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# Shop Tips FROM FORD

VOL. 2, NO. 6

Technical parts and service information published by Ford Division to assist servicemen in Service Stations, Independent Garages and Fleets.

## MODIFYING FORD V-8's for HIGH PERFORMANCE

### IN THIS ISSUE



From your Ford dealer

BILL BOYER FORD INC.
1201 HARMON PLACE
MPLS. 3, MINN. 9405, FQ

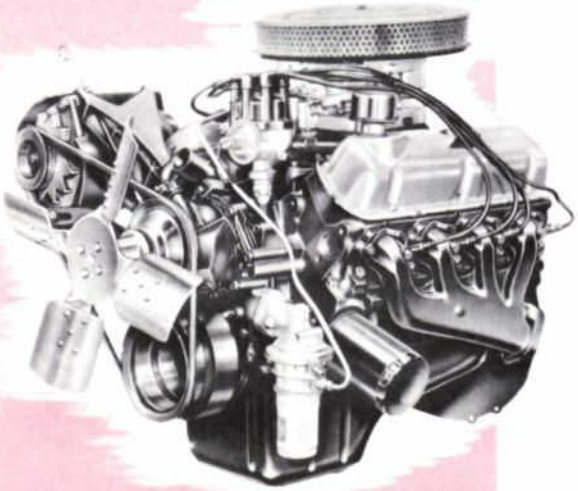
FoMoCo GENUINE PARTS

ROTUNDA

Be sure to file this and future bulletins for ready reference. If you have any suggestions for additional information that you would like to see included in this publication please write to: Ford Division of Ford Motor Company, Parts and Service Promotion and Training Dept., P.O. Box 658, Dearborn, Michigan, 48121.

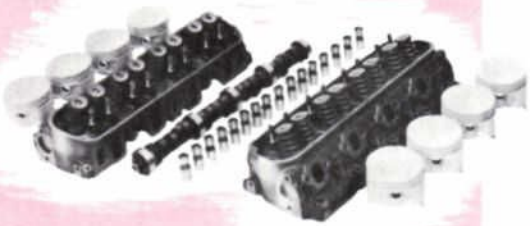
# Modifying FORD 221, 260 and 289 CID

Recently, Ford announced the availability of a full line of "Cobra Kits" designed to step up performance of 221, 260 and 289 CID engines. Now, Shop Tips gives you excerpts from a recent independent report by Ak Miller on these popular performance kits which shows how to modify a basic Ford V-8 to achieve various degrees of desired performance or power.



The basic Ford V-8's are naturals for power-increase modifications because they are designed for high volumetric efficiency and have the advantages of low piston speeds and short stroke compactness. Moreover, the basic strength and rigidity permit high boosts in power without alteration of the engines' basic compact dimensions. In general, Cobra Kit variety and the sturdy reliability of the basic design of these engines facilitate customized modification of Ford V-8's to almost any degree of performance and appearance desired.

With Cobra Kits, extra power is easily bolted on without radical machining. Basically, this increase in power output is obtained by increasing the amount of fuel/air mixture and combustion efficiency and raising the engine speed. Here are the basic Cobra Kits offered by Ford to provide stepped-up engine performance.



## COBRA COMBINATION ENGINE PERFORMANCE KITS

Each of these Performance Kits includes the Cam Kit and the Cylinder Head and Valve Kit. Also included are eight matched pistons, designed with extra clearance for the larger valve size and higher lift. These kits can easily be installed on the 221, 260 and 289 CID engines without extra machining. They should be used with manual-shift transmissions only.

| ENGINE | PERFORMANCE KIT PART NUMBER |
|---|---|
| 221 CID V-8 | C40Z-6A044-A |
| 260 CID V-8 | C40Z-6A044-B |
| 289 CID V-8 | C40Z-6A044-C |

## COBRA CYLINDER HEAD AND VALVE KIT

These cylinder heads have heavy-duty threaded rocker arm studs to resist loosening, spring seat ridges to help keep valve springs and dampers aligned and solid valve spring retainers and oil-controlling valve stem seals. Intake valve head diameter is 1.665"; exhaust, 1.445". Both are aluminized and have polished chrome-plated stems. Exhaust valves are forged, heat-resistant chrome-manganese alloy and fit 221, 260 and 289 CID V-8's. Kit includes 2 cylinder heads, 8 intake valves, 8 exhaust valves, 16 valve damper spring assemblies, 16 stem seals, 16 valve spring retainers, 32 key valve spring retainers.

FORD PART NUMBER.....C40Z-6C056-A

## COBRA HIGH PERFORMANCE CAM KIT

This is the same high-lift design camshaft used in the High-Performance 289 V-8 which powers the latest Cobra model. Cam lift is .289" and the timing duration is 306°. This kit includes 1 camshaft and 16 tappets and fits 221, 260 and 289 CID V-8's.

FORD PART NUMBER.....C40Z-6A257-A

# V-8's for HIGH PERFORMANCE

### COBRA DISTRIBUTOR KIT

This heavy-duty unit features dual contact point centrifugal spark advance control. Specially calibrated for best spark timing in the high speed range to produce maximum possible engine speed. This kit includes distributor assembly with distributor rotor, cap and spark plug cables and fits 260 and 289 CID V-8's only.

**FORD PART NUMBER**.....**C4DZ-12050-A**

### COBRA HEAVY-DUTY CLUTCH KIT

Complete clutch assembly of heavy-duty construction and semi-centrifugal design in a smooth-working unit with low slip characteristics and a firmer grip at all RPM; especially effective at high speeds. Fits 221, 260 and 289 CID V-8's. The kit includes 1 disc and 1 pressure plate.

**FORD PART NUMBER**.....**C3OZ-7A537-A**


### COBRA COMPETITION OIL PAN

Sturdy, cast-aluminum competition-type oil pan features air cooling fins for improved oil temperature control. Also has large 6½ quart capacity for added engine protection and fits 221, 260 and 289 CID V-8's.

**FORD PART NUMBER**.....**C4OZ-6675-A**

### COBRA DUAL EXHAUST KIT

For changing a Falcon 260 CID single exhaust layout to a dual system. The 4" heavy-duty glass pack mufflers are of straight-through design to minimize back pressure. The kit includes 2 glass pack mufflers, 1 exhaust pipe and 4 clamps. Available for 1963-64 Falcon 260 CID V-8 only.

**FORD PART NUMBER**.....**C4DZ-5210-A**

### COBRA SCATTER SHIELD

Made of high-carbon cast steel, this housing is designed to give extra protection for occupants and car especially at high engine speeds. Replaces cast-aluminum housing. Fits 221, 260 and 289 CID V-8's; used with manual-shift transmissions only.

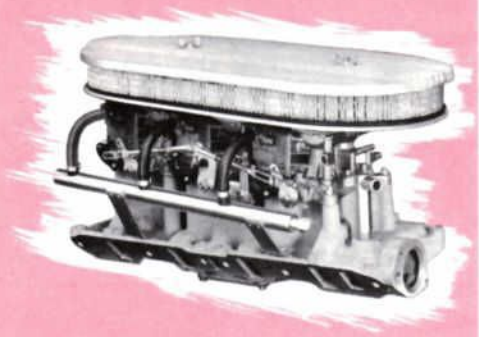
**FORD PART NUMBER**.....**C4OZ-6394-A**

# Modifying FORD 221, 260 and 289 CID

### SINGLE 4-V INDUCTION KIT

4-V Kit replaces standard 2-V induction system without major changes to basic system layout. Fits 221, 260 and 289 CID V-8's. The kit includes 1 intake manifold, 1 carburetor, 1 air cleaner, 1 spacer, plus miscellaneous seals, gaskets, studs and screws.

**FORD PART NUMBER.....C4OZ-6B068-D**



### 6-V INDUCTION KIT

Combines three 2-venturi carburetors on the precision-cast-aluminum intake manifold. Uses center carburetor for starting and for low and medium speeds. Front and rear carburetors act as secondaries and cut in at higher speed during maximum acceleration demand periods. For 260 and 289 CID V-8's only. Kit includes 1 intake manifold, 3 carburetors, 1 air cleaner and 1 fuel manifold.

**FORD PART NUMBERS.....C4OZ-6B068-A—260 CID V-8**
**C4OZ-6B068-B—289 CID V-8**

Appropriate linkage kits available separately

**3-2V Linkage Kit-1963 Falcon-C3DZ-9B843-A**
**3-2V Linkage Kit-1964 Falcon-C4DZ-9B843-A**
**3-2V Linkage Kit-1963-64 Fairlane-C4OZ-9B843-A**

### 8-V INDUCTION KIT

This kit features two 4-venturi carburetors mounted on a specially designed cast-aluminum intake manifold. Primary sections of both carburetors operate progressively from throttle linkage for starting and for low and medium speeds. Both secondaries are velocity-flow operated to cut in for acceleration and high speed use. Kit includes 1 intake manifold, 2 carburetors and 2 air cleaners. Kit fits 221, 260 and 289 CID V-8's. Available soon.

**FORD PART NUMBER.....C4OZ-6B068-E**
**2-4V Linkage Kit-1963-64 Fairlane-C4OZ-9B843-B**

### 8-V WEBER INDUCTION KIT

The ultimate induction system for "all-out" competition. Four 2-V Weber carburetors mounted on a special intake manifold for wide-open running. This is the same kind of high-output system used in Lotus Fords and Cobras. Not recommended for street use. This kit fits 221, 260 and 289 CID V-8's and includes 1 intake manifold, 4 carburetors, 1 water and fuel manifold with appropriate throttle linkage available separately. Available soon.

**FORD PART NUMBER.....C4OZ-6B068-C**
**4-2V Linkage Kit-1963 Falcon—C3DZ-9B843-B**
**4-2V Linkage Kit-1964 Falcon, 1963-64 Fairlane —C4OZ-9B843-C**

### COBRA ENGINE DRESS-UP KITS

Add the racy "Cobra" look with bright finned, polished aluminum valve covers, gleaming chrome air cleaner, filler caps and dip stick. The kits include Valve Cover Kit, oil dip stick, radiator cap, oil filler cap, master cylinder cap and air cleaner cover and filler.

| ENGINE | DRESS-UP KIT PART NUMBER |
|---|---|
| 1963 Falcon 260 CID — 1963 Fairlane 221, 260, 289 CID | C3OZ-6980-A |
| 1964 Falcon 260 CID — 1964 Fairlane 260, 289 CID | C4OZ-6980-A |


### COBRA VALVE COVER KITS

Featuring polished aluminum valve covers, these kits include 2 valve cover assemblies, 12 chrome bolts and 12 chrome washers.

| ENGINE | DRESS-UP KIT PART NUMBER |
|---|---|
| 1963 Falcon 260 CID — 1963 Fairlane 221, 260, 289 CID | C3OZ-6A547-A |
| 1964 Falcon 260 CID — 1964 Fairlane 260, 289 CID | C4OZ-6A547-A |

# V-8's for HIGH PERFORMANCE *continued*

## TIPS AND PRECAUTIONS FOR ALL ENGINES

Although the Cobra Kit line is actually a series of kits, they have been designed for maximum compatibility with each other. The kits provide a wide choice and also separate the equipment into *Street and Competition* or *All-Out Competition* packages. Development emphasis, however, has been for the enthusiast who uses his car for both normal street driving and occasional competition.

Factory clearances, stock High Performance camshaft and conventional mechanically operated distributor are used to obtain significant power increases. Nevertheless, certain preparations—as well as specific precautions—are desirable, no matter which engine you're working with.

- The Cobra dual-point distributor kit with solid wire spark plug leads should be installed to draw the best performance from any of the other Cobra Kits.
- For all-out performance, compound valve springs are necessary and should be matched as closely as possible using a spring tester and shim stock.
- A substitute or altered crankshaft assembly should be rebalanced before installation. If the heavy-duty clutch kit is used, it should be attached before rebalancing.
- For top efficiency, a dual exhaust system should be installed in place of the single one.
- The 289 High Performance connecting rods are desirable for modified 221, 260 and 289 2-V engines (rebalancing of the crankshaft assembly is required).
- The 289 4-V cylinder head and valve assembly may be used without the specially designed "eyebrow-ed" pistons if the correct stock head gaskets are used.
- When fitting 289 4-V cylinder heads to a 289 2-V, 260 or 221 inch block, be sure to use the stock gasket for the engine *block*, not the heads.
- The 289 4-V camshaft can be used in the 221 and 260 engines, and without the 4-V cylinder heads, but care must be taken to use the proper head gasket (proper for the block) to provide sufficient valve clearance.
- The 4-V High Performance cylinder heads are stock, production line parts and are not ported, relieved or polished, but may be machined if desired.
- 289 High Performance exhaust manifolds are not recommended for Falcon installation; extensive reworking of the engine compartment is required.
- Remember to use standard head gaskets designed for the engine block. Thinner ones can cause serious valve and piston damage.
- The Cobra Combination Engine Performance Kit should not be used in cars equipped with automatic transmissions.

### NOTES ON THE 221

Cobra Kits and other 289 High Performance equipment can be installed on the 221 CID engine to produce better than 200 horsepower. However, the smaller displacement of this engine will not allow the power boosts obtainable from highly modified 260 or 289 CID engines.

### NOTES ON THE 260

The stock 289 4-V High Performance camshaft and solid valve lifters can be used with 260 cylinder heads, and the 289 4-V heavy-duty valve springs can be used with stock 260 retainers. Screw-in rocker arm studs are not necessary if operation is held below 6000 RPM.

Caution: The 260 CID cylinder block cannot be bored-out to equal the four-inch bore of the 289 CID block.

The Cobra Induction Kits should be used in combination with the 289 4-V camshaft kit and heavy-duty valve springs to best obtain maximum engine speed, power and reliability.

### NOTES ON THE 289

Although the High Performance 289 V-8 is delivered with a 4-V carburetor, additional carburetion is available if premium performance is desired. Since many performance features are a part of this engine's standard equipment, modification is largely restricted to choosing the proper induction system for the type of operation planned for the car.

## DYNAMOMETER TEST RATINGS

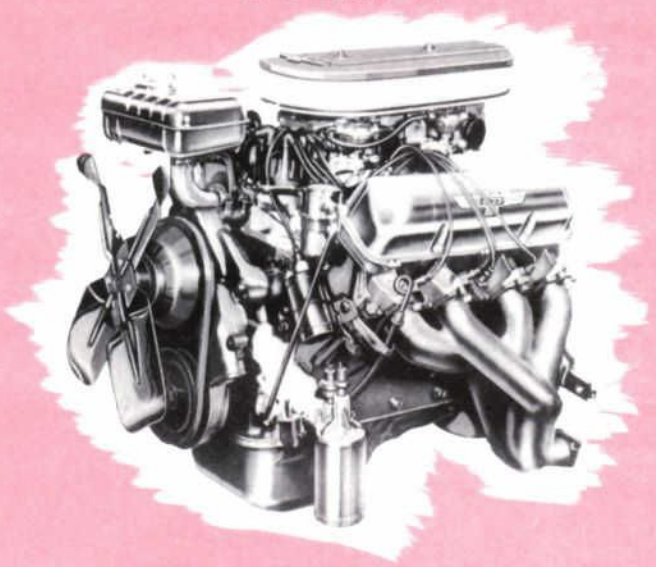
How to use chart below: Choose engine from top of columns at left if you are interested in horsepower—260 engine, Col. A—289 4-V engine, Col. B. Read down left hand column to select HP increase. Then determine components used to gain HP increase by reading across to right. Code letter "A" indicates component listed above was used on 260 engine—code letter "B", component was used on 289 4-V engine. Columns at far right give peak torque obtained using same equipment.

| STOCK RATING HORSEPOWER @ RPM A 260 CID | STOCK RATING HORSEPOWER @ RPM B 289 CID (4-V) | Heavy-duty Distributor spark plug leads | COAZ-12405-A (BF-32) spark plugs | Emission valve plugged | Cobra Cam Kit | Compound valve springs | Cobra Cylinder Head Kit | Reworked 4-V heads: ported, enlarged comb. chambers | Steel shim cyl. head gaskets | 289 4-V High Performance Exh. Manifolds | Competition (tubing) exh. headers | 4-V (1-4V) Induction Kit | 8-V (2-4V) Induction Kit | 6-V (3-2V) Induction Kit | 8-V (4-2V) Weber Kit | Generator disconnected | STOCK RATING PEAK (lbs.-ft.) TORQUE @ RPM A 260 CID | STOCK RATING PEAK (lbs.-ft.) TORQUE @ RPM B 289 CID (4-V) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 141 @ 4500 | 232 @ 5500 | | B | | | | | | | | | B | | | | AB | 227 @ 2500 | 282 @ 4000 |
| 145 @ 4500 | 242 @ 6000 | AB | $AB_1$ | AB | | | | | | | | B | | | | AB | 228 @ 2500 | 289 @ 3500 |
| 161 @ 5000 | 247 @ 5500 | AB | $AB_1$ | AB | A | A | | | B | | | B | | | | AB | 217 @ 3000 | 295 @ 3500 |
| | 249 @ 5500 | B | $B_1$ | B | | | | | B | | B | B | | | | B | 228 @ 4000 | 296 @ 3500 |
| 205 @ 5500 | 276 @ 6000 | AB | $AB_1$ | AB | A | A | | | B | | AB | | B | A | | AB | 232 @ 3500 | 285 @ 4000 |
| 220 @ 5500 | 286 @ 6500 | AB | $AB_1$ | AB | A | A | | B | B | | AB | AB | | | | AB | 228 @ 3500 | 286 @ 4500 |
| 211 @ 5500 | 314 @ 6500 | AB | $AB_1$ | AB | A | | A | B | B | | AB | | | A | | AB | 230 @ 4000 | 286 @ 4500 |
| 207 @ 6000 | 345 @ 6500 | AB | A | AB | A | | A | B | B | A | B | | | A | B | AB | 232 @ 3500 | 286 @ 4500 |
| 213 @ 6000 | | A | A | A | A | | A | | | | A | | | A | | A | 230 @ 3500 | 313 @ 5000 |
| 222 @ 5500 | | A | A | A | A | A | | | | | A | A | | | | | 240 @ 4000 | |
| 225 @ 5500 | | A | A | A | A | | A | | | | A | A | | | | | 244 @ 4000 | |

1. The 289 4-V engine used Autolite type BTF-1 (Ford Part No. C2AZ-12405-B) spark plugs up to 276 hp; higher readings were obtained using type BF-603.

**COBRA ENGINE AND DRESS-UP KITS ARE AVAILABLE THROUGH YOUR FORD DEALER. FOR ADDITIONAL DETAILS CHECK AT YOUR DEALER'S PARTS DEPARTMENT.**

# 1964½ 427 CID ENGINE AND OTHER SPECIAL ORDER HIGH PERFORMANCE PARTS



On this and the following page is a listing of Ford Special Order High Performance equipment to assist high performance enthusiasts who wish to service vehicles or prepare their own vehicles for various competitive activities.

You can order these special components through your local Ford Dealer.

**1964½—427 CUBIC INCH HIGH RISER ENGINE SPECIAL PARTS LISTING**

| 4V Engine | 8V Engine | Special Order Part Number | Description | Quantity Per Unit |
|---|---|---|---|---|
| X | X | C1AE-6010-J | Block Assembly | 1 |
| X | X | C1AE-6049-F | Head | 2 |
| X | | C1AE-6110-S | Piston | 8 |
| | X | C3AE-6110-BJ | Piston | 8 |
| | X | C3AE-6150-C | Ring Top | 8 |
| X | | C1AE-6150-A | Ring Top | 8 |
| | X | C3AE-6152-C | Ring Compression | 8 |
| X | | C1AE-6152-A | Ring Compression | 8 |
| | X | C3AE-6159-A | Segment Oil Ring | 16 |
| X | | C1AE-6159-A | Segment Oil Ring | 16 |
| | X | C3AE-6161-C | Expander Oil Ring | 8 |
| X | | C1AE-6161-A | Expander Oil Ring | 8 |
| X | X | C1AE-6200-C | Connecting Rod (7000 RPM) | 8 |
| X | X | C1AE-6211-A | Bearing Connecting Rod | 16 |
| X | X | C1AE-6214-G | Bolt—Connecting Rod—(7000 RPM) | 16 |
| | X | C1AE-6250-B | Camshaft | 1 |
| X | X | C1AE-6300-C | Crankshaft Assy. (7000 RPM) | 1 |
| X | | C1AE-6303-G | Crankshaft | 1 |
| X | X | C1AE-6333-A | Bearing—Crankshaft—Red—(7000 RPM) | 8 |
| X | X | C1AE-6333-B | Bearing—Crankshaft—Blue—(7000 RPM) | 8 |
| X | X | C1AE-6333-G | Bearing Crankshaft | 8 |
| X | X | C1AE-6337-T | Bearing Crankshaft—Red—(7000 RPM) | 2 |
| X | X | C1AE-6337-U | Bearing Crankshaft—Blue—(7000 RPM) | 2 |
| X | X | C1AE-6337-AB | Bearing Crankshaft | 2 |
| X | X | C1AE-6A338-A | Bearing Crankshaft—Thin Wall—(7000 RPM) | 2 |
| X | X | C1AE-6A339-C | Bearing Crankshaft—Thin Wall—(7000 RPM) | 2 |
| X | X | C1AE-6500-C | Tappet | 16 |
| X | X | C3AE-6505-N | Valve Exhaust | 8 |
| X | X | C1AE-6505-E | Valve Exhaust (7000 RPM) | 8 |
| X | X | C3AE-6507-J | Valve Intake | 8 |
| X | X | C1AE-6507-J | Valve Intake (7000 RPM) | 8 |
| X | X | C1AE-6524-B | Baffle | 2 |
| X | X | C3AE-6A527-A | Bolt | 8 |
| X | X | C3AE-6531-A | Support | 8 |
| X | X | C3AE-6563-B | Shaft | 2 |
| X | X | C3AE-6571-D | Seal | 16 |
| X | X | C1AE-6622-D | Pick-up Tube | 1 |
| X | X | C1AE-6675-L | Oil Pan | 1 |
| X | X | C1AE-6714-A | Oil Filter (7000 RPM) | 1 |
| X | X | C1AE-6A829-A | Tab Oil Pick-up | 1 |
| X | X | C1AE-6A829-B | Tab Oil Pick-up | 1 |
| X | | C1AE-9A274-B | Tube Fuel Filter | 1 |
| X | | C1AE-9424-G | Intake Manifold | 1 |
| X | X | C1AE-9A424-A | Seal—Manifold—Rear | 1 |
| X | X | C1AE-9A425-A | Seal—Manifold—Front | 1 |
| | X | C1AE-9424-F | Intake Manifold | 1 |
| X | | C1AE-9D281-B | Hose Carburetor Fuel | 1 |
| X | X | C3AE-9439-A | Gasket—Intake Manifold | 2 |
| X | | C1AE-9447-B | Gasket—Carburetor to Manifold | 1 |
| X | | C1AE-9447-C | Gasket—Carburetor to Manifold—(7000 RPM) | 1 |
| X | | C1AF-9510-DA | Carburetor | 1 |
| X | | C1AF-9510-DT | Carburetor—(7000 RPM) | 1 |
| | X | C1AF-9510-CU | Carburetor Primary | 1 |
| | X | C1AF-9510-CV | Carburetor Secondary | 1 |
| X | | 376515-S | Clamp—Fuel Hose | A R |
| X | | 88376-S8 | Stud—Carburetor to Manifold | A R |
| X | X | C3AE-6051-BS | Head Gasket—Stainless Steel—Right Hand | 1 |
| X | X | C1AE-6051-BS | Head Gasket—Stainless Steel—Left Hand | 1 |

| Engine Assembly | Application |
|---|---|
| C4AE-6007-H 359-A1 | 4V-Standard Transmission |
| C4AE-6007-J 359-B1 | 4V-Standard Transmission (7000 RPM) |
| C4AE-6007-H 361 A2 | 8V-Automatic Transmission |
| C4AE-6007-H 361-A3 | 8V-Standard Transmission |

## 1964 FORD AND FAIRLANE 427 C I DRAG STRIP REAR AXLE SPECIAL ORDER PARTS

| Special Order Part Number | Description |
|---|---|
| C40W-4725-A | Axle Shaft—Left Hand |
| C40W-4234-A | Axle Shaft—Right Hand |
| C2AW-4017-A | Carrier Assembly |
| C2AW-4204-D | Case—Differential Gear |
| WAB-44205-A | Seat—Differential Pinion Shaft |
| WAB-44207-A | Shaft—Differential Pinion |
| WAC-4221-A | Cone & Roller |
| WAC-4222-A | Cup—Differential Bearing |
| C1AW-4662-F | Spacer—Pinion Bearing (.466) |
| C4AW-4662-G | Spacer—Pinion Bearing (.468) |
| C4AW-4662-H | Spacer—Pinion Bearing (.470) |
| C4AW-4662-J | Spacer—Pinion Bearing (.472) |
| C4AW-4662-K | Spacer—Pinion Bearing (.474) |
| C4AW-4662-L | Spacer—Pinion Bearing (.476) |
| C4AW-4662-M | Spacer—Pinion Bearing (.478) |
| C4AW-4662-N | Spacer—Pinion Bearing (.480) |
| C4AW-4662-R | Spacer—Pinion Bearing (.482) |
| AF-4616-A | Cup—Pinion Gear Bearing |
| C4AW-4630-A | Cone & Roller—Pinion Gear Bearing |
| WAA-4616-A | Cup—Pinion Gear Front Bearing |
| WAA-4621-A | Cone & Roller Pinion Gear Front |
| C4AW-4851-A | Flange Assembly—Universal Joint (Axle End) |
| C3AW-4010-F | Housing Assembly—Rear Axle |
| C3OW-4010-J | Housing Assembly—Rear Axle |
| C4AW-4204-A | Case Assembly—Differential Gear |
| C4AW-4234-A | Axle Shaft—Right Hand |
| C1AW-4725-A | Axle Shaft—Left Hand |

## 1964 FAIRLANE AND GALAXIE DRAGSTER SPECIAL ORDER BODY PARTS

| Special Order Part Number | Description | Fairlane | Galaxie |
|---|---|---|---|
| GF-3-X | Cooler Line | | X |
| GF-4-X | Cooler Line | | X |
| W-11 | Front Vent Window (Plexiglass) | X | |
| W-21 | Front Door Window (Plexiglass) | X | |
| W-31 | Rear Side Window (Plexiglass) | X | |
| W-40 | Rear Window (Plexiglass) | X | |
| XC-46-688 | Clutch Disc—Aluminum Back | X | X |
| ATL-64-G | Air Tube—Left Hand (Fiberglass) | | X |
| ATR-64-G | Air Tube—Right Hand (Fiberglass) | | X |
| B-64-FF | Front Bumper (Fiberglass) | X | |
| H-64-FF | Hood—(Fiberglass) | X | |
| H-64-G | Hood—(Fiberglass) | | X |
| LH-64-FF | Fender—Left Hand (Fiberglass) | X | |
| RH-64-FF | Fender—Right Hand (Fiberglass) | X | |
| SR-64-G | Shift Rod | | X |
| 427 | Engine Gasket | X | |
| HE-647 | Radiator | | X |
| S-4116 | Gasket—Exhaust Manifold | X | |
| C4AW-4602-G | Driveshaft—Automatic | | X |
| C40A-4602-B | Driveshaft—Automatic | X | |
| C40A-4602-C | Driveshaft—Standard | X | |
| C3AE-6750-L | Dipstick | X | X |
| C4AE-6758-C | Breather Tube | X | X |
| C4AA-7093-E | Standard Transmission | | X |
| C4AE-8620-J | Fan Belt | X | X |
| C4AF-9600-BD | Air Cleaner (4V) | | X |
| MT-9600-A | Air Box (8V) | X | |
| C4AF-9601-C | Air Cleaner Element (4V) | | X |
| C4ZF-9651-A | Gasket-Air Cleaner (4V) | | X |
| 29905-XX | Bucket Seat | X | |
| XA-560732 | Standard Transmission | X | |
| 5071000 | Air Box (8V) | | X |

## "HX" AUTOMATIC TRANSMISSION FAIRLANE AND GALAXIE DRAGSTER SPECIAL ORDER PARTS

| Special Order Part Number | Description |
|---|---|
| C1AP-7A256-D | Lever Assembly Manual Control |
| C4AP-7A096-A | Output Shaft and Ring Gear Assembly |
| C4AP-7C053-B | Governor Assembly |
| C4AP-7902-E | Convertor Assembly |
| C4AP-7A100-F | Main Control Assembly |
| C4AP-7000-U | Automatic Transmission Assembly |

## GALAXIE DRAGSTER—FOUR SPEED STANDARD TRANSMISSION C4AA-7003-E SPECIAL ORDER PARTS

| Special Order Part Number | Description |
|---|---|
| SK-1516-QY-8 | Countershaft Gear |
| SK-1516-QY-11 | Third Speed Gear |
| SK-1516-QY-16 | Main Drive Gear |

ALL OTHER COMPONENTS FOR GALAXIE DRAGSTER TRANSMISSION ARE THE SAME AS THE CATALOGUED FOUR SPEED GALAXIE TRANSMISSION

## FAIRLANE DRAGSTER—FOUR SPEED STANDARD TRANSMISSION XA-560732 SPECIAL ORDER PARTS

| Special Order Part Number | Description |
|---|---|
| *C3AZ-7006-DSO | Transmission Case (Aluminum) |
| *C3AZ-7A039-DSO | Transmission Extension (Aluminum) |
| T-10K-16B | Main Drive Gear |
| SK-4516-RB-8A | Countershaft Gear |
| SK-4516-RB-11A | Third Speed Gear |
| SK-4516-RB-31A | Second Speed Gear |

*CAN ALSO BE USED WITH GALAXIE FOUR SPEED TRANSMISSION. ALL OTHER COMPONENTS FOR FAIRLANE DRAGSTER TRANSMISSION ARE THE SAME AS THE CATALOGUED FOUR SPEED FAIRLANE TRANSMISSION.

## *Special For Ford 352, 390, 406 and 427 Blocks*

### HIGH PERFORMANCE KIT

Specially designed to give 390, 406 and 427 CID Ford blocks more power and performance, this kit features three 2-venturi carburetors on a precision-cast aluminum intake manifold—plus special air cleaner. Mechanically operated linkage uses one carburetor for economy, or cuts in the other two for maximum speed.

**Ford Part Number. C4AZ-6B068-A**

### ENGINE DRESS-UP KIT

For 352, 390, 406 or 427 CID engines. The kit includes gleaming valve covers, air cleaner cover and oil breather cap, brake master cylinder cover, dip stick, radiator cap, fuel filter and fan guard shroud. All of the components are finished in chrome.

**Ford Part Number. C4AZ-6980-A**

# More MUSTANG SPECIFIC

In addition to the Specifications published in the April-May issue of SHOP TIPS, here are some additional specifications to aid you in servicing the new Ford Mustang.

## LUBRICATION CHARTS AND SPECIFICATIONS

| ITEM | FORD PART NUMBER | PART NAME | FORD SPECIFICATION | ALTERNATE LUBRICATION |
|---|---|---|---|---|
| Body Hinges | C0AZ-19553-A | Rotunda Silicone Lubricant | M-99C40-A or B | |
| Brake Master Cylinder | B7AZ-19542-A | Rotunda Heavy-Duty Brake Fluid | M-3833-D | Alternate fluid must meet SAE J70B specifications for 70R3 type extra heavy-duty brake fluid. |
| Distributor Cam | | Distributor Cam Grease | M-1C-66-A | Use a good high temperature No. 2 grade sodium soap grease. |
| Distributor Wick and Bushing | | Engine Oil—SAE 10W | | |
| Front Suspension Ball Joints | C1AZ-19590-B | FoMoCo Ball Joint Grease | M-1C47 | Substitute must meet Ford Specification. |
| Front Wheel Bearings | C2AZ-19585-A | FoMoCo Wheel Bearing Grease | ESA-M-1C60-A | Substitute must meet Ford Specification. |
| Hood Latch and Safety Catch | C0AZ-19553-A | Rotunda Silicone Lubricant | M-1C93A | Substitute must meet Ford Specification. |
| Lock Cylinders | B4A-19587-A | Rotunda Lock Lubricant | ESB-M-2C20-A | Substitute must meet Ford Specification. |
| Rear Axle | C2AZ-19590-A | FoMoCo Hypoid Gear Lubricant | M-2C50B*† | Substitute must meet Ford Specification. |
| Steering Gear Housing (Manual or Power) | C3AZ-19518-A | FoMoCo Special Steering Gear Grease | ESW-M-1C87-A | A good lithium base grease No. 1 grade may be used to "add to" factory fill. |
| Steering—Power (Pump Reservoir) Convertible Top Reservoir | C1AZ-19582-A | Rotunda Automatic Transmission Fluid | M2C33-C or -D | Automatic transmission fluid marked "TYPE A, SUFFIX A" may be used to "add to" factory fill. |
| Transmission (Automatic) | C1AZ-19582-A | Rotunda Automatic Transmission Fluid | M2C33-C or -D | Only one quart of Automatic transmission fluid marked "TYPE A, SUFFIX A" may be used to "add to" factory fill. |
| Transmission (Manual Shift) | C3RZ-19C547-B | Rotunda Manual Transmission Lubricant | M-568-D | Reputable SAE 80 grade mild extreme pressure type lubricant can be used to "add to" factory fill. |
| Universal Joints | C1AZ-19586-B | FoMoCo Universal Joint Lubricant | M-1C57 | Substitute lubricant must conform to Ford Specification. |

*SAE 90 grade lubricants are recommended for all temperatures above −25° F. For temperatures below −25° F. the same type of lubricant but of SAE 80 grade should be used.
†For all cars equipped with Equa-Lock axles, use M-2C50-B, plus one ounce of M-2C58-A (Ford Part Number C1AA-19B546-A) additive per pint of M-2C50-B.

## SUSPENSION

### FRONT WHEEL ALIGNMENT SPECIFICATIONS (at Curb load)

| CAR LINE | CHECKING SPECIFICATIONS | | | OPTIMUM RE-SETTING SPECIFICATIONS |
|---|---|---|---|---|
| | MINIMUM | MAXIMUM | MAXIMUM VARIATION BETWEEN WHEELS | Desired Alignment |
| MUSTANG | | | | |
| Caster—6 Cyl. | +¾° | +1¾° | ½° | +1¼° |
| Caster—8 Cyl. | −¼° | +¾° | ½° | +¼° |
| Camber—6 Cyl. & 8 Cyl. | 0° | +1° | ½° | +½° |
| Toe-In | ¼ In. | 5/16 In. | — | 3/32 In. |
| King Pin Angle | | | | 7-(at +½° camber) |
| Turning Angle of Outside Wheel with Inside Wheel Turned 20° | | | | |
| 6 Cyl. Engine—Std./Steering | 19° | 19¼° | — | 19⅛° |
| 6 Cyl. Engine—Power/Steering | 20° | 20¼° | — | 20⅛° |
| V-8 Engine—Std./Steering | 18¼° | 19° | — | 18⅝° |
| V-8 Engine—Power Steering | 18¼° | 19° | — | 18⅝° |

CATIONS

# CARBURETORS

## IDENTIFICATION

The basic part number of all the carburetors is 9510. The part number prefix and suffix appears on the identification tag mounted on the air horn.

| ENGINE | TRANSMISSION | CARBURETOR PART NO. |
|---|---|---|
| 170 Six | Manual-Shift | C4ZF-9510-J |
| 170 Six | Automatic | C4ZF-9510-K |
| 260 V-8 | Manual-Shift | C4ZF-9510-F |
| 260 V-8 | Automatic | C4ZF-9510-E |
| 289 V-8 | Manual-Shift | C4GF-9510-AE |
| 289 V-8 | Automatic | C4GF-9510-AF |

## FORD SINGLE BARREL CARBURETORS

**THROTTLE BORE DIAMETER—Inches**
C4ZF-9510-J and K ..... 1 7/16

**VENTURI DIAMETER—Inches**
C4ZF-9510-J and K ..... 1.100

**MAIN METERING JET IDENTIFICATION NUMBER**
C4ZF-9510-J
- 0-5,000 Feet ..... 60F
- 5,000-10,000 Feet ..... 58F
- 10,000-15,000 Feet ..... 56F

C4ZF-9510-K
- 0-5,000 Feet ..... 59F
- 5,000-10,000 Feet ..... 57F
- 10,000-15,000 Feet ..... 55F

**SPARK CONTROL VALVE—C4ZF-9510-J and K**
Identification Color ..... Plain
Valve Closes @ Inches of Mercury ..... 6.0

**CHOKE PLATE PULLDOWN CLEARANCE—Inches**
C4ZF-9510-J and K ..... 5/64

**ACCELERATOR PUMP CLEARANCE—C4ZF-9510-J and K**
3/16 inch from the pump cover surface to the pin in "HI" position with the throttle plate seated in the throttle bore.

**INITIAL IDLE MIXTURE ADJUSTMENT—C4ZF-9510-J and K**
1-1½ turns back from bottomed needle.

**FAST IDLE CAM SETTING**
Clearance between throttle plate and throttle bore with fast idle screw just contacting fast idle cam.
C4ZF-9510-J and K ..... #76 drill or 0.020 inch

## FORD DUAL CARBURETORS

**THROTTLE BORE DIAMETER—Inches**
C4ZF-9510-E and F ..... 1 7/16

**VENTURI DIAMETER—Inches**
C4ZF-9510-E and F ..... 1.010

**BOOSTER VENTURI CODE LETTER—**
- C4ZF-9510-E ..... CA
- C4ZF-9510-F ..... CD

**MAIN METERING JET IDENTIFICATION NO.**
C4ZF-9510-E
- 0-5,000 Feet ..... 42F
- 5,000-10,000 Feet ..... 40F
- 10,000-15,000 Feet ..... 38F

C4ZF-9510-F
- 0-5,000 Feet ..... 43F
- 5,000-10,000 Feet ..... 41F
- 10,000-15,000 Feet ..... 39F

**POWER VALVE—C4ZF-9510-E and F**
Identification Color
- 0-5,000 Feet ..... Green
- 5,000-10,000 Feet ..... Yellow
- 10,000-15,000 Feet ..... Black

Opens @ Inches of Mercury ..... 6.5-8.5

**CHOKE PLATE PULLDOWN CLEARANCE—Inches**
C4ZF-9510-E and F ..... 5/64

**FAST IDLE CAM SETTING**
Clearance between choke plate and air horn with fast idle screw on the kickdown step (index mark) of the fast idle cam.
- C4ZF-9510-E ..... 1/16 inch
- C4ZF-9510-F ..... 3/32 inch

## FORD FOUR BARREL CARBURETORS

**BOOSTER VENTURI CODE LETTER**
C4GF-9510-AE and AF
- Primary ..... KE
- Secondary ..... BA

**MAIN METERING JET IDENTIFICATION NO.**
Primary
C4GF-9510-AE
- 0-5,000 Feet ..... 48F
- 5,000-10,000 Feet ..... 46F
- 10,000-15,000 Feet ..... 44F

C4GF-9510-AF
- 0-5,000 Feet ..... 45F
- 5,000-10,000 Feet ..... 43F
- 10,000-15,000 Feet ..... 41F

Secondary
C4GF-9510-AE and AF
- 0-5,000 Feet ..... 56F
- 5,000-10,000 Feet ..... 54F
- 10,000-15,000 Feet ..... 52F

**THROTTLE BORE DIAMETER—Inches**
C4GF-9510-AE and AF
- Primary and Secondary ..... 1 9/16

**VENTURI DIAMETER—Inches**
C4GF-9510-AE and AF
- Primary ..... 1.08
- Secondary ..... 1.19

**POWER VALVE—C4GF-9510-AE and AF**
Identification Color
- 0-5,000 Feet ..... Plain
- 5,000-10,000 Feet ..... Green
- 10,000-15,000 Feet ..... Yellow

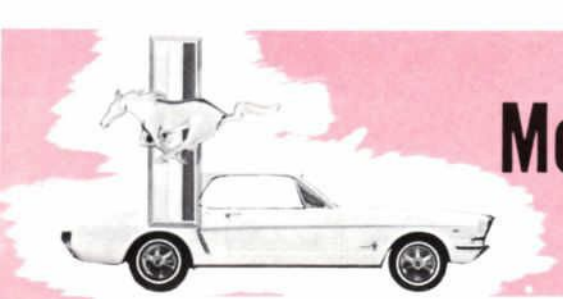
Timing—Opens @ Inches of Mercury ..... 7.5-9.5

**CHOKE PLATE PULLDOWN CLEARANCE—Inches**
- C4GF-9510-AE ..... 9/64
- C4GF-9510-AF ..... 1/8

**DRY FLOAT SETTING—C4GF-9510-AE and AF**
7/16-15/32 inch from the machined surface of the main body to the top of the free end of the float, with the float in the uppermost position.

**INITIAL IDLE MIXTURE ADJUSTMENT—C4GF-9510-AE and AF**
1-1½ turns back from the bottomed needle.

**FAST IDLE CAM SETTING**
Clearance between choke plate and air horn with fast idle screw on the kickdown step (index mark) of the fast idle cam.
- C4GF-9510-AE ..... 1/8 inch
- C4GF-9510-AF ..... 7/64 inch



# More MUSTANG SPECIFICATIONS

*continued*

## DISTRIBUTORS

ADVANCE CHARACTERISTICS

Note: The advance characteristics given apply to the distributor with the indicated number only. The distributor number is stamped on the distributor housing or on a plate attached to the distributor housing.

### 170 Six (Distributor No. C4ZF-12127-A Used with Manual-Shift Transmission)

VACUUM ADVANCE. Set the test stand to 0° at 250 rpm and 0 inches of mercury.

| Distributor (rpm) | Advance (Degrees) | Vacuum (Inches of Mercury) |
|---|---|---|
| 800 | 1¼-2¼ | 0.80 |
| 1200 | 6-7 | 1.80 |
| 1600 | 8½-9¾ | 3.00 |
| 2000 | 10-11¼ | 3.90 |

Maximum Advance Limit ..... 15°

### 170 Six (Distributor No. C4DF-12127-B Used with Automatic Transmission)

VACUUM ADVANCE. Set the test stand to 0° at 250 rpm and 0 inches of vacuum.

| Distributor (rpm) | Advance (Degrees) | Vacuum (Inches of Mercury) |
|---|---|---|
| 500 | 1-2 | 0.35 |
| 800 | 3¼-4¼ | 0.80 |
| 1200 | 6¼-7¼ | 1.80 |
| 1600 | 8¼-10½ | 3.11 |
| 2000 | 9½-10¾ | 3.90 |

Maximum Advance Limit ..... 14°

### 260 V-8 (Distributor No. C4ZF-12127-B Used with Manual-Shift Transmission)

CENTRIFUGAL ADVANCE. Set the test stand at 0° at 250 rpm and 0 inches of mercury.

| Distributor (rpm) | Advance (Degrees) | Vacuum (Inches of Mercury) |
|---|---|---|
| 700 | 1¼-2¼ | 0 |
| 800 | 3-4 | 0 |
| 1200 | 6-7¼ | 0 |
| 1600 | 8¼-9½ | 0 |
| 2000 | 8¼-10¼ | 0 |

Maximum Advance Limit ..... 10¼°

VACUUM ADVANCE. Set the test stand to 0° at 1000 rpm and 0 inches of mercury.

| Distributor (rpm) | Advance (Degrees) | Vacuum (Inches of Mercury) |
|---|---|---|
| 1000 | 1-4 | 7 |
| 1000 | 4-7 | 9 |
| 1000 | 7-10 | 12 |
| 1000 | 9½-12½ | 20 |

Maximum Advance Limit ..... 12½°

### 260 V-8 (Distributor No. C4ZF-12127-E Used with Automatic Transmission)

CENTRIFUGAL ADVANCE. Set the test stand to 0° at 250 rpm and 0 inches of mercury.

| Distributor (rpm) | Advance (Degrees) | Vacuum (Inches of Mercury) |
|---|---|---|
| 1000 | 1-2 | 0 |
| 1500 | 5-6 | 0 |
| 2000 | 9-10 | 0 |

VACUUM ADVANCE. Set the test stand to 0° at 1000 rpm and 0 inches of mercury.

| Distributor (rpm) | Advance (Degrees) | Vacuum (Inches of Mercury) |
|---|---|---|
| 1000 | 1-4 | 8 |
| 1000 | 5½-8½ | 12 |
| 1000 | 7½-10½ | 16 |
| 1000 | 8-11 | 20 |

Maximum Advance Limit ..... 11°

### 289 V-8 (Distributor No. C4ZF-12127-C Used with Manual-Shift Transmission)

CENTRIFUGAL ADVANCE. Set the test stand to 0° at 250 rpm and 0 inches of mercury.

| Distributor (rpm) | Advance (Degrees) | Vacuum (Inches of Mercury) |
|---|---|---|
| 500 | ¼-1¼ | 0 |
| 800 | 5-6 | 0 |
| 1200 | 7-8¼ | 0 |
| 1600 | 7¾-9 | 0 |
| 2000 | 8½-10 | 0 |

VACUUM ADVANCE. Set the test stand to 0° at 1000 rpm and 0 inches of mercury.

| Distributor (rpm) | Advance (Degrees) | Vacuum (Inches of Mercury) |
|---|---|---|
| 1000 | 2-5 | 8 |
| 1000 | 7-10 | 12 |
| 1000 | 9-12 | 16 |
| 1000 | 9½-12½ | 20 |

Maximum Advance Limit ..... 12½°

### 289 V-8 (Distributor No. C4GF-12127-B Used With Automatic Transmission)

CENTRIFUGAL ADVANCE. Set the test stand at 0° at 250 rpm and 0 inches of vacuum.

| Distributor (rpm) | Advance (Degrees) | Vacuum (Inches of Mercury) |
|---|---|---|
| 600 | 1-2 | 0 |
| 700 | 3-4¼ | 0 |
| 990 | 6-6¾ | 0 |
| 1500 | 8-9¼ | 0 |
| 2000 | 9¼-11 | 0 |

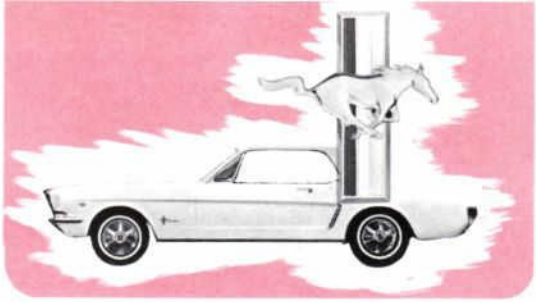
Maximum Advance Limit ..... 11°

VACUUM ADVANCE. Set the test to 0° at 1000 rpm and 0 inches of vacuum.

| Distributor (rpm) | Advance (Degrees) | Vacuum (Inches of Mercury) |
|---|---|---|
| 1000 | 2-5 | 8 |
| 1000 | 7-10 | 12 |
| 1000 | 9-12 | 16 |
| 1000 | 9½-12½ | 20 |

Maximum Advance Limit ..... 12½°

# Mustang Towing and Hoisting Procedures



## TOWING

If it is ever necessary to tow the Mustang, it is important that the towing chains be fastened only to the front suspension lower arms, using suitable wood block spacers beneath the underbody so that the towing chain or cable does not bear on the body lower panels or bumpers. (Figure 1). These spacers are 4-inch by 4-inch wood beams approximately 55 inches long. It is important that they rest on the body rails just behind the body lower panel. *Do not lift the car by the front or rear bumpers.* Make sure that the parking brake is released and the gear selector is in neutral position. It is important to know that the transmission and rear axle are in proper working order before towing.

*Figure 1—Towing the Mustang—Front View*

To tow the Mustang by the rear end, the chains are hooked around the rear axle housing. Before lifting, place 4-inch by 4-inch wood beams between the chains and under side of the car. The wood beams should be longer than the distance between the rear springs or approximately 55 inches long. (Figure 2).

If the Mustang is to be towed with the rear wheels raised, a locking device should be installed to hold the front wheels in a straight-ahead position. If the Mustang must be towed with the rear wheels on the ground, do not exceed 30 m.p.h., or a distance of 15 miles. If this speed or distance has to be exceeded, it is best to disconnect the drive shaft.

*Figure 2—Towing the Mustang—Rear View*

## HOISTING

The unitized body-frame construction requires special precautions and procedures when the car is jacked up or hoisted. In some cases, special hoist adapters must be used as recommended by specific hoist manufacturers.

### Drive-On Type Hoist

To prevent possible damage to the underbody, do not drive the car onto the drive-on type hoist without first checking for possible interference between the upright flanges of the hoist rails and the underbody. Should there be interference, the hoist flanges should be modified as necessary and or the approach ramps built up to provide the needed clearance.

### Rail Type—Free Wheeling Hoist

**Front**—The front adapters or hoist plates must be carefully positioned in contact with the lower suspension arms to assure safe, secure lifting (Figure 3).

—The hoist adapters must be positioned carefully under the rear axle to prevent damage to the shock absorbers when the car is raised. The hoist rails should be raised slowly and the position of the adapters checked (Figure 4).

### Fork Lift—Twin Post Hoist

—To assure safe hoisiting, the front post adapters must be positioned carefully to contact the center of the lower suspension arms (Figure 3).

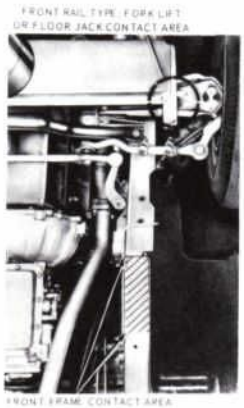



*Figure 3—Hoisting the Mustang Front Contact Areas*

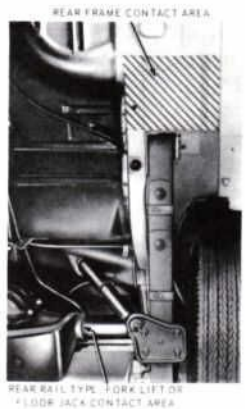



*Figure 4—Hoisting the Mustang Rear Contact Areas*

**Rear**—To prevent damage to the shock absorbers, the rear forks must contact the axle at points not farther outboard than one inch from the circumference welds near the differential housing. Carefully raise the rear post and check the position of the fork (Figure 4).

### Frame Contact Hoist

Frame contact hoist adapters are necessary to lift the car. Figures 3 and 4 show recommended contact points for the hoist pads.

# Recommended Mounting Procedures for Tractor Fifth Wheels

The fifth wheel mounting practices of the trucking industry point out the fact that, although the fifth wheel is a common device, its mounting can too easily be taken for granted. Improper methods and practices of fifth wheel mounting can lead to frame siderail damage through unevenly distributed stresses introduced by load and chassis movement.

Improper practices of installing a fifth wheel on a truck frame can often result in problems that affect reliability and performance of the vehicle.

Particular emphasis must be placed upon the forward offset of the kingpin to rear axle centerline or bogie centerline. Stress analysis of different tractor models with lightweight frames has fixed a recommended maximum forward offset of 24 inches.

Fastening reinforcement or step blocks directly to frame sidemember flanges is a practice often used but not recommended. Stress concentration caused by notches, drilling or welding on the siderail flange must be avoided. Mounting the fifth wheel supports directly to the frame sidemembers without reinforcements can result in unevenly distributed loads. This practice should be avoided.

Misapplication of fifth wheel support reinforcements can contribute to unevenly distributed stresses due to load and chassis movement. The reinforcements must not result in abrupt section changes nor cause a stress concentration by having a sharp edge lying across the sidemember flange. The reinforcements or height spacers should extend beyond the next forward crossmember, or a minimum of 20 inches from the centerline of the fifth wheel. The rearward end of the spacer should extend beyond the rear spring hanger bracket. When U-bolt mountings are used, spacers should be fastened inside the frame channel to prevent collapse of the sidemember.

The following illustrates four recommended practices for mounting fifth wheels for Ford trucks. Use of the recommended practices avoids:

- Welding to frame sidemembers
- Mounting fifth wheel directly to frame sidemembers
- Mutilating sidemembers and crossmembers
- Adding reinforcements that result in abrupt section changes
- Attaching stop blocks directly to frame sidemember flange

Figure 1 demonstrates a recommended method of mounting fifth wheels that makes a mounting plate unnecessary. The inner and outer angles are installed to allow load distribution over the forward spring hanger bracket. Stop blocks are not required with this method of mounting. It may be necessary to remove a portion of the angle to provide clearance for the hanger. Reinforcement should be added to the angle to compensate for the material removed.

Figure 2 shows another acceptable method of mounting that does not require a mounting plate. The fifth wheel is bolted to angle reinforcements that are bolted to the web of the frame sidemember. The angles extend over the forward spring hanger bracket. Stop blocks are welded to the angles.

Figure 3 illustrates a fifth wheel bolted to a corrugated mounting plate resting on the I-beam support spacers which extend over the spring brackets. The I-beam supports are anchored to the frame sidemembers. Stop blocks are welded to the I-beams as shown. Skid ramps are supported by a crossmember that is welded to the I-beams at each end. Spacers must be used between sidemember flanges to prevent collapse of the sidemember when the U-bolts are tightened. The mounting is easily adapted to a sliding fifth wheel design.

Figure 4 shows the fifth wheel bolted to a mounting plate secured to the sidemembers on wood runners. The runners which are made of oak must extend beyond the spring front hanger brackets. The fifth wheel mounting plate is prevented from shifting fore and aft by the straps attached to the rear crossmember of the frame. The mounting is also adaptable to a sliding fifth wheel design.

All recommended practices of fifth wheel mountings limit the forward offset of the kingpin to the rear axle or bogie centerline to 24 inches or less.

The recommended length of frame reinforcements should be 44 inches forward of the axle or bogie centerline and extend rearward over the rear spring hanger brackets.

All fifth wheel mounting bolts, including those provided by the fifth wheel supplier, should be of heat treated steel. Self-locking nuts or heavy duty lock-washers with plain nuts should be used in close toleranced holes. Bolt threads should not extend into shear areas of the connections.

*Figure 1*

*Figure 2*

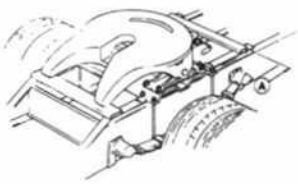


*Figure 3*

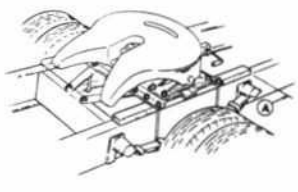


*Figure 4*

*Figure 1—The fifth wheel is bolted to the angle reinforcements. The angles are bolted to the frame web as shown. Spacers are added on inside angles to compensate for frame flange thickness.*

*Figure 2—The fifth wheel is bolted to the angle reinforcements slipped over the frame. The angles are bolted to the frame web. Stop blocks are welded to the angles as shown.*

*Figure 3—The fifth wheel is bolted to the corrugated mounting plate resting on the I-beam support spacer and anchored to the tractor frame by U-bolts. Stop blocks are welded to the I-beams as shown. Skid ramps are supported by a cross-member which is welded to the I-beams at each end.*

*Figure 4—The fifth wheel is bolted to the corrugated mounting plate. U-bolts secure the plate to the tractor frame on wood runners. Shifting is prevented by tie straps which are attached to the crossmember of the frame.*

POINT (A) IS TO BE 44" FORWARD OF REAR AXLE OR BOGIE CENTERLINE

# Detonation—Its Causes and Effects

Automotive engineers and technicians agree that detonation can be a major cause of many types of engine damage.

The results of detonation are usually loss of power, loss of fuel economy, excessive heat in the combustion chamber, and ultimately mechanical damage such as eroded or burned pistons, valves, cylinder walls, and cylinder heads, as well as broken piston rings.

You can do your customers a service by watching for signs of detonation during normal servicing and pointing them out so as to prevent expensive repairs or replacement of engine components in the future. The following information may be helpful.

When an engine emits an audible metallic sound, often identified as a "ping" or "spark knock," a form of detonation has occurred. The noise may result from combustion forces acting against the upward stroke of the piston, as in too early ignition of the fuel mixture due to improper spark timing or hot spots in the combustion chamber. A fuel having too low an octane rating for the engine will burn too rapidly, likewise, expending its force against the upward moving piston.

The detonation noise may also be the result of the collision of two flame fronts burning from opposite ends of the combustion chamber as the result of spark and hot spot ignition occurring simultaneously.

The illustrations on this page show some of the results of detonation. The most common causes are improper timing, poor carburetor efficiency, use of too low an octane gasoline, cracked or warped manifolds or removing too much stock from the gasket surface of the cylinder head when reworking engines. The following areas are places where frequent checking and preventive maintenance can help to prolong engine life and maintain efficiency.

**Distributor:** Proper timing is most important in maintaining engine life. Worn shafts, bushings, plates or points can greatly hinder timing by causing erratic advance characteristics which do not conform to specifications. When servicing the distributor, check for proper timing with precision instruments, following the manufacturer's specifications. Most suppliers of testing equipment provide specifications manuals with their instruments. These instructions should be followed exactly for best results.

**Carburetor:** Too lean a mixture in the carburetor air-fuel ratio can cause excessive heat in the combustion chamber which in turn can lead to detonation. Use of the wrong size jets or dirty, worn carburetor parts are other causes of detonation. The carburetor should be constantly checked and adjusted to insure top operating efficiency.

**Manifold:** A cracked or warped intake manifold can leak and allow too much air to be drawn into the combustion chamber, thus upsetting the air-fuel ratio which in turn creates excessive heat which in turn can burn the pistons.

**Fuel:** Use of low octane gasoline can cause detonation unless the distributor is adjusted to compensate for the change. It should also be noted that there is considerable variance in the octane of gasolines in certain areas of the United States which can create a problem for tourists or for trucks used in long distance hauling.

**Compression Ratio:** A common fault in reworking engines is that too much stock is broached or ground from the gasket surface of the cylinder head. This practice is quite common when replacing an engine with a short block assembly. Only a minimum amount of stock, enough to clean the surface, should be removed. As a possible deterrent to excessive compression ratios that may be caused by these conditions, Ford offers a new heavier cylinder head gasket for 239, 256, 272, 292, and 312 CID engines for 1954-64. This gasket is available through Ford Dealers under Ford Part Number C3TZ-6051-G. This gasket helps to make up for too much stock being removed or wavy surfaces on old engines.

In addition, good driving habits are essential in protecting engine life and efficiency; especially in the case of long distance trucking and hauling heavy loads. Sudden acceleration under heavy load without a downshift to the proper transmission speed can cause engine lugging which usually results in a very pronounced detonation and excessively high temperature in the combustion chamber. Drivers should always try to shift transmission in relation to RPM, load and speed.

# Engine Identification Tag

To facilitate the identification of engines and related parts, an engine identification tag is installed on gasoline engines built on or after January 2, 1964. On the 8 cylinder 260 and 289 CID engines, the identification tag is located under the electric heat bulb indicator. On all other engines, the tag is located under the bolt which attaches the coil to the engine (Figure 1).

Always furnish the complete engine identification tag information whenever it is necessary to make inquiries or order parts pertaining to engines built on or after January 2, 1964.

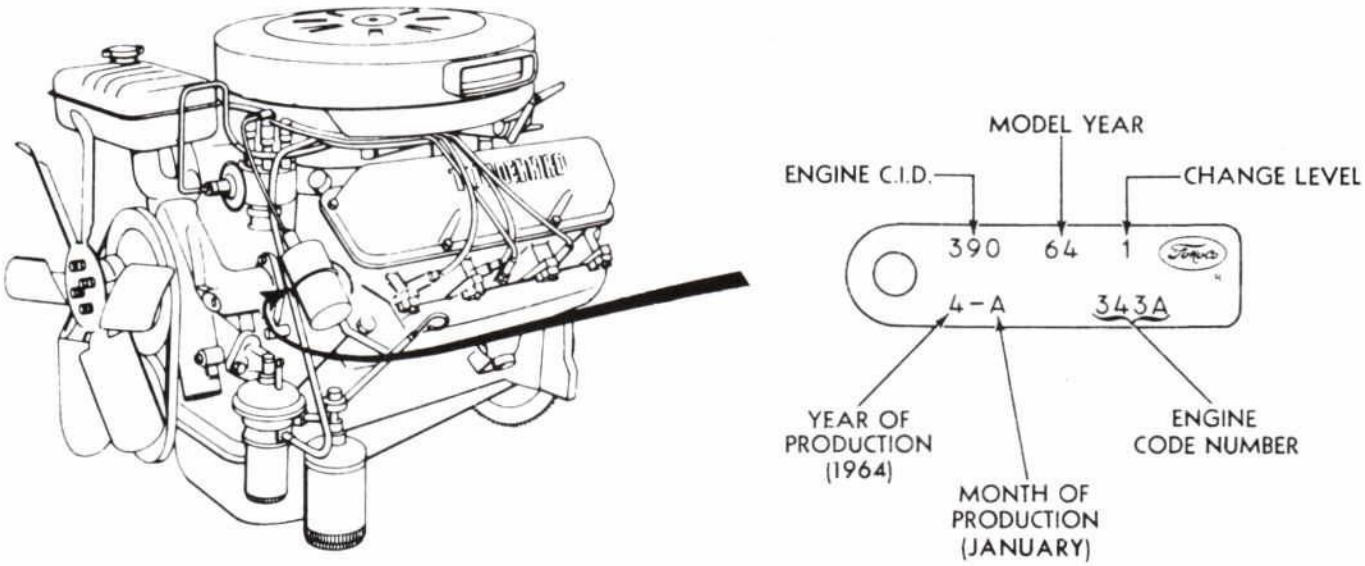



*Figure 1—Engine identification tag is installed under coil mounting bracket attaching bolt.*

# Radio System Diagnosis

Prior to removing a radio from a vehicle for repairs, a definite procedure should be followed to make certain that other radio system components are not causing the malfunction.

The following basic items should assist in instances of noise, weak reception, or a dead radio.

### Radio Dead (no background noise at full volume)

1. Check fuse, check ignition switch accessory terminal connection.
2. Check speaker leads and connections. Substitute a known quality speaker to eliminate the speaker as the cause of trouble.

### Radio Weak (fades in and out)

1. Check antenna connection at radio chassis.
2. Check antenna lead for open or ground. A known quality antenna may be substituted as a check.

### Radio Noise

1. Check antenna wand for noise by flexing.
2. Check antenna ground.
3. Check speaker for sound by adjusting tone control to maximum bass position and increasing volume above normal. Bass notes will cause a defective speaker to rattle excessively where dual speakers are used. Compare one speaker with the other for tone quality.
4. If noise is evident only when the engine is running, inspect all of the suppression equipment and secondary wiring.

# *Specifications For Front Wheel Alignment –*

## 1964 Falcon, Fairlane, Ford and Thunderbird

The following specifications are to be used when checking or re-setting the front wheel alignment for 1964 Falcons, Fairlanes, and Fords. Mustang front wheel alignment specifications are given on page 8 with the other Mustang information. The Checking Specifications give the allowable minimum and maximum limits that should be used to determine if the wheel alignment is satisfactory.

When the wheel alignment is not within the checking specifications the alignment should be re-set to the optimum specification.

All the checking and re-setting specifications for car lines are given with the vehicle at curb load conditions, which are as follows:

1. Radiator and crankcase full. 2. Jack, spare tire and wheel in proper position. 3. Front seat in rearward position. 4. All other excess loading removed. 5. The fuel tank must be full or weight equivalent to the gasoline required to fill the tank must be placed in the trunk, centrally over the gas tank area.

You may estimate the weight required at the rate of 6 lbs. per gallon of gasoline.

Data on king pin angle and turning angles is intended primarily for use in major crash repair and is not part of a normal wheel alignment check.

**FRONT WHEEL ALIGNMENT SPECIFICATIONS—ALL CAR LINES**

| CAR LINE | CHECKING SPECIFICATIONS | | | OPTIMUM RE-SETTING SPECIFICATIONS |
|---|---|---|---|---|
| | MINIMUM | MAXIMUM | Maximum Variation Between Wheels | Desired Alignment |
| **FALCON** | | | | |
| Caster | −½° | +1½° | ½° | +½° |
| Camber | −¼° | +1¼° | ½° | +½° |
| Toe-In | ¼ In. | 5/16 In. | – | 5/32 In. |
| King Pin Angle | | | | 7¼° (at +½° Camber) |
| Turning Angle of Outside Wheel With Inside Wheel Turned 20° | | | | |
| 6 Cyl. Engine—Std. Steering | 19° | 19¼° | – | 19⅛° |
| 6 Cyl. Engine—Power Steering | 20° | 20¼° | – | 20⅛° |
| V-8 Engine—Std. Steering | 18¼° | 19° | – | 18⅝° |
| V-8 Engine—Power Steering | 18¼° | 19° | – | 18⅝° |
| **FAIRLANE** | | | | |
| Caster | −1° | +1° | ½° | 0° |
| Camber | −¼° | +1¼° | ½° | +½° |
| Toe-In | 1/16 In. | 5/16 In. | – | ¼ In. |
| King Pin Angle | | | | 7¼° (at +½° Camber) |
| Turning Angle of Outside Wheel With Inside Wheel Turned 20° | 17⅜° | 17⅜° | – | 17½° |
| **FORD** | | | | |
| Caster | −1° | +1° | ½° | 0° |
| Camber | 0° | 1¼° | ½° | +⅜° |
| Toe-In | ⅛ In. | ¼ In. | – | 1/16 In. |
| King Pin Angle | | | | 7⅛° (at +⅜° Camber) |
| Turning Angle of Outside Wheel With Inside Wheel Turned 20° | 17⅜° | 17⅜° | – | 17½° |
| **THUNDERBIRD** | | | | |
| Caster | −¾° | −2¼° | ½° | −1½° |
| Camber | 0° | +⅜° | ½° | +⅜° |
| Toe-In | ⅛ In. | ¼ In. | – | ⅛ In. |
| King Pin Angle | | | | 7⅛° (at +⅜° Camber) |
| Turning Angle of Outside Wheel With Inside Wheel Turned 20° | 18¼° | 19° | – | 18⅝° |

NOTE: All checking and re-setting specifications with vehicle at curb load.

# Revised Battery Testing Procedure For All Car Lines

The capacity of a battery is the battery's ability to furnish current and maintain a minimum necessary voltage. If a battery passes the capacity test, it is in satisfactory condition. However, it may need some additional charging to bring it to peak performance.

There is one caution that must be considered, however, and that is when cold, a battery has a lower discharge capacity. If a battery fails to pass a capacity test during cold weather, remove it from the vehicle and let it stand until it reaches room temperature, then re-test.

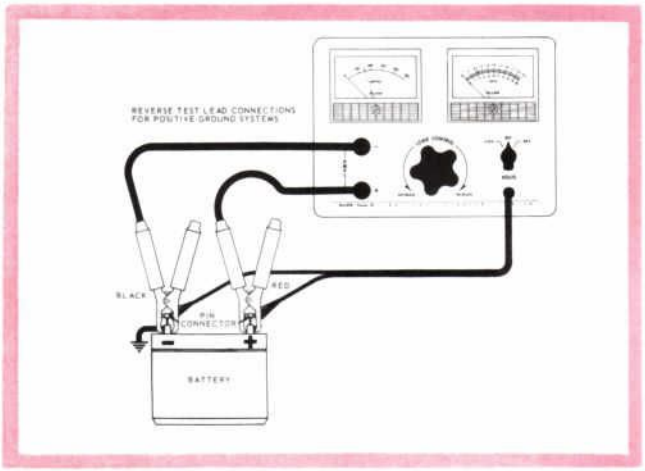



*Figure 1—Battery Capacity Test Connections*

## OPERATING PROCEDURE USING A BATTERY STARTER TESTER

### Battery Capacity Test—6 Volt And 12 Volt Only

1. Turn the Load Control Knob to the extreme "Off" position. See Figure 1.
2. Turn the Volts Switch to the 20V position.
3. Connect the Test Leads as shown in Figure 1.
4. Turn the Load Control Knob toward the Increase direction until the Ammeter reads 3 times the ampere hour rating of the battery. (Example) 6 volt battery of 80 ampere hour rating (3x80=240 amperes); 12 volt battery of 50 ampere hour rating (3x50=150 amperes)
5. *At the end of 15 seconds, read the Voltmeter. If the* voltage reading was 4.8 volts or above for 6 volt batteries or 9.6 volts or above for 12 volt batteries, the output capacity of the battery under test may be considered as good. Test the specific gravity, and, if necessary, charge the battery before placing back in service.
6. If the voltage as read is below the values as stated above, the battery needs a Three Minute Battery Test.

### Three Minute Battery Test

1. Place the battery on fast charge for 3 minutes at a rate of 75 Amps. for 6 volt battery or 40 Amps. for 12 volt battery. After charging, if the total voltage is over 7.75 volts for a 6 volt battery or 15.5 volts for a 12 volt battery, test the specific gravity, then either charge the battery, or, if the specific gravity is above 1.225, the battery may be placed back in service.