OBD COMMUNICATION FAILURES

Why Vehicles Fail to Communicate and Strategies for Repair

Maryland Vehicle Emissions Inspection Program (VEIP)

OBD COMMUNICATION FAILURES

One of the most frustrating things to diagnose is a complaint that cannot be verified when brought into your shop. You have an emissions test report before you, and all you see wrong is that the vehicle failed for communication. With some relatively simple steps and an understanding of what is required during testing, you should be able to inspect, evaluate and repair this problem confidently.

THE VEIP TESTING PROCESS

At the state VEIP stations, the OBD II emissions test is performed by connecting to the required generic DLC connector, usually located inside the vehicle under the dash. The test equipment is connected to the vehicle with the ignition key in the Off position. The ignition switch is turned to the On position but the engine is not started (Key On Engine Off or KOEO), and the MIL is verified to be functioning and illuminated. The engine is then started (Key On Engine Running or KOER), and the MIL is verified to be functioning and not illuminated (if in passing status).

Figure 1 shows how communication is established through the allocated pins according to the SAE communication protocol used. Note that different vehicles use different communication protocols; be sure you are aware of which protocol the failing vehicle uses and have your scan tool set to read that protocol. VEIP also requires ground to be present at Pin 5, and correct battery voltage at Pin 16.

Once communication is established, the VEIP test equipment queries the appropriate ECUs. Monitor readiness, MIL status, active codes (if MIL is "ON") and VIN are among the data requested and examined during the test. The test equipment then completes the test and is disconnected from the DLC.

SAE J1850 PWM
Pin 2: Bus -
Pin 10: Bus +

SAE J1850 VPW
Pin 2: Bus +

ISO 9141-2
Pin 7: K-line
Pin 15: L-line

ISO 14230 KWP2000
     (Keyword Protocol 2000)
Pin 7: K-line
Pin 15: L-line

ISO 15765 CAN
Pin 6: CAN High
Pin 14: CAN Low
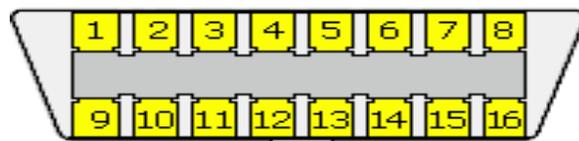
Figure 1. DLC Pin Locations

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THE TEST RESULTS

Test result details are found in the lower left hand area of the Vehicle Emissions Inspection Certificate (VEIC). When the sole reason for vehicle failure is lack of communication, the Test Information results will indicate Fail only in the Communication Results box. Any other results indicating a Fail will need to be addressed separately from the communication failure.

DIAGNOSIS AND REPAIR

When the customer brings you the vehicle for repair you will most likely attach some form of scan tool capable of accessing and viewing information and data from the vehicle. Under most circumstances a tool only capable of reading codes will not suffice in diagnosing a communication failure. These code readers only query any active codes and do not use all the Pins necessary for emissions testing.

Possible starting points for diagnosing communication failures include checking for:

LOOSE PINS IN DLC

NO POWER OR GROUND IN DLC

WARPED / STIFF DLC

CORROSION / DEBRIS IN DLC

FLASHES OUT OF DATE

OTHER ECUs / CONTROLLERS FAILING

AFTERMARKET ACCESSORIES INSTALLED ON VEHICLE (radio, cd player, alarm, remote start, etc.)

RETESTING AFTER REPAIR

When returning the vehicle to the customer ensure that you inform the owner / driver that they will most likely need to drive the vehicle for approximately one week so that all monitors are completed and ready for emissions testing. If you have the capability of running all unset monitors so that the vehicle will be immediately ready for testing and you have verified that they are completed then the vehicle can be tested.

CONCLUSION

Remember, the state OBD emissions test is performed on a generic level as required by the US EPA. VEIP uses the standard J1962 connector located somewhere inside the vehicle's driver or passenger area -- NOT manufacturer specific protocols or connectors. The vehicle is tested when it is running so that all monitors and necessary ECUs are running and reporting. If a vehicle fails for communication, it is usually due to one or more of the reasons previously listed.

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