DTC P1682

DIAGNOSTIC INSTRUCTIONS

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC DESCRIPTOR

DTC P1682

Ignition 1 Switch Circuit 2

DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ignition 1 Voltage, Powertrain Relay	P1516, P1682, P2176	P0575, P1682, P2101	P0690	-
Ignition 1 Voltage, Run/Crank Relay	-	P1682	P0575, P0650	-

TYPICAL SCAN TOOL DATA

Ignition 1 Signal

Circuit	Short to Ground	Open	Short to Voltage
Operating Conditions: Ignition ON, engine OFF, and run/crank and powertrain relay are commanded ON			
Ignition 1 Voltage, Run/Crank	0 V	0 V	B+
EC Ignition (Powertrain) Relay Feedback Signal	0 V	0 V	B+

CIRCUIT/SYSTEM DESCRIPTION

There are 2 ignition voltage circuits supplied to the engine control module (ECM). The first ignition circuit is provided by the engine controls ignition relay or powertrain relay, through a fuse. This ignition voltage circuit supplies power to all the internal ECM circuits associated with the throttle actuator control (TAC) operation. The second ignition voltage circuit is supplied by the run/crank relay through a fuse, and is used to power the remaining internal ECM circuits. If the ECM detects a voltage difference between the 2 ignition voltage circuits, DTC P1682 will set.

CONDITIONS FOR RUNNING THE DTC

- The ignition is ON.
- System voltage is more than 6 V.

- The powertrain relay is commanded ON.
- DTC P1682 runs continuously.

CONDITIONS FOR SETTING THE DTC

The ECM detects that the voltage level difference is greater than 3 V between the 2 ignition voltage circuits for less than 1 s.

ACTION TAKEN WHEN THE DTC SETS

DTC P1682 is a Type A DTC.

CONDITIONS FOR CLEARING THE DTC

DTC P1682 is a Type A DTC.

DIAGNOSTIC AIDS

This test procedure requires that the vehicle battery has passed a load test and is completely charged. Refer to **Battery Inspection/Test** .

REFERENCE INFORMATION

Schematic Reference

- **Engine Controls Schematics**
- **Power Distribution Schematics**

Connector End View Reference

Component Connector End Views

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Electrical Center Identification Views**
- **Probing Electrical Connectors**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

CIRCUIT/SYSTEM VERIFICATION

NOTE: On the scan tool, the powertrain relay is referred to as the EC ignition relay.

1. If DTCs P0685 or P0690 are set, diagnose those DTCs first.
2. Ignition ON, observe the scan tool Ignition 1 Voltage signal and the EC Ignition Relay Feedback signal parameters. There should be no more than 3 V difference between the two parameters.
3. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

CIRCUIT/SYSTEM TESTING

NOTE: You must perform the Circuit/System Verification before proceeding with Circuit/System Testing.

1. Ignition ON, observe the Ignition 1 Signal and the EC Ignition Relay Feedback scan tool parameter to determine which is more than 3 V lower than the other.

   NOTE: The Ignition 1 Signal is supplied by the Run/Crank relay. The EC Ignition Relay Feedback signal is supplied by the powertrain relay.

2. Ignition OFF, remove the relay that corresponds to the scan tool parameter that is more than 3 V lower.

   NOTE: A resistance of 6 ohms or greater in the circuit/underhood fuse block will cause the DTC to set.

3. Ignition ON, connect a 20 A fused jumper wire between B+ and the applicable ignition voltage circuit terminal. Verify that the applicable scan tool parameter displays between 9-14 V.
   - If the applicable scan tool parameter is less than the specified value, test the ignition voltage circuit for an open/high resistance. If the circuit tests normal, replace the ECM.
4. If all circuits test normal, replace the applicable relay.

REPAIR PROCEDURES

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Relay Replacement (Attached to Wire Harness)** or **Relay Replacement (Within an Electrical Center)**
- **Control Module References** for ECM replacement, setup, and programming

