



apeks
TECHNICAL SUPPORT

ATX SECOND STAGE REGULATOR



MAINTENANCE MANUAL FOR AUTHORISED TECHNICIANS

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AMENDMENTS RECORD:

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Change No.	Change Request No.	Description & Comments:	Change Date	New Issue No.	Changed By:	Approved By:
-	CRS0056	Page 11. Setting Lever Height. Direction to turn Seat was reversed in items 4 & 6.	9/06/06	5	JLH	ACD

Contents

RANGE COVERED	4
COPYRIGHT NOTICE	5
INTRODUCTION	5
WARNINGS, CAUTIONS & NOTES	5
SCHEDULED SERVICE	5
GENERAL GUIDELINES	5
GENERAL CONVENTIONS.....	6
DISASSEMBLY PROCEDURES	6
REASSEMBLY PROCEDURES.....	8
FINAL TESTING	11
TABLE 1 - TROUBLESHOOTING GUIDE	13
TABLE 2 - RECOMMENDED TOOL LIST.....	14
TABLE 3 - RECOMMENDED LUBRICANTS AND CLEANERS	15
CLEANING AND LUBRICATION PROCEDURE	16
TABLE 4 -TORQUE SPECIFICATIONS	17
TABLE 5 - TEST BENCH SPECIFICATIONS	17
ATX200, ATX100, BLACK PEARL & TUNGSTEN EXPLODED PARTS DRAWING	18
ATX50 EXPLODED PARTS DRAWING.....	19
ATX40 & AT20 EXPLODED PARTS DRAWING	20

RANGE COVERED

This manual provides factory prescribed procedures for the correct maintenance and repair of the following Apeks ATX second stage regulator range.

ATX200 / ATX100 / Black Pearl / Tungsten

Flagship model, features include: -

Adjustable cracking control

Integrated venturi control

Pneumatically balanced valve design

Micro Adjuster

Suitable for cold water use

Satin Chrome Finish

PVD Finish (Black Pearl / Tungsten).



ATX50

Features include: -

Adjustable cracking control

Integrated venturi control

Pneumatically balanced valve design

Micro Adjuster

Suitable for cold water use

Bright Chrome Finish

ATX40

Features include: -

Integrated venturi control

Pneumatically balanced valve design

Suitable for cold water use

Bright Chrome Finish

AT20

Features include: -

Integrated venturi control

Pneumatically balanced valve design

Bright Chrome Finish

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ATX Second Stage Maintenance Manual

(AP5826 Issue 5)

INTRODUCTION

This manual provides factory prescribed procedures for the correct maintenance and repair of the Apeks ATX second stage regulator range. It is not intended to be used as an instructional manual for untrained personnel. The procedures outlined within this manual are to be performed only by personnel who have received factory authorised training through an Apeks Service & Repair Seminar. If you do not completely understand all of the procedures outlined in this manual, contact Apeks to speak directly with a Technical Advisor before proceeding any further.

WARNINGS, CAUTIONS & NOTES

Pay special attention to information provided in warnings, cautions, and notes that are accompanied by one of these symbols:



WARNINGS indicate a procedure or situation that may result in serious injury or death if instructions are not followed correctly.



CAUTIONS indicate any situation or technique that will result in potential damage to the product, or render the product unsafe if instructions are not followed correctly.



NOTES are used to emphasise important points, tips, and reminders.

SCHEDULED SERVICE

It is recommended that the Apeks ATX second stage regulator should be serviced annually regardless of usage.

However, If at all unsure about the correct functioning of the Apeks ATX, then it must be officially inspected immediately.

All service and inspection details need to be documented in the Regulator Service Record in the back of the Owner's Manual to keep the Limited Lifetime Warranty in effect.

An Official Inspection consists of:

1. A pressurised immersion test of the entire unit to check for air leakage.
2. Checking for stable medium pressure that is within the acceptable range.
3. Checking for opening effort that is within the acceptable range.
4. Checking for smooth operation of the control knob and venturi switch.
5. A visual inspection of any filters for debris or discoloration.
6. A visual inspection of the exhaust valve(s) to see that they are in good condition and that it is seating against a clean and undamaged surface.
7. A visual inspection of the mouthpiece looking for tears or holes and checking the general condition.
8. Pulling back hose protectors and checking that the hoses are secure in the hose crimps.

If a regulator fails steps 1,2,3 or 4 the entire regulator should be serviced. If a regulator fails 5,6 or 7 it will be up to the technician's discretion whether or not a full service is required. Failure of step 8 requires replacement of the Hose.

GENERAL GUIDELINES

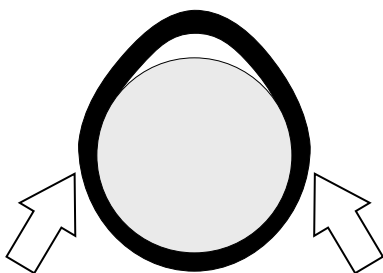
1. In order to correctly perform the procedures outlined in this manual, it is important to follow each step exactly in the order given. Read over the entire manual to become familiar with all procedures and to learn which specialty tools and replacement parts will be required before commencing disassembly. Keep the manual open beside you for reference while performing each procedure. Do not rely on memory.
2. All service and repair should be carried out in a work area specifically set up and equipped for the task. Adequate lighting, cleanliness, and easy access to all required tools are essential for an efficient repair facility.
3. During disassembly, reusable components should be segregated and not allowed to intermix with non-reusable parts or parts from other units. Delicate parts, including inlet fittings and valve seats which contain critical sealing surfaces, must be protected and isolated from other parts to prevent damage during the cleaning procedure.
4. Use only genuine Apeks parts provided in the 2nd stage service kit (AP0219). DO NOT attempt to substitute an Apeks part with another manufacturer's, regardless of any similarity in shape or size.
5. Do not attempt to reuse mandatory replacement parts under any circumstances, regardless of the amount of use the product has received since it was manufactured or last serviced.
6. When reassembling, it is important to follow every torque specification prescribed in this manual, using a calibrated torque wrench. Most parts are made of either marine brass or plastic, and can be permanently damaged by undue stress.

GENERAL CONVENTIONS

Unless otherwise instructed, the following terminology and techniques are assumed:


1. When instructed to remove, unscrew, or loosen a threaded part, turn the part anti-clockwise.
2. When instructed to install, screw in, or tighten a threaded part, turn the part clockwise.
3. When instructed to remove an 'O' Ring, use the pinch method (see figure below) if possible, or use a brass, aluminium or plastic 'O' Ring removal tool. Avoid using hardened steel picks, as they may damage 'O' Ring sealing surfaces. All 'O' Rings that are removed are discarded and replaced with brand new 'O' Rings.


Pinch Method
 Press upwards on sides of 'O' Ring to create a protrusion. Grab 'O' Ring or insert 'O' Ring tool at protrusion.



4. The following acronyms are used throughout the manual: MP is Medium Pressure; HP is High Pressure; PN is Part Number.
5. Numbers in parentheses reference the key numbers on the exploded parts schematics. For example, in the statement, "...remove 'O' ring (4) from...", the number 4 is the key number to the Spring Carrier 'O' Ring.

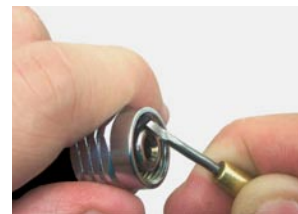
DISASSEMBLY PROCEDURES

 **NOTE:** Before performing any disassembly, refer to the exploded parts drawing, which references all mandatory replacement parts. These parts should be replaced with new, and must not be reused under any circumstances - regardless of the age of the regulator or how much use it has received since it was last serviced.

 **CAUTION:** Use only a plastic, brass or aluminium 'O' Ring removal tool (PN AT54) when removing 'O' Rings to prevent damage to the sealing surface. Even a small scratch across an 'O' Ring sealing surface could result in leakage. Once an 'O' Ring sealing surface has been damaged, the part must be replaced with new. **DO NOT** use a dental pick, or any other steel instrument.

Removal of hose

1. Using two 11/16" spanners, hold the Heat Exchanger (11) stationary while turning the Hose Swivel anti-clockwise. Remove the 'O' ring from inside the Hose Swivel. Exercise caution not to scratch the 'O' ring groove. Remove the 'O' ring from the male end of the Hose.




2. Pull back the two Hose Protectors and inspect the Hose Crimps. If either Crimp is damaged or the Hose is pulling out of the crimp then the Hose must be replaced.



Removal of diaphragm

3. Using the Apeks Front Cover Tool (PN AT31), unscrew the Case Cover (4). To remove the Purge Button and Spring (2 & 3), squeeze two adjacent tabs inward.

 **NOTE:** Ensure that the tool is firmly pressed against the Case Cover whilst unscrewing.



4. Lift out the Diaphragm Cover (5) and Diaphragm (6).



Removal of valve assembly


5. Using an 11/16" spanner, remove the Heat Exchanger (11).



6. Turn the Counterbalance Adjuster Knob (18) anti-clockwise until it stops. For the ATX40 and AT20 models use an Allen key to turn the Adjusting Screw (15). Press the Lever (28) against the Valve Spindle (25). While keeping the Lever depressed, grasp the Knob and pull the Valve Spindle assembly out of the Case (7). Remove the Valve Spindle 'O' ring (12) that will probably be left behind in the left side of the Case.



7. Grasp the Venturi Lever (14) and pull it out of the Case. Remove the 'O' ring (13) from the Venturi Lever.

 **NOTE:** The Venturi Lever may have come out with the valve Spindle in step 6. If this is the case, depress the Lever and slide the Venturi Lever off from right to left.



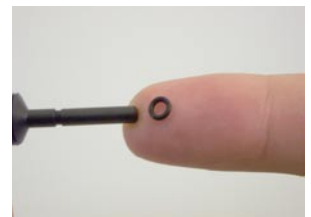
8. Turn the Counterbalance Adjuster Knob (18) or Adjusting Screw (15) clockwise (inward) one turn. The Spring Pin (29) should drop out. If the Pin remains in the Valve Spindle, use a 1/16" dowel or punch to push it partially out, then use needlenose pliers to completely remove it from the valve body.



9. Unscrew the Counterbalance Adjuster Knob (18) or Adjusting Screw (15) and completely remove it from the Valve Spindle.



10. Remove the 'O' ring (19) from the Counterbalance Adjuster Knob. Remove the Plug (32) from the Counterbalance Adjuster Knob. Using the Micro Adjustment Tool (PN AT45) or on later models an Allen key, unscrew the Spring Adjuster (15). Remove the two 'O' rings (16 & 17) from the Spring Adjuster.



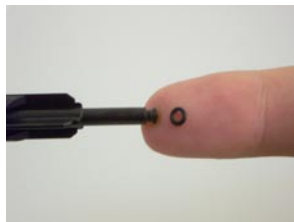
11. Remove the 'O' ring (12) from the Valve Spindle.



12. Insert a small 1/8" wooden dowel into the threaded end of the Valve Spindle and push out the Shuttle Valve assembly (20-24). Separate the Shuttle Valve assembly by pulling on each end.



14. Using a fingernail, remove the Rubber Seating (24) and small 'O' ring (22) from the Shuttle Valve.



15. Using a Slotted Seat Adjuster (PN AT51), turn the Seat (27) six to seven full turns anti-clockwise. Since the Seat is 'O' ring sealed, it will not completely unscrew from the Valve Spindle. Insert a pair of external circlip pliers into the Valve Spindle, and pull the Seat completely out. Remove the 'O' ring (26) from the Seat.




16. To remove the Exhaust Valve Cover (31), locate the retaining tab located inside the exhaust port (see picture). Using an 'O' ring pick, press in on the upper ledge of the tab at an angle and pop out the exhaust cover.



Inspection and Removal of Exhaust Valve



17. Fold back the edges of the Exhaust Valve (30) and inspect underneath. The seating surface should be clean and free of damage. Inspect the Exhaust Valve. It should be supple and have well defined edges. If it looks good, there is no need to remove it and it may be reused. If there is any sign of deterioration, it should be replaced.

 **NOTE:** If the Exhaust Valve (13) is to be removed, pinch edge of Exhaust Valve and pull tail through hole in Case (7).

Removal of mouthpiece

18. Using side cutters, snip the Mouthpiece Clip (8). Remove the mouthpiece (9).



This Ends Disassembly

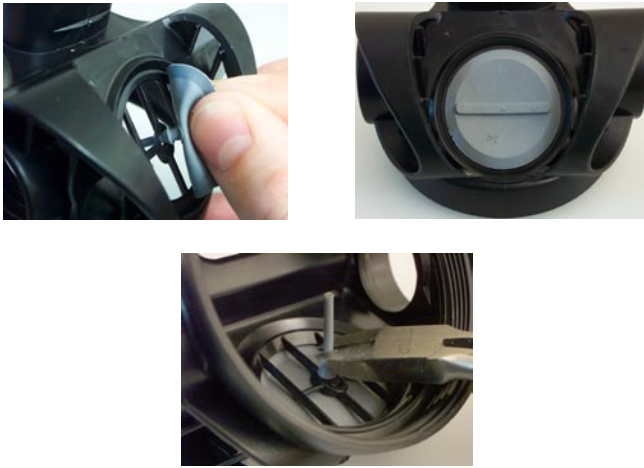
Before starting reassembly, perform parts cleaning and lubrication according to the procedures outlined in 'Cleaning & Lubrication' on page 15.

REASSEMBLY PROCEDURES

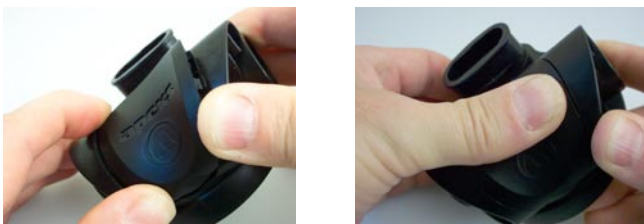
Fitting Exhaust Valve and Exhaust Valve Cover

1. If the Exhaust Valve (30) was removed, replace by threading the tail through the retaining hole on the outside of the Case (1) until the barb engages on the inside. Align the rib so it is horizontal. If the Valve is new, cut off the excess stem with side cutters leaving approximately 5mm of the tail behind.

! WARNING: Flooding may occur if the tail of the valve is not fully pulled through. Check that barb has engaged on inside of Case.



2. Orientate the Exhaust Cover (31) with the logo facing outward (the side with two tabs pointing to the left). Slide the two tabs into the exhaust port, then press down on the right side of the exhaust cover to snap it into place.

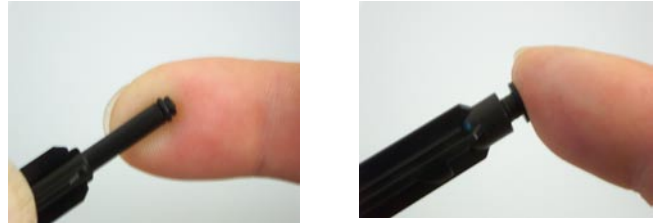


Assembling and fitting valve assembly

3. Install a new, lubricated 'O' Ring (12) onto the Valve Spindle. (25).



4. Press a new, lubricated 'O' ring (22) onto the stem of the Shuttle Valve (23). Press a new Rubber Seating (24) into the front of the Shuttle Valve.

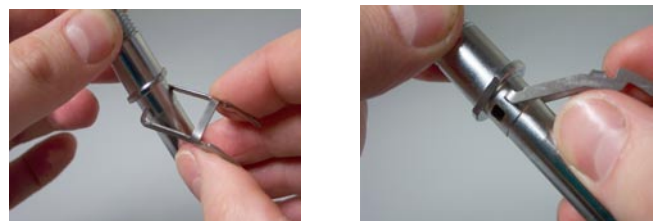
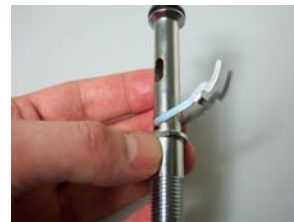


☞ NOTE: Ensure Rubber Seating has been fitted flush with Shuttle Valve.

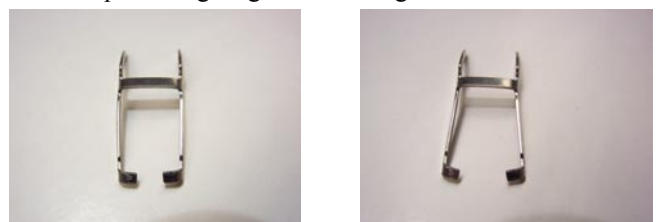
5. Fit the Valve Spring (21) onto the leading edge of the Counterbalance Cylinder (20). Carefully guide the stem of the Shuttle Valve through the Spring and into the Counterbalance Cylinder.

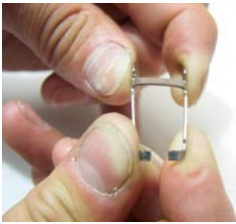


6. If you removed the Lever, replace it so that it points upwards when the air outlet hole points to the left with the threaded end facing you.

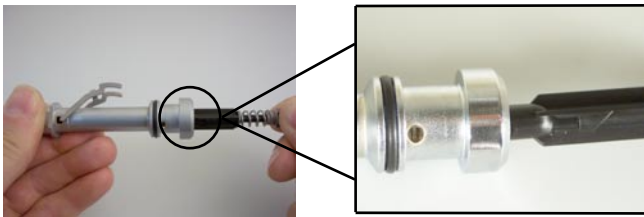



! CAUTION: Ensure that Lever is not twisted and that legs are parallel. Lever should appear as that shown on the left, not as shown on the right. If necessary, gently squeeze legs together to straighten.



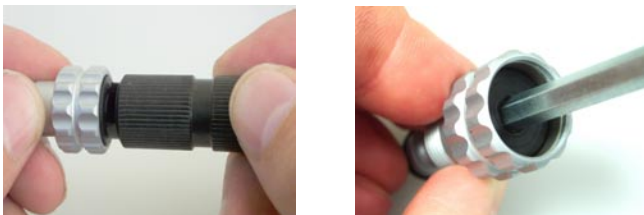
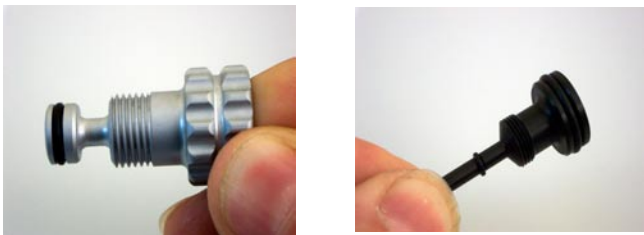


7. With the “feet” of the Shuttle Valve pointing downward (away from the Lever) and the Lever pointing straight up (perpendicular to the Valve Spindle), insert the Valve assembly into the Valve Spindle. Using your finger, press the Shuttle Valve assembly all the way into the Valve Spindle.



 **NOTE:** Ensure that the Lever has a full range of movement and does not catch on the Valve Spindle.

8. Install a new, lubricated ‘O’ ring (19) onto the Counterbalance Adjuster Knob. Install new, lubricated ‘O’ rings (16 & 17) onto the Spring Adjuster (15). Using the Micro Adjustment Tool (p/n AT45) or an Allen key, thread the Spring Adjuster into the Counterbalance Adjuster Knob (18) until it is flush with the end of the Knob, then screw in six full additional revolutions.



9. Install the Counterbalance Adjuster Knob into the Valve Spindle. There should now be spring tension on the Lever. Continue to screw clockwise until the holes for the Spring Pin are clear. Install the Spring Pin (29). Be sure that it sits evenly in the hole. Back the Adjuster Knob out anti-clockwise to apply tension on the Pin and keep it from falling out.



10. Install a new, lubricated ‘O’ ring (13) onto the Venturi Lever (14). Point the Venturi Lever upward and insert it into the Case. Press it against the Case so the ‘O’ ring is captured.




11. While depressing the Lever, insert the Valve Spindle through the Venturi Lever and into the Case. Be sure that the two flats and the two Lever feet engage in the tabs moulded into the Case .




12. Slide a new, lubricated 'O' ring (12) down the threaded end of the Valve Spindle. Screw the Heat Exchanger (11), hexagon facing outward, onto the Valve Spindle until finger tight. Using an 11/16" crows foot or deep socket, tighten to a torque of 5 Nm.



 **CAUTION:** Ensure that the Lever is vertical after tightening.

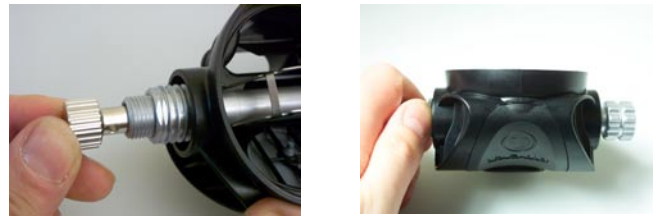


 **CAUTION:** Excessive tightening of the Heat Exchanger will damage the two flats inside the case.

13. Fit a new, lubricated 'O' ring (26) onto the Seat (27). Press the Seat, threaded end first, into the Valve Spindle. Using the Slotted Seat Adjuster Tool, push the Seat into the Valve Spindle as far as it will go.




14. While holding the rim of the Case at eye level, turn the Seat in (clockwise) until the Lever drops about 4mm below the Case rim. Then, turn the Seat anti-clockwise until the Lever is level with the Case rim.



Fitting Diaphragm

15. Position the Diaphragm (6) into the Case (7). Using your finger, work the edges of the Diaphragm into place so it sits evenly in the Case. Install the Diaphragm Cover (5) into the Case, over the Diaphragm.



 **CAUTION:** Ensure Diaphragm is seated correctly and not creased.

16. Place the small diameter end of the Spring (3) onto the Purge Button (2). Orient the Case Cover with the slotted openings pointing to the right. Properly align the Purge Button and press it into the Case Cover until it snaps into place.



17. Screw the Case Cover onto the Case. Using the Cover Tool (p/n AT31) tighten the Cover until it stops. Confirm that the Purge Button is properly aligned.



Before fitting hose, carry out suction test by holding thumb over Valve Spindle (25) to seal and trying to breathe through mouthpiece outlet port. No air should be drawn in.


Fitting Hose and Mouthpiece

18. Add a new 'O' ring to the male end of the Hose. Install a new, lubricated 'O' ring into the swivel end of the Hose.




19. Screw the Hose onto the second stage. Using an 11/16" crows-foot and torque wrench and a spanner on the Heat Exchanger, tighten the Hose to 5 Nm.



 **NOTE:** If your facility is equipped with a test bench, perform the tests before installing the mouthpiece. General instructions for performing bench tests are located in the next section, "Final Testing."

20. If equipped with a Comfo-bite Mouthpiece, make sure the 'bridge' of the Mouthpiece (9) is facing upward. Stretch the Mouthpiece over the second-stage Mouthpiece outlet port. At the base of the Mouthpiece is a groove for the Mouthpiece Clip (8). Wrap the Clip around the Mouthpiece so that the buckle points toward the Hose. Tighten the Clip and snip the excess with side cutters.



 **WARNING:** Ensure that the Mouthpiece is properly secured on the outlet port.

20. After all testing has been completed, refit the Plug (32) (If fitted) into the Counterbalance Adjuster Knob (18).



FINAL TESTING

Setting the Lever Height

1. Connect the first stage regulator to a calibrated test bench and pressurise the system to 200 (± 10) bar. Make sure that the Adjuster Knob (18 or 15) is fully wound out and that the Venturi Lever (14) is set to the "+" position.
2. Tap the purge button quickly, this will cause the regulator to freeflow. Stop the freeflow after a couple of seconds by placing a hand over the mouthpiece.
3. Place the FAIL end of the ATX Setting Tool onto the purge button decal (1). Depress the Purge button by pushing the tool towards the 2nd stage until it stops against the Front cover. If no gas flows from the second stage proceed to step 5. If gas flows from the valve follow step 4.



4. Disconnect the second stage from the hose as shown in step 1 of the disassembly procedure. Using the Slotted Seat Adjuster Tool (PN AT51), turn the seat (27) clockwise by approximately 1/16 of a turn. Repeat step 3.
5. Place the PASS end of the ATX Setting Tool onto the purge button decal (1). Depress the Purge button by pushing the tool towards the 2nd stage until it stops against the Front cover. If gas flows from the second stage the lever height has been set correctly. If no gas flows from the valve proceed to step 6.
6. Disconnect the second stage from the hose as shown in step 1 of the disassembly procedure Using the Slotted Seat Adjuster Tool (PN AT51), turn the seat (27) anti-clockwise by approximately 1/16 of a turn. Repeat both step 3 and step 5.

Second Stage Opening Effort Test


1. Connect the first stage regulator to a calibrated test bench and pressurise the system to 200 (± 10) bar. Slowly open the flowmeter control knob (start vacuum) while watching both the magnahelic gauge and the intermediate pressure gauge.
2. When the intermediate pressure begins to drop, indicating the second-stage valve is open, the magnahelic gauge should indicate an opening effort of +1.0" to +1.5". If the reading is outside of these specifications, adjust the Spring Adjuster or Adjusting Screw (15), turning anti-clockwise to lower the opening effort or clockwise to increase the opening effort. If this fails to give the correct reading refer to "Table 1 - Troubleshooting" for corrective actions.

(Testing is continued on the next page)

FINAL TESTING (CONTINUED)

External Leak Test

1. After disconnecting the regulator from the flow bench, connect it to a scuba cylinder filled to approximately 200 bar. Open the cylinder valve to repressurise the regulator, and submerge the entire system in a test tank of clean water.
2. Observe any bubbles arising from the submerged regulator over a one minute period. The recommended time is necessary due to slower bubble formation that occurs in smaller leaks. Bubbles indicate a leak, which requires the system to be disassembled at the source to check sealing surfaces, assembly sequence and component positioning in order to correct the problem(s).

 **NOTE:** Extremely small leaks may be better detected by applying a soap solution or Snoop™ to the leak area. Bubble streams will indicate the source of the leak. Before disassembling to correct any leaks, rinse the entire regulator thoroughly with fresh water and blow out all residual moisture with filtered, low-pressure air. Disassemble and remedy the problem, referring to “Table 1 - Troubleshooting.”

Subjective Breathing Test

1. Depress the Purge Button fully to ensure that an adequate volume of air needed to clear the second stage flows through the mouthpiece. Then, inhale slowly but deeply from the mouthpiece. A properly serviced and adjusted regulator should deliver air upon deep inhalation without excessive inhalation effort, freeflow, or “fluttering” of the second-stage diaphragm. When exhaling, there should be no fluttering or sticking of the exhalation valve. If any of these problems occur, refer to “Table 1 - Troubleshooting”.

This Ends Reassembly



Table 1 - Troubleshooting Guide

SYMPTOM	POSSIBLE CAUSE	TREATMENT
Leakage or freeflow from ATX Second Stage	1. Excessively high first-stage intermediate pressure.	1. Refer to first-stage Troubleshooting Guide.
	2. Rubber Seating (24) damaged or worn.	2. Replace Rubber Seating.
	3. Seat (27) adjusted incorrectly, Lever (28) set too high.	3. Reset Seat preliminary settings, and repeat Adjustment Procedures.
	4. Lever (28) bent.	4. Replace Lever.
	5. Seat (27) sealing surface damaged.	5. Replace Valve Seat.
	6. Valve Spring (21) damaged.	6. Replace Spring.
	7. Shuttle Valve 'O' Ring (22) damaged.	7. Replace 'O' Ring.
	8. Counter Balance Cylinder (20) bore damaged.	8. Replace Counter Balance cylinder.
Low purge or excessive work of breathing (full cylinder)	1. Low first-stage intermediate pressure.	1. Refer to first-stage Troubleshooting Guide.
	2. Seat (27) adjusted incorrectly, Lever (28) set too low.	2. Reset Seat preliminary settings, and repeat Adjustment Procedures.
	3. Intermediate pressure hose clogged or obstructed.	3. Clean or replace Hose.
	4. Lever (28) bent or catching on Valve Spindle (25).	4. Replace Lever.
Water entering ATX Second Stage	1. Mouthpiece (9) damaged or incorrectly fitted.	1. Replace or re-fit Mouthpiece as appropriate.
	2. Diaphragm (6) damaged.	2. Replace Diaphragm.
	3. Diaphragm (6) improperly seated in Case (7).	3. Remove Front Cover (4) and Diaphragm Cover (5) properly reassemble Diaphragm (check for distortion).
	4. Exhaust Valve (30) damaged.	4. Replace Exhaust Valve.
	5. Case (7) damaged. (Check exhaust valve seating surface.)	5. Disassemble and replace Case.
	6. Heat exchanger 'O' Ring (12) damaged.	6. Replace 'O' Ring.

Table 2 - Recommended Tool List

PART NO.	DESCRIPTION	APPLICATION
AP0430	I.P. test gauge	Intermediate pressure testing
AT54	'O' Ring removal pick	'O' Ring removal
AT31	Front Cover Tool	Case Cover removal and installation
AT45	Micro Adjustment Tool	Removal and installation of Micro Adjuster
AT51	Slotted Seat Adjuster	Removal and installation of Seat
n/a	Torque wrench, Nm or lbf/ft	Hose and Heat Exchanger
n/a	11/16" adapter for torque wrench	Hose and Heat Exchanger
AT34	11/16" spanner 2 off	Heat Exchanger
AT37	5mm Allen key	Removal and installation of Micro Adjuster
n/a	Side cutters	Zip Tie, Exhaust Valve
AT38	6mm Allen key	Removal and installation of Adjuster Screw
AT24	Internal Circlip Pliers	Removal of Seat
AT68	ATX Setting Tool	Setting of Lever Height

Table 3 - Recommended Lubricants & Cleaners

LUBRICANT / CLEANER	APPLICATION	SOURCE
Christo-Lube® MCG-111 (Lubricant)	All 'O' Ring seals	Apeks Marine Equipment Ltd PN AP1495, or Lubrication Technologies 310 Morton Street Jackson, OH 45640, USA (800) 477-8704
<div style="border: 1px solid black; padding: 5px;">  CAUTION: Silicone rubber requires no lubrication or preservative treatment. DO NOT apply grease or spray to silicone rubber parts (eg. Diaphragm, Exhaust Valves.) Doing so may cause a chemical breakdown and premature deterioration of the material. </div>		
Biox (Cleaning agent)	Biological immersion fluid for reusable stainless steel and brass parts.	Solent Divers Ltd 122-128 Lake Rd, Portsmouth, Hants, PO1 4HH
White distilled vinegar (100 gr.) (Cleaning agent)	Acid bath for reusable stainless steel and brass parts.	"Household" grade
<div style="border: 1px solid black; padding: 5px;">  CAUTION: Do not use muriatic acid for the cleaning of any parts. Even if strongly diluted, muriatic acid can harm chrome plating and may leave a residue that is harmful to 'O' Ring seals and other parts </div>		
Liquid dishwashing detergent diluted with warm water (Cleaning agent)	Degreaser for brass and stainless steel parts; general cleaning solution for plastic and rubber	"Household" grade

Cleaning & Lubrication Procedure

General Cleaning of all Parts

1. Place all components in an ultrasonic cleaning bath containing an appropriate cleaning solution, such as Biox.
2. The components should be cleaned for 6 minutes, depending upon their condition. Longer cleaning times may be used if required.
3. Rinse the components in warm fresh water.
4. The components should then be blown dry or left to dry naturally.

Lubrication and Dressing

All 'O' Rings should be lubricated with Christo-Lube® MCG-111. Dress the 'O' Rings with a very light film of grease, and remove any visible excess by running the 'O' Ring between thumb and forefinger. Avoid applying excessive amounts of Christo-Lube grease, as this will attract particulate matter that may cause damage to the 'O' Ring.

Nitrox

When it comes to issues of nitrox safety and compatibility, the concerns lie primarily with the first stage as it is subjected to high inlet pressures. High inlet pressures lead to adiabatic compression or heating of the gas. As they leave the factory, standard Apeks regulators are suitable for use with oxygen enriched gases (i.e. nitrox, etc.) providing the oxygen content does NOT EXCEED 40% (EAN40).

Any Apeks regulator, when properly cleaned, lubricated and assembled, is authorised for use with enriched air nitrox (EAN) up to 100% (EAN100). It is authorised because it has undergone adiabatic compression testing and the authorised service kit components and lubricants are compatible in elevated oxygen environments. During cleaning, a mild detergent is used to remove condensed hydrocarbons (compressor oils) from the inside passageways of the first stage. For the first stage to remain EAN100 compatible, only use hyperfiltered compressed gas (hydrocarbons < 0.1 mg/m³). Ordinary compressed breathing air to BS EN 12021:1999 does not meet this criteria. Once ordinary breathing air is used, the first stage is no longer EAN100 compatible until it is cleaned and serviced again.

Although regulator second stage components are not exposed to high pressure EAN, Apeks recommends that the same cleaning procedures be followed for the complete regulator. This prevents the possibility of cross contamination and guarantees the cleanliness of the entire regulator.


 **WARNING:** Please check the regulations regarding Nitrox in your particular country as this may differ from Apeks standard policy.

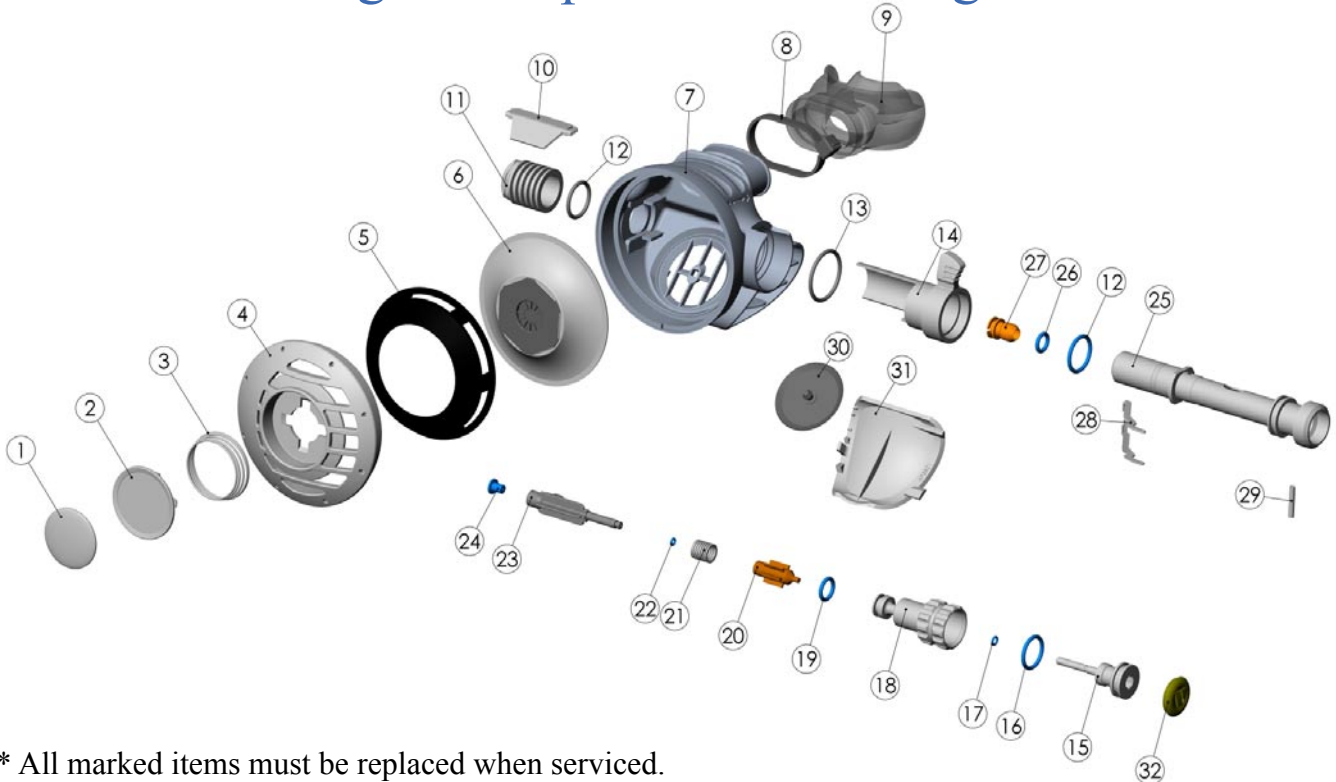
Table 4 - Torque Specifications

PART NUMBER	DESCRIPTION / KEY NUMBER	TORQUE
AP5013/S, AP5013/PVD, AP5002, AP5003	Heat Exchanger / Spacer(11),	5 Nm / 3.7 lbf/ft
AP0203	Hose	5 Nm / 3.7 lbf/ft

Table 5 - Test Bench Specifications

TEST	CONDITION	ACCEPTABLE RANGE
Opening Effort	High Pressure > 50 bar gauge Medium pressure 9.5±0.5 bar	+1.0 to +1.5 in. H ₂ O
External Leak	High Pressure > 50 bar gauge Medium Pressure 9.5±0.5 bar	No Leaks allowed

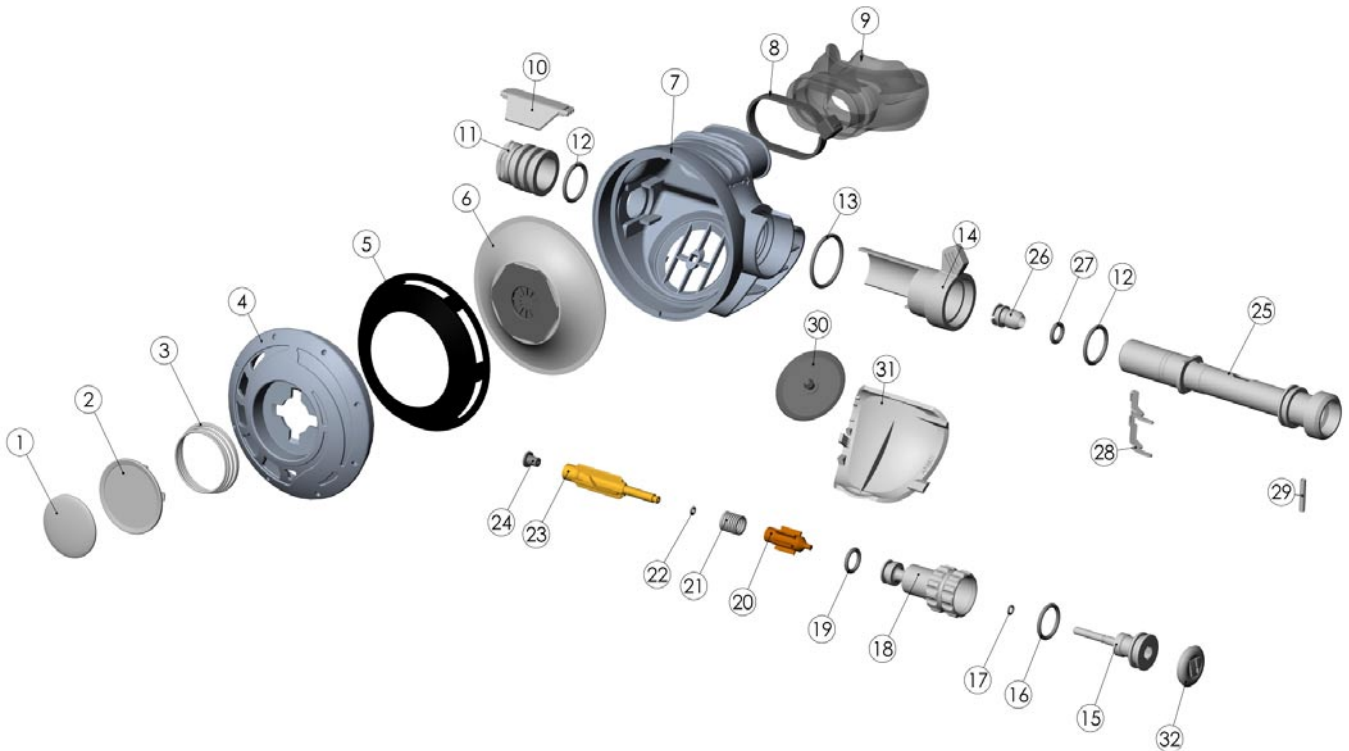
ATX200, ATX100, Black Pearl & Tungsten Exploded Parts Diagram



* All marked items must be replaced when serviced.

1	AP5823	Decal (ATX100)	16*	AP1159	'O' Ring
	AP5819	Decal (ATX200)	17*	AP5711	'O' Ring
	AP5730	Decal (Black Pearl)	18	AP6577/S	Adjusting Screw
	AP5740	Decal (Tungsten)		AP6577/PVD	Adjusting Screw (Black Pearl)
2	AP5805	Purge Button		AP6577/PVDS	Adjusting Screw (Tungsten)
3	AP2020	Spring	19*	AP1409	'O' Ring
4	AP5807	Case Cover	20	AP2038SQ	Counter Balance Cylinder
	AP0574	Case Cover (Black Pearl & Tungsten)	21	AP2021	Spring
5	AP5802/C	Diaphragm Cover	22*	AP2041	'O' Ring
6	AP5803	Diaphragm	23	AP2036	Shuttle Valve
7	AP5800	Case	24*	AP2034	Rubber Seating
8*	AP1677	Mouthpiece Clip	25	AP2028/S	Valve Spindle
9	AP5324	Comfobite Mouthpiece		AP2028	Valve Spindle (Black Pearl & Tungsten)
10	AP2037	Deflector	26*	AP1154	'O' Ring
11	AP5013/S	Heat Exchanger	27	AP2033	Seat
	AP5013/PVD	Heat Exchanger (Black Pearl)	28	AP2035	Lever
	AP5013/PVDS	Heat Exchanger (Tungsten)	29	AP1151	Spring Pin
12*	AP1267	'O' Ring	30	AP1429	Exhaust Valve
13*	AP1438	'O' Ring	31	AP5801	Exhaust Valve Cover
14	AP2039	Venturi Lever		AP5801/GREY	Exhaust Valve Cover
15	AP6578	Spring Adjuster	32	AP5830	Plug

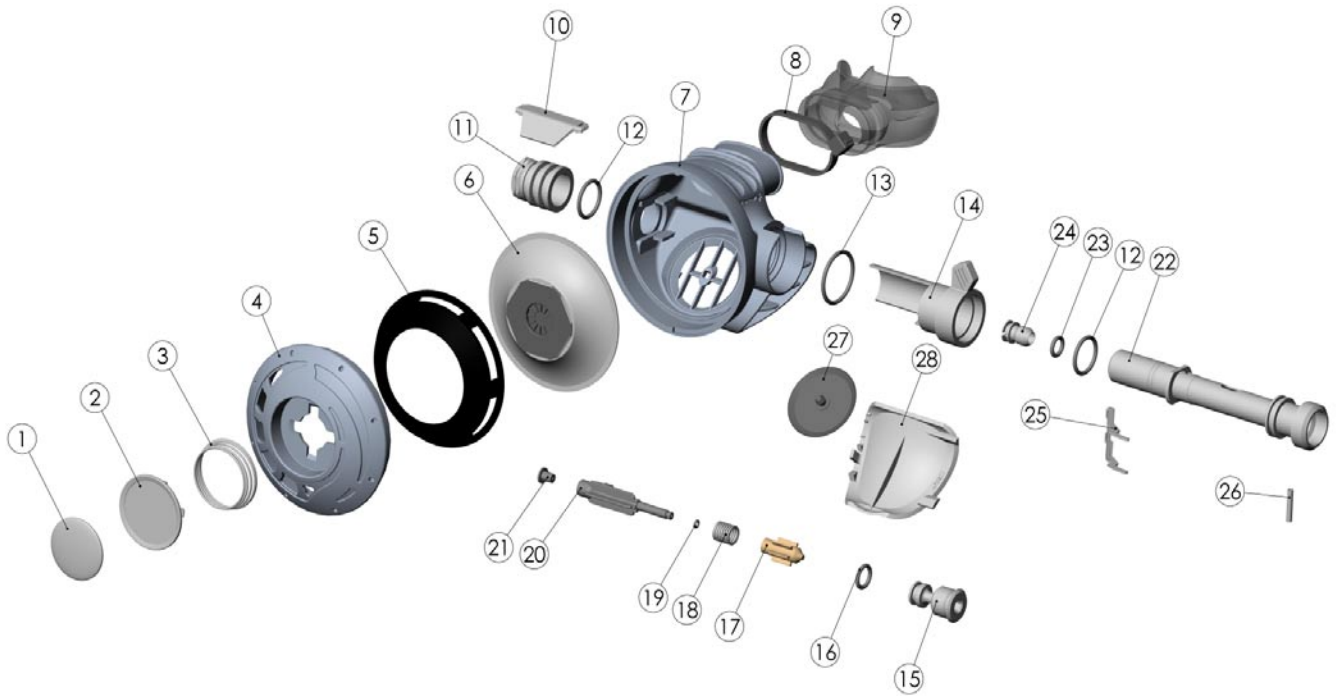
ATX50 Exploded Parts Diagram



* All marked items must be replaced when serviced.

1	AP5820	Decal	17*	AP5711	'O' Ring
2	AP5805	Purge Button	18	AP6577	Adjusting Screw
3	AP2020	Spring	19*	AP1409	'O' Ring
4	AP5807	Case Cover	20	AP2038SQ	Counter Balance Cylinder
5	AP5802	Diaphragm Cover	21	AP2021	Spring
6	AP5803	Diaphragm	22*	AP2041	'O' Ring
7	AP5800	Case	23	AP2036	Shuttle Valve
8*	AP1677	Mouthpiece Clip	24*	AP2034	Rubber Seating
9	AP5324	Comfobite Mouthpiece	25	AP2028	Valve Spindle
10	AP2037	Deflector	26*	AP1154	'O' Ring
11	AP5002	Heat Exchanger	27	AP2033	Seat
12*	AP1267	'O' Ring	28	AP2035	Lever
13*	AP1438	'O' Ring	29	AP1151	Spring Pin
14	AP2039	Venturi Lever	30	AP1429	Exhaust Valve
15	AP6578	Spring Adjuster	31	AP5801	Exhaust Valve Cover
16*	AP1159	'O' Ring	32	AP5830	Plug

ATX40 & AT20 Exploded Parts Diagram



* All marked items must be replaced when serviced.

1	AP5821	Decal (ATX40)	14	AP2039	Venturi Lever
	AP5822	Decal (AT20)	15	AP2029-1	Adjusting Screw
2	AP5805	Purge Button	16*	AP1409	'O' Ring
3	AP2020	Spring	17	AP2038SQ	Counter Balance Cylinder
4	AP5807	Case Cover	18	AP2021	Spring
5	AP5802	Diaphragm Cover	19*	AP2041	'O' Ring
6	AP5803	Diaphragm	20	AP2036	Shuttle Valve
7	AP5800	Case	21*	AP2034	Rubber Seating
8*	AP1677	Mouthpiece Clip	22	AP2028	Valve Spindle
9	AP5324	Comfobite Mouthpiece	23*	AP1154	'O' Ring
10	AP2037	Deflector	24	AP2033	Seat
11	AP5002	Heat Exchanger (ATX40)	25	AP2035	Lever
	AP5003	Spacer (AT20)	26	AP1151	Spring Pin
12*	AP1267	'O' Ring	27	AP1429	Exhaust Valve
13*	AP1438	'O' Ring	28	AP5801	Exhaust Valve Cover

Notes



ATX SECOND STAGE REGULATOR

MAINTENANCE MANUAL

FOR

AUTHORISED TECHNICIANS

Apeks Marine Equipment Ltd
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