Section 13: WHEELS, HUBS & TIRES

CONTENTS

LIST OF ILLUSTRATIONS

1. WHEELS AND TIRES

1.1 Description

Where the vehicle is provided with stud-mounted wheels, wheel studs and nuts on the left side of the vehicle have left-hand threads whereas those on the right side have right-hand threads. If equipped with hub-mounted wheels, all studs and nuts have right-hand threads. Either disc steel wheels or optional aluminium-polished wheels may be installed on the vehicle. Both are mounted with radial tubeless tires.

Both steel and aluminum wheel dimensions are 22.50 X 9 inches (571.5 X 228.6 mm) for the following recommended tire dimensions (in order of preference):

315/80 R 22.5
12.75 R 22.5
1200 R 22.5

2. WHEEL MAINTENANCE

Wheel maintenance consists of periodic inspections to ensure that wheel nuts are tightened to the proper torque. In the case of a new vehicle, or after a wheel installation, stud nuts should be tightened every 100 miles (160 km) for the first 500 miles (800 km) to allow setting in of clamping surfaces.

Wheel studs and nuts must be kept free from grease and oil. No lubricant whatsoever should be used. Cleanliness of the wheel and its rotor or brake drum mating surfaces is important for proper wheel mounting.

It is also important that wheel stud nuts be tightened alternately on opposite sides of the wheel. Refer to Figure 1 for the suggested tightening sequence.

However, for hub mounted wheels, it is recommended to add some rust protection lubricant on the pilot diameter of the hub (only to facilitate futur removal).

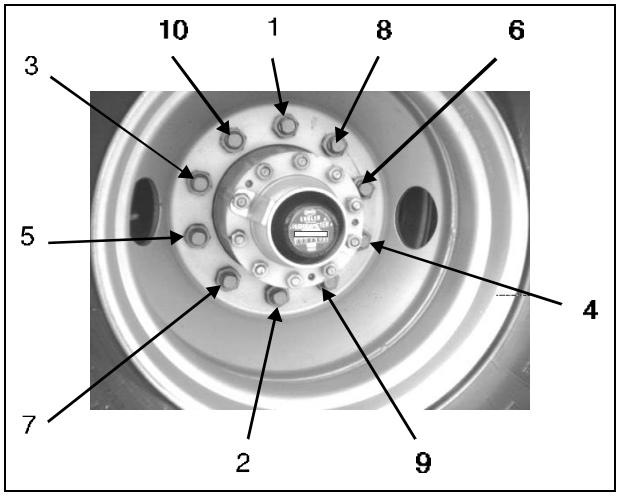


FIGURE 1: TIGHTENING SEQUENCE OEH3B404

3. SINGLE WHEEL

3.1 Removal

1. Stop engine and apply parking brake.

2. Loosen wheel nuts about one turn (do not remove the nuts). (This is not necessary if equipped with hydraulic gun.)

Note: *For stud-mounted wheels, turn nuts counterclockwise for R.H. side and clockwise for the L.H. side. For hub-mounted wheels, turn nuts counterclockwise on both side of the vehicle.*

3. Raise the vehicle by its jacking points on the body. See Section 18, "Body", under heading "16. VEHICLE JACKING POINTS".

4. Unscrew wheel hex stud nuts and remove the wheel.

3.2 Installation

1. Screw in the hex stud nuts (refer to Figure 1 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, slightly tighten the nuts to correctly position the wheel.

2. Tighten stud nuts progressively as shown in Figure 1. The final tightening should be done with a torque wrench. Tighten stud nuts to 450 - 500 lbf•ft (610 - 680 N•m) for aluminum as well as steel wheel.

3.3 Inspection

Repeat step 2 in previous paragraph.

4. DUAL WHEELS

4.1 Removal

4.1.1 Outer Wheel

Unscrew the hex stud nuts, using the Single Wheel Removal procedure described previously, paragraph 3.1.

4.1.2 Inner Wheel

1. Unscrew inner cap nuts.

2. Remove inner wheel.

4.2 Installation

4.2.1 Inner Wheel

1. Screw in the inner cap nuts (shown in Fig. 2) and refer to Figure 1 for sequence, so that wheel will position itself concentrically with hub.

2. Tighten inner cap nuts progressively according to sequence shown in Figure 1. The final tightening should be done with a torque wrench. Tighten inner cap nuts to 450 - 500 lbf•ft (610 - 680 N•m) for aluminum as well as steel wheel.

4.2.2 Outer Wheel

Tighten the hex head nuts (shown in Fig. 2) using the single wheel installation procedure described previously.

4.3 Inspection

1. Loosen a hex head nut three turns (Fig. 2).

2. Tighten the inner cap nut to the correct torque (450 - 500 lbf•ft [610 - 680 N•m]).

3. Tighten the hex head nut to the correct torque (450 - 500 lbf•ft [610 - 680 N•m]).

4. Repeat the 3 previous steps for each of the 10 *"hex head nut - inner cap nut* assemblies" according to the tightening sequence in Figure 1.

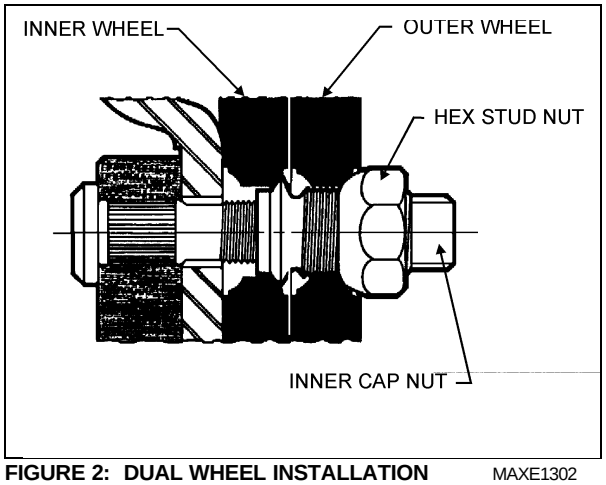


FIGURE 2: DUAL WHEEL INSTALLATION MAXE1302

Caution: *Do not attempt to tighten an inner cap nut without having previously loosened the hex head nut.*

Note: *When mounting rear dual wheels, care should be taken to position the tire valve stems 180 apart to access both inner and outer tire valves.*

5. CORROSION PROTECTION OF ALUMINUM WHEELS

1. Clean wheels often by means of a high pressure water jet. Cleaning may be accelerated with mild soap. Do not use concentrated alkaline cleaning products.

2. When tire is removed, clean and inspect wheel completely. Remove dirt and corrosion on rim by means of a wire brush. Do not use a wire brush on the outer surface of the wheel.

3. The following measures should be taken to maintain original appearance of the aluminum wheels:

- Use a sponge, a soft cloth, or a soft fiber brush, with a mild soap and warm water solution to wash the outer wheel surfaces.
- Rinse thoroughly with clean water.
- Wipe and dry thoroughly to prevent water stains.
- Wax surface with *"Simonize Body Guard"*, *"Dupont 7 New Car Wax"*, or an equivalent product.

Clean aluminum wheels as required to maintain original look.

Warning: *Wheel surfaces may have sharp or cutting edges which may cause injury to the hands. To prevent contact with sharp edges, it is strongly recommended to wear rubber gloves when washing or polishing wheels.*

6. CHECKING FOR DISTORTED WHEEL ON VEHICLE

1. Slightly raise axle to be checked and place a safety support underneath.

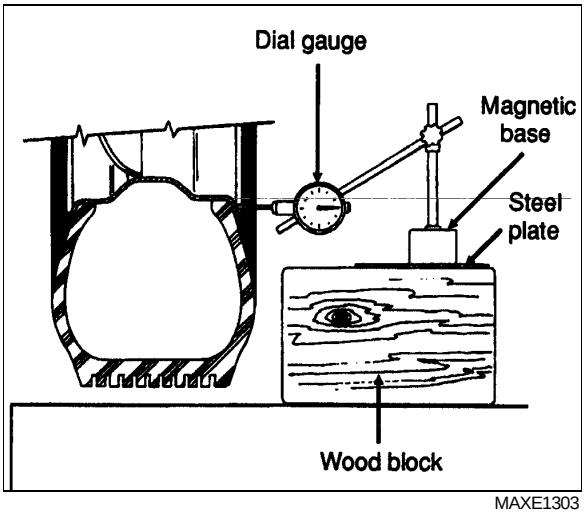
2. Check the rim for distortion. Install a dial gauge as shown in Figure 3, then rotate the wheel one full turn. As the wheel turns, note any variation on the dial gauge.

Caution: *Take care not to damage the dial gauge as it may interfere with the balancing weights on the wheel.*

3. The variation should not exceed 0.125 inch (3,2 mm). If the rim is distorted beyond this dimension, the wheel must be replaced.

4. If doubt exists whether wheel or hub is distorted, hub may be checked as follows:
   Replace the existing wheel with a wheel known to be correct. Revolve the wheel and proceed with the previously mentioned tests. If tests are within limits, the hub is satisfactory, but the wheel is distorted.

Caution:NEVER STRAIGHTEN ALUMINUM WHEELS. Never heat aluminum wheels for the purpose of repairing damages incurred after hitting a curb or resulting from other causes. The special alloy in wheels has been heat treated, and any uncontrolled heating could alter the wheel structure. Furthermore, never weld aluminum-forged wheels for any reason whatsoever.



MAXE1303

FIGURE 3: SUGGESTED DIAL GAUGE INSTALLATION

7. WHEEL STUDS

Stripped threads may be the result of excessive torquing, or a result of damage during wheel installation, when placing the wheel over the studs. Where a damaged thread is discovered, the stud must be replaced. Broken studs are a direct result of operating with loose stud nuts or improperly seated wheels. When a broken stud is replaced, the adjacent studs on each side of the broken stud must also be replaced because they could have been subject to excessive strain and may have become fatigued.

When installing wheel studs to hubs, check nuts retaining the wheel stud to wheel hub and if they are deformed, damaged or severely corroded, install new parts. Install nut (and washer where applicable) to new stud and torque to 110 - 130 lbf•ft (150 - 177 N•m) for studs mounted on front and tag axle wheel hubs and torque to 450 - 500 lbf•ft (610 - 680 N•m) for those mounted on drive axle wheel hubs.

7.1 Drive Axle

Wheel can be mounted on the drive axle with studs (3/4"-16 thread) or hub mounted (7/8"-14 thread) and with the inner cap nut (1-1/8"-16 thread).

7.2 Front and Tag Axles

Wheel can be mounted on tag axle with studs (1-1/8"-16 thread) or hub mounted (7/8"-14 thread).

Note: *Wheel studs and nuts must be kept free from grease and oil. No lubricant whatsoever should be used.*

8. SPARE WHEEL AND TIRE (if applicable)

In the case of H3 coaches, the spare wheel and tire are stored in a compartment directly behind the reclining front bumper. Access is reached by unscrewing nuts located at each extremity under the bumper, then by pushing them upwards. Lower bumper slowly as it is quite heavy (Fig. 4).

There is no spare wheel in the case of a converted vehicle. An air shutter is located behind the reclining front bumper. Access is obtained by pressing a latch located in the middle and upper part of the bumper air inlet.

FIGURE 4: FRONT BUMPER - H3 COACHES 18057

Note: *It is recommended that two people perform the above operation.*

Warning:*. This compartment has not been designed for storage. Never leave any loose objects in this area as it may interfere with steering linkage mechanism.*

9. REMOVING SPARE WHEEL AND TIRE FROM COMPARTMENT

To pull out the spare wheel and tire, open reclining bumper according to previous instructions. Loosen and turn buckle of the holding chain to release the wheel and dolly assembly. Open the front service compartment, unscrew the wing nut retaining the support and rail extension assembly, then pull out the assembly. Fix it by matching its two holes to the corresponding mounting pins located in front center of spare tire compartment. Pull out spare wheel using strap as illustrated in Figure 5. Remove tire covering, then separate spare wheel from its dolly by unscrewing the two mounting wing nuts.

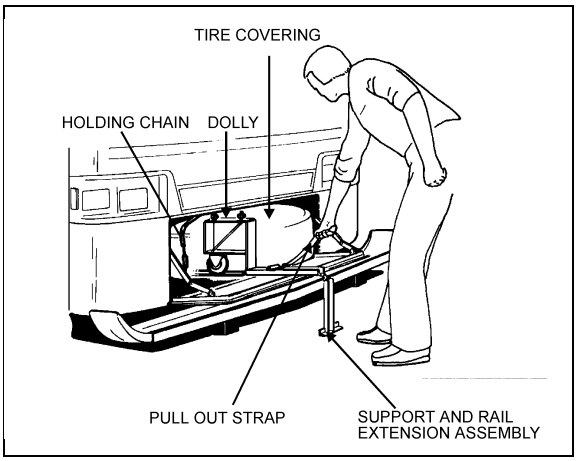


FIGURE 5: SPARE WHEEL INSTALLATION MA3E1304

Note: *Reinstall support and rail extension assembly and fix tire with loading chain before moving vehicle.*

Caution: *Check that the bumper is safely hooked in place, and that retaining nuts are firmly tightened after bumper compartment has been closed.*

Note: *The jack and wheel nut wrench are stored in the right side baggage compartment.*

10. SPARE WHEEL AND TIRE MAINTENANCE

Maintenance of the spare wheel and tire consists in ensuring that tire inflation pressure is the same as the tire on the coach which has the highest inflation pressure (refer to Recommended Tire Inflation Pressure (cold) in this section). Inspect rim to ensure that there is no important corrosion, check if spare wheel cover is in good condition and check that spare tire is securely fastened in compartment.

Caution: *If the spare wheel and tire must be installed, deflate the tire in accordance with recommended pressure.*

11. FRONT AND TAG AXLE WHEEL HUBS (OIL TYPE WHEEL HUBS)

11.1 Hub Bearing Maintenance

The front and tag axle wheel hubs use oil lubrication which eliminates periodic grease repacking of the hubs. A sight glass is provided for convenient check of oil level. Oil level should be checked daily and must be maintained to the level mark in the sight glass. If oil is not visible through the sight glass, general purpose gear lubricant SAE 90 (A.P.I. spec. GL5) must be added by removing the snap plug in center of the hub cap to bring oil to the correct level. To check oil level after vehicle has been driven, wait at least 15 minutes to ensure that oil has settled.

Caution: *Hub oil fill cap is provided with a very small vent hole. Occasionally insert a small tip to avoid hole restriction, as it prevents overpressure in bearing housing.*

11.2 Hub Bearing Inspection

1. An inspection should be made after the first 3,000 miles (4 800 km) and then at intervals of 25,000 miles (40 000 km). When the wheels are raised, they should revolve quite freely without roughness.
2. Hub bearings should have a slight end movement with the limits 0.0005 inch to 0.002 inch when rocked forward and backwards on axle stub. See paragraph "11.4 TO ASSEMBLE THE HUB" in this section.

11.3 To Remove Hub Unit

Refer to "GKN Parts and Service Manual for Axles, Manual No. 1604", Issue A, Section B, annexed to the end of Section 10, "Front Axle".

11.4 To Assemble the Hub

Refer to "GKN Parts and Service Manual for Axles, Manual No. 1604", Issue A, Section B, annexed to the end of Section 10, "Front Axle".

12. DRIVE AXLE WHEEL HUBS

12.1 Description

Drive wheels use a single oil-seal assembly and are lubricated from the oil supply in the differential housing. Bearings are tapered rollers, adjustable to compensate wear. Maintain differential oil level with general purpose gear lubricant (refer to in Section 24, *"Lubrication"* for proper oil grade selection) to ensure adequate oil supply to wheel bearings at all times.

12.2 Bearing Adjustment

To adjust drive wheel bearings, raise vehicle until both dual wheels can be turned freely (approximately 6 inches from the ground). Position jack stands under drive axle, then lower vehicle approximately 2 inches in order to avoid entire weight of the axle being supported by the suspension air bellows and the shock absorber pins.

Remove axle shaft as indicated in *"Rockwell Field Maintenance Manual No. 5"* entitled *"Single Reduction Differential Carriers"* annexed to the end of Section 11 in this maintenance manual. Remove gaskets. Unscrew lock nut and remove adjusting nut lock ring.

To adjust, tighten adjusting nut until the wheel binds, rotate the wheel while tightening so that all surfaces are in proper contact. Back off adjusting nut approximately 1/4 to 1/3 turn to assure 0.001 inch to 0.007 inch end play and to ensure that wheel turns freely. Replace lock ring, and adjust nut dowel pin in one of the holes. The ring may be turned over if necessary to allow more accurate adjustment of bearings.

Tighten lock nut and recheck bearing adjustment. Replace the axle shaft using a new gasket.

12.3 Disassembly and Repair

Jack vehicle as outlined above under heading *"Bearing Adjustment"* and remove axle shaft as indicated in *"Rockwell Field Maintenance Manual no. 5"* entitled *"Single Reduction Differential Carriers"* annexed to the end of Section 11 in this maintenance manual. Remove wheels and tires.

Caution: *Always mark position of the wheel on the axle prior to removal, to replace wheel at the same location, thus avoiding a new wheel balancing.*

Remove lock nut, lock ring and adjusting nut from axle housing to prevent the outer bearing from falling out. Remove outer bearing cone and roller assembly.

Remove screws attaching inner oil seal retainer to hub, and remove inner oil seal assembly. Remove inner bearing cone and roller assembly. Bearing cups can be removed from the hub using a hammer and a long brass drift.

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.

If excessive wear, deterioration, cracking, or pitting are present on the bearing cups, rollers, or cones, the bearings should be replaced. Seals should be replaced each time they are removed from the hub. To install new oil seal, use a suitable adaptor and drive the seal into the retainer bore until it bottoms.

When installing wheel on spindle, center the wheel hub with spindle to avoid damaging the seal with the end of the spindle. Push wheel straight over the spindle until inside diameter of seal press fits on wiper ring. Prefill hub cavity with general purpose gear lubricant (refer to Section 24 *"Lubrication"* in for proper oil grade selection). Lubricate outer bearing cone and assemble.Adjust bearing and lock.

Assemble axle flange to axle using a new gasket. Apply sealant in stud area. After both wheels have been assembled according to above procedure, fill the differential to the proper factory recommended level.

Note: *During regular inspection, do not forget to check lubricant level in differential. Clean thoroughly or replace vent as required.*

13. TIRE MAINTENANCE

The most critical factor in tire maintenance is proper inflation (Fig. 6). No tire is completely impervious to loss of air pressure. To avoid the hazards of underinflation, lost air must be replaced. Improper inflation decreases tire life.

Any underinflated tire builds up excessive heat that may result in sudden tire destruction thus resulting in possible loss of vehicle control. Check inflation pressure on all the tires, including the spare tire, at least once a week before driving when tires are cold. This is especially important in cases where vehicle is operated by more than one driver.

Warning: *Failure to maintain correct tire inflation pressure may result in sudden tire destruction, improper vehicle handling, and will cause rapid and irregular tire wear. Therefore, inflation pressures should be checked weekly and always before long distance trips.*

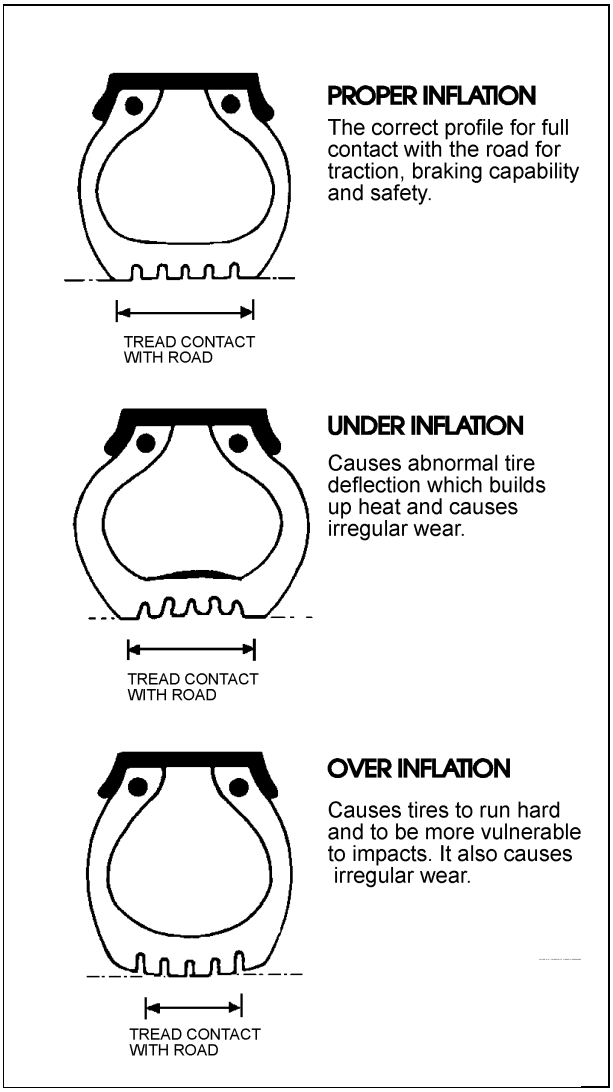


FIGURE 6: TIRE INFLATION MAXE130

13.1 Recommended Tire Inflation Pressure (Cold)

Keep the tires inflated to the recommended inflation pressure for prolonged tire life and safety. If the coach is equipped with 315/80 R 22.5 tires, then see charts below “Standard Inflation Pressure for H3 Coaches”, or else see the tire inflation pressures and loadings in the Coach Final Record in the technical publication box provided with the vehicle.

Note: *For a specific vehicle, inflation pressures vary according to loadings and type of tires.*

Note: *Tires are considered cold when the vehicle has not been driven for at least three hours, or driven less than 1 mile (1,6 km). Driving, even for a short distance, causes tires to heat up and air pressure to increase.*

Note: *Never bleed air from hot tires as tires will then be underinflated. Use an accurate tire gauge to check pressures. (Do not hit tires as an inflation check. This is an unreliable method).*

Note: *In the case of a converted vehicle, weigh vehicle fully loaded and pressurize according to tire manufacturer's recommendations.*

Warning: *All tires on the same axle should always be inflated to the same pressure. There should not be a difference in pressure between right and left tires on the same axle. A 5 psi (35 kPa) underinflation in one front tire can not only destroy ease of steering, but creates steering hazards which can lead to a potential accident.*

13.2 Tire Matching

Unmatched tires on drive axle will cause tire wear and scuffing, as well as possible damage to the drive unit. Consequently, we recommend that tires be matched within 1/8 inch of the same rolling radius, and ¾ inch of the same rolling circumference.

13.3 Wheel and Tire Balancing

Wheels and tires must be clean and free from all foreign matter. The tires should be in good condition and properly mounted. Unbalanced wheel and tire assembly can be due to a bent wheel or improper mounting. Before removing the wheel and tire assembly from the vehicle, check for swaying movement, and if necessary, check the wheel lateral runout as outlined under heading "Wheel Straightness Check". If tire balancing is required, refer to a specialist.

13.4 Tire Rotation

The 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 different (from axle to axle), the tires should be rotated in such a manner as to alleviate the condition.

Note: *There is no restriction on criss-cross rotation.*

Standard Inflation Pressure for H3 Coaches

H3-41	Tires	Rims	Normal loading			Maximum loading		
			lbs	kg	Tire pressure (psi)	lbs	kg	Tire pressure (psi)
Front	315/80 R 22.5	22.5 X 9	12510	5685	85	16500	7500	115
Diff.	315/80 R 22.5	22.5 X 9	19850	9025	80	21600	9820	85
Tag	315/80 R 22.5	22.5 X 9	11250	5115	75	13700	6225	95
Maximum gross vehicle weight rating: 49,000 lbs (22 270 kg)								

H3-45	Tires	Rims	Normal loading			Maximum loading		
			lbs	kg	Tire pressure (psi)	lbs	kg	Tire pressure (psi)
Front	315/80 R 22.5	22.5 X 9	12725	5785	85	16500	7500	115
Diff.	315/80 R 22.5	22.5 X 9	20900	9500	80	21600	9820	85
Tag	315/80 R 22.5	22.5 X 9	11815	5370	80	13700	6225	95
Maximum gross vehicle weight rating: 49,000 lbs (22 270 kg)								