Fox Alps

Fortunately the Fox Alps series of shocks are still decent performers today, and are a good option to run on older frames. However, they require regular maintenance, since, aside from cleaning, *the oil level is critical in the Alps*. Unfortunately, there is no one left who still works on them, and Fox can no longer supply parts or information for them.

This document specifically discusses the Alps 4r and 5r, and direct applicability to the 4 cannot be guaranteed.

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Parts of the shock

1. bushing
2. body
3. air valve
4. shaft
5. seal head
6. IFP *
7. urethane top out bumper
8. damper piston (negative coil spring not shown)
9. rebound adjuster

* There are two types of IFPs, a black one and a white one. The black one has the air side machined out giving the air chamber approximately 0.8cc more volume.

Parts List

Only the seals are still available new. Hard parts aren't available, nor are the urethane top out bumpers, nor the 4 and 4r wipers. For this reason I buy used shocks when they're cheaply available so I have replacements for those proprietary bits. New seals should be Buna-N (nitrile rubber)

Available parts:

222 quad ring (www.mcmaster.com) – main oil seal (4r,5r)
216 quad ring (www.mcmaster.com) – IFP seal (4r,5r), bottom out bumper (4r)
125 o-ring (www.mcmaster.com) – Under damper piston bushing on some 4r models
029 o-ring (www.mcmaster.com) – Oil seal on threads (4r,5r)
008 o-ring (www.mcmaster.com) – Adjuster oil seal (4r), bleed screw oil seal (5r)
007 o-ring (www.mcmaster.com) – Adjuster oil seal (5r)
AN-17 wiper (https://www.hydraulic-supply.com/pdf/736.pdf)– wiper (5r)

Known Problems

1. Cracked shaft – Unfortunately, there isn't much to be done prophylactically, aside from inspecting and replacing the main oil seal each time the shock is rebuilt. If possible, keep an extra shaft or two on hand.

2. Broken compression shims – The Alps uses thin compression shims, which displace quite far, and I've seen them snap. If you look at the compression shims in a used shock, you'll frequently see deformities from the stress. Like with the cracked shafts, there's isn't anything to prevent it from happening, aside from inspecting them and replacing them as needed. The shims used aren't a standard size, you so either need to make your own (hard) or steal some out of another Alps. Make sure the shim thickness is the same.

3. Broken negative spring – The coil negative spring in both the 4 and 5 will break. It's not so much a matter of if, but of when. When the spring fails, it usually eats the inside of the shock, destroying the shaft. Fortunately the spring may be removed without affecting performance. To remove the negative spring, gently pry it off its perch using a slotted screwdriver.

Installation on bike

Due to frame tolerances, especially on older frames, sometimes the shock won't line up exactly with the mounts on the frame. Usually the answer was to pull and push on things until you got it together. However, this causes unnecessary wear on the shock due to side loading. The easiest way to fix it is to sand down the outside of the bushing on one side, and use shims on the other side, until the shock is spaced so it effortless slips into the mounts.

Upgrades to the 4r

The Alps 5r is an easier shock to work on than the 4r due to the handy threaded bleed port and the seal head which uses a standard sized wiper. The 5r seal head is a direct replacement for the 4r's, and is a highly recommended upgrade. It allows you to buy new wipers for the shock, and 5r wipers also work better.

If you keep looking, you can probably find a 5r shock body to put on your 4r as well. The 5r shock body doesn't necessarily increase with the length of the shock, so be sure to measure the shock body itself to determine compatibility.

Tuning

The progression of the shock can be adjusting by adding 80w gear oil to the air chamber. The more oil added, the more progressive the shock. It also helps to seal and lubricate the IFP's quad-ring. To add oil, depressurize the shock, remove the valve core, and inject the oil using a syringe.

Rebuild

The 4's procedure is identical to the 5r, aside from the rebound adjuster service. Nothing is reverse threaded on the Alps. Pictured is a 4r.

1. The absolute first step is to release all the air and de-pressurize the shock. Be sure to record the pressure before doing so. Once it's empty remove the valve core entirely. **YOU CAN SERIOUSLY HURT YOURSELF IF YOU SKIP THIS STEP.**

2. Clamp the big seal head using a vise, only clamping it tight enough to keep it from turning. Use metal inserts to protect the aluminum seal head from the vise's teeth. I use steel downhill tire levers. Leaving the bushings in the body, put some sort of rod through the bolt hole, and use it to provide enough leverage to loosen the seal head. I usually use a long punch. If this is the first time the shock has been opened, the seal head will be very tight.

3. Have a bucket handy to catch the oil. Finish unscrewing the seal head over top of the bucket, and pull the two halves of the shock apart by hand. Frequently the urethane top out bumper will get stuck in the body, and then you'll need to pull hard to pop it out as you pull the halves apart. Be careful not the damage the urethane bumper, though, since it's not a standard part. Empty the oil out of both halves.

4. Use a pin spanner to hold the damping piston's end on the bottom of the shaft. On the 4r use the holes on the bottom of the piston, and on the 5r use the grooves on the inside edge of the piston. While holding the piston turn the shaft using a rod through the bolt hole of the shaft's bushing. Once the piston starts turning, finish unthreading it by hand and remove it. Remove the seal head from the shaft.

5. Connect a pump to the valve and pop the IFP out of the shaft. A floor pump is useful due to the higher volume of air.

6. Remove the quad-ring from the inside of the seal head, the o-ring from the outside of the seal head, the quad-ring from the IFP, and the quad-ring from the bottom of the damper piston (not present on 5r). Clean all the parts.

7. Inspect the shaft, negative coil spring, compression shims, and rebound shims (located on bottom of damper piston on 5r and not present on 4r) for any cracks. If you find any, you'll need to cannibalize parts off another Alps since they're not standard sizes; of those parts, only the compression shims are shared between the 4r and 5r. Inspect and clean the urethane top out bumper, and replace if necessary. As it's not a standard part you need to, as you guessed it, cannibalize one from another shock. The 4r and 5r use the same top out bumper. Inspect the wipers for any cracks or hardening. The 4r used a proprietary wiper, so if it needs to be replaced it either need to be pulled from another shock, or the seal head needs to be upgraded to the 5r.

8. Install new quad-rings and o-rings, lightly covering them with oil before installation. The large quad ring is a 222, while the small quad rings are a 216. The large o-ring is a 029. Apply a fine layer of high quality grease to the inside of the wiper.

9. **4r only** - damper piston, replace the bottom out bumper by prying it from the bottom of the piston, and pressing a new one into place. It's a 216 quad ring just like the IFP. If you want to remove the blue piston bushing, simply squeeze it to one side of the piston, and then gently pull it off. On some early shocks there is an energizing 125 o-ring below the bushing on the piston.

10. **5r only** - remove the two grub screws by the rebound adjuster, and set them aside, along with the small spring and ball. Remove the rebound adjuster from the body by unscrewing it, clean and inspect it, and replace the o-ring with a new 007, being sure to lightly oil it first. Reinstall the rebound adjuster. Apply blue threadlocker to the threads of the long grub screw, and reinstall it in the side hole. Tighten it until the rebound adjuster won't turn, and then back it off until it starts turning again. First drop the small ball into the oil on the bottom of the body, then the spring, and then finally the grub screw after applying blue threadlocker to its threads. Tighten until the rebound adjuster won't turn, and then back it out about 2 turns, so that the adjuster clicks every quarter turn.

11.Fill the body with your suspension oil of choice and set it aside, making sure not to spill any oil and that it's close by. On my Schwinn Sweespot I like to use oil around 32Cst@40C.

12. Spread oil in the inside of the shaft, and install the IFP, making sure the concave side is facing out, and push it in until it stops. Make sure the urethane top out bumper is properly seated on the seal head, lubricate the shaft bushing with oil, and then install the seal head on the shaft again. Sometimes the quad-ring in the seal head needs to be gently pushed into place as the shaft is inserted. Make sure the quad-ring does not roll! Completely fill the shaft with oil and screw the damper piston back on. Use the pin spanner to snug the piston down. Pull the seal head up until it's sitting against the damper piston. Holding the parts over your oil bucket, pour some more oil on top of the damper piston, and then quickly invert it onto the body and quickly push the seal head into place and tighten it down.

13. **For the 4r** the rebound adjuster needs to be removed since its hole doubles as the bleed port. Remove the grub screw located on the bottom of the body. Beneath it is a second grub screw with a hard sealant on it. Remove the sealant with a needle or dental pick and remove the second grub screw. Pull the rebound adjuster out and remove the small ball bearing which was between the grub screw and rebound adjuster. Remove the o-ring from the rebound adjuster's shaft and replace it with a new 008 o-ring, lightly applying oil before installation. **For the 5r** simply remove the allen screw on the opposite side from the rebound adjuster – that's the bleed port. Keep the shock upside down until the bleed screw / rebound adjuster has been reinstalled (step 17).

14. Gently compress the shock a little bit a couple times to help remove air from around the damper piston. Keep the bleed port at the highest point of the shock. Hook up a shock pump to the valve, and then *slowly* start to apply air. As the pressure increases, the IFP will be force toward the damper piston, displacing the oil in the shaft. The extra oil will flow out the bleed port. Once you have about the 30psi in the shock, the IFP will have moved as far as it's going to. At this point, if you accidently invert the shock and allow air to get in, you'll need to start the bleed procedure again.

15. Since there is usually still a little bit of air trapped in the shock, to purge this last little bit, I use a syringe. **On the 5r** I put several 008 o-rings on the end of the syringe and screw it into the bleed port. **On the 4r** I wrap self amalgamating tape around the end of the syringe to form a rubber cone. I'll drop the air pressure until it barely registered, then I'll slowly pump the syringe, until I stop seeing any air bubbles. I'll also move the shock around a little, to make sure any trapped air can find the bleed port.

16. Skip this step if you have NOT removed the negative spring. You need to overfill the shock with 3cc to 6cc of oil, depending on shock travel. This will pressurize the oil, helping the shock to perform better, and provides insurance against the rebound rod impacting the breaking the IFP. Once you have a good bleed, remove the shock pump and, using a syringe and the method in step 15, inject the amount of oil you want to overfill it by.

17. **On the 5r** simply reinstall the bleed port screw. **On the 4r** reinstall the rebound adjuster, and then drop the ball bearing down the grub screw hole. Clean the grub screw hole of as much oil as possible (I usually use a pipe cleaner dipped in alcohol), apply thread locker to a grub screw, and screw it into the hole. Tightening the grub screw down will make the rebound adjuster harder to turn, while loosening it will make it easier to turn. Adjust the grub screw until the rebound adjuster turns stiffly. Apply more thread locker on top of the grub screw, wait for it to harden for a bit, and then install the second grub screw, snugging it down on top of the first one. Check the rebound adjuster to make sure it can still turn. If you shake the shock and can hear splashing, you still have air in it. If there is still air in it, repeat starting at step 13.

18. Lubricate the valve core with oil and reinstall it, and set it to your normal pressure again.

19. Remove the top and bottom bushing, clean, grease, and reinstall. Clean the outside of the shock with alcohol to remove as residual oil. Snug the seal head using the vise. It doesn't need to be really tight. Reinstall it on the bike.