

Pertec FD400 Bearing Service

10 July 2015 Martin Eberhard

1. Cone Bearing

The cone bearing is glued into the plastic cone, and cannot easily be removed without damaging the cone. Fortunately, the dust covers of the cone bearing are removable, allowing the bearing to be serviced in place.

1. Close the drive door, and then remove the C-clip that holds the cone assembly to the cone arm. Retrieve and set aside the flat washer and spring washer that were beneath the C-clip.
2. Open the drive door, and remove the cone assembly. Remove the cone shaft and set it aside.
3. The bearing's dust covers are each held in place by a slim C-clip at the outside diameter of the dust cover. Only the top dust cover is easily removed with the bearing still in the cone. Remove the top dust cover's C-clip with a pointy tool, such as a fine awl or a large sewing needle. Keep your thumb over the center of the C-clip (opposite the split) while you work, so as not to let the C-clip fly away as it is released.
4. Gently nudge the dust cover with the needle to free it. Turn the cone over and tap it on your workbench, so that the dust cover will fall out.
5. Thoroughly flush the bearing with solvent until it looks clean and spins completely freely. (Contact cleaner works well for this.) Blow the bearing dry with compressed air or canned duster.
6. Use a small screwdriver to lay new grease all the way around the ball bearings, and then use your thumb to press the grease firmly into the ball bearings. Spin the bearing by hand a few revolutions. Repeat this step until you see grease ooze out around the bottom-side dust cover. Avoid getting grease on the plastic cone as much as possible.
7. Reinstall the top-side dust cover, pushing it all the way down into the grease until it is touching the ball bearings.
8. Set the center of the dust cover C-clip in place under the rim of the bearing race, and hold it there with your thumb.
9. Use a small screwdriver to hook both ends of the C-clip under the rim of the bearing race. Make sure it is seated correctly under the rim before removing your thumb from the center of the C-clip.
10. Clean up all excess grease with a clean rag. Pinch the center of the bearing, and spin the bearing quickly by rolling the cone along your rag. Clean up any grease the oozes out. Repeat this step until no grease oozes out either side of the bearing. Wipe the surfaces of the bearing clean with solvent on a rag. Run your rag through the center of the bearing to clean it too.

- Slip the cone shaft into the cone, and hold it in place while you reinstall the spring washer, the flat washer, and the C- clip that retains the cone assembly.

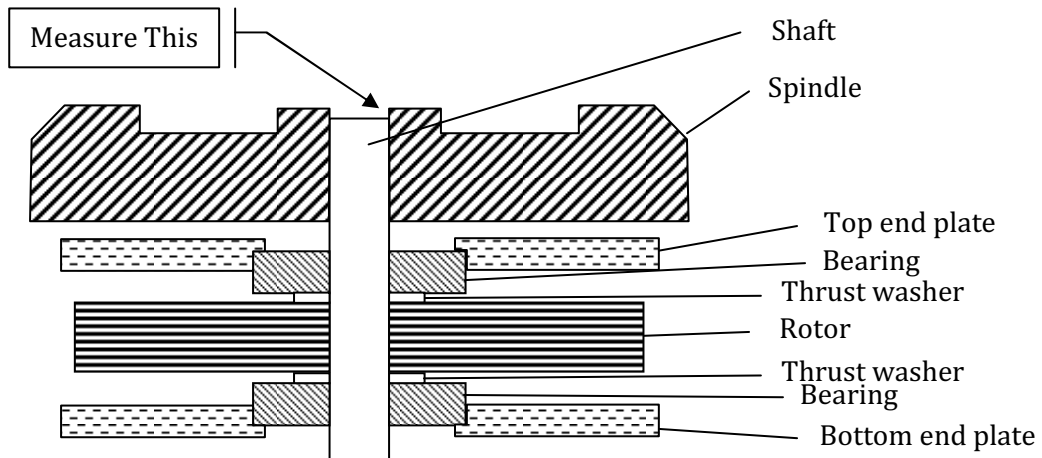
2. Spindle Motor Bearings

The spindle motor has two bearings. The dust covers of these bearings are typically crimped in place, rendering these bearings not easily serviceable. However, this bearing type is fairly common, and can be replaced. The original bearings were model 7R6, made by Nachi in Japan. Their dimensions are:

Outside diameter:	7/8"
Inside (shaft) diameter:	3/8"
Thickness:	9/32"

A suitable replacement bearing is model R6FF, made by MRC.

- Remove the disk drive's PC board and set it aside.
- Remove and set aside the four screws and four nuts that hold the spindle motor in place. Retrieve the two aluminum spacers between the spindle motor and the disk drive deck. (The index sensor assembly will now be hanging by its wires.)
- Stand the disk drive on its side and swing the spindle motor free, so that it can set on your workbench while its wires are still connected to the drive.
- Use a micrometer to measure and record the depth of the shaft within the brass spindle. (This is typically about 9 mm.)



- Remove and set aside the four screws and nuts that hold the motor together. Remove and set aside the motor's bottom end plate.
- The bottom bearing will probably come off with little effort. Retrieve and set aside the bottom thrust washer.

7. Remove the rotor (together with the top end plate and the spindle) from the motor.
8. Use a small wheel puller (e.g. Posilock Model 102) to remove the spindle from the motor shaft. Clean the shaft where the spindle was located, removing any traces of glue.
9. Remove the motor's top end plate from the shaft. Remove the top bearing. Retrieve and set aside the top thrust washer.
10. Take this opportunity to clean everything - the spindle, the rotor, the motor body, the end plates, etc.
11. Install the top thrust washer and the new top bearing. Install the top cover plate. (The top cover plate can be identified as the one that has indentations to hold the mounting nuts. The bottom cover plate has countersinks to fit the flat-head screws.)
12. Test-fit the spindle on the shaft. If it is not very tight, then use a drop of crazy-glue when installing the spindle on the shaft in the next step.
13. Use a press, a vice, or a C-clamp to press the spindle onto the motor shaft, carefully pressing it to the same position as you measured in step 4.
14. Install the rotor, bearing, top plate, and spindle subassembly into the motor, with the spindle on the same side of the motor body as are the wires that power the motor. Install the bottom thrust washer and bottom bearing, and then the bottom plate.
15. Use needle-nosed pliers to position the nuts (beneath the spindle) as you install the four screws that hold the motor together. Tighten these screws well, using a Philips screwdriver that really fits the screws.
16. Reinstall the motor in the disk drive, positioning the aluminum spacers between the motor and the disk drive deck, reinstalling the index sensor bracket at the same time. Route the motor wires around the post that mounts the PC board. Leave all four screws loose for now.
17. Close the drive door, positioning the motor such that the cone is centered (side-to-side) in the spindle, and tighten the rear two motor mounting screws. Open and close the drive door, observing the way the cone meets the spindle. Adjust the motor position until the cone meets the spindle evenly and smoothly. (Leave the front two screws loose so that you can align the index sensor.)
18. Reinstall the PC board, reconnecting its two connectors.
19. Perform a complete CE alignment, as described in section 4.5.5 of the *Pertec Models FD400/FD500 Flexible Disk Drives Operating and Service Manual No. 600500*.