Tune-Up

TUNE-UP TROUBLE SHOOTING

CONDITION & POSSIBLE CAUSE

SPARK PLUG DIAGNOSIS

Normal Spark Plug Condition
- Light Tan or Gray deposits on insulator.
- Electrode not burned or fouled.
- Gap tolerance not changed.

Cold Fouling or Carbon Deposits
- Over-rich air/fuel mixture, possibly from faulty choke, clogged air cleaner, incorrect idle adjustment or dirty carburetor.
- Faulty ignition wiring.
- Prolonged operation at idle.
- Sticking valves or worn valve guide seals.

Wet Fouling or Oil Deposits
- Worn rings and pistons.
- Excessive cylinder wear.
- Worn or loose bearings.

Gap Bridged
- Deposits in combustion chamber becoming fused to electrode under high heat.

Blistered Electrode or Overheating
- Engine overheating.
- Wrong type of fuel.
- Loose spark plugs.
- Over-advanced ignition timing.

Pre-Ignition or Melted Electrodes
- Incorrect type of fuel.
- Incorrect ignition timing.
- Burned valves.
- Engine overheating.
- Wrong type of spark plug, too hot.

Chipped Insulators
- Severe detonation.
- Improper gapping procedure.

Rust Colored Deposits
- Additives in unleaded fuel may create this condition. It may be diagnosed as water in the combustion chamber. These deposits do not affect plug performance.

ELECTRONIC IGNITION DIAGNOSIS

Before diagnosing an electronic ignition system, ensure that all wiring is properly connected between distributor, wiring connector and spark plugs. Ignition problems will show up either as: Engine Will Not Start or Engine Runs Rough.

Engine Will Not Start
- Open circuit between distributor and bulkhead connector.
- Open circuit between bulkhead connector and ignition switch.
- Open circuit between ignition switch and starter solenoid.

Engine Runs Rough
- Fuel lines leaking or clogged.
- Ignition timing incorrect.
- Centrifugal advance malfunction.
- Worn or defective spark plugs, or wiring.

CONDITION & POSSIBLE CAUSE

Component Failure
- Spark arc-over on rotor, coil or cap.
- Defective pick-up coil.
- Defective ignition coil.
- Defective vacuum unit.
- Defective control module.

ELECTRONIC IGNITION DIAGNOSIS BY OSCILLOSCOPE PATTERN

Firing Voltage Lines are the Same, But Abnormally High
- Retarded ignition timing.
- Fuel mixture too lean.
- High resistance in coil wire.
- Corrosion in coil tower terminal.
- Corrosion in distributor coil terminal.

Firing Voltage Lines are the Same, But Abnormally Low
- Fuel mixture too rich.
- Breaks in coil wire causing arcing.
- Cracked coil tower causing arcing.
- Low coil output.
- Low engine compression.

One or More, But Not All Firing Voltage Lines Are Higher Than the Others
- Carburetor idle mixture not balanced.
- EGR valve stuck open.
- High resistance in spark plug wire.
- Cracked or broken spark plug insulator.
- Intake vacuum leak.
- Defective spark plugs.
- Corroded spark plug terminals.

One or More, But Not All Firing Voltage Lines Are Lower Than the Others
- Curb idle mixture not balanced.
- Breaks in plug wires causing arcing.
- Cracked coil tower causing arcing.
- Low compression.
- Defective spark plugs, or fouled plugs.

One or More Cylinders Not Firing
- Cracked distributor cap terminals.
- Shorted spark plug wire.
- Mechanical problem in engine.
- Defective spark plugs.
- Spark plugs fouled.

GENERAL DIAGNOSIS

Hard Starting
- Binding carburetor linkage, choke linkage or choke piston.
- Restricted choke vacuum.
- Worn or dirty needle valve and seat.
- Float sticking.
- Incorrect choke adjustment.
- Defective coil.
- Improper spark plug gap.
- Incorrect ignition timing.

Tune-Up

TUNE-UP TROUBLE SHOOTING (Cont.)

CONDITION & POSSIBLE CAUSE	CONDITION & POSSIBLE CAUSE
GENERAL DIAGNOSIS (Cont.) **Detonation** • Over-advanced ignition timing. • Defective spark plugs. • Fuel lines clogged. • EGR system malfunction. • PCV system malfunction. • Vacuum leaks. • Loose fan belts. • Restricted air flow. • Vacuum advance malfunction. **Dieseling** • Binding carburetor linkage, throttle linkage, choke linkage or fast idle cam. • Defective idle solenoid. • Improper base idle speed. • Incorrect ignition timing. • Incorrect idle mixture setting. **Faulty Acceleration** • Incorrect ignition timing. • Engine cold and choke too lean. • Defective spark plugs. • Defective coil. **Faulty Low Speed Operation** • Clogged idle transfer slots. • Restricted idle air bleeds and passages. • Clogged air cleaner. • Defective spark plugs. • Defective ignition cables. • Defective distributor cap. **Faulty High Speed Operation** • Incorrect ignition timing. • Defective distributor centrifugal advance. • Defective distributor vacuum advance. • Incorrect spark plugs or plug gap. • Faulty choke operation. • Clogged vacuum passages. • Improper size or clogged main jet. • Restricted air cleaner. • Defective distributor cap, rotor or coil. • Worn distributor shaft. **Misfire At All Speeds** • Defective spark plugs. • Defective spark plug wires. • Defective distributor cap, rotor or coil. • Cracked or broken vacuum hoses. • Vacuum leaks. • Fuel lines clogged. **Hesitation** • Cracked or broken vacuum hoses. • Vacuum leaks. • Binding carburetor linkage, throttle linkage, choke linkage or fast idle cam. • Improper float setting. • Cracked or broken ignition wires. **Rough Idle, Missing or Stalling** • Incorrect curb idle or fast idle speed. • Incorrect basic timing.	**Rough Idle, Missing or Stalling (Cont.)** • Improper idle mixture adjustment. • Improper feedback system operation. • Incorrect spark plug gap. • Moisture in ignition components. • Loose or broken ignition wires. • Damaged distributor cap or rotor. • Faulty ignition coil. • Fuel filter clogged or worn. • Damaged idle mixture screw. • Improper fast idle cam adjustment. • Improper EGR valve operation. • Faulty PCV valve air flow. • Choke binding, or improper setting. • Vacuum leak. • Improper float bowl fuel level. • Clogged air bleed or idle passages. • Clogged or worn air cleaner. • Faulty choke vacuum diaphragm. • Exhaust manifold heat valve inoperative. • Improper distributor spark advance. • Leaking valves or valve components. • Improper carburetor mounting. • Excessive play in distributor shaft. • Loose or corroded wiring connections. **Engine Surges** • Improper PCV valve air flow. • Vacuum leaks. • Clogged main jets. • Clogged air bleeds. • EGR valve malfunction. • Restricted air cleaner. • Cracked or broken vacuum hoses. • Cracked or broken ignition wires. • Vacuum advance malfunction. • Defective or fouled spark plugs. **Ping or Spark Knock** • Incorrect ignition timing. • Distributor centrifugal or vacuum advance malfunction. • Carburetor setting too lean. • Vacuum leak. • EGR valve malfunction. **Poor Gasoline Mileage** • Cracked or broken vacuum hoses. • Vacuum leaks. • Defective ignition wires. • Incorrect choke setting. • Defective vacuum advance. • Defective spark plugs. • Binding carburetor power piston. • Dirt in carburetor jets. • Incorrect float adjustment. • Defective power valves. **Engine Stalls** • Incorrect idle speed. • Improper float level. • Leaking needle valve and seat. • Vacuum Leaks.