MAINTENANCE PROCEDURE FOR MK17



MAINTENANCE PROCEDURE FOR MK 17 1ST STAGE

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. **Universal tool P/N 43.040.000**
2. **Socket P/N 43.191.107**
3. **Socket extension P/N 43.300.009**
4. **Field handle tool P/N 43.300.127**
5. **O-ring extractor P/N 43.300.107**
6. **Filter retainer mounting tool P/N 43.026.101**
7. **Balance chamber tool P/N 43.300.240**
8. **Torque wrench**
9. **6 mm allen key**
10. **Interstage pressure gauge or 2nd stage adjustment tool P/N 41.043.000**
11. **Screwdriver**
12. **32 mm spanner or large adjustable wrench**
13. **Scubapro blow gun P/N 40.978.000**

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 inspect.
2. Remove the inlet protector.
3. Remove carefully the 2 rubber bumpers with the screwdriver.
4. Take the field handle tool and use preferably for strength the bigger thread 7/32" and screw it in one of the HP ports.
5. For the INT version: Remove the yoke screw, then firmly hold the field handle tool fixed to the body of the 1st stage 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. Keep the O-ring for inspection.
6. 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 and use the 6 mm socket extension to unscrew with care the DIN knob retainer. Put aside the O-ring (P/N 01.050.138) for inspection.
7. With the multifunction tool unscrew the silicone diaphragm retaining ring. Carefully remove the washer, the silicone diaphragm and the load transmitter.
8. Unscrew the spring adjustment screw with the 6 mm Allen key. Remove the nylon washer above the spring and the spring.

9. With the 32 mm spanner or the adjustable spanner, unscrew carefully the dry ambient chamber, remove the 2 washers with the O-ring extractor.
10. With the O-ring extractor carefully remove the diaphragm, the disk, the disk insert and the pin.
11. Unscrew the balance chamber with the 6 mm Allen key. Remove the balance chamber, the 2 O-rings, the spring centring washer, the spring, the balance chamber O-ring, the bushing, the spacer, the guide and the HP poppet.
12. Use the MK 16 tool and lightly push the tool against the HP orifice while blowing into the 1st stage body from the opposite side (diaphragm side) with the blowgun to carefully remove the HP orifice. With the O-ring extractor tool, remove the O-ring from the orifice.

PARTS CLEANING

WARNING: refer to parts cleaning procedure.

ASSEMBLY

1. After careful inspection of the cleaned parts and the static O-rings that do not need replacement, prepare all the parts that need to be changed at every annual service.
    1. P/N 01.028.109 the filter
    2. P/N 01.073.101 the filter retaining clip (only for INT version)
    3. P/N 10.117.103 the HP seat
    4. P/N 01.050.117 the poppet balancing O-ring
    5. P/N 01.050.145 the balance chamber O-ring or the repair kit for MK 17 P/N 10.117.040
2. **For the INT version**: insert the filter in the yoke retainer, and then fit the retaining clip with the filter retainer tool. Fit the O-ring P/N 01.050.138 in its cavity. Slightly grease the threads of the yoke retainer and the O-ring before inserting in the yoke and the saddle.

   Firmly hold the 1st stage body with the field handle tool screwed in a HP port and fixed in a vice. Place the socket on the yoke retaining screw, and 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.**
3. **For the DIN version:** assemble the O-ring P/N 01.050.138 in its cavity, slightly grease the threads and the O-ring before inserting in the DIN wheel. Place the wheel retaining O-ring and the saddle. Only use the 6 mm socket extension for tigthening. **Adjust the torque wrench to 30 Newton / meter and tighten. Never use a torque exceeding 30 Newton / meter.**
4. Now place the conical filter upside down (the tip of the filter facing the tank valve), then the spring, slightly grease the threads before screwing the filter retainer with a 4 mm allen key to 4 Newton / meter torque. Insert the “tank" O-ring (P/N 01.050.193 or 01.050.428).

   WARNING: The use of a torque wrench is highly recommended, if unavailable, for a torque of 30 Newton / meter, screw hand tight, then use a wrench and tighten 1/8 of a turn!!! An excess torque can lead to a permanent deformation or even a rupture of the parts.
5. Place the O-ring P/N 01.050.138 on the HP orifice and insert this assembly inside the body of the 1st stage taking care to guide its way in with the MK16 tool. Press the orifice slightly down in the HP chamber with the tool.

6. Place the bushing inside the balance chamber, then the O-ring followed by the centring washer. Slightly grease the 3 parts.
7. Slide the poppet spacer and guide on the poppet. Slightly grease the shaft of the poppet before inserting the spring.
8. Place the 2 O-rings on the balance chamber.
9. Insert the assembled poppet inside the assembled balance chamber.
10. Insert the whole system inside the 1st stage and screw snug with the 6 mm Allen key. Do not over torque.
11. Place the pin in the poppet followed by the disk insert and the disk.

    Note: At this stage it is possible to pressurise the 1st stage (230 bars or more if in DIN 300) to check the perfect seal between the HP seat and HP orifice. Once pressurised, there should be no leak. A slight push with the thumb on the diaphragm disk opens the system and air will flow. It is advisable to cycle the system a few times to check the air lock. Purge the system before removing the 1st stage from the tank.
12. Place the diaphragm in position, **(WARNING: the diaphragm should always be dry, no grease should be used for assembly)** then the 2 diaphragm rings.
13. Place and centre the thrust washer on the diaphragm.
14. Lubricate slightly the threads before screwing the dry ambient chamber by hand.
15. Fix the field handle tool in one of the HP ports and secure the tool in a vice. Use the 32 mm spanner or adjustable spanner and tighten snug the dry ambient chamber.

    WARNING: If the diaphragm is not properly secured by a firm tightening, there is a risk of the diaphragm coming off its groove resulting in a heavy air leak that could endanger the diver's life.
16. Slightly grease the threads of the spring adjustment screw and the spring groove before placing the nylon washer.
17. Place the spring in the cavity of the diaphragm disk.
18. Screw the adjustment screw by about 2/3 turns.
19. Reassemble all the plugs and / or the hoses after having slightly greased the threads. Do not over torque (4 to 5 Newton / meter maximum).

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

ADJUSTMENT

FOR THE ADJUSTMENT, IT IS VERY IMPORTANT TO HAVE A SUPPLY PRESSURE CURRENTLY USED FOR DIVING WITH THE REGULATOR CONCERNED (200, 230 or 300 bars).

1. Place the 1st stage on a full tank as previously indicated.
2. Place a precise interstage pressure gauge either at one of the interstage pressure ports or at the end of the regulator hose.

   WARNING: The gauge found on the adjustment tool is not precise enough because of it's small size and should not be used as a workshop gauge. A bigger size and more precise gauge should be used in a repair workshop.
3. Slowly open the tank valve.
4. Observe carefully the needle of the gauge that should move in a very smooth way before coming to a sharp stop. Cycle the regulator about 10 times by purging the 2nd stage. This is to allow all the moving internal parts to reach their permanent working position. Take note of the interstage pressure when the needle of the gauge comes to a stop.

   Three cases can occur:

   1. The interstage pressure is in between 9 and 10 bars.
   2. The interstage pressure is lower than 9 bars.
   3. The interstage pressure is higher than 10 bars.
5. 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.
6. If the interstage pressure is less than 9 bars, use a 6 mm allen key to slowly screw (clockwise) the adjustment screw. Every time the adjustment screw is turned, the regulator should be cycled about 10 times before a reading of the interstage pressure is taken. Proceed by 1/4 turn to reach the correct setting which should be in between 9 and 10 bars.
7. If the interstage pressure is higher than 10 bars, proceed as above but unscrew (anticlockwise) the adjustment screw to reach the correct setting.
8. If after several unsuccessful attempts in reaching a stable interstage pressure, change the diaphragm.

   Note: As we previously carried out the leak test between the HP orifice and seat, a bad interstage pressure lock does not come from these parts. A distorted diaphragm is often responsible for a poor interstage pressure lock!!!
9. Now fit the load transmitter through the spring adjustment screw and place the silicone diaphragm and the washer. Slightly lubricate the threads of the retaining ring and tighten with the universal tool.

   Note: Placing the silicone diaphragm should be carried out only when the 1st stage is still pressurised. Not doing so will trap air inside the dry chamber and cause a slight overpressure thus affecting the stability of the interstage pressure.
10. Close the tank valve and remove the 1st stage from the tank.
11. Place back the rubber caps and the inlet protector.