TUNE-UP

ENGINE IDENTIFICATION

Engine Identification Number is located on tag on front of right cylinder head cover of 400" engines and on right bank, upper front corner of all others. Engine displacement is indicated by fourth digit of engine number on 400" engines and by the first four digits on all others.

Application	Digits
304"	V-304
345"	V-345
392"	V-392
400"	V

MODEL IDENTIFICATION

Number is located on rear face of left front door.

613105H587201

First Four Digits – Model Code.
Fifth Digit – Engine Type.
Sixth Digit – Cab or Body Type.
Remaining Digits – Chassis Serial Number.

TUNE-UP NOTES

NOTE – For items effecting emission control tune-up, see Mitchell Manuals' Emission Control Manual.

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 – For Tune-Up purposes only, Light Duty will refer to vehicles under 6,000 lbs. G.V.W. Heavy Duty will refer to vehicles over 6,000 lbs. G.V.W.

COMPRESSION PRESSURE

With engine warm, all spark plugs removed and throttle wide open, the variation between cylinders should not exceed 10 psi.

Application	PSI
304"	145
345"	140
392"	143
400"	①

① – Not available.

VALVE TAPPET CLEARANCE

Application	Clearance (Hot)
Hydraulic Lifters	Zero Lash

VALVE ARRANGEMENT

All (Exc. 400")
E-I-E-I-E-I-E-I (Front to rear, right bank.)
I-E-I-E-I-E-I-E (Front to rear, left bank.)
400"
E-I-I-E-E-I-I-E (Front to rear, both banks.)

SPARK PLUGS

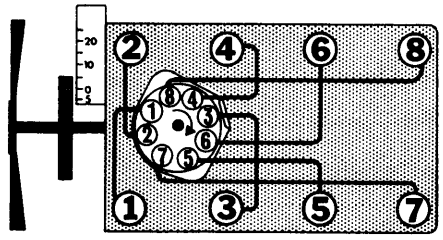
Gap (All Exc. 400")	.030"
400"	.035"
Torque (All Exc. 400")	28-30 ft. lbs.
400"	28 ft. lbs.

Spark Plug Type

Application	Champion No.
304", 345", 392"	RJ-10Y
400"	N-12Y

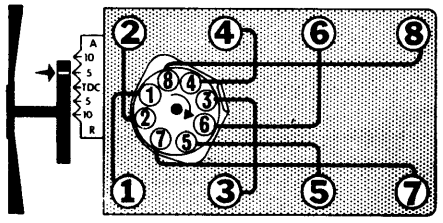
DISTRIBUTOR

Breaker Point Ignition	
Point Gap	
345" Heavy Duty	Used .016", New .019"
All Others	.016"
Cam Angle	
304" Heavy Duty	31-34°
400"	29-31°
All Others	28-32°
Breaker Arm Spring Tension	17-21 ozs.
Condenser Capacity	
400"	.18-.23 mfd.
All Others	.21-.25 mfd.
Electronic Ignition	
Air Gap	.014" ±.002"
Cam Angle (Not Adjustable)	28-30°



4IHA01

304", 345", & 392"
FIRING ORDER & TIMING MARKS



4IHA02

400"
FIRING ORDER & TIMING MARKS

IGNITION TIMING

Check or adjust timing with engine at normal operating temperature, distributor vacuum advance line disconnected and plugged, transmission in Neutral and idle speed set to specifications. Connect timing light to number one cylinder on 400" engine and to number eight cylinder on all others.

Application	Timing
400"	5° BTDC
304" Heavy Duty	5° BTDC
All Others	TDC

TUNE-UP (Cont.)

HOT (SLOW) IDLE RPM

NOTE — To compensate for fuel and temperature variations when setting idle mixture, observe these precautions. Do not idle engine continuously for more than three minutes at one time. After each three minutes of idling increase engine speed to 2000 RPM for one minute, then continue idle adjustment procedure. Check that idle stop solenoid is energized during idle adjustment.

With vehicle level, engine at normal operating temperature, choke open, air cleaner installed, air conditioning off, and transmission in Neutral, connect tachometer to engine. Turn idle mixture screw counterclockwise (out) against tab stop. Adjust idle speed screw to give specified Preliminary Mixture Adjustment RPM. Turn idle mixture screw clockwise (in) to reduce idle speed to specified Idle Speed. If idle mixture adjustment cannot be made due to limiter caps, use the following procedure. Remove limiter caps and, with engine idling, adjust engine RPM to specified Idle Speed. Adjust idle mixture screws to the point that engine RPM drops approximately 10 RPM. Install new limiter caps with tab fully counterclockwise against stop. Adjust idle speed screw to obtain Preliminary Mixture Adjustment RPM. Turn idle mixture screws clockwise (in) to reduce idle speed to specified Idle Speed.

Preliminary Mixture Adjustment RPM

Application	Light Duty	Heavy Duty
304"	730	665
345"		
Federal	745	715
Calif.	880	715
392"	760	715
400"	745	①

① — Not applicable.

Idle Speed (RPM)

Application	Light Duty	Heavy Duty
304"	575±25	625±25
345"		
Federal	575±25	675±25
Calif.	800±25	675±25
392"	700±25	675±25
400"	575±25	①

① — Not applicable.

COLD (FAST) IDLE RPM

All (Exc. Holley Model 2300 2-Bbl.) — With engine at normal operating temperature, connect tachometer, remove air cleaner and disconnect and plug vacuum signal hose at EGR valve. Holding choke plate closed, close throttle to allow fast idle adjusting screw to rest on highest step of fast idle cam. Without touching pedal, start engine and allow speed to stabilize. If engine RPM is not at specified speed, adjust by turning fast idle speed adjusting screw.

Fast Idle Speed

Application	RPM
304"	2200
345"	
Light Duty	
Federal	2000
Calif.	1550-1600
Heavy Duty	2200
392"	
Light Duty	1550-1660
Heavy Duty	2000
400"	2000

With Holley Model 2300 2-Bbl. — With hot (slow) idle properly set, choke open and fast idle adjusting screw at lowest step of fast idle cam, adjust screw so that it just touches fast idle cam.

CHOKE ADJUSTMENT

Divorced Choke — Loosen lock nut on thermostatic coil shaft. Using a screwdriver, rotate coil shaft to specified index setting.

Application	Setting
Holley Model 2210C	Index
Carter Thermo-Quad	1 Notch Rich

Integral Choke — Loosen cover retaining screws. Rotate cover to specified setting. Tighten cover retaining screws.

Application	Setting
Holley Model 4150C	2 Notches Lean

DASHPOT ADJUSTMENT

With engine at normal operating temperature and hot (slow) idle speed set, depress dashpot plunger completely into dashpot body. Loosen lock nut and rotate dashpot to obtain specified clearance between plunger and throttle lever pad.

Application	Clearance
Holley Model 2210C	.070-.090"
Carter Thermo-Quad	
Man. Trans.	.050-.070"
Auto. Trans.	.070-.090"

THROTTLE MODULATOR ADJUSTMENT

Disconnect solenoid valve vacuum hose from carburetor or intake manifold port. Disconnect vacuum hose from throttle modulator unit. Using a spare piece of suitable vacuum hose, temporarily connect throttle modulator directly to vacuum port. Start engine. Increase engine speed to 1500-2000 RPM. Throttle modulator should be extended. Release throttle allowing engine to decelerate. Extended modulator should hold engine speed at specified modulator activiated RPM. Adjust by loosening locknut and repositioning throttle modulator to obtain specified RPM. Disconnect temporary vacuum hose from throttle modulator and hold finger over end of hose. Throttle modulator should retract and engine speed should return to normal hot (slow) idle RPM.

Modulator Activated RPM

Application	RPM
All	1300-1400

IDLE STOP SOLENOID ADJUSTMENT

With engine at normal operating temperature, air cleaner in place, transmission in Neutral, and air conditioning off, adjust hot (slow) idle speed to specifications. Disconnect idle stop solenoid electrical supply wire; idle speed should drop as solenoid plunger retracts. Adjust this low idle speed to specifications by turning the low idle speed adjusting screw.

Application	RPM
Holley Model 2210C	550±25
Carter Thermo-Quad	575±25

TUNE-UP (Cont.)

GOVERNOR ADJUSTMENTS

NOTE — All governor adjustments are made with engine tuned and at normal operating temperature.

CENTRIFUGAL-TYPE GOVERNOR

Connect tachometer and race engine to determine maximum, no-load RPM. If adjustment is necessary, stop engine, remove governor clamp and gasket assembly. Turn engine over until adjusting screw hole plug appears in the opening. Remove plug and insert suitable tool (SE-2072-2), engaging adjusting tang. Turn tool handle clockwise to decrease speed and counterclockwise to increase speed; ¼ turn will change engine RPM approximately 100 RPM.

Governed Speed (No Load)

Application	RPM
All	3800

FUEL PUMP PRESSURE & VOLUME

Pressure (At 500 RPM)	5-6.5 psi
Volume (At 500 RPM)	1 qt. in 1 min.

EMISSION CONTROL

See appropriate article in EMISSION CONTROL Section.

IGNITION

DISTRIBUTOR

IHC Model 1510

Application	①IHC Part No.
Light Duty	
304" & 345" (Federal)	427908-C91
345" (Calif.)	448685-C91
392"	448686-C91
Heavy Duty	
304"	427908-C91, 448509-C91, 448510-C91
345"	427908-C91, 448511-C91, 448512-C91
392"	379282-C91, 427965-C91

① — Manufactured by Holley.

Delco-Remy

Application	Delco Part No.
400"	1112215

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

IGNITION COIL

Application	IHC Part No.
All	191455-R91

Resistance	Ohms @ 80°F
Primary	1.28-1.42
Secondary	7,200-9,500
Ballast Resistor (Loom)	1.75-1.85

CARBURETION

CARBURETORS

Holley Series 2210C 2-Bbl.

Application	Holley Part No.
Light Duty	
304" & 345"	6828
400"	6674
Heavy Duty 304" & 345"	6620

Holley Series 2300 2-Bbl.

Application	Holley Part No.
304"	6801
345"	6802

Holley Series 4150 4-Bbl.

Application	Holley Part No.
392" With Governor	6803-2
392" Without Governor	7035

Carter Thermo-Quad

Application	Carter Part No. Man. Trans.	Auto. Trans.
345"	6591S	6550S
392" Federal	6590S	6590S
392" Calif.	6592S	6551S

Other Data & Specifications — *See Tune-Up and Holley or Carter Carburetors in CARBURETION Section.*

ACCELERATOR AND DOWNSHIFT LINKAGE ADJUSTMENT

Block choke in full open position and disconnect transmission throttle rod at adjustable end. With transmission throttle rod held in its full forward position, adjust yoke so that it freely slides onto attachment point at bellcrank assembly. Reassemble and road test vehicle. If transmission does not downshift, lengthen throttle rod one turn and repeat road test.

ELECTRICAL

BATTERY

12 Volt – Negative Ground.

STARTER

Application	Delco Part No.
All (Exc. 400")	1107709
400"	1108515

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

ALTERNATOR

Application	Amps.	Delco Part No.
All (Exc. 400")	37	1100588
All (Exc. 400")	61	1100544

Application	Amps.	①IHC Part No.
400"	37	444500-C91
400"	62	444502-C91

① – Manufactured by Motorola.

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

ALTERNATOR REGULATOR

Application	Part No.
All With Delco Alternator	①
All With Motorola Alternator	444919-C91

① – Nonadjustable, integral with alternator.

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

ENGINE

INTAKE MANIFOLD TIGHTENING

Manifold bolts are tightened to 40-45 ft. lbs.

BELT ADJUSTMENT

Adjust power steering belt tension to obtain ⅜ inch deflection at belt midpoint; adjust all other belts for ½ inch deflection.

FILTERS & CLEANERS

Filter or Cleaner	Service Interval (Miles)
Oil Filter	①Replace 3,000-4,000
Air Filter	
Oil Bath	②Clean 5,000
Dry Type	③Clean 4,000
Fuel Filter	④
Gasoline Vapor Canister Filter	Replace 12,000
PCV Valve	Check 12,000

① – Or every oil change.
② – Oil with same viscosity oil in crankcase.
③ – Replace at 15,000-20,000 miles.
④ – Clean when bowl shows sediment.

COOLING CAPACITIES

Application	Quantity W/Heater
304"	19 qts.
345"	20 qts.
392"	21 qts.
400"	①

① – Information not available.

CAPACITIES (EXCEPT COOLING)

Application	Quantity
Crankcase (All Exc. 400") (Includes filter)	6 qts.
400"	5 qts.
Automatic Transmission	9.5 qts.
Man. Trans. & Rear Axle	①
Front Axle & Transfer Case	①
Four-Wheel Drive Knuckle Ends	①
Fuel Tank	
Scout	19 gals.
Travelall	
1010 & 1110	20 gals.
1210	21 gals.
Utility Body	13 gals.
Motor Home	
1310	35 gals.
1510	45 gals.
Metro	
Std.	23 gals.
Opt.	35 gals.
Conventional Cab	
1010 & 1110	15 gals.
1210 & 1310	16 gals.

① – Fill to bottom of filler plug hole.