TUNE-UP

ENGINE IDENTIFICATION

VEHICLE IDENTIFICATION NUMBER CODE

Eighth digit of Vehicle Identification Number is used to identify engine size. VIN is located on top left side of dashboard on all vehicles.

VIN Engine Codes

Application	Code
1.6L (98") 2-Bbl.	9
2.5L (151") 2-Bbl.	5

ENGINE IDENTIFICATION NUMBER CODE

Engine code is stamped at lower right side of block on 1.6L engines. It is stamped on front of block above crankshaft pulley on 2.5L engines.

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 compression test, or cranking engine with a remote starter switch, disconnect ignition switch connector (pink wire) from H.E.I. system.*

CAUTION – *Do not remove spark plug wires with engine running. H.E.I. secondary voltage is higher than standard ignition systems and may inflict harmful electrical shock.*

CAUTION – *Damage to the H.E.I. electronic module and/or coil may result if "TACH" terminal is directly grounded.*

ENGINE COMPRESSION

Compression Ratio	
1.6L	8.5:1
2.5L	8.2:1
Recommended Fuel	Unleaded (87 AKI Minimum)
Compression Pressure	
1.6L	145 psi
2.5L	140 psi
Max. Variation Between Cylinders	20 psi

Check compression pressure with engine at normal operating temperature, all spark plugs removed, and throttle and choke valves wide open.

VALVE CLEARANCE

Hydraulic Lifters	Zero Lash

VALVE ARRANGEMENT

1.6L
I-E-I-E-I-E-I-E (Front-to-rear)

2.5L
I-E-I-E-E-I-E-I

SPARK PLUGS

Application	Gap (In.)	Torque (Ft. Lbs.)
1.6L	.035	22
2.5L	.060	15

Spark Plug Type

Application	AC No.
1.6L	R42TS
2.5L	R44TSX

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 wire.

Resistance (Ohms)

Wire Length	Resistance
0-24"	30,000 Max.
Over 24"	50,000 Max.

DISTRIBUTOR

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

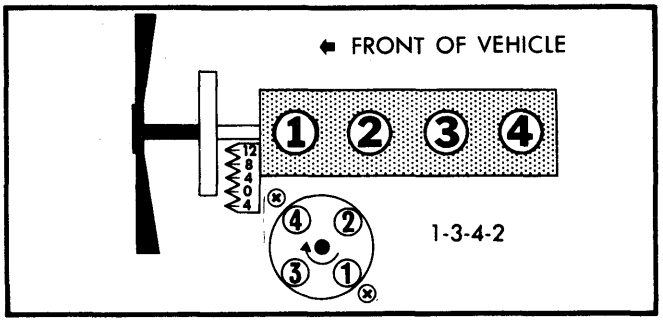

Fig. 1 1.6L Firing Order & Timing Marks

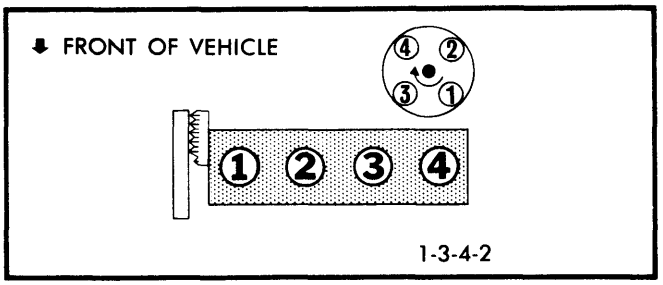

Fig. 2 2.5L Firing Order & Timing Marks

TUNE-UP (Cont.)

IGNITION TIMING

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

Check or adjust engine timing with engine idling at specified RPM and at operating temperature. Disconnect 4-wire connector from base of distributor. After adjusting timing, reconnect connector.

Ignition Timing Specifications (Degrees BTDC@RPM)

Application	Man. Trans.	Auto. Trans.
1.6L	18@800	18@700
2.5L	4@1000	4@675

IDLE SPEED

SLOW & FAST IDLE ADJUSTMENT (1.6L ONLY)

1) Engine must be at operating temperature and in Closed Loop operation. Remove air cleaner. Disconnect and plug air cleaner vacuum line, vacuum line at EGR valve, canister purge hose and canister purge control valve hose.

2) Place throttle on high step of fast idle cam. Use fast idle speed screw to adjust for fast idle RPM. Open throttle slightly to allow engine to return to idle.

3) Adjust idle speed screw to specified idle RPM. On models with A/C, disconnect compressor clutch wire and turn A/C on. Open throttle slightly to allow solenoid plunger to extend fully. Adjust solenoid screw to obtain solenoid RPM.

4) Reconnect compressor clutch wire. Return all hoses to original locations, remove test equipment, and reinstall air cleaner.

SLOW & FAST IDLE ADJUSTMENT (2.5L ONLY)

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

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.

3) Disconnect EGR valve vacuum line at carburetor and plug carburetor port. Place adjustment screw on high step of fast idle cam and adjust fast idle RPM. Remove test equipment and reconnect all hoses.

Fast Idle Speed (RPM)

Application	RPM
1.6L	2500
2.5L	2600

Idle Speed (RPM)

Application	Curb Idle	Solenoid Energized
1.6L		
Man. Trans.	①800	1150
Auto. Trans.	700	1400
2.5L		
Man. Trans.		
With A/C	②	②
Without A/C	800	1000
Auto. Trans.		
With A/C	②	②
Without A/C	550	675

① – Set to 700 RPM on decal code AUN.
② – Idle speed controlled by ISC. See Idle Speed Control adjustment procedures.

Idle Speed (With Idle Speed Control) – 1) Engine idle speed is controlled by Idle Speed Control (ISC) motor and Electronic Control Module (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, as ECM may be damaged.*

3) Connect tachometer to engine. Connect dwell meter to green mixture solenoid test lead (near carburetor). Set dwell meter to 6-cylinder scale. With A/C off, run engine until dwell meter begins to vary (closed loop operation).

4) Turn ignition off and unplug 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 as soon as motor reaches end of travel. Do not apply voltage to pins "A" or "B", as damage to internal switch will result.*

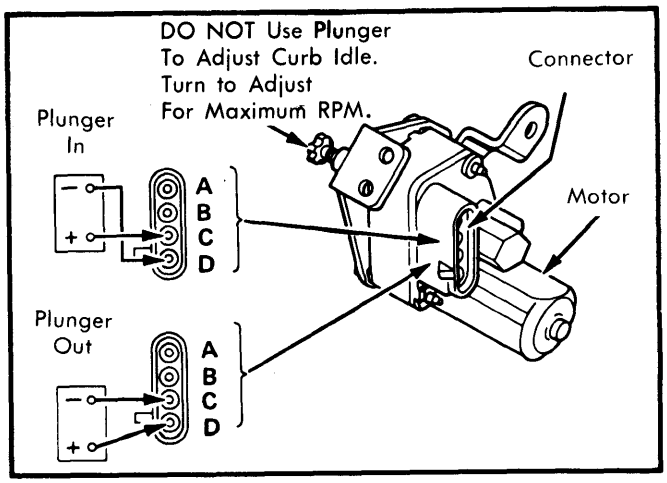

Fig. 3 Idle Speed Control Motor Connections

TUNE-UP (Cont.)

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

6) Place transmission selector in "N". Apply 12 volts to pin "D" with "C" grounded. Plunger will extend. With plunger fully extended, turn plunger to obtain maximum RPM. Apply voltage to pin "D" again with "C" grounded to check plunger extension.

7) Turn ignition off. Disconnect jumper wires and reconnect ISC connector. Start engine and place fast idle screw on top step of fast idle cam. Adjust fast idle to 2600 RPM.

8) Remove test equipment. "Check Engine" light will come on to indicate adjustments have been made. Disconnect ECM fuse for at least 10 seconds to erase trouble code and light.

NOTE – *Battery cable can be disconnected to accomplish code memory erasing. However, if battery cable is disconnected, memory will be lost in electronic radio, trip computer, clock, and other devices. To avoid having to reset these items, use ECM fuse if possible.*

Idle Speed Control Adjustment

Application	Minimum RPM	Maximum RPM
2.5L		
Man. Trans.	930-950	2000
Auto. Trans.	630-650	2400

IDLE MIXTURE

NOTE – *Idle mixture screws on all carburetors are covered by plugs. Mixture adjustment is not part of a normal tune-up and should not be necessary unless carburetor has been dismantled or vehicle fails emissions testing.*

IDLE MIXTURE ADJUSTMENT (1.6L ONLY)

1) Engine must be idling at operating temperature. Set parking brake, block wheels, and disconnect canister purge hose. Connect tachometer, then connect dwell meter to green test connector. Adjust idle speed and timing.

2) With transmission selector in "D", observe dwell reading (on 6-Cyl. scale). If dwell varies between 10-50°, mixture is correct. If dwell reading is not correct, proceed with adjustment procedure.

3) Remove carburetor and place on holding fixture upside down. Break out throttle body with punch at locator point, then drive out hardened steel plug. Remove and check idle mixture needle. If needle is damaged, replace. If in good condition, turn needle in until seated, then back out 4½ turns.

4) Reinstall carburetor without air cleaner. Start engine and idle until completely warm (dwell will begin to vary). With transmission selector in "D", slowly turn needle in or out until dwell varies within 25-35° range.

5) If dwell cannot be adjusted, carburetor must be repaired. If dwell is set correctly, check idle speed, then remove test equipment and connect hoses. Seal mixture needle with silicone sealant, then reinstall air cleaner.

IDLE MIXTURE ADJUSTMENT (2.5L ONLY)

NOTE – *Dwell will normally vary 5-10°. If dwell does vary, mixture adjustment is not required. If adjustment is necessary, center the dwell variation at the specified reading on dwell meter.*

1) Idle mixture is controlled by the ECM and is not a normal tune-up item. However, if carburetor throttle body has been replaced or diagnosis indicates mixture must be adjusted, remove carburetor.

2) Invert carburetor and make 2 small cuts with hacksaw beneath idle mixture plug. Break away casting with flat punch, then drive out plug with center punch. Remove needle and check for damage. If needle is okay, turn in until lightly seated, then back out 5 turns.

3) If plug in air horn which covers idle air bleed screw has been removed, turn screw in until lightly seated, then back out 3 turns. If plug is in place, DO NOT remove.

4) Remove vent stack screw to gain access to lean mixture screw. Turn screw in until lightly seated, then back out 2½ turns.

5) Reinstall carburetor but don't install air cleaner. Disconnect bowl vent line at carburetor and disconnect and plug vacuum line to "T" in bowl vent line (if used). Disconnect EGR valve and disconnect canister purge at carburetor. Cap carburetor port. Connect tachometer to engine and connect dwell meter to green connector near carburetor. Set meter on 6-cylinder scale.

6) Run engine at fast idle until cooling fan begins to cycle and dwell reading varies. Run engine at 3000 RPM and adjust lean mixture screw carefully until dwell reading is 35°. Return engine to idle and adjust for 700 RPM.

7) Adjust idle mixture screw with engine idling and cooling fan off. Dwell should read 25°. Turn screw in to lower dwell; out to raise dwell. Allow time for reading to stabilize after each adjustment.

8) Disconnect mixture control solenoid while cooling fan is off. Engine speed should change at least 50 RPM. If not, check for air leaks or restrictions in carburetor.

9) Run engine at 3000 RPM and check for 35° average dwell. If dwell reading is correct, remove test equipment and reinstall vent stack screen. Reconnect all hoses. Seal mixture screws with silicone sealant.

AUTOMATIC CHOKE

The choke cover on all models is riveted on and no adjustments are necessary.

FUEL PUMP

Pressure at Idle	
1.6L	2.5-6.5 psi
2.5L	6.5-8.0 psi
Volume at Idle	
All Models	1 pint in 30 sec.

EXHAUST EMISSION SYSTEMS

See EXHAUST EMISSION SYSTEMS section.

GENERAL SERVICING

IGNITION

NOTE – *Module must be replaced as a unit. A liberal coat of silicone grease MUST be applied to surface on which module will be mounted. DO NOT apply grease to terminals of module.*

DISTRIBUTOR

Delco-Remy High Energy Ignition with Electronic Spark Timing.

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

CARBURETORS

Application	Model
1.6L	Holley 6510-C
2.5L	Rochester E2SE

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

ELECTRICAL

BATTERY

Application	Cold Crank Amps@0°F	25 AMP Reserve Capacity (Minutes)
1.6L		
Man. Trans.	260	58
Auto. Trans.	315	75
2.5L		
Standard	315	75
Heavy Duty	465	115

STARTER

Delco-Remy solenoid actuated with overrunning clutch.

Starter Specifications

Application	Volts	Amps	Test RPM
Chevette	9	45-70	7000-11,900
All Other Models	9	60-85	6800-10,300

ALTERNATOR

Application	Standard Amp.	Optional Amp.
1.6L	37, 55	55, 63
2.5L	42, 63	70

ALTERNATOR REGULATOR

Delco-Remy non-adjustable, integral with alternator.
Operating Voltage (At 85°F) 13.8-14.8

BELT ADJUSTMENT

Tension (Lbs.) Using Strand Tension Gauge

Application	New	Used
Chevette		
A/C	135-145	90-100
All Others	120-130	70-80
All Other Models		
A/C	135-165	80
All Others	120-150	50

CAPACITIES

Application	Quantity
Crankcase (With or without filter)	
1.6L	4.0 qts.
2.5L	3.0 qts.
Cooling System (Including heater)	
1.6L	9.0 qts.
2.5L	9.5 qts.
Auto. Trans. (Dexron II)	3.0 qts.
Auto. Transaxle (Dexron II)	5.0 qts.
Man. Trans. (SAE 80W-90)	3.4 pts.
Man. Transaxle (Dexron II)	3.0 qts.
Rear Axle (SAE 80W-90)	1.7 pts.
Fuel Tank	
Chevette	12.5 gals.
All Other Models	14.0 gals.

REPLACEMENT INTERVALS

Component	Interval (Miles)
Oil Filter	15,000
Air Filter & PCV Filter	
Chevette	50,000
All Other Models	30,000
PCV Valve	30,000
Spark Plugs	30,000
Oxygen Sensor	30,000