

# TROUBLE SHOOTING - BASIC PROCEDURES

## Article Text

1993 Honda Prelude

For Cadi Centre Nsk CA 95051

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Sunday, July 08, 2001 11:40AM

### ARTICLE BEGINNING

#### GENERAL TROUBLE SHOOTING

**\* PLEASE READ THIS FIRST \***

**NOTE:** 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.

#### ACCESSORIES & ELECTRICAL

##### 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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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
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Check all charging  
system connections

See Indicator Warning  
Lights in STANDARD  
INSTRUMENTS in the  
ACCESSORIES &  
EQUIPMENT section

See Bench Tests in  
ALTERNATOR article

See Regulator Check in  
ALTERNATOR article

**See WIRING DIAGRAMS**

See Testing in  
ALTERNATOR article

See Indicator Warning  
Lights in STANDARD  
INSTRUMENTS in the  
ACCESSORIES &  
EQUIPMENT section

See On-Vehicle Tests  
in ALTERNATOR article

See Bench Tests in  
ALTERNATOR article

See On-Vehicle Tests  
in ALTERNATOR article

See Regulator Check in  
ALTERNATOR article

Check and replace as  
necessary

**TROUBLE SHOOT**

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
AAA		
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
AAA		
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 TROUBLESHOOTING

ALTERNATOR article

Add-on electrical accessories    Install larger  
exceeding alternator capacity    alternator

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
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Excessive alternator voltage	Check alternator output and repair as necessary
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IGNITION SYSTEM TROUBLE SHOOTING

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Ignition Secondary Trouble Shooting Chart

UAAA?

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

AAU

UAA?

UAAAA?	UAAAAAAAA?
? OK ?	? NOT OK ?
AAAAAU	AAAAAAAU

UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?

? \* 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 ?

UAAAAAAAAAAAAAAAAAAAAAAAAAAAA?

? \* Repair or replace ?  
? damaged components ?  
? as necessary ?  
AAAAAAAAAAAAAAAAAAAAAU



AAU

UAAA?

UAAAA?

UAAAAAAAA?

? OK ?

? NOT OK ?

AAAAAU

AAAAAAAU

UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?

UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?

? \* Check air Gap of the Pick-Up?

? \* Check resistance of ballast?

? coil in the distributor. ?

? resistor (if used) for the ?

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAU

? correct resistance value. ?

?

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UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?

?

UAAAA?

UAAAAAAAA?

?

? OK ?

? NOT OK ?

?

AAAAAU

AAAAAAAU

?

UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?

UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?

?

? \* Check Pick-Up coil for ?

? \* Adjust or replace as ?

?

? correct resistance value. ?

? necessary. ?

?

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UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?

?

UAAAAAAAA?

UAAAA?

?

? NOT OK ?

? OK ?

?

AAAAAAAU

AAAAAU

?

UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?

UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?

?

? \* Replace Pick-Up coil if ?

? \* Check control module for ?

?

? not to specification. ?

? good ground connections. ?

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?

UAAAA?

?

? OK ?

?

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?

? \* If vehicle fails to run at this point, go to?

?

? the appropriate article in the ENGINE ?

?

? PERFORMANCE section. ?

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UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?

UAAAA?

UAAAAAAAA?

? OK ?

? NOT OK ?

AAAAAU

AAAAAAAU

UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?

UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?

? \* Check wires from the battery?

? \* Replace ballast resistor ?

? ignition switch to the coil.?

? if the measured resistance?

? Also check the coil primary ?

? value is not within ?

? and secondary resistance. ?

? specification. ?

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BASIC STARTER TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
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
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
Starter Turns but Engine Does Not Rotate	Starter clutch slipping	See STARTER article

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Pinion shaft rusted or dry	See STARTER article
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Engine basic timing incorrect	See Ignition Timing in TUNE-UP article
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Broken teeth on engine flywheel	Replace flywheel and check for starter pinion gear damage
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Starter Will Not Crank Engine	Faulty overrunning clutch	See STARTER article
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Broken clutch housing	See STARTER article
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Broken flywheel teeth	Replace flywheel and check for starter pinion gear damage
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Armature shaft sheared or reduction gear teeth stripped	See STARTER article
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Weak battery	Charge or replace battery as necessary
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Faulty solenoid	See On-Vehicle Tests in STARTER article
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Poor grounds	Check all ground connections for tight and clean connections
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Ignition switch faulty or misadjusted	Adjust or replace ignition switch as necessary
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Starter Cranks Engine Slowly	Battery weak or defective	Charge or replace battery as necessary
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Engine overheated	See ENGINE COOLING SYSTEM article
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Engine oil too heavy	Check that proper viscosity oil is used
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TROUBLE SH



Poor battery-to-starter connections	Check that all between battery and starter are clean and tight
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Current draw too low or too high	See Bench Tests in STARTER article
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Bent armature, loose pole shoes screws or worn bearings	See STARTER article
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Burned solenoid contacts	Replace solenoid
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Faulty starter	Replace starter
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Starter Engages Engine Only Momentarily	Engine timing too far advanced	See Ignition Timing in TUNE-UP article
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Overrunning clutch not engaging properly	Replace overrunning clutch. See STARTER article
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Broken starter clutch	See STARTER article
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Broken teeth on engine flywheel	Replace flywheel and check starter pinion gear for damage
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Weak drive assembly thrust spring	See STARTER article
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Weak hold-in coil	See Bench Tests in STARTER article
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Starter Drive Will Not Engage	Defective point assembly	See Testing in STARTER article
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Poor point assembly ground	See Testing in STARTER article
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Defective pull-in coil	Replace starter solenoid
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Starter Relay Does Not Close	Dead battery	Charge or replace battery as necessary
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	Faulty wiring	Check all wiring and connections leading to relay
	Neutral safety switch faulty	Replace neutral safety switch
	Starter relay faulty	Replace starter relay
AAAAA	AAAAA	AAAAA
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
AAAAA	AAAAA	AAAAA
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
AAAAA	AAAAA	AAAAA
Solenoid Plunger Vibrates When Switch is Engaged	Weak battery	Charge or replace battery as necessary

corroded	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
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Low Current Draw	Worn brushes or weak	Replace brushes or brush springs as necessary
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High Pitched Whine	Distance too great	Align starter or check
During Cranking	between starter	that correct starter
Before Engine	pinion and flywheel	and flywheel are being
Fires but Engine		used

Fires and Cranks

Normally

AA

High Pitched	Distance too small between
Whine After Engine	starter pinion and flywheel
Fires With Key	Flywheel runout contributes
released. Engine	to the intermittent nature
Fires and Cranks	

Normally

AA

## AIR CONDITIONING & HEAT

### AIR CONDITIONING TROUBLE SHOOTING

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#### BASIC AIR CONDITIONING TROUBLE SHOOTING CHART

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CONDITION	POSSIBLE CAUSE
Compressor Not Working	u Compressor clutch circuit open.
	u Compressor clutch coil inoperative.

**TROUBLE SHO**

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

AA

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

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- Insufficient or No Cooling;  
Compressor Working
- u Expansion valve inoperative.
  - u Heater control valve stuck open.
  - u Low system pressure.
  - u Blocked condenser fins.
  - u Blocked evaporator fins.
  - u Vacuum system leak.
  - u Vacuum motors inoperative.
  - u Control cables improperly adjusted.
  - u Restricted air inlet.
  - u Mode doors binding.
  - u Blower motor inoperative.
  - u Temperature above system capacity.

AA

## HEATER SYSTEM TROUBLE SHOOTING

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## BASIC HEATER SYSTEM TROUBLE SHOOTING CHART

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CONDITION	POSSIBLE CAUSE	
Insufficient, Erratic, or No Heat	u Low Coolant Level	TRoubI

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

AA

Too Much Heat

- u Improperly adjusted cables.
- u Sticking heater control valve.
- u No vacuum to heater control valve.
- u Temperature door stuck open.

AA

Air Flow Changes During  
Acceleration

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

AA

Air From Defroster At All  
Times

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

AA

Blower Does Not Operate  
Correctly

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

AA

## BRAKES

### BRAKE SYSTEM TROUBLE SHOOTING

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#### BRAKE SYSTEM TROUBLE SHOOTING CHART

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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
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	Mismatched tires	Check tires sizes
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	Restricted brake lines or hoses	Check hose routing
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	Loose or malfunctioning caliper	See DISC BRAKES or BRAKE SYSTEM
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	Bent shoe or oily linings	See DRUM BRAKES or BRAKE SYSTEM
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	Malfunctioning rear brakes	See DRUM, DISC BRAKES or BRAKE SYSTEM
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	Loose suspension parts	See SUSPENSION
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Noises Without Brakes Applied	Front linings worn out	Replace linings
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	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
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

## BRAKE SYSTEM

Plugged master cylinder cap	See MASTER CYLINDERS or BRAKE SYSTEM
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Improper brake fluid	Replace brake fluid
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[illegible]

## 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

[illegible]

## Dragging

## Brakes

Master cylinder pistons  
not returning

See MASTER CYLINDERS  
BRAKE SYSTEM

Restricted brake lines  
or hoses  
Incorrect parking brake  
adjustment

## Check line routing

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

[illegible]



## Action

## Malfunction of power brake unit

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

## COOLING SYSTEM TROUBLE SHOOTING

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### CONDITION

### POSSIBLE CAUSE

## CORRECTION

## 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

## TROUBLE

		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	
AA			
Corrosion	Impurities In Coolant	Clean/Flush System	
AA			
Coolant Leakage	Damaged hose	Replace 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	
AA			
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	
AA			TROUBLE SH

## No Heater Core Flow

Collapsed Heater Hose	Replace Heater Hose
Plugged Heater Core	Clean/Replace Heater Core
Faulty Heater Valve	Replace Heater Valve

AA

## GASOLINE ENGINE - MECHANICAL TROUBLE SHOOTING

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## BASIC GASOLINE ENGINE - MECHANICAL TROUBLE SHOOTING CHART

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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 valve	Remove restriction
	Leaking EGR valve	Repair leak and/or replace valve
	Faulty fuel pump	Replace fuel pump
	AA	
Engine Has Low Power	Leaking fuel pump	Repair leak and/or replace fuel pump
	Excessive piston-to-bore clearance	Install larger pistons, See ENGINES
	Sticking valves or weak valve springs	Check valve train components, See ENGINES
	Incorrect valve timing	Reset valve timing, See ENGINES
	Worn camshaft lobes	Replace camshaft, See TROUBI

		ENGINES
Blown head gasket		Replace head gasket.
Clutch slipping		See ENGINES.
		Adjust pedal and/or
		replace components, See
		ENGINES
Engine overheating		Check cooling system,
		See COOLING
Auto. Trans. pressure		
regulator valve faulty		Replace pressure
		regulator valve
Auto. Trans. fluid level		Add fluid as necessary
too low		
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	Low fuel pump volume	Replace fuel pump
Speed Operation		
	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	Improper fuel pump stroke	Remove pump and reset
Acceleration		pump stroke
	Incorrect ignition timing	Reset ignition timing,
		See TUNE-UP
	Leaking valves	Replace valves, See
		ENGINES
	Worn fuel pump diaphragm	Replace diaphragm or
	or piston	piston
AA		
Intake Backfire	Improper ignition timing	Reset ignition timing,
		See TUNE-UP
	Faulty accelerator pump	Replace accelerator
	discharge	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
		TROUBLE

	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 Detonation	Ignition timing too far advanced	Reset ignition timing, See TUNE-UP
	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

AA		
External Oil Leakage	Fuel pump improperly seated or worn gasket	Remove pump, replace gasket and seat properly
	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

AA		
Excessive Oil	Worn valve stems or guides	Replace stems or guides

## Consumption

Valve "O" ring seals damaged	guides, See ENGINES 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, See ENGINES
AAA	
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

	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
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

[illegible]

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 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

[illegible]

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



	Excessive valve seat or face run-out	See ENGINES
	Worn camshaft lobes	Reface seats or valve face
		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
	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		

## ENGINE PERFORMANCE

### CARBURETOR TROUBLE SHOOTING:

**NOTE:** 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 COLD START SYMPTOMS TROUBLE SHOOTING CHART

AA

CONDITION	POSSIBLE CAUSE	CORRECTION
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AA

Engine Won't Start	Choke not closing	Check choke operation, see FUEL SYSTEMS
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	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 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
--	---------------------------	-------------------------------------

AA

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

AA

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

AA

#### BASIC HOT START SYMPTOMS TROUBLE SHOOTING CHART

AA

CONDITION

POSSIBLE CAUSE

CORRECTION

AA

Engine Won't  
Start

Engine flooded

Allow fuel to  
evaporate

AA

#### BASIC COLD ENGINE DRIVEABILITY SYMPTOMS TROUBLE SHOOTING CHART

AA

CONDITION

POSSIBLE CAUSE

CORRECTION

AA

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

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

Adjust float level,  
FUEL SYSTEMS

Repair or replace  
pump see FUEL  
SYSTEMS

Inspect lockout  
adjustment, see FUEL  
SYSTEMS

Sag or Stall After Warmup	Defective choke control switch	Replace choke control switch, see FUEL SYSTEMS
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Replace pump, see  
FUEL SYSTEMS

Adjust float level,  
see FUEL SYSTEMS

Backfiring & Black Smoke	Plugged heat crossover system	Remove restriction
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## BASIC WARM ENGINE DRIVEABILITY SYMPTOMS TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
AA		
Hesitation With Small Amount of Gas Pedal Movement	Vacuum leak	Inspect vacuum lines

Replace pump, see  
FUEL SYSTEMS

Reset float level,  
see, FUEL SYSTEMS

Inspect and/or  
replace rods, see  
FUEL SYSTEMS

Inspect system and  
remove restriction

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 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

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
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

AA

Engine Cranks	Bad battery connections	Check connections	TROUBI
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Slowly, Won't Start	or dead batteries	and/or replace batteries
Engine Cranks Normally, But Will Not Start	Engine oil too heavy	Replace engine oil
	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
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
Engines Starts/ Idles Rough W/out Smoke or Noise	Incorrect slow idle adjustment	Reset slow idle, see TUNE-UP
	Injection line fuel leaks	Check lines and connections
	Fuel return system blocked	Check lines and connections
	Air in fuel system	Bleed air from system
	Incorrect or contaminated fuel	Replace fuel
	Injector nozzle malfunction	Check nozzles, see FUEL SYSTEMS
Engines Starts and Idles Rough W/out Smoke or Noise, But Clears After Warm-Up	Injection pump timing incorrect	Reset pump timing, see FUEL SYSTEMS
	Engine not fully broken in	Put more miles on engine
	Air in system	Bleed air from system
	Injector nozzle malfunction	Check nozzles, see FUEL SYSTEMS
Engine Idles Correctly, Misfires Above Idle	Blocked fuel filter	Replace fuel filter
	Injection pump timing incorrect	Reset pump timing, see FUEL SYSTEMS
	Incorrect or contaminated fuel	Replace fuel
Engine Won't Return To Idle	Fast idle adjustment incorrect	Reset fast idle, see TUNE-UP
	Internal injection pump malfunction	Replace injection pump, see FUEL SYSTEMS
	External linkage binding	Check linkage and remove binding
Fuel Leaks On Ground	Loose or broken fuel line	Check lines and connections
	Internal injection pump seal leak	Replace injection pump, see FUEL SYSTEMS
Cylinder Knocking Noise	Injector nozzles sticking open	Test injectors, see FUEL SYSTEMS
	Very low nozzle opening pressure	Test injectors and/or replace
Loss of Engine Power	Restricted air intake	Remove restriction
	EGR valve malfunction	Replace EGR valve

Blocked or damaged exhaust system	Remove restriction and/or replace components
Blocked fuel tank filter	Replace filter
Restricted fuel filter	Remove restriction and/or replace filter
Block vent in gas cap	Remove restriction and/or replace cap
Tank-to-injection pump fuel supply blocked	Check fuel lines and connections
Blocked fuel return system	Remove restriction
Incorrect or contaminated fuel	Replace fuel
Blocked injector nozzles	Check nozzle for

[illegible][illegible]

Loud Engine	Basic timing incorrect	Reset timing, see
Noise With Black		FUEL SYSTEMS
Smoke	EGR valve malfunction	Replace EGR valve
	Internal injection pump	Replace injection pump,
	malfunction	see FUEL SYSTEMS
	Incorrect injector pump	Check pressure, see
	housing pressure	FUEL SYSTEMS

[illegible]

Engine Overheating	Cooling system leaks	Check cooling system and repair leaks
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Belt slipping or damaged	Check tension and/or replace belt
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Thermostat stuck closed	Remove and replace thermostat, see ENGINE COOLING
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Head gasket leaking	Replace head gasket
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[illegible]

Oil Light on at Idle	Low oil pump pressure	Check oil pump operation, see ENGINES
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Oil cooler or line restricted	Remove restriction and/or replace cooler
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[illegible]

Engine Won't Shut Off	Injector pump fuel solenoid does not return fuel valve to OFF position	Remove and check solenoid and replace if needed
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[illegible]

## VACUUM PUMP DIAGNOSIS

Excessive Noise    Loose pump-to-drive    Tighten screws    TROUBLE SHOOTING



assembly screws	
Loose tube on pump assembly	Tighten tube
Valves not functioning properly	Replace valves

Oil Leakage	Loose end plug	Tighten end plug
	Bad seal crimp	Remove and re-crimp seal

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
	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 regulator and fuel pump, check for restricted lines and filters
	No distributor reference pulses	Repair ignition system as necessary

TRUBLE SHOOTII

Open coolant temperature sensor circuit	Test sensor and wiring
Shorted W.O.T. switch in T.P.S.	Disconnect W.O.T. switch, engine should start
Defective ECM	Replace ECM
Fuel tank residual pressure valve leaks	Test for fuel pressure drop after shut down

AA

Hard Starting	Disconnected hot air tube to air cleaner	Reconnect tube and test control valve
	Defective Idle Air Control (IAC) valve	Test valve operation and circuit
	Shorted, open or misadjusted T.P.S.	Test and adjust or replace T.P.S.
	EGR valve open	Test EGR valve and control circuit
	Poor Oxygen sensor signal	Test for shorted or circuit
	Incorrect mixture from PCV system	Test PCV for flow, check sealing of oil filter cap

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



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.

## IGNITION SYSTEM TROUBLE SHOOTING

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### Ignition Secondary Trouble Shooting Chart

UAAA?

? START: Visually inspect Spark Plug Wires, Coil Wires, ?

? Plug Wire Boots, Rotor, and Distributor Cap for ?

? signs of damage. ?

AAU

UAA?

UAAAA?

? OK ?

AAAAAU

UAA?

? \* 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. ?

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAU

UAA?

UAAAAAAAAAAAA?

? GOOD SPARK ?

AAAAAAAAAAAAAU

UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?

? \* If plug sparks, driveability?

? problem is most likely NOT ?

? in the ignition system. ?

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAU

UAAAAAAAAA?

? NOT OK ?

AAAAAAAUA

UAAAAAAAAAAAAAAAAAAAA?

? \* Repair or replace ?

? damaged components ?

? as necessary ?

AAAAAAAAAAAAAAAAAAAAU

UAAAAAAAAAAAA?

? NO SPARK ?

AAAAAAAUA

UAAAAAAAAAAAAAAAAAAAA?

? \* Remove coil wire from the ?

? distributor and attach the ?

? modified spark plug. Ground?

? the plug and crank engine ?

? while checking for spark. ?

AAAAAAAAAAAAAAAAAAAAU

**IGNITION SYSTEM TROUBLE SHOOTING**

UAAA?	
UAAAAAAAAAAAA?	UAAAAAAAAAAAA?
? GOOD SPARK ?	? NO SPARK ?
AAAAAAAAAAAAAU	AAAAAAAAAAAAAU
UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?	UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?
? * If plug has a good spark, ?	? * Proceed to the IGNITION ?
? the problem is in the plug ?	? PRIMARY TROUBLE SHOOTING ?
? wires, distributor cap, or ?	? CHECK CHART below in this ?
? rotor. Replace components ?	? article. ?
? as necessary. ?	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAU
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAU	

### Ignition Primary Trouble Shooting Chart

UAAA?	
? START: Visually inspect primary ignition wires for ?	
? broken, frayed, split, or cut wires. Also check?	
? for loose, corroded, or disconnected connectors.?	
AAU	
UAAA?	
UAAAA?	UAAAA?
? OK ?	? NOT OK ?
AAAAAU	AAAAAU
UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?	UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?
? * Check that battery voltage ?	? * Repair or replace damaged ?
? is at least 11.5 volts. ?	? components as necessary. ?
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAU	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAU
UAAA?	
UAAAA?	UAAAA?
? NOT OK ?	? OK ?
AAAAAU	AAAAAU
UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?	UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?
? * Replace or recharge the ?	? * Check for battery voltage ?
? battery. ?	? at the positive terminal of ?
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAU	? the coil. ?
	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAU
UAAA?	
UAAAA?	UAAAA?
? OK ?	? NOT OK ?
AAAAAU	AAAAAU
UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?	UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?
? * Check air Gap of the Pick-Up ?	? * Check resistance of ballast ?
? coil in the distributor. ?	? resistor (if used) for the ?
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAU	? correct resistance value. ?
	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAU
UAAA?	
UAAAA?	UAAAA?
? OK ?	? NOT OK ?
	? TROUBI

AAAAAU	AAAAAAAAAU	?
UAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?	UAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?	?
? * Check Pick-Up coil for ?	? * Adjust or replace as ?	?
? correct resistance value. ?	? necessary. ?	?
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAU	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAU	?
UAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?		?
UAAAAAA?	UAAAA?	?
? NOT OK ?	? OK ?	?
AAAAAAAU	AAAAAU	?
UAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?	UAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?	?
? * Replace Pick-Up coil if ?	? * Check control module for ?	?
? not to specification. ?	? good ground connections. ?	?
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAU	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAU	?
	UAAAA?	?
	? OK ?	?
	AAAAAU	?
	UAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?	?
	? * If vehicle fails to run at this point, go to?	?
	? the appropriate article in the ENGINE ?	?
	? PERFORMANCE section. ?	?
	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAU	?
	UAAAAAAAAAAAAAAAAAAAAAAAAAAAAAU	
	UAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?	
UAAAA?	UAAAAAA?	
? OK ?	? NOT OK ?	
AAAAAU	AAAAAAAU	
UAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?	UAAAAAAAAAAAAAAAAAAAAAAAAAAAAA?	
? * Check wires from the battery/?	? * Replace ballast resistor ?	
? ignition switch to the coil.?	? if the measured resistance?	
? Also check the coil primary ?	? value is not within ?	
? and secondary resistance. ?	? specification. ?	
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAU	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAU	

## STARTER TROUBLE SHOOTING

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### BASIC STARTER TROUBLE SHOOTING CHART

AA		
CONDITION	POSSIBLE CAUSE	CORRECTION
AA		
Starter Fails	Dead battery or bad	Check battery charge TROUBLI

to Operate	connections between starter and battery	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

AA

Starter Will Not Crank Engine	Faulty overrunning clutch	See STARTER article
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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
	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

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

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

Solenoid Plunger Vibrates When Switch is Engaged	Weak battery	Charge or replace battery as necessary
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Solenoid contacts corroded	Clean contacts or replace solenoid
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Faulty wiring	Check all wiring leading to solenoid
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Broken connections inside switch cover	Repair connections or replace solenoid
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Open hold-in wire	Replace solenoid
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AA

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

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

High Pitched                      Distance too small between  
 Whine After Engine starter pinion and flywheel  
 Fires With Key      Flywheel runout contributes  
 released. Engine      to the intermittent nature  
 Fires and Cranks  
 Normally

#### TUNE-UP TROUBLE SHOOTING - GAS ENGINE VEHICLES

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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 SPARK PLUG TROUBLE SHOOTING CHARTS

CONDITION	POSSIBLE CAUSE	CORRECTION
Normal Spark	Light Tan or Gray deposits	No Action
Plug Condition	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
	Faulty choke	Replace choke assembly, see ENGINE PERFORMANCE section
	Clogged air filter	Clean and/or replace air filter

TROUBLE SHOOTING - B,

	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
	Engine Overheating	Check cooling system
	Wrong type of spark plug, too hot	Replace with correct spark plug, see

Chipped Insulators	Severe detonation	Check for over-advanced timing or combustion
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Rust Colored Deposits	Additives in unleaded fuel	Try different fuel brand
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Water In Combustion Chamber	Blown head gasket or cracked head	Repair or replace head or head gasket
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**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.

Engine won't start	open circuit between distributor and bulkhead connector	refill circuit
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Open circuit between ignition switch and starter solenoid	Repair circuit
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Engine Runs Rough	Fuel lines leaking or clogged	Tighten fitting, remove restriction
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Centrifugal advance                      Repair distributor  
malfunction                                  advance

**TROUBLE SHOOTING**

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

AA

# BASIC ELECTRONIC IGNITION TROUBLE SHOOTING CHARTS - USING OSCILLOSCOPE PATTERNS

AA  
CONDITION POSSIBLE CAUSE CORRECTION

AA

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

AA

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

AA

One or More, But	Carburetor idle mixture	Readjust carburetor, TROUB
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Not All Firing	not balanced	see ENGINE PERFORMANCE
Voltage Lines are		
Higher Than Others	EGR valve stuck open	Clean and/or replace valve
	High resistance in spark plug wires	Replace spark plug wires
	Cracked or broken spark plug insulator	Replace spark plugs
	Intake vacuum leak	Repair leak
	Defective spark plugs	Replace spark plugs
	Corroded spark plug terminals	Replace spark plugs

One or More, But	Curb idle mixture not	Readjust carburetor,
Not All Firing	balanced	see ENGINE PERFORMANCE
Voltage Lines Are		
Lower Than Others	Breaks in plug wires causing arcing	Replace plug wires
	Cracked coil tower causing arcing	Replace coil
	Low compression	Determine cause and repair
	Defective spark plugs	Replace spark plugs
	Corroded spark plugs	Replace spark plugs

Cylinders Not	Cracked distributor cap terminals	Replace distributor cap
Firing		
	Shorted spark plug wire	Determine cause and repair
	Mechanical problem in engine	Determine cause and repair
	Defective spark plugs	Replace spark plugs
	Spark plugs fouled	Replace spark plugs

BASIC DRIVEABILITY PROBLEMS TROUBLE SHOOTING TABLE

AA

CONDITION	POSSIBLE CAUSE	CORRECTION
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
AA		
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
AAA		
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
AAA		
Faulty Acceleration	Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
	Engine cold and choke too lean	Adjust choke and allow engine to warm-up
	Defective spark plugs	Replace spark plugs
	Defective coil	Replace coil
AAA		
Faulty Low Speed Operation	Clogged idle transfer slots	Clean idle transfer slots, see FUEL
	Restricted idle air bleeds and passages	Disassemble and clean carburetor, see FUEL
	Clogged air cleaner	Replace air filter
	Defective spark plugs	Replace spark plugs
	Defective ignition wires	Replace ignition wire see ENGINE PERFORMANCE



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

[illegible]

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

adjustment	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
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
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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
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Vacuum leak	Eliminate vacuum leak
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EGR valve malfunction	Replace EGR valve
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AA

Poor Gasoline Mileage	Cracked or broken vacuum hoses	Replace vacuum hoses
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Vacuum leaks	Repair vacuum leaks
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Defective ignition wires	Replace wires
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Incorrect choke setting	Readjust setting, see ENGINE PERFORMANCE
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Defective vacuum advance	Replace vacuum advance
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Defective spark plugs	Replace spark plugs
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Binding carburetor power piston	Eliminate binding
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	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

**NOTE:** 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.

**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	Tighten screws
	Loose tube on pump assembly	Tighten tube
	Valves not functioning properly	Replace valves
Oil Leakage	Loose end plug	Tighten end plug
	Bad seal crimp	Remove and re-crimp

AA

## MANUAL TRANSMISSION

### MANUAL TRANSMISSION TROUBLE SHOOTING

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#### MANUAL TRANSMISSION/TRANSAXLE TROUBLE SHOOTING

AA

Condition	Possible Cause
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AA

Noisy In Forward Gears	.Low gear oil level, .Loose bell housing bolts, .Worn bearings or gears
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AA

Clunk On Deceleration (FWD Only)	.Loose engine mounts, .Worn inboard CV joints, .Worn differential pinion shaft, .Side gear hub counterbore in case worn oversize
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AA

Gear Clash When Shifting Forward Gears	.Clutch Out Of Adjustment, .Shift linkage damaged or out of adjustment, .Gears or synchronizers damaged, .Low gear oil level
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AA

Transmission Noisy When Moving (RWD Only) Quiet In Neutral With Clutch Engaged	.Worn rear outputshaft bearing
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AA

Gear Rattle	.Worn bearings, .Wrong gear oil, .Low gear oil, .Worn gears
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AA

Steady Ticking At Idle (Increases With RPM)	.Broken tooth on gear
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AA

Gear Clash When Shifting

Forward Gears

.Worn or broken synchronizers

AA

Loud Whine In Reverse

.Normal condition (1)

AA

Noise When Stepping On Clutch

.Bad release bearing,

.Worn pilot bearing

AA

Ticking Or Screeching As

Clutch Is Engaged

.Faulty release bearing,

.Uneven pressure plate fingers

AA

Click Or Snap When Clutch

Is Engaged

.Worn clutch fork,

.Worn or broken front bearing

retainer

AA

Transmission Shifts Hard

.Clutch not releasing,

.Shift mechanism binding,

.Clutch installed backwards

AA

Will Not Shift Into One

Gear, Shifts Into All

Others

.Bent shift fork,

.Worn detent balls

AA

Locked Into Gear,

Cannot Shift

.Clutch adjustment,

.Worn detent balls

AA

Transmission Jumps Out

Of Gear

.Pilot bearing worn,

.Bent shift fork,

.Worn gear teeth or face

.Excessive gear train end play

.Worn synchronizers

.Missing detent ball spring

.Shift mechanism worn or out of  
adjustment

.Engine or transmission mount

bolts loose or out of adjustment

.Transmission not aligned

AA

Shift Lever Rattle

.Worn shift lever or detents

.Worn shift forks

.Worn synchronizers

AA

1009 TROUBLE SHOOTING - I



Shift Lever Hops Under  
Acceleration

.Worn engine or transmission  
mounts

(1) - Most units use spur cut gears in reverse and are noisy  
AA

POWERTRAIN

CLUTCH TROUBLE SHOOTING

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BASIC CLUTCH TROUBLE SHOOTING CHART  
AA

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

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

	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
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
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

AA

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

AA

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

AA

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

AA

Noisy	Dry release bearing	Lubricate or replace release bearing
	Dry or worn pilot bearing	Lubricate or replace bearing

AA

Transmission Click	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 **TROUBLE SHOOTING - B,**

Broken spring in slave  
cylinder

Replace slave cylinder

AA

## 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

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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 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

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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

AA

CONDITION	POSSIBLE CAUSE	CORRECTION	TROUBLE SHO
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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
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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

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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	

#### STEERING & SUSPENSION

##### MANUAL STEERING GEAR TROUBLE SHOOTING

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#### BASIC MANUAL STEERING GEAR TROUBLE SHOOTING CHART

AA

**TROUBLE SHOOTING - BASIC PROCEDURES Article Text (p. 65)**1993 Honda PreludeFor Cadi Centre Ns

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
AA		
Poor Returnability	Lack of lubricant in ball joint or linkage	Lubricate and service systems
	Binding in linkage or ball	See STEERING LINKAGE

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	joints	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		TROUBLE

Instability	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

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## BASIC POWER STEERING TROUBLE SHOOTING CHART

AA

CONDITION	POSSIBLE CAUSE	CORRECTION
AA		
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

Tighten all mounting bolts

See POWER STEERING GEAR  
article

See POWER STEERING GEAR

See STEERING COLUMN  
article

See STEERING COLUMN  
article

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

See POWER STEERING GEAR  
article

See POWER STEERING GEAR  
article

Rattle in Steering Pump	Vanes not installed	See POWER STEERING PUMP article
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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
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Tighten and check,  
replace if necessary

Squawk When Turning	Damper "O" ring on valve spool cut	See POWER STEERING PUMP article
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Moan or Whine	Pump shaft bearing scored	Replace bearing and
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Air in fluid or fluid level low	See POWER STEERING PUMP article
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Hose or column grounded	Check and replace if necessary
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Cover "O" ring missing or damaged	See POWER STEERING PUMP article
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Valve cover baffle missing or damaged	See POWER STEERING PUMP article
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Interference of components in pump	See POWER STEERING PUMP article
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Loose or poor bracket alignment	Correct or replace if necessary
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AA

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

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

Buzzing When Not Steering	Noisy pump	See POWER STEERING PUMP article
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Free play in steering shaft bearing	See STEERING COLUMN article
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Bearing loose on shaft serrations	See STEERING COLUMN article
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AA

Clicking Noise in Pump	Pump slippers too long	See POWER STEERING PUMP article
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Broken slipper springs	See POWER STEERING PUMP article
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Excessive wear or nicked rotors	See POWER STEERING PUMP article
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Damaged cam contour	See POWER STEERING PUMP article
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AA

Poor Return of Wheel	Wheel rubbing against turn signal	See STEERING COLUMN SWITCH
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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
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

**TROUBLE SHOOT**

	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
AA		
Increased Effort When Turning	High internal pump leakage	See POWER STEERING PUMP article
Wheel Fast Foaming, Milky Power Steering Fluid, Low Fluid Level or Low Pressure	Power steering pump belt slipping	Adjust or replace if necessary
	Low fluid level	Check and fill to proper level
	Engine idle speed to low	Adjust to correct 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
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
	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	See POWER STEERING GEAR article
TROUBLE SHOOTING - BASIC PROCEDURES Article Text (page 12 of 12) Honda Prelude For Cadi Centre Ns		

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

STEERING COLUMN TROUBLE SHOOTING

NOTE: 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 STEERING COLUMN TROUBLE SHOOTING CHART

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CONDITION	POSSIBLE CAUSE	CORRECTION
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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

AA

High Steering	Column assembly	See STEERING COLUMN
Shaft Effort	misaligned	article

Improperly installed dust shield	Adjust or replace
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Tight steering universal joint	See STEERING COLUMN article
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AA

High Shift	Column is out of alignment	See STEERING COLUMN
Effort		article

Improperly installed dust shield	Adjust or replace
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Seals or bearings not lubricated	See STEERING COLUMNS article
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Mounting bracket screws too long	Replace with new shorter screws
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Burrs on shift tube	Remove burrs or replace tube
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Lower bowl bearing assembled wrong	See STEERING COLUMN article
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Shift tube bent or broken	Replace as necessary
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Improper adjustment of shift levers	See STEERING COLUMN article
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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
AA		

SUSPENSION TROUBLE SHOOTING

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BASIC SUSPENSION TROUBLE SHOOTING CHART		
AA		
CONDITION	POSSIBLE CAUSE	CORRECTION
AA		
Front End Noise	Loose or worn wheel	See Wheel Bearing Adjustment in SUSPENSION
	Worn shocks or shock mountings	Replace struts or strut mountings
	Worn struts or strut	Replace struts or

	mountings	mountings
	Loose or worn lower control arm	See SUSPENSION
	Loose steering gear-to-frame bolts	See STEERING
	Worn control arm bushings	See SUSPENSION
	Ball joints not lubricated	Lubricate ball joints & see Ball Joint Checking in SUSPENSION
AA		
Front Wheel Shake, Shimmy, or Vibration	Tires or wheels out of balance	Check tire balance
	Incorrect wheel alignment	See WHEEL ALIGNMENT
	Drive shaft unbalanced	Check drive shaft balance
	Loose or worn wheel bearings	See WHEEL ALIGNMENT
	Loose or worn tie rod ends	See SUSPENSION
	Worn upper ball joints	See Ball Joint Checking 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
Abnormal Tire Wear	Unbalanced tires	Check tire balance & rotation

	Sagging or broken springs	See SUSPENSION
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	Incorrect front end alignment	See WHEEL ALIGNMENT
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	Faulty shock absorbers	Replace chock absorbers
Scuffed Tires	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
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	Frame misalignment	Check frame for damage
Spring Noises	Loose "U" Bolts	See SUSPENSION

	Loose or worn bushings	See SUSPENSION
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	Worn or missing interliners	See SUSPENSION
Shock Absorber Noise	Loose shock mountings	Check & tighten mountings

	Worn bushings	Replace bushings
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	Air in system	Bleed air from system
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	Undercoating on shocks	Remove undercoating
Car Leans or Sways on Corners	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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Shock Absorbers	Worn seals or reservoir	See SUSPENSION
Leaking	tube crimped	
AA		
Broken Springs	Loose "U" bolts	See SUSPENSION

[illegible]

## WHEEL ALIGNMENT TROUBLE SHOOTING

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## BASIC WHEEL ALIGNMENT TROUBLE SHOOTING CHART

[illegible][illegible]

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
	Worn or defective shock	Replace shock absorbers
Tires out of balance	Check tire balance	

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Pulls to One Side	Improper tire inflation	Check tire pressure
	Brake dragging	See BRAKE section
	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
	Front alignment out of tolerance	See WHEEL ALIGNMENT section
	Defective wheel bearing	See WHEEL BEARINGS in SUSPENSION section
	Uneven sway bar links	See SUSPENSION section
	Frame bent	Check for frame damage
Hard Steering	Steering system bushing worn	See STEERING section
	Idler arm bushing too tight	See STEERING LINKAGE in STEERING section
	Ball joint tight or seized	See SUSPENSION section
	Steering linkage too tight	See STEERING LINKAGE in STEERING section
	Power steering fluid low	Add proper amount of fluid
	Power steering drive belt loose	See STEERING section
	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 Bracket loose	See STEERING section
	Steering gear box (rack)	See STEERING section

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