Wheel, Hubs and Bearings — Front (Except Front Drive)

SECTION 11-10

APPLIES TO E-150 — E-350 AND F-150 — F-350 (4x2)

DESCRIPTION

Front Wheel Assembly

Each front wheel and tire assembly is bolted to its respective front hub and rotor assembly. Two opposed tapered roller bearings are installed in each hub, (Fig. 1). A grease retainer is installed at the inner end of the hub to prevent lubricant from leaking onto the rotor. The entire assembly is retained to its spindle by the lock nut or adjusting nut washer and cotter pin.

E-350 and F-350 equipped with dual wheel rear axles have the wheel and tire assembly attached to the drum with integral two-piece swiveling lug nuts.

WARNING: DO NOT ATTEMPT TO USE PAST MODEL LUG NUTS (CONE SHAPED, ONE-PIECE) TO REPLACE THE INTEGRAL TWO-PIECE SWIVELING LUG NUTS. IF SO USED, PAST MODEL LUG NUTS CAN COME LOOSE IN VEHICLE OPERATION. DO NOT ATTEMPT TO USE PAST MODEL WHEELS, WHICH HAVE CONE SHAPED LUG NUT SEATS, ON THIS VEHICLE. DO NOT ATTEMPT TO USE THE NEW DESIGN WHEELS AND LUG NUTS ON PAST MODEL WHEEL HUBS. ATTEMPTED USE OF INTERMIXED WHEELS CAN LEAD TO DAMAGE TO THE WHEEL MOUNTING SYSTEM AND COULD RESULT IN WHEELS COMING LOOSE IN OPERATION.

ADJUSTMENTS

Front Wheel Bearing Adjustment

To check the wheel bearing adjustment, raise the front of the vehicle. Then, grasp the tire at the sides, and alternately push inward and pull outward on the tire. If any looseness is felt, adjust the front wheel bearings.

F100-F350 (4x2) and E100-E350

1. Remove the hub cap or wheel cover, wheel and tire assembly, disc brake caliper and pads, (refer to Section 12-24, Disc Brakes-Light and Heavy Duty—Sliding Caliper), dustcap, locknut, adjusting nut, washer and cotter pin.
2. Tighten wheel adjusting nut to 30-33 N·m (22-25 ft. lbs.) while rotating the disc brake rotor in the opposite direction.
3. Back off the adjusting nut 1/8 turn and install locknut and cotter pin without additional movement of adjusting nut (Fig. 1). Bearing end play should be 0.025-0.254mm (0.001-0.010 inch).
4. Re-install dustcap, caliper, pads and wheel and tire assembly.

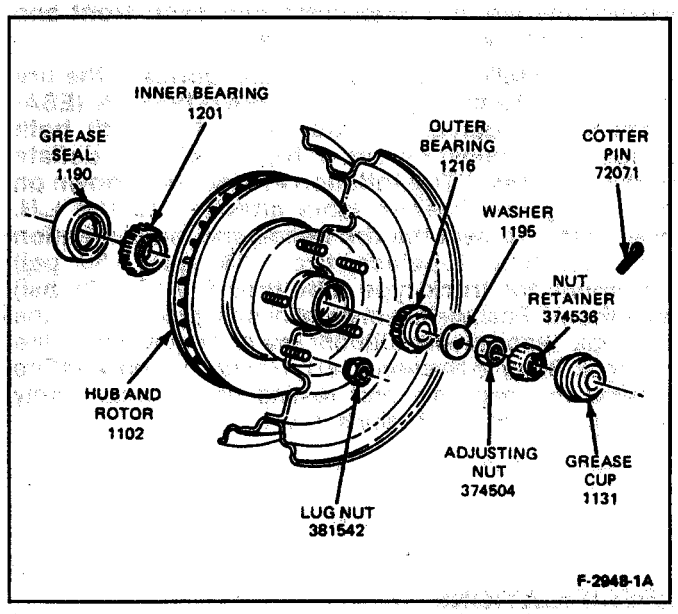

FIG. 1 Front Hub and Rotor Assembly Bearings and Grease Seal F-150—F-350 (4x2) and E-150—E-350—Typical

REMOVAL AND INSTALLATION

Front Wheel Grease Seal and Bearing Replacement and Repacking

F-150—F-350, E-150—E-350

Wheel bearing lubricant is a lithium-base grease, Multi-Purpose Long-Life Lubricant, C1AZ-19590-B (ESA-M1C75-B) or equivalent.

Sodium-base grease is not compatible with lithium-base grease and should not be intermixed. Therefore, do not lubricate front and/or rear wheel bearings without first identifying the type of original wheel bearing lubricant. Usage of incompatible bearing lubricants could result in premature lubricant breakdown.

If bearing adjustment will not eliminate looseness or rough and noisy operation, the hub and bearings should be cleaned, inspected, and repacked with specified wheel grease. If the bearing cups or the cone and roller assemblies are worn or damaged, they should be replaced.

1. Raise the vehicle until the tire clears the floor and remove the wheel and tire assembly from the hub and rotor as described in Section 11-02, Wheels and Tires.
2. Remove the brake caliper, (refer to Section 12-24, Disc Brakes-Light and Heavy Duty—Sliding Caliper), and wire it to the underbody to prevent damage to the brake hose. It is not necessary to disconnect the hose from the caliper. Do not let the caliper hang with its weight on the brake hose or the hose may become stretched, twisted or ruptured.
3. Remove the grease cap, cotter pin, locknut, adjusting nut and washer.
4. Remove the outer bearing cone and roller.
5. Pull the hub and rotor off the spindle and remove and discard the grease seal, if necessary.
6. Remove the inner bearing cone and roller from the hub. Remove all traces of old lubricant from bearings, hub and axle spindle.
7. Inspect the cups for scratches, pits or cracks. If the cups are worn or damaged, remove them with a drift. Clean the inner and outer bearing cones and rollers with solvent and dry thoroughly. **Do not spin the bearings dry with compressed air.**
8. Inspect the cones and rollers for cracks, nicks, brinelling, or seized rollers. Inspect the grease retainer and replace it if it is cracked, nicked, or dented.
9. Cover the spindle with a clean cloth and brush all loose dust and dirt from the brake assembly using Rotunda brake vacuum (model 091-00001) or equivalent. **Remove the cloth from the spindle carefully to prevent dirt from falling on the spindle.**
10. If inner or outer bearing cups were removed, install replacement inner and outer bearing cups in the hub with the appropriate bearing cup replacer tool (refer to the Special Service Tool chart in the Specifications portion of this section) and Driver Handle T80T-4000-W (Fig. 2). Be sure to seat the cups properly in the hub. The cups will be properly seated when they are fully bottomed. Replace grease retainers.
11. Pack the inside of the hub with lithium-base grease, Multi-Purpose Long-Life Lubricant, C1AZ-19590-B (ESA-M1C75-B) or equivalent. Fill the hub until the grease is flush with the inside diameters of both bearing cups. Pack the bearing cones and rollers with wheel bearing grease. Use a bearing packer for this operation, Rotunda models 012-00072, 012-00211 or 012-00250, or equivalent. If a packer is not available, work as much lubricant as possible between the rollers and cages. Lubricate the cone surfaces with grease.
12. Place the inner bearing cone and roller in the inner cup and install the new grease seal with driving tool T73T-1190-B, (Fig. 3). Be sure that the seal is fully bottomed. Apply a light coating of lithium-base grease, Multi-Purpose Long-Life Lubricant, C1AZ-19590-B, (ESA-M1C75-B) or equivalent to the lips of the grease seal.
13. Install the hub and rotor on the wheel spindle. **Keep the hub centered on the spindle to prevent damage to the grease retainer or the spindle threads.**
14. Install the outer bearing cone and roller and the flat washer on the spindle, then install the adjusting nut, and adjust the wheel bearing as outlined under Adjustments. Install the grease cap.
15. Install the caliper, (refer to Section 12-24, Disc Brakes-Light and Heavy Duty—Sliding Caliper).
16. Install the wheel and tire assembly on the hub as described in Section 11-02, Wheels and Tires.
17. Lower the vehicle and tighten the lug nuts to specification. Re-install the wheel cover or hub cap.

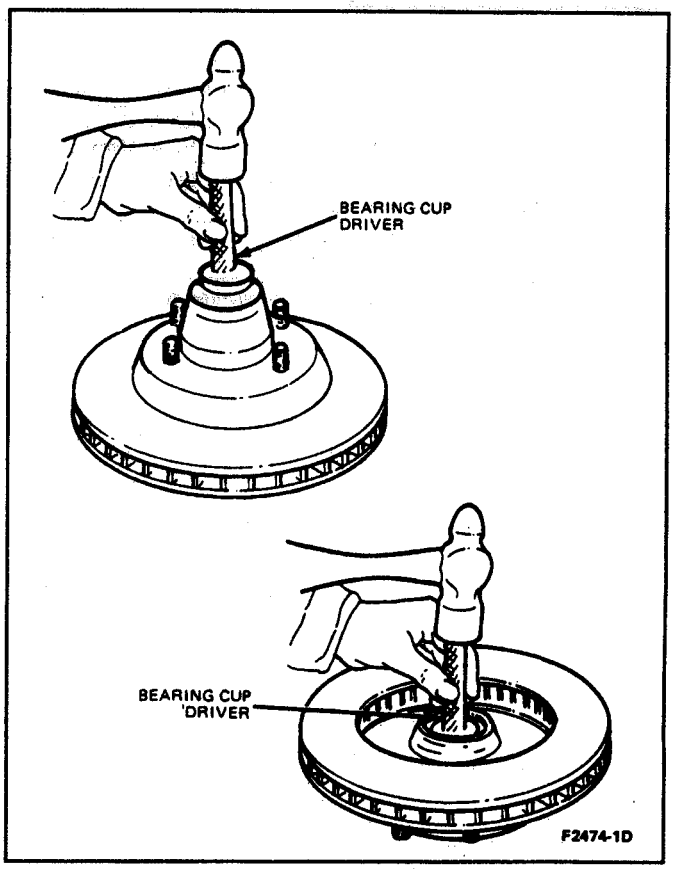

FIG. 2 Installing Bearing Cups

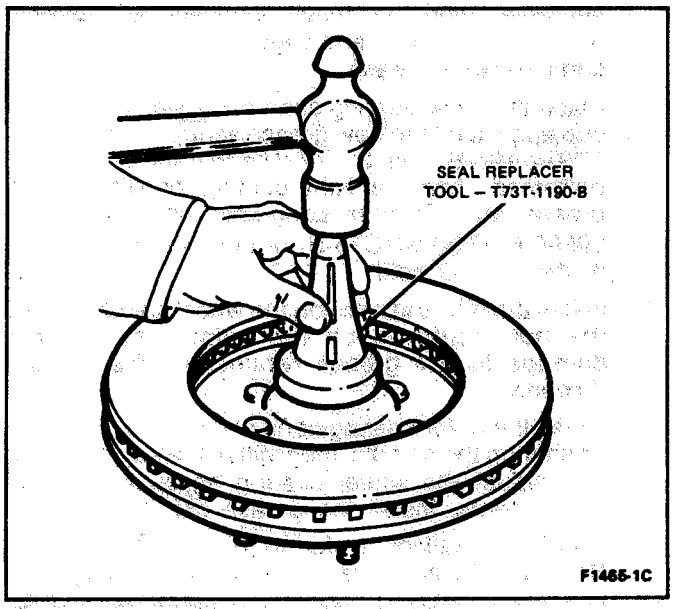

FIG. 3 Installing Grease Seal

SPECIFICATIONS

WHEEL TORQUE SPECIFICATIONS

Vehicle	Wheel	Bolt Size	Torque①	
			N-m	Ft-Lbs
E-150, F-150, Bronco	5-Lug Wheel	1/2-20	115-156	85-115
E-250, F-250 (under 8,500 GVW)	8-Lug Wheel	1/2-20	115-156	85-115
E-250, E-350, F-250 (over 8,500 GVW) F-350 — Single Rear Wheel Vehicles	8-Lug Wheel	9/16-18	156-237	115-175
E-350, F-350 — Dual Rear Wheel Vehicles With Integral Two-Piece Swiveling Lug Nuts	8-Lug Wheel	9/16-18	169-210	125-155

①Torque specifications are for clean, dirt-and-paint-free dry bolt and nut threads.

CF3943-2A

SPECIAL SERVICE TOOLS

Number	Description	Application
T50T-100-A	Impact Slide Hammer — 2-1/2 Lb.	Universal
T59L-100-B	Impact Slide Hammer — 2-1/2 Lb.	Universal
D79P-100-A	Impact Slide Hammer — 5 Lb.	Universal
T58L-101-A	Puller Attachment	Universal — Use with Slide Hammer
T77F-1102-A	Bearing Cup Puller	Universal — Use with Slide Hammer
T75T-1170-A	Lock Wedge Replacer	E-250, E-350
Tool 1175-AC	Seal Remover	Universal — Use with Slide Hammer
T75T-1176-A	Threaded Drawbar	E-150 thru E-350 — Bearing Cup Installation
T73T-1190-B	Seal Replacer	Seal No. C77Z-1190-D
T73T-1202-A	Bearing Cup Replacer	F-250, F-350, E-250 — Use with Driver Handle and Part No. 8A-1202-A
T73T-1217-B	Bearing Cup Replacer	F-250, E-250 Use with Driver Handle
D78P-1225-B	Bearing Cup Puller	Universal
D79T-4000-A	Outside Thread Chaser	Universal
T80T-4000-W	Driver Handle	Bearing Cup Installation
T73T-4222-A	Bearing Cup Replacer	F-250 — Use with Part No. CIVW-4222-A
T73T-4222-B	Bearing Cup Replacer	F-250, F-350 — Use with Part No. B7A-4222-A
Rotunda Equipment		
Rotunda — 012-00072	Wheel Bearing Packer	Up to 3-1/2" Bearings
Rotunda — 012-00211	Wheel Bearing Packer	Up to 6" Bearings
Rotunda — 012-00250	Wheel Bearing Packer	Up to 6" Bearings
Rotunda — 091-00001	Brake and Clutch Service — Vacuum	—

CF2949-2E

Wheel Hubs and Bearings — Front Wheel Drive

SECTION 11-12

APPLIES TO BRONCO, F-150 — F-350 (4x4) ONLY

DESCRIPTION AND OPERATION

The hub locks on Bronco and F-150-F350 (4x4) vehicles equipped with four-wheel drive, either automatically or manually actuate the front driving axle. When actuated, the hub lock body assembly locks the hub and wheel and tire assembly to the front driving axle axleshaft. When released, the front driving axle axleshaft is disengaged from the hub body assembly and the hub and tire and wheel assembly rotate freely on the spindle.

Two tapered opposed roller bearings allow the hub and wheel and tire assembly to rotate on the spindle. A hub seal is installed inboard of the inner bearing to prevent wheel bearing lubricant from contaminating the brake caliper and rotor surfaces.

F-350 (4x4) equipped with dual wheel rear axles have the wheel and tire assembly attached to the drum with integral two-piece swiveling lug nuts.

WARNING:—DO NOT ATTEMPT TO USE PAST MODEL LUG NUTS (CONE SHAPED, ONE-PIECE) TO REPLACE THE INTEGRAL TWO-PIECE SWIVELING LUG NUTS. IF SO USED, PAST MODEL LUG NUTS CAN COME LOOSE IN VEHICLE OPERATION. DO NOT ATTEMPT TO USE PAST MODEL WHEELS, WHICH HAVE CONE SHAPED LUG NUT SEATS, ON THIS VEHICLE. DO NOT ATTEMPT TO USE THE NEW DESIGN WHEELS AND LUG NUTS ON PAST MODEL WHEEL HUBS. ATTEMPTED USE OF INTERMIXED WHEELS CAN LEAD TO DAMAGE TO THE WHEEL MOUNTING SYSTEM AND COULD RESULT IN WHEELS COMING LOOSE IN OPERATION.

Automatic Locking Hubs Operation

Four-Wheel Drive

The vehicle must be stopped when you first shift into four-wheel drive. Place the transmission in neutral and the transfer case selector in the 4H or 4L position. The hub locks will automatically engage when the vehicle is driven. The transfer case may then be shifted between 2H and 4H with the vehicle moving, as long as the automatic hub locks remain engaged. The hubs will remain engaged until the disengage sequence is performed.

Two-Wheel Drive

Place the transfer case in the 2H position. To disengage the automatic hub locks, shift the transmission to move the vehicle in the opposite direction (forward or reverse) and drive a minimum of 30 meters (10 ft).

CAUTION: Never shift from 2H to 4H with the automatic hub locks disengaged while the vehicle is in motion. If it is necessary to shift to or from 4L, bring the vehicle to a full stop before doing so.

Manual Locking Hubs Operation

(Refer to Fig. 1).

Two-Wheel Drive

Shift the transfer case to the two-wheel drive position (2H) and turn the hub lock selector knob counter clockwise to the "FREE" position.

Four-Wheel Drive

Lock both hubs by turning the selector knob clockwise to the "LOCK" position. If the hub teeth do not engage

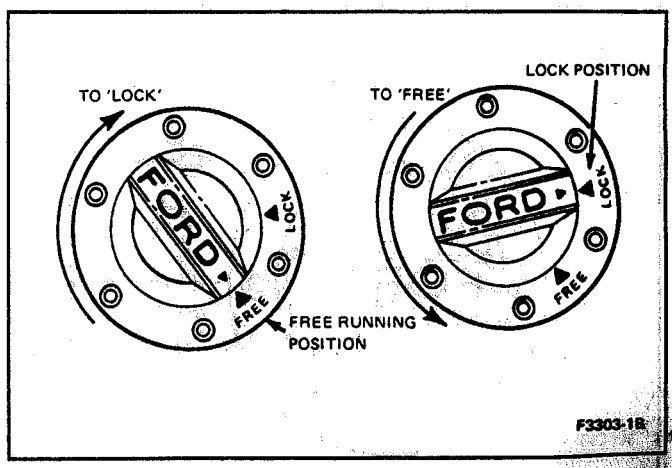

FIG. 1 Four Wheel Drive Wheel Hubs—Manual Locking Hubs

with the knob in this position, a slight movement of the wheel in either direction will complete the lock.

If the vehicle is stopped, place the transmission in neutral and select transfer case shift position.

If the vehicle is moving, the transfer case may be shifted between 2H and 4H only, providing that the hub locks are in the "LOCK" position.

Shifting to or from the 4L position requires that the vehicle be fully stopped and the transmission in neutral.

CAUTION—Both hubs must be set in the same function to avoid excess front differential wear on Non-Traction-Lok front axles or steering pull on Traction-Lok front axles.

CAUTION—Clashing of gears and resulting transfer case damage will occur if you attempt to shift to or from 4L while the vehicle is in motion or if you attempt to shift from 2H to 4H with the hub locks in the "FREE" position while the vehicle is in motion. If it is necessary to shift to or from 4L, bring the vehicle to a full stop before doing so.

ADJUSTMENTS

Front Wheel Bearing Adjustment

Bronco and F-150—F-250(4x4) With Dana 44IFS/ 44IFSH Front Driving Axle

1. Raise the vehicle and install safety stands.
2. Remove the hub lock assembly. Refer to Automatic Locking Hub or Manual Locking Hub removal and installation procedures in this Section.
3. Using Tool T59T-1197-B (Fig. 3) and a torque wrench, tighten the bearing inner adjusting nut to 68 N·m (50 ft-lb) while rotating the wheel back and forth to seat the bearing.
4. Back off the adjusting nut approximately 45 degrees.
5. Assemble lockwasher by turning inner locknut to nearest hole in the lockwasher. To lock, install the outer locknut and tighten to 203 N·m (150 ft-lbs).
6. Final end play of the wheel on the spindle should be 0.00-0.15mm (0.00-0.006 inch).
7. Install automatic hubs as described in this Section.
8. Remove safety stands. Lower vehicle.

F-250—F-350 (4x4) With Dana 50IFS Front Driving Axle

1. Raise the vehicle and install safety stands.
2. Remove the hub lock assembly. Refer to Automatic Locking Hub or Manual Locking Hub removal and installation in this Section.
3. Using Front Wheel Bearing Spanner, D78T-1197-A and a torque wrench, tighten inner locknut to 68 N·m (50 ft-lbs) to seat bearing.
4. Back off inner locknut and retighten to 41-54 N·m (31-39 ft-lbs).
5. While rotating hub, backoff locknut 135° to 150°.
6. Assemble lockwasher and outer locknut and tighten to 88 N·m (65 ft-lbs). Bend one ear of lockwasher over the inner nut and the other ear of the lockwasher over the outer nut.
7. Final end play of the spindle should be 0.02 to 0.25mm (0.001-0.009 in.).
8. Install the hub locks as described in this Section.
9. Remove safety stands. Lower vehicle.

REMOVAL AND INSTALLATION

Manual Locking Hubs

Bronco and F-150—F-350 (4x4)

Refer to Fig. 2.

1. To remove hub lock, first separate cap assembly from body assembly by removing the six (6) socket head capscrews from the cap assembly and slip apart (Fig. 1).
2. Remove snap ring (retainer ring) from the end of the axle shaft.
3. Remove the lock ring seated in the groove of the wheel hub. The body assembly will now slide out of the wheel hub. If necessary, use an appropriate puller to remove the body assembly.
4. Re-install hub in reverse order of removal. Tighten socket head capscrews to 4.0-6.2 N·m (35-55 in-lbs).

NOTE: Do not pack grease in cap. Excessive grease can cause excessive dialing effort.

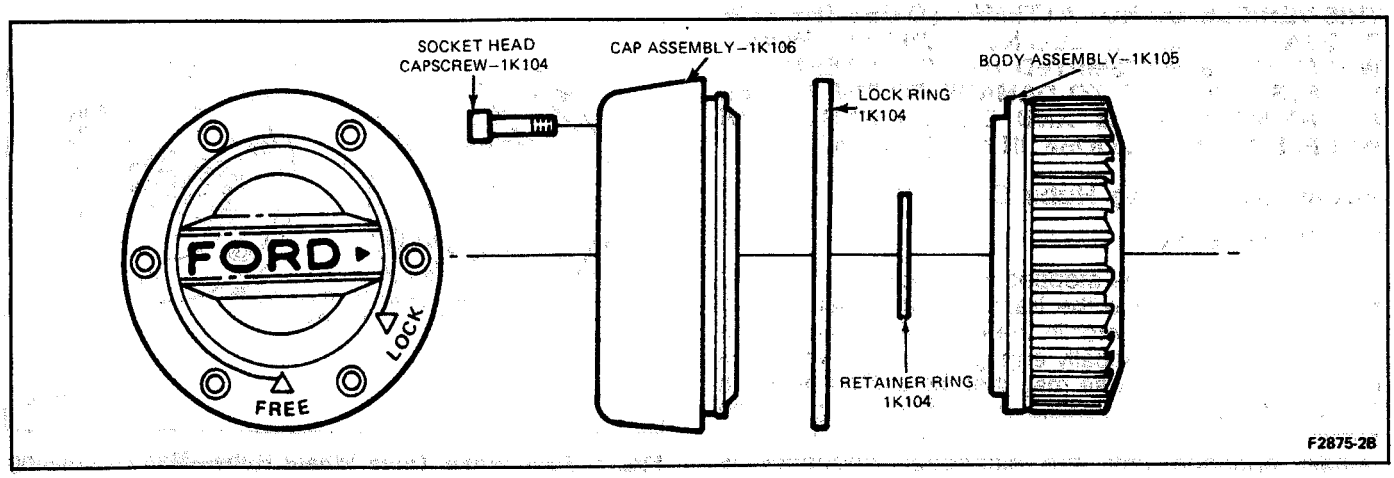

FIG. 2 Manual, Warn Locking Hubs Bronco, F-150—F350 (4x4)

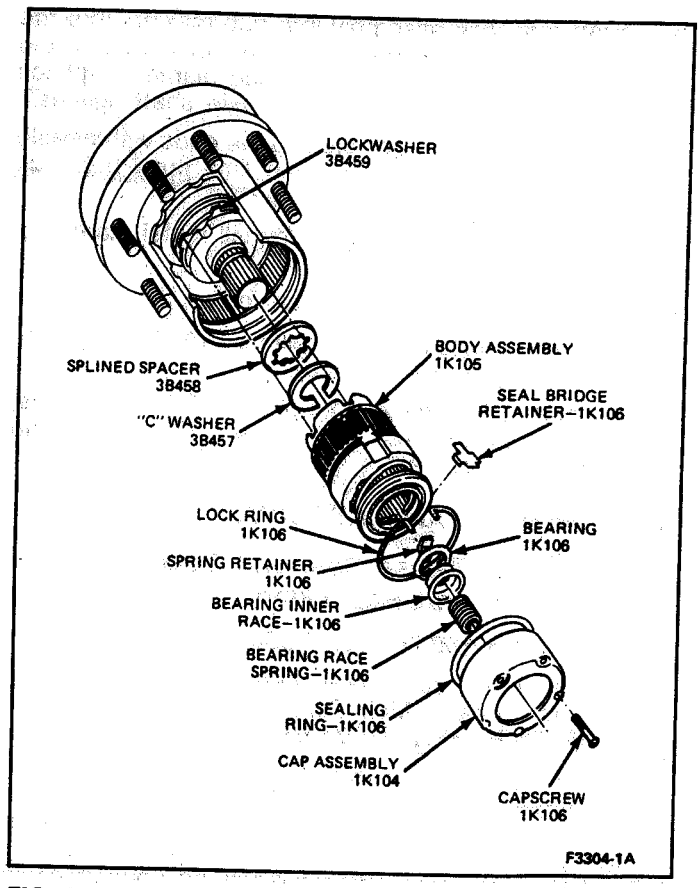

FIG. 3 Warner Automatic Locking Hub—Exploded View

Automatic Locking Hubs

Bronco, F-150—F-250 (4x4)

Refer to Fig. 3.

Removal:

1. To remove hub, first separate cap assembly from body assembly by removing the five (5) capscrews, using Torx R bit TX25, from the cap assembly.
2. Remove cover

   CAUTION: Do not drop ball bearing, bearing race, or retainer.
3. Remove rubber seal.
4. Remove seal bridge retainer (small metal stamping) from retainer ring space.
5. Remove retainer ring by closing the ends with needle nose pliers while pulling hub lock from wheel hub.

If wheel hub and spindle are to be removed:

6. Remove C washer from stub shaft groove.
7. Remove splined spacer from shaft.
8. Remove wheel bearing lock nuts and lock washer.
9. If the hub assembly requires cleaning, refer to steps 10-13.
10. Wash the cap bearing, race and retainer assembly in cleaner solvent and thoroughly dry the components. Repack the bearing with a lithium base grease, Multi-Purpose Long-Life Lubricant, C1AZ-19590-B, (ESA-M1C75-B) or equivalent. Refer to Figs. 4 and 5 for proper positioning of the bearing on the race.
11. Remove the snap ring and flat washer (Fig. 6) from the inner end of the hub lock assembly. Pull the hub sleeve and attached parts out of the drag sleeve, then cock the drag sleeve to unlock the tangs of the brake band and remove the drag sleeve assembly (Fig. 7). (NOTE: Never remove the brake band from the drag sleeve). Wash in cleaner solvent and air dry the drag sleeve and brake band. Lubricate the brake band and drag sleeve assembly with 1.5 grams (0.05 oz.) of lubricant meeting specification ESL-M1C93A (Darmex Spec. DX-123-LT.) or equivalent. Work the lubricant over the spring and area of the drag sleeve under the spring.
12. The body assembly (excludes cap assembly, and brake band and drag sleeve assembly) should be dipped in Automatic Transmission Fluid-DEXRON® -II, XT-2-QDX or equivalent and permitted to drip dry for a few minutes before proceeding with re-assembly.
13. Assemble one of the two tangs of the brake band on each side of the plastic outer cage which is located in the window of the steel inner cage. It will be necessary to cock these parts to engage the tangs in this position as the drag sleeve is positioned against the face of the cam follower (Fig. 8). Install the washer and snap ring (Fig. 6).

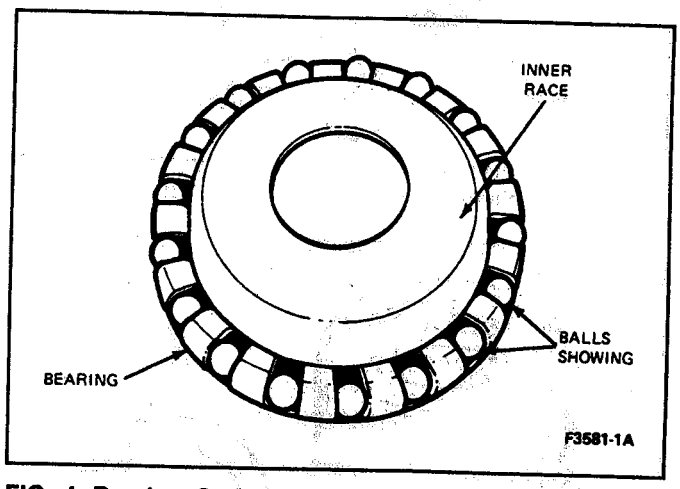

FIG. 4 Bearing Over Inner Race Installation

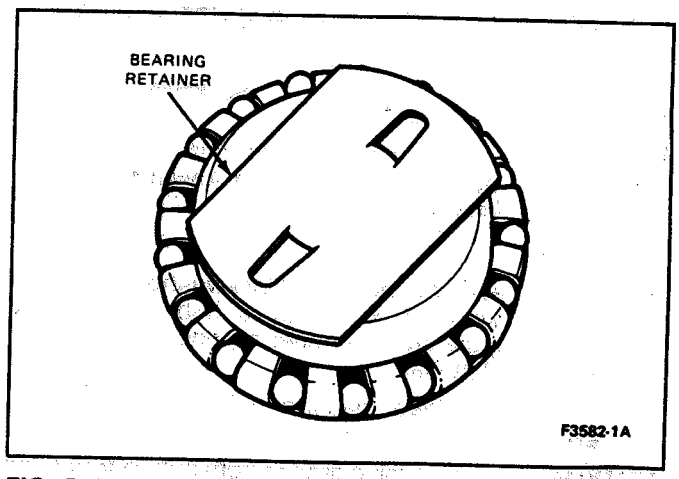

FIG. 5 Bearing Retainer Installation

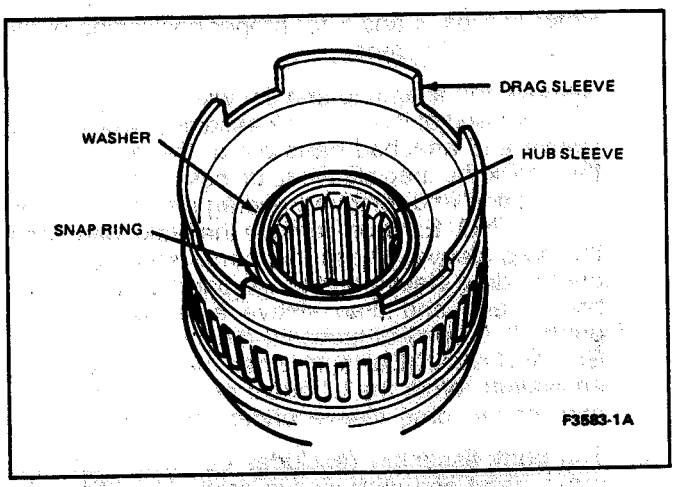

FIG. 6 Washer and Snap Ring

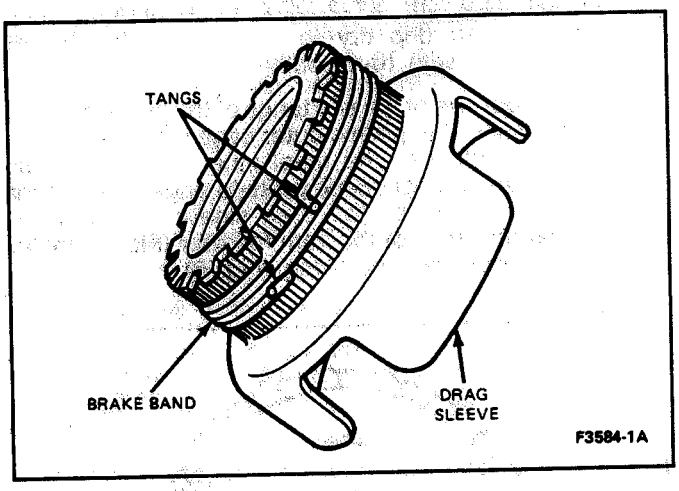

FIG. 7 Drag Sleeve and Brake Band

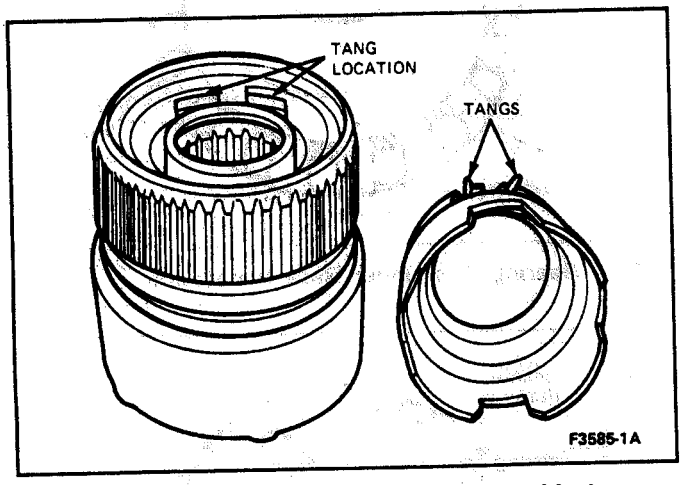

FIG. 8 Brake Band and Drag Sleeve Assembly to Body Assembly Installation

Installation:

1. Wheel bearing locknut and lockwasher installation is the same as with manual hub locks except tightening the outside wheel bearing locknut to 203 N·m (150 ft-lbs).
2. Install the splined spacer and the C washer on the axle shaft.

NOTE: Remove excessive grease from hub-lock and hub splines prior to installation.

3. Start hub lock assembly into hub making sure the large tangs are lined up with the lock washer and the outside diameter and inside diameter splines are in line with the hub and axle shaft splines.
4. Install retainer ring by closing the ends with needle nose pliers and at the same time push hub lock assembly into the hub.
5. Install seal bridge retainer (small metal stamping) with narrow end first.
6. Install rubber seal over hub lock.
7. Install cover (make sure ball bearing, bearing race and retainer are in place).
8. Tighten the 5 screws to 4.5-5.6 N·m (40-50 in-lbs) using Torx Bit TX25 in following sequence: torque one, skip one, etc.

DISASSEMBLY AND ASSEMBLY

Front Wheel Grease Seal and Bearing Replacement and Repacking

Bronco and F-150, F-250, F-350 (4x4)

The recommended wheel bearing lubricant is the lithium-base grease, Multi-Purpose Long-Life Lubricant C1AZ-19590-B (ESA-M1C75-B) or equivalent.

Sodium-base grease is not compatible with lithium-base grease and should not be intermixed. Therefore, before lubricating front and/or rear wheel bearing, **note which type was used as the original wheel bearing lubricant.** Usage of incompatible bearing lubricant could result in premature lubricant breakdown.

If bearing adjustment does not eliminate looseness or rough and noisy operation, clean, inspect and repack the hub and bearings with specified wheel grease. If bearing cups or the cone and roller assemblies are worn or damaged, they should be replaced.

1. Raise the vehicle and install safety stands.
2. If equipped with locking hubs, refer to Manual or Automatic Locking Hub Removal and Installation, this Section and remove the locking hub.
3. Remove the wheel lug nuts and the wheel and tire from the hub and rotor assembly as described in Section 11-02, Wheel and Tires.
4. Remove the wheel bearing lock nut, lock ring, and adjusting nut (Fig. 9), using Front Wheel Bearing Spanner T59T-1197-B for F-150—F-250, and Bronco or D78T-1197-A for F-350 and F-250 H.D.
5. Remove the brake caliper (refer to Section 12-24, Disc Brakes—Light and Heavy Duty—Sliding Caliper) and wire it to the frame to prevent damage to the brake hose. Do not let the caliper hang only by the brake hose to prevent damage to the hose or the caliper.
6. Remove the hub and disc assembly. The outer wheel bearing cone and roller assembly will slide out as the hub is removed (Fig. 10).
7. Remove the spindle retaining nuts, then carefully remove the spindle from the knuckle studs and axle shaft.
8. Clean all old grease from the needle bearings and the spindle bore seal.
9. Clean any old grease or dirt from these parts and replace if signs of excessive wear are noted.

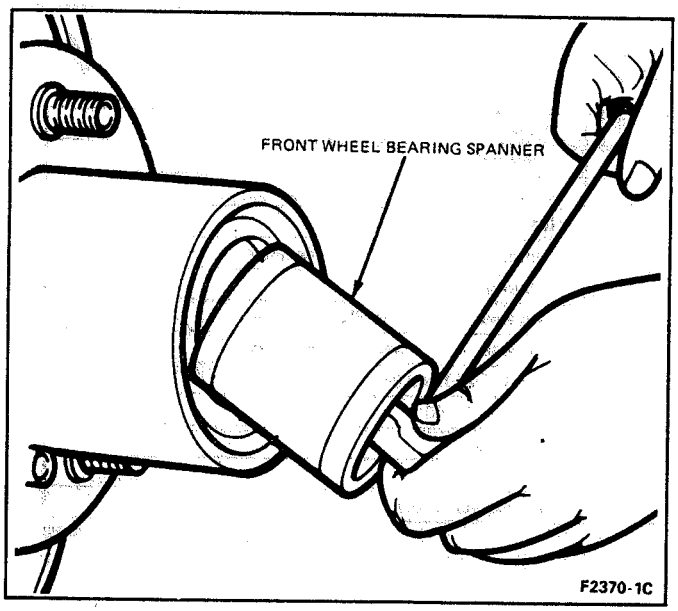

FIG. 9 Lock Nut, Lock Ring and Adjusting Nut Removal

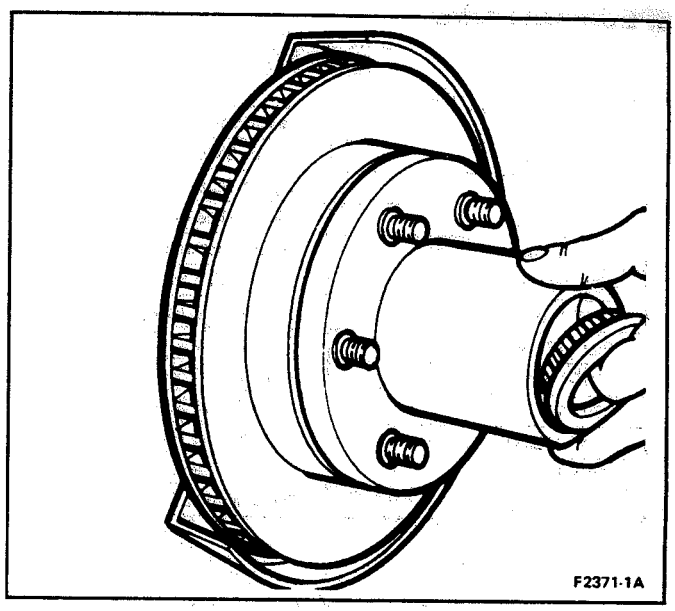

FIG. 10 Hub, Disc, and Outer Bearing Removal

10. Using Multi-Purpose Lubricant, C1AZ-19590-B Ford Specification ESA-M1C75-B or equivalent, thoroughly lubricate the needle bearing and pack the spindle face that mates with the spindle bore seal.
11. Assemble the spindle over the axle shaft onto the knuckle studs. On F-350, adjust the retaining nuts to 68-81 N·m (50-60 ft-lbs). On F-150—F-250 and Bronco, adjust the retaining nuts to 27-41 N·m (20-30 ft-lbs).
12. Remove the inner bearing cone and grease seal and bearing cups from the hub using Bearing Cup Puller, T77F-1102-A and Impact Slide Hammer, T50T-100-A.
13. Inspect the bearing cups for pits or cracks. If necessary, remove them with a drift. **If new cups are installed, install new cone and roller assemblies.**
14. Lubricate the bearings with Multi-Purpose Lubricant C1AZ-19590-B, Ford Specification, ESA-MIC75-B or equivalent. Clean all old grease from the hub. Pack the cones and rollers. If a bearing packer is not available, work as much lubricant as possible between the rollers and the cages.
15. Position the inner bearing cone and roller in the inner cup and install the grease seal.
16. Carefully position the hub and disc assembly on the spindle.
17. Install the outer bearing cone and roller, and the adjusting nut.
18. Adjust the wheel bearings as described in this Section under Adjustments.
19. Install tire and wheel as described in Section 11-02, Wheels and Tires.
20. Install the locking hubs as described in this Section under Removal and Installation.
21. Remove the safety stands and lower the vehicle.

SPECIFICATIONS

SPECIAL SERVICE TOOLS

Number	Description	Application
T50T-100-A	Impact Slide Hammer — 2-1/2 Lb.	Universal
T59L-100-B	Impact Slide Hammer — 2-1/2 Lb.	Universal
D79P-100-A	Impact Slide Hammer — 5 Lb.	Universal
T58L-101-A	Puller Attachment	Universal — Use with Slide Hammer
D80L-927-A	Wheel Hub Cap Remover	Universal
T77F-1102-A	Bearing Cup Puller	Universal — Use with Slide Hammer
Tool 1175-AC	Seal Remover	Universal — Use with Slide Hammer
T59T-1197-B	Front Wheel Bearing Spanner	F-150, F-250 and Bronco
D78T-1197-A	Front Wheel Bearing Spanner	F-250 — F-350
D78P-1225-B	Bearing Cup Puller	Universal
D79T-4000-A	Outside Thread Chaser	Universal
T-80T-4000-W	Driver Handle	Bearing Installation

CE4329-2C

WHEEL TORQUE SPECIFICATIONS

Vehicle	Wheel	Bolt Size	Torque①	
			N·m	Ft-Lbs
E-150, F-150, Bronco	5-Lug Wheel	1/2-20	115-156	85-115
E-250, F-250 (under 8,500 GVW)	8-Lug Wheel	1/2-20	115-156	85-115
E-250, E-350, F-250 (over 8,500 GVW) F-350 — Single Rear Wheel Vehicles	8-Lug Wheel	9/16-18	156-237	115-175
E-350, F-350 — Dual Rear Wheel Vehicles With Integral Two-Piece Swiveling Lug Nuts	8-Lug Wheel	9/16-18	169-210	125-155

①Torque specifications are for clean, dirt-and-paint-free dry bolt and nut threads.

CF3943-2A

Wheel Hubs and Bearings — Rear (Full Floating Axle)

SECTION 11-14

APPLIES TO HD F-250 — F-350, HD E-250 — E-350 DRW

DESCRIPTION

On all full-floating rear axle wheel hubs with tapered roller bearings, HD F-250—F-350 and HD E-250—E-350, a seal is installed behind the inner bearing to keep the wheel bearing lubricant from the brake lining and brake drum (Figs. 1 and 2).

The wheel bearings are packed with a lithium base grease, Multi-Purpose Lubricant Ford Specification C1AZ-19590-B (ESA-M1C75-B) or equivalent to provide initial lubrication until axle lubricant flows into the wheel hubs and bearings during vehicle operation. On these axles the wheel hub is vented through the axle housing vent.

Vehicles equipped with dual wheel rear axles have the wheel and tire assembly attached to the drum with integral two-piece swiveling lug nuts.

WARNING: DO NOT ATTEMPT TO USE PAST MODEL LUG NUTS (CONE SHAPED, ONE-PIECE) TO REPLACE THE INTEGRAL TWO-PIECE SWIVELING LUG NUTS. IF SO USED, PAST MODEL LUG NUTS CAN COME LOOSE IN VEHICLE OPERATION. DO NOT ATTEMPT TO USE PAST MODEL WHEELS, WHICH HAVE CONE SHAPED LUG NUT SEATS, ON THIS VEHICLE. DO NOT ATTEMPT TO USE THE NEW DESIGN WHEELS AND LUG NUTS ON PAST MODEL WHEEL HUBS. ATTEMPTED USE OF INTERMIXED WHEELS CAN LEAD TO DAMAGE TO THE WHEEL MOUNTING SYSTEM AND COULD RESULT IN WHEELS COMING LOOSE IN OPERATION.

ADJUSTMENTS

For rear wheel bearing adjustments refer to bearings, cups and seals under Disassembly and Assembly in this Section.

DISASSEMBLY AND ASSEMBLY

Bearings, Cups and Seals

HD F-250—F-350, HD E-250—E-350

Vehicles equipped with dual wheel rear axles have the wheel and tire assembly attached to the drum with integral two-piece swiveling lug nuts.

WARNING: DO NOT ATTEMPT TO USE PAST MODEL LUG NUTS (CONE SHAPED, ONE-PIECE) TO REPLACE THE INTEGRAL TWO-PIECE SWIVELING LUG NUTS. IF SO USED, PAST MODEL LUG NUTS CAN COME LOOSE IN VEHICLE OPERATION. DO NOT ATTEMPT TO USE PAST MODEL WHEELS, WHICH HAVE CONE SHAPED LUG NUT SEATS, ON THIS VEHICLE. DO NOT ATTEMPT TO USE THE NEW DESIGN WHEELS AND LUG NUTS ON PAST MODEL WHEEL HUBS. ATTEMPTED USE OF INTERMIXED WHEELS CAN LEAD TO DAMAGE TO THE WHEEL MOUNTING SYSTEM AND COULD RESULT IN WHEELS COMING LOOSE IN OPERATION.

1. Set the parking brake and loosen the axle shaft attaching bolts (Fig. 1).
2. Raise the rear wheels off the floor and place safety stands under the rear axle housing so that the axle is parallel with the floor. Release parking brake and back off the rear brake adjustment, if necessary.
3. Remove the axle shaft attaching bolts and lock washers and discard them.
4. Remove the axle shaft and discard the gasket.
5. **Do not remove or even turn the wheel bearing adjusting nut until the locking wedge is removed. Pry out with a screwdriver.**
6. Using a heavy duty dolly such as the Rotunda model 014-00030 or equivalent as shown in Fig. 3, raise the wheel to the point that all weight is removed from the wheel bearings.
7. Remove the wheel bearing adjusting nut.
8. Remove the outer bearing cone, pull the wheel assembly straight out and away from the axle.
9. Thoroughly clean the spindle of the axle housing.
10. With a brass drift, drive the inner bearing cone and inner seal out of the wheel hub. Use extra care to prevent damage to the bearing cage.
11. Clean all old grease and axle lubricant out of the wheel hub.
12. Inspect the bearing races and rollers for pitting, galling or erratic wear patterns. Inspect the rollers for end wear. Replace the bearings if worn or damaged (Fig. 4).
13. If the bearing cups are to be replaced, drive them out with a brass drift. Install the new cups with special tool Bearing Cup Replacer T75T-1225-A & B (Fig. 5).
14. Check for proper seating of the new bearing cups by trying to insert a 0.038 mm (0.0015 inch) feeler gauge between the cups and the wheel hub. The gauge should not enter beneath the cup. Check several places to make sure that the cups are squarely seated.
15. Pack each bearing cone and roller assembly with a bearing packing tool, using a lithium base grease,

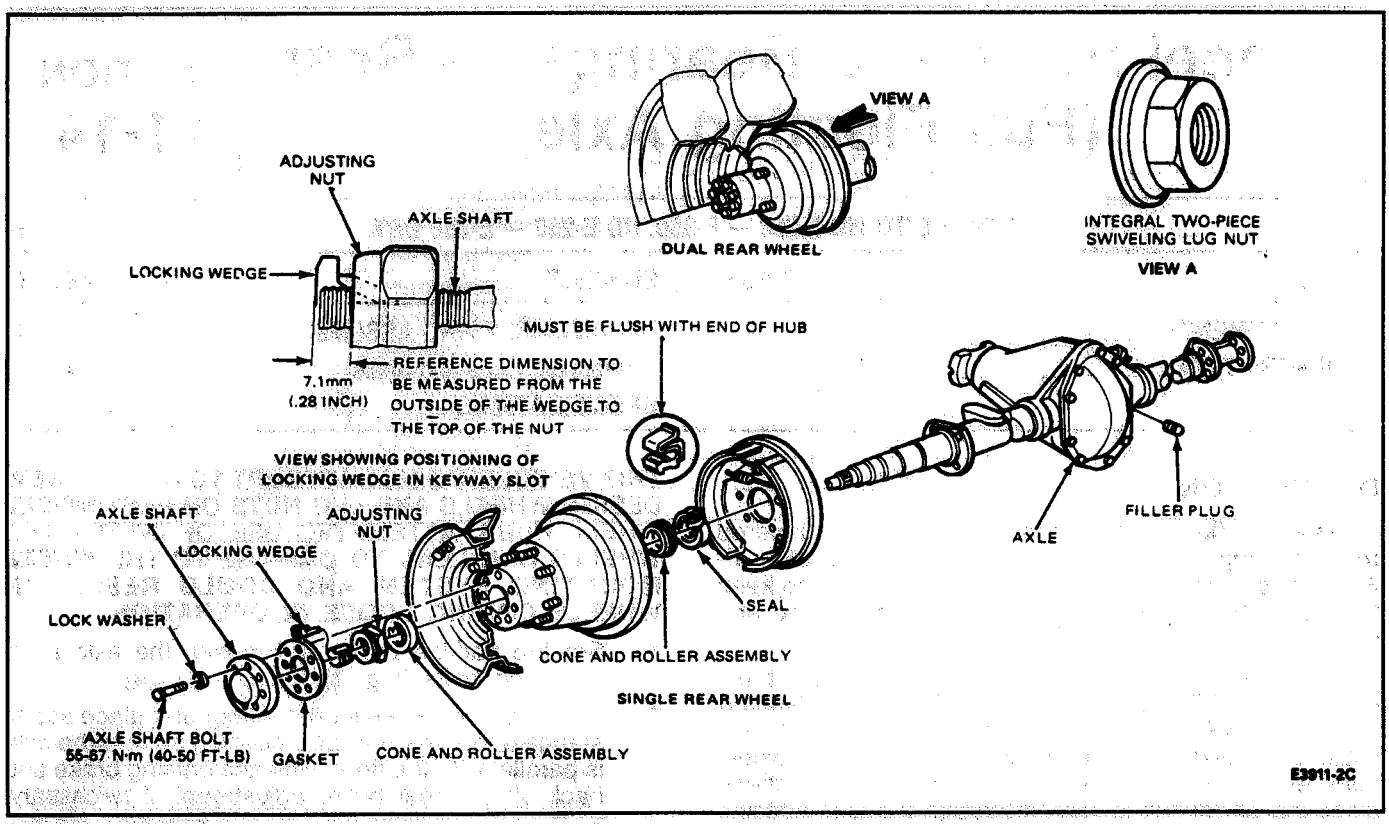

FIG. 1 Rear Wheel Hub—Dana Full-Floating Axle HD F-250—F-350, HD E-250—E-350

Multi-Purpose Long-Life Lubricant, C1AZ-19590-B (ESA-M1C75-B) or equivalent.

16. Place the inner bearing cone and roller assembly in the wheel hub, (Fig. 5). Install a new hub inner seal with tool T75T-1175-B.
17. Position the wheel assembly at the axle housing. Wrap the threads of the spindle with electricians tape. **Carefully slide the wheel assembly straight (to avoid seal damage) onto the axle housing spindle.** Remove the electricians tape.
18. Install the outer wheel bearing and start the bearing adjuster nut. Remove the wheel jack.
19. While rotating the wheel, tighten the adjusting nut to 163-189 N·m (120-140 ft. lb.) using special tool Hex Locknut Wrench T70T-4252-D or Octal Locknut Wrench T70T-4252-E. Back off the adjusting nut enough to get a 0.025-0.254 mm (0.001-0.010 inch) end play. This should require 1/8 to 3/8 turn. Position the locking wedge in the key way slot and pound wedge into position (Fig. 6).

    The locking wedge and the adjusting nut can be used over again, provided the locking wedge cuts a new groove in the nylon retainer material within the 1/8 to 3/8 turn specified. The wedge must not be pressed into a previously cut groove.

    NOTE: If it is not possible to back the nut off within the limits of 1/8-3/8, turn to obtain proper assembly (0.025-0.254 mm or 0.001-0.010 inch end play and the wedge into solid uncut nylon). Discard the nut and wedge and replace with the new ones. Discard the nut and/or wedge if there is any evidence of mutilation, damage and/or scoring.
20. Prior to reinstallation of the axle shaft, clean and remove any metallic debris in the hub bolt holes. Also inspect for cracked material around the holes, depth of the threaded hole (minimum 25.4 mm or 1 inch) and oversized threaded holes, and replace hub if any of these conditions are present. Install the axle shaft and new axle flange gasket, lock washers and new axle shaft retaining bolts. Tighten the lock bolts, 55-67 N·m (40-50 ft. lb.).
21. Adjust the brakes.
22. Remove the safety stands and lower the vehicle.

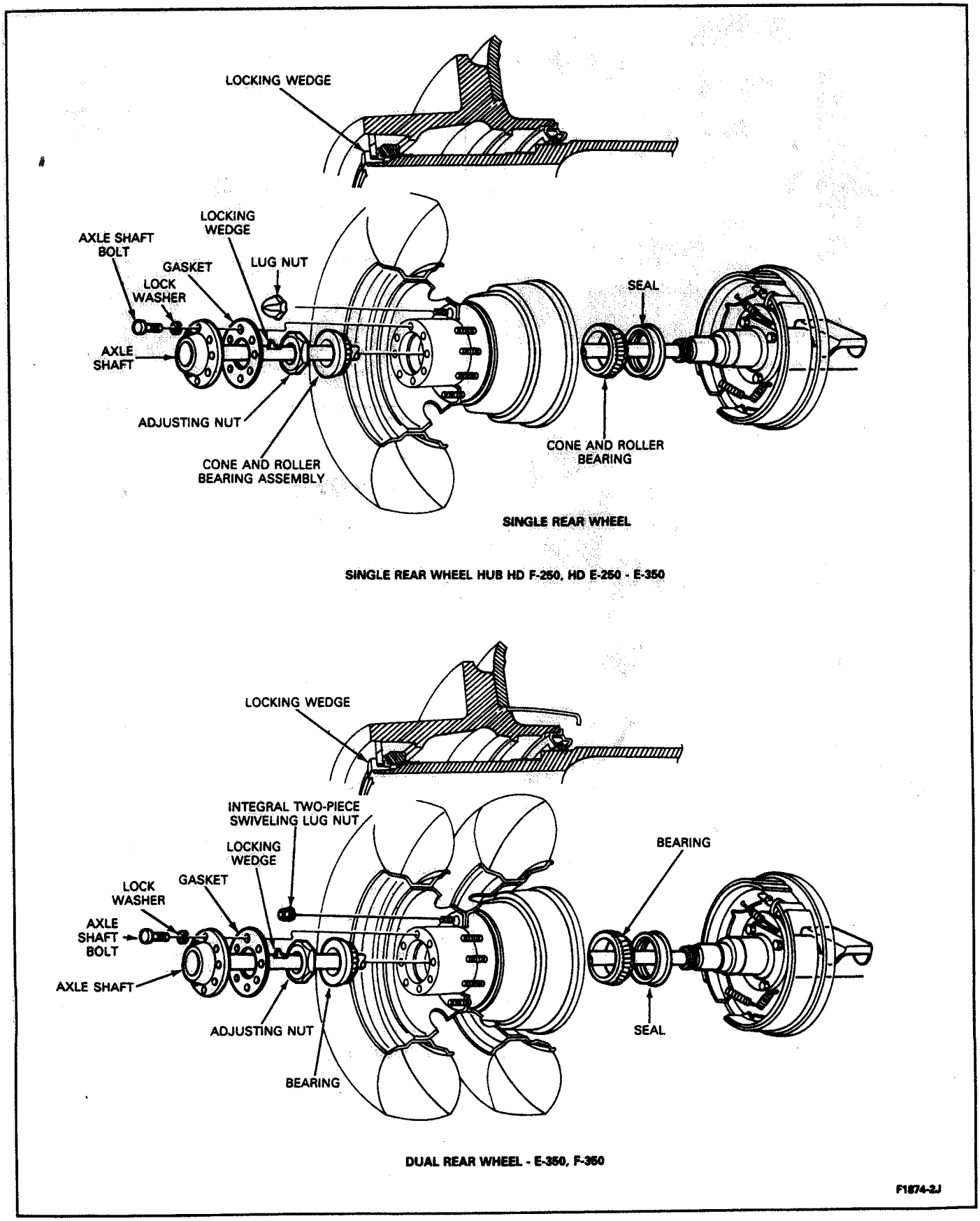

FIG. 2 Rear Wheel Hub—Dana Floating Axle—HD F-250—F-350, HD E-250—E-350

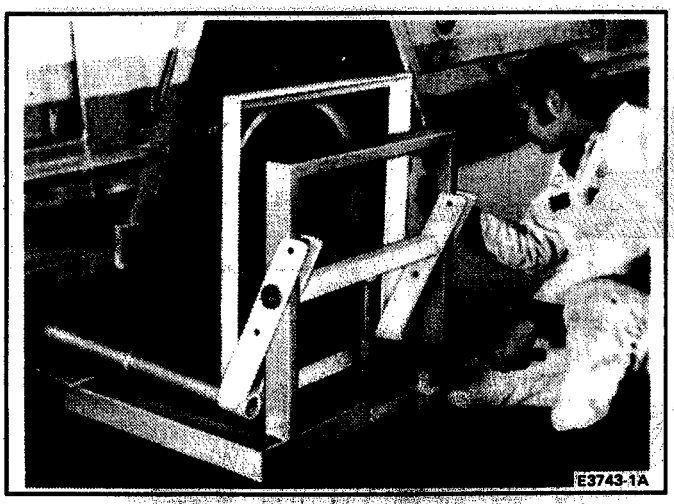

FIG. 3 Heavy Duty Wheel Dolly

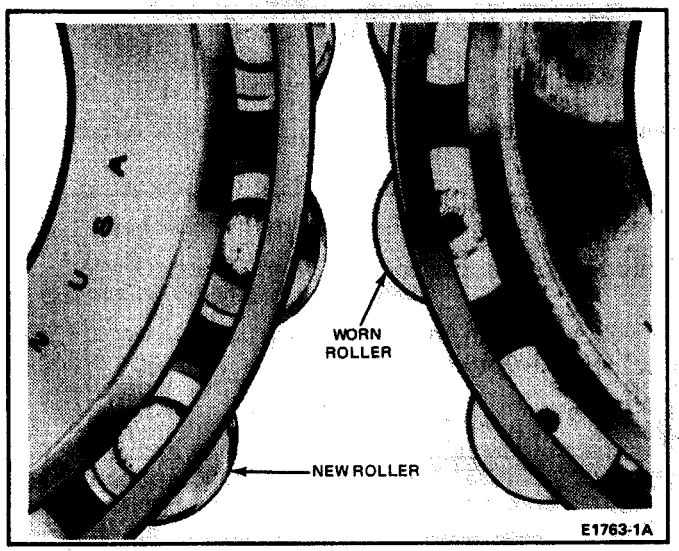

FIG. 4 Roller Bearing End Wear

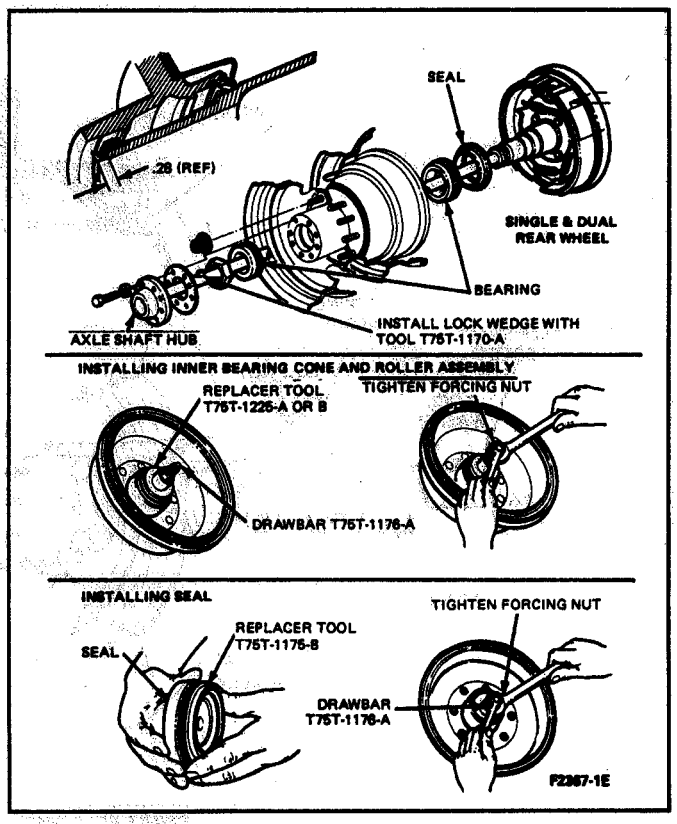

FIG. 5 Installation of Rear Wheel Bearings and Seal

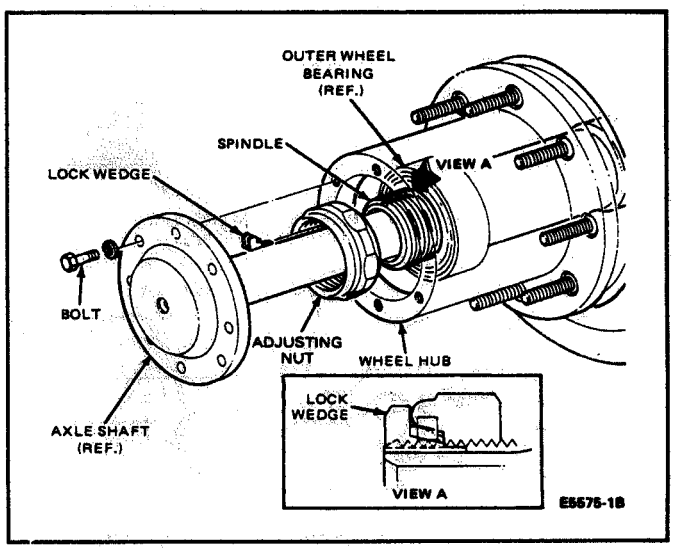

FIG. 6 Positioning Locking Wedge—E-350 and F-350

SPECIFICATIONS

SPECIAL SERVICE TOOLS

Number	Description	Application
T50T-100-A	Impact Slide Hammer — 2-1/2 Lb.	Universal
T59L-100-B	Impact Slide Hammer — 2-1/2 Lb.	Universal
D79P-100-A	Impact Slide Hammer — 5 Lb.	Universal
T58L-101-A	Puller Attachment	Universal — Use with Slide Hammer
T77F-1102-A	Bearing Cup Puller	Universal — Use with Slide Hammer
Tool-1175-AC	Seal Remover	Universal
T75T-1175-A	Seal Replacer	Use with Threaded Drawbar
T75T-1175-B	Seal Replacer	Use with Threaded Drawbar
T75T-1176-A	Threaded Drawbar	—
T73T-1202-A	Bearing Cup Replacer	Use with Driver Handle
T75T-1225-A	Bearing Cup Replacer	Use with Threaded Drawbar
T75T-1225-B	Bearing Cup Replacer	Use with Threaded Drawbar
T76T-1225-C	Bearing Cup Replacer	E-350 with DRW
D79T-4000-B	Outside Thread Chaser	Universal
T80T-4000-W	Driver Handle	Bearing Installation
T70T-4252-D	2-9/16" Hex Locknut Wrench	—
T70T-4252-E	2-9/16" Octal Locknut Wrench	—

CE4331-2D

ROTUNDA EQUIPMENT

Number	Description
014-00030	Heavy Duty Wheel Dolly

CF3417-1B

WHEEL TORQUE SPECIFICATIONS — FULL FLOAT REAR AXLES

Vehicle	Wheel	Bolt Size	Torque①	
			N·m	Ft-Lbs
E-250, E-350, F-250 (over 8,500 GVW) F-350 — Single Rear Wheel Vehicles	8-Lug Wheel	9/16-18	156-237	115-175
E-350, F-350 — Dual Rear Wheel Vehicles With Integral Two-Piece Swiveling Lug Nuts	8-Lug Wheel	9/16-18	169-210	125-155

①Torque specifications are for clean, dirt-and-paint-free dry bolt and nut threads.

CE5841-2A