

H - TESTS W/O CODES

1991-92 ENGINE PERFORMANCE General Motors Trouble Shooting - No Codes

INTRODUCTION

Before attempting to diagnose symptoms or intermittent faults, ensure steps in **F - BASIC TESTING** in this section, and the appropriate G - TESTS W/CODES article in this section have been performed. Use this article to diagnose driveability problems that exist when a hard-fault code is not present.

Symptom checks are intended to direct the technician to malfunctioning component(s) so that further diagnosis may be performed. A symptom should lead to further testing of specific components or systems, or verification of adjustment specifications.

Use intermittent test procedures to locate intermittent driveability problems that do not occur when the vehicle is being tested. These problems may cause a noticeable driveability problem or cause the malfunction warning light to illuminate on some vehicles.

It is also possible that certain driveability concerns have been rectified by the manufacturer through substitution of a revised calibration chip or computer control unit. Check with manufacturer for latest information on updated chips and control units.

NOTE: For specific testing procedures, see appropriate I - SYS/COMP TESTS article in this section. To verify specifications, refer to appropriate D - ADJUSTMENTS or C - SPECIFICATIONS article in this section.

SYMPTOMS

Before proceeding with any symptom diagnosis, perform all steps under PRELIMINARY CHECKS.

PRELIMINARY CHECKS

- Verify the on-car diagnostics are working by performing the DIAGNOSTIC CIRCUIT CHECK chart in **F - BASIC TESTING** article in this section.
- Ensure the ECM and SERVICE ENGINE SOON light are functioning properly.
- Ensure there are no trouble codes stored, or only intermittent codes are present.
- Ensure the fuel control system is operating properly by performing FIELD SERVICE MODE CHECK (except 4.9L) in **F - BASIC TESTING** article in this section, or PFI SYSTEM CHECK (4.9L) in the appropriate G - TESTS W/CODES article in this section.

- Perform fuel system pressure test in the [F - BASIC TESTING](#) article in this section.
- Perform a careful visual inspection of all systems. After all checks have been performed, verify customer complaint and locate correct symptom. Check items indicated under that symptom. Not all items listed under each symptom apply to all models and systems. These procedures will normally recommend testing of a system or component on vehicle, such as EGR, EST, TCC, etc. See appropriate I - SYS/COMP TESTS article in this section for test procedures.

NOTE: If ECM displays data but engine fails to start, proceed to **NO START - ENGINE CRANKS OKAY** in [F - BASIC TESTING](#) article in this section.

SYMPTOM DIAGNOSIS

Symptom checks cannot be used properly unless problem occurs while vehicle is being tested. To reduce diagnostic time, ensure steps in [F - BASIC TESTING](#) article and the appropriate G - TESTS W/CODES article in this section were performed before diagnosing a symptom. Symptoms available for diagnosis are as follows.

- Hard Start
- Hesitation, Sag Or Stumble
- Vehicle Surges
- Lack Of Power Or Sluggish
- Engine Backfires
- Cuts Out, Misses
- Rough, Unstable Or Incorrect Idle, Stalling
- Poor Fuel Economy
- Engine Dieseling/Run-On
- Detonation/Spark Knock
- Excessive Exhaust Emission Or Odors

HARD START

Symptom Definition

Engine cranks okay, but does not start for a long time. Engine eventually starts, and may die immediately or run okay.

Possible Cause & Correction

Check the following items:

- Check fuel pump relay by connecting test light between fuel pump test terminal (terminal "G" of ALDL on most vehicles) and ground. Turn ignition on. Light

should illuminate for 2 seconds. If light does not illuminate for 2 seconds, see FUEL PUMP RELAY in appropriate article in this section. For location of fuel pump test connector, see COMPONENT LOCATIONS in appropriate I - SYS/COMP TESTS article in this section. Also, check for blown injector fuse.

- Check for poor quality or water contaminated fuel.
- Ensure TPS is not sticking or binding.
- Check EGR operation.
- Check for a leaking injector. To do this on TBI systems, disconnect injector electrical connector at injector. Crank engine and watch for fuel leakage.
- Ensure resistance of coolant sensor circuit or coolant sensor is not too high. See CODE 15 chart in appropriate G - TESTS W/CODES article in this section, or refer to **K - SENSOR RANGE CHARTS** (for all except Saturn) in this section. Sensor Range Charts for Saturn are not available.
- Check ignition system for a worn distributor shaft, bare or shorted wires, incorrect pick-up coil resistance, loose ignition coil ground or moisture in distributor cap. Check for adequate spark using Spark Tester (ST-125).
- Check for shorts by spraying plug wires with a fine mist of water.
- Remove spark plugs and check for wet plugs, cracks, improper gap, burned electrodes or heavy carbon deposits.
- Check for correct fuel pressure in all speed ranges.
- Check for faulty in-tank fuel pump check valve (PFI only). A faulty in-tank fuel pump check valve will allow fuel in lines to drain back to tank after engine is stopped. To check this condition, turn ignition off, disconnect fuel pressure line at fuel rail and remove filler cap. Connect a radiator test pump and apply 15 psi (1.0 kg/cm²) pressure. If pressure will hold for 60 seconds, check valve is okay.
- Ensure the installed PROM/MEM-CAL application is correct for that particular vehicle. Check with dealer for latest application information.
- Check for restricted exhaust system.
- Check Idle Air Control (IAC) system. Check for foreign material in IAC bore. See DIAGNOSTIC AIDS in CODE 35 chart in the appropriate G - TESTS W/CODES article in this section.
- Check MAP or MAF sensor. Check for flooding.
- Inspect crankshaft sensor clearance and resistance. Check harmonic balancer interrupter rings for bent or missing vanes.

HESITATION, SAG OR STUMBLE

Symptom Definition

Momentary lack of response when accelerator is pushed down. Condition occurs at all vehicle speeds or usually occurs when taking off from a stop.

Possible Cause & Correction

Check the following items:

- Visually check vacuum hoses for splits, kinks and proper connections as shown on Vehicle Emission Control Information label. Check ignition wires for cracking, hardness and proper connections at both distributor cap and spark plugs.
- Check wires for pinches, cuts and proper connections.
- Ensure fuel pressure is correct at all speeds. Also, check for poor quality or water contaminated fuel.
- Check for fouled spark plugs.
- Ensure installed PROM/MEM-CAL is correct for that particular vehicle. Check with dealer for latest application information.
- Check for a binding or sticking TPS.
- Ensure initial ignition timing is properly set.
- Ensure ECM-controlled idle speed is correct.
- Check EGR system for proper operation.
- Disconnect fuel injector electrical connectors. Crank engine and check for injector leaks.
- Check engine cooling system thermostat for proper operation and application.
- Check for an open in HEI ground circuit.
- Check canister purge system for proper operation.
- Check charging system output. Repair charging system if voltage is less than 9 or more than 17 volts.
- On PFI vehicles, perform INJECTOR BALANCE TEST in the appropriate I - SYS/COMP TESTS article in this section.
- Check MAP or MAF sensor output.

VEHICLE SURGES

Symptom Definition

Engine power varies under steady throttle or cruise. Vehicle speeds up and slows down without changing position of accelerator pedal.

Possible Cause & Correction

Check the following items:

- Check operation of thermostatic air cleaner damper door.
- Ensure park/neutral switch is properly adjusted.
- Check for intermittent open or short to ground in Torque Converter Clutch (TCC) or HEI by-pass circuits.
- Check for proper operation of canister purge system.

- Check for proper operation of ESC system.
- Check for proper operation of EGR system.
- Ensure initial ignition timing is properly set.
- Check for adequate spark output using Spark Tester (ST-125).
- Check O2 sensor for lead or RTV sealant contamination. This will cause a false high voltage signal to ECM. ECM will respond by leaning air/fuel ratio.
- Check in-line fuel filter, and replace if dirty or clogged.
- Check fuel for water contamination. Ensure fuel system pressure is correct at all engine speeds.
- Remove spark plugs and check for wet plugs, cracks, improper gap, burned electrodes or heavy carbon deposits. Also, check condition of distributor cap, rotor and spark plug wires.
- Check charging system output. Repair charging system if voltage is less than 9 volts or more than 17 volts.
- Check A/C for excessive charge.
- Check for restricted exhaust system.
- Ensure driver understands operation of TCC, VCC and A/C. See owner's manual.
- Check speedometer calibration.
- Check for rich or lean conditions. Check fuel system pressure when condition exists. Check for plugged injectors. On PFI vehicles, perform INJECTOR BALANCE TEST in appropriate I - SYS/COMP TESTS article in this section.
- Ensure ECM grounds are clean and tight.
- Check for excessive use of additives in fuel.

LACK OF POWER OR SLUGGISH

Symptom Definition

Engine delivers less power than expected. Little or no increase in speed when accelerator is pushed down.

Possible Cause & Correction

Check following items:

- Ensure air filter and fuel filter are not plugged. Replace if necessary. Check for incorrect fuel pressure.
- Check for proper operation of thermostatic air cleaner damper door.
- Ensure initial ignition timing is properly set.
- Check for proper operation of TCC or VCC system.
- Check ESC system for excessive retard.
- Check EST system for proper operation.

- Ensure EGR valve is not open all the time.
- Check exhaust system for restrictions, such as a damaged or collapsed pipe, muffler or catalytic converter.
- Check charging system output. Repair charging system if voltage is less than 9 volts or more than 17 volts.
- Check for A/C clutch cutout at wide open throttle.
- Check MAP sensor output.
- Using Spark Tester (ST-125), check for available secondary voltage.
- Check engine valve timing and compression.
- Check ECM grounds for clean, tight connections.
- Check for a worn camshaft.
- Check for excessive fuel additives.

ENGINE BACKFIRES

Symptom Definition

Fuel ignites in intake manifold or in exhaust system, making a loud popping noise.

Possible Cause & Correction

Check following items:

- Check for proper valve timing.
- Check for engine vacuum leaks and/or engine not tuned to specifications.
- Check for faulty air injection divert valve or check valve.
- Check for electric air switching valve or electric air divert valve not switching air pump discharge to air cleaner/atmosphere during engine starting or deceleration.
- Check EGR valve for leaking base gasket or valve hanging open.
- Check engine for sticking or leaking valves.
- Check for fuel or water in vacuum hose to MAP sensor. Also check for restricted hose.
- Using Spark Tester (ST-125), check available output voltage of ignition coil.
- Check for crossfire between spark plugs, distributor cap and spark plug wires.
- Check for an intermittent ignition system problem.
- Ensure initial ignition timing is properly set.
- Check intake and exhaust manifold passages for casting flash.
- Check harmonic balancer interrupter rings for missing, broken or bent vanes.

CUTS OUT, MISSES

Symptom Definition

Cuts out or misses is a steady pulsation or jerking that follows engine speed and is usually more pronounced as engine load increases. Exhaust may have a steady spitting sound at idle or low speed. Perform a careful visual inspection as described in [F - BASIC TESTING](#) article in this section.

Possible Cause & Correction

Check following items:

- Check ignition wires for short or faulty insulation.
- Check distributor cap (if equipped) for moisture, dust or cracks. Spray spark plug wires with a fine mist of water to check for shorts.
- Using Spark Tester (ST-125), check for available secondary voltage.
- Check ignition system for faulty grounds.
- Ensure EST wiring harness is not routed too close to wiring which may cause induced voltage signals.
- Check ignition coil connections.
- Remove spark plugs and check for correct heat range, wear, cracks, wetness, improper gap or heavy deposits.
- Check for poor quality or water contaminated fuel.
- Check for improper fuel pressure. Check for restricted fuel filter.
- Check PFI vehicles for plugged injectors. See INJECTOR BALANCE TEST in appropriate I - SYS/COMP TESTS article in this section.
- Check ECM for proper ground circuits. Check for internal ECM intermittents.
- Check for bent push rods, broken valve springs or worn camshaft lobes.
- Check for EGR valve sticking open.
- Check TPS for sticking and binding. TPS voltage should be less than 1.25 volts at idle.
- Check for proper crank angle sensor (DIS and IDI) or pick-up coil (HEI distributor) resistance.
- Check for restricted exhaust system.
- Check injector drivers by disconnecting all injector harness connectors and connecting a 6-volt test light to each injector's harness terminal. Light should blink while cranking.
- Check engine compression. Check for incorrect valve timing.
- Check intake and exhaust manifold passages for casting flash.

Misfire Isolation

1. Start engine. Disconnect IAC motor. Using insulated pliers, remove one spark plug wire from a spark plug and ground it against the engine.

2. Note engine RPM as wire is grounded. Reconnect spark plug wire. Repeat procedure for all cylinders. Stop engine and reconnect IAC motor.
3. If engine speed dropped equally (within 50 RPM) on all cylinders, refer to ROUGH, UNSTABLE OR INCORRECT IDLE, STALLING symptom. If there is no engine RPM drop or if there is excessive variation on one or more cylinder, check spark on the respective cylinder(s).

ROUGH, UNSTABLE OR INCORRECT IDLE, STALLING

Symptom Definition

Engine runs unevenly at idle. If bad enough, vehicle will shake. Idle may vary in RPM. Either problem may cause stalling. Engine idles at incorrect RPM.

Possible Cause & Correction

Check following items:

- Ensure throttle linkage and/or TPS is not sticking or binding. Ensure throttle bore is free of foreign material.
- Ensure initial ignition timing is properly set.
- Check for vacuum leaks.
- Check engine idle speed (both base idle and ECM idle).
- Check Idle Air Control (IAC) system. Check for foreign material in IAC bore. See DIAGNOSTIC AIDS in CODE 35 chart in the appropriate G - TESTS W/CODES article in this section.
- Check for proper operation of EGR system.
- Check P/N switch circuit. Ensure P/N switch is properly adjusted.
- Check power steering pressure switch operation.
- Check charging system output. Repair charging system if voltage is less than 9 volts or more than 17 volts.
- If rough idle only occurs when engine is hot, check PCV valve for proper operation.
- On PFI vehicles, check for fuel in pressure regulator vacuum line. If fuel is present, replace regulator.
- Check evaporative emission control system.
- Check for proper spark plug gap, and check engine compression.
- Check ECM grounds for clean and tight connections.
- Check A/C signal to ECM. If problem exists only when A/C is on, check A/C system operation and pressures.
- Check for broken motor mounts.
- Ensure installed PROM/MEM-CAL is correct for that particular vehicle. Check with dealer for latest application information.

- Check MAP or MAF sensor for proper operation.
- Check O2 sensor operation. Check for silicone contamination or incorrect RTV sealant.
- Check for excessive fuel additives.
- Check for shorted or low injectors. Check fuel pressure.
- Check for leaking injectors. On PFI vehicles, perform INJECTOR BALANCE TEST in appropriate I - SYS/COMP TESTS article in this section.
- Check PCV valve operation. Check for manifold vacuum at inlet end of crankcase vent tube assembly with engine idling.
- Check ignition system. Check for moisture, dust, cracks, burns, etc. Check for shorts by spraying spark plug wires with a fine water mist. Check ignition wires for shorts and faulty insulation.
- Check to see if condition is caused by engine running either rich or lean.
- Check air injection system.
- Check for worn camshaft or weak valve springs.
- Check CTS for proper temperature-to-resistance values.
- Check exhaust system for restrictions, such as a damaged or collapsed pipe, muffler or catalytic converter.

POOR FUEL ECONOMY

Symptom Definition

Fuel economy, as measured by an actual road test, is noticeably lower than expected. Fuel economy is noticeably lower than was on this vehicle at one time.

Possible Cause & Correction

Check the following items:

- Check for proper operation of thermostatic air cleaner damper door. Also check for a clogged air filter.
- Check coolant level. Check cooling system thermostat for proper heat range and operation.
- Check coolant sensor for shift in calibration. Refer to the **K - SENSOR RANGE CHARTS** (for all except Saturn) in this section. Sensor Range charts for Saturn are not available.
- Check A/C for "full time" operation.
- Ensure initial ignition timing is properly set, and check for proper operation of EST and ESC.
- Check for proper operation of TCC or VCC.

- On vehicles with TWC/OC, check for the following conditions: air pump output not shifting to catalytic converter upon signal from ECM, and/or faulty electrical and/or vacuum circuits.
- Check exhaust system for restrictions, such as a damaged or collapsed pipe, muffler or catalytic converter.
- Check oxygen sensor for silicone or lead contamination.
- Remove spark plugs and check for wet plugs, cracks, improper gap, burned electrodes or heavy carbon deposits.
- Ensure speedometer is properly calibrated.
- Check engine compression.
- Check for dragging brakes.
- Check for correct tire pressure. Check with operator to see if vehicle is operated under excessive acceleration or is heavily loaded.

ENGINE DIESELING/RUN-ON

Symptom Definition

Engine continues to run after ignition is turned off but runs very rough. If engine runs smoothly, check ignition switch.

Possible Cause & Correction

Check the following items:

- Check for binding throttle linkage.
- Check for leaking injectors. On PFI vehicles, perform INJECTOR BALANCE TEST in appropriate I - SYS/COMP TESTS article in this section.
- Check IAC system. See DIAGNOSTIC AIDS in CODE 35 chart in the appropriate G - TESTS W/CODES article in this section.
- Check engine for overheating.
- Check for excessive use of fuel additives.

DETONATION/SPARK KNOCK

Symptom Definition

A mild to severe ping, usually worse under acceleration. The engine makes sharp metallic knocks that change with amount of acceleration.

Possible Cause & Correction

Check the following items:

- Check for obvious overheating problems.

- Ensure initial timing is correct.
- Check TPS adjustment and operation.
- Check fuel system for low pressure or volume. Also check for induction air leaks.
- Ensure ESC system is operating properly.
- Ensure EGR valve is operating properly.
- Ensure TCC or VCC system is operating properly.
- Remove carbon from engine with top engine cleaner.
- If excessive carbon exists in combustion chamber, check for excessive oil burning due to leaking valve guide seals.
- Check for incorrect basic engine parts such as camshaft, cylinder heads and pistons.
- Ensure PROM/MEM-CAL in vehicle is correct for particular vehicle. Check with dealer for latest application information.
- Check coolant sensor for shift in calibration. Refer to the **K - SENSOR RANGE CHARTS** article (for all except Saturn) in this section. Sensor Range charts for Saturn are not available.
- Check for rich or lean running conditions.
- Check spark plugs for proper application and heat range.
- Check engine compression.
- Check P/N switch circuit. Ensure P/N switch is properly adjusted.
- Check for contaminated or poor quality fuel. Check vehicle operation using a higher octane fuel.

EXCESSIVE EXHAUST EMISSIONS OR ODORS

Symptom Definition

Vehicle fails emission test. Vehicle may also have excessive "rotten egg" smell (hydrogen sulfide) being emitted from tail pipe. Excessive odors DO NOT necessarily indicate exhaust emissions are high.

Possible Cause & Correction

Check the following items:

- Check for lead contamination of catalytic converter. Look for removal/tampering at restrictor in fuel filler neck.
- Check coolant level. Check cooling system thermostat for proper operation and application.
- Check cooling fan for proper operation.
- Ensure air is not diverted to exhaust manifold but is diverted to catalytic converter (TWC/OC) or atmosphere during normal (warm) engine operation.

- If emission test shows excessive carbon monoxide (CO) and hydrocarbons (HC) emissions, and vehicle is also emitting excessive odor, check all systems and components that could cause engine to run rich. See DIAGNOSTIC AIDS in CODE 45 chart in the appropriate G - TESTS W/CODES article in this section. Also, check EGR system.
- Ensure PROM/MEM-CAL in vehicle is correct for that particular vehicle. Check with dealer for latest application information.
- If emission test shows excessive oxides of nitrogen (NOx) emissions, check all systems and components that could cause engine to run lean or to run too hot. See DIAGNOSTIC AIDS in CODE 44 chart in the appropriate G - TESTS W/CODES article in this section.
- Ensure fuel filler cap is properly installed.
- Check for plugged or stuck PCV valve. Check for fuel in crankcase.
- Check for vacuum leaks.
- Check for excessive carbon build-up. Remove with top engine cleaner.
- Check for use of excessive fuel additives.

INTERMITTENTS

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. Refer to [COMPUTER RELEARN PROCEDURES](#) article in the GENERAL INFORMATION section before disconnecting battery.

INTERMITTENT PROBLEM DIAGNOSIS

Intermittent fault testing requires duplicating circuit or component failure to identify fault. These procedures may lead to computer setting a fault code 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 the intermittent fault. A status change on DVOM indicates a fault has been located.

Use DVOM to pinpoint faults. When monitoring voltage, ensure ignition is in ON position or vehicle is running. When monitoring resistance, ensure ignition switch is in the OFF position or negative battery cable is disconnected. A status change on DVOM while performing TEST PROCEDURES indicates area of fault.

TEST PROCEDURES

Intermittent Simulation

To reproduce the conditions causing intermittent fault, use the following methods:

- Lightly vibrate component.
- Heat component.
- Wiggle or bend wiring harness.
- Spray component with water.
- Remove or apply vacuum source.

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

INTERMITTENT TROUBLE SHOOTING

Intermittent Symptom Definition

SERVICE ENGINE SOON light comes on but does not stay on. A stored code may or may not exist.

Possible Cause & Correction

To track down possible causes of an intermittent SERVICE ENGINE SOON light, check the following items:

- Check for poor mating of one connector to another. Terminals may not be fully seated. Check for improperly formed or damaged terminals. Check wire to terminal connections.
- Check for poor connection from ignition coil to ground or arcing at spark plug wires or plugs.
- Check wire from SERVICE ENGINE SOON light to ECM for short to ground.
- Check wire from test terminal "B" of ALDL for intermittent short to ground.
- Check for poor connections in ECM ground terminals.
- Check for loss of trouble code memory. To check code memory on fuel injected models, disconnect TPS and run engine at idle until SERVICE ENGINE SOON light comes on. Code 22 (or appropriate TPS code) should be stored and retained in memory when ignition is turned off. If code is not stored, ECM is faulty.
- Check for electrical system interference caused by a defective relay, or an ECM-driven solenoid or switch which may cause sharp electrical surge. This type of problem will normally occur when faulty component is operated.
- Check for aftermarket parts which may not have been produced to manufacturer's specifications. Solenoids without original-equipment diodes for circuit protection, and HEI-EST module or voltage regulator using transistors instead of silicon-chip circuitry may possibly cause voltage surges (up to 300 volts) in ECM wiring, causing temporary ECM shutdown. ECM shutdown is a normal response to system overvoltage (greater than 16-17 volts on most models). ECM will repower

when condition no longer exists. This could cause a flickering SERVICE ENGINE SOON light and stumble, with no codes set in memory.

- Check for any open diodes in A/C or engine wiring.
- Check for improper installation of electrical accessories such as auxiliary lights or 2-way radios.
- Ensure EST wires are kept away from spark plug wires, distributor wires, distributor housing, ignition coil and generator. Ensure ground wire from ECM to distributor or ignition module is connected to a good ground.