

TUNE-UP

ENGINE IDENTIFICATION

The Engine Identification Number is located on left side, upper front corner of block on four cylinder engines. On the 232" six cylinder engine it is on right side of crankcase, adjacent to distributor. The cubic inch displacement is indicated by the first four or five digits on the 196" engine and by a letter code on the 232" engine.

Application	Digits or Letter Code
196"	①4-196
232"	L

① - Suffix "E", if present, indicates an emission controlled engine.

MODEL IDENTIFICATION

Number is located on rear side 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

► **IDLE SPEED ADJUSTMENT CAUTION** - 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 CARBURETION Section or EMISSION CONTROL Section.

COMPRESSION PRESSURE

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

Application	PSI
196"	140
232"	145

VALVE TAPPET CLEARANCE

Application	Clearance (Hot)
All Hydraulic.....	Zero Lash

VALVE ARRANGEMENT

- 4 Cyl.** - E-I-E-I-E-I-E-I (Front to rear.)
- 6 Cyl.** - E-I-I-E-E-I-I-E-E-I-I-E (Front to rear.)

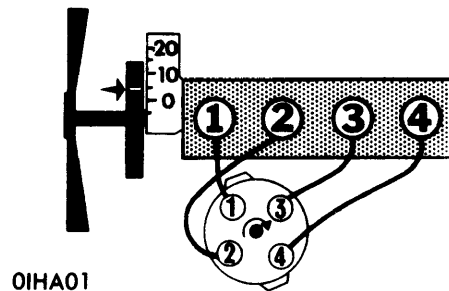
SPARK PLUGS

Gap	
4 Cyl. ....	.025-.030"
6 Cyl. ....	.033-.037"
Torque	
4 Cyl.	28-30 Ft. Lbs.
6 Cyl.	25 Ft. Lbs.

Application	Spark Plug Type	Champion No.
196"		J-10Y
232"		XN-14Y
Metro 232"		J-11Y

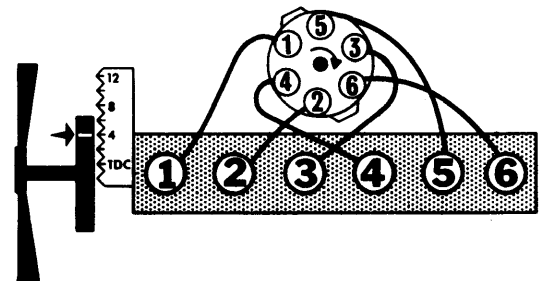
DISTRIBUTOR

Point Gap	
196" New .....	.017"
196" Used .....	.014"
196" "E" New .....	.019"
196" "E" Used .....	.016"
232" .....	.016"
Cam Angle	
196"	42-48°
232"	31-34°
Breaker Arm Spring Tension	
196"	17-20 ozs.
232"	17-21 ozs.
Condenser Capacity .....	.18-.23 mfd.



01HA01

FIRING ORDER & TIMING MARKS 4 CYL.



11HA02

FIRING ORDER & TIMING MARKS 6 CYL.

TUNE-UP (Cont.)

IGNITION TIMING

Check or adjust timing with engine at normal operating temperature, distributor vacuum advance line disconnected and plugged, transmission in Neutral, and slow (hot) idle speed set.

Application	Timing
196"	4° BTDC
196" "E"	TDC
232"	TDC

HOT (SLOW) IDLE RPM

All (Exc. W/Carb. Model 1920) — With vehicle level, engine at normal operating temperature, and choke plate wide open, adjust idle speed screw to obtain specified RPM. Adjust idle mixture screw(s) to obtain highest steady manifold vacuum or, if vacuum gauge is not available, the smoothest maximum idle speed. If necessary, reset idle speed screw to specified RPM.

NOTE — When setting idle mixture on Model 1920 carburetor, do not allow engine to idle more than three minutes without increasing engine speed to 200 RPM for one minute before continuing with adjustment procedure.

W/Carb. Model 1920 — With vehicle level, engine at normal operating temperature, choke open, air cleaner installed, air conditioning "ON", and transmission in Neutral, connect tachometer to engine. Turn idle mixture screw counterclockwise (out) against its tab stop and attach vacuum gauge to engine. Adjust idle speed 20-40 RPM faster than specifications. Turn idle mixture screw clockwise (in) to reduce idle speed to specifications. If idle adjustment cannot be made due to limiter caps, remove them and use the following procedure. Turn mixture in just to the point that idle RPM starts to drop and install new limiter cap fully counterclockwise against tab stop. Adjust idle speed 20-40 RPM faster than specifications. Turn idle mixture screw clockwise (in) to reduce idle speed to specifications.

Application	Idle Speed (RPM)	RPM
196"		450-500
196" "E"		700
232" Man. Trans.		725
232" Auto. Trans.		700

COLD (FAST) IDLE RPM

Man. Choke — The cold (fast) idle speed is set when hot (slow) idle RPM and manual choke are properly adjusted.

DISTRIBUTOR

Application	ⓐ IHC Part No.
196"	359215-C91
196" "E"	360724-C91

ⓐ — Manufactured by Holley.

Application	Delco Part No.
232"	1110479
258"	1110497

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

IGNITION

IGNITION COIL

Auto. Choke — With hot (slow) idle set and engine at normal operating temperature, turn fast idle screw in until screw just touches fast idle cam. Back screw out ½ to one turn.

CHOKE ADJUSTMENT

Man. Choke — Loosen choke cable adjusting screw on choke lever at carburetor. With choke knob in cab all the way in, pull choke cable at carburetor to remove excess slack. Release cable and tighten screw. Work choke knob in and out several times and check to see that choke is full open when knob is all the way in.

Auto. Choke — Non-adjustable. Check for freedom of movement of choke linkage; if binding occurs, replace choke unit.

DASHPOT ADJUSTMENT

With engine at normal operating temperature and idle speed set, check that dashpot stem is fully depressed. Set the dashpot adjusting screw to the clearance specified.

Application	Dashpot Clearance	Clearance
196" .....		.095-.105"
196" "E" .....		.125-.155"
232"105-.135"

FUEL PUMP PRESSURE & VOLUME

Pressure (At 1000 RPM) ⓐ

196" & 232"	4-5.5 psi
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Volume

196" (At 4000 RPM)	3.2 pts. in 1 min.
232" (At 2000 RPM)	3.6 pts. in 1 min.

ⓐ — Fuel pressure test must be taken at carburetor inlet height.

MANIFOLD HEAT CONTROL VALVE

Check valve periodically for spring tension and freedom of operation.

EMISSION CONTROL

See appropriate article in *EMISSION CONTROL Section.*

CARBURETION

CARBURETORS Holley Series 1904 1-Bbl. Holley Part No.

Application	Man. Trans.	Auto. Trans.
196"	R-2569	①
① - Not applicable.		

Holley Series 1920 1-Bbl. Holley Part No.

Application	Man. Trans.	Auto. Trans.
196" "E"	R-3993	①
196" "E"	R-4591	R-4487, R-4591
232"	R-4405	R-4405
232"	R-4542	R-4542
① - Not applicable.		

ACCELERATOR AND DOWNSHIFT LINKAGE ADJUSTMENT

Accelerator Adjustment - With accelerator linkage clean and lubricated, adjust pedal stop screw so that pedal will just strike screw when carburetor throttle plate is wide open.

Downshift Adjustment - The downshift switch is located under the pedal on conventional chassis and on a bracket under the floorboard on the Metro chassis. Loosen lock nut and adjust screw to obtain 1/4" between switch and pedal on conventional chassis and 1/4" between switch and pad on throttle linkage on Metro chassis when throttle plate is wide open.

BATTERY

12 Volt - Negative Ground.

STARTER

Application	Delco Part No.
196"	1107709
232"	1108384

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

ELECTRICAL

ALTERNATOR

Application	Amps.	Delco Part No.
196"	37	1100687
232"	37	1100688

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

ALTERNATOR REGULATOR

Application	Delco Part No.
All	1119507

Other Data & Specifications - See *Delco Alternator Regulators* in *ELECTRICAL* Section.

ENGINE

INTAKE MANIFOLD TIGHTENING

- 4 Cyl. - Manifold bolts are tightened to 40-45 ft. lbs.
- 6 Cyl. - Manifold bolts and stud nuts are tightened to 20-25 ft. lbs.

BELT ADJUSTMENT

Belts are adjusted just tight enough to prevent slipping. Too tight of an adjustment will damage bearings of water pump or accessories.

FILTERS & CLEANERS

Filter or Cleaner	Service Interval (Miles)
Oil Filter	① Replace 3,000-4,000
Air Filter	
Oil Bath	② Clean 5,000
Dry Type	③ Clean 5,000
PCV Valve	Clean 10,000
Fuel Filter	④
Distributor Shaft & Pivot Point	Oil 3,000-5,000
Distributor Cam	Lubricate 3,000-5,000

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

Application COOLING CAPACITIES Quantity

Standard	
4 Cyl.	① 12 qts.
6 Cyl.	① 11 qts.
Optional	②

- ① - Add 1.5 qts. if equipped with heater.
- ② - With increased capacity radiator, fill to one inch below top of radiator upper tank.

CAPACITIES (EXCEPT COOLING)

Application	Quantity
Crankcase	① 4 qts.
Oil Bath Air Cleaner	
4 Cyl.	1 pt.
6 Cyl.	1 qt.
Automatic Transmission	9.5 qts.
Man. Trans. & Rear Axle	②
Front Axle & Transfer Case	②
Four-Wheel Drive Knuckle Ends	②
Fuel Tank	
Scout	10 gals.
Conventional Cab	16 gals.
Travelall & Panel Body	21 gals.
Metro	
700 to 1100	15 gals.
1200	17 gals.

- ① - Add 1 quart with filter change.
- ② - Fill to bottom of filler plug hole.