TUNE-UP

ENGINE IDENTIFICATION

Engines can be identified by third digit of Vehicle Identification Number (VIN). VIN is located in several places on most vehicles. See *below*.

VIN Engine Codes

Application	VIN Code
305" (5.0L) 2-Bbl.	G
350" (5.7L) 4-Bbl.	
Light Duty	L
Heavy Duty	M
400" (6.6L) 4-Bbl.	
Light Duty	R
Heavy Duty	X
454" (7.4L) 4-Bbl. Heavy Duty	W

MODEL IDENTIFICATION

VEHICLE IDENTIFICATION NUMBER

A combination Vehicle Identification Number and Rating Plate is used on all vehicles. Plate is attached to left, top side of instrument panel on C, K, and G models and to toe and dash panel to left of steering wheel on all P models (except Motor Home Chassis). The number is supplied in various locations by motor home body builders, but is on left hand door pillar on all other models. Engine may be identified by 3rd digit of all VIN Codes, shown under *ENGINE IDENTIFICATION*.

ENGINE COMPRESSION

Compression Ratio	8.5:1
Compression Pressure	150 psi
Maximum Pressure Variation	20 psi
Recommended Fuel	Unleaded (87 AKI Minimum)

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 four compression strokes.

VALVE TAPPET CLEARANCE

Hydraulic Lifters ..... One turn down from zero lash.

VALVE ARRANGEMENT

305", 350" & 400"
E-I-I-E-E-I-I-E (Both banks, front to rear.)
454"
E-I-E-I-E-I-E-I (Left bank, front to rear.)
I-E-I-E-I-E-I-E (Right bank, front to rear.)

SPARK PLUGS

Gap	.045"
Torque	17-27 ft. lbs.

TUNE-UP NOTES

CAUTION — *IDLE SPEED ADJUSTMENT: Procedures and specifications for idle speed adjustment must be followed exactly as outlined. See "Hot (Slow) Idle RPM" under Tune-Up.*

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.*

NOTE — *SERIES IDENTIFICATION: The vehicle series numbers used in this article have been abbreviated for common reference to both Chevrolet and GMC models. Chevrolet models use numerical designation as listed; GMC models are identified as follows: 10 = 1500; 20 = 2500; 30 = 3500.*

NOTE — *For Tune-Up purposes, "Light Duty" refers to vehicles up to 8500 lbs. "Heavy Duty" refers to vehicles exceeding 8500 lbs.*

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.*

Spark Plug Type

Application	AC No.
Light Duty Emissions	R45TS
Heavy Duty Emissions	R44T

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 specifications, or fluctuates from infinity to any value, replace cable.

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.

TUNE-UP (Cont.)

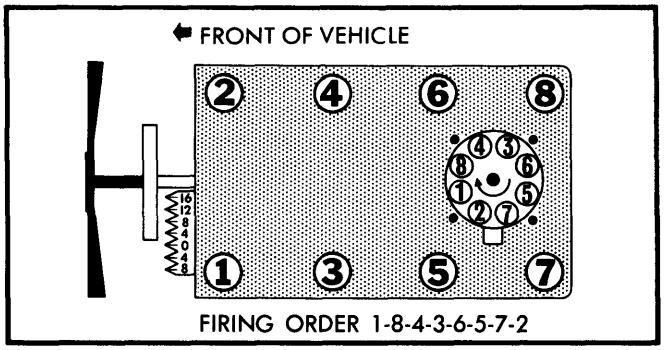

Fig. 1 305", 350", 400" & 454" Firing Order and Timing Mark Identification

IGNITION TIMING

NOTE – *Engines are equipped with a receptacle for magnetic probe timing lights, located 10°ATDC. Do not use this location for timing with a conventional light.*

1) Connect an adapter between No. 1 spark plug and No. 1 spark plug wire or use an inductive type pickup. Do not puncture wires.

2) Connect timing light according to manufacturer's instructions. Check or adjust ignition timing with engine at normal operating temperature, distributor vacuum line disconnected and plugged. Place transmission in neutral, except for Light Duty models with automatic which should be in "D". Set timing to specifications.

3) To adjust timing, loosen distributor hold down bolt and rotate distributor until timing is to specifications. Tighten hold down bolt.

Ignition Timing Specifications (Degrees BTDC@RPM)

Application	Man. Trans.	Auto. Trans.
Light Duty		
305" 2-Bbl.	8@600	8@500
350" 4-Bbl.	①8@700	①8@500
400" 4-Bbl.	.....	4@500
Heavy Duty		
350" & 400" 4-Bbl.		
Federal	4@700	4@700
Calif.	6@700	6@700
454" 4-Bbl.	4@700	4@700

① – Set timing to 6°BTDC on engines with Decal WA, LW, LX, and LZ.

HOT (SLOW) IDLE RPM

NOTE – *See engine compartment Emission Control Tune-Up Decal to prepare engine for idle speed adjustment.*

1) Set ignition timing to specifications. Disconnect lead from idle solenoid (if equipped). Adjust idle speed to specifications using idle speed screw. Transmission should be in "D" for Light Duty automatic, and in neutral on all others.

2) Disconnect lead from air conditioning compressor. Reconnect lead at idle solenoid, then turn air conditioning "ON". Open throttle slightly to allow solenoid to fully extend. Adjust solenoid idle speed by turning solenoid screw.

3) If equipped with throttle return control, connect a hand vacuum pump to control diaphragm. With engine idling, apply at least 20 in. Hg vacuum. Open throttle slightly to allow plunger to fully extend. Screw plunger in or out as necessary to obtain 1600 RPM on Federal models and 1500 RPM on Calif. models.

Idle Speed (RPM)

Application	Curb Idle	Solenoid Energized
Light Duty		
305" 2-Bbl.		
Man. Trans.	600	700
Auto. Trans.	500	600
350" 4-Bbl.		
Man. Trans.	700	.....
Auto. Trans.	500	600
400" 4-Bbl.	500	600
Heavy Duty		
All Engines	700	.....

IDLE MIXTURE

PROPANE ENRICHMENT PROCEDURE (LIGHT DUTY MODELS ONLY)

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

2) Connect tachometer to engine. Disconnect vacuum advance and set timing to specification. Reconnect vacuum advance. Disconnect crankcase ventilation tube from air cleaner. Insert hose with rubber stopper (tool J-26911 or equivalent) from propane valve into PCV tube opening in air cleaner.

3) Propane bottle must be in vertical position. slowly open control valve until maximum engine speed is reached with transmission in "D" (automatic) or neutral (manual).

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 or solenoid so speed rises above normal idle by specified amount. Readjust propane flow to be certain of maximum engine speed and adjust idle speed if necessary.

5) Turn off propane. Run engine at 2000 RPM in neutral for 30 seconds, return to idle, and place in "D". Check idle speed. If correct, no adjustment of mixture is necessary. If not correct, proceed with adjustment procedure.

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

7) Turn propane on again to check maximum engine idle speed. If speed does not meet specifications, readjust idle

TUNE-UP (Cont.)

speed screw or solenoid screw to obtain specified enriched RPM with propane flowing. Turn off propane, place transmission in neutral and run engine at 3000 RPM for 30 seconds. Recheck idle speed and repeat procedure if necessary.

Propane Enriched RPM (Light Duty Only)

Application	Man. Trans.	Auto. Trans.
305"		
Federal		
C & K Models	100-170	25-50
G Models	50-75	.....
350"		
Federal		
Cab & Chassis Models	.....	60-80
All Others	170-200	40-60
Calif.	0-20	0-20
High Alt.	.....	30-50
400"		
Federal	.....	80-100
Calif.	.....	40-60

BEST IDLE PROCEDURE (HEAVY DUTY MODELS ONLY)

1) Set parking brake and block drive wheels. Remove air cleaner after engine reaches normal operating temperature. Place transmission in neutral and connect tachometer.

2) As a starting point, turn idle mixture screws in lightly to seat and then back out 2 turns. Do not turn screw tightly against seat or damage may result.

3) With engine running, choke open, and transmission in neutral, adjust idle speed to specifications. Then adjust mixture screw to obtain maximum RPM.

4) Readjust idle speed screw to specifications and readjust mixture screw to obtain highest RPM. Shut down engine, remove gauges and install air cleaner.

COLD (FAST) IDLE RPM

1) Place transmission in neutral. Move cam follower onto highest step of fast idle cam. Disconnect and plug vacuum hose to EGR valve.

2) Start engine without touching throttle. Turn fast idle speed screw to adjust speed to specifications.

Fast Idle Speed (RPM)

Application	Man. Trans.	Auto. Trans.
Light Duty		
305" 2-Bbl.	1300	1600
350" 4-Bbl.	①1600	1600
400" 4-Bbl.	.....	1600
Heavy Duty		
All Engines	1900	1900

① – Set fast idle to 1300 on engines with decal WA, LW, LX and LZ.

AUTOMATIC CHOKE

The choke cover on all engines is riveted in place and no adjustments are possible or necessary.

FUEL PUMP PRESSURE

Pressure (At Idle)	
With Vapor Return Line	
454"	7.5-9.0 psi
All Others	5.5-7.0 psi
Without Vapor Return Line	7.5-9.0 psi
Volume	1.0 pt. in 30 seconds or less

MANIFOLD HEAT CONTROL VALVE

Check valve for freedom of movement and lubricate with a suitable solvent (GM Manifold Heat Control Valve Solvent).

EMISSION CONTROL

See appropriate article in EMISSION CONTROL Section.

GENERAL SERVICING

IGNITION

DISTRIBUTOR

Delco ..... High Energy Ignition

NOTE – *High energy ignition system module must be replaced as a unit. A liberal coat of silicone grease MUST be applied to both the module and the surface on which it will be mounted.*

Other Data & Specifications – *See Tune-Up and Delco Distributors in ELECTRICAL Section.*

IGNITION COIL

Resistance	
Primary (at 80° F)	0.4-0.5 ohms
Secondary (at 80° F)	6,000-30,000 ohms
Current Draw	
Engine Stopped	0.1-0.2 amps.
Engine Idling	0.5-1.5 amps.
Coil Output	
At all engine speeds	30 KV Min.

FUEL SYSTEMS

CARBURETORS

Application	Model
305"	Rochester M2MC 2-Bbl.
All Others	Rochester M4MC 4-Bbl.

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

ELECTRICAL

BATTERY

12 Volt – Negative Ground.

Application	Reserve Capacity	Cranking Amps.
305", 350" & 400"		
Standard	80 minutes	350
Optional	100 minutes	430
454"	125 minutes	465

GENERAL SERVICING (Cont.)

STARTER

Delco	Overrunning Clutch
Free Speed Voltage	
305"	9@5500-10,500 RPM
350", 400" & 454"	9@7500-10,500 RPM
Free Speed Amperage	
305"	①50-80@5500-10,500 RPM
350", 400" & 454"	①65-95@7500-10,500 RPM

① – Includes solenoid.

Other Data & Specifications – *See Delco Starters in ELECTRICAL Section.*

ALTERNATOR

Delco ..... Integral Regulator

General Motors offers either a 37 amp, 42 amp, 61 amp or an 80 amp alternator as standard or optional equipment.

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

ALTERNATOR REGULATOR

Delco – Non Adjustable, Integral with Alternator.
Operating Voltage (@85°F) 13.8-14.8

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

ENGINE

INTAKE MANIFOLD TIGHTENING

Tighten bolts to 30 ft. lbs. in sequence shown in illustrations.

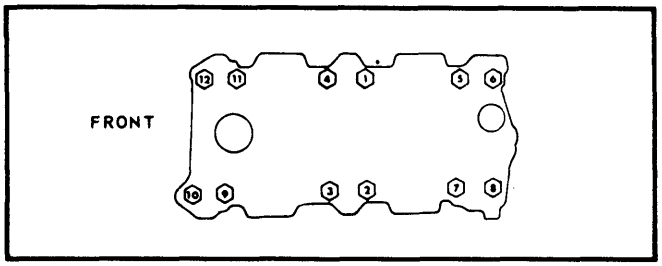

Fig. 2 305", 350" & 400" Intake Manifold Tightening Sequence

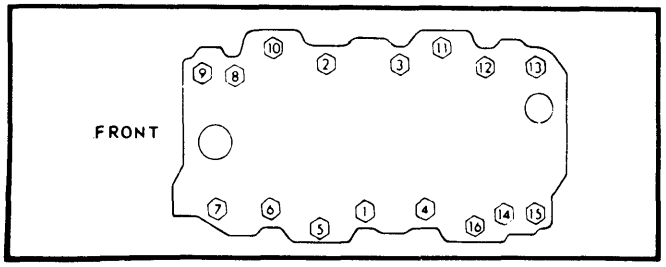

Fig. 3 454" Intake Manifold Tightening Sequence

FILTERS & CLEANERS

Filter or Cleaner	Service Interval (Miles)
Oil Filter	①
Air Cleaner Element	
Light Duty	Replace 30,000
Heavy Duty	Replace 12,000
Fuel Filter	
Light Duty	Replace 15,000
Heavy Duty	Replace 12,000
Automatic Transmission Filter	
Light Duty	Replace 100,000
Heavy Duty	Replace 24,000
PCV Valve & Filter	
Light Duty	Check 15,000 Replace 30,000
Heavy Duty	Check 12,000 Replace 24,000

① – Replace at first oil change, then every second oil change.

CAPACITIES (EXCEPT COOLING)

Application	Quantity
Crankcase	
454"	①6.0 qts.
All Others	①4.0 qts.
Automatic Transmission (Dexron)	
THM 350	
Overhaul	10.0 qts.
Refill	6.0 pts.
THM 400	
Overhaul	11.0 qts.
Refill	7.0 pts.
Manual Transmission (SAE 80W-90)	
3-Speed	3.0 pts.
4-Speed	4.0 qts.
Transfer Case (SAE 10W-30)	5.0 pts.
Front Axle (SAE 80W-90)	5.0 pts.
Rear Axle (SAE 80W-90)	②
Power Take-Off (SAE 80W-90)	5.0 qts.
Fuel Tank	
"G" Models	
Standard	22 gals.
Optional	33 gals.
"C" & "K" Models (Exc. Short W.B.)	
Main Tank, Right Side	20 gals.
Auxiliary Tank, Left Side	20 gals.
"C" & "K" Models (Short W.B.)	
Main Tank	16 gals.
Auxiliary Tank	16 gals.
Suburban & Blazer	
Standard	25 gals.
Optional	31 or 40 gals.
"P" Models	
Standard	30 gals.
Optional	40 gals.

① – Add 1 quart for filter change.
② – Fill to bottom of filler hole.

GENERAL SERVICING (Cont.)

BELT ADJUSTMENT

Tension (Lbs.) Using Strand Tension Gauge

Application	New Belt	Used Belt
Air Conditioning	135-145	90-100
All Others	120-130	70-80

CAPACITIES (COOLING)

Application	Quantity
305"	
C10 & K10	17.5 qts.
G10	
Without A/C	19.0 qts.
With A/C	20.0 qts.
350"	
C10, 20, 30 & K 10, 20, 30	
Man. Trans. without A/C or H.D. Rad.	17.5 qts.
All Others	18.0 qts.
P10, 20	
Man. Trans. with H.D. Rad.	17.0 qts.
All Others	16.5 qts.
G10, 20, 30	20.0 qts.
400"	
K20	
Auto. Trans.	18.0 qts.
Auto. Trans. with H.D. Rad.	19.0 qts.
Auto. Trans. with H.D. Rad. & A/C	20.0 qts.
G20	20.0 qts.
G30	
Auto. Trans.	20.0 qts.
Auto. Trans. with H.D. Rad.	21.0 qts.
454"	
C20, 30	
Man. Trans.	23.0 qts.
Auto. Trans.	24.0 qts.
P30	
Motor Home	24.5 qts.
All Others	23.5 qts.