











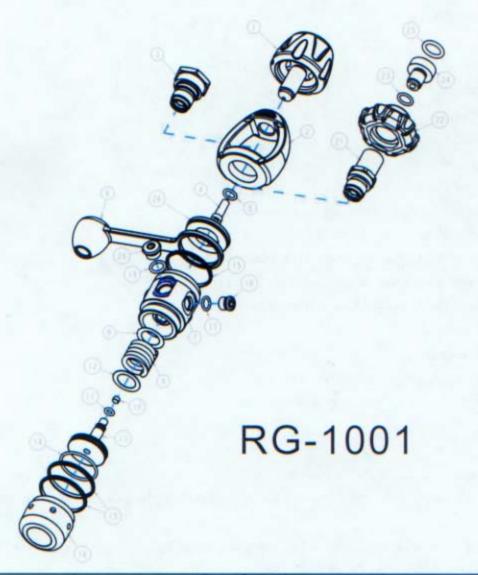


Professional SCUBA Diving Equipment

SCUBA & MAX

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NO	ITEM NO	DESCRIPTION	QTY	NO	ITEM NO	DESCRIPTION	QTY
1	0111	YOKE KNOB	1	14	2-023-01	O-RING	1
2	0055	YOKE - 3500PSI	1	15	0110	STYLE RING	3
3	0103	YOKE RETAINER	1	16	0102	END CAP	1
4	0113	FILTER	-1	17	3-903-01	O-RING	3
5	2-011-02	O-RING	1	18	0109	PLUG - LP	3
6	0118	DUST CAP	1	19	3-904-01	O-RING	1
7	0101	MAIN HOUSING	1	20	0108	PLUG - HP	1
8	0106-01	SHIM .005*	1	21	0114	DIN HOUSING	1
9	0107	SPRING	1	22	0116	DIN WHEEL KNOB	1
10	0104	HP SEAT	1	23	2-012-02	O-RING	1
П	2-008-01	O-RING	1	24	0115	DIN RETAINER	1
12	0106-02	SHIM .015"	1	25	2-112-02	O-RING	1
13	0105	PISTON-UNBALANCED	1	26	0119	STYLE DISK	1

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Before You Begin

Read these instructions completely before you begin servicing the regulator or filling whip.

These instructions are intended for people who have been AUTHORIZED by SCUBAMAX to repair SCUBAMAX Scuba equipment. If you are not so authorized - STOP.

1.0 INTRODUCTION

1.0.1 The procedures in this manual apply to the SCUBAMAX RG-1001 1ST STAGE Regulator, Refer to the exploded views as you read the service section of the manual. The Item Numbers referred to in the service section are those seen in the corresponding exploded view.



! WARNING!

NEVER tighten the hose fitting to the first stage with more than 40 in. lbs. (4.5 Nm) of torque. The inlet hose fitting will be weakened by over tightening.

Failure to heed this warning may result in serious injury or death.

NOTE:

All SCUBAMAX Scuba Regulators have service kits available which contain the parts which must be changed at every annual service no matter what their condition. The standard annual service kit part numbers are shown in the parts list. All other parts not contained in these kits must be inspected by the technician and changed if necessary. Parts will be handled under warranty, only if they have failed due to problems with material or workmanship.



! WARNING!

SCUBAMAX Scuba Regulators are manufactured using materials suitable for use with oxygen enriched gases (i.e. Nitrox, etc.) providing the oxygen content does not exceed 40%. Equipment intended for enriched air (Nitrox) use, must not be used with regular compressed breathing air or other gases. Regulators intended for enriched air use, can be serviced only by technicians trained by one of the major oxygen enriched air training agencies. Failure to heed this warning may result in serious injury or death.

- 1.0.2 This manual gives breakdowns of regulator parts, equipment specifications, servicing instructions, troubleshooting recommendations, and guidelines for proper care of SCUBAMAX regulators. This manual is intended for use only by persons specially trained and authorized to service SCUBAMAX Scuba equipment.
- 1.0.3 Anyone attempting to service or repair SCUBAMAX Scuba regulators must have a thorough understanding of the principles of operation of scuba regulators and valves, as well as the appropriate mechanical ability. The technician must be properly trained in the safe use of compressed air and the various tools and cleaning solutions involved in the procedures outlined in this manual.
- 1.0.4 The best source for current part numbers for any of the parts listed in this manual is your current parts and price list from SCUBAMAX.

1.0.5 If you have any questions, or need more information, contact your SCUBAMAX Scuba Sales Representative or SCUBAMAX Customer Service. You can e-mail you technical questions to SCUBAMAX'S mail box.

2.0 SPECIFICATIONS

SCUBAMAX RG-1001

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®

A. SCUBAMAX FIRST STAGE REGULATOR

TYPE Unbalanced Flow-by Piston Regulator

WEIGHT 1.54 lb. (.69 kg)

INTERSTAGE PRESSURE 135-145 psi (9.3-10.1 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 ----- Advanced Polymer

2.1 Torque Specifications:

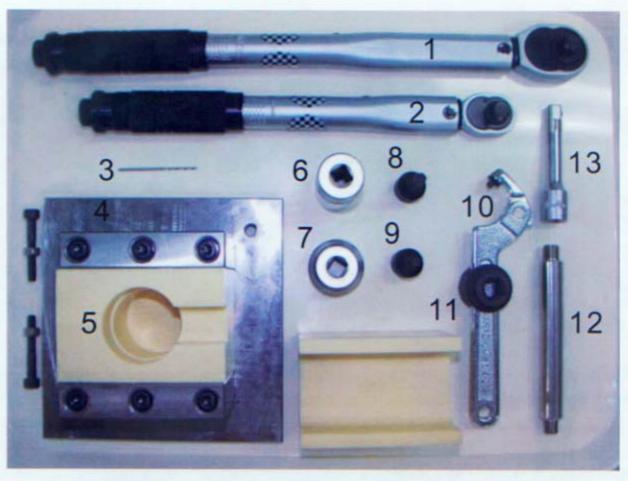
Description	Item #	Torque	
Сар	16	120-140 in/lbs (13.56-15.82 N.M)	
DIN HOUSING	21	16-18 ft/lb (21.70-24.41 N.M)	
YOKE RETAINER	3	23-25 ft/lb (31.19-33.90 N.M)	
DIN RETAINER	24	120-130 In/lb (13.56-14.69 N.M)	
Port Plugs	18,20	35-40 In/lbs (3.96-4.52 N.M)	
Hose inlet end		2-3 ft/lb (3-4 Nm)	
Hose outlet end		2-3 ft/lb (3-4 Nm)	
2nd Stage Nut		1-2 ft/lb (2-3 Nm)	

3.0 SERVICE KIT LIST

RG-1001 YOKE SERVICE KIT				
DRAWING	NO	PART NO	DESCRIPTION	QTY
0	5	2-011-02	O-RING	1
0	10	0104	HP SEAT	1
0	11	2-008-01	O-RING	1
	14	2-023-01	O-RING	1
0	17	3-903-01	O-RING	3
0	19	3-904-01	O-RING	2

RG-1001 DIN SERVICE KIT				
DRAWING	NO	PART NO	DESCRIPTION	Q'TY
0	5	2-011-02	O-RING	1
0	10	0104	HP SEAT	1
0	11	2-008-01	O-RING	1
	14	2-023-01	O-RING	1
0	17	3-903-01	O-RING	3
0	19	3-904-01	O-RING	2
0	23	2-012-02	O-RING	1
0	25	2-112-02	O-RING	1

3.1 SERVICE TOOL LIST





1	TORQUE WRENCH 19-110 N.M	2	TORQUE WRENCH 5-25 N.M
3	1.7 MM DRILL BIT	4	FIXTURE HOLDLE
5	FIXTURE BLOCK	6	13/16" HEX DEEP SOCKET
7	1" HEX DEEP SOCKET	8	1/4" HEX BIT SOCKET
9	4MM HEX BIT SOCKET	10	4MM PIN SPANNER
11	SPANNER HOLD SOCKET	12	STAINLESS HANDLE BAR
13	TORSION BAR	14	O-RING TOOL SET

4.0 SERVICE PROCEDURES FOR THE SCUBAMAX RG-1001

4.0.1

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.

4.0.2

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

4.1 TOOLS AND PARTS LIST REQUIRED FOR SCUBAMAX SERVICING

- Fixture block (supply from SCUBAMAX) OR Soft-jawed bench vise (bench vise with rubber, plastic, aluminum or plastic jaw inserts)
- PIN SPANNER AND HOLD SOCKET FOR END CAP(16)
- 1" HEX SOCKET FOR YOKE RETAINER(3)
- 4MM HEX BIT SOCKET FOR PORT PLUG(18,20)
- 1.70MM DRILL BIT FOR HP SEAT(10)
- 13/16" HEX DEEP SOCKET FOR DIN HOUSING(21)
- 1/4" HEX BIT SOCKET FOR DIN RETAINER
- 5~25N.M 3/8" TORQUE WRENCH ADJUSTABLE
- 19~110N.M 3/8" TORQUE WRENCH ADJUSTABLE
- STAINLESS HANDLE BAR
- 1st STAGE ANNUAL SERVICE KIT
- CLEAN SHOP RAGS
- LTI Christo-Lube 111[®], or Dow-Corning 111[®] Silicone Grease
- Intermediate Pressure Testing Gauge

4.2 DISASSEMBLY OF THE SCUBAMAX FIRST STAGE FOR OVERHAUL

To view all of the parts used in the SCUBAMAX first stage, look at the inside front cover of this manual. The bracketed numbers in the text refer to the corresponding circled item numbers on the exploded view drawing.

4.2.1

Use the 6" and 8" adjustable wrenches to loosen the hose nut from the PORT of 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.

Note:

Hose Protectors are easier to slide back from the 1st stage end of the hose if they are twisted and pulled when the hose is still installed in the 1st stage. If a hose protector is particularly difficult to pull back, try removing the hose and soaking the hose protector end in hot water to soften it up. Temporarily reinstall the hose and try pulling and twisting the hose protector again.

4.2.2

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) style disk(26) and upper style ring(15). Remove the yoke knob assembly (1) from the yoke (28).

Note:

If the regulator has a DIN wheel, use a 1/4" HEX BIT SOCKET to remove the DIN retainer(24) and DIN wheel (22), use a 13/16" HEX DEEP SOCKET to remove Din housing (21).

Remove the inlet filter (4). Remove and discard the filter O-ring (5), the DIN inlet O-ring (25) and Din retainer o-ring(23) if the regulator is DIN equipped.

4.2.4

Use a 4MM HEX BIT SOCKET to remove all port plugs (18,20) from the body. Discard the port plug O-rings. (17,19)

4.2.5

Put the body into the fixture block or clamp carefully in a soft-jawed bench vise. Use the PIN SPANNER to remove the Cap (16) from the Body (7). Remove any Spacer(s) (8,12), 2 x lower style ring(15). the Spring (9) and the Piston (13) from the Cap. Remove and discard the O-rings (11, 14) from the piston. Whenever possible, try to remove the O-rings by pinching them with the fingers and rolling them out of the groove.

A

! 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 will have to be replaced to stop these leaks.

4.2.6

Remove the Seat (10) from the Piston (13) by pushing it out with a 1.70MM DRILL BIT. Place one end of the drill bit on a flat hard surface. Lower the large end of the Piston over the drill bit until the flat end of the drill bit rests against the back side of the Seat. Push the Piston firmly down straight on the drill bit, until the seat is pushed out of the piston. Discard the old Seat.

See Photo



4.3 Cleaning and Inspection of the 1st Stage

4.3.1

Clean all metal parts of the first stage in an ultrasonic cleaner or cleaning solution. See Section 5.3 for recommendations on cleaning solutions. 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.

4.3.2

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

4.3.3

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.

4.3.4

Closely examine the sealing cones (orifices) in the Body (7) where the Seat (10) of the Piston (3) seal.

4.4 PRELIMINARY ASSEMBLY OF THE FIRST STAGE

4.4.1

To determine the identity of each O-ring in the Service Kit, remove them from the bag and use the O-ring Identification Chart on the front page of this manual. Lay each O-ring over its corresponding picture on the page and read the description. Before installing new O-rings into the

regulator, lightly lubricate the O-rings with LTI Christo - Lube 111 $^{\mbox{\scriptsize 8}}$ (for

enriched air regulators), or Dow-Corning 111[®] silicone grease. The most effective way to lubricate the kit O-rings is to put them in a small plastic bag with a pea sized amount of grease. Rub the O-rings and grease together in the bag until all the O-rings are coated evenly. Try not to wipe the lubrication off the O-rings when assembling them onto other parts.



4.4.2

Place the piston Seat (10) on a clean flat surface and press the Piston (13) stem straight over the seat until the new seat is installed into the end of the Piston. See the above Photo

4.4.3

Install the pre-lubricated (see 4.4.1) O-rings (11,14) onto the piston. 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. Install the 2 x lower style ring(15) onto the cap.

4.4.4

Support the Body (7) so that the Cap threaded end is facing up. Use the same number of Shims (12) that were installed in the Spring Cavity when

you took the RG-1001 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.

4.4.5

Install the Spring (7) on top of the Shim.

4.4.6

Lubricate the threads on the Cap (16) 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.

4.4.7

Use PIN SPANNER AND HOLD SOCKET to snug the Cap (16) onto the body with 120-140 in/lbs (13.56-15.82 N.M) of torque

4.4.8

Install the yoke retainer (3) into the yoke (2). Install the style disk(26) dust cap (6) onto the yoke. Install the upper style ring(15) on to the body.

4.4.9

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

4.4.10

Hand tighten the yoke , yoke retainer into the body.

Note:

If the regulator has a DIN connection, Install the new inlet filter (4) and filter O-ring (5) into the DIN housing (21).

Hand tighten the DIN housing (21) into the body

4.4.11

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

4.4.12

Tighten the yoke retainer(3) or the DIN housing(21) with a 1" HEX SOCKET or 13/16" HEX DEEP SOCKET. Tighten yoke retainer to 23-25

ft/lb (31.19-33.90 N.M). Tighten din housing to 16-18 ft/lb (21.70-24.41 N.M).

4.4.13

Install the new O-rings (25,23) into Din retainer(24)

4.4.14

Install the DIN wheel (22) into din housing (21) and hand tighten the din retainer(24)into the din bolt

4.4.15

Tighten the din retainer with 1/4" HEX BIT SOCKET. Tighten din retainer (24) to 120-130 In/Ib (13.56-14.69 N.M).

4.4.15

Install new O-rings (17,19) from the kit onto port plugs (18,20) 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).

4.4.16

Install the yoke knob and dust cap.

4.5 SET-UP AND TESTING THE FIRST STAGE

Note:

The RG-1001 regulator has an unbalanced piston 1st stage. Intermediate pressure will begin in the higher end of the range with high tank pressures and drop as the tank pressure decreases with use. For this reason, the RG-1001's intermediate pressure must be tested and set at the highest inlet (cylinder) pressure that the regulator is going to see during use. This is usually 3000 psi (207bar).

4.5.1

In the remaining open port, install the normal hoses with an intermediate pressure gauge. Make sure at least one of the ports has a functioning 2nd stage installed or that the intermediate pressure gauge has an

Over-Pressure Relief Valve.

4.5.2

Turn the air tank ON by 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 as you continue turning the air on slowly. It should stop before 150 psig (10.2 bar).

4.5.3

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

4.5.4

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. To prevent uncontrolled free flows after pushing the purge cover, keep the deflator knob on the second stage in the "-" (negative position).

4.5.5

The pressure range for RG-1001 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 spring 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 RG-1001 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.

4.5.6

After reaching the proper pressure setting, push the purge cover on the

second stage again several times and watch how the intermediate pressure reading responds. When the purge cover on the second stage is depressed, the intermediate pressure reading will drop. When the purge cover is released the pressure should return immediately to the proper lock-up pressure and stay there.

4.5.7

Let the regulator sit with the tank valve turned on for several minutes. The intermediate pressure reading may rise about 3 psi in the first three seconds after lock-up, but after that it should not rise more than another 4 psi (.3 bar) in five minutes. If it rises more than 4 psi refer to the Trouble-shooting Section 5.1 of this manual.

Note:

Never set the output pressure of the first stage above 150 psig (10.2 bar).

5.0 HELPFUL HINTS

5.1 TROUBLESHOOTING

POSSIBLE CAUSE	RECOMMENDED ACTION
Inlet filter clogged.	Replace the filter.
Air supply to 1st stage insufficient.	Verify the supply air pressure. Make sure the customer had the air valve turned all the way on during the dive.
1st improperly adjusted.	Refer to sections 4.5 of this manual.

A. CREEPING INTERMEDIATE PRESSURE:

POSSIBLE CAUSE	RECOMMENDED ACTION
Damaged or worn 1st stage seat (6).	Replace seat
Nick in sealing surface of Body Orifice (14)	Replace Body or Buff out Scratch
Seat (6) has not taken shape of Orifice yet.	Let the Regulator sit with the pressure on for a few minutes and measure pressure again.

B. HIGH FREQUENCY HUMMING OR BUZZING DURING INHALATION:

POSSIBLE CAUSE	RECOMMENDED ACTION	
Harmonic resonance between the springs and other 1st stage	Remove the main spring (7) flip it over and re-install.	
components.	Replace spring or other components	
	until resonance stops.	

5.2 PARTS CLEANING RECOMMENDATIONS

5.2.1

Regulators that see heavy use, particularly those used in salt water, often require extra effort to remove dirt and corrosion from the parts of the regulator. Some suggested cleaning solutions are listed at the end of this section, and there are probably many others being used successfully. The following are a few general suggestions we can make.

5.2.2

Don't expect your cleaning solution to do all the work in a matter of

seconds. If the solution cleans extremely rapidly, it is probably too strong and is etching the finish on the parts. Use a wooden or plastic stick or a soft bristle brush to help get rid of the thickest deposits. Take special care not to damage orifice sealing areas.

5.2.3

Soft parts absorb ultrasonic energy. Remove all O-rings and seals from metal parts before cleaning them. If possible, do not clean plastic parts with the metal parts, or at least understand that every plastic part you put into the ultrasonic cleaner is slowing down the ultrasonic cleaning process for the rest of the parts.

5.3 COMMONLY USED CLEANING SOLUTIONS

SOLUTION	COMMENTS
Hot Soapy water	Preferable. Good for plastic, silicone
	and plated metal parts.
Vinegar and water	Ingredients easily available.
(equal part solution)	Approx. 15 min. cleaning time.
(weaker solution in Ultrasonic	May damage chrome finish.
Cleaner)	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	The preferred choice. Check with the
by ultrasonic cleaner	manufacturer for strengths and
manufacturers	recommended uses for their cleaners.
	Choose soap solutions over acidic
	ones.

5.4 HANDLING TIPS

How your customers treat their regulators will directly influence the unit's function and durability.

Following are a few tips that you can pass on to your customers to help assure the durability of their SCUBAMAX Scuba Regulator.

A. PRE-DIVE CHECKS:

5.4.1

Check the hoses and hose connections for cuts, abrasions or other signs of damage before mounting the regulator on the tank valve. Slide the hose protectors back to inspect the areas of the hose normally covered. Be sure all hose connections are tight.

5.4.2

Just before mounting the regulator on the valve, always turn the valve on briefly to blow any trapped water out of the valve. There is often salty water trapped in the outlet side of the valve. This entrapped salt water being blown through the interior of the regulator is the number one source of internal corrosion and problems with Scuba regulators.

5.4.3

Before turning on the tank air valve, check to make sure that the yoke nut or DIN connection is tight and the regulator body is aligned properly, with no kinks in the hoses.

5.4.4

Turn the tank valve on slowly and listen for leaks . If any leaks are found , replace or repair parts as recommended.

5.4.5

Never lift the tank/BCD assembly by the regulator or hoses.

5.4.6

Surface-test the regulator by breathing lightly through the mouthpiece. Depressing the purge button above the water's surface is not an effective or thorough method for testing the function of the regulator.

B.POST-DIVE CARE:

5.4.7

After the dive, blow all water out of the dust cap with clean dry air or dab the water out with an absorbent cloth and place the cap securely on the regulator inlet. On multiple tank dives, use great care to keep salt water out of the regulator inlet when tanks are changed. Neglecting these simple procedures is another great cause of corrosion and wear in Scuba regulators.

5.4.8

With the dust cap securely in place, rinse the first and second stages in clean fresh water. DO NOT depress the purge button before or during rinsing since this may introduce water into the second stage and the low-pressure hose. Shake or blow all excess water from the second stage and allow the entire regulator to air-dry before storing.

5.4.9

Store regulator in a clean bag or storage box, away from sunlight, excessive heat and humidity.