4.3L V6 - VINS [W,X]

1997 Chevrolet Blazer

1996-97 ENGINES
General Motors Corp. 4.3L V6 - VIN [W] & VIN [X]

Chevrolet; Astro, Blazer, "C" & "K" Pickup, "S" & "T" Pickup, Commercial Van, Express, Sierra Suburban, Van
GMC; Jimmy, Safari, Savana, Sierra, Sonoma
Oldsmobile; Bravada

*** PLEASE READ THIS FIRST ***

NOTE: For repair procedures not covered in this article, see ENGINE OVERHAUL PROCEDURES - GENERAL INFORMATION article in GENERAL INFORMATION.

ENGINE IDENTIFICATION

Engine is identified by eighth character of Vehicle Identification Number (VIN). VIN is stamped on a metal tag on top left end of instrument panel, near windshield. See ENGINE IDENTIFICATION CODES table.

Engine can also be identified by engine identification (ID) number. Number is stamped on front of cylinder block, immediately forward of right cylinder head or on left side of cylinder block, on engine-to-transmission mating flange.

ENGINE IDENTIFICATION CODES

Engine	(1) VIN Code	Engine ID
CSI	W	L35
CSI	X	LB4

(1) - Eighth character of VIN.

ADJUSTMENTS

VALVE CLEARANCE ADJUSTMENT

NOTE: Although valve clearance adjustment is not usually required (engine uses hydraulic valve lifters), perform the following procedure after servicing valve train.

Engine uses screw-in rocker arm studs with a shoulder. Tighten rocker arm nuts to specification. See TORQUE SPECIFICATIONS.

SHIFT CABLE ADJUSTMENT

NOTE: When installing shift cable, DO NOT pull shift lever ball stud forward of transmission shift lever ball stud.

Express, "C" & "K" Pickup, Savana, Sierra, Suburban, Tahoe & Yukon

1) Ensure transmission shift lever is in mechanical park position. Rotate control lever clockwise until it reaches it's final stop position. Apply parking brake. Raise and support vehicle.

2) Slide Black retaining clip forward on shift cable end far

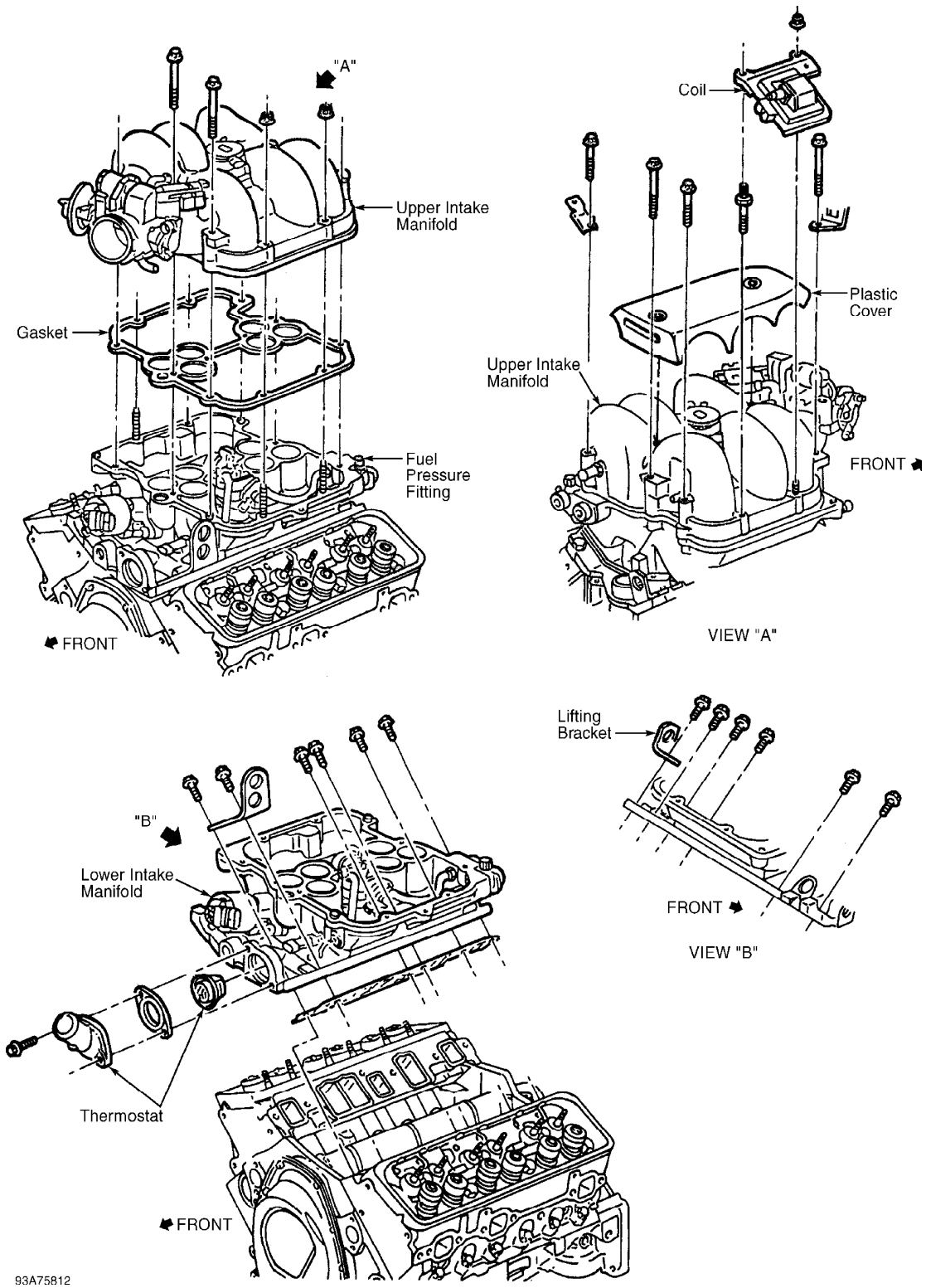

Fig. 2: Exploded View Of Intake Manifold Assembly (4.3L VIN W)
Courtesy of General Motors Corp.

SERVICE EQUIPMENT

Because R-134a is not interchangeable with R-12, separate sets of hoses, gauges and recovery/recycling equipment are required to service vehicles. This is necessary to avoid cross-contamination and damaging system.

All equipment used to service systems using R-134a must meet SAE standard J1991. The service hoses on the manifold gauge set must have manual (turn wheel) or automatic back-flow valves at the service port connector ends. This will prevent refrigerant from being released into the atmosphere.

For identification purposes, R-134a service hoses must have a Black stripe along their length and be clearly labeled SAE J2196/134a. The low pressure test hose is Blue with a Black stripe. The high pressure test hose is Red with a Black stripe. The center test hose is Yellow with a Black stripe.

NOTE: Refrigerant R-12 service hoses will ONLY be labeled SAE J2196.

All R-134a manifold gauge sets can be identified by one or all of the following:

* Labeled FOR USE WITH R-134a on set.
* Labeled HFC-134 or R-134a on gauge face.
* Light Blue color on gauge face.

In addition, pressure/temperature scales on R-134a gauge sets are different from R-12 manifold gauge sets.

MANIFOLD GAUGE SET

A manifold gauge set is used to determine system's high-side and low-side pressures, correct refrigerant charge, system diagnosis and operating efficiency. High (discharge) and low (suction) pressures must be compared to determine system operation. Manifold gauge sets for the 2 refrigerant types are basically the same except for fittings at ends of hoses. Fittings are different to ensure connection only to appropriate refrigerant system.

Low-Side Gauge

Low-side gauge, which may have a Blue identifying feature, is used to measure low-side (suction) pressure. Low-side gauge is also called a compound gauge because it can measure pressure and vacuum. Pressure scale ranges from 0 to 150 psi; vacuum scale ranges from 0 to 30 in. Hg.

High-Side Gauge

High-side gauge, which may have a Red identifying feature, is used to measure high-side (discharge) pressure. Gauge scale ranges from 0 to 500 psi.

CONNECTING GAUGE SET

NOTE: R-134a quick disconnect service couplings are connected in the same sequence as Schrader-type service valves.

Schrader-Type Valves

1) Put on safety goggles, and cover vehicle's fender. Slowly

OVERHAUL

NOTE: Use exploded view illustrations for overhaul of brake assemblies. See Figs. 5-12.

WARNING: DO NOT hone master cylinder bore. Honing destroys hardened surface, causing premature piston seal failure. If bore surface is rough or pitted, replace master cylinder.

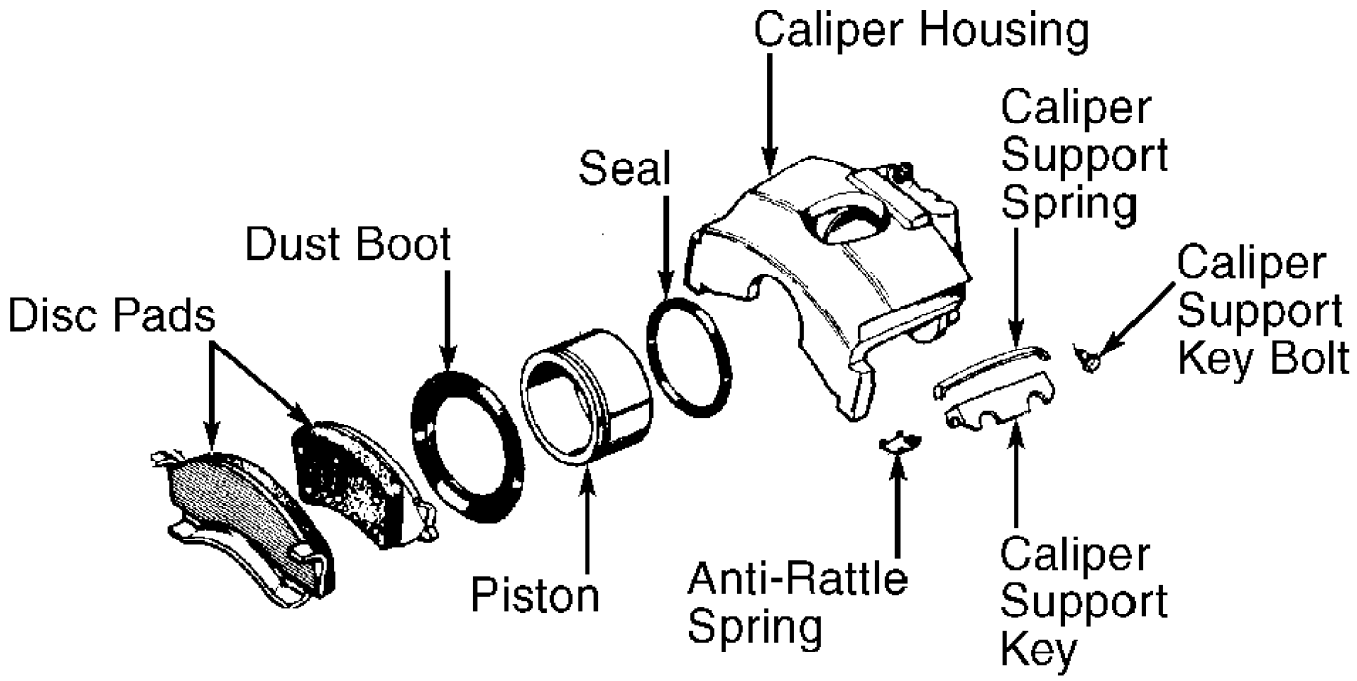

Fig. 5: Exploded View Of Sliding Caliper Assembly (Typical)
Courtesy of General Motors Corp.

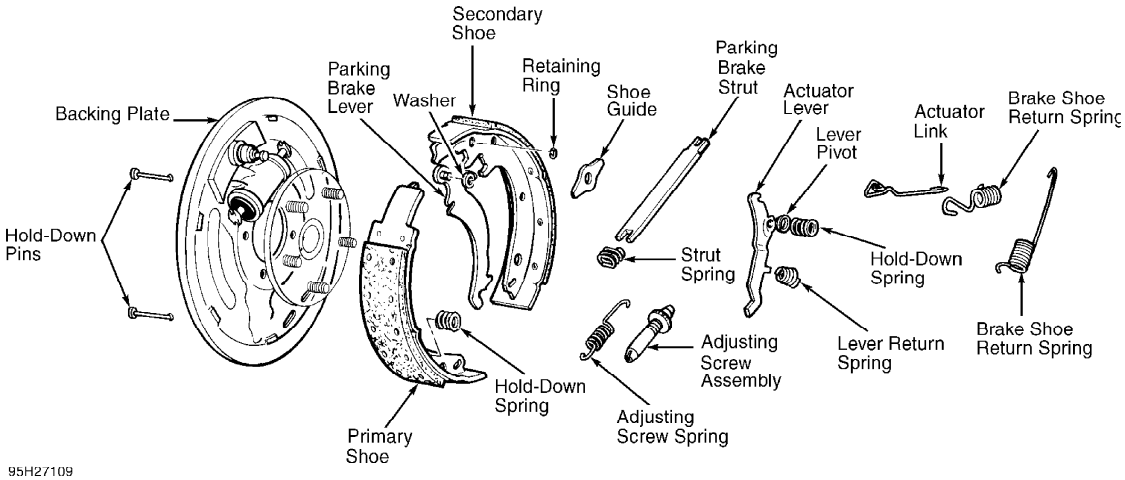

Fig. 6: Exploded View Of Rear Brake Assembly
Courtesy of General Motors Corp.

When presenting suggested repairs to the customer, you must present the facts, allowing the customer to draw their own conclusions and make an informed decision about how to proceed.

The following reasons may be used for required and suggested services. These codes are shown in the "Code" column of the MAP Uniform Inspection & Communications Standards that follow:

Reasons to Require Repair or Replacement
A - Part no longer performs intended purpose
B - Part does not meet a design specification (regardless of performance)
C - Part is missing

NOTE: When a repair is required, the shop must refuse partial service to the system in question, if the repair creates or continues an unsafe condition.

Reasons to Suggest Repair or Replacement
1 - Part is close to the end of its useful life (just above discard specifications, or weak; failure likely to occur soon, etc.)
2 - To address a customer need, convenience, or request (to stiffen ride, enhance performance, eliminate noise, etc.)
3 - To comply with maintenance recommended by the vehicle's Original Equipment Manufacturer (OEM)
4 - Technician's recommendation based on substantial and informed experience

NOTE: Suggested services are always optional. When presenting suggested repairs to the customer, you must present the facts, allowing the customer to draw their own conclusions and make an informed decision about how to proceed.

ELECTRICAL SYSTEMS

SERVICE PROCEDURES REQUIRED AND SUGGESTED FOR PROPER VEHICLE OPERATION

NOTE: When working on electrical systems, if a potentially hazardous condition is observed, require repair or replacement of affected components prior to performing further work.

ACTUATOR MOTORS (SOLENOIDS) (ELECTRIC)

ACTUATOR MOTOR (SOLENOIDS) (ELECTRIC) INSPECTION

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Connector broken	A	Require repair or replacement.
Connector (Weatherpack type) leaking	A	Require repair or replacement.

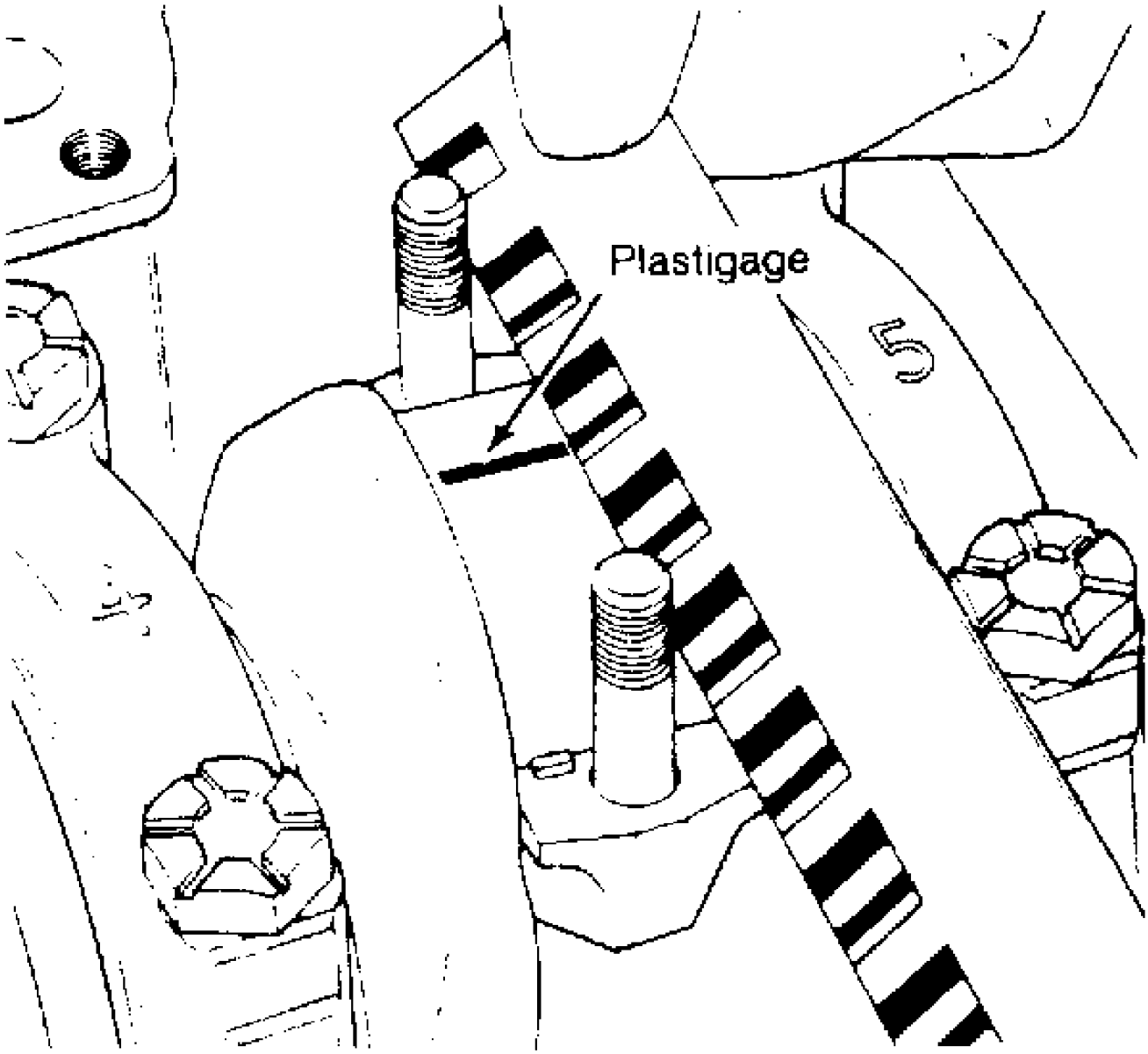

Fig. 19: Measuring Bearing Clearance - Typical
This Graphic For General Information Only

Micrometer & Telescopic Gauge Method

A micrometer is used to determine journal diameter, taper and out-of-round dimensions of the crankshaft. See CLEANING & INSPECTION under CRANKSHAFT & MAIN BEARINGS in this article.

With crankshaft removed, install bearings and caps in original location on cylinder block. Tighten bolts to specification. On connecting rods, install bearings and caps on connecting rods. Install proper connecting rod cap on corresponding rod. Ensure bearing cap is installed in original location. Tighten bolts to specification.

Using a telescopic gauge and micrometer or inside micrometer measure inside diameter of connecting rod and main bearings bores. Subtract each crankshaft journal diameter from the corresponding inside bore diameter. This is the bearing clearance.

Wire lead conductors exposed	B	..	Require repair or replacement.
Wire lead corroded	A	..	Require repair or replacement.
Wire lead open	A	..	Require repair or replacement.
Wire lead shorted	A	..	Require repair or replacement.

(1) - Determine cause and correct prior to repair or replacement of part.
(2) - Determine source of contamination, such as engine coolant, fuel, metal particles, or water. Require repair or replacement.
(3) - Inoperative includes intermittent operation or out of OEM specification. Some components may be serviceable; check for accepted cleaning procedure.

WASTE GATE CONTROL SOLENOIDS

WASTE GATE CONTROL SOLENOID INSPECTION

Condition	Code	Procedure
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require repair or replacement of hardware.
Connector broken	A	Require repair or replacement.
Connector (Weatherpack type) leaking	A	Require repair or replacement.
Connector melted	A	(1) Require repair or replacement.
Connector missing	C	Require replacement.
Contaminated	A	(2) Require repair or replacement.
Inoperative	B	(3) Require repair or replacement. Further inspection required.
Leaking	A	Require repair or replacement.
Missing	C	Require replacement.
Resistance out of specification	B	Require repair or replacement.
Restricted, affecting performance	A	Require repair or replacement.
Terminal broken	A	Require repair or replacement.
Terminal burned, affecting performance	A	(1) Require repair or replacement.
Terminal burned, not affecting performance	2	Suggest repair or replacement.
Terminal corroded, affecting performance	A	Require repair or replacement.
Terminal corroded, not affecting performance	2	Suggest repair or replacement.
Terminal loose, affecting performance	B	Require repair or replacement.
Terminal loose, not affecting performance	1	Suggest repair or replacement.

Component	Normal Draw	Maximum Draw	Time-Out (Minutes)
Anti-Theft System	0.4	1.0	...
Auto Door Lock	1.0	1.0	...
Body Control Module	3.6	12.4	20
Central Processing System	1.6	2.7	20
Electronic Control Module	5.6	10.0	...
Electronic Level Control	2.0	3.3	20
Heated Windshield Module	0.3	0.4	...
HVAC Power Module	1.0	1.0	...
Illuminated Entry	1.0	1.0	1
Light Control Module	0.5	1.0	...
Oil Level Module	0.1	0.1	...
Multi-Function Chime	1.0	1.0	...
Pass Key Decoder Module	0.75	1.0	...
Power Control Module	5.0	7.0	...
Retained Accessory Power	3.8	3.8	...
Radio	7.0	8.0	15
Twilight Sentinel Module	1.0	1.0	...
Voltage Regulator	1.4	2.0	...

INTERMITTENT PARASITIC LOAD PROBLEMS

Intermittent parasitic lad can occur because of a memory device that does not power down with ignition off. With an intermittent parasitic load, battery draw can be greater than 1.0 amp. To find and intermittent problem requires that an ammeter and Disconnect Tool (J-38758) test switch be connected and left in the circuit. See Fig. 1. Road test vehicle. After road test, turn ignition off and remove key.

Monitor the milliamps scale for 15-20 minutes after ignition is turned off. This allows monitoring memory devices to determine if they time out and stop drawing memory current. The test switch is needed to protect ammeter when the vehicles is started.

DIODE CHECK & SOLENOID TEST (GENERAL MOTORS)

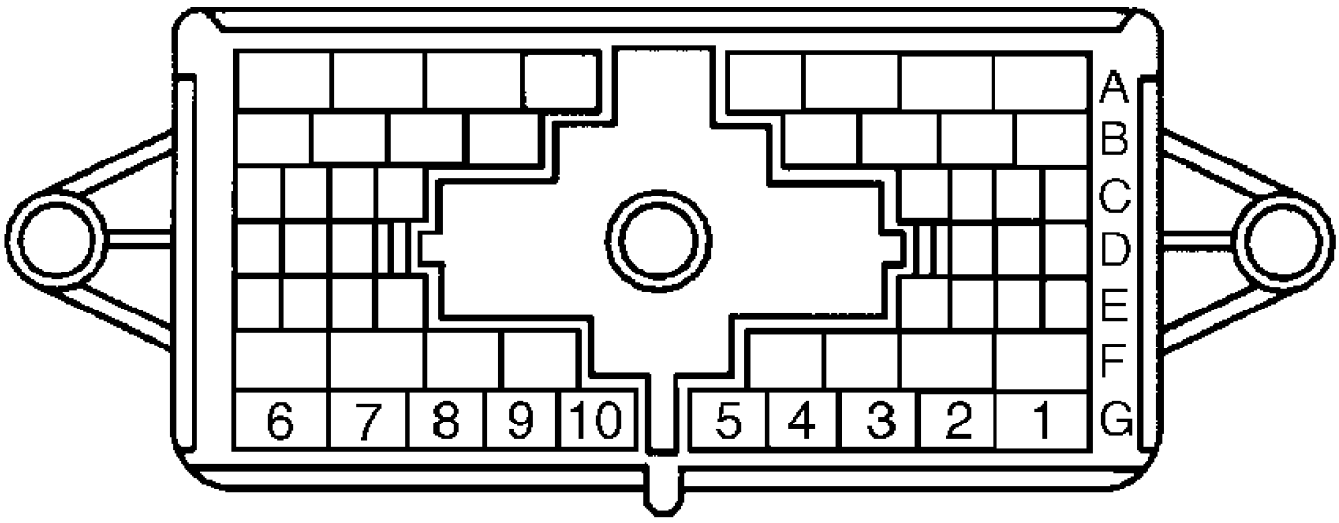

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Fig. 5: Identifying 56-pin Black C203 Connector ("S" & "T" Series) Courtesy of General Motors Corp.

SOLENOID CLICKS, ENGINE DOES NOT CRANK

1) Remove 20-amp ECM IGN fuse No. 10 from instrument panel fuse block. Turn ignition switch to START position and hold for 15 seconds. Using a DVOM, measure voltage between battery negative and positive terminals. If voltage is more than 9,5 volts, go to next step. If voltage is less 9.5 volts or less, perform battery load test. If battery is okay, go to next step. If battery fails load test, replace battery and recheck symptom.

2) Turn ignition switch to START position. Using a DVOM, measure voltage between generator terminal (Red wire) and engine ground. If voltage is more than .5 volts, replace Black wire between generator and starter relay connector terminal No. 30 including Black fusible link, and recheck symptom. If voltage is .5 volts or less, go to next step.

3) Turn ignition switch to START position. Using a DVOM, measure voltage between generator terminal (Red wire) and battery negative terminal. If voltage is more than .5 volts, replace negative battery cable. If voltage is .5 volts or less, go to next step.

4) Turn ignition switch to START position. Using a DVOM, measure voltage between battery positive terminal and ground. If voltage is more than .5 volts, replace positive battery cable. If voltage is .5 volts or less, clean starter motor mounting blots, starter motor and mounting surface, and repeat test. IF starter still does not engage, replace starter and recheck symptom.

BENCH TESTING

PRELIMINARY TESTS

NOTE: On PG260 starter motor, starter is serviced as an assembly. If test values do not meet specifications, replace starter and solenoid as an assembly.

Remove starter from vehicle. See STARTER under REMOVAL & INSTALLATION. Check starter for damage such as broken or stripped electrical terminals, broken or cracked drive end housing,

Attaching hardware threads stripped (threads missing)	A	Require replacement of part with stripped threads.
Bent	B	Require replacement.
Corroded, affecting structural integrity	A	Require replacement.
Holes distorted	A	Require replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.

RELAY RODS

RELAY ROD INSPECTION

Condition	Code	Procedure
Attaching hardware incorrect	A	Require replacement of incorrect part, if available; otherwise, replace relay rod.
Attaching hardware loose	A	Require repair or replacement of loose part, if available; otherwise, replace relay rod.
Attaching hardware missing	C	Require replacement of missing part, if available; otherwise, replace relay rod.
Attaching hardware threads damaged	A	Require repair or replacement of part with damaged threads, if available; otherwise, replace relay rod.
Attaching hardware threads stripped (threads missing)	A	Require replacement of part with stripped threads, if available; otherwise, replace relay rod.
Bent	B	Require replacement.
Binding	A	(1) Further inspection required.
Grease boot cracked	2	(2) Suggest replacement.
Grease boot missing	2	(3) Suggest replacement.
Grease boot torn	2	(4) Suggest replacement.
Grease fitting broken	A	Require replacement grease fitting.
Grease fitting missing	C	Require replacement of grease fitting.
Grease fitting won't seal	A	Require replacement of grease fitting.
Grease seal missing	2	(3) Suggest replacement.
Grease seal torn	2	(4) Suggest replacement.
Looseness (perceptible horizontal movement)	1	(5) Suggest replacement.
Looseness that is excessive	B	(5)(6) Require replacement.
Seized	A	Require replacement.
Stud bent	B	(7) Require replacement.

Application	Tool Number
Bolt & Thrust Washer	J-21474-3
Bushing Installer	J-21474-13
Nut	J-21474-4
Receiver/Installer	J-21474-5 Or J-21474-6

Rear Bushing Replacement

1) Remove lower control arm from vehicle. See LOWER CONTROL ARM. Place lower control arm in soft-jawed vise.

2) Install appropriate receiver, remover, spacer, nut and bolt as indicated. See Fig. 6. See CONTROL ARM BUSHING SERVICE EQUIPMENT table. Tighten nut until rear bushing is removed from lower control arm.

3) Assemble control arm bushing service set. Install nut, bolt, spacer and receiver. Position NEW rear bushing into lower control arm with lip side of bushing on outside of lower control arm. Tighten nut until bushing is fully seated into lower control arm.

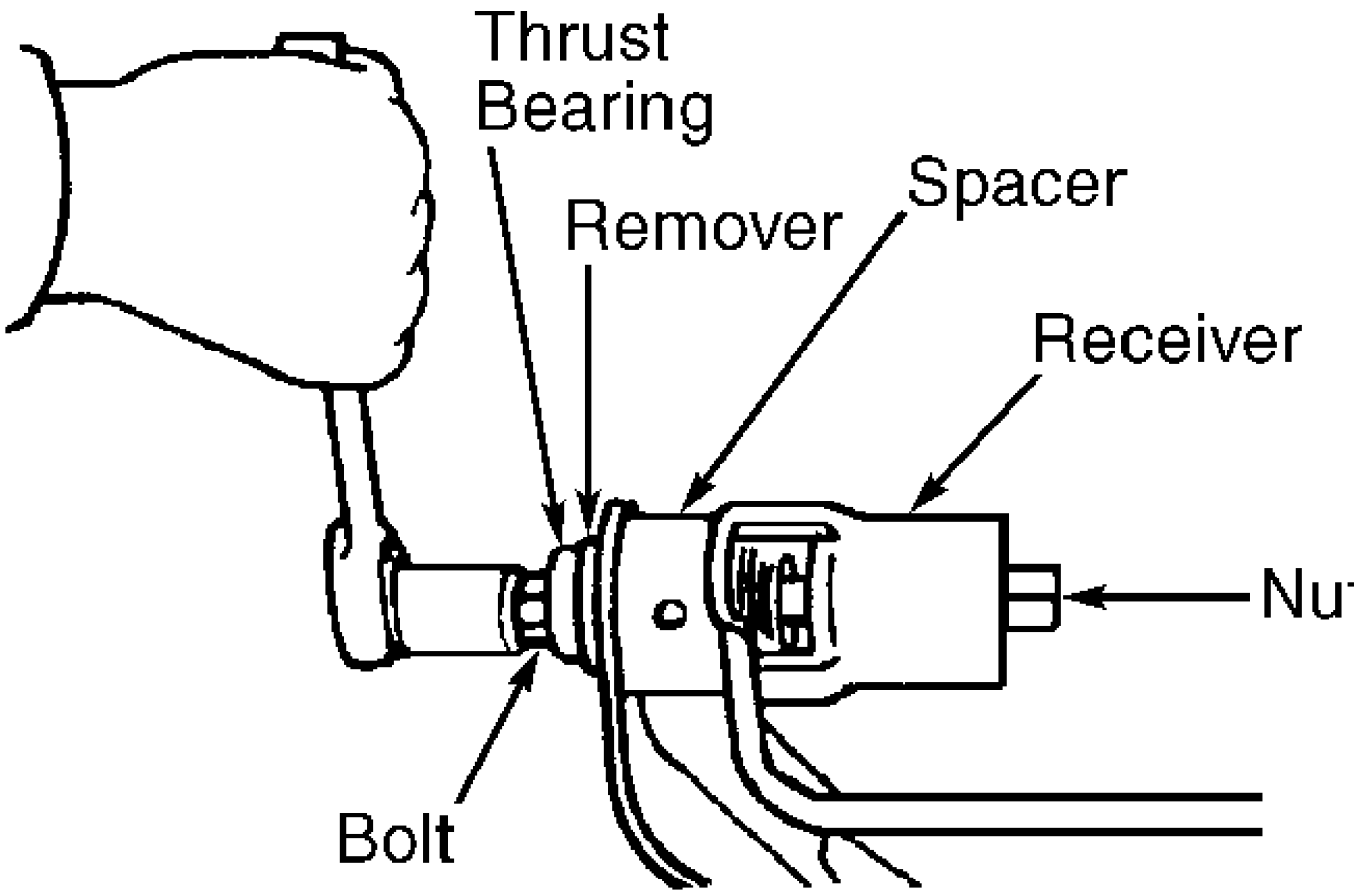


Fig. 6: Removing Lower Control Arm Rear Bushing
Courtesy of General Motors Corp.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

			if available; otherwise, replace strut rod.
Attaching hardware threads stripped (threads missing)	A	.....	Require replacement of part with stripped threads, if available; otherwise, replace strut rod.
Attaching (mating) hole oversized	A	...	Require repair or replacement of frame.
Attaching point on frame corroded, affecting structural integrity ...	A	.....	Require repair of frame.
Bent	A	.....	Require replacement.
Mating (attaching) hole oversized	A	...	Require repair or replacement of frame.
Threads damaged	A	..	Require repair or replacement.
Threads stripped (threads missing)	A	.....	Require replacement.

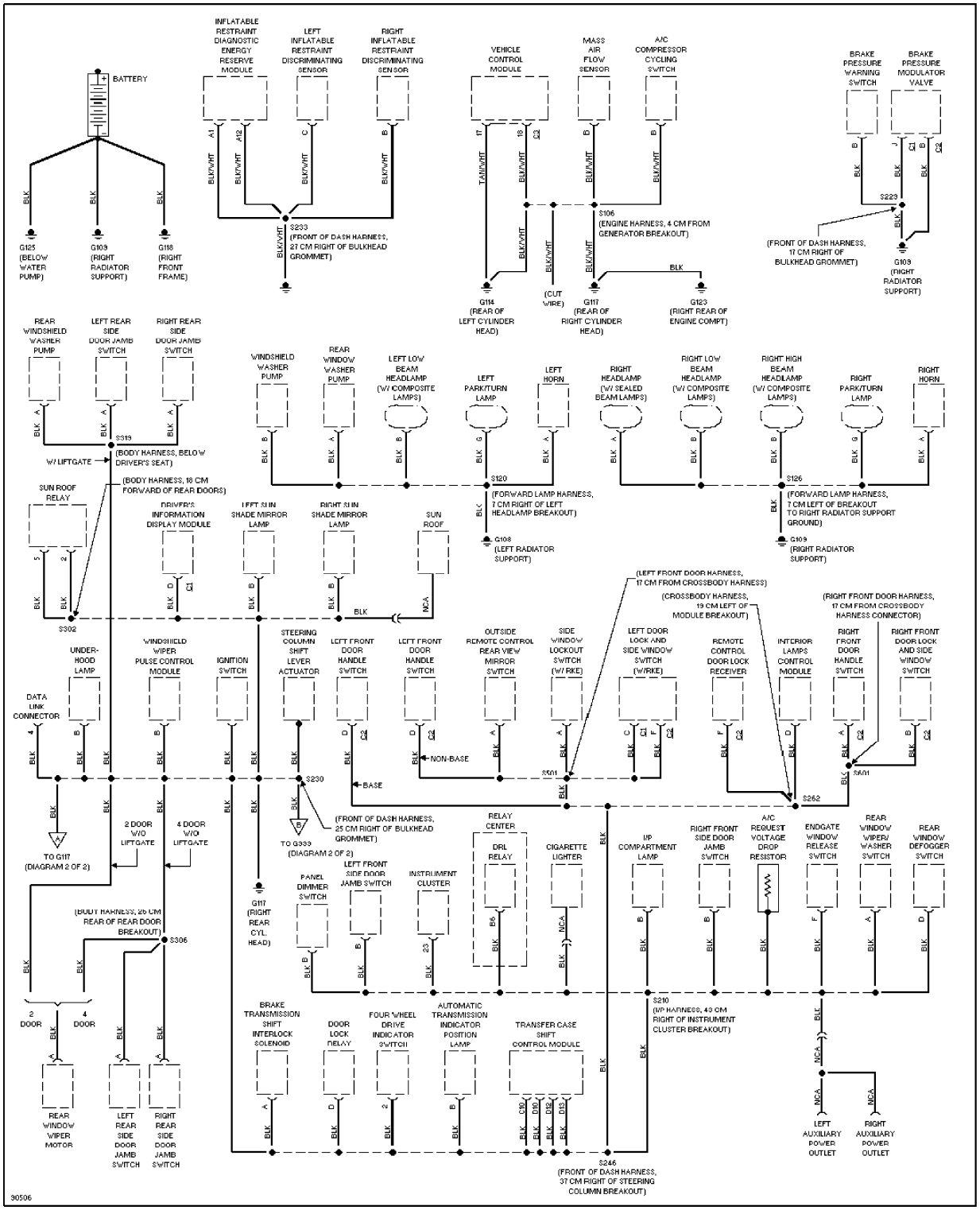
(1) - Only required if an alignment is being performed.

STRUT UPPER BEARING PLATE ASSEMBLIES

NOTE: When the following guidelines indicate replacement of bearing, only the bearing should be replaced if it is available separately; otherwise, replace the bearing plate assembly.

STRUT UPPER BEARING PLATE ASSEMBLY INSPECTION

Condition	Code		Procedure
Attaching hardware broken	A	...	Require replacement of broken part, if available; otherwise, replace bearing plate assembly.
Attaching hardware loose	A	...	Require repair or replacement of loose part, if available; otherwise, replace bearing plate assembly.
Attaching hardware missing	C	..	Require replacement of missing part, if available; otherwise, replace bearing plate assembly.
Attaching hardware threads damaged	A	...	Require repair or replacement of part with damaged threads, if available; otherwise, replace bearing plate assembly.
Attaching hardware threads stripped (threads missing)	A	.....	Require replacement of part with stripped threads, if available; otherwise, replace bearing plate assembly.
Bearing axial or radial movement exceeds vehicle manufacturer's			



Ground Distribution Circuit (1 of 2)

NOTE: If engine has been operating, allow engine to cool for about one hour before proceeding with tests.

2) Turn ignition off. Turn ignition, engine off. Using scan tool, read HO2S voltage. If voltage gradually decreases 0.15 volt, go to step 5). If voltage does not decrease, go to next step.
3) Disconnect HO2S harness connector. Connect a test light between chassis ground and ignition feed circuit at HO2S. If test light illuminates, go to next step. If test light does not illuminate, go to step 6).
4) Connect test light between ignition feed and heater ground circuits at HO2S harness connector. If test light illuminates, go to step 7). If test light does not illuminate, go to step 8).
5) DTC P0147 is intermittent. If any additional DTCs are set, diagnose affected DTCs. If no additional DTCs are set, see DIAGNOSTIC AIDS.
6) Check HO2S (bank 1 sensor 3) fuse. If fuse is open, go to step 14). If fuse is okay, go to step 9).
7) Check HO2S for faulty connection. If faulty connection is found, go to step 12). If connection is okay, go to step 15).
8) Check HO2S for faulty connection. If faulty connection is found, go to step 12). If connection is okay, go to step 10).
9) Check HO2S for faulty connection. If faulty connection is found, go to step 12). If connection is okay, go to step 11).
10) Repair open HO2S ground circuit. After repairs, go to step 16).
11) Check for open HO2S harness connector ignition feed circuit. After repairs, go to step 13).
12) Repair faulty connection. After repairs, go to step 16).
13) Repair open HO2S ignition feed circuit. After repairs, go to step 16).
14) Repair short to ground in HO2S ignition feed circuit. After repairs, go to step 16)
15) Replace HO2S. After replacing sensor, go to next step.
16) Using scan tool, select DTC, CLEAR INFO function. Start engine and allow it to reach operating temperature. Using scan tool, select DTC, SPECIFIC function and enter DTC P0147. Operate vehicle within conditions required to set DTC. If scan tool displays RAN AND PASSED, go to next step. If scan tool does not display RAN AND PASSED, return to step 2).
17) Using scan tool, select Read and Record INFO, REVIEW INFO function. If any undiagnosed DTCs are displayed, diagnose affected DTCs. If no DTCs are displayed, system is okay.

Diagnostic Aids
Check for faulty connections or damaged harness. Never solder HO2S wires.

DTC P0151 - HO2S CIRCUIT LOW VOLTAGE BANK 2, SENSOR 1

NOTE: For circuit reference, see the L - WIRING DIAGRAMS article.

Circuit Description
VCM provides about 0.45 volt reference to Heated Oxygen Sensor (HO2S). HO2S sensor signal voltage varies from about one volt when exhaust is rich to about 0.1 volt when exhaust is lean. VCM reads and stores sensor voltage information and evaluates the voltage samples to determine amount of time sensor voltage is out of range. If HO2S voltage is out of predetermined range, DTC will set.
Conditions for setting DTCs:

* No ECT, IAT, MAF, MAP or TP sensor DTCs set.

ignition on. This prevents flooding before starting. Fuel cut-off also occurs at high engine RPM or excessive vehicle speed to prevent internal damage to engine. Some models may also cut off fuel injector signals during periods of sudden, closed throttle deceleration (when fuel is not needed).

IDLE SPEED

PCM/VCM controls engine idle speed depending upon engine operating conditions. PCM/VCM senses engine operating conditions and determines best idle speed.

Idle Air Control (IAC) Valve

The IAC valve controls engine idle speed to prevent stalling during engine load changes. The IAC valve is mounted on throttle body and controls the amount of air by-passed around the throttle plate. The IAC valve controls engine idle speed by moving its pintle in and out in steps referred to as "counts" (0 counts, fully seated; 255 counts, fully retracted). Counts can be measured by observing scan tool display while connected to the Data Link Connector (DLC).

If engine RPM is too low, pintle is retracted and more air is by-passed around the throttle plate to increase engine RPM. If engine RPM is too high, pintle is extended and less air is by-passed around the throttle plate to decrease engine RPM. Normal counts on an idling engine should be near 18. When engine is idling, PCM/VCM determines proper positioning of IAC valve based on battery voltage, coolant temperature, engine load and engine RPM.

If IAC valve is disconnected or reconnected with engine running, IAC loses its reference point and must be reset. On some models, IAC is reset by turning ignition on, then off. Other models require driving vehicle at normal operating temperature over 35 MPH with circuit properly connected. Problems in IAC circuit should set a related diagnostic trouble code.

The IAC valve affects only the idle system. If valve is stuck fully open, excessive airflow into the manifold creates a high idle speed. Valve stuck closed allows insufficient airflow, resulting in low idle speed. For calibration purposes, several different IAC valves are used. Ensure replacement valve is proper design.

IGNITION SYSTEM

Enhanced Ignition System

The enhanced ignition system consists of the VCM, distributor, ignition coil driver module, ignition coil and Camshaft Position (CMP) sensor. Ignition control and by-pass functions are controlled by the VCM.

* Camshaft Position (CMP) Sensor
  CMP sensor is similar to CKP sensor. CMP sensor provides one pulse (1X signal) per camshaft revolution. VCM uses this signal in conjunction with the crankshaft position to determine which cylinder(s) are misfiring.
* Crankshaft Position (CKP) Sensor
  CKP sensor is located in the front engine cover. Air gap between sensor and target wheel is preset and is not adjustable. Target wheel has 4 slots 60 degrees apart and is keyed to the crankshaft. Rotation of target wheel creates a change in the magnetic field of the sensor which results in an induced voltage pulse. One crankshaft revolution will result in 4 pulses (4X signal). Based on these pulses, VCM is able to determine crankshaft position and engine speed. VCM will then activate the fuel injector and provide spark to