TUNE-UP

ENGINE IDENTIFICATION

VEHICLE IDENTIFICATION NUMBER CODE

Engine can be identified by the 8th digit of Vehicle Identification Number (VIN), located on top left corner of instrument panel.

VIN Engine Codes

Application	Code
4.3L (260") 2-Bbl.	F
4.3L (265") 2-Bbl.	S
4.4L (267") 2-Bbl.	J
4.9L (301") 4-Bbl.	W
4.9L (301") 4-Bbl. Turbo	T
5.0L (305") 4-Bbl.	H
5.0L (307") 4-Bbl.	Y
5.7L (350") 4-Bbl.	L
5.7L (350") 4-Bbl. (Corvette)	6
6.0L (368") DFI	9

ENGINE IDENTIFICATION NUMBER CODE

Engine code numbers are located on labels attached to valve covers, or are stamped into block at front, near right side of water pump.

TUNE-UP NOTES

NOTE — *In order to comply with emission standards, specifications shown on engine compartment emission control tune-up decal must be used in all instances.*

CAUTION — *Before making a compression test or cranking engine with a remote starting switch, disconnect ignition switch connector (pink wire) from H.E.I. system distributor.*

CAUTION — *Do not remove spark plug wires with engine running. High Energy Ignition secondary voltage is higher than standard ignition systems and may inflict harmful electrical shock.*

CAUTION — *Damage to H.E.I. electronic module and/or ignition coil may result if "TACH" terminal, in distributor cap connector, is directly grounded.*

ENGINE COMPRESSION

GASOLINE MODELS

Compression Ratio	
4.3L (260" & 265")	8.0:1
4.4L (267")	8.3:1
4.9L (301") 4-Bbl.	8.2:1
4.9L (301") Turbo	7.5:1
5.0L (305")	8.6:1
5.0L (307")	8.5:1
5.7L (350")	8.2:1
6.0L (368")	8.2:1

Recommended Fuel	Unleaded (87 AKI Minimum)
Compression Pressure (All)	120-160 psi
Max. Variation Between Cylinders	30%

Test compression with engine warm, all spark plugs removed and throttle and choke valves wide open. Crank engine through at least four compression strokes.

NOTE — *If using a remote starting switch, disconnect the ignition switch connector (pink wire) from H.E.I. distributor.*

VALVE CLEARANCE

Hydraulic Lifters	
4.4L, 5.0L (305") & 5.7L	1 turn down from zero lash
All Others	Zero lash

VALVE ARRANGEMENT

4.3L (260") & 5.0L (307")
I-E-I-E-E-I-E-I (Front to rear, both banks)
6.0L (368")
I-E-I-E-I-E-I-E (Front to rear, left bank)
E-I-E-I-E-I-E-I (Front to rear, right bank)
All Other Engines
E-I-I-E-E-I-I-E (Front to rear, both banks)

SPARK PLUGS

Application	Gap (In.)	Torque (Ft. Lbs.)
4.3L (260")	.080	25
4.3L (265")	.060	15
4.4L (267")	.045	22
4.9L (301")	.060	15
4.9L (301") Turbo	.060	20
5.0L (305")	.045	22
5.0L (307")	.080	25
5.7L (350")	.045	22
6.0L (368")	.060	25

Spark Plug Type

Application	AC No.
4.3L (260")	R46SX
4.3L (265")	R45TSX
4.4L (267")	R45TS
4.9L (301")	R45TSX
5.0L (305")	R45TS
5.0L (307")	R46SX
5.7L (350")	R45TS
6.0L (368")	R45NSX

HIGH TENSION WIRE RESISTANCE

Carefully remove ends of wire from spark plug and distributor. Using an ohmmeter, check resistance while gently twisting wire. If resistance is not to specification, or fluctuates from infinity to any value, replace cable.

Resistance (Ohms) Per Wire

Wire Length	Resistance
Under 24"	30,000 Max.
Over 24"	50,000 Max.

DISTRIBUTOR

All models are equipped with High Energy Ignition systems and no adjustments are required.

TUNE-UP (Cont.)

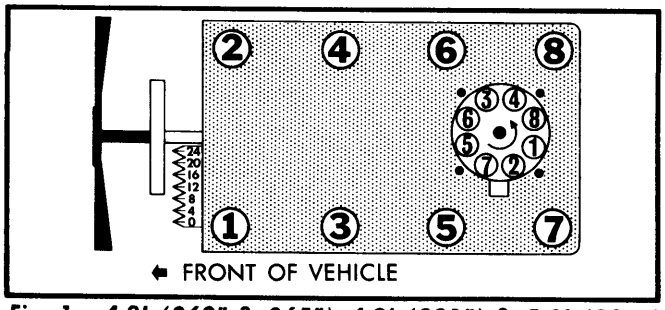

Fig. 1 4.3L (260" & 265"), 4.9L (301") & 5.0L (307") Firing Order and Timing Marks

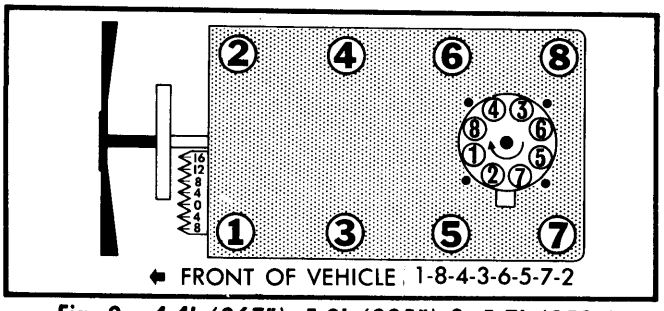

Fig. 2 4.4L (267"), 5.0L (305") & 5.7L (350") Firing Order and Timing Marks

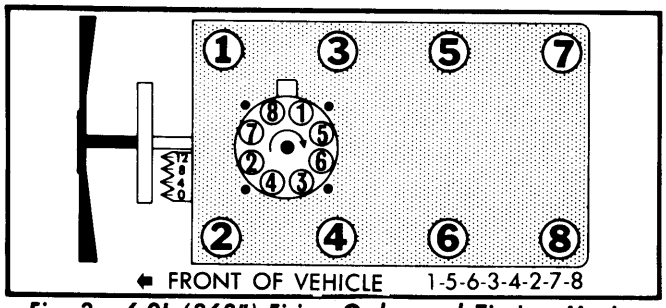

Fig. 3 6.0L (368") Firing Order and Timing Marks

IGNITION TIMING

NOTE – *Engines are equipped with a receptacle for a magnetic probe timing light, located 9.5° ATDC. Do not use this location for timing with a conventional light.*

Ignition timing procedures will vary with vehicle model and component application. Refer to Emissions Control Decal in engine compartment for correct adjustment procedures and proceed as follows:

1) Set parking brake and block drive wheels. Timing is checked and adjusted with engine at normal operating temperature, choke open and A/C off. Place transmission in Park or Neutral.

2) Disconnect and plug vacuum line to air cleaner. Remove air cleaner. On 4.9L Turbo models, connect a jumper wire between ground and the distributor by-pass connector (Blue). On 6.0L models, disconnect reference signal connector (Green) on left side of engine. Do not ground either side of connector.

3) On all other models, disconnect 4-wire connector at base of distributor. Check or adjust timing at idle or specified RPM. After adjustment, return wiring to original condition and reinstall air cleaner.

Ignition Timing (Degrees BTDC@Idle)

Application	Man. Trans.	Auto. Trans.
4.3L (260")		①②18
4.3L (265")		12
4.4L (267")		6
4.9L (301") 4-Bbl.		12
4.9L (301") Turbo		6
5.0L (305")	6	6
5.0L (307")		①15
5.7L (350")	6	6
6.0L (368")		10

① – Set timing at 1100 RPM in Park.
② – Set Cutlass (exc. wagon) to 20° BTDC.

HOT (SLOW) IDLE RPM

NOTE – *On most models, idle speed is controlled by the ECM and an Idle Speed Controller (ISC) motor. Other models use standard solenoids or a vacuum-operated Idle Load Compensator. Identify the idle speed system used on vehicle, and then follow appropriate adjustment procedures. For Cadillac models with 6.0L engine and DFI, use procedures for fuel-injected engines.*

CARBURETED ENGINES

Idle Speed (With Solenoid) – 1) Warm engine to normal operating temperature and adjust timing. With A/C off, adjust idle speed screw to curb idle RPM.

2) Disconnect compressor clutch wire and turn A/C on. Open throttle slightly to allow plunger to extend. Turn solenoid plunger to obtain correct solenoid RPM. Reconnect compressor clutch wire.

Idle Speed RPM

Application	Curb Idle	Solenoid Energized
4.4L (267")	500	600
5.0L (305") & 5.7L (350")		
Man. Trans.	700	800
Auto. Trans.	500	600

Idle Speed (With Idle Speed Control) – 1) Idle speed is controlled by ISC and ECM. Adjustment is not normally needed.

NOTE – *If idle problems are encountered, see General Motors Computer Command Control in COMPUTERIZED ENGINE CONTROLS Section.*

2) If a new ISC motor has been installed, or if diagnosis indicates adjustment is needed, use the following steps to adjust high and low limits for ISC motor.

CAUTION – *Do not disconnect or connect ISC connector with ignition on, or damage to ECM may result.*

3) Connect tachometer to engine. Connect dwell meter to

TUNE-UP (Cont.)

green mixture solenoid test lead near carburetor. Set dwell meter on 6-cylinder scale. With A/C off, run engine at fast idle until dwell meter begins to vary.

4) Turn ignition off and disconnect ISC connector. Connect jumper wires to pins "C" and "D" in motor side of connector. Connect pin "D" to ground and apply 12 volts to pin "C". Motor will retract. Disconnect wires as soon as motor reaches end of travel.

CAUTION – *Always remove voltage when motor reaches end of travel. Do not apply voltage to pins "A" or "B" or internal switch will be damaged.*

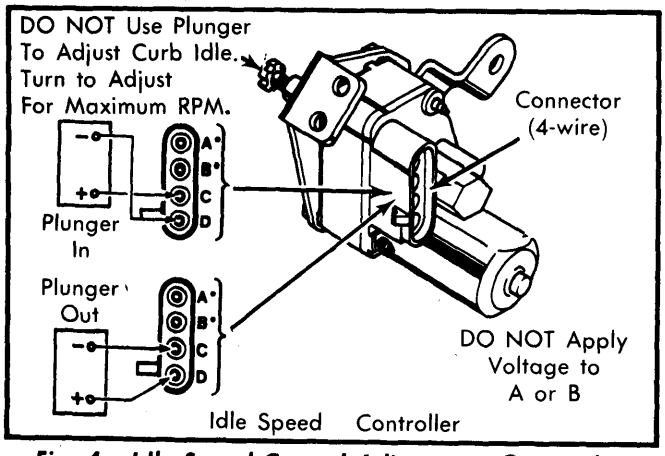

Fig. 4 Idle Speed Control Adjustment Connections

5) Start engine and run until dwell meter begins to vary (closed loop). Place transmission selector in "D" and adjust idle stop screw for minimum RPM.

6) Place transmission selector in "N". Apply 12 volts to pin "D" with pin "C" grounded. Plunger will extend, then remove wires. On manual transmission models, turn ISC plunger to obtain maximum RPM.

7) On automatic transmission models, adjust plunger to obtain 1500 RPM. Place transmission selector in "D", then turn plunger to set maximum RPM.

8) Apply voltage to pin "D" with pin "C" grounded. Motor should rachet and speed should not change. Reverse connections and retract plunger. Turn off ignition, remove test equipment, and reconnect the 4-wire connector. Disconnect ECM fuse for at least 10 seconds to erase trouble codes and "Check Engine" light.

NOTE – *Disconnecting battery will erase trouble codes, but will also erase memory in electronic radio, clock, trip computer, and other devices. To avoid having to reset these functions, use ECM fuse if possible.*

Idle Speed Control Adjustment

Application	Minimum RPM	Maximum RPM
4.3L (260")	400	850
4.3L (265")	400	1200
4.9L (301") 4-Bbl.	400	950
4.9L (301") Turbo	400	1000
5.0L (307")	400	850

Idle Speed (With Idle Load Compensator) – **1)** Remove air cleaner and plug vacuum hose to TVV. Disconnect and plug hoses to EGR, canister purge port, and ILC.

2) Back out throttle stop screw 3 turns. With engine running and transmission selector in "D", adjust plunger to obtain 725 RPM. Hold jam nut on plunger to avoid damaging ILC.

NOTE – *If ILC is being replaced, adjust plunger to 61/64" before installation.*

3) Reconnect engine vacuum to ILC and observe idle speed. If not even, stop engine and remove ILC. Remove rubber cap and metal plug from ILC rear tube.

4) Insert .090" Allen wrench in tube. Turn screw clockwise to decrease idle speed; counterclockwise to increase idle speed. One turn will change speed 75-100 RPM. Place rubber cap on ILC tube and reinstall ILC on carburetor.

5) Check idle speed with vacuum line connected. If adjustment is necessary, remove ILC and repeat adjustment with Allen wrench. Reinstall ILC and check speed, then disconnect and plug vacuum line.

6) Connect a hand vacuum pump to ILC and apply enough vacuum to fully retract plunger. Adjust idle stop screw for 550 RPM. Reconnect hoses and remove test equipment.

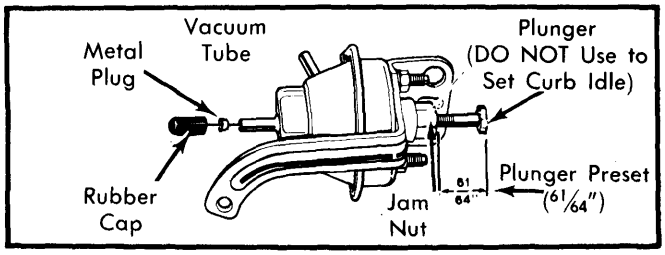

Fig. 5 Idle Load Compensator Adjustment

Idle Load Compensator Adjustment (RPM)

Application	Plunger Retracted	Plunger Extended
4.3L (260")	550	725
5.0L (307")	550	725

FUEL-INJECTED ENGINES

NOTE – *Idle speed is controlled by ECM. Idle speed adjustment is necessary only when ISC or throttle body has been replaced. The procedure involves removal and disassembly of part of the throttle body. For complete procedure, refer to General Motors Digital Fuel Injection in FUEL SYSTEMS Section.*

IDLE MIXTURE

NOTE – *Idle mixture adjustment is not normally necessary. Mixture should be adjusted only if vehicle fails testing or carburetor has been disassembled.*

MIXTURE SCREW PLUG REMOVAL

If plugs must be removed, perform following procedure.

TUNE-UP (Cont.)

1) Remove carburetor from engine, invert carburetor and drain fuel into suitable container. Place inverted carburetor on suitable holding fixture manifold side up.

2) Use hacksaw to make 2 small cuts below mixture plugs on bottom of throttle body. Use a flat punch or chisel to break out throttle body to gain access to plugs.

3) Use punch to drive out plug. If hardened plug shatters, remove loose pieces.

4) Repeat steps 2) and 3) to remove remaining plugs.

MIXTURE CONTROL ADJUSTMENT

1) Mixture control solenoid travel should be checked before adjustment. Stop engine and remove air cleaner. Insert thin metal scale in "D" shaped hole in air horn. Press down to determine travel of solenoid. Total movement should be between 1/16-1/8".

NOTE – *If solenoid movement is not correct, see Rochester E2ME and E4ME Carburetor articles in FUEL SYSTEMS Section for adjustment procedures.*

2) To adjust idle air bleed valve, set parking brake and block rear wheels. Disconnect and plug hoses as directed on Emission Control Decal in engine compartment. Check ignition timing and adjust if necessary.

3) Connect dwell meter to lead wire from mixture control solenoid in carburetor, then set dwell meter to 6 cylinder scale. Start engine and run at idle until normal operating temperature is reached and a varying dwell is noted on dwell scale.

NOTE – *It is absolutely essential that engine is operated for sufficient length of time to ensure that engine coolant sensor, and oxygen sensor in exhaust, are at full operational temperature.*

4) Adjust curb idle speed, if necessary. With engine idling, observe dwell reading. If within, or varying between 10-50° range, no further adjustment is necessary. If dwell does not vary, or falls outside the 10-50° range, perform the following:

5) With engine off, cover primary and secondary bore inlets with a shop towel or tape. Align a number 35 drill on the rivet head holding air bleed valve cover. Drill only enough to remove rivet head, then drive rivet out with small punch. Remove and discard air bleed valve cover.

6) Restart engine and allow to idle, using a screwdriver that fully fits in valve. Slowly turn valve up or down until dwell reading varies and falls within the 25-35° range, attempting to be at or as close to 30° as possible.

CAUTION – *Perform this carefully. The idle air bleed valve is very sensitive in controlling air/fuel ratios and the valve should be turned only in 1/8 turn increments.*

7) If after performing this adjustment, the dwell reading does not vary and is not within the 25-35° range, it will be necessary to remove carburetor to gain access to plugs covering the idle mixture needles and adjust the idle mixture as follows:

8) Turn mixture screws in until lightly seated, then back screws out the specified number of turns.

Preliminary Idle Mixture Screw Adjustment

Application	Turns Out
4.3L (260")	4 3/4
4.3L (265")	3 1/2
4.4L (267")	3 3/4
4.9L (301") 4-Bbl.	4 1/2
4.9L (301") Turbo	4 1/2
5.0L (305")	3 1/3
5.0L (307")	3 7/8
5.7L (350")	3 1/3

9) Reinstall carburetor (without air cleaner and gasket). Start engine, run until fully warm, and repeat Idle Air Bleed Adjustment until dwell reading is varying and within specified limits.

10) If unable to set to 25-35° dwell reading, turn mixture screws out 1 turn (if dwell is below 25°) or in 1 turn (if above 35°). Then reset idle air bleed valve to obtain correct dwell reading.

11) If necessary, reset curb idle speed and fast idle speed to specifications. Disconnect dwell meter and tachometer. Unplug and reconnect vacuum hoses, reinstall air cleaner and gasket.

COLD (FAST) IDLE RPM

NOTE – *No fast idle adjustment is required on 6.0L fuel-injected engines.*

1) Disconnect EGR vacuum line at carburetor and plug carburetor port. On 4.9L Turbo models, ground distributor bypass connector (Blue).

2) On 4.3L (260") and 5.0L (307") engines, disconnect and plug canister purge hose. Place transmission selector in "D" and follower on Low step of fast idle cam.

3) On all other engines, place follower on High step of fast idle cam and transmission selector in "N".

4) On all models, adjust RPM with fast idle speed screw. After adjustment, reconnect hoses and wiring, then remove test equipment.

Fast Idle (RPM)

Application	RPM
4.3L (260")	①700
4.3L (265")	2300
4.4L (267")	2200
4.9L (301") 4-Bbl.	2000
4.9L (301") Turbo	2400
5.0L (305")	2200
5.0L (307")	①650
5.7L (350")	2200

① – Adjust in "D" on Low step of cam.

TUNE-UP (Cont.)

AUTOMATIC CHOKE

All models are equipped with a riveted-on, indexed choke cover that is not adjustable.

FUEL PUMP

Make all tests at idle RPM. Pinch off fuel return line (if equipped). Connect pressure gauge to fuel line at carburetor and hold gauge at carburetor level.

Fuel Pump Specifications

Pressure At Idle	
4.3L (265") & 4.9L (301") 4-Bbl.	7.0-8.5 psi
6.0L (368") DFI (Electric)	12.0-14.0 psi
All Other Engines	7.5-9.0 psi
Volume (At Idle)	
All Models	One pint in 30 seconds

EXHAUST EMISSION SYSTEMS

See EXHAUST EMISSION SYSTEMS section.

GENERAL SERVICING

IGNITION

DISTRIBUTOR

Application	System
4.3L (260" & 265")	EST
4.4L (267")	EST
4.9L (301")	EST & ESC
5.0L (305" & 307")	EST
5.7L (350")	EST
6.0L (368")	EST & DFI

IGNITION COIL

Coil Resistance (Ohms@75°F)

Application	Primary	Secondary
All Models	0.4-1.0	6000-30,000

Coil Output
At all engine speeds ..... 25-35 KV Minimum①

① – Replace if below 25 KV.

CARBURETION/FUEL INJECTION

CARBURETORS

Application	Model
4.3L (260")	Rochester E2MC
4.3L (265")	Rochester E2ME
4.4L (267")	Rochester E2ME
4.9L (301")	Rochester E4ME
5.0L (305")	Rochester E4ME
5.0L (307")	Rochester E4MC
5.7L (350")	Rochester E4ME

Other Data & Specifications – *See Tune-Up and Rochester Carburetors in FUEL SYSTEMS Section.*

FUEL INJECTION

6.0L (368") engines used on Cadillac passenger vehicles are equipped with Digital Fuel Injection (DFI) with oxygen sensor and throttle body injection

Other Data & Specifications – *See Tune-Up and General Motors Digital Fuel Injection in FUEL SYSTEMS Section.*

ELECTRICAL

BATTERY

Standard		
Camaro, Caprice, Cutlass, Impala, Riviera, Toronado, 88, 98	350	90
Corvette	460	115
Cadillac	550	135
All Other Models	370	80
Optional		
Century, Electra, LeSabre, Regal, Riviera, Toronado	550	135
All Other Models	465	115

STARTER

Delco-Remy solenoid actuated with overrunning clutch.

Starter Specifications

Application	Volts	Amps	Test RPM
5.7L (350")	9	70-110	6500-10,700
6.0L (368")	9	65-95	7000-10,500
All Other Models①	9	45-70	7000-11,900

① – 5.0L (307") on Riviera 65-95A, 7000-10,500 RPM.

ALTERNATOR

Application	Standard Amps	Optional Amps
4.3L (260")	55	63, 70
4.3L (265")	63	70
4.4L (267")	37	55, 63, 70
4.9L (301") 4-Bbl.	63	70
4.9L (301") Turbo	70	.....
5.0L (305")	37, 55	55, 63, 70
5.0L (307")	55	63, 70
5.7L (350")	37, 63	55, 63, 70
6.0L (368")	63, 70	100

GENERAL SERVICING (Cont.)

ALTERNATOR REGULATOR

Delco-Remy nonadjustable, integral with alternator.

Operating Voltage (at 80°F) 13.8-14.4

Other Data & Specifications – *See Delco Alternators and Regulators in ELECTRICAL Section.*

COOLING CAPACITIES

Application	Quantity
4.3L (260")	
Cutlass	15.0 qts.
88	15.5 qts.
4.3L (265")	
Catalina, Bonneville	19.0 qts.
Grand Prix, LeMans, Regal	20.3 qts.
Firebird	21.0 qts.
4.4L (267")	
Camaro	15.0 qts.
Malibu, Monte Carlo, El Camino	21.0 qts.
Caprice, Impala	①16.8 qts.
4.9L (301") 4-Bbl.	21.0 qts.
4.9L (301") Turbo	23.0 qts.
5.0L (305")	
Camaro, Caprice, Impala	15.0 qts.
Malibu, Monte Carlo	19.0 qts.
Firebird	17.2 qts.
5.0L (307")	
Riviera, Toronado	16.4 qts.
Electra, LeSabre	18.9 qts.
Bonneville, Catalina, Cutlass, 88	15.5 qts.
98	16.1 qts.
5.7L (350")	
Camaro	16.0 qts.
Corvette	21.0 qts.
6.0L (368")	
DeVille, Fleetwood	21.4 qts.
Eldorado, Seville	22.4 qts.

① – Station Wagon with Std. Cooling, 15.5 qts.

REPLACEMENT INTERVALS

Component	Interval (Miles)
Oil Filter	
4.9L (301") Turbo (Every oil change)	3,000
All Other Engines (Every other oil change)	15,000
Air Filter	30,000
PCV Valve & Filter	30,000
Spark Plugs	30,000

OIL & FUEL CAPACITIES

Application	Quantity
Crankcase (Including Filter)	
6.0L (368") DFI	
Eldorado & Seville	6.0 qts.
DeVille & Fleetwood	5.0 qts.
All Other Engines	5.0 qts.
Fuel Tank	
Camaro, Eldorado, Firebird, Riviera, Seville, Toronado	21.0 gals.
Century, Cutlass, Grand Prix, LeMans, Malibu, Monte Carlo, Regal	18.0 gals.
El Camino	
Standard	17.5 gals.
Optional	22.5 gals.
All Other Models	
Station Wagon	22.0 gals.
Exc. Station Wagon	25.0 gals.

TRANSMISSION & DIFFERENTIAL CAPACITIES

Application	Quantity
Auto. Trans. (Dexron II)	
200C	7.0 qts.
200-4R	7.0 qts.
250C	8.0 qts.
350C	6.3 qts.
400	6.0 qts.
Auto. Transaxle (Dexron II)	10.0 qts.
Man. Trans. (SAE 80W-90)	3.5 pts.
Final Drive (SAE 80W-90)	3.3 pts.
Rear Axles (SAE 80W-90)	
7.5" Axle	3.5 pts.
8.5" & 8.75" Axle	4.3 pts.

BELT ADJUSTMENTS

Tension (Lbs.) Using Strand Tension Gauge

Application	New Belt	Used Belt
Air Pump	80	45
Alternator	145	70
A/C & Pwr. Str.	170	90
Cogged Belt	60 Min.	60 Min.