

TROUBLE SHOOTING - BASIC PROCEDURES

Article Text

1989 Toyota MR2

For Rse 555 Main Street Clarksville Va 22901

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ARTICLE BEGINNING

GENERAL TROUBLE SHOOTING

AIR CONDITIONING 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 AIR CONDITIONING TROUBLE SHOOTING CHART

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CONDITION

POSSIBLE CAUSE

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Compressor Not Working

- ù Compressor clutch circuit open.
- ù Compressor clutch coil inoperative.
- ù Poor clutch ground connection.
- ù Fan belts loose.
- ù Thermostatic switch inoperative.
- ù Thermostatic switch not adjusted.
- ù Ambient temperature switch open.
- ù Superheat fuse blown.

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Excessive Noise or Vibration

- ù Missing or loose mounting bolts.
- ù Bad idler pulley bearings.
- ù Fan belts not tightened correctly.
- ù Compressor clutch contacting body.
- ù Excessive system pressure.
- ù Compressor oil level low.
- ù Damaged clutch bearings.
- ù Damaged reed valves.
- ù Damaged compressor.

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Insufficient or No Cooling;

Compressor Working

- ù Expansion valve inoperative.
- ù Heater control valve stuck open.
- ù Low system pressure.
- ù Blocked condenser fins.
- ù Blocked evaporator fins.
- ù Vacuum system leak.
- ù Vacuum motors inoperative.
- ù Control cables improperly adjusted.
- ù Restricted air inlet.

- ù Mode doors binding.
- ù Blower motor inoperative.
- ù Temperature above system capacity.

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BRAKE SYSTEM TROUBLE SHOOTING

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BRAKE SYSTEM TROUBLE SHOOTING CHART

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CONDITION	POSSIBLE CAUSE	CORRECTION
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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

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

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Noises With

Brakes Applied	Insulator on outboard shoe damaged	See DISC BRAKES or BRAKE SYSTEM
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	Incorrect pads or linings	Replace pads or linings
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Brake Rough, Chatters

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

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

Travel	Partial brake system failure	Check fluid and pipes
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	Insufficient fluid in	
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TROUBLE SHOOT

master cylinder	See MASTER CYLINDERS or BRAKE SYSTEM
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Air trapped in system	See BRAKE BLEEDING or BRAKE SYSTEM
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Rear brakes not adjusted	See Adjustments in DRUM BRAKES or BRAKE SYSTEM
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Bent shoe or lining	See DRUM BRAKES or BRAKE SYSTEM
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Plugged master cylinder cap	See MASTER CYLINDERS or BRAKE SYSTEM
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Improper brake fluid	Replace brake fluid
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Pedal Travel
Decreasing

Compensating port plugged	See MASTER CYLINDERS or BRAKE SYSTEM
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Swollen cup in master cylinder	See MASTER CYLINDERS or BRAKE SYSTEM
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Master cylinder piston not returning	See MASTER CYLINDERS or BRAKE SYSTEM
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Weak shoe retracting springs	See DRUM BRAKES BRAKE SYSTEM
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Wheel cylinder piston sticking	See DRUM BRAKES or BRAKE SYSTEM
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Dragging
Brakes

Master cylinder pistons not returning	See MASTER CYLINDERS BRAKE SYSTEM
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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
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Remove and replace
correctly

See POWER BRAKE UNITS
BRAKE SYSTEM

See DISC, DRUM BRAKES
BRAKE SYSTEM

Brakes Grab or Uneven Braking Action

See CONTROL VALVE or
BRAKE SYSTEM

See POWER BRAKE UNITS
or BRAKE SYSTEM

See DISC, DRUM BRAKES
or BRAKE SYSTEM

Pulsation or Roughness

See DISC BRAKES or
BRAKE SYSTEM

See DISC BRAKES or
BRAKE SYSTEM

Reface or replace drums

CARBURETOR TROUBLE SHOOTING:

READ THIS FIRST:

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COLD START SYMPTOMS

BASIC COLD START SYMPTOMS TROUBLE SHOOTING CHART

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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
Engine Starts, Then Dies	Choke vacuum kick setting too wide	Check setting and adjust see, FUEL SYSTEMS
	Fast idle RPM too low	Reset RPM to specification, see TUNE-UP
	Fast idle cam index incorrect	Reset fast idle cam index, see FUEL SYSTEMS
	Vacuum leak	Inspect vacuum system for leaks
	Low fuel pump outlet	Repair or replace pump, see FUEL SYSTEMS
	Low carburetor fuel level	Check float setting see FUEL SYSTEM
Engine Quits Under Load	Choke vacuum kick setting incorrect	Reset vacuum kick setting, see FUEL SYSTEMS
	Fast idle cam index incorrect	Reset fast idle cam index, see FUEL SYSTEM
	Incorrect hot fast idle speed RPM	Reset fast idle RPM, see TUNE-UP
Engine Starts, Runs Up, Then Idles, Slowly With Black Smoke	Choke vacuum kick set too narrow	Reset vacuum kick, see FUEL SYSTEMS
	Fast idle cam index incorrect	Reset fast idle cam index, see FUEL SYSTEMS

Hot fast idle RPM too low

Reset fast idle RPM,
see TUNE-UP

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HOT STARTING SYMPTOMS

BASIC HOT START SYMPTOMS TROUBLE SHOOTING CHART

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

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COLD ENGINE DRIVEABILITY SYMPTOMS

BASIC COLD ENGINE DRIVEABILITY SYMPTOMS TROUBLE SHOOTING CHART

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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
	Fast idle cam index incorrect	Reset fast idle cam see FUEL SYSTEMS
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

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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
Backfiring & Black Smoke	Plugged heat crossover system	Remove restriction

WARM ENGINE DRIVEABILITY SYMPTOM

BASIC WARM ENGINE DRIVEABILITY SYMPTOMS TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
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 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
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

TROUB

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

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CHARGING SYSTEM TROUBLE SHOOTING

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BASIC CHARGING SYSTEM TROUBLE SHOOTING CHART

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CONDITION	POSSIBLE CAUSE	CORRECTION
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Vehicle Will Not Start	Dead battery	Check battery cells, alternator belt tension and alternator output
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Loose or corroded battery connections	Check all charging system connections
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Ignition circuit or switch malfunction	Check and replace as necessary
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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
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Loose alternator wiring connections	Check all charging system connections
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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

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

AA		
Battery	Defective battery	Check alternator
Overcharged-		output and repair as
Uses Too Much		necessary
Water		
	Defective alternator	See On-Vehicle Test and
		Bench Tests in
		ALTERNATOR article
	Excessive alternator voltage	Check alternator output
		and repair as necessary
AA		

CLUTCH TROUBLE SHOOTING

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BASIC CLUTCH TROUBLE SHOOTING CHART		
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CONDITION	POSSIBLE CAUSE	CORRECTION
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
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
Failure to Release	Oil or grease on clutch facings
	Clean or replace clutch 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

	Incorrect transmission alignment	Realign transmission
	Dry release fork between pivot	Lubricate release fork and pivot
Heavy and/or Stiff Pedal	Sticking release bearing sleeve	Replace release bearing and/or sleeve
	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
Noisy Clutch Pedal	Faulty clutch cable	Replace clutch cable
	Faulty interlock switch	Replace interlock switch
	Self-adjuster ratchet noise	Lubricate or replace self-adjuster
	Speed control interlock switch	Lubricate or replace interlock switch
Clutch Pedal Sticks Down	Binding clutch cable	See CLUTCH article
	Springs weak in pressure plate	Replace pressure plate
	Binding in clutch linkage	Lubricate and free linkage
Noisy	Dry release bearing	Lubricate or replace release bearing
	Dry or worn pilot bearing	Lubricate or replace bearing
Transmission	Worn input shaft bearing	Replace bearing
	Weak springs in pressure plate	Replace pressure plate

Release fork loose on ball stud	Replace release fork and/or ball stud
Oil on clutch disc damper	Replace clutch disc
Broken spring in slave cylinder	Replace slave cylinder

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COOLING SYSTEM TROUBLE SHOOTING

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COOLING SYSTEM TROUBLE SHOOTING		
AA		
CONDITION	POSSIBLE CAUSE	CORRECTION
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

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
Corrosion	Clean/Flush System
Impurities In Coolant	
Coolant Leakage	Replace Hose
Damaged hose	
Leaky Water Pump	Replace Water Pump
Damaged Radiator Seam	Replace/Repair Radiator
Leaky Thermostat Cover	Replace Thermostat Cover
Cylinder Head Problem	Check Head/Head Gasket
Leaky Freeze Plugs	Replace Freeze Plugs
Recovery System Inoperative	
Loose and/or Defective Radiator Cap	Replace Radiator Cap
Overflow Tube Clogged and/or Leaking	Repair Tube
Recovery Bottle Vent Restricted	Clean Vent
No Heater Core Flow	
Collapsed Heater Hose	Replace Heater Hose
Plugged Heater Core	Clean/Replace Heater Core
Faulty Heater Valve	Replace Heater Valve

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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
AA		
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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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

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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
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
Fuel Leaks On Ground	Loose or broken fuel line Internal injection pump seal leak	Check lines and connections Replace injection pump, see FUEL SYSTEMS
Cylinder Knocking Noise	Injector nozzles sticking open Very low nozzle opening pressure	Test injectors, see FUEL SYSTEMS Test injectors and/or replace
Loss of Engine Power	Restricted air intake EGR valve malfunction Blocked or damaged exhaust system Blocked fuel tank filter Restricted fuel filter Block vent in gas cap Tank-to-injection pump fuel supply blocked Blocked fuel return system Incorrect or contaminated fuel Blocked injector nozzles Low compression	Remove restriction Replace EGR valve Remove restriction and/or replace components Replace filter Remove restriction and/or replace filter Remove restriction and/or replace cap Check fuel lines and connections Remove restriction Replace fuel Check nozzle for blockage, see FUEL SYSTEMS Check valves, rings, pistons, see ENGINES
Loud Engine Noise With Black Smoke	Basic timing incorrect EGR valve malfunction Internal injection pump	Reset timing, see FUEL SYSTEMS Replace EGR valve Replace injection pump, TROUB

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 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

TROUBLE SH

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 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

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DRIVE AXLE (RWD) TROUBLE SHOOTING

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CONDITION	POSSIBLE CAUSE	CORRECTION
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AA

Knocking or Clunking	Differential Side Gear Clearance	Check Clearance
	Worn Pinion Shaft	Replace Pinion Shaft

Axle Shaft End Play	Check End Play
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

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FWD AXLE SHAFTS & CV JOINTS TROUBLE SHOOTING

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BASIC FWD AXLE SHAFTS & CV JOINTS TROUBLE SHOOTING CHART

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

FUEL INJECTION TROUBLE SHOOTING

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BASIC FUEL INJECTION TROUBLE SHOOTING CHART

AA		
CONDITION	POSSIBLE CAUSE	CORRECTION
AA		
Engine Won't Start (Crank Normally)	Cold start valve inoperative	Test valve and circuit
	Poor connection;vacuum or wiring	Check vacuum and electrical connections

AA

Poor High Speed Operation	Low fuel pump volume	Faulty pump or restricted fuel lines or filters
	Poor MAP sensor signal	Test MAP sensor, vacuum hose and wiring
	Poor Oxygen sensor signal	Test for shorted or open sensor or circuit
	Open coolant temperature sensor circuit	Test sensor and 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

AA

Ping or Knock on Acceleration	Poor Knock sensor signal	Test for shorted or open sensor or circuit	TROUBLE SHOOTING
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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

AA

NOTE: For additional electronic fuel injection trouble shooting information, see the appropriate article in the ENGINE PERFORMANCE section (not all vehicles have Computer Engine 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		
AA		
CONDITION	POSSIBLE CAUSE	CORRECTION
AA		
Engine Lopes At Idle	Intake manifold-to-head leaks	Replace manifold gasket, See ENGINES
	Blown head gasket	Replace head gasket, See ENGINES
	Worn timing gears, chain or sprocket	Replace gears, chain or sprocket
	Worn camshaft lobes	Replace camshaft, See ENGINES
	Overheated engine	Check cooling system, See COOLING
	Blocked crankcase vent	Remove restriction

TRouble SH

	Leaking valves	Replace valves, See ENGINES
	Worn fuel pump diaphragm or piston	Replace diaphragm or piston
AAA		
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
AAA		
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
AAA		
Engine	Ignition timing too far advanced	Reset ignition timing, See TUNE-UP
Detonation	Faulty ignition system	Check ignition timing, See TUNE-UP
	Spark plugs loose or faulty	Retighten or replace plugs
	Fuel delivery system clogged	Inspect lines, pump and filter for clog
	EGR valve inoperative	Replace EGR valve
	PCV system inoperative	Inspect and/or replace hoses or valve
	Vacuum leaks	Check vacuum system and repair leaks
	Excessive combustion chamber deposits	Remove built-up deposits
	Leaking, sticking or broken valves	Inspect and/or replace valves
AAA		
External Oil	Fuel pump improperly seated	Remove pump, replace gasket and seat
Leakage	or worn gasket	properly TROUBLE SHOOTING

	Oil pan gasket broken or pan bent	Straighten pan and replace gasket
	Timing chain cover gasket broken	Replace timing chain cover gasket
	Rear main oil seal worn	Replace rear main oil seal
	Oil pan drain plug not seated properly	Remove and reinstall drain plug
	Camshaft bearing drain hole blocked	Remove restriction
	Oil pressure sending switch leaking	Remove and reinstall sending switch
AAA		
Excessive Oil Consumption	Worn valve stems or guides	Replace stems or guides, See ENGINES
	Valve "O" ring seals damaged	Replace "O" ring seals, See ENGINES
	Plugged oil drain back holes	Remove restrictions
	Improper PCV valve operation	Replace PCV valve
	Engine oil level too high	Remove excess oil
	Engine oil too thin	Replace thicker oil
	Valve stem oil deflectors damaged	Replace oil deflectors
	Incorrect piston rings	Replace piston rings, See ENGINES
	Piston ring gaps not staggered	Reinstall piston rings, See ENGINES
	Insufficient piston ring tension	Replace rings, See ENGINES
	Piston ring grooves or oil return slots clogged	Replace piston rings, 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

TROUBLE SHOOTING - BA

bearings, See ENGINES

[illegible]

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

[illegible]

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

[illegible]

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

[illegible]

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

TROUBLE SHOOTING

TROUBLE SHOOTING

	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
	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

	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
<div style="border-top: 1px solid black; height: 1px; margin-top: 10px;"></div>		
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
<div style="border-top: 1px solid black; height: 1px; margin-top: 10px;"></div>		
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
<div style="border-top: 1px solid black; height: 1px; margin-top: 10px;"></div>		
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
	Improper connecting rod alignment	Remove and realign connecting rods
	Excessively worn ring grooves	Replace pistons, See ENGINES
	Improperly assembled	Re-assemble pin-to

piston pins	-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

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

CONDITION	POSSIBLE CAUSE
Insufficient, Erratic, or No Heat	<ul style="list-style-type: none"> 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.

Too Much Heat	<ul style="list-style-type: none"> 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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Air Flow Changes During
Acceleration

- ù Vacuum system leak.
- ù Bad check valve or reservoir.

AA

Air From Defroster At All
Times

- ù Vacuum system leak.
- ù Improperly adjusted control cables.
- ù Inoperative vacuum motor.

AA

Blower Does Not Operate
Correctly

- ù Blown fuse.
- ù Blower motor windings open.
- ù Resistors burned out.
- ù Motor ground connection loose.
- ù Wiring harness connections loose.
- ù Blower motor switch inoperative.
- ù Blower relay inoperative.
- ù Fan binding or foreign object in housing.
- ù Fan blades broken or bent.

AA

IGNITION SYSTEM TROUBLE SHOOTING

PLEASE READ THIS FIRST:

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IGNITION SECONDARY TROUBLE SHOOTING CHART

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3 START: Visually inspect Spark Plug Wires, Coil Wires, 3
3 Plug Wire Boots, Rotor, and Distributor Cap for 3
3 signs of damage. 3

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UAAA¿¿

3 OK 3

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3 NOT OK 3

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3 * To test secondary ignition system, modify a Spark Plug by attaching a ground wire to the body of the plug and widening the gap to 1/4-3/8". Disconnect spark plug wire and insert test plug. Ground plug, crank engine, and check for spark.

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UAAAAAAAAAAAA¿

3 GOOD SPARK 3

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UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA¿

3 * If plug sparks, driveability problem is most likely NOT in the ignition system.

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAUU

UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA¿

UAAAAAAAAAAAA¿

3 GOOD SPARK 3

AAAAAAAAAAAAUU

UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA¿

3 * If plug has a good spark, the problem is in the plug wires, distributor cap, or rotor. Replace components as necessary.

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3 * Repair or replace damaged components as necessary

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UAAAAAAAAAAAA¿

3 NO SPARK 3

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UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA¿

3 * Remove coil wire from the distributor and attach the modified spark plug. Ground the plug and crank engine while checking for spark.

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UAAAAAAAAAAAA¿

3 NO SPARK 3

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UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA¿

3 * Proceed to the IGNITION PRIMARY TROUBLE SHOOTING CHECK CHART below in this article.

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IGNITION PRIMARY TROUBLE SHOOTING CHART

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3 START: Visually inspect primary ignition wires for broken, frayed, split, or cut wires. Also check for loose, corroded, or disconnected connectors.

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3 OK 3

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3 * Check that battery voltage is at least 11.5 volts.

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UAAAA¿

3 NOT OK 3

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3 * Repair or replace damaged components as necessary.

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3 * Check wires from the battery/3	3 * Replace ballast resistor 3
3 ignition switch to the coil. 3	3 if the measured resistance 3
3 Also check the coil primary 3	3 value is not within 3
3 and secondary resistance. 3	3 specification. 3
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAUU	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAUU

MANUAL STEERING GEAR 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 MANUAL STEERING GEAR TROUBLE SHOOTING CHART

AA		
CONDITION	POSSIBLE CAUSE	CORRECTION
AA		
Rattle or Chuckling Noise in Rack and Pinion	Rack and pinion mounting bracket loose	Tighten all mounting bolts
	Lack of/or incorrect lubricant	Correct as necessary
	Steering gear mounting bolts loose	Tighten all mounting bolts
AA		
Excessive Play	Front wheel bearing improperly adjusted	See FRONT SUSPENSION article
	Loose or worn steering linkage	See STEERING LINKAGE article
	Loose or worn steering gear shift	See MANUAL STEERING GEAR article
	Steering arm loose on gear shaft	See MANUAL STEERING GEAR article
	Steering gear housing bolts loose	Tighten all mounting bolts
	Steering gear adjustment too loose	See MANUAL STEERING GEAR article

Steering arms loose on knuckles	Tighten and check steering linkage
Rack and pinion mounting loose	Tighten all mounting bolts
Rack and pinion out of adjustment	See adjustment in STEERING article
Tie rod end loose	Tighten and check steering linkage
Excessive Pitman shaft-to-ball nut lash	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
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Tie rod binding Inflate to proper pressure

Shaft seal rubbing shaft See STEERING COLUMN
article

Excessive Vertical Motion	Improper tire pressure	Inflate to proper pressure
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Tires, wheels or rotors out of balance	Balance tires then check wheels and rotors
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Worn or faulty shock absorbers	Check and replace if necessary
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Loose tie rod ends or steering	Tighten or replace if necessary
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-BASIC PROCEDURESArticle Text (p. 41) 1989 Toyota MR2 or Rse 355 M

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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

AA

Instability	Brakes dragging	See BRAKES article
	Low or uneven tire pressure	Inflate to proper pressure
	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

WARNING: This is GENERAL information. This article is not intended
TROUBLE SHOOTING - BASIC PROCEDURES Article Text (p. 42)

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 POWER STEERING TROUBLE SHOOTING CHART

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CONDITION	POSSIBLE CAUSE	CORRECTION
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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 thrust bearing adjustment	See POWER STEERING GEAR
	Free play in pot coupling	See STEERING COLUMN article
	Worn shaft serrations	See STEERING COLUMN article

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Growl in Steering Pump	Excessive pressure in hoses	Restricted hoses, see POWER STEERING GEAR article
	Scored pressure plates	See POWER STEERING GEAR article
	Scored thrust plates or rotor	See POWER STEERING GEAR article
	Extreme wear of cam ring	See POWER STEERING GEAR article

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Rattle in Steering Pump	Vanes not installed	See POWER STEERING PUMP article
	Vanes sticking in rotor	See POWER STEERING PUMP article
Swish noise in Pump	Defective flow control valve	See POWER STEERING PUMP article
Groan in Steering Pump	Air in fluid	See POWER STEERING PUMP article
	Poor pressure hose connection	Tighten and check, replace if necessary
Squawk When Turning	Damper "O" ring on valve spool cut	See POWER STEERING PUMP article
Moan or Whine in Pump	Pump shaft bearing scored	Replace bearing and fluid
	Air in fluid or fluid level low	See POWER STEERING PUMP article
	Hose or column grounded	Check and replace if necessary
	Cover "O" ring missing or damaged	See POWER STEERING PUMP article
	Valve cover baffle missing or damaged	See POWER STEERING PUMP article
	Interference of components in pump	See POWER STEERING PUMP article
	Loose or poor bracket alignment	Correct or replace if necessary
Hissing When Parking	Internal leakage in steering gear	Check valved assembly first
Chirp in Steering Pump	Loose or worn power steering belt	Adjust or replace if necessary
Buzzing When Not Steering	Noisy pump	See POWER STEERING PUMP article

	Free play in steering shaft bearing	See STEERING COLUMN article
	Bearing loose on shaft serrations	See STEERING COLUMN article
Clicking Noise in Pump	Pump slippers too long	See POWER STEERING 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
Poor Return of Wheel	Wheel rubbing against turn signal	See STEERING COLUMN 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
	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

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Loose fan belt	Adjust or replace if necessary
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Sticky flow control valve See POWER STEERING PUMP
article

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Worn poppet valve in steering gear	See POWER STEERING PUMP article
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Thrust bearing out of adjustment	See POWER STEERING GEAR article
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Steering gear coupling loose on shaft	See POWER STEERING PUMP article
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Coupling loose on worm shaft	Tighten or replace if necessary
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Excessive worm piston side play	See POWER STEERING GEAR article
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Damaged valve lever	See POWER STEERING GEAR TROUBLESHOOTING
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		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
	Right turn reaction seal	See POWER STEERING GEARTROUBL

article

See POWER STEERING GEAR
article

See POWER STEERING GEAR
article

See POWER STEERING GEAR
article

[illegible]

Replace, see POWER
STEERING GEAR article

[illegible]

See WHEEL ALIGNMENT

See POWER STEERING GEAR
article

[illegible]

See POWER STEERING PUMP
article

See POWER STEERING PUMP
article

Replace and check
adjustments

See POWER STEERING PUMP
article

See POWER STEERING PUMP
article

See POWER STEERING PUMP
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See POWER STEERING PUMP
article

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STARTER TROUBLE SHOOTING

WARNING: This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle

TROUBLE

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 STARTER TROUBLE SHOOTING CHART

AA

CONDITION	POSSIBLE CAUSE	CORRECTION
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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	See STARTER article

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dry

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

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

Check that all

TROUBLE SHI

between
battery and starter are
clean and tight

See Bench Tests in
STARTER article

See **STARTER** article

Replace solenoid

Replace starter

Starter Engages Engine Only	Engine timing too far advanced	See Ignition Timing in TUNE-UP article
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Replace overrunning clutch. See STARTER article

See **STARTER** article

Replace flywheel and
check starter pinion
gear for damage

See **STARTER** article

See Bench Tests in
STARTER article

Starter Drive Will Not Engage	Defective point assembly	See Testing in STARTER article
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See Testing in STARTER
article

Replace starter
solenoid

Starter Relay Does Not Close	Dead battery	Charge or replace battery as necessary
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Check all wiring and connections before shooting.

		relay
	Neutral safety switch faulty	Replace neutral safety switch
	Starter relay faulty	Replace starter relay
AAAAAA	AAAAAA	AAAAAA
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
	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
AAAAAA	AAAAAA	AAAAAA
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
AAAAAA	AAAAAA	AAAAAA
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
Low Current Draw	Worn brushes or weak	Replace brushes or brush springs as necessary
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
High Pitched Whine After Engine Fires With Key released. Engine Fires and Cranks Normally	Distance too small between starter pinion and flywheel Flywheel runout contributes to the intermittent nature	

STEERING COLUMN TROUBLE SHOOTING

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BASIC STEERING COLUMN TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
Noise in Steering	Coupling pulled apart	See STEERING COLUMNS article
	Column not correctly aligned	See STEERING COLUMNS article

Broken lower joint	Replace joint
Horn contact ring not	See STEERING COLUMN article
Bearing not lubricated	See STEERING COLUMN article
Shaft snap ring not properly seated	Reseat or replace snap ring
Plastic spherical joint not lubricated	See STEERING COLUMN article
Shroud or housing loose	Tighten holding screws
Lock plate retaining ring not seated	See STEERING COLUMN article
Loose sight shield	Tighten holding screws
High Steering Shaft Effort	Column assembly misaligned
	See STEERING COLUMN article
	Improperly installed dust shield
	Adjust or replace
	Tight steering universal joint
	See STEERING COLUMN article
High Shift Effort	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
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
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
Steering Locks in Gear	Release lever mechanism	See STEERING COLUMN article

SUSPENSION TROUBLE SHOOTING

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BASIC SUSPENSION TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
Front End Noise	Loose or worn wheel	See Wheel Bearing Adjustment in

	Improper rear axle alignment	Check rear axle alignment
	Power steering gear unbalanced	See STEERING
	Front brakes dragging	See BRAKES
Abnormal Tire Wear	Unbalanced tires	Check tire balance & rotation
	Sagging or broken springs	See SUSPENSION
	Incorrect front end alignment	See WHEEL ALIGNMENT
Scuffed Tires	Faulty shock absorbers	Replace chock absorbers
	Toe-In incorrect	See WHEEL ALIGNMENT
	Suspension arm bent or twisted	See appropriate SUSPENSION article
Springs Bottom or Sag	Bent or broken springs	See SUSPENSION
	Leaking or worn shock absorbers	Replace shock absorbers
Spring Noises	Frame misalignment	Check frame for damage
	Loose "U" Bolts	See SUSPENSION
	Loose or worn bushings	See SUSPENSION
Shock Absorber Noise	Worn or missing interliners	See SUSPENSION
	Loose shock mountings	Check & tighten mountings
	Worn bushings	Replace bushings
	Air in system	Bleed air from system
Car Leans or Sways on Corners	Undercoating on shocks	Remove undercoating
	Loose stabilizer bar	See SUSPENSION

Faulty shocks or mountings	Replace shocks or mountings
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Broken or sagging springs	See SUSPENSION
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AA

Shock Absorbers	Worn seals or reservoir	See SUSPENSION
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Leaking	tube crimped
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AA

Broken Springs	Loose "U" bolts	See SUSPENSION
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Inoperative shock absorbers	Replace shock absorbers
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AA

TUNE-UP TROUBLE SHOOTING - GAS ENGINE VEHICLES

PLEASE READ THIS FIRST:

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SPARK PLUG DIAGNOSIS

BASIC SPARK PLUG TROUBLE SHOOTING CHARTS

AA

CONDITION	POSSIBLE CAUSE	CORRECTION
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AA

Normal Spark	Light Tan or Gray deposits	No Action
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Plug Condition

Electrode not burned or fouled	No Action
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Gap tolerance not changed	No Action
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AA

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

	Wrong type of spark plug, too hot	Replace with correct spark plug, see ENGINE PERFORMANCE
Chipped Insulators	Severe detonation	Check for over- advanced timing or combustion
	Improper gapping procedure	Re-gap spark plugs
Rust Colored Deposits	Additives in unleaded fuel	Try different fuel brand
Water In Combustion Chamber	Blown head gasket or cracked head	Repair or replace head or head gasket

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

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
Engine Runs Rough	Fuel lines leaking or clogged	Tighten fitting, remove restriction
	Initial timing incorrect	Reset ignition timing see ENGINE PERFORMANCE

	malfunction	advance
	Defective spark plugs or wiring	Replace plugs or plug wiring
Component Failure	Spark arc-over on cap, rotor or coil	Replace cap, rotor or 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

TRUBLE SH

engine

repair

Defective spark plugs

Replace spark plugs

Spark plugs fouled

Replace spark plugs

AA

DRIVEABILITY PROBLEMS TROUBLE SHOOTING

BASIC DRIVEABILITY PROBLEMS TROUBLE SHOOTING TABLE

AA

CONDITION	POSSIBLE CAUSE	CORRECTION
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AA

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

Dieseling

Binding carburetor linkage

Eliminate binding

Binding throttle linkage

Eliminate blinding

Binding choke linkage or
fast idle cam

Eliminate binding

Defective idle solenoid

Replace idle solenoid
see ENGINE PERFORMANCE

Improper base idle speed

Reset idle speed, see
see ENGINE PERFORMANCE

Incorrect ignition timing

Reset ignition timing
see ENGINE PERFORMANCE

Incorrect idle mixture
setting

Reset idle mixture,
see ENGINE PERFORMANCE

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Faulty

Incorrect ignition timing

Reset ignition timing
see ENGINE PERFORMANCE

Acceleration

Engine cold and choke too lean

Adjust choke and
allow engine to warm-
up

Defective spark plugs

Replace spark plugs

Defective coil

Replace coil

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Faulty Low Speed

Clogged idle transfer slots

Clean idle transfer
slots, see FUEL

Operation

TROUBLE SHOOTING - BAS

	Cracked or broken vacuum hoses	Replace vacuum hoses
	Vacuum leaks	Repair vacuum leaks
	Fuel lines clogged	Remove restriction
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
Rough idle, Missing or Stalling	Cracked or broken ignition wires	Replace ignition wires
	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

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
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

		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
Engine Stalls	Improper float level	Readjust float level
	Leaking needle valve and seat	Replace needle valve and seat
	Vacuum leaks	Eliminate vacuum leaks

VACUUM PUMP - DIESEL 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.

VACUUM PUMP (DIESEL) TROUBLE SHOOTING CHART

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

WHEEL ALIGNMENT TROUBLE SHOOTING

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BASIC WHEEL ALIGNMENT TROUBLE SHOOTING CHART		
AA		
CONDITION	POSSIBLE CAUSE	CORRECTION
AA		
Premature Tire Wear	Improper tire inflation	Check tire pressure
	Front alignment out of tolerance	See ALIGNMENT SPECS in WHEEL ALIGNMENT section
	Suspension components worn	See SUSPENSION section
	Steering system components worn	See STEERING section
	Improper standing height	See WHEEL ALIGNMENT
	Uneven or sagging springs	See SUSPENSION section
	Bent wheel	See WHEEL ALIGNMENT
	Improper torsion bar adjustment	See SUSPENSION section
	Loose or worn wheel bearings	See WHEEL BEARING ADJ. in SUSPENSION section

See STEERING section

See WHEEL ALIGNMENT

See STEERING section

See SUSPENSION section

See SUSPENSION section

[illegible]

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

See WHEEL BEARINGS in
SUSPENSION section

Check tire pressure

See SUSPENSION section

See Adjustment in
WHEEL ALIGNMENT section

See SUSPENSION section

Replace shock absorbers

See SUSPENSION section

[illegible]

Front End Shimmy	Tire out of balance/round	Check tire balance
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See WHEEL ALIGNMENT

See WHEEL ALIGNMENT
section

See SUSPENSION section

Replace shock absorber

See WHEEL BEARING ADJ.
in SUSPENSION section

Power steering reaction See STEERING section
Bracket loose

Steering gear box (rack) See STEERING section
mounting loose

Steering gear adjustment See STEERING section
loose

Worn spherical joints See SUSPENSION section

AA

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

Frame bent Check frame for damage

AA

Camber Not Control arm bent See SUSPENSION section
Adjustable

Frame bent Check frame for damage

Hub & bearing not seated See SUSPENSION section
properly

AA

END OF ARTICLE