

## TUNE-UP

### ENGINE IDENTIFICATION

The engine can be identified by the fourth 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 Codes

Application	Code
300" (4.9L) 6 Cyl. 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

**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.*

**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	
300" 6 Cylinder 1-Bbl. ....	8.9:1
Recommended Fuel.....	⓪(87 AKI Minimum)
⓪ — Leaded or unleaded. If equipped with a catalytic converter, unleaded fuel (87 AKI Minimum) must be used.	

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 TAPPET CLEARANCE

Application	Clearance
300" .....	⓪.100-.200"
⓪ — Clearance allowable with tappet collapsed. Desired clearance is .125-175".	

### VALVE ARRANGEMENT

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

### SPARK PLUGS

Gap .....	.042-.046"
Torque .....	15-25 ft. lbs.

#### Spark Plug Type

Application	Autolite No.
300" .....	BSF-42 or BRP-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.

**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.

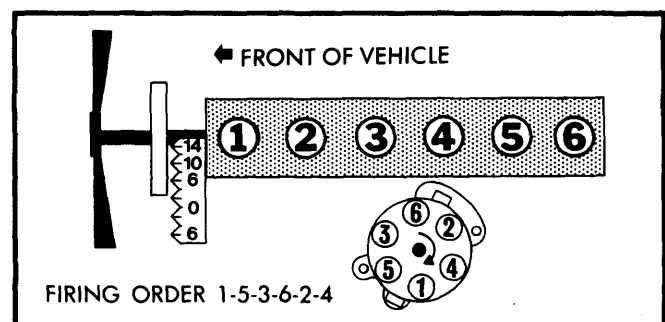


Fig. 1 300" Firing Order & Timing Mark Identification

### 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  $\pm 2^\circ$ , 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.
300" 6 Cyl.		
Light Duty .....	6@500 .....	10@500
Heavy Duty		
Federal .....	12@700 .....	12@700
Calif. ....	10@700 .....	10@500

### HOT (SLOW) IDLE RPM

**NOTE** — An engine that idles smoothly, but runs rough at 1000-2000 RPM, may be caused by crossed orange and purple primary ignition wires in engine harness between distributor and module. To check, turn ignition key off, and rotate engine until initial timing marks align. Remove distributor cap. One spoke of armature should be opposite stator pole. If pole is between spokes, wires are probably crossed.

**NOTE** — If specified idle speed cannot be achieved by normal adjustments on vehicles with speed control, disconnect accelerator cable at carburetor throttle lever. If idle speed can then be achieved, check speed control installation.

### LIGHT DUTY

**Preliminary Adjustments** — 1) Apply parking brake and block wheels. Turn off all accessories. Remove air cleaner assembly and plug vacuum lines to air cleaner.

2) Revise dump valve lines for dump valves with one or two vacuum lines at the side by disconnecting and plugging line(s). For dump valves with one line at top only, remove line at dump valve and plug it, if it is not connected to intake manifold. Then, connect a slave line from dump valve fitting to intake manifold fitting. Check throttle and choke linkage for free movement. Connect a tachometer (Rotunda 20362 or equivalent).

**Curb Idle Speed** — 1) Run engine at 2500 RPM for 15 seconds in neutral, then allow engine to return to curb idle. Place transmission in "D".

2) Allow engine to stabilize at curb idle speed. Measure and adjust if not within  $\pm 50$  RPM of specification.

3) To set curb idle speed, adjust curb idle speed screw. If equipped with throttle solenoid positioner, rotate hex nut on

end of plunger, or if equipped with solenoid dashpot, rotate dashpot assembly.

4) If equipped with throttle solenoid positioner (TSP), press throttle lever against plunger and collapse positioner. Engine speed should drop to 500 RPM. If not, adjust curb idle screw.

5) If equipped with air conditioning, disconnect compressor clutch wire and turn system "ON". Engine speed should increase 100 RPM. If not, adjust solenoid.

**Final Adjustments** — 1) Reconnect dump valve vacuum lines to original positions. Reinstall air cleaner assembly and reconnect vacuum lines.

2) Run engine at 2500 RPM for 15 seconds in neutral. Recheck idle speed and repeat procedure if not within 50 RPM of specifications.

**NOTE** — Air cleaner must be installed when making final curb idle speed measurement. If a final curb idle speed adjustment is required, check bowl vent setting. See Carter Carburetors in FUEL SYSTEMS Section.

### Hot (Slow) Idle RPM (Light Duty Models)

Application	Man. Trans.	Auto. Trans.
Federal .....	600 .....	550
Calif. ....	700 .....	550

### HEAVY DUTY

**Preliminary Adjustments** — 1) Apply parking brake and block wheels. Turn off all accessories and disengage all power take-off units.

2) Place transmission in neutral and run engine until warm. Stop engine and remove air cleaner, plugging any disconnected hoses. Check throttle and choke linkage for binding.

3) Disconnect system vacuum hose to decel throttle control diaphragm and plug hose. If equipped, disconnect fuel evaporation purge valve signal vacuum line at first point of removal other than valve.

**NOTE** — Do not remove vacuum line at purge valve or valve damage may result.

4) Connect tachometer (Rotunda 20362 or equivalent).

**Curb Idle Speed** — 1) If equipped with a throttle solenoid positioner (TSP) or solenoid-dashpot, check that solenoid is energized. Run engine at 2500 RPM for 15 seconds in neutral. Return engine to idle and let speed stabilize.

2) Compare speed to specifications and adjust if necessary. If equipped with TSP, loosen solenoid body lock nut and rotate solenoid body until curb idle speed is achieved. Tighten lock nut.

**NOTE** — It may be necessary to temporarily disconnect solenoid wire when rotating solenoid body to prevent twisting.

## TUNE-UP (Cont.)

3) On carburetors without a solenoid device, turn throttle adjusting screw until curb idle speed meets specifications.

4) Place transmission in neutral and collapse TSP solenoid plunger by forcing throttle lever against plunger. Idle speed should drop to 500 RPM. If not, adjust with throttle adjusting screw.

### Hot (Slow) Idle RPM (Heavy Duty Models)

Application	Curb Idle	TSP "OFF"
Man. Trans. ....	700	500
Auto. Trans. ....	550	500

**Decel Throttle Control Speed** - 1) If engine is equipped with a separate decel throttle control diaphragm and TSP, check curb idle speed first.

2) Connect a vacuum line directly from intake manifold vacuum to decel throttle control diaphragm. Run engine in neutral at 2500 RPM for 15 seconds, then let engine speed stabilize at idle. Compare to specifications.

3) If engine speed is not within  $\pm 50$  RPM, adjust diaphragm shaft length by loosening lock nut on adjusting screw and rotating screw until specification is obtained. Tighten lock nut.

4) Disconnect slave vacuum hose from diaphragm and plug hose. Let engine return to curb idle speed. Repeat procedure until consistent specified speed checks are obtained.

5) Place transmission in neutral and collapse TSP solenoid plunger by forcing throttle lever against plunger. Idle speed should drop to 500 RPM. If not, adjust with throttle adjusting screw.

**NOTE** - To avoid damage to diaphragm, hold shaft with one 1/4" open-end wrench, while adjusting screw with second wrench of same size.

### Decel Throttle Control System RPM

Application	Man. Trans.	Auto. Trans.
300" .....	1450 $\pm$ 50	1450 $\pm$ 50

**Final Adjustments** - Remove slave manifold vacuum hose and reconnect decel throttle control vacuum hose to diaphragm. Reinstall air cleaner assembly and attach all vacuum hoses to original locations. Recheck curb idle speed with air cleaner assembled. Stop engine after necessary adjustments are completed. Remove test equipment and tighten air cleaner wing nuts.

## COLD (FAST) IDLE RPM

### LIGHT DUTY

Follow instructions under Preliminary Adjustments, **HOT (SLOW) IDLE RPM, LIGHT DUTY**. Then proceed as follows:

**Fast Idle Adjustment** - 1) Remove spark delay from distributor vacuum advance line and route vacuum line directly to advance side of distributor.

2) Trace EGR signal vacuum line from EGR valve to carburetor. If EGR/PVS or temperature vacuum switch is located in vacuum routing, disconnect EGR line at EGR valve and plug line. If none is found, do not detach EGR vacuum line.

3) Disconnect fuel evaporative purge valve signal vacuum line. Trace purge valve vacuum line from valve on canister to first point where line can be detached. Disconnect at THAT point and cap the open port and plug line.

4) With engine at normal operating temperature, choke plate fully open and transmission in neutral, place fast idle lever on 2nd highest step of fast idle cam. Check fast idle RPM.

5) Run engine at approximately 2500 RPM for 15 seconds and recheck fast idle speed after engine stabilizes. Repeat until stable fast idle RPM is achieved. Readjust if not within  $\pm 100$  RPM.

6) Reconnect vacuum lines and spark delay valve.

### Cold (Fast) Idle RPM (Light Duty Models)

Calibration Number	RPM	Cam Step
0-51F-R0, 0-51S-R0, 0-51T-R0 & 0-52S-R0	..... 1600	2nd Highest
All Others	..... 1400	2nd Highest

### HEAVY DUTY

Follow instructions under Preliminary Adjustments, **HOT (SLOW) IDLE, HEAVY DUTY**. Then proceed as follows:

**Fast Idle Adjustment** - 1) Disconnect and plug EGR vacuum hose at EGR valve. With engine at normal operating temperature and choke fully open, run engine at 2500 RPM for 15 seconds in neutral. Return to idle and let speed stabilize.

2) If equipped with automatic choke, depress throttle lever and manually rotate fast idle cam until fast idle screw rests on 2nd highest step of cam. Compare fast idle speed to specifications and adjust as necessary. Repeat procedure until speed consistently matches specifications.

### Cold (Fast) Idle RPM (Heavy Duty Models)

Application	RPM	Cam Step
All Models .....	1600	2nd Highest

## 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.

## TUNE-UP (Cont.)

### 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 T75-9600-A) 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). Check curb idle speed or A/C neutral, run engine at 2500 RPM for 15 seconds before each mixture check.

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** — 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).

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

Calibration Number <sup>①</sup>	RPM Gain (Check)	Reset RPM (Adjust)
0-51F-R0, 0-51L-R0, 0-51M-R0 .....	10-70 .....	20-40
0-52H-R0, 0-52S-R0 .....	10-50 .....	20-40
0-51S-R0, 0-51T-R0 .....	60-150 .....	100-120
All Others .....	20-150 .....	50-80

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.

### 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.

### AUTOMATIC CHOKE ADJUSTMENT

Loosen choke cover screws and turn choke cover in direction indicated on cover to specified setting.

#### Automatic Choke Specifications

Calibration Number	Choke Setting
0-51G-R0, 0-51H-R0, 0-52H-R0, 0-52J-R0, 0-52I-R0, 0-52M-R0 .....	2 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

### MANIFOLD HEAT CONTROL VALVE

Check valve for freedom of movement and lubricate with a suitable solvent (Rotunda).

### 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 .....	1.13-1.23 ohms
Secondary .....	7,700-9,300 ohms
Primary Ballast Resistor .....	1.05-1.15 ohms

**Coil Reserve Voltage** ..... 28 Kv minimum.

### FUEL SYSTEMS

#### CARBURETOR

Application	Carb. Model
300" .....	Carter YFA 1-Bbl.

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

### ELECTRICAL

#### BATTERY

**12 Volt** — Negative Ground

Application	Amp. Hr. Rating
Standard .....	36 or 45 (Calif.)
Optional .....	45, 68, 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
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 300" engine. Although both look alike, they are not interchangeable.

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

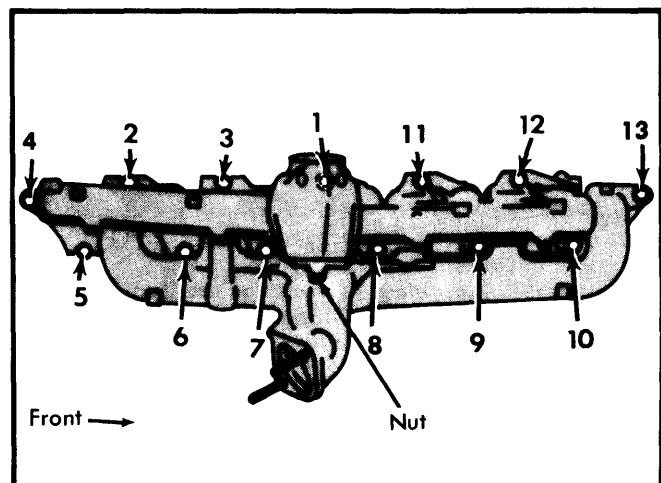
**Other Data & Specifications** — See *Motorcraft Alternators* in *ELECTRICAL* Section.

### ENGINE

#### INTAKE MANIFOLD

Tighten nuts and bolts on manifold in sequence illustrated.

Application	Intake Manifold Tightening (Ft. Lbs.)	
	Intake	Exhaust
300" .....	22-32	28-33



**Fig. 2 Intake & Exhaust Manifold Tightening Sequence**

## GENERAL SERVICING (Cont.)

### CAPACITIES (EXCEPT FUEL & COOLING)

Application	Quantity
Crankcase .....	① 6.0 qts.
Drive Axles (Hypoid Gear Lube) .....	②
Transfer Case (Dexron II) .....	6.5 pts.
Auto. Trans. (Dexron II)	
C-4 .....	10 qts.
C-6 .....	11.8 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 Without Extension .....	6.5 pts.
4-Speed Overdrive .....	4.5 pts.

- ① — Includes 1 quart for filter change.  
 ② — Fill to bottom of filler plug hole.

### 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

### COOLING CAPACITIES

Application	Quarts
"E" Models①	
With Heater .....	16.0
With Heater & A/C .....	21.0
"F" Models	
With Heater .....	13.0
With Heater & A/C .....	14.0

- ① — Add .8 qt. for auxiliary heater.

### BELT ADJUSTMENT

Tension (Lbs.) Using Strand Tension Gauge		
Application	New Belt	① Used Belt
1/4" Belts .....	40-80	40-60
All Others .....	90-160	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