
**II stage R2 Ice/ Special, II stage R 1 Pro
DOWNSTREAM 2nd STAGE REGULATOR**

Service and Repair Manual

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INTRODUCTION

Scubatech regulators are the products of many years of research and development. Scubatech has utilized proven materials and design to maximize reliability and performance. This manual is intended only as a guide for the experienced repair person that has completed a Scubatech service and repair seminar. It is not intended to educate inexperienced repair personnel or the consumer in all aspects of Scubatech regulator repair. Scubatech repair seminars are available periodically to Scubatech Dealers. Servicing and repair at the repair shop level mainly involves cleaning, inspection, adjustment, and replacement of worn parts.

If you have any questions on any of the procedures, inspections, or tests, please contact Scubatech Sp. Z O.O.:

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SAFETY PRECAUTIONS

This manual provides step by step instructions for the disassembly, inspection, cleaning, reassembly, and testing of the Scubatech II stage R2 Ice/Special, II stage R1 Pro 2ed stage regulator. It is recommended that all steps are followed in the order given. Read each section completely PRIOR to beginning work described in that section. This will familiarize the repair technician with important precautions to take during each service procedure. Pay close attention to all WARNINGS, CAUTIONS, and NOTES that are intended to draw your attention to items of importance.

Definition of Warnings, Cautions, and Notes:

GENERAL PROCEDURES

MAINTENANCE SCHEDULES

Regulators are subjected to a variety of environmental elements that over time can affect the performance of the product. As an Scubatech Dealer you are advised to inform your staff and customer that Scubatech regulator require complete servicing at least once a year. Under certain circumstances a complete servicing is required every 3-6 months. Some of these circumstances are:

Frequent or improper use

Inadequate routine freshwater rinsing

Regulator use in dirty or polluted waters

Rental use

Regular use in chlorinated (pool) water

Recommended maintenance schedules are based on average use under normal conditions and assume that recommended preventative maintenance and storage procedures have been followed as outlined in the Scubatech owner's manuals. Advise the customer that any adjustments or servicing on Scubatech regulators must be performed by Scubatech, or by an Scubatech Dealer that has attended a Scubatech service seminar.

Pre Test – Before Disassembly:

- First stage IP – high/low tank pressure test – sweep and drift.
- 2ed stage cracking effort at 9,0-10bar IP.
Primary preset: **32-42** (mm of water)
Octopus preset: 35-47 (mm of water)

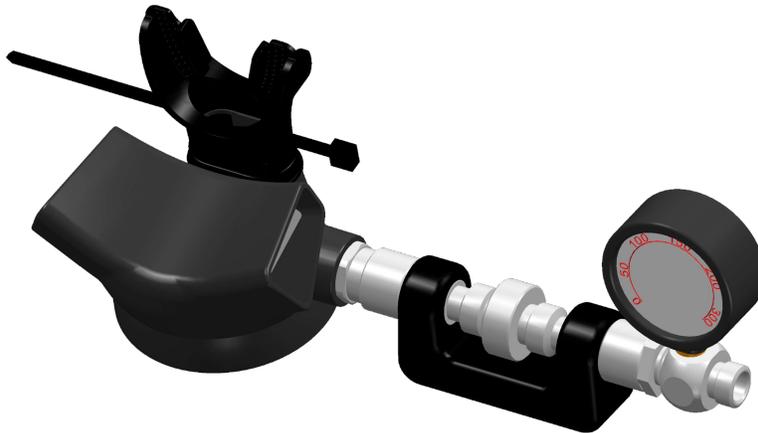
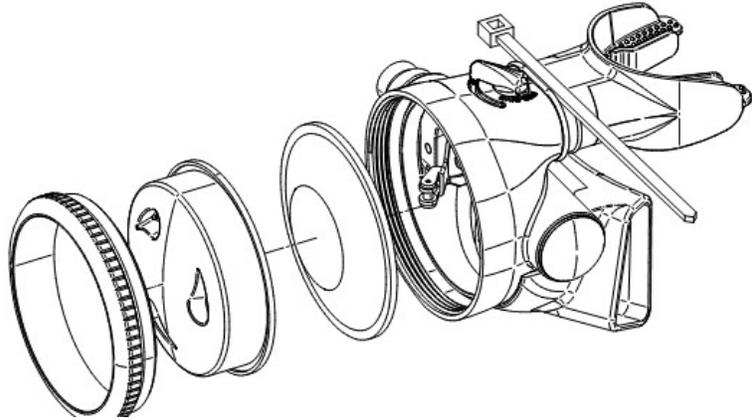
Disassemble – Forethought Preparation.

- Check existing orifice depth.
Mean the full set of the LP seat and Orifice, the depth of the set be determined by the Orifice profile (Shape end).
- Check existing nylon insert nut location
The nylon insert should lock the poppet well. If the nylon insert cannot work or loosing, should replace a new nylon insert nut.

Disassembly procedures

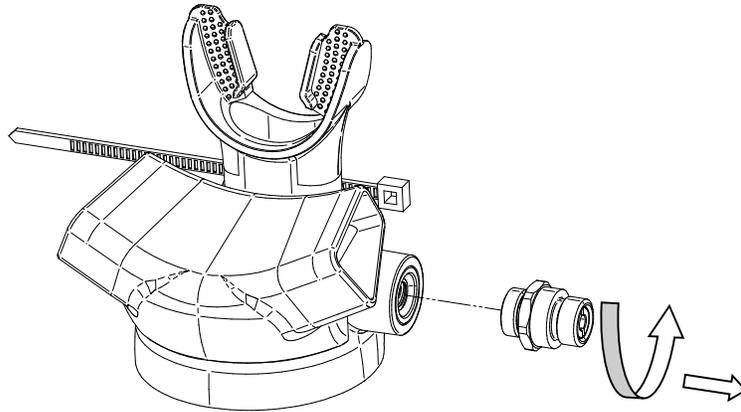
Step1:

Remove the Cover ring, PU cover (some of types are the solid front cover with spring purge button) and Diaphragm from Main housing, and set aside. Use the P92 Inline tool adjustment install into the II stage R1 Pro hose inlet end, turn the P92 counter-clockwise to loosen the Orifice for the Coupling.



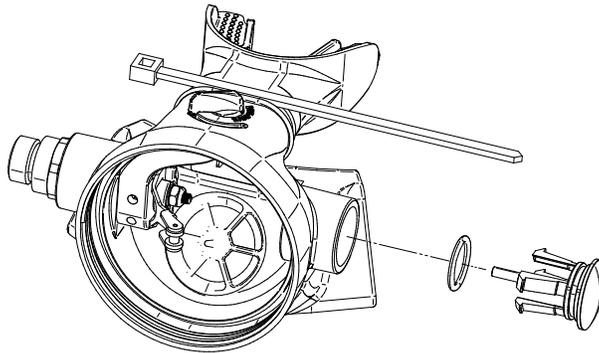
Step2:

Apply a 19mm Hex key socket on the coupling, turn counter-clockwise to loosen the coupling. Remove and discard the static O-ring from the coupling. Separate the Orifice form coupling.

**Step3:**

Step3-1: for II stage R1 Pro

Remove the Side Plug form Main Housing (Press the snap and push out the Side Plug from Main Housing inside.). Remove and discard the static O-ring form Side Plug.

**Step3-2: for II stage R2 Ice/Special**

Remove and discard the decal form the Adjustment knob.

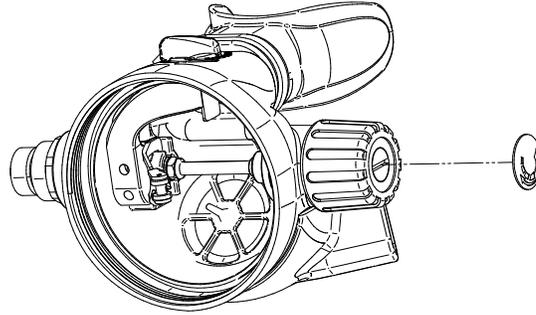
Apply a screwdriver into the knob screw and turn counter-clockwise to loosen the screw. Separate the adjustment knob.

Apply a 19mm hex key socket on the adjustment nut, turn it counter-clockwise until the nut full loosen form the body.

Separate the Adjust Spring, Adjust Piston, Remove and discard the static O-ring, keep the Teflon washer.

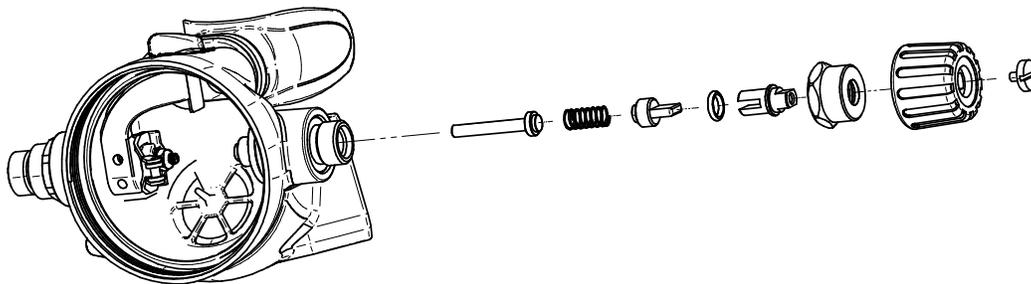
Step3-2.1

Apply a O-ring pick tooling on the decal, remove and discard the decal



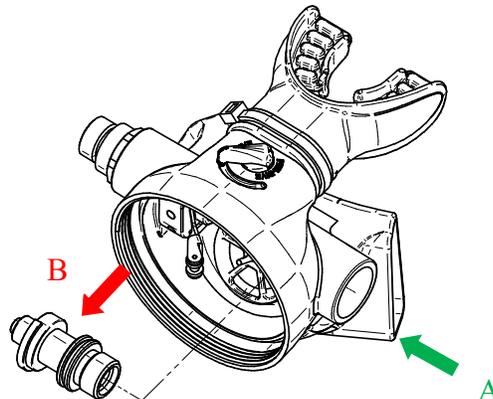
Step3-2.2

- A. Apply a screw driver on the Knob Nut. Disassembly the Knob Screw and Adjust Knob and set aside.
- B. Apply 19mm Hex key socket on the Knob Nut, turn counter-clockwise to loosen the Knob Nut.
- C. Separate the Adjust Cap Nut, Adjust Shift, 010 O-Ring, Adjust Screw, Adjust Spring and Transmitter Piston, set all aside and discard the 010 O-Ring.



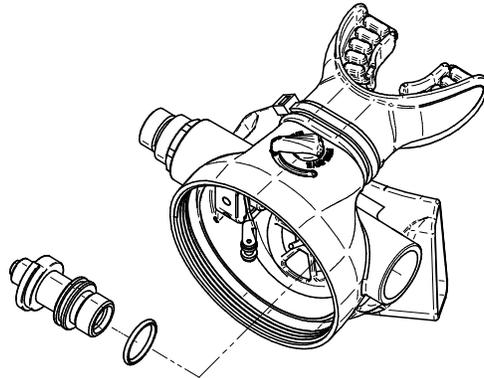
Step3-2.3

- A. Push the Adjust Tube into the Main Housing to disassembly.
- B. Remove the Adjust Tube from Main Housing.



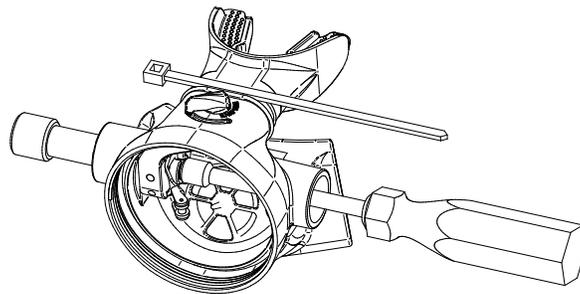
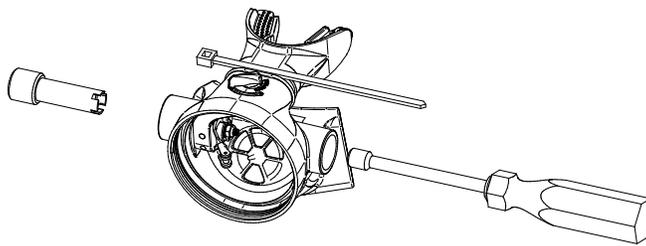
Step3-2.4

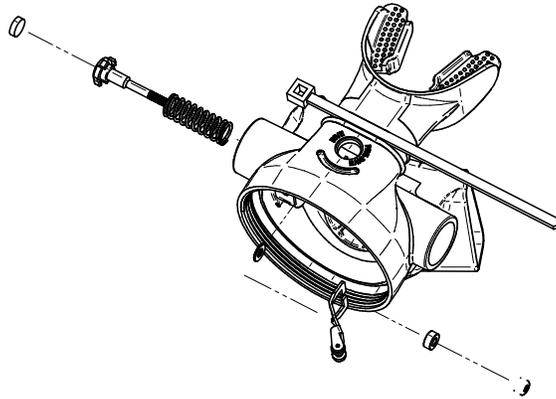
Remove and discard the 015 O-Ring from the Adjust Tube.



Step4:

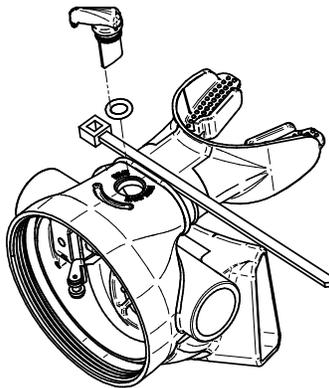
Apply a poppet driver tool into the main housing from brass nut insert, hold it. Apply a 1/4" hex key socket on the nylon insert nut. Hold on the hex key socket; turn the poppet tool to loosen the nylon insert nut. Separate the lever arm, thin poppet washer and thick poppet washer from internality. Remove and discard the LP seat.





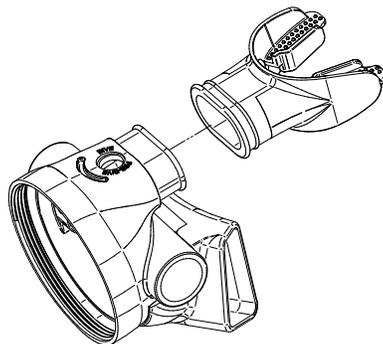
Step5:

Remove the C-clip from the Venturi knob. Remove and discard the O-ring, set the Venturi knob aside.

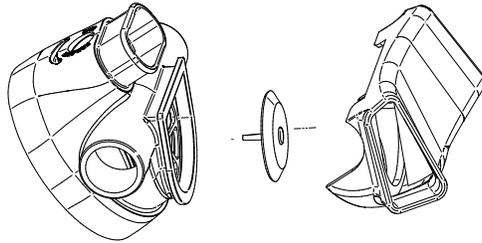


Step6:

Remove the Nylon trip and mouthpiece form Main Housing.



Immerse the Main housing into the hot water. Soften and remove the exhaust tee, Remove the exhaust valve.



Cleaning – Preventive Procedures:

- Protect orifice and all threads form damage.
- Use Scubatech’s specified cleaning & degreasing agents & procedures.

Clean procedures:

For Metal parts:

All metal parts should be cleaned first in a warm (not over 55C) mild soap and water solution. Use a soft nylon bristle brush to help remove any excess or loose contamination. After an initial warm water and soap cleaning all parts should be thoroughly rinsed in clean fresh water and dried with filtered low pressure (2 bar) air. After an initial cleaning in warm soap and water solution, metal parts should be cleaned in an ultrasonic cleaner using the appropriate ultrasonic cleaning solution (see Lubricant and Cleaner Table 2, the Crystal Simple Green cleaner usually use on the Oxygen Clean).

For Plastic parts:

All plastic parts should be cleaned first in a warm (not over 40C) mild soap and water solution. Use a soft nylon bristle brush to help remove any excess or loose contamination. After an initial warm water and soap cleaning all parts should be thoroughly rinsed in clean fresh water and dried with filtered low pressure (2,0 bar) air. After an initial cleaning in warm soap and water solution, metal parts should be cleaned in an ultrasonic cleaner using the appropriate ultrasonic cleaning solution.

NOTICE

Be sure all O-rings are removed before cleaning in an ultrasonic cleaner or chemical bath. Cleaning solutions may damage these components.

Parts Inspection – Preventive Trouble Shooting:

Replace dynamic O-rings

All O-rings should be replaced at every servicing. New O-rings should be inspected for contamination and/or imperfections, and lightly dressed with a thin film of approved lubricant prior to installation. (See Lubricant and Cleaner, Table 2.) Do not use any petroleum based lubricants or products, or any aerosol silicone sprays on any part of Scubatech regulators. The petroleum base or

propellant gas may attack or weaken plastic or rubber parts. Refer to Table 2 for a list of approved lubricants.

Replace LP seat. (set the shiny side on top)

Replace nylon insert nut (if needs)

Replace POM orifice (maybe the old Orifice still work, but must replace this for the safety solution)

Inspect diaphragm for cuts and holes (if damaged, replace it)

Inspect exhaust valve for damage, check the round edge. Replace it for damage

Inspect the LP seat for imperfection.

Check through hole on air balanced poppet

Inspect hose outer cover at fitting junction

Assembly – Preventive Procedures:

Special tools where required to protect parts.

Use orifice preset tool when available

Use Scubatech's recommended lubricants

Torque assemblies where specified

Demand valve Setup Prior to Turing Air On:

Preset orifice to approximate depth with

Preset tool

Thread depth reference – the cracking effort preset for Primary or Octopus

Preset nylon insert nut to end point:

Poppet thread must be full completely through the nylon insert

Preset recommended thread exposure beyond nylon insert nut – turn back about 3.5 turns for preset

Preset lever to Maximum height with only a slight amount of slack

Do not install diaphragm assembly in this time

Install inline adjusting tool (P92) if required

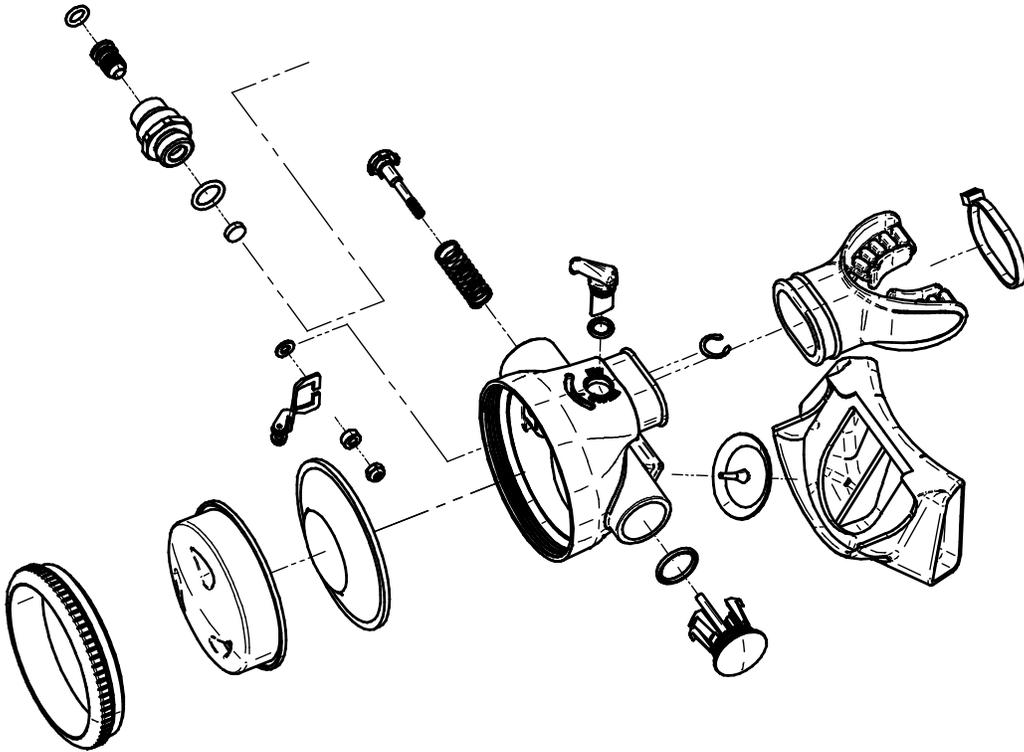
Connect LP hose form the first stage

Pressurize 2ed stage

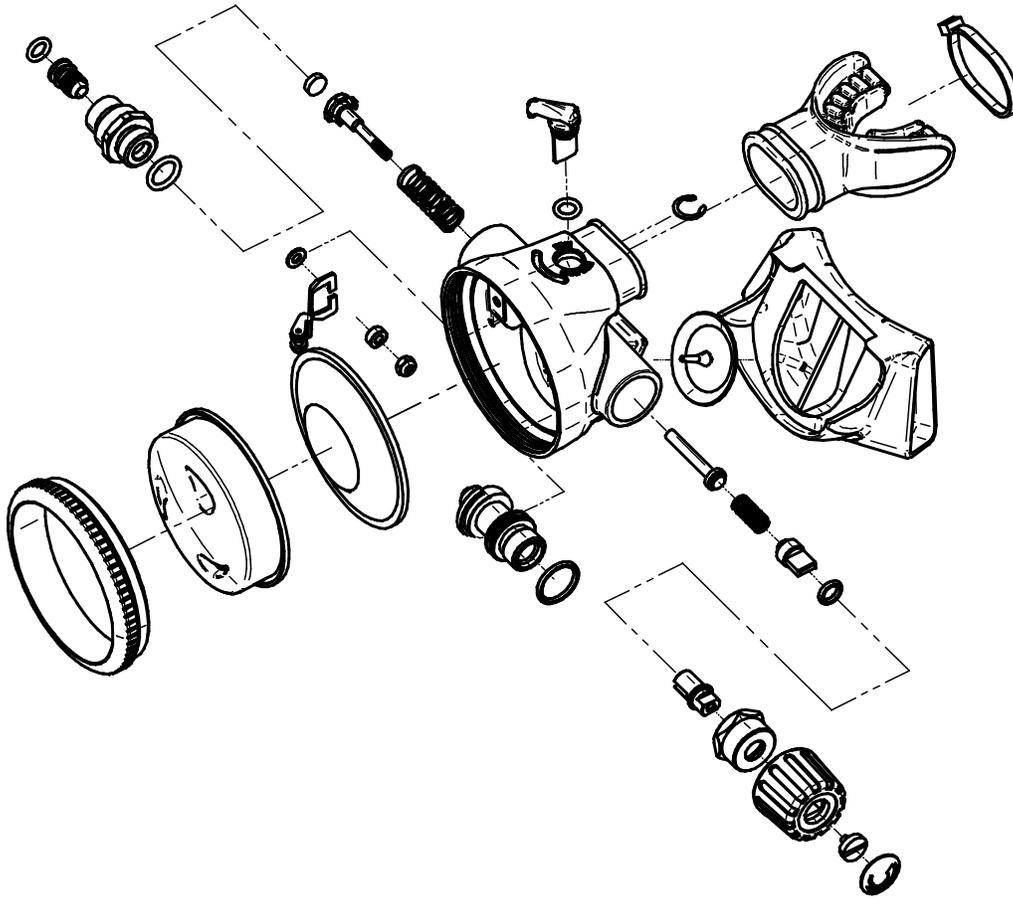
Watch for lever drop when air pressure is applied

Recheck IP for correct pressure range and drift

II stage R1Pro Schematic Drawing



II stage R2 Ice/Special Pro -P Schematic Drawing



The II stage R1Pro Downstream Demand valve reassemble and adjustments:
The laws of downstream demand valve adjustments.

The cracking effort of the valve is a direct result of the force required to depress the lever

The force required to depress the lever, and open the valve, is a direct result of spring load.

The spring load required to seal the valve airtight is the direct result of overcoming IP downstream force, plus all seating force factors.

Always adjust the lever to maximum height to insure full poppet orifice separation.

Assemble inner valve components:

Poppet, spring, Lever, Washers and nylon insert nut.

Note: install poppet threads completely full through the nylon insert, turn back 3 or 3.5 turns of the nylon insert nut.

Install the orifice with static O-ring into coupling

Install the coupling with static O-ring into the Main Housing, adjust the orifice by inline adjusting tool with the lever depressed to prevent cutting the soft seat.

Adjust nylon insert nut to allow for slight lever slack

Pressurize the valve at correct IP.

If the demand valve leak initially, one of the following conditions exist and must be rectified before continuing:

There is no slack in the lever (lever loosing)

The IP is too high

The spring is too weak

Poor seating result between the orifice and LP seat.

If the demand valve dose not leak:

Back the orifice outward until the valve leaks air, than turn the orifice inward until the leak stops,

Note: the orifice may need to be readjusted after the LP seat has taken an initial set during the break in period.

Depress lever several times to be certain that the valve will seal airtight when the lever is released

Install and secure diaphragm, top cover and cover ring assembly.

Note: if diaphragm assembly causes the demand valve to leak air, the lever is too high. Turn the orifice inward until the leak stops.

Install the side plug with static O-ring into the Main Housing

Install the 2ed stage onto flow bench.

Check the 2ed stage cracking effort

The II stage R2 Ice/Special adjustable downstream 2ed stage reassemble and adjustments:

Additional step form Install into

SECOND STAGE TROUBLESHOOTING

SYMPTOM	CAUSE	ACTION REQUIRED
Leaking or Freeflow from 2 ^{ed} stage	<ol style="list-style-type: none"> 1. High 1st stage intermediate pressure.(Should be 9-10 Bar) 2. LP seat (12) damaged or worn 3. Orifice (14) incorrectly adjusted Lever Arm (16) set too low. 4. Orifice(14) sealing surface damaged 5. Main Spring (13) damaged. 	<ol style="list-style-type: none"> 1. Refer to first-stage Troubleshooting Guide 2. Replace rubber seating 3. Reset crown and perform Final Tuning & Testing procedures. 4. Replace Orifice 5. Replace poppet spring.
Low purge or excessive work of breathing (full cylinder pressure)	<ol style="list-style-type: none"> 1. Low intermediate pressure. (should be 9-10 bar) 2. Lever Arm(16) not properly engaged with shuttle valve 3. Orifice (14) incorrectly adjusted, Lever Arm(16) set too low 4. Intermediate pressure hose Intermediate pressure hose 	<ol style="list-style-type: none"> 1. Refer to first-stage Troubleshooting Guide. 2. Disassemble and inspect condition of shuttle valve and lever 3. Reset Orifice and perform Final Tuning & Testing procedures 4. Clean or replace hose.
External air leakage	<ol style="list-style-type: none"> 1. Intermediate pressure hose loose. (Immersion Test) 2. Orifice O-ring(15) damaged 3. Main Housing(1) damaged 	<ol style="list-style-type: none"> 1. Tighten to 40 inch-lbs at female second-stage fitting 2. Disassemble and replace O-ring. 3. Disassemble and replace case.
Water entering second-stage	<ol style="list-style-type: none"> 1. Hole in mouthpiece (5). 2. Demand diaphragm(9) damaged 3. Exhaust valve diaphragm(3) damaged 4. Venture knob O-ring(11) dirty, damaged, or worn 5. Main Housing (1) damaged. (Check exhaust valve sealing surface.) 6. Heat Sink O-ring (6) damaged. 	<ol style="list-style-type: none"> 1. Replace mouthpiece 2. Replace demand diaphragm 3. Replace exhaust valve diaphragm. 4. Disassemble and replace O-ring. 5. Disassemble and replace case 6. Disassemble and replace O-ring.