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Follow the trail of broken parts

We are well into snow season, the time of year that shops hope will bring them new work. With snow comes work on plow trucks and the urgency to get them back out there making money. For the 4L80-E, Sonnax now has a Sure Cure kit and many existing and new parts that will add durability to your rebuild.

The biggest issue with the 4L80-E is an extensive history of broken parts. Over the years, piece after piece has been updated to reduce breaking. The rear band was strengthened, the rear band anchors were reinforced, first with ribs and then with more material, so now they look like little volcanoes on the back of the case, and the direct piston was made stronger. In addition to these, oil passages in the case are known to crack and the direct drum and reverse servo commonly break.

So what does this trail of broken parts have in common? Pressure, and lots of it – way too much for what the parts were designed to handle. This is the result of cross leaks inside the transmission allowing reverse oil pressure to enter the EPC circuit, causing the pump to create excessive pressure (see the Tech Box on page 2 for detailed explanation). Inside the 4L80-E, cross leaks occur in a number of places: narrow OEM boost valve lands and worn boost valve sleeve bores let reverse oil past, additional reverse oil enters the EPC circuit between the sleeve and stator bore (this is where o-rings help) and more oil cross leaks between the pump and stator castings.

Sonnax boost valve kit **34200-10K** helps all of these with wider valve lands for improved separation, a high-quality sleeve that does not wear like OEM, o-ringed sleeve and, if for some other reason pressure gets too high in the EPC circuit, the valve has a special internal pressure relief. This is similar to the TV pressure relief ball and spring used in other units (many Fords), but is more effective because it is located right at the boost valve where it is needed most.

A more mysterious problem that plagues many 4L80-E units is low cooler flow. Low flow allows the TCC piston to drag on the front cover when it should be released. Symptoms are engine surge or stalls at idle, low cooler flow, and even low power and lube-related failures. To prevent these problems and for that extra measure of durability, be sure to include the **34200-14K** pressure regulator with its line-to-lube and built-in anti-drainback feature in all of your rebuilds.

In the valve body, the Sonnax TCC regulator valve kit seals against bore wear and has an improved TCC apply when the optional spring is used. A new part to look at

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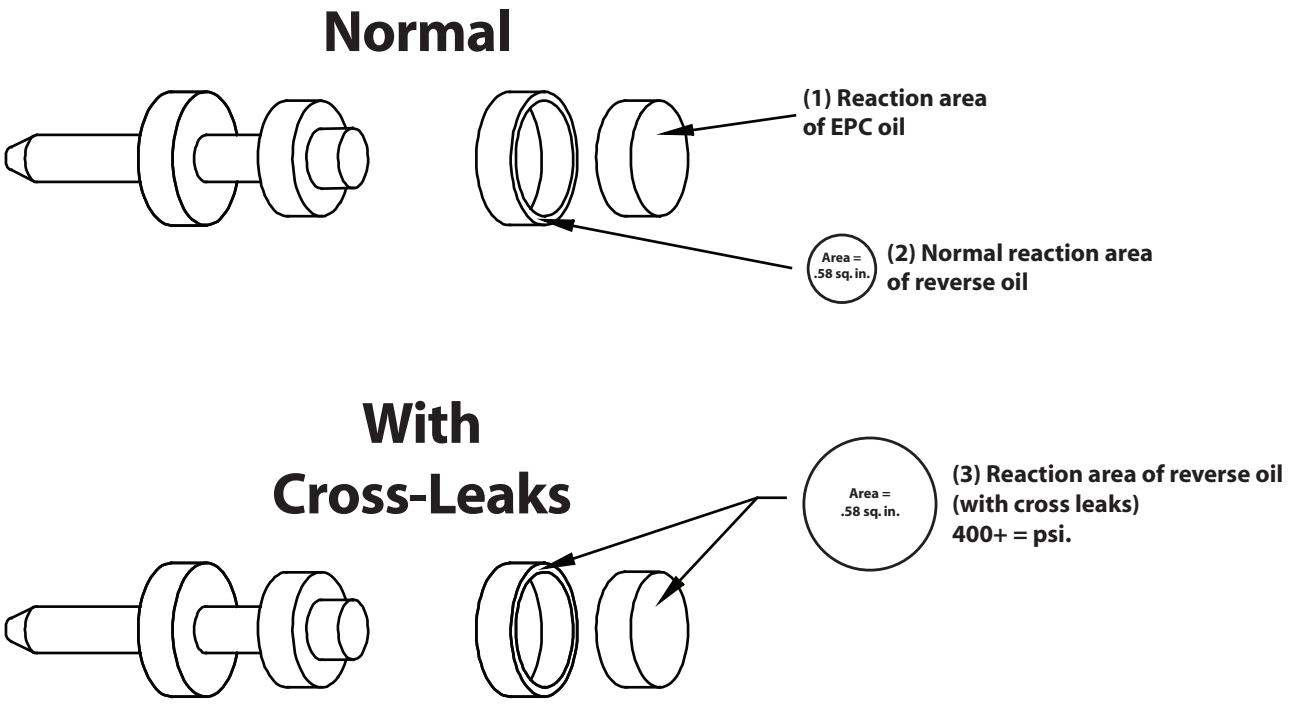
is the **34994-16K** manual valve. This part is a drop-in replacement for the OEM valve (no machining required) featuring improved sealing and support. The manual valve kit includes a handy o-ringed bore plug to prevent loss of critical AFL oil pressure.

Outside the unit, most plow trucks get rusty underneath from all the salt used to clear roads. Sonnax manual shaft **38511-01K** has rust-resistant zinc plating. This part fits early units without a NSS and can also be used in THM 400s.

Tech Box



Under normal conditions torque signal (EPC) oil pressure reacts only on the end of the boost valve (1), and reverse oil pressure reacts only on a much smaller surface area equal to the difference in the two valve diameters (2). The relatively small reaction area for the reverse oil limits how high line pressure can go when in reverse.

When reverse oil cross leaks into the EPC circuit, the reverse oil now reacts on both areas of the boost valve. The combined area (3) is almost four times greater than the normal reverse reaction area alone. Imagine this scenario when a plow truck is jammed into reverse or a delivery truck that has been running all day is put in reverse and has the throttle floored to back up quickly. As the reverse oil cross leaks into the EPC area and reacts on the combined area of the boost valve, what you get is runaway high line pressure (400+psi) and a loud crack as something blows. Now it is just another 4L80-E with no reverse.

Figure 2