



# Tech Tip

ELECTRICAL 197

## MAKING AN ACCURATE DIAGNOSIS

### Always Start with the Basic Checks First

**N**ew technology poses new challenges. Many of these challenges require more than the information provided in repair manuals or diagnostic code charts. Much is learned once the vehicle is put into service and into real world vehicle operating conditions. Following are some conditions that can promote difficult to diagnose symptoms.

#### BASIC CHECKS FIRST

Diagnosing electrical problems or components should always start with the source of energy, and that would be the battery. Make certain the battery is fully charged and has clean, tight connections.

Electronic control modules (ECMs) monitor the electrical values of the electronic components to determine if they are operating in their desired range. Minute resistance or voltage variations can have a detrimental effect on the system operation. Often, terminal resistance related conditions that can affect the system or component operation are not measurable with test instruments that are used daily in most repair shops.

The integrity of the wiring, terminals and electrical connectors should always be confirmed. Many intermittent or hard failures are often resolved by moving a wiring harness, disconnecting and reconnecting a connector, tightening a connector, or performing a ground circuit clean-up. These simple checks can often prevent the replacement of some expensive electrical/electronic components, which are often blamed for a failure.

**Case in point:** 2015-2016 Chevrolet Impala owners may complain with one or more of the following symptoms.

- 1) Vehicle won't start.
- 2) Intermittently, the engine will not crank/turn over.
- 3) Remote-Start function inoperative.
- 4) Anti-Theft Light may be illuminated.
- 5) The Check Engine light may be on with diagnostic code PO513 set in memory.

**GM advises...**the described condition may be the result of a loose or corroded ground terminal at ground location G103. The terminal and contact surface must be cleaned and tightened. Check for factory bulletins, as they can save you many hours of diagnostic time.

#### LOW VOLTAGE AND ELECTRONIC COMPONENTS

When performing safety inspections on your customer's vehicle, make battery testing and charging system output a part of your safety check. Testing the battery can prevent the customer from having to pay for a service call or tow bill that often exceeds the cost of a new battery.

A low voltage condition can create some major challenges with the vehicle's electronics. For example, a No Fob message with a no-start symptom may be the result of a vehicle that is not driven daily. A low voltage condition due to a vehicle being parked for 2-3 weeks can create some challenging symptoms due to a parasitic current drain.

Never leave the fob within 25 feet of the vehicle when parked, as its presence will prevent the computers from entering the sleep mode, resulting in a battery discharge condition. A low voltage condition results in modules not communicating, thereby creating some anomalies with the vehicle's electrical system. A lot of diagnostic time can be wasted searching for a system or component related failure when a low battery condition, poor electrical connection, or voltage drop during cranking was the culprit.

When diagnosing a battery discharge condition, pay special attention to any electrical accessories that have been added to the vehicle. Add-on devices or accessories can influence other systems or components. The result can be engine performance symptoms, illuminated Check Engine light and stored trouble codes, battery discharge, or failure of other system components/accessories.

For example: Wiring into the courtesy lamp circuit for a power source for an accessory may result in the power timer in the Body Control Module (BCM) continuously resetting itself. The BCM will remain awake and the amp draw may rise to 4 amps and then drop to a low milliamp reading momentarily and continually repeating this cycle, resulting in a battery discharge condition. A low voltage condition can create some major issues with electrical components such as Keyless Entry or Push Button Start, etc.

## ALDL CONNECTOR

The Assembly Line Data Link Connector (ALDL) allows access to the system for diagnostics. Some companies utilize that same connector for other reasons. For example, insurance companies offer improved rates for those vehicles that are seldom driven or how the vehicle is being driven. They utilize the connector link to access the data. Fleet companies monitor their vehicles for maintenance purposes, fuel economy, etc. Companies that offer performance enhancement options often utilize the ALDL connector. In some cases, vehicle manufacturers have denied engine warranty claims when such devices have been installed, especially in cases whereby piston or cylinder wall damage has occurred.

Be aware that systems and monitoring/tracking devices that plug into the ALDL connector can influence the vehicle's electronics, and this should be a part of your diagnostic process. The symptoms may include driveability issues with the engine, transmission, erratic or false gauge readings, Check Engine lamp illumination with trouble codes stored, TPMS lamp illumination, battery discharge due to bus or LAN traffic remaining active.

Troubleshooting symptoms resulting from electrical interference via the ALDL connector can be a challenge, as the accessory is often removed prior to taking the vehicle in for repairs. Make certain you question the vehicle owner on the use of such accessories or else you may be chasing a problem that has been removed.

GM issued a TSB concerning various issues that may occur with an aftermarket ALDL or an interface device affecting their vehicle related to high or low speed data bus traffic. The information contained was not intended to single out any one device or symptom, but provide information that may be useful in diagnosing issues that do not have other diagnostic methods to identify the cause of the symptoms encountered.

- 1) The radio may not turn off after shutting down the vehicle.
- 2) Bus or LAN traffic may stay active leading to a discharged battery.
- 3) Problems reprogramming modules because of interference or the device will not allow the bus to power down.
- 4) ONSTAR may lose the ability to provide diagnostic data.
- 5) Various engine and transmission performance issues with SES/Check Engine light set.
- 6) Intermittent driveability issues.
- 7) Reduced power message and codes.
- 8) Stabilitrak message and codes.

- 9) CO561 stored in the EBCM leading to a traction control issue.
- 10) No high-speed LAN communication along with various communication U-codes.
- 11) Transmission may not shift for one key cycle (TCM in default mode).
- 12) Erratic gauge readings or flickering displays.
- 13) SES, MIL or CEL light set and numerous DTC communication codes such as UO100, UO101, U186B and U1862.
- 14) Diesel power-up devices causing no power in 4WD low range.
- 15) Erratic electric power steering boost potentially associated with codes U2109, U2107, U2100, B1325, C0000.
- 16) Battery discharge.
- 17) Service Tire Pressure Monitoring (TPM) system light illuminated. Cannot relearn TPM.
- 18) Specific to Hybrids:
  - a) Reduced propulsion power message.
  - b) Service high voltage charging system message.

## ELECTRICAL INTERFERENCE

Radio Frequency Interference (RFI) has become a common challenge for the technician performing automotive diagnostics. The most common complaint is a No Fob Detected message and the customer faced with a vehicle that will not start.

The system utilizes a complex radio frequency system to determine the proximity of the fob. Unfortunately, certain limitations and conditions may limit the signal strength resulting in a lack of signal detection. The system may not recognize a fob placed too close to a door switch, or it may require moving the fob to different locations in the passenger compartment to improve the signal strength when interference conditions exist. Following are some RFI conditions that can affect the system operation: RFI created by devices such as radar detectors, 2-way radios, cell phones and chargers (even though they may not be plugged in), computers and other electronic devices, fluorescent lighting, electronic advertising signs, aftermarket accessories, high RF traffic areas such as pay-at-the-pump gas stations, or devices from another vehicle in close proximity. These are real world encounters that the technician must be prepared to deal with on a weekly basis.

Most vehicles equipped with push button start have a special slot or space to place the fob when these conditions occur. This places the fob near one of the antennas to improve the signal strength. Make certain your customer is familiar with this location in their vehicle.

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