

Rear drum to disk conversion for a '00 Toyota Camry LE 4 cylinder

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*** THIS IS A SERIOUS JOB. The activities described here will affect your brake system and can cause it to be inoperable due to error, or if a part fails during operation. Any work where you go under the car is dangerous, so be careful. ***

I can't promise it will work for your car or that I will provide any support beyond the information here. Feel free to re-distribute this – just point back to the forums and sites listed below. Let me know if you have any suggestions or comments – kocho_chestimenski@yahoo.com.

Thanks to all folks on the www.toyotanation.com, www.camryman.org and SC3 forums that provided information and advice. Thanks also to the Australian car web site that pointed me to (and has a copy of) another drum to disk conversion project for an older car and to whoever created it at smellytofu.com (although I can't find this anymore).

Problem

Brake fading, vibrations and noise at moderate to hard braking at highway speed or during repeated braking at slower speeds, especially when the car is loaded

Cause

Rear drum brakes

Solution

Install disk brakes from a v6 Camry.

Step-by-step instructions

I strongly suggest you do one side first and do not disassemble the second side until you are done with the first – you will likely need to look at the still assembled side for a reference.

I am assuming that you will be reusing your own wheel hub. If you buy a complete brake/hub/axle-carrier assembly, some of the steps described below will not be necessary and it will be a little bit easier to do the swap (just make sure your new hub is good). If you remove the axle carrier, you may need to get an alignment done. Otherwise an alignment should not be necessary.

A. Preparation

1. Set a day aside – it took me about 8 hours (two sessions of about 4 hours each) on my own with no power tools and being my first time doing this I took my time.

- Plus I had to redo some steps as I missed something or put things together incorrectly. Make sure you can get to an open parts store if necessary (have a friend's car handy). Better yet - get your friend to help. A shop should be able to do this for about 3 hours I estimate.
2. Get all parts, supplies and tools (see the provided list). Attach all internal brake parts to the backing plate, including the parking brake cable, before starting work on the car. Make sure everything fits together and you have all bolts and other stuff.
 3. Get a printout of the rear brake and related areas to use as a reference during work.
 4. Make sure your car is not hot – you will be working around the exhaust pipe.
 5. Make sure your brake fluid reservoir is up to max and that you have at least one bottle of new brake fluid at hand.

B. Removal and installation

6. **Lift the car.** Jack-up the car and secure on jack stands or use a lift so that you can comfortably and safely get under the car all the way from the rear to the middle under the cabin.
7. **Remove the rear wheels.**
8. **Clean-up** the fender gap and brakes area from dirt and grime if needed.
9. **Prep fasteners.** Apply Liquid Wrench or PB Blaster on the fasteners that you will be removing, if they are rusty. For my car it was not really necessary, but it won't hurt and will make the removal easier.
10. **Loosen the parking brake cable.** Detach one of the parking brake cables from the brackets so that the cable becomes loose. Do not detach the cable from the brake; just detach the brackets holding it in place to the car underbody. Make a note of the position of the brackets – better yet don't remove the second cable yet so you can use it as a reference.
11. **Remove the heat shield on the exhaust resonator.** Remove the two nuts holding the heat-shield above the exhaust resonator from the rear and the one in the front. Remove the heat shield.
12. **Detach the loosened parking brake cable from the puller plate.**
13. **Remove the drum.** Make sure your parking brake is released. Use two bolts in the drum's two holes made for the purpose of pulling it out of the brake assembly. Use a hard plastic hammer or a regular hammer and a piece of wood to loosen the drum. Without a hammer to loosen the drum you will likely strip the threads off the drum. Be patient and screw-in the bolts evenly and only a turn or two at a time, hammering out the drum repeatedly to help it loosen-up.
14. **Clean the brakes with brake cleaner.**
15. **Remove the wheel hub.** There are four bolts holding the wheel hub (and thus the backing plate) to the axle carrier. Remove them, using an extension for your socket wrench to reach through the openings in the hub. Once you have all four bolts removed, pull-out the hub – it should just come off easily. If it is stuck, loosen it up carefully with the plastic hammer or a regular metal hammer with a piece of wood. Take it out carefully as not to damage the anti-lock brake sensor in the axle carrier or the teeth on the hub. Make sure you don't let any dirt or other

- contaminants get in the bearing (in the hub) or on the ABS sensor (in the axle carrier opening).
16. **Detach the parking brake cable from the brake pad puller.** Disconnect the cable from the puller in the brake assembly. No need to detach the cable housing with the two bolts on the back of the plate. You will not be reusing the cable – the disk brake cables are different – so you can leave it attached to the drum brakes.
 17. **Loosen the brake flex line.** Remove the bolt holding the flex line to the strut. This way you'll be able to loosen the backing plate first, before spilling a drop of brake fluid (do not detach the flex line from the metal brake line yet).
 18. **Loosen and remove the backing plate.** It may just be ready to come off when you pull it. If it is stuck, you may need to hammer it out carefully with a soft plastic hammer or with a regular hammer with a piece of wood. Notice that there is a rubber o-ring around the center hole of the backing plate. You should replace this o-ring with a new one later in the process. Clean-up rusty metal areas with fine sand paper if necessary.
 19. **Detach the flex line from the metal line.** Open the brake fluid reservoir and make sure it is filled to the “full” mark with brake fluid. Use a flared wrench and counter with an open-ended wrench to unscrew. Once you unscrewed the nut, remove the spring plate holding the flex line in place and remove the line. Make sure you have a pan to collect brake fluid as it will spill out. Also make sure your new caliper has a flex line attached to it and ready to get attached in place of the one you just removed. You cannot reuse your old flex lines – the disk brake caliper needs a different line than the drum brake cylinder. You want to lose as little fluid as possible at this step and keep the hydraulic system exposed to air for as short time as possible. If you start losing too much brake fluid, fill-up the reservoir with more fluid so that no air enters the system from the reservoir side.
 20. **Attach the new flex brake line.** Your new flex brake line should be attached to the caliper before starting work (to minimize the fluid loss and the time you have the brake system exposed to air, dirt and humidity). Attach the flex line to the metal brake line, put back the spring plate to secure the line in place, and securely tighten the nut to connect the two lines. While doing this, keep your caliper hung with a piece of wire or rope to the rear suspension spring so it does not overstretch flex line. Clean-up the area with brake cleaner and rags – brake fluid may cause spots on paint.
 21. **Install the new backing plate and wheel hub.** Slide the plate on the axle carrier. All brake parts and the parking brake cable should have been attached prior to this operation. Install the new o-ring around the center hole. Apply some bearing grease if necessary so that there is a good seal (make sure you do not cover the ABS sensor with grease, although it probably won't hurt either way). Align the bolt openings and install the hub. Torque the four bolts gradually (do a star pattern and a couple of passes) to the specified torque. Double-check the torque and all connections.
 22. **Install the brake disk.** Align it so that the opening for adjusting the parking brake is aligned with one of the large openings on the wheel hub. There are two openings on the hub but one is off-center as is the opening on the disk. Make sure these one is lined-up with the opening on the disk. Attach the disk with a couple

- of lug nuts temporarily and adjust the parking brake pads (see your repair manual for details). Place the rubber cover plug on the parking brake opening.
23. **Install the caliper mounting plate.** Attach the mounting plate with the two bolts with locking washers and torque to spec.
 24. **Install the brake pads on the mounting plate.** Make sure all springs and anti-squeal plates are properly installed. Lubricate the plates before installation with a small amount of caliper grease or other anti-squeal compound. Make sure you do not put too much and that there is none on the braking surfaces. Excessive amounts will be squeezed-out when applying the brakes and will create a mess and possibly incapacitate your brakes if it gets on the braking surfaces.
 25. **Install the caliper.** Lubricate the pin holes with caliper grease (some small amount comes with the caliper repair kit, but be prepared to use more). Quality caliper grease is important – use synthetic if possible for better temp resistance. Make sure the rubber boots around the two pins are secured in place and lubricated on the inside. You may need to press-in the caliper piston before attempting to install the caliper to clear the brake pads (press it in before connecting the flex house – will be easier). I was able to do this by hand; a c-clamp may help. Put in and tighten to spec the two sliding pin bolts – make sure the rubber boots are still properly attached.
 26. **Attach the parking brake cable.** Route the cable carefully around the rear suspension control arm and attach it to the parking brake pulley first, before securing the other brackets of the cable. Re-attach the other brackets.
 27. **Bleed the brake.** Bleed the brake as per your bleeding kit instructions or refer to your repair manual. Keep bleeding until no air comes out. Make sure you keep the brake fluid reservoir full. Verify you have a firm brake pedal feel after the bleeding is complete.
 28. **Do the other side, test drive.** Go slowly till you make sure it stops fine. Double check for leaks a few times – old calipers and line connections may leak.
 29. **Adjust the parking brake cable.** If necessary, adjust the slack on the parking brake cable. The brake shoes should have already been adjusted through the adjuster in the brake. The parking brake may still need to be adjusted – the tensioner can be accessed through the parking brake slot with the help of a craw-foot wrench and a deep socket (size 10mm for both). This way you do not need to remove the center console to do this adjustment. Be careful not to drop the tools in there (and have a magnetic pick-up tool at hand, in case you drop something in)

C. Some general advice

- Keep all fasteners in a safe place – you will reuse them if they are in good condition. You can just screw some of them by hand back where you took them from until you need them again during the swap.
- Use proper anti-locking compound on the fasteners.
- Double-check everything as you go so that there is no doubt in your mind you did it right. It's bad if you can't remember if you applied the right torque to the hub mounting bolts. You wouldn't want to drive if unsure, and the only way to check is to undo half of what you already did (trust me on this one ☺)...

- Refer to the diagrams to confirm the proper torque even if you think you remember it.

D. Parts List

Here is my parts list. You can source the parts differently from me (e.g. buy new or reconditioned, as opposed to from a junk yard). Here's what I used:

From a junk yard:

I used parts from a '00 Toyota Camry LE v6 with antilock brakes. I'm not sure if it was a Japan or US built. You can most likely use any '97-'01 model and possibly even later or earlier generations (with or without ABS), but I can't 100% confirm that. I used some springs and bolts from a Gen3 because some of the ones in my Gen4 v6 were lost at the junk yard (other things may fit as well).

While at the junk yard, see if you can collect some spare brake springs, bolts etc. for the brakes – they often discard these things around the cars from where the parts are salvaged.

- 2 backing plates (best if you can get them with all springs, parking brake pads and parking brake cables attached) \$25 each. If any of the parts are not good – buy new from the dealer (e.g. retaining springs, brake pads, etc.) or poke around in the junk yard to see if you can get them from other cars
- 2 calipers (with brake pads and the flex lines attached, with the 4 mounting bolts for the caliper mounting plate to the brake backing plates), \$50 each. Toyota also sells the bolts for under a dollar each, so if these were lost at the junk yard, you can buy them from the dealership.
- 2 disks with the rubber plugs covering the brake adjustment opening, \$25 each. Only get disks from the junk yard if they are in really good condition from a new car. Otherwise – get new ones from a dealer or go aftermarket.
- Proportioning valve (goes in the engine compartment). This should have been \$35, but I got it for free. I did not install this because the rear brakes seem to have the right pressure now.

From the dealership:

- Toyota wheel hub o-ring set of two (\$8) - needs to be replaced when you reinstall the hubs
- Toyota brake fluid two bottles to be safe, although one might be enough if you do not lose too much (\$5 ?). Get more if you decide to use this opportunity to replace all your brake fluid.
- Caliper repair kit \$30, which includes everything you need to recondition both calipers. Recommended if you get older calipers or if they have damage on the rubber parts. It includes some caliper grease too, but might it not be enough. I only used the rubber boots though – did not want to mess with disassembling the calipers completely as they looked fine.

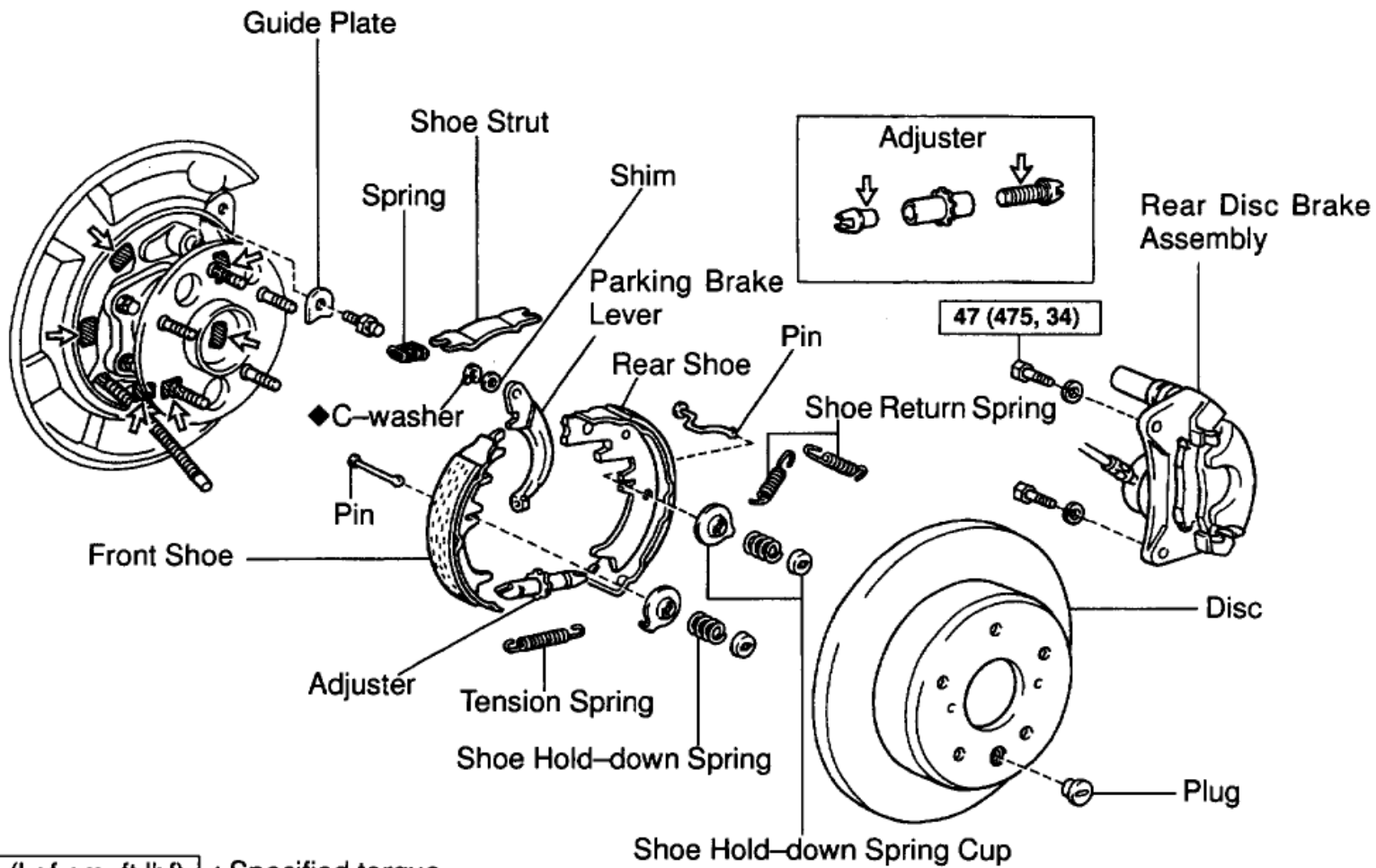
In addition, I got the following parts/supplies:

- Anti-rust spray paint (\$3) to paint the backing plates, since they had some rust. Used it also to paint the disks (except for the braking surfaces) as well. In retrospect, some high-temp would have probably worked better on the disks, as disks get pretty hot, but my paint is still holding fine for now.
- A jar of caliper grease (synthetic) \$7-8. Forgot the brand, but it is blue and very thick and the plastic jar comes with a brush attached to the screw-on metal cover. I'm very pleased with the way it is handling high temperature so far. Although you only need a little, get a whole jar. You can use it again next time you do brakes. Otherwise a pair of the small packages they sell at PepBoys might also do the job (although they do not say "synthetic")
- Resurface the disks if you got old ones. \$16 for the pair (\$8 each at PepBoys)
- Brake cleaner spray \$3
- Brake bleeding kit (one-man type with a valve so you do not need a second person to pump the brakes, \$5)
- Anti-seize paste (\$3)

Tools

- Torque wrench
- Metric socket set
- Metric open-end wrench set
- Flare wrench (10mm)
- Crow foot wrench (10mm)
- Deep socket (10mm)
- Flat-head screwdriver (the biggest you can fit through the disk parking brake adjustment hole)
- Pliers
- Hammer (hard plastic, or you can use a metal one plus a piece of wood)
- Collection pan for the fluids
- Rags
- Flash light with plenty of batteries
- Jack, jack-stands, or lift...

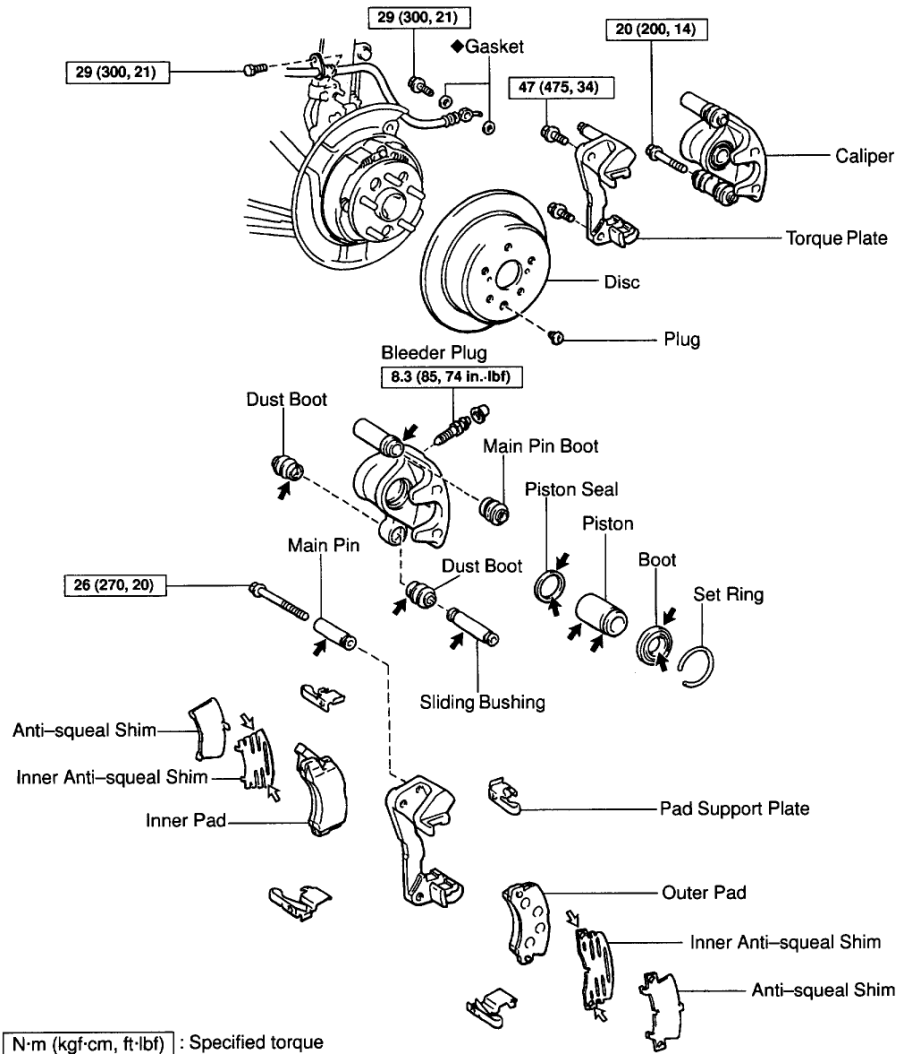
Diagrams and pictures



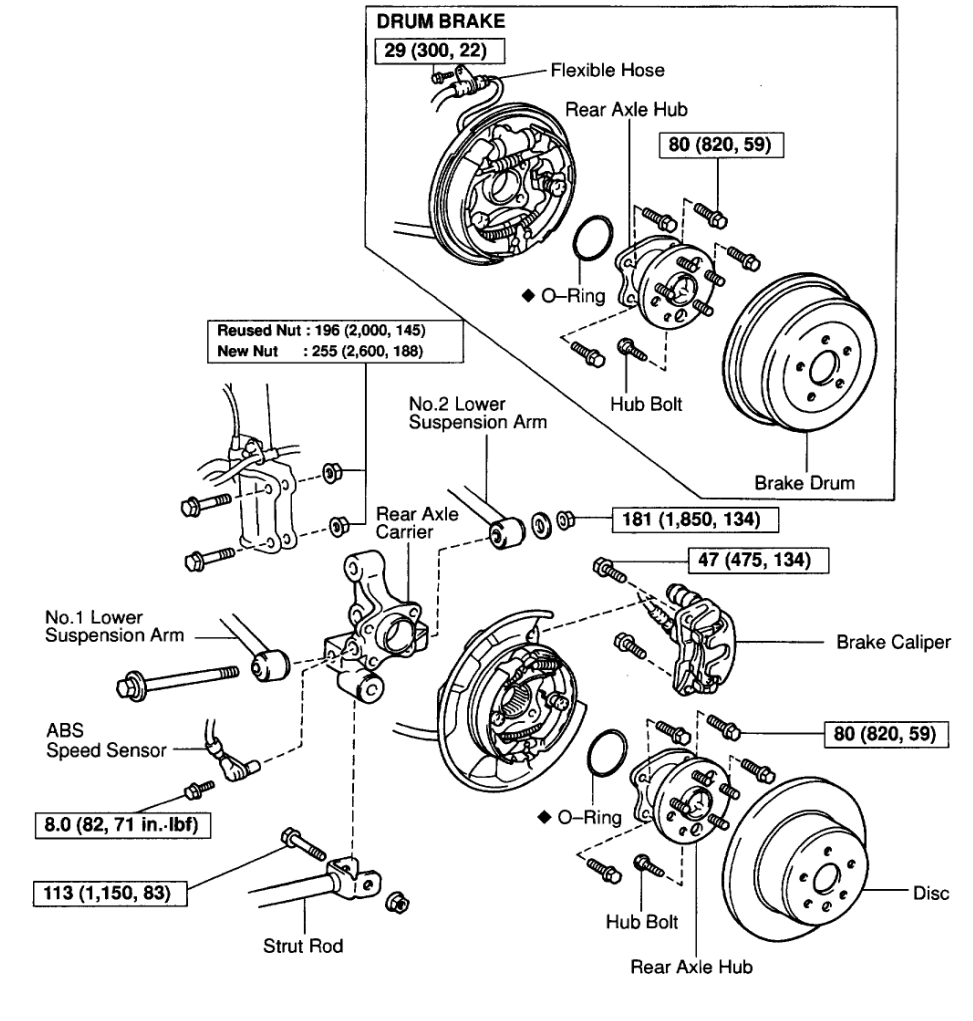
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

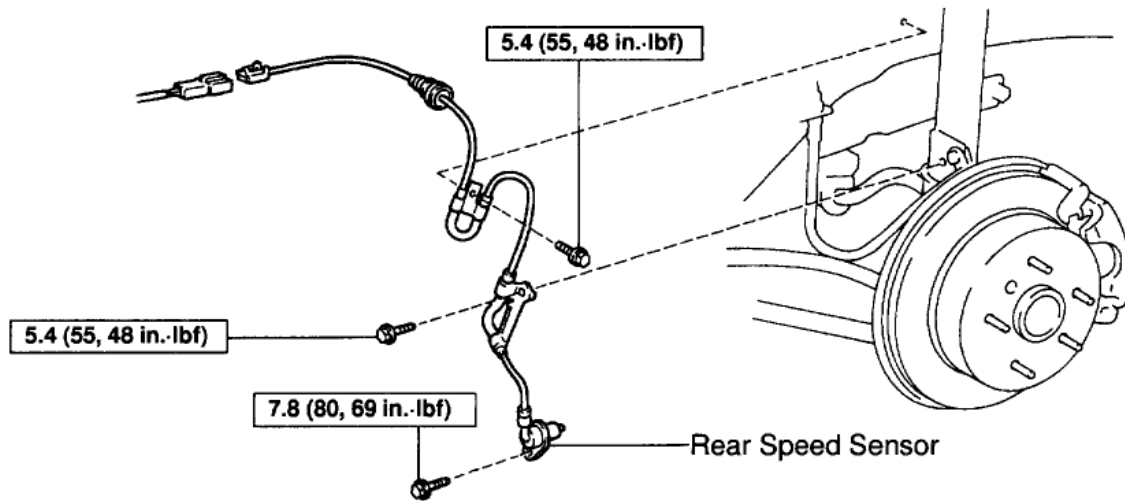
↔ High temperature grease



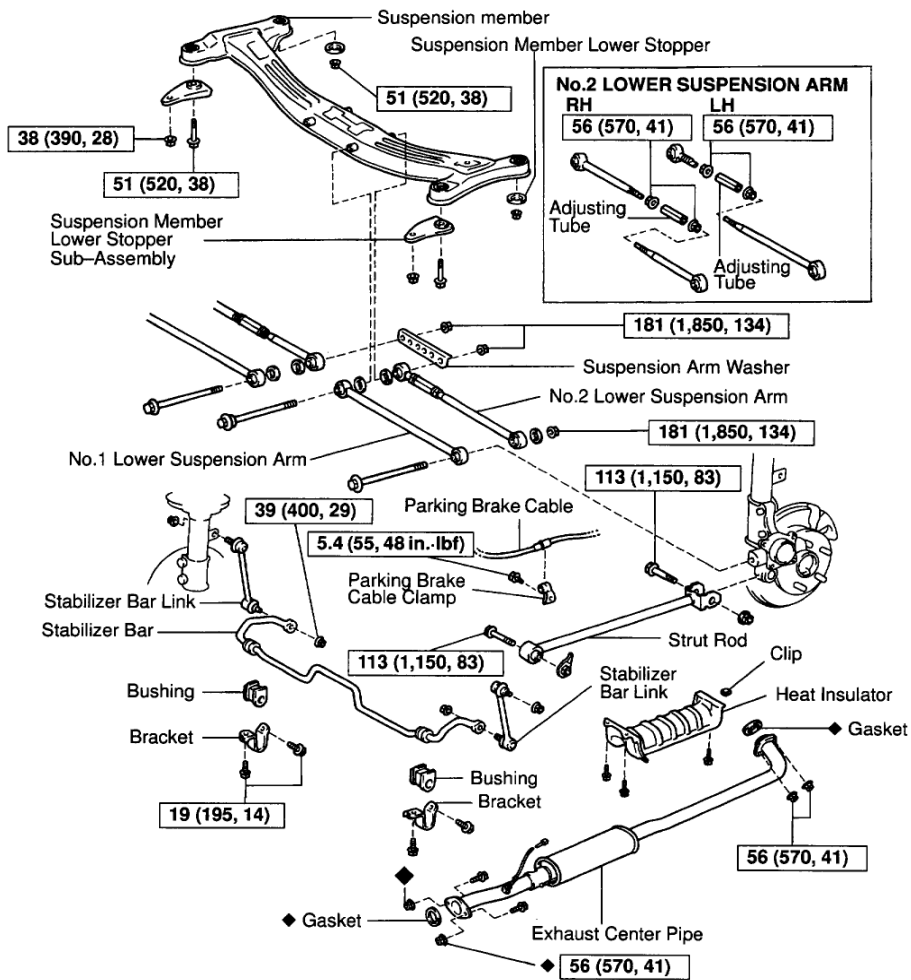
N·m (kgf·cm, ft·lbf) : Specified torque
 ◆ Non-reusable part
 ← Lithium soap base glycol grease
 ⇄ Disc brake grease



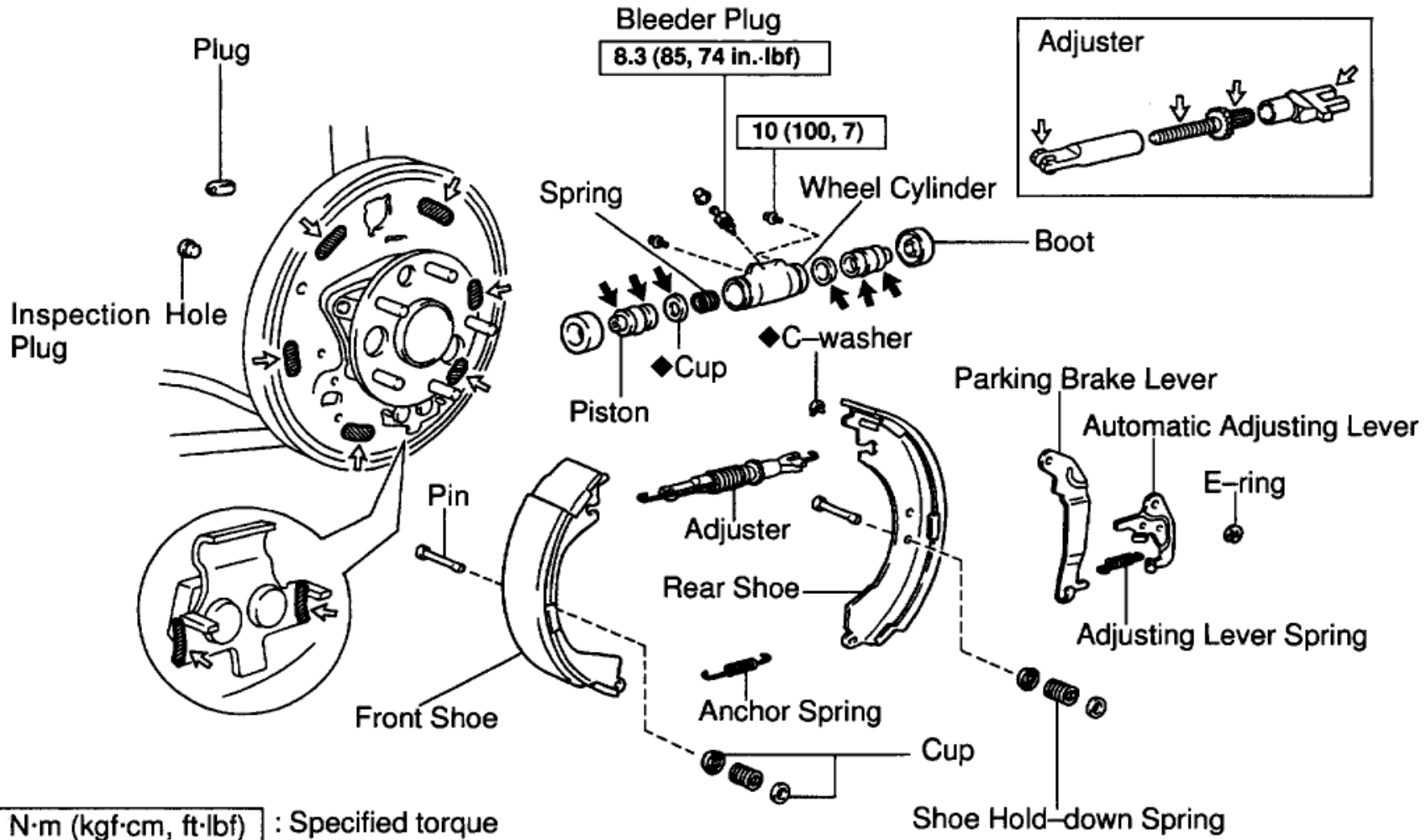
N·m (kgf·cm, ft·lbf) : Specified torque
 ◆ Non-reusable part



N·m (kgf·cm, ft·lbf) : Specified torque



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable torque



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

← Lithium soap base glycol grease

↶ High temperature grease



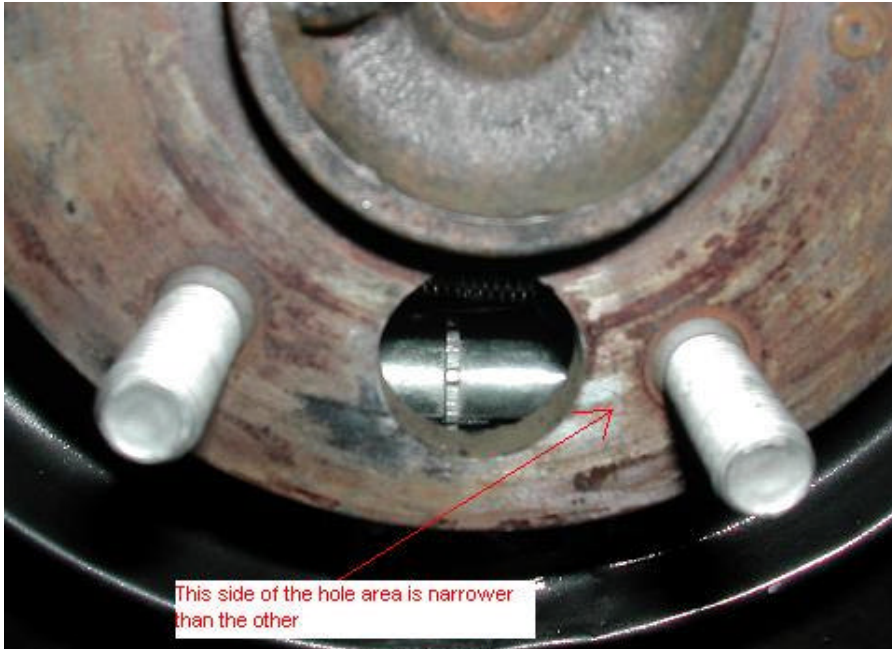
Up: drum and disk in the rear – before and after
Below left: drum backing plate; right – no brakes





Up-left: disk brake backing plate installed (old brake still hanging by the parking brake cable); right – the hub off the car
Below left: removing the spring plate from the brake

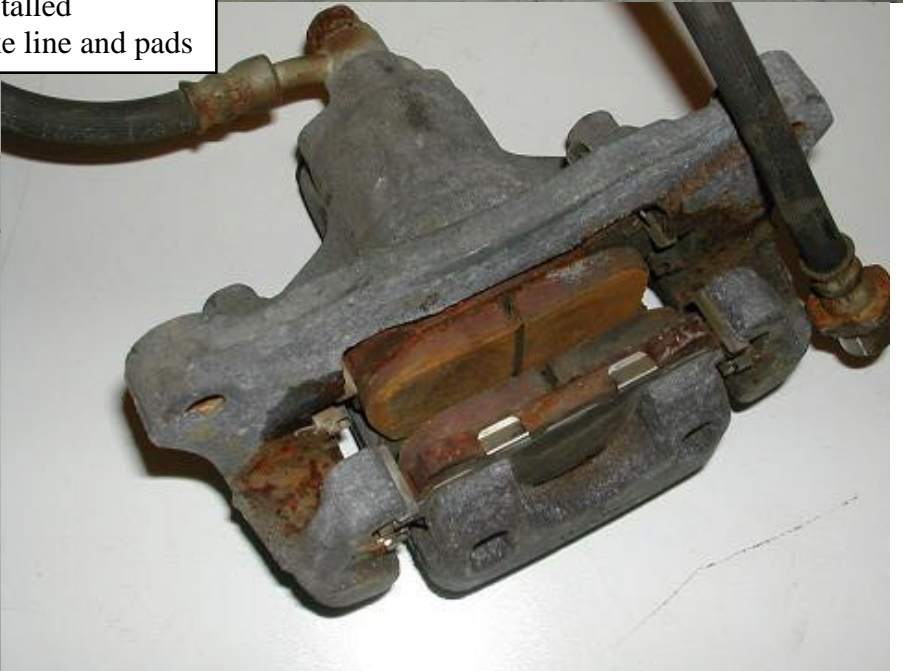




This side of the hole area is narrower than the other



Up-left: the adjuster for the parking brake; right – the disk brake installed
Below left: proportioning valve (not used); right – caliper with brake line and pads





Left: the disks – before and after (after me taking the rust off and before the shop resurfaced it)

Right: me sweating on the balcony while removing rust and smoothing a disk with a hand-file to get it to the “after” state. The disks were so rusty, the shop would not take them for resurfacing. I had to take the rust off with scrubbing attachment on my drill, then filed-away the roughest parts with a metal file... Use a dust mask if you do this – lots of rust and dust comes off. After I was done, the shop had no issues taking them and resurfaced them just fine – would have saved me much effort if they looked past the thick layer of rust...first cleaning these disks by hand was tough. In retrospect, if I had to do it again, I’d just buy new disks....