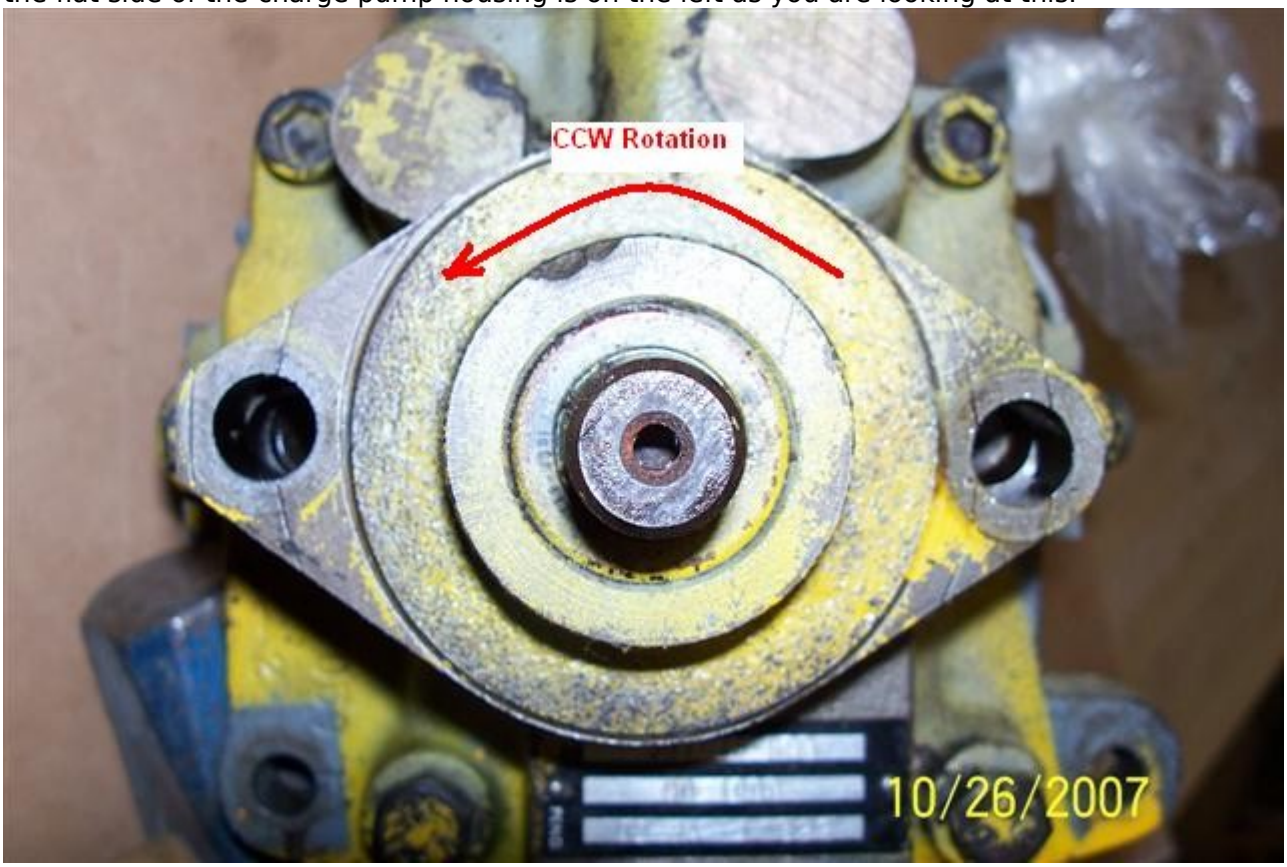
Posted on Friday, October 26, 2007 - 11:59 pm:

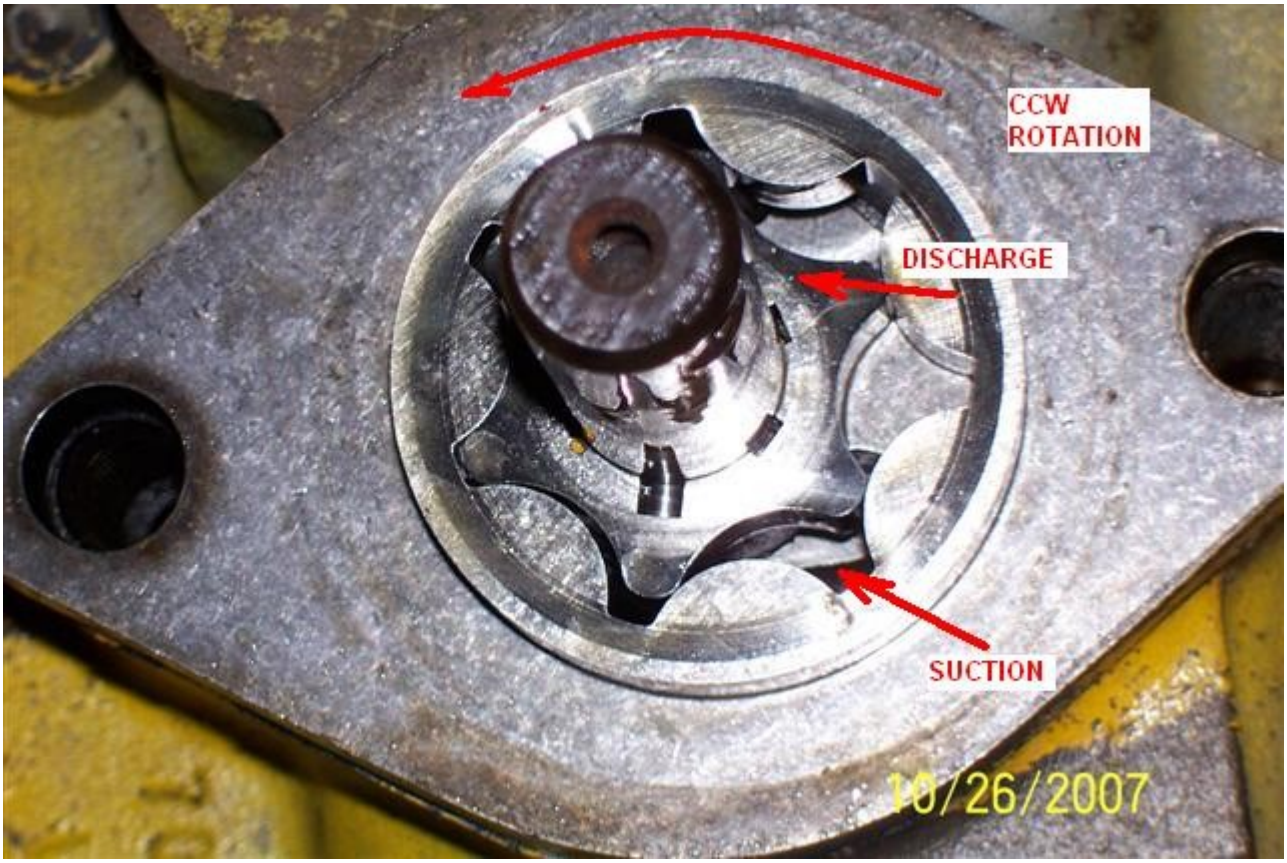
OK everyone, more on the pump reverse.

I am not a hydraulics guy but this is my understanding of how the hydrostatic system works. The hydro pump itself (not the charge pump)is not a gear or vane pump, it is a piston pump driven through a swash plate. The swash plate changes angle when the outside control lever (trunnion) is changed. The net result is a variable displacement pump that can vary from zero output to full in either flow direction. The motor is internally an exact copy of the pump and it is driven in the direction determined by the incoming flow. I was going to guess how changing the charge pump housing changes the input shaft direction (remember we are not trying to reverse the output shaft direction, we just want to mount the engine the other way around), but instead of guessing I went down and pulled the charge pump off a hydro, and took some pictures to show exactly how this works.

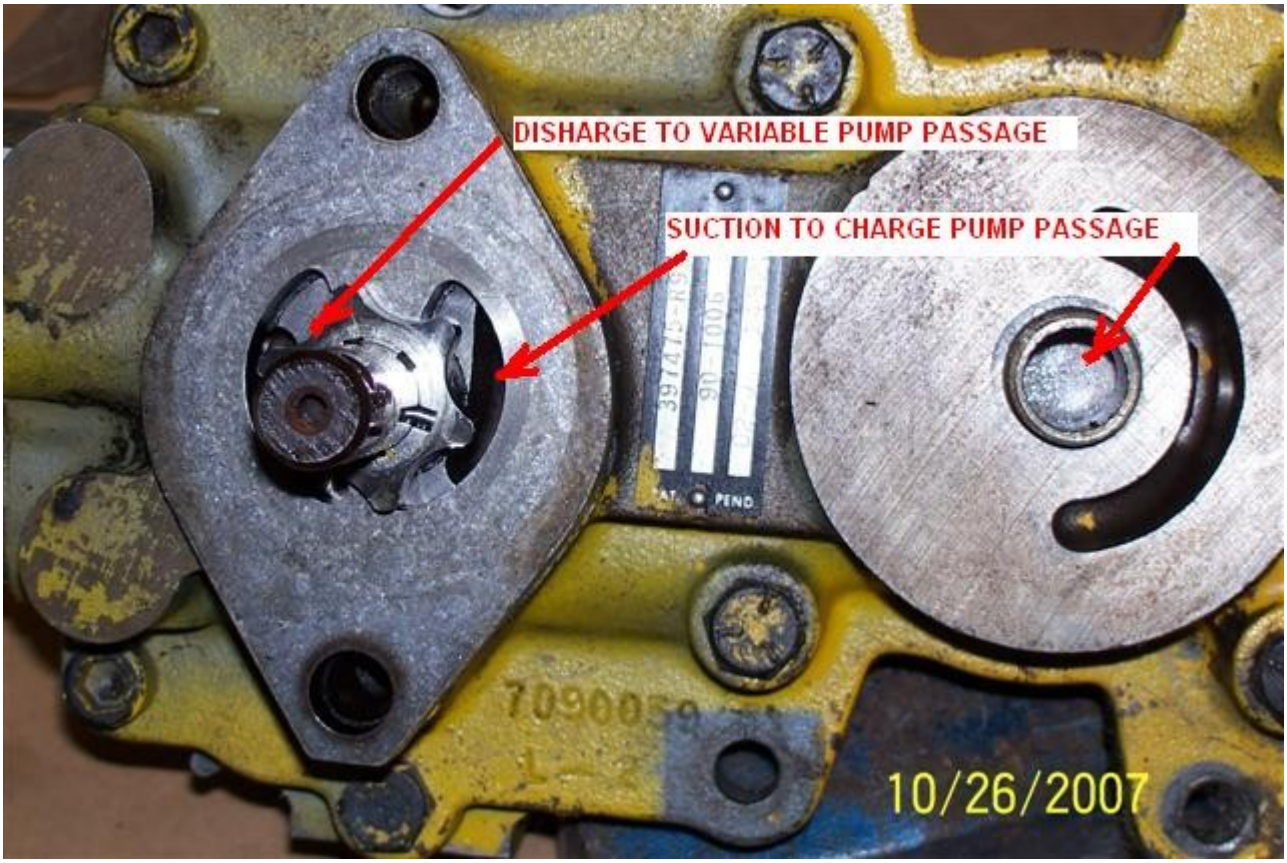
This is the front of the charge pump in the standard configuration the input shaft turns CCW and the flat side of the charge pump housing is on the left as you are looking at this.



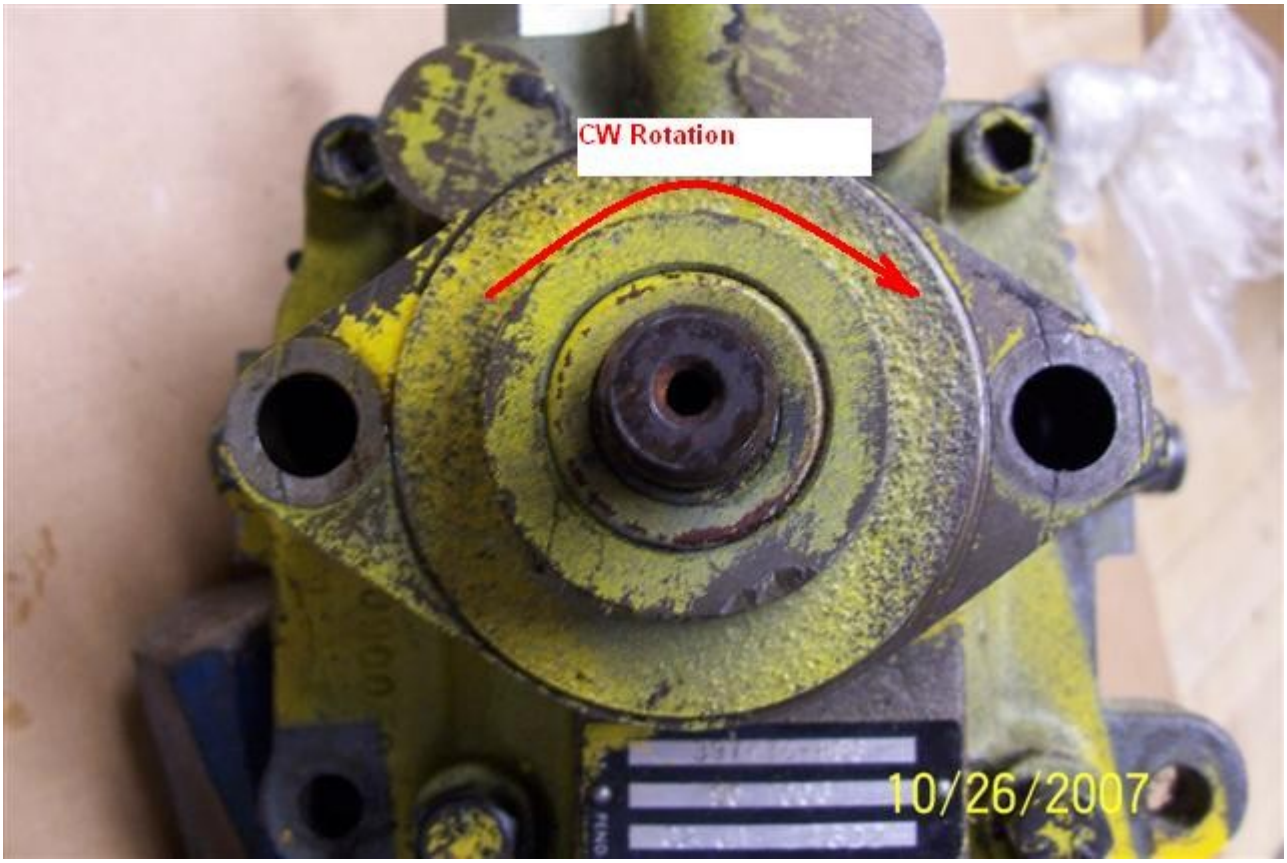
The secret to the reversing is that the inside of the housing is machined off-center so that the driven gerotor part of the charge pump is offset to the right as you are looking at this.



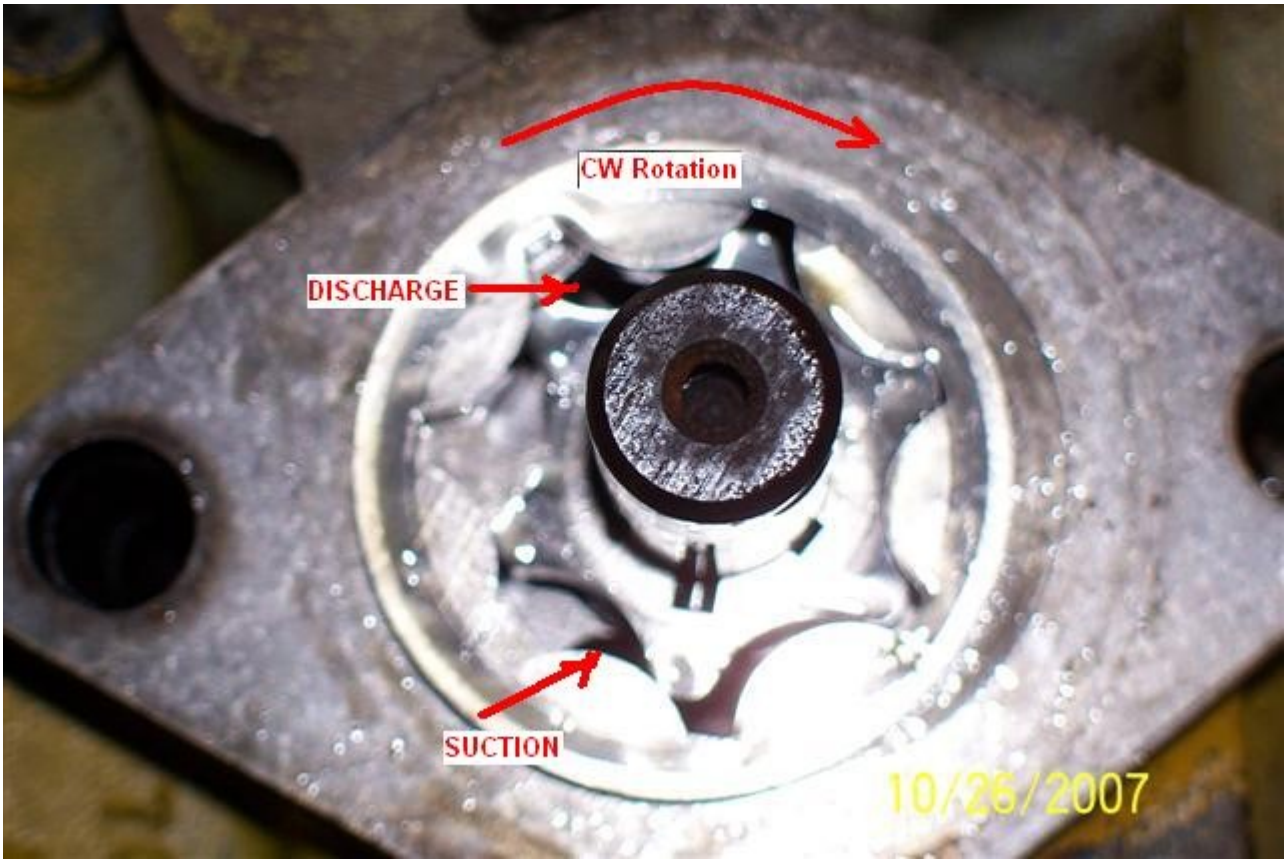
So then, when the charge pump turns CCW, the gear rotates CCW and pulls oil up from the sump in the rear axle, through the filter, through the charge pump, and off to the main hydro pump. If you were to just turn the motor around and change the input rotation it would be trying to draw oil from the main pump instead of the sump and nothing would work.



Now when you change the flat side of the charge pump housing to the right side, the off center machining on the inside places the driven gerotor to the left side of the driving gear.



When the input shaft is now driven CW, the suction again comes from the bottom and pulls oil up from the sump in the rear axle, through the filter, through the charge pump, and off to the main hydro pump. If you were to just turn the charge pump around without changing the input rotation it would be trying to draw oil from the main pump instead of the sump and again nothing would work.



Clear as mud, right? Now that I have looked at it I saved myself all the work of setting up a test using an electric motor. If anyone needs more pictures let me know.

No change to the control is needed. If the charge housing is flipped and the engine is turned around so it drives CW instead of CCW, the trunnion still works the same way because the flow from the charge pump still pressurizes the maim pump in the same direction. My hat is off to the designer(s), this is so simple to do and no new parts are required.

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