taking as much oil as we can from the excavator without affecting performance.

Since we use variable speed hydraulic motors, we can now set the speed of the cutter to the optimum speed with the flow that we have available.

The priority valve is activated by the operator by a simple toggle switch in the cab. With the switch on, the valve opens, oil is diverted and the cutter head spins. With the switch off, you are in normal excavator mode.

What happens if we don’t use a diverter valve?

This has been tried before and the result is that when you turn on the hammer circuit, the cutter head will spin up normally. The problem comes when you start moving the cutter head with the excavator. Every time you move the machine the cutter head will slow dramatically. When you stop moving the machine, the cutter head will speed back up.