

# SERVICE AND REPAIR MANUAL

## for

### ANDREX FRICTION SHOCK ABSORBERS TE1

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FOR RELIABILITY & PERFORMANCE!**

THE Andrex friction type suspension damper has established a reputation for efficiency and dependability second to none. Where the aim is for extra speed and performance, the Andrex gives matching stability and safety, with improved road-holding and handling qualities.

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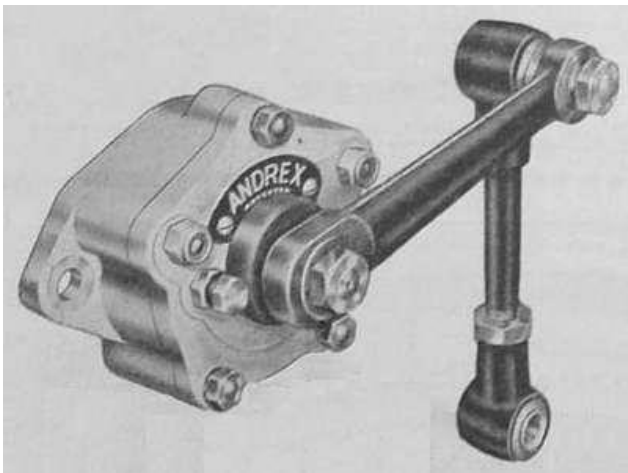
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There is an article written on:

*The MGA With An Attitude*

[MGaguru.com](http://MGaguru.com)

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**ANDREX Friction Shock Absorbers - FS-125**

That article is, from my point of view, giving a very good description of how the Andrex Friction Shock absorbers are working and what kind of performance they were/are giving to your vintage car.

This Service and repair Manual is based on my earlier drawings that can be found on:

[https://www.mg-cars.org.uk/mgtd/mgtd\\_andrex\\_shocks.htm](https://www.mg-cars.org.uk/mgtd/mgtd_andrex_shocks.htm)

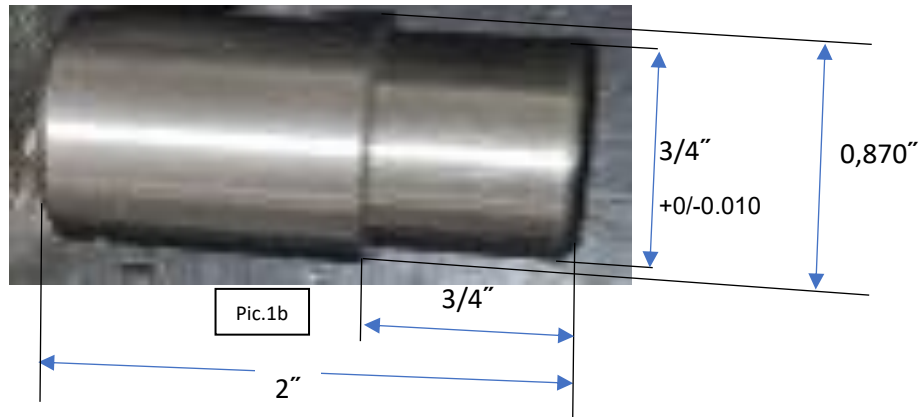
<http://mgaguru.com/mgtech/suspensn/fs125b.htm>

## Tools needed:

- ❖ Whitworth spanners.
- ❖ Drive bolt and a back support tube for removal/insert of the *Bearing Bush* in the *End Cover*



Pic.1a

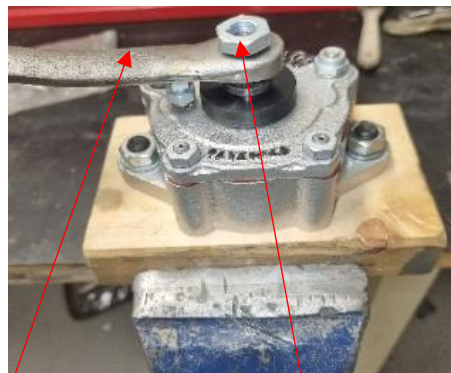


Pic.1b

- ❖ 7/16 screw tap for pulling out the *small end bearing bush*.
- ❖ Scale for adjusting the damper force.

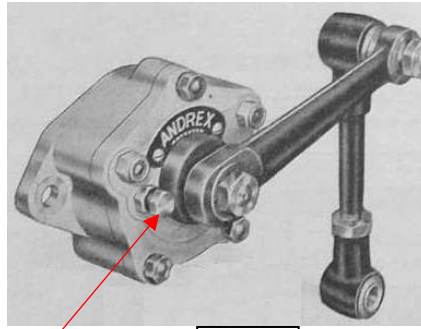
## Dismantling:

1. Take the Andrex damper of the car by loosening the *Damper Arm and Linkage* from the car body /frame. Then unscrew the two nuts and bolts on each side of the *Damper Housing* that holds it to a welded-on bracket in the rear, and to the front "wishbone" and the spring pan in the front. In the front there is normally a piece of steel between the back of the *Damper Housing* and the wishbone. It is there to fill up the space in the U-shaped wishbone to give a steady foundation for the damper. Clean the outside of the *Damper Housing*. Use strong soap or kerosine and a brush, steel brush or a power cleaner.
2. It makes it easier to work with the Andrex dampers if it's fixed to a plank of 2"x 4" or to a suitable square steel pipe. Drill two holes that fits to the two mounting holes on each side of the damper and fix it on with two bolts and nuts. In this way it easier to clamp it in a vise or on to a work bench while working on it.



Pic.2

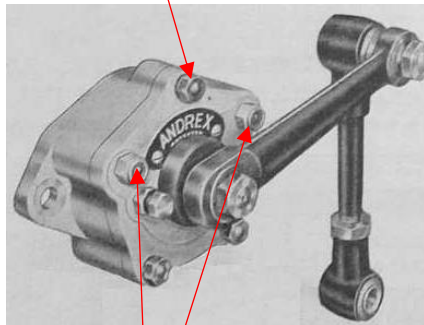
3. Take of the *Damper Arm and Linkage* by unscrewing the *Nut* holding the *Damper Arm* to the *Axle Shaft*. The *Damper Arm* is connected to the *Axle Shaft* with a spline, use a pulley to pull the arm off the *Axle Shaft*.
4. Take of the *Rubber Seal Cap*.



Pic.3a

5. Unscrew the *Adjustment Screw and Counter Nut* from the end cover and empty it for oil.

6. Unscrew the 5 *nuts* holding the *End Cover* to the *Damper Housing*.



Pic.3b

7. The two *Lock Nuts* on the widest part of the damper, are holding the two *Through Bolts* that goes through the *Damper Housing* to fix/hold the two *Fixed Friction Disks* inside, so they don't move or rotate. When unscrew the *nuts* these two bolts can be rotating with the nuts. They are countersunk into the back side of the *Damper Housing* and is hard to get a good hold off with a spanner or socket wrench. Use a flat screwdriver and force it between the countersunk walls and the hexagon head of the screw to try to block or jam the screw from rotating while unscrewing the nut.

8. The *End Cover* has a tight fit to the *Damper Housing* and after many years of neglect and corrosion it can be quite difficult to open. Use a penetrating oil or let it soak overnight in diesel oil or kerosine. Tap repeatedly carefully around the edges with a small hammer to make the *end cover* come loose from the *damper housing*. A torch lamp is also an option, to carefully heat the *Damper Housing* around the edge to make it expands and in that way make the *End Cover* is loosen from the *Damper Housing*. Use a couple of flat screwdrivers and carefully pry them into the small gap (where the gasket is) between the End Cover and the body. In this way try to separate the two halves by carefully bending and twisting the screwdrivers. Do it carefully so you don't damage the gasket surface. Work your way around and bend a little, shifting from side to side.

9. When it finally comes open it might look like this (Pic. 4a and 4b):



Pic.4a



Pic.4b

10. Separate the different *friction discs* from each other. The *Axle Shaft* can be rusty so the two circular *Rotating Friction Discs* that are attached to it by spline can be difficult to get off. Use a soft drive bolt (brass, aluminum), and a steel tube for a holding-on tool and try to carefully hammer the *Axle Shaft* out from the discs.
11. There is a small steel *Sleeve* at the end of the *Axle Shaft* working as a *distance sleeve* between the *Damper Arm* and the *End Cover*. This *sleeve* might be stuck inside the *End Cover's Bearing Bush* (Pic.5) or stuck on to the end of the *Axle Shaft*.



Pic.5

12. Clean the Splined *Axle Shaft* and inspect the two splined areas, the two bearing surfaces and the threads for damages.
13. Clean out the bottom groves in the spline with a steel brush or a small screwdriver. The two bearing surfaces can be carefully ground with #400-#600 sandpaper and oil while rotating in a lathe ore a drill press. See if the two lubrication holes are open and clean. One is bored inn from the side through the biggest splined area, (Pic.6) meeting the one that is bored up through the center from the bottom end.



Pic.6

Old and new Splined Axle



Pic.7

14. Clean all the different steel disks with a rotating steel brush or similar. Then, if needed, grind with sandpaper and finally polish them.
15. Clean out the inside of the *Damper Housing* and *End Cover* with a brush and a suitable cleaning medium. If needed use a fine sandpaper #240. For cleaning the outside of the *Damper Housing*, a rotating steel brush or media blasting is suitable.
16. Before painting the outside: Let the *Damper Housing* and *End Cover* soak for some hours in an acid washing liquid. Ex. 50/50 water and an ordinary household rust and lime remover, this is to remove the oxide layer. Then wash it off with clean water, let it dry, wash again with Aceton and add a layer of aluminum primer before painting the outside (Pic. 8).
17. The inside bottom of the *Damper Housing* is a friction surface for a *wood disk* and must be clean, smooth, and even (Pic.9).



Pic.8



Pic.9



18. Inspect the two *bearing bushes* for wear. One located in the bottom of the *Damper Housing*, and the other inserted in the *End Cover*.
19. To replace the *bearing bush* in the *End Cover*: Press out the old *bearing bushing*, either way, in vice. Use a drive pin (Pic.1a,1b and 10) and a socket wrench or a suitable piece of a steel tube as a support on the opposite side (Pic.11a a 11b). Insert the new *bearing bushing* the same way. Make it flush with the edge of the protruding flange on the inside of the *End Cover* (Pic.10).



Pic.10



Pic.11a



Pic.11b

20. To remove the *small bearing bushing* that is inserted the bottom of the *Damper Housing* use a 7/16" thread tap. Screw the thread tap into the bushing, and carefully pry or pull the *bearing bushing* out (Pic. 12).



Pic.12

21. Insert the new *Bearing bushing* using the *Splined Axle Shaft* and a vice to carefully press it inn to place (Pic.13)



Pic.13

## Modifications

### **Oil seals and air ventilation:**

1. Except from the *Rubber Seal Cap* the *Andrex friction dampers* did not have a proper oil seal for the *Axle Shaft*.
2. This can be improved by making an O-ring groove at the outer end of the bearing surface of the Axle Shaft. That fits an O-ring size:  $\varnothing 9/16'' \times 3/32''$  (Pic. 14). (Also see drawing no.: 071120.OH)



Pic.14

3. For the bolts use Dowty seals on:

- Both ends of the two *Through Bolts* (Pic.15, 35 and 36)
- Between the *End Cover* and the *Counter Nut* on the *Friction Adjustment bolt* (Pic.16).
- Between the *Damper Housing* and the *Air vent unit* (Pic. 20)

The three *Stud Screws* with *Nuts* will be sealed of by the *Gasket*. (Pic.17)



Pic.15



Pic.16



Pic.17

4. To prevent pressure/vacuum inside caused by internal and external temperatur changes, an air ventilation on the top of the *Damper Housing* might be an option.



Pic.18



Pic.19



Pic.20



Pic.21



Pic.22

- This example is using an adjustable **Parker Legris Flow Control Silencer Part no.: 0672 00 13**. (Pic.23) It is an adjustable air silencer for air tools. By adjusting/screwing the top of it the airflow can be adjusted. The reason for using this one is that there will be some more distance from the oil level inside to the top of the ventilation hole. Adjust it so that just a minimum of air is coming through it. (1/5th of an opening turn)
- Another alternative of ventilation cap is: **Lenz Brass Filler plug Type KMF & KMV 14** (Pic.24)



Pic.23



Pic.24



Pic.25



Pic.26

- A tube fitting and a small “pigtail” made from a thin copper tube is also an option (Pic.25 and 26). Let the outlet end of the tube face down and carefully flatten the end of the tube with a pair of plyers to make a minimum of air opening.
- Make sure no part of the treads is sticks out on the inside of the *Damper Housing* and cause obstruction to any of the *friction disks* movement. If needed add an extra Dowty ring or shorten the length of the threaded part of the ventilation unit that is screwed on to the *Damper Housing*. (Pic.21)

## Assembly

1. Soak new *wooden discs* in oil for at least 24 hours.
2. Check that the *Dowty seals* for the *Through Bolts* fits in to the countersunk holes in the back side of the *Damper Housing* (pic. 27).



Pic.27

3. Take the *Axle Shaft* and put first the *Distance/Thrust Washer* on and then the *O-ring*. Lube the *O-ring* with silicone grease (Pic.28).
4. Lube the *bearing bush* in the *End Cover* with silicone grease.
5. Put the *Gasket* on to the *Damper Housing* (Pic. 34).
6. Take the *End Cover* and put the two *Through Bolts* in from the front end. This is to use them as guide pins for assembly when stacking all the disks up on the inside of the *End Cover* (Pic 29).
7. Hold the *End Cover* with the inside facing up, please the *Spring Plate* with the two rounded knobs facing down so it fits in to the two round recessions on the inside of the *End Cover* (Pic.29).



Pic.28



Pic.29

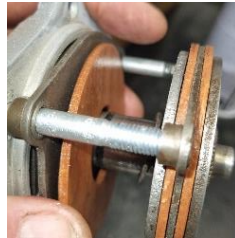


Pic.30

8. Next please the *Pressure Distribution Plate* on top of the *Spring Plate*, with the flat side facing up. See that the little hole at the edge of it is lined up with the “top stud screw hole” of the *End Cover* (Pic. 30).
9. Take the *Fixed Friction Disk*, that have a little notch on top of it, and place it so that the little notch is fitting in to the hole in the *Pressure Distribution Disk* (Pic. 31). (This is there to prevent the *Pressure Distribution Disk* from rotating and come out of position.)
10. Put the *Axle Shaft* with its *Distance/Thrust Washer* and *O-Ring* in place through the bushing of the *End Cover*. Be careful so the last *Fixed Friction Disk* is not getting misaligned with the little hole in the *Pressure Distribution Disk*. (Pic. 32)



Pic.31



Pic.32



Pic.33



11. Next ad a *Wood Disk*, then a *Splined Steel Disk*, a *Wood Disk*, a *Fixed Steel Disk* (without a notch), a *Wood Disk*, a *Splined Steel Disk*, and at last a *Wood Disk* (Pic.33).
12. Take the *Damper Housing*, with its *gasket*, and please it over the *End Cover* and the whole stack of friction disks. (Pic. 34). The *Through Bolts* are quite tight in its holes when sliding the Damper housing on. Line up the *Axle Shaft* so it targets the *Bearing Bush* in the bottom of the *Damper Housing* and squeeze and hold the two parts together.



Pic.34



Pic.35



Pic.36



Pic.37

13. While holding the *End Cover* tight against the *Damper Housing*, Screw the *Nuts* with its *Spring Washers* on to the *Stud Bolts*, don't tighten the screws yet.
14. Take out the two *Through Bolts*, one by one, and put them back in the other way around. From the backside to the front. Don't forget the *Dowty seals* (Pic.35). Use *Dowty seals* under the *Nuts* for the *Through Bolts* (Pic.36) and tighten all the *Nuts* evenly in a crisscross pattern. Check and see if the *Axle Shaft* is rotating during/after the tightening.
15. Screw on the *Friction Adjustment Bolt* and *Backnut* with a *Dowty seal*, to the *End Cover* (Pic. 37). Don't tight it too much, just enough to make a small pressure that will hold everything inside in place.
16. Put the *Sleeve* back on. Tapered side down. Ad silicone grease in the gap between the spline on the *Axle Shaft* and the *Bearing Bush*. Use a socket wrench to push the *Sleeve* down on the *Axle Shaft* all the way down until it stops against the edge of the bigger diameter of the *Axle Shaft* (Pic. 38a and 38b).



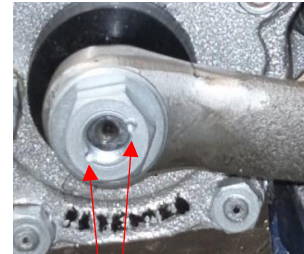
Pic.38a



Pic.38b



Pic.39a



Pic.39b

17. Add more silicone grease before putting the *Rubber Seal cap* on (Pic. 39a).
18. Put the *Damper Arm* with its *Washer* and *Nut* back on and tighten the *Nut*. Ad two punch marks in the front of the *Nut*, between the threads, to lock it off (Pic. 39b).
19. Fill it up with oil trough the hole for the *Friction Adjustment Bolt*. If a modification for *air ventilation* have been made, that hole can also be used for oil filling (Pic. 40).



Pic.40



Pic.41



20. The spring pressure is adjusted by turning the *Friction Adjustment Bolt*, after slackening the *Locknut*. There are approximately two and a half full turns of adjustment available, with each quarter turn making a difference of 3 lbs. in loading.

Use a scale at the end of the *Damper Arm* to measure the friction force (Pic. 41). NB! *damper arms* have different length. The two longest, straight, arms are for the rear.

Damper setting:

- 24 lbs for the front.
- 22 lbs for the rear.

## 25. **Oil type.**

The original oil that was used on the Andrex Dampers was a heavy thick transmission oil grade SAE 180-190.

If you do the above-mentioned modification for a better oil seal, my recommendation for oil is:

- 10-30 STOU oil. An all-round motor/transmission/hydraulic/wet brake, farming machinery oil.
- 10-30 UTTO oil. An all-round transmission/hydraulic/wet brake, farming machinery oil.
- ATF oil. A complex lubrication fluid that covers a wide specter: Hydraulic, transmission, friction, lubrication, cooling, it is gently to gaskets, rubber and friction lining (and hopefully wood).

These 3 types of oil are quite easy to find on the market, they have a long life, low foaming, and have very good friction characteristics.

## 26. **Spare parts.**

The *Rubber Seal cap* and all the internal parts, except from the *Spring Plate* and the *Pressure Distribution Disc*, (Pic. 42) can be bought from:

**VCSA, Vintage & Classic Shock Absorbers, Sanderstead, South Croydon, Surrey, UK**

**Graham Brown E-mail: [grahamvcsa@hotmail.co.uk](mailto:grahamvcsa@hotmail.co.uk)**

The *Bearing bushings* can be bought from:

- **McMaster-Carr:** #14. *Bearing bush front*, 6381K548, 3/4"x7/8"x3/4", (to short but works)  
6381K171, 3/4"x7/8"x1" (Cut to right length)  
#4. *Bearing bush rear*, 6381K561, 7/16"x9/16"x11/4" (Cut in to 3 pcs, length 3/8")
- **123Bearing:** #14. *Bearing bush front*, BAI19.05-22,225-19,05 (2/8" short but it works)  
#4. *Bearing bush rear*, BFA11.113-14.288-19.05-1.588-25.40 (Cut in 2 pcs, length 3/8")



Pic.42

## 27. The Damper Arm spline repair

- The spline on the *Daper Arm* and *Axle Shaft* can some times be badly dammaged, and the *Damper Arm* can also be splitted.



Pic.43



Pic.44



Pic.45

- For the *Axle Shaft* there is only one option, to buy a new one (Pic. 45).
- For the *Damper Arm* there is a hope. It is possible to buy a splined piece of tubes that can be cut to the right legth. And, after cutting of the broken piece of spline, then be welded on to the *Damper Arm* (Pic. 46a-b, 47, 48, 49).



Pic.46a



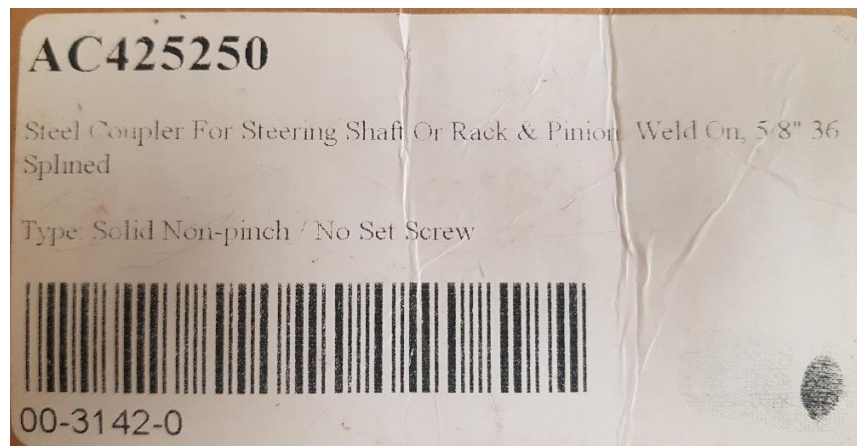
Pic.46b



Pic.47



Pic.48



Pic.49