

GMC Motorhome Front Wheel Bearing Replacement

Utilizing Warner Puller Tools



Remember, cleanliness is next to Godliness, so if work on this project remains unfinished overnight, place a baggy over any greased parts or if at any time you are working under dusty conditions, cover all your parts under plastic sheeting.

(Dennis Simpson, Portage MI, May 2002)

Parts (for both front wheels)

- 2 ea bearing sets (e. g. Timken 23)
- 2 ea seals - inner (e. g. Chicago Rawhide 25515)
 - outer (Chicago Rawhide 24888)
- 2 ea cotter keys - axle
 - outer tie rod
 - upper ball joint
 - lower ball joint

Optional

(depending on condition found after disassembly)

- 6 ea 3/8", grade 5 grease seal retainer plate bolts
- 6 ea "O" small rings to fit over above bolts
- 2 ea grease boots - outer tie rod
 - upper ball joint
 - lower ball joint
- 2 ea brake calipers (choice of original or 80 mm size)
- Right & left brake hoses (choice of original or 80 mm size)
- 2 ea upper ball joints
- 2 ea lower ball joints
- 4 ea caliper mounting bolts/pins
- brake pad set
- 2 ea banjo bolts (i. e. for 80 mm calipers)
- Stabilizer bar end link hardware kit (e. g. graphite impregnated polyurethane bushings)
- 2 ea outer tie rod ends

Recommended Tools

- 3/4" drive socket set
- Warner bearing puller/installer
- Hammers - soft faced (plastic headed) or rubber hammer
 - minimum 8 lb
 - ball peen
- Floor or bottle jack
- 2 ea jack stands (i. e. prefer 3 ton if available)
- 1/4 x 12" line up punch
- Cotter key remover
- Allen wrench's - caliper mounting bolt
 - bearing puller clamp
- 3/8-16 NC tap

- 7/16-20 NF tap
- T-slider tap wrench
- Drill motor
- 7/16" drill bit
- Combination wrench's - 3/4"
 - 9/16" 12-pt/9/16" box end (e. g. Sears 43923)
 - 7/8"
 - 15/16"
 - 1-1/8"

- 12" adjustable (e. g. Crescent) wrench
- Impact wrench and sockets
- Small bottle jack or Porta-Power type unit
- Center punch
- Assorted sizes of common screwdrivers

Other Supplies

- 4-5 cans of spray brake cleaner
- Penetrant oil
- Shop and paper towels
- Hand wipes (Lava brand heavy duty hand cleaner towels recommended)
- Tube of Mobil 1 or preferred brand of synthetic grease
- Mechanics wire
- Permatex brand EXTEND spray
- Silicon brake grease
- Anti seize compound
- Sheet of 80 grit sandpaper



Fig. 1. Permatex Extend on the left and Mobil 1 tube of synthetic grease on the right used to pack bearings.

DISCLAIMER: These instructions are intended to be used as a way to facilitate communication on how to change your front wheel bearings and are not intended as absolute.

Removal and Teardown

1. Remove hubcap (if originals steel wheel is in use), hub dust cover, and axle cotter key.
2. Loosen:
 - a. Axle nut with $\frac{3}{4}$ " drive 1-1/2" socket set or impact wrench. Spray penetrant on axle threads exposed around castle nut. Attempt to back off nut. If unsuccessful, lightly hit castle nut between the notches with a ball peen hammer and line-up punch to break rust bond.

See below photo.



Fig. 2. Note $\frac{3}{4}$ " drive ratchet with extension and 1-1/2" socket over drive axle nut. Turn wrench in conventional counterclockwise direction to loosen nut, both driver and passenger sides.

- b. Wheel lug nuts.
3. Block rear wheels, jack up front end of coach from the center of and let down on top of jack stands resting under front frame cross member.

4. Remove:
 - a. Front wheel.
 - b. Caliper mounting bolts/pins and caliper. Tie up caliper out of way to A frame with mechanics wire so it does not hang by flexible brake hose.
 - c. Axle nut and washer.
5. Remove cotter key from both upper and lower ball joint and tie rod end studs.
6. Back off ball joint and tie rod stud castle nuts ($\frac{3}{4}$ " wrench on both top ball joint and tie rod nuts; $\frac{15}{16}$ " wrench on bottom ball joint nut) such that top of nuts are flush with the end of the studs.
7. With 8# hammer, rap on eye of knuckle steering arm to make outer tie rod end stud pop out of place. Repeat for both upper and lower ball joint studs by rapping on each ball joint stud knuckle eyes.
8. Remove both ball joint and tie rod stud nuts after studs have popped loose.
9. Lift:
 - a. Outer tie rod end stud out of knuckle steering arm and place out of way.
 - b. Knuckle and hub assembly out of ball joint stud eyes and slide off drive shaft. After removal, place assembly on the bench in preparation for disassembly.



Fig 3. Knuckle and hub assembly on the bench.

10. Place hub and knuckle assembly on top of work bench. Using the 9/16" combination/box end wrench (preferably make sure you use the type wrench having a slightly angled box-end head), back out the three bolts securing grease seal retainer plate in place. An opened ended wrench is not recommended. It tends to slip off the head of the bolt heads and does not have desirable head angle.
11. If replacing both front wheel bearings, separately mark one hub and knuckle as a set. For example, use center punch to make marks on each piece somewhere.
12. Place tire wheel side up on top of work surface and set hub upside down on top of the wheel such that all wheel studs fit in bolt holes in the wheel. Secure hub to wheel with two lug nuts placed opposite each other and snugged tight by hand.

See below photo



Fig. 4. Inverted hub inserted in the wheel bolt holes.

13. Clean out/chase the threads on back side of the knuckle that hold the three bolts removed in step 10 above with 3/8-16 NC tap. If tap will not engage in any of the holes, use drill motor and 7/16" drill bit to enlarge hole opening to top depth of threads.

Note: Failure to do so will result in attempted newly cut threads not lining up with existing ones.

See below photos.



Fig 5 This photo illustrates enlargement of inner grease seal retainer plate threaded bolt holes in the knuckle when needed.



Fig. 6. Chasing grease seal retainer plate bolt hole threads in the knuckle.

14. Remove inner grease seal and discard.



Fig. 7. Inner grease seal removal.

15. Place circular Warner puller tool plate in end of exposed hub shaft opening.



Fig. 8. Circular Warner puller tool plate (aka “puck”) placed over end of hub shaft. Puller screw point bears on this plate when pulling the knuckle off the hub.

Install puller screw through triangular shaped Warner puller tool knuckle puller plate and bolt plate in place on knuckle with the three long bolts and washers.

With 1-1/8” combination wrench, separate knuckle from hub and set aside.



Fig. 9. Warner bearing puller tool knuckle puller plate bolted in place shown with puller screw in place.

16. Separate Warner bearing puller tool round bearing puller clamp halves. Push outer seal down sufficiently and in turn, install first one

of the bearing puller clamp halves and then the second one around base of bearing set. Use a soft face/rubber hammer as an aid in seating halves around the bearings. Bolt bearing puller tightly in place using Allen head screws and Allen wrench.

Install two long OTC puller tool rods in place on puller bearing clamp and place the OTC 927 puller tool bar with pulling screw in place, nut under bar, on top of the rods. Secure rods to bar with washers and nuts.

With 1-1/8" open-end wrench holding puller nut, use 12" adjustable wrench to turn pulling screw to pull bearing set off hub shaft.

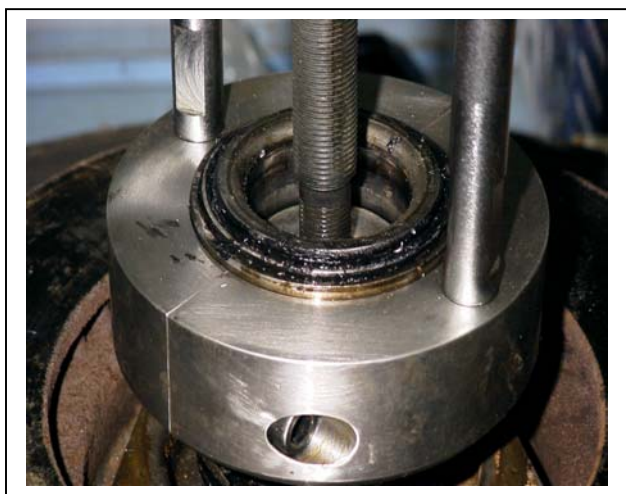


Fig. 10. Warner bearing tool puller clamp halves assembled around the bearing pack. Also shown are the OTC puller tool rods threaded into the bearing puller clamp and the puller screw resting on the "puck".

17. Unbolt OTC puller tool from bearing puller halves. Unbolt bearing puller halves from bearing set. Unless bearing set is to be reused, discard, however it is suggested that you save spacer as spare for possible future use.

If being reused, set aside to be cleaned and inspected.

18. Remove outer seal from hub shaft and discard.

19. Remove inner grease seal retainer plate from hub shaft and set aside.
20. Remove and inspect three grease seal retainer plate bolts for reuse. Consider replacing with new grade 5 bolts.
21. Completely de-grease residue from both hub and knuckle.
22. Measure for tolerances as follows:

- a. Hub shaft, which must not be tapered or have a step on it. It is a ground dimension and should have a uniform measure from a minimum of 2.0015 to a maximum of 2.0020 inches. Anything less and the hub should be replaced or shaft reconditioned/rebuilt (e. g. metalized and ground).



Fig. 11. Caliper being used to measure hub shaft dimension.

- b. Knuckle bore, which should uniformly measure 3.2510 to 3.2525 inches. Bore can be 0.0015 inches out of round if the average diameter is within tolerance. However, the minimum diameter must not be less than 3.2510 inches. Knuckle measurements are best made with three-point cylinder bore measuring tool.

Note: bearing race OD measures 3.250 inches, so fit in knuckle is not interference.

If necessary, recondition/rebuild (e. g. alternatives are metalize and machine,

machine for oversize race, or sleeve with high strength tubing).



Fig. 12. Measuring bore of knuckle with caliper.

- c. Brake disc, which is to measure between 2.000 to 2.130 inches. Discard if below minimum.

23. Thoroughly clean grease from:

- a. Inside of wheel surface. This is done in order to determine if grease is leaking from bearings upon use.
- b. Upper and lower A arms.
- c. Axle and CV joint boot.
- d. Tie rod end.



Fig. 13. This picture illustrates both the upper and lower control arms as well as the

drive shaft with outer CV joint. Note castle nut in place on the axle shaft.

24. Inspect condition of:

- a. Tie rod and both upper and lower ball joint grease boots. Replace if damaged or torn.
- b. CV joint boot for tears and clamp condition. Repair/recondition as necessary.
- c. Outer tie rod and both ball joint stud looseness. Replace as necessary.

25. Clean:

- a. Inner grease seal retainer plate removed in step 19 above of any grease/rust. Remove grease residue by spraying with the spray brake cleaner. When dry, if necessary, corrosion control by spraying EXTEND on all surfaces of the plate and set aside to dry.
- b. Same for knuckle. Chase caliper mounting bolt/pin hole threads with 7/16-20 NC tap.

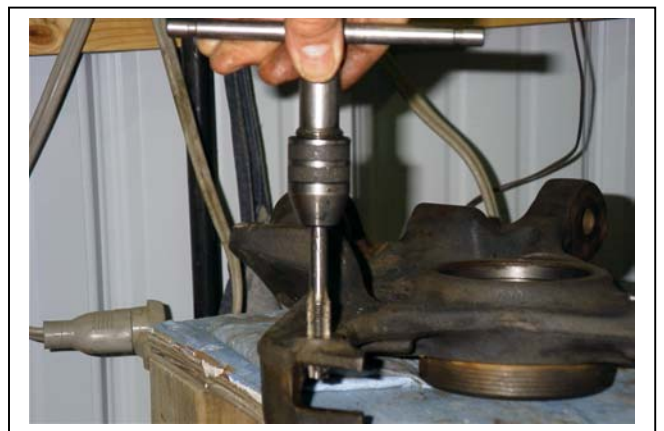


Fig. 14. Caliper mounting bolt/pin hole threads being chased/cleaned.

- c. Same for hub. Sand brake disc on both surfaces with < 120 grit sandpaper to deglaze.

Clean hub shaft.



Fig. 15. Cleaning hub shaft.

This completes the process for one wheel. Now repeat for the opposite side, if necessary.

Reassembly

1. Place tire wheel side up on top of work surface and set hub upside down on top of the wheel such that all wheel studs fit in bolt holes in the wheel. Secure hub to wheel with two lug nuts placed opposite each other and snugged tight by hand. See Fig. 4 above.
2. Cut slots across threaded end of retainer plate bolts with hack saw, band saw, Dremel tool with disc, etc., to facilitate use of screwdriver in threading bolts back in place.

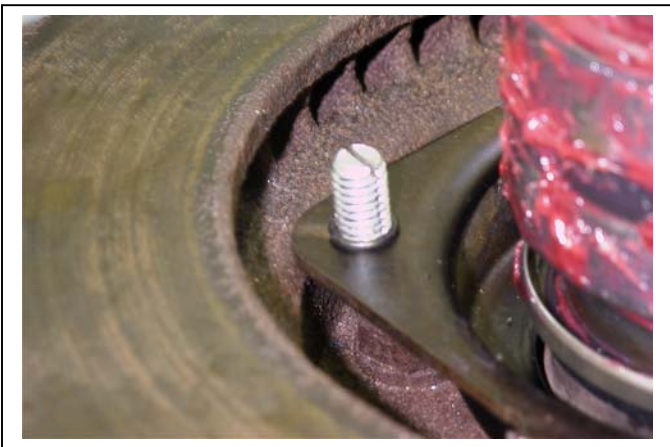


Fig. 16. Illustrates slot cut across end of outer seal retainer plate bolts. Note “O” ring retaining bolt in seal retainer plate.

3. Place seal (outer) retainer plate:
 - a. Bolts with lock washers upward through holes in the plate and secure from top side with “O” rings, in three places. Coat threads with anti seize compound or a light coating of grease at a minimum.
 - b. In place over hub shaft.



Fig. 17. Seal (outer) retainer plate, with bolts in place, and outer seal in place over hub shaft. Note hub shaft bearing stop shoulder just above seal as well as light coating of grease on hub shaft.

4. Grease:
 - a. Hub shaft lightly as shown in Fig. 15 above.
 - b. Outer seal rubber lips lightly and set in place, properly oriented on hub shaft.See above photo, Fig. 17.
5. Pack bearings with synthetic type grease (e. g. Mobil 1) and stack in place and set aside on top of work bench.



Fig. 18. Bearing being packed with grease.

Note: Fig 21 & 22 are wrong. Bearing is backwards. See next page from the maintenance manual for correct placement.

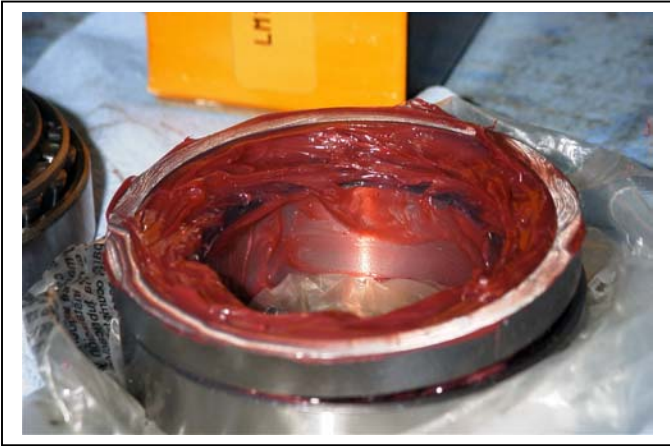


Fig 19. Note spacer ring in place on top of lower bearing.

5. For the next series of steps, it helps to have a helper present.
 - a. Thread press bar forcing screw through OTC puller bar and set aside. Make sure screw nut rests on top of the bar.
6. Lift hub up out of the wheel on one side high enough to place the axle cavity pressing screw retainer in center of hub axle bore. While holding retainer in place, tilt hub back down as far as is still comfortable.



Fig. 20. Axle cavity pressing screw retainer.

- b. Place packed bearing set stack in place on end of hub shaft and thread the forcing screw and puller bar, assembled in step 5a above, through the center of the bearings. Secure screw into retainer in center of the

hub and then back it off a quarter turn. This facilitates removal of the screw without need for a tool to hold the retainer while backing it out.



Fig. 21. Bearings stacked on top of hub shaft. Note OTC puller bar and pressing/forcing screw in place on the shaft.

With 1-1/8" combination wrench, turn screw to press bearing set in place until it bottoms on the hub stop. The stop is visible in Figs. 15 and 17 above.



Fig. 22. Pressing bearings onto hub shaft by turning nut on the forcing screw with a wrench.

7. After bearing set is pressed in place, disassemble and remove bearing press hardware. Dave Lenzi says it works better to first install the inner seal into the

10 knuckle, then inner bearing, race, spacer, race and outer bearing then draw hub shaft into the knuckle.

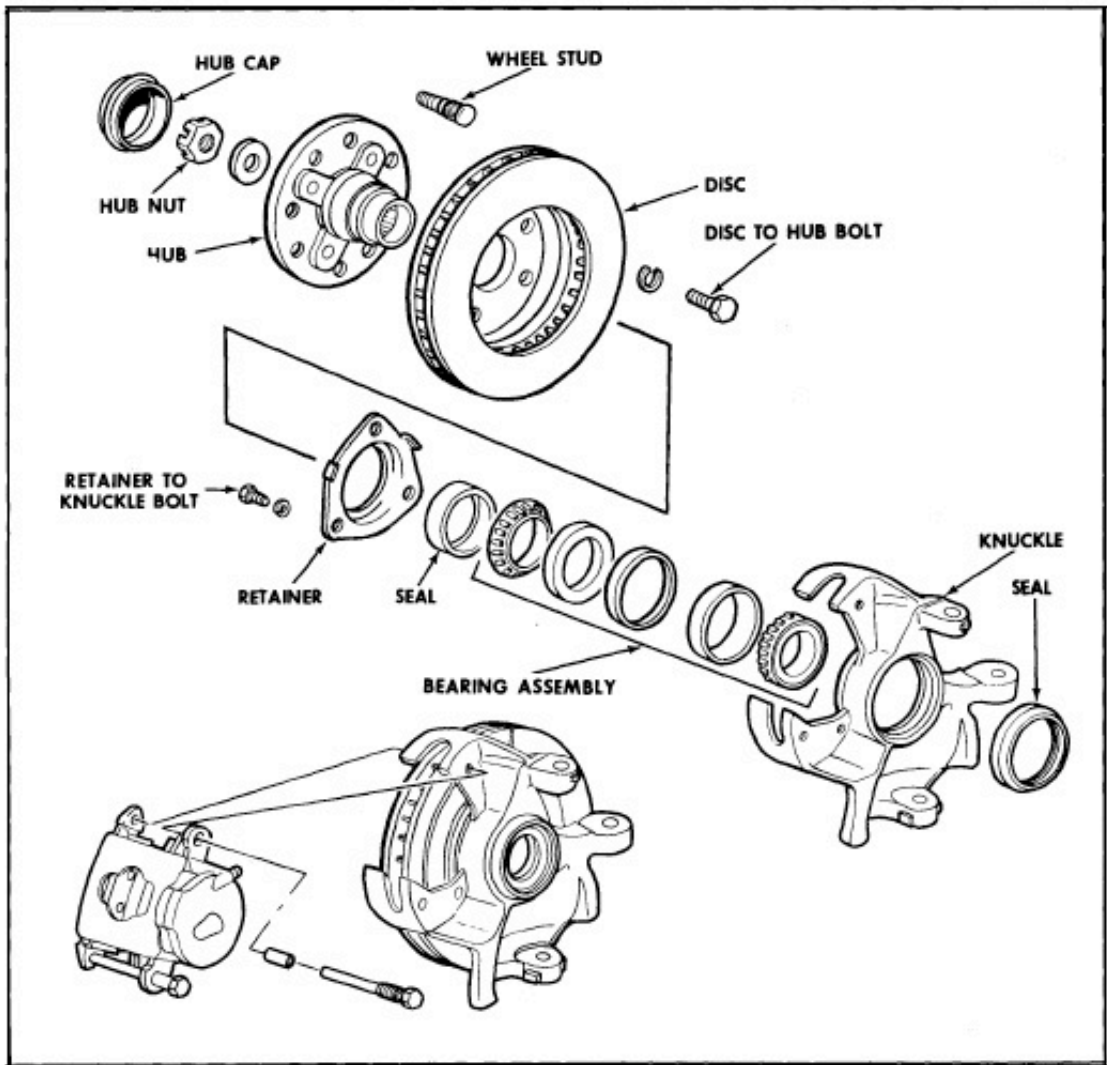


Figure 6—Disc and Hub Assembly

8. Pull up outer seal retainer plate, thread three bolts in place, and tighten.



Fig. 23. Threading inner grease seal retainer plate bolt in place.



Fig. 24. Inner grease seal retainer bolt being tightened.

9. Pack remainder of inner grease seal retainer plate bolt hole openings with grease for corrosion protection.



Fig. 25. Packing bolt holes with grease.

10. Chamfer metal edge of inner seal. Doing so facilitates seating the seal in the bore of the knuckle.



Fig. 26. Using a file to chamfer metal edge of inner seal.

11. Set inner seal in place on knuckle by lightly tapping on it with a soft-faced hammer and line-up punch. Leave metal part of the seal stick up ~ 1/8" above face of knuckle bore.

Assembly is now ready to mount back in place on the coach.

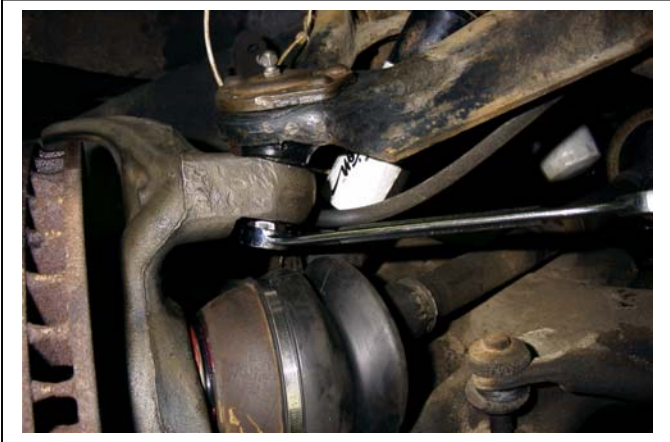


Fig. 27. Upper ball joint nut being tightened in place.

12. To mount assembly on the coach, lift and maneuver it so that end of axle shaft is threaded through the back side of knuckle and then lift it onto stud of lower ball joint. Hold the assembly in place while threading nut onto ball joint stud finger tight.
13. Push down on upper A-arm with one hand and guide upper ball joint stud into upper ball joint eye of knuckle. You may find it helpful to slightly jack up lower A-arm to facilitate connecting.
14. Place tie rod end stud in knuckle steering eye and thread nut finger tight on it to secure it in place.
15. Torque both upper and lower ball joint and tie rod stud nuts to 35 lbs-ft. Secure nuts with cotter key in hole in the end of each stud.
16. Thread axle nut on axle shaft and tighten to 120 lbs-ft if able to do so before axle spins. Otherwise, wait until wheel is reinstalled to finish torquing.



Fig. 28. Axle nut being tightened.



Fig. 29. Tightening axle nut draws the outer CV joint, seen on the right side above, in close proximity to back side of the knuckle, on the left side, and in the process seats the inner grease seal lips.

17. Replace caliper
18. Replace front wheel.
19. Repeat process on other wheel.
20. Remove jack stands and lower jack.
21. Tighten axle nuts to 120 lbs-ft and install cotter key in axle. If need be, torque nut until it lines up with axle hole, not to exceed 280 lbs-ft.

22. Replace hub dust cap and hubcap (if original steel wheel is in use).
23. Test drive, noting temperature of hub after stopping. Note inside of wheel to see if grease is leaking past seal.

------(end)-----

NOTES SECTION