

TUNE-UP

ENGINE IDENTIFICATION

VEHICLE IDENTIFICATION NUMBER CODE

Engine can be identified by the fifth digit of the Vehicle Identification Number. This number is stamped on a plate located on upper surface of dashboard on driver's side and can be seen through the windshield. Number can also be found on Vehicle Certification Label mounted to rear face of left-hand door.

Engine Codes

Application	Code
200" (3.3L) 1-Bbl.	B
250" (4.1L) 1-Bbl.	C

TUNE-UP NOTES

NOTE — Due to running changes in production and emission standards, manufacturer recommends that specifications shown on engine compartment emission control tune-up decal be used in all instances.

NOTE — If the Dura Spark 2-piece distributor cap must be removed, first remove top portion, then rotor, then bottom portion. If any spark plug wire is disconnected with this system, connection must be first greased with silicone grease before it is reattached.

NOTE — When connecting a tachometer to Dura Spark ignition coil, install the alligator clip on tachometer into the "DEC" (TACH TESTING) cavity.

CAUTION — On vehicles equipped with catalytic converters, do not allow or create a condition of engine misfire in more than one cylinder for more than 30 seconds. Damage to converter may result due to loading converter with unburned air/fuel mixture.

ENGINE COMPRESSION

Compression Ratio	
200"	8.5:1
250"	8.6:1
Recommended Fuel	Unleaded (87 AKI Minimum)

Test compression with all spark plugs removed and engine at normal operating temperature. Crank engine through at least five compression strokes before recording reading. Maximum compression variation should not exceed 25% between highest and lowest cylinders.

VALVE TAPPET CLEARANCE

Hydraulic Lifters..... Zero Lash

VALVE ARRANGEMENT

E-I-I-E-I-E-E-I-E-I-I-E (Front to rear).

SPARK PLUGS

Gap048-.052"
Torque	10-15 ft. lbs.

Spark Plug Type

Application	Autolite No
All Models	BSF-82

HIGH TENSION WIRE RESISTANCE

1) Loosen wires from spark plugs by twisting spark plug boot carefully to loosen seal on spark plug. Remove wires by pulling on plug boot. Remove distributor cap from distributor, leaving wires connected to cap.

NOTE — DO NOT disconnect wires from distributor cap unless replacement is necessary.

2) Using an ohmmeter, check resistance of each wire by connecting one ohmmeter lead to spark plug terminal and other lead to distributor cap insert. If more than 5000 ohms resistance per inch, remove wire and test again. If still over 5000 ohms per inch, replace wire.

NOTE — Whenever a high resistance wire is disconnected, the interior of the spark plug terminal boot must be coated with dielectric silicone grease before reconnection.

DISTRIBUTORS

All models are equipped with Dura Spark II ignition system and no adjustments are required.

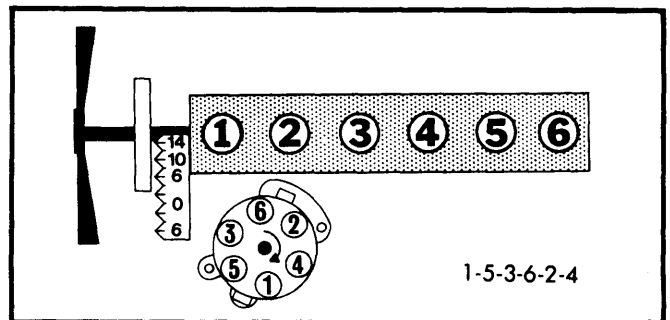


Fig. 1 200" and 250" Firing Order and Timing Marks

IGNITION TIMING

NOTE — Timing instrument should be connected to number one spark plug using suitable adaptor or snap-on connector. Do not puncture spark plug wire or boot to make connection.

NOTE — Magnetic probe timing device may be used if instrument is available and engine is so equipped. Timing probe offset is 135°ATDC on 200" and 250" engine.

1) Clean front damper surface and make white mark on proper degree line of damper and pointer. Turn A/C off and de-energize throttle solenoid positioner (if equipped). Disconnect and plug vacuum lines from distributor.

2) If equipped with dual mode timing ignition module, disconnect the 3-pin switch assembly from ignition module.

3) On all models, connect timing light to No. 1 spark plug and a tachometer to engine.

TUNE-UP (Cont.)

NOTE — On Dura Spark II ignition systems, use only a clamp-on type inductive pickup timing light and a tachometer rated for this system.

4) With engine at normal operating temperature, adjust ignition timing to specification. If initial timing is within $\pm 2^\circ$ of specification, do not adjust. Reconnect 3-pin connector.

5) If more than $\pm 2^\circ$, loosen distributor hold down bolt and adjust timing to specification. Tighten hold down bolt and recheck timing.

6) Reconnect 3-pin connector on dual mode timing module and check its function as follows: Disconnect and plug vacuum line to switch. Using a vacuum pump, apply a minimum of 12 in. Hg vacuum to switch, timing should be to specifications. Apply zero vacuum to switch, timing should be 3-6° less than specifications, if not, replace unit.

Ignition Timing Specifications (Degrees BTDC@RPM)

Application	Man. Trans.	Auto. Trans.
200"		
Federal & Calif.		
With A/C	① 12@750	10@750
Without A/C	① 10@750	7@750
250"		
Federal		
With A/C	8@750	10@750
Without A/C	4@750	10@750
① — Granada and Monarch, timing is 8@750 with A/C, and 4@750 without A/C.		

HOT (SLOW) IDLE RPM

VEHICLE PREPARATION

NOTE — Leave all vacuum hoses attached to air cleaner assembly when relocating air cleaner to perform carburetor adjustment. Air cleaner must be installed when measuring engine speeds.

CAUTION — Do not allow engine to idle for extended periods as catalyst overheating may cause excessive underbody temperatures.

NOTE — Some engines may experience normal fluctuations in idle speeds, causing variations in engine speed measurement. If this occurs, check speed three times and use average speed.

1) Apply parking brake and block wheels. If equipped with automatic parking brake release, disconnect and plug vacuum line at parking brake.

2) Turn off all accessories. Start engine and bring up to normal operating temperature. Turn off engine.

3) Trace purge valve vacuum hose from purge valve to first point where hose can be detached. Disconnect hose at THAT point, cap port and plug hose.

CAUTION — Do not disconnect hose from purge valve itself, or valve damage may occur.

4) Check throttle and choke linkages for freedom of movement. Correct, if necessary, and attach tachometer to engine.

CURB IDLE SPEED

NOTE — These instructions also include speed tests for A/C "ON", A/C "OFF" and Throttle Solenoid Positioner "OFF" (TSP "OFF").

1) With air conditioner off, engine at normal operating temperature, choke plate fully opened, and shift lever in "NEUTRAL" for manual transmission vehicles or "DRIVE" for automatic transmission vehicles, measure each engine speed and compare to specifications.

NOTE — Method of adjusting engine speed depends upon devices used to control speed. Examine carburetor, determine devices used and if they operate properly.

2) Before checking speeds (including re-checks), run engine at 2500 RPM for 15 seconds in "NEUTRAL" (manual transmission) or "PARK" (automatic transmission). Allow engine speed to stabilize. Measure idle RPM and compare to specifications.

3) Repeat step 2) three times. If average speed is not within ± 50 RPM of specification, adjust respective engine speed as follows:

Curb Idle Speed RPM

Application	Man. Trans.	Auto. Trans.
200"		
Federal	① 700	② 550
Calif.	② 600
250"	① ③ 700	② 550

① — With A/C "ON" 900 RPM.

② — With A/C "ON" 700 RPM.

③ — If equipped with Carter YFA carburetor, idle speed is 600; with A/C "ON" 700.

No Solenoid Device — Turn throttle stop adjusting screw until specified curb idle RPM is obtained.

Non A/C and A/C "OFF" — Turn throttle stop adjusting screw until specified curb idle RPM is obtained.

Anti-Diesel TSP — Turn throttle solenoid positioner "ON" adjusting screw until specified curb idle is reached. For TSP "OFF", run engine and collapse TSP plunger by forcing throttle lever pad against plunger. Turn throttle adjusting screw until specified TSP "OFF" RPM is obtained.

A/C TSP — Turn throttle stop adjusting screw until specified curb idle RPM is obtained. For A/C "ON", move climate control selector on instrument panel to A/C "ON" to energize TSP. Open throttle to allow solenoid plunger to extend fully. Release throttle, and disconnect A/C compressor clutch wire at compressor. Adjust TSP "ON" adjusting screw until specified RPM is obtained. Then, move climate control selector to "OFF" position and reconnect compressor clutch wire.

Throttle Solenoid Positioner

Application	"OFF" RPM
All Models	450

TUNE-UP (Cont.)

NOTE — If adjustment is required, loosen lock nut securing TSP and turn TSP until specified A/C "ON" RPM is obtained. Then tighten lock nut.

ENGINE SERVICE AFTER SPEED CHECKS

Reconnect fuel evaporative purge valve signal vacuum hose. Stop engine and remove all test equipment. Reconnect automatic parking brake release vacuum line and tighten air cleaner wing nuts.

IDLE MIXTURE

NOTE — If adjustments to the air/fuel mixture are made that require removing the idle limiter caps, it is imperative that the BLUE SERVICE LIMITER CAPS be installed. Idle mixture should be adjusted only during carburetor repair, or when necessary as a result of government inspection laws.

PROPANE ENRICHMENT PROCEDURE

NOTE — For specifications for Propane Enrichment, see Emission Control Tune-Up Decal.

1) Leave all vacuum signal hoses attached to air cleaner assembly when relocating air cleaner for carburetor adjustments. Air cleaner must be installed for engine speed checks.

CAUTION — Do not let engine idle for extended periods, as catalyst overheating may cause excessive underbody temperatures.

2) Apply parking brake and block wheels. Disconnect automatic brake release and plug vacuum connection. Connect tachometer (20362 or equivalent). Remove and plug vacuum line to distributor. Check to see correct PCV valve is being used (high or low flow).

3) Check air cleaner element and replace if necessary. Disconnect and plug fuel evaporative purge return hose at engine. Disconnect fuel evaporative purge hose at air cleaner and plug nipple.

NOTE — Be sure tachometer is rated for system on vehicles equipped with Dura Spark II ignition.

4) Disconnect flexible fresh air tube from air cleaner duct or adapter. Insert hose from propane enrichment tool (Rotunda T75L-9600-A) into duct or fresh air tube.

5) For vehicles equipped with thermactor, disconnect and plug hoses of dump valves equipped with two fittings. If dump valves have one fitting, remove and plug hose at valve. Connect slave hose to dump valve and intake manifold vacuum fittings.

6) Be sure idle mixture limiter(s) is set to maximum rich position (counterclockwise against stop). Check curb idle speed or A/C "OFF" RPM and set to specifications. With shift lever in "NEUTRAL", run engine at 2500 RPM for 15 seconds before each mixture check.

7) With engine idling at normal operating temperature, place transmission shift lever in "NEUTRAL" for manual transmission or "DRIVE" for vehicles with automatic transmissions. Gradually open propane tool valve and watch for engine

speed gain on tachometer. When speed reaches maximum and begins to drop off, note amount of speed gain.

NOTE — If engine speed will not drop off, check bottle gas supply. Repeat if necessary with new bottle.

8) Compare measured speed gain to specifications on vehicle decal. If mixture adjustment is necessary, adjust to "Reset RPM". If speed increase is within "RPM Gain" specification, proceed to step 15).

9) If measured speed gain is zero RPM and minimum speed gain specification is zero RPM, proceed to step 12).

10) If measured speed gain is GREATER than specification, turn mixture screw(s)/limiter(s) counterclockwise in equal amounts and repeat steps 6) through 8) until measured speed rise meets "Reset RPM" specification. After final adjustment, proceed to step 15).

11) If measured speed gain is LESS than specifications, turn mixture screw(s)/limiter(s) clockwise in equal amounts and repeat steps 6) through 8) until speed rise meets "Reset RPM" specifications. After final adjustment, proceed to step 15).

12) If there is ZERO increase in RPM and the minimum speed gain specification is zero RPM, perform the following speed drop test. While watching tachometer, adjust mixture screw(s)/limiter(s) clockwise by number of turns specified on decal. Note drop in engine speed.

13) If measured speed drop is EQUAL TO or drops off MORE THAN speed drop specification, return mixture limiter(s) to maximum rich position or mixture screw(s) to position prior to adjustment. Then proceed to step 15).

14) If measured speed drop is LESS THAN the specified minimum, leave mixture limiter(s) in adjusted position and repeat steps 6) through 13).

15) Check curb idle speed and remove all test equipment. Reconnect all components and reinstall air cleaner, if removed.

Propane Enriched Idle Speed RPM

Application	Man. Trans.	Auto. Trans.
200"		
Federal	740	570
Calif.	680
250"	770	660

COLD (FAST) IDLE RPM

NOTE — Follow instructions for Vehicle Preparation under HOT (SLOW) IDLE RPM and then proceed as follows:

1) Disconnect EGR vacuum hose at EGR valve. Plug hose. With engine running at normal operating temperatures, choke plate fully opened and shift lever in "NEUTRAL" (manual transmission) or "PARK" (automatic transmission), run engine at 2500 RPM for 15 seconds.

2) Place fast idle lever on specified step of fast idle cam. Allow engine speed to stabilize and measure fast idle RPM. Repeat 3 times and adjust if average RPM is not within ± 100 RPM of specification. Turn engine off and reconnect vacuum lines removed.

TUNE-UP (Cont.)

3) Perform services outlined under *HOT (SLOW) IDLE RPM, Engine Service After Speed Checks.*

Fast Idle Speed

Application	RPM
200"	
Federal	
Man. Trans.	1600
Auto. Trans.	2000
Calif.	2300
250"	1700

AUTOMATIC CHOKE

Loosen choke cover retaining screws. Rotate choke cover until mark on cover aligns with specified setting on choke housing. Tighten choke cover retaining screws.

Automatic Choke Setting

200" & 250"	
Federal	2NR
Calif.	IN

NOTE — Some California models are not adjustable due to a tamperproof choke cover and assembly that has no index marks.

FUEL PUMP

Check fuel pump pressure and volume with pump installed on engine, operating temperature normal, transmission in "N" and engine running at curb idle speed. When making pressure test, pinch off pump-to-tank return fuel line.

Pressure	5.0-7.0 psi
Volume	
200"	1 pint in 30 seconds
250"	1 pint in 20 seconds

EXHAUST EMISSION SYSTEMS

See EXHAUST EMISSION SYSTEMS section.

GENERAL SERVICING

IGNITION

DISTRIBUTOR

All models are equipped with Motorcraft Dura Spark II ignition system.

IGNITION COIL

Application	Specification
Coil Primary (@75° F)	1.13-1.23 ohms
Coil Secondary (@75° F)	7,700-9,300 ohms
Ballast Resistor (@75° F)	1.05-1.15 ohms
Coil Output (@75° F)	28 KV Min.

CARBURETION

CARBURETORS

Application	Model
200"	
Federal	Holley 1946
Calif.	Holley 1946-C
250"	Carter YFA

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

ELECTRICAL

BATTERY

12 Volt — Negative Ground

Application	Standard Amps	Optional Amps
200"		
All Models	36, 45	54, 77
250"		
All Models	36, 45	54

STARTER

Motorcraft positive engagement type.

Application	Cranking RPM	Cranking Amps
4" Armature	180-250	150-250
4½" Armature	150-290	150-210

ALTERNATOR

Motorcraft external regulator alternator.

Color Code	Rated Amp. Output
Rear Terminal	
Orange	40
Green	60
Black	65
Side Terminal	
Black	70

GENERAL SERVICING (Cont.)

ALTERNATOR REGULATOR

Motorcraft Solid State Electronic Regulator, calibrated and preset by manufacturer. No adjustment is required or possible on this unit.

FILTERS & CLEANERS

NOTE — Refer to decal on vehicle for maintenance schedule code.

Filter or Cleaner	Replacement Interval (Miles)	
	"A"	"B"
Oil Filter	①10,000	①10,000
Air Cleaner	30,000	30,000
Crankcase Vent Filter ...	40,000	30,000
PCV Valve	20,000	30,000
Fuel Filter	②	②

- ① — Change every 6,000 miles in severe service.
- ② — Replace only one time at 10,000 miles.

CAPACITIES (COOLING)

Application	Standard Qts.	Optional Qts.
200"	8.1	8.1
250"	10.6	10.8

BELT ADJUSTMENT

Tension (Lbs.) Using Strand Tension Gauge

Application	New Belt	①Used Belt
All Belts (Exc. 1/4").....	120-160.....	75-120
1/4" Belts	50-80	40-60

① — Any belt operated for 10 minutes or more.

CAPACITIES (EXCEPT COOLING)

Application	Quantity
Crankcase	
200"	①4.0 qts.
250"	①4.0 qts.
Manual Transmission (Hypoid Gear Lube)	
4-Speed	2.8 pts.
4-Speed Overdrive	4.5 pts.
Automatic Transmission	
C-3 Transmission (Type F ATF)	②8.0 qts.
C-4 Transmission (Dexron II)	
Fairmont, Zephyr, Mustang & Capri	②7.7 qts.
Granada & Monarch	②10.2 qts.
Jatco (Dexron II)	8.5 qts.
Rear Axle (Hypoid Gear Lube)	
200"	3.5 pts.
250"	4.5 pts.
Fuel Tank	
Mustang & Capri	12.5 gals.
Fairmont & Zephyr	14.0 gals.
Granada & Monarch	18.0 gals.

- ① — Add 1 qt. with filter change.
- ② — Approximate dry capacity. Includes oil cooler and lines. Use dipstick for accurate refill.