GROUP

SUSPENSION 04

(3000 & 5000)

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SECTION 04-00 Suspension—Service

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VEHICLE APPLICATION

Taurus / Sable.

DESCRIPTION

The section covers Adjustments and Cleaning and Inspection procedures for the front and rear suspensions. Refer to the appropriate section in this group for Diagnosis, Removal and Installation and Disassembly and Assembly procedures.

CLEANING AND INSPECTION

Suspension, Front

Inspection

Do not check alignment without first making the following inspection for front end damage or wear:

1. Check for specified air pressure in all four tires.
2. Raise front of vehicle off floor. Refer to Section 00-02. Grasping upper and lower surfaces of tire, move each front wheel in and out to check front suspension ball joints and mounts for looseness, wear and damage. Tighten all loose nuts and bolts to specification. Replace all worn parts. Refer to Section 04-01.

CLEANING AND INSPECTION (Continued)

3. Check steering gear mountings and tie rod connections for looseness. Tighten all mountings to specification. If tie rods are worn or bent, replace parts. Refer to Section 11-02.
4. Spin each front wheel with wheel spinner and check and balance each wheel as necessary. Refer to Section 04-01.
5. Check action of shock absorbers and suspension springs. If they are not in good condition, vehicle may not settle in normal / level position.

Ball Joint, Lower

Inspection

1. Raise vehicle until wheels fall to full down position. Refer to Section 00-02.
2. Have an assistant grasp lower edge of tire and move wheel and tire assembly in and out.
3. As wheel is being moved in and out, observe lower end of knuckle and lower control arm. Any movement indicates abnormal ball joint wear.
4. If any movement is observed, install new lower control arm assembly.

Suspension, Rear

At regular intervals, the following rear suspension checks should be made:

1. Check for evidence of fluid leaks on rear shock absorbers. (A light film of fluid is permissible. Make sure fluid is not from sources other than shock absorber.)
2. Check shock absorber operation.
3. Check condition of upper and lower suspension arms pivot bushings and tension strut bushings.

   Replace any damaged or worn components. Refer to procedures under Removal and Installation.

Shock Absorber Checks

All vehicles are equipped with low-pressure gas-filled hydraulic shock absorber struts of the direct acting type. They are non-adjustable and non-refillable. They cannot be serviced as a cartridge and must be serviced as an assembly.

1. **Oil Leak:** A light film of oil (weepage) on the upper portion of the shock absorber is permissible and is a result of proper shock lubrication. Weepage is a condition in which a thin film of oil may be deposited on the shock outer tube (body) and is normally noticed due to the collection of dust in this area. Shock absorbers which exhibit this weepage condition are functional units and should not be replaced. Leakage is a condition in which the entire shock body is covered with oil and the oil will drip from the shock onto the pavement.
   If this condition exists:
   a. Ensure that fluid observed is not from sources other than the shock absorber.
   b. Replace the worn or damaged shock absorber.
2. **Vehicle Sag:** Many times shock absorbers are replaced in an effort to solve a vehicle sag concern. Shock absorbers by design are hydraulic damping units only, and unlike suspension springs, do not support any suspension loads. Therefore, replacing a shock absorber will not correct a vehicle sag concern.
3. **Replacement in Pairs:** In the past it was recommended that shock absorbers be replaced in pairs if one unit became unserviceable. Improved sealing, due to new materials and design and improved rod machining and hardening techniques along with improved manufacturing quality checks have added to the functional reliability of shock absorbers. **Therefore, shocks no longer need to be replaced in pairs when only one unit is not serviceable.**

Vehicle Inspection

1. Check all tires for proper inflation pressure.
2. Check tire condition to confirm proper front end alignment, tire balance and overall tire condition such as separation or bulges.
3. Check the vehicle for optional suspension equipment such as heavy duty handling or trailer tow suspensions. These suspensions will have a firmer ride feeling than standard suspensions.
4. Check vehicle attitude for evidence of possible overload or sagging. Check luggage compartment area.
5. Road test vehicle to confirm customer concern after performing above Steps.

Hoist Check

1. **Noise:** Noise can be caused by loose suspension or shock attachments. Verify that all attachments or the suspension components and shock absorbers are tight. Replace any worn or damaged upper stud insulators. Replace any shock absorber that has a damaged integral lower mounting bushing. Check shock absorbers for external damage.

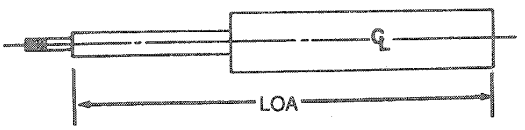
CLEANING AND INSPECTION (Continued)

2. **Bottom/Hopping:** Check condition of the rubber suspension travel stops (jounce/rebound bumpers). Replace if worn or missing. Examine for evidence of previous overload or damaged components.
3. **Force-Check:** Support lower arm or axle, and remove lower shock attachment. Stroke shock absorber body using as much travel as possible. The action should be smooth and uniform throughout each stroke. Damping forces should be equivalent on both sides of the vehicle.
4. Replace only the worn or damaged shock absorber. **Shock absorbers do not require replacement in pairs, unless both units are worn or damaged.**

Bench Test

The shock absorbers are gas-pressurized, which results in the shocks being fully extended when not restrained. If a shock does not fully extend, it is damaged and should be replaced. Check length overall (LOA). If the shock does not meet the length overall requirement, there is a good indication something internal is not to specification and the shock should be replaced.

With the shock in the normal upright position, compress it and allow it to extend three times to purge the pressure chamber of any gas that may have been introduced during handling.



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SHOCK LOA SPECIFICATION

Front	Rear
541-533mm (21.30-20.98 in.)	646-636mm (25.4-25 in.)

Place the shock absorber right side up in a vise. Hand stroke the shock absorber as fast as possible using as much travel as possible. Action should become smooth and uniform throughout each stroke. Higher resistance on extension than on compression is normal.

CAUTION: If the combination dust shield/jounce bumper has been removed from the shock absorber, care must be taken to avoid excessive bottoming of the rod during the compression stroke to avoid internal damage.

The following conditions are abnormal:

- A lag or skip at reversal of travel near mid-stroke when shock is properly primed and in the installed position
- Seizing
- Noise, other than a faint swish, such as a clicking upon fast stroke reversal
- Excessive fluid leakage
- With rod fully extended, any lateral motion of rod in relation to outer can

If shock absorber action remains erratic after purging air, install a new shock absorber, replacing only the damaged unit. Shock absorbers are not to be replaced as sets. Refer to Section 04-01 for Front Shocks or Section 04-02 for Rear Shocks.

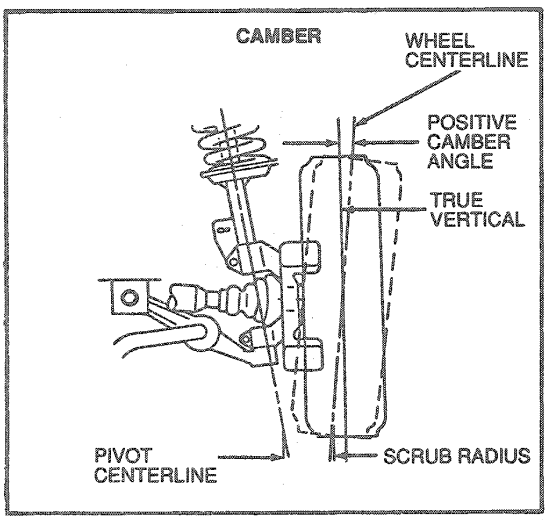
ADJUSTMENTS

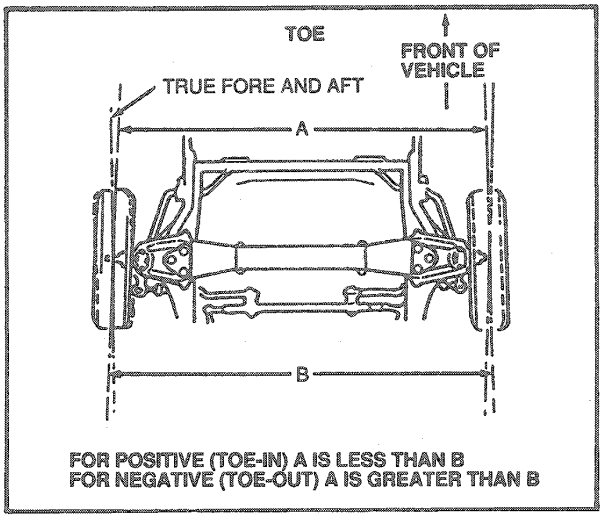
Equipment Installation

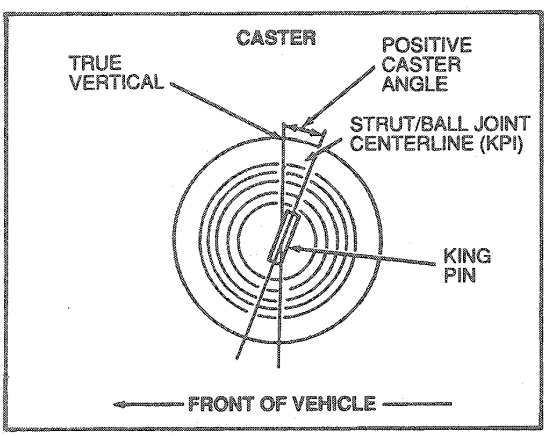
Equipment used for alignment inspection must be accurate. All wheel alignment readings must be performed on an alignment rack leveled to within 1.59mm (1/16-inch) side-to-side and front-to-rear. The instrumentation used must have a means of compensating for wheel runout and must be capable of reading individual (LH and RH) toe measurements.

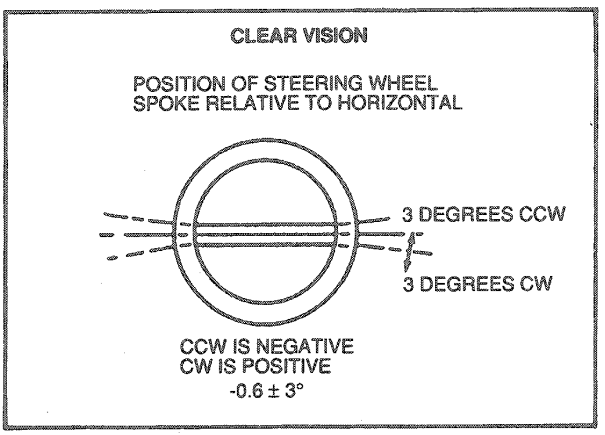
ADJUSTMENTS (Continued)

Reference Definitions, Front









SIDE-TO-SIDE

SIDE-TO-SIDE MEANS THE VALUE OF THE LEFT SIDE MINUS THE VALUE OF THE RIGHT SIDE
EXAMPLE:
LEFT CAMBER = + 3/4 DEGREES
RIGHT CAMBER = + 1/4 DEGREES
SIDE-TO-SIDE = 3/4 DEGREES — 1/4 DEGREES = + 1/2 DEGREES
EXAMPLE:
LEFT CAMBER = + 1/4 DEGREES
RIGHT CAMBER = +3/4 DEGREES
SIDE-TO-SIDE = 1/4 DEGREES -3/4 DEGREES = +1/2 DEGREES

NOMINAL

THE NOMINAL VALUE IS THE PREFERRED VALUE

TOLERANCE

THE TOLERANCE IS THE RANGE OF ACCEPTABLE VALUES AROUND THE NOMINAL VALUE
EXAMPLE:
S-S CAMBER = + 1/2 DEGREES (NOM.) ± 3/4 DEGREES (TOL.) MEANS THAT VALUES BETWEEN +1-1/4 DEGREES AND -1/4 DEGREES ARE ACCEPTABLE.

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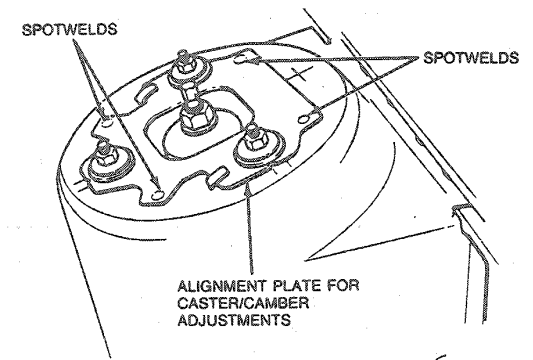
ADJUSTMENTS (Continued)

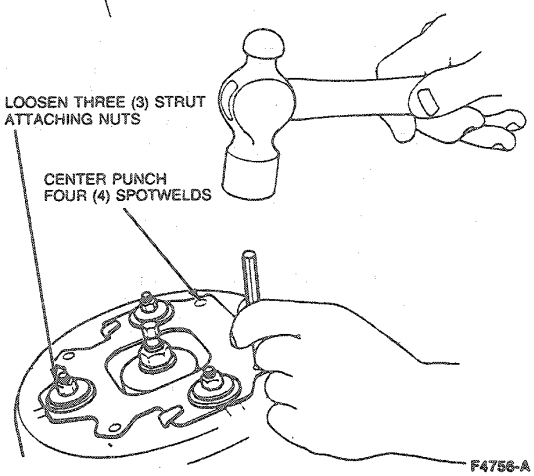
Caster and Camber, Front

NOTE: Refer to Section 02-01 to check subframe alignment before caster / camber adjustments are performed.

NOTE: Vehicles that require camber / caster adjustment can be corrected by loosening the subframe retaining bolts and shifting the subframe as required. If further adjustment is required, use the following procedure:

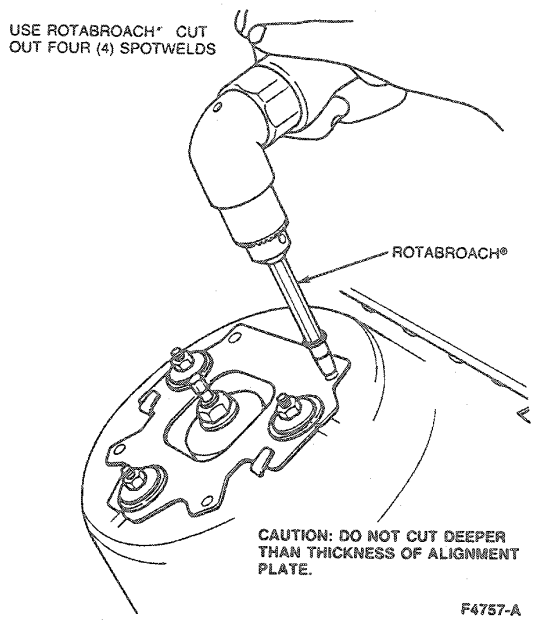
1. Center punch four spot welds on alignment plate(s).



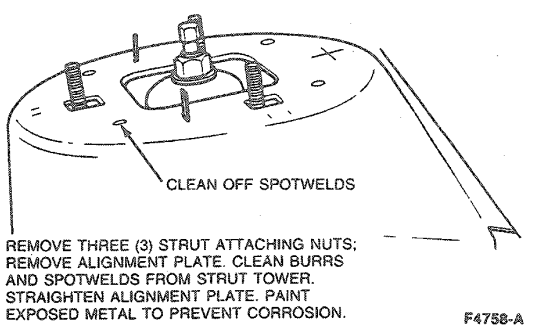


2. Loosen three nuts attaching strut to vehicle.
3. Use Rotabroach® or an equivalent to remove four welds.

   CAUTION: Do not cut deeper than necessary to remove alignment plate.



4. Remove three nuts attaching strut mount to tower.
5. Remove alignment plate.
6. Clean burrs from tower and alignment plate and paint exposed metal on strut tower and plate.



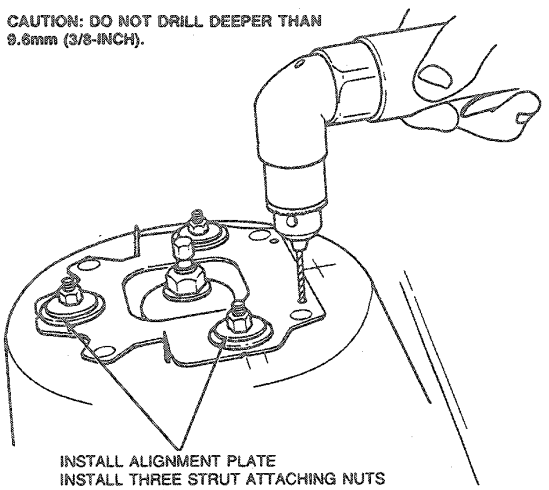
7. Install alignment plate.
8. Install three strut mount nuts, loosely.

   NOTE: Caster measurements must be made on the LH side by turning the LH wheel through the prescribed angle of sweep and on the RH side by turning the RH wheel through the prescribed angle of sweep.

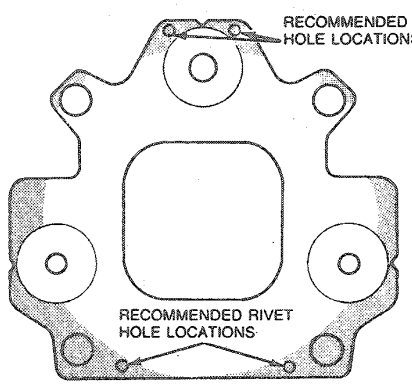
   NOTE: When using alignment equipment designed to measure caster on both the RH and LH side, turning only one wheel will result in a significant error in the caster angle for the opposite side.
9. Make alignment-camber / caster adjustments.
10. Tighten three strut mount nuts to 27-41 N·m 20-30 lb-ft).

ADJUSTMENTS (Continued)

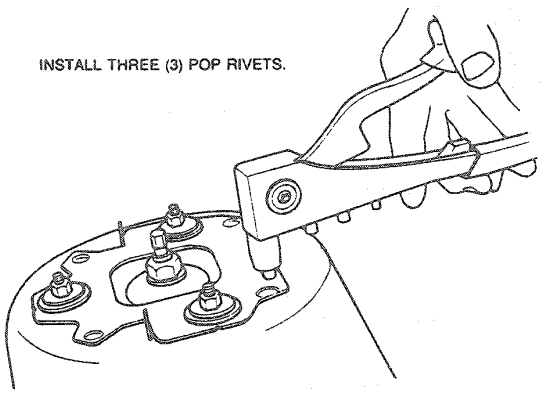
11. Drill three 3.2mm (1/8 inch) holes through alignment plate and strut tower and paint exposed metal.



CAUTION: Do not drill deeper than 9.6mm (3/8 inch) into shock tower.



12. Install three pop-rivets 3.2mm (1/8 inch) diameter x 6.4mm (1/4 inch) grip range.



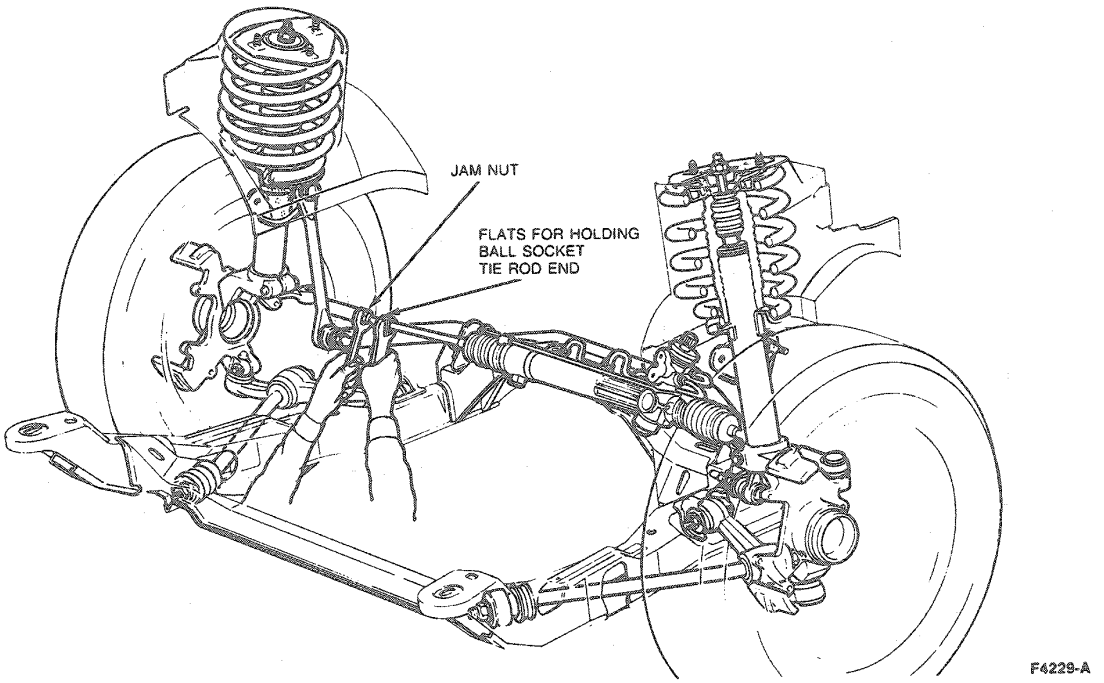
Toe, Front

1. Ensure alignment equipment is calibrated and in good working condition to obtain accurate results.
2. Start engine (power steering only) and move steering wheel back and forth several times until it is in straight-ahead or centered position.
3. Turn engine OFF (power steering only) and lock steering wheel in place using a steering wheel holder. Loosen and slide off small outer clamp from steering gear boot prior to starting toe adjustment to prevent boot from twisting.

   NOTE: When jam nuts are loosened for toe adjustment, the nuts must be tightened to 48-68 N·m (35-50 lb-ft). Attach boot clamp after setting is completed and ensure boot is not twisted.

ADJUSTMENTS (Continued)

4. Adjust LH and RH tie rods until each wheel has one-half of desired total toe specification. Correct toe setting is given in Specifications.



Wheel Turning Angle, Front

The turning angle cannot be adjusted directly because it is a result of the combination of caster, camber and toe adjustments and should, therefore, be measured only after the toe adjustment has been made. When the inside wheel is turned 20 degrees, turning angle of outside wheel should be as specified in Specifications.

NOTE: If the turning angle does not measure to specification, check the steering knuckle or other suspension or steering parts for a bent or loose condition.

Steering Pull / Drift

NOTE: When trying to correct for pull / drift, refer to the following conditions:

Vehicle will pull / drift:

a. Toward the side with the most positive camber.

b. Toward the side with the least positive caster.

NOTE: Rear camber is preset at the factory for the sedan and wagon. However, if the rear camber for the station wagon is out of specification, refer to Camber, Rear.

Camber, Rear

Adjustment Kit Installation

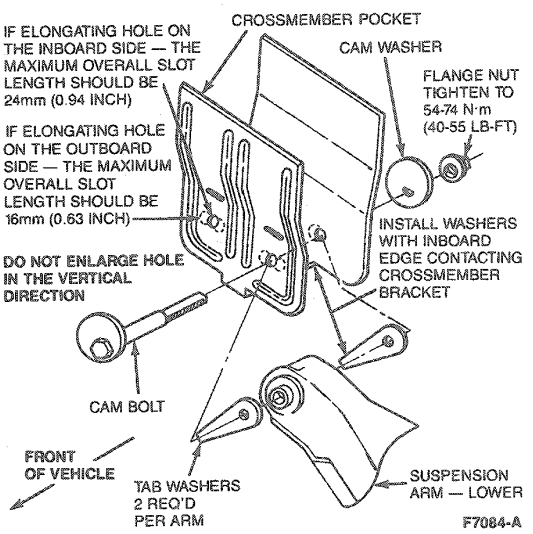
Taurus / Sable Station Wagons Only

Excessive wear on the inboard edges of the rear tires may be caused by camber and rear toe settings that are not within specification. To correct this, reset rear camber and rear toe to specification. If camber cannot be set to specification, install an adjustable camber kit if not previously installed, using the following service procedure.

1. Inspect rear suspension for damage. Replace any damaged components before continuing.
2. Measure and record vehicle rear wheel alignment settings for LH camber, RH camber, LH toe and RH toe.
   a. If vehicle is in specification for camber but out of specification for toe, reset toe to nominal specification of +0.06 degrees toe-in for each individual wheel.
   b. If both camber and toe are within specification, reset toe to nominal specification of +0.06 degrees toe-in for each individual wheel.
   c. If vehicle is out of specification for camber on either side, proceed with Step 3.

ADJUSTMENTS (Continued)

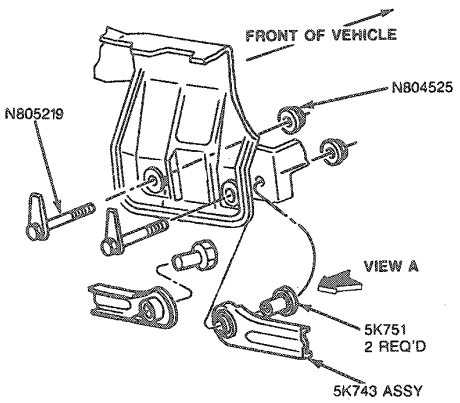
3. Obtain Rear Camber Adjustment Kit E7DZ-5K751-A or equivalent.
4. Raise vehicle using frame hoist. Refer to Section 00-02.
5. Remove stabilizer bar U-brackets from outboard ends of lower arms.
6. Remove parking brake cable retaining bracket from crossmember center bracket.
7. Place a floor jack with a wood block under lower arm stamping midway between lower arm inner pivot bushing and lower arm coil spring.
8. Remove and discard lower arm inner pivot retaining nut.
9. Using floor jack, pre-load underside of lower arm. Remove and discard lower arm inner pivot bolt.
10. Using floor jack, slowly lower the arm out of crossmember pocket until coil spring is completely relaxed. A pry bar will be required to guide lower arm toward outboard direction to clear crossmember stamping as arm is being lowered.
11. Using a 1/2-inch diameter tapered rotary file, elongate both forward and rearward lower arm crossmember holes to the following dimensions.
    a. If camber measurement from Step 2 was out-of-specification in the **negative** direction, elongate hole horizontally on inboard side until overall slot length measures 24mm (0.94 inch).
    b. If camber measurement from Step 2 was out-of-specification in the **positive** direction, elongate hole horizontally on outboard side until overall slot length measures 16mm (0.63 inch).
12. Using floor jack, raise lower arm back up into crossmember pocket.
13. Install kit inner pivot cam bolt from front side of crossmember. As cam bolt is being installed, the two kit tab washers are to be installed on bolts so that one washer is trapped between each end of inner pivot bushing inner sleeve and inside surface of crossmember pocket.
14. Place kit cam washer and nut on bolt, position tab washers to be in contact with crossmember bracket, and tighten nut to 54-74 N·m (40-55 lb-ft).
15. Repeat Steps 7 through 14 for opposite side of vehicle.
16. Reinstall stabilizer bar U-brackets and parking brake cable bracket. Tighten U-bracket retaining bolts to 27-40 N·m (20-30 lb-ft).
17. Align rear wheels as outlined.

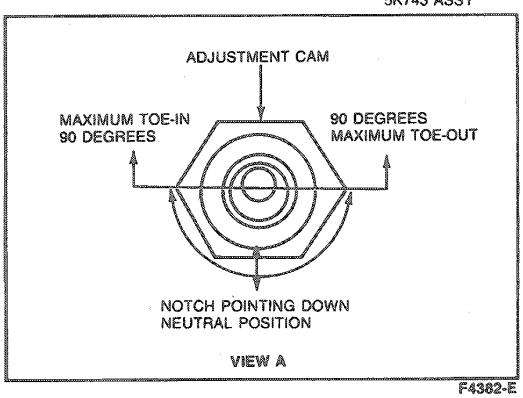


ADJUSTMENTS (Continued)

Toe, Rear

Toe-in and Toe-out can be adjusted when it is determined that the vehicle is not within alignment specification. To adjust the toe of either wheel, loosen the bolt attaching rear control arm to body and rotate alignment cam until the required alignment setting is obtained. Tighten control arm retaining bolt to 54-74 N·m (40-55 lb-ft).





Wheel Toe, Rear—Individual

NOTE: If the alignment equipment is Rotunda, computerized 4-wheel alignment system 006-01803 or equivalent, the following method for determining individual rear wheel toe can be used instead of sighting the rear wheels.

Place a ruler on the center of the front wheel and note where the vertical line of light crosses the scale. Do the same for the other side.

The difference between the two readings should not exceed 25.4mm (1 inch).

Wheel Alignment, Rear

1. Place vehicle on alignment rack.
2. Reset rear toe to nominal specification of +0.06 degrees (+0.031 inch) toe-in for each individual wheel.
   a. Loosen lower arm pivot nut approximately one turn.
   b. Adjust camber to -0.90 degrees by rotating cam bolt.

      NOTE: Rim of cams will ride against ribs which are formed in crossmember bracket. The cam is not intended to be turned a full 360 degrees.
   c. Hold cam bolt head in position with a back-up wrench and tighten inner pivot nut to 54-74 N·m (40-55 lb-ft).

      CAUTION: Use care when tightening so as not to disturb cam/alignment setting.

SPECIFICATIONS

FRONT WHEEL TURNING ANGLE

Vehicle	Turning Angle at Outside Wheel with Inside Wheel Turned 20 Degrees
Taurus/Sable	Left Wheel and Right Wheel 18.25°

SPECIFICATIONS (Continued)

WHEELBASE AND TREAD WIDTH

Vehicle Taurus/Sable	Wheelbase		Tread Width			
			Front		Rear	
	mm	Inches	mm	Inches	mm	Inches
Sedan	2694	106.1	1565.6	61.6	1520.8	59.9
Wagon	2694	106.1	1565.6	61.6	1518	59.8

FRONT WHEEL ALIGNMENT (CURB HEIGHT WITH 1/2 TANK OF FUEL)

Item	Alignment Factors		
	Nominal	Minimum	Maximum
Taurus/Sable Sedan			
Caster[a]	+3.8°	+2.8°	+4.8°
Caster Difference Side-to-Side (left minus right)	0°	-0.85°	+0.85°
Camber	-0.5°	-1.1°	+0.1°
Camber Difference Side-to-Side (left minus right)	0°	-0.70°	+0.70°
Total Toe (left plus right)	-0.100 inch -0.200°	-0.225 inch -0.450°	+0.15 inch +.030°
Clear Vision[b]	-0.6°	-3.6°	+2.4°
Taurus/Sable Station Wagon			
Caster[a]	+3.7°	+2.7°	+4.7°
Caster Difference Side-to-Side (left minus right)	0°	-0.85°	+0.85°
Camber	-0.40°	-1.00°	-0.20°
Camber Difference Side-to-Side (left minus right)	0°	-0.70°	+0.70°
Total Toe (left plus right)	-0.100 inch -0.200°	-0.225 inch -0.450°	+0.15 inch +0.30°
Clear Vision[b]	-0.6°	-3.6°	+2.4°

a Caster measurements must be made on the LH side by turning left wheel through the prescribed angle of sweep and on the RH side by turning the right wheel through the prescribed angle of sweep for the equipment being used. When using alignment equipment designed to measure caster on both the RH and LH side, turning only one wheel will result in a significant error in caster angle for the other wheel.
b Steering wheel angle—negative is ccw.

REAR WHEEL ALIGNMENT (CURB HEIGHT WITH 1/2 TANK OF FUEL)

Item	Alignment Factors		
	Nominal	Minimum	Maximum
Taurus/Sable Sedan			
Camber[a]	-0.90°	-1.60°	-0.20°
Camber Difference[a] Side-to-Side (left minus right)	0°	-1.20°	+1.20°
Toe (individual sides)	+0.030 inch +0.06°	-0.095 inch -0.19°	+0.155 inch +0.31°
Total Toe (left plus right)	+0.060 inch +0.12°	-0.060 inch -0.13°	+0.185 inch +0.37°
Taurus/Sable Station Wagon			
Camber[b]	-0.90°	-1.90°	+0.10°
Camber Difference[b] Side-to-Side (left minus right)	0°	-1.20°	+1.20°
Toe (individual sides)	+0.030 inch +0.06°	-0.095 inch -0.19°	+0.155 inch +0.31°
Total Toe (left plus right)	+0.060 inch +0.12°	-0.060 inch -0.13°	+0.185 inch +0.37°

a Camber is factory set and cannot be adjusted.
b Adjustable with kit, Part No. E7OZ-5K751-A.

SPECIFICATIONS (Continued)

TORQUE SPECIFICATIONS

Description	N·m	Lb-Ft
Strut Top Mount Nuts	27-41	20-30
Tie Rod Jam Nuts	48-68	35-50
Rear Control Arm Bolt	61-88	45-65
Rear Alignment Kit Cam Nut	54-74	40-55
Rear Stabilizer U-Bracket Bolts	27-40	20-30

SPECIAL SERVICE TOOLS

ROTUNDA EQUIPMENT

Model	Description
006-01803	Computerized 4-Wheel Alignment System

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VEHICLE APPLICATION

Taurus/Sable.

DESCRIPTION

The front-wheel drive front suspension is a MacPherson gas-pressurized strut design. The shock absorber strut assembly includes a rubber isolated top mount, seat and bearing assembly and coil spring insulator, and is attached at the top by three bolts retaining the top mount of the strut to the body side apron. The lower end of the assembly is inserted into a pinch joint designed into the knuckle. A forged lower arm assembly is attached to the subframe and steering knuckle. A tension strut connects to the lower arm and to the subframe. A sealed cartridge bearing is pressed into the steering knuckle and retained with a snap ring. The front-wheel hub is pressed into the bearing. A halfshaft outboard CV joint spline is pressed through the hub and is retained by a prevailing torque nut.

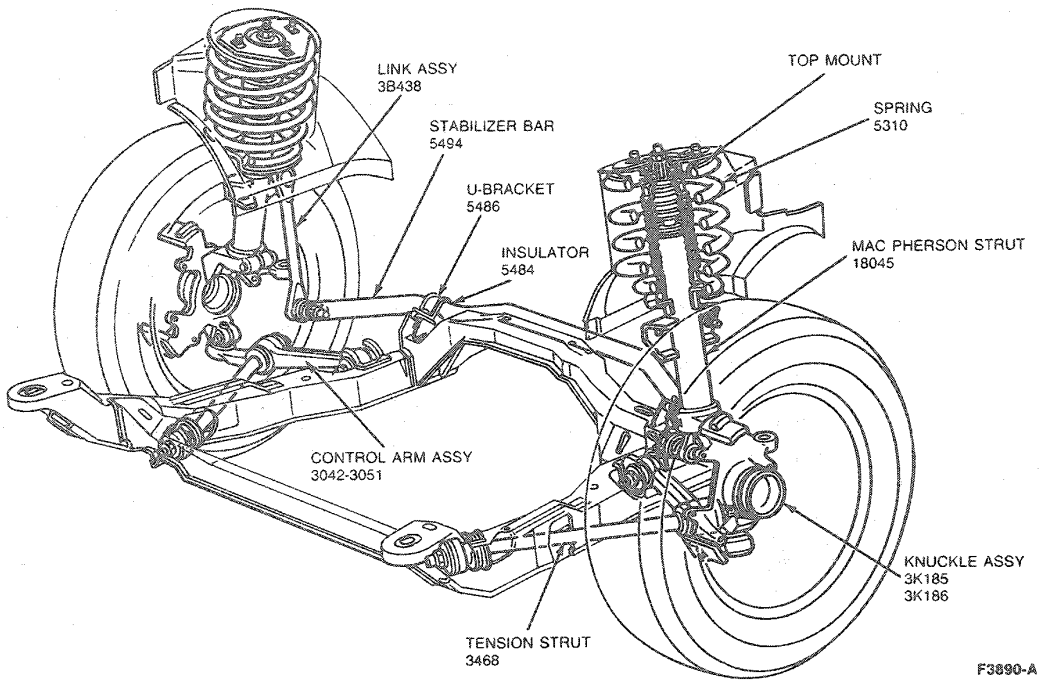
WARNING: ALL VEHICLES ARE EQUIPPED WITH GAS-PRESSURIZED SHOCK ABSORBERS WHICH WILL EXTEND UNASSISTED. DO NOT APPLY HEAT OR FLAME TO THE SHOCK STRUT DURING REMOVAL.

When a gas-pressurized shock strut is held in a vertical position, it is normal for it to be fully extended because the strut is charged with a gas pressure of up to 593 kPa (86 psi) above the oil level which results in an extending force on the piston rod that can produce a fully extended preload of up to 222 N (50 lb) on the piston rod.

Due to the preload, it will take up to 222 N (50 lb) to push the strut rod down into the cylinder tube (outer can). **This is normal and does not indicate a binding condition.**

DESCRIPTION (Continued)

When installed on the vehicle, the gas-pressurized shock strut will exhibit more oscillation (bounce) when the vehicle is bounced up / down at the front bumper than with a conventional strut. This is due to the gas pressure and valving and is a normal condition.



Components

- **Strut Upper Mounts:** Isolate strut and spring from body.
- **Seat and Bearing Assembly:** Provides a bearing pivot point and retains suspension spring.
- **Coil Springs:** Allow proper setting of suspension ride heights and control suspension travel during driving / handling maneuvers.
- **Steering Knuckles:** Transmit steering input pivoting about the lower control arm ball joints and upper mount bearing, house driveline components which propel vehicle, and support brake caliper through pins.
- **Forged Lower Control Arms:** Control lateral (side-to-side) movement of each front wheel. Inner pivot attachment is pivot point for suspension.
- **Ball Joints:** Connect steering knuckle to outer ends of forged lower control arms. They are pivot points for suspension travel and turning.
- **Tension Struts:** Control longitudinal (fore-and-aft) movement of wheels to reduce harshness when wheels hit sudden irregularities in road surface.
- **Stabilizer Bar:** Transmits forces to control vehicle roll during cornering.
- **Stabilizer Bar Link Assembly:** Provides increased roll control by attaching the stabilizer bar to the shock strut.
- **Shock Absorber Struts:** Provide dynamic damping of suspension, limit downward movement of wheels by an internal rebound stop and upward movement with an external jounce bumper. Provide lateral, longitudinal and vertical support for the front wheels.

All suspension mounting points are rubber insulated to minimize transfer of road noise and vibration to body and interior.

Component Replacement

The following components may be replaced either individually or as an assembly:

- Gas-pressurized shock absorber struts must be replaced as an assembly. The strut is not serviceable. Replace only the damaged shock absorber strut. Shock absorbers are not to be replaced as sets.
- Strut upper mounts may be replaced individually.

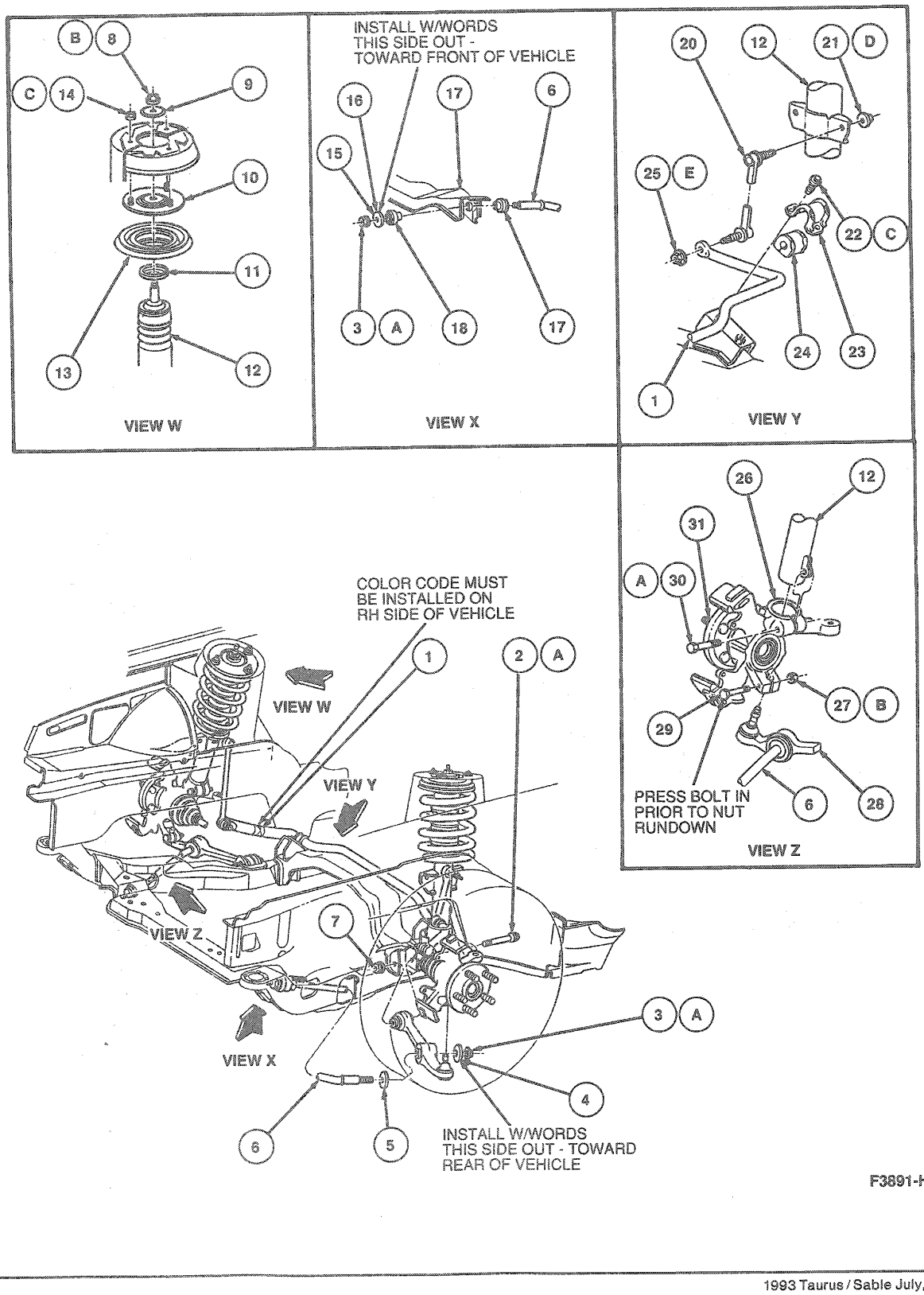
DESCRIPTION (Continued)

- Bearing and seat assemblies may be replaced individually.
- Coil springs may be replaced individually.
- Lower coil spring insulator may be replaced individually.
- Steering knuckles may be replaced individually.
- Wheel hubs may be replaced individually.
- Bearings and / or retaining rings may be replaced individually.
- Forged lower arm assemblies are replaceable with the ball joint, inner bushing and tension strut-to-arm insulator included in the assembly. The arm assemblies may be replaced individually.
- Ball joint seals are not replaceable.
- Ball joint is not replaceable.
- Tension strut insulators in the lower arm may be replaced individually.
- Lower arm inner pivot bushings may be replaced individually.
- Tension struts may be replaced individually.
- Tension strut-to-subframe insulators may be replaced individually.
- Tension strut washers at the subframe and lower control arm are replaceable with proper Ford approved hardened components.
- Stabilizer bar may be replaced.
- Stabilizer bar-to-subframe insulators may be replaced individually.
- Stabilizer bar brackets may be replaced individually.
- Stabilizer bar double ball joint links may be replaced individually.
- Stabilizer bar link ball joints are not replaceable.

Suspension Fasteners

Suspension fasteners are important attaching parts in that they could affect performance of vital components and systems, and / or could result in major service expense. They must be replaced with ones of the same part number or with an equivalent part if replacement becomes necessary. **DO NOT** use a replacement part of lesser quality or substitute design. Torque values must be as specified during assembly to ensure proper retention of parts. New fasteners must be used whenever old fasteners are loosened or removed and when new components are installed.

DESCRIPTION (Continued)



DESCRIPTION (Continued)

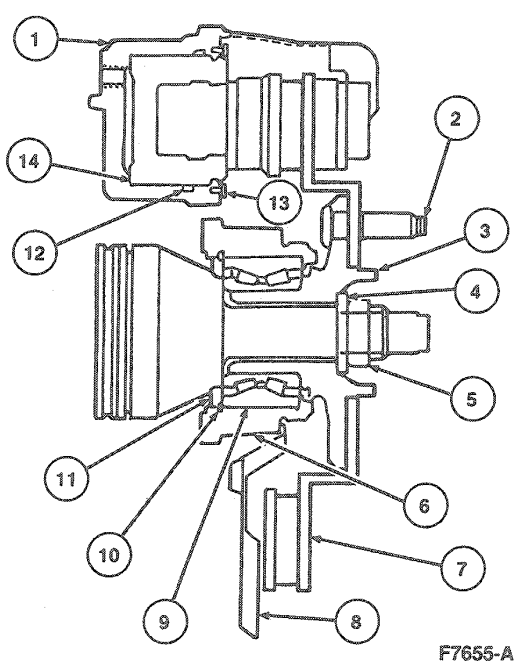
Item	Part Number	Description
1	5494	Stabilizer Bar
2A	N803990-S160	Bolt (2 Req'd)
3A	N800237-S101	Nut (4 Req'd)
4	N804350-S1036	Washer (2 Req'd)
5	N805708-S7	Washer (2 Req'd)
6	3468	Tension Strut (2 Req'd)
7	N805480-S160	Nut (2 Req'd)
8B	N804608-S150	Nut (2 Req'd)
9	N804002-S100	Washer (2 Req'd)
10	18183	Strut Mount Assy (2 Req'd)
11	N806779-S100	Washer (2 Req'd)
12	18045	Strut Assy
13	3K028	Bearing and Seat Assy (2 Req'd)
14C	N803826-S150	Nut (6 Req'd)
15	N804018-S36M	Flat Washer (Except SHO/MTX and Police) (2 Req'd)
16	N805627-S36M	Cupped Washer (SHO/MTX and Police) (2 Req'd)
17	—	Subframe
18	3C078	Bushing Insulator (Red—SHO/MTX and Police) (2 Req'd)

(Continued)

Item	Part Number	Description
19	3C067	Bushing Assy (2 Req'd)
20	3B438	Link Assy (2 Req'd)
21D	N804911-S160	Nut (2 Req'd)
22C	N806899-S7	Bolt (4 Req'd)
23	5486	U-Bracket (2 Req'd)
24	5484	Insulator (2 Req'd)
25E	N804446-S160	Nut (2 Req'd)
26	3K185 RH 3K186 LH	Knuckle Assy
27B	N803985-S160	Nut (2 Req'd)
28	3051 LH 3042 RH	Control Arm Assy
29	N804021-S160	Bolt (2 Req'd)
30A	N803989-S160	Bolt (2 Req'd)
31	1104	Hub Assy
A		Tighten to 98-132 N·m (73-97 Lb-Ft)
B		Tighten to 53-72 N·m (40-53 Lb-Ft)
C		Tighten to 30-40 N·m (23-29 Lb-Ft)
D		Tighten to 77-103 N·m (57-75 Lb-Ft)
E		Tighten to 47-63 N·m (35-46 Lb-Ft)

Wheel Assembly

Each front wheel is bolted to a hub assembly. There are two opposed tapered roller bearings (inner and outer) with grease retainer seals (inner and outer), encased in one single cup or cartridge. This bearing assembly is pressed into the steering knuckle bore from the inboard side until it rests against the shoulder on the outboard side. A snap ring is installed in a groove on the inboard side of the knuckle bore for added bearing retention. A bearing dust seal is installed on the constant velocity (CV) joint, inboard of the knuckle/bearing/hub assembly. The hub assembly is pressed into the bearing/knuckle assembly. The CV joint splined shaft is pressed through the hub. A prevailing torque hub nut and washer retain the hub assembly to the CV joint.



F7655-A

DESCRIPTION (Continued)

Item	Part Number	Description
1	2B118 RH 2B119 LH	Caliper Assy
2	1107	Wheel Bolt Assy
3	1104	Hub Assy
4	N801336-S101	Washer
5	N804199-S191	Hub Nut
6	3K185 RH 3K186 LH	Knuckle Assy
7	1125	Rotor
8	2K004 RH 2K005 LH	Dust Shield
9	1215	Cartridge Bearing Assy
10	N803955-S	Snap Ring
11	1N013	Dust Seal Assy
12	—	Seal
13	—	Boot
14	—	Piston

REMOVAL AND INSTALLATION

Control Arm, Lower

Removal

1. Raise vehicle on a hoist. Refer to Section 00-02.
2. Remove wheel and tire assembly.
3. Remove and discard nut from tension strut. Pull off dished washer.

   NOTE: Ensure steering column is in unlocked position. **DO NOT** use a hammer to separate ball joint from knuckle.
4. Remove and discard lower control arm ball joint nut and pinch bolt. Using a screwdriver, slightly spread the knuckle pinch joint and separate control arm from steering knuckle. A drift punch may be used to remove bolt. **Use extreme care to not damage ball joint boot seal.**

   CAUTION: Do not allow steering knuckle/halfshaft to move outward. Over-extension of the tripod CV joint could result in separation of internal parts, causing failure of the joint.
5. Remove and discard lower control arm inner pivot bolt and nut.
6. Remove lower control arm assembly from tension strut.

Installation

NOTE: Ensure the front washer is present at tension strut-to-arm attachment.

1. Insert tension strut into lower control arm bushing.
2. Position lower control arm into subframe bracket. Install a new nut and bolt. Tighten to 98-132 N·m 73-97 lb-ft).
3. Assemble lower control arm ball joint stud to steering knuckle, making sure that ball stud groove is properly positioned. **Use extreme care to not damage ball joint seal.**
4. Insert a new pinch bolt and nut. Tighten to 53-72 N·m (40-53 lb-ft).
5. Clean tension strut threads to remove dirt and contamination.
6. Install dished washer, dished side away from lower arm bushing and new nut on tension strut. Tighten to 98-132 N·m (73-97 lb-ft).
7. Install wheel and tire assembly. Refer to Section 04-04. Tighten nuts to 109-142 N·m (81-105 lb-ft).
8. Lower vehicle.

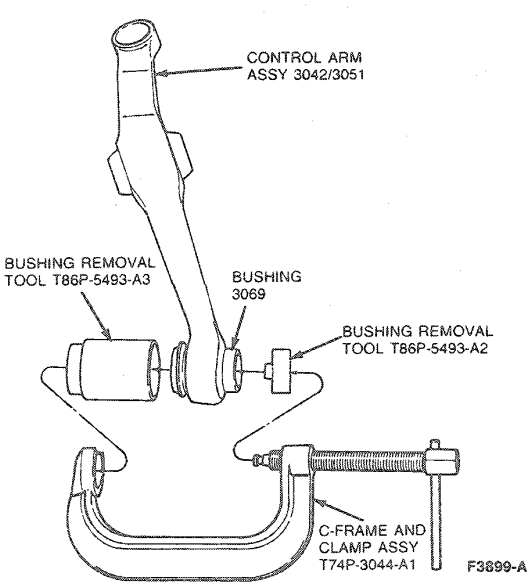
Inner Pivot Bushing

Tools Required:

- C-Frame and Clamp Assembly T74P-3044-A1
- Lower Control Arm Bushing Service Set T86P-5493-A
- Bushing Removal Tool T86P-5493-A2
- Bushing Removal Tool T86P-5493-A3
- Bushing Installation Tool T86P-5493-A4

Removal

1. Remove lower control arm as outlined.
2. Using Bushing Removal Tools T86P-5493-A3, T86P-5493-A2 from Lower Control Arm Bushing Service Set T86P-5493-A, and C-Frame and Clamp Assembly T74P-3044-A1, remove old bushing from control arm.



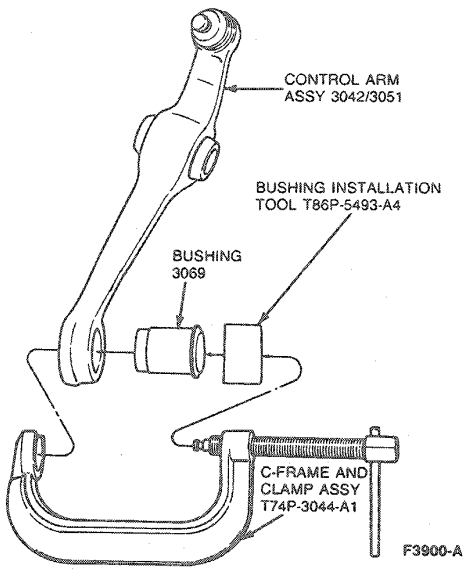
NOTE: C-clamp must be held tight in a bench vise.

REMOVAL AND INSTALLATION (Continued)

Installation

NOTE: Ensure that the bushing flange is at front of the arm.

1. Using Bushing Installation Tool T86P-5493-A4 from Lower Control Arm Bushing Service Set T86P-5493-A, and C-Frame and Clamp Assembly T74P-3044-A1, install new bushing in lower control arm by tightening C-clamp slowly until the tool bottoms on arm. Tool sets the bushing to correct installation depth.



2. Install lower control arm as outlined.

Control Arm-to-Tension Strut Insulator, Lower

Tools Required:

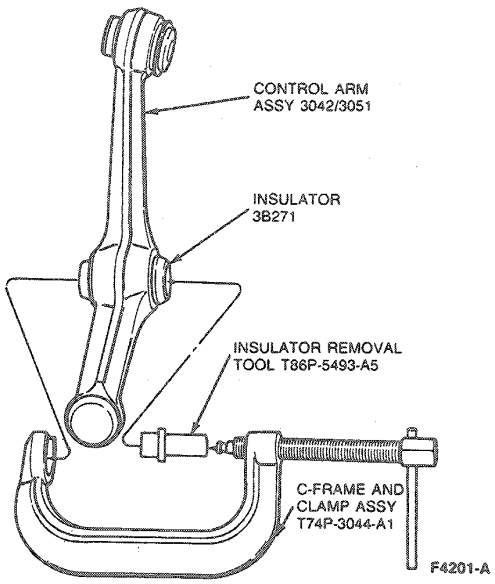
- C-Frame and Clamp Assembly T74P-3044-A1
- Lower Control Arm Bushing Service Set T86P-5493-A
- Insulator Installation Tool T86P-5493-A1
- Insulator Installation Tool T86P-5493-A2

Removal

1. Remove lower control arm as outlined.

   NOTE: C-clamp must be held tight in a bench vise.

2. Using Insulator Removal Tool T86P-5493-A5 from Lower Control Arm Bushing Service Set T86P-5493-A, and C-Frame and Clamp Assembly T74P-3044-A1, remove old bushing from control arm.



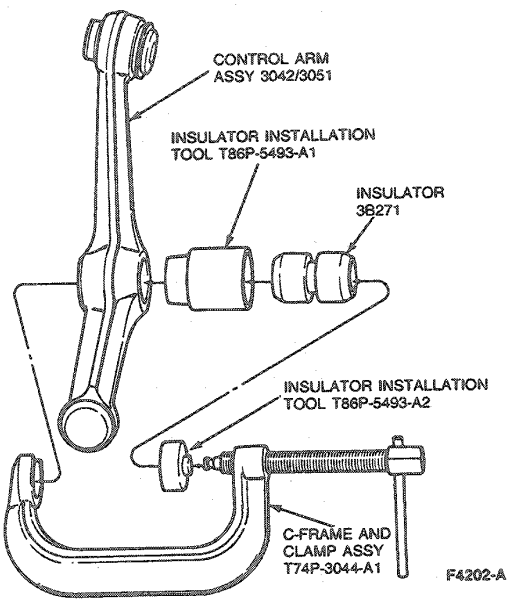
Installation

NOTE: Saturate new bushing and lower arm with vegetable oil such as Mazola® or an equivalent oil. Use only vegetable oil. Any mineral or petroleum based oil or brake fluid will deteriorate the rubber bushing.

1. Using Insulator Installation Tools T86P-5493-A1, T86P-5493-A2 from Lower Control Arm Bushing Service Set T86P-5493-A, and C-Frame and Clamp Assembly T74P-3044-A1, install new insulator bushing in lower control arm by tightening the C-clamp very slowly until bushing pops into place.

REMOVAL AND INSTALLATION (Continued)

2. Install lower control arm as outlined.



Tension Strut-to-Subframe Insulators

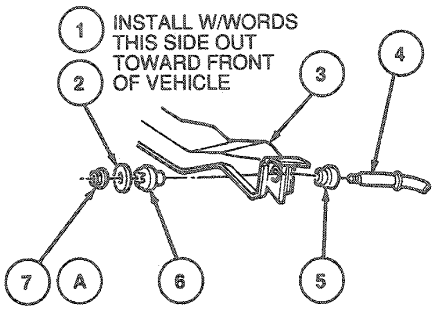
Removal

1. Remove lower control arm as outlined.
2. Remove and discard nut, washer and insulator from front of tension strut and pull strut rearward to remove from subframe.
3. Remove and discard insulator from tension strut.

Installation

1. Install new insulator on tension strut end and insert into subframe.
2. Install new front insulator.
3. Clean tension strut threads to remove dirt and contamination.

4. Install new washer and new nut. Tighten to 98-132 N·m (73-97 lb-ft).
5. Install lower control arm as outlined.



Item	Part Number	Description
1	N804018-S36M	Flatwasher (Except SHO/MTX and Police) (2 Req'd)
2	N805627-S36M	Cupped Washer (SHO and Police) (2 Req'd)
3	—	Subframe
4	3468	Tension Strut (2 Req'd)
5	3C078	Insulator (2 Req'd)
6	3C067	Bushing Assy (2 Req'd)
7A	N800237-S101	Nut (2 Req'd)
A		Tighten to 98-132 N·m (73-97 Lb-Ft)

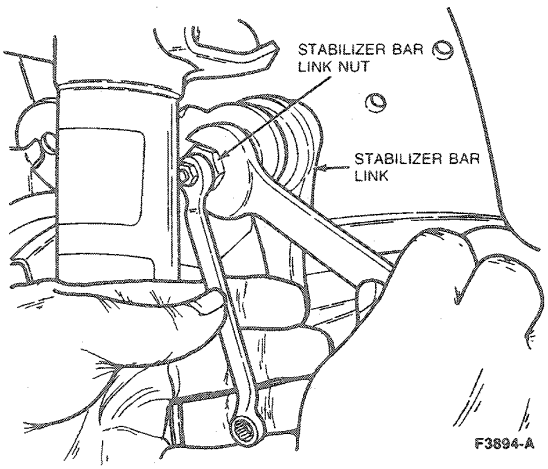
Stabilizer Bar/Link Assembly and/or Insulators

Removal

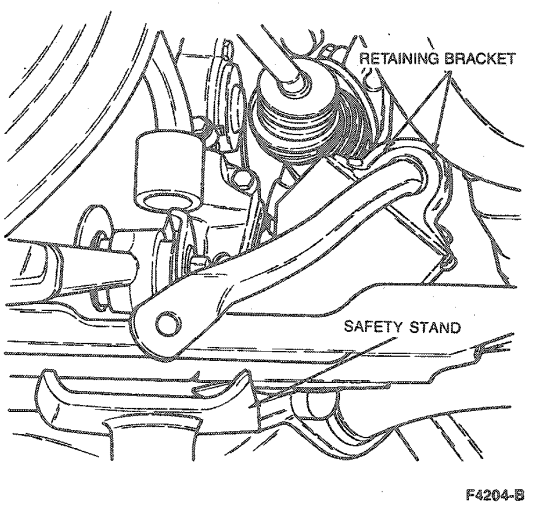
1. Raise vehicle on a hoist. Refer to Section 00-02.
2. Support vehicle with hoist or safety stands behind subframe.

REMOVAL AND INSTALLATION (Continued)

3. Remove and discard nuts retaining link assembly to stabilizer bar and shock strut with a 8mm closed-end wrench and 18mm open-end wrench.



4. Remove nuts retaining steering gear to subframe, and move gear off the subframe.
5. With another set of support safety stands under subframe, remove two rear subframe retaining bolts. Lower rear of the subframe to obtain access to stabilizer bar mounting brackets.



6. Remove stabilizer bar U-bracket bolts and replace insulators, U-brackets and / or stabilizer bar as required. Discard insulators and bolts.

Installation

1. Clean stabilizer bar to remove dirt and contamination in area of stabilizer bar insulator installation position.
2. Lubricate inside diameter of new insulators with Rubber Suspension Insulator Lube E25Y-19553-A (ESF-M99B112-A) or equivalent. Do not use any mineral or petroleum based lubricants as they will deteriorate the rubber insulators.
3. Install new insulators onto stabilizer bar and position them in approximate location.
4. Install U-brackets on insulators and install new bolts. Tighten to 30-40 N·m (23-29 lb-ft).
5. Raise subframe and install new subframe-to-body retaining bolts. Position steering gear onto subframe and install retaining nuts. Tighten to 115-135 N·m (85-99 lb-ft).
6. Install new nuts and secure link assembly to stabilizer bar and shock strut. Tighten to 77-103 N·m (57-75 lb-ft) at shock strut and 47-63 N·m (35-46 lb-ft) at stabilizer bar.
7. Remove safety stands.
8. Lower vehicle.

Hub and Wheel Bearings

Tools Required:

- Hub Remover / Replacer T81P-1104-C
- Front Bearing Remover T83P-1104-AH2
- Wheel Bolt Adapters T83P-1104-BH1
- Drive Tube T83T-3132-A1
- Two Stud Adapter T86P-1104-A1
- Front Bearing Spacer T86P-1104-A2
- Bearing Installer T86P-1104-A3
- Bearing Dust Seal Installer T86P-1104-A4
- Shaft Protector D80L-625-1
- Front Hub Puller D80L-1002-L
- Three-Jaw Puller D80L-1013-A

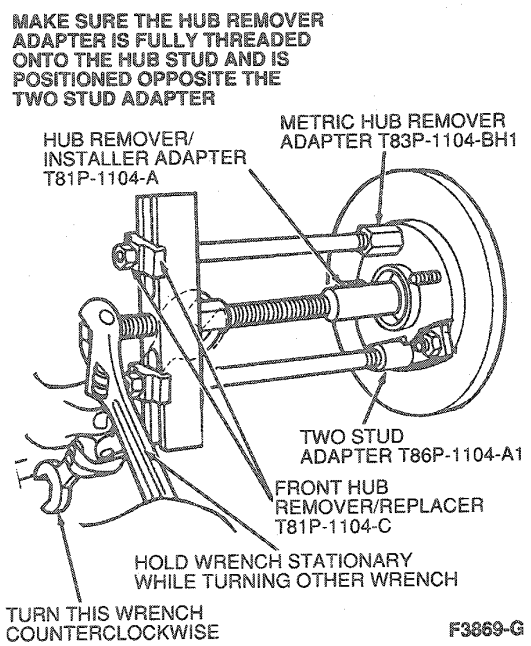
Removal

1. Remove wheelcover / hub cover from wheel and tire assembly and loosen wheel lug nuts.
2. Remove hub nut retainer and washer by applying sufficient torque to the nut to overcome prevailing torque feature of crimp in nut collar. Do not use an impact-type tool to remove hub nut retainer. Hub nut retainer must be discarded after removal.
3. Raise vehicle on hoist. Refer to Section 00-02.
4. Remove wheel and tire assembly.
5. Remove brake caliper by loosening caliper locating pins and rotating caliper off rotor, starting from lower end of caliper and lifting upward. Do not remove caliper pins from caliper assembly. Lift caliper off rotor and hang it free of rotor. Do not allow caliper assembly to hang from brake hose. Support caliper assembly with a length of wire.

REMOVAL AND INSTALLATION (Continued)

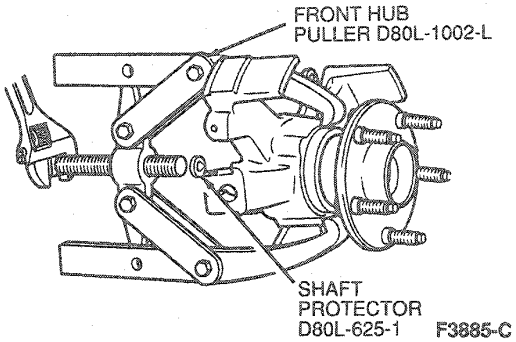
6. Remove rotor from hub by pulling it off the hub bolts. If rotor is difficult to remove from hub, strike rotor sharply between studs with a rubber or plastic hammer.

   If rotor will not pull off, apply Rust Penetrant and Inhibitor D7AZ-19A501-AA (ESR-M99C56-A) or equivalent to inboard and outboard rotor hub mating surfaces. Install 3-Jaw Puller D80L-1013-A or equivalent and remove rotor by pulling on rotor outside diameter and pushing on hub center. If excessive force is required for removal, check rotor for lateral runout prior to installation.
7. Lateral runout must be checked with nuts clamping stamped hat section of rotor.
8. Remove rotor splash shield. Refer to Section 06-03.
9. Disconnect lower control arm and tie rod from knuckle (leave strut attached) as outlined.
10. Loosen two strut top mount-to-apron nuts.
11. Install Hub Remover / Installer Adapter T81P-1104-A with Front Hub Remover / Replacer T81P-1104-C and Wheel Bolt Adapters T83P-1104-BH1 and Two Stud Adapter T86P-1104-A1 and remove hub, bearing and knuckle assembly by pushing out CV joint outer shaft until it is free of assembly.

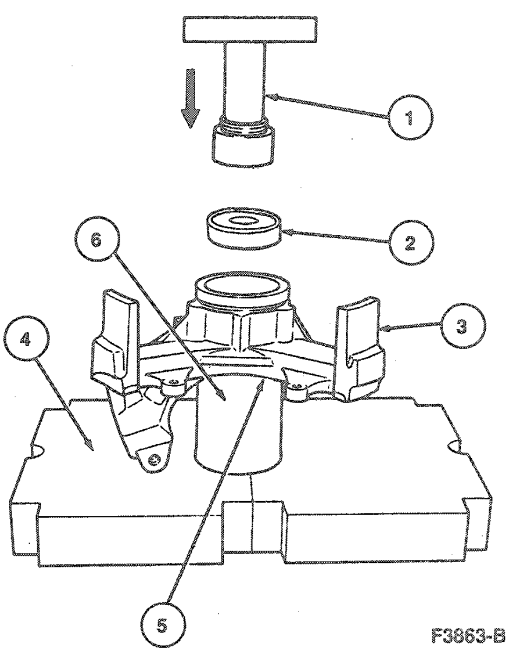


12. Support knuckle with a length of wire, remove strut bolt and slide hub / bearing / knuckle assembly off strut.
13. Carefully remove support wire, and carry hub / bearing / knuckle assembly to a bench.
14. On the bench, install Front Hub Puller D80L-1002-L and Shaft Protector D80L-625-1 or equivalent, with jaws of puller on knuckle bosses and remove hub.

    NOTE: Ensure the shaft protector is centered, clears the bearing ID, and rests on the end face of the hub journal.



15. Remove snap ring, which retains bearing in knuckle assembly, with snap ring pliers and discard.
16. Using a hydraulic press, place Front Bearing Spacer T86P-1104-A2 step side up on press plate and position knuckle (outboard side up) on the spacer. Install Front Bearing Remover T83P-1104-AH2 centered on the bearing inner race and press bearing out of the knuckle.
17. Discard bearing.



REMOVAL AND INSTALLATION (Continued)

Item	Part Number	Description
1	—	Arbor Press
2	T83P-1104-AH2	Front Bearing Remover Tool
3	—	Knuckle-Outboard Side Up
4	—	Face Plate
5	—	Step Side Up
6	T86P-1104-A2	Front Bearing Spacer Tool

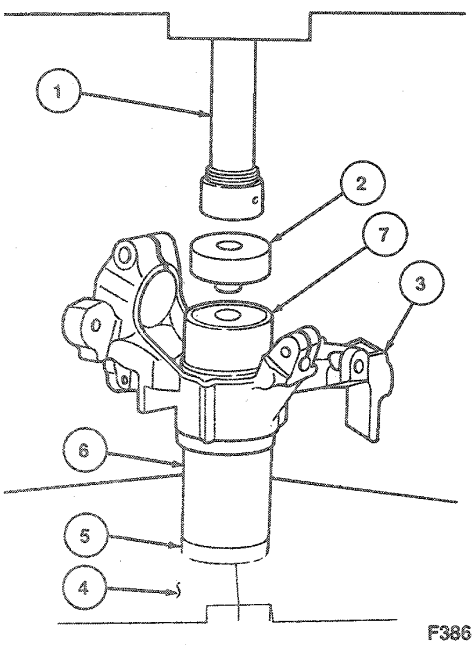
TF3863B

Installation

NOTE: If hub bearing journal is scored or damaged, replace hub. Do not attempt to service. The front wheel bearings are of a cartridge design and are pregreased, sealed, and require no scheduled maintenance. The bearings are preset and cannot be adjusted. If a bearing is disassembled for any reason, it must be replaced as a unit. No individual service seals, roller or races are available.

1. On bench, remove all foreign material from knuckle bearing bore and hub bearing journal to ensure correct seating of new bearing.
2. Place Front Bearing Spacer T86P-1104-A2 step side down on hydraulic press plate and position knuckle (outboard side down) on spacer. Position a new bearing in inboard side of knuckle. Install Bearing Installer T86P-1104-A3 (undercut side facing bearing), on bearing outer race and press bearing into knuckle. Ensure that bearing seats completely against shoulder of knuckle bore.

   CAUTION: Bearing Installer T86P-1104-A3 must be positioned as indicated above to prevent bearing damage during installation.

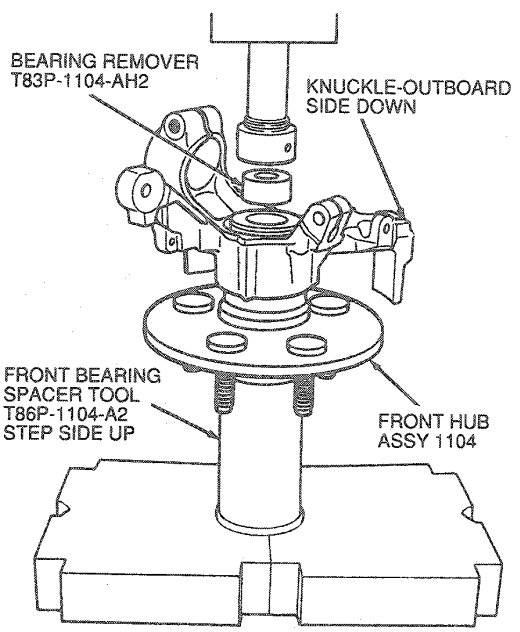


F3864-D

Item	Part Number	Description
1	—	Arbor Press
2	T86P-1104-A3	Bearing Installer Tool (Must be Positioned with Undercut Side Facing Bearing)
3	—	Knuckle-Outboard Side Down
4	—	Face Plate
5	—	Step Side Down
6	T86P-1104-A2	Front Bearing Spacer Tool
7	1215	Bearing Assy

TF3864D

3. Install a new snap ring (part of bearing kit) in knuckle groove using snap ring pliers.
4. Place Front Bearing Spacer T86P-1104-A2 on the arbor press plate and position hub on tool with lugs facing downward. Position knuckle assembly (outboard side down) on the hub barrel. Place Bearing Remover T83P-1104-AH2 flat side down, centered on inner race of the bearing and press down on tool until bearing is fully seated onto hub. Ensure that hub rotates freely in knuckle after installation.

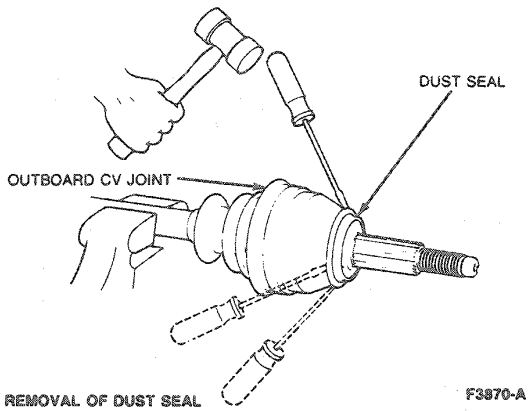


F3865-D

REMOVAL AND INSTALLATION (Continued)

5. Prior to hub/bearing/knuckle installation, replace bearing dust seal on the outboard CV joint with new seal from bearing kit.

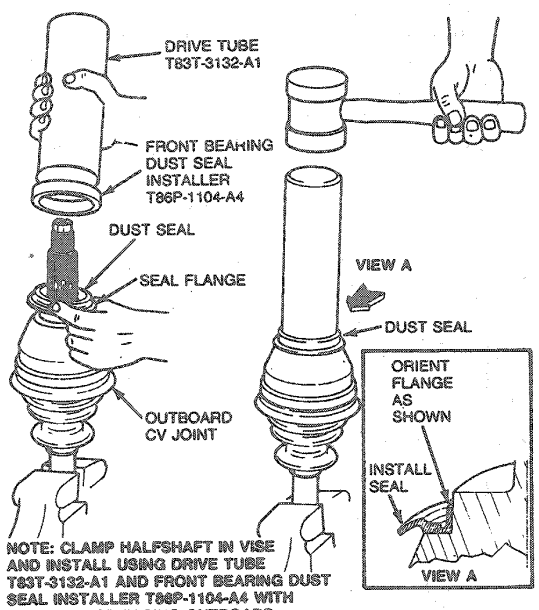
NOTE: TAP UNIFORMLY TO REMOVE DUST SEAL, USING LIGHT DUTY HAMMER AND SCREWDRIVER.



REMOVAL OF DUST SEAL F3870-A

6. Install new dust seal, ensuring seal flange faces outboard toward bearing. Use Drive Tube T83T-3132-A1 and Front Bearing Dust Seal Installer T86P-1104-A4.

DUST SEAL INSTALLATION



NOTE: CLAMP HALFSHAFT IN VISE AND INSTALL USING DRIVE TUBE T83T-3132-A1 AND FRONT BEARING DUST SEAL INSTALLER T86P-1104-A4 WITH SEAL FLANGE FACING OUTBOARD.

F3866-B

7. Suspend the hub/bearing/knuckle assembly on the vehicle with wire and attach the strut loosely to the knuckle. Lubricate the CV joint stub shaft splines with SAE 30 weight motor oil and insert shaft into hub splines as far as possible using hand pressure only. Check that splines are properly engaged.

8. Temporarily fasten rotor to hub with washers and two lug nuts. Insert a steel rod into rotor diameter and rotate clockwise to contact knuckle.

   CAUTION: Do not use power or impact-type tools to tighten the hub nut.

9. Install hub nut washer and new hub nut retainer. Rotate nut clockwise to seat CV joint. Tighten nut to 230-275 N·m (170-202 lb-ft). Remove steel rod, washers and lug nuts.
10. Complete installation of front suspension components as outlined.

    NOTE: Apply a small amount of Disc Brake Caliper Slide Grease D7AZ-19590-A (ESA-M1C172-A) or equivalent to pilot diameter of rotor.

11. Install rotor splash shield. Refer to Section 06-03.
12. Install disc brake rotor to hub assembly.
13. Install disc brake caliper over rotor.
14. Ensure outer brake shoe spring hook is seated under upper arm of knuckle.
15. Install wheel and tire assembly, tightening wheel lug nuts finger-tight.
16. Lower vehicle and block wheels to prevent vehicle from rolling.

    WARNING: REPLACEMENT LUG NUTS OR STUDS MUST BE OF THE SAME TYPE AND SIZE AS THOSE BEING REPLACED.

17. Tighten wheel lug nuts to 115-142 N·m (85-105 lb-ft).
18. Install wheelcover or hub cover and lower vehicle completely to the ground.
19. Remove wheel blocks.

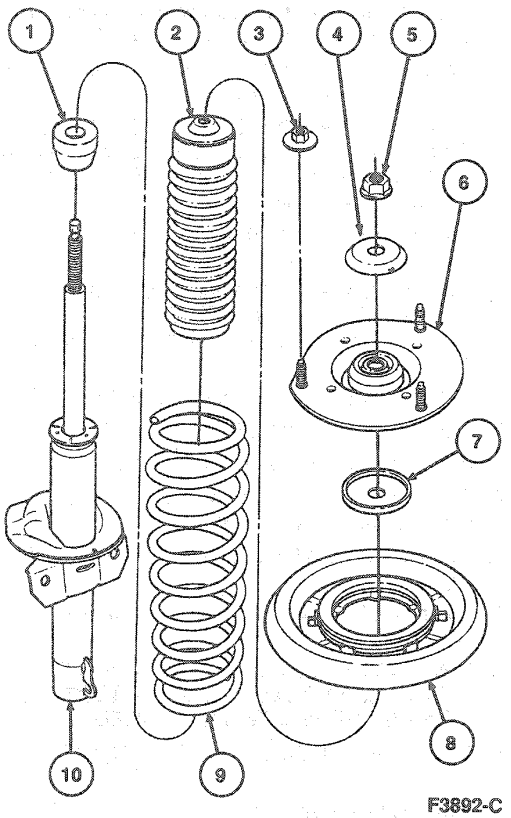
Shock Absorber Strut, Spring, Bearing and Seat Assembly, and Upper Mount

Tools Required:

- Tie Rod Remover Adapter T81P-3504-W
- MacPherson Strut Spring Compressor D85P-7178-A or Rotunda Spring Compressor D86-00029
- Tie Rod End Remover TOOL-3290-D

CAUTION: Never attempt to disassemble the spring or top mount without first compressing the spring using Universal MacPherson Strut Spring Compressor D85P-7178-A or Rotunda Spring Compressor 086-00029, or equivalent.

REMOVAL AND INSTALLATION (Continued)

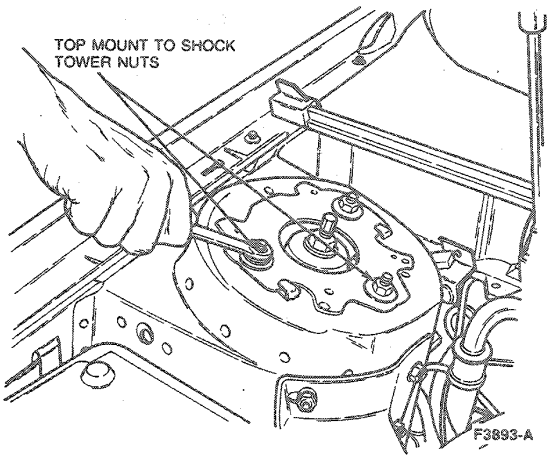


F3892-C

Item	Part Number	Description
1	18A085	Jounce Bumper
2	18K005	Dust Boot
3	N803826-S100	Nut (3 Req'd)
4	N804002-S100	Washer
5	N804104-S36	Nut
6	18183	Top Mount Bracket Assy
7	N806779-S100	Washer
8	3K028	Bearing and Seat Assy
9	5310	Front Spring
10	18045	Shock Strut

Removal

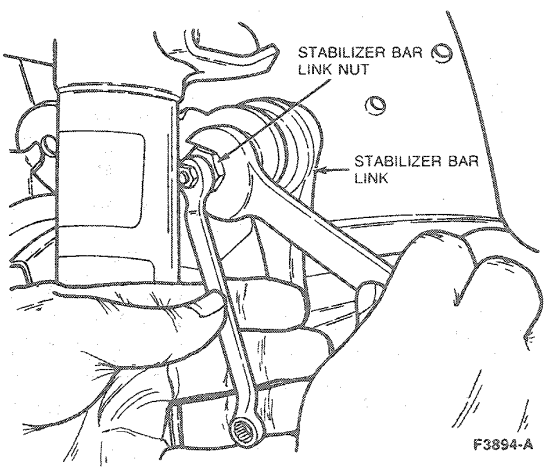
1. Turn ignition to OFF position to place steering column in unlocked position.
2. Remove hub nut as outlined.
3. Loosen, but do not remove, three top mount-to-shock tower nuts.



F3893-A

NOTE: Do not raise vehicle by lower control arms.

4. Raise vehicle on a hoist. Refer to Section 00-02.
5. Remove tire and wheel assembly. Refer to Section 04-04.
6. Move brake caliper and wire out of the way. Refer to Section 06-03.
7. Remove brake rotor. Refer to Section 06-03.
8. Remove cotter pin from tie rod end stud and remove slotted nut. Discard cotter pin and nut.
9. Using Tie Rod End Remover TOOL-3290-D and Tie Rod Remover Adapter T81P-3504-W or equivalent, remove tie rod from knuckle.
10. Remove stabilizer bar link nut, and remove link from strut.



F3894-A

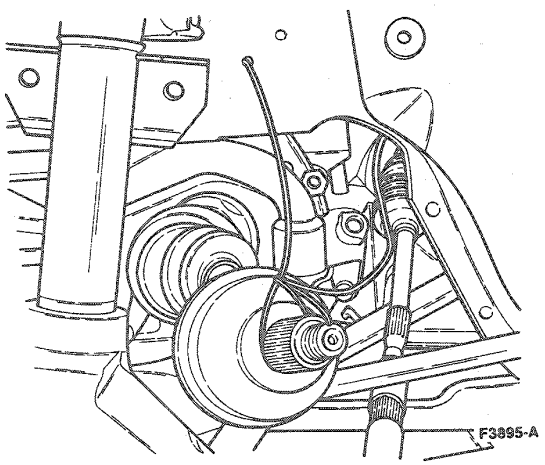
CAUTION: Use extreme care to not damage the ball joint boot seal.

REMOVAL AND INSTALLATION (Continued)

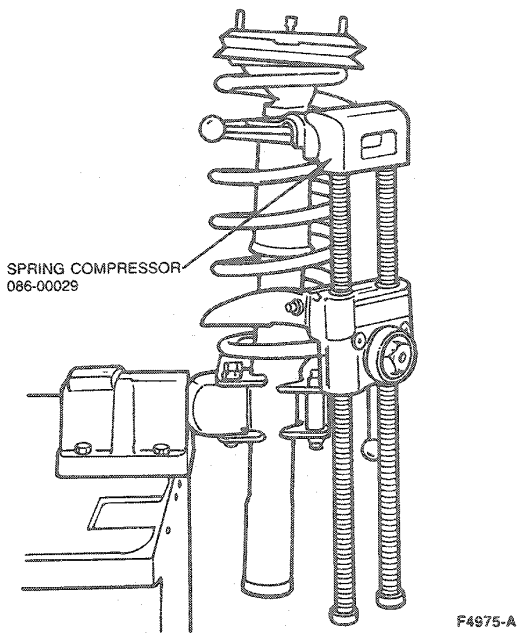
11. Remove and discard lower arm-to-steering knuckle pinch bolt and nut. (A drift punch may be used to remove bolt.) Using a screwdriver, slightly spread knuckle-to-lower arm pinch joint and remove lower arm from steering knuckle.

    CAUTION: Do not allow the halfshaft to move outboard. Over-extension of the tripod CV joint could result in separation of internal parts, causing failure of the joint.

12. Press halfshaft from hub as outlined. Wire halfshaft to body to maintain level position.

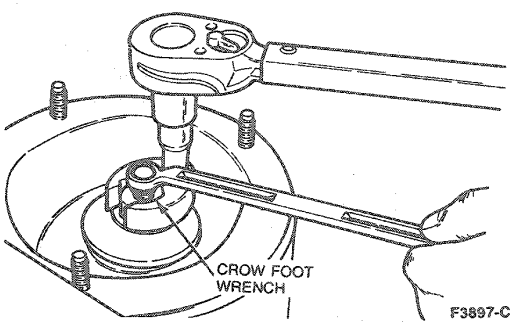


13. Remove shock absorber strut-to-steering knuckle pinch bolt. Using a large screwdriver, slightly spread knuckle-to-strut pinch joint, if required, for removal.
14. Remove steering knuckle and hub assembly from shock absorber strut.
15. Remove three top mount-to-shock tower nuts and remove strut and spring assembly from vehicle.
16. Compress spring with Spring Compressor 086-00029 or equivalent.



CAUTION: It is important that the retaining nut be turned and rod held still to prevent fracture of the rod at the base of the hex.

17. Place 10mm box-end wrench on top of shock strut shaft and hold while removing top shaft retaining nut with a 21mm 6-point crow foot wrench and ratchet.



18. Loosen Spring Compressor 086-00029 or equivalent, then remove top mount bracket assembly, bearing plate assembly and spring.

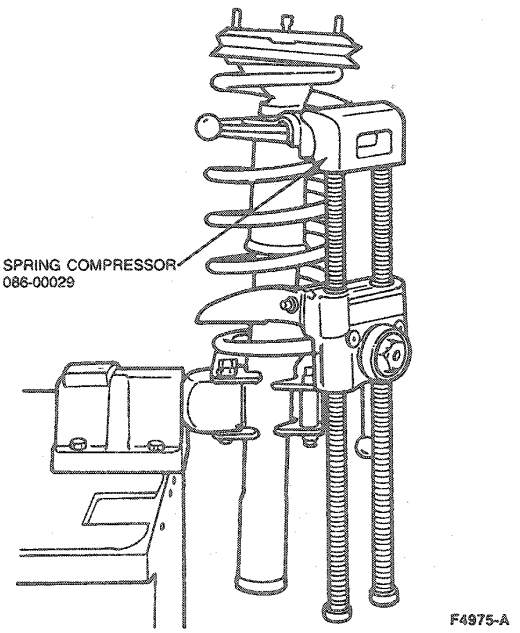
Installation

CAUTION: Make sure that the correct assembly sequence and proper positioning of bearing and seat assembly are followed. The bearing and seat assembly is press-fit onto the upper mount.

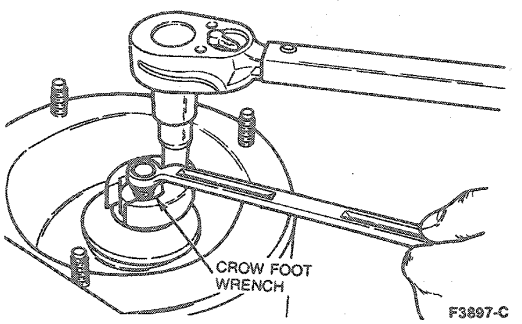
NOTE: When servicing, check the spring insulator for damage before assembly. If the outer metal splash shield is bent or damaged, it must be bent back carefully so that it does not touch the locator tabs on the bearing and seal assembly.

REMOVAL AND INSTALLATION (Continued)

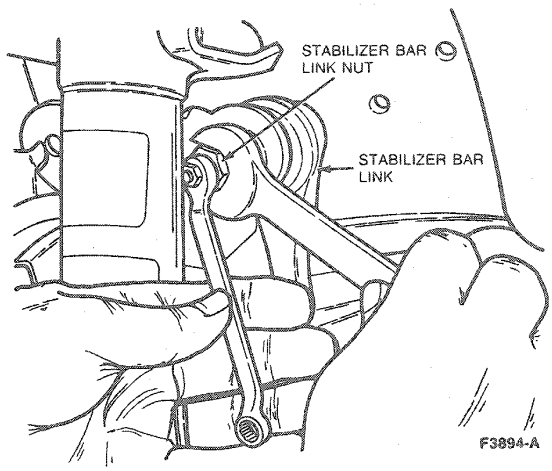
1. Install Spring Compressor 086-00029 or equivalent.
2. Install spring, bearing plate assembly, lower washer and top mount bracket assembly.
3. Compress spring with Spring Compressor 086-00029 or equivalent.
4. Install upper washer and nut on the shock strut shaft.



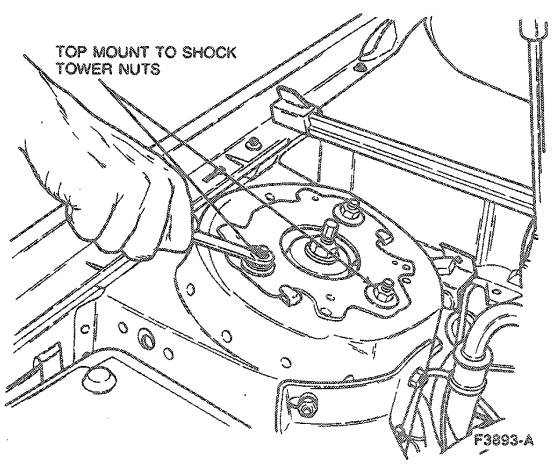
5. Place a 10mm box-end wrench on top of shock strut shaft and hold while tightening top shaft retaining nut with a 21mm 6-point crow foot wrench and ratchet to 53-72 N·m (40-53 lb-ft).



6. Install strut and spring assembly and three top mount-to-shock tower nuts.
7. Install steering knuckle and hub assembly to shock absorber strut.
8. Install a new shock absorber strut-to-steering knuckle pinch bolt. Tighten to 98-132 N·m (73-97 lb-ft).
9. Install halfshaft into hub as outlined.
10. Install lower arm to steering knuckle ensuring that ball stud groove is properly positioned. **Use extreme care to not damage ball joint seal.** Install a new pinch bolt and nut. Tighten to 53-72 N·m (40-53 lb-ft).
11. Install stabilizer bar link to strut and install a new stabilizer bar link nut. Tighten to 77-103 N·m (57-75 lb-ft).



12. Install tie rod end onto knuckle.
13. Install a new tie rod end slotted nut. Tighten to 31-47 N·m (23-34 lb-ft).
14. Install a new slotted nut retaining cotter pin.
15. Install brake rotor. Refer to Section 06-03.
16. Install brake caliper. Refer to Section 06-03.
17. Install tire and wheel assembly.
18. Tighten three top mount-to-shock tower nuts to 30-40 N·m (23-29 lb-ft).



REMOVAL AND INSTALLATION (Continued)

19. Lower vehicle and tighten hub nut to 230-275 N·m (170-202 lb-ft).
20. Depress brake pedal several times prior to moving vehicle.

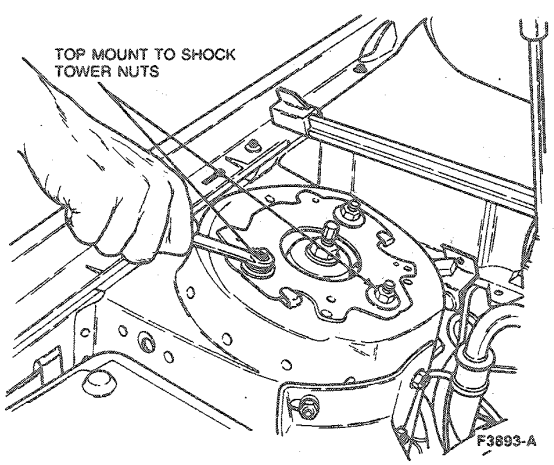
Steering Knuckle

Tools Required:

- Tie Rod End Remover Adapter T81P-3504-W
- Heavy Duty Riveter D80L-23200-A

Removal

1. Turn ignition to OFF position to place steering column in unlocked position.
2. Remove hub nut as outlined.
3. Raise vehicle on a hoist. Refer to Section 00-02.
4. Remove tire and wheel assembly. Refer to Section 00-02.
5. Remove cotter pin from the tie rod end stud and remove slotted nut. Discard cotter pin and nut.
6. Using Tie Rod End Remover TOOL-3290-D and Tie Rod End Remover Adapter T81P-3504-W or equivalent, remove tie rod end from knuckle.
7. Remove stabilizer bar link assembly from strut.
8. Remove brake caliper and wire in such a manner as to obtain working space. Remove brake rotor. Refer to Section 06-03.
9. Loosen, but do not remove, three top retaining nuts (top mount-to-shock tower).

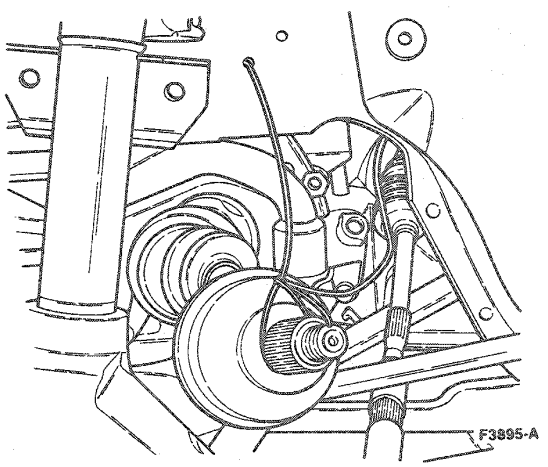


NOTE: Ensure steering column is in unlocked position, and do not use a hammer to separate ball joint from knuckle. **Use extreme care not to damage boot seal.**

10. Remove and discard lower arm-to-steering knuckle pinch bolt and nut. (A drift punch may be used to remove bolt.) Using a screwdriver, slightly spread knuckle-to-lower arm pinch joint and remove lower arm from steering knuckle.

    CAUTION: Do not allow the halfshaft to move outboard. Over-extension of the tripod CV joint could result in separation of internal parts, causing failure of the joint.

11. Remove shock absorber strut-to-steering knuckle pinch bolt. Using a large screwdriver, slightly spread knuckle-to-strut pinch joint.
12. Press halfshaft from hub as outlined. Wire halfshaft to body to maintain a level position.



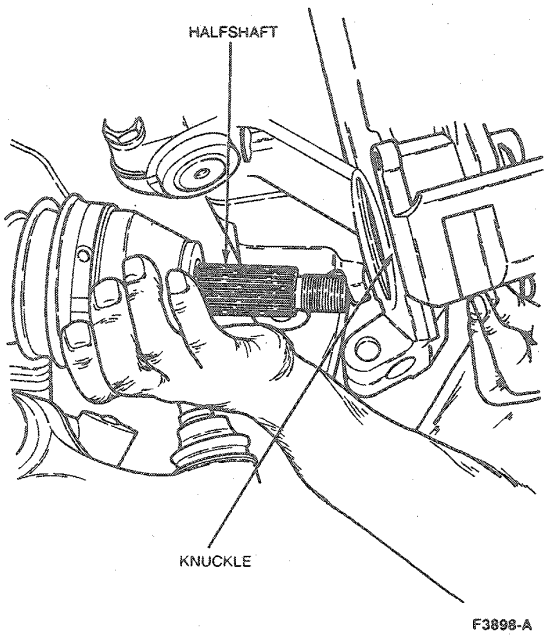
13. Remove rotor splash shield, if so equipped, from knuckle. Refer to Section 06-03.
14. Remove steering knuckle and hub assembly from the shock absorber strut.
15. Place assembly on a bench and remove the hub, retainer ring and bearing as outlined.

Installation

1. Install rotor splash shield using new rivets and Heavy Duty Riveter D80L-23200-A or equivalent. Refer to Section 06-03.
2. Install bearing, retainer ring and hub as outlined. Replace seal pressed on outboard CV joint, if required.
3. Install steering knuckle onto shock absorber strut and loosely install a new pinch bolt in knuckle to retain strut.

REMOVAL AND INSTALLATION (Continued)

4. Install steering knuckle and hub on halfshaft.



5. Install lower control arm to knuckle, making sure that ball stud groove is properly positioned. Install a new nut and bolt and tighten nut. **Use extreme care not to damage boot seal.** Tighten to 53-72 N·m (40-53 lb-ft). Tighten strut-to-knuckle pinch bolt to 98-132 N·m (73-97 lb-ft).
6. Install the rotor and brake caliper. Tighten caliper locking pins to 25-34 N·m (19-25 lb-ft). Refer to Section 06-03.
7. Position tie rod end into knuckle, install a new slotted nut and tighten. If necessary, advance nut to align slot and install a new cotter pin. Tighten to 31-47 N·m (23-34 lb-ft).
8. Install stabilizer bar link assembly to strut and install a new nut. Tighten to 77-103 N·m (57-75 lb-ft).
9. Install tire and wheel assembly. Refer to Section 00-02.
10. Lower vehicle.
11. Install the three nuts retaining top mount to apron. Tighten to 30-40 N·m (23-29 lb-ft).Tighten hub nut to 230-275 N·m (170-202 lb-ft).
12. Pump brake pedal prior to moving vehicle to position brake linings.

ADJUSTMENTS

Wheel Bearings

The front wheel bearings are of a cartridge design and are pregreased, sealed and require no scheduled maintenance. The bearings are preset and cannot be adjusted. If a bearing is disassembled for any reason, it must be replaced as a unit. No individual service seals, roller or races are available. The hub nut torque of 230-275 N·m (170-202 lb-ft) restricts bearing / hub relative movement and maintains axial position of the hub. Due to the importance of the hub nut torque / tension relationship, take the following precautions during service:

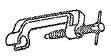
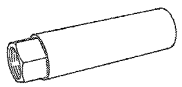
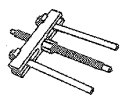
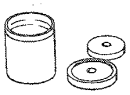
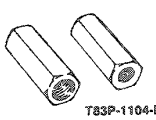
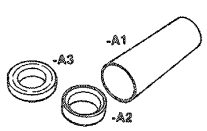
1. Since the bearing cannot be adjusted, the hub nut retainer must not be backed off after reaching the required torque of 230-275 N·m (170-202 lb-ft) during installation.
2. The hub nut must be replaced with a new nut whenever the nut is backed off or removed. Never reuse the nut.
3. Impact-type tools must not be used to tighten the hub nut or bearing damage will result.
4. The hub and CV joint splines have an interference fit requiring special tools for disassembly. The hub nut retainer must not be used to accomplish assembly. Refer to Section 05-04.
5. To remove the hub nut retainer, apply sufficient torque to the nut to overcome the prevailing torque feature of the nut collar.

SPECIFICATIONS

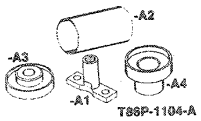
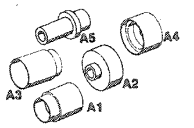
TORQUE SPECIFICATIONS

Description	N·m	Lb-Ft
Strut Top Mount to Body	30-40	23-29
Strut to Top Mount	53-72	40-53
Strut to Knuckle	98-132	73-97
Control Arm to Knuckle	53-72	40-53
Control Arm to Subframe	98-132	73-97
Tension Strut to Control Arm	98-132	73-97
Tension Strut to Sub-Frame	98-132	73-97
Stabilizer Bar Bracket to Subframe	30-40	23-29
Stabilizer Bar Link Assembly to Stabilizer Bar	47-63	35-46
Stabilizer Bar Link Assembly to Shock Strut	77-103	57-75
Tie Rod End to Steering Knuckle	31-47	23-34
Steering Gear Nuts	115-135	85-99
Caliper Locking Pins	25-34	19-25
Hub Nut	230-275	170-202
Lug Nuts	115-142	85-105

SPECIAL SERVICE TOOLS

Tool Number/ Description	Illustration
T74P-3044-A1 C-Frame and Clamp	 T74P-3044-A1
T81P-1104-A Hub Remover/Installer Adapter	 T81P-1104-A
T81P-1104-C Front Hub Remover/Installer	 T81P-1104-C
T81P-3504-W Tie Rod Remover Adapter	 T81P-3504-W
T83P-1104-AH2 Front Bearing Remover	 T83P-1104-AH
T83P-1104-BH1 Wheel Bolt Adapters	 T83P-1104-BH
T83T-3132-A1 Drive Tube	 T83T-3132-A

(Continued)

Tool Number/ Description	Illustration
T86P-1104-A1 Two Stud Adapter T86P-1104-A2 Front Bearing Spacer T86P-1104-A3 Bearing Installer T86P-1104-A4 Front Bearing Dust Seal Installer	 T86P-1104-A
T86P-5493-A1 Insulator Installation Tool T86P-5493-A2 Bushing Removal/Insulator Installation Tool T86P-5493-A3 Bushing Removal Tool T86P-5493-A4 Bushing Installation Tool T86P-5493-A5 Insulator Removal Tool	 T86P-5493-A

Tool Number	Description
D80L-1002-L	Front Hub Puller
D80L-625-1	Shaft Protector
D85P-7178-A	Universal MacPherson Strut Spring Compressor
TOOL-3290-D	Tie Rod End Remover

ROTUNDA EQUIPMENT

Model	Description
086-00029	Spring Compressor

SECTION 04-02 Suspension and Wheel Ends, Rear

SUBJECT	PAGE
DESCRIPTION AND OPERATION	
Component Replacement	04-02-4
Components	04-02-3
Sedan	04-02-1
Station Wagon	04-02-2
Wheel Assembly	04-02-8
REMOVAL AND INSTALLATION	
Anti-Lock Sensor Ring	04-02-30
Bearing and Hub Assembly, Disc Brakes	04-02-29
Bearing and Hub Assembly, Drum Brakes	04-02-29
Control Arm	04-02-28
Shock Absorber	04-02-12

SUBJECT	PAGE
REMOVAL AND INSTALLATION (Cont'd.)	
Shock Absorber Strut, Upper Mount and Spring	04-02-13
Springs	04-02-25
Stabilizer Bar, Insulators and Link Assembly	04-02-16
Suspension Arm, Lower	04-02-21
Suspension Arms, Upper	04-02-19
Tension Strut	04-02-21
SPECIAL SERVICE TOOLS	04-02-32
SPECIFICATIONS	04-02-31
VEHICLE APPLICATION	04-02-1

VEHICLE APPLICATION

Taurus / Sable.

DESCRIPTION AND OPERATION

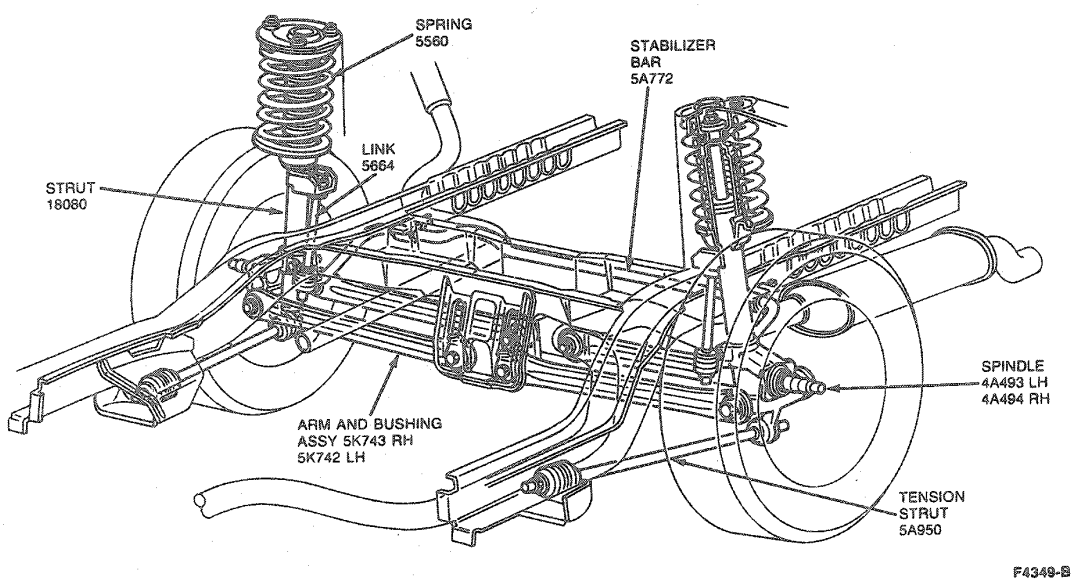
Sedan

These vehicles use a MacPherson strut independent rear suspension. Each side consists of an upper mount and washers, a shock absorber strut assembly, two parallel control arms per side, tension strut, cast spindle and shock strut mounted stabilizer bar.

DESCRIPTION AND OPERATION (Continued)

The shock absorber strut assembly includes an upper washer, top mount, dust shield, jounce bumper, coil spring insulator, coil spring, spring damper and lower washer. The strut assembly is attached at the top by three studs, which retain the top mount of the strut to the inner body side panel. The lower end of the assembly is attached to the spindle with a pinch clamp and bolt that goes through a locator tab welded to the strut. The two stamped control arms attach to the underbody and spindle with nuts and bolts. A tension strut attaches to the underbody and to the cast spindle.

CAUTION: Rear suspension fasteners are important parts because they could affect the performance of vital components and systems and/or could result in major service expense. They must be replaced with the same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during re-assembly to ensure proper retention of this part.



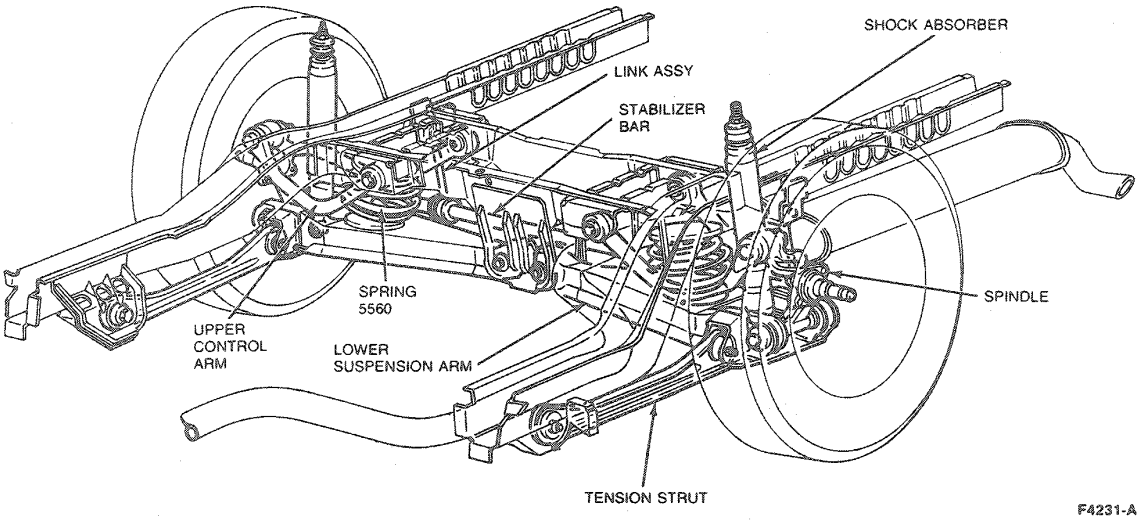
Station Wagon

The station wagon suspension consists of five major components: the upper and lower control arms, shock absorber, two-piece cast spindle, tension strut, and a coil spring mounted between the lower suspension arm and the body crossmember.

DESCRIPTION AND OPERATION (Continued)

The shock absorber assembly is connected to the body side panel by a rubber insulated top mount assembly and nut, and to the lower suspension arm by two studs pressed into a bar pin mounted in a rubber bushing. The upper suspension arms connect at the spindle and the crossmember while the lower suspension arm connects to the underbody and spindle. A coil spring is located between the lower suspension arm and body crossmember inboard of the shock absorber. A tension strut is connected to the underbody and the lower suspension arm.

NOTE: Never attempt to heat, quench or straighten any rear suspension part. Replace with a new part.



Components

Sedan

- **Stamped Control Arms:** Two per side, control lateral (side-to-side) movement of each wheel.
- **Toe Adjustment Cam:** Adjusts length of rear control arms for setting rear wheel toe-in alignment.
- **Tension Strut:** Controls fore-and-aft wheel movement.
- **Coil Spring:** Controls suspension travel and provides ride height control.
- **Shock Absorber Strut:** Reacts to braking forces, provides necessary suspension damping, and also provides controlled entry into the full travel conditions through an internal rebound stop and integral jounce bumper.
- **Cast Spindle:** This two-piece cast spindle with pressed-in stem, supports the wheel and attaches the two control arms, tension strut, shock absorber strut, and brake assembly.
- **Stabilizer Bar:** Resists body roll to keep vehicle level during cornering.
- **Suspension Bushing and Insulator:** All suspension mounting points are rubber insulated to minimize road noise and vibrations to the passengers.
- **Suspension Fasteners:** These fasteners are important attaching parts that could affect the performance of vital components and systems and / or could result in major service expense. They must be replaced with fasteners of the same part number or with an equivalent part if replacement becomes necessary. **Do not** use a replacement part of lesser quality or substitute design. Torque values must be used as specified during assembly to ensure proper retention of these parts. New attaching fasteners must be used whenever the old attaching fasteners are loosened or removed and when new component parts are installed.

Station Wagon

- **Upper Control Arms:** Control lateral (side-to-side) movement of each wheel.
- **Stamped Lower Arm:** Controls the lateral (side-to-side) movement of each wheel and contains the lower spring seat and holds the rear suspension toe setting cam.

DESCRIPTION AND OPERATION (Continued)

- **Tension Strut:** Controls fore-and-aft wheel movement.
- **Coil Spring:** Controls suspension travel and provides ride height control.
- **Shock Absorber:** Provides necessary suspension damping. It also provides rebound control through an internal rebound stop.
- **Cast Spindle:** Supports the wheel and attaches the lower and upper arms and brake assembly.
- **Stabilizer Bar / Link Assembly:** Controls body lean during cornering.
- **Suspension Bushings and Insulators (Rubber):** Minimize road noise and vibration.
- **Suspension Fasteners:** These fasteners are important parts that could affect the performance of vital components and systems and / or could result in major service expense. They must be replaced with the same part number or with an equivalent part if replacement becomes necessary. **DO NOT** use a replacement part of lesser quality or substitute design. Torque value must be used as specified during assembly to ensure proper part retention. New fasteners must also be used whenever the old fasteners are loosened or removed and when new components are installed.

Component Replacement

Sedan

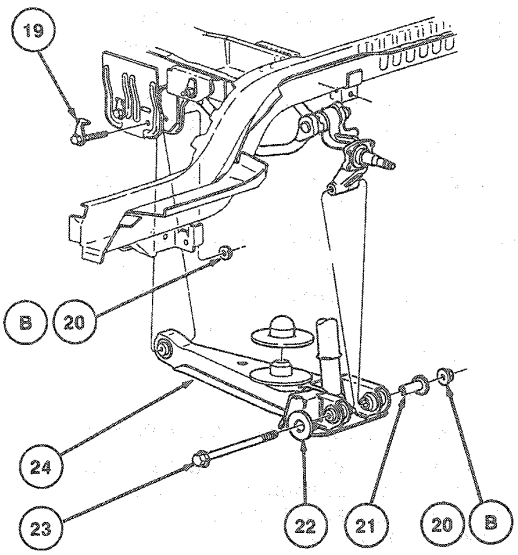
On the MacPherson strut independent rear suspension, the following components may be replaced individually or as an assembly:

- The shock absorber strut upper mount may be replaced individually.
- The jounce bumpers may be replaced individually.
- The shock absorber strut is not serviceable as a cartridge and must be replaced as an assembly. Replace individual assemblies as required. They do not need to be replaced in pairs.
- Control arm bushings are not serviceable. They must be replaced with a control arm and bushing assembly.
- Tension strut and tension strut bushings may be replaced individually.
- Coil springs may be replaced individually.
- The spindle stem is not serviceable and must be replaced with a spindle and stem assembly.
- All stabilizer bar components may be replaced individually.

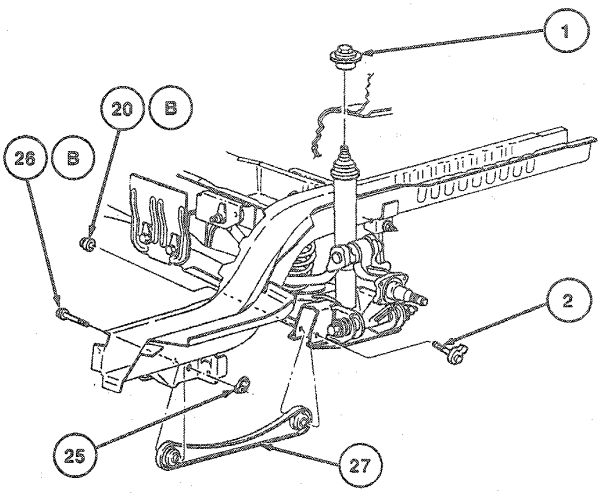
Station Wagon

- The shock absorber upper mounting is serviceable.
- The shock absorber is serviceable and must be replaced as an assembly. Replace only the damaged shock absorber. It is not necessary to replace them in pairs.
- Upper and lower suspension arms are serviced as an assembly. The bushings are not serviced.
- Tension strut bushings are not serviced. They must be replaced with a tension strut and bushing assembly.
- Stabilizer bar, U-brackets and insulators are serviceable. The link is serviced as an assembly.
- Coil springs are serviceable.

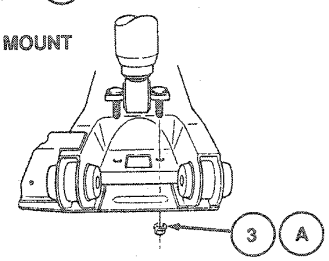
DESCRIPTION AND OPERATION (Continued)



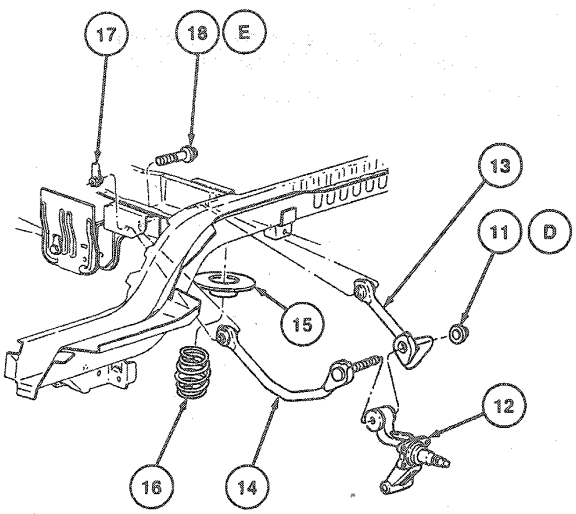
INSTALLATION LOWER
ARM AND LOWER SPRING SEAT



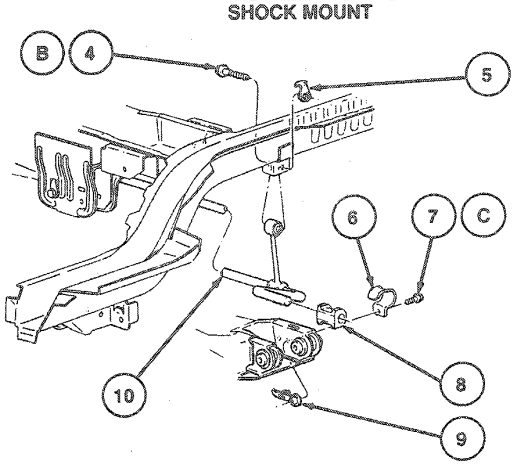
INSTALLATION TENSION
STRUT AND UPPER SHOCK MOUNT



INSTALLATION LOWER
SHOCK MOUNT



INSTALLATION UPPER ARM
SPINDLE AND UPPER SPRING SEAT



INSTALLATION STABILIZER BAR

F4232-G

Item	Part Number	Description
1	18A192	Assy (2 Req'd)
2	N805219-S150	Bolt (2 Req'd)
3A	N620481-S101	Nut (4 Req'd)
4B	N804414-S150	Bolt (2 Req'd)
5	N804411-S150	Nut (2 Req'd)

(Continued)

Item	Part Number	Description
6	5486	U-Bracket (2 Req'd)
7C	N605919-S7	Bolt (2 Req'd)
8	4A037	Insulator (2 Req'd)
9	N804004-S161	Nut (2 Req'd)
10	5A771	Assy

(Continued)

DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
11D	N804891-S150	Nut (2 Req'd)
12	4A494RH 4A493 LH	Spindle Assy
13	5A926 RH 5A927 LH	Upper Arm Rear Assy
14	5A922 RH 5A923 LH	Upper Arm Front Assy
15	5536	Insulator (2 Req'd)
16	5560	Spring (2 Req'd)
17	N805408-S150	Nut (4 Req'd)
18E	N803990-S160	Bolt (4 Req'd)
19	N804010-S150	Bolt (2 Req'd)
20B	N800937-S160	Nut (2 Req'd)
21	5K751	Adjusting Cam (2 Req'd)
22	N804284-S36M	Washer

(Continued)

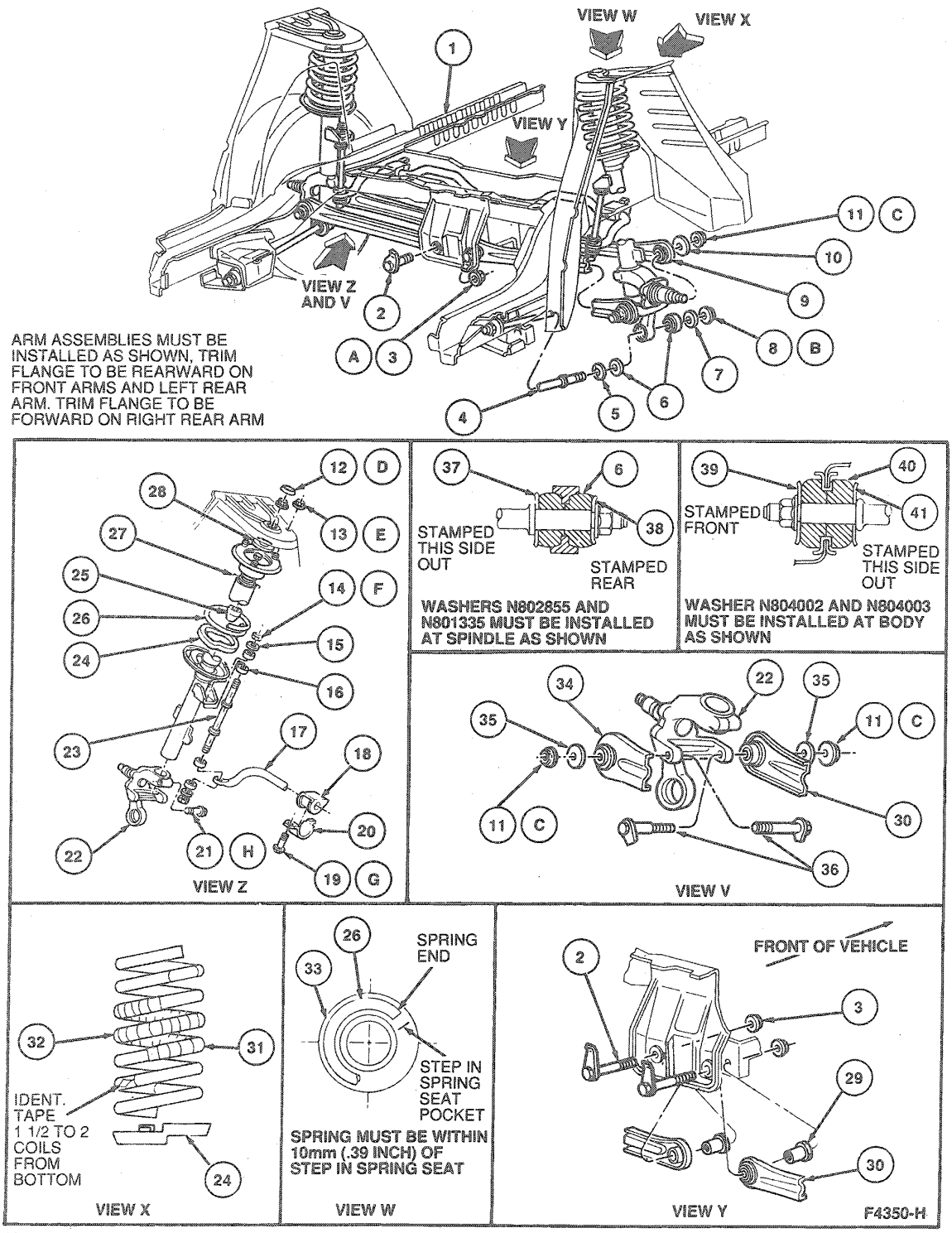
Item	Part Number	Description
23	N804635-S150	Bolt
24	5A649 RH 5A648 LH	Lower Arm Assy
25	N804410-S150	Nut (2 Req'd)
26B	N804641-S150	Bolt (2 Req'd)
27	5A952	Tension Strut Assy (2 Req'd)
A		Tighten to 19.1-25.9 N·m (13-20 Lb-Ft)
B		Tighten to 54-71 N·m (40-52 Lb-Ft)
C		Tighten to 30-40 N·m (23-30 Lb-Ft)
D		Tighten to 203-258 N·m (150-190 Lb-Ft)
E		Tighten to 98-132 N·m (73-97 Lb-Ft)

Inspection

1. Check for evidence of fluid leaks on shock absorbers. (A light film of fluid is permissible. Verify fluid is not from sources other than shock absorber).
2. Check shock absorber operation (whether operation is stiff, rough or spongy).
3. Check condition of control arm pivot bushings and tension strut bushings.

   If the above checks reveal evidence of excessive wear, deterioration, or improper operation, replace damaged components.

DESCRIPTION AND OPERATION (Continued)



DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
1	—	Frame
2	N805219-S151	Bolt (4 Req'd)
3A	N8044525-S150	Nut (4 Req'd)
4	5A950	Tension Strut (2 Req'd)
5	N802855-S36	Washer (2 Req'd)
6	5K897	Insulator (4 Req'd)
7	N801335-S36	Washer (2 Req'd)
8B	N620484-S151	Nut (4 Req'd)
9	5K743	Arm Assy (2 Req'd)
10	N804001-S100	Washer (4 Req'd)
11C	N800937-S160	Nut
12D	N804608-S150	Nut
13E	N801310-S100	Nut (6 Req'd)
14F	N800280-S7	Nut (4 Req'd)
15	N802100-S36M	Washer (4 Req'd)
16	5493	Insulator (8 Req'd)
17	5A772	Stabilizer Bar
18	4A037	Insulator (2 Req'd)
19G	N804637-S56	Bolt (2 Req'd)
20	4AD47	U-Bracket (2 Req'd)
21H	N80194-2-S100	Bolt (2 Req'd)
22	4A493 Assy LH 4A494 Assy RH	Spindle
23	5664	Link (2 Req'd)
24	5K617	Insulator (2 Req'd)
25	18A085	Jounce Bumper (2 Req'd)
26	5560	Spring (2 Req'd)
27	N804232-S100	Washer (2 Req'd Some Vehicles)

(Continued)

Item	Part Number	Description
28	N804232-S100	Washer (2 Req'd)
29	5K751	Adjusting Cam (2 Req'd)
30	5K743	Arm Assy
31	5A669	Rear Spring Damper (4 Req'd)
32	5A545	Rear Spring Insulator Retainer
33	10080	Spring Seat Pocket
34	5K742	Arm Assy (2 Req'd)
35	N804001	Washer
36	N804348-S150	Bolt (4 Req'd)
37	N802855	Washer (2 Req'd)
38	N801335	Washer (2 Req'd)
39	N804002-S36	Washer (2 Req'd)
40	5A959	Insulator (4 Req'd)
41	N804003-S36	Washer (2 Req'd)
A		Tighten to 68-92 N·m (50-67 Lb-Ft)
B		Tighten to 47-63 N·m (35-46 Lb-Ft)
C		Tighten to 59.5-80.5 N·m (44-59 Lb-Ft)
D		Tighten to 53-72 N·m (40-53 Lb-Ft)
E		Tighten to 25-34 N·m (19-25 Lb-Ft)
F		Tighten to 7-9.5 N·m (5-7 Lb-Ft)
G		Tighten to 34-46 N·m (25-33 Lb-Ft)
H		Tighten to 68-92 N·m (50-67 Lb-Ft)

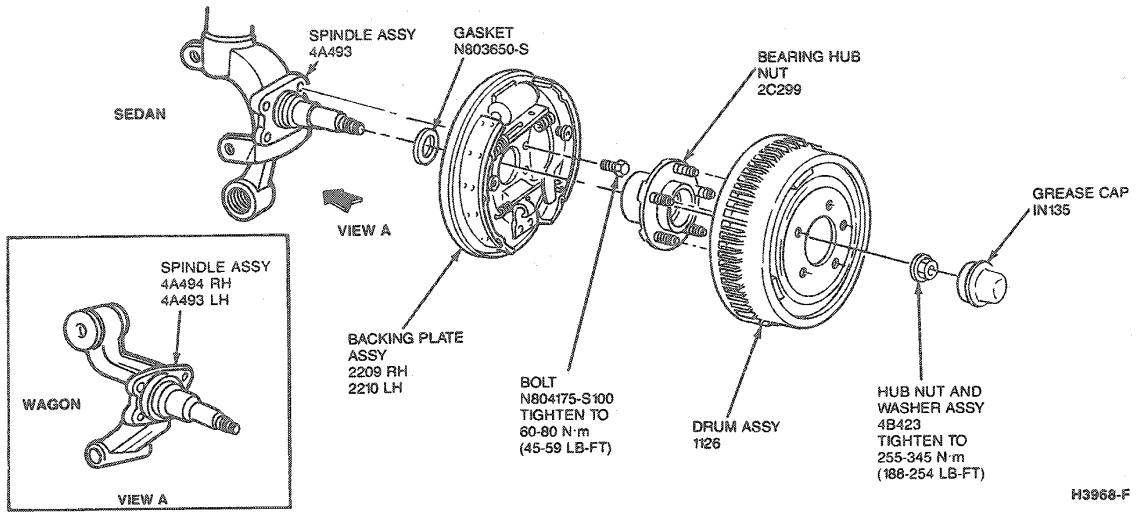
Wheel Assembly

Each rear wheel is bolted to a bearing and hub assembly. The bearing and hub assembly is lubricated for life and has integral seals.

A nut and washer assembly retains the bearing and hub assembly to the spindle.

DESCRIPTION AND OPERATION (Continued)

Drum Brakes



DESCRIPTION AND OPERATION (Continued)

Disc Brakes with Anti-Lock

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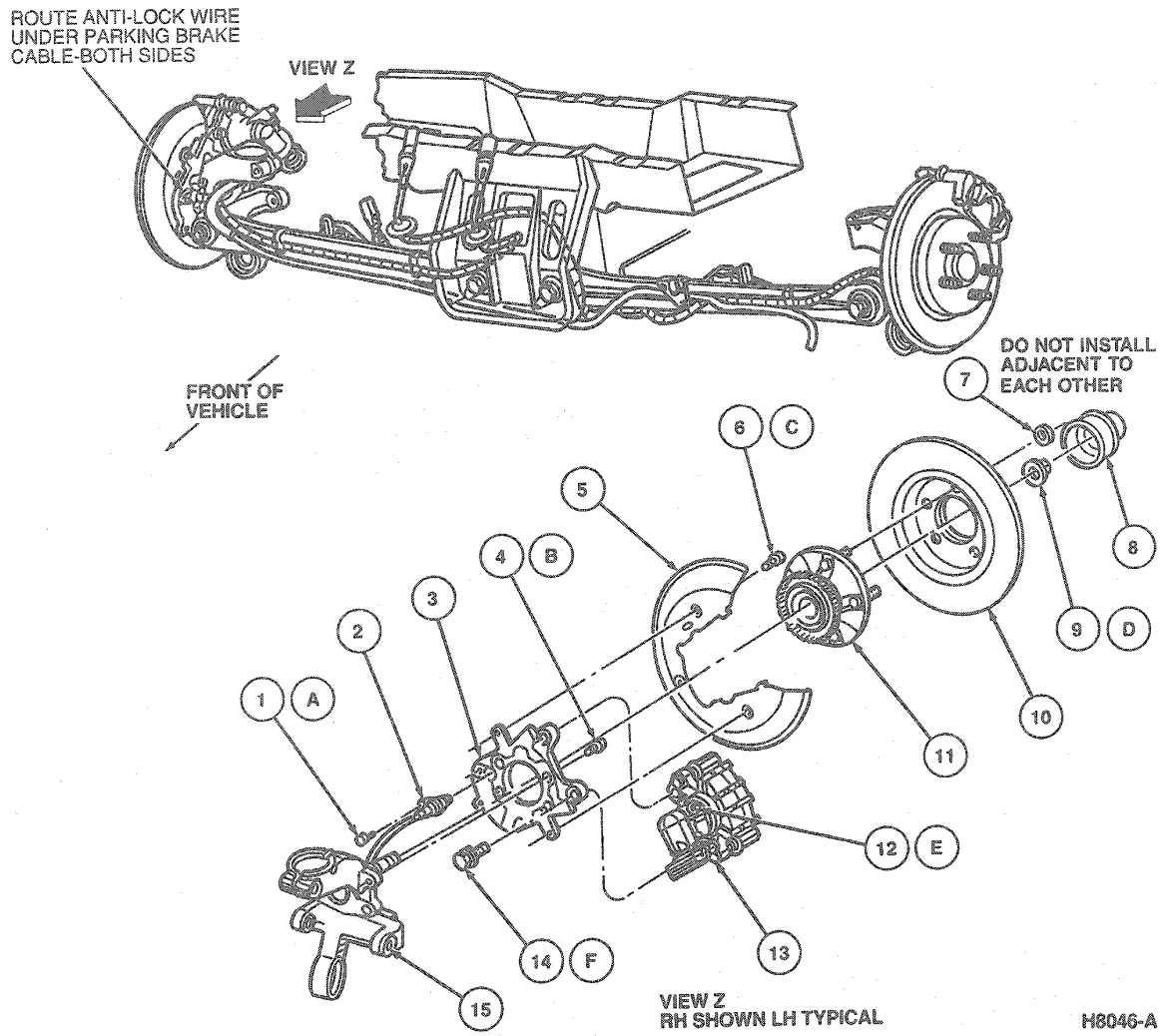


Item	Part Number	Description
1A	N605518-S100	Bolt
2	2C216 (LH) 2C190 (RH)	Anti-Lock Sensor Assy
3	2C101 (LH) 2C100 (RH)	Disc Brake Adapter
4B	N805086-S100	Bolt (4 Req'd)
5	2C028	Splash Shield
6C	N602726-S2	Bolt (3 Req'd)
7	W623485-S2	Retainer Nut (2 Req'd)
8	1N135	Dust Cap
9D	2B423	Nut

(Continued)

Item	Part Number	Description
10	2C026	Rotor
11	2B664	Hub Assy
12E	—	Bleed Screw
13	2K327 (RH) 2K328 (LH)	Caliper Assy
14F	N805163-S150	Bolt (2 Req'd)
15		Knuckle Assy
A		Tighten to 4.5-6.8 N·m (3-5 Lb-Ft)
B		Tighten to 59-81 N·m (44-60 Lb-Ft)

(Continued)

DESCRIPTION AND OPERATION (Continued)

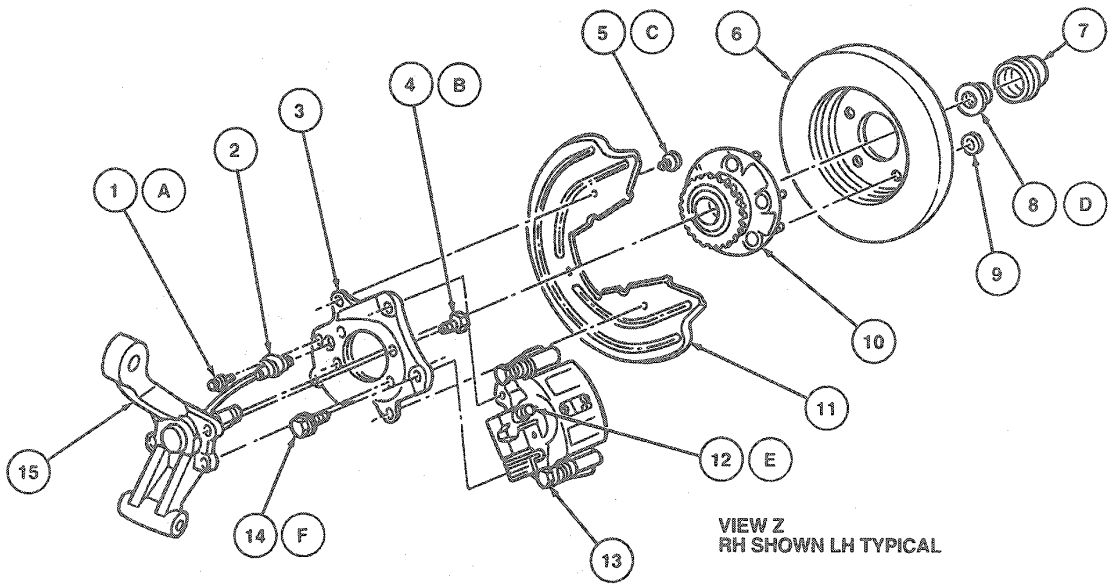
Item	Part Number	Description
C		Tighten to 8-12 N·m (6-9 Lb-Ft)
D		Tighten to 255-345 N·m (188-254 Lb-Ft)

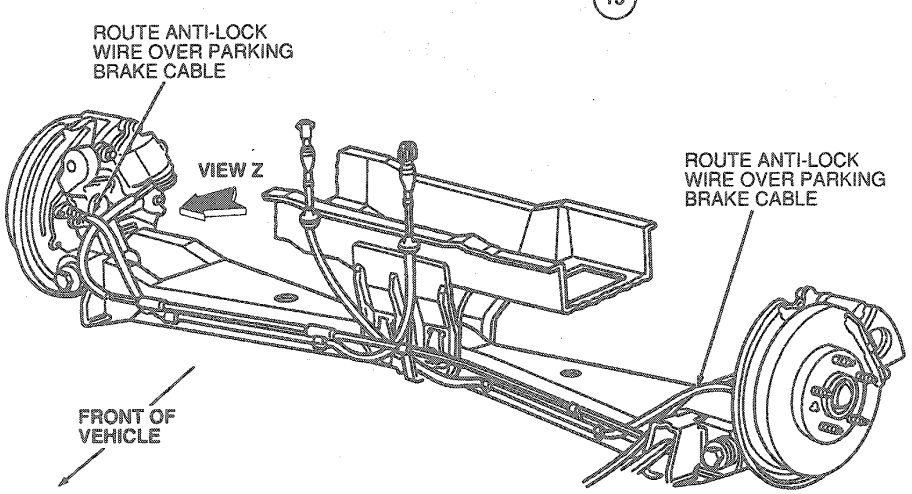
Item	Part Number	Description
E		Tighten to 8-13 N·m (6-10 Lb-Ft)
F		Tighten to 87-119 N·m (64-88 Lb-Ft)

(Continued)

TH8046A

Station Wagon





H8047-A

DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
1A	N605518-S100	Bolt
2	2C216 (LH) 2C190 (RH)	Anti-Lock Sensor Assy
3	2C100 (RH) 2C101 (LH)	Disc Brake Adapter
4B	N805086-S100	Bolt (4 Req'd)
5C	N602726-S2	Bolt (3 Req'd)
6	2C026	Rotor
7	1N135	Dust Cap
8D	4B423	Nut
9	W623485-S2	Retainer Nut (2 Req'd)
10	2B664	Hub Assy
11	2C028	Splash Shield
12E	—	Bleed Screw

(Continued)

Item	Part Number	Description
13	3K327 (RH) 3K328 (LH)	Caliper Assy
14F	N805163-S150	Bolt (2 Req'd)
15	—	Rear Knuckle
A		Tighten to 4.5-6.8 N·m (3-5 Lb-Ft)
B		Tighten to 59-81 N·m (44-60 Lb-Ft)
C		Tighten to 8-12 N·m (6-9 Lb-Ft)
D		Tighten to 255-345 N·m (188-254 Lb-Ft)
E		Tighten to 8-13 N·m (6-10 Lb-Ft)
F		Tighten to 87-119 N·m (64-88 Lb-Ft)

TH8047A

REMOVAL AND INSTALLATION

Shock Absorber

Station Wagon

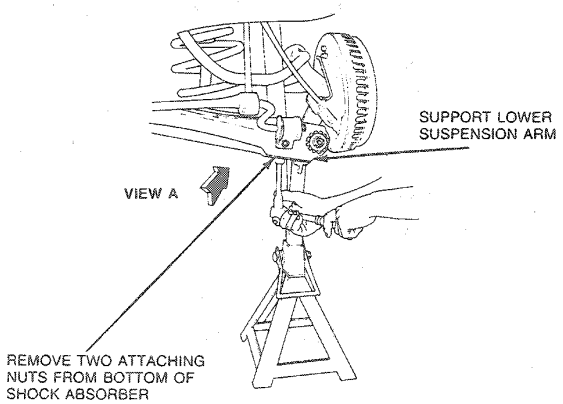
Removal

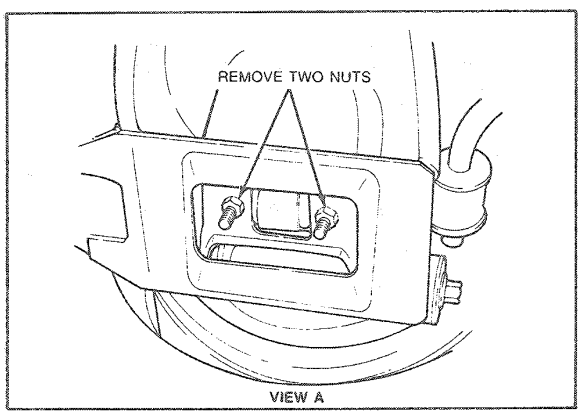
Refer to illustration under Description.

NOTE: Refer to the diagnostic procedure in Section 04-00 before replacing a shock absorber for a noise concern.

1. Raise vehicle on a hoist. Refer to Section 00-02.
2. Remove tire and wheel assembly.
3. Position a jackstand under lower suspension arm and remove two nuts retaining shock absorber to lower suspension arm.

CAUTION: The lower suspension arm must be supported before removal of upper or lower shock absorber attachments to prevent damage to attached components.





F4234-B

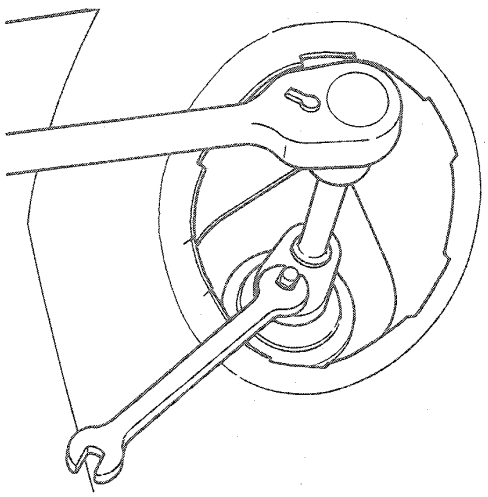
4. From inside of vehicle, remove rear compartment access panels.

   NOTE: If the shock absorber is to be reused, do not grip the shaft with pliers or vise grips as this will damage the shaft surface finish and result in severe oil leakage.

NOTE: If a frame contact hoist is used, support the lower suspension arm with a floor jack. If a twin-post hoist is used, support the body with floor jacks on lifting pads forward of the tension strut body bracket.

REMOVAL AND INSTALLATION (Continued)

5. Remove and discard top shock absorber retaining nut using a crow foot wrench and ratchet while holding the shock absorber shaft with an open-end wrench.



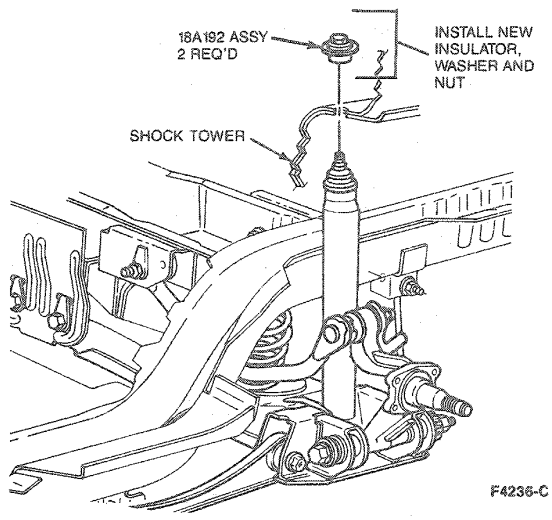
6. Remove washer and rubber insulator from shock.

   NOTE: The shock absorbers are gas-filled. It will require an effort to collapse the shock in order to remove the shock absorber from the lower arm.

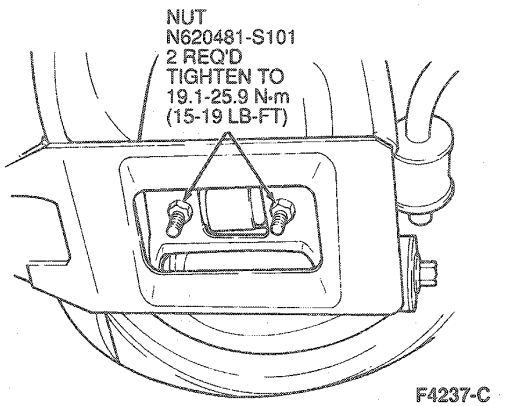
7. Remove shock absorber from vehicle.

Installation

1. Install a new washer and insulator assembly on upper shock absorber rod.
2. Position upper part of shock absorber into shock tower opening in the body and push slowly on lower part of shock absorber until mounting studs are lined up with mounting holes in the lower suspension arm.
3. Install new lower retaining nuts. Do not tighten at this time.
4. Install a new insulator, washer and nut assembly on top of shock absorber. Tighten nut to 25.5-34.5 N·m (19-25 lb-ft).
5. Install rear compartment access panel.



6. Tighten two lower retaining nuts to 19.1-25.9 N·m (15-19 lb-ft).



7. Install wheel and tire assembly.
8. Remove floor jack and lower vehicle.

Shock Absorber Strut, Upper Mount and Spring

Sedan

Tools Required:

- Rotunda Spring Compressor 086-00029

WARNING: DO NOT ATTEMPT TO REMOVE THE SPRING FROM THE STRUT WITHOUT FIRST COMPRESSING THE SPRING WITH A TOOL DESIGNED FOR THAT PURPOSE.

NOTE: Refer to the diagnostic procedure in Section 04-00 before replacing a shock absorber for a noise concern.

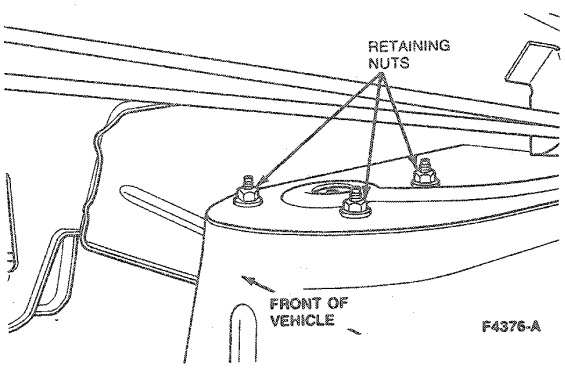
REMOVAL AND INSTALLATION (Continued)

Removal

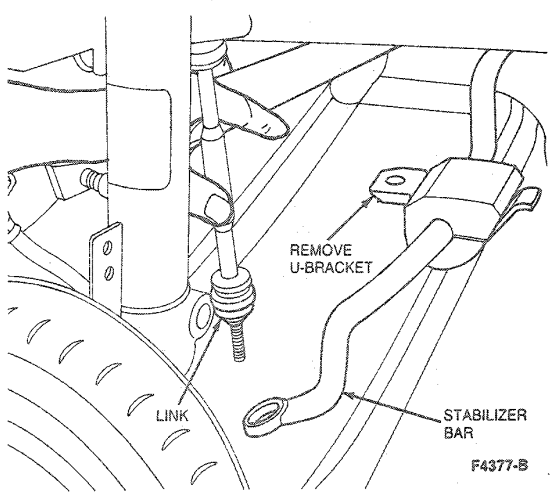
1. Raise hoist or jack only enough to contact body. Refer to Section 00-02.

   CAUTION: Do not raise vehicle by tension strut. Damage to strut may result.

2. Open luggage compartment lid and loosen but do not remove, three nuts retaining the upper strut mount to body.



3. Raise vehicle. Remove wheel and tire.
4. Remove bolt retaining brake differential control valve to control arm.
5. Wire brake control valve to body to ensure proper support leaving about 152mm (6 inches) clearance to aid in strut removal.
6. Remove clip attaching brake hose to shock strut bracket and carefully move hose out of the way.
7. Remove stabilizer bar U-bracket from body, if so equipped.
8. Remove nut, washer and insulator attaching stabilizer bar to link and separate stabilizer bar from link, if so equipped.



9. Remove nut, washer and insulator retaining tension strut to spindle. Move spindle rearward enough to separate it from the tension strut.

   CAUTION: Care should be taken when removing the shock strut that the rear brake flex hose is not stretched or the steel brake tube is not bent.

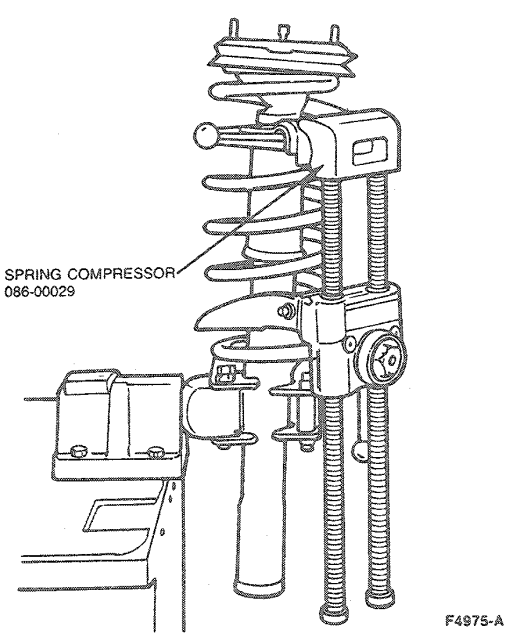
10. Remove and discard shock strut-to-spindle pinch bolt. Using a large screwdriver, slightly spread strut-to-spindle pinch joint, if required, for removal.
11. Lower jackstand and separate shock strut from spindle.
12. From inside luggage compartment area, remove and discard three upper mount-to-body nuts. Care should be taken so the shock strut does not drop when removing the three upper nuts.
13. Remove strut from vehicle.
14. Remove nut, washer and insulator attaching link to shock strut and remove link.

    WARNING: DO NOT ATTEMPT TO REMOVE THE SPRING FROM THE STRUT WITHOUT FIRST COMPRESSING THE SPRING WITH A TOOL DESIGNED FOR THAT PURPOSE.

    CAUTION: Do not attempt to remove strut rod nut by turning rod and holding nut. Nut must be turned and rod held stationary to avoid possible fracture of rod at base of hex.

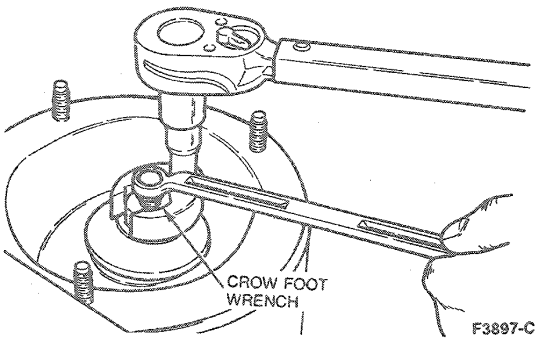
    NOTE: Before compressing spring, mark location of insulator to top mount using a grease pencil.

15. Place strut, spring and upper mount assembly in Spring Compressor 086-00029 or equivalent.



REMOVAL AND INSTALLATION (Continued)

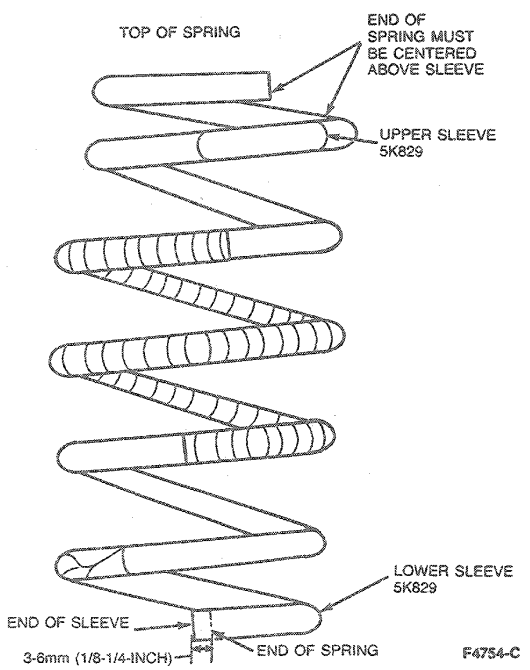
16. Place 10mm box wrench on top of shock strut shaft and hold while removing top shaft mounting nut with a 21mm 6-point crow foot wrench and ratchet.



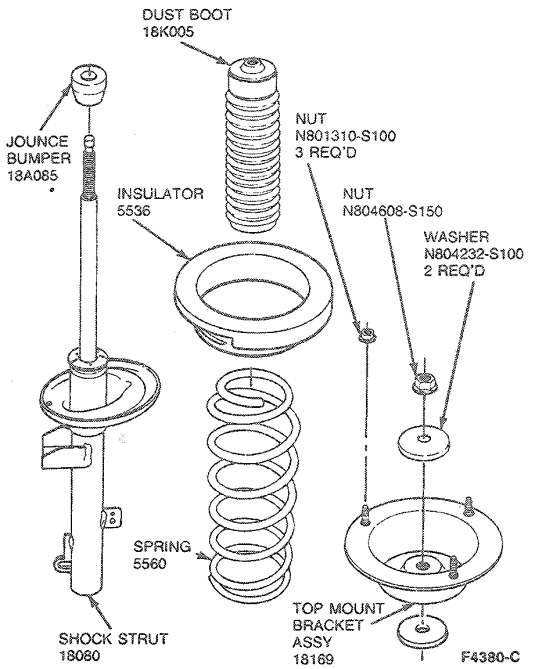
17. Loosen spring compressor tool, then remove top mount bracket assembly, spring insulator and spring.

Installation

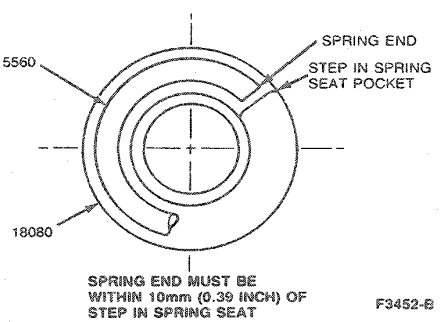
1. Inspect spring to ensure dampers, sleeves and clips are properly positioned.



2. Using Spring Compressor 086-00029 or equivalent, install spring, spring insulator, bottom washer, if equipped, top mount, upper washer and nut on strut shaft.



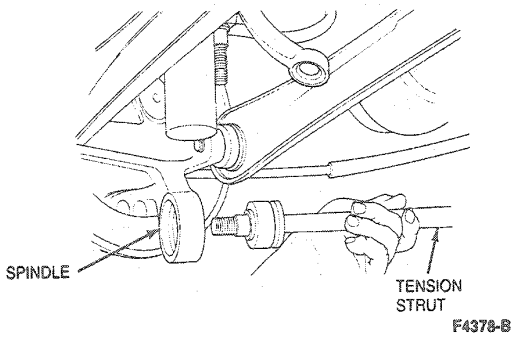
3. Ensure spring is properly located in upper and lower spring seats and that mount washers are positioned correctly.



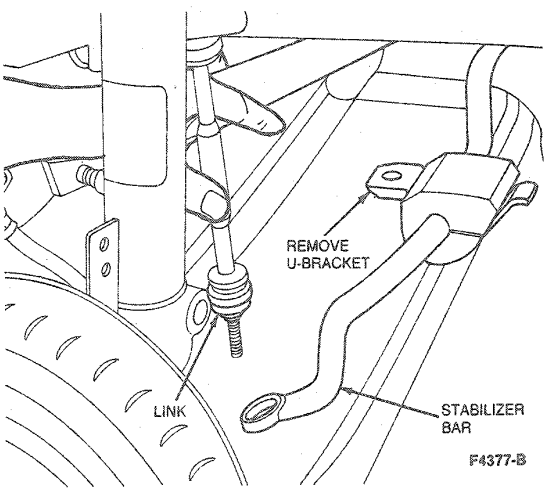
4. Tighten rod nut to 53-72 N·m (40-53 lb-ft). Use a 21mm crow foot wrench to **turn** the nut and a 10mm box wrench to **hold** shaft so it will not turn while tightening nut. Do not use pliers or vise-grips on strut rod as finished rod surface could be damaged.
5. Position stabilizer bar link in shock strut bracket. Install insulator, washer and nut. Tighten to 7-9.5 N·m (5-7 lb-ft).
6. Insert three upper mount studs into strut tower in apron and hand start three new nuts. **Do not** tighten at this time.
7. Partially raise vehicle. Refer to Section 00-02.
8. Install shock strut into spindle pinch joint.
9. Install a new pinch bolt into spindle and through the shock strut bracket. Tighten to 68-92 N·m (51-67 lb-ft).

REMOVAL AND INSTALLATION (Continued)

10. Move spindle rearward and install tension strut into spindle. Install insulator, washer and nut on tension strut. Tighten nut to 47-63 N·m (35-46 lb-ft).



11. Postion link into stabilizer bar. Install insulator, washer and nut on link. Tighten to 7-9.5 N·m (5-7 lb-ft).
12. Position stabilizer bar U-bracket on body. Install bolt. Tighten to 34-46 N·m (25-33 lb-ft).
13. Install brake hose to shock strut bracket.
14. Install brake control differential valve on control arm and remove retaining wire.
15. Tighten three top mount-to-body nuts to 25-34 N·m (19-25 lb-ft).
16. Install wheel and tire assembly and lower vehicle.



Stabilizer Bar, Insulators and Link Assembly

Sedan

Removal

CAUTION: Do not raise vehicle by tension strut. Damage to strut may result.

1. Raise vehicle on a hoist. Refer to Section 00-02.
2. Remove nuts, washers and insulators retaining stabilizer bar to right side and left side links. Discard nuts.
3. Remove and discard bolts attaching U-brackets and stabilizer bar to body and remove stabilizer bar.
4. Inspect U-bracket insulators and replace if damaged or worn.
5. Remove nut, washer and insulator retaining link to shock strut bracket. Discard nut.
6. Check link insulators and replace if damaged or worn.

Installation

1. Position link into shock strut bracket and install the insulator, washer and a new nut. Tighten to 7-9.5 N·m (5-7 lb-ft).
2. Position stabilizer bar, U-brackets and insulators on body. Install new bolt. Tighten to 34-46 N·m (25-34 lb-ft).
3. Position stabilizer bar onto links. Install insulators, washers and new nuts. Tighten to 7-9.5 N·m (5-7 lb-ft).
4. Lower vehicle.

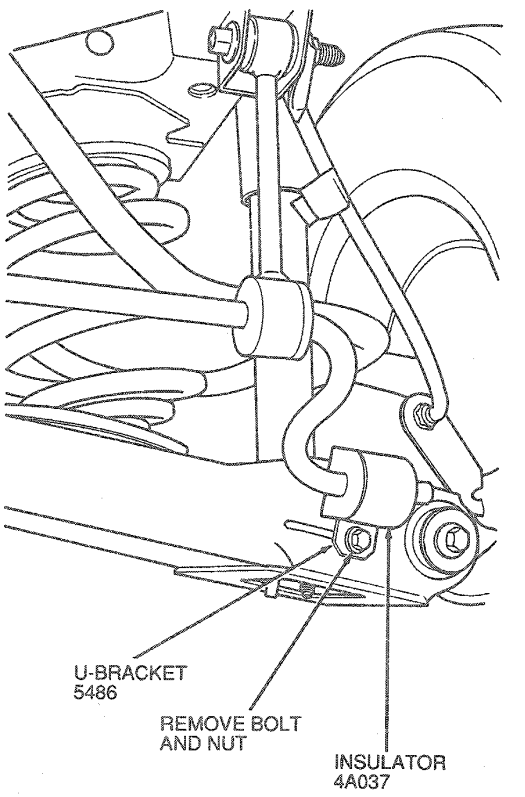
Station Wagon

Removal

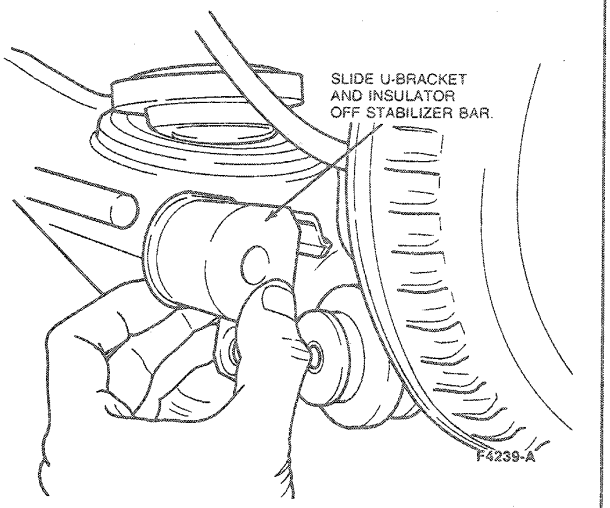
1. Raise vehicle on hoist. Refer to Section 00-02.
2. Support vehicle with jackstands under lower arms so that stabilizer bar lower arm insulator is neutralized.

REMOVAL AND INSTALLATION (Continued)

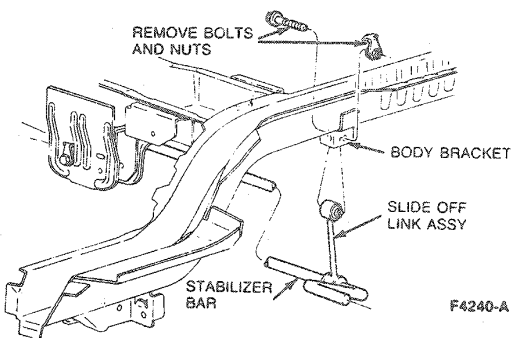
3. Remove and discard two bolts and nuts retaining U-brackets and insulators to lower suspension arms.



4. Clean stabilizer bar of dirt and other contamination and slide U-bracket and insulator off of stabilizer bar. Separate U-bracket from insulator and inspect insulator. Replace insulator if damaged or worn.



5. Remove and discard two bolts and nuts attaching link assemblies to body brackets.
6. Remove stabilizer bar and link assemblies from vehicle.
7. Slide link assemblies off of stabilizer bar. Inspect link assemblies and replace if damaged or worn.



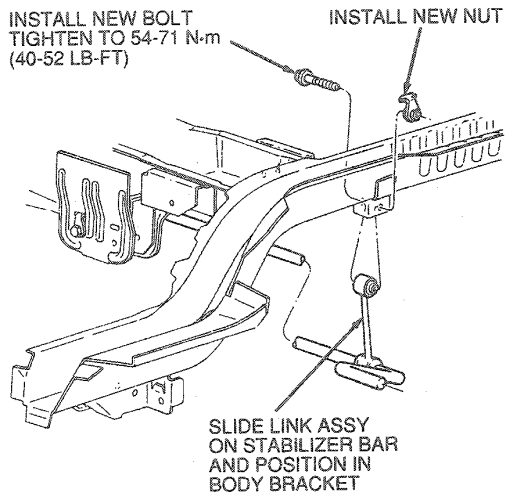
Installation

1. Clean stabilizer bar of dirt and other contamination.

   NOTE: If the rear stabilizer bar to body link assemblies are being re-used, clean the link lower insulator inside diameter with a bottle brush to remove any dirt or paint build-up. Lubricate the insulator prior to reassembly. ONLY use Ford Rubber Insulator Lubricant E25Y-19553-A (ESF-M99B112-A) or equivalent.
2. Lubricate stabilizer bar from the stabilizer bar end to the link insulator contact area with Ford Rubber Insulator Lubricant E25Y-19553-A (ESF-M99B112-A) or equivalent and slide on two link assemblies to approximate position.

REMOVAL AND INSTALLATION (Continued)

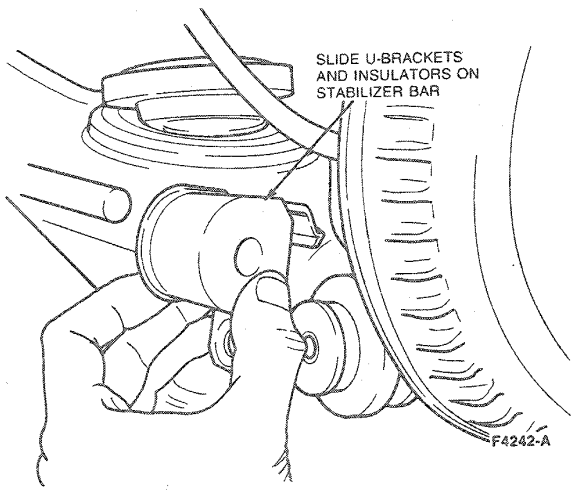
3. Install stabilizer bar and link assemblies on vehicle. Attach link assemblies to body brackets with two new bolts and nuts. Tighten bolts to 54-71 N·m (40-52 lb-ft).



F4241-B

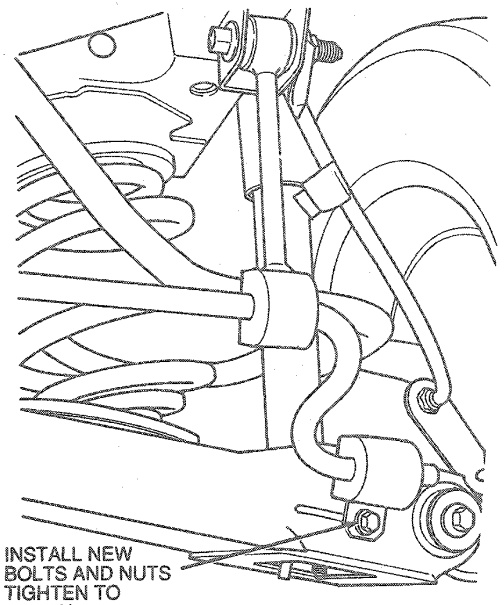
NOTE: If the rear stabilizer bar insulators are reinstalled, clean the insulator inside diameter with a bottle brush to remove any dirt or paint build-up. Lubricate the insulators using Ford Rubber Insulator Lubricant E25Y-19553-A (ESF-M99B112-A) or equivalent.

4. Slide U-brackets and insulators on both ends of stabilizer bar.



F4242-A

5. Position U-brackets on lower suspension arms and install two new bolts and nuts. Tighten bolts to 30-40 N·m (23-30 lb-ft).



F4243-C

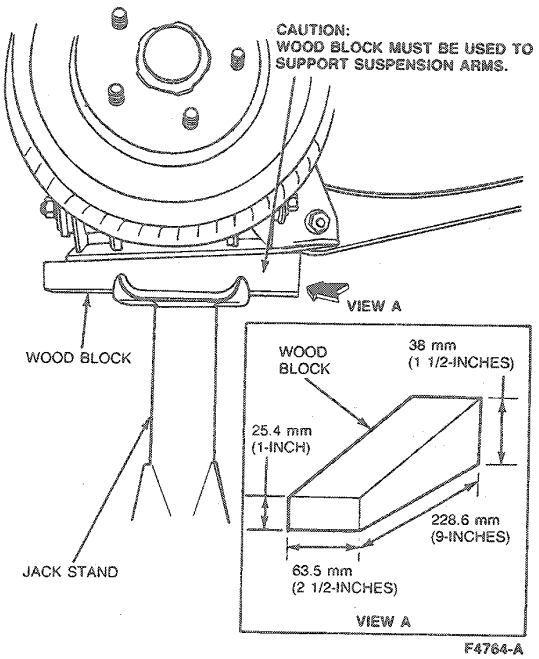
REMOVAL AND INSTALLATION (Continued)

Suspension Arms, Upper

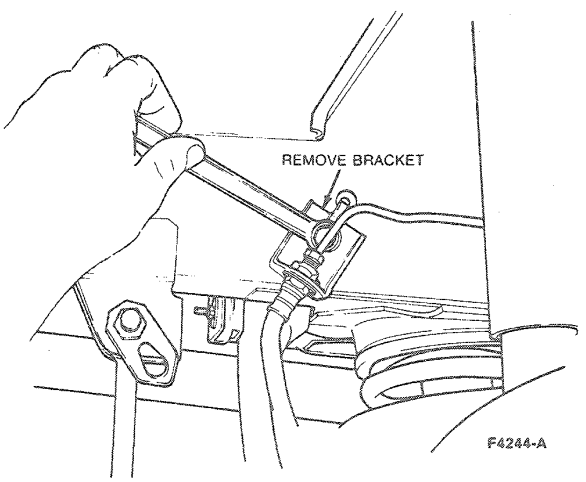
Station Wagon

Removal

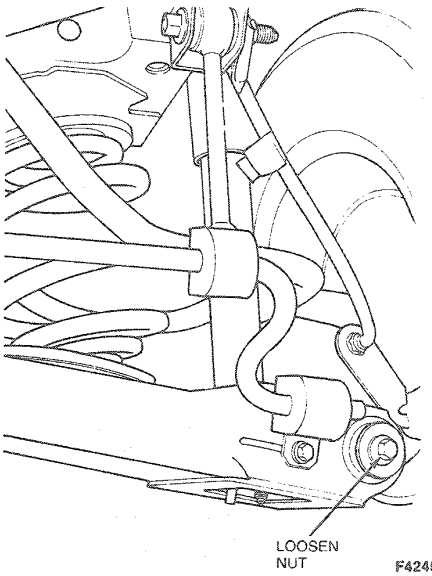
1. Raise vehicle on a hoist and place a jackstand and wood block under rear lower suspension arm to support it at normal curb height. Refer to Section 00-02.



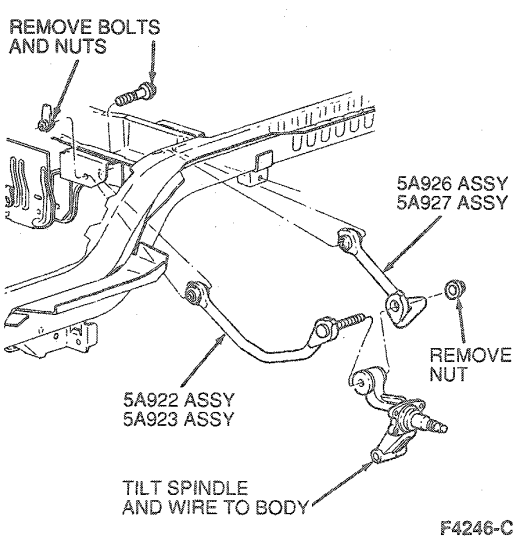
2. Remove wheel and tire assembly.
3. Remove brake line flexible hose bracket from body.



4. Loosen, do not remove, nut attaching spindle to upper arms.
5. Loosen, do not remove, nut attaching spindle to lower suspension arm.



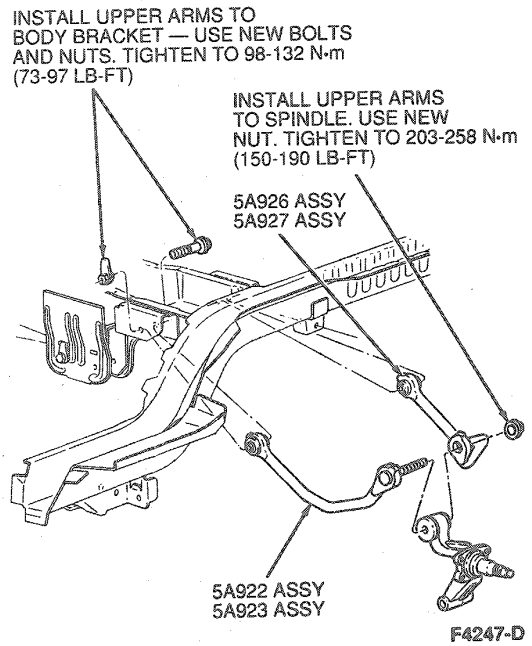
6. Remove and discard bolts and nuts attaching front and rear upper suspension arms to body brackets. Make sure that spindle does not fall outward.
7. Carefully tilt top of spindle outward, allowing it to pivot on lower suspension arm retaining bolt until ends of the upper suspension arms are clear of the body bracket. Wire spindle to body in this position.
8. Remove and discard nut connecting upper suspension arms to spindle and remove arms from vehicle.



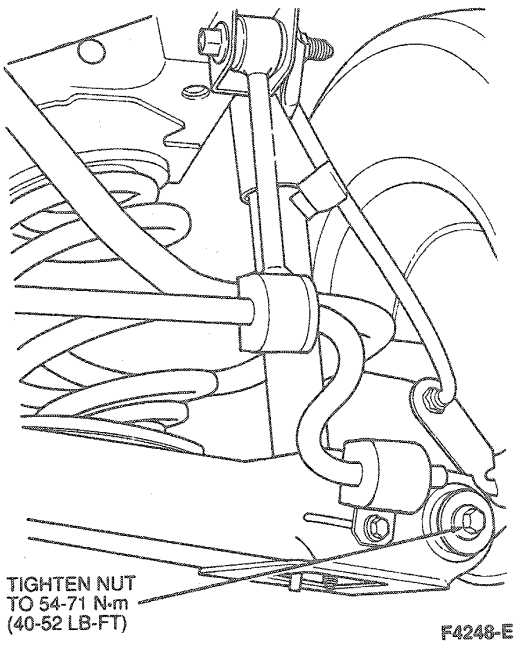
REMOVAL AND INSTALLATION (Continued)

Installation

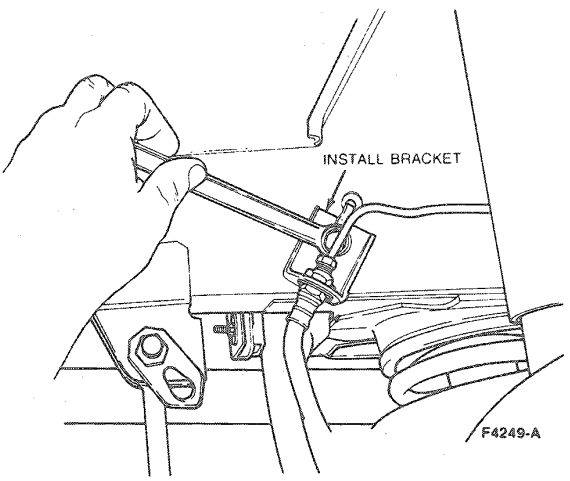
1. Install upper suspension arms on spindle and install a new nut. DO NOT tighten at this time.
2. Position upper suspension arm ends to body bracket and install new bolts and nuts. Tighten to 98-132 N·m (73-97 lb-ft). Remove wire from spindle.
3. Tighten nut attaching upper suspension arms to spindle to 203-258 N·m (150-190 lb-ft).



4. Tighten nut attaching lower suspension arm to spindle to 54-71 N·m (40-52 lb-ft).



5. Install brake line bracket to body.



6. Install wheel and tire assembly.
7. Remove jackstand and lower vehicle.
8. Check rear wheel alignment.

REMOVAL AND INSTALLATION (Continued)

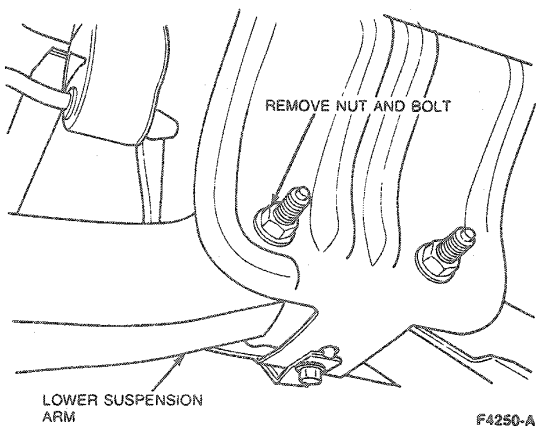
Suspension Arm, Lower

Station Wagon

Removal

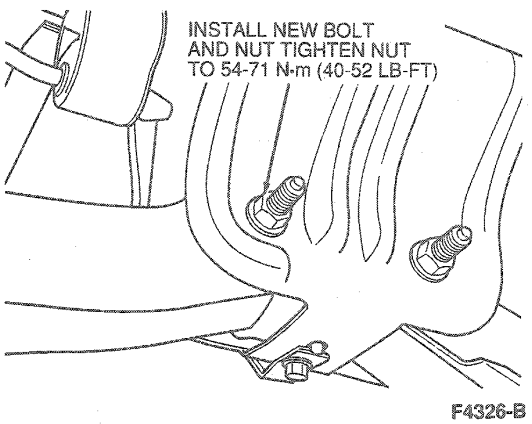
NOTE: If a twin-post hoist is used, a floor jack must be placed under the lifting pads on the underbody forward of the tension strut body bracket. Lower the rear hoist post out of the way.

1. Raise vehicle on a hoist. Refer to Section 00-02.
2. Remove tire and wheel assembly.
3. Remove spring as outlined under Springs, Removal.
4. Remove and discard bolt and nut attaching lower suspension arm to center body bracket and remove arm.



Installation

1. Position lower suspension arm-to-center body bracket and install a new bolt and nut. Do not tighten at this time. Install this bolt with bolt head toward front of vehicle.
2. Install spring as outlined under Springs, Installation.
3. Support lower suspension arm in normal curb height. Tighten nut attaching arm to body bracket to 54-71 N·m (40-52 lb-ft).



4. Tighten nut attaching lower suspension arm to spindle to 54-71 N·m (40-52 lb-ft).

   NOTE: After lower arm installation, it is necessary to check rear alignment.
5. Remove floor jacks and lower vehicle.

Tension Strut

Sedan

Removal

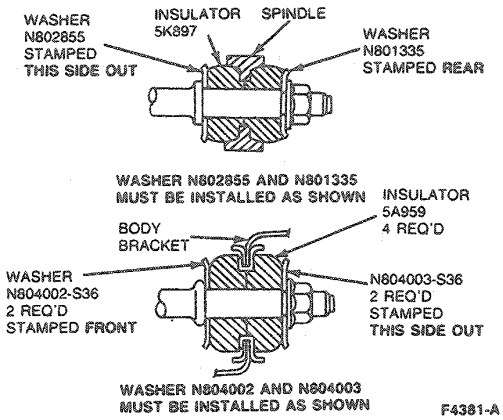
1. Raise vehicle on frame contact hoist using lift pads located to rear of front wheels and forward of rear wheels. Raise hoist only enough to contact body. Refer to Section 00-02.
2. From inside luggage compartment, loosen, but **do not** remove, three nuts retaining the upper shock strut mount to body.
3. Raise vehicle and remove wheel and tire assembly.
4. Remove and discard nut retaining tension strut to spindle.
5. Remove and discard nut retaining tension strut to body.
6. Move spindle rearward enough for tension strut to be removed.

Installation

1. Place new washers and bushings on both ends of new tension strut. Bushings at front and rear of tension strut are different. The rear bushings have indentations in them.

REMOVAL AND INSTALLATION (Continued)

2. Insert one end into body bracket and install a new bushing, washer and nut. Do not tighten at this time.

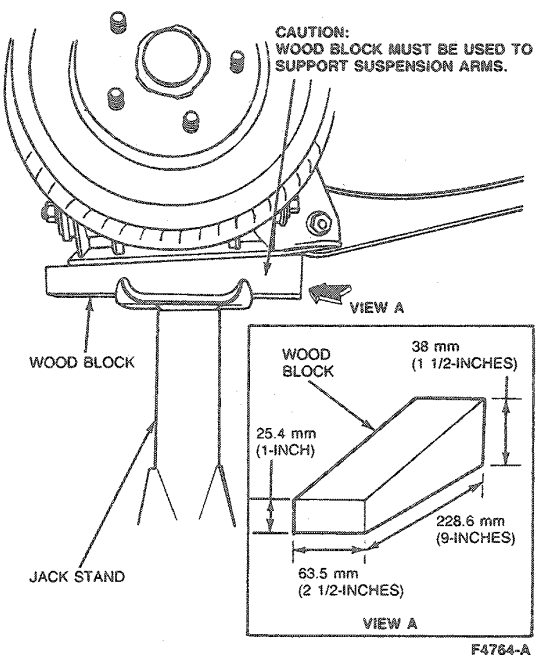


3. Pull back on spindle enough so tension strut end can be installed in spindle.
4. Install new bushing, washer and nut. Refer to illustration under Installation, Step 2. Verify that bushings are correctly piloted into the spindle. Tighten nut to 47-63 N·m (35-46 lb-ft).
5. Verify that bushings are correctly piloted into the body bracket. Tighten nut to 47-63 N·m (35-46 lb-ft).
6. Support spindle with jackstand. Remove three strut-to-body retaining nuts. Install three new strut-to-body retaining nuts. Tighten to 25-34 N·m (19-25 lb-ft).
7. Remove jackstand.
8. Install tire and wheel assembly.
9. Lower vehicle.

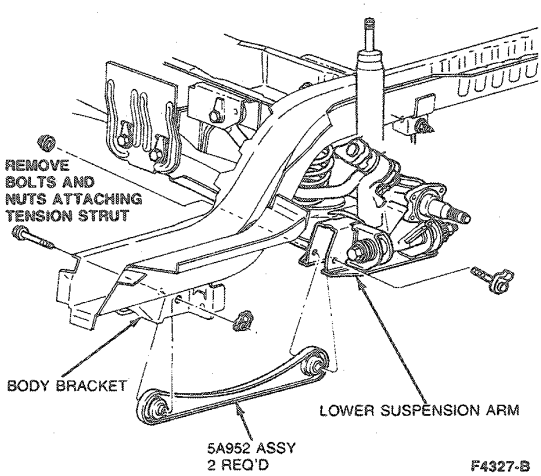
Station Wagon

Removal

1. Raise vehicle on a frame contact hoist. Refer to Section 00-02.
2. Place a floor jack and a wood block under rear lower suspension arm and raise arm to normal curb height.



3. Remove wheel and tire assembly.
4. Remove and discard nut and bolt retaining tension strut to lower suspension arm.
5. Remove and discard nut and bolt retaining tension strut to body bracket and remove strut assembly.



Installation

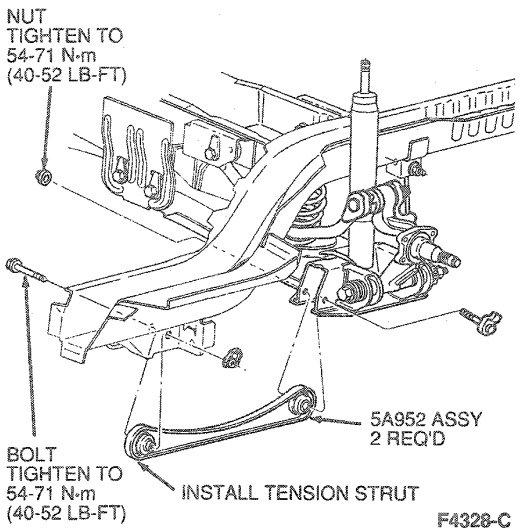
1. Insert front end of tension strut into body bracket and install a new bolt and nut. Do not tighten at this time.
2. Position tension strut in lower suspension arm. Install a new bolt and nut. Tighten nut to 54-71 N·m (40-52 lb-ft).
3. Tighten retaining bolt at front of tension strut to body bracket to 54-71 N·m (40-52 lb-ft).

REMOVAL AND INSTALLATION (Continued)

4. Install wheel and tire assembly.

   NOTE: After tension strut installation it may be necessary to check rear wheel alignment.

5. Remove floor jack and lower vehicle.



Sedan

Removal

CAUTION: Do not raise vehicle by tension strut. Damage to strut may result.

1. Raise vehicle on a hoist. Refer to Section 00-02.
2. Remove tire and wheel assembly.
3. Remove brake drum. Refer to Section 06-02.
4. Remove clip retaining brake flex hose to shock strut bracket.

   NOTE: Care should be taken to ensure that brake flex hose is not stretched and brake tube is not bent.

5. Remove four bolts retaining brake backing plate to the spindle. Refer to Section 06-02.
6. Remove brake backing plate from spindle and wire it out of the way.
7. Remove and discard control arm to spindle bolts, washers and nuts.
8. Remove tension strut nut, washer and bushing. Discard nut.
9. Remove and discard pinch bolt retaining spindle to shock strut and remove spindle from vehicle.

Installation

1. Loosely assemble new arm bolt through spindle boss holes.
2. Position spindle onto tension strut and then onto shock strut.
3. Insert a new strut-to-spindle pinch bolt. **Do not** tighten at this time.
4. Install tension strut bushing, washer and new nut. **Do not** tighten at this time.
5. Install new arm to spindle, washers and nuts.
6. Install a jackstand to support suspension at normal curb height before tightening fasteners.
7. Tighten spindle-to-strut bolt to 68-92 N·m (50-67 lb-ft).
8. Tighten tension strut nut to 47-63 N·m (35-46 lb-ft).
9. Tighten control arm to spindle nuts to 59.5-80.5 N·m (44-59 lb-ft).
10. Install brake backing plate. Refer to Section 06-02.
11. Install brake flex line clip onto shock strut.
12. Install brake drum. Refer to Section 06-02.
13. Install wheel and tire assembly.
14. Lower vehicle.

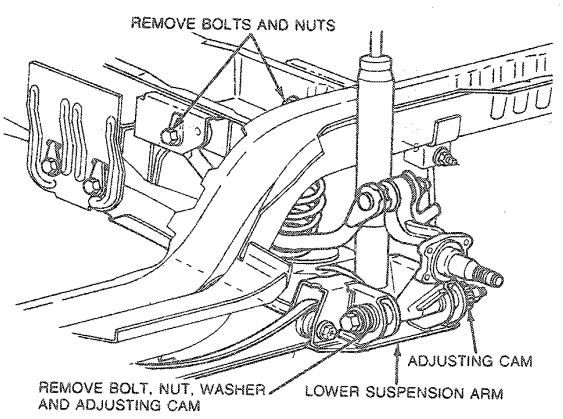
Station Wagon

Removal

1. Raise vehicle on hoist. Refer to Section 00-02.

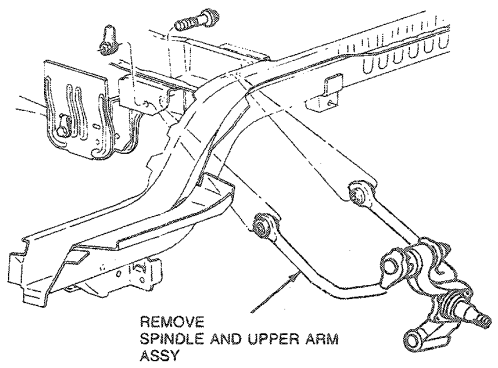
   NOTE: If a frame contact hoist is used, a jackstand must be placed under the lower suspension arm to raise it to curb height.

2. Remove wheel and tire assembly.
3. Remove brake drum and wheel bearings as outlined.
4. Remove brake backing plate assembly from spindle. Refer to Section 06-02.
5. Remove and discard bolts and nuts attaching front and rear upper suspension arms to body crossmember.
6. Remove bolt, one washer, adjusting cam and nut attaching spindle to lower suspension arm. Discard bolt, washer and nut.



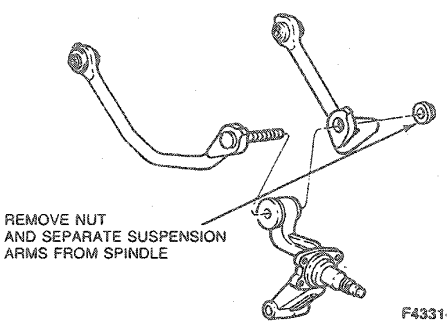
REMOVAL AND INSTALLATION (Continued)

7. Remove spindle and upper suspension arms from vehicle as an assembly.



F4330-B

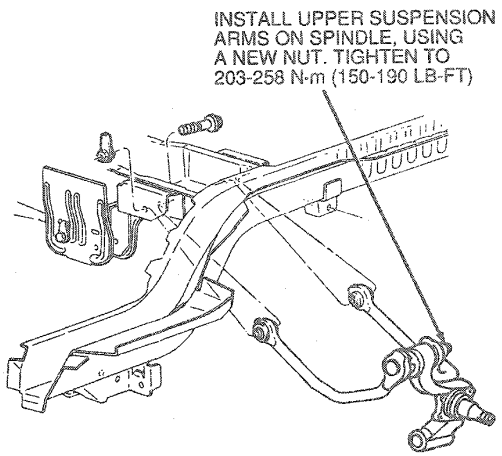
8. Remove and discard nut attaching upper suspension arm to spindle and remove suspension arms from spindle.



F4331-B

Installation

1. Install upper suspension arms on spindle using a new nut. DO NOT tighten at this time.

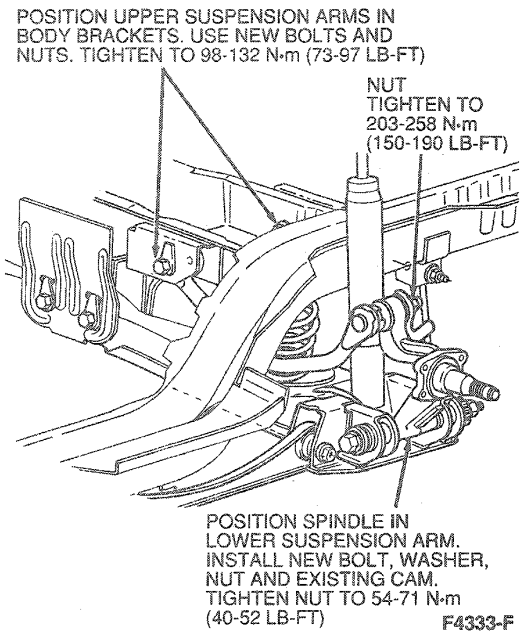


F4332-C

2. Position spindle and suspension arm assembly on lower suspension arm. Install new bolt, washer, existing adjusting cam and a new nut. DO NOT tighten at this time.
3. Position front and rear upper suspension arms to body bracket and install new bolts and nuts. DO NOT tighten at this time.
4. Ensure that the lower suspension arm is supported so that the lower suspension arm is at normal curb height.
5. Tighten the bolts attaching the front and rear upper suspension arms to body to 98-132 N·m (73-97 lb-ft).
6. Tighten the nut attaching the upper suspension arms to spindle to 203-258 N·m (150-190 lb-ft).
7. Tighten the nut attaching the spindle to lower suspension arm to 54-71 N·m (40-52 lb-ft).

REMOVAL AND INSTALLATION (Continued)

8. Install brake backing plate assembly to spindle. Refer to Section 06-02.



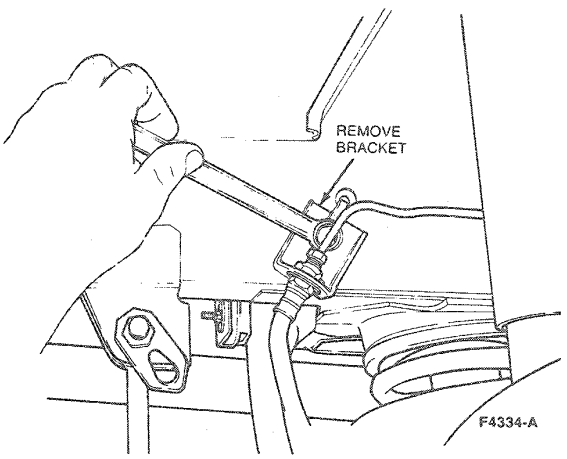
9. Install brake drum and wheel bearings.
10. Install wheel and tire assembly.
11. Remove jackstand and lower vehicle.
12. Check rear wheel alignment.

Springs

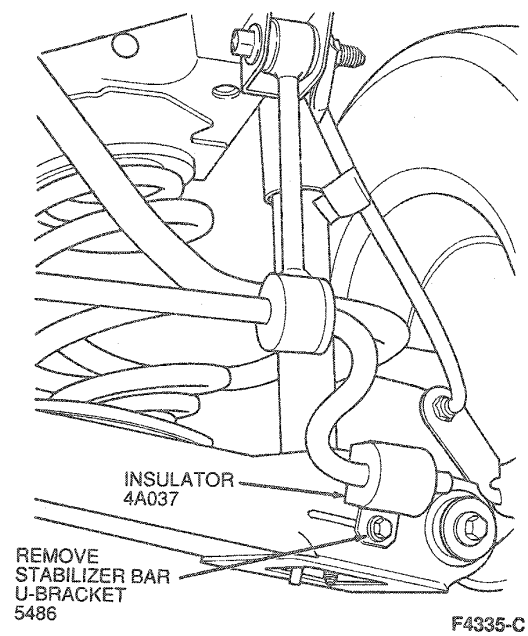
Removal

NOTE: If a twin-post hoist is used, vehicle must be supported on jackstands placed under pads of the underbody forward of the tension strut bracket.

1. Raise vehicle on a hoist and place a floor jack under lower suspension arm. Raise lower arm to normal curb height. Refer to Section 00-02.
2. Remove wheel and tire assembly.
3. Remove the bracket retaining the brake flexible hose to body.

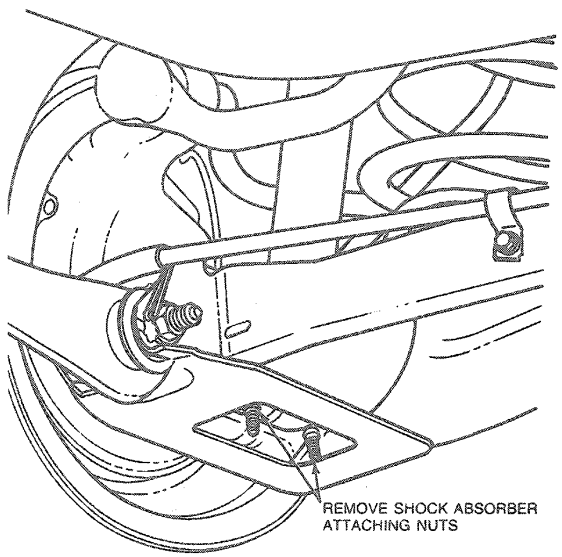


4. Remove stabilizer bar U-bracket from lower suspension arm.

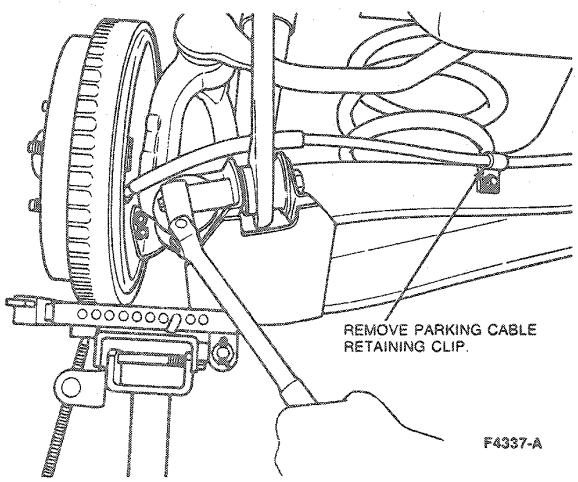


REMOVAL AND INSTALLATION (Continued)

5. Remove and discard nuts attaching shock absorber to lower suspension arm.

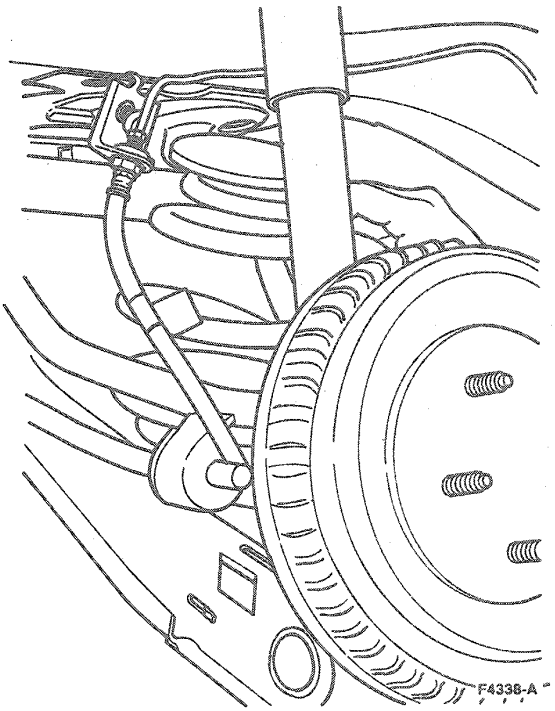


6. Remove parking brake cable and clip from lower suspension arm.
7. On vehicles equipped with rear disc brakes, remove ABS cable from clips on lower suspension arm.
8. Remove and discard bolt and nut attaching tension strut to lower suspension arm.
9. Wire spindle and upper suspension arms to body to prevent them from dropping down.



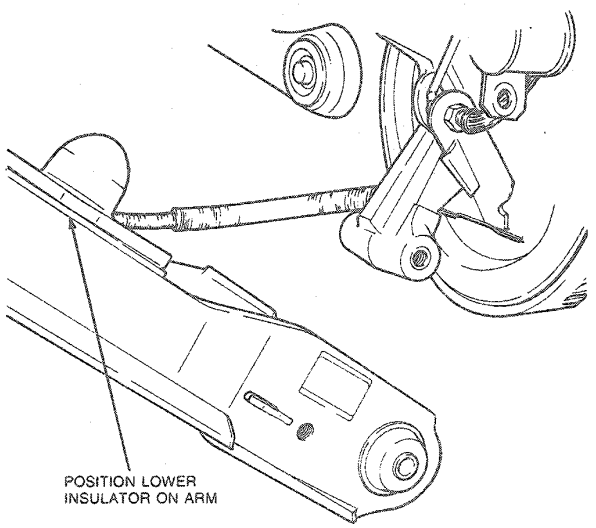
10. Remove nut, bolt, washer and adjusting cam retaining lower suspension arm to spindle. Discard nut, bolt and washer.

11. Slowly lower suspension arm with floor jack until spring can be removed.



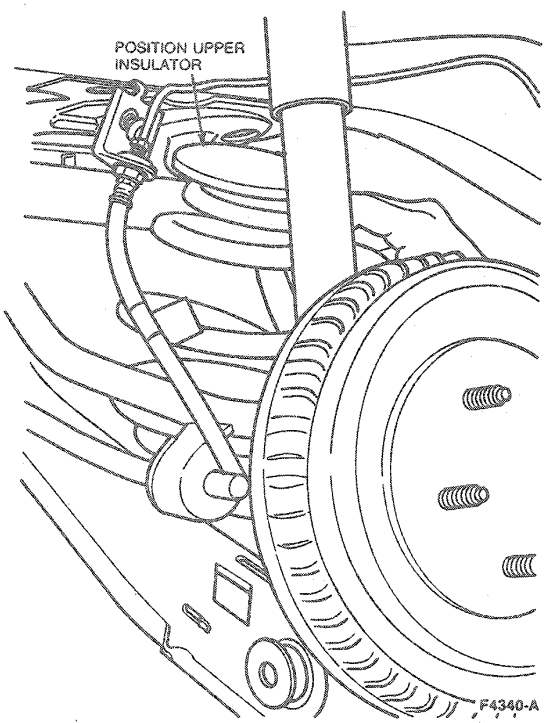
Installation

1. Position lower insulator on lower suspension arm and press insulator downward into place. Verify insulator is properly seated.

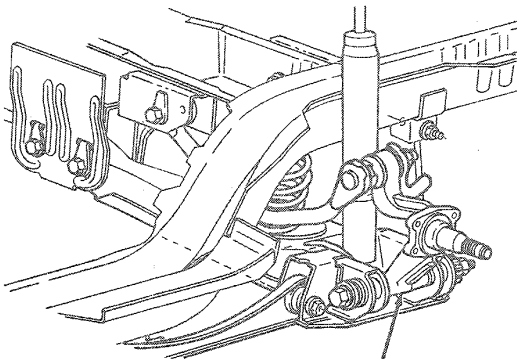


REMOVAL AND INSTALLATION (Continued)

2. Position upper insulator on top of spring. Install spring on lower suspension arm, making sure spring is properly seated.
3. Slowly raise suspension arm with floor jack and guide upper spring insulator onto upper spring seat on underbody.



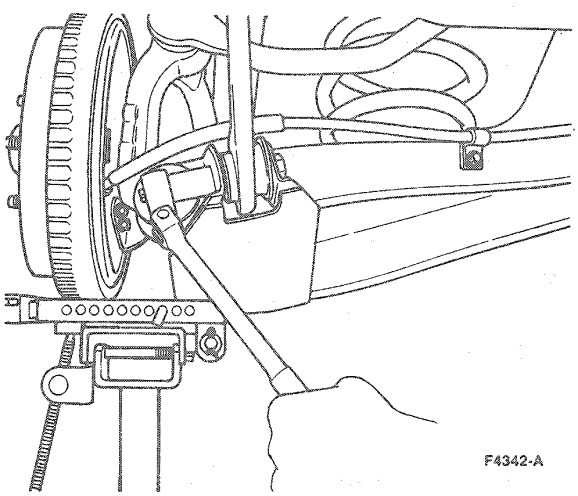
4. Position spindle in lower suspension arm and install a new bolt, nut, washer and existing cam. Install bolt with the head toward front of vehicle. DO NOT tighten at this time.



POSITION SPINDLE IN LOWER SUSPENSION ARM. INSTALL NEW BOLT, WASHER, NUT AND EXISTING CAM. TIGHTEN NUT TO 54-71 N·m (40-52 LB-FT)

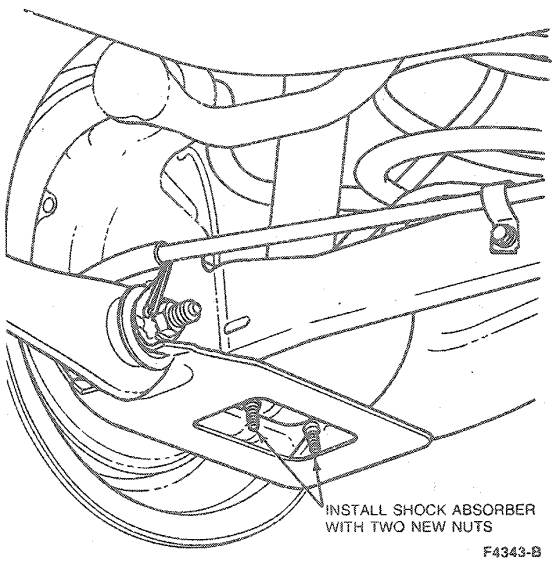
F4341-D

5. Remove wire from spindle and suspension arms.
6. Install tension strut in lower suspension arm using a new bolt and nut. DO NOT tighten at this time.
7. Install parking brake cable and clip to lower suspension arm.
8. On vehicles equipped with rear disc brakes, install ABS cable into clips on lower suspension arm.

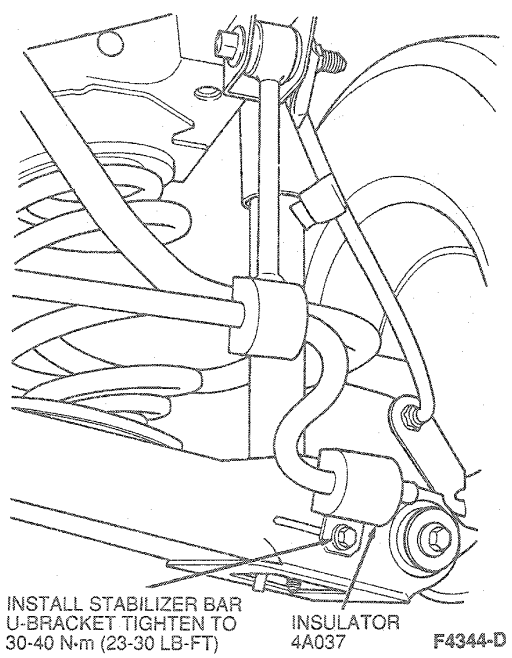


REMOVAL AND INSTALLATION (Continued)

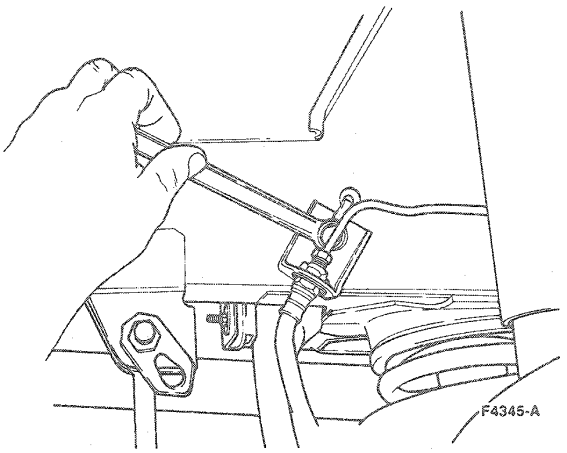
9. Position shock absorber on lower suspension arm and install two new nuts. Tighten to 19.1-25.9 N·m (15-19 lb-ft).



10. Install stabilizer bar and U-bracket to lower suspension arm using a new bolt. Tighten to 30-40 N·m (23-30 lb-ft).



11. Install flexible brake hose bracket to body. Tighten bolt to 11-16 N·m (8-12 lb-ft).



12. Using floor jack, raise lower suspension arm to normal curb height. Tighten lower suspension arm to spindle nut to 54-71 N·m (40-52 lb-ft). Tighten tension strut to body bracket bolt to 54-71 N·m (40-52 lb-ft).
13. Install wheel and tire assembly.
14. Remove floor jack and lower vehicle.
15. Check rear wheel alignment.

Control Arm

Sedan

Removal

CAUTION: Do not raise vehicle by tension strut.

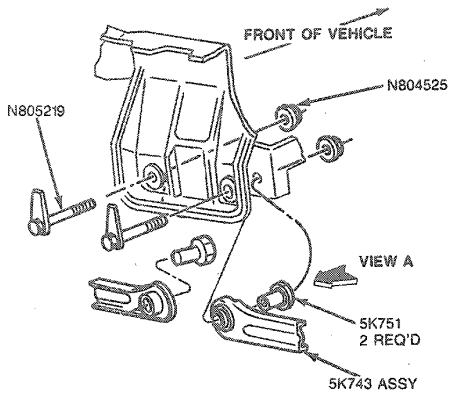
1. Raise vehicle on a hoist. Refer to Section 00-02.
2. Disconnect brake proportioning valve from left side front arm. Refer to Section 06-00.
3. Disconnect parking brake cable from front arms. Refer to Section 06-05.
4. Remove and discard arm-to-spindle bolt, washer and nut.
5. Remove and discard arm-to-body bolt and nut.
6. Remove arm from vehicle.

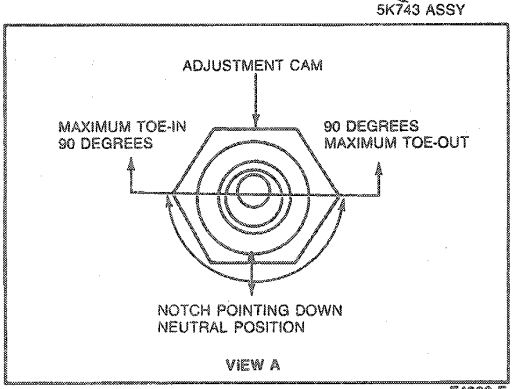
Installation

NOTE: When installing new control arms, the offset on all arms must face up. (The arms are stamped "bottom" on the lower edge.) The flange edge of the right side rear arm stamping must face the front of the vehicle. The other three must face the rear of the vehicle.

REMOVAL AND INSTALLATION (Continued)

NOTE: The rear control arms have two adjustment cams that fit inside the bushings at the arm-to-body attachment. The cam is installed from the rear on the left arm and from the front on the right arm.





1. Position arm, and cam where required, at center of vehicle. Insert new bolt and nut. **Do not** tighten at this time.
2. Move arm end up to spindle and insert new bolt, washer and nut. Tighten nut to 59.5-80.5 N·m (44-59 lb-ft).
3. Tighten arm-to-body nut to 68-92 N·m (50-67 lb-ft).
4. Install parking brake cable to front arms. Refer to Section 06-05.
5. Install brake proportioning valve to left side front arm. Refer to Section 06-00.
6. Lower vehicle.
7. After control arm replacement, the alignment should be checked for rear toe and reset if required.

Bearing and Hub Assembly, Drum Brakes

Tools Required:

- Coil Remover T89P-19623-FH

Removal

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Remove wheel and tire assembly. Refer to Section 04-04.
3. Remove two pushnuts retaining drum to hub and remove drum.
4. Remove grease cap from bearing and hub assembly and discard cap.
5. Remove hub retaining nut and discard.
6. Remove bearing and hub assembly from spindle.

Installation

1. Position bearing and hub assembly on spindle.
2. Install new hub retaining nut and tighten to 255-345 N·m (188-254 lb-ft).
3. Install new grease cap using Coil Remover T89P-19623-FH. Tap on tool until grease cap is fully seated.
4. Install brake drum on hub. Install two pushnuts that retain drum.
5. Install wheel and tire assembly.
6. Lower vehicle.

Bearing and Hub Assembly, Disc Brakes

Removal

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Remove wheel and tire assembly. Refer to Section 04-04.
3. Remove caliper assembly from brake adapter. Support caliper assembly with a length of wire. Refer to Section 06-04.
4. Remove push on nuts that retain rotor to hub and remove rotor.
5. Remove grease cap from bearing and hub assembly and discard grease cap.
6. Remove bearing and hub assembly retaining nut and discard.
7. Remove bearing and hub assembly from spindle.

Installation

1. Position bearing and hub assembly on spindle.
2. Install new hub retaining nut. Tighten to 255-345 N·m (188-254 lb-ft).
3. Install a new grease cap using Coil Remover T89P-19623-FH. Tap on tool until grease cap is fully seated.
4. Install rotor assembly on hub. Install two push-on nuts that retain rotor.
5. Install caliper assembly to brake adapter.

REMOVAL AND INSTALLATION (Continued)

6. Install wheel and tire assembly.
7. Lower vehicle.

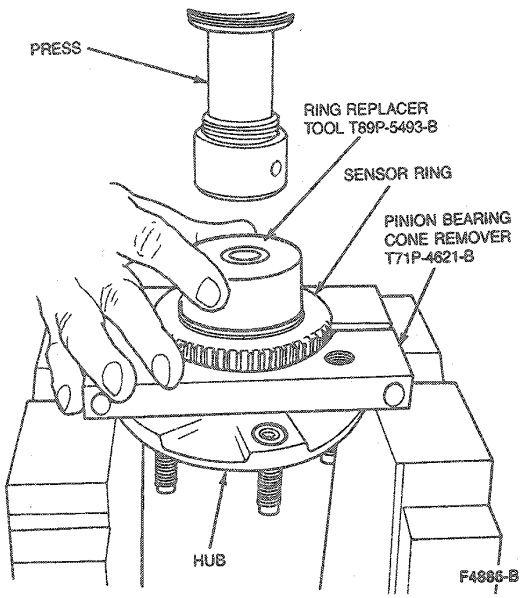
Anti-Lock Sensor Ring

Tools Required:

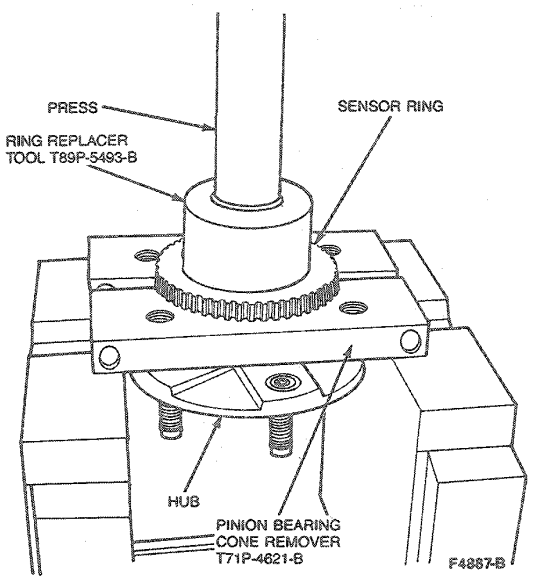
- Pinion Bearing Cone Remover T71P-4621-B
- Anti-Lock Sensor Ring Installer T88P-20202-B
- Ring Replacer Tool T89P-5493-B

Removal

1. Place hub assembly on press, using Pinion Bearing Cone Remover T71P-4621-B. Position tool between sensor ring and hub. Position Ring Replacer tool T89P-5493-B on the hub.

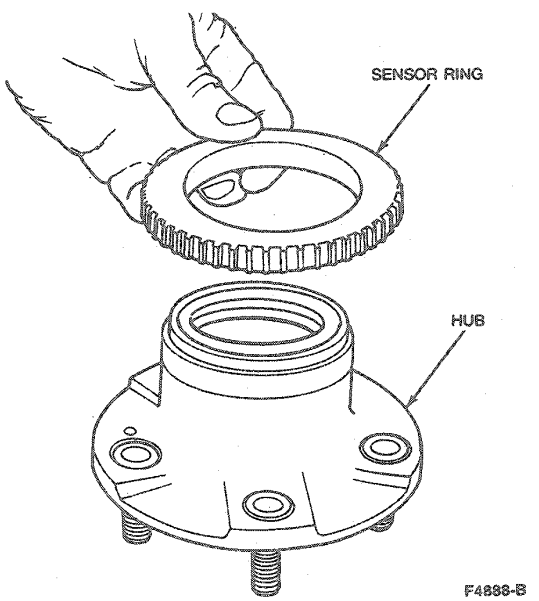


2. Press anti-lock sensor ring off of hub assembly.



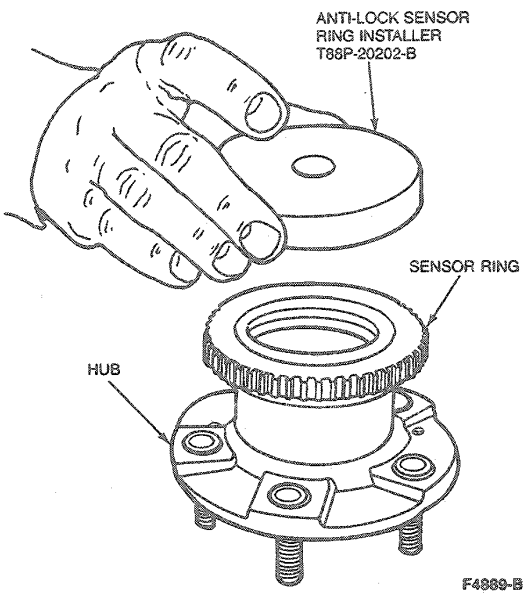
Installation

1. Place anti-lock sensor ring on hub assembly.

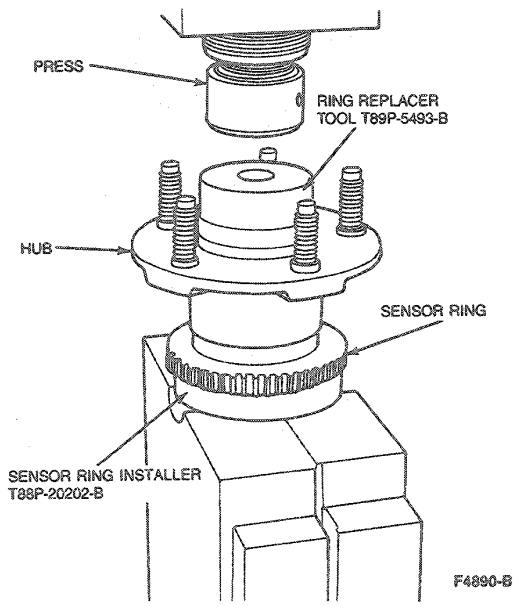


REMOVAL AND INSTALLATION (Continued)

2. Place Anti-Lock Sensor Ring Installer T88P-20202-B over speed indicator ring.



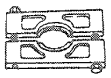
3. Place hub, anti-lock sensor Ring and Anti-Lock Sensor ring Installer T88P-20202-B in press. Using Ring Replacer Tool T89P-5493-B press anti-lock sensor ring on hub until ring bottoms on hub.



SPECIFICATIONS

Description	N·m	Lb-Ft
Shock Absorber-to-Body	25.5-34.5	19-25
Shock Absorber-to-Lower Suspension Arm	19.1-25.9	13-20
Upper Suspension Arms-to-Body	95-129	70-95
Shock Absorber-to-Body (Wagon)	25.5-34.5	19-25
Shock Absorber-to-Lower Suspension Arm (Wagon)	19.1-25.9	15-19
Upper Suspension Arms-to-Body (Wagon)	98-132	73-97
Upper Suspension Arms-to-Spindle (Wagon)	203-258	150-190
Lower Suspension Arm-to-Body (Wagon)	54-71	40-52
Lower Suspension Arm-to-Spindle (Wagon)	54-71	40-52
Tension Strut-to-Body (Wagon)	54-71	40-52
Tension Strut-to-Lower Suspension Arm (Wagon)	54-71	40-52
Stabilizer Bar U-Bracket-to-Lower Suspension Arm (Wagon)	30-40	23-30
Stabilizer Link Assembly-to-Body (Wagon)	54-71	40-52
Brake Hose Bracket-to-Body	11-16	8-12
Lower Control Arm-to-Spindle (Sedan)	59.5-80.5	44-59
Lower Control Arm-to-Body (Sedan)	68-92	50-67
Tension Strut-to-Body (Sedan)	47-63	35-46
Tension Strut-to-Spindle (Sedan)	47-63	35-46
Strut Top Mount-to-Body (Sedan)	25-34	19-25
Strut-to-Spindle Bolt	68-92	50-67
Stabilizer Link-to-Strut Bracket (Sedan)	7-9.5	5-7
Stabilizer Link-to-Stabilizer Bar (Sedan)	7-9.5	5-7
Stabilizer Bar U-Bracket (Sedan)	34-46	25-33
Hub Nut	255-345	188-254
Brake Adapter-to-Caliper Bolt	59-81	44-59
Brake Adapter-to-Spindle Bolt	59-81	44-59
Shield-to-Brake Adapter Screw	8-12	6-8
Anti-Lock Sensor Screw	4.5-6.8	40-60 (Lb-In)
Caliper Bleeder Screw	8-13	71-115 (Lb-In)
Backing Plate Bolt	60-80	45-59
Rear Strut Rod-to-Upper Mount	53-72	40-53

SPECIAL SERVICE TOOLS

Tool Number	Description
T71P-4621-B Pinion Bearing Cone Remover	 T71P-4621-B
T88P-20202-B Anti-Lock Sensor Ring Installer	 T88P-20202-B
T89P-5493-B Ring Replacer Tool	 T89P-5493-B
T89P-19623-FH Coil Remover	 T89P-19623-FH

ROTUNDA EQUIPMENT

Model	Description
086-00029	Spring Compressor

SECTION 04-04 Wheels and Tires

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Tire Maintenance	04-04-8
Tire Replacement	04-04-10
Tire Rotation	04-04-9
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Tread Wear Indicators	04-04-9
Vibration	04-04-12
Wheel and Tire Indexing	04-04-9
Wheel Bearing, Front	04-04-13
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Spare Tire	04-04-7
Tire Inspection	04-04-7
Tire Sizes	04-04-7
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DESCRIPTION	
Spare Tire, Lightweight Temporary	04-04-4
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Wheel Lug Nuts	04-04-4
Aluminum Wheel Lug Nuts	04-04-4
Wheelcovers	04-04-2
Wheels	04-04-2
REMOVAL AND INSTALLATION	
Hoisting	04-04-5
Tire	04-04-6
Wheel and Tire	04-04-5
Wheel Ornaments	04-04-6
SPECIAL SERVICE TOOLS	04-04-13
SPECIFICATIONS	04-04-13
VEHICLE APPLICATION	04-04-1

VEHICLE APPLICATION

Taurus / Sable.

DESCRIPTION

Factory installed tires and wheels are designed to operate satisfactorily with loads up to and including full-rated load capacity when inflated to recommended inflation pressures.

Correct tire pressures and driving techniques have an important influence on tire life. Heavy cornering, excessively rapid acceleration and unnecessary sharp braking increase tire wear.

Tires

When replacing tires, only tires of the size, speed rating, load range, and construction type (radial) originally installed on the vehicle are recommended. Use of any other tire size or type may seriously affect ride, handling, speedometer / odometer calibration, vehicle ground clearance, and tire clearance to the body and chassis.

WARNING: DO NOT MIX DIFFERENT TYPES OF TIRES ON THE SAME VEHICLE SUCH AS RADIAL, BIAS, OR BIAS-BELTED TIRES EXCEPT IN EMERGENCIES (TEMPORARY SPARE USAGE), BECAUSE VEHICLE HANDLING MAY BE SERIOUSLY AFFECTED AND MAY RESULT IN LOSS OF CONTROL.

Consider the following when replacing tires:

1. To achieve best all around vehicle performance, tires of different construction should not be mixed on the same vehicle.
2. It is recommended that new tires be installed in pairs on the same axle.
3. When replacing only one tire, it should be paired with the tire having the most tread, to equalize braking traction.
4. Snow tires should be of a size and type equivalent to other tires on the vehicle as recommended on the tire decal.

   CAUTION: Tire chains cannot be used on vehicles equipped with P215/60R16-94V tires.

DESCRIPTION (Continued)

Wheels

Wheels must be replaced when they are bent, dented, heavily rusted, have air leaks (aluminum wheels can, in most cases, be serviced using the procedure under Adjustments) or elongated bolt holes, and have excessive lateral or radial runout. Wheels with a lateral or radial runout greater than the recommended specification may cause an objectionable, high-speed vehicle vibration.

Replacement wheels must be equal to the original equipment wheels in load capacity, diameter, width, offset and mounting configuration. An improper wheel may affect wheel and bearing life, ground and tire clearance, or speedometer and odometer calibrations.

Corrosion buildup can result in wheels sticking to the axle or rotor flange after extensive service. To prevent this from recurring once the wheels are removed, use the following procedure:

1. Clean axle / rotor flange and wheel bore of corrosion with wire brush, steel wool or other suitable material.
2. Coat wheel bore with Disc Brake Caliper Slide Grease D7AZ-19590-A (ESA-M1C172-A) or equivalent. Do not apply grease to wheel lug nut seats or wheel studs.
3. Install wheel on vehicle.

Wheelcovers

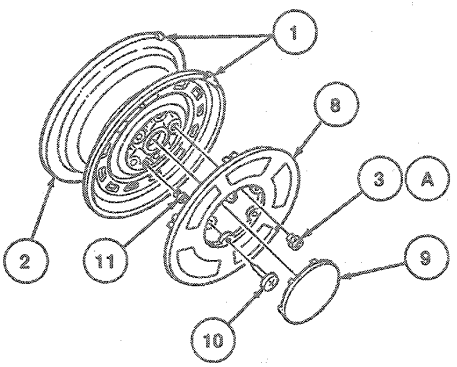
Ornament Applique Replacement (All Types Using Medallions—Except Snap-On Type Ornaments)

If a wheelcover is not damaged but is missing its ornament applique, the applique should be replaced by using the following procedure:

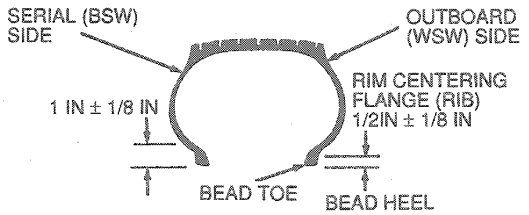
1. Remove any old mastic present in wheelcover ornament cavity.
2. Thoroughly clean contact area on wheelcover with Extra Strength Spot and Stain Remover B7A-19521-AA (ESR-M5B197-A) or equivalent.

   CAUTION: Do not allow solvent to contact other wheelcover surfaces.
3. Apply three dime-sized daubs of Ford Silicone Rubber E7TZ-19562-A (WSE-M4G320-A2) to wheelcover.
4. Install ornament applique with slight twisting pressure to ensure proper seating. Ideal curing time before installing wheelcover is 24 hours.

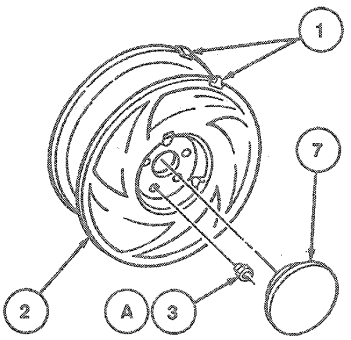
DESCRIPTION (Continued)

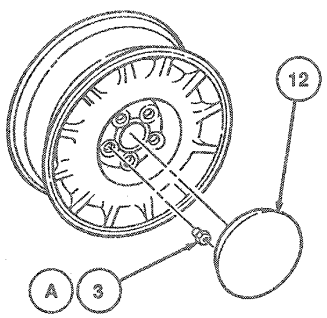


TIRE BEAD LUBRICANT REQUIREMENT



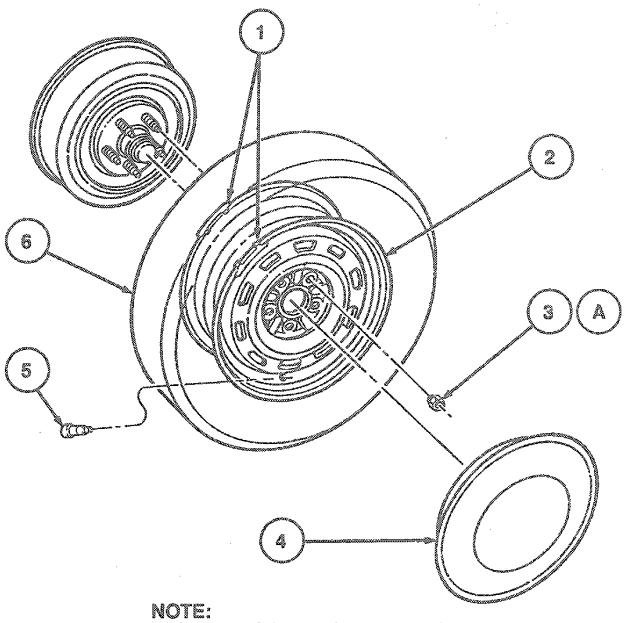
NOTE
APPLY TIRE BEAD LUBRICANT CIMCUMFERENTIALLY (360°) TO THE TIRE BEAD MOUNTING SURFACE ON BOTH SIDES OF THE TIRE. LUBRICANT COVERAGE MUST EXTEND FROM THE BEAD TOE TO THE RIM CENTERING FLANGE (RIB) OR AT LEAST 1" ± 1/8" ABOVE THE HEEL OF THE BEAD ON THE BLACK SIDEWALL (SERIAL SIDE) AND FROM THE BEAD TOE TO AT LEAST 1/2" ± 1/8" ABOVE THE HEEL OF THE BEAD ON THE WHITE SIDEWALL (OUTBOARD SIDE) OF THE TIRE.





INSTALLATION FOR CAST ALUMINUM WHEEL SAME AS MAIN VIEW EXCEPT AS SHOWN

SABLE LS +



NOTE:
WHEEL LUG NUT TORQUE MUST BE CONTROLLED TO PREVENT WHEEL DAMAGE. NUTS MUST BE ASSEMBLED WITHOUT LUBRICATION.

F7656-A

Item	Part Number	Description
1	—	Split Weights
2	1007	Wheel
3A	1012	Wheel Lug Nuts
4	1130	Wheelcover
5	1700	Air Valve

(Continued)

Item	Part Number	Description
6	1508	Tire
7	1A097	Center Piece
8	1000	Wheelcover
9	1141	Center Piece
10	N806654-S55	Cover Retainer

(Continued)

DESCRIPTION (Continued)

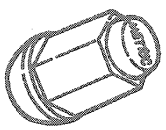
Item	Part Number	Description
11	1A100	Cover Retainer

(Continued)

Item	Part Number	Description
12	1A096	Center Piece
A		Tighten to 115-142 N·m (85-105 Lb-Ft)

Wheel Lug Nuts

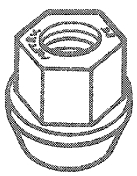
All vehicles use metric (M-12) wheel lug nuts. Replacement wheel lug nuts must be of the same type and thread size. All metric (M-12) wheel lug nuts are identified by the word METRIC stamped on the top surface of the nut.



F3494-B

Aluminum Wheel Lug Nuts

Aluminum wheels must use special "bulge" type metric (M-12) wheel lug nuts with enlarged chamfers, or distortion of the aluminum wheel lug nut seat will result.



F7808-A

Anti-Theft Wheel Lug Nuts

Optional aluminum wheels on vehicles are equipped with anti-theft wheel lug nuts (one per wheel) that are installed during vehicle pre-delivery. The key is attached to the wheel lug nut wrench, stowed with the spare tire. To allow vehicle service in the event the key has been misplaced, a Rotunda Locking Wheel Lug Nut Master Key Set 013-00006 or equivalent is available at most Ford and Lincoln/Mercury dealer service departments. The key has a circular keyway that is matched to the female slot in the anti-theft wheel lug nut.

To remove or install the anti-theft wheel lug nut, insert the key into the slot of the wheel lug nut, place the wheel lug nut wrench on the key, and while applying pressure on the key, remove or install the wheel lug nut.

Spare Tire, Lightweight Temporary

WARNING: THE TEMPORARY SPARE IS PROVIDED ONLY FOR TEMPORARY EMERGENCY USE. DO NOT USE AS A REGULAR TIRE. SERVICE AND REPLACE THE REGULAR TIRE AS SOON AS POSSIBLE. ANY CONTINUOUS ROAD USE OF THIS TEMPORARY, EMERGENCY TIRE MAY RESULT IN TIRE FAILURE, LOSS OF VEHICLE CONTROL, AND POSSIBLE INJURY TO VEHICLE OCCUPANTS.

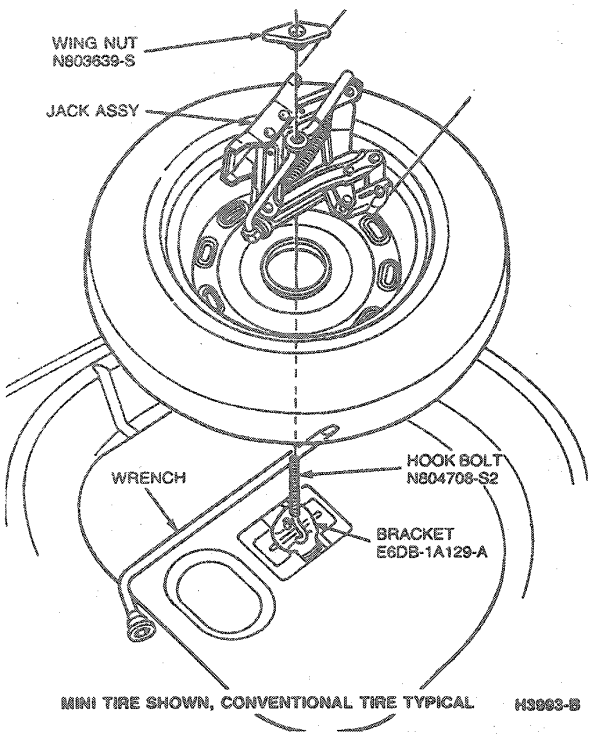
CAUTION: Because the temporary spare is a smaller diameter than the standard tire, ground clearance is reduced. Use care when a temporary spare is being used and avoid any obstacles that may come in contact with the underside of the vehicle.

A lightweight, temporary spare tire and wheel is standard equipment.

The temporary spare is designed to provide additional luggage room and a lightweight, easy-to-use spare tire. This spare is a normal-type radial ply with a reduced tread depth to provide an estimated tread life of 3218.6 km (2000 miles). It is intended for emergency use only and has a maximum speed capacity of 80 km/h (50 mph).

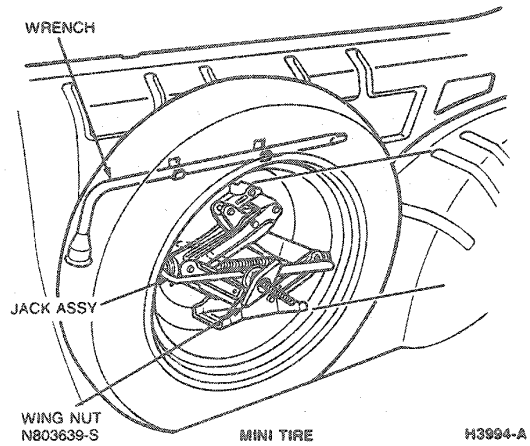
DESCRIPTION (Continued)

Sedan



MINI TIRE SHOWN, CONVENTIONAL TIRE TYPICAL H3993-B

Wagon



MINI TIRE H3994-A

Directions for Use

1. The temporary spare tire is for temporary, emergency use only and not for continuous use as a road wheel. Do not exceed 80 km/h (50 mph) under any circumstances. Replace with a regular tire as soon as possible.
2. Do not use tire chains with temporary spare. Check cold inflation pressure monthly and when used, maintain cold inflation pressure as specified on vehicle tire pressure decal.
3. Avoid abusive use such as driving over potholes. Carefully read Owner Guide before using this emergency spare. When tread wear indicators appear on tire, replace tire/wheel assembly. Do not reuse wheel once tire has worn out.
4. Do not exceed vehicle maximum load rating noted on tire decal.
5. Do not attempt to service or remove the temporary spare from its wheel.
6. Do not attempt to use the wheel for any other type of tire.

REMOVAL AND INSTALLATION

Hoisting

Incorrect hoisting can damage steering linkage components and front end suspension struts. Refer to Section 00-02 for hoisting instructions.

Wheel and Tire

Removal

1. Remove wheelcover with tapered end of wheel lug nut wrench by inserting and twisting handle, then prying against inner wheelcover flange. Loosen, but do not remove, the wheel lug nuts.

   NOTE: All wheel lug nuts are metric (M-12). Replacement wheel lug nuts must be of the same type and thread size as original. Metric wheel lug nuts are identified by the word METRIC stamped on the top surface of the nut.

   Aluminum wheels require a special bulge-type wheel lug nut with enlarged chamfer to prevent distortion of the wheel lug nut seat.
2. Raise vehicle until tire clears floor.
3. Remove wheel lug nuts and pull wheel off hub and drum assembly (rear) or hub assembly (front).

Installation

1. Clean dirt from hub mounting surface.
2. Place wheel on hub and drum assembly or hub assembly and tighten wheel lug nuts alternately.

   NOTE: Replacement wheel lug nuts must be metric (M-12) and same type and size as original equipment (19mm HEX). Some dealers have Mazda (M-12) which do not have a 19mm hex and will not work with the Taurus/Sable wrench.
3. Lower vehicle and tighten wheel lug nuts to 115-142 N·m (85-105 lb-ft).
4. Align wheelcover with valve stem extension matching the hole in the wheelcover (also identified on backside of wheelcover with valve stem logo). Hit with the palm of your hand on the outside edges of the wheelcover until it is snapped in place all the way around.

REMOVAL AND INSTALLATION (Continued)

Wheel Ornaments

Removal and Installation

Aluminum Wheels

Installation of the wheel ornament is made by inserting one side of the ornament into the center of the wheel opening and striking the opposite of the ornament with the palm of the hand until the ornament is seated in the opening.

Center Attached Two-Piece Bolt-On Wheelcover

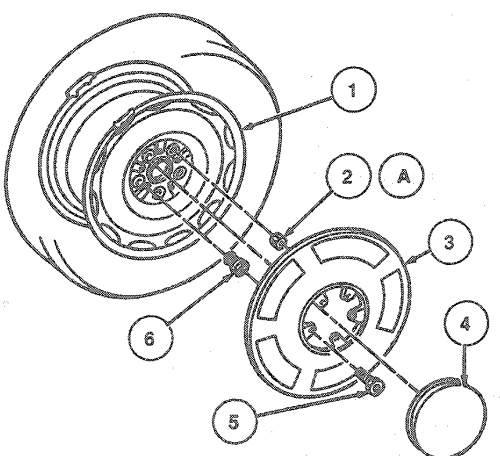
NOTE: A Phillips screwdriver is required for the installation of the wheelcover; however, the wheel may be removed from the vehicle without removing the wheelcover. Only the center cap of the wheelcover needs to be removed.

Removal

1. Pry the center cap from the wheelcover using the lug wrench provided with the vehicle.
2. The wheel, with the wheelcover still attached, may now be removed from the vehicle by removing the five lug nuts.
3. If the tire needs to be removed from the wheel, first remove the five screws, using the Phillips screwdriver, and pull the wheelcover off of the wheel.

Installation

1. Align the valve hole in the wheelcover with the valve stem and install the wheelcover into the wheel.
2. Align the holes in the wheelcover mounting pads with the center holes in the anchor.
3. Install the five screws and tighten securely with a Phillips screwdriver.
4. Align the legs of the center ornament with the slots on the wheelcover and install.



INSTALLATION OF SEMI-STYLED STEEL WHEEL WITH SCREW ON WHEEL COVER

F7809-A

Item	Part Number	Description
1	1007	Wheel Assy
2A	1012	Lug Nut (5 Req'd)
3	1000	Wheelcover
4	1141	Wheelcover
5	N806654-S55	Screw (5 Req'd)
6	1A100	Wheel Ornament Screw Anchor
A		Tighten to 115-142 N·m (85-105 Lb-Ft)

Tire

Tools Required:

- Rotunda Tire Changer 104-00235

Follow instructions provided with Rotunda Tire Changer 104-00235 or equivalent.

Use appropriate equipment and adhere to prescribed safety instructions to avoid damage to the tire and possible injury.

Do not remove temporary spare tire from the wheel assembly. If tread wear indicators appear on temporary spare, replace complete tire and wheel assembly.

CLEANING AND INSPECTION

Appearance

To clean wheels, wheelcovers and wheel ornamentation, use a mild soap and water solution and rinse thoroughly with clear water.

CAUTION: Do not use steel wool, abrasive-type cleaner or strong detergents containing high alkaline or caustic agents as damage to the protective coating and discoloration may result.

NOTE: Automatic car wash tire brushes may damage aluminum and styled road wheel protective coatings. Before using such a service, be sure abrasive-type brushes are not being used.

Wheel Inspection

Inspect the wheel lug nuts and tighten to 115-142 N·m (85-105 lb-ft). Loose wheel lug nuts can cause shimmy and vibration, and may also destroy the stud holes in the wheels.

Ensure wheels and hubs are clean. Stones wedged between the wheel and rotor or rear drum or lumps of mud and grease can unbalance the wheel.

Check for wheel damage. Wobble or shimmy caused by a damaged wheel will eventually damage the bearings. Inspect the rims for dents that could leak air.

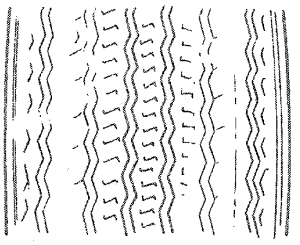
CLEANING AND INSPECTION (Continued)

Tire Sizes

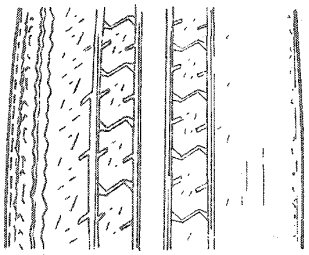
It is mandatory to use only the tire sizes recommended on the tire chart attached to the vehicle. Larger or smaller tires can damage the vehicle and affect durability and may require changing of the speedometer drive gears. Ensure wheel size and offsets match those recommended for the tire in use.

Tire Inspection

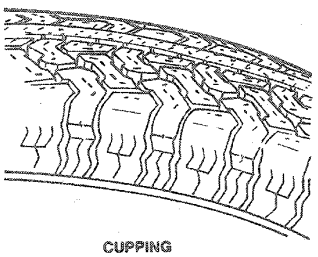
Inspect tires for wear. Abnormal or excessive wear may be caused by incorrect wheel alignment, wheel / tire imbalance, or improper tire pressure.



UNDERINFLATION

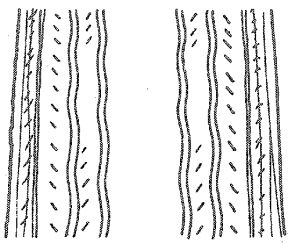


INCORRECT TOE-IN OR EXTREME CAMBER

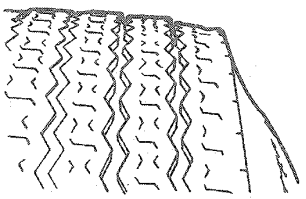


CUPPING

UNDERINFLATION AND/OR MECHANICAL IRREGULARITIES SUCH AS OUT-OF-BALANCE CONDITION OF WHEEL AND/OR TIRE, AND BENT OR DAMAGED WHEEL.
POSSIBLE LOOSE OR WORN STEERING TIE-ROD OR STEERING IDLER ARM.
POSSIBLE LOOSE, DAMAGED OR WORN FRONT SUSPENSION PARTS.



OVERINFLATION



FEATHERING DUE TO MISALIGNMENT

F3050-C

Spare Tire

The spare tire and jack are stowed under the rear load floor in sedan, and rear quarter panel in station wagon. Refer to Section 00-02 for information on how the tire, jack and wrench are stowed.

Temporary Spare Tire

The temporary spare tire is lightweight and is for limited mileage, emergency use only. It should be used only until the regular tire is serviced. This tire is identified by the wording TEMPORARY USE ONLY moulded into the tire.

ADJUSTMENTS

Steel Wheels

Wheel services that use welding, heating or peening are not approved. An inner tube is not acceptable service for leaky wheels or tires.

Air Leaks

Tools Required:

- Rotunda Electric Heat Gun 107-00300

If air pressure in an aluminum wheel is low, the following procedure should be performed **prior to considering wheel replacement.**

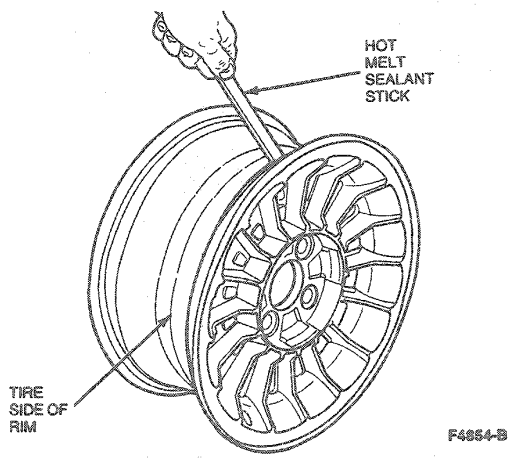
1. Remove tire and wheel assembly, and inspect wheel for structural damage. If none exists, go to Step 2. If the wheel is damaged, replace.

ADJUSTMENTS (Continued)

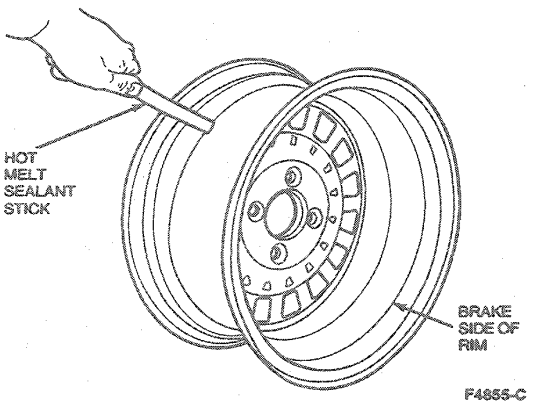
2. With tire mounted on wheel, locate air leak using a water bath or equivalent method, and mark location. Check complete wheel for possible additional leaks. When leaks are marked, dismount tire. Mark the valve location on the tire for proper indexing.
3. On the tire side of the wheel, thoroughly clean the leaking area with Professional Choke and Linkage Cleaner E8AZ-19A501-AA (ESR-M14P10-A) or equivalent, or use sandpaper of approximately 80-grit to remove all contamination. Using the sandpaper, score the surface of the wheel to improve adhesion of the sealer. Adequate area around the leak should be prepared to ensure covering the leak. If the valve stem is close to the area, remove it.
4. Use a clean cloth to remove all cleaner or sanding dust.

   NOTE: Do not use a torch containing oxyacetylene.
5. Heat the prepared area with Rotunda Electric Heat Gun 107-00300 or equivalent or propane torch until Hot Melt Sealant Stick E7AZ-19554-A (ESA-M4G280-A) flows. Apply the hot melt material over the prepared area using a liberal flow and wiping action to ensure coverage of the leaking area. The service is most effective when heat is applied to the brake side of the wheel and sealer is melted by heat in the metal rim.
6. Apply only enough heat to melt the sealer, then remove heat source. After servicing the leak, allow the wheel to cool until it can be handled safely.

Tire Side of Wheel



Brake Side of Wheel



7. Assemble tire and wheel. Inflate tire to the recommended pressure as indicated on the tire pressure decal.
8. Repeat Step 2 to verify service.
9. When the service is complete, inflate properly, balance the assembly and install on vehicle.

   NOTE: Use caution when mounting the tire so as not to damage the sealer.

Tire Maintenance

To maximize tire performance, inspect tires for signs of improper inflation and uneven wear, which may indicate a need for balancing, rotation or front suspension alignment.

Tires should also be checked frequently for cuts, stone bruises, abrasions, blisters and for objects that may have become imbedded in the tread. More frequent inspections are recommended when rapid or extreme temperature changes occur, or where road surfaces are rough or occasionally littered with debris.

As a further visible check of tire condition, tread wear indicators are moulded into the bottom of the tread grooves. The tire should be replaced when these indicator bands become visible.

To clean tires, use a mild soap and water solution only, and rinse thoroughly with clear water. Do not use any caustic solutions or abrasive materials. Do not use steel wool, wire brushes, gasoline, paint thinner or similar materials having a mineral oil base. These materials are harmful to tires and will eventually discolor the whitewalls and raised letters.

Tire Inflation

Tire inflation pressure is carefully calculated to give the vehicle satisfactory ride and steering characteristics without compromising long tire tread life.

ADJUSTMENTS (Continued)

A vehicle tire pressure decal, located on the rear door RH lock pillar below the rear door striker, gives the recommended cold tire inflation pressure. The cold tire inflation pressure can be measured after the vehicle has been parked for three hours or has been driven less than 5 km (3 miles).

A higher tire inflation pressure than the recommended pressure can cause a hard ride, tire bruising, carcass damage and rapid wear at the center of the tire. Low tire pressure can produce tire squeal, hard steering, rim dents, high temperatures and rapid wear on the outer edges of the tires. Unequal pressures can cause uneven braking and reduced handling.

WARNING: OVER- OR UNDER-INFLATED TIRES CAN REDUCE TIRE LIFE, ADVERSELY AFFECT VEHICLE HANDLING, AND POSSIBLY LEAD TO A SUDDEN FAILURE THAT COULD RESULT IN THE LOSS OF VEHICLE CONTROL WITHOUT WARNING.

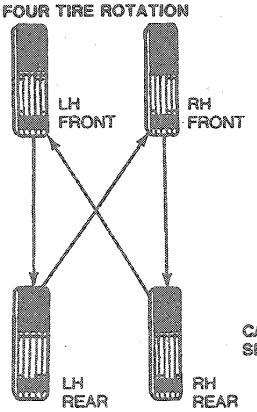
Tire Rotation

To equalize tire wear, tires may be rotated, but not until the cause of unusual or uneven tire wear is determined and corrected.

Front and rear tires perform different jobs and can wear differently depending on the type of vehicle and driving habits. To equalize wear and optimize tire life, rotate tires at approximately 12,000 km (7,500 miles) and then each 24,000 km (15,000 miles) thereafter.

If abnormal wear is detected, find and correct the cause, and rotate the tires following the diagram to allow more even wear.

FOUR TIRE ROTATION

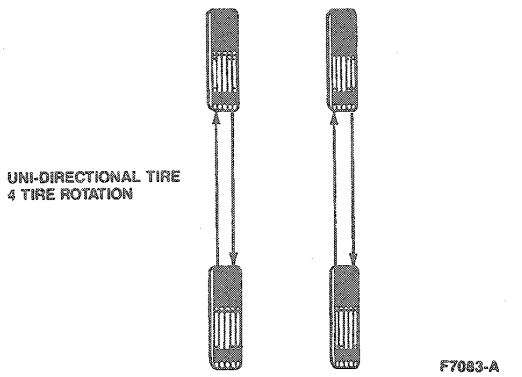


FOUR TIRE ROTATION

ROTATE THE LH REAR TIRE TO THE RH FRONT POSITION AND THE RH REAR TO THE LH FRONT POSITION. ROTATE THE LH FRONT TO THE LH REAR AND THE RH FRONT TO THE RH REAR POSITION

CAUTION: DO NOT USE TEMPORARY SPARE TIRES IN THE TIRE ROTATION.

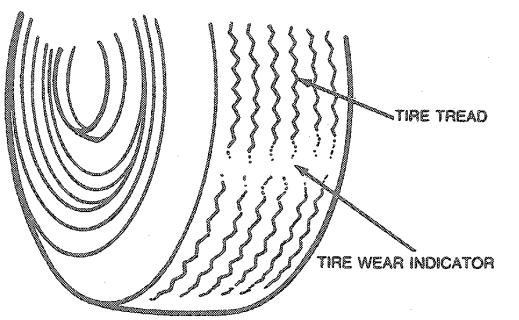
F3647-D



CAUTION: Never use the temporary spare for tire rotation or as a regular tire.

Tread Wear Indicators

Original equipment tires have built-in tread wear indicators to show when tires need replacement. These indicators will appear as 12.7mm (1/2 inch) wide bands when the tire tread depth becomes 1.58mm (1/16 inch). When the indicators appear in two or more adjacent grooves, at three locations around the tire, or when cord or fabric is exposed, tire replacement due to tread wear is recommended.



Wheel and Tire Indexing

When servicing wheels or tires, the following procedure for matching the tire and wheel must be followed to ensure that the best possible ride characteristics are maintained.

1. When removing a worn tire from a wheel, mark the valve location on the tire prior to removal.

ADJUSTMENTS (Continued)

2. If the original tire is to be remounted, index the valve mark on the tire to the valve of the original wheel. Go to Step 6.

   If a new wheel is being installed, locate the tire matching point based on the valve position on the original wheel relative to its matching point described in Step 3.

3. Locate the matching point on the wheel.

   Steel Wheels: There is either a chartreuse sticker on the outside rim flange, or, if the sticker is missing, a yellow paint mark in the dropwell of the rim that must be transferred to the outside rim flange.

   Aluminum Wheels: The matching point on aluminum wheels is at the tire valve.

4. Locating the matching point on a new tire:

   Many replacement tires as well as original equipment tires are marked for first harmonic matching to the wheel. These marks vary in type and color. Consult the tire dealer for details on mark identification.

5. Mount the tire on the wheel and line up the chartreuse paint mark or sticker on the new tire sidewall or the matching point of the original tire with the mark on the rim of the steel wheel or the tire valve of the aluminum wheel.

6. Inflate and balance the tire and wheel assembly.

Tire Replacement

Tools Required:

- Rotunda Tire Changer 104-00235

Use the Rotunda Tire Changer 104-00235 or equivalent to mount or dismount tires. Follow the equipment manufacturer's instructions. Do not use hand tools or tire irons alone to change tire as this may cause damage to the tire beads or wheel rim.

Rim bead seats on steel wheels should be cleaned with a wire brush or coarse steel wool to remove lubricants, old rubber and light rust.

Aluminum wheel rim bead seats should be cleaned with a non-abrasive cleaner to remove tire mounting lubricants and old rubber. Before mounting or dismounting a tire, bead area should be well lubricated with Rubber Lubricant D9AZ-19583-A (ESR-M99B135-A) or equivalent.

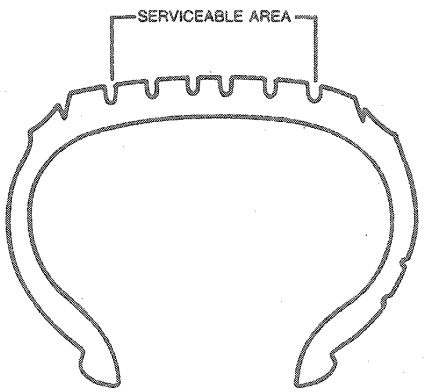
After mounting, inflate the tire so its beads are completely sealed. Install the valve core and inflate the tire to the proper pressure.

Tire Service

Punctured tires should be removed from the wheel and permanently serviced from the inside using a combination service plug and vulcanized patch. When servicing a puncture, always follow the manufacturer's instructions for using the service kit.

Service punctures in the tread area only. Never attempt to service punctures in the tire shoulders or sidewalls. In addition, do not service any tire that has sustained the following damage:

- Bulges or blisters
- Ply separation
- Broken or cracked beads
- Fabric cracks or cuts
- Tires worn to the fabric, or if wear indicators are visible
- Punctures larger than 6.35mm (1/4 inch)



F2691-C

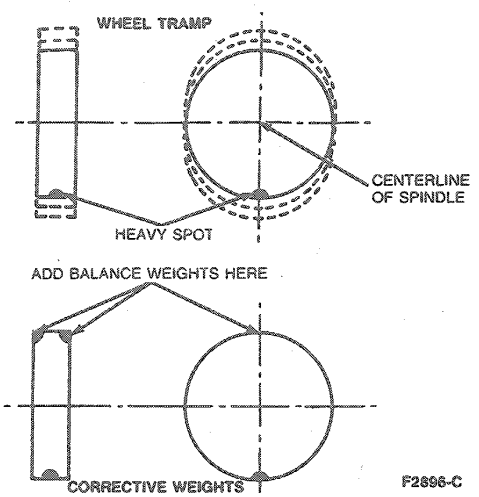
WARNING: TIRE SEALANTS THAT ARE INJECTED THROUGH THE VALVE STEM ARE NOT TO BE USED TO SERVICE PUNCTURED TIRES BECAUSE THEY CAN PRODUCE WHEEL RUST AND CAUSE TIRE IMBALANCE.

Tire and Wheel Balance

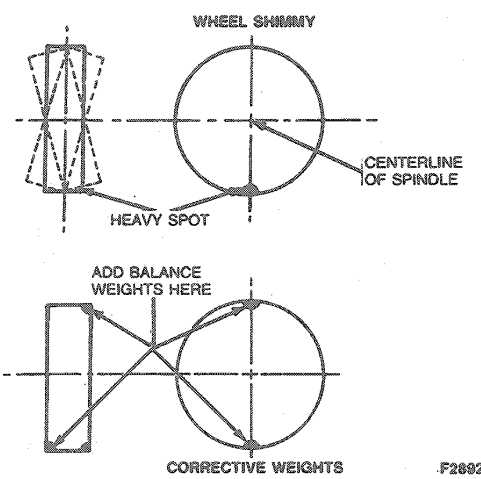
There are two types of wheel and tire balance: static and dynamic.

ADJUSTMENTS (Continued)

A **Static** balance is the equal distribution of weight around the wheel. Wheels that are statically unbalanced cause a bouncing action called wheel tramp.



A **Dynamic** balance is the equal distribution of weight on each side of the centerline so that when the tire spins there is no tendency for the assembly to move from side-to-side. Wheels that are dynamically unbalanced may cause wheel shimmy.



Deposits of mud must be cleaned from the inside of the rim. Stones should be removed from the tread in order to avoid operator injury during spin balancing and to obtain a good balance. The tire should be inspected for any damage, then balanced according to the equipment manufacturer's explicit instructions.

Off-Vehicle Balancing

Tools Required:

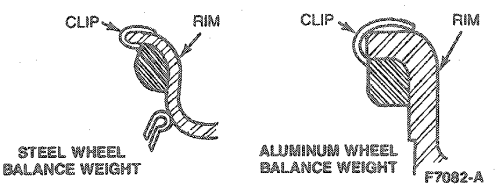
- Rotunda Off-Vehicle Wheel Balancer 078-00153 with Adapter Set 078-00055 or 078-00071
- Rotunda Off-Vehicle Balancer 006-01699 with Accessory Kit 006-01640

When balancing wheels off the vehicle, use a balancer that pilots the wheel by its center hole. If the wheel tramp and vehicle vibration is not corrected by the off-vehicle balance, an on-vehicle balance may be needed.

When performing an off-vehicle wheel balance on vehicles equipped with aluminum wire spoke wheels, use one of the following electronic balancers to provide the proper wheel balance:

- Rotunda Off-Vehicle Wheel Balancer 078-00153 with Rotunda Wheel Adapter Set 078-00055, 078-00071 or equivalent
- Rotunda Off-Vehicle Wheel Balancer 006-01699 with Accessory Kit 006-01640 or equivalent

Aluminum wheels have thicker rim flanges and require specially designed balance weights. Wheel weights for aluminum wheels are coated to prevent corrosion and should be installed with a plastic mallet.



1. Loosen wheel lug nuts of wheel(s) to be balanced. Raise front or rear of vehicle, as required. Refer to Section 00-02.
2. Remove wheel to be balanced. Remove center cap and mount wheel to balance machine. Lock hub adapter into spindle.
3. The balance equipment should have been calibrated by factory approved technicians within the last 90 days.
4. The equipment retaining surfaces, cones, cone springs, wing nuts, and mounting cups must be clean and without defects.
5. All tire labels, stones, dirt, and any other foreign material must be removed from the tire and wheel assembly. Particular attention should be paid to ensuring that the wheel mounting face and pilot hole are clean and free of foreign material.
6. The tire and wheel assembly must be mounted on the machine using a back mounted cone. Front coning of the assembly is not permitted.
7. The machine must be operated in the DYNAMIC mode only.
8. The factory balance weights **should not** be removed from the wheel before checking the balance status.

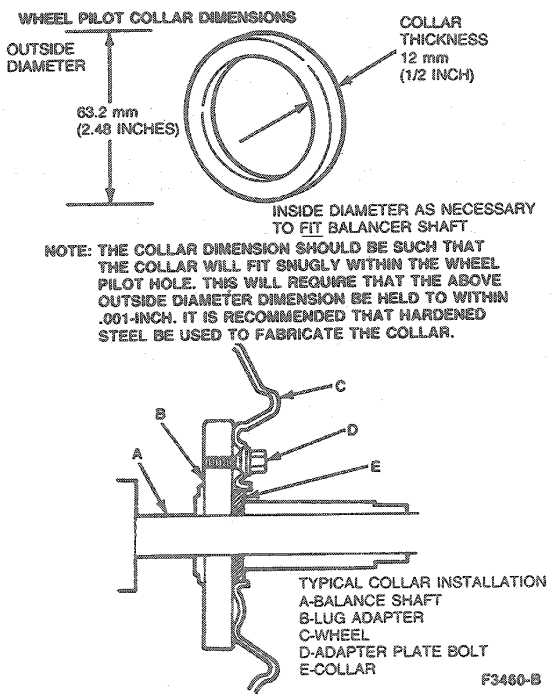
ADJUSTMENTS (Continued)

9. Spin the tire and wheel assembly on the machine in accordance with the balance equipment manufacturer's instructions.
10. Any tire and wheel assembly that shows a machine reading of 0.50 ounces or less in the DYNAMIC mode cannot be considered outside of factory specifications when checked on field accurate balance equipment.
11. If DYNAMIC correction is required, remove and discard the factory balance weights. Re-spin the tire and wheel assembly and add new correction weights in accordance with balance equipment manufacturer's instructions. Never add more than 85g (3 oz) to either rim flange. Always recheck balance after weight is added.

    NOTE: Tire and wheel rebalancing should not be required when rotating tires.
12. Remove the tire and wheel assembly from the machine and mount on the vehicle.
13. Lower the vehicle to the ground. Tighten the wheel lug nuts to 115-142 N·m (85-105 lb-ft).

Optional Lug Adapter

For a more consistent wheel balance, optional lug adapters and wheel pilot collars should be used. This additional equipment ensures proper wheel position on the balance equipment. This equipment is available for all Rotunda off-vehicle wheel balancers. Refer to Specifications.



On-Vehicle Balancing

CAUTION: The suspension should not be allowed to hang free. When the constant velocity joint is run at a very high angle, extra vibrations can occur as well as damage to seals and joints.

The lower control arm should be supported as far outboard as possible.

If the above method cannot be used, an off-vehicle balancer should be used.

WARNING: ON FRONT-WHEEL DRIVE VEHICLES, FRONT WHEELS SHOULD BE SPUN WITH THE ENGINE. DRIVE WHEEL SPIN SHOULD BE LIMITED TO 56 KM/H (35 MPH) AS INDICATED ON THE SPEEDOMETER. THIS LIMIT IS NECESSARY BECAUSE THE SPEEDOMETER INDICATES ONLY ONE-HALF OF THE ACTUAL WHEEL SPEED WHEN ONE DRIVE WHEEL IS SPINNING AND THE OTHER DRIVE WHEEL IS STOPPED. UNLESS CARE IS TAKEN IN LIMITING DRIVE WHEEL SPIN, THE SPINNING WHEEL CAN REACH EXCESSIVE SPEEDS. THIS CAN RESULT IN POSSIBLE TIRE DISINTEGRATION OR DIFFERENTIAL FAILURE, WHICH COULD CAUSE SERIOUS PERSONAL INJURY OR EXTENSIVE VEHICLE DAMAGE.

Vibration

NOTE: Do not align vehicle for vibration concerns. Vibration cannot be improved or eliminated by alignment.

If vehicle vibration persists after the wheels have been balanced, it may be caused by either tire or wheel runout. The vibration may also be caused by damage to the tire tread or sidewall, worn or bent halfshafts, engine vibration or worn engine mounts, frozen (seized) shock absorbers or unindexed tires/wheels.

Tire and Wheel Runout

Tools Required:

- Rotunda Radial Run-Out Gauge 007-00014

Excessive radial and lateral runout of a wheel and tire assembly can cause roughness, vibration, wheel tramp, and steering wheel nibble (tremor).

To avoid false readings caused by temporary flat spots in the tires, check runout only after the vehicle has been driven. Visually inspect the tire carcass for abnormal bulges or distortions.

Runout should be measured with a Radial Run-Out Gauge 007-00014 or equivalent. All measurements should be made on the vehicle with the tires inflated to recommended load inflation pressures and with the wheel bearings adjusted to specification.

For service and adjustment, refer to Section 00-04.

ADJUSTMENTS (Continued)

Wheel Bearing, Front

Wheel bearings are not adjustable. Loose, worn or damaged wheel bearings can cause noise, vibration and uneven tire wear, and should be replaced.

SPECIFICATIONS

WHEEL SPECIFICATIONS

Type	Color/Code	Wheel Size	No. of Bolts	Bolt Diameter	Offset	Tire Usage	Size
Steel	Brown/Brown GA[1]	14 x 5.5	5	107.95	42	P195/70R14 O205/70R14	14
Steel	Blue/Yellow JA[1]	15 x 6	5	107.95	42	P205/65R15	15
Aluminum Cast	—	15 x 6	5	107.95	42	P205/65R15	15
Steel Mini-Spare	Red/Red SP[1]	14 x 4	5	107.95	35.6	T135/80R14 T135/80D14	14

1 Code stamped at valve stem

WHEEL SPECIFICATIONS—TAURUS SHO

Type	Color/Code	Wheel Size	No. of Bolts	Bolt Diameter	Offset	Tire Usage	Size
Aluminum Cast	—	16 x 6	5	107.95	42	P215/60R 16-94V	16
Steel Mini-Spare	Blue/Brown TW*	15 x 4	5	107.95	38.9	T125/90R15	15

* Code stamped at valve stem.

TORQUE SPECIFICATIONS

Description	N·m	Lb-Ft
Wheel Lug Nuts	115-142	85-105

SPECIAL SERVICE TOOLS

ROTUNDA EQUIPMENT

Model	Description
006-01640	Adapter Set for 006-01699
006-01699	Off-Vehicle Wheel Balancer

(Continued)

ROTUNDA EQUIPMENT (Cont'd)

Model	Description
036-00118	Off-Vehicle Wheel Balancer
078-00055, 71	Adapter Set for 078-00153
078-00153	Off-Vehicle Wheel Balancer
104-00235	Tire Changer
007-00014	Radial Run-Out Gauge
107-00300	Electric Heat Gun
013-00006	Master Key Set Locking Lug Nut

GROUP

DRIVELINE 05

(4000)

SECTION 05-04 Halfshafts, Front Drive

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Hoisting	05-04-7
Towing	05-04-7
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Wheel and Tire Balancing, Front	05-04-7
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DISASSEMBLY AND ASSEMBLY	
Inboard CV Joint	05-04-24
Link Shaft/Halfshaft — SHO Manual Transmission	05-04-34
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DISASSEMBLY AND ASSEMBLY (Cont'd.)	
Outboard CV Joints Dust Seal	05-04-22
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VEHICLE APPLICATION

Taurus/Sable.

DESCRIPTION

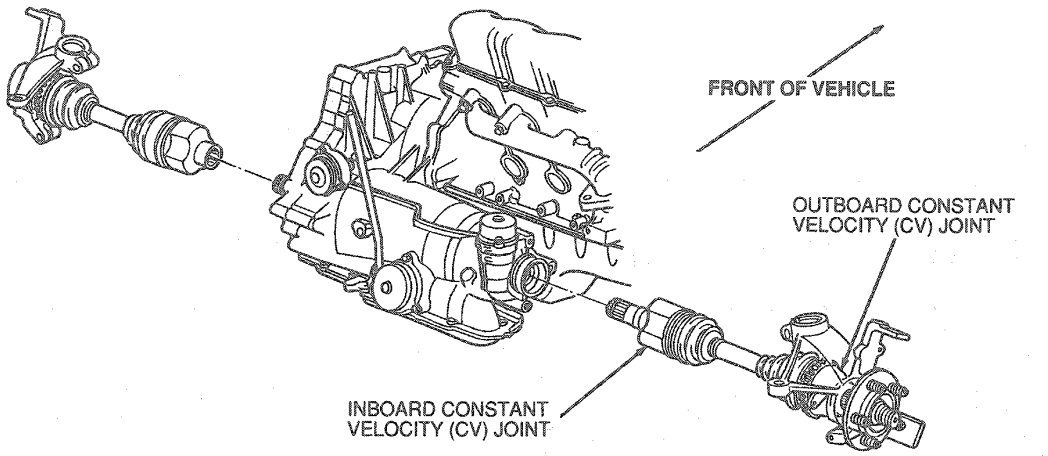
The front-wheel drive halfshaft employs constant velocity (CV) joints at both its inboard (differential) and outboard (wheel) ends for vehicle operating smoothness. The CV joints are connected by an interconnecting shaft. The interconnecting shafts (LH and RH) are splined at both ends and are retained in the inboard and outboard CV joints by circlips.

With the exception of the link shaft assembly used on the MTX transaxles on the RH side, the inboard CV joint stub shaft is splined and held in the differential side gear by a circlip. The link shaft assembly is retained by the support bearing. The outboard CV joint stub shaft is pressed on and secured with a prevailing torque nut. The CV joints are lube-for-life with a special CV joint grease and require no periodic lubrication. The CV joint boots, however, should be periodically inspected and replaced immediately when damage or grease leakage is evident. Continued operation would result in CV joint wear and noise due to contamination or loss of the CV joint grease.

The halfshaft design is similar for AXODE transmission applications except 3.8L powertrains are equipped with heavy duty halfshafts which include larger diameter, 32 tooth spline interconnecting shafts and internal CV joint components. The MTX equipped SHO vehicles employ a link shaft and support bearing in their design. SHO automatic transmission vehicles are equipped with Tri-Plan CV joints and no link shaft. Close attention should be given to service procedures as there are significant differences in design that affect disassembly and assembly. Halfshaft removal procedures also differ between automatic and manual transaxles. Halfshaft removal is accomplished (on AXODE and MTX applications) by applying a load to the back face of the inboard constant velocity (CV) joint assembly.

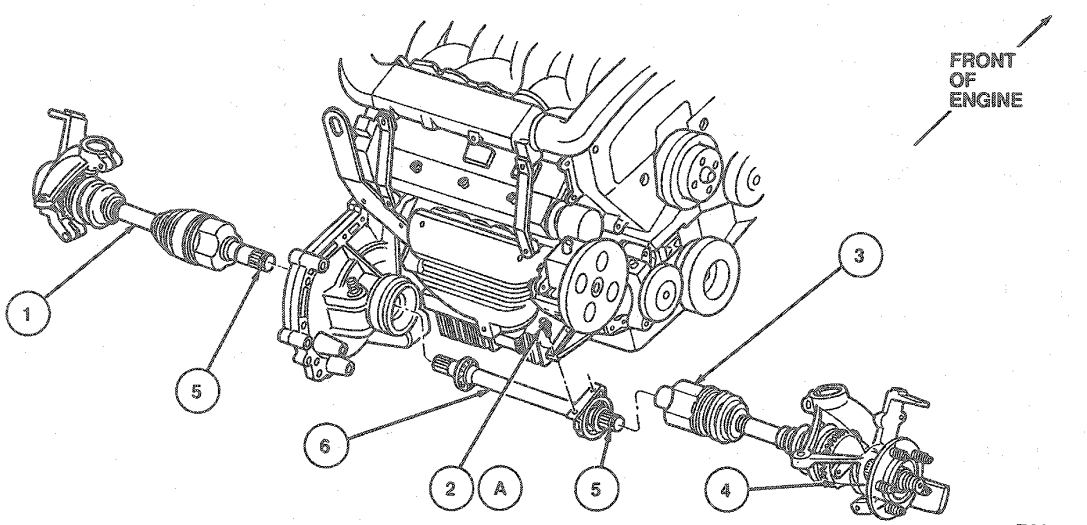
DESCRIPTION (Continued)

AXODE



E8284-A

MTX

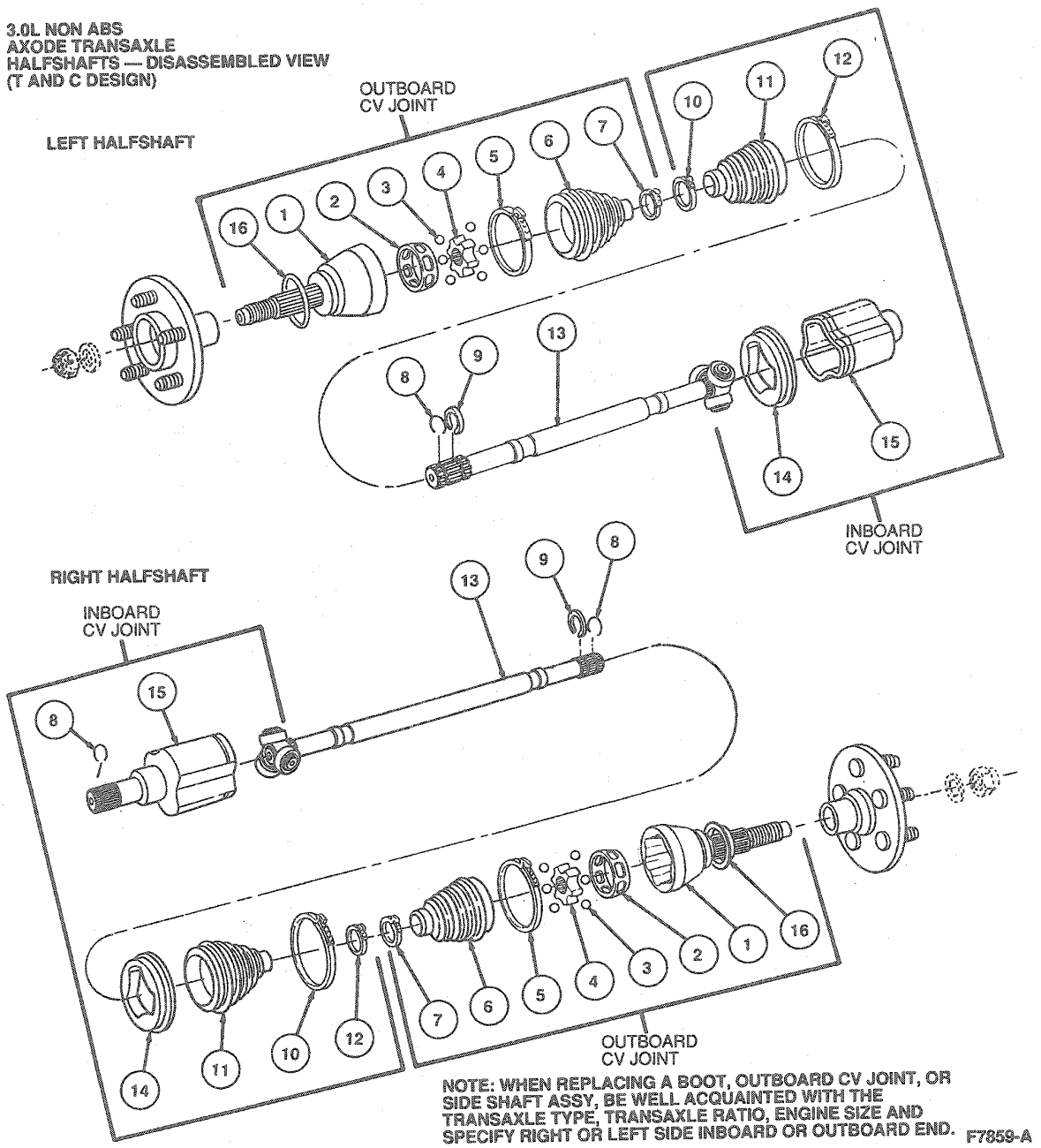


E8285-A

Item	Part Number	Description
1	3B437	LH Halfshaft Assy
2A	N605904-S100	Bolt (2 Req'd)
3	—	RH Inboard CV Joint
4	—	RH Outboard CV Joint
5	—	Snap Rings (2 Req'd)
6	3C081	Link Shaft Assy
A		Tighten to 21-32 N·m (15.5-23 Lb-Ft)

DESCRIPTION (Continued)

3.0L NON ABS
AXODE TRANSAXLE
HALFSHAFTS — DISASSEMBLED VIEW
(T AND C DESIGN)



Item	Description
1	Outboard Joint Outer Race and Stub Shaft
2	Ball Cage
3	Balls (6 Req'd)
4	Outboard Joint Inner Race
5	Boot Clamp (Large)
6	Boot

(Continued)

Item	Description
7	Boot Clamp (Small)
8	Circlip
9	Stop Ring
10	Boot Clamp (Small)
11	Boot
12	Boot Clamp (Large)
13	Interconnecting Shaft

(Continued)

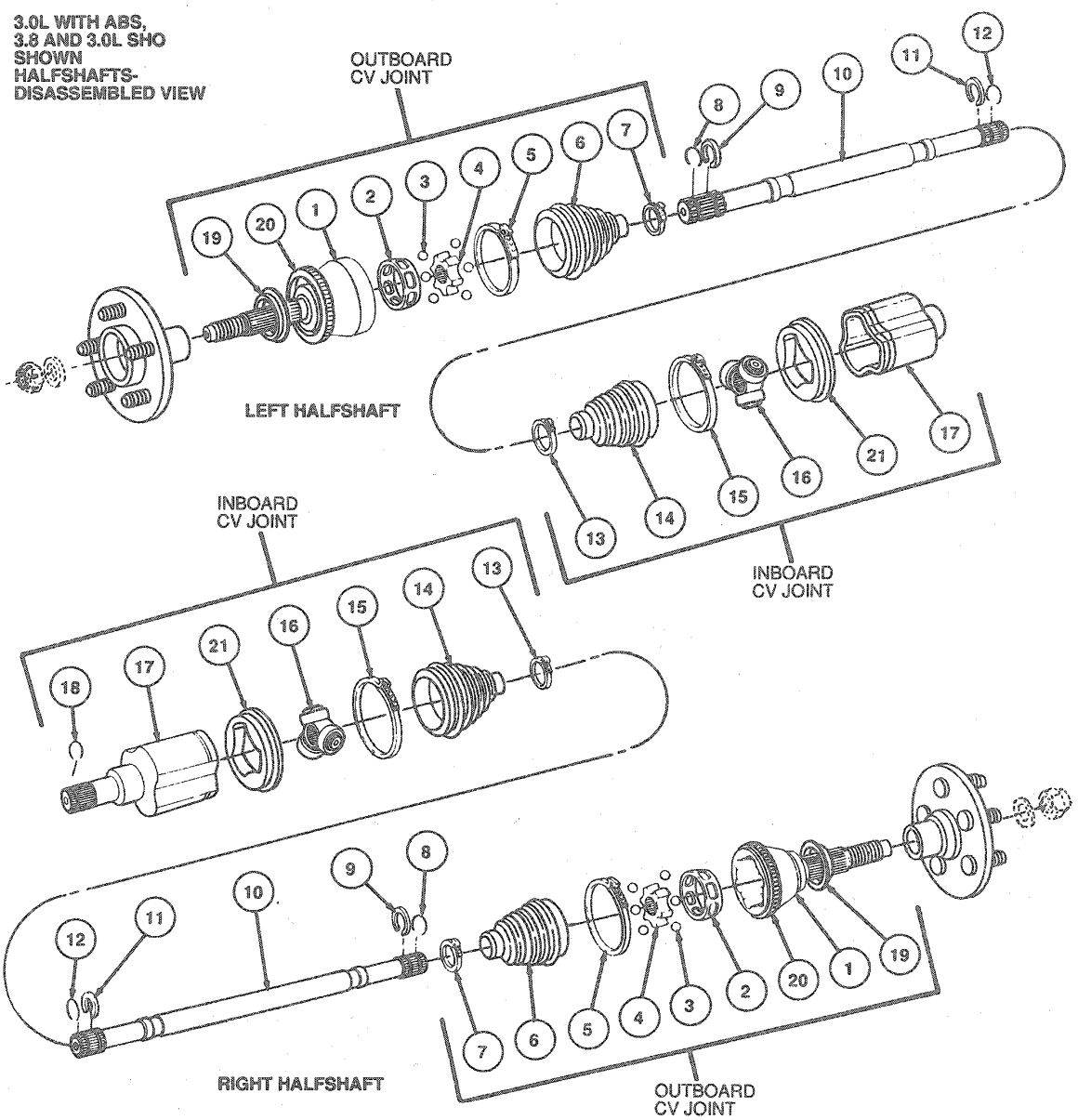
DESCRIPTION (Continued)

Item	Description
14	Trilobe Insert

(Continued)

Item	Description
15	Inboard Joint Outer Race and Stub Shaft
16	Dust Seal

3.0L WITH ABS, 3.8 AND 3.0L SHO SHOWN HALFSHAFTS- DISASSEMBLED VIEW



NOTE: WHEN REPLACING A BOOT, CV, JOINT, INTERCONNECTING SHAFT, OR COMPLETE HALFSHAFT ASSY, BE WELL ACQUAINTED WITH THE TRANSAXLE TYPE, TRANSAXLE RATIO, ENGINE SIZE AND SPECIFY RIGHT OR LEFT SIDE INBOARD OR OUTBOARD END.

E5523-G

DESCRIPTION (Continued)

Item	Description
1	Outboard Joint Outer Race and Stub Shaft
2	Ball Cage
3	Balls (Six)
4	Outboard Joint Inner Race
5	Boot Clamp (Large)
6	Boot
7	Boot Clamp (Small)
8	Circlip
9	Stop Ring

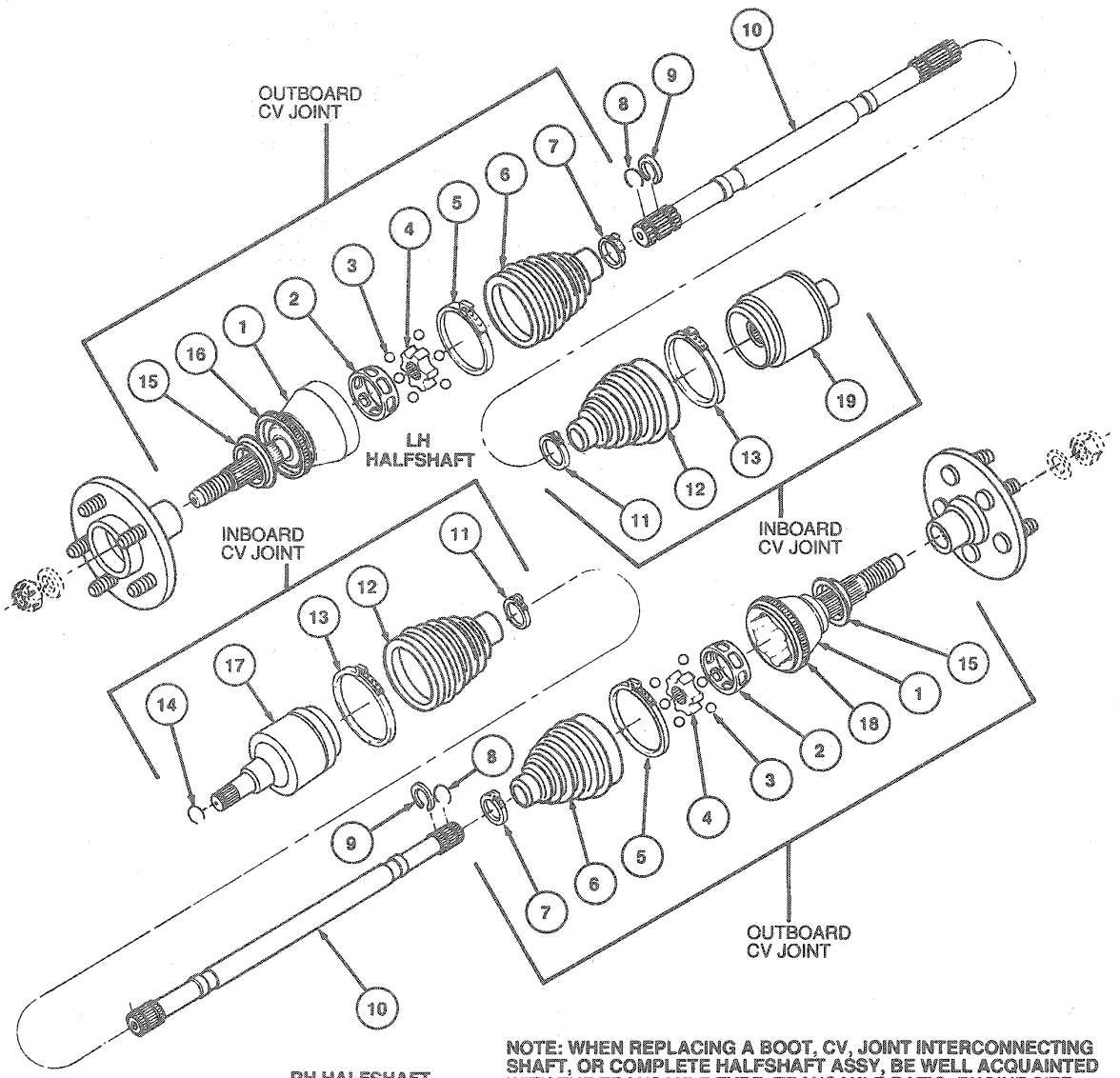
(Continued)

Item	Description
10	Interconnecting Shaft
11	Stop Ring
12	Circlip
13	Boot Clamp (Small)
14	Boot
15	Boot Clamp (Large)
16	Inboard Joint Tripod Assy
17	Inboard Joint Outer Race and Stub Shaft
18	Circlip
19	Dust Seal
20	Speed Indicator Ring (Anti-Lock Brakes)
21	Trilobe Insert

DESCRIPTION (Continued)

3.2L SHO Automatic

HALFSHAFTS — DISASSEMBLED VIEW



NOTE: WHEN REPLACING A BOOT, CV, JOINT INTERCONNECTING SHAFT, OR COMPLETE HALFSHAFT ASSY, BE WELL ACQUAINTED WITH THE TRANSAXLE TYPE, TRANSAXLE RATIO, ENGINE SIZE AND SPECIFY RH OR LH SIDE INBOARD OR OUTBOARD END.

E6708-F

Item	Part Number	Description
1	3B413	Outboard Joint Outer Race and Stub Shaft
2	3B413	Ball Cage
3	3B413	Balls (Six)
4	3B413	Outboard Joint Inner Race

(Continued)

Item	Part Number	Description
5	3B478	Boot Clamp (Large)
6	3A331	Boot
7	3B478	Boot Clamp (Small)
8	N803655-S	Circlip
9	N803657-S	Stop Ring

(Continued)

DESCRIPTION (Continued)

Item	Part Number	Description
10	3A329	Interconnecting Shaft
11	3B478	boot Clamp (Small)
12	3A331	Boot
13	3B478	Boot Clamp (Large)
14	N803655-S	Circlip
15	3K070	Dust Seal

(Continued)

Item	Part Number	Description
16	2C182	Speed-Indicator ring (Anti-Lock Brakes)
17	3B414	Inboard Tri-Plan CV Joint (If equipped)
18	2C182	Speed Indicator Ring (Anti-Lock Brakes)
19	3B414	Inboard Tri-Plan CV Joint (If equipped)

*NOTE: The Tri-Plan CV Joint can be identified by its large round outer race. This type CV Joint does not have a removable tripod.

Halfshaft Handling

Care should be exercised during halfshaft removal and installation, and during the various component disassembly and assembly procedures as outlined.

- Do not remove inboard CV joint by pulling on interconnecting shaft.
- The complete halfshaft should be handled by the interconnecting shaft to avoid pulling apart or potential damage to the inboard plunging CV joint.

  CAUTION: Never hold the CV joint and halfshaft assembly by the inboard or outboard joint only.
- Do not over-angle CV joints beyond their capacity.
- Ensure that ground surfaces and splines are not damaged.
- Do not allow CV joint boots to come into contact with sharp edges or hot engine and exhaust components.
- Do not drop assembled halfshafts, as the impact will cut the CV joint boots from the inside without external evidence of damage.
- Halfshaft assembly is not to be used as a lever arm to position other front end components. Always support free end of halfshaft.
- Ensure internal CV joint cleanliness and proper grease refill when boot is replaced.
- An assembled inboard CV joint may be damaged if it is "over-plunged" outward from the joint housing.
- Never use a hammer to remove or install halfshafts.

Wheel and Tire Balancing, Front

WARNING: ON-VEHICLE FRONT WHEEL AND TIRE BALANCING WITH FRONT SUSPENSION IN THE FULLY EXTENDED (REBOUND) POSITION MAY OVERHEAT AND DAMAGE THE CV JOINTS. PROPER BALANCING REQUIRES THAT THE FRONT WHEEL(S) AND TIRE(S) BE LIFTED OFF THE GROUND BY PLACING A JACK UNDER THE FRONT SUSPENSION LOWER ARM.

ANOTHER METHOD IS TO REMOVE THE FRONT WHEEL(S) AND TIRE(S) FROM THE VEHICLE FOR BALANCING.

Hoisting

Never raise vehicle using the halfshafts as lift points. Refer to Section 00-02.

Towing

Never tow vehicle using the halfshafts as anchor points for tow truck cable chains.

Undercoating and Rustproofing

Extreme care must be taken during undercoating and rustproofing procedures to protect CV joint boots from coating materials. Foreign materials on the rubber boot convolutions will cause advanced wear.

OPERATION

The primary purpose of the front-wheel drive halfshaft is to transmit engine torque from the transaxle to the front wheels. Additionally, the constant velocity joints used must be capable of operating at varying angles and provide a means for shaft length changes to allow for vertical suspension (wheel) and engine dynamic movement.

OPERATION (Continued)

These requirements are satisfied by using constant velocity (CV) joints at the inboard (differential) end and outboard (wheel) end of the halfshaft. A constant velocity joint is a mechanism for transmitting uniform torque and rotary motion while operating through its angle range. The inboard CV joint is a "plunge"-type joint which provides for the required axial movement to affect shaft length changes. The outboard CV joint has a higher angle capability than the inboard CV joint to accommodate wheel turning angles.

The front-wheel drive CV joints and halfshaft assemblies rotate at approximately one-third the speed of conventional rear wheel drive driveshafts and do not contribute to rotational vibration disturbances.

DIAGNOSIS

NOTE: CV joints should not be replaced unless disassembly and inspection reveals unusual wear.

Noise and Vibration in Turns

Clicking, popping or grinding noises while turning may be caused by the following:

1. Damaged CV joint boots or loose boot clamps resulting in inadequate or contaminated lube in outboard or inboard CV joints.
2. Another component contacting halfshaft assembly.
3. Worn, damaged or improperly installed wheel bearing, brake or suspension / steering components.

Vibration at Highway Speeds:

1. Out of balance front wheels or tires.
2. Out of round front tires.
3. Improperly seated outboard CV joint in front wheel hub.

Refer to Section 00-04 for high-speed shake diagnosis.

NOTE: Halfshafts are not balanced and do not contribute to rotational vibration disturbances.

Shudder or Vibration During Acceleration:

1. Excessively high CV joint operating angles caused by improper ride height. Check ride height, verify proper spring rate and check items 1, 2 and 3 under Halfshaft or CV Joint Pullout.
2. Excessively worn or damaged inboard or outboard CV joint.

Halfshaft or CV Joint Pullout

1. Inboard CV joint circlip missing or not properly seated in transaxle side gear.
2. Engine / transaxle assembly mispositioned. Check engine mounts for damage or wear.
3. Frame rail or strut tower out of position or damaged. Check underbody dimensions. Refer to Section 01-00.
4. Front suspension components worn or damaged. Check for worn bushings or bent components (stabilizer bar, control arm, etc.).

INSPECTION

1. Inspect boots for evidence of cracks, tears or splits.

   NOTE: While inspecting the boots, watch for indentations ("dimples") in the boot convolutions. If an indentation is observed, it must be removed. Refer to CV Joint Boot Indentation Removal procedure.
2. Inspect underbody for any indication of grease splatter in vicinity of CV joint boots, outboard and inboard locations, which is an indication of boot and / or clamp damage.
3. A boot vent is used on the RH inboard silicone rubber boot on AXODE applications. The tri-lobe boot uses a pinhole vent inboard of the small clamp. The non tri-lobe boot uses a keyway vent between the interconnecting shaft and the boot under the small clamp. A small amount of grease leakage at the vent is normal.
4. Inspect for transaxle differential oil seal leakage at inboard CV joint.
5. Ensure wheel hub retainer nut is the correct prevailing torque type.
6. The silicone boot will sweat during operation, causing a light film of grease to show on the outside of the boot. This condition is normal.

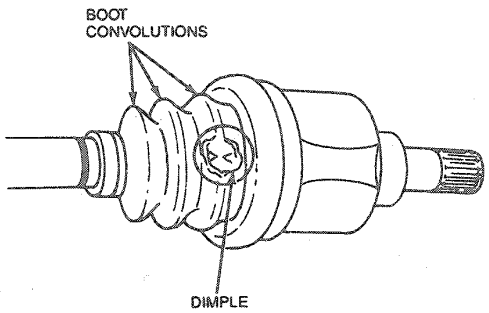
CV Joint Boot Indentation

Removal

Indentations or "dimples" in the inboard and / or outboard CV joint boots may occur due to improper handling during storage or service of the halfshafts. If, during inspection, a boot is observed to be "dimpled," perform the following procedure.

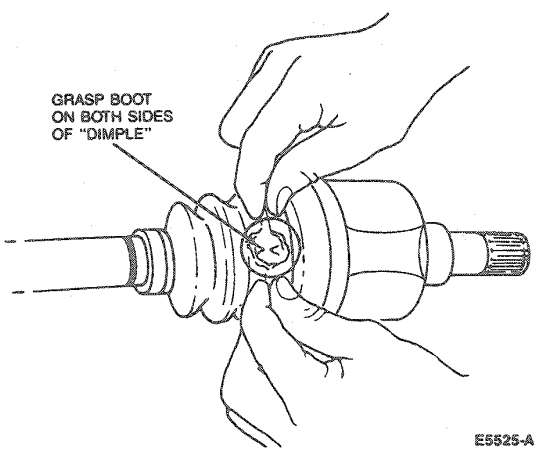
INSPECTION (Continued)

1. Inspect the boot(s) for any sign of grease leakage in the dimple which would indicate a cut. Replace the boot if a cut exists or if there is evidence of other damage.



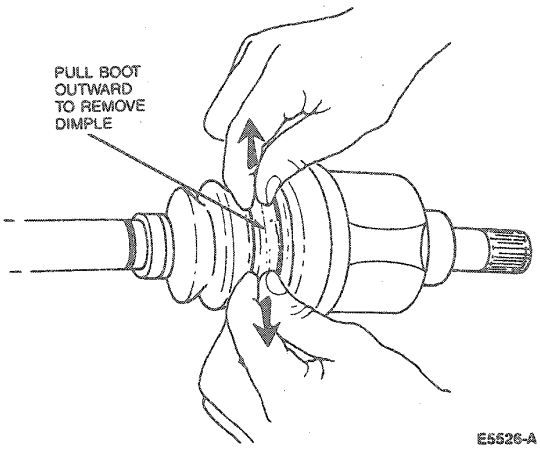
E5524-A

2. If the boot is in good condition, the dimple can be removed as follows:
   a. Grasp the dimpled convolution on either side of the dimple using the forefinger and thumb of each hand.



E5525-A

   b. While grasping boot, pull the convolution by moving hands in opposite directions. The dimple should "pop out." If the dimple does not invert or if it dimples again, one clamp should be removed and the internal and external air pressure equalized. Refer to Boot Installation for the necessary procedure.



E5526-A

Extreme care should be taken not to allow CV joint boots to come in forceful contact with foreign objects that may cause the external boot convolutions to become indented.

REMOVAL AND INSTALLATION

Halfshaft Assembly

Removal

Tools Required:

- Front Hub Installer T81P-1104-A
- Metric Hub Remover Adapter T86P-1104-A1
- Front Hub Remover/Replacer T81P-1104-C
- Transaxle Plugs T81P-1177-B
- Metric Hub Remover Adapter T83P-1104-BH
- CV Joint Puller T86P-3514-A1
- CV Joint Puller Extension T86P-3514-A2
- Impact Slide Hammer D79P-100-A

CAUTION: When removing both the LH and RH halfshafts on MTX equipped vehicles, Transaxle Plugs T81P-1177-B must be installed. Failure to use these tools can result in dislocation of the differential side gears. Should the gears become misaligned, the differential will have to be removed from the transaxle to re-align the gears.

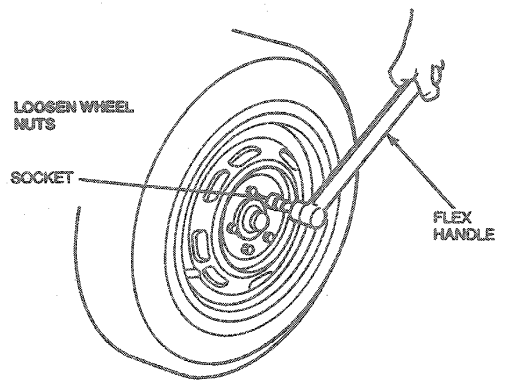
CAUTION: Do not begin this removal procedure unless the following parts are available:

- **A new hub retainer nut assembly (Step 1).**
- **A new lower control arm-to-steering knuckle retaining bolt and nut (Step 4).**
- **A new inboard CV joint stub shaft circlip.**
- **A new link shaft snap ring.**

Once removed, these parts must not be reused during assembly. Their torque holding ability or retention capability is diminished during removal.

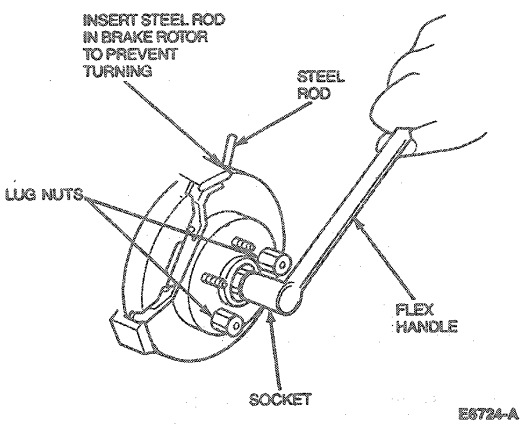
REMOVAL AND INSTALLATION (Continued)

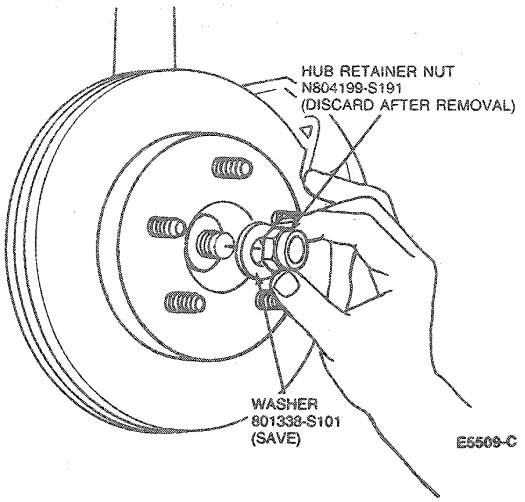
1. Remove wheelcover / hub cover from wheel and tire assembly and loosen wheel lugs nuts.



CAUTION: Discard the hub retainer nut. It is a torque prevailing design and cannot be reused.

2. After raising the vehicle on a frame contact hoist and removing the wheel and tire assembly, remove the hub retainer nut and washer.

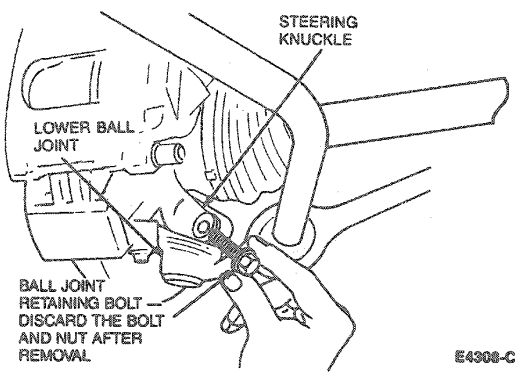




3. Remove nut from the ball joint-to-steering knuckle retaining bolt.

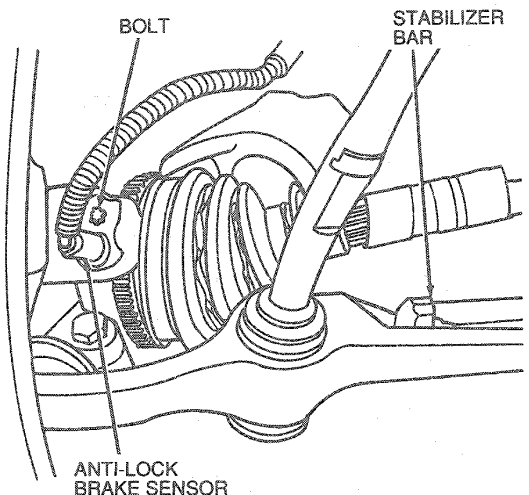
CAUTION: Discard the bolt and nut. They are of a torque prevailing design and cannot be reused.

4. Drive bolt out of steering knuckle using a punch and hammer.



REMOVAL AND INSTALLATION (Continued)

5. If equipped with anti-lock brakes, remove anti-lock brake sensor and position out of way.



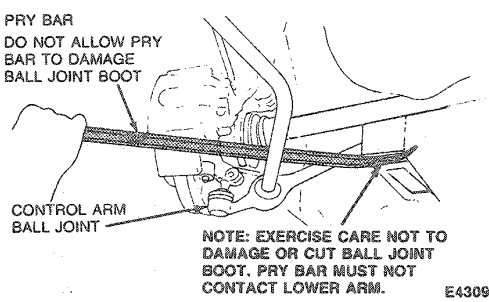
E8287-A

6. Separate ball joint from steering knuckle using a pry bar.

   Position the end of the pry bar outside of bushing pocket to avoid damage to bushing.

   Use care to prevent damage to the ball joint boot.

   Remove stabilizer bar link at stabilizer bar.

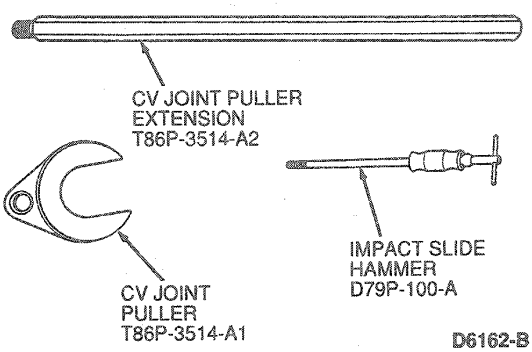


E4309-C

The remaining removal procedures for the RH and LH halfshafts are different depending on application. Refer to the appropriate procedure for the vehicle you are servicing.

Halfshaft—AXODE, RH and LH; MTX, LH

NOTE: The following tools are required to remove the inboard CV joints.

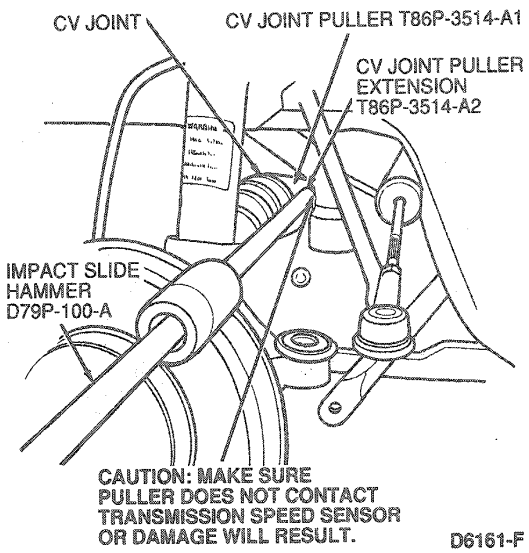


D6162-B

NOTE: Turn steering hub and / or wire strut assembly out of the way.

7. Install CV Joint Puller T86P-3514-A1 between CV joint and transaxle case.
8. Install CV Joint Puller Extension T86P-3514-A2 into CV joint puller and hand tighten.

   Install Impact Slide Hammer D79P-100-A or equivalent onto extension.
9. Remove CV joint from transaxle.

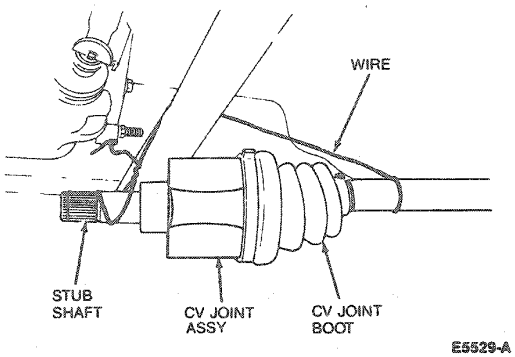


D6161-F

CAUTION: Do not allow shaft to hang unsupported, damage to the outboard CV joint may result.

REMOVAL AND INSTALLATION (Continued)

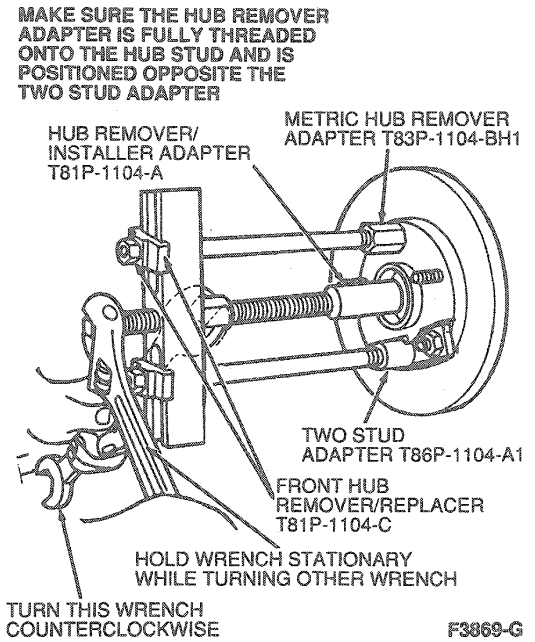
10. Support the end of the shaft by suspending from a convenient underbody component with a length of wire.



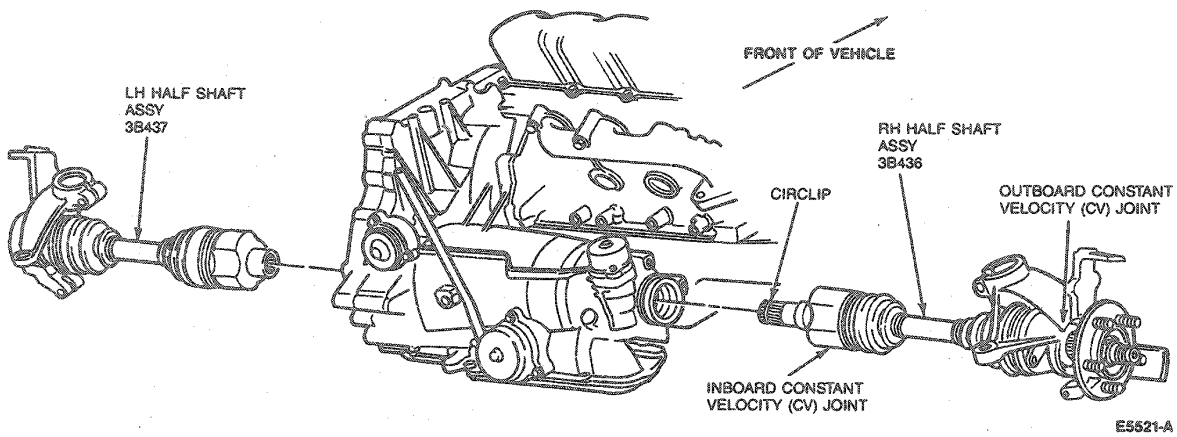
CAUTION: Never use a hammer to separate the outboard CV joint stub shaft from the hub. Damage to the CV joint threads and internal components may result.

11. Separate the outboard CV joint from the hub using Front Hub Remover / Replacer T81P-1104-C, Metric Hub Remover Adapter T83P-1104-BH, T86P-1104-A1 and Front Hub Installer T81P-1104-A.

12. Remove halfshaft assembly from vehicle.



AXODE



Refer to illustration under Step 9 of Halfshaft / Link Shaft for MTX.

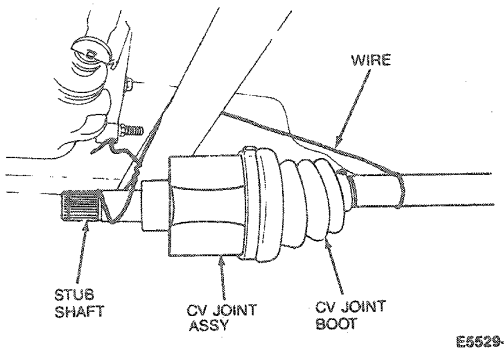
Halfshaft / Link Shaft — MTX, RH

7. Remove two bearing support retaining bolts from bracket. Slide link shaft out of transaxle.

CAUTION: Do not allow the shaft to hang unsupported, damage to the outboard CV joint may result.

REMOVAL AND INSTALLATION (Continued)

8. Support end of shaft by suspending from a convenient underbody component with a length of wire.

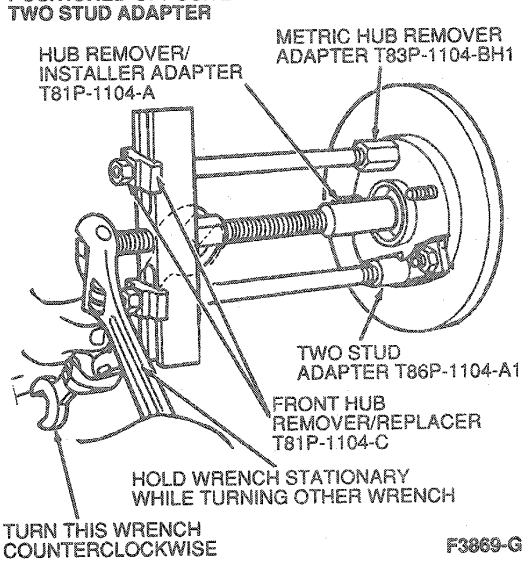


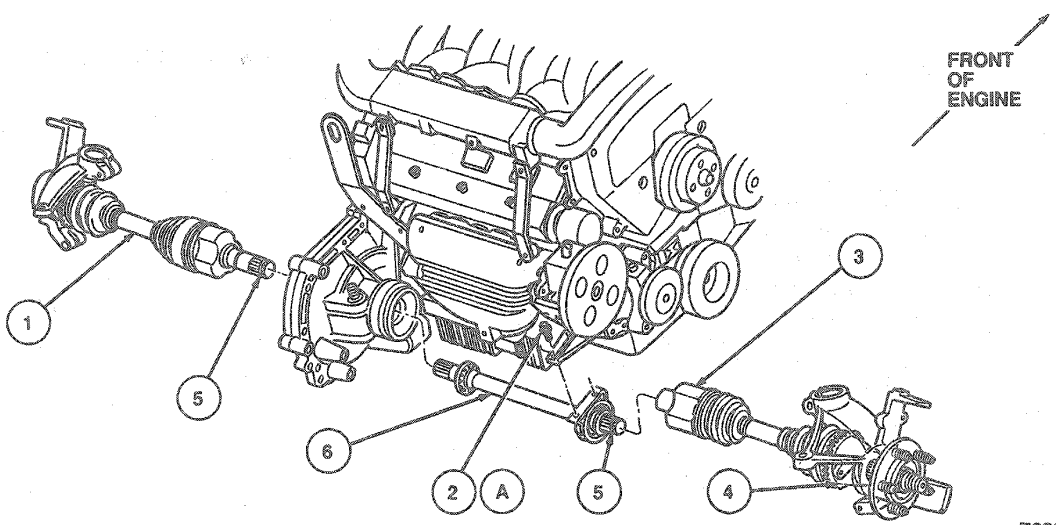
CAUTION: Never use a hammer to separate the outboard CV joint stub shaft from the hub. Damage to the CV joint threads and internal components may result.

NOTE: The RH link shaft and halfshaft assembly are removed as a complete unit. Refer to Disassembly and Assembly to separate link shaft and halfshaft.

9. Separate the outboard CV joint from the hub using Front Hub Remover / Replacer T81P-1104-C, Metric Hub Remover Adapter T83P-1104-BH, T86P-1104-A1 and Front Hub Installer T81P-1104-A.

MAKE SURE THE HUB REMOVER ADAPTER IS FULLY THREADED ONTO THE HUB STUD AND IS POSITIONED OPPOSITE THE TWO STUD ADAPTER





Item	Part Number	Description
1	3B437	LH Halfshaft Assy
2A	N605904-S100	Bolt (2 Req'd)
3	—	RH Inboard CV Joint

(Continued)

REMOVAL AND INSTALLATION (Continued)

Item	Part Number	Description
4	—	RH Outboard CV Joint
5	—	Snap Rings (2 Req'd)
6	3C081	Link Shaft Assy
A		Tighten to 21-32 N·m (15.5-23 Lb-Ft)

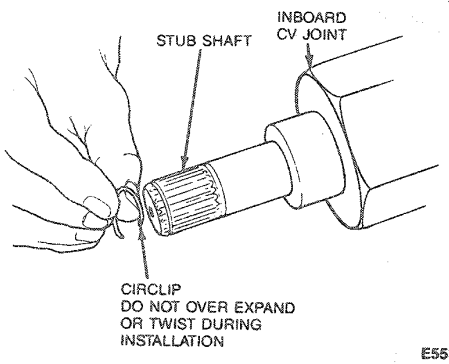
Installation

NOTE: To install the circlip properly, start one end in the groove and work the circlip over the stub shaft end and into the groove. This will avoid over-expanding the circlip.

CAUTION: DO NOT reuse circlip. A new circlip must be installed each time the inboard CV joint is installed into the transaxle differential.

1. Install a new circlip on the inboard CV joint stub shaft and / or link shaft.

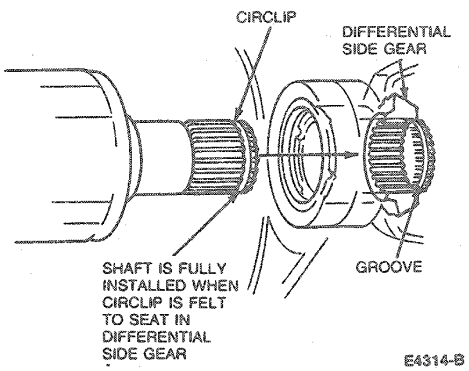
   The outboard CV joint stub shaft does not have a circlip.



   NOTE: A non-metallic mallet may be used to aid in seating the circlip into the differential side gear groove. If a mallet is necessary, tap only on the outboard CV joint stub shaft.

2. Carefully align splines of inboard CV joint stub shaft or link shaft with the splines in the differential. Exerting some force, push CV joint into differential until the circlip is felt to seat in the differential side gear. On MTX equipped vehicles, tighten link shaft bearing retaining bolts to 21-32 N·m (16-23 lb-ft).

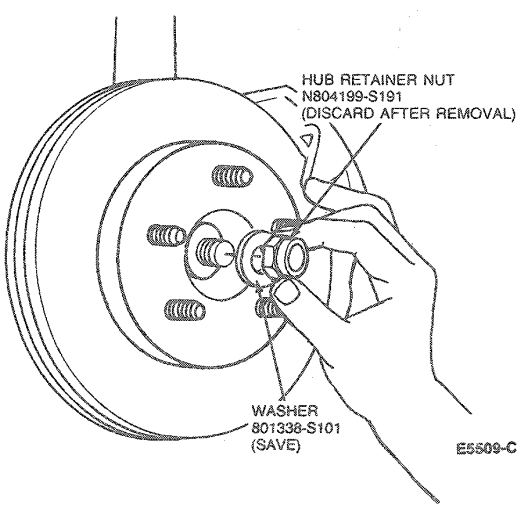
   Use care to prevent damage to the differential oil seal.



3. Carefully align splines of outboard CV joint stub shaft with splines in hub and push the shaft into the hub as far as possible.
4. Temporarily fasten rotor to hub with washers and two wheel lug nuts. Insert a steel rod into the rotor and rotate clockwise to contact the knuckle to prevent the rotor from turning during CV joint installation.

   CAUTION: A new hub retainer nut must be installed.

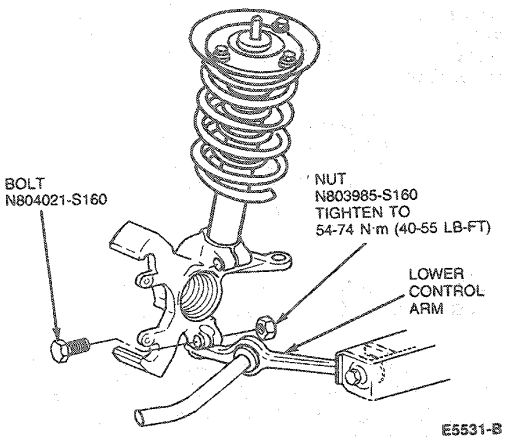
5. Install the hub nut washer and a new hub retainer nut. Manually thread the retainer onto the CV joint shaft as far as possible.



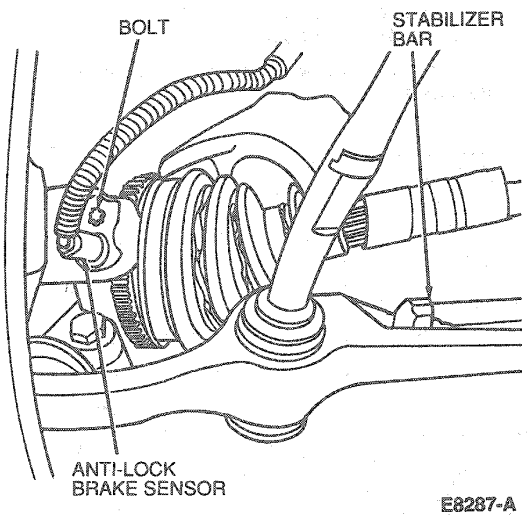
REMOVAL AND INSTALLATION (Continued)

CAUTION: A new bolt and nut must be installed.

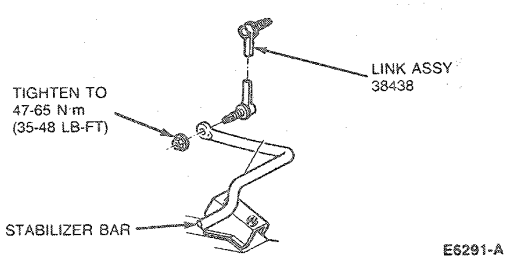
6. Connect control arm to the steering knuckle and install a new nut and bolt. Tighten nut to 54-74 N·m (40-55 lb-ft).



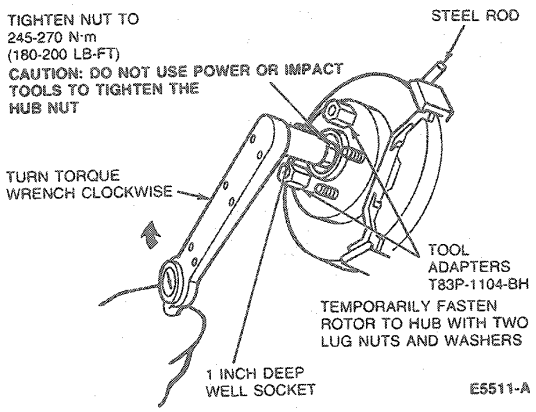
7. Install anti-lock brake sensor if equipped.



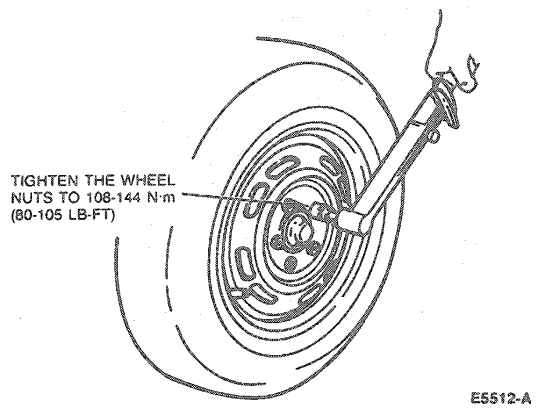
8. Connect stabilizer bar link to stabilizer bar. Tighten to 47-65 N·m (35-48 lb-ft).



9. Tighten hub retainer nut to 245-270 N·m (180-200 lb-ft).



10. Install wheel and tire assembly and lower vehicle.
11. Tighten wheel lug nuts to 115-142 N·m (85-105 lb-ft).



12. Fill transaxle to proper level with specified lubricant.

AXODE—ESP-M2C185-A MERCON®

Refer to Section 07-02.

MTX—ESP-M2C185-A MERCON®

Refer to Section 07-03 for the Transaxle Fluid Level Check.

DISASSEMBLY AND ASSEMBLY

Outboard CV Joint and Boot

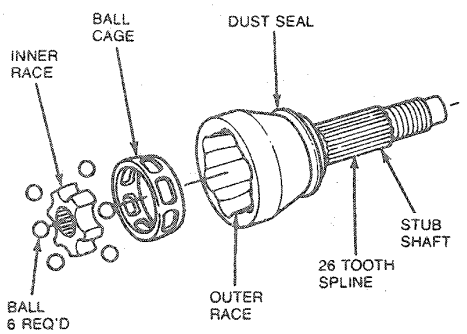
Tools Required:

- Boot Clamp Pliers D87P-1098-A

DISASSEMBLY AND ASSEMBLY (Continued)

Disassembly

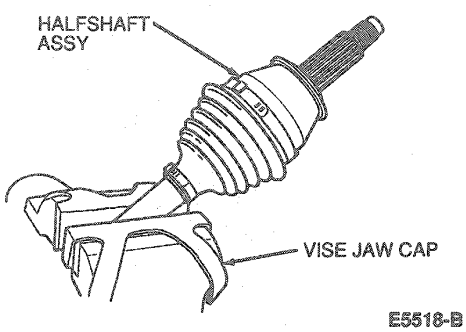
NOTE: The CV joint components are matched during manufacture and therefore cannot be interchanged with components from another CV joint. Extreme care should be taken not to mix or substitute like components between CV joints.



E4266-D

1. Clamp halfshaft in a vise. Do not allow vise jaws to contact the boot or its clamp.

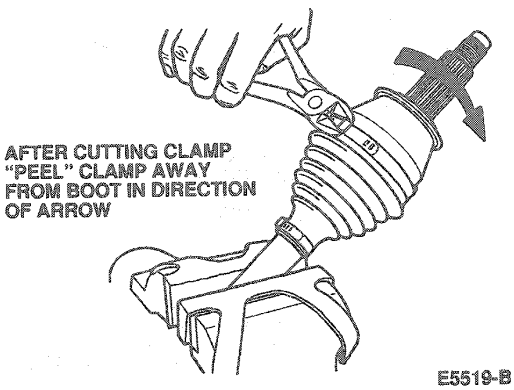
   The vise should be equipped with jaw caps to prevent damage to any machined surfaces.



E5518-B

2. Cut the large boot clamp using side cutters and pull away from the boot.

   After removing the clamp, roll boot back over shaft.



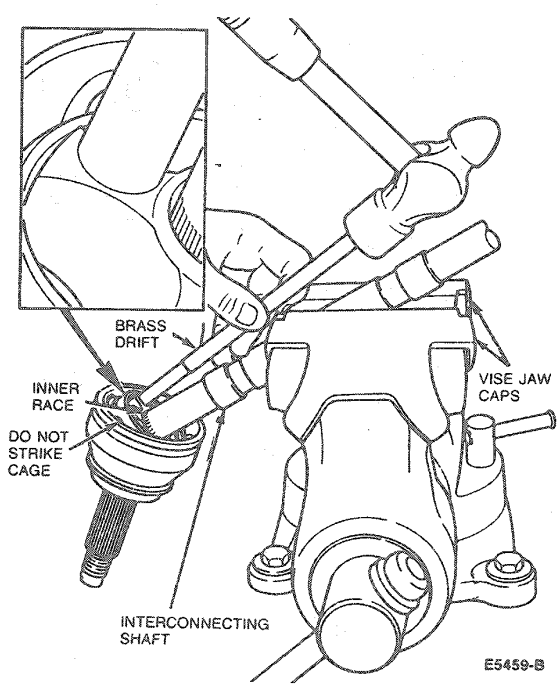
E5519-B

3. Support interconnecting shaft in a soft jaw vise and angle the CV joint to expose the inner bearing race.

   NOTE: Vise jaw caps are made of copper, brass, wood or other soft material. They are slipped over the steel jaws of the vise so as not to scratch or nick finished surfaces.

4. Using a brass drift and hammer, give a sharp tap to the inner bearing race to dislodge the internal circlip and separate the CV from the interconnecting shaft. Care should be taken not to drop the CV joint at separation.

   The boot (not shown), can now be removed from the shaft.

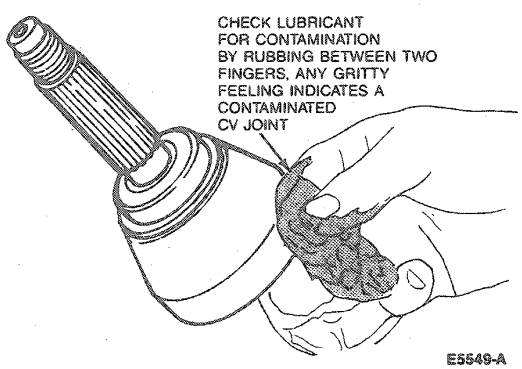


E5459-B

DISASSEMBLY AND ASSEMBLY (Continued)

5. Inspect CV joint grease for contamination. If the CV joints are operating satisfactorily, and the grease does not appear to be contaminated, add grease and replace boot.

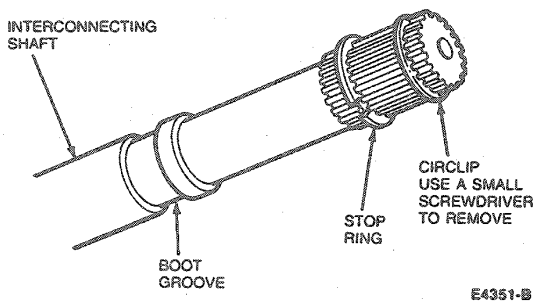
   If the lubricant appears contaminated, proceed with a complete CV joint disassembly and inspection.



CAUTION: DO NOT reuse circlip. Replace used circlip with a new circlip before assembly.

6. Remove circlip located near the end of the shaft. Discard the circlip. A new clip is supplied with both the boot replacement kit and CV joint.

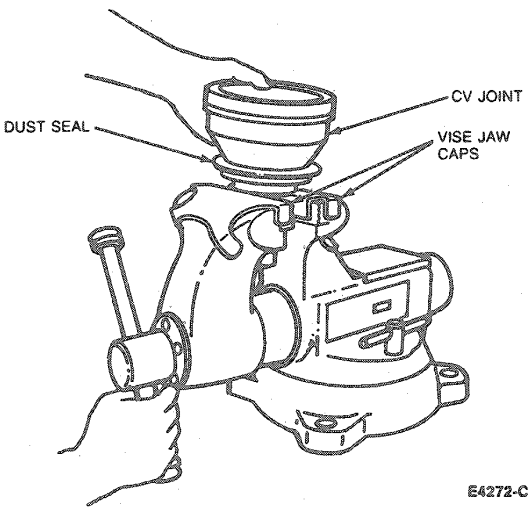
   The stop ring, located just below the circlip, should be removed only if it is damaged, worn or otherwise unserviceable.

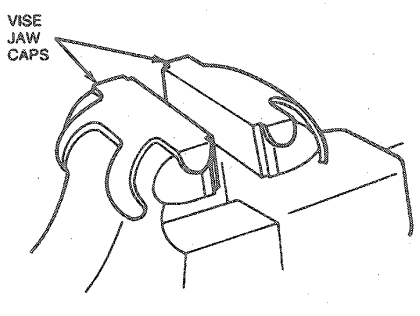


NOTE: Vise jaw caps are made of copper, brass, wood or other soft material. They are slipped over the steel jaws of the vise so as not to scratch or nick finished surfaces.

7. Clamp CV joint stub shaft in a vise with the outer face facing up. Care should be taken not to damage dust seal.

   The vise must be equipped with jaw caps to prevent damage to the shaft splines.

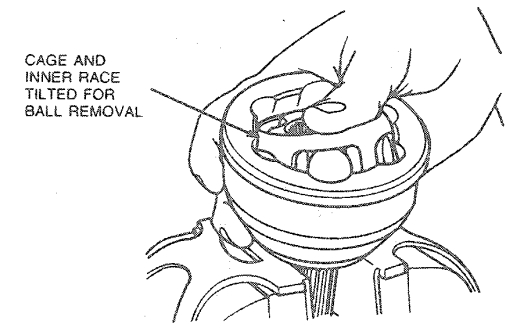


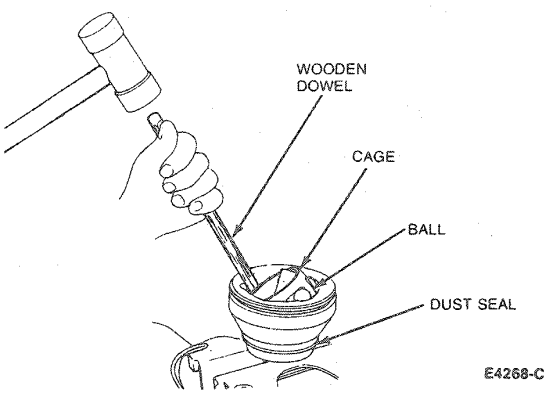


DISASSEMBLY AND ASSEMBLY (Continued)

8. Press down on inner race until it tilts enough to allow removal of the ball.

   A tight assembly can be tilted by tapping the inner race with wooden dowel and hammer. Do not hit the cage.





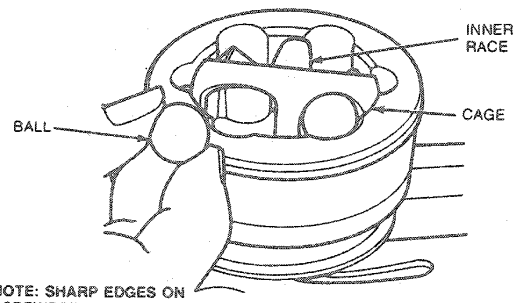
CAUTION: Exercise care to prevent scratching or other damage to the inner race or cage spheres.

9. With the cage sufficiently tilted, remove ball from cage.

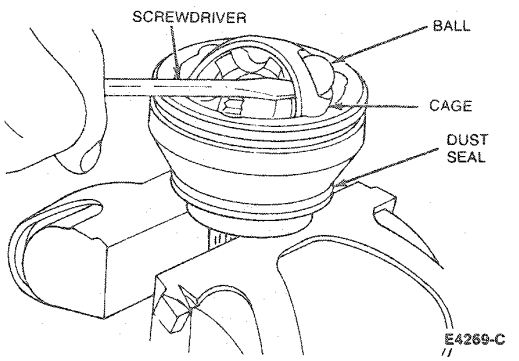
   Repeat this Step until all six balls are removed.

   If balls are tight in the cage, use a screwdriver to pry the balls from cage.

   If a screwdriver is necessary, use an old screwdriver and blunt any sharp edges on the blade with a grinder or file.

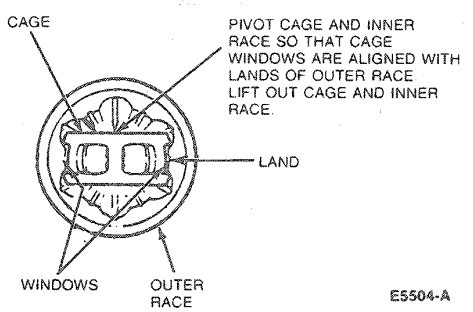


NOTE: SHARP EDGES ON SCREWDRIVER SHOULD BE BLUNTED TO PREVENT SCRATCHING OF FINISHED SURFACES.

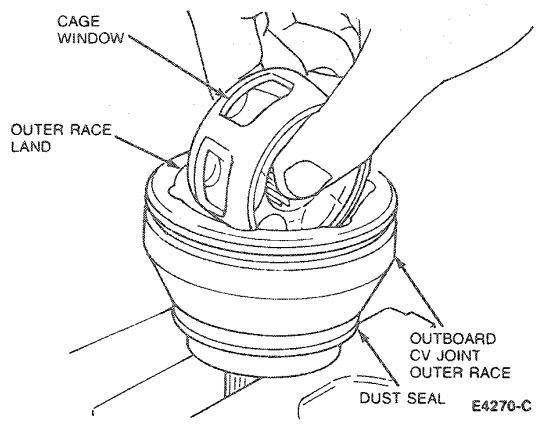


10. Pivot cage and inner race assembly until it is straight up and down in the outer race. Align cage windows with outer race lands while pivoting the bearing cage.

    With the cage pivoted and aligned, lift assembly from the outer race.



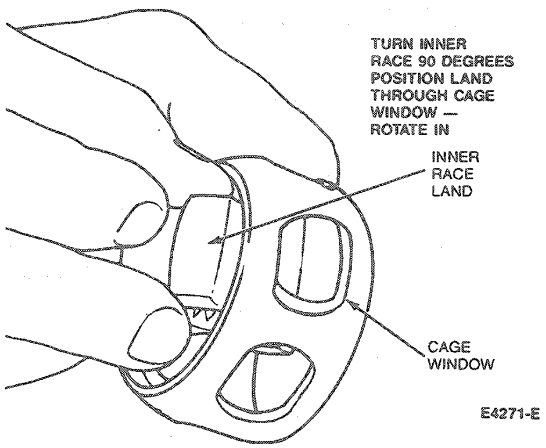
DISASSEMBLY AND ASSEMBLY (Continued)



11. Rotate inner race up and out of the cage.

Cage Windows

Pivot the inner race until it is straight up and down in the cage. Align one of the inner race lands with one of the cage windows and position the race through the window. Rotate the inner race up and out of the cage.



Inspection

1. Clean all parts (except boots) in a suitable solvent.
2. Wipe excessive grease from boots and wash in soap and water **only.**
3. Inspect boots for cuts or damage.
4. Inspect all CV joint parts for excessive wear, looseness, pitting, rust and cracks.

   NOTE: Because CV joint components are matched during assembly, individual components are not available for service. If inspection determines a part to be unserviceable, the CV joint must be replaced as an assembly.

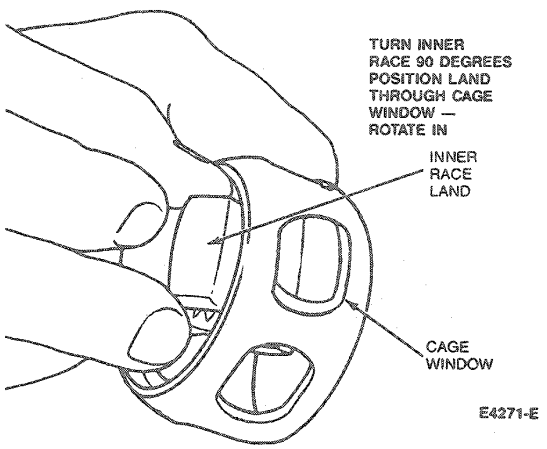
5. Replace parts only if required.

Do not replace a joint merely because the parts appear polished. Shiny areas in ball races and on the cage spheres are normal. A CV joint should be replaced ONLY if inspection determines a component(s) to be cracked, broken, severely pitted, worn or otherwise unserviceable.

Assembly

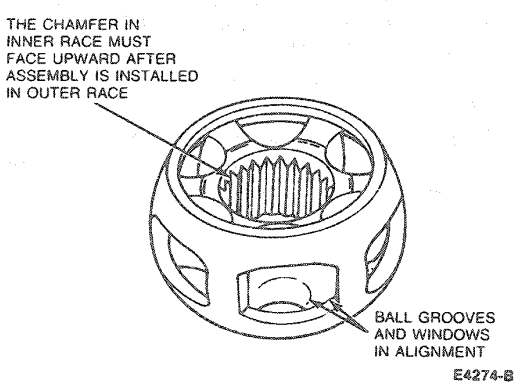
1. Apply a light coating of grease on inner and outer ball races.

   Install the inner race in the bearing cage.



CAUTION: Use only Ford Constant Velocity Joint Grease E43Z-19590-A (ESP-M1C207-A) or equivalent.

2. Install inner race and cage assembly in the outer race.

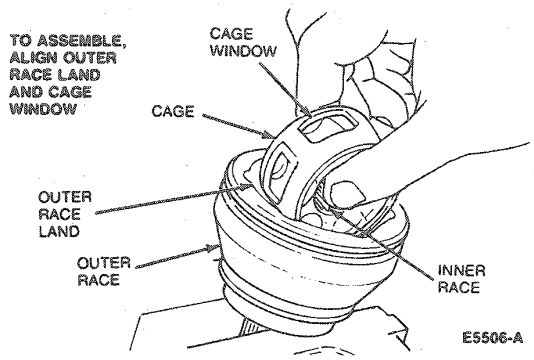


3. Install the assembly vertically and pivot 90 degrees into position.
4. Align bearing cage and inner race with outer race.

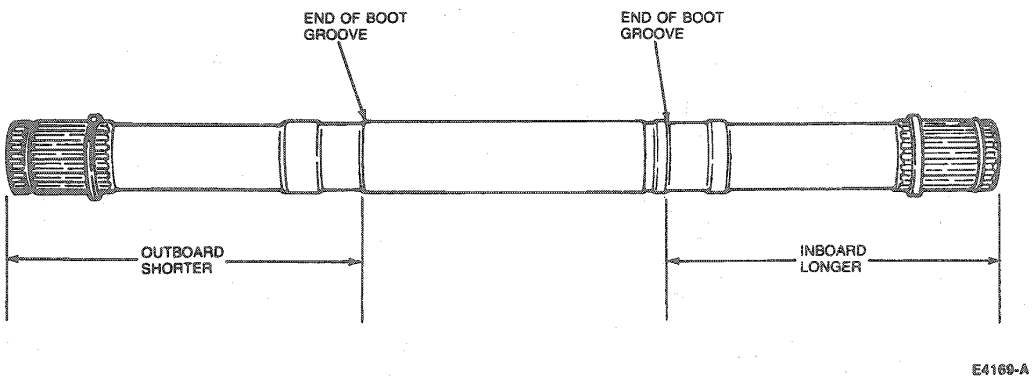
   Tilt the inner race and cage and install a ball.

DISASSEMBLY AND ASSEMBLY (Continued)

Repeat this Step until six balls are installed.



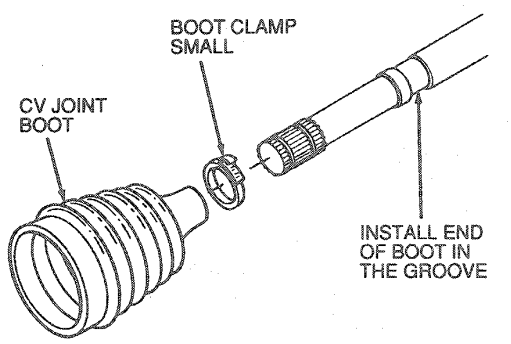
5. The LH and RH interconnecting shafts are not the same end for end. The outboard end is shorter from end of shaft to end of boot groove than the inboard end. Take a measurement to ensure correct inboard and outboard CV joint-to-shaft installation.



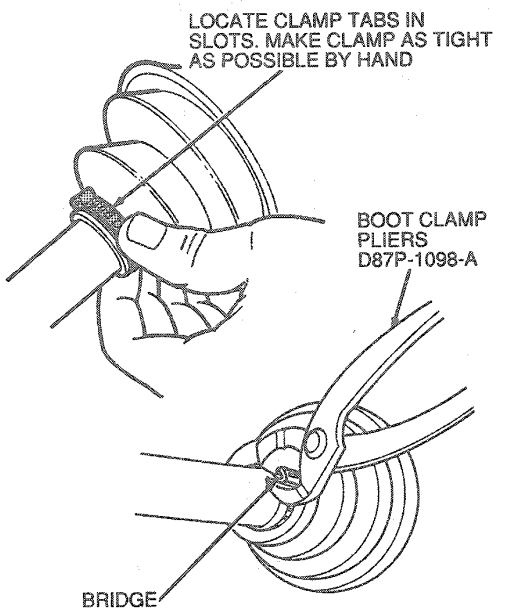
CAUTION: Tighten the clamp securely, but not to the point where the clamp bridge is cut or the boot is damaged.

6. If removed, install CV joint boot after removing stop ring.

   Ensure the boot is seated in its groove and clamp in position using Boot Clamp Pliers D87P-1098-A or equivalent.



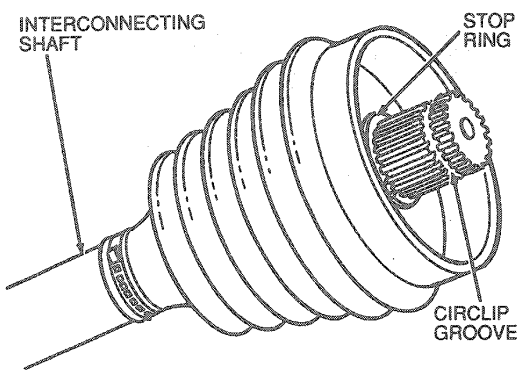
DISASSEMBLY AND ASSEMBLY (Continued)



E4298-F

7. If removed, install the stop ring.

   If not removed, ensure stop ring is properly seated in its groove.



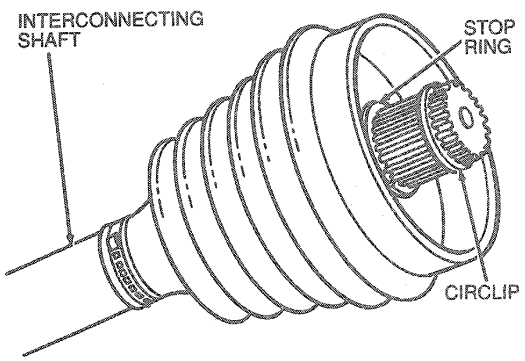
E4296-C

NOTE: To install circlip, start one end in the groove and work the circlip over the stub shaft end and into the groove. This will avoid over-expanding the circlip.

CAUTION: DO NOT reuse circlip. Replace circlips before assembly.

8. Install a new circlip, supplied with the service kit, in the groove nearest the end of the shaft.

   Do not over-expand or twist the circlip during installation.

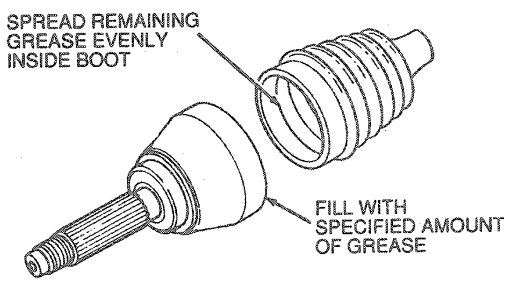


E4293-C

9. Before positioning boot over CV joint, pack CV joint and boot with the grease supplied in the service kit as follows:

   NOTE: Use Ford Constant Velocity Joint Grease E43Z-19590-A (ESP-M1C207-A) or equivalent on all outboard CV joints.

   Pack CV joint with grease. Any grease remaining in tube is to be spread evenly inside boot. For grease quantity, refer to Lubricant Specifications.

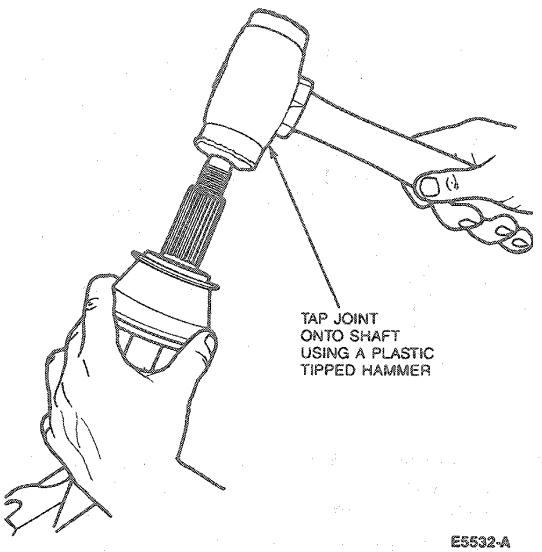


OUTBOARD CV JOINT E6700-B

DISASSEMBLY AND ASSEMBLY (Continued)

10. With the boot held back, position CV joint on shaft and tap into position using a plastic tipped hammer.

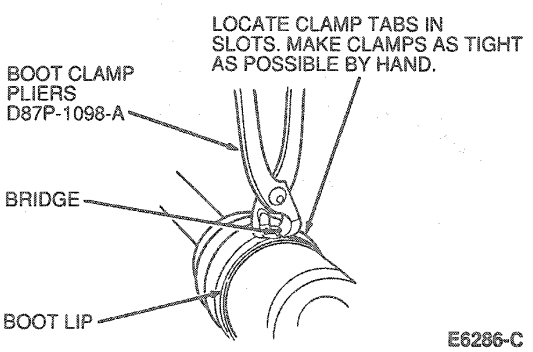
    The CV joint is fully seated when the circlip locks in the groove cut into the CV joint inner race. Check for circlip seating by attempting to pull the joint from the shaft.



E5532-A

11. Remove all excess grease from the CV joint external surfaces and mating boot surface.
12. Position boot over CV joint.

    CAUTION: Tighten the clamp securely, but not to the point where the clamp bridge is cut or the boot is damaged.
13. Make sure the boot is seated in its groove and clamp in position using Boot Clamp Pliers D87P-1098-A or equivalent.



E6286-C

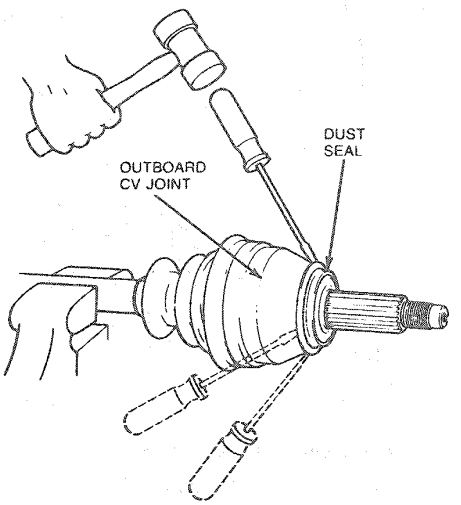
Outboard CV Joints Dust Seal

Disassembly

Tools Required:

- Spindle / Axle Seal Installer T83T-3132-A1
- Dust Seal Installer T86P-1104-A4

Using a light duty hammer and screwdriver, tap uniformly around seal until it becomes unseated.

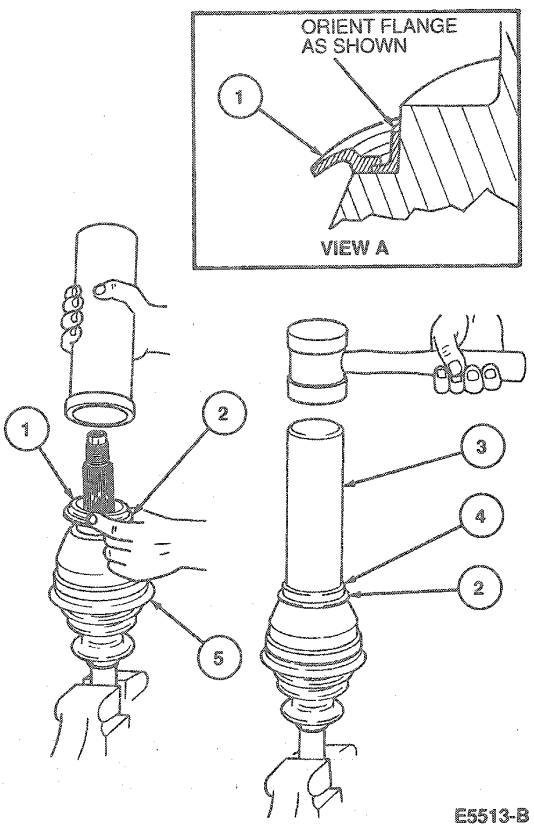


E5453-B

Assembly

Using Spindle / Axle Seal Installer T83T-3132-A1 and Dust Seal Installer T86P-1104-A4, install the dust seal. The dust seal flange must face outboard.

DISASSEMBLY AND ASSEMBLY (Continued)



Item	Part Number	Description
1	—	Seal Flange
2	—	Dust Seal
3	T83T-3132-A1	Spindle / Axle Seal Installer
4	T86P-1104-A4	Dust Seal Installer
5	—	Outboard CV Joint

TE5513B

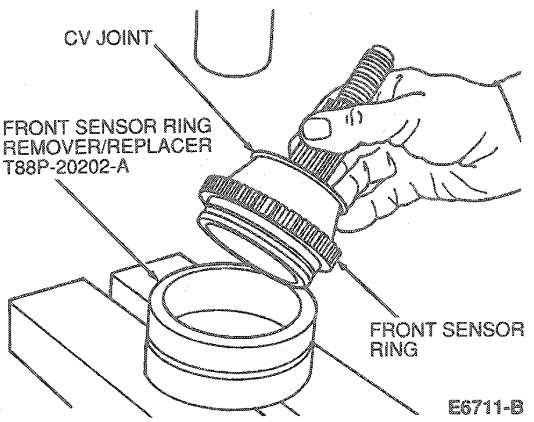
Speed Indicator Ring

Disassembly

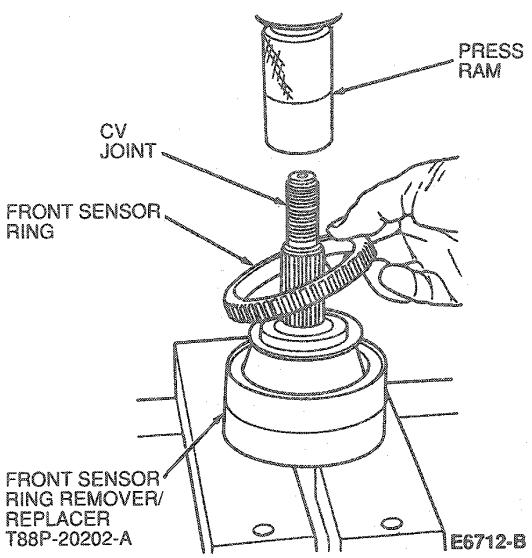
Tools Required:

- Sensor Ring Remover / Replacer T88P-20202-A

1. Remove outboard CV joint as outlined.
2. Position Front Sensor Ring Remover / Replacer T88P-20202-A on a press. Position CV joint on tool.



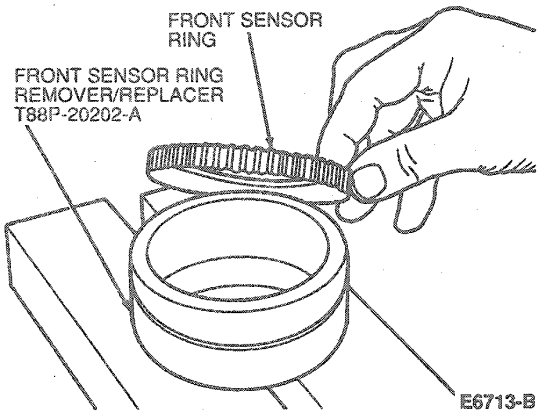
3. With CV joint positioned on tool, use press ram to apply pressure to CV joint and remove speed indicator ring.



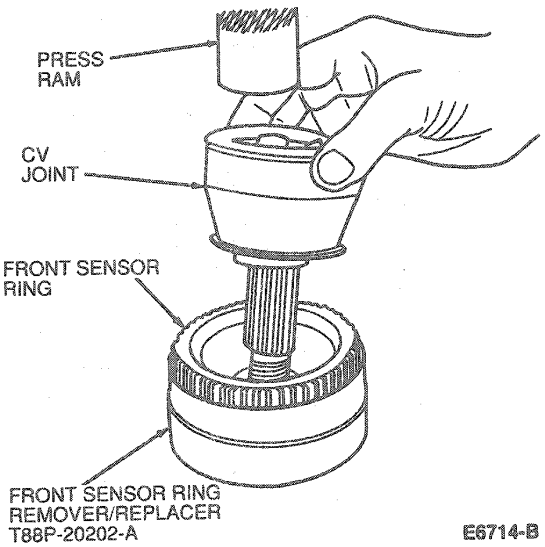
DISASSEMBLY AND ASSEMBLY (Continued)

Assembly

1. With Front Sensor Ring Remover / Replacer T88P-20202-A positioned on press, place sensor ring on tool.

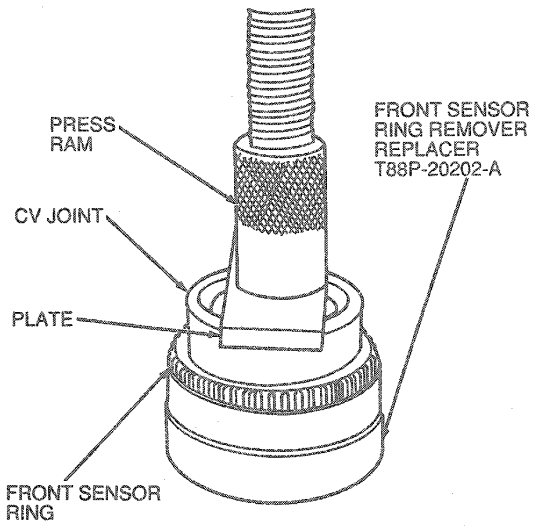


2. Position CV joint in Front Sensor Remover / Replacer T88P-20202-A. Allow CV joint to rest on ring.



CAUTION: Extra care should be taken not to damage the front sensor ring during installation. If teeth are damaged, brake performance will be affected.

3. With CV joint installed in tool, place a steel plate across CV joint back face. Press CV joint until CV joint bottoms out in Front Sensor Ring Remover Replacer T88P-20202-A. The ring will be properly installed when bottomed out in tool.



Inboard CV Joint

Three different designs of inboard CV joints are used on Taurus / Sable:

1. **3.0L Non-ABS:** Tripod design. Positive retention of tripod assembly to interconnecting shaft. CV joint and interconnecting shaft are serviced as an inboard sideshaft assembly only. Boot kits and clamps are serviced.
2. **3.0L ABS, 3.8L and 3.0L SHO Manual Transmission:** Tripod design. Tripod assembly removable from interconnecting shaft. Inboard CV joint kit, interconnecting shaft, boot kits and clamps are serviced.
3. **3.2L SHO Automatic Transmission:** Tri-Plan design. The tri-plan CV joint is removable from the interconnecting shaft. The tripod assembly is permanently retained inside the outer race by a crimped metal ring. The tri-plan CV joint is serviced as an assembled CV joint, interconnecting shaft, boot kits and clamps are also serviced.

Disassembly — 3.0L Non-ABS Inboard CV Joints

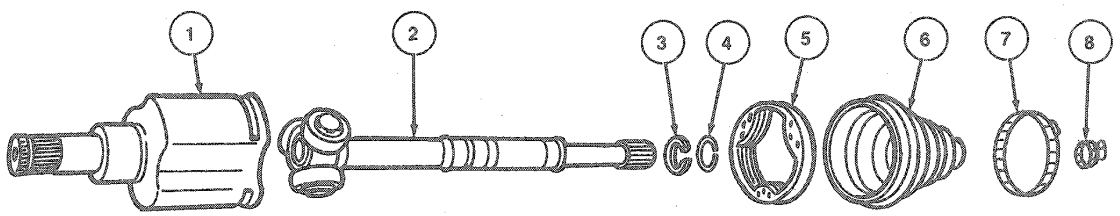
Tools Required:

- Boot Clamp Pliers D87P-1090-A
- Boot Clamp Pliers D87P-1098-A

CAUTION: Although the designs are similar, there is no interchangeability of parts between the three designs. The CV joint tripod, outer race, boot and interconnecting shaft are unique for each style.

DISASSEMBLY AND ASSEMBLY (Continued)

NOTE: The tripod assembly cannot be removed from the interconnecting shaft on this design. If a tripod assembly, outer race or interconnecting shaft is required, an inboard side shaft assembly must be used. However, if a boot kit or clamps are required, these are available.



E8836-A

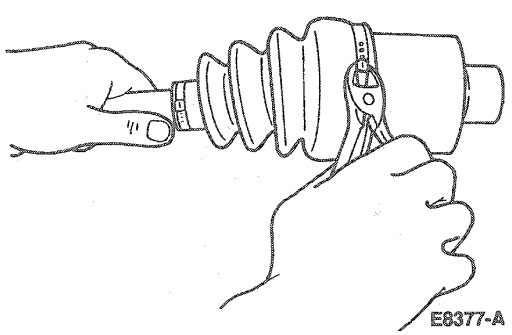
Item	Description
1	Inboard Joint Outer Race and Stub Shaft
2	Interconnecting Shaft Assy
3	Stop Ring

(Continued)

Item	Description
4	Circlip
5	Trilobe Insert
6	Inboard Boot
7	Boot Clamp (Large)
8	Boot Clamp (Small)

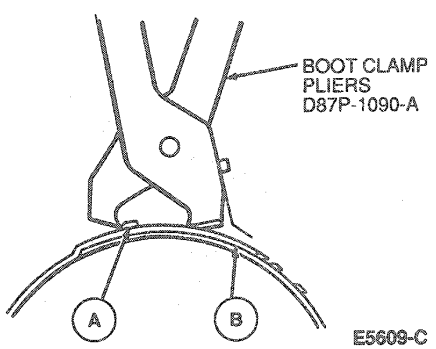
CAUTION: On all vehicles (except SHO powertrains), the RH inboard CV joint requires a reusable, low profile large boot clamp. A special tool is required to remove and install the clamp. Use Boot Clamp Pliers D87P-1090-A or equivalent.

1. Cut and remove both boot clamps and slide boot back on shaft.



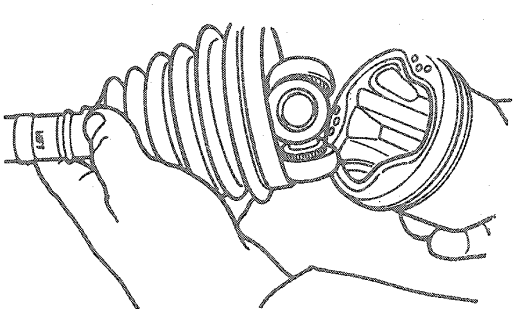
E8377-A

Remove clamp by engaging pincer jaws in closing hooks (A and B) and drawing hooks together. Disengage windows and locking hooks and remove clamp.



E5609-C

2. Slide outer race off tripod.

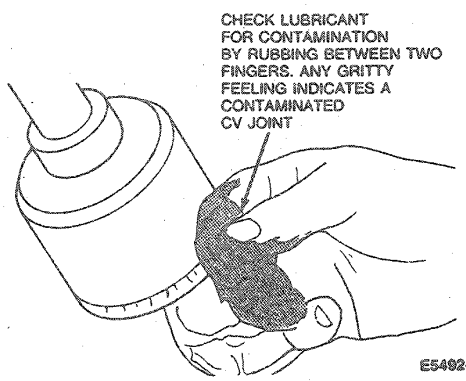


E8367-A

DISASSEMBLY AND ASSEMBLY (Continued)

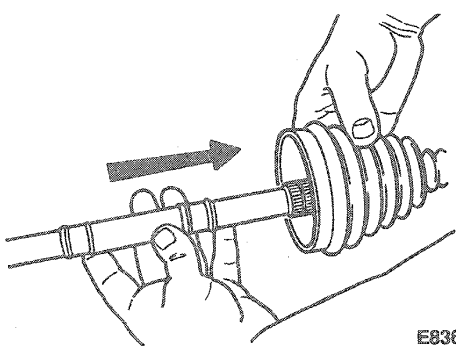
3. When replacing damaged CV joint boots, the grease should be checked for contamination. If the CV joints are operating satisfactorily, and the grease does not appear to be contaminated, add grease and replace the boot.

   If the grease appears contaminated, proceed with a complete CV joint disassembly and inspection.

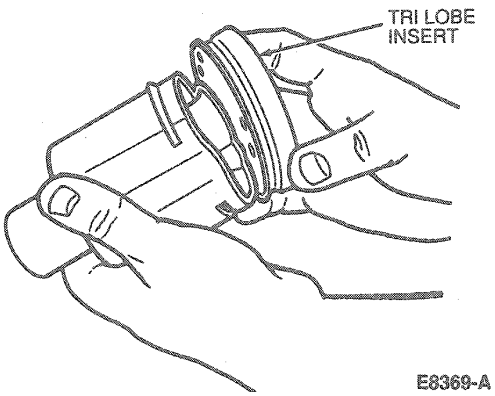


   NOTE: If further disassembly is required, first remove outboard CV joint and boot as outlined in Outboard CV Joint and Boot Disassembly and Assembly Section.

4. Remove outboard CV joint stop ring and circlip.
5. Slide inboard boot of interconnecting shaft.

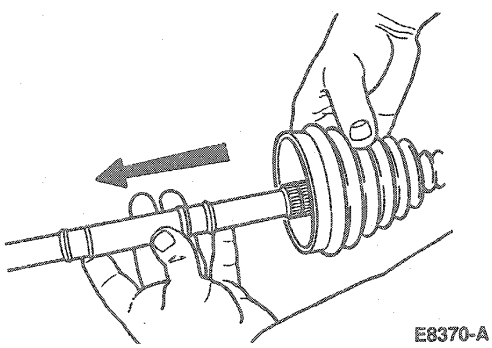


6. Remove trilobe insert from CV joint outer race. Remove grease from outer race and inspect outer race and tripod assembly.

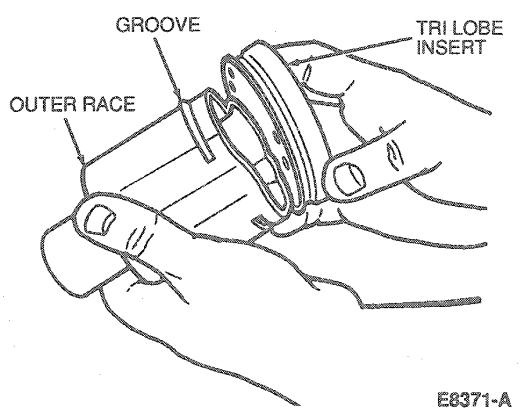


Assembly

1. Install CV joint boot on interconnecting shaft. Position boot to allow for CV joint outer race installation.



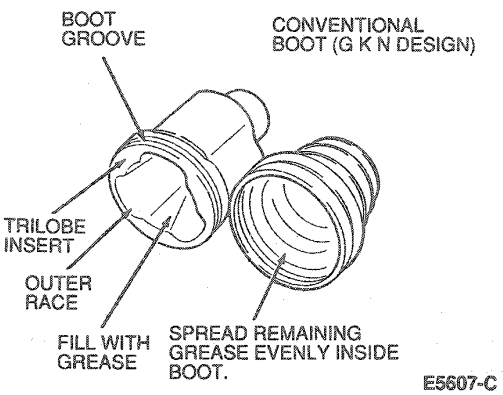
2. Install trilobe insert on CV joint outer race. Position in groove on outer race.



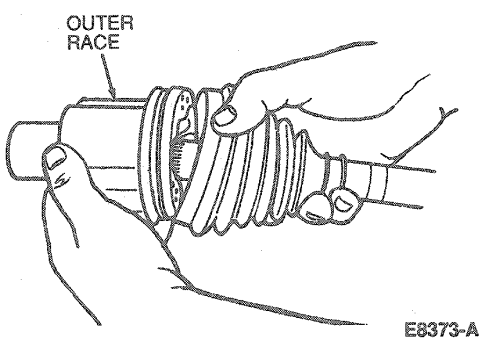
   NOTE: Use Ford Constant Velocity Grease E43Z-19590-A (ESP-M1C207-A) or equivalent.

DISASSEMBLY AND ASSEMBLY (Continued)

3. Fill CV joint outer race with grease and spread remaining grease evenly inside boot. Total fill is 250 grams (9 oz).



4. Install outer race on tripod assembly.

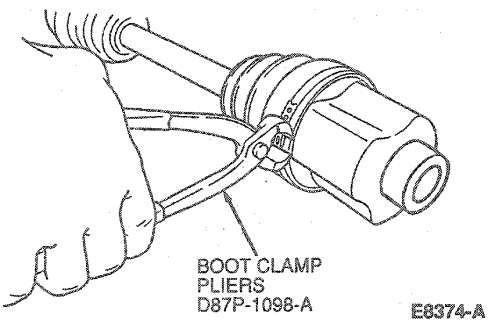


NOTE: Before installing boot clamp, ensure any air pressure which may have built up in boot is relieved. Insert a dulled screwdriver blade between boot and outer bearing race to allow trapped air to escape from boot. The air should be released from the boot only after adjusting to dimension shown in Specifications.

5. Remove all excess grease from CV joint external surfaces and mating boot surface. Position boot over CV joint making sure boot is seated in groove. Move CV joint in and out, as necessary, to adjust to length shown in Specifications

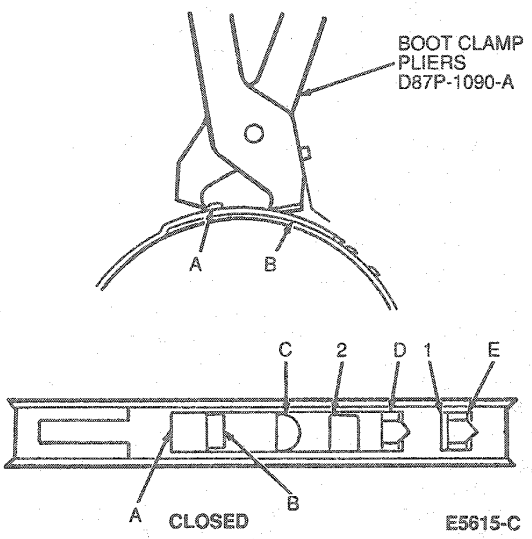
CAUTION: All vehicles (except SHO powertrains) require a reusable low profile large clamp on the RH inboard CV joint.

6. Seat boot in groove and clamp in position using Boot Clamp Pliers D87P-1098-A or equivalent on left inboard CV joints.



Install clamp as follows:

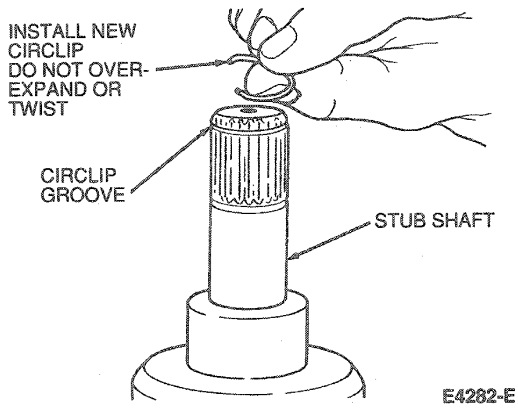
a. With boot seated in groove, place clamp over boot.
b. Engage hook (C) in window.
c. Using Boot Clamp Pliers, D87P-1090-A or equivalent, place pincer jaws in closing hooks (A and B)
d. Secure clamp by drawing closing hooks together. When windows (1 and 2) are above locking hooks (D and E) spring tab will press windows over locking hooks and engage clamp.



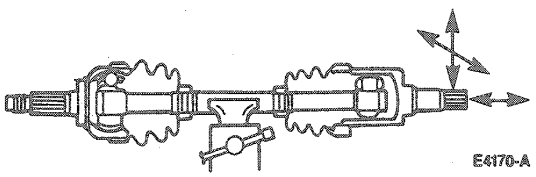
CAUTION: Do not over-expand or twist circlip during installation. DO NOT reuse circlips. Replace with new circlips before assembly.

DISASSEMBLY AND ASSEMBLY (Continued)

7. On RH side CV joints, install a new circlip, supplied with service kit, in groove nearest end of shaft by starting one end in groove and working circlip over stub shaft end and into groove.



8. Work the CV joint through its full range of travel at various angles. The joint should flex, extend and compress smoothly.



Disassembly — 3.0L ABS, 3.8L and SHO Manual Transmission

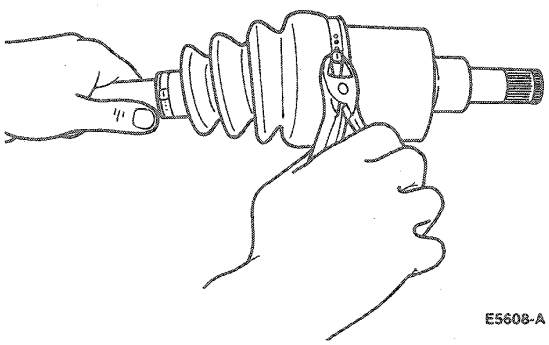
Tools Required:

- Boot Clamp Pliers D87P-1090-A
- Boot Clamp Pliers D87P-1098-A

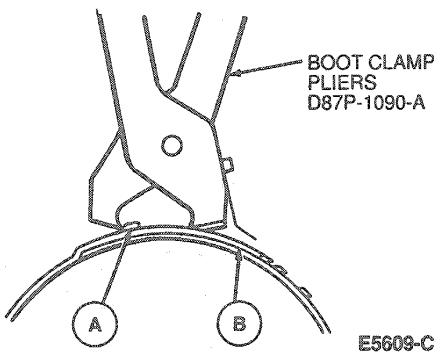
CAUTION: Although the designs are similar, there is no interchangeability of parts between the three designs. The CV joint tripod, outer race, boot and interconnecting shaft are unique for each style.

CAUTION: On all vehicles (except SHO powertrains) the RH inboard CV joint requires a reusable, low profile large boot clamp. A special tool is required to remove and install the clamp. Use Boot Clamp Pliers D87P-1090-A or equivalent.

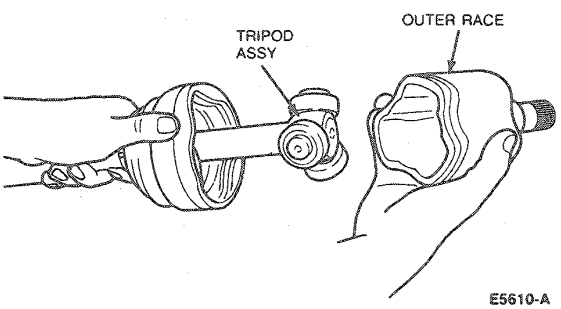
1. Cut and remove both boot clamps and slide boot back on shaft.



Remove clamp by engaging pincer jaws in closing hooks (A and B) and drawing hooks together. Disengage windows and locking hooks and remove clamp.



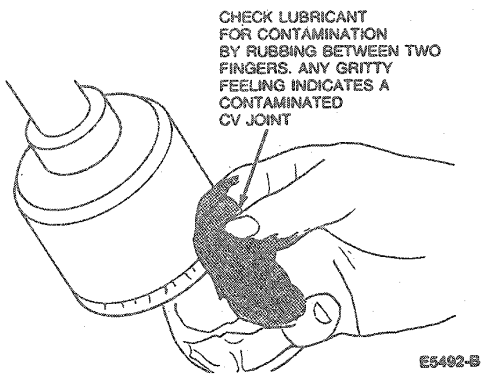
2. Slide outer race off of tripod.



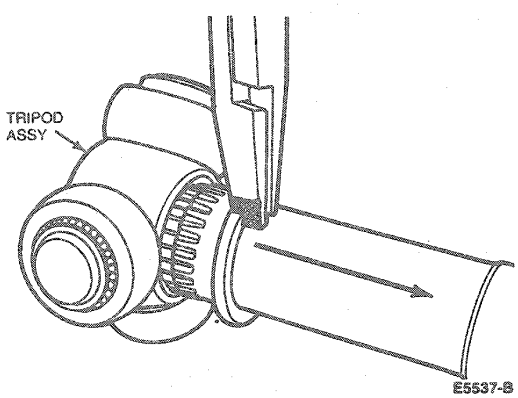
DISASSEMBLY AND ASSEMBLY (Continued)

3. When replacing damaged CV joint boots, the grease should be checked for contamination. If the CV joints are operating satisfactorily, and the grease does not appear to be contaminated, add grease and replace the boot.

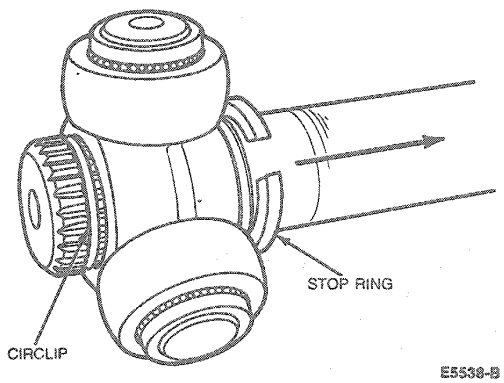
   If the grease appears contaminated, proceed with a complete CV joint disassembly and inspection.



4. Move stop ring back on shaft using snap-ring pliers.



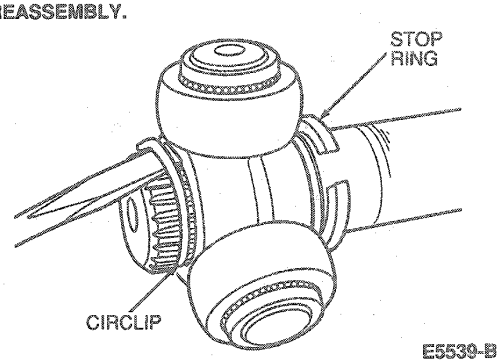
5. Move tripod assembly back on shaft to allow access to circlip.



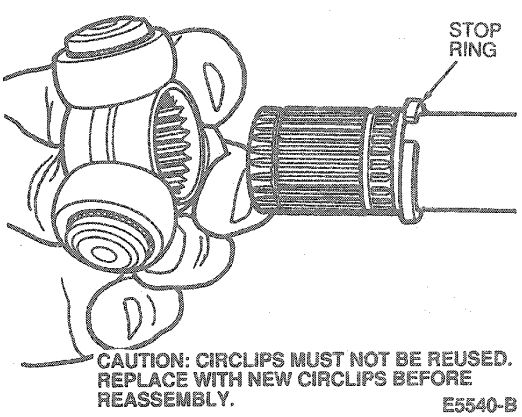
CAUTION: Circlips must not be reused. Replace with new circlips before reassembly

6. Remove circlip from shaft.

CAUTION: CIRCLIPS MUST NOT BE REUSED. REPLACE WITH NEW CIRCLIPS BEFORE REASSEMBLY.



7. Remove tripod assembly from shaft. Remove boot if necessary.

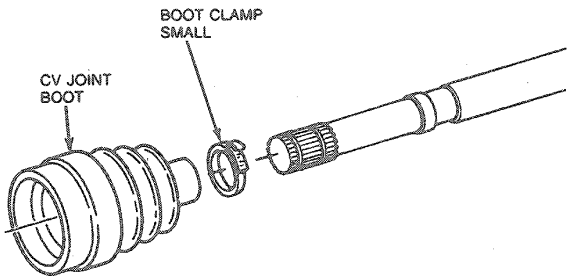


Assembly

CAUTION: Tighten clamp securely, but not to the point where clamp bridge is cut or boot is damaged.

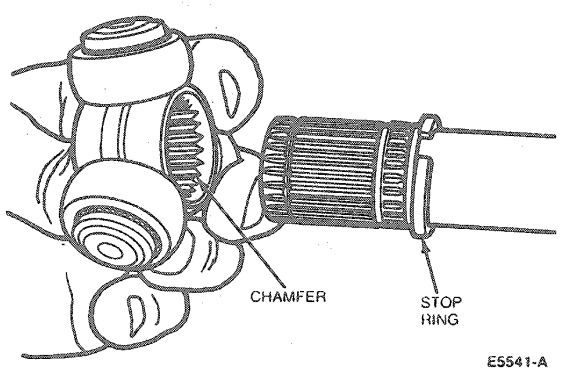
DISASSEMBLY AND ASSEMBLY (Continued)

1. Install CV joint boot on shaft, if removed during disassembly. Ensure boot is seated in boot groove on shaft. Tighten clamp using Boot Clamp pliers.



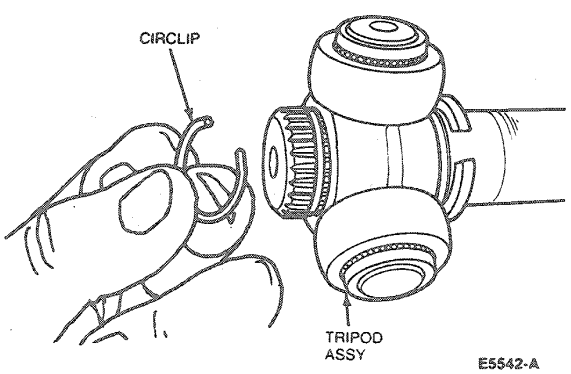
E4297-C

2. Install tripod assembly on shaft with chamfered side toward stop ring.



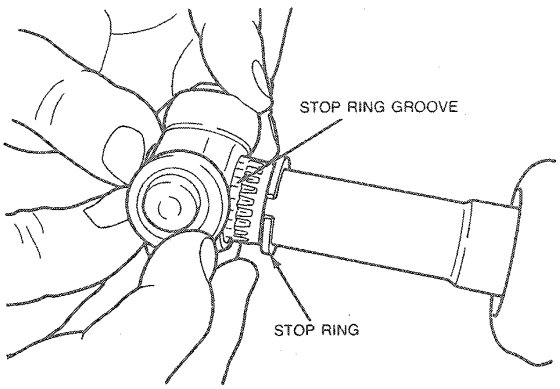
E5541-A

3. Install new circlip.



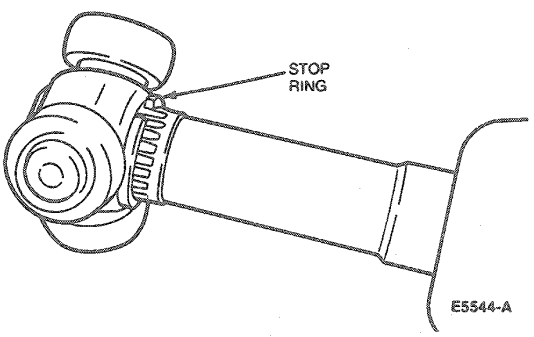
E5542-A

4. Compress circlip and slide tripod assembly forward over circlip to expose stop ring groove.



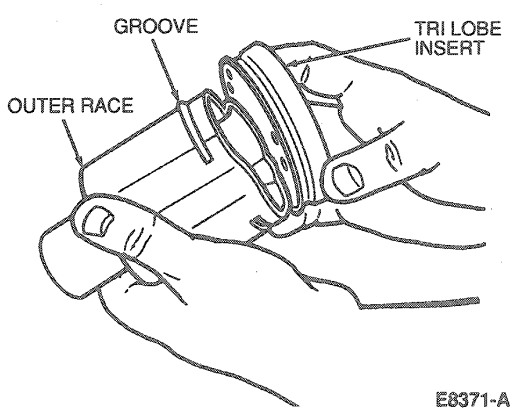
E5543-A

5. Move stop ring into groove using snap-ring pliers, making sure it is fully seated in groove.



E5544-A

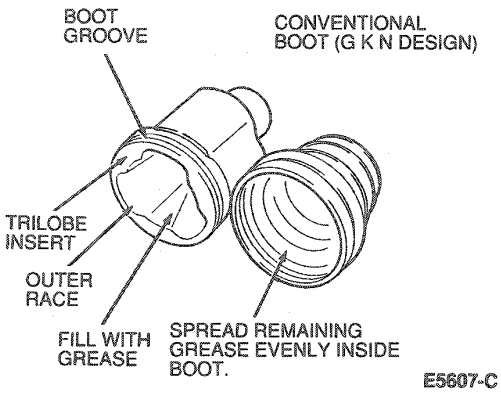
6. Install trilobe insert over CV joint inner race and position on outer race.



E8371-A

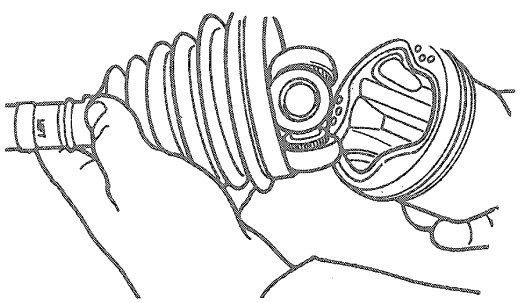
DISASSEMBLY AND ASSEMBLY (Continued)

7. Fill CV joint outer race and CV boot with grease and spread remaining grease evenly inside boot. Total combined fill is 250 grams (9 oz). Use Ford Constant Velocity Joint Grease High Temperature E43Z-19590-A (ESP-M1C207-A) or equivalent.



E5607-C

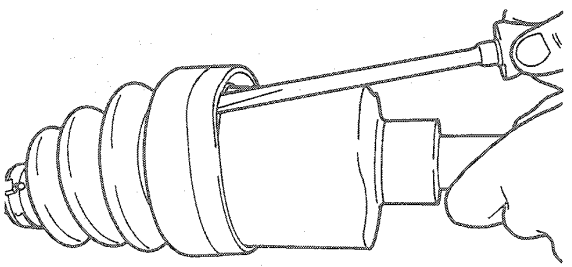
8. Install outer race over tripod assembly.



E8367-A

NOTE: Before installing boot clamp, ensure any air pressure which may have built up in boot is relieved. Insert a dulled screwdriver blade between boot and trilobe insert to allow trapped air to escape from boot. The air should be released from the boot only after adjusting to dimension shown in Specifications.

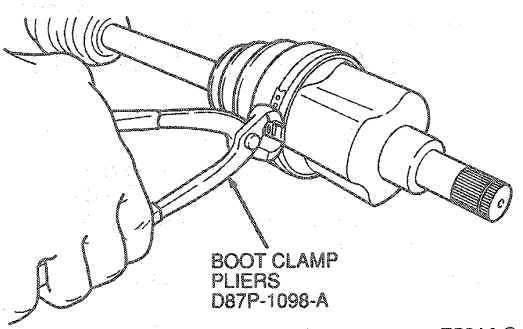
9. Remove all excess grease from CV joint external surfaces and mating trilobe insert surface. Position boot over CV joint making sure boot is seated in groove. Move CV joint in and out, as necessary, to adjust to length shown in Specifications.



E5613-A

CAUTION: All vehicles (except SHO powertrains) require a reusable low profile large clamp on the RH inboard CV joint.

10. Seat boot in groove and clamp in position using Boot Clamp Pliers D87P-1098-A or equivalent.



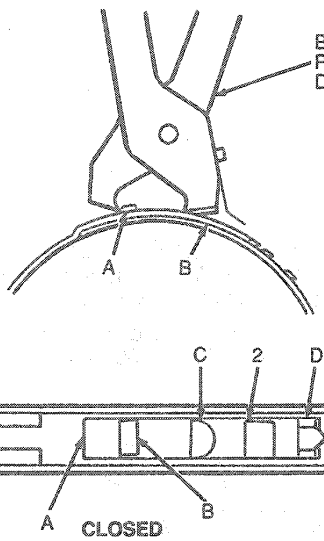
E5614-C

Install clamp as follows:

a. With boot seated in groove, place clamp over boot.
b. Engage hook (C) in window.
c. Using Boot Clamp Pliers, D87P-1090-A or equivalent, place pincer jaws in closing hooks (A and B).

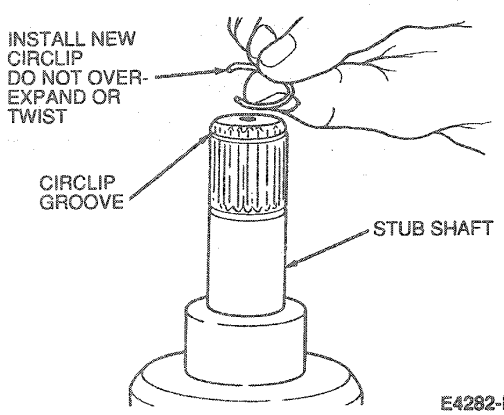
DISASSEMBLY AND ASSEMBLY (Continued)

d. Secure clamp by drawing closing hooks together. When windows (1 and 2) are above locking hooks (D and E) spring tab will press windows over locking hooks and engage clamp.

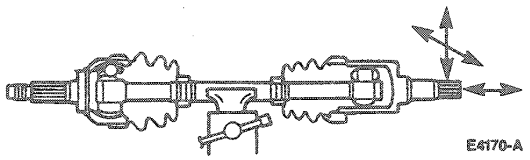


CAUTION: Do not over-expand or twist circlip during installation. DO NOT reuse circlips. Replace with new circlips before assembly.

11. Install a new circlip, supplied with service kit, in groove nearest end of shaft by starting one end in groove and working circlip over stub shaft end and into groove.



12. Work the CV joint through its full range of travel at various angles. The joint should flex, extend and compress smoothly.

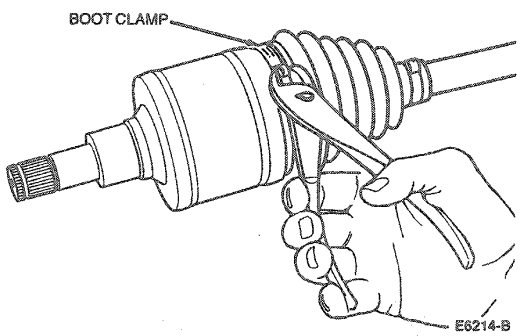


Disassembly — 3.2L SHO Automatic Transmission

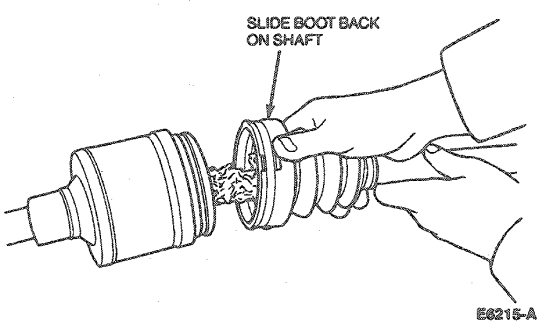
Tools Required:

- Boot Clamp Pliers D87P-1090-A
- Boot Clamp Pliers D87P-1098-A

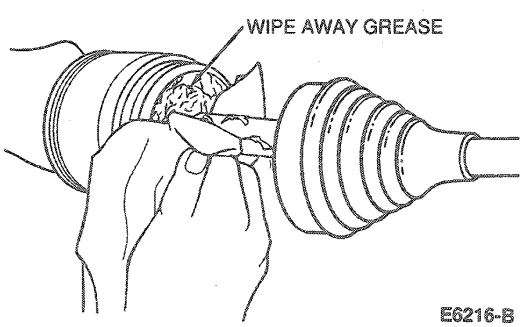
1. Cut and Remove both boot clamps.



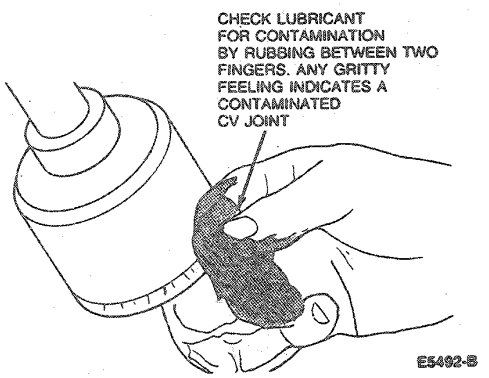
2. Slide boot back on shaft.



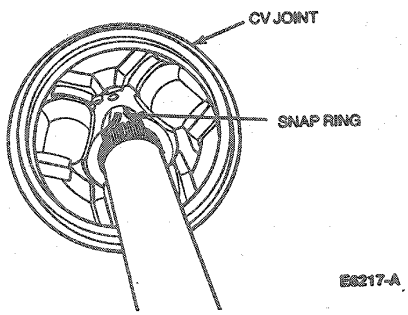
3. Wipe grease away from CV joint.



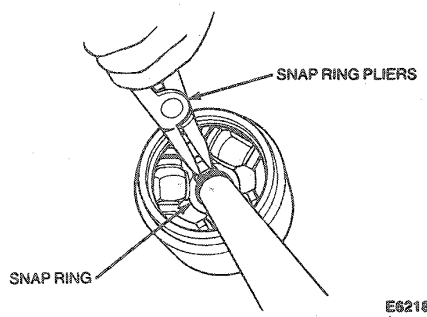
DISASSEMBLY AND ASSEMBLY (Continued)



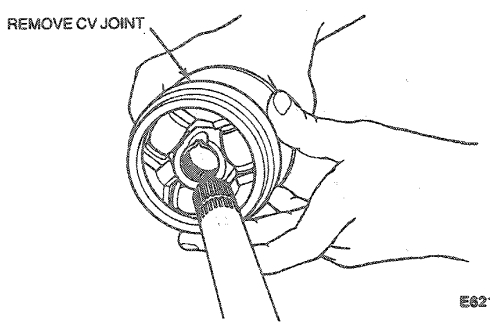
4. After grease has been removed, position CV joint in a vise with snap ring facing up.



5. Using snap ring pliers, expand snap ring and pull CV joint from shaft.

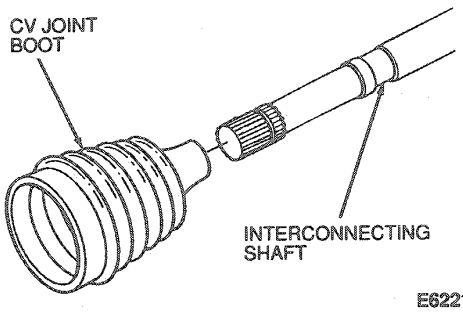


6. Remove CV joint.

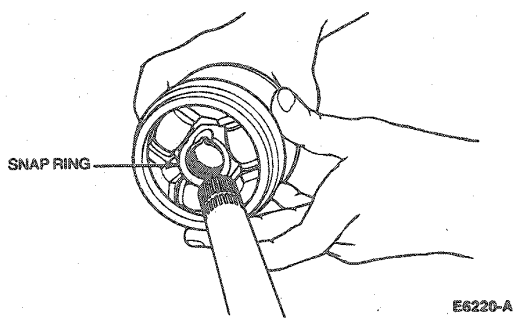


Assembly

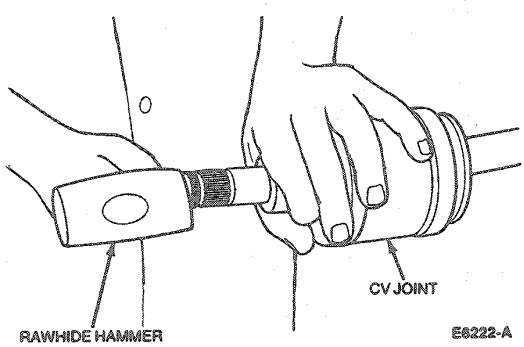
1. If removed, install CV joint boot on interconnecting shaft. Slide boot down shaft to allow room for CV joint installation.



2. Position CV joint tripod on interconnecting shaft splines.



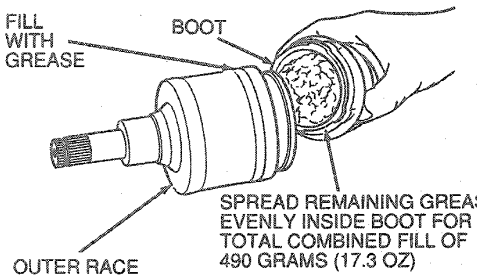
3. With tripod splines engaged with interconnecting shaft splines, tap into position using a rawhide hammer. The CV joint is fully seated when the snap ring locks into groove in interconnecting shaft. Check by attempting to pull CV joint from shaft.



NOTE: Use Ford Constant Velocity Joint Grease High Temperature E43Z-19590-A (ESP-M1C207) or equivalent.

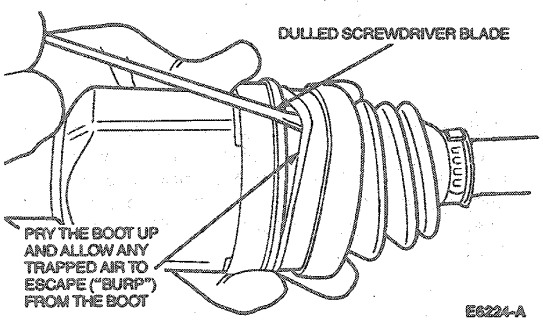
DISASSEMBLY AND ASSEMBLY (Continued)

4. Fill CV joint outer race with grease, then spread remaining grease evenly inside boot for a total combined fill of 490 grams (17.3 oz).

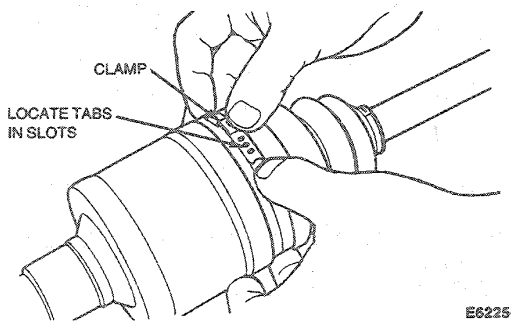


NOTE: Before installing boot clamp, ensure any air pressure which may have built up in boot is relieved. Insert a dulled screwdriver blade between boot and outer bearing race to allow trapped air to escape from boot. The air should be released from the boot only after adjusting dimension shown in Specifications.

5. Remove all excess grease from CV joint external surfaces and boot sealing surface. Slide boot up shaft and position on CV joint and interconnecting shaft boot groove. Move CV joint in and out, as necessary, to adjust to length shown in Specifications.

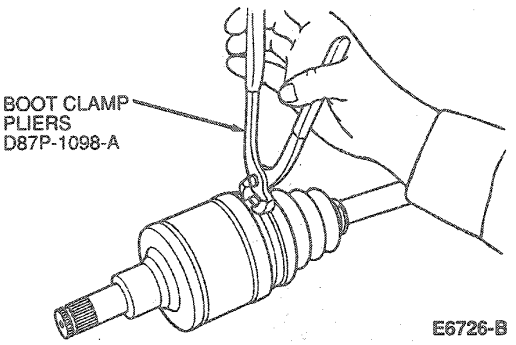


6. Locate clamp tabs in slots. Make clamps tight as possible by hand.



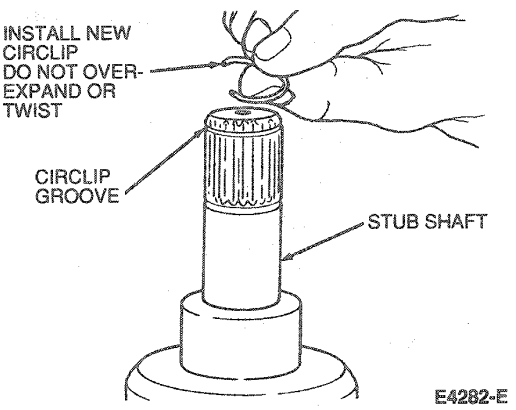
CAUTION: Tighten the clamps securely, but not to the point where the clamp bridges are cut or the boot is damaged.

7. Ensure boot is seated in its grooves and clamp in position using Boot Clamp Pliers D87P-1098-A or equivalent.



CAUTION: Do not over-expand or twist circlip during installation. DO NOT reuse circlips. Replace with new circlips before assembly

8. Install a new circlip, supplied with service kit, in groove nearest end of shaft. Start one end in groove and work circlip over stub shaft end and into groove.



Link Shaft/Halfshaft — SHO Manual Transmission

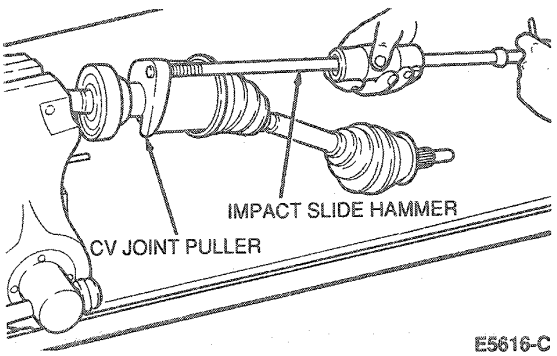
Disassembly and Assembly

Tools Required:

- CV Joint Puller T86P-3514-A1
- Impact Slide Hammer D79P-100-A
- Bearing Puller Attachment D84L-1123-A

DISASSEMBLY AND ASSEMBLY (Continued)

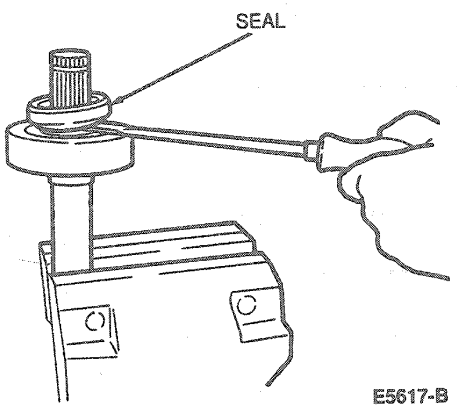
1. Clamp link shaft in vise with halfshaft supported on work bench. Using CV Joint Puller T86P-3514-A1 and Impact Slide Hammer D79P-100-A or equivalent, separate link shaft from halfshaft.



E5616-C

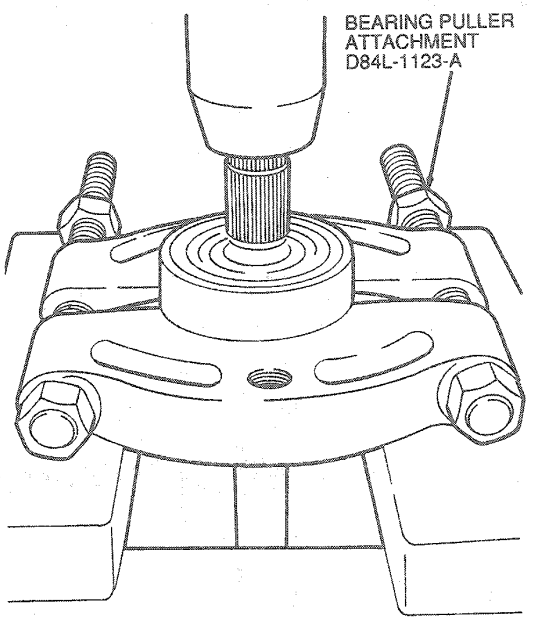
2. Remove seal from link shaft by prying it off with a screwdriver.

   CAUTION: Use care to prevent damage to bearing dust shield.



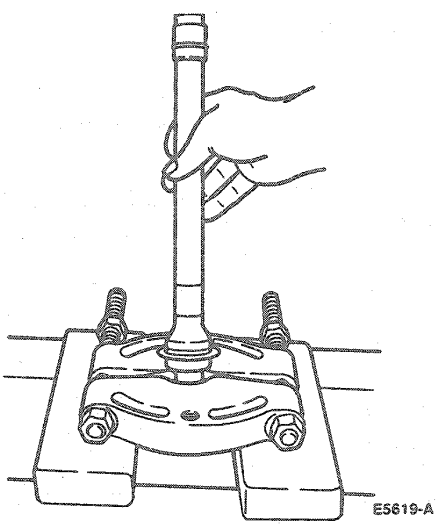
E5617-B

3. Place shaft assembly in arbor press, using Bearing Puller Attachment D84L-1123-A or equivalent, with bearing supported and press out link shaft.



E5618-C

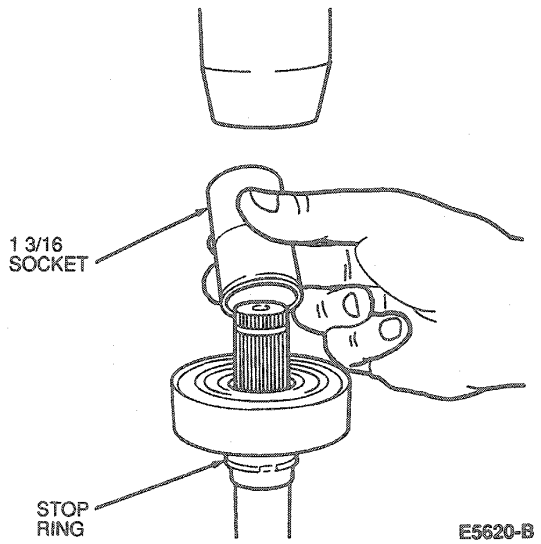
4. Support link shaft in press fixture with step in shaft.



E5619-A

DISASSEMBLY AND ASSEMBLY (Continued)

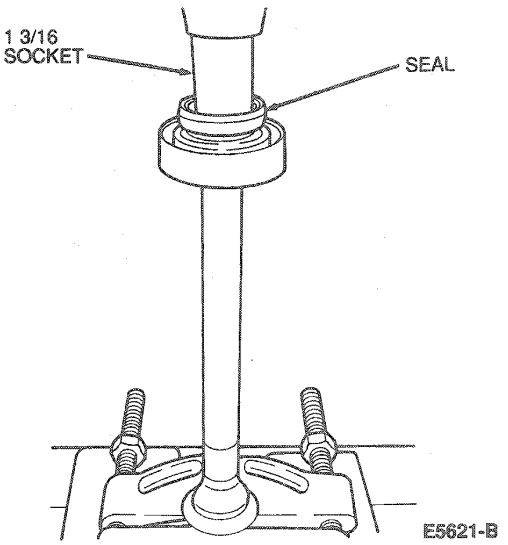
5. Place bearing on shaft and press bearing onto shaft using a 1-3/16 inch deep well socket until it contacts stop ring.



6. Place seal on shaft and press seal onto shaft using a 1-3/16 inch deep well socket until it contacts bearing.

7. Assemble halfshaft and link shaft.

   NOTE: Before assembly, coat link shaft spline, seal lip and seal cavity with Constant Velocity Joint Grease High Temperature E2FZ-19590-A (ESP-M1C207-A) or equivalent.



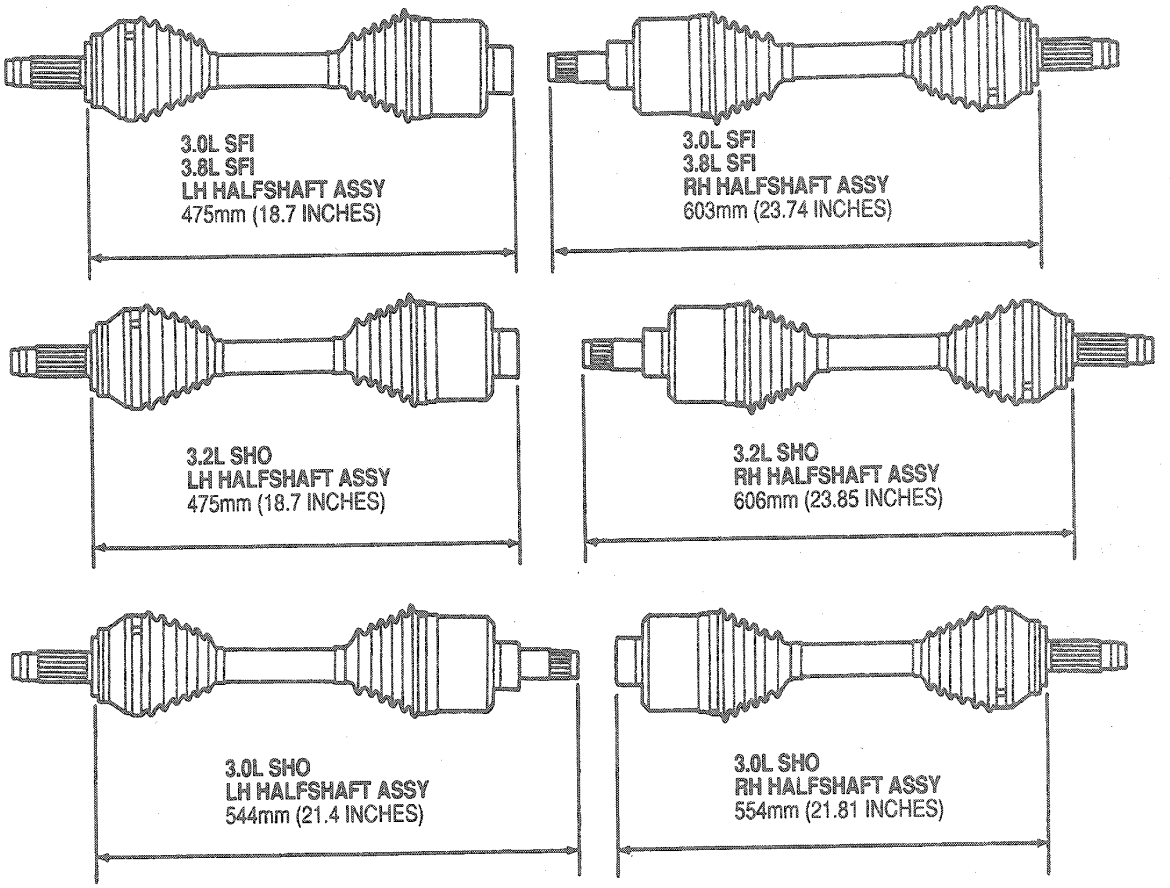
SPECIFICATIONS

LUBRICANT SPECIFICATIONS—HALFSHAFT ASSEMBLIES

POWERTRAIN		SPECIFICATION	TOTAL FILL AMOUNT			
			INBOARD CV		OUTBOARD CV	
Engine	Transmission	Lubricant	LH	RH	LH	RH
3.0L	AXODE without ABS	ESP-M1C207-A (E43Z-19590-A)	250 g 8.8 oz	250 g 8.8 oz	145 g 5.1 oz	145 g 5.1 oz
3.0L	AXODE with ABS	ESP-M1C207-A (E43Z-19590-A)	250 g 8.8 oz	250 g 8.8 oz	170 g 6.0 oz	170 g 6.0 oz
3.8L	AXODE without ABS	ESP-M1C207-A (E43Z-19590-A)	250 g 8.8 oz	250 g 8.8 oz	170 g 6.0 oz	170 g 6.0 oz
3.8L	AXODE with ABS	ESP-M1C207-A (E43Z-19590-A)	250 g 8.8 oz	250 g 8.8 oz	170 g 6.0 oz	170 g 6.0 oz
3.2L	SHO Automatic	ESP-M1C207-A (E43Z-19590-A)	490 g 17.3 oz	490 g 17.3 oz	170 g 6.0 oz	170 g 6.0 oz
3.2L	SHO Manual MTX	ESP-M1C207-A (E43Z-19590-A)	250 g 8.8 oz	250 g 8.8 oz	170 g 6.0 oz	170 g 6.0 oz

SPECIFICATIONS (Continued)

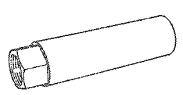
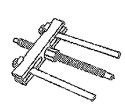
HALFSHAFT ASSEMBLED LENGTHS



TORQUE SPECIFICATIONS

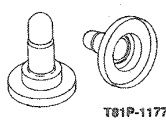
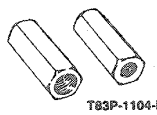
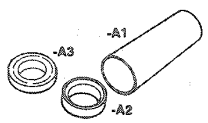
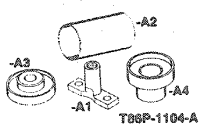
Description	N·m	Lb-Ft
Front Hub Retainer Nut	245-270	180-200
Control Arm To Steering Knuckle Nut	54-74	40-55
Stabilizer Link to Stabilizer Bar	47-65	35-48
Wheel Lug Nuts	115-142	85-105
Link Shaft Bearing Retaining Bolts	21-32	16-23
Link Shaft Bearing Bracket Bolts	40-64	30-47

SPECIAL SERVICE TOOLS

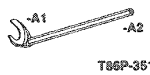
Tool Number/ Description	Illustration
T81P-1104-A Front Hub Installer	
T81P-1104-C Front Hub Remover/Replacer	

(Continued)

SPECIAL SERVICE TOOLS (Continued)

Tool Number/ Description	Illustration
T81P-1177-B Transaxle Plugs	
T83P-1104-BH Metric Hub Remover Adapter	
T83T-3132-A1 Spindle/Axle Seal Installer	
T86P-1104-A1 Metric Stud Adapter T86P-1104-A4 Dust Seal Installer	

(Continued)

Tool Number/ Description	Illustration
T86P-3514-A Tool Set— Consists of: T86P-3514-A1 CV Joint Puller, T86P-3514-A2 CV Joint Puller Extension	
T88P-20202-A Front Sensor Ring Remover/Replacer	

Tool Number	Description
D79P-100-A	Impact Slide Hammer
D83P-4026-A	Halfshaft Remover
D84L-1123-A	Bearing Puller Attachment
D87P-1090-A	Boot Clamp Pliers
D87P-1096-A	Boot Clamp Pliers

GROUP

BRAKE SYSTEM 06

(2000)

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BRAKE SYSTEM, PARKING	06-05-1
BRAKE SYSTEM, POWER	06-07-1
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BRAKES, FRONT DISC	06-03-1
BRAKES, REAR DISC	06-04-1
BRAKES, REAR DRUM	06-02-1

SECTION 06-00 Brake System—Service

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Brake Hose	06-00-15
Brake Tubing	06-00-14
Disc Brakes	06-00-14
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VEHICLE APPLICATION

Taurus / Sable and Taurus SHO.

DESCRIPTION

WARNING: BRAKE FLUID CONTAINS POLYGLYCOL ETHERS AND POLYGLYCOLS. AVOID CONTACT WITH EYES. WASH HANDS THOROUGHLY AFTER HANDLING. IF BRAKE FLUID CONTACTS EYES, FLUSH EYES WITH RUNNING WATER FOR 15 MINUTES. GET MEDICAL ATTENTION IF IRRITATION PERSISTS. IF TAKEN INTERNALLY, DRINK WATER AND INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.

This Section covers the Diagnosis and Testing, and the Cleaning and Inspection procedures for the Brake system. Refer to the appropriate Section in this Group for further information.

DIAGNOSIS AND TESTING

Brake System Diagnosis

Diagnosis of mechanical and hydraulic concerns associated with the brake system is covered in this Section.

In addition to the Brake System Diagnosis charts, further specific diagnosis charts are furnished for the master cylinder, brake control valve and the vacuum brake booster.

Always check the fluid level in the master cylinder before performing the test procedures. If the fluid level is not at the MAX line to 4.0mm (0.16 inch) below on the master cylinder reservoirs, add Heavy-Duty Brake Fluid C6AZ-19542-AA (ESA-M6C25-A) or DOT-3 equivalent.

CAUTION: Use of any other than the approved DOT-3® brake fluid will cause permanent damage to brake components and will render the brakes inoperative.

If a brake is locked and the vehicle must be moved, open the bleeder screw on both front wheels to let out enough fluid to relieve the pressure. Close the bleeder screws. This bleeding operation will release the brakes but will not correct the cause of trouble.

Hydraulic System

Two major concerns can occur in hydraulic brake systems: external leaks, and master cylinder bypass (internal leak). Hydraulic brake systems and their components, the master cylinder and valves, do not cause the vehicle to vibrate or pull, the brakes to grab or squeal, or the brake pedal to pulse, except during ABS operation. In most cases, they will not even make the brakes drag. The sources of these concerns are found elsewhere in the brake system, but it is always a good policy to first check the entire hydraulic system for leaks before continuing to diagnose any other brake concerns.

Master Cylinder

Normal Conditions

The following conditions are considered normal and are not indications that the master cylinder is in need of service:

Condition 1: New brake systems are not designed to produce as hard a pedal effort as in the past. Complaints of light pedal efforts should be compared to pedal efforts on another vehicle, same model and year.

Condition 2: A trace of brake fluid existing on the booster shell below the master cylinder mounting flange. This results from the normal lubricating action of the master cylinder bore end seal.

Condition 3: Fluid level will decrease with front lining wear.

Abnormal Conditions

Changes in brake pedal feel or travel are indicators that something could be wrong in the brake system. The following conditions use brake pedal feel and the warning indicator along with reservoir fluid level, as indicators in diagnosing brake system concerns.

Condition 1: Pedal goes down fast. This could be caused by an external leak or internal leak.

Condition 2: Pedal eases down slowly. This could be caused by an external leak or internal leak.

Condition 3: Pedal is low and / or feels spongy. This condition may be caused by: no fluid in the reservoir, reservoir cap vent holes clogged, rear brakes out of adjustment, or air in the hydraulic system.

Condition 4: Pedal effort excessive. This may be caused by a bind or obstruction in pedal / linkage or insufficient booster vacuum.

Condition 5: Rear brake lockup during light pedal force. This may be caused by wrong tire pressure, grease or fluid on linings / damaged linings, improperly adjusted parking brakes, or damaged / contaminated pressure control valve(s).

Condition 6: Erratic pedal effort. This condition could be caused by brake booster malfunction, or extreme caliper piston knock back or improperly installed disc brake shoe and lining.

Condition 7: Brake warning indicator ON. This may be caused by low fluid level, ignition wire routing too close to fluid level indicator assembly, or float assembly damage.

NOTE: Prior to performing any diagnosis, ensure that the brake system warning indicator is functional.

The diagnosis techniques and service procedures are referenced in the Brake Master Cylinder Diagnosis charts. Refer to these charts for proper use of diagnosis techniques in diagnosing brake hydraulic system concerns.

Diagnostic Technique No. 1

External Fluid Leaks—Check

It is possible that all evidence of fluid leakage may have washed off, if the vehicle has been operated in rain or snow, as brake fluid is water soluble. Refill system, bleed, and apply the brakes several times. Examine the system to verify that the reservoir fluid level is actually dropping. Locate and correct the external leak. If fluid level drops and no external leak can be found, check for a master cylinder bore end seal leak.

Diagnostic Technique No. 2

Master Cylinder Bypass Condition Check

1. Check fluid in master cylinder. Fill reservoir if low or empty.

DIAGNOSIS AND TESTING (Continued)

2. Observe fluid level in reservoir. If after several brake applications the fluid level remains the same, measure wheel turning torque required to rotate wheels with brakes applied as follows:
   - Place transmission in NEUTRAL and raise vehicle on hoist. Refer to Section 00-02.
   - Apply brakes with a minimum of 445N (100 lbs) and hold for approximately 15 seconds. With brakes still applied, exert torque on front wheels to 101 N·m (75 lb-ft). If either wheel rotates, inspect internal components of master cylinder. Replace or service master cylinder.

Diagnostic Technique No. 3

Reservoir Sealing Points—Check

An empty reservoir condition may be caused by two types of non-pressure external leaks.

Type 1: An external leak may occur at the master cylinder reservoir cap because of improper positioning of the gasket and cap. Reposition cap and gasket.

Type 2: An external leak may occur at the reservoir mounting grommets. Service such a leak by installing new grommets.

Type 3: ABS only - An external leak may occur at either end of the HCU supply hose or the HCU reservoir.

Diagnostic Technique No. 4

Brake Pedal Reserve—Check

Where a low pedal or the feel of a bottomed out condition exists, check for brake pedal reserve.

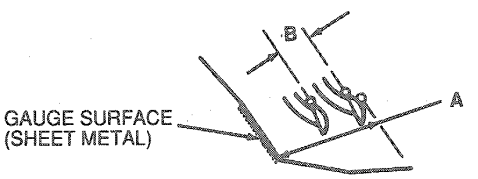
1. Operate engine at idle with the transmission in either PARK or NEUTRAL.
2. Depress brake pedal lightly three to four times.
3. Allow 15 seconds for vacuum to replenish booster.

   NOTE: This increased resistance may feel like something has bottomed out.
4. Apply brake pedal until it stops moving downward or an increased resistance to the pedal travel occurs.
5. Hold pedal in applied position and raise the engine speed to approximately 2,000 rpm.

   NOTE: The additional movement of the brake pedal is the result of the increased engine manifold vacuum which exerts more force on the brake booster during engine rundown. This means that additional stroke is available in the master cylinder, and the brake system is not bottoming out as a customer may believe.
6. Release accelerator pedal and observe that brake pedal moves downward as engine returns to idle speed.

Brake Pedal Free Height Measurements

1. Insert a slender, sharp-pointed prod through carpet and sound deadener to dash panel metal. Measure distance to center on top of brake pedal pad.
2. If the position of pedal is not within specification, check brake pedal for missing, worn, or damaged bushings, or loose retaining bolts and replace, if required.
3. If pedal free height is still out of specification, check brake pedal, booster or master cylinder to ensure correct components are installed. Replace components as necessary.



H4001-B

TYPE	PEDAL FREE HEIGHT "A" MAX.	PEDAL FREE HEIGHT "A" MIN.	MAXIMUM PEDAL TRAVEL (INCHES) "B"
Power Disc	172mm (7.0 Inches)	156mm (6.0 Inches)	59.5mm (2.34 MAX.)

NOTE: Vehicles close to maximum pedal travel specifications may be improved by bleeding the brake system.

Brake Pedal Travel Measurement

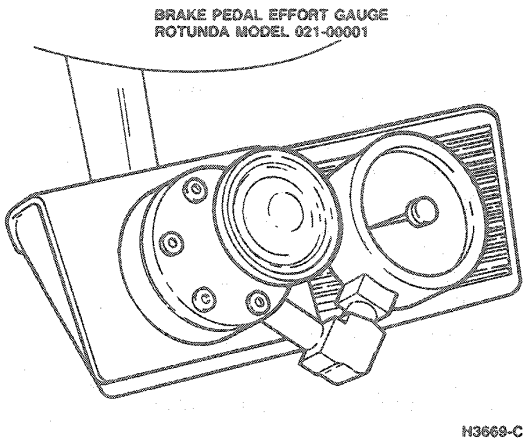
Tools Required:

- Brake Pedal Effort Gauge 021-00001

1. With engine running and transmission in PARK or NEUTRAL, block wheels and release parking brake.

DIAGNOSIS AND TESTING (Continued)

2. Install Rotunda Brake Pedal Effort Gauge 021-00001 or equivalent on the brake pedal pad.



3. Hook a steel measuring tape to the brake pedal. Measure and record the distance from the brake pedal free height position to the reference point, which is at the six o'clock position on the steering wheel rim.
4. With steel tape still hooked to brake pedal, depress brake pedal by pressing downward on Rotunda Brake Pedal Effort Gauge 021-00001 or equivalent. Apply a 111N (25 lb) load to center of pedal. Maintain the pedal load, and measure the distance from brake pedal to the fixed reference point on steering wheel rim parallel to centerline of steering column.
5. If pedal travel is more than the maximum specification on vehicles with self-adjusting / drum brakes, make several reverse stops with a forward stop before each. Move vehicle in reverse and forward for approximately 10 feet. Then, apply brakes and hold brake pedal down until vehicle is completely stopped. This will actuate brake self-adjusters. If these stops do not bring brake pedal travel within specification, make several additional forward and reverse stops as outlined above.
6. On self-adjusting rear drum brakes, if the second series of stops does not bring brake pedal travel within specification, remove brake drums, and check brake adjusters to ensure they are functioning. Check brake lining for wear or damage. Service or replace all worn or damaged components. Adjust brake. Refer to Section 06-02.
7. If all drum brake adjusters, brake drums and brake shoe linings are functional, and brake travel is not within specification, check pedal assembly for missing or loose attachments.
8. If above Steps do not bring brake travel within specification, bleed brake system.

Power Brake Functional Test

Vacuum Booster

Inspect all hoses and connections. All unused vacuum connectors should be capped. Hoses and their connections should be properly secured and in good condition with no holes or collapsed areas. Inspect check valve on power unit for damage.

Booster Operation Check

1. Check hydraulic brake system for leaks or insufficient fluid.
2. With transmission in NEUTRAL, stop engine and apply parking brake. Depress brake pedal several times to exhaust all vacuum in the system.
3. Depress pedal and hold it in the applied position. Start engine. If vacuum system is operating, pedal will tend to move downward under constant foot pressure. If no motion is felt, the vacuum booster system is not functioning.
4. Remove vacuum hose from brake booster check valve connection. Manifold vacuum should be available at the check valve end of the hose with engine at idle speed and transmission in NEUTRAL. If manifold vacuum is available to the booster, connect vacuum hose to booster and repeat Steps 2 and 3. If no downward movement of brake pedal is felt, replace brake booster.
5. Operate engine a minimum of 10 seconds at fast idle. Stop engine, and let vehicle stand for 10 minutes. Then, depress brake pedal with approximately 89N (20 lbs) of force. Pedal feel should be the same as that noted with engine operating. If pedal feels hard (no power assist), replace check valve and retest.

   If brake pedal feels spongy, bleed hydraulic system to remove air. Refer to Section 06-06.

Refer to Vacuum Brake Diagnosis chart to assist in vacuum booster diagnosis.

DIAGNOSIS AND TESTING (Continued)

BRAKE SYSTEM DIAGNOSIS

CONDITION	POSSIBLE SOURCE	ACTION
• Brakes Do Not Apply	• Insufficient brake fluid. • Binding or damaged brake pedal linkage.	• Add fluid, bleed system, check for leaks. • Service as required.
• Excessive Pedal Travel or Pedal Goes to Floor	• Air in system. • Loose brake tube end fittings. • Malfunctioning master cylinder. • Malfunctioning ABS hydraulic unit. • Loose wheel bearings — front. • Loose or missing pedal bushings / fasteners.	• Bleed system. • Tighten to specification. • Refer to Master Cylinder Diagnosis. • Refer to ABS Diagnosis, Section 06-09. • Replace as required. • Check and replace as required.
• Excessive Pedal Effort to Stop Vehicle	• Binding or damaged pedal linkage. • Engine vacuum loss. • Booster inoperative. • Worn or contaminated linings. • Brake system.	• Inspect. Service as required. • Check engine vacuum, and vacuum at check valve to booster. Service as required. • Perform power brake function test or vacuum booster diagnosis. • Inspect. Replace if necessary. • Inspect wheel cylinders or caliper pistons, restricted lines or hoses, contaminated brake fluid, improper operation of proportioning or metering valve. Service as necessary.
• Spongy Pedal	• Air in system. • Loose or improper brake pedal, pedal support, booster, master cylinder attachment. • Brake system.	• Bleed system. • Service as required. • Inspect for damaged or distorted parts in brake caliper assemblies, cracked brake drums, mis-machined anchor plates.
• Brakes Drag, Slow or Incomplete Release	• Parking brake cable out of adjustment or binding. • Front wheel bearings worn or damaged. • Blocked master cylinder compensator ports. • On front disc brakes — loose or missing innershoe clip. • Brake adjustment (rear). • On front disc brakes — LH or RH shoes misassembled. • Restriction in hydraulic system. • Caliper piston seizure.	• Check cables for correct adjustment or bind. • Check bearings for wear, damage or bind. • Refer to Master Cylinder Diagnosis. • Inspect and replace if required. • Check and adjust. • Check and service. • Check and service. • Check and service.
• Noise at Wheels When Brakes are Applied — Snap or Clicks	• On disc brakes — loose or missing inner anti-rattle clip. • On front disc brakes — missing pin insulator. • On front disc brakes — missing or loose pins.	• Lubricate and replace[1] • Lubricate and replace[1]. • Lubricate and replace[1].
Noise at Wheels When Brakes are Applied — Scrape or Grind	• Worn brake linings. • Caliper to wheel or rotor interference. • Other brake system components: Warped or bent brake splash shield, cracked rotors. • Tires rubbing against chassis or body. • Rotor to spindle interference.	• Replace drums or rotors if heavily scored. • Replace as required. • Inspect and service. • Inspect and service. • Replace as required.

1 Use Disc Brake Caliper Slide Grease D7AZ-19590-A (ESA-M1C172-A) or equivalent.

DIAGNOSIS AND TESTING (Continued)

BRAKE SYSTEM DIAGNOSIS (Continued)

CONDITION	POSSIBLE SOURCE	ACTION
• Noise at Wheels When Brakes are Applied — Squeaks, Squeals, or Chatter. NOTE: Brake friction materials inherently generate noise and heat in order to dissipate energy. As a result, occasional squeal is normal and is aggravated by severe environmental conditions such as cold, heat, wetness, snow, salt, mud, etc. This occasional squeal is not a functional concern and does not indicate any loss of brake effectiveness.	• Rotors and pads worn or scored. • On disc brakes — missing or damaged brake pad insulators. • On disc brakes — burred or rusted calipers. • Dirty, greased, contaminated or glazed linings. • Improper lining parts.	• Inspect, service or replace. • Replace. • Clean or deburr. • Clean or replace. Lightly sand off glaze. • Inspect for correct usage. Replace.
• Noise at Wheels, Brakes Not Applied — Squeak or Squeal	• Wheelcover attachment. • Loose wheel retaining lug nuts. Other brake system components: • Loose or extra parts in brakes. • Worn, damaged, or insufficiently lubricated wheel bearings. • Improper positioning of shoe in caliper. • Outside diameter of rotor rubbing caliper housing. • Improper installation of disc brake anti-rattle clip.	• Seat covers with a rubber mallet. Service flanges or replace cover. • Tighten to specification. Replace wheel if stud holes are damaged. • Inspect, service or replace as required.
• Noise at Wheels, Brakes Not Applied — Growling, Click or Rattle	• Stones or foreign material trapped inside wheelcovers. • Loose grease cap. • Loose wheel lug nuts. • Disc brake caliper — loose or missing anti-rattle clips or support pins. • Worn, damaged or dry wheel bearings.	• Remove stones, etc. • Service or replace. • Tighten to specification. Replace if stud holes are elongated. • Inspect, service or replace. • Inspect, lubricate or replace.
• Brakes Pull to One Side	• Unequal air pressure in tires. • Grease or fluid on linings. Glazed linings. • Loose or missing disc brake caliper retaining pins. • Improper size or type lining on one wheel. • Stuck or seized calipers. • Restricted brake lines or hoses. Other brake system components: • Improper positioning of disc brake shoe and lining in the caliper. • Damaged or worn wheel bearings.	• Inflate tires to correct pressure. • Replace. • Replace missing bolts. Tighten to specification. • Replace with correct brake lining in axle sets. • Service or replace. • Service or replace. • Inspect, service or replace as required.
• Brakes Grab or Lock-up When Applied	• Tires worn or incorrect pressure. • Grease or fluid linings — damaged linings. • Improper size or type of linings. Other brake system components: • Pins for caliper attachment loose or missing. • Worn, damaged or dry wheel bearings. • Improperly adjusted parking brake.	• Inflate tires to correct pressure. Replace tires with worn tread. • Inspect, service or replace. • Replace with correct brake in axle sets. • Inspect, service or replace as required.

DIAGNOSIS AND TESTING (Continued)

BRAKE SYSTEM DIAGNOSIS (Continued)

CONDITION	POSSIBLE SOURCE	ACTION
• Brake Warning Indicator On	• Hydraulic system. • Shorted indicator circuit. • Parking brake not returned. • Brake warning indicator switch.	• Refer to Master Cylinder Diagnosis. • Correct short in warning circuit. • Refer to Parking Brake Will not Release or Fully Return below. • Replace.
• Intermittent Loss of Pedal	• Loose wheel bearings.	• Replace as required. • Perform Steps under Excessive Pedal Travel or Pedal Travel Goes to Floor.
• Rough Engine Idle or Stall, Brakes Applied	• Vacuum leak in neutral switch. • Vacuum booster.	• Check lines for leaks. Service or replace as required. • Check vacuum booster for internal leaks. Replace if required.
• Parking Brake Control Will Not Latch (Manual Release)	• Kinked or binding release cable. • Control assembly.	• Inspect, service or replace. • Inspect, service or replace.
• Parking Brake Control Will Not Latch (Automatic Release)	• Vacuum leak. • Vacuum switch. • Control assembly.	• Service as required. • Test. Replace if necessary. • Service or replace.
• Parking Brake Will Not Release or Fully Return (Manual Release)	• Cable disconnected. • Control assembly binding. • Parking brake linkage binding. • Rear brakes.	• Connect cable or replace. • Service or replace. • Service or replace. • Check rear brakes shoe retracting springs and parking brake levers. On rear disc brakes verify levers return fully to released position. Adjust cables or service caliper as required.
• Parking Brake Will Not Release or Fully Return (Automatic Release)	• Vacuum line leakage or improper connections. • Neutral switch. • Control assembly.	• Inspect and service. • Adjust or replace. • Service or replace.
• Roughness—An Unsmooth Feeling While Braking in NEUTRAL Evidenced by a Pulsating Brake Pedal	• Corrosion buildup on rotor surfaces. • Rotor thickness variation. • Rear brake roughness. • Wheel / tire imbalance. • Drivetrain imbalance. • Worn tires.	• Make 5 to 10 stops. If roughness is still present, replace or turn rotor.[2] • Replace or turn rotor.[2] • Attempt stopping the vehicle using the parking brake. If roughness is present, check drums / rotors for excessive wear or runout. Refinish or replace as necessary. • Verify and service as necessary. • Attempt stopping vehicle in NEUTRAL transmission position. If roughness is gone, drivetrain should be inspected. • Replace tires.

TH8037A

DIAGNOSIS INDEX

Description	Pinpoint Test
Vibration Diagnosis	
Vibration When Brakes Are Applied	A
Master Cylinder Diagnosis	
Pedal Goes Down Fast	B
Pedal Eases Down Slowly	C
Pedal Is Low and / or Feels Spongy	D

(Continued)

DIAGNOSIS INDEX (Cont'd)

Description	Pinpoint Test
Pedal Effort Excessive	E
Rear Brake Lockup During Light Brake Pedal Force	F
Excessive and / or Erratic Pedal Travel	G
Brake Warning Lamp On	H
Front Brakes Drag	I

(Continued)

2 Turning rotors is not a chargeable warranty claim except with prior approval of Ford Parts and Service Division.

DIAGNOSIS AND TESTING (Continued)

DIAGNOSIS INDEX (Cont'd)

Description	Pinpoint Test
Vacuum Brake Booster Diagnosis	
Excessive Brake Pedal Effort or Vacuum Leaks	J
Vacuum Brake Booster Noise	K
Slow or Incomplete Brake Pedal Return	L

TH5165C

PINPOINT TEST A: VIBRATION WHEN BRAKES ARE APPLIED

TEST STEP		RESULT ▶	ACTION TO TAKE
A1	VERIFY CONDITION		
	• Road test vehicle without applying brakes 40-80 km/h (25-50 mph). • **Is a vibration present?**	No ▶ Yes ▶	GO to **A2.** REFER to Section 00-04 to service this condition first. REPEAT Step.
A2	REAR BRAKE VIBRATION		
	• Road test vehicle with medium application on the parking brake only. NOTE: With manual release parking brake control, hold the parking brake release in release position during parking brake application. • **Was a vibration present?**	No ▶ Yes ▶	GO to **A3.** CHECK rear discs for excessive wear or runout. REFER to Section 06-04 for rear disc brake procedures.
A3	FRONT BRAKE VIBRATION		
	• Road test vehicle with light and medium application on the pedal. • **Was a vibration present?**	No ▶ Yes ▶	Vehicle OK. CHECK front rotors for excessive runout or cracks. REFER to Section 06-03 for disc brake rotor procedures. REPEAT Step **A3.**

TH7813B

PINPOINT TEST B:
MASTER CYLINDER DIAGNOSIS
PEDAL GOES DOWN FAST

TEST STEP		RESULT ▶	ACTION TO TAKE
B1	VERIFY CONDITION		
	• Road test vehicle and depress brake pedal. • **Was pedal effort normal?**	Yes ▶ No ▶	Vehicle OK. GO to **B2.**
B2	BRAKE FLUID LEVEL		
	• Check master cylinder brake fluid reservoir level. • **Is fluid level acceptable?**	Yes ▶ No ▶	GO to **B3.** CHECK reservoir sealing points (use Diagnostic Technique No. 3), ADD fluid and BLEED system. REPEAT Test **B1.**
B3	PRESSURIZE SYSTEM		
	• Pump brake pedal rapidly (five times).	Pedal height builds up, then sinks ▶ Pedal height builds up and holds ▶	GO to **B4.** CHECK rear brake adjustment and ADJUST if necessary. If condition still exists, BLEED system for air. REPEAT Test **B1.**

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B: MASTER CYLINDER DIAGNOSIS PEDAL GOES DOWN FAST (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
B4	BRAKE SYSTEM LEAKS		
	• Check for external brake system leaks (use Diagnostic Technique No. 1). • **Any leaks found?**	No ▶ Yes ▶	GO to **B5.** SERVICE as necessary, ADD fluid and BLEED system. REPEAT Test **B1.**
B5	MASTER CYLINDER BYPASS TEST		
	• Test for master cylinder bypass (use Diagnostic Technique No. 2). • **Was a problem found?**	No ▶ Yes ▶	System OK. REPLACE damaged parts, ADD fluid and BLEED system. REPEAT Test **B1.**

TH4843B

PINPOINT TEST C: MASTER CYLINDER DIAGNOSIS PEDAL EASES DOWN SLOWLY

TEST STEP		RESULT ▶	ACTION TO TAKE
C1	VERIFY CONDITION		
	• Check if condition occurs during actual stopping application by depressing the brake pedal while the vehicle is moving.	Condition occurs only when vehicle is stationary ▶ Condition occurs while vehicle is moving and braking performance is affected ▶	No action required. (SEE Normal Condition No. 1) GO to **C2.**
C2	BRAKE SYSTEM LEAKS		
	• Check for external brake system leaks. (Refer to Diagnostic Technique No. 1) • **Were any leaks found?**	No ▶ Yes ▶	GO to **C3.** SERVICE as necessary. ADD fluid and BLEED system. REPEAT Test **C1.**
C3	MASTER CYLINDER BYPASS TEST		
	• Test for master cylinder bypass. (Refer to Diagnostic Technique No. 2) • **Was a problem found?**	No ▶ Yes ▶	System OK. REPLACE damaged parts, ADD fluid and BLEED system. REPEAT Test **C1.**

TH4844B

PINPOINT TEST D: MASTER CYLINDER DIAGNOSIS PEDAL IS LOW AND/OR FEELS SPONGY

TEST STEP		RESULT ▶	ACTION TO TAKE
D0	VERIFY CONDITION		
	• Road test vehicle and apply brake pedal. • **Was pedal effort normal?**	Yes ▶ No ▶	Vehicle OK. GO to **D1.**
D1	BRAKE FLUID LEVEL CHECK		
	• Check master cylinder brake fluid reservoir level. • **Is fluid level acceptable?**	Yes ▶ No ▶	GO to **D2.** CHECK reservoir sealing points. (USE Diagnostic Technique No. 3). ADD fluid and BLEED system.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST D: MASTER CYLINDER DIAGNOSIS PEDAL IS LOW AND/OR FEELS SPONGY (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
D2	FILLER CAP VENT CHECK		
	• Check if filler cap vent holes are clogged or dirty. • **Was a concern found?**	No ▶ Yes ▶	GO to D3. CLEAN as necessary. REPEAT Test D0.
D3	BLEED BRAKE SYSTEM		
	• Bleed brake system as described in this section. • **Is condition still present?**	No ▶ Yes ▶	Vehicle OK. GO to D4.
D4	FRONT HUB NUT CHECK		
	• Check front wheel hub nut for looseness (Refer to Section 04-01). • **Was hub nut loose?**	No ▶ Yes ▶	CHECK rear brake adjustment and ADJUST if necessary. REPEAT Test D0. REPLACE with new nut and stake. **Do not reuse the nut.** REPEAT Test D0.

TH4003C

PINPOINT TEST E: MASTER CYLINDER DIAGNOSIS—PEDAL EFFORT EXCESSIVE

TEST STEP		RESULT ▶	ACTION TO TAKE
E1	VERIFY CONDITION		
	• Depress brake pedal fully several times.	Pedal is good ▶ Pedal has long stroke and requires excessive effort ▶	Vehicle OK. GO to E2.
E2	BRAKE PEDAL LINKAGE TEST		
	• Detach booster push rod from pedal pin and depress brake pedal fully. • **Did pedal move freely?**	Yes ▶ No ▶	CHECK booster vacuum availability as described under Vacuum Booster Diagnosis in this Section. SERVICE or REPLACE brake pedal linkage. REPEAT Test E1.

TH6375B

PINPOINT TEST F: MASTER CYLINDER DIAGNOSIS— REAR BRAKE LOCKUP DURING LIGHT BRAKE PEDAL FORCE

TEST STEP		RESULT ▶	ACTION TO TAKE
F1	VERIFY CONDITION		
	• Road test vehicle and apply brakes lightly. • **Do brakes lockup?**	No ▶ RH rear lockup ▶ LH rear lockup ▶ Both lockup ▶	Vehicle OK. GO to F4. GO to F5. PERFORM Tests F4and F5.
F2	TIRE INSPECTION		
	• Check for excessive tire wear or improper tire pressures. • **Are tires good?**	Yes ▶ No ▶	GO to F3. SUBSTITUTE known good tires if worn. INFLATE to proper pressure. REPEAT Test F1.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST F:
MASTER CYLINDER DIAGNOSIS—
REAR BRAKE LOCKUP DURING LIGHT BRAKE PEDAL FORCE (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
F3	BRAKE PAD INSPECTION		
	• Inspect brake pads for grease or fluid on linings and/or wear concerns. • **Are there concerns?**	Yes ▶ No ▶	GO to **F4.** REPLACE if necessary. REPEAT Test **F1.**
F4	PRESSURE CONTROL VALVE TEST—RH REAR		
	• Install pressure gauges in the LH front and RH rear bleeder screws. Apply 6895 kPa (1000 psi) in front brake system. The rear brake pressure must be between 4692-5164 kPa (680-750 psi). • **Is rear brake pressure between 4692-5164 kPa (680-750 psi)?**	Yes ▶ No ▶	INSPECT parking brake and ADJUST as required. REPLACE RH rear valve.
F5	PRESSURE CONTROL VALVE TEST—LH REAR		
	• Install pressure gauges in RH front and LH rear bleeder screws. Apply 6895 kPa (1000 psi) in front brake system. The rear brake pressure must be between 3964-4343 kPa (575-630 psi). • **Is rear brake pressure between 3964-4343 kPa (575-630 psi)?**	Yes ▶ No ▶	INSPECT parking brake and ADJUST as required. REPLACE LH rear valve.

TH6376B

PINPOINT TEST G:
MASTER CYLINDER DIAGNOSIS—
EXCESSIVE AND/OR ERRATIC PEDAL TRAVEL

TEST STEP		RESULT ▶	ACTION TO TAKE
G1	ROUGH ROAD TEST		
	• Road test vehicle under rough road conditions. Apply brakes slowly. • **Are brakes good?**	Yes ▶ No ▶	Vehicle OK. GO to **G2.**
G2	WHEEL BEARING CHECK		
	• Check for loose wheel bearings. • **Are wheel bearings loose?**	No ▶ Yes ▶	CHECK rotor for thickness variances. (REFER to Section 06-03 for front disc overhaul procedures). REPLACE wheel bearing if damaged. TIGHTEN wheel bearing assembly to specification. REPEAT Test **G1.**

TH6377B

PINPOINT TEST H:
MASTER CYLINDER DIAGNOSIS—
BRAKE WARNING LAMP ON

TEST STEP		RESULT ▶	ACTION TO TAKE
H1	BRAKE FLUID LEVEL		
	• Check master cylinder brake fluid reservoir level. • **Is fluid level good?**	Yes ▶ No ▶	GO to **H3.** GO to **H2.**
H2	BRAKE SYSTEM LEAKAGE		
	• Check reservoir sealing points and external brake system for leakage. (Refer to Diagnostic Techniques No. 1 and 3). • **Does system leak?**	No ▶ Yes ▶	FILL reservoir. GO to **H3.** SERVICE as necessary, ADD fluid and BLEED system.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST H: MASTER CYLINDER DIAGNOSIS— BRAKE WARNING LAMP ON (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
H3	IGNITION WIRING CHECK		
	• Check that ignition wiring is not within a 50.8mm (2-inches) radius of the reed switch Fluid Level Indicator (FLI) assembly. • **Is ignition wiring good?**	Yes ▶ No ▶	GO to H4. REROUTE wiring as necessary.
H4	FLOAT ASSEMBLY CHECK		
	• Check is float is stuck of if magnet is dislodged from float. • **Is float functional?**	Yes ▶ No ▶	CHECK if ignition prove out circuit is working properly. REPLACE reservoir assembly.

TH4849C

PINPOINT TEST I: MASTER CYLINDER DIAGNOSIS FRONT BRAKES DRAG

TEST STEP		RESULT ▶	ACTION TO TAKE
I1	VERIFY CONDITION		
	• Road test vehicle and apply brakes. • **Are brakes functional?**	Yes ▶ No ▶ No ▶	Vehicle OK. INSPECT fluid control valve for contamination. (REFER to Fluid Control Valve Assembly procedure in this section). REPEAT I1. CHECK vacuum booster push rod adjustment. REPEAT I1.

TH6378B

PINPOINT TEST J: EXCESSIVE BRAKE PEDAL EFFORT OR VACUUM LEAKS

TEST STEP		RESULT ▶	ACTION TO TAKE
J1	VERIFY CONDITION		
	• With engine off, depress and release brake pedal five times to deplete all vacuum from booster. Depress pedal, hold with light pressure. Start engine.	Pedal falls slightly, then holds ▶ Pedal does not hold ▶	GO to J2. GO to J4.
J2	VACUUM BOOSTER LEAK TEST		
	• Run engine to medium speed, release accelerator and turn engine off. Wait 90 seconds and apply brakes. Two or more applications should be power assisted. • **Does vacuum booster work?**	Yes ▶ No ▶	Vehicle OK. GO to J3.
J3	POWER SECTION CHECK VALVE TEST		
	• Disconnect vacuum hose for booster check valve at manifold. Blow into hose attached to check valve. • **Does air pass through valve?**	Yes ▶ No ▶	INSTALL new check valve and REPEAT Step J2. REPLACE booster. REPEAT Step J1.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST J: EXCESSIVE BRAKE PEDAL EFFORT OR VACUUM LEAKS (Continued)

TEST STEP		RESULT	ACTION TO TAKE
J4	POWER SECTION TEST		
	• Disconnect vacuum hose from booster vacuum check valve. Run engine at idle. Check vacuum supply with a vacuum gauge.	Above 40.5 kPa (12 in-Hg) and booster does not operate	REPLACE booster. REPEAT Step **J1.**
		Below 40.5 kPa (12 in-Hg)	SERVICE or REPLACE vacuum hose and vacuum fittings. Also TUNE or SERVICE engine as required. REPEAT Step **J1.**

TH7820A

PINPOINT TEST K: VACUUM BRAKE BOOSTER NOISE

TEST STEP		RESULT	ACTION TO TAKE
K1	VERIFY CONDITION		
	• Run engine at fast idle for 10 seconds or longer. Depress brake pedal and listen for noise. Compare results with known good system. • **Was a noise present?**	No	Vehicle OK.
		Yes	GO to **K2.**
K2	PUSH ROD ADJUSTMENT		
	• Check and adjust booster push rod. • **Is push rod adjustment OK?**	Yes	BLEED brake system.
		No	REPLACE booster. REPEAT Step **K1.**

TH7814A

PINPOINT TEST L: SLOW OR INCOMPLETE BRAKE PEDAL RETURN

TEST STEP		RESULT	ACTION TO TAKE
L1	VERIFY CONDITION		
	• Run engine at fast idle while making several brake applications. Pull brake pedal rearward with approximately 44.5 N (10 lbs) force. Release the pedal and measure the distance to the toe board. Make a heavy brake application. Release the brake pedal and measure the pedal to toe board distance. The pedal should return to its original position. • **Did pedal return to original position?**	Yes	Vehicle OK.
		No	GO to **L2.**
L2	BRAKE PEDAL BINDING		
	• Check pedal to be sure it is operating freely. • **Is the pedal operating freely?**	Yes	REPLACE booster.
		No	CORRECT any sticking or binding. REPEAT **L2.**

TH7811A

CLEANING AND INSPECTION

Service Precautions

1. Grease or any other foreign material must be kept off lining surfaces and braking surfaces of rotor, and external surfaces of hub during service operation. In handling the rotor and caliper assemblies, avoid deformation of brake rotor and nicking or scratching of brake linings.

   CAUTION: Do not pry on plastic piston with a screwdriver or other tools, as this will cause chipping.

2. If a caliper piston is removed for any reason, piston seal must be replaced. Exercise care not to damage plastic piston by protecting it from contact with any metal or sharp objects.
3. During removal and installation of a wheel assembly, exercise care not to interfere with and damage splash shield or bleeder screw fitting.
4. Ensure vehicle is centered on the hoist before servicing any front end components to avoid bending or damaging splash shield on full right or left wheel turns.

CLEANING AND INSPECTION (Continued)

5. Do not attempt to clean or restore oil or grease-soaked brake linings. When contaminated linings are found, brake linings must be replaced in complete axle sets and the rotor braking surfaces wiped clean.
6. Calipers must be installed with bleed screws in upward position for proper bleeding of air from brake system.
7. Always replace rubber caliper pin insulators when replacing linings.

Disc Brakes

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Remove wheel and tire from hub and rotor.
3. Inspect brake shoes and lining for wear. If the lining is worn to within 3mm (1/8-inch) of the shoe, replace all four shoe and lining assemblies (complete axle set) on front or rear wheels as required.
4. Visually check caliper. If caliper housing is leaking, it should be replaced. If a seal is leaking, caliper must be disassembled and new seals installed. If a piston is seized in bore, a new caliper housing is required. Care should be taken not to dent, scratch or chip the plastic piston.
5. Lower vehicle.

   Refer to Section 06-03 for disc brake rotor service procedure.

Drum Brakes

Tools Required:

- Rotunda Brake Vacuum 091-00001 or Rotunda Brake Parts Washer 065-00016
- Rotunda Brake Drum Micrometer 010-00010

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Remove wheel and tire assembly from spindle.
3. Remove drum assembly from spindle. Use an industrial vacuum cleaner such as Rotunda Brake Vacuum 091-00001 or Rotunda Brake Parts Washer 065-00016 or equivalent, to remove all dust from backing plates and interior of the brake drums.
4. Inspect brake shoes for excessive lining wear or shoe damage. If lining is damaged or worn within 0.794mm (1/32-inch) of the rivet heads on riveted linings or within 1.524mm (0.060-inch) of the shoe on bonded linings, they must be replaced. Replace any lining that has been contaminated with oil, grease or brake fluid. Replace lining in axle sets. Prior to replacement of lining, drum diameter should be checked using Rotunda Brake Drum Micrometer 010-00010 or equivalent to determine that brake drum braking surface diameter is within specification. If braking surface diameter exceeds specification, drum must be replaced.
5. Check condition of brake shoes, retracting spring, hold-down springs, and drum for signs of overheating. If shoes have a slight blue coloring, indicating overheating, retracting and hold-down springs should be replaced. **Overheated springs lose their pull and could cause new lining to wear prematurely, if not replaced. If brake drums are heat spotted, indicating an overheated condition, they should be replaced.**
6. Lower vehicle.
7. Refer to Section 04-02 for hub and drum installation and bearing adjustment procedure.

Brake Booster

Check booster operation as noted under Power Brake Functional Test. If brake booster is damaged or inoperative, replace it with a new booster. **The brake booster is serviced only as an assembly, including the check valve.**

Hydraulic Lines

Double wall steel tubing is used throughout the brake system with the exception of the flexible hoses at the front and rear wheels.

Always bleed the applicable primary or secondary brake system after primary or secondary brake system hose or line replacement.

When connecting a tube to a hose, tube connector or brake cylinder, tighten the tube fitting nut to specification.

Brake Tubing

Tools Required:

- Brake Line Flaring Tool D81L-2268-A
- Lb-In Torque Wrench D81L-600-A

WARNING: COPPER TUBING SHOULD NOT BE USED IN A HYDRAULIC SYSTEM.

CLEANING AND INSPECTION (Continued)

Certain brake tube bundles are serviced as complete assemblies. If not serviced, the following service procedure should be used:

1. Obtain the recommended bulk 3/16-inch double wall steel brake tubing and the correct standard tube nuts for 3/16-inch tubing.
2. Cut tubing to length required. Clean burrs after cutting. The correct length may be obtained by measuring the removed tube with a string and adding 1.2mm (1/8 inch) for each flare.
3. Place tube nut onto tube into correct direction and flare the end of the tube with an SAE inverted flare or the metric ISO flare as required, using Brake Line Flaring Tool D81L-2268-A, or equivalent.
4. Repeat on the opposite end of the tube.
5. Bend the replacement tube to match the removed tube using a tubing bender. When the replacement brake tube is installed, maintain adequate clearance to metal edges, and moving or vibrating parts.
6. Install brake tube and torque tube nuts to 16-20 N·m (142-177 lb-in) with Lb-Inch Torque Wrench D81L-600-A, or equivalent.
7. Bleed the serviced primary or secondary circuit.

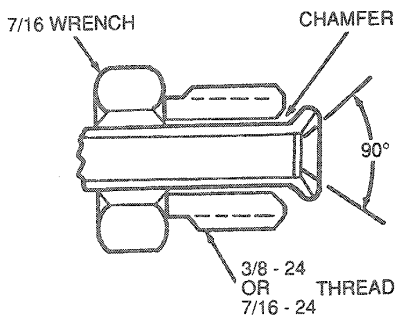
If either end of the Tube to Tube Connection requires replacement, replace both ends with the SAE double 45 degree union connection.

All brake tubing should be flared properly to provide good leakproof connections. Clean brake tubing by flushing with clean brake fluid before installation.

When connecting a tube to a hose, tube connector, or brake cylinder, tighten the tube fitting nut to specification with Lb-In Torque Wrench D81L-600-A or equivalent.

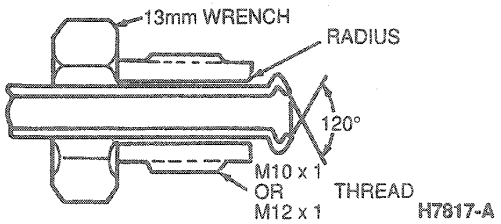
Commonly used types of brake line flared connection:

1. SAE double 45 degree flare.



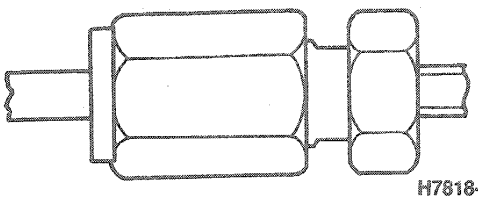
H7816-A

2. ISO Metric flare.

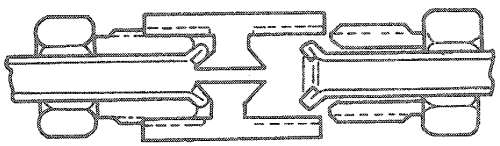


H7817-A

3. Tube to tube connection.


H7818-A

4. SAE double 45 Union (repair).


H7819-A

Brake Hose

A flexible brake hose should be replaced if it shows signs of softening, cracking or other damage.

When installing a new front brake hose, two new sealing washers should be used. Positioning of the front hose is controlled by a self-indexing brass block. When attaching brake hose connection to caliper, tighten bolt to 41-54 N·m (30-40 lb-ft). Attach intermediate bracket to shock strut and tighten screw. Engage the opposite end of hose to bracket on the body. Install the horseshoe-type retaining clip and connect tube to hose with tube nut. Inspect position of installed hose for clearance to other chassis components.

Positioning of rear brake hose is controlled by self-indexing end fittings.

Engage either end of hose to the bracket on the body. Install the horseshoe-type retaining clip and connect tube to hose with the tube fitting nut. Engage opposite end of hose to bracket on rear spindle. Install the horseshoe-type retaining clip and connect tube to hose with tube fitting nut.

Inspect position of installed hose for contact with other chassis parts.

SPECIFICATIONS

TORQUE SPECIFICATIONS

Description	N·m	Lb-Ft
Front Hub Nut	244-271	180-200
Brake Hose Connection to Caliper	41-54	30-40
Torque On Front Wheels	101	75
Hydraulic Tube Connections	16-20	142-177 (Lb-In)

ROTUNDA EQUIPMENT

Model	Description
021-00001	Brake Pedal Effort Gauge
010-00010	Brake Drum Micrometer
091-00001	Brake Vacuum
065-00016	Brake Parts Washer

SPECIAL SERVICE TOOLS

Tool Number	Description
D81L-600-A	Lb-In Torque Wrench
D81L-2269-A	Brake Line Flaring Tool

SECTION 06-02 Brakes, Rear Drum

SUBJECT	PAGE
ADJUSTMENTS	
Brake Shoes	06-02-9
CLEANING AND INSPECTION	06-02-7
DESCRIPTION	
Brake System, Drum	06-02-1
OVERHAUL	
Brake Drum Refinishing	06-02-7
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Wheel Cylinders	06-02-8
REMOVAL AND INSTALLATION	
Bearing Hub Unit Assembly	06-02-3
Brake Backing Plate	06-02-7
Brake Drums	06-02-3
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SPECIAL SERVICE TOOLS	06-02-10
SPECIFICATIONS	06-02-10
VEHICLE APPLICATION	06-02-1

VEHICLE APPLICATION

Taurus / Sable.

DESCRIPTION

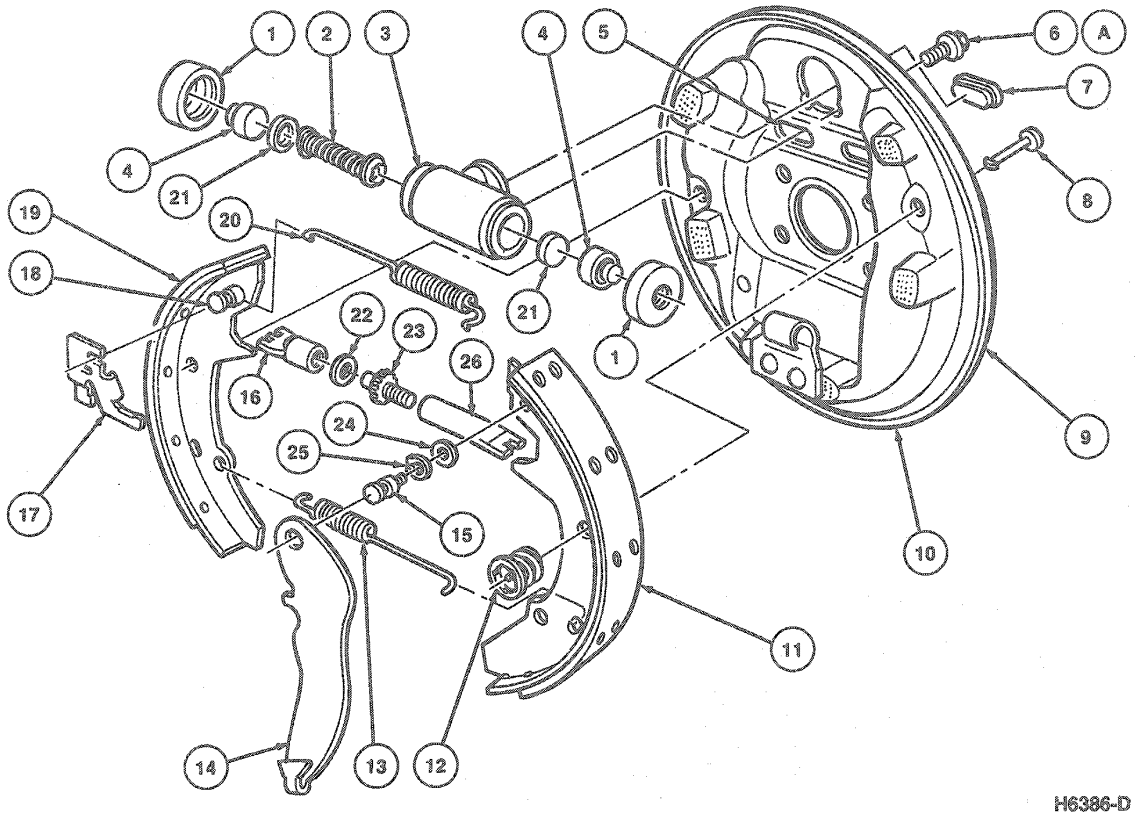
WARNING: BRAKE FLUID CONTAINS POLYGLYCOL ETHERS AND POLYGLYCOLS. AVOID CONTACT WITH EYES. WASH HANDS THOROUGHLY AFTER HANDLING. IF BRAKE FLUID CONTACTS EYES, FLUSH EYES WITH RUNNING WATER FOR 15 MINUTES. GET MEDICAL ATTENTION IF IRRITATION PERSISTS. IF TAKEN INTERNALLY, DRINK WATER AND INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.

Brake System, Drum

Rear drum brakes are non-servo, leading-trailing shoe design. Two different rear brake assemblies are used. Taurus / Sable sedan models use a 225mm (8.85 inch) diameter brake assembly.

Taurus / Sable wagon models use a 250mm (9.84 inch) diameter brake assembly. The automatic adjustment of the 250mm and 225mm (9.84 and 8.85 inch) drum assemblies use an incremental adjuster that adjusts during braking whenever a wear gap appears sufficient to actuate the adjuster wheel. Brake adjustment occurs in forward and rearward braking.

DESCRIPTION (Continued)



H6386-D

Item	Part Number	Description
1	—	Boot (Part of 2261)
2	—	Spring Expander (Part of 2261)
3	2261	Wheel Cylinder
4	—	Piston and Insert (Part of 2261)
5	—	Shoe Adjustment Access Hole
6A	N801327	Wheel Cylinder Retaining Screw (2 Req'd)
7	2092	Access Hole Cover
8	2L265	Shoe Hold-Down Pin
9	2212 (LH) 2211 (RH)	Backing Plate Assy
10	2209 (RH) 2210 (LH)	Complete Brake Assy
11	2200	Trailing Shoe and Lining
12	2068	Shoe Hold-Down Spring Assy
13	2035	Lower Retracting Spring

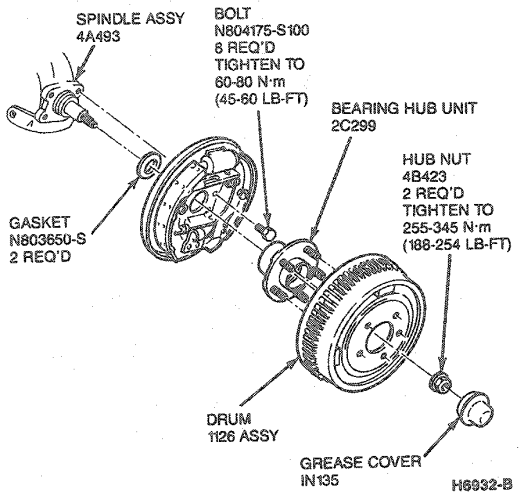
(Continued)

Item	Part Number	Description
14	2A637 (RH) 2A638 (LH)	Parking Brake Lever
15	2107	Parking Brake Lever Pin
16	2048	Adjuster Socket
17	2A177 (LH) 2A176 (RH)	Adjuster Lever
18	2107	Parking Brake Lever Pin
19	2W023 (RH) 2W024 (LH)	Leading Shoe and Lining
20	2049	Adjusting Screw Retracting Spring
21	—	Cup (Part of 2261)
22	384373-S	Washer
23	—	Adjusting Screw (Part of 2261)
24	356297-S2	Washer
25	2106	Parking Lever Retaining Clip
26	—	Adjusting Pivot Nut (Part of 2048)
A		Tighten to 12-18 N·m (106-159 Lb-in)

TH6386D

DESCRIPTION (Continued)

The rear drums are attached to the rear axle spindle by a bearing hub unit with push nuts. Wheel studs are located in the bearing hub unit for retaining the rear wheels. The wheel studs and lug nuts are metric (12mm).



REMOVAL AND INSTALLATION

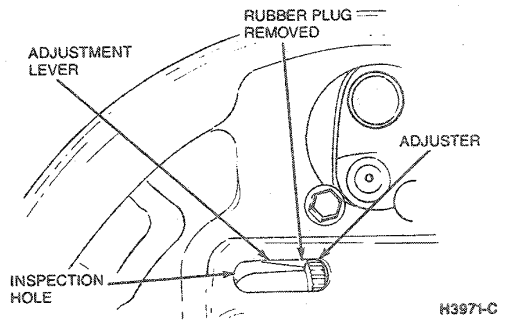
Brake Drums

Removal

1. Raise vehicle on a hoist. Refer to Section 00-02.
2. Remove wheel ornament (wheelcover) and nut covers as required.
3. Remove tire and wheel assembly. Refer to Section 04-04.
4. Remove the two drum retaining nuts.

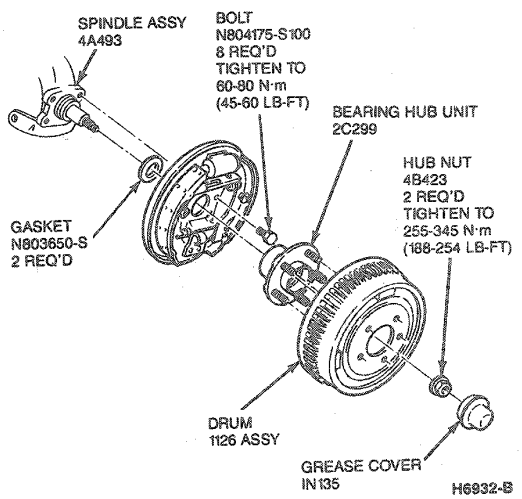
   NOTE: If the drum assembly will not come off for brake service, pry rubber plug from backing plate inspection hole and use the following procedure:

On 225mm and 250mm (8.85 inch and 9.84 inch) brakes, remove the brake line-to-axle retention bracket. This will allow sufficient room for insertion of a screwdriver and brake tools to disengage adjusting lever and back-off the adjusting screw.



Installation

1. Install drum assembly on bearing hub.
2. Install tire and wheel assembly. Refer to Section 04-04.
3. Install wheel ornament (wheelcover) and nut covers as required.
4. Lower vehicle.



Bearing Hub Unit Assembly

Removal

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Remove tire and wheel assembly. Refer to Section 04-04.
3. Remove drum assembly.
4. Remove grease cap and discard.
5. Remove bearing hub nut.
6. Remove bearing hub unit from spindle.

Installation

NOTE: Bearing hub unit is lubricated for life.

REMOVAL AND INSTALLATION (Continued)

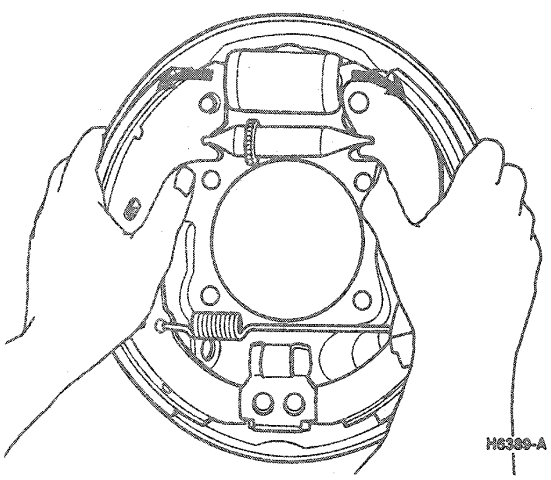
1. Position bearing hub unit assembly on spindle.
2. Install hub nut and tighten to 255-345 N·m (188-254 lb-ft).
3. Install new grease cap using a 1 7/8 inch x 3/4 inch drive socket.
4. Install drum.
5. Install tire and wheel assembly. Install wheel cover. Refer to Section 04-04.
6. Lower vehicle.

Brake Shoes

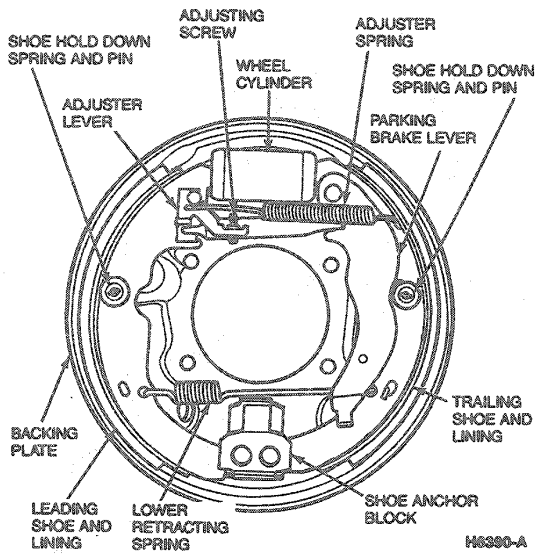
225mm and 250mm (8.85 inch and 9.84 inch)

Removal

1. Raise vehicle on a hoist. Refer to Section 00-02.
2. Remove wheel, tire, hub and drum assembly. Refer to Section 04-02.
3. Remove parking brake cable from parking brake lever.
4. Remove two shoe hold-down springs and pins.
5. Lift brake shoes, springs, and adjuster assembly off backing plate and wheel cylinder assembly. Be careful not to bend adjusting lever during assembly removal.



6. Remove retracting springs from lower brake shoe attachments and upper shoe-to-adjusting lever attachment points. This will separate brake shoes and disengage adjuster mechanism.



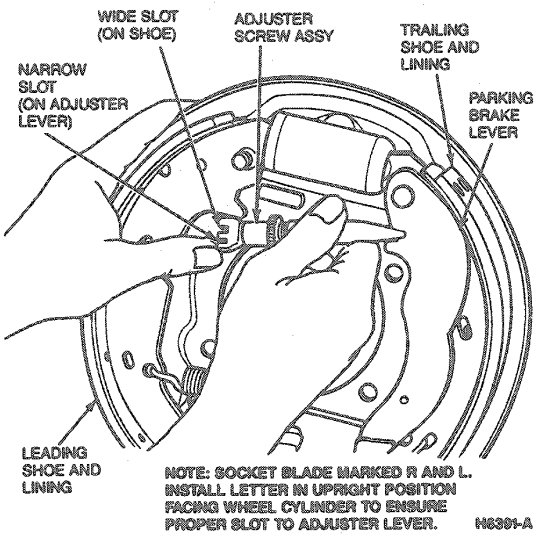
7. Remove horseshoe retaining clip and spring washer and remove from trailing shoe.

Installation

1. Apply a light coating of Disc Brake Caliper Slide Grease D7AZ-19590-A (ESA-M1C172-A) or equivalent to backing plate brake shoe contact areas.
2. Apply a light coat of Premium Long-Life Grease XG-1-C (ESA-M1C75-B) or equivalent to threaded areas of adjuster screw and socket. Assembly brake adjuster with stainless steel washer. Turn socket all the way down on screw, then back off one half turn.
3. Install parking brake lever to trailing shoe with spring washer and new retaining clip. Crimp clip to securely retain lever.
4. Position trailing shoe or backing plate and attach hand brake cable.
5. Position leading shoe on backing plate and attach lower retracting spring to brake shoes.

REMOVAL AND INSTALLATION (Continued)

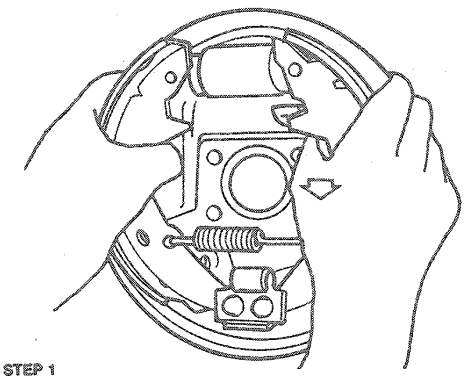
6. Install adjuster assembly to slots in brake shoes. Socket end must fit into slot in leading shoe (wider slot). Slot in adjuster nut must fit into slots in trailing shoe and parking brake lever.



7. Install adjuster lever on pin on leading shoe and to slot in adjuster socket.
8. Install upper retracting spring in slot on trailing shoe and slot in adjuster lever. Adjuster lever should contact star and adjuster assembly.
9. Install brake shoe anchor pins, springs and retainers. Remove Brake Cylinder Clamp D81L-1103-B or equivalent.

REMOVAL AND INSTALLATION (Continued)

10. Install brake drum as outlined.

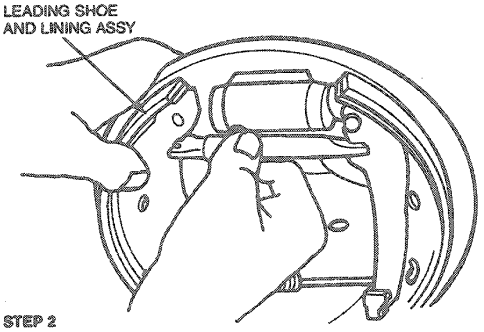


STEP 1

A. ASSEMBLE PARKING BRAKE CABLE TO TRAILING SHOE AND PARKING BRAKE LEVER

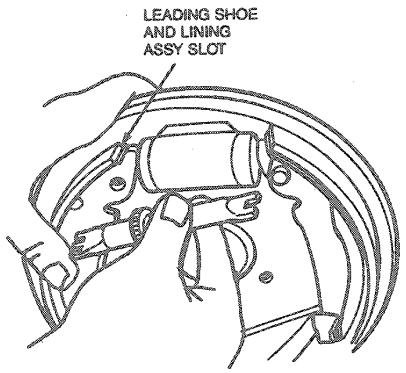
B. INSTALL LOWER RETRACTING SPRING TO LEADING-TRAILING SHOES

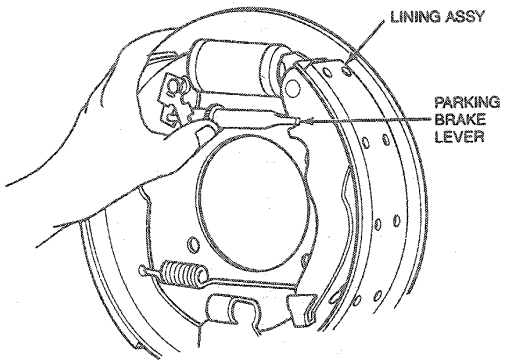
C. INSTALL THIS ASSY TO BACKING PLATE FITTING SHOES INTO THE WHEEL CYLINDER PISTON SLOTS.



STEP 2

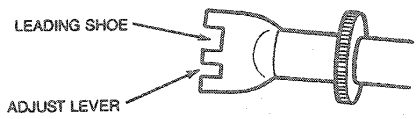
INSTALL ADJUSTER SOCKET TO LEADING SHOE AND LINING ASSY.



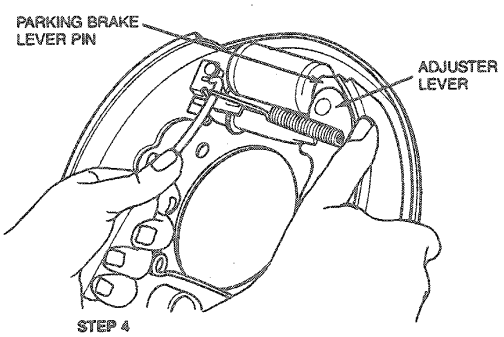


STEP 3

INSTALL ADJUSTER SCREW ASSY



NOTE: SOCKET BLADE MARKED R AND L INSTALL LETTER IN UPRIGHT POSITION TO ENSURE PROPER SLOT ENGAGEMENT TO PARKING BRAKE LEVER.



STEP 4

INSTALL THE ADJUSTER LEVER IN GROOVE OF ADJUSTER PIN ON LEADING SHOE.

STEP 5

A. INSTALL SHOE HOLD-DOWN SPRINGS AND PINS.

B. INSTALL UPPER RETRACTING SPRING TO TRAILING SHOE SLOT. STRETCH SPRING TO INSTALL TO LEADING SHOE. IF ADJUSTER LEVER DOES NOT CONTACT STAR WHEEL AFTER SPRING INSTALLATION CHECK ADJUSTER SOCKET INSTALLATION.

H6392-A

Wheel Cylinder

Removal

1. Remove wheel / tire and drum assemblies as outlined.
2. Remove brake shoe assembly as outlined.
3. Disconnect brake tube from wheel cylinder.

   NOTE: Use caution to prevent brake fluid from contacting brake linings or they must be replaced.

REMOVAL AND INSTALLATION (Continued)

4. Remove wheel cylinder retaining bolts and remove wheel cylinder.

Installation

Wipe the end(s) of the hydraulic line to remove any foreign matter before making connections.

1. Position wheel cylinder on backing plate and finger-tighten brake tube to cylinder.
2. Secure cylinder to backing plate by installing retaining bolts. Tighten bolts to 10-14 N·m (8-10 lb-ft).
3. Install tube nut fitting (using a tube nut wrench).
4. Install and adjust brakes as outlined.
5. Install drum and wheel / tire assembly. Refer to Section 04-02.
6. Bleed brake system before driving vehicle.

Brake Backing Plate

Removal

1. Remove wheel / tire assembly. Refer to Section 04-04.
2. Remove brake drum as outlined.
3. Remove and discard grease cap and retaining nut. Remove bearing hub unit from spindle.
4. Disconnect brake line from brake cylinder.
5. Remove brake shoes, adjuster assemblies, wheel cylinder and parking brake cable from backing plate.
6. Remove bolts retaining backing plate to spindle. Discard bolts.
7. Remove backing plate and foam gasket.

Installation

1. Install new foam gasket on spindle.
2. Install backing plate with new adhesive coated retaining bolts.
3. Install wheel cylinder and connect brake line as outlined.
4. Install brake shoes and adjuster assemblies. Insert parking brake cable through backing plate. Prongs must be securely locked in place. Connect parking brake cable to lever.
5. Install bearing and hub unit on spindle. Install nut and tighten to 255-345 N·m (188-254 lb-ft).
6. Install new grease cover using a 1-7 / 8 inch x 3 / 4 inch drive socket.

   Adjust brake shoes and install brake drum and wheels. Bleed brake system. Refer to Section 06-00.

   NOTE: Whenever rear brake linings are removed, the parking brake cable tension should be checked. Refer to Section 06-05 and adjust as required.

CLEANING AND INSPECTION

Tools Required:

- Rotunda Brake and Clutch Service Vacuum 091-00001

1. Use an industrial vacuum cleaner such as Rotunda Brake and Clutch Service Vacuum 091-00001 or equivalent to remove all dust from backing plates and interior of brake drums.
2. Inspect brake shoes for excessive lining wear or shoe damage. If lining is damaged or worn within 0.79mm (1 / 32 inch) of the rivet heads on riveted linings, it must be replaced. Replace any lining that has been contaminated with oil, grease or brake fluid. Replace lining in axle sets only. Never replace just one shoe of a brake assembly. Replace both leading and trailing shoes. Prior to replacement of lining, drum diameter should be checked to determine that brake drum diameter is within specification. If braking surface diameter exceeds specification, drum must be replaced.
3. Check condition of brake shoes, retracting spring, hold-down springs, and drum for signs of overheating. If shoes have a slight blue coloring, indicating overheating, retracting and hold-down springs should be replaced. Overheated springs lose their tension and could allow new lining to drag and wear prematurely, if not replaced.
4. Inspect all other brake parts and replace any that are worn or damaged.
5. Inspect brake drum and, if necessary, refinish. The maximum inside diameter is shown on each brake drum. If maximum inside diameter is exceeded either by wear or refinishing, drum must be replaced.

OVERHAUL

Brake Drum Refinishing

Tools Required:

- Brake Adjustment Gauge D81L-1103-A or Rotunda Brake Drum Micrometer 104-00046

Minor scores on a brake drum can be removed with sandpaper. Do not refinish drums to remove score marks. A drum surface which is highly polished can cause brake lockup or noise. This polished condition should be removed with sandpaper. A drum that is out of round sufficient to cause vehicle vibration or roughness when braking should be refinished. Remove only enough stock to true-up the drum. When brake drum maximum inside diameter shown on the drum is exceeded either through wear or refinishing, the drum must be replaced.

Check inside diameter of brake drum with Brake Adjustment Gauge D81L-1103-A, Rotunda Brake Drum Micrometer 104-00046 or equivalent.

After a drum is refinished, wipe refinished surface with a cloth soaked in clean, denatured alcohol. If one drum is refinished, the opposite drum on the same axle should also be refinished to the same diameter.

OVERHAUL (Continued)

Brake Shoe Relining

Brake linings on 225mm and 250mm (8.85 inch and 9.84 inch) brakes must be replaced if they are worn within 0.79mm (1/32 inch) of a rivet head or have been contaminated with brake fluid, grease or oil.

Failure to replace worn linings will result in a scored drum. **When it is necessary to replace linings, they must also be replaced on the wheel on the opposite side of the vehicle. Inspect brake shoes for distortion, cracks or looseness. If this condition exists, the shoe must be discarded. Do not attempt to service a damaged brake shoe. Never change only one brake shoe and lining in a brake assembly.**

1. Wash brake shoes thoroughly in clean solvent. Dry thoroughly. Remove all burrs or rough spots from shoes.
2. Position new lining on shoe. Starting in center, insert and secure rivets, working alternately towards each end. **Replacement linings are ground, and no further grinding is required.**

   NOTE: Whenever rear brake linings are removed, the parking brake cable tension should be checked. Refer to Section 06-05 and adjust as required.
3. Check clearance between shoe and lining. The lining must seat tightly against shoe with not more than 0.20mm (0.008 inch) clearance between any two rivets.

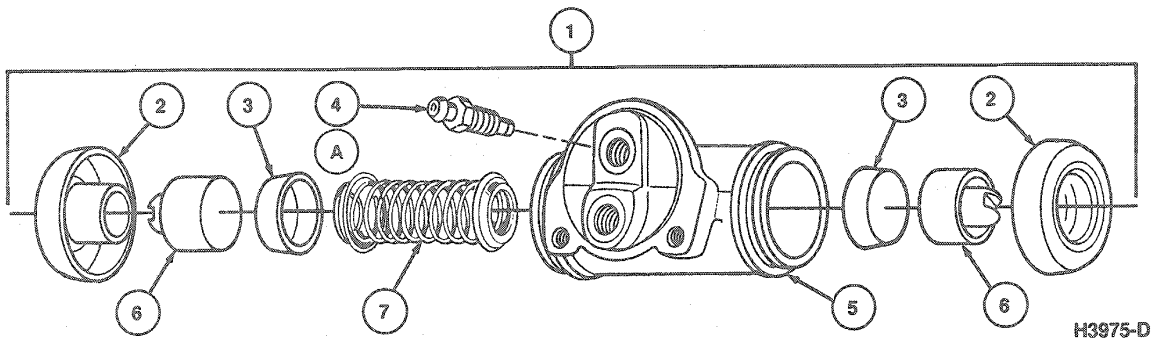
Wheel Cylinders

Wheel cylinders should not be disassembled unless they are leaking. Carefully pull lower edges of wheel cylinder boots away from cylinder, and note whether interior is wet with brake fluid. Excessive fluid at this point indicates leakage past piston cups and a need for wheel cylinder overhaul.

NOTE: A slight amount of fluid is nearly always present and acts as a lubricant for the piston. It is not necessary to remove the brake cylinder from the backing plate to disassemble, inspect, hone, and overhaul the cylinder. Removal is necessary only if the cylinder is damaged or scored beyond service.

Disassembly

1. Remove brake shoe assembly as outlined.
2. Disengage wheel cylinder boots from retaining grooves in wheel cylinder casting. Remove each boot and piston from wheel cylinder as an assembly.
3. Remove wheel cylinder rubber cups and spring and expander assemblies from wheel cylinder bore.



H3975-D

Item	Part Number	Description
1	2261	Wheel Cylinder Assy
2	—	Boot (Part of 2261)
3	—	Cup (Part of 2261)
4A	—	Wheel Cylinder Bleeder Screw (Part of 2261)
5	—	Cylinder Housing (Part of 2261)

Item	Part Number	Description
6	—	Piston (Part of 2261)
7	—	Return Spring and Cup Expander Assy (Part of 2261)
A		Tighten to 10-20 N·m (7.5-15 Lb-Ft)

TH3975D

(Continued)

4. Discard all rubber parts.

5. Remove bleeder screw from cylinder.

OVERHAUL (Continued)

6. Wash all parts in clean, denatured alcohol.
7. Inspect pistons for scratches, scoring, or other visible damage. Replace if necessary. Always replace rubber cups and dust boots.
8. Inspect cylinder bore for score marks or rust. If either condition is present, cylinder bore must be honed. However cylinder should not be honed more than 0.08mm (0.003 inch) beyond its original diameter.
9. Wash cylinder with clean, denatured alcohol after honing. Dry it with compressed air.
10. Make sure that bleeder hole is open.

Assembly

Use all parts in the wheel cylinder service kit.

1. Apply light coating of heavy-duty brake fluid to all internal parts.
2. Thread bleeder screw into cylinder.
3. Insert return spring and cup expander assembly, and pistons into their respective positions in cylinder bore. Place a boot over each end of cylinder.
4. Install brake shoe assemblies as outlined.
5. Install drum assembly and wheel assembly.
6. Bleed brake system. Refer to Section 06-00.

   NOTE: Ensure that brake line is installed in lower wheel cylinder hole and bleed screw in upper hole. Always bleed brakes before driving vehicle.

ADJUSTMENTS

Brake Shoes

Tools Required:

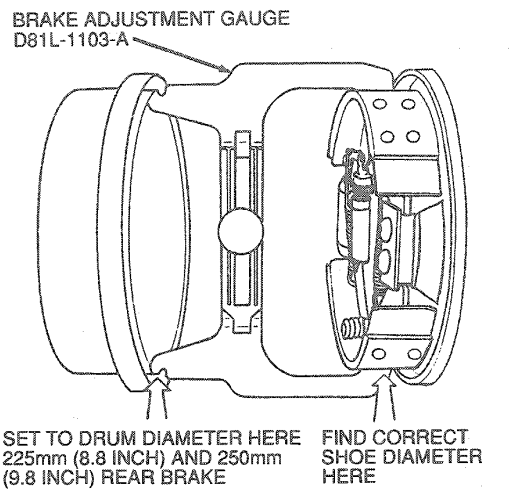
- Brake Adjustment Gauge D81L-1103-A

After any brake service work, obtain a firm brake pedal before moving the vehicle. Adjusted brakes must not drag; wheel must turn freely.

The hydraulic rear drum brakes are self-adjusting and require a manual adjustment only after the brake shoes have been relined, replaced or when the length of the adjusting screw has been changed while performing some other service operation. The manual adjustment is performed with the drum removed, using the tool and the procedure detailed below.

When adjusting the rear brake shoes, check the parking brake cables for proper adjustment. Make sure that the equalizer operates freely with the shoes centered on the backing plate.

1. Apply a small quantity of Disc Brake Caliper Slide Grease D7AZ-19590-A (ESA-M1C172-A) or equivalent to points where the shoes contact the backing plate, taking care not to get lubricant on linings.
2. Determine inside diameter of the drum braking surface using a Brake Adjustment Gauge D81L-1103-A or equivalent.



H7379-C

3. Adjust the brake shoe diameter to fit the gauge. Line the brake shoes up vertically so that the flats on the bottom of the brake shoes are aligned approximately 1.5mm (0.05 inch) above the bottom of the brake shoe abutment plate before setting the gauge diameter. Hold automatic adjusting lever out of engagement while rotating adjusting screw. If necessary lubricate. Make sure adjusting screw rotates freely.
4. Rotate brake shoe gauge around brake shoes to ensure proper setting.
5. Install drum as outlined. Install tire and wheel assembly. Refer to Section 04-04.
6. Install the wheelcover / ornament and nut covers as required.
7. Complete adjustment by applying brakes several times. Brakes should be applied with a minimum of 111N (25 lb) force.
8. After brake shoes have been properly adjusted, check operation of brakes by making several stops from varying forward speeds.

SPECIFICATIONS

BORE DIAMETERS

Vehicle	Brake Drum Diameter		Wheel Cylinder Bore Diameter	
	Inside Diameter (mm)	Boring Limit (Max. mm)[1]	Front[2]	Rear[2]
Taurus / Sable	225 and 250	1.5 on the diameter	—	25.4mm (1.00 inch)

1 Max. Runout .127mm (.005 inch)
2 Max. Allowable Hone 0.076mm (.003 inch)

REAR DRUM BRAKE LINING DIMENSIONS

Vehicle	Brake Shoe	Color Code	Brake Diameter		Lining Size	
			mm	Inches	mm	Inches
Sedan	Leading Trailing	None None	225 225	8.85 8.85	38 38	1.49 1.49
Wagon	Leading Trailing	None None	250 250	9.84 9.84	45 45	1.77 1.77

TORQUE SPECIFICATIONS

Description	N·m	Lb-Ft
Wheel Cylinder-to-Backing Plate Bolts	10-14	8-10
Rear Brake Backing Plate-to-Spindle	60-80	45-60
Wheel Cylinder Bleeder Screw	10-20	7.5-15.0
Lug Nuts	115-142	85-105
Bearing Hub Unit	255-345	188-254
Brake Tube to Cylinder	15-20	11-15

SPECIAL SERVICE TOOLS

Tool Number	Description
D81L-1103-A	Brake Adjustment Gauge

ROTUNDA EQUIPMENT

Model	Description
104-00046	Brake Drum Micrometer
091-00001	Brake and Clutch Service Vacuum

SECTION 06-03 Brakes, Front Disc

SUBJECT	PAGE
DESCRIPTION	06-03-1
OVERHAUL	
Phenolic Piston (Steel Piston For SHO and Police) and Three-Finger Inner Shoe Clip	06-03-6
Rotor Machining	06-03-8
Rotor Minimum Thickness	06-03-8
Rotor Service	06-03-8
Runout Check	06-03-9
REMOVAL AND INSTALLATION	
Brake Lining	06-03-4
Brake Rotor	06-03-5
Caliper Assembly	06-03-3
Rotor Splash Shield	06-03-5
Service Precautions	06-03-3
SPECIAL SERVICE TOOLS	06-03-10
SPECIFICATIONS	06-03-10
VEHICLE APPLICATION	06-03-1

VEHICLE APPLICATION

Taurus / Sable.

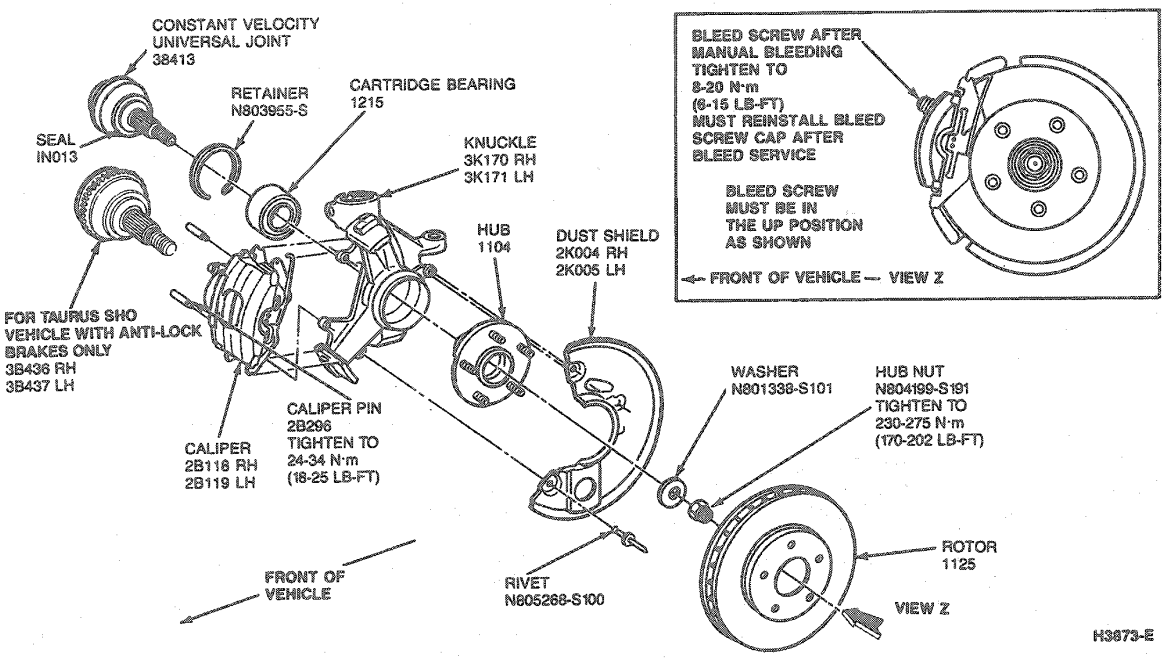
DESCRIPTION

WARNING: BRAKE FLUID CONTAINS POLYGLYCOL ETHERS AND POLYGLYCOLS. AVOID CONTACT WITH EYES. WASH HANDS THOROUGHLY AFTER HANDLING. IF BRAKE FLUID CONTACTS EYES, FLUSH EYES WITH RUNNING WATER FOR 15 MINUTES. GET MEDICAL ATTENTION IF IRRITATION PERSISTS. IF TAKEN INTERNALLY, DRINK WATER AND INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.

Front disc brakes use pin slider-type caliper assemblies with a 258mm (10.2 inch) composite rotor. The caliper has a plastic piston with a piston seal and a press-in type dust boot (Taurus SHO vehicles and police package equipped vehicles use a steel piston). The caliper is attached to the front suspension knuckle with two Torx®-head locating pins. Rubber insulators isolate the stainless steel locating pins from direct contact with the caliper.

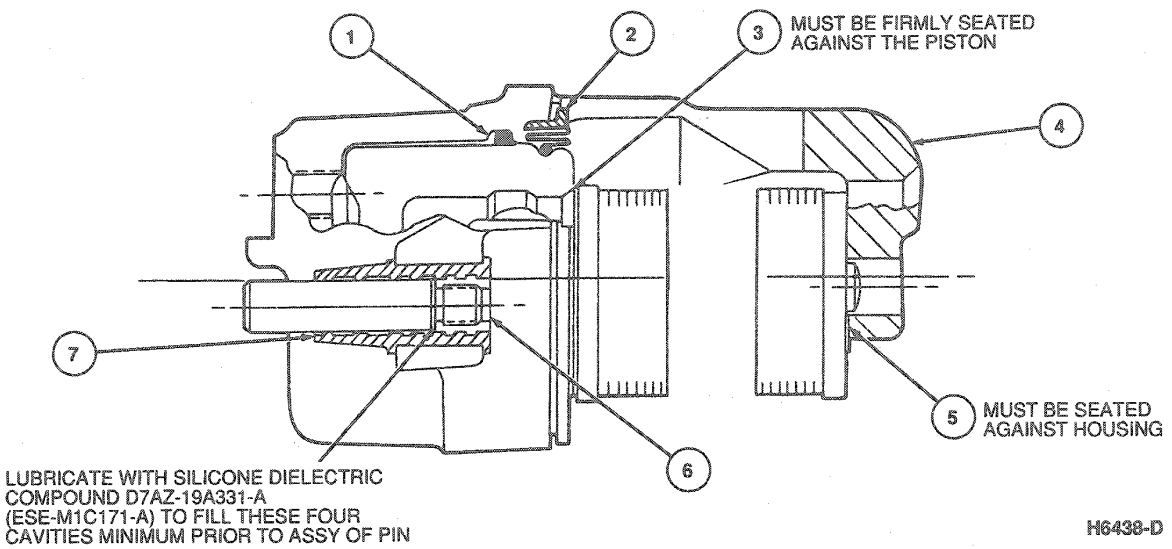
DESCRIPTION (Continued)

The vehicles are equipped with galvanized steel disc brake splash shields. The shields are attached to the front knuckle with three pop rivets per side and are not interchangeable side-to-side.



The inner shoes are interchangeable left to right and use a three-finger clip that fits inside the caliper piston. The outer shoes are not interchangeable and use a dual-purpose clip which holds the brake shoes on the caliper housing and also prevents caliper rattle. The flanges on both inner and outer shoe assemblies slide on machined surfaces of the knuckle assembly.

DESCRIPTION (Continued)



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Item	Part Number	Description
1	2B115	Piston Seal
2	2207	Dust Boot
3	2019	Inner Brake Shoe Assy (Must be Firmly Seated Against the Piston)
4	2B294 RH 2B302 LH	Caliper Housing
5	2018 RH 2C088 LH	Outer Brake Shoe Assy (Must Be Seated Against Housing)
6	2B296	Caliper Locating Pin
7	2B299	Insulator

TH6438D

(Continued)

REMOVAL AND INSTALLATION

Service Precautions

1. Grease or any other foreign material must be kept off lining surfaces and braking surfaces of rotor, and external surfaces of hub during service operation. In handling rotor and caliper assemblies, avoid deformation, nicking or scratching of brake linings and rotor.
2. If a caliper piston is removed for any reason, piston seal and dust boot must be replaced. Exercise care not to damage plastic piston by protecting it from contact with any metal or sharp-edged objects.
3. During removal and installation of a wheel assembly, exercise care not to interfere with, or damage caliper splash shield, if so equipped, or the bleeder screw fitting.
4. Vehicle must be centered on hoist before servicing any front end components to avoid bending or damaging rotor splash shield, if so equipped, on full right or left wheel turns. Refer to Section 00-02.
5. Do not attempt to clean or restore oil or grease-soaked brake lining. When contaminated linings are found, brake linings must be replaced in complete axle sets and rotor braking surfaces wiped clean.
6. The LH and RH calipers must be installed on the correct side of the vehicle to be sure bleed is in the topmost position for proper purging of air from the front brake system during bleeding.

Caliper Assembly

Tools Required:

- Torx® Drive Bit D79P-2100-T40

Removal

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Remove wheel and tire assembly from rotor mounting face. Use care to avoid damage or interference with bleeder screw fitting during removal.
3. Mark caliper assembly to ensure it is installed on correct knuckle during installation.

REMOVAL AND INSTALLATION (Continued)

4. Disconnect flexible brake hose from caliper. Remove hollow retaining bolt that connects hose fitting to caliper. Remove hose assembly from caliper and plug hose.
5. Remove caliper locating pins using Torx® Drive Bit D79P-2100-T40 or equivalent.

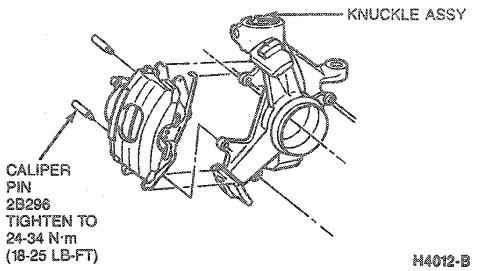
   CAUTION: Do not pry directly against plastic piston, or damage to piston will occur.
6. Lift caliper off rotor, integral knuckle and anchor plate using rotating motion.

Installation

1. Retract piston fully in piston bore. Position caliper assembly above rotor with anti-rattle spring under upper arm of knuckle. Install caliper over rotor with rotating motion. Ensure inner and outer shoes are properly positioned and outer anti-rattle spring is properly positioned.

   Ensure correct caliper assembly, as marked during removal, is installed on correct knuckle. The caliper bleed screw should be positioned on top of caliper when assembled on vehicle.

   NOTE: The caliper locating pins must be inserted and threads hand-started.
2. Lubricate locating pins and inside of insulators with Silicone Dielectric Compound D7AZ-19A331-A (ESE-M1C171-A) or equivalent. Install locating pins through caliper insulators and into knuckle attaching holes.
3. Using Torx® Drive Bit D79P-2100-T40 or equivalent, tighten caliper locating pins to 24-34 N·m (18-25 lb-ft).
4. Remove plug and install brake hose on caliper with new copper washer on each side of fitting outlet. Insert retaining bolt through washers and fittings. Tighten bolts to 41-54 N·m (30-40 lb-ft).
5. Bleed brake system. Refer to Section 06-00. Always replace rubber bleed screw cap after bleeding.
6. Fill master cylinder as required.
7. Install wheel and tire assembly. Tighten wheel lug nuts to 115-142 N·m (85-105 lb-ft).
8. Lower vehicle.
9. Pump brake pedal prior to moving vehicle to position brake linings.
10. Road test vehicle.



Brake Lining

Tools Required:

- Torx® Drive Bit D79P-2100-T40

Removal

Refer to the illustration under Caliper Assembly Installation.

1. Remove master cylinder cap and check fluid level in reservoir. Remove brake fluid until reservoir is half full. Discard removed fluid.
2. Raise vehicle on hoist. Refer to Section 00-02.
3. Remove wheel and tire assembly from rotor mounting face. Use care to avoid damage or interference with caliper splash shield or bleeder screw fitting.

   NOTE: It is not necessary to disconnect hydraulic connections.
4. Remove caliper locating pins using Torx® Drive Bit D79P-2100-T40 or equivalent. Refer to illustration under Caliper Assembly Installation.
5. Lift caliper assembly from integral knuckle and anchor plate and rotor using rotating motion. Do not pry directly against plastic piston or damage will occur.
6. Remove outer shoe and lining assembly from caliper assembly.
7. Remove inner shoe and lining assembly.
8. Inspect both rotor braking surfaces. Minor scoring or buildup of lining material does not require machining or replacement of rotor. Hand-sand glaze from both rotor braking surfaces using garnet paper 100A (medium-grit) or aluminum oxide 150-J (medium).
9. Suspend caliper inside fender housing with wire. Use care not to damage caliper or stretch brake hose.

Installation

CAUTION: Metal or sharp objects cannot come into direct contact with piston surface or damage will result.

REMOVAL AND INSTALLATION (Continued)

1. Use a 10cm (4-inch) C-clamp and wood block 70mm x 25mm (2-3/4 inch x 1 inch) and approximately 19mm (3/4 inch) thick to seat caliper hydraulic piston in its bore. This must be done to provide clearance for caliper assembly to fit over rotor during installation. Extra care must be taken during this procedure to prevent damage to plastic piston.
2. Remove all rust buildup from inside of caliper legs (outer shoe contact area).
3. Install inner shoe and lining assembly in caliper piston(s). Do not bend shoe clips during installation in piston or distortion and rattles can occur.
4. Install correct outer shoe and lining assembly. Ensure clips are properly seated.
5. Install caliper as outlined.
6. Install wheel and tire assembly. Tighten wheel lug nuts to 115-142 N·m (85-105 lb-ft).
7. Lower vehicle.
8. Pump brake pedal prior to moving vehicle to position brake linings. Refill master cylinder.
9. Road test vehicle.

Brake Rotor

Tools Required:

- 3-Jaw Puller D80L-1013-A

Removal

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Remove wheel and tire assembly from rotor mounting face. Be careful to avoid damage or interference with caliper bleeder screw fitting and rotor splash shield.

   CAUTION: Handle rotor and caliper assembly in such a way as to prevent deformation of rotor, and nicking, scratching or contamination of brake linings/rotor surfaces.
3. Remove caliper assembly from rotor as outlined. If caliper does not require servicing, it is not necessary to disconnect brake hose or remove caliper from vehicle. Position caliper out of the way and support it with a length of wire to avoid damaging the caliper and hose.

   NOTE: If excessive force must be used during rotor removal, the rotor should be checked for lateral runout prior to installation.
4. Remove rotor from hub assembly by pulling it off the hub studs.

   If additional force is required to remove rotor, apply Rust Penetrant and Inhibitor D7AZ-19A501-AA (ESR-M99C56-A) or equivalent on front and rear rotor/hub mating surfaces. First, strike rotor between studs with a plastic hammer. If this does not work then attach 3-Jaw Puller D80L-1013-A or equivalent and remove rotor.

Installation

1. If rotor is being replaced, remove protective coating from new rotor with Carburetor Tune-Up Cleaner D9AZ-19579-BA (ESR-M14P9-A) or equivalent. If original rotor is being installed, make sure rotor braking and mounting surfaces are clean. Apply a small amount of Silicone Dielectric Compound D7AZ-19A331-A (ESE-M1C171-A) or equivalent to pilot diameter of rotor.
2. Install rotor on hub assembly.
3. Install caliper assembly on rotor as outlined.
4. Install wheel and tire assembly to rotor mounting face. Tighten wheel lug nuts to 115-142 N·m (85-105 lb-ft).
5. Lower vehicle.
6. Pump brake pedal prior to moving vehicle to position brake linings.
7. Road test vehicle.

Rotor Splash Shield

Tools Required:

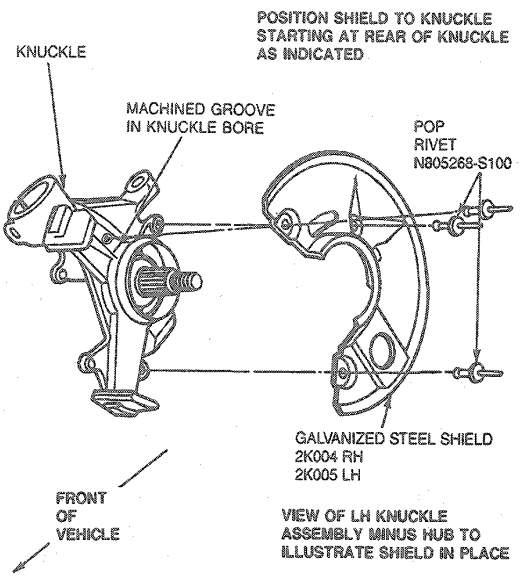
- Heavy-Duty Riveter D80L-23200-A

Removal

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Remove wheel and tire assembly, caliper and rotor, as outlined. It is not necessary to disconnect hydraulic connections.
3. Remove three rivets retaining splash shield to knuckle by punching out the mandrel located in the center of the rivet. With a chisel, cut off rivet at knuckle and punch out rivet remaining in hole.

REMOVAL AND INSTALLATION (Continued)

4. Remove splash shield by pulling it outboard.



Installation

1. Locate shield until shield attachment surfaces contact knuckle mounting bosses and holes in knuckle bosses are aligned with mounting holes in shield.
2. Install new rivets using Heavy-Duty Riveter D80L-23200-A or equivalent (three per shield) through attaching holes in shield and knuckle. The rivet body head should clamp shield attachments securely to knuckle bosses.
3. Install brake rotor, caliper assembly and wheel and tire assembly as outlined.
4. Make certain splash shield does not contact rotor. Rotate wheel to visually inspect for contact.
5. Lower vehicle.
6. Pump brake pedal prior to moving the vehicle to position brake linings.
7. Road test vehicle.

OVERHAUL

Tools Required:

- Air Nozzle Assembly TOOL-7000-DE

After service, pump brake pedal and obtain a firm pedal before moving the vehicle. Riding the brake pedal (common on left-foot application) must be avoided when driving the vehicle.

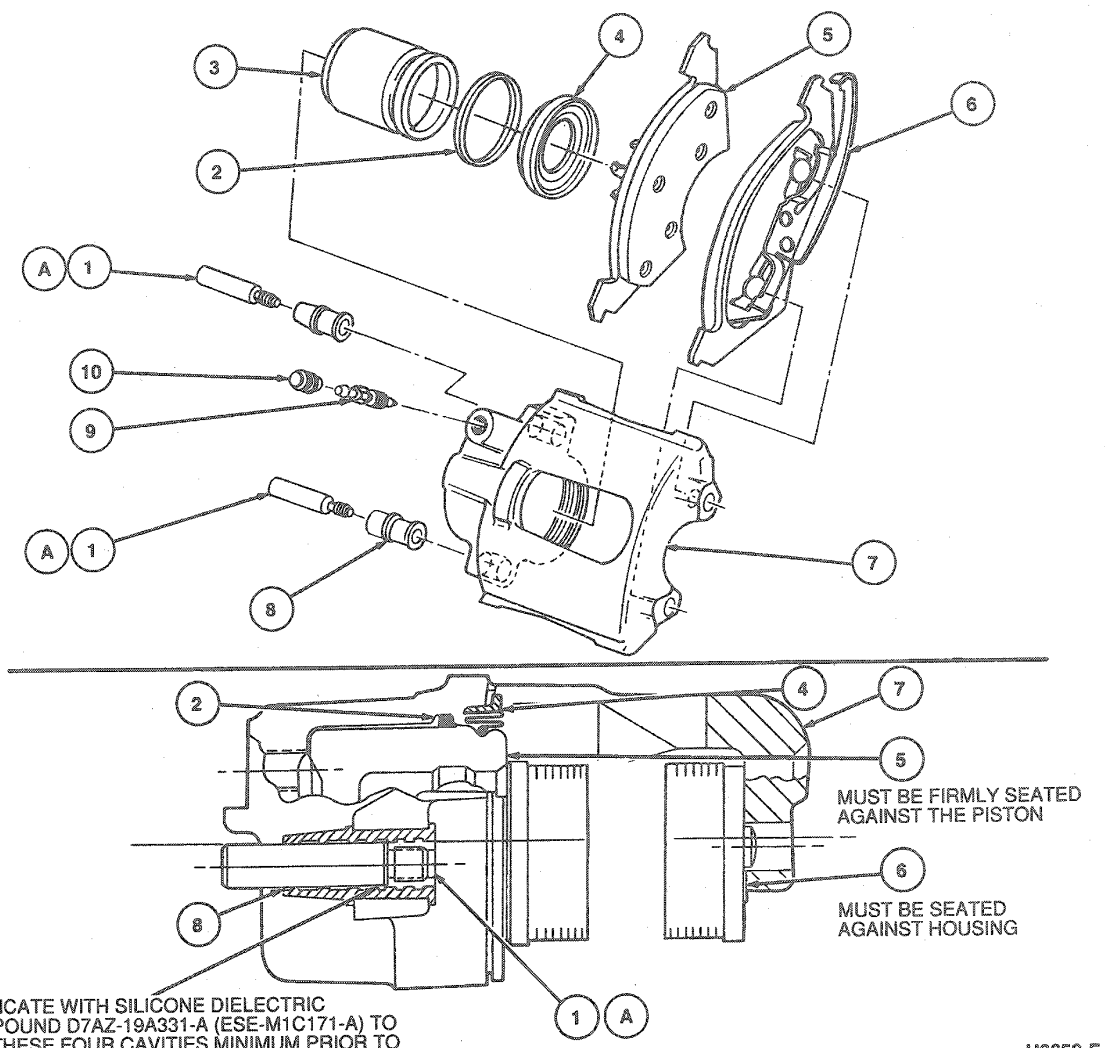
Phenolic Piston (Steel Piston For SHO and Police) and Three-Finger Inner Shoe Clip

Disassembly

1. Remove caliper assembly from knuckle and rotor as outlined. Do not use screwdriver or similar tool to pry piston back into cylinder bore. Use a C-clamp. Remove outer shoe by pushing shoe to move "buttons" from caliper housing and slipping down caliper leg until clip is disengaged. Remove inner shoe by pulling it straight out of piston.

   NOTE: Inner shoe removal force may be as high as 45-90N (10-20 lbs).

OVERHAUL (Continued)



Item	Part Number	Description
1A	2B296	Caliper Locating Pin
2	2B115	Piston Seal
3	2196	Piston
4	2207	Dust Boot
5	2019	Inner Shoe
6	2018 RH 2C088 LH	Outer Shoe

Item	Part Number	Description
7	2B302 LH 2B294 RH	Caliper Housing
8	2B299	Insulator
9	8M-2208	Bleeder Screw
10	26126	Dust Cap
A		Tighten to 24-34 N·m (18-25 Lb-Ft)

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(Continued)

OVERHAUL (Continued)

CAUTION: Do not use a screwdriver or any similar tool to pry piston out of bore. It will result in damage to piston. Cushion piston's impact against caliper when blowing it out of bore by placing shop towels between piston and caliper bridge. Use care because the piston can develop considerable force from pressure buildup.

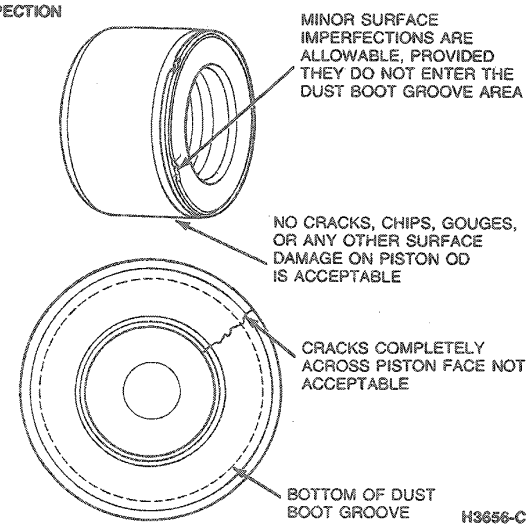
2. Disconnect the caliper from the hydraulic system, and blow the piston out by using air pressure. Apply air pressure to the fluid port in the caliper with Air Nozzle Assembly TOOL-7000-DE or equivalent to remove the piston. If the piston is seized and cannot be forced from the caliper, tap lightly around the piston while applying air pressure.
3. Remove the dust boot from the caliper assembly.
4. Remove the rubber piston seal from the cylinder and discard it.

Cleaning and Inspection

Clean all metal parts and phenolic piston with isopropyl alcohol. Then clean out and dry the grooves and passageways with compressed air. Ensure that caliper bore and component parts are thoroughly clean.

Check the cylinder bore and piston for damage or excessive wear. Replace the piston if it is pitted, scored, corroded, or the plating is worn off. Do not replace phenolic piston for cosmetic surface irregularities or small chips between the piston boot groove and shoe face.

PHENOLIC PISTON INSPECTION



Assembly

1. When assembling caliper, examine piston for surface irregularities or small chips and cracks. Replace piston if damaged. Be sure to clean foreign material from piston surfaces and lubricate with brake fluid before inserting into caliper. Always install new seal and dust boot.
2. When installing piston back into bore, use wood block or another flat stock, like an old shoe lining assembly, between C-clamp and piston. **Do not apply C-clamp directly to piston surface.** This can result in damage to piston. Be sure piston is not cocked.
3. Ensure dust boot is tight in boot groove on piston and in caliper.
4. To install inner shoe with three-finger clip attached to shoe into piston, grab each end of shoe, making it square with piston. Push firmly until shoe clip snaps into piston. Do not allow shoe or clip tangs to cock during installation.

Rotor Service

Refer to Section 06-00, Diagnosis and to the following information for servicing and conditions requiring rotor refinishing.

Brake pulsation (brake roughness) that is present during brake application is caused by either foreign material build-up or contamination on the rotor braking surface or uneven rotor thickness.

If there is a foreign material build-up or contamination found on rotor or lining surfaces, hand sand linings and rotors. Uneven rotor thickness (thickness variation) may be caused by the following:

- Rotor lateral runout in excess of 0.05mm (0.003 inch) when rotor is mounted on hub.
- Caliper drag.
- Abrasive action of brake lining.

If brake pulsation (brake roughness) is present, attempt stopping vehicle with transaxle in the NEUTRAL position. If the pulsation (roughness) is gone, the drivetrain should be inspected. If pulsation (roughness) remains, stop vehicle from 48 km/h (30 mph) using parking brake. If pulsation remains, inspect rear brakes. If pulsation is gone, inspect front brakes.

Rotor Minimum Thickness

Rotor minimum thickness must not be less than 24.75mm (0.974 inch) or less than number cast on inside of the rotor after refinishing.

Rotor Machining

Tools Required:

- Rotunda Disc Brake Lathe 054-00080

Do not machine, cut or true up new rotors prior to installation on vehicle. Making a light cut on a new rotor may cause excessive runout and result in brake shudder several thousand miles later. If is best to clean oil film off a new rotor with solvent and install it on vehicle.

OVERHAUL (Continued)

Never use a brake lathe that cuts only one face of the rotor at a time. It must be a simultaneous straddle cut. All rotor refinishing must adhere to the rule that equal amounts of rotor stock are removed from each braking surface each time a rotor is refinished.

On vehicle brake lathes machine the rotor while it is on the hub and is turning perpendicular to the axis of the hub, the same axis as the hub. This procedure reduces rotor lateral runout to near zero by cutting the rotor therefore cancelling the affect of stacked tolerance of the hub, rotor and spindle. Follow the on vehicle brake lathe manufacturers instructions on machining procedures.

A bench mounted disc brake lathe machines the rotor to the axis of the lathe arbor and will not reduce total lateral runout associated with stacked tolerances of the hub, rotor and spindle. Follow the manufacturers instructions on machining procedures.

With both types of brake lathes set cutting tool to just contact the high spots on the rotor, then adjust cutting tool to the minimum depth required to clean up the rotor face. Best results are obtained with a first cut that totally removes the old rotor surfaces followed by a second light finish cut. The total material removed (combination of both sides) must not exceed the minimum discard thickness and is marked on the inside of the rotor.

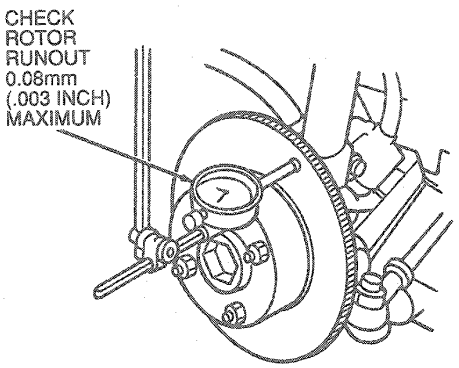
To improve initial brake pedal feel and surface finish on a machined rotor, lightly sand rotor surface with 120 grip paper prior to road testing.

Runout Check

NOTE: Whenever brake rotor has been separated from hub face, clean any rust or foreign material from mating surface on hub face and rotor. Failure to do this may result in increased lateral runout of the rotor and brake pulsation.

Install rotors on hubs and hold in place by using inverted wheel lug nuts and washers to seat rotors to hubs. Tighten wheel lug nuts to 115 N·m (85 lb-ft).

Using a dial indicator measure rotor lateral runout as shown. The dial indicator should be centered on braking surface. Rotate rotor while measuring runout. If runout is greater than 0.08mm (0.003 inch), rotor must be repositioned (indexing) on hub to obtain the lowest possible runout.



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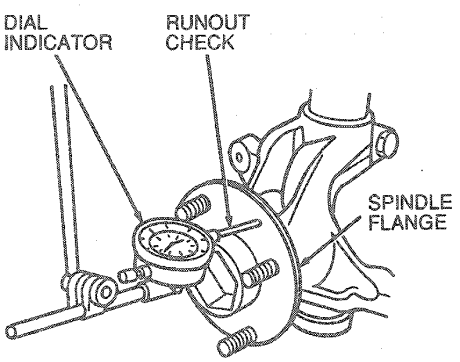
If lateral runout rotor is above 0.08mm (0.003 inch) after repositioning (indexing), the hub and bearing assembly must be inspected. Using a dial indicator measure hub and bearing assembly face runout as shown. Hub runout must be less than 0.06mm (0.002 inch). If hub face runout is greater than 0.06mm (0.002 inch) a new hub must be installed.

NOTE: If rotor lateral runout remains greater than 0.08mm (0.003 inch) after the following service procedures, this indicated that the brake lathe requires service:

- Rotor machining.
- Rotor repositioning (indexing) and
- Verifying hub face runout is less than 0.06mm (0.002 inch)



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NOTE: Rotunda Disc Brake Lathe 054-00080 or equivalent should be used to refinish disc brake rotors.

Cleaning and Inspection

1. Remove wheel and tire from hub and rotor.
2. Inspect brake shoes and lining for wear. If lining is worn to within 3.2mm (1/8 inch) of shoe, replace all four shoe and lining assemblies (complete axle set) on front or rear wheels as appropriate.

OVERHAUL (Continued)

3. Visually check caliper. If caliper housing is leaking, it should be replaced. If a seal is leaking, caliper must be disassembled and new seals and dust boot installed. If a piston is seized in the bore, a new caliper housing is required. Care must be taken while removing plastic piston.

SPECIFICATIONS

FRONT DISC BRAKE DIMENSIONS

Component	Specification
Lining Material	B x D7800E ABEX 91646-Q B Non-SHO, Police
Lining Size Inner and Outer	144mm x 46mm x 9.7mm (5.7 x 1.8 x 0.38 inch) 144mm x 46mm x 10mm (5.7 inches x 1.8 inches x .3 inches) SHO Vehicles Only
Lining Wear Limit (from shoe surface)	3.175mm (0.125 inch)
Caliper Cylinder Bore Diameter	66mm (2.598 inch)
Front Rotor Nominal Thickness	26.0mm (1.024 inches)
Front Rotor Minimum Thickness[1]	24.75mm (0.974 inch)
Front Rotor Diameter	258.0mm (10.16 inches)
Front Rotor Allowable Runout On Vehicle	0.076mm max. (0.003 inch)
Front Rotor Finish	0.40-3.2 micro-meters (10-80 micro-meters)
Front Rotor Thickness Variation	0.013mm max. (0.0005 inch)

1 Minimum safe thickness is shown on each rotor.

BRAKE HYDRAULIC SYSTEM TORQUE SPECIFICATIONS

Component	N·m	Lb-Ft
Caliper Bleeder Screw	8-20	6-15
Caliper Locating Pin	24-34	18-25
Brake Hose Connection to Caliper	41-54	30-40
Hydraulic Tube Connections—	15-20	11-15
Wheel Nuts	115-142	85-105
Hub Nut	230-275	170-202

All hydraulic lines must be tightened to the specific torque value and be free of fluid leakage.

SPECIAL SERVICE TOOLS

Tool Number	Description
D79P-2100-T40	Torx® Drive Bit
D80L-1013-A	3-Jaw Puller
D80L-23200-A	Heavy Duty Riveter
TOOL-7000-DE	Air Nozzle Assembly

ROTUNDA EQUIPMENT

Model	Description
054-00080	Disc Brake Lathe

SECTION 06-04 Brakes, Rear Disc

SUBJECT	PAGE
DESCRIPTION	
Anchor Plate	06-04-4
Brake Adapter	06-04-4
Caliper Assembly	06-04-4
Splash Shield	06-04-4
OVERHAUL	
Caliper Assembly	06-04-11
Rotor Refinishing	06-04-13
REMOVAL AND INSTALLATION	
Anchor Plate	06-04-9
REMOVAL AND INSTALLATION (Cont'd.)	
Brake Adapter	06-04-11
Brake Shoe and Lining	06-04-7
Caliper Assembly	06-04-5
Rotor	06-04-8
Rotor Splash Shield	06-04-9
SPECIAL SERVICE TOOLS	06-04-14
SPECIFICATIONS	06-04-13
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VEHICLE APPLICATION

Taurus / Sable.

DESCRIPTION

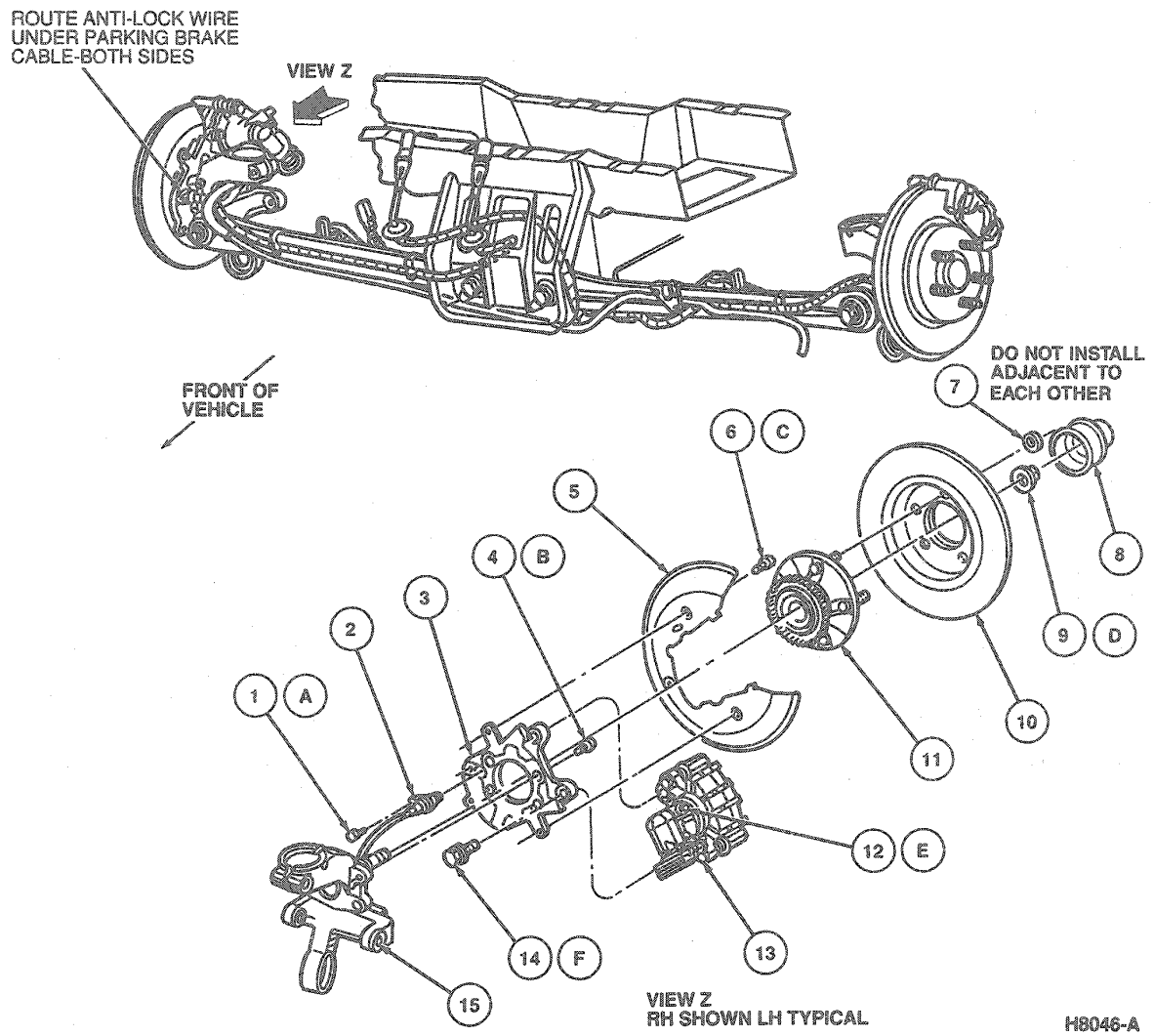
WARNING: BRAKE FLUID CONTAINS POLYGLYCOL ETHERS AND POLYGLYCOLS. AVOID CONTACT WITH EYES. WASH HANDS THOROUGHLY AFTER HANDLING. IF BRAKE FLUID CONTACTS EYES, FLUSH EYES WITH RUNNING WATER FOR 15 MINUTES. GET MEDICAL ATTENTION IF IRRITATION PERSISTS. IF TAKEN INTERNALLY, DRINK WATER AND INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.

The rear disc brakes consist of solid full cast rotors and hydraulically activated caliper assemblies with integral mechanically (cable) operated parking brake mechanisms.

Except for the parking brake mechanism, the rear caliper assembly is similar to the pin slider front brake caliper. The added parking brake lever on the back of the caliper is cable-operated by the parking brake pedal located below the instrument panel, similar to rear drum brake installations. The caliper parking brake mechanism is self-adjusting.

DESCRIPTION (Continued)

Sedan



Item	Part Number	Description
1A	N605518-S100	Bolt
2	2C216 (LH) 2C190 (RH)	Anti-Lock Sensor Assy
3	2C101 (LH) 2C100 (RH)	Disc Brake Adapter
4B	N805086-S100	Bolt (4 Req'd)
5	2C028	Splash Shield
6C	N602726-S2	Bolt (3 Req'd)
7	W623485-S2	Retainer Nut (2 Req'd)
8	1N135	Dust Cap
9D	2B423	Nut
10	2C026	Rotor
11	2B664	Hub Assy

(Continued)

Item	Part Number	Description
12E	—	Bleed Screw
13	2K327 (RH) 2K328 (LH)	Caliper Assy
14F	N805163-S150	Bolt (2 Req'd)
15		Knuckle Assy
A		Tighten to 4.5-6.8 N·m (3-5 Lb-Ft)
B		Tighten to 59-81 N·m (44-60 Lb-Ft)
C		Tighten to 8-12 N·m (6-9 Lb-Ft)
D		Tighten to 255-345 N·m (188-254 Lb-Ft)

(Continued)

DESCRIPTION (Continued)

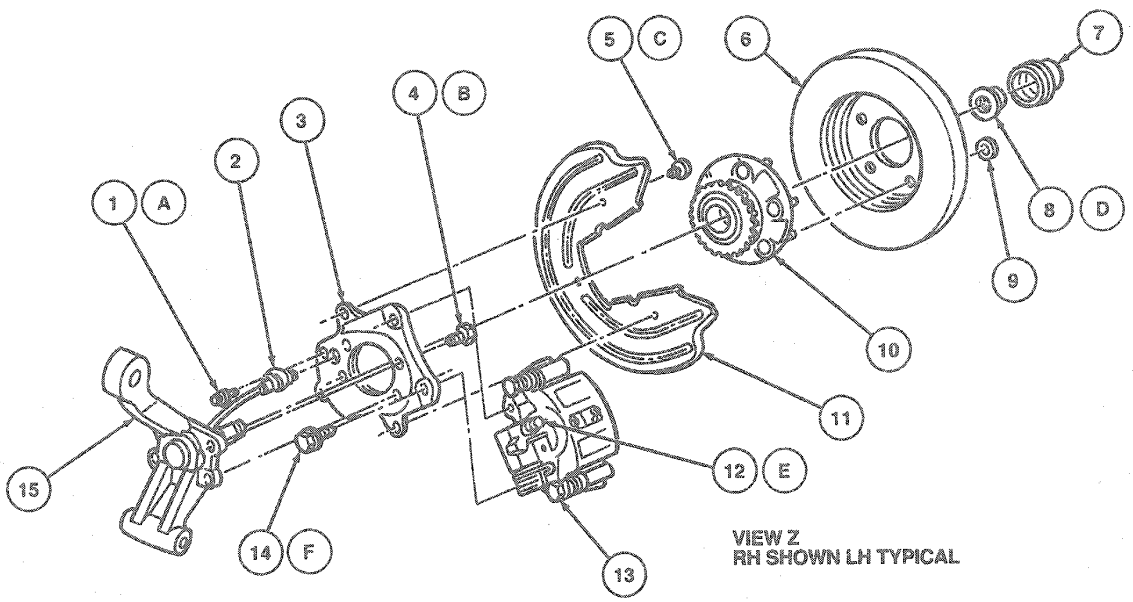
Item	Part Number	Description
E		Tighten to 8-13 N·m (6-10 Lb-Ft)

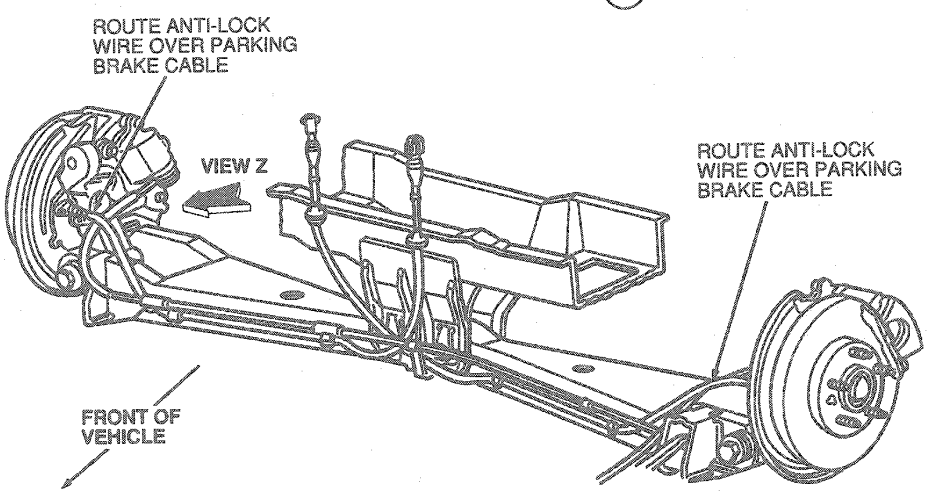
(Continued)

Item	Part Number	Description
F		Tighten to 87-119 N·m (64-88 Lb-Ft)

TH8046A

Station Wagon





H8047-A

Item	Part Number	Description
1A	N605518-S100	Bolt
2	2C216 (LH) 2C190 (RH)	Anti-Lock Sensor Assy

(Continued)

Item	Part Number	Description
3	2C100 (RH) 2C101 (LH)	Disc Brake Adapter
4B	N805086-S100	Bolt (4 Req'd)
5C	N602726-S2	Bolt (3 Req'd)

(Continued)

DESCRIPTION (Continued)

Item	Part Number	Description
6	2C026	Rotor
7	1N135	Dust Cap
8D	4B423	Nut
9	W623485-S2	Retainer Nut (2 Req'd)
10	2B664	Hub Assy
11	2C028	Splash Shield
12E	—	Bleed Screw
13	3K327 (RH) 3K328 (LH)	Caliper Assy
14F	N805163-S150	Bolt (2 Req'd)
15	—	Rear Knuckle

(Continued)

Item	Part Number	Description
A		Tighten to 4.5-6.8 N·m (3-5 Lb-Ft)
B		Tighten to 59-81 N·m (44-60 Lb-Ft)
C		Tighten to 8-12 N·m (6-9 Lb-Ft)
D		Tighten to 255-345 N·m (188-254 Lb-Ft)
E		Tighten to 8-13 N·m (6-10 Lb-Ft)
F		Tighten to 87-119 N·m (64-88 Lb-Ft)

TH8047A

Caliper Assembly

The caliper assembly consists of:

- A pin slider caliper housing with a single piston and parking brake mechanism
- Inner and outer shoe and lining assemblies
- Anchor plate

The caliper assembly has two lubricated locating pins that position the caliper relative to the anchor plate. Rubber slider pin boot seals prevent lubrication wash out and pin corrosion.

Caliper Housing Assembly

The component parts of the housing assembly are outlined under Caliper Assembly, Removal and Installation. The piston has a moulded rubber dust boot on its outer end. The boot attaches to the cylinder bore and provides a seal between the housing and the piston. A rubber O-ring is positioned in a groove in the piston to provide a seal between the piston and housing. The components in the parking brake mechanism cavity in the back of the caliper housing are lubricated with Silicone Dielectric Compound D7AZ-19A331-A (ESE-M1C171-A) or equivalent silicone grease.

The parking brake cable is secured to the parking brake operating lever by a barrel crimp on the end of the cable. The parking brake cable is secured to the caliper by a retaining clip. When the parking brake is applied, the cable rotates the lever shaft. The push rod drives the piston and shoe lining assembly against the rotor, creating the braking force.

An automatic adjuster in the piston moves on the push rod to compensate for lining wear and to maintain lining-to-rotor clearance (gap) when the brakes are not applied.

Shoe and Lining Assembly

The shoe and lining assemblies are held in place by the caliper housing and the anchor plate. The inner and outer shoe and lining assemblies are common.

NOTE: Brake friction materials inherently generate noise and heat in order to dissipate energy. As a result, occasional squeal is possible, and is aggravated by severe environmental conditions such as cold, heat, rain, snow, salt, mud, etc.

Anchor Plate

The anchor plate transmits braking torque from the inner and outer shoe and lining assemblies to the brake adapter.

Rotor

The rear disc brake rotors are solid full cast. The rotor is mounted on the rear hub.

Splash Shield

A splash shield is screwed to the brake adapter to protect the rotor inboard surface from road splash contaminants. The wheel guards the outboard surface of the rotor. The splash shield is common for RH and LH and has tabs that will interfere with the adapter mounting flange to prevent incorrect installation.

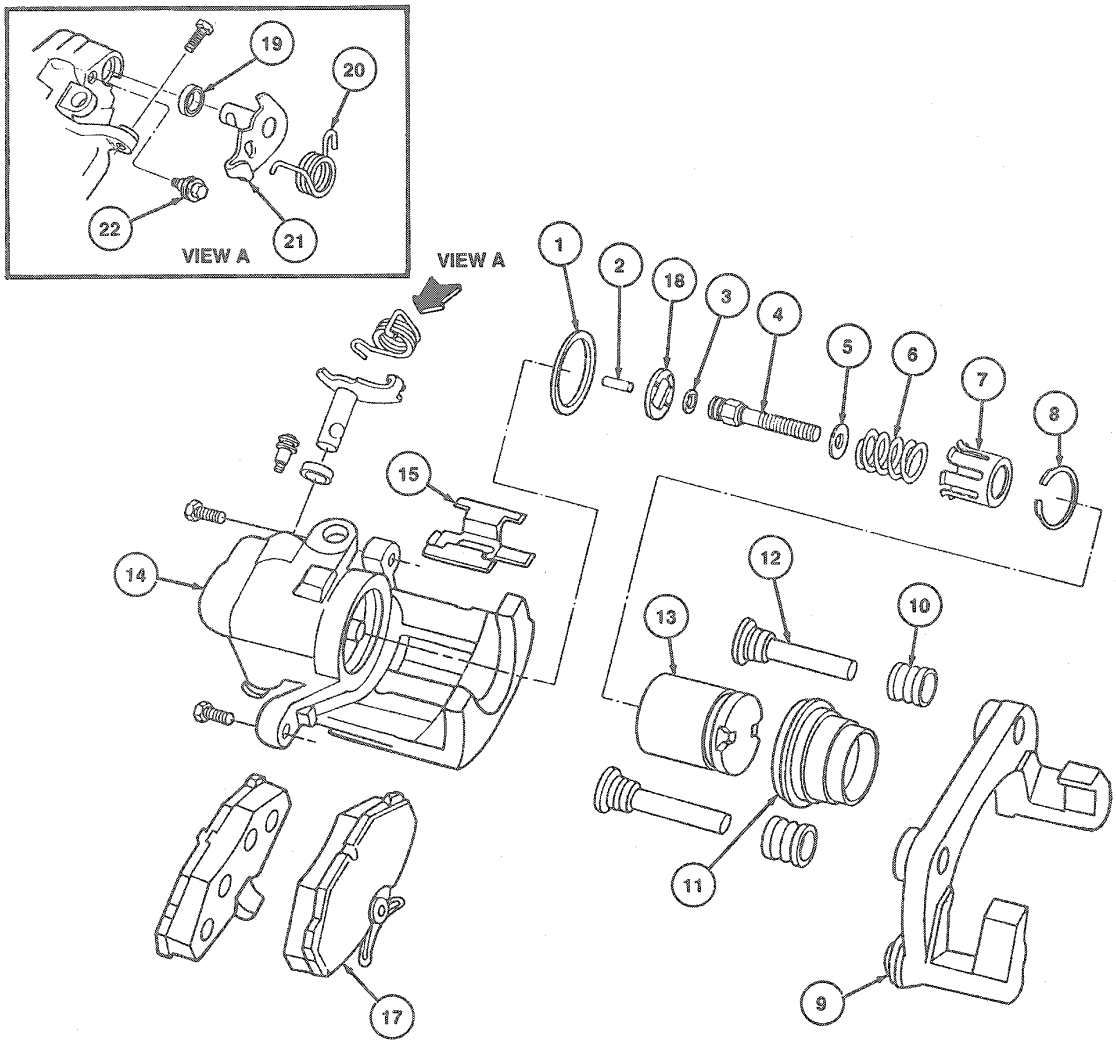
Brake Adapter

The brake adapter is attached to the rear knuckle by four bolts. The adapters are not interchangeable and are stamped RH and LH.

REMOVAL AND INSTALLATION

Caliper Assembly

During service, handle the caliper assembly and rotor in such a way as to avoid nicking, scratching or contaminating the brake linings or deforming the rotor.



H5166-E

Item	Part Number	Description
1	2N182	Piston Seal
2	2L627	Pin
3	2L594	O-Ring Seal
4	2N139	Push Rod
5	1N020	Flat Washer
6	2L396	Spring
7	2A787	Spring Cage
8	2A746	Snap Ring (Circlip)
9	2B511 (RH) 2B512 (LH)	Anchor Plate

(Continued)

Item	Part Number	Description
10	2A492	Slider Pin Boot Seal (2 Req'd)
11	2206	Piston Dust Boot
12	2B296	Slider Pin (2 Req'd)
13	2B588	Piston
14	2N122 (RH) 2N123 (LH)	Caliper Housing
15	—	Anti-Rattle Clip
16A	2N386	Slider Pin Pinch Bolt (2 Req'd)

(Continued)

REMOVAL AND INSTALLATION (Continued)

Item	Part Number	Description
17	2218	Shoe and Lining Assy
18	2N183	Locating Washer
19	2B595	Parking Brake Lever Shaft Seal
20	2L642	Parking Brake Lever Return Spring
21	2A637 (RH) 2A638 (LH)	Parking Brake Lever
22	2A795	Parking Brake Spring Retainer Bolt
A		Tighten to 31-35 N·m (23-26 lb-ft)

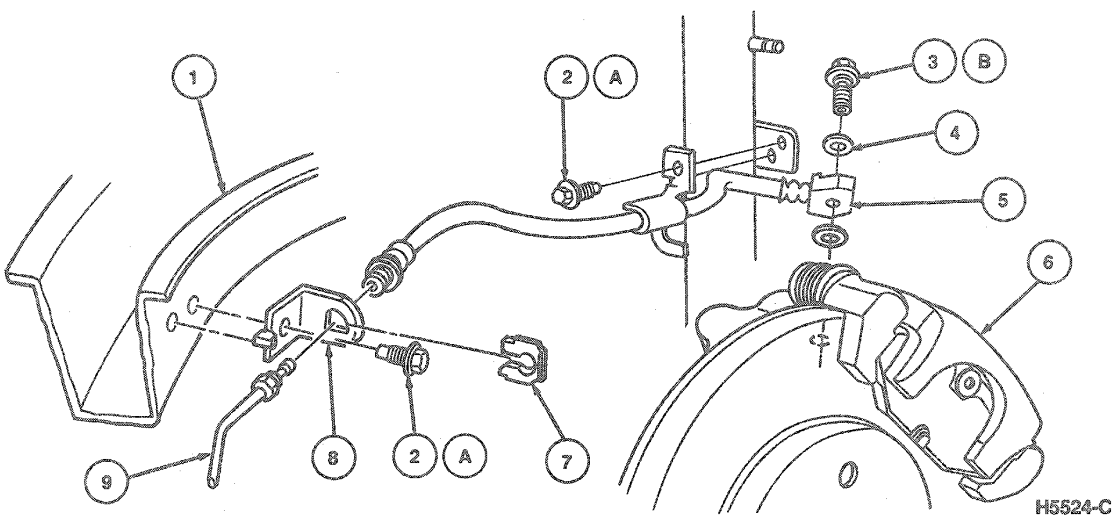
(Continued)

TH5166E

After any service, pump the brake pedal to obtain a firm brake pedal before moving the vehicle. Riding the brake pedal (common with LH-foot application) must be avoided when driving the vehicle.

Removal

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Remove wheel and tire assembly. Refer to Section 04-04.
3. Remove brake flex hose from caliper assembly.



H5524-C

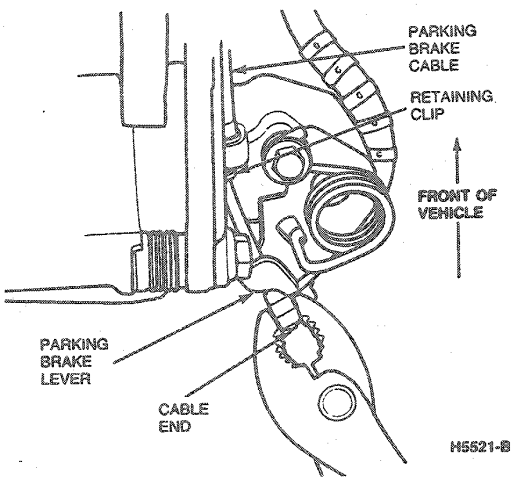
Item	Part Number	Description
1	—	Side Rail
2A	W611635-S150	Screw
3B	N801052-S100	Screw
4	388949-S	Washer (2 Req'd)
5	2A442 RH 2A478 LH	Hose Assy
6	2K328	Caliper Assy
7	386493-S150	Clip (2 Req'd)
8	2073	Bracket (2 Req'd)
9	2C287	Brake Line Assy
A		Tighten to 11-16 N·m (8-11 Lb-Ft)
B		Tighten to 40-60 N·m (30-45 Lb-Ft)

(Continued)

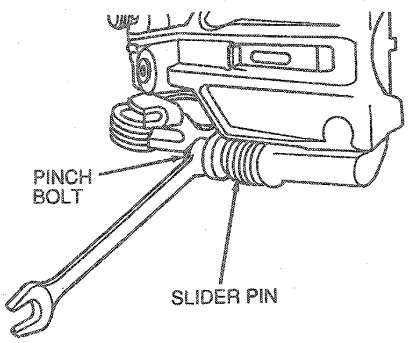
TH5524C

REMOVAL AND INSTALLATION (Continued)

4. Remove retaining clip from parking brake at caliper.
   Disengage parking brake cable end from lever arm.



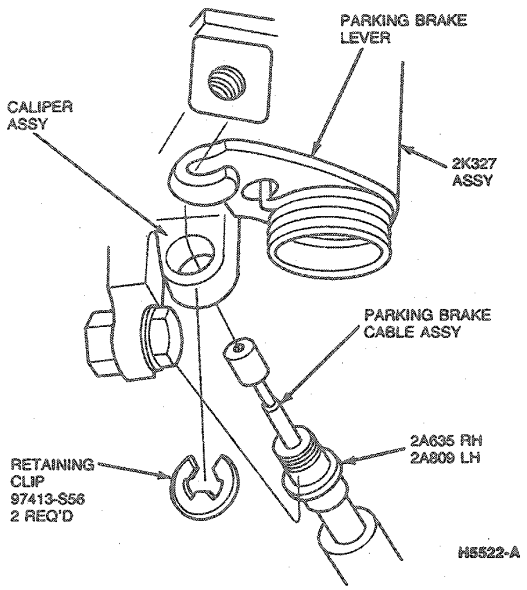
5. Remove guide pin bolts.



6. Lift caliper assembly away from anchor plate.
7. Remove slider pins and boots from anchor plate.

Installation

1. Apply Silicone Dielectric Compound D7AZ-19A331-A (ESE-M1C171-A) or equivalent to inside of slider pin boots and to slider pins.
2. Position slider pins and boots in anchor plate.
3. Position caliper assembly on anchor plate. Ensure that shoe and lining assemblies are installed correctly.
4. Remove residue from the pinch bolt threads and apply one drop of Threadlock and Sealer E0AZ-19554-AA (ESE-M4G204-A) or equivalent. Install guide pin bolts and tighten to 31-35 N·m (23-26 lb-ft).
5. Attach cable end to parking brake lever. Install cable retaining clip on caliper assembly.



6. Using new washers, connect brake flex hose to caliper. Tighten retaining bolt to 41-54 N·m (30-40 lb-ft).
7. Bleed brake system. Refer to Section 06-09.
8. Install wheel and tire assembly. Refer to Section 04-04. Tighten wheel lug nuts to 115-142 N·m (85-105 lb-ft).
9. Lower vehicle.

Brake Shoe and Lining

Removal

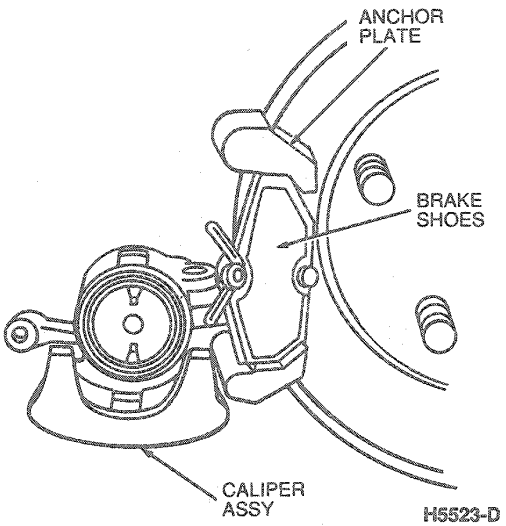
Tools Required:

- Rear Caliper Piston Adjuster T87P-2588-A

1. Raise vehicle on a hoist. Refer to Section 00-02.
2. Remove wheel and tire assembly. Refer to Section 04-04.
3. Remove screw retaining brake hose bracket to shock absorber bracket.
4. Remove retaining clip from parking brake cable at caliper. Remove cable end from parking brake lever.
5. Remove upper guide pin bolt.

REMOVAL AND INSTALLATION (Continued)

6. Rotate caliper away from rotor.

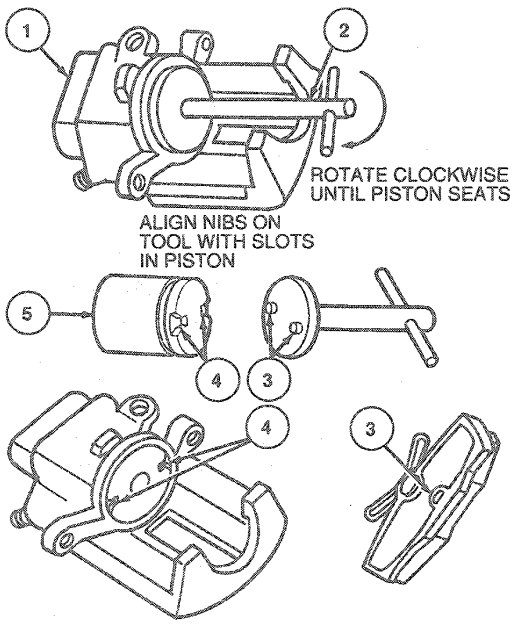


7. Remove inner and outer shoe and lining assemblies from anchor plate.

Installation

NOTE: Ensure that one of the two slots in piston face is positioned so it will engage nib on brake shoe.

1. Using Rear Caliper Piston Adjuster T87P-2588-A rotate piston clockwise until it is fully seated.



Item	Part Number	Description
1	—	Caliper Housing
2	T87P-2588-A	Rear Caliper Piston Adjuster
3	—	Nibs
4	—	Slots
5	—	Piston

TH6537D

2. Install inner and outer shoe and lining assemblies in anchor plate.
3. Rotate caliper assembly over rotor into position on anchor plate. Ensure that shoe and lining assemblies are installed correctly.
4. Remove residue from the pinch bolt threads and apply one drop of Threadlock and Sealer E0AZ-19554-AA (ESE-M4G204-A) or equivalent. Install and tighten guide pin bolts to 31-35 N·m (23-26 lb-ft).
5. Attach cable end to parking brake lever. Install cable retaining clip on caliper assembly.
6. Position brake flex hose and bracket assembly to shock absorber bracket and install retaining screw. Tighten to 11-16 N·m (8-11 lb-ft).
7. Install wheel and tire assembly. Refer to Section 04-04.
8. Lower vehicle.

Rotor

Removal

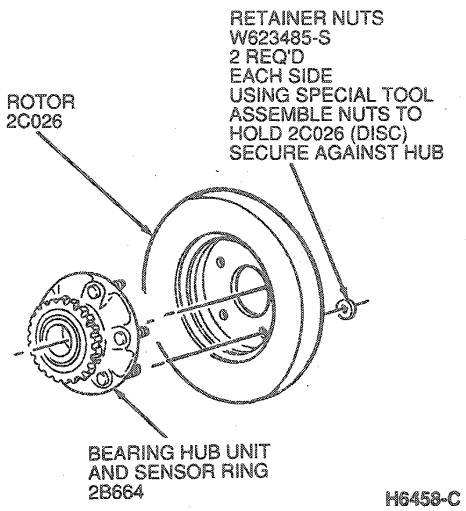
1. Remove caliper assembly as outlined. If service to caliper assembly is not necessary, do not disconnect flexible hose from caliper in this operation.

Support caliper with a wire hook or other means, so that flexible hose is not stretched or twisted.

2. Remove anchor plate as outlined.

REMOVAL AND INSTALLATION (Continued)

3. Remove two retainer nuts. Remove rotor from rear hub.



Installation

1. If rotor is being replaced, remove protective coating from new rotor with carburetor Tune-Up Cleaner D9AZ-19579-BA (ESR-M14P9-A) or equivalent.
2. Install rotors on their corresponding hubs. Install two new retaining nuts securely.
3. Install the anchor as outlined.
4. Install shoe and lining assemblies.
5. Install the caliper assembly as outlined.

Anchor Plate

Removal

NOTE: Anchor plate removal is required to remove the rotor.

1. Remove caliper assembly as outlined. If service to the caliper assembly is not necessary, do not disconnect flexible hose from caliper in this operation. Support caliper with a wire hook or other means, so that flexible hose is not stretched or twisted.
2. Remove the upper and lower anchor plate-to-brake adapter retaining bolts. Remove anchor plate.

Installation

1. Clean all foreign material and locking compound residue from the retaining bolts and mating surfaces of brake adapter and anchor plate.

   NOTE: Anchor plates are **not** interchangeable from right to left.
2. Position anchor plate on brake adapter. Add one drop of Threadlock and Sealer E0AZ-19554-AA (ESE-M4G204-A) or equivalent to each bolt and attach the anchor plate to the brake adaptor. Tighten to 87-119 N·m (64-88 lb-ft).
3. Install caliper assembly as outlined.

Rotor Splash Shield

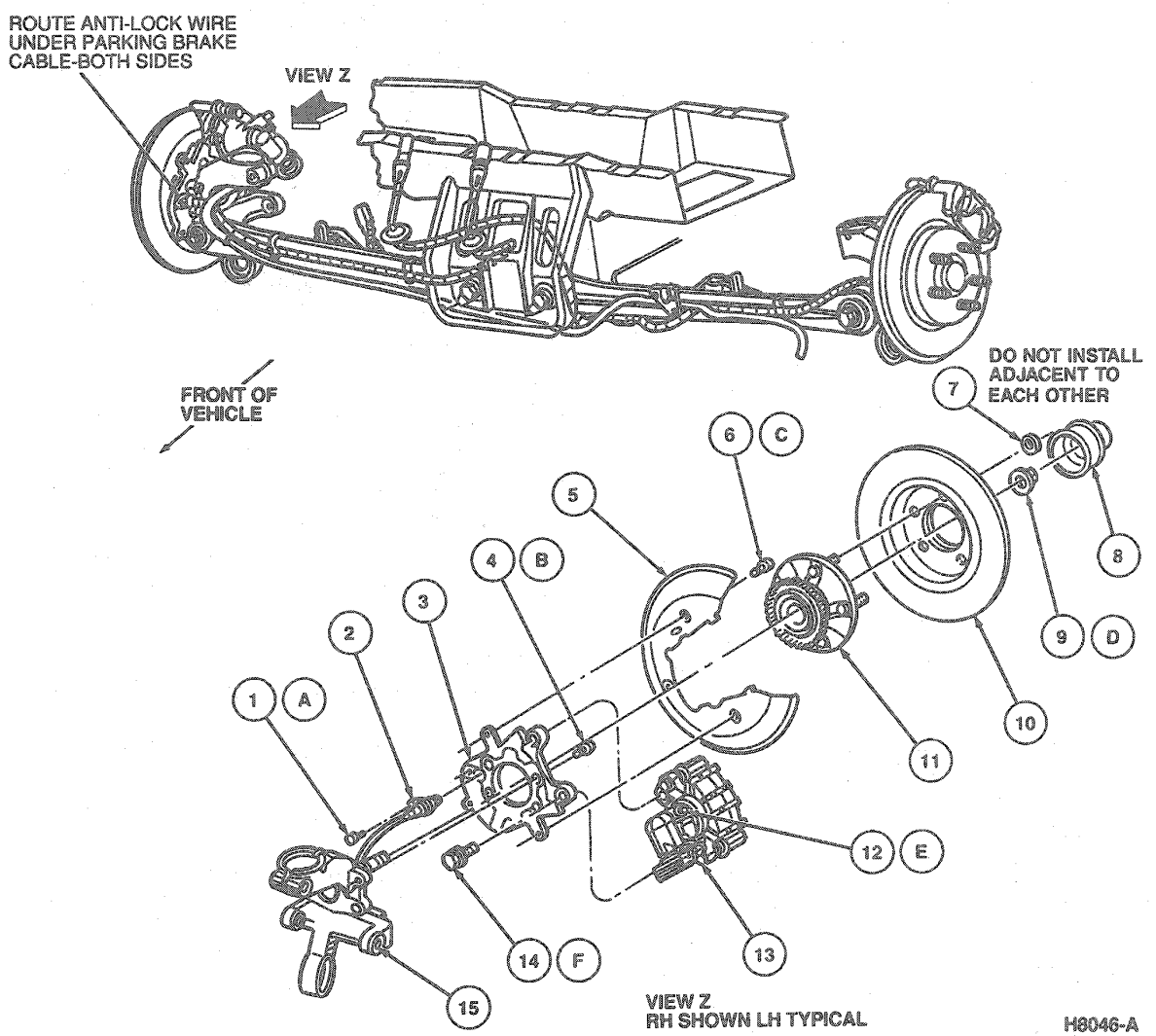
Removal

1. Remove three screws that attach splash shield to brake adapter.
2. Remove splash shield.

Installation

1. If shield is bent, straighten it before installation.
2. Position shield to brake adapter. Install retaining screws. Tighten to 8-12 N·m (6-9 lb-ft). Ensure that tabs on shield do not interfere with brake adapter.

REMOVAL AND INSTALLATION (Continued)



Item	Part Number	Description
1A	N605518-S100	Bolt
2	2C216 (LH) 2C190 (RH)	Anti-Lock Sensor Assy
3	2C101 (LH) 2C100 (RH)	Disc Brake Adapter
4B	N805086-S100	Bolt (4 Req'd)
5	2C028	Splash Shield
6C	N602726-S2	Bolt (3 Req'd)
7	W623485-S2	Retainer Nut (2 Req'd)
8	1N135	Dust Cap
9D	2B423	Nut
10	2C026	Rotor
11	2B664	Hub Assy
12E	—	Bleed Screw

(Continued)

Item	Part Number	Description
13	2K327 (RH) 2K328 (LH)	Caliper Assy
14F	N805163-S150	Bolt (2 Req'd)
15		Knuckle Assy
A		Tighten to 4.5-6.8 N·m (3-5 Lb-Ft)
B		Tighten to 59-81 N·m (44-60 Lb-Ft)
C		Tighten to 8-12 N·m (6-9 Lb-Ft)
D		Tighten to 255-345 N·m (188-254 Lb-Ft)
E		Tighten to 8-13 N·m (6-10 Lb-Ft)

(Continued)

REMOVAL AND INSTALLATION (Continued)

Item	Part Number	Description
F		Tighten to 87-119 N·m (64-88 Lb-Ft)

TH8046A

Brake Adapter

Removal

1. Remove caliper assembly as outlined. If service to caliper assembly is not necessary, do not disconnect flexible hose from caliper in this operation.

   Support caliper with a wire hook or other means, so that flexible hose is not stretched or twisted.
2. Remove anchor plate as outlined.
3. Remove rotor as outlined.
4. Remove hub. Refer to section 04-02.
5. Remove splash shield as outlined.
6. Remove four retaining bolts and remove adapter.

Installation

NOTE: Adapters are not interchangeable from right to left and are stamped RH and LH.

1. Install brake adapter on knuckle.
2. Install four retaining bolts and tighten to 59-81 N·m (44-60 lb-ft).
3. Install bearing hub unit, nut and washer assembly. Tighten to 255-345 N·m (188-254 lb-ft).
4. Install the hub. Refer to section 04-02.
5. Install the splash shield, rotor, anchor plate and caliper assembly as outlined.

OVERHAUL

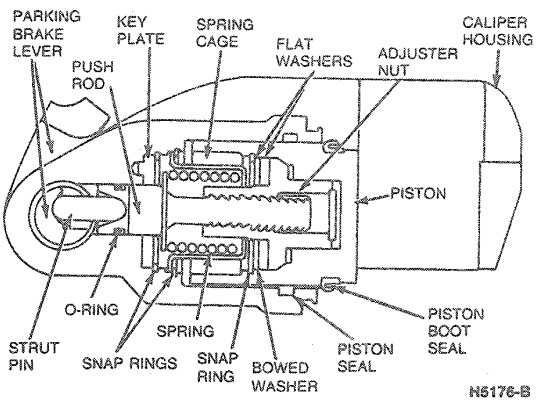
Caliper Assembly

Tools Required:

- Rear Caliper Piston Adjuster T87P-2558-A
- Rear Caliper Spring Compressor Set T87P-2588-B

Disassembly

1. Remove caliper assembly as outlined.
2. Mount caliper in a vise. Use vise-jaw protectors.
3. Using Rear Caliper Piston Adjuster T87P-2588-A, turn piston counterclockwise and remove piston from caliper piston bore.
4. Remove and discard piston dust boot seal and piston seal from caliper bore.



H5176-B

CAUTION: The snap ring (circlip) and spring cover are under spring load. Care should be taken when removing the snap ring (circlip).

5. With suitable snap-ring (circlip) pliers, remove snap ring (circlip) retaining push rod assembly from caliper.
6. From caliper bore, remove spring cover, spring, washer, key plate and pull out push rod and strut pin.
7. Remove and discard O-ring seal from push rod.
8. Remove parking brake lever return spring, unscrew parking brake lever stop bolt and pull parking brake lever out of caliper housing.

Cleaning and Inspection

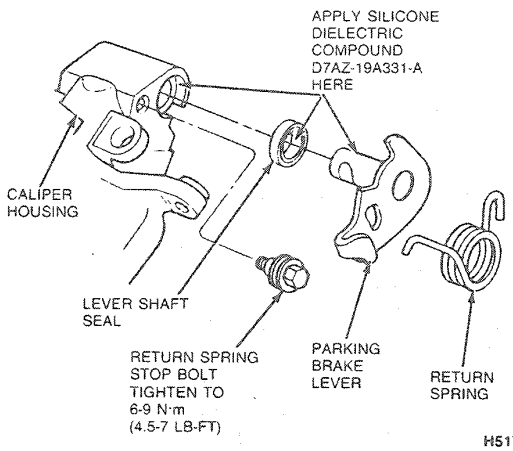
1. Clean all metal parts with isopropyl alcohol. Use clean, dry compressed air to clean out and dry grooves and passages. Ensure caliper bore and component parts are completely free of any foreign material.
2. Inspect caliper bores for damage or excessive wear. If piston is pitted, scored or plating is worn off, replace piston assembly.

Assembly

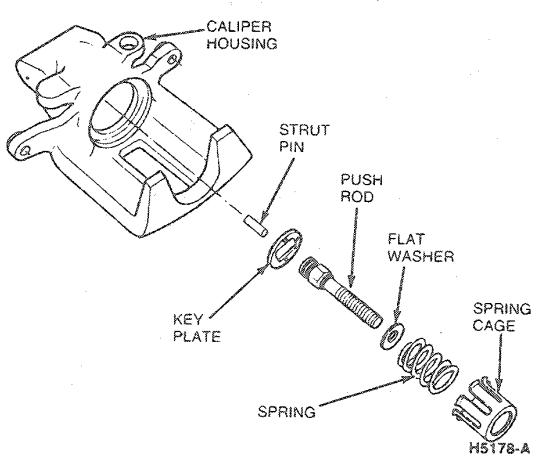
1. Lightly grease parking brake lever bore and lever shaft seal with Silicone Dielectric Compound D7AZ-19A331-A (ESE-M1C171-A) or equivalent. Press parking brake lever shaft seal into caliper bore.

OVERHAUL (Continued)

2. Grease parking brake shaft recess and slightly grease parking brake lever shaft. Insert shaft into bore in caliper housing.

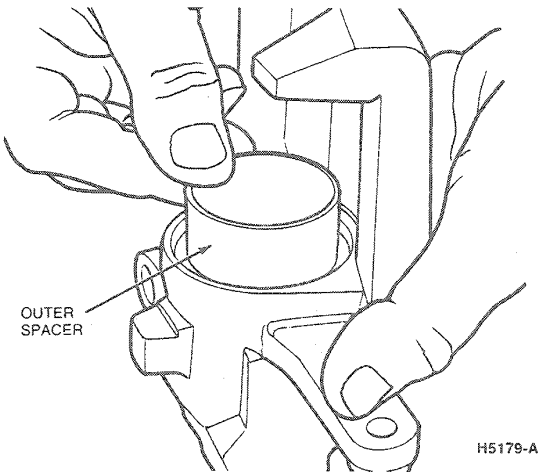


3. Screw lever stop bolt into caliper housing. Tighten to 6-9 N·m (4.5-7 lb-ft). Attach parking brake lever return spring to stop bolt and insert free end into parking brake lever slot.
4. Install a new O-ring seal in groove of push rod. Grease recess at push rod end with Silicone Dielectric Compound D7AZ-19A331-A (ESE-M1C171-A) or equivalent.
5. Position strut pin into caliper housing and in recess of parking brake lever shaft. Insert push rod into push rod bore of caliper housing. Ensure pin is positioned correctly between shaft recess and recess at end of push rod. Place key plate over push rod so that locating nib fits into drilled locating hole in caliper housing. Install flatwasher, push rod, spring and spring cover in order.

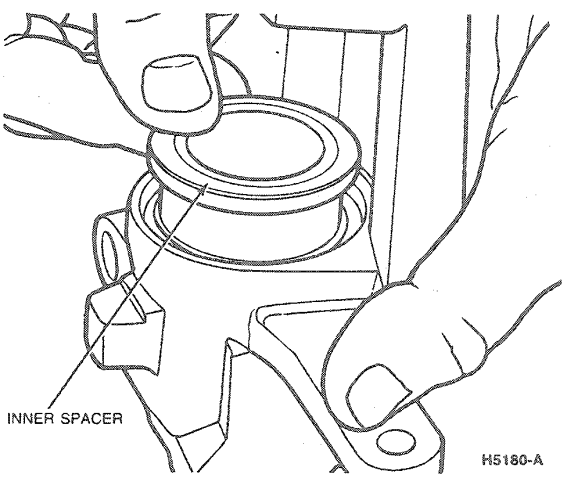


NOTE: Tools used in Steps 6 through 9 are part of Rear Caliper Spring Compressor Set T87P-2588-B.

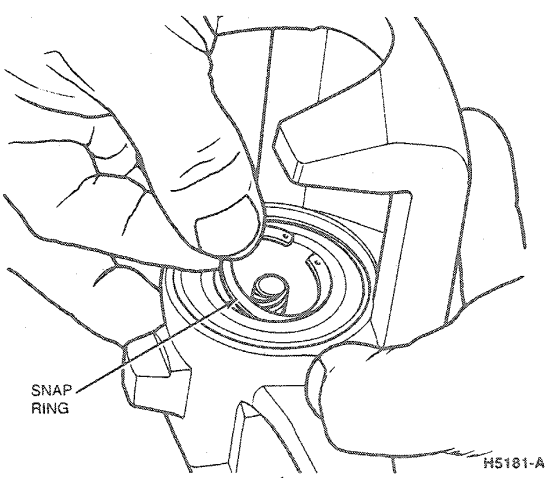
6. Insert outer spacer into piston bore.



7. Insert inner spacer into piston bore.

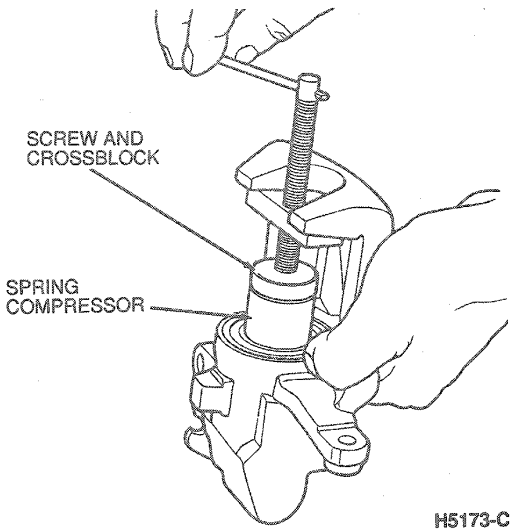


8. Place snap ring inside of inner spacer.



OVERHAUL (Continued)

9. Position spring compressor and screw and crossblock on push rod, and lightly screw tool clockwise to compress spring. Install snap ring (circlip).



CAUTION: Snap ring should click into place. Do not overcompress spring.

10. Install new piston seal in groove in caliper housing after lubricating seal with Heavy-Duty Brake Fluid C6AZ-19542-AA (ESA-M6C25-A) or equivalent.
11. Coat piston and piston dust boot with Heavy Duty Brake Fluid C6AZ-19542-AA (ESA-M6C25-A)or equivalent. Install dust boot into piston bore of caliper. Spread dust boot over piston and seat dust boot in piston groove. Rotate piston clockwise using Rear Caliper Piston Adjuster T87P-2588-A or equivalent until piston is fully seated.

    NOTE: Ensure one slot in piston face is positioned so it will engage with nib on brake pad shoe.
12. Install caliper assembly as outlined.

Rotor Refinishing

Tools Required:

- Rotunda Rotor Mounting Adapter 054-0032

The rear disc rotor is a solid full cast. A simplified method of measuring maximum allowable stock removal using a standard hand micrometer eliminates the need for special tools as on previous rear disc rotors. However, a Rotunda Rotor Mounting Adapter 054-00032 or equivalent will be required for use on the brake lathe for refinishing.

All rotor refinishing must adhere to the rule that equal amounts of rotor stock are removed from each braking surface each time a rotor is refinished.

The minimum allowable overall rotor thickness continues to be stamped on the rotor and must not be exceeded.

1. With a suitable micrometer, measure overall thickness of rotor braking surface at four equally spaced points around rotor.

    NOTE: Using a micrometer to measure rotor thickness simplifies the previous rotor measurement procedure, but it is mandatory that an equal amount of material be removed from each side of the rotor each time the rotor is turned.
2. Using lowest reading from Step 1, subtract minimum allowable thickness stamped into rotor. The difference, if any, represents the total amount of material available for machining. A thickness reading less than the minimum rotor thickness requires rotor replacement.
3. After measuring rotor, install rotor in lathe arbor using the special adapter that is required for proper rotor alignment. Never use a lathe that cuts only one face of the rotor at a time. It must be a simultaneous straddle cut. Install a dial indicator to read rotor lateral runout near center of rotor face. If runout is 0.050mm (0.002 inch) or below, proceed to machine rotor. If runout is over 0.050mm (0.002 inch), loosen rotor on arbor, and rotate rotor 90 degrees. Read runout, and if it is below 0.050mm (0.002 inch), proceed to machine the rotor. If runout is still over 0.050mm (0.002 inch), again loosen rotor, and rotate it an additional 90 degrees. Check runout. If runout is 0.050mm (0.002inch) or less, proceed to machine the rotor. If the runout still exceeds 0.050mm (0.002 inch), return rotor to best runout position obtained. If rotor runout can be brought below 0.050mm (0.002 inch), proceed to machine rotor. If rotor cannot be brought below 0.050mm (0.002 inch) runout, it must be replaced.
4. Set cutting tool to just contact high spots on rotor, then adjust cutting tool to minimum depth required to clean up rotor face. Equal material must be removed from each side. Do not exceed allowable stock removal. Clean all cuttings and chips from rotor and lubricate the hub pilot diameter with Disc Brake Caliper Slide Grease D7AZ-19590-A, (ESA-M1C172-A) or equivalent grease prior to installing rotor. Lubrication is required to ease future removal of rotor.

SPECIFICATIONS

BRAKE DIMENSIONS

Description	Specification Metric (USA) [1]
Lining Material	Nuturn 90-085
Lining Size Inner and Outer	93 x 34.5 x 12 (3.66 x 1.36 x 0.47)

(Continued)

SPECIFICATIONS (Continued)

BRAKE DIMENSIONS (Cont'd)

Description	Specification Metric (USA) [1]
Lining Wear Limit (From Shoe Surface)	3.12 (0.123)
Caliper Cylinder Bore Diameter	42.9 (1.69)
Rear Rotor Nominal Thickness	24.0 (0.94)
Rear Rotor [2] Minimum Thickness	12.75 (0.050)
Rear Rotor Diameter Inner Outer	 171 (6.73) 256.5 (10.10)
Rear Rotor Allowable Runout	0.050 (0.002)
Rear Rotor Finish [3]	0.4-3.2um (16-25u in)
Rear Rotor Thickness Variation	0.01 (0.0004)

1 mm (inches) unless specified.
2 Minimum safe thickness is shown on each rotor.
3 um micrometer (u in. micro inches)

TORQUE SPECIFICATIONS

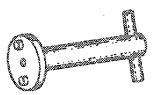
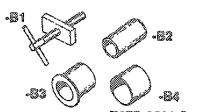
Description	N·m	Lb-Ft
Flex Hose-to-Caliper Retaining Bolt	41-54	30-40
Anchor Plate Retaining Bolts	87-119	64-88
Splash Shield Retaining Screws	8-12	71-106 (Lb-In)
Brake Adapter Retaining Bolts	59-81	44-60
Slider Pin Pinch Bolt	31-35	23-26
Parking Brake Lever Limiting Bolt	6-9	4.5-7
Brake Flex Hose Bracket to Strut	11-16	8-11

(Continued)

TORQUE SPECIFICATIONS (Cont'd)

Description	N·m	Lb-Ft
Hub Retainer and Washer Assembly	255-345	188-254
Sensor Assembly Screw	4.5-6.8	40-60 (Lb-In)
Bleeder Screw	8-13	71-115 (Lb-In)
Wheel Lug Nuts	115-142	85-105

SPECIAL SERVICE TOOLS

Tool Number / Description	Illustration
T87P-2588-A Rear Caliper Piston Adjuster	 T87P-2588-A
T87P-2588-B Caliper Spring Compressor Set	 -B1 -B2 -B3 -B4 T87P-2588-B

ROTUNDA EQUIPMENT

Model	Description
054-00032	Rotor Mounting Adapter

SECTION 06-05 Brake System, Parking

SUBJECT	PAGE
ADJUSTMENTS	
Parking Brake	06-05-6
DESCRIPTION	
Control Assemblies	06-05-1
DIAGNOSIS AND TESTING	
Vacuum Release Parking Brake	06-05-3
REMOVAL AND INSTALLATION	
Cable, Front	06-05-4
REMOVAL AND INSTALLATION (Cont'd.)	
Cables, Rear	06-05-5
Control Assembly	06-05-3
Parking Brake Manual Release Handle and Cable Assembly	06-05-4
SPECIAL SERVICE TOOLS	06-05-8
SPECIFICATIONS	06-05-8
VEHICLE APPLICATION	06-05-1

VEHICLE APPLICATION

Taurus / Sable.

DESCRIPTION

WARNING: BRAKE FLUID CONTAINS POLYGLYCOL ETHERS AND POLYGLYCOLS. AVOID CONTACT WITH EYES. WASH HANDS THOROUGHLY AFTER HANDLING. IF BRAKE FLUID CONTACTS EYES, FLUSH EYES WITH RUNNING WATER FOR 15 MINUTES. GET MEDICAL ATTENTION IF IRRITATION PERSISTS. IF TAKEN INTERNALLY, DRINK WATER AND INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.

The parking brake system is cable actuated and controlled by an independent foot-operated parking brake control.

Control Assemblies

An independent foot-operated parking brake control actuates the rear wheel brake shoes through a cable system.

The parking brake warning indicator can be actuated by the parking brake control. It warns the driver to release the parking brake control before driving the vehicle. If the indicator remains lit, a brake malfunction has occurred.

The automatic (vacuum) release parking brake control is optional equipment.

On the automatic vacuum-type parking brake system, the vacuum power unit with mounting bracket is bolted to the control assembly.

The vacuum-actuated diaphragm within the unit is connected by a rod to the lower end of the release lever.

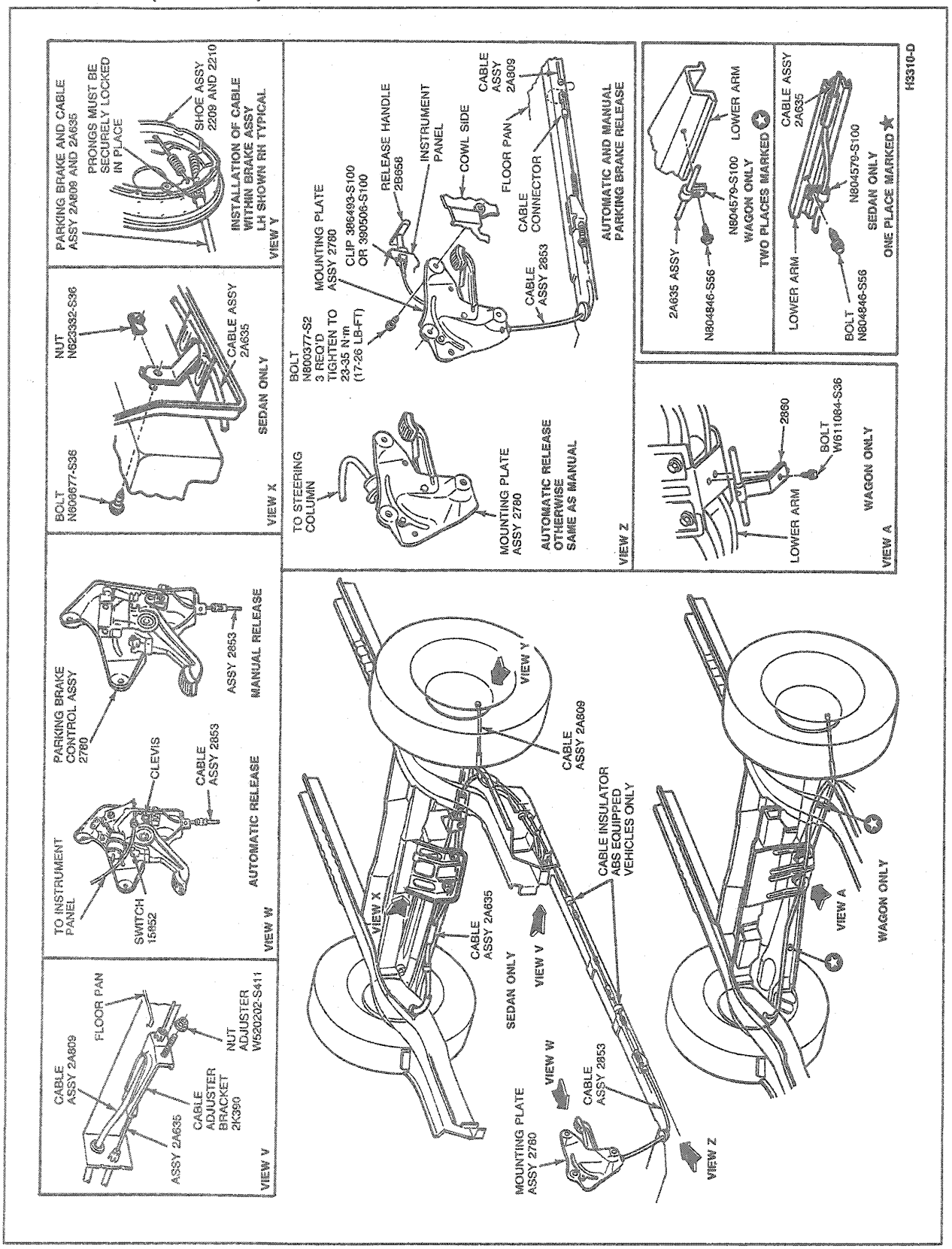
Hoses connect the vacuum motor to the engine manifold through a vacuum release switch at the steering column or floor shifter.

The vacuum motor is actuated to release the parking brake whenever the engine is running and the transmission is in a forward driving gear.

To manually release the automatic vacuum-type parking brake, a T-handle extends from the lower portion of the instrument panel, left of the steering column. Pulling on this handle releases the parking brake.

On the manually-released type, a T-handle extends from the lower portion of the LH side of the instrument panel. Pulling this handle releases the parking brake.

DESCRIPTION (Continued)



DIAGNOSIS AND TESTING

Vacuum Release Parking Brake

Tools Required:

- Rotunda Vacuum Tester 021-00014

Look closely at the operation of the brake linkage as the brake pedal is depressed. Then, check the operation of the brake linkage when the manual release lever is activated. These checks will indicate whether the manual parking brake control linkage is operating properly or requires service or adjustment. Adjustment may be necessary if the parking brake is unable to prevent moderate vehicle movement. Perform tests of the parking brake system and controls after making sure the linkage and manual controls operate properly.

When testing a parking brake vacuum release system, a minimum of 34 kPa (10 in-Hg) should be available at all points where vacuum is applied. This can be checked with a gauge such as Rotunda Vacuum Tester 021-00014 or equivalent.

Failure to maintain 34 kPa (10 in-Hg) during vacuum system tests could be caused by a loose hose connection, resulting in a vacuum leak. When checking for vacuum between two points, trace the hose along its entire routing to ensure it is not crossed with another hose or connected to the wrong connection.

All of the vacuum parking brake control checks are to be performed with the engine running at idle speed.

To detect any leaks in the parking brake vacuum hoses or to find disconnected or improperly connected hoses, listen for a hissing sound along the hose routing.

CAUTION: Do not apply air pressure to the vacuum system under any circumstances because the actuator diaphragm in the parking brake vacuum motor may be damaged.

1. Start engine and run it at idle speed. With the transaxle shift control in NEUTRAL, depress parking brake pedal to apply parking brake. Move transaxle shift control to D range, and observe the parking brake sector to determine if sector returns to its zero travel position when parking brake releases. If parking brake releases, parking vacuum control is working properly.

   NOTE: The parking brake vacuum release does not operate with transaxle in REVERSE.

2. If parking brake does not release, test for vacuum at vacuum line which is connected to the parking brake release vacuum motor. This can be accomplished by removing hoses from each component and attaching it to vacuum gauge. Vacuum will be available at vacuum motor only when transaxle selector is in D range. Connect two distributor tester vacuum hose adapters together with a coupling as a connector attaching the gauge. A minimum of 34 kPa (10 in-Hg) is required to actuate parking brake vacuum motor. If minimum reading is not present when performing this check, determine the damaged component and replace.

Operation Test

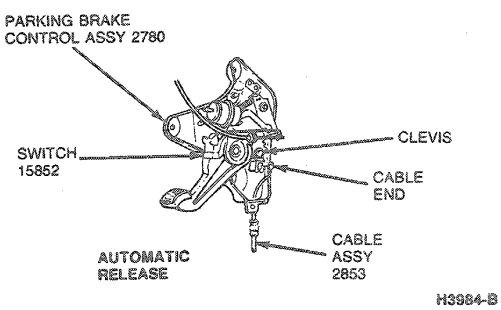
Check operation of the parking brake with vehicle on a hoist and parking brake fully released. Refer to Section 00-02. If there is any slack in the cables or if rear brakes drag when wheels are turned, adjust as required.

REMOVAL AND INSTALLATION

Control Assembly

Removal

1. Fully release parking brake.
2. Raise vehicle. Refer to Section 00-02.
3. Remove all tension from rear cables by backing off adjusting nut from equalizer or adjuster.
4. Lower vehicle.
5. Disconnect vacuum hose from vacuum release motor, if so equipped.
6. Disconnect release cable from parking brake control release arm and remove release cable grommet from parking brake control.
7. Disconnect wiring connector from parking brake warning indicator switch.
8. Remove cable end from clevis at brake control.



9. Remove push pin from cowl side trim panel.
10. Remove conduit retainer from control assembly using a 13mm box-end wrench to depress retaining prongs.
11. Remove three bolts and one push pin retaining control assembly to cowl side panel.
12. Remove control assembly from vehicle.

Installation

1. Position control assembly in vehicle.
2. Fit cable assembly through its mounting hole, and press pronged retainer in place. Ensure prongs are securely locked in place. Connect the cable end fitting to clevis at control assembly.
3. Install retaining bolts and push pin to cowl side bracket. Tighten screws to 23-35 N·m (17-26 lb-ft).

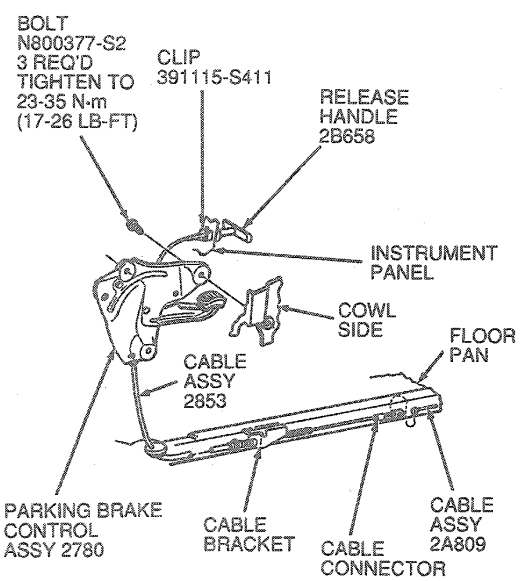
REMOVAL AND INSTALLATION (Continued)

4. Connect vacuum hose to vacuum release actuator, if so equipped.
5. Connect release cable to parking brake control release arm and install release cable grommet to parking brake control.
6. Connect wiring connector to parking brake warning indicator switch.
7. Raise vehicle. Refer to Section 00-02. Check parking brake operation and adjust as required. Lower vehicle.

Parking Brake Manual Release Handle and Cable Assembly

Removal

1. Disconnect release cable from parking brake control release arm and remove release cable grommet from parking brake control.
2. From under instrument panel, using a screwdriver, pry off and remove retainer clip securing cable and handle to instrument panel. Pull handle and cable assembly out of instrument panel.



AUTOMATIC AND MANUAL PARKING BRAKE RELEASE HANDLE H3986-C

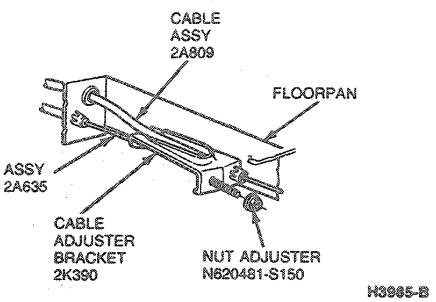
Installation

1. Start cable and handle assembly through locating hole in instrument panel and install retainer clip that secures handle to instrument panel.
2. Connect release cable to parking brake control release arm and install release cable grommet to parking brake control.

Cable, Front

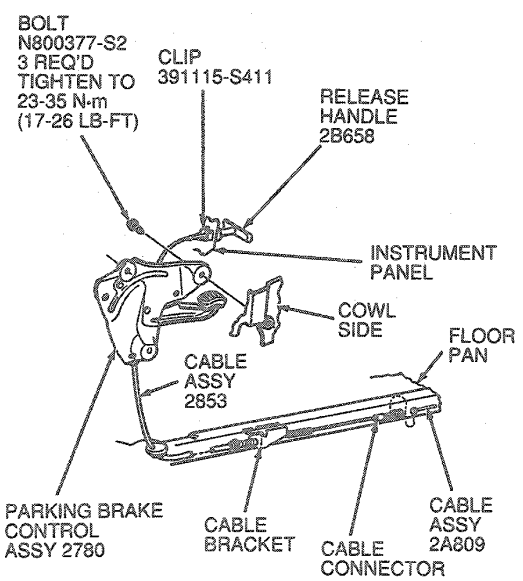
Removal

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Loosen adjuster nut at adjuster bracket.
3. Lower vehicle.
4. Disconnect cable from control assembly at clevis, using a 13mm box-end wrench to depress the conduit retaining, prongs and remove cable end pronged fitting from brake control.
5. Remove LH cowl side panel and pull carpet back to expose cable.
6. Raise vehicle. Refer to Section 00-02.



H3985-B

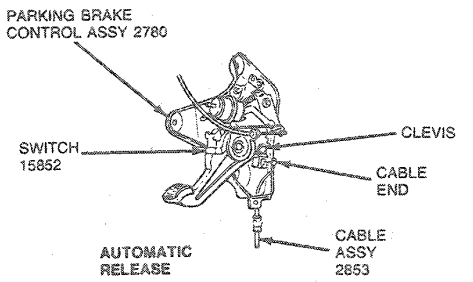
7. Disconnect front cable from rear cable at cable connector.
8. Remove cable and push-in prong retainer from cable bracket, using a 13mm box-end wrench to depress retaining prongs.



AUTOMATIC AND MANUAL PARKING BRAKE RELEASE HANDLE H3986-C

REMOVAL AND INSTALLATION (Continued)

9. Pull grommet down from floorpan.



Installation

1. Start cable through hole in floorpan and secure grommet in place.

   NOTE: Prongs must be securely locked in place.
2. Position cable through front cable bracket at frame side rail. Push prong into bracket.
3. Connect rear cable to front cable at connector.
4. Lower vehicle.
5. Push prong retainer into parking brake housing until prongs are secure, then connect cable to control clevis.
6. Reinstall carpet and LH cowl panel.
7. Raise vehicle. Refer to Section 00-02.
8. Adjust parking brake and lower vehicle.
9. Check parking brake operation.

Cables, Rear

LH Cable

Removal

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Remove parking brake cable adjusting nut.
3. Remove rear cable end fitting from front cable connector.
4. **Drum Brakes:** Remove wheel and drum assembly. Refer to Section 06-02.
5. **Drum Brakes:** Disconnect brake cable end from parking brake actuating lever. Using a 13mm box-end wrench to depress the conduit retaining prongs, remove cable end pronged fitting from backing plate.
6. **Disc Brakes:** Disconnect brake cable end from parking brake actuating lever by removing E-clip from conduit end of fitting at caliper, and remove cable from caliper.
7. Push plastic snap-in grommet rearward to disconnect from side rail bracket.
8. Remove pronged connector from parking brake adjuster bracket. Remove cable assembly.

Installation

1. Insert cable through side rail bracket and adjuster bracket. Ensure pronged connector is securely attached to brake adjuster bracket.
2. Seat plastic snap-in grommet inside rail bracket.

   NOTE: Cable must be located over the RH cable.
3. **Drum Brakes:** Insert cable end into brake assembly backing plate and push pronged cable end into brake backing plate hole. Ensure prongs are locked in place.

   NOTE: Cable must be located over the RH cable.
4. **Disc Brakes:** Insert cable end into caliper and install E-clip.
5. Attach cable end to parking brake actuating lever.
6. Attach cable to front cable connector.
7. Install drum and wheel assembly. Refer to Section 06-02.
8. Install brake cable adjusting nut.
9. Adjust parking brake and lower vehicle.
10. Check for proper operation.

RH Cable

Removal

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Remove parking brake cable adjusting nut.
3. Use a 13mm box-end wrench to remove conduit retainer prongs and remove cable from frame side rail bracket.
4. **Disc Brakes:** Disconnect brake cable from parking brake actuating lever by removing E-clip from conduit end fitting at caliper and remove cable from caliper.
5. **Drum Brakes:** Remove wheel and drum assembly.
6. **Drum Brakes:** Disconnect brake cable from parking brake actuating lever. Using a 13mm box-end wrench to depress the conduit retaining prongs, remove cable end pronged fitting from brake backing plate.
7. **Sedan:** Remove brake pressure control valve bracket at suspension arm.
8. **Sedan:** Remove cable retaining screw and clip from lower suspension arm and one screw from cable bracket at crossmember. Remove entire RH cable assembly.

   Wagon: Remove cable retaining clip and screw from each lower suspension arm, and one screw from cable retaining clip on lower suspension arm inner mounting bracket.

Installation

1. Insert cable into opening in frame side rail bracket and threaded end of cable in adjuster, and start adjuster nut on threads. Ensure pronged fitting is pressed into frame side rail bracket and securely locked in place.

REMOVAL AND INSTALLATION (Continued)

2. Route cable under LH brake cable and lower suspension arms.
3. Secure cable end into parking brake actuating lever.
4. **Disc Brakes:** Insert cable end into caliper and install E-clip.
5. **Drum Brakes:** Insert cable end pronged fitting into brake backing plate and securely lock in place.
6. Attach cable locator crossmember bracket and install nut and screw. Tighten to 8-11 N·m (71-97 lb-in).
7. Install brake cable retaining clips (wagon) or screw and clip (sedan) to suspension arms. Tighten retaining screws to 8-11 N·m (71-97 lb-in).
8. Install brake pressure control valve assembly bracket to control arm. Tighten to 6-8 N·m (50-70 lb-in).
9. **Drum Brakes:** Install drum and wheel assembly. Refer to Section 06-02.
10. Adjust parking brake.
11. Lower vehicle.
12. Check for proper operation.

ADJUSTMENTS

Parking Brake

Cable Adjustment

Taurus/Sable Drum Brake

1. Make sure parking brake is fully released.
2. Place transaxle in NEUTRAL. Raise vehicle on axle-type hoist. Refer to Section 00-02. If body contact hoist is used, support rear axle with jackstands.
3. Tighten adjusting nut against cable equalizer, causing a rear wheel brake drag. (Refer to the appropriate illustration for location of the adjusting nut).

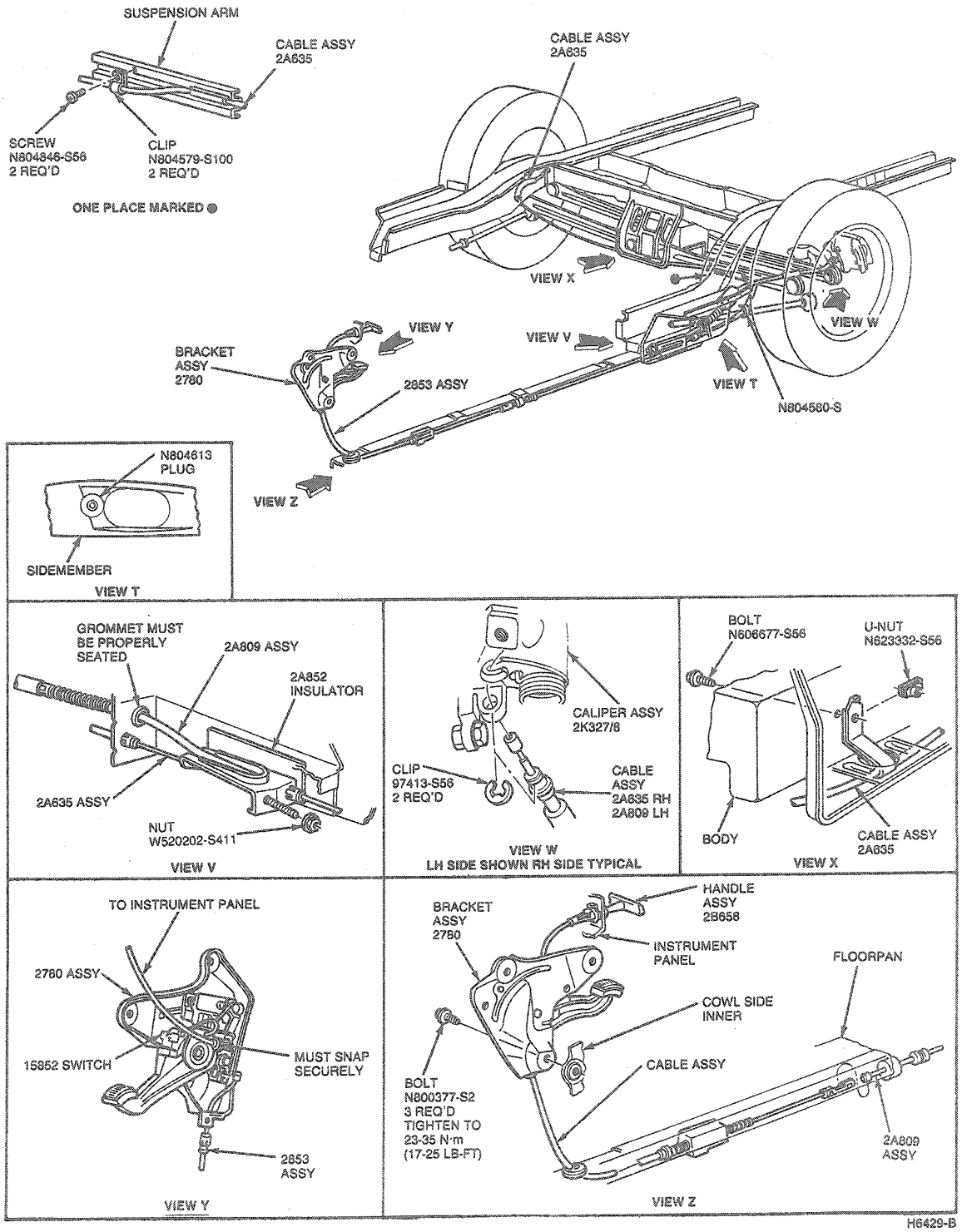
   Loosen adjusting nut until rear brakes are fully released. There should be no brake drag. If brake cables are replaced in any system having a foot-operated control assembly, stroke parking brake control with approximately 445N (100 lb) pedal effort, then release control and repeat this step.
4. Lower vehicle and check operation of parking brake.

Taurus SHO, Taurus/Sable Disc Brake

1. Make sure parking brake is fully released.
2. Raise vehicle. Refer to Section 00-02.
3. Tighten adjusting nut against cable adjuster bracket until there is a slight (less than 1.59mm (1/16 inch) movement of either rear parking brake lever at caliper. Refer to the illustration.

   If brake cables are replaced in any system having a foot-operated control assembly, depress parking brake control fully, then release control and repeat this step.
4. Lower vehicle and check operation of parking brake.

ADJUSTMENTS (Continued)



SPECIFICATIONS

TORQUE SPECIFICATIONS

Description	N·m	Lb-In
Parking Brake Assembly to Cowl Mounting Bolts	23-35	17-26 (Lb-Ft)
Cable Retaining Clip Screw	8-11	71-97
Brake Pressure Control Valve Assy	6-8	50-70
Cable Locator Bracket	8-11	71-97

SPECIAL SERVICE TOOLS

ROTUNDA EQUIPMENT

Model	Description
021-00014	Vacuum Tester

SECTION 06-06 Brake System, Hydraulic

SUBJECT	PAGE
ADJUSTMENTS	
Brake Pressure Control Valve	06-06-13
Brake Vacuum Booster Push Rod-To-Master Cylinder	06-06-11
DESCRIPTION	
Brake System, Anti-Lock	06-06-1
Brake System, Dual	06-06-2
Fluid Level Indicator	06-06-6
Master Cylinder	06-06-1
Pressure Control Valves	06-06-2
OVERHAUL	
Master Cylinder	06-06-10
REMOVAL AND INSTALLATION	
Brake Master Cylinder Reservoir	06-06-6
Brake Pedal	06-06-8
Brake Pressure Control Valve	06-06-6
Master Cylinder	06-06-6
SPECIAL SERVICE TOOLS	06-06-14
SPECIFICATIONS	06-06-13
VEHICLE APPLICATION	06-06-1

VEHICLE APPLICATION

Taurus / Sable and Taurus SHO.

DESCRIPTION

WARNING: BRAKE FLUID CONTAINS POLYGLYCOL ETHERS AND POLYGLYCOLS. AVOID CONTACT WITH EYES. WASH HANDS THOROUGHLY AFTER HANDLING. IF BRAKE FLUID CONTACTS EYES, FLUSH EYES WITH RUNNING WATER FOR 15 MINUTES. GET MEDICAL ATTENTION IF IRRITATION PERSISTS. IF TAKEN INTERNALLY, DRINK WATER AND INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.

Brake System, Anti-Lock

The ABS is a four-wheel system which prevents wheel lockup by automatically modulating the brake pressure during an emergency stop. By not locking the wheels, it enables the driver to maintain steering control and stop in the shortest possible distance under most conditions.

During normal braking the ABS and Non-ABS brake pedal feel will be the same. During ABS operation, a pulsation can be felt in the brake pedal, accompanied with a fall then a rise in pedal height and a clicking sound.

Vehicles with ABS are equipped with a pedal actuated dual brake system. The system consists of the following:

- Power brake booster
- Master cylinder
- Brake pressure control valves
- Brake tubes and hoses

The dual hydraulic system is diagonally split with the LH front and RH rear comprising one circuit and the RH front and LH rear, the other circuit.

Master Cylinder

The master cylinder has a common plastic reservoir and fluid level indicator combined in one assembly. The ABS master cylinder has a fitting for connecting the hydraulic control unit (HCU) supply hose.

DESCRIPTION (Continued)

Brake System, Dual

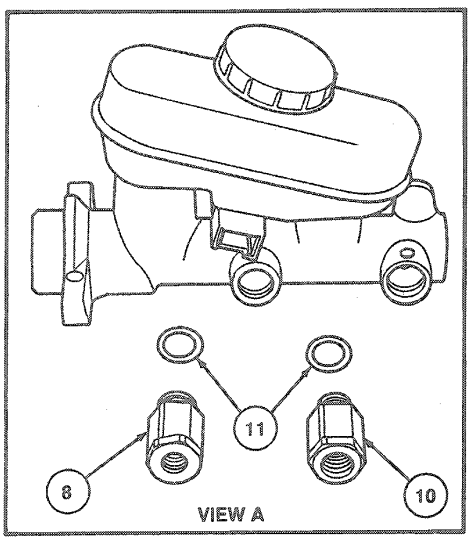
The dual hydraulic brake system is a conventional, pedal-actuated system with a master cylinder, pressure control valve, brake tubes and hoses. The hydraulic brake line routing has been diagonally split front to rear (LH front to RH rear and RH front to LH rear). The master cylinder has a common reservoir, brake pressure control valves (wagon only), and a fluid level indicator, all combined in one assembly.

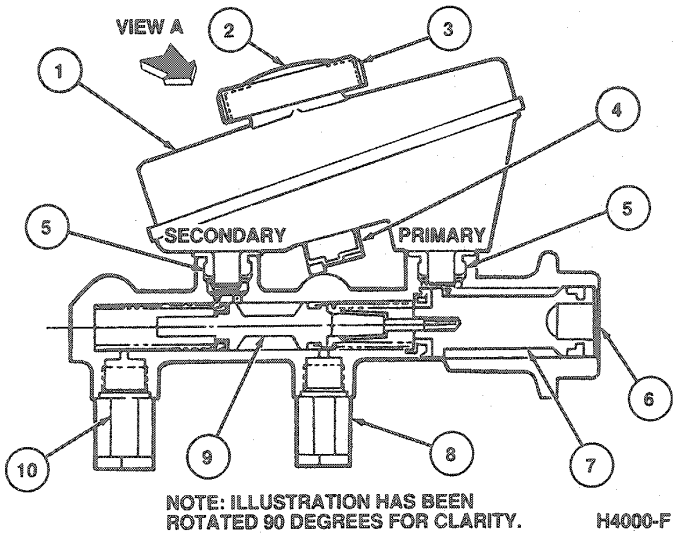
Pressure Control Valves

The sedan and station wagon use different types of rear brake pressure control valves. The valve for the sedan is mounted to the floorpan near the left rear wheel. It uses a mechanical linkage to the lower suspension arm to vary valve performance based on the rear weight of the vehicle.

The valves for the station wagon are installed in the master cylinder. They limit the pressure level at the rear brakes to minimize rear wheel lockup during hard braking.

Wagon





NOTE: ILLUSTRATION HAS BEEN ROTATED 90 DEGREES FOR CLARITY. H4000-F

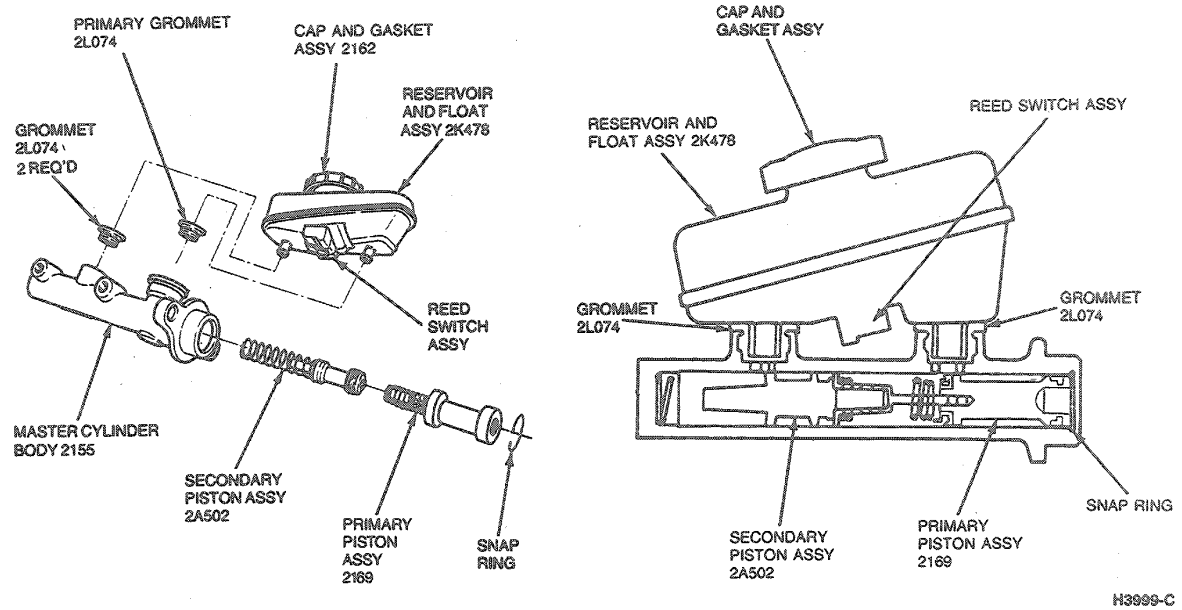
Item	Part Number	Description
1	2K478	Reservoir and Float Assy
2	2162	Cap and Gasket Assy
3	—	Cap Vent Slot (2 places)
4	—	Reed Switch Assy
5	2L074	Grommet
6	—	Snap Ring

(Continued)

Item	Part Number	Description
7	2169	Primary Piston Assy
8	2B091	LH Rear Pressure Control Valve
9	2A502	Secondary Piston Assy
10	2B091	RH Rear Pressure Control Valve
11	—	O-Ring

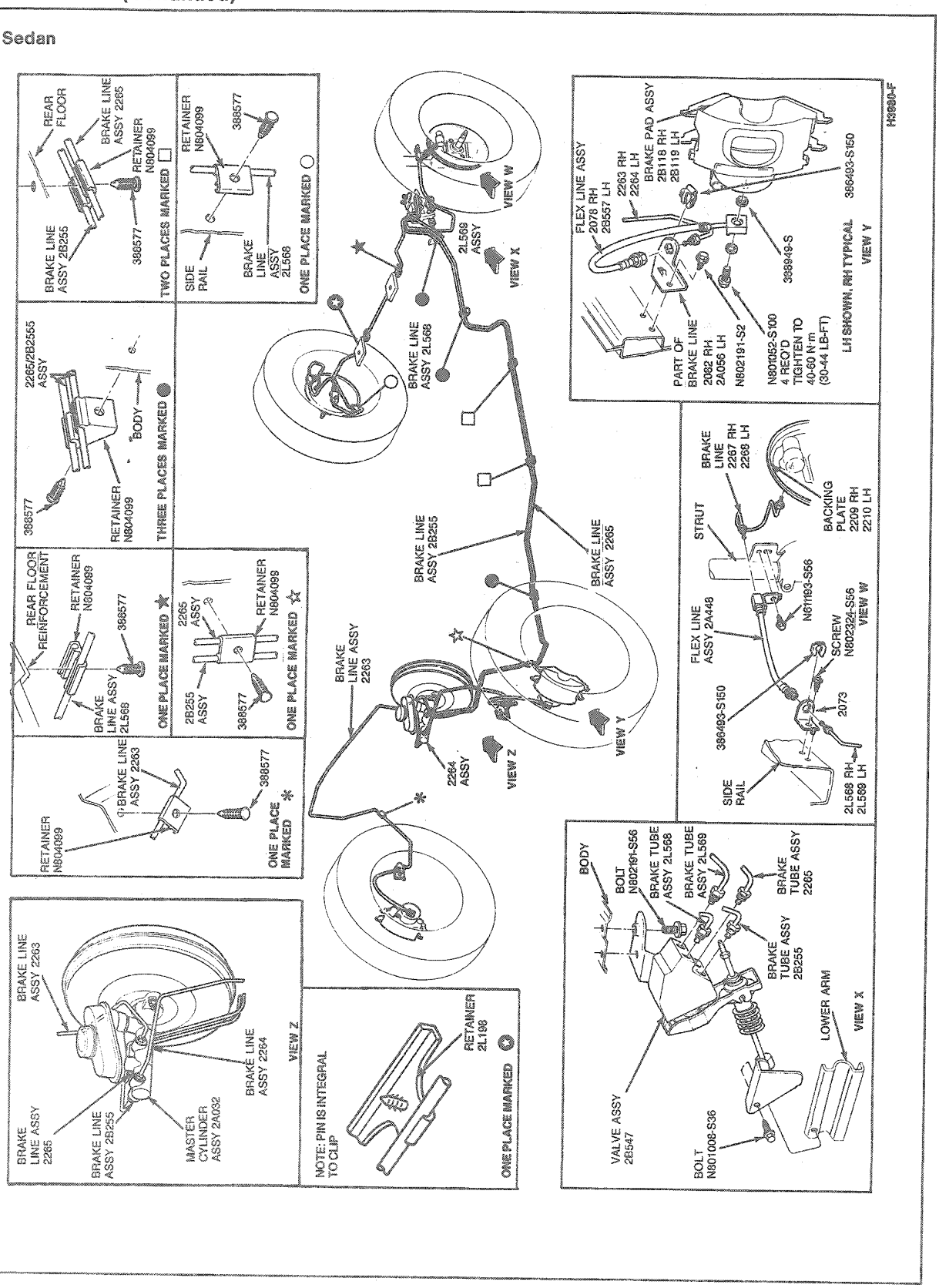
DESCRIPTION (Continued)

Sedan



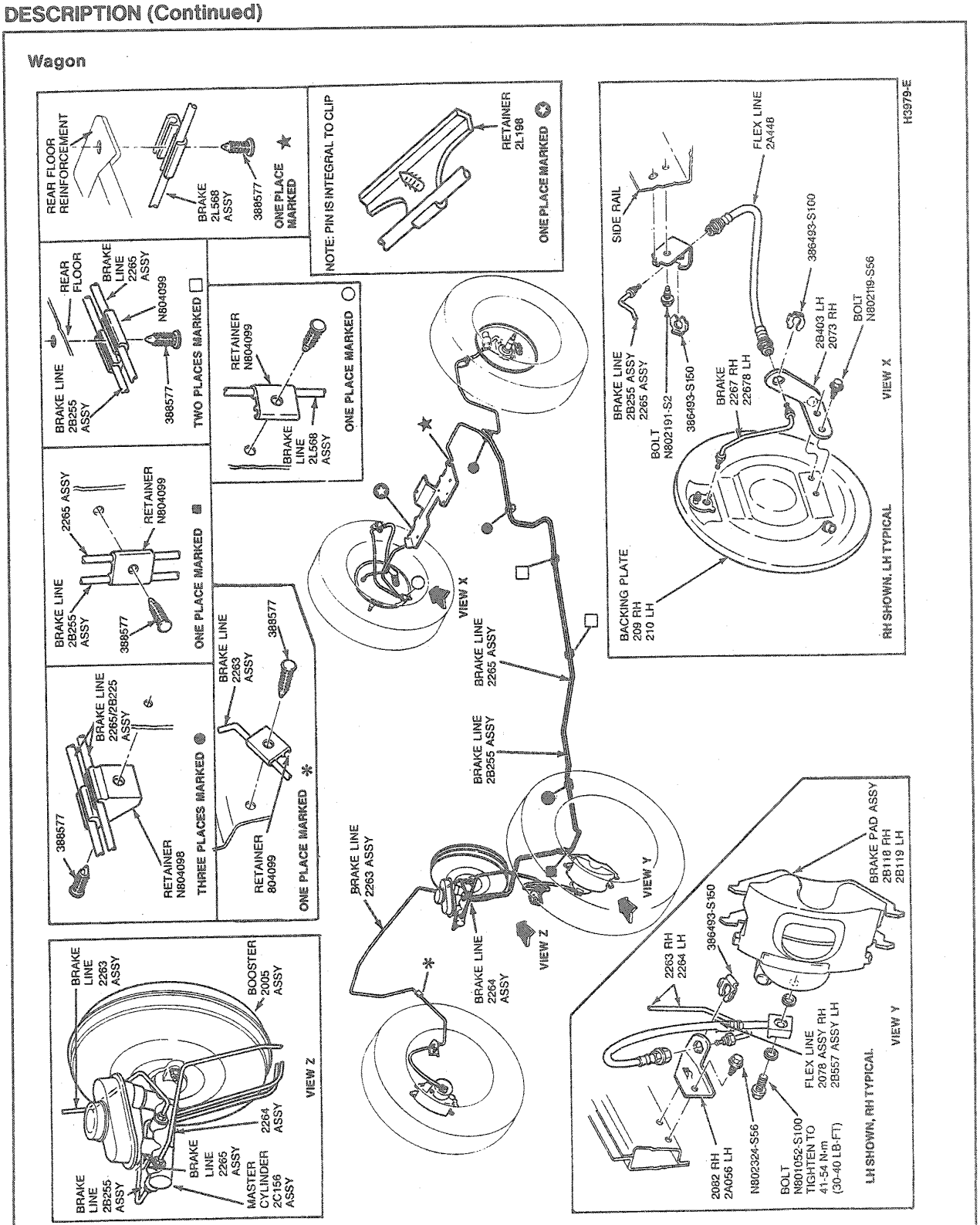
DESCRIPTION (Continued)

Sedan



DESCRIPTION (Continued)

Wagon



DESCRIPTION (Continued)

Fluid Level Indicator

The fluid level indicator replaces the pressure differential valve used in the previous brake systems. It is contained inside the body of the master cylinder plastic reservoir and activates the BRAKE warning indicator whenever fluid level is low.

REMOVAL AND INSTALLATION

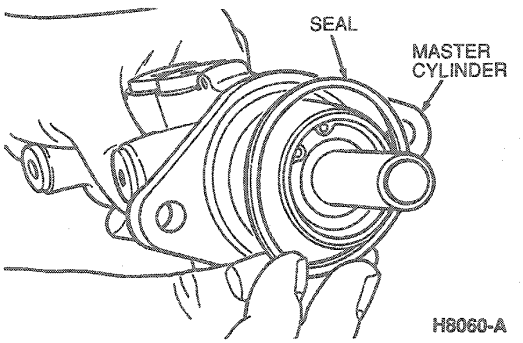
Master Cylinder

Removal

1. For ABS vehicles, depress brake pedal several times to exhaust all vacuum in system.
2. Remove brake tubes from primary and secondary outlet ports of master cylinder and pressure control valves (wagon).
3. Disconnect brake warning indicator connector.
4. For ABS vehicles, disconnect hydraulic control unit (HCU) supply hose at master cylinder and secure in a position to prevent loss of brake fluid.
5. Remove two nuts retaining master cylinder to brake booster assembly.
6. Slide master cylinder forward and upward from vehicle.

Installation

1. For ABS vehicles, install a new seal in groove in master cylinder mounting face.



2. Position master cylinder over booster push rod and onto two studs on booster assembly.
3. Install nuts and tighten to 21-29 N·m (16-21 lb-ft).
4. Install brake tubes to master cylinder and pressure control valve (wagon) outlet ports.
5. For ABS vehicles, install HCU supply hose to master cylinder fitting and secure with hose clamp.
6. Connect brake warning indicator connector.
7. Fill master cylinder with Heavy Duty Brake Fluid C6AZ-19542-AA (ESA-M6C25-A) or DOT 3 equivalent to 4.0mm (0.16 inch) below MAX line on side of reservoir.
8. Bleed brake system as outlined.
9. Operate brakes several times, then check for external hydraulic leaks.

Brake Master Cylinder Reservoir

Removal

NOTE: Whenever the small (secondary) reservoir port is removed from the master cylinder, the reservoir assembly must be replaced and new grommets must be installed.

1. Disconnect fluid level indicator switch.
2. Remove cap from reservoir.
3. Using needle-nose pliers, remove float from reservoir (vehicles without ABS).
4. Remove brake fluid from reservoir.
5. For ABS vehicles, disconnect HCU supply hose from reservoir fitting and secure in a position to prevent loss of brake fluid.
6. Remove primary reservoir port from master cylinder by prying upward with rod or long screwdriver. For ABS vehicles, while prying upward on reservoir, simultaneously pry reservoir retaining leg off pin.
7. Remove secondary reservoir port in same manner and discard complete reservoir assembly.
8. Remove grommets from master cylinder.

Installation

1. Wet new grommet in clean brake fluid and press into master cylinder.
2. Wet reservoir ports in clean brake fluid and press new reservoir assembly into grommets. For ABS vehicles, while pressing the reservoir into grommets, assemble reservoir retaining legs on pins.
3. For ABS vehicles, install HCU supply hose to reservoir fitting and secure with hose clamp.
4. Connect fluid level indicator switch.
5. Fill master cylinder with specified brake fluid to MAX line. Use Heavy-Duty Brake Fluid C6AZ-19542-AA (ESA-M6C25-A) or DOT-3 equivalent.

Brake Pressure Control Valve

Sedan

Removal

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Disconnect four brake tubes from valve assembly and note position.

REMOVAL AND INSTALLATION (Continued)

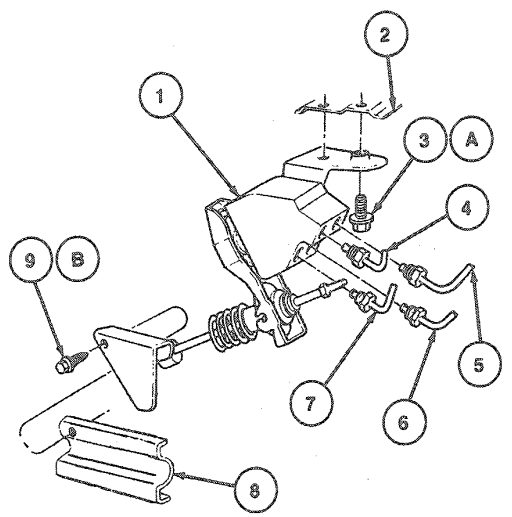
3. Remove screw retaining valve bracket to lower suspension arm.

   NOTE: The service replacement valve will have a red plastic gauge clip on the valve and must not be removed until installed on the vehicle.

4. Remove two screws retaining valve bracket to underbody and remove assembly.

Installation

1. Ensure rear suspension is in full rebound.
2. Ensure the red plastic gauge clip is in position on the valve and the operating rod lower adjustment screw is loose.
3. Position valve assembly to underbody and install two retaining screws.
4. Position valve lower mounting bracket to lower suspension arm. Install one retaining screw. Tighten to 6-8 N·m (4-6 lb-ft). Ensure the valve adjuster sleeve is resting on lower bracket and install setscrew.
5. Connect four brake tubes in the same position as removed.
6. Bleed rear brakes.
7. Remove red plastic gauge clip and lower vehicle.



H4007-E

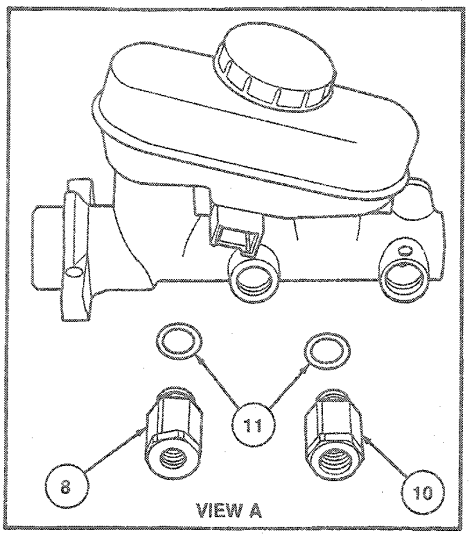
Item	Part Number	Description
1	2B547	Valve Assy
2	—	Body
3A	N802191-S56	Bolt
4	2L568	Brake Tube Assy
5	2L569	Brake Tube Assy
6	2265	Brake Tube Assy
7	2B255	Brake Tube Assy
8	—	Lower Arm
9B	N804846-S56	Bolt
A		Tighten to 11.4-15.6 N·m (8-12 Lb-Ft)
B		Tighten to 6-8 N·m (4-6 Lb-Ft)

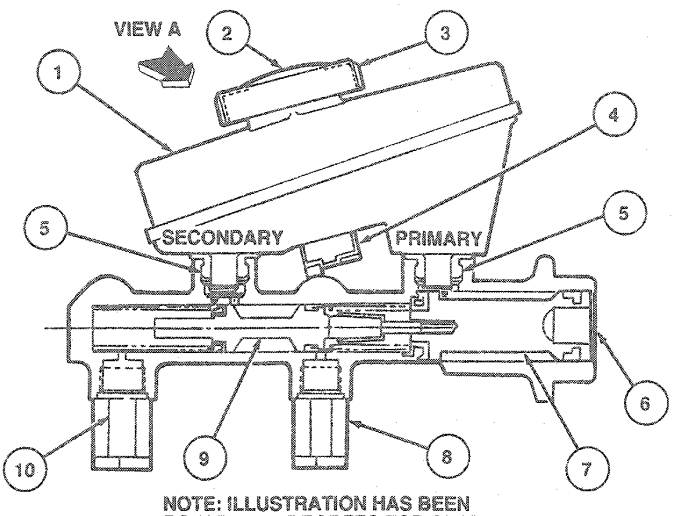
Station Wagon

Removal

1. Disconnect primary or secondary brake tube as necessary.
2. Loosen and remove pressure control valve from the master cylinder housing.

REMOVAL AND INSTALLATION (Continued)





Item	Part Number	Description
1	2K478	Reservoir and Float Assy
2	2162	Cap and Gasket Assy
3	—	Cap Vent Slot (2 places)
4	—	Reed Switch Assy
5	2L074	Grommet
6	—	Snap Ring

(Continued)

Item	Part Number	Description
7	2169	Primary Piston Assy
8	2B091	LH Rear Pressure Control Valve
9	2A502	Secondary Piston Assy
10	2B091	RH Rear Pressure Control Valve
11	—	O-Ring

Installation

1. Install pressure control valve in master cylinder housing port and tighten to 13-24 N·m (10-18 lb-ft).
2. Install the brake tube and tighten to 16-20 N·m (12-15 lb-ft).
3. Fill and bleed brake system as outlined.

Brake Pedal

Removal

1. Disconnect battery ground cable.
2. Disconnect stoplamp switch wire connector from the switch.
3. Remove push rod retainer and nylon washer. Slide stoplamp switch outboard along brake pedal pin just far enough for outer hole of switch frame to clear pin. Remove switch by sliding it upward. Remove black stoplamp switch bushing from push rod.
4. Loosen four power brake booster retaining nuts at the pedal support and slide the push rod and inner nylon washer, on vehicle without speed control, off pedal pin.
5. Remove locknut and then remove pivot bolt, brake pedal, pivot spacer and bushings from the pedal support. Remove speed control adapter, if so equipped, by unlatching the locking tab.

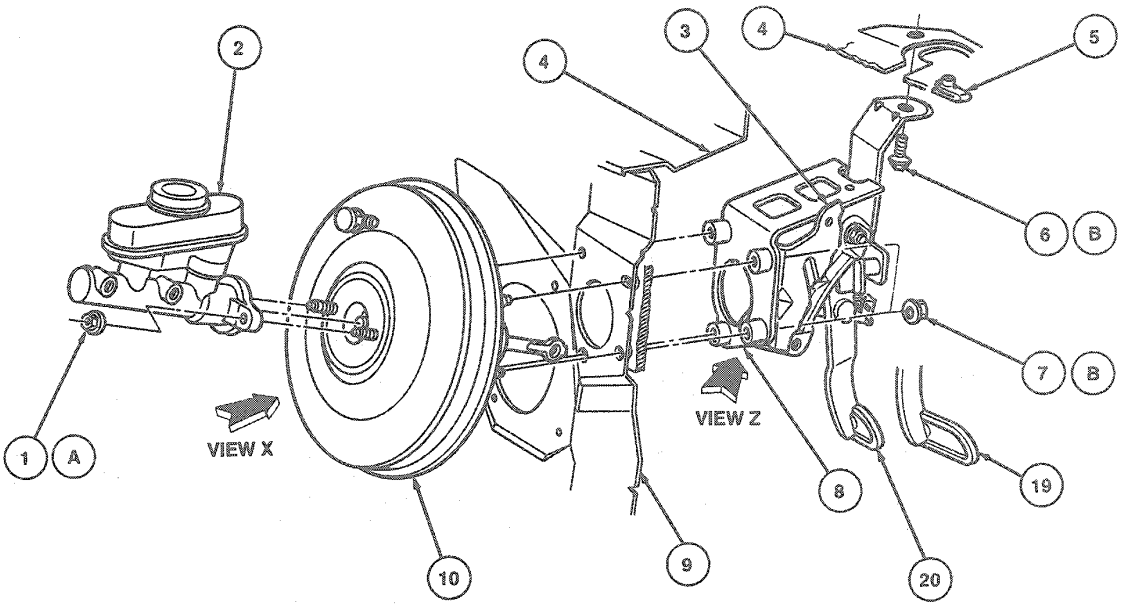
Installation

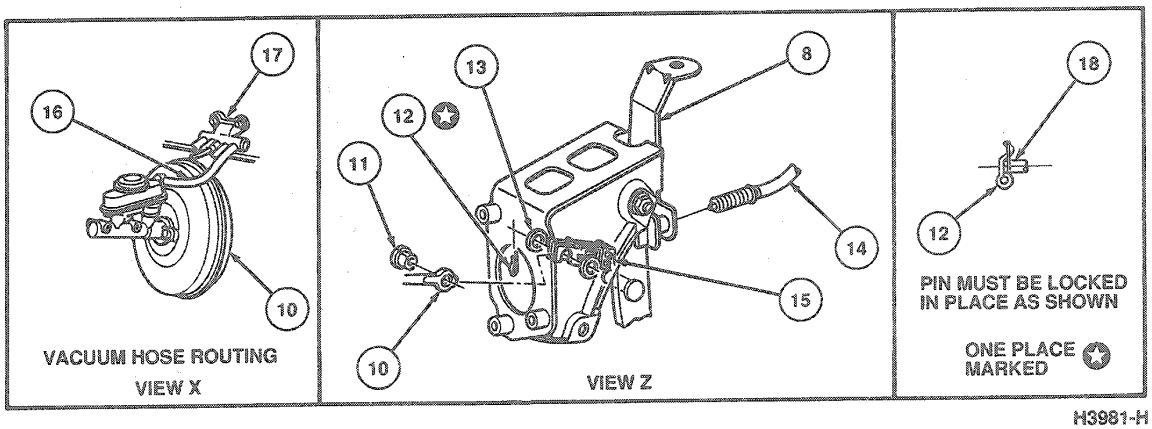
1. Apply a light coating of SAE 10W40 engine oil to clean bushings. Locate bushings and pivot spacer in brake pedal hub.
2. Position brake pedal in the pedal support and install pivot bolt. Install locknut. Tighten to 14-27 N·m (10-20 lb-ft).

   NOTE: The head of the booster push rod bushing must be on the side of the booster pushrod away from the pedal.

REMOVAL AND INSTALLATION (Continued)

3. Install the inner nylon washer or speed control adapter, if so equipped, the master cylinder push rod, and the black stoplamp switch bushing on the brake pedal pin. Do not oil stoplamp switch. Position the stoplamp switch so that it straddles the push rod with the slot on the pedal pin and the switch outer frame hole just clearing the pin. Slide the switch down onto the pin and push rod. Slide assembly inboard toward brake pedal arm. Install outer nylon washer and push rod retainer. Lock retainer securely.
4. Tighten booster retaining nuts to 21-29 N·m (16-21 lb-ft).
5. Connect stoplamp switch wire to the switch.
6. Connect battery ground cable.





H3981-H

Item	Part Number	Description
1A	382802-S191	Nut
2	2A032 (Sedan) 2C156 (Wagon)	Master Cylinder Assy

(Continued)

Item	Part Number	Description
3	7B633	Clutch Control Assy
4	—	Cowl
5	N800538-S100	U-Nut

(Continued)

REMOVAL AND INSTALLATION (Continued)

Item	Part Number	Description
6B	N606689-S2	Bolt
7B	N620481-S2	Nut
8	2450	Assy
9	—	Dash Panel
10	2005	Booster Assy
11	2A309	Bushing
12	380699-S100	Clip
13	2B129	Washer
14	—	Vacuum Tube

(Continued)

Item	Part Number	Description
15	13480	Stoplamp Assy
16	381298-SX42A	Vacuum Hose to Check Valve
17	9C490	Vacuum Tree
18	2455	Pedal Assy
19	—	Automatic Transmission
20	—	Manual Transmission
A		Tighten to 18-34 N·m (14-25 Lb-Ft)
B		Tighten to 16-30 N·m (12-22 Lb-Ft)

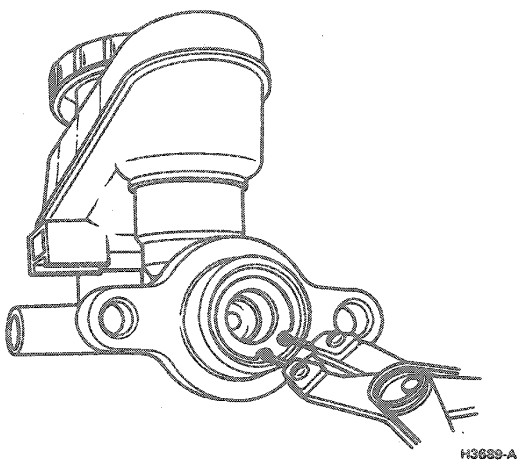
OVERHAUL

Master Cylinder

NOTE: The ABS master cylinder will not be overhauled due to internal adjustments which require extensive special tools and fixtures. If service is necessary the master cylinder must be replaced.

Disassembly

1. Clean the outside of the master cylinder thoroughly. Remove cap. Drain all brake fluid from cylinder. Always discard used brake fluid.
2. Depress primary piston and remove snap ring from retaining groove at the open end of the bore.



H3689-A

NOTE: If master cylinder is to be put into vise to aid in disassembly, mount into vise by flange only to avoid damage to bore or reservoir areas.

3. Remove primary and secondary piston assemblies from master cylinder. Tap open end of cylinder on bench to remove pistons. If secondary piston does not readily come out, apply air pressure to secondary outlet port to assist removal.
4. Remove the reservoir as outlined.
5. On wagon models, remove pressure control valves.

Inspection

1. Wash master cylinder body, especially bore, along with primary and secondary piston assemblies in clean brake fluid. Denatured or isopropyl alcohol can be used instead.

   CAUTION: Blistering or swelling indicates contamination of brake fluid by a petroleum-based solvent or oil. In that case, all rubber components in the brake hydraulic system must be inspected and replaced and the entire system must be flushed with clean brake fluid to prevent recontamination.

   The components which must be replaced are:

   - Front brake caliper seals
   - Rubber front brake hoses
   - Rear wheel cylinder seals
   - Rubber rear brake hoses
   - Pressure control valves
   - Primary and secondary piston assemblies
   - Reservoir grommets
   - Cap assemblies
2. Inspect seals on primary and secondary piston assemblies for cuts, nicks, scratches or signs of wear and for presence of any blistering or swelling.

   CAUTION: Honing of the bore on aluminum master cylinders is not permitted as the anodic coating and hardness could be removed.
3. Inspect master cylinder bore for pitting, corrosion or heavy wear. Heavy wear is characterized by scoring or galling of metal.

   NOTE: The aluminum body of the master cylinder is anodized. Some signs of bore wear, as evidenced by lighter areas of the anodized surface, are normal and not detrimental.

OVERHAUL (Continued)

Assembly

1. Dip replacement piston assemblies in clean Heavy-Duty Brake Fluid C6AZ-19542-AA (ESA-M6C25-A) or DOT-3 equivalent for lubrication prior to assembly into cylinder.
2. Install secondary (smaller) piston assembly into bore, spring end first.
3. Install primary piston assembly, spring end first.
4. Depress primary piston and install snap ring.
5. Install pressure control valves as outlined.
6. Fill and bleed master cylinder. Refer to Hydraulic System Bleeding procedure.
7. Install cap on master cylinder reservoir and secure.

ADJUSTMENTS

Brake Vacuum Booster Push Rod-To-Master Cylinder

ABS Vehicles

The vacuum booster push rod (output rod) is not adjustable. The push rod length is set during assembly. A properly set push rod that remains within the booster after it was assembled in production, should never require service.

A booster that is suspected of having an improper set push rod length will indicate either of the following:

- A push rod which is too long, will prevent the master cylinder piston from completely releasing hydraulic pressure and cause brakes to drag.
- A push rod which is too short will increase brake pedal travel and cause a clunk or groaning noise from the booster.

If necessary, booster push rod length can be verified with a depth micrometer using the following procedure:

1. Without disconnecting the brake tubes, disassemble the master cylinder from the booster.

   CAUTION: The master cylinder must be supported to prevent damage to the brake tubes.
2. Measure the push rod length while a force of approximately 22N (5 lb) is applied to push rod end. The correct push rod dimension is 28.3mm ± 0.3mm (1.11 inch ± 0.01 inch).
3. If the push rod dimension is correct, assemble master cylinder to booster. Alternate the tightening of the retaining nuts to 21-29 N·m (16-21 lb-ft).
4. If the push rod dimension is incorrect, replace the booster. The push rod length is not adjustable.

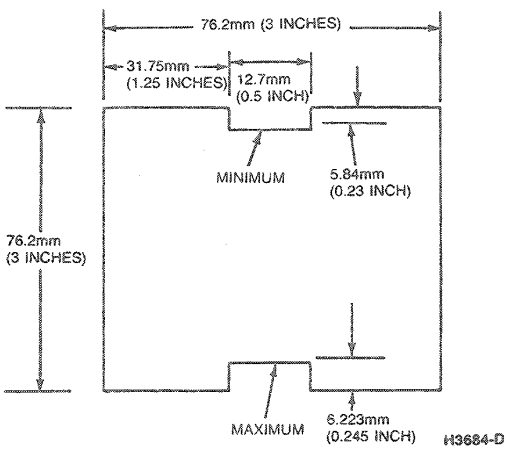
Non ABS Vehicles

The vacuum booster has an adjustable push rod (output rod) which is used to compensate for dimensional variations in an assembled booster. The push rod length is adjusted after each booster power unit has been assembled in production. **A properly adjusted push rod that remains within the booster after it was assembled in production should never require a service adjustment.**

A booster that is suspected of having an improper push rod length will indicate either of the following:

- A push rod which is too long will prevent master cylinder piston from completely releasing hydraulic pressure and cause brakes to drag.
- A push rod which is too short will increase brake pedal travel and cause a clunk or groaning noise from booster.

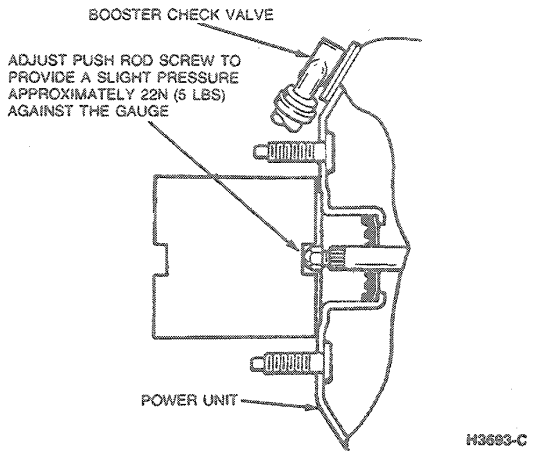
If necessary, a booster push rod length can be checked with a push rod gauge using the following procedure:



1. Without disconnecting brake tubes, disconnect master cylinder and set it away from booster power unit. Master cylinder must be supported to prevent damaging brake tubes.

ADJUSTMENTS (Continued)

2. With engine idling, check and adjust push rod length. A force of approximately 22N (5 lb) applied to the push rod with the gauge will ensure that push rod is seated with power unit.



3. Install master cylinder on booster. Gradually alternate tightening of the retaining nuts to 21-29 N·m (16-21 lb-ft).

Hydraulic System Bleeding

NOTE: Refer to Section 06-09 for ABS bleeding instructions when HCU is serviced.

When any part of the hydraulic system has been disconnected for service, air may enter system and cause spongy pedal action. Bleed the hydraulic system after it has been opened to ensure that all air is expelled.

1. Clean all dirt from master cylinder filler cap.
2. If master cylinder is known or suspected to have air in bore, it must be bled before any of the wheel cylinders or calipers. To bleed master cylinder, loosen upper secondary LH front outlet fitting approximately three-quarter turn.
3. Have assistant push brake pedal down slowly through full travel. Close outlet fitting, then return pedal slowly to full released position. **Wait five seconds,** then repeat operation until air bubbles cease to appear.
4. Loosen upper primary RH front outlet fitting approximately three-quarter turn.
5. Repeat Step 3.
6. To continue to bleed brake system, remove rubber dust cap from wheel cylinder bleeder fitting or caliper fitting. Check to ensure bleeder fitting is positioned at upper half of front caliper. If not, caliper is located on wrong side. Place suitable box wrench on bleeder fitting and attach rubber drain tube to fitting. **The end of tube should fit snugly around bleeder fitting.**
7. Submerge free end of tube in container partially filled with clean brake fluid and loosen bleeder fitting approximately three-quarter turn.
8. Have assistant push brake pedal down slowly through full travel. Close bleeder fitting, then return pedal to full release position. **Wait five seconds,** then repeat this operation until air bubbles cease to appear at submerged end of bleeder tube.
9. When fluid is completely free of air bubbles, secure bleeder fitting and remove bleeder tube. Install rubber dust cap on bleeder fitting.
10. Repeat this process on opposite diagonal system. Refill master cylinder reservoir after each wheel cylinder or caliper is bled, and install master cylinder cover and gasket. When bleeding operation is completed, fluid level should be filled to maximum fill level indicated on reservoir.
11. Always ensure disc brake pistons are returned to their normal positions by depressing brake pedal several times until normal pedal travel is established.
12. Check pedal feel. If pedal feels "spongy" repeat bleed procedure.

Pressure Bleeding

Tools Required:

- Rotunda Brake Bleeder 104-00064

For pressure bleeding, use bleeder-type bleeder tank only, such as Rotunda Brake Bleeder 104-00064 or equivalent.

Bleed longest line first on the system being bled. The bleeder tank should contain enough new brake fluid to complete bleeding operation. Use Heavy-Duty Brake Fluid C6AZ-19542-AA (ESA-M6C25-A) or DOT 3 equivalent for all brake applications. Never reuse brake fluid that has been drained from the hydraulic system. Pressure bleeder tank should be charged with approximately 69-206 kPa (10-30 psi) of air pressure.

CAUTION: Never exceed 344 kPa (50 psi) pressure.

1. Clean all dirt from master cylinder reservoir cover.
2. Remove master cylinder filler cap and fill master cylinder reservoir with specified brake fluid. Install pressure bleeder adapter tool to master cylinder and attach bleeder tank hose to fitting on adapter. Follow manufacturer's instructions when installing adapter.
3. If all wheel cylinders are to be bled, start with RH rear brake wheel cylinder and attach bleeder tube **snugly around bleeder fitting.**
4. Open valve on bleeder tank to admit pressurized brake fluid to master cylinder reservoir.
5. Submerge free end of tube in container partially filled with clean brake fluid and loosen bleeder fitting.
6. When air bubbles cease to appear in fluid at submerged end of bleeder tube, close bleeder fitting and remove tube. Replace rubber dust cap on bleeder screw.

ADJUSTMENTS (Continued)

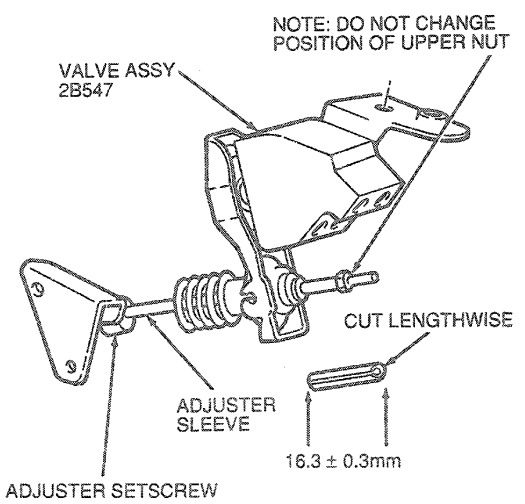
7. Repeat Steps 3 through 6 at LH front wheel caliper.
8. Next, repeat Steps 4, 5 and 6, starting at LH wheel cylinder and ending at RH front wheel caliper.
9. When bleeding operation is completed, close bleeder tank valve and remove tank hose from adapter fitting.
10. After disc brake service, ensure disc brake pistons are returned to their normal positions and the shoe and lining assemblies are properly seated. This is accomplished by depressing the brake pedal several times until normal pedal travel is established.
11. Remove the pressure bleeder adapter tool from master cylinder. Fill the master cylinder reservoir to 4.0mm (0.16 inch) below the MAX line on the reservoir. Install the master cylinder cap.

Brake Pressure Control Valve

Sedan

1. Drive vehicle on a hoist or alignment machine, so that vehicle is at curb load level and wheels are on a flat surface.

   NOTE: Do not change position of the upper nut on valve operating rod.
2. Loosen valve adjuster setscrew.
3. Obtain a piece of rubber or vacuum hose or plastic tubing 3/8-inch OD x 1/4-inch ID. Cut a piece 16.3mm ± 0.3mm and slice it lengthwise as shown.



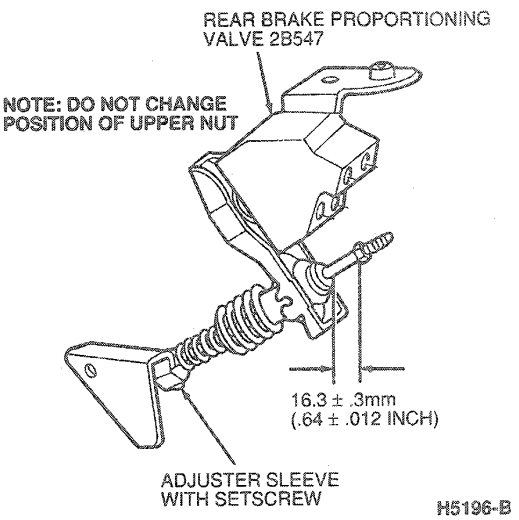
H4008-D

4. Place this length of hose or tubing on valve operating rod. Refer to illustration under Step 3.
5. Ensure the adjuster sleeve is resting on the lower mounting bracket. Install setscrew. The dimension will position the valve for normal operation. Remove hose or tube.

If further adjustment is necessary refer to the following procedures:

Decrease Pressure at Rear Brakes

1. Ensure suspension is at curb height.
2. Loosen adjuster setscrew.
3. Move adjuster sleeve up toward valve body on the operating rod 1mm for each 413 kPa (60 psi) pressure decrease.
4. Install setscrew in adjuster sleeve in desired position.



H5196-B

Increase Pressure at Rear Brakes

1. Ensure suspension is at curb height position.
2. Loosen adjuster setscrew.
3. Move adjuster sleeve down away from the valve body on the operating rod 1mm for each 413 kPa (60 psi) pressure increase.
4. Tighten setscrew in desired position.

SPECIFICATIONS

BRAKE BOOSTER APPLICATIONS

Vehicle	Booster Type and Size
Taurus/Sable	Vacuum—270mm (10.6 inch) Diameter Single Diaphragm

SPECIFICATIONS (Continued)

TORQUE SPECIFICATIONS

Description	N·m	Lb-Ft
Master Cylinder Mounting Nuts	21-29	16-21
Booster Retaining Nuts	21-29	16-21
Wheel Cylinder Bleeder Screw	10-20	7.5-15
Caliper Bleeder Screw	8-20	6-15
Brake Hose Connection to Caliper	41-54	30-40
Rear Hose Bracket Attachment	11-16	8-12
Brake Tube Connections—All[1]	16-20	12-15
Pressure Control Valves to Master Cylinder	13-22	10-16
Brake Pedal Pivot Shaft Nut	14-27	10-20
Proportioning Valve Bracket to Lower Arm	6-8	4-6

SPECIAL SERVICE TOOLS

ROTUNDA EQUIPMENT

Model	Description
104-00064	Brake Bleeder

1 All hydraulic lines must be tightened to the specific torque value and be free of fluid leakage

SECTION 06-07 Brake System, Power

SUBJECT	PAGE
ADJUSTMENTS	
Brake Booster-to-Master Cylinder Push Rod	06-07-4
DESCRIPTION	06-07-1
DIAGNOSIS AND TESTING	06-07-1
REMOVAL AND INSTALLATION	
Brake Booster, Vacuum	06-07-1
SPECIFICATIONS	06-07-5
VEHICLE APPLICATION	06-07-1

VEHICLE APPLICATION

Taurus / Sable.

DESCRIPTION

WARNING: BRAKE FLUID CONTAINS POLYGLYCOL ETHERS AND POLYGLYCOLS. AVOID CONTACT WITH EYES. WASH HANDS THOROUGHLY AFTER HANDLING. IF BRAKE FLUID CONTACTS EYES, FLUSH EYES WITH RUNNING WATER FOR 15 MINUTES. GET MEDICAL ATTENTION IF IRRITATION PERSISTS. IF TAKEN INTERNALLY, DRINK WATER AND INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.

The diaphragm-type brake booster is self-contained and is mounted on the engine side of the dash panel. The vacuum brake booster uses engine intake manifold vacuum and atmospheric pressure for its power.

Adjustment of the push rod (non-ABS) and replacement of the check valve are the only services permitted on the brake booster.

If any brake booster is damaged or inoperative, replace it with a new booster. The brake booster (including the check valve) is serviced only as an assembly.

DIAGNOSIS AND TESTING

Refer to Section 06-00.

REMOVAL AND INSTALLATION

Brake Booster, Vacuum

Removal

1. Disconnect battery ground cable and remove tubes from primary and secondary outlet ports of master cylinder.
2. Disconnect manifold vacuum hose from booster check valve.
3. Disconnect warning indicator.
4. Remove two nuts retaining master cylinder to brake booster assembly and remove master cylinder.
5. Working inside vehicle below instrument panel, remove stoplamp switch wiring connector from switch. Remove push rod retainer and outer nylon washer from pedal pin. Slide stoplamp switch along brake pedal pin just far enough for outer hole to clear pin. Refer to Section 17-01. Remove stoplamp switch by sliding it upward. Be careful not to damage stoplamp switch during removal.
6. Remove booster-to-dash panel retaining nuts. Slide booster push rod and push rod bushing off brake pedal pin.
7. Working inside engine compartment, remove two screws from manifold vacuum fitting at dash panel, and position out of way.
8. Position wiring harness out of the way.
9. Remove transmission shift cable and bracket assembly. Refer to Section 07-05.
10. Move booster forward until booster studs clear dash panel and remove booster.

Installation

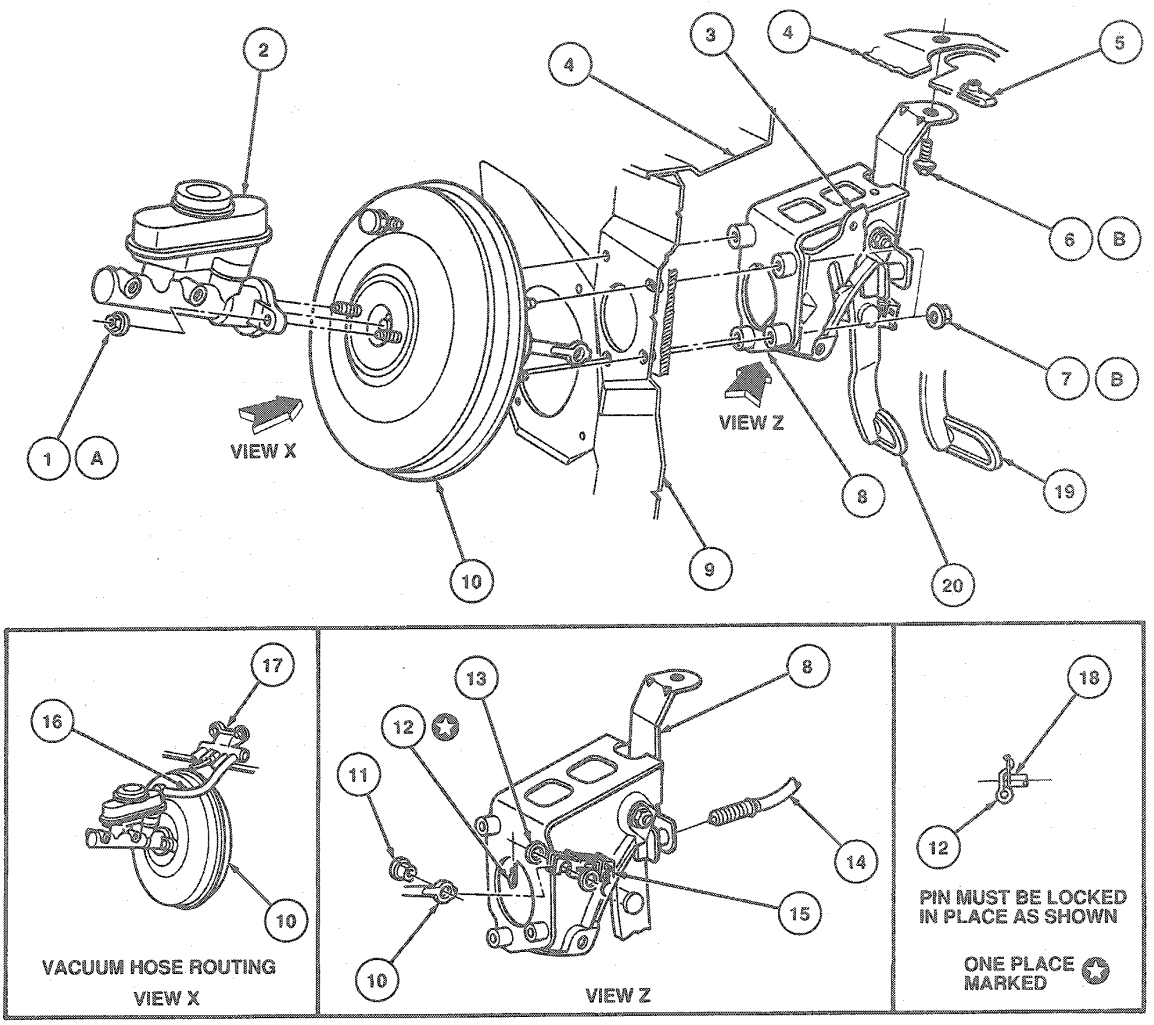
1. Align pedal support inside vehicle and place booster in position on dash panel. Hand-start retaining nuts.

   NOTE: The head of the push rod bushing must be on the booster, push rod away from the pedal.

REMOVAL AND INSTALLATION (Continued)

2. Working inside vehicle, install inner nylon washer or speed control adapter, push rod and push rod bushing on brake pedal pin. Tighten booster-to-dash panel retaining nuts to 21-29 N·m (16-21 lb-ft).
3. Position stoplamp switch so that it straddles booster push rod with stoplamp switch slot toward pedal blade and hole just clearing pin. Slide stoplamp switch down onto pin. Slide assembly toward pedal arm, being careful not to bend or deform switch. Install nylon washer on pin and secure all parts to pin with hairpin retainer. Ensure retainer is fully installed and locked over pedal pin. Install stoplamp switch wiring connector on stoplamp switch. Refer to Section 17-01.
4. Position manifold vacuum fitting to dash panel and install two retaining screws.
5. Move wiring harness into position.
6. Install shift cable and bracket assembly. Refer to Section 07-05.
7. Connect manifold vacuum hose to booster check valve.
8. Position master cylinder assembly on booster assembly studs.
9. Install brake tube fittings into master cylinder ports. Tighten to 14-24 N·m (10-17 lb-ft). Tighten master cylinder nuts to 21-29 N·m (16-21 lb-ft).
10. Connect warning indicator.
11. Bleed brake system. Refer to Section 06-00.
12. Adjust manual shift linkage.
13. Connect battery ground cable and start engine. Check power brake function.
14. For vehicles with speed control, refer to Section 10-03 for dump valve adjustments.

REMOVAL AND INSTALLATION (Continued)



H3981-H

Item	Part Number	Description
1A	382802-S191	Nut
2	2A032 (Sedan) 2C156 (Wagon)	Master Cylinder Assy
3	7B633	Assy (Clutch Controls Release—Manual Trans Only)
4	—	Cowl
5	N800538-S100	U-Nut
6B	N606689-S2	Bolt
7B	N620481-S2	Nut
8	2450	Assy
9	—	Dash Panel
10	2005	Booster Assy
11	2A309	Bushing

(Continued)

Item	Part Number	Description
12	380699-S100	Clip
13	2B129	Washer
14	—	Vacuum Tube
15	13480	Stoplamp Assy
16	381298-SX42A	Vacuum Hose to Check Valve
17	9C490	Vacuum Outlet Manifold
18	2455	Pedal Assy
19	—	Automatic Transmisssion
20	—	Manual Transmission
A		Tighten to 21-29 N·m (16-21 Lb-Ft)
B		Tighten to 16-29 N·m (12-21 Lb-Ft)

TH3981H

ADJUSTMENTS

Brake Booster-to-Master Cylinder Push Rod

ABS Vehicles

The vacuum booster push rod (output rod) is not adjustable. The push rod length is set during assembly. A properly set push rod that remains within the booster after it was assembled in production, should never require service.

A booster that is suspected of having an improper set push rod length will indicate either of the following:

- A push rod which is too long will prevent the master cylinder piston from completely releasing hydraulic pressure and cause brakes to drag.
- A push rod which is too short will increase brake pedal travel and cause a clunk or groaning noise from the booster.

If necessary, booster push rod length can be verified with a depth micrometer using the following procedure:

1. Without disconnecting the brake tubes, disassemble the master cylinder from the booster.

   CAUTION: The master cylinder must be supported to prevent damage to the brake tubes.

2. Measure the push rod length while a force of approximately 22N (5 lb) is applied to push rod end. The correct push rod dimension is 28.3mm ± 0.3mm (1.11 inch ± 0.01 inch).
3. If the push rod dimension is correct, assemble master cylinder to booster. Alternate the tightening of the retaining nuts to 21-29 N·m (16-21 lb-ft).
4. If the push rod dimension is incorrect, replace the booster. The push rod length is not adjustable.

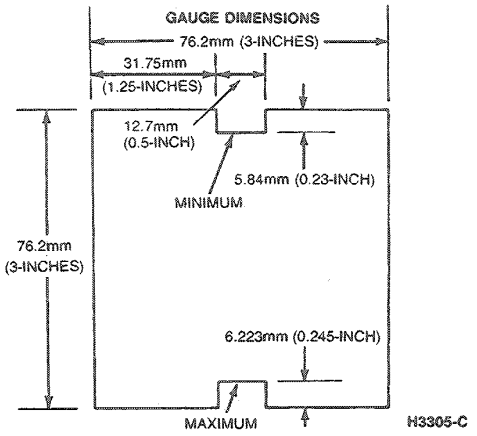
Non ABS Vehicles

The vacuum booster has an adjustable push rod (output rod), which is used to compensate for dimensional variations in an assembled booster. The push rod length is adjusted after each power booster unit has been assembled in production. **A properly adjusted push rod that remains assembled to the booster with which it was matched in production should never require a service adjustment.**

A booster that is suspected of having an improper push rod length will indicate either of the following:

- A push rod that is too long will prevent the master cylinder piston from completely releasing hydraulic pressure, eventually causing the brakes to drag.
- A push rod that is too short will have excessive brake pedal travel and cause a groaning noise to come from the booster.

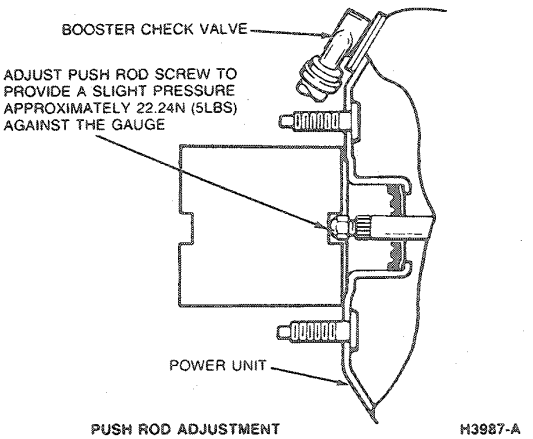
If necessary, booster push rod length can be checked with a push rod gauge by using the following procedure.



1. Without disconnecting brake tubes, disconnect master cylinder and set it away from booster power unit. The master cylinder must be supported to prevent damaging brake tubes.

   CAUTION: Do not adjust too long or brake drag could result.

2. With engine running, check and adjust push rod length as shown. A force of approximately 22N (5 lb) applied to push rod with gauge will ensure that push rod is seated within the power unit. If adjustment is necessary, grip rod only by knurled area.



3. Install master cylinder on booster unit. Gradually and alternately tighten retaining nuts to 21-29 N·m (16-21 lb-ft). Refer to Section 06-00.

SPECIFICATIONS

TORQUE SPECIFICATIONS

Description	N·m	Lb-Ft
Booster-to-Dash Panel Retaining Nut	21-29	16-21
Master Cylinder-to-Booster Locking Nuts	21-29	16-21
Brake Tube Fittings	14-24	10-17
Pedal Support-to-Cowl Top	16-29	12-21

SECTION 06-09 Brake System, Anti-Lock

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Pedal Travel Switch	06-09-70
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VEHICLE APPLICATION

Taurus / Sable, Taurus SHO.

DESCRIPTION

WARNING: BRAKE FLUID CONTAINS POLYGLYCOL ETHERS AND POLYGLYCOLS. AVOID CONTACT WITH EYES. WASH HANDS THOROUGHLY AFTER HANDLING. IF BRAKE FLUID CONTACTS EYES, FLUSH EYES WITH RUNNING WATER FOR 15 MINUTES. GET MEDICAL ATTENTION IF IRRITATION PERSISTS. IF TAKEN INTERNALLY, DRINK WATER AND INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.

The Taurus / Sable has a 4-wheel anti-lock brake system (ABS) as an option. The system is standard on Taurus SHO. The system prevents wheel lockup by automatically modulating the brake pressure during an emergency stop. By not locking the wheels, the driver can maintain steering control, and stop the vehicle in the shortest possible distance under most conditions.

The brake pedal force required to engage the ABS function may vary with the road surface conditions. A dry surface requires a higher force, while a slippery surface requires much less force.

During the ABS operation, the driver will sense a pulsation in the brake pedal, accompanied by a slight up and down movement in the pedal height and a clicking sound. The pedal effort and pedal feel during normal braking are similar to that of a conventional power brake system.

The ABS consists of the following major components:

- Vacuum booster and master cylinder assembly.
- Hydraulic Control Unit (HCU).
- ABS module.
- Wheel sensors.
- Pedal travel switch.

Vacuum Booster

The diaphragm-type brake booster is self-contained and is mounted on the engine compartment side of the dash panel.

The vacuum brake booster uses engine intake manifold vacuum and atmospheric pressure for its power.

If the brake booster is damaged or inoperative, replace it with a new booster. The brake booster (excluding the check valve) is serviced only as an assembly.

DESCRIPTION (Continued)

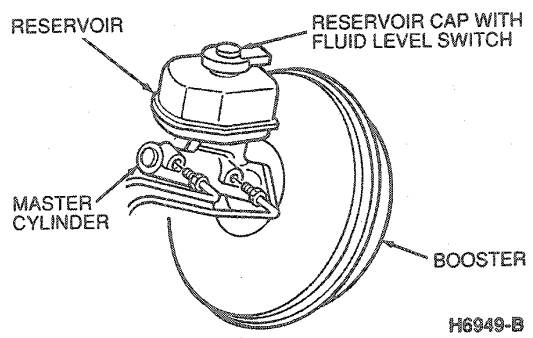
Brake Booster-To-Master Cylinder Push Rod

The vacuum booster push rod (output rod) is not adjustable. If the push rod length is incorrect, replace the booster assembly.

Master Cylinder

The master cylinder is a tandem master cylinder. The primary (rear) circuit feeds the RH front and LH rear brakes. The secondary circuit (front) feeds the LH front and RH rear brakes. It is serviced as a complete assembly.

The master cylinder reservoir is a clear translucent plastic container with three main chambers. An integral fluid level switch is part of the reservoir cap assembly, with one electrical connector pointing rearward for wire harness connection. A low pressure hose is attached to the reservoir which feeds brake fluid to the hydraulic control unit reservoir. The reservoir and cap are serviced separately.



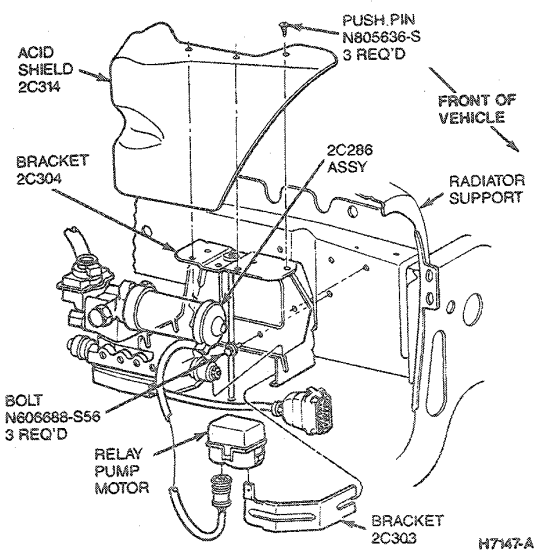
Hydraulic Control Unit (HCU)

3.0L, 3.8L and 3.0L/3.2L SHO

The HCU is located in the front of the engine compartment on the LH side of the vehicle. It attaches to a bracket that is mounted to the LH front inside rail inside the engine compartment. On Taurus / Sable vehicles, the battery and battery tray sit on top of the HCU mounting bracket. On Taurus SHO vehicles, the ABS electronic control unit sits on top of the HCU mounting bracket. The HCU consists of a valve body assembly, pump and motor assembly, and a brake fluid reservoir with fluid level indicator assembly. During normal braking, fluid from the master cylinder enters the HCU through two inlet ports located at the rear of the HCU. The fluid then passes through four normally open inlet valves, one to each wheel. (Refer to the Hydraulic Schematic.) If the ABS module senses that a wheel is about to lock, the ABS module activates the appropriate inlet valve which closes that valve. This prevents any more fluid from entering the affected brake. The ABS module then looks at the wheel again. If it is still decelerating, the ABS module then opens the normally closed outlet valve which decreases the pressure trapped in the line. The valve body, pump and motor, and reservoir are serviced separately. Other than seals and gaskets, no internal parts can be serviced.

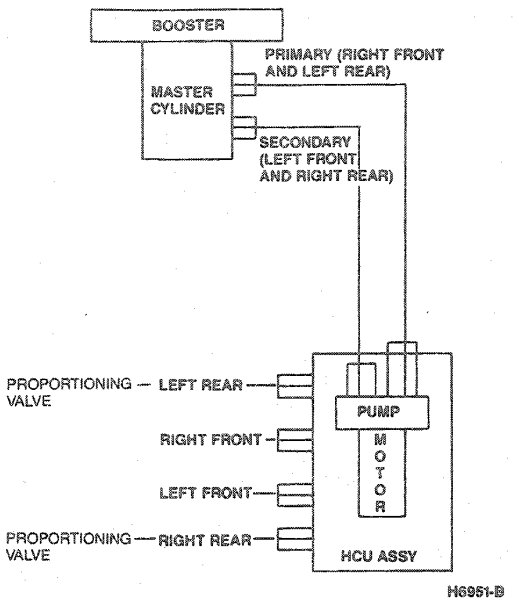
Acid Shield

On Taurus / Sable a rubber acid shield is used to protect the HCU and wiring in case of major battery damage. It attaches to the top of the HCU mounting bracket with three plastic push pins. There is also a rubber drain tube that is attached to the HCU mounting bracket. It allows leaking battery acid to drain to the ground.



DESCRIPTION (Continued)

Hydraulic Schematic



ABS Module

The ABS Module is located in the engine compartment. On Taurus / Sable vehicles it is located on the front RH side next to the washer bottle. On the Taurus SHO vehicle it is mounted on top of the HCU mounting bracket.

It is an on-board diagnostic non-repairable unit consisting of two microprocessors and the necessary circuitry for their operation. These microprocessors are programmed identically. The ABS module monitors system operation during normal driving as well as during anti-lock braking.

Under normal driving conditions, the microprocessors produce short test pulses to the solenoid valves that check the electrical system without any mechanical reaction. Impending wheel lock conditions trigger signals from the ABS module that open and close the appropriate solenoid valves. This results in moderate pulsations in the brake pedal. If brake pedal travel exceeds a preset dimension determined by the pedal travel switch setting, the ABS module will send a signal to the pump to turn on and provide high pressure to the brake system. When the pump starts to run, a gradual rise in pedal height will be noticed. This rise will continue until the pedal travel switch closes and the pump will shut off until the pedal travel exceeds the travel switch setting again. During normal braking, the brake pedal feel will be identical to a standard brake system.

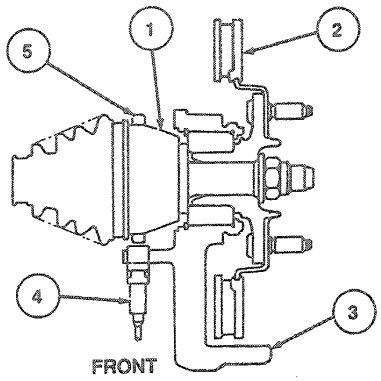
Most malfunctions which occur to the anti-lock brake system will be stored as a coded number in the keep-alive memory of the ABS module. The codes can be retrieved by following the on-board diagnostic procedures. Refer to Diagnosis and Testing.

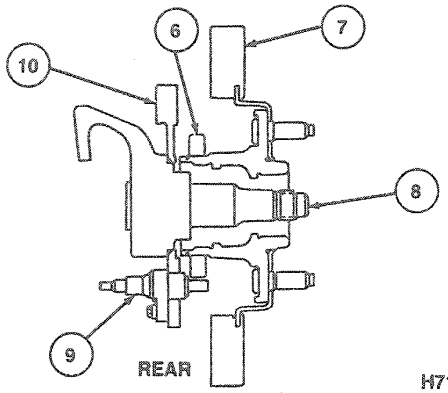
Wheel Sensors

The anti-lock brake system uses four sets of variable-reluctance sensors and toothed speed indicator rings to determine the rotational speed of each wheel. The sensors operate on magnetic induction principal. As the teeth on the speed indicator ring rotate past the stationary sensor, a signal proportional to the speed of the rotation is generated and sent to the ABS module through a coaxial cable and shielded wiring harness.

The front sensors are attached to the suspension knuckles, and the front speed indicators are pressed onto the outer CV joints. The rear sensors are attached to the rear caliper adapter plates, and the rear speed indicator rings are pressed onto the rear wheel hub assemblies.

DESCRIPTION (Continued)





Item	Part Number	Description
1	3B436 RH 3B437 LH	CV Joint
2	1125	Rotor
3	3K170 RH 3K171 LH	Spindle Assy
4	2C204 RH 2C205 LH	Anti-Lock Sensor

(Continued)

Item	Part Number	Description
5	2C182	Anti-Lock Sensor Ring
6	2B664	Anti-Lock Sensor Ring
7	2C026	Rotor
8	—	Rear Spindle
9	2C216 LH 2C190 RH	Anti-Lock Sensor
10	2C101 LH 2C100 RH	Rear Disc Adapter

Pedal Travel Switch

The anti-lock brake system uses a pedal travel switch which monitors brake pedal travel and sends this information to the ABS module through the wire harness. The switch adjustment is critical to pedal feel during ABS cycling.

The switch is mounted in a hole in the RH side wall of the brake pedal support and to a pin on the dump valve adapter bracket.

The switch is normally closed. When brake pedal travel exceeds the switch setting during an anti-lock stop, the electronic controller senses that the switch is open and grounds the pump motor relay coil. This energizes the relay and turns the pump motor on. When the pump motor is running, the master cylinder is filled with high pressure brake fluid and the brake pedal will be pushed up until the switch closes. When the switch closes, the pump is turned off and the pedal will drop some with each ABS control cycle until the travel switch opens again and the pump is turned on again. This minimizes pedal feedback during ABS cycling.

If the pedal travel switch is not adjusted properly or is not electrically connected, it will result in objectionable pedal feel during ABS stops. Most concerns with the switch or its installation will result in the pump running during the entire ABS stop. The pedal will become very firm, pushing the driver's foot up to an unusually high position.

OPERATION

When the brakes are applied, fluid is forced from the master cylinder outlet ports to the hydraulic control unit (HCU) inlet ports. This pressure is transmitted through four normally open solenoid valves contained inside the HCU, then through the outlet ports of the HCU to each wheel. The primary (rear) circuit of the master cylinder feeds the right front and left rear brakes. The secondary (front) circuit of the master cylinder feeds the left front and right rear brakes. If the ABS module senses that a wheel is about to lock, based on wheel speed sensor data, it pulses the normally open solenoid valve closed, for that circuit. This prevents any more fluid from entering that circuit. The ABS module then looks at the sensor signal from the affected wheel again. If that wheel is still decelerating, it opens the normally closed solenoid valve for that circuit. This dumps any pressure that is trapped between the normally open valve and the brake back to the reservoir. Once the affected wheel comes back up to speed, the ABS module returns the valves to their normal condition allowing fluid flow to the affected brake.

The ABS module monitors the electro-mechanical components of the system. Malfunction of the anti-lock brake system will cause the ABS module to shut off or inhibit the system. However, normal power assisted braking remains. Malfunctions are indicated by one or two warning indicators inside the vehicle.

Loss of hydraulic fluid in the HCU reservoir will disable the anti-lock system.

OPERATION (Continued)

The 4-wheel anti-lock brake system is self monitoring. When the ignition switch is placed in the RUN position, the ABS module will perform a preliminary self check on the anti-lock electrical system indicated by a three to four second illumination of the amber ANTI-LOCK indicator in the instrument cluster. During vehicle operation, including normal and anti-lock braking, the ABS module monitors all electrical anti-lock functions and some hydraulic operations.

In most malfunctions of the anti-lock brake system, the amber ANTI-LOCK BRAKE and/or red BRAKE indicator(s) will be illuminated. The sequence of illumination for these warning indicators combined with the symptoms, can determine the appropriate diagnostic tests to perform. However, most malfunctions are recorded as a coded number in the ABS module memory and assist in pinpointing the component needing service.

BRAKE SYSTEM BLEEDING

Tools Required:

- Anti-Lock Test Adapter T90P-50-ALA
- Rotunda EEC-IV Breakout Box 014-00322

The anti-lock brake system must be bled in two steps:

1. The master cylinder and hydraulic control unit must be bled using the Anti-Lock Test Adapter T90P-50-ALA. If this procedure is not followed, air will be trapped in the Hydraulic Control Unit which will eventually lead to a spongy brake pedal.

   To bleed the master cylinder and HCU, disconnect the 55-pin plug from the ABS module and install the Anti-Lock Brake Breakout Box/Bleeding Adapter to the wire harness 55-pin plug.

   a. Place Bleed/Harness switch in Bleed position.

   b. Turn ignition to ON position. At this point the red OFF indicator should turn on.

   c. Push motor button on adapter down. This starts the pump motor. The red OFF indicator will turn off and the green ON indicator will turn on. The pump motor will run for 60 seconds once the motor button is pushed. If the pump motor is to be turned off for any reason before this 60 seconds has elapsed, push the abort button and the pump motor will turn off.

   d. After 20 seconds of pump motor operation, push and hold the valve button down. Hold valve button for 20 seconds then release.

   e. The pump motor will continue to run for an additional 20 seconds after the valve button is released.

2. The brake lines can be bled in the conventional manner, as outlined in Section 06-06.

   Bleed in the following sequence:

   - RH Rear
   - LH Front
   - LH Rear
   - RH Front

DIAGNOSIS AND TESTING

Warning Indicator Functions

The anti-lock brake system uses two warning indicators to alert the driver of malfunctions in the system.

The red BRAKE warning indicator will come on for only two reasons. If the brake fluid level in the master cylinder reservoir falls below the level which is determined by the switch point of the Fluid Level Switch (FLS), the BRAKE indicator will come on. Also, if the parking brake is applied, the BRAKE indicator will come on.

The amber CHECK ANTI-LOCK BRAKE warning indicator will come on for numerous reasons. It warns the driver that the ABS has been turned off due to a condition that exists in the system. Normal power-assisted braking remains but the wheels can lock during a panic stop while the indicator is on. Certain procedures must be followed to find the fault in this situation. They are explained in this section.

Ensure the diagnostic procedures are followed step-by-step in order as indicated.

WARNING: FOLLOWING THE WRONG SEQUENCE OR BYPASSING STEPS WILL LEAD TO UNNECESSARY REPLACEMENT OF PARTS, AND/OR INCORRECT RESOLUTION OF THE SYMPTOM.

The diagnostic procedure consists of four sections:

1. On-Board Diagnostics
2. Manual Quick Tests
3. Warning Indicator Symptom Chart
4. Diagnostic Tests (including electrical schematics.)

On-Board Diagnostics

Tools Required:

- Rotunda SUPER STAR II Tester 007-00041B

The anti-lock brake system (ABS) module is capable of performing a self-test using Rotunda SUPER STAR II Tester 007-00041B or equivalent. The procedures for using the SUPER STAR II Tester are covered in the Anti-Lock Diagnostic Section.

If the SUPER STAR II Tester is not available, the Anti-Lock Quick Check Sheet should be used as outlined.

DIAGNOSIS AND TESTING (Continued)

The anti-lock brake control module monitors system operation and can store all defined Diagnostic Trouble Codes (DTCs) in its memory. It is important to understand that the ABS module CANNOT recognize some failures, therefore if a condition exists and no DTCs are stored by the ABS module, other diagnostic steps must be followed.

The module cannot store a DTC if there is no power to the module. This condition can be found by using the Quick Check Sheet.

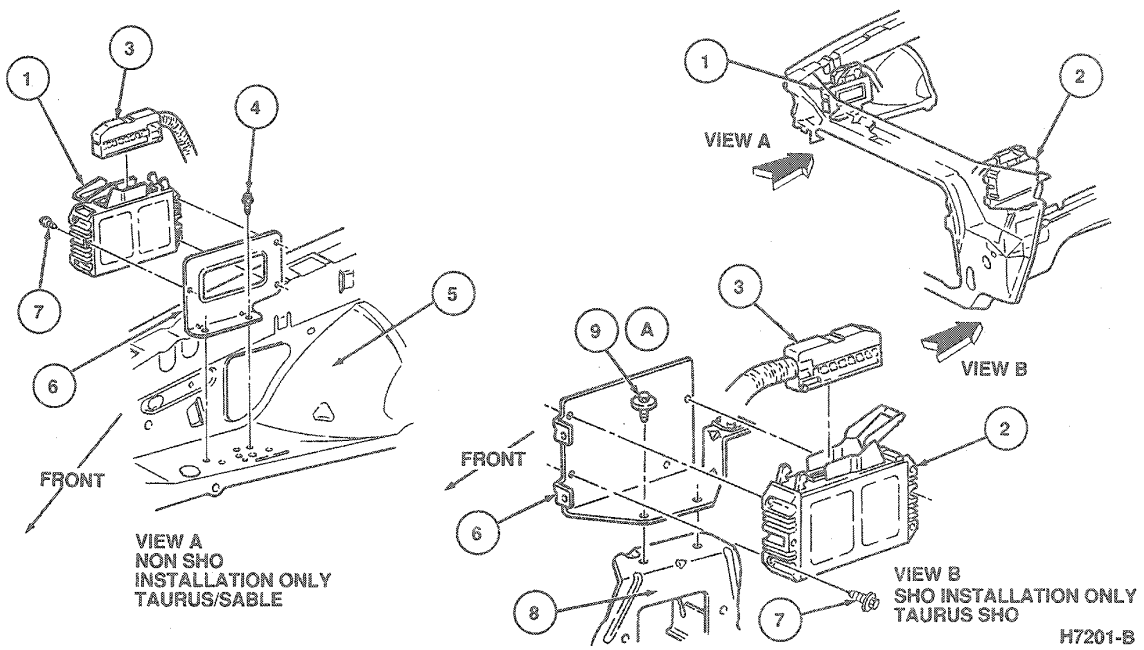
A 20 series code will override any other stored code and will not allow other codes to be output if the failure exists while the on-board diagnostic is being run. If the failure is intermittent or if the code was left in the ABS module due to improper erasing procedures, the code will be output during on-board diagnostic but the next code will also be output.

STAR Tester Connection and Battery Check

1. Turn ignition switch to OFF position.
2. Locate SUPER STAR II Tester connector in engine compartment behind LH shock tower.

   NOTE: Only one multi-pin connector is used.
3. Connect SUPER STAR II Tester connector to vehicle connector.

ABS Module



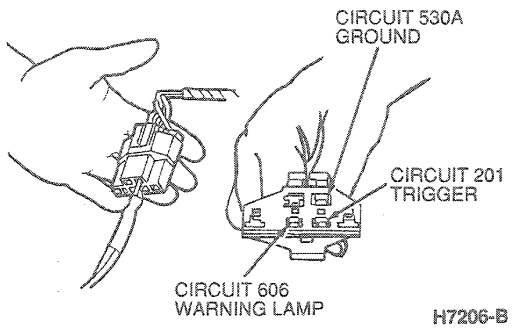
Item	Part Number	Description
1	2C219	ABS Module 3.0L and 3.8L
2	2C218	ABS Module SHO Only
3	—	Harness Assy
4	N611194-S2	Bolt (2 Req'd)
5	—	RH Engine Compartment

(Continued)

Item	Part Number	Description
6	2C214	Bracket
7	N805640-S2	Screw (3 Req'd)
8	—	LH Engine Compartment
9A	N800935-S55	Bolt (3 Req'd)
A		Tighten to 8-12 N·m (6-8 Lb-Ft)

DIAGNOSIS AND TESTING (Continued)

SUPER STAR II Tester Connections

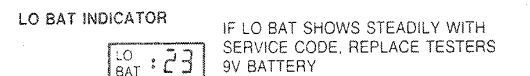


H7206-B

4. Turn on power switch on RH side of SUPER STAR II Tester. A steady 00 or blank screen will appear to signify that SUPER STAR II Tester is ready to start on-board diagnostics and receive DTCs.

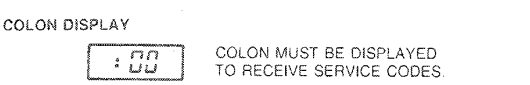
H4860-A

NOTE: If the message LO BAT appears in upper LH corner of read-out display and stays on, replace SUPER STAR II Tester's 9-volt battery before continuing with on-board diagnostic. The message LO BAT will appear momentarily when power switch is turned off.



H4861-A

5. With ignition still off, push self-test button in center of SUPER STAR II Tester.
6. Push self-test button again. This deactivates self-test sequence.



H4862-A

7. If SUPER STAR II Tester passes above test (00 or blank screen with button in TEST position), proceed with On-Board Diagnostic procedure. If any DTCs appear during On-Board Diagnostic, refer to the On-Board Diagnostic Trouble Code Index.

On-Board Self-Test Procedure

The anti-lock brake system has self-diagnostic capabilities, however, the module as received from manufacturing is equipped with a stored error code (61). This will affect the service procedure.

The error codes can be retrieved from the ABS module in the following manner.

1. Connect SUPER STAR II Tester to connector located in engine compartment behind LH shock tower.
2. Turn on SUPER STAR II Tester and latch button down in TEST position.
3. Turn ignition switch to RUN position.
4. Read first code output. After approximately 15 seconds the next code will be output. Leave button latched until all codes are output.

   NOTE: Ensure that all codes are written down.

The diagnostic procedure should be as follows providing that the CHECK ANTI-LOCK BRAKE indicator stays on all the time or flashes intermittently.

NOTE: If the BRAKE warning indicator is on or intermittently comes on, refer to the warning indicator symptom chart in this Section.

1. If the first code received is in the 20s and no other code is received, service the indicated component. No other codes can be output if a 20s DTC exists. After servicing the indicated 20s code, repeat the procedure for retrieving error codes.

   NOTE: If there are more codes stored in the ABS module memory, no codes will erase until all codes have been output by the SUPER STAR II Tester, all malfunctions have been serviced and the vehicle is driven above 40 Km/h (25 mph). This means that if a 20s code originally existed and was serviced, it can be ignored when running the On-Board Diagnostic the second time.
2. If a Code 61 is received with any other code, ignore the code 61 and service the other indicated malfunctions. If after correcting all other indicated malfunctions, the CHECK ANTI-LOCK BRAKE indicator is still on, service the FLS circuit.
3. If a Code 61 is received and no other DTCs are received, service the FLS Circuit.
4. If no code, or only a Code 11 is received, use the Anti-Lock Quick Check Sheet since some possibilities are not recognized and retained in the ABS module memory.

Memory Erasing

1. The original error codes in the ABS module from the assembly plant will erase automatically if everything is in working order and the vehicle is driven above 40 Km/h (25 mph).

   NOTE: If self diagnostic PINPOINT TEST STEPS continually lead to REVERIFY symptom, go to ANTI-LOCK QUICK TEST CHECK.
2. All error codes must be output, all malfunctions corrected (anti-lock indicator off), and vehicle driven above 40 Km/h (25 mph) before the memory will clear.

   NOTE: Each time the engine is started the ABS module will count 2 run cycles.
3. The ABS module will erase all stored codes if it counts 250 consecutive run cycles without recognizing a malfunction.

DIAGNOSIS AND TESTING (Continued)

ON-BOARD DIAGNOSTIC TROUBLE CODE INDEX

DIAGNOSTIC TROUBLE (COMPONENT)	PINPOINT TEST STEP
11 (ABS Module)	AA1
22 (LH Front Inlet Valve)	BB1
23 (LH Front Outlet Valve)	BB4
24 (RH Front Inlet Valve)	BB6
25 (RH Front Outlet Valve)	BB8
26 (RH Rear Inlet Valve)	BB10
27 (RH Rear Outlet Valve)	BB12
28 (LH Rear Inlet Valve)	BB14
29 (LH Rear Outlet Valve)	BB16
31 (LH Front Sensor)	CC1
32 (RH Front Sensor)	CC8
33 (RH Rear Sensor)	CC15
34 (LH Rear Sensor)	CC22
35 (LH Front Sensor)	CC1
36 (RH Front Sensor)	CC8
37 (RH Rear Sensor)	CC15
38 (LH Rear Sensor)	CC22
41 (LH Front Sensor)	CC1
42 (RH Front Sensor)	CC8
43 (RH Rear Sensor)	CC15
44 (LH Rear Sensor)	CC22

(Continued)

ON-BOARD DIAGNOSTIC TROUBLE CODE INDEX (Cont'd)

DIAGNOSTIC TROUBLE (COMPONENT)	PINPOINT TEST STEP
51 (LH Front Outlet Valve)	DD1
52 (RH Front Outlet Valve)	DD5
53 (RH Rear Outlet Valve)	DD9
54 (LH Rear Outlet Valve)	DD13
55 (LH Front Sensor)	CC1
56 (RH Front Sensor)	CC8
57 (RH Rear Sensor)	CC15
58 (LH Rear Sensor)	CC22
61 (FLS Circuits)	EE1
62 (Travel Switch)	EE1
63 (Pump Motor Speed Sensor)	EE7
64 (Pump Motor Pressure)	EE29
67 (Pump Motor Relay)	E1
71 (LH Front Sensor)	CC1
72 (RH Front Sensor)	CC8
73 (RH Rear Sensor)	CC15
74 (LH Rear Sensor)	CC22
75 (LH Front Sensor)	CC1
76 (RH Front Sensor)	CC8
77 (RH Rear Sensor)	CC15
78 (LH Rear Sensor)	CC22

TH7910B

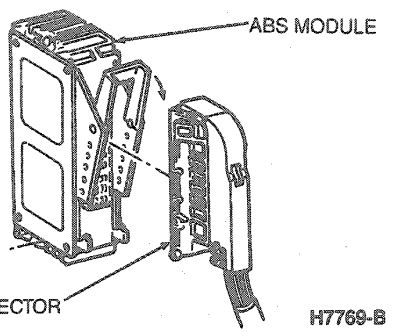
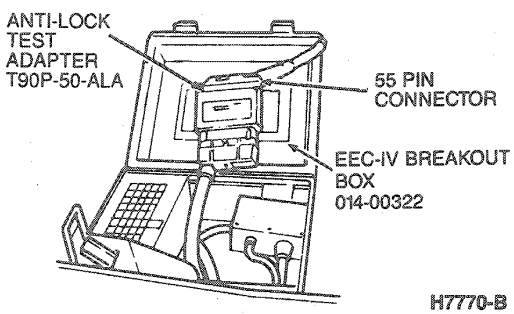
PINPOINT TEST AA: ABS MODULE DIAGNOSIS

TEST STEP		RESULT ▶	ACTION TO TAKE
AA1	DTC 11: ELECTRICAL DISTURBANCE		
	• Read all DTC's and record. • After all DTC's are read and written down, drive vehicle above 40 km/h (25 mph) to clear memory. • Read all DTC's again.	DTC 11 repeated ▶	REPLACE ABS module.
		Memory erased or other DTC's present except code 11 ▶	PERFORM test step associated with DTC's. REFER to On-Board Diagnostic Trouble code index, and SERVICE next code.

TH6965B

DIAGNOSIS AND TESTING (Continued)

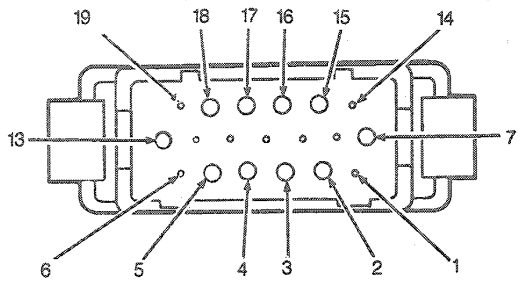
PINPOINT TEST BB:
SOLENOID VALVE DIAGNOSIS

TEST STEP	RESULT ▶	ACTION TO TAKE
BB1 DTC 22: NO REFERENCE VOLTAGE OR LH FRONT INLET VALVE		
• Disconnect 55-pin plug from ABS module.	10 volts minimum ▶	REMOVE jumper. GO to Step **BB2.**
 H7769-B	Less than 10 volts ▶	REPLACE or SERVICE cable harness Circuits 640, 532, or 606. NOTE: If test for code 22 continually leads to REVERIFY code 22, GO to Anti-Lock quick test-check.
• Connect EEC-IV Breakout Box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the anti-lock 55-pin plug wiring harness.		
 H7770-B		
• Connect a jumper between Pins 34 and 19. • With ignition switch ON, measure voltage between breakout box Pins 3 and 60.		
BB2 CHECK LH FRONT INLET VALVE AND CIRCUIT		
• Measure resistance between breakout box Pins 3 and 20. • **Is resistance between 5 and 8 ohms?**	Yes ▶	REVERIFY code 22. NOTE: If other codes are output, SERVICE next code.
	No ▶	GO to **BB3.**

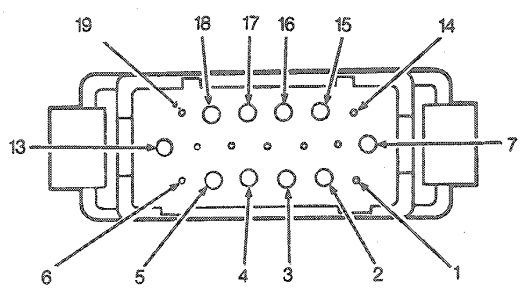
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST BB:
SOLENOID VALVE DIAGNOSIS (Continued)

TEST STEP		RESULT	ACTION TO TAKE
BB3	CHECK LH FRONT INLET VALVE ● Disconnect valve body 19-pin connector. ● Measure resistance between Pins 17 and 7. ● **Is resistance between 5 and 8 ohms?**	Yes ▶ No ▶	REPLACE or SERVICE cable harness Circuits 495. REPLACE valve body.
BB4	DTC 23: CHECK LH FRONT OUTLET VALVE AND CIRCUIT ● Measure resistance between breakout box Pins 3 and 2. ● **Is resistance between 3 and 6 ohms?**	Yes ▶ No ▶	GO to BB.. NOTE: If any other codes are output, SERVICE next code. GO to BB5.
BB5	CHECK LH FRONT OUTLET VALVE ● Disconnect valve body 19-pin connector. ● Measure resistance between Pins 18 and 7. ● **Is resistance between 3 and 6 ohms?**	Yes ▶ No ▶	REPLACE or SERVICE cable harness Circuit 498. REPLACE valve body.
BB6	DTC 24: CHECK RH FRONT INLET VALVE AND CIRCUIT ● Measure resistance between breakout box Pins 3 and 38. ● **Is resistance between 5 and 8 ohms?**	Yes ▶ No ▶	GO to BB8. NOTE: If other codes are output, SERVICE next code. GO to BB7.



VALVE BODY CONNECTOR H7771-A

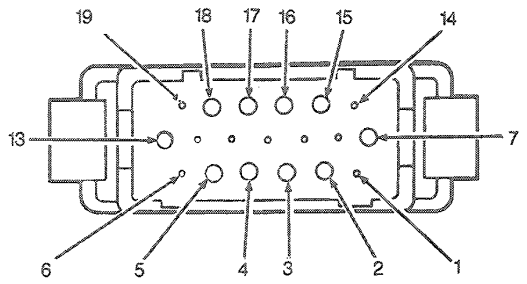


VALVE BODY CONNECTOR H7771-A

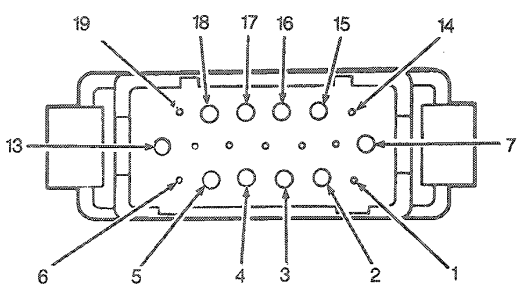
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST BB:
SOLENOID VALVE DIAGNOSIS (Continued)

TEST STEP		RESULT	ACTION TO TAKE
BB7	CHECK RH FRONT INLET VALVE ● Disconnect valve body 19-pin connector. ● Measure resistance between Pins 15 and 7. ● **Is resistance between 5 and 8 ohms?**	Yes ▶ No ▶	REPLACE or SERVICE cable harness Circuit 510. REPLACE valve body.
BB8	DTC 25: CHECK RH FRONT OUTLET VALVE AND CIRCUIT ● Measure resistance between breakout box Pins 3 and 21. ● **Is resistance between 3 and 6 ohms?**	Yes ▶ No ▶	GO to **BB10.** NOTE: If other codes are output, SERVICE next code. GO to **BB9.**
BB9	CHECK RH FRONT OUTLET VALVE ● Disconnect valve body 19-pin connector. ● Measure resistance between Pins 16 and 7. ● **Is resistance between 3 and 6 ohms?**	Yes ▶ No ▶	REPLACE or SERVICE cable harness Circuit 497. REPLACE valve body.



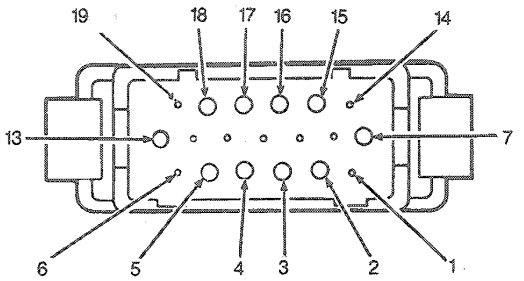
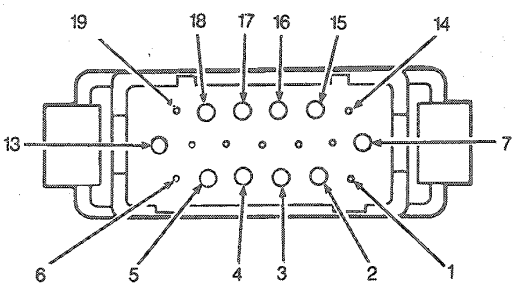
VALVE BODY CONNECTOR H7771-A



VALVE BODY CONNECTOR H7771-A

DIAGNOSIS AND TESTING (Continued)

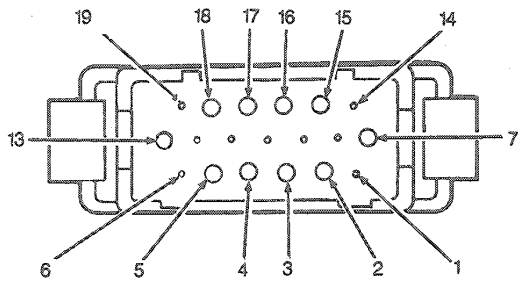
PINPOINT TEST BB:
SOLENOID VALVE DIAGNOSIS (Continued)

TEST STEP	RESULT	ACTION TO TAKE
BB10 DTC 26: CHECK RH REAR INLET VALVE AND CIRCUIT ● Measure resistance between breakout box Pins 3 and 55. ● **Is resistance between 5 and 8 ohms?**  VALVE BODY CONNECTOR H7771-A	Yes ▶ No ▶	GO to **BB12.** NOTE: If other codes are output, SERVICE next code. GO to **BB11.**
BB11 CHECK RH REAR INLET VALVE ● Disconnect valve body 19-pin connector. ● Measure resistance between Pins 2 and 7. ● **Is resistance between 5 and 8 ohms?**  VALVE BODY CONNECTOR H7771-A	Yes ▶ No ▶	REPLACE or SERVICE cable harness Circuit 455 (Taurus / Sable). Circuit 678 (Taurus SHO). REPLACE valve body.
BB12 DTC 27: CHECK RH REAR OUTLET VALVE AND CIRCUIT ● Measure resistance between breakout box Pins 3 and 18. ● **Is resistance between 3 and 6 ohms?**	Yes ▶ No ▶	GO to **BB14.** NOTE: If other codes are output, SERVICE next code. GO to **BB13.**

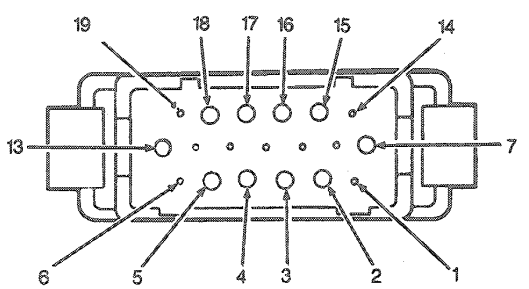
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST BB:
SOLENOID VALVE DIAGNOSIS (Continued)

TEST STEP	RESULT	ACTION TO TAKE
BB13 CHECK RH REAR OUTLET VALVE ● Disconnect valve body 19-pin connector. ● Measure resistance between Pins 3 and 7. ● **Is resistance between 3 and 6 ohms?**	Yes ▶	REPLACE or SERVICE cable harness Circuit 599 (Taurus / Sable). Circuit 685 (Taurus SHO).
	No ▶	REPLACE valve body.
BB14 DTC 28: CHECK LH REAR INLET VALVE AND CIRCUIT ● Measure resistance between breakout box Pins 3 and 54. ● **Is resistance between 5 and 8 ohms?**	Yes ▶	GO to **BB16.** NOTE: If other codes are output, SERVICE next code.
	No ▶	GO to **BB15.**
BB15 CHECK LH REAR INLET VALVE ● Disconnect valve body 19-pin connector. ● Measure resistance between Pins 4 and 7. ● **Is resistance between 5 and 8 ohms?**	Yes ▶	REPLACE or SERVICE cable harness Circuit 496.
	No ▶	REPLACE valve body.
BB16 DTC 29: CHECK LH REAR OUTLET VALVE AND CIRCUIT ● Measure resistance between breakout box Pins 3 and 36. ● **Is resistance between 3 and 6 ohms?**	Yes ▶	GO to **BB18.** NOTE: If other codes are output, SERVICE next code.
	No ▶	GO to **BB17.**



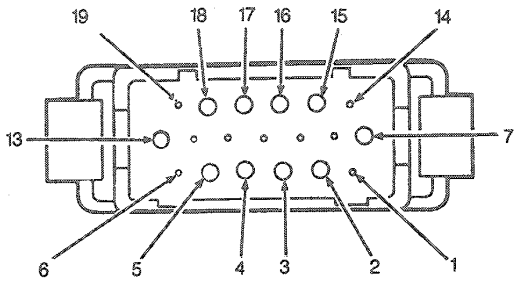
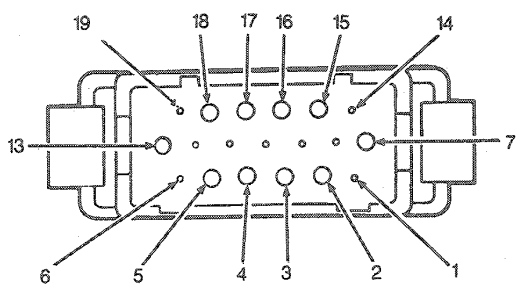
VALVE BODY CONNECTOR H7771-A



VALVE BODY CONNECTOR H7771-A

DIAGNOSIS AND TESTING (Continued)

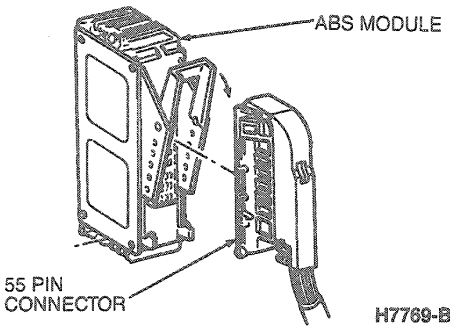
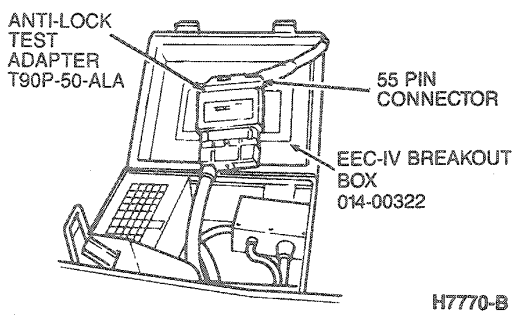
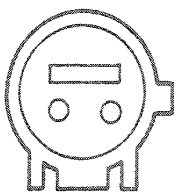
PINPOINT TEST BB:
SOLENOID VALVE DIAGNOSIS (Continued)

TEST STEP	RESULT	ACTION TO TAKE
BB17 CHECK LH REAR OUTLET VALVE ● Disconnect valve body 19-pin connector. ● Measure resistance between Pins 5 and 7. ● **Is resistance between 3 and 6 ohms?**  VALVE BODY CONNECTOR H7771-A	Yes ▶ No ▶	REPLACE or SERVICE cable harness Circuit 499. REPLACE valve body.
BB18 CHECK VALVE BODY POWER FEED AND CIRCUITRY ● Remove main power relay from harness connector. ● Check for continuity between breakout box Pins 3 and 33. ● **Is there continuity?**	Yes ▶ No ▶	GO to **BB19.** REPLACE or SERVICE cable harness circuit 532.
BB19 CHECK VALVE BODY INTERNAL POWER FEED CIRCUITS ● Disconnect valve body 19-pin connector. ● Check for continuity between Pins 7 and 13 on valve body.  VALVE BODY CONNECTOR H7771-A ● **Is there continuity?**	Yes ▶ No ▶	REVERIFY symptom. REPLACE valve body. NOTE: If symptom is reverified and no malfunction is found, GO to Anti-Lock Quick Test Check.

TH7291D

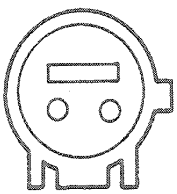
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST CC:
WHEEL SENSOR DIAGNOSIS

TEST STEP	RESULT	ACTION TO TAKE
CC1 DTC's 31, 35, 41, 55, 71 OR 75: CHECK LH FRONT SENSOR ● Turn ignition switch OFF. ● Disconnect 55-pin connector from ABS module.  H7769-B ● Connect EEC-IV Breakout Box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the 55-pin connector on wiring harness.  H7770-B ● Measure resistance between Pins 30 and 48. ● **Is resistance between 800 and 1400 ohms?**	Yes ▶ No ▶	GO to **CC3.** GO to **CC2.**
CC2 CHECK LH FRONT SENSOR RESISTANCE ● Disconnect LH front wheel sensor plug. ● Measure resistance of sensor at sensor plug. ● **Is resistance between 800 and 1400 ohms?**  LH FRONT SENSOR H7773-A	Yes ▶ No ▶	SERVICE or REPLACE cable harness Circuit 521 or 522. REPLACE LH front sensor.

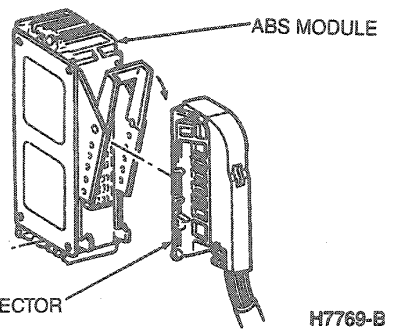
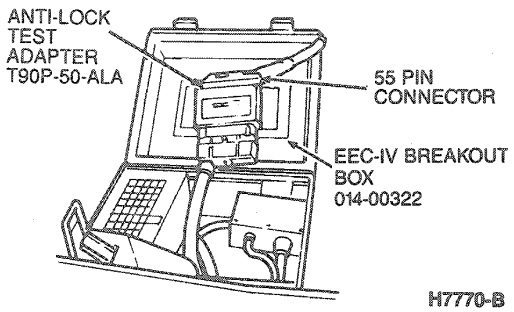
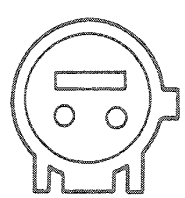
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST CC:
WHEEL SENSOR DIAGNOSIS (Continued)

TEST STEP		RESULT	ACTION TO TAKE
CC3	CHECK LH FRONT SENSOR VOLTAGE		
	• Turn ignition switch OFF. • Place vehicle on hoist and raise wheels clear of ground. Refer to Section 00-02. • Set multi-meter to voltage range (2 volts AC). • Measure voltage between Pins 30 and 48 at breakout box while spinning LH front wheel at approximately 1 revolution per second.	Between 0.10 and 1.40 volts AC ▶ Less than 0.10 or more than 1.40 volts AC ▶	GO to **CC4.** CHECK sensor mounting, air gap or toothed wheel mounting. CORRECT as required.
CC4	CHECK LH FRONT SENSOR CIRCUIT CONTINUITY TO GROUND		
	• Check continuity between breakout box Pins 30 and 60. • **Is continuity present?**	No ▶ Yes ▶	GO to **CC6.** GO to **CC5.**
CC5	CHECK LH FRONT SENSOR TO GROUND		
	• Disconnect LH front wheel sensor plug. • Check for continuity between each sensor plug pin (sensor side) and vehicle ground. • **Is continuity present?**  **LH FRONT SENSOR H7773-A**	Yes ▶ No ▶	REPLACE LH front sensor. SERVICE or REPLACE cable harness Circuit 521 or 522. RECONNECT sensor plug.
CC6	CHECK ABS MODULE TO GROUND WIRE		
	• Check continuity between breakout box Pin 60 and body ground. • **Was continuity present?**	Yes ▶ No ▶	GO to **CC7.** SERVICE or REPLACE cable harness Circuit 530 (Taurus/Sable). Circuit 57 or 530 (Taurus SHO).
CC7	CHECK LH FRONT WHEEL BEARING		
	• Check front wheel bearing end play. • Inspect toothed sensor ring visually for damaged teeth. • **Were loose or damaged parts found?**	Yes ▶ No ▶	REPLACE damaged parts. REVERIFY symptom.

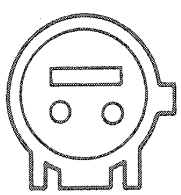
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST CC:
WHEEL SENSOR DIAGNOSIS (Continued)

TEST STEP		RESULT	ACTION TO TAKE
CC8	DTC'S 32, 36, 42, 56, 72 OR 76: CHECK RH FRONT SENSOR		
	• Turn ignition switch OFF. • Disconnect 55-pin connector from ABS module.  H7769-B • Connect EEC-IV breakout box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the 55-pin connector on wiring harness.  H7770-B • Measure resistance between Pins 29 and 47. • **Is resistance between 800 and 1400 ohms?**	Yes ▶ No ▶	GO to CC10. GO to CC9.
CC9	CHECK RH FRONT SENSOR RESISTANCE		
	• Disconnect RH front sensor plug. • Measure resistance of sensor at sensor plug. • **Is resistance between 800 and 1400 ohms?**  RH FRONT SENSOR H7774-A	Yes ▶ No ▶	SERVICE or REPLACE cable harness Circuit 514 or 516. REPLACE RH front sensor.

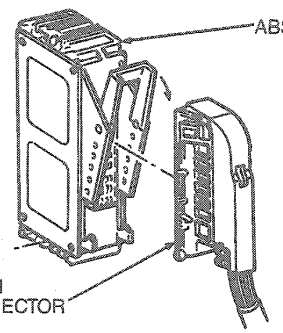
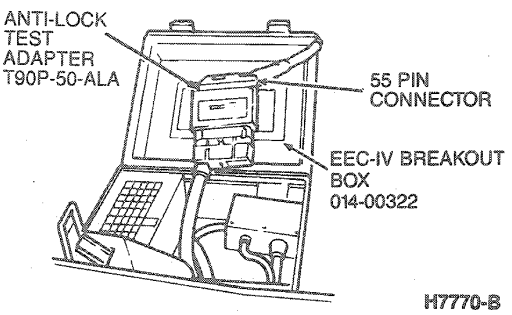
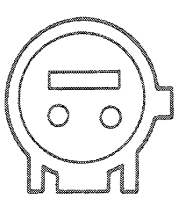
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST CC:
WHEEL SENSOR DIAGNOSIS (Continued)

TEST STEP		RESULT	ACTION TO TAKE
CC10	CHECK RH FRONT SENSOR VOLTAGE		
	• Turn ignition switch OFF. • Place vehicle on hoist and raise wheels clear of ground. Refer to Section 00-02. • Set multi-meter to voltage range (2 volts AC) • Measure voltage between Pins 29 and 47 at breakout box while spinning RH front wheel at approximately 1 revolution per second.	Between 0.10 and 1.40 volts AC ▶ Less than 0.10 or more than 1.40 volts AC ▶	GO to CC11. CHECK sensor mounting, air gap or toothed wheel mounting. CORRECT as required.
CC11	CHECK RH FRONT SENSOR CIRCUIT CONTINUITY TO GROUND		
	• Check continuity between breakout box Pins 29 and 60. • **Is continuity present?**	No ▶ Yes ▶	GO to CC13. GO to CC12.
CC12	CHECK RH FRONT SENSOR TO GROUND		
	• Disconnect RH front wheel sensor plug. • Check for continuity between each sensor plug pin (sensor side) and vehicle ground. • **Is continuity present?**  RH FRONT SENSOR H7774-A	Yes ▶ No ▶	REPLACE RH front sensor. SERVICE or REPLACE cable harness Circuit 514 or 516. RECONNECT sensor plug.
CC13	CHECK ABS MODULE TO GROUND WIRE		
	• Check continuity between breakout box Pin 60 and body ground. • **Is continuity present?**	Yes ▶ No ▶	GO to CC14. SERVICE or REPLACE cable harness Circuit 530 (Taurus / Sable). Circuit 57 or 530 (Taurus SHO).
CC14	CHECK RH FRONT WHEEL BEARING		
	• Check front wheel bearing end play. • Inspect toothed sensor ring visually for damaged teeth. • **Were any parts loose or damaged?**	Yes ▶ No ▶	REPLACE damaged parts. REVERIFY symptom.

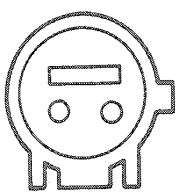
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST CC:
WHEEL SENSOR DIAGNOSIS (Continued)

TEST STEP		RESULT	ACTION TO TAKE
CC15	DTC'S 33, 37, 43, 57, 73 OR 77: CHECK RH REAR SENSOR		
	• Turn ignition switch OFF. • Disconnect 55-pin connector from ABS module.	Yes ▶ No ▶	GO to CC17. GO to CC16.
	 H7769-B		
	• Connect EEC-IV breakout box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the 55-pin connector on wiring harness.		
	 H7770-B		
	• Measure resistance between Pins 27 and 45. • **Is resistance between 800 and 1400 ohms?**		
CC16	CHECK RH REAR SENSOR RESISTANCE		
	• Disconnect RH rear sensor plug. • Measure resistance of sensor at sensor plug. • **Is resistance between 800 and 1400 ohms?**	Yes ▶ No ▶	SERVICE or REPLACE cable harness Circuit 523 or 524. REPLACE RH rear sensor.
	 RH REAR SENSOR H7775-A		

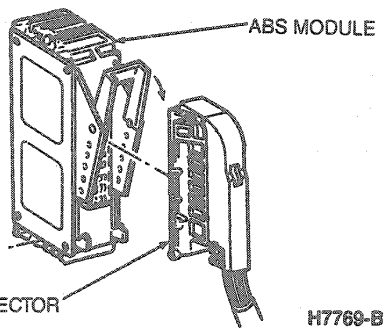
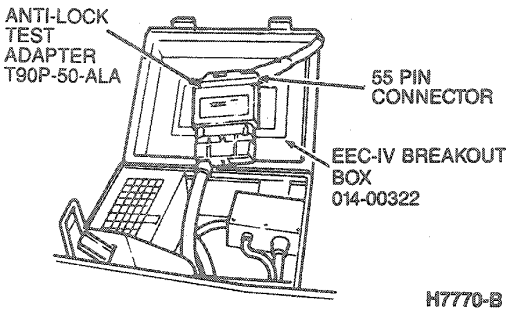
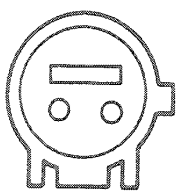
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST CC:
WHEEL SENSOR DIAGNOSIS (Continued)

TEST STEP		RESULT	ACTION TO TAKE
CC17	CHECK RH REAR SENSOR VOLTAGE		
	• Turn ignition switch OFF. • Place vehicle on hoist and raise wheels clear of ground. Refer to Section 00-02. • Set multi-meter to voltage range (2 volts AC). • Measure voltage between Pins 27 and 45 at breakout box while spinning RH rear wheel at approximately 1 revolution per second.	Between 0.10 and 1.40 volts AC ▶ Less than 0.10 or more than 1.40 volts AC ▶	GO to CC18. CHECK sensor mounting, air gap or toothed wheel mounting. CORRECT as required.
CC18	CHECK RH REAR SENSOR CIRCUIT CONTINUITY TO GROUND		
	• Check continuity between breakout box Pins 27 and 60. • **Is continuity present?**	No ▶ Yes ▶	GO to CC20. GO to CC19.
CC19	CHECK RH REAR SENSOR TO GROUND		
	• Disconnect RH rear wheel sensor plug. • Check for continuity between each sensor plug pin (sensor side) and vehicle ground. • **Is continuity present?**  RH REAR SENSOR H7775-A	Yes ▶ No ▶	REPLACE RH rear sensor. SERVICE or REPLACE cable harness Circuit 523 or 524. RECONNECT sensor plug.
CC20	CHECK ABS MODULE TO GROUND WIRE		
	• Check continuity between breakout box Pin 60 and body ground. • **Is continuity present?**	Yes ▶ No ▶	GO to CC21. SERVICE or REPLACE cable harness Circuit 530 (Taurus / Sable). Circuit 57 or 530 (Taurus SHO).
CC21	CHECK FOR EXCESSIVE AXLE VIBRATION		
	• Check differential housing for excessive play. • Check rear axle bearings for excessive play. • Inspect toothed sensor ring for damaged teeth. • **Were any parts loose or damaged?**	Yes ▶ No ▶	SERVICE or REPLACE damaged parts. REVERIFY symptom.

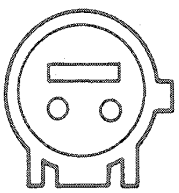
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST CC:
WHEEL SENSOR DIAGNOSIS (Continued)

TEST STEP	RESULT	ACTION TO TAKE
CC22 DTC'S 34, 38, 44, 58, 74 OR 78: CHECK LH REAR SENSOR		
• Turn ignition switch OFF. • Disconnect 55-pin connector from ABS module. • Measure resistance between Pins 28 and 46. • **Is resistance between 800 and 1400 ohms?**	Yes ▶ No ▶	GO to **CC24.** GO to **CC23.**
 H7769-B		
• Connect EEC-IV breakout box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the 55-pin connector on wiring harness.		
 H7770-B		
CC23 CHECK LH REAR SENSOR RESISTANCE		
• Disconnect LH rear sensor plug. • Measure resistance of sensor at sensor plug. • **Is resistance between 800 and 1400 ohms?**	Yes ▶ No ▶	SERVICE or REPLACE cable harness Circuit 518 or 519. REPLACE LH rear sensor.
 LH REAR SENSOR H7776-A		

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST CC:
WHEEL SENSOR DIAGNOSIS (Continued)

TEST STEP		RESULT	ACTION TO TAKE
CC24	CHECK LH REAR SENSOR VOLTAGE		
	• Turn ignition switch OFF. • Place vehicle on hoist and raise wheels clear of ground. Refer to Section 00-02. • Set multi-meter to voltage range (2 volts AC) • Measure voltage between Pins 28 and 46 at breakout box while spinning LH rear wheel at approximately 1 revolution per second.	Between 0.10 and 1.40 volts AC ▶ Less than 0.10 or more than 1.40 volts AC ▶	GO to CC25. CHECK sensor mounting, air gap or toothed wheel mounting. CORRECT as required.
CC25	CHECK LH REAR SENSOR CIRCUIT CONTINUITY TO GROUND		
	• Check continuity between breakout box Pins 28 and 60. • **Is continuity present?**	No ▶ Yes ▶	GO to CC27. GO to CC26.
CC26	CHECK LH REAR SENSOR TO GROUND		
	• Disconnect LH rear wheel sensor plug. • Check for continuity between each sensor plug pin (sensor side) and vehicle ground.  LH REAR SENSOR H7776-A	Yes ▶ No ▶	REPLACE LH rear sensor. SERVICE or REPLACE cable harness Circuit 518 or 519. RECONNECT sensor plug.
CC27	CHECK ABS MODULE TO GROUND WIRE		
	• Check continuity between breakout box Pin 60 and body ground. • **Is continuity present?**	Yes ▶ No ▶	GO to CC28. SERVICE or REPLACE cable harness Circuit 530 (Taurus/Sable). Circuit 57 or 530 (Taurus SHO).
CC28	CHECK FOR EXCESSIVE AXLE VIBRATION		
	• Check differential housing for excessive play. • Check rear axle bearings for excessive play. • Inspect toothed sensor ring for damaged teeth. • **Were any parts loose or damaged?**	Yes ▶ No ▶	SERVICE or REPLACE damaged parts. REVERIFY symptom.

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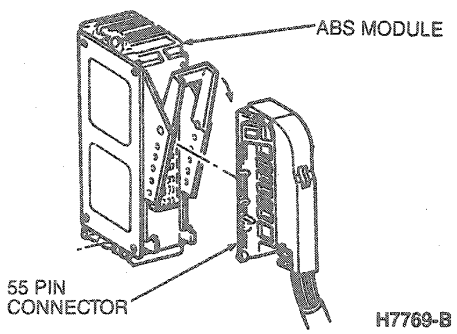
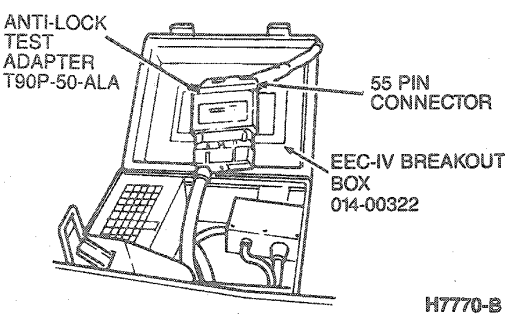
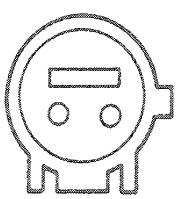
DIAGNOSIS AND TESTING (Continued)

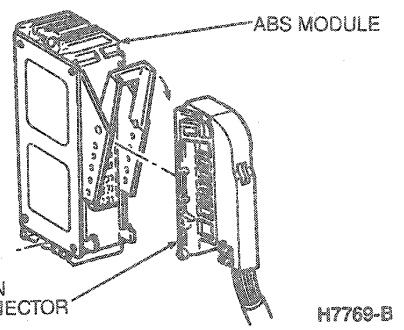
PINPOINT TEST DD:
WHEEL SENSOR DIAGNOSIS

TEST STEP	RESULT	ACTION TO TAKE
DD1 DTC 51 AND / OR 71: CHECK LH FRONT SENSOR CIRCUIT CONTINUITY		
• Turn ignition switch OFF. • Disconnect 55-pin plug from ABS Module. • Check for continuity between breakout box Pins 60 and 30. • **Is continuity present?**	Yes ▶ No ▶	GO to **DD2.** GO to **DD3.**
		
• Connect EEC-IV breakout box, 014-00322 with Anti-Lock Test Adapter, T90P-50-ALA or equivalent to the anti-lock 55-pin plug harness.		
		
DD2 CHECK LH FRONT SENSOR CONTINUITY		
• Disconnect LH front wheel sensor plug. • Check for continuity between each sensor plug pin (sensor side) and vehicle ground. • **Is continuity present?**	Yes ▶ No ▶	REPLACE LH front sensor. SERVICE or REPLACE cable harness Circuit 521 or 522. RECONNECT sensor plug.
		

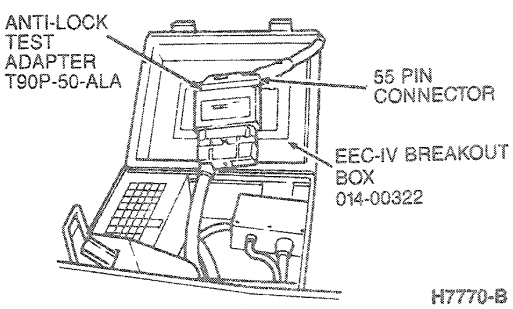
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST DD:
WHEEL SENSOR DIAGNOSIS (Continued)

TEST STEP		RESULT	ACTION TO TAKE
DD3	CHECK ABS MODULE TO GROUND WIRE		
	• Check continuity between breakout box Pin 60 and body ground. • **Is continuity present?**	Yes No	GO to **DD4.** SERVICE or REPLACE cable harness Circuit 530 (Taurus / Sable). Circuit 57 or 530 (Taurus SHO).
DD4	CHECK ANTI-LOCK OPERATION LH FRONT WHEEL		
	• Lift vehicle and rotate wheels to ensure they turn freely. • Apply moderate brake pedal effort and check that LH front wheel will not turn. • Jump Pins 34 and 19. • Short Pins 2, 20 and 60 to each other at breakout box. • Check that LH front wheel turns freely with ignition switch ON. **CAUTION: Do not leave ignition on for more than 1 minute, or valve damage may result.**	Wheel turns freely Wheel does not turn freely or pedal drops	REVERIFY symptom. REPLACE solenoid valve body.
DD5	DTC 52 AND / OR 72: CHECK RH FRONT SENSOR CIRCUIT CONTINUITY		
	• Turn ignition switch OFF. • Disconnect 55-pin plug from ABS Module. • Check for continuity between breakout box Pins 60 and 29. • **Is continuity present?**	Yes No	GO to **DD6.** GO to **DD7.**

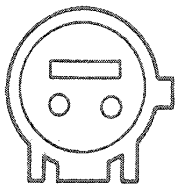


- Connect EEC-IV breakout box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the anti-lock 55-pin plug wiring harness.



DIAGNOSIS AND TESTING (Continued)

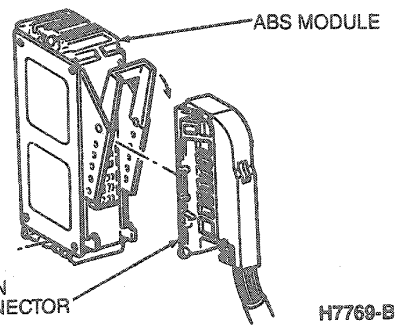
PINPOINT TEST DD:
WHEEL SENSOR DIAGNOSIS (Continued)

TEST STEP		RESULT	ACTION TO TAKE
DD6	CHECK RH FRONT SENSOR CONTINUITY		
	• Disconnect RH front wheel sensor. • Check for continuity between each sensor plug pin (sensor side) and vehicle ground. • **Is continuity present?**  RH FRONT SENSOR H7774-A	Yes ▶ No ▶	REPLACE RH front sensor. SERVICE or REPLACE cable harness Circuit 514 or 516. RECONNECT sensor plug.
DD7	CHECK ABS MODULE TO GROUND WIRE		
	• Check continuity between breakout box Pin 60 and body ground. • **Is continuity present?**	Yes ▶ No ▶	GO to **DD8.** SERVICE or REPLACE cable harness Circuit 530 (Taurus / Sable). Circuit 57 or 530 (Taurus SHO).
DD8	CHECK ANTI-LOCK OPERATION RH FRONT WHEEL		
	• Lift vehicle and rotate wheels to ensure they turn freely. • Apply moderate brake pedal effort and check that RH front wheel will not turn. • Jump Pins 34 and 19. • Short Pins 21, 38 and 60 to each other at breakout box. • Check that RH front wheel turns freely with ignition switch ON.	Wheel turns freely ▶ Wheel does not turn freely or pedal drops ▶	REVERIFY symptom. REPLACE solenoid valve body.

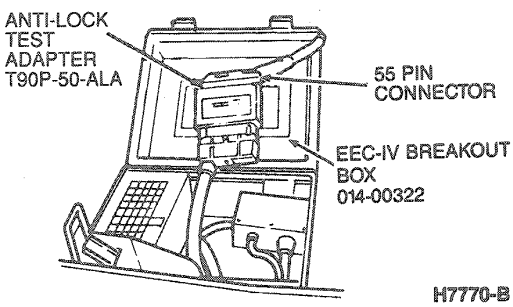
DIAGNOSIS AND TESTING (Continued)

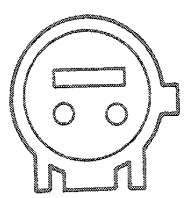
PINPOINT TEST DD:
WHEEL SENSOR DIAGNOSIS (Continued)

TEST STEP	RESULT	ACTION TO TAKE
DD9 DTC 53 AND / OR 73: CHECK RH REAR SENSOR CIRCUIT CONTINUITY ● Turn ignition switch OFF. ● Disconnect 55-pin plug from ABS Module. ● Check for continuity between breakout box Pins 60 and 27. ● **Is continuity present?**	Yes ▶ No ▶	GO to **DD10.** GO to **DD11.**
DD10 CHECK RH REAR SENSOR CONTINUITY ● Disconnect RH rear wheel sensor plug. ● Check for continuity between each sensor plug pin (sensor side) and vehicle ground. ● **Is continuity present?**	Yes ▶ No ▶	REPLACE RH rear sensor. SERVICE or REPLACE cable harness Circuit 523 or 524. RECONNECT sensor plug.



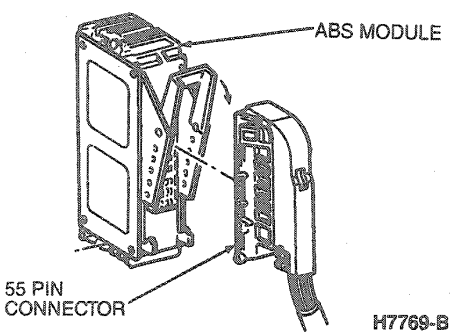
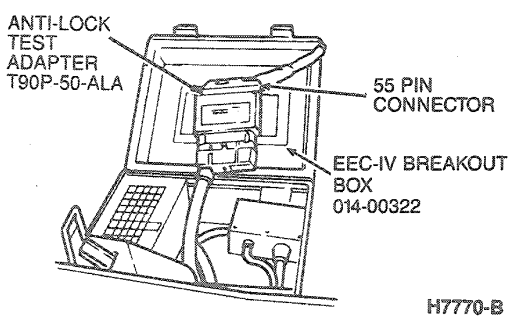
● Connect EEC-IV breakout box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the anti-lock 55-pin plug wiring harness.





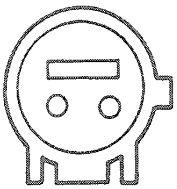
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST DD:
WHEEL SENSOR DIAGNOSIS (Continued)

TEST STEP		RESULT	ACTION TO TAKE
DD11	CHECK ABS MODULE TO GROUND WIRE		
	• Check continuity between breakout box Pin 60 and body ground. • **Is continuity present?**	Yes ▶ No ▶	GO to **DD12.** SERVICE or REPLACE cable harness Circuit 530 (Taurus / Sable). Circuit 57 or 530 (Taurus SHO).
DD12	CHECK ANTI-LOCK OPERATION RH REAR WHEEL		
	• Lift vehicle and rotate wheels to ensure they turn freely. • Apply moderate brake pedal effort and check that RH rear wheel will not turn. • Jump Pins 34 and 19. • Short Pins 18, 55 and 60 to each other at breakout box. • Check that RH rear wheel turns freely with ignition switch ON.	Wheel turns freely ▶ Wheel does not turn freely or pedal drops ▶	REVERIFY symptom. REPLACE solenoid valve body.
DD13	DTC 54 AND / OR 74: CHECK LH REAR SENSOR CIRCUIT CONTINUITY		
	• Turn ignition switch OFF. • Disconnect 55-pin plug from ABS Module. • Check for continuity between breakout box Pins 60 and 28. • **Is continuity present?**  • Connect EEC-IV breakout box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the anti-lock 55-pin plug wiring harness.  	Yes ▶ No ▶	GO to **DD14.** GO to **DD15.**

DIAGNOSIS AND TESTING (Continued)

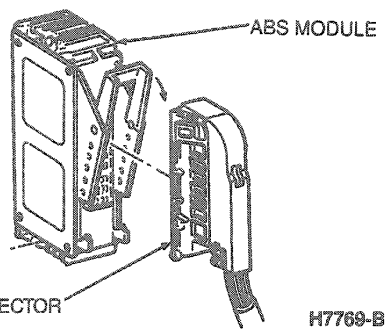
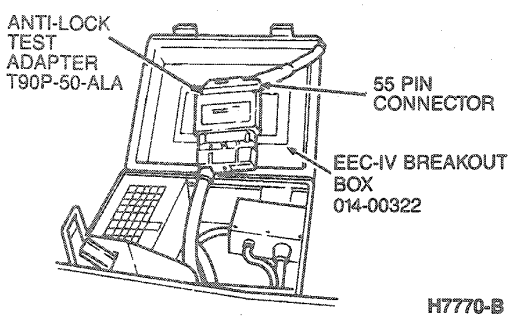
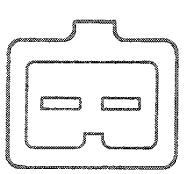
PINPOINT TEST DD:
WHEEL SENSOR DIAGNOSIS (Continued)

TEST STEP	RESULT	ACTION TO TAKE
DD14 CHECK LH REAR SENSOR CONTINUITY • Disconnect LH rear wheel sensor plug. • Check for continuity between each sensor plug pin (sensor side) and vehicle ground. • **Is continuity present?**  LH REAR SENSOR H7776-A	Yes ▶ No ▶	REPLACE LH rear sensor. SERVICE or REPLACE cable harness Circuit 518 or 519. RECONNECT sensor plug.
DD15 CHECK ABS MODULE TO GROUND WIRE • Check continuity between breakout box Pin 60 and body ground. • **Is continuity present?**	Yes ▶ No ▶	GO to **DD16.** SERVICE or REPLACE cable harness Circuit 530 (Taurus / Sable). Circuit 57 or 530 (Taurus SHO).
DD16 CHECK ANTI-LOCK OPERATION LH REAR WHEEL • Lift vehicle and rotate wheels to ensure they turn freely. • Apply moderate brake pedal effort and check that LH rear wheel will not turn. • Jump Pins 34 and 19. • Short Pins 36, 54 and 60 to each other at breakout box. • Check that LH rear wheel turns freely with ignition switch ON. **CAUTION: Do not leave ignition on for more than 1 minute, or valve damage may result.**	Wheel turns freely ▶ Wheel does not turn freely or pedal drops ▶	REVERIFY symptom. REPLACE solenoid valve body.

TH7912B

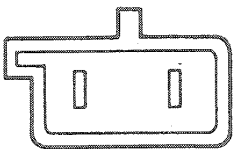
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST EE:
FLUID LEVEL INDICATOR/PEDAL TRAVEL SWITCH/PRESSURE SWITCH DIAGNOSIS

TEST STEP		RESULT	ACTION TO TAKE
EE1	DTC 61, AND/OR 62: CHECK FLS NO. 2, PEDAL TRAVEL SWITCH AND PRESSURE SWITCH		
	• Turn ignition switch OFF. • Disconnect 55-pin plug from ABS module.  H7769-B • Connect EEC-IV Breakout Box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the anti-lock 55-pin plug harness.  H7770-B • Check for continuity between breakout box Pins 8 and 60. • **Is continuity present?**	No ▶ Yes ▶	GO to EE3. GO to EE2.
EE2	CHECK FLS NO. 2 SWITCH		
	• Disconnect 2-pin plug on FLS located on small reservoir on hydraulic control unit.  2 PIN CONNECTOR ON SMALL RESERVOIR ON HCU H7777-A • Check for continuity between each pin and body ground. • **Is continuity present?**	Yes ▶ No ▶	REPLACE HCU reservoir. SERVICE or REPLACE cable harness (Circuit 542, 535, or 549 Taurus/Sable). Circuit 550, 535, or 549 (Taurus SHO).

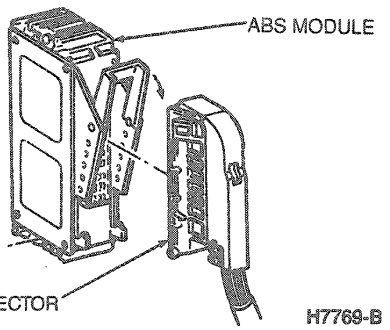
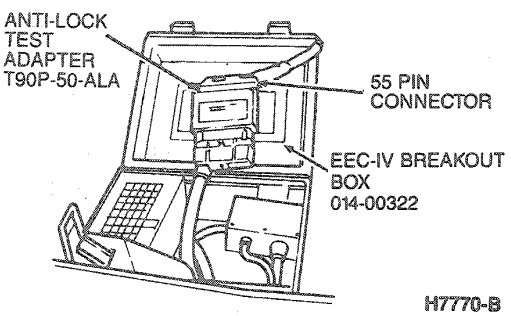
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST EE:
FLUID LEVEL INDICATOR/PEDAL TRAVEL SWITCH/PRESSURE SWITCH DIAGNOSIS (Continued)

TEST STEP		RESULT	ACTION TO TAKE
EE3	CHECK FOR VOLTAGE ON FLS NO. 2 SWITCH AND CIRCUITRY		
	• Turn ignition switch to ON position. • Measure voltage between breakout box Pins 8 and 60.	No voltage ▶ 12 volts ▶	GO to EE4. SERVICE or REPLACE cable harness circuit 542, 535, or 549 (Taurus/Sable). Circuit 550, 535, or 549 (Taurus SHO).
EE4	CHECK PEDAL TRAVEL SWITCH AND CIRCUITRY		
	• Check for continuity between breakout box Pins 5 and 60. • **Is continuity present?**	No ▶ Yes ▶	GO to EE6. GO to EE5.
EE5	CHECK PEDAL TRAVEL SWITCH		
	• Disconnect 2-pin plug on pedal travel switch.  **2 PIN BRAKE PEDAL POSITION SWITCH** **H7778-A** • Check for continuity between each pin and body ground. • **Is continuity present?**	Yes ▶ No ▶	REPLACE pedal travel switch. SERVICE or REPLACE cable harness (Circuit 535 or 549).
EE6	CHECK FOR VOLTAGE ON PEDAL TRAVEL SWITCH AND CIRCUITRY		
	• Turn ignition switch to ON position. • Measure voltage between breakout box Pins 5 and 60.	No voltage ▶ 12 volts ▶	VERIFY code 61 and/or 62. SERVICE or REPLACE cable harness circuit 542, 535 or 549 (Taurus/Sable). Circuit 550, 535 or 549 (Taurus SHO).

DIAGNOSIS AND TESTING (Continued)

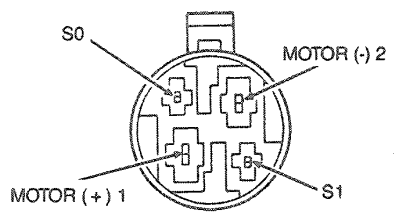
PINPOINT TEST EE:
FLUID LEVEL INDICATOR/PEDAL TRAVEL SWITCH/PRESSURE SWITCH DIAGNOSIS (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
EE7	DTC 63: CHECK PUMP MOTOR SPEED SENSOR AND CIRCUIT		
	NOTE: The ABS module will check the pump speed sensor and circuitry by running the pump for about 0.5 second each time the ignition is switched on and the vehicle speed reaches 30 km/h (19 mph). ● Turn ignition switch OFF. ● Disconnect 55-pin plug from ABS Module.  ● Connect EEC-IV breakout box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the anti-lock 55-pin plug harness.  ● Check resistance between breakout box Pins 31 and 49. ● **Is resistance between 5 and 100 ohms?**	Yes ▶ No ▶	GO to EE13. GO to EE8.

DIAGNOSIS AND TESTING (Continued)

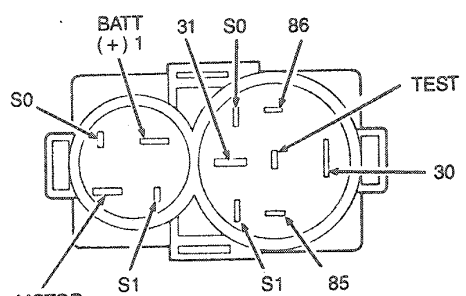
PINPOINT TEST EE:
FLUID LEVEL INDICATOR/PEDAL TRAVEL SWITCH/PRESSURE SWITCH DIAGNOSIS (Continued)

TEST STEP	RESULT	ACTION TO TAKE
EE8 CHECK PUMP MOTOR SPEED SENSOR ● Disconnect 4-pin plug on pump motor. ● Measure resistance between Pins S0 and S1 on pump motor. ● **Is resistance between 5 and 100 ohms?**	Yes No	▶ GO to **EE9.** ▶ REPLACE pump and motor.
EE9 CHECK PUMP MOTOR RELAY ● Disconnect 7-pin plug on pump motor relay and remove relay. ● Check continuity from Pin S0 on 7-pin side to Pin S0 on 4-pin side of relay. ● **Is continuity present?**	Yes No	▶ GO to **EE10.** ▶ REPLACE pump motor relay.
EE10 CHECK PUMP MOTOR RELAY ● Check continuity from Pin S1 on 7-pin side to Pin S1 on 4-pin side of relay. ● **Is continuity present?**	Yes No	▶ GO to **EE11.** ▶ REPLACE pump motor relay.



4 PIN PUMP MOTOR CONNECTOR

H7784-B



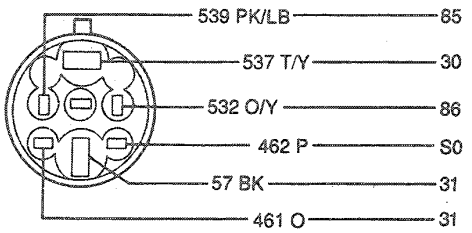
PUMP MOTOR RELAY

H7780-B

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST EE:
FLUID LEVEL INDICATOR/PEDAL TRAVEL SWITCH/PRESSURE SWITCH DIAGNOSIS (Continued)

TEST STEP	RESULT	ACTION TO TAKE
EE11 CHECK CIRCUIT 462 • Check continuity between breakout box Pin 31 and Pin S0 on pump motor connector 7-pin plug (harness side). • **Is continuity present?**	Yes No	GO to **EE12.** SERVICE or REPLACE cable harness Circuit 462.
EE12 CHECK CIRCUIT 461 • Check continuity between breakout box Pin 49 and Pin S1 on pump motor connector 7-pin plug (harness side). • **Is continuity present?**	Yes No	REVERIFY reading in STEP EE7. SERVICE or REPLACE cable harness Circuit 461.
EE13 CHECK MOTOR SPEED SENSOR SHORT TO BATTERY + • Turn ignition switch to ON. • Measure voltage between breakout box Pins 31 and 60.	No voltage 12 volts	GO to **EE20.** GO to **EE20.**
EE14 CHECK PUMP MOTOR • Disconnect pump motor to relay 4-pin plug connector. • Turn ignition switch to ON. • Measure voltage between breakout box Pins 31 and 60.	No voltage 12 volts	REPLACE pump and motor. GO to **EE14.**
EE15 CHECK CIRCUIT 462 • Disconnect wire harness to relay 7-pin plug. • Turn ignition switch to ON. • Measure voltage between breakout box Pins 31 and 60.	No voltage 12 volts	GO to **EE16.** SERVICE or REPLACE cable harness Circuit 462.
EE16 CHECK CIRCUIT 461 • Turn ignition switch to ON. • Measure voltage between breakout box Pins 49 and 60.	No voltage 12 volts	REPLACE pump motor relay. SERVICE or REPLACE cable harness Circuit 461.
EE17 CHECK MOTOR SPEED SENSOR SHORT TO GROUND • Turn ignition switch OFF. • Check for continuity between breakout box Pins 31 and 60. • **Is continuity present?**	No Yes	GO to **EE20.** GO to **EE18.**
EE18 CHECK CIRCUIT 462 • Disconnect wire harness to relay 7-pin plug. • Check for continuity between breakout box Pins 31 and 60. • **Is continuity present?**	Yes No	SERVICE or REPLACE cable harness Circuit 462. GO to **EE19.**

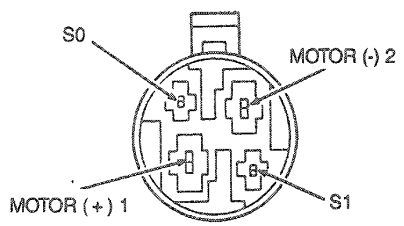


7 PIN PUMP MOTOR RELAY CONNECTOR HARNESS SIDE H7781-B

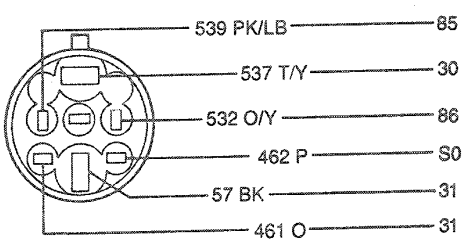
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST EE:
FLUID LEVEL INDICATOR/PEDAL TRAVEL SWITCH/PRESSURE SWITCH DIAGNOSIS (Continued)

TEST STEP	RESULT	ACTION TO TAKE
EE19 CHECK CIRCUIT 461 ● Check for continuity between breakout box Pins 49 and 60. ● **Is continuity present?**	Yes ▶ No ▶	SERVICE or REPLACE cable harness Circuit 461. REPLACE pump motor relay.
EE20 CHECK PUMP MOTOR OPERATION ● Reconnect pump motor relay to pump and wire harness. ● Jumper Pins 15, 34 and 60 at breakout box. ● Turn ignition to ON position. ● **Does pump motor run?**	Yes ▶ No ▶	REVERIFY code 63. GO to **EE21.**
EE21 CHECK PUMP MOTOR OPERATION ● Disconnect pump motor relay from pump motor. ● Ground Pin 2 and apply 12 volts to Pin 1 of pump motor connector. ● **Does pump motor run?**	Yes ▶ No ▶	GO to **EE22.** REPLACE pump motor.
EE22 CHECK POWER TO RELAY ● Disconnect wire harness from pump motor relay. ● Check voltage between Pin 30 on wire harness to pump motor relay connector and ground.	Over 10 volts ▶ Less than 10 volts ▶	GO to **EE23.** SERVICE or REPLACE battery, Circuit 537 or Anit-Lock Motor 40A fuse.



4 PIN PUMP MOTOR CONNECTOR H7784-B

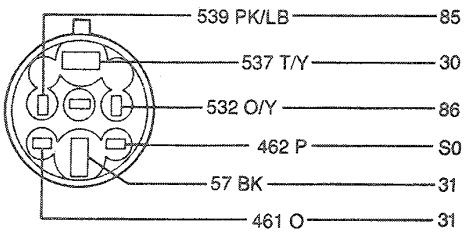


7 PIN PUMP MOTOR RELAY CONNECTOR HARNESS SIDE H7781-B

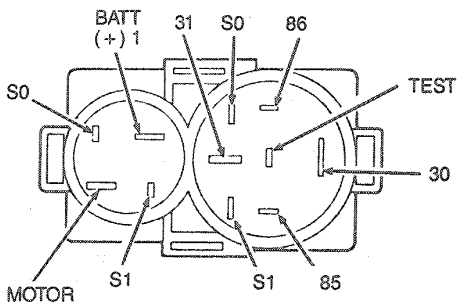
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST EE:
FLUID LEVEL INDICATOR/PEDAL TRAVEL SWITCH/PRESSURE SWITCH DIAGNOSIS (Continued)

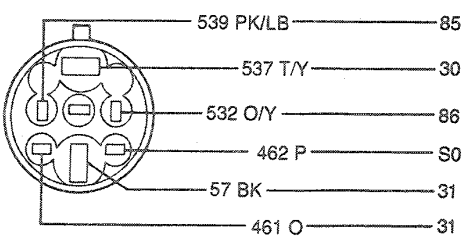
TEST STEP	RESULT	ACTION TO TAKE
EE23 CHECK POWER TO RELAY COIL • Jumper Pins 34 and 60 at breakout box. • Turn ignition to ON position. • Measure voltage between Pin 86 and ground.	Over 10 volts ▶ Less than 10 volts ▶	GO to **EE24.** SERVICE or REPLACE cable harness Circuit 532.
EE24 CHECK PUMP MOTOR RELAY COIL • Measure resistance between Pins 85 and 86 on pump motor relay. • **Is resistance between 45 and 105 ohms?**	Yes ▶ No ▶	GO to **EE25.** REPLACE pump motor relay.
EE25 CHECK CIRCUIT 539 • Check for continuity between breakout box Pin 15 and Pin 85 on wire harness to pump motor relay connector. • **Is continuity present?**	Yes ▶ No ▶	GO to **EE26.** SERVICE or REPLACE cable harness Circuit 539.



7 PIN PUMP MOTOR RELAY
CONNECTOR HARNESS SIDE H7781-B



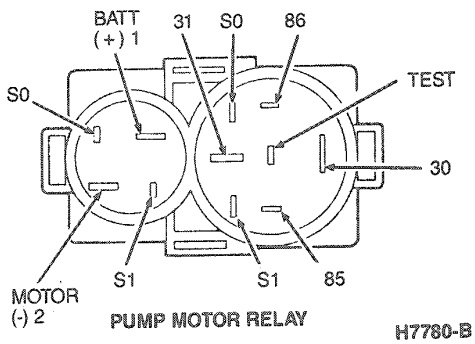
PUMP MOTOR RELAY
H7780-B



7 PIN PUMP MOTOR RELAY
CONNECTOR HARNESS SIDE H7781-B

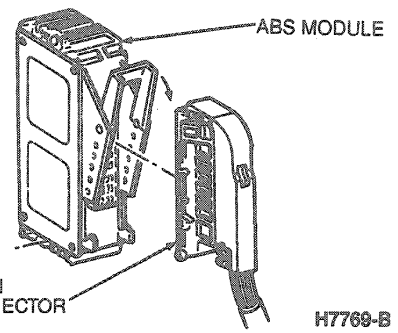
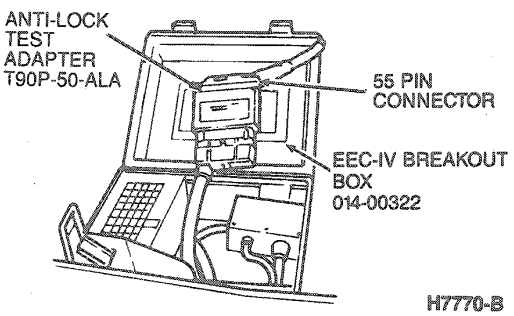
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST EE:
FLUID LEVEL INDICATOR/PEDAL TRAVEL SWITCH/PRESSURE SWITCH DIAGNOSIS (Continued)

TEST STEP	RESULT ▶	ACTION TO TAKE
EE26 CHECK CIRCUIT 57 ● Check for continuity between wire harness to pump motor relay connector Pin 31 and ground. ● **Is continuity present?**	Yes ▶ No ▶	GO to **EE27.** SERVICE or REPLACE cable harness Circuit 57.
EE27 CHECK PUMP MOTOR RELAY ● Connect battery + to Pin 86 and battery - to Pin 85 of pump motor relay. ● Check for continuity between Pin 30 and Pin 1 on relay. ● **Is continuity present?**	Yes ▶ No ▶	GO to **EE28.** REPLACE pump motor relay.
EE28 CHECK PUMP MOTOR RELAY ● Check continuity between Pins 2 and 31 on pump motor relay. ● **Is continuity present?**  PUMP MOTOR RELAY H7780-B	Yes ▶ No ▶	REPLACE ABS module. REPLACE pump motor relay.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST EE:
FLUID LEVEL INDICATOR/PEDAL TRAVEL SWITCH/PRESSURE SWITCH DIAGNOSIS (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
EE29	DTC 64: CHECK PUMP MOTOR PRESSURE CAPABILITY		
	• Turn ignition switch OFF. • Disconnect 55-pin plug from ABS module.  • Connect EEC-IV breakout box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the anti-lock 55-pin plug harness.  • Jumper Pins 15, 34 and 60. • Apply and hold brake pedal. • Turn ignition switch to ON. • **Does brake pedal rise?**	Yes ▶ No ▶	REVERIFY code 64. REPLACE pump and motor.

TH7929B

DIAGNOSIS AND TESTING (Continued)

ANTI-LOCK QUICK CHECK SHEET USING 60-PIN EEC-IV BREAKOUT BOX, TOOL T83L-50-EEC-IV①

NOTE: Before performing tests below, the Pre-Test Checks must be performed as outlined.

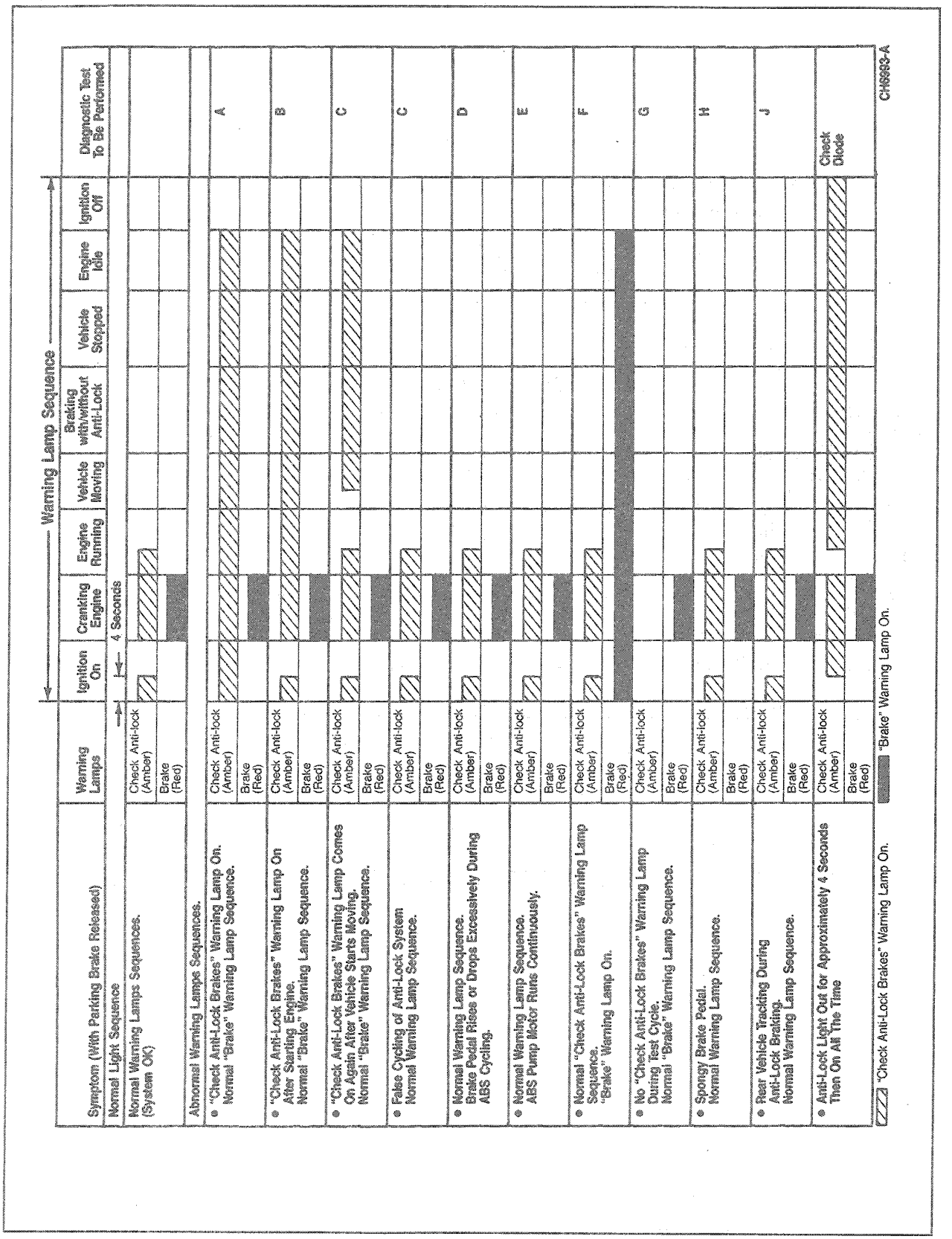
NOTE: If fault is intermittent the tests listed below will NOT find the fault. Use controller service code or call Hot-Line if this situation occurs.

Item to be Tested	Ignition Mode	Measure Between Pin Numbers	Tester Scale/Range	Specification	Test Step
Battery Check	ON	60 + 53	VOLTS	10 Minimum	A1
Main Relay Coil	OFF	53 + 34	OHMS	45 to 90 ohms	A6
Jumper pins 60 and 34					
Power from Main Relay	ON	19 + 33	VOLTS	10 minimum	A5
	Remove jumper from pins 60 and 34				
Main Relay Circuit	OFF	60 + 33	CONTINUITY	continuity	A9
Sensor Resistance (RR)	OFF	27 + 45	K OHMS	0.8-1.4K ohms	C5
Sensor Resistance (LF)	OFF	30 + 48	K OHMS	0.8-1.4K ohms	C1
Sensor Resistance (LR)	OFF	28 + 46	K OHMS	0.8-1.4K ohms	C7
Sensor Resistance (RF)	OFF	29 + 47	K OHMS	0.8-1.4K ohms	C3
Valve Resistance (IFL)	OFF	3 + 20	OHMS	5-8 ohms	BB2
Valve Resistance (IFR)	OFF	3 + 38	OHMS	5-8 ohms	BB6
Valve Resistance (IRL)	OFF	3 + 54	OHMS	5-8 ohms	BB14
Valve Resistance (IRR)	OFF	3 + 55	OHMS	5-8 ohms	BB10
Valve Resistance (OFL)	OFF	3 + 2	OHMS	3-6 ohms	BB4
Valve Resistance (OFR)	OFF	3 + 21	OHMS	3-6 ohms	BB8
Valve Resistance (ORR)	OFF	3 + 18	OHMS	3-6 ohms	BB12
Valve Resistance (ORL)	OFF	3 + 36	OHMS	3-6 ohms	BB16
Pump Motor Speed Sensor Resistance	OFF	31 + 49	OHMS	5-100 ohms	EE8
Reservoir Warning (FLS #2)	OFF	8 + 26	OHMS	LESS THAN 5 OHMS	A14
Pedal Travel Switch:					
Pedal NOT Applied	OFF	5 + 26	CONTINUITY	continuity	D2
With Minimum 3 Inch Apply	OFF	5 + 26	CONTINUITY	no continuity	D4
Sensor Cable Continuity Wiring to Ground (RR)	OFF	27 + 60	CONTINUITY	no continuity	B3
(LF)	OFF	30 + 60	CONTINUITY	no continuity	B7
(LR)	OFF	28 + 60	CONTINUITY	no continuity	B1
(RF)	OFF	29 + 60	CONTINUITY	no continuity	B5
Sensor Voltage:					
Rotate wheels (RR)	OFF	27 + 45	AC MVOLTS	100-1400 mvolts	C19
@ 1 revolution (LF)	OFF	30 + 48	AC MVOLTS	100-1400 mvolts	C17
per second. (LR)	OFF	28 + 46	AC MVOLTS	100-1400 mvolts	C20
(RF)	OFF	29 + 47	AC MVOLTS	100-1400 mvolts	C18

① If Quick Test does not isolate symptom, refer to Diagnostic Indicator Symptom Chart.

CH7908-B

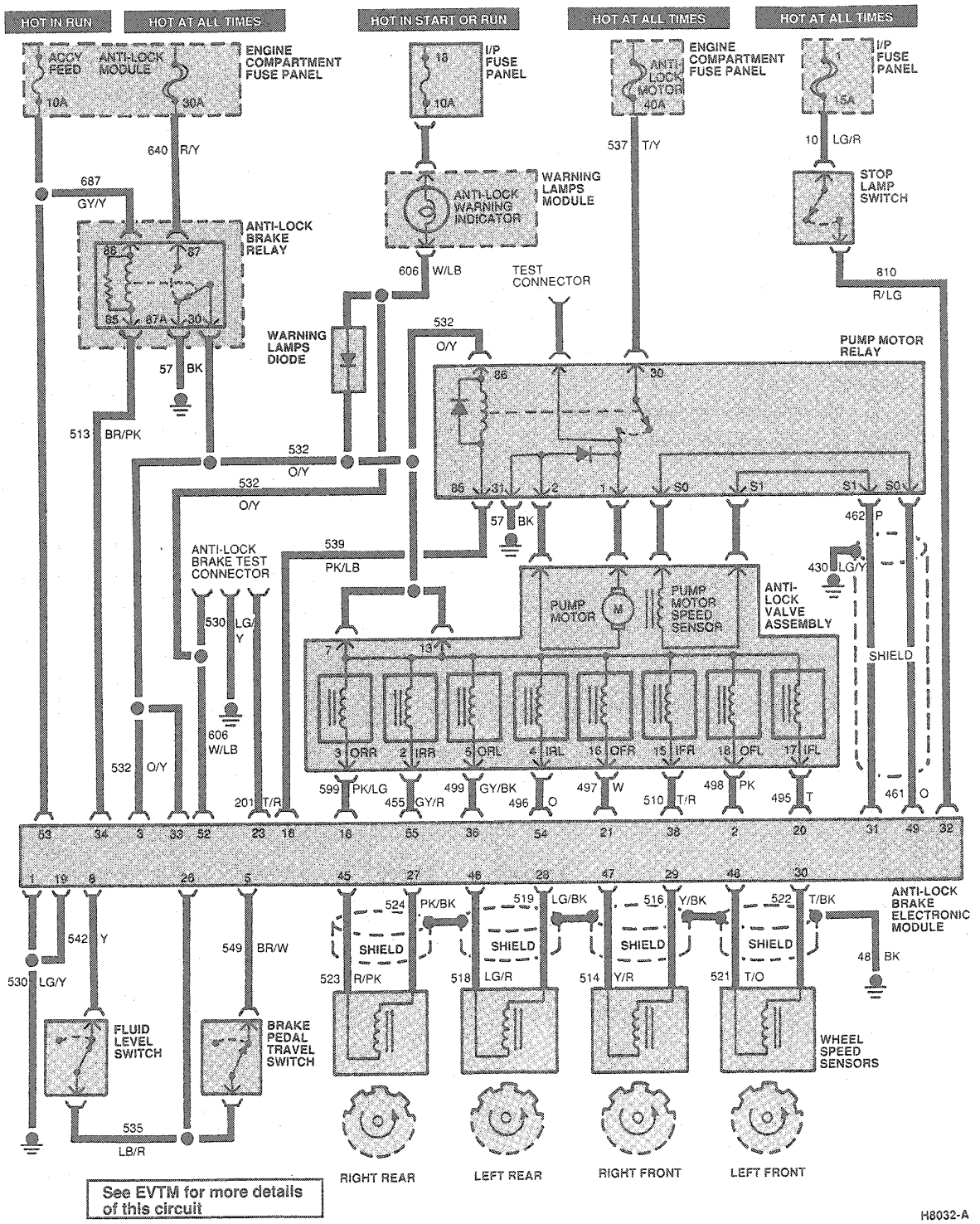
DIAGNOSIS AND TESTING (Continued)



DIAGNOSIS AND TESTING (Continued)

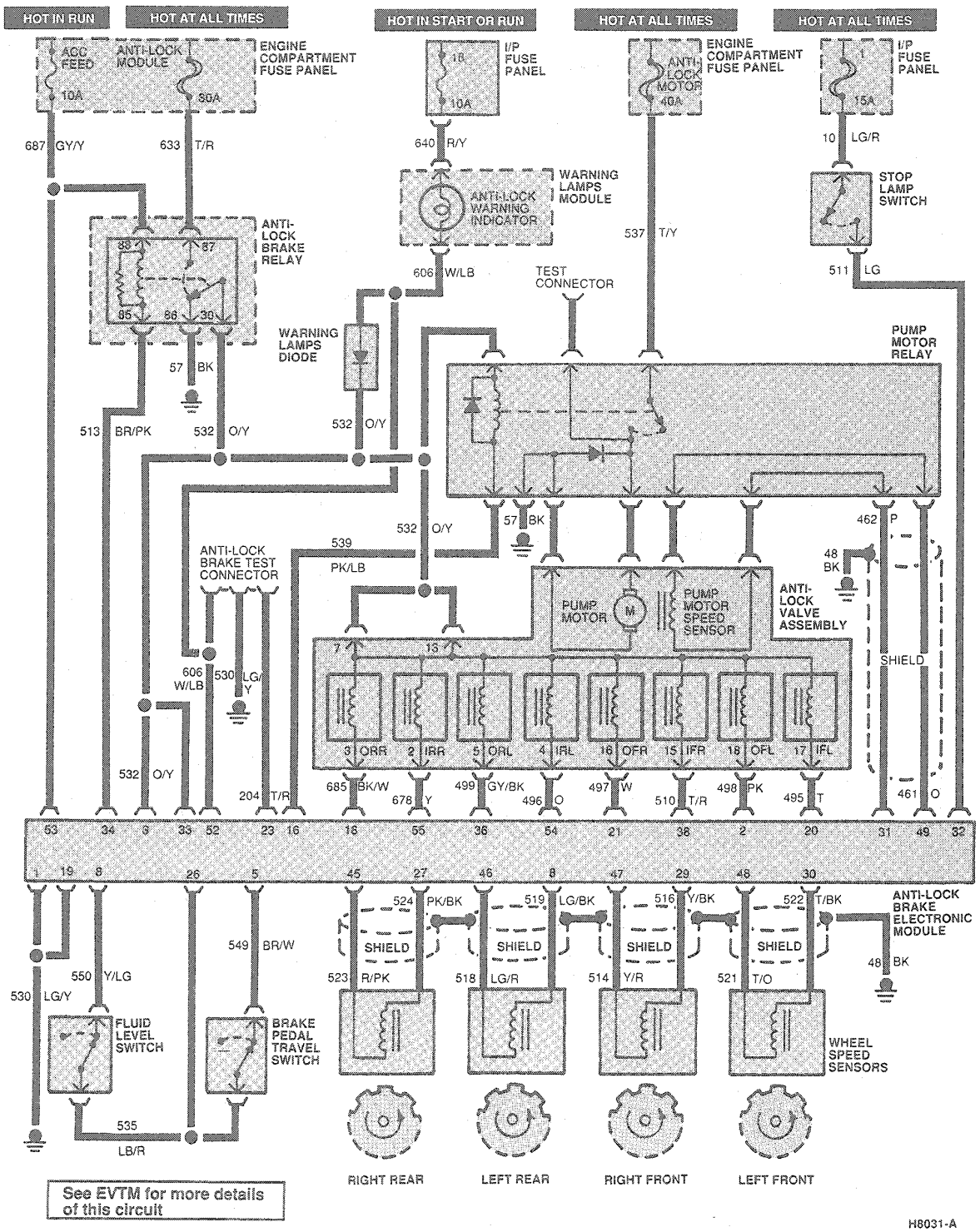
System Schematic

Taurus / Sable

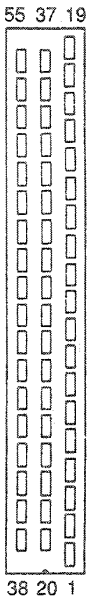


DIAGNOSIS AND TESTING (Continued)

Taurus SHO



DIAGNOSIS AND TESTING (Continued)



ANTI-LOCK BRAKE MODULE
CONNECTOR HARNESS SIDE H8091-A

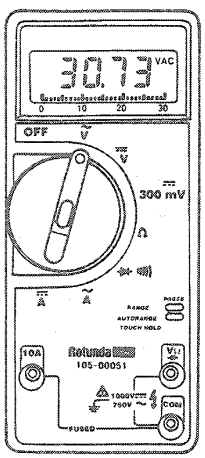
Pin Number	Circuit	Circuit Function
1	530 (LG/Y)	Ground
2	498 (PK)	ABS Valve Assembly
3	532 (O/Y)	ABS Power Relay
4	—	Not Used
5	549 (BR/W)	ABS Brake Pedal Travel Switch
6	—	Not Used
7	—	Not Used
8	542 (Y) 550 (Y/LG)*	Brake Fluid Level Switch No. 2
9	—	Not Used
10	—	Not Used
11	—	Not Used
12	—	Not Used
13	—	Not Used
14	—	Not Used
15	539 (PK/LB)	Anti-Lock Motor Relay
16	—	Not Used
17	—	Not Used
18	599 (PK/LG) 685 (BK/W)*	ABS Valve Assembly
19	530 (LG/Y)	Ground
20	495 (T)	ABS Valve Assembly
21	497 (W)	ABS Valve Assembly
22	—	Not Used
23	201 (T/R)	Test Connector
24	—	Not Used
25	—	Not Used
26	535 (LB/R)	ABS Switch to Level Switch No. 2
27	524 (PK/BK)	Right Rear Sensor-LO
28	519 (LG/BK)	Left Rear Sensor-LO
29	516 (Y/BK)	Right Front Sensor-LO
30	522 (T/BK)	Left Front Sensor-LO
31	462 (P)	Pump Motor Speed Sensor
32	511 (LG)	Stop Lamp Switch
33	532 (O/Y)	ABS Power Relay
34	513 (BR/PK)	ABS Power Relay
35	—	Not Used
36	499 (GY/BK)	ABS Valve Assembly
37	—	Not Used
38	510 (T/R)	ABS Valve Assembly
39	—	Not Used
40	—	Not Used
41	—	Not Used
42	—	Not Used
43	—	Not Used
44	—	Not Used
45	523 (R/PK)	Right Rear Sensor-HI
46	518 (LG/R)	Left Rear Sensor-HI
47	514 (Y/R)	Right Front Sensor-HI
48	521 (T/O)	Left Front Sensor-HI
49	461 (O)	ABS Motor Relay
50	—	Not Used
51	—	Not Used
52	606 (W/LB)	Test Connector
53	687 (GY/Y)	Hot in RUN
54	496 (O)	ABS Valve Assembly
55	455 (GY/R) 678 (Y)*	ABS Valve Assembly

* SHO Only.

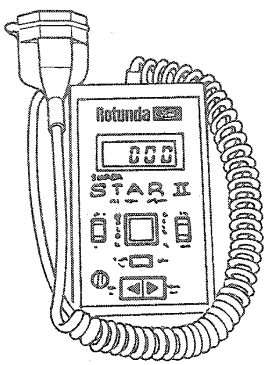
DIAGNOSTIC TESTS (A-J)

Equipment Required

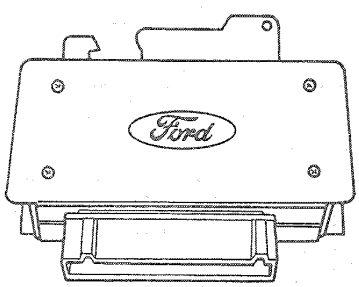
- Anti-Lock Test Adapter T90P- 50-ALA.
- EEC-IV Breakout Box T83L-50-EEC-IV, Rotunda Breakout Box 014-00322 or equivalent.
- Rotunda Digital / Analog Volt-Ohmmeter 007-00001 or equivalent.
- Rotunda SUPER STAR II Tester 007-0041B or equivalent.



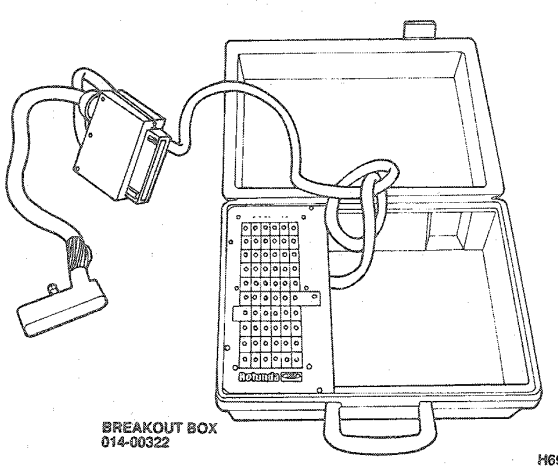
ROTUNDA DIGITAL/ANALOG VOLT-OHMMETER 105-00051



ROTUNDA SUPER STAR II TESTER 007-0041B



ANTI-LOCK TEST ADAPTER T90P-50-ALA



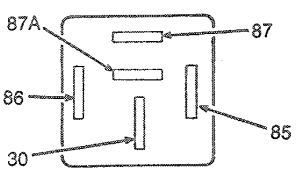
BREAKOUT BOX 014-00322

H6994-E

Refer to the wiring diagram when performing the Diagnostic Tests to locate wire circuits indicated in the tests. Each test is completely independent of the other tests and within each test are sequences that can identify a concern without requiring completion of the entire test procedure.

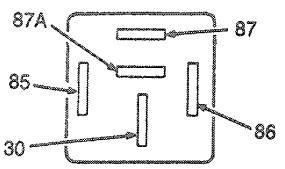
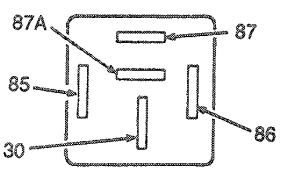
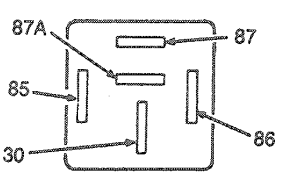
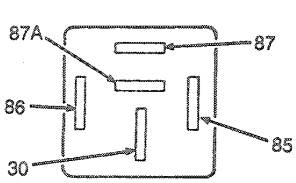
DIAGNOSTIC TESTS (A-J) (Continued)

PINPOINT TEST A:
ANTI-LOCK WARNING INDICATOR ON
(WITH BRAKE WARNING INDICATOR OFF)

TEST STEP		RESULT ▶	ACTION TO TAKE
A1	CHECK POWER TO ABS MODULE ● Disconnect 55-pin plug from ABS Module. ● Connect EEC-IV Breakout Box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the Anti-Lock 55-pin plug wiring harness. ● Set multi-meter to read volts DC. ● Turn ignition switch ON. ● Measure voltage between breakout box Pins 53 and 60.	Over 10 volts ▶ Under 10 volts ▶	GO to A4. GO to A2.
A2	CHECK ABS MODULE TO GROUND WIRE ● Check continuity between breakout box Pin 60 and body ground.	Continuity ▶ No continuity ▶	GO to A3. SERVICE or REPLACE cable harness Circuit 530 (Taurus / Sable). Circuit 57 or 530 (Taurus SHO).
A3	CHECK IGNITION TO ABS MODULE WIRE ● Check for continuity between breakout box Pin 53 and ignition switch wire 687.	Continuity ▶ No Continuity ▶	REVERIFY reading at Test Step A1. SERVICE or REPLACE cable harness Circuit 687, or fuse.
A4	CHECK GROUND ● Check for continuity between breakout box Pins 19 and 60.	Continuity ▶ No Continuity ▶	GO to A5. SERVICE or REPLACE cable harness Circuit 530 (Taurus / Sable). Circuit 57 or 530 (Taurus SHO).
A5	CHECK MAIN RELAY OPERATION ● Jumper Pins 34 and 60 at breakout box. ● Turn ignition to ON. ● Measure voltage between breakout box Pins 33 and 19.	Over 10 volts DC ▶ Under 10 volts DC ▶	GO to A12. GO to A6.
A6	CHECK MAIN RELAY COIL ● Turn ignition to OFF. ● Remove jumper from breakout box Pins 34 and 60. ● Measure resistance between breakout box Pins 53 and 34.	45 to 90 ohms ▶ Any other reading ▶	GO to A8. GO to A7.
A7	CHECK MAIN RELAY COIL (Continued) ● Remove main power relay.  MAIN POWER RELAY H7782-B ● Measure resistance between main relay Pins 85 and 86.	45 to 90 ohms ▶ Any other reading ▶	SERVICE or REPLACE cable harness Circuit 513 or 687. REPLACE main relay.

DIAGNOSTIC TESTS (A-J) (Continued)

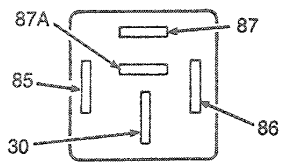
PINPOINT TEST A:
ANTI-LOCK WARNING INDICATOR ON
(WITH BRAKE WARNING INDICATOR OFF) (Continued)

TEST STEP	RESULT	ACTION TO TAKE
A8 CHECK POWER TO MAIN RELAY COIL		
• Turn ignition ON.  **MAIN POWER RELAY CONNECTOR (HARNESS SIDE)** **H7783-A** • Measure voltage between main relay connector Pin 86 and ground.	Over 10 volts DC ▶ Under 10 volts DC ▶	GO to **A9.** SERVICE cable harness Circuit 687.
A9 CHECK POWER TO RELAY		
• Turn ignition ON.  **MAIN POWER RELAY CONNECTOR (HARNESS SIDE)** **H7783-A** • Measure voltage between main relay connector Pin 87 and ground.	Over 10 volts DC ▶ Under 10 volts DC ▶	GO to **A10.** SERVICE cable harness Circuit 533 or 30 A fuse.
A10 CHECK CIRCUIT 532		
• Turn ignition OFF.  **MAIN POWER RELAY CONNECTOR (HARNESS SIDE)** **H7783-A** • Check for continuity between main relay connector Pin 30 and breakout box Pin 33.	Continuity ▶ No Continuity ▶	GO to **A11.** SERVICE or REPLACE cable harness Circuit 532.
A11 CHECK RELAY OPERATION		
• With main power relay removed from connector. • Apply battery + to Pin 86 and battery - to Pin 85 on relay. • Check continuity between relay Pins 30 and 87.  **MAIN POWER RELAY** **H7782-B**	Continuity ▶ No Continuity ▶	REVERIFY reading at Test Step **A5.** REPLACE main power relay.

DIAGNOSTIC TESTS (A-J) (Continued)

PINPOINT TEST A:
ANTI-LOCK WARNING INDICATOR ON
(WITH BRAKE WARNING INDICATOR OFF) (Continued)

TEST STEP		RESULT	ACTION TO TAKE
A12	CHECK CIRCUIT 57		
	• Check for continuity between relay connector Pin 87A and ground.	Continuity ▶	GO to A13.
		No Continuity ▶	SERVICE or REPLACE cable harness Circuit 57.
A13	CHECK CIRCUIT 606		
	• Jumper Pins 34-19. • Turn ignition ON. • Check voltage between breakout box Pins 52 and 60.	Over 10 volts DC ▶	GO to A14.
		Under 10 volts DC ▶	SERVICE or REPLACE cable harness Circuit 606.
A14	CHECK FLS NO. 2 AND CIRCUITRY		
	• Measure resistance between breakout box Pins 8 and 26.	Less than 5 ohms ▶	GO to A16.
		Any other reading ▶	GO to A15.
A15	CHECK FLS NO. 2		
	• Disconnect 2-pin plug from FLS No. 2, located on HCU reservoir. • Measure resistance between Pins 1 and 2 on HCU reservoir.	Less than 5 ohms ▶	SERVICE or REPLACE cable harness Circuit 542 or 535 (Taurus / Sable). Circuit 550 or 535 (Taurus SHO).
		Any other reading ▶	REPLACE HCU reservoir.
A16	ABS MODULE CHECK		
	• If Self-Diagnostics, ABS Quick Test and Test A did not find problem, replace ABS Module with a known good module. • **Is ABS indicator still on?**	Yes ▶	REVERIFY that all tests have been performed.
		No ▶	REPLACE ABS Module.

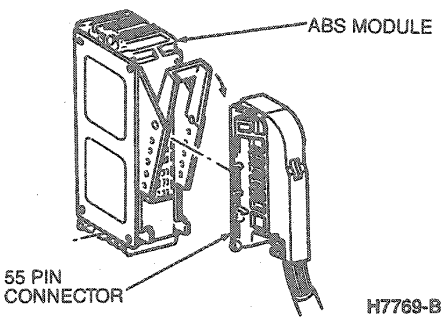
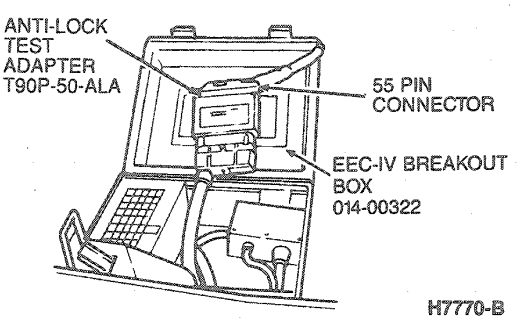
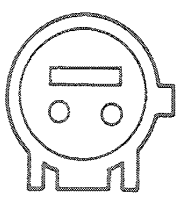


MAIN POWER RELAY CONNECTOR
(HARNESS SIDE) H7783-A

TH7913B

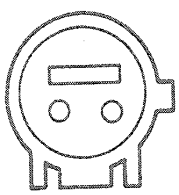
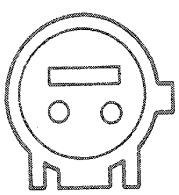
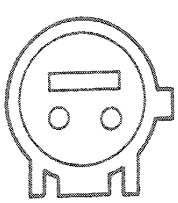
DIAGNOSTIC TESTS (A-J) (Continued)

PINPOINT TEST B:
ANTI-LOCK INDICATOR ON AFTER ENGINE STARTS
(BRAKE WARNING INDICATOR OFF)

TEST STEP		RESULT ▶	ACTION TO TAKE
B1	CHECK CONTINUITY OF CIRCUITS 518 AND 519		
	• Turn ignition switch OFF. • Disconnect 55-pin plug from ABS Module. • Check continuity between breakout box Pins 28 and 60.  • Connect EEC-IV breakout box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the Anti-Lock 55-pin plug on the wiring harness.  • **Is continuity present?**	Yes ▶ No ▶	GO to **B2.** GO to **B3.**
B2	CHECK LH REAR SENSOR TO GROUND		
	• Disconnect LH rear wheel sensor plug. • Check for continuity between each sensor pin (sensor side) and vehicle ground. • **Is continuity present?**  	Yes ▶ No ▶	REPLACE LH rear sensor. REPLACE or SERVICE cable harness Circuit 518 or 519.
B3	CHECK CONTINUITY OF CIRCUITS 523 AND 524		
	• Check for continuity between breakout box Pins 27 and 60. • **Is continuity present?**	Yes ▶ No ▶	GO to **B4.** GO to **B5.**

DIAGNOSTIC TESTS (A-J) (Continued)

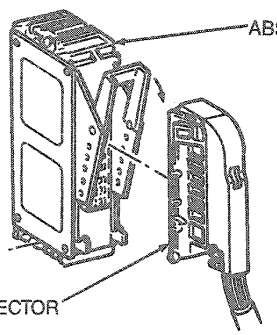
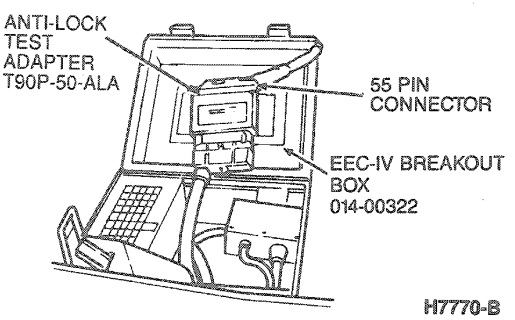
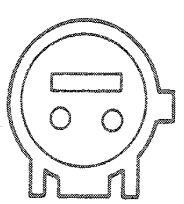
PINPOINT TEST B:
ANTI-LOCK INDICATOR ON AFTER ENGINE STARTS
(BRAKE WARNING INDICATOR OFF) (Continued)

TEST STEP		RESULT	ACTION TO TAKE
B4	CHECK RH REAR SENSOR TO GROUND		
	• Disconnect RH rear wheel sensor plug. • Check for continuity between each sensor pin (sensor side) and vehicle ground. • **Is continuity present?**  RH REAR SENSOR H7775-A	Yes No	▶ REPLACE RH rear sensor. ▶ REPLACE or SERVICE cable harness Circuit 523 or 524.
B5	CHECK CONTINUITY OF CIRCUITS 514 AND 516		
	• Check for continuity between breakout box Pins 29 and 60. • **Is continuity present?**	Yes No	▶ GO to **B6.** ▶ GO to **B7.**
B6	CHECK RH FRONT SENSOR TO GROUND		
	• Disconnect RH front wheel sensor plug. • Check for continuity between each sensor pin (sensor side) and vehicle ground. • **Is continuity present?**  RH FRONT SENSOR H7774-A	Yes No	▶ REPLACE RH front sensor. ▶ REPLACE or SERVICE cable harness Circuit 514 or 516.
B7	CHECK CONTINUITY OF CIRCUITS 521 AND 522		
	• Check for continuity between breakout box Pins 30 and 60. • **Is continuity present?**	Yes No	▶ GO to **B8.** ▶ Test Complete. If Anti-Lock indicator pattern remains, REPEAT Test B.
B8	CHECK LH FRONT SENSOR TO GROUND		
	• Disconnect LH front wheel sensor plug. • Check for continuity between each sensor pin (sensor side) and vehicle ground. • **Is continuity present?**  LH FRONT SENSOR H7773-A	Yes No	▶ REPLACE LH front sensor. ▶ REPLACE or SERVICE cable harness Circuit 521 or 522.

TH6999D

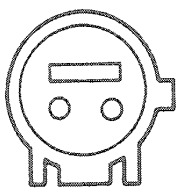
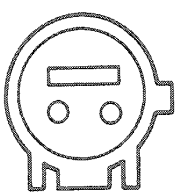
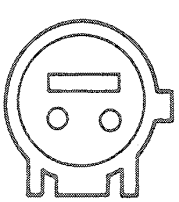
DIAGNOSTIC TESTS (A-J) (Continued)

PINPOINT TEST C: ANTI-LOCK WARNING INDICATOR ON AFTER VEHICLE STARTS TO MOVE OR FALSE CYCLING OF ANTI-LOCK SYSTEM

TEST STEP		RESULT	ACTION TO TAKE
C1	MEASURE LH FRONT SENSOR CIRCUIT RESISTANCE		
	• Turn ignition switch to OFF position. • Disconnect 55-pin connector from ABS module.  • Connect EEC-IV breakout box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the 55-pin connector on wiring harness.  • Set multi-meter to read resistance. • Measure resistance between Pins 30 and 48. • **Is resistance between 800 and 1400 ohms?**	Yes ▶ No ▶	GO to C3. GO to C2.
C2	CHECK LH FRONT SENSOR RESISTANCE		
	• Disconnect LH front sensor plug. • Measure resistance of sensor at sensor plug. • **Is resistance between 800 and 1400 ohms?**  	Yes ▶ No ▶	SERVICE or REPLACE cable harness Circuit 521 or 522. REPLACE LH front sensor.
C3	MEASURE RH FRONT SENSOR CIRCUIT RESISTANCE		
	• Measure resistance between breakout box Pins 29 and 47. • **Is resistance between 800 and 1400 ohms?**	Yes ▶ No ▶	GO to C5. GO to C4.

DIAGNOSTIC TESTS (A-J) (Continued)

PINPOINT TEST C: ANTI-LOCK WARNING INDICATOR ON AFTER VEHICLE STARTS TO MOVE OR FALSE CYCLING OF ANTI-LOCK SYSTEM (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
C4	CHECK RH FRONT SENSOR RESISTANCE ● Disconnect RH front sensor plug. ● Measure resistance of sensor at sensor plug. ● **Is resistance between 800 and 1400 ohms?**  RH FRONT SENSOR H7774-A	Yes ▶ No ▶	SERVICE or REPLACE cable harness Circuit 514 or 516. REPLACE RH front sensor.
C5	MEASURE RH REAR SENSOR CIRCUIT RESISTANCE ● Measure resistance between breakout box Pins 27 and 45. ● **Is resistance between 800 and 1400 ohms?**	Yes ▶ No ▶	GO to C7. GO to C6.
C6	CHECK RH REAR SENSOR RESISTANCE ● Disconnect RH rear sensor plug. ● Measure resistance of sensor at sensor plug. ● **Is resistance between 800 and 1400 ohms?**  RH REAR SENSOR H7775-A	Yes ▶ No ▶	SERVICE or REPLACE cable harness Circuit 523 or 524. REPLACE RH rear sensor.
C7	MEASURE LH REAR SENSOR CIRCUIT RESISTANCE ● Measure resistance between breakout box Pins 28 and 46. ● **Is resistance between 800 and 1400 ohms?**	Yes ▶ No ▶	GO to C9. GO to C8.
C8	CHECK LH REAR SENSOR RESISTANCE ● Disconnect LH rear sensor plug. ● Measure resistance of sensor at sensor plug. ● **Is resistance between 800 and 1400 ohms?**  LH REAR SENSOR H7776-A	Yes ▶ No ▶	SERVICE or REPLACE cable harness Circuit 518 or 519. REPLACE LH rear sensor.
C9	CHECK LH FRONT SENSOR AND CIRCUITRY TO GROUND ● Check for continuity between breakout box Pins 30 and 60. ● **Is continuity present?**	Yes ▶ No ▶	GO to C10. GO to C11.

DIAGNOSTIC TESTS (A-J) (Continued)

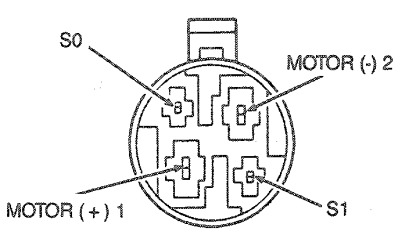
PINPOINT TEST C: ANTI-LOCK WARNING INDICATOR ON AFTER VEHICLE STARTS TO MOVE OR FALSE CYCLING OF ANTI-LOCK SYSTEM (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
C10	CHECK LH FRONT SENSOR TO GROUND		
	• Disconnect LH front sensor plug. • Check for continuity between each sensor pin and body ground. • **Is continuity present?**	Yes ▶ No ▶	REPLACE LH front sensor. SERVICE or REPLACE cable harness Circuit 521 or 522.
C11	CHECK RH FRONT SENSOR AND CIRCUITRY TO GROUND		
	• Check for continuity between breakout box Pins 29 and 60. • **Is continuity present?**	Yes ▶ No ▶	GO to **C12.** GO to **C13.**
C12	CHECK RH FRONT SENSOR TO GROUND		
	• Disconnect RH front sensor plug. • Check for continuity between each sensor pin and body ground. • **Is continuity present?**	Yes ▶ No ▶	REPLACE RH front sensor. SERVICE or REPLACE cable harness Circuit 514 or 516.
C13	CHECK RH REAR SENSOR AND CIRCUITRY TO GROUND		
	• Check for continuity between breakout box Pins 27 and 60. • **Is continuity present?**	Yes ▶ No ▶	GO to **C14.** GO to **C15.**
C14	CHECK RH REAR SENSOR TO GROUND		
	• Disconnect RH rear sensor plug. • Check for continuity between each sensor pin and body ground. • **Is continuity present?**	Yes ▶ No ▶	REPLACE RH rear sensor. SERVICE or REPLACE cable harness Circuit 523 or 524.
C15	CHECK LH REAR SENSOR AND CIRCUITRY TO GROUND		
	• Check for continuity between breakout box Pins 28 and 60. • **Is continuity present?**	Yes ▶ No ▶	GO to **C16.** GO to **C17.**
C16	CHECK LH REAR SENSOR TO GROUND		
	• Disconnect LH rear sensor plug. • Check for continuity between each sensor pin and body ground. • **Is continuity present?**	Yes ▶ No ▶	REPLACE LH rear sensor. SERVICE or REPLACE cable harness Circuit 518 or 519.
C17	CHECK LH FRONT SENSOR VOLTAGE OUTPUT		
	• Measure voltage between breakout box Pins 30 and 48 while spinning LH front wheel at approximately 1 revolution per second.	Between 0.10 and 1.40 volts AC ▶ Less than 0.10 or more than 1.40 volts AC ▶	GO to **C18.** CHECK wheel sensor mounting, air gap or toothed wheel. CORRECT as required.
C18	CHECK RH FRONT SENSOR VOLTAGE OUTPUT		
	• Measure voltage between breakout box Pins 29 and 47 while spinning RH front wheel at approximately 1 revolution per second.	Between 0.10 and 1.40 volts AC ▶ Less than 0.10 or more than 1.40 volts AC ▶	GO to **C19.** CHECK wheel sensor mounting, air gap or toothed wheel. CORRECT as required.

DIAGNOSTIC TESTS (A-J) (Continued)

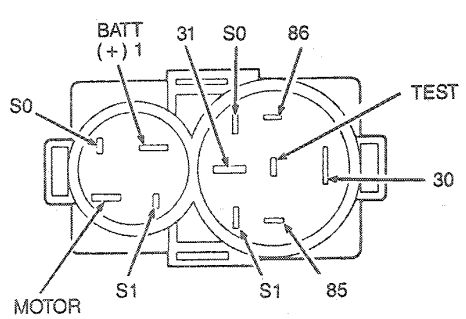
PINPOINT TEST C: ANTI-LOCK WARNING INDICATOR ON AFTER VEHICLE STARTS TO MOVE OR FALSE CYCLING OF ANTI-LOCK SYSTEM (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
C19	CHECK RH REAR SENSOR VOLTAGE OUTPUT ● Measure voltage between breakout box Pins 27 and 45 while spinning RH rear wheel at approximately 1 revolution per second.	Between 0.10 and 1.40 volts AC ▶ Less than 0.10 or more than 1.40 volts AC ▶	GO to **C20.** CHECK wheel sensor mounting, air gap or toothed wheel. CORRECT as required.
C20	CHECK LH REAR SENSOR VOLTAGE OUTPUT ● Measure voltage between breakout box Pins 28 and 46 while spinning LH rear wheel at approximately 1 revolution per second.	Between 0.10 and 1.40 volts AC ▶ Less than 0.10 or more than 1.40 volts AC ▶	GO to **C21.** CHECK wheel sensor mounting, air gap or toothed wheel. CORRECT as required.
C21	CHECK MOTOR SPEED SENSOR AND CIRCUITRY ● Measure resistance between breakout box Pins 31 and 49. ● **Is resistance between 5 and 100 ohms?**	Yes ▶ No ▶	GO to **C27.** GO to **C22.**
C22	CHECK PUMP MOTOR SPEED SENSOR ● Disconnect 4-pin plug on pump motor. ● Measure resistance between Pins S0 and S1 on pump motor. ● **Is resistance between 5 and 100 ohms?**	Yes ▶ No ▶	GO to **C23.** REPLACE pump and motor.
C23	CHECK PUMP MOTOR RELAY ● Disconnect 7-pin plug on pump motor relay and remove relay, ● Check continuity from Pin S0 on 7-pin side to Pin S0 on 4-pin side of relay. ● **Is continuity present?**	Yes ▶ No ▶	GO to **C24.** REPLACE pump motor relay.



4 PIN PUMP MOTOR CONNECTOR

H7784-B

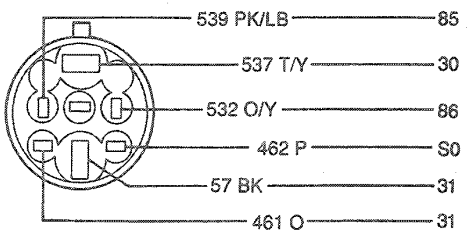


PUMP MOTOR RELAY

H7780-B

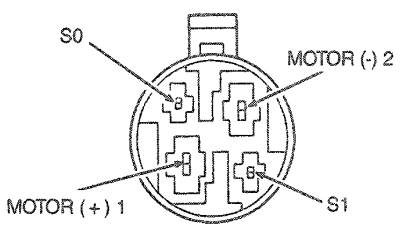
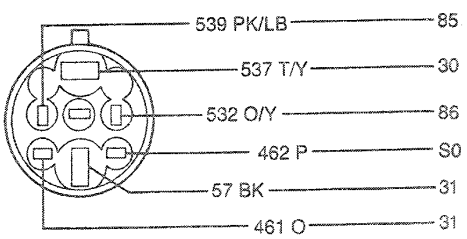
DIAGNOSTIC TESTS (A-J) (Continued)

PINPOINT TEST C: ANTI-LOCK WARNING INDICATOR ON AFTER VEHICLE STARTS TO MOVE OR FALSE CYCLING OF ANTI-LOCK SYSTEM (Continued)

TEST STEP		RESULT	ACTION TO TAKE
C24	CHECK PUMP MOTOR RELAY		
	• Check continuity from Pin S1 on 7-pin side to Pin S1 on 4-pin side of relay. • **Is continuity present?**	Yes ▶ No ▶	GO to **C25.** REPLACE pump motor relay.
C25	CHECK CIRCUIT 462		
	• Check continuity between breakout box Pin 31 and Pin S0 on pump motor connector 7-pin plug (harness side). • **Is continuity present?**  **7 PIN PUMP MOTOR RELAY CONNECTOR HARNESS SIDE H7781-B**	Yes ▶ No ▶	GO to **C26.** SERVICE or REPLACE cable harness Circuit 462.
C26	CHECK CIRCUIT 461		
	• Check continuity between breakout box Pin 49 and Pin S1 on pump motor connector 7-pin plug (harness side). • **Is continuity present?**	Yes ▶ No ▶	REVERIFY reading at **C21.** SERVICE or REPLACE cable harness Circuit 461.
C27	CHECK MOTOR SPEED SENSOR SHORT TO BATTERY +		
	• Turn ignition switch to ON. • Measure voltage between breakout box Pins 31 and 60.	No voltage ▶ 12 volts ▶	GO to**C31.** GO to **C28.**
C28	CHECK PUMP MOTOR		
	• Disconnect pump motor relay 4-pin plug connector. • Turn ignition switch to ON. • Measure voltage between breakout box Pins 31 and 60.	No voltage ▶ 12 volts ▶	REPLACE pump and motor. GO to **C29.**
C29	CHECK CIRCUIT 462		
	• Disconnect wire harness to relay 7-pin plug. • Turn ignition switch to ON. • Measure voltage between breakout box Pins 31 and 60.	No voltage ▶ 12 volts ▶	GO to **C30.** SERVICE or REPLACE cable harness Circuit 462.
C30	CHECK CIRCUIT 461		
	• Turn ignition switch to ON. • Measure voltage between breakout box Pins 49 and 60.	No voltage ▶ 12 volts ▶	REPLACE pump motor relay. SERVICE or REPLACE cable harness Circuit 461.
C31	CHECK MOTOR SPEED SENSOR SHORT TO GROUND		
	• Check for continuity between breakout box Pins 31 and 60. • **Is continuity present?**	No ▶ Yes ▶	GO to **C34.** GO to **C32.**

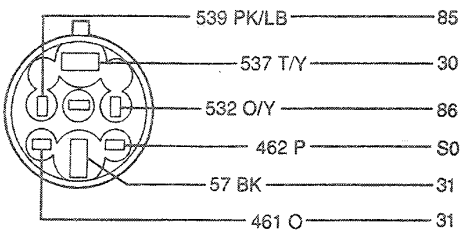
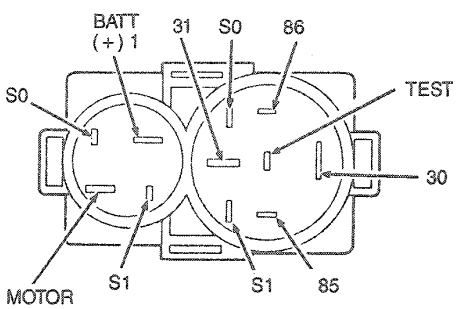
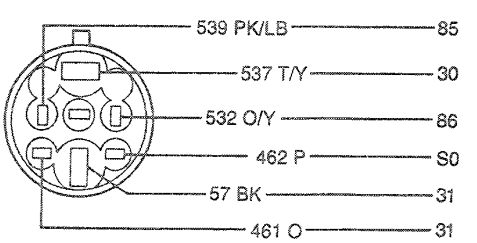
DIAGNOSTIC TESTS (A-J) (Continued)

PINPOINT TEST C: ANTI-LOCK WARNING INDICATOR ON AFTER VEHICLE STARTS TO MOVE OR FALSE CYCLING OF ANTI-LOCK SYSTEM (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
C32	CHECK CIRCUIT 462 ● Disconnect wire harness to relay 7-pin plug. ● Check for continuity between breakout box Pins 31 and 60. ● **Is continuity present?**	Yes ▶ No ▶	SERVICE or REPLACE cable harness Circuit 462. GO to **C33.**
C33	CHECK CIRCUIT 461 ● Check for continuity between breakout box Pins 49 and 60. ● **Is continuity present?**	Yes ▶ No ▶	SERVICE or REPLACE cable harness Circuit 461. REPLACE pump motor relay.
C34	CHECK PUMP MOTOR OPERATION ● Reconnect pump motor relay to pump and wire harness. ● Jumper Pins 15, 34 and 60 at breakout box. ● Turn ignition to ON position. ● **Does pump motor run?**	Yes ▶ No ▶	REPLACE ABS module. GO to **C35.**
C35	CHECK PUMP MOTOR OPERATION ● Disconnect pump motor relay from pump motor. ● Ground Pin 2 and apply 12 volts to Pin 1 of pump motor connector. ● **Does pump motor run?**  **4 PIN PUMP MOTOR CONNECTOR** H7784-B	Yes ▶ No ▶	GO to **C36.** REPLACE pump motor.
C36	CHECK POWER TO RELAY ● Disconnect wire harness from pump motor relay. ● Check voltage between Pin 30 on wire harness to pump motor relay connector and ground.  **7 PIN PUMP MOTOR RELAY CONNECTOR HARNESS SIDE** H7781-B	Over 10 volts ▶ Less than 10 volts ▶	GO to **C37.** SERVICE or REPLACE battery, circuit 537 or Anti-Lock Motor 40 A fuse.

DIAGNOSTIC TESTS (A-J) (Continued)

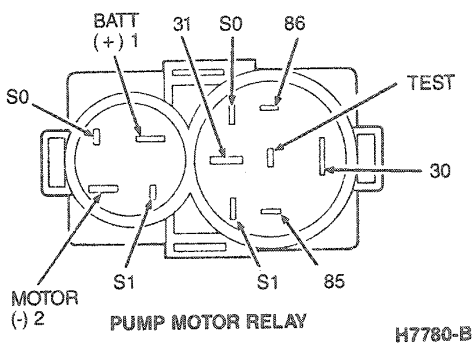
PINPOINT TEST C: ANTI-LOCK WARNING INDICATOR ON AFTER VEHICLE STARTS TO MOVE OR FALSE CYCLING OF ANTI-LOCK SYSTEM (Continued)

TEST STEP	RESULT	ACTION TO TAKE
C37 CHECK POWER TO RELAY COIL • Jumper Pins 34 and 60 at breakout box. • Turn ignition to ON position. • Measure voltage between Pin 86 and ground.  7 PIN PUMP MOTOR RELAY CONNECTOR HARNESS SIDE H7781-B	Over 10 volts ▶ Less than 10 volts ▶	GO to **C38.** SERVICE or REPLACE cable harness Circuit 532.
C38 CHECK PUMP MOTOR RELAY COIL • Measure resistance between Pins 85 and 86 on pump motor relay. • **Is resistance between 45 and 105 ohms?**  PUMP MOTOR RELAY H7780-B	Yes ▶ No ▶	GO to **C39.** REPLACE pump motor relay.
C39 CHECK CIRCUIT 539 • Check for continuity between breakout box Pin 15 and Pin 85 on wire harness to pump motor relay connector. • **Is continuity present?**  7 PIN PUMP MOTOR RELAY CONNECTOR HARNESS SIDE H7781-B	Yes ▶ No ▶	GO to **C40.** SERVICE or REPLACE cable harness Circuit 539.

DIAGNOSTIC TESTS (A-J) (Continued)

PINPOINT TEST C: ANTI-LOCK WARNING INDICATOR ON AFTER VEHICLE STARTS TO MOVE OR FALSE CYCLING OF ANTI-LOCK SYSTEM (Continued)

TEST STEP		RESULT	ACTION TO TAKE
C40	CHECK CIRCUIT 57 ● Check for continuity between wire harness to pump motor relay connector Pin 31 and ground. ● **Is continuity present?**	Yes No	GO to C41. SERVICE or REPLACE cable harness Circuit 57.
C41	CHECK PUMP MOTOR RELAY ● Connect battery + to Pin 86 and battery - to Pin 85 of pump motor relay. ● Check for continuity between Pin 30 and Pin 1 on relay. ● **Is continuity present?**	Yes No	GO to C42. REPLACE pump motor relay.
C42	CHECK PUMP MOTOR RELAY ● Check continuity between Pins 2 and 31 on pump motor relay. ● **Is continuity present?**	Yes No	REVERIFY results at Test Step C34. REPLACE pump motor relay.



PUMP MOTOR RELAY H7760-B

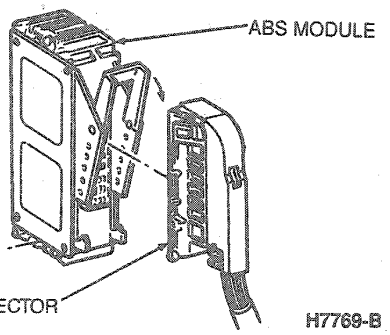
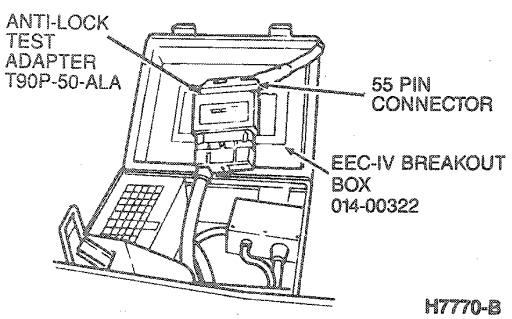
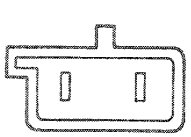
TH7930B

PINPOINT TEST D: ANTI-LOCK WARNING INDICATOR SEQUENCE NORMAL — BRAKE PEDAL RISES OR DROPS EXCESSIVELY DURING ABS CYCLING

TEST STEP		RESULT	ACTION TO TAKE
D1	CHECK PEDAL SWITCH ADJUSTMENT NOTE: Before running Test Step D, adjust pedal position switch as outlined in this section. ● **Is pedal feel normal during ABS cycling?**	Yes No	Condition corrected. GO to D2.

DIAGNOSTIC TESTS (A-J) (Continued)

PINPOINT TEST D:
ANTI-LOCK WARNING INDICATOR SEQUENCE NORMAL —
BRAKE PEDAL RISES OR DROPS EXCESSIVELY DURING ABS CYCLING (Continued)

TEST STEP		RESULT	ACTION TO TAKE
D2	CHECK PEDAL TRAVEL SWITCH AND CIRCUITRY		
	• Turn ignition switch to OFF position. • Disconnect 55-pin plug from ABS Module.  • Connect EEC-IV Breakout Box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the anti-lock 55-pin plug on the wiring harness.  • Check continuity between breakout box Pins 5 and 26. • **Is continuity present?**	Yes ▶ No ▶	GO to **D4.** GO to **D3.**
D3	CHECK PEDAL TRAVEL SWITCH		
	• Disconnect pedal travel switch 2-pin plug. • Check for continuity between Pins 1 and 2. • **Is continuity present?**  	Yes ▶ No ▶	SERVICE or REPLACE cable harness Circuit 535 or 549. REPLACE pedal travel switch.
D4	CHECK PEDAL TRAVEL SWITCH FUNCTION		
	• Push brake pedal down at least 3 inches and hold down. • Check for continuity between breakout box Pins 5 and 26. • **Is continuity present?**	Yes ▶ No ▶	GO to **D5.** GO to **D6.**

DIAGNOSTIC TESTS (A-J) (Continued)

PINPOINT TEST D:
ANTI-LOCK WARNING INDICATOR SEQUENCE NORMAL —
BRAKE PEDAL RISES OR DROPS EXCESSIVELY DURING ABS CYCLING (Continued)

TEST STEP		RESULT ▶	ACTION TO TAKE
D5	CHECK PEDAL TRAVEL SWITCH		
	• Disconnect pedal travel switch 2-pin plug from wire harness. • Check continuity between Pins 1 and 2 (switch side) with brake pedal down at least 3 inches. • **Is continuity present?**	Yes ▶ No ▶	REPLACE pedal travel switch. SERVICE or REPLACE cable harness Circuit 535 or 549.
D6	CHECK PUMP PRESSURE		
	• Jumper Pins 15, 34 and 60 at breakout box. • Apply moderate pressure on brake pedal and hold. • Turn ignition switch to ON position. • **Does brake pedal rise?**	Yes ▶ No ▶	REVERIFY symptom. REPLACE pump and motor.

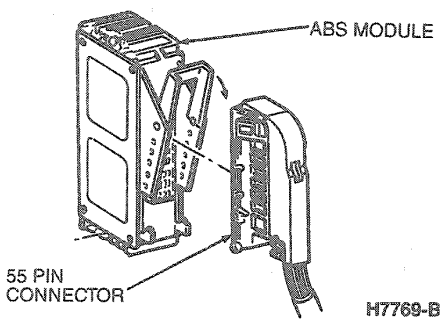
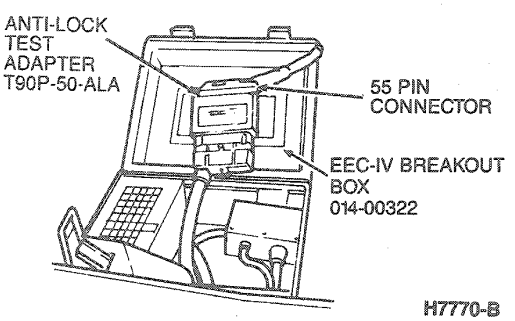
TH8101A

PINPOINT TEST E:
ANTI-LOCK WARNING INDICATOR SEQUENCE NORMAL— ABS PUMP MOTOR RUNS CONTINUOUSLY (IGNITION ON/IGNITION OFF)

TEST STEP		RESULT ▶	ACTION TO TAKE
E1	VERIFY PUMP MOTOR CONDITION		
	• With vehicle standing still: • Check if pump motor runs with ignition switch in ON or OFF position.	Pump runs with ignition in OFF position ▶ Pump runs with ignition in ON position ▶	GO to E2 GO to E3.
E2	CHECK PUMP MOTOR RELAY		
	• Remove pump motor relay. • Check for continuity between Pin 30 and test pin on the relay. • **Is continuity present?**	Yes ▶ No ▶	REPLACE pump motor relay. REVERIFY that pump motor runs with ignition in OFF position.

DIAGNOSTIC TESTS (A-J) (Continued)

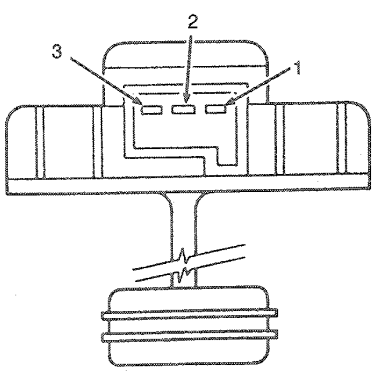
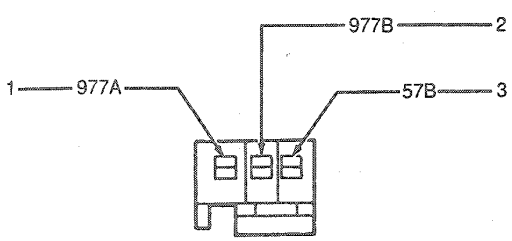
PINPOINT TEST E:
ANTI-LOCK WARNING INDICATOR SEQUENCE NORMAL — ABS PUMP MOTOR RUNS CONTINUOUSLY (IGNITION ON/IGNITION OFF) (Continued)

TEST STEP		RESULT	ACTION TO TAKE
E3	CHECK CIRCUIT 539 TO GROUND		
	• Turn ignition switch OFF. • Disconnect 55-pin plug from ABS module.  • Connect EEC-IV Breakout Box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the anti-lock 55-pin plug wiring harness.  • Check for continuity between breakout box Pins 15 and 60. • **Is continuity present?**	Yes ▶ No ▶	GO to E4. GO to E5.
E4	CHECK CIRCUIT 539		
	• Disconnect pump motor relay from wire harness. • Check for continuity between breakout box Pins 15 and 60. • **Is continuity present?**	Yes ▶ No ▶	SERVICE or REPLACE cable harness Circuit 539. REPLACE pump motor relay.
E5	CHECK ABS MODULE		
	• Reconnect pump motor relay and ABS module. • Turn ignition to ON. • **Does pump motor run?**	Yes ▶ No ▶	REPLACE ABS module. REVERIFY symptom.

TH6411D

DIAGNOSTIC TESTS (A-J) (Continued)

PINPOINT TEST F:
BRAKE WARNING INDICATOR ON (WITH ANTI-LOCK INDICATOR OFF, PARKING BRAKE RELEASED AND BRAKE LINING WEAR CHECKED)

TEST STEP	RESULT	ACTION TO TAKE
F1 CHECK BRAKE FLUID LEVEL ● Check that brake fluid is no more than 4mm (0.16 inch) below MAX line located on side of master cylinder reservoir.	Low ▶ Normal ▶	CHECK system for external leaks. SERVICE as required. GO to **F2.**
F2 CHECK FLUID LEVEL SWITCH ● Disconnect 3-pin plug on master cylinder fluid reservoir cap. ● Check for continuity between Pins 1 and 3 on reservoir cap. ● **Is continuity present?**  3 PIN FLUID RESERVOIR CAP H7786-A	Yes ▶ No ▶	REPLACE reservoir fluid cap. GO to **F3.**
F3 CHECK FOR GROUND CONCERN ● Check for grounded wire harness, Circuit 977. ● **Is wire harness grounded?**  3 PIN FLUID RESERVOIR CAP CONNECTOR HARNESS SIDE H7927-A	Yes ▶ No ▶	SERVICE or REPLACE cable harness Circuit 977A. REVERIFY "BRAKE" indicator on.

TH7916A

PINPOINT TEST G:
NO ANTI-LOCK WARNING INDICATOR ON WHEN IGNITION SWITCH TURNED ON

TEST STEP	RESULT	ACTION TO TAKE
G1 CHECK IGNITION FEED AND FUSE ● Check for 12 volts to lamp socket with ignition ON.	12 volts ▶ No voltage ▶	GO to **G2.** SERVICE ignition feed or fuse as required.

DIAGNOSTIC TESTS (A-J) (Continued)

PINPOINT TEST G:
NO ANTI-LOCK WARNING INDICATOR ON WHEN IGNITION SWITCH TURNED ON (Continued)

	TEST STEP	RESULT ▶	ACTION TO TAKE
G2	CHECK WARNING INDICATOR BULB		
	• Check warning indicator bulb. • **Is bulb good?**	Yes ▶ No ▶	GO to G3. REPLACE bulb.
G3	CHECK CIRCUIT 603		
	• Check continuity between lamp socket and breakout box Pin 52. • **Is continuity present?**	No ▶ Yes ▶	SERVICE or REPLACE cable harness Circuit 606. GO to G4.
G4	CHECK DIODE		
	• Inspect diode for damage or loose or bad connection. • Check if diode is installed backwards.	Diode good ▶ Diode damaged or installed backwards ▶	REVERIFY symptom. REPLACE diode.

TH7914B

PINPOINT TEST H:
SPONGY BRAKE PEDAL WITH/WITHOUT ANTI-LOCK FUNCTION (NO WARNING INDICATOR)

	TEST STEP	RESULT ▶	ACTION TO TAKE
H1	CHECK COMPONENT MOUNTING		
	• Check for proper brake pedal and booster/master cylinder attachment. • Bleed brake system as outlined. • **Is pedal spongy?**	Yes ▶ No ▶	GO to H2. Condition corrected.
H2	BLEED BRAKE SYSTEM		
	• Rebleed brake system. • **Is pedal spongy?**	Yes ▶ No ▶	REPLACE master cylinder. Condition corrected.

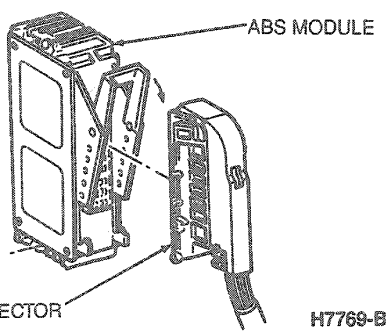
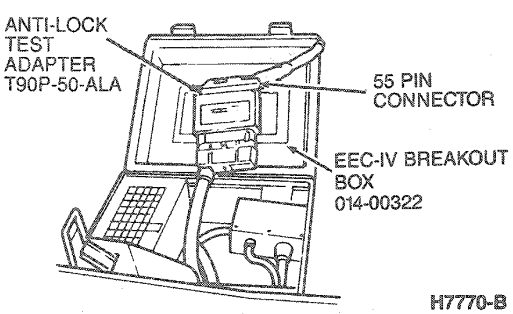
TH7789B

PINPOINT TEST J:
POOR VEHICLE TRACKING DURING ANTI-LOCK FUNCTION (WARNING INDICATOR OFF)

	TEST STEP	RESULT ▶	ACTION TO TAKE
J1	VERIFY CONDITION		
	• Verify condition exists as reported. • Bleed brake system as outlined. • **Does vehicle track poorly?**	No ▶ Yes ▶	Condition corrected. GO to J2.

DIAGNOSTIC TESTS (A-J) (Continued)

PINPOINT TEST J:
POOR VEHICLE TRACKING DURING ANTI-LOCK FUNCTION
(WARNING INDICATOR OFF) (Continued)

TEST STEP		RESULT	ACTION TO TAKE
J2	CHECK ANTI-LOCK VALVE OPERATION		
	• Turn ignition switch OFF. • Disconnect 55-pin plug from ABS module.  • Connect EEC-IV breakout box 014-00322 with Anti-Lock Test Adapter T90P-50-ALA or equivalent to the Anti-Lock 55-pin connector on wire harness.  • Lift vehicle and rotate wheels to ensure they turn freely. • Jump Pins 19 and 34 at breakout box. • Short Pins 20, 2 and 60 to each other at breakout box. • Apply moderate brake pedal effort and check that LH front wheel will not turn. • Check to see that LH front wheel turns freely when ignition switch is ON. **CAUTION: Do not leave ignition on for more than 1 minute, or valve damage may result.**	Wheel turns freely Wheel does not turn freely or pedal drops	▶ TURN ignition switch OFF. DISCONNECT wire leads. GO to **J3.** ▶ VERIFY correct wiring between 55-pin connector and 19-pin connector on valve block per wiring diagram. ▶ If wiring is correct, REPLACE solenoid valve block.
J3	CHECK ANTI-LOCK OPERATION RH FRONT WHEEL		
	• Jump Pins 19 and 34 at breakout box. • Short Pins 38, 21 and 60 to each other at breakout box. • Apply moderate brake pedal effort. Check that RH front wheel will not turn with ignition OFF. • Check that RH front wheel turns freely with ignition ON. **CAUTION: Do not leave ignition on for more than 1 minute or valve damage may result.**	Wheel turns freely Wheel does not turn freely or pedal drops	▶ TURN ignition switch OFF. DISCONNECT wire leads. GO to **J4.** ▶ VERIFY correct wiring between 55-pin connector and 19-pin connector on valve block per wiring diagram. ▶ If wiring is correct, REPLACE solenoid valve block.

DIAGNOSTIC TESTS (A-J) (Continued)

PINPOINT TEST J:
POOR VEHICLE TRACKING DURING ANTI-LOCK FUNCTION
(WARNING INDICATOR OFF) (Continued)

TEST STEP		RESULT	ACTION TO TAKE
J4	CHECK ANTI-LOCK OPERATION RH REAR WHEEL		
	• Jump Pins 19 and 34 at breakout box. • Short Pins 55, 18 and 60 to each other at breakout box. • Apply moderate brake pedal effort. Check that RH rear wheel will not turn with ignition OFF. • Check that RH rear wheel turns freely with ignition ON. **CAUTION: Do not leave ignition on for more than 1 minute or valve damage may result.**	Wheel turns freely ▶ Wheel does not turn freely or pedal drops ▶	TURN ignition switch OFF. DISCONNECT wire leads. GO to J5. VERIFY correct wiring between 55-pin connector and 19-pin connector on valve block per wiring diagram. ▶ If wiring is correct, REPLACE solenoid valve block.
J5	CHECK ANTI-LOCK OPERATION LH REAR WHEEL		
	• Jump Pins 19 and 34 at breakout box. • Short Pins 36, 54 and 60 to each other at breakout box. • Apply moderate brake pedal effort. Check that LH rear wheel turns freely with ignition ON. **CAUTION: Do not leave ignition on for more than 1 minute or valve damage may result.**	Wheel turns freely ▶ Wheel does not turn freely or pedal drops ▶	TURN ignition switch OFF. DISCONNECT wire leads and breakout box. LOWER vehicle. REVERIFY symptom. VERIFY correct wiring between 55-pin connector and 19-pin connector on valve block per wiring diagram. ▶ If wiring is correct, REPLACE solenoid valve block.

TH7915B

REMOVAL AND INSTALLATION

Master Cylinder Reservoir Checking and Filling

Brake fluid level in the master cylinder reservoir should be between 4mm (0.16 inch) below the MAX line on the side of the reservoir and the MAX line. If brake fluid is low, the red BRAKE indicator will illuminate. To add brake fluid, clean and remove cap and pour clean brake fluid into the top of the reservoir. Fill to specification mentioned above. Use Heavy-Duty Brake Fluid C6AZ-19542-AA (ESA-M6C25-A) or DOT-3 equivalent. If brake fluid has to be added often, check all hydraulic connections for leaks.

Brake Booster Assembly

Removal

1. With engine turned OFF, pump brake pedal until all vacuum is removed from booster. This will prevent master cylinder seal from being sucked into booster during disassembly.
2. Disconnect manifold vacuum hose from booster check valve.
3. Disconnect electrical connector from master cylinder reservoir cap (fluid level indicator).
4. Remove brake tubes from primary and secondary outlet ports of the master cylinder, and remove HCU supply hose. Plug ports and reservoir feed to prevent brake fluid from leaking onto paint and wiring.
5. Inside the passenger compartment, remove stoplamp switch wiring connector from switch (under instrument panel). Disengage pedal position switch from stud.
6. Remove hairpin retainer and outer nylon washer from pedal pin. Slide stoplamp switch off brake pedal just far enough for outer arm to clear pin.
7. Remove switch. Be careful not to damage switch during removal.
8. Remove booster-to-dash panel retaining nuts. Slide bushing and booster push rod off brake pedal pin.
9. From inside engine compartment, move booster forward until booster studs clear dash panel. Remove booster and master cylinder assembly.
10. Place booster and master cylinder assembly on a clean bench. Remove two nuts retaining master cylinder to booster. Slide master cylinder away from booster.

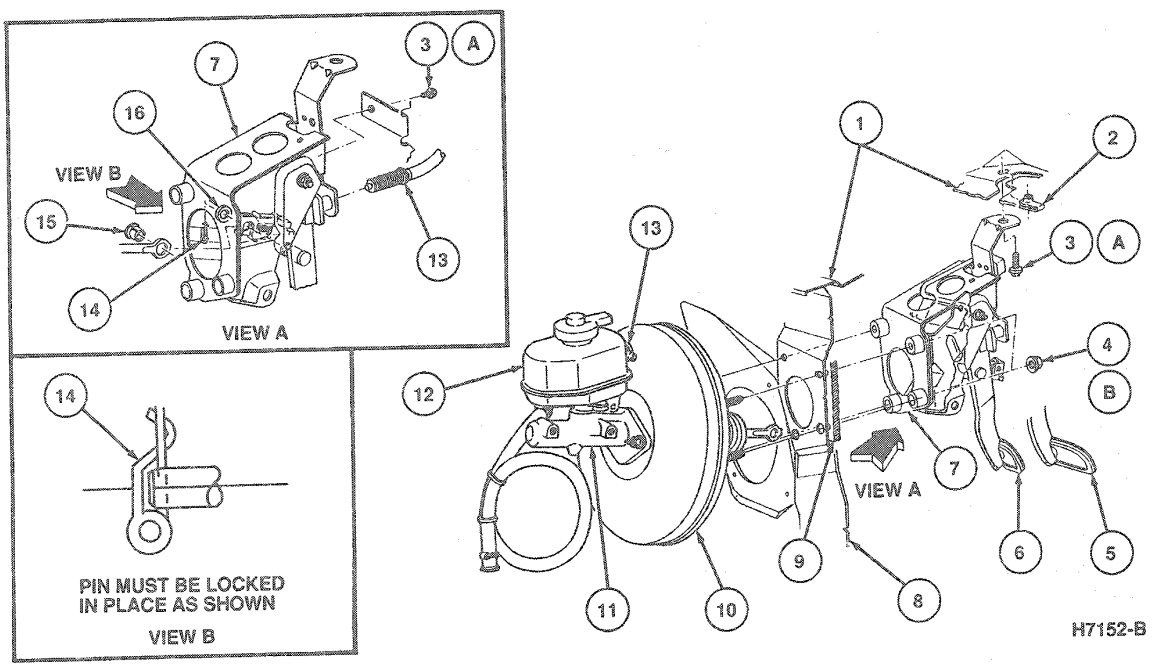
REMOVAL AND INSTALLATION (Continued)

Installation

1. Slide master cylinder onto booster studs. Ensure seal is in place in groove on master cylinder and install two retaining nuts. Tighten nuts to 21-29 N·m (16-21 lb-ft).
2. Place booster and master cylinder assembly in position on dash.
3. Inside passenger compartment, install booster push rod and bushing on brake pedal pin with head of bushing away from pedal. Secure booster to dash panel with self-locking nuts. Tighten nuts to 21-29 N·m (16-21 lb-ft).

   CAUTION: Use care not to bend or deform switch.

4. Position stoplamp switch so that it straddles booster push rod with switch slot toward pedal blade and hole just clearing pin. Slide switch completely onto pin.
5. Install outer nylon washer on pin and secure all parts to pin with hairpin retainer. Make sure retainer is fully installed and locked over pedal pin. Install stoplamp switch wiring connector.
6. Install pedal travel switch as outlined. Adjust switch as outlined under Adjustments.
7. Connect brake tubes to master cylinder and tighten to 15-20 N·m (11-15 lb-ft). Connect HCU supply hose to reservoir.
8. Connect manifold vacuum hose to booster check valve and electrical connector to master cylinder reservoir cap.
9. Bleed brake system as outlined.



Item	Part Number	Description
1	—	Cowl
2	N800538-S100	Nut
3A	N606689-S2	Bolt
4B	N620481-S2	Nut (4 Req'd)
5	—	Brake Pedal (Auto)
6	—	Brake Pedal (Manual)
7	2450	Pedal Bracket Assy
8	—	Dash Panel
9	—	Dash

(Continued)

Item	Part Number	Description
10	2B195	Vacuum Booster
11	2B195	Master Cylinder
12	2B195	Reservoir
13	9C727	Speed Control Valve
14	380699-S100	Pin
15	2A309	Bushing
16	2B129	Spacer
A		Tighten to 16-30 N·m (12-22 Lb-Ft)
B		Tighten to 21-29 N·m (16-21 Lb-Ft)

REMOVAL AND INSTALLATION (Continued)

Master Cylinder

Removal

1. With engine OFF, pump brake pedal until all vacuum is removed from booster. This will prevent master cylinder seal from being sucked into booster during disassembly.
2. Disconnect electrical connector from master cylinder assembly (fluid level indicator).
3. Remove brake tubes from primary and secondary outlet ports of master cylinder. Plug ports to prevent brake fluid from leaking onto paint and wiring.
4. Remove two nuts retaining master cylinder to brake booster assembly.
5. Slide master cylinder forward and upward from vehicle.

Installation

1. Install new seal into groove in master cylinder. Ensure seal is seated properly or booster will leak.
2. Position master cylinder assembly onto two studs on booster assembly.
3. Install two retaining nuts and tighten to 21-29 N·m (16-21 lb-ft).
4. Install front and rear brake tubes to master cylinder outlet ports and tighten to 14-24 N·m (10-18 lb-ft).
5. Connect fluid level indicator electrical connector to master cylinder assembly.
6. Fill master cylinder reservoir with specified brake fluid to full mark on side of reservoir. Use Heavy Duty Brake Fluid C6AZ-19542-AA or BA (ESA-M6C25-A) or DOT-3 equivalent.
7. Bleed master cylinder and primary and secondary brake systems as outlined.
8. Bleed entire brake system using special bleeding adapter as outlined.
9. Operate brake several times, then check for external leaks.

Hydraulic Control Unit (HCU)

Taurus / Sable

Removal

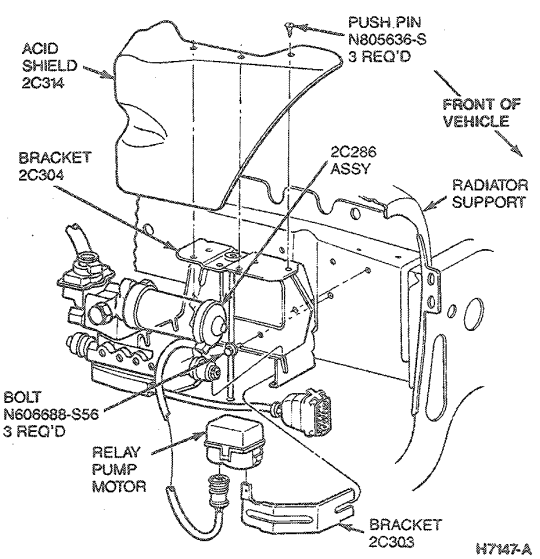
1. Disconnect and remove battery from vehicle.
2. Remove battery tray from vehicle.
3. Remove three plastic push pins holding acid shield to HCU mounting bracket and remove acid shield.
4. Disconnect 19-pin connector from HCU to wire harness, and disconnect 4-pin connector from HCU to pump motor relay.
5. Remove two tubes from inlet ports and four tubes from outlet ports of HCU. Plug each port to prevent brake fluid from spilling onto paint and wiring.

   NOTE: Nut on front of HCU also retains the relay mounting bracket.
6. Remove three nuts retaining HCU assembly to mounting bracket and remove assembly from vehicle.

Installation

NOTE: Attach relay mounting bracket with nut on front of HCU.

1. Position HCU assembly into mounting bracket. Install three retaining nuts and tighten to 16-24 N·m (12-18 lb-ft).
2. Connect four tubes to outlet ports on side of HCU and two tubes to inlet ports on rear of HCU and tighten to 15-20 N·m (11-15 lb-ft).
3. Connect 19-pin connector to harness and 4-pin connector to pump motor relay.
4. Install acid shield and three plastic push pins holding acid shield to HCU mounting bracket.
5. Install battery tray.
6. Install battery and connect cables.
7. Bleed brake systems, as outlined and check for fluid leaks.



Taurus SHO

Removal

1. Disconnect battery ground cable. Remove ABS module and mounting bracket from top of HCU mounting bracket.
2. Disconnect 19-pin connector retaining HCU to wire harness and disconnect 4-pin connector HCU to pump motor relay.

REMOVAL AND INSTALLATION (Continued)

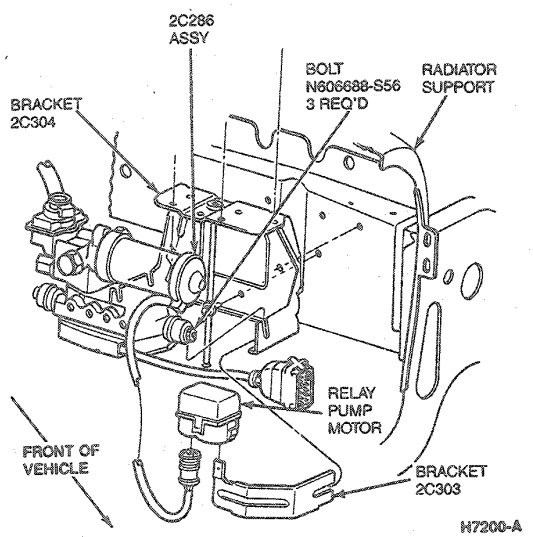
3. Remove two tubes from inlet ports and four tubes from outlet ports of HCU, plug each port to prevent brake fluid from spilling on paint and wiring.
4. Remove three nuts that attach the HCU assembly to mounting bracket and remove assembly from vehicle.

   NOTE: Nut on front of HCU also retains the relay mounting bracket.

Installation

1. Position HCU assembly into mounting bracket. Install three retaining nuts and tighten to 16-24 N·m (12-18 lb-ft).

   NOTE: Install relay mounting bracket with nut on front of HCU.
2. Connect four tubes to outlet ports on side of HCU and tighten to 15-20 N·m (11-15 lb-ft).
3. Connect 19-pin connector to harness and 4-pin connector to pump motor relay.
4. Install ABS module mounting bracket and ABS module to top of HCU mounting bracket.
5. Connect battery and bleed brake system as outlined and check for fluid leaks.



ABS Module

Removal

1. Disconnect negative battery cable.
2. Remove trim panel in luggage compartment (behind rear seat) to expose electronic control unit. Refer to Section 01-05.
3. Disconnect 55-pin connector from ABS module. Unlock connector by pulling up lever completely. Move top of connector away from ABS module until all terminals are clear, then pull connector up out of slots in ABS module.
4. Remove three screws attaching ABS module to mounting bracket and remove ABS module.

Installation

1. Align ABS module with bracket so that lever is facing up and side with two mounting holes is flat against bracket at top.

   NOTE: If all three mounting holes in ABS module do not line up with holes in mounting bracket, ABS module is incorrectly aligned with bracket.
2. Install three retaining screws and tighten to 1.7-2.3 N·m (15-20 lb-in).
3. Connect 55-pin connector by installing bottom part of connector into slots in ABS module and pushing top portion of connector into ABS module. Then, pull locking lever completely down to ensure proper installation.
4. Install trim panel cover.
5. Connect negative battery cable.

Wheel Sensors, Front

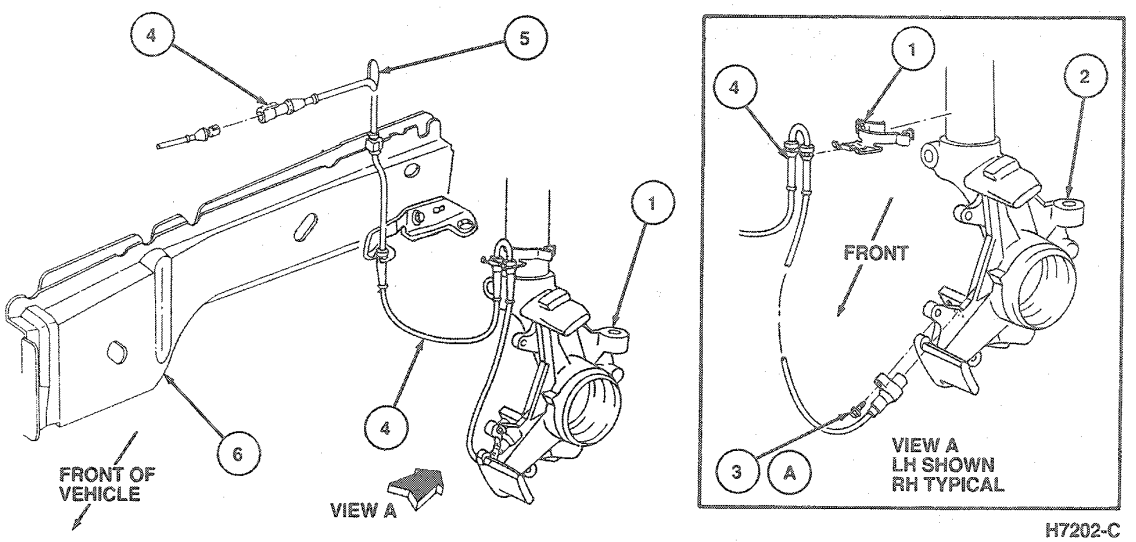
Removal

1. Disconnect sensor connector located in engine compartment.
2. For RH front sensor, remove two plastic push studs to loosen front section of splash shield in wheel well. For LH front sensor, remove two plastic push studs to loosen rear section of splash shield.
3. Thread sensor wire through holes in fender apron. For RH front sensor, remove two retaining clips behind splash shield.
4. Raise vehicle on a hoist. Refer to Section 00-02. Remove wheel and tire assembly.
5. Disengage sensor wire grommets at height sensor bracket and from retainer clip on shock strut just above spindle.
6. Loosen sensor retaining screw and remove sensor assembly from front knuckle.

Installation

1. Align front wheel speed sensor with its mounting holes on front knuckle. Tighten retaining screw to 4.5-6.8 N·m (40-60 lb-in).
2. Install grommets at height sensor bracket and the retainer clip at shock strut.
3. Thread wire through holes in fender apron. Install retainer clips (for RH sensor only). Secure splash shield with plastic push studs.
4. Connect sensor connector to wiring harness from engine compartment.

REMOVAL AND INSTALLATION (Continued)



Item	Part Number	Description
1	2C194	Retainer Clip
2	3K170 RH 3K171LH	Spindle Assy
3A	N805151-S100	Bolt

(Continued)

Item	Part Number	Description
4	2C204	Sensor Assy
5	—	Hole in Spring Tower
6	—	LH Side Member
A		Tighten to 4.5-6.8 N·m (40-60 Lb-In)

Wheel Sensor, Rear

Sedan

Removal

1. Remove rear seat and seat back insulation. Refer to Section 01-10.
2. Disconnect sensor from harness and tie one end of string or wire to sensor connector, and tie other end to rear seat sheet metal bracket.
3. Push sensor wire grommet and connector through floorpan, drawing string or wire with sensor connector.
4. Disconnect string or wire from the sensor from underneath vehicle.
5. Raise vehicle on hoist. Refer to Section 00-02.
6. Disconnect routing clips from suspension arms and remove sensor retaining bolts from rear brake adapters.

Installation

1. Insert rear wheel speed sensor into hole in adapter and install retaining bolt. Tighten to 4.6-6.8 N·m (40-60 lb-in).
2. Install sensor routing clips to suspension arms.
3. Attach string or wire to new sensor connector, then pull sensor connector through hole in floorpan using string or wire.
4. Install sensor wire grommet into hole in floorpan.
5. Remove string or wire and connect sensor to harness.
6. Install rear seat back.

Station Wagon

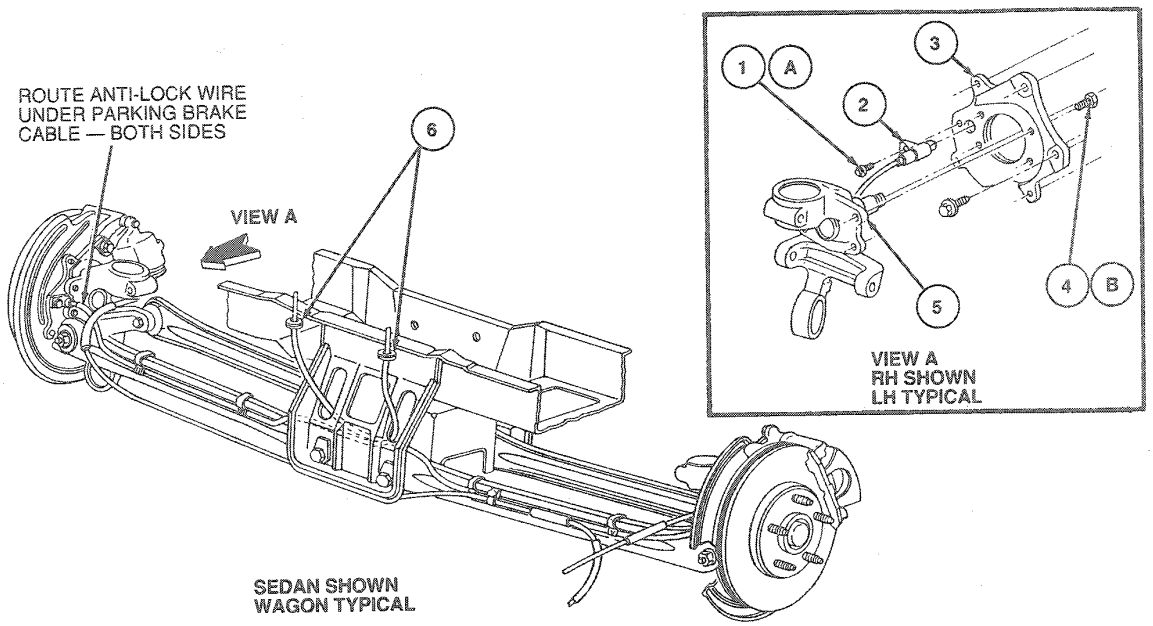
Removal

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Remove sensor wire with attached grommet from hole in floorpan.
3. Disconnect sensor from harness.
4. Remove routing clips then remove sensor retaining bolt and sensor.

Installation

1. Install rear wheel speed sensor and retaining bolt. Tighten to 4.6-6.8 N·m (40-60 lb-in).
2. Route sensor harness and install clips.
3. Connect sensor to harness. Push through hole in floorpan and install grommet.
4. Lower vehicle.

REMOVAL AND INSTALLATION (Continued)



Item	Part Number	Description
1A	N805151-S100	Bolt
2	2C216 LH 2C190 RH	Sensor Assy
3	2C101 LH 2C100 RH	Hub Adapter

(Continued)

Item	Part Number	Description
4B	N805086-S100	Bolt (4 Req'd)
5	—	Rear Knuckle Assy
6	—	Floor Grommets
A		Tighten to 4.5-6.8 N·m (40-60 Lb-In)
B		Tighten to 60-80 N·m (45-60 Lb-Ft)

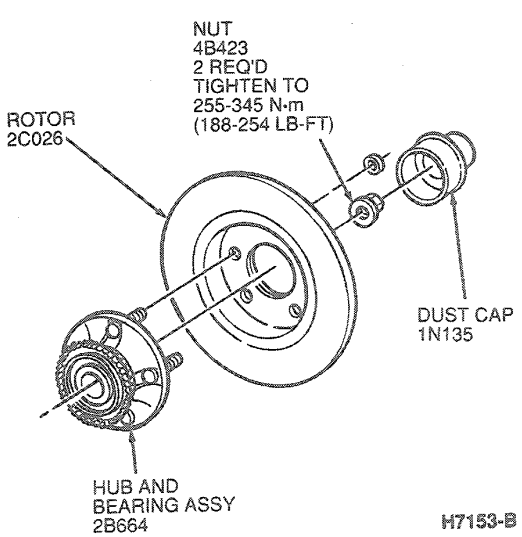
Speed Indicator Ring, Front

Refer to Section 05-04 for Front Speed Indicator Removal and Installation procedures.

Speed Indicator Ring, Rear

Removal

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Remove wheel and tire assembly.
3. Remove caliper, rotor and rear hub assemblies. Refer to Sections 04-02 and 06-04.



REMOVAL AND INSTALLATION (Continued)

4. Position hub assembly in an arbor press and press hub out of speed sensor ring.

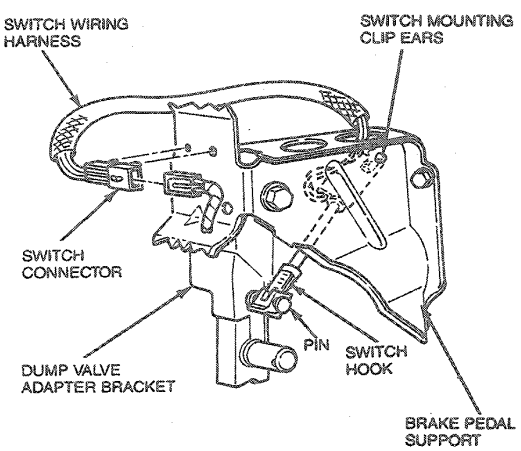
Installation

1. Position speed sensor ring over hub.
2. Using a flat piece of steel or similar tool, press ring down until it is flush with top of hub.
3. Install rear hub, rotor and caliper. Refer to Sections 04-02 and 06-04 for procedures.
4. Install wheel and tire assembly. Tighten wheel lug nuts to 115-142 N·m (85-105 lb-ft).

Pedal Travel Switch

Removal

1. Disconnect wiring harness lead at switch connector.
2. Using a flat-bladed screwdriver, or similar tool, pry connector locator from holes in brake pedal support.
3. Unsnap switch hook from pin on dump valve adapter bracket.
4. Using needlenose pliers, or similar tool, squeeze tabs on switch mounting clip and push clip through hole in brake pedal support.
5. Remove switch by feeding switch harness through hole in top of brake pedal support bracket.



Installation

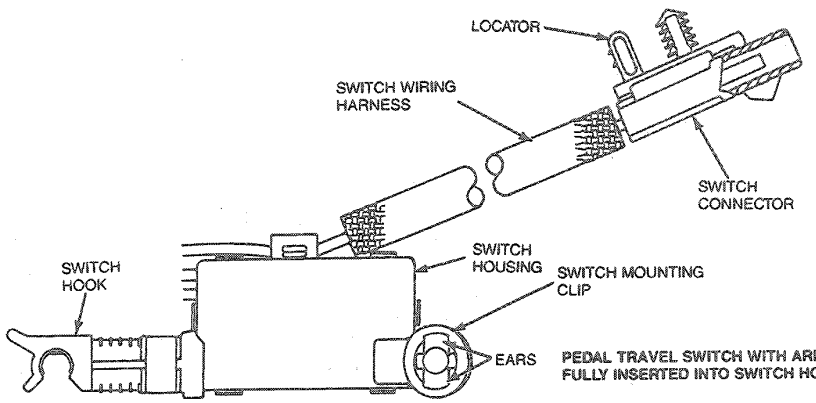
1. Feed switch harness through forward hole in top of brake pedal support. Route harness around the LH side of support and install locators to holes in vertical tab with open side of connector facing center of vehicle.

   NOTE: Ensure wiring from harness is restricted from coming in contact with steering universal joint.
2. Connect switch to vehicle harness.
3. Insert switch mounting clip to hole in brake pedal support and press firmly toward brake pedal support sidewall until a click is heard.
4. Rotate switch and ensure that mounting clip tabs are fully engaged.
5. Adjust switch as outlined.

ADJUSTMENTS

Pedal Travel Switch

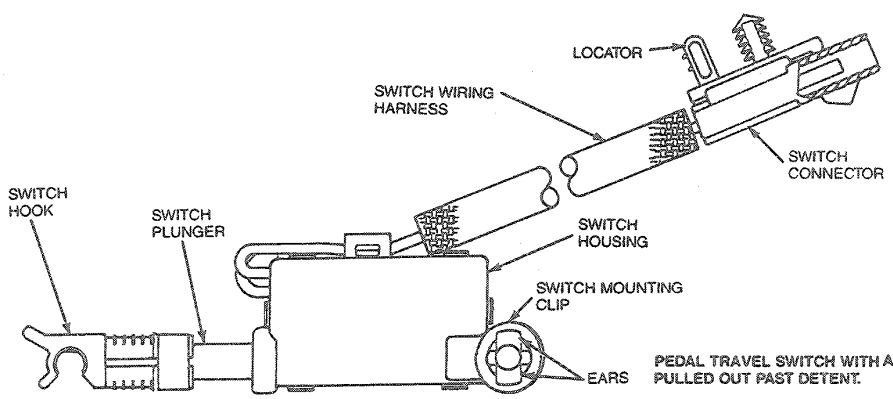
To adjust the pedal travel switch, push the switch plunger fully into the switch housing as shown. This zeroes out the switch adjustment so that it can be automatically reset to the correct dimension during the following steps.



PEDAL TRAVEL SWITCH WITH ARM FULLY INSERTED INTO SWITCH HOUSING.

H7150-A

Slowly pull the arm back out of the switch housing past the detent point. **At this point it should be impossible to reattach the arm to the pin unless the brake pedal is forced down.** To complete the adjustment, depress the brake pedal until the switch hook can be snapped onto the pin. Snap hook onto pin and pull brake pedal back up to its normal at rest position. This automatically sets the switch to the proper adjustment. Any time the switch is unhooked from the pin for any reason, the above resetting procedure should be performed to ensure correct switch adjustment.



PEDAL TRAVEL SWITCH WITH ARM PULLED OUT PAST DETENT.

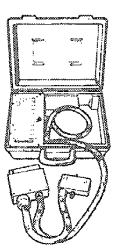
H7151-A

SPECIFICATIONS

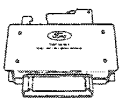
TORQUE SPECIFICATIONS

Description	N·m	Lb-Ft
Booster to Dash Panel—Nut	21-29	16-21
Brake Tube to Master Cylinder—Fitting	16-20	12-15
Master Cylinder to Booster—Nut	21-29	16-21
Hydraulic Control Unit to Bracket—Nut	16-20	12-15
Brake Tubes to Hydraulic Control Unit	14-24	10-18
ABS Module to Bracket Screws	1.7-2.3	15-20 (Lb-In)
Front Wheel Speed Sensor—Bolt	4.5-6.8	40-60 (Lb-In)
Hub Adapter Bolts	60-80	45-60
Hub Nut	257-352	190-260
Wheel Lug Nuts	115-142	85-105
ABS Module Bracket Bolts	8-12	6-8

SPECIAL SERVICE TOOLS

Tool Number/ Description	Illustration
T83L-50-EEC-IV Breakout Box	 T83L-50-EEC-IV
T85T-4616-AH Pinion Bearing Cup Replacer	 T85T-4616-AH

(Continued)

Tool Number/ Description	Illustration
T89P-20202-A Sensing Ring Installer	 T89P-20202-A
T90P-50-ALA Anti-Lock Test Adapter	 T90P-50-ALA

ROTUNDA EQUIPMENT

Model	Description
007-0041B	SUPER STAR II Tester
014-00322	EEC-IV 60 Pin Breakout Box
105-00051	Digital / Analog Volt-Ohmmeter