

Ford 4R100 TroubleShooting

Over the past year Chelsea Technical Services has received several inquiries about P.T.O.s on the Ford 4R100 transmissions not completely engaging or once engaged and a load is put on the system the P.T.O. does not appear to work. Until now there has not been an effective way to check the transmission coast clutch* as a possible cause, other than taking the vehicle to a Ford Service Shop.

*The coast clutch is used for engine braking and drives the transmission P.T.O. gear.

Chelsea engineering has developed a tool to determine if the coast clutch is functioning normally in P.T.O. mode. It involves using our speed sensor, Chelsea part number 379243 (and O-Ring 28-P-171). If the Chelsea unit was not originally equipped with the Electric Over-Speed Option (E.O.C.), then these two parts must be ordered. A multi-meter (digital works best) must be used to check the AC output voltage from the speed sensor.

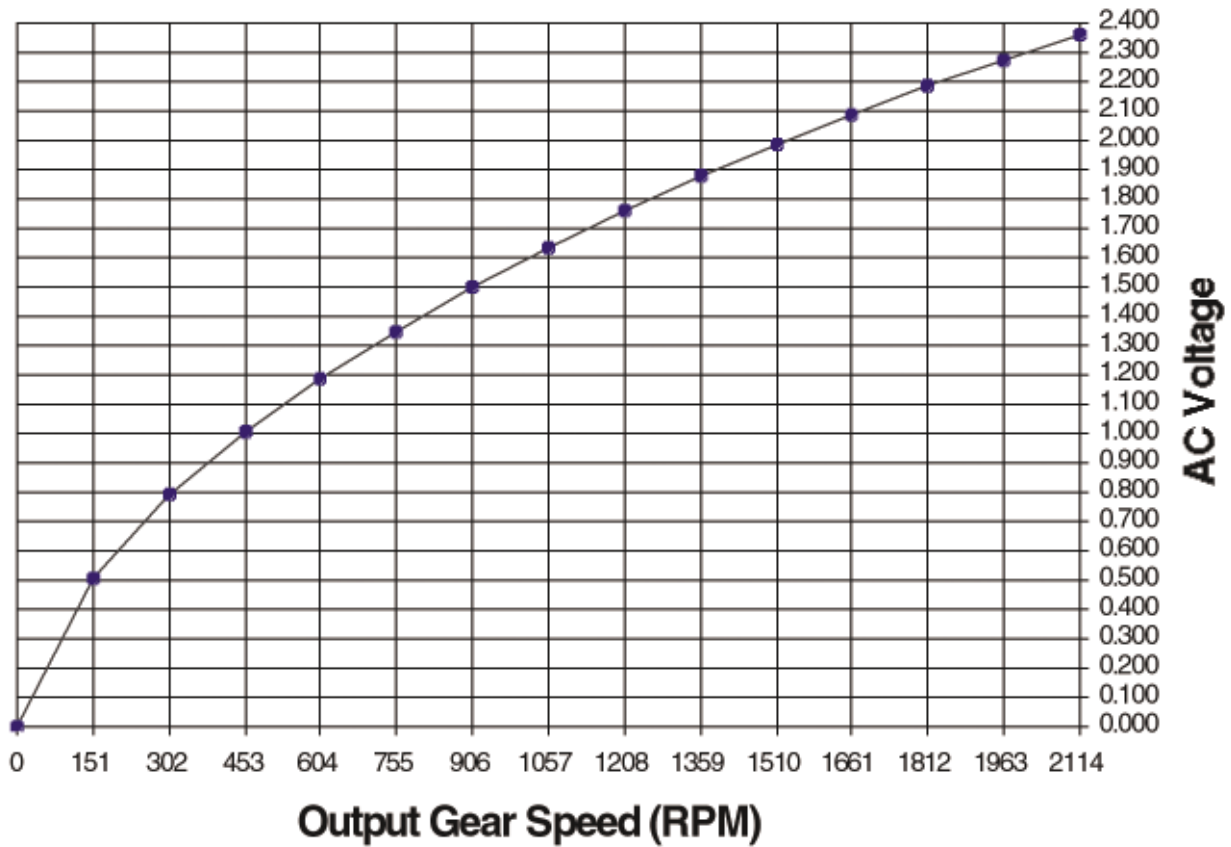
- ♦ There is diagnostic information in owner's manual (379715 December 2000) which is supplied with the P.T.O. These diagnostic checks should be made prior to checking the voltage output of the speed sensor. (See Attached Page)
- ♦ The first voltage check is made with the P.T.O. engaged and no load on the system (i.e. no auxiliary equipment driven by the P.T.O. must be running).
- ♦ The second voltage check should be made with the P.T.O. and the auxiliary equipment engaged. On the back side of this page is a chart which correlates the voltage of the speed sensor to the speed of the output gear in the P.T.O.
- ♦ If the coast clutch is functioning normally the two voltage checks made will be very similar. However, if the coast clutch is slipping, the voltage levels will be different. A normally functional unit will produce approximately 2.2 to 2.3 volts.

**WARNING:**

- ♦ Rotating auxiliary driveshafts are dangerous. You can snag clothes, skin, hair, hands, etc. This can cause serious injury or death.
- ♦ Do not go under the vehicle when the engine is running.
- ♦ Do not work on or near an exposed shaft when the engine is running.
- ♦ Shut off the engine before working on the power take-off or driven equipment.
- ♦ Exposed rotating driveshafts must be guarded.

OVER

379243 Output Voltage vs. RPM on 242/244 PTO



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4R100 / P.T.O. Diagnostics / Troubleshooting Guide

P.T.O. does not work:

On a 7.3L diesel engine, did the engine ramp-up to 1200 RPM (in Park) when P.T.O. switch was activated? If not check the connection between the Ford #322 circuit (light blue w/ yellow stripe wire) and the Chelsea light blue w/ yellow stripe wire. This connection may be found behind the access panel located below the steering column. If the connection is good go to 4.1

On a 6.8L gas engine, check to see if the Overdrive Cancel (located in the instrument panel) light illuminates when P.T.O. switch is activated. If the light does not illuminate go to 4.1

1a) Check the transmission line pressure. Install a pressure gauge and “dead-head” the line from the transmission pressure port. With the P.T.O. switch “ON” (and the engine running within the recommended RPM range) the pressure should be 60 to 175 PSI. If not, check the transmission fluid level. If the fluid level is correct, contact the local Ford dealer for service.

1b) Check the pressure going to the P.T.O. clutch pack. Install a pressure gauge between the manifold “OUT” port and the clutch pack on the P.T.O. Switch the P.T.O. “ON” and allow engine to stabilize within recommended RPM range. If the pressure is significantly less than the pressure checked in 1a) it indicates the probability of a cut o-ring or torn seal. Remove the P.T.O. and have it serviced. Ensure that both checks 1a) and 1b) and performed at the same engine RPM.

4.1 If the battery has been disconnected for an extended period, or the battery loses power, the PCM may “forget” its P.T.O. logic. This means that the transmission P.T.O. circuit will operate, thereby disabling the P.T.O. itself. On the 7.3L equipped truck, the engine not ramping-up to 1200 RPM indicates this when the P.T.O. switch is engaged. On the 6.8L equipped truck, the only “good” indicator is that the Overdrive Cancel light is not illuminated when the P.T.O. switch is engaged. To correct this situation, the truck must be taken on a “re-learn” drive. Usually it takes less than one mile. However, it may take more than one mile and it may also take more than one re-learn drive to correct the problem. Note: After starting the engine, do not wait to start the re-learn drive (i.e. don’t let the truck sit and idle before starting the re-learn drive). The time period in which the PCM re-learns its settings is relatively short.

4.2 If the truck loses battery power (it goes “dead”, it is disconnected, etc.) and a boom or bucket is extended, obviously the truck cannot be taken on a re-learn drive. Contact the local Ford and see if they possess a Transmission Tester. The Ford Service Technician can use the tester to “over-ride” the coast clutch solenoid valve and allow temporary P.T.O. operation. Once the boom/bucket has been retracted/lowered the truck must then be taken on a re-learn drive.

4.3 Most Ford Service Shops possess a Transmission Tester. This tester may be used to diagnose transmission problems, which inhibit P.T.O. operation. The tester can check the solenoids (voltage, resistance, and operation) and coast clutch engagement.

Does the P.T.O. indicator light stay on after the switch is shut off?

Check the location of the hoses on the manifold. The hose installed in the manifold port marked “OUT” must go to the P.T.O. clutch pack. The hose at the port marked “IN” must come from the transmission pressure port. If it is a pre-manifold unit check to see that the hose installed in the port marked “CYL” goes to the P.T.O. clutch pack. The hose at the port marked “IN” must come from the transmission pressure port.