

Diagnostic Strategy

Overview

The diagnostic process for each transmission concern will vary depending on the symptoms and condition of the vehicle. The diagnostic process below is an efficient method to collect as much data as possible about the concern before performing a repair or removing the transmission from the vehicle for teardown and further inspection. Intermittent concerns and concerns that result in default or fail-safe operations can be difficult to diagnose.

Automatic Transmission Diagnosis

Many transmission faults will set one or more diagnostic trouble codes (DTCs) in the PCM/ TCM. In some instances a group of diagnostic trouble codes (DTCs) may indicate a particular fault. The transmission may only operate in default or failsafe modes while certain diagnostic trouble codes (DTCs) are set.

Begin diagnosis by performing the PCM Quick Test. Refer to Powertrain Control/Emissions Diagnosis (PC/ED) manual. Record all diagnostic trouble codes (DTCs) and related freeze frame data. Clear the diagnostic trouble codes (DTCs) after recording the information.

Preliminary Inspection

The preliminary inspection will:

1. Find obvious causes for a concern by performing under hood and under vehicle visual inspections.
2. Adjust the selector lever linkage. (if equipped)
3. Collect a fluid sample.

PID Monitor/record on Road Test

Using the diagnostic trouble codes (DTCs) and freeze frame data as a guide, prepare the scan tool to make a recording of the event. Select the transmission parameter identifications (PIDs) that are related to the concern as well as parameter identifications (PIDs) for general automatic transmission operation. Since you may only get one or two chances to duplicate the concern, it is better to have more data on the recording. If possible, set datalogger to automatically start recording when a PID reaches a certain value. For example, you might want the recording to start 6 seconds before a fault PID changes from No Fault to Fault.

The PCM/ TCM may set a DTC after the first occurrence of the fault. Some diagnostic trouble codes (DTCs) may require up to 5 consecutive occurrences before setting. Drive the vehicle in a manner similar to the freeze frame data conditions if possible. If no freeze frame data is available, then perform this road test:

- Drive vehicle normally for 1-3 minutes to warm up the fluid.
- From a stop, accelerate the vehicle to 80 kph (50 mph) with the shifts occurring at approximately 2000 rpm. Stay in 6th gear for 30 seconds or until the TCC applies. Repeat this two times.
- From a stop, accelerate the vehicle to 80 kph (50 mph) with the shifts occurring at approximately 3000 rpm. Stay in 6th gear for 30 seconds or until the TCC applies. Repeat this two times.

After the road test, review the recording and check for newly set diagnostic trouble codes (DTCs). Electrical fault diagnostic trouble codes (DTCs) are diagnosed in pinpoint tests. Hydraulic, mechanical, and performance fault diagnostic trouble codes (DTCs) are diagnosed in component tests. Use the DTC chart for detailed diagnosis:

REFER to: Diagnostic Trouble Code (DTC) Charts and Pinpoint Tests - 6.2L V8 (307-01A Automatic Transmission, Transfer Case and Power Transfer Unit - 6-Speed Automatic Transmission â€“ 6R100, Diagnosis and Testing).

If no diagnostic trouble codes (DTCs) are set, use the data collected, the clutch application chart and the solenoid application chart to determine suspect transmission systems for the concern. Use the component test to diagnose each suspect system.

Pinpoint Tests

The pinpoint tests are divided by component or system. Each test is a series of circuit checks to verify the integrity of the wiring harness between the PCM/ TCM and the solenoid or sensor.

Component Tests

The component tests are divided by system. Each test lists the possible symptoms the system can exhibit. For each symptom is a list of components that could cause the symptom. The components are listed in least intrusive to most intrusive order.

Perform Repair

An automatic transmission contains over 400 individual components. All of these components must be in good working order. Many repairs are fairly straightforward. In these repairs you will:

- Clean and inspect all removed parts
- Attempt to determine the root cause of the failure
- Identify and repair/replace any related damaged parts
- Carefully document findings on the repair order

In the case of clutch failure where the transmission fluid is heavily contaminated with friction material, the transmission needs to be overhauled. The repair requires complete disassembly and cleaning of the transmission. All seals and gaskets (except the reusable pan gaskets) should be replaced.

Complete Repair

After reassembling the transmission, the following steps must be performed before returning the vehicle to the customer.

- Initial transmission fluid fill - this may be completed before the transmission is installed in the vehicle.
 - Clear adaptive tables – required for overhaul and when the solenoid body has been replaced.
 - Reset misfire monitor – required whenever the transmission has been removed.
 - Road test until the transmission fluid is up to operating temperature. This is required to make sure transmission fluid cooler is full of transmission fluid.
 - Perform adaptive drive cycle – required if the adaptive tables were cleared.
 - Set transmission fluid level – transmission fluid is now at the correct temperature and the transmission fluid cooler has been purged of air.
 - Verify the repair resolved the concern – this is also known as the post repair road test.
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