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INSIDE: *Blowin' In The Wind: 2014 Ram HD and 1500 Coverage. See page 40.*

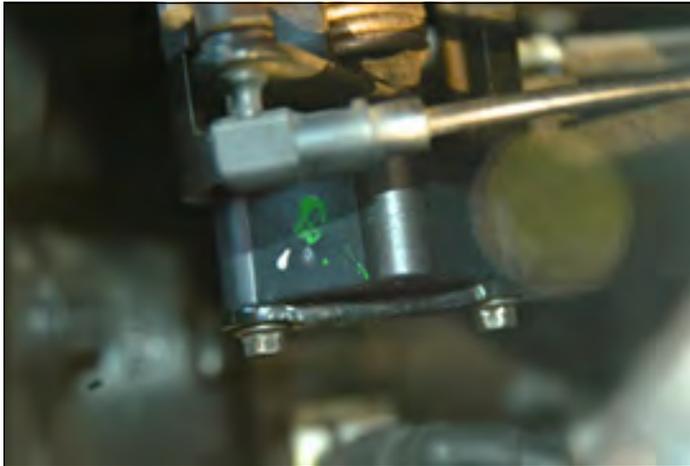
TPS QUIRK

Recently, I was able to take care of some nagging quirks. I get bugged when little annoyances begin to multiply, and this one had been going on a little too long. The throttle position sensor (TPS) had began to show early signs of failure. I'd be driving along, minding my own business, and the truck would elect to downshift from fourth gear to third gear with no warning. (Other TPS "bad" symptoms can be no torque converter lockup or unscheduled locking and unlocking.) I had found a way to pedal around the downshift and get back into fourth gear, but it was beginning to really annoy me. So having time to replace the TPS was good.

Changing out a faulty TPS requires a voltmeter, 7mm socket, a paper clip (sharpened on one end) and good quality dielectric grease. The service manual outlines one process; I was taught a simpler method that I'd like to share with you.

The TPS is located on the driver's side of the P7100 injection pump and is attached by two 7mm bolts to the throttle linkage. There is a small plug at the base of the TPS in the four-o'clock position containing three wires. The wires are:

- Black – ground
- Orange/Dark Blue Stripe – signal
- Purple/White Stripe – 5-volt power



A small black box located to the front and side of the P7100 injection pump.

Testing the TPS is simple. I sharpened one end of a paperclip (a highly technical diagnostic tool) and inserted it into the center pin of the three-wire plug. Be sure it is far enough to make contact with the center pin connector. Install the plug back into the TPS, being careful not to break off the keeper on the side of the plug. To the paperclip signal lead I attached the positive connector of my voltmeter. Attach the negative connector to the negative pole on the battery.



A sharpened paper clip inserted into the center position of the connector.

I wanted to read the voltage present with the key in the on position to observe the increase and decrease of the voltage as the throttle is manually increased and decreased. Make note of the voltage. The service manual says to adjust the voltage between .8 to 1.2-volts at idle or in this case with the key on engine not running. My voltage read .864, which is the minimum, as stated in the service manual. I then observed the voltage as I slowly moved the throttle by hand from idle to wide-open throttle (WOT). This should be a smooth rise in voltage. If it jumps around, the TPS is defective and should be replaced. No surprise, Red Ryder's old TPS voltage was jumping around; time for a replacement. Geno's Garage is where I turned for the new TPS. The part number is 3930318 for the 12-valve version. The service is great and shipping solid.



My line voltage at idle (key on, engine not running) was .864 volts.

The Installation

What has become common knowledge over the years is that it is better to set the volts at the higher range of the scale for better converter lock and shift points later in the rpm range rather than earlier. The voltage is adjusted by installing the TPS with the bolts snug and the paperclip in place so that a voltmeter can measure the voltage just as was done for testing. (Key in the on position, engine not running.) Slowly rotating the TPS will change the voltage. The TPS rotation is in very small increments: clockwise to reduce the voltage and counterclockwise to increase the voltage. It takes very little rotation to make a change in voltage. Set the voltage for the upper range (1.2-volts) and lock down the 7mm bolts and it's good to go.

The Modification

However, there is a way to enhance the shift points. If I set the TPS at 1.8-volts, not only will I receive better shift points and lockup, but the torque converter will remain locked up when I remove my foot from the accelerator pedal. Not to worry, it will disengage if you apply the brake pedal or at lower speeds. This has all kinds of advantages in terms of enhancing the driving characteristics of the automatic to be more in line with that of a manual transmission. An example: If I remove my foot from the accelerator going downhill, the torque converter unlocks and I begin to freewheel. By modifying the TPS to obtain 1.8-volts, the torque converter remains locked until I either touch the brake or slow to a point where it unlocks. I found my modification would promote torque converter lockup in fourth gear at speeds approximately above 45mph and in third gear down to speeds approximately 30mph. It also works great with the exhaust brake engaged.

To make the modification I used a small screwdriver to remove the steel inserts from the two mounting holes by pushing them out.



Remove the two steel sleeves from the TPS.

Next, using a 3/16" round file, I carefully "slotted" the two mounting holes allowing for more counterclockwise rotation for increased voltage. Be careful not to file past the mounting hole supports in the switch housing. Mount the modified switch in place, remembering to apply a dab of dielectric silicon in the sensor's plug socket to promote good contact and eliminate moisture.



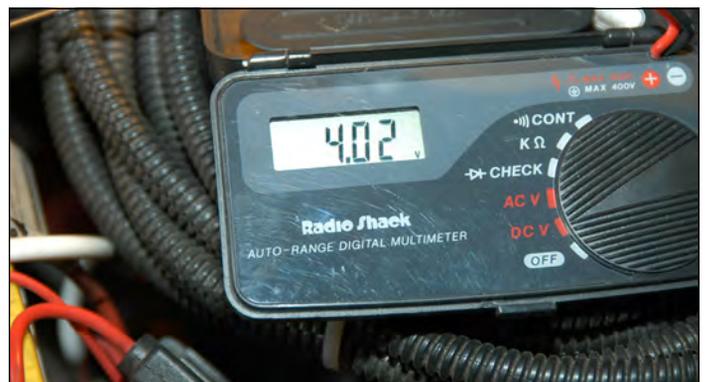
Using a 3/16" rat-tail file, I slotted the two mounting holes allowing for more rotation of the switch.

Using the same procedure I used to test the TPS, I now set the new modified TPS to 1.8-volts.



I now have 1.8 volts at the "idle" position of the TPS.

After locking down the 7 mm bolts I rechecked the idle voltage and manually moved the throttle to WOT, checking the voltage was smooth as it increases and decreases.



Manually moving the TPS from idle to WOT the voltage displays smoothly to 4 volts.

After road testing, the new, modified TPS works as advertised! This is one of those simple TDR shadetree modifications that make a big difference in the drivability of Turbo Diesels with automatic transmissions and is another benefit of being a TDR member.