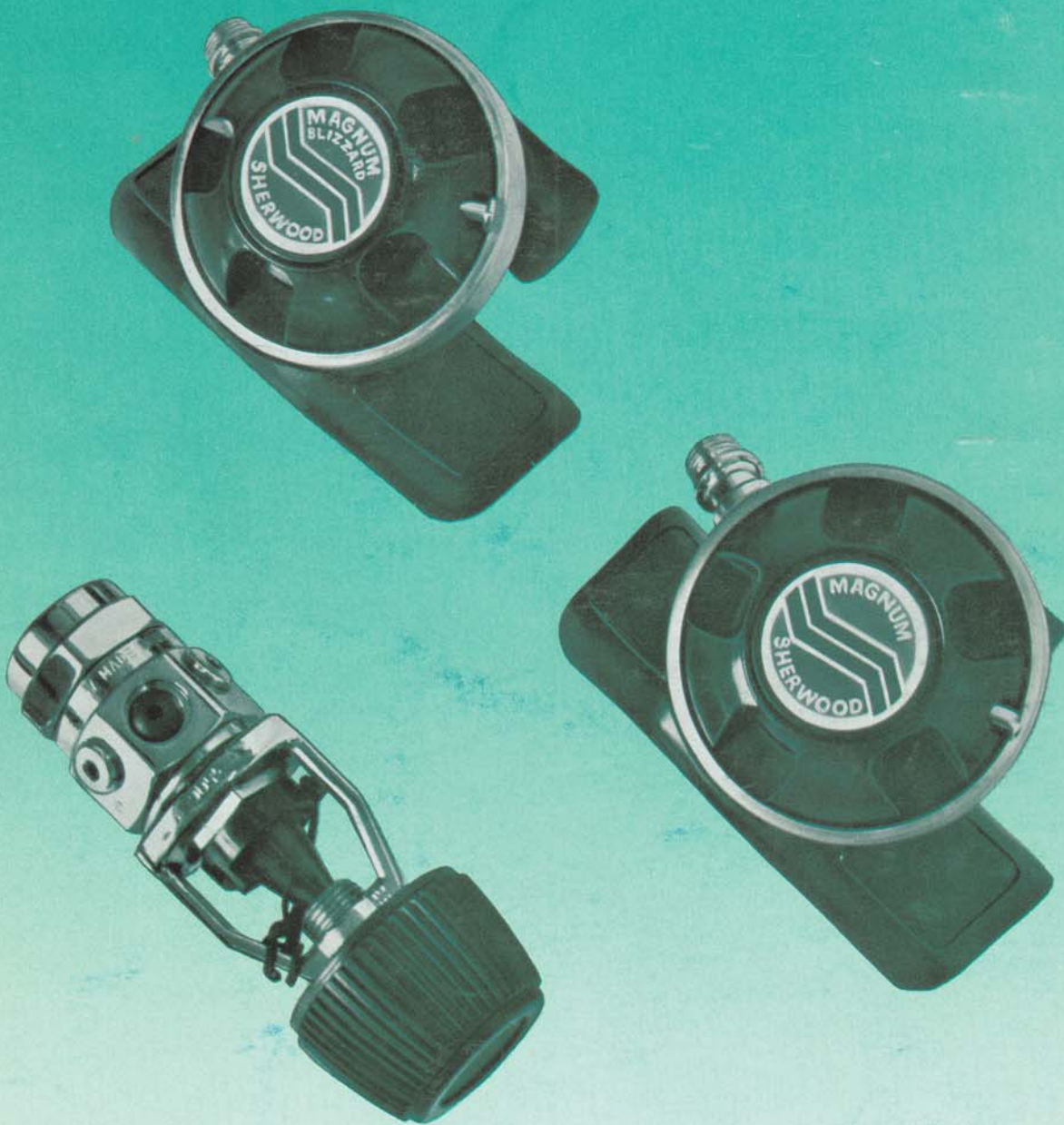


# ASSEMBLY AND MAINTENANCE GUIDE

**FOR REFERENCE ONLY**  
**SOME PARTS MAY NO LONGER BE AVAILABLE**  
**SOME TECHNICAL BULLETINS MAY APPLY TO THIS REGULATOR**



# SHERWOOD

3200-3300 REGULATORS



# SHERWOOD

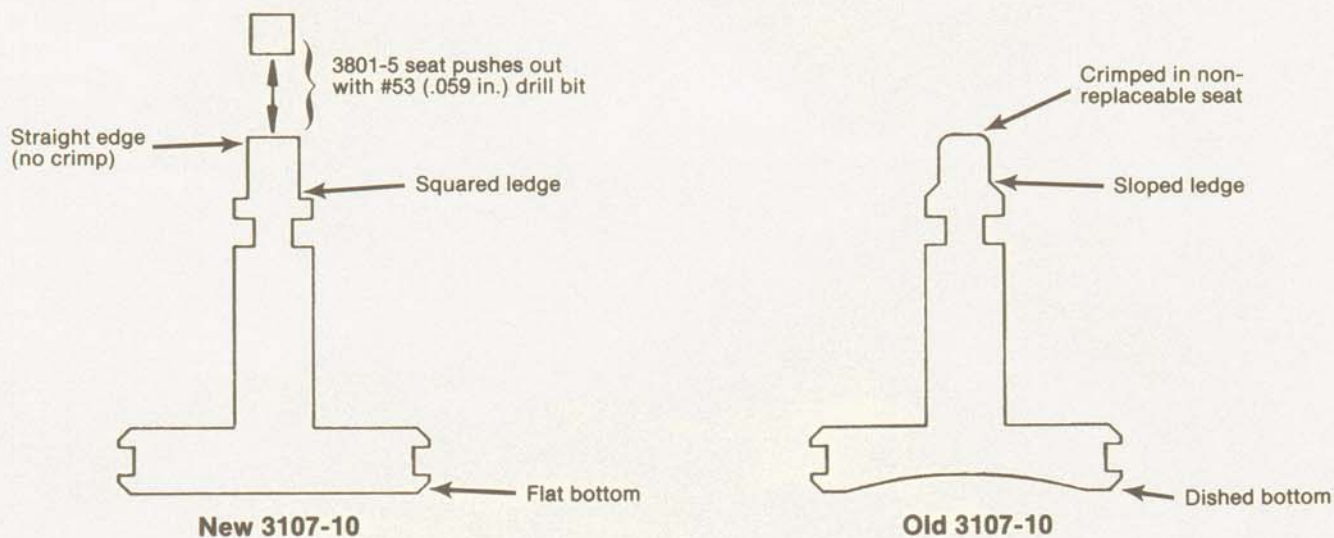
## TECHNICAL BULLETIN

NO. 101  
OCTOBER, 1988

**SUBJECT:** Part #3107-10. Improved piston for Magnum, Oasis, Blizzard, and Brut Regulators.

As of September 1988, Sherwood will begin phasing in a new style piston with improved performance and serviceability features. This new style piston is usable in all above named regulators where the older style 3107-10 piston has been used, and has several improved features. The new lower volume flat backed base gives quicker regulator response times, and the new removable teflon seat gives much more efficient serviceability. The new 3107-10 piston uses exactly the same o-rings as before. The teflon seat, part number 3801-5, is the same unit used in the Ultima regulator SRB3800. The seat can be pushed out with a number 53 (.059 inches) drill bit or object of similar dimensions, and a new seat is easily pressed in place. The procedure is identical to that used for Ultima seat replacement (refer to your Ultima manual for details). Visual differences are shown in the diagrams. At every service interval, it will be necessary to change the seat; however, it will no longer be necessary to replace the entire piston, as in the past. When you send in your older style piston for servicing credit, a new style piston with a removable seat will be returned to you. After this, only seats will need to be replaced in any regulator with the new piston. There is no reason to change over to the new style piston immediately. Simply replace your old stock as servicing is required and eventually the phase-in will be complete.

### Visual Differences in Old & New Styles



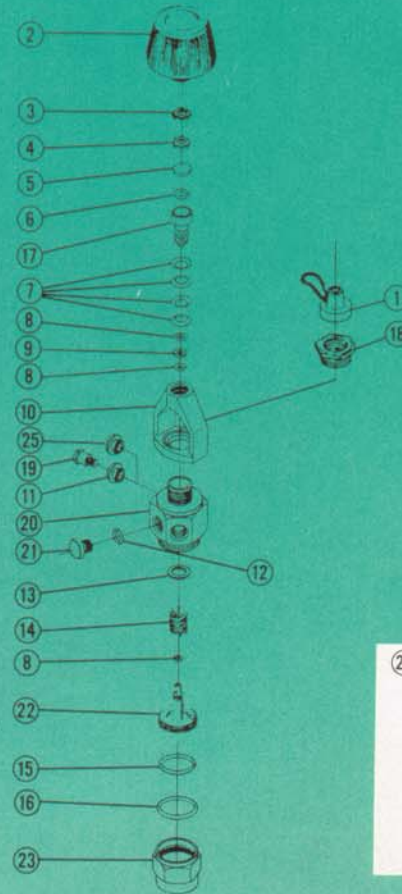
**SHERWOOD** 

A division of HARSCO corporation  
Gas Control Products:  
120 Church St./Lockport, NY 14094  
716/433-3891/Telex 9-1208/Fax 716/439-9601



## MAGNUM & MAGNUM BLIZZARD

NO.	CAT. NO.	DESCRIPTION
1	3529-6A	Cap & Cord Assembly
2	1-4005-30	Knob Assembly (molded)
3	3504-6	Star Washer (Large)
4	19-3106-15	Star Washer (Small)
5	3106-14	Filter
6	G011B	O-ring (was 3329-6)
7	64-8010-8	Spring, Disc
8	G007A	O-ring (was 3348-7, small piston & orifice)
9	3106-12	Back-Up Ring
10	2-2005-10	Yoke
11	3106-7	Bleeder Valve Pre-Jan 1984
12	G011B	O-ring (was 3329-6)
13	6526	Shim
14	3529-3	Spring
15	G022A	O-ring (was 3505-18, piston)
16	G122A	O-ring (was 3106-4, Body)
17	29-3106-13	Moving Orifice
18	1-1665-17	Retaining Nut
19	9-3106-5	Shoulder Screw
20	2-3106-1	Body
21	1-3105-6	Plug
22	3107-10	Piston Assembly
23	2-3106-2	Cap
24	3106-9	Orifice Assembly
25	3106-6	Bleeder Valve post Jan. 1984



## ASSEMBLY AND MAINTENANCE

### MAGNUM & MAGNUM BLIZZARD REGULATOR - SRB 3205 FIRST STAGE

#### DISASSEMBLY

Note: Standard inspection of components shall be performed during disassembly of the regulator

1. Remove knob (2) retaining nut (18) and yoke (10) from body (20).
2. Remove the end cap (23).
3. Remove the piston (22) from the end cap.
4. Remove the spring (14) any shims (13) and body o-ring (16) from the regulator body.
5. Remove the larger star washer (3) from the inlet side of the regulator first stage and discard.
6. Using a wooden stick or a Q-tip, push the moving orifice assembly (24) out of the regulator body. Use extreme caution not to damage the orifice edge.
7. Remove the o-rings (8) and back-up ring (9) from the moving orifice assembly.
8. Remove the smaller star washer (4) and filter (5) and discard. Save o-ring seal (6).

NOTE: The 3106-14 filter (5) is smaller than standard filters and is not interchangeable.

9. **New Style-**Grasp bleeder valve (25) with fingers and pull out. **Older Style-**(pre-1984), remove shoulder screw (19) and bleeder valve (11).

10. Clean all metal parts **except the piston** in a suitable solution such as white vinegar in an ultrasonic bath. Wash in clear water and dry.

11. Clean the piston manually. **Avoid** placing liquid or grease on the bleed control restrictor, (located on piston face).

#### ASSEMBLY

1. Re-install cleaned, but **unlubricated** o-ring (6) in moving orifice assembly. Install a new star washer (4) and filter (5).
2. Insure that the disc springs (7) are in the proper orientation on the moving orifice (17). (See item 24).
3. Lubricate and install the o-rings (8) and back-up rings (9) onto the moving orifice.

4. Lubricate o-rings (8) and (15) for the piston (22) and install.

NOTE: Be sure the teflon seat in the piston (Item 22) is free of nicks, scratches, and imperfections. Any imperfection will increase the lockup pressure above the desired setting, or the lockup pressure will slowly creep to a higher pressure after the initial lockup is attained.

5. Gently place the piston (22) into the cap (23). Place the spring (14) onto the piston and any shims (13) onto the spring.

6. Replace cleaned and lubricated body o-ring (16) onto body.

7. Assemble the cap (with piston, spring, and shims), onto the body (20) and secure snugly.

8. Re-install bleeder valve in body.

9. Insert the moving orifice (24) into the regulator body.

10. Insert the larger star washer (3) to hold orifice (24) in place.

11. Install yoke (10), retaining nut (18), and yoke screw (2). (Lightly lubricate retaining nut threads).

# SHERWOOD

## 3200-3300 REGULATORS



## TEST AND TROUBLESHOOTING

Always test the first stage regulator with Sherwood's test gauge and relief valve P/N SYA-4700. (The demand valve acts as a relief valve in the event of a malfunction).

1. Introduce 2700-3000 PSIG to the system. If new piston and orifice have been installed, demand regulator may pop slightly during seating process. Flow air through demand valve on test gauge several times to get all parts properly seated.

2. Submerge first stage regulator into water.

3. Bleed Air Test—a small stream of bubbles should be escaping from the one-way check valve only. Number and size of bubbles may vary but the amount of escaping bubbles should be equal to 13-17 c.c. per minute. To check this, invert a 1 oz. container over the escaping bubbles under water (Figure 1)\*. The water displaced will slowly empty the glass. It should take approximately two minutes to completely empty a 1 oz. container. If

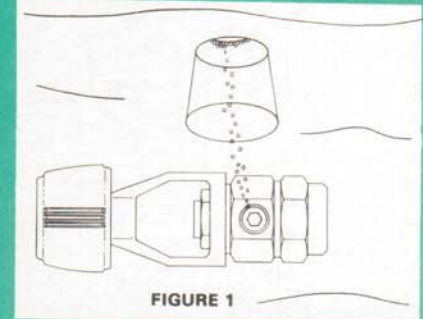
bubbling is extreme, check o-rings and o-ring sealing surfaces for potential leak paths. If bubbling is very low, check restrictor for foreign matter. Replace piston if necessary.

NOTE: On pre-1984 regulators—Do not overtighten the bleed screw. Tightening bleeder screw will not change the amount of air escaping from bleeder valve. This is controlled by the restrictor in the piston only. Tampering with the bleed screw may cause the screw to break off. Damage of this kind is not covered by warranty. Kit No. 4000-105 contains items necessary for bleed screw repair.

4. Connect pressure gauge to a low pressure port with the remaining outlet ports suitably plugged.

5. Interstage Pressure Test—if bleed air test is satisfactory, check 1st stage pressure; that is outlet pressure of the first stage regulator during a no flow condition. The lockup pressure shall be

125±10 at 2700-3000 PSIG inlet pressure. If lockup pressure is low and spring has been replaced, add shims. (If original spring has been reused, replace original shims). If lockup pressure is high, remove shims. SRB 3300 Regulator may be set to a maximum of 145 PSI 1st stage pressure.

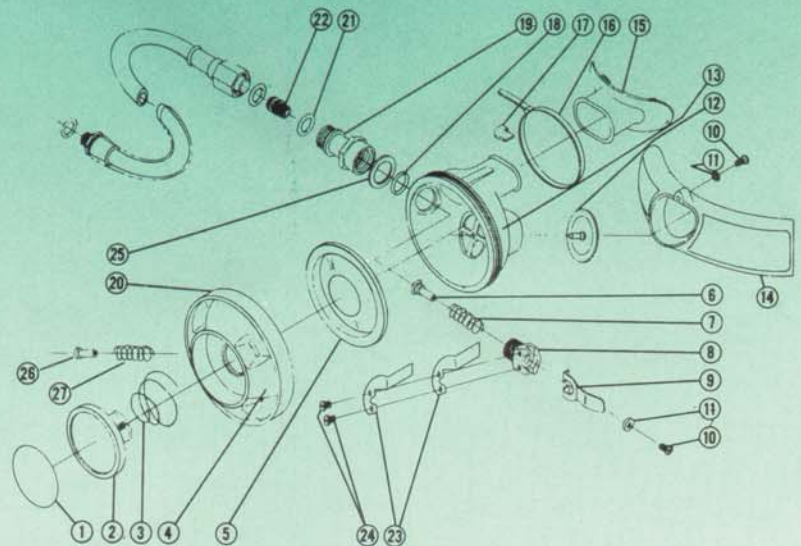


\*A small graduated cylinder (25cc capacity) also works well for this test.

NO.	CAT. NO.	DESCRIPTION
1	3106-19	Decal, magnum blizzard, SRB3200
1A	3106-20	Decal, magnum, SRB3300
2	3004-1	Purge button
3	19-4006-12	Spring, purge button
4	3004P-2	Bezel
4A	3004P-2B	Bezel with lock button
5	4006-13	Diaphragm
6	46-4006-21	Poppet Assy., teflon coated (SRB3200)
6A	4006-21	Poppet Assy., standard (SRB3300)
7	19-978-10	Spring, low pressure
8	1-3106-17R	Lever support, magnum blizzard (SRB3200)
8A	1-3004-8RH	Lever support, Magnum (SRB3300)
9	46-4006-9	Lever, demand valve, magnum blizzard (SRB3200)
9A	19-4000-9	Lever, demand valve, magnum (SRB3300)
9B	46-4006-30	Lever, demand valve, roller, magnum blizzard (SRB3200)
9C	19-4006-30	Lever, demand valve, roller, magnum (SRB3300)
10	19-4000-9	Screw
11	19-4006-17	Washer
12	4006-15	Valve, exhalation
13	3004P-1	Case
14	4006-8	Exhaust Tee
15	3786-7	Mouthbit
16	3786-9	Tie
17	19-3004-9	Lock
18	G907A	O-ring (was 3004-6)
19	1-3004-4	Housing, demand valve
20	19-3004-5	Ring, reinforcing
21	G010D	O-ring (was 1322-21)
22	29-4006-20	Adjustable orifice
23	25-3106-16	Heater Fins, magnum blizzard (SRB3200)
24	19-3106-18	Screw, magnum blizzard (SRB3200)
25	1-3004-12	Washer
26	1-3004-14	Button
27	19-3004-15	Spring
28	3809-50-31	Hose assembly, includes o-rings

### LEXAN DEMAND REGULATOR

SR3002P Black, Lexan, right hand, standard  
(Magnum SRB 3300)  
SR3206P Black, Lexan, right hand with heaters  
(Magnum Blizzard - SRB3200)



**SHERWOOD**  
3200-3300 REGULATORS



# LEXAN SECOND STAGE DEMAND REGULATORS FOR MAGNUM AND MAGNUM BLIZZARD (SRB 3200 & 3300)

## DISASSEMBLY

Any time hose fittings are loosened or tightened, two wrenches should be used to prevent cracking the plastic housing.

1. Remove the protecting lock (17).
2. Remove the bezel (4) and the diaphragm (5).
3. Remove screw (10) and the exhaust tee (14). Remove heater fins (23) if installed.
4. With a 3/4 inch wrench on the lever support (8) in the interior of lexan case (13), remove the demand valve housing (19), using a 13/16 inch wrench. NOTE: Do not put any strain on lexan body during this operation.
5. Remove the adjustable orifice (22) from demand valve housing (19) by unscrewing orifice and pushing out.
6. To remove worn low pressure poppet assembly (6), place socket (4700-6) over square head of assembly (6). While holding socket firmly in hand, remove philips screw (10). Discard stem assembly (6) and save all other parts.
7. Clean all metal parts in white vinegar.
8. Inspect all parts for damage or cracking. Pay special attention to case in area of hose penetration.

NOTE: Difference in Magnum (SRB 3300) and Magnum Blizzard (SRB 3200) is in the

demand regulator. In the Magnum Blizzard, parts (6) and (9) are teflon coated and the case contains two nickel plated copper heater fins (23). The Magnum demand regulator contains conventional parts. First stages are identical.

## ASSEMBLY

1. Using self-tapping screw (10), prethread the new low pressure seat stem assembly (6) two or three turns.
2. Place the low-pressure spring (7) over the poppet assembly (6) and place it seat side down on a clean workbench.
3. Place washer (11) over self-tapping screw (10) and place the screw in the hole in the lever support (8).
4. Lower the lever support (8) onto the spring (7) and poppet assembly (6) and start the screw into the stem. Turn it one or two turns.
5. Compare the lever (9) to a new lever. If the lever is deformed, replace it. NOTE: New style roller levers (P/N4006-30) can be used in place of flat lever (P/N 4006-9).
6. Turn the resulting assembly up side down and slip the demand valve lever (9) under the washer.
7. Tighten the screw (10) down tight,

holding the stem assembly with the demand valve stem socket (4700-6).

8. Place the resulting assembly in the recess in the second stage case (13).
9. Install the o-ring (18) from the outside of the case, over the threads of the lever support assembly.
10. Place the washer (25) with outer flange cupped outwards around the o-ring (18).
11. Install the demand valve housing (19) onto the lever support assembly.
12. Holding the lever support assembly with a 3/4 inch socket from the inside, torque the demand valve housing to 70 in. lbs. max. Be sure no strain is placed on lexan body during torquing.
13. Lubricate the o-ring (21) and install it on the adjustable orifice (22).
14. Screw the adjustable orifice (22) into the demand valve housing. Depress lever (9), while turning orifice to avoid cutting seat.
15. Alternately screw the adjustable orifice into the housing and blow into the housing until you can no longer blow through the second stage. This tells you that the poppet is just touching the orifice.
16. Place a properly adjusted first stage on a tank containing a **minimum** of 2700 PSI. You are now ready to do the final adjustments on the second stage.

NOTE: The finest adjustments can be made using a pail of water on the repair bench and adjusting the second stage using bubbles as visual air flow indicator at the lever support assembly (8).

1. Using second stage adjusting tool, (P/N SYA 4701), adjust the second stage adjustable orifice inward until no air escapes from the second stage. How far in the orifice is adjusted depends on second stage use. Just barely stop the bubbles for a primary regulator, but adjust further in on an octopus second stage to prevent free flows.

NOTE: Adjustable orifice (22) should be turned only when lever (9) is depressed to prevent damaging the poppet seat (6) with the sharp cutting edge of the orifice (22).

2. After setting the spring tension, the lever should be set so that it just touches the diaphragm when assembly of the

## TEST AND TROUBLE SHOOTING

second stage is completed. If the lever is too high, a potential free flow problem exists. If the lever is too low, there will be a hesitation in the breathing performance of the regulator and an increase in breathing resistance.

3. Using tool 4005.16, check the lever height. (See figure 2).
4. To change the lever height, insert the slot on the tool onto the lever just below the bend point. (see figure 3).
5. Move the lever off of the stop ears of the lever support and bend the lever with the thumb using the adjusting tool to hold the lever. Apply all bending force on the lever outboard of the adjusting tool towards lever tip. Never bend lever at the pivot support.
6. Check the lever height.
7. Continue to bend with the thumb and check the lever height until the lever is the same height as the tool.

8. Insert new exhaust valve (12) from the outside of second stage body.

9. Install the diaphragm, (5) the front cover (4) and the lock (17).
10. Place your thumb in the opening in the exhaust Tee (14) and stretch it over the boss on the second stage body. Secure it with a screw (10) and washer (11).
11. Check the inhalation resistance of the regulator by slowly submerging it in water, purge downward. Air should start to flow before water level reaches the mouth piece.
12. Turn off the air and purge the regulator.
13. With the regulator still on the tank, try to inhale on the regulator. No air should enter the second stage.
14. If air enters the second stage, check for leaks around the exhaust valve and diaphragm.

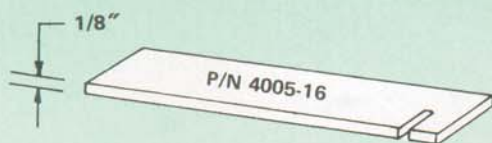


FIGURE 2

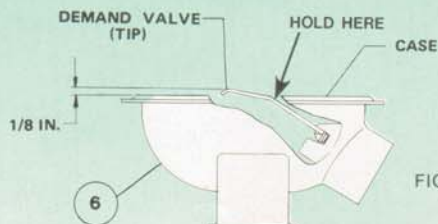


FIGURE 3

# SHERWOOD

3200-3300 REGULATORS



## TROUBLE SHOOTING SECOND STAGE

### SMALL FREE FLOW FROM SECOND STAGE

A. Check first stage output pressure; if proper, continue.

NOTE: If Sherwood Second Stage is being used as an octopus on another make of regulator, it must be readjusted for the different hose pressure of that make.

B. Check adjustment of the second stage using adjustable orifice tool (SYA4701).

1. If unable to stop flow by adjusting orifice spring tension, disassemble second stage and inspect the seat for mechanical damage or foreign particles embedded in sealing surface.

2. Inspect the orifice cutting edge for mechanical damage and corrosion.

3. Clean or replace as necessary.

4. Readjust orifice.

C. Check lever height.

### HIGH INHALATION RESISTANCE

A. Check first stage pressure.

B. Check adjustment of orifice.

NOTE: If second stage poppet is dirty or worn, orifice may have to be adjusted to such a point to stop bubbling that inhalation resistance is beyond acceptable range.

C. Check lever height using tool (4005-16).

D. Inspect diaphragm for stiffness. Replace if necessary.

### STICKY EXHALATION

A. Replace exhalation valve.

### WATER IN SECOND STAGE

A. A deteriorating exhalation valve.

B. A damaged diaphragm.

NOTE: The sealing surface in the lexan housing at the exhalation valve or diaphragm can be damaged also and should be inspected.

C. Cracks in housing.

### HIGH INHALATION RESISTANCE ONLY AT GREATER DEPTHS OR LOW TANK PRESSURE.

A. Replace first stage inlet filter.

### NOISY INHALATION (HUMMING OR BUZZING)

Caused by spring mass resonance. Depending on what parts are resonating one or more of the following actions will stop the buzzing.

A. If in first stage — Rotate main spring end to end and reinstall.

— Install a new piston.

— Install new spring.

B. If in second stage — Rotate poppet spring end to end.

— Install new poppet and orifice.

— Install new spring.

# SHERWOOD

3200-3300 REGULATORS

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