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CLYMER

MUSTANG II

1974-1978

SHOP MANUAL

MUSTANG II 1974-1978 A169 CLYMER PUBLICATIONS

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JEFF ROBINSON
Publisher

CLYMER PUBLICATIONS

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12860 MUSCATINE STREET · P.O. BOX 20 · ARLETA, CALIFORNIA 91331

FIRST EDITION
First Printing October, 1976
Second Printing August, 1973

SECOND EDITION
Revised by Jim Combs to include 1977-1978 models
First Printing May, 1979
Second Printing October, 1980
Third Printing August, 1981

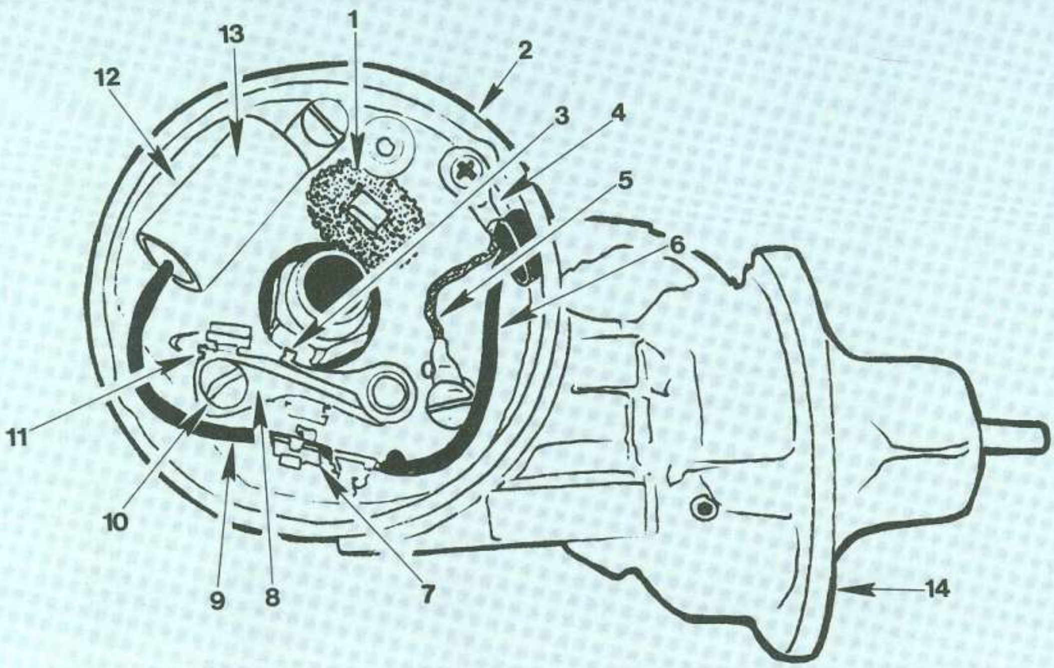
Printed in U.S.A.

ISBN: 0-89287-119-9

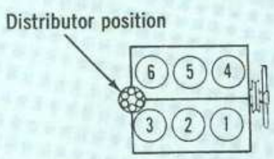
Photos and illustrations courtesy of Ford Motor Company

CONTENTS

QUICK REFERENCE DATA

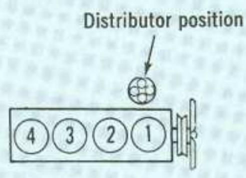


1. Lube wick
2. Distributor housing
3. Rubbing block
4. Sub-plate
5. Ground wire
6. Primary wire
7. Terminal
8. Breaker point assembly
9. Condenser wire
10. Front attaching screw
11. Adjusting slot
12. Breaker point and condenser plate
13. Condenser
14. Vacuum diaphragm



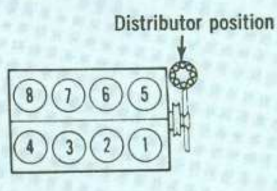
FIRING ORDER 1-4-2-5-3-6

2800cc V6



FIRING ORDER 1-3-4-2

2300cc 4-CYLINDER



FIRING ORDER 1-5-4-2-6-3-7-8

302 cid V8

TUNE-UP SPECIFICATIONS

	Engine (Cylinders/Carburetor/Displacement in Cu.In./Usage)	Transmission	Basic Timing	Curb Idle (rpm)
1974	4/2 bbl/140/All	Man.	6°BTDC	850
	4/2 bbl/140/All	Auto.	6°BTDC	750
	V6/2 bbl/171/All	Man.	12°BTDC	750
	V6/2 bbl/171/All	Auto.	12°BTDC	650
1975	4/2 bbl/140/All	Man.	6°BTDC	850
	4/2 bbl/140/Federal	Auto.	6°BTDC	750D
	4/2 bbl/140/California	Auto.	10°BTDC	750D
	V6/2 bbl/171/All	Man.	6°BTDC	850
	V6/2 bbl/171/Federal	Auto.	10°BTDC	750D
	V6/2 bbl/171/California	Auto.	8°BTDC	750D
	V8/2 bbl/302/All	Auto.	6°BTDC	700D
1976	4/2 bbl/140/All	Man.	6°BTDC	750
	4/2 bbl/140/Federal	Auto.	6°BTDC	650D
	4/2 bbl/140/California	Auto.	10°BTDC	750
	V6/2 bbl/171/All	Man.	6°BTDC	850
	V6/2 bbl/171/Federal	Auto.	10°BTDC	700D
	V6/2 bbl/171/California	Auto.	8°BTDC	700D
	V8/2 bbl/302/All	Auto.	6°BTDC	700D
1977	4/2 bbl/140/All	Man.	6°BTDC	850
	4/2 bbl/140/Federal	Auto.	20°BTDC	800D
	4/2 bbl/140/Calif. & High Alt.	Auto.	20°BTDC	750D
	V6/2 bbl/171/All	Man.	*	850
	V6/2 bbl/171/All with A/C	Auto.	12°BTDC	750D
	V6/2 bbl/171/All w/o A/C	Auto.	12°BTDC	700D
	V8/2 bbl/302/Federal	Auto.	*	*
	V8/2 bbl/302/California	Auto.	12°BTDC	700D
1978	4/2 bbl/140/All	Man.	6°BTDC*	850
	4/2 bbl/140/Federal	Auto.	20°BTDC*	800D
	4/2 bbl/140/California	Auto.	20°BTDC*	750D
	V6/2 bbl/171/All	Man.	10°BTDC	850
	V6/2 bbl/171/Federal with A/C	Auto.	12°BTDC*	750D
	V6/2 bbl/171/Federal w/o A/C	Auto.	12°BTDC*	650D
	V6/2 bbl/171/California with A/C	Auto.	6°BTDC	750D
	V6/2 bbl/171/California w/o A/C	Auto.	6°BTDC	650D
	V8/2 bbl/302/All	Man.	10°BTDC	800
	V8/2 bbl/302/All	Auto.	10°BTDC	

*Check emissions decal in engine compartment; many changes made during the year.

SPARK PLUGS AND POINTS

	Type	Gap
Spark plugs		
1974-1975		
4 cyl.	AGRF-42	0.034 in.
V6	AGR-42	0.034 in.
V8	ARF-42	0.034 in.
1976		
4 cyl., V6	AWRF-42	0.034 in.
V8	ARF-42	0.044 in.
Points		
(1974 only)	—	0.027 in. (35-41° dwell)

SPARK PLUGS

	Type	Gap
1977		
4 cyl.	AWRF-42	0.034 in.
V6*	AWSF-42	0.034 in.
V8*	ARF-52-6	0.060 in.
1978		
4 cyl., V6	AWSF-42	0.034 in.
V8	ARF-42	0.050 in.

*Correct spark plug and gap may vary for vehicles sold in different geographical areas. Check the emission control label in the engine compartment for your vehicle.

VALVE CLEARANCES (V6 ENGINE)

	Intake	Exhaust
1974-1975 (engine hot)	0.014 in.	0.016 in.
1976 and later (engine cold)	0.014 in.	0.016 in.

CAPACITIES

	2300cc	2800cc	302cid
Crankcase (w/filter change)	5 qt.	5 qt.	5 qt.
Crankcase (w/o filter change)	4 qt.	4½ qt.	4 qt.
Cooling system (w/air cond.)	9.1 qt.	8.6 qt.	14.6 qt.
Cooling system (w/o air cond.)	8.8 qt.	8.4 qt.	14.6 qt.
Automatic transmission	7 qt.	7 qt.	7 qt.
Rear axle	3 qt.	3 qt.	2 qt.

RECOMMENDED LUBRICANTS

Engine oil	API Service SE
Brake fluid	DOT 3 or DOT 4
Ball-joints and front wheel bearings	Ball-joint and multipurpose lube
Latches	Polyethylene grease
Lock cylinders	Lock oil, graphite, or spray lube
Rear axle	Ford hypoid gear lube
Steering gear	Ford hypoid gear lube
Manual transmission	Ford standard transmission fluid
Automatic transmission	Type F (Ford specification ESW-M2C33-F)
Speedometer cable	Speedometer cable lube
Engine coolant	Ethylene glycol type

SINGLE GRADE OILS

Outside Temperature Range	Oil Viscosity*
− 10 to + 32°F	10W
+ 10 to + 60°F	20W-20
+ 32 to + 90°F	30W
Above + 60°F	40W

*If your car will be operating with maximum loads on the engine or if you are driving at sustained high speeds above 60 mph, use the next heavier viscosity oil.

MULTIGRADE OILS

Outside Temperature Range	Oil Viscosity*
Below + 32°F	5W-30
− 10 to + 90°F	10W-30
− 10 to + 90°F or above	10W-40
Above + 10°F	20W-40

*If your car will be operating with maximum loads on the engine or if you are driving at sustained high speeds above 60 mph, use the next heavier viscosity oil.

—NOTES—

MUSTANG II

1974-1978

SHOP MANUAL

CHAPTER ONE

GENERAL INFORMATION

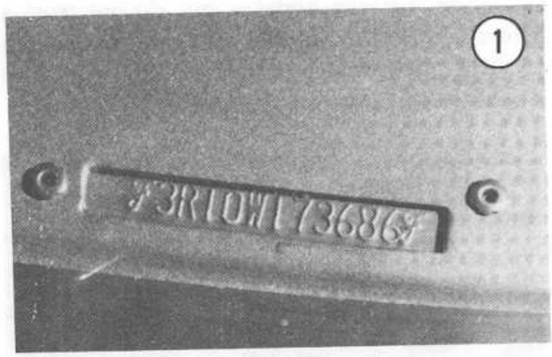
The Mustang II is available in four body styles: hardtop, 3-door 2 + 2, Ghia, and Mach I. The standard engine is a 2300cc, overhead cam, inline four, manufactured by Ford Motor Company, U.S.A. A 2800cc, overhead valve V6 made by Ford of Germany and an American-made 302 cid, overhead valve V8 are optional. A 4-speed manual transmission is standard, with a 3-speed automatic transmission available.

This book provides service information and procedures for all Mustang II's sold in the U.S. through 1978. Chapters One through Twelve contain specific information on 1974-1976 models and general information on all models through 1978. A supplement at the rear of the book contains specific information on 1977-1978 models.

Standard U.S. size fasteners are used throughout the car with the exception of certain engine and drive line components. Metric tools, when required, are identified in the individual chapters of this manual.

The vehicle identification number used for registration is on a plate attached to the instrument panel and visible from outside the car **(Figure 1)**. The first digit indicates the model year. This is followed by a letter indicating the assembly plant, a 2-digit body serial code, a letter identifying the engine, and a 6-digit vehicle serial number.

1



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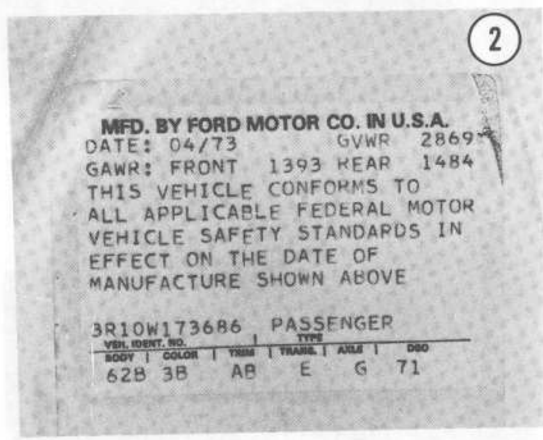


The vehicle certification label is attached to the rear edge of the driver's door **(Figure 2)**.

General specifications **(Table 1)** are found at the end of the chapter.

SERVICE HINTS

Observing the following practices will save time, effort, and frustration, as well as prevent possible injury.

— Throughout this manual the word "front" refers to the front of the car. The front of any part is the end nearest the front of the car when the part is installed.

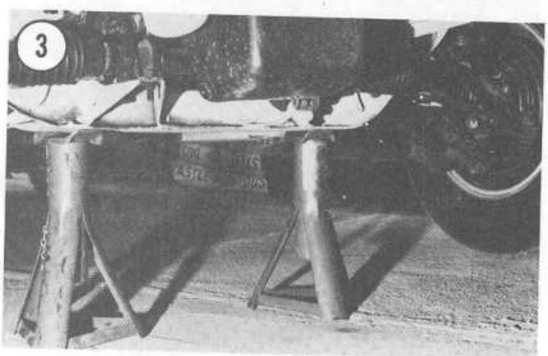
— The words "left" and "right" refer to the sides of the car as seen by a person sitting in the car facing forward. For example, the steering wheel is on the left side.

— Disconnect the battery ground cable before working near electrical connections and before disconnecting wires.

— Avoid flames or sparks when working near a charging battery or near flammable liquids such as brake fluids or gasoline.

— When working under a car, do not trust a hydraulic or mechanical jack to hold the car up by itself. Always use jackstands. **Figures 3 and 4** show good positions for jackstands.

3



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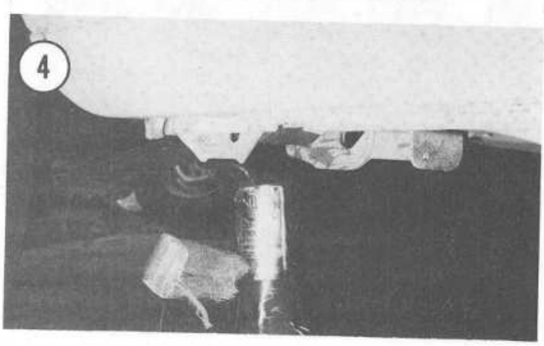


— Tag all similar internal parts for location, and mark all mating parts for position. Record number and thickness of any shims as they are removed. Small parts such as bolts can be identified by placing them in plastic sandwich bags and sealing and labeling the bags with masking tape.

— Protect finished surfaces from physical damage or corrosion. Keep gasoline and brake fluid off painted surfaces.

— Frozen or very tight bolts and screws can often be loosened by soaking with penetrating oil, then sharply striking the bolt head a few times with a hammer and punch (or screwdriver for screws). Heat is to be avoided unless absolutely necessary, since it may melt, warp, or remove the temper from many parts.

— No parts, except those assembled with a press fit, require unusual force during assembly. If a part is hard to remove or install, find out why before proceeding.

— Cover all openings after removing parts to keep dirt, small tools, etc., from falling in.

— When assembling two parts, start all fasteners, then tighten evenly.

— When buying replacement parts, take the old part to the parts store, if possible, for comparison to the new one.

MANUAL ORGANIZATION

This chapter provides general information and specifications.

Chapter Two explains all periodic lubrication and routine maintenance necessary to keep your car running well. Chapter Two also includes recommended tune-up procedures, eliminating the need to constantly consult chapters on the various subassemblies.

Chapter Three provides methods and suggestions for quick and accurate diagnosis and repair of problems. Troubleshooting procedures discuss typical symptoms and logical methods to pinpoint the trouble. It also discusses equipment useful both for preventive maintenance and troubleshooting.

Some of the procedures in this manual call for special tools. In all such cases the tool is illustrated, either in actual use or alone. Special tools may be ordered from Owatonna Tools, Inc., Owatonna, Minnesota 55060.

Subsequent chapters describe specific

systems such as the engine, transmission, and electrical system. Each chapter provides complete disassembly, repair, and assembly procedures in simple step-by-step form. If a repair is impractical for the home mechanic, it is so indicated. It is usually faster and less expensive to take such repairs to a Ford dealer or competent repair shop. Specifications concerning a particular system are included at the end of the appropriate chapter.

A well-equipped mechanic may find he can substitute tools already on hand or can fabricate his own. In addition, similar tools are avilable at large auto parts stores and tool rental dealers. In many cases, a great deal of time and money can be saved by having a dealer or repair shop perform only the step which requires the special tool, and doing the rest of the work yourself.

Table 1 GENERAL SPECIFICATIONS

Wheelbase	96.2 in.
Track	
Front	55.6 in.
Rear	55.8 in.
Length	175. in.
Width	70.2 in.
Height	
Hardtop and Ghia	49.9 in.
3-Door 2+2 and Mach 1	49.6 in.
Curb Weight	
Hardtop and Ghia	2,743 lb.
3-Door 2+2 and Mach 1	2,822 lb.

CHAPTER TWO

LUBRICATION, MAINTENANCE, AND TUNE-UP

This chapter deals with all the normal maintenance necessary to keep the Mustang II running properly. It includes summaries of service intervals in table form (**Tables 1, 2, and 3**). The last part of the chapter contains a tune-up procedure which simplifies and organizes the process.

Service intervals are based on months or thousands of miles, whichever comes first.

Ford manufactures and recommends its own lubricants for most maintenance procedures. **Tables 4 and 5** list recommended oil viscosities for various temperature ranges. Recommended lubricants are listed in **Table 6**.

ROUTINE CHECKS

The following checks should be performed at each stop for gas.

1. Check engine oil level. If necessary, top up to the SAFE or MAX mark on the dipstick. See **Figure 1**. See Tables 4 and 5 for recommended grades.

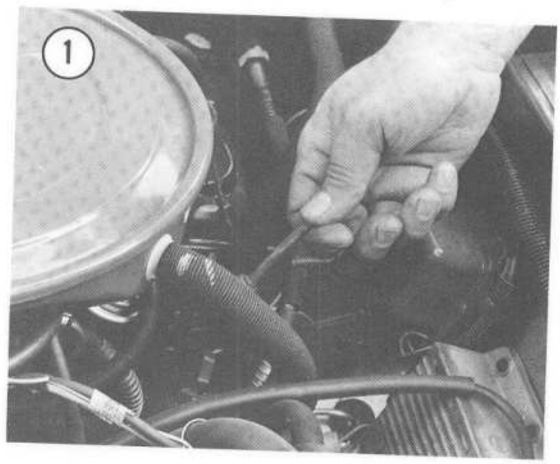


Table 1 ROUTINE CHECKS

Interval	Item	Procedure
Fuel stop	Engine oil	Check level
	Engine coolant	Check level
	Windshield washers	Check container level
Monthly	Tire pressures	Check (or when visibly low)
	Battery electrolyte	Check level (more often in hot weather)

Table 2 SCHEDULED MAINTENANCE (1974 MODELS)

Interval	Item	Procedure
3,000 miles or three months	Engine oil (severe service only)	Change
	Oil filter (severe service only)	Replace (first 3,000 miles then each 6,000 miles
6,000 miles or six months	Engine oil (normal service	Change
	Oil filter (normal service)	Replace (first 6,000 miles then each 12,000 miles)
	Transmission fluid (manual and automatic)	Check level (first 6,000 miles then each 12,000 miles)
	Fuel system filter	Replace (first 6,000 miles only)
	Idle fuel mixture, 2300cc	Adjust (first 6,000 miles, first 12,000 miles then each 12,000 miles)
	Idle fuel mixture, 2800cc	Adjust (first 6,000 miles and first 24,000 miles)
	Fast idle speed, 2300cc	Adjust (first 6,000 miles, first 12,000 miles then each 12,000 miles)
	Fast idle speed, 2800cc	Adjust (first 6,000 miles and first 24,000 miles)
	Curb idle speed and TSP off-speed, 2300cc	Adjust (first 6,000 miles, first 12,000 miles then each 12,000 miles)
	Curb idle speed and TSP off-speed, 2800cc	Adjust (first 6,000 miles and first 24,000 miles)
	Carburetor throttle and choke linkage, and delay valve, 2300cc	Adjust or replace (first 6,000 miles, first 12,000 miles then each 12,000 miles)
	Carburetor throttle and choke linkage, and delay valve, 2800cc	Adjust or replace (first 6,000 miles and first 24,000 miles)
	Deceleration valve	Adjust or replace (first 6,000 miles, first 12,000 miles then each 12,000 miles)
	Exhaust manifold bolts	Torque (first 6,000 miles)
	Intake manifold bolts/nuts	Torque (first 6,000 miles then each 12,000 miles)
	Ignition timing	Adjust (first 6,000 miles, first 12,000 miles then each 12,000 miles)
	Distributor points	Inspect (first 6,000 miles only)
	Drive belts	Inspect and adjust (first 6,000 miles, first 12,000 miles then each 12,000 miles)
	Rear axle fluid	Check level (first 6,000 miles then each 12,000 miles)

(continued)

Table 2 SCHEDULED MAINTENANCE (1974 MODELS) (continued)

Interval	Item	Procedure
6,000 miles or six months	Clutch pedal free play	Check
	Lock cylinders	Lubricate
12,000 miles or 12 months	Air cleaner element	Check
	Oil filler cap	Clean
	Valves, 2800cc	Adjust
	PCV system	Inspect hoses and make adjustments (first 12,000 then each 24,000 miles)
	Distributor points	Replace
	Distributor cap and rotor, 2300cc	Inspect
	Spark plug wires	Inspect
	Spark plugs	Replace*
	Spark control system	Check
	Air cleaner temperature control and delay valve	Check
	Belt-driver accessory mounting bolts, 2300cc	Torque
	Evaporative emission canister, 2300cc	Inspect
	EGR system and delay valve	Check
	Engine coolant	Check condition and protection
	Brake fluid	Check
	Steering linkage	Check for looseness
	Automatic transmission bands	Adjust (first 12,000 miles only)
24 months	Engine coolant	Replace (regardless of mileage)
24,000 miles or 24 months	Air cleaner element	Replace
	Air cleaner PCV filter	Replace
	Fuel vapor emission system	Inspect
	PCV valve	Replace
	PCV system	Clean
	Distributor cap and rotor, 2800cc	Inspect
	Thermactor system	Check
	Cooling hoses and clamps	Inspect
	Brake linings, hoses and lines	Inspect
	Front wheel bearings	Clean and repack
36,000 miles or 36 months	Front suspension ball-joints	Lubricate

*18,000 miles or 18 months on engines using unleaded or low lead fuel

Table 3 SCHEDULED MAINTENANCE (1975-1976 MODELS)

Interval	Item	Procedure
2,500 miles or 2½ months	Engine oil (severe service only)	Change
	Oil filter (severe service only)	Replace (first 2,500 miles then each 5,000 miles
5,000 miles or 5 months	Engine oil (normal service)	Change
	Oil filter (normal service)	Replace (first 5,000 miles then each 12,000 miles)
	Tranmission fluid (manual and automatic)	Check level (first 5,000 miles then each 10,000 miles)
	Fast idle speed ①	Check and adjust (first 5,000 miles, first 15,000 miles then each 15,000 miles)
	Fast idle speed ②	Check and adjust (first 5,000 miles, first 20,000 miles then each 20,000 miles)
	Curb idle speed ①	Check and adjust (first 5,000 miles, first 15,000 miles then each 15,000 miles)
	Fast idle speed ②	Check and adjust (first 5,000 miles, first 20,000 miles then each 20,000 miles)
	Throttle solenoid off speed	Check and adjust (first 5,000 miles only)
	Fuel deceleration valve, 2300cc and 2800cc ①	Check and adjust (first 5,000 miles, first 15,000 miles then each 15,000 miles)
	Fuel deceleration valve, 2300cc and 2800cc ②	Check and adjust (first 5,000 miles, first 20,000 miles then each 20,000 miles)
	Rear axle fluid	Check level (first 5,000 miles, first 15,000 miles then each 15,000 miles)
	Brake fluid	Check level (first 5,000 miles, first 15,000 miles then each 15,000 miles)

(continued)

Table 3 SCHEDULED MAINTENANCE (1975-1976 MODELS) (continued)

Interval	Item	Procedure
5,000 miles or 5 months	Clutch pedal free play	Check (first 5,000 miles, first 15,000 miles then each 15,000 miles)
	Exhaust system heat shields	Inspect (first 5,000 miles, first 15,000 miles then each 15,000 miles)
15,000 miles or 15 months	Intake manifold bolts, 302 cid only ①	Torque (first 15,000 miles only)
	Exhaust control valve ①	Check and lubricate
	Engine coolant ①	Check condition and protection (first 15,000 miles then each 30,000 miles)
	Drive belts ①	Inspect and adjust
	PCV system ①	Inspect hoses make adjustments (first 15,000 miles then each 30,000 miles)
	Thermactor system ①	Check
	Ignition system ①	Check with scope
	Spark plugs ①	Replace
	Spark plug wires ①	Inspect
	Ignition timing ①	Adjust
	Distributor cap and rotor ①	Inspect and clean
	Spark control system and delay valve ①	Check
	Idle fuel mixture ①	Adjust
	Throttle and choke linkage and air valve ①	Check
	Air cleaner element ①	Check (first 15,000 miles then each 30,000 miles)
	Air cleaner temperature control and delay valve ①	Check
	Fuel system filter ①	Replace (first 15,000 miles only)

(continued)

Table 3 SCHEDULED MAINTENANCE (1975-1976 MODELS) (continued)

Interval	Item	Procedure
15,000 miles or 15 months	Valves, 2800cc ①	Adjust
	Belt driven accessory mounting bolts ①	Torque
	Steering linkage	Check for looseness
	Front suspension	Check for looseness or damaged seals
	Automatic transmission bands	Adjust (first 15,000 miles only)
20,000 miles or 20 months	Intake manifold bolts, 302 cid only ②	Torque (first 20,000 miles only)
	Exhaust control valve ②	Check and lubricate
	Engine coolant ②	Check condition and protection (first 20,000 miles then each 30,000 miles)
	Drive belts ②	Inspect and adjust
	PCV valve ②	Replace
	PCV system ②	Inspect hoses, clean system and make adjustments
	Air cleaner PCV filter ②	Replace
	Evaporative emission canister ②	Inspect then adjust, repair or replace if required
	Fuel vapor system ②	Inspect fuel tank filler cap, hoses and vapor lines
	Thermactor system ②	Check
	Deceleration valve 2300cc and 2800cc ②	Check
	Ignition system ②	Check with scope
	Spark plugs ②	Replace
	Spark plug wires ②	Inspect
	Ignition timing ②	Adjust
	Distributor cap and rotor ②	Inspect and clean

(continued)

Table 3 **SCHEDULED MAINTENANCE (1975-1976 MODELS)** (continued)

Interval	Item	Procedure
20,000 miles or 20 months	Spark control system and delay valve ②	Check
	Idle fuel mixture ②	Adjust
	Throttle and choke linkage and air valve ②	Check
	Air cleaner element ②	Replace
	Air cleaner temperature control and delay valve ②	Check
	Fuel system filter ②	Replace (first 20,000 miles only)
	Valves, 2800cc ②	Adjust
	Belt driven accessory mounting bolts ②	Torque
25,000 miles or 25 months	Brake linings, hoses and lines	Inspect
	Front wheel bearings	Clean and repack
30,000 miles or 30 months	Drive belts ①	Inspect
	PCV valve ①	Replace
	PCV system ①	Inspect hoses, clean system and make adjustments
	Air cleaner PCV filter	Replace
	Evaporative emission canister ①	Inspect then adjust, repair or replace if required
	Fuel vapor system ①	Inspect fuel tank filler cap, and hoses
	Air cleaner element ①	Replace
	Front suspension and steering linkage	Lubricate
	Automatic transmission fluid	Drain and refill
35,000 miles or 35 months	Cooling system hoses and clamps	Check
	Engine coolant ①	Replace
40,000 miles or 40 months	Engine coolant ②	Replace
	Drive belts	Inspect

① California only ② Other 49 states

Table 4 SINGLE GRADE OILS

Outside Temperature Range	Oil Viscosity
−10 to +32°F	10W
+10 to +60°F	20W-20
+32 to +90°F	30W
Above +60°F	40W

Table 5 MULTIGRADE OILS

5W-30*	Below +32°F
10W-30	−10 to +90°F
10W-40	−10 to +90°F or above
20W-40	Above +10°F

*If your car will be operating with maximum loads on the engine or if you are driving at sustained high speeds above 60 mph, use the next heavier viscosity oil.

Table 6 RECOMMENDED LUBRICANTS

Engine oil	API Service SE
Brake fluid	DOT 3 or DOT 4
Ball-joints and front wheel bearings	Ball-joint and multipurpose lube
Latches	Polyethylene grease
Lock cylinders	Lock oil, graphite, or spray lube
Rear axle	Ford hypoid gear lube
Steering gear	Ford hypoid gear lube
Manual transmission	Ford standard transmission fluid
Automatic transmission	Type F (Ford specification ESW-M2C33-F)
Speedometer cable	Speedometer cable lube
Engine coolant	Ethylene glycol type

2. Check coolant level. It should be ¾-1½ in. below the filler neck. (Bottom of filler neck in top radiator hose for constant-full cooling systems.)

3. Check the level of the windshield washer container. It should be kept full.

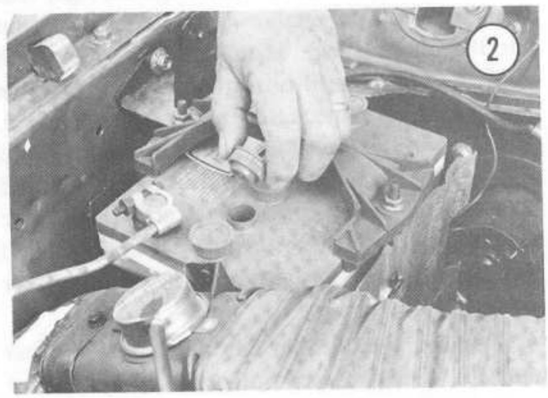
MONTHLY

Tire Pressures

Check tire pressures once a month or when tires are visibly low. This should be done when the tires are cold. Correct pressures for your tire size are listed on the right-hand door lock pillar. Maximum pressures are also imprinted on the tires.

Battery

Check the electrolyte level about once a month, or more often in hot weather. It should be up to the ring inside each filler hole. See **Figure 2**. Fill with ordinary tap water unless local water is hard. Use distilled water in hard water areas.



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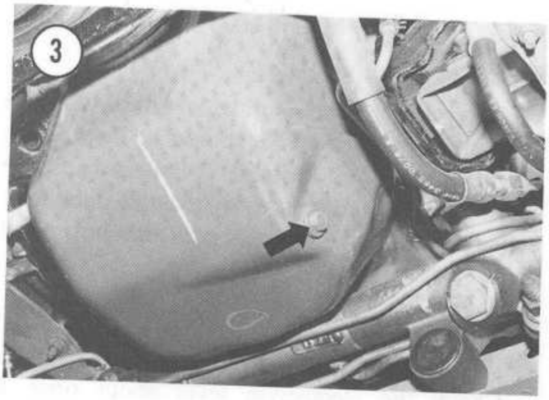
SCHEDULED MAINTENANCE

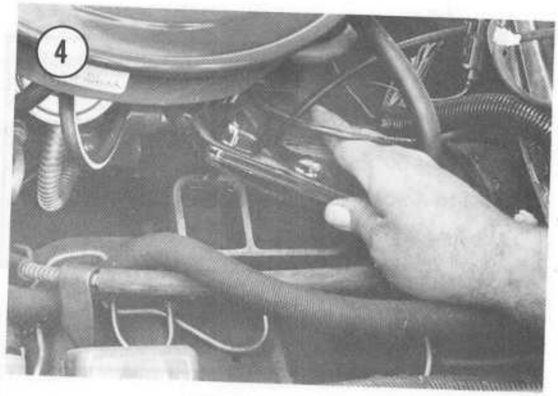
All of the following procedures are done at specified intervals of mileage or time, except coolant replacement. This is done as specified in Table 2 or 3, regardless of mileage.

Engine Oil and Filter Change

All cars require oil rated "For API Service SE." See Tables 5 and 6 for recommended grades.

1. To drain the oil, first drive the car until the engine warms up. This allows the oil to drain freely. Then place a container under the oil pan and remove the drain plug (**Figure 3**). The plug is near the right rear corner of the oil pan on 2800cc, and near the left center of the oil pan on 2300cc and 302 cid engines.





2. Let the oil drain completely (10-15 minutes), then reinstall the drain plug.

3. If the filter is being changed (every other oil change typically), position the drain pan beneath it (left side center for 2300cc engines, right side rear for 2800cc engines, and left side front for 302 cid engines). Then loosen the filter with a filter wrench until oil flows from it. Remove and discard the filter after the oil stops draining. Clean the filter mounting on the engine. Coat the gasket on a new filter with clean oil and screw the filter in until it contacts the engine mounting. Tighten ½ turn further by hand. Do not overtighten. Do not tighten with a filter wrench.

4. Remove the oil filler cap on the valve cover and fill with the recommended oil (Tables 5 and 6). Capacity for 2300cc engines is 5.0 quarts with filter change, 4.0 quarts without. Capacity for 2800cc engines is 5 quarts with filter change, 4.5 quarts without. Capacity for 302 cid engines is 4.0 quarts with filter change, 3.5 quarts without.

5. Start the engine. The engine warning light will stay on for approximately 30 seconds. Let the engine run for a few minutes and check for leaks. Check oil level on the dipstick and top up if necessary.

Brake Fluid

Brake fluid level should be checked at the intervals specified in Tables 2 and 3 as well as anytime the brake pedal can be pushed within 2 in. of the floor. Clean the area around the master cylinder cover. Push the cover retainer to one side (**Figure 4**). Lift the cover off and make sure the brake fluid level in both sections is within ¼ in. of the top of the master cylinder. Top up if necessary with DOT 3 or DOT 4 brake fluid.

Manual Transmission Oil Level

Park the car on a level surface. Place the transmission in neutral, set the handbrake, and block all 4 wheels. Working beneath the car, clean the area around the filler plug (left-hand side of the transmission). Remove the plug using a ⅜ in. drive ratchet without a socket. The oil should be up to the bottom of the filler hole. If not, top up with transmission fluid. A turkey baster, available at many grocery stores, makes an excellent filling tool.

Automatic Transmission Fluid Level

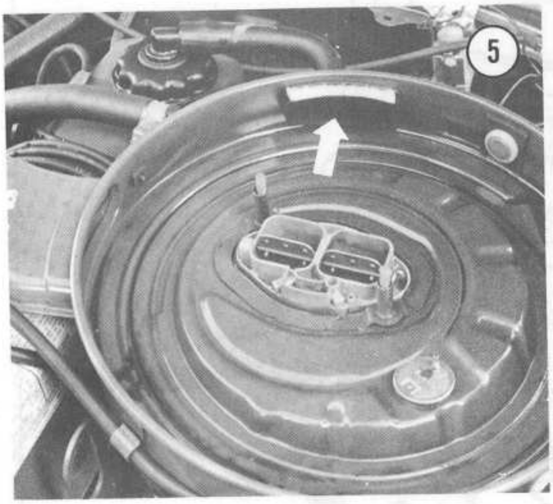
Park the car on a level surface. Place the transmission in PARK and set the handbrake. Run the engine until warm, then let it idle. Move the shift lever through all gear positions and then back to PARK. Clean the area around the transmission dipstick cap. Remove the dipstick, wipe it clean, and push it all the way back in. Pull the dipstick out and note the fluid level. It should be between the ADD and FULL marks. If the level is below the ADD mark, add fluid through the dipstick tube until the level is between the ADD and FULL marks. Do not add fluid unless the level is at or below the ADD mark. Use only Type F automatic transmission fluid (Ford specification M2C33-F). Do not use Type A or Dexron fluid.

CAUTION

Do not overfill the transmission, or it may be damaged.

Air Cleaner PCV Filter

To replace the filter, remove the air cleaner cover and filter element. Lift out the old PCV filter (**Figure 5**) and install a new one. Reinstall the air cleaner element and cover.



Exhaust Manifold Bolts

The exhaust manifold bolts should be torqued to specifications at the first service interval (Tables 2 and 3). See Chapter Five.

Valve Clearance Adjustment

This should be done after the cylinder head bolts have been torqued. See the procedure in the *Tune-up* section of this chapter.

Carburetor

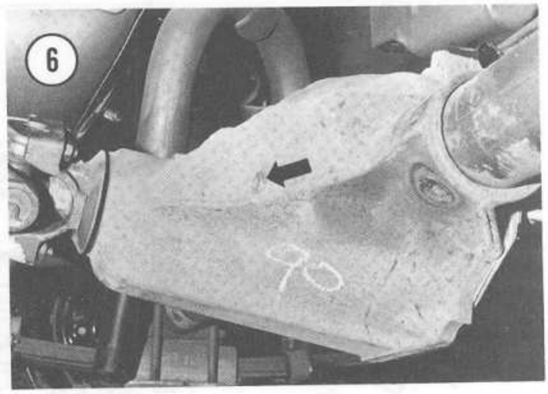
Check idle speed, idle fuel mixture, and fast idle adjustments as described in Chapter Five.

Clutch Free Play

Check and adjust if necessary as described in Chapter Eight.

Rear Axle Oil Level

Park the car on a level surface, set the handbrake, and block one wheel. Clean the area around the filler plug (**Figure 6**). Remove the plug, using a ⅜ in. drive ratchet without a socket. Oil level should be within ¼ in. of the bottom of the filler plug hole. Top up with Ford hypoid gear lube if it is low.

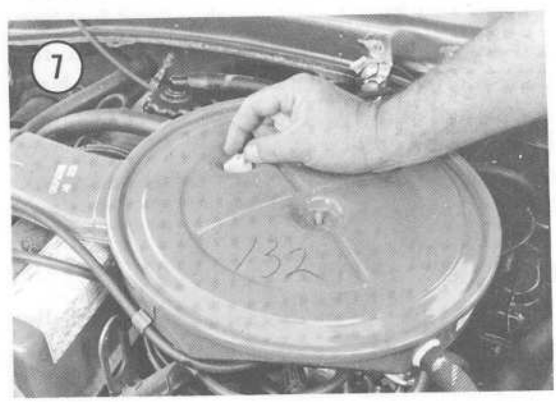


Hinges, Locks, Latches

Lubricate seat track and hood latches with a spray lubricant such as WD-40 or Ford LPS. Operate the latches several times to work in the lubricant. Lubricate door, trunk, and hood latches in the same manner. To lubricate locks, spray a small amount of spray lubricant into the lock cylinder. As an alternative, coat the key with lock oil or graphite. Insert the key and work the lock several times. Remove and clean the key.

Air Cleaner Element

To replace the element remove the air cleaner cover by removing the wing nut(s) securing the cover. Remove the cover and lift out the filter element (**Figure 7**). Install a new element in the reverse order.



Fuel Filter

All engines use a non-repairable, inline fuel filter, mounted directly on the carburetor fuel inlet (**Figure 8**). To remove the fuel filter first

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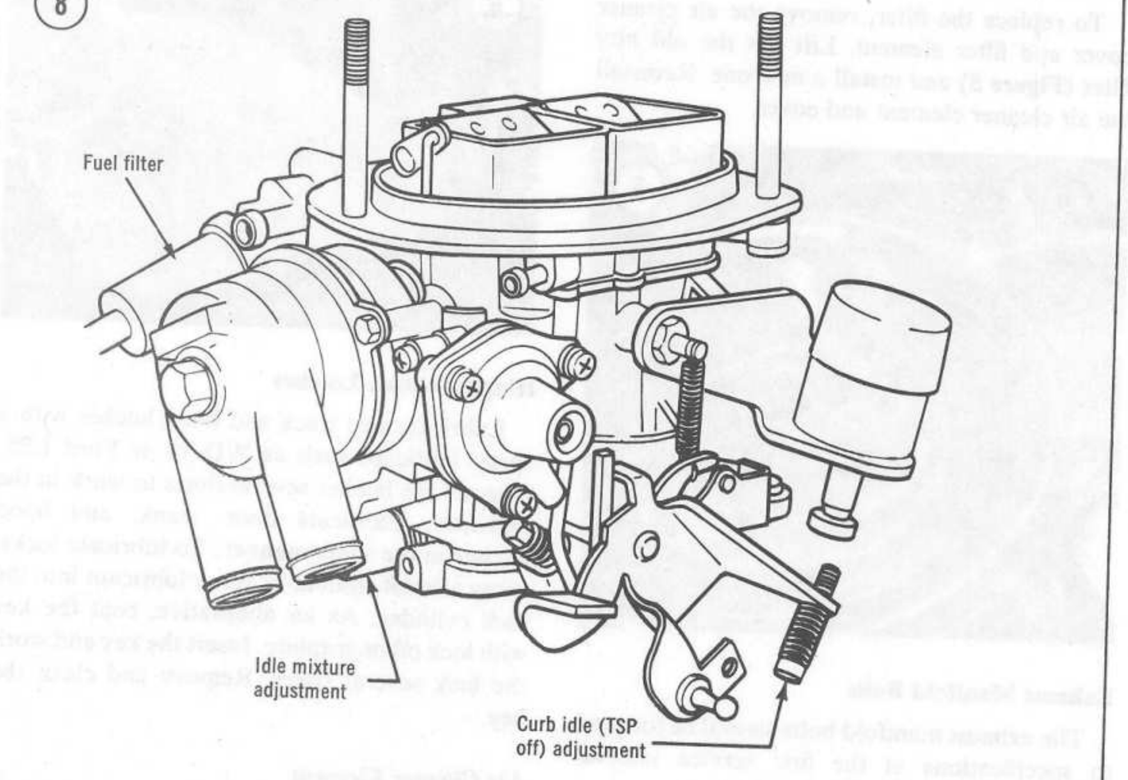


remove the air cleaner, then loosen or remove the clamp securing the fuel inlet hose to the metal fuel line from the fuel pump. Unscrew the fuel filter from the carburetor, then disconnect the fuel filter hose from the metal fuel line and discard the fuel filter, hose and clamps. Installation is the reverse of this procedure. New clamps and inlet hose should always be installed whenever a fuel filter is replaced. Once the new fuel filter is installed, start the engine and check for fuel leaks.

Fuel Lines

The fuel lines should be inspected periodically for crimps, cracks, twists and signs of gasoline leakage. See Chapter Five.

Intake Manifold Bolts

The intake manifold bolts should be torqued to specifications at the first service interval (Tables 2 and 3). See Chapter Five.

Drive Belts

Inspect the fan belt and all accessory drive belts at each service interval. Replace worn belts. Check and adjust drive belt tension as described in Chapter Six.

Engine Coolant and Cooling Hoses

Remove the radiator cap and check the condition of the coolant. If it looks dirty or rusty, flush the radaitor and replace the coolant as described in Chapter Six. Inspect all heater hoses, and the upper and lower radiator hoses. Replace any hoses that are cracked, deteriorated, or extremely soft. Make sure that all hoses are correctly installed (firmly seated on their mating connectors), and all hose clamps are secure. Engine coolant should be drained, and the cooling system flushed and refilled every 24 months regardless of vehicle mileage. (Consult Table 3 in this chapter for engine coolant replacement intervals on 1975-1976 vehicles.)

Deceleration Valve

The deceleration (decel) valve timing should be checked at the first 6,000 miles, the first 12,000 miles then each 12,000 miles thereafter (1974 models), or the first 5,000 miles, the first 15,000 miles, then each 15,000 miles (1975-1976 models). The procedure for checking deceleration valve timing is given in Chapter Five.

Ignition Timing and Distributor Point Adjustment

Procedures for checking and adjusting ignition timing and distributor point gap are provided in the *Tune-up* section of this chapter. Distributor point adjustment applies only to 1974 models, as all 1975-1976 models are equipped with solid-state, breakerless ignition systems.

Front Wheel Bearings

At the recommended intervals, remove the front wheel bearings, clean thoroughly, and repack and install as described in Chapter Eleven.

Brake Lines and Linings

On drum brakes, remove the drums and inspect the linings. See Chapter Ten. Replace brake shoes if linings are worn within 1/32 in. of any rivet, or contaminated with oil, grease, or brake fluid. Check drums for scoring or uneven wear. Have the drums turned if necessary. Check drums and shoes for blue tinted areas indicating overheating. Replace any overheated parts. In addition, always replace brake springs if overheated parts are found.

On disc brakes, check the discs for scoring or corrosion. Have the discs turned if necessary. Remove and inspect the pads as described in Chapter Ten. Replace pads if worn within 1/32 in. of any rivet head, or if the pad linings are contaminated with oil, grease, or brake fluid.

Check wheel cylinders and disc brake calipers for brake fluid leaks. Rebuild or replace leaking cylinders or calipers.

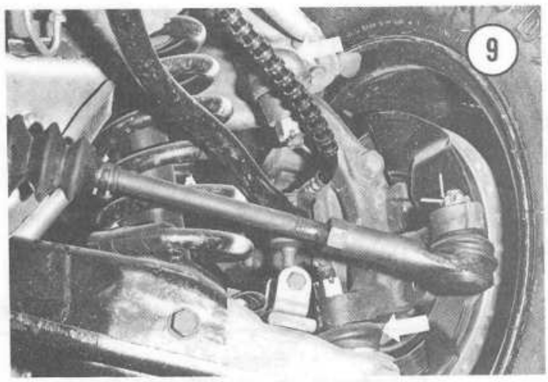
Check all brake lines and hoses for cracks, leaks or wear. If worn, cracked, or crimped spots are visible, find the cause of interference and correct it. Replace lines or hoses that are worn or otherwise damaged.

Front Suspension, Ball-Joint Lubrication

Securely block the rear wheels so that the car will not roll in either direction. Jack up the front end of the car and place on jackstands.

NOTE: *If the car has been parked in temperatures below 20°F, park the vehicle in a heated garage until the ball-joints will accept grease.*

Clean the area around the ball-joint grease plugs (**Figure 9**). Remove the plugs with a 3/16 in. socket. Inject multipurpose grease with a rubber-tipped, hand-operated grease gun. Apply grease until the ball-joint boot swells, then reinstall the grease plug.



CAUTION

Do not force so much grease into the ball-joint that it escapes from the ball-joint boot. This will ruin the boot's weather-tight seal.

PCV System

The PCV (positive crankcase ventilation) system should be cleaned and inspected, and the PCV valve replaced at the interval specified in Table 2 or 3. Refer to the *Emission Control Systems* section of Chapter Five for cleaning, inspection and replacement procedures.

Fuel Vapor Emission System and Evaporative Emission Canister

The fuel vapor emission system includes the fuel tank fill control and venting system, the pressure/vacuum relief fill cap, the fuel tank vapor separator and the evaporative emission canister. The system should be inspected and cleaned at the interval specified in Table 2 or 3. Refer to the *Emission Control* section of Chapter Five for inspection, cleaning, and replacement procedures.

Steering Linkage

The steering linkage should be checked at the intervals specified in Table 2 or 3 for excessive looseness or wear. To do this, turn the steering wheel so that the front wheels are aligned directly ahead. Turn the steering wheel from right to left while having an assistant monitor the movement of the front tires. There should be no more than ⅜ in. free play at the steering wheel rim before the front tires begin to move.

TUNE-UP

A complete tune-up should be performed every 12,000 miles (15,000 miles for 1975-1976 vehicles sold in California, 20,000 miles for 1975-1976 vehicles sold in the other 49 states) under normal conditions. More frequent tune-ups may be required if the vehicle is used for frequent stop-and-go driving. Because certain systems in the engine interact, the tune-up procedures should be performed in the following order:

1. Tighten cylinder head bolts
2. Adjust valve clearances (2800cc only)
3. Perform ignition system work
4. Adjust carburetor

Tables 7 and 8 provide tune-up specifications.

Table 7 SPARK PLUGS AND POINTS

	Type	Gap
Spark plugs		
1974-1975		
4 cyl.	AGRF-42	0.034 in.
V6	AGR-42	0.034 in.
V8	ARF-42	0.034 in.
1976		
4 cyl., V6	AWRF-42	0.034 in.
V8	ARF-42	0.044 in.
Points		
(1974 only)	—	0.027 in. (35-41° dwell)

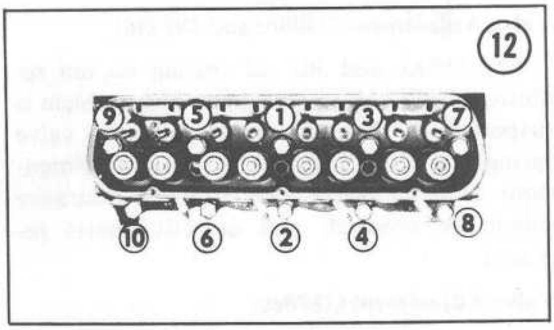
Table 8 TUNE-UP SPECIFICATIONS (1974-1976 MODELS)

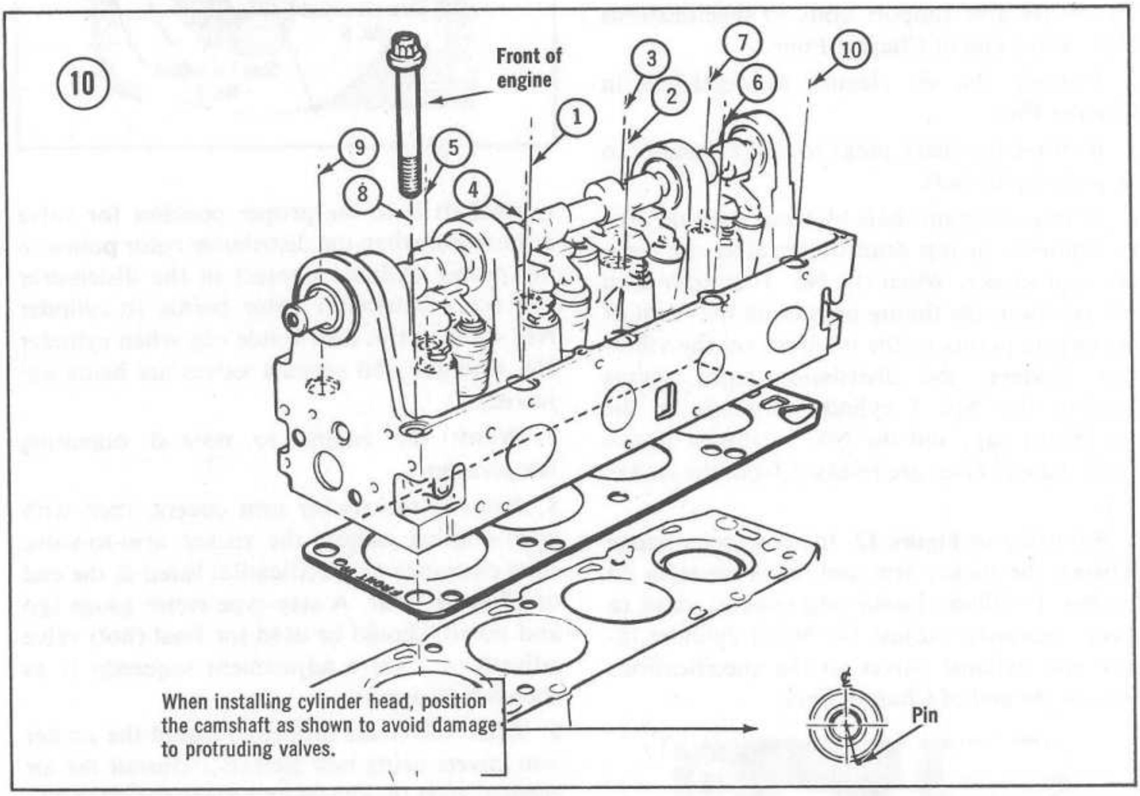
	Engine (Cylinders/Carburetor/Displacement in Cu.In./Usage)	Transmission	Basic Timing	Curb Idle (rpm)
1974	4/2 bbl/140/All	Man.	6°BTDC	850
	4/2 bbl/140/All	Auto.	6°BTDC	750
	V6/2 bbl/171/All	Man.	12°BTDC	750
	V6/2 bbl/171/All	Auto.	12°BTDC	650
1975	4/2 bbl/140/All	Man.	6°BTDC	850
	4/2 bbl/140/Federal	Auto.	6°BTDC	750D
	4/2 bbl/140/California	Auto.	10°BTDC	750D
	V6/2 bbl/171/All	Man.	6°BTDC	850
	V6/2 bbl/171/Federal	Auto.	10°BTDC	750D
	V6/2 bbl/171/California	Auto.	8°BTDC	750D
	V8/2 bbl/302/All	Auto.	6°BTDC	700D
1976	4/2 bbl/140/All	Man.	6°BTDC	750
	4/2 bbl/140/Federal	Auto.	6°BTDC	650D
	4/2 bbl/140/California	Auto.	10°BTDC	750
	V6/2 bbl/171/All	Man.	6°BTDC	850
	V6/2 bbl/171/Federal	Auto.	10°BTDC	700D
	V6/2 bbl/171/California	Auto.	8°BTDC	700D
	V8/2 bbl/302/All	Auto.	6°BTDC	700D

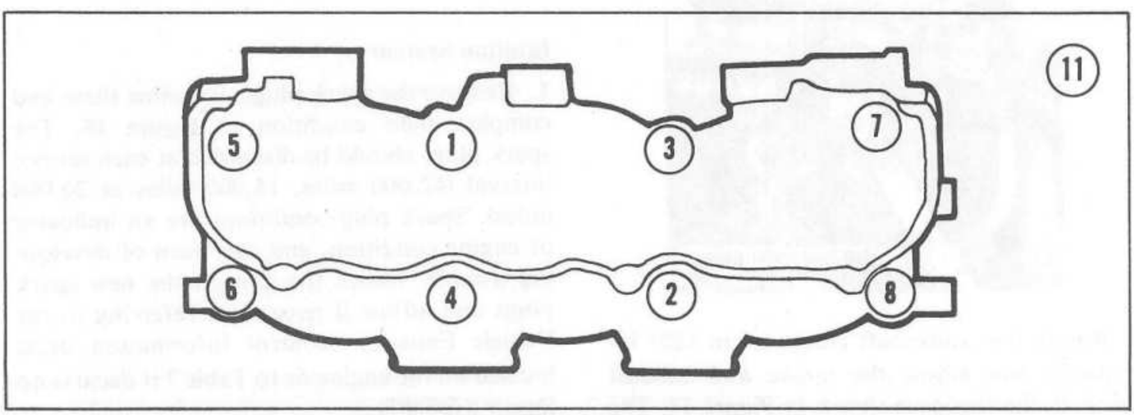
2

Cylinder Head Bolts

On 2300cc engines, tighten the cylinder head bolts to 60 ft.-lb. then to 80 ft.-lb. in the sequence shown in **Figure 10**. On 2800cc engines, tighten the cylinder head bolts to 40 ft.-lb., then to 50 ft.-lb., and finally 65-80 ft.-lb. in the sequence shown in **Figure 11**. On 302 cid engines, tighten the cylinder head bolts to 50 ft.-lb., then 60 ft.-lb., and finally to 65-72 ft.-lb. in the sequence shown in **Figure 12**.







Valve Adjustment (2300cc and 302 cid)

The 2300cc and 302 cid engines do not require periodic valve adjustment. If a problem is suspected in the valve train then the valve spring assembled height, the camshaft dimensions and the valve lash adjuster clearance should be checked, and defective parts replaced.

Valve Adjustment (2800cc)

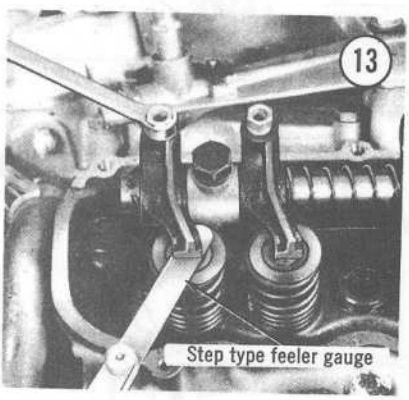
1. Remove the rocker arm covers and torque the rocker arm support bolts to specifications listed at the end of Chapter Four.

2. Remove the air cleaner as described in Chapter Five.

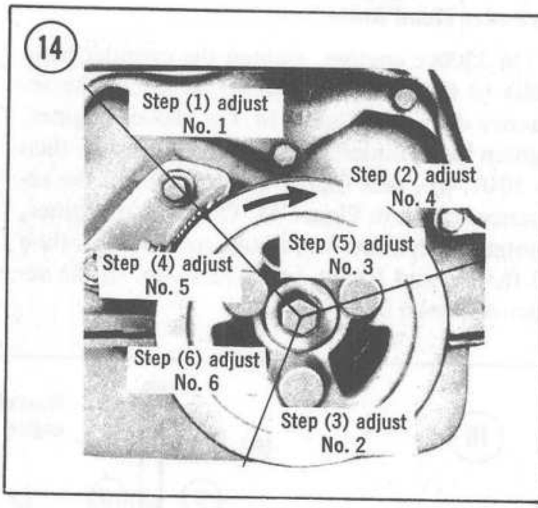
3. Remove the spark plugs to make it easier to turn the crankshaft.

4. Rotate the crankshaft by hand until the No. 1 cylinder is at top dead center after the compression stroke. When the No. 1 cylinder is in this position, the timing pointer on the front of the engine points to the 0° mark on the vibration damper, the distributor rotor points towards the No. 1 cylinder position in the distributor cap, and the No. 1 cylinder intake and exhaust valves are released from the rocker arms.

5. Referring to **Figure 13**, insert a feeler gauge between the rocker arm and the valve stem on the No. 1 cylinder intake and exhaust valve to check clearance. Adjust the No. 1 cylinder intake and exhaust valves to the specifications listed at the end of Chapter Four.



6. Rotate the crankshaft clockwise in 120° increments and adjust the intake and exhaust valves in the sequence shown in **Figure 14**. The crankshaft is in the proper position for valve adjustment when the distributor rotor points to the proper cylinder contact in the distributor cap (i.e., distributor rotor points to cylinder No. 4 contact in distributor cap when cylinder No. 4 intake and exhaust valves are being adjusted).



7. Warm the engine to normal operating temperature.

8. Remove the rocker arm covers, then with engine idling, adjust the rocker arm-to-valve stem clearance to specification listed at the end of Chapter Four. A step-type feeler gauge (go and no-go) should be used for final (hot) valve adjustment. Valve adjustment sequence is as shown in Figure 14.

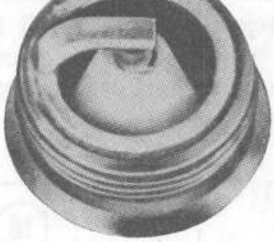
9. After valves are adjusted, install the rocker arm covers using new gaskets, reinstall the air cleaner, start the engine and check for oil leaks.

Ignition System

1. Remove the spark plugs. Examine them and compare their condition to **Figure 15**. The spark plugs should be discarded at each service interval (12,000 miles, 15,000 miles or 20,000 miles). Spark plug conditions are an indicator of engine condition, and can warn of developing trouble. Check the gap on the new spark plugs and adjust if necessary, referring to the Vehicle Emission Control Information decal located on the engine or to Table 7 if decal is no longer available.

(15)

SPARK PLUG CONDITION



NORMAL

• Identified by light tan or gray deposits on the firing tip.
• Can be cleaned.

GAP BRIDGED

• Identified by deposit buildup closing gap between electrodes.
• Caused by oil or carbon fouling. If deposits are not excessive, the plug can be cleaned.

OIL FOULED

• Identified by wet black deposits on the insulator shell bore electrodes.
• Caused by excessive oil entering combustion chamber through worn rings and pistons, excessive clearance between valve guides and stems, or worn or loose bearings. Can be cleaned. If engine is not repaired, use a hotter plug.

CARBON FOULED

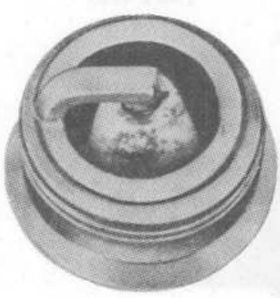
• Identified by black, dry fluffy carbon deposits on insulator tips, exposed shell surfaces and electrodes.
• Caused by too cold a plug, weak ignition, dirty air cleaner, defective fuel pump, too rich a fuel mixture, improperly operating heat riser, or excessive idling. Can be cleaned.

LEAD FOULED

• Identified by dark gray, black, yellow, or tan deposits or a fused glazed coating on the insulator tip.
• Caused by highly leaded gasoline. Can be cleaned.

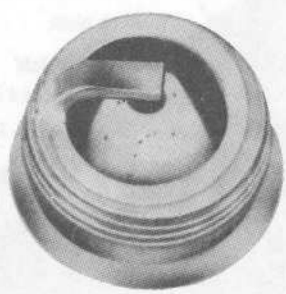
WORN

• Identified by severely eroded or worn electrodes.
• Caused by normal wear. Should be replaced.



FUSED SPOT DEPOSIT

• Identified by melted or spotty deposits resembling bubbles or blisters.
• Caused by sudden acceleration. Can be cleaned.



OVERHEATING

• Identified by a white or light gray insulator with small black or gray brown spots and with bluish-burnt appearance of electrodes.
• Caused by engine overheating, wrong type of fuel, loose spark plugs, too hot a plug, low fuel pump pressure, or incorrect ignition timing. Replace the plug.

PREIGNITION

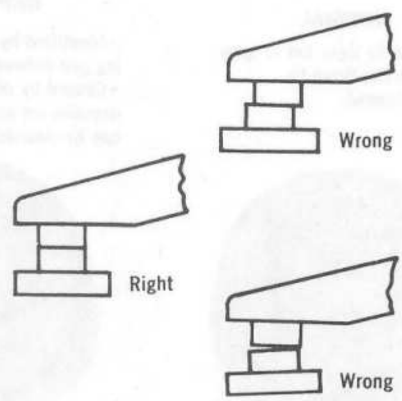
• Identified by melted electrodes and possibly blistered insulator. Metallic deposits on insulator indicate engine damage.
• Caused by wrong type of fuel, incorrect ignition timing or advance, too hot a plug, burned valves, or engine overheating. Replace the plug.

2. Remove the distributor cap and rotor. Look for factory numbers on the plug wires. Make your own if they are not visible so that the plug wires can be reinstalled in their correct position. Clean the spark plug wires, the coil-to-distributor wire, and the primary (thin) wire running from the coil to the distributor. Check all wires for wear, melting, or cracked insulation. Replace any wires that show any of these conditions. Replace the distributor cap and rotor if they are damaged or excessively worn.

3. Inspect the distributor points (1974 models only). If the points are not too badly burned or pitted to be gapped accurately, or if the metal transfer between the contacts is less than the point gap, the points are serviceable. However, it is recommended that the points be replaced at each serviceable interval.

To replace points on 2300cc or 302 cid engines, loosen the screws securing the point and condesner leads to the breaker plate. See **Figure 16** for 2300cc engines, or **Figure 17** for 302 cid engines. Remove the condenser retaining screw and lift the condenser off the distributor breaker point plate. Remove the 2 breaker point retaining screws, and lift the breaker point assembly off the distributor. Wipe the distributor cam and breaker plate clean. Make sure the new points are aligned correctly (**Figure 18**). If necessary, carefully bend the fixed contact of the breaker points to properly align the point contacts. Install the new breaker points by reversing the removal procedure. Apply a small amount of distributor cam lubricant to the cam lobes.

18



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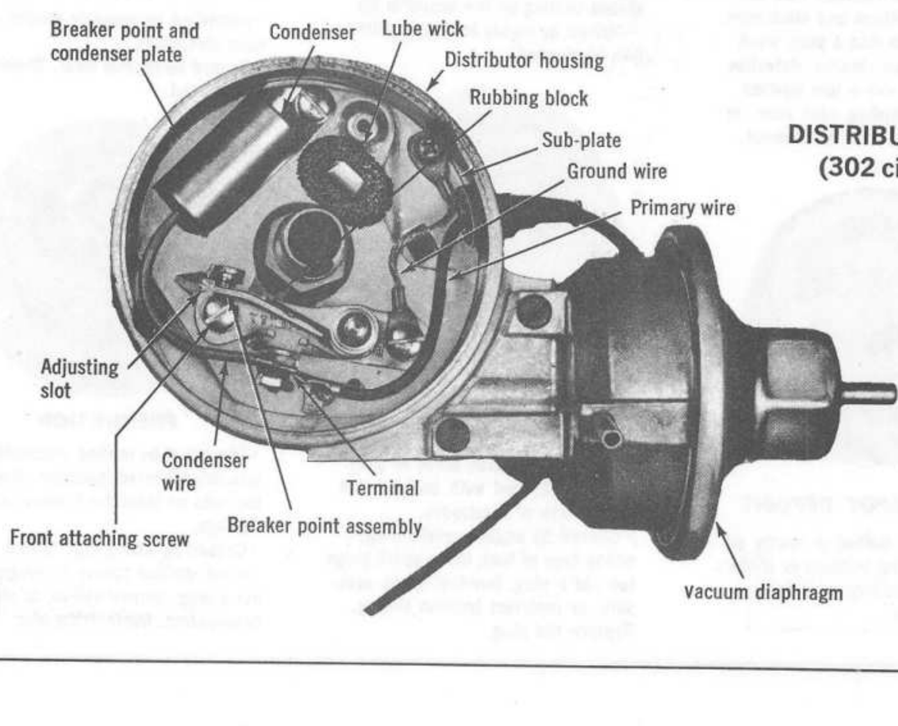

DISTRIBUTOR (302 cid)

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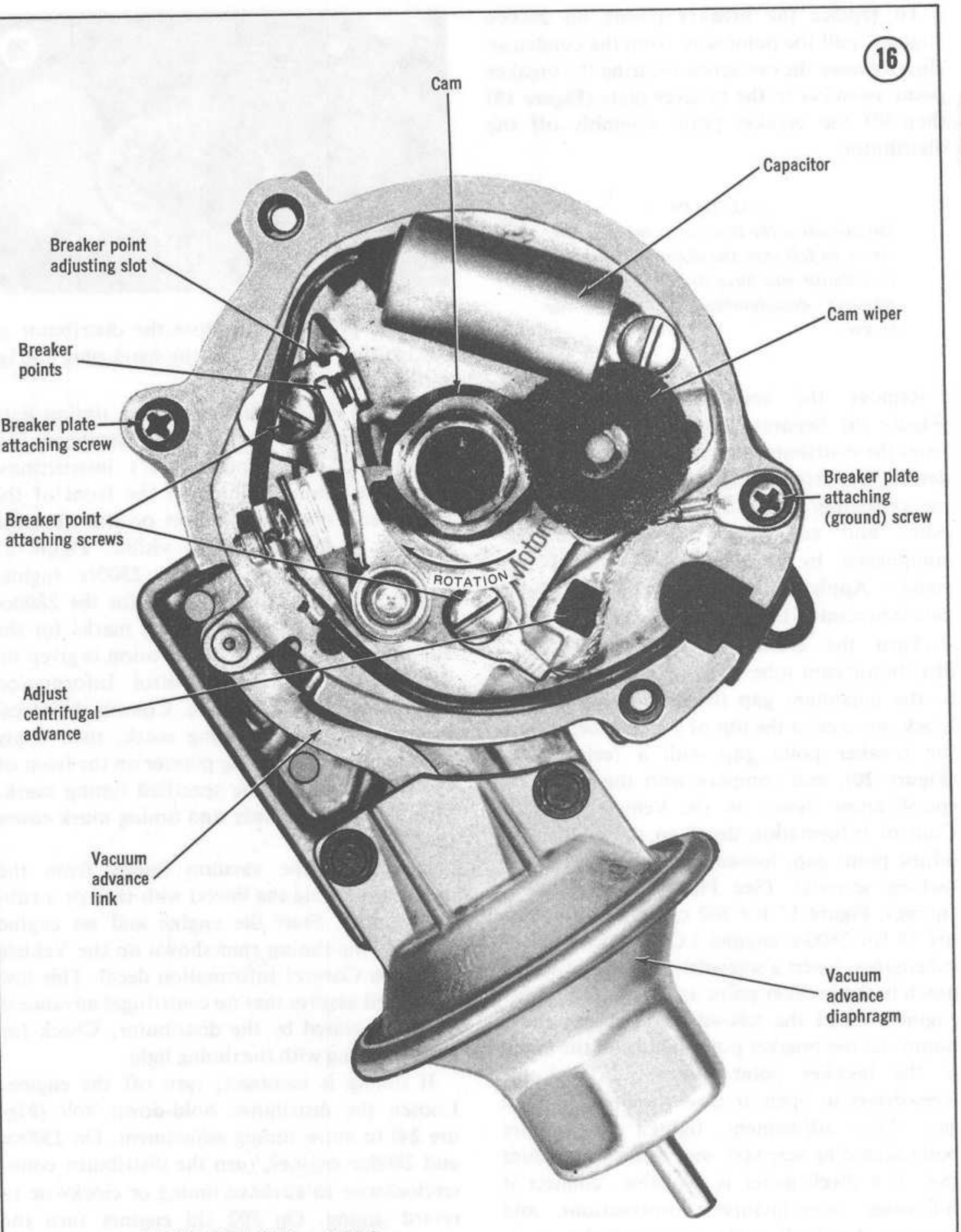


DISTRIBUTOR — 2300cc

To replace the breaker points on 2800cc engines, pull the point wire from the condenser clip. Remove the one screw securing the breaker point assembly to the breaker plate **(Figure 19)** then lift the breaker point assembly off the distributor.

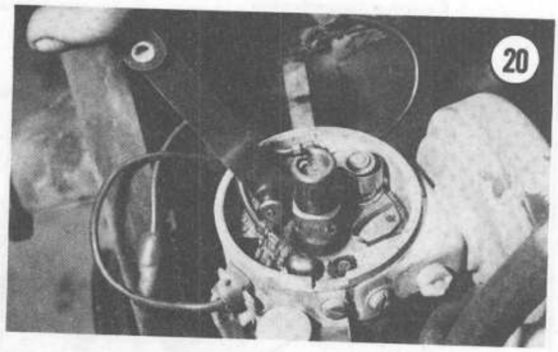
CAUTION

Do not allow the breaker point retaining screw to fall into the distributor, or the distributor will have to be removed and possibly disassembled to extract the screw.

Remove the condenser retaining screw (Figure 19). Separate the rubber wire grommet from the distributor body. Disconnect the condenser wire from the ignition coil, and remove the condenser from the distributor. Breaker point and condenser installation are accomplished by reversing the removal procedure. Apply a small amount of distributor cam lubricant to the cam lobes.

4. Turn the crankshaft by hand until a distributor cam lobe opens the breaker points to the maximum gap (breaker point rubbing block centered at the top of a cam lobe). Check the breaker point gap with a feeler gauge **(Figure 20)**, and compare with the point gap specification shown on the Vehicle Emission Control Information decal on the engine. To adjust point gap, loosen the breaker point attaching screw(s). (See Figure 16 for 2300cc engines, Figure 17 for 302 cid engines, or Figure 19 for 2800cc engines.) On 2300cc and 302 cid engines, insert a screwdriver in the adjusting notch in the breaker point assembly. On 2800cc engines, insert the screwdriver between the 2 bumps on the breaker point plate and the notch in the breaker point assembly. Twist the screwdriver to open or close the breaker point gap. After adjustment, tighten the breaker point attaching screw(s), and recheck the point gap. If a dwell meter is available, connect if following manufacturer's instructions and measure the dwell angle. Compare the measured dwell angle with the specified dwell angle on the Vehicle Emission Control Information decal on the engine.

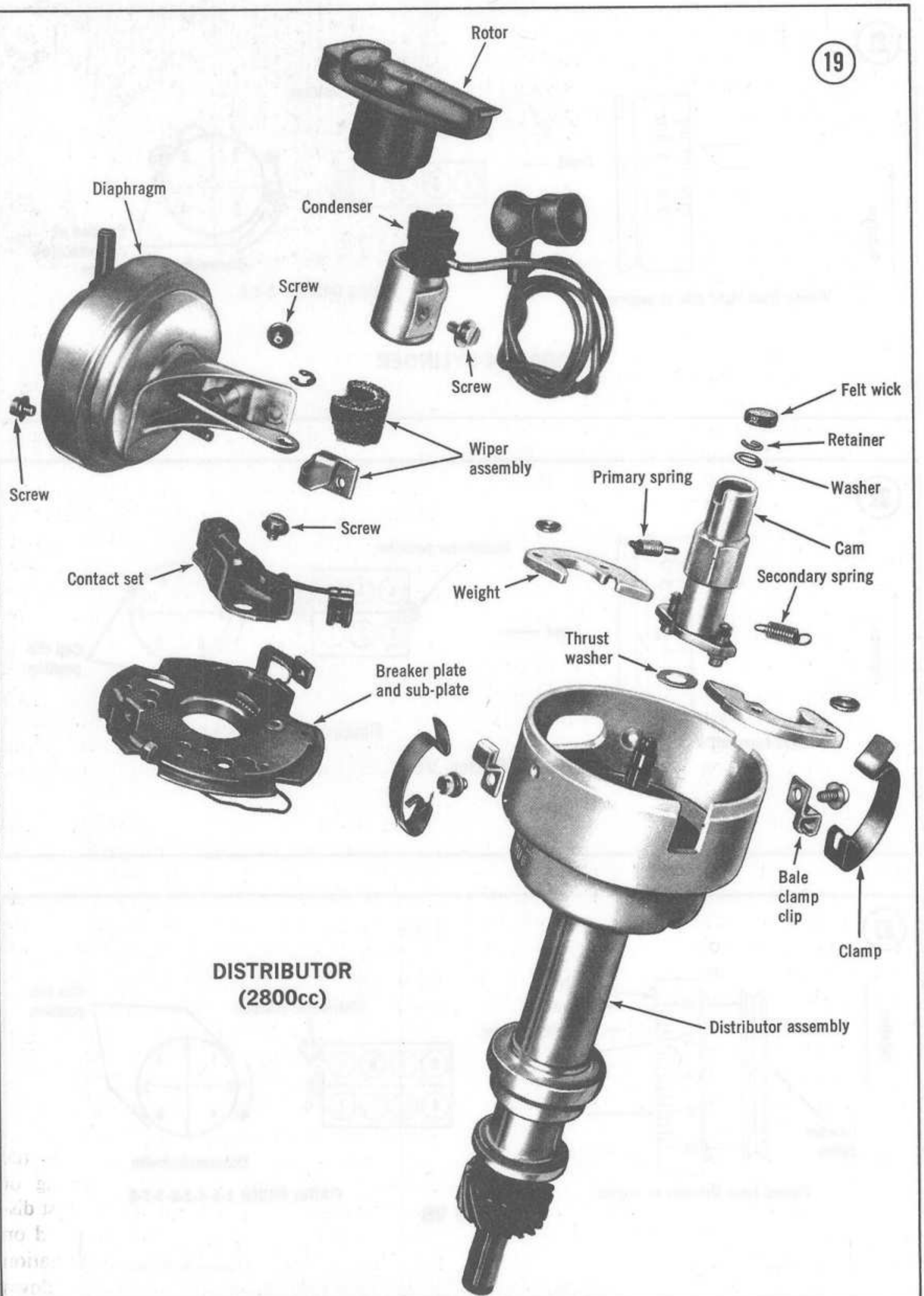
5. Install the distributor rotor and cap. Connect the primary lead from the distributor to the ignition coil. Connect the spark plug and ignition coil wires.



6. Adjust ignition timing with a timing light and tachometer. Connect the instruments according to the manufacturer's instructions. Clean the timing pointer on the front of the engine and the timing marks on the vibration damper so they are easily visible. **Figure 21** shows timing marks for the 2300cc engine. **Figure 22** shows timing marks for the 2800cc engine. **Figure 23** shows timing marks for the 302 cid engine. Timing information is given on the Vehicle Emission Control Information decal located on the engine. Consult this decal to find the correct timing mark, then apply white paint to the timing pointer on the front of the engine, and to the specified timing mark. This makes the pointer and timing mark easier to see.

Disconnect the vacuum line(s) from the distributor. Plug the line(s) with tape or a rubber stopper. Start the engine and set engine speed at the timing rpm shown on the Vehicle Emission Control Information decal. This low idle speed assures that no centrifugal advance is being generated by the distributor. Check for proper timing with the timing light.

If timing is incorrect, turn off the engine. Loosen the distributor hold-down bolt **(Figure 24)** to allow timing adjustment. On 2300cc and 2800cc engines, turn the distributor counterclockwise to advance timing or clockwise to retard timing. On 302 cid engines turn the distributor clockwise to advance timing or counterclockwise to retard timing. Adjust distributor timing to the specifications listed on the Vehicle Emission Control Information decal, then tighten the distributor hold-down



DISTRIBUTOR
(2800cc)

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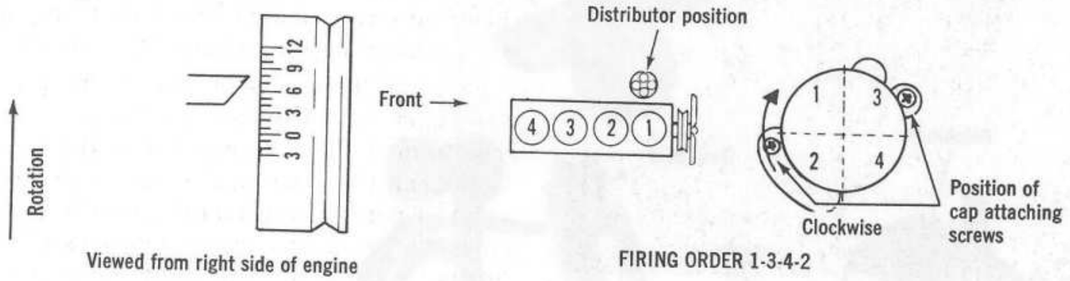

2300cc 4-CYLINDER

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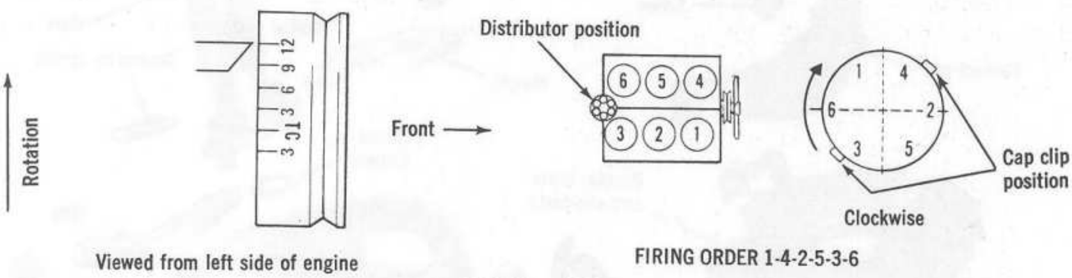

2800cc V6

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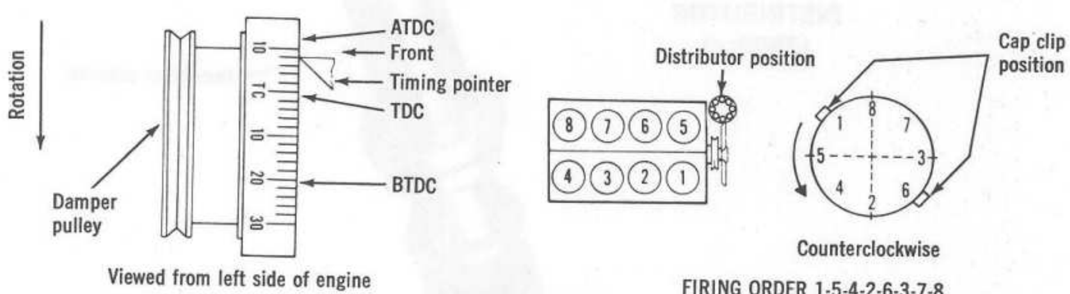
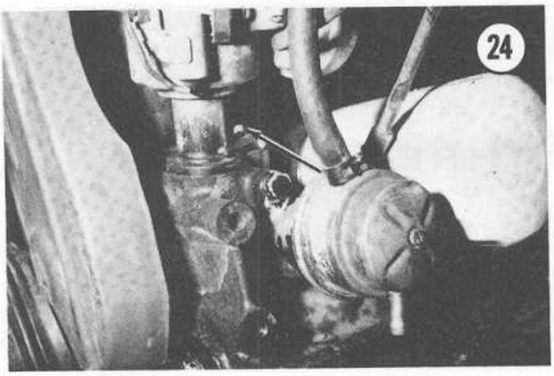


302 cid V8



nut, and recheck timing. Continue this process until timing is correct.

After timing has been correctly set, check the centrifugal advance by slowly increasing the engine speed to 2,000 rpm. Timing should advance from the original idle setting. Check the vacuum advance by removing the tap from the vacuum line running to the carburetor, connecting the carburetor vacuum hose to the advance diaphragm (farthest from the distributor on dual-diaphragm distributors), then slowly increasing engine speed to 2,000 rpm. Timing should advance as it did when checking the centrifugal advance, although at a different rate.

To check the vacuum retard diaphragm in dual-diaphragm distributors, connect vacuum hose from the intake manifold to the retard diaphragm (the one nearest the distributor body). Timing should retard immediately. If either the retard or advance functions of the distributor fail to work properly, the distributor must be checked on special testing equipment. Remove the distributor from the engine, and take it to a Ford dealer or ignition specialist.

Carburetor

Carburetor adjustments include idle speed, idle fuel mixture, and fast idle settings. See Chapter Five for these adjustment procedures.

CHAPTER THREE

TROUBLESHOOTING

Troubleshooting the Mustang II can be relatively easy if done in a logical, orderly manner. The first step in any troubleshooting procedure must be defining the symptoms as closely as possible. After the symptoms are defined, areas which could cause the problems are tested and analyzed. Guessing at the cause of a problem may provide the solution, but it can easily lead to frustration, wasted time, and a series of expensive, unnecessary parts replacements.

The troubleshooting procedures in this chapter analyze typical symptoms, and show logical methods of isolating causes. These are not the only methods. There may be several ways to solve a problem, but only a systematic, methodical approach can guarantee success.

TROUBLESHOOTING INSTRUMENTS

The following equipment is necessary to troubleshoot any engine properly:

a. Voltmeter, ammeter and ohmmeter
b. Hydrometer
c. Compression tester
d. Vacuum gauge
e. Fuel pressure gauge
f. Dwell meter
g. Tachometer
h. Strobe timing light
i. Exhaust gas analyzer

Items a-f are basic for any car. Items g-i are necessary for exhaust emission control compliance. The following is a brief description of each instrument. Consult a basic auto repair manual for more detailed information.

Voltmeter, Ammeter, and Ohmmeter

For testing the ignition system and electrical system, a good voltmeter is needed. A voltmeter covering 0-20 volts is satisfactory. It should have an accuracy of about ±½ volt, which excludes the type found in car instrument panels.

An ohmmeter measures electrical resistance. It is useful for checking continuity (open and short circuits) and testing fuses and lights.

The ammeter measures electrical current. Ammeters for automotive use should cover 0-10 amperes and 0-100 amperes. These are useful for checking battery starting and charging current.

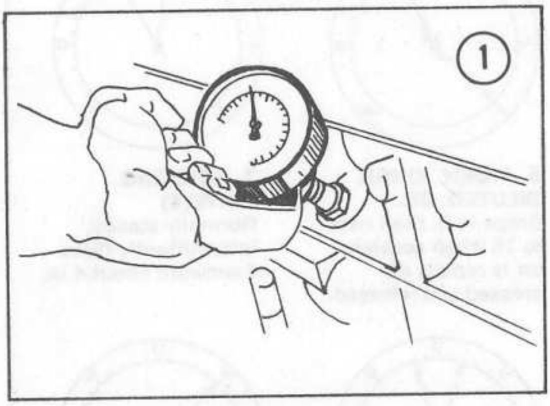
Some inexpensive VOM's (volt-ohmmeters) combine all three instruments into one. The ammeter ranges are usually too small for automotive work, though.

Hydrometer

The hydrometer gives a useful indication of battery condition and charge by measuring the specific gravity of the electrolyte in each cell. Complete details on use and interpretation of readings are given in Chapter Seven.

Compression Tester

The compression tester measures the compression pressure built up in each cylinder. Interpretation of compression test results can indicate general cylinder and valve condition. **Figure 1** shows a compression tester in use.



There are 2 types of compression tests, "wet" and "dry". These tests are interpreted together to isolate problems in cylinders and valves. The dry compression test is performed first. To test:

1. Warm the engine to normal operating temperature. Make sure the choke valve is completely open.
2. Remove the spark plugs.
3. Connect the compression tester to one cylinder following manufacturer's instructions.
4. Have an assistant crank the engine over until there is no further increase in compression. Hold the accelerator to the floor while cranking.
5. Remove the tester and record each reading.
6. Repeat Steps 3-5 for each cylinder.

When interpreting the results, actual readings are not as important as the differences in readings. The lowest reading must be within 5% of the highest. A greater difference indicates worn or broken rings, leaky or sticking valves, or a combination of all.

If the dry compression test indicates a problem (excessive variation in readings), isolate the cause with a wet compression test. This is done in the same way as the dry compression test, except that about one tablespoon of oil is poured down the spark plug hole before performing Steps 3-5. If the wet compression readings are much greater than the dry compression readings, the trouble is probably due to worn or broken rings. If there is little difference between wet and dry readings, the trouble is probably due to leaky or sticking valves.

3

Vacuum Gauge

The vacuum gauge is one of the easiest instruments to use, but one of the most difficult for the inexperienced mechanic to interpret. The results are interpreted with other findings to isolate problems.

To use the vacuum gauge connect it to the distributor vacuum line at the intake manifold.

NOTE: *Subtract one in. from reading for every 1,000 ft. of altitude.*

Figure 2 shows numerous typical readings with interpretations. Numbers given are approximate. Results are not conclusive without comparing to other tests, such as compression.

Fuel Pressure Gauge

This instrument is necessary for testing fuel pump performance. Fuel system troubleshooting procedures in this chapter use a fuel pressure gauge.

Dwell Meter

A dwell meter measures how many degrees of cam rotation that the distributor points remain closed when the engine is running. Since this angle is determined by breaker point gap, the dwell angle is an accurate indication of point gap. Dwell angle for all 1974 models is 35-41°. Dwell angle measurement is not meaningful on 1975-1976 models because they employ breakerless solid state ignition systems.

Many tachometers intended for testing and tuning include a dwell meter. Follow the manufacturer's instructions to measure dwell.

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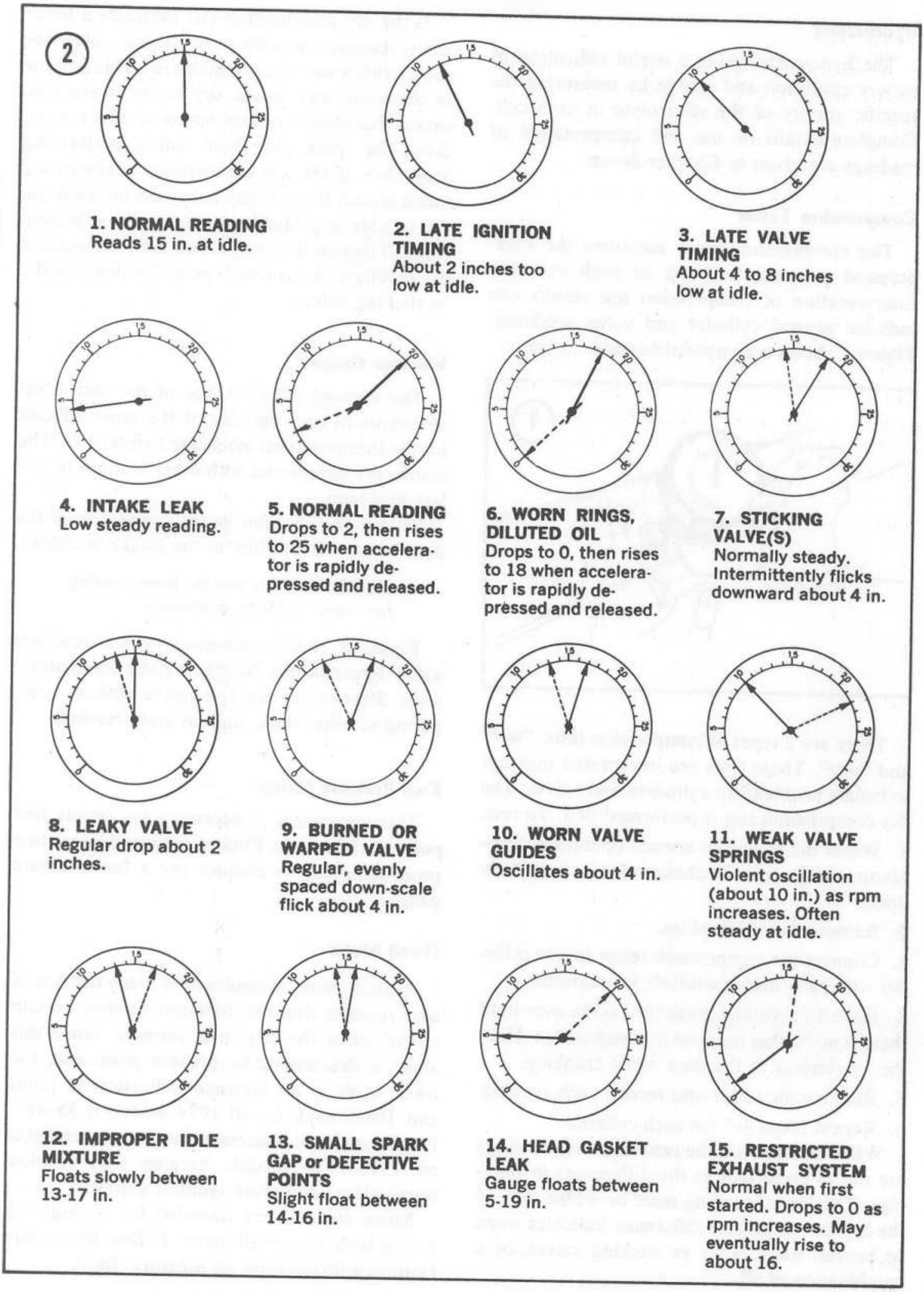

1. NORMAL READING
Reads 15 in. at idle.

2. LATE IGNITION TIMING
About 2 inches too low at idle.

3. LATE VALVE TIMING
About 4 to 8 inches low at idle.

4. INTAKE LEAK
Low steady reading.

5. NORMAL READING
Drops to 2, then rises to 25 when accelerator is rapidly depressed and released.

6. WORN RINGS, DILUTED OIL
Drops to 0, then rises to 18 when accelerator is rapidly depressed and released.

7. STICKING VALVE(S)
Normally steady. Intermittently flicks downward about 4 in.

8. LEAKY VALVE
Regular drop about 2 inches.

9. BURNED OR WARPED VALVE
Regular, evenly spaced down-scale flick about 4 in.

10. WORN VALVE GUIDES
Oscillates about 4 in.

11. WEAK VALVE SPRINGS
Violent oscillation (about 10 in.) as rpm increases. Often steady at idle.

12. IMPROPER IDLE MIXTURE
Floats slowly between 13-17 in.

13. SMALL SPARK GAP or DEFECTIVE POINTS
Slight float between 14-16 in.

14. HEAD GASKET LEAK
Gauge floats between 5-19 in.

15. RESTRICTED EXHAUST SYSTEM
Normal when first started. Drops to 0 as rpm increases. May eventually rise to about 16.

Tachometer

A tachometer is necessary for setting ignition timing and adjusting the carburetor. The best instrument for this purpose is one with a range of 0-2,000 rpm. Tachometers with an extended range (0-6,000 or 0-8,000 rpm) lack accuracy at lower speeds. The tachometer should be capable of detecting changes of 25 rpm.

Strobe Timing Light

This instrument is necessary for tuning and emission control adjustments. It permits very accurate ignition timing. The light flashes precisely at the same instant that No. 1 cylinder fires, so the position of the crankshaft pulley at that instant can be seen. On all engines, marks on the pulley are aligned with a timing pointer on the engine front cover while the engine is running.

Exhaust Analyzer

This instrument is necessary to check emission control adjustments accurately. It samples the exhaust gases from the tailpipe and measures the thermal conductivity of the exhaust. Since different gases conduct heat at varying rates, thermal conductivity of the exhaust is a good indicator of the gases present.

Exhaust analyzers are relatively expensive to buy, but some large rent-all dealers have them available at a modest price.

However, bear in mind that if you perform the work yourself, and even though the emissions are within legal limits, you are not certified and consequently the work cannot be certified. In some cases it may be possible to have a certified shop or specialist verify that the settings are correct. However, this requires time for which you are likely to be charged.

It is therefore recommended that exhaust emission-related work be performed by a specialist to save time and money.

STARTER

Starter system troubles are relatively easy to isolate. The following are common symptoms and causes.

1. *Engine cranks very slowly or not at all*—Turn on the headlights. If the lights are very dim, the battery or connecting wires are probably at fault. Check the battery as described in Chapter Seven. Also check the adjustment of the alternator drive belt. If the belt is loose, and the alternator pulley can be turned by hand with little effort, the battery is not being adequately charged and does not have sufficient reserve to turn the starter. Check the wiring for breaks, shorts, or dirty connections.

If the battery or connecting wires are not at fault, turn the headlights on and try to crank the engine. If the lights dim drastically, the starter is probably shorted to ground. Remove it and test as described in Chapter Seven.

If the lights remain bright or dim only slightly when trying to start the engine, the trouble may be in the starter, relay, or wiring. On automatic transmission models, the neutral start switch may also be at fault. Perform the following steps to isolate the cause.

WARNING

Disconnect the coil wire and move it as far from the coil as possible to prevent accidental starting. Keep away from moving parts (fan, alternator, etc.) when working in the engine compartment.

a. If the starter doesn't respond at all, connect a 12-volt test lamp between the starter terminal and ground. Turn the ignition key to START. If the lamp lights, the starter is probably at fault. Remove it and test as described in Chapter Seven. If the lamp doesn't light, the problem is somewhere in the starting circuit. Perform the next steps.
b. On automatic transmission models, disconnect the wiring connector from the neutral start switch (Chapter Nine). Connect a jumper wire between the terminals on the wiring connector, then turn the ignition key to START. If the starter turns, adjust or replace the neutral start switch as described in Chapter Nine.
c. Connect a jumper wire between the battery and starter terminals on the starter relay

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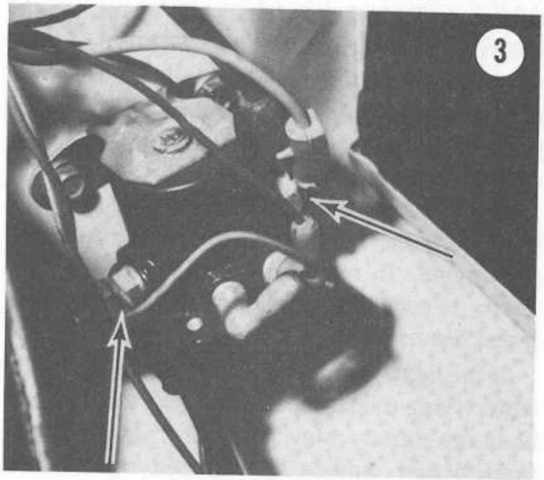
(**Figure 3**). If the starter doesn't respond at all, the relay is probably defective. If the starter cranks normally, perform the next step.



d. Connect a test lamp between the starter terminal on the starter relay and ground. Turn the ignition key to START. If the lamp doesn't light, check the ignition switch and associated wiring. Turn the key to START and work it around in the switch. If the lamp lights erratically, the ignition switch is probably defective.

e. If the problem still has not been isolated, check all wiring in the starting circuit with an ohmmeter or other continuity tester. See wiring diagrams in Chapter Seven.

2. *Starter turns, but does not engage with flywheel ring gear* – This problem may be caused by a defective starter drive mechanism, or broken pinion or ring gear teeth. Remove and inspect the starter as described in Chapter Seven.

3. *Loud grinding noises when starter runs* – This may mean the teeth on pinion or flywheel are not meshing properly or it may mean the starter drive mechanism is damaged. In the first case, remove the starter and examine the gear teeth. In the latter case, remove the starter and repair the starter drive mechanism.

CHARGING SYSTEM

Charging system troubles may be in the alternator, voltage regulator, battery, or fan belt. The following symptoms are typical.

1. *Battery dies frequently, even though alternator warning lamp shows no discharge* – This can be caused by a fan belt that is just slightly too loose. Grasp the alternator pulley and try to turn it. If the pulley can be turned without moving the fan belt, the fan belt needs to be tightened. The battery may also be at fault. Test it as described in Chapter Seven. In addition, it is important that the battery's condition be checked if it has become severely discharged because of a faulty alternator, regulator, or loose fan belt; when discharged, a battery is prone to sulfating. That is, the deposits that are normally held to the plates by electrostatic attraction fall from the plates and collect in the bottom of the case. At the extreme, the deposits build up to the extent that they contact the bottom of 2 or more dissimilar plates causing a dead short and rendering one or more cells unserviceable.

This condition is irreversable and the battery must be replaced.

2. *Alternator warning lamp does not come on when ignition is switched on* – This may indicate a defective ignition switch, battery, voltage regulator, or lamp. First, try to start the car. If it doesn't start, check the ignition switch and battery. If the car starts, find the voltage regulator and disconnect the wiring connector. Ground the light green and red wire; this is the lamp wire. If the lamp lights, the voltage regulator is defective, not properly grounded (try tightening the mounting screws), or the alternator brushes are not making contact. Test the alternator and regulator as described in Chapter Seven. If the alternator light does not light when the wire is grounded, the bulb is probably burned out; replace it.

3. *Alternator warning lamp comes on and stays on* – This usually indicates that no charging is taking place. First check fan belt tension as described in Chapter Six. Then check battery condition with a hydrometer, and check all wiring connections in the charging system. If this does not locate the trouble, check the alter-

nator and voltage regulator, using test procedures described in Chapter Seven.

4. *Alternator shows intermittent discharge* — This usually indicates the charging system is working intermittently. Check the fan belt tension, and check all electrical connections in the charging system. Check the alternator.

5. *Battery requires frequent additions of water, or lamps require frequent replacement* — The alternator is probably overcharging the battery. The voltage regulator is probably at fault.

6. *Excessive noise from alternator* — Check for loose alternator mounting. The problem may also be worn alternator bearings. If the alternator whines, a shorted diode may be indicated.

ENGINE

These procedures are to be used when the starter cranks the engine over normally. If not, refer to *Starter* section in this chapter.

1. *Engine will not start* — This problem could be caused by the ignition system or the fuel system. First find out if there is high voltage to the spark plugs. To do this, disconnect one of the spark plug wires. Hold the wire about ¼ in. to ½ in. from ground (any metal in the engine compartment) with an *insulated screwdriver*.

WARNING

Do not hold the spark plug wire by hand. Even a tiny break in the insulation could cause you to become part of the circuit; the high-voltage discharge can cause serious injury or even death.

Crank the engine over. If sparks do not jump to ground, or the sparks are very weak, the problem may be in the ignition system. See the *Ignition System* section of this chapter for further details. If good sparks occur, the trouble may be in the fuel system. See *Fuel System* section of this chapter.

2. *Engine misses steadily* — Remove one spark plug wire at a time and ground the wire. If engine miss increases, that cylinder was working properly. Reconnect the wire and check the others. When a wire is disconnected and the miss remains the same, that cylinder is not firing. Check spark as described in Step 1. If no spark occurs for one cylinder only, check the distributor cap, wire, and spark plug. If spark occurs on the non-firing cylinder, check compression and intake manifold vacuum to isolate the trouble.

3. *Engine misses erratically at all speeds* — There are several possible causes, which may be difficult to find. The problem could be in the ignition system, exhaust system (exhaust restriction), fuel system, or it could be an intake manifold leak. Follow troubleshooting procedures for these systems carefully to isolate the trouble.

4. *Engine misses at idle only* — Trouble could exist anywhere in the ignition system. Follow ignition system troubleshooting procedures carefully. The problem could also be in the carburetor idle adjustments. Check as described in Chapter Five. Also check all vacuum lines and the intake manifold for leaks. If one cylinder misses and has a low compression reading, the cause could be broken or worn rings or defective valves.

5. *Engine misses at high speed only* — Problems could exist in the fuel system, ignition system, or vacuum lines. Check the fuel system as described in *Fuel System Troubleshooting*. Also check spark plugs and wires. See *Ignition System Troubleshooting*.

6. *Low performance at all speeds, poor acceleration* — Trouble usually exists in ignition system or fuel system. Check both systems with appropriate procedures. Check also for clutch slippage and brake drag.

7. *Excessive fuel consumption* — This can be caused by many factors seemingly unrelated to fuel consumption. Check for clutch slippage (manual transmissions), brake drag, defective wheel bearings, and poor front end alignment. Check ignition system and fuel system as described later.

8. *Oil light does not light when ignition is switched on* — Check alternator gauge for discharge. If alternator gauge does not indicate discharge, go to Step 1, *Charging System Troubleshooting*. If only the oil light is off, open the hood and locate the oil pressure and water

temperature senders. See Chapter Four. Ensure the wires are connected to the senders and making good contact. Pull the wire off each sender and ground it. If the lamp lights, replace the sender. If the lamp doesn't light, replace the bulb.

9. *Oil light comes on or flickers when engine is running* – The oil light warns of low oil pressure. Since the light may be indicating complete loss of oil pressure, stop the engine immediately; coast to a stop with the clutch disengaged (manual transmissions) or shift to neutral (automatic transmissions).

Once the car is stopped, look for obvious indications of trouble such as a puddle of oil under the car or a boiled-over radiator. Check the oil level. Look at the oil pressure sender and make sure the wire hasn't fallen off. Check for a shorted sender with an ohmmeter or other continuity tester. Any unusual noises before the engine was shut off may indicate engine damage due to lack of oil pressure.

10. *Temperature gauge moves to H (*HOT*) and stays there* – Stop the car immediately and determine the cause, especially if the engine seems excessively hot. Check fan belt tension. Check the temperature sender and make sure the wire hasn't fallen off. Check for a shorted temperature sender with an ohmmeter or other continuity tester. Do not restart the engine until you know why the light went on and the problem has been corrected.

IGNITION SYSTEM

These procedures assume the battery is in good enough condition to crank the engine at a normal rate.

1. *No spark to one plug* – The only possible causes are a defective distributor cap or spark plug wire. Examine the distributor cap for moisture, dirt, carbon tracking between the contacts, or other visible defects.

2. *No spark to any plugs* – This could be caused by trouble in the primary or secondary circuits. First remove the coil wire from the center of the distributor cap. Hold the end of the wire about 1/4 in. from ground with an *insulated screwdriver*.

WARNING

Do not hold the spark plug wire by hand. Even a tiny break in the insulation could cause you to become part of the circuit; the high-voltage discharge can cause serious injury or even death.

Crank the engine. If sparks occur, the trouble is in the rotor, distributor cap, or points. Remove the cap and check for burns, moisture, dirt, carbon tracking, etc. Check the rotor for excessive pitting, burning, wear, or cracks. Replace if necessary. Check the points for excessive gap (or none at all), burning, pitting, or looseness. Replace or adjust them if necessary.

If the coil does not produce any spark, check the secondary (high voltage) wire for opens. If the wire is good, crank the engine so the breaker points are open. With the points open, check voltage from the negative terminal of the coil to ground with a voltmeter or test lamp. If voltage is present, the coil is probably bad. Have it checked or substitute a coil known to be good. If voltage is not present, check wire connections to the coil and distributor. Temporarily disconnect the wire from the coil negative terminal and measure voltage from the terminal to ground. If voltage is present, the distributor is shorted. Examine breaker points and connecting wires carefully. If voltage is still not present, measure voltage from the coil positive terminal to ground. Voltage on the positive terminal, but not on the negative, indicates a defective coil. No voltage on the positive terminal indicates an open wire between the positive terminal and the battery.

3. *Weak spark*–If the spark is so small it cannot jump 1/4-1/2 in. to ground, check the battery condition as described in Chapter Seven. Other causes are bad breaker points, condenser, incorrect point gap, dirty or loose connections in the primary circuit, or dirty or burned rotor or distributor. Also check for worn distributor cam lobes.

4. *Missing*–This is usually caused by fouled or damaged plugs, plugs of the wrong heat range, or incorrect plug gap. Clean and regap the

spark plugs. This trouble can also be caused by weak spark (Step 3) or incorrect ignition timing.

FUEL SYSTEM

Fuel system problems must be isolated at the fuel pump, fuel lines, or carburetors. These procedures assume the ignition system has been checked and properly adjusted.

1. *Engine will not start*–First make sure fuel is being delivered to the carburetor. Remove the air cleaner, look into the carburetor throat, and depress the accelerator several times. There should be a stream of fuel from the accelerator pump nozzle each time the accelerator is depressed. If not, check the fuel pump delivery, float valve, and float adjustment (Chapter Five).

If fuel is delivered and the engine still will not start, check the automatic choke to make sure it is not stuck, out of adjustment, or damaged. If necessary, rebuild or replace the carburetor. See Chapter Five.

2. *Engine runs at fast idle*–Check the choke setting. Check the idle mixture, idle speed, and decel valve adjustments. See Chapter Five.

3. *Rough idle or engine miss with frequent stalling*–Check idle mixture and idle speed adjustments. See Chapter Five.

4. *Engine "diesels" (continues to run) when ignition is switched off*–Check idle mixture (probably too rich), ignition timing, and idle speed (probably too fast). Check the throttle solenoid for proper operation. Check for overheated engine.

5. *Stumbling when accelerating from idle*–Check the idle speed and idle mixture adjustments. Check the accelerator pump. See Chapter Five.

6. *Engine misses at high speed or lacks power*–This indicates possible fuel starvation. Check fuel pump pressure and capacity. Check float needle valves. Check for a clogged fuel filter or air cleaner.

7. *Black exhaust smoke*–This indicates a badly overrich mixture. Check idle mixture and idle speed adjustment. Check choke setting. Check for excessive fuel pump pressure, leaky floats, or worn needle valves.

8. *Excessive fuel consumption*–Check for overrich mixture. Make sure choke mechanism works properly. Check idle mixture and idle speed. Check for excessive fuel pump pressure, leaky floats, or worn float needle valves.

Fuel Pump Pressure Testing

1. Install a T-fitting in the fuel line close to the carburetor (**Figure 4**).

2. Connect a fuel pressure gauge to the fitting with a short tube.

3. Run the engine at 500 rpm (550 rpm for a 2300cc engine), then pinch off the fuel line between the T-fitting and carburetor. Let the fuel pressure stabilize, then note the reading on the gauge. It should be 3.5-5.5 psi for 2300cc and 2800cc engines and 5.0-7.0 psi for 302 cid engines. If pressure is appreciably below the minimum figure, the fuel filter or lines may be clogged. Try changing the fuel filter and blowing out the fuel lines with compressed air before replacing the fuel pump.

> NOTE: *On 2300cc engines, the pump-to-tank fuel return line must be pinched off prior to pressure testing.*

Fuel Pump Capacity Testing

1. Disconnect the fuel line from the carburetor.

2. Fit a rubber hose over the fuel line so the fuel can be emptied into a graduated container.

3. Start the engine and run at 500 rpm (550 rpm for 2300cc engines). At that speed, a 2300cc or 2800cc engine fuel pump should produce one pint of fuel in 25 seconds. A 302 cid engine fuel pump should produce a pint of fuel in 20 seconds. If no fuel, or only a very small amount, flows from the rubber hose, the problem could be clogged fuel lines or filter.

EXHAUST EMISSION CONTROL

The following symptoms and procedures apply when the ignition and carburetor have been adjusted as described in Chapters Two and

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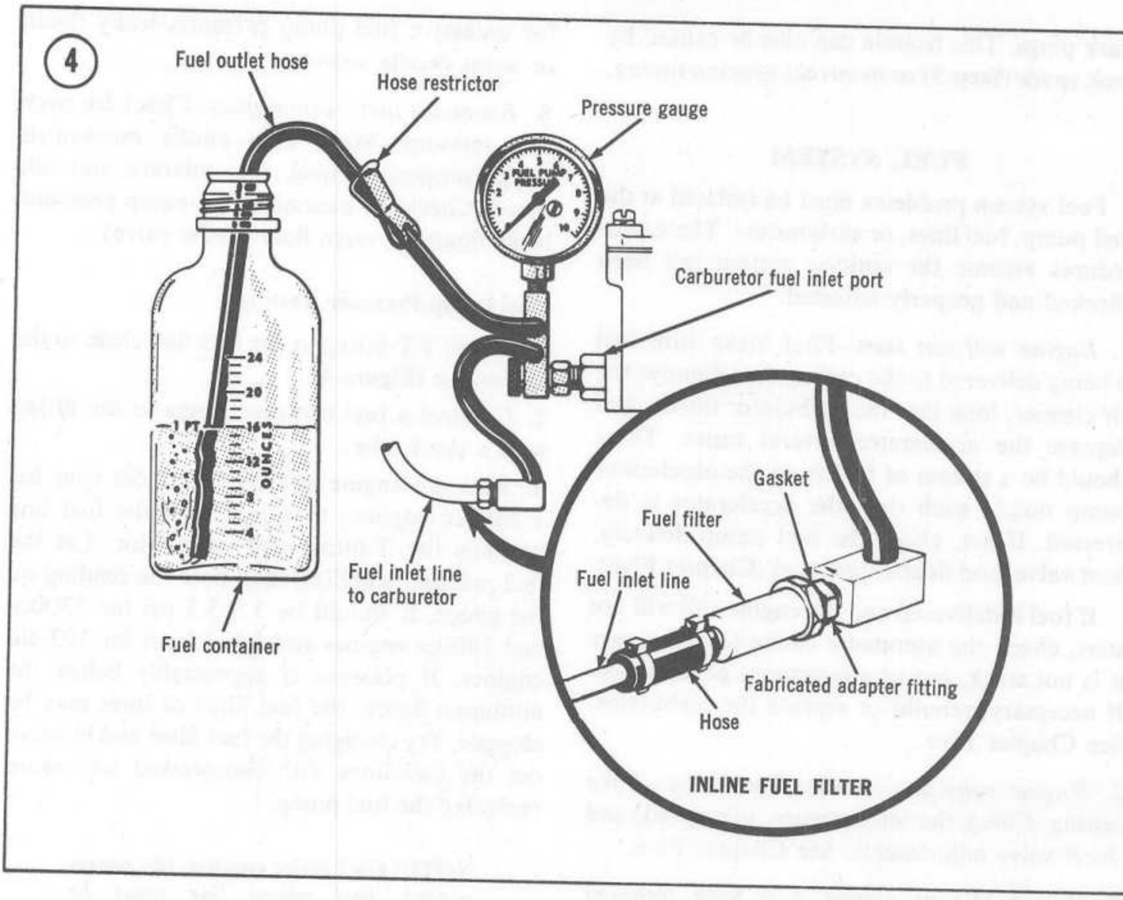


Five, and the results have been checked on an accurate gas analyzer.

1. *CO content too low*–Make sure idle speed is not too low. Check idle mixture adjustment. Check engine condition with a compression and vacuum test.

2. *CO content too high*–Check idle mixture adjustment. Check for clogged or dirty air cleaner. Make sure choke is all the way open. Check carburetor condition. Clean or replace as necessary. Check engine condition with a compression and vacuum test.

CLUTCH

All clutch problems, except adjustments or cable replacement, require removal of the transmission to identify the cause and make repairs.

1. *Slippage*–This condition is most noticeable when accelerating in high gear at relatively low speed. To check slippage, drive at a steady speed in second or third gear. Without letting up the accelerator, push in the clutch long enough to let engine speed increase (one or two seconds). Then let the clutch out rapidly. If the clutch is good, engine speed will drop quickly or the car will jump forward. If the clutch is slipping, engine speed will drop slowly and the car will not jump forward.

Slippage results from insufficient clutch pedal free play, oil or grease on the disc, worn pressure plate, or a weak diaphragm spring. Riding the clutch pedal can cause the disc surface to become glazed, resulting in slippage. Also check the withdrawal lever to make sure it is not binding and preventing full engagement.

2. *Drag or failure to release*–This trouble usually causes difficult shifting and gear clash, especially when downshifting. The cause may be excessive clutch pedal free play, warped or bent pressure plate or clutch disc, stretched

clutch cable, broken or loose disc linings, or warped flywheel. Also check condition of the transmission input shaft splines.

3. *Chatter or grabbing*—There are several possible causes. Check tightness of transmission-to-frame and engine-to-transmission mounting bolts. Check for worn or misaligned pressure plate and clutch disc, and warped flywheel.

4. *Other noises*—Noise usually indicates a dry or defective release bearing. Check the bearing and replace if necessary. Also check all parts for misalignment or uneven wear.

MANUAL TRANSMISSION

Transmission problems are usually indicated by one or more of the following symptoms:

a. Difficulty shifting gears
b. Gear clash when downshifting
c. Slipping out of gear
d. Excessive noise in neutral
e. Excessive noise in gear
f. Oil leaks

Transmission symptoms are sometimes hard to distinguish from clutch symptoms. Be sure the clutch is not causing the trouble before working on the transmission. Transmission procedures are described in Chapter Nine.

AUTOMATIC TRANSMISSION

Automatic transmission problems are usually indicated by rough or excessively slow shifting. Check fluid level and condition, then perform other testing procedures. See Chapter Nine.

BRAKES

1. *Brake pedal goes to floor*—There are numerous causes for this, including excessively worn linings, air in the hydraulic system, leaky brake lines, leaky wheel cylinders and disc brake calipers, or leaky or worn master cylinder. Check for leaks and thin brake linings. Bleed the brakes. If the problem still exists, rebuild the wheel cylinders and calipers and/or the master cylinder.

2. *Spongy pedal*—Normally caused by air in the system. Bleed the brakes.

3. *Brakes pull*—Check for wet or greasy brake linings, leaky wheel cylinders and calipers, loose calipers, frozen or seized pistons, and restricted brake lines or hoses. Check front end alignment, and look for suspension damage. Tires also affect braking; check tire pressures and condition.

4. *Brake squeal or chatter*—Check brake lining thickness and brake drum roundness. Check discs for excessive runout. Make sure the rear brake shoes are not loose. Clean away all dirt on shoes, pads, drums, and discs.

5. *Dragging brakes*—Check brake adjustment, including handbrake. Brake adjustment is an unlikely cause, since the brakes are self-adjusting, but it is a possibility. Check for broken or weak shoe return springs (rear brakes), worn piston seals (front brakes), swollen rubber parts due to improper brake fluid or contamination. Clean or replace defective parts.

6. *Hard pedal*—Check brake linings for contamination. Also check for restricted brake lines and hoses.

7. *High-speed fade*—Check for distorted or out-of-round brake drums. Check discs for excessive runout. Be sure recommended brake fluid is installed. Drain entire system and refill if in doubt.

8. *Pulsating pedal*—Check for distorted or out-of-round drums. Check discs for excessive runout.

STEERING AND SUSPENSION

The following symptoms indicate steering or suspension trouble:

a. Steering is hard
b. Car pulls to one side
c. Car wanders or front wheels wobble
d. Steering has excessive play
e. Tire wear is abnormal

Unusual steering, pulling, or wandering is usually caused by bent or otherwise misaligned suspension parts. This is difficult to check without proper alignment equipment. See Chapter Eleven for repairs that you can perform, and those that must be left to a dealer or front end specialist.

If the trouble seems to be excessive play, check wheel bearing adjustment first. This is the most frequent cause. Total play in the steering mechanism should be no more than ⅜ in., measured at the steering wheel rim. If play is excessive, check the rack-and-pinion assembly for worn parts. Also make sure the assembly is securely bolted down. Check tie rod end ball-joints by shaking each tie rod. Check suspension ball-joints as described in Chapter Eleven.

Tire wear may be caused by suspension troubles, but may have many other causes. See *Tire Wear Analysis* following.

TIRE WEAR ANALYSIS

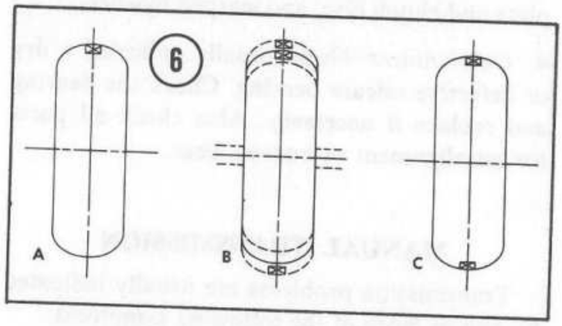
Abnormal tire wear should always be analyzed to determine its causes. The most common causes are:

a. Incorrect tire pressure
b. Improper driving
c. Overloading
d. Bad road surfaces
e. Incorrect wheel alignment

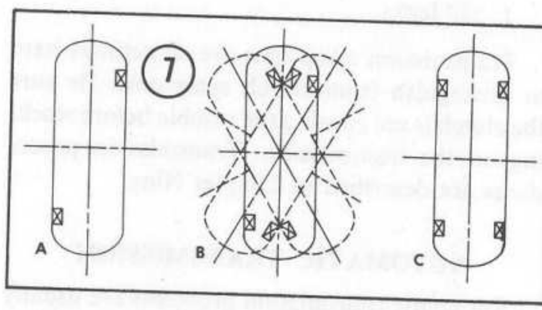
Figure 5 identifies wear patterns and indicates the most probable causes.

WHEEL BALANCING

All 4 wheels and tires must be in balance along 2 axes. To be in static balance (**Figure 6**), weight must be evenly distributed around the axis of rotation. (A) shows a statically unbalanced wheel; (B) shows the result—wheel tramp or hopping; (C) shows proper dynamic balance.



To be in dynamic balance (**Figure 7**), the centerline of the weight must coincide with the centerline of the wheel. (A) shows a dynamically unbalanced wheel; (B) shows the result—wheel wobble or shimmy; (C) shows proper dynamic balance.



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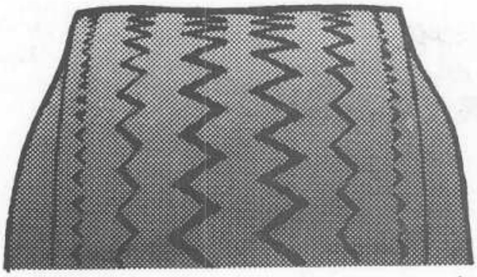
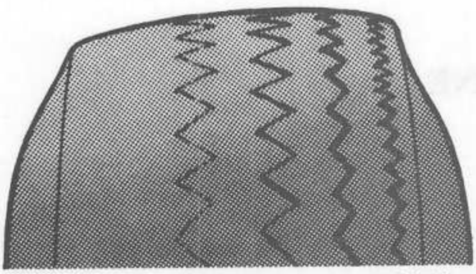
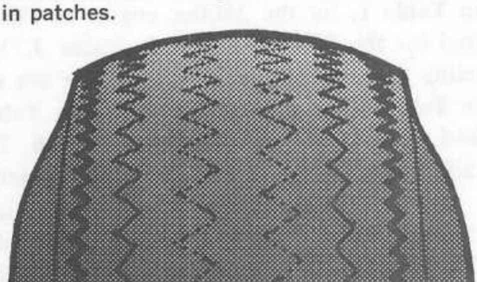


Underinflation—Worn more on sides than in center.

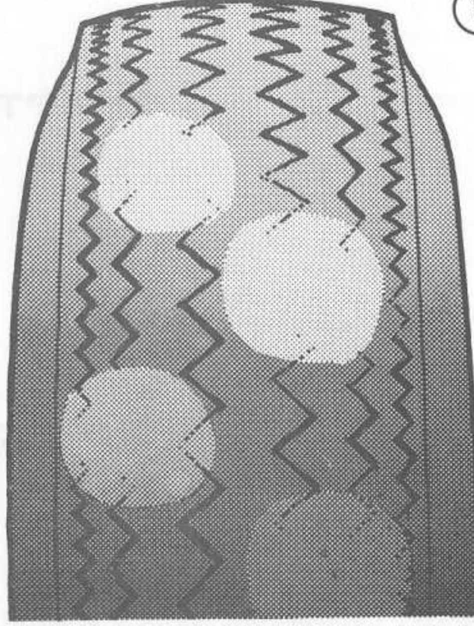


Wheel Alignment—Worn more on one side than the other. Edges of tread feathered.

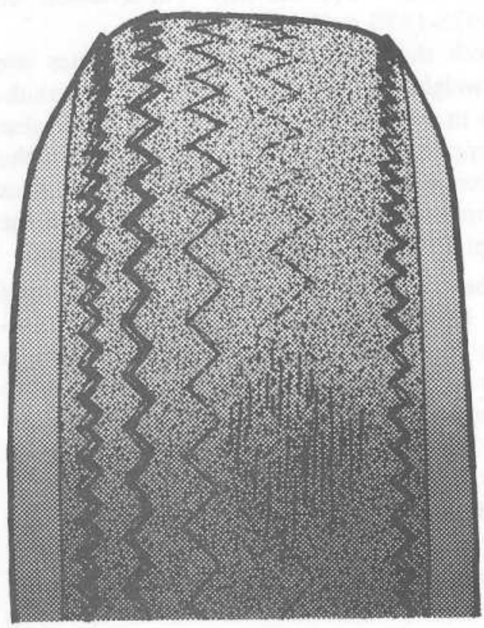
Road Abrasion—Rough wear on entire tire or in patches.



Overinflation—Worn more in center than on sides.



Wheel Balance – Scalloped edges indicate wheel wobble or tramp due to wheel unbalance.



Combination—Most tires exhibit a combination of the above. This tire was overinflated (center worn) and the toe-in was incorrect (feathering). The driver cornered hard at high speed (feathering, rounded shoulders) and braked rapidly (worn spots). The scaly roughness indicates a rough road surface.

CHAPTER FOUR

ENGINE

A 2300cc 4-cylinder OHC engine is standard on all Mustang II's. Optional engines are a 2800cc 60° OHV six (available on all model years) and a 302 cid OHV V8, available on all 1975-1976 models.

Both the 2300cc and 2800cc engines use lightweight cast iron cylinder blocks. The crankshaft in the 2300cc engine and 302 cid engine is supported on 5 main bearings, while the 2800cc V6 engine uses 4 bearings. The engines are unchanged for both model years, with the exception of certain emission control devices.

The 2300cc engine camshaft is supported by 4 bearings, in stands integral with the cylinder head, and operates the valves through pivot-type rocker arms using hydraulic valve lash adjusters at the fulcrum point of the rocker arm. The camshaft is driven from the crankshaft by a toothed rubber belt which also operates an auxiliary shaft, from which the oil pump, fuel pump, and distributor are driven. The water pump, alternator, fan, and other accessories are separately driven from the crankshaft by a conventional V-belt.

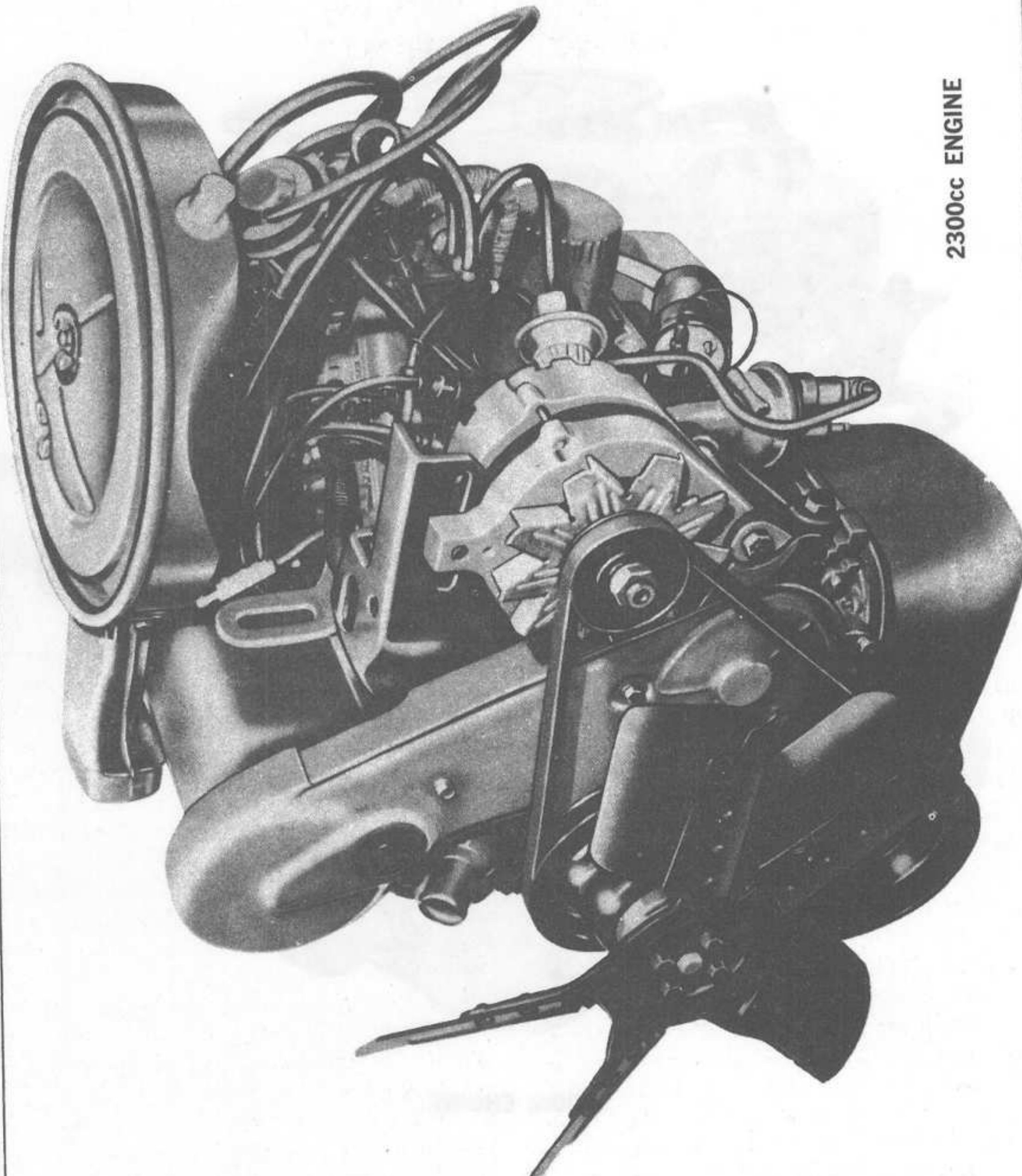
The 2800cc V6 engine is similar in construction to a standard Ford V8 engine except for the number of cylinders and the 60° block inclination. The camshaft is mounted in the engine block, above the crankshaft, and is supported by 4 bearings. The camshaft acts through hydraulic lifters, pushrods, and rocker arms to operate the overhead valves. The camshaft also operates the distributor, the oil pump, and the fuel pump directly. The camshaft in turn is driven by the crankshaft through 2 timing gears. The alternator, Thermactor pump, water pump, and all other engine-powered accessories are driven from the crankshaft pulley by V-belts.

The 302 cid engine is a standard Ford V8 configuration. Except for the 90° block inclination, and the number of cylinders, engine design and operation is identical to that just described for the 2800cc V6 engine, except that the camshaft is driven from the crankshaft through 2 timing gears and a timing chain.

Specifications for the 2300cc engine are given in **Table 1**, for the 2800cc engine in **Table 2**, and for the 302 cid engine in **Table 3**. Tightening torques for the 2300cc engine are given in **Table 4**, for the 2800cc engine in **Table 5**, and for the 302 cid engine in **Table 6**. These tables are found at the end of this chapter.

Figures 1 and 2 show the overall configuration of the 2300cc engine. **Figure 3** shows the 2800cc V6 engine, and **Figure 4** shows the 302 cid V8 engine.

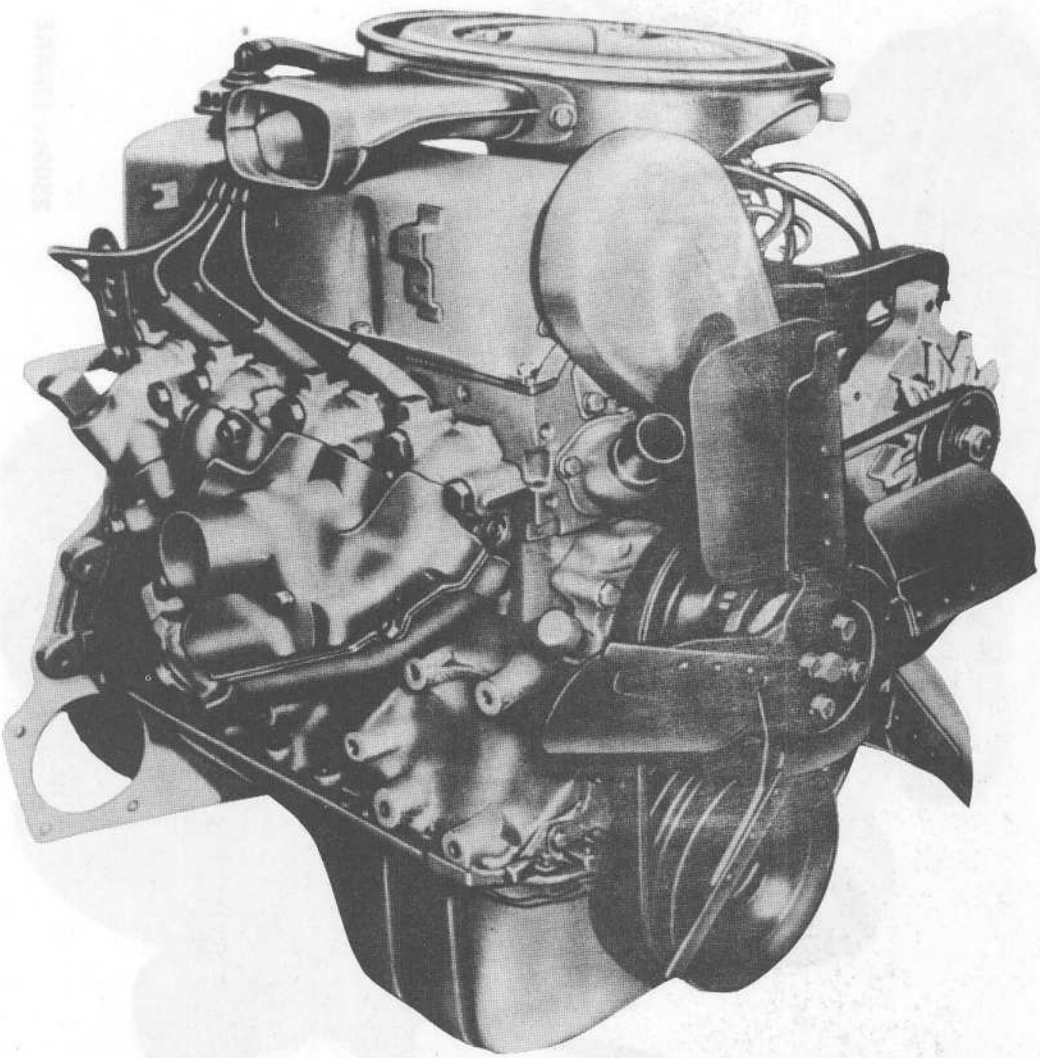
NOTE: *A set of metric wrenches is required to work on the 2300cc engine.*



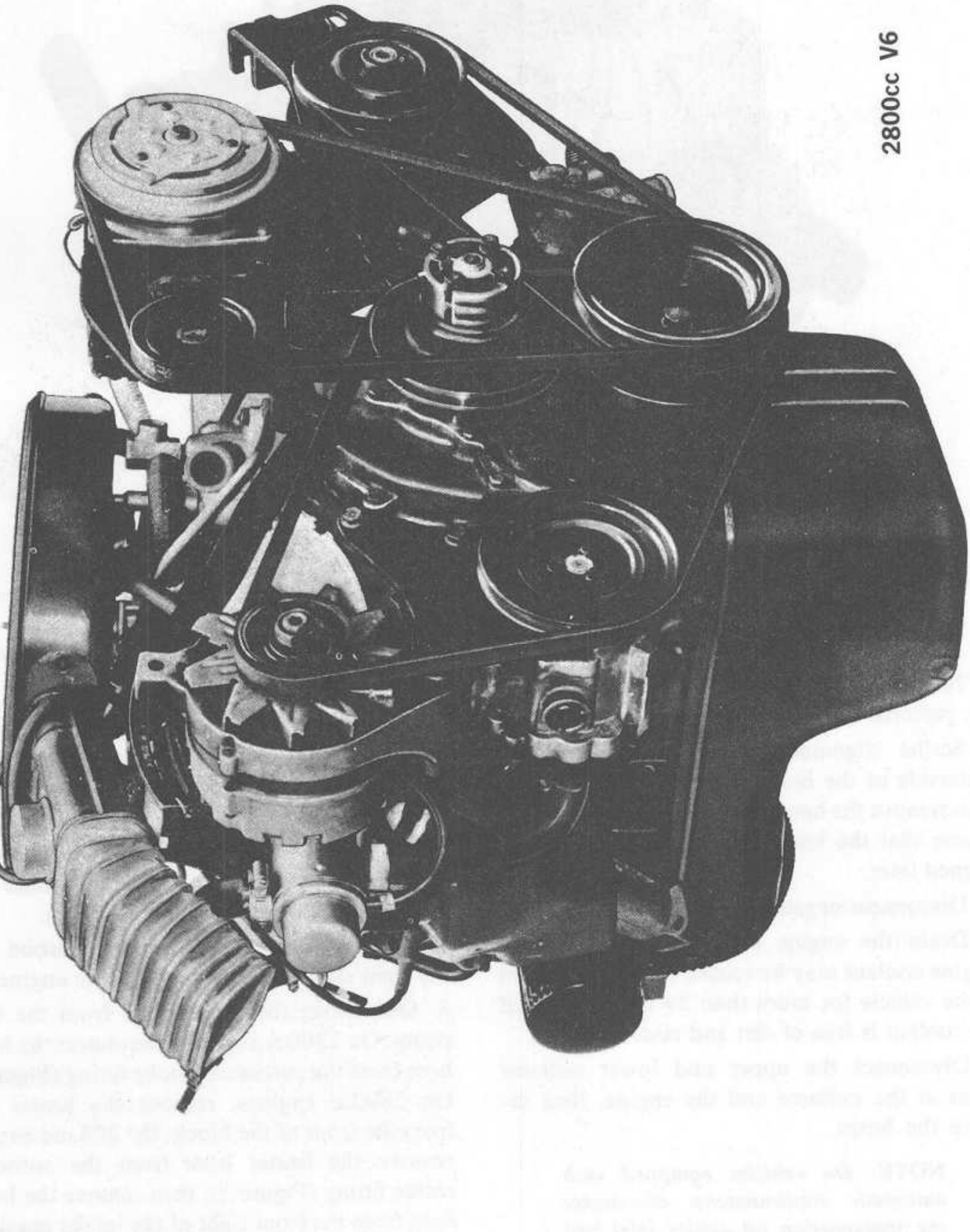
1

2300cc ENGINE

2



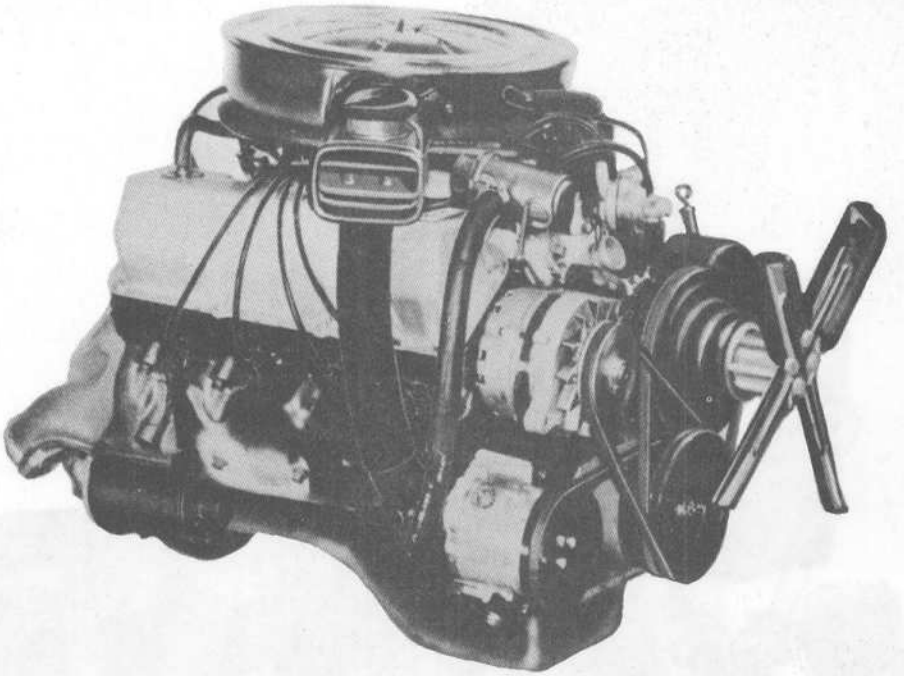
2300cc ENGINE



3

2800cc V6

4



302 cid V8 ENGINE

ENGINE REMOVAL

To remove any of the engines from the vehicle, perform the following steps.

1. Scribe alignment marks directly onto the underside of the hood around the hood hinges then remove the hood. The alignment marks will ensure that the hood is properly installed and aligned later.

2. Disconnect negative cable from battery.

3. Drain the engine coolant and engine oil. Engine coolant may be reused if it has not been in the vehicle for more than 24 months, and if the coolant is free of dirt and rust.

4. Disconnect the upper and lower radiator hoses at the radiator and the engine, then remove the hoses.

> NOTE: *On vehicles equipped with automatic transmissions, disconnect the transmission oil cooler inlet and outlet lines from the bottom of the radiator. Plug all lines and fittings to prevent loss of transmission fluid, and contamination of lines.*

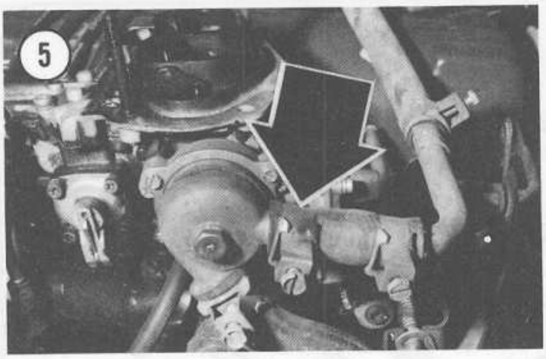
5. Remove the radiator and shroud as described in Chapter Six. If necessary to gain clearance at the front of the engine, remove the 4 bolts attaching the fan, then remove the fan, spacer, and fan pulley, as required.

6. Remove the air cleaner and intake duct assembly as described in Chapter Five.

7. Remove the exhaust manifold shroud from the right side of the engine (2300cc engines).

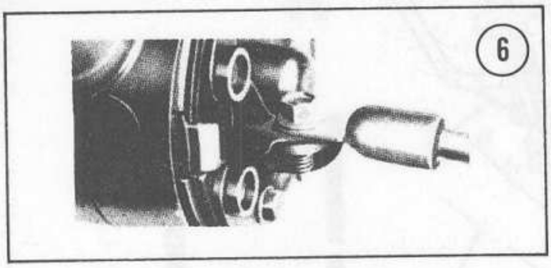
8. Disconnect the heater hose from the water pump. On 2300cc engines, disconnect the heater hose from the automatic choke fitting (**Figure 5**). On 2800cc engines, remove the heater hose from the front of the block. On 302 cid engines, remove the heater hose from the automatic choke fitting (Figure 5), then remove the heater hose from the front right of the intake manifold.

9. Disconnect the throttle cable from the carburetor (Chapter Five).



10. Label and detach the wires and connectors attached to the alternator, then remove the alternator (Chapter Seven).

11. Disconnect the starter cable at the starter terminal and note position for reinstallation (**Figure 6**).



12. On automatic transmission models, detach the downshift rod at the accelerator cable mounting bracket near the carburetor (**Figure 7 or Figure 8**).

13. Disconnect all ground wires from the engine block.

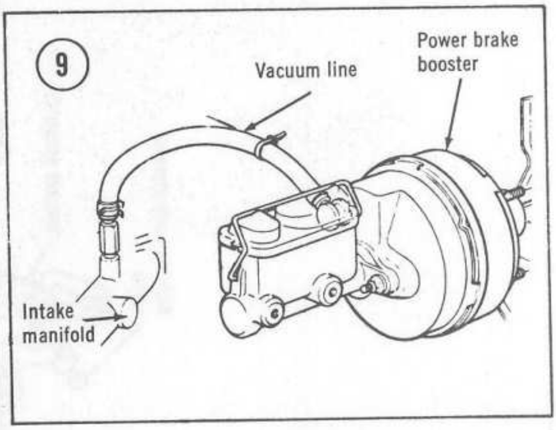
14. On models equipped with air conditioning, remove the compressor from its mounting bracket. On 2300cc models, the compressor is mounted on the right side of the engine below the Thermactor pump (if installed). On 2800cc and 302 cid models, the compressor is mounted at the top left of the engine.

WARNING

Never disconnect refrigerant lines. The refrigerant creates freezing temperatures when it evaporates, and poisonous gases if discharged near an open flame. If disconnecting the refrigerant lines becomes necessary, refer the job to a Ford dealer or an air conditioning specialist.

15. On models equipped with power steering, detach the power steering pump bracket from the engine, remove the drive belt from the pump, then position the power steering pump out of the way and in a position that will prevent fluid leakage from the pump. On all models, the power steering pump is located on the left side of the engine.

16. On models equipped with power brakes, disconnect the brake vacuum line at the intake manifold (**Figure 9**).



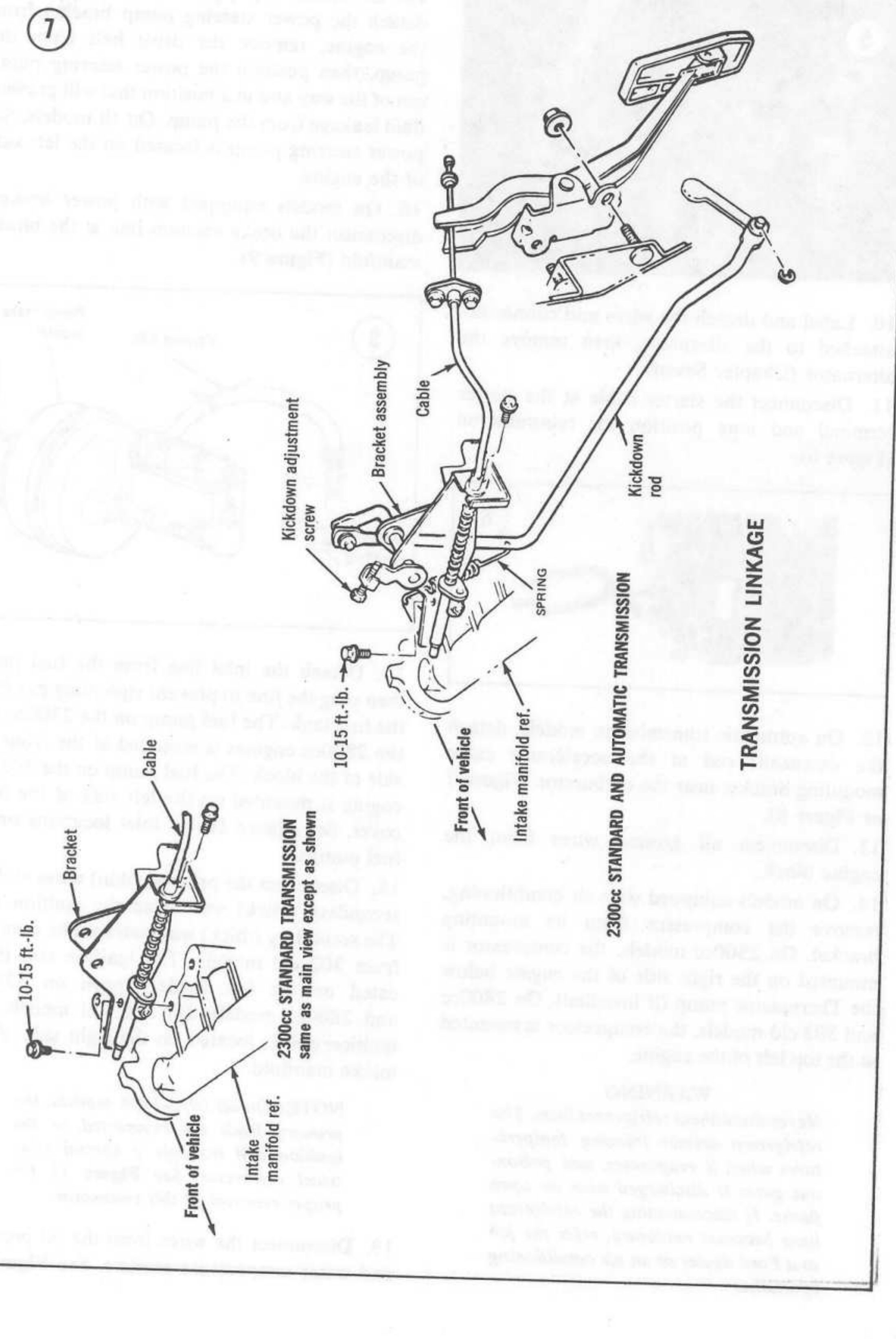
17. Detach the inlet line from the fuel pump then plug the line to prevent siphoning gas from the fuel tank. The fuel pump on the 2300cc and the 2800cc engines is mounted at the front left side of the block. The fuel pump on the 302 cid engine is mounted on the left side of the front cover. See **Figure 10** for inlet locations on all fuel pumps.

18. Disconnect the primary (thin) wires and the secondary (thick) wire from the ignition coil. The secondary (thick) wire need not be removed from 302 cid models. The ignition coil is located on the left fender apron on 2300cc and 2800cc models. On 302 cid models, the ignition coil is located on the right side of the intake manifold.

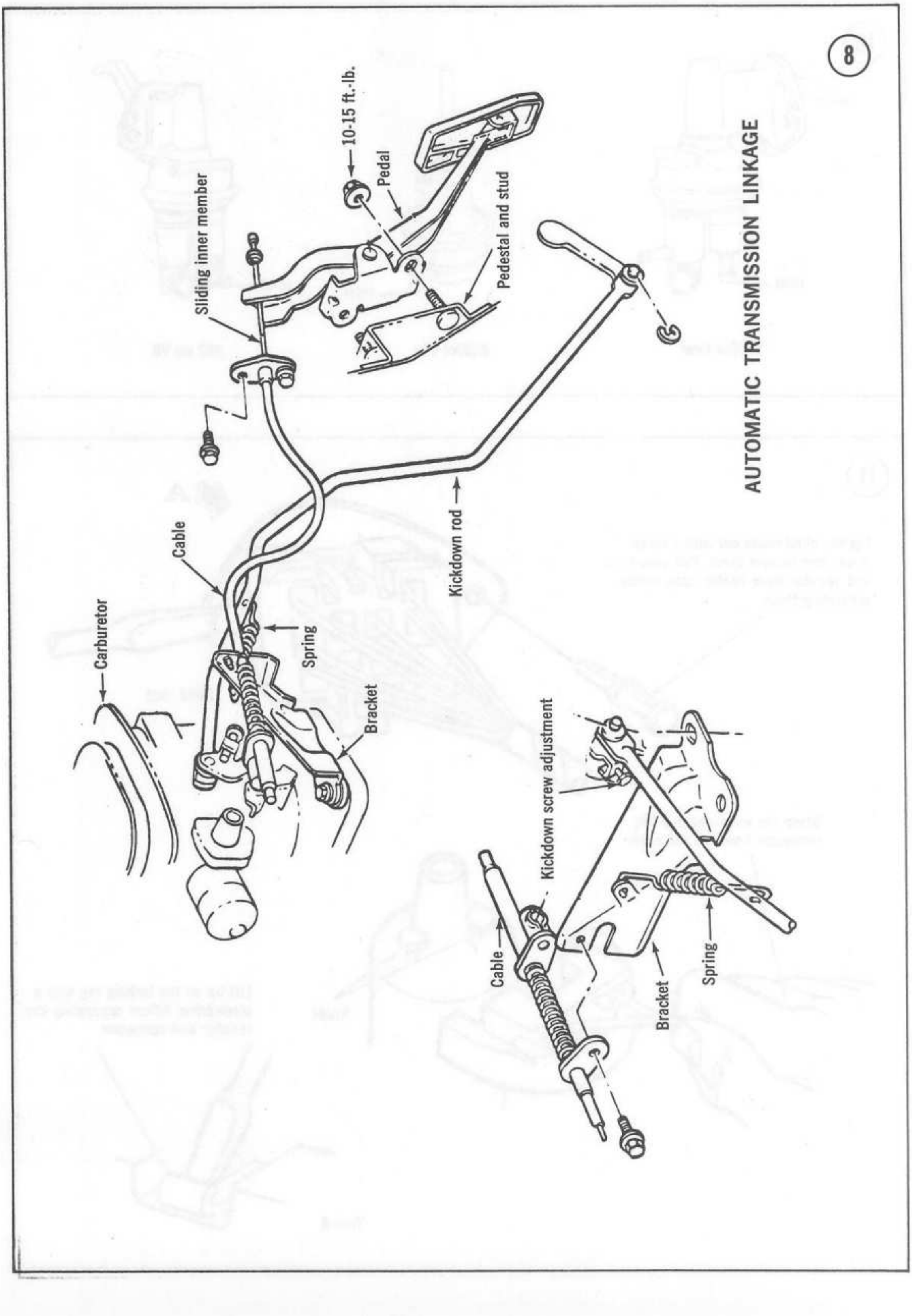
NOTE: *On all 1975-1976 models, the primary leads are connected to the ignition coil through a special electrical connector. See* **Figure 11** *for proper removal of this connector.*

19. Disconnect the wires from the oil pressure and water temperature senders. See **Figure 12**

7

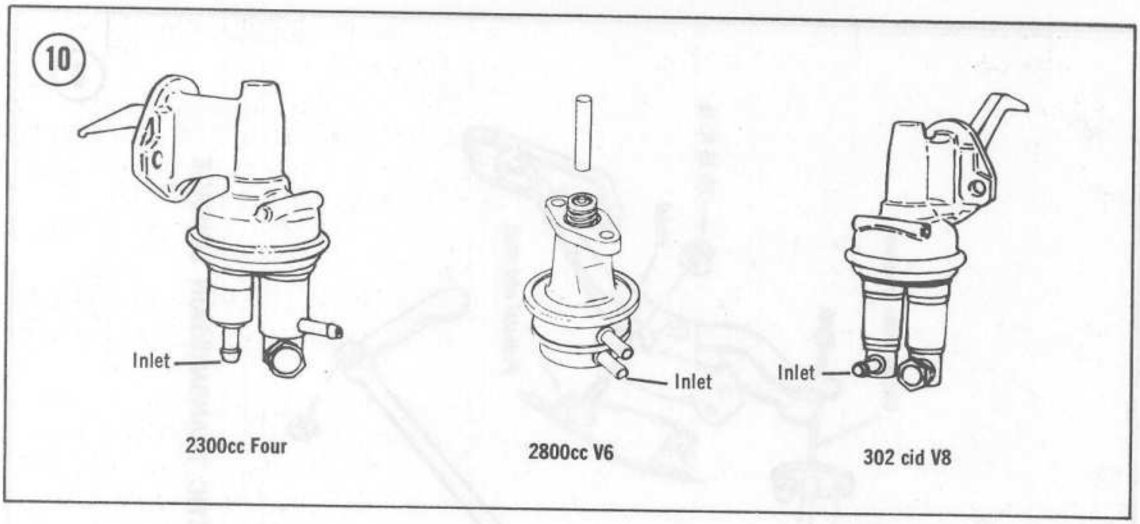


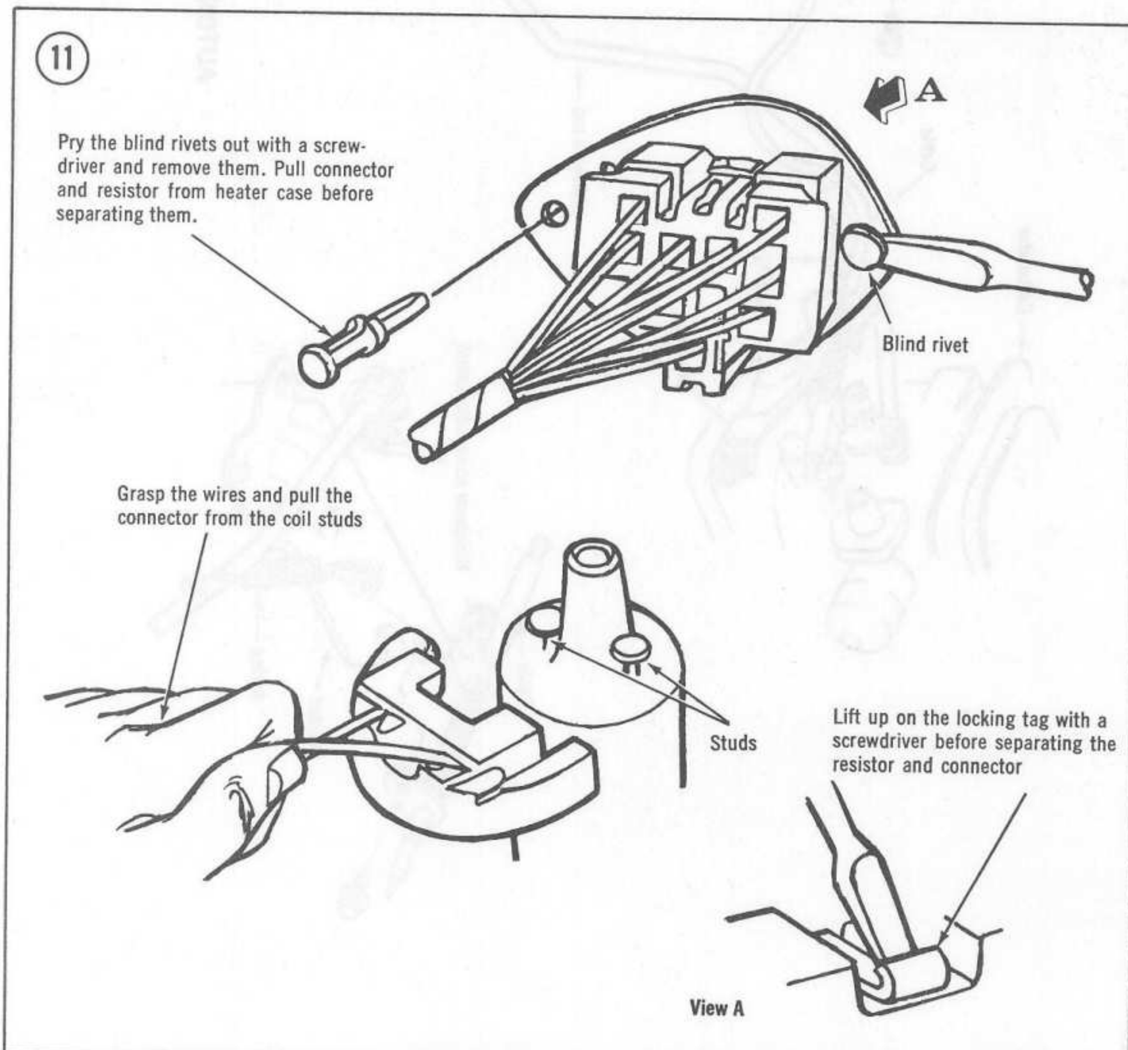
TRANSMISSION LINKAGE

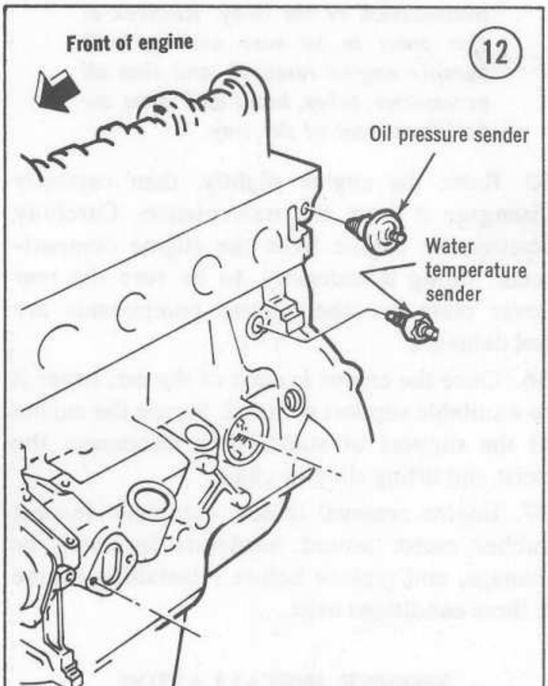


AUTOMATIC TRANSMISSION LINKAGE

4


10
Inlet
Inlet
Inlet
2300cc Four
2800cc V6
302 cid V8


11
A
Pry the blind rivets out with a screw-driver and remove them. Pull connector and resistor from heater case before separating them.
Blind rivet
Grasp the wires and pull the connector from the coil studs
Studs
Lift up on the locking tag with a screwdriver before separating the resistor and connector
View A



2300cc ENGINE

for 2300cc engines, and **Figure 13** for 2800cc and 302 cid engines.

20. Remove the wiring harness from the engine wire looms and position out of the way of engine removal. Check to ensure that no other external wiring is connected to the engine block.

21. Jack up the front end of the car and place it on jackstands.

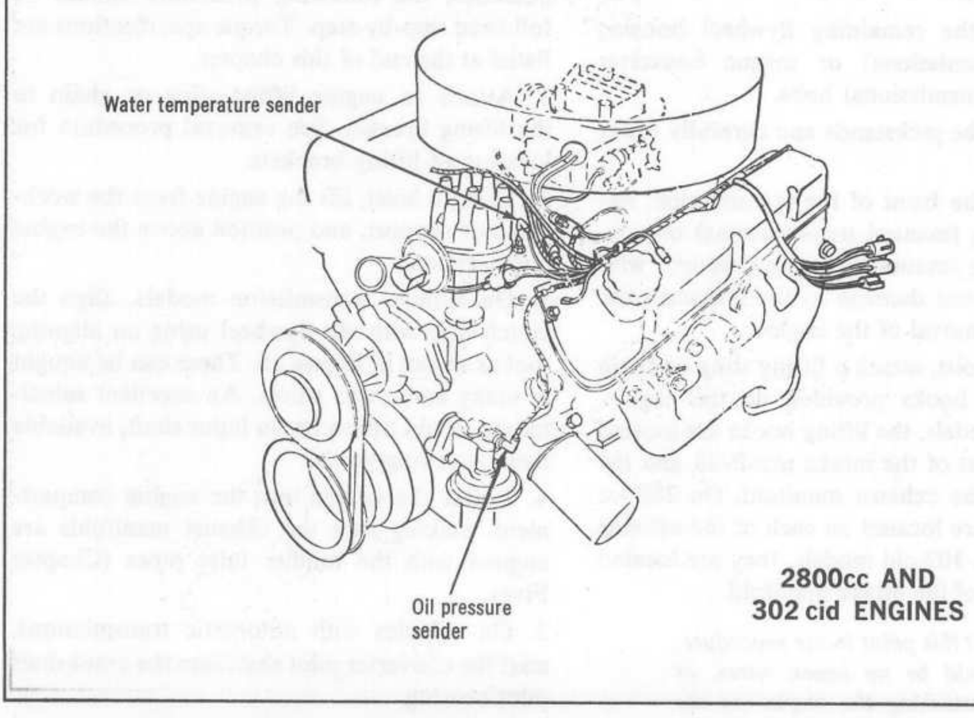
22. On manual transmission models, detach the clutch cable from the release lever (Chapter Eight).

23. On automatic transmission models, disconnect the downshift rod from the downshift control lever. See Figure 7 for 2300cc engines, or Figure 8 for 2800cc and 302 cid engines.

24. Detach the muffler inlet pipe at the exhaust manifold (Chapter Five).

25. Disconnect the transmission oil cooler lines from the retaining clip at the cylinder block, and position them out of the way. These lines were previously removed from the automatic transmission oil cooler at the bottom of the radiator.

26. Detach the automatic transmission filler tube from the cylinder block and move slightly out of the way.

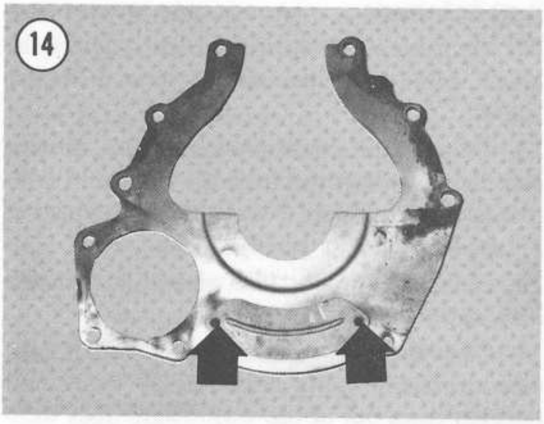


2800cc AND 302 cid ENGINES

27. Remove the starter, and position the ground strap (if installed) out of the way.

28. On automatic transmission models, remove the 2 torque converter drain plug access cover bolts and the access cover (**Figure 14**). Detach the torque converter from the flywheel as described in Chapter Nine.

14



29. Remove the flywheel housing (manual transmissions) or torque converter housing (automatic transmissions) upper attaching bolts.

30. Remove the through bolts from the right and left front engine mounts as described later in this chapter.

31. Remove the remaining flywheel housing (manual transmissions) or torque converter (automatic transmissions) bolts.

32. Remove the jackstands and carefully lower the vehicle.

33. Support the front of the transmission, flywheel housing (manual transmissions) or converter housing (automatic transmissions), with a jack to prevent damage to the transmission, and to ease removal of the engine.

34. Using a hoist, attach a lifting sling or chain to the lifting hooks provided on the engine. On 2300cc models, the lifting hooks are located at the left front of the intake manifold and the right rear of the exhaust manifold. On 2800cc models, they are located on each of the exhaust manifolds. On 302 cid models, they are located on either side of the intake manifold.

> NOTE: *At this point in the procedure, there should be no hoses, wires, or linkages attaching the engine to the transmission or the body. Recheck at this point to be sure nothing will hamper engine removal, and that all accessories, tubes, hoses and wires are positioned out of the way.*

35. Raise the engine slightly, then carefully disengage it from the transmission. Carefully remove the engine from the engine compartment, tilting if necessary, to be sure the rear cover plate or other engine components are not damaged.

36. Once the engine is clear of the car, lower it to a suitable support or stand. Secure the engine in the support or stand, then disconnect the hoist and lifting sling or chain.

37. Engine removal is now complete. Inspect rubber motor mount insulators for wear or damage, and replace before reinstalling engine if these conditions exist.

ENGINE INSTALLATION

Engine installation is basically the reverse of the removal procedure. However, because engine installation must be performed accurately to ensure proper operation of the engine, clutch, transmission, and other related systems and accessories, the following procedure should be followed step-by-step. Torque specifications are listed at the end of this chapter.

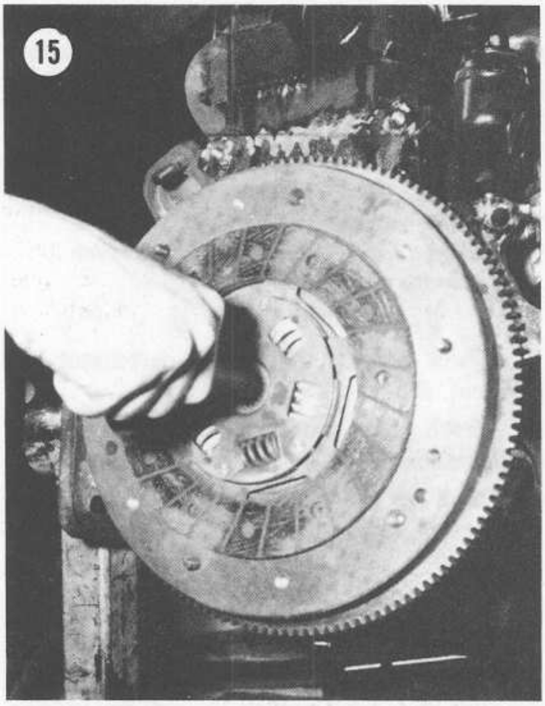
1. Attach an engine lifting sling or chain to the lifting bracket. See removal procedure for location of lifting brackets.

2. Using a hoist, lift the engine from the workstand or support, and position above the engine compartment.

3. On manual transmission models, align the clutch disc with the flywheel using an aligning tool as shown in **Figure 15**. These can be bought at many auto parts stores. An excellent substitute is an old transmission input shaft, available from wrecking yards.

4. Lower the engine into the engine compartment, making sure the exhaust manifolds are aligned with the muffler inlet pipes (Chapter Five).

5. On vehicles with automatic transmissions, start the converter pilot shaft into the crankshaft pilot bearing.



6. On vehicles with manual transmissions, start the transmission main shaft into the clutch disc. It may be necessary to roll the car in fourth gear, or rotate the crankshaft from the front of the engine to properly align the transmission shaft splines and the clutch disc splines. Either method is equally acceptable. However, *the crankshaft should always be rotated in the clockwise direction as viewed from the front of the engine*. If the transmission shaft will not enter the flywheel splines after having been installed into the clutch disc, rotate the crankshaft further (clockwise) until the transmission shaft is fully seated (flywheel housing and rear cover plate mate).

7. Install the flywheel housing (or converter housing) upper attaching bolts, making sure the rear cover plate pilot studs engage the housing, then remove the jack from under the transmission (or housing).

8. Install the through bolts in the right-front and left-front motor mounts and torque to specification. See *Motor Mounts Removal/Installation* later in this chapter.

9. Remove the hoist and lifting sling or chain.

10. Raise the front end of the car and place it on jackstands.

11. Install the remaining flywheel housing (or converter housing) attaching bolts, then torque all attaching bolts to specification.

12. Connect muffler inlet pipes to the exhaust manifold(s), and torque nuts to specification.

13. On vehicles with automatic transmissions, attach the converter to the flywheel, and tighten the bolts to specification (Chapter Nine). Install the converter access cover and 2 attaching bolts.

14. Install the starter and attaching bolts, and tighten to specification. Be sure the engine ground strap (if installed) is secured by one of the starter attaching bolts, then connect the starter cable.

15. Connect the plugged fuel line from the gas tank to the inlet of the fuel pump.

16. Connect the transmission filler tube to the cylinder block.

17. Install the transmission oil cooler lines in the cylinder block retaining clips.

18. Connect the automatic transmission downshift rod to the downshift control lever at the transmission (Figure 7 for 2300cc engines, or Figure 8 for 2800cc or 302 cid engines). Position the top end of the rod for connection at the carburetor.

19. Attach the clutch cable to the release lever as described in Chapter Eight.

20. Remove jackstands and lower the vehicle.

21. Replace the wiring harness in its original position.

22. Reconnect the wires to the oil pressure sender and the water temperature sender.

23. Connect the primary and secondary leads to the ignition coil. Refer to Figure 11 for proper installation of primary lead connector (1975-1976 models only).

24. Connect the power brake booster (if installed) vacuum line to the intake manifold.

25. On vehicles equipped with power steering, install the drive belt, power steering pump, bracket, and bracket attaching bolts. Adjust drive belt tension as described in Chapter Six.

26. On vehicles equipped with air conditioning, install the compressor in its mounting bracket, being careful not to crimp or unnecessarily bend the refrigerant lines. Install the drive belt and

adjust for proper tension as described in Chapter Six.

27. On vehicles equipped with automatic transmissions, connect the top end of the downshift rod to the carburetor throttle linkage as shown in Figure 7 (2300cc engines) or Figure 8 (2800cc and 302 cid engines). Connect the throttle cable to the throttle linkage at the carburetor after the downshift rod is installed.

28. Connect heater hoses in their original positions. See *Removal* procedure.

29. Install the alternator and attaching bolts to the alternator bracket. Referring to the wire labeling attached during engine removal, reconnect the alternator, then install the drive belt and tension as described in Chapter Six.

> NOTE: *If the alternator leads were not labeled when the engine was removed, or if the labels are no longer legible, refer to the wiring color codes given in the diagrams at the end of Chapter Seven for proper wire identification.*

30. On 2300cc engines, install the exhaust manifold shroud.

31. Install the air cleaner and intake duct assembly.

32. Install the spacer, fan, radiator, and shrouding.

33. Connect the upper and lower radiator hoses. If the vehicle is equipped with automatic transmission, connect the 2 transmission oil cooler lines to the oil cooler at the bottom of the radiator.

34. Refill and bleed the cooling system as described in Chapter Six.

35. Fill the engine crankcase with the proper grade and quality of oil (Chapter Two).

36. If the vehicle is equipped with automatic transmission, perform the transmission downshift linkage adjustment (Chapter Nine). If the vehicle is equipped with manual transmission, perform the clutch adjustment (Chapter Nine).

37. Make sure that no hoses, ground straps, or wiring has been inadvertently left disconnected. Review the removal and installation procedures to correct such errors.

38. Connect the negative cable to the battery. Operate the engine at a fast idle while checking gaskets and hose connections for leaks. Continue to operate the engine at this speed until normal operating temperature is obtained.

> NOTE: *Check oil level in the automatic transmission while the engine is idling. Top up as necessary to prevent damage to the transmission.*

39. Check ignition timing and carburetor adjustment. Refer to Chapter Two.

40. Install the hood in accordance with the scribe marks made during removal procedure.

41. Road test the vehicle for proper operation.

DISASSEMBLY

The following sequences are basic outlines that tell how much of the engine needs to be removed and disassembled to perform specific types of service. The sequences are designed to keep engine disassembly to a minimum, thus avoiding unnecessary work. The major assemblies mentioned in these sequences are covered in detail under their own individual headings within this chapter, unless otherwise noted.

To use these sequences, first determine what type of engine service you plan to do (a valve job, for example), then turn to the sequence that covers that type of service. Perform a specific step within a sequence, turn to the heading covering the major assembly or component mentioned in that step, and perform the removal and inspection procedures contained under that heading. To reassemble or install, reverse the sequences, performing the installation or assembly procedures contained under that major heading.

Decarbonizing or Valve Service

1. Remove the exhaust and intake manifolds (Chapter Five).
2. On 2800cc and 302 cid engines, remove the valve rocker assembly. On 2300cc engines, remove the rocker arms.
3. Remove the cylinder head.

4. Remove and inspect the valves. Inspect valve seats, grinding when necessary. Inspect valve guides and ream as needed.
5. Assemble by reversing Steps 1-4.

Ring and Connecting Rod Service

1. Remove the oil pan.
2. Remove the oil pump.
3. Remove the pistons together with the connecting rods.
4. Remove the piston rings, then remove the pistons from the connecting rods.
5. Inspect the pistons, piston pins, and connecting rods. Replace as needed.
6. Assemble by reversing Steps 1-4.

General Overhaul

1. Remove the engine from the car as described previously.
2. Remove the motor mounts (front and rear).
3. Remove the fuel pump, carburetor, and intake and exhaust manifolds (Chapter Five).
4. Remove the fan, spacer (if installed), pulley, water pump, and thermostat (Chapter Six).
5. Remove the distributor (Chapter Seven).
6. Remove the oil pressure and water temperature senders (Figure 12 for 2300cc engines, Figure 13 for 2800cc and 302 cid engines).
7. On 2300cc engines, remove auxiliary shaft.
8. Remove the PCV valve and the crankcase oil separator (Chapter Two).
9. Remove the oil filter.
10. On 2800cc engines remove the valve rocker assembly. On 2300cc and 302 cid engines, remove the rocker arms.
11. Remove the cylinder head.
12. Remove the camshaft.
13. Remove the oil pan.
14. Remove the oil pump.
15. Remove the pistons together with the connecting rods.
16. Remove the flywheel.
17. Remove the crankshaft and main bearings.
18. Assemble by reversing Steps 1-17.

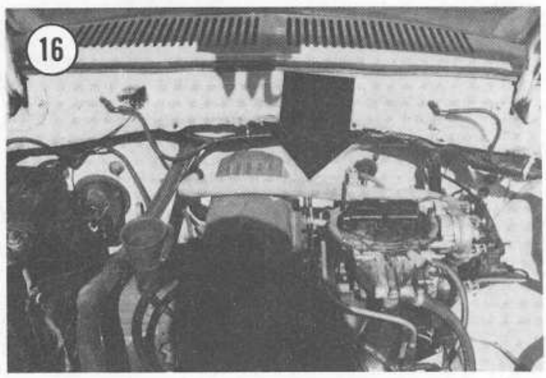
ROCKER ARM COVERS

Removal and Installation

1. Remove the air cleaner and intake duct assembly (Chapter Five).
2. Disconnect the spark plug wires from the spark plugs and the wire looms and lay them back out of the way.

> NOTE: *Steps 3-5 apply to 2300cc engines only.*

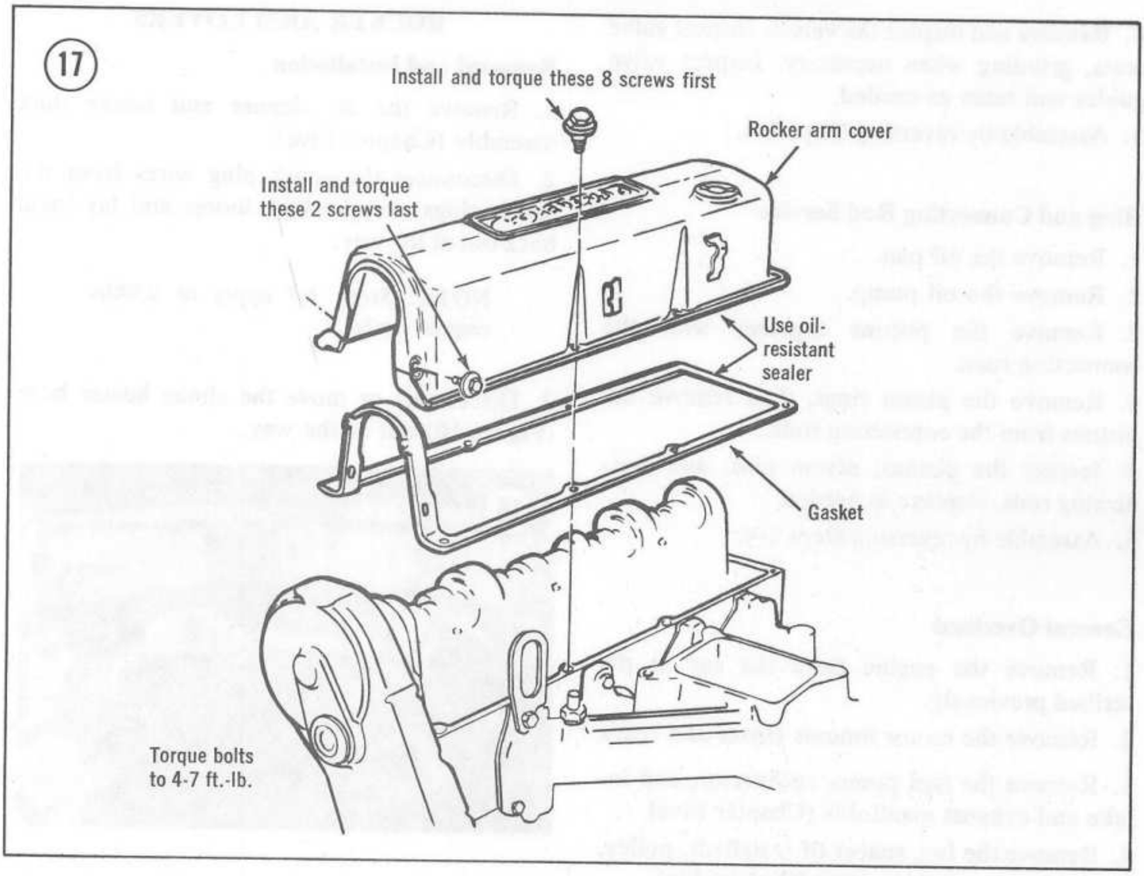
3. Disconnect or move the choke heater hose (**Figure 16**) out of the way.



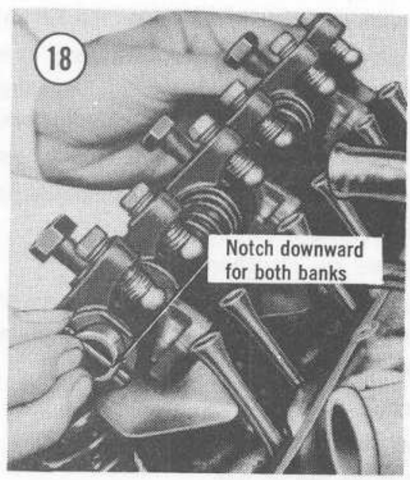
4. Disconnect, or move out of the way, any other hoses preventing removal of the rocker arm cover.
5. Remove the rocker arm cover attaching bolts with a 6mm socket, then remove the rocker arm cover gasket (**Figure 17**).

> NOTE: *Steps 6-9 apply to 2800cc and 302 cid engines only.*

6. Remove emission control equipment and hoses, as ncessary, to remove rocker arm cover.
7. Disconnect the spark plug wires from the plugs by twisting and pulling the molded cap only. Remove the spark plug wires from the retainers on top of the rocker arm covers, then position the wires out of the way.
8. If the carburetor throttle linkage interferes with removal, disconnect the throttle cable from the linkage, then disconnect the linkage mounting bracket (Chapter Five).
9. Remove rocker arm cover attaching screws, then remove rocker arm cover and gasket.



10. Installation is the reverse of these steps. Use a new gasket, coated on the rocker arm cover side with oil-resistant gasket sealer. On 2300cc engines, tighten rocker arm cover attaching bolts to specifications as shown in Figure 17. On 2800cc and 302 cid engines, tighten rocker arm cover attaching screws to specification. Two minutes later tighten the screws to the same specification.



ROCKER ASSEMBLY AND PUSHRODS (2800cc)

Removal/Installation

1. Remove the rocker arm cover as described earlier.

2. Remove the 3 rocker arm shaft retaining bolts by loosening each bolt 2 turns at a time, in sequence, until all bolts are free of the cylinder heads (**Figure 18**). Then lift the rocker assembly and oil baffle (mounted below the rocker assembly) off the cylinder head.

3. Lift the pushrods out of their bores. Make a holder to keep the pushrods in order. The pushrods must be reinstalled in the same bores from which they were removed.

4. Installation is the reverse of these steps. Apply white grease such as Lubriplate to both

ends of the pushrods, the valve stem tips, and the rocker arm ends (contact points). Tighten rocker arm shaft retaining bolts to specification, then adjust valve clearance (Chapter Two).

Disassembly

1. Referring to **Figure 19**, remove the spring washer and pin from one end of the rocker arm shaft.

2. Slide the rocker arms, rocker arm shaft supports, and spring off the shaft. Be sure to mark the individual parts in the sequence in which they were removed, so that the parts can be reassembled in their original positions.

3. Drill a hole in the plug in one end of the rocker arm shaft. Insert a long steel rod through the drilled hole and knock the plug out of the other end of the shaft. Remove the drilled plug from the shaft by using the steel rod from the opposite end of the shaft.

Inspection

1. Clean all parts in solvent and make sure all oil passages in the rocker arms, supports and shaft are clear.

2. Check the pushrods for wear or damage, particularly at the ends. Check the pushrods for straightness by rolling on a piece of glass. A clicking sound will be heard if the pushrod is bent even slightly. Replace bent, worn, or otherwise damaged pushrods.

> NOTE: *If you have a dial gauge, rotate the pushrods between accurate centers (V-blocks) with the dial gauge contacting the center of the pushrod. Replace the pushrod if runout (eccentricity) is greater than 0.012 in.*

3. Check the rocker arm shafts and rocker arms for signs of seizure or excessive wear. Clearance between rocker arms and rocker arm shafts should be 0.001-0.0035 in. Maximum permissible clearance is 0.006 in. This measurement should be made with a feeler gauge. However, if reasonable wear is expected, the entire assembly should be taken to your Ford dealer or a competent garage for inspection.

4. Check the valve stem contact surface on the rocker arm for wear. Replace worn rocker arms. Do not attempt to smooth rocker arm bores or contact surfaces.

Assembly

1. Tap new plugs into the ends of the rocker arm shaft.

> NOTE: *Apply Lubriplate or equivalent to the rocker arm shaft and friction surfaces of all other components of the rocker assembly, before assembly, to provide initial lubrication.*

2. Install a spring washer and pin in one end of the rocker arm shaft, then install the rocker arms, supports, and springs in their original location (Figure 19). New components may be installed in any location.

3. Install the pin and spring washer in the other end of the rocker arm shaft.

CAUTION

The notch in the front face of the rocker arm shaft must point downward when the rocker assembly is in a normal installed position (Figure 18) to ensure that the rocker arm shaft oil holes are properly oriented. If the

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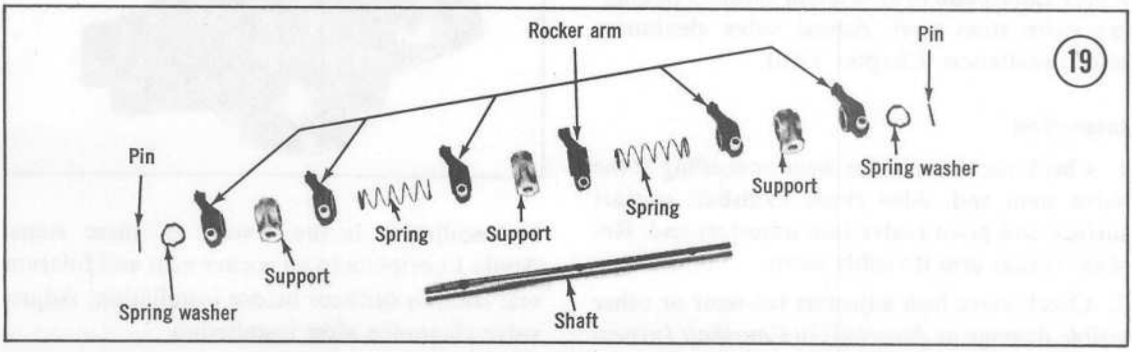

rocker arm shaft is not properly oriented, lubrication will be cut off from the rocker assembly, resulting in rapid, excessive wear and eventual rocker assembly failure.

ROCKER ARMS (2300cc)

Removal/Installation

1. Remove the rocker arm cover as described earlier.
2. Turn the engine by hand until the low side of the camshaft contacts the rocker arm being removed.
3. Remove the rocker arm retaining spring as shown in **Figure 20** (early models only).

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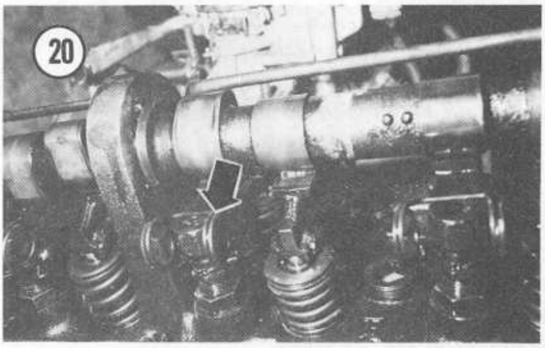


4. Using a valve spring compressor such as Ford tool T74P-6565-B (**Figure 21**) compress the valve spring just enough to remove the rocker arm over the valve lash adjuster.

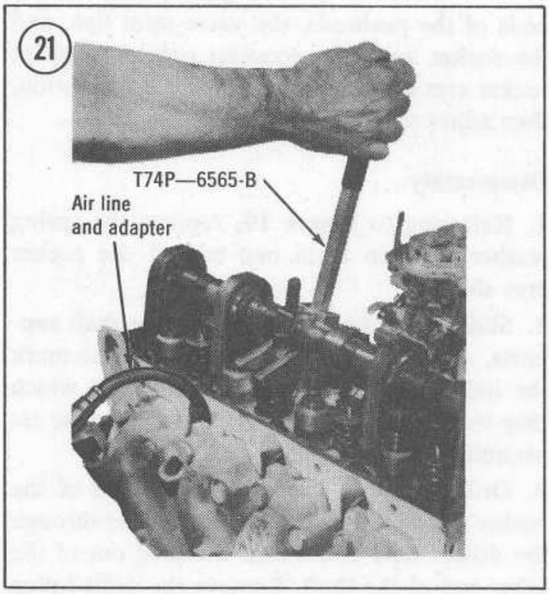
NOTE: *A pry bar may be used for rocker arm removal if a special tool is not available.*

5. Installation is the reverse of these steps. Apply Lubriplate to all friction surfaces (including valve stem tips). Adjust valve clearances after installation (Chapter Two).

Inspection

1. Check rocker arms for wear or scuffing at the valve stem end. Also check camshaft contact surface and pivot (valve lash adjuster) end. Replace rocker arm if visibly worn.
2. Check valve lash adjusters for wear or other visible damage as described in *Camshaft Inspection* later in this chapter. Replace if these conditions are evident.

21

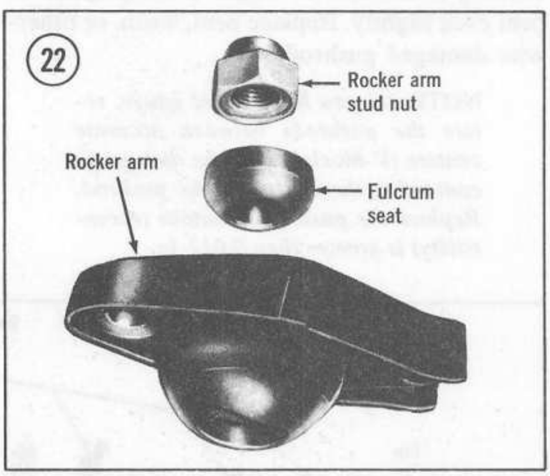


ROCKER ARMS (302 cid)

Removal/Installation

1. Remove the valve rocker arm cover as described earlier.
2. Loosen and remove valve rocker arm stud nut, fulcrum seat, and rocker arm (**Figure 22**).

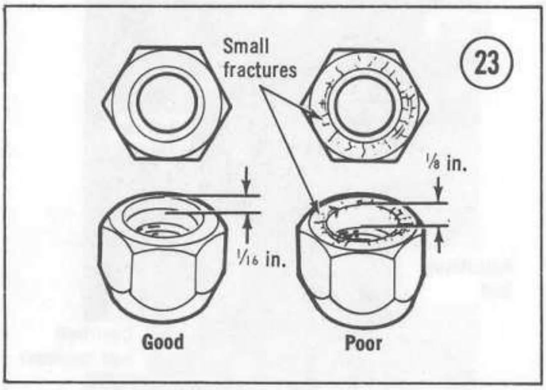
22



3. Installation is the reverse of these steps. Apply Lubriplate to all rocker arm and fulcrum seat friction surfaces before installation. Adjust valve clearance after installation.

Inspection

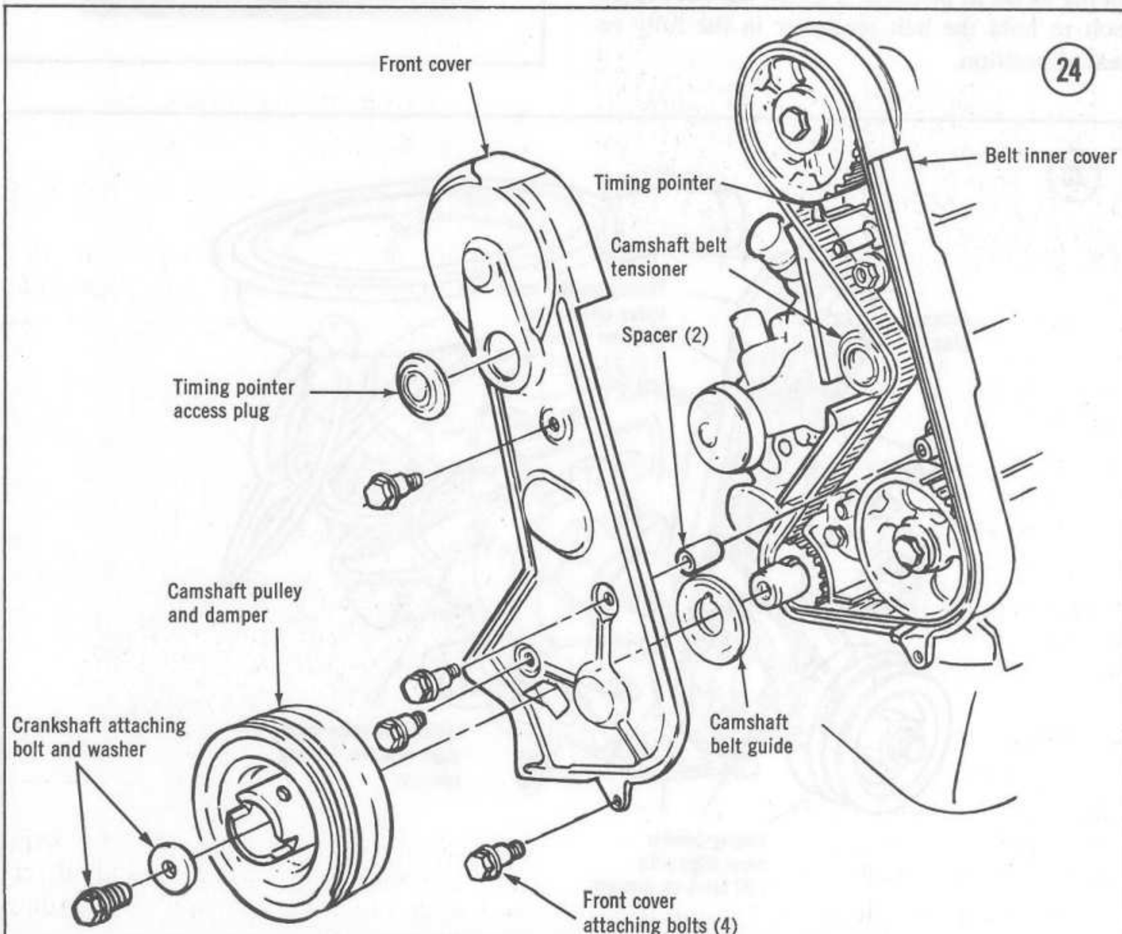
Check rocker arms stud nut for damage such as fractures or excessive chamfer (**Figure 23**). Chamfer should not exceed 1/16 in. Stud nuts with chamfer greater than 1/16 in. can cause valves to be held open.



FRONT COVER, CAMSHAFT BELT, DRIVE SPROCKETS, FRONT SEALS, AND AUXILIARY SHAFT (2300cc)

Front Cover and Camshaft Belt Removal/Installation

1. Remove the fan shroud, fan, spacer and fan pulley, as described in Chapter Six.
2. Remove the 4 front cover attaching bolts (**Figure 24**), then remove the front cover. With chalk, draw an arrow on the camshaft belt, in the normal direction of rotation (clockwise). If the belt is to be reinstalled, it must move in the same direction.
3. Turn the engine over in a clockwise direction by using a wrench on the crankshaft pulley bolt, until the number one piston is at top dead center on the compression stroke.



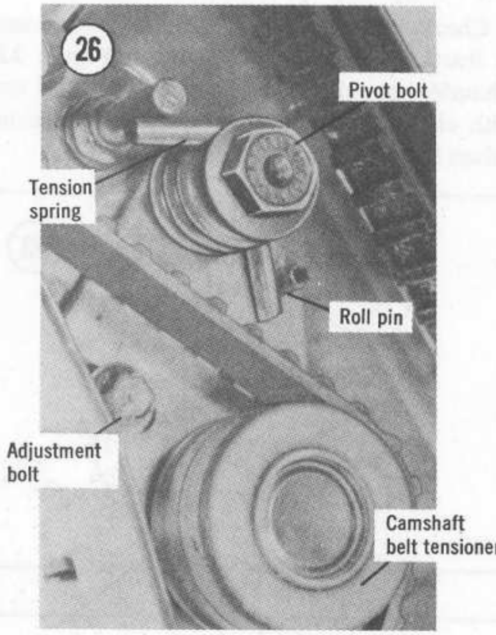
CAUTION

Turn the engine over only in its normal direction of rotation (clockwise as viewed from the front of the car). Reversing the direction of rotation may cause the camshaft belt to slip on the sprockets, disturbing engine timing.

When the crankshaft is correctly positioned, the 0° (TDC) mark on the vibration damper will align with the timing pointer on the front of the engine (**Figure 25**), the distributor rotor (or armature) will point as described in Chapter Seven, and the camshaft timing pointer will align with the timing mark on the camshaft drive sprocket.

4. Loosen the camshaft belt tensioner adjustment bolt (**Figure 26**), then position the tension adjusting tool, as shown in **Figure 27**, on the tension spring rollpin, and release the belt tensioner as far as possible. Tighten the adjustment bolt to hold the belt tensioner in the fully released position.

26



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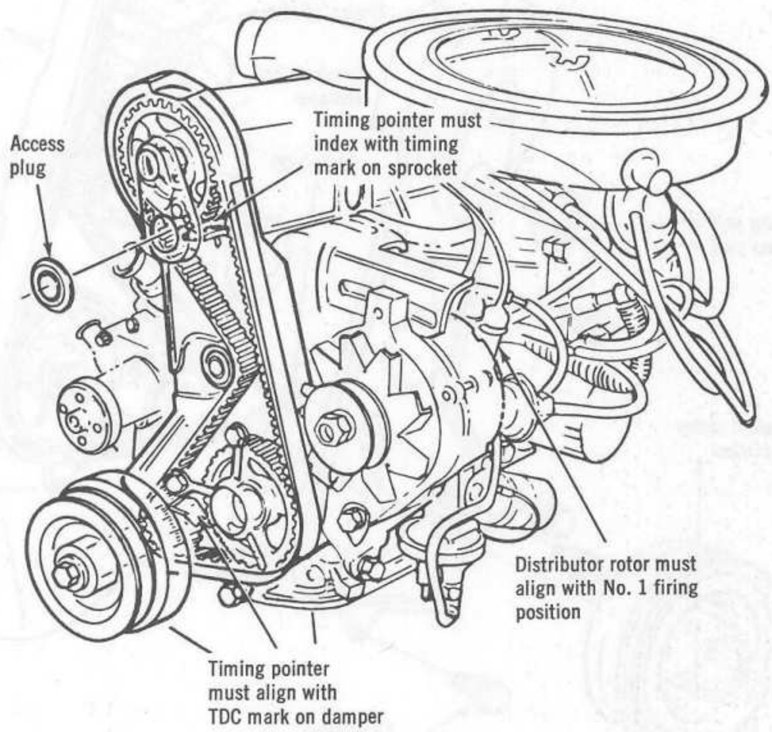

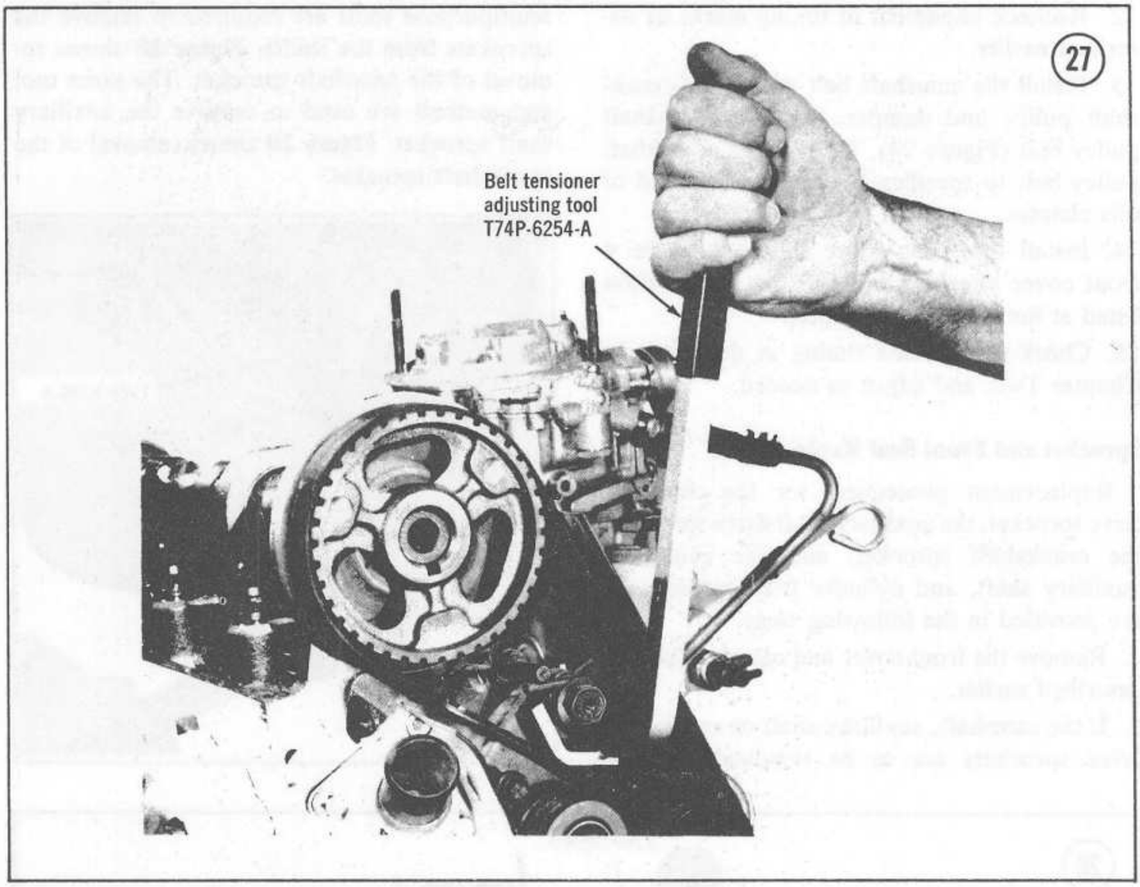

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5. Remove the crankshaft pulley attaching bolt, the crankshaft pulley and damper, and the camshaft timing belt guide (Figure 24).

6. Remove the camshaft belt and inspect it for wear, missing teeth or other damage. Replace the belt if any of these conditions exist.

CAUTION

Do not bend or twist the belt or use sharp instruments on it when removing it. Also keep grease and oil out of contact with it; they will cause it to deteriorate and render it unserviceable. Also do not rotate any of the camshaft belt sprockets while the belt is removed. Rotating any of the sprockets will upset engine timing.

7. Make sure the timing marks on the vibration damper and front of the engine, the camshaft sprocket and timing pointer, and the distributor rotor (armature) and body are properly aligned, as described in Step 3. See Figure 25.

8. Install the camshaft belt on the 3 drive sprockets (camshaft sprocket, auxiliary shaft sprocket and camshaft sprocket) and the camshaft belt tensioner. Align the belt fore and aft on the sprockets.

9. Loosen the camshaft belt tensioner adjustment bolt (Figure 26) to allow the tensioner to move against the belts.

10. Remove the spark plugs, then rotate the crankshaft 2 complete revolutions in the normal direction of rotation to remove slack from the camshaft belt.

CAUTION

The spark plugs must be removed prior to rotating the engine to prevent the camshaft belt from jumping sprocketed teeth during engine rotation.

11. Tighten the camshaft belt tensioner adjustment and pivot bolts (Figure 26) to specifications listed at the end of this chapter.

12. Recheck alignment of timing marks as described earlier.

13. Install the camshaft belt guide, the crankshaft pulley and damper, and the crankshaft pulley bolt (Figure 24). Tighten the crankshaft pulley bolt to specification listed at the end of this chapter.

14. Install the front cover and tighten the 4 front cover attaching bolts to the specification listed at the end of this chapter.

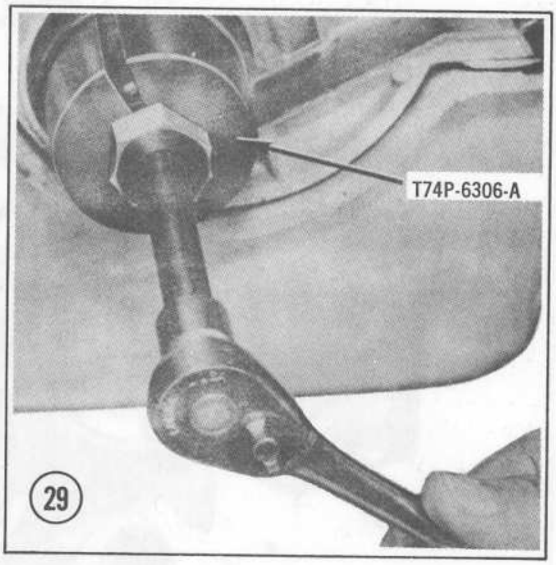
15. Check the ignition timing as described in Chapter Two, and adjust as needed.

Sprocket and Front Seal Replacement

Replacement procedures for the camshaft drive sprocket, the auxiliary shaft drive sprocket, the crankshaft sprocket, and the camshaft, auxiliary shaft, and cylinder front cover seals are provided in the following steps.

1. Remove the front cover and camshaft belt as described earlier.

2. If the camshaft, auxiliary shaft or crankshaft drive sprockets are to be removed, special, multipurpose tools are required to remove the sprockets from the shafts. **Figure 28** shows removal of the camshaft sprocket. The same tool and method are used to remove the auxiliary shaft sprocket. **Figure 29** shows removal of the crankshaft sprocket.



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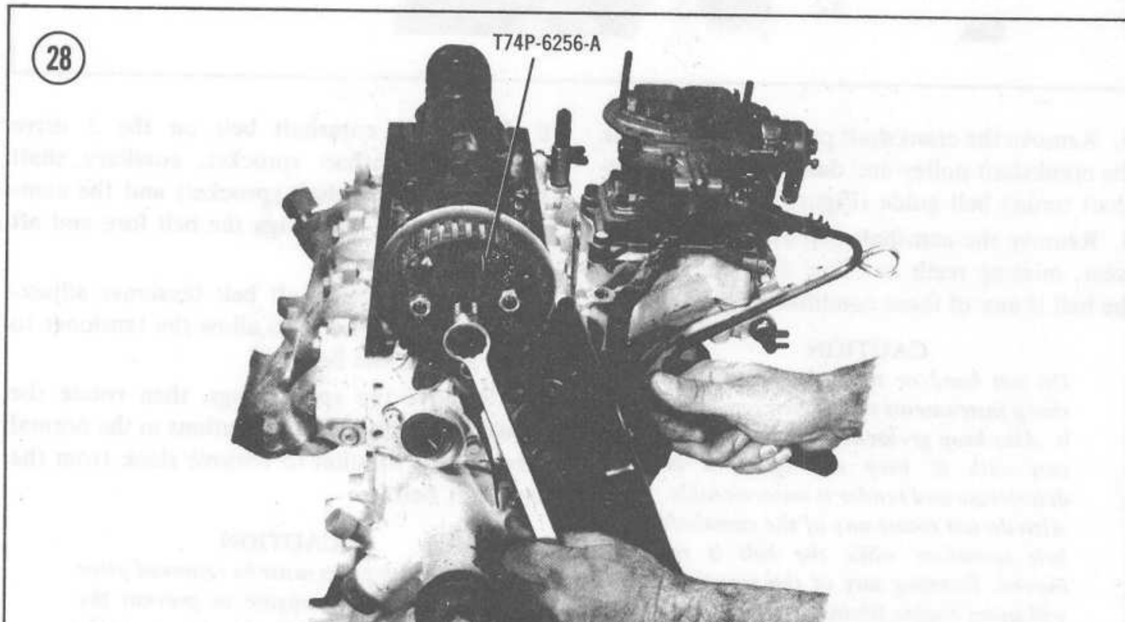


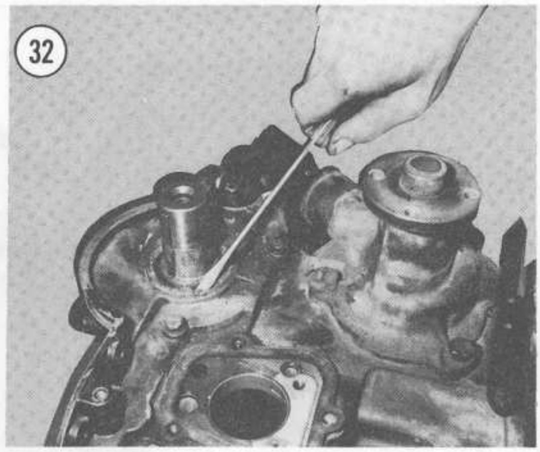
28

Installation of the sprocket is basically the reverse of this procedure. However, the threaded insert in the sprocket puller must be removed during camshaft sprocket or auxiliary shaft sprocket installation (**Figure 30**), to allow the center attaching bolt to be installed and tightened. (See the specifications at the end of this chapter for proper torque values.) No special tool is required to install crankshaft sprocket. Always use a new attaching bolt when replacing the camshaft sprocket, or wrap the old bolt threads with Teflon tape.

3. To replace the camshaft seal or auxiliary shaft seal, use a common seal removal tool as shown in **Figure 31**. Be sure that the jaws of the tool are gripping the thin edges of the seal very tightly before operating the jack-screw portion of the tool. If a seal removal tool is not available, insert a screwdriver into the seal as shown in **Figure 32**, then pry out the seal.

4. Install new camshaft or auxiliary shaft seals by tapping in gently with a hollow drift having the same outer diameter as the seal.

32



5. To remove the cylinder front cover seal, install the seal removal tool as shown in **Figure 33**, then remove and install the seal as described earlier.

Auxiliary Shaft Removal/Installation

1. Remove the front cover and camshaft belt as described earlier.

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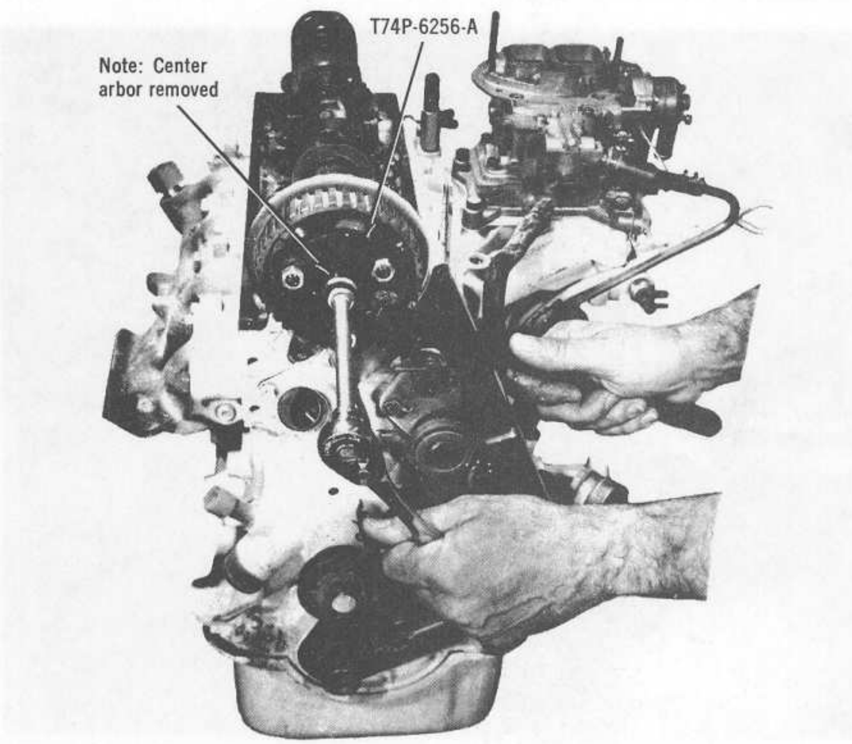

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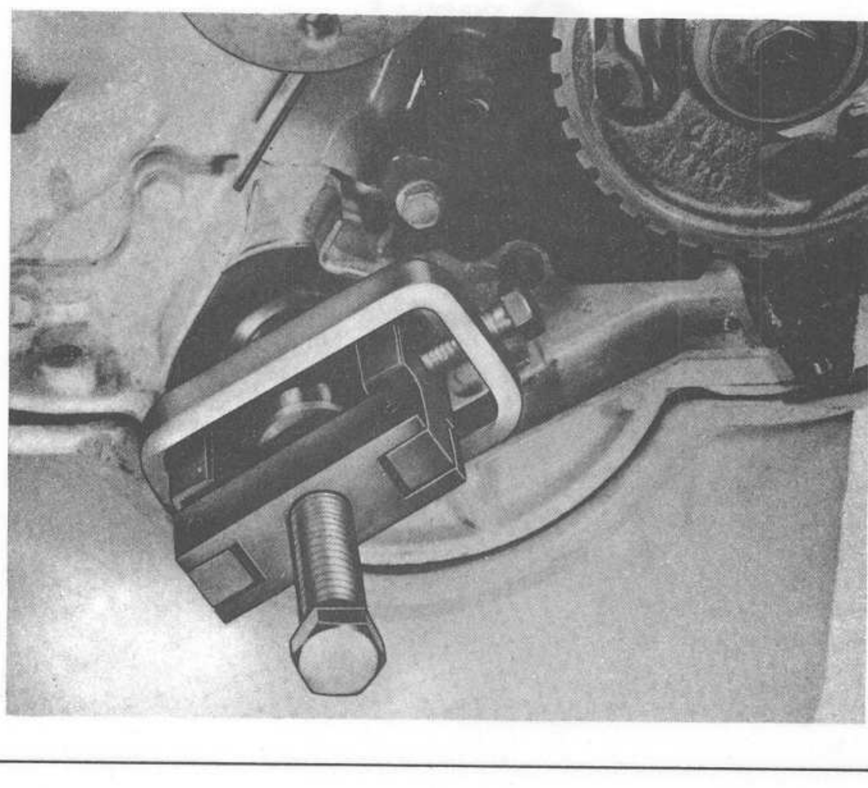

2. Remove the auxiliary shaft sprocket as described earlier.

3. Remove the distributor (Chapter Seven) and fuel pump (Chapter Five).

4. Remove the 3 attaching bolts securing the auxiliary shaft cover to the block (**Figure 34**).

5. Remove the 2 attaching screws securing the auxiliary shaft retaining (thrust) plate to the engine block then remove the retaining plate.

6. Carefully withdraw the auxiliary shaft from the engine block, being careful that the fuel pump eccentric and distributor drive gear are not allowed to touch the auxiliary shaft bearing surfaces.

7. Examine the auxiliary shaft bearings for obvious wear or damage. If the bearing is visibly worn or defective, remove it with an internal puller such as Ford tool T58L-101-A and a slide hammer such as Ford tool T59L-100-B (**Figure 35**).

NOTE: *If the engine is out of the car and you do not have the necessary tools, take the engine block to a Ford dealer or competent machine shop for auxiliary shaft bearing replacement.*

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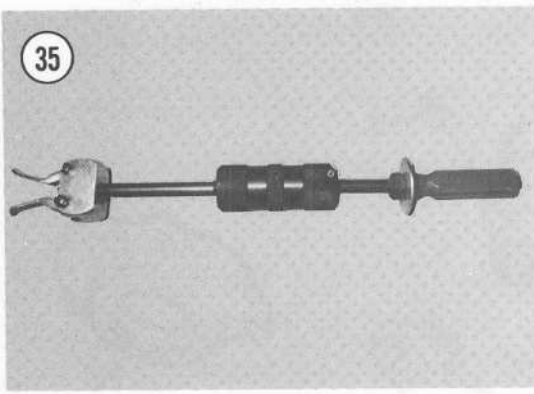


8. Installation is the reverse of these steps. If the auxiliary shaft bearings were removed, install the new bearings using a hollow drift of suitable size or Ford tool T57T-7003-A. Tighten all attaching hardware to specifications listed at the end of this chapter.

CAUTION

Make sure the oil holes in the auxiliary shaft bearings are aligned with those in the engine block before installing.

FRONT COVER, TIMING GEARS, AND FRONT OIL SEAL (2800cc)

Front Cover Removal

1. Remove the oil pan as described later under *Oil Pan Removal.*

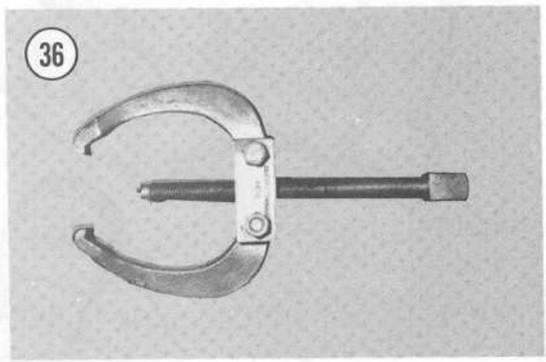
2. Drain the cooling system. Remove the radiator, shrouding, fan and water pump (Chapter Six).

3. Remove the air conditioner compressor and bracket as described under *Engine Removal* (if vehicle is so equipped).

4. Remove the alternator and drive belt as described under *Engine Removal.*

5. Remove the crankshaft pulley using a suitable puller (**Figure 36**).

36



6. Remove the front cover retaining bolts. If necessary, tap the cover lightly with a plastic hammer to break the gasket seal, then remove the front cover.

7. Examine the front cover plate gasket (between front cover plate and engine block) for leaks or other obvious damage. If the front cover plate gasket needs replacement, remove the 2 attaching bolts (**Figure 37**), then the front cover plate.

8. Remove the 2 guide sleeves from the cylinder block (Figure 37), and examine the seal rings on each guide sleeve for leakage or other damage. Replace if necessary.

Front Cover Installation

1. Clean all mating surfaces of gasket material. If the front cover plate gasket is to be replaced, apply sealing compound to the gasket surfaces

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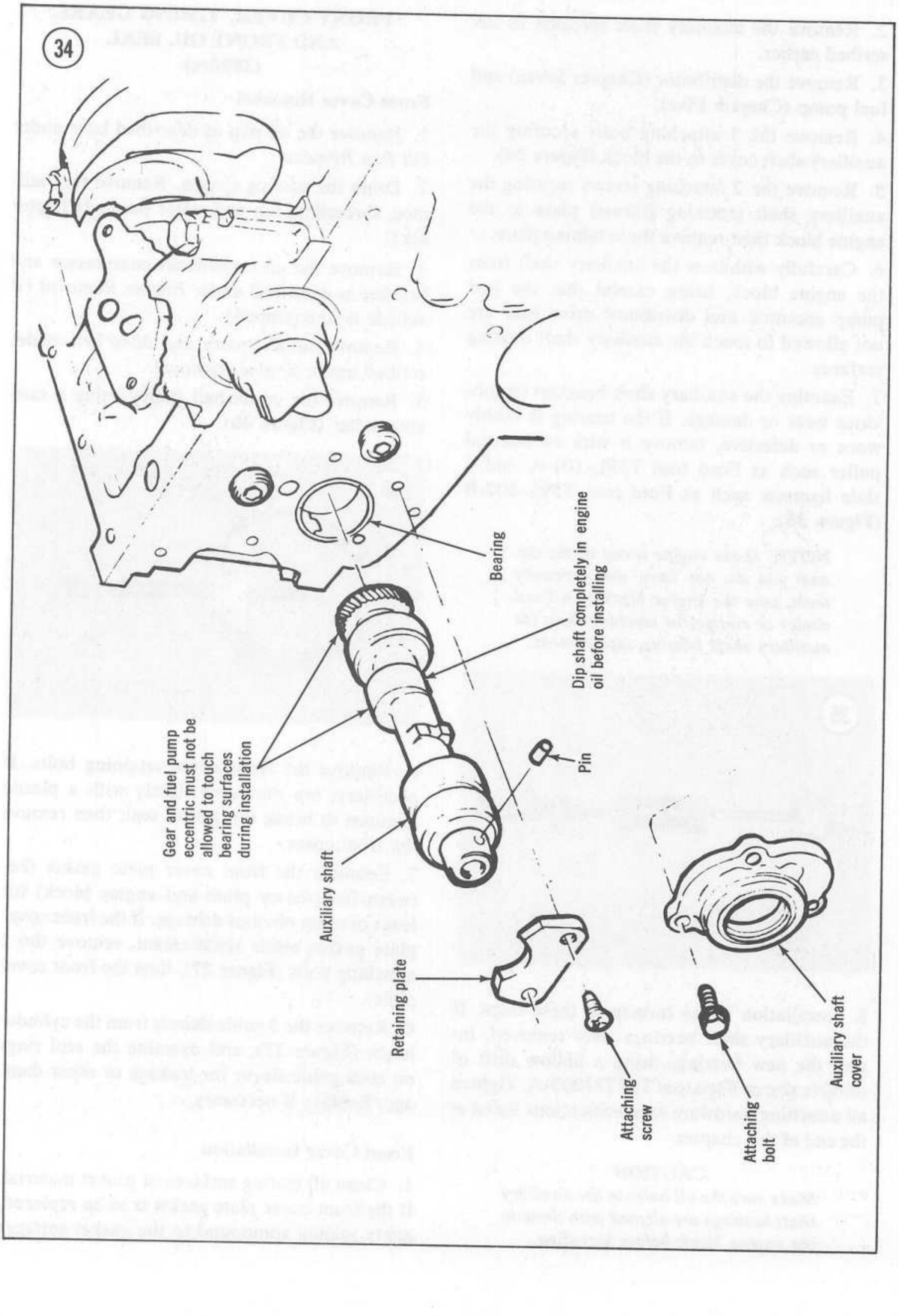
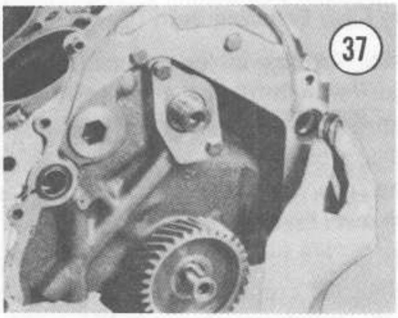
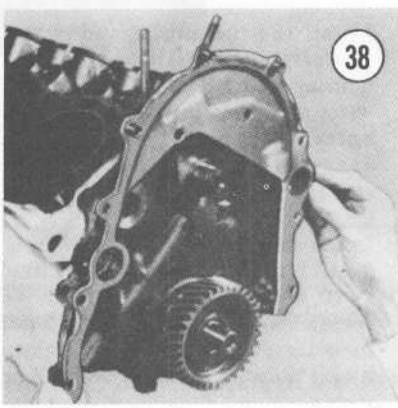
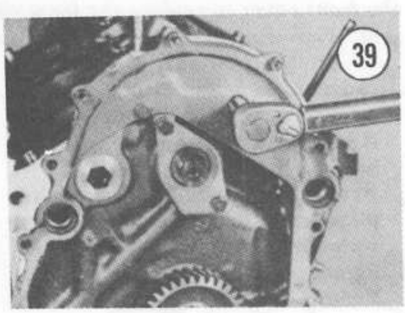

Bearing
Dip shaft completely in engine oil before installing
Pin
Gear and fuel pump eccentric must not be allowed to touch bearing surfaces during installation
Auxiliary shaft
Retaining plate
Attaching screw
Attaching bolt
Auxiliary shaft cover



on the cylinder block and the back side of the front cover plate. Position the gasket and front cover plate on the cylinder block (**Figure 38**), and temporarily install 4 front cover screws to position and hold gasket and cover plate in place.



2. Install and tighten the 2 cover plate attaching bolts (**Figure 39**), then remove the 4 front cover attaching screws that were temporarily installed.



3. Install the guide sleeves in the cylinder block with the chamfered side of the sleeve toward the front cover (Figure 37). Do not use gasket sealer on the guide sleeves or their seal rings.

4. Apply sealing compound to the front cover gasket surface, then position the gasket on the front cover.

5. Install the front cover on the engine and start all retaining screws 2-3 turns. Center the front cover by inserting Ford tool shown in **Figure 40** into the crankshaft pulley opening the front cover, or by inserting a hollow drift of appropriate size to center the front cover on the crankshaft. Tighten front cover attaching bolts to specification listed at the end of this chapter.

6. Install crankshaft pulley and tighten attaching bolt to specification listed at the end of this chapter.

7. Install the oil pan as described in *Oil Pan Installation* later in this chapter.

8. Install the air conditioning compressor (if so equipped), the alternator and drive belts, the water pump, fan, shroud and radiator, and any other parts previously removed to provide clearance. Adjust drive belt tension as described in Chapter Six.

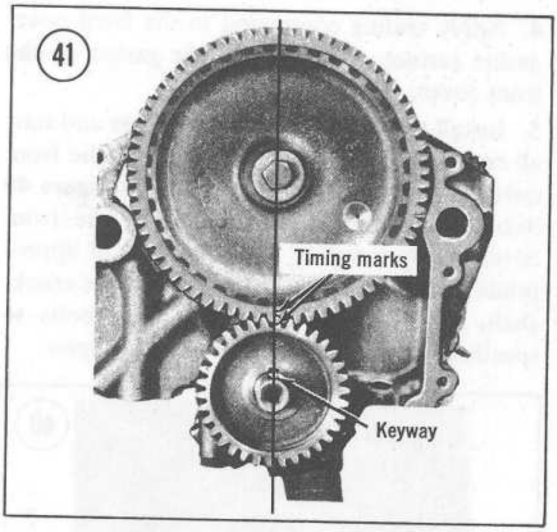
9. Ensure that all cooling system hoses are properly installed, then fill the cooling system with proper coolant as described in Chapter Six.

Timing Gear Removal

1. Remove the front cover as described previously to gain access to the timing gears.

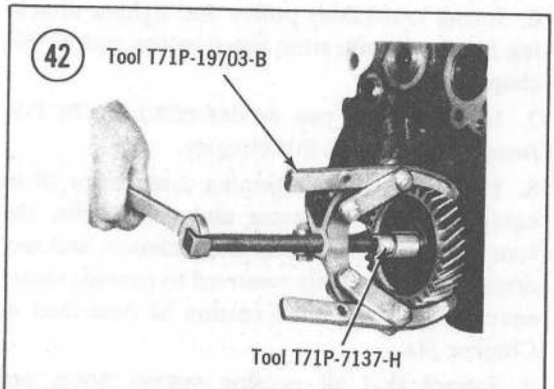
2. Check the camshaft end play as described later in this chapter, and replace the thrust plate and spacer ring, as required, to achieve the proper end play. See specifications at the end of this chapter.

3. Remove the camshaft sprocket retaining bolt and washer (**Figure 41**), then slide the sprocket



off the camshaft. Make sure not to lose the camshaft key.

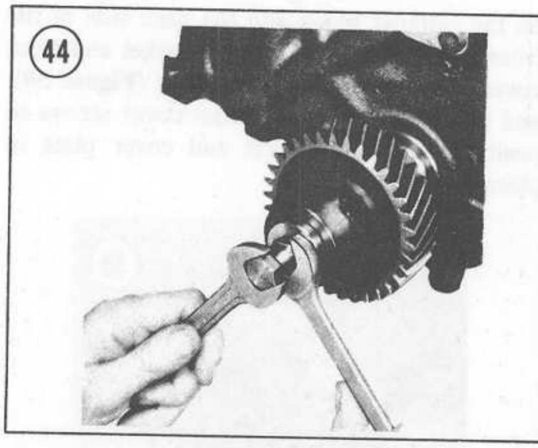
4. Using a gear puller such as the Ford tool shown in **Figure 42**, remove the crankshaft timing sprocket, then remove the key from the crankshaft (Figure 41).



Timing Gear Installation

1. Install the key in the camshaft (if removed previously), then align the keyway in the camshaft sprocket with the key in the camshaft and slide the sprocket onto the camshaft. Make sure that the sprocket seats tightly against the camshaft spacer (**Figure 43**).

2. Position the key in the crankshaft (Figure 41) then align the crankshaft sprocket keyway and install the sprocket as shown in **Figure 44**.

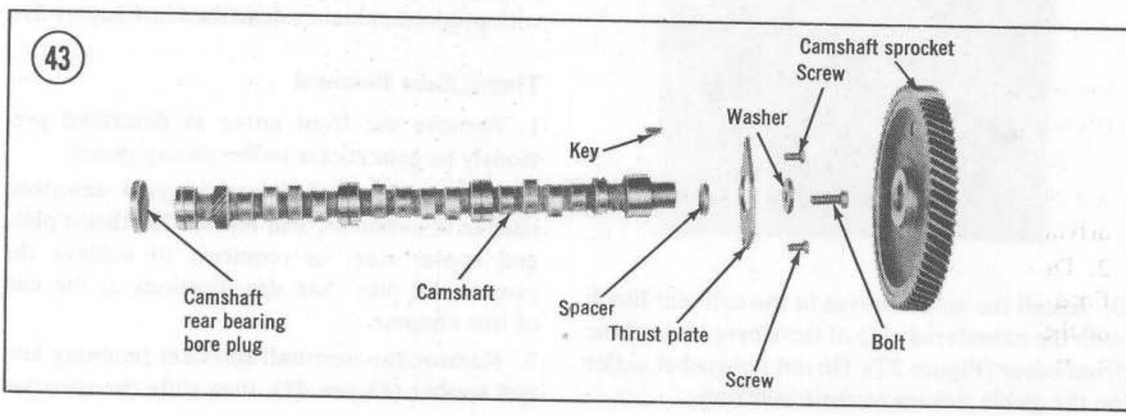


3. Install the front cover and accessory equipment as described in *Front Cover Installation.*

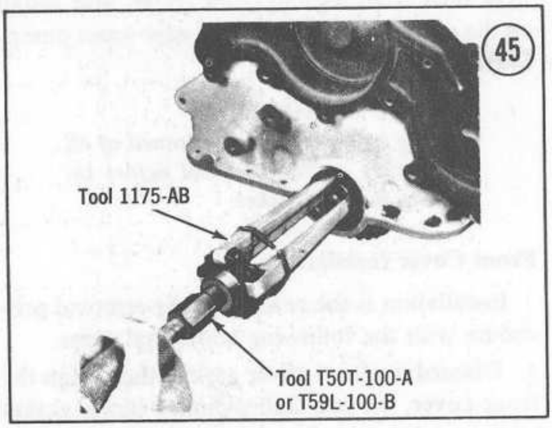
Front Oil Seal Replacement (In Chassis)

1. Remove the radiator, shroud, fan, crankshaft pulley and water pump drive belt, as described in *Front Cover Removal.*

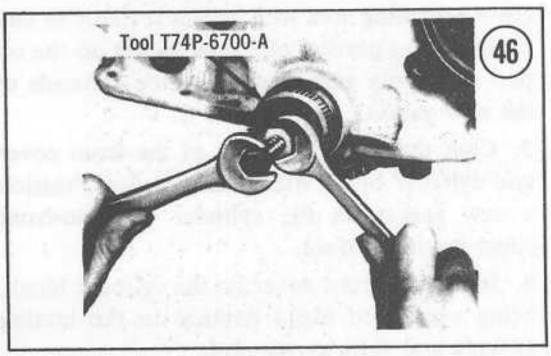
> NOTE: *It is not necessary to remove the front cover to replace the front oil seal.*



2. Using the Ford tool shown in **Figure 45**, remove the front cover oil seal.



3. Before installing, coat the new front cover oil seal with Lubriplate or equivalent. Using the Ford tool shown in **Figure 46**, or a hollow drift of the same diameter as the seal, slide the new oil seal onto the crankshaft. Drive the oil seal onto the crankshaft, using the drift or special tool, until the seal abutts against the front cover.



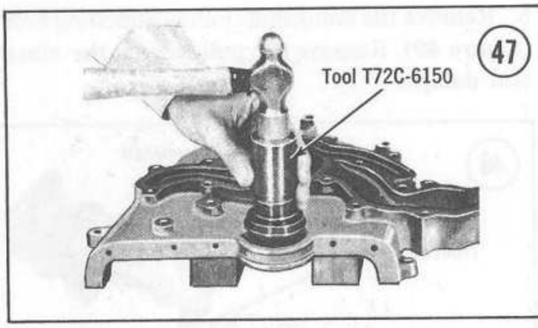
4. The remainder of the installation is the reverse of removal.

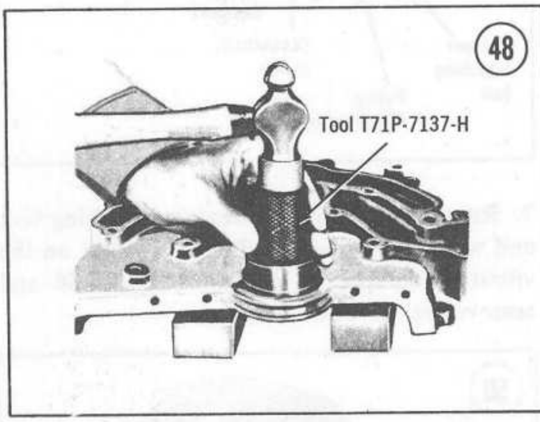
Front Oil Seal Removal/Installation (Front Cover Removed)

1. Support the front cover, as shown in **Figure 47**, to prevent damage to the cover while driving out the front seal.

2. Drive the seal out of the front cover using the Ford tool shown in Figure 47, or a hollow drift of the same diameter as the seal.

3. Before installing, coat the new oil seal with Lubriplate or equivalent. Carefully drive the new oil seal into the front cover using the Ford tool shown in **Figure 48**, or a hollow drift of the same diameter as the oil seal.





FRONT COVER, TIMING CHAIN AND DRIVE SPROCKETS, AND FRONT OIL SEAL (302 cid)

Front Cover Removal

1. Drain the cooling system, then remove the radiator, shroud, fan, spacer, and radiator hoses (Chapter Six).

2. Remove the air conditioner drive belt and idler pulley bracket (if vehicle is so equipped), alternator drive belt, power steering drive belt and power steering pump (if vehicle is so equipped), and all accessory brackets which attach to the water pump.

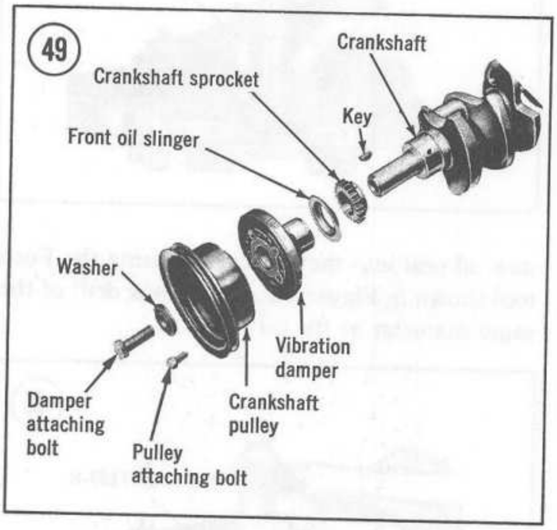
3. Remove the water pump pulley attaching bolts, then remove the water pump pulley.

4. Disconnect the heater hose and water pump hose at the water pump.

5. Drain the crankcase and remove the oil level dipstick.

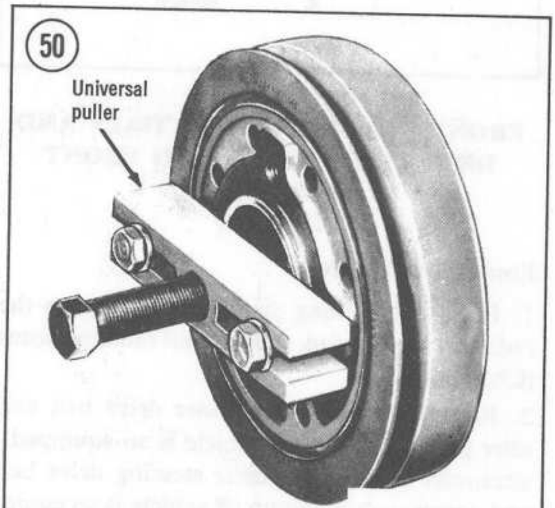
6. Remove the crankshaft pulley attaching bolts (**Figure 49**). Remove the pulley from the vibration damper.

(49)



7. Remove the vibration damper attaching bolt and washer (Figure 49). Install a puller on the vibration damper as shown in **Figure 50** and remove the vibration damper.

(50)



8. Remove the oil pan-to-front cover attaching bolts, then use a thin bladed knife to cut the oil pan-to-front cover gasket flush with the cylinder block front face.

9. Remove the front cover-to-cylinder block attaching bolts, and remove the front cover and water pump as an assembly.

10. If a new cylinder front cover is to be installed, detach the water pump, gasket, and dipstick tube from the old front cover, and install on the new front cover, using a new water pump-to-front cover gasket.

CAUTION

Mating surfaces must be cleaned of all old gasket sealing material before installing the new gasket.

Front Cover Installation

Installation is the reverse of the removal procedure with the following additional steps.

1. Discard the front cover gasket, then clean the front cover, oil pan and cylinder block gasket mating surfaces of all gasket and sealer material.

NOTE: *A new front oil seal should be installed in the front cover each time the front cover is removed. Refer to the removal/installation procedure described later in this chapter.*

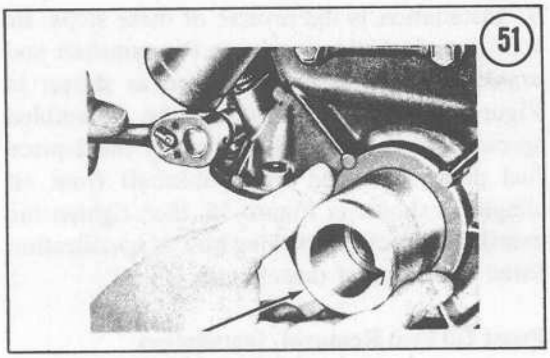
2. Coat the gasket surface of the oil pan-to-front cover attaching area with gasket sealer. Cut and position that portion of a new gasket on the oil pan and apply gasket sealer to the cut ends of the new gasket.

3. Coat the gasket surfaces of the front cover and cylinder block with gasket sealer. Position a new gasket on the cylinder block-to-front cover mating surface.

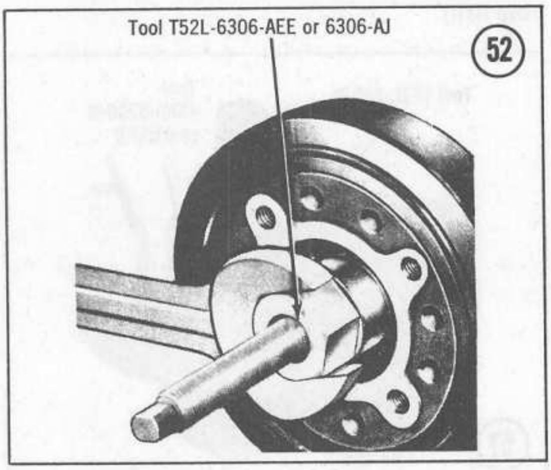
4. Install the front cover on the cylinder block, being careful to avoid damage to the mating gaskets and front cover seal.

5. Coat the threads of the front cover attaching bolts with oil-resistant sealer. Install all attaching bolts using the Ford tool shown in **Figure 51**, or a drift of suitable size to align front cover. Tighten the oil pan-to-front cover attaching bolts to specifications listed at the end of this chapter. Tighten the front cover-to-cylinder block attaching bolts to specification and remove the alignment tool or drift.

6. Apply Lubriplate or equivalent to the surface area of the vibration damper inner hub that contacts the front oil seal, then apply white grease to the front of the crankshaft and install the vibration damper.



7. Install the vibration damper using the Ford tool shown in **Figure 52**, or an equivalent device and tighten vibration damper attaching bolt to specification listed at the end of this chapter.



8. Start the engine and operate at a fast idle to check for oil or coolant leaks.

Timing Chain and Sprocket Removal/Installation

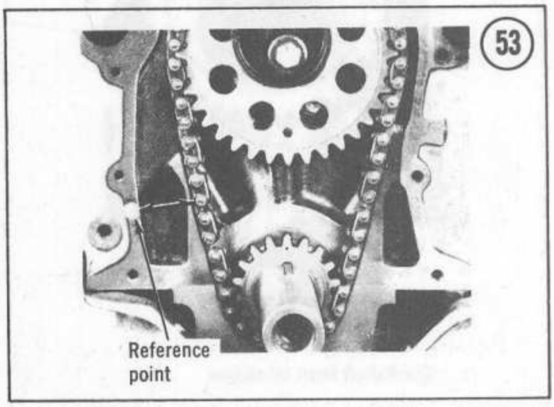
1. Remove the cylinder front cover as described earlier.

2. Disconnect the outlet line from the fuel pump (Figure 10). Remove the fuel pump attaching bolts and lay the pump to one side with the flexible fuel line still attached.

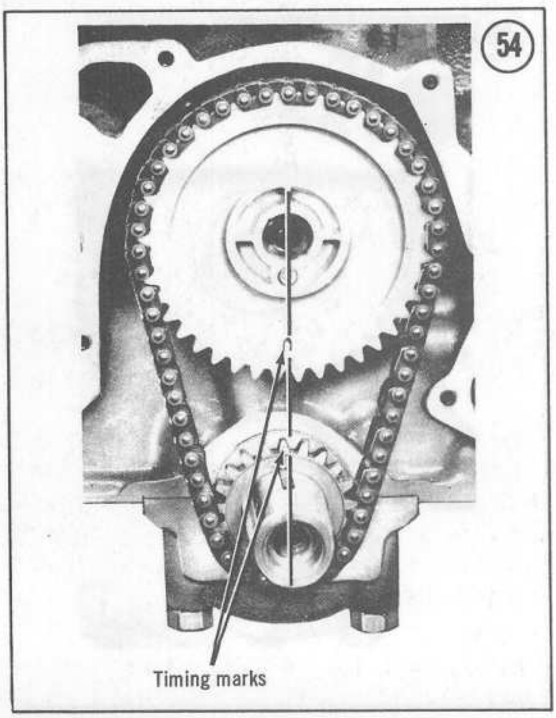
3. Remove the front oil slinger from the crankshaft (Figure 49).

4. Check timing chain deflection as follows. Rotate the crankshaft in a counterclockwise direction (viewed from front of vehicle) to take up slack on the left side of the timing chain.

5. Measure distance from a reference point on the cylinder block (**Figure 53**). Rotate the crankshaft in the opposite direction to take up the slack in the right side of the timing chain. Force the left side of the timing chain toward the reference mark, and measure the distance to the reference mark once again. The difference between the 2 measurements is the timing chain deflection. Timing chain deflection must not exceed 0.500 in.



6. Turn the engine by hand until the timing marks on the camshaft sprocket and crankshaft sprocket are aligned as shown in **Figure 54**.



7. Remove the camshaft sprocket attaching bolt, washer and 2 piece fuel pump eccentric (**Figure 55**).

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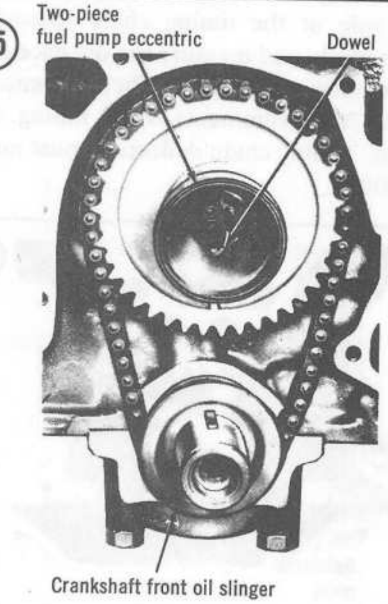

8. Slide both sprockets and the timing chain forward and remove as an assembly (**Figure 56**).

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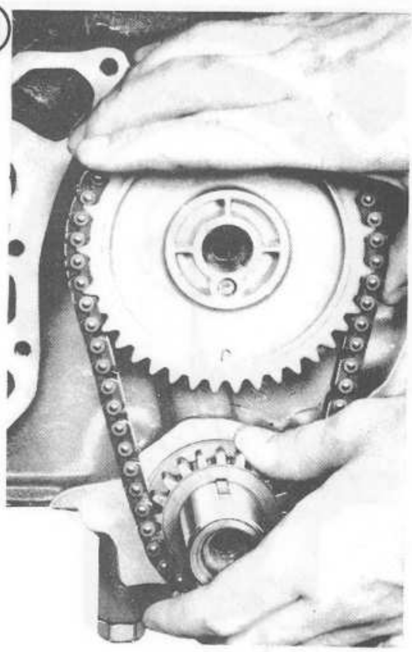

9. Installation is the reverse of these steps. Be sure that the timing marks on the camshaft and crankshaft sprockets are aligned as shown in Figure 54 before installing the assembled sprockets and timing chain. Install the 2-piece fuel pump eccentric and crankshaft front oil slinger as shown in Figure 55, then tighten the camshaft sprocket attaching bolt to specification listed at the end of this chapter.

Front Oil Seal Removal/Installation

1. Remove the cylinder front cover as described earlier.
2. Support the front cover around the area of the oil seal. Drive the seal out of the front cover with the Ford tool shown in **Figure 57**, or a suitable drift.

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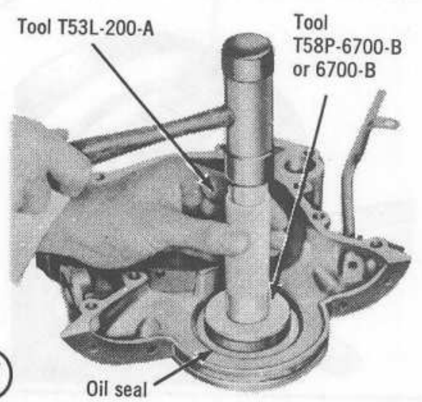
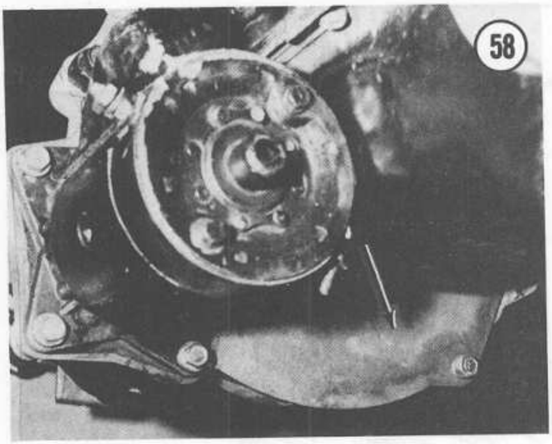


3. Coat the new front oil seal with grease, turn the front cover over, and drive in the new seal using the Ford tool shown in Figure 57 or a suitable drift. The oil seal must be fully seated in the front cover recess.
4. Install the front cover as described earlier.

OIL PAN
(2300cc)

Removal

1. Drain the engine oil and remove the dipstick.
2. Remove the flywheel inspection cover (**Figure 58**), and remove the starter if required to gain access to the oil pan attaching bolts (Chapter Seven).



3. Disconnect the rack and pinion steering unit from the crossmember as described in Chapter Eleven, then move unit forward to provide clearance for the oil pan.

4. Disconnect the swaybar (if vehicle is so equipped) at the end links (Chapter Eleven), and rotate the bar to provide clearance during oil pan removal. Remove the oil pan attaching bolts. Remove the oil pan and gasket.

Installation

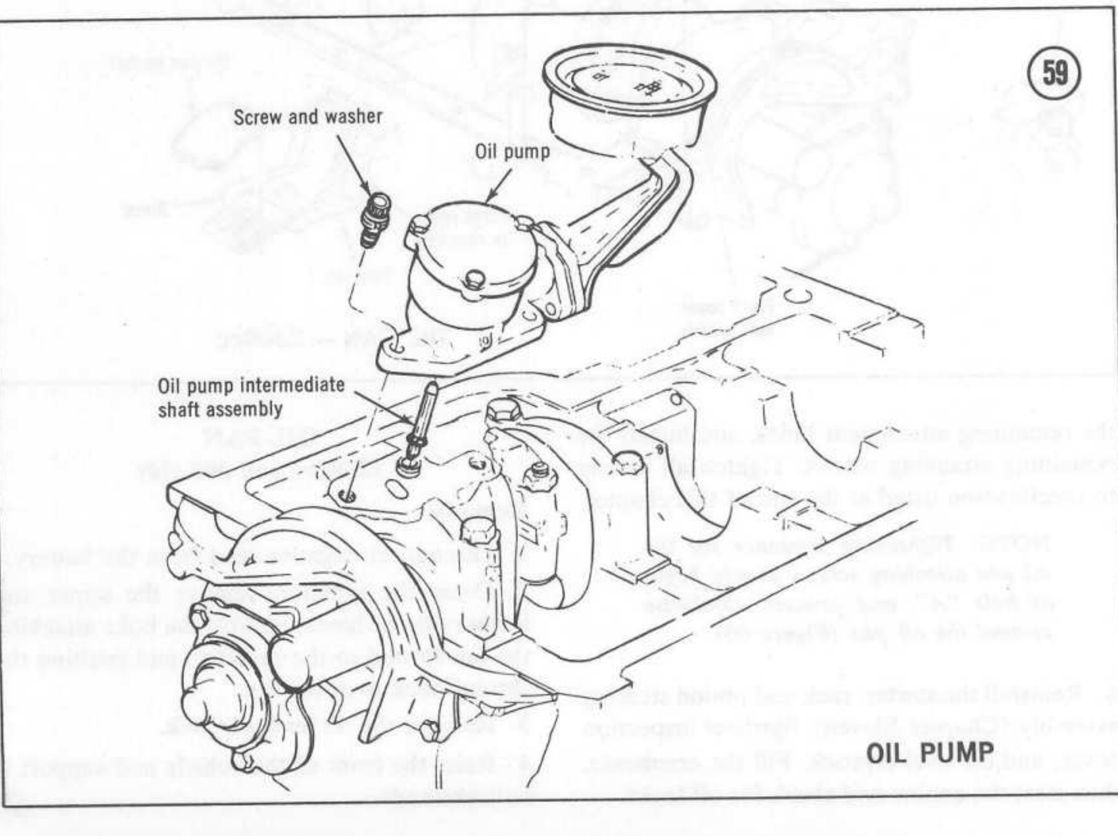
1. Clean the oil pump pickup screen and filler tube (**Figure 59**).

2. Clean all traces of old gasket material and sealer from oil pan, cylinder block, front cover and rear main bearing cap. Be sure to clean the seal groove in the front cover and rear main bearing cap (**Figure 60**). Be careful not to gouge the sealing surfaces.

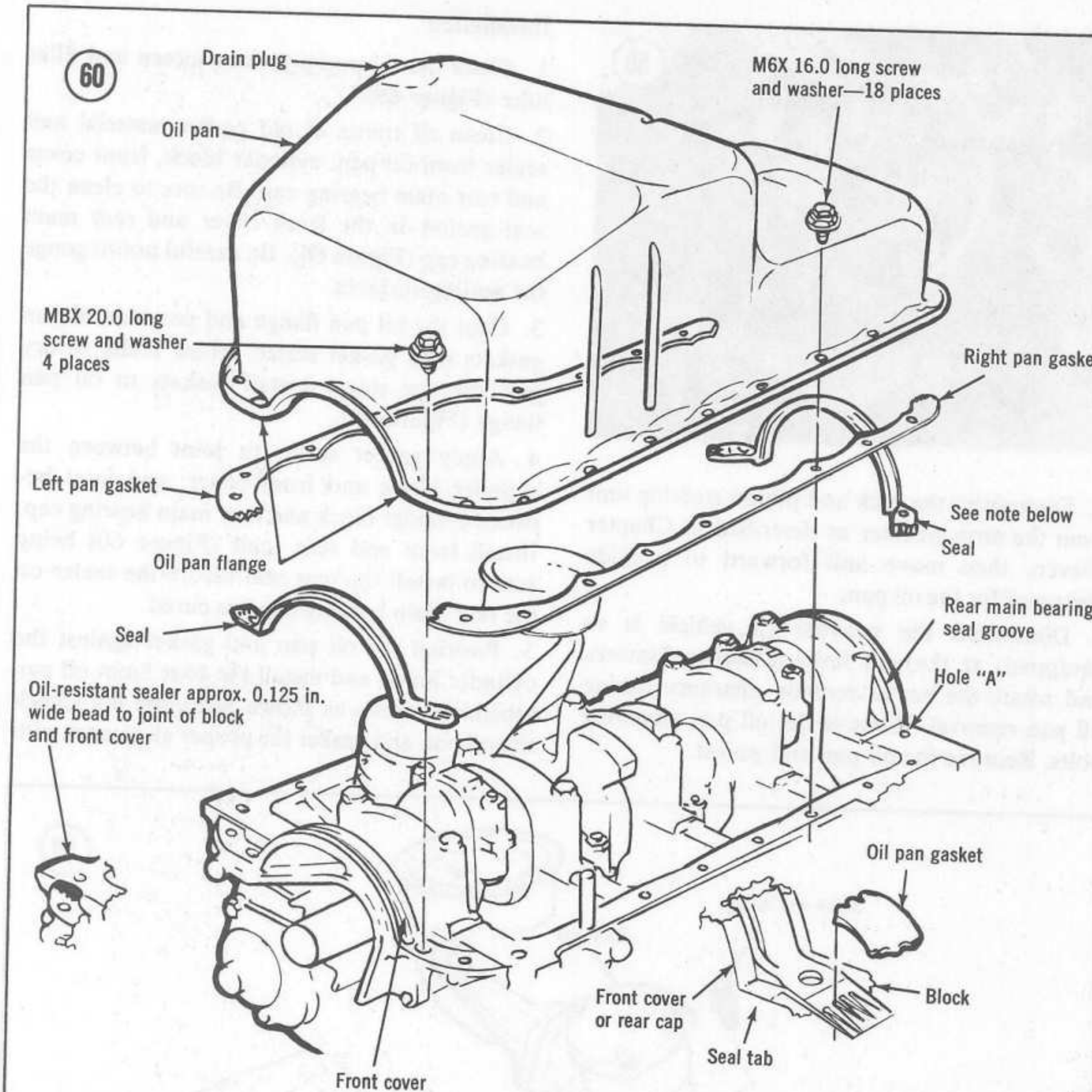
3. Coat the oil pan flange and pan side of pan gaskets with gasket sealer. Allow sealer to dry past the wet stage. Install gaskets to oil pan flange (Figure 60).

4. Apply gasket sealer to joint between the cylinder block and front cover, and joint between cylinder block and rear main bearing cap. Install front and rear seals (Figure 60) being sure to install the rear seal before the sealer on the rear main bearing cap has cured.

5. Position the oil pan and gasket against the cylinder block and install the four 8mm oil pan attaching screws as shown in Figure 60. Check the oil pan and gasket for proper alignment with



OIL PUMP



OIL PAN — 2300cc

the remaining attachment holes, and install the remaining attaching screws. Tighten all screws to specification listed at the end of this chapter.

> NOTE: *Tightening sequence for the oil pan attaching screws should begin at hole "A", and proceed clockwise around the oil pan (Figure 60).*

6. Reinstall the starter, rack and pinion steering assembly (Chapter Eleven), flywheel inspection cover, and oil level dipstick. Fill the crankcase, then start the engine and check for oil leaks.

OIL PAN (2800cc and 302 cid)

Removal

1. Disconnect negative lead from the battery.
2. Drain the radiator, remove the upper and lower radiator hoses, remove the bolts attaching the fan shroud to the radiator, and position the shroud back over the fan.
3. Remove the oil level dipstick.
4. Raise the front of the vehicle and support it on jackstands.

5. Disconnect the automatic transmission cooler lines at the radiator as described in Chapter Ten.

6. Drain the engine oil from the crankcase.

7. Disconnect the battery cable from the starter. Remove the starter as described in Chapter Seven.

8. Disconnect power steering hoses (if vehicle is so equipped), remove the 2A crossmember and remove the rack and pinion steering assembly as described in Chapter Eleven. Position the steering gear out of the way to allow clearance for the oil pan removal.

9. Disconnect the swaybar (if vehicle is so equipped) at the end links (Chapter Eleven). Rotate the bar to provide clearance during oil pan removal.

10. On 2800cc V6 models, remove the through bolts connecting the front motor mounts to the attaching brackets. See *Engine Removal*. Raise the front of the engine sufficiently to allow the oil pan to be removed. Place wooden blocks between the front motor mounts and their attaching brackets.

11. Remove the oil pan attaching bolts, then remove the oil pan.

Installation

Installation is basically the reverse of the removal procedure, with the following additional steps.

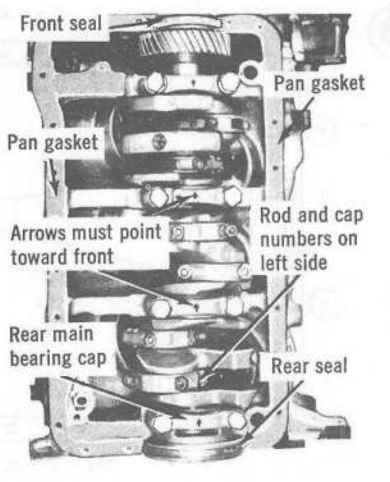
1. Clean the mating surfaces of the engine block and the oil pan of all sealer and gasket material. Be careful not to gouge the sealing surfaces.

2. Coat the engine block mating surfaces of the oil pan gaskets with oil-resistant sealer. Once tacky, position the oil pan gaskets on the cylinder block, and align with the oil pan mounting holes in the engine block. See **Figure 61** for 2800cc engines or **Figure 62** for 302 cid engines.

3. Install the oil pan-to-engine block seals as shown in Figure 61 (2800cc engines) or Figure 62 (302 cid) secured in place with contact cement, or a suitable sealant material.

4. Position the oil pan on the cylinder block. On 2800cc engines, install 4 attaching bolts as shown in Figure 60 to secure the front and rear of the oil pan, then install the remaining bolts and tighten in the sequence shown in **Figure 63** to the specifications listed at the end of this chapter. For 302 cid engines install an attaching bolt, finger-tight, on each side of the oil pan, then install the remaining oil pan attaching bolts.

61



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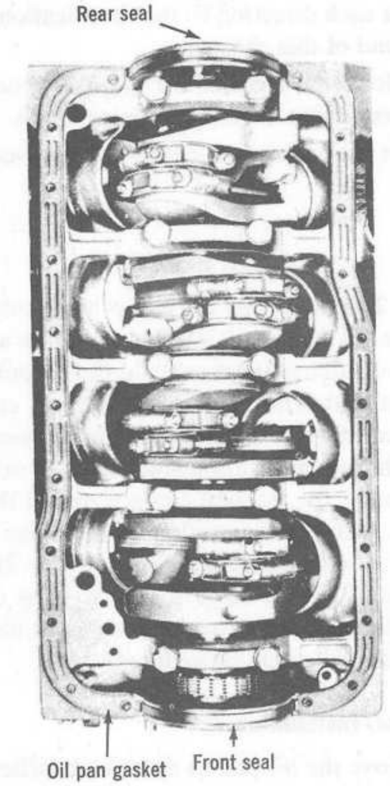

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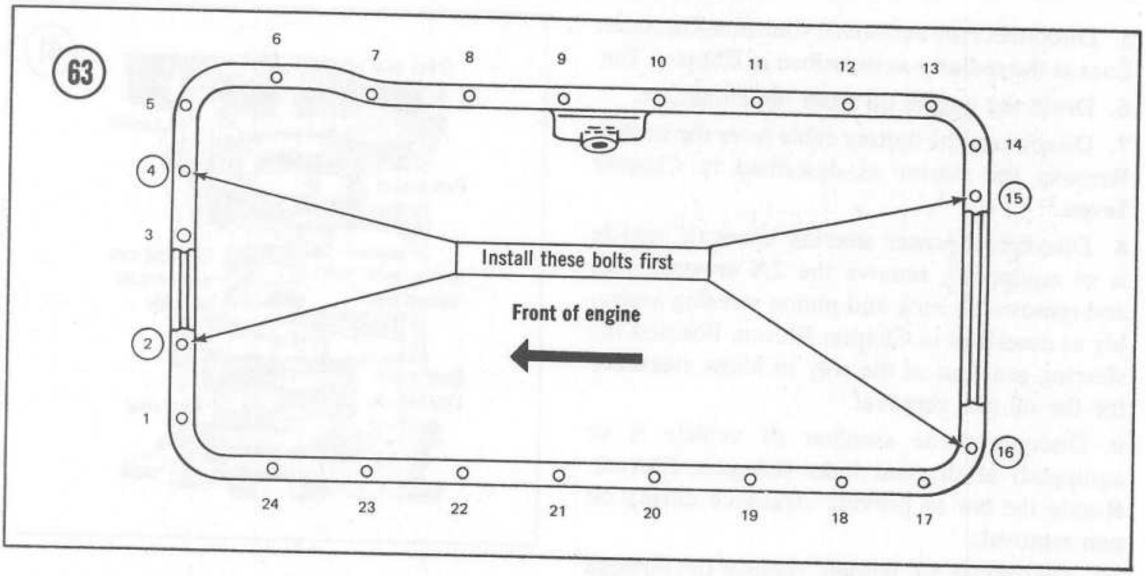


Tighten the oil pan bolts from the center outward in each direction to the specification listed at the end of this chapter.

5. Perform the steps of the removal procedure in reverse order to complete installation.

6. Start the engine and check for oil or coolant leaks.

OIL PUMP

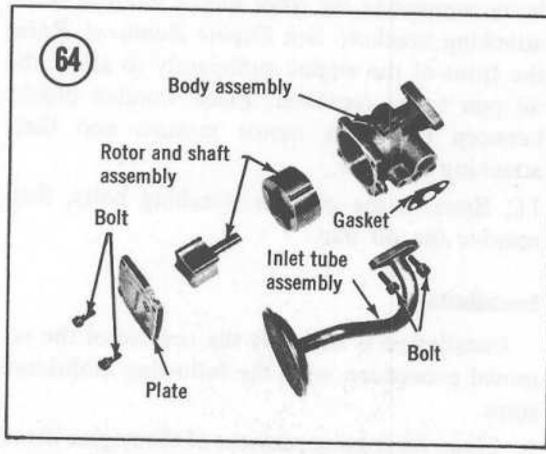
The 2300cc engine oil pump is mounted inside the oil pan, and is replaceable as a unit. Under no circumstances should the oil pump be disassembled. The 2800cc and 302 cid engines use an eccentric bi-rotor type oil pump mounted inside the oil pan. Although different in external appearance, the internal components of these 2 pumps, and their operation is the same. **Figure 64** is a disassembled view of the 2800cc pump, and **Figure 65** is a similar view of the 302 cid pump. Refer to these views as needed, during the following procedures.

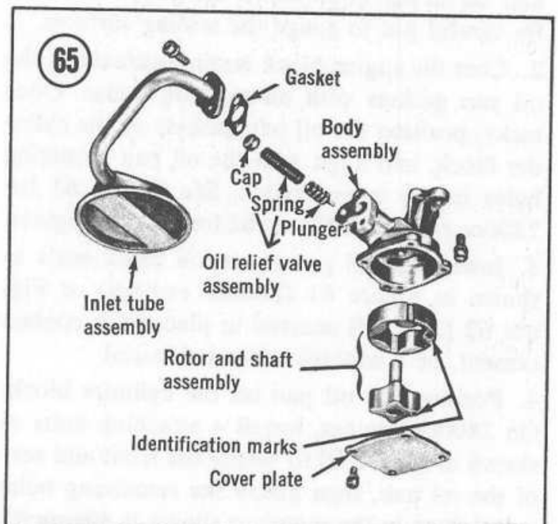
Removal/Installation

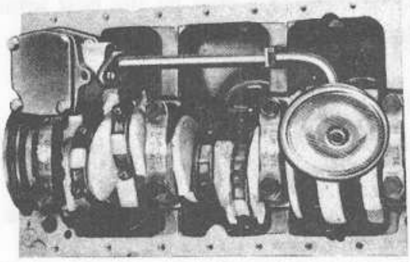
1. Remove the oil pan as described earlier.

2. On 2800cc engines, remove the bolt that attaches the inlet tube assembly and oil pickup screen to the block (**Figure 66**).

3. Remove the 2 bolts securing the inlet tube assembly to the oil pump body. Remove the inlet tube assembly and gasket.



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4. Remove the bolts attaching the oil pump body to the engine block, then remove the oil pump.

> NOTE: *Be sure that the oil pump drive (intermediate) shaft is removed from the engine block when the oil pump is removed.*

5. After disassembly, repair and reassembly, or replacement, prime the pump by filling with engine oil and rotating the oil pump drive shaft to distribute oil throughout the pump.

6. Install the oil pump drive shaft in the engine block until the shaft is firmly seated. Install the oil pump to the engine block and secure with the oil pump attaching bolts.

> NOTE: *Do not force the oil pump into position if it will not seal readily; the drive shaft may be misaligned. Rotate drive shaft until oil pump seats easily.*

7. Install the inlet tube assembly to the oil pump body, then tighten all bolts to specifications listed at the end of this chapter. On 2800cc engines, secure the inlet tube assembly to the engine block, and tighten attaching nut to specification listed at the end of this chapter. Install the oil pan as described earlier.

Disassembly, Inspection, and Assembly

1. Separate the inlet tube assembly from the oil pump body (Figure 64 or 65).

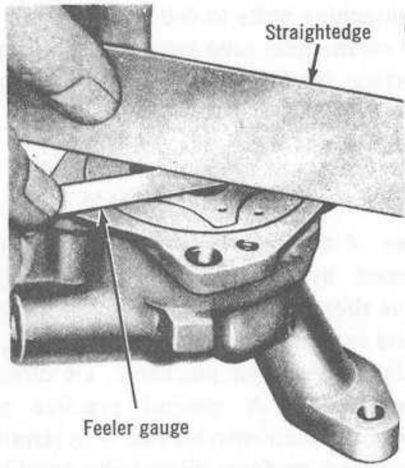
2. Remove the oil pump cover plate attaching bolts, then remove the cover plate.

3. Lift the 2-piece rotor and shaft assembly out of the pump body.

4. Thoroughly clean all parts in solvent.

5. Measure rotor end play by placing a straightedge over the pump body and rotor assembly, then inserting a feeler gauge between the rotor and the straightedge (**Figure 67**). Rotor end play should be 0.001-0.004 in.

> NOTE: *The 2-piece inner-rotor shaft and outer rotor are replaced only as an assembly. The individual parts are not replaceable.*



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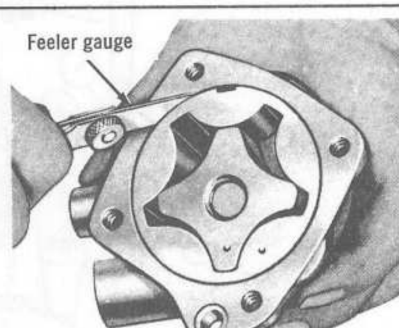
6. Measure clearance between the outer rotor (outer race) and the pump body with a feeler gauge. See **Figure 68**. This clearance should be 0.001-0.007 in. (2300cc engines); 0.006-0.012 in. (2800cc engines); or 0.001-0.013 in. (302 cid engines).



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7. Drill a small hole in the center of the oil relief valve cap, insert a self-threading, sheet metal screw into the cap, then pull the cap out of the oil relief valve chamber (Figure 65). Remove the relief valve spring and plunger from the pump body.

8. Oil all pump parts thoroughly before beginning assembly.

9. Assembly is the reverse of the removal procedure. Be sure the identification marks on the inner rotor-shaft and outer rotor align as shown in Figure 68, and will be facing downward (away from the engine, toward the ground), when the pump is installed. Tighten the cover plate attaching bolts to 6-9 ft.-lb. Install a new gasket on the inlet tube assembly-to-pump mating surface, then tighten the inlet tube attaching bolts to 6-9 ft.-lb.

CYLINDER HEAD

Some of the following procedures must be performed by a Ford dealer or competent machine shop, since they require special knowledge and expensive machine tools. Others, while possible for the home mechanic, are difficult or time-consuming. A general practice among those who do their own service is to remove the cylinder head, perform disassemby except valve removal, and take the head to a machine shop for inspection and service. Since the cost is relatively low in proportion to the required effort and equipment, this may be the best approach, even for more experienced owners.

Removal (2300cc)

1. Drain the cooling system and remove the thermostat (Chapter Six).
2. Remove the air cleaner and intake duct assembly (Chapter Five).
3. Remove exhaust manifold (Chapter Five).
4. Remove the intake manifold, together with the carburetor, decel valve, and EGR valve (if so equipped). See Chapter Five.
5. Remove the rocker arm cover as described earlier in this chapter.
6. Remove the front cover and timing belt as described earlier in this chapter.
7. Loosen the cylinder head bolts in the sequence shown in **Figure 69**. The bolts should be loosened in 2 progressive stages to prevent warping of the cylinder head.
8. Lift the cylinder head away from the block, remove the cylinder head gasket, then place the cylinder head on a soft surface to prevent scratching or otherwise damaging the cylinder head-to-engine block mating surface. If possible,

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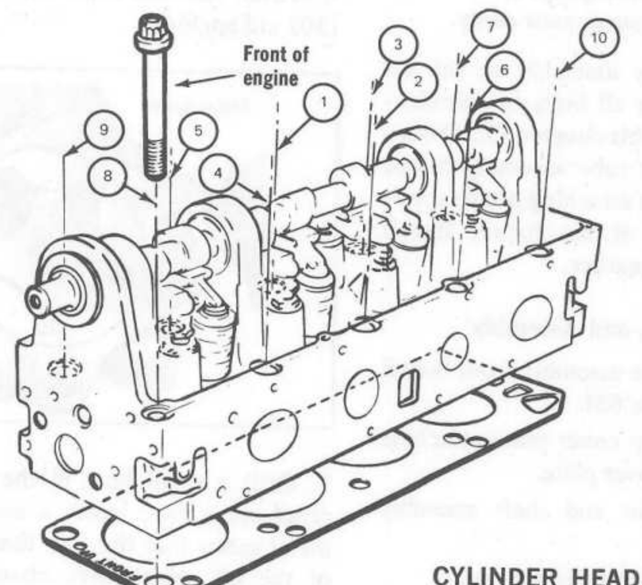

CYLINDER HEAD — 2300cc

do not lay the cylinder head on its mating surface at all.

Installation (2300cc)

1. Be sure the cylinder head and engine block mating surfaces, and the cylinder bores are clean and free of deposits, sealant, or other debris. Check all visible oil passages in the cylinder head and engine block for cleanliness.
2. Install a new cylinder head gasket. Never reuse an old head gasket. Do not use gasket sealer on the gasket.
3. Place the cylinder head on the block and align with the head gasket. Put the head bolts into their mounting holes and insert through the head gasket into the engine block.

> NOTE: *If the cylinder head and head gasket are difficult to align, make guide pins by cutting the heads off 2 cylinder head mounting bolts. Install the guide pins in 2 diagonally opposite mounting holes in the engine block. Be sure the guide pins will protrude from the top of the cylinder head far enough to be removed once the cylinder head is in place.*

4. Tighten the cylinder head mounting bolts in the sequence shown in Figure 69. Tighten the head bolts in 2 steps. In the first step, tighten the head bolts to a nominal 60 ft.-lb. In the second (final) step, tighten the head bolts in sequence to 80-90 ft.-lb.
5. Perform Steps 1-6 of the *Removal* procedure in reverse order to complete installation.

Removal (2800cc and 302 cid)

1. Remove the air cleaner and intake duct assembly (Chapter Five).
2. Remove the intake manifold and carburetor as an assembly (Chapter Five).
3. Remove the rocker arm covers as described earlier in this chapter.

> NOTE: *Depending upon how the vehicle is equipped, it may be necessary to disconnect and reposition some of the accessory equipment. Refer to the* Engine Removal *procedures, described earlier in this chapter if it is necessary to reposition accessory equipment.*

4. *(302 cid engine only)* If the left cylinder head is to be removed on a vehicle equipped with air conditioning or power steering, refer to *Engine Removal* procedures described earlier in this chapter for disconnection, repositioning, or removal of the accessories. If the right-hand cylinder head is to be removed, remove the alternator mounting bracket bolt and spacer, and the ignition coil.
5. Remove exhaust manifold (Chapter Five).
6. *(2800cc engines only)* Remove the rocker assembly and pushrods as described earlier in this chapter.
7. Loosen the rocker arm stud nuts so that the rocker arms can be rotated to the side (away from the pushrods). Remove the pushrods (**Figure 70**), and install in order in a holder (as described earlier in this chapter) so that pushrods may be installed in the same bores from which they were removed. Remove the exhaust valve stem caps (**Figure 71**).

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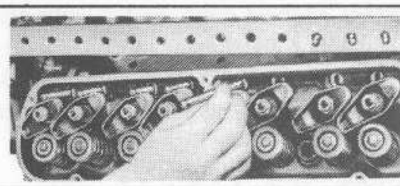

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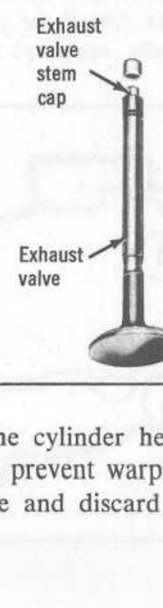

8. Remove the cylinder head attaching bolts in 2 stages to prevent warping of the cylinder head. Remove and discard the cylinder head gasket.

NOTE: *If the cylinder head is difficult to remove, try turning the engine over by hand with the spark plugs installed. The compression in the cylinders should force the cylinder head loose.*

9. Once the cylinder head is removed from the engine, lay it on a soft surface so as not to damage the cylinder head-to-engine block mating surface.

Installation (2800cc and 302 cid)

1. Clean the cylinder head mating surfaces and the engine block, intake manifold, and valve rocker arm cover surfaces to which the cylinder head mounts. Be sure that the cylinder bores are clean, and check all visible oil and water passages for cleanliness.
2. Install a new cylinder head gasket(s). Never reuse an old head gasket. Do not use gasket sealer on head gaskets. Left and right cylinder head gaskets are different on 2800cc engines. Ensure that gaskets are installed with the marked words FRONT and TOP toward the front of the car and the top of the cylinder block.
3. *(2800cc engines only)* Install cylinder head on engine block by sliding carefully over guide studs (**Figure 72**), then inserting head bolts through their mounting hole, the cylinder head gasket, and into the engine block.

NOTE: *If the head(s) and gasket are difficult to align, make guide pin by cutting the heads off 2 cylinder head mounting bolts. Install the guide pins in 2 diagonally opposite mounting holes in the engine block. Be sure the guide pins will protrude from the top of the cylinder head far enough to be removed once the cylinder head is in place.*

4. Tighten the head bolts in the sequence given in **Figure 73** (2800cc) or **Figure 74** (302 cid). Cylinder head bolts should be tightened in 3 steps. First, each bolt should be tightened in the sequences indicated to 40 ft.-lb. (2800cc engines) or 50 ft.-lb. (302 cid engines). Second, each bolt should be tightened to 50 ft.-lb. (2800cc engines), or 60 ft.-lb. (302 cid engines). Third, and final torques, should be 65-80 ft.-lb. (2800cc engines) or 65-72 ft.-lb. (302 cid engines).

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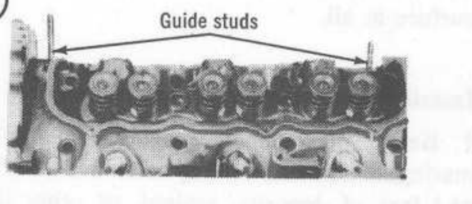

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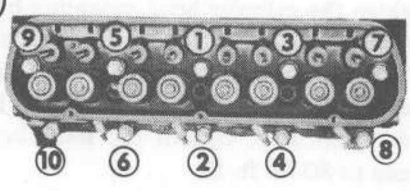

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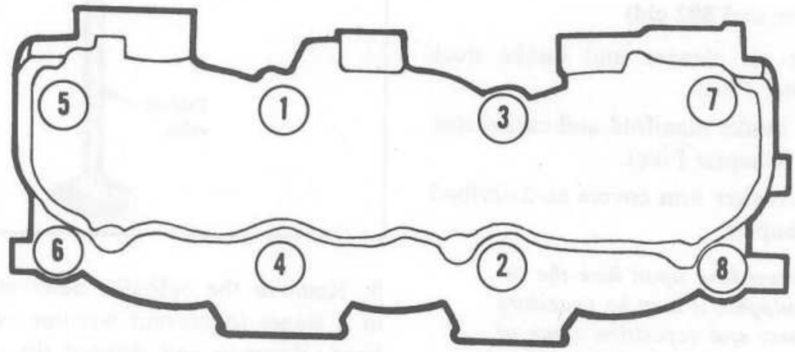


5. *(302 cid engines only)* Clean the pushrods in solvent and blow out the oil passages in the pushrods with compressed air. Check end of the pushrods for nicks, grooves, roughness, or excessive wear. Check all pushrods for straightness, as described under *Rocker Assembly* or *Rocker Arm* description earlier in this chapter. Apply Lubriplate or equivalent to both ends of each pushrod before installing in original position. On 302 cid engine, install the exhaust valve stem caps (Figure 71).

6. The remainder of the installation procedure is accomplished by performing Steps 1-7 of the *Removal* procedure in reverse order. After installation is complete, perform the tune-up as described in Chapter Two.

Inspection

1. Check the cylinder head for coolant leaks before attempting cleaning.

2. Clean the cylinder head thoroughly in solvent. While cleaning, check for cracks or other visible damage. Look for corrosion or foreign material in oil or water passages. Clean the passages with a stiff spiral wire brush, then blow them out with compressed air.

3. Check the cylinder head-to-block mating surface for flatness. Place an accurate straightedge along the surface. If there is any gap (cylinder head warp) between the straightedge and the cylinder head, measure the gap with a feeler gauge. Measure lengthwise and diagonally across the head. Maximum permissible head warp is 0.003 in. for any 6 in. surface of the cylinder head length, or 0.006 in. overall. Have the head milled by a Ford dealer or competent machine shop if cylinder head warp is excessive. A maximum of 0.010 in. may be removed from the head.

4. Check the condition of cylinder head guide studs (if installed) and replace damaged or excessively worn studs.

Decarbonizing

1. Without removing the valves, remove all deposits from the combustion chambers, intake ports, and exhaust ports. This operation should be done with a wire brush dipped in solvent. A blunt aluminum scraper may also be used if care is taken not to scratch, gouge, or otherwise damage the cylinder head or valves.

2. After all carbon is removed from the combustion chamber and ports, clean the entire cylinder head in solvent.

3. Using the same method, clean away all carbon on the piston tops.

CAUTION

Do not attempt to remove the carbon ridge on the cylinder wall at the top of the cylinder bore.

4

VALVES AND VALVE SEATS

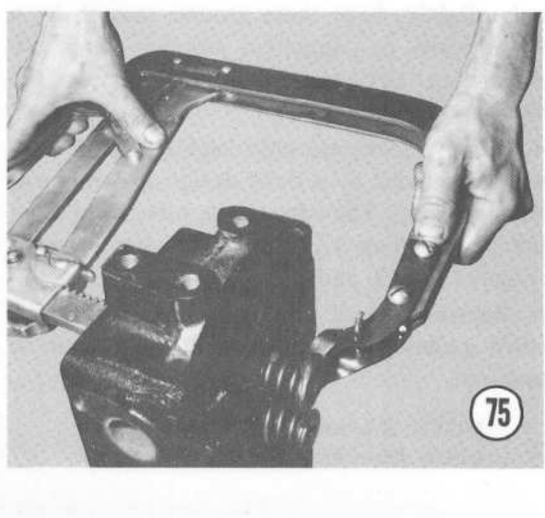
Valve Removal

1. On 2800cc engines, remove the rocker assembly. On 2300cc and 302 cid engines, remove the individual rocker arms. See procedures earlier in this chapter.

2. Remove cylinder head as described earlier.

3. On 302 cid engines, remove the exhaust valve stem caps.

4. Compress each valve spring with a valve spring compressor (**Figure 75**). Remove the retainer locks (valve keepers), then release tension on the valve spring. Remove the valve spring retainers and spring. Remove the valve through the combustion chamber. **Figure 76** shows valve components for 2800cc engines, other engine valve components are similar.



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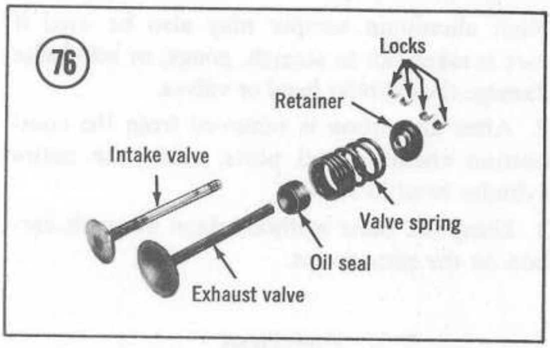


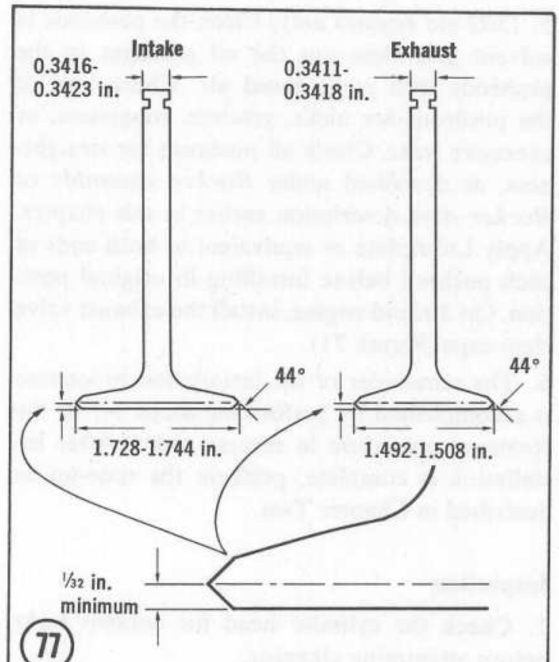
5. Label all removed parts so they can be reinstalled in the same location from which they were removed.

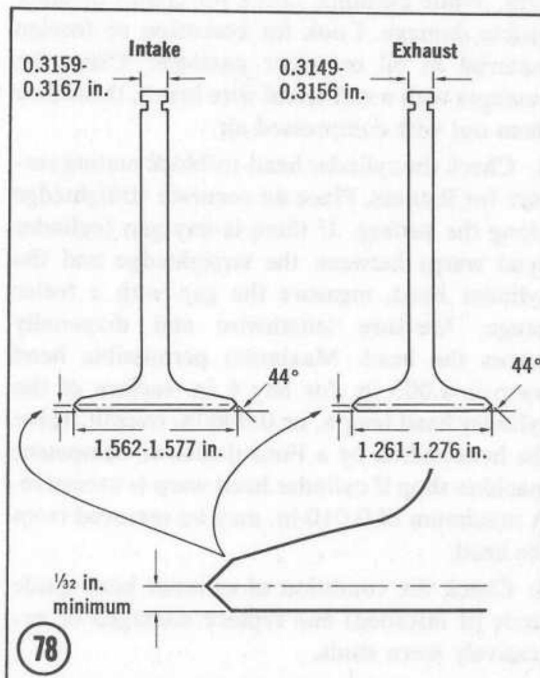
CAUTION
Remove any burrs from valve stem grooves before removing the valves through the combustion chamber. Otherwise the valve guides may be damaged.

Valve and Valve Guide Inspection

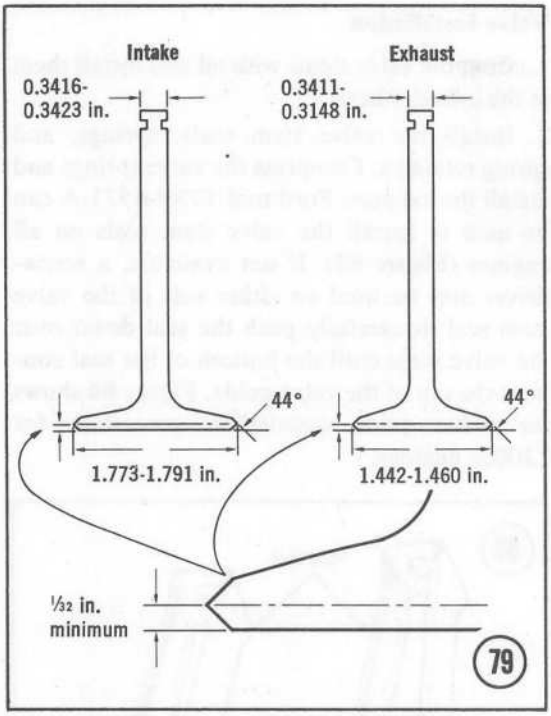
1. Clean the valves with a wire brush and solvent. Discard cracked, warped, or burned valves.
2. Measure valve stem diameter at top, center, and bottom for wear. Use a micrometer or have the measurements done by a Ford dealer or competent machine shop. Also measure the length of each valve, and the maximum diameter of each valve head. **Figure 77** shows dimensions for 2300cc valves, **Figure 78** shows dimensions for 2800cc valves, and **Figure 79** shows dimensions for 302 cid valves.
3. If valve stem ends are grooved or nicked only slightly, have them ground smooth by a Ford dealer or competent machine shop. No more than 0.010 in. may be ground from the valve stem ends.
4. If valve faces are only slightly pitted, they may be refaced by a Ford dealer or competent machine shop. The edge of the valve head must not be less than 1/32 in. thick after refacing (Figures 77, 78, and 79).
5. Removal of all carbon and varnish from valve guides with a stiff spiral wire brush is required.

NOTE: *The next step assumes that all valves have been measured and are within specifications. For valves with worn stems, proceed to Step 7.*





6. Insert each valve into the guide from which it was removed. Hold valve just slightly off its



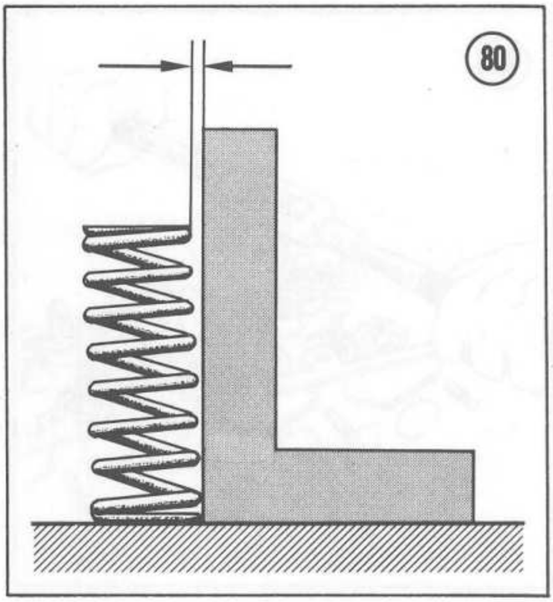
seat and rock it back and forth in a direction parallel with the rocker arms. This is the direction in which the greatest wear normally occurs. If the valve rocks more than slightly, the valve guide is worn and should be reamed for an oversize valve stem as described later in this chapter.

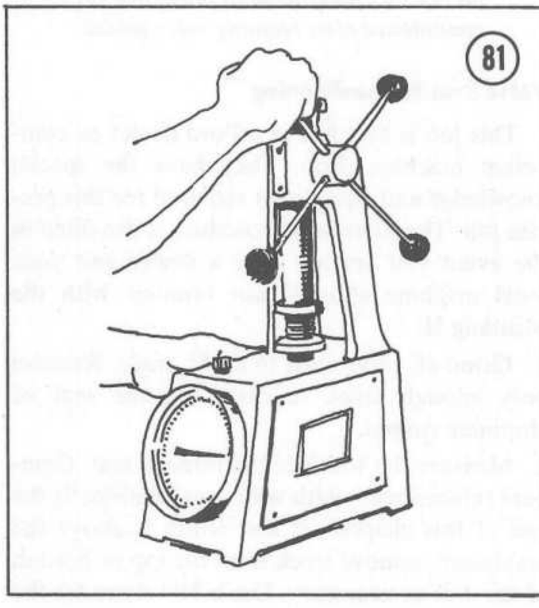
7. If there is any doubt about valve guide condition after performing Step 6, measure the valve guide at top, center, and bottom with a bore gauge. Compare the valve guide measurements with the valve stem specifications shown in Figures 77, 78, and 79, and listed at the end of this chapter, to determine stem-to-guide clearance. If clearance is excessive, have valve guides reamed for oversized valve stems.

8. Check the valve springs for deformation with a square (**Figure 80**). Replace any spring more than 5/64 in. out-of-square.

9. Test the valve springs under load with a spring tester (**Figure 81**). Compare spring loaded lengths with the specifications at the end of this chapter. Replace any springs that do not meet specifications.

10. Inspect valve seats. If worn or burned, they must be reconditioned. Valve seat reconditioning should be done by a Ford dealer or compe-

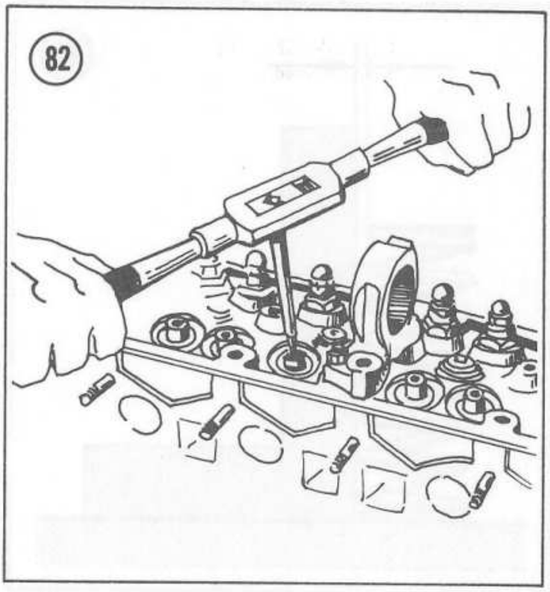




tent machine shop, although the procedure is described later in this section.

Valve Guide Reaming

Valve guides on all engines are integral with the cylinder head. When guides are worn, they must be reamed to accept a valve with an oversize stem. This is a precise job that should be left to a Ford dealer or competent machine shop. **Figure 82** shows a valve guide being reamed.



NOTE: *Valve seats must always be reconditioned after reaming valve guides.*

Valve Seat Reconditioning

This job is best left to a Ford dealer or competent machine shop. They have the special knowledge and equipment required for this precise job. The following procedure is provided in the event you are not near a dealer and your local machine shop is not familiar with the Mustang II.

1. Grind all valve seats to a 45° angle. Remove only enough stock to clean up the seat or eliminate runout.

2. Measure the width of the refaced seat. Compare refaced seat width with specifications at the end of this chapter. If seat width is above the maximum, remove stock from the top or bottom of the seat as necessary. Use a 30° stone for the top of the valve seat, and a 60° stone for the bottom.

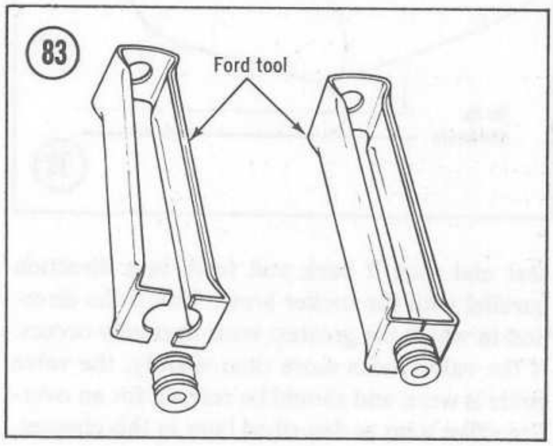
3. Grind all valves to a 44° angle. Do not lap out the interference fit of valves and seats after grinding.

4. Check the fit of each valve to its seat. To do this, coat the valve face with Prussian blue. Insert the valve in the guide, then rotate the valve under light pressure against its seat. If the valve seats properly, the blue will transfer evenly to the valve face.

Valve Installation

1. Coat the valve stems with oil and install them in the cylinder head.

2. Install the valve stem seals, springs, and spring retainers. Compress the valve springs and install the keepers. Ford tool T73P-6571-A can be used to install the valve stem seals on all engines (**Figure 83**). If not available, a screwdriver may be used on either side of the valve stem seal to carefully push the seal down over the valve stem until the bottom of the seal contacts the top of the valve guide. **Figure 84** shows the valve guide installation procedure for 2300cc engines.

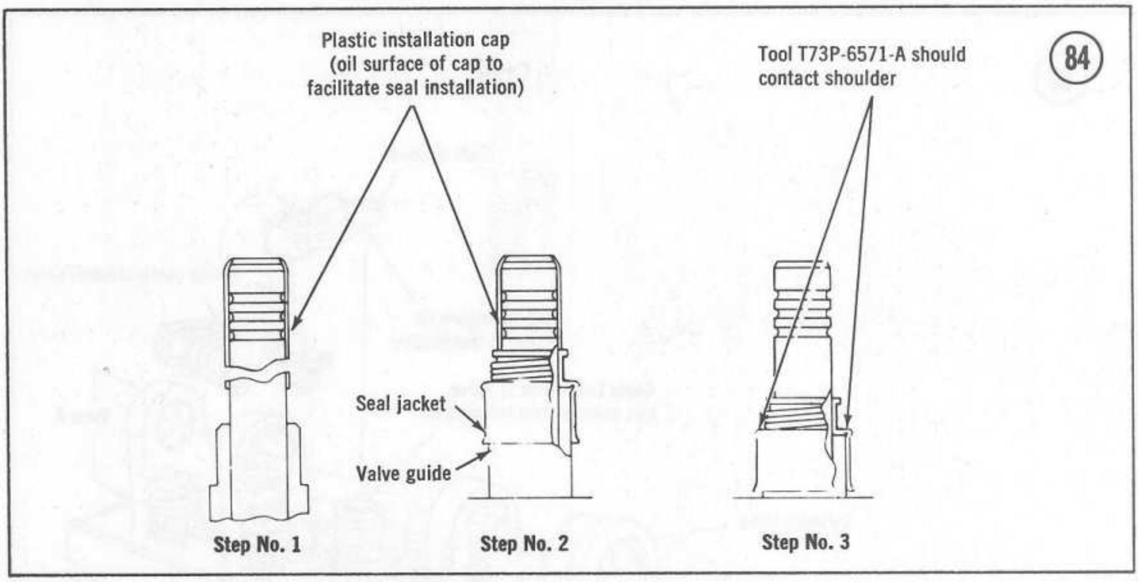


Valve Spring, Retainer, Seal, and Lock Replacement (Cylinder Head Installed)

A defective valve spring, retainer, seal, or lock can be replaced without removing the cylinder head, as long as the valve is undamaged. An air compressor capable of at least 140 psi is required, as well as a spark plug hole adapter for the compressor (Figure 21). The compressor can be rented from an equipment rental dealer if you do not have one.

1. On 2800cc engines, remove the rocker assembly. On 2300cc engines and 302 cid engines, remove both rocker arms (intake and exhaust) from the cylinder being worked on.

2. Attach spark plug hole adapter and the air compressor to the spark plug hole (Figure 21). Apply a minimum of 140 psi air pressure to the cylinder.



3. Compress the valve spring and remove the retainer locks spring retainer and valve spring as described under *Valve Removal*. Discard the valve stem seal. Wrap tape around the end of the valve stem so the valve will not fall through the guide into the cylinder.

4. Slide the valve up and down to make sure it does not bind in the valve guide. If the valve does bind, the cylinder head will have to be removed for repairs.

5. If a defective valve stem seal is to be replaced, press on the new seal as described under *Valve Installation*.

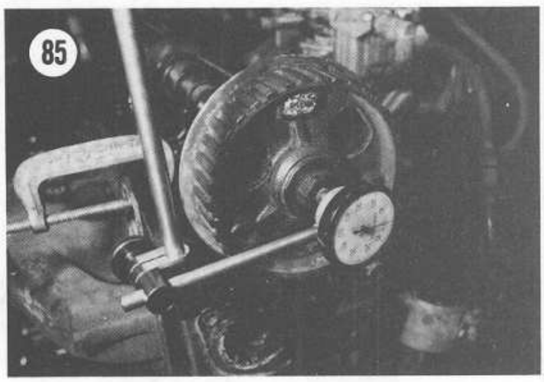
6. Install the valve spring, retainer, and retainer locks as described under *Valve Installation*. Install the rocker assembly (2800cc) or intake and exhaust rocker arms (2300cc and 302 cid).

CAMSHAFT

Removal/Installation (2300cc)

1. Remove the camshaft front cover and timing belt as described earlier in this chapter.

2. Check camshaft end play before removal. To do this, push the camshaft as far toward the rear of the engine as it will go. Install a dial gauge on the front of the engine with the pointer touching the front of the camshaft sprocket (**Figure 85**). Set the dial gauge at zero, then pry the camshaft forward as far as it will go with a large screwdriver. If the dial gauge reading exceeds 0.009 in., replace the camshaft thrust (retaining) plate (**Figure 86**).



3. Remove the rocker arm cover and rocker arms as described earlier in this chapter.

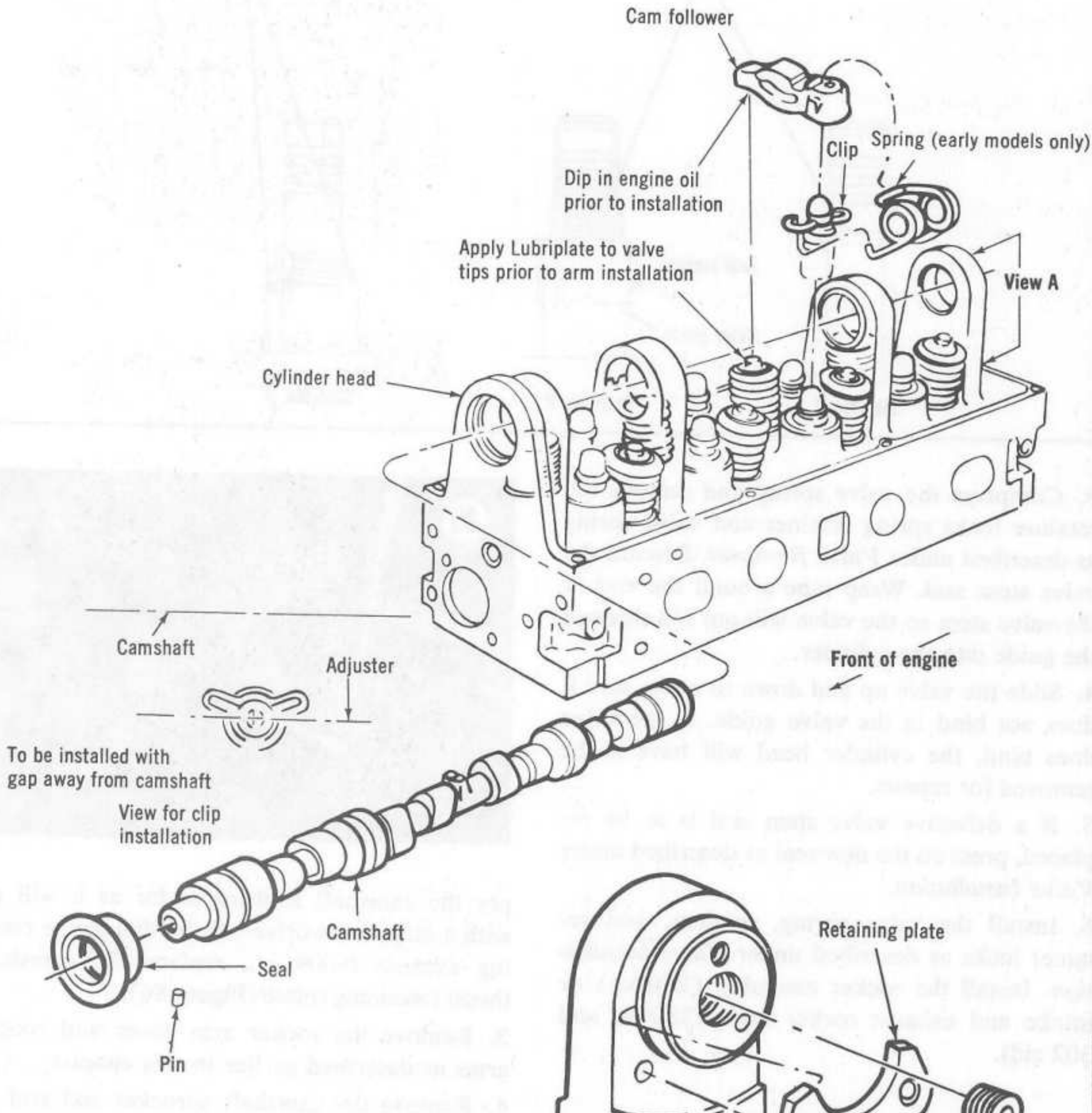
4. Remove the camshaft sprocket and seal as described earlier in this chapter.

5. Remove the thrust (retaining) plate from the rear camshaft support stand of the cylinder head (Figure 86).

6. Carefully remove the camshaft from the bearings. Rotate the camshaft while removing. Do not let the cam lobes touch or nick the bearings.

7. Installation is the reverse of these steps. Dip the camshaft completely in engine oil before

86



CAMSHAFT — 2300cc

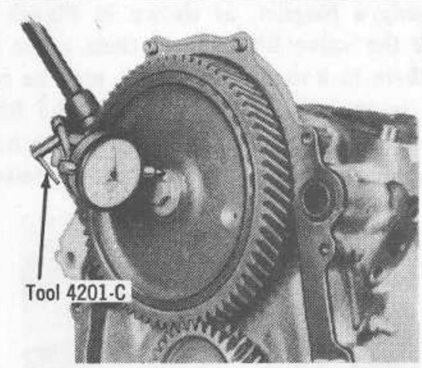
installation. Carefully install the camshaft so as not to touch or nick the bearings. Tighten the thrust (retaining) plate attaching screws to 5-8 ft.-lb. Align all timing marks as described for timing belt installation.

Removal/Installation (2800cc and 302 cid)

Because camshaft replacement procedures normally include the replacement of the camshaft bearings, and because camshaft bearing replacement is a dealer or machine shop procedure, camshaft replacement normally means removing the engine from the vehicle. However, it is possible to replace the camshaft with the engine in the vehicle. The following procedure details in-vehicle removal. To remove the camshaft from the engine with the engine out of the vehicle, refer to *Engine Removal* procedure, then continue with that portion of the following procedure to remove and install the camshaft in the engine block.

1. Drain the cooling system, then remove the radiator, shrouding, fan, and water pump as described in Chapter Six.
2. Remove the oil pan as described under *Oil Pan Removal*.
3. Remove the camshaft front cover as described earlier in this chapter.
4. Check camshaft end play. To do this, push the camshaft as far toward the rear of the engine as it will go. Install a dial gauge on the front of the engine with the pointer touching the camshaft sprocket retaining bolt or washer (**Figure 87** for 2800cc engines or **Figure 88** for 302 cid engines). Set the dial gauge at zero, then pry the camshaft forward as far as it will go with a large screwdriver. If the dial gauge reading exceeds 0.009 in., replace the camshaft thrust (retaining) plate, and spacer if so equipped (2800cc engines only), to reduce camshaft end play within specifications listed at the end of this chapter. Replacement of the thrust plate is accomplished during camshaft installation procedures.
5. Remove the timing gears (2800cc engines), or timing chain and drive sprockets (302 cid engines).

87



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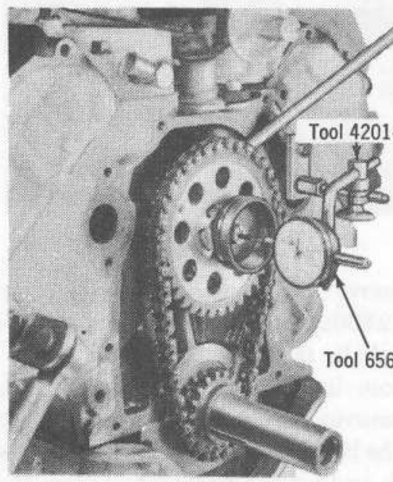
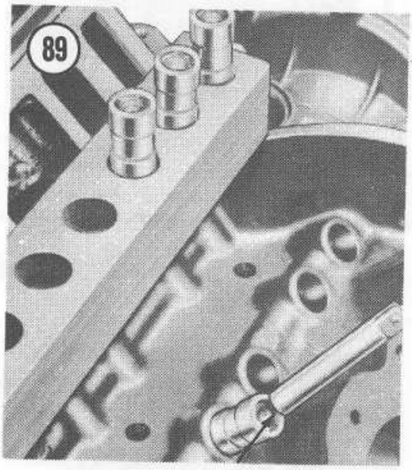


6. Remove the oil pump as described earlier in this chapter.
7. Remove the fuel pump (Chapter Five).
8. Remove the distributor (Chapter Seven).
9. Perform all steps under the *Cylinder Head Removal* procedure described earlier in this chapter, except removal of the cylinder head attaching bolts, the cylinder head gasket, and the cylinder head.

> NOTE: *Under normal circumstances, it is a good idea to remove the cylinder head for inspection of the head, valves, and cylinder, at this time because of the level to which the engine has been disassembled. Replacement of a camshaft should normally be accompanied by inspection, cleaning and service (as required) of the rest of the valve train.*

10. Using a magnet, as shown in **Figure 89**, remove the valve lifters from their bores and place them in a rack so that they may be reinstalled in their original locations. The lifters should be rotated back and forth in their bores to loosen them from gum or varnish deposits.



11. Remove the thrust (retaining) plate and spacer (2800cc engines only) from the front of the camshaft, then carefully remove the camshaft from its bearings. Rotate the camshaft while removing. Do not let the cam lobes touch or nick the bearing surfaces. **Figure 90** shows the camshaft and related parts for 2800cc engines, and **Figure 91** shows the camshaft and related parts for 302 cid engines.

12. Installation is the reverse of these steps. Dip the camshaft completely in engine oil before installation. Carefully install the camshaft so as not to touch or nick the bearing surfaces. Install a spacer ring (2800cc engines only) and thrust plate of the proper thickness to reduce camshaft end play within specifications listed at the end of this chapter. Tighten the thrust plate attaching screws to 12-15 ft.-lb. (2800cc), or 9-12 ft.-lb. (302 cid). Align all timing marks as described for timing gear (2800cc) or timing chain and drive sprocket (302 cid) installation.

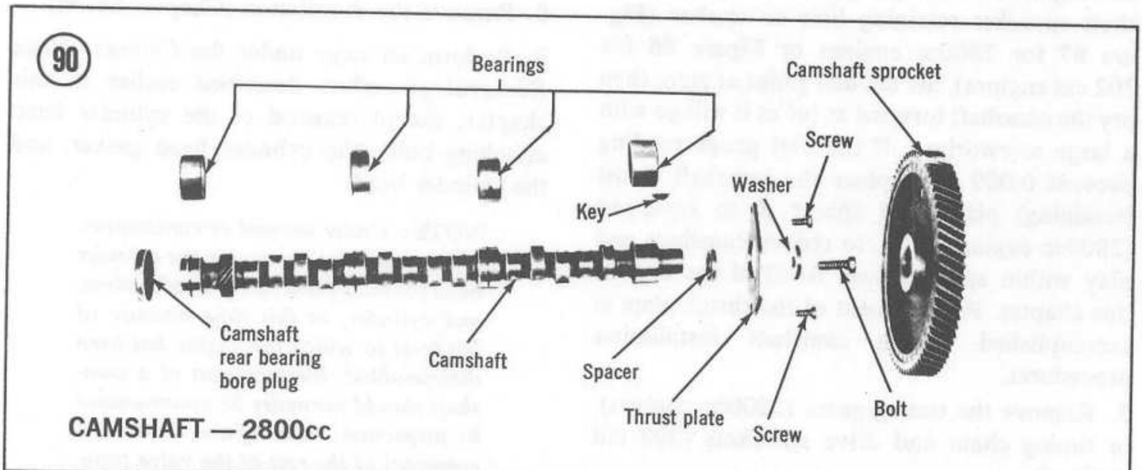
Camshaft Inspection

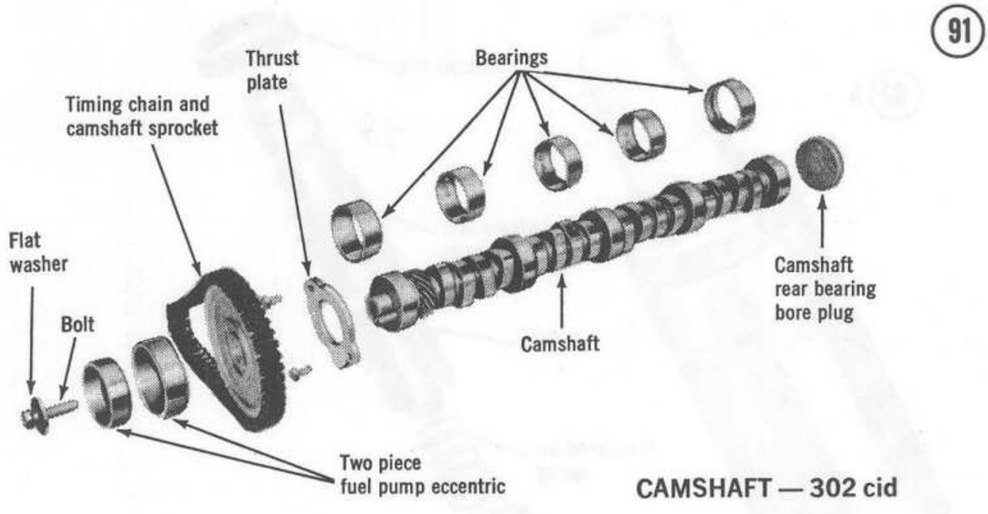
1. Check all machined surfaces of the camshaft for nicks or grooves. Minor defects may be removed with a smooth oilstone. Severe damage or wear beyond the specifications, listed at the end of this chapter, requires replacement of the camshaft.

2. Measure the inner diameter of the camshaft bearings, being careful not to damage the bearing material. Compare this measurement with the specifications listed at the end of this chapter. If the bearings are excessively worn, grooved, pitted, or scored, have them replaced by a Ford dealer or competent machine shop. If the camshaft bearings are to be replaced, the cylinder head (2300cc engines) or engine block (2800cc and 302 cid engines) must be removed and taken to a Ford dealer or machine shop for bearing installation.

CAUTION

All camshaft bearings should be replaced, even if only one bearing is





CAMSHAFT — 302 cid

worn. Otherwise the camshaft may be out of alignment when reinstalled.

3. Measure the outer diameter of the camshaft journals. Compare this measurement with the specifications listed at the end of this chapter. Replace the camshaft if the journals exceed the wear, or out-of-round specification listed at the end of this chapter.

4. Subtract the journal diameter measurement from the bearing diameter measurement to determine the bearing-to-journal clearance. If this clearance exceeds the specifications listed at the end of this chapter, either the camshaft bearings or the camshaft (or both) is worn and must be replaced. Compare both the journal and bearing measurements with the nominal values to determine which must be replaced.

5. On 2800cc and 302 cid engines, inspect the camshaft rear bearing bore plug (Figure 90 or 91) for oil leakage. If oil leakage is evident, replace the plug as described later in this chapter, or refer the job to a Ford dealer or competent garage.

Tappet Inspection (2800cc and 302 cid)

1. Thoroughly clean tappets in solvent.

2. Check the tappets for wear or scores. Replace any tappets that show these conditions.

3. Check the bottom surface of each tappet to make sure it is slightly convex. If the bottom (camshaft contact) surface is worn flat, the tappet may only be reused in its original location and with the original camshaft.

Valve Lash Adjuster Inspection (2300cc)

Two types of hydraulic valve adjusters are used (**Figures 92A and 92B**). Both adjusters are assembled with a simple crimped collar retaining ring which snaps into a groove on the outside body. This collar can be removed to permit cleaning of the adjuster parts. Further testing of the valve lash adjusters requires a special test fixture and should be referred to a Ford dealer.

Camshaft Rear Bearing Bore Plug Removal/Installation

If the engine is removed from the vehicle, replacement of the camshaft rear bearing bore plug is accomplished by drilling a small hole in the plug, inserting a screwdriver, or other convenient device, and prying the plug out of the engine block. If the engine is installed in the vehicle, the following procedure should be followed.

1. Remove the transmission (Chapter Nine).

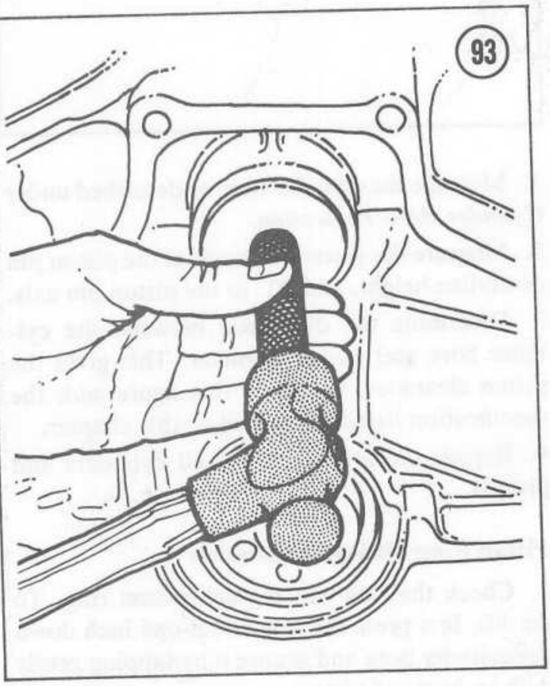

92 A
Retaining ring
Follower arm
fulcrum
Plunger
Plunger return
spring
Body
TYPE I LASH ADJUSTER
92 B
Retaining ring
Follower arm
fulcrum
Metering plate
Plunger
Plunger return
spring
Body
TYPE II LASH ADJUSTER

2. Remove the clutch components (manual transmission) or torque converter (automatic transmission) and housing as described in Chapter Eight.

3. Remove the flywheel attaching bolts and the flywheel as described later in this chapter.

4. Remove the engine rear cover plate, then remove the bore plug as described earlier.

5. Installation is the reverse of these steps. Install the bore plug using Ford tool shown in **Figure 93** or a hollow drift of suitable diameter.



PISTON/CONNECTING ROD ASSEMBLIES

Piston/Connecting Rod Removal

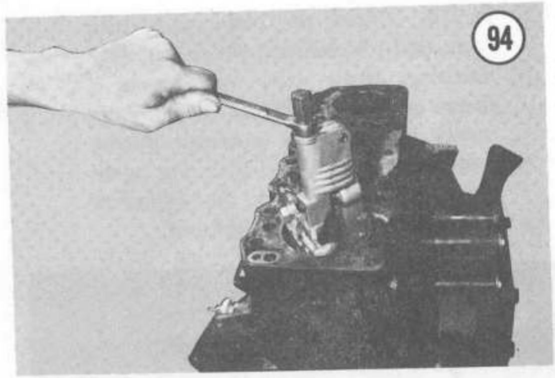
1. Remove the cylinder head and oil pan as described earlier.

2. Remove the carbon ridge at the top of the cylinder bores with a ridge reamer (**Figure 94**).

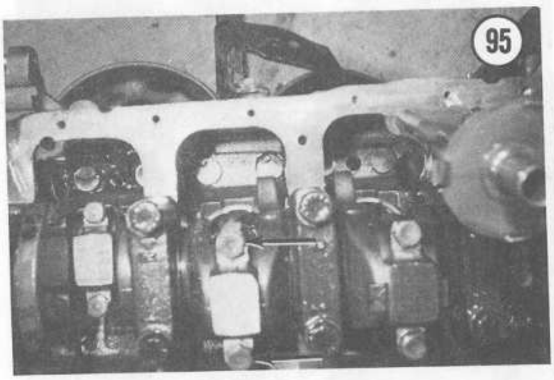
CAUTION

Do not cut more than 1/32 in. into the ring travel area when using the ridge reamer.

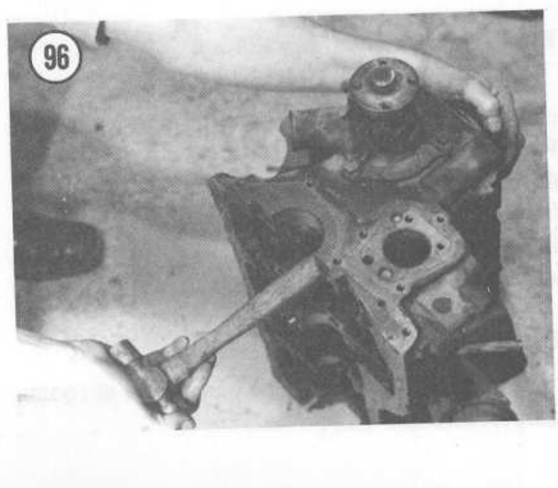
3. Rotate the crankshaft until the piston is at bottom dead center, and the connecting rod is centered in the cylinder bore.



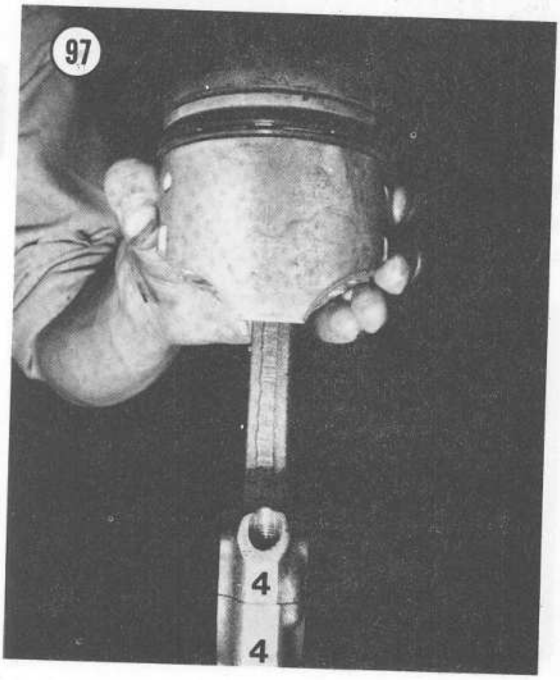
4. Unbolt the connecting rod cap (**Figure 95**), and remove the rod cap and bearing from the crankshaft.



5. Free the connecting rod and piston assembly from the crankshaft by tapping gently with a wooden hammer. Remove the connecting rod bearing, then push the piston and connecting rod assembly out of the cylinder bore using a wooden hammer handle as shown in **Figure 96**.



> NOTE: *Check the connecting rods, caps, and pistons for cylinder number marking. Make your own marks if there are none* (**Figure 97**). *These marks are extremely important during reassembly to ensure that the same parts are installed in the cylinders from which they were removed.*



97

6. Remove the rings using a ring remover. See **Figure 98**.

WARNING

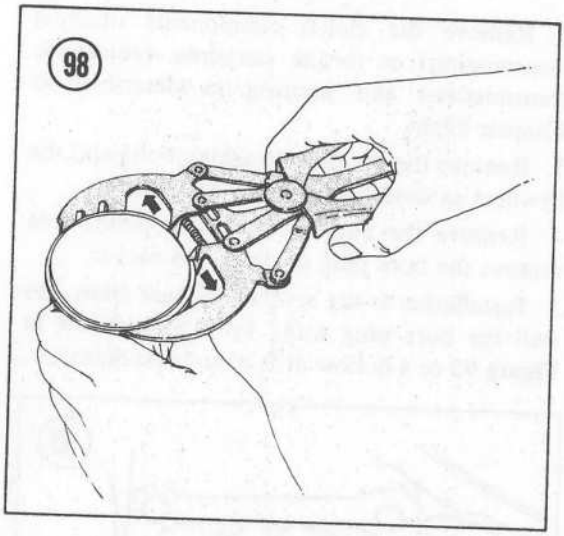
Be extremely careful when handling the oil ring rails. They tend to be very sharp, particularly when the engine is well run in.

Piston Pin Removal/Installation

Pistons on all engines are press-fitted to the connecting rods, and slip fit into the pistons. Removal requires an arbor press, or similar device, and a suitable support tool. This is a job for a Ford dealer or machine shop, equipped to fit the pistons and pin, as well as align the pistons with the connecting rods.

Piston Clearance Check

This procedure should be performed at room temperature (70°F).



98

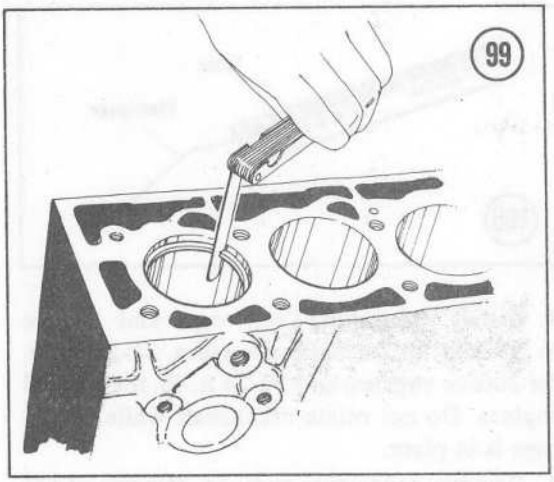
1. Measure the cylinder bore as described under *Cylinder Bore Inspection*.
2. Measure the piston diameter at the piston pin centerline height, and 90° to the piston pin axis.
3. Determine the difference between the cylinder bore and piston diameter. This gives the piston clearance. Compare this figure with the specification listed at the end of this chapter.
4. Repeat the procedure for all cylinders and pistons.

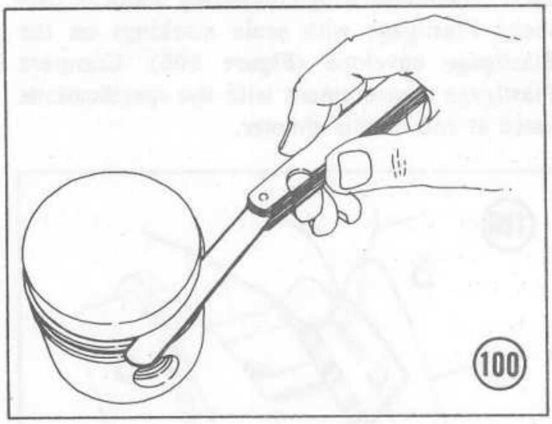
Piston Ring Fitting/Installation

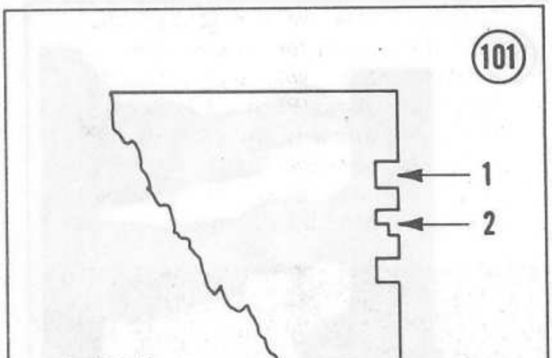
1. Check the ring gap of each piston ring. To do this, first press the ring about one inch down the cylinder bore and square it by tapping gently with an inverted piston.

> NOTE: *If the cylinders have not been rebored, check the ring gap at the bottom of the ring travel, where the cylinder is least worn.*

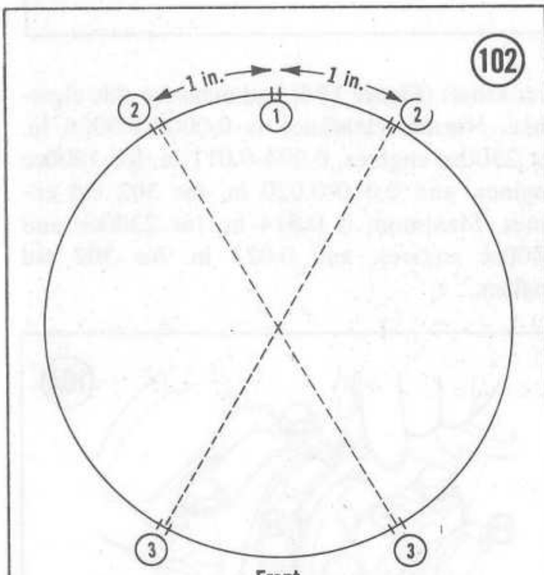
2. Measure the ring gap with a feeler gauge as shown in **Figure 99**. Compare the ring gap with the specifications at the end of this chapter. If the ring gap is not within specification, use another set of rings.
3. Check side clearance of the rings as shown in **Figure 100**. Place the feeler gauge beneath the ring and insert all the way into the ring groove. The feeler gauge should slide all the way around the piston without binding. Any wear that occurs will form a step at the inner







1. Normal
2. High step



1. Oil ring spacer gap
2. Oil ring segment gaps
3. Compression ring gaps

portion of the ring grooves lower edge. If large steps are discernable (**Figure 101**), the pistons should be replaced. Compare the inserted feeler gauge size with the specification at the end of this chapter.

4. Using a ring expander tool, carefully install the oil control ring assembly, then the compression rings. The top side of the compression rings are marked and must be installed toward the top of the piston.

5. When installing the oil ring assembly, position the gaps in the assembly rings as shown in **Figure 102**.

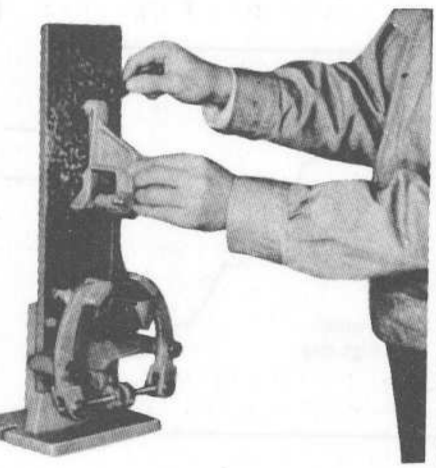
Connecting Rod Inspection

1. Check the pistons for shiny, scuffed areas above the piston pins on one side and below the piston pin on the other. This indicates a bent connecting rod.

2. Have the connecting rods checked by your Ford dealer or a competent machine shop for twisting, bends, and overall straightness and alignment. **Figure 103** shows a typical connecting rod aligner. If necessary, have connecting rods realigned to meet specifications listed at the end of this chapter.

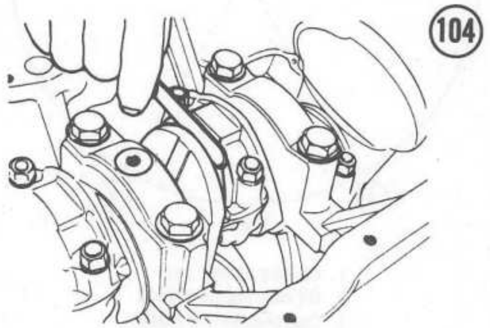
3. Install the connecting rods and bearings on the crankshaft. Insert a feeler gauge between the side of the connecting rod big end and the

(103)



crankshaft (**Figure 104**) and measure side clearance. Normal clearance is 0.0008-0.0026 in. for 2300cc engines, 0.004-0.011 in. for 2800cc engines, and 0.010-0.020 in. for 302 cid engines. Maximum is 0.014 in. for 2300cc and 2800cc engines, and 0.023 in. for 302 cid engines.

(104)

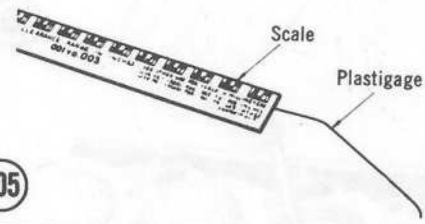


Measuring Bearing Clearance

1. Assemble connecting rods with bearings on the proper crankshaft journal. Do not tighten.

2. Cut a piece of Plastigage (**Figure 105**) the width of the bearing. Insert the Plastigage between crankshaft journal and connecting rod bearing.

> NOTE: *Do not place the Plastigage over the crankshaft journal oil hole.*

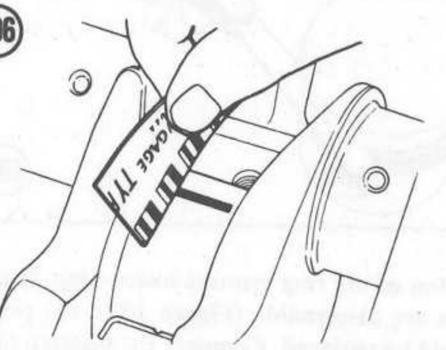


(105)

3. Install connecting rod cap and torque to 30-36 ft.-lb. for 2300cc engines, 21-25 ft.-lb. for 2800cc engines, and 19-24 ft.-lb. for 302 cid engines. Do not rotate crankshaft while Plastigage is in place.

4. Remove connecting rod cap. Bearing clearance is determined by comparing width of flattened Plastigage with scale markings on the Plastigage envelope (**Figure 106**). Compare Plastigage measurement with the specifications listed at end of this chapter.

(106)



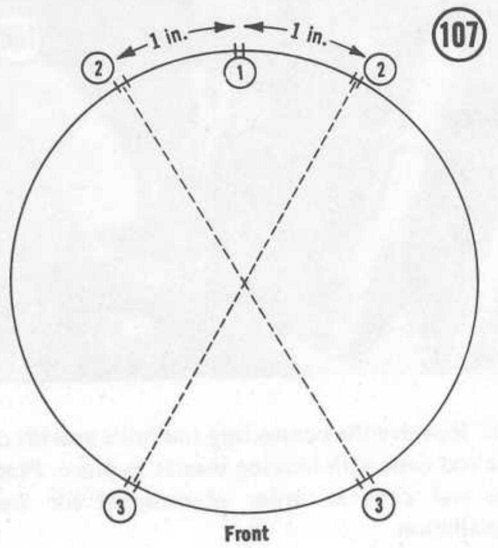
Piston/Connecting Rod Installation

1. Remove cylinder wall glaze with a hone if new piston rings are to be installed. Follow hone manufacturer's recommendations.

2. Oil piston rings, pistons, and cylinder walls with light engine oil. Be sure to install pistons in same cylinders from which they were removed or to which they were fitted.

3. Install piston rings on piston. Be sure ring gaps are properly spaced around the piston as shown in **Figure 107**.

4. Install piston ring compressor on piston. Push piston into the cylinder with a hammer handle until it is slightly below top of cylinder.



1. Oil ring spacer gap
2. Oil ring segment gaps
3. Compression ring gaps

Be sure to guide connecting rods to avoid damage to crankshaft journals.

NOTE: *Install piston with notch in the piston head facing toward the front of the engine.*

5. Check bearing clearance. See *Measuring Bearing Clearance*, this chapter. Apply a light coat of engine oil to the journals and bearings after the bearings have been fitted.

6. Turn crankshaft throw to bottom of its stroke. Push piston down until connecting rod bearing seats on crankshaft journal.

7. Install connecting rod cap. Tighten nuts to specifications.

8. Check side clearance between connecting rods on each crankshaft journal after piston and connecting rod assemblies are installed.

9. Disassemble, clean, and assemble oil pump. Clean oil pump inlet tube screen and oil pan and block gasket surfaces. Prime oil pump by filling either inlet or outlet port with engine oil and rotating pump shaft to distribute oil within housing. Install oil pump and oil pan. Install cylinder heads. See *Oil Pump* and *Cylinder Head* sections in this chapter for removal/installation procedures.

CRANKSHAFT, MAIN BEARINGS, AND REAR OIL SEAL

Crankshaft, main bearings, and rear oil seal removal, inspection, and installation procedures may be performed with the engine still in the vehicle. However, this is a job for a competent auto mechanic or a Ford dealer. The following procedure details removal, inspection, and installation procedures once the engine has been removed from the vehicle.

4

Crankshaft, Main Bearings, and Rear Oil Seal Removal

1. Remove the engine from the vehicle as described under *Engine Removal* earlier in this chapter.

2. On 2300cc engines, remove the front cover, camshaft belt, crankshaft sprocket, and front cover oil seal as described under *Front Cover, Camshaft Belt, Drive Sprockets, Front Seals, and Auxiliary Shaft* earlier in this chapter.

3. On 2800cc engines, remove the front cover, timing gears, and front oil seal as described under *Front Cover, Timing Gears, and Front Oil Seal* earlier in this chapter.

4. On 302 cid engines, remove the front cover, timing chain and drive sprockets, and the front oil seal as described under *Timing Cover, Timing Chain and Drive Sprocket, and Front Oil Seal* earlier in this chapter.

5. Disconnect the spark plug wires from the spark plugs, then remove the spark plugs from the cylinders.

6. Remove the flywheel (manual or automatic) from the rear of the crankshaft as described under *Flywheel Removal* later in this chapter, then remove the engine rear cover plate.

7. Remove the oil pan as described under *Oil Pan Removal* earlier in this chapter.

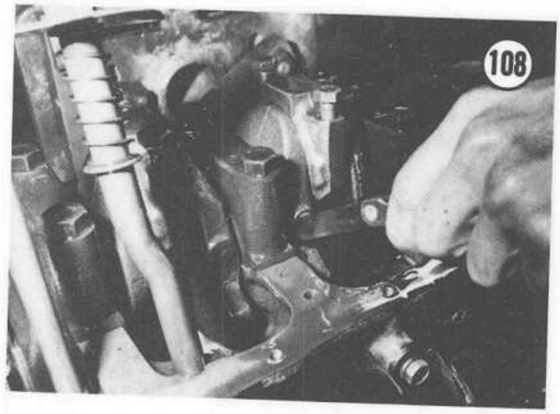
8. Remove the oil pump as described under *Oil Pump Removal* earlier in this chapter.

9. Before removing the crankshaft, check crankshaft end play. Use a large screwdriver or pry bar to force the crankshaft as far toward the front of the engine as it will go, then measure the clearance between the front of the thrust bearing and the crankshaft using a feeler gauge

(**Figure 108**). In all engines, the thrust bearing is the third main bearing from the front of the engine. Replace the thrust bearing if the crankshaft end play exceeds the specification listed at the end of this chapter.

> NOTE: *Crankshaft, main bearing, and crankshaft rear oil seal arrangements are shown in* **Figure 109** *(2300cc),* **Figure 110** *(2800cc) and* **Figure 111** *(302 cid). Refer to these illustrations, as required, during removal, inspection, and installation procedures.*

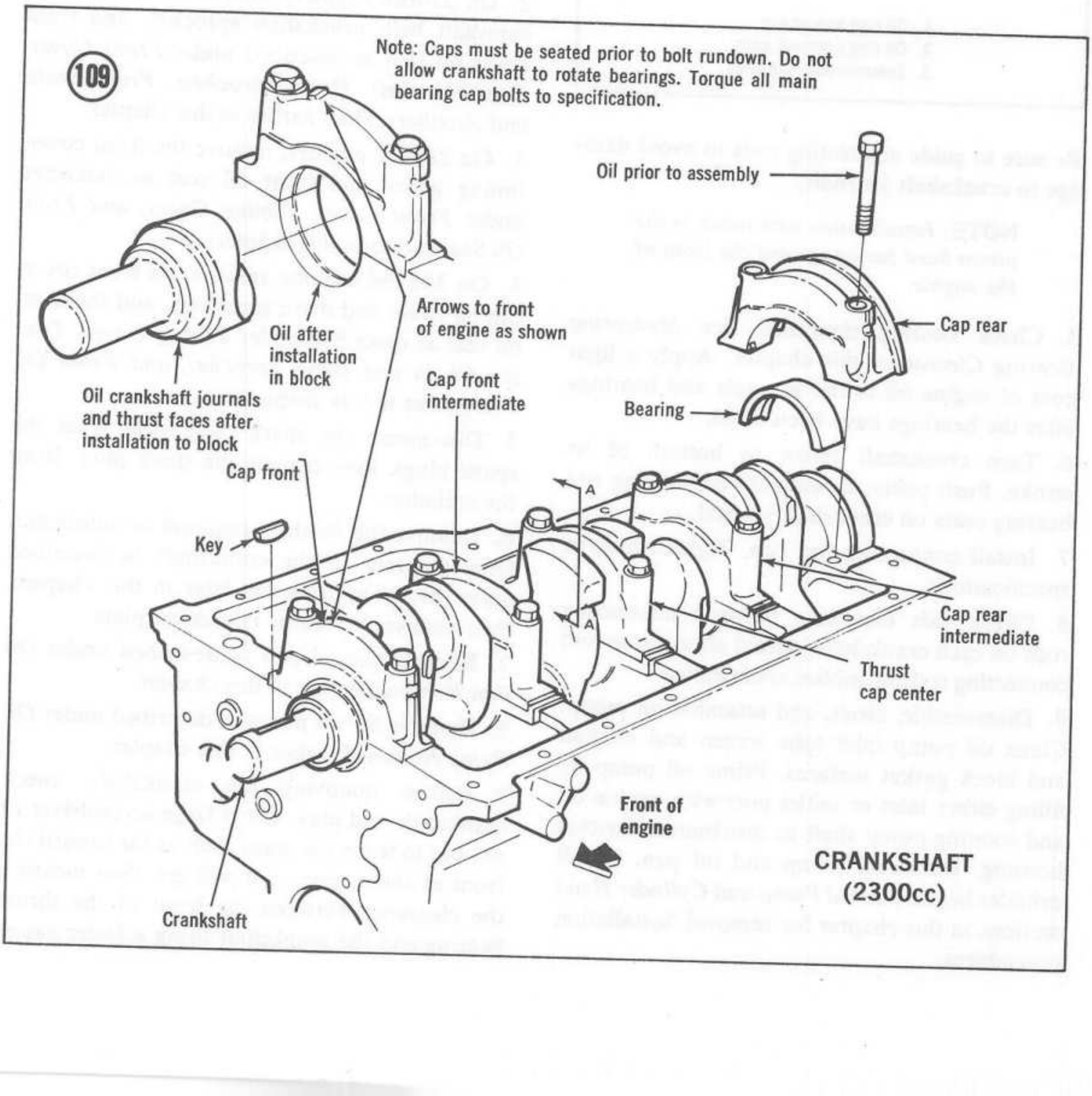
10. Check the rod and main bearing caps for match marks or numbers. Make your own marks if there are none.



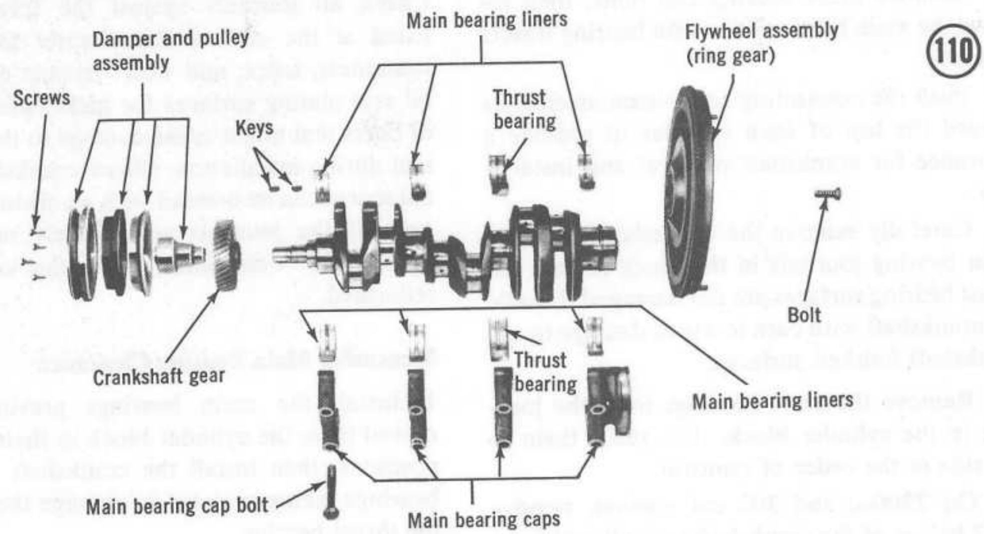
108

11. Remove the connecting rod bolts and lift off the rod caps with bearing inserts in place. Place the rod caps in order of removal for easy installation.

109

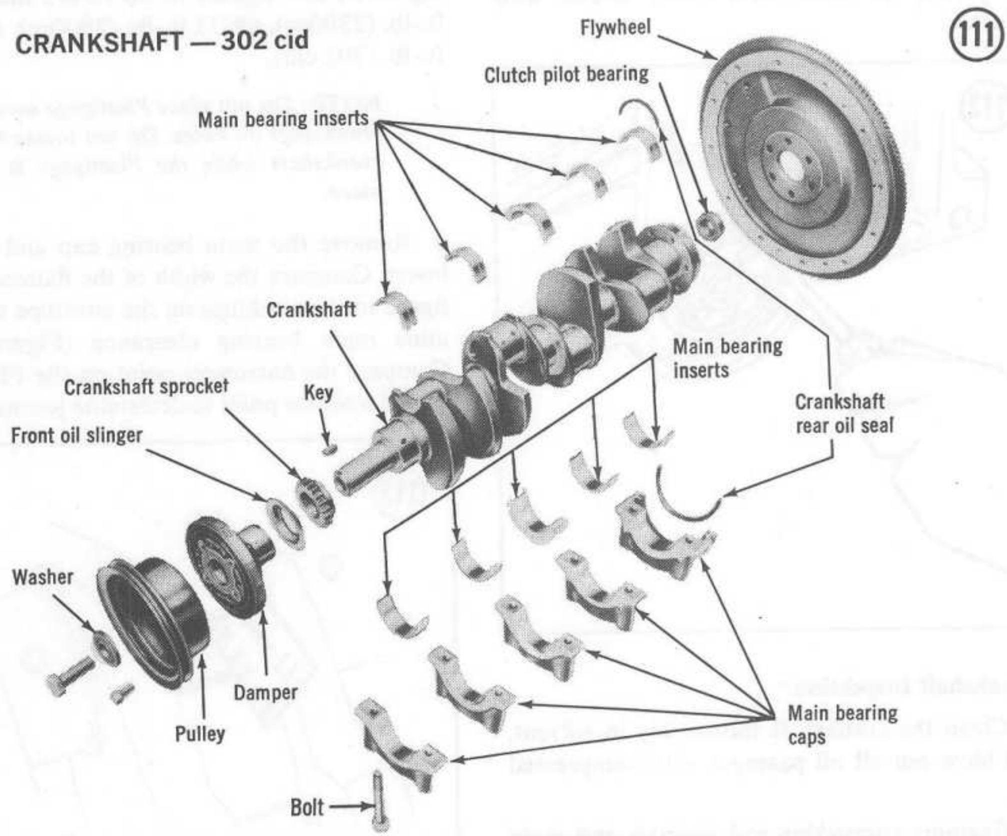


CRANKSHAFT (2300cc)



CRANKSHAFT — 2800cc

CRANKSHAFT — 302 cid



12. Remove main bearing cap bolts, then remove the main bearing caps with bearing inserts attached.

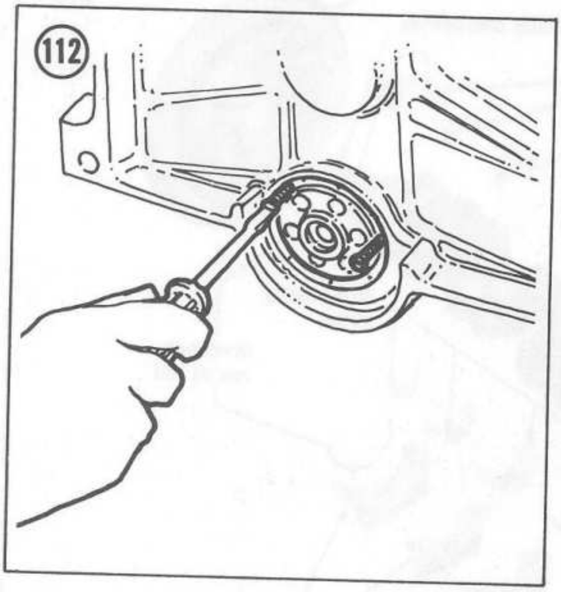
13. Push the connecting rod/piston assemblies toward the top of each cylinder to provide a clearance for crankshaft removal and installation.

14. Carefully remove the crankshaft from the main bearing journals in the block so that the thrust bearing surfaces are not damaged. Handle the crankshaft with care to avoid damage to the crankshaft finished surfaces.

15. Remove the main bearings from the journals in the cylinder block, then place them to the side in the order of removal.

16. On 2300cc and 302 cid engines, remove the 2 halves of the crankshaft rear oil seal from the cylinder block and the rear main bearing cap, then discard. On 2800cc engines, insert a sheet metal screw on each side of the rear oil seal (**Figure 112**), then remove the rear oil seal by pulling on both sheet metal screws with pliers.

112



Crankshaft Inspection

1. Clean the crankshaft thoroughly in solvent, and blow out all oil passages with compressed air.

2. Examine connecting rod journals and main bearing journals for wear, scoring, or cracks. Check all journals against the specifications listed at the end of this chapter for out-of-roundness, taper, and wear. Inspect crankshaft oil seal mating surfaces for nicks, sharp edges, or burrs that might cause damage to the rear oil seal during installation. Minor crankshaft journal scores can be dressed with an oilstone. However, if the journals are severely marred or exceed the wear limit, have the crankshaft refinished.

Measuring Main Bearing Clearance

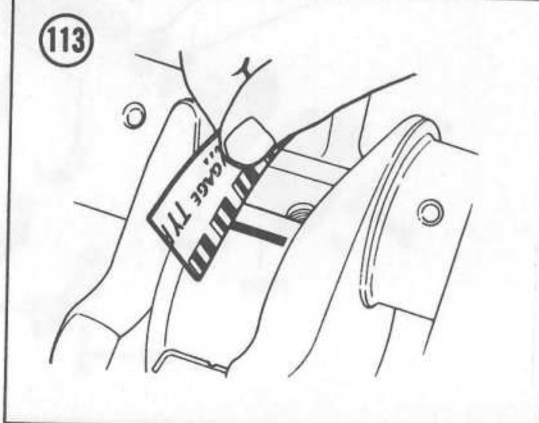
1. Install the main bearings previously removed from the cylinder block in their original positions, then install the crankshaft on these bearings taking care not to damage the sides of the thrust bearing.

2. Cut a piece of Plastigage the width of the main bearing journal to be measured. Lay the Plastigage on the main bearing journal. Install the main bearing cap, complete with main bearing insert and tighten to 60 ft.-lb., then 80-90 ft.-lb. (2300cc), 65-75 ft.-lb. (2800cc), or 60-70 ft.-lb. (302 cid).

> NOTE: *Do not place Plastigage across crankshaft oil holes. Do not rotate the crankshaft while the Plastigage is in place.*

3. Remove the main bearing cap and bearing insert. Compare the width of the flattened Plastigage to the markings on the envelope to determine main bearing clearance (**Figure 113**). Compare the narrowest point on the Plastigage with the widest point to determine journal taper.

113



4. If wear is greater than the specifications listed at the end of this chapter, a 0.001 or 0.002 in. undersize bearing may be used on ½ of the journal in combination with the standard bearing on the other half. If undersize bearings are used on more than one journal, the undersize bearing should be installed in the cylinder block, not in the main bearing cap. If this does not produce the correct crankshaft-to-main bearing clearance, the crankshaft should be refinished by a Ford dealer or a competent machine shop, and undersize main bearings installed.

Crankshaft Rear Oil Seal Installation (2300cc and 302 cid)

1. Clean the rear oil seal grooves in the cylinder block and rear main bearing cap with a brush and solvent such as lacquer thinner or trichloroethylene. Also clean the areas where silicone rubber sealer is to be later applied to the cylinder block and rear main bearing cap. See **Figure 114**.

2. Dip the halves of the seal in clean engine oil.

3. Carefully install ½ of the seal in its groove in the cylinder block and the other ½ of the seal in its groove in the rear main bearing cap as shown in **Figure 115**. The lip of the installed seal must face the front of the engine as shown in Figure 115.

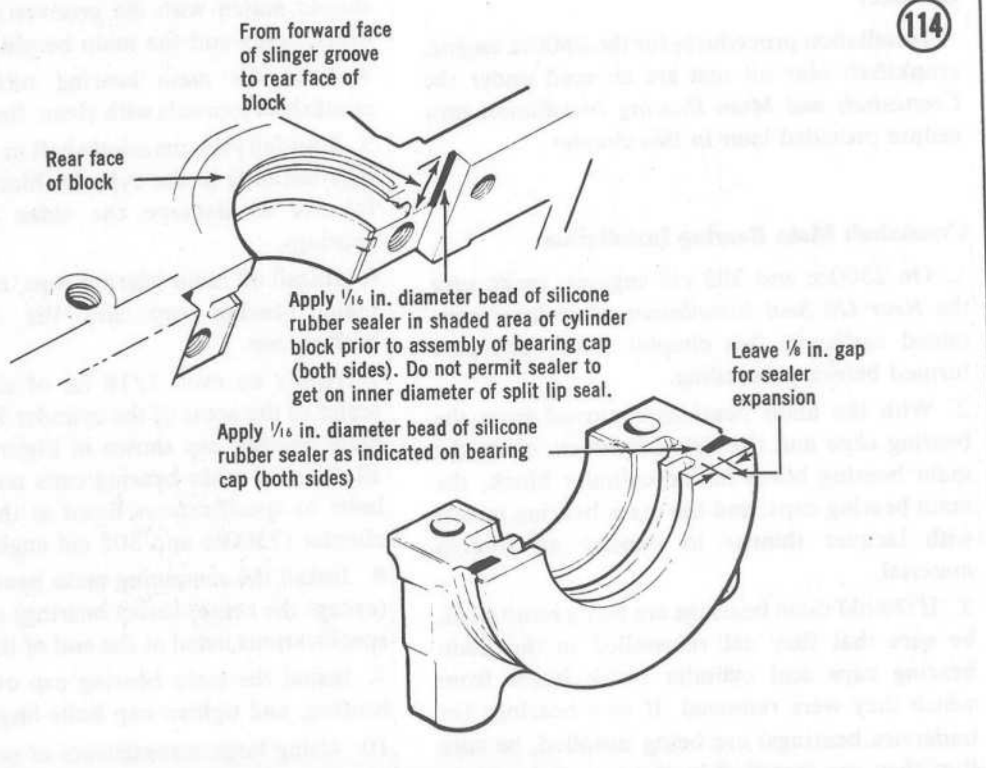
CAUTION

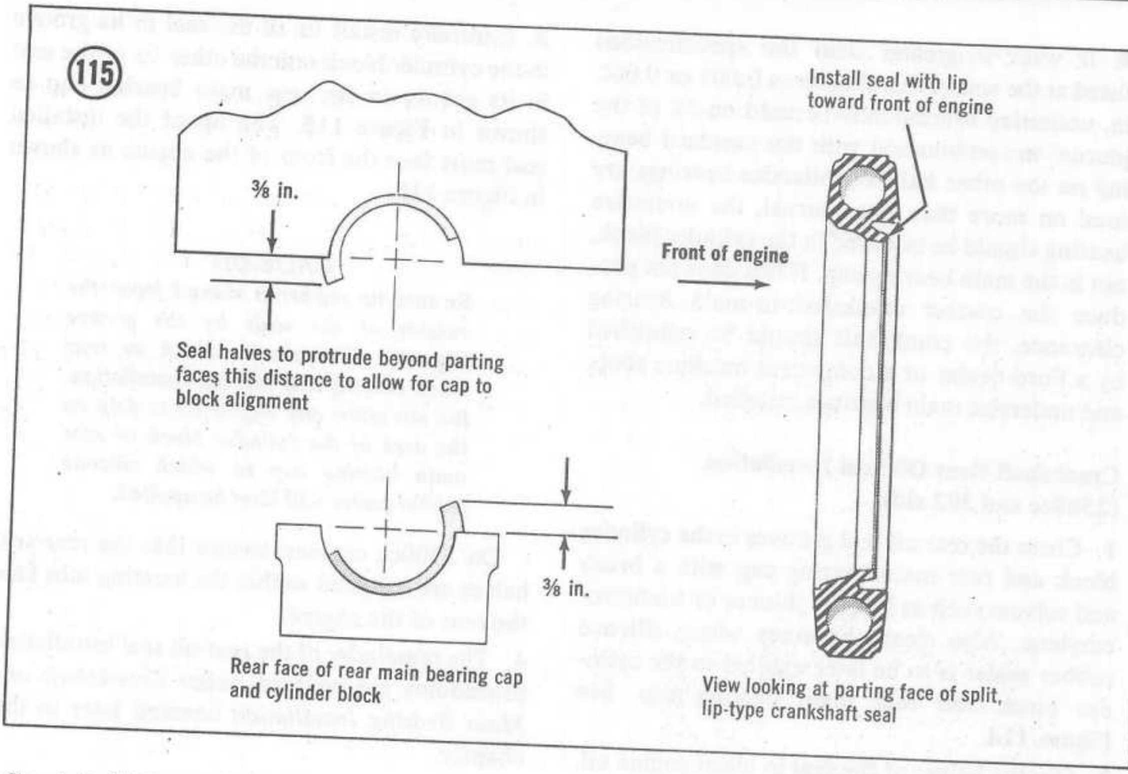
Be sure no rubber is shaved from the outside of the seals by the groove edges in the cylinder block or rear main bearing cap during installation. Do not allow any engine oil to drip on the area of the cylinder block or rear main bearing cap to which silicone rubber sealer will later be applied.

On 2300cc engines, ensure that the rear seal halves are installed so that the locating tabs face the rear of the engine.

4. The remainder of the rear oil seal installation procedures are covered under *Crankshaft and Main Bearing Installation* covered later in this chapter.

114





Crankshaft Rear Oil Seal Installation (2800cc)

Installation procedures for the 2800cc engine, crankshaft rear oil seal are covered under the *Crankshaft and Main Bearing Installation* procedure provided later in this chapter.

Crankshaft Main Bearing Installation

1. On 2300cc and 302 cid engines, make sure the *Rear Oil Seal Installation* procedures contained earlier in this chapter have been performed before proceeding.
2. With the main bearings removed from the bearing caps and the cylinder block, clean the main bearing bores in the cylinder block, the main bearing caps, and the main bearing inserts with lacquer thinner to remove all foreign material.
3. If the old main bearings are being reinstalled, be sure that they are reinstalled in the main bearing caps and cylinder block bores from which they were removed. If new bearings (or undersize bearings) are being installed, be sure that they are installed in the proper location. The tangs on the backside of all main bearings should match with the grooves in the cylinder block bores and the main bearing caps.
4. Coat the main bearing surfaces and the crankshaft journals with clean, heavy engine oil.
5. Carefully lay the crankshaft in the main bearings installed in the cylinder block, being careful not to damage the sides of the thrust bearings.
6. Install all main bearing caps, except the rear main bearing cap and the center thrust bearing cap.
7. Apply an even 1/16 in. of silicone rubber sealer to the areas of the cylinder block and rear main bearing cap shown in Figure 114. Install all the rear main bearing caps and tighten cap bolts to specifications listed at the end of this chapter (2300cc and 302 cid engines only).
8. Install the remaining main bearing cap bolts (except the center thrust bearing) and tighten to specifications listed at the end of this chapter.
9. Install the main bearing cap over the thrust bearing, and tighten cap bolts finger-tight.
10. Using large screwdrivers or pry bars, force the crankshaft as far forward as possible, and

the thrust bearing cap as far rearward as possible. This aligns the 2 halves of the thrust bearing. Holding the crankshaft and thrust bearing cap in this position, tighten the thrust bearing cap nuts to specifications listed at the end of this chapter.

11. Reinstall the connecting rods and caps on the crankshaft.

12. On the 2800cc engines, install the crankshaft rear oil seal by coating the inside of the seal with Lubriplate and the outer surface of the seal with clean engine oil. Position the seal in the recess between the cylinder block and the rear end of the crankshaft. Drive the seal into position using a hollow drift of appropriate diameter (**Figure 116**). Be sure the seal is firmly seated.

116

13. The remainder of the installation procedure is accomplished by performing Steps 1 through 8 of the removal procedure in reverse order.

CYLINDER BLOCK INSPECTION

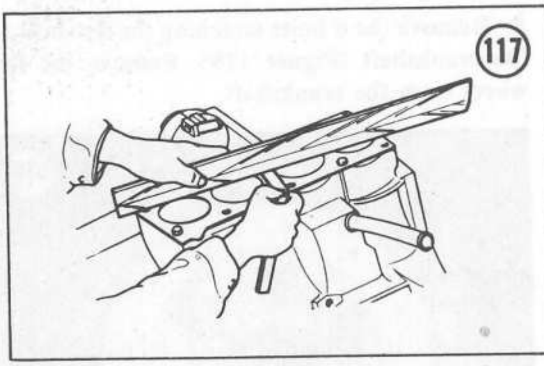
1. Clean the cylinder block thoroughly with solvent and check all freeze plugs for leaks. Replace any plugs that are suspect. It is a good idea, at this level of disassembly, to replace all the freeze plugs. While cleaning, check oil and water passages for dirt, sludge, and corrosion. If the passages are very dirty or clogged, the block should be boiled out by a Ford dealer or competent automotive shop.

2. Examine the cylinder block for cracks. It is a good idea to take the block to a Ford dealer or competent automotive shop for magnafluxing, to locate any hairline cracks that might escape visual examination.

3. Check all machined gasket surfaces for nicks or burrs. If necessary, smooth the surfaces with an oilstone.

4. Check the cylinder head mating surface(s) of the block for flatness. Use an accurate straightedge and feeler gauge as shown in **Figure 117**. Maximum cylinder head warp is 0.003 in. or less over any 6 inches, in any direction, and 0.006 in. over the full length of the cylinder block. Have the block resurfaced by a machine shop if warp is in excess of specification. Do not remove more than 0.010 in. from the block/cylinder head mating surface.

117



5. Measure the cylinder bores for out-of-roundness, or excessive wear, with a bore gauge (**Figure 118**). Measure the cylinder bores at top and bottom, in both the front-to-rear and side-to-side directions. Compare the measurements to specifications at the end of this chapter. If the cylinders exceed maximum tolerances, they must be rebored. Cylinder reboring is a job for a Ford dealer or competent machine shop.

> NOTE: *When reboring cylinders, the main bearing caps must be installed and torqued to specifications to prevent distortion of main bearing bores.*

FLYWHEEL (MANUAL TRANSMISSION)

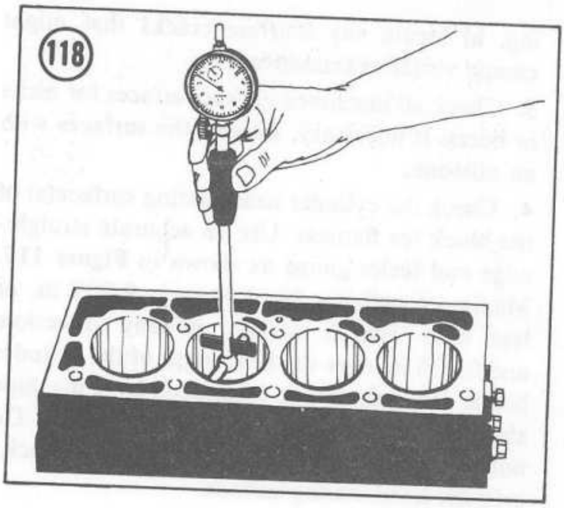
Removal/Installation

1. Remove the transmission as described in Chapter Nine.

2. Remove the clutch from the flywheel as described in Chapter Eight.

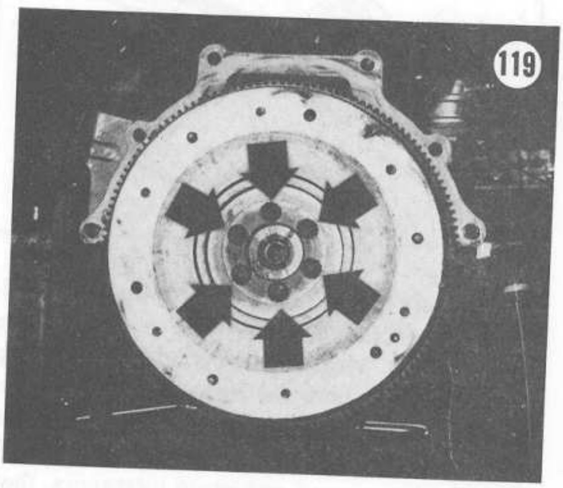
4

118



3. Remove the 6 bolts attaching the flywheel to the crankshaft (**Figure 119**). Remove the flywheel from the crankshaft.

119



4. Installation is the reverse of these steps. Tighten the flywheel bolts gradually in a diagonal pattern. Metric bolts are used on the 2300cc engine (10mm). Tighten these bolts to 54-64 ft.-lb. Tighten the bolts on the 2800cc engine to 47-51 ft.-lb. On 302 cid engines, tighten the bolts to 75-85 ft.-lb.

Inspection

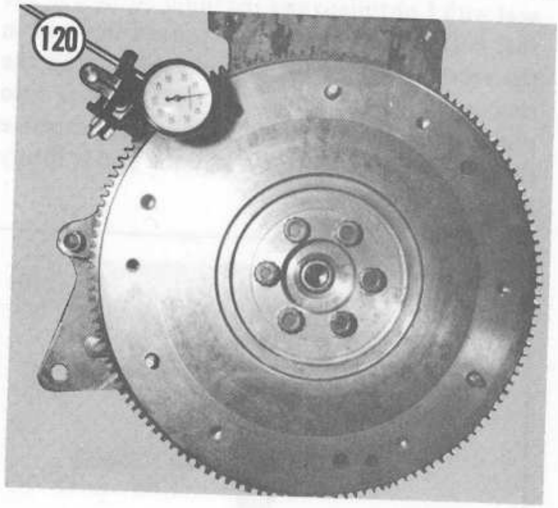
1. Check the flywheel for cracks or heat damage (blue-tinted area). Replace the flywheel if these conditions are detected.

2. Check the friction surface of the flywheel for wear or scoring. If necessary, have the flywheel turned to smooth it. This should be done by a competent machine shop. Do not have more than 0.045 in. removed from the flywheel friction surface.

3. Check the ring gear for worn or damaged teeth. If wear or damage is evident, have a new ring gear shrunk onto the flywheel.

4. Check the flywheel face for runout. Connect a dial gauge as shown in **Figure 120** to the flywheel. Maximum permissible runout is 0.005 in.

120



FLYWHEEL (AUTOMATIC TRANSMISSION)

The automatic transmission flywheel is fastened to the crankshaft with 6 bolts, as is the manual transmission flywheel. Inspection procedures are basically the same as the manual transmission flywheel. However, the automatic transmission flywheel must be replaced if the ring gear is defective.

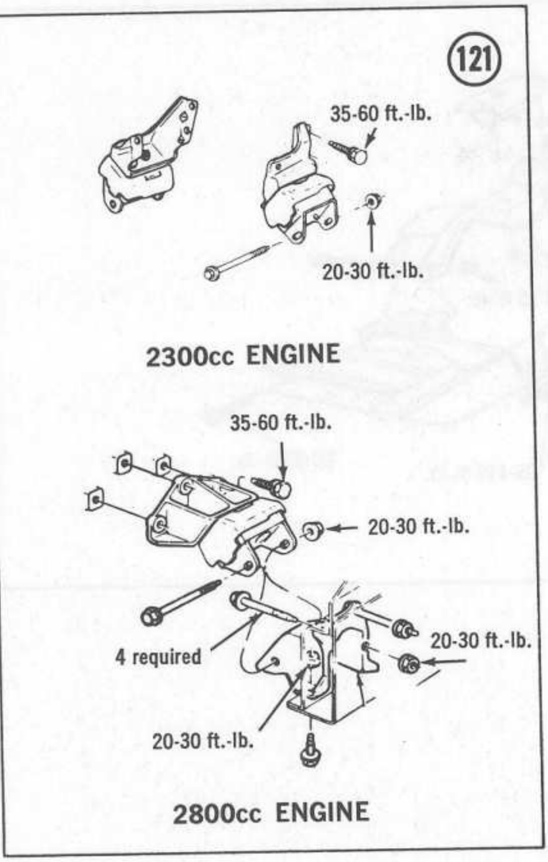
MOTOR MOUNTS (FRONT AND REAR)

Front Mount Removal/Installation (2300cc and 2800cc)

1. Remove the fan shrouding attaching screws.

2. Support the front of the engine using a wooden block and jack placed under the oil pan.

3. Remove the through bolt and locknut attaching the motor mount to the support bracket (**Figure 121**).



NOTE: *Whenever self-locking mounting bolts and locknuts are removed, both bolts and nuts must be replaced.*

4. Remove the support bracket attaching bolts and nuts from the frame side rail.

5. Using the jack, raise the engine sufficiently to remove the support brackets from the vehicle.

6. Remove the motor mount-to-cylinder block attaching bolts and lockwashers, then remove the motor mount.

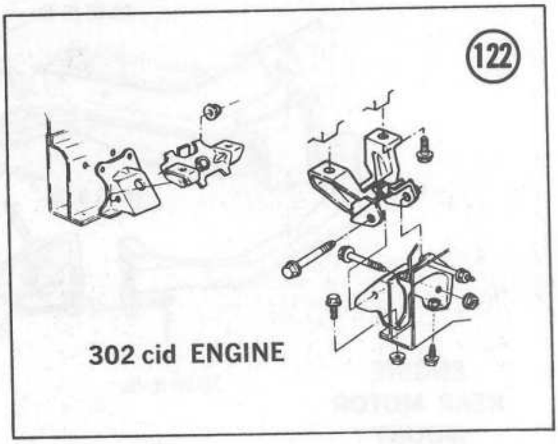
7. Installation is the reverse of these steps. Tighten all of the attaching nuts and bolts to specification.

Front Mount Removal/Installation (302 cid)

1. Support the front of the engine using a block of wood and a jack under the oil pan.

2. Remove the through bolt and locknut attaching the motor mount to the support bracket (**Figure 122**).

NOTE: *Whenever self-locking mounting bolts and locknuts are removed, both bolts and nuts must be replaced.*



3. Raise the engine slightly with the jack, to gain access to the motor mount attaching bolts, and to allow the motor mount to be removed from bewteen the engine block and support bracket.

4. Remove the motor mount-to-cylinder block attaching bolts, then remove the motor mount.

5. Installation is the reverse of these steps. Tighten all of the attaching bolts and nuts to specification.

Rear Motor Mounts Removal/Installation

1. Remove the 2 locknuts attaching the rear motor mount to the rear crossmember. See **Figure 123**.

2. Support the transmission with a block of wood and a jack below the main body of the transmission.

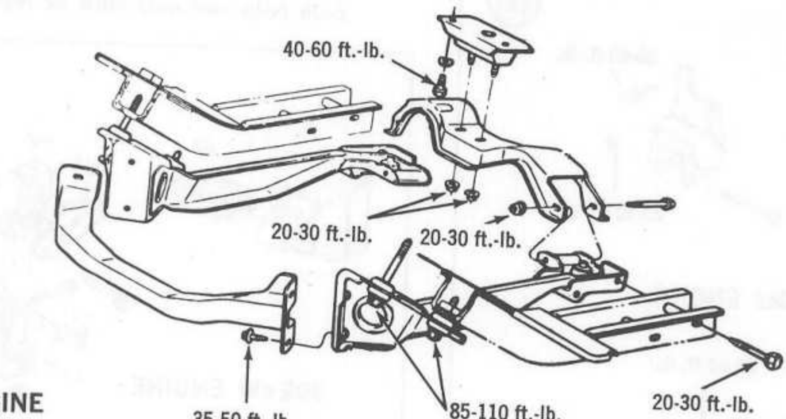
3. Remove the through bolts and locking nuts attaching rear crossmember to frame rails.

4. Remove the 2 bolts attaching the rear motor mount to the transmission.

5. If necessary, raise the transmission sufficiently to allow the rear crossmember and motor mount to be removed, then remove the crossmember and motor mount.

6. Installation is the reverse of these steps. Tighten all of the attaching bolts and nuts to specification.

123



ENGINE REAR MOTOR MOUNT

Table 1 2300cc ENGINE SPECIFICATIONS

General Specifications	
Piston displacement	2300cc (140.4 cu. in.)
Bore	3.780 in.
Stroke	3.126 in.
Oil pressure (hot at 2,000 rpm)	40-60 psi
Compression pressure (cranking speed)	Lowest cylinder within 75% of highest
Firing order	1-3-4-2
Cylinder Head	
Valve guide bore diameter (standard intake and exhaust)	0.3433-0.3443 in.
Valve seat width, intake	0.060-0.090 in. (1974-75); 0.060-0.080 in. (1976)
Valve seat width, exhaust	0.070-0.090 in.
Valve seat angle	45°
Valve seat runout (maximum)	0.0016 in.
Valve arrangement (front to rear)	E-I-E-I-E-I-E-I
Rocker Arm	
Rocker arm to cam clearance	
Intake	0.008 in. (cold)
Exhaust	0.010 in. (cold)
Rocker arm ratio	1.64:1
Valve Lash Adjusters	
Diameter	0.8422-0.8427 in.
Clearance to bore	0.0007-0.0027 in.
Gap at cam (collapsed)	
Nominal	0.040-0.050 in. (1974-75); 0.035-0.055 in. (1976)
Maximum	0.010-0.070 in.
Valve Springs	
Approximate free length	1.82 in.
Assembled height	$1\frac{35}{64}$-$1\frac{37}{64}$ in. (1974); $1\frac{17}{32}$-$1\frac{19}{32}$ in. (1975-76)
Pressure at length	
1974	78-86 lb. @ 1.56 in.
	199-221 lb. @ 1.16 in.
1975-1976	71-79 lb. @ 1.56 in.
	180-198 lb. @ 1.16 in.
Maximum out of square	0.078 in.
Valves	
Stem-to-guide clearance	
Intake	0.0010-0.0027 in.
Exhaust	0.0015-0.0032 in.
Wear limit	0.0055 in.
Face angle	44°
Valve face runout	0.0020 in.
Head diameter	
Intake	1.728-1.744 in.
Exhaust	1.492-1.508 in.

(continued)

Table 1 2300cc ENGINE SPECIFICATIONS (continued)

Valves (continued)	
Stem diameter, standard	
Intake	0.3416-0.3423 in.
Exhaust	0.3411-0.3418 in.
Camshaft	
Lobe lift	
Intake	0.244 in.
Exhaust	0.244 in.
Maximum lift loss	0.005 in.
Journal-to-bearing clearance	
Standard	0.001-0.003 in.
Maximum	0.006 in.
Journal diameter	1.7713-1.7720 in.
Bearing diameter	1.7730-1.7742 in.
Journal runout (maximum)	0.005 in.
Journal out-of-round (maximum)	0.0005 in.
End play	
Nominal	0.001-0.007 in.
Maximum	0.009 in.
Auxiliary Shaft	
Bearing clearance	0.001-0.0028 in. (1974-75); 0.0006-0.0026 in. (1976)
End play	0.001-0.007 in.
Cylinder Block	
Bore diameter	3.7795-3.7831 in.
Bore diameter wear limit	+0.005 in.
Out-of-round (maximum)	0.001 in.
Taper (maximum)	0.010 in.
Main bearing bore diameter	2.5902-2.5910 in.
Crankshaft	
Main bearing journal diameter	2.3982-2.3990 in.
Main bearing journal wear limit	+0.005 in.
Main bearing journal runout (maximum)	0.002 in.
Main bearing journal out-of-round (maximum)	0.0004 in. (1974-75); 0.0006 in. (1976)
Main bearing journal taper (maximum)	0.003 in. (1974); 0.0006 in. per in. (1975-76)
Connecting rod journal diameter	2.0464-2.0472 in.
Connecting rod journal taper (maximum)	0.003 in. (1974); 0.0006 in. per in. (1975-76)
Journal out-of-round (maximum)	0.0004 in. (1974); 0.0006 in. (1975-76)
Crankshaft free end play	0.004-0.008 in.
Crankshaft free end play wear limit	0.012 in.
Main Bearings	
Clearance to crankshaft	
Standard	0.0008-0.0015 in.
Permissible	0.0008-0.0026 in.

(continued)

Table 1 2300cc ENGINE SPECIFICATIONS (continued)

Connecting Rod Bearings	
Clearance to crankshaft	
Standard	0.0006-0.0015 in. (1974); 0.0008-0.0015 in. (1975-76)
Permissible	0.0009-0.0027 in. (1974); 0.0008-0.0026 in. (1975-76)
Connecting Rods	
Piston pin bushing inside diameter	0.9104-0.9112 in.
Bearing bore	2.1720-2.1728 in.
Bearing bore out-of-round and taper (max.)	0.0004 in.
Alignment*	
Twist	0.012 in.(1974); 0.024 in. (1975-76)
Bend	0.004 in. (1974); 0.012 in. (1975-76)
Side clearance	0.0008-0.0026 in. (1974); 0.0035-0.0105 in. (1975-76)
Pistons	
Diameter, standard	3.7780-3.7786 in.
Clearance to cylinder bore	0.0013-0.0021 in. (1974); 0.0014-0.0022 in. (1975-76)
Pin bore diameter	0.9123-0.9127 in. (1974); 0.9123-0.9126 in. (1975-76)
Ring groove width	
Compression	0.080-0.081 in.
Oil	0.188-0.189 in.
Piston Pins	
Length	3.010-3.040 in.
Diameter	0.9120-0.9123 in.
Clearance to piston	0.0002-0.0004 in.
Clearance to connecting rod	Interference fit
Piston Rings	
Compression ring width	0.077-0.080 in. (1974-75); 0.077-0.078 in. (1976)
Compression ring side clearance	
Normal	0.002-0.004 in.
Wear limit	0.006 in.
Oil ring side clearance	Snug
Ring gap	
Compression	0.010-0.020 in.
Oil	0.015-0.055 in.
Flywheel	
Clutch face runout	0.005 in. (1974); 0.008 in. (1975); 0.005 in. (1976)
Oil Pump	
Rotor end clearance	0.001-0.004 in.
Outer race to housing clearance	0.001-0.007 in.

*Bearing bore and pin bushing must be parallel and in same vertical plane within 0.004 in. at ends of 8 in. long bar measured at 4 in. from either side of connecting rod.

4

Table 2 2800cc ENGINE SPECIFICATIONS

General Specifications	
Piston displacement	2800cc (170.9 cu. in.)
Bore	3.66 in.
Stroke	2.70 in.
Oil pressure (hot at 2,000 rpm)	40-55 psi
Firing order	1-4-2-5-3-6
Compression pressure (cranking speed)	Lowest cylinder within 75% of highest
Cylinder Head	
Valve guide bore diameter	0.3174-0.3184 in.
Valve seat width	0.060-0.079 in.
Valve seat angle	45°
Valve seat runout (maximum)	0.0015 in.
Valve arrangement (front to rear)	I-E-E-I-E-I (L.H.) I-E-I-E-E-I (R.H.)
Rocker Assembly	
Rocker arm shaft diameter	0.7799-0.7811 in.
Rocker arm bore diameter	0.7830-0.7842 in.
Rocker arm to shaft clearance	0.0019-0.0043 in.
Rocker arm ratio	1.46:1
Tappets	
Diameter	0.8736-0.8741 in.
Clearance to bore	0.0009-0.0024 in.
Out-of-round (maximum)	0.0013 in.
Valve stem to rocker arm clearance (valve clearance)	
Intake	0.014 (hot, 1974-1975; cold, 1976 on)
Exhaust	0.016 (hot, 1974-1975; cold, 1976 on)
Valve Springs	
Approximate free length	
1974-1977-1978	1.91 in.
1975-1976	1.99 in.
Assembled height	$1\frac{37}{64}$-$1\frac{39}{64}$
Pressure at length	
1974-1977-1978	60-68 lb. @ 1.585 138-149 lb. @ 1.222
1975-1976	66.5-74.5 lb. @ 1.585 143.5-1.56.0 lb. @ 1.222
Maximum out-of-square	0.078 in.
Valves	
Stem-to-guide clearance	
Intake	0.0008-0.0025 in.
Exhaust	0.0018-0.0035 in.
Wear limit (both)	0.0055 in.

(continued)

Table 2 2800cc ENGINE SPECIFICATIONS (continued)

Valves (continued)	
Face angle	44°
Head diameter	
Intake	1.562-1.577 in.
Exhaust	1.261-1.276 in.
Stem diameter, standard	
Intake	0.3158-0.3167 in.
Exhaust	0.3149-0.3156 in.
Camshaft	
Lobe lift	0.2555 in.
Maximum lift loss	0.005 in.
Journal-to-bearing clearance	0.0010-0.0026 in.
Wear limit	0.006 in.
Journal diameter	
No. 1	1.6497-1.6505 in.
No. 2	1.6347-1.6355 in.
No. 3	1.6197-1.6205 in.
No. 4	1.6047-1.6055 in.
Bearing diameter	
No. 1	1.6515-1.6523 in.
No. 2	1.6365-1.6373 in.
No. 3	1.6215-1.6223 in.
No. 4	1.6065-1.6073 in.
Journal runout (maximum)	0.005 in.
Journal out-of-round (maximum)	0.0003 in.
End play	
Nominal	0.0008-0.0040 in.
Maximum	0.0090 in.
Cylinder Block	
Bore diameter	3.6614-3.6630 in.
Out-of-round (maximum)	0.0015 in.
Taper (maximum)	0.010 in.
Main bearing bore diameter	2.3866-2.3874 in.
Bore diameter wear limit	+0.005 in.
Crankshaft	
Main bearing journal diameter	2.2433-2.2441 in.
Main bearing journal wear limit	0.005 in.
Main bearing journal runout (maximum)	0.002 in.
Main bearing journal out-of-round (maximum)	0.0006 in.
Main bearing journal taper (maximum)	0.0005 in per in.
Connecting rod journal diameter	2.1252-2.1260 in.
Connecting rod journal taper (maximum)	0.0006 in. per in.
Journal out-of-round (maximum)	0.0006 in.
Crankshaft free end play	0.004-0.008 in.
Crankshaft free end play wear limit	0.012 in.

(continued)

4

Table 2 2800cc ENGINE SPECIFICATIONS (continued)

Main Bearings	
Clearance to crankshaft	
Standard	0.0005-0.0016 in.
Permissible	0.0005-0.0019 in.
Connecting Rod Bearings	
Clearance to crankshaft	
Standard	0.0005-0.0015 in.
Permissible	0.0005-0.0022 in.
Connecting Rods	
Piston pin bore diameter	0.9450-0.9452 in.
Bearing bore	2.2370-2.2378 in.
Bearing bore out-of-round and taper (maximum)	0.0004 in.
Alignment*	
Twist	0.006 in.
Bend	0.004 in.
Side clearance	0.004-0.011 in.
Pistons	
Diameter, standard	3.6605-3.6614 in.
Clearance to cylinder bore	0.001-0.002 in.
Pin bore diameter	0.9450-0.9452 in.
Ring groove width	
Upper compression	0.0803-0.0811 in.
Lower compression	0.1197-0.1205 in.
Oil	0.1579-0.1587 in.
Piston Pins	
Length	2.835-2.866 in.
Diameter	0.9446-0.9450 in.
Clearance to piston	0.0003-0.0006 in.
Clearance to connecting rod	Interference fit
Piston Rings	
Compression ring width	0.0778-0.0783 in. (top); 0.1172-0.1177 in. (bottom)
Compression ring side clearance	
Normal	0.0020-0.0033 in.
Wear limit	0.006 in.
Oil ring side clearance	Snug
Ring gap	
Compression	0.015-0.023 in.
Oil	0.015-0.055 in.
Flywheel	
Clutch face runout	0.005 in.
Oil Pump	
Rotor end clearance	0.0011-0.0041 in.
Outer race to housing clearance	0.006-0.012 in.

*Bearing bore and pin bushing must be parallel and in same vertical plane within 0.004 in. at ends of 8 in. long bar measured at 4 in. from either side of connecting rod.

Table 3 302 CID ENGINE SPECIFICATIONS

General Specifications	
Piston displacement	4950cc (302 cu. in.)
Bore	4.00 in.
Stroke	3.00 in.
Oil pressure (hot at 2,000 rpm)	40-60 psi
Firing order	1-5-4-2-6-3-7-8
Compression pressure (cranking speed)	Lowest cylinder within 75% of highest
Cylinder Head	
Valve guide bore diameter	0.3433-0.3443 in.
Valve seat width	0.060-0.080 in.
Valve seat angle	45°
Valve seat runout (maximum)	0.002 in.
Valve arrangement (front to rear)	E-I-E-I-E-I-E-I (L.H.) I-E-I-E-I-E-I-E (R.H.)
Valve Springs	
Approximate free length	
Intake	1.94 in.
Exhaust	1.85 in. (1975); 1.87 in. (1976)
Assembled height	
Intake	$1\frac{43}{64}$-$1\frac{45}{64}$ in (1974-75); $1\frac{21}{32}$-$1\frac{23}{32}$ in (1976)
Exhaust	$1\frac{19}{32}$-$1\frac{39}{64}$ in. (1974-75); $1\frac{9}{16}$-$1\frac{5}{8}$ in (1976)
Pressure at length	
Intake	76-84 lb. @ 1.69 in. 190-210 lb. @ 1.31 in.
Exhaust	76-84 lb. @ 1.60 in. 190-210 lb. @ 1.22 in.
Maximum out-of-square	0.078 in.
Valves	
Stem-to-guide clearance	
Intake	0.0010-0.0027 in.
Exhaust	0.0015-0.0032 in.
Face angle	44°
Head diameter	
Intake	1.773-1.791 in.
Exhaust	1.442-1.460 in.
Stem diameter, standard	
Intake	0.3416-0.3423 in.
Exhaust	0.3411-0.3418 in.
Camshaft	
Lobe lift	
Intake	0.2303 in. (1974-75); 0.2373 in. (1976)
Exhaust	0.2375 in. (1974-75); 0.2474 in. (1976)
Maximum lift loss	0.005 in.
Journal-to-bearing clearance	0.001-0.003 in.
Journal-to-bearing wear limit	0.006 in.

(continued)

Table 3 **302 CID ENGINE SPECIFICATIONS** (continued)

Camshaft (continued)	
Journal diameter	
No. 1	2.0805-2.0815 in.
No. 2	2.0655-2.0665 in.
No. 3	2.0505-2.0515 in.
No. 4	2.0355-2.0365 in.
No. 5	2.0205-2.0215 in.
Bearing diameter	
No. 1	2.0825-2.0835 in.
No. 2	2.0675-2.0685 in.
No. 3	2.0525-2.0535 in.
No. 4	2.0375-2.0385 in.
No. 5	2.0225-2.0235 in.
Journal runout (maximum)	0.005 in.
Journal out-of-round (maximum)	0.0005 in.
End play	
Nominal	0.001-0.007 in.
Maximum	0.009 in.
Cylinder Block	
Bore diameter	4.0004-4.0052 in.
Out-of-round (maximum)	0.0015 in.
Taper (maximum)	0.001 in.
Main bearing bore diameter	2.4412-2.4420 in.
Bore diameter wear limit	+0.005 in.
Crankshaft	
Main bearing journal diameter	2.2482-2.2490 in.
Main bearing journal wear limit	0.005 in.
Main bearing journal runout (maximum)	0.002 in.
Main bearing journal out-of-round (maximum)	0.0004 in.
Main bearing journal taper (maximum)	0.0006 in. per in.
Connecting rod journal diameter	2.1228-2.1236 in.
Connecting rod journal taper (maximum)	0.0006 in. per in.
Journal out-of-round (maximum)	0.0006 in.
Crankshaft free end play	0.004-0.008 in.
Crankshaft free end play wear limit	0.012 in.
Main Bearings	
Clearance to crankshaft	
Standard	
No. 1	0.0001-0.0005 in. (1974-75); 0.0005-0.0015 in. (1976)
All others	0.0005-0.0015 in. (1974-75); 0.0005-0.0015 in. (1976)
Permissible	
No. 1	0.0001-0.0020 in.
All others	0.0005-0.0024 in.
Connecting Rod Bearings	
Clearance to crankshaft	
Standard	0.0008-0.0015 in.
Permissible	0.0008-0.0026 in.

(continued)

Table 3 302 CID ENGINE SPECIFICATIONS (continued)

Conecting Rods	
Piston pin bore diameter	0.9104-0.9112 in.
Bearing bore	2.2390-2.2398 in.
Bearing bore out-of-round and taper (maximum)	0.0004 in.
Alignment*	
Twist	0.024 in.
Bend	0.012 in.
Side clearance	0.010-0.020 in.
Pistons	
Diameter, standard	3.9984-3.9990 in.
Clearance to cylinder bore	0.0018-0.0026 in.
Pin bore diameter	0.9122-0.9126 in.
Ring groove width	
Upper compression	0.080-0.091 in.
Lower compression	0.080-0.091 in.
Oil	0.1880-0.1890 in.
Piston Pins	
Length	3.010-3.040 in.
Diameter	0.9120-0.9123 in.(1974-75); 0.9118-0.9124 in. (1976)
Clearance to piston	0.0002-0.0004 in.
Clearance to connecting rod	Interference fit
Piston Rings	
Compression ring width	0.077-0.078 in.
Compression ring side clearance	
Normal	0.002-0.004 in.
Wear limit	0.006 in.
Oil ring side clearance	Snug
Compression ring gap	0.010-0.020 in.
Oil ring steel rail gap	0.015-0.055 in.
Flywheel	
Clutch race runout	0.010 in.
Oil Pump	
Rotor end clearance	0.001-0.004 in.
Outer race to housing	0.001-0.013 in.
Timing Chain	
Maximum deflection	0.005 in.

*Bearing bore and pin bushing must be parallel and in same vertical plane within 0.004 in. at ends of 8 in. long bar measured at 4 in. from either side of connecting rod.

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Table 4 TIGHTENING TORQUES, 2300cc ENGINE

Item	Torque (ft.-lb.)	Metric Sizes (If Applicable)
Auxiliary shaft cover bolts	6-9	M6
Auxiliary shaft sprocket bolt	28-40	M10
Auxiliary shaft thrust plate bolt	6-9	M6
Camshaft belt tensioner bolts	28-40	M10 (pivot)
	14-21	M8 (adj)
Camshaft drive sprocket bolt	50-71	M12
Camshaft thrust plate bolts	6-9	M6
Carburetor to spacer stud	7.5-15	M8
Carburetor to spacer nut	10-14	M8
Carburetor spacer to manifold bolt	14-21	M8
Connecting rod cap nuts	Step 1 25-30	M9
	Step 2 30-36	—
Crankshaft damper bolt	80-114	M14
Cylinder front cover bolts	6-9	M6
Cylinder head bolts	Step 1 60	M12
	Step 2 80-90	—
Decel valve nut	10-15	—
Decel valve to intake manifold adapter	22-28	—
Distributor clamp bolt	20-28	M10
Distributor vacuum tube to intake manifold adapter	5-8	—
Exhaust manifold to cylinder head (nut or bolt)	Step 1 8	M10
	Step 2 16-23	—
Exhaust manifold to EGR pipe (connector)	25-35	—
Flywheel to crankshaft bolts	54-64	M10
Front (timing belt) cover bolts	6-9	M6
Fuel filter to carburetor	80-100 in.-lb.	—
Fuel pump to cylinder block bolts	14-21	M8
Inner timing belt cover stud	14-21	M8
Intake manifold to cylinder head (nut or bolt)	Step 1 8	M8
	Step 2 16-23	
Main bearing cap bolts	Step 1 60	M12
	Step 2 80-90	—
Oil pressure sending unit to cylinder block	8-18	—
Oil pump pick-up tube to oil pump	14-21	M8
Oil pump pick-up tube to cylinder block	14-21	M8
Oil pan drain plug	15-25	M14
Oil pan to cylinder block bolts	7-9	M6
	11-13	M8
Oil filter insert to block	20-25	—
Oil filter	See Text	—
Rocker arm cover bolts	4-7	M6
Rocker arm cover shield bolts	28-40	M10
Spark pugs to cylinder head	10-15	M14

(continued)

Table 4 TIGHTENING TORQUES, 2300cc ENGINE (continued)

Item	(Torque (ft.-lb.)	Metric Sizes (If Applicable)
Thermactor check valve to exhaust manifold	25-35	—
Water jacket drain plug	23-28	—
Water outlet connection bolts	14-21	M8
Water pump to cylinder block bolts	14-21	M8
Water temperature sending unit to cylinder head	8-18	—
EGR tube nut	8-12	—
EGR tube to exhaust manifold (connector)	8-12	—
EGR valve to spacer bolt	14-21	M8
*General tightening torques	6-9	M6
	14-21	M8
	28-40	M10
	50-71	M12
	80-114	M14
	12-18	¼-18 pipe
	23-33	⅜-18 pipe

*If not otherwise specified.

Table 5 TIGHTENING TORQUES, 2800cc ENGINE

Item	Torque (ft.-lb.)	Metric Sizes (If Applicable)
Alternator mounting bolt to cylinder head	18-25	M8
Alternator pivot bolt	45-60	—
Alternator adjustment arm to front cover bolt	50-71	M12
Alternator adjustment arm to alternator	24-40	—
Camshaft sprocket bolt	30-36	M10
Camshaft thrust plate bolts	12-15	M8
Carburetor spacer stud	3-5	—
Carburetor spacer to manifold stud	3-5	—
Carburetor to spacer nut	4-18	M8
Connecting rod cap nuts	21-25	M8
Crankshaft damper bolt	92-103	M12
Crankshaft pulley to damper bolts	18-25	M8
Crankcase vent valve	11-14	—
Cylinder head bolts	Step 1 29-40 Step 2 40-51 Step 3 65-80	M12
Cylinder front plate to cylinder block	12-15	M8
Decel valve nut	27-30	—
Decel valve to manifold adapter	30-34	—
Distributor clamp bolt	12-15	M8
EGR tube fittings	15-20	—
EGR valve to spacer bolt	12-15	M8
Exhaust manifold to EGR pipe (connector)	25-35	—
Exhaust manifold to cylinder head (nut or bolt)	16-23	M10/M8
Fan to water pump hub	14-20 (through 1974) 12-18 (1975-1976)	M8
Flywheel to crankshaft bolts	47-51	M10
Front cover to cylinder block bolts	12-15	M8
Fuel filter to carburetor	80-100 in.-lb.	—
Fuel pump to cylinder block bolts	12-15	M8
Intake manifold to cylinder heads (nut or bolt)	Step 1 3-6 Step 2 6-11 Step 3 11-16 Step 4 15-18	M8
Main bearing cap bolts	65-75	M12
Monolithic timing pointer to cylinder front cover bolt	5-7	M6
Oil pump pick-up tube to oil pump	7-9	M6
Oil pump pick-up tube to main bearing cap bolt	12-15	M8
Oil pump cover bolt	7-9	M6
Oil pan drain plug	15-20	M14
Oil pan to cylinder block bolts	5-7	M6
Oil filter to cylinder block (insert)	10-15	—
Oil filter to engine	½ turn after gasket contact	—

(continued)

Table 5 TIGHTENING TORQUES, 2800cc ENGINE (continued)

Item	Torque (ft.-lb.)	Metric Sizes (If Applicable)
Rocker arm cover bolts	3-5	M6
Rocker arm shaft support bolts	43-49	M10
Spark plug to cylinder head	15-20 (through 1974) 10-15 (1975-1976)	—
Thermactor pump mounting bracket to cylinder block bolts	28-40	M10
Thermactor pump mounting bracket to cylinder head bolts	18-25	M8 —
Thermactor pump adjustment arm to pump bolt	22-32	—
Thermactor pump pivot bolt	30-45	—
Water jacket drain plug	14-18	—
Water outlet connection bolts	12-15	M8
Water pump to cylinder block bolts	7-9	M6
Water temperature sending unit to intake manifold	7-11	—
*General tightening torques	6-9	M6
	14-21	M8
	28-40	M10
	50-71	M12
	80-114	M14
	5-8	1/8 pipe
	12-18	1/4 pipe
	22-33	3/8 pipe
	25-35	1/2 pipe
	6-9	1/4-20 US
	12-18	5/16-18 US
	14-20	5/16-24 US
	22-32	3/8-16 US
	27-38	3/8-24 US
	45-57	7/16-14 US
	40-60	7/16-20 US
	55-80	1/2-13 US

*If not otherwise specified

4

Table 6 TIGHTENING TORQUES, 302 CID ENGINE

Item		Torque (ft.-lb.)
Alternator bracket to cylinder block		15-20
Alternator pivot bolt		45-57
Alternator adjusting arm to cylinder block		15-20
Alternator adjusting arm to alternator		24-40
Camshaft sprocket bolt		40-45
Camshaft thrust plate bolts		9-12
Carburetor mounting nuts		12-15
Carburetor mounting stud to intake manifold		15 maximum
Connecting rod cap nuts		19-24
Crankshaft damper bolt		70-90
Crankshaft pulley to damper bolts		35-50
Cylinder head bolts		Step 1 55-65 Step 2 65-72
Distributor vacuum control valve		15-18
EGR valve to carburetor spacer		12-18
Exhaust manifold to cylinder block		18-24
Fan to water pump hub		12-18
Flywheel to crankshaft bolts		75-85
Fuel filter to carburetor		80-100 in.-lb.
Fuel pump to cylinder front cover		19-27
Intake manifold to cylinder heads		23-25
Main bearing cap bolts		60-70
Oil filter insert to block		20-30
Oil filter to insert (cartridge type)		½ turn after gasket contact
Oil pan drain plug		15-25
Oil pan to cylinder block bolts	5/16 x 18 1/4 x 20	9-11 7-9
Oil pump pick-up tube to oil pump		10-15
Power steering pump pulley to damper bolt		35-50
Rocker arm cover bolts		3-5
Thermactor pump bracket to cylinder block bolts		15-20 (through 1974) 12-18 (1975-1976)
Thermactor pump pivot bolt		22-32
Thermactor pump adjusting arm to pump body bolt		22-32
Thermactor pump adjusting arm to cylinder block bolt		15-20 (through 1974) 12-18 (1975-1976)
Thermactor pump pulley to shaft bolt		80-115 in.-lb. (through 1974) 130-180 in.-lb. (1975-1976)
*General tightening torques:	1/4-20	6-9
	5/16-18	12-18
	3/8-16	22-32
	7/16-14	40-55
	1/2-13	55-80
	9/16-18	85-120

*If not otherwise specified

CHAPTER FIVE

FUEL, EXHAUST, AND EMISSION CONTROL SYSTEMS

The Mustang II fuel system consists of a rear-mounted fuel tank connected through a fuel line to a mechanical fuel pump. The pump delivers fuel through a fuel filter to a 2-barrel carburetor.

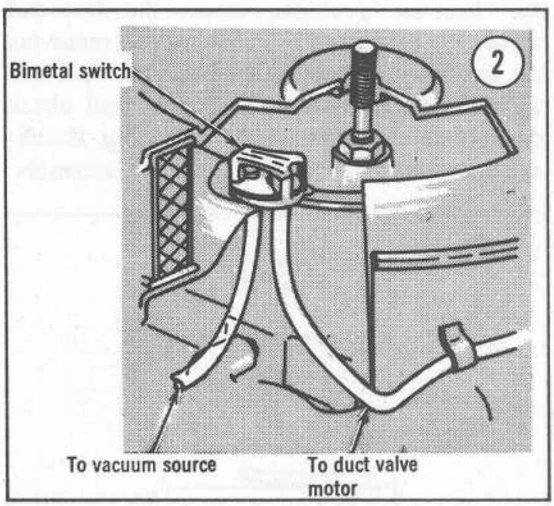
Both single and dual exhaust systems are available on a Mustang II. The exact parts included in each exhaust system are described later in this chapter.

Basic emission control devices used on Mustang II's are also covered in this chapter. These devices include the fuel vapor emission control system, the PCV system, the EGR system and spark delay valve, the Thermactor system, and the decel valve.

This chapter includes service procedures for all parts of the fuel, exhaust, and emission control systems that do not require special equipment available only through a Ford dealership or specialized maintenance facility.

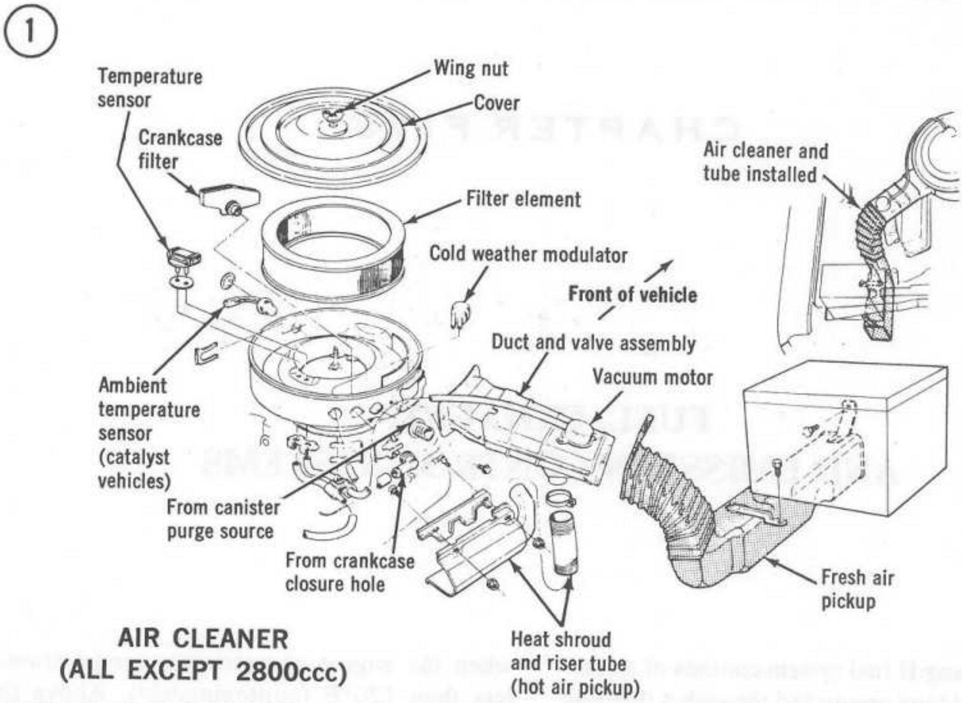
AIR CLEANER

The air cleaner and duct assembly for all engines, except the 2800cc engine, are shown in **Figure 1**. The 2800cc V6 engine is similar to that shown in Figure 1, but does not include a fresh air pick-up tube. The duct and valve assembly (Figure 1), included on all engines, draws hot air from around the exhaust manifold when the engine compartment temperature is less than 120°F (approximately). Above that temperature the duct and valve assembly allows air to be inducted through the normal air inlet (fresh air pickup tube). The duct and valve assembly controlling air input is vacuum operated, and controlled by a bimetal switch located inside the air cleaner (**Figure 2**).



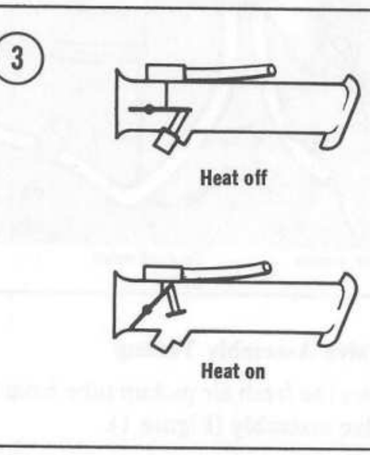
Duct and Valve Assembly Testing

1. Disconnect the fresh air pickup tube from the duct and valve assembly (Figure 1).



AIR CLEANER (ALL EXCEPT 2800ccc)

2. With the engine cold and the engine compartment temperature under 75°F, look into the air intake of the duct and valve assembly, and ensure that the air intake valve is in the "heat-on" position (**Figure 3**). If the air valve is not in the "heat-on" position, remove the duct and valve assembly from the air cleaner by removing the hex head cap screws securing the duct and valve assembly to the air cleaner, and check the valve assembly linkage for binding. If linkage binds, replace the duct and valve assembly.



3. Remove the air cleaner cover and place a thermometer, capable of reading in excess of 120°F next to the bimetal air intake control switch (Figure 2).

4. Reinstall the air cleaner cover, then start the engine and let it idle until the air valve opens to the "heat-on" position. Remove the air cleaner cover and note the temperature reading of the thermometer. The temperature should not exceed 120°F. If the duct and valve assembly fails any part of this test, check for binding of the air valve. If no binding is observed, replace the duct and valve assembly.

Duct and Valve Assembly Removal/Installation

1. Remove the hex head cap screws that secure the intake duct and valve assembly to the air cleaner.

2. Loosen the heat shroud riser tube pipe clamp (Figure 1), and disconnect the heat shroud riser tube from the duct and valve assembly.

3. Disconnect the vacuum hose from the vacuum motor on top of the duct and valve assembly.

4. On 2300cc and 302 cid engines, remove the fresh air pickup tube from the duct and valve assembly (Figure 1), then remove the duct and valve assembly from the engine.

5. Installation is the reverse of these steps.

Air Cleaner Removal/Installation

1. Loosen the heat shroud riser tube pipe clamp (Figure 1), then disconnect the heat shroud riser tube from the duct and valve assembly.

2. Disconnect the fresh air pickup tube from the duct and valve assembly.

3. Disconnect the line from the vacuum source to the bimetal switch inside the air cleaner, at the air cleaner (Figure 2).

4. Remove the wing nut attaching air cleaner cover to carburetor air horn stud.

5. Disconnect the crankcase ventilation system closure hose at the air cleaner body by removing the clip securing the elbow to the air cleaner shell (**Figure 4**).

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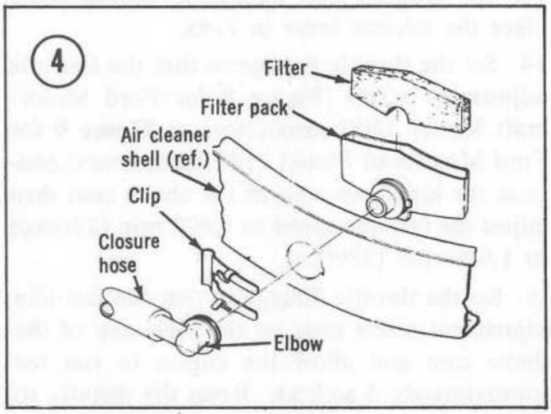

6. Disconnect the purge hose from the evaporative emission canister to the air cleaner at the air cleaner body (Figure 1).

7. Disconnect the cold weather modulator and the ambient temperature sensor (catalytic exhaust system vehicles) at the air cleaner body.

8. Ensure that all vacuum lines and hoses are disconnected from the air cleaner body, and duct and valve assembly, then lift the air cleaner from the engine. If the air filter element is to be replaced, remove the air cleaner cover from the air cleaner body, then lift the filter element from the air cleaner body.

9. Inspect the carburetor-to-air cleaner body gasket and replace if necessary.

10. Wipe all inside surfaces of the air cleaner body with a clean cloth, then install the filter element in the air cleaner body.

11. Install the air cleaner body on the carburetor, making sure the duct and valve assembly are properly aligned.

12. The remainder of the installation procedure is the reverse of the removal procedure.

CARBURETORS

The Mustang II uses 2 different carburetors. All 1974 models and the 2300cc 1975-1976 models use a Ford Motorcraft Model 5200 carburetor. The 2800cc and 302 cid 1975-1976 models use a Ford Motorcraft Model 2150 carburetor. The model 5200 carburetor is a 2-barrel, 2-stage carburetor using an automatic choke heated by engine coolant. The carburetor design remains basically the same for both model years. However, specifications vary slightly with model year, transmission type, state of delivery and installed optional equipment, such as air conditioning. The carburetor number is stamped on the metal tag attached to the carburetor as shown in **Figure 5**.

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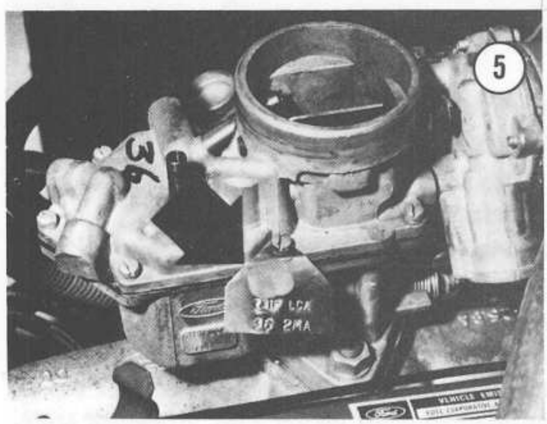
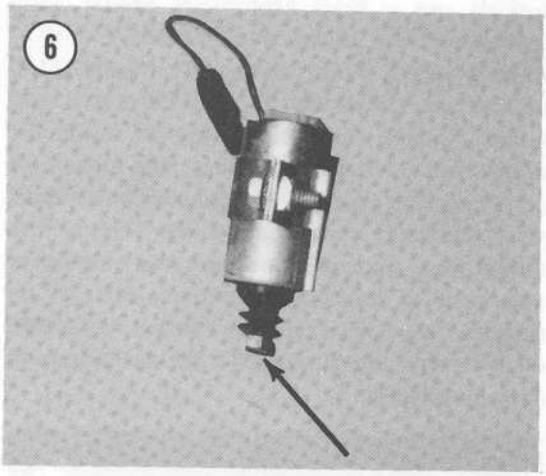


The Ford Motorcraft Model 2150 carburetor is a 2-barrel, with each barrel containing both a main and a booster venturi. This carburetor also uses an automatic choke heated by engine coolant. The carburetor number on these carburetors is also stamped on a metal tag attached to the carburetor as shown in Figure 5.

Most models use an anti-dieseling solenoid (**Figure 6** typical). The solenoid plunger extends when the ignition is turned on, and retracts when it is turned off. At idle the throttle lever rests against the extended plunger. When the engine is turned off, the retracting plunger allows the throttle to close further than normal. This helps stop the engine from "dieseling" (running after the ignition is turned off). The procedures contained in this chapter cover basic carburetor adjustments, and carburetor removal and installation. Further disassembly, adjustment, or removal is not recommended, and should be referred to a Ford dealer or a competent carburetor repair shop.



Curb Idle and Fast Idle Speed Adjustment (2300cc and 2800cc)

1. Remove the air cleaner and duct assembly as described earlier in this chapter.
2. Plug all vacuum lines at source of vacuum.
3. Set the parking brake and block the wheels so that the car cannot roll.
4. Check the throttle and choke linkages for freedom of movement and lubricate or repair, as required. See Chapter Two, *Scheduled Maintenance.*
5. Start the engine and warm to normal operating temperature.
6. Connect a tachometer and timing light to the engine.
7. Check engine timing against the specification listed on the vehicle emission control information decal on the engine. Adjust engine timing as described in the *Tune-Up* section of Chapter Two. Reinstall any distributor vacuum lines previously disconnected while checking engine timing.
8. Remove the EGR vacuum line at the EGR valve, and plug the vacuum line.
9. If so equipped, remove the spark delay valve and route the distributor primary vacuum advance directly to the distributor primary diaphragm (advance side). Leave the vacuum line connected to the retard side of dual diaphragm distributors.
10. Disconnect the carburetor decel valve hose at the carburetor, and plug the carburetor decel port (**Figure 7**).
11. If the vehicle is equipped with air conditioning, turn the air conditioner off.
12. Ensure that the engine is at normal operating temperature, and that the choke plate is fully opened.
13. On vehicles with automatic transmission, place the selector lever in PARK.
14. Set the throttle linkage so that the fast idle adjustment screw (**Figure 8** for Ford Motorcraft Model 5200 carburetors or **Figure 9** for Ford Motorcraft Model 2150 carburetors) contacts the kickdown step of the choke cam then adjust the fast idle speed to 1,800 rpm (2300cc) or 1,600 rpm (2800cc).
15. Set the throttle linkage so that the fast idle adjustment screw rests on the high step of the choke cam and allow the engine to run for approximately 5 seconds. Reset the throttle so that the fast idle adjustment screw contacts the kickdown step as shown in **Figure 10**. After allowing idle rpm to stabilize, recheck fast idle speed and adjust as necessary to bring it to specification. Repeat Steps 12 through 14, as required, until fast idle speed returns to specification each time the choke cam is returned to the kickdown step position.
16. Rotate the choke cam so that the fast idle adjustment screw contacts the high step of the choke cam, allowing the engine to run at normal curb idle speed and wait for approximately 5 seconds.
17. On vehicles equipped with an anti-dieseling

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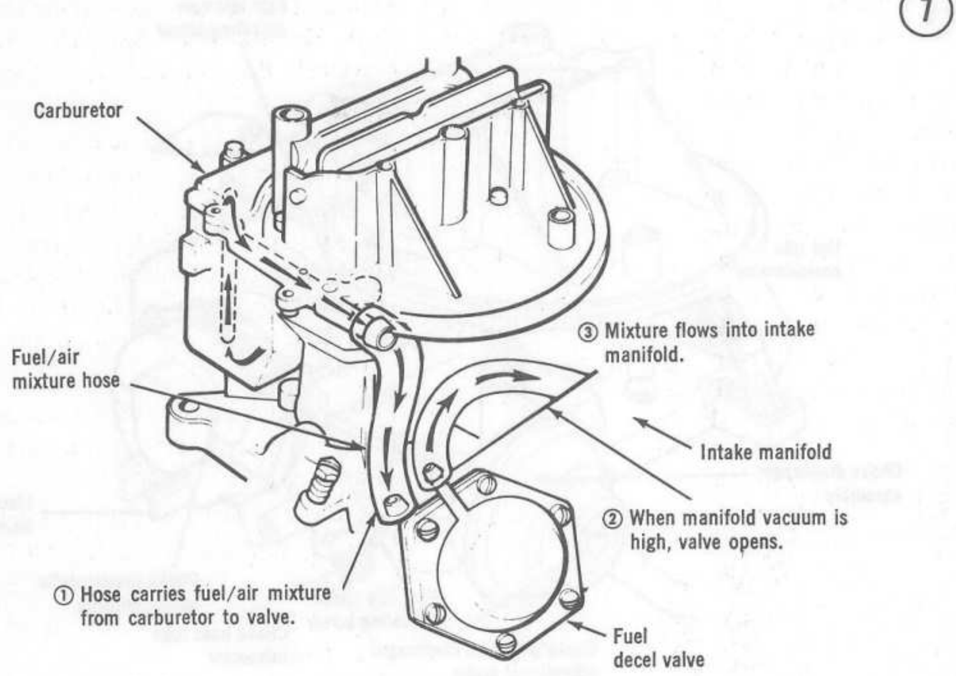

DECEL VALVE

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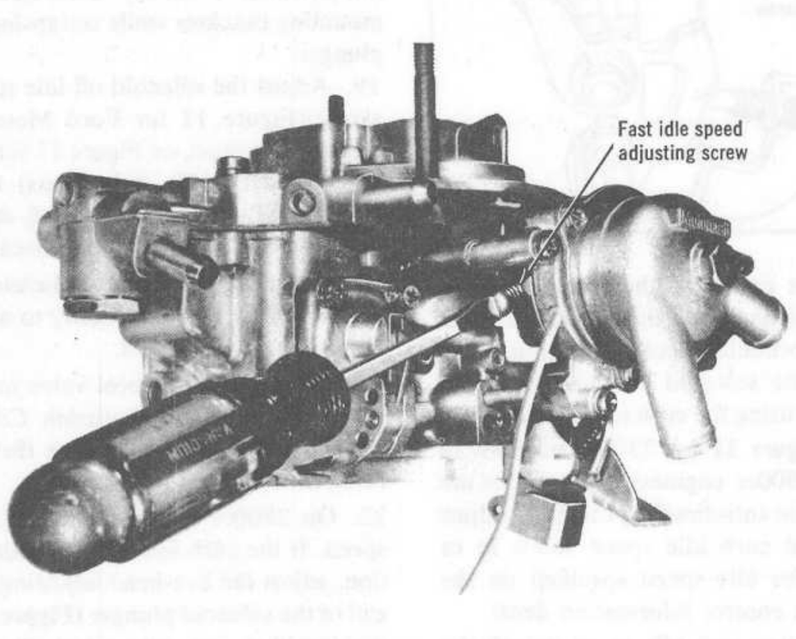

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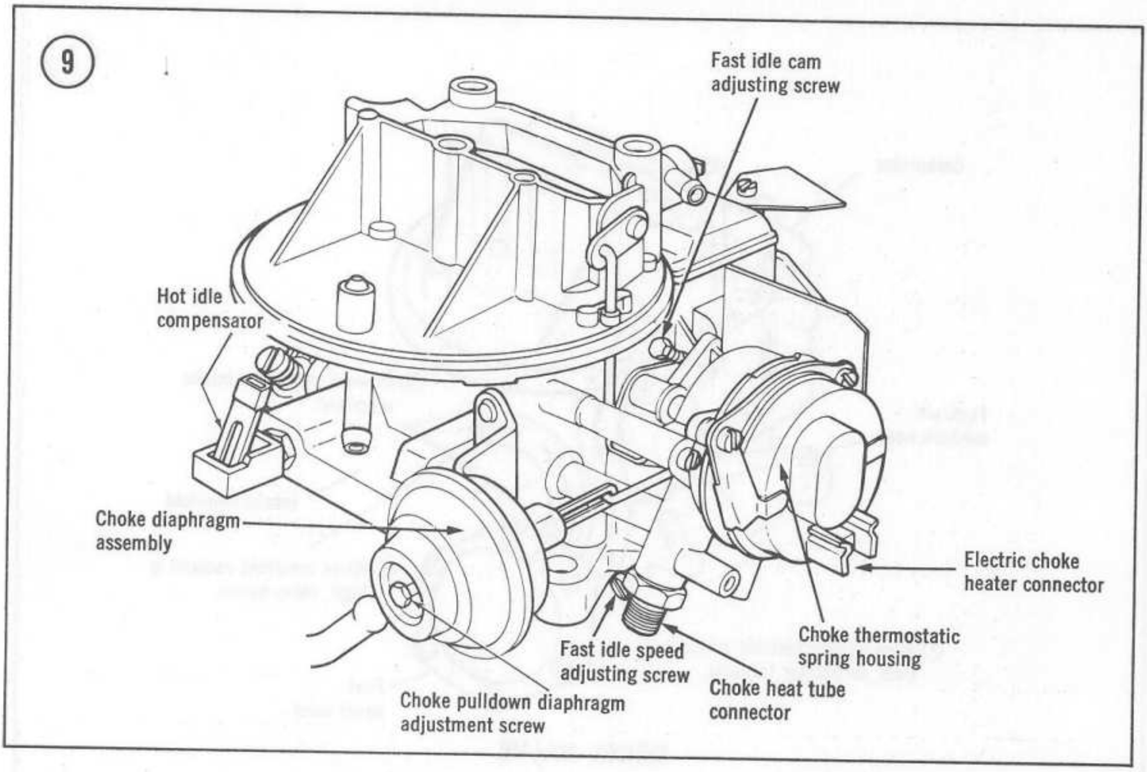

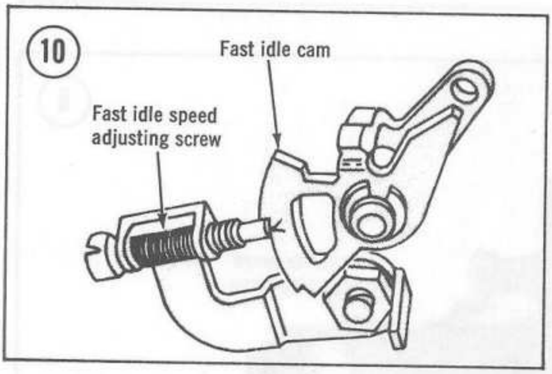

solenoid (Figure 6), adjust the curb idle speed to the specifications shown on the vehicle emission control information decal. This adjustment is made with the solenoid energized (plunger fully extended), using the curb idle speed adjustment screw (**Figure 11** for 2300cc engines, or **Figure 12** for 2800cc engines). On vehicles not equipped with the anti-dieseling solenoid, adjust the conventional curb idle speed screw in or out to obtain the idle speed specified on the vehicle emission control information decal.

18. After adjusting curb idle speed on vehicles equipped with the anti-dieseling solenoid, unplug the solenoid electrical connector, and collapse the solenoid plunger by forcing the throttle linkage against the plunger. Ensure that the solenoid assembly does not move in its mounting brackets while collapsing the solenoid plunger.

19. Adjust the solenoid off idle speed adjusting screw (Figure 11 for Ford Motorcraft Model 5200 carburetors, or Figure 12 for Ford Motorcraft Model 2150 carburetors) to obtain the lower (TSP-off) rpm specified on the vehicle emission control information decal.

20. Reconnect the solenoid electrical connector, then open the throttle slightly to allow the solenoid plunger to expand.

21. Adjust the fuel decel valve to specification as described in the *Emission Control System* part of this chapter each time the idle speed is reset, then recheck idle speed.

22. On 2800cc engines, recheck the curb idle speed. If the curb idle speed is out of specification, adjust the hex-head adjusting screw on the end of the solenoid plunger (**Figure 13**) to obtain the specified curb idle speed. If adjustment is necessary, increase engine speed to approxi-

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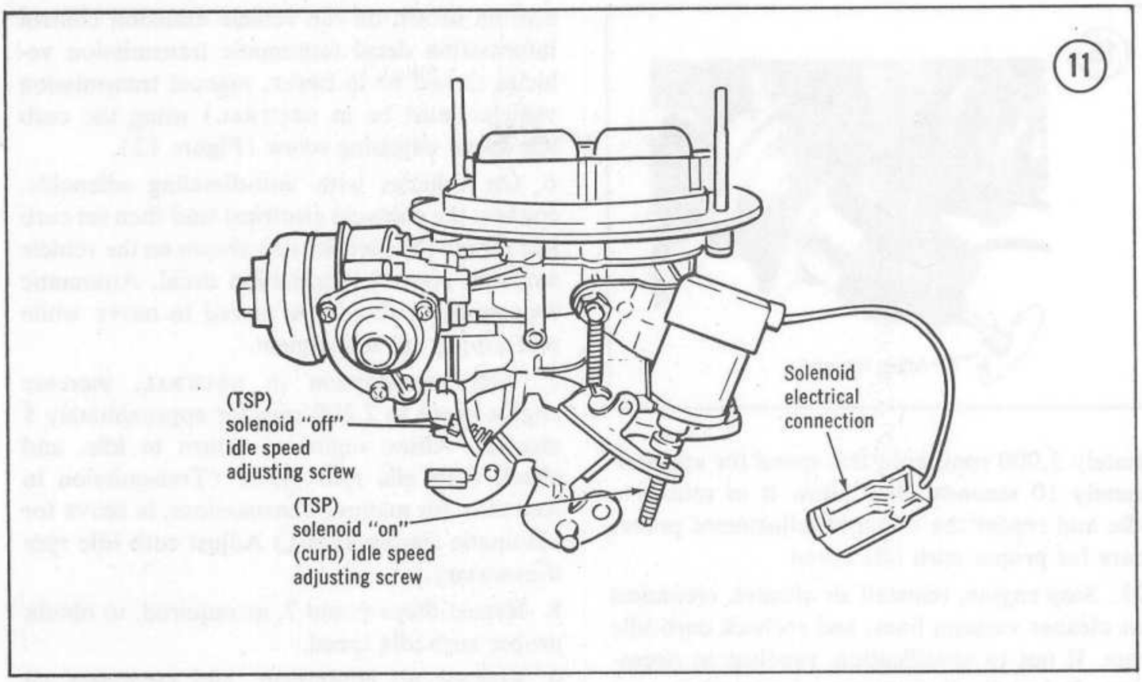
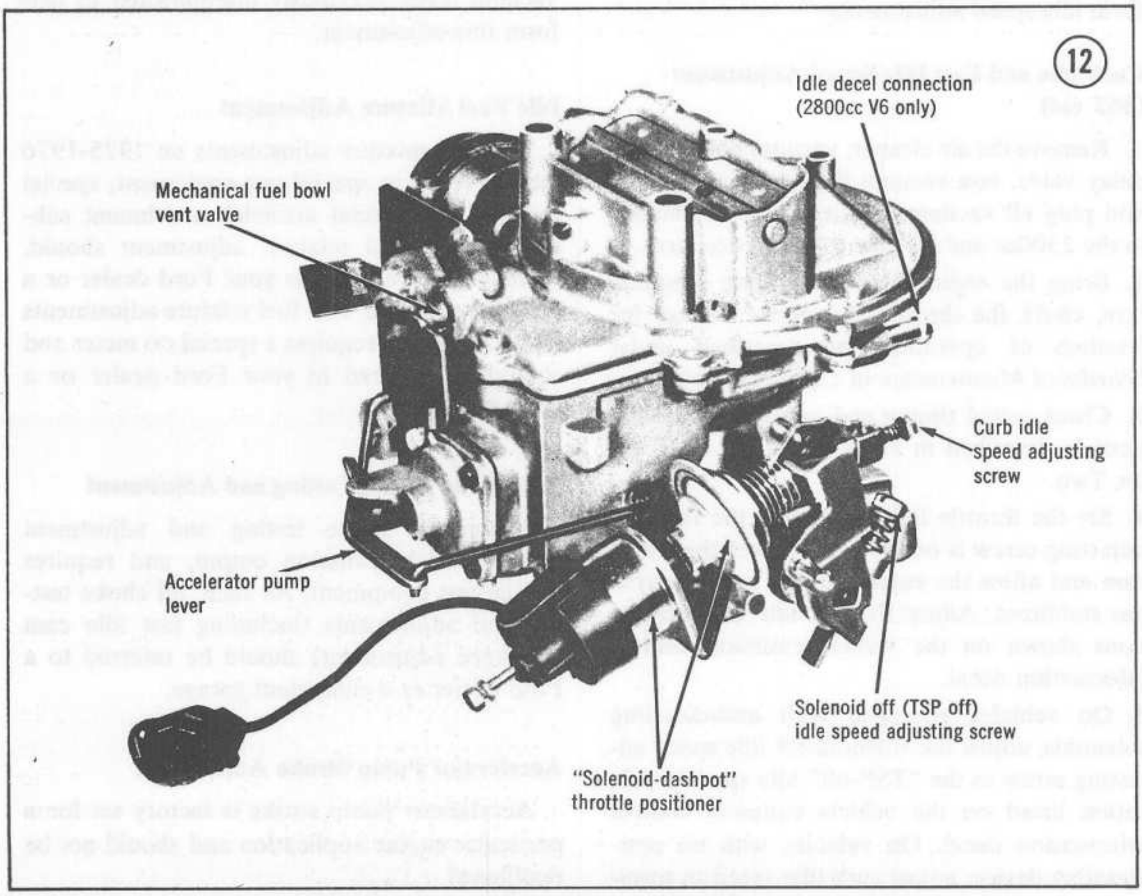
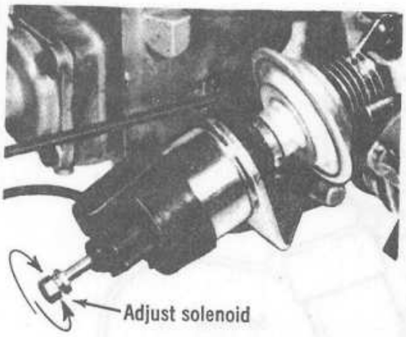

Solenoid
electrical
connection
(TSP)
solenoid "off"
idle speed
adjusting screw
(TSP)
solenoid "on"
(curb) idle speed
adjusting screw

12


Idle decel connection
(2800cc V6 only)
Mechanical fuel bowl
vent valve
Curb idle
speed adjusting
screw
Accelerator pump
lever
Solenoid off (TSP off)
idle speed adjusting screw
"Solenoid-dashpot"
throttle positioner

13



mately 2,000 rpm, hold this speed for approximately 10 seconds, then allow it to return to idle and repeat the solenoid adjustment procedure for proper curb idle speed.

23. Stop engine, reinstall air cleaner, reconnect air cleaner vacuum lines, and recheck curb idle rpm. If not to specification, readjust as necessary. Reinstall all equipment removed to perform idle speed adjustments.

Curb Idle and Fast Idle Speed Adjustment (302 cid)

1. Remove the air cleaner, vacuum hoses, spark delay valve, EGR vacuum line, decel valve hose and plug all vacuum source inputs as detailed in the 2300cc and 2800cc engine procedures.

2. Bring the engine up to operating temperature, check the throttle and choke linkage for freedom of operation (as described under *Scheduled Maintenance* in Chapter Two).

3. Check initial timing and adjust to specifications as described in *Tune-up* section of Chapter Two.

4. Set the throttle linkage so that the fast idle adjusting screw is on the high step of the choke cam and allow the engine to run until the rpm has stabilized. Adjust the fast idle to specifications shown on the vehicle emission control information decal.

5. On vehicles equipped with anti-dieseling solenoids, adjust the solenoid-off idle speed adjusting screw to the "TSP-off" idle sped specification listed on the vehicle emission control information decal. On vehicles with no anti-dieseling device, adjust curb idle speed to specification shown on the vehicle emission control information decal (automatic transmission vehicles should be in DRIVE, manual transmission vehicles must be in NEUTRAL) using the curb idle speed adjusting screw (Figure 12).

6. On vehicles with anti-dieseling solenoids, connect the solenoid electrical lead then set curb idle rpm to the specification shown on the vehicle emission control information decal. Automatic transmissions should be placed in DRIVE while performing this adjustment.

7. With transmission in NEUTRAL, increase engine speed to 2,200 rpm for approximately 5 seconds. Allow engine to return to idle, and check curb idle rpm again. (Transmission in NEUTRAL for manual transmissions, in DRIVE for automatic transmissions.) Adjust curb idle rpm if necessary.

8. Repeat Steps 6 and 7, as required, to obtain proper curb idle speed.

9. Replace all equipment, and reconnect all vacuum hoses previously disconnected to perform this adjustment.

Idle Fuel Mixture Adjustment

Idle fuel mixture adjustments on 1975-1976 models requires special test equipment, special tools, and a special artificial enrichment substance. Idle fuel mixture adjustment should, therefore, be referred to your Ford dealer or a competent garage. Idle fuel mixture adjustments on 1974 models requires a special CO meter and should be referred to your Ford dealer or a competent garage.

Automatic Choke Testing and Adjustment

Automatic choke testing and adjustment affects vehicle emission output, and requires special test equipment. As such, all choke testing and adjustments (including fast idle cam clearance adjustment) should be referred to a Ford dealer or a competent garage.

Accelerator Pump Stroke Adjustment

Accelerator pump stroke is factory set for a particular engine application and should not be readjusted.

Carburetor Removal/Installation

1. Remove the air cleaner and duct assembly as described earlier in this chapter.

2. Disconnect the anti-dieseling solenoid electrical connector (Figure 11 or Figure 12).

3. Disconnect the electrical lead to the electric choke heater (**Figure 14** for Ford Motorcraft Model 5200 carburetors or Figure 9 for Ford Motorcraft Model 2150 carburetors).

4. Disconnect all vacuum lines and emission hoses from the carburetor.

5. On Model 5200 carburetors, remove the hex-head screw and washer attaching the water cover to the choke housing (**Figure 15**). On Model 2150 carburetors, disconnect the choke heat tube from the automatic choke (Figure 9).

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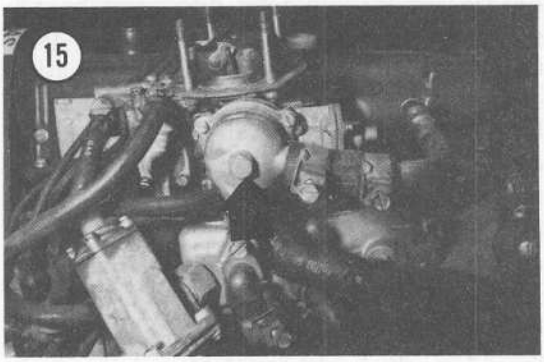

6. Disconnect throttle linkage at carburetor.

7. Remove the 4 nuts attaching the carburetor to the intake manifold, then lift the carburetor from the intake manifold.

8. Installation is the reverse of these steps. Examine the carburetor-to-intake manifold gasket and replace if necessary.

FUEL PUMPS

Non-repairable fuel pumps are used on all engines. If troubleshooting procedures in Chapter Three indicate a defective fuel pump, it must be replaced.

Fuel Pump Replacement

Figure 16 shows the fuel pump used on all engines. The fuel pump on the 2300cc and the 2800cc engines is mounted at the front left side of the block. The fuel pump on the 302 cid engine is mounted on the left side of the front cover.

1. Disconnect both fuel lines from the pump. Place the inlet line (Figure 16) at a level higher than the top of the vehicle fuel tank so the fuel tank won't be siphoned dry.

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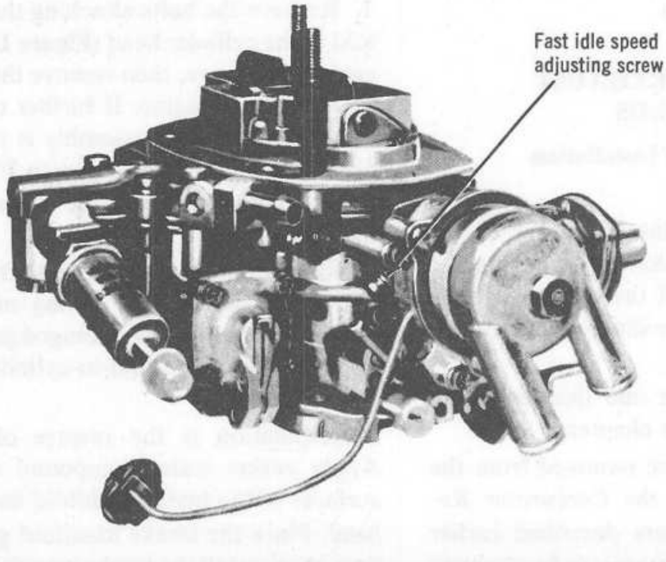

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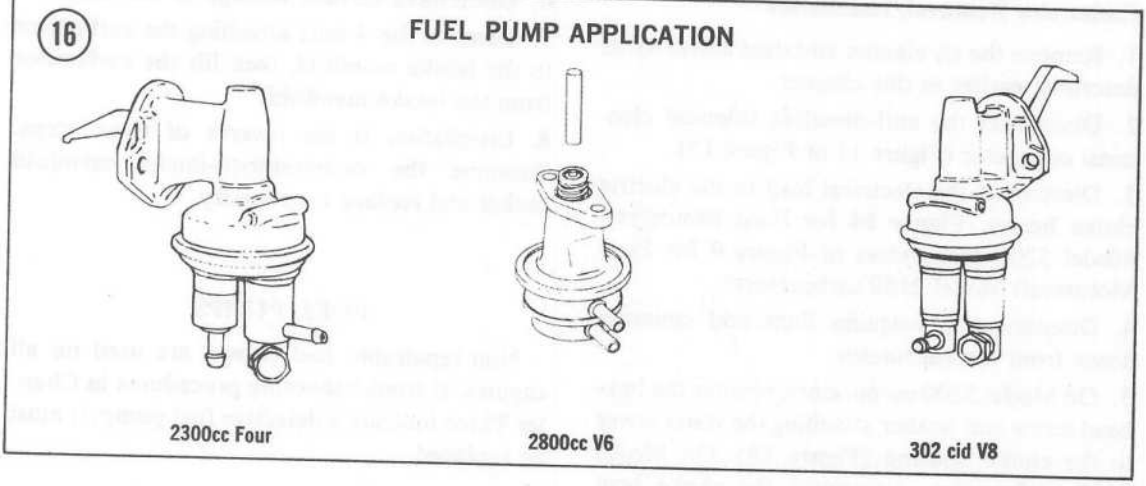


2. Remove the 2 bolts securing the fuel pump to the engine block or front cover, then lift the pump away from the engine.

3. Installation is the reverse of these steps. Remove all gasket material from the fuel pump and mounting pad. Apply oil-resistant gasket sealer to both sides of the new fuel pump gasket, then position the new gasket on the pump flange and install pump and gasket on the mounting pad.

> NOTE: *Make sure the fuel pump rocker arm, or rod, is riding on the camshaft or intermediate shaft eccentric before installing attaching bolts. Tighten attaching bolts to 14-21 ft.-lb. (2300cc), 12-15 ft.-lb. (2800cc), or 19-27 ft.-lb. (302 cid).*

INTAKE AND EXHAUST MANIFOLDS

Intake Manifold Removal/Installation (2300cc)

1. Drain the radiator below the level of the intake manifold. This is done by opening the drain tap at the bottom of the radiator. If the coolant is clean, it should be drained into a clean container and reused.

2. Remove the air cleaner and duct assembly as described earlier in this chapter.

3. If the carburetor is to be removed from the intake manifold, perform the *Carburetor Removal/Installation* procedure described earlier in this chapter. If the carburetor is to be removed with the intake manifold, disconnect the throttle linkage from the carburetor, disconnect the anti-dieseling solenoid electrical connector (Figure 11) and the automatic choke heater electrical connector (Figure 12). Disconnect all vacuum lines, emission hoses and the fuel line from the carburetor. Remove the hex-head bolt and washer attaching the water cover to the automatic choke housing (Figure 15).

4. Disconnect the PCV valve from the hose connecting it to the carburetor spacer.

5. Disconnect all vacuum lines and emission hoses from the intake manifold.

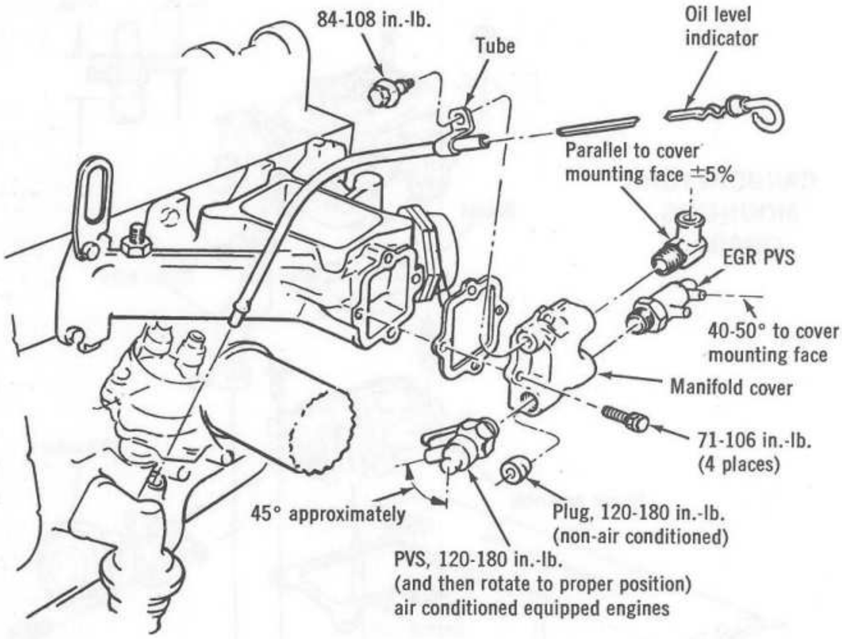
6. Remove the bolt attaching the oil filler tube to the intake manifold (**Figure 17**).

7. Remove the bolts attaching the intake manifold to the cylinder head (**Figure 18**), remove the engine lifting eye, then remove the intake manifold from the engine. If further disassembly of the intake manifold assembly is required to replace individual parts, refer to Figure 17, Figure 18 and **Figure 19** for disassembly information.

8. Remove all gasket material from the manifold and cylinder head mating surfaces. Check manifold for cracks or damaged gasket surfaces. Replace intake manifold-to-cylinder head gasket if necessary.

9. Installation is the reverse of these steps. Apply gasket sealer compound to the mating surfaces of the intake manifold and the cylinder head. Place the intake manifold gasket in position, then install the intake manifold and tighten

17



INTAKE MANIFOLD — 2300cc

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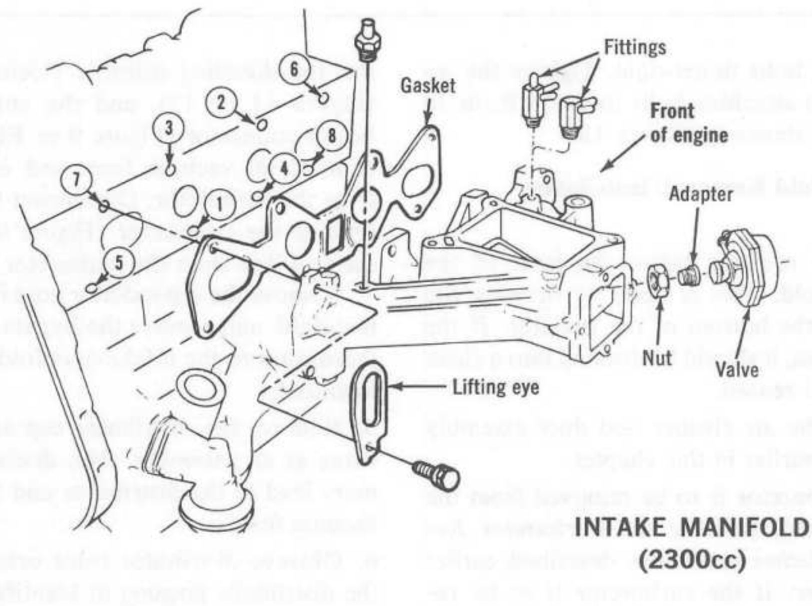

INTAKE MANIFOLD (2300cc)

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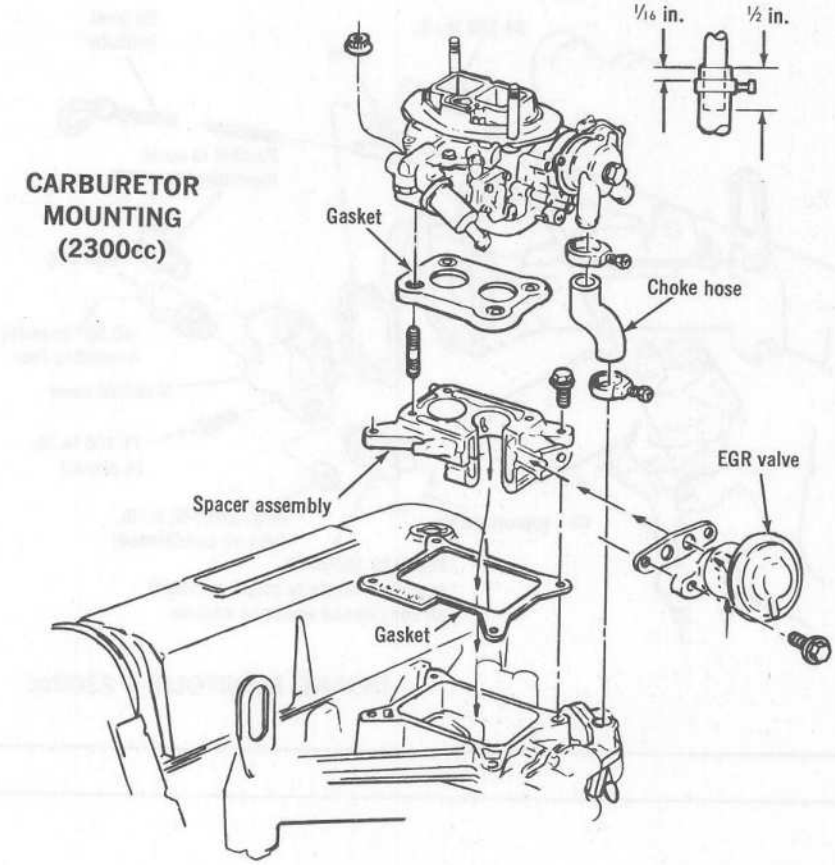

the attaching bolts finger-tight. Tighten the intake manifold attaching bolts to 14-21 ft.-lb. in the sequence shown in Figure 18.

Intake Manifold Removal/Installation (2800cc)

1. Drain the radiator below the level of the intake manifold. This is done by opening the drain tap at the bottom of the radiator. If the coolant is clean, it should be drained into a clean container and reused.

2. Remove the air cleaner and duct assembly as described earlier in this chapter.

3. If the carburetor is to be removed from the intake manifold, perform the *Carburetor Removal/Installation* procedure described earlier in this chapter. If the carburetor is to be removed with the intake manifold, disconnect the throttle linkage from the carburetor. Disconnect the anti-dieseling solenoid electrical connector (Figure 11 or 12), and the automatic choke heater connector (Figure 9 or Figure 14). Disconnect all vacuum lines and emission hoses from the carburetor. Disconnect the choke heat tube at the carburetor (Figure 9). Disconnect the fuel line from the carburetor.

4. Remove the top radiator hose from the intake manifold, and remove the bypass hose from the thermostat to the intake manifold, at the intake manifold.

5. Remove the distributor cap and spark plug wires as an assembly, then disconnect the primary lead to the distributor and the distributor vacuum lines.

6. Observe distributor rotor orientation, mark the distributor housing to identify the direction that the rotor is pointing, then remove the distributor as described in Chapter Seven.

7. Disconnect and mark all vacuum lines and emission hoses obstructing removal of the intake manifold and the rocker arm covers.

8. Remove the rocker arm covers as described under *Rocker Arm Cover Removal* in Chapter Four.

9. Remove intake manifold attaching bolts and nuts (**Figure 20**). Tap manifold lightly with a plastic or rubber hammer to break gasket seal, then lift intake manifold off of the engine.

10. Clean the intake manifold and cylinder head mating surfaces of all old gasket material and sealing compound.

11. Installation is the reverse of these steps. Apply sealing compound to the mating surfaces of the intake manifold and the cylinder heads. Place the intake manifold in position on the cylinder head, making sure that the tab on the right cylinder head fits into the cutout of the manifold gasket. Apply sealing compound to the intake manifold retaining bolt bosses, then install the intake manifold. Tighten the intake manifold retaining bolts in the sequence shown in Figure 20. Tighten intake manifold bolts in 4 steps as follows:

1. 3-6 ft.-lb.
2. 6-11 ft.-lb.
3. 11-16 ft.-lb.
4. 15-18 ft.-lb.

After engine has been operated retighten all bolts/nuts to 15-18 ft.-lb.

Intake Manifold Removal/Installation (302 cid)

1. Drain the radiator below the level of the intake manifold. This can be done by opening the tap at the bottom of the radiator. If the coolant is clean, drain it into a clean container and reuse.

2. Disconnect the automatic choke heat tube (Figure 9) at the inlet near the right rocker arm cover. Disconnect the upper radiator hose at the coolant outlet housing (**Figure 21**), and the water pump bypass hose at the coolant outlet housing.

3. Remove the air cleaner and duct assembly as described earlier in this chapter.

4. Disconnect the automatic transmission and power brake booster vacuum lines at the intake manifold, if the vehicle is so equipped.

5. Disconnect all electrical leads from the ignition coil.

6. Remove the Thermactor bypass valve and air supply hoses.

7. Disconnect the spark plug wires from the spark plugs, remove the wires from the looms on the rocker arm covers, then remove the distributor cap and the spark plug wires as an assembly.

8. Remove the EGR vacuum amplifier at the rear of the manifold.

9. Remove the carburetor as described earlier in this chapter.

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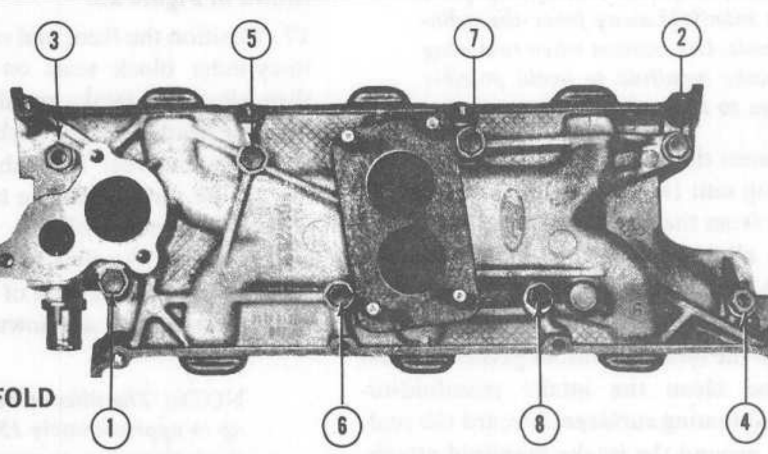

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INTAKE MANIFOLD (2800cc)

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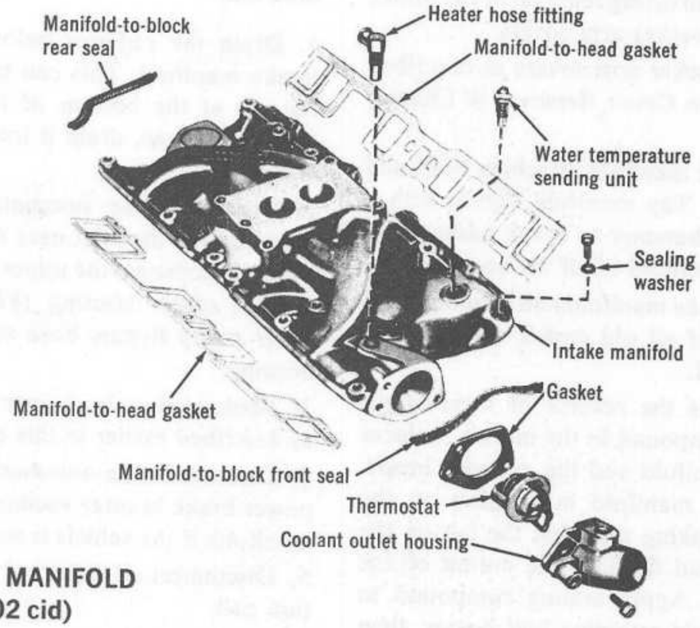


INTAKE MANIFOLD (302 cid)

10. Remove the distributor as described in Chapter Seven.

11. Disconnect the crankcase ventilation hose PCV valve and oil filler cap at the left rocker arm cover.

12. If vehicle is equipped with air conditioning, remove the air conditioning compressor-to-intake manifold brackets.

13. Remove the intake manifold from engine.

> NOTE: *It may be necessary to pry the intake manifold away from the cylinder heads. Use caution when removing the intake manifold to avoid possible damage to the gasket sealing surfaces.*

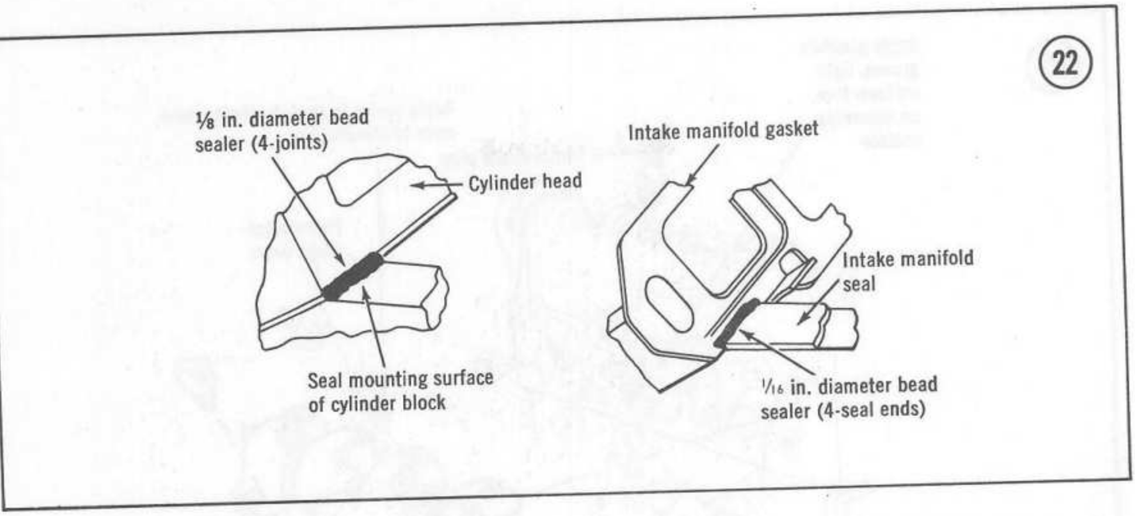
14. Disconnect the lead from the water temperature sending unit (Figure 21) then remove the heater hose from the intake manifold and check to see that all hoses, vacuum lines, electrical connections, and emission control system lines are disconnected from the intake manifold.

15. Remove the intake manifold gasket and seal material and clean the intake manifold-to-cylinder head mating surfaces. Discard the sealing washers around the intake manifold attaching bolts.

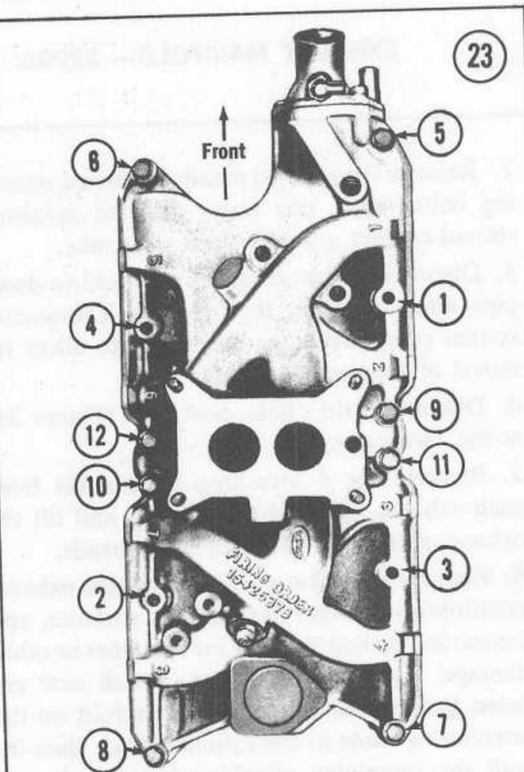
16. Installation is the reverse of these steps. Ensure that the intake manifold-to-cylinder head mating surfaces are clean of all gasket material. Ensure that the cylinder block surfaces are clean in the area where the front and rear intake manifold-to-cylinder block seals were removed. Cleaning the mating surfaces is accomplished using a solvent such as lacquer thinner or trichlorethylene. Apply a ⅛ in. bead of silicone rubber sealer to the mating surface points shown in **Figure 22**.

17. Position the front and rear intake manifold-to-cylinder block seals on the cylinder block then place the intake manifold gaskets on the cylinder heads with the gaskets interlocked with the front and rear seal tabs as shown in Figure 22. Be sure the intake manifold gaskets are properly aligned with the intake ports in the cylinder heads. Apply a 1/16 in. bead of silicone rubber sealer to each end of the intake manifold front and rear seal as shown in Figure 22.

> NOTE: *The silicone rubber sealer sets up in approximately 15 minutes, making it important to complete the manifold installation quickly.*



18. Install the intake manifold using new sealing washers around the intake manifold attaching bolts, then tighten the intake manifold bolts to 23-25 ft.-lb. in the sequence shown in **Figure 23**.

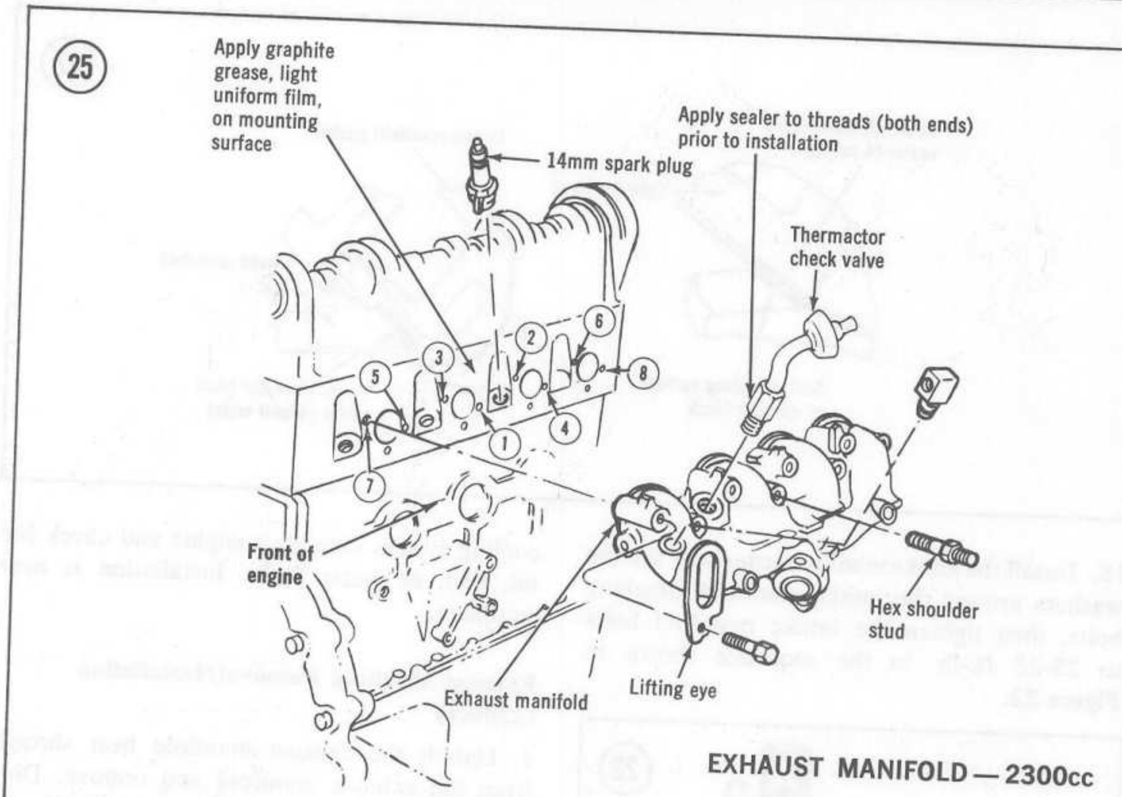


19. Reinstall all equipment previously removed. Reconnect all hoses, lines, wires, and emission control devices previously removed. Fill the cooling system then start engine and check for oil, fuel, or water leaks. Installation is now complete.

Exhaust Manifold Removal/Installation (2300cc)

1. Unbolt the exhaust manifold heat shroud from the exhaust manifold and remove. Disconnect the heat riser tube from the air cleaner duct assembly.
2. Disconnect the down pipe from the exhaust manifold (**Figure 24**).

3. Disconnect the Thermactor check valve (**Figure 25**) at the exhaust manifold, then disconnect any remaining lines, ground straps, etc., connected to the exhaust manifold.
4. Remove the 8 manifold attaching bolts/studs, then remove the engine lifting eye (Figure 25). Lift the exhaust manifold off the engine.



EXHAUST MANIFOLD — 2300cc

5. Clean all gasket material from the exhaust manifold-to-cylinder head mating surfaces, and from the exhaust manifold-to-down pipe mating surfaces. Inspect the manifold for cracks or damage to the mating surfaces and replace if necessary.

6. Installation is the reverse of these steps. Lightly coat the exhaust manifold-to-cylinder head mating surfaces with graphite grease. Install a new gasket between the exhaust manifold and the down pipe. Install the exhaust manifold then tighten the exhaust manifold-to-cylinder head attaching bolts to 8 ft.-lb. In a second step, tighten all manifold attaching bolts to 16-23 ft.-lb. Tighten the exhaust manifold attaching bolts in the sequence shown in Figure 25. Tighten the exhaust manifold-to-down pipe attaching nuts to 17-25 ft.-lb.

Exhaust Manifold Removal/Installation (2800cc)

1. Remove the air cleaner and duct assembly as described earlier in this chapter.

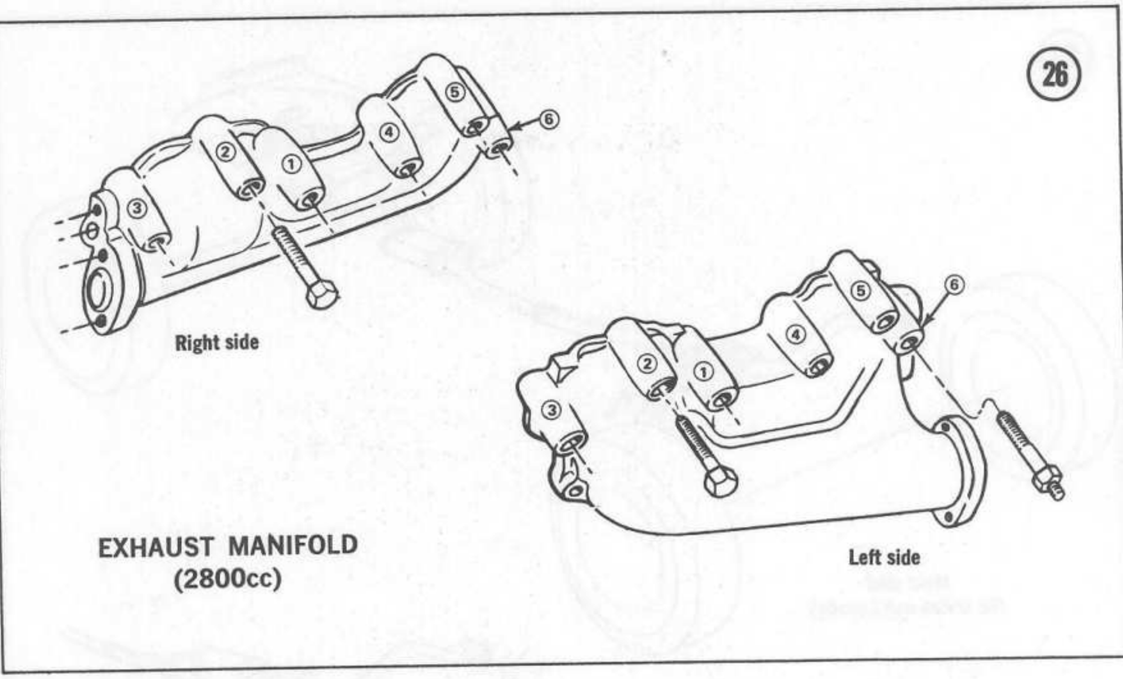
2. Remove the exhaust manifold shroud attaching bolts (right side only) and the manifold shroud-to-duct assembly heat riser tube.

3. Disconnect the exhaust manifold-to-down pipe attaching nuts, then remove Thermactor system components, as necessary, to allow removal of exhaust manifolds.

4. Disconnect the choke heat tube (Figure 34) at the carburetor.

5. Remove the 6 attaching bolts/studs from each exhaust manifold (**Figure 26**) and lift the exhaust manifolds off the cylinder heads.

6. Remove all gasket material from the exhaust manifold-to-cylinder head mating surfaces, and inspect the mating surfaces for scratches or other damage. Repair as necessary. Install new exhaust gaskets and the exhaust manifold on the positioning studs in the cylinder head, then install the remaining attaching bolts/studs and tighten in the sequence shown in Figure 26 to 16-23 ft.-lb. Install a new exhaust manifold-to-down pipe gasket, and tighten the attaching nuts to 17-25 ft.-lb.



7. Install the exhaust manifold shroud, the heat rising tube, the Thermactor system components removed previously, and the air cleaner duct assembly.

Exhaust Manifold Removal/Installation (302 cid)

1. Remove the air cleaner duct assembly.

2. Disconnect the automatic choke heat chamber air inlet hose from the inlet tube near the right rocker arm cover.

3. Remove the heat stove/exhaust manifold shroud and the heat riser tube to the air cleaner duct assembly.

4. Disconnect the nuts attaching the exhaust manifold to the down pipe, then disconnect the spark plug wires and remove the spark plugs.

5. Remove the exhaust manifold heat shields, then remove the exhaust manifold-to-cylinder head attaching bolts and washers, and lift the exhaust manifold from the engine.

6. Clean the exhaust manifold-to-cylinder head, and down pipe mating surfaces of all gasket material and check for cracks or other damage. Replace exhaust manifold if necessary.

7. Install new gaskets then accomplish manifold installation by reversing the above steps.

EXHAUST SYSTEM

Different factory installed exhaust systems are used on the 2300cc, 2800cc and 302 cid engines. In addition, service replacement exhaust systems may be installed on your vehicle. As such, you should inspect the exhaust system on your vehicle, compare the installed system to the 3 factory-installed systems shown in **Figures 27, 28 and 29**, then use the following removal/installation procedures as a guide in performing exhaust system services.

Resonator Inlet Pipe (Down Pipe) Removal/Installation

1. Raise the vehicle to provide working space, then support the vehicle with jackstands.

2. Remove the screws that attach the inlet pipe front hanger insulator to the inlet pipe bracket (2300cc only).

3. On 2800cc engines without catalytic converter, remove the U-bolt clamp between the inlet pipe and the resonator pipe slip joint connection. With catalytic converter, remove the front flange attaching nuts at the catalytic converter.

4. Loosen the attaching screws at the muffler rear hanger support (2800cc only).

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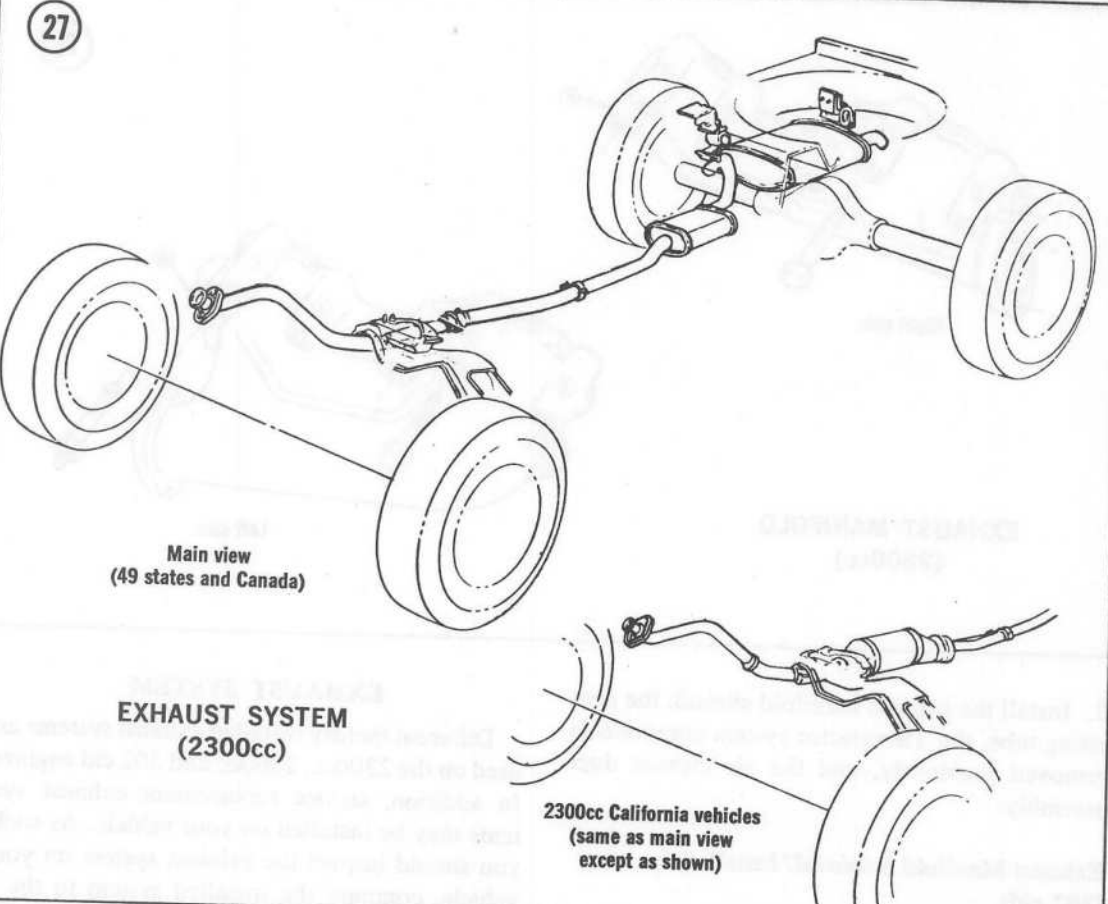

EXHAUST SYSTEM
(2300cc)

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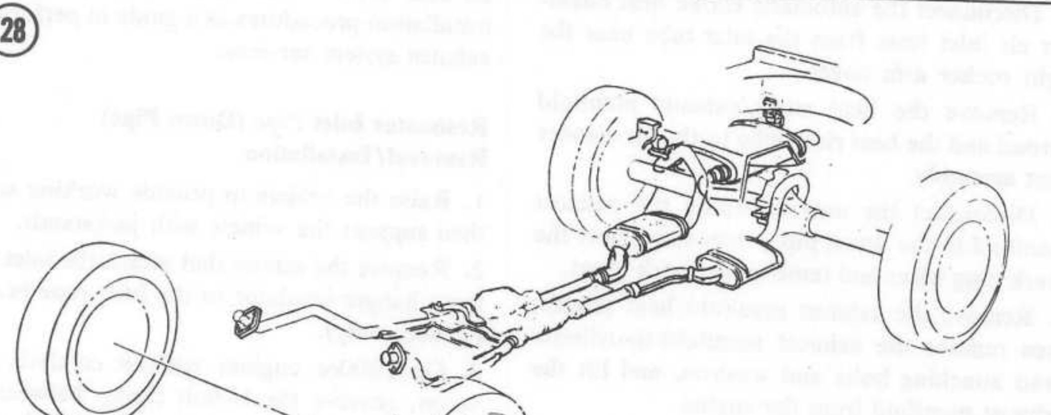

EXHAUST SYSTEM
(2800cc)

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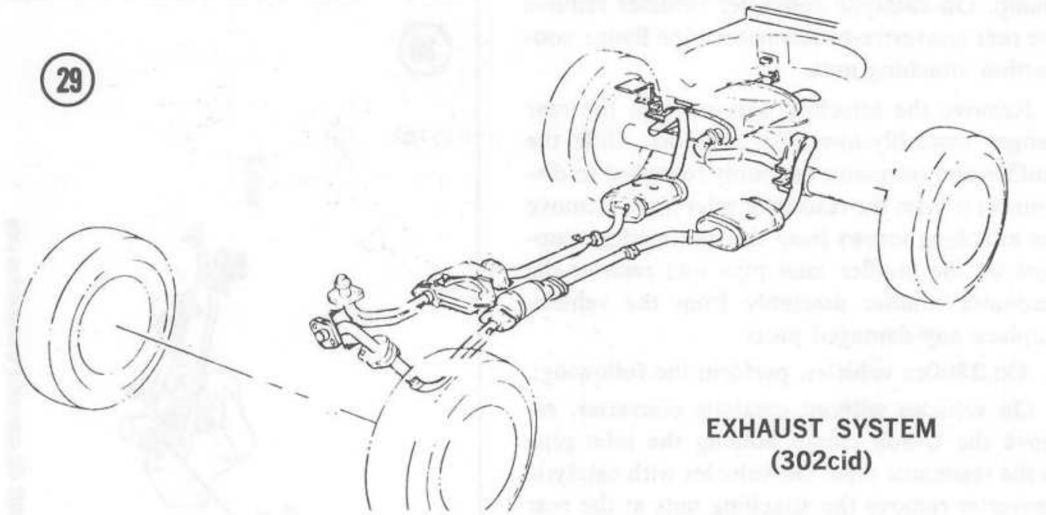

EXHAUST SYSTEM (302cid)

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5. Support the resonator/muffler assembly with a soft wire.

6. Remove the inlet pipe to resonator slip joint clamp (2300cc without catalytic converter).

7. On 2300cc engines without catalytic converter, remove the attaching nuts securing the inlet pipe to the exhaust manifold and remove the inlet pipe. Replace any damaged parts.

8. On 2300cc vehicles with catalytic converter, remove the attaching nuts at the cone type flange connection located at the rear of the catalytic converter. Remove the nuts attaching the inlet pipe flange to the exhaust manifold and remove the inlet pipe. Replace any damaged parts.

> NOTE: *The inlet pipe and catalytic converter are one assembly and must be removed as a unit.*

9. On 2800cc vehicles remove the attaching screws holding the inlet pipe support hanger to the inlet pipe. Slide the resonator/muffler assembly rearward to disengage the inlet pipe slip joint connection or the front flange connection at the catalytic converter. Remove the inlet pipe-to-exhaust manifold attaching nuts and remove the inlet pipe. Replace any damaged parts.

10. On 302 cid vehicles without catalytic converters, remove the clamp securing the H-pipe to the resonator pipes, then separate the slip joint connections. On 302 cid vehicles with catalytic converters, remove the screws securing the exhaust shields to the inlet pipes and remove the exhaust shields, remove the screws securing the inlet H-pipe to the front support bracket, then loosen the rear catalytic converter flange attaching nuts and remove the front catalytic converter flange attaching nuts at the inlet H-pipes.

Remove the H-pipe attaching the nuts at the right-hand exhaust manifold, and the left-hand exhaust manifold extension pipe. Remove the H-pipe and left-hand heat valve. Remove the left-hand manifold extension pipe-to-exhaust manifold attaching nuts, then remove the extension pipe. Replace any damaged parts.

11. Installation is the reverse of these steps. Clean all gasket material from mating surfaces and install new gaskets. Consult Figures 27, 28 and 29 when installing new components.

Muffler and Resonator Assembly Removal/Installation

1. Raise the vehicle by means of the frame lift points to allow the axle full downward travel. This provides adequate clearance to remove and replace the muffler, resonator, and pipe.

2. Support resonator inlet pipe with soft wire.

3. On 2300cc engines perform the following:

On non-catalytic converter vehicles, loosen and remove the inlet pipe-to-resonator pipe clamp. On catalytic converter vehicles remove the rear converter-to-resonator pipe flange connection attaching nuts.

Remove the attaching screws from the rear hanger assembly-to-muffler support. Slide the muffler and resonator assembly rearward to disconnect it from the resonator inlet pipe. Remove the attaching screws from the intermediate support on the muffler inlet pipe and remove the resonator/muffler assembly from the vehicle. Replace any damaged parts.

4. On 2800cc vehicles, perform the following:

On vehicles without catalytic converter, remove the U-bolt clamp holding the inlet pipe to the resonator pipe. On vehicles with catalytic converter remove the attaching nuts at the rear flange connection of the catalytic converter.

Remove the attaching screws securing the muffler to the rear support hanger. Slide the resonator/muffler assembly rearward until the resonator pipe is separated from the inlet pipe. Remove the screws attaching the intermediate support bracket to the resonator, then remove the resonator/muffler assembly. Replace any damaged parts.

5. On 302 cid engines perform the following:

On vehicles without catalytic converters, loosen and remove the inlet pipe-to-resonator pipe clamp. On vehicles with catalytic converters, remove the screws attaching the exhaust shields to the inlet pipes, and remove the exhaust shields, then remove the converter-to-resonator connection flange attaching nuts.

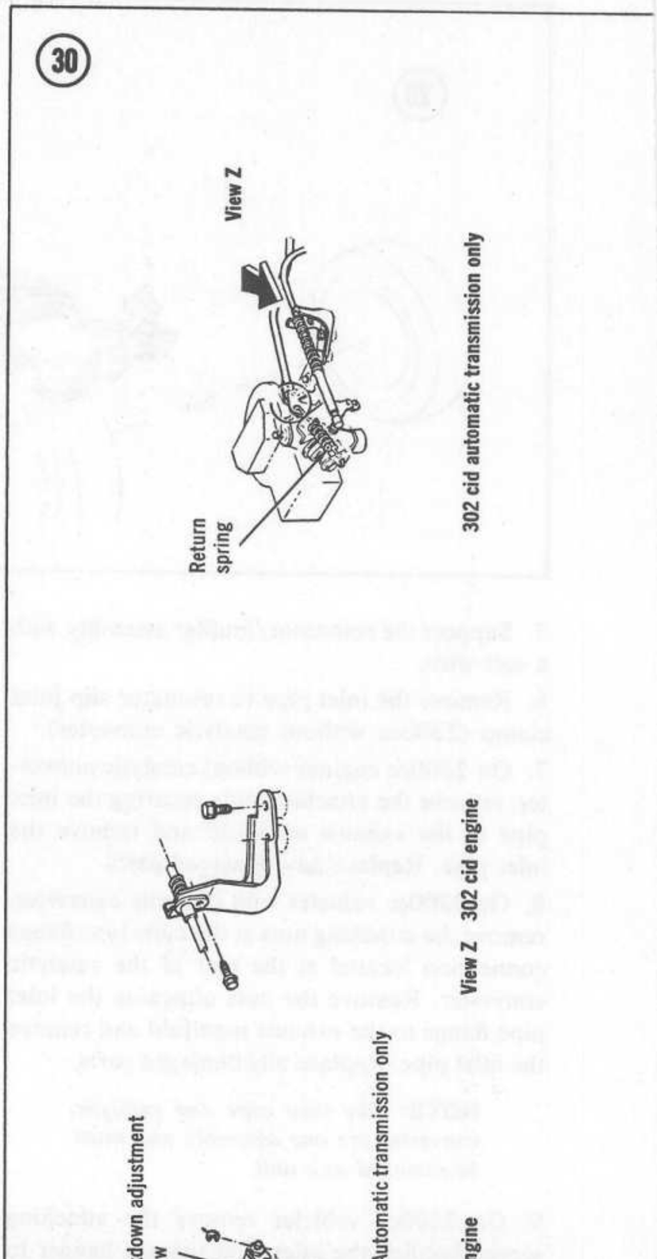
Remove the screws attaching the muffler to the rear support bracket. Loosen the left resonator assembly clamp, and remove the resonator pipe from the muffler. Remove the screws attaching the resonator outlet pipe to the intermediate support bracket. Remove the resonator/muffler assembly. Replace any damaged parts.

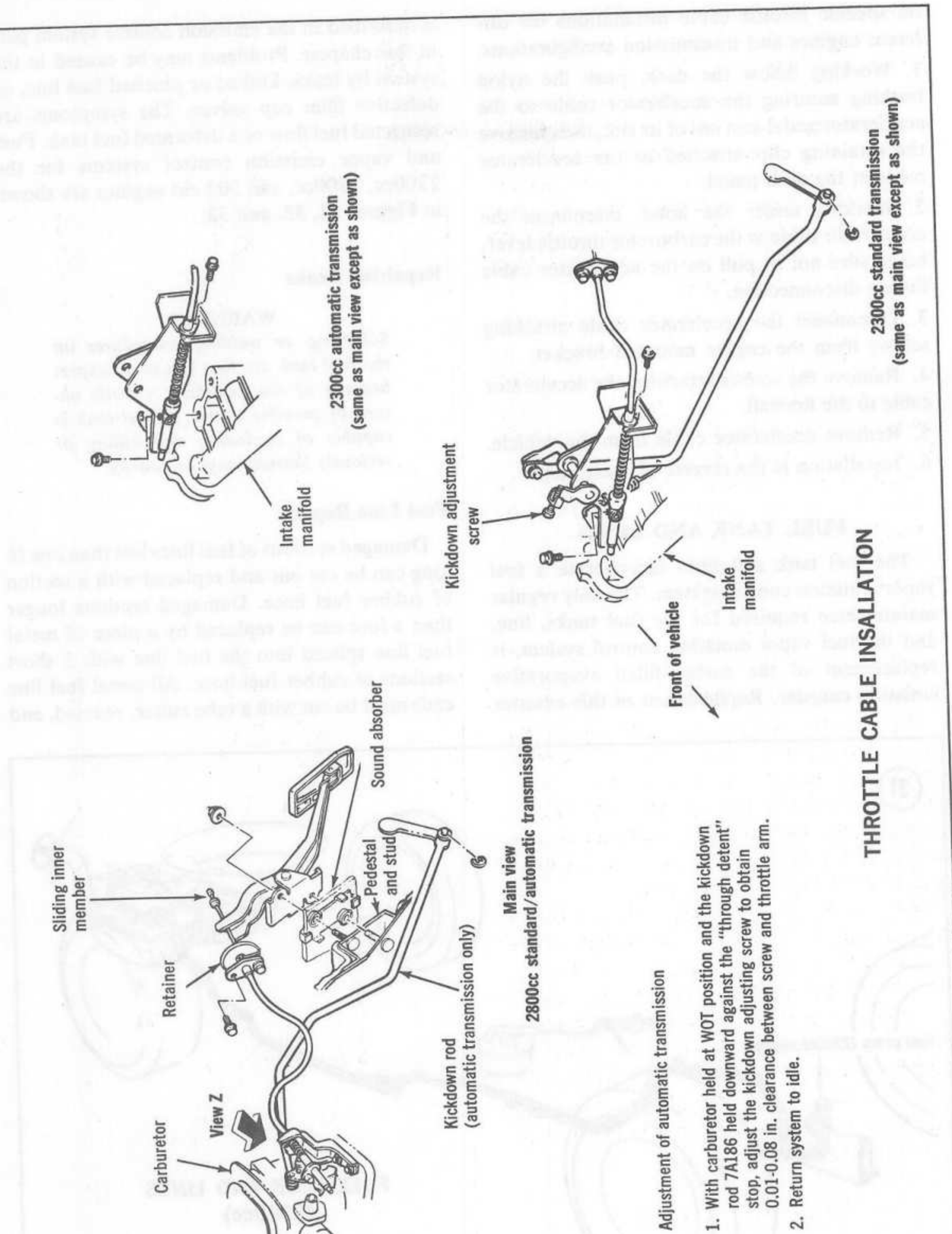
6. Clean all mating surfaces of gasket material, install new gaskets, then reverse the above steps to perform installation.

THROTTLE CABLE

Removal/Installation

The following removal/installation procedure covers all vehicles. Refer to **Figure 30** for details





THROTTLE CABLE INSALLATION

on specific throttle cable installations for different engines and transmission configurations.

1. Working below the dash, push the nylon bushing securing the accelerator cable to the accelerator pedal arm out of its slot, then remove the retaining clip attached to the accelerator cable at the dash panel.

2. Working under the hood, disconnect the accelerator cable at the carburetor throttle lever, being sure not to pull on the accelerator cable during disconnection.

3. Disconnect the accelerator cable attaching screws from the engine mounted bracket.

4. Remove the screws attaching the accelerator cable to the firewall.

5. Remove accelerator cable from the vehicle.

6. Installation is the reverse of these steps.

FUEL TANK AND LINES

The fuel tank and lines incorporate a fuel vapor emission control system. The only regular maintenance required for the fuel tanks, line, and the fuel vapor emission control system, is replacement of the carbon-filled evaporative emission canister. Replacement of this canister is described in the emission control system part in this chapter. Problems may be caused in the system by leaks, kinked or pinched fuel line, or defective filler cap valves. The symptoms are restricted fuel flow or a deformed fuel tank. Fuel and vapor emission control systems for the 2300cc, 2800cc, and 302 cid engines are shown in **Figures 31, 32, and 33**.

Repairing Leaks

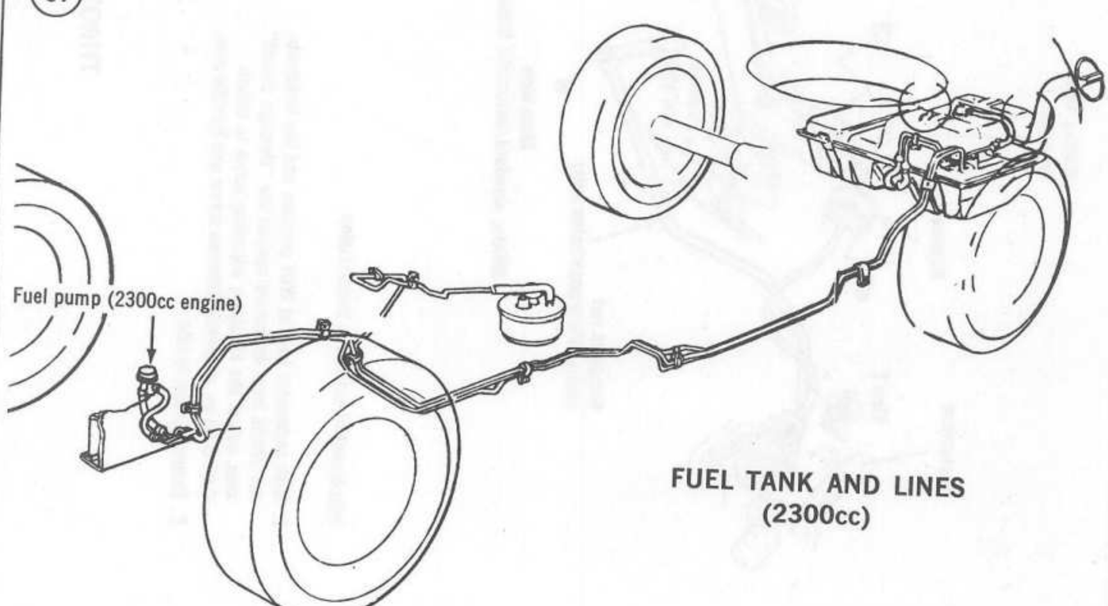
WARNING

Soldering or welding procedures on the fuel tank are best left to an expert because of the extremely volatile nature of gasoline fumes. A fuel tank is capable of exploding and killing or seriously burning anyone nearby.

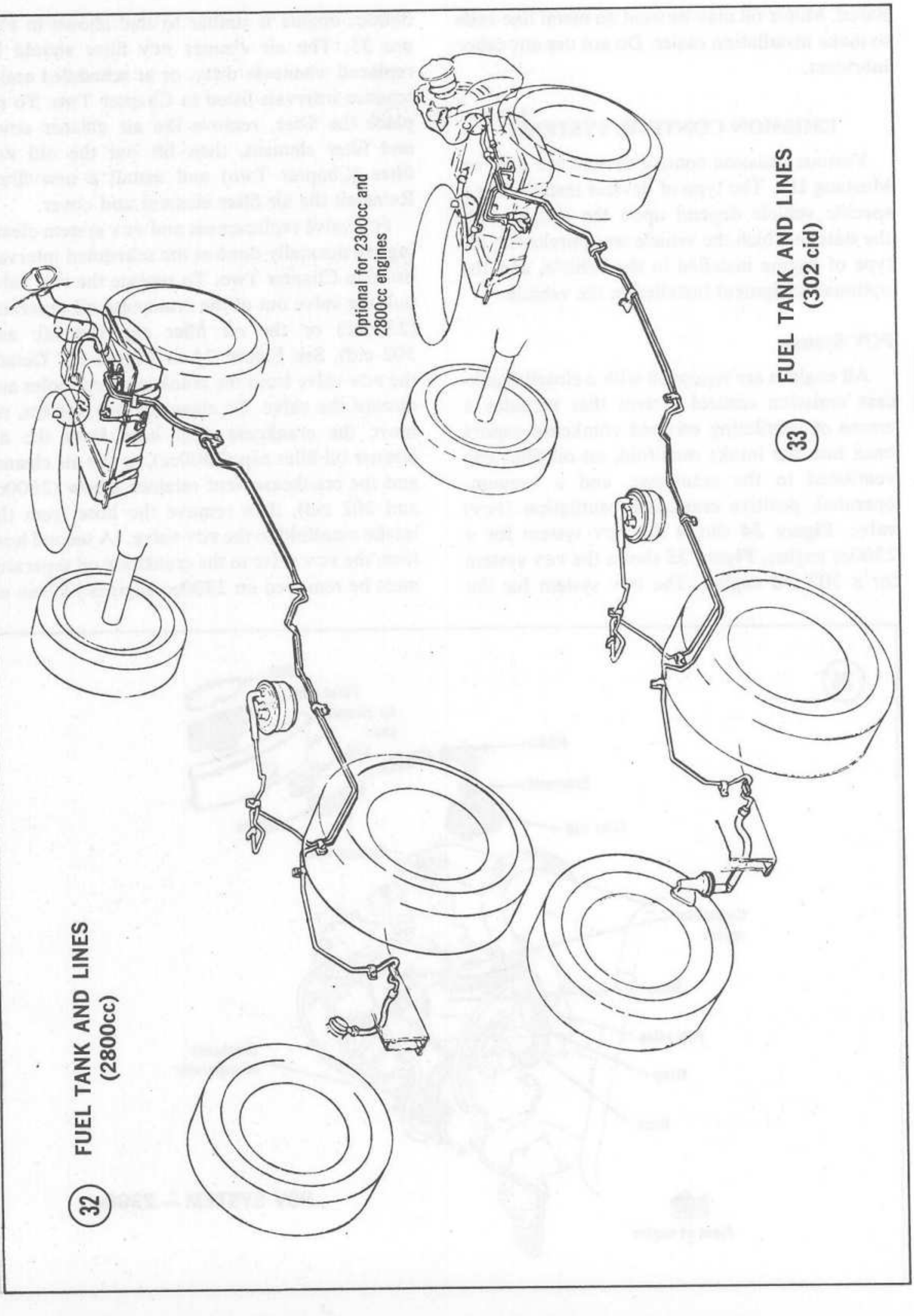
Fuel Line Repairs

Damaged sections of fuel lines less than one ft. long can be cut out and replaced with a section of rubber fuel hose. Damaged sections longer than a foot can be replaced by a piece of metal fuel line spliced into the fuel line with 2 short sections of rubber fuel hose. All metal fuel line ends must be cut with a tube cutter, reamed, and

31



FUEL TANK AND LINES
(2300cc)



32 FUEL TANK AND LINES (2800cc)

33 FUEL TANK AND LINES (302 cid)

flared. Motor oil may be used on metal line ends to make installation easier. Do not use any other lubricant.

EMISSION CONTROL SYSTEMS

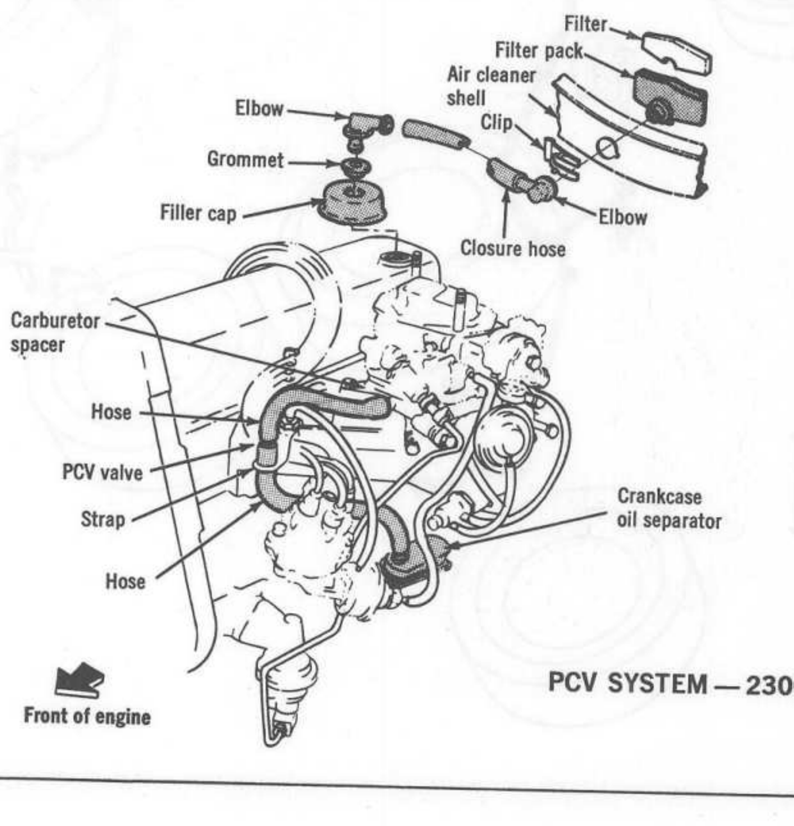
Various emission control devices are used on Mustang II's. The type of devices installed on a specific vehicle depend upon the model year, the state in which the vehicle was purchased, the type of engine installed in the vehicle, and the optional equipment installed in the vehicle.

PCV System

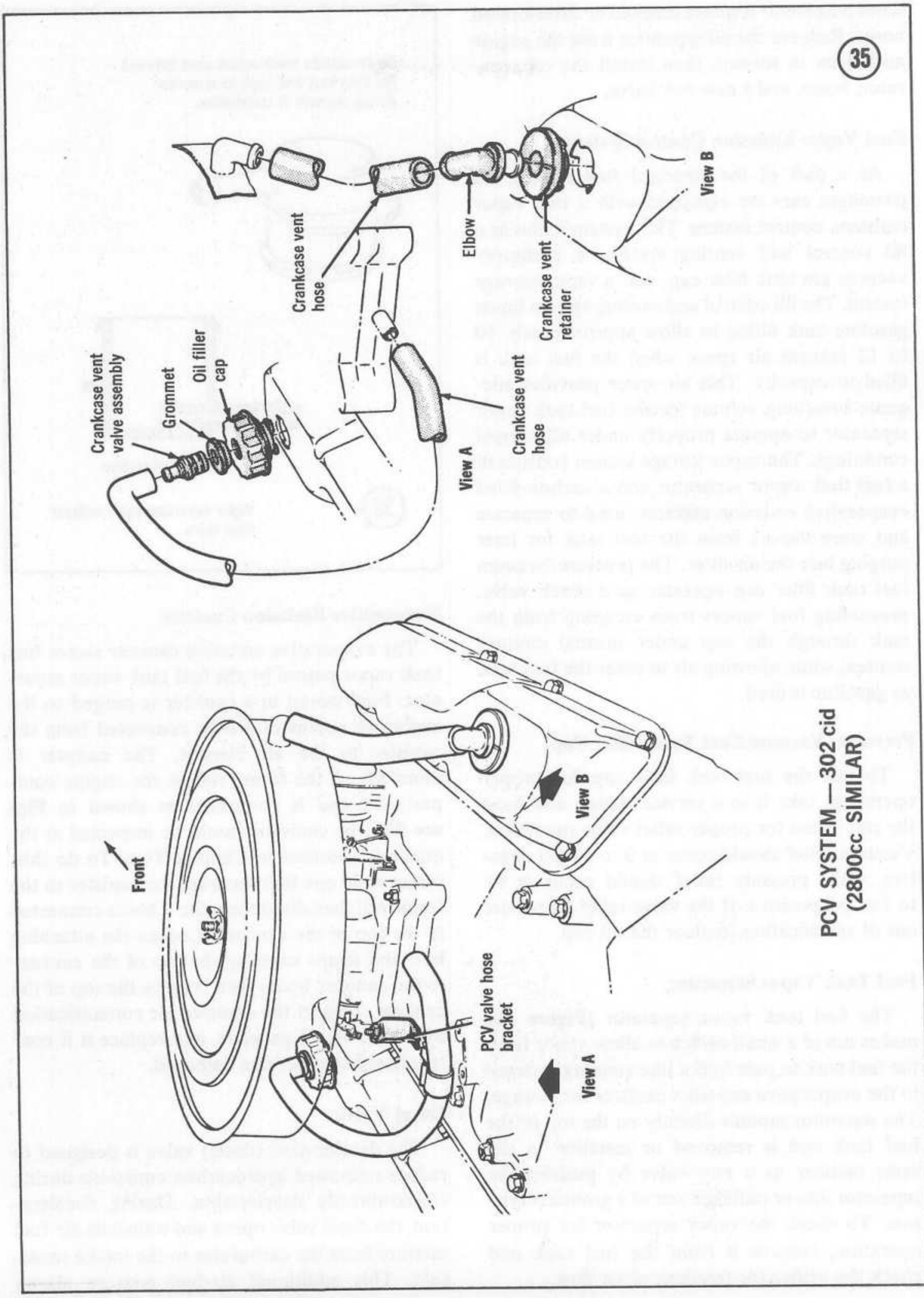
All engines are equipped with a closed crankcase emission control system that includes a means of ventilating escaped crankcase vapors back into the intake manifold, an oil filler cap ventilated to the crankcase, and a vacuum-operated, positive crankcase ventilation (PCV) valve. **Figure 34** shows the PCV system for a 2300cc engine. **Figure 35** shows the PCV system for a 302 cid engine. The PCV system for the 2800cc engine is similar to that shown in Figure 35. The air cleaner PCV filter should be replaced whenever dirty, or at scheduled maintenance intervals listed in Chapter Two. To replace the filter, remove the air cleaner cover and filter element, then lift out the old PCV filter (Chapter Two) and install a new filter. Reinstall the air filter element and cover.

PCV valve replacement and PCV system cleaning are normally done at the scheduled intervals listed in Chapter Two. To replace the PCV valve pull the valve out of the crankcase oil separator (2300cc) or the oil filler cap (2800cc and 302 cid). See Figure 34 or Figure 35. Detach the PCV valve from the crankcase vent holes and discard the valve. To clean the PCV system, remove the crankcase vent hose from the air cleaner oil filler cap (2300cc), or the air cleaner and the crankcase vent retainer elbow (2800cc and 302 cid), then remove the hose from the intake manifold to the PCV valve. (A second hose from the PCV valve to the crankcase oil separator must be removed on 2300cc engines.) Clean all

34



PCV SYSTEM — 2300cc



PCV SYSTEM — 302 cid (2800cc SIMILAR)

hoses in solvent. Replace cracked or deteriorated hoses. Remove the oil separator from the engine and clean in solvent, then install the oil separator, hoses, and a new PCV valve.

Fuel Vapor Emission Control System

As a part of the standard fuel system, all passenger cars are equipped with a fuel vapor emission control system. This system includes a fill control and venting system, a pressure/vacuum gas tank filler cap, and a vapor storage system. The fill control and venting system limits gasoline tank filling to allow approximately 10 to 12 percent air space when the fuel tank is filled to capacity. This air space provides adequate breathing volume for the fuel tank vapor separator to operate properly under all normal conditions. The vapor storage system consists of a fuel tank vapor separator and a carbon-filled evaporative emission canister, used to separate and store vapors from the fuel tank for later purging into the air filter. The pressure/vacuum fuel tank filler cap operates as a check valve, preventing fuel vapors from escaping from the tank through the cap under normal circumstances, while allowing air to enter the fuel tank as gasoline is used.

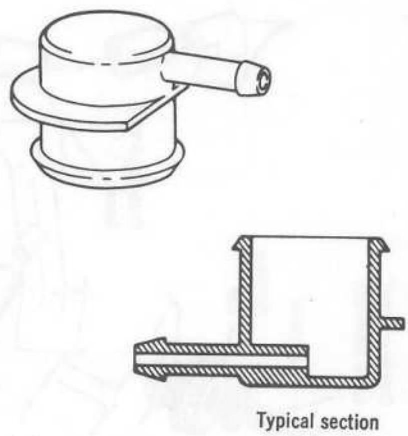
Pressure/Vacuum Fuel Tank Filler Cap

To test the fuel tank filler cap for proper operation, take it to a service station and have the cap tested for proper relief valve operation. Vacuum relief should occur at 0 to ¼ psi negative, while pressure relief should occur at ¾ to 1¼ psi positive. If the valve relief points are out of specification, replace the fill cap.

Fuel Tank Vapor Separator

The fuel tank vapor separator (**Figure 36**) makes use of a small orifice to allow vapor from the fuel tank to pass into a line running forward to the evaporative emission canister for storage. The separator mounts directly on the top of the fuel tank and is removed or installed in the same manner as a PCV valve by pushing the separator into or pulling it out of a grommet type seal. To check the vapor separator for proper operation, remove it from the fuel tank and check the orifice for freedom of air flow.

Sharp objects must not be used between the tank seal and push-in separator during removal or installation.



36

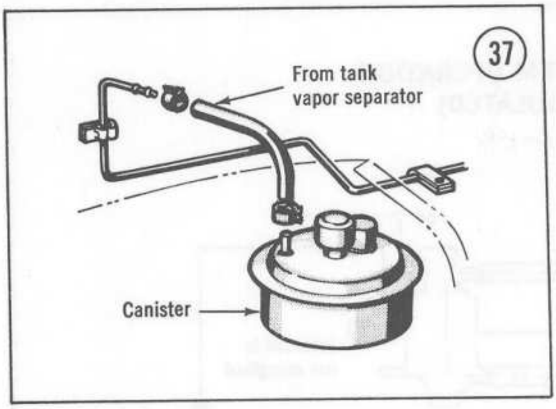
Vapor separator valve without float valve

Evaporative Emission Canister

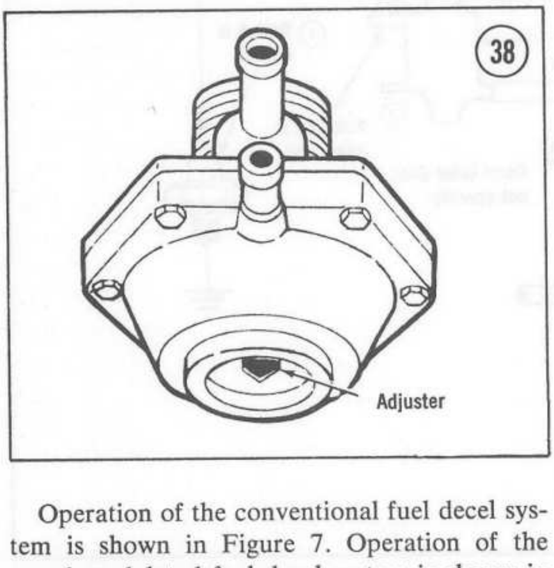
The evaporative emission canister stores fuel tank vapor passed by the fuel tank vapor separator. Fuel stored in a canister is purged to the engine by means of a hose connected from the canister to the air cleaner. The canister is mounted on the frame rail in the engine compartment and is connected as shown in **Figure 37**. The canister should be inspected at the intervals specified in Chapter Two. To do this, remove the one bolt securing the canister to the frame rail then disconnect the 2 hoses connected to the top of the canister. Loosen the attaching bolt and straps securing the top of the canister to the canister body, then remove the top of the canister. Inspect the canister for contamination by water, oil, or gasoline, and replace it if contaminated or otherwise damaged.

Decel Valve

The deceleration (decel) valve is designed to reduce unburned hydrocarbon emissions during closed-throttle deceleration. During deceleration, the decel valve opens and transmits air-fuel mixture from the carburetor to the intake manifold. This additional air-fuel mixture allows



combustion to continue during deceleration, minimizing burned hydrocarbons in the exhaust. Both the 2300cc and the 302 cid engines utilize the standard 2-port decel valve shown in **Figure 38**. The 2800cc engine uses a speed-modulated fuel decel system, which ties decel valve operation into vehicle speed. In this system, the decel valve is prevented from operating when the vehicle is in a deceleration mode below 11 mph, and is allowed to operate when the vehicle is decelerating from speed above 11 mph.



Operation of the conventional fuel decel system is shown in Figure 7. Operation of the speed-modulated fuel decel system is shown in **Figure 39**.

Conventional Decel Valve Adjustment

1. Connect a vacuum gauge in the decel valve-to-carburetor hose (Figure 7), using a T-fitting.
2. Connect a tachometer to the engine.
3. Start engine and raise engine speed to 3,000 rpm. Hold engine speed there for 5 seconds.
4. Release the throttle suddenly. Note the time required for the vacuum gauge to drop to 0 psi. The time should be 3-4½ seconds for 2300cc engines, and 2 seconds minimum on 2800cc and 302 cid engines.
5. If delay is out of specification, adjust the decel valve for proper delay. See Figure 38.

Decel Valve Removal/Installation

To remove the decel valve, disconnect the hoses connecting the decel valve to the carburetor and intake manifold (Figure 7), then unscrew the decel valve from the intake manifold. Installation is the reverse of this procedure.

Speed-Modulated Fuel Decel System Adjustment

Adjustment of the decel valve in the speed-modulated fuel decel system is identical to the adjustment in the conventional system. However, operation of the transmission interlock switch and the control solenoid should be checked prior to attempting adjustment of the decel valve. To check proper operation of the transmission interlock switch, connect a voltmeter from the negative battery terminal to the connector on the top of the interlock switch. With the transmission in high gear (manual transmission) or reverse gear (automatic transmission) the voltmeter should indicate less than ½ volt. With the transmission in first gear (manual transmission) or low gear (automatic transmission), the voltmeter should indicate 9 volts or greater. If the voltmeter indication is incorrect, the transmission interlock switch is faulty and should be replaced. To check operation of the control solenoid, shift the transmission to neutral and note that the vacuum gauge shows no vacuum reading. With the clutch disengaged and the transmission in high gear (manual transmission), or with the brake firmly engaged and the transmission in reverse gear (automatic transmission) the vacuum gauge reading should move upscale. If the vacuum gauge reading does not move upscale, the control solenoid should be replaced.

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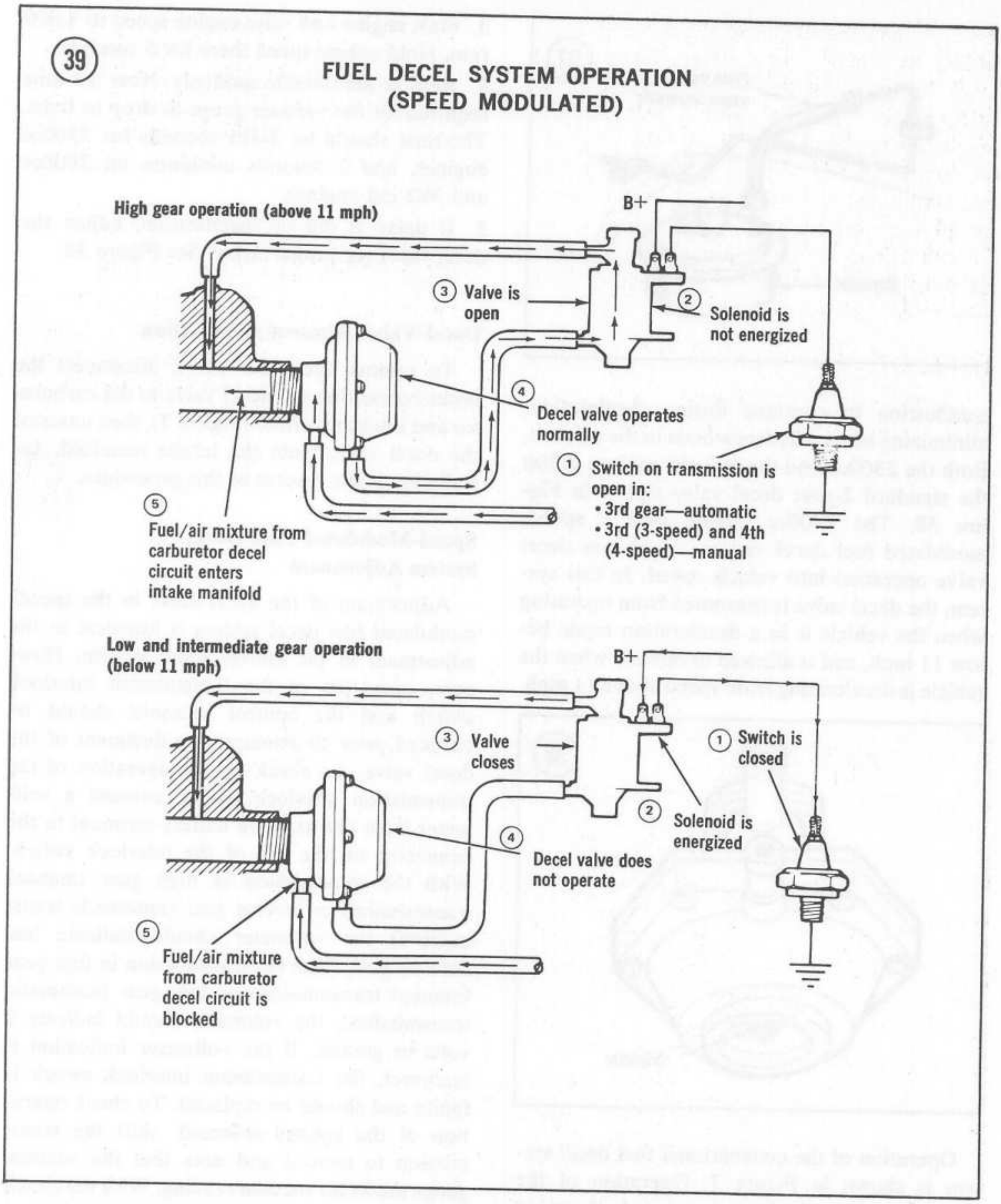


Decel Valve (Speed-Modulated) Removal/Installation

Removal and installation procedures for the decel valve in the speed-modulated fuel decel system are the same as those for the conventional decel system.

EGR System and Delay Valve

The exhaust gas recirculation (EGR) system is designed to reintroduce small amounts of exhaust gas into the combustion cycle, thereby reducing the generation of nitrous oxide (NOX). The amount of exhaust gas reintroduced into the cycle and the timing of the cycle are controlled by engine vacuum, temperature, and other factors. The delay valve (spark delay valve) delays vacuum advance signals from the carburetor to the distributor, thereby retarding distributor advance during acceleration. The EGR system requires special tools and facilities for proper servicing. It is therefore recommended that inspection, adjustment, and overall maintenance of the EGR system be referred to a Ford dealer or competent garage.

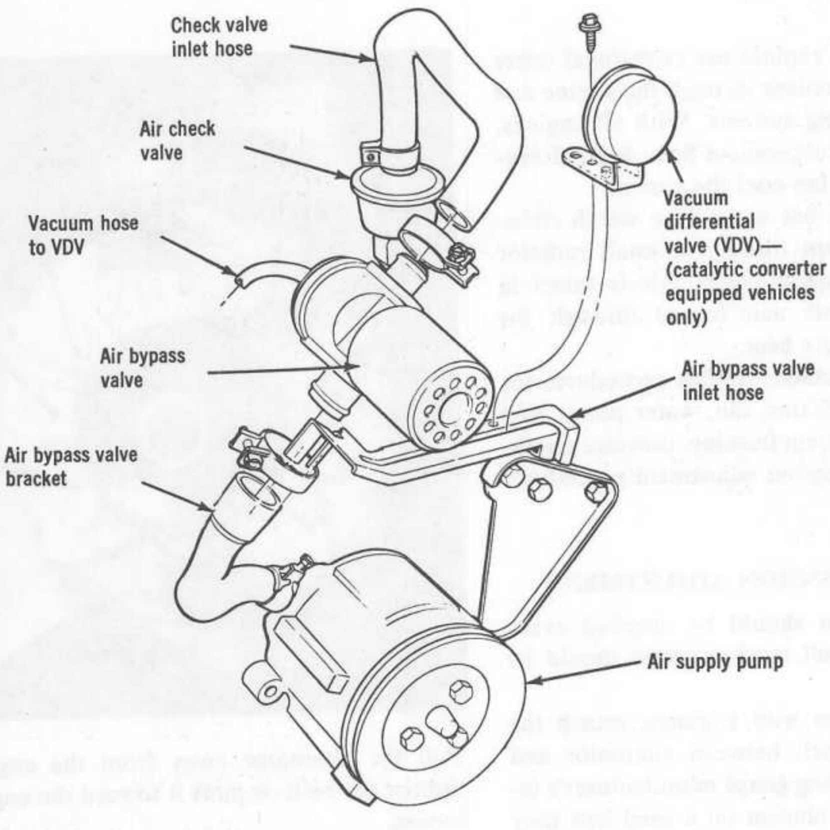
Thermactor System

The Thermactor system reduces carbon monoxide and hydrocarbon content of the combustion gases by injecting fresh air into the hot exhaust gas stream as it leaves the combustion chamber. A typical Thermactor system is shown in **Figure 40**. Inspection, adjustment and overall service of the Thermactor system should be referred to your Ford dealer or a competent garage.

Carburetor Throttle and Choke Linkage

Check the external choke and throttle linkage for binding or contamination. Clean the linkage as required, or if necessary, apply small amounts of spray lubricant (WD-40 or Ford LPS) to all linkage friction points.

40



THERMACTOR SYSTEM

CHAPTER SIX

COOLING SYSTEM AND HEATER

All Mustang II engines use centrifugal water pumps to pump coolant through the engine and cooling and heating systems. With all engines, a thermostat controls coolant flow, and a downflow radiator and fan cool the system.

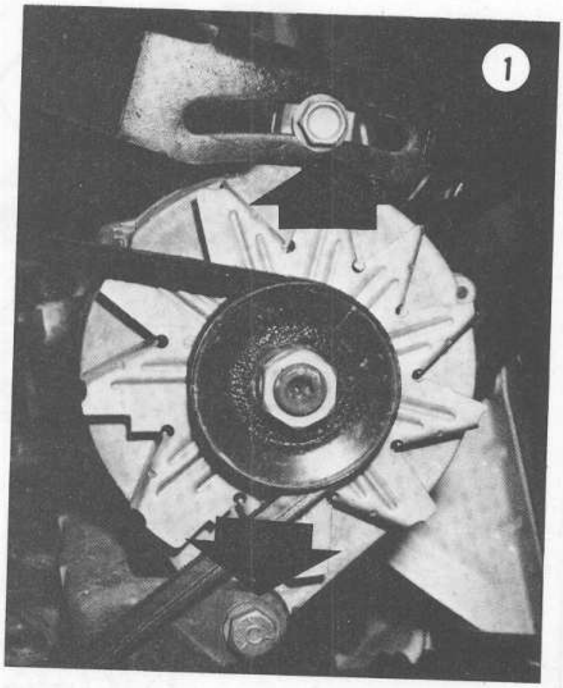
The heater is a hot water type which circulates engine coolant through a small radiator behind the instrument panel. Air is taken in through cowl vents and forced through the radiator to distribute heat.

This chapter includes service procedures for the thermostat, radiator, fan, water pump, and heater. Cooling system flushing, pressure checking, and fan belt tension adjustment procedures are described.

FAN BELT TENSION ADJUSTMENT

Fan belt tension should be checked every 12,000 miles. A belt tension gauge should be used if available.

To check tension with a gauge, attach the gauge to the fan belt between alternator and water pump, following gauge manufacturer's instructions. Correct tension on a used belt (any belt used more than 10 minutes) is 75-120 lb. Correct tension on new belts is 120-160 lb. If adjustment is necessary, loosen the alternator mounting bolts (**Figure 1**, typical mounting).



Pull the alternator away from the engine to tighten the belt, or push it toward the engine to loosen.

If a tension gauge is not available, press down on the belt between water pump and alternator. The belt should move about ¼ in. Adjust as needed by moving the alternator.

CAUTION
Do not overtighten the belt; this will overload the alternator and water pump bearings, as well as cause the belt to wear rapidly.

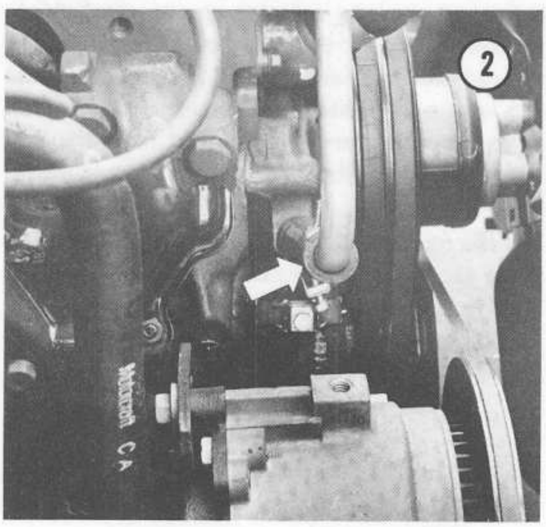
COOLING SYSTEM FLUSHING

A mixture of ethylene glycol-based anti-freeze and water protects the cooling system from freezing to —20°F. The system should be inspected every 12,000 miles or 12 months. If the coolant appears dirty or rusty, the system should be cleaned with a chemical cleaner, drained, flushed with clean water, and refilled. Severe corrosion may require pressure flushing, a job for a dealer or radiator shop. Flushing and coolant replacement are required every 24 months.

NOTE: *See Table 3, Chapter Two, for cooling system service intervals.*

Flushing

1. Drain the cooling system by opening the drain tap on the lower right side of the radiator. Do not open the engine block drain plug.
2. Remove the radiator cap.
3. Disconnect the heater hose from the water pump (**Figure 2**). The hose will be a drain during flushing.



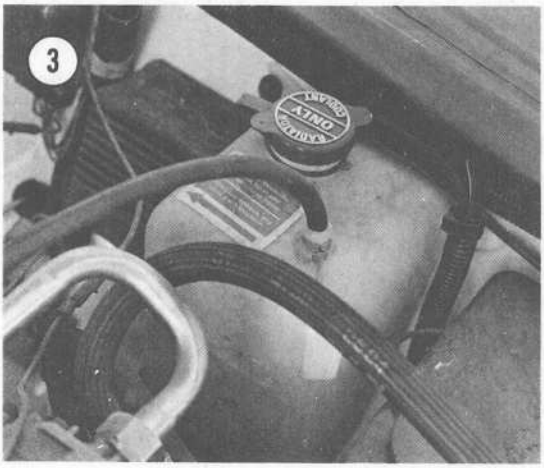
4. Remove the thermostat as described later in this chapter, then reinstall thermostat housing.
5. Turn the heater control on the instrument panel to WARM.
6. Connect a water supply such as a garden hose to the heater hose port on the water pump. This does not have to be a positive fit, as long as most of the water enters the engine. If necessary, temporarily connect a length of heater hose to the water pump port to make the garden hose connection more convenient.
7. Turn water on and flush for 3 to 5 minutes. Do not run the engine. During the last minute of flushing, repeatedly squeeze the upper radiator hose to expel all trapped coolant.
8. Turn off the water and reconnect the heater hose to the water pump.
9. Drain the entire system by opening the radiator drain tap, then disconnecting the lower hose from the radiator.

Refilling

1. Be sure all hoses are connected, and the instrument panel heater control is on warm (maximum for 302 cid engines).
2. Fill the cooling system with a 50/50 mixture of ethylene glycol-based anti-freeze and water, even if you live in a climate that does not require this degree of freeze protection. The anti-freeze is a good corrosion inhibitor. Coolant capacity is 8.5 quarts for the 2300cc engine (9.1 quarts with air conditioning), 12.3 quarts for 2800cc engine (13.2 quarts with air conditioning), and 16.3 quarts for the 302 cid engine (all configurations). When the system is full, replace the radiator cap.

NOTE: *In constant-full cooling systems installed in 302 cid engine configurations the cooling system is filled through the filler neck in the upper radiator hose (***Figure 3***) until the coolant level is up to the bottom of the filler neck. The plastic reservoir bottle is then filled to the* HOT LEVEL *mark.*

3. Run the engine at a fast idle and recheck the coolant level in the radiator (and the reservoir bottle, if installed). Top up if more than ¾ in. below the filler neck (or HOT LEVEL mark in reservoir bottle). Also check system for leaks.



4. After driving several miles, recheck the coolant level. It takes some time for all the air to be removed from the system. Normal coolant level is ¾ in. to 1½ in. below the filler neck (bottom of filler neck for constant-full cooling systems).

PRESSURE CHECK

If the cooling system requires repeated topping up, there is probably a leak. The following procedures requires a cooling system pressure tester. This can be done by a Ford dealer or service station if you do not have such a tool.

1. Remove the radiator cap.

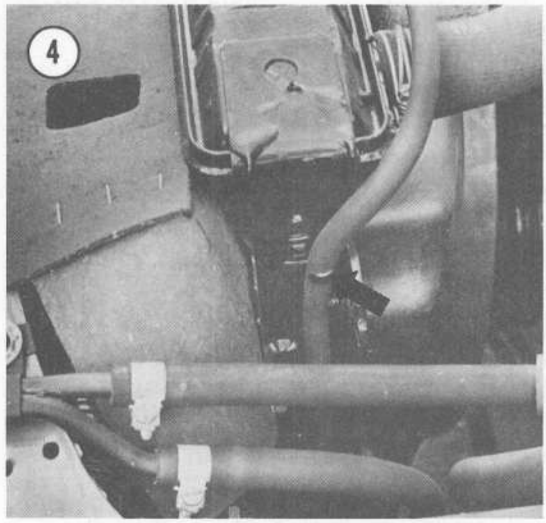
2. Wet the rubber gasket on the cap, then reinstall it tightly.

3. Detach the electrical connector from the engine temperature sender, then remove the sender. The temperature sender in all engines is located in the engine block.

> NOTE: *A small amount of coolant will be lost when the sender is removed. The radiator cap must remain in place to prevent the cooling system from draining.*

4. Install an adapter (½ in. male pipe thread on one end, and a hose fitting on the other) in place of temperature sender. Tighten securely.

5. Detach the radiator overflow hose (or overflow-to-reservoir hose) from its retaining clips. Make sure the hose is in good condition and securely connected to the radiator. Immerse the free end of the hose in a container of water (**Figure 4**).



6. Attach the pressure tester to the hose fitting at the temperature sender and pump until bubbles appear in the container of water from the overflow hose. Keep pumping until the bubbles stop, then note the reading on the pressure tester gauge. This should range from 12-16 psi.

7. If the gauge reading exceeds 16 psi, the radiator cap must be replaced.

8. If bubbles continue and the pressure drops below 10 psi, the radiator cap is not holding pressure. Release the pressure tester. Remove the radiator cap and check for damage. If the cap appears in good condition, wash it in clean water, reinstall, and repeat Step 6. If the cap still fails to hold pressure, it must be replaced.

9. If the bubbles in the water container cease and the radiator cap holds 10-16 psi, watch the tester gauge for 2 minutes. There should be no drop in pressure. If pressure falls off, there is a leak. Inspect all hoses, freeze plugs, and connections for coolant residue.

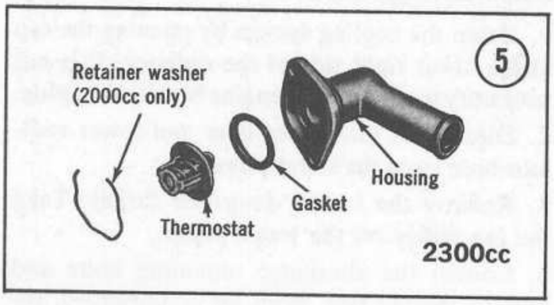
THERMOSTAT

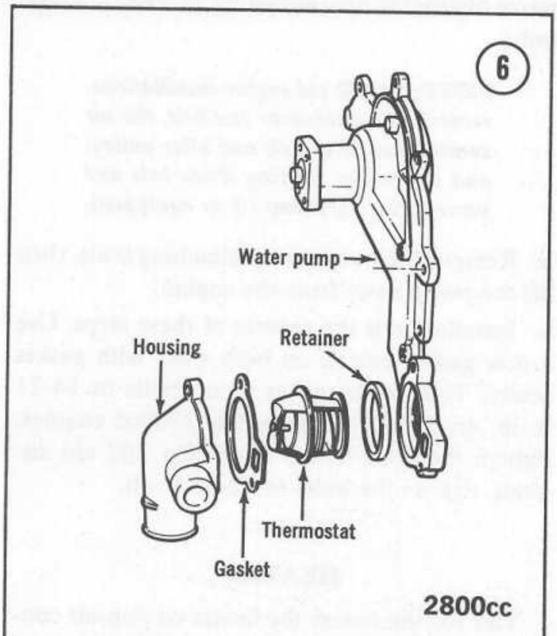
Removal

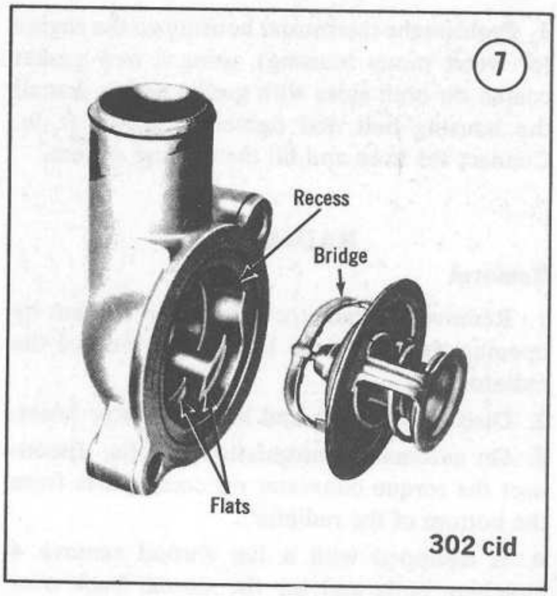
1. Drain the cooling system by opening the radiator drain tap. It is not necessary to remove the cylinder block drain plug.

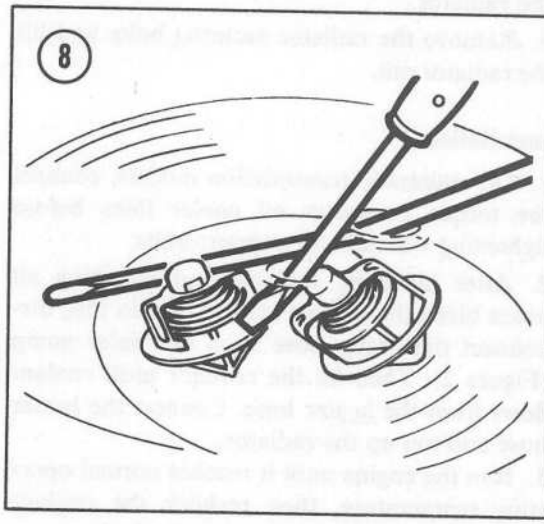
2. Disconnect the radiator hose from the thermostat housing (top radiator hose for the 2300cc and 302 cid engines or bottom radiator hose to the 2800cc engine).

3. Remove 2 bolts attaching the thermostat housing to the engine. Lift the thermostat away from the engine, together with the thermostat, then lift out the thermostat and gasket (**Figures 5, 6 and 7** for 4-cylinder, V6 and V8 engines).









Testing

1. Submerge the thermostat in water monitored with a thermometer (**Figure 8**). Heat the water until the thermostat valve begins to open, then check the water temperature. It should range from 188-195°F. If the valve opens at the wrong temperature or fails to open, replace thermostat.

2. Measure the lift of the thermostat valve. To do this, mark a screwdriver at a point ¼ in. from the tip. The screwdriver is used as a measuring device. Heat the water until the thermostat valve is fully open and measure the lift of the valve with the marked screwdriver. Replace the thermostat if the valve opens less than ¼ in.

Installation

1. If a new thermostat is being installed, test as described in the previous procedure.

2. Install the thermostat in the housing.

3. Position the thermostat housing on the engine (or water pump housing), using a new gasket coated on both sides with gasket sealer. Install the housing bolt and tighten to 12-15 ft.-lb. Connect the hose and fill the cooling system.

RADIATOR

Removal

1. Remove the radiator cap. Drain coolant by opening the tap at the lower right side of the radiator.
2. Disconnect upper and lower radiator hoses.
3. On automatic transmission models, disconnect the torque converter oil cooler lines from the bottom of the radiator.
4. If equipped with a fan shroud remove 4 attaching bolts and lay the shroud back over the radiator.
5. Remove the radiator securing bolts and lift the radiator out.

Installation

1. On automatic transmission models, connect the torque converter oil cooler lines before tightening the radiator support bolts.
2. After installing radiator and attaching all hoses bleed the cooling system. To do this, disconnect the heater hose from the water pump (Figure 2). Then fill the radiator until coolant flows from the heater hose. Connect the heater hose and top up the radiator.
3. Run the engine until it reaches normal operating temperature, then recheck the coolant level. Check the cooling system for leaks.

FAN

Removal/Installation

1. Loosen the fan belt.
2. If the car is equipped with a fan shroud, remove the 4 attaching bolts and lay the shroud back over the fan.
3. Remove the bolts and lockwashers attaching the fan to the water pump hub. Lift the fan away from the water pump hub.
4. Installation is the reverse of these steps. Tighten the fan bolts to 12-18 ft.-lb.

WATER PUMP

A defective water pump is usually the problem when the engine overheats and no other cause can be found. A water pump will often warn of impending failure by making noise. Rebuilding the water pump is impractical as it requires considerable time and effort, and is little cheaper than purchasing a rebuilt water pump.

Removal/Installation

1. Drain the cooling system by opening the tap at the lower right side of the radiator. It is not necessary to remove the engine block drain plug.
2. Disconnect the heater hose and lower radiator hose from the water pump.
3. Remove the fan as described earlier. Take the fan pulley off the water pump.
4. Loosen the alternator mounting bolts and remove the fan belt. With air conditioning, remove alternator and mounting bracket (2800cc only).

> NOTE: *In 302 cid engine installations, remove the alternator fan belt, the air conditioner drive belt and idler pulley, and the power steering drive belt and power steering pump (if so equipped).*

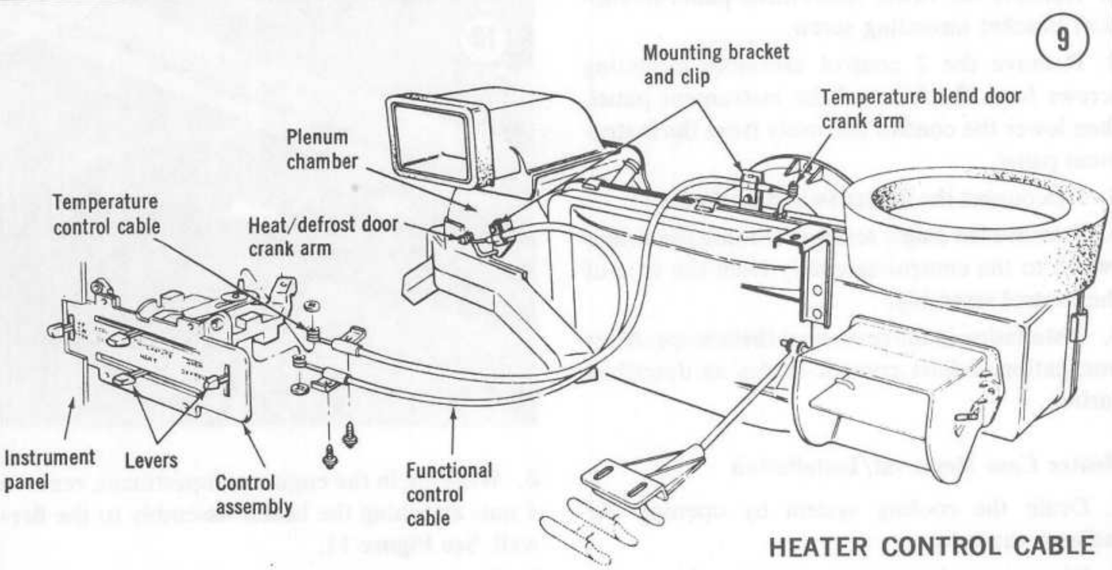
5. Remove the water pump attaching bolts, then lift the pump away from the engine.
6. Installation is the reverse of these steps. Use a new gasket coated on both sides with gasket sealer. Tighten the water pump bolts to 14-21 ft.-lb. on 2300cc engines. On 2800cc engines, tighten the bolts to 6-9 ft.-lb. On 302 cid engines, tighten the bolts to 12-18 ft.-lb.

HEATER

This section covers the heater on non-air conditioned models only. Repair of the integral heater on air-conditioned models requires special skills and tools, and should be left to a Ford dealer or other competent repair shop.

Temperature Control Cable Adjustment

1. Loosen the temperature control cable mounting screw near the temperature blend door crank area (**Figure 9**).



HEATER CONTROL CABLE

2. Move the temperature control lever on the instrument panel to WARM (all the way to the right) then back off ⅛ in.

3. Move the temperature blend door crank arm toward the mounting bracket as far as it will go, then tighten the mounting screw.

Functional Control Cable Adjustment

1. Loosen the functional control cable mounting screw near the heat/defrost door crank arm (Figure 9).

2. Move the function control lever on the instrument panel to DEFROST position then back off ⅛ in. from the end of the slot.

3. Move the heat/defrost door crank arm to the full DEFROST position and tighten the mounting screw.

Control Cable Removal/Installation

1. Remove the push nuts and mounting screws that retain the control cables to the control head.

2. Remove the push nuts that connect the control cables to the heat/defrost door crank arm or temperature blend door crank arm as required then remove associated cable mounting screws.

3. Remove the control cable to be replaced.

4. Installation is the reserve of these steps. After installation, adjust the control cables as described earlier.

Control Assembly Removal/Installation

1. Remove the lower instrument panel-to-support bracket mounting screws.

2. Remove the 2 control assembly mounting screws from the front of the instrument panel, then lower the control assembly from the instrument panel.

3. Disconnect the electrical connectors from the blower switch, system-off switch, and illumination bulb harness.

4. Disconnect the electrical connectors from the defogger switch and the warning lamp, if so equipped.

5. Disconnect the functional control cable and temperature control cable from the control assembly as described earlier, and remove the control assembly.

6. Installation is the reverse of these steps. After installation, adjust control cables as described earlier.

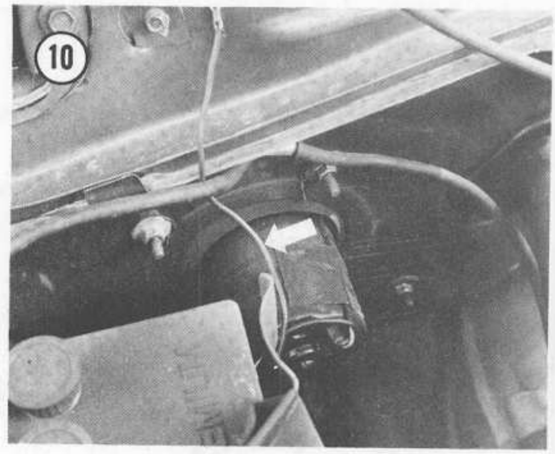
Heater Switch Removal/Installation

1. Pull the control knob off the heater switch lever.

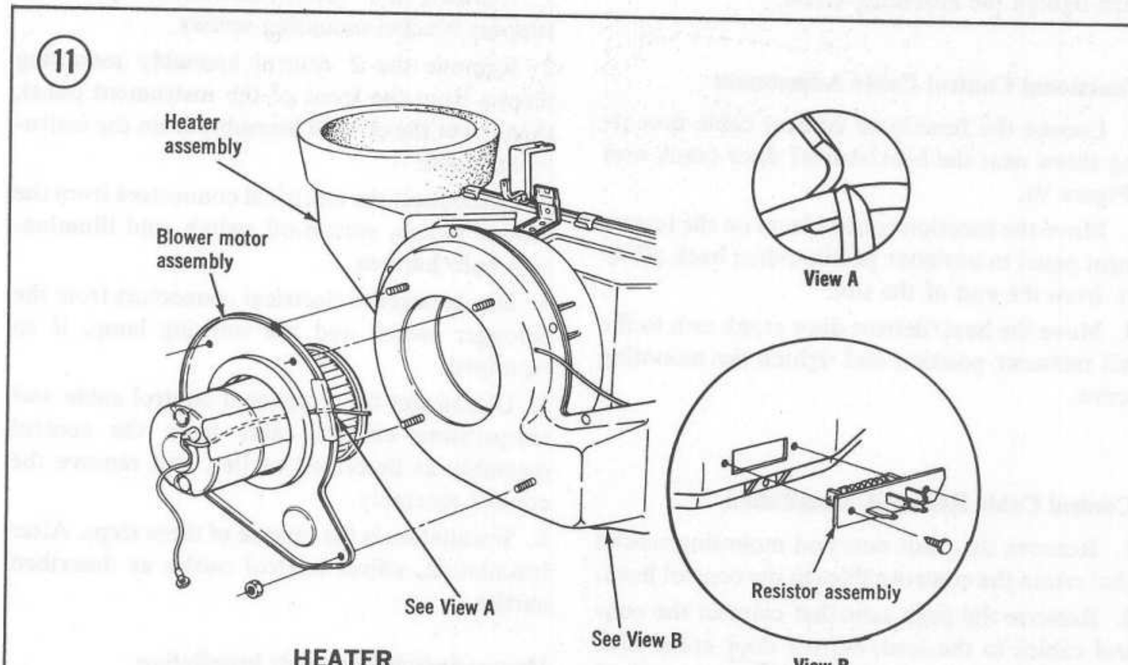
2. Remove the lower instrument panel-to-support bracket mounting screw.
3. Remove the 2 control assembly mounting screws from the front of the instrument panel, then lower the control assembly from the instrument panel.
4. Disconnect the heater switch lead wire.
5. Remove the single screw mounting the heater switch to the control assembly from the face of the control assembly.
6. Installation is the reverse of these steps. After installation, adjust control cables as described earlier.

Heater Case Removal/Installation

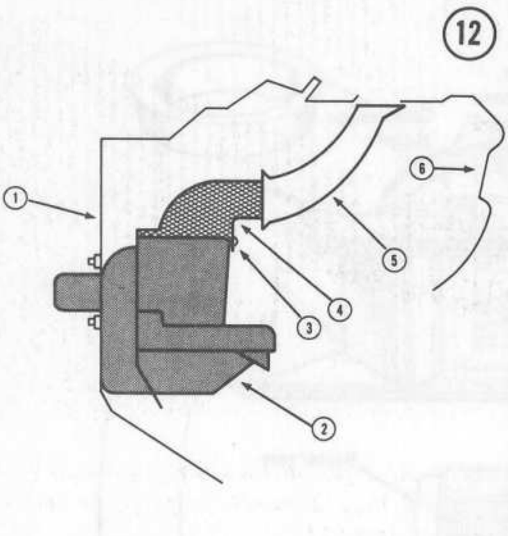
1. Drain the cooling system by opening the radiator drain tap.
2. Disconnect the negative battery cable.
3. Working in the engine compartment, disconnect the black blower motor ground wire. See **Figure 10**.
4. Disconnect the heater hoses from the engine block.
5. Remove the glove compartment.



6. Working in the engine compartment, remove 4 nuts attaching the heater assembly to the firewall. See **Figure 11**.
7. Detach control cables as described earlier.
8. Remove the radio for access.
9. Remove the snap rivet that attaches the defroster air duct to plenum chamber (**Figure 12**).
10. Pull the air duct toward the rear of the car, into the defroster nozzle. This detaches the forward edge of the duct from the plenum chamber.



HEATER



1. Firewall
2. Heater assembly
3. Snap rivet
4. Defroster duct
5. Defroster nozzle
6. Instrument panel

11. Tilt the rear end of the duct up and forward to detach it from the defroster nozzle. Move the duct to the left to clear the nozzle, then take it out from under the instrument panel.

12. Remove 2 screws securing the right-hand air vent and take it out.

13. Remove the screw from the heater case-to-instrument panel bracket. Take the heater case assembly out from the instrument panel. Pull the heater hoses through the firewall, then detach them from the heater case.

14. Installation is the reverse of these steps. Refill the cooling system with anti-freeze and water. Adjust the temperature and control cables as described earlier.

Blower Motor Removal/Installation

1. Remove the heater case as described earlier.
2. Disconnect the orange blower motor wire from the resistor (Figure 11).
3. Remove 4 nuts that secure the blower motor (Figure 13), then lift it out.
4. Installation is the reverse of these steps.

Heater Core Removal/Installation

1. Remove the heater case as described earlier.
2. Remove the compression gasket (**Figure 13**) from the cowl air inlet.
3. Using a screwdriver, remove 11 clips holding the front and rear halves of the heater case together. Separate the halves of the case (Figure 14).
4. Lift the heater core from the case.
5. Installation is the reverse of these steps. Fill the cooling system with anti-freeze and water. Adjust the temperature and control cables as described earlier.

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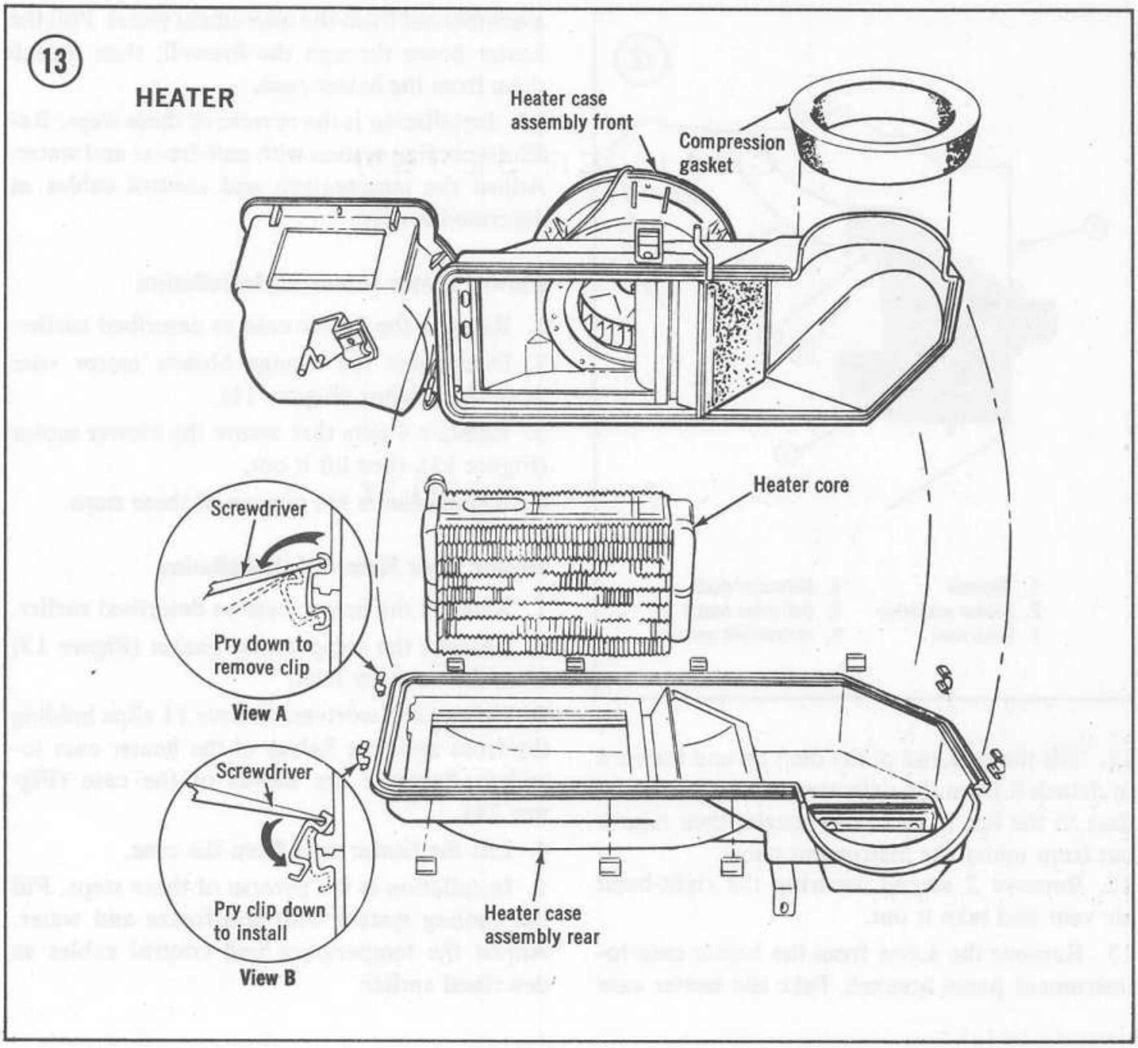
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HEATER
Heater case assembly front
Compression gasket
Heater core
Screwdriver
Pry down to remove clip
View A
Screwdriver
Pry clip down to install
View B
Heater case assembly rear

CHAPTER SEVEN

ELECTRICAL SYSTEM

The Mustang II has a 12-volt negative ground electrical system. This chapter includes service procedures for the battery, starter, charging system, lighting system, ignition system, fuses, instruments, and windshield wipers, as well as distributor-related emission controls. Wiring diagrams are included at the end of the chapter.

BATTERY

Care and Inspection

1. Disconnect both battery cables and remove the battery.
2. Clean the top of the battery with a baking soda and water solution. Scrub with a stiff bristle brush. Wipe battery clean with a cloth moistened in ammonia or baking soda solution.

CAUTION

Keep cleaning solution out of battery cells or the electrolyte will be seriously weakened.

3. Clean battery terminals with a stiff brush or a tool made for this purpose.
4. Examine entire battery case for cracks.
5. Install the battery and reconnect the battery cables.
6. Coat the battery terminals with light mineral grease or Vaseline after tightening.
7. Check electrolyte level and top up with distilled water if necessary.

Testing

Hydrometer testing is a good way to check battery condition. Use a hydrometer with numbered graduations from 1.200 to 1.300 rather than one with just color-coded bands. To use the hydrometer, squeeze the rubber bulb, insert the tip in the cell and release the bulb (**Figure 1**). Draw enough electrolyte to float the weighted float inside the hydrometer. Note the number in line with the surface of the electrolyte. This is the specific gravity of the cell. Return the electrolyte to the cell from which it came.

The specific gravity of electrolyte in each battery cell is an excellent indicator of that cell's condition. If the reading is below 1.200, the battery needs to be charged. However, if there is a difference in specific gravity of 0.050 or more between any cells, the battery must be replaced.

CAUTION

Battery electrolyte must be fully topped up and the negative cable disconnected before charging battery.

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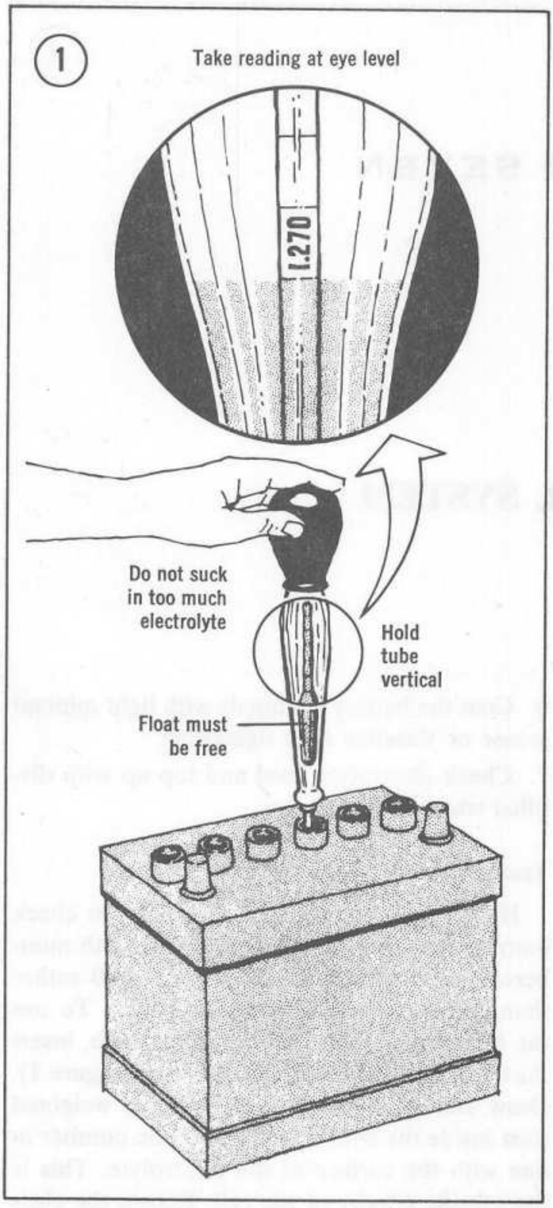


Charging

There's no need to remove the battery from the car to charge it. Make certain the area is well ventilated and that there is no chance of sparks or flame being in the vicinity of the battery; during charging, highly explosive hydrogen gas is produced by the battery.

Disconnect the ground lead at the battery. Remove the caps from the cells and top up each cell with distilled water. Never add electrolyte to a battery that has been in service.

Connect the charger to the battery—negative to negative, positive to positive. If the charger output is variable, select a low setting (1.5-2 amps), set the voltage selector to 12 and plug the charger in. If the battery is severely discharged (1.200 or less specific gravity) allow it to charge for at least 8 hours. Less charge deterioration requires less charging time.

After the battery has been charged for a suitable period of time, unplug the charger and disconnect it from the battery. Be extremely careful about sparks. Test the condition of each cell with a hydrometer as described above. Compare the results to **Table 1**.

Table 1 ELECTROLYTE SPECIFIC GRAVITY

	Permissible Value	Full Charge Value at 68°F
Moderate climate	Over 1.20	1.26
Cold climate	Over 1.22	1.28
Warm climate	Over 1.18	1.23

If the specific gravity indicates that the battery is fully charged, and if the reading remains the same after one hour, the battery can be considered to be in good condition and fully charged. Check the electrolyte level and add water if necessary, install the caps and reconnect the ground lead.

ALTERNATOR

The alternator is belt driven from the engine. Current is supplied from the alternator-regulator system to the rotating field of the alternator through 2 brushes to 2 slip rings.

The alternator produces power in the form of alternating current. The alternating current is rectified to direct current by 6 diodes (8 diodes in 61 ampere alternators). The alternator regulator automatically adjusts the alternator field current to maintain the alternator output voltage within prescribed limits to correctly charge the battery. The alternator is self current limiting.

Alternator repairs require specialized equipment and skills. While repairs are possible, it is generally more practical for the home mechanic to have the alternator serviced by a Ford dealer or competent repair shop. The following test procedures will tell you if repairs are necessary.

Output Test

1. Disconnect the coil wire from the distributor and ground it so the engine won't start. Turn the engine over with the starter several times, for several seconds each time. This partially discharges the battery so the alternator will register output if it is working. After turning the engine over, reconnect the coil wire.

2. Disconnect the wire from the alternator BAT terminal. Connect an ammeter between the terminal and the wire. The ammeter must have a wide enough range to cover the alternator's rated output. See **Table 2** for output ratings.

Table 2 ALTERNATOR OUTPUT RATINGS

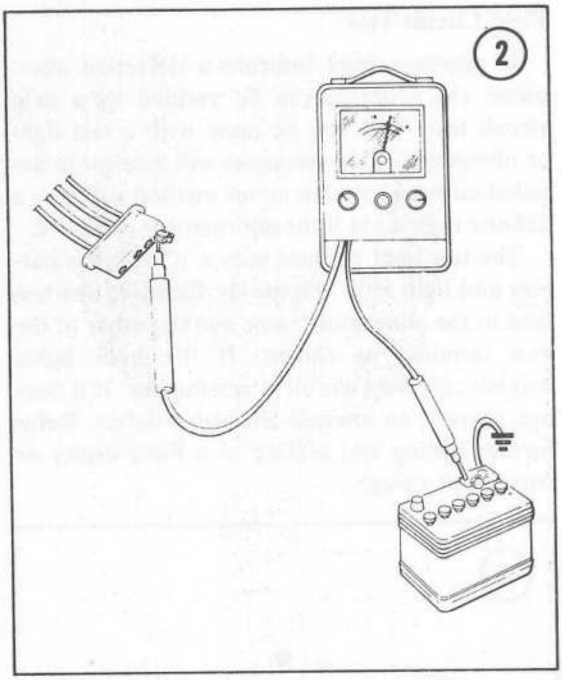
Stamp Color	Rated Output, Amperes
Purple	38
Orange	42
Red	55
Green	61
Black	65

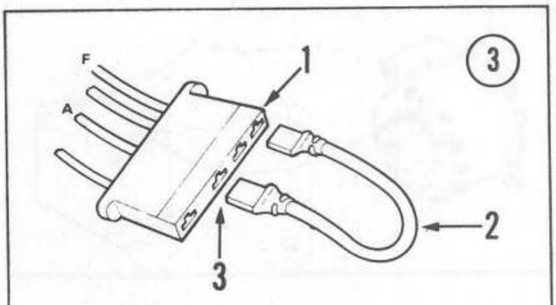
3. Start the engine. Turn on all lights and electrical equipment. If the ammeter reading is approximately the same as the alternator's rated output, the alternator is working properly. If no current is produced, the trouble must be isolated to the alternator or regulator. Perform the following tests.

Wiring Harness Test

The harness between the regulator plug and alternator must be tested for grounded wires before performing the next test. Otherwise the voltage regulator may be damaged.

To test, disconnect the wire connector from the regulator. Connect one test probe of an ohmmeter to the F terminal of the harness (**Figures 2 and 3**). Connect the other probe to the battery negative terminal. The ohmmeter should read between 4 and 250 ohms. If the ohmmeter does not indicate within this range, there is a ground in the harness that must be found and repaired.





1. "F" terminal
2. Jumper wire
3. "A" terminal

Isolation Test

If the harness was OK in the previous test, connect a jumper wire between the A and F terminals of the regulator wiring connector (Figure 3). Disconnect the wire from the alternator BAT terminal. Connect an ammeter between the wire and the terminal.

Run the engine at 1,500 rpm, with all lights and accessories on. If the ammeter indicates approximately the rated output of the alternator (see Table 2 for output ratings) a defective regulator is indicated. If the ammeter shows a low reading, the alternator is probably at fault.

7

Field Circuit Test

If previous tests indicate a defective alternator, the problem can be verified by a field circuit test. This can be done with a test light or ohmmeter. The ohmmeter will give more detailed information, but either method will give a definite indication if the alternator is defective.

The test light method uses a 12-volt car battery and light bulb (**Figure 4**). Connect one test lead to the alternator frame and the other to the FLD terminal as shown. If the bulb lights brightly, the field circuit is satisfactory. If it does not, there is an internal alternator defect. Refer further testing and service to a Ford dealer or competent garage.

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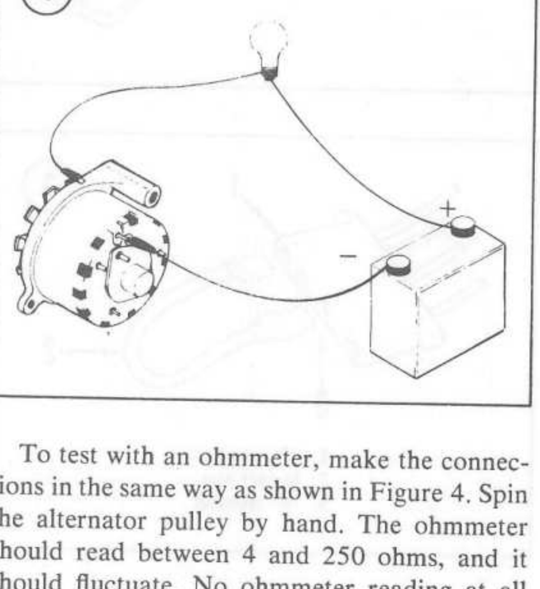

To test with an ohmmeter, make the connections in the same way as shown in Figure 4. Spin the alternator pulley by hand. The ohmmeter should read between 4 and 250 ohms, and it should fluctuate. No ohmmeter reading at all indicates an open brush lead, sticking or worn brushes, or a defective rotor. If the reading is less than 4 ohms, a grounded brush assembly, grounded field terminal, or defective rotor may be the cause.

Alternator Removal/Installation

1. Disconnect the negative cable from battery.
2. Loosen the alternator mounting bolts (**Figure 5**—typical mounting bolt location). Remove the adjusting arm bolt. Detach the fan belt from the alternator pulley.

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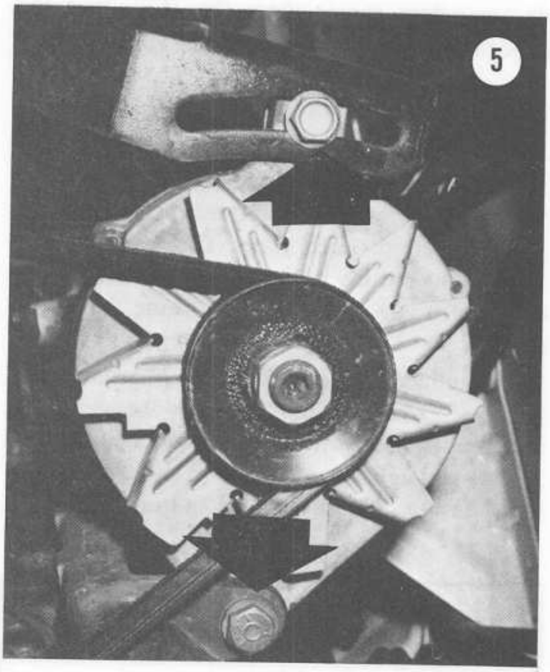


3. Carefully note the locations of the alternator wires and remove the electrical connectors from the alternator. The stator and field connectors are the push-on type. They should be pulled straight off the terminal studs to prevent damage.
4. Remove the alternator mounting bolts, and remove the alternator.
5. Installation is the reverse of these steps. Adjust fan belt tension as described in Chapter Six.

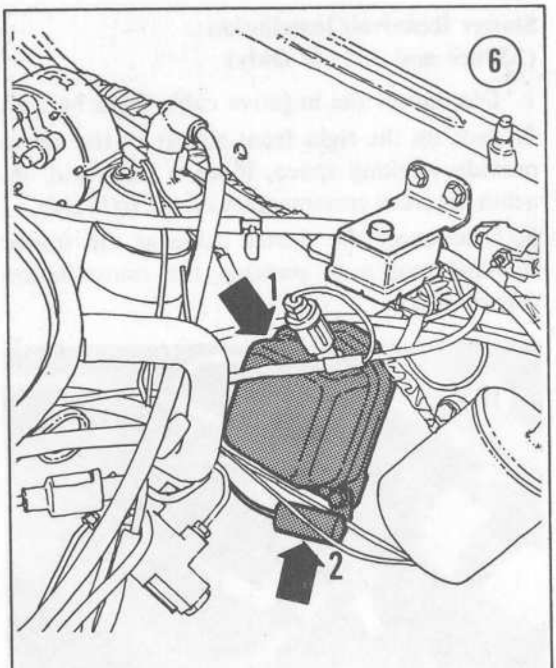
VOLTAGE REGULATOR

The electro-mechanical regulator is factory calibrated and sealed and is not to be adjusted. Some models may be equipped with a transistorized regulator which is adjustable.

If a defective regulator is suspected, test it together with the alternator as described earlier in this chapter. Replace regulator if defective.

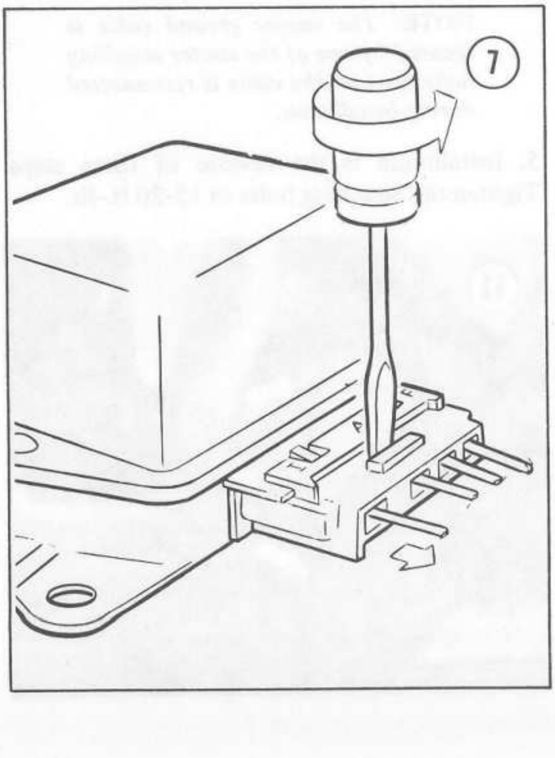
Replacement (Electro-Mechanical Regulator)

1. Disconnect the negative cable from battery.
2. Remove the regulator mounting screws. The regulator is located on the left hand front fender apron (**Figure 6**).
3. Use a screwdriver to unlock the regulator



1. Voltage regulator
2. Radio suppression condenser

wire connector and then disconnect the regulator from the wiring harness (**Figure 7**).



4. Connect the new regulator to the wiring harness.
5. Mount the regulator to the regulator mounting plate. The radio suppression condenser mounts under one mounting screw (Figure 6). The ground lead mounts under the other mounting screws.
6. Connect the negative cable to the battery.

Replacement (Transistorized Regulator)

1. Disconnect the negative cable from battery.
2. Remove the regulator mounting screws. The regulator is located on the left-hand, front fender apron (Figure 6).
3. Disconnect the regulator from the wiring harness (Figure 7).
4. Connect the new regulator to the wiring harness.
5. Mount regulator. The ground lead mounts under one of the mounting screws.
6. Connect the negative cable to the battery.

Voltage Regulator Adjustment (Transistorized Regulator Only)

The only adjustment on the transistorized regulator is the voltage limiter adjustment.

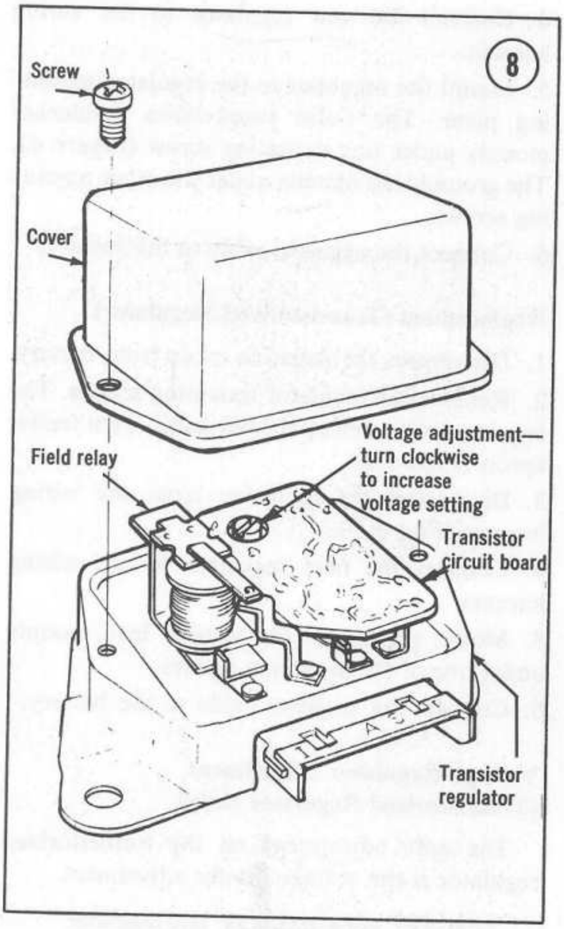
> NOTE: *Adjustment of the regulator must be made with the regulator at normal operating temperature.*

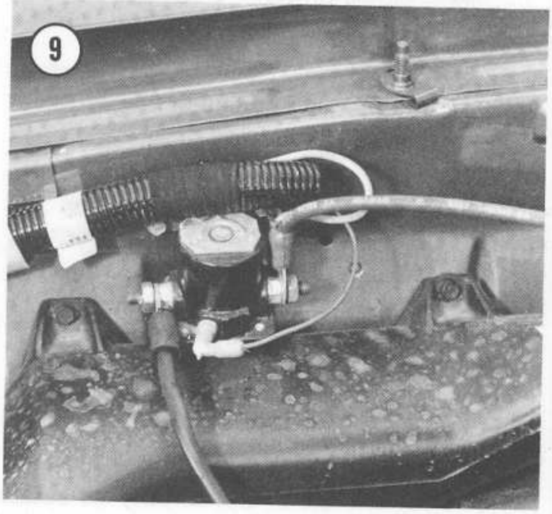
1. Remove the top regulator mounting screws and remove cover from regulator (**Figure 8**).
2. Use a fiber rod as a screwdriver for this adjustment. Turn voltage adjustment (Figure 8) clockwise to increase the voltage setting; and counterclockwise to decrease the voltage setting. Consult a local Ford dealer or competent garage for proper voltage setting.

STARTER

Starter Relay Replacement

1. Disconnect the negative cable from battery.
2. Carefully disconnect and identify (to ensure proper reconnection) the starter, battery, and ignition switch wires attached to the relay terminals. The starter relay is located on the right front fender apron (**Figure 9**).

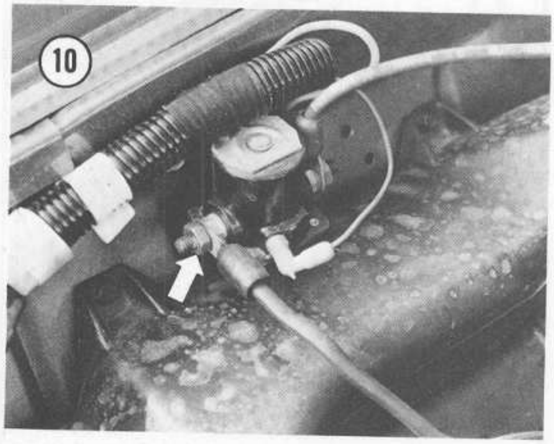




3. Remove the screws securing the relay to the fender apron. Lift the relay out.
4. Installation is the reverse of these steps.

Starter Removal/Installation (2300cc and 302 cid Only)

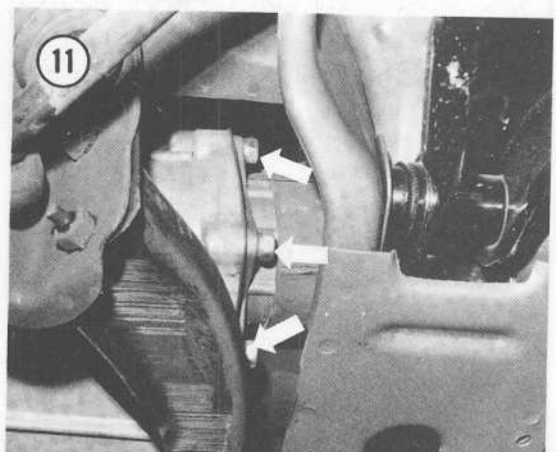
1. Disconnect the negative cable from battery.
2. Jack up the right front corner of the car to provide working space. Place a jackstand beneath the front crossmember on the right side.
3. Disconnect the starter cable at the starter terminal and note position for reinstallation (**Figure 10**).



4. Remove the 3 starter attaching bolts (**Figure 11**). Pull the starter forward, then lower it away from the car.

> NOTE: *The engine ground cable is secured by one of the starter attaching bolts. Be sure the cable is reconnected during installation.*

5. Installation is the reverse of these steps. Tighten the attaching bolts to 15-20 ft.-lb.



Starter Removal (2800cc Only)

1. Disconnect the negative cable from battery.
2. Jack up the front end of the car and place it on jackstands.

> NOTE: *Place jackstands on the longitudinal (front-to-rear) frame members of the car. Do not place the jackstands under the crossmember as this assembly must be removed during the following procedure.*

3. Remove 4 bolts retaining the crossmember under the bell housing.
4. Remove the flex coupling clamping screw at attachment point to steering gear (Chapter Eleven).
5. Remove 3 nuts and bolts that attach steering gear to crossmember.
6. Disengage steering gear from flex coupling and pull steering gear down to provide access to starter motor.
7. Disconnect the starter cable at the starter terminal and note position for reinstallation (Figure 10).
8. Remove the 3 starter attaching bolts and remove the starter.

> NOTE: *The engine ground cable is secured by one of the starter attaching bolts. Be sure the cable is reconnected during installation.*

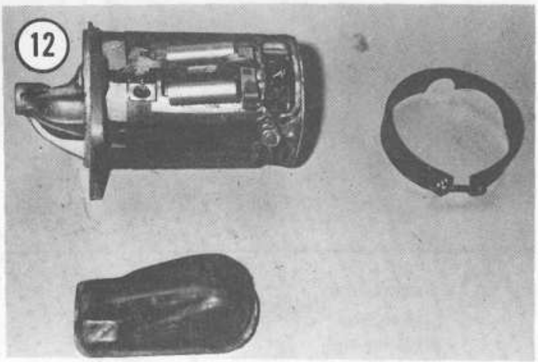
Starter Installation (2800cc Only)

1. Position starter motor and engine ground cable to engine and install 3 attaching bolts. Tighten the attaching bolts to 15-20 ft.-lb.
2. Install the starter cable to the starter motor terminal (Figure 10).
3. Position steering gear splined shaft to flex coupling and steering gear to crossmember as described in Chapter Eleven. Observe line on coupling at flat on shaft.
4. Install 3 attaching bolts and nuts to steering gear and crossmember.
5. Install clamping screws to flex coupling.
6. Install crossmember using 4 bolts and nuts.
7. Remove jackstands and lower car to floor.
8. Connect negative cable to the battery.

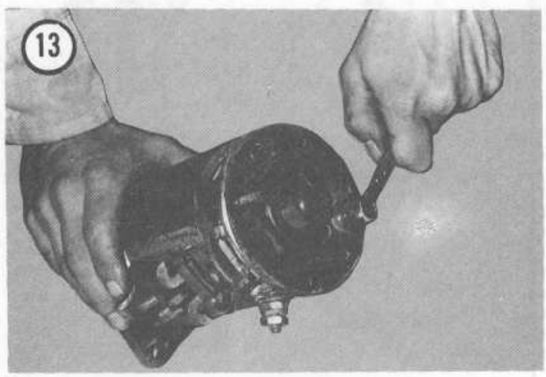
Brush Replacement

Starter brushes should be replaced when they are worn to ¼ in. Always install a complete set of new brushes.

1. Remove brush cover band, gasket, and starter drive plunger lever cover (**Figure 12**).



2. Remove 2 through bolts from starter frame (**Figure 13**).



3. Note position of brush leads (**Figure 14**). Remove brushes from their holders.
4. Remove drive end housing and plunger lever return spring.
5. Remove starter drive plunger lever pivot pin and lever. Remove armature.
6. Remove brush end plate. Remove ground brush retaining screws from frame and remove brushes. Cut insulated brush leads from field coils as close to field connection point as possible. Refer to **Figure 15**.
7. Clean and inspect starter motor. Replace brush end plate if insulator between field brush holder and end plate is cracked or broken.

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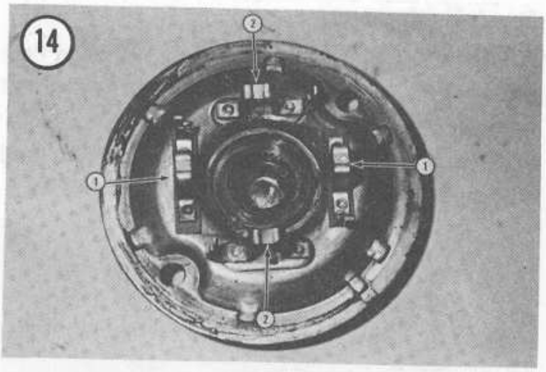
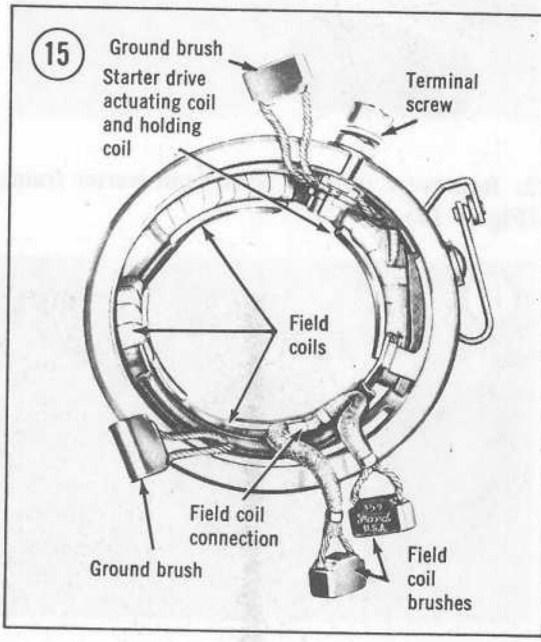


1. Insulated brush holders
2. Grounded brush holders

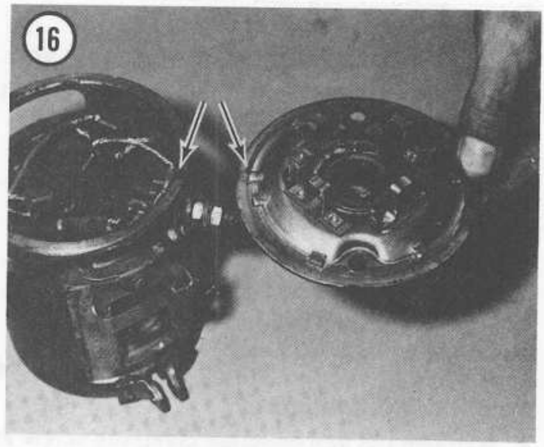


8. Install new insulated field brushes lead on field coil connection. Position and crimp the clip provided with the brushes to hold brush lead to connection. Solder lead, clip, and connection together with rosin core solder and a 300-watt iron.

9. Install ground brush leads to frame with retaining screws.

10. Clean commutator with fine sandpaper. Position brush end plate to starter frame with end plate boss in frame slot (**Figure 16**).

11. Install armature in starter frame. Install starter drive gear plunger lever to frame and starter drive assembly. Install pivot pin.



12. Partially fill drive end housing bearing bore with grease. Position return spring on plunger lever and drive end housing to starter frame. Install through bolts and tighten to 55-75 in.-lb. Be certain stop ring retainer is seated properly in drive end housing.

13. Install commutator brushes in brush holders. Center brush springs on brushes.

14. Position plunger lever cover and brush cover band, with its gasket, on the cover. Tighten band retaining screw.

15. Install starter as described in this chapter.

LIGHTS AND SWITCHES

Headlight Replacement

1. Remove the screws securing the headlight door (cover). See **Figure 17** for typical single headlight installation.

2. Remove the 3 screws attaching the retainer ring to the adjusting ring (Figure 17), and remove the retainer ring.

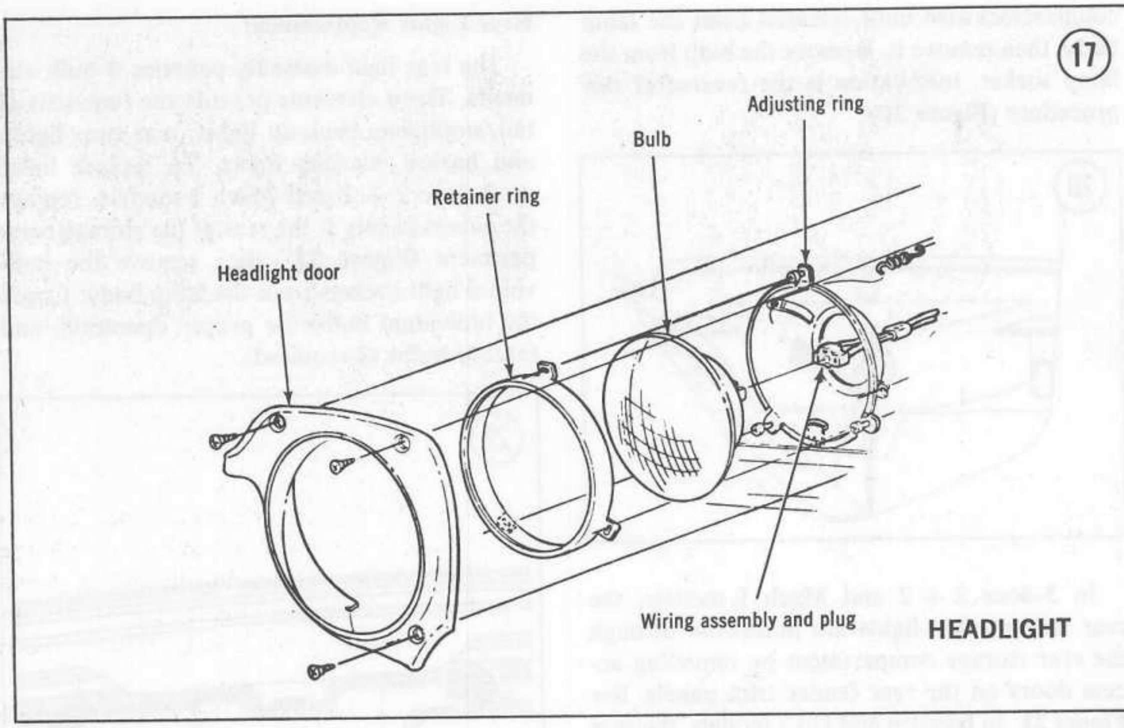
3. Pull the headlight bulb forward, out of the fender, and disconnect the wiring assembly plug.

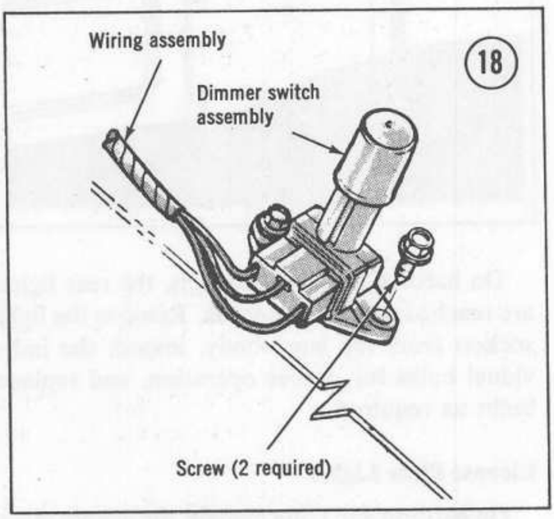
4. Installation is the reverse of these steps. Have the headlights aimed by a Ford dealer or certified lamp adjusting station.

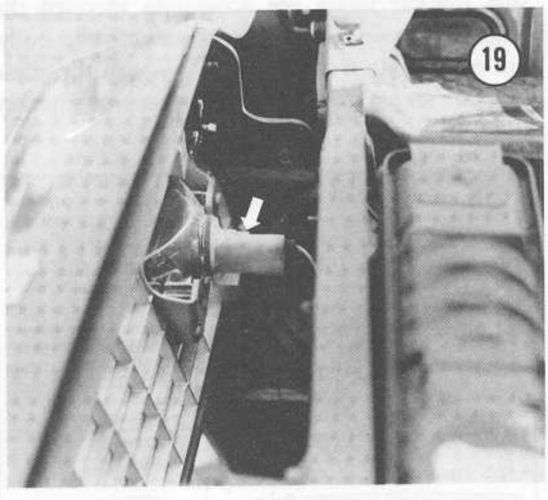
Dimmer Switch Removal/Installation

1. Pull floor carpet back from area of dimmer switch. See **Figure 18**.

2. Remove 2 sheet metal mounting screws securing the dimmer switch to the floorboard.







3. Disconnect 3-wire connector from dimmer switch and remove switch.
4. Installation is the reverse of these steps.

Parking/Turn Signal Bulb Replacement

To replace bulbs, open the hood and locate the parking/turn signal light bulb socket. See **Figure 19**. Turn the bulb socket counterclockwise until released from the light body, then remove the bulb and socket from the light body. Press in on the bulb and turn counterclockwise to remove it from the socket. Installation is the reverse of this procedure.

Side Marker Bulb Replacement

Front side marker bulbs are accessible from beneath the front fenders. To replace, reach beneath the fender and turn the bulb socket counterclockwise until released from the lamp body, then remove it. Remove the bulb from the lamp socket. Installation is the reverse of this procedure (**Figure 20**).

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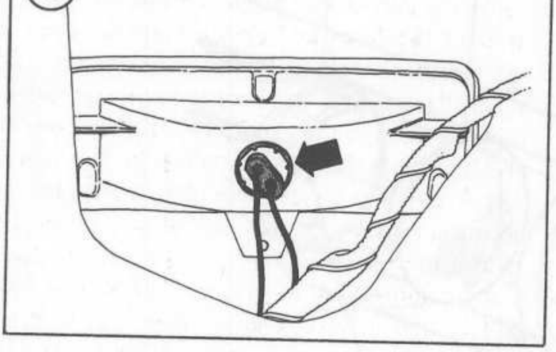
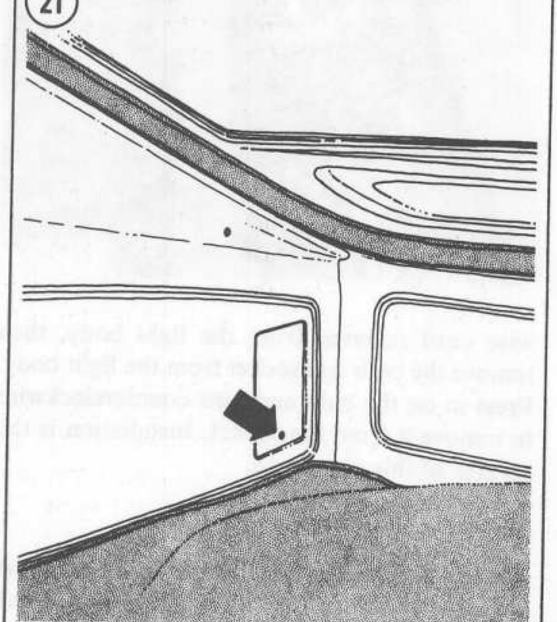


In 3-door 2 + 2 and Mach I models, the rear side marker lights are accessible through the rear storage compartment by removing access doors on the rear fender trim panels. See **Figure 21**. In hardtop and Ghia models, the rear side marker lights are accessible through the trunk. Rear side marker light sockets and bulbs are removable from the light body in the same manner explained for the front side marker lights.

21



Rear Lights Replacement

The rear light assembly contains 4 bulb elements. These elements provide the functions of tail/stoplights, back-up lights, rear turn lights, and hazard warning lights. To replace bulbs on 3-door 2 + 2 and Mach I models, remove the access panels at the rear of the storage compartment (**Figure 22**), then remove the individual light sockets from the lamp body. Check the individual bulbs for proper operation, and replace bulbs as required.

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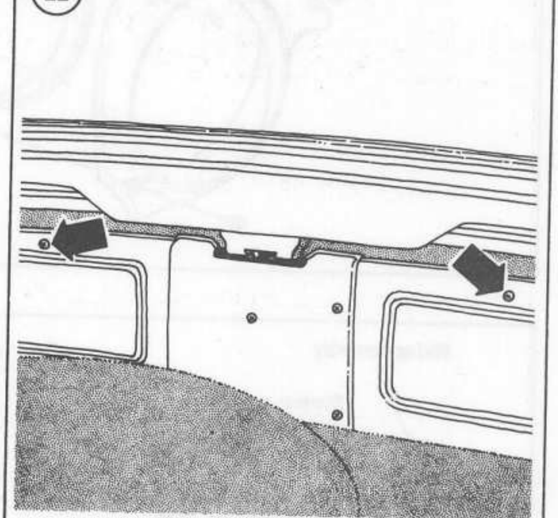


On hardtop and Ghia models, the rear lights are reached through the trunk. Remove the light sockets from the lamp body, inspect the individual bulbs for proper operation, and replace bulbs as required.

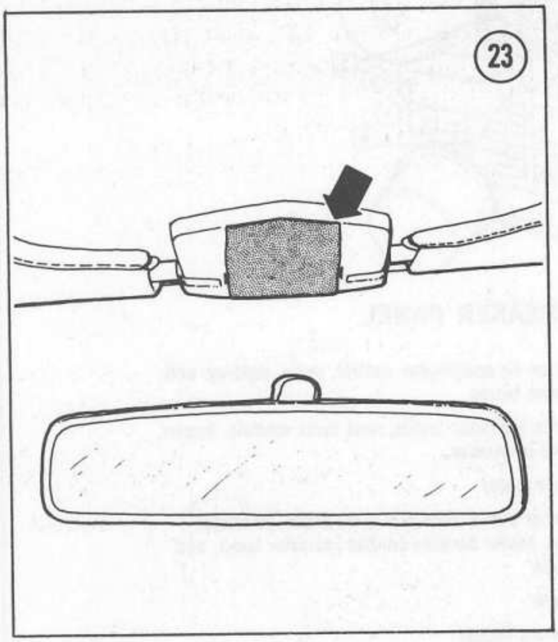
License Plate Lights

On hardtop and Ghia models, the license plate lamp body is accessible through the trunk. To replace bulbs on these models, open the trunk lid, then remove the 2 light bulb sockets from the license plate lamp body. Inspect the bulbs for proper operation, and replace as required.

On 3-door 2 + 2 and Mach I models, license plate light bulbs are replaced by removing the screws securing the license plate lamp lens to the lamp body. Installation is the reverse of this procedure.

Dome and Map Lights

To replace a bulb in the dome light, pry the dome light lens sideways, and pull down off the light body. See **Figure 23**. Pry the bulb from the lamp socket using a pencil or similar wooden object. Install in the reverse order.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In vehicles equipped with optional map lights, push forward on the retainer handle to release the map light stalk from its housing in the lamp body. Unscrew the map light lens from the map light barrel to gain access to the bulb, then remove the bulb by pushing in and turning counterclockwise. Installation is the reverse order.

Stoplight Switch

Remove and replace the stoplight switch as described in Chapter Ten of this manual.

Turn Signal and Hazard Flashers

Both the turn signal and the hazard flasher units are mounted on the fuse panel located above the accelerator pedal below the dash panel. Refer to fuse replacement procedures discussed later in this chapter for location of turn signal and hazard flashers, and for removal and replacement procedures.

FUSES, CIRCUIT BREAKERS, AND FUSIBLE LINKS

Fuse Replacement

A combination fuse/circuit breaker panel is mounted beneath the instrument panel, directly above the accelerator pedal. This panel contains most of the fuses and circuit breakers used in the electrical system. It also contains the turn signal flasher and the hazard warning flasher. **Figure 24** shows the location of all fuses, circuit breakers, and flashers installed in the panel. The 2 flasher units and the one circuit breaker are removed by pulling these units directly away from the panel body. The fuses are most easily removed by use of an inexpensive fuse puller, that is available at many auto parts stores, or by prying the fuse out gently with ½ a clothespin.

Whenever a fuse blows, the cause of the trouble should be determined before replacing the fuse. Usually the trouble is a short circuit in the wiring. This may be caused by worn-through insulation, or a wire which has worked itself loose and shorted to ground. Always carry spare fuses of all required values in the glove compartment.

CAUTION

Never substitute tinfoil or wire for a fuse. An overload could cause major damage to the electrical system, or an electrical fire and complete loss of the car.

Circuit Breakers

Circuit breakers are used to protect the windshield wiper circuit and most of the lighting circuits. The circuit breaker protecting the windshield wiper circuit is located on the fuse panel as shown in Figure 24. The 2 circuit breakers protecting the lighting circuits are integral with the light switch and are automatically resetting. If the car lights flash on and off at regular intervals, the lighting circuit is probably overloaded. Check the circuits by referring to the wiring diagrams provided at the end of this chapter. To remove the windshield wiper circuit breaker from the fuse panel, simply pull the breaker away from the panel. To replace the circuit breakers in the headlight switch, the entire

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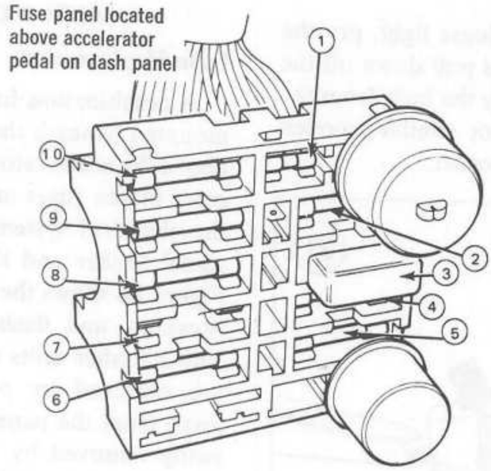


FUSE/CIRCUIT BREAKER PANEL

① (4 amp fuse)	Cluster, heater or air conditioner control, radio, ashtray, and clock illumination lamps
② (7.5 amp fuse)	Oil, brakes, belts indicator lamps, seat belts module, buzzer, throttle solenoid positioner
③ (6.0 amp circuit breaker)	Windshield wiper motor
④ (15 amp fuse)	Windshield washer pump, door ajar, park brake, headlight indicator lamps, heater backlite control indicator lamp, and anti-theft module
⑤ (7.5 amp fuse)	Radio/tape player
⑥ (20 amp fuse)	Horn and cigarette lighter
⑦ (15 amp fuse)	Dome light, glove box, map, trunk door, instrument panel, courtesy headlights indicator lights, key, headlight warning buzzer, clock feed, anti-theft trigger, horn feed, and seat belt module
⑧ (15 amp fuse)	Stoplight and hazard warning lamps
Headlight switch (18 amp circuit breaker)	Headlights, high beam indicator (not shown)
Headlight switch (15 amp circuit breaker)	Park/tail/side marker lamps, license plate lamp, turn indicator lamp (1974 models only), automatic shift indicator lamp (PRND21)—(not shown)
⑨ (15 amp fuse)	Heater
(30 amp fuse)	Air conditioner
⑩ (15 amp fuse)	Back-up lamps (turn signal lamps—1975 models only)

switch must be replaced. Refer to the headlight switch removal/installation procedures covered in the instrument cluster removal procedures provided earlier in this chapter.

Fusible Links

Fusible links are short sections of thin wire installed in a heavier wire. They are intended to burn out if an overload occurs, thus protecting the wiring harness and remainder of the circuit. Fusible links are incorporated in the electric choke circuit, the engine compartment light circuit, the load circuit, the heated backlight circuit, and the back-up light circuit (1974 models only). Refer to the wiring diagrams at the end of this book for the location of fusible links.

NOTE: *Fusible links are a dealer replaceable item, and should be referred to your local Ford dealer or a competent garage.*

Warning Buzzers

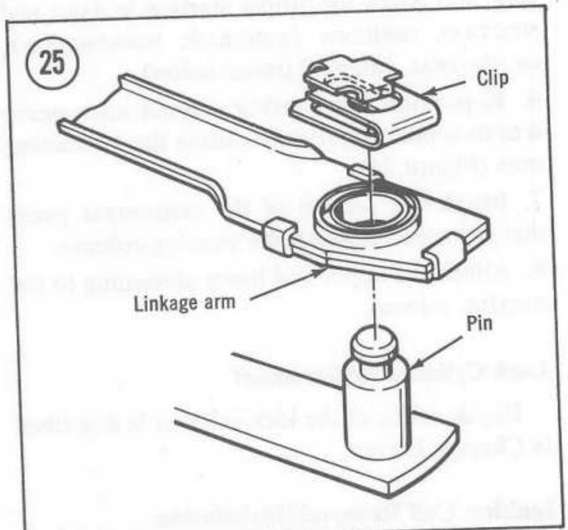
The Mustang II incorporates both a key warning buzzer and a seat belt warning buzzer. These units are mounted behind the right-hand side of the instrument panel near the top of the glove compartment. Both buzzers are replaced by pulling directly out of their mating electrical connectors, and replacing with a new unit.

WINDSHIELD WIPERS AND WASHERS

Wiper Motor Replacement

The windshield wiper motor is located beneath the instrument panel on the firewall, and is replaced as follows.

1. Disconnect negative cable from battery.
2. Working beneath the dash, remove the retaining clip from the pin on the wiper motor pivot shaft, then disconnect the linkage arm from the pivot shaft pin (**Figure 25**).



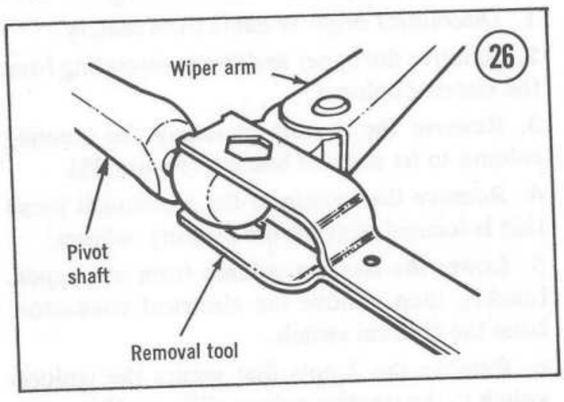
3. Remove the 3 nuts attaching the wiper motor to the firewall.
4. Disconnect the wiper motor from the electrical connector leading into the wiring harness, then remove the wiper motor.
5. Installation is the reverse of these steps. Tighten the 3 wiper motor attaching nuts to 3-6 ft.-lb.

Wiper Switch Removal/Installation

1. Remove negative cable from battery.
2. Remove the windshield wiper switch knob by pulling away from the instrument panel.
3. Working beneath the instrument panel, remove the wiper switch bezel nut, then remove the windshield wiper assembly from the instrument panel and remove the electrical connector from the switch.
4. Installation is the reverse of this procedure. Check operation of the switch after installation.

Wiper Arm and Blade Replacement

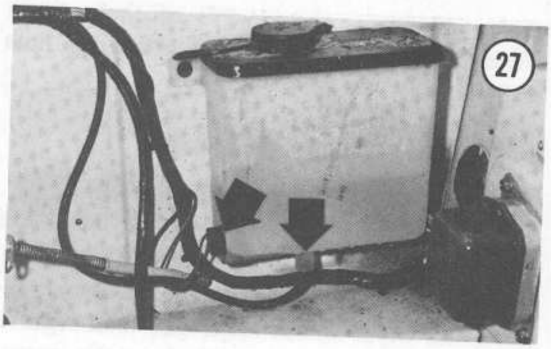
To replace the wiper arm and blade assembly, swing the arm and blade assembly away from the windshield and hold the arm and blade assembly in this position. Using a soft-jawed wiper removal tool, available from your Ford dealer, or a pair of soft-jawed (or padded) pliers, pull the arm and blade assembly off the pivot shaft. To install, hold the arm and blade assembly in the swung out position, and then push the assembly onto the pivot shaft. See **Figure 26**.



Washer Motor Replacement

The washer motor and pump are mounted inside the washer reservoir. No repairs are possible to the motor, pump, or reservoir. If one part is defective, replace entire assembly.

To replace, disconnect the electrical connector and hose from the reservoir (**Figure 27**).



Remove the reservoir retaining screws, then lift the reservoir assembly from the fender apron. Installation is the reverse of this procedure.

IGNITION SYSTEM

The ignition system consists of the ignition switch, the ignition coil, the distributor, and associated wiring and control devices. Replacement procedures are described herein for all elements of the system. The only element of the ignition system which is repairable is the distributor.

Ignition Switch Removal

The ignition switch is mounted on top of the steering column (**Figure 28**). To replace the ignition switch, perform the following.

1. Disconnect negative cable from battery.
2. Remove the upper and lower shrouding from the steering column.
3. Remove the 4 nuts attaching the steering column to its support bracket (Figure 28).
4. Remove the section of the instrument panel that is located beneath the steering column.
5. Lower the steering column from its support bracket, then remove the electrical connectors from the ignition switch.
6. Remove the 2 nuts that secure the ignition switch to the steering column (Figure 28).
7. Remove the pin that connects the ignition switch plunger to the actuator, then remove the ignition switch.

Ignition Switch Installation

NOTE: *Both the locking mechanism at the top of the steering column and the switch itself must be in the* LOCK *position prior to installation of the ignition switch to ensure proper subsequent adjustment.*

1. Move the shift lever into PARK position (automatic transmission) or REVERSE (manual transmission), then turn the key to LOCK position and remove the key.

NOTE: *Replacement switches, when received, are already locked by a wire inserted in the locking hole.*

2. Position the hole in the end of the ignition switch plunger to the hole in the actuator, then install the connecting pin.
3. Position the ignition switch on the steering column, and install the 2 retaining nuts. Do not tighten the retaining nuts at this time.
4. Move the ignition switch up and down the steering column to locate the mid-position of the actuator lash. Once located, tighten the 2 retaining nuts.
5. Remove the substitute locking pin, install the 2 electrical connectors to the ignition switch, reconnect the negative cable to the battery, and check for proper starting in PARK and NEUTRAL positions (automatic transmission), or NEUTRAL (manual transmission).
6. Reposition the steering column and secure it to its supporting brackets using the 4 retaining nuts (Figure 28).
7. Install the section of the instrument panel that is located beneath the steering column.
8. Attach the upper and lower shrouding to the steering column.

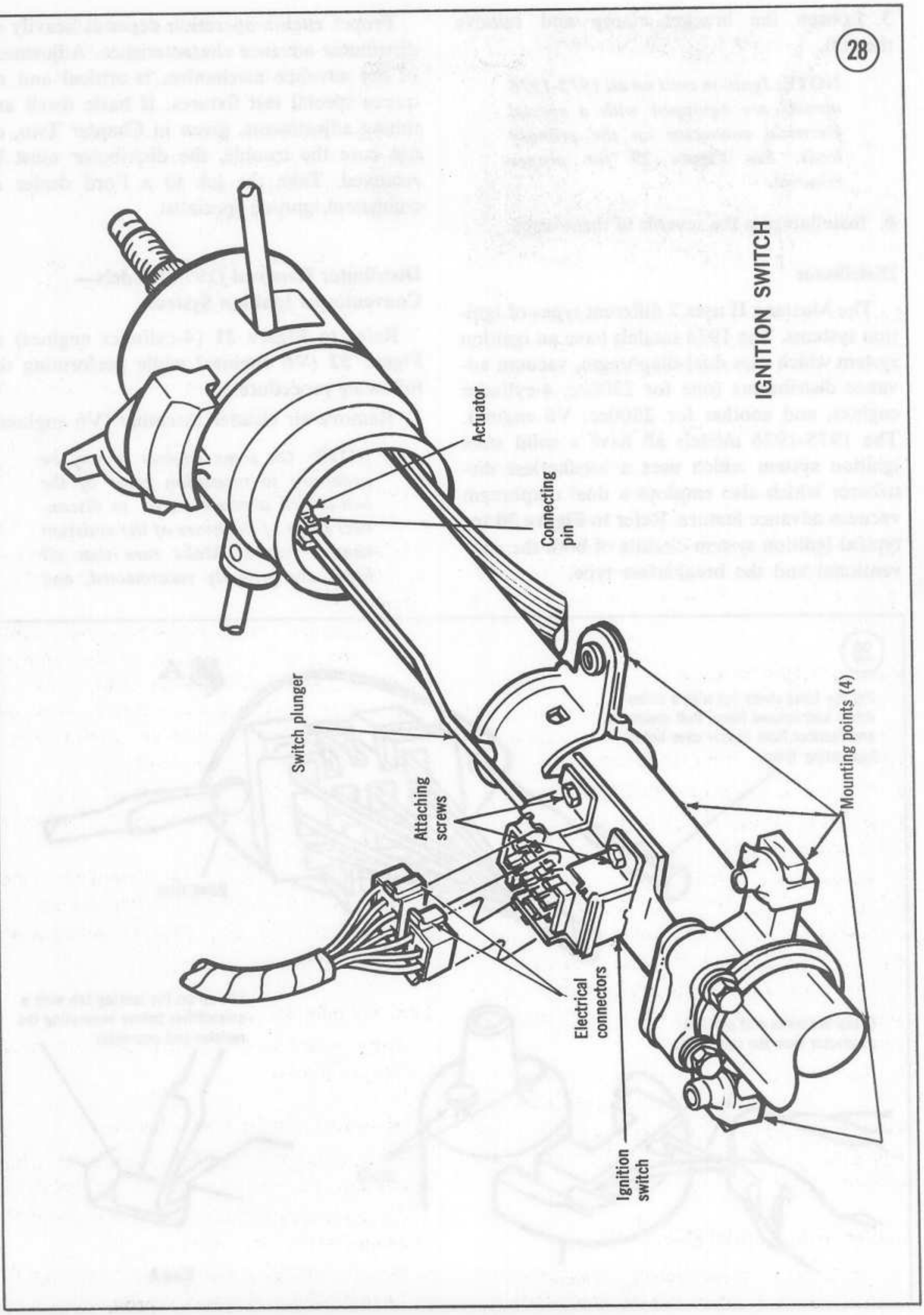
Lock Cylinder Replacement

Replacement of the lock cylinder is described in Chapter Eleven.

Ignition Coil Removal/Installation

The ignition coil is mounted on the left front fender apron just behind the voltage regulator.

1. Disconnect the primary (thin) wires and the secondary (thick) wire from the coil.
2. Remove the 2 retaining screws securing the coil and bracket to the fender apron.



28

IGNITION SWITCH

3. Loosen the bracket clamp and remove the coil.

NOTE: *Ignition coils on all 1975-1976 models are equipped with a special electrical connector on the primary leads. See* **Figure 29** *for proper removal.*

4. Installation is the reverse of these steps.

Distributor

The Mustang II uses 2 different types of ignition systems. The 1974 models have an ignition system which uses dual-diaphragm, vacuum advance distributors (one for 2300cc, 4-cylinder engines, and another for 2800cc, V6 engine). The 1975-1976 models all have a solid state ignition system which uses a breakerless distributor which also employs a dual diaphragm vacuum advance feature. Refer to **Figure 30** for typical ignition system circuits of both the conventional and the breakerless type.

Proper engine operation depends heavily on distributor advance characteristics. Adjustment of the advance mechanism is critical and requires special test fixtures. If basic dwell and timing adjustments, given in Chapter Two, do not cure the trouble, the distributor must be removed. Take the job to a Ford dealer or competent ignition specialist.

Distributor Removal (1974 Models—Conventional Ignition System)

Refer to **Figure 31** (4-cylinder engines) or **Figure 32** (V6 engines) while performing the following procedure.

1. Remove air cleaner assembly (V6 engines).

NOTE: *On some engines it may be necessary to reposition some of the belt-driven accessories, or to disconnect some of the hoses of the emission control system. Make sure that all hoses are properly reconnected, and*

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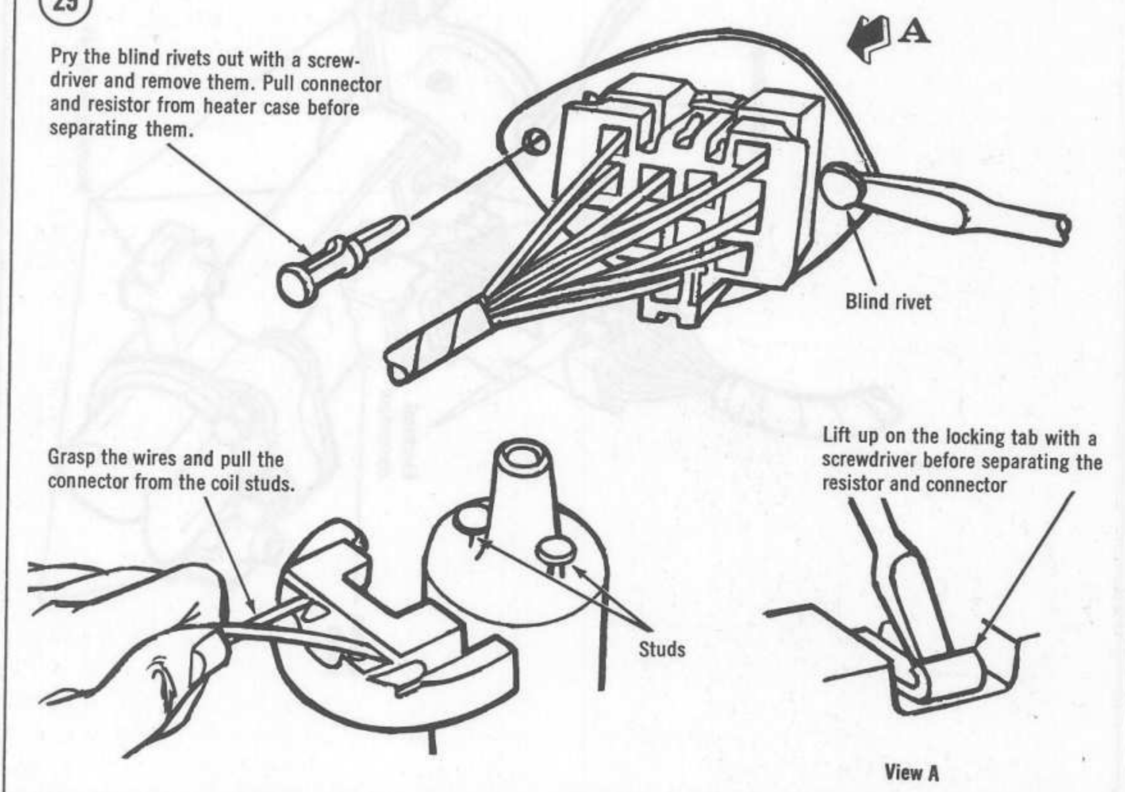

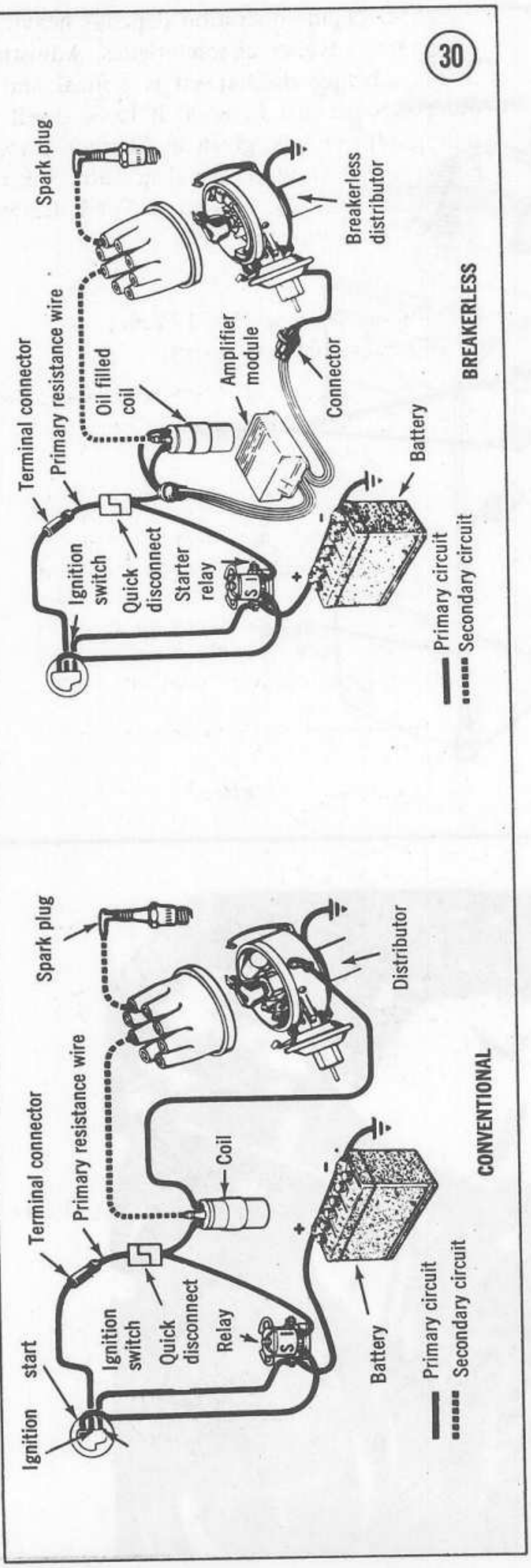

that all belt-driven accessories are tensioned to specification before the engine is restarted.

2. Remove the distributor cap and disconnect both vacuum lines from distributor diaphragm.

3. Disconnect the distributor primary lead (Figure 30) at the ignition coil.

4. To make installation easier, use the remote starter switch (**Figure 33**) mounted on the left front fender apron (above the voltage regulator), or a separate remote starter switch, to rotate the engine until the No. 1 cylinder is at top dead center on the compression stroke. This position is reached when the 0° mark on the engine crankshaft damper aligns with the timing pointer, and the distributor rotor points toward the No. 1 terminal in the distributor cap.

5. Scribe match marks on the distributor body and engine block where the distributor shaft enters the block. Scribe another mark on the top lip of the distributor body to indicate the direction the distributor rotor is pointing.

6. Remove the distributor hold-down bolt attaching the distributor to the engine block, then carefully lift the distributor away from the engine block.

Distributor Removal (1975-1976 Models—Breakerless Ignition System)

To remove the distributor, refer to Figure 31 (4-cylinder engines), Figure 32 (V6 engines), or **Figure 34** (V8 engines), while performing the following steps.

1. Remove the air cleaner assembly (V6 and V8 engines only), then disconnect the distributor wiring connector (Figure 30) from the vehicle wiring harness.

2. Remove the distributor cap and disconnect both vacuum lines from distributor diaphragm.

3. Disconnect the distributor primary lead (Figure 30) at the ignition coil.

4. To make installation easier, use the remote starter switch (Figure 33) mounted on the left front fender apron (above the voltage regulator), or a separate remote starter switch, to rotate the engine until the No. 1 cylinder is at top dead center on the compression stroke. This position

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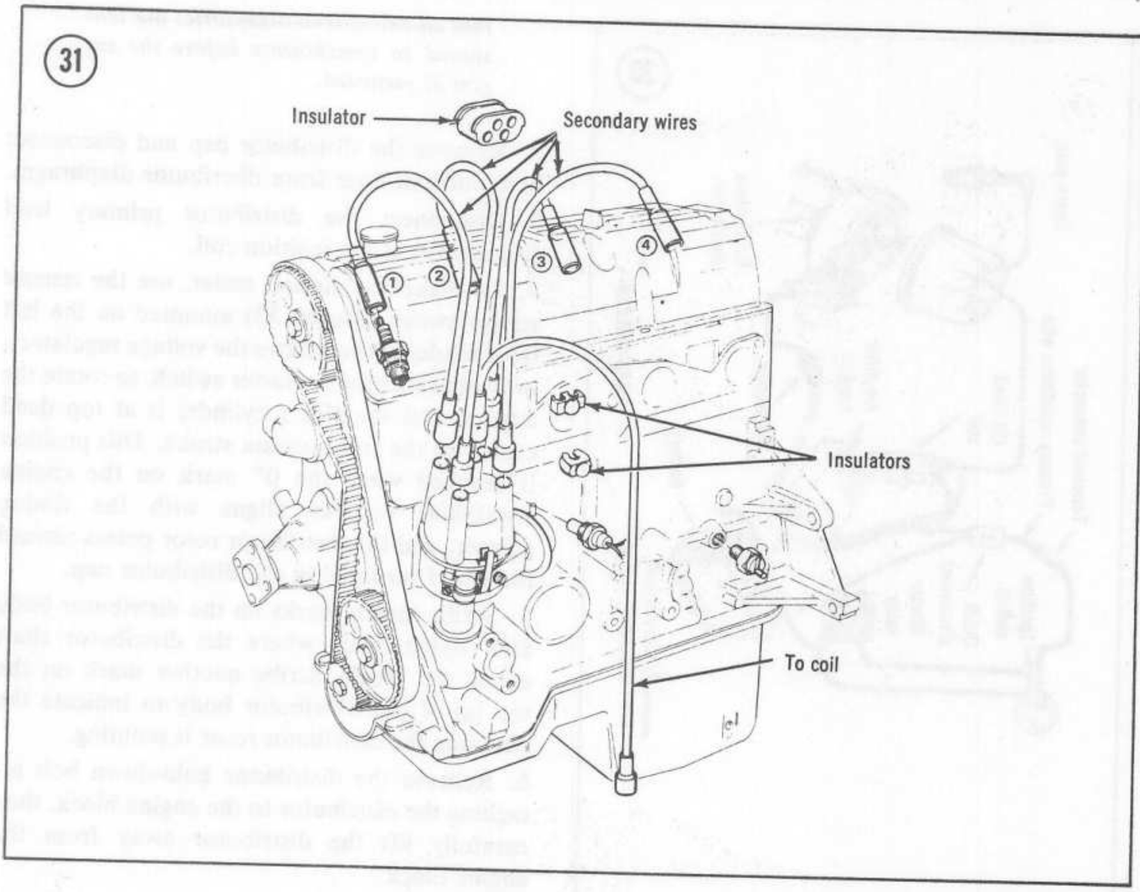

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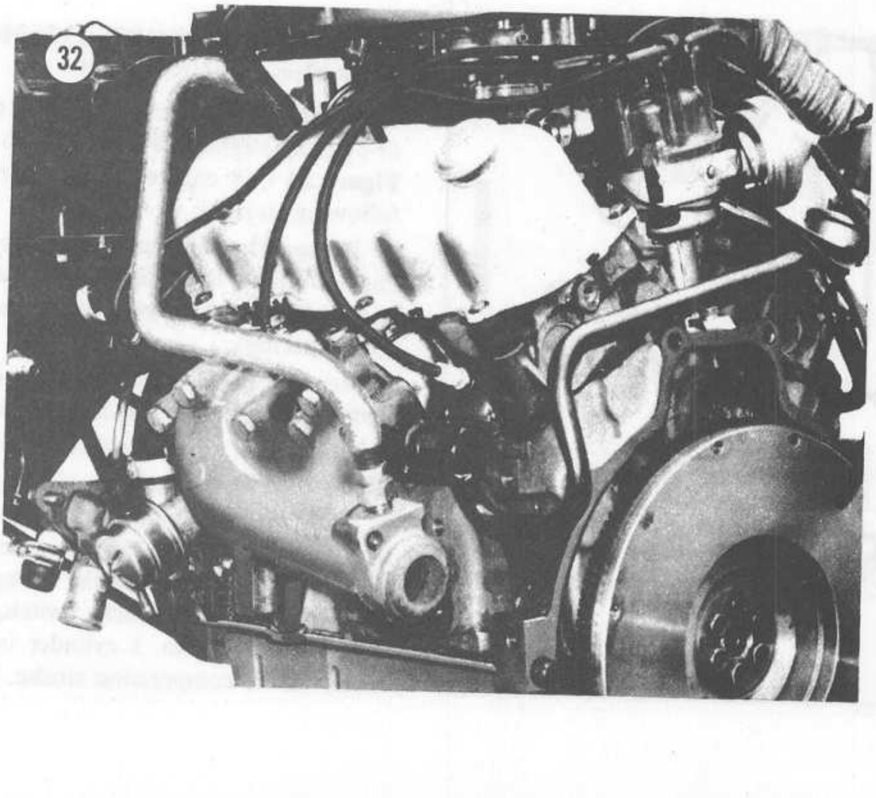

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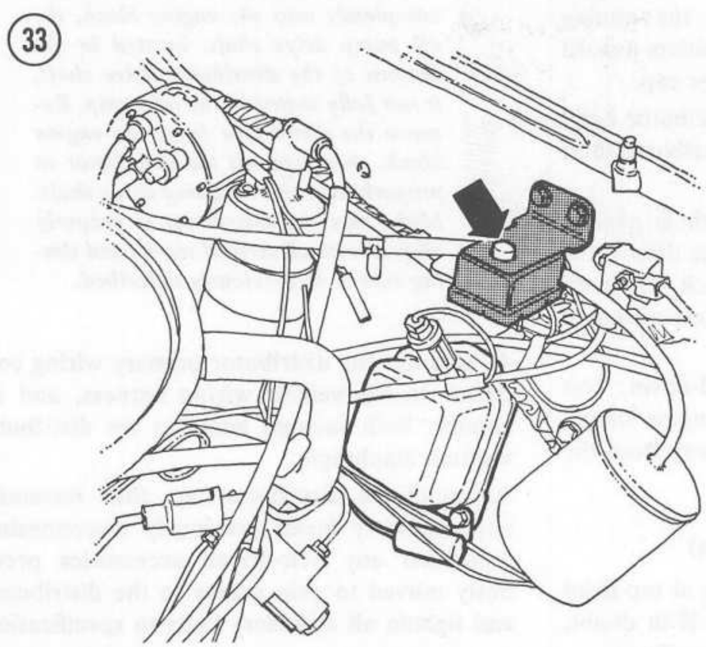

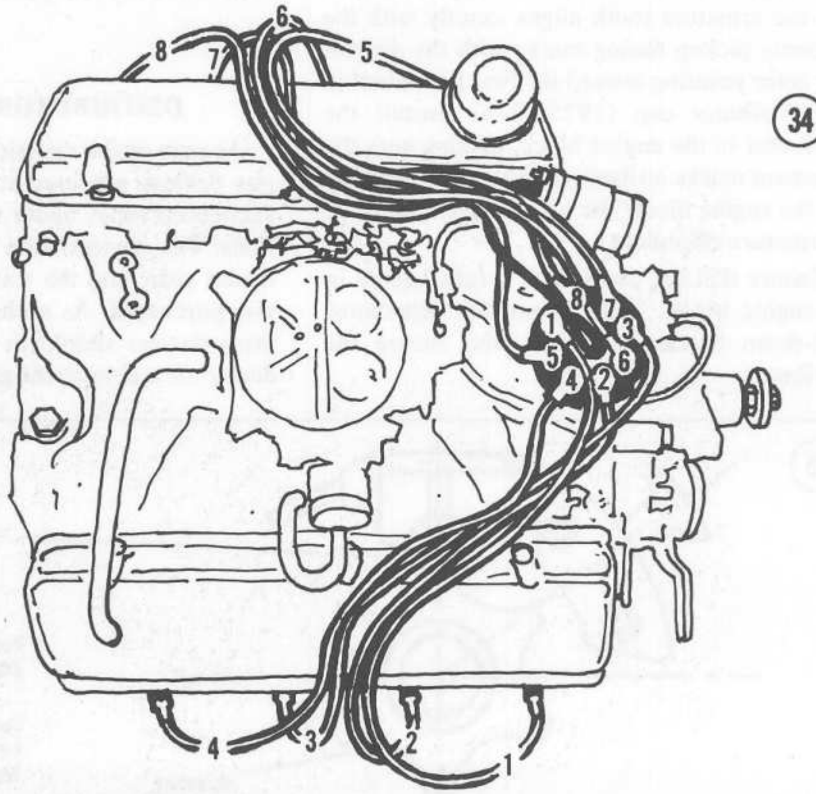

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is reached when the 0° marks on the engine crankshaft damper aligns with the timing pointer, and the distributor rotor points toward the No. 1 terminal in the distributor cap.

5. Scribe match marks on the distributor body and the engine block where the distributor shaft enters the block.

6. Ensure that the armature tooth is exactly aligned with the timing mark on the distributor magnetic pickup (**Figure 35**). Each ½ tooth alignment error is equal to 7¾ degrees of engine timing error.

7. Remove the distributor hold-down bolt attaching the distributor to the engine block, then carefully lift the distributor away from the engine block.

Distributor Installation (All Models)

1. Make sure the No. 1 cylinder is at top dead center on the compression stroke. If in doubt, refer to the distributor removal procedures.

2. Make sure the distributor rotor points to the scribe marks on the distributor body (1974), or that the armature tooth aligns exactly with the magnetic pickup timing marks with the distributor rotor pointing toward the No. 1 terminal in the distributor cap (1975-1976). Install the distributor in the engine block, making sure the alignment marks scribed on the distributor body and the engine block line up. Recheck the rotor or armature alignment.

3. Ensure that the distributor is fully seated in the engine block. Then install the distributor hold-down bracket and bolt and secure the distributor.

NOTE: *If the distributor fails to insert completely into the engine block, the oil pump drive shaft, located in the bottom of the distributor drive shaft, is not fully seated in the oil pump. Remove the distributor from the engine block, then reinstall the distributor to properly seat the oil pump drive shaft. Make sure the distributor is properly aligned with all scribed marks and timing marks as previously described.*

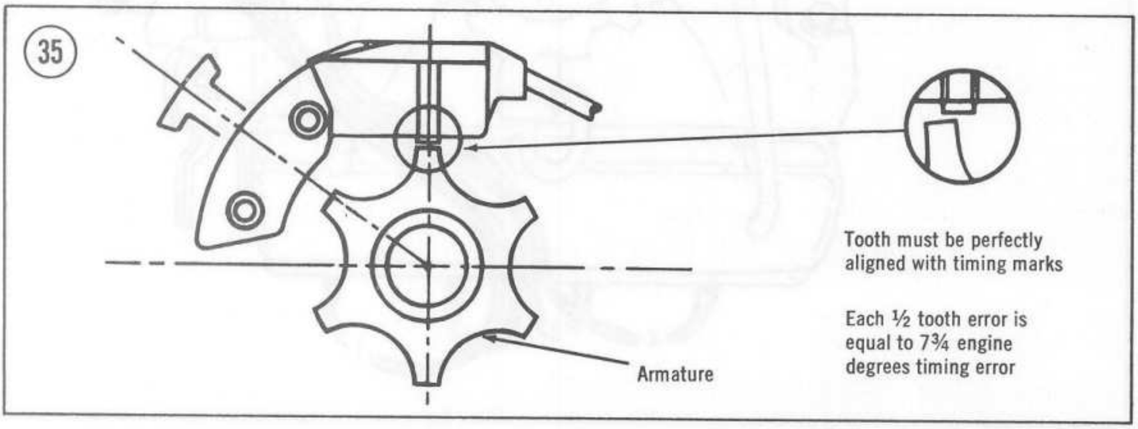
4. Connect the distributor primary wiring connector to the vehicle wiring harness, and reconnect both vacuum hoses to the distributor vacuum diaphragm.

5. Install the distributor cap, then reconnect any accessory hoses previously disconnected, reposition any belt-driven accessories previously moved to gain access to the distributor, and tighten all accessory belts to specification.

6. Reinstall air cleaner assembly (V6 and V8 engines), then check and adjust ignition timing as described in Chapter Two.

DISTRIBUTOR CONTROLS

As part of the emission control system, various devices are used to affect the distributor vacuum advance under different driving conditions. The devices used vary with engine type, model year, and the state in which the vehicle was purchased. As such, testing and service of these devices should be referred to your Ford dealer, or a competent garage.



CHAPTER EIGHT

CLUTCH

Mustang II clutches are single, dry-disc types with a diaphragm spring. Pressure plate diameter is 8½ in. with 2300cc engines, 9½ in. with 2800cc engines, and 10 in. with 302 cid engines. See **Table 1**, at the end of the chapter, for clutch specifications.

Major clutch components are the disc, pressure plate, release mechanism, and linkage. The disc has friction material riveted to both facings. Coil springs in the center of the disc absorb shock and smooth clutch engagement. The release mcehanism, consisting of a release lever and bearing, engages and disengages the clutch. The release mechanism is activated by a cable connected to the clutch pedal. **Figure 1** shows the clutch components for the 2300cc engine. **Figure 2** shows the clutch components for the 2800cc engine and the 302 cid engine.

CLUTCH ADJUSTMENT

Clutch adjustment is necessary to take up slack in the clutch cable caused by cable stretch and disc wear. The cable should be adjusted whenever the clutch fails to disengage completely, and also when new parts are installed. Normal clutch pedal free play is 1⅜-1⅝ in.

CAUTION

Improper adjustment of the clutch pedal is one of the most frequent causes of clutch failure and can be a contributing factor to some transmission failures.

1. Remove the clutch cable retaining clip at the dash panel. See **Figure 3** for 2300cc Mustang II; **Figure 4** for 2800cc and 302 cid models.
2. Remove the screw holding the clutch cable attaching bracket to the fender apron.
3. Pull the clutch cable toward the front of the car until the adjustment nut can be rotated. Rotate the nut away from the adjustment sleeve approximately ¼ in.
4. Release the clutch cable to neutralize the system, then pull the cable until free movement of the release lever is eliminated.
5. Rotate the adjustment nut toward the adjustment sleeve until contact is made, then index into the next notch.
6. Reinstall the clutch cable retaining clip and secure cable attaching bracket to the fender apron.

CLUTCH CABLE REPLACEMENT

2300cc Model

1. At the dash panel, remove the clutch cable retaining clip and pull the cable toward the front of the car until the adjustment nut can be

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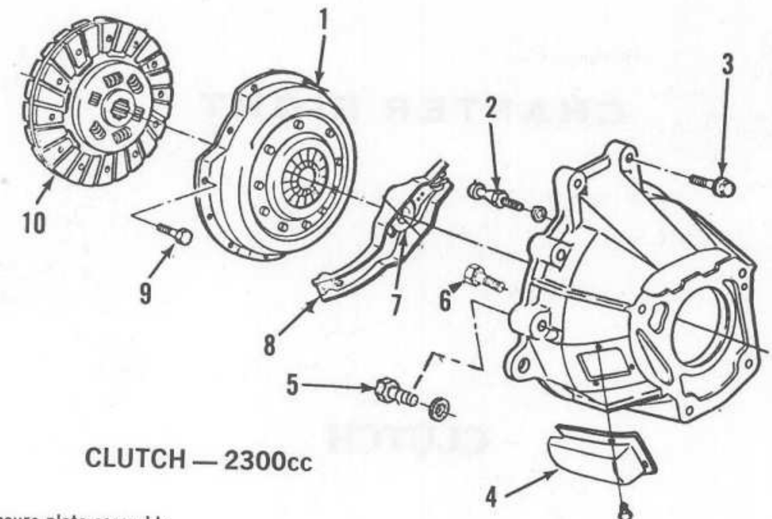

CLUTCH — 2300cc

1. Pressure plate assembly
2. Release lever fulcrum
3. Clutch housing to engine-bolt (2 upper)
4. Release lever cover
5. Clutch housing to engine-bolt (remainder)
6. Clutch housing to transmission-bolt
7. Release bearing hub
8. Release lever
9. Clutch cover bolt
10. Clutch disc

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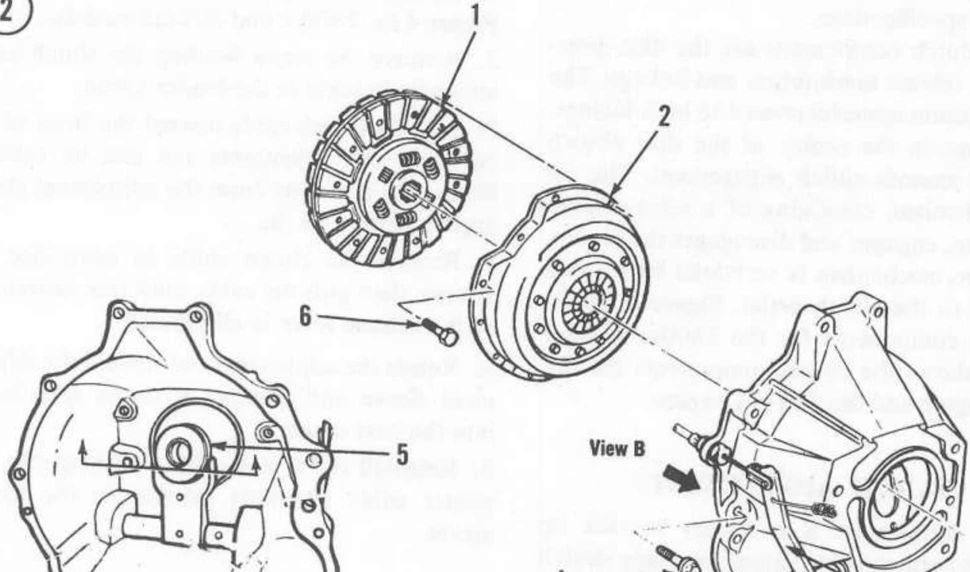
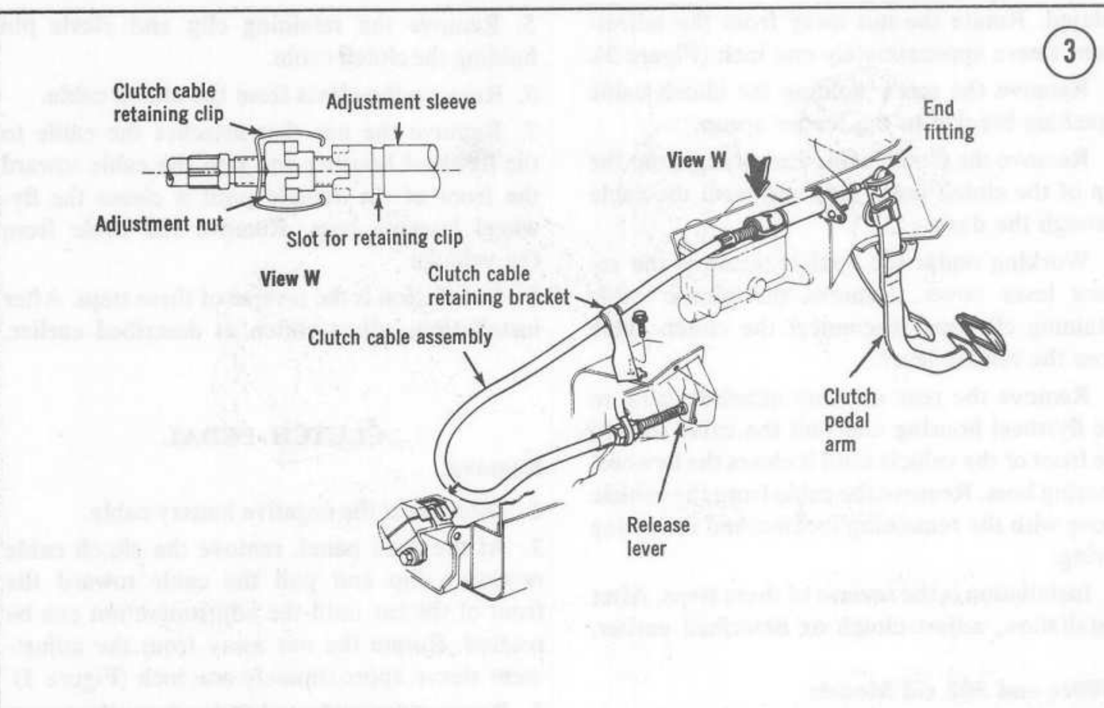
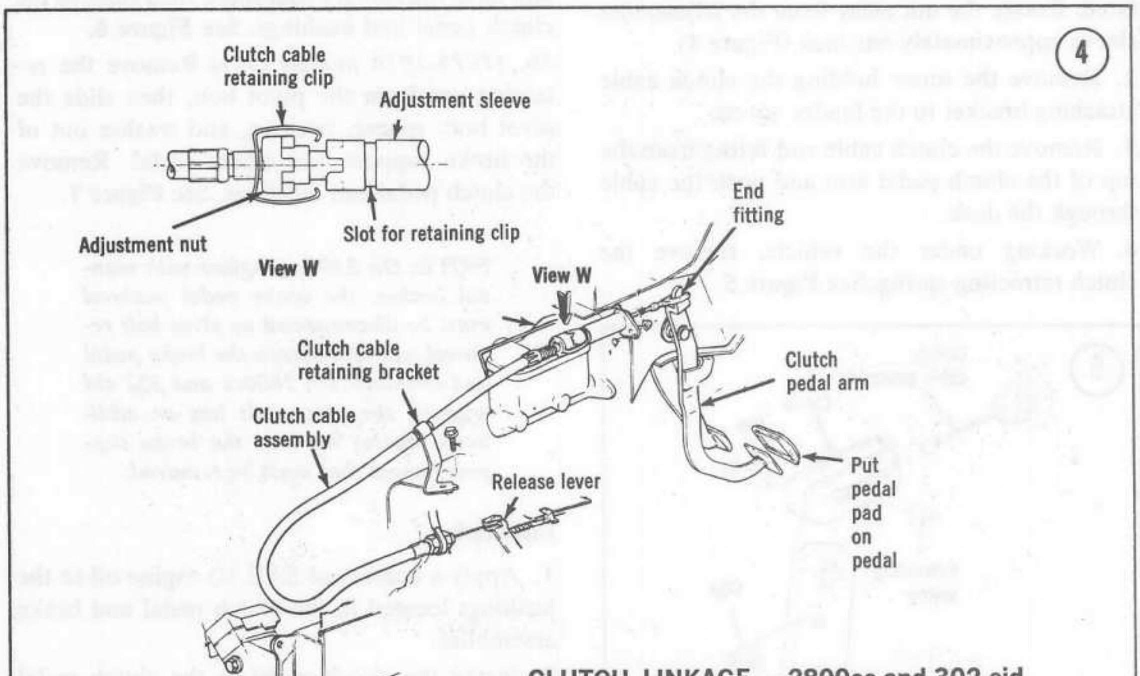


CLUTCH— 2800cc and 302 cid

1. Clutch disc
2. Pressure plate assembly
3. Release lever
4. Clutch housing to engine-bolt
5. Release bearing
6. Clutch cover bolt



CLUTCH LINKAGE — 2300cc



CLUTCH LINKAGE — 2800cc and 302 cid

rotated. Rotate the nut away from the adjustment sleeve approximately one inch (Figure 3).

2. Remove the screw holding the clutch cable attaching bracket to the fender apron.

3. Remove the clutch cable end fitting from the top of the clutch pedal arm and push the cable through the dash.

4. Working under the vehicle, remove the release lever cover. Remove the plastic cable retaining clip and disconnect the clutch cable from the release lever.

5. Remove the rear nut that attaches cable to the flywheel housing and pull the cable toward the front of the vehicle until it clears the flywheel housing boss. Remove the cable from the vehicle along with the remaining locknut and retracting spring.

6. Installation is the reverse of these steps. After installation, adjust clutch as described earlier.

2800cc and 302 cid Models

1. At the dash panel, remove the clutch cable retaining clip and pull the cable toward the front of the car until the adjustment nut can be rotated. Rotate the nut away from the adjustment sleeve approximately one inch (Figure 4).

2. Remove the screw holding the clutch cable attaching bracket to the fender apron.

3. Remove the clutch cable end fitting from the top of the clutch pedal arm and push the cable through the dash.

4. Working under the vehicle, remove the clutch retracting spring. See **Figure 5**.

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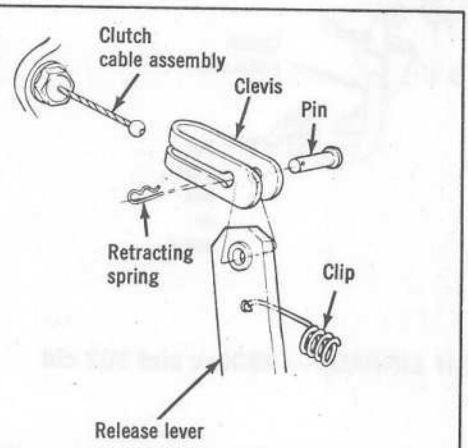

5. Remove the retaining clip and clevis pin holding the clutch cable.

6. Remove the clevis from the clutch cable.

7. Remove the nut that attaches the cable to the flywheel housing and pull the cable toward the front of the vehicle until it clears the flywheel housing boss. Remove the cable from the vehicle.

8. Installation is the reverse of these steps. After installation, adjust clutch as described earlier.

CLUTCH PEDAL

Removal

1. Disconnect the negative battery cable.

2. At the dash panel, remove the clutch cable retaining clip and pull the cable toward the front of the car until the adjustment nut can be rotated. Rotate the nut away from the adjustment sleeve approximately one inch (Figure 3).

3. Remove the cable end fitting from the top of the clutch pedal arm.

4a. *(1974 models only)* Remove the retaining clip from the clutch pedal shaft, then remove the clutch pedal and bushings. See **Figure 6**.

4b. *(1975-1976 models only)* Remove the retaining nut from the pivot bolt, then slide the pivot bolt, spacer, bushing, and washer out of the brake support and clutch pedal. Remove the clutch pedal and bushings. See **Figure 7**.

> NOTE: *On 2300cc engines with manual brakes, the brake pedal pushrod must be disconnected as pivot bolt removal will also detach the brake pedal and bushings. On 2800cc and 302 cid engines, the pivot bolt has an additional spacer between the brake support flanges that must be removed.*

Installation

1. Apply a coating of SAE 10 engine oil to the bushings located in the clutch pedal and brake assemblies.

2. Install the clutch pedal to the clutch pedal shaft (or pivot bolt and spacer) and install the retaining clip (or retaining nut) to the brake support.

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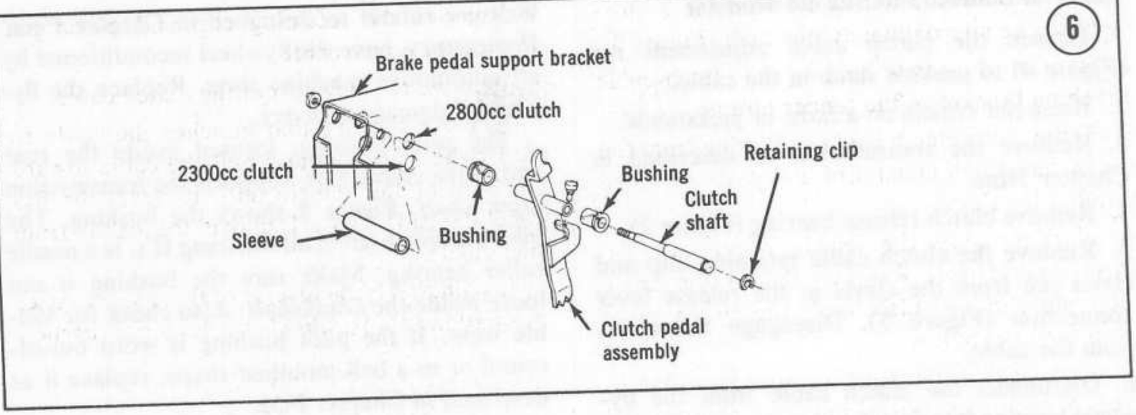

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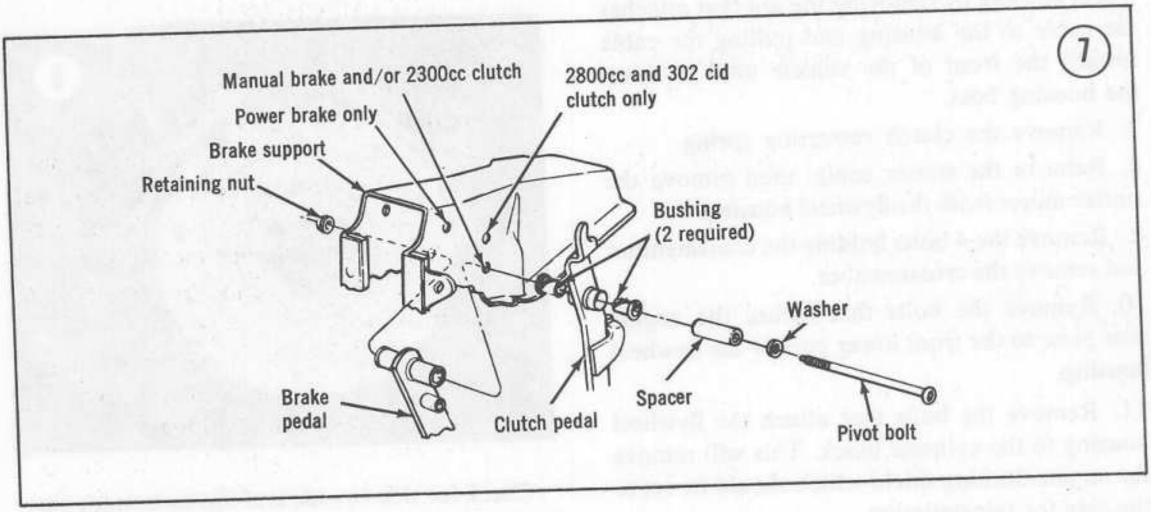


3. Attach the brake pedal pushrod (2300cc engines with manual brake only).
4. Tighten pivot bolt retaining nut.
5. Install the cable end fitting over the top of the clutch pedal arm.
6. Adjust the clutch pedal free travel.
7. Connect the battery cable.

CLUTCH

Removal (2800cc Model)

1. Loosen the clutch cable adjustment nut (Figure 3) to provide slack in the cable.
2. Raise the vehicle on a hoist or jackstands.
3. Remove the transmission as described in Chapter Nine.
4. Remove the clutch release lever cover and clutch cable retaining clip. Disengage clutch cable from release lever (Figures 1 and 3).
5. Disconnect the clutch cable from the flywheel housing.
6. Remove the starter cable and the starter motor from the flywheel housing.
7. Remove the bolts that secure the engine rear plate to the front lower part of the flywheel housing.
8. Remove the bolts that attach the housing to the cylinder block.
9. Move the housing back just far enough to clear the pressure plate, then remove.
10. Loosen evenly the 6 pressure plate cover attaching bolts, to release the spring tension without distortion of the cover.
11. Mark the flywheel and the edge of the pressure plate so they may be reassembled in the same relative positions. Use a sharp punch for marking.
12. Remove the pressure plate and clutch disc.

8

Removal (2800cc and 302 cid Models)

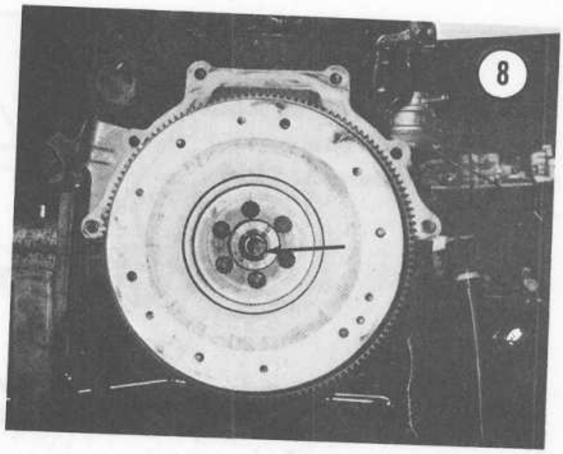
1. Loosen the clutch cable adjustment nut (Figure 4) to provide slack in the cable.
2. Raise the vehicle on a hoist or jackstands.
3. Remove the transmission as described in Chapter Nine.
4. Remove clutch release bearing (Figure 2).
5. Remove the clutch cable retaining clip and clevis pin from the clevis at the release lever connection (Figure 5). Disengage the clevis from the cable.
6. Disconnect the clutch cable from the flywheel housing by removing the nut that attaches the cable to the housing and pulling the cable toward the front of the vehicle until it clears the housing boss.
7. Remove the clutch retracting spring.
8. Remove the starter cable; then remove the starter motor from the flywheel housing.
9. Remove the 4 bolts holding the crossmember and remove the crossmember.
10. Remove the bolts that secure the engine rear plate to the front lower part of the flywheel housing.
11. Remove the bolts that attach the flywheel housing to the cylinder block. This will remove the engine decking shield which should be set to the side for reinstallation.
12. Move the housing back just far enough to clear the pressure plate, then remove.
13. Loosen the 6 pressure plate cover attaching bolts evenly to release the spring tension and avoid distortion of the cover.
14. Mark the flywheel and the edge of the pressure plate so they may be reassembled in the same relative positions. Use a sharp punch for marking.
15. Remove the pressure plate and clutch disc.

Inspection

Never replace clutch parts without considering the cause of failure. To do so only invites repeated problems.

Clean the friction surface of the flywheel with non-petroleum base cleaner such as trichloroethylene or alcohol. Inspect for cracks or scores and excessive runout. Attach a dial gauge and measure runout as described in Chapter Four. If necessary, have the flywheel reconditioned by an automotive machine shop. Replace the flywheel if damage is severe.

The pilot bushing, located inside the rear end of the crankshaft, supports the transmission input shaft. **Figure 8** shows the bushing. The pilot bushing used in all Mustang II's, is a needle roller bearing. Make sure the bushing is not loose inside the crankshaft. Also check for visible wear. If the pilot bushing is worn out-of-round or to a bell-mouthed shape, replace it as described in Chapter Four.



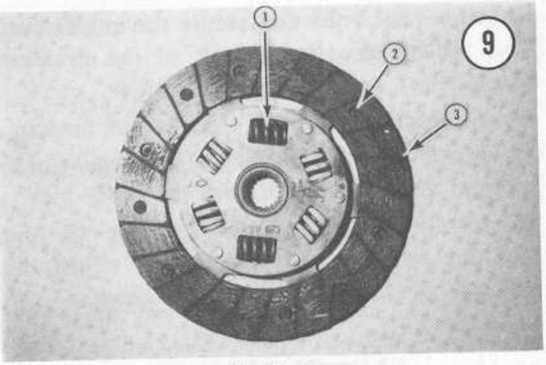
Check for side-to-side and top-to-bottom play in the pilot bushing. If it is loose or sloppy, replace it as described in Chapter Four.

Check the clutch disc (**Figure 9**) for oil or grease on the facings, glazed facings, warped facings, loose or missing rivets, facings worn down to rivets, and broken springs (loose springs are OK). The disc must be replaced if any of these conditions are present. The disc should also be replaced if the facings are worn and a new pressure plate is being installed.

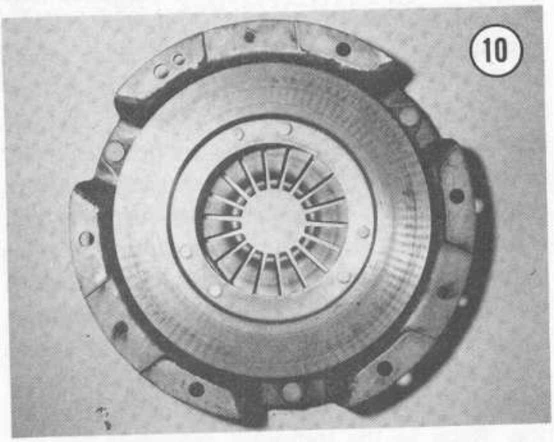
CAUTION

Eliminate the source of any oil or grease before replacing the disc.

Check the pressure plate (**Figure 10**) for scoring, overheating (blue-tinted areas), and cracks. Replace the pressure plate if these are evident. If inspection does not reveal the problem, take the disc and pressure plate to a competent garage and have the disc checked for deflection, and the pressure plate checked for proper dia-



1. Disc spring
2. Rivet
3. Clutch facing



phragm spring height and runout. Do not attempt to readjust the fingers or dismantle the pressure plate without proper tools and experience.

Check the release bearing as described later in this chapter to determine if it caused the original trouble. Never reuse a release bearing unless necessary. When other clutch parts are worn, the bearing is probably worn. If it is necessary to reinstall the old bearing, do not wash it in solvent; wipe with a clean cloth.

Installation (2300cc Model)

1. Be sure your hands are clean.

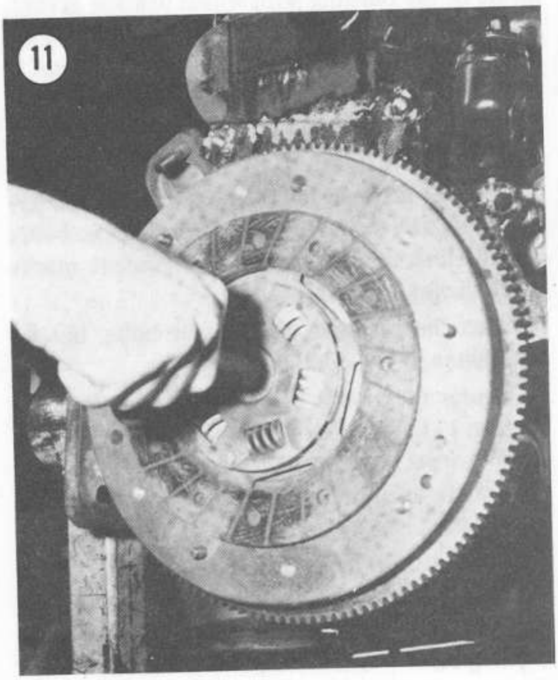
2. Inspect the disc facings, pressure plate, and flywheel to be sure they are free of oil, grease, or other foreign material. Do not touch the disc facings.

3. Clean the clutch pilot bushing. Coat the inside of the bushing with wheel bearing grease. Wipe off any excess grease so it will not be thrown onto the clutch disc when the car is driven.

4. Place the clutch disc and pressure plate in position on the flywheel. Make sure the pressure plate fits over the 3 dowel pins on the flywheel. If the original pressure plate is being reused, line up the punched alignment marks made during removal.

5. Start the pressure plate cover bolts, but do not tighten.

6. Center the clutch disc with an aligning tool (**Figure 11**). These can be bought at many auto parts stores. An excellent substitute is an old transmission input shaft, available from wrecking yards.



7. Tighten the pressure plate cover bolts. Tighten gradually in a diagonal pattern to prevent warping the clutch cover, then remove aligning tool. Correct torque is 12-24 ft.-lb.

8. Install release mechanism in the clutch housing as described in this chapter.

9. Position the flywheel housing on the dowels in the cylinder block.

10. Install the starting motor and connect the starter cable.

11. Install the bolts that secure the engine rear plate to the front lower part of the flywheel housing.

12. Connect the clutch to the flywheel huosing.

13. Connect the clutch cable to the release lever and reinstall the clutch cable retaining clip.

14. Install the clutch release lever cover.

Installation (2800cc and 302 cid Models)

1. Be sure your hands are clean.

2. Inspect the disc facings, pressure plate, and flywheel to be sure they are free of oil, grease, or other foreign material. Do not touch the disc facings.

3. Clean the clutch pilot bushing. Coat the inside of the bushing with wheel bearing grease. Wipe off any excess grease so it will not be thrown onto the clutch disc when the car is driven.

4. Place the clutch disc and pressure plate in position on the flywheel. Make sure the pressure plate cover fits over the 3 dowel pins on the flywheel. If the original pressure plate is being reused, line up the punched alignment marks made during removal.

5. Start the pressure plate cover bolts, but do not tighten.

6. Center the clutch disc with an aligning tool (Figure 11). These can be bought at many auto parts stores. An excellent substitute is an old transmission input shaft, available from wrecking yards.

7. Tighten the pressure plate cover bolts. Tighten gradually in a diagonal pattern to prevent warping the clutch cover, then remove aligning tool. Correct torque is 12-24 ft.-lb.

8. Install release bearing to release lever.

9. Position the flywheel housing on the dowels in the cylinder block. Install and alternately tighten the attaching bolts to 28-38 ft.-lb. The engine decking shield is installed during this step using the appropriate housing bolts.

10. Install the 4 crossmember bolts and tighten.

11. Install the starting motor and connect the starter cable.

12. Install the transmission as described in Chapter Nine.

13. Install the bolts that secure the engine rear plate to the front lower part of the flywheel housing.

14. Connect the clutch to the flywheel housing.

15. Install the clevis and connect the clutch cable to the release lever with the clevis pin.

16. Install the clutch cable retaining clip and retaining spring. After installation, adjust the clutch as described earlier in this chapter.

CLUTCH RELEASE MECHANISM

The release mechanism removal requires that the transmission be removed first. The release mechanism is incorporated in the clutch housing, which in turn is bolted to the front of the transmission. In 2300cc installations, the release lever and release bearing are both removed from the clutch housing for servicing. In both the 2800cc and 302 cid installations, only the release bearing is removed. The following procedures apply to 2300cc installations only. For 2800cc and 302 cid installations, remove and install the release bearing through the opening in the rear of the clutch housing. All release bearings should be lubricated prior to installation. Refer to the following procedure for instructions on lubrication. Transmission removal procedures are described in Chapter Nine.

Removal

1. Remove the release lever cover from the clutch housing (**Figure 12**).

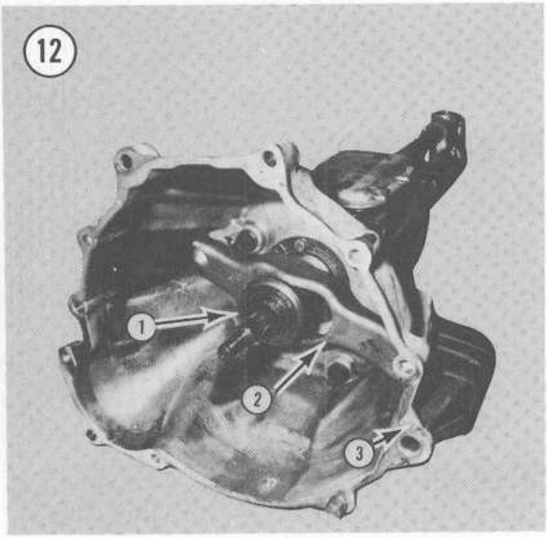
2. Pull the end of the release lever off the fulcrum ball. The lever snaps on and off the fulcrum. Take the lever and release bearing out of the clutch housing.

3. Remove the release bearing from the release lever. The bearing is held in place by 2 spring clips. Push the bearing away from the clips to remove.

Inspection

Check release mechanism for the following:

a. Wear at the contact point of the release lever and its fulcrum ball. Replace the lever of fulcrum if worn.



1. Release bearing
2. Release lever
3. Dust cover

b. Grease leaking from the release bearing. Replace the bearing if this is evident.
c. A worn release bearing. To check, hold the inner race with fingers and rotate the outer race while applying light pressure to it. If the bearing feels rough or makes noise, replace it.

CAUTION

The release bearing is prelubricated and sealed. Do not clean the bearing in solvent or it will be ruined. Clean with a lint-free cloth.

Installation

1. Fill the grease groove of the release bearing hub with lithium-base grease. Clean all excess grease from inside the bore of the bearing hub.
2. Push the release bearing into place on the release lever. When the bearing is in place, rotate it to make sure it operates smoothly.
3. Place the release lever into the clutch housing with the cable end projecting through the hole in the clutch housing.
4. Snap the release lever onto its fulcrum ball.
5. Install the release lever cover in the clutch housing.
6. Install the transmission as described in Chapter Nine.
7. Connect the clutch cable to the flywheel housing, connect the clutch cable to the release lever and reinstall the cable retainer.
8. Install the transmission as described in Chapter Nine. After installation, adjust the clutch as described in this chapter.

8

Table 1 CLUTCH SPECIFICATIONS

Type	Single dry plate, diaphragm spring
Size	
With 2300cc engines	$8\frac{1}{2}$ in.
With 2800cc engines	$9\frac{1}{2}$ in.
With 302 cid engines	10 in.
Pedal free-play	$1\frac{3}{8}$ - $1\frac{5}{8}$ in.
Torque	
Flywheel housing bolts	28-38 ft.-lb.
Pressure plate to flywheel bolts	12-24 ft.-lb.

CHAPTER NINE

TRANSMISSION

The Mustang II uses a 4-speed Model RAD manual transmission as standard equipment. A 3-speed C3 automatic is optional with the 2300cc engine, and a 3-speed C4 automatic is optional with both the 2800cc and the 302 cid engines. This chapter contains, removal, repair, and installation procedures for the manual transmission, as well as testing, adjustment, removal, and installation procedures for the automatic. Complete torque specifications are given in **Table 1** at the end of the chapter.

MANUAL TRANSMISSION

The RAD 4-speed transmission is fully synchronized with all gears except the reverse gear being in constant mesh. All forward speed changes are accomplished through forged blocker ring synchronized units.

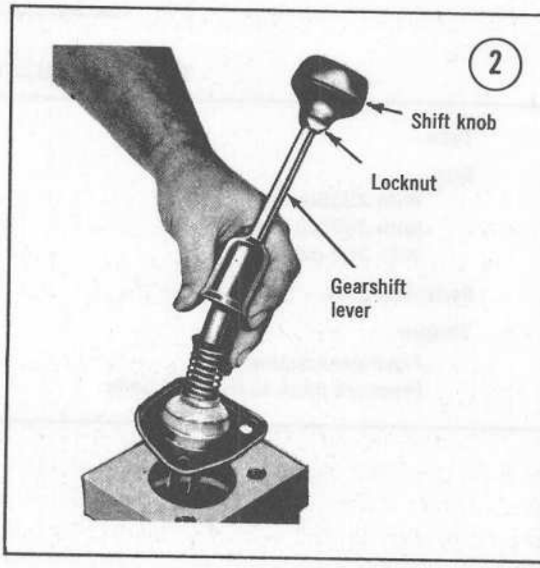
Shift Lever Removal

1. Disconnect the ground cable from battery.
2. Place the gearshift lever in NEUTRAL position.
3. Remove the carpet and shift lever boot (**Figure 1**).
4. Remove the 3 shift lever attaching bolts.

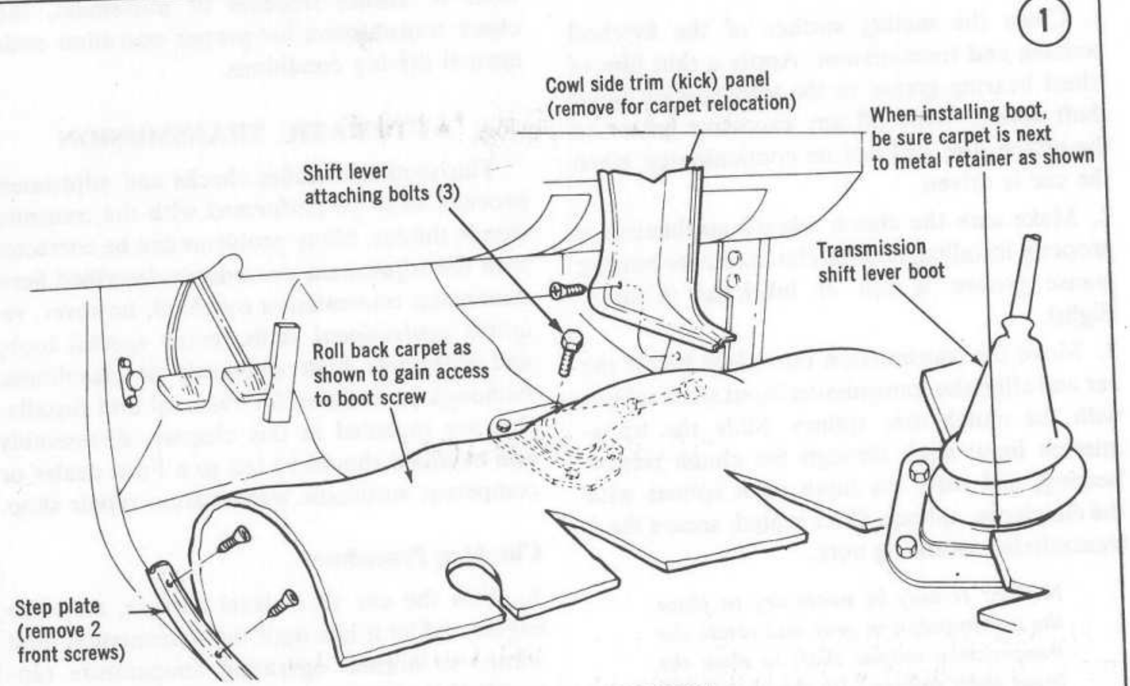
CAUTION
Bolts are metric (8mm).

Shift Lever Installation

1. Make sure the shift lever insulator is mounted directly on top of the shift rail.
2. Position the shift lever in the transmission extension housing so that the forked ends of the shift lever engage the insulator properly. See **Figure 2**.



3. Install the 3 shift lever attaching bolts (8mm).
4. Install shift lever boot and attaching screws.



SHIFT LEVER REMOVAL

5. Position the carpet or floor mat, and install the step plates and screws.
6. Install the 2 kick panels.
7. Install the locknut and shift knob (if removed previously).
8. Operate the shift lever to ensure proper operation.

Transmission Removal

1. Disconnect negative cable from battery.
2. Place the gearshift lever in NEUTRAL, then loosen the locknut just below the gearshift knob. Unscrew the gearshift knob and locknut.
3. Remove the shift lever as described earlier in this chapter.
4. Raise the vehicle on a hoist or jackstands. Remove the drive shaft, as described in Chapter Twelve, and either drain the transmission or insert a plug in the extension housing to prevent lubricant leakage.
5. Disconnect the seat belt sensing switch and the back-up lamp switch wires from the transmission.
6. Remove the speedometer cable and driven gear from the extension housing, then plug the speedometer cable hole to prevent lubricant leakage.
7. Support the rear of the engine with a jack, then remove the bolts attaching the rear crossmember to the frame.
8. Remove the 2 bolts attaching the rear crossmember to the transmission extension housing, then remove the rear crossmember.
9. Lower the engine, as required, to allow removal of the bolts attaching the transmission to the flywheel housing.
10. Slide the transmission away from the flywheel housing taking care to prevent damage to the clutch release bearing.
11. Once the transmission is separated from the flywheel housing, remove the transmission from under the vehicle.

NOTE: *Leave the jack beneath the engine to support it while the transmission is out of the car.*

9

Transmission Installation

1. Clean the mating surface of the flywheel housing and transmission. Apply a thin film of wheel bearing grease to the transmission input shaft spline. Wipe off any excessive grease so the clutch disc will not be contaminated when the car is driven.

2. Make sure the clutch release mechanism is properly installed, and the clutch release bearing grease groove is full of lubricant (Chapter Eight).

3. Move the transmission into place below the car and align the transmission input shaft splines with the clutch disc splines. Slide the transmission input shaft through the clutch release bearing, and mate the input shaft splines with the clutch disc splines. Once mated, secure the 4 transmission attaching nuts.

> NOTE: *It may be necessary to place the transmission in gear and rotate the transmission output shaft to align the input shaft splines with the clutch disc splines.*

4. Use the jack supporting the engine to raise the engine until the transmission is in normal position, then secure the rear crossmember to the frame and tighten to 20-30 ft.-lb.

5. Install the 2 bolts attaching the rear crossmember to the transmission extension housing and tighten to 40-60 ft.-lb.

6. Remove the jack from beneath the engine.

7. Install the speedometer cable and driven gear in the transmission extension housing, and tighten to 3-5 ft.-lb.

8. Install the drive shaft making sure it is connected in the original position.

9. Fill the transmission with lubricant recommended in Chapter Two until the lubricant appears at the bottom of the filler plug hole, then install the filler plug and tighten 15-25 ft.-lb.

10. Reconnect the seat belt sensing switch and the back-up lamp switch on the transmission extension housing. Lower the car.

11. Working inside the vehicle, reinstall the shift lever and carpet as described earlier in this chapter.

12. Move the shift lever through all gear positions to ensure freedom of movement, then check transmission for proper operation under normal driving conditions.

AUTOMATIC TRANSMISSION

This section includes checks and adjustment procedures to be performed with the transmission in the car. Many problems can be corrected with the adjustment procedures described here. Automatic transmission overhaul, however, requires professional skills, many special tools, and extremely high standards of cleanliness. Although procedures for removal and installation are included in this chapter, disassembly and overhaul should be left to a Ford dealer or competent automatic transmission repair shop.

Checking Procedures

1. With the car on a level surface, start the engine and let it idle until the transmission fluid warms to normal operating temperature (approximately 30 minutes). Proper operating temperature may also be obtained by driving the vehicle 15-20 miles under normal city type driving conditions. When normal operating temperature is obtained, park the vehicle, apply the brakes and move the shift lever through all gear positions to PARK. With the engine running, check the transmision fluid level on the dipstick. Top up if the fluid level is below the ADD mark. Do not top up if the fluid level is between the ADD and FULL marks.

CAUTION

Do not overfill the transmission. An excessive fluid level can cause the fluid to become foamy, resulting in wear or damage to the transmission.

2. Move the selector lever through the gears feeling for the lever detents. Make sure the selector lever pointer indicates the correct gear at each lever position. If it does not, adjust the shift linkage as described in this chapter.

3. Make sure the starter operates only in NEUTRAL or PARK. If a problem is detected, adjust the neutral start switch as described in this chapter.

4. Connect a tachometer to the engine and measure idle rpm. It should be 550 rpm for

2300cc engines, and 500 rpm for 2800cc and 302 cid engines. If idle is incorrect, adjust as described in Chapter Five.

5. With engine idling and brakes applied, move selector lever through the gears. The shift into gear should be noticeable, but not excessively harsh.

6. With the engine at idle, release the brakes and check for excessive creeping in 1, 2, D, and R.

Road Test

1. Place the gear selector lever in 1 position and accelerate. There should be no transmission upshift.

2. Accelerate in 1, then shift to 2; there should be an upshift.

3. Drive in DRIVE at a speed over 30 mph. Pull the shift lever into 2 position, then into 1 position. The transmission should downshift to second.

4. Run at a speed below 25 mph in DRIVE, and pull the selector lever to 1. The transmission should downshift to first.

5. Accelerate in DRIVE from a standing start, using just enough throttle to get the car moving. Note the speedometer reading when the car shifts from first to second, then second to third. Compare the observed speedometer readings with specifications in **Tables 2, 3, or 4** as applicable.

Table 2 2300cc ENGINE AUTOMATIC TRANSMISSION SHIFT SPEEDS

Throttle Position	Range	Shift	Shift Speed*
Minimum	D	1-2	11-15
	D	2-3	16-22
	D	3-2	13-16
	D	2-1	6-9
To detent	D	1-2	15-21
	D	2-3	29-40
	D	3-2	35 Max.
	D	2-1	20-31
Wide open	D	1-2	35-41
	D	2-3	62-69
	D	3-2	63 Max.
	D	3-1	23 Max.

*3.55:1 rear axle ratio

6. Accelerate in DRIVE with gas pedal pushed to the downshift detent, but not through it. Notice the first-to-second and second-to-third shift speeds, and compare with Tables 2, 3, or 4 as applicable.

7. Drive with the transmission in third gear. Press the accelerator to the floor (through the

Table 3 2800cc ENGINE AUTOMATIC TRANSMISSION SHIFT SPEEDS

Throttle Position	Range	Shift	1*	2**	3***
Minimum	D	1-2	8-10	7-9	7-8
	D	2-3	9-22	8-20	7-19
	D	3-1 or 2-1	8-10	7-9	7-8
	1	2-1	33-42	29-37	28-35
To detent	D	1-2	23-37 (19-34)	20-33 (16-31)	19-32 (16-29)
	D	2-3	38-56 (33-52)	33-49 (29-46)	32-47 (28-44)
	D	3-2	33 Maximum	29 Maximum	28 Maximum
	D	3-1 or 2-1	10 Maximum	9 Maximum	8 Maximum
Wide open	D	1-2	41-54 (39-52)	36-47 (34-45)	35-45 (33-44)
	D	2-3	72-91 (70-89)	64-80 (62-79)	61-77 (59-75)
	D	3-2	77 Maximum	68 Maximum	65 Maximum
	D	3-1 or 2-1	46 Maximum	40 Maximum	39 Maximum

*3.00:1 rear axle ratio **3.40:1 rear axle ratio ***3.55:1 rear axle ratio
Numbers in parentheses apply to California emission control equipped vehicles only.

9

Table 4 302 CID ENGINE AUTOMATIC TRANSMISSION SHIFT SPEEDS

Throttle Position	Range	Shift	1*	2**	3***
Minimum	D	1-2	8-11	7-10	7-9
	D	2-3	10-24 (8-23)	9-21 (7-20)	8-20 (7-19)
	D	3-1	8-10	7-9	7-8
	1	2-1	29-37 (25-34)	26-32 (22-30)	25-31 (21-29)
To detent	D	1-2	21-32 (11-27)	19-28 (10-24)	18-27 (10-23)
	D	2-3	41-52 (33-44)	36-46 (29-39)	35-44 (28-37)
	D	3-2	35 Max. (30 Max.)	31 Max. (26 Max.)	29 Max. (25 Max.)
	D	3-1 or 2-1	19 Max. (11 Max.)	17 Max. (10 Max.)	16 Max. (9 Max.)
Wide open	D	1-2	35-44 (32-42)	31-39 (28-37)	30-37 (27-35)
	D	2-3	58-70 (56-67)	52-62 (49-59)	49-59 (47-57)
	D	3-2	65 Max. (61 Max.)	57 Max. (55 Max.)	55 Max. (53 Max.)
	D	3-1 or 2-1	32 Max. (30 Max.)	28 Max. (26 Max.)	27 Max. (25 Max.)

*3.00:1 rear axle ratio **3.40:1 rear axle ratio ***3.55:1 rear axle ratio
Numbers in parentheses apply to California emission control equipped vehicles only.

downshift detent). Compare the third-to-second and the third-to-first shift speeds with Tables 2, 3, or 4 as applicable.

8. Park the car on a slope. Apply the brakes and shift to PARK. Release the brake and make sure the transmission holds the car without rolling. Check with the car facing both up and down the hill.

Leak Inspection

1. Check the speedometer cable connection to the transmission extension housing (**Figure 3**). Replace the rubber seal if necessary.

2. Check the transmission oil pan. If leaking is evident, tighten the bolts to 12-17 ft.-lb. If necessary, remove the oil pan and replace the mating gasket.

3. Check the connection between the transmission oil filler (dipstick) tube and the transmission case. Replace the O-ring seal if a leak is detected. To replace, detach the filler tube bracket from the engine, lift the filler tube out of the transmission, install a new O-ring, then reinstall the filler tube and reconnect the filler tube bracket.

4. Check the transmission fluid cooler lines and fittings. If a leak cannot be stopped by tightening the fittings, replace the damaged parts.

5. Remove the radiator cap and look at the engine coolant. If the transmission fluid is present in the coolant, the transmission fluid cooler in the bottom of the radiator is probably leaking. Consult your Ford dealer or other competent repair shop.

6. If transmission fluid cooler leaking is suspected, disconnect the cooler lines from the cooler fitting at the lower part of the radiator. Attach a pressure gauge to one fitting and apply 50-75 psi air pressure to the other fitting. If the cooler fails to hold pressure, it is defective and must be replaced by a dealer or radiator shop.

7. Check the downshift control lever and the manual lever where they enter the left side of the transmission for leaks. Replace the seals as needed.

8. Remove the torque converter access cover at the front of the flywheel housing, and check the torque converter drain plug (**Figure 4**) for leakage. If the plug leaks, remove it and coat the threads with gasket sealer. Reinstall and tighten to 28-38 ft.-lb.

9. After inspection for leaks is complete, fill the transmission with fluid.

> NOTE: *The following 3 procedures—manual linkage adjustment, downshift linkage adjustment, and neutral start switch adjustment—must be performed in the order in which they are listed.*

Manual Linkage Adjustment

1. Place the transmission shift lever in DRIVE. Apply the handbrake firmly. Raise the front end of the vehicle and place it on jackstands.

2. Working beneath the car, loosen the nut securing the manual linkage rod to the base of the shift lever (**Figure 5**).

3. Move the transmission manual lever (Figure 5) to the DRIVE position (second detent from the rear of the transmission).

4. Have an assistant press the transmission shift lever firmly against the rear DRIVE stop, then tighten the nut securing the manual linkage rod to the base of the shift lever to 10-20 ft.-lb.

5. Lower the car from the jackstands, and check the operation of the transmission in each shift lever position.

Downshift Linkage Adjustment

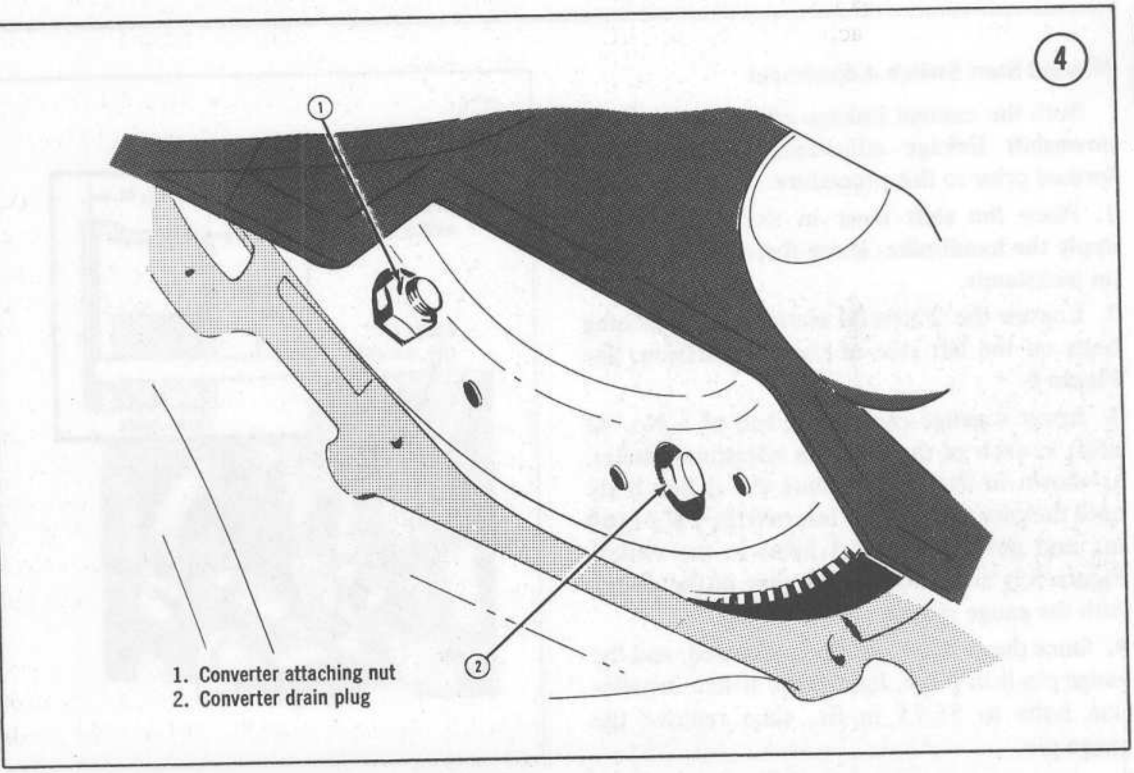
The manual linkage adjustment must be accomplished before attempting the downshift linkage adjustment.

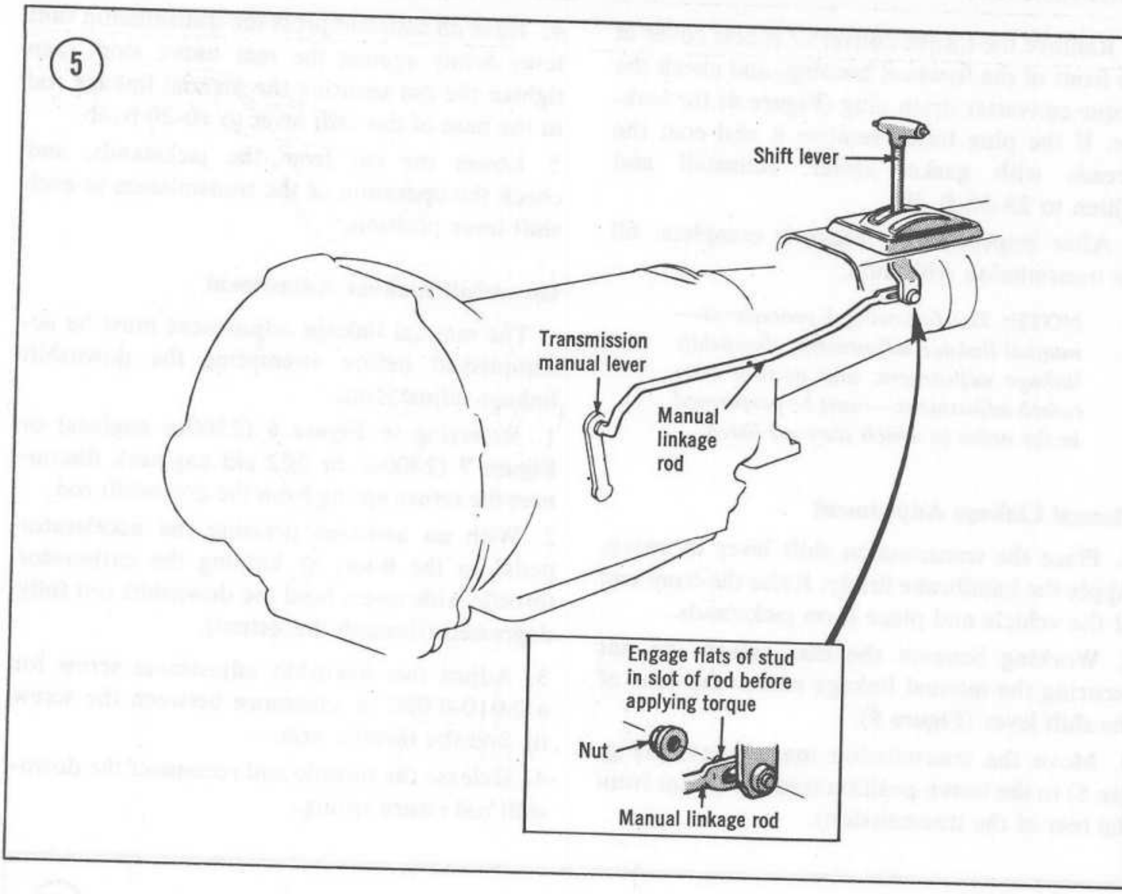
1. Referring to **Figure 6** (2300cc engines) or **Figure 7** (2800cc or 302 cid engines), disconnect the return spring from the downshift rod.

2. With an assistant pressing the accelerator pedal to the floor, or holding the carburetor throttle wide open, hold the downshift rod fully depressed (through the detent).

3. Adjust the downshift adjustment screw for a 0.010-0.080 in. clearance between the screw tip and the throttle arm.

4. Release the throttle and reconnect the downshift rod return spring.





Neutral Start Switch Adjustment

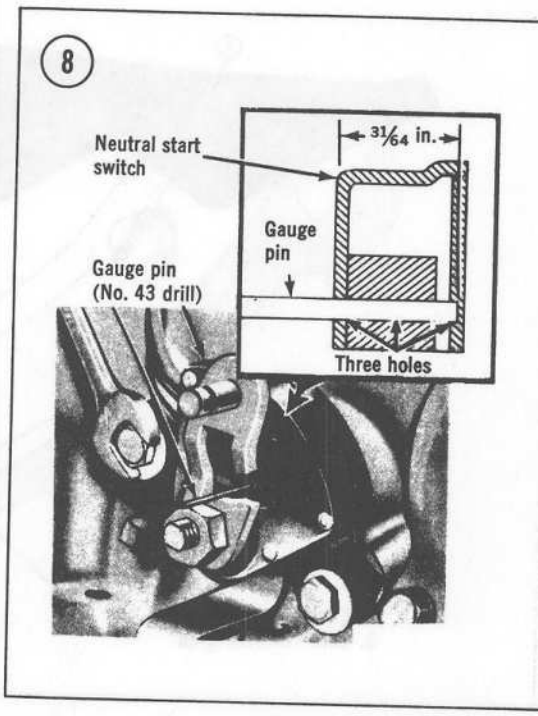
Both the manual linkage adjustment and the downshift linkage adjustment must be performed prior to this procedure.

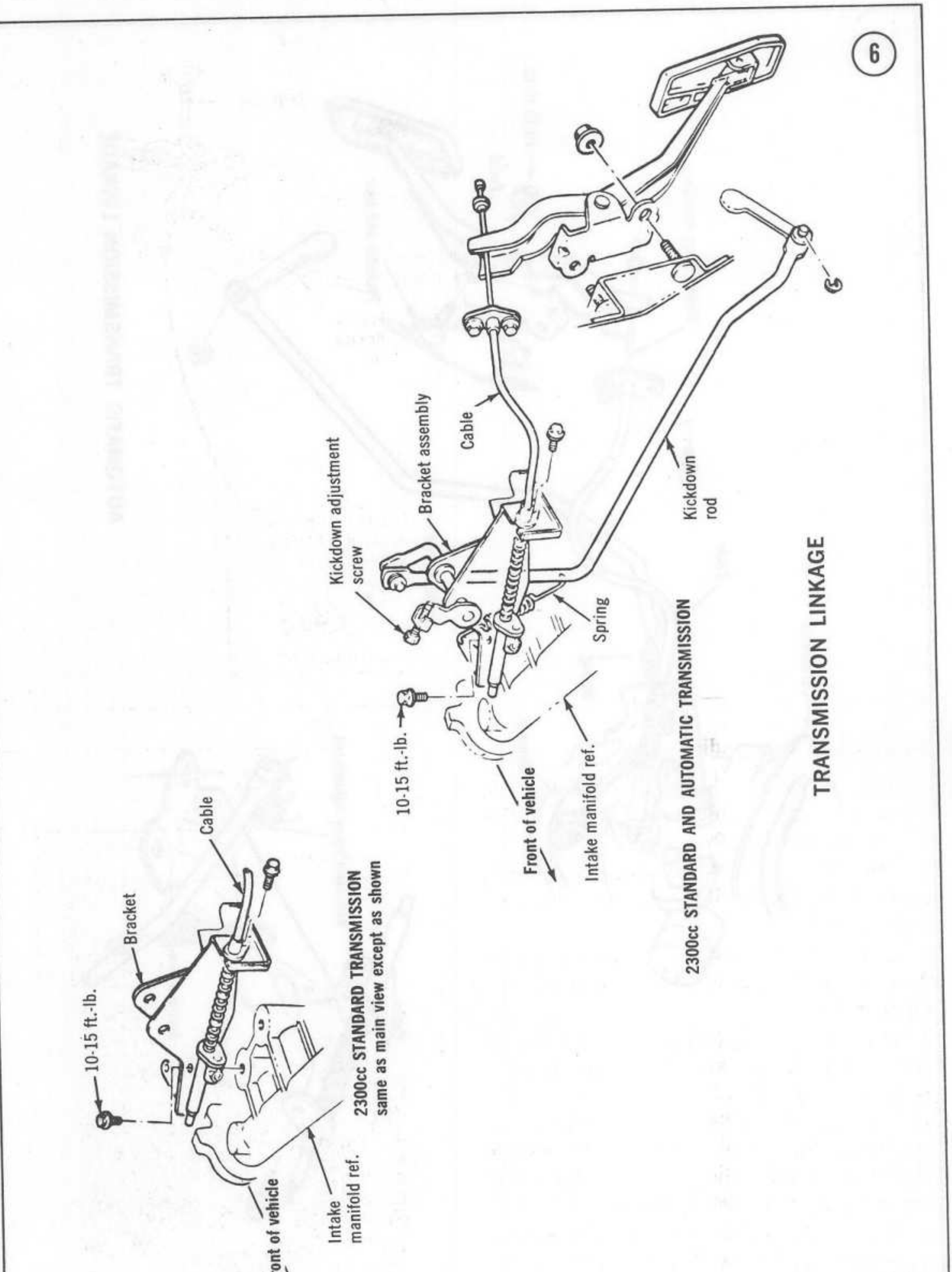
1. Place the shift lever in NEUTRAL. Firmly apply the handbrake. Raise the car and place it on jackstands.

2. Loosen the 2 neutral start switch attaching bolts on the left side of the transmission. See **Figure 8.**

3. Insert a gauge pin (shank end of a No. 43 drill) in each of the 3 switch adjustment holes, as shown in Figure 8. Rotate the switch body until the gauge pin can be inserted the full 31/64 in., and go through all 3 holes in the switch. Figure 8 is a cross-sectional view of the switch with the gauge pin properly inserted.

4. Once the switch is properly adjusted, and the gauge pin is in place, tighten the switch installation bolts to 55-75 in.-lb., then remove the gauge pin.





TRANSMISSION LINKAGE

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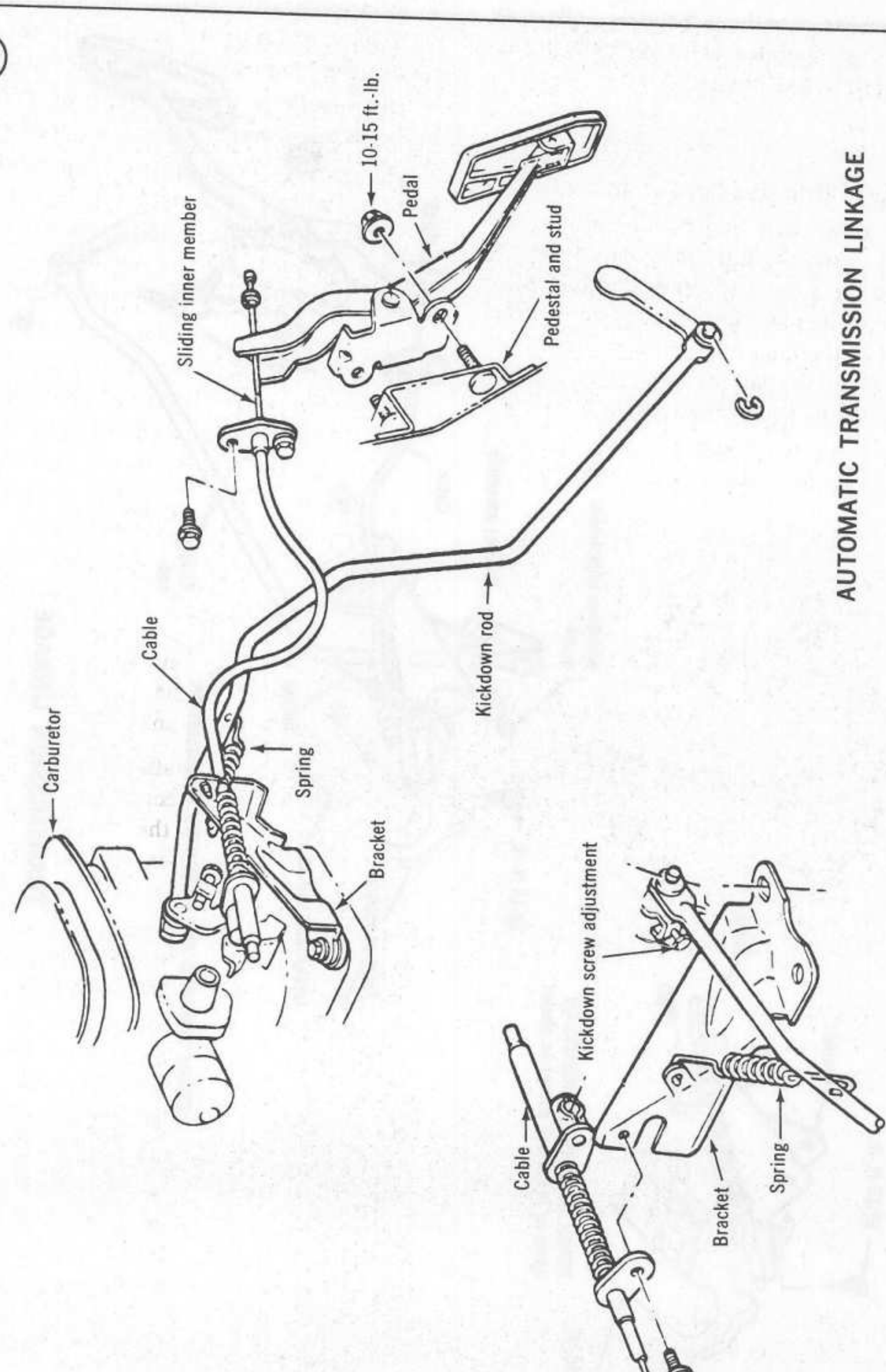
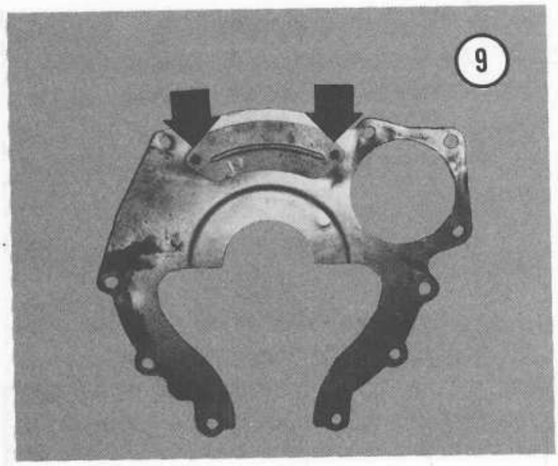


AUTOMATIC TRANSMISSION LINKAGE

5. Lower the car from the jackstands, and verify that the starter operates only when the transmission is in NEUTRAL or PARK.

Removal

1. Raise the vehicle on a hoist or jackstands.
2. Place a drain pan under the transmission fluid pan. Loosen the fluid pan bolts from the rear toward the front and drain the fluid from one corner of the pan. Secure 2 attaching bolts at the front of the fluid pan and 2 at the rear to temporarily hold the pan in place.
3. Working at the front of the flywheel housing, remove the 2 torque converter drain plug access cover bolts and the access cover (**Figure 9**).



4. Use a wrench on the crankshaft pulley attaching bolt to crank the engine to gain access to the 3 torque converter attaching bolts, then remove these bolts.

CAUTION

On belt-driven overhead camshaft engines, never turn the engine backward. This will cause the cam belt to jump teeth.

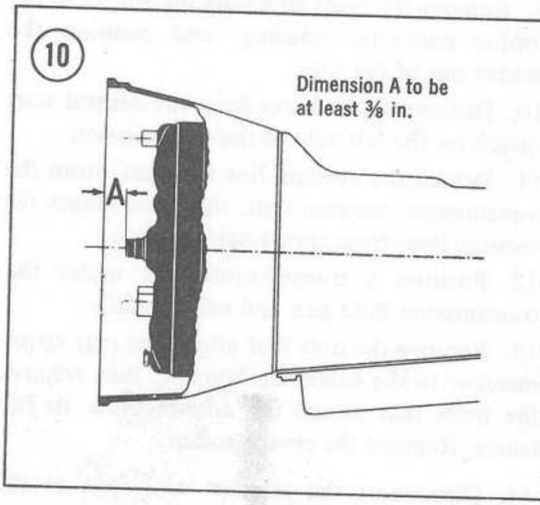
5. Use a wrench on the crankshaft pulley attaching bolt once again to crank the engine until the torque converter drain plug is accessible. Place a drain pan under the converter drain plug and remove the plug. After all the fluid has been drained from the converter, reinstall the plug and tighten to 28-38 ft.-lb.
6. Remove the drive shaft as described in Chapter Twelve and plug the rear end of the extension housing to prevent lubricant leakage.
7. Disconnect the speedometer cable (Figure 3) from the transmission extension housing.
8. Disconnect the transmission manual shift rod at the transmission manual lever (Figure 5), and disconnect the downshift rod at the transmission downshift lever (Figures 6 and 7).
9. Remove the bolts attaching the starter to the torque converter housing, and position the starter out of the way.
10. Disconnect the wires from the neutral start switch on the left side of the transmission.
11. Detach the vacuum line (or lines) from the transmission vacuum unit, then disconnect the vacuum lines from their retaining clips.
12. Position a transmission jack under the transmission fluid pan and raise slightly.
13. Remove the nuts that attach the rear crossmember to the extension housing, then remove the bolts that attach the crossmember to the frame. Remove the crossmember.
14. Disconnect the muffler inlet pipe at the exhaust manifold and secure it in a raised position to the right side of the vehicle.
15. Lower the jack under the transmission fluid pan and allow the transmission to hang.
16. Position a jack to the front of the engine and raise the engine to gain access to the 2 upper converter housing-to-engine attaching bolts.
17. Disconnect the oil cooler lines at the transmission, then remove the lines from the retaining clips at the cylinder block and position out of the way. Plug all openings to keep out dirt.
18. Remove the remaining converter housing-to-engine attaching bolts.
19. Disconnect the transmission filler tube from the cylinder block and lift the filler tube from the transmission case. Plug the opening to keep out dirt.
20. Secure the transmission to the supporting jack with a safety chain.
21. Remove the 2 upper converter housing-to-engine attaching bolts.
22. Carefully move the transmission to the rear and down to remove it from under the vehicle.

9

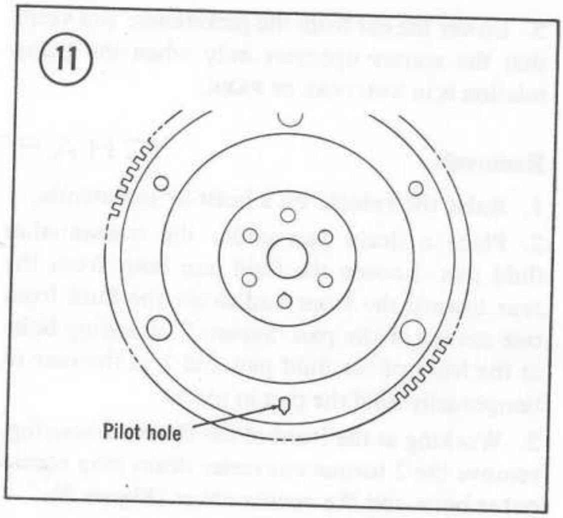
Installation

Installation is the reverse of the removal procedure plus the following steps.

1. Ensure that the torque converter hub is fully engaged in the pump gear (**Figure 10**). During installation, the transmission and torque converter assembly must be kept in a slightly nose up position to prevent the converter hub from disengaging the pump gear.



2. Prior to mating the transmission with the engine, rotate the torque converter so that the converter drain plug and attaching points are in alignment with their mating holes in the flywheel.
3. In 2300cc engine installation, the first flywheel-to-converter attaching bolt must be installed through the flywheel pilot hole (**Figure 11**) and tightened to specifications (27-37 ft.-lb.) before installing the remaining 2 attaching bolts. If the first attaching bolt is not installed in the pilot hole, a misalignment of the flywheel holes and the mating torque converter weld nuts may occur. This misalignment may cause subsequent transmission or flywheel failures.
4. Fill the transmission with Type F automatic transmission fluid. To fill, add 5 quarts, then run the engine as described earlier in this chapter until the transmission warms to normal operating temperature. Check the transmission fluid level and top up as needed. Do not overfill the transmission.



CAUTION
Do not race the engine at any time during the filling procedure.

5. Check the transmission, torque converter, and all lines and points of attachment for leaks.
6. Perform the manual linkage, downshift linkage, and neutral start switch adjustments as described earlier.

Table 1 TIGHTENING TORQUES C3 and C4 TRANSMISSIONS

Item	ft.-lb.
Flywheel to converter housing	27-37
Oil pan to transmission case	12-17
Converter housing to engine	28-38
Downshift lever nut (outer)	7-11
Manual lever nut (inner)	30-40
Converter drain plug	28-38
Selector lever shift rod retaining nut	10-20
Neutral start switch to transmission case	55-75 in.-lb.
Rear crossmember to frame	20-30
Rear crossmember (motor mount) to frame	40-60

CHAPTER TEN

BRAKES

The Mustang II uses front disc brakes and rear drum brakes. The front disc brakes are ventilated, and use a single-piston, sliding caliper. All brakes are self-adjusting. The handbrake is a mechanical type which operates the rear brakes through a cable linkage.

The front and rear brake systems are operated by a tandem, dual master cylinder so that if one system fails, the other will keep working. A warning light, activated by a hydraulic valve in the engine compartment, warns the driver of any extreme pressure drop in either system.

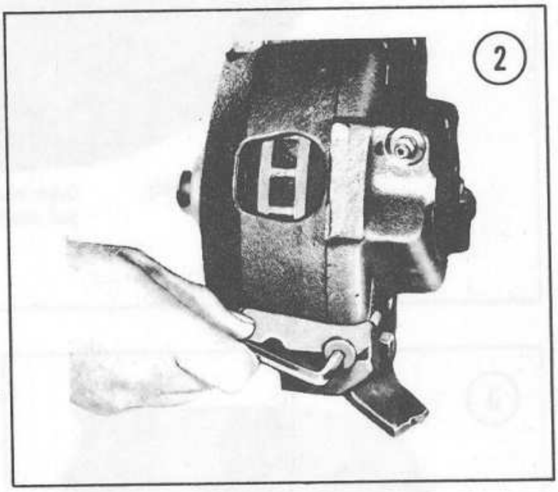
Tables 1 and 2 provide brake specifications. **Table 3** provides torque specifications. They are found at the end of the chapter.

DISC BRAKE PADS

Removal

The brake pads should be replaced whenever one pad is worn within 1/32 in. of any rivet head. Replace the brake pads as follows (**Figure 1**).

1. Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the front wheels.
2. Remove the retaining screws from the brake caliper retaining key using the appropriate size Allen wrench (**Figure 2**).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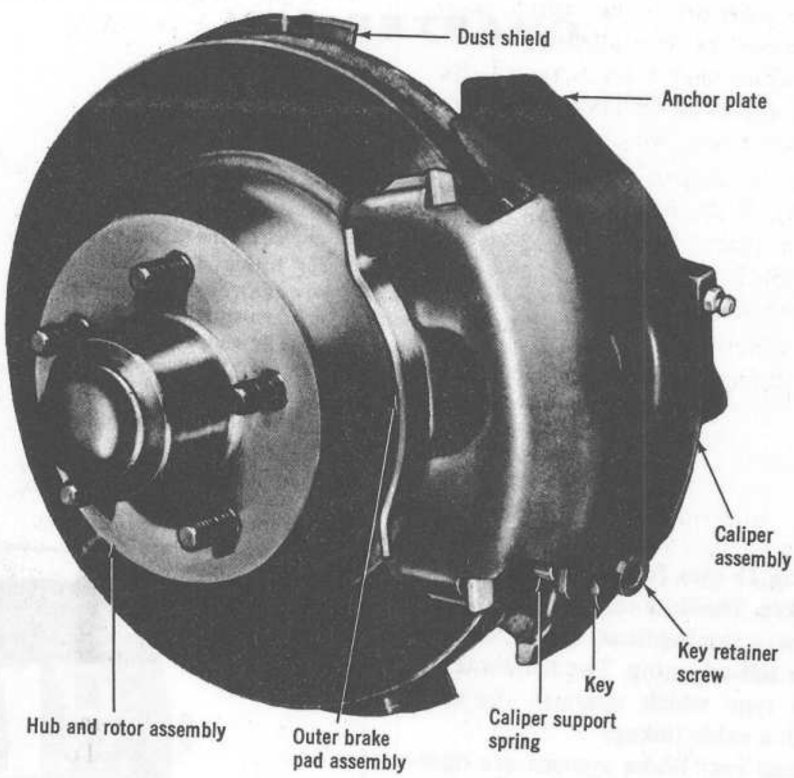
3. Slide the caliper retaining key and support spring inward or outward to remove from the anchor plate (**Figure 3**). Use a hammer and drift, as necessary, but take care not to damage the key.
4. Press the caliper assembly downward against the anchor plate, then rotate the upper end of the caliper up out of the anchor plate to remove the caliper (**Figure 4**).

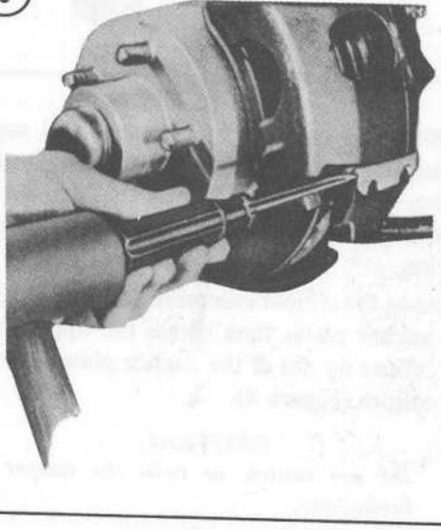
CAUTION

Do not stretch or twist the caliper brake hose.

1


Dust shield
Anchor plate
Caliper
assembly
Key retainer
screw
Key
Caliper support
spring
Hub and rotor assembly
Outer brake
pad assembly

3



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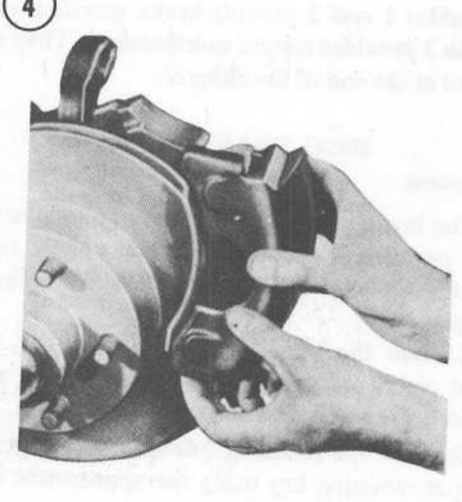


5. Hang the caliper assembly from the upper suspension arm with wire. Do not allow it to hang from the brake line.

6. If the brake pads are to be reused, mark them so that they can be reinstalled in the same position from which they were removed. Reused pads must always be installed in the same position from which they were removed.

7. Remove the inner pad from the anchor plate (**Figure 5**). If the brake shoe anti-rattle clip becomes displaced when the pad is removed, reposition it with the clip loop toward the inside of the anchor plate.

8. Remove the outer brake pad from the caliper assembly by tapping lightly on the outer pad assembly.

Inspection

1. Inspect the pads for wear and damage caused by overheating. Check for grease, oil, or brake fluid on the friction material. If the pads are overheated (indicated by blue-tinted areas), replace them. Pads must also be replaced if they have been contaminated by grease, oil, or brake fluid.

WARNING

If pads are being replaced on one wheel, they must also be replaced on the other wheel to maintain equal brake action, and avoid excessive brake pull under normal driving conditions.

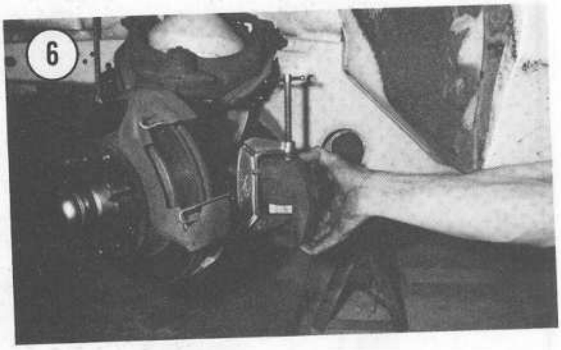
2. Carefully clean the outside of the caliper. Look for brake fluid leaks, and overhaul the caliper assembly as described later in this chapter if leaks are detected.

3. Inspect the flexible brake hose attached to the caliper. Replace the brake hose if it is swollen, cracked, or leaking.

Installation

1. If new pads are to be installed, press the caliper piston (Figure 5) into its bore to provide clearance for the brake pads. Use a 4 in. C-clamp and a block of wood 1 x 1¾ x ¾ in. thick to compress the piston (**Figure 6**).

6



2. Make sure the anti-rattle clips are in place, then install the inner and outer brake pads.

NOTE: *If old pads are being reused, install them in the same position from which they were removed. New pads are interchangeable between inner and outer positions.*

3. Remove the C-clamp and block of wood (if used) from the brake caliper. Remove the wire

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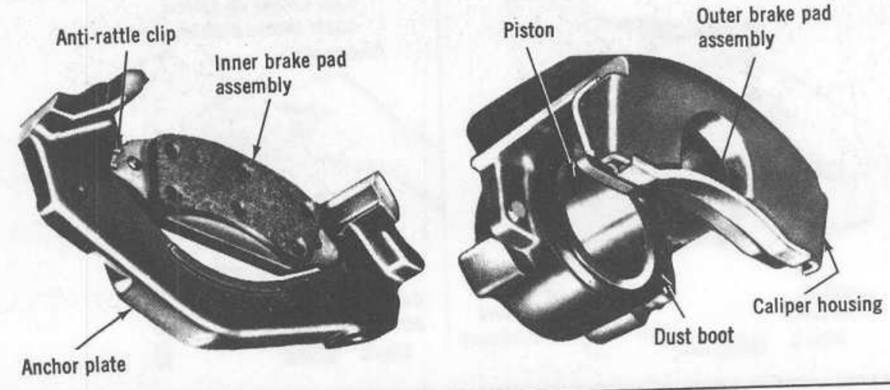


attaching the caliper to the upper suspension arm.

4. Position the caliper housing lower V-groove on the anchor plate lower abutment surface. Refer to **Figure 7** for a step-by-step illustration of the following anchor plate and caliper assembly installation procedure.

5. Pivot the caliper housing upward toward the brake rotor until the outer edge of the caliper dust boot is approximately ¼ in. from the upper edge of the inner brake pad assembly.

6. Position a piece of lightweight cardboard between the inner brake pad and the lower half of the caliper housing dust boot to prevent pinching the dust boot between the caliper piston and the inner brake pad during installation.

7. Rotate the caliper housing toward the brake rotor until a slight resistance is felt, then remove the cardboard slowly toward the center of the brake rotor while rotating the caliper completely down over the rotor.

8. Slide the caliper up against the anchor plate

7

upper abutment surface, then center the caliper over the lower anchor plate abutment, position the caliper support spring and key in the slot and drive them into opening between the lower end of the caliper and the lower anchor plate abutment.

9. Align the semi-circular slot in the key with the retaining screw hole in the anchor plate, then install the key retaining screw using an Allen wrench, and tighten to 12-16 ft.-lb.

10. Pump the brake pedal several times to seat the brake caliper and pads. Recheck the caliper and brake hose for leaks.

11. Install the wheel and wheel nuts. Lower the car from the jackstands and tighten the wheel nuts to 80-105 ft.-lb.

DISC BRAKE CALIPER AND ANCHOR PLATE

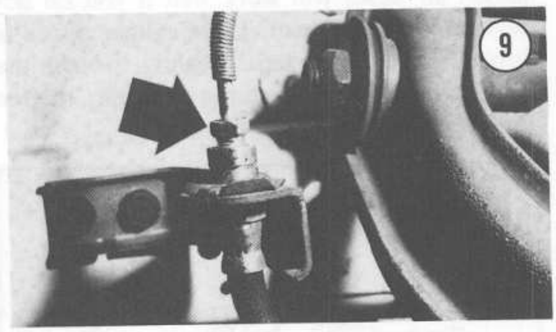
The disc brake calipers are supported by anchor plates, which are bolted to the wheel spindle arms. When the brake pedal is pressed, hydraulic pressure from the master cylinder causes each caliper piston to press the inner brake pad against the rotor (disc). This pressure slides the caliper inward (towards the center of the car), pulling the outer brake pad against the disc. The pads then squeeze the disc, stopping the wheel.

Figure 8 is a disassembled view of one caliper. Refer to it as needed for the following procedures.

Caliper Removal/Installation

1. Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands and remove the wheel.

2. Unscrew the tube fitting that connects the brake hose to its bracket on the frame (**Figure 9**). Pull out the horseshoe-type clip and detach the hose from the brackets.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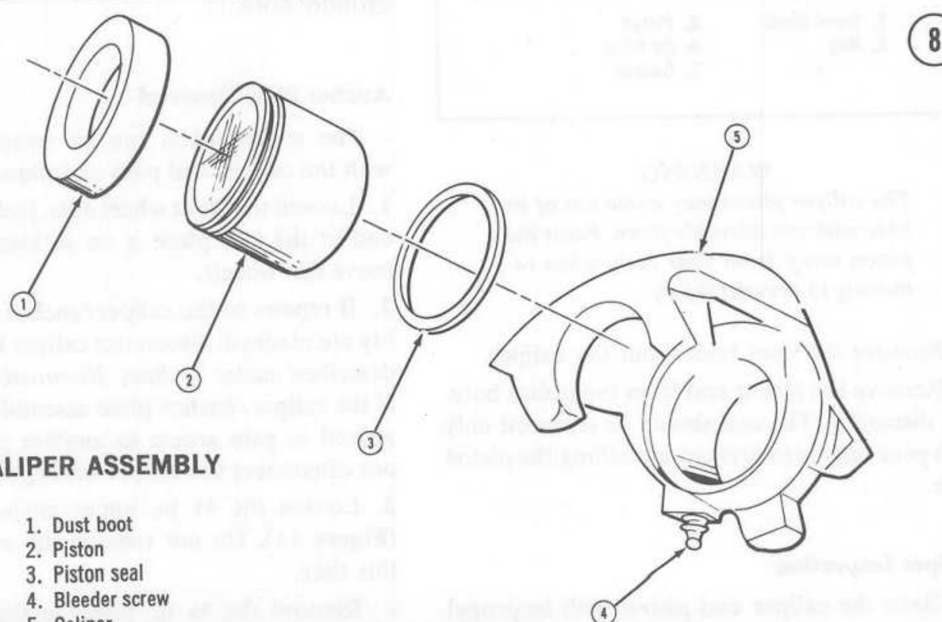
3. Unscrew the entire hose assembly from the caliper.



8

CALIPER ASSEMBLY

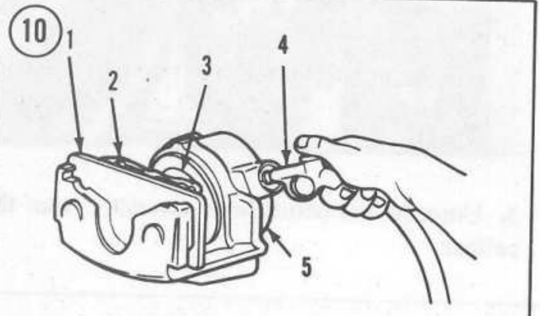
1. Dust boot
2. Piston
3. Piston seal
4. Bleeder screw
5. Caliper

4. Perform Steps 2-5 under *Disc Brake Pad Replacement* to remove the caliper.

5. To install the caliper, perfom Steps 10-22 under *Disc Brake Pad Replacement*. After installation, bleed the brakes and center the pressure differential valve as described in this chapter.

Caliper Disassembly

1. Place several layers of cloth or a block of soft wood over the caliper piston, then blow compressed air into the brake hose fitting (**Figure 10**) to force the caliper piston out of its bore. Service station air hoses will work well if you do not have an air compressor. If the caliper piston is difficult to remove, tap it lightly around the edges, while applying compressed air, to free the piston in its bore.



1. Wood block
2. Rag
3. Piston
4. Air hose
5. Caliper

WARNING
The caliper piston may come out of its bore with considerable force. Point the piston away from your body when removing to prevent injury.

2. Remove the dust boot from the caliper.

3. Remove the piston seal from the piston bore, and discard it. The seal should be removed only with your fingers to prevent scratching the piston bore.

Caliper Inspection

1. Clean the caliper and piston with isopropyl alcohol.

2. Check the cylinder bore for wear, damage, and rough or scored cylinder walls. Replace the caliper if any of these conditions is detected.

3. Check the piston circumference for worn chrome plating, scoring, or corrosion. Replace the piston if any of these conditions are detected.

Caliper Assembly

1. Dip a new piston seal in clean brake fluid and install in the cylinder bore. Be sure the seal is fully seated in its groove and is not twisted in any way.

NOTE: *Never reuse a caliper piston seal. In addition to preventing brake fluid leaks, the seal retracts the caliper piston when the brake pedal is released. Very minor damage or age deterioration can make the seal totally inoperative.*

2. Install a new dust boot, making sure the dust boot lip is properly seated in its groove in the caliper housing.

3. Coat the cylinder bore and the piston with clean brake fluid and install the piston in its bore. Insert the piston through the dust boot. Seat the dust boot outer lip in its groove in the piston, then push the piston all the way into the cylinder bore.

Anchor Plate Removal

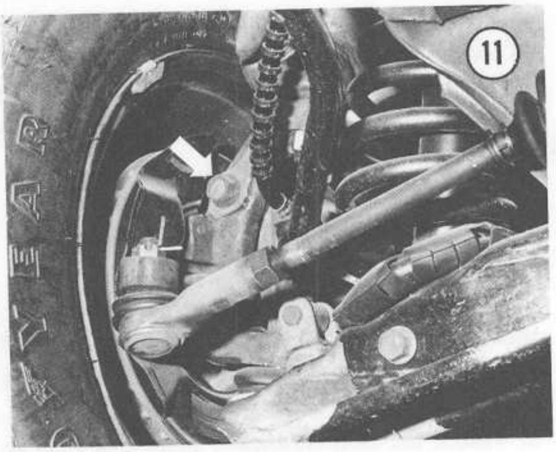
The anchor plate can be removed together with the caliper and pads as follows:

1. Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the wheels.

2. If repairs to the caliper/anchor plate assembly are planned, disconnect caliper brake hose as described under *Caliper Removal/Installation*. If the caliper/anchor plate assembly is being removed to gain access to another part only, do not disconnect the caliper brake hose.

3. Loosen the ¾ in. upper anchor plate bolt (**Figure 11**). Do not remove the upper bolt at this time.

4. Remove the ⅝ in. lower anchor plate bolt (**Figure 12**), and discard the bolt.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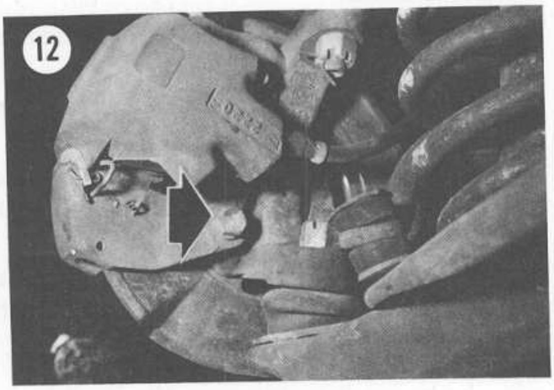
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5. Support the caliper/anchor plate assembly with one hand, and remove the upper anchor plate bolt with the other. Discard the upper anchor plate bolt.

6. Carefully slide caliper/anchor plate assembly off the brake disc far enough to insert a piece of folded cardboard between the brake pads. This will ensure that the brake pads and caliper piston remain in place.

7. Lift the caliper/anchor plate assembly clear of the brake disc. If the assembly is only being removed to gain access to another part, hang the assembly from the upper suspension arm with a wire. Do not allow it to hang from the brake line.

Anchor Plate Installation

1. Guide the caliper/anchor plate assembly toward the brake disc with both hands.

2. Slide the caliper over the disc, lower end first and slowly remove the folded cardboard used to hold the brake pads in place.

3. Install a new upper anchor plate attaching bolt, and tighten it finger-tight.

4. Install a new lower anchor plate bolt, and tighten it finger-tight.

5. Tighten the upper anchor plate bolt to 90-120 ft.-lb.

> NOTE: *The upper anchor plate bolt must be torqued first.*

6. Tighten the lower anchor plate bolt to 55-75 ft.-lb.

7. If the brake hose was originally detached from the caliper, reconnect it, then bleed the brakes and center the pressure differential valve as dscribed in this chapter.

8. Install the wheels and wheel nuts. Lower the car and tighten the wheel nuts to 80-105 ft.-lb.

BRAKE DISCS

Inspection

1. Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands and remove the wheels.

2. Check front wheel bearing adjustment as described in Chapter Eleven. Adjust if needed.

3. Remove the caliper as described earlier. Leave the brake hose connected and hang the caliper from the upper suspension arm with wire. Do not allow it to hang from the brake line.

4. Inspect the disc surface for deep scratches. Small marks are not important, but deep radial scratches reduce braking efficiency and increase brake pad wear. If the disc is deeply scratched, it can be turned on a lathe to smooth the surfaces. However, the disc must not be cut thinner than 0.810 in.

5. With a dial gauge contacting the swept area of the disc, rotate the disc one full turn and measure runout. Normal runout is 0.003 in. or less. Replace or turn the disc if runout is in excess of this amount.

6. Use a micrometer to measure the thickness of the disc at several points around the circumference, and at varying distances from the center of the disc. Standard disc thickness is 0.870 in. If the disc is less than 0.810 in. at any point, replace it.

Removal

1. Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the front wheels.

2. Remove the caliper/anchor plate assembly as described earlier. It is not necessary to detach the brake hose attached to the caliper. Hang the caliper/anchor plate assembly from the front suspension arm with wire. Do not allow it to hang from the brake line.

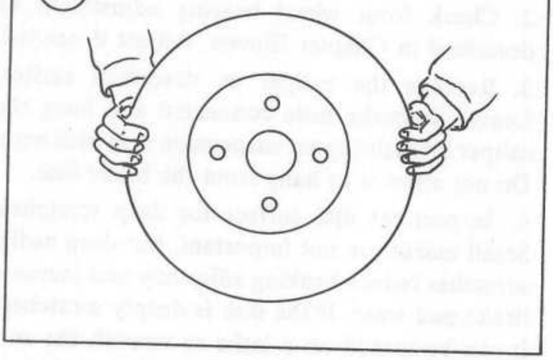
CAUTION
Do not stretch or twist the brake hose.

3. Remove the wheel bearing grease cap cotter pin, nut lock, and adjusting nut as described in Chapter Eleven.

4. Grasp the disc in both hands (**Figure 13**) and pull it off the spindle far enough to loosen the wheel bearing washer and outer wheel bearing.

5. Push the disc back onto the spindle and take the washer and outer wheel bearing off the spindle.

13



6. Pull the brake disc off the spindle together with the inner wheel bearing and grease seal.

Installation

1. If a new disc is being installed, remove the protective coating on the disc surfaces with carburetor degreaser. New wheel bearings must be installed, using the procedures described in Chapter Eleven.

2. If the original disc is being installed, pack the wheel bearings with grease as described in Chapter Eleven. The wheel bearing and grease seal must be in good condition. The braking surfaces of disc should be cleaned prior to installation.

3. Slide the brake disc, together with the inner wheel bearing and grease seal onto the spindle.

CAUTION
Keep the disc centered on the spindle to prevent damage to the grease seal and spindle threads.

4. Install the outer wheel bearing and washer, then install the wheel bearing adjusting nut and tighten it finger-tight. Make sure the disc rotates freely.

5. Install the caliper/anchor plate assembly as described earlier.

6. Adjust the wheel bearings as described in Chapter Eleven.

7. Lower the car and tighten all wheel nuts to 80-105 ft.-lb.

8. Bleed the brakes and center the pressure differential valve if the caliper brake hose was disconnected.

9. Pump the brake pedal several times to seat the brake pads and caliper, then drive the car to make sure the brakes operate properly.

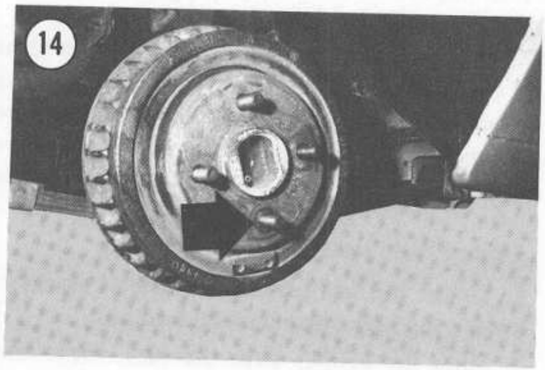
BRAKE DRUMS

Removal

1. Loosen the rear wheel nuts, jack up the rear end of the car, place it on jackstands and remove the rear wheels.

2. Use pliers to remove the 3 Tinnerman nuts securing the brake drum to the axle shaft studs (**Figure 14**).

14

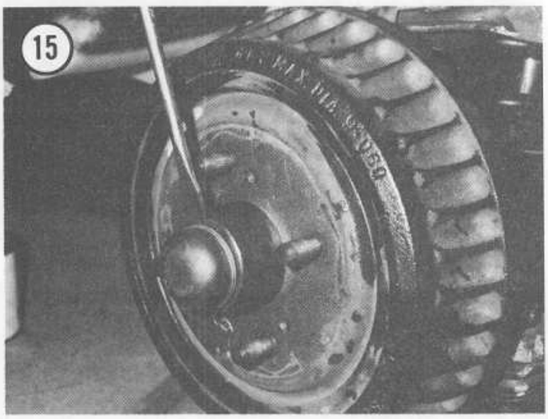


3. If the brake drum is free, pull it off the axle studs. If the brake shoes are holding the brake

drum, preventing removal, pry the rubber cover from the backing plate. Insert a narrow screwdriver through the hole in the backing plate (**Figure 15**), and disengage the adjusting lever from the adjusting screw. While holding the adjusting lever away from the adjusting screw, back off on the adjusting screw with a brake adjusting tool until the drum is free of the brake shoes.

CAUTION
Do not damage the notches in the adjusting screw while turning. The self-adjusting mechanism will not operate properly if the adjusting screw notches are damaged.

15



Inspection

1. Clean the brake drum inner surface with solvent before inspection.
2. Check the drum surface for scoring, excessive or uneven wear, corrosion, or heat spots (blue-tinted areas). Minor scratches can be removed with fine emery paper. If heat spots are visible, the drum must be replaced.
3. If you have a micrometer, measure the drum for wear and out-of-roundness. This measurement can be most easily done by a Ford dealer or machine shop. The maximum permissible out-of-roundness is 0.007 in. Maximum permissible drum diameter is 9.060 in. If the drum is out-of-round, scored, or worn, it can be turned on a lathe to repair it. However, the inside diameter of the drum must not be increased to more than 9.060 in.

NOTE: *If the drum diameter is less than 0.030 in. oversize after turning, standard brake linings can be used. If the drum diameter is 0.030-0.060 in. oversize, oversized linings must be installed.*

Installation

1. If a new brake drum is being installed, remove the brake drum protective coating with carburetor degreaser. Lightly sand the brake surface with fine sandpaper to make sure that no coating residue remains. Wipe the drum clean with a cloth soaked in alcohol. Install new wheel bearings as described in Chapter Eleven.
2. If the original brake drum is being reinstalled, the original wheel bearings may be used. However, clean and pack them with grease as described in Chapter Eleven.
3. If the brake adjustnig screw was backed off to remove the brake drum, readjust the screw until the brake drum will just fit over the brake shoes.
4. Install the brake drum and the 3 Tinnerman retaining nuts.
5. Adjust the brakes as described later in this chapter. Install the wheel and the wheel nuts. Lower the car and tighten the wheel nuts to 80-105 ft.-lb.

BRAKE SHOES

Inspection

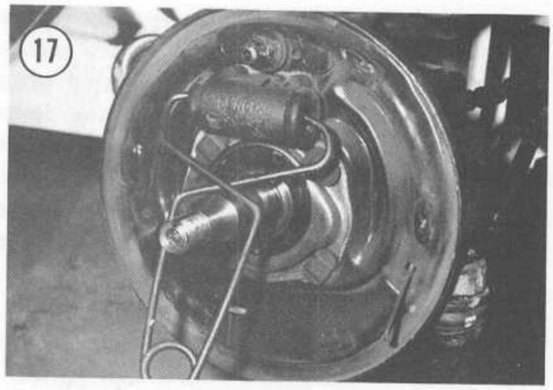
1. Loosen the rear wheel nuts, jack up the rear end of the car, place it on jackstands and remove the rear wheels.
2. Remove brake drums as described earlier.
3. Brush all dust from the brake drum inner surface and the brake shoes.
4. Inspect the lining material on the brake shoes. Make sure it is not cracked, unevenly worn, or separated from the brake shoes. Replace the brake shoes if the linings are worn to within 1/32 in. of any rivet head. The brake shoes must also be replaced if there is oil, grease, or brake fluid on the linings. If blue-tinted areas are visible on brake shoes (indicating overheating), replace the shoes.

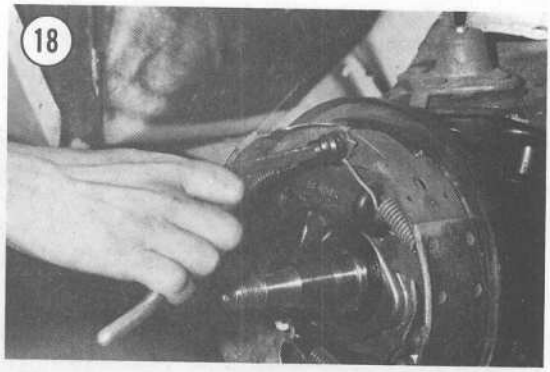
> NOTE: *Replacement of the hold-down and retracting springs is strongly recommended if the brake shoes have been overheated. Heat weakens the springs and could cause premature lining wear.*

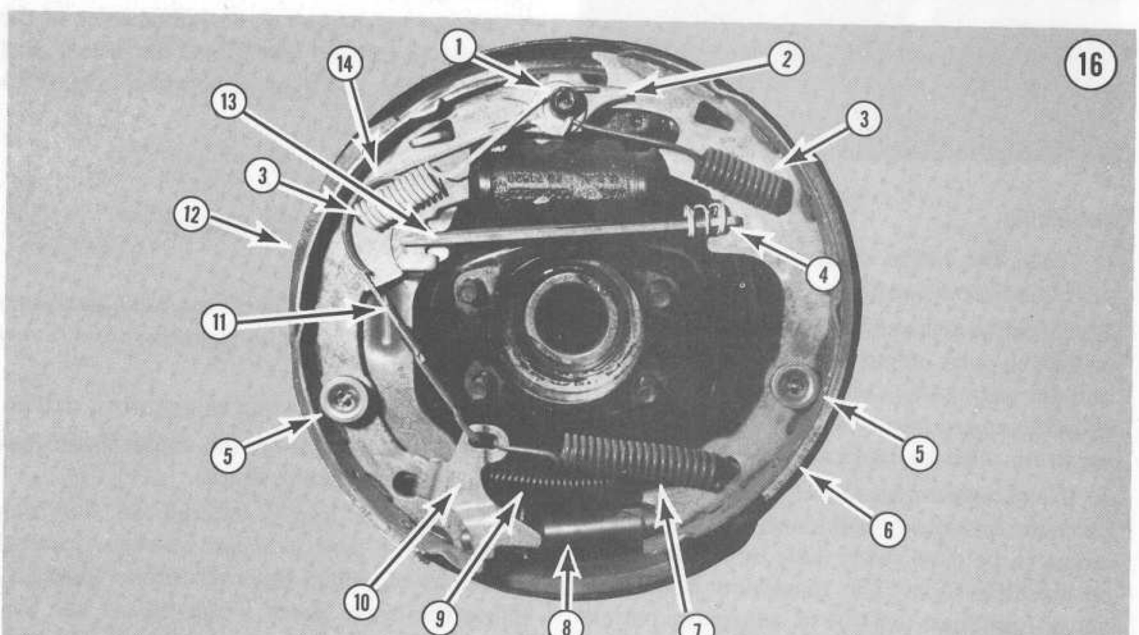
Removal

Figure 16 shows a rear brake assembly, and should be referred to as necessary for disassembly and assembly procedures. It is a good idea to complete all work on one side of the car at a time, leaving the other brake assembled for reference.

1. Loosen the rear wheel nuts, jack the rear end of the car up, place it on jackstands, and remove the rear wheels.
2. Remove the rear brake drums as described earlier.
3. Place a clamp over the ends of the wheel cylinder (**Figure 17**).
4. Remove the brake retracting springs with a spring removal tool (**Figure 18**). Place the socket end of the tool over the anchor pin and twist the







1. Anchor pin
2. Shoe guide plate
3. Retracting springs
4. Handbrake link spring
5. Hold-down washers
6. Primary brake shoe
7. Self-adjuster spring
8. Adjuster
9. Handbrake cable
10. Self-adjuster lever
11. Self-adjuster cable
12. Secondary shoe
13. Handbrake link
14. Self-adjuster cable guide

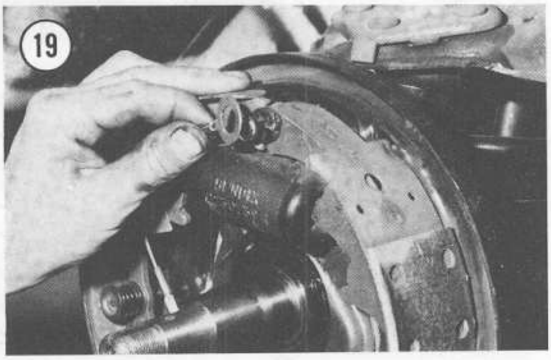
tool to remove the spring. Remove the secondary (rear most) spring, then the primary spring.

WARNING

The brake springs can be removed with a heavy screwdriver, but this is difficult and actually dangerous. Spring removal tools are inexpensive and available at most auto parts stores.

5. Lift the self-adjusting cable off the anchor pin (**Figure 19**). Unhook the other end of the cable from the self-adjuster lever and lay the cable aside.

19



6. Remove the hold-down springs as shown in **Figure 20**. Press the spring retaining collars inward and twist until the pins fit through the slots in the retaining collars. Collect the pins, retaining collars, and springs.

7. Spread the upper end of the brake shoes away from the wheel cylinders (**Figure 21**). Pull the shoes off, together with the adjusting screw, self-adjuster spring, and self-adjuster lever.

8. Separate the handbrake lever from the secondary shoe (Figure 16). Detach the handbrake cable from the lever, then remove the handbrake and link spring.

Installation

1. Attach the handbrake lever to the secondary (rearmost) brake shoe.

2. Apply a thin coat of high-temperature grease to the friction points between the brake shoes and backing plate.

CAUTION

Do not contaminate the brake linings by getting grease on them.

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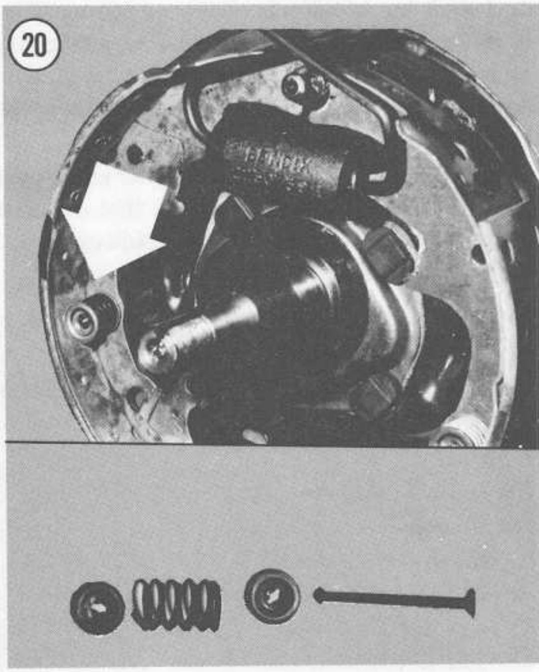

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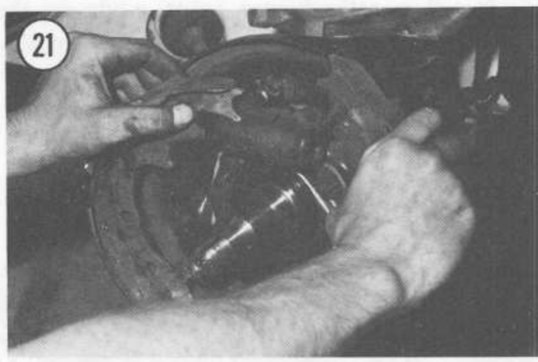

3. Position the brake shoes on the backing plate and secure them with the hold-down springs (**Figure 22**).

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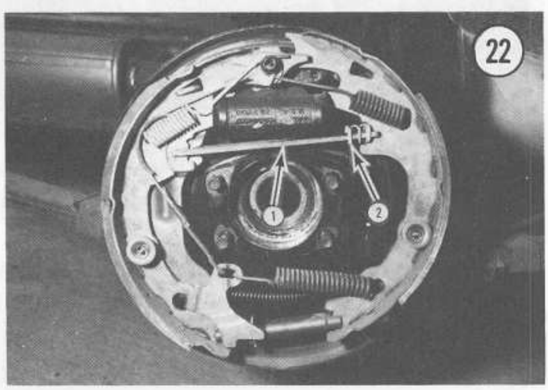

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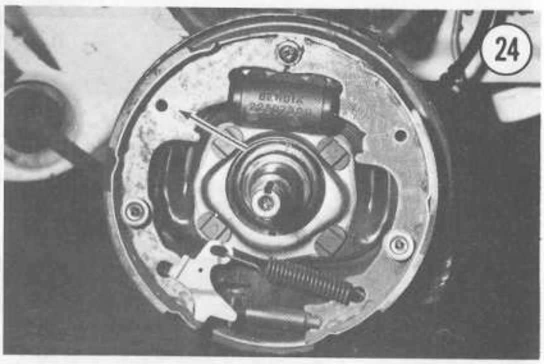
4. Install the handbrake link and spring (Figure 22). Back off the handbrake adjusting nut, as described under *Handbrake Adjustment*, then reconnect the handbrake cable to the handbrake lever.

5. Place the loop of the self-adjuster cable over the anchor pin (**Figure 23**). Note that one side of the cable loop is crimped. This side must face the backing plate.

23

6. Install a self-adjuster cable guide in the secondary (rearmost) brake shoe (**Figure 24**). Lay the cable in the cable guide groove.

> NOTE: *The cable must be properly placed in the cable groove. Do not let the cable get between the cable guide and the brake shoe.*

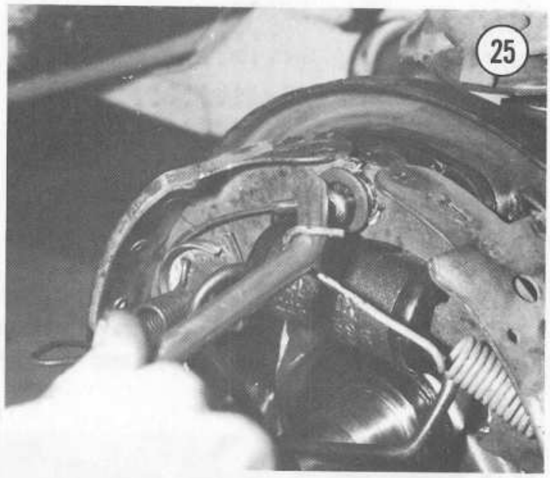


24

7. Install the primary (frontmost) brake retracting spring. Use the brake spring tool as shown in **Figure 25**.

8. Install the secondary brake retracting spring. Make sure the self-adjuster cable and spring ends are flat on the anchor pin.

9. Remove the clamp from the wheel cylinder.



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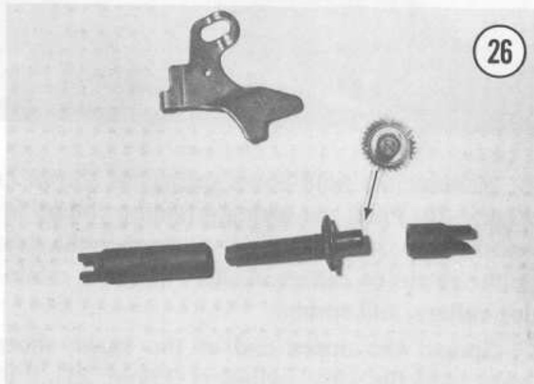
10. Apply a light, even coat of high-temperature grease to the adjusting screw threads (**Figure 26**). Turn the adjusting screw all the way into the pivot nut, then back off ½ turn.

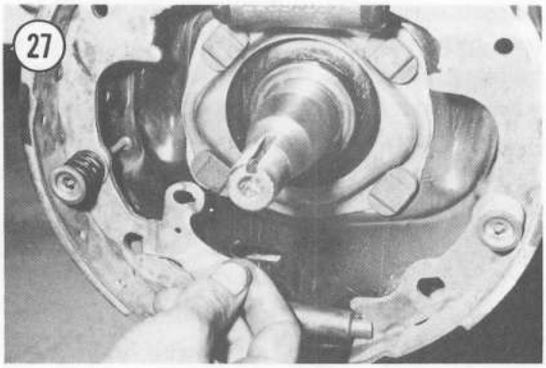


26

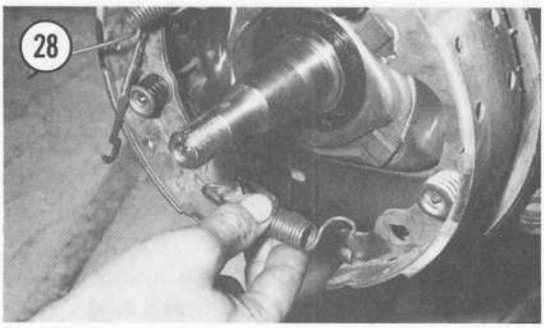
11. Place the socket of the spring removal tool on the adjusting screw. Install the adjusting screw assembly between the bottom ends of the brake shoes. The socket end faces the rear of the car, and pivot nut end faces the front.

> NOTE: *If the adjusting screw assembly is installed on the wrong side of the car, the brake shoes will be retracted instead of expanded when the self-adjusting mechanism operates. This will cause the rear brakes to be inoperative. The adjusting screws and levers are stamped (R) and (L) for left and right sides (Figure 26).*

12. Hook the self-adjuster lever into the hole in the secondary shoe (**Figure 27**).

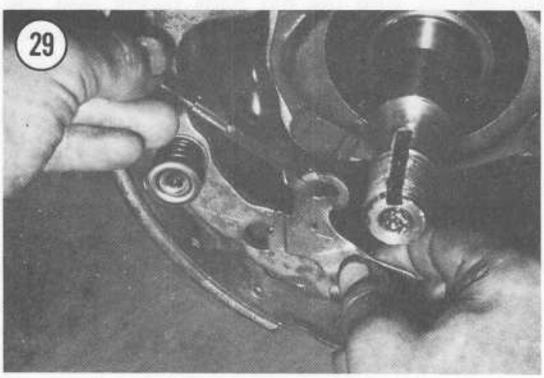


13. Install the adjuster spring in the primary brake shoe web (**Figure 28**). The hook end of the spring must be completely into the hole, and the last coil of the spring should be at the edge of the hole.

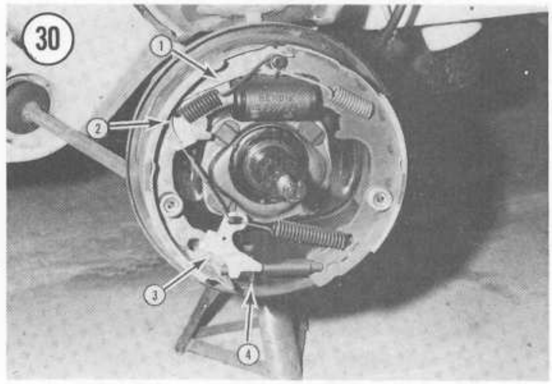


14. Attach the other end of the self-adjuster spring to the oval hole in the self-adjuster lever.

15. Hook the self-adjuster cable into the self-adjuster lever (**Figure 29**).



16. After installation, check the self-adjuster assembly for proper installation. To do this, pull the self-adjuster cable far enough to lift the self-adjuster lever past one tooth on the adjusting wheel (**Figure 30**). Watch the self-adjuster lever. It should snap into place behind the next tooth. When the cable is released, the self-adjuster lever should rotate the adjusting wheel one tooth and the lever should return to its original position. If the adjusting lever movement is slow, or the adjusting wheel fails to turn, perform the following Steps 17-22 to determine the cause. If the adjusting mechanism works properly, go to Step 23.



1. Self-adjuster cable
2. Cable guide
3. Self-adjuster lever
4. Adjusting wheel

17. Make sure the adjusting screw socket (Figure 26) is properly seated in its notch in the secondary brake shoe.

18. Make sure the self-adjuster lever contacts the adjusting wheel at a point 5/32-7/32 in. above the center line of the adjusting screw. If the contact point is too low, the lever will not turn the adjusting screw properly.

19. Check the ends of the self-adjuster cable where the wire enters the hook and loop. The wire should extend all the way through, or slightly beyond, the crimped portion of the hook and loop. If the wire does not extend all the way through, the cable must be replaced.

20. Measure the cable length. Correct cable length is 8-13/32 in. from the end of the hook to the end of the loop. Replace the cable if it is too long.

21. Check the cable guide for damage. The guide must lie flat on the brake shoe, and the cable groove must be parallel to the brake shoe. Replace the cable guide if damage is evident.

22. Check the self-adjuster lever for wear or damage at the hook that attaches it to the brake shoe. Replace the lever if wear or damage is evident.

23. Install the brake drum and adjust the brakes as described later in this chapter.

24. Install the wheels and wheel nuts. Lower the car and tighten the wheel nuts to 80-105 ft.-lb.

WHEEL CYLINDERS

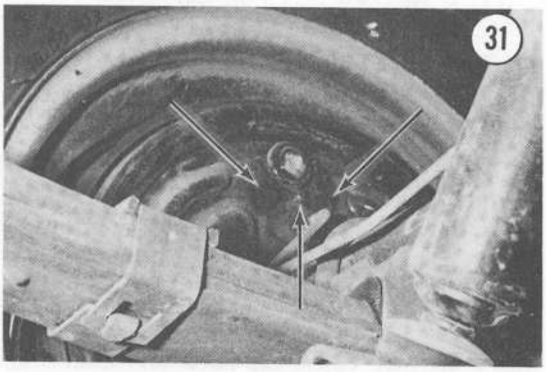
Removal/Installation

1. Remove the brake drums and shoes as described earlier.

2. Unscrew the brake line nut from the wheel cylinder (**Figure 31**). Remove 2 bolts and lockwashers attaching the wheel cylinder to the backing plate, then lift the cylinder away from plate.

CAUTION

Do not bend rear brake lines away from the wheel cylinders after unscrewing the nut. Bending the brake line will make it difficult to reconnect. The wheel cylinder will separate from the brake line when it is lifted out.



3. Installation is the reverse of these steps. Wipe the ends of the brake lines clean before reconnecting. Tighten the wheel cylinder attaching bolts to 6-10 ft.-lb. Bleed the brakes and center the pressure differential valve as described later in this chapter.

Overhaul

Wheel cylinders can be rebuilt without removing them from the backing plate. However, extreme care must be taken not to let any dirt or foreign material enter the cylinders during rebuilding. **Figure 32** is an exploded view of one wheel cylinder. Refer to it as needed during the following procedure.

1. Remove the rubber boot from each end of the wheel cylinder. Discard the boots.

2. Take out the pistons, piston cups, and return springs. Discard the piston cups.

3. Remove the bleeder screw from the cylinder.

4. Thoroughly clean all parts with brake fluid, then blow dry with compressed air.

5. Inspect the piston and replace it if it is scored, worn, or damaged.

6. Check the cylinder bore for scoring, corrosion, or excessive wear. If any of these conditions are visible, the bore may be honed smooth. However, the cylinder may not be honed more than 0.003 in. over the standard wheel cylinder diameter (0.875 in.). If the wheel cylinder bore would have to be honed more than 0.003 in. oversize to smooth it, the wheel cylinder must be replaced.

7. Make sure the bleeder screw hole is unobstructed.

8. Coat the cylinder bore, return spring, new piston cups, and pistons with brake fluid.

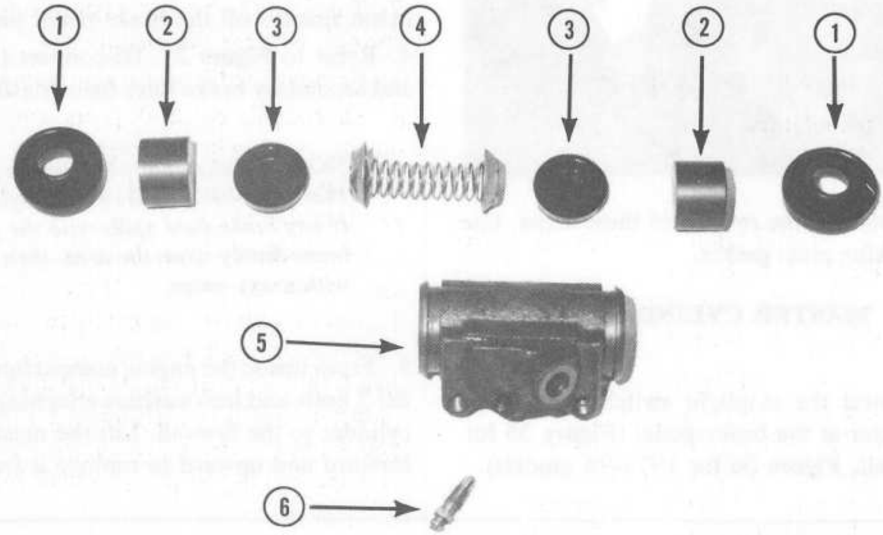
9. Install the bleeder screw and tighten it to 32-65 in.-lb.

10. Refer to Figure 32. Install the return spring in the cylinder. Install both piston cups, taking care not to bend back the lips of the cups. Install the pistons with the flat ends facing into the cylinder and the hollow ends facing outward. Install a new rubber boot over each end of the wheel cylinder.

SPLASH SHIELD/BACKING PLATE

Disc brakes are provided with splash shields to protect them from dirt and water. Drum brakes are equipped with backing plates which hold the brake assembly, as well as keeping contaminants off of the brake shoes and drums. Removal of shields or backing plates is not necessary for normal brake inspection or repair procedures.

32



1. Rubber boot
2. Piston
3. Piston cup
4. Return spring
5. Cylinder body
6. Bleeder screw

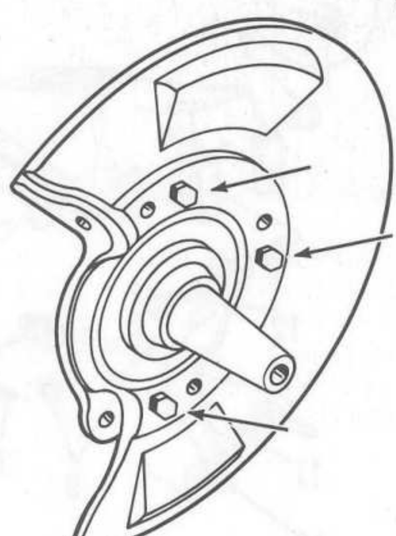
Splash Shield Removal/Installation

1. Remove caliper/anchor plate assembly and brake disc as described in this chapter.
2. Remove the bolts and lockwashers attaching the splash shield to the spindle arm (**Figure 33**). Lift the splash shield clear of the car.
3. Installation is the reverse of these steps.

Backing Plate Removal/Installation

1. Remove the brake shoes, adjuster assembly, handbrake mechanism, and wheel cylinder as described earlier in this chapter.
2. Remove the rear axle shaft as described in Chapter Twelve.
3. Compress the prongs on the handbrake cable retainer (**Figure 34**), and remove the cable retainer and housing from the backing plate.
4. Remove the backing plate and gasket from the axle housing.

33



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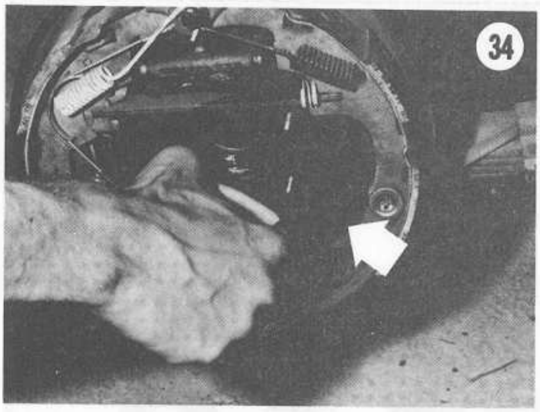


5. Installation is the reverse of these steps. Use a new backing plate gasket.

MASTER CYLINDER

Removal

1. Disconnect the stoplight switch wires from the connector at the brake pedal (**Figure 35** for 1974 models, **Figure 36** for 1975-76 models).

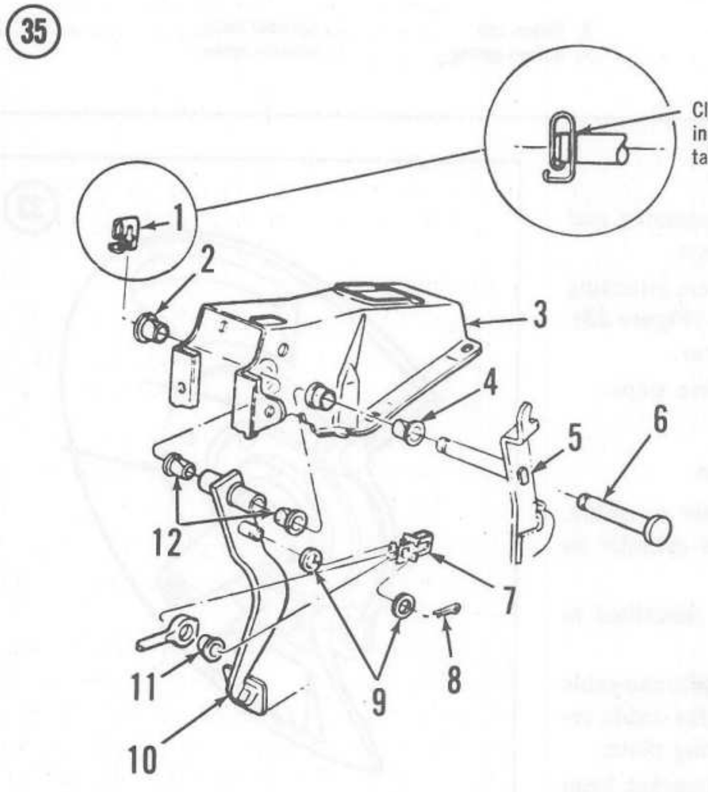
2. Remove the stoplight switch retaining clip. Slide the stoplight switch off the brake pedal pin just far enough to clear the pin, then lower the switch out of the way, and remove it.

3. Loosen the master cylinder attaching bolts from the engine compartment, and slide the master cylinder pushrod, its bushings, and 2 nylon spacers off the brake pedal pin.

4. Refer to **Figure 37**. Disconnect the primary and secondary brake lines from master cylinder.

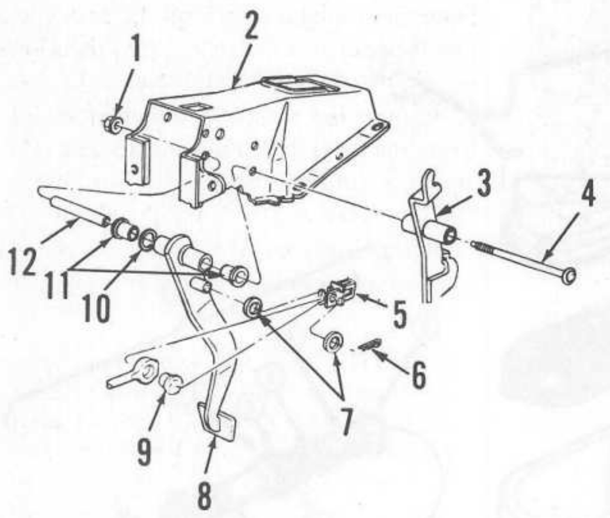
> NOTE: *Brake fluid will damage paint. Place rags beneath the master cylinder. If any brake fluid spills onto the paint, immediately wipe the area, then wash with soapy water.*

5. From inside the engine compartment, remove the 2 bolts and lockwashers attaching the master cylinder to the firewall. Lift the master cylinder forward and upward to remove it from vehicle.



BRAKE PEDAL — 1974

1. Retaining clip
2. Bushing
3. Pedal support assembly
4. Bushing
5. Clutch pedal and pivot shaft
6. Pivot shaft (automatic transmission only)
7. Stoplight switch
8. Retaining clip
9. Washer
10. Brake pedal
11. Bushing
12. Bushing



BRAKE PEDAL 1975-1976

1. Nut
2. Pedal support assembly
3. Clutch pedal
4. Pivot shaft
5. Stoplight switch
6. Retaining clip
7. Washer
8. Brake pedal
9. Bushing
10. Washer
11. Bushing
12. Sleeve

Disassembly

Refer to Figure 37.

1. Clean the outside of the master cylinder before taking it apart.

2. Remove the filler cover and gasket. Pour out any brake fluid left in the master cylinder.

3. Remove the secondary piston stop bolt and O-ring from the bottom of the master cylinder.

4. Press the primary piston into the cylinder, then remove the snap ring from its groove (**Figure 38**).

5. Remove the pushrod and primary piston from the master cylinder bore.

NOTE: *Do not take apart the primary piston assembly. The assembly is preadjusted at the factory and is replaced as a unit.*

6. Remove the secondary piston assembly.

NOTE: *Do not remove the outlet tube seats, outlet check valves, or check valve springs from the master cylinder.*

Inspection

1. Clean all parts in isopropyl alcohol.

2. Inspect the pistons for wear, chipping, or other visible defects. Replace as needed.

NOTE: *When using a master cylinder repair kit,* install all parts supplied with kit.

3. Make sure all passages and openings are unobstructed. Blow the cylinder bore out with compressed air.

4. Check the cylinder bore for scores, pitting, corrosion, or wear. If these conditions are visible, the bore may be honed smooth. However, the bore diameter must not be increased by more than 0.003 in. over the standard diameter (0.938 in.).

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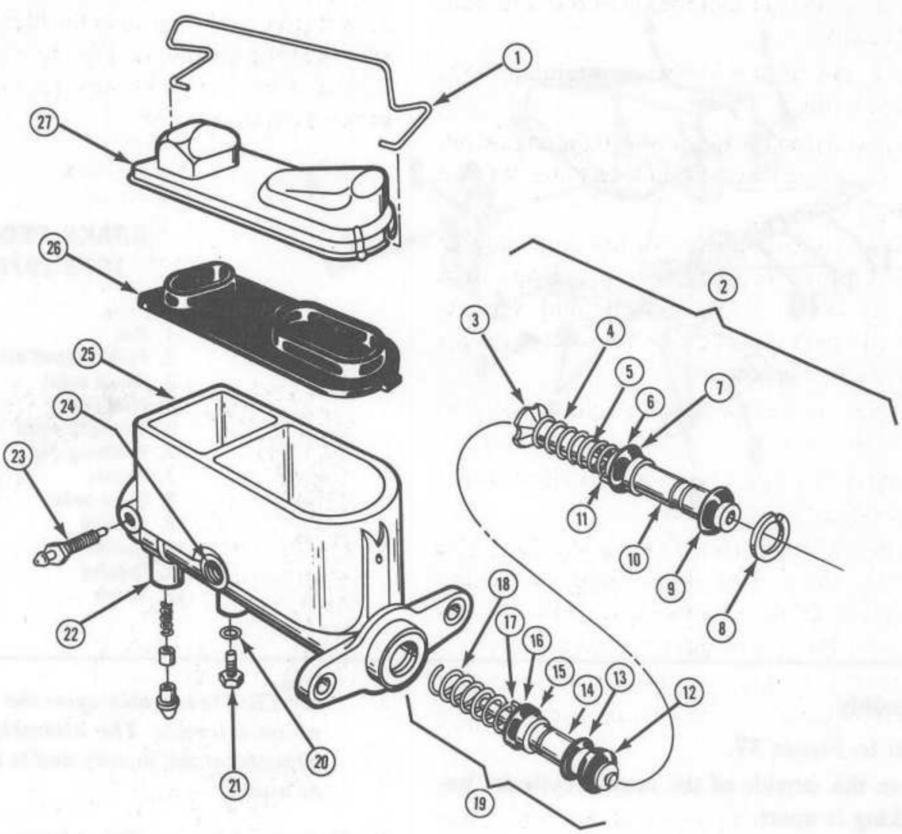
37



MASTER CYLINDER

1. Cover clip
2. Primary piston assembly
3. Return spring retainer
4. Return spring
5. Screw
6. Cup
7. Protector
8. Snap ring
9. Cup
10. Piston
11. Retainer
12. Pumping cup
13. O-ring
14. Piston
15. Protector
16. Cup
17. Retainer
18. Return spring
19. Secondary piston assembly
20. O-ring
21. Piston stop bolt
22. Secondary brake outlet*
23. Bleeder screw*
24. Primary brake outlet
25. Master cylinder body
26. Gasket

*Disc brakes only

Assembly

1. Dip all parts except the master cylinder body in clean brake fluid.

2. Assemble the return spring and secondary piston assembly. Carefully insert this assembly in the master cylinder bore.

3. Install the primary piston assembly in the cylinder bore. Press the piston into the bore and secure with a snap ring (Figure 38).

4. Install the rubber boot and retainer on the pushrod. Install the pushrod in the primary piston. Stretch the pushrod boot over the master cylinder body, then seat the lip of the boot in its groove.

5. Install the piston stop bolt O-ring in the bottom of the master cylinder.

6. Install the gasket in the master cylinder cover. Make sure the gasket is properly seated in the cover.

7. Install the master cylinder cover and gasket on the cylinder. Secure with the cover clip.

Installation

1. Insert the master cylinder pushrod and boot to the firewall.
2. Install the master cylinder retaining bolts and leave loose.
3. Coat the nylon bushings with light engine oil. Place one nylon washer and bushing on the brake pedal pin.
4. Position the stoplight switch and master cylinder pushrod on the brake pedal pin, then install the other nylon bushing and washer. Secure with the retaining clip. Connect stoplight switch wiring connector.
5. Tighten master cylinder attaching bolts to 13-25 ft.-lb.
6. Connect the primary and secondary brake lines to the master cylinder.
7. Fill the master cylinder with brake fluid. Use Ford Extra Heavy Duty brake fluid, or a brake fluid marked DOT 3 on the label. Fill to within ¼ in. of the top of the reservoirs.
8. Bleed the brakes and center the pressure differential valve as described later in this chapter.
9. Press the brake pedal several times, then check the master cylinder for brake fluid leaks.

BRAKE BLEEDING

The hydraulic system should be bled whenever air is suspected of entering it or when braking effectiveness is reduced. If the pedal feels soft, or if pedal travel increases considerably, bleeding is usually called for. Bleeding is also necessary whenever a hydraulic line is disconnected, or the braking system is repaired.

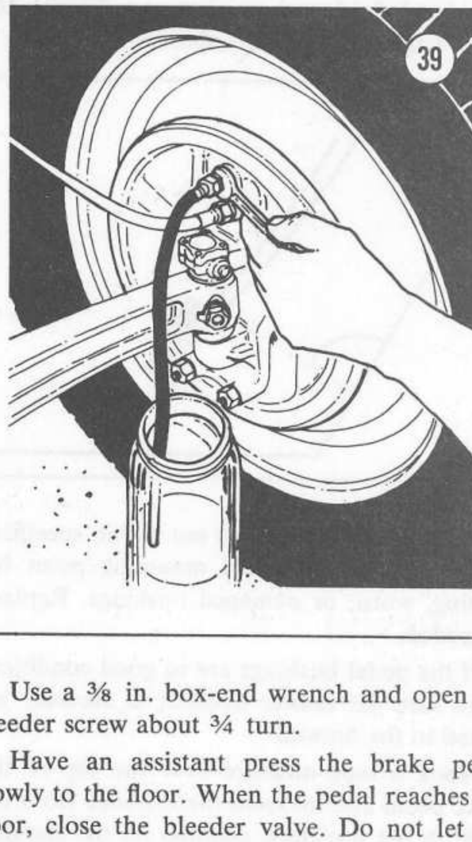
Because this procedure requires handling brake fluid, be careful not to contaminate brake pads, shoes, discs, or drums with fluid. Clean all dirt from bleeder screws before beginning. Two people are required to bleed the system—one to operate the brake pedal, and the other to open and close the bleed valves.

Bleeding should be conducted in the following order: master cylinder, right rear, left rear, right front, left front.

1. Clean away all dirt around the master cylinder. Top up the reservoir with brake fluid (Ford Extra Heavy Duty or DOT 3). Leave the top off the reservoir and cover it with a clean shop rag.
2. Attach a rubber hose to the bleeder screw. Be sure the tube fits snugly. Dip the other end of the tube in a jar containing several inches of clean brake fluid (**Figure 39**).

CAUTION

Do not allow the end of the tube to come out of the brake fluid during bleeding. This could allow air into the system, requiring that the bleeding procedure be done over.



3. Use a ⅜ in. box-end wrench and open the bleeder screw about ¾ turn.
4. Have an assistant press the brake pedal slowly to the floor. When the pedal reaches the floor, close the bleeder valve. Do not let the pedal up until the bleeder screw is closed.
5. Release the pedal slowly.
6. Repeat Steps 3-5 until the fluid entering the jar from the tube is free of air bubbles.
7. Repeat this procedure at the other bleeder screws.

NOTE: *Watch the brake fluid level in the master cylinder throughout the bleeding procedure. If either of the* *reservoirs are allowed to become empty, air will be sucked into the hydraulic system and the bleeding procedure must be repeated.*

BRAKE PEDAL

Adjustment

1. With the handbrake fully released (engine running for power brake installations), measure the distance from the top of the brake pedal pad to the floorboard sheet metal (through the carpet and sound deadener) as shown in **Figure 40**. Pedal height should be as specified in Table 1.

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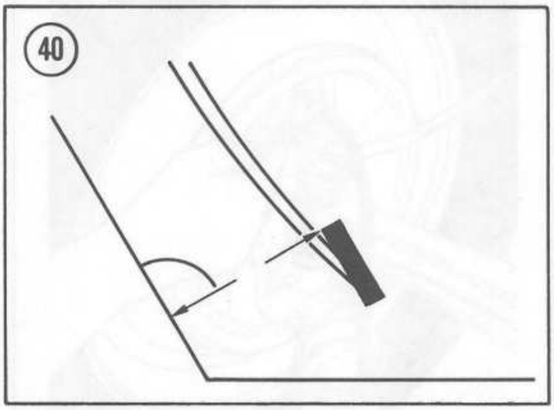


2. If brake pedal height is not within specification, check at the pedal mounting point for missing, worn, or damaged bushings. Replace as needed.

3. If the pedal bushings are in good condition, make sure the master cylinder is securely attached to the firewall.

4. Hook a tape measure over the top of the brake pedal and measure the distance from the pedal to the 6 o'clock position on the steering wheel rim. Press the brake pedal firmly with about 50 lb. pressure and measure again. The difference between these 2 measurements is the pedal travel. This distance should not exceed the specifications in Table 1.

5. If pedal travel is excessive, pump the brake pedal rapidly, several times. If pedal travel is reduced significantly (pedal pumps up), there is probably air in the hydraulic system. Bleed the brakes as described in this chapter.

6. If pumping the brake pedal does not reduce pedal travel, adjust the brakes using the self-adjuster mechanism. To do this, drive the car forward about 10 feet, then press the brake pedal firmly (50 lb. pressure) and hold down until the car stops. Drive the car backward about 10 feet and stop it in the same manner. Repeat this procedure several times. If a series of forward and reverse stops does not reduce pedal travel to within specifications, make another series of forward and reverse stops.

7. If pedal travel is still excessive, check the pedal attachment point for worn or missing pedal bushings. Replace as needed.

8. If pedal bushings are in good condition, remove the brake drums and inspect the self-adjuster mechanisms as described under *Brake Shoes, Installation.*

Removal/Installation (Automatic Transmission)

1. Disconnect the negative battery cable.

2. Disconnect the stoplight switch wires from the connector at the brake pedal, as described previously.

3. Remove the stoplight switch as described under *Master Cylinder, Removal.*

4. Slide the master cylinder pushrod sideways off its pin on the brake pedal.

5. Referring to Figure 35 or 36, as appropriate, remove the retaining clip (1974 models), or nut (1975-1976 models) from the pivot shaft at the top of the brake pedal. Then remove the pivot shaft, brake pedal, bushings, and other hardware from the support bracket.

NOTE: *The brake pedal pivot shaft mounting point varies for different size engines, manual steering, and power steering. Verify mounting configuration in your vehicle with Figure 35 or 36 before removing the brake pedal, pivot shaft, or attaching hardware.*

6. Installation is the reverse of these steps. Coat the nylon washers and bushings with light (SAE 10W40) engine oil. Check pedal height and travel as described earlier.

Removal/Installation (Manual Transmission)

1. Disconnect the clutch cable from the top of the clutch pedal as described in Chapter Eight.
2. Disconnect the stoplight switch wires from the connector at the brake pedal.
3. Remove the stoplight switch as described later in this chapter.
4. Slide the master cylinder pushrod sideways off its pivot pin on the brake pedal.
5. Refer to Figure 35 or 36. Remove the retaining clip (1974 models) or nut (1975-1976 models) from the clutch/brake pedal pivot shaft. Slide the clutch pedal to the left out of the support bracket. Lower the brake pedal and bushings away from the support bracket.

> NOTE: *Verify clutch/brake pedal shaft mounting position with Figure 35 or 36 before removing brake pedal.*

6. Installation is the reverse of these steps. Check clutch pedal free play and adjust if needed. Check brake pedal height and travel, and adjust if needed.

STOPLIGHT SWITCH REPLACEMENT

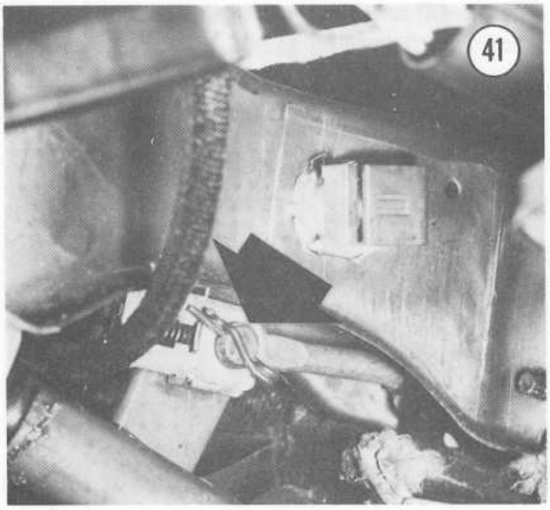
The stoplight switch is a mechanical type device located on the brake pedal, straddling the master cylinder pushrod.

1. Disconnect the stoplight switch wires from the connector at the brake pedal.
2. Use pliers to pull the retaining clip from the stoplight switch pivot pin (**Figure 41**).
3. Slide the stoplight switch to the right, just far enough so the right-hand side of the switch is off the pivot pin. Lower the switch straight down away from the pin. It is not necessary to slide the master cylinder pushrod off the pin.
4. Installation is the reverse of these steps.

BRAKE ADJUSTMENT

Disc Brakes

The front disc brakes are adjusted automatically by the piston seals. Therefore, no adjustment procedure is necessary or provided.



Drum Brakes

The rear drum brakes are self-adjusting. Manual adjustment is unnecessary unless the brakes have been repaired. In such case use the following procedure.

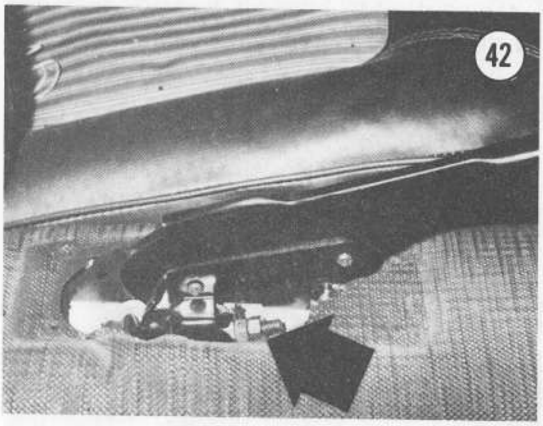
1. Loosen the rear wheel nuts, jack up the rear end of the car and place it on jackstands.
2. Pry the rubber cover from the rear brake backing plate.
3. Insert a narrow-bladed screwdriver through the backing plate and push the self-adjuster lever away from the adjusting wheel (Figure 15).
4. Turn the adjusting wheel upward with a brake adjusting tool until the brakes lock the drum.
5. Back off the adjusting wheel until the brake drum can be turned with very slight drag.
6. Repeat the procedure on the opposite wheel.

HANDBRAKE

Adjustment

1. Securely block both front wheels so the car will not roll in either direction.
2. Fully release the handbrake and place the transmission in NEUTRAL.
3. Jack up the rear end of the car until the tires are clear of the ground. Support the car with jackstands.
4. Tighten the handbrake cable adjusting nut

(**Figure 42**) until the rear brakes drag when the wheels are turned by hand.



5. Loosen the adjusting nut until the brakes just stop dragging.

6. Remove the jackstands, lower the car, and make sure the handbrake operates properly.

Removal/Installation

1. Completely remove the handbrake adjusting nut shown in Figure 42.

2. Remove the 2 bolts attaching the handbrake lever to the transmission tunnel (**Figure 43**). Lift the handbrake lever out.

3. Installation is the reverse of these steps. Tighten the handbrake attaching bolts to 10-16 ft.-lb. Adjust the handbrake linkage as described earlier.

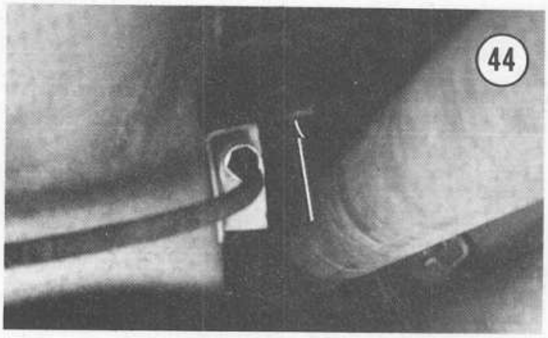
Cable Removal

1. Securely block both front wheels so the car will not roll in either direction.

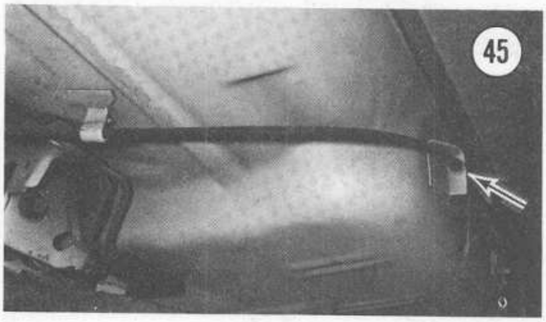
2. Release the handbrake and loosen the attaching nuts (Figure 42).

3. Jack up the rear end of the car until the tires are clear of the ground. Place jackstands beneath the car.

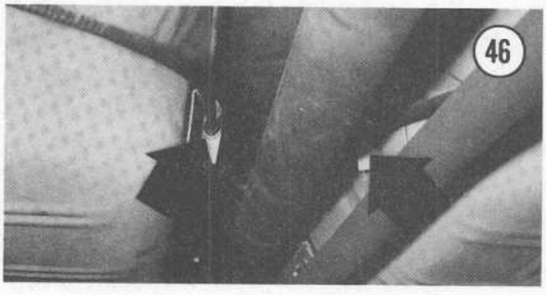
4. Unhook the handbrake cable from the equalizer (**Figure 44**).



5. Use pliers to compress the cable retainer prong (**Figure 45**) and release the cable from the bracket attaching it to the frame.



6. Open the ends of the floor pan cable clips (**Figure 46**) and remove the retaining clip that attaches the cable to the bolt on the bracket.

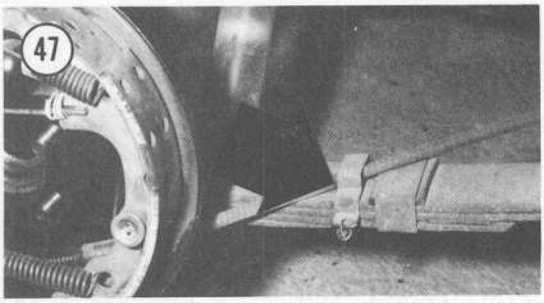


7. Remove the rear wheels and brake drums as described earlier.

8. Remove the self-adjuster spring and separate the cable ends from the handbrake levers.

9. Compress the retainer prong and pull the cable ends through the backing plate.

10. Remove the cable retainer from each rear spring (**Figure 47**). Lower the cable away from the retainers and withdraw from the car.



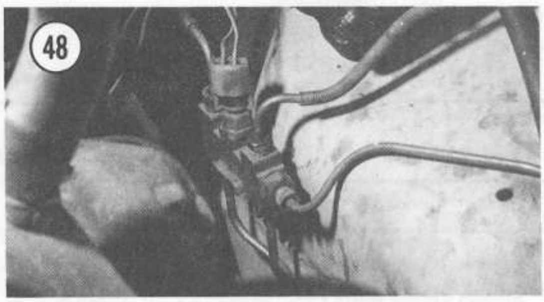
Cable Installation

1. Insert the cable ends into the backing plate. Pull the ends in until the retainer prongs lock the cable in place.
2. Connect the cable ends to the handbrake levers.
3. Install self-adjuster springs.
4. Position the cable in the retainers on the rear springs (Figure 47). Install retainer.
5. Place cable in floor pan clips (Figure 46). Bend the clips closed.
6. Place the cable in a retainer bracket, then pull the cable forward until the retainer prongs lock in place.
7. Hook cable into equalizer.
8. Install the rear brake drums and wheels, then lower the car and tighten wheel nuts to 80-105 ft.-lb.
9. Adjust the handbrake linkage as described earlier.

PRESSURE DIFFERENTIAL VALVE AND WARNING LIGHT SWITCH

The pressure differential valve and warning light switch are combined into a single unit located in front of the master cylinder on the fender apron. If hydraulic pressure drops severely in either the front or rear brake system, the valve operates the switch activating the warning light in the passenger compartment. The pressure differential valve must be centered whenever the brakes are bled. To center, turn the ignition switch to ACC or ON (but do not start the engine). Press the brake pedal firmly until the warning light goes out (if illuminated). Turn ignition switch OFF.

If the pressure differential valve is defective, replace it. Do not attempt to repair the valve. Refer to **Figure 48** during following procedure.



1. Disconnect the brake warning light wiring connector from the valve.
2. Detach the hydraulic lines from the valve.
3. Remove 2 bolts and nuts attaching the valve to the front fender apron. Lift the valve out of the car.
4. Installation is the reverse of these steps. Bleed the brakes and center the new valve, as described in this chapter, before driving the vehicle.

Table 1 BRAKE PEDAL HEIGHT AND TRAVEL SPECIFICATIONS

Brake Type	Pedal Height Maximum	Pedal Height Minimum	Pedal Travel
1974 non-power	8½ in.	7³⁄₁₆ in.	2½ in.
1974 power	6⅞ in.	6 in.	2⅝ in.
1975-1976 non-power	8⅞ in.	7⁹⁄₁₆ in.	2⅞ in.
1975-1976 power	7⁷⁄₁₆ in.	6⅝ in.	3 in.

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Table 2 BRAKE SPECIFICATIONS

Pedal	
Free height	See Table 1
Stroke, maximum	See Table 1
Master Cylinder	
Bore diameter	0.938 in. (front disc brakes)
	0.9375 in. (front drum brakes)
Wheel Cylinder Diameter	
Disc brakes	2.600 in.
Rear drum brakes	0.875 in.
Discs	
Diameter	9.3 in.
Thickness	
Standard	0.870 in.
Minimum	0.810 in.
Drums	
Diameter	
Standard	9.000 in.
Maximum	9.060 in.
Maximum out-of-round	0.007 in.

Table 3 TIGHTENING TORQUES

Item	ft.-lb.	Item	ft.-lb.
Caliper bleeder screw (disc brakes)	6-15	Wheel cylinder installation bolts	6-10
Splash shield bolts (disc brakes)	9-14	Pressure differential valve installation bolts	7-11
Caliper key retaining screw (disc brakes)	12-16	Front backing plate bolts	28-35
Upper anchor plate bolts (disc brakes)	90-120	Rear backing plate bolts	20-40
Lower anchor plate bolts (disc brakes)	55-75	Wheel cylinder bleeder screws	32-65 in.-lb. (1974-1975); 110-160 in.-lb. (1976)
Handbrake lever mounting bolts	10-16		
Master cylinder installation bolts	13-25	Brake hose to front caliper	20-30

CHAPTER ELEVEN

FRONT SUSPENSION, WHEEL BEARINGS, AND STEERING

The Mustang II uses a conventional independent front suspension, with upper and lower control arms (A-arms) and coil springs. Telescopic shock absorbers are mounted inside the springs. Struts are used to control front/rear movement of the suspension arms. A stabilizer bar connects the lower control arms. **Figure 1** shows the front suspension.

Rack-and-pinion steering is used. The steering mechanism is controlled through a 2-section steering column, the upper half of which is collapsible. The lower half of the column is a rigid shaft with universal joint.

Table 1 provides steering specifications; **Tables 2, 3, and 4** torque recommendations. They are found at the end of the chapter.

WHEEL ALIGNMENT

Several front suspension angles affect the running and turning of the front wheels. These angles must be properly aligned to prevent excessive tire wear, as well as to maintain directional stability and ease of steering. They are:

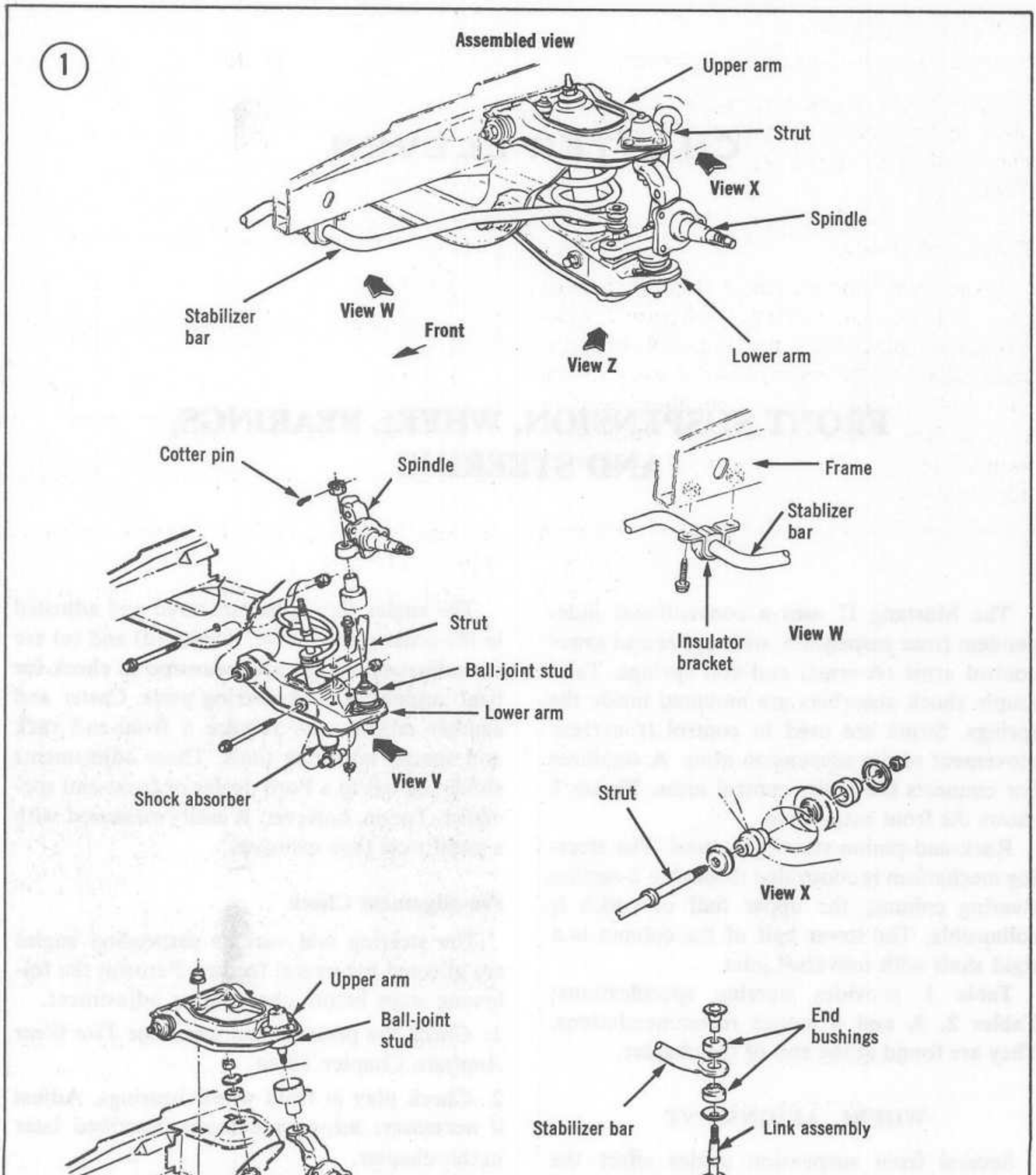
a. Caster
b. Camber
c. Toe-in
d. Steering axis inclination
e. Steering angle

The angles should be measured and adjusted in the order given above. Angles (d) and (e) are not adjustable. They are measured to check for bent suspension and steering parts. Caster and camber adjustments require a front-end rack and special adjusting tools. These adjustments should be left to a Ford dealer or front-end specialist. Toe-in, however, is easily measured with a good steel tape measure.

Pre-alignment Check

The steering and various suspension angles are affected by several factors. Perform the following steps before checking or adjustment.

1. Check tire pressure and wear. See *Tire Wear Analysis*, Chapter Three.
2. Check play in front wheel bearings. Adjust if necessary, using procedures described later in this chapter.
3. Check play in ball-joints as described later in this chapter.
4. Check for broken springs.
5. Remove any excessive load.
6. Check shock absorbers as described later in this chapter.
7. Check tie rods for looseness as described in this chapter. Check rack-and-pinion mechanism for looseness (3/8 in. free play at wheel rim).



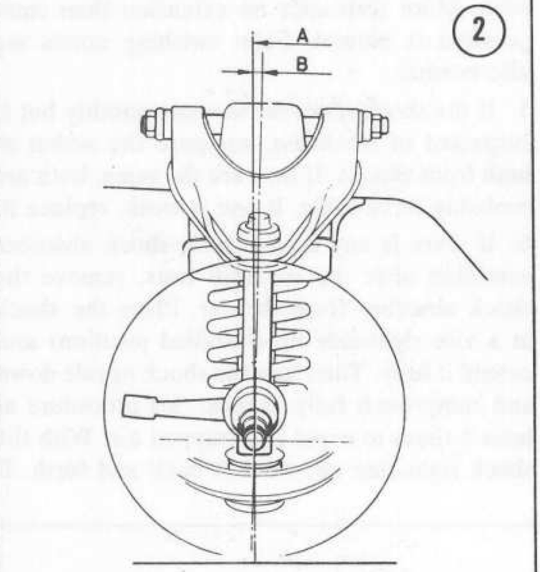
FRONT SUSPENSION

8. Check wheel balance.
9. Check rear suspension for looseness.

Front tire wear patterns can indicate several alignment problems. These are discussed and illustrated under *Tire Wear Analysis*, Chapter Three.

Caster and Camber

Caster is the inclination of the line through the ball-joints from vertical. See **Figure 2**. Positive caster shifts the wheel forward; negative caster shifts the wheel rearward. Caster causes the wheels to return to a straight ahead position after a turn. It also prevents the wheel from wandering due to wind, potholes, or uneven road surfaces.

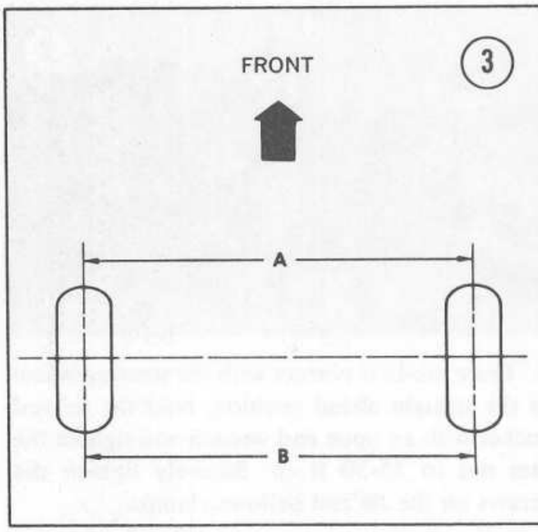


A — Vertical line
B — Caster

Camber is the inclination of the wheel from vertical. With positive camber, the top of the tire leans outward. With negative camber, the top of the tire leans inward.

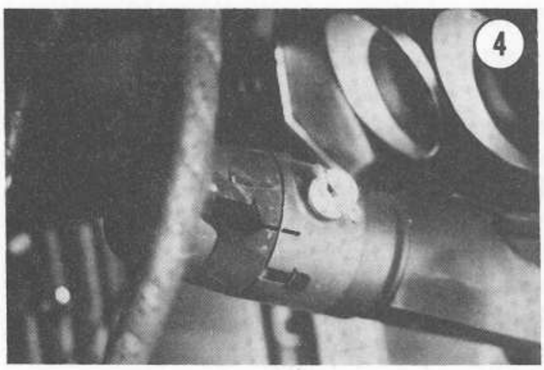
Toe-in

Toe-in should range from 0-¼ in. This means distance A in **Figure 3** should be equal to or ¼



in. less than distance B. If toe-in is incorrect, adjust as follows.

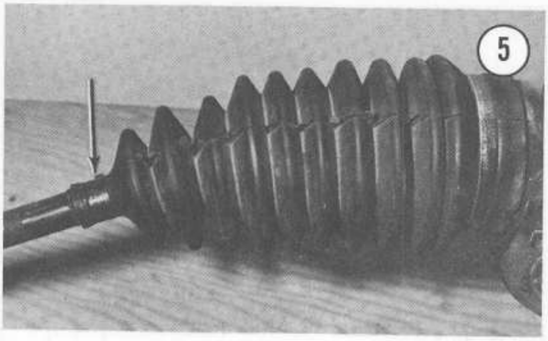
1. Make sure the steering wheel and column alignment marks are lined up (**Figure 4**).



2. Loosen the clamp screw on the tie rod bellows (**Figure 5**). Make sure the bellows can rotate freely on the tie rod. Otherwise the bellows will be twisted and damaged.
3. Hold the tie rod socket with an open end wrench and loosen the jam nut (**Figure 6**).
4. While holding the tie rod socket steady, turn the tie rod with Vise Grips to increase or reduce toe-in. See Figure 6. Tie rod lengths should be equal after adjustment.

CAUTION

Do not grip the tie rod threads with the Vise Grips.



5. Once toe-in is correct with the steering wheel in the straight ahead position, hold the tie rod socket with an open end wrench and tighten the jam nut to 35-50 ft.-lb. Securely tighten the screws on the tie rod bellows clamps.

Steering Axis Inclination

Steering axis inclination is the inward or outward lean of the line through the ball-joints. It is not adjustable on the Mustang II.

Turning Angle

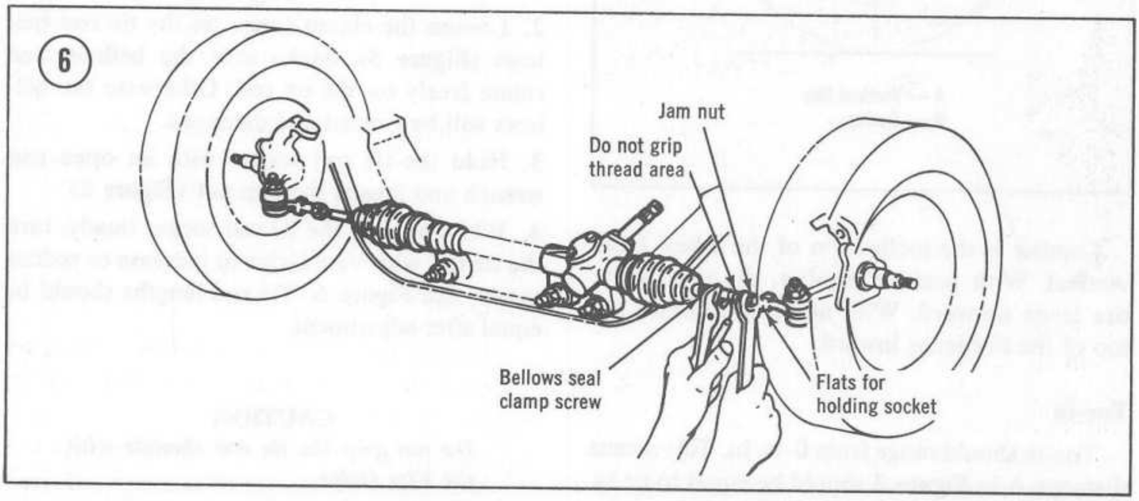
When a car turns, the inside wheel makes a smaller circle than the outside wheel. Because of this, the inside wheel turns at a greater angle than the outside wheel. When the inside wheel is turned 20° from straight ahead, the outside wheel should be turned 18.84°. Turning angle is the result of a combination of caster, camber, and toe-in adjustments. If the turning angle is incorrect after these adjustments have been made, check for bent suspension parts.

FRONT SHOCK ABSORBERS

Testing

Before replacing shock absorbers, check as follows.

1. Make sure the shock absorber is securely installed. Tighten to specified torque if necessary.
2. Replace any worn or damaged rubber insulators.
3. Check for leaking fluid. A thin film of fluid is permissible. If excess fluid is visible, make sure it comes from the shock absorber, and not some other source, before replacing. Replace shock absorbers showing severe fluid leakage.
4. Disconnect the lower end of the shock absorber. See *Replacement*, Step 2. Work the shock absorber up and down as far and fast as possible. Action should become smooth and even. More resistance on extension than compression is normal. Faint swishing noises are also normal.
5. If the shock absorber moves smoothly but is suspected of weakness, compare the action of both front shocks. If they are the same, both are probably serviceable. If one is weak, replace it.
6. If there is any doubt about shock absorber condition after the previous tests, remove the shock absorber from the car. Place the shock in a vise right-side up (installed position) and extend it fully. Then turn the shock upside down and compress it fully. Repeat this procedure at least 3 times to expel any trapped air. With the shock right-side up, work it back and forth. If



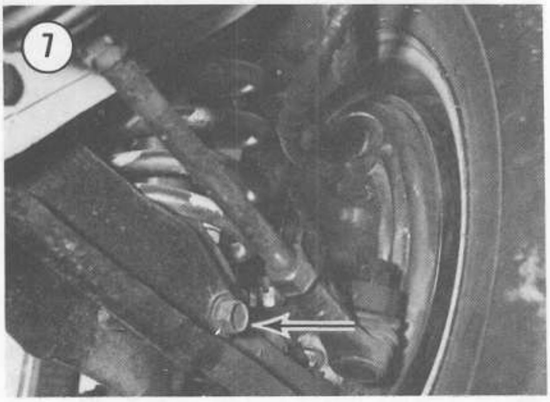
action is not smooth and even, replace the shock absorber.

Replacement

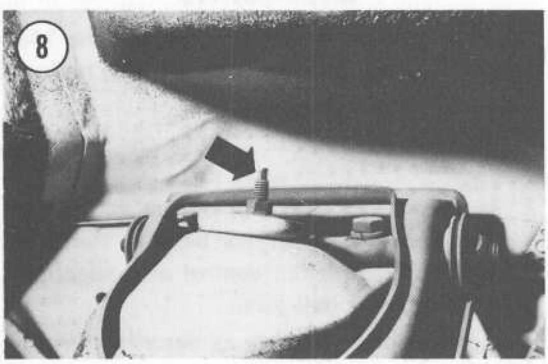
1. Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the front wheels.

2. Apply penetrating oil to the shock absorber lower bolt, then remove the bolt (**Figure 7**).

NOTE: *If the bolt is difficult to remove, place a jack beneath the lower control arm and raise it gradually until the bolt is easy to remove.*



3. Hold the shock absorber upper stud with a wrench, then remove the retaining nut. See **Figure 8**.



4. Remove the washer and rubber insulator from the top of the shock absorber. Remove the shock absorber downward through the lower suspension arm.

5. Installation is the reverse of these steps. Use new rubber insulators. Tighten the shock absorber upper nut to 22-30 ft.-lb. Tighten the lower bolt to 60-80 ft.-lb. If necessary, use a jack to align the control arm and lower bolt hole.

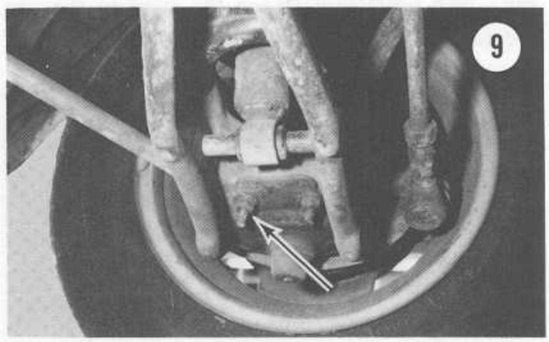
NOTE: *If it is difficult to compress the rubber insulators at the top of the shock absorber, insert a screwdriver through the top of the coil spring. Use the screwdriver as a lever and the spring as a fulcrum to compress the insulator.*

STABILIZER BAR

Removal/Installation

1. Jack up the front end of the car to provide working space. Support the car with jackstands.

2. Remove the nut from the lower end of the stabilizer attaching stud (**Figure 9**). Repeat this step at the other side of the car.



3. Detach the stabilizer bar insulator brackets from the car frame (Figure 1).

4. Refer to Figure 1. Disassemble the insulator brackets and end bushings. Replace any worn or damaged components, especially rubber insulators.

5. Installation is the reverse of these steps. Tighten all nuts and bolts to the specifications listed at the end of the chapter.

STRUTS

Removal/Installation

1. Remove the nut securing the rear end of the strut to the frame (**Figure 10**). Slide off the washer and rubber insulator.

2. Detach the strut from the lower control arm (Figures 1 and 9). Pull the strut from the frame.

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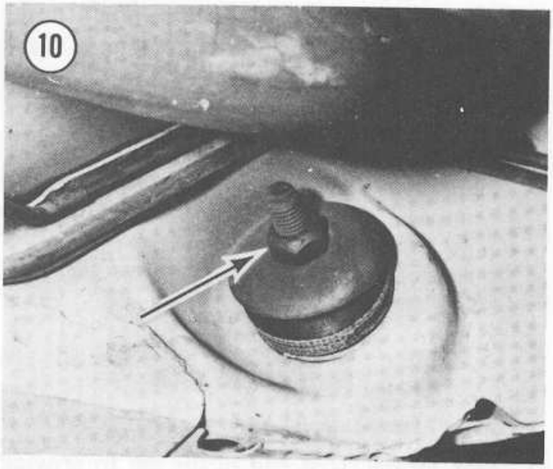
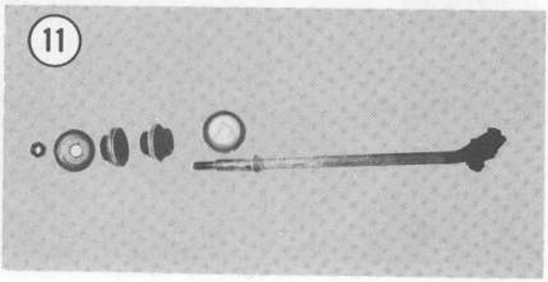


CAUTION

The strut bolts are splined. Turn the nuts only.

3. Refer to **Figure 11**. Inspect the insulators, nuts, and bolts that attach the strut to the car. Replace any worn or damaged parts.



4. Installation is the reverse of these steps. Tighten all nuts and bolts to the specifications listed at the end of the chapter.

COIL SPRINGS

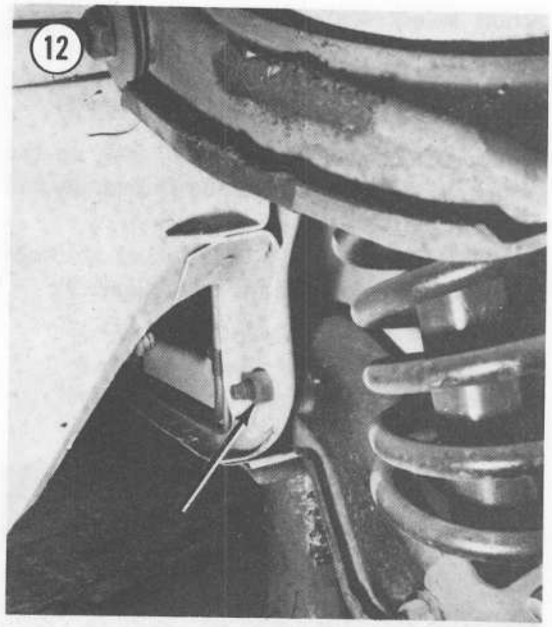
Removal/Installation

1. Jack up the front end of the car and place it on jackstands. Place a jack beneath the lower control arm to support it.

2. Remove the shock absorber as described earlier.

3. Detach the strut from the lower control arm as described earlier. Detach the stabilizer bar as described earlier.

4. Remove the bolt attaching the inner end of the lower control arm to the frame (**Figure 12**).



5. Slowly lower the jack beneath the control arm until the spring is free. Take the spring out.

6. Installation is the reverse of these steps. Secure the rubber insulator to the top of the spring with tape. Be sure the bottom of the spring is properly seated in the control arm. The end of the spring must be no more than ½ in. from the depression in the control arm.

BALL-JOINTS

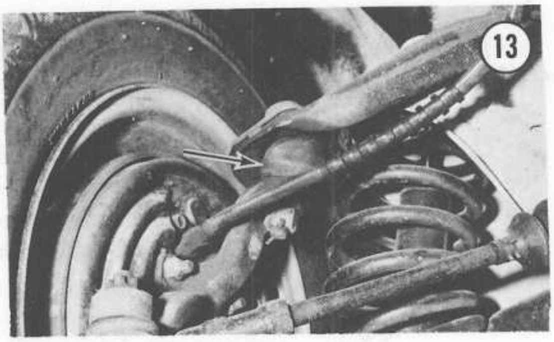
Ball-joints are not replaceable on the Mustang II. The entire control arm must be replaced if the ball-joint is worn.

Inspection

1. Jack up the front end of the car and place it on jackstands. Place a jack beneath the lower control arm. Raise the control arm slightly to unload the lower ball-joint.

2. Adjust wheel bearings as described later in this chapter.

3. While an assistant moves the lower edge of the tire in and out, watch for movement between the upper control arm and spindle. See **Figure 13**. If movement is visible, the upper ball-joint is worn. Replace the upper control arm as described later in this chapter.



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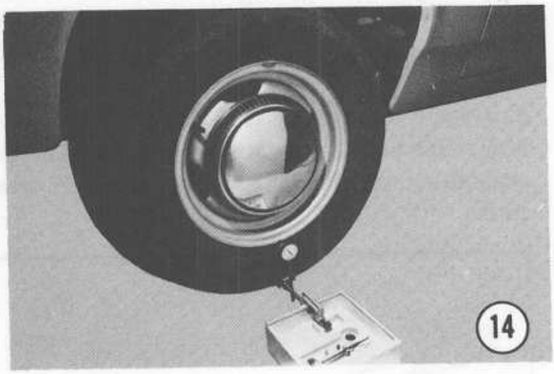
NOTE: *Looseness of the* lower *ball-joint during Step 3 is normal and does not indicate lower ball-joint wear.*

4. Position a dial gauge as shown in **Figure 14**. The gauge pointer must make contact with the wheel rim near the lower ball-joint.



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5. Have an assistant grasp the tire at top and bottom and move it slowly in and out. Note the reading on the dial gauge. This is ball-joint radial play. If it exceeds 0.250 in., the ball-joint is excessively worn. Replace the entire lower control arm as described in this chapter.

CONTROL ARMS

Lower Control Arm Removal/Installation

1. Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the front wheels.

NOTE: *Place the jackstands under the frame directly behind the control arms.*

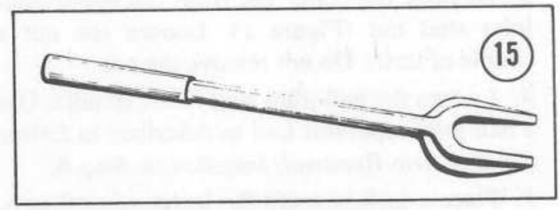
2. Remove the disc brake caliper and hang it from the frame with wire to prevent damaging the brake hose. See Chapter Ten.

3. Disconnect the lower end of the shock absorber from the control arm and push it up out of the way (Figure 7).

4. Disconnect the stabilizer bar and strut from the lower control arm as described earlier.

5. Remove the cotter pin from the lower ball-joint stud nut (Figure 1). Loosen the nut a couple of turns. Do not remove the nut.

6. Loosen the ball-joint stud in the spindle. To do this, apply pressure with a ball-joint separator tool (**Figure 15**). At the same time, tap the spindle with a hammer near the ball-joint. Ball-joint separator tools are available at many auto parts stores.



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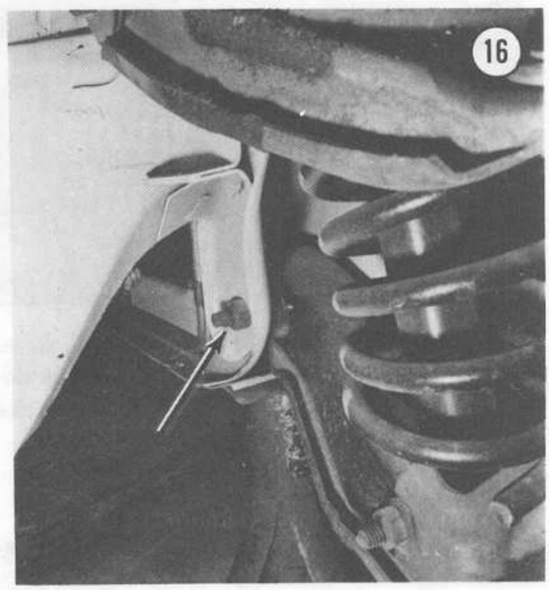
7. Place a jack beneath the lower control arm to support it.

8. Remove the ball-joint stud nut. Lower the control arm with the jack.

9. Remove the control arm pivot bolt (**Figure 16**). Lower the control arm clear of the car.



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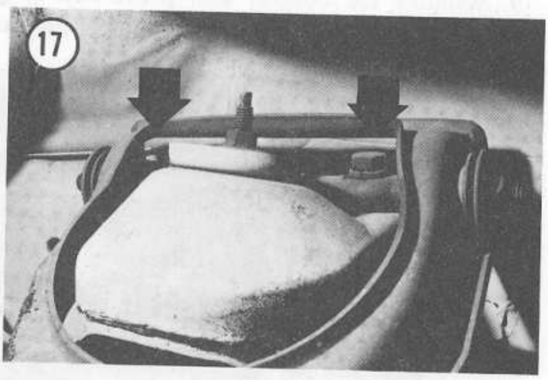
10. Installation is the reverse of these steps. Install the control arm pivot bolt loosely. Tighten the ball-joint stud nut, shock absorber bolt, and strut bolts to correct torque before tightening the control arm pivot bolt.

Upper Control Arm Removal/Installation

1. Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the front wheels.

NOTE: *Locate jackstands under the frame directly behind the control arms.*

2. Unbolt the disc brake caliper from the spindle and hang it from the frame with wire.
3. Remove the cotter pin from the upper ball-joint stud nut (Figure 1). Loosen the nut a couple of turns. Do not remove the nut.
4. Loosen the ball-joint stud in the spindle. Use a ball-joint separator tool as described in *Lower Control Arm Removal/Installation*, Step 6.
5. Place a jack beneath the lower control arm. Raise the jack enough to take all pressure off the upper ball-joint stud nut. Remove the nut.
6. Remove 2 bolts attaching the upper arm inner shaft to the frame (**Figure 17**). Lift the upper arm and shaft away from the car.



7. Installation is the reverse of these steps. After installation, adjust wheel bearings as described later in this chapter. Pump the brake pedal several times to relocate brake pads.

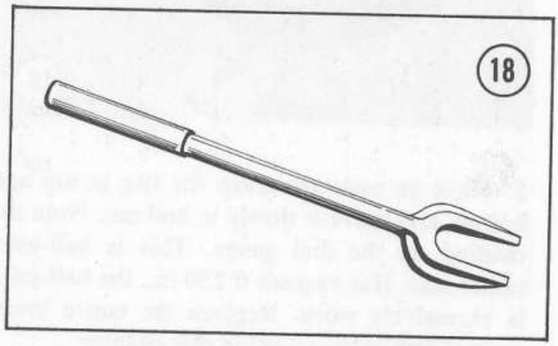
Inspection

1. Thoroughly clean all parts in solvent before inspection.
2. Check the control arm for cracks or other visible defects, especially around the ball-joint. Replace the control arm if cracks or other damage can be seen.
3. Check the control arm bushings for cracks or signs of melting. Bushing replacement requires special tools. If the bushings are defective, take the control arm to a Ford dealer for bushing replacement.

WHEEL SPINDLE

Removal/Installation

1. Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the front wheels.
2. Detach the disc brake caliper from the spindle. Hang it from the frame with wire. Do not allow it to hang from the brake line. Remove the brake disc hub and splash shield. See Chapter Ten.
3. Detach the steering tie rod from the spindle arm with a tie rod separator (**Figure 18**). Tie rod separators are available at many auto parts stores.



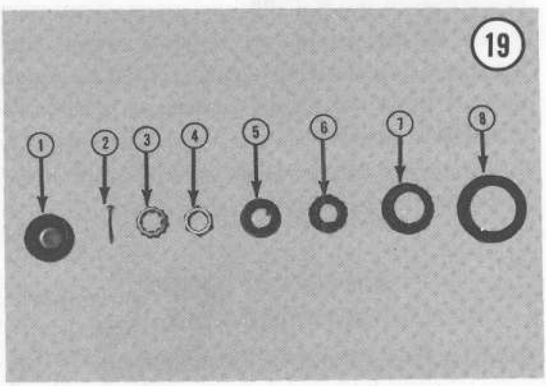
4. Remove the cotter pins from both ball-joint stud nuts (Figure 1). Loosen the nuts one or two turns. Do not remove the nuts yet.
5. Loosen both ball-joint studs in the spindles. To do this, apply pressure with a ball-joint separator tool as shown in Figure 18. At the same time, tap the spindle near each stud with a hammer. Ball-joint separator tools are available at many auto parts stores.
6. Place a jack beneath the lower control arm. Lower the jack enough to remove the spindle. Take out the spindle and coil spring.

7. Installation is the reverse of these steps. Tighten the ball-joint stud nuts to 75 ft.-lb., then continue tightening until the cotter pins can be inserted. Do not tighten over 90 ft.-lb. Use new cotter pins. Adjust wheel bearings as described later in this chapter. Pump the brake pedal several times to relocate the brake pads.

WHEEL BEARINGS

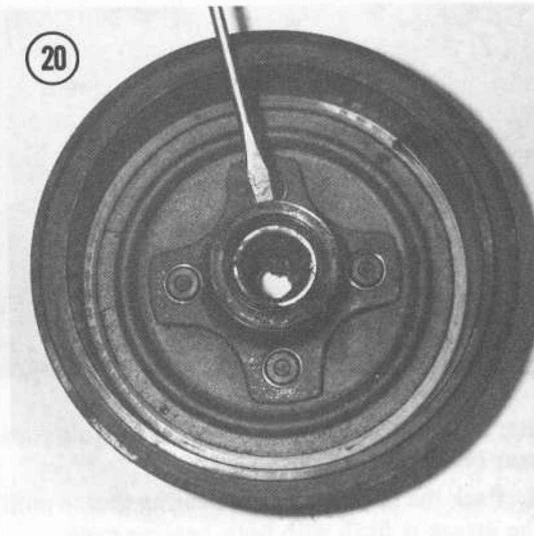
Removal

1. Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the front wheels.
2. Unbolt the disc brake caliper from the wheel spindle and hang it from the frame with wire. See Chapter Ten. Do not allow it to hang from the brake line.
3. Remove the grease cap from the hub. Tap lightly with the mallet to free cap.
4. Refer to **Figure 19**. Remove the cotter pin, nut lock, wheel bearing adjusting nut, and washer from the wheel spindle.



1. Grease cap
2. Cotter pin
3. Nut lock
4. Wheel bearing nut
5. Bearing washer
6. Outer bearing
7. Inner bearing
8. Grease seal

5. Pull the disc or drum outward about one in., then push it back onto the spindle. This will loosen the outer wheel bearing so it can be removed (Figure 19).
6. Pull the brake disc off the spindle, together with the inner wheel bearing and grease seal.
7. Working through the center of the hub, drive the grease seal out with a drift or screwdriver (**Figure 20**).



8. Once the grease seal is out, take out the inner wheel bearing.

Inspection

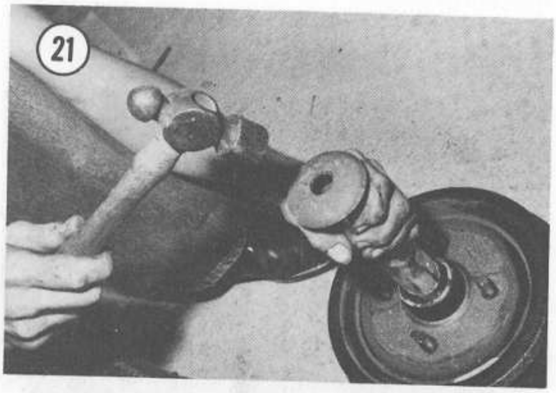
1. Clean all parts thoroughly in solvent before inspection. Be sure all old grease is removed from wheel bearings (inner and outer).
2. Check the wheel bearing cups (outer races). Look for signs of wear, scoring, chipping, rust, or the bluish tint that indicates overheating. If any of these defects can be seen, drive out the bearing cups with a drift, in the same manner used for grease seal removal. Remove the bearing cups gradually and evenly, tapping around the circumference of the cup.

CAUTION
If a bearing cup is replaced, the corresponding bearing must also be replaced.

3. Inspect inner and outer bearing assemblies for rust, galling, wear, and bluish tint that indicates overheating. Rotate the bearings and check for roughness and excessive noise. Replace any suspect bearings, together with the corresponding bearing cups.

Installation

1. If the bearing cups were removed, drive them into place with a drift such as the one shown in **Figure 21**. The drift should be the same diam-



eter as the bearing cup. Be sure the bearing cups seat evenly in the hub.

2. Pack the hub with wheel bearing grease until the grease is flush with both bearing cups.

3. Pack the bearings with grease. Work as much grease as possible between the rollers. Put grease in one hand and drag the bearing through it (**Figure 22**).

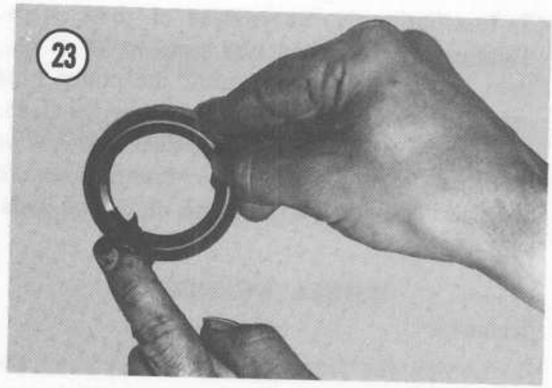
4. Fill the grease seal lip with grease (**Figure 23**). Drive the grease seal into place in the hub. Be sure the seal is properly seated.

5. Install the brake disc on the wheel spindle. Be careful not to damage the spindle threads or grease seal.

6. Refer to Figure 19 and install the outer bearing, flat washer, and adjusting nut on the wheel spindle.

Adjustment

1. Loosen the wheel bearing adjusting nut 3 turns, then pull the brake disc in and out several times to push the brake pads away from the disc.



2. Rotate the disc and at the same time tighten the wheel bearing adjusting nut to 17-25 ft.-lb.

3. Back off wheel bearing adjusting nut ½ turn.

4. If an in.-lb. torque wrench is available, tighten the adjusting nut to 10-15 in.-lb. Otherwise tighten the nut finger-tight.

5. Install the nut lock and a new cotter pin. Bend over both ends of the cotter pin.

6. Grasp the hub firmly in both hands and shake it up, down, and sideways. There should be no play in the bearing.

7. Install the grease cap, then the wheel. Spin the wheel and check for bearing noise or roughness. If these are evident, clean or replace the bearings as needed.

8. Pump the brake pedal several times to relocate the brake pads.

STEERING WHEEL AND COLUMN

Steering Wheel Removal/Installation

1. Turn the steering wheel to the straight ahead position. Check for factory alignment marks. Make your own if these are not visible. See Figure 4.

2. Disconnect the ground cable from the battery.

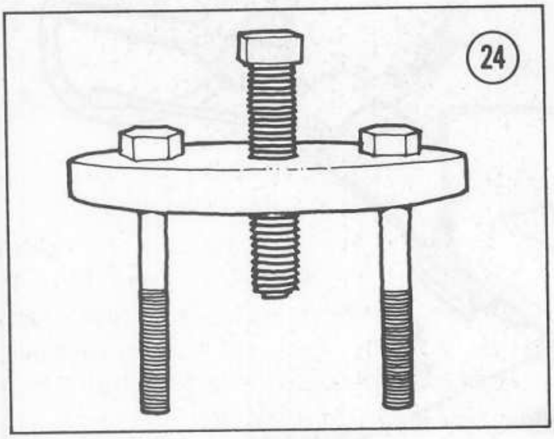
3. Remove 2 screws from the back of the steering wheel, then lift off the crash pad.

4. Disconnect the horn wires.

5. Remove the steering wheel nut.

6. Remove the steering wheel with a puller such as the one shown in **Figure 24**. The puller bolts must have 5/16-24 threads.

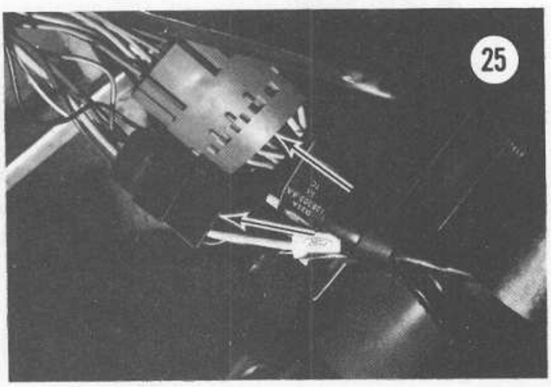
CAUTION
Do not use a knock-off type puller or strike the steering column while removing the steering wheel, as damage to the steering shaft or bearings may result.



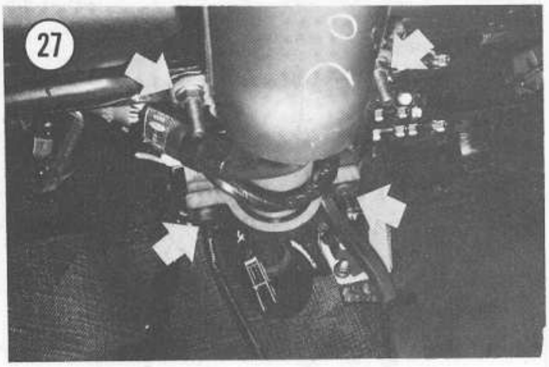
7. Installation is the reverse of these steps. Line up the steering wheel and column alignment marks shown in Figure 4. Tighten the steering wheel nut to 30-40 ft.-lb. Then install the horn button or crash pad.

Steering Column Removal/Installation

1. Disconnect negative cable from battery.
2. Detach the electrical connector at the base of the steering column (**Figure 25**).



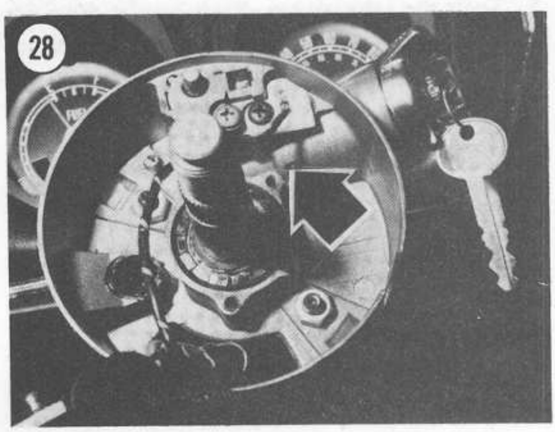
3. Detach the lower steering shaft from the rack-and-pinion assembly (**Figure 26**).
4. Remove the lower trim shroud (Figure 26).
5. Separate the lower steering column seal dust boot from the dash panel (Figure 26).
6. Remove 4 nuts attaching the steering column to its support bracket (**Figure 27**).

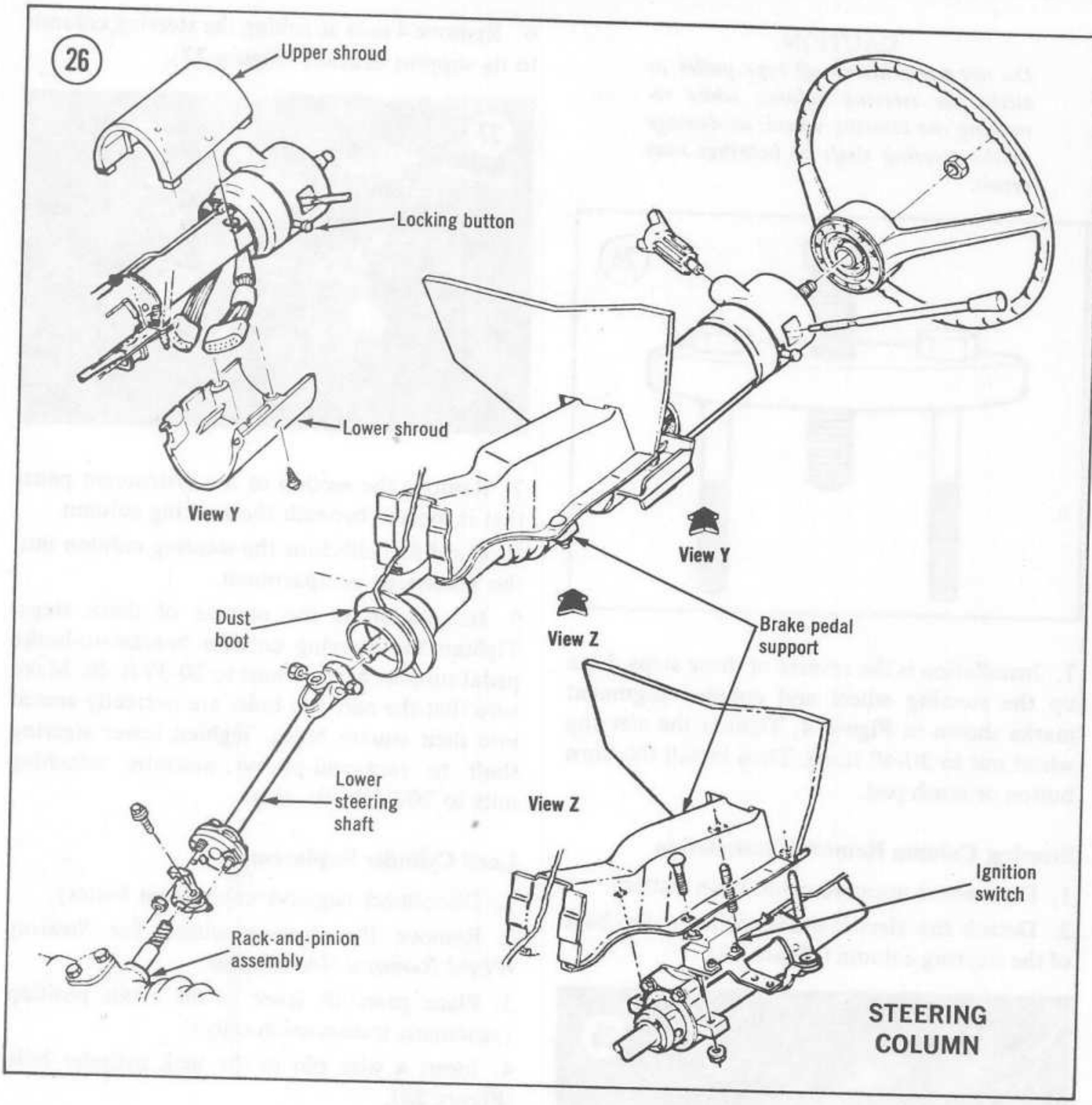


7. Remove the section of the instrument panel that is located beneath the steering column.
8. Carefully withdraw the steering column into the passenger compartment.
9. Installation is the reverse of these steps. Tighten the steering column bracket-to-brake pedal support bracket nuts to 20-37 ft.-lb. Make sure that the carriage bolts are correctly seated into their square holes. Tighten lower steering shaft to rack-and-pinion assemby attaching nuts to 20-37 ft.-lb. also.

Lock Cylinder Replacement

1. Disconnect negative cable from battery.
2. Remove the steering wheel. See *Steering Wheel Removal/Installation.*
3. Place gearshift lever in the PARK position (automatic transmission only).
4. Insert a wire pin in the lock cylinder hole (**Figure 28**).





5. Turn the ignition on. Push on the wire pin and pull the lock cylinder out of the steering column. Remove the wire pin.

6. Installation is the reverse of these steps.

RACK-AND-PINION ASSEMBLY

Removal/Installation (Manual and Power Steering)

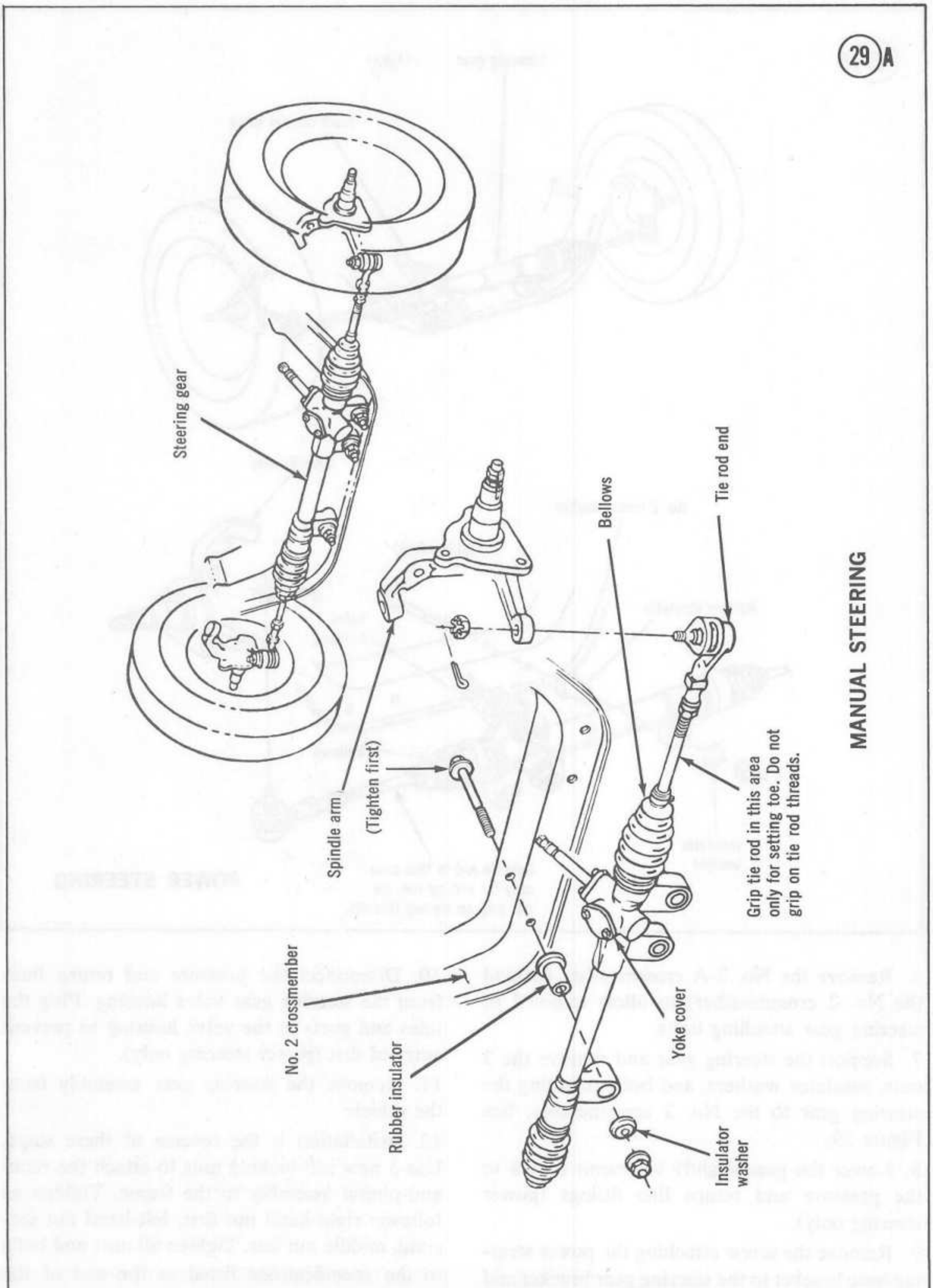
1. Disconnect the battery ground cable and turn the ignition key to the unlocked position.

2. Turn the steering wheel to the straight ahead position. Line up the steering wheel and column alignment marks (Figure 4). Make your own marks if there are none. Leave the ignition key in the ON position.

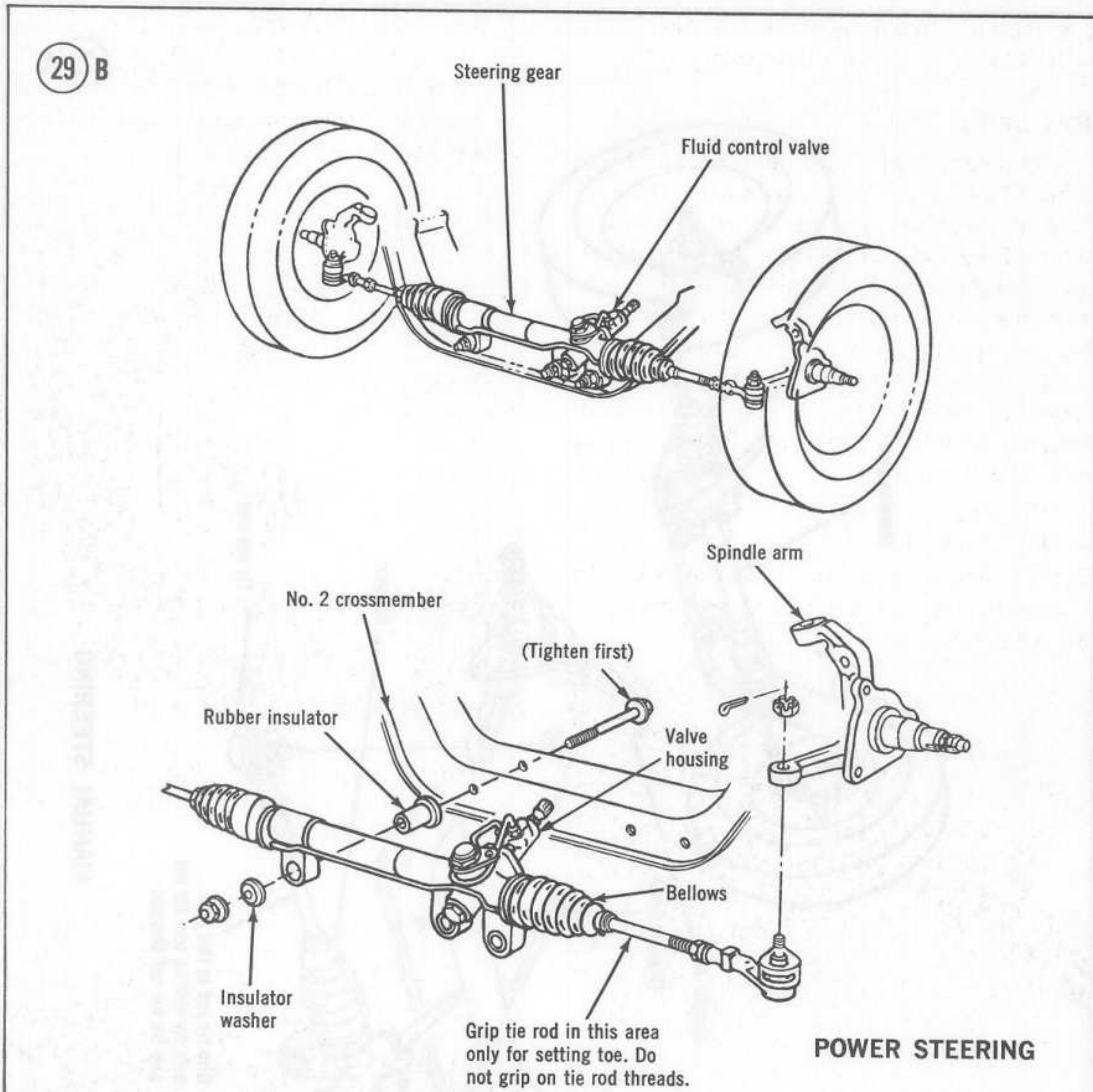
3. Jack up the front end of the car and place it on jackstands.

4. Detach the tie rods from the wheel spindle arms (**Figures 29A and 29B**). Tie rod separator tools such as the one shown in Figure 18 are available at many auto parts stores.

5. Detach the lower steering shaft from the rack-and-pinion assembly (Figure 26).



MANUAL STEERING



6. Remove the No. 2-A crossmember (behind the No. 2 crossmember) to allow removal of steering gear attaching bolts.

7. Support the steering gear and remove the 3 nuts, insulator washers, and bolts retaining the steering gear to the No. 2 crossmember. See Figure 29.

8. Lower the gear slightly to permit access to the pressure and return line fittings (power steering only).

9. Remove the screw attaching the power steering hose bracket to the steering gear bracket and remove (power steering only).

10. Disconnect the pressure and return lines from the steering gear valve housing. Plug the lines and ports in the valve housing to prevent entry of dirt (power steering only).

11. Remove the steering gear assembly from the vehicle.

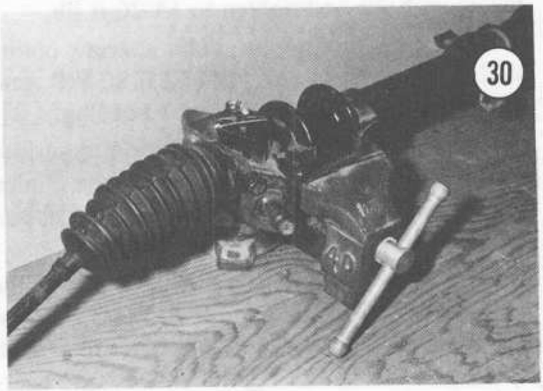
12. Installation is the reverse of these steps. Use 3 new self-locking nuts to attach the rack-and-pinion assembly to the frame. Tighten as follows: right-hand nut first, left-hand nut second, middle nut last. Tighten all nuts and bolts to the specifications listed at the end of the chapter. Use new cotter pins to secure the tie

rod end nuts. Check toe-in as described earlier in the chapter and adjust if necessary.

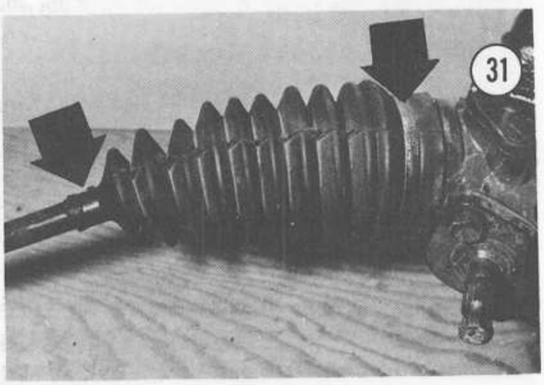
Disassembly

The inner tie rods, rack, housing, and upper pinion bearing are not replaceable. The rack housing assembly must be replaced if any of these parts is defective. Removable components are the rubber bellows, pinion shaft seal, support yoke, pinion shaft, lower bearing, upper bearing, spacer, gaskets, shims, and cover. Disassembly of power steering units requires special tools and experience and should not be attempted. Refer maintenance of power steering units to your Ford dealer or a competent garage.

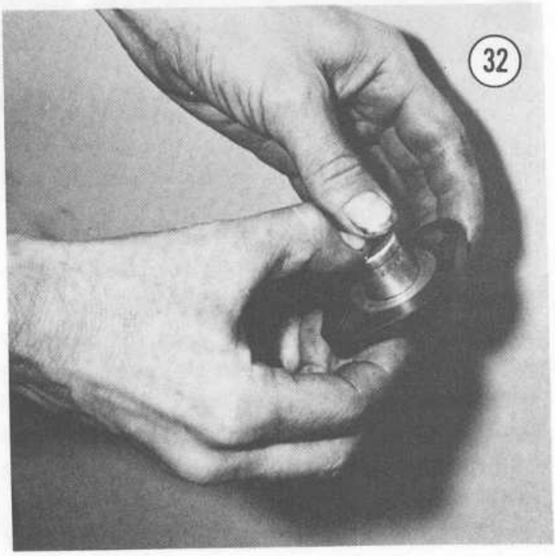
1. Thoroughly clean the rack-and-pinion assembly in solvent.
2. Place the assembly in a soft-jawed vise with the jaws gripping the left-hand mounting pad. See **Figure 30**.



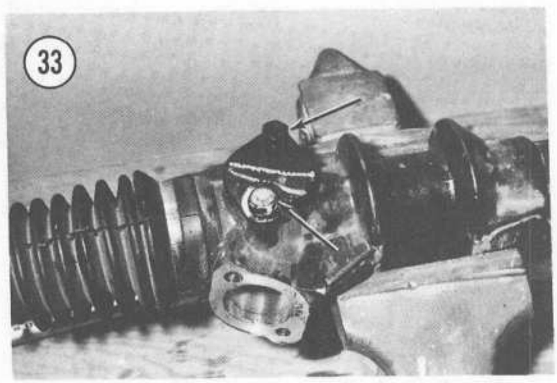
3. Loosen the bellows clamps (**Figure 31**). Remove the bellows.



4. Remove the rack-and-pinion assembly from the vise and drain the oil. Work the rack back and forth several times to expel all oil.
5. Push out the pinion seal with a socket. See **Figure 32**. Discard the seal.



6. Remove the yoke cover (**Figure 33**). Remove the cover shims, gasket, yoke spring, and yoke. Discard the gasket.



7. Move the rack to full left or full right lock. Note the position of the flat on the pinion shaft. The flat must be in the same position when the pinion shaft is reinstalled, or the steering wheel will not be aligned correctly.
8. Remove the pinion cover (**Figure 34**). Remove the shims and gasket. Discard the gasket.
9. Take out the pinion lower bearing, pinion shaft, and spacer.

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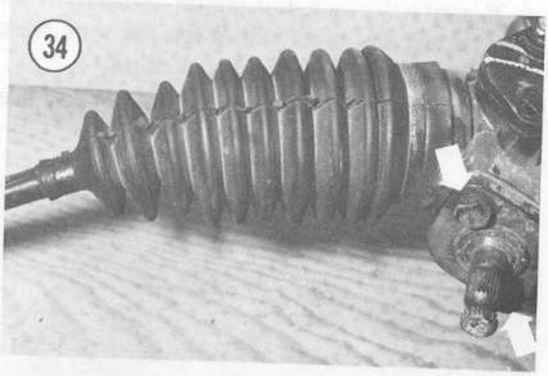


34

Inspection

1. Check the rubber bellows for cracks or deterioration. Replace as needed.

2. Check the inner tie rod ends for excessive looseness. Check the upper pinion bearing for roughness or looseness. Check the rack and housing for visible wear or damage. Replace the rack assembly if any of these conditions are detected.

3. Check the support yoke and spring for wear or damage. Replace as needed.

4. Check the lower pinion bearing for roughness or looseness. Check the pinion shaft and spacer for wear or damage. Replace as needed.

Assembly

1. Install the rubber bellows.

2. Place the rack housing in a soft-jawed vise with one end upright. Pour approximately 7 ounces (0.44 pint) of SAE 90 E.P. (Extreme Pressure) gear oil into the bellows. Work the rack back and forth to distribute the oil.

CAUTION

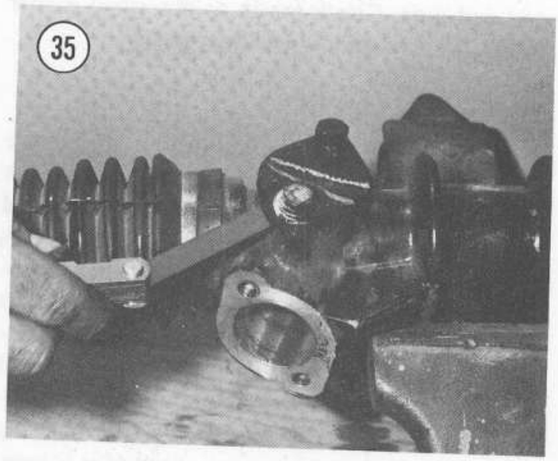
Do not overfill with oil, or the bellows may be damaged by excessive pressure.

3. Install the bellows clamps. The clamp tightening screws must be parallel to the pinion shaft, with the ends pointing upward.

4. Install the support yoke and cover without shims, gasket, or spring. Tighten the cover bolt until the cover just touches the yoke.

Adjustment

1. Measure the gap between the cover and rack housing with a feeler gauge (**Figure 35**). Select



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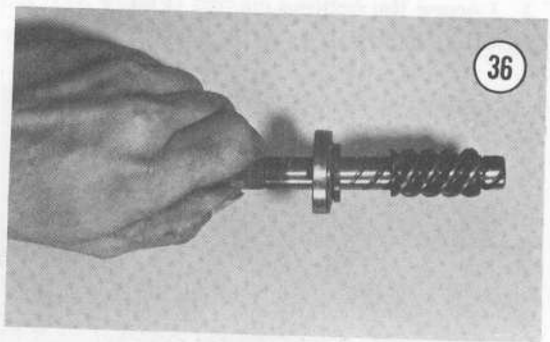
cover shims with a combined thickness of 0.005-0.006 in. greater than the gap.

2. Remove the yoke cover. Install the spring, gasket, selected shims, then the cover. Apply Permatex No. 3 to the cover bolt threads. Install the cover bolts and tighten to 15-20 ft.-lb.

3. Lubricate the pinion shaft spacer, pinion shaft, and lower bearing with SAE 90 E.P. gear oil. Install the spacer in the rack housing.

4. Move the rack to the position described under *Disassembly*, Step 7. Install the pinion with the flat in the same position as it was before removal.

5. Insert the upper bearing in its bore in the rack housing. Grasp the upper end of the pinion shaft and move it so the pinion shaft aligns with the lower bearing. See **Figure 36**. Once the bearing and shaft are aligned, tap the bearing evenly into its bore.



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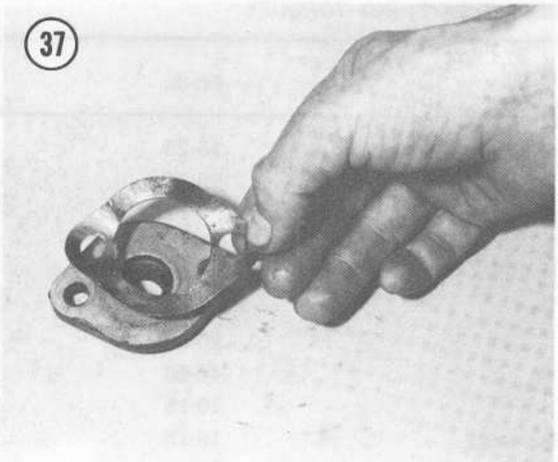
6. Lay a new pinion cover gasket on the cover flange (**Figure 37**). Install shims until the stack of shims is flush with the gasket. Check this with



a straightedge, using light pressure. Add one 0.005 in. shim to the stack to preload the bearings.

7. Install the selected shims, thinnest shims first. The 0.093 in. shim goes next to the cover. Install the cover. Coat the cover bolt threads with Permatex No. 3. Install the bolts and tighten to 15-20 ft.-lb.

8. Install a new pinion oil seal. Coat the inside diameter of the seal with multipurprose grease. Tap the seal into place with a hollow drift (such as a piece of pipe) the same diameter as the outer edge of the seal.

Table 2 MANUAL STEERING TIGHTENING TORQUES

Item	ft.-lb.
Support yoke cover bolts	15-20
Pinion cover bolts	15-20
Rack housing to crossmember (left side)	80-100
Tie rod end to inner tie rod	35-50
Tie rod end to spindle arm	35-47*
Pinion shaft to flexible coupling	20-37

*Tighten to 35 ft.-lb., then to the nearest cotter pin slot.

Table 1 STEERING SPECIFICATIONS

Type	Rack and pinion
Gear ratio (manual)	
At straight-ahead position	24.2
At full turn	18.34
Gear ratio (power)	
At straight-ahead position	19.03
At full turn	16.24
Number of turns	
Manual	4.15
Power	3.30
Lubricant capacity	
Manual	Approximately 7 oz. or 0.44 pints
Power	Approximately 5.2 oz. or 0.33 pints (Bellows capacity) 2.44 pints (power steering reservoir)
Steering wheel play	⅜ in. or less (at wheel rim)

11

Table 3 POWER STEERING TIGHTENING TORQUES

Item	Ft.-lb.
Pressure line fitting (pump-to-gear ½ hex)	16-25
Return line fitting	25-34
Hose orientation bracket-to-gear mounted bracket screw	7-12
Gear-to-crossmember mounting bolt nut	80-100
Tie rod end-to-spindle arm nut	35-47
Tie rod end-to-tie rod jam nut	35-50
Steering flex coupling bolt	20-30
Yoke plug locknut	44-66
Pressure line fittings at valve	10-15
Pressure line fittings at power cylinder (gear housing)	10-15
Valve housing to gear housing bolts	12-15
Pinion bearing locknut	44-66
Pinion bearing plug	60-100
Rack bushing locknut	80-120
Tie rod ball socket locknut	25-35

Table 4 TIGHTENING TORQUES, FRONT SUSPENSION

Item	Ft.-lb.
Lower control arm to frame	75-110 (through 1974) 95-120 (1975-1976)
Upper control arm to frame	80-110 (through 1974) 95-120 (1975-1976)
Stabilizer bar to lower control arm	10-18 (through 1974) 15-18 (1975-1976)
Stabilizer bar to frame	6-12 (through 1974) 9-22 (1975-1976)
Ball-joint to spindle (upper and lower)	60-90* (through 1974) 75-90 (1975-1976)
Strut to lower control arm	35-50 (through 1974) 40-60 (1975-1976)
Strut to frame	60-80 (through 1974) 70-80 (1975-1976)
Shock absorber upper nut	22-30 (all models)
Shock absorber lower bolt	60-80 (through 1974) 70-80 (1975-1976)

*Tighten to minimum specification, then tighten nut to nearest cotter pin slot and insert cotter pin.

CHAPTER TWELVE

REAR SUSPENSION, DIFFERENTIAL, AND DRIVE SHAFT

The Mustang II rear suspension consists of semi-elliptic rear springs, controlled by conventional telescopic shock absorbers. Four different rear axles are used on the Mustang II. One is of the conventional integral carrier type, and one is of the conventional removable carrier type. The third is a Borg-Warner locker differential used in integral carrier housings. The fourth is a Traction-Lok limited slip differential used in removable carrier housings. The drive shaft is a one-piece tube supported at front and rear by universal joints. The front yoke has internal splines that slide on the transmission main shaft, allowing the drive shaft to change length to compensate for axle movement.

This chapter includes service procedures for the rear suspension, axle shafts, wheel bearings, and drive shaft. Removal, inspection, and installation procedures are provided for the 4 types of rear axles described above. Actual differential repair, however, requires professional skills and many expensive special tools, and is best left to a dealer or other competent repair shop. Inspection procedures in this chapter will tell you if differential repairs are necessary.

Table 1 provides differential and rear suspension specifications; **Table 2** torque recommendations. They are found at the end of the chapter.

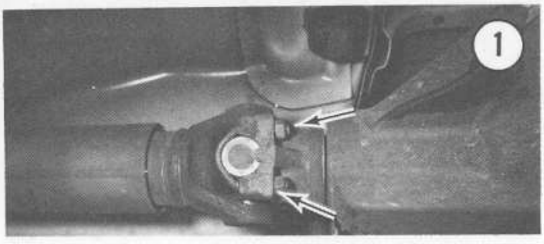
DRIVE SHAFT

Removal/Installation

1. Securely block both front wheels so the car will not roll in either direction. Jack up the rear end of the car and place it on jackstands.

2. Check for yellow factory alignment marks on the drive shaft and the companion flange on the differential. Make your own marks if they are not visible. The drive shaft must be installed in its original position to prevent imbalance and vibration.

3. Remove 2 U-bolts attaching the drive shaft to the companion flange (**Figure 1**). Lower the shaft away from the differential. Wrap tape around the loose U-joint bearings so they do not fall out.



4. Pull the drive shaft toward the rear of the vehicle until the slip yoke clears the transmis-

12

sion extension housing and the seal. Either drain the transmission or plug the extension housing to prevent lubricant leakage.

5. Installation is the reverse of these steps. Tighten the companion flange U-bolts to 8-15 ft.-lb. Check the extension housing oil seal (Chapter Nine) and replace if necessary. Be sure to match the alignment marks made during removal.

Inspection

1. Check the drive shaft for bending. Rotate it between accurate centers, such as V-blocks or a lathe, and measure runout with a dial gauge. Measure at front, center, and at the rear between balance weights and yoke welds. Maximum runout is 0.035 in.

2. Inspect the universal joints. If the spiders or bearings show signs of wear, replace them.

Universal Joint Repair

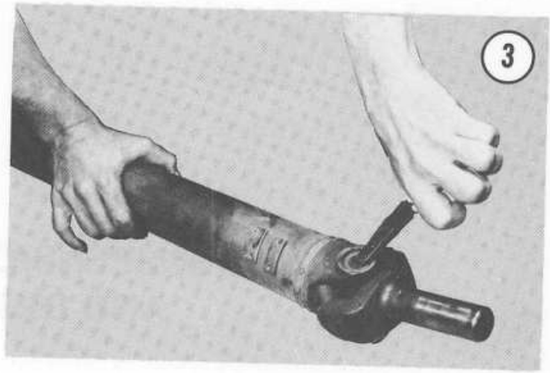
Refer to **Figure 2**.

1. Lightly scribe or punch alignment marks on the yoke (or coupling flange) and drive shaft before disassembly.

2. Place the drive shaft in a vise as near the U-joint as possible. Be careful not to distort the shaft.

3. Remove snap rings that retain the U-joint bearings (**Figure 3**).

3



4. Press out one bearing, using a C-clamp and 2 sockets as shown in **Figure 4**. One socket must be small enough to fit inside the bearing hole in the yoke. The other socket must be large enough that the bearing will fit inside it. When the C-clamp is tightened, one bearing is pressed out of the yoke and into the large socket.

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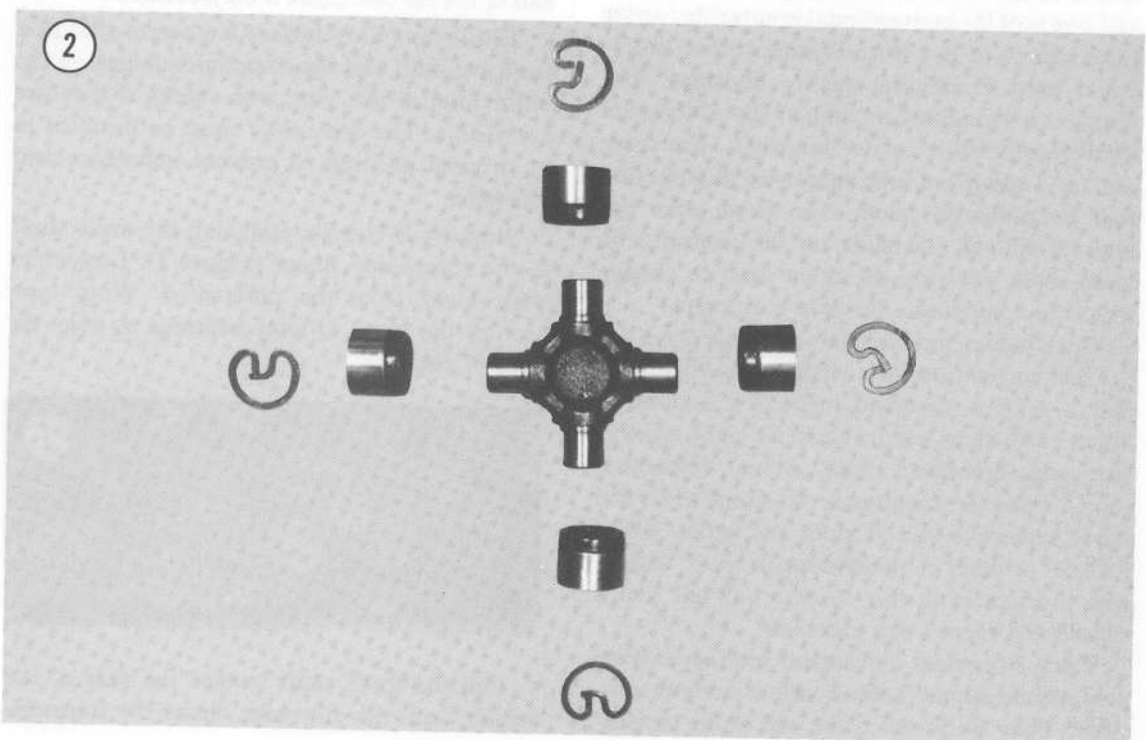
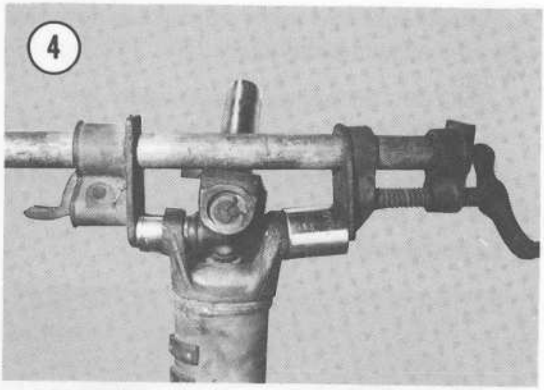




NOTE: *If the bearing comes out only part way, pull it the rest of the way with pliers or Vise Grips.*

5. Using the same method as Step 4, press the spider in the other direction to remove the opposite bearing. Take out the thrust bearings and seals.

6. Remove the spider from the yokes.

7. Assemble in the reverse order. Pack the bearing cups with grease.

NOTE: *If the U-joints bind after assembly, rap sharply on the yokes with a brass or other soft metal hammer. Be careful not to hit the bearings.*

REAR AXLE

Shaft Removal

The rear axle shafts, wheel bearings, and oil seal can be replaced without removing the differential assembly from the axle housing.

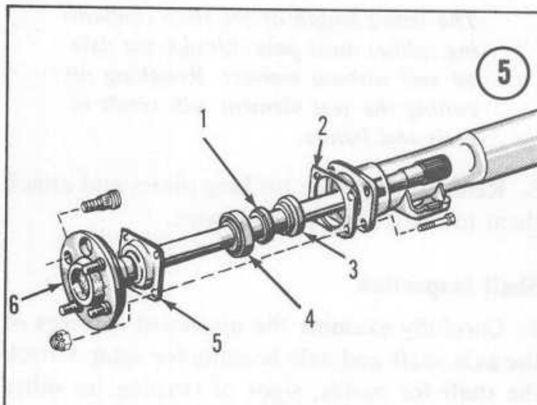
Figure 5 shows a typical axle shaft and related parts. Refer to it as needed for this procedure.

1. Securely block both front wheels so the car will not roll in either direction. Jack up the rear end of the car and place it on jackstands.

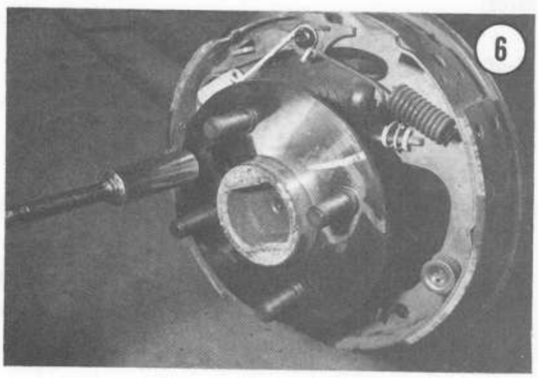
2. Remove the wheels and brake drums. See Chapter Ten.

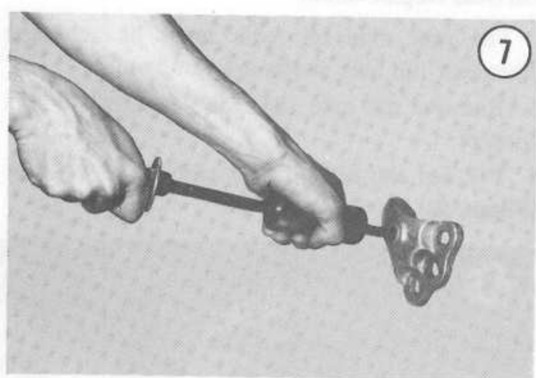
3. Working through the hole provided in each axle shaft flange, remove the nuts that secure the wheel bearing retainer plate (**Figure 6**).

4. Mark the axle shafts for location (right and left) and pull them from the housing. If necessary, use a slide hammer and adapter (**Figure 7**). These are available from tool rental dealers.



1. Wheel bearing retainer
2. Gasket
3. Axle shaft seal
4. Wheel bearing
5. Wheel bearing retainer
6. Axle shaft





5. Once the axle shafts are loose, withdraw them from the housing.

CAUTION
Removal and insertion of rear axle shafts must be performed with caution.

12

The entire length of the shaft (including spline) must pass through the axle oil seal without contact. Roughing or cutting the seal element will result in early seal failure.

6. Remove the brake backing plates and attach them to the frame rail with wire.

Shaft Inspection

1. Carefully examine the machined surfaces of the axle shaft and axle housing for wear. Check the shaft for bends, signs of twisting, or other damage. Check the splines for wear and roughness. If necessary, smooth the splines with fine emery paper.
2. Inspect the rear wheel bearing. Rotate it and check for noise, roughness, or looseness. If in doubt about the bearing, replace it as described later.

Shaft Installation

Installation is the reverse of the removal procedure, plus the following.

1. Pack the wheel bearing with grease.
2. Use a new flange gasket coated on both sides with gasket sealer.
3. Install a new oil seal as described in the next procedure. Tighten the axle shaft retainer nuts to 20-40 ft.-lb.

Oil Seal Replacement

The rear axle oil seals must be replaced whenever the axle shafts are removed.

1. Remove the axle shaft as described in this chapter.
2. Pry out the old oil seal with a screwdriver (**Figure 8**).

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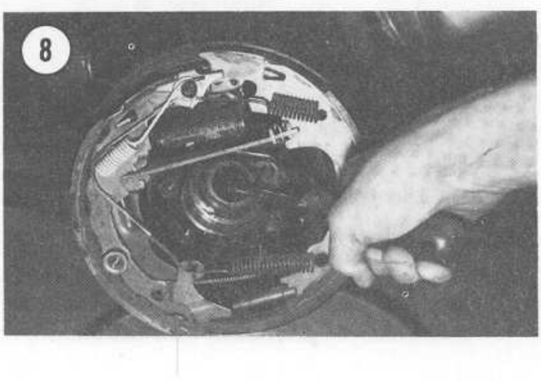

3. Lightly coat the outer edge of a new seal with oil-resistant gasket sealer (No. 2 Permatex).

NOTE: *Do not put gasket sealer on the sealing lip.*

4. Tap the seal into place with a suitable drift (**Figure 9**). Be careful not to distort the seal.
5. Coat the seal lip with grease.

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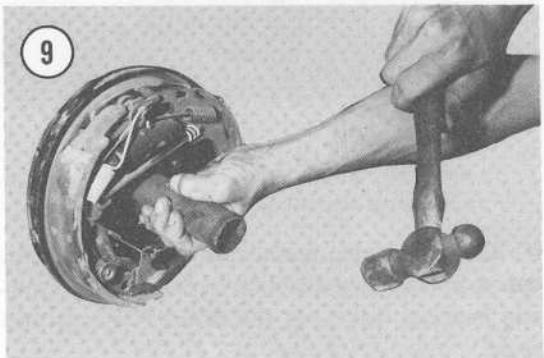

Rear Wheel Bearing Replacement

The following procedure requires a press and special support stands. Rather than improvise tools, the job should be taken to a machine shop or Ford dealership, which has the equipment to replace the bearing safely. A great deal of expense can be saved by removing the axle shaft yourself and taking it to the repair shop.

1. Remove the axle shaft as described earlier.
2. Using a hammer and cold chisel, make several deep nicks in the bearing retainer ring (**Figure 10**). The retainer ring will then slide off easily.

CAUTION
Do not hit the axle shaft with the chisel when removing the retainer ring.

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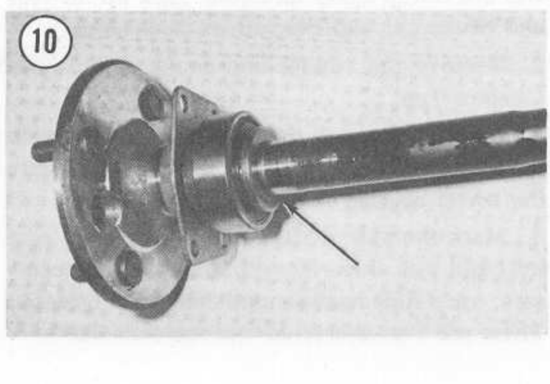

3. Place the axle shaft in a press stand. Press the retainer bearing off, then take off the retainer plate.

4. Place the retainer plate and new bearing on the axle shaft. Place the assembly on a press stand. Press the bearing on until it seats firmly against the shaft shoulder.

5. Press a new retainer ring onto the shaft until it seats firmly against the bearing.

CAUTION

Do not attempt to press the bearing and retainer ring on at the same time.

6. Pack the bearing with multipurpose grease.

Differential Carrier and Axle Housing Removal/Installation (Integral Carrier Axle)

The rear axle assembly on some Mustang II models is an integral type housing, hypoid design. The differential carrier and axle housing are permanently combined into a single unit (**Figure 11**). A cover on the rear of the differential carrier provides access for inspection.

1. Securely block both front wheels so the car will not roll in either direction. Jack up the rear end of the car and place it on jacksatnds. Position the jackstands, beneath the underbody as shown in **Figure 12**.

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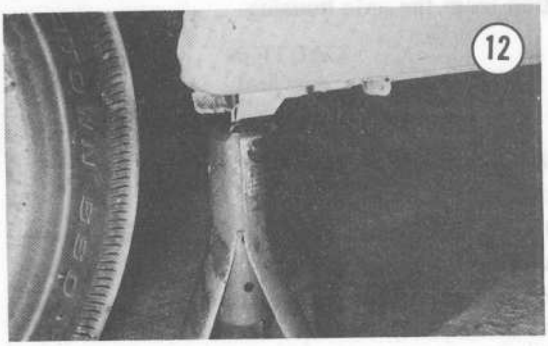

2. Drain the rear axle oil.

3. Disconnect the drive shaft from the differential companion flange as described earlier. Leave the front end of the drive shaft in the transmission.

4. Disconnect the lower ends of the shock absorbers as described later in this chapter.

5. Remove the brake drums (Chapter Ten).

6. Remove the axle shafts as described in this chapter.

7. Remove vent hose from vent tube (Corbin

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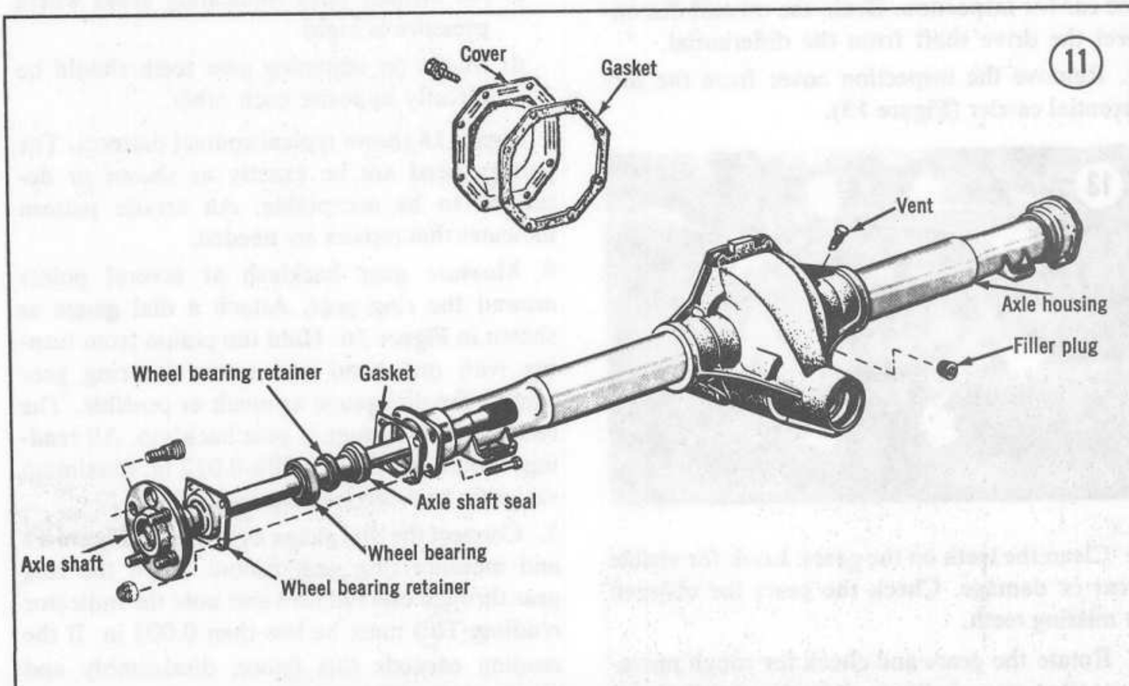

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clamp), then remove vent tube from brake tube junction and axle housing.

8. Detach the hydraulic brake line T-connection from the axle housing.

CAUTION

Do not open any brake lines or the brakes will have to be bled.

9. Detach the brake line from its retaining clip on the axle housing.

10. Remove both brake backing plates from the axle housing. Hang them from the frame with wire. Leave the brake lines and handbrake cables attached.

11. Place a jack beneath the axle housing to support it.

12. Remove the rear spring U-bolt nuts as described in this chapter. Lower the axle housing away from the car.

13. Installation is the reverse of these steps. Fill the axle with a lubricant recommended in Chapter Two. Approximate capacity is 3 pints.

Differential Carrier Inspection (Integral Carrier Axle)

1. The axle housing need not be removed from the car for inspection. Drain the oil and disconnect the drive shaft from the differential.

2. Remove the inspection cover from the differential carrier (**Figure 13**).

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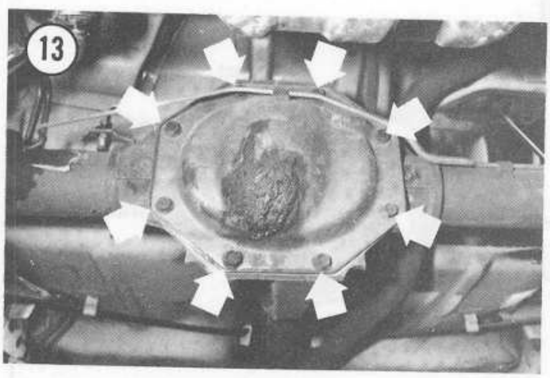


3. Clean the teeth on the gears. Look for visible wear or damage. Check the gears for chipped or missing teeth.

4. Rotate the gears and check for rough movement that may indicate defective bearings or chipped gears. Turn the gears with a wrench on the differential case bolts (**Figure 14**).

14

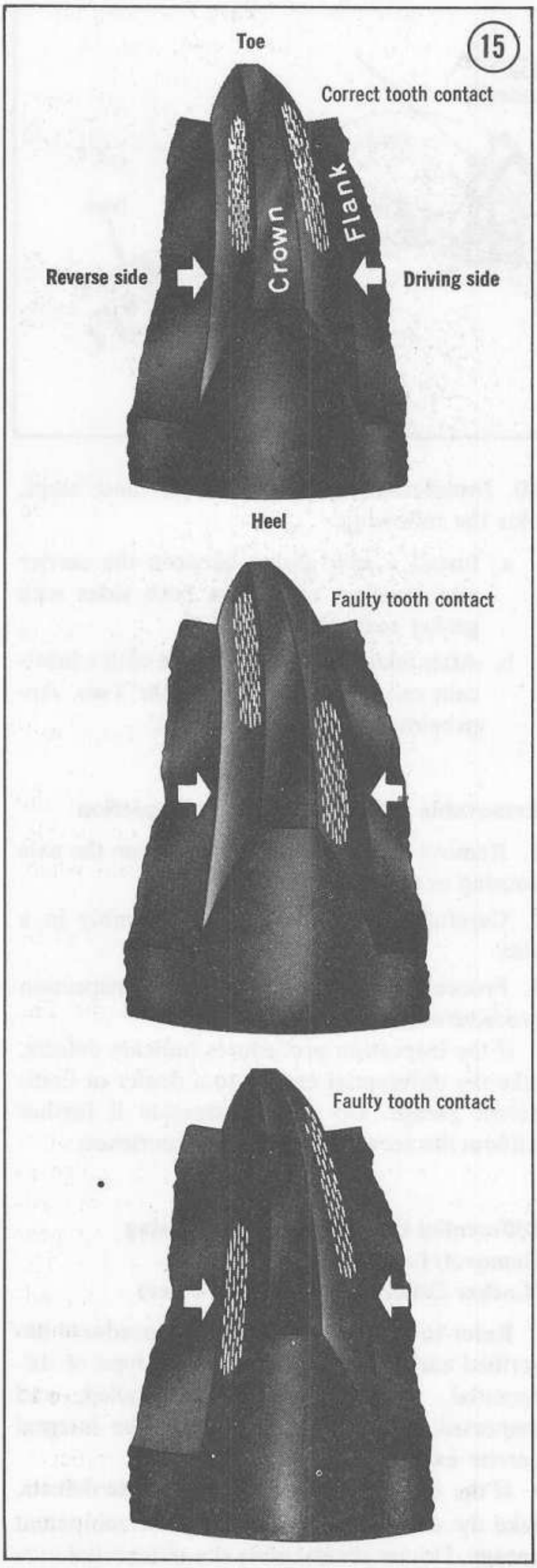
5. Check the tooth contact pattern on the pinion and ring gear. To do this, apply a thin, even coat of lead oxide to the ring gear teeth. Turn the gear several turns in both directions so the contact pattern of the teeth is pressed into the coat of lead oxide. The contact pattern should have the following characteristics:

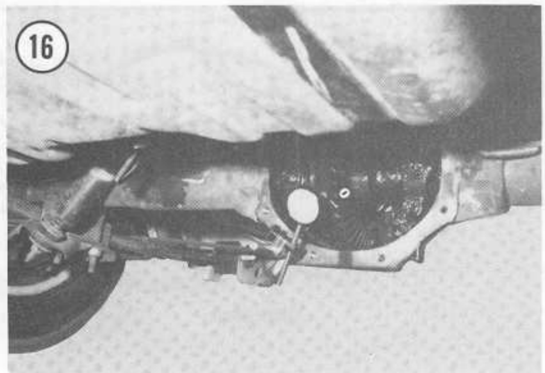
a. Both drive and coast patterns fairly well centered on the teeth.
b. Some clearance between the top of the teeth and the top of the pattern is desirable.
c. No distinct lines (indicating areas where pressure is high).
d. Marks on adjoining gear teeth should be directly opposite each other.

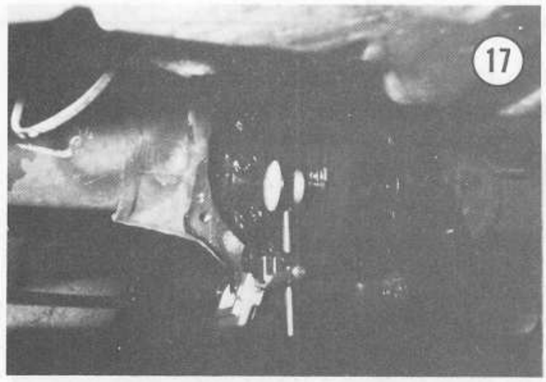
Figure 15 shows typical contact patterns. The pattern need not be exactly as shown or described to be acceptable. An erratic pattern indicates that repairs are needed.

6. Measure gear backlash at several points around the ring gear. Attach a dial gauge as shown in **Figure 16**. Hold the pinion from turning with one hand and move the ring gear against the dial gauge as much as possible. The reading on the gauge is gear backlash. All readings should be within 0.008-0.012 in. Maximum variation between readings is 0.003 in.

7. Connect the dial gauge as shown in **Figure 17** and measure ring gear runout. Turn the ring gear through one full turn and note the indicator reading. This must be less than 0.003 in. If the reading exceeds this figure, disassembly and repair of the differential are necessary.







If the inspection procedures indicate defects, take the axle housing to a dealer or competent garage. Do not disassemble the differential carrier further without the necessary tools and experience.

Differential Carrier and Axle Housing Removal/Installation (Removable Carrier Axle)

The rear axle assembly is a hypoid gear type. The entire differential carrier assembly is bolted to the axle housing (**Figure 18**).

> NOTE: *Removal and installation of the entire rear axle assembly is accomplished in the same manner as that described earlier for the integral carrier axle.*

Differential Carrier/Axle Housing Separation (Removable Carrier Axle)

1. Securely block both front wheels so the car will not roll in either direction. Jack up the rear end of the car and place it on jackstands. Posi-

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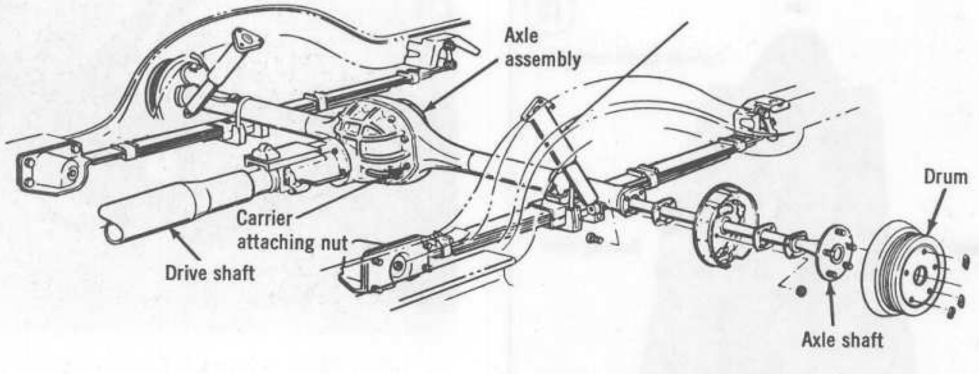

tion the jackstands beneath the underbody as shown in **Figure 19**.

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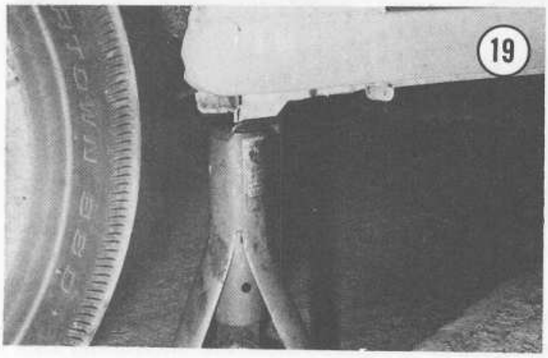


2. Drain the rear axle oil.
3. Disconnect the drive shaft from the differential companion flange as described earlier. Leave the front end of the drive shaft in the transmission.
4. Remove the brake drums (Chapter Ten).
5. Remove the axle shafts as described earlier.
6. Detach the brake line from its retaining clip on the axle housing.
7. Remove both brake backing plates from the axle housing. Hang them from the frame with wire. Leave the brake lines and handbrake cables attached.
8. Clean area around carrier to housing surfaces with a wire brush and wipe clean, to prevent dirt entry into the housing.
9. Remove the carrier attaching nuts and washers (Figure 18). Remove the carrier assembly from the axle housing.
10. Installation is the reverse of these steps, plus the following.
    a. Install a new gasket between the carrier and housing, coated on both sides with gasket sealer.
    b. After installation, fill the axle with a lubricant recommended in Chapter Two. Approximate capacity is 3 pints.

Removable Differential Carrier Inspection

1. Remove the differential carrier from the axle housing as described earlier.
2. Carefully mount the carrier assembly in a vise.
3. Proceed with differential carrier inspection procedures as described earlier.

If the inspection procedures indicate defects, take the differential carrier to a dealer or competent garage. Do not disassemble it further without the necessary tools and experience.

Differential Carrier and Axle Housing Removal/Installation (Locker Differential—Borg-Warner)

Refer to integral carrier axle procedures described earlier for removal of this type of differential, which is removed, installed, and inspected in the same manner as the integral carrier axle.

If the inspection procedures indicate defects, take the axle housing to a dealer or competent garage. Do not disassemble the differential carrier further without the necessary tools and experience.

The case assembly of this locking differential is a non-serviceable item and must be replaced complete.

Differential Carrier and Axle Housing Removal/Installation (Traction-Lok Limited Slip Differential—Ford)

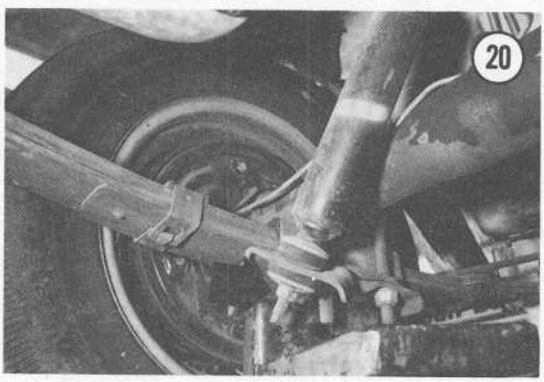
Refer to removable carrier procedures described earlier for removal of this type of differential, which is removed, installed, and inspected in the same manner as the removable carrier differential.

If the inspection procedure indicates defects, remove the differential carrier unit and take it to a Ford dealer or competent garage. Do not disassemble the differential carrier further without necessary tools and experience.

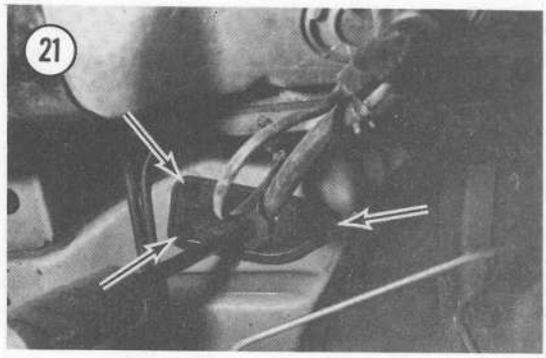
REAR SUSPENSION

Shock Absorber Replacement

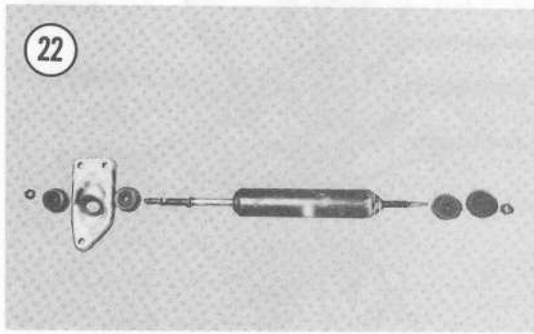
1. Securely block both front wheels so the car will not roll in either direction. Jack up the front end of the car and place it on jackstands.
2. Remove the nut securing the lower end of the shock absorber to the spring plate (**Figure 20**).



3. Remove 3 bolts securing the upper shock absorber mounting bracket to the underbody (**Figure 21**).
4. Compress the shock absorber, then take it out from under the car.



5. Referring to **Figure 22**, remove the mounting bracket, bushings, and washers from the shock absorber.



6. Inspect the shock absorber bushings. Replace any that are worn, cracked, or deteriorated. Install the mounting bracket, bushings, and washers on the new shock absorber. Install a new shock absorber-to-bracket nut and tighten to 14-26 ft.-lb.
7. Bolt the bracket to the underbody. Tighten the bolts to 18-30 ft.-lb.
8. Compress the shock absorber and place its lower stud in the spring plate. Install the washer, bushing, and nut. Tighten the nut to 14-26 ft.-lb.

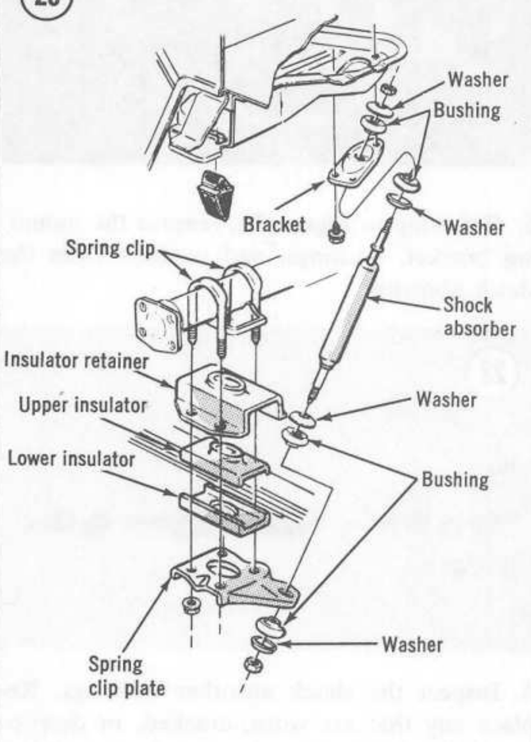
12

Rear Spring Removal

1. Securely block both front wheels so the car will not roll in either direction. Jack up the rear end of the car. Place jackstands beneath the underbody and a jack beneath the differential carrier.
2. Disconnect the lower end of the shock absorber. Push the shock absorber out of the way.
3. Lower the rear axle as far as it will go by itself.

4. Remove the locknuts from the rear spring U-bolts (**Figure 23**). Discard the locknuts. Remove the spring plate and lower insulator.

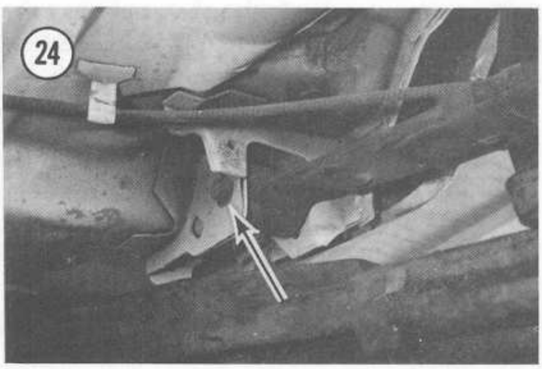
23



5. Raise the jack beneath the rear axle just enough to remove all weight from the spring.

6. Remove the locknut and bolt from the front end of the spring (**Figure 24**).

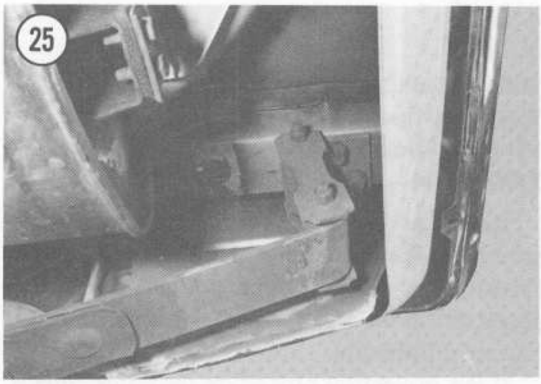
24



7. Remove 2 rear shackle nuts (**Figure 25**). Remove the shackle and lower the spring away from the car.

8. Remove the 4 rear shackle bushings.

25



Rear Spring Installation

New locknuts and bolts must be used whenever a spring has been removed.

1. Insert the shackle bushings in the rear end of the spring and in the spring rear bracket.

2. Insert the shackle in the spring from the outboard side. Tighten the shackle locknuts finger-tight.

3. Place the front end of the spring in its bracket. Insert the spring bolt from the outboard side. Install the locknut and tighten finger-tight.

4. Place the insulators and insulator retainer on the spring.

5. Lower the jack beneath the car until the axle rests on the spring. Install the U-bolts and spring plate. Torque the U-bolt locknuts to 40-45 ft.-lb.

6. Connect the lower end of the shock absorber. Use a new locknut.

7. Place jackstands under the rear axle. Remove the jackstands from beneath the underbody. Lower the car until the spring is approximately in its normal loaded position.

8. Tighten the front locknuts to 80-120 ft.-lb. Tighten the rear shackle nuts to 14-22 ft.-lb.

9. Remove the jackstands and lower the car.

Table 1 DIFFERENTIAL AND REAR SUSPENSION SPECIFICATIONS

Differential type	Hypoid, integral carrier
	Hypoid, gear type, removable carrier
Ratio	
2300cc engines	3.00:1
2800cc engines	3.00:1
	3.40:1
	3.55:1
302 cid engines	3.00:1
	3.40:1
	3.55:1
Ring gear diameter	
Integral carrier	6-3/4 in.
Removable carrier	8.0 in.
Ring gear runout, maximum	0.003 in.
Ring gear backlash*	0.008-0.012 in.
Lubricant capacity (approximate)	
Integral	3.0 pints
Removable	4.0 pints
Rear suspension type	Semi-elliptic leaf springs, tubular shock absorbers.

*Maximum variation between readings 0.003 in.

Table 2 TIGHTENING TORQUES

Item	Ft.-lb.
Axle shaft bearing retainer nuts	20-40
Carrier to housing stud nuts (removable carrier)	25-40
Differential cover bolts (integral carrier)	25-35
Oil filler plug	25-50
Pinion nut	140 (minimum)
Shock absorber nuts	14-26
Spring front bolt and nut	80-120
Spring rear shackle nuts	14-22
Spring U-bolt nuts	40-45 (through 1974)
	30-45 (1975-1976)
Universal joint flange U-bolt nuts	8-15

SUPPLEMENT

1977-1978 SERVICE INFORMATION

This supplement contains service and maintenance information for 1977-1978 Mustang II's. The information supplements the procedures in the main body of the book, referred to in this supplement as the "basic book."

The chapter headings in this supplement correspond to those in the basic book. If a chapter is not included in the supplement, there are no changes to the information given in that chapter of the basic book that affect 1977 and 1978 models.

If your vehicle is covered by this supplement, carefully read the supplement and then read the appropriate chapter in the basic book before beginning any work.

CHAPTER TWO

LUBRICATION, MAINTENANCE, TUNE-UP

Lubrication, maintenance, and tune-up procedures for 1977 and 1978 models are the same as those given in Chapter Two of the basic book for 1976 models, except that the intervals given in **Tables 1 and 2** of this supplement should be observed.

Tables 1 and 2 contain two schedules, A and B. To determine which of these schedules pertains to your vehicle, check the Vehicle Emission Control decal in the engine compartment. See **Figure 1**, upper right corner.

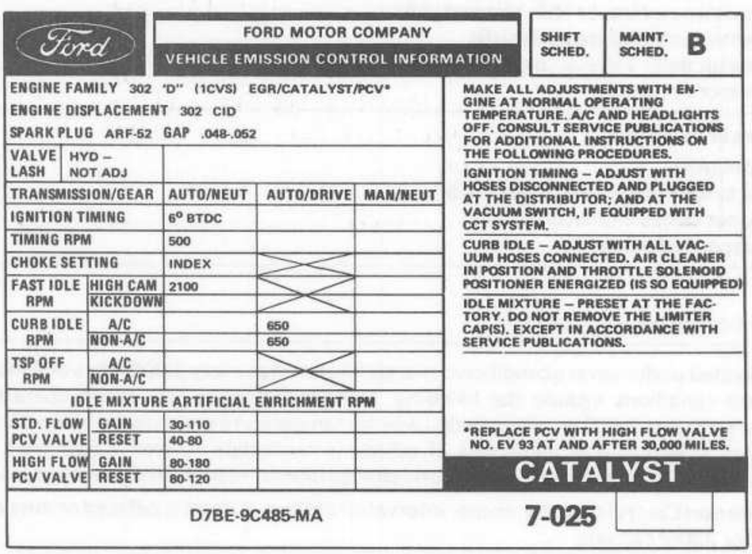
Tune-up specifications for 1977-1978 models are given in **Tables 3 and 4**. Procedures given in Chapter Two of the basic book apply.

NOTE: *For the correct tune-up specifications for your vehicle, refer to the Vehicle Emission Control decal in the engine compartment. This is the only way to obtain the exact specifications for your vehicle, as running changes were made on some engines during the years covered by this supplement. If the decal is missing or damaged and cannot be read, try the specifications given in **Tables 3 and 4**. If use of the specifications results in poor performance, consult your Ford dealer.*

Table 3 SPARK PLUGS

	Type	Gap
1977		
4 cyl.	AWRF-42	0.034 in.
V6*	AWSF-42	0.034 in.
V8*	ARF-52-6	0.060 in.
1978		
4 cyl., V6	AWSF-42	0.034 in.
V8	ARF-42	0.050 in.

*Correct spark plug and gap may vary for vehicles sold in different geographical areas. Check the emission control label in the engine compartment for your vehicle.



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13

Table 1 SCHEDULED MAINTENANCE — 2300 & 2800cc ENGINES

SCHEDULES A AND B

See Vehicle Emission Control decal to determine schedule for your vehicle. Items in schedule below are designated (A) for schedule A, (B) for schedule B, and (AB) for both schedules.

First 5,000 Miles or 5 Months

- Check valve clearances on 2800cc engine and adjust as required (A).
- Check fast idle speed and adjust as required (A).
- Check curb idle speed and adjust as required (A).
- Check "TSP-Off" speed and adjust as required (A).
- Check ignition basic timing and adjust as required (A).

Every 10,000 Miles or 10 Months

- Check valve clearances on 2800cc engine and adjust as required (B).
- Check drive belt tension (B).
- Check fast idle speed and adjust as required (B).
- Check curb idle speed and adjust as required (B).
- Check "TSP-Off" speed and adjust as required (B).
- Check ignition basic timing and adjust as required (B).

First 10,000 Miles or 10 Months

- Change engine oil (AB).[1]
- Change engine oil filter (AB).[1]

Every 20,000 Miles or 20 Months

- Replace spark plugs (A).
- Check valve clearances on 2800cc engine and adjust as required (AB).
- Check drive belt tension (AB).
- Replace PCV valve and check idle fuel mixture on 2300cc engine (A)[2].
- Check curb idle speed and adjust as required (AB).
- Check choke system and adjust as required (A).
- Check thermactor delay valve, if so equipped (A).

Every 30,000 Miles or 30 Months

- Replace PCV valve and check idle fuel mixture on 2300cc engine (B)[2].
- Check choke system and adjust as required (B).
- Replace crankcase filter in air cleaner (AB).
- Replace carburetor air cleaner filter element (AB).
- Check air cleaner temperature control (B).
- Check thermactor delay valve, if so equipped (B).
- Inspect fuel vapor system (B).

Every 40,000 Miles or 40 Months

- Replace coolant (AB).
- Check cooling system hoses and clamps (AB).
- Check air cleaner temperature control (A).
- Inspect fuel vapor system (A).

Annually

- Check coolant condition and protection.

1. If vehicle is operated under severe conditions, change oil and filter every 3,000 miles or 3 months, whichever comes first. Severe conditions include the following: extended idling or low speed operation (police, taxi, deliver), towing trailers over 2,000 lb. gross loaded weight, temperature consistently below 10°F for 60 days or longer, or operation in severe dust conditions. If vehicle is consistently driven 7,500 miles or less every 6 months, change oil every 7,500 miles or 6 months and change filter at first and then every second oil change.

2. See Vehicle Emission Control decal for proper interval on 2800cc. If decal is defaced or missing, change valve at intervals given for 2300cc engine.

Table 2 SCHEDULED MAINTENANCE — 302 cid ENGINE

SCHEDULES A AND B

See Vehcile Emission Control decal in engine compartment to determine schedule for your vehicle. Items in schedule below are designated (A) for schedule A, (B) for schedule B, and (AB) for both schedules.

First 7,500 Miles or 7½ Months
- Change engine oil (AB)*.
- Check drive belt tension (B).
- Check fast idle speed and adjust as required (AB).
- Check curb idle speed and adjust as required (AB).
- Check "TSP-Off" speed and adjust as required (AB).
- Check ignition basic timing and adjust as required (AB).

Every 7,500 Miles or 7½ Months
- Change engine oil (AB)*.

Every 15,000 Miles or 15 Months
- Replace engine oil filter (AB)*

Every 22,500 Miles or 22½ Months
- Replace spark plugs (A).
- Check drive belt tension (AB).
- Replace PCV valve (A).
- Check idle fuel mixture and adjust as required (A).
- Check curb idle speed and adjust as required (A).
- Check choke system and adjust as required (A).
- Check thermactor delay valve, if so equipped (A).

Every 30,000 Miles or 30 Months
- Replace spark plugs (B).
- Replace PCV Valve (B).
- Check idle fuel mixture and adjust as required (B).
- Check curb idle speed and adjust as required (B).
- Check choke system and adjust as required (B).
- Replace carburetor air cleaner filter element (AB).
- Replace crankcase filter in air cleaner (AB).
- Check air cleaner temperature control (B).
- Check thermactor delay valve, if so equipped (B).
- Inspect fuel vapor system (B).

Every 45,000 Miles or 45 Months
- Check air cleaner temperature control (A).
- Inspect fuel vapor system (A).
- Replace coolant (AB).
- Check cooling system hoses and clamps (AB).

Annually
- Check coolant condition and protection (AB).

*Change engine oil every 3,000 miles or 3 months and filter every second oil change if vehicle is operated under severe conditions. Severe conditions include the following: extended idling or low speed operation (police, taxi, delivery), towing trailers over 2,000 lb. gross loaded weight, temperature consistently below 10°F for 60 days or longer, or operation in severe dust conditions.

Table 4 TUNE-UP SPECIFICATIONS (1977-1978 MODELS)

	Engine (Cylinders/Carburetor/Displacement in Cu.In./Usage)	Transmission	Basic Timing	Curb Idle (rpm)
1977	4/2 bbl/140/All	Man.	6°BTDC	850
	4/2 bbl/140/Federal	Auto.	20°BTDC	800D
	4/2 bbl/140/Calif. & High Alt.	Auto.	20°BTDC	750D
	V6/2 bbl/171/All	Man.	*	850
	V6/2 bbl/171/All with A/C	Auto.	12°BTDC	750D
	V6/2 bbl/171/All w/o A/C	Auto.	12°BTDC	700D
	V8/2 bbl/302/Federal	Auto.	*	*
	V8/2 bbl/302/California	Auto.	12°BTDC	700D
1978	4/2 bbl/140/All	Man.	6°BTDC*	850
	4/2 bbl/140/Federal	Auto.	20°BTDC*	800D
	4/2 bbl/140/California	Auto.	20°BTDC*	750D
	V6/2 bbl/171/All	Man.	10°BTDC	850
	V6/2 bbl/171/Federal with A/C	Auto.	12°BTDC*	750D
	V6/2 bbl/171/Federal w/o A/C	Auto.	12°BTDC*	650D
	V6/2 bbl/171/California with A/C	Auto.	6°BTDC	750D
	V6/2 bbl/171/California w/o A/C	Auto.	6°BTDC	650D
	V8/2 bbl/302/All	Man.	10°BTDC	800
	V8/2 bbl/302/All	Auto.	10°BTDC	*

*Check emissions decal in engine compartment; many changes made during the year.

CHAPTER FOUR

ENGINE

The procedures and specifications provided in Chapter Four of the basic book apply also to 1977-1978 models, with the following conditions. In **Tables 1 and 3** of Chapter Four, the specifications indicated for 1976 models apply also to 1977-1978 models. **Table 2** of Chapter Four has been amended to include 1977-1978 models.

CHAPTER FIVE

FUEL, EXHAUST, AND EMISSION CONTROL SYSTEMS

Carburetors

A new carburetor, the Motorcraft Model 2700VV, was used on some 1977-1978 models (2800cc and 302 cid). This carburetor is different from the carburetors used on previous models, and features two throats or barrels with venturis that vary in area according to engine speed and load. The 2700VV (VV stands for variable venturi) has a dual-element venturi valve that is controlled by manifold vacuum and throttle position. The valve is connected to the two main fuel metering rods, which control fuel flow. In operation, the valve moves in and out of the air flowing through the two throats of the carburetor as engine speed and load vary, causing a more even air speed, and hence more even air-fuel mixture, over the engine operating range. The need for supplementary systems — such as a separate idle circuit, enrich-valve system, and choke — has been eliminated.

Because of the complexity of the system and the requirement for special tools and skills, service of the 2700VV carburetor should be limited to the procedures given in this chapter.

Engine Fast Idle Speed Adjustment

> NOTE: *Air cleaner assembly must be installed with all hoses attached when making engine speed measurements. Also, some engines may indicate oscillations at idle speeds, rather than a steady rpm. If this is the case with your engine, use the average speed.*

1. Apply parking brake and block the wheels. If vehicle has automatic parking brake release, disconnect vacuum line at the parking brake and plug it.

2. Start engine and allow it to reach normal operating temperature. Make sure all accessories are off. Turn engine off.

3. On 2300cc engine with thermactor, revise dump valve vacuum hoses. On dump valves with 1 or 2 vacuum hoses on sides, disconnect and plug the hoses. On dump valves with one vacuum hose on top only (connected to spark port on carburetor), remove the hose at the dump valve and plug it, then connect another hose from the dump valve to a vacuum fitting on the intake manifold.

4. Disconnect the fuel evaporative purge valve vacuum hose. Trace the hose from the purge valve, located on the canister, to the nearest fitting where the hose can be detached. Disconnect hose and plug it, then cap the opening in the fitting.

5. Make sure throttle and choke linkages operate freely.

6. Connect a tachometer to the engine, following the manufacturer's instructions. The tachometer test lead should be equipped with an alligator clip and attached to the distributor electronic control terminal on the ignition coil connector as shown in **Figure 2**. A tachometer designed for use with high energy ignition systems (Ford tool No. 02-0362 or equivalent) should be used.

7. On all engines except those equipped with the 2700VV carburetor, remove the vacuum hoses from the spark delay valve, if so equipped, and connect the distributor vacuum advance hose directly to the advance side of the distributor. On engines with the 2700VV carburetor, remove the vacuum advance line from the distributor and plug it.

8. If there is a ported vacuum switch (PVS) in the exhaust gas recirculation (EGR) valve vacuum line, disconnect the vacuum hose at the EGR valve and plug the hose. If there is no EGR/PVS, do not disconnect the EGR vacuum hose. See **Figure 3** for EGR system components location.

9. Start engine and allow it to idle at normal operating temperature. Make sure choke plate, if so equipped, is fully opened and the transmission is in either NEUTRAL (manual) or PARK (automatic).

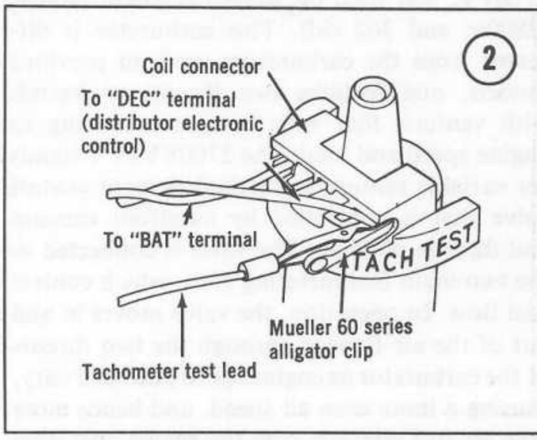
10. Place fast idle lever on the specified (see Vehicle Emission Control decal) step of the fast idle cam and allow engine speed to stabilize. If fast idle speed is not within 100 rpm of specification, adjust by turning the high speed adjustment screw. See **Figure 4** (Model 5200), **Figure 5** (Model 2150), or **Figure 6** (Model 2700VV). Make sure high cam speed positioner (HCSP) is disengaged an Model 2700VV carburetor. See **Figure 7**.

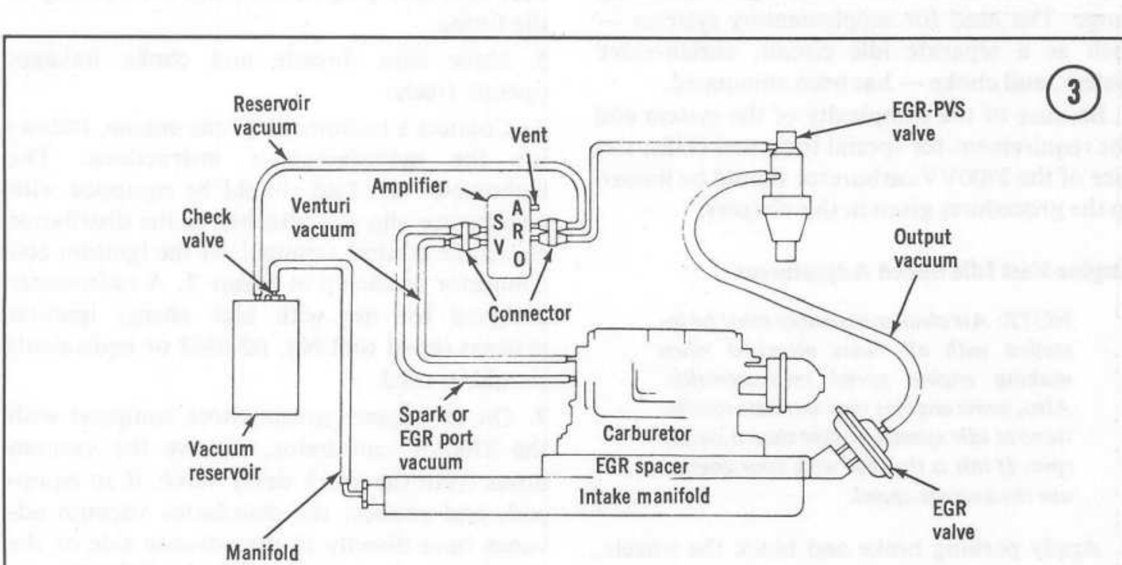
11. Operate the engine at about 2,500 rpm for 15 seconds and recheck fast idle speed. Readjust if required.

12. On 302 cid engines with the 2700VV carburetor, check auxiliary fast idle speed by turning off the engine, disconnecting and plugging the vacuum hose at the vacuum-operated throttle modulator. Connect another hose directly between a vacuum source on the intake manifold to the throttle modulator and start the engine. Depress throttle until the vacuum modulator plunger is fully extended, then release throttle. Check auxiliary fast idle speed and adjust if required by loosening the locknut and turning the modulator as required. Tighten locknut and reconnect vacuum hoses to original positions.

13. Repeat Steps 10 through 12 as required until the specified fast idle speed can be repeated.

14. Turn off engine and reconnect all vacuum hoses to their original positions.





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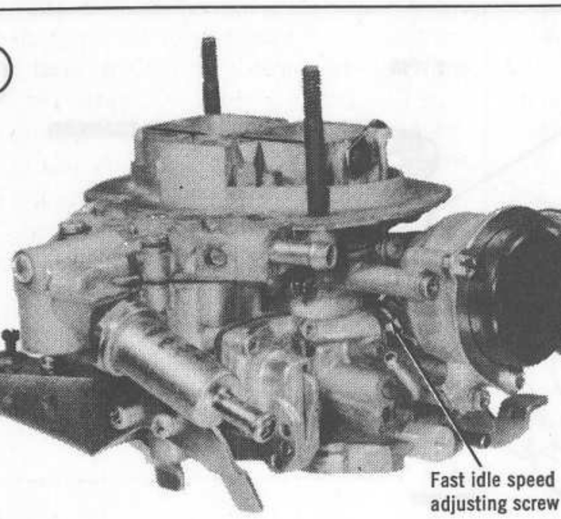
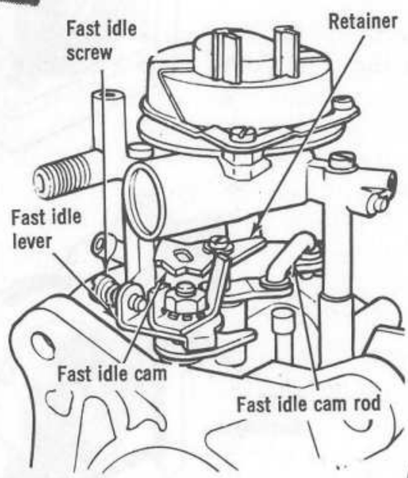

Fast idle speed
adjusting screw


Fast idle
screw
Retainer
Fast idle
lever
Fast idle cam
Fast idle cam rod

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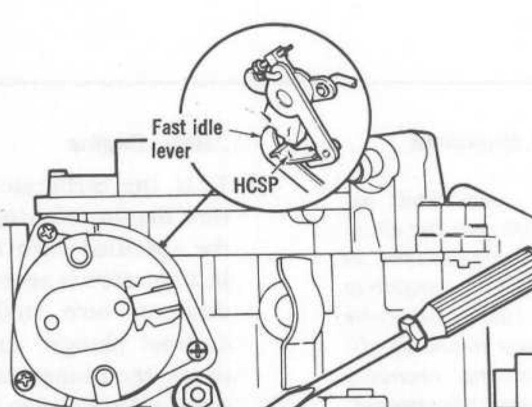
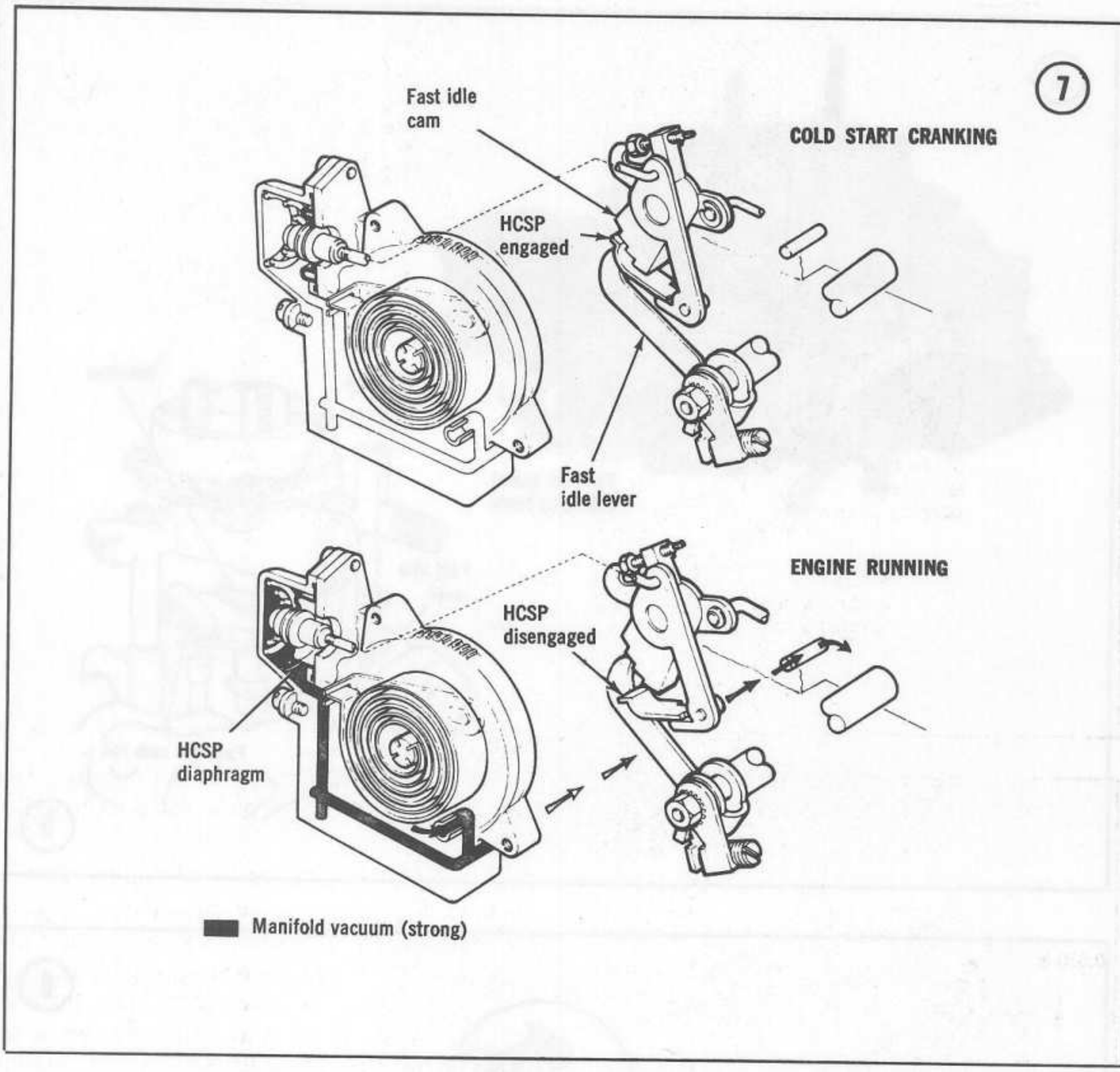

Fast idle
lever
HCSP



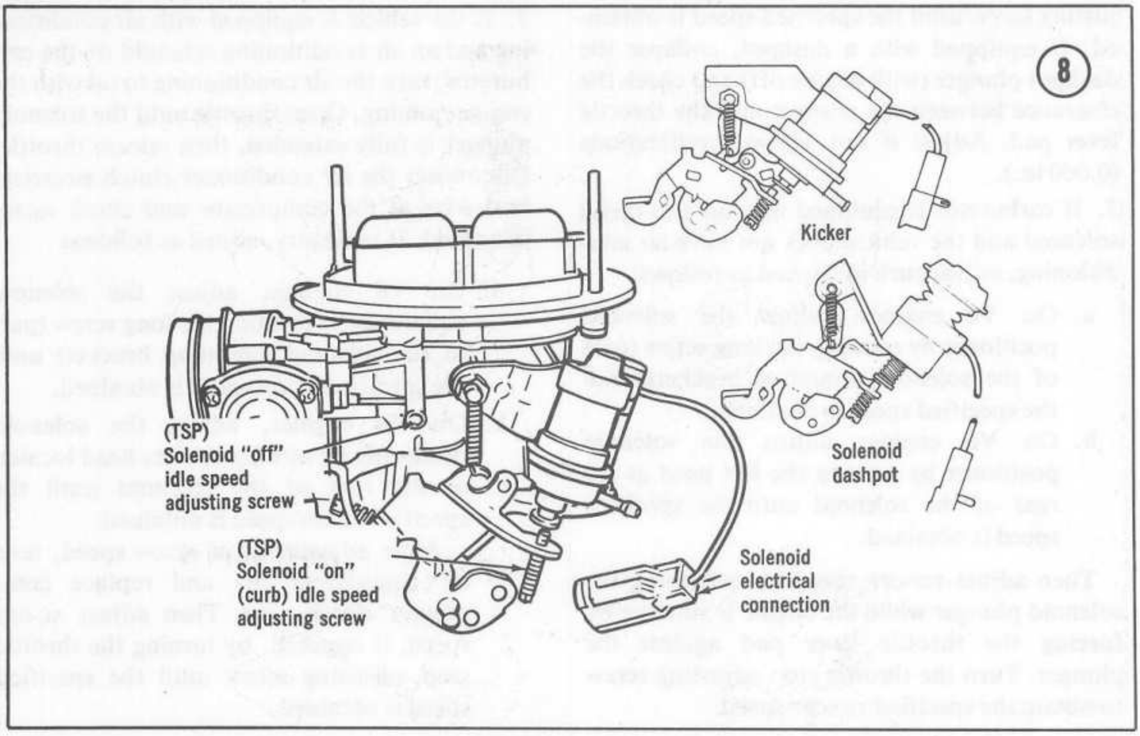
Engine Curb Idle Speed Adjustment

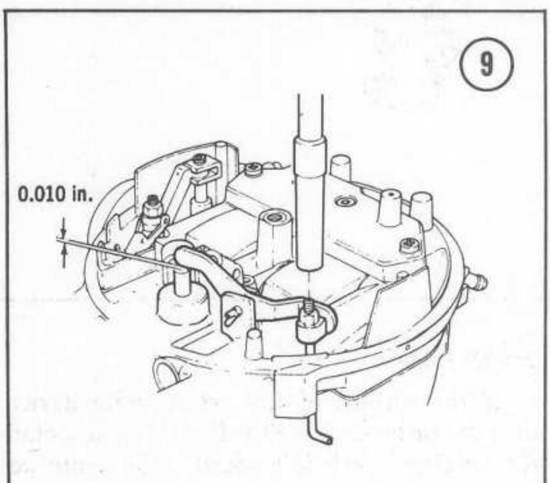
NOTE: *Before each speed check, accelerate engine to 2,500 rpm for about 15 seconds with transmission in* NEUTRAL *or* PARK, *then allow engine to return to curb idle. Unless otherwise specified, air conditioner should be off. Engine should be at normal operating temperature with choke fully opened. Block wheels, set emergency brake, and place transmission selector lever in the specified gear or position (see Vehicle Emission Control decal in engine compartment). Measure each engine speed as defined and if not within 50 rpm of the specified speed, adjust as required.*

2300cc Engine

1. If the carburetor has no solenoid device, turn the throttle stop adjusting screw to obtain the specified curb idle speed. Make sure adjusting screw is against stop. If equipped with a dashpot, turn engine off and collapse the dashpot plunger and check the clearance between the plunger and the throttle lever pad. Adjust if not within the specified limit.

2. If equipped with an anti-diesel solenoid or solenoid-dashpot, adjust curb idle speed by turning the TSP-ON idle adjusting screw (**Figure 8**). Then, with the engine running, collapse the solenoid plunger by forcing the throttle lever pad against the solenoid plunger. Turn the





throttle stop adjusting screw until the specified TSP-OFF idle speed is obtained.

3. If equipped with air conditioning and a vacuum-operated throttle modulator, adjust curb idle by loosening the locknut securing the throttle modulator and rotating the modulator until a clearance exists between the modulator stem and the throttle lever pad. Adjust curb idle speed by turning the throttle stop adjusting screw until the specified speed is obtained. Adjust the throttle lever pad, then tighten the locknut.

4. If equipped with air conditioning and a vacuum-operated throttle modulator with a dashpot, adjust curb idle speed by turning the throttle stop adjusting screw until the specified speed is obtained. Collapse the throttle modulator plunger and measure the clearance between the stem pad and the TSP-ON adjusting screw. If not within specifications, turn the TSP-ON adjusting screw until the specified clearance is obtained.

2800cc and 302 cid Engines

NOTE: *On engines equipped with the Model 2700VV carburetor, accelerator pump lash must be checked and adjusted, if required, each time curb idle speed is adjusted. Apply a slight pressure on nylon nut on accelerator pump plunger and lever. See* **Figure 9.** *Adjust, if required, to obtain clearance of 0.010 in. by using the nylon nut.*

1. If the carburetor has no solenoid device, adjust curb idle by turning the throttle stop ad-

justing screw until the specified speed is obtained. If equipped with a dashpot, collapse the dashpot plunger (with engine off) and check the clearance between the plunger and the throttle lever pad. Adjust if not within specifications (0.060 in.).

2. If carburetor is equipped with an anti-diesel solenoid and the vehicle does not have air conditioning, adjust curb idle speed as follows:

a. On V8 engines, adjust the solenoid positioner by rotating the long screw (part of the solenoid mounting bracket) until the specified speed is obtained.
b. On V6 engines adjust the solenoid positioner by turning the hex head at the rear of the solenoid until the specified speed is obtained.

Then adjust TSP-OFF speed by collapsing the solenoid plunger while the engine is running by forcing the throttle lever pad against the plunger. Turn the throttle stop adjusting screw to obtain the specified TSP-OFF speed.

3. If the vehicle is equipped with air conditioning and an air conditioning solenoid on the carburetor, turn the air conditioning to ON with the engine running. Open throttle until the solenoid plunger is fully extended, then release throttle. Disconnect the air conditioner clutch electrical lead wire at the compressor and check AC-ON idle speed. If necessary, adjust as follows:

a. On V8 engines, adjust the solenoid positioner by rotating the long screw (part of the solenoid mounting bracket) until the specified AC-ON speed is obtained.
b. On V6 engines, adjust the solenoid positioner by turning the hex head located at the rear of the solenoid until the specified AC-ON speed is obtained.

After adjustment of AC-ON speed, turn air conditioner off and replace compressor clutch wire. Then adjust AC-OFF speed, if required, by turning the throttle stop adjusting screw until the specified speed is obtained.

INDEX

14

V

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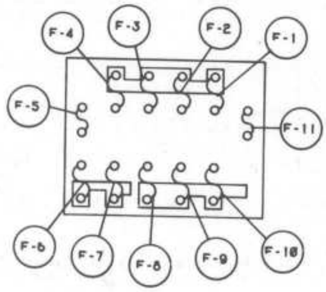
NOTES



WIRING COLOR KEY PRIMARY COLORS

BLACK	BK	LIGHT GREEN	LG
BROWN	BR	DARK BLUE	DB
TAN	T	LIGHT BLUE	LB
RED	R	PURPLE	P
PINK	PK	GRAY	GY
ORANGE	O	WHITE	W
YELLOW	Y	HASH	(H)
DARK GREEN	DG	DOT	(D)

STRIPE IS UNDERSTOOD AND HAS NO COLOR KEY

FUSE CHART

F-1 (7.5 AMP) RADIO
F-2 (15 AMP) W/S WASHER
F-3 (6 AMP) W/S WIPER CIRCUIT BREAKER
F-4 (7.5 AMP) WARNING LAMPS
F-5 (4 AMPS) INSTR. LAMPS
F-6 (15 AMPS) BACKUP LAMPS
F-7 (15 AMPS) HEATER
NOTE-30 AMP FUSE REQUIRED FOR A/C
F-8 (15 AMPS) EMERG. FLASHER & STOP LAMP SWITCH
F-9 (15 AMPS) COURTESY LAMP SWITCH & ACCY.
F-10 (20 AMPS) HORN & CIGAR LITER
F-11 EMPTY

HEAVY SOLID LINE REPRESENTS BATTERY FEED
HEAVY DASHED LINE REPRESENTS ACCESSORY FEED

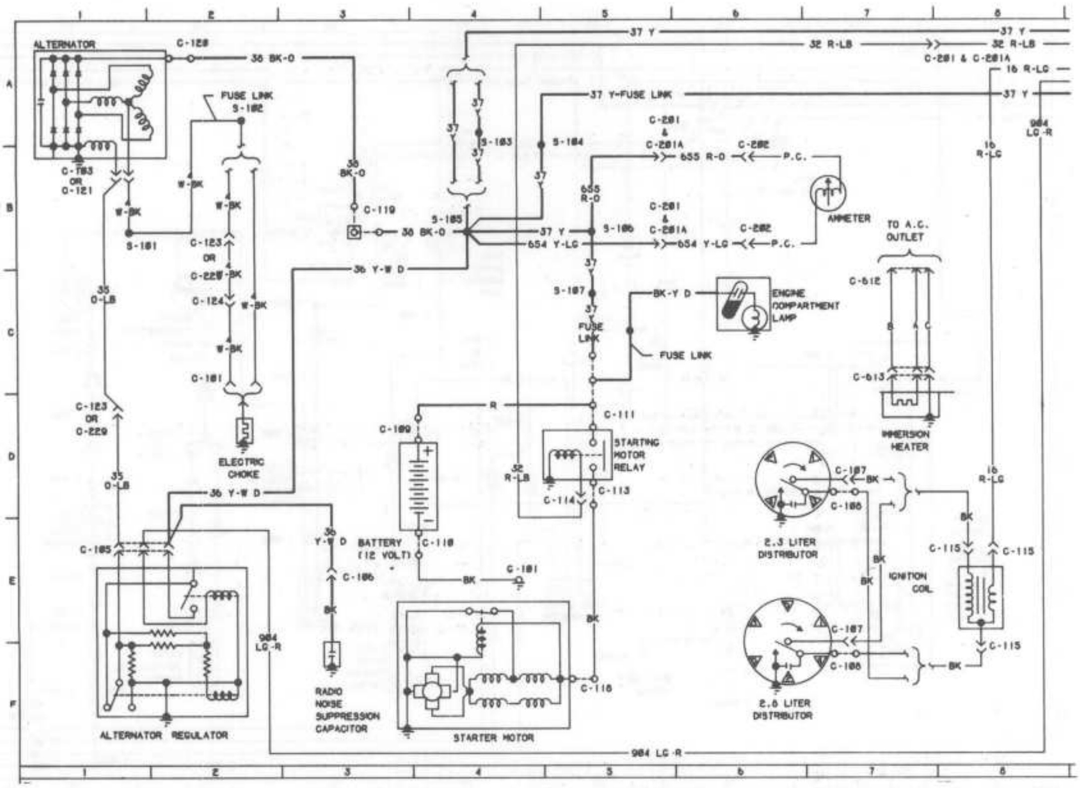
DOOR LOCK CYLINDER SW.	F-58. F-59
HORN WARNING ACTUATOR	C-57
HEADLAMPS ON WRNG. RELAY	E-62
LIFT GATE OPEN WRNG.	E-70
DOOR OPEN WRNG.	F-55. F-56
PARKING BRAKE LAMP	E-55

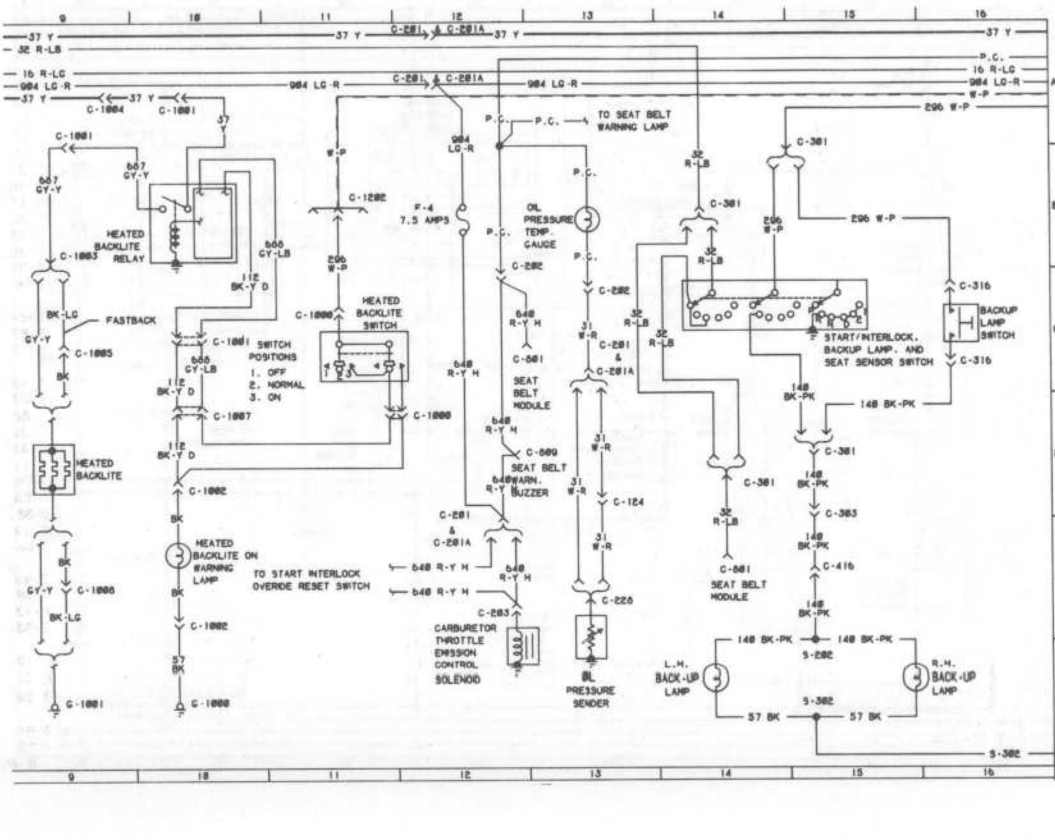
BULB CHART

LAMP DESCRIPTION	CANDLEPOWER OR WATTAGE	TRADE NUMBER
HEADLAMP		
H/LOW BEAM	50-60	6014
FRONT PARK/TURN	3-32	1157NA
TAIL/STOP	3-32	1157
REAR TURN SIGNAL	32	1156
BACK UP	32	1156
SIDE MARKER		
FRONT	2	194
REAR	2	194
LICENSE PLATE	2	194
COURTESY		
DOME	12	211-2
INSTR. PANEL	6	631
GLOVE BOX	3	1816
LUGGAGE COMPT.	6	631
MAP	.7	1445
DOOR	4	214-2
ENGINE COMP.	6	631
ILLUMINATION		
PRNDL	.7	1445
HEATER CONTROL	.1	161
ASH TRAY	.75	1892
CLOCK	2	194
CLUSTER	2	194
RADIO	2	1893
WARNING		
ALT.	2	194
BRAKES DUAL	2	194
DOOR AJAR	2	194
HEADLAMP ON	2	194
PARKING BRAKE	2	194
TEMP. OIL	2	194
SEAT BELT	2	194
INDICATOR		
HI-BEAM	2	194
TURN	2	194
HEATED BACKLITE	.5	PIA
AM-FM STEREO	.75	1892
AM-FM STEREO/TAPE	.5	37

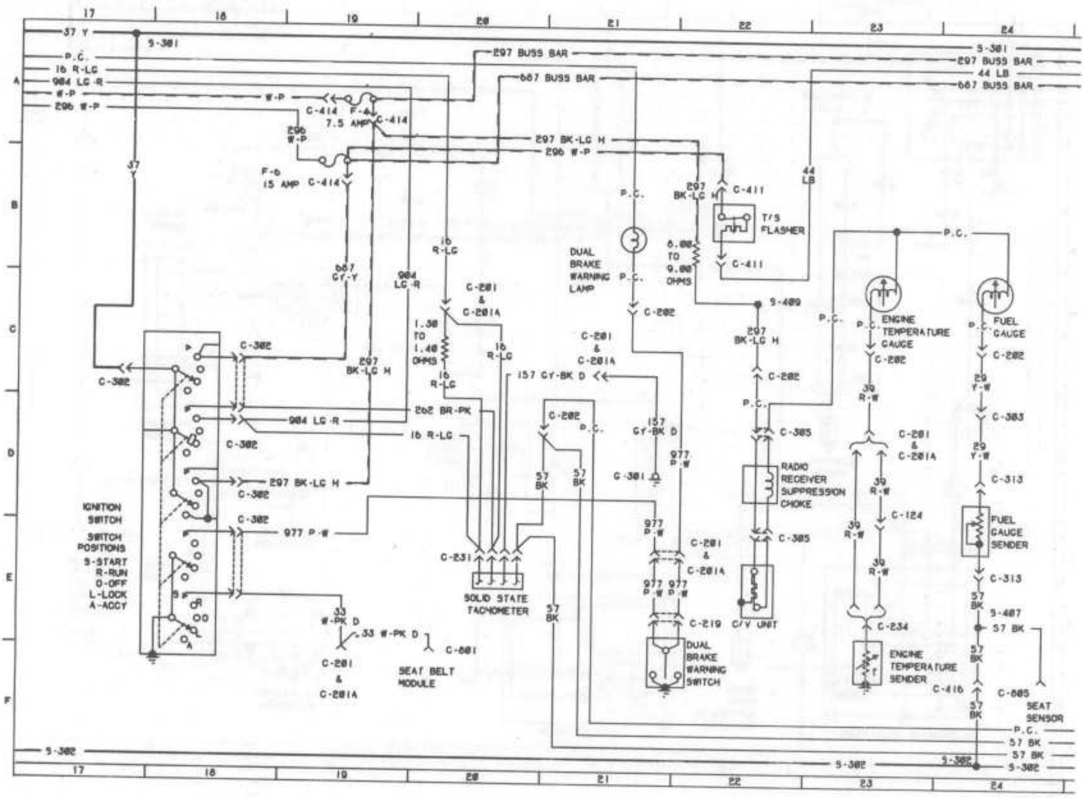
COMPONENT	LOCATION
A/C CLUTCH SOLENOID	E-29
ALTERNATOR	A-1
ALTERNATOR REGULATOR	F-1
BATTERY	D-3.C-49.C-74
BLOWER MOTOR RESISTOR A/C	E-27
BLOWER MOTOR RESISTOR HEATER	E-26
CIGAR LIGHTER	C-31
CLOCK	C-71
CONSTANT VOLTAGE UNIT	E-22
DISTRIBUTOR	D-E-F-6
EMISSION CONTROL SOLENOID	F-12
ELECTRIC CHOKE	D-2
FLASHERS	
EMERGENCY WARNING	D-30
TURN SIGNAL	B-22
FUEL GAGE	B-24
FUEL GAGE SENDER	E-24
OIL PRESS.	B-13
TEMPERATURE	B-23
TACHOMETER	E-20
HEATED BACKLITE	D-9
HEATED BACKLITE RELAY	B-10
HORN	E-32.F-59
IGNITION COIL	E-8
JUNCTION BLOCK	B-3
ILLUMINATIONS	
A/C SWITCH	B-41
HEATER SWITCH	B-41
CLUSTER	B-42.B-43
PRNDL	E-37
CLOCK	C-72
ASH TRAY	C-72
IMMERSION HEATER	D-6
INDICATORS	
DOOR AJAR	C-55
DUAL BRAKE WARNING	C-21
HEATED BACKLITE	D-10
HI BEAM	F-33
PARKING BRAKE	D-55
SEAT BELT WARNING	E-96
TURN SIGNAL	D-29
KEY REMINDER BUZZER	F-61
LAMPS	
BACK UP	F-14.F-16
DOOR COURTESY	
R.H.	E-66
L.H.	E-64
DOME	E-63
HEADLAMPS	
L.H.	E-34
R.H.	E-35
LICENSE	E-45.E-46
FRONT PARK/TURN	
L.H.	E-34
R.H.	E-36
ENGINE COMP.	C-6
GLOVE BOX	D-96
LUGGAGE COMP.	E-71
STOP AND TAIL	
L.H.	E-43. E-44
R.H.	E-47
REAR AND TURN	
L.H.	E-46
R.H.	E-46
SIDE MARLER	
L.H. FRONT	E-35
R.H. FRONT	E-37
L.H. REAR	E-43
R.H. REAR	E-48
MOTORS	
HEATER BLOWER	F-29
HEATER BLOWER A/C	F-29
STARTER	F-4
WINDSHIELD WASHER PUMP	D-47
WINDSHIELD WIPER	D-46
NOISE SUPPRESSION CAPACITOR	F-3
RADIO	D-38. B-39
RADIO SUPPRESSION CHOKE	D-22
RADIO SPEAKER	F-38. F-39. F-40
SEAT BELT ACTUATOR ASSY	B-93
SEAT BELT REMINDER BUZZER	C-96
START INTERLOCK RESET SW.	C-87
STARTER MOTOR RELAY	D-5. A-50. D-74
SWITCHES	
A/C BLOWER	D-27
A/C MODE	B-27
AMBIENT TEMP.	D-28
DOOR JAMB	
L.H.	E-63
R.H.	E-67
DUAL BRAKE WARNING	F-22
HEADLAMP	C-35
HEADLAMP DIMMER	C-33
HEATED BACKLITE	C-11
HEATER BLOWER	D-26
HEATER MODE	C-26
HORN	C-32. C-60
IGNITION	E-17. E-79. D-49
KEY REMINDER	F-60
SEAT BELT RETRACTOR	
L.H.	E-93
R.H.	E-92
OIL PRESSURE	F-13
SEAT SENSOR	E-93. D-94
START INTERLOCK AND BACK-UP LAMP	C-15. D-90
STOPLAMP	B-31
TURN SIGNAL	B-29
TRANSMISSION SEAT BELT SENSOR	D-91
WATER TEMPERATURE	E-23
WINDSHIELD WIPER AND WASHER	B-46

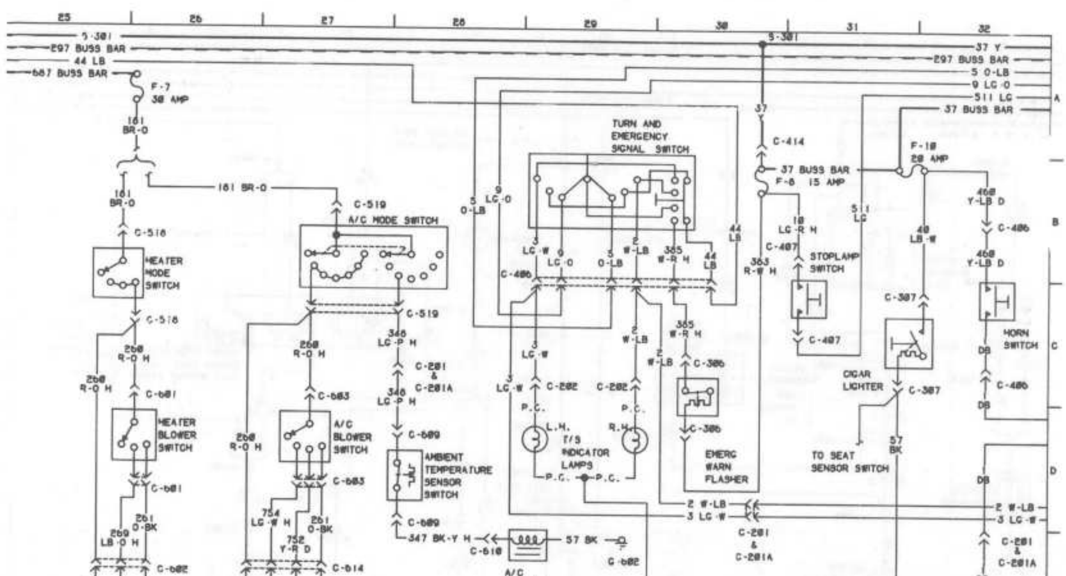
1974 MUSTANG II — PAGE 2



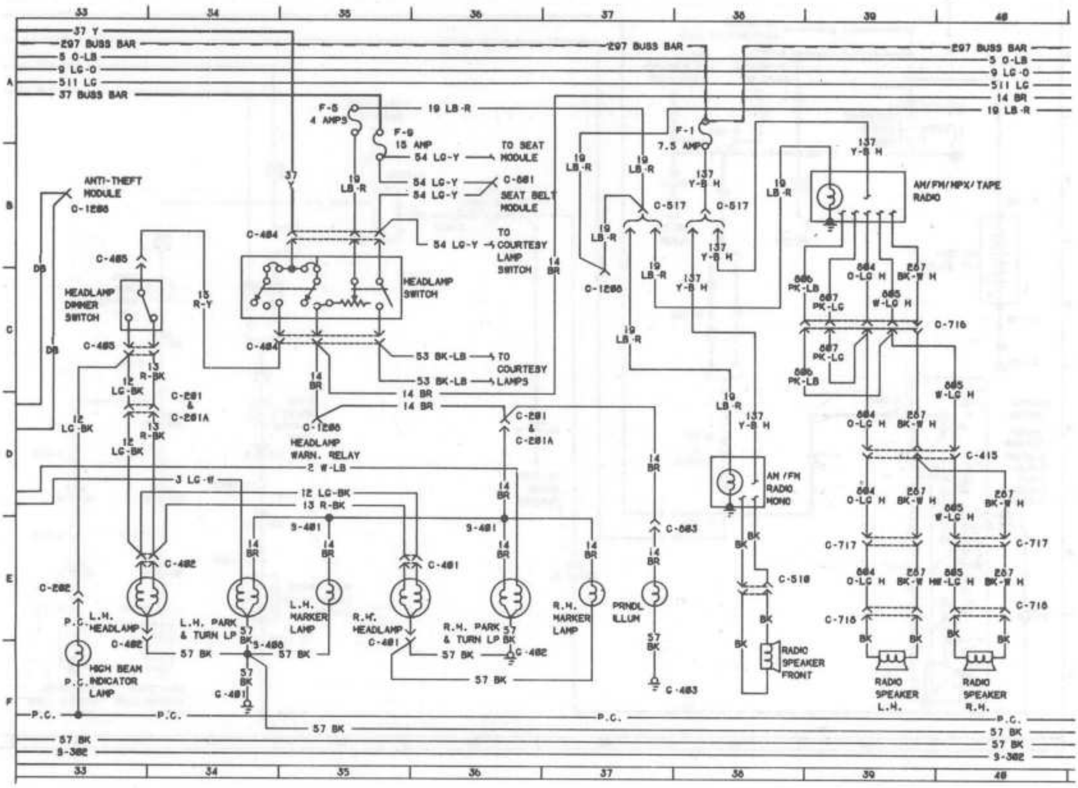


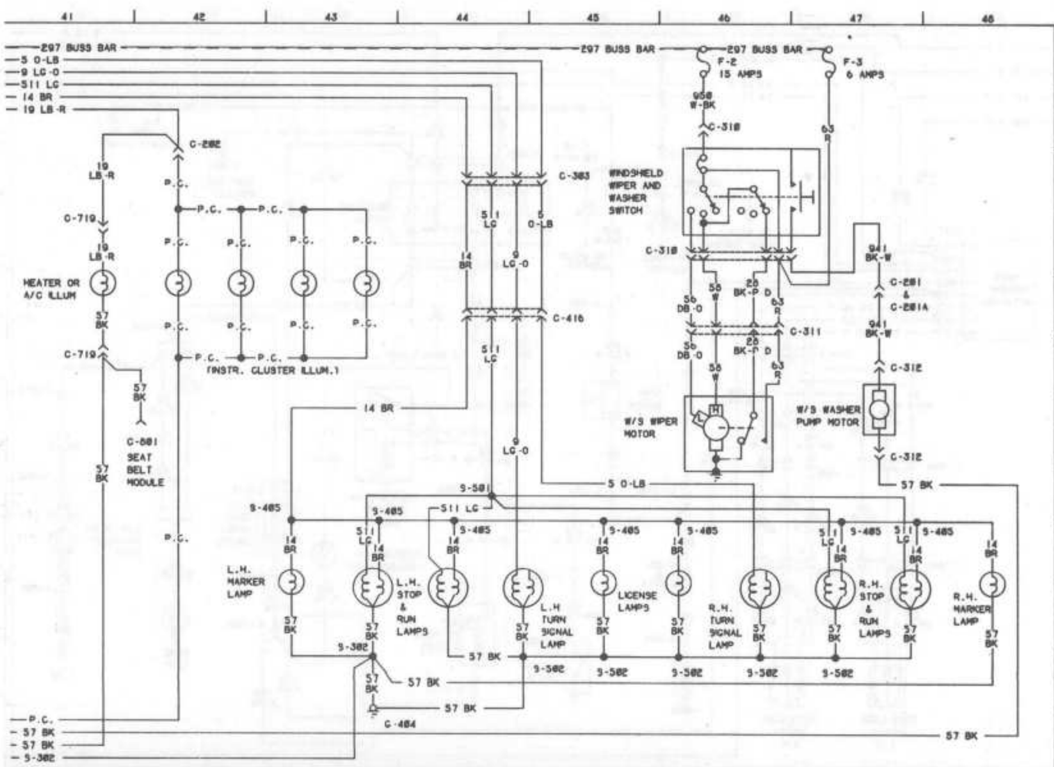
1974 MUSTANG II — PAGE 3



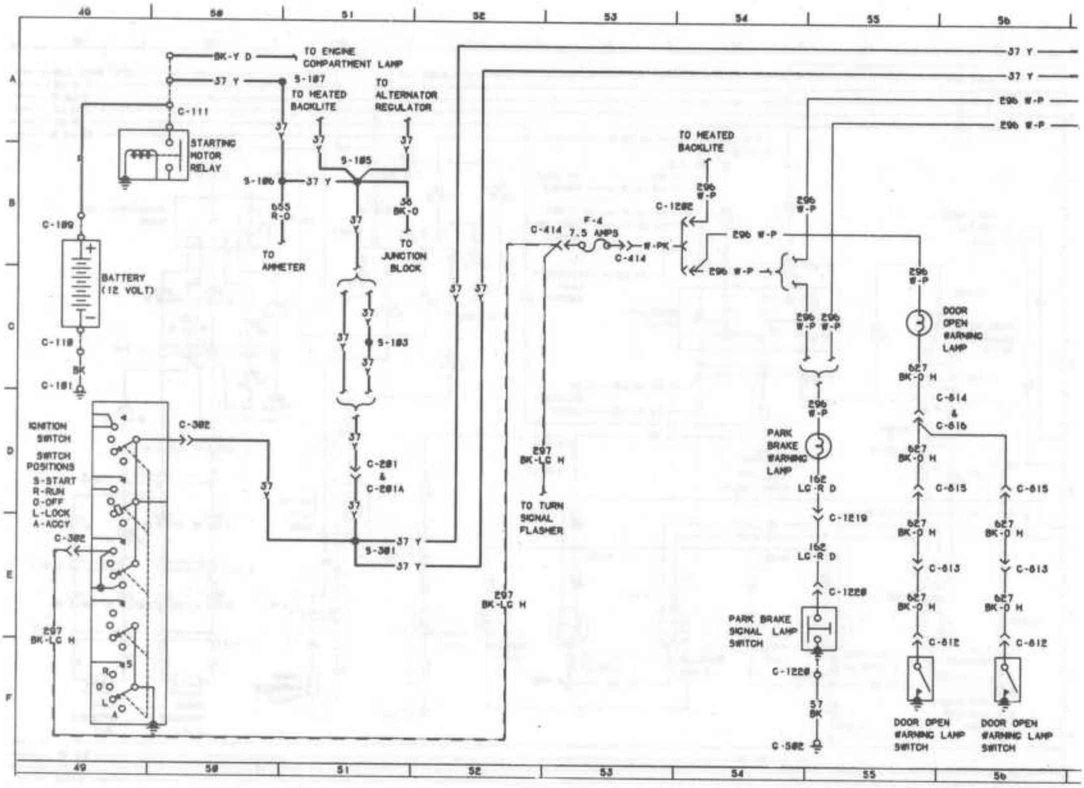


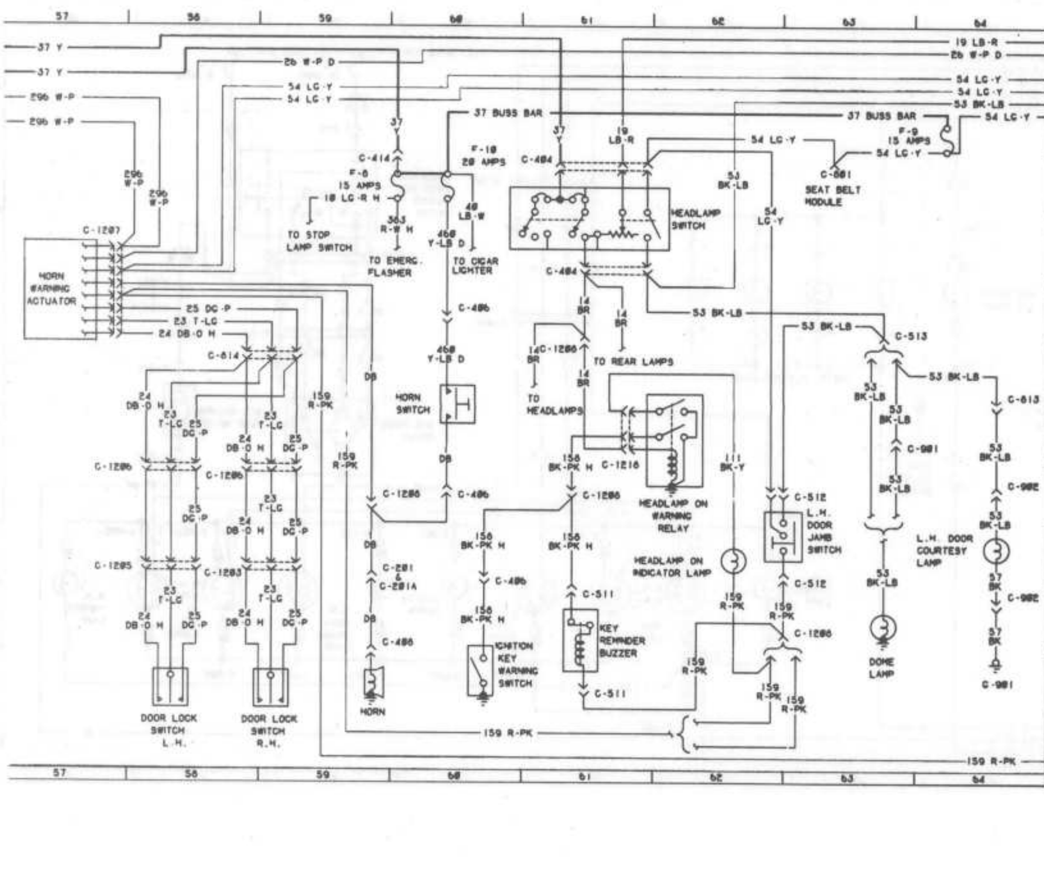
1974 MUSTANG II — PAGE 4

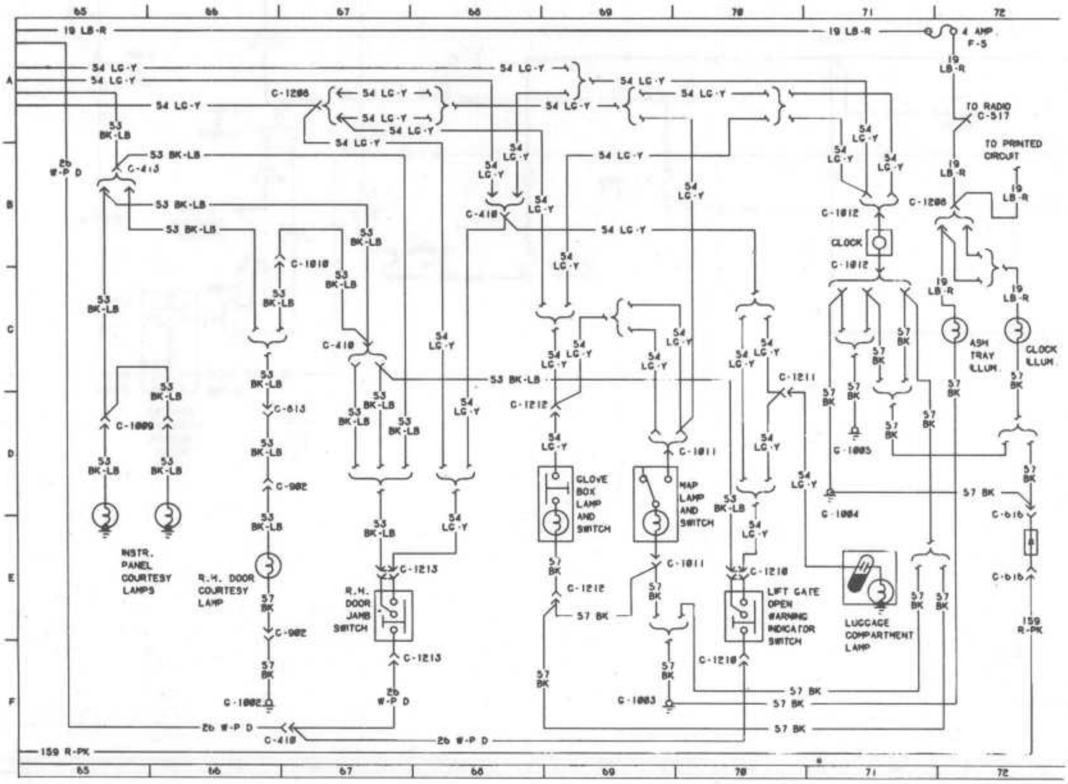


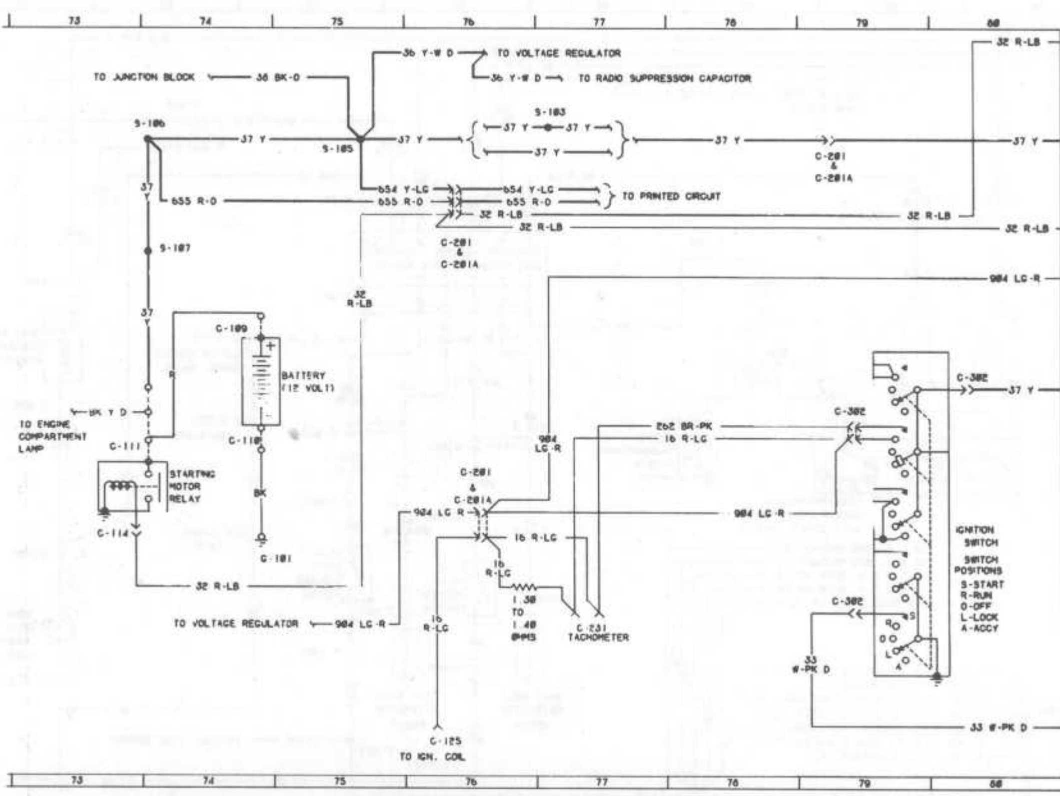


1974 MUSTANG II — PAGE 5

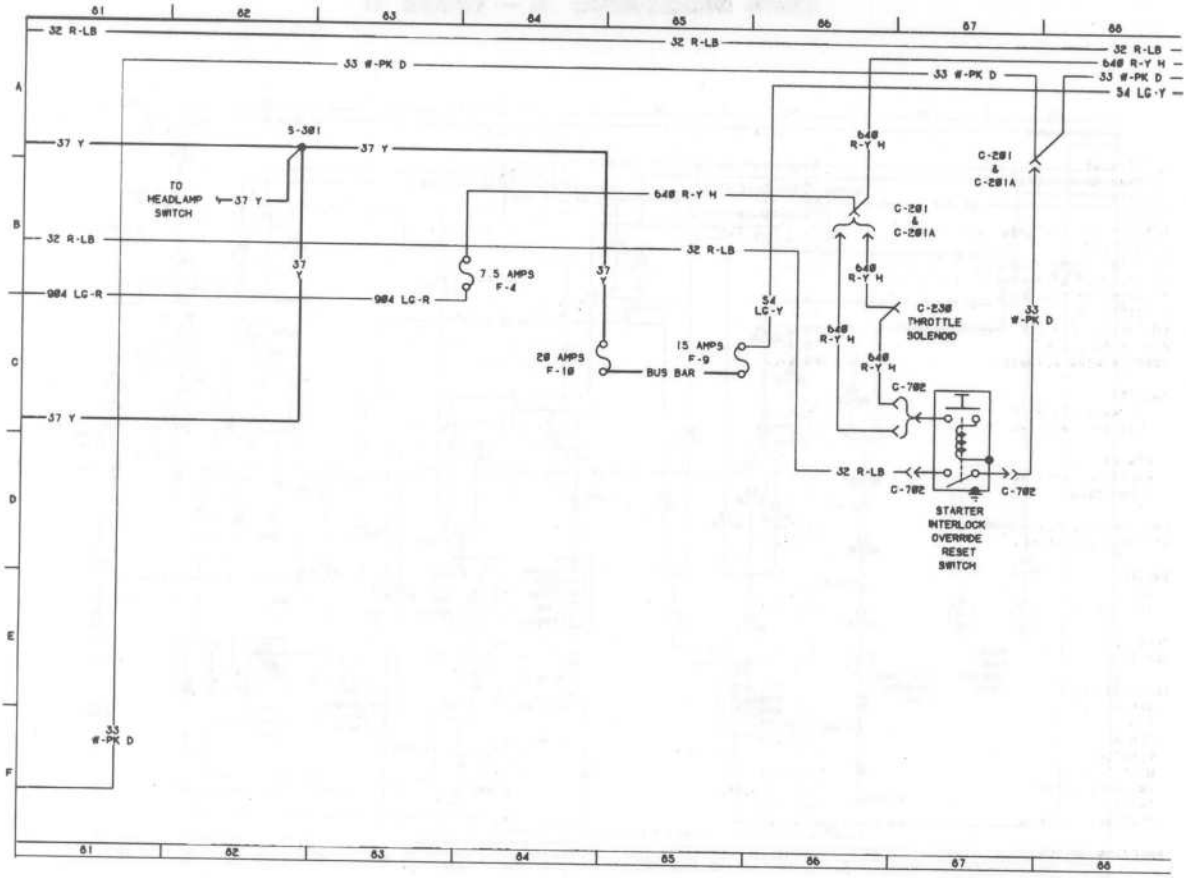


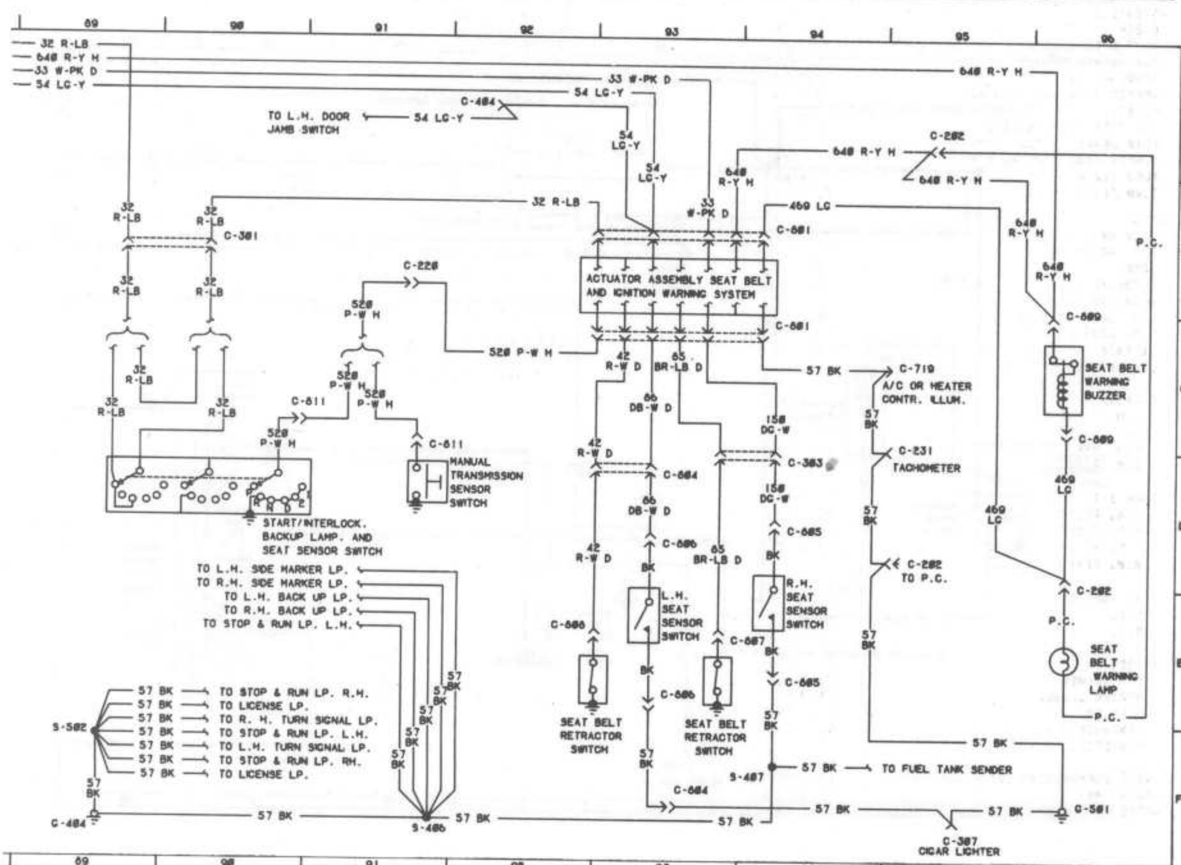



INSTR. PANEL COURTESY LAMPS
R.H. DOOR COURTESY LAMP
R.H. DOOR JAMB SWITCH
GLOVE BOX LAMP AND SWITCH
MAP LAMP AND SWITCH
LIFT GATE OPEN WARNING INDICATOR SWITCH
LUGGAGE COMPARTMENT LAMP
CLOCK
ASH TRAY ILLUM.
CLOCK ILLUM.
TO RADIO C-517
TO PRINTED CIRCUIT
4 AMP. F-5


TO JUNCTION BLOCK
TO VOLTAGE REGULATOR
TO RADIO SUPPRESSION CAPACITOR
TO PRINTED CIRCUIT
BATTERY (12 VOLT)
TO ENGINE COMPARTMENT LAMP
STARTING MOTOR RELAY
TO VOLTAGE REGULATOR
1.30 TO 1.40 OHMS
C-231 TACHOMETER
C-125 TO IGN. COIL
IGNITION SWITCH
SWITCH POSITIONS
S-START
R-RUN
O-OFF
L-LOCK
A-ACCY

1974 MUSTANG II — PAGE 7





1975 MUSTANG II — KEY

COMPONENT	LOCATION
ALTERNATOR	PG.2-A1,2,3,-B4
ALTERNATOR REGULATOR	PG.2-E1,F1 & 2
AMMETER	PG.3-C16
BATTERY	PG.1-B3, & PG.2-B5
BREAKERLESS IGNITION MODULATOR	PG.3-D10 &11
CIGAR LIGHTER	PG.6-C2
DISTRIBUTOR BREAKERLESS (2.3 LITRE)	PG.2-D5
DISTRIBUTOR BREAKERLESS (2.8 LITRE)	PG.2-E5
DISTRIBUTOR BREAKERLESS (302 C.I.D.)	PG.2-F5
ELECTRIC CHOKE	PG.2-C3
ENGINE TEMPERATURE SENDER	PG.2-F13
HEATED BACKLITE	PG.9-D6
HORN WARNING ACTUATOR	PG.6-B7
BUZZERS	
KEY REMINDER	PG.6-E4
SEAT BELT WARNING	PG.3-C13
FLASHERS	
EMERGENCY WARNING	PG.4-C6
TURN SIGNAL	PG.4-C7
FUEL GAGE SENDER	PG.3-D9
OIL PRESSURE SENDER	PG.2-F12
GAUGES	
FUEL	PG.3-C10
TACHOMETER	PG.2-E15
HORN	PG.7-E12
IGNITION COIL	PG.2-F10
ILLUMINATIONS	
A/C SWITCH	PG.9-C15
ASH TRAY	PG.9-C11
CLOCK	PG.9-C10
CLUSTER	PG.9-C12, 13
HEATER CONTROL	PG.9-C14
INSTRUMENT PANEL	PG.6-E12,E14
PRNDL	PG.9-D16
SEAT BELT WARNING	PG.3-E13
IMMERSION HEATER	PG.9-D8
INDICATORS	
CLOCK	PG.7-C8
DOOR OPEN WARNING	PG.6-B1
DUAL BRAKE WARNING	PG.2-C12
HEADLAMP ON	PG.6-D5
HEATED BACKLITE WARNING	PG.9-E4
HI-BEAM	PG.4-E1
OIL PRRESSURE WARNING	PG.2-C12
PARK BRAKE ON INDICATOR	PG.7-C10
TEMPERATURE WARNING	PG.2-C12
TURN SIGNAL (L.H.)	PG.4-E4
TURN SIGNAL (R.H.)	PG.4-E5
LAMPS	
BACK UP (L.H.)	PG.5-D4
BACK UP (R.H.)	PG.5-D13
DOME	PG.6-E10
HEADLAMP (L.H.)	PG.4-D9
HEADLAMP (R.H.)	PG.4-D12
L.H. DOOR COURTESY	PG.6-D11
R.H. DOOR COURTESY	PG.6-E15
LICENCE	PG.5-D7,D9
LUGGAGE COMPARTMENT	PG.7-D3
MARKERS	
L.H. FRONT	PG.4-D12
R.H. FRONT	PG.4-D15
L.H. REAR	PG.5-D1
R.H. REAR	PG.5-D16
PARK & TURN	
L.H. FRONT	PG.4-D10
R.H. FRONT	PG.4-D14
L.H. REAR	PG.5-D5
R.H. REAR	PG.5-D12
STOP TURN & TAIL	
L.H.	PG.5-D2,D6
R.H.	PG.5-D10, D14
MOTORS	
A/C BLOWER	PG.8-F13
HEATER BLOWER	PG.8-F10
STARTER	PG.2-B7
WINDSHIELD WASHER PUMP	PG.7-D16
WINDSHIELD WIPER	PG.7-D14
NOISE SUPPRESSION CAPACITOR	PG.2-F4
RADIO (AM)	PG.8-B2
RADIO (AM/FM/MPX)	PG.8-B5,6

COMPONENT	LOCATION
RADIO SPEAKERS	
FRONT	PG.8-F3
LEFT REAR	PG.8-F5
RIGHT REAR	PG.8-F6
C/V UNIT	PG.3-D10
RADIO SUPPRESSION CHOKE	PG.3-D10
RELAYS	
HEADLAMP ON WARNING	PG.6-D3
HEATED BACKLITE	PG.9-B5
STARTING MOTOR	PG.1-B4, PG.3-B6
RESISTORS	
BLOWER MOTOR	PG.8-E10, E12
SOLENOIDS	
A/C CLUTCH	PG.8-E15
CARBURETER THROTTLE EMMISSION CONTROL	PG.2-C11
EXHAUST GAS RECIRCULATING VACUUM VALVE	PG.2-D7
VACUUM VALVE	PG.2-C10
LAMPS & SWITCHES	
INTERIOR LAMP, MAP LAMP & SWITCHES	PG.7-D5
GLOVE BOX LAMP & SWITCH	PG.7-C6
SWITCHES	
A/C BLOWER	PG.8-C12
A/C MODE	PG.8-B13,14
AMBIENT TEMPERATURE SENSOR	PG.8-D15
BACK-UP LAMP	PG.5-A16
DISTRIBUTOR MODULATOR AMBIENT	PG.2-D6
DOOR JAMS	
L.H. FRONT	PG.6-C9
R.H. FRONT	PG.6-E16
DOOR LOCK CYLINDER	PG.6-E6, 7
DOOR OPEN WARNING LAMP	PG.6-F1,F2
DUAL BRAKE WARNING	PG.2-F12
HEADLAMP	PG.1-C7, PG.7-C2, PG.11-B3,4
HEADLAMP DIMMER	PG.4-D1
HEATED BACKLITE	PG.9-C2
HEATER BLOWER	PG.8-C12
HEATER MODE	PG.8-B10
HORN	PG.7-C12
IGNITION	PG.1-C4,D4,E4, PG.4-B15,C15,D15,E15
IGNITION KEY WARNING	PG.6-E4
LUGGAGE COMPARTMENT DOOR OPEN WARNING INDICATOR	PG.7-D2
MANUAL TRANSMISSION SENSOR	PG.3-F4
PARK BRAKE SIGNAL LAMP	PG.7-E10
REAR HATCH INTRUSION INDICATOR	PG.7-C4
R.H. SEAT SENSOR	PG.3-E8
L.H. SEAT SENSOR	PG.3-E6
R.H. SEAT BELT RETRACTOR	PG.3-E7
L.H. SEAT BELT RETRACTOR	PG.3-E5
START/INTERLOCK, BACKUP LAMP, AND SEAT SENSOR	PG.3-E1,2
STARTER INTERLOCK OVERRIDE RESET	PG.2-B9
STOPLAMP	PG.4-C4
TURN & EMERGENCY SIGNAL	PG.4-C4,5
WINDSHIELD WIPER WASHER 2 SPEED DEPRRESSED PARK	PG.7-B14,15

WIRING COLOR KEY
PRIMARY COLORS

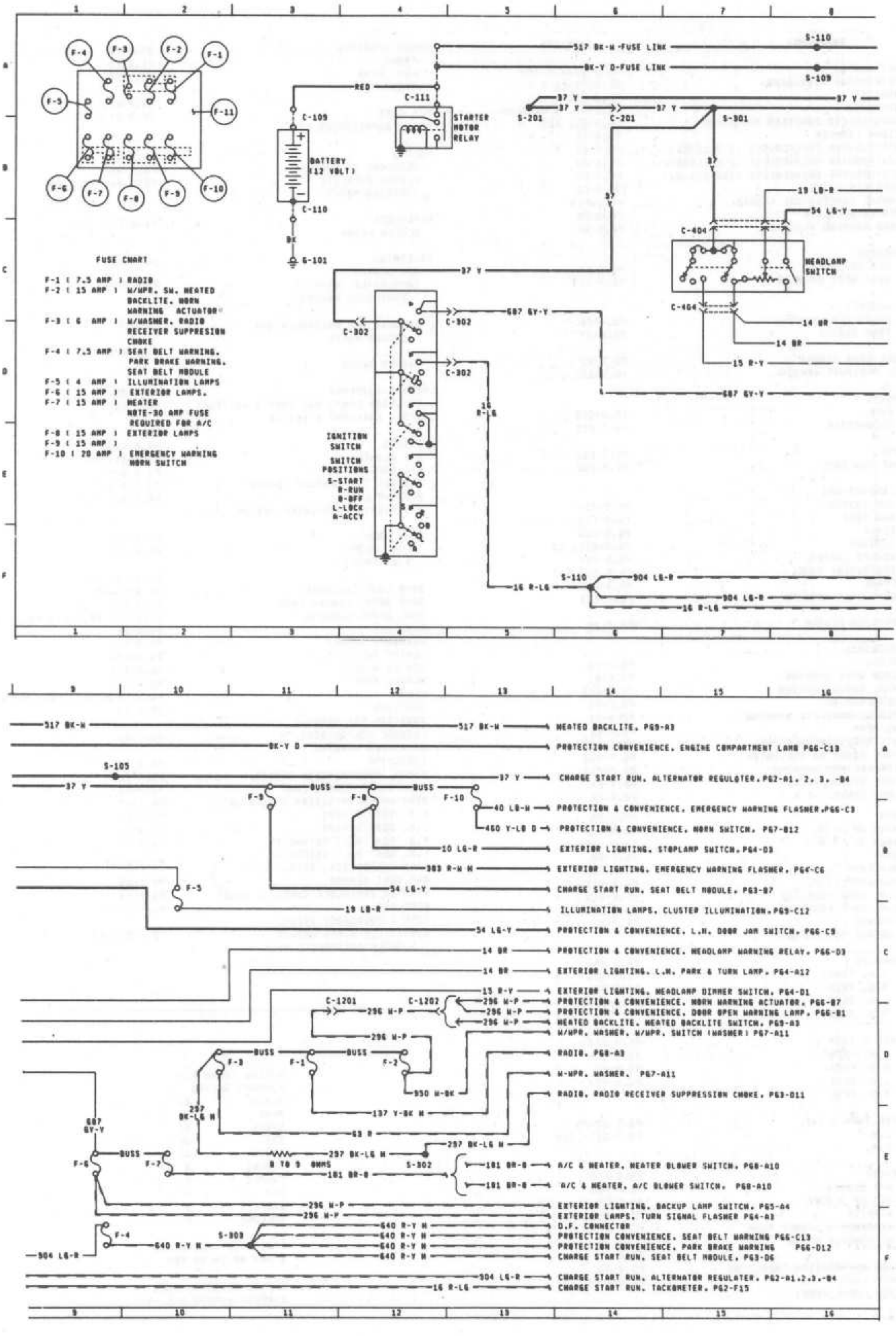
BLACK	BK
BLUE	BL
BROWN	BR
GRAY	GY
GREEN	GR
ORANGE	O
PURPLE	P
RED	R
WHITE	W
YELLOW	Y

STRIPE IS UNDERSTOOD & HAS NO COLOR KEY

STRIPE OPTIONAL WHEN CIRCUIT NUMBER HAS (*'

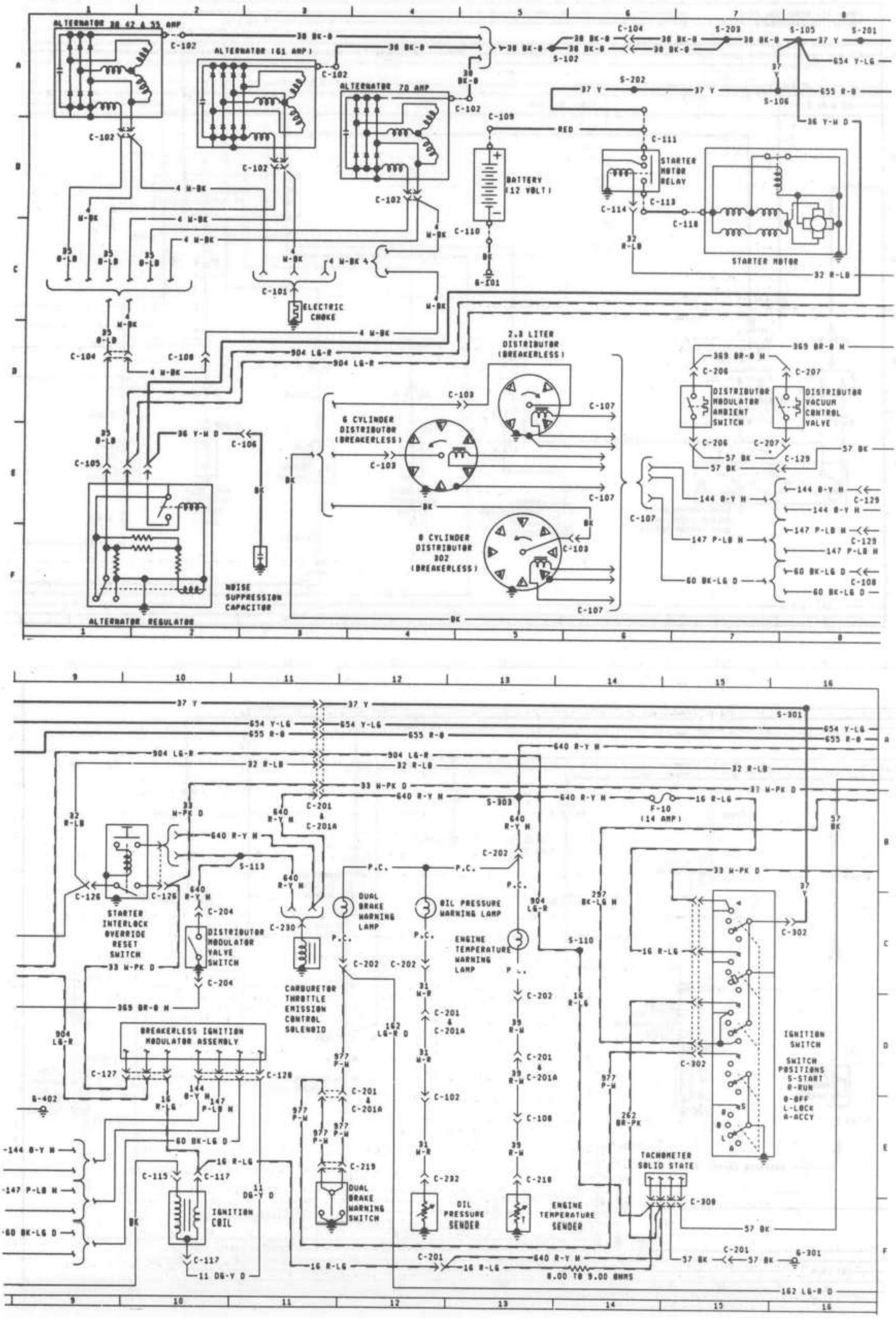
1975 MUSTANG II — PAGE 1

Power Distribution



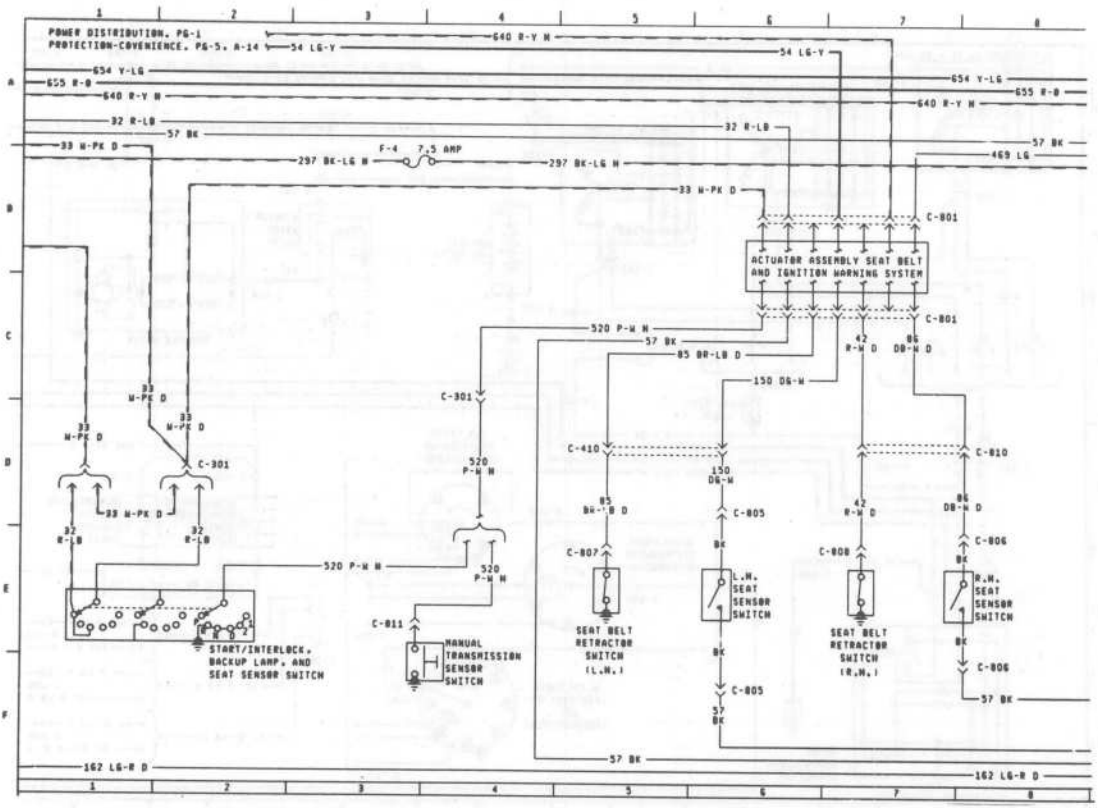
1975 MUSTANG II — PAGE 2

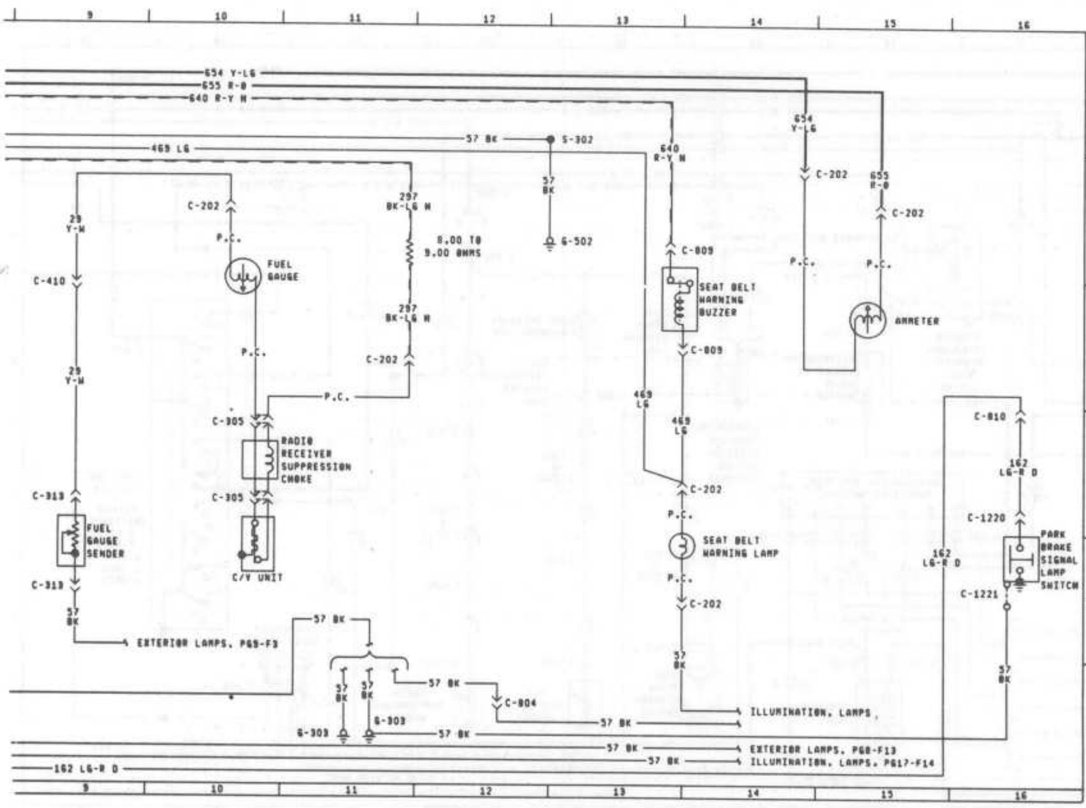
Charge, Start, Run



1975 MUSTANG II — PAGE 3

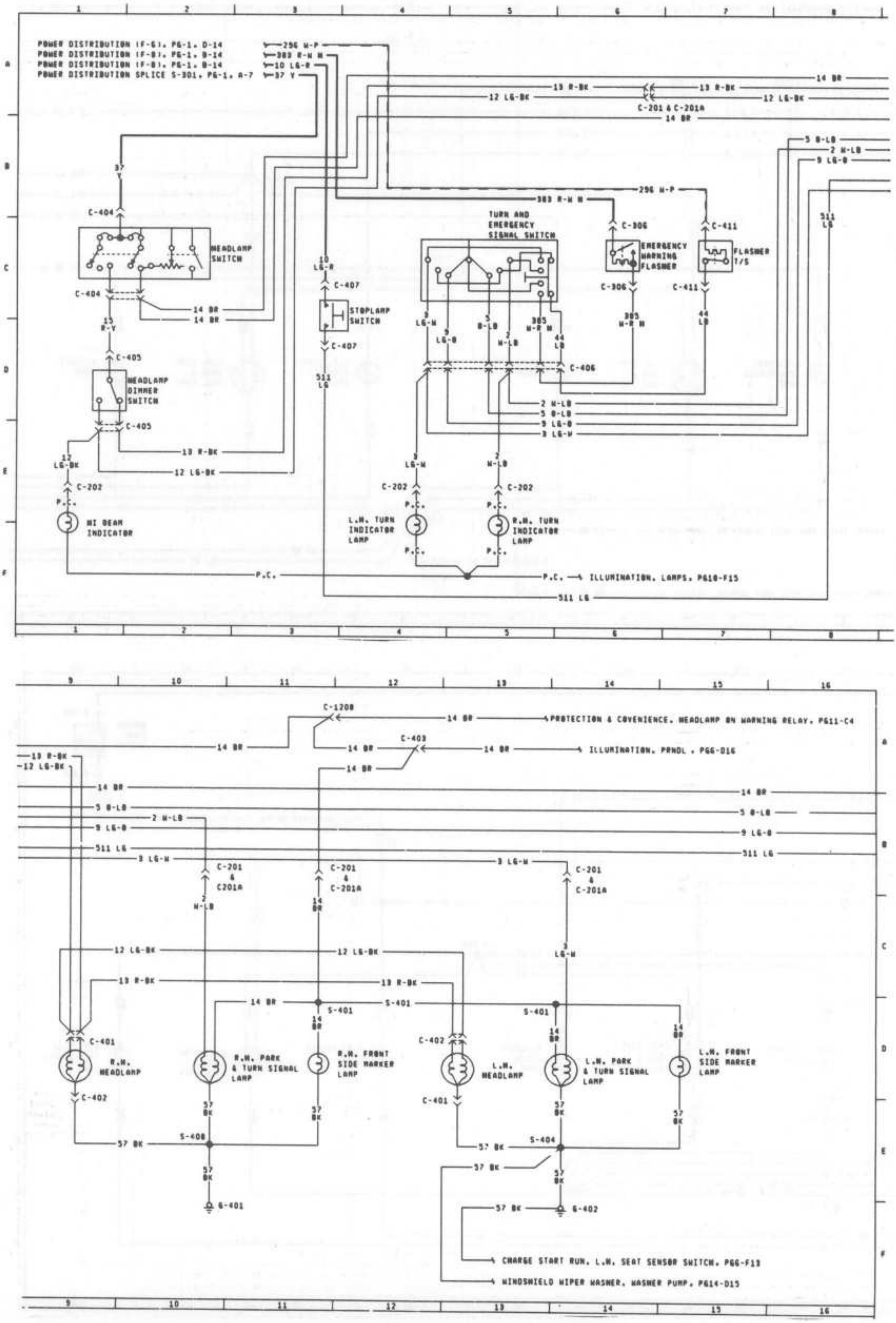
Charge, Start, Run





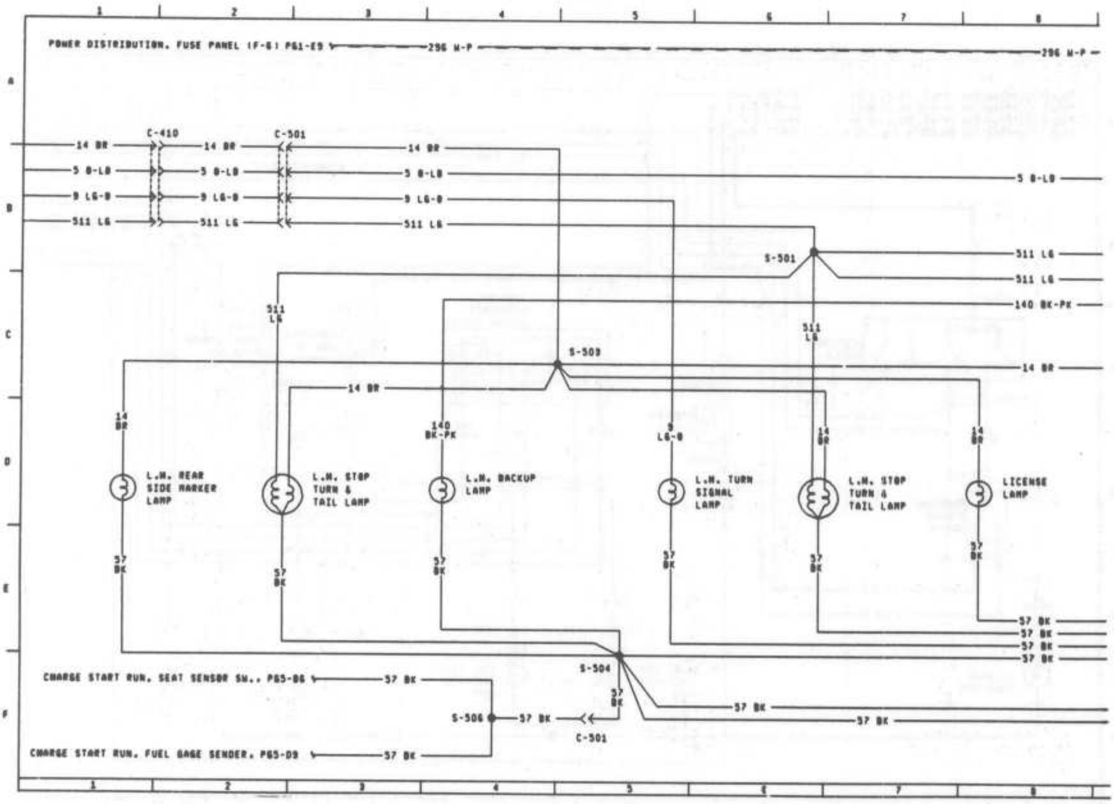
1975 MUSTANG II — PAGE 4

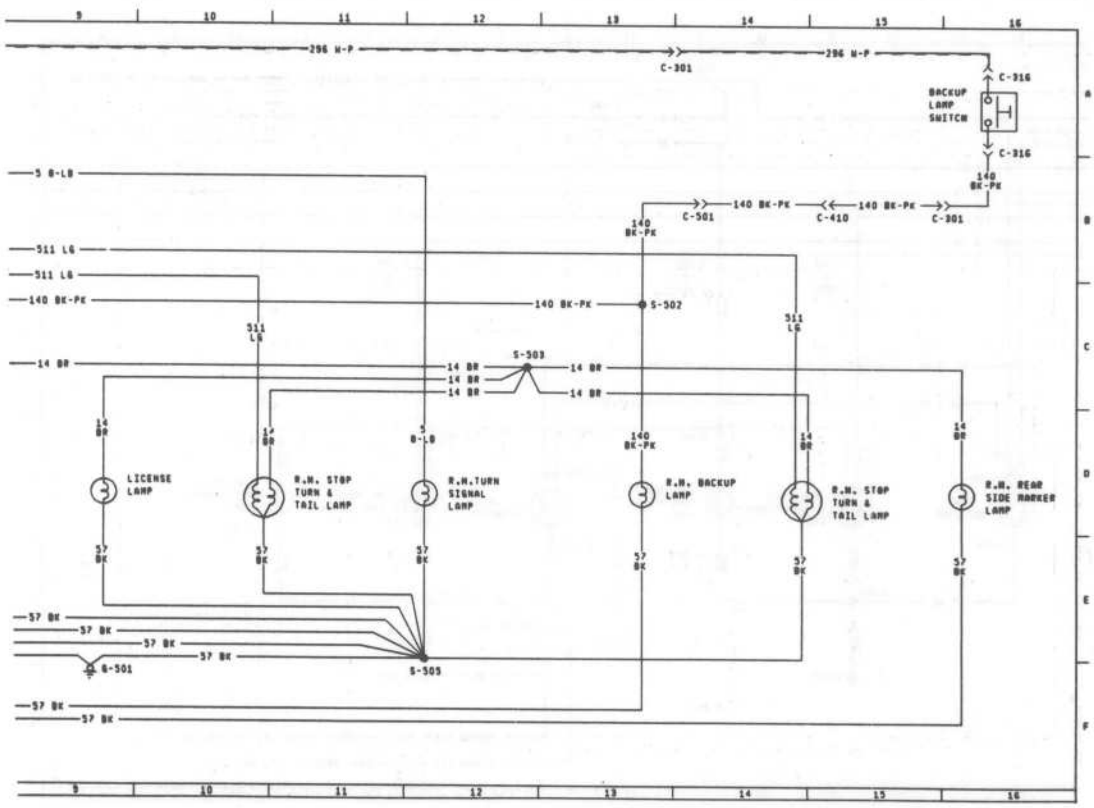
Exterior Lighting



1975 MUSTANG II — PAGE 5

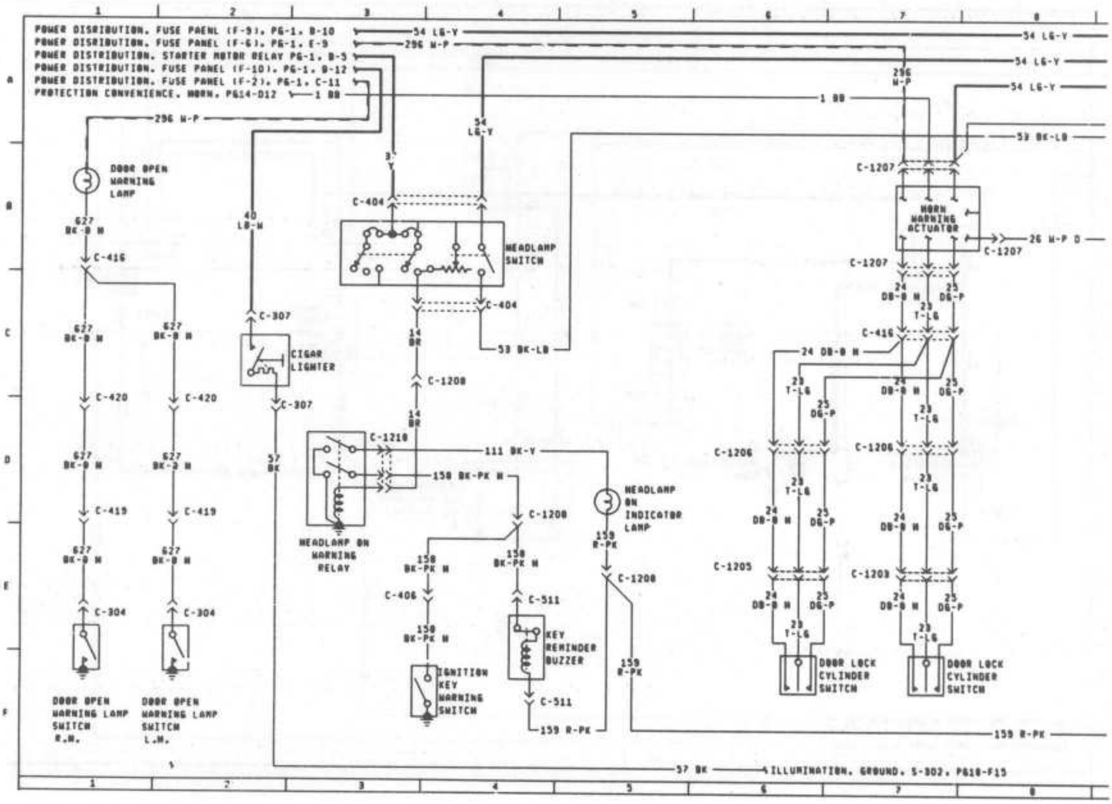
Exterior Lighting

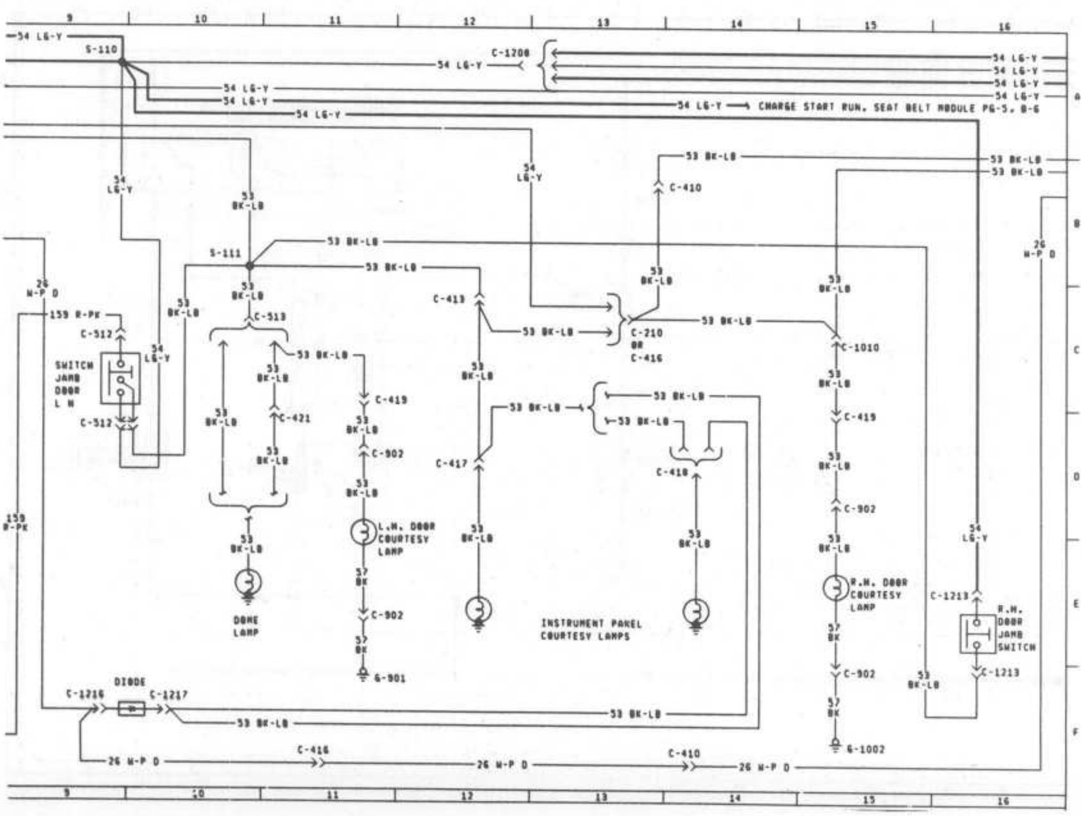




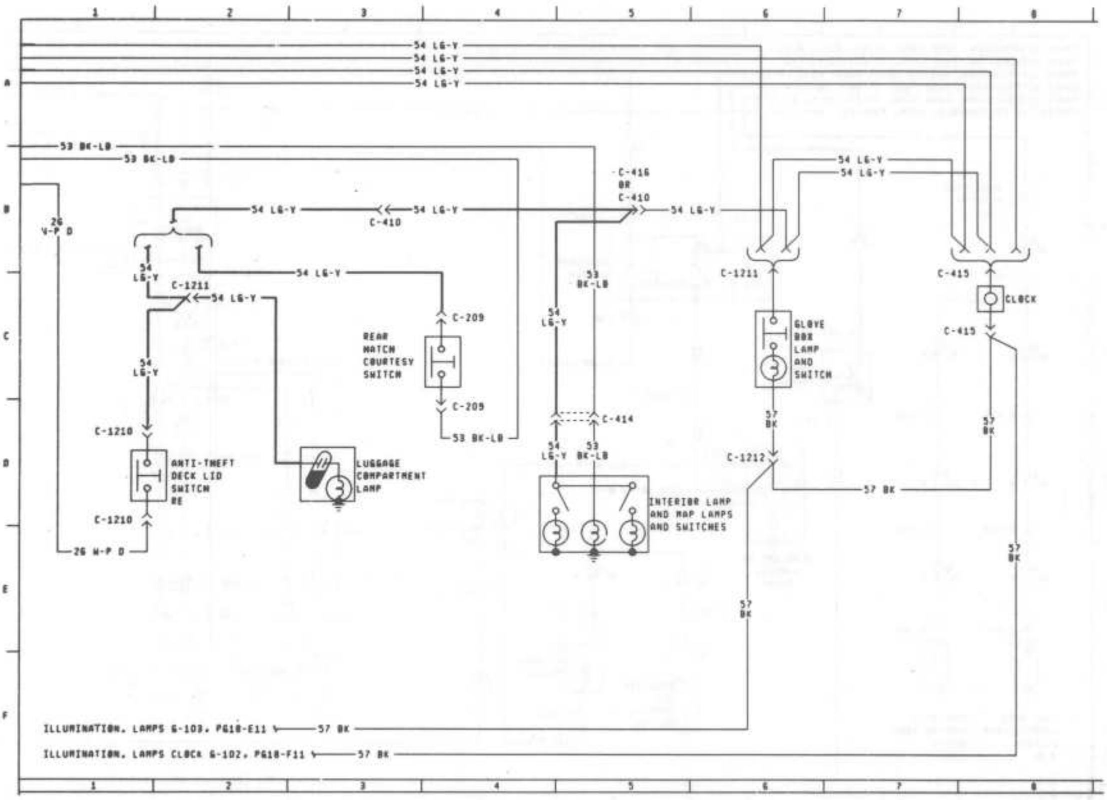
1975 MUSTANG II — PAGE 6

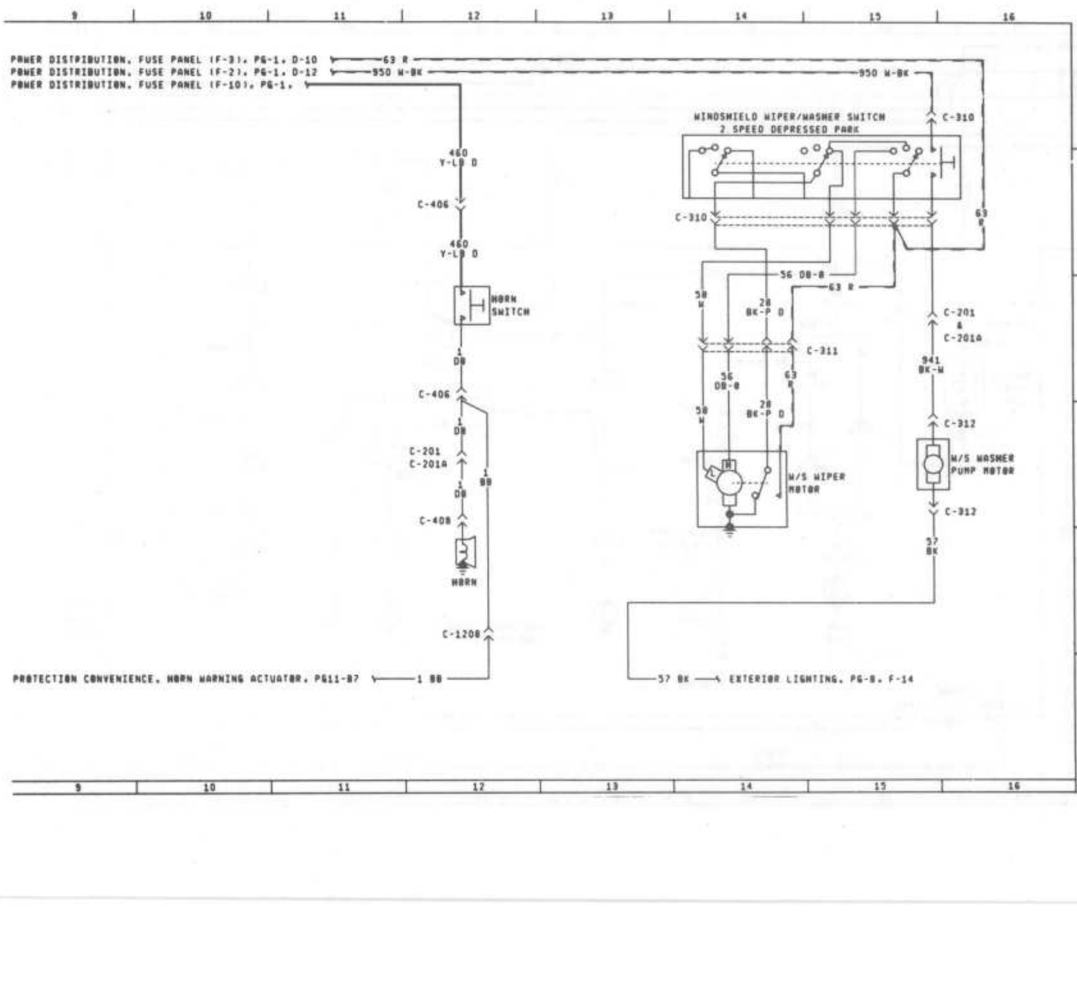
Protection and Convenience





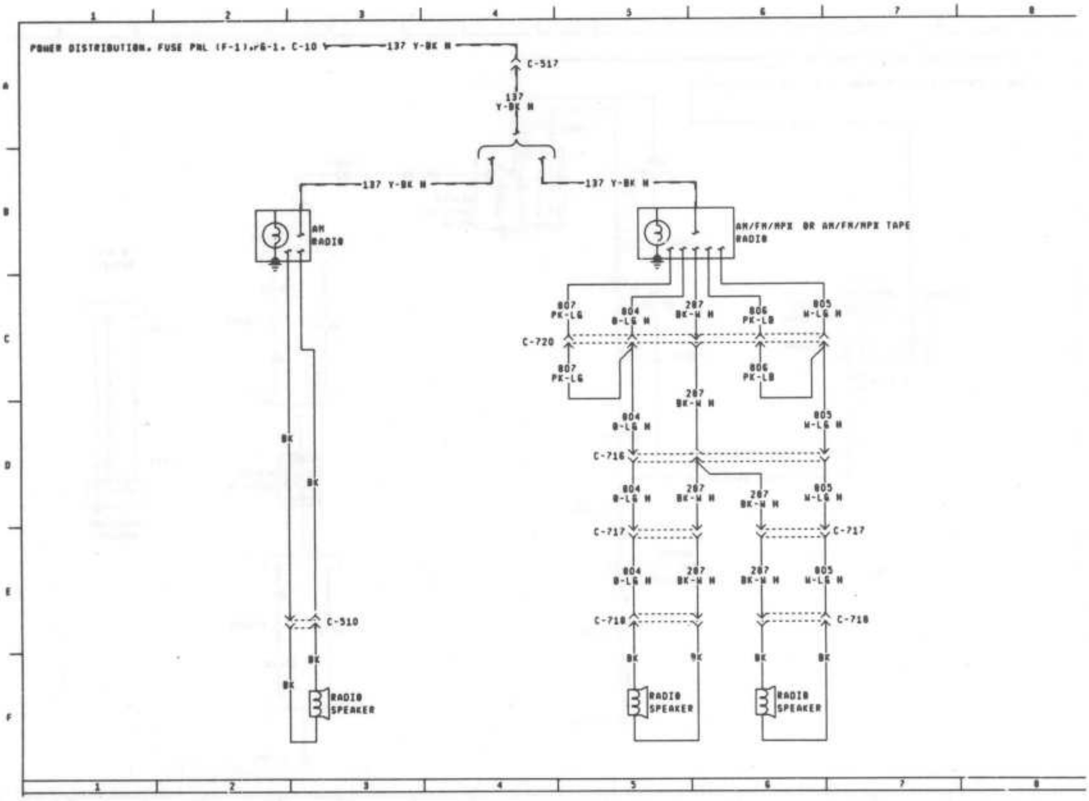
Protection and Convenience; Windshield Wiper/Washer

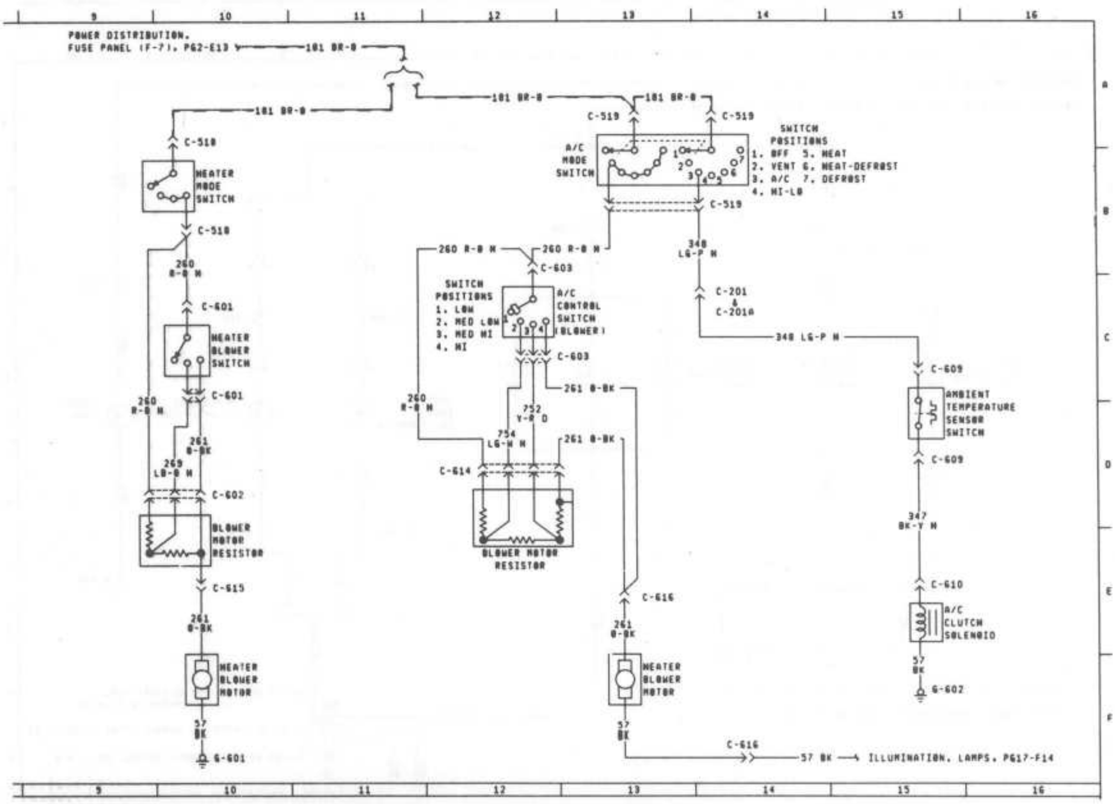




1975 MUSTANG II — PAGE 8

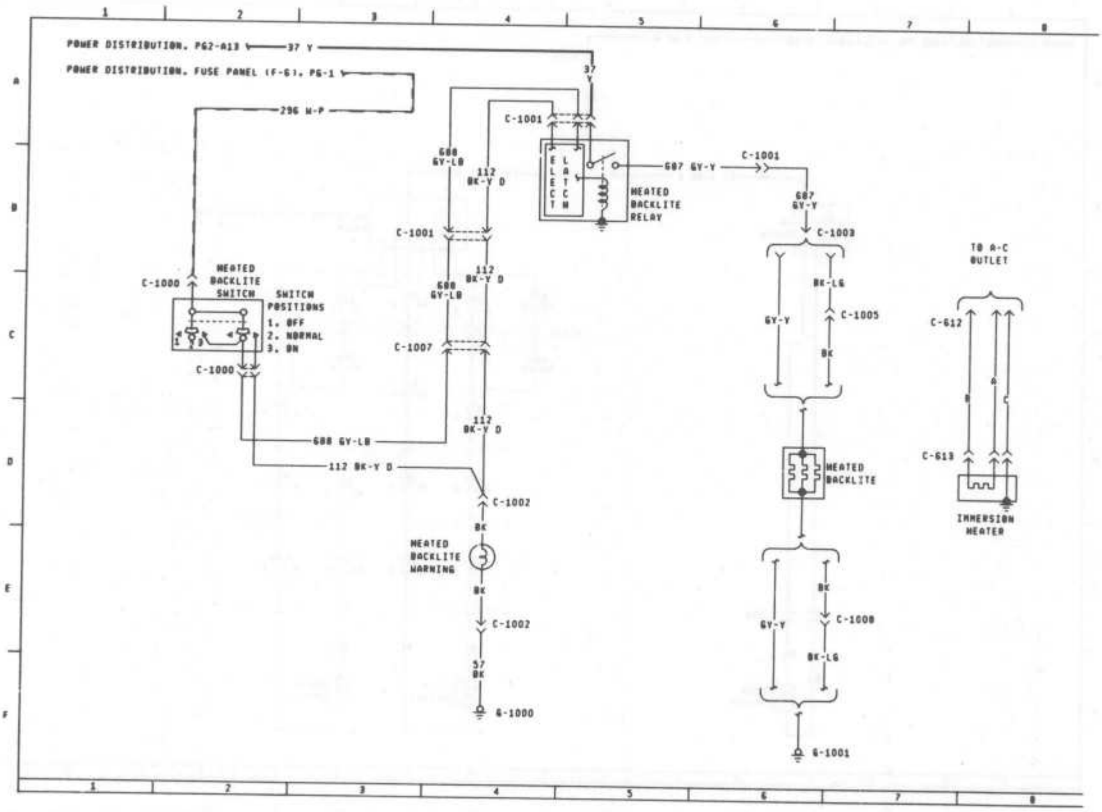
Radio, Air Conditioner/Heater

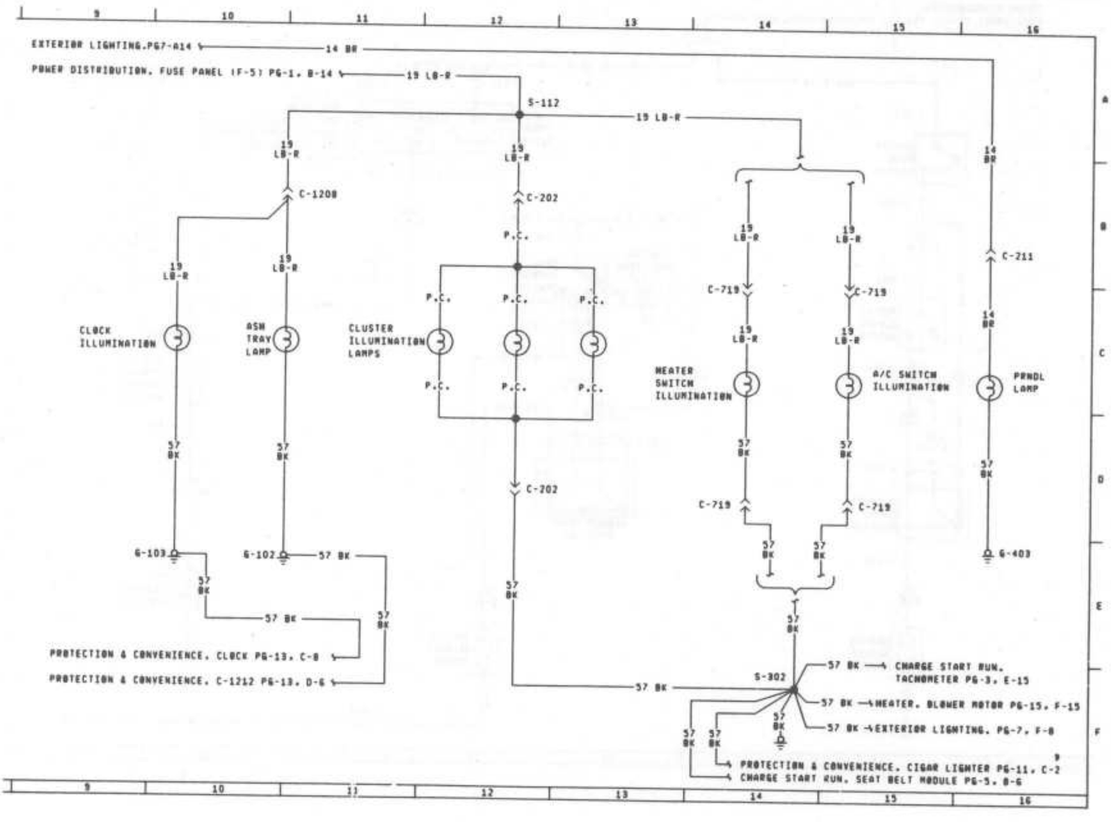




1975 MUSTANG II — PAGE 9

Heated Backlite, Immersion Heater, and Illumination Lamps





1976 MUSTANG II — KEY

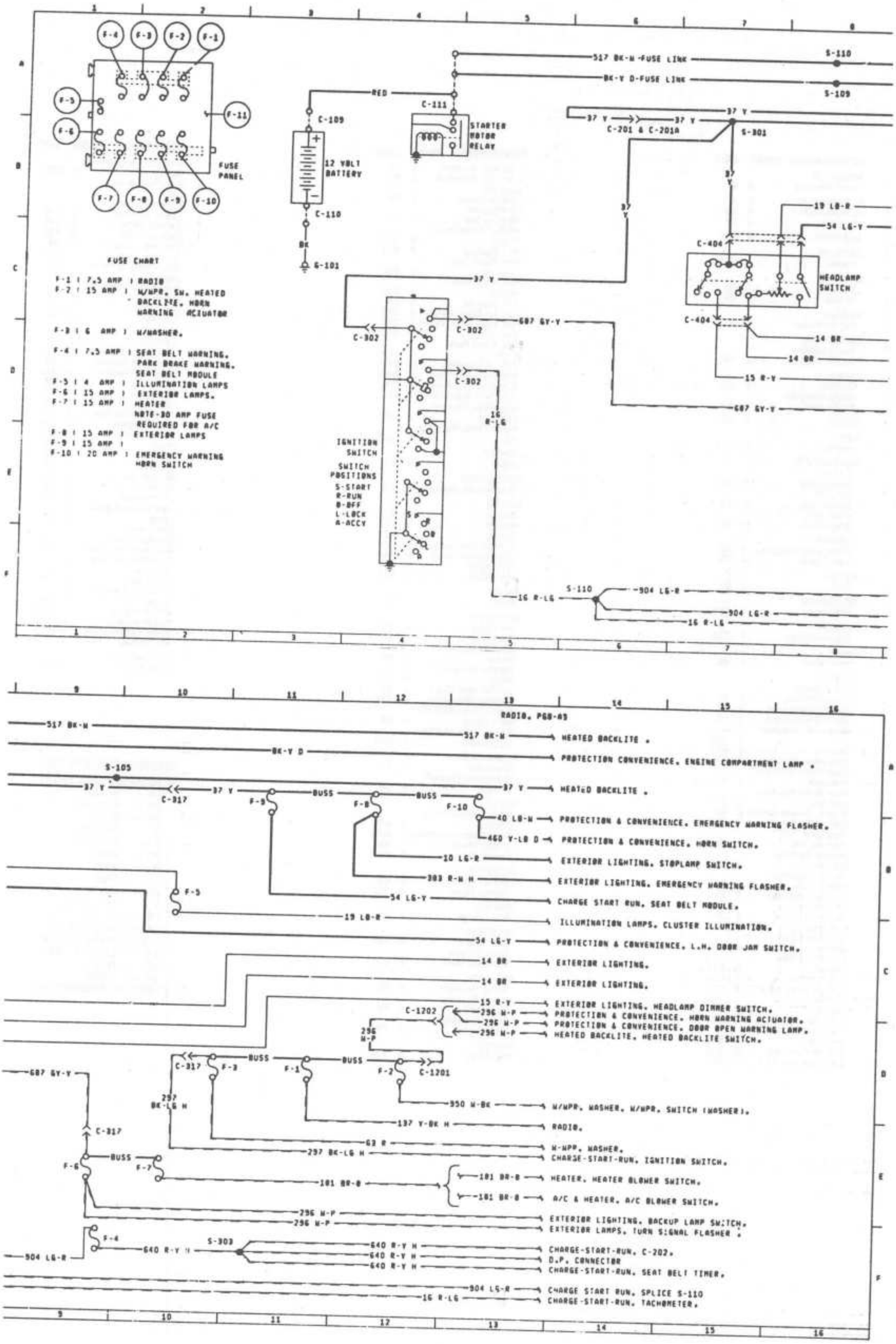
COMPONENT	PAGE	LOC
ACTUATOR		
Horn Warning	6	B7
ALTERNATOR	2	A1
ALTERNATOR	2	B4
61 Amp.	2	B3
AMMETER	3	C8
BACKLITE		
Heated	3	D14
BATTERY		
12 Volt	1	B3
12 Volt	2	B5
BUZZER		
Key Reminder	6	E4
CAPACITOR		
Radio Ignition Interference	2	F3
CHOKE		
Electric	2	C3
Radio Receiver Suppression	3	D6
CLOCK	7	C6
COIL		
Ignition	2	E11
DISTRIBUTOR		
2.3 Liter Breakerless	2	D5
2.8 Liter Breakerless	2	E4
8 Cyl. 302 Breakerless	2	F5
FLASHER		
Emergency Warning	4	C7
Turn Signal	4	C6
GAUGE		
Fuel	3	B6
GOVERNOR		
W/S Wiper	7	C10
HEATER		
Engine Block	3	D16
HORN		
Low Pitch	8	E8
LAMP		
A/C & Heater Controls Illum.	9	C7
Clock Illumination	9	D1
Clock Illumination	9	D4
Cluster Illumination (4)	9	C13
Dome	6	E10
Dome/Map Switches	7	D4
Door Open Warning Indicator	6	B1
Dual Brake Warning Indicator	2	B13
Engine Compartment	6	B3
Glove Box Switch	7	C6
Headlamp "ON" Warning Ind.	6	D5
Heated Backlite Warning Ind.	3	E12
Heater Controls Illumination	9	C6
Hi Beam Indicator	4	E1
I/P Ash Tray Illumination	9	D3
L.H. Backup	5	D4
L.H. Front Door Courtesy	6	D11
L.H. Front Side Marker	4	D11
L.H. License	5	D8
L.H. Lo Beam Head	4	D9
L.H. Rear Side Marker	5	D1
L.H. T/S	5	D5
L.H. Front Park and T/S	4	D10
L.H. I/P Courtesy	6	E13
L.H. Stop and Park	5	D2
L.H. Stop an Park	5	D6
L.H. Turn Indicator	4	E4
Luggage Compartment	7	D2
Oil Pressure Warning Ind.	2	C14
PRNDL Illumination (Floor)	9	C15
R.H. Backup	5	D13
R.H. Front Door Courtesy	6	E15
R.H. Front Side Marker	4	D15
R.H. License	5	D9
R.H. Lo Beam Head	4	D13
R.H. Rear Side Marker	5	D16
R.H. T/S	5	D12
R.H. Front Park & T/S	4	D14
R.H. I/P Courtesy	6	E14
R.H. Stop and Park	5	D10
R.H. Stop and Park	5	D14
R.H. Turn Indicator	4	E5
Seat Belts Warning Indicator	7	E7
Water Temp Warning Ind.	2	C15
LIGHTER		
Cigar	6	C2
MODULATOR		
Breakerless Ignition	2	C10
MOTOR		
Blower	8	E10
Blower	8	E13
Starter	2	B7
W/S Washer Pump	7	F9
W/S Washer Pump	7	D16
W/S Wiper	7	E11
W/S Wiper	7	E14
PANEL		
Fuse	1	A1
RECEIVER		
AM Radio	8	B1
AM Radio	9	D9
AM/FM Monaural Radio	8	B2
AM/FM Monaural Radio	9	D10
AM/FM/MPX Radio	8	B4
AM/FM/MPX Radio	9	D11
Stereo Tape AM/FM/MPX Radio	8	B6
Stereo Tape AM/FM/MPX Radio	9	D12
REGULATOR		
Alternator	2	E1
Instrument Cluster Voltage	3	D6
RELAY		
Back Window Heat Control	3	A13
Headlamp on Warning	6	D3
Starter Motor	1	A4
Starter Motor	2	B6
RESISTOR		
Blower Motor	8	D9
Blower Motor	8	D12
SENDER		
Fuel Gauge	3	D5
SOLENOID		
A/C Clutch	8	E15
Carb. Throttle Emission Cont.	2	C11
SPEAKER		
Radio Receiver	8	E2
Radio Receiver Rear Seat	8	F4
Radio Receiver Rear Seat	8	F6
SWITCH		
A/C Mode	8	A13
Ambient Temperature Sensor	8	C15
Anti-Theft Deck Lid	7	D1
Back Window Heater Control	3	C10
Backup Lamp	5	A16
Backup Lamp	5	A15
Courtesy Lamp	6	C9
Courtesy Lamp	6	E16
Door Open Warning Lamp	6	E1
Door Open Warning Lamp	6	E2
Door Lock Cylinder	6	E6
Door Lock Cylinder	6	E7
Dual Brake Warning	2	E13
Gear Shift Neutral	3	D2
Gear Shift Neutral	5	A13
Headlamp	1	C7
Headlamp	4	C1
Headlamp	6	B5
Headlamp Dimmer	4	D1
Heater Blower	8	C10
Heater Mode	8	B10
Horn	8	B8
Ignition	1	D4
Ignition	3	C4
Ignition Key Warning	6	F4
Oil Pressure	2	E14
Park Brake Signal Lamp	3	D7
Rear Hatch Courtesy Lamp	7	C3
Seat Belt Retractor	7	E8
Seat Belt Warning Indicator	7	C7
Stoplamp	4	C3
Turn and Emergency Signal	4	C4
W/S/W Washer	7	A15
W/S/W Washer	7	B10
Water Temperature	2	E15
A/C Control	8	C12
TACHOMETER		
Solid State	3	F2

WIRING COLOR KEY (PRIMARY COLORS)

BK — BLACK
BR — BROWN
GY — GRAY
O — ORANGE
P — PURPLE
PK — PINK
R — RED
T — TAN
W — WHITE
Y — YELLOW
DB — DARK BLUE
LB — LIGHT BLUE
DG — DARK GREEN
LG — LIGHT GREEN
(D) — DOT
(H) — HASH
STRIPE IS UNDERSTOOD

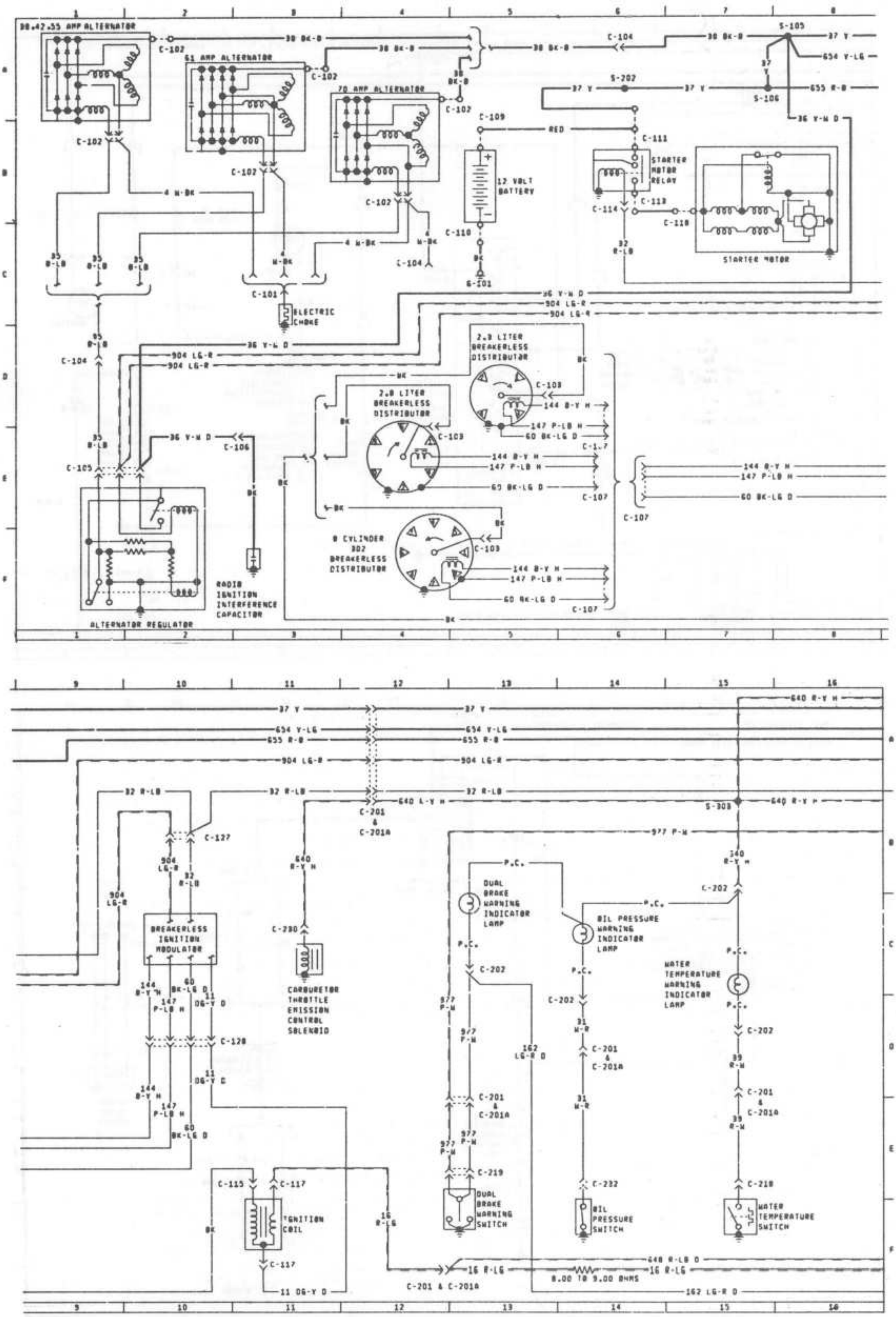
1976 MUSTANG II — PAGE 1

Power Distribution



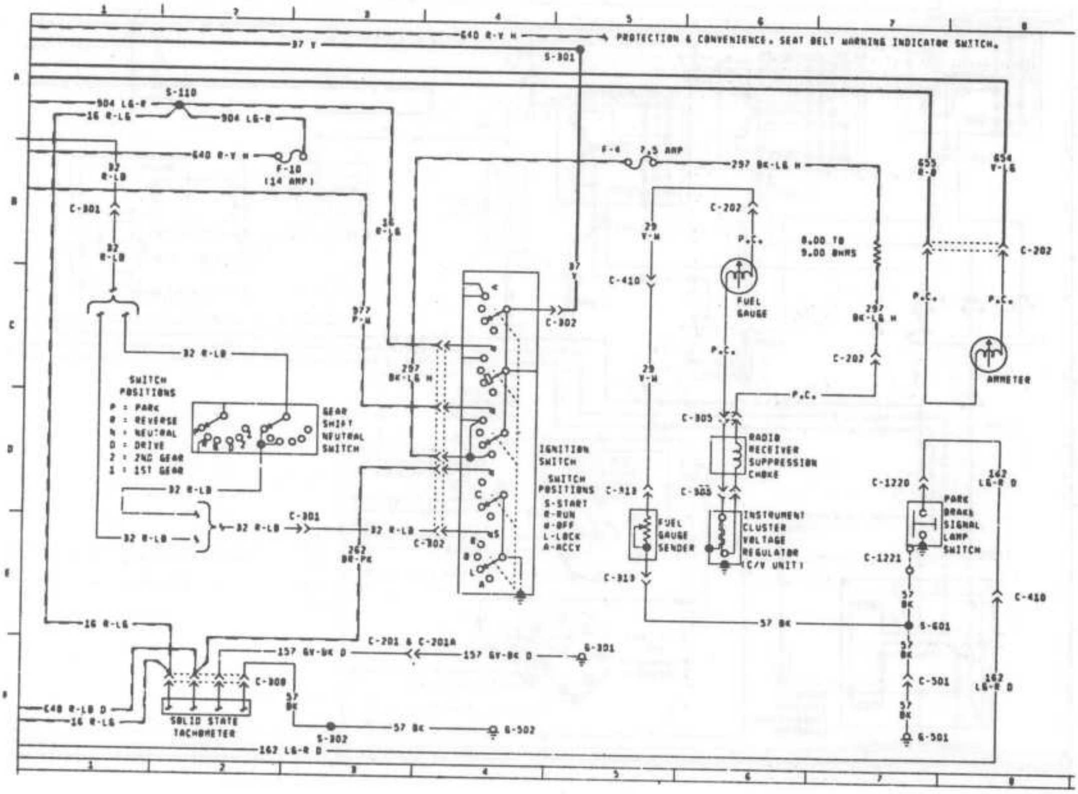
1976 MUSTANG II — PAGE 2

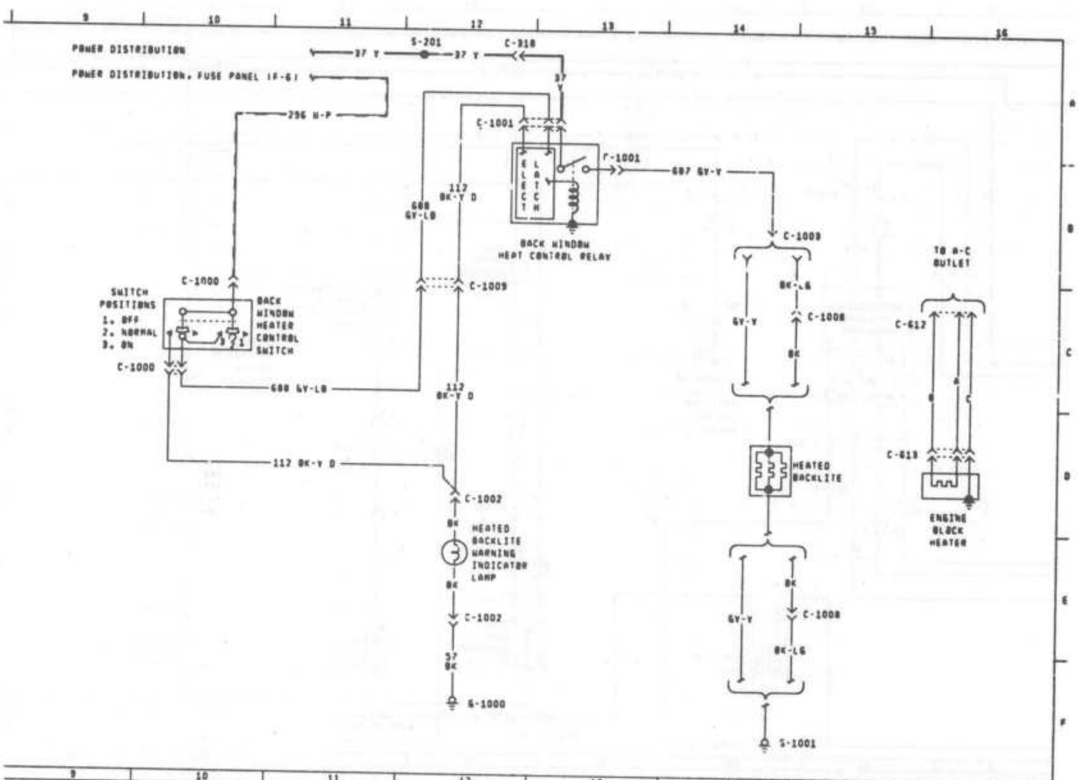
Charge, Start, Run



1976 MUSTANG II — PAGE 3

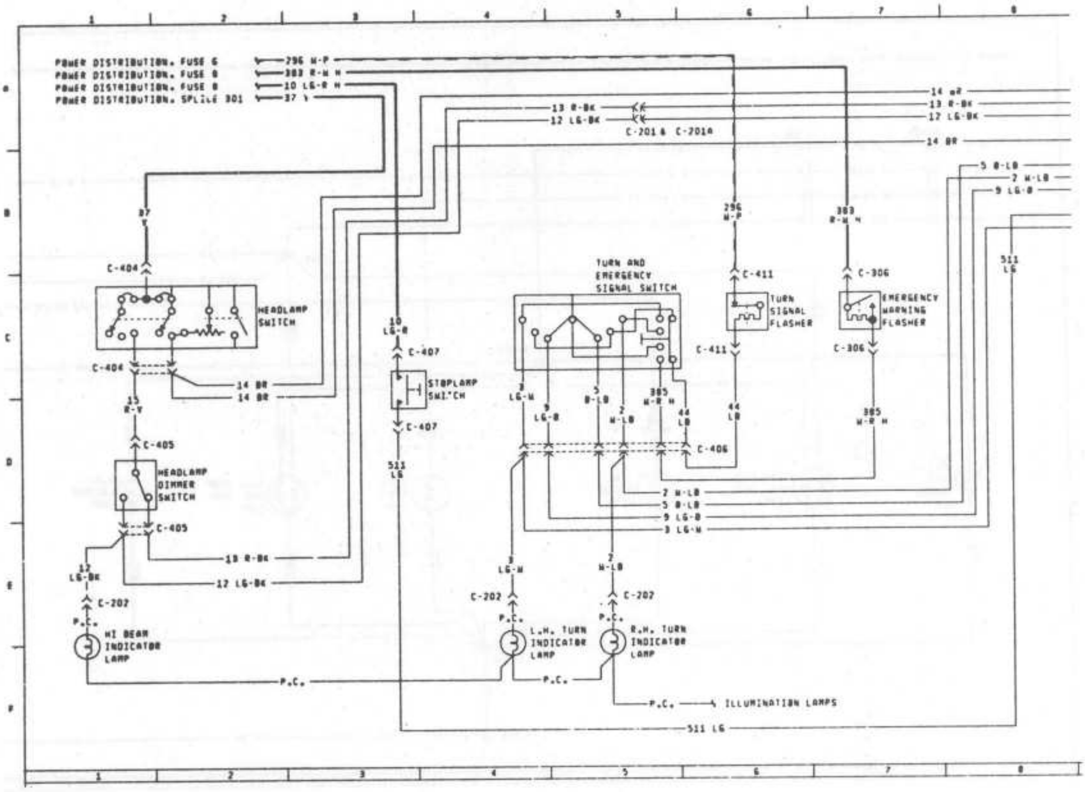
Charge, Start, Run; Heated Backlite; Immersion Heater

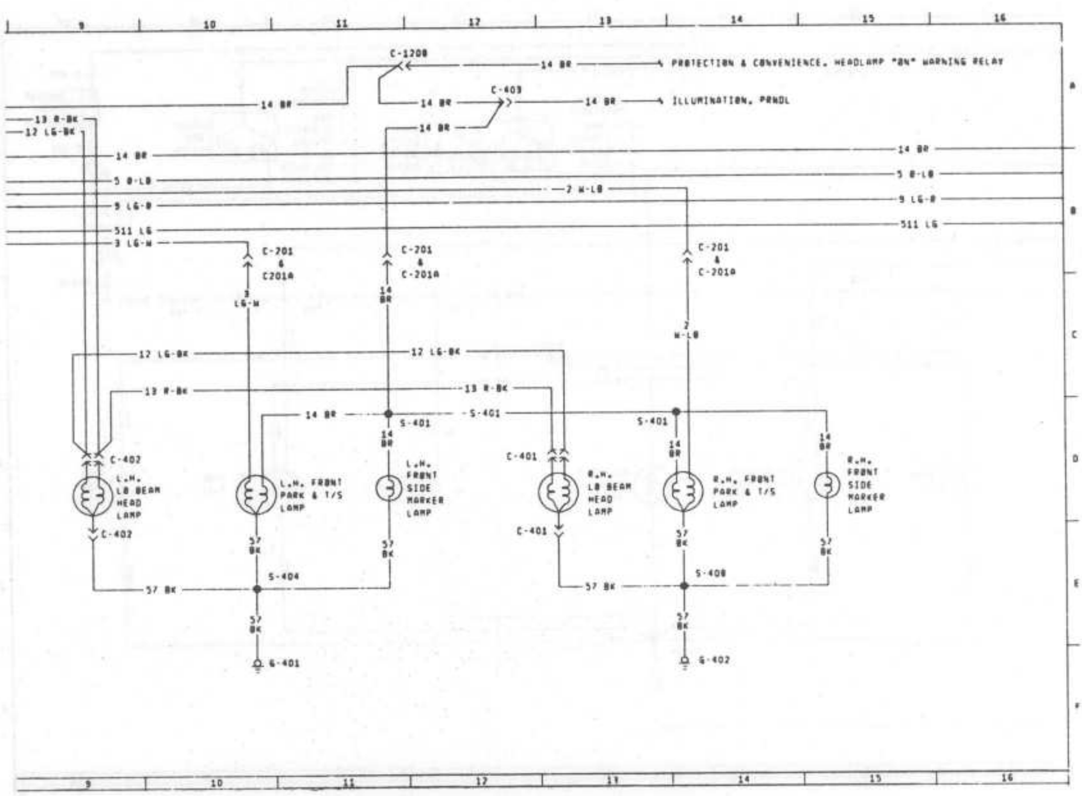


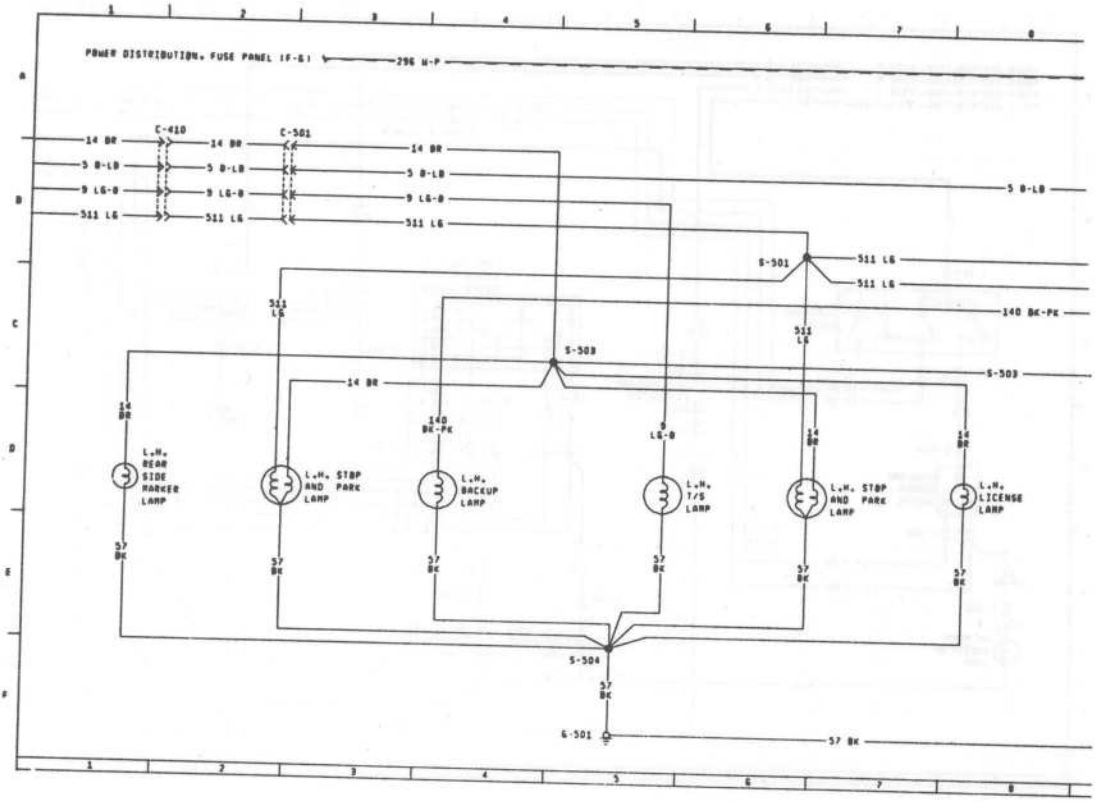
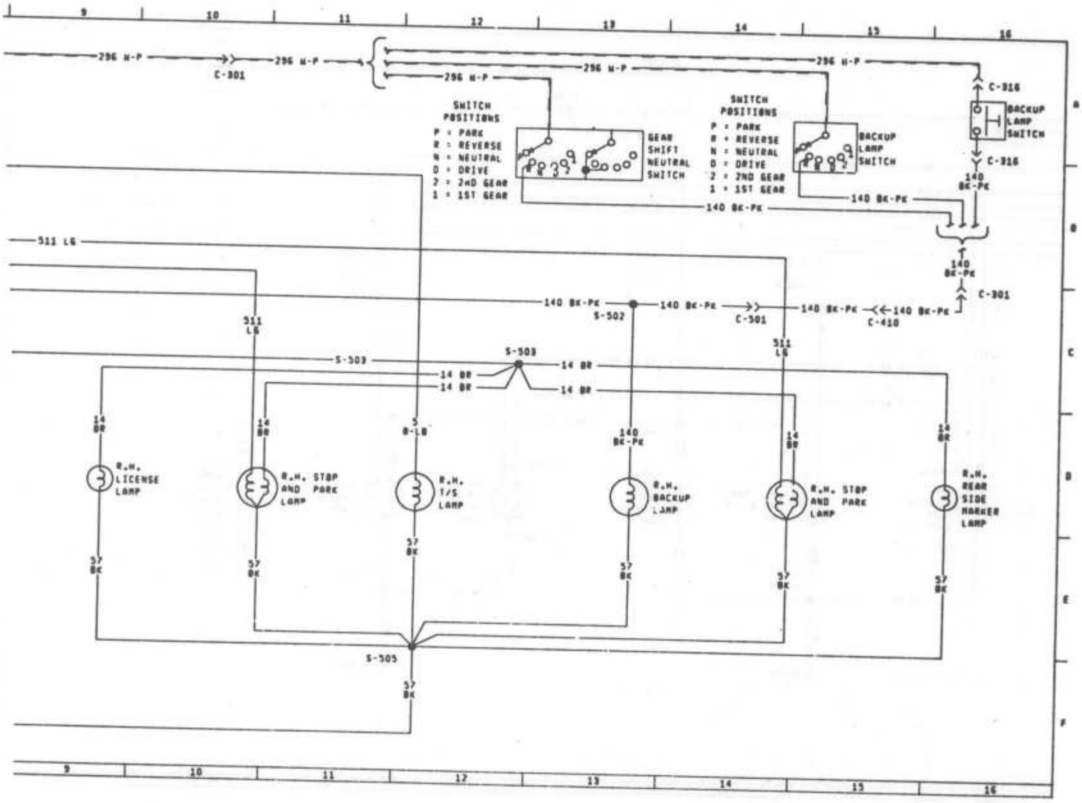


1976 MUSTANG II — PAGE 4

Exterior Lamps

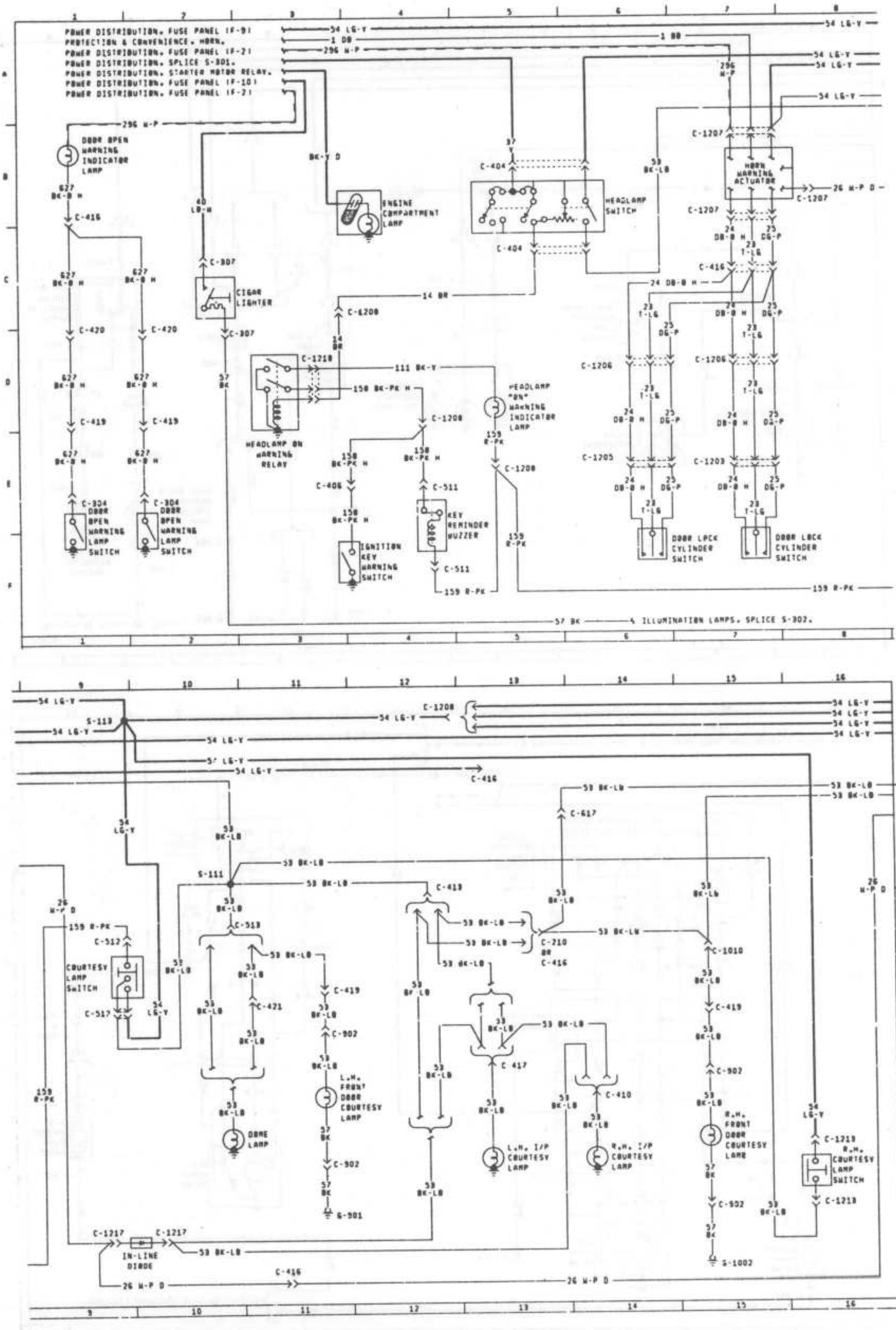




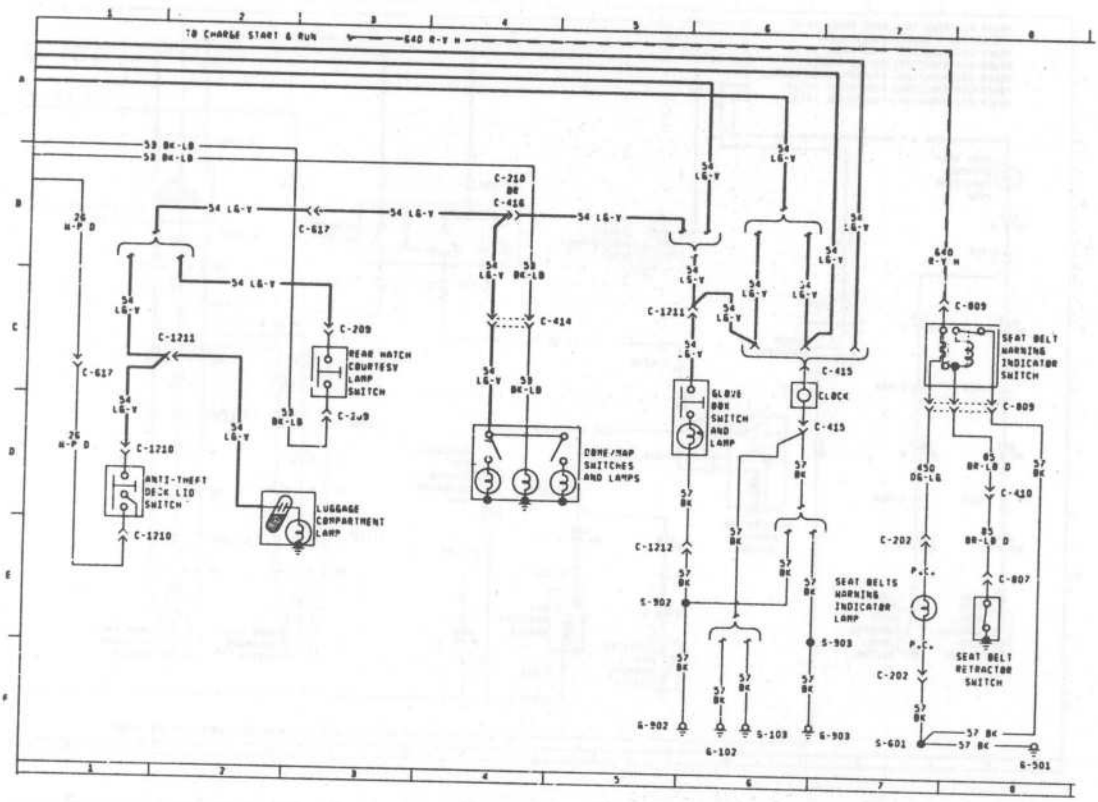

POWER DISTRIBUTION, FUSE PANEL (F-6)
296 W-P
C-410
C-501
14 BR
5 B-LB
9 LG-B
511 LG
S-501
140 BK-PK
S-503
L.H. REAR SIDE MARKER LAMP
L.H. STOP AND PARK LAMP
L.H. BACKUP LAMP
L.H. T/S LAMP
L.H. STOP AND PARK LAMP
L.H. LICENSE LAMP
57 BK
S-504
G-501

296 W-P
C-301
SWITCH POSITIONS
P = PARK
R = REVERSE
N = NEUTRAL
D = DRIVE
2 = 2ND GEAR
1 = 1ST GEAR
GEAR SHIFT NEUTRAL SWITCH
BACKUP LAMP SWITCH
C-316
140 BK-PK
511 LG
S-502
C-501
C-410
S-503
14 BR
5 B-LB
R.H. LICENSE LAMP
R.H. STOP AND PARK LAMP
R.H. T/S LAMP
R.H. BACKUP LAMP
R.H. STOP AND PARK LAMP
R.H. REAR SIDE MARKER LAMP
57 BK
S-505

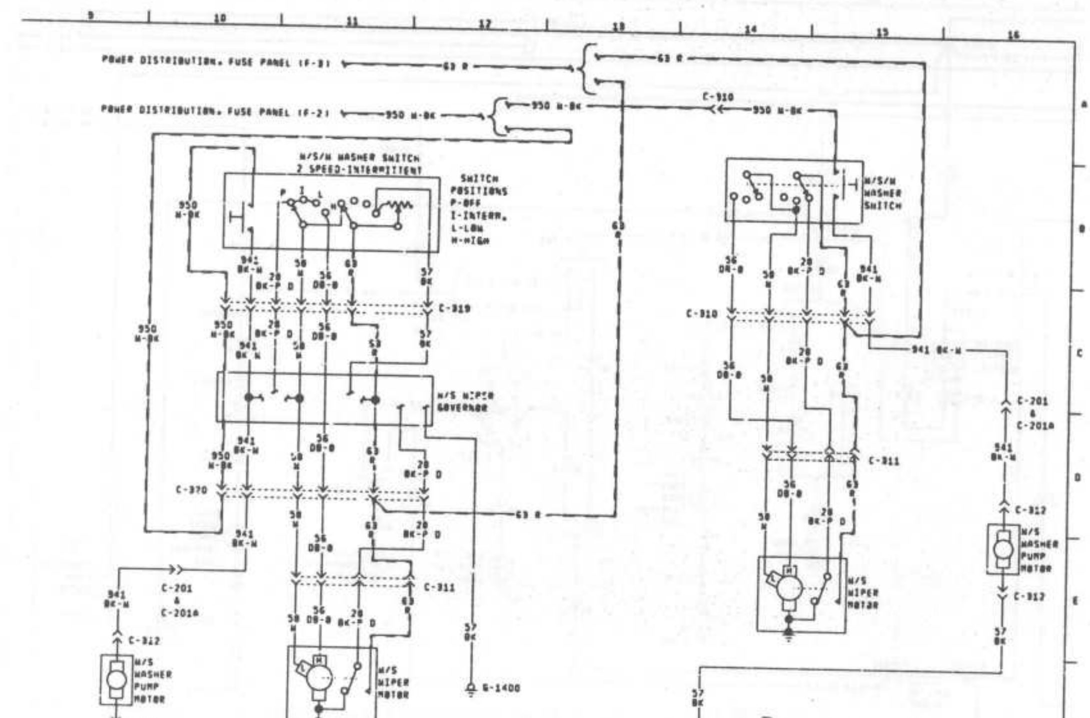
1976 MUSTANG II — PAGE 6

Protection and Convenience; Engine Compartment Light



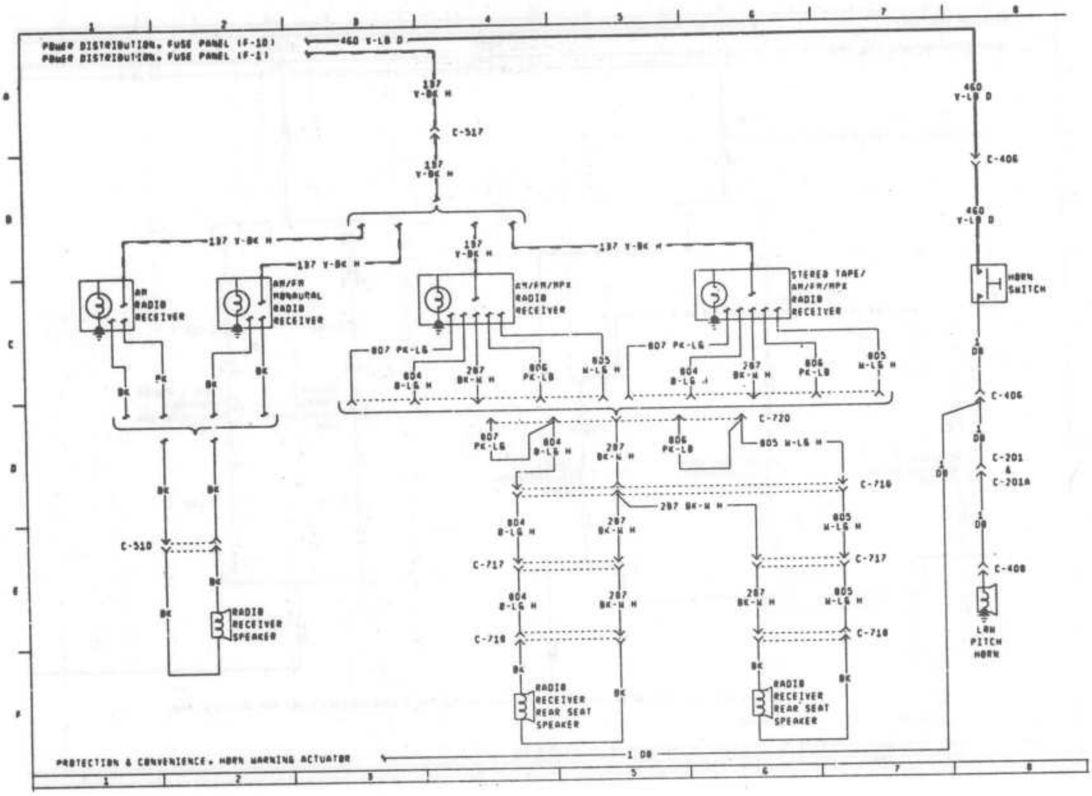
Protection and Convenience; Windshield Wiper/Washer

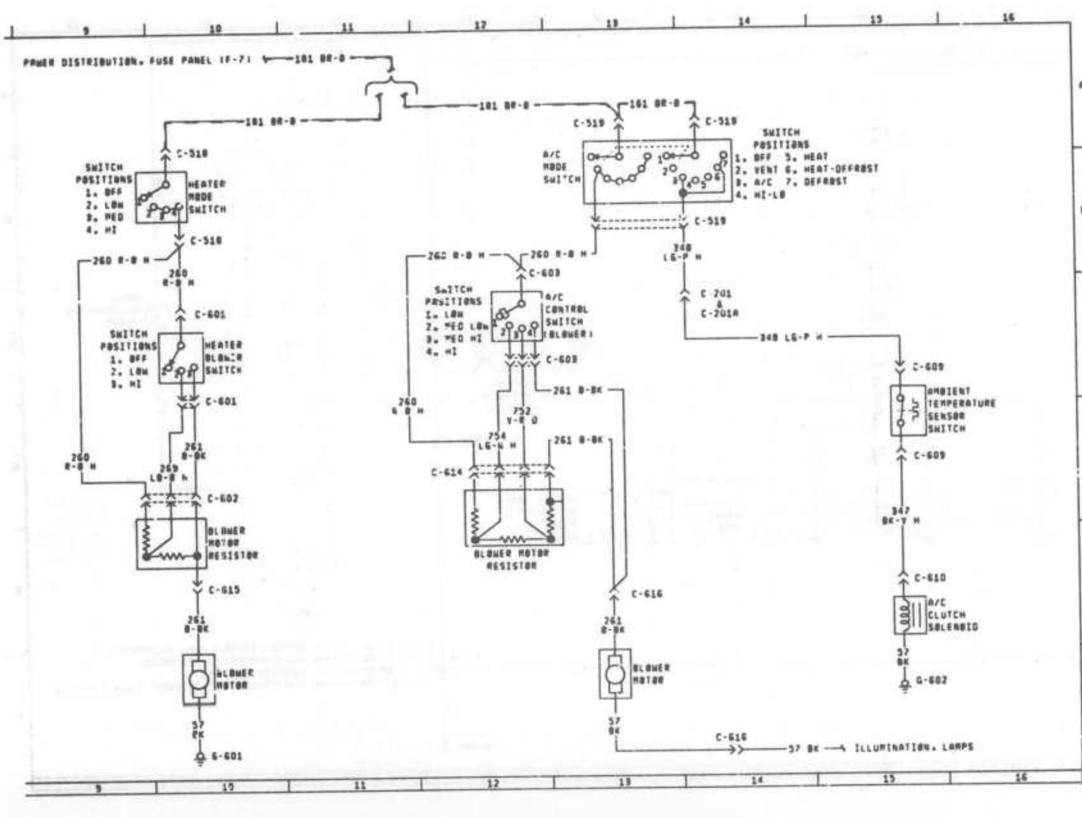




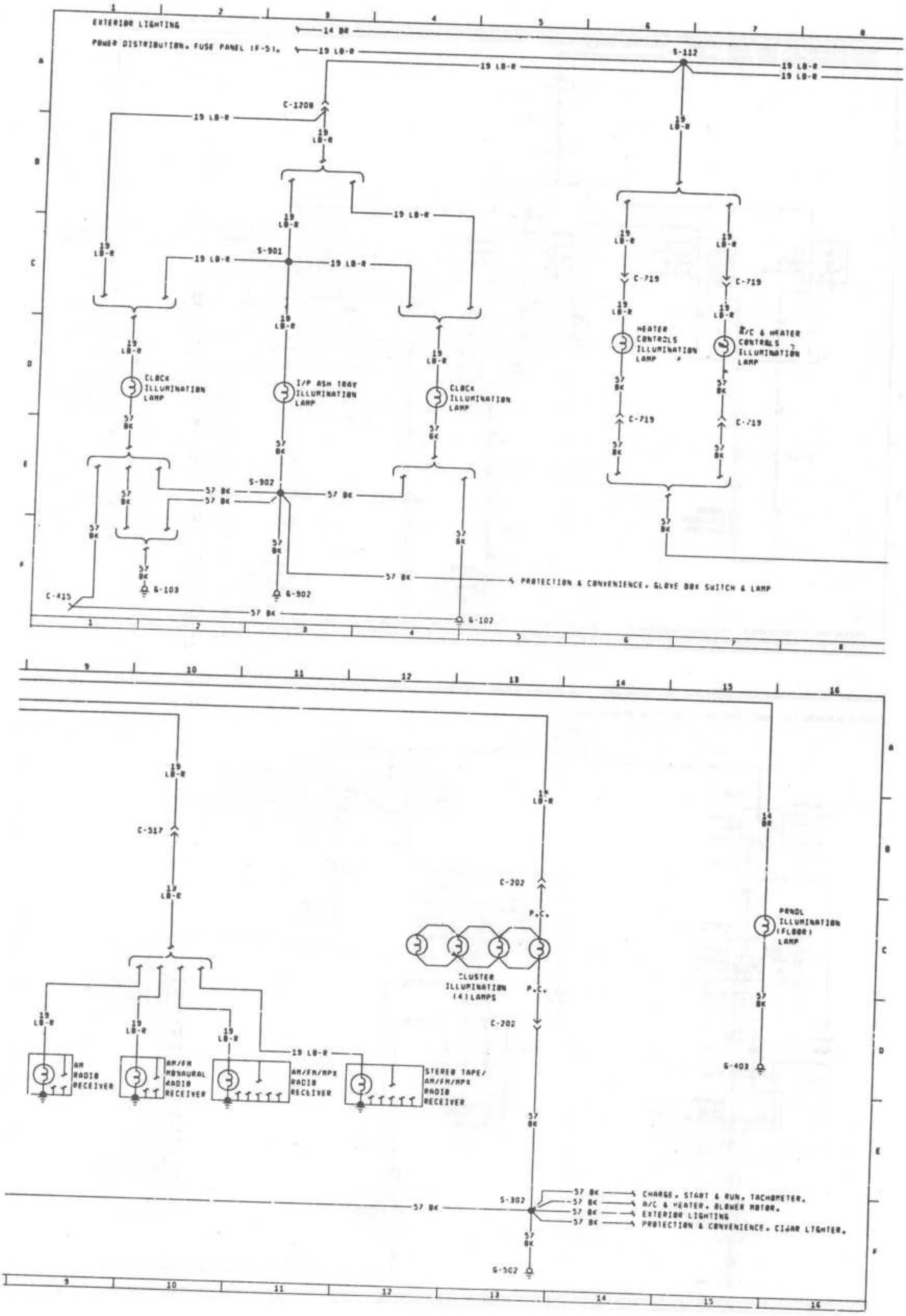
1976 MUSTANG II — PAGE 8

Radio, Horn, Air Conditioner and/or Heater





1976 MUSTANG II — PAGE 9
Illumination Lamps



1977 MUSTANG II — KEY

ALTERNATOR..........................2 A1
ALTERNATOR..........................2 B4
  61 AMP............................2 B3

AMMETER.............................3 C8

BACKLITE
  HEATED............................3 D14

BATTERY
  12 VOLT...........................1 B3
  12 VOLT...........................2 B5

BUZZER
  KEY REMINDER......................6 E4

CAPACITOR
  RADIO IGNITION INTERFERENCE.......2 F3
  RADIO VOLTAGE REGULATOR...........2 D12

CHOKE
  ELECTRIC..........................2 C3
  RADIO RECEIVER SUPPRESSION........3 D6

CLOCK...............................6 C15

COIL
  IGNITION..........................2 E11

CONTROL
  TACHOMETER SIGNAL.................3 E2

DISTRIBUTOR
  2.3 LITER BREAKERLESS.............2 D5
  2.8 LITER BREAKERLESS.............2 E4
  8 CYL 302 BREAKERLESS.............2 F5

FLASHER
  EMERGENCY WARNING.................4 C7
  TURN SIGNAL.......................4 C6

GAUGE
  FUEL..............................3 B6

GOVERNOR
  W/S WIPER.........................7 C10

HEATER
  ENGINE BLOCK......................3 D16

HORN
  LOW PITCH.........................8 E8

LAMP
  A/C & HEATER CONTROLS ILLUM.......9 C7
  CLOCK ILLUMINATION................9 D4
  CLUSTER ILLUMINATION (4)..........9 C13
  DOME..............................6 E6
  DOME/MAP SWITCHES.................6 D13
  DOOR OPEN WARNING INDICATOR.......6 B1
  DUAL BRAKE WARNING INDICATOR......2 B13
  ENGINE COMPARTMENT................6 B3
  GLOVE BOX SWITCH..................6 D14
  HEADLAMP "ON" WARNING IND.........6 D5
  HEATED BACKLITE WARNING IND.......3 E12

LAMP
CONTINUED...
  HEATER CONTROLS ILLUMINATION......9 C6
  HI BEAM INDICATOR.................4 E1
  I/P ASH TRAY ILLUMINATION.........9 D3
  L.H. BACKUP.......................5 D4
  L.H. FRONT SIDE MARKER............4 D11
  L.H. LICENSE......................5 D8
  L.H. LO BEAM HEAD.................4 D9
  L.H. REAR SIDE MARKER.............5 D1
  L.H. T/S..........................5 D5
  L.H. FRONT PARK & T/S.............4 D10
  L.H. I/P COURTESY.................6 F7
  L.H. STOP AND PARK................5 D2
  L.H. STOP AND PARK................5 D6
  L.H. TURN INDICATOR...............4 E4
  LUGGAGE COMPARTMENT...............6 C11
  OIL PRESSURE WARNING IND..........2 B14
  PRNDL ILLUMINATION (FLOOR)........9 C15
  R.H. BACKUP.......................5 D13
  R.H. FRONT SIDE MARKER............4 D15
  R.H. LICENSE......................5 D9
  R.H. LO BEAM HEAD.................4 D13
  R.H. REAR SIDE MARKER.............5 D16
  R.H. T/S..........................5 D12
  R.H. FRONT PARK & T/S.............4 D14
  R.H. I/P COURTESY.................6 F8
  R.H. STOP AND PARK................5 D10
  R.H. STOP AND PARK................5 D14
  R.H. TURN INDICATOR...............4 E5
  SEAT BELTS WARNING INDICATOR......7 D3
  WATER TEMP WARNING IND............2 B15

LIGHTER
  CIGAR.............................6 C2

MODULATOR
  BREAKERLESS IGNITION..............2 C10

MOTOR
  BLOWER............................8 E10
  BLOWER............................8 E13
  STARTER...........................2 B7
  W/S WASHER PUMP...................7 F9
  W/S WASHER PUMP...................7 D16
  W/S WIPER.........................7 E11
  W/S WIPER.........................7 E14

PANEL
  FUSE..............................1 A1

RECEIVER
  AM RADIO..........................8 B1
  AM RADIO..........................9 D9
  AM/FM MONAURAL RADIO..............8 B2
  AM/FM MONAURAL RADIO..............9 D10
  AM/FM/MPX RADIO...................8 B4
  AM/FM/MPX RADIO...................9 D11
  STEREO TAPE/ AM/FM/MPX RADIO......8 B6
  STEREO TAPE/ AM/FM/MPX RADIO......9 D12

REGULATOR
  ALTERNATOR........................2 E1
  INSTRUMENT CLUSTER VOLTAGE........3 D6

RELAY
  BACK WINDOW HEAT CONTROL..........3 A12
  HEADLAMP ON WARNING...............6 D3
  STARTER MOTOR.....................1 A4
  STARTER MOTOR.....................2 B6

RESISTOR
  BLOWER MOTOR......................8 D9
  BLOWER MOTOR......................8 D12

SENDER
  A.T.C. WATER TEMP IND SW &........2 E15
  FUEL GAUGE........................3 D5

SOLENOID
  A/C CLUTCH........................8 E14
  A/C CLUTCH........................8 E16
  CARB THROTTLE EMISSION CONT.......2 D16
  CARBURETOR VALVE CONTROL..........2 C11

SPEAKER
  RADIO RECEIVER....................8 E2
  RADIO RECEIVER REAR SEAT..........8 F4
  RADIO RECEIVER REAR SEAT..........8 F6

SWITCH
  A/C MODE..........................8 A13
  AMBIENT TEMPERATURE SENSOR........8 C14
  BACK WINDOW HEATER CONTROL........3 C10
  BACKUP LAMP.......................5 A16
  BACKUP LAMP.......................5 A15
  COURTESY LAMP.....................6 D6
  COURTESY LAMP.....................6 D7
  DOOR OPEN WARNING LAMP............6 E1
  DOOR OPEN WARNING LAMP............6 E2
  DUAL BRAKE WARNING................2 E13
  GEAR SHIFT NEUTRAL................3 C2
  GEAR SHIFT NEUTRAL................5 A13
  HEADLAMP..........................1 C7
  HEADLAMP..........................4 C1
  HEADLAMP..........................6 B5
  HEADLAMP DIMMER...................4 D1
  HEATER BLOWER.....................8 C10
  HEATER MODE.......................8 B10
  HORN..............................8 B8
  IGNITION..........................1 D4
  IGNITION..........................3 C4
  IGNITION KEY WARNING..............6 F4
  OIL PRESSURE......................2 F14
  PARK BRAKE SIGNAL LAMP............3 D7
  REAR HATCH COURTESY LAMP..........6 C10
  SEAT BELT BUCKLE..................7 E3
  SEAT BELT WARNING INDICATOR.......7 B3
  STOPLAMP..........................4 C3
  TURN AND EMERGENCY SIGNAL.........4 C4
  W/S/W WASHER......................7 B10
  W/S/W WASHER......................7 A15
  WATER TEMPERATURE.................2 E16
  A/C CONTROL.......................8 C12

TACHOMETER..........................3 F1

BULB CHART

LAMP DESCRIPTION	TRADE NUMBER
A/C & HEATER CONTROLS ILLUM	161
CLOCK ILLUMINATION	194
CLUSTER ILLUMINATION (4)	194
DOME	212-2
DOME/MAP SWITCHES	212-2
DOOR OPEN WARNING INDICATOR	194
DUAL BRAKE WARNING INDICATOR	194
ENGINE COMPARTMENT	89
GLOVE BOX SWITCH	1816
HEADLAMP "ON" WARNING IND	194
HEATED BACKLITE WARNING IND	2162
HEATER CONTROLS ILLUMINATION	161
HI BEAM INDICATOR	194
I/P ASH TRAY ILLUMINATION	1892
L.H. BACKUP	1156
L.H. FRONT SIDE MARKER	194
L.H. LICENSE	168
L.H. LO BEAM HEAD	6014
L.H. REAR SIDE MARKER	194
L.H. T/S	1156
L.H. FRONT PARK & T/S	1157
L.H. I/P COURTESY	89

BULB CHART

LAMP DESCRIPTION	TRADE NUMBER
L.H. STOP AND PARK	1157
L.H. TURN INDICATOR	194
LUGGAGE COMPARTMENT	89
OIL PRESSURE WARNING IND	194
PRNDL ILLUMINATION (FLOOR)	1893
R.H. BACKUP	1156
R.H. FRONT SIDE MARKER	194
R.H. LICENSE	168
R.H. LO BEAM HEAD	6014
R.H. REAR SIDE MARKER	194
R.H. T/S	1156
R.H. FRONT PARK & T/S	1157
R.H. I/P COURTESY	89
R.H. STOP AND PARK	1157
R.H. TURN INDICATOR	194
SEAT BELTS WARNING INDICATOR	194
WATER TEMP WARNING IND	194
AM RADIO	1893
AM/FM MONAURAL RADIO	1893
AM/FM/MPX RADIO	1892
AM/FM/MPX RADIO	1893
STEREO TAPE/ AM/FM/MPX RADIO	37

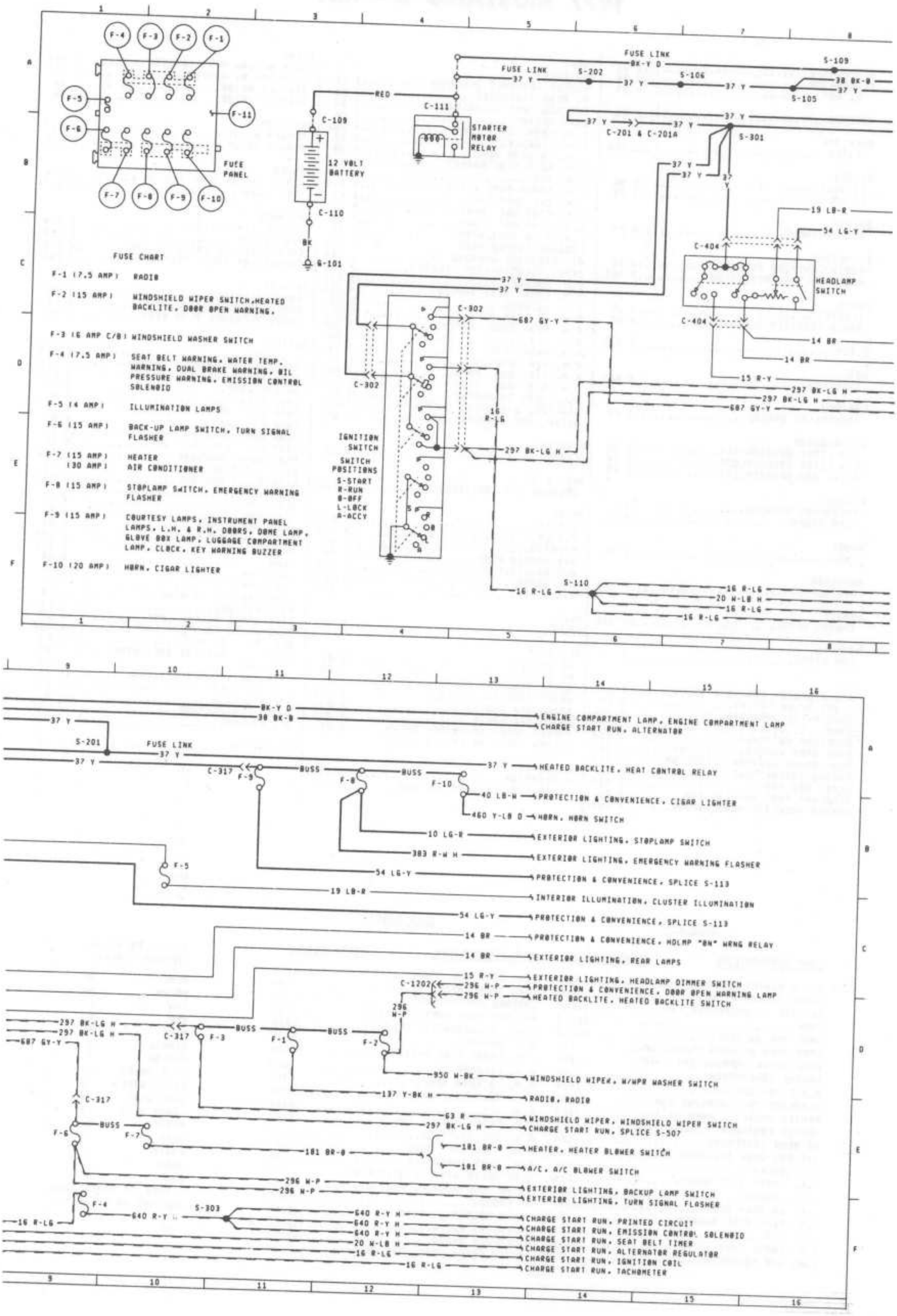
WIRING COLOR KEY
PRIMARY COLORS

BLACK	BK
BROWN	BR
TAN	T
RED	R
PINK	PK
ORANGE	O
YELLOW	Y
DARK GREEN	DG
LIGHT GREEN	LG
DARK BLUE	DB
LIGHT BLUE	LB
PURPLE	P
GRAY	GY
WHITE	W
HASH	(H)
DOT	(D)

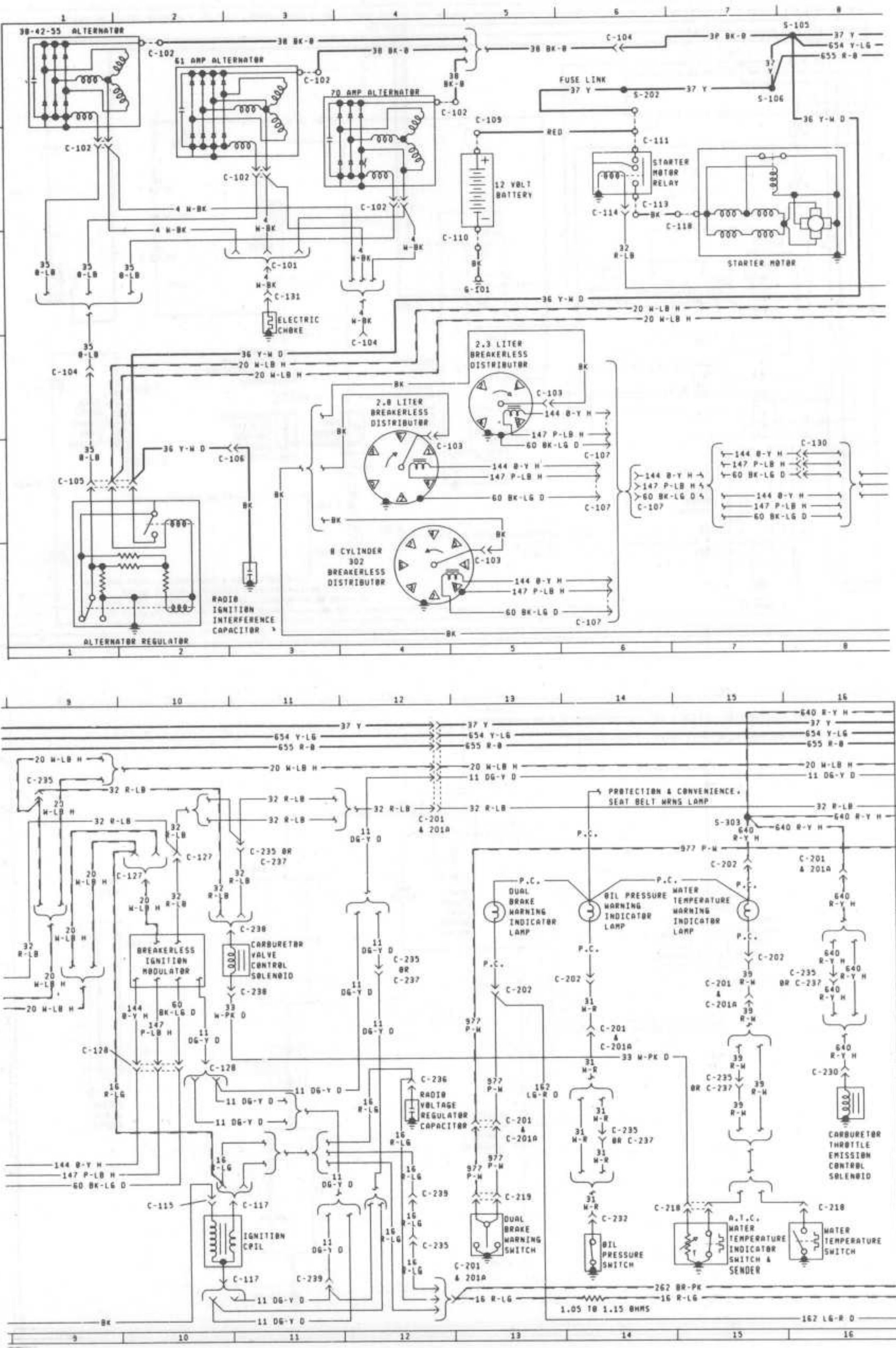
STRIPE IS UNDERSTOOD AND HAS NO COLOR KEY

1977 MUSTANG II — PAGE 1

Power Distribution

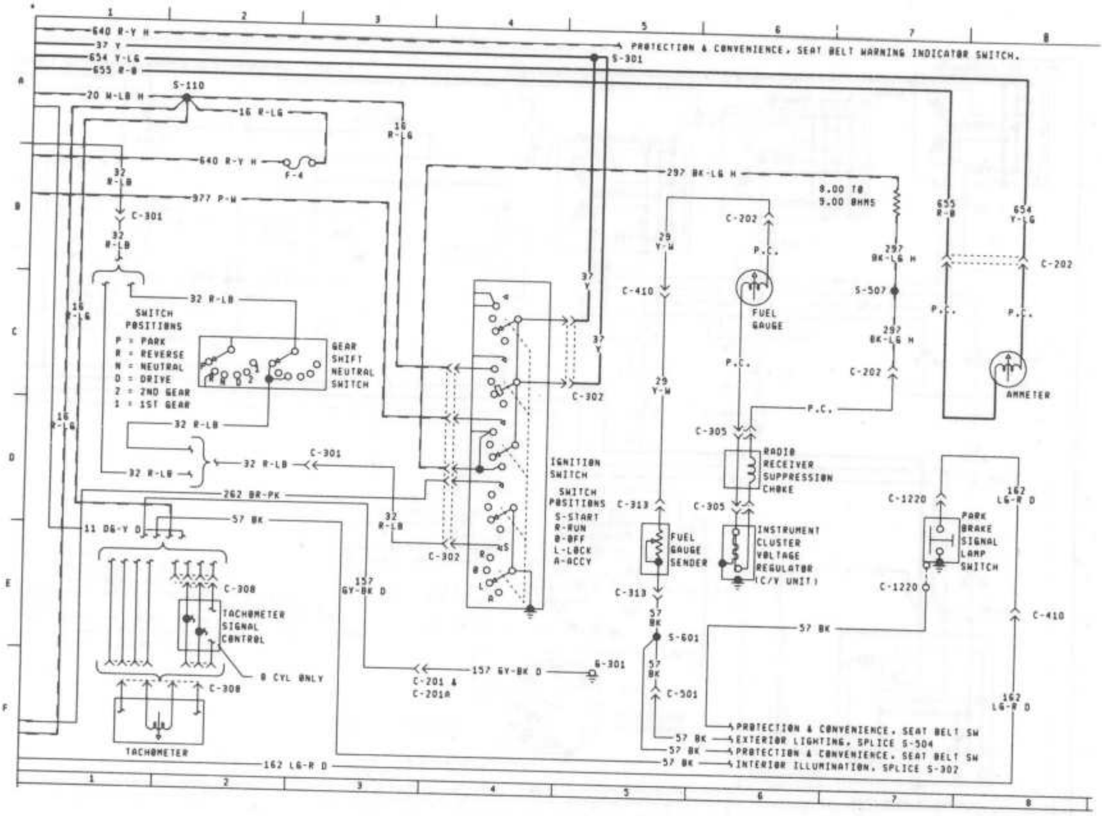


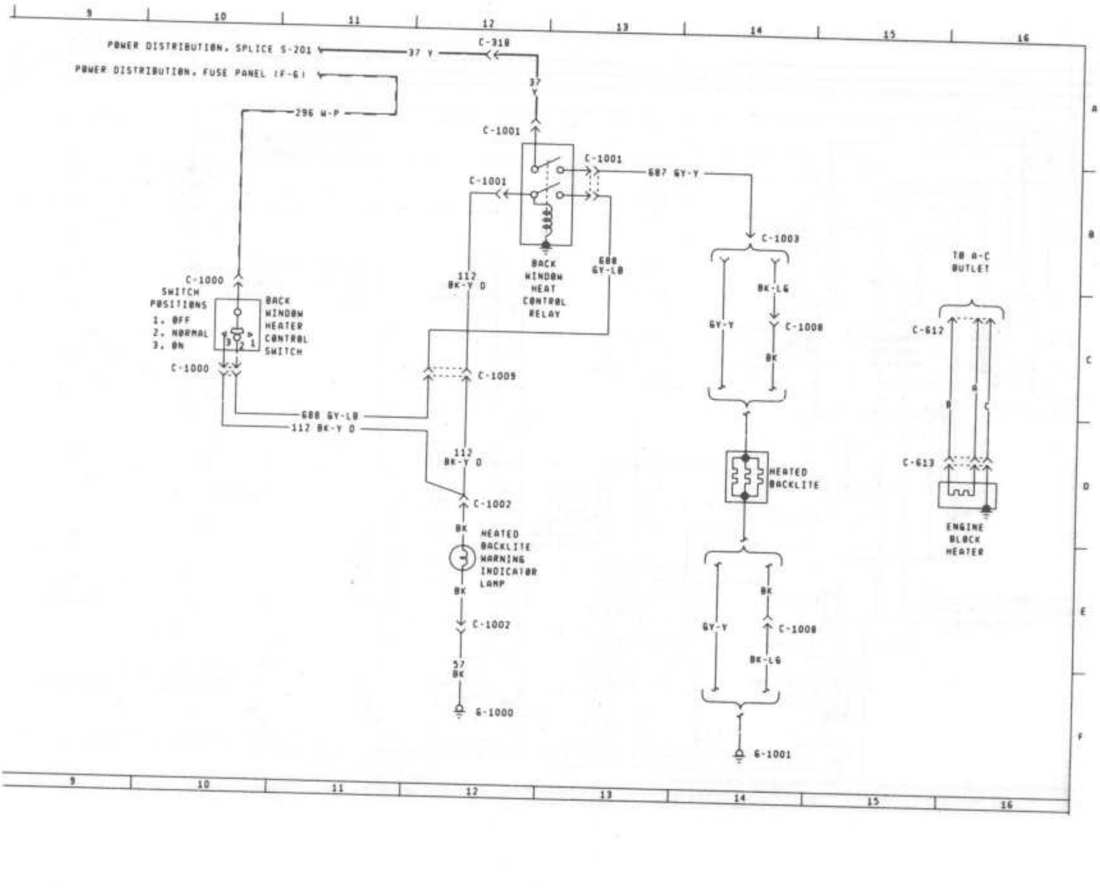
Charge, Start, Run



1977 MUSTANG II — PAGE 3

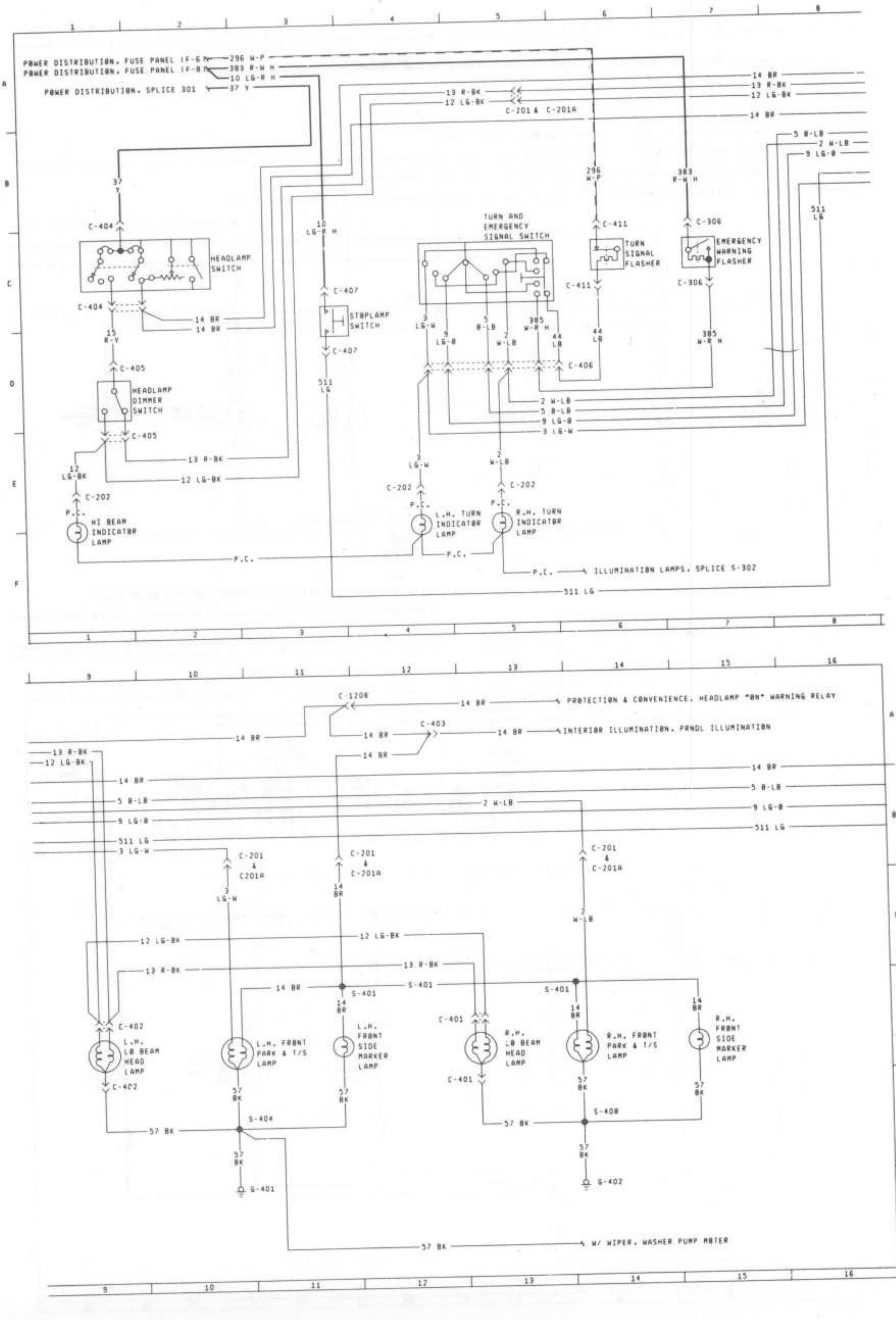
Charge, Start, Run; Heated Backlite; Immersion Heater





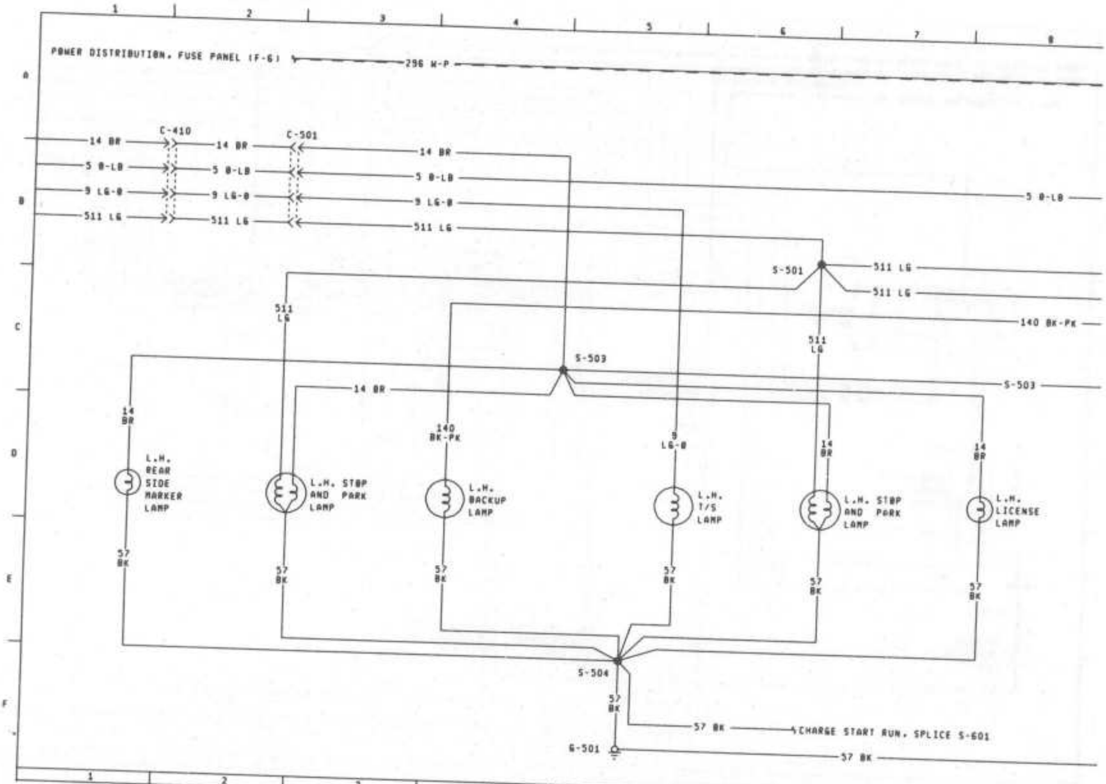
1977 MUSTANG II — PAGE 4

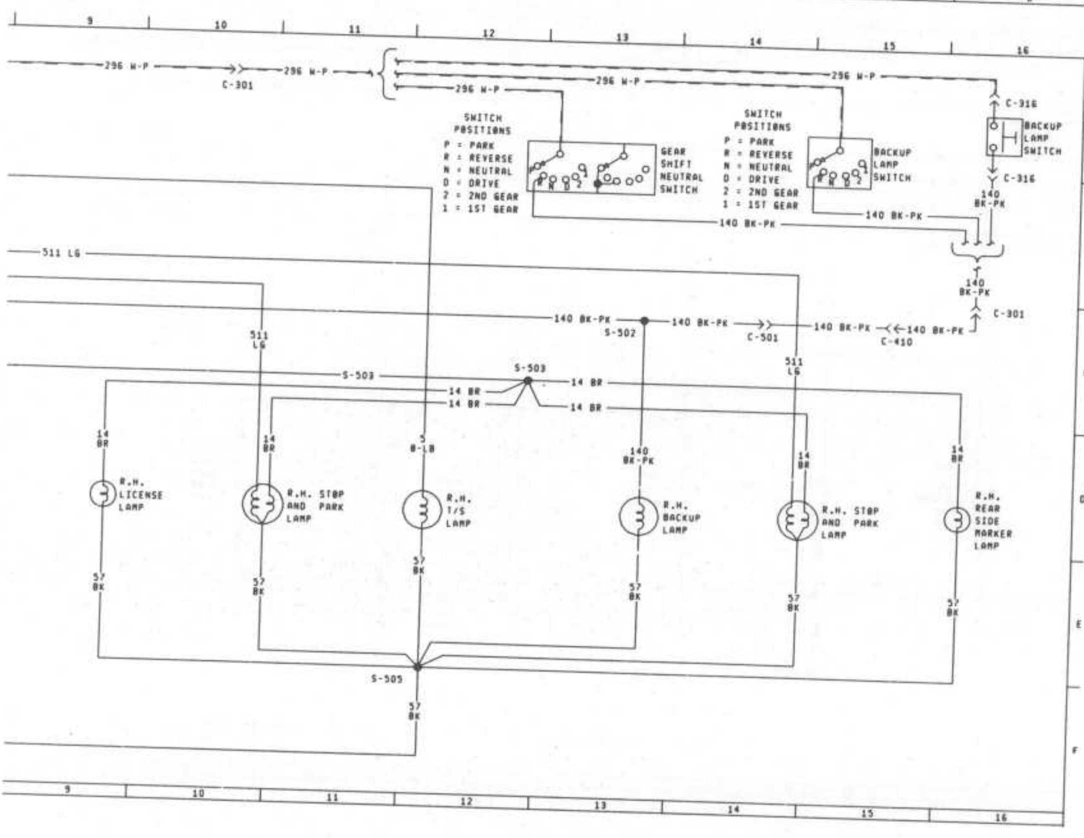
Exterior Lighting



1977 MUSTANG II — PAGE 5

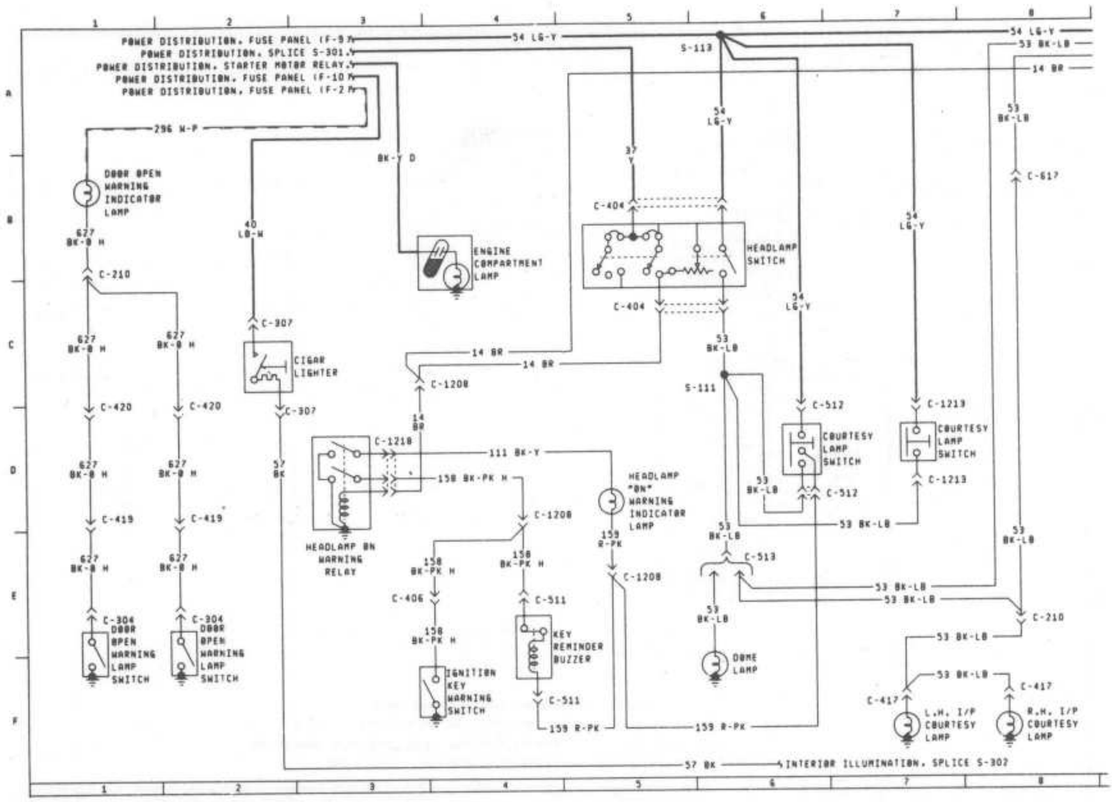
Exterior Lighting

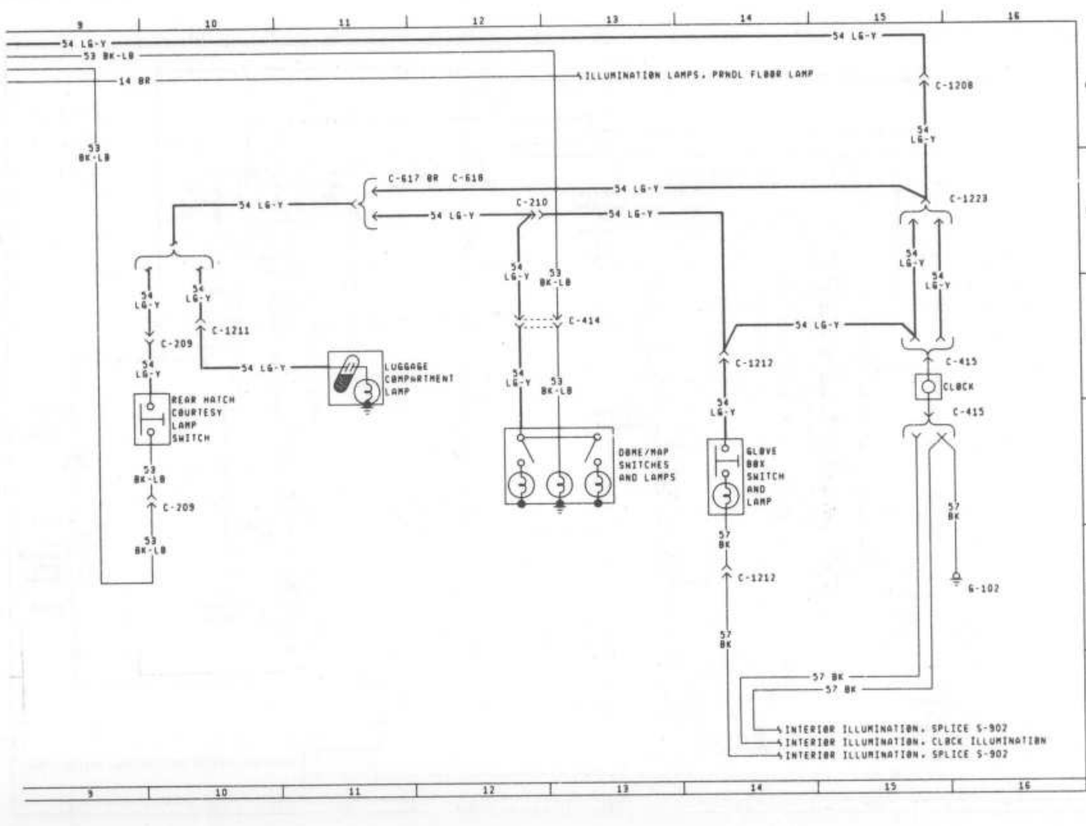




1977 MUSTANG II — PAGE 6

Protection and Convenience; Engine Compartment Light

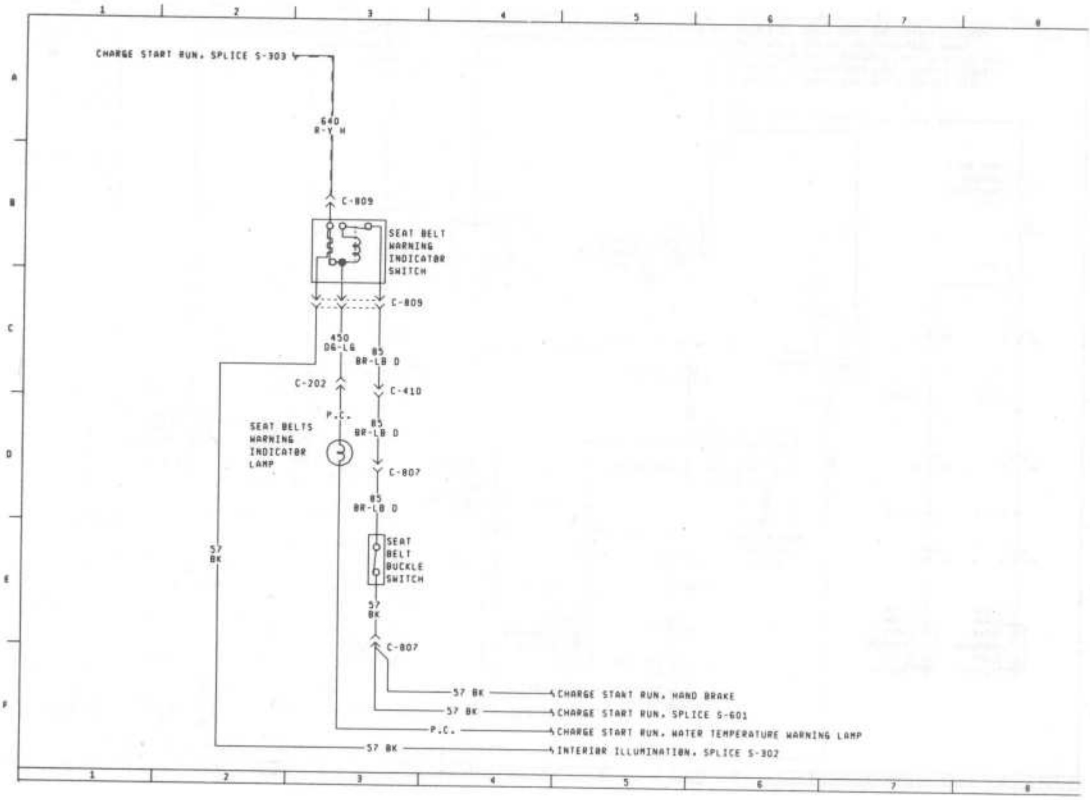


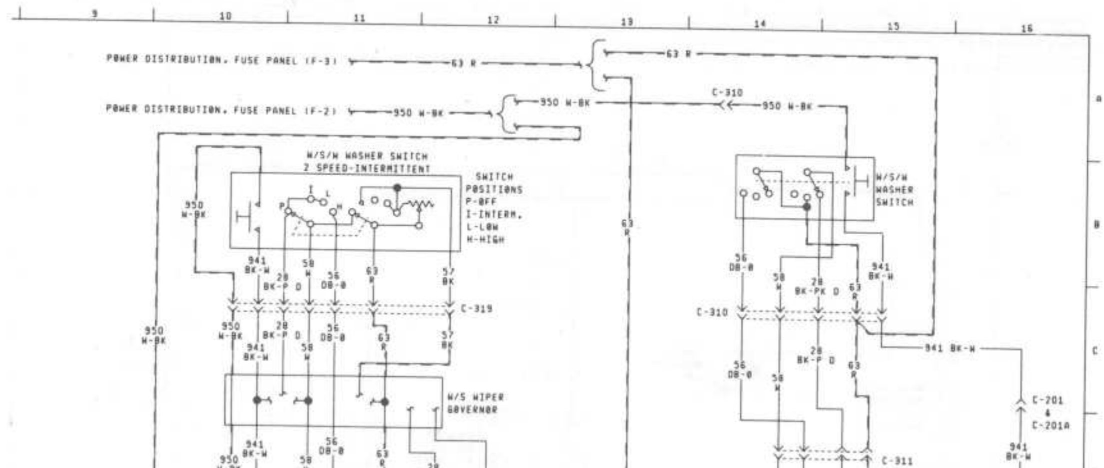


15

1977 MUSTANG II — PAGE 7

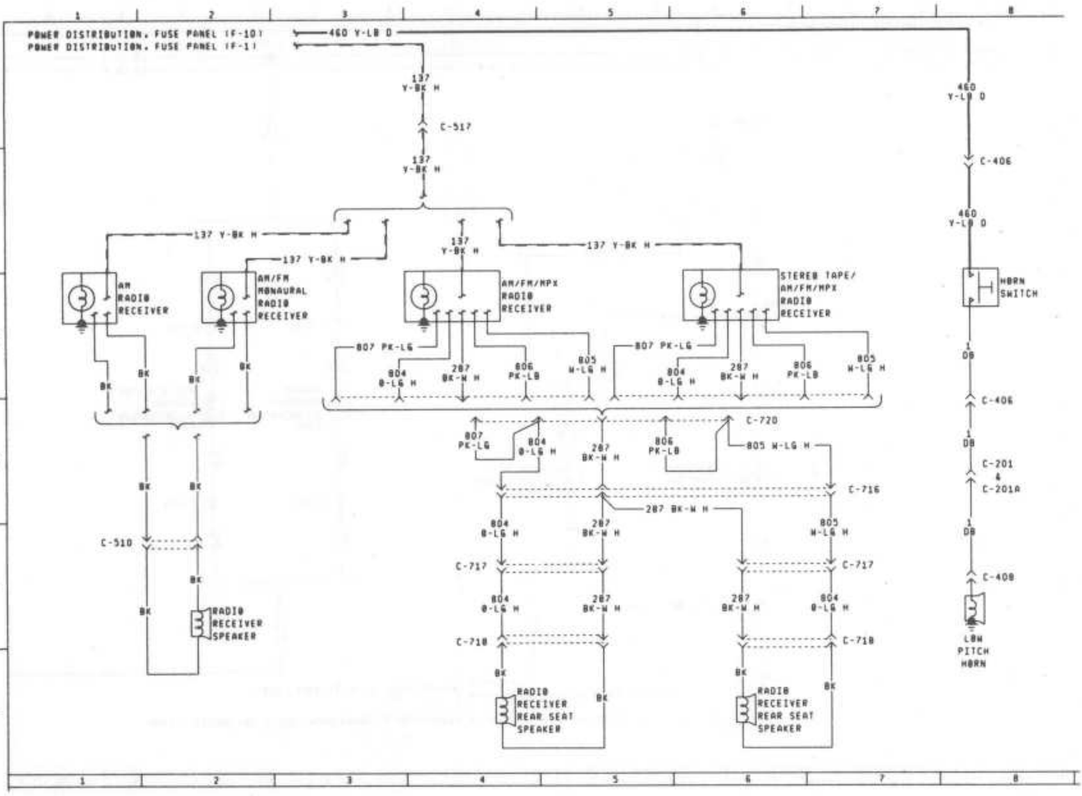
Protection and Convenience; Windshield Wiper/Washer

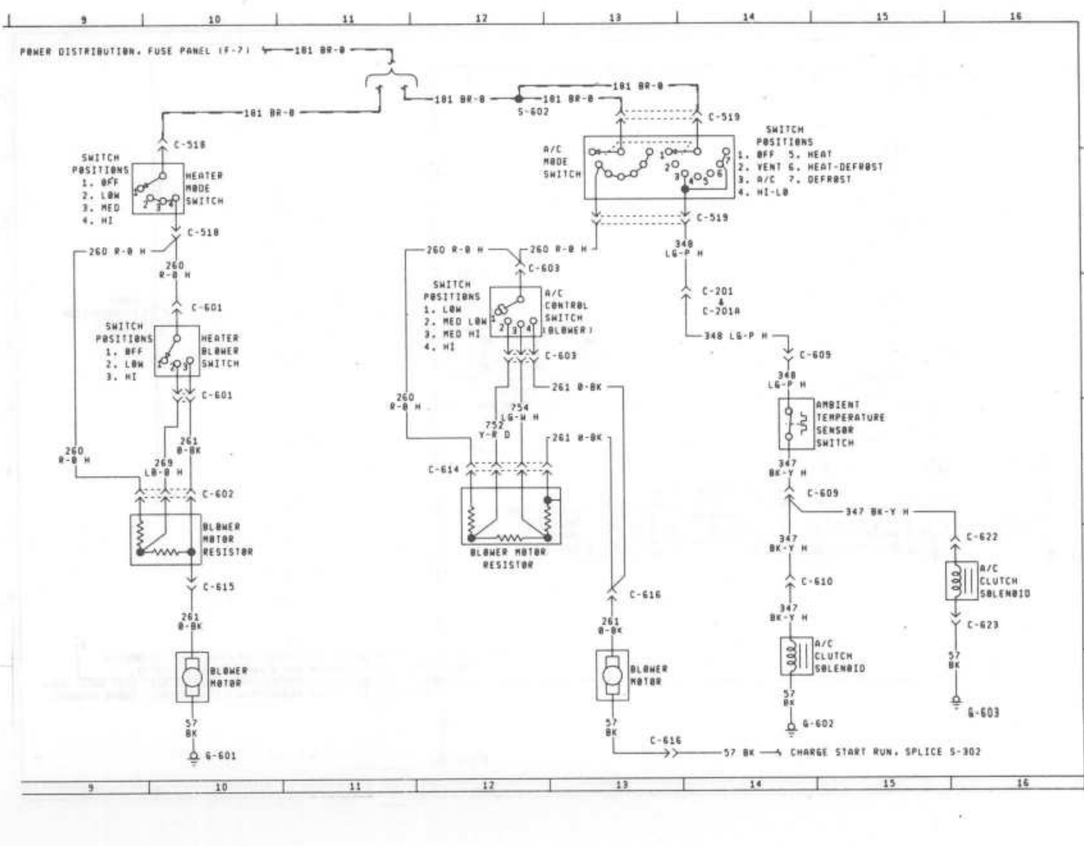




1977 MUSTANG II — PAGE 8

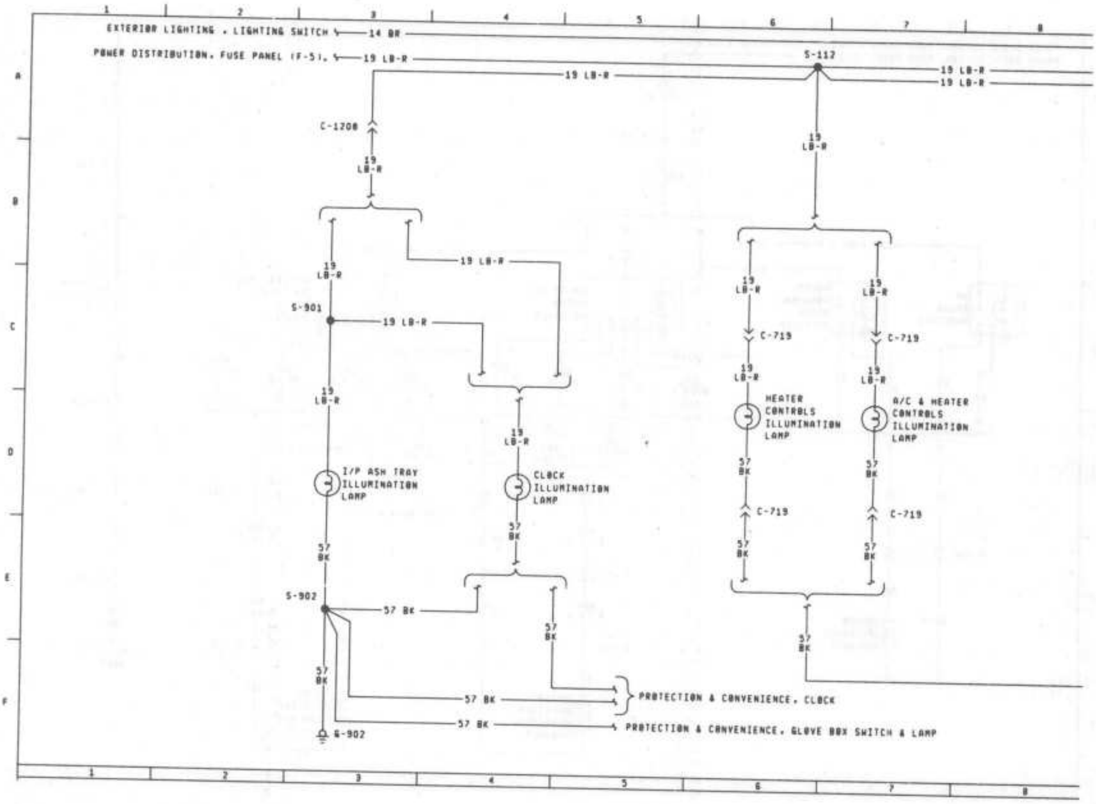
Radio, Horn, Air Conditioning and/or Heater

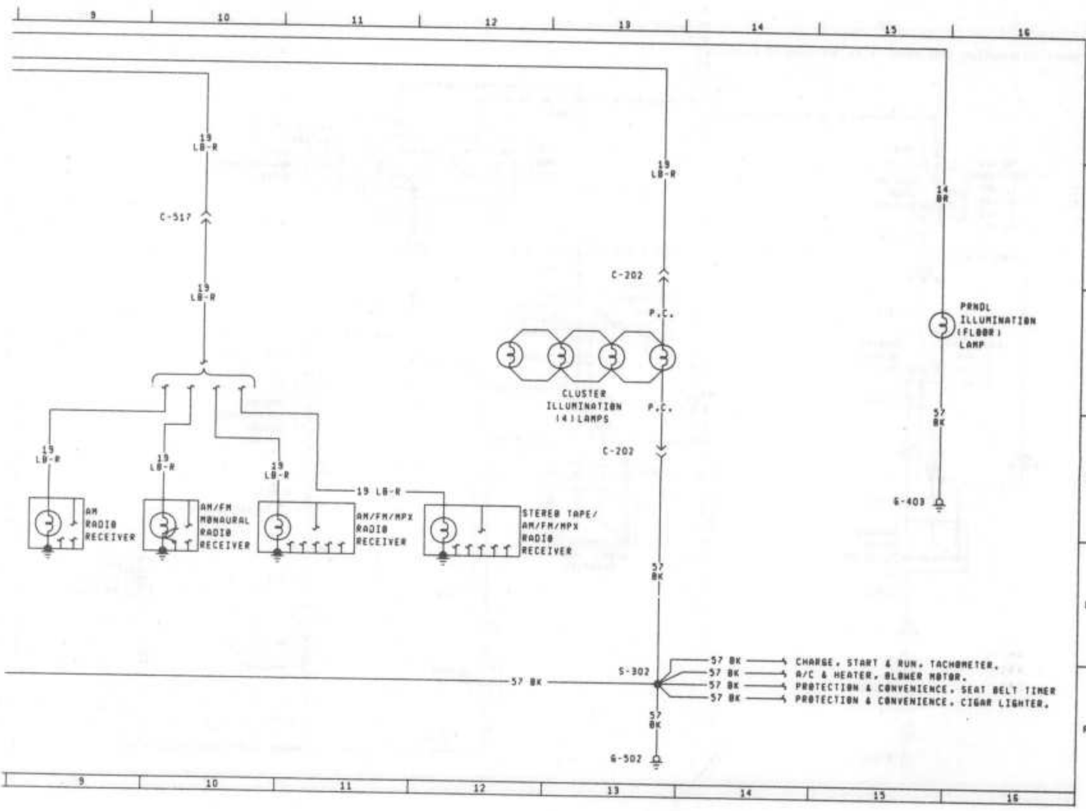




1977 MUSTANG II — PAGE 9

Illumination Lamps





1978 MUSTANG II — KEY

ALTERNATOR
- 40 AMP............................2 A1
- 60 AMP............................2 B3
- 70 AMP............................2 B4

AMMETER.............................3 C6

BACKLITE
- HEATED............................5 D16

BATTERY
- 12 VOLT...........................1 A3
- 12 VOLT...........................2 B5

BUZZER
- EXTERIOR LAMP WARNING.............8 E4

CAPACITOR
- RADIO IGNITION INTRFERENCE........2 F3
- RADIO IGNITION INTERFERENCE.......2 D11

CHOKE
- ELECTRIC..........................2 D2
- RADIO RECEIVER SUPPRESSION........3 C10

CLOCK...............................9 E3

COIL
- IGNITION..........................2 D11

CONTROL
- TACHOMETER SIGNAL.................3 E9

DISTRIBUTOR
- 2.3 LITER BREAKERLESS.............2 D6
- 2.8 LITER BREAKERLESS.............2 F6
- 8 CYL 302 BREAKERLESS.............2 E6

FLASHER
- EMERGENCY WARNING.................4 B7
- TURN SIGNAL.......................4 B6

GAUGE
- FUEL..............................3 B11

GOVERNOR
- W/S WIPER.........................6 C6

HEATER
- ENGINE BLOCK......................3 D16

HORN
- LOW PITCH.........................6 E16

LAMP
- A/C & HEATER CONTROLS ILLUM.......7 D4
- CLOCK ILLUMINATION................7 D2
- CLUSTER ILLUMINATION (4)..........7 C5
- DOME..............................8 D9
- DOME..............................8 D16
- DOME/MAP SWITCH...................8 D15
- DOOR OPEN WARNING INDICATOR.......8 B2
- DUAL BRAKE WARNING INDICATOR......3 B3
- ENGINE COMPARTMENT................8 C3
- GLOVE BOX SWITCH..................9 E1
- HEADLAMP "ON" WARNING IND.........8 D5
- HEATED BACKLITE WARNING IND.......5 E14
- HEATER CONTROLS ILLUMINATION......7 D3
- HI BEAM INDICATOR.................4 E1
- I/P ASH TRAY ILLUMINATION.........7 D1
- L.H. BACKUP.......................5 C2
- L.H. FRONT SIDE MARKER............4 D10
- L.H. STOP AND PARK................5 C3
- L.H. TURN INDICATOR...............4 E4
- LUGGAGE COMPARTMENT...............8 E12
- OIL PRESSURE WARNING IND..........3 B1
- PRNDL ILLUMINATION (FLOOR)........7 B7
- R.H. BACKUP.......................5 C7
- R.H. FRONT SIDE MARKER............4 D15
- R.H. LICENSE......................5 D5
- R.H. LO BEAM HEAD.................4 D14
- R.H. REAR SIDE MARKER.............5 C8
- R.H. T/S..........................5 D6
- R.H. FRONT PARK & T/S.............4 D13
- R.H. I/P COURTESY.................8 E9
- R.H. STOP AND PARK................5 C5
- R.H. STOP AND PARK................5 D7
- R.H. TURN INDICATOR...............4 E5
- SEAT BELTS WARNING INDICATOR......3 D12
- STEREO INDICATOR..................6 A13
- VANITY MIRROR SWITCH..............8 D13
- WATER TEMP WARNING IND............3 B2

LIGHT
- LOCK CYLINDER ILLUMINATION........9 D8
- LOCK CYLINDER ILLUMINATION........9 D7

LIGHTER
- CIGAR.............................8 B1

MODULATOR
- BREAKERLESS IGNITION..............2 C14

MOTOR
- BLOWER............................7 E10
- BLOWER............................7 E12
- STARTER...........................2 B6
- W/S WASHER PUMP...................6 F6
- W/S WIPER.........................6 F4

PANEL
- FUSE..............................1 A1

RECEIVER
- AM RADIO..........................6 B9
- AM RADIO..........................7 D5
- AM WITH STEREO TAPE RADIO.........6 B14
- AM WITH STEREO TAPE RADIO.........7 D8
- AM/FM MONAURAL RADIO..............6 B10
- AM/FM MONAURAL RADIO..............7 E6
- AM/FM/MPX RADIO...................6 B11

RECEIVER CONTINUED...
- AM/FM/MPX RADIO...................7 D6
- STEREO TAPE/ AM/FM/MPX RADIO......6 B13
- STEREO TAPE/ AM/FM/MPX RADIO......7 E7

REGULATOR
- ALTERNATOR........................2 E1
- INSTRUMENT CLUSTER VOLTAGE........3 C10

RELAY
- BACK WINDOW HEAT CONTROL..........5 B15
- STARTER MOTOR.....................1 A4
- STARTER MOTOR.....................2 B6
- WARNING INDICATOR.................8 C5

RESISTOR
- BLOWER MOTOR......................7 D9
- BLOWER MOTOR......................7 D11

SENDER
- A.T.C. WATER TEMP IND SW &........3 F2
- FUEL GAUGE........................3 D11
- WATER TEMPERATURE INDICATOR.......3 F1

SOLENOID
- A/C CLUTCH........................7 E13
- A/C CLUTCH........................7 E16
- CARB THROTTLE EMISSION CONT.......3 F4
- CARB THROTTLE EMISSION CONT.......7 F14
- CARBURETOR FLOAT BOWL VENT........3 E3
- CARBURETOR FLOAT BOWL VENT........3 D5
- CARBURETOR VALVE CONTROL..........2 E15
- SEATBELT RETRACTOR................8 F8
- SEATBELT RETRACTOR................8 F7

SPEAKER
- RADIO RECEIVER....................6 E10
- RADIO RECEIVER REAR SEAT..........6 F14
- RADIO RECEIVER REAR SEAT..........6 F13

SWITCH
- A/C MODE..........................7 A13
- BACK WINDOW HEATER CONTROL........5 C13
- BACKUP LAMP.......................5 B11
- BACKUP LAMP.......................5 B13
- COURTESY LAMP.....................8 A6
- COURTESY LAMP.....................8 A7
- DOOR OPEN WARNING.................8 E2
- DOOR OPEN WARNING.................8 E2
- DUAL BRAKE WARNING................3 E2
- GEAR SHIFT NEUTRAL................3 E5
- GEAR SHIFT NEUTRAL................5 B9
- HEADLAMP..........................1 C7
- HEADLAMP..........................4 C2
- HEADLAMP..........................8 A4
- HEADLAMP DIMMER...................4 D2
- HEATER BLOWER.....................7 C10
- HEATER MODE.......................7 B10
- HORN..............................6 B16
- IGNITION..........................1 D5
- IGNITION..........................3 D8
- IGNITION KEY WARNING..............8 E3
- INTERIOR LAMP.....................9 E5
- INTERIOR LAMP.....................9 E5
- L.H. LICENSE......................5 D4
- L.H. LO BEAM HEAD.................4 D10
- L.H. REAR SIDE MARKER.............5 C1
- L.H. T/S..........................5 D3
- L.H. FRONT PARK & T/S.............4 D11
- L.H. I/P COURTESY.................8 E10
- L.H. STOP AND PARK................5 D1
- OIL PRESSURE......................2 E16
- PARK BRAKE SIGNAL LAMP............3 D14
- REAR HATCH COURTESY LAMP..........8 E11
- SEAT BELT BUCKLE..................3 D13
- SEAT BELT WARNING INDICATOR.......3 A13
- STOPLAMP..........................4 C1
- TURN AND EMERGENCY SIGNAL.........4 C4
- W/S/W WASHER......................6 B1
- W/S/W WASHER......................6 B3
- W/S/W WASHER......................6 B6
- A/C CONTROL.......................7 C11

TACHOMETER..........................3 F9

THERMISTOR..........................8 E7
THERMISTOR..........................8 E8

THERMOSTAT
- A/C EVAPORATOR....................7 C15

TIMER
- ILLUMINATED ENTRY.................9 A6

WIRING COLOR KEY
PRIMARY COLORS

BLACK	BK
BROWN	BR
TAN	T
RED	R
PINK	PK
ORANGE	O
YELLOW	Y
DARK GREEN	DG
LIGHT GREEN	LG
DARK BLUE	DB
LIGHT BLUE	LB
PURPLE	P
GRAY	GY
WHITE	W
HASH	(H)
DOT	(D)

STRIPE IS UNDERSTOOD AND HAS NO COLOR KEY

BULB CHART

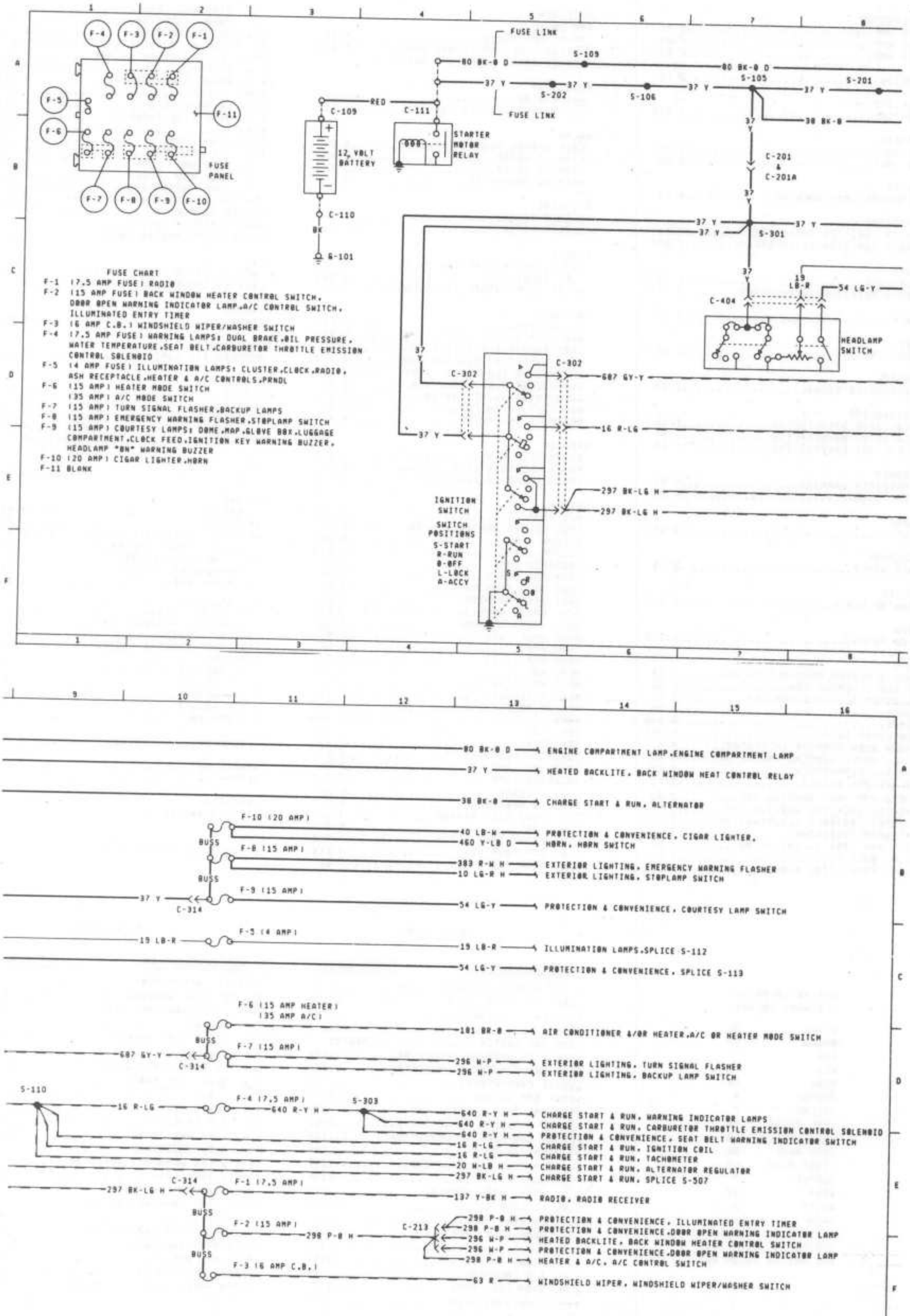
LAMP DESCRIPTION	TRADE NUMBER
A/C & HEATER CONTROLS ILLUM	161
CLOCK ILLUMINATION	194
CLUSTER ILLUMINATION (4)	194
DOME	212-2
DOME/MAP SWITCH	1816/212-2
DOOR OPEN WARNING INDICATOR	194
DUAL BRAKE WARNING INDICATOR	194
ENGINE COMPARTMENT	89
GLOVE BOX SWITCH	1816
HEADLAMP "ON" WARNING IND	194
HEATED BACKLITE WARNING IND	2162
HEATER CONTROLS ILLUMINATION	161
HI BEAM INDICATOR	194
I/P ASH TRAY ILLUMINATION	1892
L.H. BACKUP	1156
L.H. FRONT SIDE MARKER	194
L.H. LICENSE	194
L.H. LO BEAM HEAD	6014
L.H. REAR SIDE MARKER	194
L.H. T/S	1156
L.H. FRONT PARK & T/S	1157
L.H. I/P COURTESY	89
L.H. STOP AND PARK	1157
L.H. TURN INDICATOR	194

BULB CHART

LAMP DESCRIPTION	TRADE NUMBER
LUGGAGE COMPARTMENT	89
OIL PRESSURE WARNING IND	194
PRNDL ILLUMINATION (FLOOR)	1893
R.H. BACKUP	1156
R.H. FRONT SIDE MARKER	194
R.H. LICENSE	194
R.H. LO BEAM HEAD	6014
R.H. REAR SIDE MARKER	194
R.H. T/S	1156
R.H. FRONT PARK & T/S	1157
R.H. I/P COURTESY	89
R.H. STOP AND PARK	1157
R.H. TURN INDICATOR	194
SEAT BELTS WARNING INDICATOR	194
STEREO INDICATOR	1892
VANITY MIRROR SWITCH	212-2
WATER TEMP WARNING IND	194
AM RADIO	1893
AM WITH STEREO TAPE RADIO	1893
AM/FM MONAURAL RADIO	1893
AM/FM/MPX RADIO	1892
STEREO TAPE/ AM/FM/MPX RADIO	37
STEREO TAPE/ AM/FM/MPX RADIO	1893

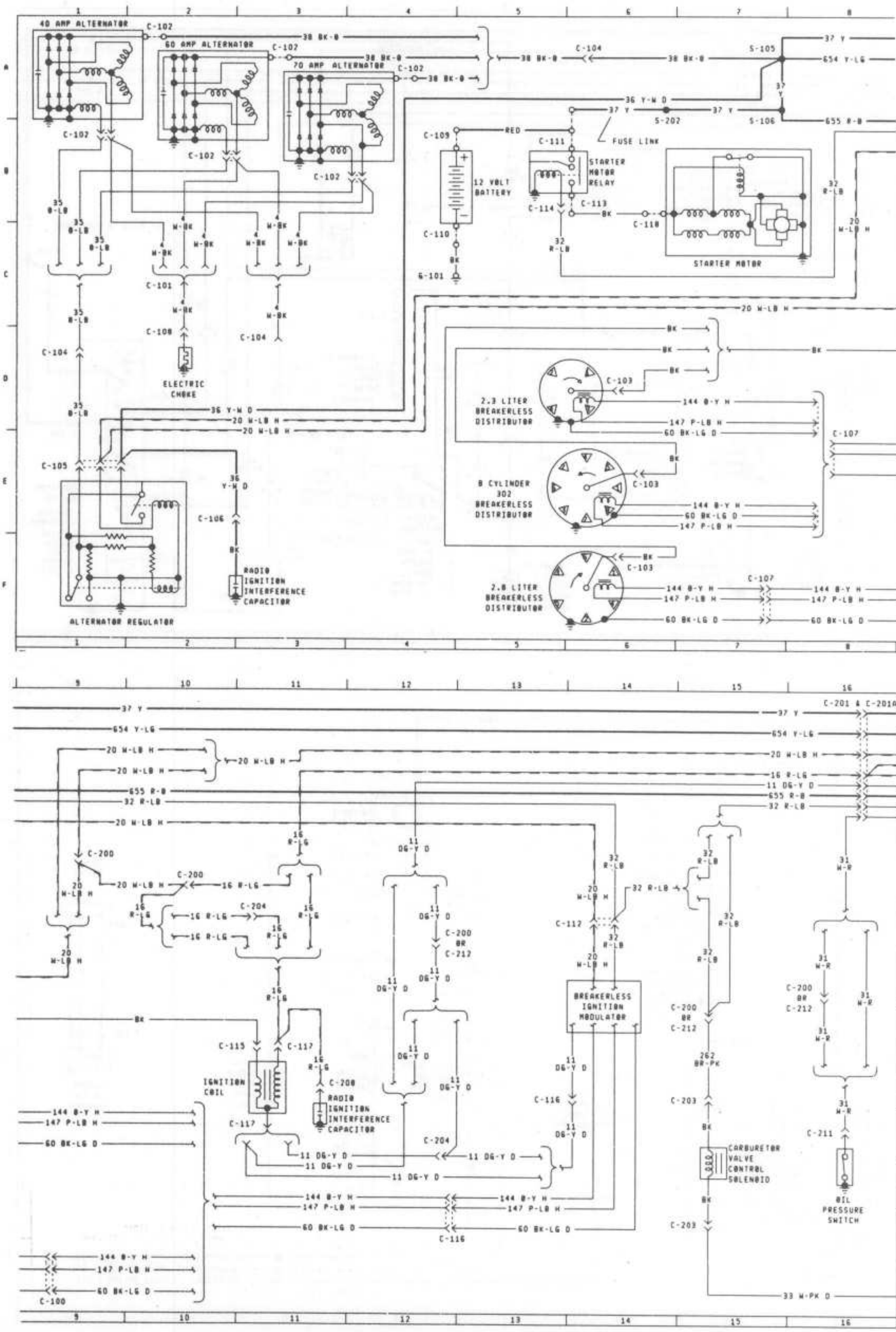
1978 MUSTANG II — PAGE 1

Power Distribution



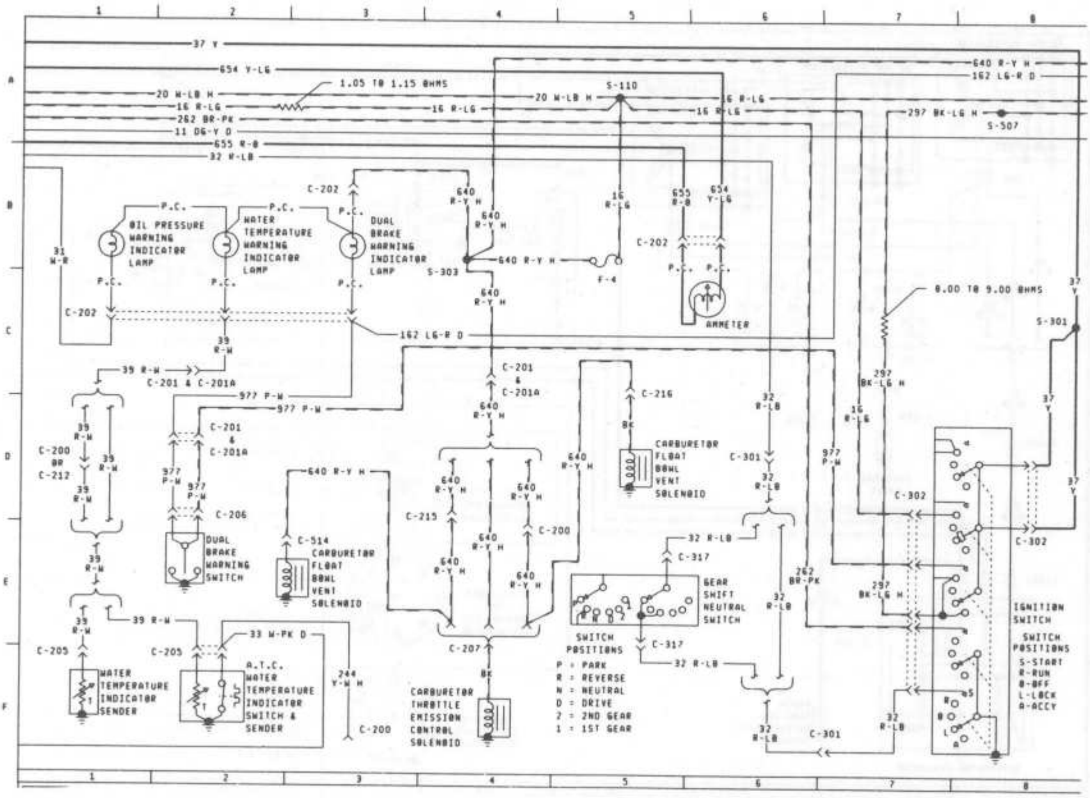
1978 MUSTANG II — PAGE 2

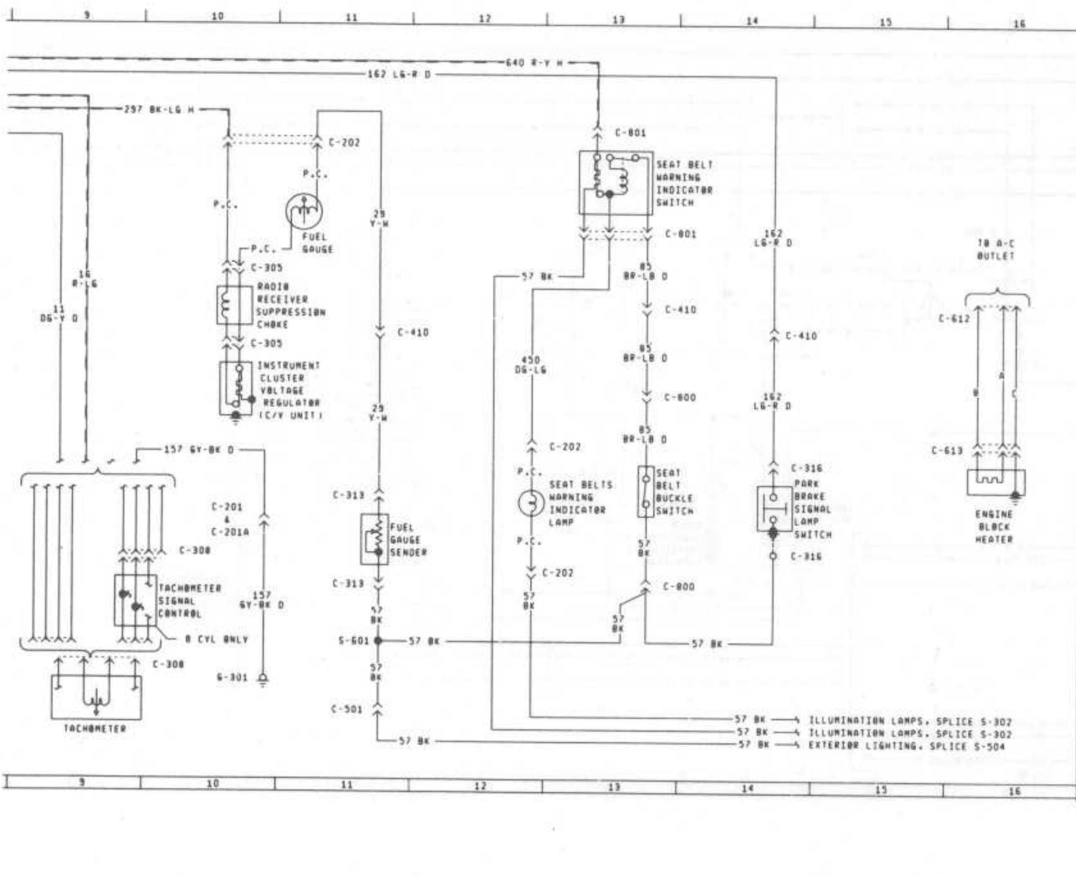
Charge, Start, Run



1978 MUSTANG II — PAGE 3

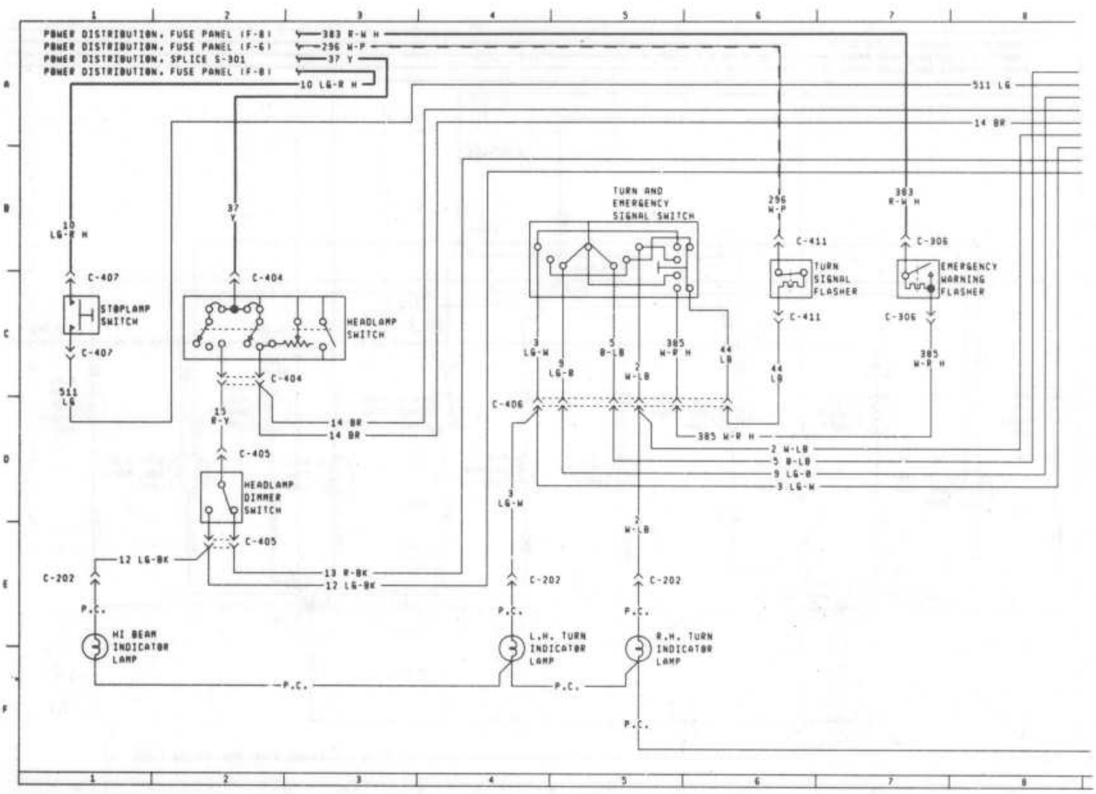
Charge, Start, Run; Immersion Heater

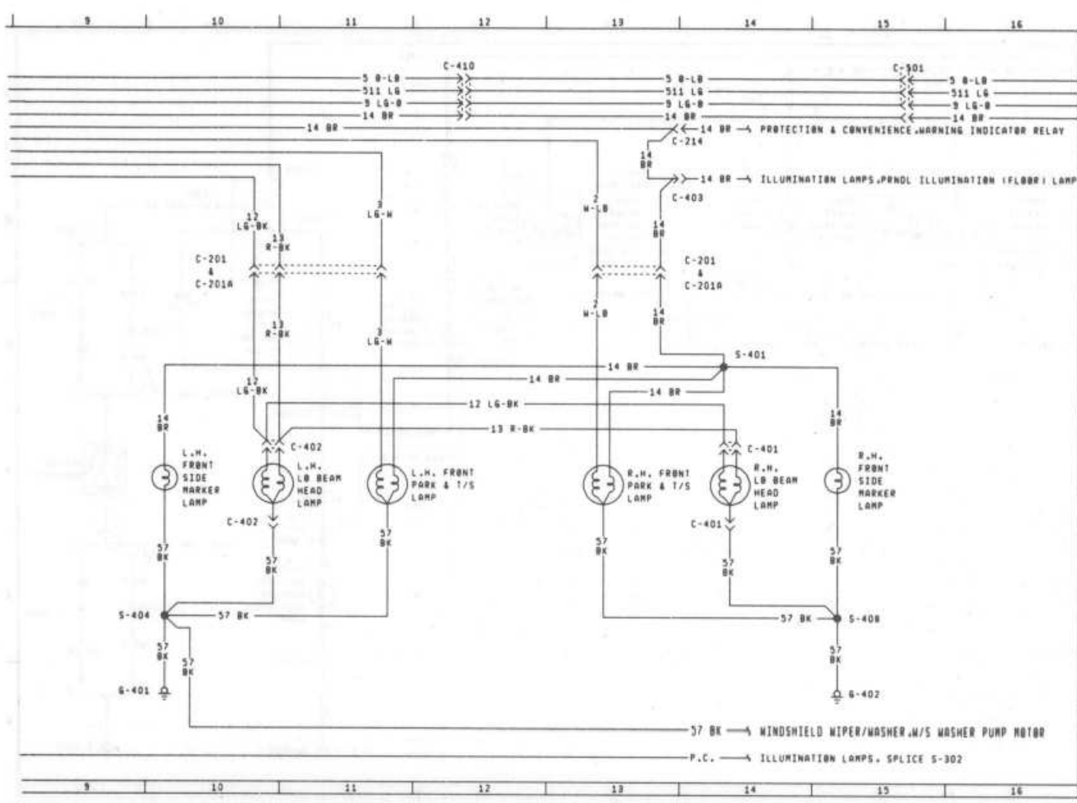




1978 MUSTANG II — PAGE 4

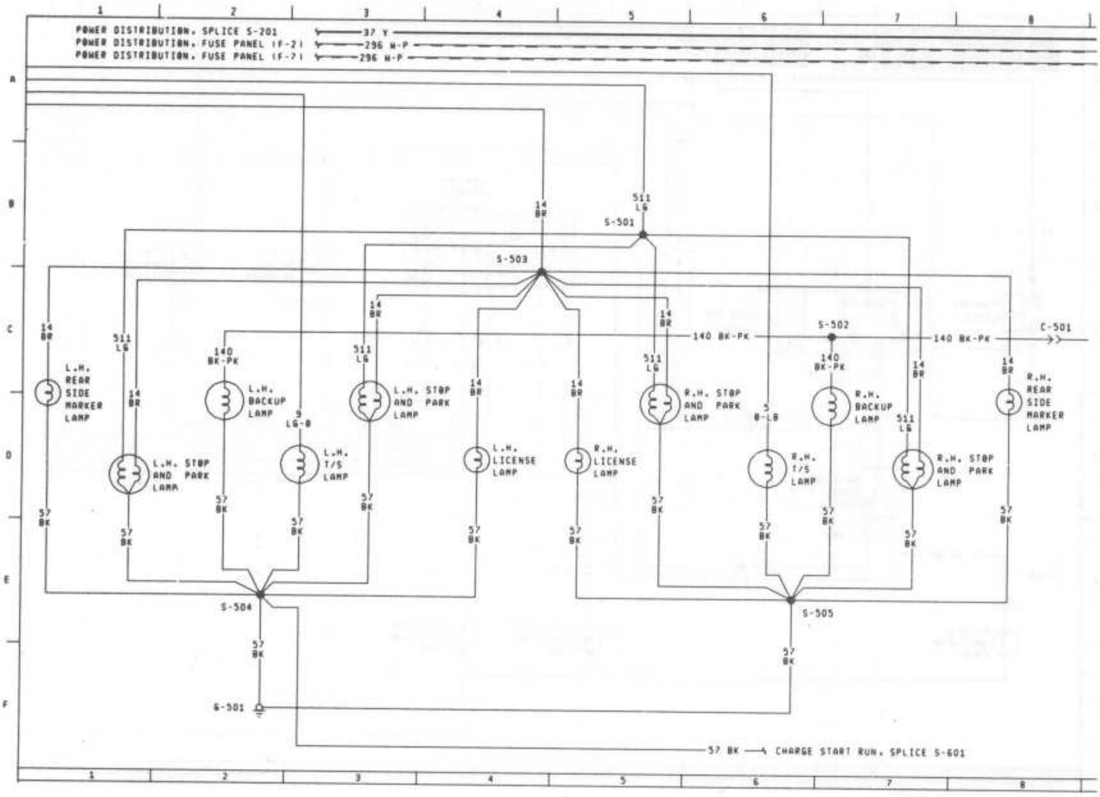
Exterior Lighting

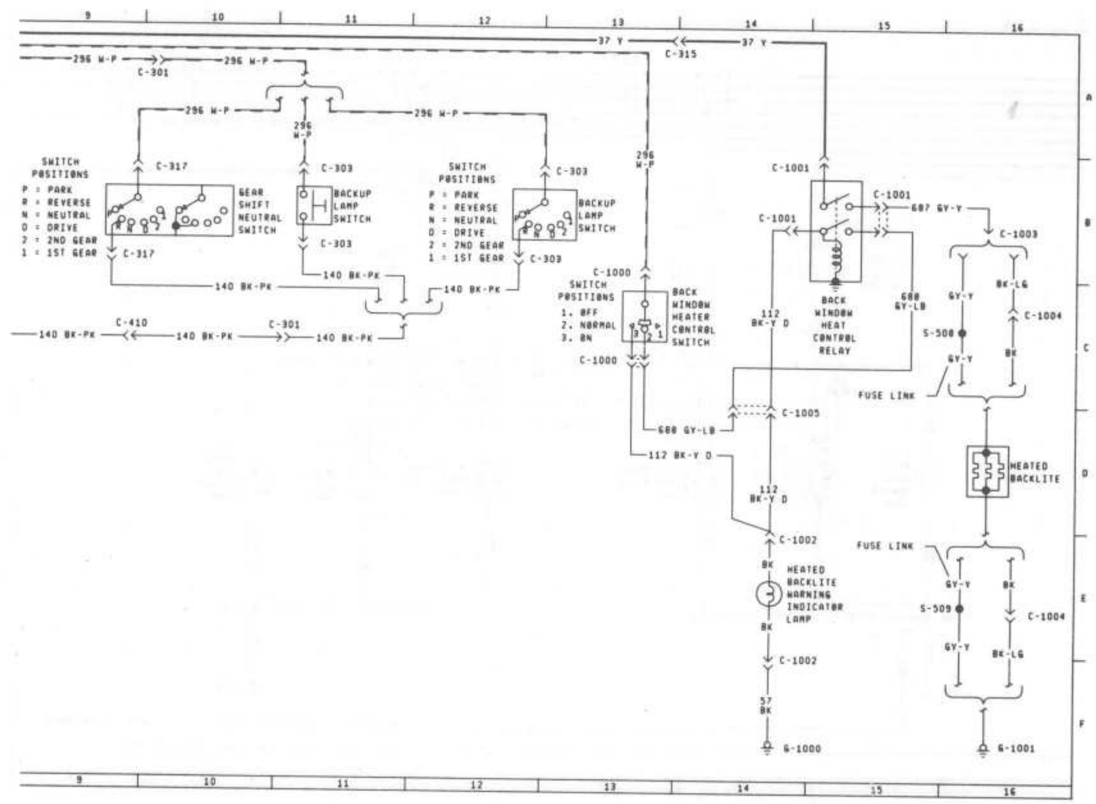




1978 MUSTANG II — PAGE 5

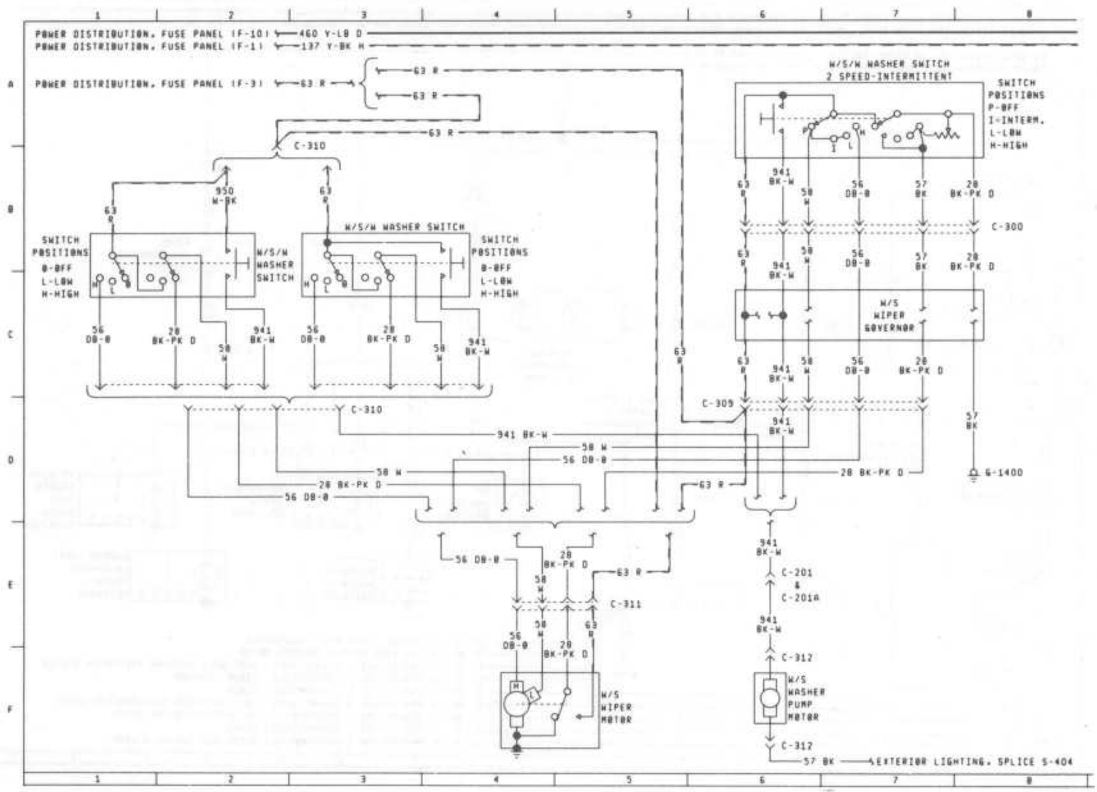
Exterior Lighting; Heated Backlite

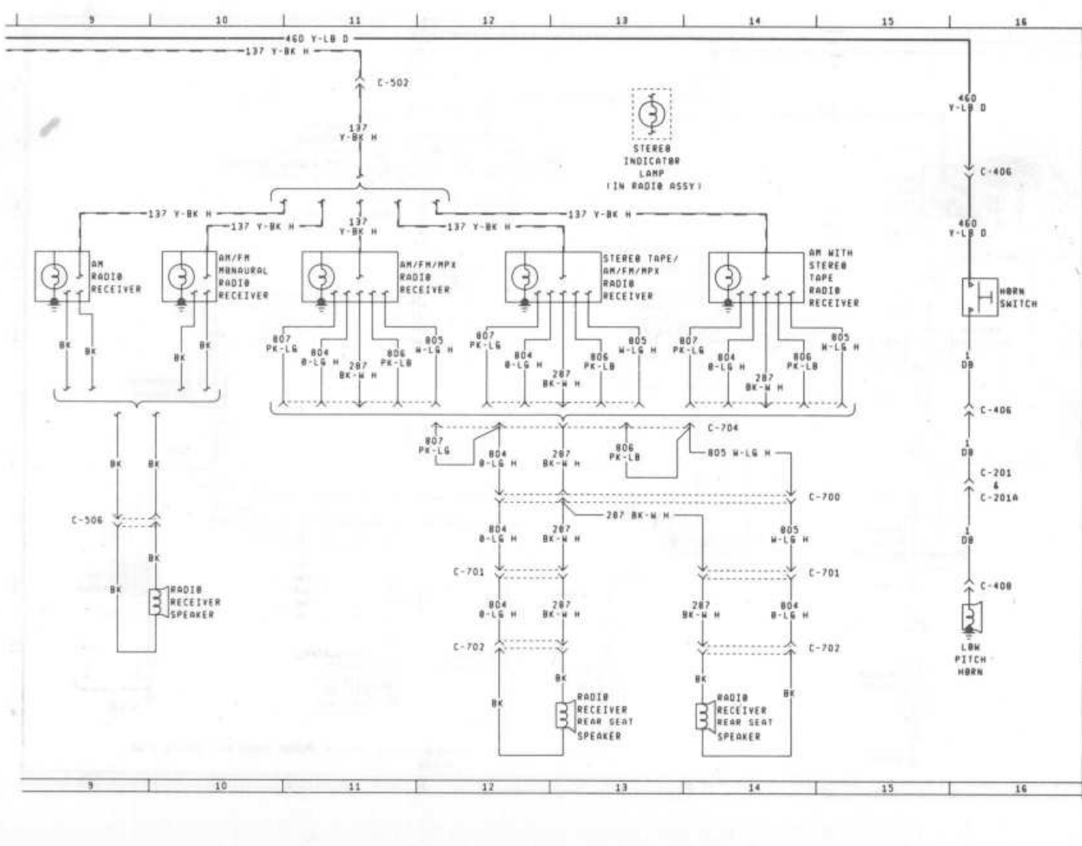




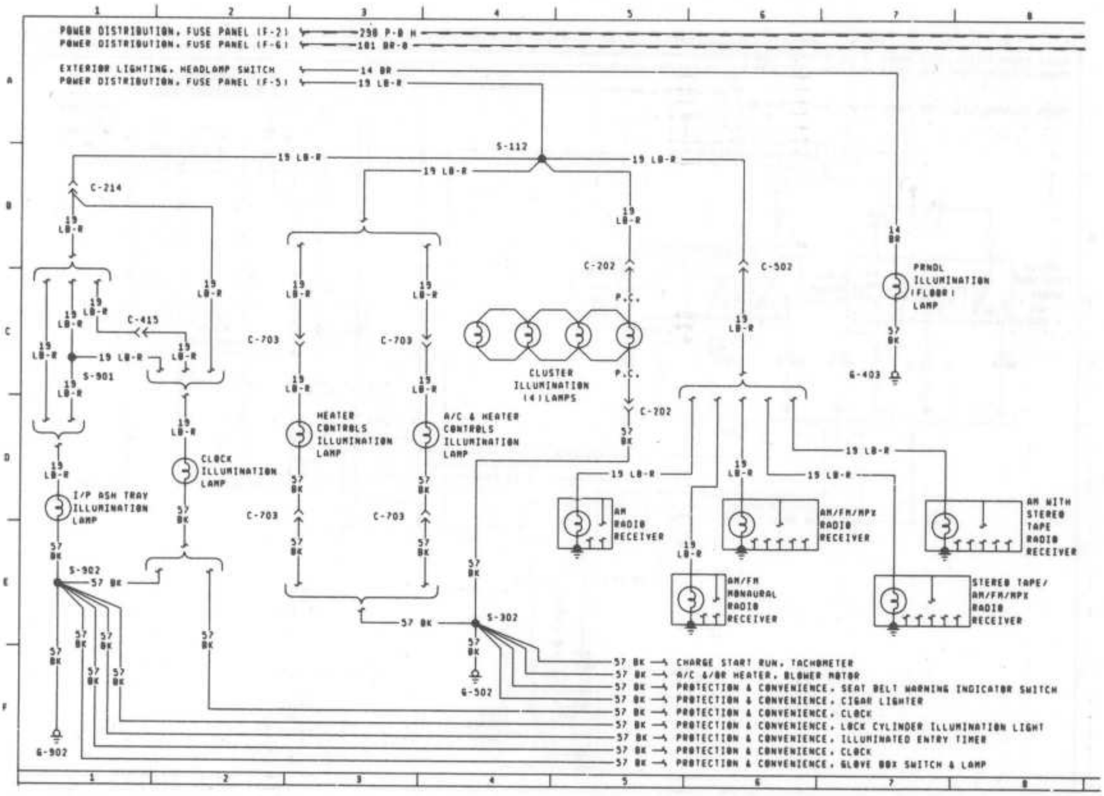
1978 MUSTANG II — PAGE 6

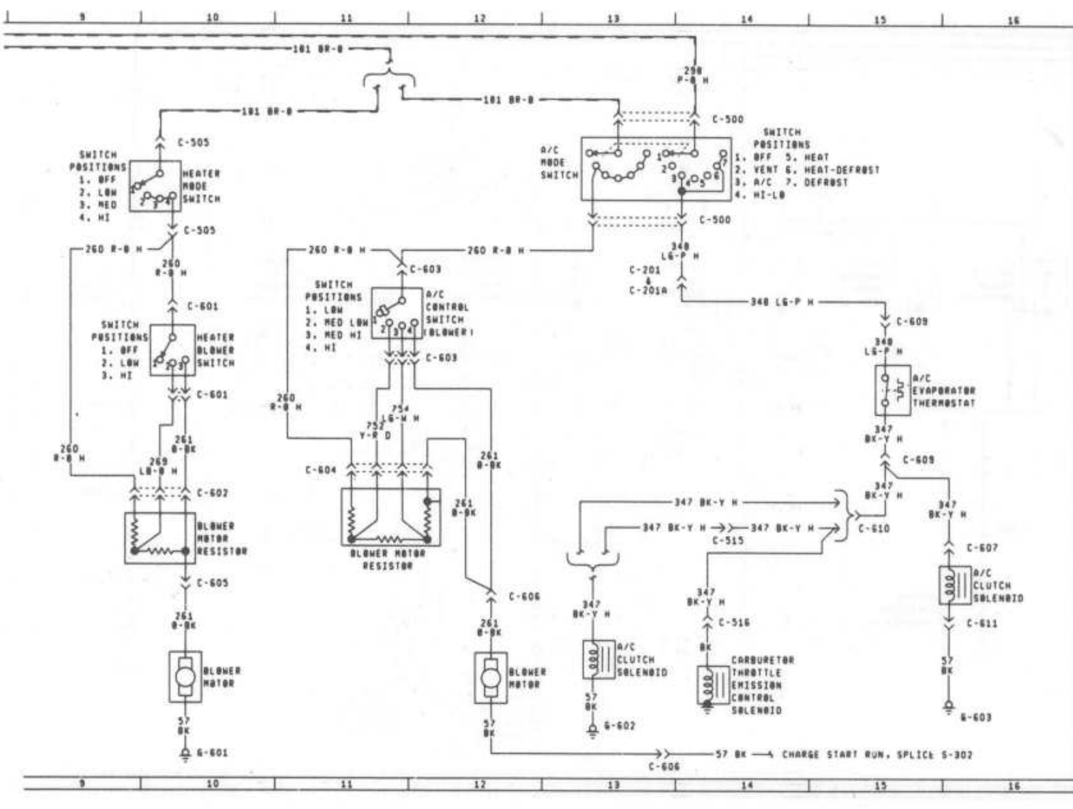
Windshield Wiper/Washer; Radio; Horn





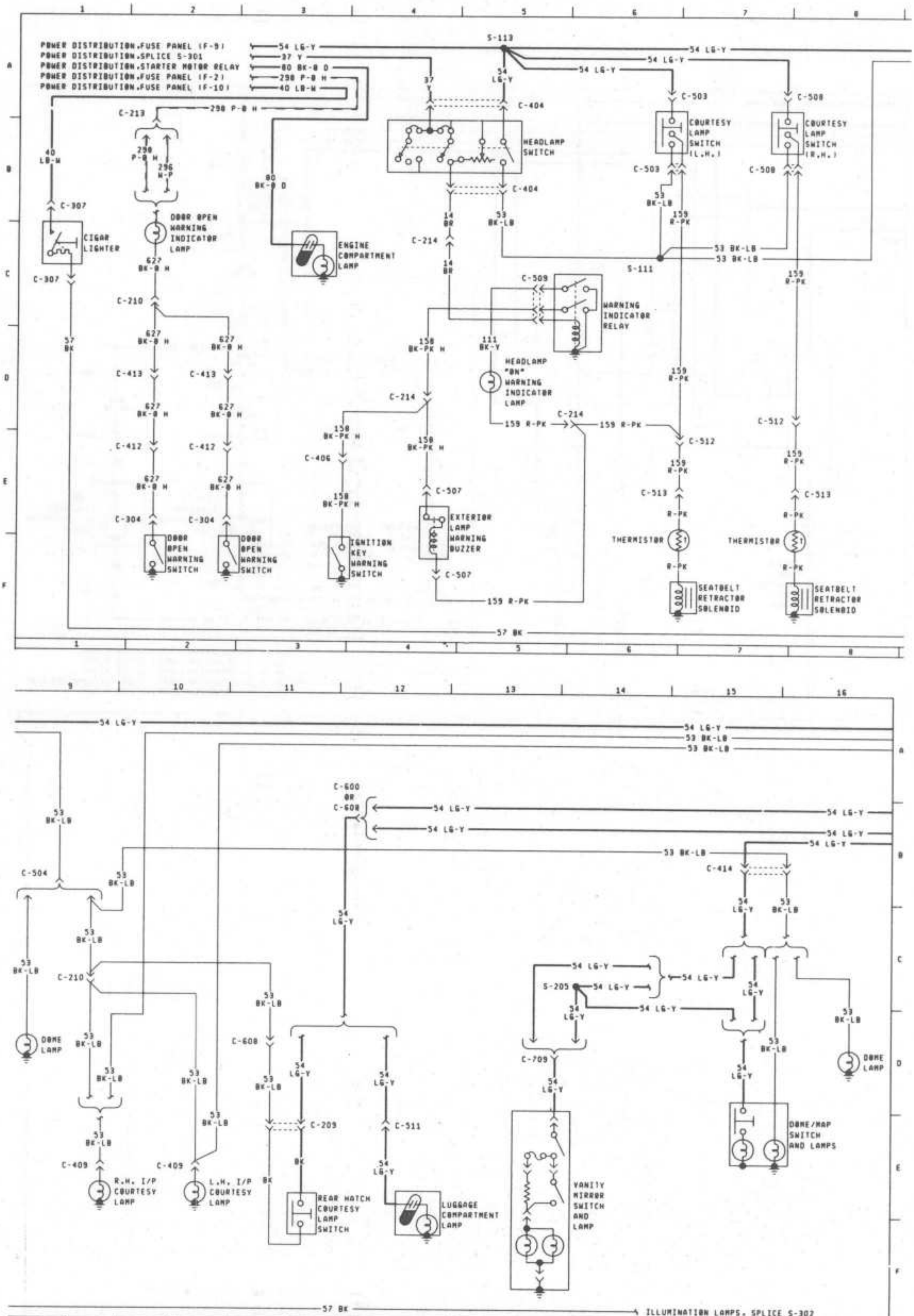
1978 MUSTANG II — PAGE 7
Illumination Lamps; Air Conditioner and/or Heater





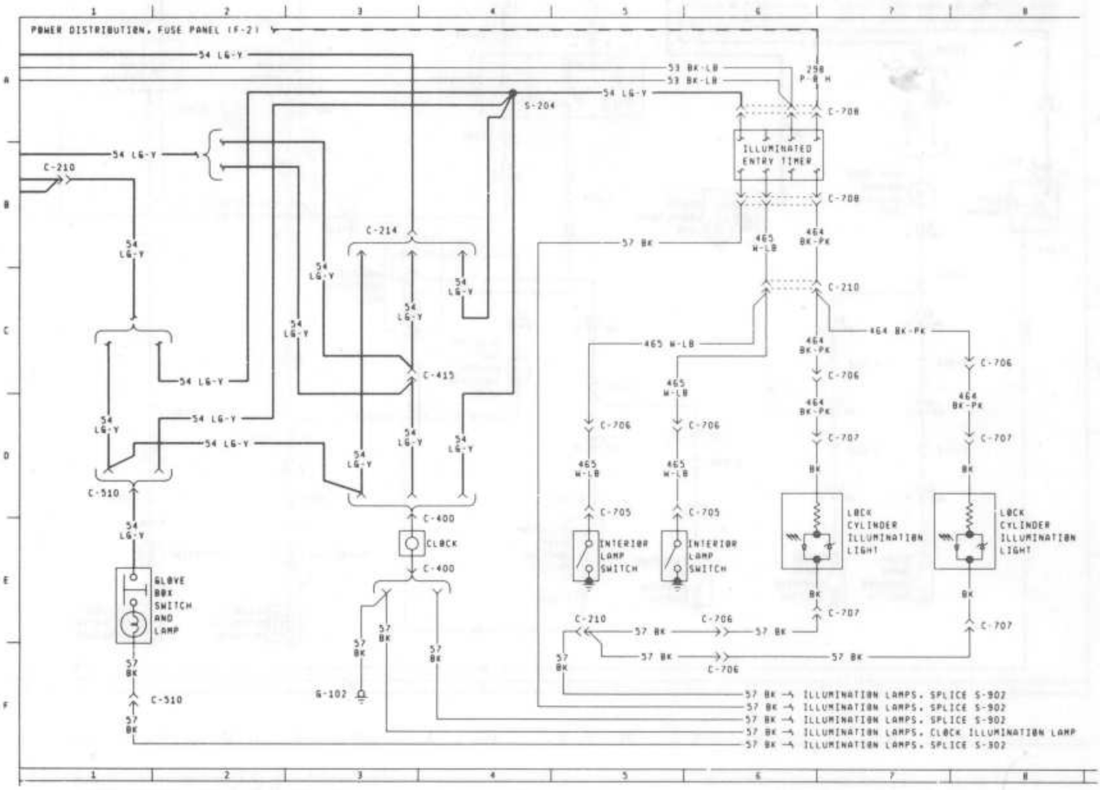
1978 MUSTANG II — PAGE 8

Protection and Convenience



1978 MUSTANG II — PAGE 9

Protection and Convenience



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