Engine Trouble Shooting

GASOLINE ENGINE TROUBLE SHOOTING

The following Trouble Shooting guide covers all mechanical problems which relate to all engines in general. For specific Trouble Shooting problems relating to Diesel engines, see Diesel Engine Trouble Shooting in this section.

CONDITION & POSSIBLE CAUSE	CONDITION & POSSIBLE CAUSE
Engine Lopes While Idling • Intake manifold-to-head leaks. • Blown head gasket. • Worn timing gears, chain or sprocket. • Worn camshaft lobes. • Overheated engine. • Blocked crankcase vent valve. • Leaking EGR valve. • Faulty fuel pump.	**Intake Backfire** • Improper ignition timing. • Faulty accelerator pump discharge. • Improper choke operation. • Defective EGR valve. • Too lean fuel mixture. • Initial choke valve clearance too large.
Engine Has Low Power • Leaking fuel pump. • Sticking valves, weak valve springs, incorrect valve timing or worn camshaft lobes. • Excessive piston-to-bore clearance. • Blown head gasket. • Improper power steering glow control valve operation. • Clutch slipping on manual transmission. • Engine overheating. • Improper pressure regulator valve operation on automatic transmission. • Improper automatic transmission fluid level. • Improper operation of diverter valve. • Vacuum leaks. • Leaking piston rings.	**Exhaust Backfire** • Vacuum leak. • Faulty diverter valve. • Faulty choke operation. • Exhaust system leak. **Engine Detonation** • Overadvanced timing or faulty ignition system. • Spark plugs loose or cracked. • Fuel lines, fuel filter or fuel pump clogged or faulty. • EGR valve inoperative. • PCV system inoperative. • Vacuum leaks. • Excessive combustion chamber deposits. • Leaking, sticking or broken valves.
Faulty High Speed Operation • Low fuel pump volume. • Leaking engine valves, or faulty valve springs. • Incorrect valve timing. • Intake manifold restricted. • Worn distributor shaft. **Faulty Acceleration** • Improper fuel pump stroke. • Incorrect basic ignition timing. • Inoperative pump discharge check ball or needle. • Faulty elastomer valve. • Worn or damaged pump diaphragm or piston. • Leaking engine valves.	**External Oil Leakage** • Improperly seated fuel pump, or worn gasket. • Improperly seated or broken push rod cover gasket. • Improperly seated or broken oil filter gasket. • Improperly seated or broken oil pan gasket, or bent oil pan gasket surface. • Improperly seated or broken timing chain cover gasket. • Improperly seated or worn rear main bearing oil seal. • Loose oil line plugs. • Improperly seated oil pan drain plug. • Obstructed camshaft rear bearing drain hole. • Oil pressure sending switch leaking.

GASOLINE ENGINE TROUBLE SHOOTING (Cont.)

CONDITION & POSSIBLE CAUSE	CONDITION & POSSIBLE CAUSE
Excessive Oil Consumption • Intake or exhaust valve "O" ring seal damaged or has excessive looseness. • Worn valve stems or guides. • Plugged oil drain back holes. • Improper PCV valve operation. • Engine oil level too high. • Engine oil too thin. • Valve stem oil deflectors missing or damaged. • Piston rings improperly installed or incorrect size. • Piston rings out-of-round, broken or scored. • Piston ring gaps not staggered. • Piston ring tension insufficient due to engine overheating. • Piston ring grooves or oil return slots clogged. • Piston rings sticking in ring grooves. • Ring grooves worn excessively. • Compression rings installed upside down. • Excessively worn or scored cylinder walls. • Mismatch of oil ring expander and rail. • Intake gasket dowels too long. • Excessive main or connecting rod bearing clearance. **No Oil Pressure** • Low oil level. • Oil pressure gauge or sending unit broken. • Oil pump malfunction. • Oil pressure relief valve sticking. • Oil passages on pressure side of pump blocked. • Oil pickup screen or tube blocked. • Loose oil inlet tube. • Excessive clearance at main or connecting rod bearing. • Loose camshaft bearings. • Internal leakage at oil passages. **Low Oil Pressure** • Low engine oil level, or engine oil too thin. • Oil pressure relief spring weak or stuck. • Oil pickup tube and screen blocked, or has air leak. • Excessive oil pump clearance. • Excessive main, rod or camshaft bearing clearance.	**High Oil Pressure** • Improper grade of oil. • Oil pressure gauge or sending unit inaccurate. • Oil pressure relief valve sticking closed. **Noisy Main Bearings** • Inadequate oil supply. • Excessive main bearing clearance. • Excessive crankshaft end play. • Loose flywheel or torque converter. • Loose or damaged vibration damper. • Eccentric or out-of-round crankshaft journals. • Excessive belt tension. **Noisy Connecting Rods** • Inadequate oil supply. • Excessive bearing clearance or missing bearing. • Crankshaft connecting rod journal out-of-round. • Misaligned connecting rod or cap. • Improperly tightened connecting rod bolts. **Noisy Pistons and Rings** • Excessive piston-to-cylinder wall clearance. • Cylinder walls excessively tapered or out-of-round. • Piston ring broken. • Piston pin loose or seized. • Connecting rods misaligned. • Piston ring side clearance excessively loose or tight. • Excessive carbon build-up on piston. **Noisy Valve Train Components** • Insufficient oil supply. • Worn or bent push rods. • Worn rocker arms, or bridged pivots. • Dirt or chips in hydraulic valve lifters. • Excessive valve lifter leak down. • Valve lifter face worn. • Broken or cocked valve springs. • Excessive valve stem-to-guide clearance. • Valve bent. • Loose rocker arms. • Excessive valve seat runout. • Missing valve lock. • Push rod rubbing or contacting cylinder head.

GASOLINE ENGINE TROUBLE SHOOTING (Cont.)

CONDITION & POSSIBLE CAUSE	CONDITION & POSSIBLE CAUSE
Noisy Valve Train Components (Cont.) • Excessively worn camshaft lobes. • Plugged valve lifter oil feed holes. • Faulty valve lifter check ball. • Rocker arm retaining nut installed upside down. • Valve lifters incorrectly fitted to bore size. • Faulty valve lifter plunger, or push rod seat. • Improper valve lash. **Burned, Sticking or Broken Valves** • Weak valve springs. • Improper valve lifter clearance. • Improper valve guide clearance, or worn guides. • Out-of-round valve seats, or improper valve seat width. • Deposits or gum formation on valve stems, seats or guides. • Warped valves or faulty valve forgings.	**Burned, Sticking or Broken Valves (Cont.)** • Exhaust back pressure. • Improper spark timing. **Broken Pistons and/or Rings** • Undersize pistons. • Wrong type or size of rings. • Tapered or eccentric cylinder bore. • Improper connecting rod alignment. • Excessively worn ring grooves. • Improperly assembled piston pins. • Insufficient ring gap clearance. • Engine overheating. • Incorrect ignition timing. **Excessive Exhaust Noise** • Leaks at exhaust pipe joints. • Burned or blown out muffler or exhaust pipe. • Exhaust pipe leaking at manifold flange. • Exhaust manifold cracked or broken. • Leak between manifold and cylinder head. • Obstruction in muffler or tail pipe.

DIESEL ENGINE TROUBLE SHOOTING

Diesel engine mechanical diagnosis is the same as that for gasoline engines for such items as noisy lifters, rod bearings, main bearings, valves, rings and pistons. The following trouble shooting guide cover those items which apply only to diesel engines.

CONDITION & POSSIBLE CAUSE	CONDITION & POSSIBLE CAUSE
Engine Does Not Crank • Loose or corroded battery cables, or dead batteries. • Loose starter connections or faulty starter. **Engine Cranks Slowly but Does Not Start** • Loose or corroded battery cables, or batteries do not have a sufficient charge. • Wrong weight engine oil in engine.	**Engine Cranks Normally but Does Not Start** • Glow plugs not functioning. • Glow plug control system not functioning. • Fuel not being injected into cylinders. • No fuel going to injection pump. • Fuel filter blocked. • Fuel tank filter blocked. • Fuel pump not operating. • Fuel return system blocked. • No voltage to fuel solenoid. • Incorrect or contaminated fuel.

DIESEL ENGINE TROUBLE SHOOTING (Cont.)

CONDITION & POSSIBLE CAUSE	CONDITION & POSSIBLE CAUSE
Engine Cranks Normally but Does Not Start (Cont.) • Incorrect injection pump timing. • Low compression. • Injection pump malfunction. **Engine Starts but Will Not Run at Idle** • Incorrect slow idle adjustment. • Fast idle solenoid not functioning. • Fuel return system blocked. • Glow plugs turning off too soon. • Injection pump timing incorrect. • Insufficient fuel going to injection pump. • Incorrect or contaminated fuel. • Low compression. • Injection pump malfunction. • Fuel solenoid closes in "RUN" position. **Engine Starts and Idles Rough Without Abnormal Smoke or Noise** • Incorrect slow idle adjustment. • Injection line fuel leaks. • Fuel return system blocked. • Air in fuel system. • Incorrect or contaminated fuel. • Injector nozzle malfunction. **Engine Starts and Idles Rough Without Abnormal Smoke or Noise, but Clears After Warm-Up** • Injection pump timing incorrect. • Engine has not fully broken in. • Air in fuel system. • Injector nozzle malfunction. **Engine Misfires Above Idle but Idles Correctly** • Blocked fuel filter. • Injection pump timing incorrect. • Incorrect or contaminated fuel. **Engine Will Not Return to Idle** • External linkage binding or adjusted wrong. • Fast idle adjustment incorrect. • Internal injection pump malfunction. **Fuel Leaking on Ground** • Loose or broken fuel line or connection. • Internal injection pump seal leak.	**Knocking Noise from Cylinders** • Injector nozzles sticking open. • Very low nozzle opening pressure. **Noticeable Loss of Engine Power** • Restricted air intake. • EGR valve malfunction. • Restricted or damaged exhaust system. • Blocked fuel tank filter • Blocked fuel filter, or fuel tank vacuum vent in gas cap. • Restricted fuel supply from tank to injection pump. • Restricted fuel return system. • Incorrect or contaminated fuel. • External compression leaks. • Blocked injector nozzles. • Low compression. **Excessive Black Smoke and Loud Engine Noise** • Basic timing incorrect. • EGR valve malfunction. • Injector pump housing pressure not to specifications. • Internal injection pump malfunction. **Engine Overheating** • Cooling system leaks. • Belt slipping or damaged. • Thermostat stuck closed. • Head gasket leaking **Oil Light On at Idle** • Oil cooler, or oil cooler line restricted. • Low oil pump pressure. **Engine Will Not Shut Off** • Injector pump fuel solenoid doesn't return fuel valve to "OFF" position. **VACUUM PUMP DIAGNOSIS** **Excessive Noise** • Loose screws between pump and drive assembly. • Loose tube on pump assembly. • Valves not functioning properly. **Oil Leakage** • Loose end plug. • Bad crimp.