TUNE-UP

ENGINE IDENTIFICATION

The engine can be identified by the eighth digit of the Vehicle Identification Number. The number is located on the Safety Compliance label (on left front door pillar) and on a metal plate riveted to the driver's side of the dash and visible through windshield.

VIN Engine Code

Application	Code
4.9L (300") 1 Bbl.	E

MODEL IDENTIFICATION

Model identification can be found on bottom line of Safety Compliance label located on left front door pillar.

TUNE-UP NOTES

NOTE — *For other items affecting Tune-Up, see FUEL SYSTEMS Section or EMISSION CONTROL Section.*

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.***

NOTE — ***Due to production changes, 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, use the decal specifications.***

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

NOTE — ***In some applications within this article it will be necessary to refer to engine calibration number. To determine location of calibration number decal on engine, refer to Ford Motor Co. Vacuum Diagrams in EMISSION CONTROL Section.***

ENGINE COMPRESSION

Compression Ratio	
4.9L	8.9:1

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 cylinder.

VALVE CLEARANCE

Application	Clearance
4.9L	①.100-.200"

① — Clearance allowable with tappet collapsed. Desired clearance is .125-175".

VALVE ARRANGEMENT

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

SPARK PLUGS

Application	Gap (In.)	Torque (Ft. Lbs.)
4.9L	.042-.046	15-25

Application	Spark Plug Type Autolite No.
4.9L	BSF-42

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.

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. Replace any wire with over 5000 ohms resistance per inch. New wires should have a resistance of 7000 ohms per foot.

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

DISTRIBUTORS

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

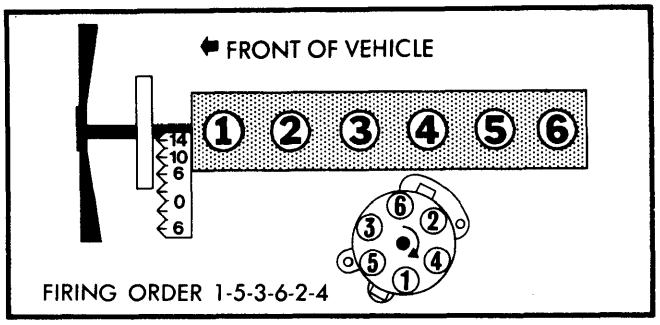

Fig. 1 Firing Order and Timing Marks

IGNITION TIMING

NOTE — *Engines are equipped with a receptacle for use with magnetic pick-up timing lights, located at 135°ATDC. Do not use this location for timing with a conventional timing light.*

TUNE-UP (Cont.)

1) Place mark on proper degree line of damper (or of pointer and damper notch). Disconnect vacuum lines at distributor and plug lines.

2) Connect timing light using adaptor or inductive pick-up. Do not puncture spark plug leads. Connect an accurate tachometer.

3) Start engine and warm to operating temperature. With engine idling in neutral, check timing. If within ±2°, do not reset. If outside specifications, loosen distributor hold-down bolt and rotate to set timing. Recheck after tightening bolt.

Ignition Timing Specifications (Degrees BTDC@RPM)

Application	Man. Trans.	Auto. Trans.
4.9L		
Light Duty	6@800	10@800
Heavy Duty	10@800	12@800

HOT (SLOW) IDLE RPM

LIGHT DUTY

1) Place transmission in "Neutral" or "Park", with engine at normal operating temperature. Turn A/C Heat Selector off.

2) Allow engine speed to stabilize and measure curb idle speed. To set curb idle speed, adjust curb idle speed screw to obtain specified reading. See *Fig. 2*.

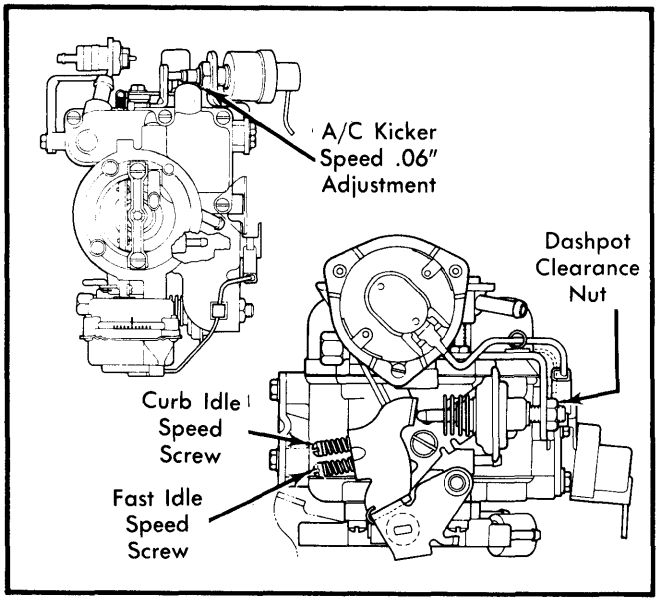

Fig. 2 Adjusting YFA 1-Bbl. Carburetor on 4.9L Engines (Light Duty)

3) Place transmission in "Neutral" or "Park". Speed up engine momentarily, and recheck curb idle RPM. Readjust if necessary.

4) Check dashpot clearance, adjusting if necessary. Move AC Heat Selector to maximum cooling (blower switch in high position). Disconnect A/C clutch wire. Check and adjust for A/C-On RPM.

Light Duty Idle Speed (RPM)①

Application	Curb Idle	②Solenoid/Kicker Energized
4.9L		
Man. Trans.	600③	700
Auto. Trans.	550④	.....

① — Subtract 50 RPM if engine has less than 100 hours use.
② — A/C-On reading.
③ — A/C-Off or Non-A/C reading.
④ — Non-A/C reading.

HEAVY DUTY

1) Place transmission in "Neutral" or "Park", with engine at normal operating temperature. Turn A/C Heat Selector off.

2) Activate Throttle Solenoid Positioner (TSP). Set curb idle to specification by screwing solenoid in or out. See *Fig. 3*.

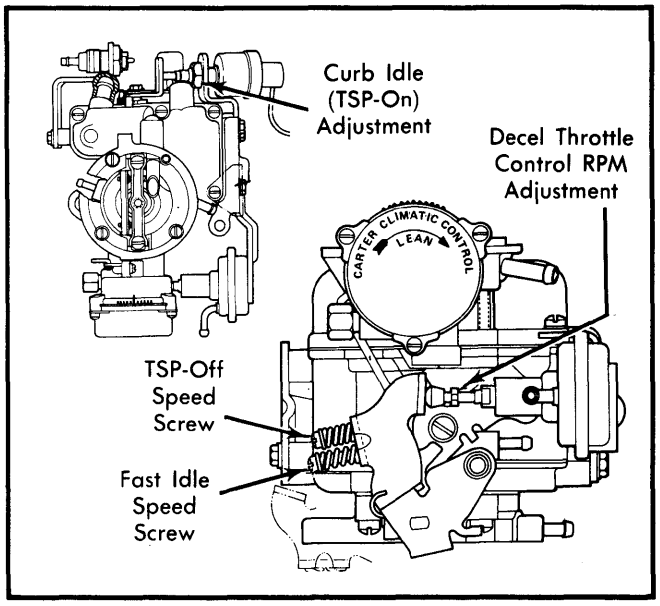

Fig. 3 Adjusting YFA 1-Bbl. Carburetor on 4.9L Engines (Heavy Duty)

3) With transmission selector lever in either "Neutral" or "Park" position, increase engine speed momentarily, letting it return to normal curb idle. Check RPM and readjust if required.

4) To set TSP-Off RPM, bring engine to normal operating temperature. Place A/C Heat Selector in "Off" position. Disconnect TSP wire. Place transmission in "Neutral". Using TSP-Off adjusting screw, set TSP-Off RPM to specifications. Reconnect TSP wire to terminal.

Heavy Duty Idle Speed (RPM)

Application	Curb Idle (TSP-On)	TSP-Off RPM
4.9L		
Man. Trans.	700	500
Auto. Trans.	550①	500

① — 600 RPM for Calibration No. 5-77-R1; 700 RPM for Calibration No. 9-77J-R12.

TUNE-UP (Cont.)

COLD (FAST) IDLE RPM

LIGHT DUTY

1) Place transmission in "Neutral". Bring engine to normal operating temperature. Disconnect vacuum hoses at EGR, purge valve or purge solenoid valve and plug hoses.

2) Disconnect vacuum hose from cold start vacuum switch (orange vacuum switch on valve corner). Plug hose. Using a slave vacuum hose, connect manifold vacuum to cold start vacuum switch.

3) Place fast idle screw on second step (kickdown) of fast idle cam. Adjust fast idle speed to specifications. See *Fig. 2*. Remove plugs from vacuum hoses and restore all hoses to their original locations.

Light Duty Fast Idle Speed (RPM)

Application	①RPM	Cam Step
4.9L		
Man. Trans.	1400	2nd (Kickdown)
Auto. Trans.	1400	2nd (Kickdown)

① – Subtract 150 RPM if engine has less than 100 miles use.

HEAVY DUTY

NOTE – *Procedure includes setting Decel Throttle Control.*

1) Place transmission in "Neutral". Bring engine to normal operating temperature. Disconnect vacuum hoses at EGR, purge valve, or purge solenoid valve. Plug hoses.

2) Disconnect and plug vacuum hose to decal throttle control diaphragm. Place fast idle adjusting screw on second step (kickdown) of fast idle cam. See *Fig. 3*. Adjust fast idle speed to specifications.

3) Using a slave vacuum hose, connect manifold vacuum to decal throttle control diaphragm. Adjust diaphragm shaft length until specified RPM is obtained. Remove plugs and restore vacuum hoses to their original locations.

Heavy Duty Fast Idle Speed (RPM)

Calibration Number	Fast Idle Speed	Decel Throttle Control Speed
5-77-R1, 5-78-R1, 9-78J-R0	1500	.....
9-77J-R11	1600	1950 + 50
9-77J-R12, 9-77S-R10	1600	1450 + 50

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 Procedure, see Emission Control Tune-Up Decal. If no decal can be located, use specifications at end of instructions.*

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).

3) Disconnect and plug fuel evaporative purge valve signal hose at engine. Disconnect purge hose at air cleaner and plug nipple.

4) Disconnect flexible fresh air tube from air cleaner duct or adapter. Insert hose from propane enrichment tool (Rotunda T75L-9600-A) about ¾ the way into duct or fresh air tube. Disconnect PCV valve from grommet and allow valve to draw underhood air during adjustment.

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

6) Be sure idle mixture limiter(s) is set to maximum rich position (counterclockwise against stop). With engine at normal operating temperature, check curb idle speed or A/C-Off RPM. Adjust as necessary. Run engine at 2500 RPM for 15 seconds before each mixture check. Check ignition timing, and adjust as necessary.

7) With engine idling in neutral, 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 – *Propane cartridge must be in vertical position. If engine speed will not drop off, check bottle gas supply. If necessary, repeat test with new bottle.*

8) Compare measured speed gain with specifications. If mixture adjustment is necessary, adjust so gain is within "Reset RPM" specifications. If propane enrichment speed gain is within "RPM Gain" specifications, proceed to step **11**).

9) If measured speed gain is greater than specification, turn mixture screws counterclockwise in equal amounts and recheck until measured speed rise is within "Reset RPM" specifications. Then proceed to step **11**).

TUNE-UP (Cont.)

10) If measured speed gain is less than specification, turn mixture screws clockwise in equal amounts and recheck until measured speed rise is within "Reset RPM" specifications. Then proceed to step **11)**.

11) Check curb idle and remove all test equipment. Reconnect hoses in original positions and connect PCV valve.

Idle Mixture Specifications (Propane Enrichment)

Calibration Number①	RPM Gain (Check)	Reset RPM (Adjust)
Light Duty		
1-52K-R0, R10 & 1-52L-R0, R10	20-110	60
All Others	10-50	20
Heavy Duty	②	②

① — Calibration No. is located on an identification label on front of valve cover. On some engines, label may be on same component as Emission Certification Decal.

② — See Emission Control Decal.

DASHPOT ADJUSTMENT

Each time curb idle speed is adjusted, check dashpot clearance. Collapse dashpot stem and check clearance between dashpot stem and throttle lever pad. To adjust, remove air cleaner and loosen lock nut on dashpot. Turn dashpot in or out to achieve specified clearance. Tighten lock nut. *See Fig. 2.*

Dashpot Clearance Specifications①

Calibration Number	Clearance (Inches)
1-51D-R0, 1-51D-R10, 1-51D-R12	.105-.135
All Others	.055-.085

① — Light Duty models only.

AUTOMATIC CHOKE ADJUSTMENT

NOTE — *Some 1981 carburetors may have tamperproof choke assemblies.*

Drill heads from 2 rivets and remove rivets. Loosen remaining screw, and turn choke cover in direction indicated on cover to specified setting. Install new rivets and tighten screw.

Automatic Choke Specifications

Calibration Number	Choke Setting
Light Duty	Non-Adjustable
Heavy Duty	
5-77-R1 & 5-78-R1	1 Rich
All Others	Index

FUEL PUMP

Check fuel pump at idle RPM with engine in normal operating temperature and transmission in neutral.

Pressure	5.0-7.0 psi
Volume	One Pint in 20 seconds

EMISSION CONTROL

See appropriate article in EMISSION CONTROL Section.

GENERAL SERVICING

IGNITION

DISTRIBUTOR

All units are equipped with Motorcraft Dura-Spark II Ignition system. Units are self-contained and require no outside adjustments.

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

IGNITION COIL

Resistance	
Primary	1-2 ohms
Secondary	7700-9600 ohms
Primary Ballast Resistance Wire	1.05-1.15 ohms
Coil Reserve Voltage	28 Kv minimum.

FUEL SYSTEMS

CARBURETOR

Application	Carb. Model
4.9L Engine	
Light Duty	
Federal	Carter YFA 1-Bbl.
Calif.	Carter YFA 1-Bbl. Feedback
Heavy Duty	Carter YFA 1-Bbl.

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

TUNE-UP (Cont.)

ELECTRICAL

BATTERY

Application	Amp. Hr. Rating
Standard	
Federal	36
Calif.	45
Optional	45, 48, 54, 63, 71, 77, 81

STARTER

Motorcraft positive engagement type with either a 4" or 4½" armature.

Engine Cranking Speed	
4" Armature	180-250 RPM
4½" Armature	150-290 RPM
Starter Current Draw	
4" Armature	150-200 amps.
4½" Armature	150-180 amps.

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

ALTERNATORS

All Models use Motorcraft Alternators.

I.D. Color	Rated Amp. Output
Rear Terminal	
Orange	40
Green	60 or 65
Side Terminal	
Black	70
Red	100

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

ALTERNATOR REGULATORS

Two Motorcraft Electronic Voltage Regulators are used on 4.9L engines. Although both look alike, they are not interchangeable.

Application	Color Coding
Used with Ammeter	Blue label
Used with Indicator Lamp	Black label

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

CAPACITIES (EXCEPT FUEL & COOLING)

Application	Quantity
Crankcase	①6.0 qts.
Drive Axles (Hypoid Gear Lube)②	
Front	3.9 pts.
Rear	6.5 pts.
Transfer Case (Dexron II)	
Warner 1435	6.5 pts.
New Process 208	7.0 pts.
Auto. Trans. (Dexron II)③	
C-4	9.6 qts.
C-6	
2-WD	11.9 qts.
4-WD	13.4 qts.
AOT	12.0 qts.
Man. Trans. (SAE 80W-90)	
Ford 3.03	3.5 pts.
T-18	7.0 pts.
New Process 435	7.0 pts.
New Process 435 w/Ext	6.5 pts.
4-Speed Overdrive	4.5 pts.

① – Includes 1 quart for filter change.
② – Fill to bottom of filler plug hole.
③ – Use Auto. Trans. dipstick for exact refill.

FUEL TANK CAPACITIES

Application	Gallons
F100, F150, F250 (Short W.B.)	
Standard	16.5
Auxiliary	19.0
F100, F150, F250, F350 (Long W.B.)	
Standard	19.0
Auxiliary	19.0
E100, E150, Club Wagon (Short W.B.)	
Standard	18.0
Auxiliary	18.0
All Other "E" Models (Long W.B.)	
Standard	22.1
Auxiliary	18.0
Bronco	
Standard	25
Optional	32

GENERAL SERVICING (Cont.)

COOLING CAPACITIES

Application	Quarts
"E" Models①	
With Heater	15.0
With Heater & A/C	20.0
"F" Models & Bronco	
With Heater	13.0
With Heater & A/C	14.0

① – Add .8 quart for auxiliary heater.

BELT ADJUSTMENT

Tension (Lbs.) Using Strand Tension Gauge

Application	New Belt	①Used Belt
1/4" Belts	50-80	40-60
All Others	120-160	75-120

① – Any belt operated for 10 minutes or more.

FILTERS & CLEANERS

Filter or Cleaner	Service Interval (Miles)
Oil Filter	
E100, E150, F100, F150	Replace 10,000
All Others	Replace 15,000
Air Filter	Replace 30,000
PCV Filter	Replace 30,000