

## TUNE-UP

### ENGINE IDENTIFICATION

Engine can be identified by the eighth digit of the Vehicle Identification Number (VIN). The VIN number is stamped on a plate attached to the left top side of dash.

#### VIN ENGINE CODE

Application	VIN Code
2.8L (173") 2-Bbl. ....	B

### TUNE-UP NOTES

**NOTE:** For other items affecting tune-up, see FUEL SYSTEMS Section or EMISSION CONTROL Section.

**NOTE:** Due to changes and corrections, always refer to Engine Tune-Up Decal in engine compartment before attempting tune-up. In the event of a conflict between specifications given in this manual and decal specifications, decal specifications prevail.

**CAUTION:** When performing tune-up on vehicles equipped with a catalytic converter, do not allow or create a condition of engine misfire in one or more cylinders for an extended period of time. Damage to converter from overheating may occur due to loading with unburned fuel.

### ENGINE COMPRESSION

When making compression checks, disconnect the ignition switch connector Pink wire from high energy ignition system. With air cleaner removed and throttle and choke wide open, crank engine through at least 4 compression strokes.

#### COMPRESSION SPECIFICATIONS

Compression Ratio .....	8.5:1
Compression Pressure .....	100 psi (7.0 kg/cm <sup>2</sup> ) minimum
Maximum Pressure Variation .....	30%

### VALVE CLEARANCE

All engines are equipped with hydraulic lifters. Lifters should be adjusted to 1½ turns from zero lash.

#### VALVE ARRANGEMENT

E-I-I-E-I-E (Left bank, front to rear)  
E-I-E-I-I-E (Right bank, front to rear)

### SPARK PLUGS

#### SPARK PLUG SPECIFICATIONS

Application	Gap In. (mm)	Torque Ft. Lbs. (N.m)
All Models .....	.045 (1.2)	7-15 (9-20)

#### SPARK PLUG TYPE

Application	AC Number
All Models .....	R42TS

### HIGH TENSION WIRE RESISTANCE

Carefully remove ends of wire from spark plug and distributor. Spark plug boot should be turned ½ turn before removing. Using an ohmmeter, check resistance while gently twisting wire. If resistance is not to specifications, or fluctuates from infinity to any value, replace cable.

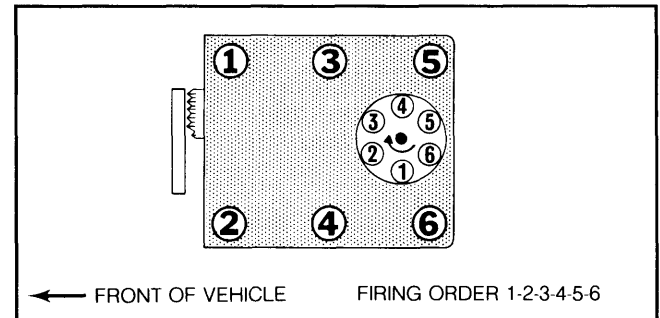
#### RESISTANCE (Ohms)

Wire Length	Maximum
Under 24" .....	30,000
Over 24" .....	50,000

### DISTRIBUTOR

All models are equipped with a Delco High Energy Ignition system. No adjustments are required.

Fig. 1: Firing Order and Timing Mark



Magnetic probe located at 9.5°ATDC.

### IGNITION TIMING

1) Install timing light with an adapter between No. 1 spark plug and No. 1 spark plug wire, or use an inductive type pickup. Do not puncture wire.

2) Check or adjust ignition timing with engine at normal operating temperature, distributor advance line disconnected and plugged, and automatic transmission in "D" (if equipped).

#### TIMING SPECIFICATIONS (Degrees BTDC@RPM)

Application	Man. Trans.	Auto. Trans.
Federal Models .....	1 8@650	2 16@650
Calif. Models .....	10@750	10@650

- 1 — Decal numbers CHN 6@650, CMK 10@700.
- 2 — Decal numbers CVR 14@650, CTN 16@650.

### HOT (SLOW) IDLE RPM

1) Warm engine to normal operating temperature. Place transmission in neutral. Disconnect and plug distributor vacuum hose, canister purge line and EGR vacuum line.

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## TUNE-UP (Cont.)

2) Pinch off idle compensator vacuum line by bending rubber hose. Adjust throttle adjust screw to obtain specified idle RPM. If vehicle is equipped with air conditioning, turn A/C on maximum cold and high blower.

3) Disconnect and ground single wire from back of A/C compressor. Open throttle momentarily to make sure solenoid is fully extended and allow to close. Adjust screw on throttle lever to obtain specified solenoid RPM.

### IDLE SPEED SPECIFICATIONS

Application	Idle RPM	Solenoid RPM
Federal Models .....	650	850
Calif. Models		
Man Trans. ....	750	950
Auto. Trans. ....	650	850

### IDLE MIXTURE

#### FEDERAL MODELS

##### Propane Enriched Idle

1) Remove carburetor from engine, invert and drain fuel into container. Place carburetor in holding fixture with manifold side up. Use hacksaw to make 2 small cuts below mixture plugs on bottom of throttle body. Use flat punch or chisel to break out throttle body to gain access to plugs. Use a punch to drive out plugs. If they shatter, remove pieces.

2) Reinstall carburetor. Disconnect and plug vacuum parking brake hose. Warm engine to normal operating temperature. Air conditioning should be "OFF". Disconnect and plug hoses as directed on Emission Control Label.

3) Check and adjust timing, if necessary. Set idle speed. Disconnect crankcase ventilation hose from air cleaner. Insert hose with rubber stopper from propane cartridge into crankcase ventilation hole in air cleaner. Propane cartridge must be vertical.

4) If vehicle is equipped with manual transmission, place transmission in neutral. If equipped with automatic transmission, place in "D". Add propane until speed drops. If enriched speed is within specification, mixture is correct. If not, lightly seat screw and back out screw so engine will run.

5) Back out screw  $\frac{1}{8}$  turn at a time until maximum speed is reached. Then set idle speed to enriched idle specification. Turn mixture screw in until idle speed is obtained. Recheck enriched speed with propane. If not within specification, repeat adjustment.

### PROPANE ENRICHED RPM

Application	RPM
Federal Models .....	40

**NOTE:** Idle mixture adjustment for California models is not normally necessary. Mixture should be adjusted only when carburetor has been disassembled or when vehicle fails to meet emission standards.

### CALIFORNIA MODELS

#### Idle Mixture

1) Remove carburetor from engine, and invert and drain fuel into container. Place carburetor in holding fixture with manifold side up. Use hacksaw to make 2 small cuts below mixture plugs on bottom of throttle body. Use flat punch or chisel to break out throttle body to gain access to plugs. Use a punch to drive out plugs. If they shatter, remove pieces.

2) Turn mixture screws in until lightly seated, then back out  $1\frac{1}{2}$  turns. Remove vent stack screen assembly to gain access to lean mixture screw. Turn in until lightly seated and back out  $2\frac{1}{2}$  turns. Reinstall carburetor on engine without air cleaner. Disconnect bowl vent line.

3) Disconnect and plug vacuum hose at "T" in vent line (if used). Disconnect EGR valve and canister purge hose at carburetor and plug ports on thermal vacuum switch. Leave all other hoses connected. Connect dwell meter to mixture control solenoid test lead (Green connector).

4) Set dwell meter to 6-cylinder position. Connect tachometer to distributor tachometer lead. Block drive wheels and set parking brake. Run engine on high step of fast idle cam until cooling fan starts to cycle (at least 3 minutes and until in closed loop).

5) Run engine at 3000 RPM and adjust lean mixture screw slowly in small increments. Allow time for dwell to stabilize after turning screw. Obtain an average dwell of  $35^\circ$ . It is normal for the dwell to increase and decrease over a small range.

6) Return to idle and adjust idle speed with cooling fan in off cycle. Adjust idle mixture screws to obtain an average dwell of  $25^\circ$  with cooling fan in off cycle. Disconnect mixture control solenoid and check for an RPM change of at least 50 RPM.

7) If not, check idle air bleed circuit. Run engine at 3000 RPM for a few moments and note dwell reading. If not at  $35^\circ$  average dwell, repeat adjustment procedure. Reconnect system hoses, replace vent stack screen and remove test equipment.

### COLD (FAST) IDLE RPM

Warm up vehicle. Remove and plug vacuum lines listed on emission label. Place fast idle screw on highest step of fast idle cam. Adjust fast idle screw to obtain fast idle RPM.

### FAST IDLE RPM

Application	Man. Trans.	Auto. Trans.
Federal .....	1800	2100
Calif. ....	2100	2100

### THROTTLE POSITION SENSOR

**NOTE:** Throttle Position Sensor (TPS) adjustment is required only when indicated by the computer command control diagnostic procedure.

1) Using a  $\frac{3}{64}$ " drill, drill a hole in the steel plug covering TPS adjustment screw. Use care to avoid

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damaging screw head. Using small slide hammer or easy out, remove steel plug from air horn.

2) Disconnect the TPS sensor and jumper all 3 terminals. Make jumpers from Nos. 16, 18, or 20 gauge wire approximately 6" long. Connect digital voltmeter (J-29125 or equivalent) from TPS connector center terminal to bottom terminal.

3) With ignition "ON", A/C "OFF" and engine not running, turn the TPS screw with screw driver to obtain .26 volts at curb idle throttle position. Install new plug, driving in until flush with raised pump lever boss.

### AUTOMATIC CHOKE

Automatic choke is non-adjustable.

## FUEL PUMP

### FUEL PUMP SPECIFICATIONS

Application	Pressure psi (kg/cm <sup>2</sup> )	Volume Pints (Liters)
All Models .....	5.5-6.5 (2.6-4.6)	1 in 30 sec. (.47 in 30 sec.)

## EMISSION CONTROL

NOTE: See appropriate article in EMISSION CONTROL Section.

## GENERAL SERVICING

### IGNITION

#### DISTRIBUTOR

California models use Delco Electronic Spark Timing system with detonation sensor and 5-pin module. All other models use a standard HEI system with 4-pin module.

#### DISTRIBUTOR PICKUP COIL RESISTANCE (Ohms)

All Models .....	500-1500
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#### IGNITION COIL

#### COIL RESISTANCE (Ohms)@75°F (24°C)

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

## FUEL SYSTEMS

### CARBURETORS

Application	Model
Federal Models .....	Rochester 2SE
California Models .....	Rochester E2SE

## ELECTRICAL

### BATTERY

Application	Cold Cranking Amps. <sup>1</sup>	Reserve Capacity Minutes
All Models .....	465	115

<sup>1</sup> — At 0°F (-18°C).

### STARTER

All models are equipped with Delco overrunning clutch starters.

### STARTER SPECIFICATIONS

Application	Volts	Amps.	Test RPM
All Models .....	10.6	50-80	7500-11,400

### ALTERNATOR

All models are equipped with Delco alternators with integral voltage regulator.

### ALTERNATOR SPECIFICATIONS

Application	Rated Ampere Output
Standard .....	37
Optional .....	63

#### Field Current Draw @12 volts

All Models .....	<sup>1</sup> 4.5-5.5 amps.
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<sup>1</sup> — At 80°F (27°C).

### ALTERNATOR REGULATOR

All models are equipped with Delco nonadjustable voltage regulators, integral with alternator.

## ADJUSTMENTS

### BELT ADJUSTMENT

Application	Tension Using Strand Tension Gauge Lbs. (Kg)
New Belt	
Air Conditioning .....	146 (66)
Power Steering .....	135 (61)
Alternator .....	146 (66)
Air Pump .....	135 (61)
Used Belt <sup>1</sup>	
All Belts .....	67

<sup>1</sup> — Any belt that has been rotated at least one complete revolution of the engine pulley.

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## GENERAL SERVICING (Cont.)

### SERVICE INTERVALS

#### REPLACEMENT INTERVALS

Component	Interval (Miles)
Fuel Filter .....	15,000
Spark Plugs .....	30,000
PCV Valve & Filter .....	30,000
Air Filter .....	30,000

### CAPACITIES

#### FLUID CAPACITIES

Application	Quantity
Cooling System .....	12.0 qts. (11.4L)
Crankcase .....	<sup>1</sup> 4.0 qt. (3.8L)
Automatic Transmission	
Overhaul .....	19.0 pts. (8.9L)
Refil .....	7.0 pts. (3.3L)
Man. Trans. ....	<sup>2</sup>
Fuel Tank	
Standard .....	13.0 gal. (49.2L)
Optional .....	20.0 gal. (75.7L)

<sup>1</sup> — With or without filter.

<sup>2</sup> — Fill to bottom of fill hole.