

# ENGINE SUPPORT TROUBLESHOOTING THE ENGINE

ENGINE PROBLEM	POSSIBLE CAUSES	POSSIBLE SOLUTIONS
Engine will not start but producing exhaust smoke	Starting procedure is not correct	Verify the correct starting procedure
	Engine cranking speed is too low	Check the engine cranking speed with a handheld tachometer; if the cranking speed is less than 150 rpm, refer to engine manual
	Starting aid is necessary for cold weather	Check for correct operation of cold starting aid
	Air in the fuel system	Bleed the fuel system and check for leaks
	Fuel supply is not adequate	Check the flow through the filter to locate the source of the restriction
	Fuel drain backup	Verify the fuel return line is plumbed to the bottom of the tank
	Fuel pump overflow valve is malfunctioning	Check the overflow valve; replace if necessary
	Fuel transfer pump malfunctioning	Inspect the fuel transfer pump; replace if necessary
	Intake air restriction is high	Check the air intake system for restriction
	Fuel contaminated	Verify by operating the engine with clean fuel from a temporary tank
	Throttle linkage adjustment is not correct	Check the fuel pump throttle linkage adjustment
	Valves or injectors adjusted wrong	Adjust valves and injectors
	Injector is malfunctioning	Inspect the injectors. Replace if necessary
	Engine will not start and is not producing exhaust smoke	Starting procedure is not correct
Fuel level is low in tank		Fill the fuel tank
Electric or manual fuel shutdown binds		Check for loose wires and verify that the solenoid is functioning; check that the manual shut off level is not binding at the injector pump
Air in the fuel system		Bleed the fuel system and check for leaks
Engine will not start and is not producing exhaust smoke continued	Fuel transfer pump malfunctioning	Inspect the fuel transfer pump; replace if necessary
	Fuel drain backup	Verify the fuel return line is plumbed to the bottom of the tank
	Fuel pump overflow valve is malfunctioning	Check the overflow valve; replace if necessary
	Throttle linkage adjustment is not correct	Check the fuel pump throttle linkage adjustment
	Fuel injector pump is malfunctioning	Perform the fuel injector pump test
	Fuel injector pump timing is not correct	Adjust injector timing

ENGINE PROBLEM	POSSIBLE CAUSES	POSSIBLE SOLUTIONS
Engine will not start and is not producing exhaust smoke continued (cont)	Blown low oil pressure and/or high coolant temperature safety cut-out switches	Check fuse and/or replace gauges if necessary
Coolant temperature is above normal	Coolant level is low	Inspect the engine and cooling system for external coolant leaks; repair if necessary and replace lost coolant
	Radiator fins are damaged or obstructed with debris	Inspect the radiator fins' clean and repair the fins as necessary
	Cooling system hose is collapsed, restricted or leaking	Inspect the radiator hoses
	Lubricating oil level is low	Check the lubricating oil level.; verify the dipstick calibration and the oil pan capacity.; fill the system to the specified level
	Fan shroud is damaged or missing or the air recirculation base are damaged or missing	Inspect the shroud and the recirculation base; repair, replace or install if necessary
	Fan drive belt is loose, tight or not in alignment	Check the fan drive belt
	Fan drive is malfunctioning	Check the fan drive belt
	Fan drive is malfunctioning	Check the fan drive
	Radiator cap is not correct, is malfunctioning, or has low pressure rating	Check the radiator pressure cap
	Temperature gauge is malfunctioning	Check and/or replace the temperature gauge
	Thermostat is not correct or is malfunctioning	Check the thermostat for the correct part number and for the correct operation
	Fuel pump is malfunctioning	Test the fuel pump on a fuel pump test stand; replace the fuel pump if necessary
	Water pump is malfunctioning	Check the engine's water pump for correct operation; replace the water pump if necessary
	Air in the cooling system	Inspect and bleed the cooling system
	Cooling system is contaminated with dirt, scale or sludge	Clean the cooling system
Low lubricating oil pressure	Lubricating oil level is low	Check and replenish lubricating oil
	Lubricating oil pressure sensor or gauge is malfunctioning	Check the oil pressure switch or gauge for correct operation
	Lubricating oil is diluted with fuel	Change the oil; if the oil becomes diluted again, contact an authorized repair facility
	Lubricating oil is diluted with water	Check for a missing dipstick, rain cap and/or oil fill cap
	Lubricating oil does not meet specification for operating conditions	Change the oil and filters
	Lubricating oil leak	Inspect the engine for external oil leaks; tighten the cap screws, pipe plugs and fittings; replace gaskets if necessary
	Lubricating oil viscosity not correct	Make sure the correct lubricating oil is being used
	Lubricating oil high pressure relief valve is malfunctioning	Remove and inspect the high-pressure relief valve
Engine runs rough or misfires	Lubricating oil filter is plugged	Change the oil and filter.
	Fuel contaminated	Verify operation of engine with clean fuel in a temporary tank
	Air in the fuel	Bleed the fuel system and check for leaks
	Fuel leak	Check the fuel lines, fuel connections and fuel filters for leaks

ENGINE PROBLEM	POSSIBLE CAUSES	POSSIBLE SOLUTIONS
Engine runs rough or misfires (cont.)	Fuel pump overflow valve is malfunctioning	Check the overflow valve; replace if necessary
	Fuel lift pump is malfunctioning	Check the fuel lift pump for correct operation; check the pump output pressure; replace the fuel lift pump if necessary
	Valve lash excessive	Adjust valves; make sure the push rods are not bent and/or rocker levers are not severely worn
	Fuel injector pump timing not correct	Inspect the injectors; replace the injectors as necessary
	Fuel injector pump malfunctioning	Put the engine at top dead center; check and adjust the fuel timing



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