

MAINTENANCE PROCEDURE FOR MK25 EVO 1st STAGE





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WARNING: this maintenance procedure is only for appointed Scubapro technicians that followed a complete course on equipment repair and in no case can replace a technical repair course delivered by an appointed SCUBAPRO/ UWATEC appointed staff.

Tools needed:

1. Socket P/N 43.191.107
2. Cap tool P/N 43.300.999
2. Socket extension P/N 43.300.009
3. Field handle tool P/N 43.300.127
4. O ring extractor P/N 43.300.107
5. Filter retainer mounting tool P/N 43.026.101
6. Bushing assembly tool P/N 43.300.226
7. Torque wrench P/N 43.300.130P
8. 14 mm spanner
9. Inter stage pressure gauge P/N 28.158.000
10. Flat blade screwdriver
11. 7/32" Allen extension or 7/32 Allen key
12. 4 mm Allen key
13. 22 mm socket
14. Cristolube MCG 111 lubricant

DISASSEMBLY

1. Unscrew all hoses from the 1st stage with the universal tool being careful not to damage the chrome plating. Remove all the plugs from the 1st stage with the 4 mm Allen key of the universal tool. Remove the o rings from the plugs with the o ring extractor tool and discard.
2. Remove the inlet protector and the bumper cap with the screwdriver.
3. Take the field handle tool and use preferably for strength the bigger thread 7/32" and screw it in the HP port. Hold it in the vice.
- 4a. For the INT version: Remove the yoke screw, screw the field handle tool on the body of the 1st stage. Firmly hold the field handle tool in a vice and use the socket and socket extension to carefully remove the yoke retainer. Remove the filter retaining clip with the screwdriver, the filter and the o ring with the o ring remover. Discard both o ring and filter.
- 4b. For the DIN version: Remove with the o ring extractor the "tank" o ring, then with the 4 mm Allen key unscrew the filter retainer. Remove the spring and the filter. Firmly hold the field handle tool in a vice and use the 6 mm socket extension to unscrew with care the DIN knob retainer. Discard the o ring and filter.
5. Unscrew the cap with the cap tool.
6. Carefully remove the piston, the spring and the nylon washer/s.
7. Remove the silicone sleeve from the piston shaft. Remove the sleeve from the piston head.



8. Remove the bushing (capsule) from the body.
9. Unscrew with the 22 mm socket the seat retainer and remove the thrust disc, and with the 4 mm Allen key, remove by screwing the inter stage pressure adjustment screw.
10. Insert the screwdriver with care (in the cavity left by the removal of the piston) and push away the seat. Remove the spring.
11. With the o ring extractor remove the o ring from the seat groove
12. With the o ring extractor carefully remove the two super glide bushings and the H.P o' ring.
13. Screw the field handle tool into one of the interstage outlets of the swivel.
14. With the 7/32" Allen key or the 7/32" Allen extension, unscrew the swivel retainer.
14. With the o ring extractor remove the o ring and the nylon washer.

PARTS CLEANING

WARNING: refer to parts cleaning procedure.

ASSEMBLY

1. After careful inspection of the cleaned parts, prepare all the parts that need to be changed at every service.
 - a. P/N 01.028.109 the filter
 - b. P/N 01.073.101 the filter retaining clip (only for INT version)
 - c. P/N 10.101.161 the HP seat
 - d. P/N 01.050.161 The swivel o ring
 - e. P/N 01.050.136 the piston shaft HP o ring
 - f. P/N 01.050.177 the piston head o ring (there are 2 o rings)
 - g. P/N 01.050.138 the HP seat o ring
 - h. P/N 01.060.607 the anti-friction ring
 - i. P/N 10.700.105 the anti friction bushing
 - j. P/N 10.700.403 the silicone sleeve
 - k. or the repair kit P/N 10.750.045
- 2a. For the INT version, place the filter in the yoke retainer, then the retaining clip on top and push with the filter retainer mounting tool. Assemble the o ring P/N 01.050.158 on the yoke retainer. Slightly lubricate the threads and the o ring before assembling the parts on the 1st stage body. Firmly hold the field handle tool in a vice and use the bigger thread (7/16") screwed in the HP port of the 1st stage for optimal strength. Fit the socket on the yoke retainer, and the socket extension on the torque wrench and screw. **Adjust the torque wrench to 30 Newton / meter and tighten. Never use a torque exceeding 30 Newton / meter.**
WARNING: The use of a torque wrench is compulsory. An excess torque can lead to a permanent deformation or rupture of parts.

- 2b. For the DIN version, assemble the o' ring P/N 01.050.158 on the DIN retaining screw. Slightly lubricate the threads and the o' ring before assembling the parts through the DIN knob and screw on the 1st stage body. Fix the socket extension on the torque wrench. **Adjust the torque wrench to 30 Newton / meter and tighten. Never use a torque exceeding 30 Newton / meter.**
WARNING: The use of a torque wrench is compulsory. An excess torque can lead to a permanent deformation or rupture of parts.
 Now place the conical filter upside down (the tip of the filter facing the tank valve), then the spring, and screw the filter retainer with a 4 mm Allen key to 4 Newton/meter. Slightly lubricate the threads before inserting the "tank" o' ring (P/N 01.050.428)
 3. Piston preparation:
 The piston is equipped with a T.I.S bushing (Thermal Insulating System) and it is recommended to lubricate the piston before inserting the bushing to prevent stagnation of water between the parts although the piston has a small static o ring to prevent water entry. Fit the T.I.S 1 silicone sleeve on the piston shaft. Now fit the 2 o rings in the groves and lubricate to fill the cavity between the 2 o rings.
 4. Assemble the swivel o ring on the cap and slightly grease.
 5. Slightly grease the anti friction washer and place it in the groove inside the cap.
 6. Fix the field handle tool in one of the interstage pressure outlets of the swivel and hold this assembly in a vice. Slightly grease the groove of the swivel and assemble. Fix the 7/32" Allen extension on the torque wrench and hand tighten the swivel retainer. **Adjust the torque wrench to 8 Newton / meter and tighten. Never use a torque exceeding 8 Newton / meter.**
 7. Unscrew the field handle tool from the swivel and fix it into one of the HP ports of the 1st stage.
 8. Carefully insert the piston in the assembled cap and swivel.
 9. Place the spring on the piston.
 10. Slightly lubricate the threads of the body of the 1st stage and the bushing cavity then place the bushing (capsule). Place back the nylon washer/s P/N 01.060.219 inside the bushing. Place the spring and assemble the two parts with great care especially when the piston is inserted in the body of the 1st stage. Do not over tighten.
 11. Using the bushing assembly tool, first slide on the piston shaft the cylindrical outer glide ring.
- WARNING: It is important to follow the assembly procedure of this ring:**
 Slide on the piston shaft the ring through the widest opening first and carefully push with the new plastic bushing assembly tool.
12. Now insert the slightly greased o ring P/N 01.050.136 on the piston shaft and push with the same tool (The o ring will now sit on the 1st inserted ring and will be in contact with the side opposite to the 4 small holes).
 13. Now insert on the piston shaft the second ring with the shoulder facing outside and carefully push it in position with the tool.



WARNING: There are two generations of assembly tools: the older generation made of chrome plated brass and the actual version made of a special plastic that cannot damage the piston. Do not use the old metal bushing insertion tool anymore.

4. 14. Next place the spring.
15. Assemble the o ring on the new HP seat.
16. Place the assembled HP seat in the body of the 1st stage.
Warning: Take care to place the cavity of the HP seat facing the “knife edge” of the piston. The smooth flat bottom cavity should face the piston.
17. Slightly lubricate the inter stage adjustment screw before inserting it from the internal side by **unscrewing** with the 4 mm Allen key until a resistance is felt, then, place the thrust disc with the centring nipple inside the HP seat cavity.
18. Lubricate slightly the threads of the assembled seat retainer. Place back the nylon washer over the threads and screw to 17 Newton/meter with a 22 mm socket and the torque wrench.
19. Reassemble all the plugs and / or the hoses after having slightly lubricated the threads. Do not over torque (5 Newton / meter maximum).

THE 1ST STAGE IS NOW READY FOR THE ADJUSTMENT PHASE.

ADJUSTMENT

IT IS VERY IMPORTANT TO USE A TANK FILLED TO THE NORMAL WORKING PRESSURE OF THE REGULATOR (200, 230 or 300 bars) TO CARRY OUT THE ADJUSTMENT OF THE INTERSTAGE PRESSURE.

1. Mount the 1st stage on a properly filled tank as mentioned above.
2. Fix the interstage pressure gauge either on the 1st stage or at the end of one of the hoses.
3. **WARNING:** For a repair workshop, it is recommended to use a bigger and more precise gauge.
4. Slowly open the tank valve.
5. Carefully observe the needle of the gauge as the pressure rises. The needle should move regularly and stop dead without any creeping of the interstage pressure. The regulator should now be cycled about 10 to 15 times by pushing the purge of the 2nd stage so that all the parts take their permanent position. Take note of the interstage pressure. Three cases can occur: a) The interstage pressure is in between 9 and 10 bars. b) The interstage pressure is less than 9 bars. c) The interstage pressure is more than 10 bars.



6. If the gauge indicates an interstage pressure between 9 and 10 bars with a good stability of the needle of the gauge, a good adjustment has been reached.
7. If the interstage pressure is lower than 9 bars. Close the tank valve and purge the 2nd stage. **Unscrew** with a 4 mm Allen key the adjustment screw inside the seat retainer. It is advised to proceed by $\frac{1}{4}$ turn as the total adjustment span is 1 to $\frac{1}{4}$ turn.
8. Proceed as per paragraph 3, 4 and 5.
9. **WARNING: Do not place any washer P/N 01.060.219 under the shoulder of the seat retainer to adjust inter stage pressure. If the adjustment screw is fully unscrewed and the inter stage pressure is still low, open the 1st stage and place one or more washers P/N 01.060.219 between the spring and the bushing (capsule). Do not pile up more than 3 washers. (See assembly procedure paragraph 10)**
10. If the inter stage pressure is higher than 10 bars, then proceed as per paragraph No 6 and **screw** the adjustment screw and proceed as per paragraph 5 or 6. It is advised to proceed by $\frac{1}{4}$ turn as the total adjustment span is 1 and $\frac{1}{2}$ turn.
11. If after several unsuccessful attempts to reach the correct inter stage pressure, change the HP seat. If still unsuccessful, then change the piston after a careful check of its knife edge.
12. After the adjustment of the inter stage pressure, place the cap over the seat retainer.
13. Place back the inlet protector.