

EMISSION CONTROL SYSTEM

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DESCRIPTION AND OPERATION

EMISSION CONTROL SYSTEM—3.1L DIESEL ENGINE

DESCRIPTION

The 3.1L diesel Engine Control Module (ECM) and Powertrain Control Module (PCM) monitor and control many different circuits in the fuel injection pump and engine systems. If the ECM senses a problem with a monitored circuit that indicates an actual problem, a Diagnostic Trouble Code (DTC) will be stored in the PCM's memory, and eventually may illuminate the Check Engine Lamp constantly while the key is on. If the problem is repaired, or is intermittent, the ECM will erase the DTC after 40 warm-up cycles. A warm-up cycle consists of starting the vehicle when the engine is cold, then the engine to warms up to a certain temperature, and finally, the engine temperature falls to a normal operating temperature, then the key is turned off.

Certain criteria must be met for a DTC to be entered into ECM memory. The criteria may be a specific range of engine rpm, engine or fuel tempera-

ture and/or input voltage to the ECM. A DTC indicates that the ECM has identified an abnormal signal in a circuit or the system. A DTC may indicate the result of a failure, but never identify the failed component directly.

There are several operating conditions that the ECM does not monitor and set a DTC for. Refer to the following Monitored Circuits and Non-Monitored Circuits in this section.

ECM MONITORED SYSTEMS

The ECM can detect certain problems in the electrical system.

Open or Shorted Circuit – The ECM will not distinguish between an open or a short to ground, however the ECM can determine if sensor output (which is the input to ECM) is within proper range. It also determines if the circuit is open or shorted.

Output Device Current Flow – The ECM senses whether the output devices are electrically connected.

If there is a problem with the circuit, the ECM senses whether the circuit is open, shorted to ground (-), or shorted to (+) voltage.

DESCRIPTION AND OPERATION (Continued)

ECM NON-MONITORED SYSTEMS

The ECM does not monitor the following circuits, systems or conditions that could have malfunctions that result in driveability problems. A DTC will not be displayed for these conditions.

Fuel Pressure: Fuel pressure is controlled by the fuel injection pump. The ECM cannot detect fuel pressure problems in this component. The ECM does a comparison analysis of fuel quantity, fuel timing, fuel temperature, and control sleeve sensor inputs to determine if a fuel problem exists.

Cylinder Compression: The ECM cannot detect uneven, low, or high engine cylinder compression.

Exhaust System: The ECM cannot detect a plugged, restricted or leaking exhaust system.

Fuel Injector Malfunctions: The ECM cannot determine if the fuel injector is clogged, or the wrong injector is installed. The fuel injectors on the diesel engine are **not controlled** by the ECM, although a defective fuel injector sensor **is monitored** by the ECM.

Vacuum Assist: Leaks or restrictions in the vacuum circuits of vacuum assisted engine control system devices are not monitored by the ECM.

ECM System Ground: The ECM cannot determine a poor system ground. However, a DTC may be generated as a result of this condition.

ECM/PCM Connector Engagement: The ECM cannot determine spread or damaged connector pins. However, a DTC may be generated as a result of this condition.

HIGH AND LOW LIMITS

The ECM compares input signals from each input device. It will establish high and low limits that are programmed into it for that device. If the inputs are not within specifications and other DTC criteria are met, a DTC will be stored in memory. Other DTC criteria might include engine rpm limits or input voltages from other sensors or switches. The other inputs might have to be sensed by the ECM when it senses a high or low input voltage from the control system device in question.

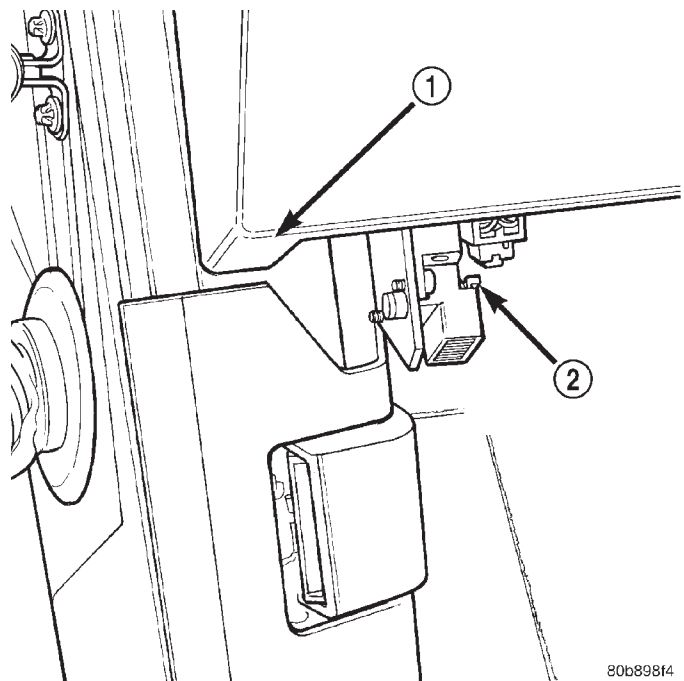
DIAGNOSTIC TROUBLE CODES

DESCRIPTION

On the following pages, a list of DTC's is provided for the 3.1L diesel engine. A DTC indicates that the ECM has recognized an abnormal signal in a circuit or the system. A DTC may indicate the result of a failure, but most likely will not identify the failed component directly.

ACCESSING DIAGNOSTIC TROUBLE CODES

A stored DTC can be displayed through the use of the DRB III® scan tool. The DRB III® connects to the data link connector. The data link connector is located under the instrument panel near bottom of the steering column (Fig. 1).



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Fig. 1 Data Link Connector Location — LHD Typical

- 1 - INSTRUMENT PANEL LOWER/LEFT EDGE
- 2 - DATA LINK CONNECTOR

ERASING TROUBLE CODES

After the problem has been repaired, use the DRB III® scan tool to erase a DTC.

DESCRIPTION AND OPERATION (Continued)

ENGINE CONTROL MODULE (ECM) DRBIII® CODES

Generic Scan Tool Code	DRB III® Scan Tool Display
P0115	Temperature of Engine Coolant SRC High Exceeded Temperature of Engine Coolant SRC Low Exceeded
P0180	Fuel Temperature Sensor SRC High Exceeded Fuel Temperature Sensor SRC Low Exceeded
P0235	Turbocharger Boost Sensor Signal High Exceeded Turbocharger Boost Sensor Signal Low Exceeded Turbocharger Boost Sensor Supply High Exceeded Turbocharger Boost Sensor Supply Low Exceeded Turbocharger Boost Sensor Plausibility
P0400	EGR Open Circuit EGR Short Circuit
P0500	Veh. Speed Sensor PEC Frequency Too High Veh. Speed Sensor SRC High Exceeded Veh. Speed Sensor Plausibility
P0725	Engine Speed Sensor Dynamic Plausibility Engine Speed Sensor Over Speed Recognition Engine Speed Sensor Static Plausibility
P1105	Atmosphere Pressure Sensor SRC High Exceeded Atmosphere Pressure Sensor SRC Low Exceeded
P1110	Air Temp. Sensor SRC High Exceeded Air Temp. Sensor SRC Low Exceeded
P1201	Needle Movement Sensor SRC High Exceeded Needle Movement Sensor SRC Low Exceeded
P1220	Fuel Quantity Actuator Negative Governor Deviation Cold Fuel Quantity Actuator Negative Governor Deviation Warm Fuel Quantity Actuator Positive Governor Deviation Cold Fuel Quantity Actuator Positive Governor Deviation Warm
P1225	Control Sleeve Sensor Signal High Exceeded Control Sleeve Sensor Signal Low Exceeded Control Sleeve Sensor Start End Position Not Attained Control Sleeve Sensor Stop End Position Not Attained
P1515	Accelerator Pedal Sensor PWG Plausibility With Potentiometer Accelerator Pedal Sensor PWG Plausibility With Low-Idle Switch Accelerator Pedal Sensor PWG Plausibility With Brake Input Accelerator Pedal Sensor Plausibility Accelerator Pedal Sensor Signal High Exceeded

DESCRIPTION AND OPERATION (Continued)

Generic Scan Tool Code	DRB III® Scan Tool Display
P1600	Battery Voltage SRC High Exceeded
P1610	Regulator Lower Regulator Limit Regulator Upper Regulator Limit
P1615	Microcontroller Gate-Array Monitoring Microcontroller Gate-Array Watchdog Microcontroller Prepare Fuel Quantity Stop Microcontroller Recovery Has Occurred Microcontroller Redundant Overrun Monitoring
P1630	Solenoid Valve Controller Open Circuit Solenoid Valve Controller Short Circuit
P1635	Glow Relay #1 Controller Open Circuit Glow Relay #1 Controller Short Circuit
1640	Glow Relay #2 Controller Open Circuit Glow Relay #2 Controller Short Circuit
P1655	A/C Control Open Circuit A/C Control Short Circuit
P1660	Redundant Emergency Stop Plausibility In After-Run Redundant Emergency Stop Powerstage Defective
P1680	EEPROM Plausibility Checksum Error for Adj. (EGR) EEPROM Plausibility Checksum Error in CC212 EEPROM Plausibility Communication With EEPROM EEPROM Plausibility Func. Switch Wrong or Missing EEPROM Plausibility VIN Checksum Error EEPROM Plausibility Ver Number Not Corresponding
P1703	Brake Signal Plausibility With Redundant Contact
P1725	Inductive Aux. Speed Sensor Dynamic Plausibility Inductive Aux. Speed Sensor Overspeed Recognition Inductive Aux Speed Sensor Plausibility Inductive Aux. Speed Sensor Static Plausibility
P1740	Clutch Signal Plausibility

DESCRIPTION AND OPERATION (Continued)

POWERTRAIN CONTROL MODULE (PCM) DRBIII® CODES

Generic Scan Tool Code	DRBIII Scan Tool Display
P0117	Engine Coolant Volts Low
P0118	Engine Coolant Volts High
P0122	Throttle Position Sensor Voltage Low
P0123	Throttle Position Sensor Voltage High
P0460	Fuel Level Unit No Change Over Miles
P0462	Fuel Level Sending Unit volts Too Low
P0463	Fuel Level Sending Unit volts Too High
P0522	Oil Pressure Voltage Too Low
P0523	Oil Pressure Voltage Too High
P0600	SPI Communications
P0601	Internal Self-Test
P0622	Generator Field Not Switching Properly
P0712	Trans Temperature Sensor Voltage Too Low
P0713	Trans Temperature Sensor Voltage Too High
P0720	Low Output Speed Sensor RPM Above 15 MPH
P0743	Torque Converter Clutch Solenoid/Trans Relay Circuit
P0748	Governor Pressure Solenoid/Trans Relay Circuits
P0751	O/D Switch Pressed (Lo) More Than 5 Miles
P0753	Trans 3-4 Shift Solenoid/Trans relay Circuit
P1491	Radiator Fan Control Relay Circuit
P1492	Ambient/Batt temp Sen Volts Too High
P1493	Ambient/Batt temp Sen Volts Too Low
P1594	Charging System Voltage Too High
P1595	Speed Control Solenoids Circuits
P1596	Speed Control Switch Always High
P1597	Speed Control Switch Always Low
P1682	Charging System Voltage Too Low
P1683	Speed Control Power Relay or S/C 12V Driver Circuit
P1685	SKIM Invalid Key
P1686	No SKIM Bus Message
P1687	No MIC Bus Message
P1696	PCM EEPROM Write Denied
P1762	Governor Pressure Sensor Offset Volts Too Lo Or High
P1763	Governor Pressure Sensor Volts Too High
P1764	Governor Pressure Sensor Volts Too Low
P1765	Trans 12 Volt Supply Relay Control Circuit

