TUNE-UP

ENGINE IDENTIFICATION

VEHICLE IDENTIFICATION NUMBER CODE

Fifth digit of Vehicle Identification Number, located on plate attached to top left side of instrument panel, is the engine code letter.

VIN Engine Codes

Application	Code
98" (1.6L) 2-Bbl.	
Base Engine	9
High Output	0
151" (2.5L) 2-Bbl.	
Citation	5
Monza	V

ENGINE IDENTIFICATION NUMBER CODE

Engine identification number is stamped on a pad on right side of block below no. 1 spark plug on 98" engines. On 151" (VIN V) engines, number is on left rear corner of block. On 151" (VIN 5) engines, number is stamped in pad on left front corner of engine.

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	
98"	8.5:1
151"	8.3:1
Recommended Fuel	Unleaded (87 AKI Minimum)
Compression Pressure	
98"	145 psi
151"	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 TAPPET CLEARANCE

Hydraulic Lifters	Zero Lash

VALVE ARRANGEMENT

98"
I-E-I-E-I-E-I-E (Front-to-rear)
151"
I-E-I-E-E-I-E-I

SPARK PLUGS

Gap	
98"	.035"
151"	.060"
Torque	
98"	22 ft. lbs.
151"	15 ft. lbs.

Spark Plug Type

Application	AC No.
98"	R42TS
151"	
Monza Calif.	R44TSX
All Other Models	R43TSX

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.

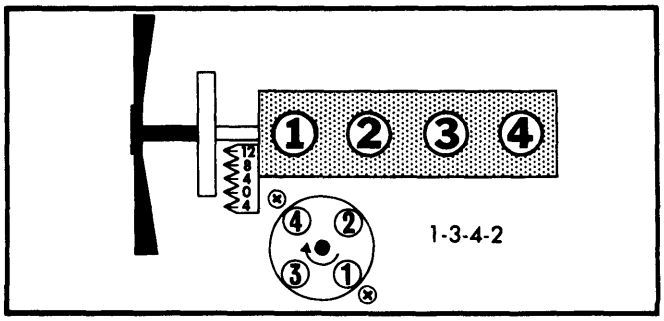

Fig. 1 98" Firing Order and Timing Marks

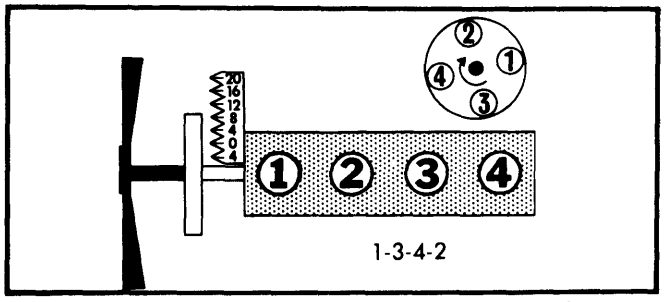

Fig. 2 151" Firing Order and Timing Marks VIN V

TUNE-UP (Cont.)

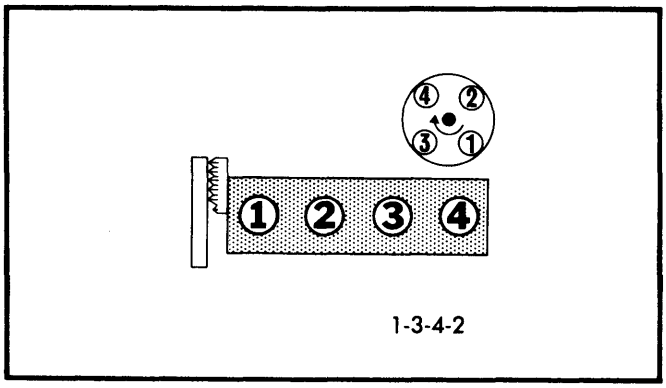

Fig. 3 151" Firing Order and Timing Marks VIN 5

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 ignition timing with engine at normal operating temperature, distributor vacuum advance hose disconnected and plugged and engine at speed specified in following table.

Ignition Timing Specifications (Degrees BTDC@RPM)

Application	Man. Trans.	Auto. Trans.
98"		
Federal	12@800	18@750
Calif.	12@800	18@800
151"		
VIN V	12@1000	12@650
VIN 5	10@1000	10@650

HOT (SLOW) IDLE RPM

98" 2-Bbl.

1) With engine at normal operating temperature, ignition timing set, and air conditioning "OFF", disconnect and plug the following hoses:
- Vacuum source hose to air cleaner
- Vacuum hose at distributor
- Vacuum hose at EGR valve
- Purge hose at vapor canister

2) Place automatic transmission in Drive. Adjust idle speed screw to obtain specified "Curb Idle" RPM. Reconnect distributor vacuum hose.

3) On models with air conditioning, place transmission in Park or Neutral. Disconnect electrical connector from air conditioning compressor.

4) Turn air conditioning "ON" and open throttle momentarily to allow solenoid plunger to fully extend. Place automatic transmission in Drive.

5) Adjust solenoid screw to obtain specified "Solenoid Energized" RPM. After adjustments are completed, reconnect electrical connector to compressor and all disconnected hoses.

151" 2-Bbl.

1) Disconnect air conditioning clutch connector. Warm engine to normal operating temperature, place automatic transmission in "D" and manual in neutral. Disconnect canister purge hose.

2) On vehicles without air conditioning, set idle by turning solenoid plunger. Then disconnect solenoid lead and set idle with idle speed screw.

3) On vehicles with air conditioning, set idle with idle speed screw. Turn air conditioning "ON" and open throttle momentarily so solenoid extends fully. Adjust solenoid plunger or screw to set solenoid idle.

4) On all models, connect hoses and remove test equipment.

Idle Speed (RPM)

Application	Curb Idle	Solenoid Energized
98" 2-Bbl.		
Fed. Auto. Trans.	750	1150
All Other Models	800	1150
151" 2-Bbl.		
Man. Trans.		
With A/C	1000	1250
Without A/C	500	1000
Auto. Trans.		
With A/C	650	850
Without A/C	500	650

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.*

MIXTURE SCREW PLUG REMOVAL

If plug(s) must be removed, perform the following procedure:

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

2) Using a punch between the 2 locator points under throttle body (manifold side), break through throttle body and drive out hardened steel plug covering mixture needle.

NOTE – *Plug will shatter rather than remain intact. Remove loose pieces.*

3) Reinstall carburetor on engine. Use a thin wall 3/16" deep socket to make mixture adjustments.

TUNE-UP (Cont.)

PROPANE ENRICHMENT PROCEDURE (FEDERAL VEHICLES ONLY)

1) With engine at normal operating temperature, choke fully open and air conditioning "OFF" (if equipped), set parking brake and block drive wheels. Disconnect and plug hoses as directed on Emission Control/Tune-Up Decal under the hood.

2) Connect tachometer to engine. Set curb idle to specifications on Emission Label. Disconnect vacuum advance and set timing to specifications on Emission Label. Reconnect vacuum advance. Disconnect crankcase ventilation hose at air cleaner (Citation and Monza) or charcoal canister (Chevette). Insert propane hose with rubber stopper tool (J-26911) into opening in air cleaner or crankcase ventilation hose.

3) Propane cartridge must be in vertical position. Slowly open propane control valve until maximum engine speed is reached with automatic transmission in DRIVE and manual transmission in NEUTRAL.

NOTE – *Too much propane will cause engine speed to drop.*

4) Observe propane flow meter to ensure propane cartridge is full. With propane flowing, adjust idle speed screw to the "Enriched" RPM. Readjust propane flow to be certain of maximum engine speed and adjust idle speed if necessary.

5) Turn off propane. Place transmission in NEUTRAL and run at 2000 RPM for 30 seconds. Put transmission in DRIVE (manual transmission in NEUTRAL). Check idle speed. If idle speed agrees with idle speed shown on Emission Decal, idle mixture is correct. Proceed to step **8)**.

6) If idle speed is too low, carefully remove plug from mixture screw and back screw out (richen) 1/8 turn at a time until correct speed is reached. If speed is too high, turn mixture screw in (leaner) 1/8 turn at a time until correct speed is obtained.

NOTE – *It may be necessary to remove air cleaner to reach idle mixture screw. Reinstall air cleaner to check idle speed.*

7) Turn propane on again to check maximum engine idle speed. If speed is different from specification, readjust idle speed screw to "Enriched" RPM with propane flowing. Turn off propane, place transmission in Neutral and accelerate engine to 2000 RPM for 30 seconds. Recheck idle speed. Idle speed should agree with specifications. If not, repeat procedure starting with step **6)**.

8) If idle is unusually rough, turn mixture screws in until lightly seated. Back screws out equally to previous position and rerun propane idle test starting with step **2)**. If idle is correct, turn engine off and remove propane tool. Connect PCV system and reconnect all other hoses.

Propane Enrichment RPM

Application	Enriched RPM
98" 2-Bbl.	
Man. Trans.	925
Auto. Trans.	800
151" 2-Bbl.	
Citation Man. Trans.	1250
Monza Man. Trans.	1150
All Auto. Trans.	700

IDLE MIXTURE ADJUSTMENT – C-4 SYSTEM (CITATION & MONZA)

1) Remove carburetor and drive out mixture screw plugs. Turn screw in until seated, then out 4½-5 turns. If plug in air horn that covers idle air bleed screw has been removed, turn screw until seated and back out 3 turns. If plug is in place, DO NOT remove.

2) Remove vent stack screen, turn lean mixture screw in until seated and out 2½ turns. Reinstall carburetor, but not air cleaner. Disconnect bowl vent line, and disconnect and plug vacuum hose to "T" in vent line (if equipped). Disconnect EGR valve and canister purge at carburetor and plug carburetor port.

3) Connect tachometer to distributor brown connector, and dwell meter to green solenoid test lead. Set dwell meter on 6 cylinder setting.

4) Start engine and run on high step of fast idle cam for at least 3 minutes, or until dwell meter is moving over 5°-10° range. Run engine at 3000 RRM and adjust lean mixture screw carefully until dwell meter indicates 35°. Allow engine to run for a few seconds to stabilize after each adjustment.

5) Return engine to idle and adjust speed to 700 RPM in neutral. When cooling fan is off, adjust idle mixture screw carefully to obtain dwell reading of 25°. If too low, back screw out; if too high, turn screw in. Allow engine to stabilize between adjustments.

6) Disconnect mixture control solenoid lead while cooling fan is off. If idle speed doesn't drop at least 50 RPM, check idle air bleed adjustment. Reconnect solenoid and recheck 3000 RPM setting. If necessary, repeat adjustment procedure.

7) Reconnect all hoses and remove test equipment. Replace vent stack screen over lean mixture screw. Reset curb idle.

IDLE MIXTURE ADJUSTMENT – C-4 SYSTEM (CHEVETTE)

1) Disconnect hoses as indicated by Emission Label. Connect dwell meter and tachometer, then adjust curb idle if necessary. With engine idling in "D", check dwell meter. If moving over a 10°-50° range, mixture is correct.

TUNE-UP (Cont.)

2) If dwell reading is not moving, stop engine and remove staking and plug over idle mixture screw (on top of carburetor). Start engine and idle in "D". Adjust screw until dwell varies from 25°-30°. Turn only 1/8 turn at a time.

3) If dwell can be adjusted, procedure is completed. If not, stop engine and remove carburetor. Break out throttle body with punch and remove caps covering mixture needles. Remove needles, check tip condition, and replace if necessary. Install needles until lightly seated, then back out 4½ turns.

4) Install carburetor and run engine for at least 3 minutes. Turn mixture screw in or out carefully with engine idling in "D" until dwell varies within 25°-35° range. If dwell is below 25°, turn mixture needles out 1 turn. If dwell is above 35°, turn needles in 1 turn.

5) Readjust idle mixture screw until dwell is correct. Adjust curb and fast idle if necessary. Replace all hoses and remove test equipment.

COLD (FAST) IDLE RPM

1) Warm engine to operating temperature, set timing and idle, and turn air conditioning "OFF". Disconnect and plug EGR hose or port on all models and canister purge hose in 151" models.

2) Place transmission in Park or Neutral. Position fast idle adjusting screw on highest step of fast idle cam. Adjust fast idle screw to obtain specified fast idle RPM. Reconnect all disconnected hoses.

Fast Idle Speed (RPM)

Application	RPM
98" 2-Bbl.	
Calif. Man. Trans.	2600
All Other Models	2500
151" 2-Bbl.	
Monza	
Calif. Man. Trans.	2400
All Other Models	2600
Citation	
Calif. Man. Trans.	2200
Calif. Auto. Trans.	2400
All Other Models	2600

AUTOMATIC CHOKE

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

FUEL PUMP

Pressure At Idle	
98"	2.5-6.5 psi
151" Citation	6.5-8.0 psi
Vacuum At Idle	
151" Monza	12 in Hg.
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.*

DISTRIBUTOR

Delco-Remy – High Energy Ignition

IGNITION COIL

Resistance

Primary (at 75°F)	.4-1.0 ohms
Secondary (at 75°F)	6000-30,000 ohms

Coil Output

At all engine speeds	25-35 KV Minimum①

① – Replace if below 25 KV.

CARBURETION

CARBURETORS

Application	Model
98"	
Federal	Holley 5210-C
Calif.	Holley 6510-C
151"	
Federal	Rochester 2SE
Calif.	Rochester E2SE

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

GENERAL SERVICING (Cont.)

ELECTRICAL

BATTERY

12 Volt – Negative Ground.

Application	Cold Crank 0°F	25 AMP Reserve Capacity (Minutes)
98" (1.6 Liter)		
Standard	275	60
Heavy Duty	350	80
151" (2.5 Liter)		
Standard	350	80
Optional	430	100
Heavy Duty	465	125

STARTER

Delco-Remy solenoid actuated with overrunning clutch.

Free Speed Voltage & Amperage

Chevette	9	45-70	7000-11,900
Citation	9	45-70	7000-11,900
Monza	9	50-75	6500-10,000

ALTERNATOR

Application	Standard Amp.	Optional Amp.
Chevette, Monza	37, 55	55, 63
Citation	42, 63	70

ALTERNATOR REGULATOR

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

ENGINE

INTAKE & EXHAUST MANIFOLD TIGHTENING

Tighten manifold bolts starting at the center and working outwards, to the following torque:

Application	Ft. Lbs.
98"	
Intake Manifold	15
Center Exhaust Manifold	15
End Exhaust Manifold	22
151"	
Intake Manifold	25
Exhaust Manifold	37

BELT ADJUSTMENT

Tension (Lbs.) Using Strand Tension Gauge

Application	New	Used
Chevette		
A/C	135-145	90-100
All Others	120-130	70-80
Citation & Monza		
A/C	135-165	80-100
All Others	120-150	75-80

CAPACITIES

Application	Quantity
Crankcase	
Chevette (With or without filter)	4.0 qts.
Citation & Monza (With or without filter)	3.0 qts.
Cooling System	
Chevette	①9.0 qts.
Citation	①9.5 qts.
Monza	11.0 qts.
Auto. Trans. (Dexron II)	
All Models	5.0 qts.
Man. Trans. (SAE 80W-90)	
Chevette & Monza	3.25 pts.
Man. Transaxle (Dexron II)	
Citation	3 qts.
Rear Axle (SAE 80W-90)	
Chevette	1.75 pts.
Monza	3.5 pts.
Fuel Tank	
Chevette	12.5 gals.
Citation	14.0 gals.
Monza	18.5 gals.

① – Add .25 qt. with A/C.

FILTERS & CLEANERS

Filter or Cleaner	Service Interval (Miles)
Oil Filter	Replace every 2nd oil change
Air Cleaner	
Chevette	Replace every 50,000
Citation & Monza	Replace every 30,000
Fuel Filter	Replace every 15,000
Canister Filter	Replace every 30,000
PCV Valve	Replace every 30,000
PCV Filter	
Chevette	Replace every 50,000
Citation & Monza	Replace every 30,000