



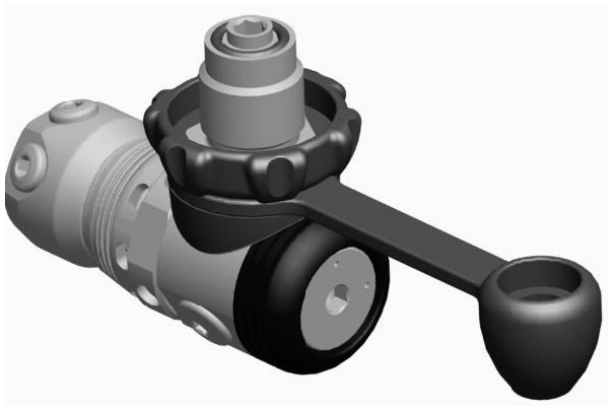
R10 1st Stage Service Manual



PATRIOT 1ST STAGE

Balanced Regulator 1ST STAGE

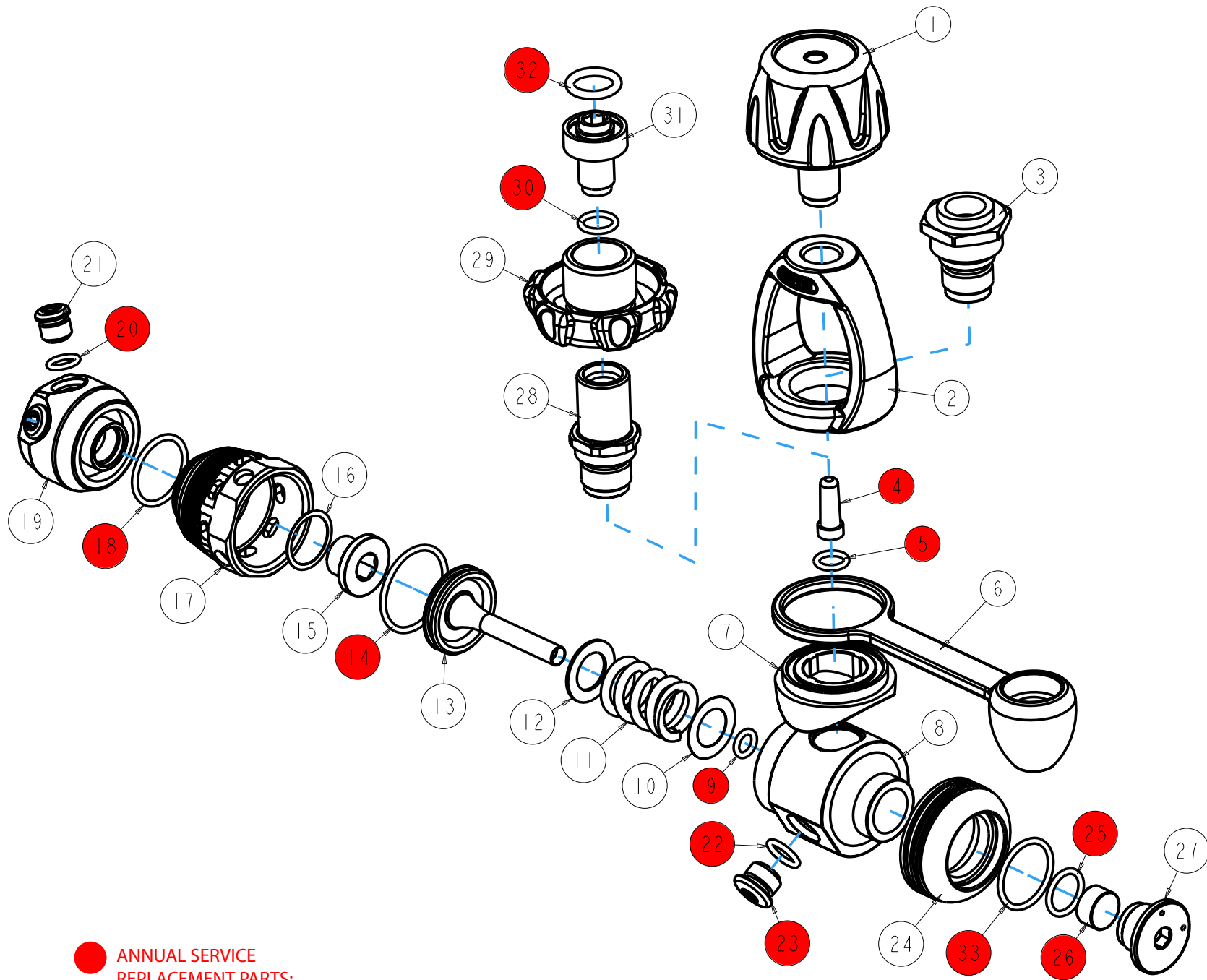
- Maximum working pressure 3500psi (232 bar)
- Low pressure port swivel assembly for versatile positioning
- Intermediate pressure output balanced piston
- 135-145PSI
- Four 3/8-24 UNF-2B intermediate pressure ports
- Two 7/16-20 UNF-2B high pressure port
- Chromium plated brass body
- Stainless steel springs
- Yoke or DIN



SPECIFICATIONS

PINNACLE AS-103

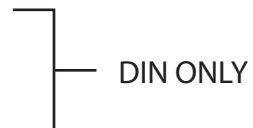
AIR FLOW	33 cu. ft. (935 liters/min). @ 1 atmosphere
INHALATION RESISTANCE	0.9" -2.0" (2.3 - 5.08 cm) w.c. @ 1 atmosphere
EXHALATION RESISTANCE	0.6" (1.52 cm) w.c. max. @ 1 atm.
RECOMMENDED LUBRICANT	LTI Christo-Lube 111®
PINNACLE FIRST STAGE REGULATOR	
TYPE	balanced Piston Regulator - swivel
WEIGHT	2.1 lb.(.95 kg)
INTERSTAGE PRESSURE	135-145 psi (9.4-10 bar) @ 3000 psi inlet (207 bar)
# LOW PRESSURE PORTS	4 (3/8"-24 UNF)
# HIGH PRESSURE PORTS	1 (7/16"-20 UNF)
MATERIALS	Body ----- CDA-360 Brass O-rings ----- Buna-N Seat ----- TEFLON



**ANNUAL SERVICE
REPLACEMENT PARTS:
790482**

BALANCE PISTON 1ST STAGE REGULATOR PART LIST			
NO	ITEM NO	DESCRIPTION	Q'TY
1	0111	YOKE KNOB	1
2	0055	YOKE	1
3	0133	YOKE RETAINER	1
4	0113	FILTER	1
5	2-011-02	O-RING	1
6	0118	DUST CAP	1
7	0132	SADDLE	1
8	0261	MAIN HOUSING	1
9	2-010-02	O-RING	1
10	0131-02	WASHER - THINER	1
11	0135	MAIN SPRING	1
12	0131-02	WAHSER - THICKER	1
13	0136	PISTON	1
14	2-022-01	O-RING	1
15	0137	SWIVEL RETAINER	1
16	0143	SWIVEL WASHER	1
17	0262	CAP	1
18	2-019-01	O-RING	1
19	0139	LP PORT SWIVEL	1
20	3-903-01	O-RING	3
21	0109	LP PLUG	3
22	3-904-01	O-RING	2
23	0108	HP PLUG	2
24	0264	STYLE CAP	1
25	2-014-02	O-RING	1
26	0140	HP SEAT	1
27	0141	HP SEAT CAP	1
28	0114	DIN HOUSING	1
29	0116	DIN WHEEL KNOB	1
30	2-012-02	O-RING	1
31	0115	DIN RETAINER	1

32	2-112-02	O-RING	1
33	2-019-01	O-RING	1


 DIN ONLY

SERVICE KIT LIST 790482

NO	PART NO	DESCRIPTION	Q'TY	
9	2-010-02	O - RING	1	PISTON/BODY
14	2-022-01	O - RING	1	PISTON TOP
18	2-019-01	O - RING	1	CAP/LP PORT SWIVEL
20	3-903-01	O - RING	3	LP PORT OR ATLANTIS LP HOSE
22	3-904-01	O - RING	2	HP PORT OR ATLANTIS HP HOSE
25	2-014-02	O - RING	1	HP SEAT
26	0140	HP SEAT	1	STYLE SEAT /HP SEAT CAP
30	2-012-02	O - RING	1	DIN RETAINER INTERNAL
32	2-112-02	O - RING	1	DIN RETAINER EXTERNAL
33	2-019-01	O - RING	1	STYLE CAP / HP SEAT CAP
4	0113	FILTER	1	
5	2-011-02	FILTER O-RING	1	FILTER

Torque Specifications:

Description	Item #	Torque
Cap	16	120-140 in/lbs (13.56-15.82 N.M)
DIN HOUSING	21	16-18 ft/lb (21.70-24.41 N.M)
YOKE RETAINER	3	23-25 ft/lb (31.19-33.90 N.M)
DIN RETAINER	24	120-130 In/lb (13.56-14.69 N.M)
Port Plugs	18,20	35-40 In/lbs (3.96-4.52 N.M)
Hose inlet end		2-3 ft/lb (3-4 Nm)
Hose outlet end		2-3 ft/lb (3-4 Nm)

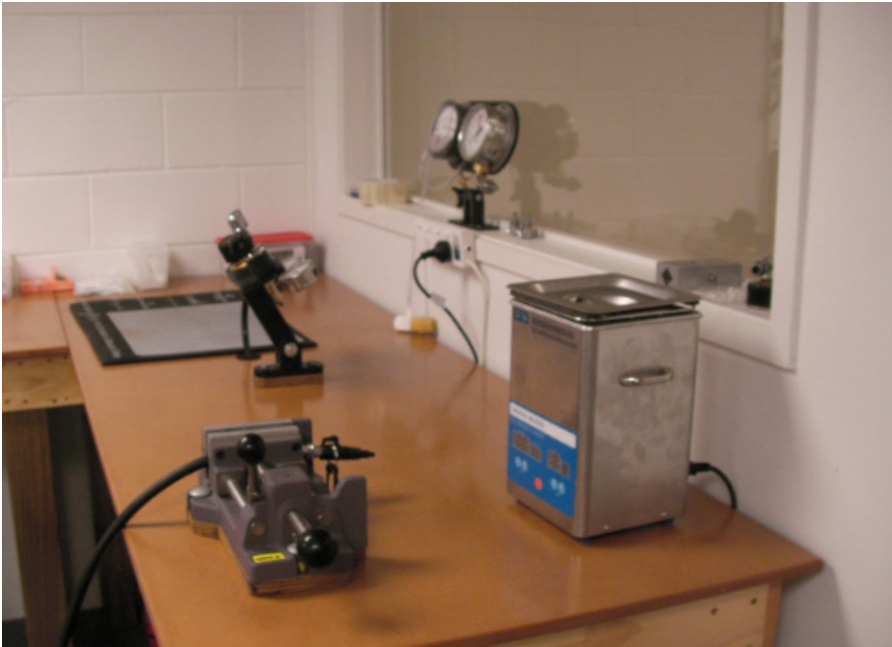
SERVICE PROCEDURES FOR THE AS-103

Before you begin disassembly of the regulator, test the first and second stages for output pressures and leakage. Pre-testing in this way will help the technician to pinpoint any specific problems requiring repair.



SERVICE PROCEDURES FOR THE AS-103

The work area must be clean and well lit, with clean compressed air available to blow sand and dirt from parts.



PATRIOT 1ST STAGE ANNUAL SERVICE KIT

HANDLE BAR

6" & 8" ADJUSTABLE WRENCH - HOSE

4MM HEX BIT SOCKET (ALLEN KEY) = PORT PLUGS

PIN SPANNER (RING SPANNER) = CAP

1/4" HEX BIT SOCKET (ALLEN KEY) = HP SEAT RETAINER

8MM HEX BIT SOCKET (ALLEN KEY) = SWIVEL SEAT RETAINER

1.7MM DRILL BIT = SEAT

PISTON BULLET

1" HEX SOCKET

TORSION BAR

SOCKET WRENCH

TORQUE WRENCH 0-35 NM

INTERMEDIATE PRESSURE TESTING GAUGE

SILICONE GREASE

CHRISTO LUBE

O'RING PICKS

SOAPY SPRAY



Use the 6" and 8" adjustable wrenches to loosen the hose nut from the PORT of the 1st stage. Remove the hose assembly from the second stage.

Inspect the hose assembly for any cuts or cracks, especially on the hose at the metal ferrules. Blow the interior bores of the hoses.

Replace the hose assembly if any cuts or cracks are found. Remove and discard the O-rings from each end of the hose. Clean, rinse, and blow-dry the interior bores of the hoses. Replace the hoses if necessary.



Put the body into the fixture block or clamp carefully in a soft-jawed bench vise. Use 1" HEX SOCKET to loosen and remove the yoke retainer (3) , the dust cap (6) and saddle (7).

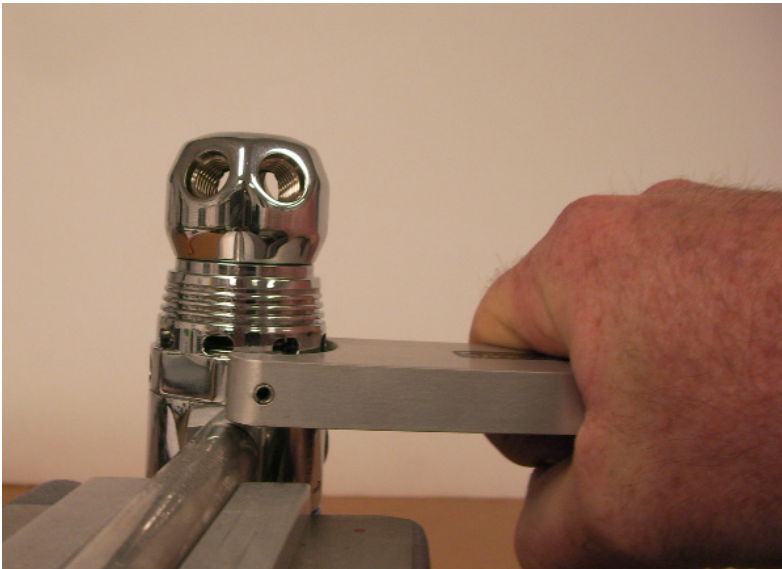
Remove the yoke knob assembly (1) from the yoke (2). remove the inlet filter (4) and the filter O-ring (5).



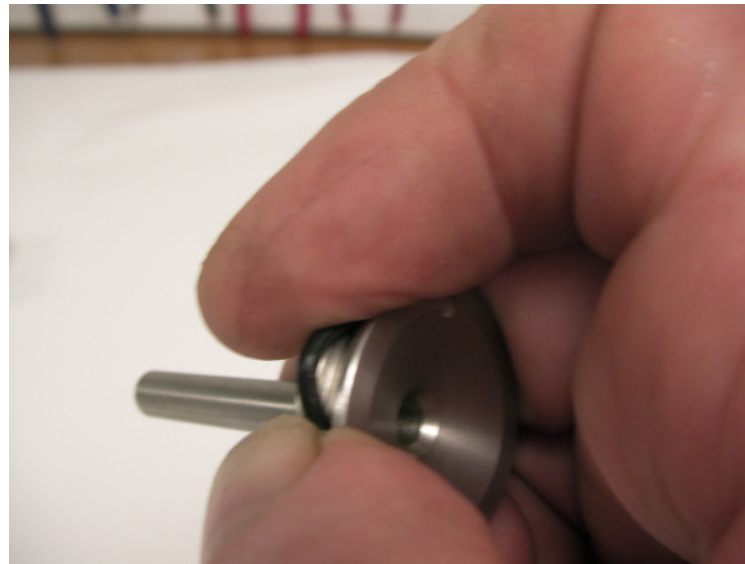
Use a 4MM HEX BIT SOCKET to remove all port plugs (21, 23) from the body. Discard the port plug O-rings. (20, 22)



Screw the STAINLESS HANDLE BAR into the HP port. Put the body into the fixture block or on the table. Use the PIN SPANNER to remove the Cap (17) from the Body (8).



Remove any Spacer(s) (10, 12), the Spring (11) and the Piston (13) from the Cap. Remove and discard the O-rings (14) from the piston. Remove and discard the O-rings (9) from the body. Whenever possible, try to remove the O-rings by pinching them with the fingers and rolling them out of the groove.



WARNING

If a sharp pick is used to remove the O-rings, it should be made from soft brass, not steel. ANY scratches left in the groove when removing O-rings will cause leaks (bubbling out of the Cap ambient pressure ports) and the piston or body will have to be replaced to stop these leaks.



Put the body into the fixture block again with the hp seat cap (27) facing up. Use a 1/4" HEX BIT SOCKET to remove the seat cap (27).



Remove the Seat (26) from the seat cap (27) by pushing it out with a 1.70MM DRILL BIT or pneumatic pressure with air. Place one end of the drill bit on a flat hard surface. Lower the large end of the seat cap over the drill bit until the flat end of the drill bit rests against the back side of the Seat. Push the seat cap firmly down straight on the drill bit, until the seat is pushed out of the seat cap. Discard the old Seat.



Remove the o-ring (25) from the body (8). Remove the o-ring (33) and style cap (24).



Screw the STAINLESS HANDLE BAR into the lp port swivel. Use an 8mm BIT SOCKET to remove the swivel retainer (15) and swivel washer (16). Remove and discard the o-ring (18) from the cap (17).



Cleaning and Inspection of the 1st Stage

Clean all metal parts of the first stage in an ultrasonic cleaner or cleaning solution. Remove the O-rings before cleaning any metal parts since the soft O-ring material will absorb cleaning energy from the ultrasonic cleaner reducing its effectiveness. If major visible corrosion or deposits exist on parts, use a bristle brush, wooden, or plastic stick to rub the deposits off. Allowing acidic cleaning solutions to do all of the work, if deposits are severe, will result in damage to internal chrome plating which will make parts even more susceptible to future corrosion.



SOLUTION	COMMENTS
Hot Soapy water	Preferable. Good for plastic, silicone and plated metal parts.
Vinegar and water (equal part solution) (weaker solution in Ultrasonic Cleaner)	Ingredients easily available. Approx. 15 min. cleaning time. May damage chrome finish. Never use on plastic parts. Vinegar dissolves the plastics in most polymers making them brittle and more prone to breakage.
Simple Green R and Water	Simple Green is a readily available degreaser. Read the product label for mixing ratios with water.
Cleaning solutions recommended by ultrasonic cleaner manufacturers	The preferred choice. Check with the manufacturer for strengths and recommended uses for their cleaners. Choose soap solutions over acidic ones.

Remove the regulator parts from the cleaning solution. Rinse with clean fresh water, then blow internal passageways dry with clean, dry compressed air.



Inspect all O-ring grooves for scratches or wear. If the regulator was leaking air because of scratches or wear, replace the parts. If some corrosion deposits persist, carefully wipe them away with a plastic scrubbing cloth or plastic or wooden dowel. Blow any resulting dust out of the regulator parts.



Closely examine the sealing cones (orifices) in the piston (13) where the Seat (26) and the Piston seal.



Place the HP Seat (26) on a clean flat surface and press the seat cap (27) stem straight over the seat until the new seat is installed into the end of the HP Seat Cap.



Install the pre-lubricated O-rings (14) onto the piston and O-ring (9) into the body (8) and o-ring (18) onto the cap (17) .

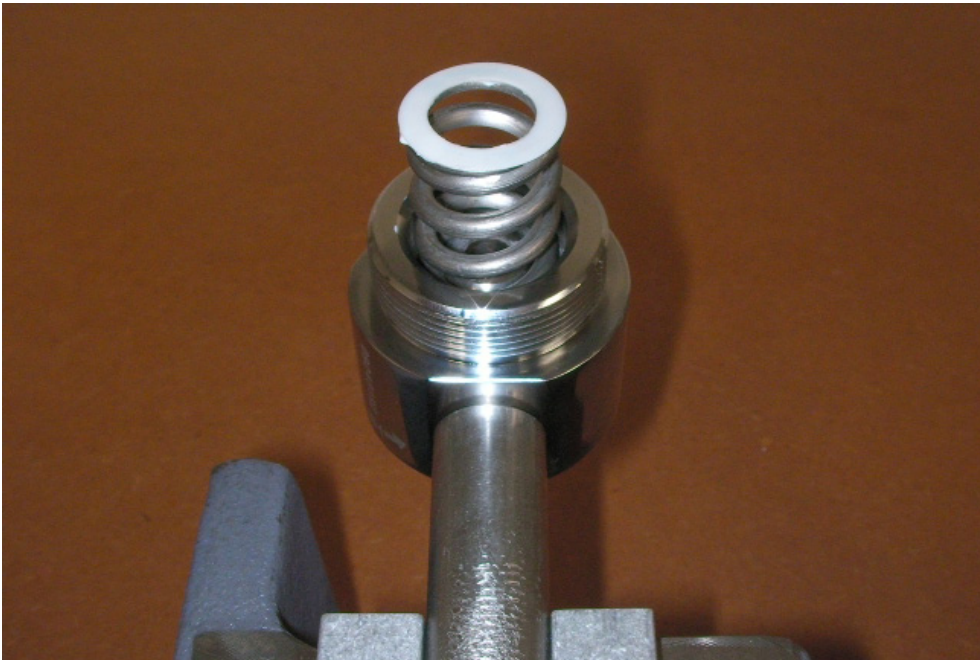
Put the swivel washer into place on the cap (17) and insert the swivel retainer (15) into the cap(17) and then screw to the LP swivel with the cap assembly. Tighten the swivel retainer (15) with an 8mm SOCKET, follow the Torque Specifications. (13.6 to 15.8 Nm)



Carefully guide the large end of the Piston into the Cap until it bottoms. Use a gentle rocking motion if necessary to move the Piston into the Cap, but do not cock it at too severe an angle since this may cause the Piston to gouge the sealing surface of the Cap.



Support the Body (8) so that the Cap threaded end is facing up. Use the same number of Shims (12, 10) that were installed in the Spring Cavity when you took the AS-103 apart. If there was one shim, it goes on the Body side of the Spring (9). If there were two Shims, install one at each end of the Spring. Install the Spring (11) on top of the Shim.



Lubricate the threads on the Cap (17) with grease. Put the Cap with its Piston (13) installed over the Spring and Shim sitting in the cavity of the body and screw them together as far as you can by hand. (Photos shown without cap for ease of view).



Screw STAINLESS HANDLE BAR into HP port. Put the body into the fixture block or on the table. Use PIN SPANNER AND HOLD SOCKET to snug the Cap (17) onto the body with 120-140 in/lbs (13.56-15.82 N.M) of torque.



Put the style cap (24) onto the body (8). Install the pre-lubricated O-ring (33) into the style cap and o-ring (25) onto the body. Screw the seat cap assembly to the body. Tighten the HP seat cap (27) with a 1/4" HEX BIT SOCKET, follow the Torque Specifications. (13.5-15.5 Nm)



Install the yoke retainer (3) into the yoke (2). Install the saddle (7) and the dust cap (6) onto the yoke.



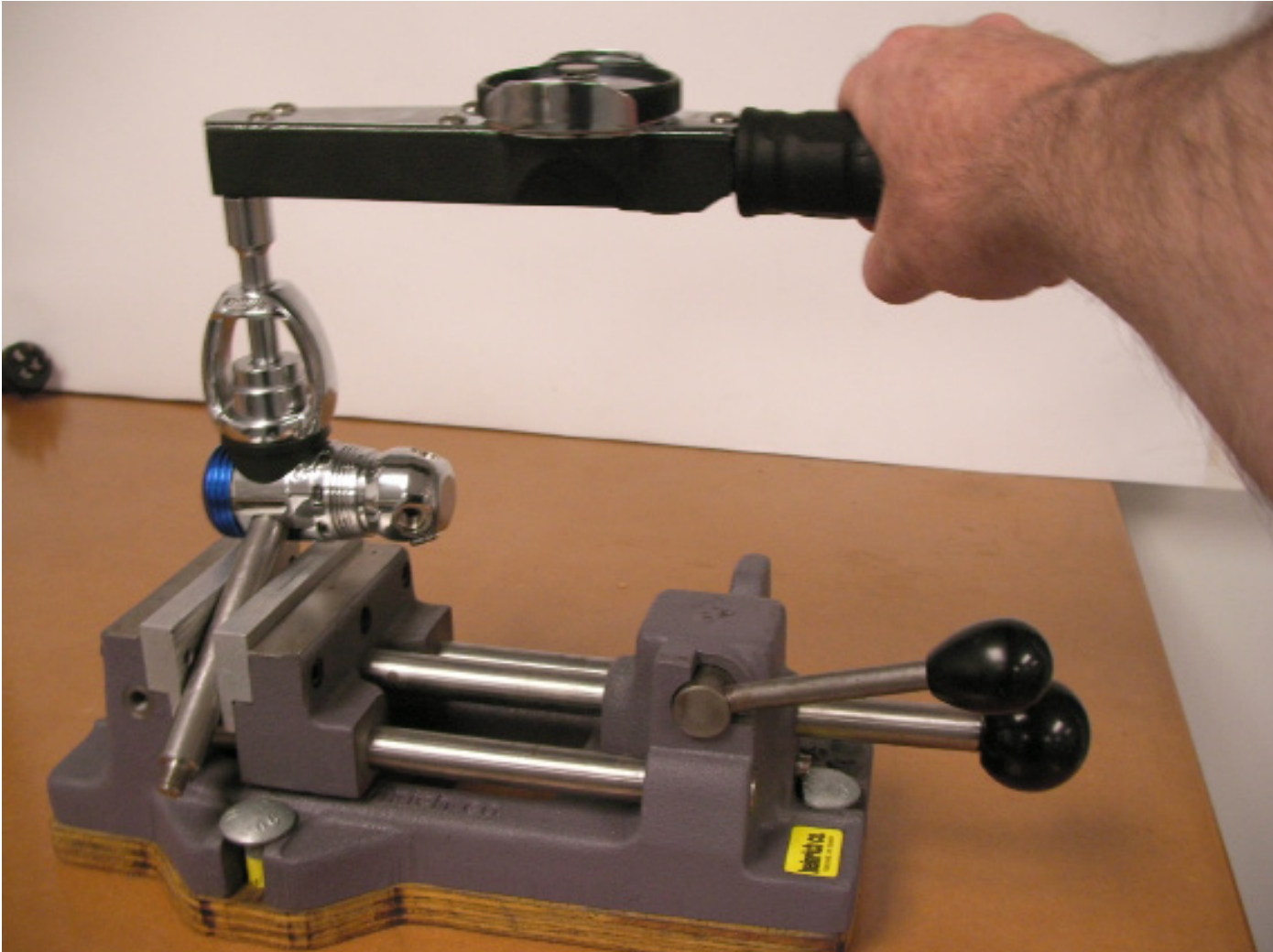
Install the new inlet filter (4) and filter O-ring (5) into the yoke retainer (3).



Place the body carefully into a fixture so that the yoke retainer is facing up.



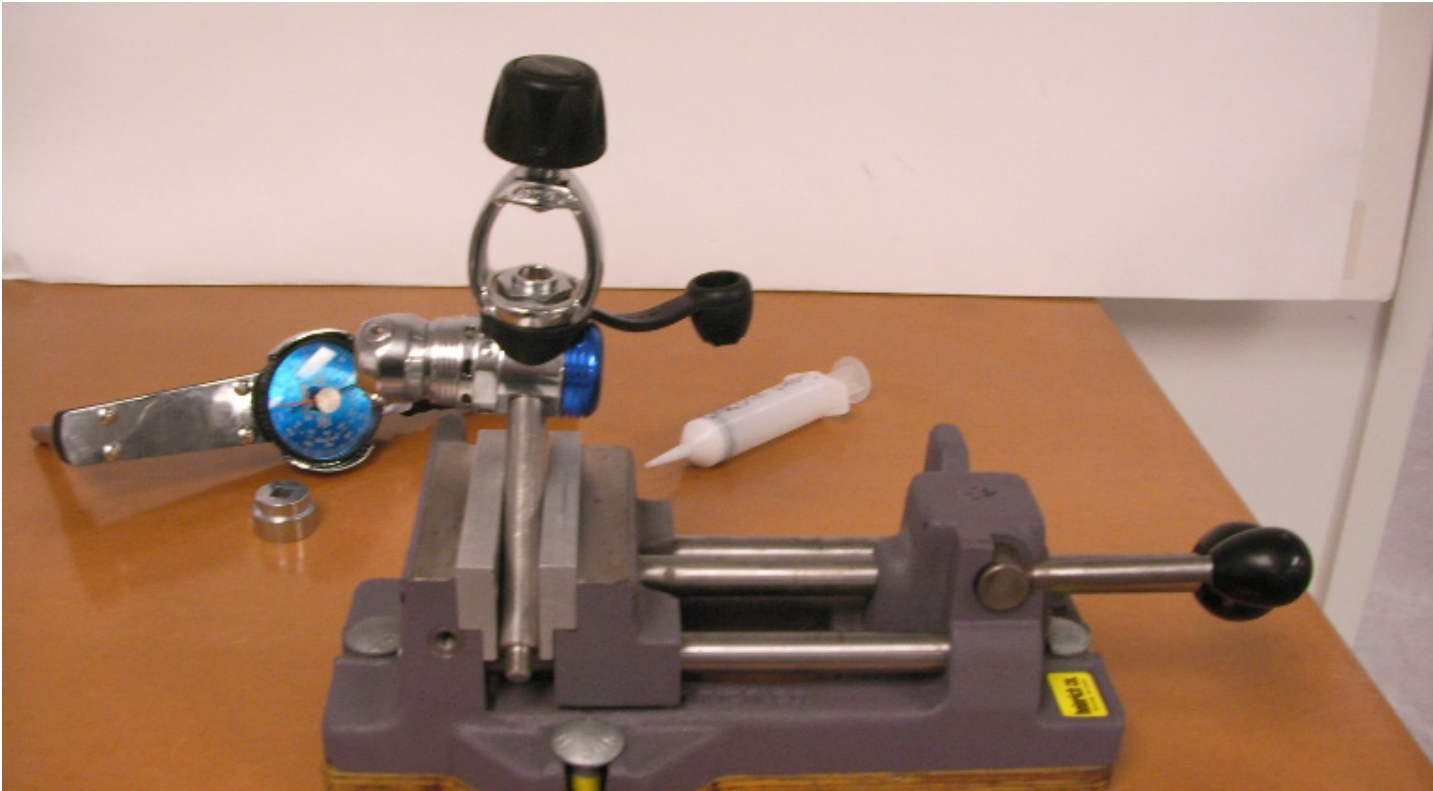
Tighten the yoke retainer (3) with a 1" HEX SOCKET to 23-25 ft/lb (31.19-33.90 N.M).



Install new O-rings (20,22) from the kit onto port plugs (21,23) and install the port plugs into the appropriate ports. Use the 4MM HEX BIT SOCKET to tighten port plugs to 35-40 In/lbs (3.96-4.52 N.M).



Install yoke knob (1) onto the yoke.

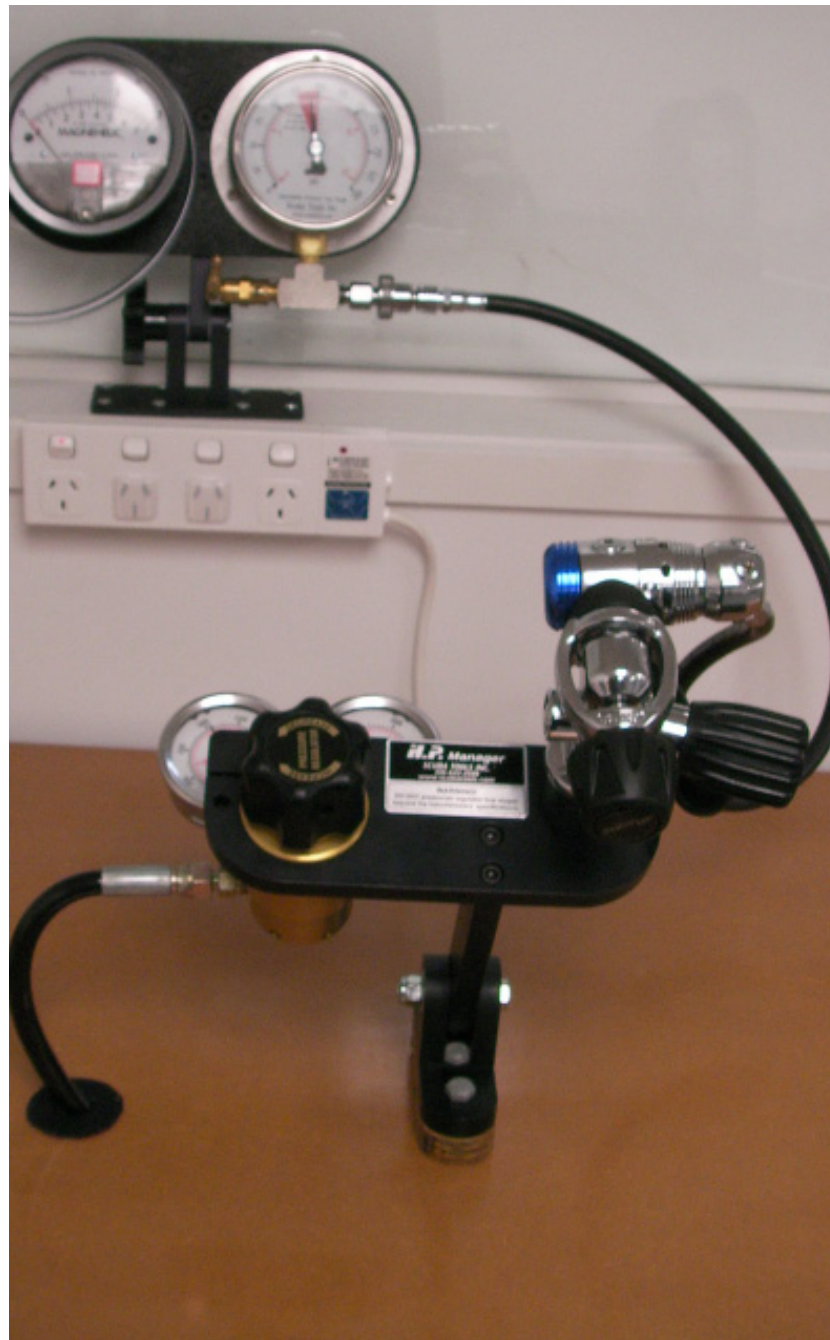


SET-UP AND TESTING THE FIRST STAGE

Install an intermediate pressure test gauge with over-pressure release valve into one of the low-pressure ports of the first stage, or a functional 2nd stage into another low pressure port. Plug any remaining open outlet ports with suitable port plugs.

Attach the regulator to a tank valve giving a source pressure of between 2700 and 3500 psig (186-240 Bar).

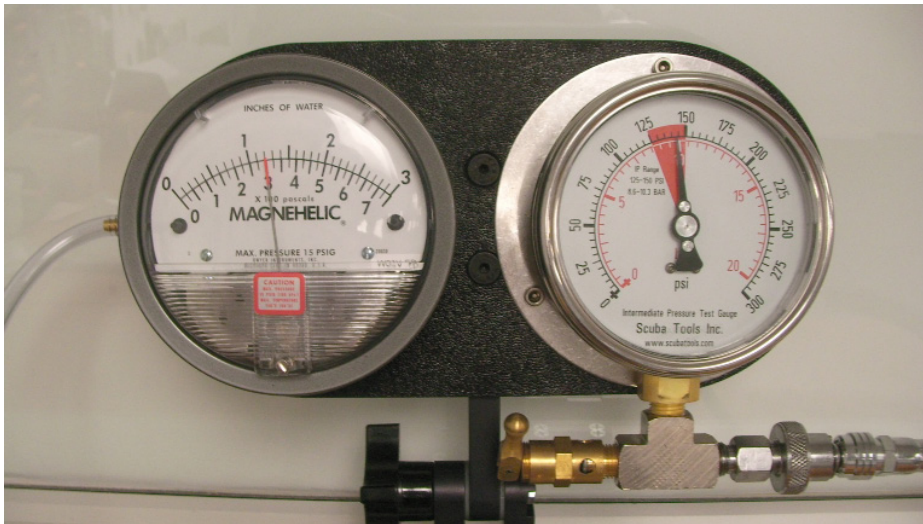
NOTE: The following test determines the regulator's lock-up pressure (the pressure put out by the first stage during a no flow condition).



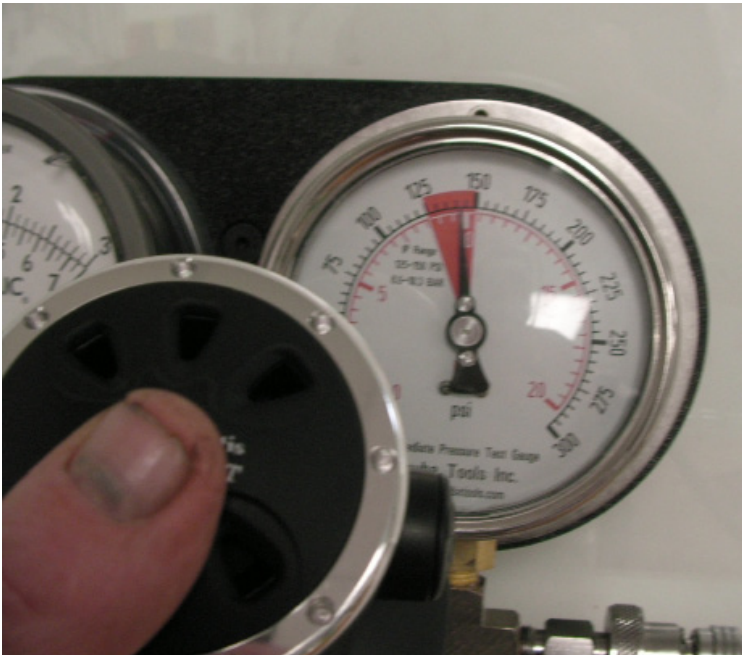
Turn the air tank ON SLOWLY while listening for any unusual air leaks. If any are heard, turn the air off immediately and determine the source of the leak. If no leaks are found, watch the intermediate pressure gauge reading rise. It should stop before 150 psi (10.2 bar).



If the in-line pressure gauge continues to rise above 150 psi (10.2 bar), turn the air supply off immediately and inspect the regulator to determine the cause.



Depress the 2nd stage purge cover fully, then release it several times to clear particles from the regulator, and to work the internal parts into place.



The pressure range for AS-103 Regulators at 3000 psi inlet pressure is 130-150 psi (9-10.2 bar). Add Shims (12) in either side of the spring (9) to raise the intermediate pressure. Remove Shims to lower the pressure.

The pressure increase per shim is not linear due to the rate of the spring, so no specific increase per shim can be given. Generally, only add a shim if the intermediate pressure (when the cylinder pressure is 3000 psi) is below the 130-150 (9-10.2 bar) range. Adding just one shim under these conditions will not push the intermediate pressure above the maximum 150 pressure. Do not aim for a specific pressure within the range, just add or remove shims to get the pressure within the range.

The optimal intermediate pressure for AS-103 regulators is 140 psi (10 bar), but any setting between 130 and 150 psi (9-10.2bar) at 3000 psi (207 bar) inlet pressure will provide good stable performance.