

SHERWOOD SCUBA® REGULATORS

maximus®
(SRB3600)



Assembly & Maintenance Guide

FIRST STAGE - MAXIMUS® SRB3600

ITEM #	CATALOG #	DESCRIPTION
	SRB3601	First Stage Complete
1	.5105-70	Handwheel Assembly
2	.3504-6	Star Washer
	J2790056B	Filter Retaining Ring
3	.1390-7	Filter
4	.29-3106-13A	Moving Orifice (bare, no O-rings)
5	.19-8010-8	Disc Spring
6	MS28774-007	Backup Ring (for Moving Orifice)
7	G007A	O-ring (for Moving Orifice, 2 ea.)
8	.3801-20	Dust Cap
9	.1-1665-17	Yoke Nut
10	.2-3801-4	Yoke
11	.1-3105-6	L.P. Port Plugs
12	G011B	O-ring (for L.P. Port Plugs)
13	.3106-6	One Way Bleed Valve
14	J07-S1024-08DB	Locking Allen Screw
15	.2-3601-1A	Main Body
16	G904A	O-ring (for H. P. port plug)
17	.1-3405-4	H. P. Port Plug
18	G024A	O-ring (fits on large end of Body)
19	.2-3601-7	Pressure Adjusting Ring
20	G025A	O-ring (fits on Pressure Adj. Ring)
21	.3801-12B	Main Spring
22	G007A	O-ring (for small end of piston)
23	.3801-5	Piston Seat
24	.25-3601-13	Piston (Bare, no O-rings or seat)
25	G022A	O-ring (for large end of Piston)
26	.2-3601-8	Cap
27	.3601-15	Cap Label

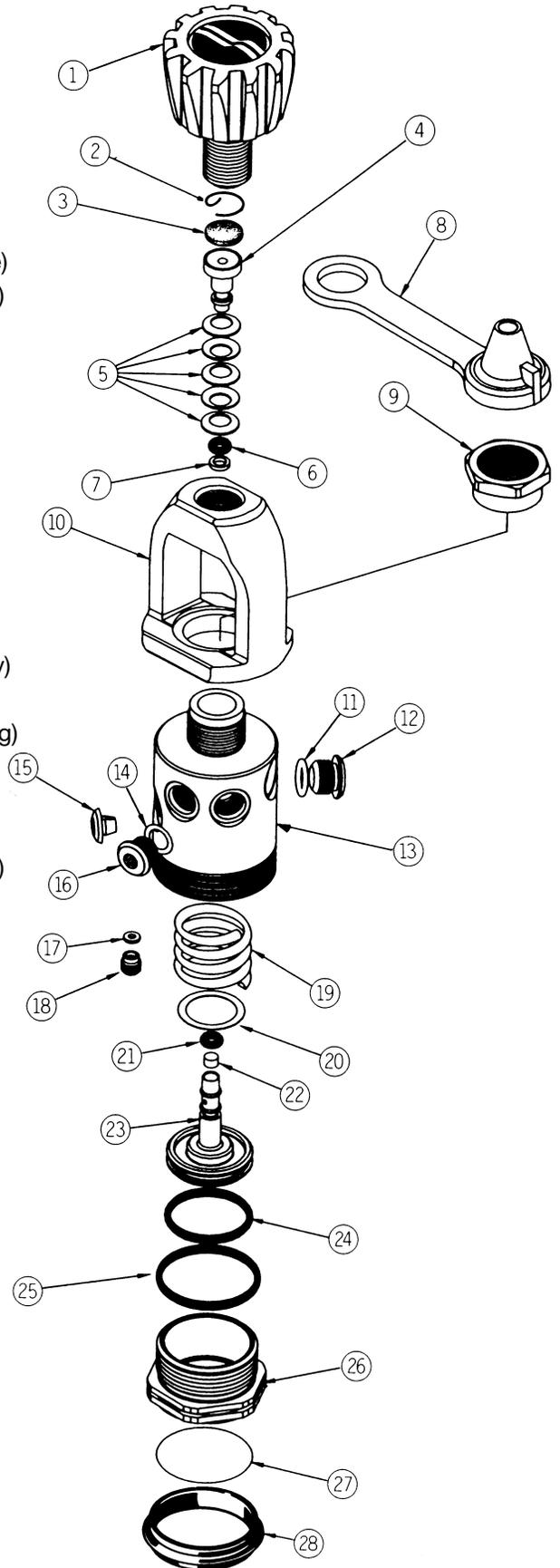


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BEFORE YOU BEGIN.....

READ THESE INSTRUCTIONS COMPLETELY BEFORE YOU BEGIN SERVICING THE REGULATOR.

THESE INSTRUCTIONS ARE INTENDED FOR PEOPLE WHO HAVE BEEN AUTHORIZED BY SHERWOOD TO REPAIR SHERWOOD SCUBA EQUIPMENT. IF YOU ARE NOT SO AUTHORIZED - STOP.

1.0 INTRODUCTION

1. This manual is written as a guide to the annual servicing and maintenance of the **Sherwood Maximus SRB3600 regulator**.
2. This manual gives breakdowns of regulator parts, equipment specifications, servicing instructions, troubleshooting recommendations, and guidelines for proper care of these regulators. The manual is intended for use **only** by persons specially trained and authorized to service Sherwood Scuba equipment.
3. Anyone attempting to service or repair Sherwood Scuba regulators **must** have a thorough knowledge 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.
4. The best source for current part numbers for any of the parts listed in this manual is your authorized Sherwood Scuba distributor.
5. Because of the many unique features found in Sherwood regulators, Sherwood conducts seminars on a regular basis throughout North America to train technicians in proper service and repair procedures for all current Sherwood regulators. In addition, all Sherwood dealers and their staff members are encouraged to attend the seminars to gain an in-depth understanding of the construction, special features and operation of Sherwood regulators. For information on the dates and locations of upcoming Sherwood service seminars near you, contact your Sherwood Scuba distributor or sales representative.

NOTE: You must be authorized by Sherwood to work on Sherwood Scuba equipment. You can obtain proper authorization by attending all appropriate seminars given in your area. This is the only way you can become an authorized Sherwood technician.

6. Companion instructional VHS videotapes to this and other Sherwood Scuba repair manuals are available from your authorized Sherwood Scuba distributor at a nominal cost. Ask your Sherwood Scuba sales representative for details.
7. If you have any questions, or need more information, contact your Sherwood Scuba sales representative or Authorized Distributor.

2.0 SPECIFICATIONS

2.1 GENERAL SPECIFICATIONS FOR THE SRB3600 MAXIMUS REGULATOR

REGULATOR MODEL:	Sherwood SRB3600 Maximus
AIR FLOW:	32 cu. ft./min. (850 liters)/min. @ 1 atmosphere
INHALATION RESISTANCE:	1.1" w.c. (2.8 cm w.c.) @ 1 atmosphere
EXHALATION RESISTANCE:	0.5" w.c. (1.3 cm w.c.) max. @ 1 atm.
RECOMMENDED LUBRICANT:	LTI Christo-Lube® MCG#111, Dow Corning #111 Compound®, Parker Super O-Lube®, or equivalent

2.2. First Stage Regulator (SRB3601)

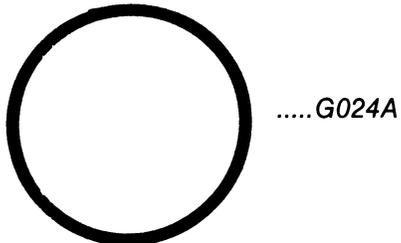
TYPE:	Externally adjustable, flow-by piston with Moving orifice balancing, and Positive Air Purge (Dry Air Bleed), U.S. Pat. # 4,226,257
WEIGHT:	1 lb. 11 oz. (.8kg)
INTERSTAGE PRESSURE:	120 -150 psi (8.3-10 Bar)
MAXIMUM INLET PRESSURE:	232 Bar for SRB3600CE Model
POSITIVE AIR PURGE FLOW RATE:	13-25 cc/minute
# LOW PRESSURE PORTS:	5 (3/8"-24 UNF)
# HIGH PRESSURE PORTS:	1 (7/16"-20 UNF)
MATERIALS:	Body – CDA-360 Brass O-rings – Buna-N Bleed Valve – Ethylene Propylene Piston Seat – Teflon®

2.3. Second Stage Regulator (SRB3602):

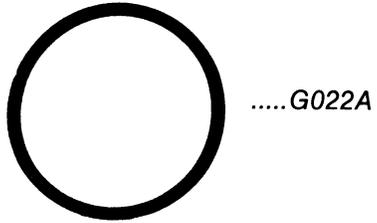
TYPE:	Downstream poppet, diaphragm, externally – adjustable, with underarm hose routing
WEIGHT:	8 oz. (.23 kg) w/o hose
HOSE LENGTH:	40 in. (1.02 m)
MATERIALS :	Cover –Thermoplastic Triax® Case –Thermoplastic Triax® Poppet Seat – Buna-N O-Rings – Buna-N Diaphragm – Tufel® (blue) Exhaust Valve – Thermoplastic Elastomer Wisdom® Mouthpiece - C-Flex®

Maximum certified depth is 50m.

3.0 O-RINGS REFERENCE CHART



.....G024A



.....G022A



.....G015C



.....G014C



.....G904A



.....G011B



.....G010A



.....G007A



.....G006B

4.0 SPECIAL FEATURES OF THE MAXIMUS SRB3600 REGULATOR

4.1 FIRST STAGE FEATURES

- 1 The external adjustability of the first stage allows you to adjust the regulator output to match the type of diving being done. Relatively low outlet pressure (120 psi, 8.3 Bar) helps the regulator resist freezing in cold water diving. Medium outlet pressure (130 psi, 9 Bar), combines good breathing effort and durability. Relatively high outlet pressure (150 psi, 10 Bar), maximizes flow rate for high work effort dives.

4.1 SECOND STAGE FEATURES

- 1 The Maximus regulator's unique underarm hose routing protects the hose from snagging on obstructions during close quarters diving (coral, caves, wrecks, piers, etc.). This routing also allows for better head movement, thus lowering jaw fatigue caused by the hose pushing or pulling the second stage. A longer hose and unique swivels make the regulator ideal in air-sharing exercises.
2. The large high flow Wisdom® mouthpiece and the oval exhaust valve provide comfort and lower breathing resistance.
3. The externally adjustable demand valve in the second stage allows the diver to custom-tailor the regulator to the diving conditions and interstage pressure. The knob can be backed off for extended storage periods of longer than three months, eliminating the need for purge button lock down tabs.
4. To help prevent rapid pressure buildup in the first stage, the Maximus allows you to leave the knob in the backed off (counter-clockwise) position when the air is first turned on, and then close the knob (clockwise) until the airflow just stops. This is especially important when high (3500 psi, 241 Bar) tank pressures are used because it helps prevent rapid heat buildup at the piston seat.
5. The smooth hydrodynamic shape of the second stage is less resistant to forward motion through water, thus lowering jaw fatigue. The shape is also designed to resist free-flowing caused by rapid initial immersion or forward motion.
6. With lower interstage hose pressure (120 psi, 8.3 Bar), the heat transfer fins become warmer during exhalation, and transfer heat to the lever support area (thus aiding in freeze resistance). At high interstage hose pressures (135-150 psi, 9.3-10 Bar), the transfer fins become much colder, causing condensation and moisture retention for the diver.

BEFORE YOU BEGIN:

Before you begin disassembly of the regulator, test the first and second stages for output pressures and leakage. Pretesting in this way will help you to pinpoint any specific areas requiring repair. Make sure your work area is clean and well lighted, with clean compressed air available to blow sand and dirt from parts.

5.0 FIRST STAGE PROCEDURES

5.1 TOOLS REQUIRED FOR FIRST STAGE SERVICING

- Bench vise
- 3/32" Allen wrench
- 5/32" Allen wrench
- 6" or 8" adjustable wrenches
- 15" adjustable wrench
- Pocket screwdriver (slotted)
- Sherwood 50 cc Graduated Cylinder (p/n TL110)
- Sherwood Piston Seat Removal Tool (p/n TL112)
- Sherwood Plastic Probe (p/n TL111) to push out orifice
- Sherwood Regulator Support Handle (p/n TL113)
- Sherwood Intermediate Pressure Gauge (p/n TL119)
- Sherwood Inlet Filter Installation Tool (p/n TL115)
- Sherwood O-ring Installation Cones:
 - Brass-colored - p/n TL106 (for installing O-ring onto piston tip)
 - Green-colored - p/n 38-TL107 (for installing first O-ring onto moving orifice)
 - Black-colored - p/n 29-TL108 (for installing second O-ring onto moving orifice)
- Annual Service Kit # 4000-4
- Enriched Air Conversion Kit #4000-4N

NOTE: for more information on Sherwood tools and their uses, see Sherwood's Tools, Repair Kits and Accessories - Assembly & Maintenance Guide, available from your authorized Sherwood distributor.

5.2 DISASSEMBLY OF FIRST STAGE

To view all the parts used in the first stage, fold out the front cover of this manual. The circled numbers below refer to the corresponding numbers on the drawing.

1. Use 6" or 8" adjustable wrenches to disconnect all hoses from the first stage. Pull back the hose protector from the inlet end of the hose. Inspect the hoses for wear. Pay particular attention to the area where the metal ferrules meet the rubber hose material. Replace hoses if necessary.
2. Unscrew and remove the handwheel (1).
3. Remove the dust cap (8).
4. Install a Sherwood regulator support handle (p/n 4700-15) into one of the low-pressure ports. Use the support handle and a 15" adjustable wrench or bench vise to loosen the yoke nut from the body (15). See Photo # 1.

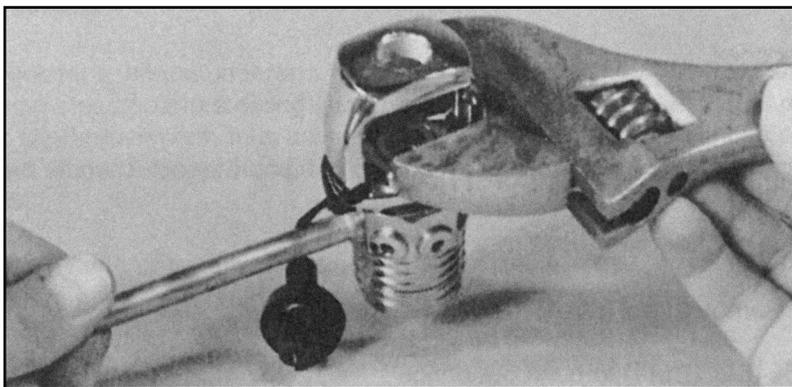


Photo #1

5. Remove the yoke (10) and yoke nut (9) from the body.

NOTE: If a Sherwood DIN adapter (p/n SAA5300) is installed in place of the normal yoke assembly, remove it at this time. See Sherwood Scuba Technical Bulletin #104 for servicing procedures for the SAAS300 DIN adapter.

6. Use a 5/32" Allen wrench to remove all remaining port plugs (11) (17) from the main body (17).
7. Use a 3/32" Allen wrench to remove the locking Allen screw (14) from the main body (see Photo #2).



Photo #2

8. Use a regulator support handle and a 15" adjustable wrench or bench vise to remove the cap (26) and pressure adjusting ring (19) as a unit from the main body. Keep the wrench on the adjusting ring flats, not on the cap flats, for this operation. This will ensure that the two units do not separate (see Photo # 3).

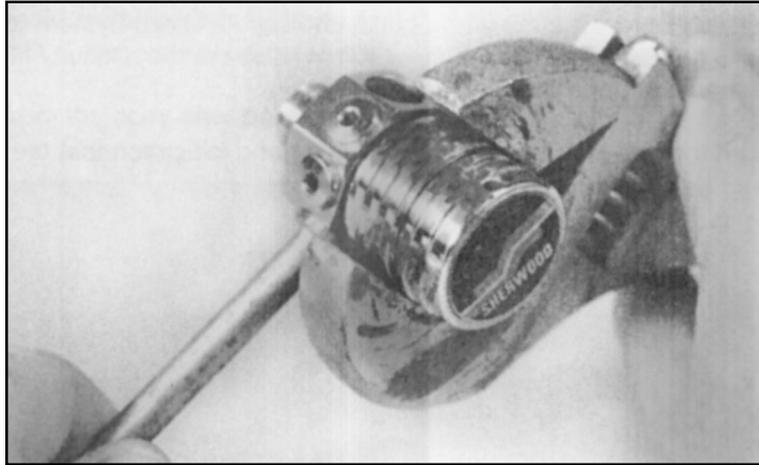


Photo #3

9. Use a 15" adjustable wrench and a bench vise to separate the cap from the adjusting ring (see Photo # 4).

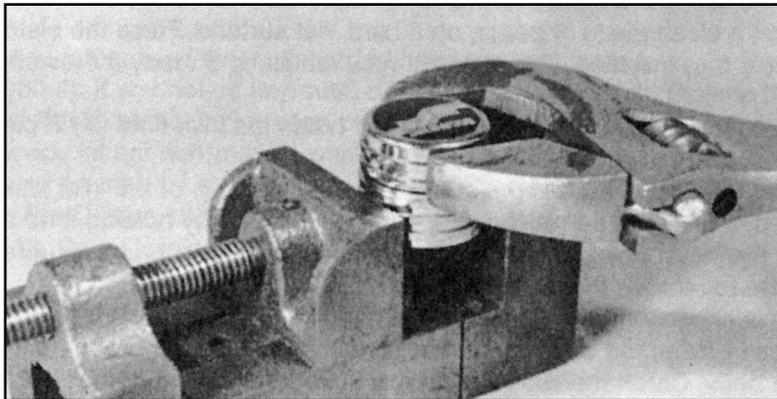


Photo #4

10. Remove the piston (24) and spring (21) from the cap.
11. Remove the piston O-rings and discard them. Take care not to scratch the O-ring grooves in the piston. Remove the piston seat (23) by pushing through the stem with the Sherwood piston seat removal tool (p/n TL112) from the large end. The seat will then pop out. Discard the old seat.



12. **If any grease or oil gets on the flow control element assembly in the face of the piston, the air flow will be impeded.**
- a. Keep greasy fingertips away from the piston during servicing.

- b. Use a clean, dry cloth to wipe the piston surface if it needs cleaning.
- c. Do not put the piston in a cleaning solution or ultrasonic cleaner. If there is any oil on the surface, it will coat the piston.
- d. A coating of grease or oil will interfere with the air flow through the flow control element in the face of the piston (see Photo #5). It may also cause the Dry Air Bleed System to cease working. Although this is not dangerous to the diver, it may increase the difficulty of breathing through the regulator upon descent.
- e. If no air is bubbling from the one-way bleed valve, this is a good indication that the positive air purge system is not working.

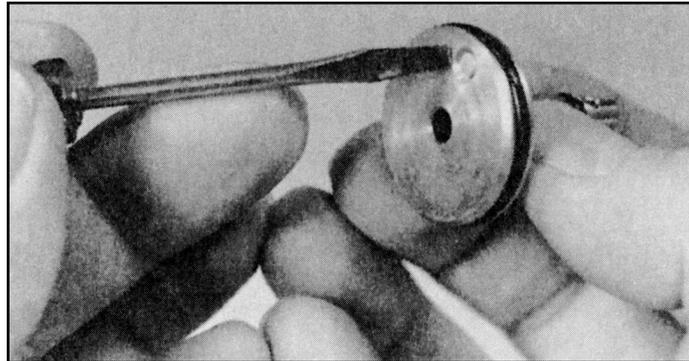


Photo #5

- 13. Place a new piston seat on a clean piece of paper, on a hard, flat surface. Press the piston tip firmly over the seat until it is fully installed. The piston is now rebuilt, and ready for installation.
- 14. Use a pocket screwdriver to remove the star washer (2) that holds the filter (3) in place. Most units used a star washer (a flat disc washer with six outward facing legs). Units made after 1997 use a wire-retaining ring with a forward hook. The only first stage bodies that can use this reusable ring, have a groove machined into the area above the filter for the ring to fit snugly into. Always discard the used filter and old style star washers, newer style retaining rings are saved for reuse.
- 15. Remove the moving orifice (4) from the body by pushing it with a soft plastic probe from the large threaded end of the body. Catch the orifice assembly in your hand as it comes out the yoke nut thread end of the body (see Photo # 6). Carefully inspect the disc springs (5) for any cracks. Replace all five disc springs if any cracks are found.

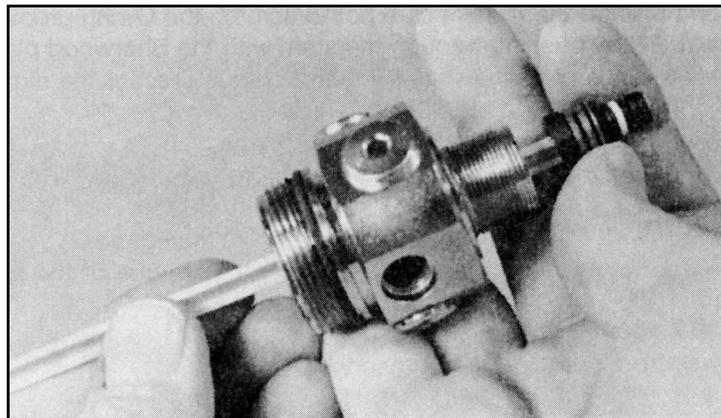


Photo #6

16. Remove the one-way bleed valve (13) from the body using your fingers or a soft plastic probe. **DO NOT** use a metal screwdriver or blade since this will scratch the sealing surface against which the bleed valve seals. This scratch may allow water to enter the first stage spring chamber during use.

The sealing surface on the body where the one-way valve seals must be totally clean of deposits. If any deposits remain on the sealing surface after initial cleaning, take a **fine** abrasive polishing stick and polish the surface to remove deposits (see Photo #7).

17. Blow all residue from the body after polishing.

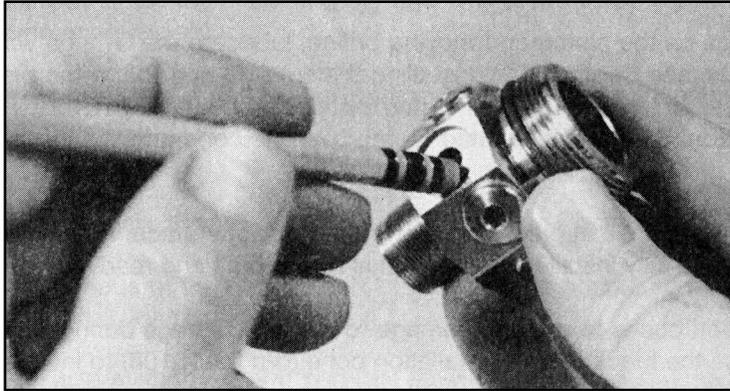


Photo #7

18. Remove the large O-ring (18) from the body and the large O-ring (20) from the pressure adjusting ring.
19. Inspect all O-rings (other than those discarded because they were found in the Maximus annual service kit # 4000-4). If you notice any cuts, deformities, or abrasion, replace the damaged O-rings. Otherwise, these static O-rings can be reused in the first stage. Most of the O-rings not found in the service kit are non-moving gaskets with little or no pressure across them. The clean environment created by the Positive Air Purge System (Dry Air Bleed) makes this re-use possible. Clean the O-rings carefully with a lint free rag, and re-lubricate lightly with LTI Christo-Lube® MCG #111, Dow-Corning 111® Silicone grease, Parker O-ring Lube®, or equivalent.
20. If necessary, clean all metal parts of the first stage **except the piston** in an ultrasonic cleaner or cleaning solution.



Remove the O-rings before cleaning any metal parts; most cleaning solutions can damage the O-ring material. See Section 7.3 for recommendations on cleaning solutions.

21. Remove the regulator parts from the cleaning solution. Blow all internal passageways dry with clean, dry compressed air.
22. The piston O-rings and the moving orifice O-rings move in bores. Inspect these bores for corrosion or wear. If the bores are leaking air because of wear, replace the parts. If some corrosion deposits persist, carefully wipe them away with a plastic scrubbing cloth. Blow any resulting dust out of the regulator parts.
23. Inspect the moving orifice's sealing surface (located at the top edge of the orifice cone). Any

nicks, scratches, or corrosion at the top of the cone can allow air to pass, which could result in creeping hose pressures. Polish out the defects using a **fine** abrasive polishing stick. When polishing, apply a **light** pressure to prevent excessive wear on the cone. You do not need to polish the rough outer edge of the cone; this is not a sealing surface. Use compressed air to blow away any dust created by the polishing process.

5.3 ASSEMBLY OF FIRST STAGE

1. Kit # 4000-4 is the Annual Service Kit for the SRB3600 Maximus. This kit contains the minimum parts to be replaced at every annual service interval.
2. Before installing new O-rings on the piston and moving orifice, lubricate the O-rings with one of the recommended lubricants (**see Section 7.3**). Installing the small O-ring (22) on the piston will be easier if you use the brass-colored Sherwood O-ring installation cone (p/n TL106). Place the cone over the tip of the piston. Slide the lubricated O-ring over the cone until it slips into the piston groove.
3. Place the new piston seat (23) on a clean piece of paper on a hard flat surface. Press the piston tip firmly over the seat until it is fully installed. The piston is now rebuilt and ready for installation.
4. Use the Sherwood installation cones to prevent damage to the new O-rings during installation onto the moving orifice. Use the black O-ring installation cone (p/n 29-TL108) to install first the new O-ring (7) and then the used backup washer (6) onto the wider groove on the moving orifice. Position them so that the black O-ring is closest to the wide end of the moving orifice. Use the green O-ring installation cone (p/n 38-TL107) to install the O-ring into the groove closest to the pointed tip of the orifice.
5. Using a greased soft probe, **lightly** lubricate the first 1/8" of the **small** bore in the body (15) where the small piston and moving orifice O-rings seal.
6. With your finger, push the moving orifice assembly, pointed orifice end first, into the yoke end of the main body as far as possible. Place the inlet filter (3) into the main body on top of the moving orifice. Place the new star washer (2) from the service kit on top of the filter screen.

NOTE: Replace domed screen P/N 3601-16 with filter P/N 1390-7. Some first stage bodies have a groove machined in the inlet for a filter retaining ring P/N J2790056B. For first stage bodies without the groove use a star washer P/N 3504-6

7. Replace the lightly lubricated O-ring (20) onto the pressure adjusting ring (19). Lightly lubricate the piston bore in the pressure adjusting ring on the surface where the large piston O-ring will seal.
8. Place the main spring (21) over the piston stem. Insert the main spring and piston (with its clean, lubricated new O-rings and seat) into the pressure adjusting ring.
9. Screw the cap (26) onto the pressure adjusting ring. Use a 15" adjustable wrench and bench vise to **snugly** tighten the cap to the pressure adjusting ring (see Photo # 4). **Do not overtighten.**
10. Replace the lightly lubricated O-ring (18) onto the main body. Be sure to place the O-ring into the groove right next to the threads, **not** in the groove away from contact with the threads. Lightly lubricate the bore in the pressure adjusting ring where the body O-ring (18) will seal. With

a greased soft probe, lightly lubricate the first 1/8" of the small bore in the main body where the small piston O-ring will seal.

11. Install the pressure adjusting ring/cap assembly onto the body. Hand-tighten the assembly onto the body until it bottoms on the thread.
12. Lubricate the locking Allen screw (14) with silicone grease, and place a small dab of grease onto the hole in the main body where the Allen screw is inserted. Using a 3/32" Allen wrench, screw the locking Allen screw into the main body until it lightly bottoms on the thread. **Do not tighten further.**
13. Using your index finger, install the clean and dry one-way bleed valve (13) into the body (15). No particular orientation is necessary.

NOTE: If you use the bleed valve with the Sherwood logo molded into it P/N 3106-6 you will notice a "dot" molded near the right side of the logo. Install the bleed valve with the "dot" oriented closest to the inlet of the regulator (towards the yoke).

14. Lightly lubricate the body yoke nut threads with silicone grease and install the yoke (10) and the yoke nut (9) onto the body.
15. Using the regulator support handle (p/n 4700-15) in one of the LP pressure ports of the body and a 15" adjustable wrench, tighten the yoke nut snugly (see Photo # 1).
16. Lightly lubricate the threads of the handwheel (1) with silicone grease and install the handwheel and dust cap (8) onto the yoke (10).
17. If the first stage has a SYA-5300 or SYA5200 DIN adapter instead of a standard yoke, see the installation instructions given in Sherwood Technical Bulletin 104 for overhaul and installation instructions of the DIN adapter.

5.4 TESTING OF FIRST STAGE

NOTE: For safety, always test the first stage regulator with at least one second stage installed. The demand valve in the second stage acts as a relief valve in the event of a malfunction.

5.4.1 Before You Begin Testing

1. Install an intermediate pressure test gauge (p/n TL119) into one of the low pressure ports of the first stage. Plug any open outlet ports with suitable port plugs.
2. Install the first stage onto a tank valve, and introduce 2700 - 3500 psig to the inlet of the regulator. Flow air through the regulator by pushing the purge button on the second stage several times to get all parts properly seated.

5.4.2 Dry Air Bleed flow Test

1. Submerge the first stage under several inches of water.
2. A small stream of bubbles should be escaping from the one-way bleed valve on the first stage and nowhere else on the body. The number and size of the bubbles may vary from regulator to regulator, but the volume of air should be 13 - 25 cc per minute. To check this, use the following steps:
 - a. Invert a small (25 cc capacity) graduated cylinder filled with water over the underwater flow of

bubbles. The air entering the cylinder will gradually empty some of the water out of the cylinder.

b. After exactly one minute, remove the graduated cylinder from the air flow and raise the cylinder to the surface so that the air/water dividing line inside the cylinder matches the water level outside the cylinder. The measurement at this point should be between 13 and 25 cc.

c. If the reading is significantly higher than 25 cc, check the O-rings and sealing surfaces mated to the piston. If the reading is below 13 cc, check the flow control element in the piston (24) to determine if it has been clogged by grease or other foreign matter. If it is clogged, the piston must be replaced.

5.4.3 Intermediate Pressure Test

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

1. Attach any Sherwood second stage to one of the low pressure ports and the Sherwood intermediate pressure gauge (TL119) to another low pressure port. Plug all other ports with appropriate port plugs.
2. Attach the regulator to a tank valve giving a source pressure of between 2700 and 3500 psig (186 and 240 Bar).
3. Turn the supply air 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 pressure gauge reading rise as you continue turning the air on **slowly**. It should stop at about 120 psig (8.3 Bar) when the pressure adjusting ring (19) is screwed all the way in.
4. If the pressure gauge continues to rise above 140 psig (9.7 Bar), turn the air supply off immediately and inspect the regulator to determine the cause.
5. Once the air pressure stops rising, the internal parts should be worked into place by allowing air to escape from the second stage several times by pushing the purge button.
6. To raise the pressure to the desired final setting, slowly turn the pressure adjusting ring in a counter-clockwise direction (as seen when looking down at the cap end of the regulator) in 1/8-turn stages. At the end of each 1/8-turn, push the purge button several times to let the internal parts work into place to give a true reading.
7. If the pressure goes above the correct reading, turn the pressure adjusting ring clockwise in 1/8 turn increments. Between each 1/8 turn, the purge button of the second stage **must** be depressed to allow the pressure to drop.
8. After the correct pressure has been reached, let the regulator sit for several minutes and then depress the Purge Button again to check that the regulator returns to the proper pressure.
9. Once the proper pressure has been set, use the 3/32" Allen wrench to tighten the locking Allen screw (14). Tighten the screw clockwise only enough to stop the pressure adjusting ring from being moved by hand. **Do not overtighten**. Check the intermediate pressure one more time after you have tightened the Allen screw.
10. **Never set the output pressure of the first stage above 150 psig (10.3 Bar).**

6.0 SECOND STAGE PROCEDURES

6.1 TOOLS REQUIRED FOR SECOND STAGE SERVING

- 5/32" nut driver (if you don't have a 5/32" nut driver, use a 5/16 - 18 x 2" socket set screw)
- 5/8" wrench
- 3/4" wrench
- 1/4" nut driver
- Slotted screwdriver
- Size "0" square drive screwdriver (such as a Channel Lock SL-0)
- # 10 Tom screwdriver
- Phillips screwdriver
- Side cutting pliers
- Sherwood Lever Height Adjusting Tool (p/n 4005-16)
- Red Loctite® (stud locking adhesive)

6.2 DISASSEMBLY OF SECOND STAGE

To view the complete parts list of the second stage, fold out the back cover of this manual.

1. Remove the mouthpiece (14) by cutting the mouthpiece tie (15) with side cutting pliers. Examine the condition of the mouthpiece. Pay particular attention to the area on top just behind where the old tie tightened. This is a prime area for small holes to develop. If the mouthpiece is in good condition, it can be reused.
2. Remove the two cover retaining screws (20) using a size "0" square drive screwdriver or a Phillips screwdriver.

NOTE: Always remove these screws before peeling the cover off the case. If you peel the cover off the case without removing these screws, eventually the screw holes in the cover will elongate and no longer hold the screws. This is not covered under warranty!

3. Roll the cover (21) off the top of the case (17) using your thumb and forefinger.
4. **At this point the Sherwood logo on the purge button (22) can be changed to a different color.** See the parts list on the foldout back cover for available colors. If you are going to change the color, follow the next five steps. Otherwise, go on to Item 5 in this section.
 - a. Look at the tab inside the cover that holds the logo in place.

- b. If the tab has a metal grip ring holding the logo into the cover, grasp the ring with pliers so that squeezing the pliers causes the jaws of the grip ring to open. Pull the grip ring off, and then remove the logo by pulling it from the outside of the case.
 - c. If the logo has a plastic barb built into it, instead of the grip ring, then it is the newer style. Simply pull the logo from the outside of the cover until it pops out.
 - d. To install the new logo with a grip ring: flatten the old grip ring with pliers until it has its original shape. Then install the logo from the outside of the cover. Slide the straightened grip ring down the stem of the replacement logo until it bottoms. Check the grip ring for tightness.
 - e. To install the new logo with a self-holding barb: push the new logo into the case from the outside until the barb is fully engaged inside the cover.
5. Using your thumbnail or a slotted screwdriver, gently pry the diaphragm retaining ring (19) out of the case (see Photo #8).
 6. Gently remove the diaphragm (18) from the case.
 7. Using a size "0" square drive screwdriver or a small Phillips screwdriver, loosen and remove the screw (2) and washer (3) from the orifice adjusting knob (4).
 8. Remove the adjusting knob from the end of the adjusting orifice.
 9. Using a small slotted screwdriver, remove the cir-clip (5) from the adjusting orifice.
 10. Holding the base of the orifice housing with a 3/4" wrench, use a 5/8" wrench to remove the retainer nut (6) from the orifice housing (13).
 11. Remove the swivel fitting (7) from the orifice housing. Inspect the inner sealing surfaces for scratches.
 12. While holding the plastic case (17) in your hand, use a 3/4" wrench to remove the orifice housing from the lever support (26). The case is reinforced to withstand this operation.
 13. Before removing the lever support (26) and assembly from the case, look into the mouthpiece tube from the outside. There are two plastic tabs in the mouthpiece tube against which the fins rest. The fins should rest on the side of the tabs towards the orifice housing (on the right side as you look into the mouthpiece tube from the outside). **Remember this placement when you reassemble the regulator!**
 14. Remove the lever support (26) and assembly from the case with the heat transfer (30) (31) still attached. There is no reason to remove these fins from the lever support during a normal service interval. If you do have to remove the fins, use a 5/32" socket wrench to remove and replace the screws (32).
 15. Normally, only the poppet stem seat insert (23) will need to be changed to restore the second stage to like-new performance. To change this stem seat insert, leave the lever assembly together.
 - a. Carefully remove the old seat insert from the poppet cavity using a pen knife or similar object.
 - b. Put the new seat insert on a clean flat surface and lower the poppet cavity over it. Install the black molded seat (p/n 978-9BN) with the identifying Sherwood symbol facing outward.

16. If you need to replace certain parts of the lever assembly (stem, spring, lever, etc.), you can do this by temporarily screwing the orifice housing (13) with the orifice (10) back onto the lever support and assembly (without the plastic case). With these parts screwed together, the locking nut (29) can be removed without all of the components springing apart. Remove the old part, install the new part, and re-tighten the locking nut (29).
17. Hold the orifice housing (13) in one hand. Temporarily install the adjusting knob (29) and use it to turn the orifice clockwise until it comes out of the orifice housing. Remove and discard the O-rings on the orifice (8) (9) and the orifice housing (11) (12).
18. Grasp the oval exhaust valve (16) with your fingers and pull first one and then the other locking nipple out of the case.
19. Rinse all plastic and silicone parts in clean fresh water, and then blow the parts dry with compressed air.
20. Inspect the case (17) for any cracks. Look particularly closely at the area where the orifice housing and the lever support clamp down. Replace the case if you find any cracks. **Squeeze marks and lines caused by compression of the case between the lever support and orifice housing are not a reason for changing the case.**
21. Inspect the exhaust valve and the diaphragm for any tears or pin holes by stretching them gently as you hold them up to a light. If you are repeatedly tearing diaphragms while inspecting, you are applying too much force.
22. Inspect the orifice (10) for any nicks, scratches, or corrosion. Polish out any corrosion or minor scratches using a fine-grit rubberized polishing stick or a clean new pencil eraser. Remember not to apply too much pressure when rotating the polishing stick. Check frequently to see when the corrosion or scratch is gone and stop at that point. Blow all dust and debris out of the orifice housing using clean compressed air.
23. Inspect all O-ring grooves in the metal parts of the second stage. Clean all O-ring grooves with a lint-free cloth.

NOTE: Prior to this point, you should have cleaned and inspected all parts, following proper service procedures. Do not continue until this has been done.

6.3 ASSEMBLY OF SECOND STAGE

1. Install the exhaust valve (16) into the case by inserting the two nipples into the small holes from the outside of the case. Reach inside the case and pull each nipple firmly with the fingers until you hear or feel it "click" into place. Inspect the exhaust valve to see that it is properly seated.
2. Install the lever support (26) and assembly into the case, setting it firmly between the guide ribs in the case.
3. Lubricate and install new O-rings (8) (9) from the annual service kit onto the orifice (10). Install the orifice back into the orifice housing (13) using your fingertip. Use the adjusting knob (4) to turn the orifice counter-clockwise until it stops.
4. Apply a drop of mild thread locker (such as Loctite 242® or equivalent) to the threads of the lever support (26).

5. Screw the orifice housing (13) onto the threads of the lever assembly. Use a 3/4" wrench on the orifice housing to tighten them together snugly (70 in. lbs, 7.8 nm).
6. Lubricate and install new O-rings (11)(12) from the annual service kit onto the orifice housing (13). Note that the larger of the two O-rings goes on the end of the housing closest to the case (17).
7. Lightly lubricate the inner bore of the swivel fitting with a recommended grease. Install the swivel fitting onto the orifice housing.
8. While holding the orifice housing with a 3/4" wrench, use a 5/8" wrench to install the retainer nut (6) onto the orifice housing thread. Tighten the retainer, nut snugly (70 in lbs, 7.8 nm).
9. Install the cir-clip (5) onto the orifice (10).
10. Install the adjusting knob (4) onto the orifice (10) .
11. Install the washer (3) onto the screw (2). Place a small drop of locking adhesive onto the threads of the screw, and install it snugly into the orifice using a size "0" square drive screwdriver or a Phillips screwdriver.
12. Install the cap (8) back onto the adjuster knob.

NOTE: Do not allow lubrication (grease on finger, silicone overspray, etc.) to get on the case (17), the diaphragm (18), or the retaining ring (19). This may cause these parts to slip or deteriorate.

**THE FOLLOWING STEPS (13 -18) MUST BE PERFORMED AFTER THE REGULATOR SECOND STAGE IS SET Up.
(See Section 6.5, Set-Up of Second Stage).**

13. Install the diaphragm (18) into the case (17) so that it sits evenly on the ledge.
14. Inspect the diaphragm retaining ring (19). You will see a long tab and a short tab on the ring. The short tab lines up with the short notch in the case when the ring is installed.
 - a. If the diaphragm is **blue**, the retaining ring must also be **blue** to give the proper fit.
 - b. If you are replacing a white or black diaphragm with a new blue diaphragm, the black retaining rings will not fit properly. You **must** use a blue retaining ring! These rings are available from your Sherwood Scuba distributor at no cost. You should always have several on hand.
15. Install the proper diaphragm retaining ring into the case so that it holds the diaphragm in place.
16. Install the cover (21) onto the case by first hooking the bottom section over the exhaust valve area, and then working the rest of the up and over the front section. Work the cover around with your hands until everything is in place.
17. Using a size "0" square drive screwdriver or a Phillips screwdriver, install the cover retaining screws (20) through the screw holes in the cover and into the holes in the case. **Do not overtighten!** These screws are threading into plastic, which will hold well in service but is easily stripped if the screws are overtightened.

18. Install the mouthpiece (14) and the new mouthpiece tie (15) from the service kit.

6.4 SET-UP OF SECOND STAGE

For the following adjustments, remove the exhaust tee, cover, and diaphragm.

1. Turn the adjusting knob (4) **out** counter-clockwise all the way, and then in clockwise 1/8 turn.
2. Use a 1/4" nut driver to turn the locking nut (29) counter-clockwise outward, until the lever (26) is just loose enough so that the tip of the lever moves loosely up and down about 1/16".
3. Attach the second stage to its accompanying overhauled and properly adjusted first stage, and mount on an air tank filled to between 2700 and 3500 psig (186 and 240 Bar). Install an intermediate pressure gauge into one of the low pressure ports.
4. With the air off, use a 1/4" nut driver to adjust the nut (29) so that the lever (27) is just barely snugged against the lever support (26).
5. Fully depress the lever (27) with your thumb. Slowly turn on the tank valve until you hear a slight hissing from the second stage lever area.
6. Release the lever. The air pressure will build up in the hose. When the intermediate pressure gauge reads full and proper intermediate pressure, you should hear no hissing, and the lever should not be loose against the lever support.
 - a.. If the lever is loose against the lever support, depress the lever and turn the adjusting nut clockwise in 1/8 turn increments, releasing the lever between turns to check for snugness and leaks.
 - b. If the lever is snug against the lever support but air is hissing, depress the lever and turn the adjusting nut counter-clockwise in 1/8 turn increments, releasing the lever between turns to check for snugness and leaks.
7. When you find the point where the lever is snug against the lever support with no hissing, turn the air on fully and depress the lever several times to work the parts in. The regulator should not hiss after this working-in. If it does hiss, repeat Steps 6a and 6b above.
8. With the air on, turn the adjusting knob (4) fully counter-clockwise. You should hear a slight hissing (this is the long term storage position for the second stage). The hissing should stop when you turn the knob clockwise about 1/8 turn.
9. After setting the adjusting nut (29), check the relationship between the diaphragm wear plate and the tip of the lever assembly.
 - a. Install the diaphragm and retaining ring. The tip of the lever should just barely touch the diaphragm.
 - b. Touch the diaphragm lightly with your finger. If there is a significant gap between the lever tip and diaphragm, then the lever is too **low**. Remove the diaphragm and bend the lever slightly upward with Sherwood's Lever Bending Tool (p/n 4005-16).
 - c. If the regulator hisses slightly when the air is turned on, but stops hissing when you remove the diaphragm, then the lever is too **high**. Use Sherwood's Lever Bending Tool to bend the lever slightly downward.

- d. Replace the diaphragm. Continue to test the gap between the lever and the diaphragm after each bending until the lever is in the correct position.
10. Return to **Section 6.3, Step 13** of this manual (Assembly of Second Stage) to complete assembly of the regulator.

6.5 TESTING OF SECOND STAGE

6.5.1 Inhalation effort

Check the inhalation effort of the second stage with a pan of water about five inches deep.

1. Slowly immerse the second stage with the front cover down and level. The regulator should flow as soon as the diaphragm is a little deeper than level with surface of the water.
2. If you use a water column or water manometer to check inhalation effort, it should not exceed 1¹/₄" w. c. (3.2 cm) at cracking. It should drop to about 3/4" w. c. (19 cm) at one atmosphere and a moderate flow rate. You can alter the inhalation effort within a certain range.
3. You can increase the inhalation effort by turning the adjusting nut (29) counter-clockwise. However, discontinue counter-clockwise adjusting when the lever (27) becomes loose against the lever support (26).
4. You can decrease the inhalation effort by turning the adjusting nut clockwise. Discontinue clockwise adjusting when air begins to hiss past the second stage poppet.

6.5.2 Exhalation Effort

1. If you do not use instruments to check the exhalation effort, the flow should feel smooth and unrestricted.
2. If you use a water column, it should not exceed 1/2" w.c. (1.3 cm) at one atmosphere.
3. Brand new Exhaust Valves will sometimes adhere slightly to the case, causing a slight increase in inhalation effort. This condition will disappear with use.

6.5.3 Leak Test

1. Disconnect the air supply. Purge the regulator of all positive air pressure.
2. Slowly immerse the second stage in a pan of water with the mouthpiece pointing straight up.
3. Immerse the regulator until the water is 1/4" to 1/8" (.64 to .32 cm) from the lip of the mouthpiece.
4. Hold the regulator in this position for one minute and then slowly raise it out of the water.
5. Tip the regulator mouthpiece downward and watch the inside of the mouthpiece tube. If any water escapes from the mouthpiece tube, check for source of leakage.

6.5.4 External Air Leaks

1. Attach the regulator first stage to a tank short enough to totally submerge the first and second stage in your filling station cooling water.
2. With the tank valve still turned off, flood the second stage completely with water, and then position it mouthpiece up.
3. Turn the tank air valve on **slowly** and then watch for any leaks in the first or second stage (except for the normal flow of air from the one-way bleed valve on the first stage). Look particularly closely at the first stage area where the adjusting module meets the body. If the module-to-body O-ring (18) is in the wrong groove, you will see air leaking from between the module and the body instead of from the black one-way bleed valve system.
4. Repair any leaks.
5. Check for the correct positive air purge flow rate. See **Section 5.4, Testing of First Stage**, for the proper method.

7.0 HELPFUL HINTS

7.1 TROUBLESHOOTING REGULATORS

POSSIBLE CAUSE

HIGH INSTALLATION EFFORT AT DEPTH:

- a. Inlet filter clogged.
- b. No air flowing through the dry air bleed system.
- c. High pressure air supply insufficient.
- d. Second stage improperly adjusted.

FREE FLOWING:

- a. Intermediate pressure too high.
- b. Damaged or worn HP piston seat.
- c. Damaged or worn HP poppet stem seat.
- d. Nicked or corroded orifice sealing.
- e. Demand lever in second stage bent too high.
- f. Weak spring in second stage.
- g. Second stage improperly adjusted.

h. Parts in the second stage have been severely chilled due to repeated purging and have shrunk, allowing air to flow.

WET BREATHING:

- a. Improper clearing, or diver diving in total head-down position.

RECOMMENDED ACTION

- Replace the filter.
- Check the flow rate coming out of the one-way bleed valve (13). If no or low air flow is detected, clean the flow element in the piston, or replace the piston.
- Verify the supply air pressure. Make sure the customer had the tank valve turned all the way on.
- Repeat Steps 1 through 12 in **Section 6.4, Set-Up of Second Stage.**

- Adjust the first stage's outlet pressure to below 150 psig.
- Replace seat (p/n 3801-5). This also gives high intermediate pressure.
- Replace seat (p/n 978-9BN).
- Dress the orifices in the first and second stages with a polishing stick, or replace the orifices.
- Adjust or replace the lever.
- Replace the spring.
- Repeat Steps 1 through 12 in **Section 6.4, Set-Up of Second Stage.**
- Allow the second stage to warm up to room temperature. This chilling will not occur in normal diving conditions.

- Instruct the diver on proper clearing technique.

- | | |
|--|---------------------------------------|
| b. Diaphragm improperly installed. | Visually check position of diaphragm. |
| c. Hole in the mouthpiece at tie area. | Replace the mouthpiece. |
| d. Hole in the diaphragm. | Replace the diaphragm. |
| e. Damaged exhaust valve, or edges of the exhaust valve not firmly seated on the case. | Replace exhaust valve. |
| f. Crack in case. | Replace case. |

HUMMING OR BUZZING DURING INHALATION:

- | | |
|---|---|
| a. Harmonic resonance between the springs and the mass of the piston. | Refer to Section 5.2 in this manual. Disassemble the first stage and flip the main spring over. Change the position of the piston in its bore. If resonance is still present, install a new piston and spring. |
|---|---|

NO AIR COMING FROM DRY AIR BLEED VALVE ON FIRST STAGE:

- | | |
|---|--|
| a. Piston flow element is plugged with grease | Replace piston. |
| b. Body-to-module O-ring (18) in wrong groove body, to groove between flange and threads. | Move O-ring from groove between flange and |

7.2 PARTS CLEANING RECOMMENDATIONS

Regulators which see heavy use, particularly those used in salt water, often need 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. Here are a few general suggestions we can make:

- 1 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. Dress the orifice sealing areas with a fine-grit polishing stick or pencil eraser after drying the parts.
2. Immerse only those parts which really need cleaning. With Sherwood's Dry Air Bleed system, the interior of the first stage is always clean and dry, so the piston and spring should never need cleaning. Immersing the clean Sherwood piston in contaminated cleaning solution can plug the flow control element in the face of the piston, which could slow or stop the flow through the positive air purge system.
3. Many of the solutions used for cleaning metal parts can damage the nitrile compounds found in O-rings. For this reason, remove all O-rings before placing parts in a cleaning bath.
4. If the first stage moving orifice (p/n29-3106-13A) is corroded because salt water has entered through the inlet filter, first make an attempt to clean it with a clean lint-free cloth or a **soft** brush in a fresh soapy water solution. If you must use a cleaning solution in an ultrasonic

cleaner, isolate the orifice from the side walls and all other parts. Do this by placing the orifice **individually** in a plastic cup in the cleaning hopper. This will help prevent mechanical damage to the sealing surfaces of the orifice. Polish the orifice with a clean pencil eraser. Blow off dust and debris after polishing.

5. Due to its unique stainless mesh design, the inlet filter of the Sherwood SR3601 first stage can be cleaned in the ultrasonic cleaner. Visually inspect the filter before and after cleaning. Blow the filter dry with clean compressed air.
6. Check the strength of any cleaning solution by placing a spare chrome-plated part in the bath for a few minutes longer than the time you expect to leave the parts in. If visible damage to the chrome finish results, then the solution is too strong.

7.3 COMMONLY USED CLEANING SOLUTIONS

SOLUTION	COMMENTS
Soapy Water	Good for plastic and silicone parts.
Vinegar and Water Equal part solution	Ingredients easily available, 15 minutes approx. cleaning time.
1000 cc Water 60 gr. Sulfuric Acid 60 gr. Potassium Dichromate.	Fast acting solution that should be made and used with care. Use gloves and safety glasses.
Cleaning solutions recommended by Ultrasonic Cleaner Manufacturers.	Usually the best route to go. Check with the manufacturer for strengths and uses for their cleaners. Some brand names of cleaning solutions are "Branasonic [®] ", "Micro [®] ", "Oakite 31 [®] ", and "Brex [®] ".

7.4 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 **Maximus SRB3600** regulator.

7.4.1 Pre-Dive Checks

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.
2. 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.
3. Turn the tank valve on **slowly** and listen for leaks.

4. **Never** lift the tank/BCD assembly by the regulator or hoses.
5. Surface-test the regulator by breathing lightly through the mouthpiece. Depressing the purge button above the water's surface is **not a thorough method** for fully testing the function of the regulator.

7.4.2 Post-Dive Care

- 1 After the dive, blow all water out of the dust cap with clean dry air 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 the greatest cause of corrosion and wear in scuba regulators. When used properly, Sherwood's exclusive Dry Air Bleed System keeps all other water-borne contamination out of the first stage body.

NOTE: A tiny stream of air bubbles escaping from a small black valve on the first stage indicates that the Dry Air Bleed System is working. The amount of air used is negligible (13-25 cc/min.). The system should be checked periodically, particularly after servicing, to ensure that there is some air escaping from the black one-way bleed valve. If no air is escaping from the valve when air pressure is applied to the first stage, have the regulator inspected.

2. 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.
3. Store the regulator in a clean bag or storage box, away from sunlight, excessive heat and humidity.

8.0 TWO YEAR WARRANTY AND MAINTENANCE INFORMATION

8.1 PROPER PROCEDURE FOR WARRANTY PAPERWORK

1. For detailed information on the operation of the Sherwood Scuba Two Year Limited Warranty, please refer to Sherwood Scuba Technical Bulletin #112.
2. In most situations, no paperwork will be necessary. The customer will bring his or her regulator in for one of its two annual servicings under the warranty. No parts other than those contained in the standard annual service kits will be needed. Discard all old parts replaced by new kit parts.
3. Remove one of the colored annual service rings from the main hose protector. When you have collected several of these rings (25-50), contact your regional distributor for a Return Goods Authorization Number. The color of the ring will determine the credit or type of service kit you will get in return.
4. If you replace parts other than those contained in the standard annual servicing kit, **you will have to submit paperwork.** If the regulator meets the conditions of the two-year warranty, and the warranty is still active, fill out the Sherwood Warranty Replacement Parts Form. You **must** describe the problem with the part you are returning in **Part Five** of the form. If this area is blank, you will not receive credit for that part.
5. For Sherwood Scuba regulators **manufactured before Jan. 1, 1993** which still have a valid Lifetime Limited Warranty, you, the dealer, must send the white Warranty Service Form to Sherwood. The information will be recorded by Sherwood to determine whether or not the warranty on that particular regulator is still in effect.

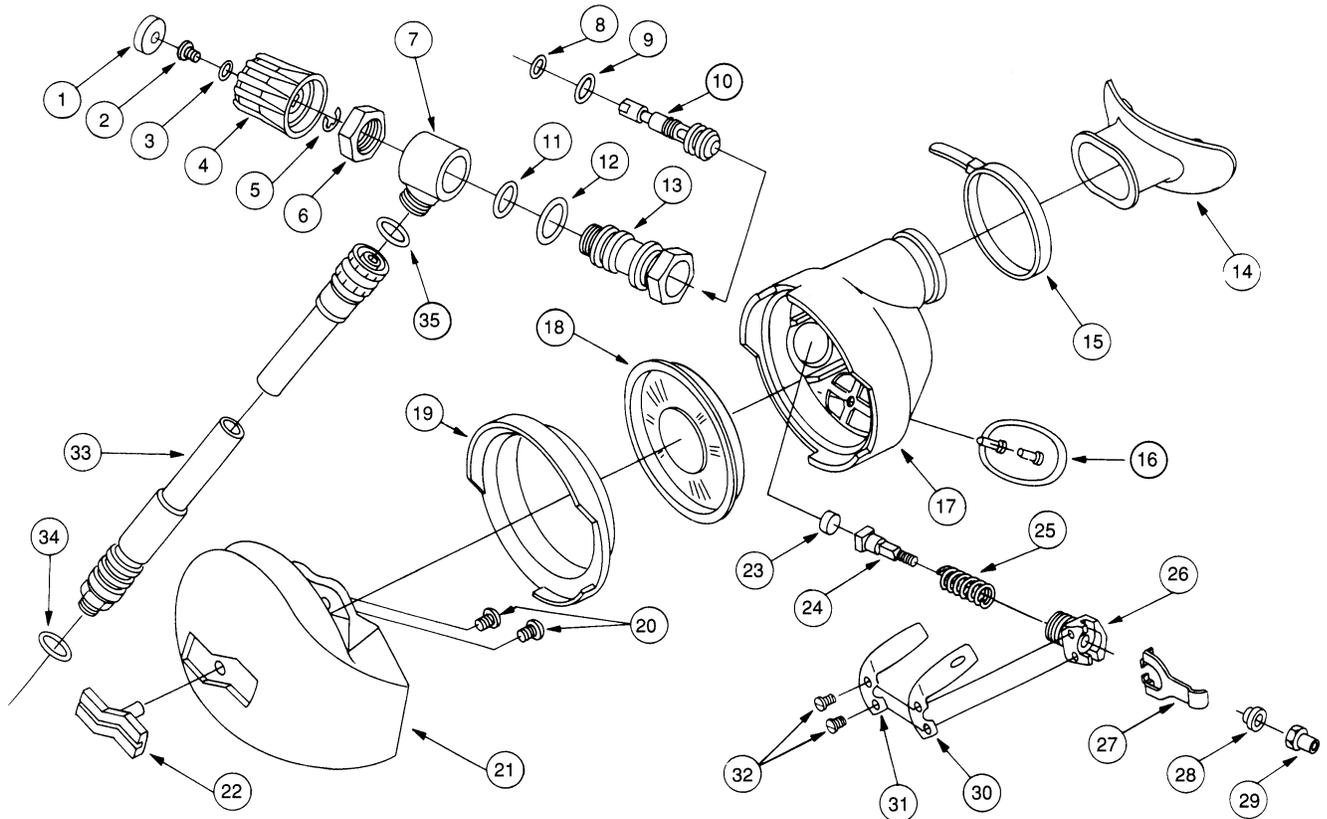
8.2 SCHEDULED MAINTENANCE

1. To keep the owner warranty in effect, your customers must have their regulators inspected and serviced annually (within 6 weeks before or after the anniversary of the date of purchase) by an authorized Sherwood dealer. **Failure to do so invalidates the warranty.**
2. Even with infrequent use, the regulator should be serviced annually to ensure proper performance and satisfy warranty requirements.
3. In Sherwood Scuba regulators **manufactured before Jan. 1, 1993** which still have a valid Lifetime Limited Warranty, you, the dealer, must send the white Warranty Service Form in to Sherwood. The information will be recorded by Sherwood to determine whether or not the warranty on that particular regulator is still in effect.

SECOND STAGE - MAXIMUS® SRB3602

ITEM #	CATALOG #	DESCRIPTION
1	3602-16B	Cap (for adjusting knob)
2	J12C04045B	Screw
3	19-4006-17	Washer
4	3702-16C	Adjuster Knob
5	3602-35	Cir-Clip
6	1-3602-15	Nut
7	2-3602-14	Swivel Fitting
8	G006B	O-ring (orifice small end)
9	G011B	O-ring (orifice large end)
10	29-3602-12	Orifice
11	G014C	O-ring (orifice housing small end)
12	G015C	O-ring (orifice housing large end)
13	1-3602-13A	Orifice Housing
14	3602-3LS	Mouthpiece (Wisdom)
15	3786-9W	Mouthpiece Tie
16	3602-6A	Exhaust Valve
17	3602-1D	Case
18	3602-4A	Diaphragm
19	3602-17	Retaining Ring (Blue)
20	J12C04045B	Front Cover Retaining Screw

ITEM #	CATALOG #	DESCRIPTION
21	3602-2	Front Cover
22	3602-5APK	Logo Insert (Pink)
	3602-5ARD	Logo Insert (Red)
	3602-5AWH	Logo Insert (White)
	3602-5AY	Logo Insert (Yellow)
	3602-5ANG	Logo Insert (Green)
	3602-5ARG	Logo Insert (Orange)
23	978-9BN	Seat insert (black)
24	29-3602-18	Stem (bare, no seat)
25	19-3602-29	Spring
26	9-3602-7	Lever Support
27	3602-20A	Lever
28	3602-9A	Washer (white)
29	J11N0440BP	Adjusting Nut
30	25-3602-22	Fin (dimpled end)
31	25-3602-21	Fin (plain end)
32	J113481874BARC	Screw for fins
33	5016-20-41	Hose Assembly (41" High Flow)
34	G010A	O-ring (hose outlet end)
35	G011B	O-ring (hose inlet end)





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