

4T65Es and the Mysterious Code P0730

A 2001 Buick Century Custom was brought to a transmission shop with a complaint of jerky shifts. A road test of the vehicle showed all shifts were harsh, and a scan check registered the generic gear ratio error code P0730. Since Code P0730 does not illuminate the malfunction indicator light, the harsh shift was the customer's only clue that anything was wrong.

For a Code P0730 to set, the PCM must detect an incorrect gear ratio caused by excessive slip within the transaxle: to be exact, a gear ratio that is off by more than 5% for more than seven seconds.

The next morning the technician road-tested the vehicle, while monitoring vehicle function with a scan tool. The vehicle's performance was normal for the first five minutes. After five minutes, the shift adapts timing started to increase. The shift timing continued to increase until it maxed out at 2.8 seconds. Since the PCM will only tolerate shift timing as high as .65 seconds, it had maxed out line pressure long before the shift timing had maxed out.

Since the P0730 code is related to ratio, the technician scrolled to the gear ratio line of the data stream. Third gear is the easiest ratio to check, so the technician went there first. Third gear should be 1:1. The technician found that the 3rd gear ratio was low by 10%. When the 1st, 2nd and 4th gear ratios were checked, all were found to be low by 10%. A gear ratio that

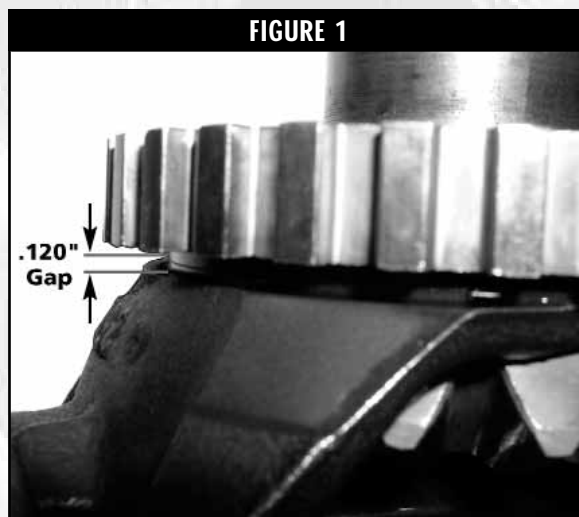


FIGURE 1

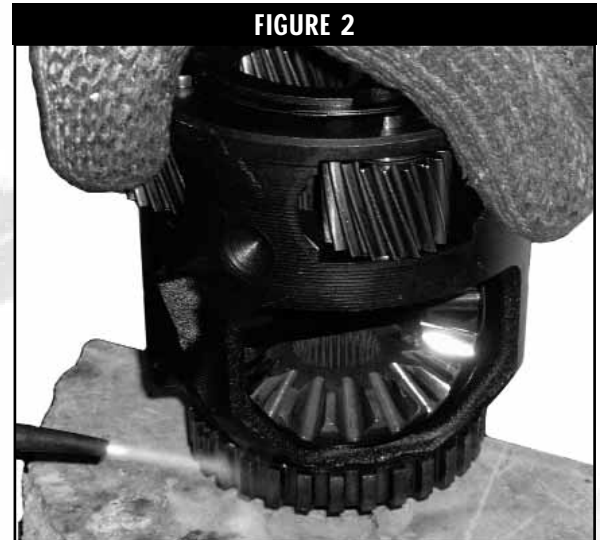


FIGURE 2

is off by 10% is two times the amount that is needed to set a code.

Since all of the ratios were off by 10%, the technician reasoned that the code was most probably not set by component slippage. He also figured that since the slippage seemed to be consistent, the problem was probably something related to data supplied by either the input speed sensor (ISS) or the vehicle speed sensor (VSS).

The ISS signal compared favorably to the engine rpm, so that was ruled out. The PCM compares the known axle ratio to a calculated ratio for each gear range, so the PCM was checked to verify that it was correct for the vehicle (correct known axle ratio). The PCM was proved to be correct so the technician zeroed in on the final drive and the final drive's reluctor. The vehicle was put on the lift and the differential was removed. The final drive turned out to be the correct ratio for the vehicle and the reluctor had the correct tooth count.

The light at the end of the tunnel seemed to be fading fast at this point, and then the technician noticed a clue. The reluctor is supposed to be butted flush to the differential. On this differential, the reluctor had a .120-inch gap between it and the differential (see Figure 1).

The technician started the process of removing

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the reluctor. The final drive was placed on the bench with the reluctor facing down. The final drive was slowly rotated while the reluctor was heated with a torch (see Figure 2). On or after three revolutions the reluctor usually falls off. In this case the reluctor fell off as soon as the heat from the torch touched it. The reluctor was not even warm to the touch, but would spin freely on the differential. After about 10 minutes the reluctor again would not turn independently of the differential. Normal operating temperatures were

sufficient to expand the reluctor enough to free the wheel on the differential. Replacing the reluctor did eliminate the P0730 code.

If you have had a P0730 code in the past that you ended up replacing a unit to correct, you may want to revisit that unit. Pull the differential and do the torch test. If it falls off immediately, you will only have to replace the reluctor to have a good stock unit.

