DIVE GEAR EXPRESS

DGX Gears D6
First Stage Service Manual

Revision 3 Published 09/23/2022

Revision	Date	Changes
1	02/19/2021	Initial publication
2	10/20/2021	Updated schematic diagram
3	09/23/2022	Minor technical edits for clarity; replaced Fig. 3; removed Figs. 4 and 5 and renumbered subsequent Figs.; replaced Figs. 21, 29, 30, 39, and 43; added Fig. 44 and renumbered subsequent Figs.

1. Overview

(1) The availability of subassemblies and components, repair parts, specialized tools, and maintenance manuals does not imply qualification to assemble and/or service scuba equipment. Improper service of dive equipment can lead to severe injury or death. Dive Gear Express recommends that non-qualified individuals seek professional training/mentoring before attempting repairs or servicing on any diving equipment.

> **Failure to follow the procedures outlined herein may result in serious injury or death!**

(2) In the following pages will be found the disassembly, assembly, tuning and troubleshooting steps for these components. Photos are used throughout to illustrate the procedures.

> **Please pay special attention to all Caution Notes!**

(3) Whenever an item of extra importance needs to be observed, a “Caution Note:” will appear, followed by the required information. See below.

> **Caution Note: This must be read and followed!**

(4) Included in this manual is a list of recommended/required tools for each disassembly, assembly, and testing section. They are identified in each section where they are used.

(5) A schematic diagram is located at the rear of this manual. The diagram contains the detailed parts lists. The diagram also includes the torque specifications for parts where required.

(6) A general troubleshooting guide with space for notes is also included for those using a printed version. Those who prefer an electronic version should keep detailed notes in an accessible location for their own observations and service tips, as well as a record of service.

(7) Throughout the text, parts are referenced using the item number on the schematic to facilitate locating each individual component.

(8) Parts should not be taken out of their packaging until the actual assembly stage is reached, and the user is ready to lubricate, where necessary, and install them.

(9) Ensure the service area is free of any environmental factors that may cause problems during the servicing of your regulators. The area must be clean and organized. The use of nitrile gloves is highly recommended for final rinsing and assembly. This will minimize the risk of skin oils contaminating the internal components of the regulator.

(10) Ensure that all required servicing/testing air supplies are available and at the proper test pressures if not using a regulated supply from a single source. “**Modified Grade E” air as typically delivered at a dive shop fill station is preferred.**

> **Caution Note: Only use air from a breathing air source! Do not use a hardware store shop compressor.**

Cleaning and Rinsing - General Considerations

(11) Cleaning and rinsing of the components should be done using clean, fresh water.

(12) Only use degreasers that leave no organic residue (e.g., Extreme Simple Green, Blue Gold Cleaner, or any clear liquid dish soap that does not contain scents or dyes).

(13) To remove corrosion, use a 50/50 vinegar/water solution and nylon brushes. Areas of heavy corrosion not removed with vinegar can be addressed with mild phosphoric acid solutions available from scuba supply houses.

(14) Allow parts to air dry without the use of loop-weave cloths that may leave fibers.

(15) Once all service procedures have been completed and bench testing done, in-water testing in a confined environment such as a swimming pool is recommended to confirm proper function before taking the regulator on an actual dive.

Cleaning of Regulator Parts

(16) Cleaning of parts that are going to be reused is one of the most critical steps in servicing the regulator. As was stated earlier, use the proper solutions for the job at hand. Removal of hydrocarbons and debris should be accomplished before attempting removal of corrosion. Areas of corrosion are often also coated with old lubricant or oily contaminants. Before attempting to remove corrosion, use warm detergent and a soft brush to remove oils and debris. Then use an acidic solution to remove corrosion. Once corrosion has been removed, inspect parts and repeat detergent washing as needed. Wearing nitrile gloves throughout the process reduces the risk of contaminating the parts with skin oils.

(17) First, prepare a warm solution of detergent from the list above. Immerse both plastic and metal parts and agitate thoroughly. Protect critical delicate parts (such as the Turret Bolt) by washing them separately or isolating them in a small plastic container with holes. Use a soft nylon brush and/or soft rags soaked in detergent to scrub away visible debris and contaminants. Corrosion will likely not be removed during this step. Rinse repeatedly in clean water.

(18) Now address visible corrosion by submerging **metal parts only** in a 1:1 dilution of white vinegar and hot water. Do not immerse plastic parts in an acid bath - it will degrade the plastic and make it more susceptible to cracking. Agitate the parts occasionally and allow parts to stand in the acidic solution for ten minutes. Wearing gloves, remove and inspect parts, and reimmerse them for an additional ten minutes if visible corrosion is still noted. Removal of corrosion will leave bare brass behind, which will not affect regulator function, but will necessitate more frequent future inspection and service. After the acid bath, rinse all metal parts thoroughly.

(19) Best practice is to neutralize any possible residual acid remaining in crevices and threads, by immersing all acid-treated parts in a neutralizing solution of warm water and sodium bicarbonate (baking soda) in a ratio of 1 tablespoon per gallon of water. After a brief neutralizing soak, again rinse all parts thoroughly. In areas with high mineral content in the water, a final rinse with distilled water should be considered. A plastic colander is excellent for drainage after rinsing. For very small parts, a mesh strainer for sink drains works well. Often sold as a set, they are inexpensive and can be used for many types of regulator components. Again, protect delicate parts from contact with hard metal surfaces. Retained final rinse water should be allowed to stand and examined for a surface sheen indicative of residual hydrocarbon residue. If noted, return to step (17) above.

(20) After washing and rinsing the regulator parts, allow them to air dry. Using a drying rack will facilitate this. Do not lay the parts on a paper towel or loop-weave cloth towel. Doing so runs the risk of having fibers stick to them that will cause issues with sealing. If a cloth is used as an aid to drying, make sure to use a tight, flat weave lint-free cloth that has previously been well washed to remove fabric sizing.

Inspection After Cleaning

(21) Before assembling the regulator, it is necessary to inspect all the cleaned components. Using a magnifying glass or inexpensive USB microscope, ensure all parts are clean and contaminant-free, and check the components for damage that may have been hidden by corrosion or lubricant. Look for scratches that may affect the sealing of the regulator.

(22) Lay all parts out on your padded work surface following the schematic. A rubber or silicone mat of suitable size that is clean and free of contaminants works well for this.

(23) Now that all parts have been cleaned and checked, the assembly can begin. Remove the new parts from the service kit bag and lay them out following the schematic, matching them to the old parts for size. Then make sure all old parts that are to be replaced have been discarded or segregated.

> **Caution Note: Removing parts from their packaging before they are to be used runs the risk of mixing them up. Some O-rings are very close in size but are not interchangeable! Keep parts in their packaging until you are ready to exchange them for their used equivalent.**

(24) As with the parts that have been cleaned, it is a good idea to inspect the new parts as well. Inspect the HP Seat to ensure it is free of any defects. Check all O-rings and inspect them as you use them for nicks or imperfections. Inspect the washers to ensure they are free of burrs or other defects that could affect their function. It is critical to use the parts list on the schematic to ensure that all new parts are present and accounted for in their required quantities.

(25) **Lubrication can be overdone**. Doing so runs the risk of trapping excess dirt or debris on the parts. One way of reducing the risk of overdoing it is to use the lube-in-a-bag method - Fig. 1

Fig. 1

This involves using a small clean plastic bag containing a small amount of lubricant. The O-ring is inserted into the bag, worked around to evenly coat with lube while squeezing off excess, then taken out of the bag and used in its location - Fig. 2.

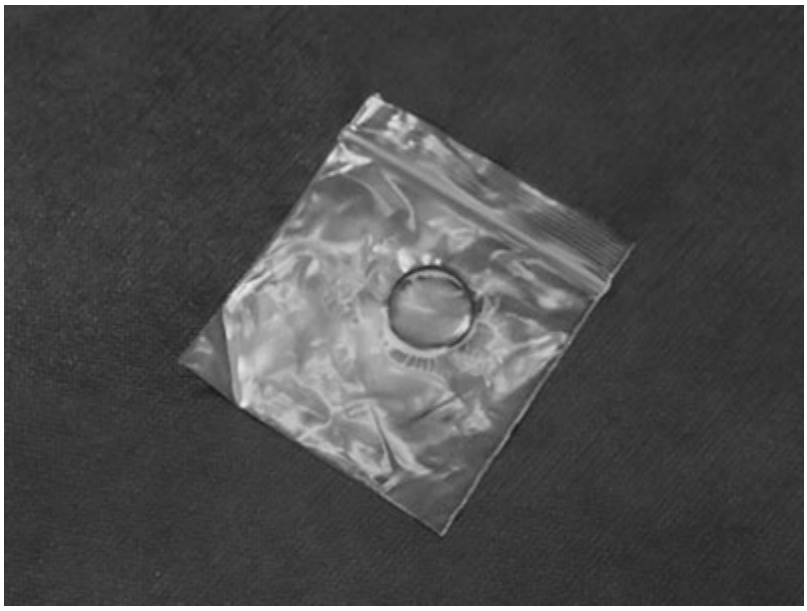


Fig. 2.

(26) Another way is to apply a small amount of lubricant to the gloved index finger and massage the O-ring between the thumb and index finger.

(27) **Under most circumstances, a lubricant should be used very sparingly or not at all.** In nearly all scuba applications, if you can see the lubricant, too much has been applied. Before using any lubricant, any existing lubrication should be removed before new is applied. In dynamic applications, it is used to reduce excessive wear. Static O-rings do not generally require the use of lubricant.

(28) Do not unnecessarily lubricate parts. Certain parts are specifically noted to be installed without lubrication. Not lubricating unnecessarily helps to keep those parts clean and free of debris that might otherwise cling to the lubricant.

2. Tool List - Fig. 3

1. Open End 3/4” and Hose or Adjustable Wrenches
2. 3/8” Breaker Bar or Ratchet Handle
3. Vise Handle (First Stage Body Holding Tool)
4. 3/4” | 19mm Deep Socket
5. 0-300 in-lb Torque Wrench
6. #6 Hook Spanners (2) with 0.156 Pin
7. 5/32”, 3/16” and 6mm Hex Keys
8. 6mm Hex Socket
9. Thin Wooden Dowels
10. Blunt Brass Spade and Blunt Brass Pick
11. Heavy Nylon and Thin Brass Picks
12. 2.5mm Plastic Crochet Hook

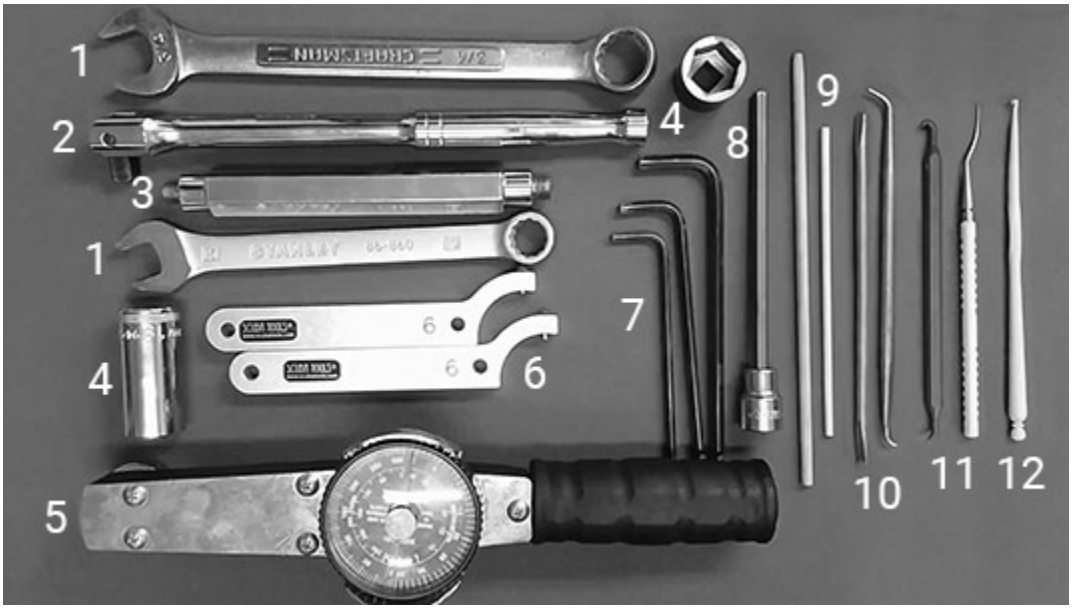


Fig. 3

(1) The First Stage Body Holding Tool, Thin Jaw Adjustable Wrench, Spanner Wrench and Brass O-Ring Pick Set can be found at Dive Gear Express using the link below.

https://www.divegearexpress.com/tools/scuba-tools

(2) Tools may also be purchased from Scuba Tools at the link below.

www.scubatools.com

(3) Additional useful items are a magnifying glass or inexpensive USB microscope, nitrile gloves and, to aid in rinsing, a plastic colander and small mesh strainers for smaller parts.

3. Preliminary Testing

(1) Preliminary testing of the regulator is necessary to identify any issues with the first and second stages and verify the overall regulator function. This testing will include:

1. Visual inspection of the first and second stages
2. Inspection of the hoses
3. Intermediate Pressure (IP) check
4. Cracking effort and second stage negative pressure test

Visual inspection is done to identify issues that could affect servicing and to ensure that pressurizing the system will not compromise the safety of the service technician.

Check all connections to make sure they are secure.

Check that on the first stage, there are no extruded O-rings, and hoses are tight.

Check that there are no defects in the SPG.

Ensure that the DIN assembly is secure, the O-ring is intact and is able to form a seal.

The technician will inspect the filter for signs of verdigris corrosion or discoloration suggestive of water intrusion.

Detailed inspection of hoses is done to ensure it is safe to pressurize the regulator set. Look for evidence that might lead to hose failure. Check all hose connection crimps. Defects must be addressed before pressurizing the system! Replacement of any suspect hoses is recommended.

> **Caution Note: Defects in hoses require replacement before pressurizing the regulator! Failure to do so may result in serious injury!**

(2) Check the SPG for any signs of cracking of the face, water intrusion, and corrosion around the SPG-to-hose connection. If using a console or boot, it is necessary to remove the SPG from the rubber boot. Once this is done, the HP spool should be inspected and, if necessary, replaced.

(3) The Intermediate Pressure (IP) of the system should be tested, after the preceding checks have been done to ensure technician safety. Checking of IP is done by attaching an IP gauge to the low pressure (LP) inflator hose. The system is then pressurized while partially depressing the purge button on one of the second stages. Depressing the purge button slightly on the second stage prevents damage to the system by providing a relief valve should the IP rise rapidly to unsafe levels. Once the system has been pressurized, the purge is released, and the IP checked.

> **Caution Note: If the second stage is leaking even slightly, IP will be affected. If it is leaking, turn the adjustment knob to stop the flow or use a second stage that is not leaking when paired with the first stage. It is a clear indication that the second stage requires rebuilding if turning the adjustment knob does not stop the flow.**

(4) The standard operating range for the system is with an IP of 135 psi. Ideally, the system is operating at 135 psi +/- 5 psi and show no signs of “creep” or instability at 3000 psi.

> **Caution Note: “Creep” will show as steadily increasing IP while the regulator is not in use. Normally the IP will drop 5-10 psi during a breath or purge and then return to its setting. It should not return to the setting and keep increasing. This indicates a problem with the HP Seat, Lifter, or sealing O-rings.**

(5) If the system shows no sign of creep or IP instability, it may not be necessary to rebuild the first stage, with some exceptions.

> **Caution Note: If the unit shows signs of internal corrosion or the filter shows evidence of contamination, the unit must be rebuilt, regardless of the IP.**

(6) The regulator will require rebuilding if small bubbles are leaking from between the turret retainer and main body, from under the rubber cap, or out of the high-pressure seat retainer. Knowledge of flooding of the first stage will also require the unit to be rebuilt. Even fresh water contains dissolved minerals and other materials that, over time, may cause the regulator to malfunction.

(7) After the IP has been checked, hoses and regulator body inspected, and SPG evaluated, the service of the first stage can take place.

4. First Stage Disassembly

(1) Additional tips for performing disassembly of the D6 First Stage can be found in our video at:

https://www.youtube.com/watch?v=cKMoqbUnomA

(2) Ensure the system is depressurized. Document the position of all hoses and port plugs. The use of small, clean containers to hold parts is recommended.

(3) In the following steps, the part numbers from the schematic will be used with their description. The numbers on the photos also correspond with the parts list on the schematic. Items in the service kits are identified in the same way. Have both in front of you while following the instructions. Be sure to keep all old parts organized and separate from new ones in the service kit. The old washers and O-rings will be replaced with new ones from the service kit and the remaining parts will be cleaned and reused.

1. Remove all hoses and loosen the Env Cap (22) - Fig. 4.

Fig. 4

2. Remove the Env Cap (22), Silicone Disk (21), and Transmitter (20) - Fig. 5. It is often easier to remove the cap with the first stage installed on an unpressurized cylinder. **It may be necessary to use both pin spanners to loosen the cap if corrosion is present.** If this is the case, soaking in 50/50 hot water/vinegar solution will aid in freeing up the connection. Use even steady pressure to work with both pin spanners. If it is badly seized or the holes are in such orientation that using both is impaired by the DIN Wheel (07), perform Step 3. and then try to remove the Env Cap. Remove the port plugs (32, 34) with O-rings (31*, 33*) - Fig. 6.

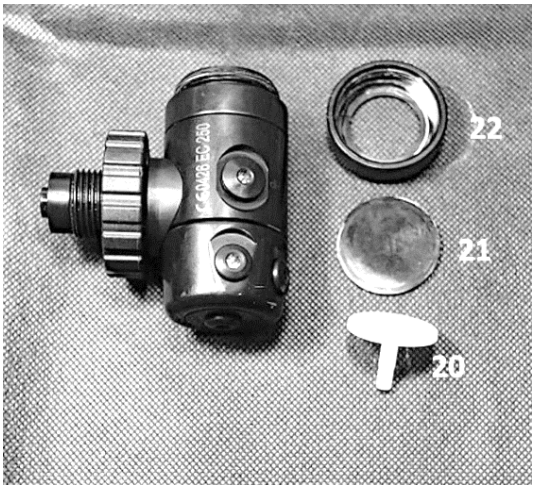


Fig. 5

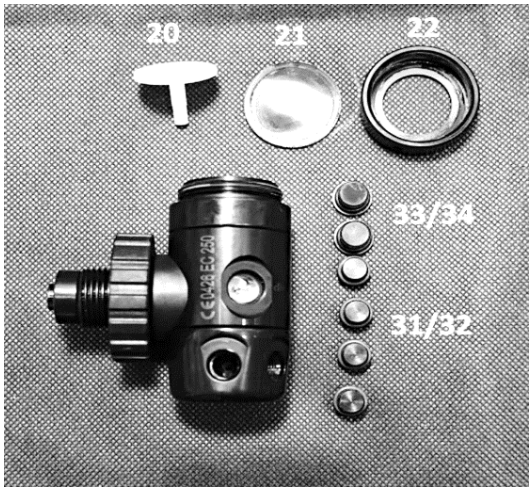


Fig. 6

Caution Note: Take whatever steps are necessary for keeping track of items that are part of an assembly. This degree of organizing the workspace will reduce the risk of mistakes resulting in the regulator's failure.

3. Secure the regulator in a vise using the first stage handle with the DIN assembly facing up - Fig. 7. Remove the DIN Retainer (03) using a 6mm Hex - Fig. 8.

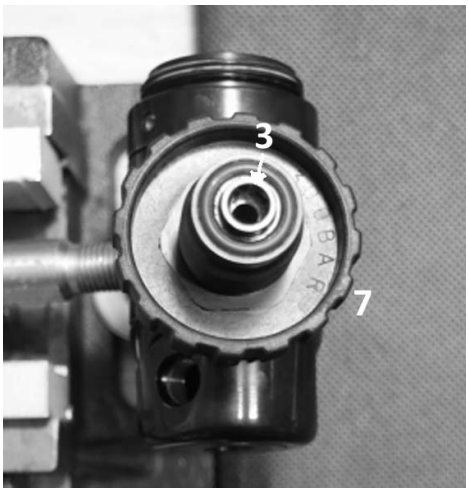


Fig. 7

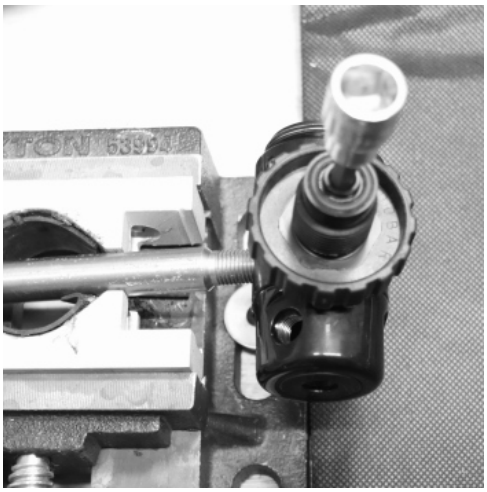


Fig. 8

4. Lift the DIN Wheel (07) off the DIN Housing (08) - Fig. 9. Loosen and remove the DIN Housing using a 19mm deep socket or open-end wrench - Fig. 10. Remove the Saddle (10). Fig. 11 shows all parts disassembled at this point.

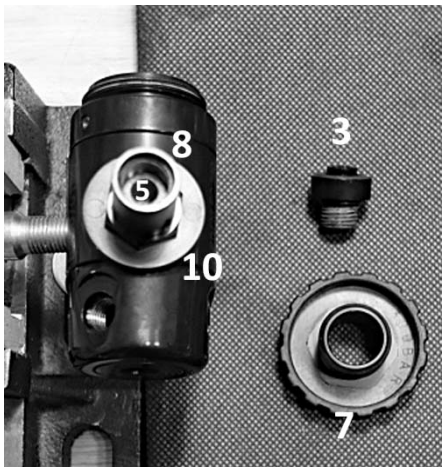


Fig. 9

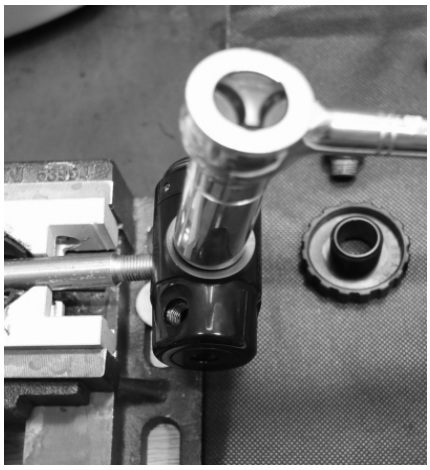


Fig. 10

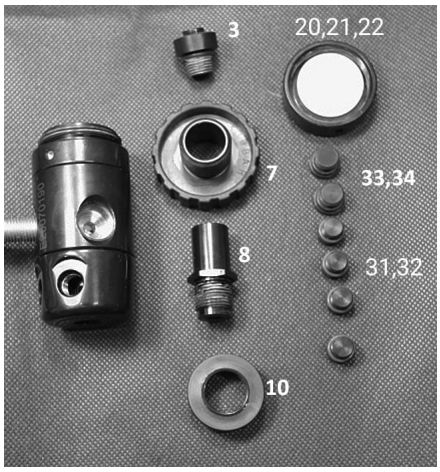


Fig. 11

5. Unscrew the Adjustment Screw (19) until no spring pressure is felt with the 6mm hex - Fig. 12. Three to four turns are sufficient. Do not remove the screw. With the first stage handle in one of the high-pressure ports, and a pin spanner, loosen, but do not remove, the Diaphragm Cap (18) by applying firm, even downward pressure. Do this with the first stage on the rubber pad - Fig. 13. At this point, there will be a gap between the Main Housing (11) and the Diaphragm Cap (18) - Fig. 14.

Fig. 12

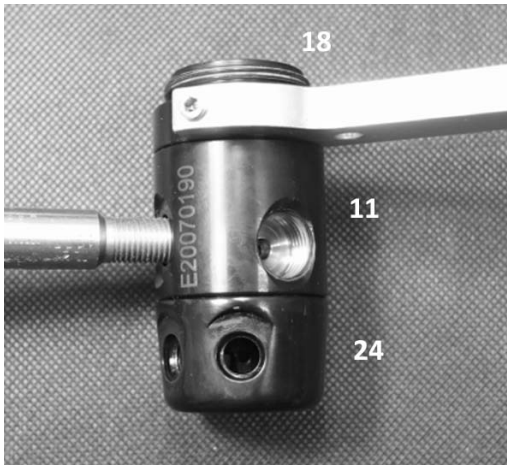


Fig. 13

Fig. 14

Caution Note: If the regulator has not been properly rinsed, the connection may be too tight to loosen without damage. In this case, it may be necessary to soak the assembly in a 50/50 hot water/vinegar solution and try loosening it again. Do not try to force by tapping with a mallet on the spanner or using a breaker bar. Too much torque can deform the pin spanner locating hole. The hole can also be damaged by using too small of a pin on the spanner. A 0.156 is the correct diameter pin.

6. Turn the regulator over so that the Turret (24) faces up - Fig. 15. Unscrew the Diaphragm Cap assembly - Fig. 16.

Fig. 15

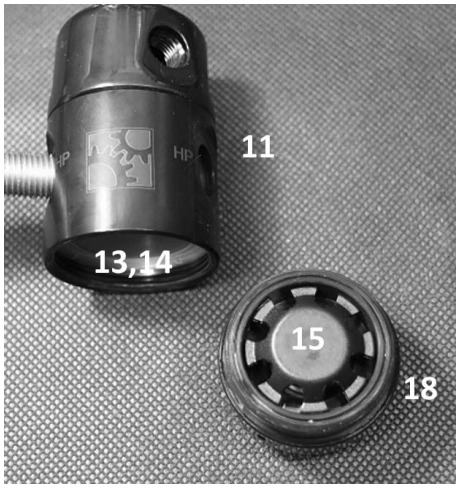


Fig. 16

The Diaphragm Cap assembly consists of the Cap (18), the Spring Seat (15), Spring Washers (16*), Main Spring (17), and Adjust Screw (19) - Fig. 17.

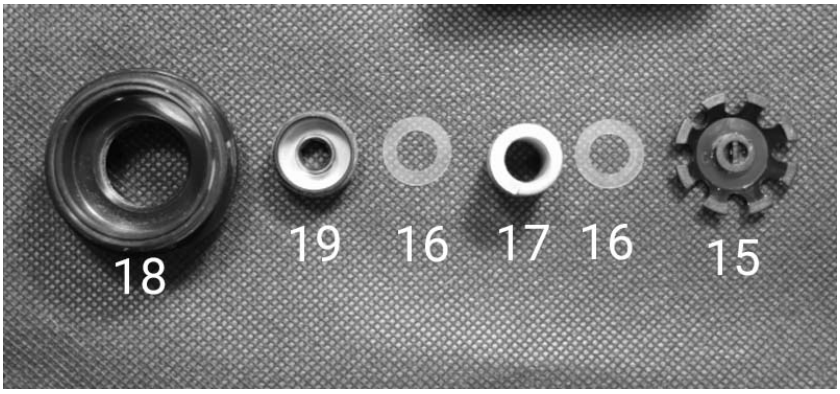


Fig. 17

7. Turn the Main Housing (11) upright as shown to expose the Diaphragm (13*) and Diaphragm Washer (14*) - Fig. 18. Using a blunt brass or plastic pick, remove the Washer and Diaphragm. This will expose the Lifter (12) - Fig. 19.

Fig. 18

Fig. 19

8. Remove the Lifter (12) from the Main Housing by inverting the regulator body to let it fall out - Fig. 20. If the Lifter does not fall free, carefully lift it free to avoid bending the center pin or wait until Step 11. After the Turret Bolt is removed, the Lifter will fall free.

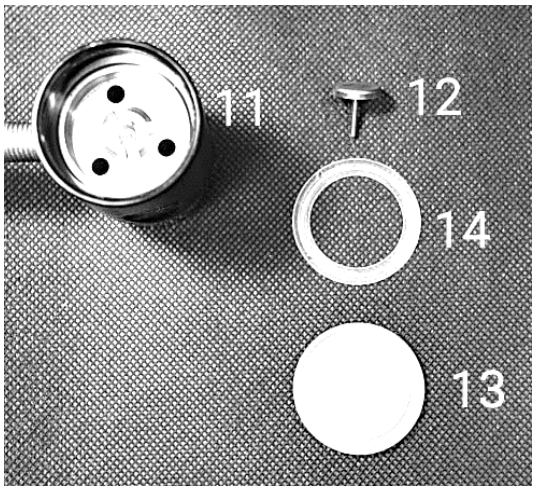


Fig. 20

9. Secure the first stage handle in the vise with the Turret (24) facing up and insert the 6mm hex into it, making sure that it is firmly seated and straight. Failure to firmly seat the hex may damage the sides of Turret Bolt (30) - Fig. 21.

Fig. 21

10. With the 6mm hex and ratchet, loosen the Turret Bolt (30) - Fig. 22. **Do not remove it at this time.** Take the first stage handle and regulator out of the vise. Turn the Main Housing vertical as seen, and using the 6mm hex, remove the Turret Bolt - Fig. 23. Note that this removes the entire HP Seat assembly. Doing it in this manner ensures that no parts are accidentally lost.

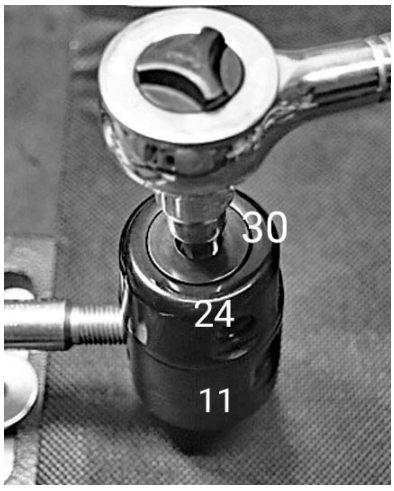


Fig. 22

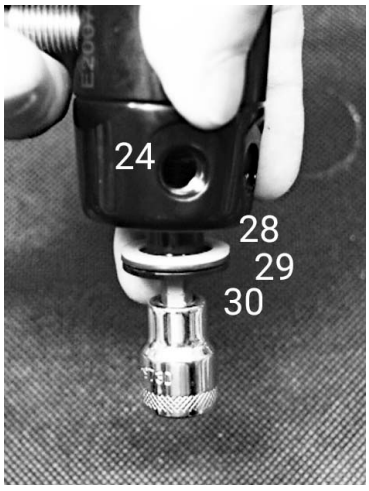


Fig. 23

11. Set the Main Housing aside and carefully remove the HP Seat (25*). Pull the Valve Spring (26) off the Turret Bolt. Remove the Thrust Washer (28*) and O-ring (29*). Using the pinch method or brass/nylon pick, remove the O-ring (04*) - Figs. 24 and 25.

Fig. 24

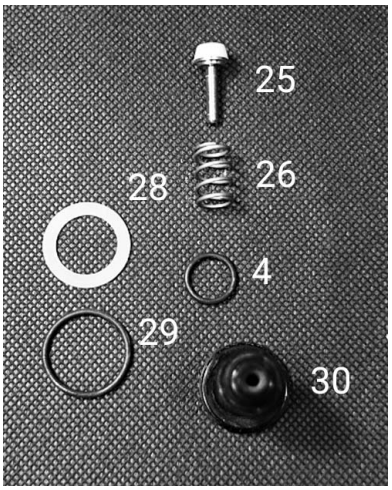


Fig. 25

12. Removal of O-ring (27*) requires great care. **The sealing of this O-ring with the stem of the HP seat and Turret bolt inner surface is critical to the regulator's safe operation.** Using a nylon pick, remove the O-ring by carefully working it out of its location, and then retrieve it with the plastic crochet hook. It is better to work it from the "outside in" to avoid scratching the Turret bolt side - Fig. 26. It can also be stabbed and worked out. It sometimes will come out in pieces. This is acceptable. Just make sure the Turret Bolt is cleaned well afterward. Carefully inspect the sealing surface using a magnifying glass. **Any scratch will compromise the ability to seal the HP Seat stem.** Fig. 27 shows the O-ring removed from the Turret Bolt.

Fig. 26

Fig. 27

13. Remove the Turret (24) from the regulator Main Housing - Fig. 28. Remove the O-ring (23*) from the Main Housing. Note that the O-ring may come off with the Turret - Fig. 29.

Fig. 28

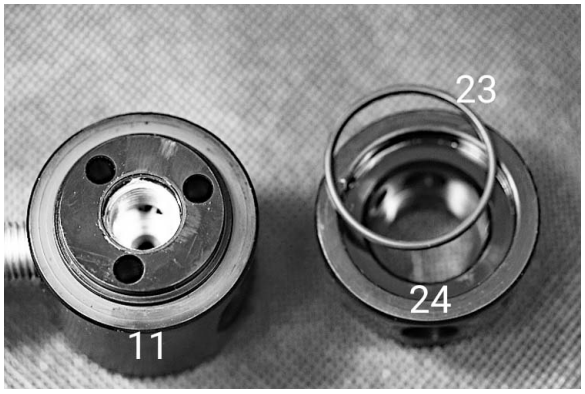


Fig. 29

14. Carefully inspect the machined orifice in the Main Housing. It should show no evidence of nicks or uneven surfaces on the bevels - Fig. 30.

Caution Note: Do not insert any metal tool into the bore of the Main Housing! A scratch on the orifice will cause irreparable IP creep.

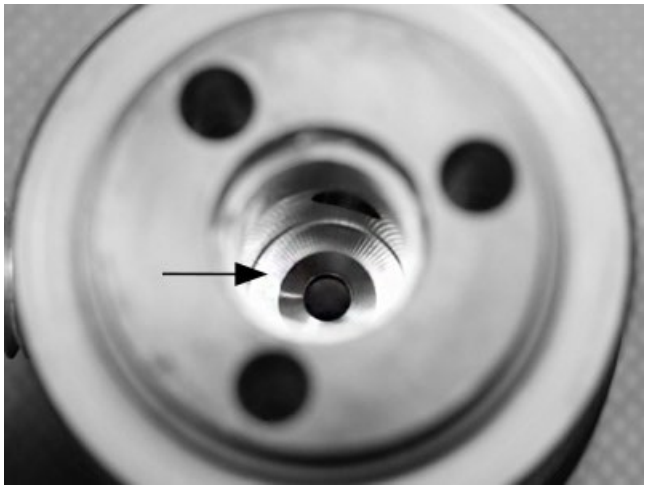


Fig. 30

This completes the disassembly of the D6 First Stage.

(4) The photographs below show the disassembled first stage - Fig. 31 and the items in the Service Parts Kit - Fig. 32. The parts not in the service kit need to be washed, rinsed and dried, as discussed previously.

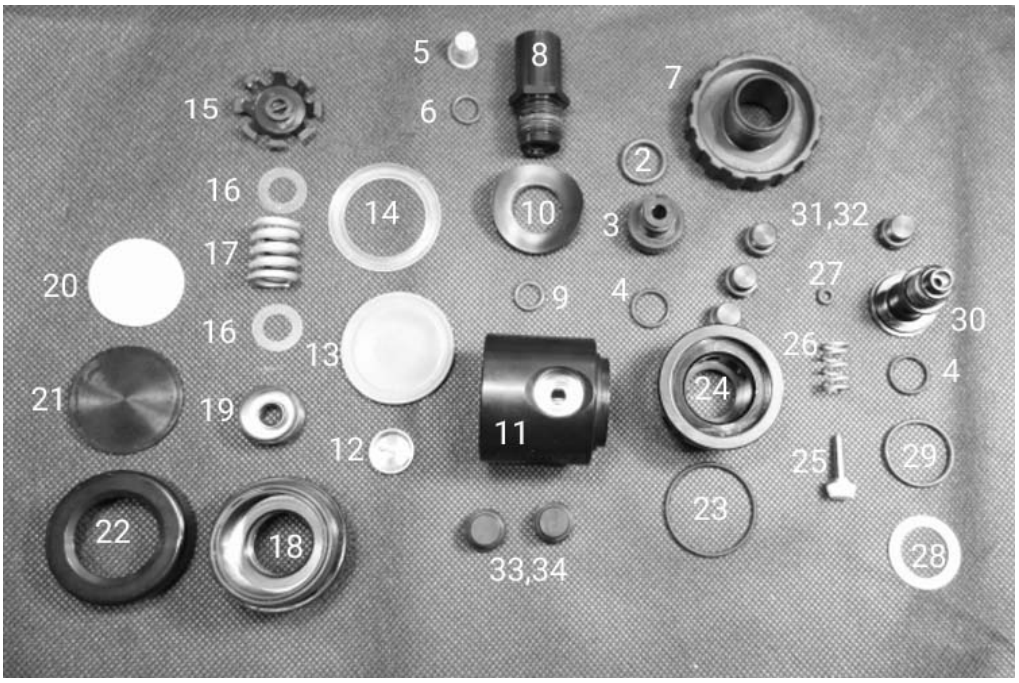


Fig. 31

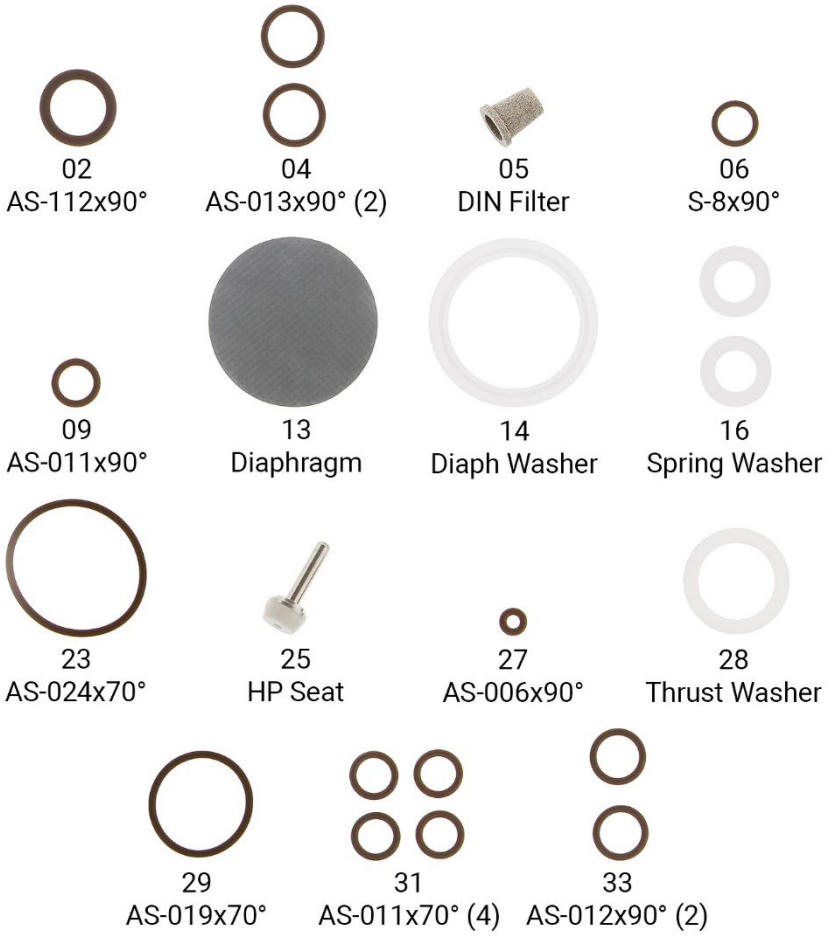


Fig. 32

5. First Stage Assembly

(1) Additional tips for performing reassembly and tuning of the D6 First Stage can be found in our videos at:

https://www.youtube.com/watch?v=Nd5OtVJ8MEc

and

https://www.youtube.com/watch?v=xkvb-rXKcGY

(2) Before starting the first stage assembly, complete a thorough inspection of all parts to be reused. Refer to the Overview Inspection section for details. At this time, open the service kit and lay out the parts. Use the schematic diagram and Service Parts Kit photo to identify each part.

Caution Note: Only use enough lubricant to lightly coat the O-rings and ensure no debris is trapped on them.

1. The first step in assembling the now cleaned first stage is to assemble the regulator's diaphragm side. Place the Lifter (12) in the Main Housing (11) hole as shown - Fig. 33. Install the Diaphragm (13*) by inserting one side and working it into place using your finger, a blunt brass spade or a nylon pick - Fig. 34.

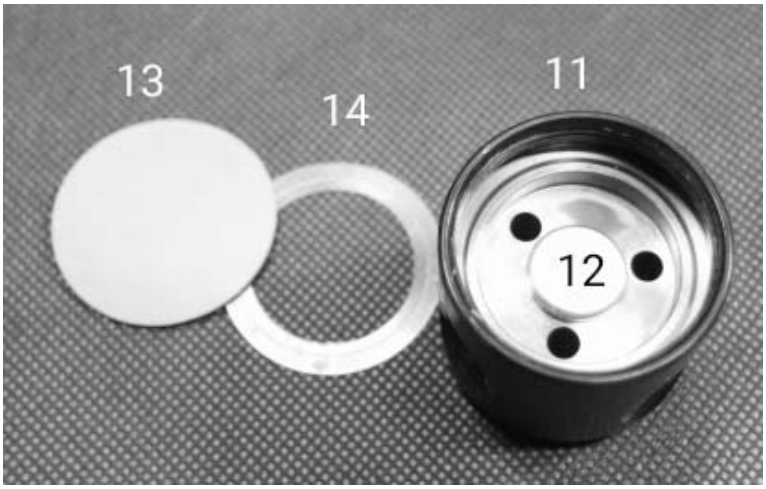


Fig. 33


Fig. 34

2. Install the Diaphragm Washer (14*) in the same manner by inserting one side and pulling it under the lip as you work it into place - Fig. 35. Using the brass spade or nylon pick, smooth the Washer to ensure it is firmly seated below the threads of the Main Housing - Fig. 36. **Do not wrinkle the Washer.** This will cause the Diaphragm to leak.

Fig. 35

Fig. 36

3. The Diaphragm Cap (18), Adjust Screw (19), Spring Seat (15), Washers (16*), and Main Spring (17) will be assembled in the order shown in Fig. 37.

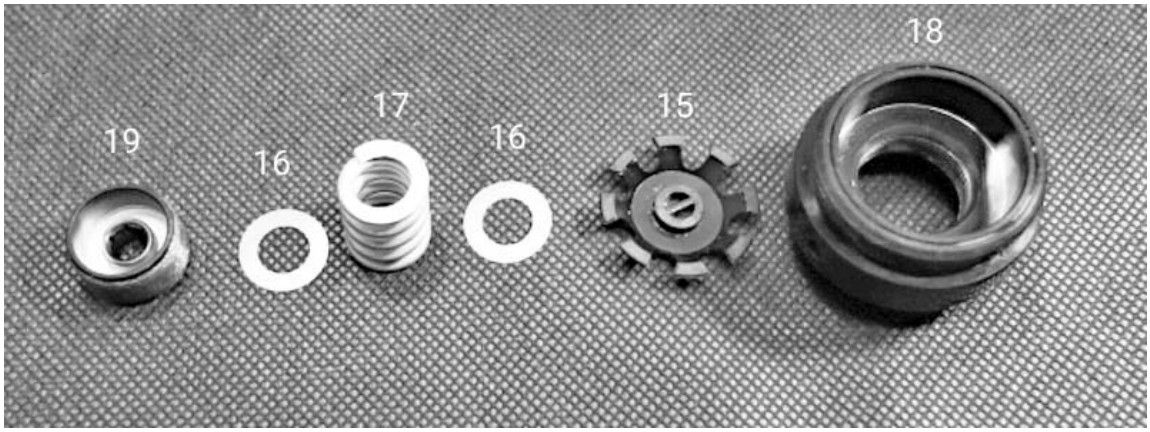


Fig. 37

4. Turn the Adjust Screw (19) into the Diaphram Cap (18) until 3 to 4 threads are showing as illustrated - Fig. 38. Stack the Washer (16*), Main Spring (17) Washer (16*), and Spring Seat (15) in the Adjust Screw (18). Turn the regulator Main Housing upside down and screw the Cap assembly into it. Hand tighten - Fig. 39.

Fig. 38

Fig. 39

5. Tighten the Diaphragm Cap assembly onto the Main Housing using the pin spanner - Fig. 40. There should be no gap between the Main Housing and the Cap - Fig. 41. The connection is tight when pressure is applied using the spanner, and no movement is observed. Inspect the pin of the Lifter inside the bore of the Main Housing to ensure it is centered in the bore. If not, add another turn to the Adjust Screw (19). This will force the lifter more tightly against its mating surface and center the pin.

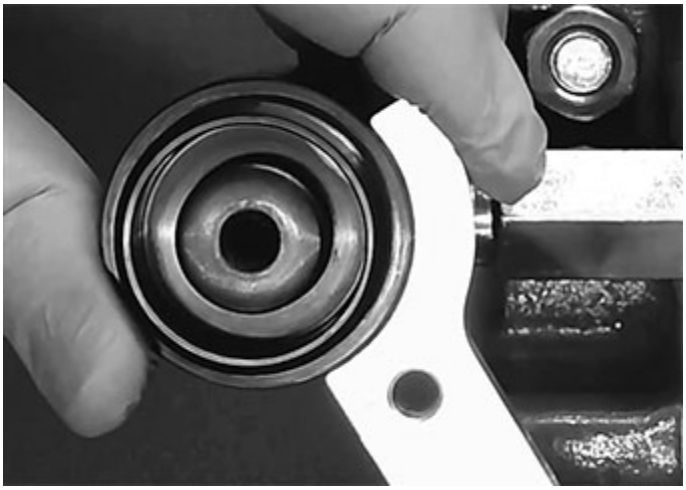


Fig. 40

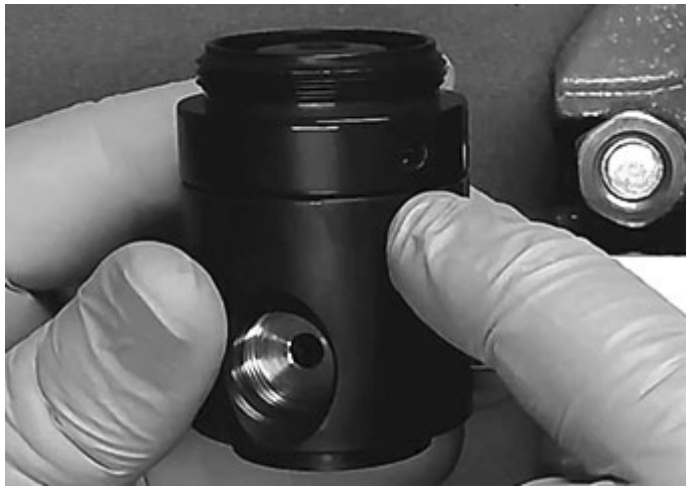


Fig. 41

6. Turn the Main Housing so that the HP side faces up. Lubricate the O-ring (23*) and place it on the Housing - Fig. 42. Push the Turret (24) onto the Housing and turn it to be sure it is seated and rotates smoothly - Fig. 43. There should be some resistance, but it should not hang up or seize. Any dirt, hair, or other debris will compromise the seal.

Fig. 42

Fig. 43

7. Set the Turret Bolt (30) on a flat surface. Using the Tribolube syringe, apply a small amount of lube to the O-ring seating area. Install the O-ring (27*) using a dowel to push it into place and seat - Fig. 44. Lubricate one of the O-rings (04*) and work it onto the Turret Bolt's threads. Place O-ring (29*) on the Turret Bolt, followed by the Thrust Washer (28*) - Fig. 45.

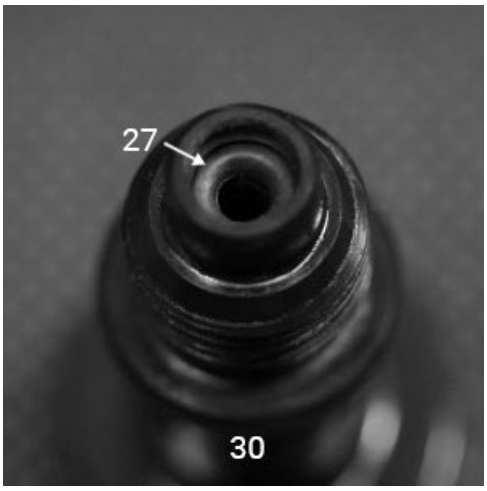


Fig. 44

Fig. 45

8. Place the Valve Spring (26) on the Turret Bolt (30) - Fig. 46. Lubricate the HP Seat (25*) tip by placing it in the bag used to lubricate the O-rings and rotate it. Push the HP Seat stem into the O-ring (27*) until it seats on the Valve Spring (26) as shown - Fig. 47. Push down on the seat a few times to ensure it moves without binding or tilting.

Fig. 46

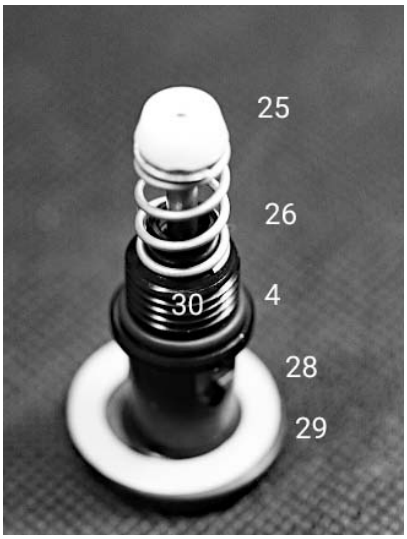


Fig. 47

9. Install the Turret Bolt assembly (25*-30 and 04*) into the Main Housing - Fig. 48. This is done by holding the Housing vertical and the Turret Bolt assembly on the hex socket. Insert the assembly up into the housing and turn until the threads are engaged. Continue to turn the Turret Bolt assembly until it is seated.

Fig. 48

10. If not already done, install the first stage handle in one of the HP ports. Clamp the handle in a vise with the Turret Bolt facing up - Fig. 49. Using the torque wrench and hex socket, torque the Turret Bolt to 170 in-lbs/200 kgf-cm/19 N·m - Fig. 50. **Ensure the socket is firmly seated and straight. Failure to do this may result in stripping the hex sides.**

Fig. 49


Fig. 50

11. Turn the first stage handle so that the DIN inlet is facing up. Place the Saddle (10) on the inlet. Install the O-ring (09*) at the end of the DIN Housing (08) - Fig. 51. A tiny amount of lube – only enough to result in a slight sheen - to prevent the O-ring from seizing and being damaged can be applied. This is enough to reduce the risk of damaging it. Screw the DIN Housing in and apply 230 in-lbs/260 kgf-cm/26 N·m of torque with the 19mm deep socket and the torque wrench - Fig. 52.

Fig. 51

Fig. 52

12. Set the DIN Wheel (07) on the DIN Housing - Fig. 53. Place the O-ring (06*) on the Filter (05*) as shown - Fig. 54. Place the pair in the DIN Housing and push into place with the dowel rod - Fig. 55.

Fig. 53

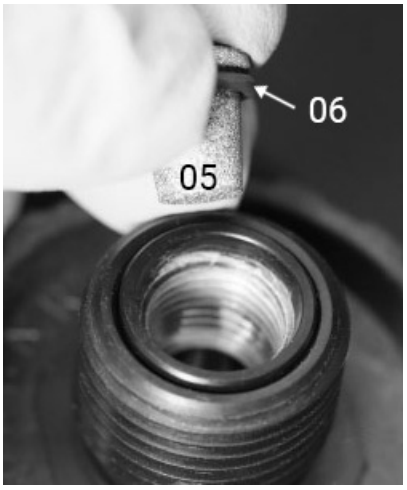


Fig. 54

Fig. 55

Caution Note: Torquing the DIN Housing and DIN Retainer connections to different values reduces the housing's risk of becoming loose or the retainer and housing to be seized. This can occur when the regulator is pressurized and then rotated on the tank valve to orient it, usually for hose routing. Subsequently, a diver may notice the loose retainer and grab a hex to snug it up, possibly to the same torque as the housing. Now when the body is turned, the entire assembly is loosened. Always use the proper torque on the components. If the retainer should loosen, and no torque wrench is handy, the proper thing to do is wait until one is to tighten the assembly. Only rotate the regulator on the valve when depressurized to achieve optimal hose routing.

13. Install the O-ring (04*) on the thread end of the DIN Retainer (03) - Fig. 56. Screw the DIN Retainer into the DIN Housing. Using the torque wrench and the 6mm hex, torque the connection to 150 in-lbs/170 kgf-cm/17 N·m - Fig. 57.

Fig. 56


Fig. 57

14. Install the O-ring (02*) into the DIN Retainer (03) - Fig. 58. **This completes the assembly of the first stage.** Testing and adjustments may now be made. The Transmitter (20), Silicone Disc (21), and Env Cap (22) are not installed until the testing and adjustment steps are complete - Fig. 59. **Only install the Transmitter (20), Silicone Disc (21), and ENV CAP (22) when the regulator is pressurized.**

Fig. 58

Fig. 59

First Stage Torque Specifications

(3) For a successful rebuild, it is necessary to use proper torque on all connections that require it. The following specifications should be used, listed in the order they occur in the assembly:

Turret Bolt (30) to Main Housing (11)	170 in-lbs/200 kgf-cm/19 N·m
DIN Housing (08) to Main Housing (11)	230 in-lbs/260 kgf-cm/26 N·m
DIN Retainer (03) to DIN Housing (08)	150 in-lbs/170 kgf-cm/17 N·m

6. First Stage Testing

(1) To test the first stage, a regulated breathing air supply, OCA Grade Source if the regulator is to be used with Nitrox, or several SCUBA cylinders are needed. If using a regulated supply, set the initial supply to 500 psi. If using cylinders, 3 are recommended with 500 psi, 1500 psi, and 3000 psi levels. You will need to move the regulator between the cylinders, and each time it is pressurized, be sure to have the purge button depressed slightly and allow the supply pressure to come up with this safety measure used. A transfill whip like the one from Dive Gear Express will make setting up the cylinders easier.

https://www.divegearexpress.com/dgx-transfill-hose-with-analog-gauge

(2) Attach a second stage with a hose with an in-line tool/IP gauge combination, or a second stage with a hose and a low pressure inflator hose with plug-in IP gauge. With the supply set to 500 psi, slowly pressurize the regulator while slightly purging the second stage to act as a safety.

(3) Allow the second stage to slightly flow and release the purge button slowly. Observe the IP. It should come up to between 90 and 120 psi and stay at that reading. If it goes over 135 psi, immediately purge the second stage and turn the supply pressure off. Back the Adjustment Screw out one full turn. Reapply pressure as before. Adjust the IP in small increments. As you approach the target pressure of 135 psi, it will take less of a turn to affect the pressure.

(4) With the reg at 135 psi, breathe or purge the second stage 40-50 times to improve the high pressure seal.

(5) Next, increase the supply to 1500 psi and repeat the procedure. Observe the IP and ensure that it is not creeping. It may change a few psi as the seat and orifice begin to develop a groove. This is normal and does not indicate a problem.

(6) Now increase the supply pressure to 3000 psi and repeat the procedure as before. The IP may drop as much as 10 psi or less than that. Turn the Adjustment Screw until you have 135 psi on the IP gauge. Purge or breathe the second stage 40-50 times. The IP should hold steady. Do not exceed 135 psi at 3000 psi supply pressure.

> **Caution Note: A balanced diaphragm first stage is designed to slightly increase the IP as cylinder pressure drops. With the IP at 135 psi at 3000 psi, the IP may increase to 140+ at 500 psi or less. This is normal. If the IP was set near the top of the normal operating range of 140+ at 3000 psi, it would likely rise above the maximum operating pressure of 145 psi. It could overcome the second stage and cause a free flow (possibly icing if diving in colder water).**

(7) With the first stage pressurized, install the Transmitter (20), Silicone Disc (21), and Env Cap (22) hand tight. **Do not overtighten with a pin spanner.** These parts are installed only when the first stage is pressurized because they trap a small amount of air when they are installed. If installed when the regulator is depressurized, this amount of air is added to by the pressure of the transmitter rising when the valve is turned on. This, in turn, forces the Silicone Disc to bulge upwards and compromises the seal. It also will deform the disc over time, necessitating a replacement of the disc.

(8) Finally, take the first stage with the second stage and LP inflator hose and place it on a cylinder that can be submerged in water. Submerge the first stage and check for any leaks between the Main

Housing and Turret, DIN connection, port plugs, and hose connections. If none are present, the first stage service and testing are complete.

Caution Note: Do not submerge the second stage with the in-line tool attached or with the plug-in IP gauge on the low pressure inflator. They are made for surface use only and submerging them may result in damage to the tool or gauge!

(9) General Trouble Shooting – Not all possibilities may be noted.

No airflow	Check supply pressure
Free flowing	Excessive IP; HP Seat bad, Orifice edge compromised or damaged
Excessive IP	Bad HP Seat, HP Seat assembly O-ring(s) bad
Leaks between seams on Main Housing	Bad O-rings; excessive IP; Main Housing/End Caps damaged; dirt introduced during a rebuild; Diaphragm or Washer compromised
DIN connection loosening	Failure to properly torque connection; adjusting orientation while pressurized

Item	Description	Qty	Item	Description	Qty	Item	Description	Qty
02*	AS-112x90°	1	13*	Diaphragm	1	24	Turret	1
03	DIN Retainer	1	14*	Diaph Washer	1	25*	HP Seat	1
04*	AS-013x90°	2	15	Spring Seat	1	26	Valve Spring	1
05*	DIN Filter	1	16*	Spring Washer	2	27*	AS-006x90°	1
06*	S-8x90°	1	17	Main Spring	1	28*	Thrust Washer	1
07	DIN Wheel	1	18	Diaphragm Cap	1	29*	AS-019x70°	1
08	DIN Housing	1	19	Adjust Screw	1	30	Turret Bolt	1
09*	AS-011x90°	1	20	Transmitter	1	31*	AS-011x70°	4
10	Saddle	1	21	Silicone Disk	1	32	LP Plug	4
11	Main Housing	1	22	Env Cap	1	33*	AS-012x90°	2
12	Lifter	1	23*	AS-024x70°	1	34	HP Plug	2

Note: Items marked with * are included in service parts kit to be replaced at time of service.

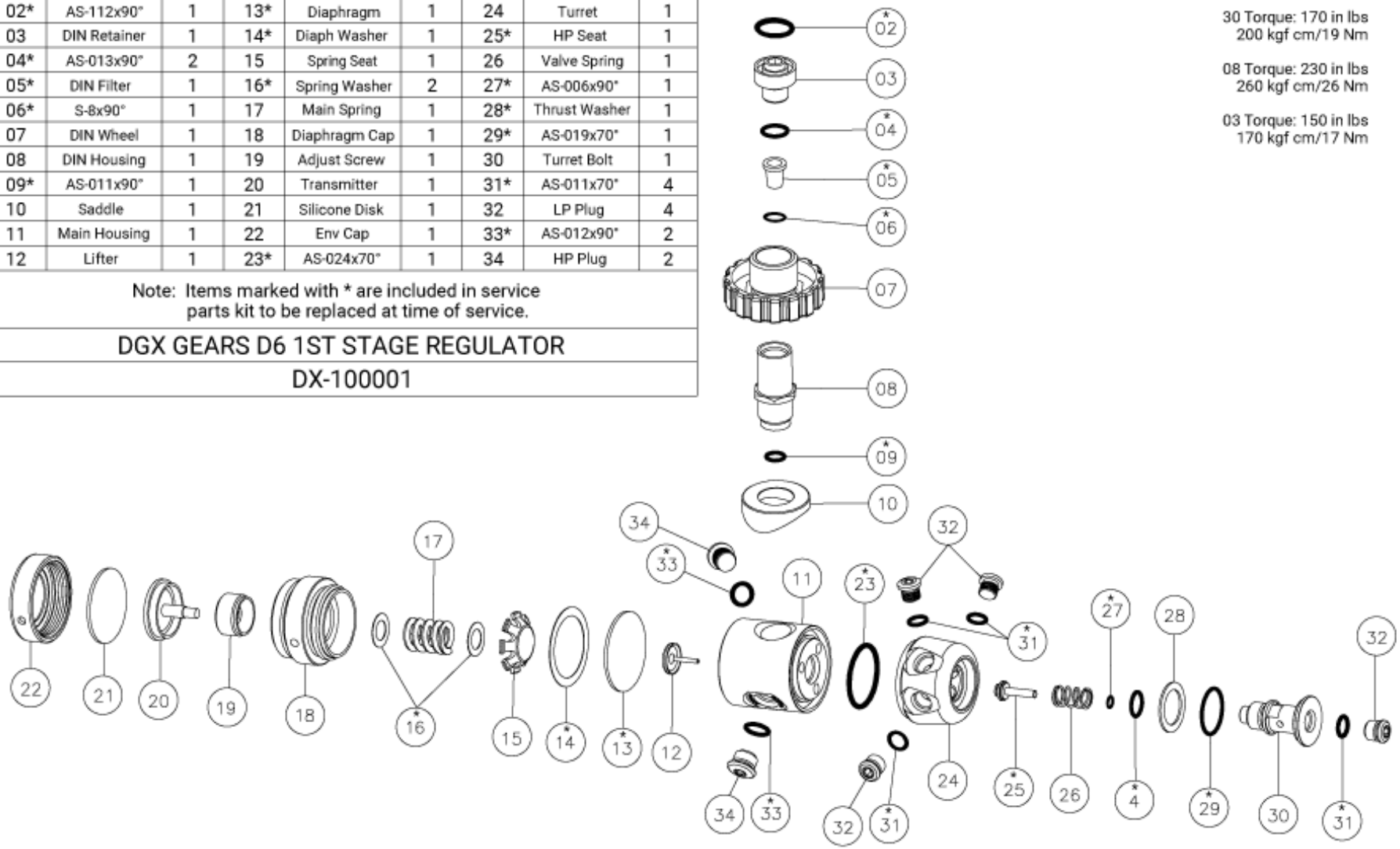
DGX GEARS D6 1ST STAGE REGULATOR

DX-100001

30 Torque: 170 in lbs
200 kgf cm/19 Nm

08 Torque: 230 in lbs
260 kgf cm/26 Nm

03 Torque: 150 in lbs
170 kgf cm/17 Nm



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