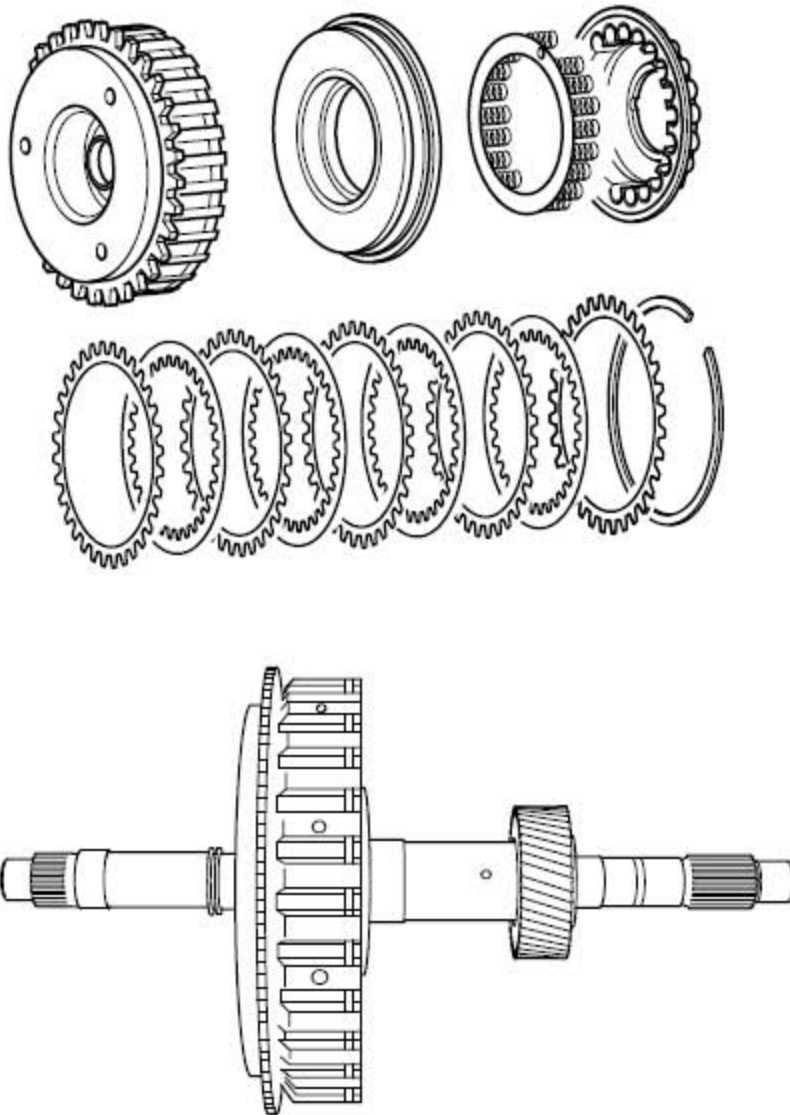


DTC P0731 GEAR 1 INCORRECT RATIO

COMPONENT LOCATION



UD CLUTCH

GENERAL DESCRIPTION

The value of the input shaft speed should be equal to the value of the output shaft speed, when multiplied by the 1st gear ratio, while the transaxle is engaged in the 1st gear. For example, if the output speed is 1000 rpm and the 1st gear ratio is 2.842, then the input speed is 2,842 rpm.

DTC DESCRIPTION

This code is set if the value of input shaft speed is not equal to the value of the output shaft, when multiplied by the 1st gear ratio, while the transaxle is engaged in 1st gear. This malfunction is mainly caused by mechanical troubles such as control valve sticking or solenoid valve malfunctioning rather than an electrical issue.

DTC DETECTING CONDITION

| Item | Detecting Condition | Possible cause |
|--------------------------|---|--|
| DTC Strategy | • 1st gear incorrect ratio | <ul style="list-style-type: none"> • Faulty Input speed sensor • Faulty output speed sensor • Faulty UD clutch or LR brake or Oneway clutch |
| Enable Conditions | <ul style="list-style-type: none"> • Engine speed >450rpm • Output speed >350rpm • Shift stage 1st. gear • Input speed >0rpm • A/T oil temp sensor voltage <4.5V • Voltage of Battery >10V • TRANSAXLE RANGE SWITCH is normal and after 2sec is passed from IG ON | |
| Threshold value | <ul style="list-style-type: none"> • $\text{Input speed}/1\text{st gear ratio} - \text{output speed} \geq 200\text{rpm}$ | |
| Diagnostic Time | • More than 1sec | |
| Fail Safe | • Locked into 3rd gear. (If diagnosis code P0731 is output four times, the transaxle is locked into 3rd gear) | |

SIGNAL WAVEFORM

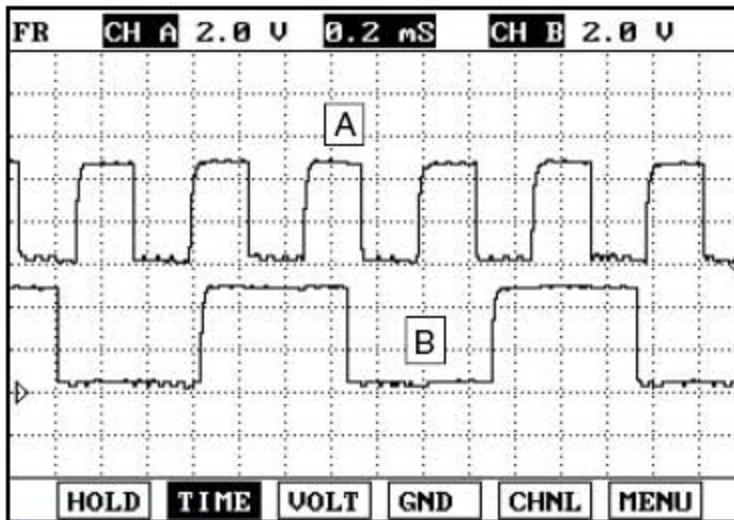


FIG.1)

A: INPUT SPEED SENSOR
B: OUTPUT SPEED SENSOR

MONITOR SCANTOOL DATA

- 1). Connect scan tool to data link connector(DLC).
- 2). Engine "ON".
- 3). Monitor the "ENGINE SPEED, INPUT SPEED SENSOR, OUTPUT SPEED SENSOR, GEAR POSITION" parameter on the scantool.
- 4). Perform the "STALL TEST" with gear position "1"

Specification : 2000~2700 engine rpm

| 1.2 CURRENT DATA | |
|---------------------|----------|
| ✖ CRK POSITION SNSR | 2329 rpm |
| ✖ INPUT SPEED SNSR | 0 rpm |
| ✖ OUTPUT SPEED SNSR | 0 rpm |
| ✖ SHIFT POSITION | 1 |
| THROTTLE P.SENSOR | 39.2 % |
| FLUID TEMP.SENSOR | 86 °C |
| VEHICLE SPEED | 0 Km/h |
| L&RSV DUTY | 0.0 % |

FIX SCRN FULL PART GRPH HELP

OPERATING ELEMENT OF EACH SHIFTING RANGE

| | UD/C | OD/C | REV/C | 2ND/B | LR/B | OWC |
|----|------|------|-------|-------|------|-----|
| P | | | | | ● | |
| R | | | ● | | ● | |
| N | | | | | ● | |
| D1 | ● | | | | ● | ○ |
| D2 | ● | | | ● | | |
| D3 | ● | ● | | | | |
| D4 | | ● | | ● | | |

※ Low & Reverse Brake is released when the vehicle speed is over 7Km/h(5 MPH).

Stall test procedure in D1 and reason

Procedure

- 1). Warm up the engine
- 2). After positioning the select lever in "D" , depress the foot brake pedal fully.
After that, depress the accelerator pedal to the maximum
The slippage of 1st gear operating parts can be detected by stall test in D1.

Reason for stall test

- 1). If there is no mechanical defaults in A/T, all slippage occurs in the torque converter.
- 2). Therefore, engine revolution is output, but input and output speed revolution must be "zero" due to wheel's lock.
- 3). If 1st gear operating part has faults, input speed revolution will be out of specification.
- 4). If output speed revolution is output. It means that the foot brake force is not applied fully. Remeasuring is required.
- 5). Is "STALL TEST " within specification?

YES

- ▶ Go to "Signal Circuit Inspection" procedure.

NO

- ▶ Go to "Component inspection" procedure.

CAUTION

- Do not let anybody stand in front of or behind the vehicle while this test is being carried out.
- Check the A/T fluid level and temperature and the engine coolant temperature.
 - Fluid level : At the hot mark on the oil level gauge.
 - Fluid temperature : 176 F~ 212 F (80~100 C).
 - Engine coolant temperature : 176 F~ 212 F (80~100 C).
- Chock both rear wheels(left and right).
- Pull the parking brake lever on with the brake pedal fully depressed.
- The throttle should not be left fully open for more than eight seconds.
- If carrying out the stall test two or more times, move the select lever to the "N" position and run the engine at 1,000 rpm to let the A/T fluid cool down before carrying out subsequent tests.

SIGNAL CIRCUIT INSPECTION

- 1). Connect Scantool.
- 2). Engine "ON".
- 3). Monitor the "INPUT & OUTPUT SPEED SENSOR" parameter on the scantool.
- 4). Accelerate the Engine speed until about 2000 rpm in the 1st gear.

Specification : INPUT SPEED - (OUTPUT SPEED × GEAR RATIO) ≤ 200 RPM

| 1.2 CURRENT DATA | |
|--------------------|----------|
| × ENGINE RPM | 2127 rpm |
| × INPUT SPEED | 2056 rpm |
| × OUTPUT SPEED | 730 rpm |
| × SHIFT POSITION | 1 GEAR |
| × SELECT LEVER SW. | L |
| HIUEC MODE | MODE F |
| VEHICLE SPEED | 22 MPH |
| THROTTLE P. SENSOR | 14.1 % |

5). Are "INPUT & OUTPUT SPEED SENSOR" within specifications?

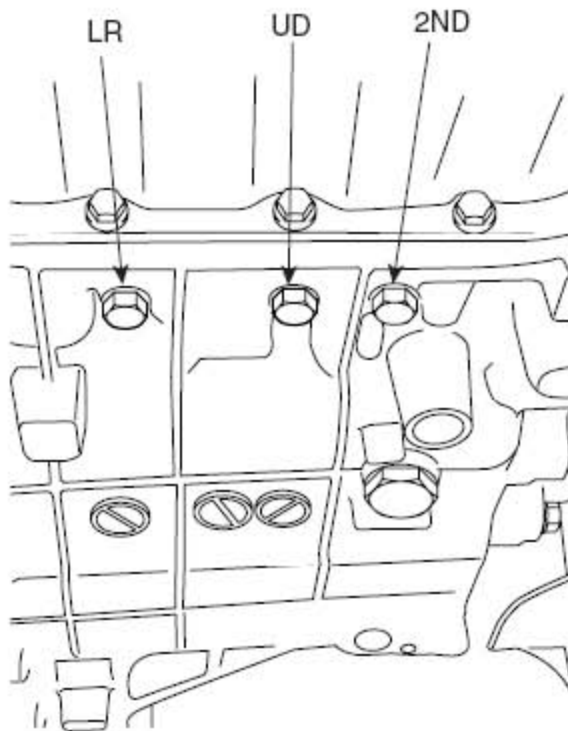
YES

▶ Go to "Component Inspection" procedure.

NO

▶ Check for electrical noise of circuit in INPUT & OUTPUT SPEED SENSOR or replace INPUT & OUTPUT SPEED SENSOR. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION



- 1). Connect oil pressure gauge to "UD" and "L/R" port.
- 2). Engine "ON".
- 3). Drive the car with gear position 1 in "SPORTS MODE".
- 4). Compare it with reference data as below.

Specification : shown below

| Measurement condition | | | Standard hydraulic pressure kPa (psi) | | | | | | |
|-------------------------|----------------|--------------------|---------------------------------------|-------------------------|----------------------------|------------------------------|-----------------------|-----------------------------------|-------------------------------------|
| Selector lever position | Shift position | Engine speed (rpm) | Under drive clutch pressure | Reverse clutch pressure | Over-drive clutch pressure | Low & reverse brake pressure | Second brake pressure | Damper clutch Apply pressure (DA) | Damper clutch Release pressure (DR) |
| P | - | 2,500 | - | - | - | 260-340 (38-50) | - | - | - |
| | | | | 1,270 | | 1,270 | | | |
| R | Reverse | 2,500 | - | 1,770 (185-256) | - | 1,770 (185-256) | - | - | - |
| N | - | 2,500 | - | - | - | 260-340 (38-50) | - | - | - |
| | | | | | | 1,010 | | | |
| | 1st gear | 2,500 | 430-510 (62-74) | - | - | 1,050 (146-152) | - | - | - |
| D | 2nd gear | 2,500 | 430-510 (62-74) | - | - | - | 430-510 (62-74) | - | - |
| | 3rd gear | 2,500 | 430-510 (62-74) | - | 430-510 (62-74) | - | - | More than 730 (100) | 0-10 (0-1) |
| | 4th gear | 2,500 | - | - | 430-510 (62-74) | - | 780-880 (110-130) | More than 730 (100) | 0-10 (0-1) |

The values are subject to change according to vehicle model or condition

5). Is oil pressure value within specification?

YES

▶ Repair AUTO TRANSAXLE(Clutch or Brake) as necessary and Go to "Verification of Vehicle Repair" procedure.

NO

▶ Replace AUTO TRANSAXLE (BODY CONTROL VALVE faulty) as necessary and go to "Verification of Vehicle Repair " procedure.

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

- 1). Connect scan tool and select "Diagnostic Trouble Codes(DTCs)" mode.
- 2). Using a scantool, Clear DTC.
- 3). Operate the vehicle within DTC Enable conditions in general information.
- 4). Are any DTCs present ?

YES

▶ Go to the applicable troubleshooting procedure.

NO

▶ System performing to specification at this time.