



# **HELMET SIDE BLOCK VALVE**

## **AP0281/SB**



# **OWNER AND MAINTENANCE MANUAL**

Document No.  
AP2549SB

Issue 03  
06/03/2017

APEKS MARINE EQUIPMENT LTD, NEPTUNE WAY, BLACKBURN, LANCASHIRE. BB1 2BT  
Tel: +44 (0) 1254 692200 Fax: +44 (0) 1254 692211 E-mail: [info@apeks.co.uk](mailto:info@apeks.co.uk) Web: [www.apeks.co.uk](http://www.apeks.co.uk)

## AMENDMENTS RECORD:

Amendments and approval of this document can only be carried out by the relevant people listed on the Approved list of signatures, which is listed in the Apeks Quality Manual. To instigate a change, a Task / Change request form, (Form No. 'DESI/10002'), must be completed and passed to the relevant person(s) for approval which are listed on the Approved List of Signatures. When approval has been granted and recorded this table can then be completed and the document up issued.

Change No.	Change Request No.	Description & Comments:	Change Date	New Issue No.	Changed By:	Approved By:
	1557	UPDATED PART NUMBERS	10/06/16	2	DL	AD
	1605	Change 90° Elbow to new Elbow Change length of hose	06/03/2017	3	DA	AD

## COPYRIGHT NOTICE

This manual is copyrighted, all rights reserved. It may not, in whole or in part, be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine readable form without prior consent in writing from Apeks Marine Equipment Ltd. It may not be distributed through the internet or computer bulletin board systems without prior consent in writing from Apeks Marine Equipment Ltd.

©2016 Apeks Marine Equipment Ltd.  
Helmet Side Block Valve Owner  
and Maintenance Manual

## INTRODUCTION

This manual provides factory prescribed procedures for the correct use, installation and maintenance of the helmet side block valve P/N. AP0281/SB.

## 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. Before beginning any disassembly, it is important to first perform the initial inspection procedure. Refer to **Table 1 -Troubleshooting Guide** in the back of the manual, to determine the possible cause of any symptoms which may be present.
4. As each unit is disassembled, reusable components should be segregated and not allowed to intermix with non-reusable parts or parts from other units. Delicate parts, including valve shaft and valve seats which contain critical sealing surfaces, must be protected and isolated from other parts to prevent damage during the cleaning procedure.
5. Use only genuine Apeks parts provided in the service kit.
6. 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.
7. When reassembling, it is important to follow every torque specification prescribed in this manual, using a calibrated Newton Meter torque wrench. Most parts are made of either marine brass or plastic, and can be permanently damaged by undue stress.

## WARNINGS, CAUTIONS & NOTES

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



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



**CAUTION** 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 emphasize important points, tips, and reminders.

## SCHEDULED SERVICE

It is recommended that the helmet side block valve should be examined annually regardless of usage.

A full service should be performed every one (1) years.

With heavy use in contaminated water it is recommended to service the helmet side block valve more regularly. In some contaminated water it may be preferable to replace the seals after every use and this should be determined via risk assessment.

 **WARNING:** This manual provides essential instructions for the proper setup, inspection, use and care of your new helmet side block valve. It is very important to take time to read these instructions in order to understand and fully utilize the function and safety features of the helmet side block valve. Improper use of your helmet side block valve could result in serious injury or death.

## SAFETY INFORMATION

Before using this helmet side block valve, you must receive instruction and certification in surface supplied full face mask/helmet diving from a recognized training agency. Use of this equipment by uncertified or untrained persons is dangerous and can result in injury or death.

### **WARNING!**

- Do not dive with a surface umbilical gas supplied full face mask or helmet without a bailout/emergency gas supply.
- The umbilical gas supply system must be equipped with a non-return valve (check valve). This is to prevent a “squeeze” and possible catastrophic loss of the divers breathing air should the surface umbilical supply fail. Without this valve the diver will suffer serious injury or death.
- The bailout supply first stage regulator must be fitted with a pressure relief valve in a **LOW PRESSURE** port.

# Description

This helmet side block valve can only be used with the Gorski G3000SS or G2000SS Diving Helmets.

The helmet side block valve allows the diver to switch from the primary air supply to an alternate bailout air supply (or Emergency Gas Supply - EGS), in case of failure of the primary supply. The primary supply is provided through a surface-supply umbilical. The EGS/bailout supply is provided by a SCUBA cylinder with 1st stage regulator worn by the diver.

The helmet side block valve is attached to the right hand side of the helmet where the diver can open the valve unaided and in nil visibility conditions.

The AP0281/SB Helmet Side Block Valve has been CE certified by DNV-GL Det Norske Veritas-Germanischer Lloyd SE, Brooktorkai 18, 20457 Hamburg, Germany Notified Body number 0098 and has been found to be in accordance with the requirements of Council Directive 89/686/EEC. When examined the product satisfied the requirements of the manufacturer's technical specifications (based upon BS EN 15333 requirements), which has been previously assessed and deemed to meet the basic health and safety requirements (Annex II) of the directive.

The CE certified depth of 50 m (165 ft) is a standard maximum certification depth for diving equipment that is used to provide a uniform benchmark for measuring performance.



# AP0281/SB Helmet Side Block Valve fitting

1. Using a 1/4" hex key unscrew the latch cap screw 400113 from the RIGHT side of the helmet.



2. Re-use the grower washer 400120 on the new hexagonal head screw 530006 included in the kit.



3. Position the side block valve over the loose latch and align the holes with the helmet mounting hole in between.



4. Place the hexagonal head screw with grower washer through the side block valve, helmet mounting hole and into the threaded latch hole.



5. Use a torque wrench and 1/2" crowfoot fitting to tighten the hexagonal head screw 530006 (13) and apply 15 Nm (133 in.lbs) of torque.



6. Connect the MP short hose AP0203/1-0.27M male end to the 3/8" outlet of the helmet side block valve. Use a torque wrench and 9/16" crowfoot fitting to apply 5 Nm (44 in.lbs) of torque to the hose male end.



7. Using PTFE tape on the elbow AP2555 3/8" NPT male thread, connect it to the 3/8" NPT female end of the check valve 400041 on the helmet manifold body. Use a 13/16 spanner and screw the elbow AP2555 in until tight. The orientation of the female threaded part of AP2555 should be as close to the main input valve as possible but not so much as to block the fitment of AP2541. Using PTFE tape on the 3/8" NPT male thread of adaptor AP2541 screw it in to the 3/8" NPT female end of the elbow AP2555 using a 13/16 spanner on AP2555 to keep it still and 7/8" spanner on AP2541 until tight



8. Connect the MP short hose AP0203/1-0.27M to adaptor AP2541 while holding adaptor still with 7/8" spanner use torque wrench and 11/16" crowfoot fitting to apply 5Nm (44 in.lbs) to AP0203/1-0.27M



9. Connect the MP supply hose from the 1st stage regulator on the EGS/bailout cylinder to the 9/16" inlet connector of the side block valve. Use a torque wrench and 11/16" crowfoot fitting to apply 5 Nm (44 in.lbs) of torque to the hose female end.





# Helmet side block valve setup

Ensure that the helmet side block valve is fitted correctly and securely to the helmet.

 **NOTE:** The outlet port is 3/8" UNF - 24 thread.

 **NOTE:** The inlet port is 9/16" UNF - 20 thread.

 **NOTE:** The helmet side block valve must be checked to ensure the valve seals.

 **WARNING:** If the bailout valve leaks, gas will empty from the bailout cylinder leaving no air for the diver in an emergency situation.

## Operation

 **CAUTION:** Ensure the bailout first stage regulator is set between 9.0-10.0 bar (130-145 psi).

- Close the helmet side block valve by turning the hand wheel clockwise until it stops hand tight.

 **CAUTION:** Do not overtighten the hand wheel, this may damage the valve seal and/or seat and the helmet side block valve will have to be serviced or even discarded.


- Open the bailout cylinder valve and isolate the surface supply.
- Open the helmet side block valve briefly and listen for the flow of gas. If no gas flow is heard, check the cylinder valve is open and/or the hoses for blockages. If there is still no gas flow, remove the helmet side block valve and bailout gas system and have it serviced or replaced.

### Diving

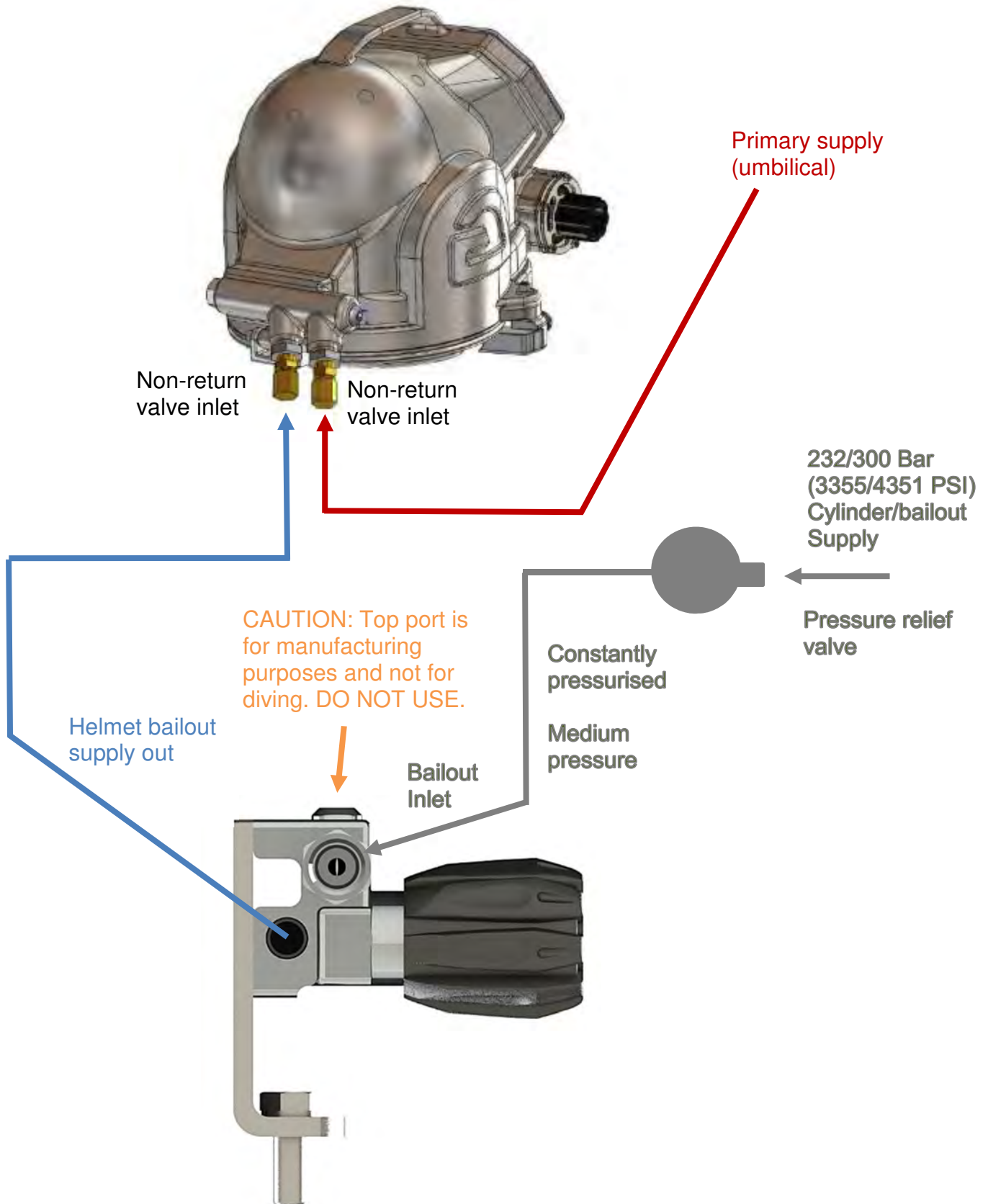
- In case of umbilical air supply failure, open helmet side block valve fully by turning the hand wheel anticlockwise until it stops.

 **WARNING:** The bailout cylinder only allows the diver a few minutes of air and he must immediately return to the surface or to a place of safety.

 **NOTE:** Close helmet side block valve when not in use.

 **CAUTION:** Always keep the bailout hose pressurized after test and make sure the helmet side block valve is closed.

# Configuration of AP0281/SB helmet side block valve, G3000SS



## Cleaning

- Wash valve with clean water, use warm water if possible if diving in water +5 °C (41 °F) or less. Ensure all dirt and debris has been removed from under the hand wheel.
- Check that the hand wheel turns smoothly and free.

## Inspection


Inspect the rubber parts, plastic parts and non-return valves at regular intervals and have them replaced if there are any signs of damage or wear. See page 2 for scheduled service details.

## Storage

The helmet side block valve should be dried and stored in a cool and dry location. All service parts including rubber and plastic components should be stored in a sealed bag in a cool, dry and dark location.

## Warranty Information


- Apeks warrants to the original purchaser that the product will remain free from defects in material and workmanship throughout its useful life, provided that it receives normal use, proper care and prescribed service.
- This warranty does not apply to units subject to misuse, abuse, neglect, modifications or unauthorized service.
- This warranty is limited to repair or replacement only at the discretion of Apeks/Aqualung.

 **WARNING: It is dangerous for untrained and uncertified persons to use the equipment covered by this warranty. Therefore, use of this equipment by an untrained person renders any and all warranties null and void. Use of open circuit umbilical gas supplied equipment by anyone who is not a trained or certified diver, or receiving training under the supervision of an instructor could lead to serious injury or death.**

Whenever your unit requires prescribed service or warranty consideration, Apeks/Aqualung requires that the work is carried out by an authorized technician. For help finding a technician in your area, please contact Apeks/Aqualung.

[www.apeks.co.uk](http://www.apeks.co.uk)

[www.aqualung.com](http://www.aqualung.com)

 **NOTE:** This warranty gives you specific legal rights. You may have rights which vary from country to country

**AQUA LUNG DISCLAIMS AND EXCLUDES ANY LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. SOME STATES IN THE U.S. AND CERTAIN OTHER COUNTRIES DO NOT ALLOW EXCLUSIONS OR LIMITATIONS OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THIS MAY NOT APPLY TO YOU.**

### **Restrictions**

The following restrictions apply to this warranty:

- This warranty does not cover normal wear. Factory prescribed service by an authorized dealer is required at least once annually.
- This warranty does not extend to damages caused by improper use, improper maintenance, neglect, unauthorized repairs, modifications, accidents, fire or casualty.
- Cosmetic damage, such as scratches, dents and nicks are not covered by this warranty.

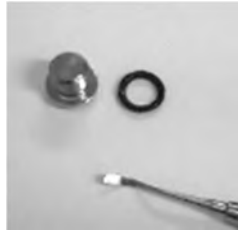
# **MAINTENANCE SECTION**

## Disassembly procedures for the helmet side block valve

1. Unscrew all UNF blanking plugs (9) using 5mm hex key.



2. Remove O ring's (15) from blanking plug's using O ring removal tool.



3. Holding cylinder valve hand wheel (6) and using 8mm hex key remove retaining nut (8) and spring (7). Slide cylinder valve hand wheel away from shaft (2).



4. Unscrew gland nut (4) using 7/8" spanner



5. Unscrew shaft (2) from gland nut (4) counter-clockwise by hand. Holding shaft, turn gland nut counterclockwise. Keep safe for reassembly.



**Caution:** Take care when handling the shaft (2), not to cause damage to the face side.

6. Remove O rings (3) and (5) from gland nut (4) using O ring removal tool.



**Caution:** When removing O ring (5) be careful not to damage internal bore of gland nut.

7. Unscrew connector (11) using 17mm spanner.



8. Remove O ring (12) using O ring removal tool.



9. Unscrew the countersink screws (14) using 2,5mm hex key, remove the support (10).



**Disassembly for the for the helmet side block valve is now complete**

## Assembly procedures for the helmet side block valve

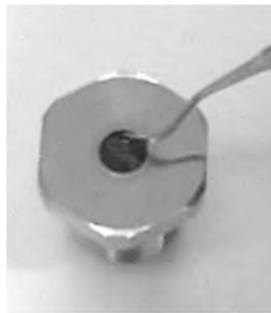
1. Fit the support (10) and screw in the countersink screws (14) using 2,5mm hex key.



2. Insert the lightly greased O ring (5) into the internal O ring groove inside the gland nut (4).



**Caution:** Ensure O ring is fully captured in groove and sat flat.



3. Fit O ring (3) over the external thread of the gland nut (4) down to the external O ring groove.



4. Lightly grease the shaft (2) and insert into the gland nut (4) rotating slightly to prevent damage to the internal O ring (5).



5. Engage thread and turn until the shaft shoulder is touching the gland nut.



6. Screw the shaft/gland nut sub assembly all the way into the top turret of the main body (1). Use a torque wrench with 7/8" crowfoot fitting to apply 12 Nm (106 in.lbs) of torque to the gland nut (4).



7. Place hand wheel (6) over shaft ensuring the square shoulder is fully inserted into the square hole of the hand wheel.



8. Press the spring (7) onto the retaining nut (8). Secure the hand wheel (6) with the retaining nut (8). Use a torque wrench with 8mm hex key to apply 5 Nm (44 in.lbs) of torque to the retaining nut (8).



9. Put the O ring (12) over the 1/2" thread on the connector (11).



10. Screw the connector (11) into the 1/2" bailout inlet port. Use a torque wrench with 17mm crowfoot fitting to apply 15 Nm (133 in.lbs) of torque to the connector (11).



11. Fit O ring (15) over the thread on blanking plug (9).




12. Screw blanking plug (9) into the body (1). Use a torque wrench with 5mm hex key to apply 5Nm (44 in.lbs) of torque to the blanking plug.



**Assembly for the helmet side  
block valve is now complete**



**Helmet side block valve**  
**Test Procedure**

 **NOTE:** To perform the test on the helmet side block valve an air supply is required. Illustrated is a test bench supply, a cylinder can be used as an alternative. Supply pressure needs to be between 9.0 and 10.0 Bar (130-145 psi).




1. Attach a 9/16" medium pressure regulator hose to the bailout connector. Hand tighten with 11/16" spanner.




2. Ensure hand wheel is in the closed position on the helmet side block valve. Slowly turn on air supply then slowly open helmet side block valve, an audible gas flow should be present. Close helmet side block valve hand wheel.



 **NOTE:** If there's no gas flow, check gas supply. If supply has no faults check helmet side block valve for blockages / debris.

3. Submerge helmet side block valve and allow trapped air to escape. Check for leaks via the open port.




 **WARNING.** This test is to determine whether the shaft seat seals correctly.

Remove from the water and allow the valve to drain, disperse any remaining water by opening valve.

4. Attach 3/8" medium pressure hose to open port hand tighten with 9/16" spanner. Use either a regulator hose connected to a second stage or an inflation hose connected to an inflation valve.



 **NOTE:** Which ever hose type used, it is only required for pressure relief.

Open helmet side block valve. Immerse helmet side block valve into water and check for leaks on all fittings.



5. Turn off air supply.



6. Vent air from the unit by purging the valve or from an attached regulator.



**If any leaks are found refer to the Trouble Shooting Guide**

# Table 1 - Trouble Shooting Guide

SYMPTOM	POSSIBLE CAUSE	TREATMENT
Air leakage from open outlet port (Valve closed)	1. Valve hand wheel not tight enough	Hand tighten the hand wheel
	2. Shaft seat sealing surface damaged.	Disassemble the shaft sub-assembly and replace shaft
	3. Valve body seat sealing surface damaged.	Replace helmet side block valve
	4. Debris trapped under valve seat seal surface.	Blow air through the helmet side block valve to dislodge debris or disassemble shaft sub-assembly to remove debris
	5. Excessively high bailout supply pressure.	Inspect 1 <sup>st</sup> stage on bailout cylinder, set pressure to 130.5-137.7 psi (9-9.5 bar)
		Remove 1 <sup>st</sup> stage and have serviced by a qualified technician
6. Valve seat loosened off shaft.	Disassemble the shaft sub-assembly and replace shaft	
Air leakage from closed outlet port/s (Valve open)	1. Bailout inlet leaking	Remove adaptor, inspect O-ring and replace if damaged.
	2. Leaking out of hand wheel.	Disassemble the shaft sub-assembly, inspect O-rings and shaft for damage or wear and replace where necessary.
	3. All other 3/8 UNF outlet ports leaking	Remove blanking plugs, inspect O-ring and replace if damaged.
	4. Excessively high bailout supply pressure	Inspect 1 <sup>st</sup> stage on bailout cylinder, set pressure to 130.5-137.7 psi (9-9.5 bar)
Remove 1 <sup>st</sup> stage and have serviced by a qualified technician		
Hand wheel jammed	1. Excess dirt and debris	Disassemble the shaft sub-assembly and clean & service helmet side block valve
	2. Shaft / Gland nut thread failure	Replace shaft, gland nut and O-rings
Shaft unable to be removed from gland nut	1. Over tightening hand wheel nut	Remove shaft assembly and replace shaft, gland nut and O-rings
Hand wheel meets resistance when turning or turns unevenly (i.e. cork-screws)	1. Shaft dry	Disassemble the shaft sub-assembly and lubricate shaft
	2. Shaft bent	Disassemble the shaft sub-assembly and replace shaft

## Table 2 - Recommended Tool List

PART NO.	DESCRIPTION	APPLICATION
AT84	O-Ring Pick	O-Rings
AP1493	PerFluoroLube® 20/1 (Lubricant)	O-Ring Lubrication
AT76-4	2,5 mm Hex Key	Screw M4 x 10 CSK (14)
AT37	5 mm Hex Key	Blanking Plug (9)
AT35	8 mm Hex Key	Retaining Nut (8)
495371	17 mm Spanner/Wrench	1/2" – 9/16" Connector (11)
487076	22 mm Spanner/Wrench	Gland Nut Helmet Side Block Valve (4)
490932	1/2" Spanner/Wrench	Screw 5/16" (13)
	1/4" Hex key	Helmet Latch Cap Screw 400113
	5mm Hex Key Bit (for torque wrench)	Port Plug
	8mm Hex Key Bit (for torque wrench)	Retaining Nut (8)
	17mm Hex Key Bit (for torque wrench)	1/2" – 9/16" Connector (11)
	7/8" Crowfoot Fitting (for torque wrench)	Gland Nut Helmet Side Block Valve (4)
	1/2" Crowfoot Fitting (for torque wrench)	Screw 5/16" (13)
	Torque Wrench in Nm (or in.lbs)	Apply torques as listed in Table 4

# Cleaning and Lubrication Procedure

## Cleaning Brass and Stainless Steel Parts

1. If required, pre-clean in warm, soapy water\* using a nylon bristle tooth brush.
2. Thoroughly clean parts in an ultrasonic cleaner filled with a solution of household white distilled vinegar (Acetic Acid) mixed with fresh water (max 50% vinegar). Clean ultrasonically for 5 minutes (max 10 minutes). DO NOT place plastic, rubber, silicone or anodized aluminium parts in vinegar.
3. Remove parts from the ultrasonic cleaner and rinse with fresh water. If tap water is extremely “hard,” place the parts in a bath of distilled water to prevent any mineral residue. Agitate lightly, and allow to soak for 5-10 minutes. Remove and blow dry with low pressure (25 PSI/1.7 Bar) filtered air. Inspect closely to ensure proper cleaning and like-new condition.

## Cleaning Plastic & Rubber Parts

Parts made of plastic or rubber may be soaked and cleaned in soapy water. Use only a soft nylon toothbrush to scrub away any deposits. Rinse in fresh water and thoroughly blow dry, using low pressure filtered air.





**Caution:** Do not place plastic and rubber parts in acid solutions. Doing so may alter the physical properties of the component, causing it to prematurely degrade and/or break.

## Lubrication and Dressing

All O rings should be lubricated with Christo-Lube MCG-111 or PerFluoroLube 20/1. 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 lubricant as this will attract particulate matter that may cause damage to the O ring.

\*Soapy water is defined as “household” grade liquid dishwashing detergent diluted in warm water.

## Table 3 - Recommended Lubricants & Cleaners

LUBRICANT / CLEANER	APPLICATION	SOURCE
Christo-Lube® MCG-111 (Lubricant).	All O ring seals	Lubrication Technologies 310 Morton Street Jackson, OH 45640, USA (800) 477-8704, or Apeks Marine Equipment Ltd PN AP1495
PerFluoroLube® 20/1 (Lubricant).	All O ring seals	Performance Fluids Suite 101 Lomeshaye Buisness Park Turner Road Nelson Lancashire BB9 7DR
<div style="border: 1px solid black; padding: 5px;">  <b>CAUTION:</b> 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	Biox LTD 52 Hughenden Avenue High Wycombe Bucks HP13 5SJ
White distilled vinegar (100gr.) (Cleaning agent)	Acid bath / ultrasonic cleaner for reusable stainless steel and brass parts	"Household" grade
<div style="border: 1px solid black; padding: 5px;">  <b>CAUTION:</b> 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 dish washing detergent diluted with warm water (Cleaning agent)	Degreaser for stainless steel and brass parts, general cleaning solution for plastic and rubber	"Household" grade

## Table 4 - Torque Specifications

PART NUMBER	DESCRIPTION / KEY NUMBER	TORQUE
AP8021	Retaining Nut M5 Helmet Side Block Valve	5 Nm (44 in.lbs)
AP3048	Gland Nut Helmet Side Block Valve	12 Nm (106 in.lbs)
AP3047	Blanking Plug	5 Nm (44 in.lbs)
530005	1/2" – 9/16" Connector	15 Nm (133 in.lbs)
530006	Hexagonal Screw 5/16"	15 Nm (133 in.lbs)
AP0203/1-0.27MT	MP Short Hose (3/8" male thread end)	5 Nm (44 in.lbs)
AP0203/1-0.27MT	MP Short Hose (11/16 swivel head end)	5 Nm (44 in.lbs)

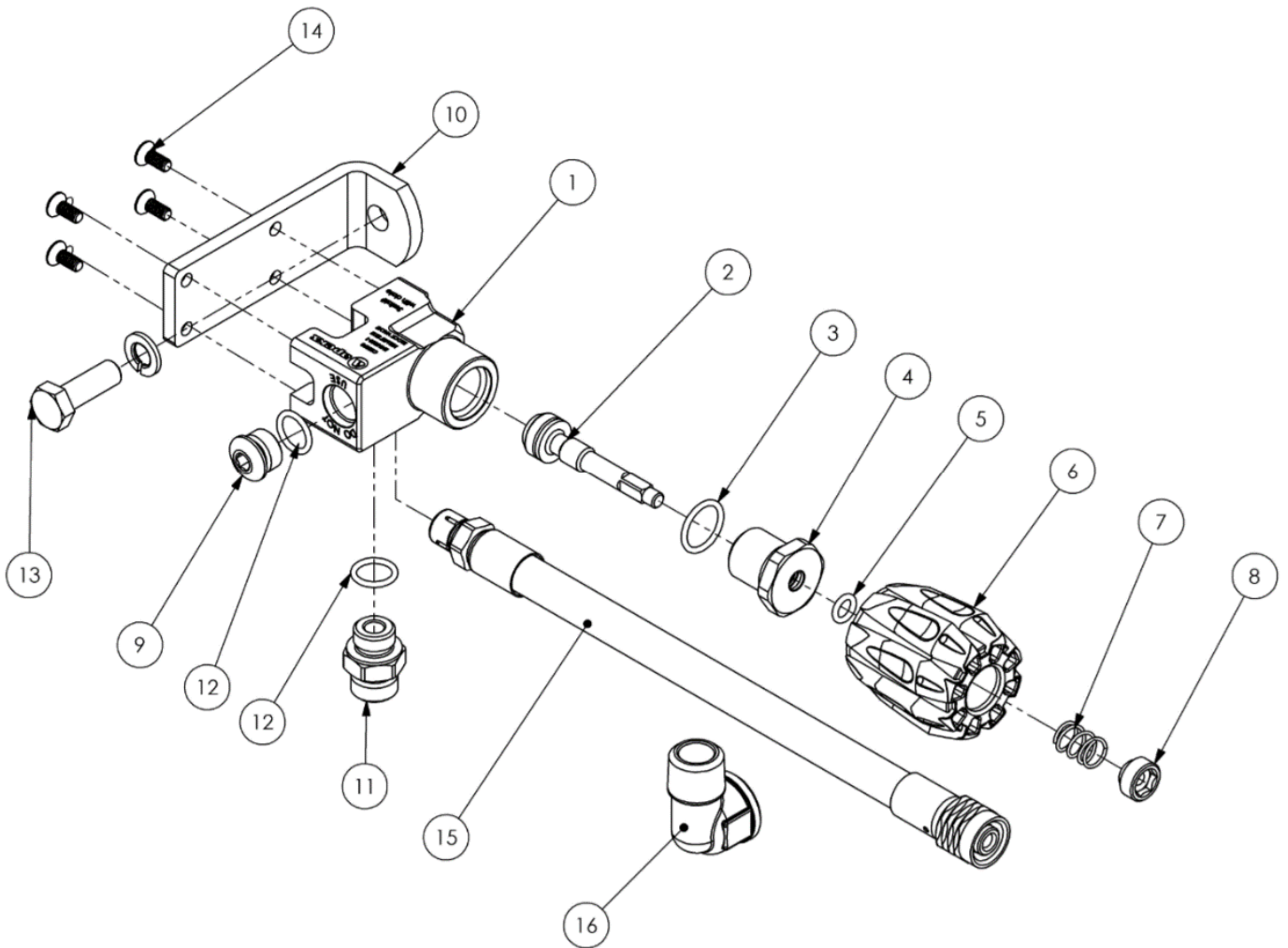
## Table 5 - Test Bench Specifications

TEST	CONDITION	ACCEPTABLE RANGE
Internal/External Leak	High Pressure >200 Bar Gauge (2900 psi) Med Pressure $9.5 \pm 0.5$ Bar ( $137 \pm 7$ psi)	No Visual Leaks Allowed

# AP0281/SB Helmet Side Block Valve

## Exploded View

1	530001	Helmet side block valve body	9	AP1487	Plug 1/2"
2	AP3047	Shaft helmet side block valve	10	530002	Support
3	AP1267	BS015 'O' Ring	11	530005	1/2" - 9/16" LP Connector
4	AP3048	Gland nut helmet side block	12	AP1410	BS013 'O' Ring
5	AP1154	BS010 'O' Ring	13	530006	Hexagonal Screw 5/16" x 24
6	AP8014	Handwheel	14	AP3056	Screw M4 x 10 CSK A4
7	AP4012	Spring	15	AP0203/1-0.27M	MP short hose
8	AP8021	Nut	16	AP2555	Elbow 3/8" to 3/8" NPT





**TECHNICAL SUPPORT**

**HELMET SIDE BLOCK VALVE**

**OWNER and MAINTENANCE MANUAL**

Apeks Marine Equipment Ltd  
Neptune Way, Blackburn, Lancashire, England, BB1 2BT  
Tel: 0044 (0) 1254 692200