

## INTRODUCTION

Before diagnosing symptoms or intermittent faults, perform steps in BASIC DIAGNOSTIC PROCEDURES article and appropriate SELF-DIAGNOSTICS article. Use this article to diagnose driveability problems existing when a hard fault code is not present or vehicle is not equipped with a self-diagnostic system.

**NOTE:** Some driveability problems may have been corrected by manufacturer with a revised computer calibration chip or computer control unit. Check with manufacturer for latest chip or computer application.

Use intermittent test procedures to locate driveability problems that do not occur when the vehicle is being tested. These test procedures should also be used if a soft (intermittent) trouble code was present but no problem was found during self-diagnostic testing.

**NOTE:** For specific testing procedures, see appropriate SYSTEM & COMPONENT TESTING article. For specifications, see ON-VEHICLE ADJUSTMENTS or SERVICE & ADJUSTMENT SPECIFICATIONS article.

## SYMPTOM DIAGNOSIS

**CAUTION:** When battery is disconnected, vehicle computer may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION before disconnecting the battery.

Symptom checks cannot be used properly unless problem occurs while vehicle is being tested. To reduce diagnostic time, ensure steps in BASIC DIAGNOSTIC PROCEDURES article and appropriate SELF-DIAGNOSTICS article were performed before diagnosing a symptom. Following symptoms are available for diagnosis:

- **ABNORMAL ENGINE NOISE**
- **A/C DOES NOT TURN OFF DURING WIDE OPEN THROTTLE (WOT)**
- **EMISSIONS FAILURE**
- **ENGINE RUNS ROUGH, MISSES, HESITATES, STUMBLES, SURGES OR STALLS DURING ACCELERATION OR CRUISE, OR ENGINE BUCKS OR**

## **JERKS DURING ACCELERATION, CRUISE OR DECELERATION**

- **ENGINE STALLS AT IDLE OR JUST AFTER STARTING**
- **ENGINE VIBRATION**
- **EXCESSIVE OIL CONSUMPTION**
- **EXHAUST SMOKE**
- **FUEL ODER IN ENGINE COMPARTMENT**
- **HART TO START (LONG CRANKING, ERRATIC CRANKING OR ERRATIC STARTING)**
- **HIGH IDLE OR RUN-ON**
- **KNOCKING OR PINGING DURING ACCELERATION OR CRUISE**
- **LACK OR LOSS OF POWER DURING ACCELERATION OR CRUISE**
- **LOW IDLE OR ENGINE STALLS DURING DECELERATION**
- **NO CRANK**
- **NO START (CRANKS NORMALLY)**
- **POOR FUEL MILEAGE**
- **ROUGH OR UNSTABLE IDLE**
- **SLOW RETURN TO IDLE**
- **SULPHUR EXHAUST SMELL**

### **ABNORMAL ENGINE NOISE**

- Check for low oil level.
- Check for worn engine parts.
- Check for incorrectly tensioned or damaged drive belts.
- Check for intake system vacuum leak.
- Check for loose components.

### **A/C DOES NOT TURN OFF DURING WIDE OPEN THROTTLE (WOT)**

- Check for Throttle Position (TP) sensor circuit malfunction.
- Check for loose TP sensor.

### **EMISSIONS FAILURE**

- Check for incorrect engine compression.
- Check for incorrect valve timing.
- Check for worn engine parts.
- Check for malfunctioning cooling system.
- Check for restricted air filter.

- Check for intake system vacuum leak.
- Check for throttle body malfunction.
- Check for spark plug malfunction.
- Check for spark plug wire malfunction.
- Check for fuel pump malfunction.
- Check for fuel pressure regulator malfunction.
- Check for restricted or plugged fuel lines.
- Check for restricted fuel filter or fuel intake sock.
- Check for Camshaft Position (CMP) sensor malfunction.
- Check for damaged camshaft.
- Check for incorrect air/fuel mixture ratio.
- Check for restricted exhaust system.
- Check for catalytic converter malfunction.
- Check for EGR system malfunction.
- Check for evaporative emission control system malfunction.
- Check for PCV valve malfunction.

**ENGINE RUNS ROUGH, MISSES, HESITATES, STUMBLES, SURGES OR STALLS DURING ACCELERATION OR CRUISE, OR ENGINE BUCKS OR JERKS DURING ACCELERATION, CRUISE OR DECELERATION**

- Check for incorrect engine compression.
- Check for incorrect valve timing.
- Check for poor fuel quality.
- Check for overheating engine.
- Check for restricted air filter.
- Check for intake system vacuum leak.
- Check for throttle body malfunction.
- Check for spark plug malfunction.
- Check for Crankshaft Position (CKP) sensor malfunction.
- Check for damaged crankshaft pulley.
- Check for incorrect gap between CKP sensor and crankshaft pulley.
- Check for fuel pump malfunction.
- Check for fuel pressure regulator malfunction.
- Check for restricted or plugged fuel lines.
- Check for fuel injector malfunction.
- Check for restricted fuel filter or fuel intake sock.

- Check for Camshaft Position (CMP) sensor malfunction.
- Check for damaged camshaft.
- Check for incorrect air/fuel mixture ratio.
- Check for restricted exhaust system.
- Check for EGR system malfunction.
- Check for evaporative emission control system malfunction.
- Check for PCV valve malfunction.
- Check reference voltage circuit malfunction.
- Check for main relay malfunction.
- Check for Mass Air Flow (MAF) sensor circuit malfunction.
- Check for Throttle Position (TP) sensor circuit malfunction.
- Check TP sensor for looseness and misadjustment.
- Check for incorrect A/C refrigerant charging amount.
- Check for malfunctioning A/C relay circuit.
- Check for malfunctioning condenser fan circuit.
- Check for slipping clutch (M/T).
- Check for A/T malfunction.
- Check for Vehicle Speed Sensor (VSS) circuit malfunction.

#### **ENGINE STALLS AT IDLE OR JUST AFTER STARTING**

- Check for incorrect engine compression.
- Check for incorrect valve timing.
- Check for hydrostatically-locked engine.
- Check for poor fuel quality.
- Check for overheating engine.
- Check for restricted air filter.
- Check for intake system vacuum leak.
- Check for Idle Air Control (IAC) valve malfunction.
- Check for ignition coil malfunction.
- Check for incorrect ignition timing do to Crankshaft Position (CKP) sensor malfunction or damaged crankshaft pulley.
- Check for spark plug malfunction.
- Check for spark plug wire malfunction.
- Check for Crankshaft Position (CKP) sensor malfunction.
- Check for damaged crankshaft pulley.
- Check for incorrect gap between CKP sensor and crankshaft pulley.

- Check for fuel pump malfunction.
- Check for fuel pressure regulator malfunction.
- Check for restricted or plugged fuel lines.
- Check for fuel injector malfunction.
- Check for fuel system fuel leaks.
- Check for incorrect air/fuel mixture ratio.
- Check for restricted exhaust system.
- Check for EGR system malfunction.
- Check for evaporative emission control system malfunction.
- Check for PCV valve malfunction.
- Check for malfunctioning main relay.
- Check for incorrect A/C refrigerant charging amount.
- Check for malfunctioning A/C relay circuit.
- Check for malfunctioning condenser fan circuit.

#### **ENGINE VIBRATION**

- Check for incorrectly tensioned or damaged drive belts.
- Check for loose engine or transaxle mounts.
- Check for loose or damaged cooling fan or condenser fan mounts.
- Check for incorrect tire balance.
- Check for suspension malfunction.
- Check for driveline malfunction.

#### **EXCESSIVE OIL CONSUMPTION**

- Check for incorrect engine oil viscosity.
- Check for wrong dipstick.
- Check for restricted PCV system.
- Check for worn engine parts.

#### **EXHAUST SMOKE**

- Check for worn engine parts.
- Check for cooling system malfunction.
- Check for restricted air filter.
- Check for spark plug malfunction.
- Check for spark plug wire malfunction.

- Check for fuel pump malfunction.
- Check for fuel pressure regulator malfunction.
- Check for restricted or plugged fuel lines.
- Check for fuel injector malfunction.
- Check for Pressure Regulator Control (PRC) solenoid valve malfunction.
- Check for restricted PCV system.

#### **FUEL ODER IN ENGINE COMPARTMENT**

- Check for fuel pressure regulator malfunction.
- Check for fuel system leaks.
- Check for Evaporative emission control system malfunction.

#### **HART TO START (LONG CRANKING, ERRATIC CRANKING OR ERRATIC STARTING)**

- Check for poor fuel quality.
- Check for restricted air filter.
- Check for intake system vacuum leak.
- Check for spark plug malfunction.
- Check for spark plug wire malfunction.
- Check for Crankshaft Position (CKP) sensor malfunction.
- Check for damaged crankshaft pulley.
- Check for incorrect gap between CKP sensor and crankshaft pulley.
- Check for fuel pump malfunction.
- Check for fuel pressure regulator malfunction.
- Check for restricted or plugged fuel lines.
- Check for restricted fuel filter or fuel inlet sock.
- Check for pressure regulator control solenoid valve malfunction.
- Check for incorrect air/fuel mixture ratio.
- Check for restricted exhaust system.
- Check for EGR system malfunction.
- Check for evaporative emission control system malfunction.
- Check for PCV valve malfunction.
- Check for MAF sensor circuit malfunction.

#### **HIGH IDLE OR RUN-ON**

- Check throttle cable adjustment.

- Check Engine Coolant Temperature (ECT) sensor malfunction.
- Check for incorrect load signal input.

#### **KNOCKING OR PINGING DURING ACCELERATION OR CRUISE**

- Check for incorrect engine compression.
- Check for malfunctioning cooling system.
- Check for overheating engine.
- Check for fuel pump malfunction.
- Check for fuel pressure regulator malfunction.
- Check for MAF sensor circuit malfunction.

#### **LACK OR LOSS OF POWER DURING ACCELERATION OR CRUISE**

- Check for incorrect engine compression.
- Check for incorrect valve timing.
- Check for poor fuel quality.
- Check for overheating engine.
- Check for restricted air filter.
- Check for intake system vacuum leak.
- Check for throttle body malfunction.
- Check for tumble swirl control system malfunction.
- Check for spark plug malfunction.
- Check for Crankshaft Position (CKP) sensor malfunction.
- Check for damaged crankshaft pulley.
- Check for incorrect gap between CKP sensor and crankshaft pulley.
- Check for fuel pump malfunction.
- Check for fuel pressure regulator malfunction.
- Check for restricted or plugged fuel lines.
- Check for fuel injector malfunction.
- Check for Camshaft Position (CMP) sensor malfunction.
- Check for damaged camshaft.
- Check for restricted exhaust system.
- Check for EGR system malfunction.
- Check for evaporative emission control system malfunction.
- Check for PCV valve malfunction.
- Check for incorrect A/C refrigerant charging amount.

- Check for malfunctioning A/C relay circuit.
- Check for malfunctioning condenser fan circuit.
- Check for slipping clutch (M/T).
- Check for A/T malfunction.
- Check for Vehicle Speed Sensor (VSS) circuit malfunction.
- Check for dragging brakes.

#### **LOW IDLE OR ENGINE STALLS DURING DECELERATION**

- Check for intake system vacuum leak.
- Check for Idle Air Control (IAC) valve malfunction.
- Check for incorrect air/fuel mixture ratio.
- Check for evaporative emission control system malfunction.
- Check for brake switch circuit malfunction.
- Check for neutral switch (M/T) or clutch switch (M/T) circuit malfunction.
- Check for Mass Air Flow (MAF) sensor circuit malfunction.
- Check for Throttle Position (TP) sensor circuit malfunction.
- Check TP sensor for looseness and misadjustment.
- Check for A/C relay circuit malfunction.

#### **NO CRANK**

- Check for starter malfunction.
- Check for open starter or ignition switch circuit.
- Check for low battery charge.
- Check for charging system malfunction.
- Check for hydrostatically-locked engine.
- Check for seized drive plate (A/T) or flywheel (M/T).
- Ensure transmission is in Park (A/T) or neutral (M/T). Ensure clutch is fully depressed (M/T).

#### **NO START (CRANKS NORMALLY)**

- Check for incorrect engine compression.
- Check for incorrect valve timing.
- Check for hydrostatically-locked engine.
- Check for poor fuel quality.
- Check for overheating engine.
- Check for intake system vacuum leak.



- Check for Idle Air Control (IAC) valve malfunction.
- Check for ignition coil malfunction.
- Check for incorrect ignition timing do to Crankshaft Position (CKP) sensor malfunction or damaged crankshaft pulley.
- Check for spark plug malfunction.
- Check for spark plug wire malfunction.
- Check for Crankshaft Position (CKP) sensor malfunction.
- Check for damaged crankshaft pulley.
- Check for incorrect gap between CKP sensor and crankshaft pulley.
- Check for fuel pump malfunction.
- Check for fuel pressure regulator malfunction.
- Check for restricted or plugged fuel lines.
- Check for fuel injector malfunction.
- Check for fuel system fuel leaks.
- Check for incorrect air/fuel mixture ratio.
- Check for restricted exhaust system.
- Check for EGR system malfunction.
- Check for evaporative emission control system malfunction.
- Check for PCV valve malfunction.
- Check for reference voltage circuit malfunction.
- Check for main relay malfunction.

#### **POOR FUEL MILEAGE**

- Check for incorrect engine compression.
- Check for incorrect valve timing.
- Check for proper engine coolant level.
- Check for malfunctioning cooling system.
- Check for cooling fan system malfunction.
- Check for poor fuel quality.
- Check for restricted air filter.
- Check for tumble swirl control system malfunction.
- Check for spark plug malfunction.
- Check for spark plug wire malfunction.
- Check for fuel pump malfunction.
- Check for fuel pressure regulator malfunction.
- Check for restricted or plugged fuel lines.

- Check for restricted fuel filter or fuel intake sock.
- Check for Pressure Regulator Control (PRC) solenoid valve malfunction.
- Check for Camshaft Position (CMP) sensor malfunction.
- Check for damaged camshaft.
- Check for restricted exhaust system.
- Check for PCV valve malfunction.
- Check for condenser fan malfunction.
- Check for incorrect ATF level.
- Check for dragging brakes.

#### **ROUGH OR UNSTABLE IDLE**

- Check for incorrect engine compression.
- Check for incorrect valve timing.
- Check for poor fuel quality.
- Check for overheating engine.
- Check for intake system vacuum leak.
- Check for Idle Air Control (IAC) valve malfunction.
- Check for incorrect ignition timing do to Crankshaft Position (CKP) sensor malfunction or damaged crankshaft pulley.
- Check for spark plug malfunction.
- Check for spark plug wire malfunction.
- Check for Crankshaft Position (CKP) sensor malfunction.
- Check for damaged crankshaft pulley.
- Check for incorrect gap between CKP sensor and crankshaft pulley.
- Check for fuel pump malfunction.
- Check for fuel pressure regulator malfunction.
- Check for restricted or plugged fuel lines.
- Check for fuel injector malfunction.
- Check for restricted fuel filter or fuel inlet sock.
- Check for Camshaft Position (CMP) sensor malfunction.
- Check for damaged camshaft.
- Check for incorrect air/fuel mixture ratio.
- Check for restricted exhaust system.
- Check for EGR system malfunction.
- Check for evaporative emission control system malfunction.
- Check for PCV valve malfunction.

- Check for power steering pressure switch circuit malfunction.
- Check for incorrect A/C refrigerant charging amount.
- Check for malfunctioning A/C relay circuit.
- Check for malfunctioning condenser fan circuit.
- Check for incorrect load signal input.

### **SLOW RETURN TO IDLE**

- Check for cooling fan system malfunction.
- Check for throttle body malfunction.
- Check for Engine Coolant Temperature (ECT) sensor malfunction.
- Check for incorrect load signal input.

### **SULPHUR EXHAUST SMELL**

- Check for poor fuel quality.
- Check for evaporative emission control system malfunction.

## **INTERMITTENTS**

### **INTERMITTENT PROBLEM DIAGNOSIS**

Intermittent fault testing requires duplicating circuit or component failure to identify problem. These procedures may lead to computer setting a fault code (on some systems) which may help in diagnosis.

If problem vehicle does not produce fault codes, monitor voltage or resistance values using a DVOM while attempting to reproduce conditions causing intermittent fault. A status change on DVOM indicates a fault has been located.

Use a DVOM to pinpoint faults. When monitoring voltage, ensure ignition switch is in ON position or engine is running. Ensure ignition switch is in OFF position or negative battery cable is disconnected when monitoring circuit resistance. Status changes on DVOM during test procedures indicate area of fault.

### **TEST PROCEDURES**

#### **Intermittent Simulation**

To reproduce conditions creating an intermittent fault, use the following methods:

- Lightly vibrate component.
- Heat component.

- Wiggle or bend wiring harness.
- Spray component with water.
- Remove/apply vacuum source.

Monitor circuit/component voltage or resistance while simulating intermittent. If engine is running, monitor for self-diagnostic codes. Use test results to identify a faulty component or circuit.