



# **APV200 Inflator Maintenance Manual**

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Written by Tino de Rijk

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# 1. Introduction

## 1.1 Functional description

Developed from the original A.P.Valve, the APV200 has been ergonomically restyled but continues to offer the combined functions of a BCD power inflator and emergency jacket breathing valve. The APV200 is a replacement part for post-2007 (BUDDY and AP Diving) BCD's.

N.B. If you require a replacement for pre-2007 BUDDY BCD's, you need the previous version of this inflator, the AP200.

## 1.2 Servicing

Before servicing this APV200 inflator, you must receive instruction and certification in the maintenance of this breathing valve/inflator by AP Diving Ltd.

Without the correct training it is possible to configure the APV200 inflator incorrectly in an unsafe manner. Factory or Dealer prescribed service for this gas isolator is recommended at least once annually.



**WARNING:** when servicing the APV200 inflator it is VERY important that all parts that may suffer wear and tear get replaced. It is also very important that the correct tools are used to avoid damaging any part of the breathing valve/inflator in the disassembly and assembly process. Please don't try to save money by re-using parts that really should be replaced during a proper service.

## 1.3 Warranty

This APV200 inflator is covered by APD's 1-year warranty against defects in materials or workmanship. This warranty is only extended to the original purchaser, and is not transferable. For more information, be sure to read the warranty section of the user manual, and the purchaser should save the sales receipt.

A copy of the receipt must be presented whenever obtaining warranty service.

## 1.4 Copyright and Applicable Law

This Maintenance 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 (including the Internet) or machine-readable form without prior consent in writing from AP Diving Ltd.

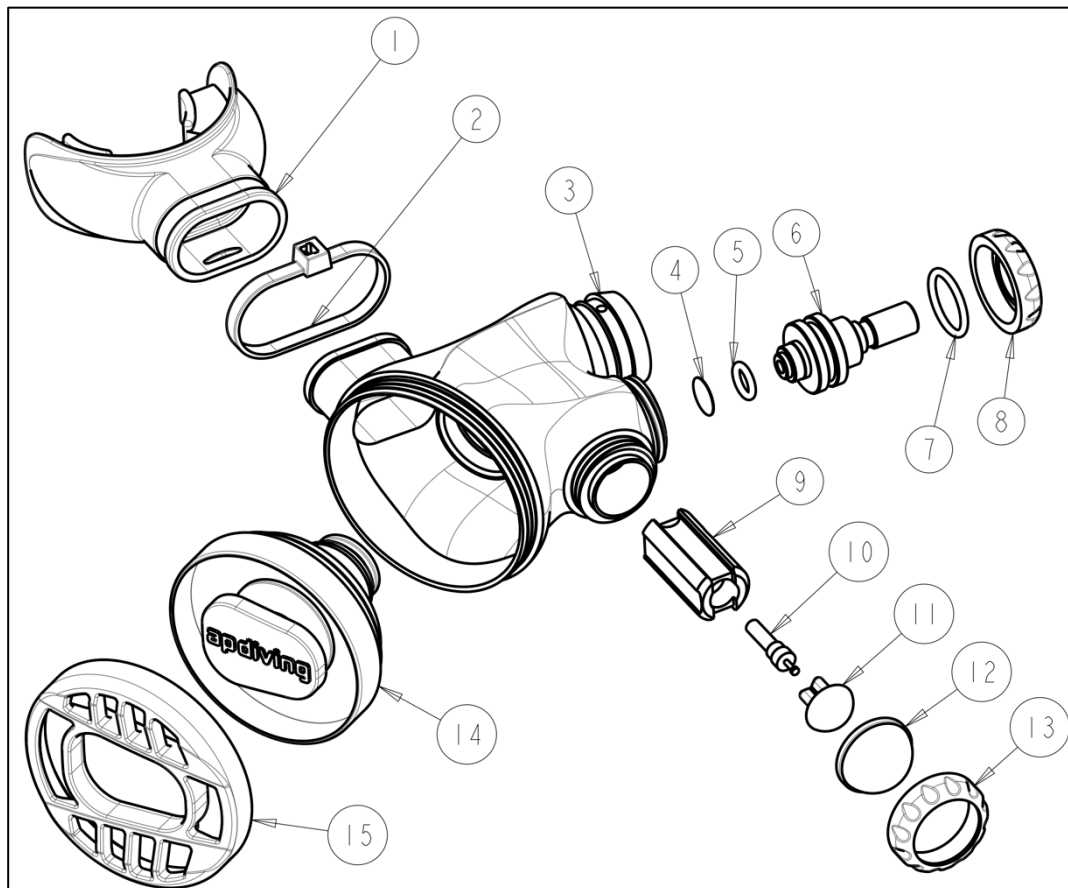
All products are sold on the strict understanding that only English Law applies in cases of warranty claims and product liability, regardless of where the equipment is purchased or used. Should a claim be made then the venue for this would be in Truro, England.

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APV200 inflator Maintenance Manual

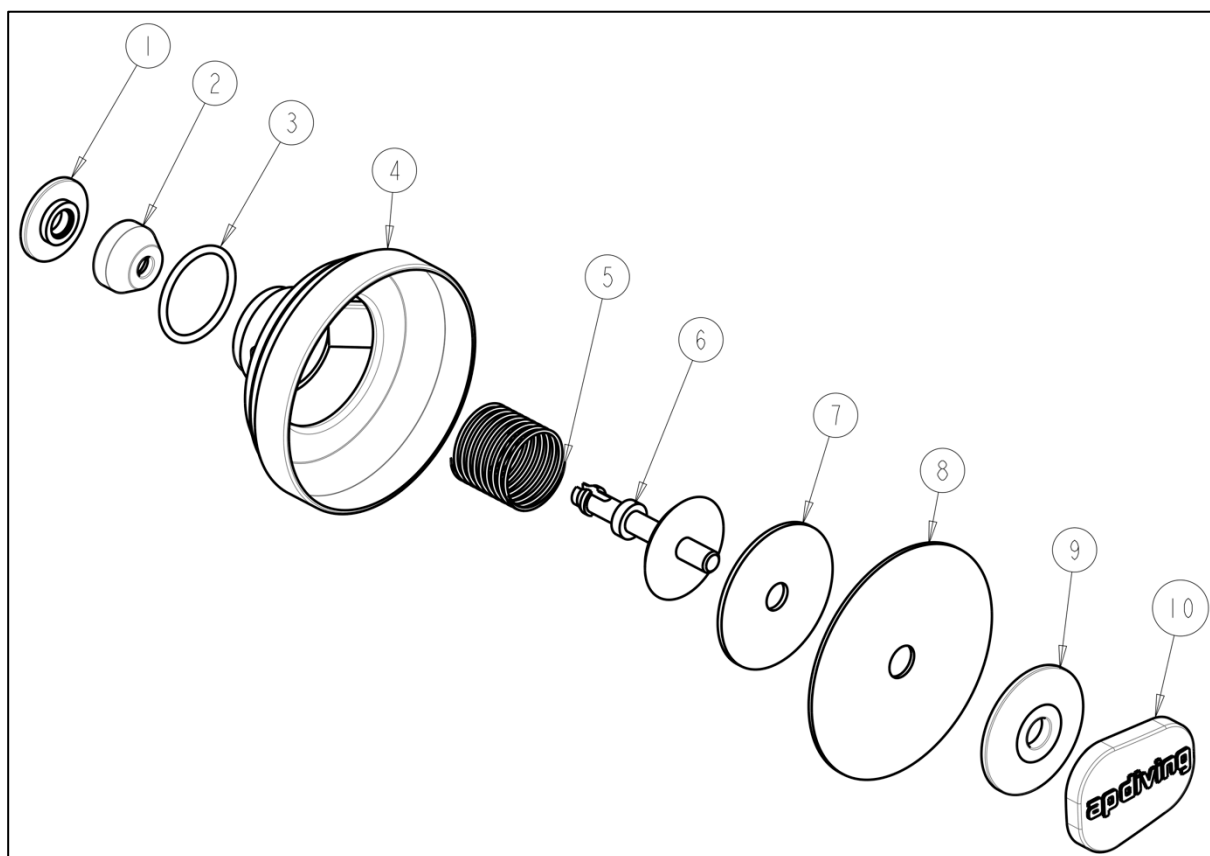
## 2. APV200 inflator Exploded Diagram and Parts List

### 2.1 APV200 inflator Main Assembly



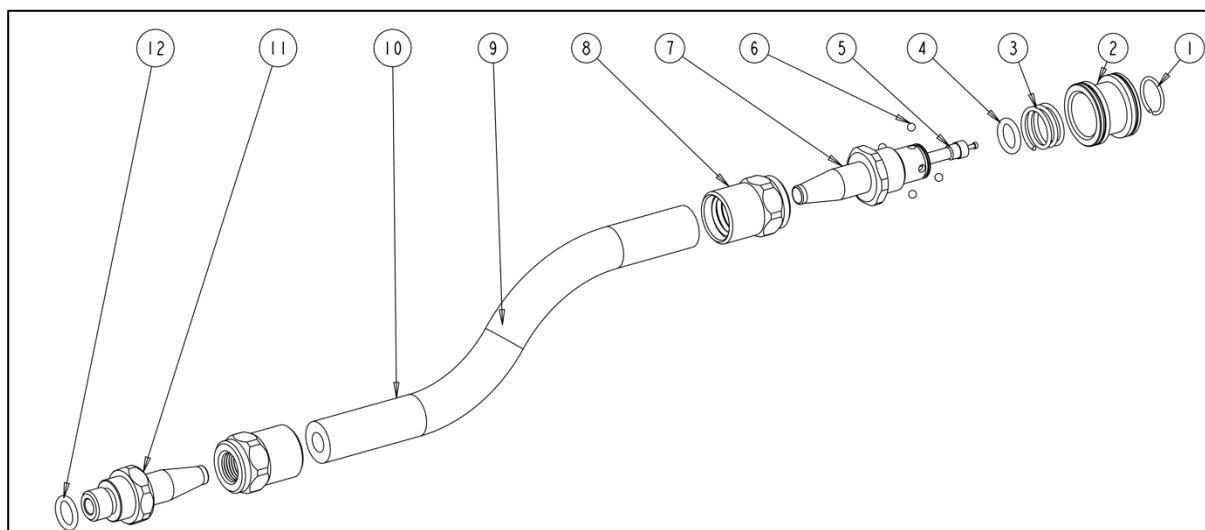
| <b>NUMBER</b> | <b>DESCRIPTION</b> | <b>PART NUMBER</b> | <b>QUANTITY</b> |
|---------------|--------------------|--------------------|-----------------|
| 1             | Mouth piece        | AP-18              | 1               |
| 2             | Ty-rap             | AP-21              | 1               |
| 3             | APV200 body        | APV-200-1          | 1               |
| 4             | Mesh filter        | AP-100-41          | 1               |
| 5             | BS010 O-ring       | BS-010-N70         | 1               |
| 6             | Inlet stem         | APV-200-10         | 1               |
| 7             | BS015 O-ring       | BS-015-N70         | 1               |
| 8             | Stem retainer      | APV-100-12         | 1               |
| 9             | Direct feed body   | AP-200-12-N        | 1               |
| 10            | Core valve         | AP-100-44          | 1               |
| 11            | Direct feed button | AP-200-14N         | 1               |
| 12            | Button cap         | AP-100-14          | 1               |
| 13            | Cap retainer       | APV-100-13         | 1               |
| 14            | Breathing module   | APV-200-3          | 1               |
| 15            | Module cap         | APV-100-10         | 1               |

## 2.2 APV200 Breathing Module



| NUMBER | DESCRIPTION          | PART NUMBER    | QUANTITY |
|--------|----------------------|----------------|----------|
| 1      | Back end washer      | AP-100-39      | 1        |
| 2      | Back end rubber      | AP-100-38      | 1        |
| 3      | BS 18.1 x 1.6 O-ring | BS18.1+1.6-N70 | 1        |
| 4      | Body                 | AP-100-37      | 1        |
| 5      | Spring               | AP-100-36      | 1        |
| 6      | Stem                 | AP-100-35      | 1        |
| 7      | Washer               | AP-100-34      | 1        |
| 8      | Diaphragm            | AP-200-33      | 1        |
| 9      | Diaphragm washer     | AP-100-32      | 1        |
| 10     | Button               | APV-100-31     | 1        |


## 2.3 AP50 Inflator Hose Assembly



| <b>NUMBER</b> | <b>DESCRIPTION</b>            | <b>PART NUMBER</b> | <b>QUANTITY</b> |
|---------------|-------------------------------|--------------------|-----------------|
| 1             | Collar circlip                | AP-50-P6           | 1               |
| 2             | Sliding collar                | AP-50-P1           | 1               |
| 3             | Spring                        | AP-50-P5           | 1               |
| 4             | O-ring                        | BS-011-N70         | 1               |
| 5             | Schraeder valve               | AP-100-44          | 1               |
| 6             | Ball bearing                  | AP-50-P7           | 4               |
| 7             | Snap connector body           | AP-50-P2           | 1               |
| 8             | Hose collar                   | AP-50-P3           | 2               |
| 9             | Oxygen heat shrink (optional) | HS-01              | 1               |
| 10            | Hose                          | AP-50-C            | 1               |
| 11            | 3/8" UNF hose end             | AP-50-P4           | 1               |
| 12            | O-ring                        | BS-903-N70         | 1               |


### 3. Service Kit Contents and Tools

#### 3.1 Service Kit Contents

 **WARNING:** When replacing O-rings, next to the size, the hardness of the O-rings (declared in degrees Shore, and indicated by the suffixes N70 or N90) is ESSENTIAL for proper operation. AP Diving deliberately chooses the N70 hardness of the O-rings for the APV200 inflator.

If, against our recommendation, you choose to select your O-rings to come from another source than AP Diving Ltd., make sure you select the right type in size AND hardness AND material (composition).

The main service kit for the APV200 inflator has part number APV200A:

| SERVICE KIT DESCRIPTION  | PART NUMBER |
|--|-------------|
| APV200 Inflator Service Kit<br> This is the primary service kit with all parts that should be replaced during regular service | APV200A     |

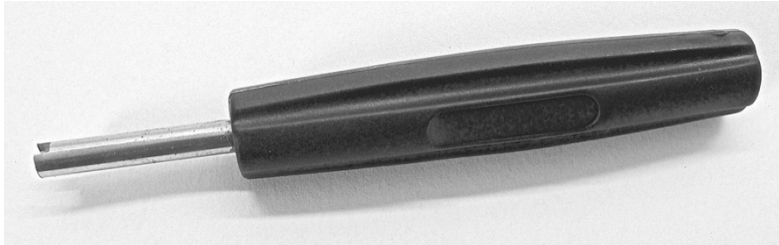




### 3.2 Special Tools needed

When servicing the APV200 inflator, the following special tool is needed:

| DESCRIPTION  | PART NUMBER |
|--|-------------|
| Tool for removing/replacing the core valve and Schraeder valve | AP50E       |



AP50E

### 3.3 Standard Tools needed

Besides the special tools mentioned above, there are no special tools needed for servicing the APV200 inflator gas isolator.

Normal tools needed are:

- Pliers;
- O-ring picking tools;
- Oxygen-compatible or Silicon grease (depending on the gas the inflator is exposed to)
  - o see chapter 5 for remarks about when you need to keep this device in oxygen service;
- (Access to) an ultrasonic bath for cleaning the metal parts.



**WARNING:** Do NOT use aggressive chemicals. They might damage the metal plating of the APV200 inflator. Use an ultrasonic cleaning bath with a suitable cleaning fluid. A very good cleaning fluid is Biox "O2" immersion fluid. See [WWW.BIOXINT.COM](http://WWW.BIOXINT.COM) for further information and distributors.

The use of rubber gloves while re-assembling the APV200 inflator is recommended to avoid rendering the APV200 inflator oxygen unclean due to human touch.

## 4. Disassembly Instructions

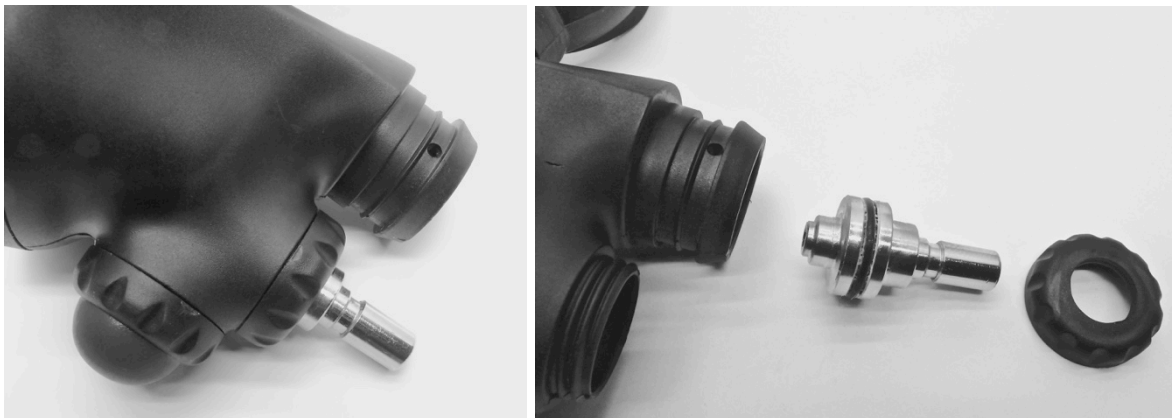
### 4.1 Remove steel pin (if fitted) that holds the pull cord to the dumping elbow

- Push the steel pin out of the main body.
  - o The pin can be just pushed out. It is not screwed in; it is held in place by friction.



### 4.2 Remove stem retainer and inlet stem from main body

- Unscrew the stem retainer counter-clockwise.
- Pull the inlet stem out straight; no need to rotate.



### 4.3 Remove O-ring from inlet stem

- This O-ring needs to be replaced during service.



### 4.4 Unscrew cap retainer from main body

- Unscrew counter-clockwise.



### 4.5 Remove blue button cap

- Just pull it off.
- The button cap needs to be replaced during service.



#### 4.6 Remove direct feed button from direct feed body

- Just pull it out.



#### 4.7 Remove direct feed body from main body

- Shake the main body a bit, and the feed body will drop out.



#### 4.8 Remove O-ring and mesh filter from direct feed body

- Both the O-ring and the mesh filter need to be replaced during service.





#### 4.9 Unscrew core valve from direct feed body

- Use tool AP50E tool or equivalent to unscrew the core valve out of the feed body.
- Unscrew counter-clockwise.
- The core valve needs to be replaced during service.



#### 4.10 Unscrew module cap from APV200 body

- Unscrew counter-clockwise.



#### 4.11 Remove breathing module from APV200 body

- Gently pry the breathing module out.
- It might help a bit to also give the backside of the module a gentle push with your finger, pushing through the big hole of the corrugated hose inlet.
- Make sure you pull it out straight: if you allow it to make an angle with the main body it will get stuck. In that case push it back in all the way and start again.



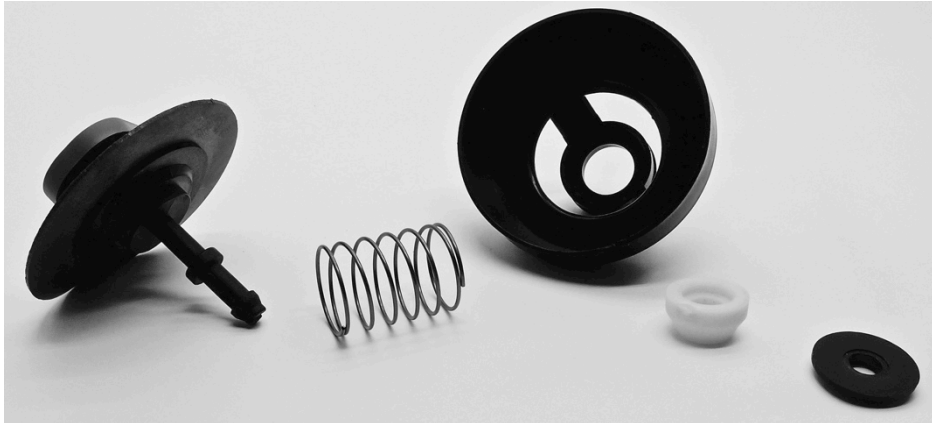
#### 4.12 Pull back end washer and back end rubber from stem assembly

- The end of the stem is split. You can wiggle the back end washer a bit and just pull it off.
- After having removed the washer, the white back end rubber can just be taken off.
- The white back end rubber needs to be replaced during service.



#### 4.13 Remove stem assembly from breathing module

- The stem can now just be taken out.
- Make sure you don't lose the spring.



#### 4.14 Remove O-ring from breathing module

- This O-ring needs to be replaced during service.



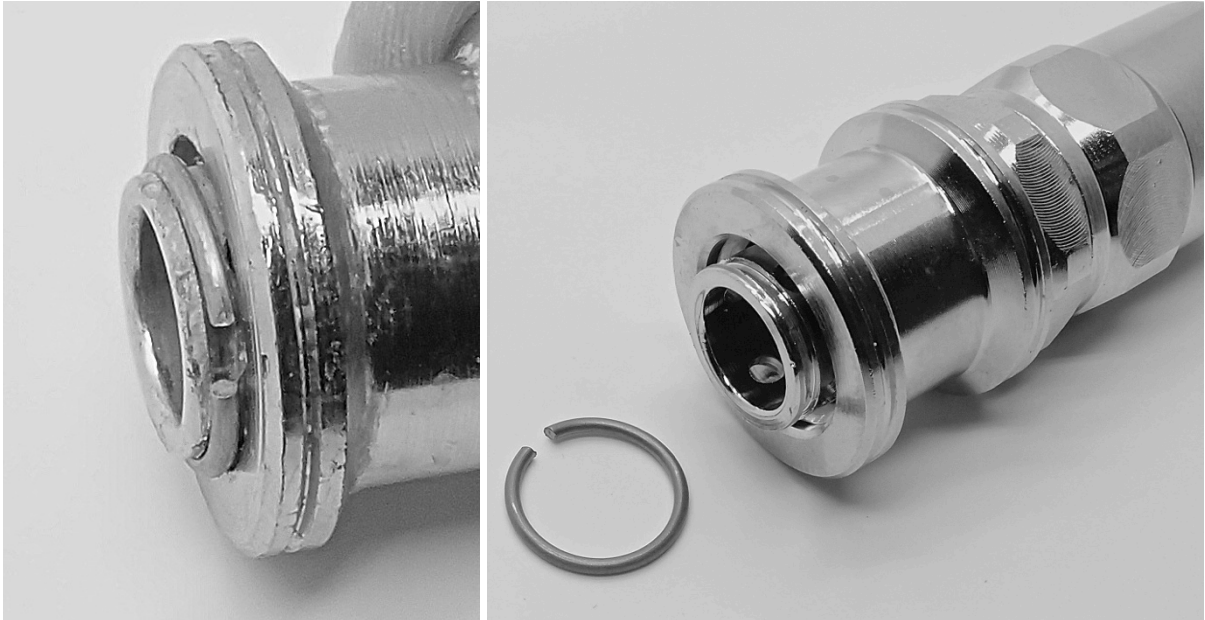
**This completes the disassembly of the APV200 inflator**



## AP50 Medium Pressure (MP) hose disassembly

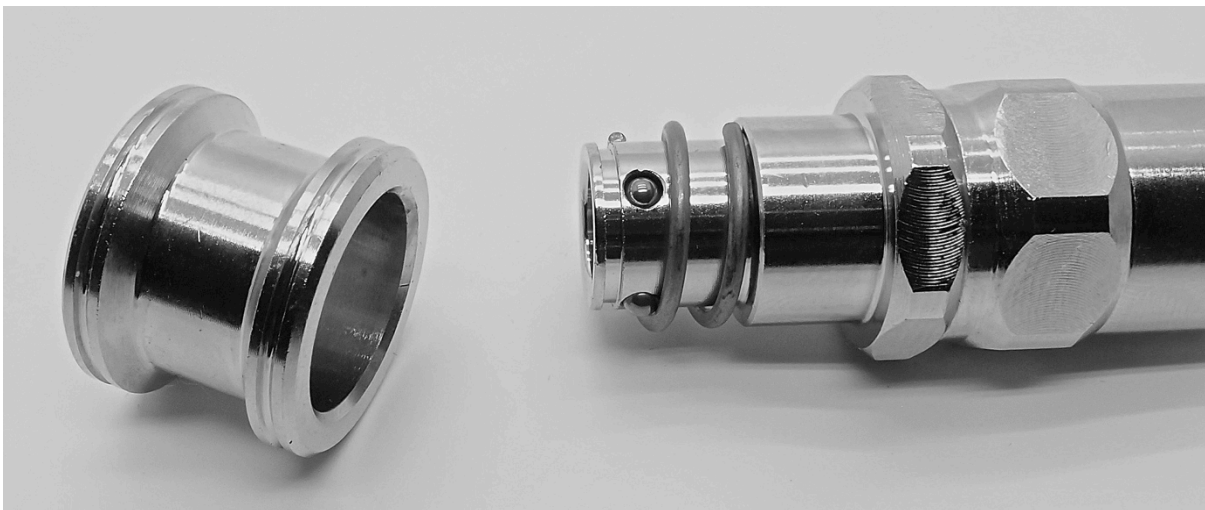
### 4.15 Remove circlip from snap connector body

- Use small pliers to remove the circlip from the snap connector body.
- Take care not to widen the circlip, as it will otherwise not be usable again during assembly.



### 4.16 Remove sliding collar from snap connector body

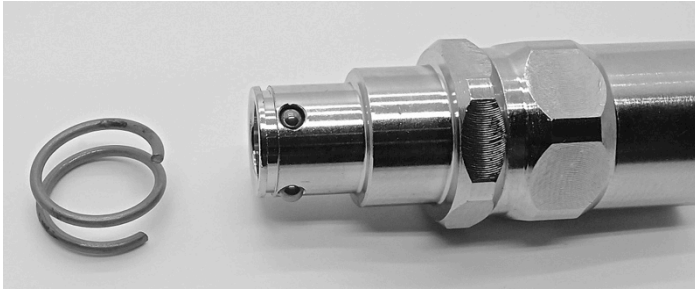
- Just pull it off.





#### 4.17 Remove spring from snap connector body

- Just pull it off.
- Make sure you do not inadvertently let the ball bearings drop out in the process.



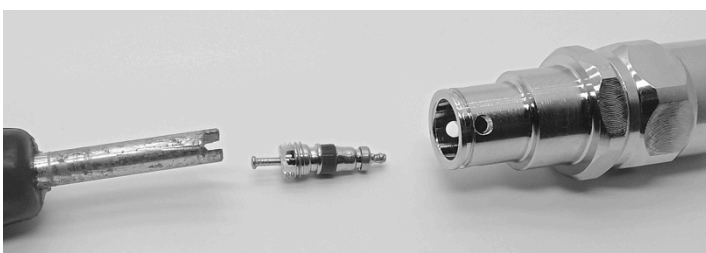
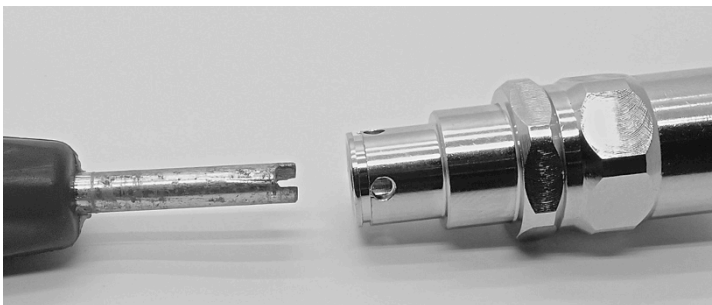
#### 4.18 Remove 4 ball bearings from snap connector body

- Use a small tray to catch the 4 ball bearings to avoid losing them.



#### 4.19 Unscrew Schraeder valve from snap connector body

- Use the AP50E tool or equivalent to unscrew the Schraeder valve from the body.
- Unscrew counter-clockwise.
- This Schraeder valve needs to be replaced during service.



#### 4.20 Remove O-ring from snap connector body

- Use a curved O-ring pick to remove this O-ring.
- This O-ring needs to be replaced during service.



**This completes the disassembly of the AP50 Medium Pressure hose.**

## 5. Clean and Replace Service Parts

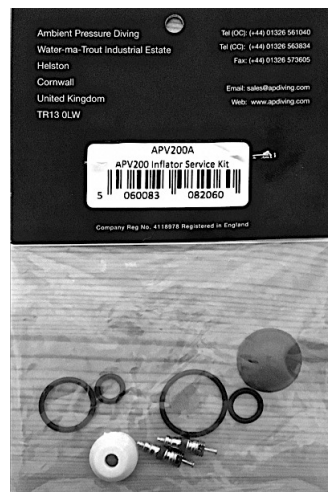
The servicing of the APV200 inflator contains 4 “action groups”:

1. Removing and binning all parts that should be replaced. This includes all O-rings.
2. Depending on the gas content the APV200 inflator is exposed to, keep it in oxygen service. The CGA (Compressed Gas Association), US Navy, UK's HSE and the EIGA (European Industrial Gas Association) all recommend that breathing gasses with an oxygen content of 23.5% or higher should be treated as 100% oxygen. However, some technical training agencies still use 40% as the maximum percentage that is allowed for equipment that is not in oxygen service.  
AP Diving advises to err on the side of safety, and to use the value of 23.5% as the cutoff percentage beyond which the equipment must be in oxygen service.  
If in doubt: keep it in oxygen service, as that only takes a little bit more effort.
3. Ultrasonic-cleaning of all disassembled metal parts. This is mandatory if the APV200 inflator is to be kept in oxygen service, but recommended in all other servicing situations.
4. Lightly grease new parts, fit them, and re-assemble the APV200 inflator with the correct tools and the correct torques. Use oxygen-compatible grease, and avoid contaminating the metal parts after cleaning. Use the smallest amount of grease possible.

### 5.1 Service kit contents

As described in chapter 3.1, all the parts included in the APV200A Inflator Service Kit always need to be replaced when servicing the APV200 inflator. The service kit contents are:

| DESCRIPTION  | PART NUMBER    | QUANTITY |
|--|----------------|----------|
| Button cap   | AP-100-14      | 1        |
| White back end rubber  | AP-100-38      | 1        |
| Mesh filter for direct feed body                               | AP-100-41      | 1        |
| BS010 O-ring for direct feed body                              | BS-010-N70     | 1        |
| Core valves (direct feed body and MP hose snap connector body) | AP-100-44      | 2        |
| BS 18.1 x 1.6 O-ring for breathing module                      | BS18.1+1.6-N70 | 1        |
| BS015 O-ring for inlet stem                                    | BS-015-N70     | 1        |
| BS011 O-ring on inside of snap connector body of MP hose       | BS-011-N70     | 1        |



## 5.2 Ultrasonically clean deposits from all metal parts

Clean deposits from all metal parts, like chalk and salt.



**WARNING:** Do NOT use aggressive chemicals. They might damage the metal plating. Use an ultrasonic cleaning bath with a suitable cleaning fluid instead. A good cleaning fluid is Biox "O2" immersion fluid. See [WWW.BIOXINT.COM](http://WWW.BIOXINT.COM) for further information and distributors.

The use of rubber gloves while re-assembling the APV200 is highly recommended to avoid rendering the APV200 unclean due to human touch.

For photographic clarity no rubber gloves are worn on the photos in this manual.

## 5.3 Replace all O-rings with new ones from the Service Kit



**WARNING:**

- Replace all O-rings: do NOT re-use old ones.
- ONLY use original parts from APD, to make sure the O-rings:
  - o Are the exact size;
  - o Are of the correct material (especially important in a high oxygen content and overpressure environment);
  - o Are of the correct stiffness (degrees Shore).

## 6. Assembly Instructions

**⚠ WARNING:** When assembling the APV200 inflator, use rubber gloves to avoid polluting it while assembling and rendering it not oxygen-clean.

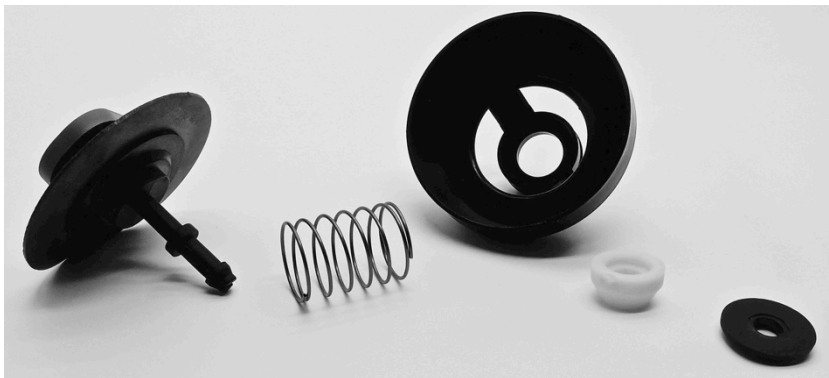
### 6.1 Fit new O-ring onto breathing module

- This O-ring needs to be replaced during service.



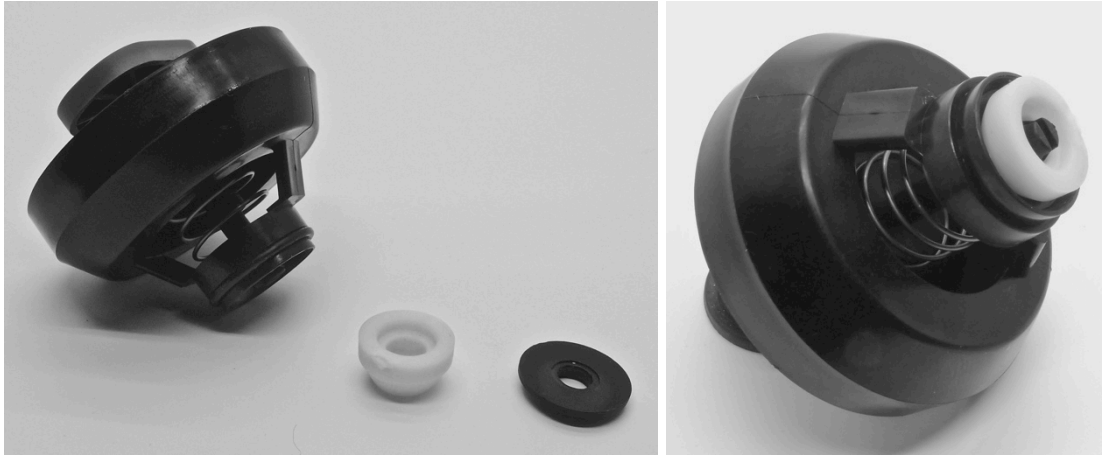
### 6.2 Push stem assembly with spring into breathing module

- Put the spring onto the stem.
- Push the stem with fitted spring into the breathing module.



### 6.3 Put new back end rubber and back end washer onto stem assembly

- The end of the stem is split. You can just push the new white back end rubber onto the stem assembly, with the rounded side facing the breathing module.
- Push the back end washer over the split end of the stem.
- Check proper placement by rotating the washer to make sure it is fully over the split end of the stem.



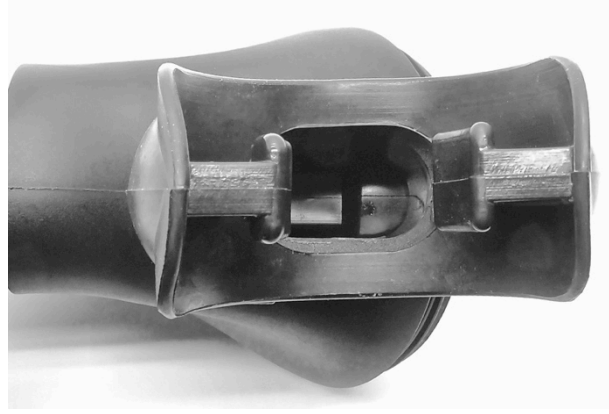
### 6.4 Push breathing module into APV200 body

- Gently push the breathing module straight into the body, making sure not to trap or dislodge the O-ring in the process.
- Make sure the legs are in the correct position, as shown on next page.
  - o Do NOT rotate the breathing module during placement.





**CORRECT**: legs of breathing module are NOT visible through mouthpiece



**INCORRECT**: legs of breathing module ARE visible through mouthpiece

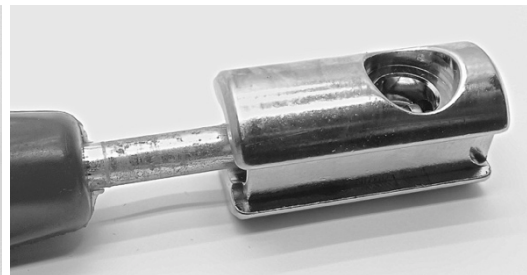
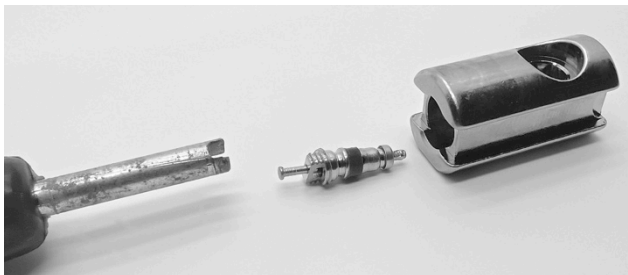
### 6.5 Screw module cap onto APV200 body

- Screw clockwise.



### 6.6 Screw new core valve into direct feed body

- The core valve needs to be replaced during service.
- Use tool AP50E tool or equivalent to screw the core valve into the feed body.
- Screw clockwise.





### 6.7 Fit new O-ring and mesh filter into direct feed body

- Both the O-ring and the mesh filter need to be replaced during service.



### 6.8 Push direct feed body into main body

- Notice the grooves in the side of the direct feed body. They need to align with the ridges inside the direct feed body hole of the main body.
- The O-ring needs to be facing up, in the direction of the direct feed button hole.
  - o When placed correctly, the O-ring is visible in the dead center of the direct feed button hole.



### 6.9 Push direct feed button into direct feed body

- Just push it in.





### 6.10 Fit new blue button cap

- Just push it on.
- Make sure there is no visible gap between the blue cap and the main body.



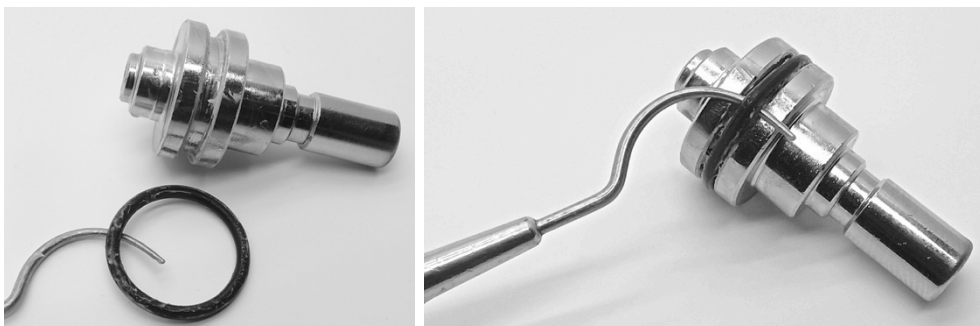
### 6.11 Screw cap retainer onto main body

- Screw clockwise.
- The retainer should be done up tight using a torque of 2 Nm, which is as tight as possible using your fingers PLUS nipping it up with a suitable tool.
  - o Make sure not to damage the retainer in the process.
- If the retainer is not securely tightened there is a risk of it being lost over time, which may result in catastrophic failure if unnoticed.



### 6.12 Fit new O-ring onto inlet stem

- This O-ring needs to be replaced during service.



### 6.13 Push inlet stem into main body and screw stem retainer on

- Push the inlet stem straight in.
- Make sure the inside end of the stem (the shorter left side on the photo) hooks into the O-ring of the direct feed body which should be visible in the centre of the hole.
- Screw the stem retainer on, clockwise.
- The retainer should be done up tight using a torque of 2 Nm, which is as tight as possible using your fingers PLUS nipping it up with a suitable tool.
  - o Make sure not to damage the retainer in the process.
- If the retainer is not securely tightened there is a risk of it being lost over time, which may result in catastrophic failure if unnoticed.



### 6.14 Refit steel pin (if fitted) that holds the pull cord to the dumping elbow

- o Push the steel pin into the main body. It is held in place by friction.



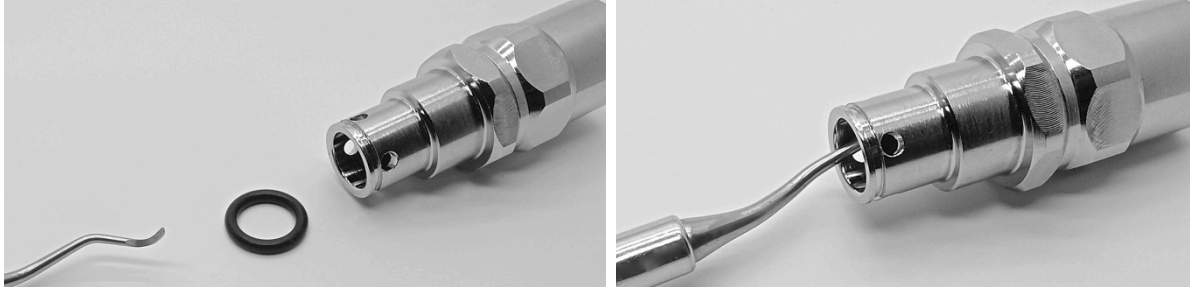
**This completes the re-assembly of the APV200 inflator**



## AP50 hose assembly

### 6.15 Fit new O-ring inside snap connector body

- Fit a new lightly greased O-ring to the inside of the snap connector body.



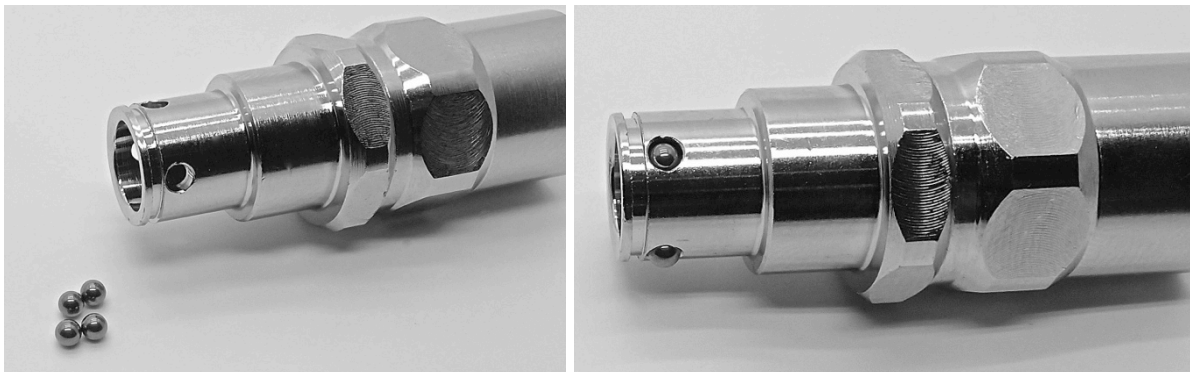
### 6.16 Screw new Schraeder valve into snap connector body

- Use tool AP50E or equivalent to screw a new Schraeder valve into the snap connector body.
- Screw clockwise. Do not use force.



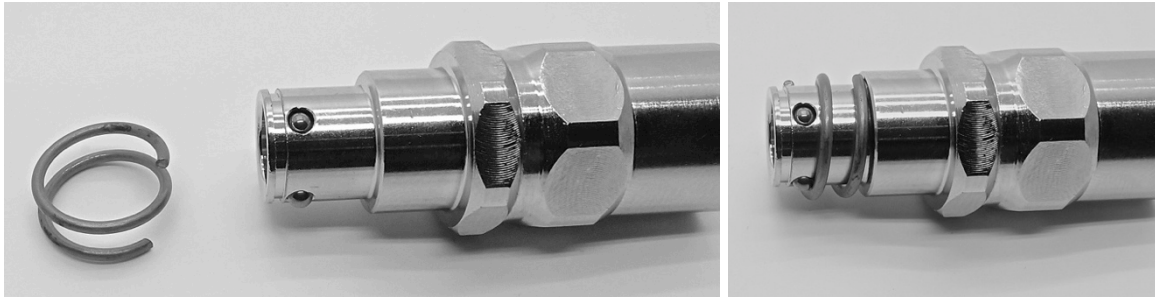
### 6.17 Push 4 ball bearings back into snap connector body

- Lightly grease the ball bearings before putting them back in place.
  - o This will also help to prevent them falling out again in the process.
- Perform this and the next action above a tray, so you don't lose the ball bearings if they happen to drop out.
  - o Check that all 4 ball bearings are in place before proceeding.



### 6.18 Put spring onto snap connector body

- Again: make sure you do not lose one of the 4 ball bearings during this step.




### 6.19 Push sliding collar onto snap connector body

- The collar can only go on in one way. Push it on with the wider opening facing the hose, and the smaller opening facing the circlip, to be fitted in the next step.
- Again: make sure you do not lose one of the ball bearings during this step.



### 6.20 Refit circlip onto snap connector body

- Before fitting it back on, make sure it hasn't been stretched and become too wide during removal. If unsure: use a new circlip.
-  **WARNING:** If that is the case, it may come inadvertently off again during use, rendering the whole hose connection and anything it is attached to inoperable!
- Just push it back on. Check that you can rotate it in its groove after fitting. It should rotate, but only with slight difficulty. If it rotates too easily, it may have become too wide. In that case remove it, tighten it up and refit it – or fit a new one.



**This completes the re-assembly of the AP50 Medium Pressure hose.**

## 7. Testing Instructions

### 7.1 Test spring operation and hose sealing by pushing complete hose on and off the Inflator unit

- If assembled correctly, the sliding collar should jump forward while pushing / sliding it onto inlet stem of the inflator.
- If assembled correctly, pulling back the sliding collar will release the hose from the Inflator.

### 7.2 Test for leaks and proper operation

1. With the MP hose disconnected, close up the BCD/wing convoluted hose inlet with your thumb while simultaneously pressing on the big grey deflation button with your index finger from the same hand. Now try to breathe in or out through the mouthpiece: no air should come in or out.
2. Keep blocking the big BCD/wing convoluted hose inlet with your thumb, and also keep pressing the big grey deflation with your index finger. Now press on the blue inflation button. Now breathe in again through the mouthpiece: you should be able to breath in and out (with considerable resistance) with air coming only through the MP hose inlet.
3. Release all fingers, except the index finger that keeps pressing on the big grey deflation button. Breathe in and out through the mouthpiece: you should be able to breath in and out without resistance, with air coming in only through the BCD/wing convoluted hose entrance. Check that by blocking the BCD/wing convoluted hose entrance temporarily with your thumb.
4. With all fingers released, blow on the BCD/wing convoluted hose inlet. The air flow should be blocked. Now depress the big grey deflation button. Air should be able to flow freely without resistance through the inflator, escaping through the mouthpiece.
5. Connect the AP50 MP hose to an MP air source (around 9 bar). Submerge it in water. No bubbles should come out.
6. Connect the AP50 MP hose a few times to the Inflator and disconnect. This should be a smooth operation and no leaks should be present. Check by submerging in water.
7. With the EV50 MP hose connected, press on the blue inflation button. Air should come out of the inflator. When you stop pressing the blue button, the gas flow should stop.