APPLIED GMC 510-440-1101 / 1 (800) 752-7502 47626 KATO RD. FREMONT, CA 94538 GMC ALL DISC BRAKE KIT

Shade Tree Mechanic's Guide to Disc Brake Upgrade Installation Instructions

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Note: These instructions are based on an installation of the six wheel disc upgrade kit by a shade tree mechanic. It is complete to the best of the author's ability to accurately record the steps involved. Following these instructions should aid in the installation of this upgrade but cannot guarantee or warrant a successful installation. Your results are your own responsibility and if there are any questions about a step in the process, please seek assistance by calling Applied GMC.

The following instructions take you through the installation of the rear disc brake upgrade. Inventory your parts to make sure that the kit you received included all the necessary parts.

Disc Brake Upgrade Parts:

- 4 Wheel Disc Upgrade
 - 4 disc rotors
 - 4 calipers with pads
 - 4 backing plates
 - 4 spacers
 - 2 sets of SS brake hoses (2 hoses to a set) with banjo connection for 80mm calipers and 4 banjo bolts
 - 1 parking brake line valve
 - 16 bolts ($\frac{1}{2}$ 13) to mount rotors to hubs
 - 2 junction fittings to mount on the bogies
 - Disc-to-Disc proportional valve is highly recommended (optionally, you might want to purchase the pigtail adapter cable to make the electrical installation easier)

• 6 Wheel Disc Upgrade (all the above plus the following)

- Extra capacity master cylinder with special mounting bracket
- Sensitized brake booster
- 1 set (2 hoses) SS front brake hoses with retaining bracket with banjo connection
- 1 set of above listed brake hoses will have connection to fit OEM 70mm calipers

Special Tools Needed:

- 3/8 ", 7/16", and 1/2" tubing wrenches
- 10 mm tubing wrench
- Tube bender if installing larger capacity master cylinder
- Impact wrench See instructions for removing drum bolts without an impact wrench
- GM Allen wrench for caliper bolts

Prior to beginning installation:



- 1. Before beginning this project, grind the casting bosses off of the four new calipers to prevent them from interfering with the backing plates. The two to be used on the front must be completely ground off. The two to be used on the rear/front are not as critical.
- 2. If you plan on painting your calipers, now is a good time to complete this task. Allow sufficient time for the paint to dry based on the instructions included with the paint.
- 3. If repacking the bearings (highly recommended) purchase four wheel bearing seals to have ready for reassembly of the hubs to the spindles.
- 4. Purchase sufficient brake fluid for replacing all the fluid and for bleeding the brakes. 2 32 oz bottles recommended (more may be needed if you have trouble removing air from lines).

If installing the six wheel disc brake upgrade, it is more efficient if you remove the front calipers and install the new 80mm calipers on both sides before continuing with the rear brakes. Also, if you can lift the coach to get all six wheels off the ground and adequately block the coach for safety, then this will make the entire job much easier. If only doing the four wheel disc upgrade, proceed to the "Rear Disc Brake Installation" section.

Front Brake Installation:

- 1. Jack and support the front of the motor home using your preferred method so that both wheels are off the ground. Be sure to adequately block the coach to prevent serious injury. Note: Lift entire coach if possible.
- 2. Remove the front wheels.
- 5. Remove the cotter pin and castle nut (or some call this a castellated nut) on the upper ball joint to free up the brake hose bracket. Remove the brake hose bracket attached to the frame.

- 6. Unfasten the brake line attached to the brake hose and unfasten the brake hose from the caliper. Remove the clip holding the brake hose and remove the brake hose. Be prepared to plug the brake line to keep brake fluid from going everywhere.
- 7. Replace the castle nut and cotter pin.
- 8. Remove the caliper. If removing the right hand side, it helps to turn the steering wheel to the left which allows the caliper bolt to be removed easily. Turn the steering wheel to the right when removing/installing the left hand caliper. Make sure to retain the noise dampening clip for use when installing the caliper on the rear/rear. (Note: If you are painting your calipers, this is a good time to paint the front calipers so they will be dry and ready to install on the rear/rear wheel.)
- 9. Install the disc pads into the new 80mm caliper and install the caliper. Be sure to mount the caliper marked with an "R" (embossed on the back of the piston casting) on the right side and the one marked with a "L" on the left side. If installing the EBC yellow disc pads, make sure to stick the noise dampening plate to the back of the disc pads.
- 10. Install the new SS brake hose. Attach the end to the original bracket using the large nut to secure. (Note: do not initially tighten the large nut until the other end is attached to the caliper.) Attach the hose to the caliper using the provided banjo bolt. Adjust the hose so that it is twisted properly to lay close to the upper A-arm then tighten the large nut. Attach the brake line to the end of the new brake hose.





- 11. Position the provided bracket onto the A-arm and mark where best to drill a hole. It is possible to use one of the bolts removed from the rear metal brake line attached to the Bogie Arm, in which case drill the hole with a 5/16" drill bit. Or, drill a hole sized to your choice.
- 12. Put the brake hose into the channel of the bracket and crimp the edge down to hold the hose in place. It is also possible to slit a length of 3/8" rubber hose and put around the brake line then insert into the bracket channel then crimp the edge down a little to retain the hose. A nylon zip tie can be used to insure the hose stays in the channel. This will prevent the brake hose from chafing in the bracket channel. Have a helper turn steering wheel from lock to lock while observing the hose to ensure there is no



binding.

13. Repeat these steps for the other front disc brake.

Rear Disc Brake Installation:

When installing Rear Disc Brakes you can completely finish one side before going to the other side.

- 1. Jack up the coach on the side you are working on and make sure to adequately block the coach to prevent injury. Note: Lift both sides, if possible.
- 2. Remove the wheel.



- 3. Remove the drum brake and hub assembly. Now would be a good time to check and repack the wheel bearings. If not repacking the bearings, then be sure to cover and protect the bearing, bearing races, and hubs from becoming contaminated. Note: It is highly recommended that the rear wheel bearings be repacked at this time.
- 4. Place drum and hub assembly upside down onto a wheel laying on the ground in order to make it easier to work on the hub.





5. Using an impact wrench, remove the 8 bolts holding the drum to the hub. If you do not have an impact wrench or the wrench does not break the bolts loose, then use a breaker bar with an extension. With the hub mounted on the wheel, you can easily hold the assembly while breaking the bolts loose.

6. Place spacer onto hub, then place the rotor onto the hub and install with (4) $\frac{1}{2}$ – 13 bolts.



- Repack bearings and replace rear bearing and seal (there has been some problems with getting the correct seal, see here: <<u>http://gmcmotorhome.info/rear.html#BEARINGS</u>
) – cover to protect until ready to install rotor and hub assembly.
- 8. Take loose the emergency brake cable and remove the clips holding the cable for the front and rear wheels.
- 9. Remove the emergency brake cable from the actuator lever and remove from the backing plate. If you can remove the cable retaining clips and pull the cable free from the backing plate, it will be easier to remove from the actuator lever. It might be easier to just take the brake shoes off of the backing plate. It is then easy to remove the actuator lever and unclip and remove the cable from the backing plate. Remove the drum backing plate by removing the four bolts. Retain the bolts for later use on the disc backing plates.





- 10. Install the disc backing plate with the center of the caliper attach points in the 12:00 o'clock position. Make sure the backing plates are installed with the countersunk holes out so that the bolt heads are recessed.
- Install the rotor and hub assembly and adjust bearing load as per instructions in the shop manual (also instructions available here: <<u>http://gmcmotorhome.info/rear.html#BEARINGS</u> >). Insure that the rotor does not contact the backing plate mounting bolts. It may be necessary to grind the top of the

bolts slightly to provide adequate clearance.





12. **Rear – front wheel caliper install:** Stick the anti-noise shims onto the pads and install the pads into the caliper. Install the caliper marked for the Left side (marked with an L on the piston casting) on the right side wheel (for left side – use caliper marked with an R). This will position the attach point for the banjo bolt toward the center of the bogie allowing much easier fitting of the brake hose. Do not tighten the caliper because you will need to remove for bleeding.



Rear – Rear wheel caliper install: If this is a 6 wheel upgrade kit, then install the caliper removed from the front wheel onto the rear-rear wheel keeping the caliper marked for right on the right side. Otherwise, install the new caliper keeping the caliper marked with an "R" on the right side. Again, keep the caliper marked "L" on the left when doing that side.

- 13. Install the brake hoses using the supplied banjo bolts. For the 6 wheel upgrade, in the rear-rear caliper (the original caliper from the front), use the hose with the correct fitting (not a banjo fitting). It is easier to install the hoses onto the junction fitting then attach the original tubing before bolting the junction fitting onto the bogie (there is not enough movement in the original tubing to easily get it into an already bolted in place junction fitting). Eventually, the hoses will be zip tied to the bogie arms but you should wait to do this until after the bleeding operation.
- 14. Repeat steps 1 13 for the other side.

Installation of Master Cylinder and Sensitized Booster (six wheel disc brake upgrade)

1. Remove old master cylinder and bracket.

- Remove old booster. Removing the booster requires removal of the lower panel of the dash. Then, to provide better access to the four nuts holding the booster, part of the dash can be cut without showing and without causing any structural integrity problems. You might consider using a multi-tool. Follow this link to a thread on making access cuts to the dash: <<u>http://gmc.mybirdfeeder.net/GMCforum/index.php?</u>
 <u>t=msg&goto=103290&rid=1215&srch=sensitized+booster#msg_103290</u> >
- 3. Install new sensitized booster.
- 4. Install new bracket for the master cylinder. This bracket goes between the master cylinder and booster (the original bracket was attached to the front side of the master cylinder).
- 5. Bench bleed the master cylinder as per instructions included in the box.



6. The original master cylinder had the line for the front brakes coming from the rear reservoir and the back brakes from the front. The new high capacity master cylinder has the lines reversed. This causes some additional work to bend the lines to attach to the correct reservoir. A small hand tube bending tool can aid in this task. Take care not to kink the tubes.

Installation of Disc-to-Disc Proportional Valve (Optional, but recommended)

- 1. Remove old proportional valve. Be sure to use tubing wrenches to avoid rounding off the tubing fitting.
- 2. Install new proportional valve. All tubes should fit the same as the old. The electrical connection for notification of brake failure is different on the new valve. You must either devise a connection approach or purchase an adapter (available from Applied GMC).

Installation of the Parking Brake Valve

- 1. The parking brake plunger should be mounted on the parking brake lever base and bolted down.
- 2. Use the right angel elbows and attach the line from the master cylinder to the proportional valve.
- 3. Utilize the tubing provided to attach the parking brake valve to the proportional valve.

Bleed the Brake System

Beginning with the right rear-rear, bleed the rear calipers. Repeat steps in sequence with right rear-front, left rear-rear, then left rear-front.

- 1. Remove the caliper mounting bolts, tip the caliper up so that the bleeder screw is at the top.
- 2. Take the cover off the master cylinder. Open the bleed screw on the caliper, then wait for gravity to fill the caliper with fluid. Move the caliper around some and tap with a hammer to dislodge air. When the fluid runs clear tighten the bleed screw and re-install the caliper.
- 3. If doing the six wheel upgrade, proceed with bleeding the right front caliper then the left front caliper. These calipers should be oriented correctly for bleeding without having to remove the caliper.
- 4. Put the cover on the master cylinder, press the pedal and it should be high and firm. Check for leaks in the hydraulic connections. Re-check the pedal. If it does not pump up and remain firm but is spongy, then you may need to do some further bleeding either with a power bleeder or by using the pedal. In this case, care needs to be taken when removing the rear calipers to tip the caliper so that the bleeder is at the top. The caliper needs to be slipped back onto the rotor behind the backing plate so that the piston has something to "push" against to prevent blowing out the piston. Alternately, you could use a C-clamp to keep the piston from expanding out during this bleeding method.
- 5. Once the bleeding has been completed, use zip ties to secure the brake hoses to the vertical bogie arm structure.
- 6. Replace wheel. Rotate wheel and check that there is no contact with the calipers and that the brake hoses are secured adequately to not interfere with the wheel/tire.
- 7. Test drive. Also, if your kit came with the EBC (yellow sticky pads), follow the instructions included in the box for proper breaking in of the pads.