

TROUBLE SHOOTING - BASIC PROCEDURES

Article Text (p. 2)

1993 Volkswagen EuroVan

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Saturday, March 18, 2000 10:38PM

BRAKE SYSTEM TROUBLE SHOOTING

WARNING: This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

BRAKE SYSTEM TROUBLE SHOOTING CHART

AA

CONDITION POSSIBLE CAUSE CORRECTION

AA

Brakes Pull Left or Right	Incorrect tire pressure	Inflate tires to proper pressure
	Front end out of alignment	See WHEEL ALIGNMENT
	Mismatched tires	Check tires sizes
	Restricted brake lines or hoses	Check hose routing
	Loose or malfunctioning caliper	See DISC BRAKES or BRAKE SYSTEM
	Bent shoe or oily linings	See DRUM BRAKES or BRAKE SYSTEM
	Malfunctioning rear brakes	See DRUM, DISC BRAKES or BRAKE SYSTEM
	Loose suspension parts	See SUSPENSION

AA

Noises Without Brakes Applied	Front linings worn out	Replace linings
	Dust or oil on drums or rotors	See DRUM, DISC BRAKES or BRAKE SYSTEM

AA

Noises With Brakes Applied	Insulator on outboard shoe damaged	See DISC BRAKES or BRAKE SYSTEM
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Brake Rough, Chatters or Pulsates	Incorrect pads or linings	Replace pads or linings
	Excessive lateral runout	Check rotor runout

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Parallelism not to specifications	Reface or replace rotor
Wheel bearings not adjusted	See SUSPENSION
Rear drums out-of-round	Reface or replace drums
Disc pad reversed, steel against rotor	Remove and reinstall pad

AA

Excessive Pedal Effort

Malfunctioning power unit	See POWER BRAKES or BRAKE SYSTEM
Partial system failure	Check fluid and pipes
Worn disc pad or lining	Replace pad or lining
Caliper piston stuck or sluggish	See DISC BRAKES or BRAKE SYSTEM
Master cylinder piston stuck	See MASTER CYLINDERS or BRAKE SYSTEM
Brake fade due to incorrect pads for linings	Replace pads or linings
Linings or pads glazed	Replace pads or linings
Worn drums	Reface or replace drums

AA

Excessive Pedal Travel

Partial brake system failure	Check fluid and pipes
Insufficient fluid in master cylinder	See MASTER CYLINDERS or BRAKE SYSTEM
Air trapped in system	See BRAKE BLEEDING or BRAKE SYSTEM
Rear brakes not adjusted	See Adjustments in DRUM BRAKES or BRAKE SYSTEM
Bent shoe or lining	See DRUM BRAKES or BRAKE SYSTEM
Plugged master cylinder cap	See MASTER CYLINDERS or BRAKE SYSTEM

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	Improper brake fluid	Replace brake fluid
AA		
Pedal Travel		
Decreasing	Compensating port plugged	See MASTER CYLINDERS or BRAKE SYSTEM
	Swollen cup in master cylinder	See MASTER CYLINDERS or BRAKE SYSTEM
	Master cylinder piston not returning	See MASTER CYLINDERS or BRAKE SYSTEM
	Weak shoe retracting springs	See DRUM BRAKES BRAKE SYSTEM
	Wheel cylinder piston sticking	See DRUM BRAKES or BRAKE SYSTEM
AA		
Dragging		
Brakes	Master cylinder pistons not returning	See MASTER CYLINDERS BRAKE SYSTEM
	Restricted brake lines or hoses	Check line routing
	Incorrect parking brake adjustment	See DRUM BRAKES BRAKE SYSTEM
	Parking Brake cables frozen	See DRUM BRAKES BRAKE SYSTEM
	Incorrect installation of inboard disc pad	Remove and replace correctly
	Power booster output rod too long	See POWER BRAKE UNITS BRAKE SYSTEM
	Brake pedal not returning freely	See DISC, DRUM BRAKES BRAKE SYSTEM
AA		
Brakes Grab or		
Uneven Braking		
Action	Malfunction of combination valve	See CONTROL VALVE or BRAKE SYSTEM
	Malfunction of power brake unit	See POWER BRAKE UNITS or BRAKE SYSTEM

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Binding brake pedal	See DISC, DRUM BRAKES or BRAKE SYSTEM
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Pulsation or Roughness	Uneven pad wear caused by caliper	See DISC BRAKES or BRAKE SYSTEM
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	Uneven rotor wear	See DISC BRAKES or BRAKE SYSTEM
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	Drums out-of-round	Reface or replace drums
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AA

CARBURETOR TROUBLE SHOOTING:

READ THIS FIRST:

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COLD START SYMPTOMS

BASIC COLD START SYMPTOMS TROUBLE SHOOTING CHART

AA

CONDITION	POSSIBLE CAUSE	CORRECTION
Engine Won't Start	Choke not closing	Check choke operation, see FUEL SYSTEMS

	Choke linkage bent	Check linkage, see FUEL SYSTEM
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AA

Engine Starts, Then Dies	Choke vacuum kick setting too wide	Check setting and adjust see, FUEL SYSTEMS
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	Fast idle RPM too low	Reset RPM to specifi- cation, see TUNE-UP
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	Fast idle cam index incorrect	Reset fast idle cam index, see FUEL SYSTEMS
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	Vacuum leak	Inspect vacuum system for leaks
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Low fuel pump outlet	Repair or replace pump, see FUEL SYSTEMS
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Low carburetor fuel level	Check float setting see FUEL SYSTEM
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AA

Engine Quits Under Load	Choke vacuum kick setting incorrect	Reset vacuum kick setting, see FUEL SYSTEMS
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Fast idle cam index incorrect	Reset fast idle cam index, see FUEL SYSTEM
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Incorrect hot fast idle speed RPM	Reset fast idle RPM, see TUNE-UP
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AA

Engine Starts, Runs Up, Then Idles, Slowly	Choke vacuum kick set too narrow	Reset vacuum kick, see FUEL SYSTEMS
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With Black Smoke	Fast idle cam index incorrect	Reset fast idle cam index, see FUEL SYSTEMS
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Hot fast idle RPM too low	Reset fast idle RPM, see TUNE-UP
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AA

HOT STARTING SYMPTOMS

BASIC HOT START SYMPTOMS TROUBLE SHOOTING CHART

AA

CONDITION	POSSIBLE CAUSE	CORRECTION
Engine Won't Start	Engine flooded	Allow fuel to evaporate

AA

COLD ENGINE DRIVEABILITY SYMPTOMS

BASIC COLD ENGINE DRIVEABILITY SYMPTOMS TROUBLE SHOOTING CHART

AA

CONDITION	POSSIBLE CAUSE	CORRECTION
Engine Stalls in Gear	Choke vacuum kick setting incorrect	Reset choke vacuum kick, see FUEL SYSTEMS

Fast idle RPM incorrect	Reset fast idle RPM, see TUNE-UP
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	Fast idle cam index incorrect	Reset fast idle cam see FUEL SYSTEMS
AA		
Acceleration Sag or Stall	Defective choke control switch	Replace choke control switch
	Choke vacuum kick setting incorrect	Reset choke vacuum kick see, FUEL SYSTEMS
	Float level incorrect (too low)	Adjust float level, FUEL SYSTEMS
	Accelerator pump defective	Repair or replace pump see FUEL SYSTEMS
	Secondary throttles not closed	Inspect lockout adjustment, see FUEL SYSTEMS
AA		
Sag or Stall After Warmup	Defective choke control switch	Replace choke control switch, see FUEL SYSTEMS
	Defective accelerator pump	Replace pump, see FUEL SYSTEMS
	Float level incorrect (too low)	Adjust float level, see FUEL SYSTEMS
AA		
Backfiring & Black Smoke	Plugged heat crossover system	Remove restriction
AA		

WARM ENGINE DRIVEABILITY SYMPTOM

BASIC WARM ENGINE DRIVEABILITY SYMPTOMS TROUBLE SHOOTING CHART

AA

CONDITION	POSSIBLE CAUSE	CORRECTION
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AA

Hesitation With Small Amount of Gas Pedal Movement	Vacuum leak	Inspect vacuum lines
	Accelerator pump weak or inoperable	Replace pump, see FUEL SYSTEMS
	Float level setting too low	Reset float level, see, FUEL SYSTEMS
	Metering rods sticking or binding	Inspect and/or replace rods, see

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FUEL SYSTEMS

Carburetor idle or transfer system plugged Inspect system and remove restriction

Frozen or binding heated air inlet Inspect heated air door for binding

AA

Hesitation With Heavy Gas Pedal Movement Defective accelerator pump Replace pump, see FUEL SYSTEMS

Metering rod carrier sticking or binding Remove restriction

Large vacuum leak Inspect vacuum system and repair leak

Float level setting too low Reset float level, see FUEL SYSTEMS

Defective fuel pump, lines or filter Inspect pump, lines and filter

Air door setting incorrect Adjust air door setting, see FUEL

AA

CHARGING SYSTEM TROUBLE SHOOTING

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BASIC CHARGING SYSTEM TROUBLE SHOOTING CHART

AA

CONDITION POSSIBLE CAUSE CORRECTION

Vehicle Will Not Start Dead battery Check battery cells, alternator belt tension and alternator output

Loose or corroded battery connections Check all charging system connections

Ignition circuit or switch Check and replace as

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	malfunction	necessary
AA		
Alternator Light Stays On With Engine Running	Loose or worn alternator drive belt	Check alternator drive tension and condition, See Belt Adjustment in TUNE-UP article in the TUNE-UP section
	Loose alternator wiring connections	Check all charging system connections
	Short in alternator light wiring	See Indicator Warning Lights in STANDARD INSTRUMENTS in the ACCESSORIES & EQUIPMENT section
	Defective alternator stator or diodes	See Bench Tests in ALTERNATOR article
	Defective regulator	See Regulator Check in ALTERNATOR article
AA		
Alternator Light Stays Off With Ignition Switch ON	Blown fuse	See WIRING DIAGRAMS
	Defective alternator	See Testing in ALTERNATOR article
	Defective indicator light bulb or socket	See Indicator Warning Lights in STANDARD INSTRUMENTS in the ACCESSORIES & EQUIPMENT section
AA		
Alternator Light Stays OFF With Ignition Switch ON	Short in alternator wiring	See On-Vehicle Tests in ALTERNATOR article
	Defective rectifier bridge	See Bench Tests in ALTERNATOR article
AA		
Lights or Fuses Burn Out Frequently	Defective alternator wiring	See On-Vehicle Tests in ALTERNATOR article
	Defective regulator	See Regulator Check in ALTERNATOR article

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Defective battery

Check and replace as necessary

AA

Ammeter Gauge Shows Discharge

Loose or worn drive belt

Check alternator drive belt tension and condition. See Belt Adjustment in TUNE-UP article in the TUNE-UP section

Defective wiring

Check all wires and wire connections

Defective alternator or regulator

See Bench Tests and On-Vehicle Tests in ALTERNATOR article

Defective ammeter, or improper ammeter wiring connection

See Testing in STANDARD INSTRUMENTS in the ACCESSORIES & EQUIPMENT section

AA

Noisy Alternator

Loose drive pulley

Tighten drive pulley attaching nut

Loose mounting bolts

Tighten all alternator mounting bolts

Worn or dirty bearings

See Bearing Replacement ALTERNATOR article

Defective diodes or stator

See Bench Test in ALTERNATOR article

AA

Battery Does Stay Charged

Loose or worn drive belt

Check alternator drive belt tension and condition. See Belt Adjustment in appropriate TUNE-UP article in the TUNE-UP section

Loose or corroded battery connections

Check all charging system connections

Loose alternator connections

Check all charging system connections

Defective alternator or battery

See On-Vehicle Tests and Bench Tests in

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ALTERNATOR article

Add-on electrical accessories exceeding alternator capacity Install larger alternator

AA

Battery	Defective battery	Check alternator
Overcharged- Uses Too Much Water		output and repair as necessary

Defective alternator	See On-Vehicle Test and Bench Tests in ALTERNATOR article
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Excessive alternator voltage	Check alternator output and repair as necessary
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CLUTCH TROUBLE SHOOTING

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BASIC CLUTCH TROUBLE SHOOTING CHART

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CONDITION	POSSIBLE CAUSE	CORRECTION
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AA

Chattering or Grabbing	Incorrect clutch adjustment	Adjust clutch
	Oil, grease or glaze on facings	Disassemble and clean or replace
	Loose "U" joint flange	See DRIVE AXLES article
	Worn input shaft spline	Replace input shaft
	Binding pressure plate	Replace pressure plate
	Binding release lever	See CLUTCH article
	Binding clutch disc hub	Replace clutch disc
	Unequal pressure plate contact	Replace worn/misaligned components
	Loose/bent clutch disc	Replace clutch disc

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Incorrect transmission alignment Realign transmission

Worn pressure plate, disc or flywheel Replace damaged components

Broken or weak pressure springs Replace pressure plate

Sticking clutch pedal Lubricate clutch pedal & linkage

Incorrect clutch disc facing Replace clutch disc

Engine loose in chassis Tighten all mounting bolts

AA

Failure to Release Oil or grease on clutch facings Clean or replace clutch disc

Incorrect release lever or pedal adjustment See CLUTCH article

Worn or broken clutch facings Replace clutch disc

Bent clutch disc or pressure plate Replace damaged components

Clutch disc hub binding on input shaft Clean or replace clutch disc and/or input shaft

Binding pilot bearing Replace pilot bearing

Sticking release bearing sleeve Replace release bearing and/or sleeve

Binding clutch cable See CLUTCH article

Defective clutch master Replace master cylinder

Defective clutch slave Replace slave cylinder

Air in hydraulic system Bleed hydraulic system

AA

Rattling Weak or broken release lever spring Replace spring and check alignment

Damaged pressure plate Replace pressure plate

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Broken clutch return spring	Replace return spring
Worn splines on clutch disc or input shaft	Replace clutch disc and/or input shaft
Worn clutch release bearing	Replace release bearing
Dry or worn pilot bearing	Lubricate or replace pilot bearing
Unequal release lever contact	Align or replace release lever
Incorrect pedal free play	Adjust free play
Warped or damaged clutch disc	Replace damaged components

AA

Slipping	Pressure springs worn or	Release pressure plate
	Oily, greasy or worn facings	Clean or replace clutch disc
	Incorrect clutch alignment	Realign clutch assembly
	Warped clutch disc or pressure plate	Replace damaged components
	Binding release levers or clutch pedal	Lubricate and/or replace release components

AA

Squeaking	Worn or damaged release	Replace release bearing
	Dry or worn pilot or release bearing	Lubricate or replace assembly
	Pilot bearing turning in crankshaft	Replace pilot bearing and/or crankshaft
	Worn input shaft bearing	Replace bearing and seal
	Incorrect transmission alignment	Realign transmission
	Dry release fork between pivot	Lubricate release fork and pivot

AA

Heavy and/or Stiff Pedal	Sticking release bearing sleeve	Replace release bearing and/or sleeve
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Dry or binding clutch pedal hub	Lubricate and align components
Floor mat interference with pedal	Lay mat flat in proper area
Dry or binding ball/fork pivots	Lubricate and align components

Faulty clutch cable	Replace clutch cable
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Noisy Clutch Pedal	Faulty interlock switch	Replace interlock switch
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Self-adjuster ratchet noise	Lubricate or replace self-adjuster
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Speed control interlock switch	Lubricate or replace interlock switch
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Clutch Pedal Sticks Down	Binding clutch cable	See CLUTCH article
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Springs weak in pressure plate	Replace pressure plate
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Binding in clutch linkage	Lubricate and free linkage
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Noisy	Dry release bearing	Lubricate or replace release bearing
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Dry or worn pilot bearing	Lubricate or replace bearing
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Worn input shaft bearing	Replace bearing
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Transmission Click	Weak springs in pressure plate	Replace pressure plate
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Release fork loose on ball stud	Replace release fork and/or ball stud
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Oil on clutch disc damper	Replace clutch disc
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Broken spring in slave cylinder	Replace slave cylinder
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COOLING SYSTEM TROUBLE SHOOTING

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COOLING SYSTEM TROUBLE SHOOTING

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CONDITION	POSSIBLE CAUSE	CORRECTION
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AA

Overheating	Coolant Leak	Fill/Pressure Test System
	A/C Condenser Fins Clogged	Remove/Clean Condenser
	Radiator Fins Clogged	Remove/Clean Radiator
	Thermostat Stuck Closed	Replace Thermostat
	Clogged Cooling System Passages	Clean/Flush Cooling System
	Water Pump Malfunction	Replace Water Pump
	Fan Clutch Malfunction	Replace Fan Clutch
	Retarded Ignition Timing	Reset Ignition Timing
	Cooling Fan Malfunction	Test Cooling Fan/Circuit
	Cooling Fan Motor Malfunction	Test Fan Motor
	Cooling Fan Relay Malfunction	Test Fan Relay
	Faulty Radiator Cap	Replace Radiator Cap
	Broken/Slipping Fan Belt	Replace Fan Belt
	Restricted Exhaust	Repair Exhaust System

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Corrosion	Impurities In Coolant	Clean/Flush System
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Coolant Leakage	Damaged hose	Replace Hose
	Leaky Water Pump	Replace Water Pump
	Damaged Radiator Seam	Replace/Repair Radiator

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Leaky Thermostat Cover	Replace Thermostat Cover
Cylinder Head Problem	Check Head/Head Gasket

Leaky Freeze Plugs	Replace Freeze Plugs
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AA

Recovery System Inoperative

Loose and/or Defective Radiator Cap	Replace Radiator Cap
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Overflow Tube Clogged and/or Leaking	Repair Tube
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Recovery Bottle Vent Restricted	Clean Vent
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AA

No Heater Core Flow

Collapsed Heater Hose	Replace Heater Hose
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Plugged Heater Core	Clean/Replace Heater Core
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Faulty Heater Valve	Replace Heater Valve
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DIESEL ENGINE TROUBLE SHOOTING

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NOTE: Diesel engines mechanical diagnosis is the same as gasoline engines for items such as noisy valves, bearings, pistons, etc. The following trouble shooting covers only items pertaining to diesel engines.

BASIC DIESEL ENGINE TROUBLE SHOOTING CHART

AA

CONDITION	POSSIBLE CAUSE	CORRECTION
Engine Won't Crank	Bad battery connections or dead batteries	Check connections and/or replace batteries
	Bad starter connections or bad starter	Check connections and/or replace batteries

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AA

Engine Cranks Slowly, Won't Start	Bad battery connections or dead batteries	Check connections and/or replace batteries
	Engine oil too heavy	Replace engine oil

AA

Engine Cranks Normally, But Will Not Start	Glow plugs not functioning	Check glow plug system, see FUEL SYSTEMS
	Glow plug control not functioning	Check controller, see FUEL SYSTEMS
	Fuel not injected into cylinders	Check fuel injectors, see FUEL SYSTEMS
	No fuel to injection pump	Check fuel delivery system
	Fuel filter blocked	Replace fuel filter
	Fuel tank filter blocked	Replace fuel tank filter
	Fuel pump not operating	Check pump operation and/or replace pump
	Fuel return system blocked	Inspect system and remove restriction
	No voltage to fuel solenoid	Check solenoid and connections
	Incorrect or contaminated fuel	Replace fuel
	Incorrect injection pump timing	Re-adjust pump timing, see FUEL SYSTEMS
	Low compression	Check valves, pistons, rings, see ENGINES
	Injection pump malfunction	Inspect and/or replace injection pump

AA

Engine Starts, Won't Idle	Incorrect slow idle adjustment	Reset idle adjustment, see TUNE-UP
	Fast idle solenoid malfunctioning	Check solenoid and connections
	Fuel return system blocked	Check system and remove restrictions
	Glow plugs go off too soon	See glow plug diagnosis in FUEL SYSTEMS
	Injection pump timing incorrect	Reset pump timing, see FUEL SYSTEMS
	No fuel to injection pump	Check fuel delivery system
	Incorrect or contaminated fuel	Replace fuel
	Low compression	Check valves, piston, rings, see ENGINES
	Injection pump malfunction	Replace injection pump, see FUEL SYSTEMS
	Fuel solenoid closes in RUN position	Check solenoid and connections

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Engines Starts/ Idles Rough W/out 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	Reset slow idle, see TUNE-UP Check lines and connections Check lines and connections Bleed air from system Replace fuel Check nozzles, see FUEL SYSTEMS
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AA

Engines Starts and Idles Rough W/out Smoke or Noise, But Clears After Warm-Up	Injection pump timing incorrect Engine not fully broken in Air in system Injector nozzle malfunction	Reset pump timing, see FUEL SYSTEMS Put more miles on engine Bleed air from system Check nozzles, see FUEL SYSTEMS
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AA

Engine Idles Correctly, Misfires Above Idle	Blocked fuel filter Injection pump timing incorrect Incorrect or contaminated fuel	Replace fuel filter Reset pump timing, see FUEL SYSTEMS Replace fuel
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AA

Engine Won't Return To Idle	Fast idle adjustment incorrect Internal injection pump malfunction External linkage binding	Reset fast idle, see TUNE-UP Replace injection pump, see FUEL SYSTEMS Check linkage and remove binding
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AA

Fuel Leaks On Ground	Loose or broken fuel line Internal injection pump seal leak	Check lines and connections Replace injection pump, see FUEL SYSTEMS
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AA

Cylinder Knocking Noise	Injector nozzles sticking open Very low nozzle opening pressure	Test injectors, see FUEL SYSTEMS Test injectors and/or replace
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AA

Loss of Engine Power	Restricted air intake EGR valve malfunction Blocked or damaged exhaust system Blocked fuel tank filter Restricted fuel filter	Remove restriction Replace EGR valve Remove restriction and/or replace components Replace filter Remove restriction and/or replace filter
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DRIVE AXLE - NOISE DIAGNOSIS

UNRELATED NOISES

Some driveline trouble symptoms are also common to the engine, transmission, wheel bearings, tires, and other parts of the vehicle. Ensure cause of trouble actually is in the drive axle before adjusting, repairing, or replacing any of its parts.

NON-DRIVE AXLE NOISES

A few conditions can sound just like drive axle noise and have to be considered in pre-diagnosis. The 4 most common noises are exhaust, tires, CV/universal joints and wheel trim rings.

In certain conditions, the pitch of the exhaust gases may sound like gear whine. At other times, it may be mistaken for a wheel bearing rumble.

Tires, especially radial and snow, can have a high-pitched tread whine or roar, similar to gear noise. Also, some non-standard tires with an unusual tread construction may emit a roar or whine.

Defective CV/universal joints may cause clicking noises or excessive driveline play that can be improperly diagnosed as drive axle problems.

Trim and moldings also can cause a whistling or whining noise. Ensure none of these components are causing the noise before disassembling the drive axle.

GEAR NOISE

A "howling" or "whining" noise from the ring and pinion gear can be caused by an improper gear pattern, gear damage, or improper bearing preload. It can occur at various speeds and driving conditions, or it can be continuous.

Before disassembling axle to diagnose and correct gear noise, make sure that tires, exhaust, and vehicle trim have been checked as possible causes.

CHUCKLE

This is a particular rattling noise that sounds like a stick against the spokes of a spinning bicycle wheel. It occurs while decelerating from 40 MPH and usually can be heard until vehicle comes to a complete stop. The frequency varies with the speed of the vehicle.

A chuckle that occurs on the driving phase is usually caused by excessive clearance due to differential gear wear, or by a damaged tooth on the coast side of the pinion or ring gear. Even a very small tooth nick or a ridge on the edge of a gear tooth is enough the cause the noise.

This condition can be corrected simply by cleaning the gear tooth nick or ridge with a small grinding wheel. If either gear is damaged or scored badly, the gear set must be replaced. If metal has

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broken loose, the carrier and housing must be cleaned to remove particles that could cause damage.

KNOCK

This is very similar to a chuckle, though it may be louder, and occur on acceleration or deceleration. Knock can be caused by a gear tooth that is damaged on the drive side of the ring and pinion gears. Ring gear bolts that are hitting the carrier casting can cause knock. Knock can also be due to excessive end play in the axle shafts.

CLUNK

Clunk is a metallic noise heard when an automatic transmission is engaged in Reverse or Drive, or when throttle is applied or released. It is caused by backlash somewhere in the driveline, but not necessarily in the axle. To determine whether driveline clunk is caused by the axle, check the total axle backlash as follows:

1) Raise vehicle on a frame or twinpost hoist so that drive wheels are free. Clamp a bar between axle companion flange and a part of the frame or body so that flange cannot move.

2) On conventional drive axles, lock the left wheel to keep it from turning. On all models, turn the right wheel slowly until it is felt to be in Drive condition. Hold a chalk marker on side of tire about 12" from center of wheel. Turn wheel in the opposite direction until it is again felt to be in Drive condition.

3) Measure the length of the chalk mark, which is the total axle backlash. If backlash is one inch or less, drive axle is not the source of clunk noise.

BEARING WHINE

Bearing whine is a high-pitched sound similar to a whistle. It is usually caused by malfunctioning pinion bearings. Pinion bearings operate at drive shaft speed. Roller wheel bearings may whine in a similar manner if they run completely dry of lubricant. Bearing noise will occur at all driving speeds. This distinguishes it from gear whine, which usually comes and goes as speed changes.

BEARING RUMBLE

Bearing rumble sounds like marbles being tumbled. It is usually caused by a malfunctioning wheel bearing. The lower pitch is because the wheel bearing turns at only about 1/3 of drive shaft speed.

CHATTER ON TURNS

This is a condition where the entire front or rear of vehicle vibrates when vehicle is moving. The vibration is plainly felt as well

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as heard. Extra differential thrust washers installed during axle repair can cause a condition of partial lock-up that creates this chatter.

AXLE SHAFT NOISE

Axle shaft noise is similar to gear noise and pinion bearing whine. Axle shaft bearing noise will normally distinguish itself from gear noise by occurring in all driving modes (Drive, cruise, coast and float), and will persist with transmission in Neutral while vehicle is moving at problem speed.

If vehicle displays this noise condition, remove suspect axle shafts, replace wheel seals and install a new set of bearings. Re-evaluate vehicle for noise before removing any internal components.

VIBRATION

Vibration is a high-frequency trembling, shaking or grinding condition (felt or heard) that may be constant or variable in level and can occur during the total operating speed range of the vehicle.

The types of vibrations that can be felt in the vehicle can be divided into 3 main groups:

- * Vibrations of various unbalanced rotating parts of the vehicle.
- * Resonance vibrations of the body and frame structures caused by rotating of unbalanced parts.
- * Tip-in moans of resonance vibrations from stressed engine or exhaust system mounts or driveline flexing modes.

DRIVE AXLE - RWD TROUBLE SHOOTING

WARNING: This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing. For definitions of listed noises or sounds, see DRIVE AXLE - NOISE DIAGNOSIS.

DRIVE AXLE (RWD) TROUBLE SHOOTING

AA

CONDITION POSSIBLE CAUSE CORRECTION

AA

Knocking or Clunking

Differential Side Gear Clearance	Check Clearance
----------------------------------	-----------------

Worn Pinion Shaft	Replace Pinion Shaft
-------------------	----------------------

Axle Shaft End Play	Check End Play
---------------------	----------------

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Missing Gear Teeth	Check Differential/ Replace Gear
--------------------	-------------------------------------

Wrong Axle Backlash	Check Backlash
---------------------	----------------

Misaligned Driveline	Realign Driveline
----------------------	-------------------

AA

Clinking During Engagement

Side Gear Clearance	Check Clearance
---------------------	-----------------

Ring and Pinion Backlash	Check Backlash
--------------------------	----------------

Worn/Loose Pinion Shaft	Replace Shaft/Bearing
-------------------------	-----------------------

Bad "U" Joint	Replace "U" Joint
---------------	-------------------

Sticking Slip Yoke	Lube Slip Yoke
--------------------	----------------

Broken Rear Axle Mount	Replace Mount
------------------------	---------------

Loose Drive Shaft Flange	Check Flange
--------------------------	--------------

AA

Click/Chatter On Turns

Differential Side Gear Clearance	Check Clearance
-------------------------------------	-----------------

Wrong Turn On Plates (1)	Replace Clutch Plates
--------------------------	-----------------------

Wrong Differential Lubricant (1)	Change Lubricant
-------------------------------------	------------------

AA

Knock Or Click

Flat Spot on Rear Wheel Bearing	Replace Wheel Bearing
------------------------------------	-----------------------

AA

Low Vibration At All Speeds

Faulty Wheel Bearing	Replace Wheel Bearing
----------------------	-----------------------

Faulty "U" Joint	Replace "U" Joint
------------------	-------------------

Faulty Drive Shaft	Balance Drive Shaft
--------------------	---------------------

Faulty Companion Flange	Replace Flange
-------------------------	----------------

Faulty Slip Yoke Flange	Replace Flange
-------------------------	----------------

(1) - Limited slip differential only.

AA

FWD AXLE SHAFTS & CV JOINTS TROUBLE SHOOTING

WARNING: This is GENERAL information. This article is not intended

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to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

BASIC FWD AXLE SHAFTS & CV JOINTS TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE
Grease Leaks	CV boot torn or cracked
Clicking Noise on Cornering	Damaged outer CV
Clunk Noise on Acceleration	Damaged inner CV
Vibration or Shudder on Acceleration	Sticking, damaged or worn CV Misalignment or spring height

FUEL INJECTION TROUBLE SHOOTING

WARNING: This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

BASIC FUEL INJECTION TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
Engine Won't Start (Crank Normally)	Cold start valve inoperative	Test valve and circuit
	Poor connection;vacuum or wiring	Check vacuum and electrical connections
	Contaminated fuel	Test fuel for water or alcohol
	Defective fuel pump relay or circuit	Test relay and wiring
	Battery too low	Charge and test battery
	Low fuel pressure	Test pressure regul-

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sensor circuit	wiring
Faulty ignition operation	Check wires for cracks or poor connections, test secondary voltage with oscilloscope
Contaminated fuel	Test fuel for water or alcohol
Intermittent ECM ground	Test ECM ground connection for resistance
Restricted air cleaner	Replace air cleaner
Restricted exhaust system	Test for exhaust manifold back pressure
Poor MAF sensor signal	Check leakage between sensor and manifold
Poor VSS signal	If tester for ALCL hook-up is available check that VSS reading matches speedometer

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|                               |                                       |                                                              |
|-------------------------------|---------------------------------------|--------------------------------------------------------------|
| Ping or Knock on Acceleration | Poor Knock sensor signal              | Test for shorted or open sensor or circuit                   |
|                               | Poor Baro sensor signal               | Test for shorted or open sensor or circuit                   |
|                               | Improper ignition timing              | See VEHICLE EMISSION CONTROL LABEL (where applicable)        |
|                               | Check for engine overheating problems | Low coolant, loose belts or electric cooling fan inoperative |

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NOTE: For additional electronic fuel injection trouble shooting information, see the appropriate article in the ENGINE PERFORMANCE section (not all vehicles have Computer Engine

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Control articles). Information is provided there for diagnosing fuel system problems on vehicles with electronic fuel injection.

GASOLINE ENGINE - MECHANICAL TROUBLE SHOOTING

WARNING: This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

BASIC GASOLINE ENGINE - MECHANICAL TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
Engine Lopes At Idle	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	Replace manifold gasket, See ENGINES Replace head gasket, See ENGINES Replace gears, chain or sprocket Replace camshaft, See ENGINES Check cooling system, See COOLING Remove restriction Repair leak and/or replace valve Replace fuel pump
Engine Has Low Power	Leaking fuel pump Excessive piston-to-bore clearance Sticking valves or weak valve springs Incorrect valve timing Worn camshaft lobes Blown head gasket Clutch slipping Engine overheating Auto. Trans. pressure	Repair leak and/or replace fuel pump Install larger pistons, See ENGINES Check valve train components, See ENGINES Reset valve timing, See ENGINES Replace camshaft, See ENGINES Replace camshaft, See ENGINES Adjust pedal and/or replace components, See ENGINES Check cooling system, See COOLING

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regulator valve faulty	Replace pressure regulator valve
Auto. Trans. fluid level too low	Add fluid as necessary
Improper vacuum diverter valve operation	Replace vacuum diverter valve
Vacuum leaks	Inspect vacuum system and repair as required
Leaking piston rings	Replace piston rings, See ENGINES

AA

Faulty High Speed Operation	Low fuel pump volume	Replace fuel pump
	Leaking valves or worn	Replace valves and/or springs, See ENGINES
	Incorrect valve timing	Reset valve timing, See ENGINES
	Intake manifold restricted	Remove restriction
	Worn distributor shaft	Replace distributor

AA

Faulty Acceleration	Improper fuel pump stroke	Remove pump and reset pump stroke
	Incorrect ignition timing	Reset ignition timing, See TUNE-UP
	Leaking valves	Replace valves, See ENGINES
	Worn fuel pump diaphragm or piston	Replace diaphragm or piston

AA

Intake Backfire	Improper ignition timing	Reset ignition timing, See TUNE-UP
	Faulty accelerator pump discharge	Replace accelerator pump
	Improper choke operation	Check choke and adjust as required
	Defective EGR valve	Replace EGR valve
	Fuel mixture too lean	Reset air/fuel mixture, See TUNE-UP
	Choke valve initial clearance too large	Reset choke valve initial clearance

AA

Exhaust Backfire	Vacuum leak	Inspect and repair vacuum system
	Faulty vacuum diverter valve	Replace vacuum diverter valve
	Faulty choke operation	Check choke and adjust as required
	Exhaust system leak	repair exhaust system leak

AA

Engine	Ignition timing too far	Reset ignition timing,
--------	-------------------------	------------------------

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return slots clogged	See ENGINES
Piston rings sticking in grooves	Replace piston rings, See ENGINES
Piston ring grooves excessively worn	Replace piston and rings, See ENGINES
Compression rings installed upside down	Replace compression rings correctly, See ENGINES
Worn or scored cylinder walls	Rebore cylinders or replace block
Mismatched oil ring expander and rail	Replace oil ring expander and rail, See ENGINES
Intake gasket dowels too long	Replace intake gasket dowels
Excessive main or connecting rod bearing clearance	Replace main or connecting rod bearings, See ENGINES

AA

No Oil Pressure	Low oil level	Add oil to proper level
	Oil pressure sender or gauge broken	Replace sender or gauge
	Oil pump malfunction	Remove and overhaul oil pump, See ENGINES
	Oil pressure relief valve sticking	Remove and reinstall valve
	Oil pump passages blocked	Overhaul oil pump, See ENGINES
	Oil pickup screen or tube blocked	remove restriction
	Loose oil inlet tube	Tighten oil inlet tube
	Loose camshaft bearings	Replace camshaft bearings, See ENGINES
	Internal leakage at oil passages	Replace block or cylinder head

AA

Low Oil Pressure	Low engine oil level	Add oil to proper level
	Engine oil too thin	Remove and replace with thicker oil
	Excessive oil pump clearance	Reduce oil pump clearance, See ENGINES
	Oil pickup tube or screen blocked	Remove restrictions
	Main, rod or cam bearing clearance excessive	Replace bearing to reduce clearance, See ENGINES

AA

High Oil Pressure	Improper grade of oil	Replace with proper oil
	Oil pressure relief valve stuck closed	Eliminate binding
	Oil pressure sender or gauge faulty	Replace sender or gauge

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AA

Noisy Main Bearings	Inadequate oil supply	Check oil delivery to main bearings
	Excessive main bearing clearance	Replace main bearings, See ENGINES
	Excessive crankshaft end play	Replace crankshaft, See ENGINES
	Loose flywheel or torque converter	Tighten attaching bolts
	Loose or damaged vibration damper	Tighten or replace vibration damper
	Crankshaft journals out-of-round	Re-grind crankshaft journals
	Excessive belt tension	Loosen belt tension

AA

Noisy Connecting Rods	Excessive bearing clearance or missing bearing	Replace bearing, See ENGINES
	Crankshaft rod journal out-of-round	Re-grind crankshaft journal
	Misaligned connecting rod or cap	Remove rod or cap and realign
	Incorrectly tightened rod bolts	Remove and re-tighten rod bolts

AA

Noisy Pistons and Rings	Excessive piston-to-bore clearance	Install larger pistons, See ENGINES
	Bore tapered or out-of-round	Rebore block
	Piston ring broken	Replace piston rings, See ENGINES
	Piston pin loose or seized	Replace piston pin, See ENGINES
	Connecting rods misaligned	Realign connecting rods
	Ring side clearance too loose or tight	Replace with larger or smaller rings
	Carbon build-up on piston	Remove carbon

AA

Noisy Valve Train	Worn or bent push rods	Replace push rods, See ENGINES
	Worn rocker arms or bridged pivots	Replace push rods, See ENGINES
	Dirt or chips in valve lifters	Remove lifters and remove dirt/chips
	Excessive valve lifter leak-down	Replace valve lifters, See ENGINES
	Valve lifter face worn	Replace valve lifters, See ENGINES
	Broken or cocked valve springs	replace or reposition springs
	Too much valve stem-to-guide clearance	Replace valve guides, See ENGINES
	Valve bent	Replace valve, See ENGINES

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Loose rocker arms	Retighten rocker arms, See ENGINES
Excessive valve seat run-out	Reface valve seats, See ENGINES
Missing valve lock	Install new valve lock
Excessively worn camshaft lobes	Replace camshaft, See ENGINES
Plugged valve lifter oil holes	Eliminate restriction or replace lifter
Faulty valve lifter check ball	Replace lifter check ball, See ENGINES
Rocker arm nut installed upside down	Remove and reinstall correctly
Valve lifter incorrect for engine	Remove and replace valve lifters
Faulty push rod seat or lifter plunger	Replace plunger or push rod

AA

Noisy Valves	Improper valve lash	Re-adjust valve lash, See ENGINES
	Worn or dirty valve lifters	Clean and/or replace lifters
	Worn valve guides	Replace valve guides, See ENGINES
	Excessive valve seat or face run-out	Reface seats or valve face
	Worn camshaft lobes	Replace camshaft, See ENGINES
	Loose rocker arm studs	Re-tighten rocker arm studs, See ENGINES
	Bent push rods	Replace push rods, See ENGINES
	Broken valve springs	Replace valve springs, See ENGINES

AA

Burned, Sticking or Broken Valves	Weak valve springs or warped valves	Replace valves and/or springs, See ENGINES
	Improper lifter clearance	Re-adjust clearance or replace lifters
	Worn guides or improper guide clearance	Replace valve guides, See ENGINES
	Out-of-round valve seats or improper seat width	Re-grind valve seats
	Gum deposits on valve stems, seats or guides	Remove deposits
	Improper spark timing	Re-adjust spark timing

AA

Broken Pistons/Rings	Undersize pistons	Replace with larger pistons, See ENGINES
	Wrong piston rings	Replace with correct rings, See ENGINES
	Out-of-round cylinder bore	Re-bore cylinder bore

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Improper connecting rod alignment	Remove and realign connecting rods
Excessively worn ring grooves	Replace pistons, See ENGINES
Improperly assembled piston pins	Re-assemble pin-to-piston, See ENGINES
Insufficient ring gap clearance	Install new rings, See ENGINES
Engine overheating	Check cooling system
Incorrect ignition timing	Re-adjust ignition timing, See TUNE-UP

AA

Excessive Exhaust Noise	Leaks at manifold to head, or to pipe	Replace manifold or pipe gasket
	Exhaust manifold cracked or broken	Replace exhaust manifold, See ENGINES

AA

HEATER SYSTEM TROUBLE SHOOTING

WARNING: This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

BASIC HEATER SYSTEM TROUBLE SHOOTING CHART

AA

CONDITION	POSSIBLE CAUSE
-----------	----------------

Insufficient, Erratic, or No Heat

- ù Low Coolant Level
- ù Incorrect thermostat.
- ù Restricted coolant flow through heater core.
- ù Heater hoses plugged.
- ù Misadjusted control cable.
- ù Sticking heater control valve.
- ù Vacuum hose leaking.
- ù Vacuum hose blocked.
- ù Vacuum motors inoperative.
- ù Blocked air inlet.
- ù Inoperative heater blower motor.
- ù Oil residue on heater core fins.
- ù Dirt on heater core fins.

AA

Too Much Heat	ù Improperly adjusted cables.
	ù Sticking heater control valve.
	ù No vacuum to heater control valve.
	ù Temperature door stuck open.

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3 Disconnect spark plug wire 3
3 and insert test plug. Ground 3
3 plug, crank engine, and 3
3 check for spark. 3

AAUU

UAAA;
UAAAAAAAAAA;
3 GOOD SPARK 3
AAAAAAAAUU

UAAAAAAAAAA;
3 NO SPARK 3
AAAAAAAAUU

UAAA;
3 * If plug sparks, driveability 3

3 problem is most likely NOT 3
3 in the ignition system. 3

AAUU

UAAA;
3 * Remove coil wire from the 3

3 distributor and attach the 3
3 modified spark plug. Ground 3
3 the plug and crank engine 3
3 while checking for spark. 3

AAUU

UAAA;
UAAAAAAAAAA;
3 GOOD SPARK 3
AAAAAAAAUU

UAAAAAAAAAA;
3 NO SPARK 3
AAAAAAAAUU

UAAA;
3 * If plug has a good spark, 3

3 the problem is in the plug 3
3 wires, distributor cap, or 3
3 rotor. Replace components 3
3 as necessary. 3

AAUU

UAAA;
3 * Proceed to the IGNITION 3

3 PRIMARY TROUBLE SHOOTING 3
3 CHECK CHART below in this 3
3 article. 3

AAUU

IGNITION PRIMARY TROUBLE SHOOTING CHART

UAAA;
3 START: Visually inspect primary ignition wires for 3

3 broken, frayed, split, or cut wires. Also check 3
3 for loose, corroded, or disconnected connectors. 3

AAUU

UAAAA;
3 OK 3
AAAAUU

UAAAA;
3 NOT OK 3
AAAAUU

UAAA;
3 * Check that battery voltage 3

3 is at least 11.5 volts. 3

AAUU

UAAA;
3 * Repair or replace damaged 3

3 components as necessary. 3

AAUU

UAAAAA;
3 NOT OK 3
AAAAUU

UAAAA;
3 OK 3
AAAAUU

UAAA;
3 * Replace or recharge the 3

3 battery. 3

AAUU

UAAA;
3 * Check for battery voltage 3

3 at the positive terminal of 3
3 the coil. 3

AAUU

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refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

BASIC MANUAL STEERING GEAR TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
Rattle or Chucking Noise in Rack and Pinion	Rack and pinion mounting bracket loose Lack of/or incorrect lubricant	Tighten all mounting bolts Correct as necessary
	Steering gear mounting bolts loose	Tighten all mounting bolts
Excessive Play	Front wheel bearing improperly adjusted Loose or worn steering linkage Loose or worn steering gear shift Steering arm loose on gear shaft Steering gear housing bolts loose Steering gear adjustment too loose Steering arms loose on knuckles Rack and pinion mounting loose Rack and pinion out of adjustment Tie rod end loose Excessive Pitman shaft-to-ball nut lash	See FRONT SUSPENSION article See STEERING LINKAGE article See MANUAL STEERING GEAR article See MANUAL STEERING GEAR article Tighten all mounting bolts See MANUAL STEERING GEAR article Tighten and check steering linkage Tighten all mounting bolts See adjustment in STEERING article Tighten and check steering linkage Repair as necessary
Poor Returnability	Lack of lubricant in ball joint or linkage	Lubricate and service systems

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Binding in linkage or ball joints See STEERING LINKAGE and SUSPENSION article

Improper front end alignment See WHEEL ALIGNMENT article

Improper tire pressure Inflate to proper pressure

Tie rod binding Inflate to proper pressure

Shaft seal rubbing shaft See STEERING COLUMN article

AA

Excessive Vertical Motion Improper tire pressure Inflate to proper pressure

Tires, wheels or rotors out of balance Balance tires then check wheels and rotors

Worn or faulty shock absorbers Check and replace if necessary

Loose tie rod ends or steering Tighten or replace if necessary

Loose or worn wheel bearings See SUSPENSION article

AA

Steering Pulls to One Side Improper tire pressure Inflate to proper pressure

Front tires are different sizes Rotate or replace if necessary

Wheel bearings not adjusted properly See FRONT SUSPENSION article

Bent or broken suspension components See FRONT SUSPENSION article

Improper wheel alignment See WHEEL ALIGNMENT article

Brakes dragging See BRAKES article

AA

Instability Low or uneven tire pressure Inflate to proper pressure

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Loose or worn wheel bearings	See FRONT SUSPENSION article
Loose or worn idler arm bushing	See FRONT SUSPENSION article
Loose or worn strut bushings	See FRONT SUSPENSION article
Incorrect front wheel alignment	See WHEEL ALIGNMENT article
Steering gear not centered	See MANUAL STEERING GEARS article
Springs or shock	Check and replace if necessary
Improper cross shaft	See MANUAL STEERING GEARS article

AA

POWER STEERING TROUBLE SHOOTING

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BASIC POWER STEERING TROUBLE SHOOTING CHART

AA

CONDITION	POSSIBLE CAUSE	CORRECTION
Rattle or Chucking Noise	Pressure hoses touching engine parts	Adjust to proper clearance
	Loose Pitman shaft	Adjust or replace if necessary
	Tie rods ends or Pitman arm loose	Tighten and check system
	Rack and pinion mounts loose	Tighten all mounting bolts
	Free play in worm and	See POWER STEERING GEAR article
	Loose sector shaft or	See POWER STEERING GEAR

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thrust bearing adjustment

Free play in pot coupling See STEERING COLUMN
article

Worn shaft serrations See STEERING COLUMN
article

AA

Growl in Excessive pressure in Restricted hoses, see
Steering Pump hoses POWER STEERING GEAR
article

Scored pressure plates See POWER STEERING GEAR
article

Scored thrust plates or See POWER STEERING GEAR
rotor article

Extreme wear of cam ring See POWER STEERING GEAR
article

AA

Rattle in Vanes not installed See POWER STEERING PUMP
Steering Pump article

Vanes sticking in rotor See POWER STEERING PUMP
article

AA

Swish noise in Defective flow control See POWER STEERING PUMP
Pump valve article

AA

Groan in Air in fluid See POWER STEERING PUMP
Steering Pump article

Poor pressure hose Tighten and check,
connection replace if necessary

AA

Squawk When Damper "O" ring on valve See POWER STEERING PUMP
Turning spool cut article

AA

Moan or Whine Pump shaft bearing scored Replace bearing and
in Pump fluid

Air in fluid or fluid See POWER STEERING PUMP
level low article

Hose or column grounded Check and replace if
necessary

Cover "O" ring missing See POWER STEERING PUMP
or damaged article

Valve cover baffle See POWER STEERING PUMP

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missing or damaged article

Interference of components in pump See POWER STEERING PUMP article

Loose or poor bracket alignment Correct or replace if necessary

AA

Hissing When Internal leakage in Check valved assembly
Parking steering gear first

AA

Chirp in Loose or worn power Adjust or replace if
Steering Pump steering belt necessary

AA

Buzzing When Noisy pump See POWER STEERING PUMP
Not Steering article

Free play in steering shaft bearing See STEERING COLUMN article

Bearing loose on shaft serrations See STEERING COLUMN article

AA

Clicking Noise Pump slippers too long See POWER STEERING PUMP
in Pump article

Broken slipper springs See POWER STEERING PUMP article

Excessive wear or nicked rotors See POWER STEERING PUMP article

Damaged cam contour See POWER STEERING PUMP article

AA

Poor Return of Wheel rubbing against See STEERING COLUMN
Wheel turn signal SWITCHES article

Flange rubbing steering gear adjuster See STEERING COLUMN article

Tight or frozen steering shaft bearing See STEERING COLUMN article

Steering gear out of adjustment See POWER STEERING GEAR article

Sticking or plugged spool valve See POWER STEERING PUMP article

Improper front end alignment See WHEEL ALIGNMENT article

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Wheel bearings worn or loose	See FRONT SUSPENSION article	
Ties rods or ball joints binding	Check and replace if necessary	
Intermediate shaft joints binding	See STEERING COLUMN article	
Kinked pressure hoses	Correct or replace if necessary	
Loose housing head spanner nut	See POWER STEERING GEAR article	
Damaged valve lever	See POWER STEERING GEAR article	
Sector shaft adjusted too tight	See ADJUSTMENTS in POWER STEERING GEAR article	
Worm thrust bearing adjusted too tight	See ADJUSTMENTS in POWER STEERING GEAR article	
Reaction ring sticking in cylinder	See POWER STEERING GEAR article	
Reaction ring sticking in housing head	See POWER STEERING GEAR article	
Steering pump internal leakage	See POWER STEERING PUMP article	
Steering gear-to-column misalignment	See STEERING COLUMN article	
Lack of lubrication in linkage	Service front suspension	
Lack of lubrication in ball joints	Service front suspension	
=====		
Increased Effort When Turning	High internal pump leakage	See POWER STEERING PUMP article
Wheel Fast	Power steering pump belt slipping	Adjust or replace if necessary
Foaming, Milky Power Steering Fluid, Low Fluid Level or Low Pressure	Low fluid level	Check and fill to proper level
	Engine idle speed to low	Adjust to correct

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setting

Air in pump fluid system See POWER STEERING PUMP
article

Pump output low See POWER STEERING PUMP
article

Steering gear
malfunctioning See POWER STEERING GEAR
article

AA

Wheel Surges or Jerks Low fluid level Check and fill to proper
level

Loose fan belt Adjust or replace if
necessary

Insufficient pump
pressure See POWER STEERING PUMP
article

Sticky flow control valve See POWER STEERING PUMP
article

Linkage hitting oil pan
at full turn Replace bent components

AA

Kick Back or Free Play Air in pump fluid system See POWER STEERING PUMP
article

Worn poppet valve in
steering gear See POWER STEERING PUMP
article

Excessive over center
lash See POWER STEERING GEAR
article

Thrust bearing out of
adjustment See POWER STEERING GEAR
article

Free play in pot coupling See POWER STEERING PUMP
article

Steering gear coupling
loose on shaft See POWER STEERING PUMP
article

Steering disc mounting
bolts loose Tighten or replace if
necessary

Coupling loose on worm
shaft Tighten or replace if
necessary

Improper sector shaft
adjustment See POWER STEERING GEAR
article

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Excessive worm piston side play	See POWER STEERING GEAR article
Damaged valve lever	See POWER STEERING GEAR article
Universal joint loose	Tighten or replace if necessary
Defective rotary valve	See POWER STEERING GEAR article

AA

No Power When Parking	Sticking flow control valve	See POWER STEERING PUMP article
	Insufficient pump pressure output	See POWER STEERING PUMP article
	Excessive internal pump leakage	See POWER STEERING PUMP article
	Excessive internal gear leakage	See POWER STEERING PUMP article
	Flange rubs against gear adjust plug	See STEERING COLUMN article
	Loose pump belt	Adjust or replace if necessary
	Low fluid level	Check and add proper amount of fluid
	Engine idle too low	Adjust to correct setting
	Steering gear-to-column misaligned	See STEERING COLUMN article

AA

No Power, Left Turn	Left turn reaction seal "O" ring worn	See POWER STEERING GEAR article
	Left turn reaction seal damaged/missing	See POWER STEERING GEAR article
	Cylinder head "O" ring damaged	See POWER STEERING PUMP article

AA

No Power, Right Turns	Column pot coupling bottomed	See STEERING COLUMN article
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Right turn reaction seal "O" ring worn See POWER STEERING GEAR article

Right turn reaction seal damaged See POWER STEERING GEAR article

Internal leakage through piston end plug See POWER STEERING GEAR article

Internal leakage through side plugs See POWER STEERING GEAR article

AA

Lack of Effort in Turning Left and/or right reaction seal sticking in cylinder head Replace, see POWER STEERING GEAR article

AA

Wanders to One Side Front end alignment incorrect See WHEEL ALIGNMENT article

Unbalanced steering gear valve See POWER STEERING GEAR article

AA

Low Pressure Due to Steering Pump Flow control valve stuck or inoperative See POWER STEERING PUMP article

Pressure plate not flat against cam ring See POWER STEERING PUMP article

Extreme wear of cam ring Replace and check adjustments

Scored plate, thrust plate or rotor See POWER STEERING PUMP article

Vanes not installed properly See POWER STEERING PUMP article

Vanes sticking in rotor slots See POWER STEERING PUMP article

Cracked/broken thrust or pressure plate See POWER STEERING PUMP article

AA

STARTER TROUBLE SHOOTING

WARNING: This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available

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BASIC STARTER TROUBLE SHOOTING CHART

AA

CONDITION POSSIBLE CAUSE CORRECTION

AA

Starter Fails to Operate	Dead battery or bad connections between starter and battery	Check battery charge and all wires and connections to starter
	Ignition switch faulty or misadjusted	Adjust or replace ignition switch
	Open circuit between starter switch ignition terminal on starter relay	Check and repair wires and connections as necessary
	Starter relay or starter defective	See Testing in STARTER article
	Open solenoid pull-in wire	See Testing in STARTER article

AA

Starter Does Not Operate and Headlights Dim	Weak battery or dead cell	Charge or replace battery as necessary
	Loose or corroded battery connections	Check that battery connections are clean and tight
	Internal ground in starter windings	See Testing in STARTER article
	Grounded starter fields	See Testing in STARTERS
	Armature rubbing on pole shoes	See STARTER article

AA

Starter Turns but Engine Does Not Rotate	Starter clutch slipping	See STARTER article
	Broken clutch housing	See STARTER article
	Pinion shaft rusted or dry	See STARTER article
	Engine basic timing incorrect	See Ignition Timing in TUNE-UP article
	Broken teeth on engine flywheel	Replace flywheel and check for starter pinion gear damage

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AA

Starter Will Not Crank Engine	Faulty overrunning clutch	See STARTER article
	Broken clutch housing	See STARTER article
	Broken flywheel teeth	Replace flywheel and check for starter pinion gear damage
	Armature shaft sheared or reduction gear teeth stripped	See STARTER article
	Weak battery	Charge or replace battery as necessary
	Faulty solenoid	See On-Vehicle Tests in STARTER article
	Poor grounds	Check all ground connections for tight and clean connections
	Ignition switch faulty or misadjusted	Adjust or replace ignition switch as necessary

AA

Starter Cranks Engine Slowly	Battery weak or defective	Charge or replace battery as necessary
	Engine overheated	See ENGINE COOLING SYSTEM article
	Engine oil too heavy	Check that proper viscosity oil is used
	Poor battery-to-starter connections	Check that all between battery and starter are clean and tight
	Current draw too low or too high	See Bench Tests in STARTER article
	Bent armature, loose pole shoes screws or worn bearings	See STARTER article
	Burned solenoid contacts	Replace solenoid

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	Faulty starter	Replace starter
AA		
Starter Engages Engine Only Momentarily	Engine timing too far advanced	See Ignition Timing in TUNE-UP article
	Overrunning clutch not engaging properly	Replace overrunning clutch. See STARTER article
	Broken starter clutch	See STARTER article
	Broken teeth on engine flywheel	Replace flywheel and check starter pinion gear for damage
	Weak drive assembly thrust spring	See STARTER article
	Weak hold-in coil	See Bench Tests in STARTER article
AA		
Starter Drive Will Not Engage	Defective point assembly	See Testing in STARTER article
	Poor point assembly ground	See Testing in STARTER article
	Defective pull-in coil	Replace starter solenoid
AA		
Starter Relay Does Not Close	Dead battery	Charge or replace battery as necessary
	Faulty wiring	Check all wiring and connections leading to relay
	Neutral safety switch faulty	Replace neutral safety switch
	Starter relay faulty	Replace starter relay
AA		
Starter Drive Will Not Disengage	Starter motor loose on mountings	Tighten starter attach bolts
	Worn drive end bushing	See STARTER article
	Damaged engine flywheel teeth	Replace flywheel and starter pinion gear for damage

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Drive yolk return spring broken or missing	Replace return spring
Faulty ignition switch	Replace ignition switch
Insufficient clearance between winding leads to solenoid terminal and main contact in solenoid	Replace starter solenoid
Starter clutch not disengaging	Replace starter clutch
Ignition starter switch contacts sticking	Replace ignition switch

AA

Starter Relay Operates but Solenoid Does Not	Faulty solenoid switch, switch connections or	Check all wiring between relay and solenoid or replace relay or solenoid as necessary
--	---	---

Broken lead or loose soldered connections	Repair wire or wire connections as necessary
---	--

AA

Solenoid Plunger Vibrates When Switch is Engaged	Weak battery	Charge or replace battery as necessary
--	--------------	--

Solenoid contacts corroded	Clean contacts or replace solenoid
----------------------------	------------------------------------

Faulty wiring	Check all wiring leading to solenoid
---------------	--------------------------------------

Broken connections inside switch cover	Repair connections or replace solenoid
--	--

Open hold-in wire	Replace solenoid
-------------------	------------------

AA

Low Current Draw	Worn brushes or weak	Replace brushes or brush springs as necessary
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AA

High Pitched Whine During Cranking Before Engine Fires but Engine Fires and Cranks Normally	Distance too great between starter pinion and flywheel	Align starter or check that correct starter and flywheel are being used
---	--	---

AA

High Pitched	Distance too small between
--------------	----------------------------

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shield

Tight steering universal joint See STEERING COLUMN article

AA

High Shift Column is out of alignment See STEERING COLUMN article

Improperly installed dust shield Adjust or replace

Seals or bearings not lubricated See STEERING COLUMNS article

Mounting bracket screws too long Replace with new shorter screws

Burrs on shift tube Remove burrs or replace tube

Lower bowl bearing assembled wrong See STEERING COLUMN article

Shift tube bent or broken Replace as necessary

Improper adjustment of shift levers See STEERING COLUMN article

AA

Improper Trans. Shifting Sheared shift tube joint Replace as necessary

Sheared lower shaft lever Replace as necessary

Improper shift lever adjustment See STEERING COLUMN article

Improper gate plate adjustment See STEERING COLUMN article

AA

Excess Play in Column Instrument panel bracket bolts loose Tighten bolts and check bracket

Broken weld nut on jacket See STEERING COLUMN article

Instrument bracket capsule sheared See STEERING COLUMN article

Column bracket/jacket bolts loose Tighten bolts and check bracket

AA

Steering Locks in Gear Release lever mechanism See STEERING COLUMN article

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		in SUSPENSION
	Worn shock absorbers	Replace shock absorbers
	Worn strut bushings	Replace strut bushings
AA		
Car Pulls to One Side	Mismatched or uneven tires	Check tire condition
	Broken or sagging springs	See SUSPENSION
	Loose or worn strut bushings	See SUSPENSION
	Improper wheel alignment	See WHEEL ALIGNMENT
	Improper rear axle alignment	Check rear axle alignment
	Power steering gear unbalanced	See STEERING
	Front brakes dragging	See BRAKES
AA		
Abnormal Tire Wear	Unbalanced tires	Check tire balance & rotation
	Sagging or broken springs	See SUSPENSION
	Incorrect front end alignment	See WHEEL ALIGNMENT
	Faulty shock absorbers	Replace shock absorbers
AA		
Scuffed Tires	Toe-In incorrect	See WHEEL ALIGNMENT
	Suspension arm bent or twisted	See appropriate SUSPENSION article
AA		
Springs Bottom or Sag	Bent or broken springs	See SUSPENSION
	Leaking or worn shock absorbers	Replace shock absorbers
	Frame misalignment	Check frame for damage
AA		
Spring Noises	Loose "U" Bolts	See SUSPENSION
	Loose or worn bushings	See SUSPENSION
	Worn or missing interliners	See SUSPENSION
AA		
Shock Absorber	Loose shock mountings	Check & tighten

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Noise	mountings
Worn bushings	Replace bushings
Air in system	Bleed air from system
Undercoating on shocks	Remove undercoating
~~~~~	
Car Leans or Sways on Corners	Loose stabilizer bar See SUSPENSION
Faulty shocks or mountings	Replace shocks or mountings
Broken or sagging springs	See SUSPENSION
~~~~~	
Shock Absorbers Leaking	Worn seals or reservoir tube crimped See SUSPENSION
~~~~~	
Broken Springs	Loose "U" bolts See SUSPENSION
Inoperative shock absorbers	Replace shock absorbers
~~~~~	

TUNE-UP TROUBLE SHOOTING - GAS ENGINE VEHICLES

PLEASE READ THIS FIRST:

WARNING: This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

SPARK PLUG DIAGNOSIS

BASIC SPARK PLUG TROUBLE SHOOTING CHARTS

CONDITION	POSSIBLE CAUSE	CORRECTION
~~~~~		
Normal Spark Plug Condition	Light Tan or Gray deposits	No Action
	Electrode not burned or fouled	No Action
	Gap tolerance not changed	No Action
~~~~~		
Cold Fouling or Carbon Deposits	Overrich air/fuel mixture	Adjust air/fuel mixture, see ENGINE PERFORMANCE section

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Faulty choke	Replace choke assembly, see ENGINE PERFORMANCE section
Clogged air filter	Clean and/or replace air filter
Incorrect idle speed or dirty carburetor	Reset idle speed and/or clean carburetor
Faulty ignition wires	Replace ignition wiring
Prolonged operation at idle	Shut engine off during long idle
Sticking valves or worn valve guide seals	Check valve train

AA

Wet Fouling or Oil Deposits	Worn rings and pistons	Install new rings and pistons
	Excessive cylinder wear	Rebore or replace block

	Excessive valve guide clearance	Worn or loose bearing
--	---------------------------------	-----------------------

AA

Gap Bridged	Deposits in combustion chamber becoming fused to electrode	Clean combustion chamber of deposits
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AA

Blistered Electrode	Engine overheating	Check cooling system
	Wrong type of fuel	Replace with correct fuel

	Loose spark plugs	Retighten spark plugs
	Over-advanced ignition timing	Reset ignition timing see ENGINE PERFORMANCE

AA

Pre-Ignition or Melted Electrodes	Incorrect type of fuel	Replace with correct fuel
-----------------------------------	------------------------	---------------------------

	Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
	Burned valves	Replace valves

	Engine Overheating	Check cooling system
--	--------------------	----------------------

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Wrong type of spark plug, too hot	Replace with correct spark plug, see ENGINE PERFORMANCE
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AA

Chipped Insulators	Severe detonation	Check for over- advanced timing or combustion
-----------------------	-------------------	---

Improper gapping procedure	Re-gap spark plugs
-------------------------------	--------------------

AA

Rust Colored Deposits	Additives in unleaded fuel	Try different fuel brand
--------------------------	-------------------------------	-----------------------------

AA

Water In Combustion Chamber	Blown head gasket or cracked head	Repair or replace head or head gasket
-----------------------------	--------------------------------------	--

AA

ELECTRONIC IGNITION DIAGNOSIS

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

BASIC ELECTRONIC IGNITION TROUBLE SHOOTING CHARTS

AA

CONDITION	POSSIBLE CAUSE	CORRECTION
-----------	----------------	------------

Engine Won't Start	Open circuit between distributor and bulkhead connector	Repair circuit
-----------------------	---	----------------

Open circuit between bulkhead connector and ignition switch	Repair circuit
---	----------------

Open circuit between ignition switch and starter solenoid	Repair circuit
---	----------------

AA

Engine Runs Rough	Fuel lines leaking or clogged	Tighten fitting, remove restriction
----------------------	----------------------------------	--

Initial timing incorrect	Reset ignition timing see ENGINE PERFORMANCE
--------------------------	---

Centrifugal advance malfunction	Repair distributor advance
------------------------------------	-------------------------------

Defective spark plugs or	Replace plugs or plug
--------------------------	-----------------------

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

ELECTRONIC IGNITION DIAGNOSIS BY OSCILLOSCOPE PATTERN

BASIC ELECTRONIC IGNITION TROUBLE SHOOTING

CHARTS - USING OSCILLOSCOPE PATTERNS

CONDITION	POSSIBLE CAUSE	CORRECTION
Firing Voltage Lines are the Same, but Abnormally High	Retarded ignition timing	Reset ignition timing, see ENGINE PERFORMANCE section
	Fuel mixture too lean	Readjust carburetor, see ENGINE PERFORMANCE
	High resistance in coil wire	Replace coil wire
	Corrosion in coil tower terminal	Clean and/or replace coil
	Corrosion in distributor coil terminal	Clean and/or replace distributor cap
Firing Voltage Lines are the Same but Abnormally Low	Fuel mixture too rich	Readjust carburetor, see ENGINE PERFORMANCE
	Breaks in coil wire causing arcing	Replace coil wire
	Cracked coil tower causing arcing	Replace coil
	Low coil output	Replace coil
	Low engine compression	Determine cause and repair
One or More, But	Carburetor idle mixture	Readjust carburetor,

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CONDITION	POSSIBLE CAUSE	CORRECTION

Hard Starting	Binding carburetor linkage	Eliminate binding
	Binding choke linkage	Eliminate binding
	Binding choke piston	Eliminate binding
	Restricted choke vacuum	Check vacuum lines for blockage
	Worn or dirty needle valve and seat	Clean carburetor, see ENGINE PERFORMANCE
	Float sticking	Readjust or replace float see the ENGINE PERFORMANCE section
	Incorrect choke adjustment	Reset choke adjustment see ENGINE PERFORMANCE
	Defective coil	Replace coil
	Improper spark plug gap	Regap spark plugs
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE	

Detonation	Over-advanced ignition timing	Reset ignition timing see ENGINE PERFORMANCE
	Defective spark plugs	Replace spark plugs
	Fuel lines clogged	Clean fuel lines
	EGR system malfunction	Check and repair EGR system
	PCV system malfunction	Repair PCV system
	Vacuum leaks	Check and repair vacuum system
	Loose fan belts	Tighten or replace fan belts, see ENGINE PERFORMANCE
	Restricted airflow	Remove restriction
Vacuum advance malfunction	Check distributor operation	

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Defective distributor vacuum advance Replace advance unit

Incorrect spark plugs or plug gap Check gap and/or replace spark plugs

Faulty choke operation Check choke and repair as required

Clogged vacuum passages Remove restrictions

Improper size or clogged main jet Check jet size and clean, see FUEL

Restricted air cleaner Check filter and replace as necessary

Defective distributor cap, rotor or coil Replace cap, rotor or coil

AA

Misfire at All Defective spark plugs Replace spark plugs
Speeds

Defective spark plug wires Replace spark plug wires

Defective distributor cap, rotor, or coil Replace cap, rotor, or coil

Cracked or broken vacuum hoses Replace vacuum hoses

Vacuum leaks Repair vacuum leaks

Fuel lines clogged Remove restriction

AA

Hesitation Cracked or broken vacuum hoses Replace vacuum hoses

Vacuum leaks Repair Vacuum leaks

Binding carburetor linkage Eliminate binding

Binding throttle linkage Eliminate binding

Binding choke linkage or fast idle cam Eliminate binding

Improper float setting Readjust float setting, see FUEL

Cracked or broken ignition Replace ignition

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	wires	wires
Rough idle, Missing or Stalling	Incorrect curb idle or fast idle speed	Reset idle speed, see see ENGINE PERFORMANCE
	Incorrect basic timing	Reset ignition timing see ENGINE PERFORMANCE
	Improper idle mixture adjustment	Reset idle mixture, see ENGINE PERFORMANCE
	Improper feedback system operation	Check feedback system see ENGINE PERFORMANCE
	Incorrect spark plug gap	Reset spark plug gap, see ENGINE PERFORMANCE
	Moisture in ignition components	Dry components
	Loose or broken ignition wires	Replace ignition wires
	Damaged distributor cap or or rotor	Replace distributor cap or rotor
	Faulty ignition coil	Replace ignition coil
	Fuel filter clogged or worn	Replace fuel filter
	Damaged idle mixture screw	Replace idle mixture screw, see FUEL
	Improper fast idle cam adjustment	Reset fast idle cam adjustment, see TUNE- see ENGINE PERFORMANCE
	Improper EGR valve operation	Replace EGR valve
	Faulty PCV valve air flow	Replace PCV valve
	Choke binding or improper choke setting	Reset choke or eliminate binding
	Vacuum leak	Repair vacuum leak
	Improper float bowl fuel level	Reset float adjustment, see FUEL
	Clogged air bleed or idle passages	Clean carburetor passages, see FUEL

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Clogged or worn air cleaner filter	Replace air filter
Faulty choke vacuum diaphragm	Replace diaphragm, see ENGINE PERFORMANCE
Exhaust manifold heat valve inoperative	Replace heat valve
Improper distributor spark advance	Check distributor operation
Leaking valves or valve components	Check and repair valvetrain
Improper carburetor mounting	Remove and remount carburetor
Excessive play in distributor shaft	Replace distributor
Loose or corroded wiring connections	Repair or replace as required

AA

Engine Surges	Improper PCV valve airflow	Replace PCV valve
	Vacuum leaks	Repair vacuum leaks
	Clogged air bleeds	Remove restriction
	EGR valve malfunction	Replace EGR valve
	Restricted air cleaner filter	Replace air filter
	Cracked or broken vacuum hoses	Replace vacuum hoses
	Cracked or broken ignition wires	Replace ignition wires
	Vacuum advance malfunction	Check unit and replace as necessary
	Defective or fouled spark plugs	Replace spark plugs

AA

Ping or Spark Knock	Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
	Distributor centrifugal or vacuum advance malfunction	Check operation and replace as necessary

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Carburetor setting too lean Readjust mixture setting, see ENGINE PERFORMANCE

Vacuum leak Eliminate vacuum leak

EGR valve malfunction Replace EGR valve

AA

Poor Gasoline Mileage Cracked or broken vacuum hoses Replace vacuum hoses

Vacuum leaks Repair vacuum leaks

Defective ignition wires Replace wires

Incorrect choke setting Readjust setting, see ENGINE PERFORMANCE

Defective vacuum advance Replace vacuum advance

Defective spark plugs Replace spark plugs

Binding carburetor power piston Eliminate binding

Dirt in carburetor jets Clean and/or replace jets

Incorrect float adjustment Readjust float setting, see FUEL

Defective power valve Replace power valve, see ENGINE PERFORMANCE

Incorrect idle speed Readjust idle speed

AA

Engine Stalls Improper float level Readjust float level

Leaking needle valve and seat Replace needle valve and seat

Vacuum leaks Eliminate vacuum leaks

AA

VACUUM PUMP - DIESEL TROUBLE SHOOTING

WARNING: This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to

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problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

NOTE: Diesel engines mechanical diagnosis is the same as gasoline engines for items such as noisy valves, bearings, pistons, etc. The following trouble shooting covers only items pertaining to diesel engines.

VACUUM PUMP (DIESEL) TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
Excessive Noise	Loose pump-to-drive assembly screws Loose tube on pump assembly Valves not functioning properly	Tighten screws Tighten tube Replace valves
Oil Leakage	Loose end plug Bad seal crimp	Tighten end plug Remove and re-crimp seal

WHEEL ALIGNMENT TROUBLE SHOOTING

WARNING: This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

BASIC WHEEL ALIGNMENT TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
Premature Tire Wear	Improper tire inflation Front alignment out of tolerance Suspension components worn Steering system components worn Improper standing height Uneven or sagging springs	Check tire pressure See ALIGNMENT SPECS in WHEEL ALIGNMENT section See SUSPENSION section See STEERING section See WHEEL ALIGNMENT See SUSPENSION section

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Bent wheel	See WHEEL ALIGNMENT
Improper torsion bar adjustment	See SUSPENSION section
Loose or worn wheel bearings	See WHEEL BEARING ADJ. in SUSPENSION section
Worn or defective shock	Replace shock absorbers

Tires out of balance	Check tire balance
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AA

Pulls to One Side

Improper tire inflation	Check tire pressure
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Brake dragging	See BRAKE section
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Mismatched tires	See WHEEL ALIGNMENT
------------------	---------------------

Broken or sagging spring	See SUSPENSION section
--------------------------	------------------------

Broken torsion bar	See SUSPENSION section
--------------------	------------------------

Power steering valve not centered	See STEERING section
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Front alignment out of tolerance	See WHEEL ALIGNMENT section
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Defective wheel bearing	See WHEEL BEARINGS in SUSPENSION section
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Uneven sway bar links	See SUSPENSION section
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Frame bent	Check for frame damage
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Steering system bushing worn	See STEERING section
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AA

Hard Steering

Idler arm bushing too tight	See STEERING LINKAGE in STEERING section
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Ball joint tight or seized	See SUSPENSION section
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Steering linkage too tight	See STEERING LINKAGE in STEERING section
----------------------------	--

Power steering fluid low	Add proper amount of fluid
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Power steering drive belt loose	See STEERING section
---------------------------------	----------------------

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Power steering pump defective See STEERING section

Steering gear out of adjustment See STEERING section

Incorrect wheel alignment See WHEEL ALIGNMENT

Damaged steering gear See STEERING section

Damaged suspension See SUSPENSION section

Bent steering knuckle or supports See SUSPENSION section

Vehicle "Wanders" Strut rod or control arm bushing worn See SUSPENSION section

Loose or worn wheel bearings See WHEEL BEARINGS in SUSPENSION section

Improper tire inflation Check tire pressure

Stabilizer bar missing or defective See SUSPENSION section

Wheel alignment out of tolerance See Adjustment in WHEEL ALIGNMENT section

Broken spring See SUSPENSION section

Defective shock absorbers Replace shock absorbers

Worn steering & suspension components See SUSPENSION section

Front End Shimmy Tire out of balance/round Check tire balance

Excessive wheel runout See WHEEL ALIGNMENT

Insufficient or improper caster See WHEEL ALIGNMENT section

Worn suspension or steering components See SUSPENSION section

Defective shock absorbers Replace shock absorber

Wheel bearings worn or loose See WHEEL BEARING ADJ. in SUSPENSION section

Power steering reaction See STEERING section

TROUBLE SHOOTING - BASIC PROCEDURES

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1993 Volkswagen EuroVan

For Volkswagen Technical Site

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Saturday, March 18, 2000 10:39PM

Bracket loose

Steering gear box (rack) mounting loose See STEERING section

Steering gear adjustment loose See STEERING section

Worn spherical joints See SUSPENSION section

AA

Toe-In Not Adjustable Lower control arm bent See SUSPENSION section

Frame bent Check frame for damage

AA

Camber Not Adjustable Control arm bent See SUSPENSION section

Frame bent Check frame for damage

Hub & bearing not seated properly See SUSPENSION section

AA

END OF ARTICLE