DIVE GEAR EXPRESS

DGX Gears XTRA
First Stage Service Manual

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Revision	Date	Changes
5d	08/17/2020	Initial publication
6	09/28/2020	Minor technical edits for clarity; edited photos for clarity and added part numbers; replaced Figs. 26, 30, 32, 33; updated schematic diagram
7	09/23/2022	Minor technical edits for clarity; replaced Fig 3; removed Figs. 4 and 5 and renumbered following Figs.; replaced Figs. 23, 29, 35, 36 and 37
7a	04/24/2023	Updated schematic diagram to renumber part 17 to parts 17 and 17-1
7b	10/25/2023	Updated text, Figs. and schematic diagram to renumber parts 26* and 27*, and label part D11* as included in service parts kit

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 Piston knife edge) 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.

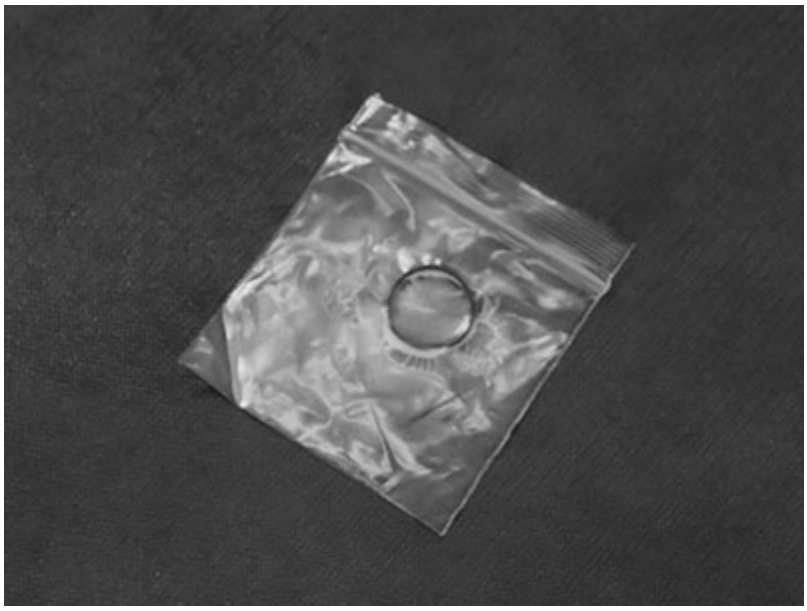


Fig. 2.

(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. 3/8″ Breaker Bar or Ratchet Handle
2. Open End Hose or Adjustable Wrench
3. Vise Handle (First Stage Body Holding Tool)
4. 4, 5 and 6mm Hex Sockets and Hex Keys
5. 3/4” | 19mm Socket
6. 0-300 in-lb Torque Wrench
7. Tribolube 71
8. #5 Hook Spanner with 0.240 or 0.156 Pin
9. Thin Wooden Dowels
10. Thin Brass and Heavy Nylon Picks
11. Blunt Brass Pick and Blunt Brass Spade
12. Intermediate Pressure Gauge
13. Piston Bullet
14. Piston Bushing Tool

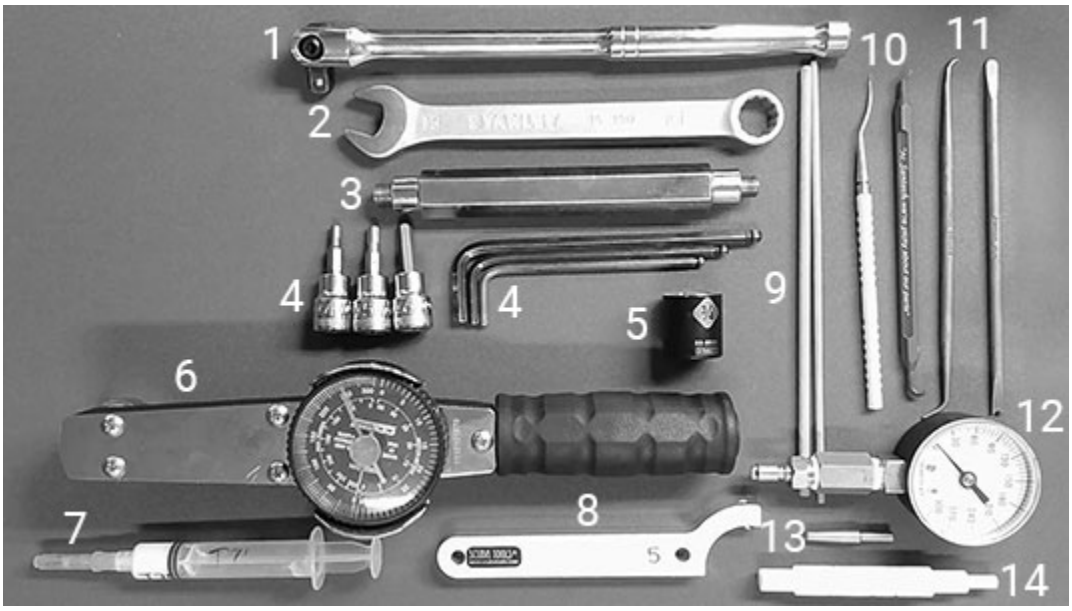


Fig. 3

(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, Piston, 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 XTRA First Stage can be found in our video at:

https://www.youtube.com/watch?v=KOl-oxsuBAE

(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 the schematic 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 marked with an asterisk (*) will be replaced with new ones from the service kit and the remaining parts will be cleaned and reused.

1. Remove all hoses and port plugs (21, 24) with O-rings (22*, 25*) - Fig. 4.

Fig. 4

2. Remove the Shutter Valve (D2) using a 4mm hex and Shutter Crown (D4), which contains the Spring (D6) and two small nylon Seats (D5*) - Fig. 5.

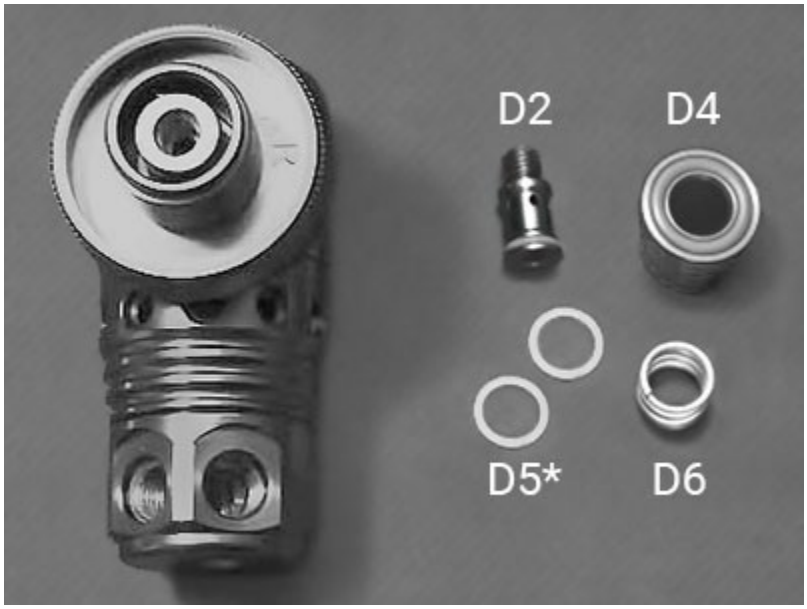


Fig. 5

3. Remove the Retainer Housing (D8) with the 4mm hex and lift the Handwheel (D9) from the body - Fig. 6.

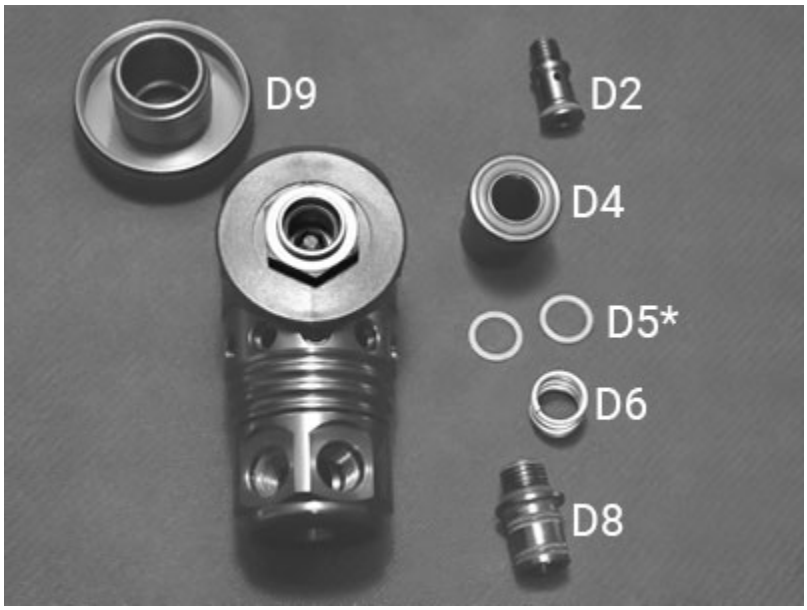


Fig. 6

4. Insert the First Stage Body Holding Tool into one of the high pressure ports and clamp the tool into a vise - Fig. 7.

NEVER CLAMP THE FIRST STAGE BODY INTO THE JAWS OF A VISE!

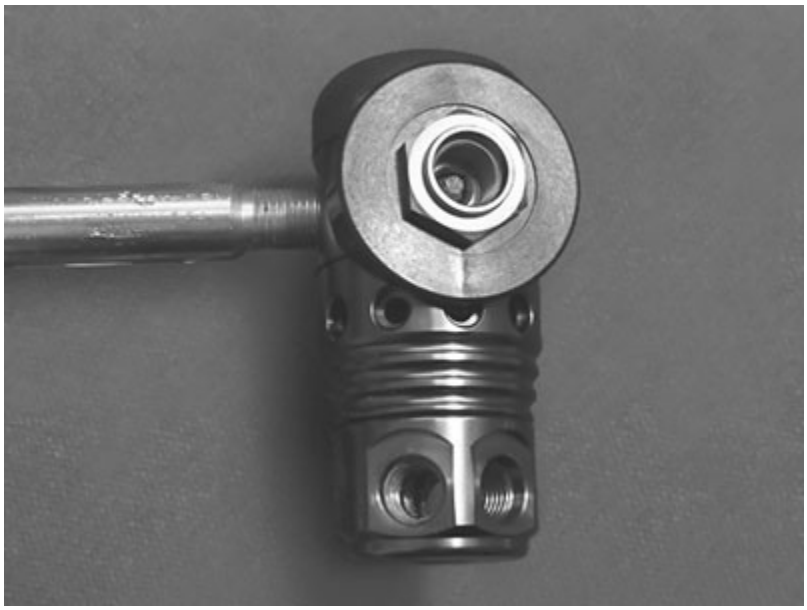


Fig. 7

Caution Note: Clamping the body of the regulator into the jaws of a vise may result in damage to the body that will require replacement of the regulator. Always use a first stage holding tool to secure the regulator.

5. Using a 3/4” | 19mm socket and ratchet loosen the Filter Retainer (D10) - Fig. 8. Be sure to hold the socket firmly so that it does not slip. Using steady, even pressure remove the Retainer and Saddle (08).

Fig. 8

6. Carefully remove the O-rings (D1*, D3*, D7*) from the Shutter Valve, Shutter Crown, Retainer Housing and Filter Retainer. Use the pinch method and a brass or nylon pick. Do not use a steel pick that could damage the sealing surface. Remove the Filter (D11*) and set aside. Retain the Spring (D6) and items listed above with the parts to be reused - Fig 9. The washers and O-rings will be replaced.

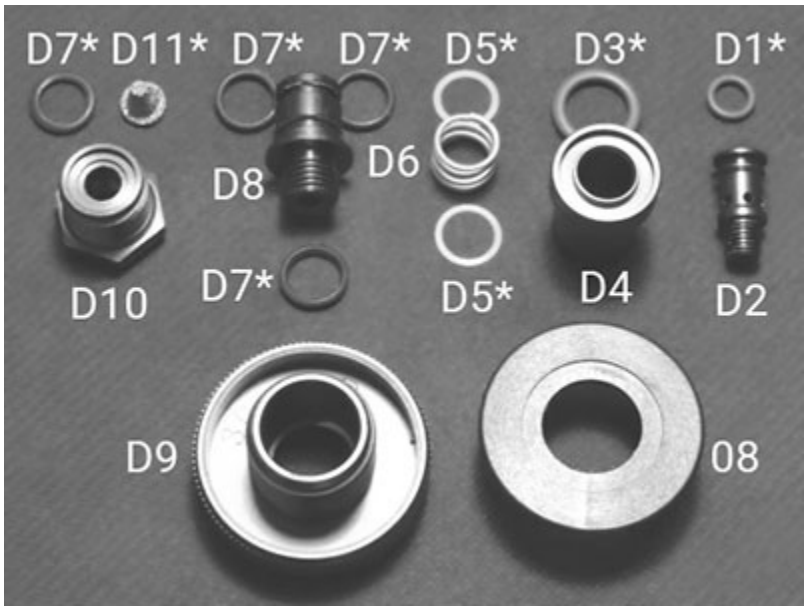


Fig. 9

Caution Note: Take whatever steps are necessary for keeping track of items that are part of an assembly. This degree of organization will reduce the risk of mistakes that can result in a failure of the regulator.

7. Using the Multi-Tool, carefully remove the rubber End Cap (34) - Fig. 10. This exposes the HP Seat Retainer (33) - Fig. 11.


Fig. 10

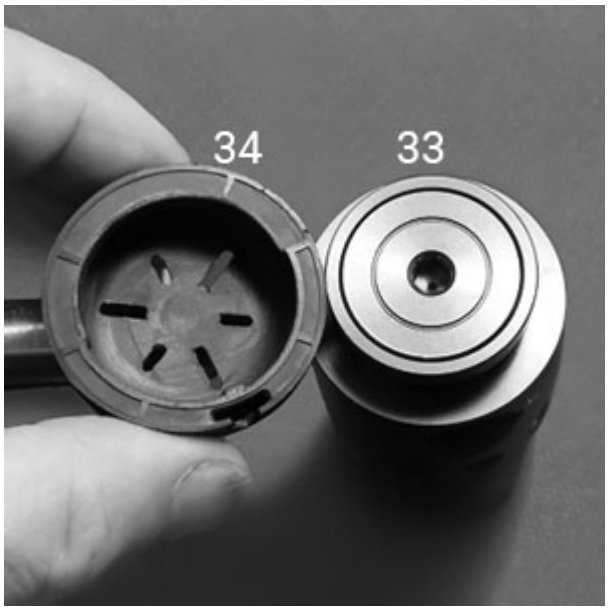


Fig. 11

8. Loosen the HP Seat Retainer with a 5mm hex wrench and remove it from the body, exposing the HP Seat (31*) - Fig. 12.

Fig. 12

9. Push out the HP Seat with a blunt pick or thin hex key, remove the O-ring (32*) and Spring (29). Remove O-ring (30*) with a brass or nylon pick from its groove in the body of the regulator - Fig. 13.

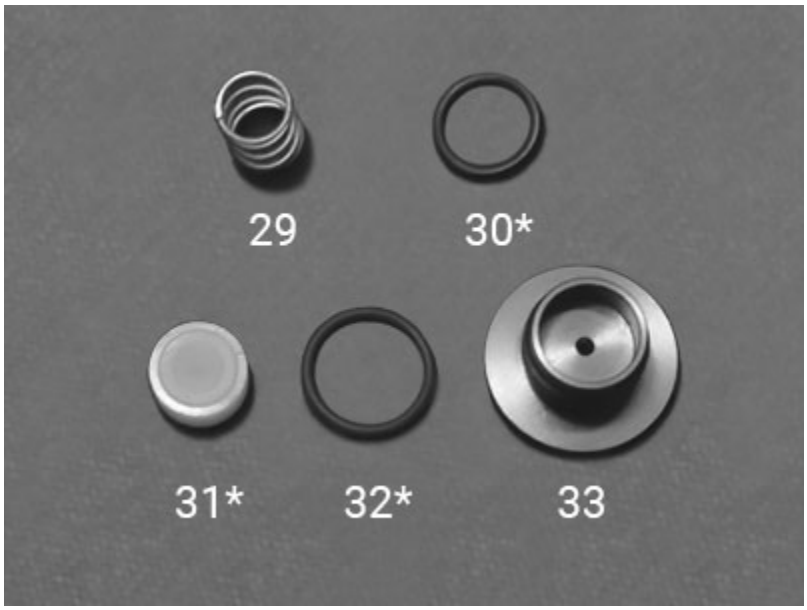


Fig. 13

10. Using the universal wrench or a pin spanner with an appropriate pin, and with the first stage handle secure - Fig. 14, loosen the End Cap (19)/Port Swivel (23) assembly so that a gap is visible - Fig. 15.

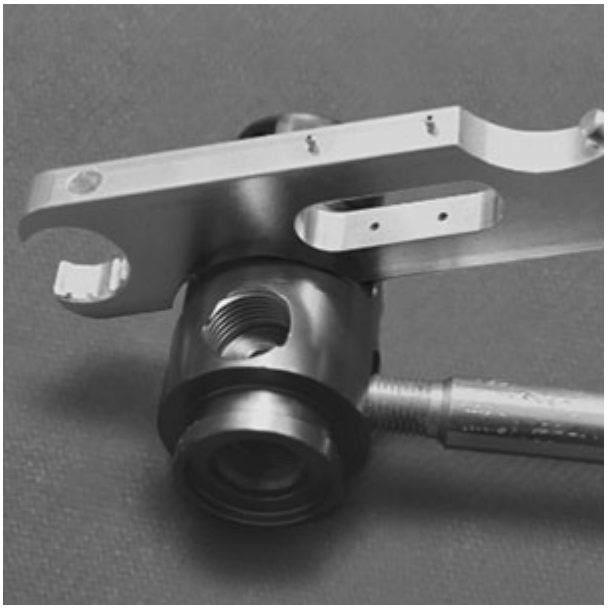


Fig. 14

Fig. 15

11. Holding the regulator vertical, with the end cap/turret on the bottom, unscrew the assembly from the Body (11) - Fig. 16. This allows access to the Washer (12*), Spring (13), Washer (12-1*), and Piston (14) - Fig. 17.

Fig. 16

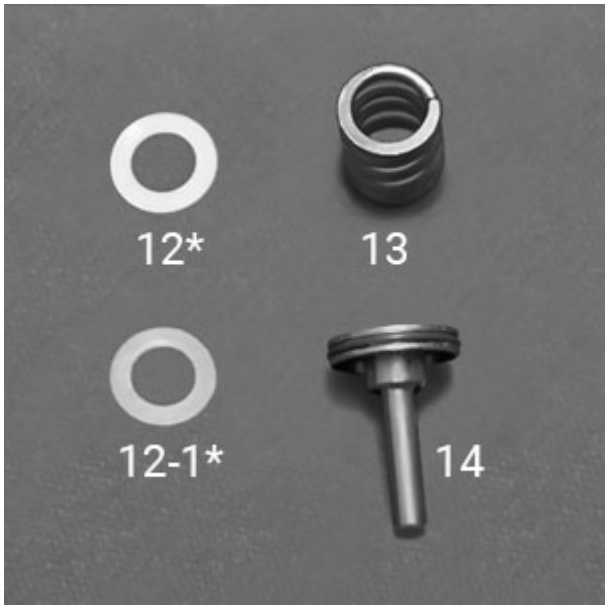


Fig. 17

12. Remove O-ring (15*) from the piston using the pinch method to avoid scratching the piston sides - Fig. 18.

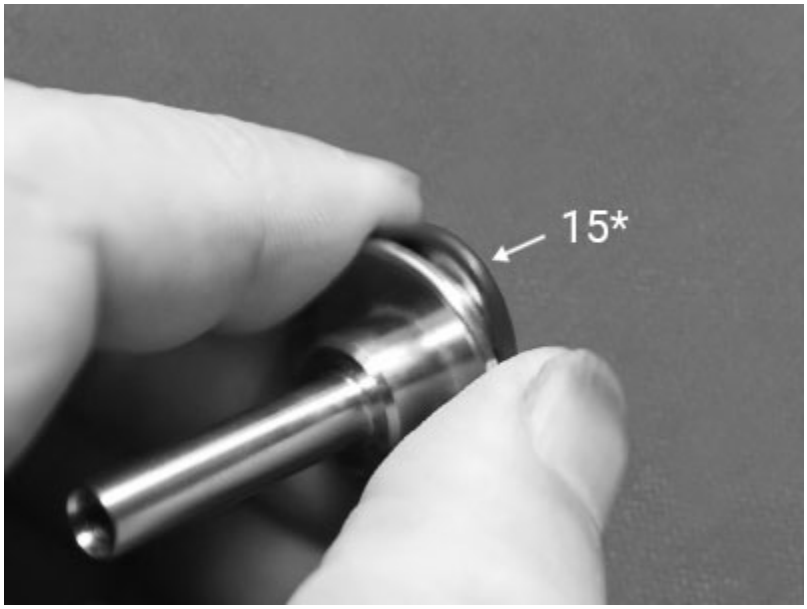


Fig. 18

13. Carefully remove the following components from the HP side of the regulator Body: Washer (28), O-ring (26*), and Teflon Washer (27*) using the Piston Stem Bushing Assembly Tool - Fig. 19. Turn the Body over and remove the other O-ring (26*) with a nylon pick - Fig. 20. Do not use a metal tool to remove this O-ring.

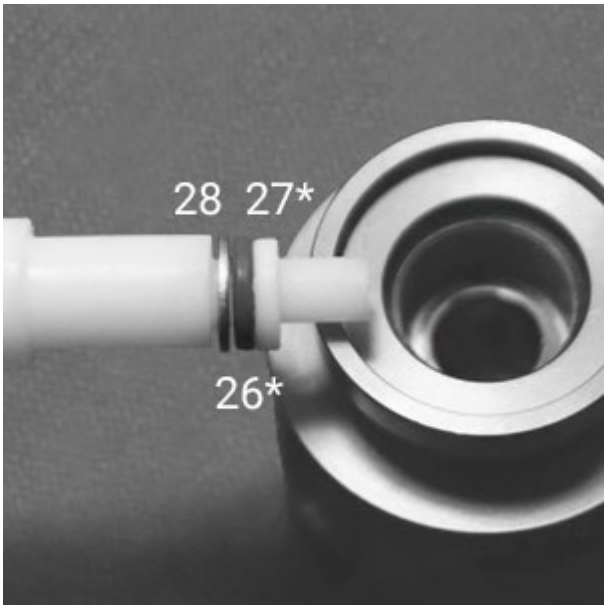


Fig. 19

Fig. 20

14. Disassemble the turret by inserting a first stage handle into one of the low pressure ports, then using a 6 mm hex wrench to unscrew the Nut (16) from the Port Swivel (23) - Fig. 21.

Fig. 21

15. This allows access to the Washer (17a). Remove the Washer. Pull the End Cap from the Port Swivel and remove the Washer (17b) and O-ring (20*) from the Port Swivel - Fig. 22. **Take note of the Washers. The smaller one (a) goes into the End Cap and the larger (b) onto the Port Swivel at reassembly.**

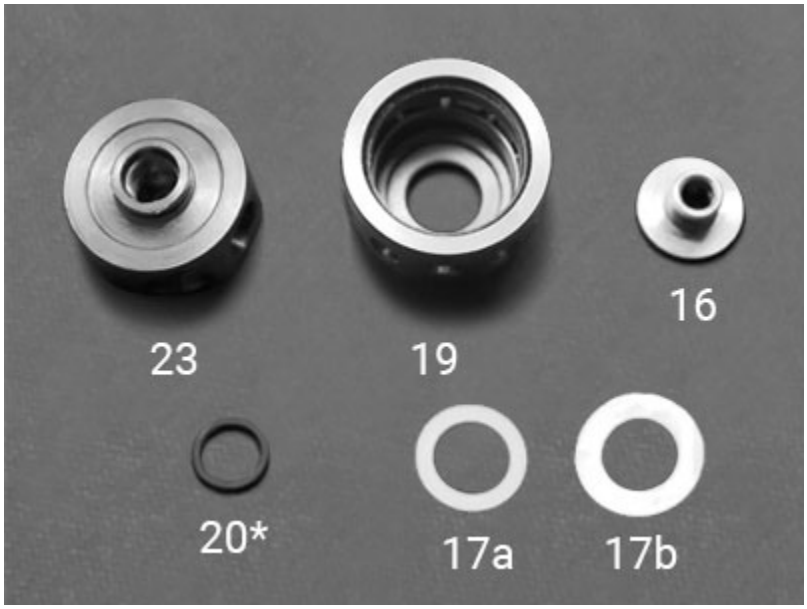


Fig. 22

This completes the disassembly of the XTRA First Stage.

(4) The photographs below show the disassembled first stage - Fig. 23 and First Stage Service Parts Kit - Fig. 24. All the parts not in the service kit need to be washed, rinsed and dried, as discussed previously. O-rings and washers that will be replaced with new from the service kit should be discarded.

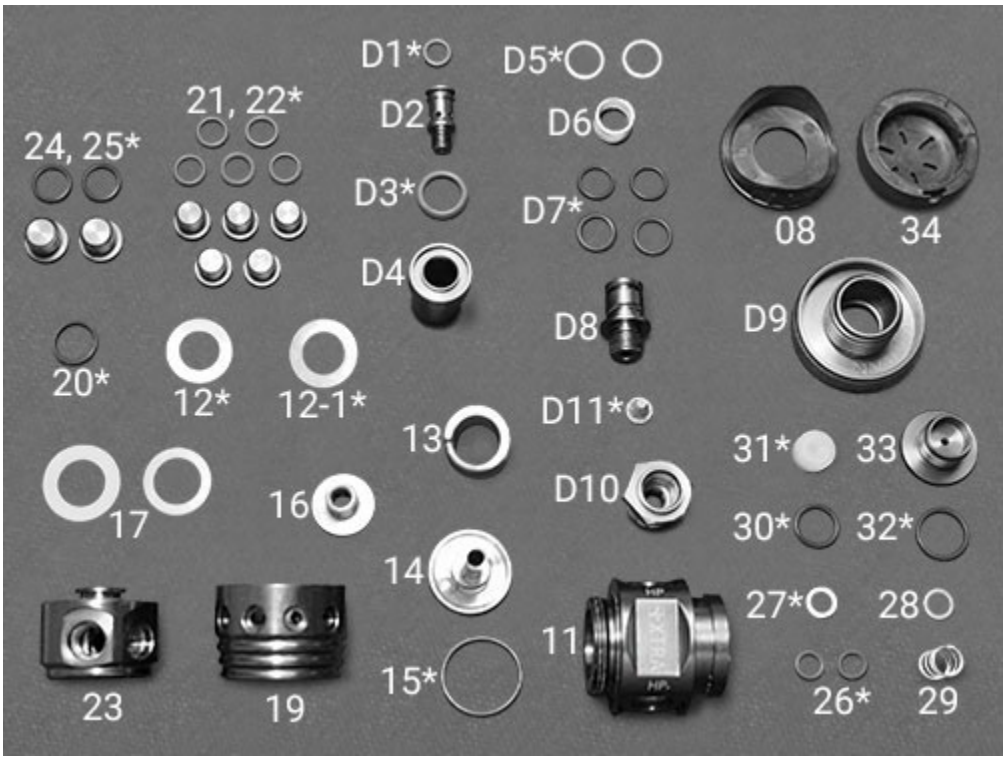


Fig. 23

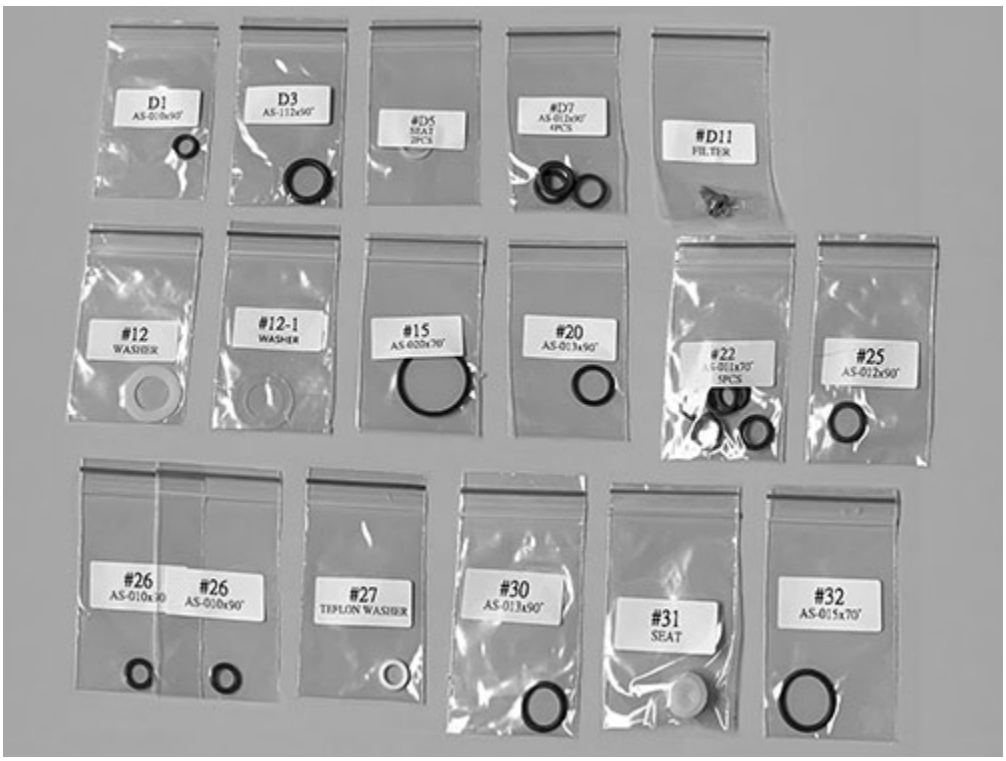


Fig. 24

5. First Stage Assembly

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

https://www.youtube.com/watch?v=1b8Xx3VVf2o

(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 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 turret. Lubricate the O-ring (20*) and install it on the Port Swivel (23) - Fig. 25, along with the larger Washer (17b) - Fig. 26.

Fig. 25

Fig. 26

2. Next, take the End Cap (19) and press it onto the Port Swivel. Install the other smaller Washer (17a) into the recess for it - Fig. 27. Install the Nut (16) and torque this to 70 in-lbs/81 kgf-cm/7.9 N·m using a 6mm hex, with the first stage handle installed in one of the open LP ports - Fig. 28.

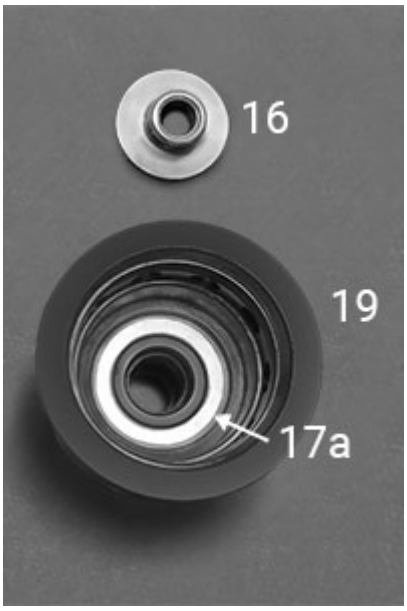


Fig. 27


Fig. 28

3. Set this assembly aside and install one of the lubricated O-rings (26*) into the groove on the regulator body that the End Cap/Port Swivel assembly screws onto - Fig. 29. Use the Piston Stem Bushing Assembly Tool and on the narrower end place in the following order the Washer (28), generously lubricated O-ring (26*), and Teflon Washer (27*) - Fig. 30.

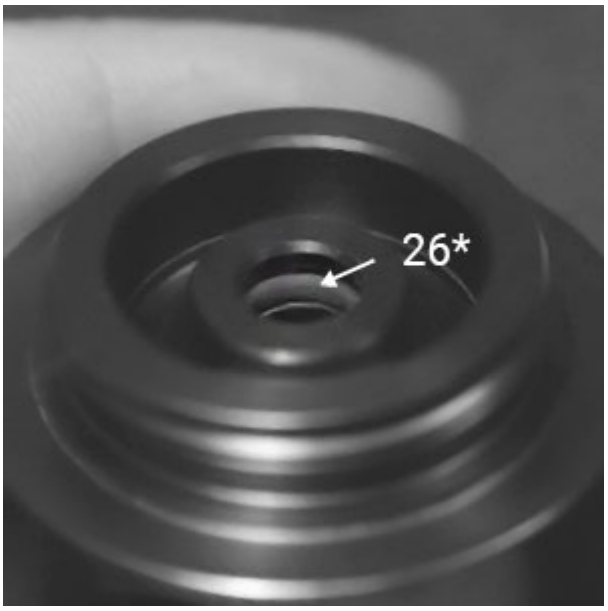


Fig. 29

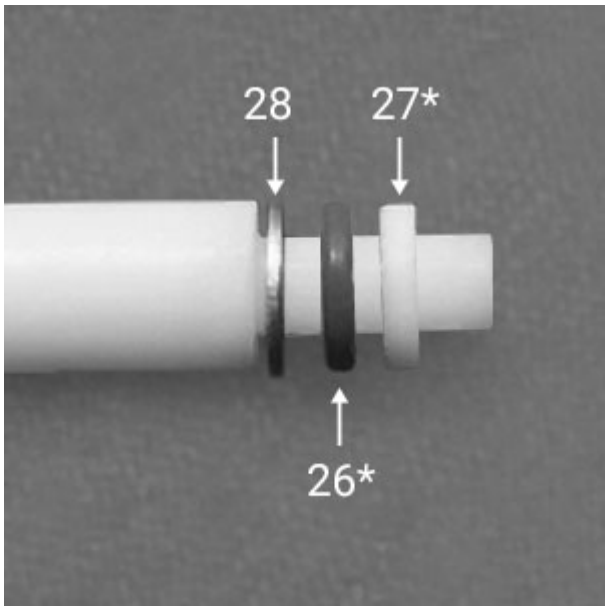


Fig. 30

4. Next, lubricate the O-ring (15*) and install it on the Piston (14) - Fig. 31. Carefully insert a piston bullet into the shaft of the Piston to protect the knife edge. Now place the Washer (12-1*) on the Piston, followed by the Spring (13) - Fig. 32, and the Washer (12*) - Fig. 33.

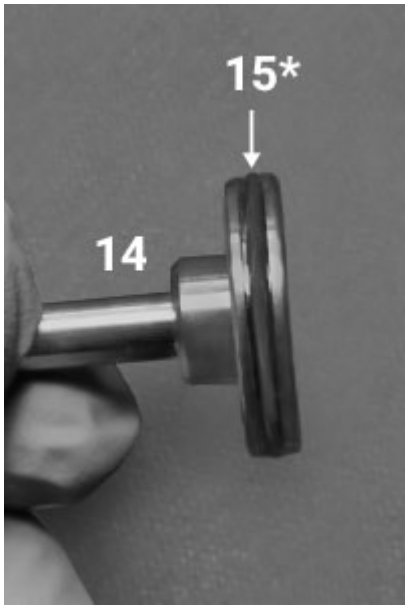


Fig. 31

Fig. 32

Fig. 33

5. Carefully slide the Piston Assembly into the End Cap/Port Swivel Assembly - Fig. 34. Using the previously assembled Washer/O-ring/Teflon Washer stack, insert the stack into the HP side of the regulator Body (11), as shown on the schematic. Slightly twist the tool, and the stack will come off in the body - Fig. 35.


Fig. 34

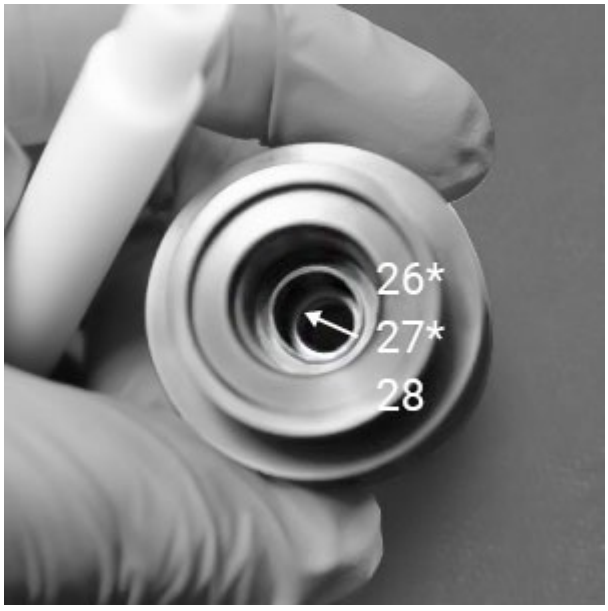


Fig. 35

6. Reverse the tool to hold the stack, protecting the Piston end with a piston bullet - Fig. 36. Insert the Piston/End Cap/Port Swivel assembly into the Body and screw it on hand tight - Fig. 37. Remove the bushing tool and piston bullet from the high pressure end of the Body.

Fig. 36

Fig. 37

7. Install the first stage handle into a high pressure port - Fig. 38. Use the Multi-Tool to tighten the End Cap/Port Swivel assembly to the Body. A piece of rubber may be used to lessen the chance of scratching the End Cap - Fig. 39. Tighten the connection so that no gap is visible, and the connection is secure. There is no torque specification for this.

Fig. 38

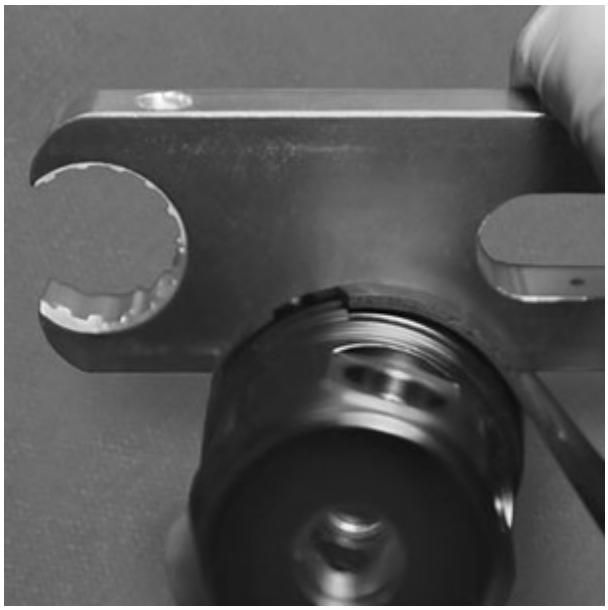


Fig. 39

8. Set the assembly aside and install the O-ring (30*) in the HP side of the body, using a heavy nylon pick or thin wooden dowel, and place the Spring (29) on top of the Washer Stack - Fig. 40. Install the O-ring (32*) onto the HP Seat Retainer (33) and place the HP Seat (31*) into the HP Seat Retainer. Orient the seat with the concave side (arrow indicates detail) towards the Piston and the flat side facing the HP Seat Retainer - Fig. 41.

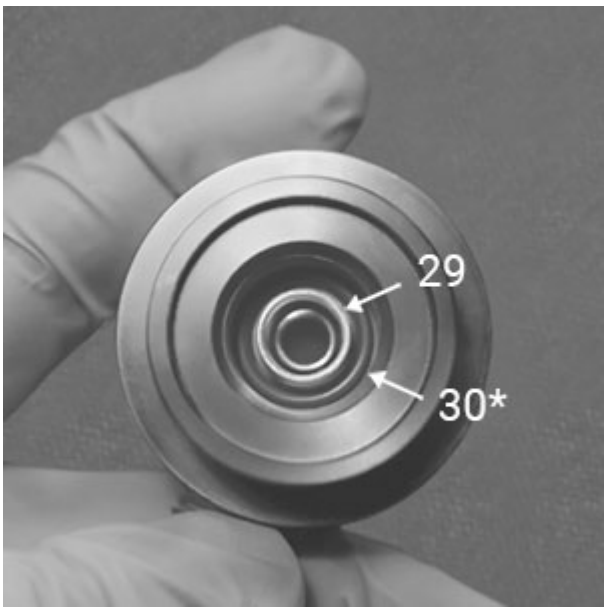


Fig. 40

Fig. 41

9. Install the HP Seat Retainer into the Body and torque this to 130 in-lbs/150 kgf-cm/15 Nm - Fig. 42.


Fig. 42

10. Once the HP Seat Retainer is torqued to its proper specification, install the rubber End Cap (34) onto the regulator body. Orient the groove in the side to line up with the DIN Inlet on the Body - Fig. 43.

Fig. 43

11. Place the Saddle (08) over the DIN Inlet. Insert the Filter (D11*) and O-ring (D7*) into the Filter Retainer (D10), as shown on the schematic diagram - Fig. 44.

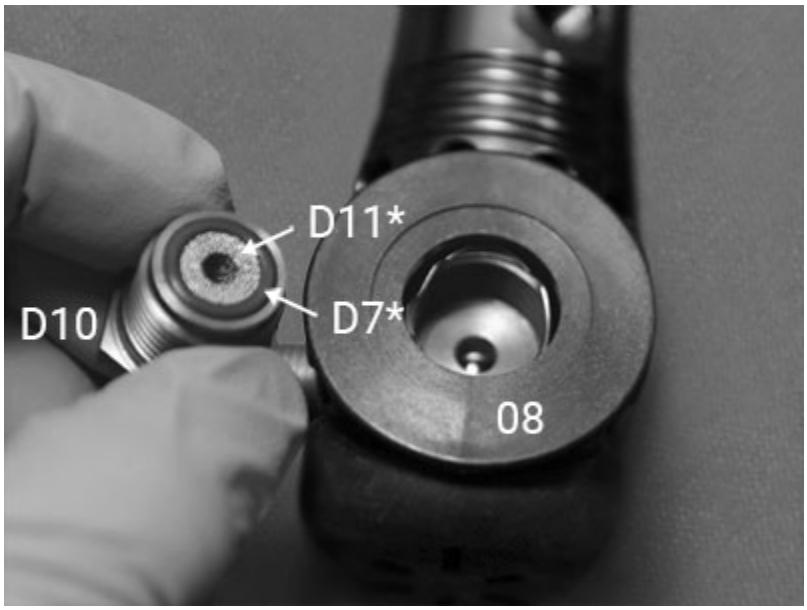


Fig. 44

12. Torque the Filter Retainer to 260 in-lbs/300 kgf-cm/30 N·m. Set the Handwheel (D9) on the Filter Retainer. Lubricate the three remaining O-rings (D7*) and install them on the Retainer Housing (D8) - Fig. 45.

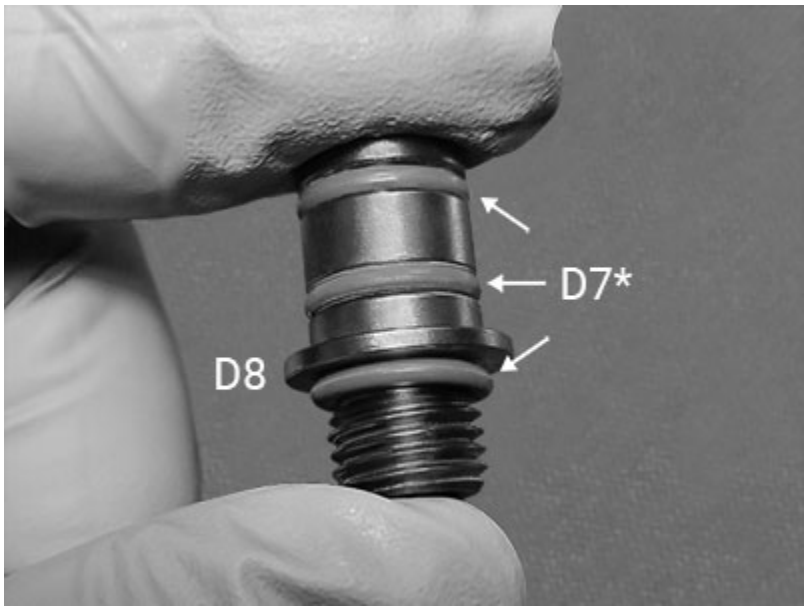


Fig. 45

13. Insert the Retainer Housing into the Handwheel and torque this to 86 in-lbs/100 kgf-cm/9.7 N·m using a 4mm hex. Take the Shutter Crown (D4) and install first one Seat (D5*) the Spring (D6) and the second Seat (D5*) inside the Shutter Crown - Fig. 46.

Fig. 46

14. Slide the Shutter Crown assembly onto the Retainer Housing - Fig. 47**. It is best to do this as illustrated or even hold the reg upside down and slide the crown up into it to prevent the washers/spring from falling out.**

Fig. 47

15. Lubricate the O-ring (D1*) and install it on the Shutter Valve (D2) - Fig. 48. Slide the Shutter Valve into the Crown - Fig. 49 and install the O-ring (D3*). Then using a 4mm hex, torque the Valve to 27 in-lbs/31 kgf-cm/3 N·m - Fig. 50. Replace the O-rings (22, 25*) on port plugs (21, 24) and replace port plugs and hoses based on the configuration used. Port plug should be torqued to 35 in-lbs/40 kgf-cm/4 N·m.

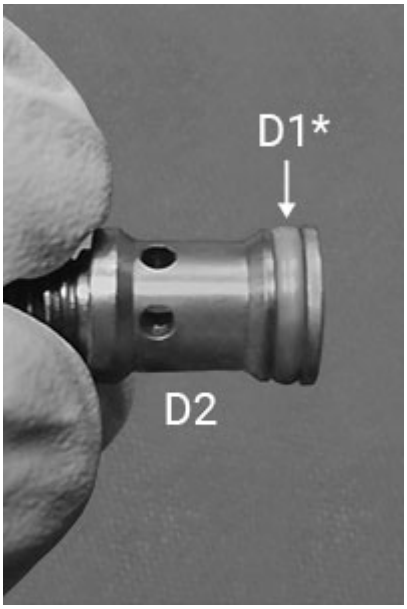


Fig. 48

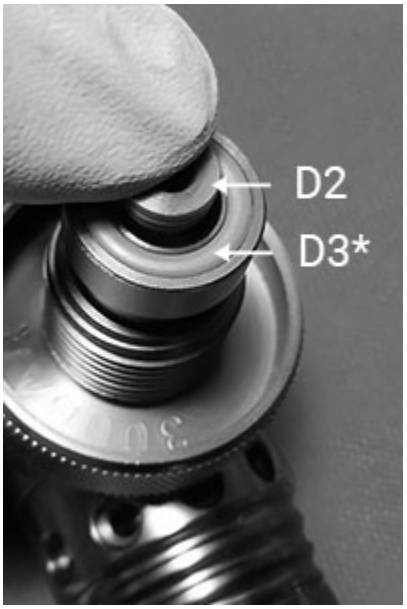


Fig. 49

Fig. 50

This completes the assembly of the XTRA First Stage.

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:

Nut (16) to Port Swivel (23) to End Cap (19)	70 in-lbs/81 kgf-cm/7.9 N·m
HP Seat Retainer (33) to Body (11)	130 in-lbs/150 kgf-cm/15 N·m
Filter Retainer (D10) to Body (11)	260 in-lbs/300 kgf-cm/30 N·m
Retainer Housing (D8) to Filter Retainer (D10)	86 in-lbs/100 kgf-cm/9.7 N·m
Shutter Valve (D2) to Retainer Housing (D8)	27 in-lbs/31 kgf-cm/3 N·m
Port Plugs (21, 24)	35 in-lbs/40 kgf-cm/4 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 at least 125 psi and stay at that reading. Breathe the second stage or depress purge button 25 to 50 times. Observe the IP. It should drop slightly, 5-10 psi, on each purge, then come back up. If the IP goes above 145 psi and continues to climb, shut off the air supply and purge the regulator to avoid damaging it.

> **Caution Note: If the Intermediate Pressure (IP) goes over the recommended level and continues to climb, an issue with the regulator is indicated. It could be an issue with the HP Seat, the sealing surface between an O-ring and another component, a damaged Piston knife edge, or a missing component. The regulator will need to be disassembled, inspected carefully, and rebuilt again. It cannot be tested further with an improper IP.**

(4) If the IP is stable, listen for any leaks. If none are noted, the testing can continue.

(5) Next, increase the supply to 1500 psi and repeat the procedure. Observe the IP and ensure that it is not creeping. It may drop a few psi as the seat and the piston edge 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 should not exceed 145 psi and should show no signs of creep. 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 body and turret, DIN connection, port plugs, and hose connections, and if none are present, the first stage service and testing is 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!**

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

No airflow	Check supply pressure
Free flowing	Excessive IP; HP Seat bad; Piston edge damaged
Excessive IP	Bad HP Seat; HP Seat or Piston O-ring(s) bad
Leaks between seams on Body	Bad O-rings; excessive IP; Body/End Caps damaged; dirt introduced during a rebuild

D2 Torque: 27 in-bs
31 kgf-cm/3 N·m

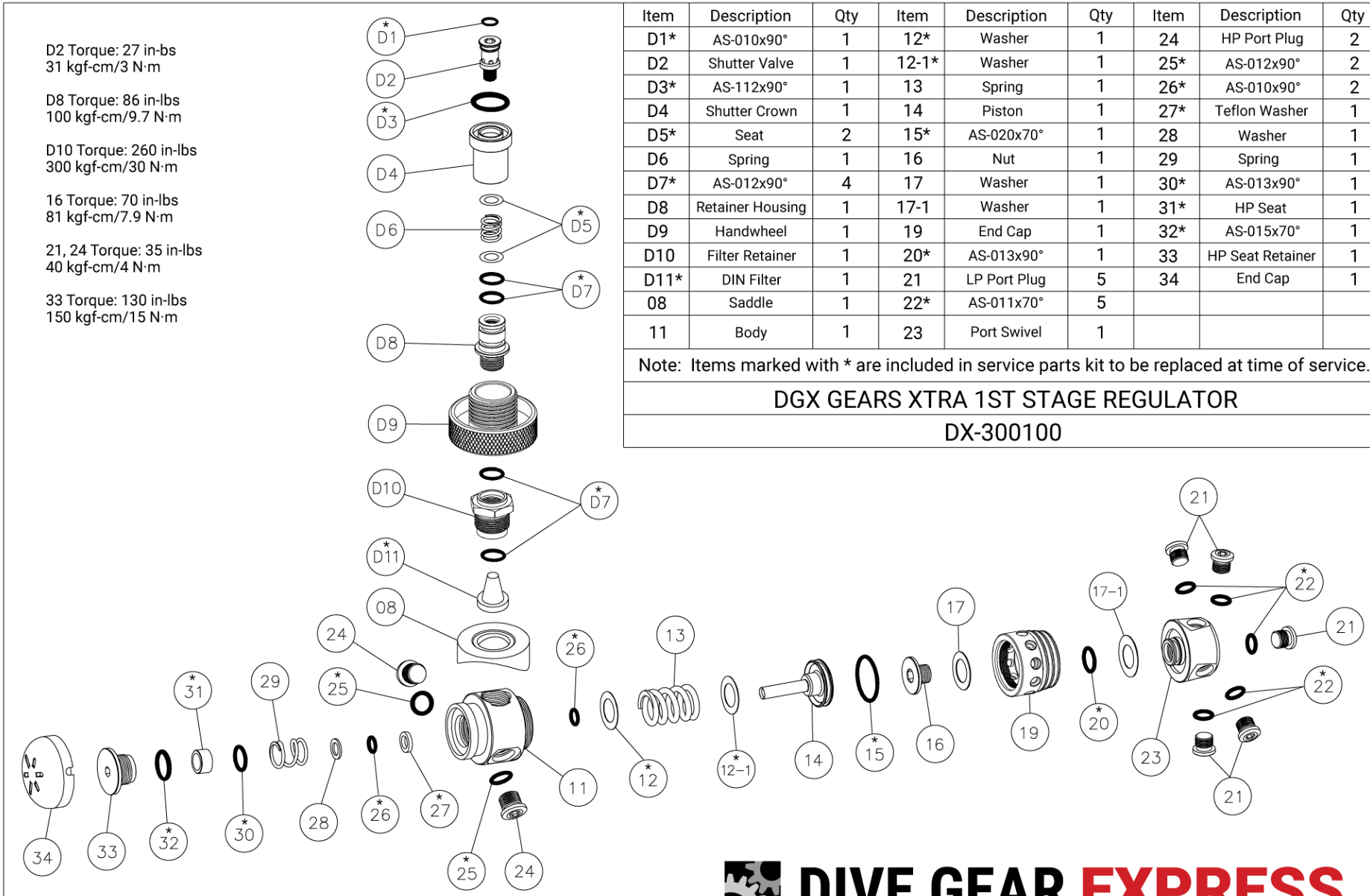
D8 Torque: 86 in-lbs
100 kgf-cm/9.7 N·m

D10 Torque: 260 in-lbs
300 kgf-cm/30 N·m

16 Torque: 70 in-lbs
81 kgf-cm/7.9 N·m

21, 24 Torque: 35 in-lbs
40 kgf-cm/4 N·m

33 Torque: 130 in-lbs
150 kgf-cm/15 N·m



Item	Description	Qty	Item	Description	Qty	Item	Description	Qty
D1*	AS-010x90°	1	12*	Washer	1	24	HP Port Plug	2
D2	Shutter Valve	1	12-1*	Washer	1	25*	AS-012x90°	2
D3*	AS-112x90°	1	13	Spring	1	26*	AS-010x90°	2
D4	Shutter Crown	1	14	Piston	1	27*	Teflon Washer	1
D5*	Seat	2	15*	AS-020x70°	1	28	Washer	1
D6	Spring	1	16	Nut	1	29	Spring	1
D7*	AS-012x90°	4	17	Washer	1	30*	AS-013x90°	1
D8	Retainer Housing	1	17-1	Washer	1	31*	HP Seat	1
D9	Handwheel	1	19	End Cap	1	32*	AS-015x70°	1
D10	Filter Retainer	1	20*	AS-013x90°	1	33	HP Seat Retainer	1
D11*	DIN Filter	1	21	LP Port Plug	5	34	End Cap	1
08	Saddle	1	22*	AS-011x70°	5			
11	Body	1	23	Port Swivel	1			

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

DGX GEARS XTRA 1ST STAGE REGULATOR

DX-300100

DIVE GEAR EXPRESS