RFI 206

ELECTRICAL INTERFERENCE

Diagnosing Radio Frequency Interference Symptoms

Vehicles today incorporate a complex radio frequency system that controls many features such as Keyless Entry, Keyless Start/Stop, Remote Start and other electrical accessory components. Vehicle owners cherish these creature comforts as they eliminate the frustration of dealing with keys to control the same functions as the frequency-controlled devices. Often, they have a change of heart when interference from another system or device disrupts the operation of the system, leaving them unable to enter, exit or start the vehicle.

Few symptoms are more frustrating than staring at a No Fob Detected/Key Not Detected message when attempting to start your vehicle. These symptoms usually occur at the most inopportune time such as being late for work, picking the kids up at school/daycare, late for an appointment, or stranded while on a trip. Hopefully, the symptom will not occur during an emergency. Additional symptoms may include an intermittent illuminated Security Light, Tire Pressure Monitor Message or poor Remote Keyless Entry Range. Often, trouble codes will be stored, leading the technician on a mission that may be impossible to resolve, as it may be difficult to create the same events that disrupted the signal resulting in the trouble codes.

NO FOB/NO KEY DETECTED

When the message and symptom appear, the vehicle can usually be started by placing the fob in a special slot/pocket, which is in close proximity to one of multiple antennas, which improves the signal strength. For example, Fig. 1 reflects the special slot/pocket located in the glove box of a Corvette. On some vehicles the slot may be located in the center console or a cavity within the dash.

FIG. 1

Nissan's procedure calls for positioning the fob next to the Start/Stop button, while at the same time depressing the button to achieve the same increased signal strength (see Fig. 2). Some procedures call for depressing the start button with the tip of the key fob.

FIG. 2

Every vehicle owner should familiarize themselves with this feature and the location of the special slot/pocket or starting procedure. It is only a matter of time when they will encounter the No Fob/No Key Detected message.

RADIO FREQUENCY INTERFERENCE

Radio frequency interference (RFI) is a condition that occurs when multiple signals or frequencies start interfering with other electrical systems or components. Computers programmed to read signal parameters within a precise calibration range may behave strangely when subjected to RFI. The symptoms may include a no-start, erratic idle, hesitation, stalling, erratic transmission shifting, misfire condition, flashing lights, etc. When these conditions occur, the technician often has a difficult time re-creating the symptoms encountered by the vehicle owner, as they may be intermittent or related to a specific location or condition. This presents a diagnostic challenge when attempting to pinpoint the source of the electrical interference, as the technician must create those same events.

Following are some conditions that can create radio frequency induced symptoms:

- Communication devices/2-way radios
- Radar detectors
- GPS devices
- Cell phone chargers

Laptop computers
Electronic accessories/devices
Fluorescent lighting
Electronic advertising signs
High RFI traffic areas/gas station speed passes
Electronic interference from a nearby vehicle/accessory devices
Keyless access transmitters from nearby vehicles
Vehicle immobilizer keys from other vehicles
Charging devices/cell phone chargers
Gate/door entrance devices
Building access transponder/entrance devices
Toll bridge/highway passes
Parking access cards attached to key ring
Access swipe passes attached to key ring
USB power ports in use (lighting, chargers, etc)

GM has cautioned the dealer technicians to be aware of the following lighting that includes aftermarket LED dome, tail, turn, stop, strip, floor, door, logo and headlights. In many cases, when the LED lighting is turned on it can interfere with a RF signal. For example, the remote keyless entry (RKE) may be inoperative after the first fob button press. When the RKE button is pressed the dome lights may turn on, and if equipped with an aftermarket LED dome light, it can interfere with any additional fob button presses.

Always consider…any add-on accessories have the potential to interfere with another RF signal and those concerns should be eliminated before spending countless hours of diagnostic time to no avail.

MULTIPLE TRANSMITTERS

FIG. 3

Be cautious of attaching multiple transmitters/fobs on a single key ring as RFI-related symptoms can occur.

Be sure to ask the vehicle owner if the fob currently with the vehicle is the unit in which the symptoms occurred.

Often a vehicle is brought in for service and the problem has been removed by the vehicle owner by separating the fob from multiple devices/transmitters attached to the same key ring.

Consider the key ring illustrated in Fig. 3. This key ring could create a myriad of RFI-related performance issues that would challenge the best technician.

ALDL CONNECTOR

The ALDL (Assembly Line Data Link) connector allows access to the computer system for diagnostics. Some companies utilize that connector for other reasons such a fleet monitoring, fuel economy, maintenance intervals, performance enhancement, etc.

Consider any accessories, electrical devices, power-up devices, or fleet monitoring/tracking devices that plug into the ALDL connector, as they can influence the vehicle's electronics. The symptoms may include driveability issues with the engine and transmission, erratic or false gauge readings, Service Engine Soon (SES) light illumination with stored trouble codes, TPMS light illumination, battery discharge due to the Bus or LAN traffic remaining active, etc. These symptoms may be challenging for the technician, as these accessory items are often disconnected by the vehicle owner when the vehicle is taken in for repairs. Make certain you question the vehicle owner, as determining the use of such ALDL devices can save a lot of diagnostic time searching for a condition that has been removed from the vehicle prior to you receiving it for diagnostics.

LOW VOLTAGE

When encountering a No Fob/No Key detected message some basic tests should be performed prior to getting too deep into the diagnostics or re-programming devices.

1) The first consideration should be the voltage level of the fob battery. A "Low Fob Battery" message is often displayed on the dash if the voltage drops below 2.6 volts for three consecutive ignition cycles.
2) The starting, lighting and ignition battery must be above 10 volts for the system to accurately detect the fob signal. Voltage in the 10-volt range can prevent entry of the vehicle. The low voltage symptoms often occur when the vehicle is not driven for a 2–3 week period, resulting in a battery discharge condition due to parasitic current drain. The vehicle owner should never leave the fob within 25 feet of the vehicle when parked. The presence of the fob prevents the computers from going to sleep, resulting in a battery discharge condition. Pay special attention to any accessories that may have been added. If wired incorrectly, they may keep the computers awake, promoting an excessive parasitic current drain and a discharged battery.

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