Section C8

Torque Converter Clutch (TCC) System

Contents

General Description

Purpose

The Torque Converter Clutch (TCC) system is designed to eliminate power loss by the converter (slippage) to increase fuel economy. By locking the converter clutch, a more effective coupling to the flywheel is achieved. The converter clutch is operated by an Engine Control Module (ECM) controlled solenoid.

Operation

The TCC solenoid valve, under the control of the TCC Relay, opens and closes the automatic transmission oil passage to lock and unlock the torque converter clutch.

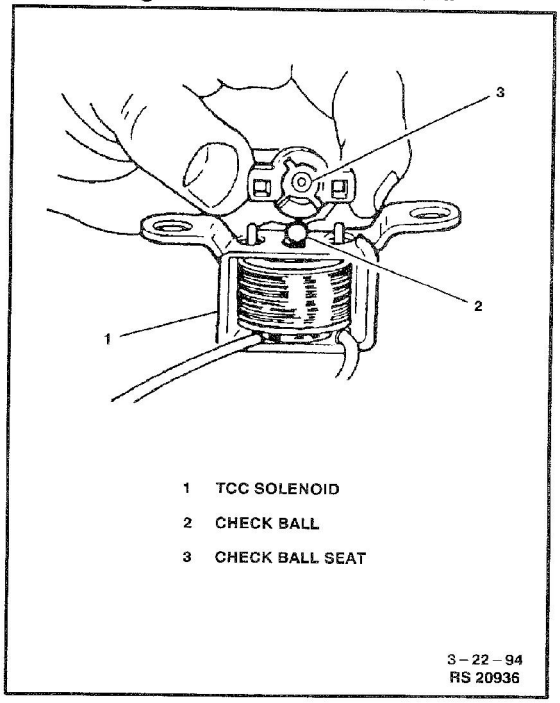
The factors which the ECM uses to control the relay are the signals from the following sensor:

- Throttle Position (TP) sensor (throttle opening)
- Camshaft Position sensor
- Engine Coolant Temperature (ECT) sensor
- Vehicle Speed Sensor (VSS)

The ECM turns the TCC relay only when the following condition are satisfied.

- Engine is running.
- Engine coolant temperature is above 60°C (140°F).
- Throttle valve opening is between 6.4° and 64.5°.
- Brake is not applied.
- Vehicle speed is greater than 75.4 km/h 46 mph.

Figure C8-1 - TCC Solenoid



Diagnosis

The diagnosis of the Torque Converter Clutch (TCC) system is covered in *Section 7A*.

If the Engine Control Module (ECM) detects a Vehicle Speed Sensor (VSS) input malfunction in the system, the TCC will not apply.

If the ECM doesn't switch the TCC "ON" during driving, sensors such as ECT, VSS and TP should also be checked.

On-Vehicle Service

- See *Section 7A* for Torque Converter Clutch (TCC) solenoid service information.

Diagnosis

Results Of Incorrect Operation

- A plugged valve or hose may cause
  - Rough idle.
  - Stalling or slow idle speed.
  - Oil leaks.
  - Oil in air cleaner.
  - Sludge in engine.
- A leaking valve or hose would cause
  - Rough idle.
  - Stalling.
  - High idle speed.

PCV Valve

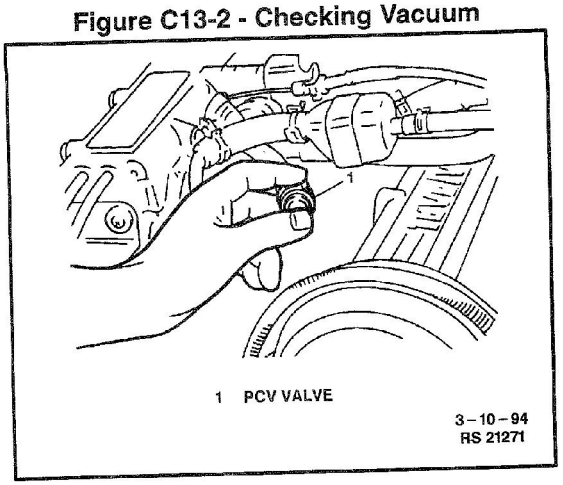
Inspect

- Run the engine at idle.
- Place your finger over the end of the PCV valve to check for vacuum. If there is no vacuum, check for clogged valve. Replace as necessary (*Figure C13-2*).

Notice: If engine is idling rough, this may be caused by a clogged PCV valve or plugged hoses; therefore, never adjust idle speed without first checking PCV valve and hoses.

- Remove PCV valve from PCV hose. Shake PCV valve and listen for a rattle. If valve does not rattle, replace PCV valve.

Figure C13-2 - Checking Vacuum



PCV Hose

Check hoses for proper connection, leakage, clog and deterioration. Replace as necessary.

On-Vehicle Service

PCV Valve

An engine which is operated without any crankcase ventilation can be damaged. Therefore, it is important to replace the Positive Crankcase Ventilation (PCV) valve at intervals shown in *Section 0B*.

Periodically inspect the hoses and clamps and replace if showing signs of deterioration.

Remove or Disconnect

1. Negative (-) battery cable.
2. Three bolts and throttle cover.
3. One clamp and PCV hose from PCV valve.
4. Rubber insulator from PCV valve.
5. PCV valve from intake manifold.

Install or Connect

1. PCV valve to intake manifold.
2. Rubber insulator to PCV valve.
3. PCV hose to PCV valve; secure with one clamp.
4. Throttle cover; secure with three bolts.

Tighten

- Throttle cover bolts to 15 N•m (11 lb. ft.).

5. Negative (-) battery cable.

Tighten

- Negative (-) battery cable-to-negative (-) battery terminal retainer to 15 N•m (11 lb. ft.).

Specifications

Engine Fastener Tightening Specifications

Application	N•m	Lb Ft	Lb In
Negative (-) Battery Cable-to-Negative (-) Battery Terminal Retainer	15	11	—
Throttle Cover Bolts	15	11	—