



Wensivair

SCUBA REGULATOR



Repairing

Manual



BUNN'S DIVING EQUIPMENT CORPORATION LTD., HONG KONG.

SENSIVAIR REGULATOR

"SENSIVAIR" IS A SINGLE STAGE REGULATOR WITH A DOUBLE STAGE PERFORMANCE; TROUBLE FREE; EASY TO REPAIR AND MAINTAIN. THE MOST RELIABLE DIVING GEAR IN THE WORLD TODAY.

This brochure has been compiled to enable owners of "SENSIVAIR" Regulators to carry out routine maintenance and repairs. Study this pamphlet carefully before dismantling any part of the equipment.

(1) Distinctive Features of the "SENSIVAIR" Regulator

The "SENSIVAIR" is a modern, revolutionary twin-hose single stage regulator of incredible simplicity and safe construction. It provides an exceedingly smooth and sensitive air flow with a built in automatic reserve. A constant air flow is supplied at only 1.5 W.G. and there is no variation of air flow at any depths as long as the cylinder pressure is over 300 p.s.i. As the pressure drops to 300 p.s.i., a restricted air flow will occur and so warn the diver that he has only 10 minutes of air remaining before his cylinder is empty.

There are only a total of 31 parts to the STANDARD Model (i.e. without pressure gauge attachment) and 35 parts for the DIVE-GAUGE Model with pressure gauge take-off. Each part has been precision built under professional supervision and tested under the most stringent conditions to meet the requirements of the United States, Great Britain, and France. The regulator was designed specifically for use under the roughest and toughest conditions for both sport and professional divers.

Maintenance and repairs are so simple and easy that a diver can carry out his own repair works at any time and any place. It requires only a crew driver to accomplish these repairs.

(2) Construction

The "SENSIVAIR" is divided into two separate chambers - an upper and a lower. The upper chamber is open to sea water. Used air from the exhaust breathing tube is released into this chamber and passes through the slots of the regulator casing into the sea. The sea water enters through the upper chamber casing slots and permits equalisation of pressure at any depth.

The lower chamber is closed to sea water and remain dry at all times. The cylinder valve is fixed to the lower chamber yoke. Fresh air from the cylinder passes through this part of the regulator. The air flow is controlled by the "toggle lever" movement which in turn is regulated by the movement of the diaphragm. Air passes down the inlet hose through a non-return valve fitted in the mouthpiece and into the mouth.

The diaphragm is water-tight and fitted between the upper and lower chambers. When a slight suction is applied, the diaphragm is depressed causing the toggle levers to open, and air is released into the lower chamber.

The toggle lever assembly is screwed into the centre of the lower chamber and is the most important part of the regulator. It is responsible for the smooth and constant air flow.

The corrugated rubber twin air hoses comprise an inlet tube and exhaust tube, they are designed to permit a speedy flow

of air to the mouthpiece and exhaust valve respectively.

The contour mouthpiece has been described as the most comfortable ever manufactured, it is fitted with non-return valves which minimize the dead air space in the mouthpiece and eliminates the build up of carbondioxide.

(3) Performance

It is extremely easy for even a novice to test the sensibility of the "SENSIVAIR". The super sensitive venturi action can be tested on land by sucking lightly on the mouthpiece. Immediately remove the mouth from the mouthpiece and a continuous gentle flow of air will result. This can be stopped by placing a finger lightly in front of the mouthpiece, the free air flow will immediately cease.

This feature is completely new in either double or single hose regulators.

(4) Laboratory Tests

To test the superiority of the "SENSIVAIR" over all other regulators it was submitted to Global Marine Inc. in the United States, and the British Sub-Aqua Club for 'field' testing.

In the United States, where there are full facilities for carrying out special tests, the regulator was subjected to a cycling test, whereby the regulator was attached to a mechanical breathing machine and was cycled for a time period equivalent in use to 100 hours of underwater time. The pressure differential across the diaphragm was varied from sea water depth equivalents of 10-150 feet. A flow volume characteristic study was performed on a regulator to determine the amount of effort required for inhalation and exhalation under varying conditions of ambient pressure differential.

After 30 equivalent hours on the cycling machine, the regulator had a tendency to

free-flow on inhalation pressure. It was found that the inhalation pressure requirement was 1.5" column water pressure and exhalation of 2.3" column water pressure. This was well within the U. S. Navy specifications allowed for professional equipment of this type.

Further, the regulator also had been used for a period of time in excess of 50 underwater hours by four different divers. The skill and experience level of the divers ranged from one novice sport diver to professional diving instructors. Depth ranges from the test were from 0 to 10 feet (Swimming Pool test) through open sea to a depth of 210 feet. The regulator was also subject to dry environment chamber testing through recompression chamber facilities, U.S. Naval Shipyard, Long Beach. During this phase the regulator was dry tested to depth equivalent of 200 feet using standard compressed air as a breathing medium.

Through the entire testing phase, the regulator functioned well and at no time was serious difficulty encountered by any of the divers utilizing this regulator. The regulator was subject to various work loads ranging from minimal diver work output during swimming pool tests through maximal underwater work effort at a depth of 200 feet. It is estimated that energy out of divers during the testing phase range from a minimum of 1,000 B.T.U. per hour to approximately 17,000 B.T.U. per maximum. The volume of air would range between 1 cu. ft. per minute and 22 cu. ft. per minute required from the regulator.

There was also an evaluation made prior to any water testing of "SENSIVAIR" to determine the basic design feasibility and material qualifications. At that time the regulator was found to be well constructed and simply designed, and the materials utilized were considered to be thoroughly comparable with the requirements for a professional diving regulator.

Parts Break-down for Dive-Gauge SENSIVAIR two-hose regulator

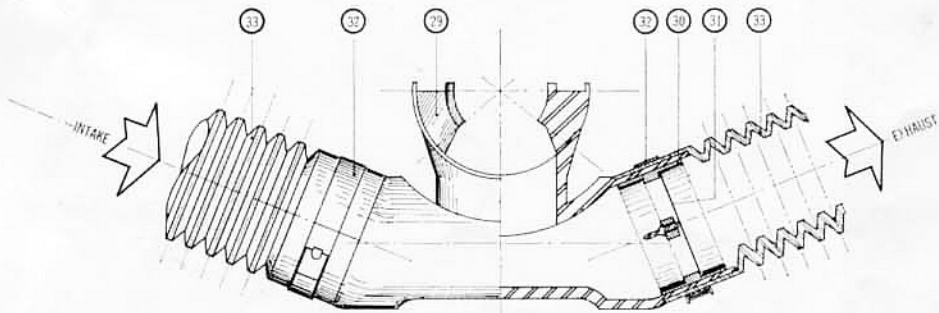
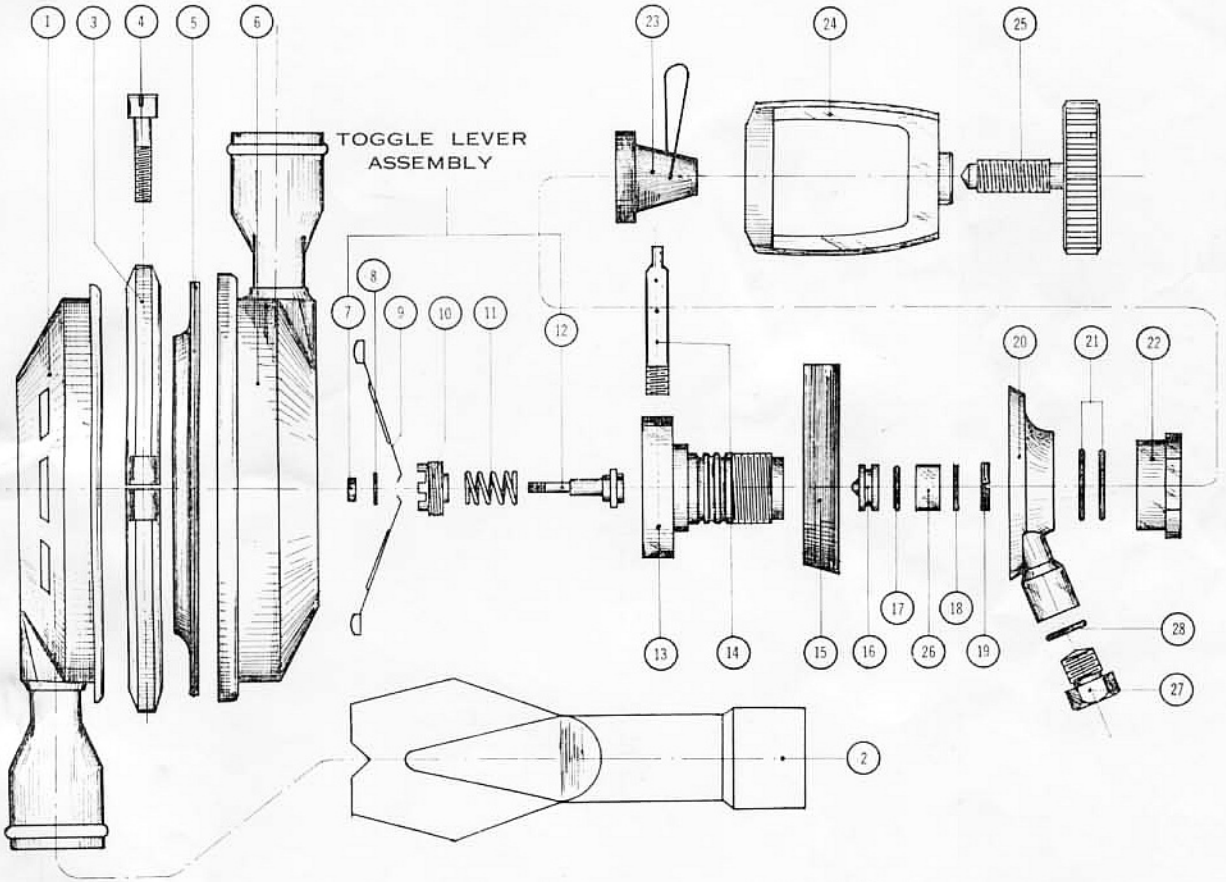
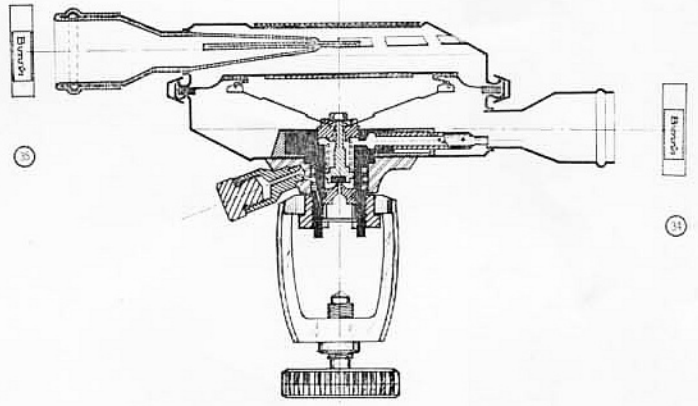
Key	Part No.	Descriptions
Housing:		
1.	S1/1	1. Top Chamber
2.	S1/2	2. Exhaust Valve
3.	S1/3	3. Clamp
4.	S1/4	4. Clamp Screw
5.	S1/5	5. Diaphragm with Plate
6.	S1/6	6. Bottom Chamber
Toggle Levers Assembly:		
7.	S2/1	1. Lock Nut
8.	S2/2	2. Washer
9.	S2/3	3. Lever
10.	S2/4	4. Lever Seat
11.	S2/5	5. Spring
12.	S2/6	6. Valve Shank
Body Valve & Adaptor:		
13.	S3/1B	1. H. P. Port Body Valve
14.	S3/2	2. Venturi Pipe
15.	S3/3	3. Rubber Seat Gasket
16.	S3/4	4. Orifice Nozzle
17.	S3/5	5. O ring for Nozzle (S3/4)
18.	S3/6	6. Filter
19.	S3/7	7. Filter Retainer Ring
20.	S3/8B	8. H.P. Port Body Washer
21.	S3/15	9. O ring for H. P. Port Body Valve (S3/1B)
22.	S3/9	10. Yoke Retainer
23.	S3/10	11. Rubber Stopper
24.	S3/11	12. Adaptor Yoke
25.	S3/12B	13. Delux Adaptor Screw
26.	S3/13	14. Spacer
27.	S3/14	15. Nut Stopper
28.	S3/5	16. O ring for Nut Stopper (S3/14)
Mouthpiece Hose Assembly:		
29.	S4/1	1. Mouthpiece
30.	S4/2	2. Non-return-valve Seat
31.	S4/3	3. Non-return-valve Diaphragm
32.	S4/4	4. Easy-Clip A
33.	S4/5	5. Rubber Hose
34.	S4/6	6. Easy-Clip B
35.	S4/7	7. Easy-Clip C

Regulator Repair Chart for STANDARD AND DIVE-GAUGE SENSIVAIR Twin Hose Regulators

Problem	Regulator	Source	Repair Procedure
1. Air Leaking	Standard Dive-Gauge	A. Toggle Lever Assembly seated too high.	Readjust to proper position.
	ditto	B. Scratch on nylon seat of valve shank.	Re-place with new valve shank.
	ditto	C. Orifice Nozzle damaged.	Re-place with new orifice.
	ditto	D. Toggle Levers spring weakened.	Re place with new spring or toggle lever assembly.
	Dive-Gauge	E. O ring in high pressure port body valve and Dive-Gauge fitting is being damaged or not securely tightened.	Clean and lubricate with Silicone Grease or re-place with new O rings.
2. Hard Inhalation.	Standard Dive-Gauge	A. Diaphragm not properly seated on Toggle Shoulders.	Readjust to proper setting.
	ditto	B. Toggle Levers assembly set too low	Readjust to proper position.
	ditto	C. Filter block up	Clean the filter or re-place with new filter dish.
3. Hard Exhalation.	Standard Dive-Gauge	A. Non-return-valve diaphragm being damaged	Reinstall or replace a new diaphragm.
	ditto	B. Exhaust valve twisted	Readjust to proper position.
	ditto	C. Exhaust valve & Non-Return-Value Rubber perished.	Re-place new parts.
4. Water Getting into Regulator.	Standard Dive-Gauge	A. Worn or damaged diaphragm.	Re-place with new one.
	ditto	B. Hose leaks due to wear or damage (especially to connections).	Re-place with new hose.
	ditto	C. Loosen Easy-Clip on the air inlet hose.	Securely lock Clips again.
	ditto	D. Malfunction of the exhaust valve in the cover or non-return-valves in the mouthpiece.	Clean or re-place the valves.
	ditto	E. Diver at fault (not holding the mouthpiece properly)	This usually happens to beginners.
5. Heavy Venturi Action or Air Flood	Standard Dive-Gauge	A. Toggle Levers Spring weakened.	Re-place with new Toggle Lever Set.
	ditto	B. Wear of Venturi pipe.	Re-place with new Venturi pipe.

DIVE-GAUGE SENSIVAIR

Twin-Hose Regulator



MOUTHPIECE ASSEMBLY