

MC-9 MAINTENANCE MANUAL

SECTION 15

WHEELS HUBS AND TIRES

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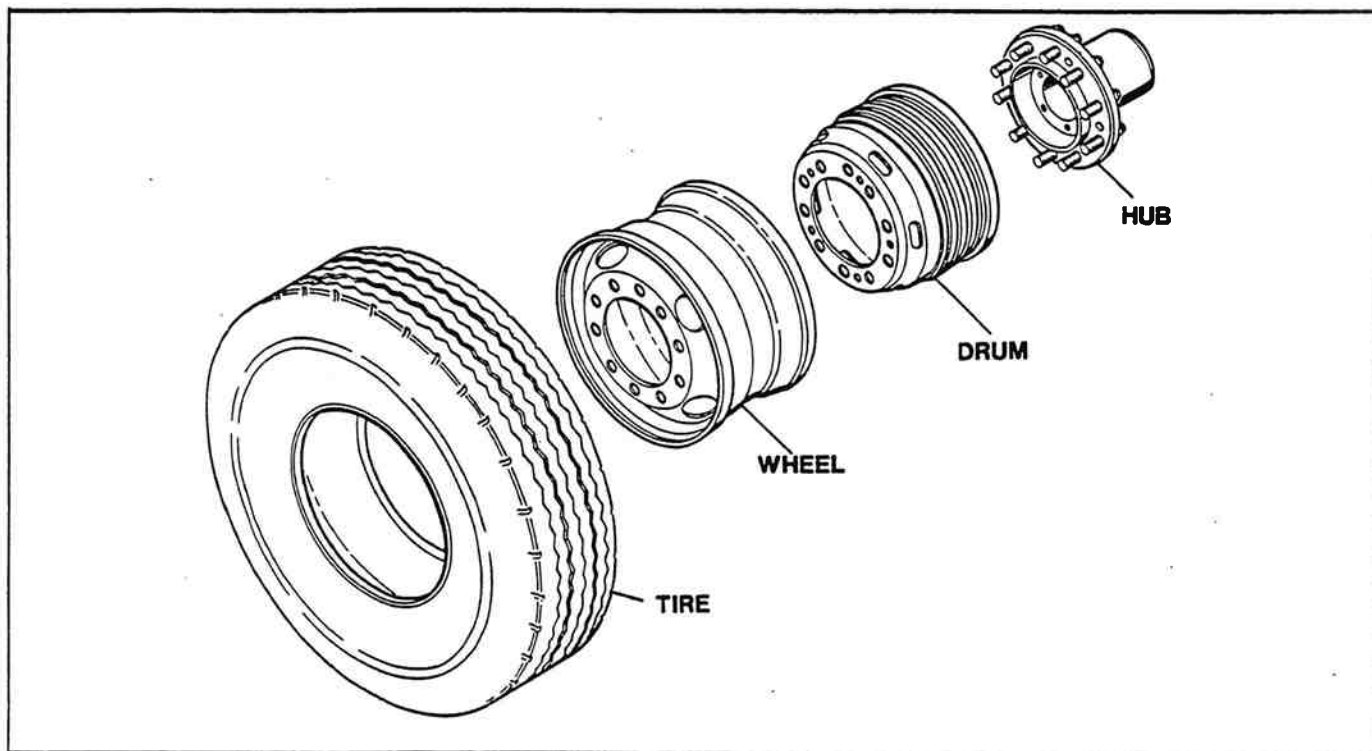


Figure 15-1. Tire, Wheel, Drum and Hub.

WHEELS, HUBS AND TIRES

Wheels supplied on the coach vary according to the specifications of the user. They are of standard type and manufacture and may have either 2-piece or 3-piece rims. Either tube type or tubeless tires may be used.

Standard wheels are 22.50 x 8.25" (571.5 x 209.5 mm) for tires of the following sizes: 12.00" x 22.50" (304.8 x 571.5 mm), 12.5" x 22.5" (317.5 x 571.5 mm) or 12.75R x 22.5 (323.9 x 571.5 mm). See figure 15-1.

The spare wheel and tire are carried in a compartment immediately behind the front bumper. Access is gained by releasing retaining locks located directly beneath the bumper, then pulling bumper out and up. Bumper will lock in the open position. Make sure that both bumper locks are firmly in place after closing compartment door.

WHEEL MAINTENANCE

Maintenance consists of periodic checks to see that wheel nuts are tightened to the proper torque. With a new coach, or after new wheels have been installed, stud nuts should be tightened every 100 miles (161 km) for the first 500 miles (805 km) to allow setting in of clamping surfaces.

Standard equipment consists of stud-mounted wheels; hub-mounted wheels are optional.

Stud-mounted wheels rely on the cone-shaped wheel nuts to hold the wheel on the hub in the proper location. After July '85, all 96/102 series coaches have, on the front axles, five cone-shaped wheel nuts and five flanged wheel nuts, installed alternately. Rear and trailing wheels have only the cone-shaped wheel nuts.

When installing front wheels (stud-mounted) always install and tighten the cone-shaped wheel nuts first to properly center the wheel. Tighten the nuts progressively, on alternate sides of the wheel. Final tightening should be with a torque wrench to 450-500 lb-ft (610-678 Nm) torque. The torque requirement is for both the cone-shaped and the flanged wheel nuts.

CAUTION: Do not intermix stud-mount nuts with nuts used on hub-mounted wheels. Stud-mounted wheels must be installed with cone-shaped and flanged stud nuts. Rear and trailing axle stud-mounted wheels must be installed with the cone-shaped stud nuts.

Hub-mounted wheels (optional equipment) are mounted with a close tolerance fit of the wheel over the axle hub flange.

The nuts used with hub-mounted wheels are flat. Cone-shaped or flanged nuts are not used with hub-mounted wheels. The nuts are to be tightened progressively on alternate sides of the wheel. Final tightening should be with a torque wrench to 450-500 lb-ft (610-678 Nm) torque.

CAUTION: Do not intermix stud nuts for hub-mounted wheels with those intended for use with stud-mounted wheels. Do not use stud-mount wheels in place of hub-mount wheels. Do not adapt either type of wheel for a different mounting.

Wheel studs and nuts must be kept free from grease and oil. No lubricant should be used, except for the cap nut condition described below.

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Corrosion or galling of the stud and nut assembly can reach a point where removal of cap nuts is difficult. If this is a persistent problem, a light application of lubricant can be applied on the first three threads of the stud and the first three threads of the inner cap nut. Care should be taken to keep all lubricant from ball seat of stud hole or ball faces of cap nuts.

In case of a broken, cracked or worn hub face, it should be replaced. A badly worn hub face is always caused by running wheel assemblies in a loose condition. If the wear is not too excessive, the entire hub face can be machined to a flat surface with the studs removed. Otherwise, with a badly out-of-flat or worn condition, the hub should be replaced.

When mounting rear dual wheels, care should be taken to position the tire valve stems 180° apart so that access to both inner and outer tire valves may be obtained (figure 15-2).

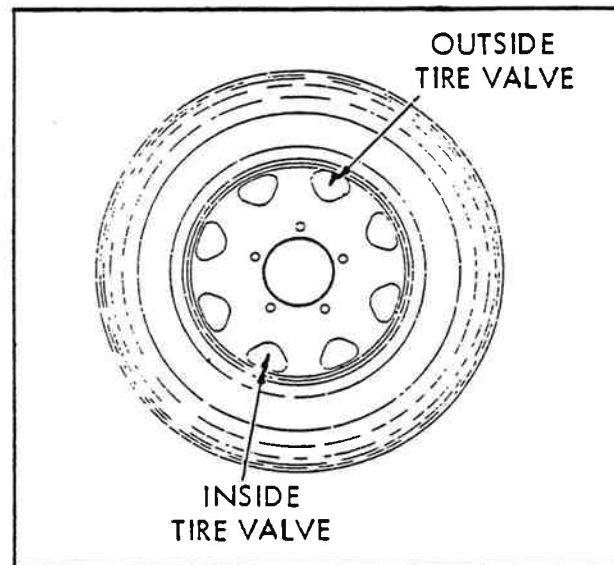


Figure 15-2. Proper Tire Valve Position.

CHANGING WHEELS

Whenever it is necessary to change a wheel when a flat tire occurs, the following procedures should be followed:

FRONT AXLE:

1. Turn front wheels to extreme right or left, depending on which tire is flat, so that the front of the flat tire is turned outward.
2. Run flat tire up on runup block. (Refer to figure 15-3.) Run up block is supplied in the coach tool compartment.
3. Apply parking brakes.
4. Place jack under front jack pad and raise coach.
5. Remove run-up block and proceed to change wheel.
6. Lower jack and remove from under jack pad.

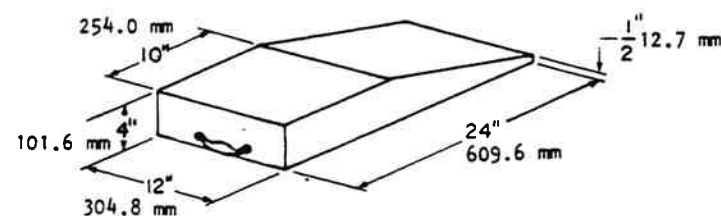


Figure 15-3. Run-up Block.

REAR DRIVE OUTSIDE DUAL:

1. Place wooden run-up block at inside tire.
2. Drive coach onto block to raise outside dual off ground.
3. Fully apply parking brakes.
4. Proceed to change wheel.

REAR DRIVE INSIDE DUAL:

1. Fully apply parking brakes.
2. Position jack under rear jack pad.
3. Jack up axle and proceed to change wheel.

REAR TRAILING WHEEL

1. Release air pressure from bellows by turning the air release valve towards the rear of the coach until air is released from bellows.
2. Position jack under jack pad and jack up flat tire.
3. Change the wheel.

NOTE: If no spare wheel is available for the rear trailing axle, the wheel should be raised and removed from axle. The hold-up link should be installed to hold up the axle. Reduce road speed to a minimum with trailing axle in raised position.

It is important that wheel stud nuts be tightened alternately on opposite sides of wheel. Refer to figure 15-4 for suggested sequence for tightening and follow this recommended procedure:

1. Run the stud nuts in lightly referring to figure 15-4 for sequence so that wheel will position itself concentrically with hub. This is important; otherwise, wheel may be eccentric with hub and will not run straight. In this initial step, run the nuts up only as necessary to correctly position the wheel.
2. Tighten stud nuts progressively as shown in figure 15-4 with an impact wrench.
3. Tighten stud nuts to 450-500 ft. lbs. (610-678 Nm) torque.

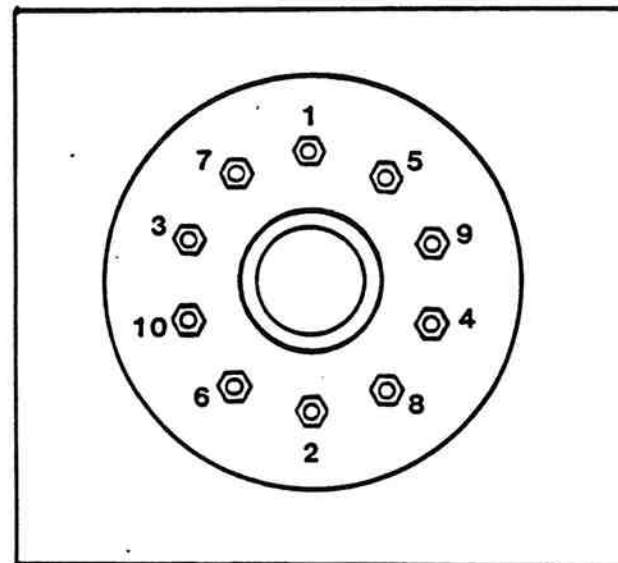


Figure 15-4. Stud Nut Tightening Sequence.

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TIRES

MAINTENANCE

The correct maintenance procedure is essential to safe and economical tire service. Daily, inspect each tire carefully for cuts or foreign matter such as nails, glass, etc. Remove any foreign matter lodged between tires and dual wheels.

Check tire inflation pressure (figure 15-5) with an accurate gauge. Pressure should be checked before starting a run and should be as recommended by tire manufacturer. Always use the same gauge to check the pressure to eliminate any differences resulting from gauge error.

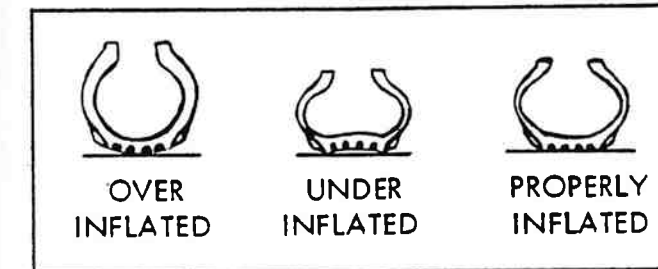


Figure 15-5. Tire Inflation.

If pressure loss is greater than normal, remove and inspect tire to determine cause. Replace any missing valve caps.

NOTE: Tire pressure should be checked with pressure cold.

The valve core is a spring loaded check valve in the stem permitting inflation or deflation of the tire. The valve is provided to seal the air in the tire. When the valve cap is tightened on the stem, the sealing washer inside the cap is pressed tightly against the top of the stem, preventing air leakage.

REPLACEMENT

When tires are changed, especially to the new low profile tires now available, clearances and revolutions per mile may be affected. Before making changes to tires with different specifications, ensure that the replacement tires have adequate clearances and that the revolutions per mile are not seriously affected. Customers who have already changed to replacement tires, especially to low profile tires, should check to ensure that the tires are not rubbing and that the revolutions per mile have not affected the speedometer reading.

INFLATION

Improper inflation is the greatest cause of accelerated tire wear. Tires should be checked frequently for this condition. Unless correct air pressure is consistently maintained, tires will not function as they should; consequently, safe, economical operation of the coach will be affected.

An under-inflated tire runs sluggishly, heats up quickly because of greater flexing, and is subjected to more frequent bruising. Over-inflation does not compensate for over-loading. It does not add strength to the tire; in fact, it actually weakens the tire by reducing its ability to absorb road shock, and may cause a blow-out.

In addition to the effect improperly inflated tires may have on tire life, improperly inflated tires will degrade steering, riding comfort, and safe driving.

All tires on the same axle should always carry the same air pressure. A difference in air pressure between rear tires and front tires may be permissible within certain limitations; however, there should not be a difference in pressures between the right and left tires on the same axle. A 5 psi (34.5 kPa) under-inflation in one front tire not only can cause hard steering, but can create steering hazards which may cause unsafe operation. An under-inflated rear tire can seriously affect braking. Balance tire pressures for ease of steering, comfort in riding, safety in driving, as well as for minimum fuel consumption and maximum tire mileage.

NOTE: Before rotating tires, consult the tire manufacturer. They are the source for directions relating to specific tires.

ROTATION

Radial tires should be rotated only when necessary. If the tires are wearing evenly, there is no need to rotate. If irregular wear becomes apparent, or if the wear rate on the tires is perceptively uneven, the tires should be rotated in such a manner to alleviate the problem. There is no restriction on criss-cross rotation.

Bias-ply tires should be interchanged at regular intervals to obtain maximum life. Change wheels without dismounting tires so direction of rotation will be reversed. The following system of interchanging is recommended: Right front to left rear inside or right rear outside. Left front to right rear inside or left rear outside.

If inside dual tires show more wear than outside dual tires, place front tires on inside when changing. In this case, outside dual tires can be interchanged between right and left side of vehicle.

If outside dual tires show more wear than inside dual tires, place front tires on outside dual tires when changing. At the same time, interchange right and left hand inside dual tires.

New tires should be installed on front wheels where they run coolest. Baggage should always be placed as far to the rear as possible. This puts the load on the rear axle and reduces front tire stress.

SAFETY PRECAUTIONS

WARNING: Exercise care when handling wheels and tires. Careful attention to the following suggestions will prevent injury. Make it a rule to respect the explosive force contained in an inflated tire.

Refer to figure 15-6.

1. Prepare for any tire repair operation in a proper way. In servicing tires be careful not to drop them on the feet, hands or body, or heavily on the floor. Practice proper methods of lifting. When carrying tires or wheels avoid oil and objects on the floor. Keep floor clean and dry.

2. Deflating a tire properly is very important. First reduce pressure as much as possible by pushing the valve core plunger. Keep your eyes away from valve. Remove valve core to ensure complete deflation. Wear approved safety glasses or goggles when using compressed air.

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3. Demounting tires from wheels requires special care. Tires on drop center rims are best handled on a wheel holder, or tire changing machine. This will prevent cuts on hands and wrists and will make it unnecessary to use a mallet for seating the tire. Use only standard tire mounting tools and equipment. Use of makeshift tools, screwdrivers, or pliers to force tires on or off rims or wheels is dangerous.

4. Use special care when using tire irons. Grip them firmly and keep them free of oil and grease. They can slip and fly with tremendous force.

5. After removal, a careful inspection of the tire should be made and all necessary repairs performed. A tire spreader is helpful but use care when working around it. Keep spreader arms closed when machine is idle.

6. Inspect wheel parts carefully for rust, damage, or distortion. Never use wheels which are out of shape, rusted, cracked

or broken in any way. Never use a ring or other rim parts of different manufacture than the original rims or any different size or type. Tires or rims often require a buffing operation before mounting after repairs are made. Always wear safety glasses or a face shield when buffing tires or rims.

7. Avoid hammering on wheels with steel hammers. Small bits of steel may break off hammer or rim and fly into eyes, face, or body. Use rubber covered, steel-headed hammers whenever possible.

8. Stand away from valve stem as far as possible when inflating tires. Avoid a position where the face or body is immediately over the work being done on any tire in which there is pressure. Use only accurate, tested gauges to insure proper air pressure.

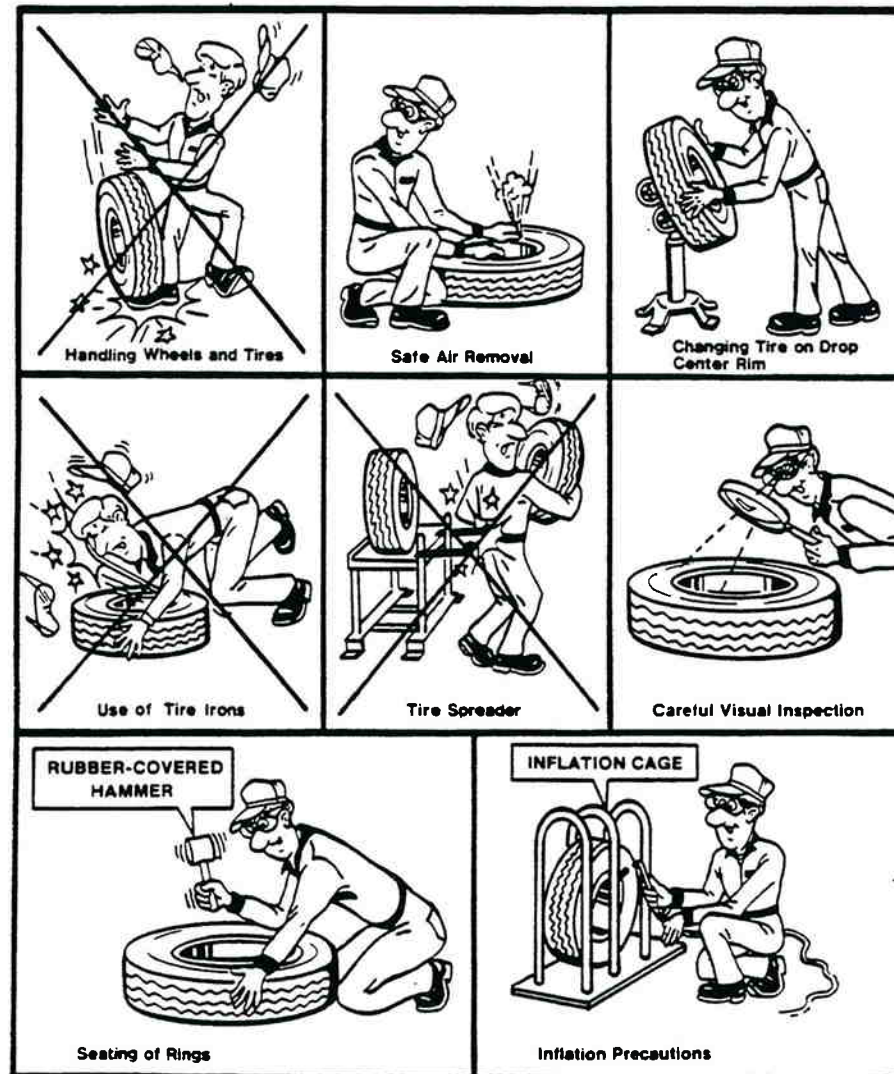


Figure 15-6. Safety Precautions.

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MANUAL DEMOUNTING AND MOUNTING OF TIRES

NOTE: This procedure applies to tires on both demountable rims and disc wheels. **Tools required:** 2 tubeless tire tools, 1 pair vise-grip pliers, lubricant and brush.

CAUTION: Avoid the use of any lubricant containing water, or any solvent injurious to rubber.

DEMOUNTING

1. Deflate tire.
2. With tire lying flat, loosen both beads by walking on tire with heels close to rim.
3. With wide side of rim down, lubricate top bead.
4. With stops toward rim, insert spoon ends of both tools about 10" (254 mm) apart.
5. Holding bead in well with foot, pull one tool toward center of rim. See figure 15-7.



Figure 15-7. Pulling First Tool Toward Center.

6. Hold tool in position with one foot and pull second tool toward center of rim. Progressively work bead off rim, taking additional bites as necessary (figure 15-8).
7. Stand assembly in vertical position. Lubricate second bead.



Figure 15-8. Second Tool Toward Center.

8. At top of assembly insert straight end of tool between bead and back flange of rim at about a 45° angle. Turn tool so that it is perpendicular to rim. Pry second bead off. See figure 15-9.



Figure 15-9. Prying Off Second Bead.

MOUNTING

1. Be sure correct valve is used and is properly installed in the rim. Inspect rim to insure bead seats are clean and smooth.
2. Place rim on floor with side down and lubricate first bead of tire and upper bead seat of rim (figure 15-10).



Figure 15-10. Applying Lubricant.

3. Push first bead into well of rim and onto rim as far as possible.
4. Using straight end of tool (with stop resting on rim flange), take small bites to work remaining section of first bead on to rim. Refer to figure 15-11.



Figure 15-11. Installing First Bead On Rim.

5. Hold second bead in well by standing on tire and anchor with vise-grip pliers (snub side toward tire).

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Figure 15-12. Installing Second Bead.

6. Using spoon end of tire tool with stop toward rim, take small bites until bead slips over flange. If necessary, insert second tire tool and lubricate last 6" (152 mm) of bead before completely mounting (figure 15-12). Inflate tire to recommended pressure. Examine valve assembly occasionally to avoid leaks.

SAFETY PRECAUTION

Use only rims free from damage, rust or pitting.

FRONT AND TRAILING WHEELS

Front wheel and trailing wheel hubs use oil lubrication which eliminates periodic repacking of the hubs. A sight glass is provided for convenient check of oil level which should be checked daily; if not visible in the sight gauge level mark, sufficient SAE 30 engine oil should be added through the composition snap plug at the center of the hub cap to bring level to the correct point.

BEARING ADJUSTMENT

To adjust the wheel bearings:

1. Remove capscrews, lockwashers, hub cap, and gasket.

2. Flatten lock nut retainer and remove lock nut, and lock nut ring.
3. Before bearing adjustment is made, brakes must be released and must not drag.
4. Check bearing play by jacking up the wheels one at a time and observing bearing play using a long bar under the tire.
5. Observe movement of brake drum in relation to brake spider. If bearings are adjusted properly, movement of the drum will be just perceptible and the wheel will turn freely.
6. Tighten adjusting nut to 150 lb-ft (203 Nm) torque while at the same time rotating the wheel in both directions to make sure all surfaces are in proper contact.
7. Back off adjusting nut about ¼ turn to make sure the wheel turns freely.
8. Replace lock ring with valve pin in adjusting nut inserted in the hole of the ring.
9. Install nut lock, lock ring, lock nut and tighten to 100-150 lb. ft. (136-203 Nm) torque.
10. Recheck bearing adjustment and repeat the above steps if necessary.
11. Bend lips of nut lock over flats of lock nut.
12. Replace gasket and hub cap using new gasket and lockwashers.

DISASSEMBLY AND INSPECTION

1. If bearings are to be removed, jack up vehicle and remove wheel.
 2. Remove brake drum-to-hub retaining screws and remove brake drum. See figure 15-13.
 3. Remove hub cap and gasket.
 4. Remove lock nut, nut lock, lock ring and bearing adjusting nut.
 5. Pull hub assembly off spindle, being careful not to let the bearing fall out of hub. The oil seal and bearings can now be removed from the hub.
- All parts should be thoroughly cleaned. Bearing cone and roller assemblies can be cleaned in a suitable cleaning solvent using a stiff brush to remove old lubricant.

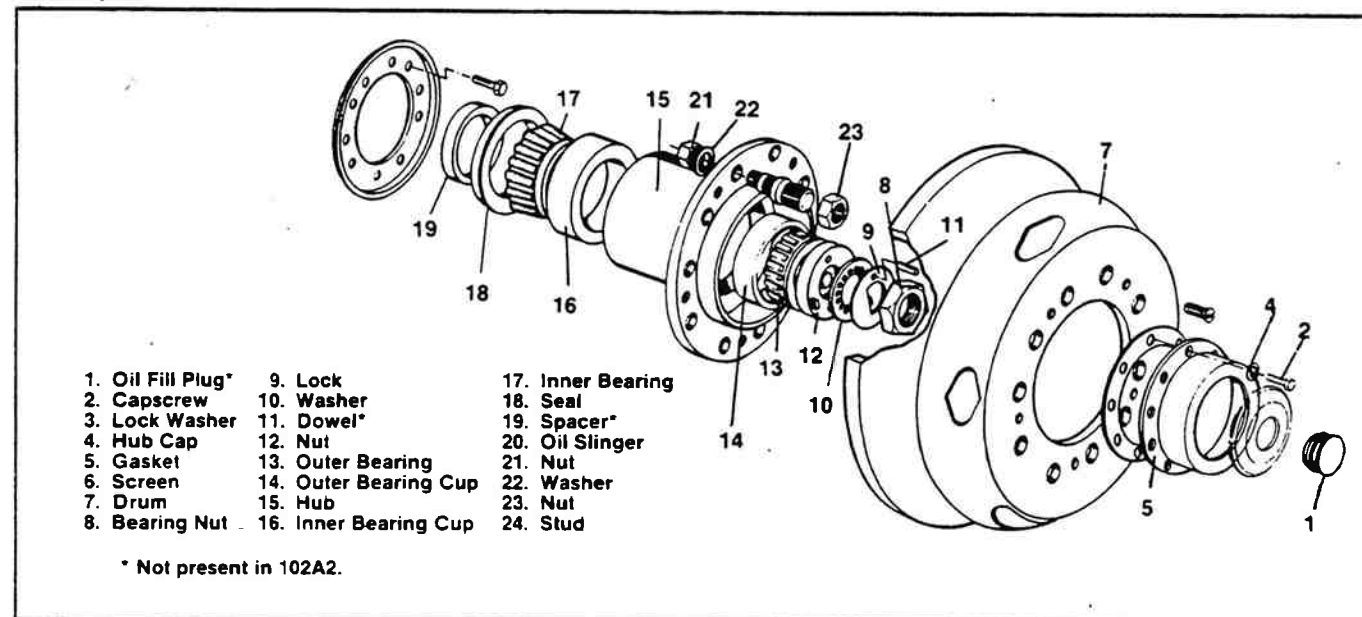


Figure 15-13. Front and Trailing Hub and Drum.

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If excessive wear, deterioration, cracking, scoring or pitting are present on the bearing cups, rollers or cones, the bearings should be replaced. Seals should be inspected for wear, deterioration, distortion, or damage at the sealing surfaces. Defective seal assemblies should be replaced.

Installation is the reverse of disassembly. Refer to Oil Seals, Front Wheels and Trailing Wheels, for oil seal installation. Bearings must be adjusted as explained in previous procedure.

DRIVE WHEELS

Drive wheels use a single oil-seal assembly and are lubricated from the supply of oil in the differential housing. Bearings are tapered roller, adjustable for wear.

The hubs require no periodic checking of lubricant level, provided correct level is maintained in the differential housing.

BEARING ADJUSTMENT

To adjust the drive wheel bearings, proceed as follows:

1. Jack up the rear of the coach after blocking the front wheels to prevent rolling.
2. Remove the plug from the bottom of the axle housing and drain the lubricant.
3. Remove the axle shaft drive stud nuts and lock washers. See figure 15-14.
4. Using a heavy steel hammer or drift, sharply rap the axle shaft flange in the center to free the tapered dowels.

5. Remove the dowels.

CAUTION: Do not pry the axle shaft free. To do so will damage the hub and oil seals.

6. Remove the axle shaft.
7. Remove and discard the axle shaft gasket.
8. Remove the outer bearing lock nut and washer.
9. While rotating the wheel, tighten the adjusting nut until the wheel binds. This assures proper contact of all bearing contact surfaces.
10. Back off the adjusting nut approximately ½ turn and check that the wheel turns freely.
11. Replace the washer, positioning locking tab in groove of axle beam.
12. Install lock nut, tighten to 100-125 ft. lbs. (136-170 Nm) torque.
13. Rotate wheel to check bearing adjustment. Wheel must rotate freely without any end play.
14. Install axle shaft and new gasket. Take care to properly mate shaft splines in drive gear of differential.
15. Insert the tapered dowels into the shaft flange and hub.
16. Install the stud nuts and lock washers. Tighten to 200-250 ft. lbs. (271-339 Nm) torque.
17. Clean differential drain plug of any steel particles captured by the plug's magnetism and install in differential case.
18. Remove fill plug and add proper quantity of oil as specified in Sections 2 and 10 of this manual.

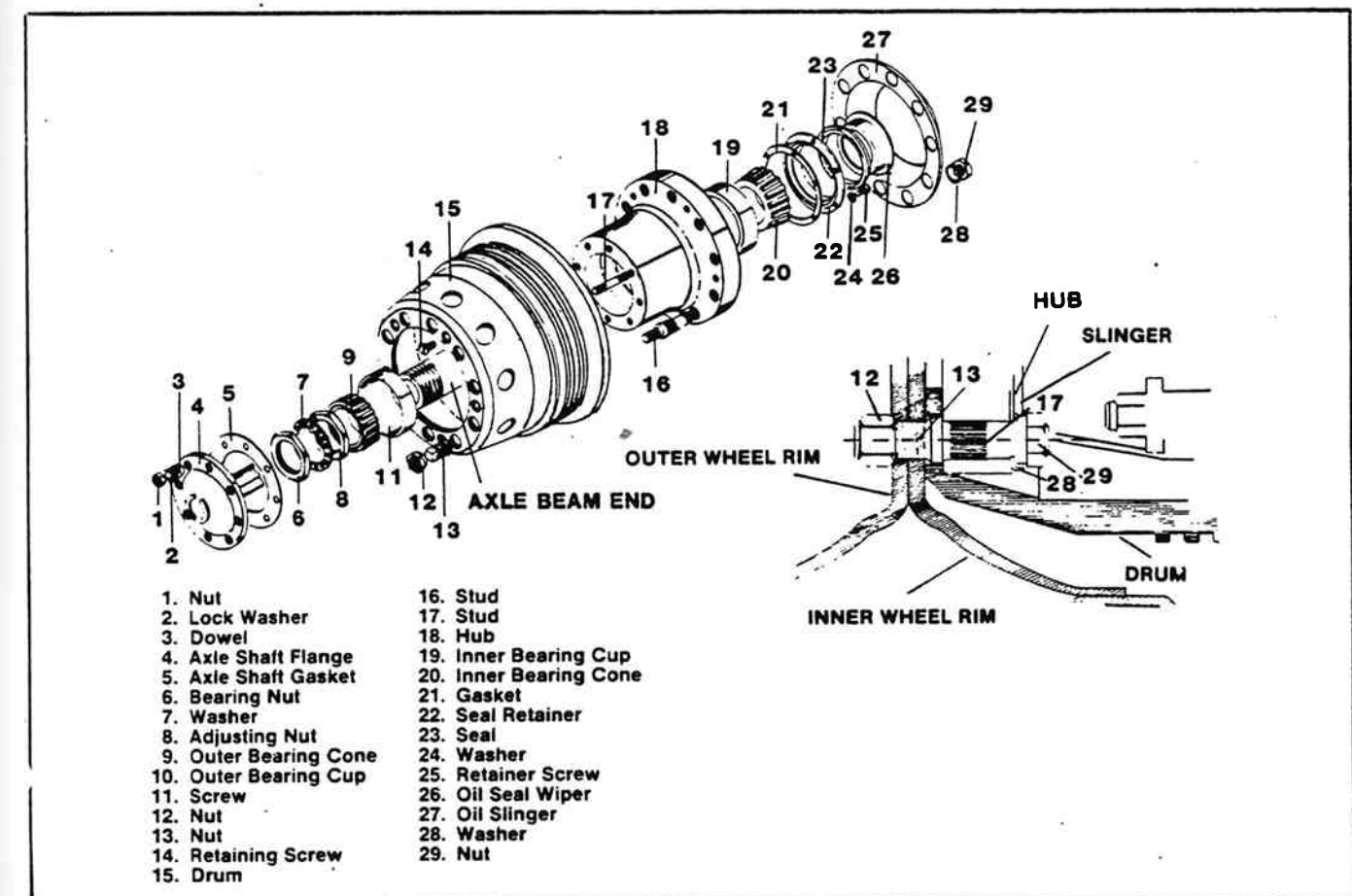


Figure 15-14. Drive Axle Hub and Drum.

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DISASSEMBLY AND INSPECTION

First block the front wheels to prevent the coach from rolling, jack up the rear and remove the wheel nuts, tires and rims. Then perform steps 2 thru 8 of the previous procedure (Bearing Adjustment). Follow this procedure for disassembly and repair:

1. Remove the drum-to-hub retaining screws.
2. Remove the brake drum from the hub.
3. Remove the bearing nut washer and adjusting nut.
4. Remove the hub, taking care that the outer bearing cone does not fall out of the hub.
5. Remove the outer bearing cone.
6. Remove the nut and washer mounting the oil slinger to the hub. Remove the slinger.
7. Remove the seal retainer screws, seal wiper, washer, the seals, seal retainer and gasket. Discard the gasket.
8. Remove the inner bearing cone.
9. Using a hammer and brass driver, remove the inner and outer bearing cups.
10. Clean all parts thoroughly with cleaning solvent. Dry with compressed air. Use a stiff brush to remove hard, caked-on lubricant.
11. Inspect bearing cups, cones including rollers and hub for pitting, scoring, cracks, deterioration or wear. Replace as necessary.
12. Inspect seals for distortion, cracks, deterioration or damage. Replace as necessary. Refer to Oil Seal Installation, below.
13. Installation procedure is reverse of disassembly.
14. Perform adjustment procedure as specified.

OIL SEAL INSTALLATION

FRONT HUBS AND TRAILING WHEEL HUBS

Tool 20-103 should be used for the installation of oil seals into the seal bore of the hub. Use of this tool assures correct placement of the seal to prevent leakage of lubricant.

FRONT HUBS AND TRAILING WHEEL HUBS

Proceed as follows to install the oil seal in the front hubs and trailing wheel hubs (inner bearing cup must be in place in hub):

1. Remove any burrs or nicks from spindle shoulder. Use emery cloth or stone.
2. Apply liberal coat of Boretite sealant (Chicago-Rawhide) or equivalent to spindle shoulder O.D.
3. Bolt the centering plate of tool 20-103 to the hub. Bolts need only be finger-tight.
4. Turn wheel over and remove any burrs or nicks from the bore of the hub.
5. Lightly coat bore of hub with Boretite or equivalent.
6. Insert rod (cotter pin end) of tool 20-103 in hole of centering plate.
7. Apply lubricant to inner bearing cone and insert into cup in hub.
8. Place tool 20-103 squarely on edge of seal bore.
9. Slip the seal adapter over the tool rod. Rest it on the seal so that the lip of the adapter fits over the outside of the seal (figure 15-15).
10. Insert centering plug in bore of inner bearing cone (figure 15-16).

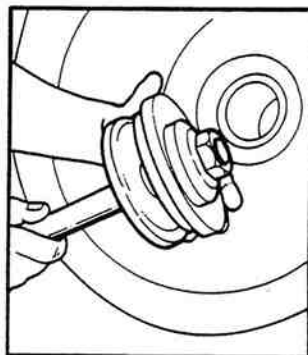


Figure 15-15. Seal and Adapter on Tool Rod.

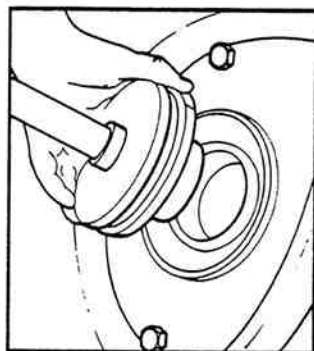


Figure 15-16. Installing Tool With Seal in Hub.

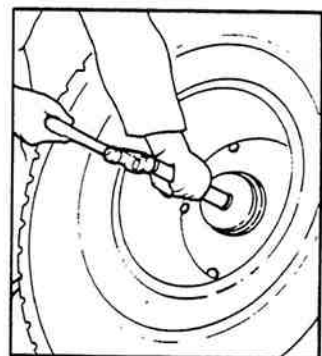


Figure 15-17. Driving Seal Into Bore.

11. Using either a 3-5 lb. (1.4-2.3 kg) hammer or slide-hammer, drive the seal into the bore until it bottoms out. See figure 15-17.
12. Remove tool 20-130 and centering plate. Wheel is now ready for installation on the axle.

CAUTION: Do not damage seal when installing wheel over axle spindle.

Refer to Bearing Adjustment, above, to seat and adjust the wheel bearings. Add the correct quantity of SAE 30 engine oil to the hub for proper lubrication.

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DRIVE WHEEL HUBS

Follow this procedure to install the oil seal in the drive wheel hub (inner bearing cup and cone must be in place in hub):

1. Remove any nicks or burrs from the axle housing seal shoulder.
2. Apply a liberal coat of Boretite sealant (Chicago-Rawhide) or equivalent to shoulder OD and face.
3. Apply light coating of Boretite sealant or equivalent to retainer face.
4. Install retainer and new gasket in hub.
5. Bolt the hub bar to the hub. Use two flange nuts and install finger-tight.
6. Turn the wheel over.
7. Coat the bore of the seal retainer with Boretite sealant or equivalent.

8. Insert the assembly rod (cotter pin end) in the center hole of the hub bar.

9. Slip seal adapter over the rod and locate it on the seal so that the lip of the adapter fits over the outside of the seal. Refer to figure 5-15.

10. Position the tool squarely on the edge of the seal bore (figure 15-16).

11. Using either a 3-5 lb. (1.4-2.3 Kg) hammer or slide-hammer, drive the seal into the bore until it bottoms (figure 15-17).

12. Remove the tool hardware. The wheel is now ready for installation on the coach.

Refer to Bearing Adjustment, above, to seat and adjust the wheel bearings. Add the correct quantity of SAE 140 (0°F & above) or SAE 90 (below 0°F) differential oil to the differential to provide proper lubrication for the hub.

