



# **APV300 Inflator Maintenance Manual**

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Written by Tino de Rijk

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# 1. Introduction

## 1.1 Functional description

The APV300 is a low profile power inflator with inflate, deflate and oral inflate functions. It is designed for use with the AP travel BCD range - the AP Commando Escape or the AP Travelwing. Please Note: the APV300 does not feature the emergency jacket-breathing function of the other AP valves - the AP200 series or the AP100 Auto Air series - which are designed to be used in conjunction with a 0.4 litre emergency mini-cylinder. The AP travel BCDs do not have a facility for mounting an emergency mini-cylinder.

## 1.2 Servicing

Before servicing this APV300 inflator, you must receive instruction and certification in the maintenance of this valve by AP Diving Ltd. Without the correct training it is possible to configure the APV300 inflator incorrectly in an unsafe manner. Factory or Dealer prescribed service for this valve is recommended at least once annually.



**WARNING:** when servicing the APV300 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 valve 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 APV300 inflator is covered by APD's 2-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

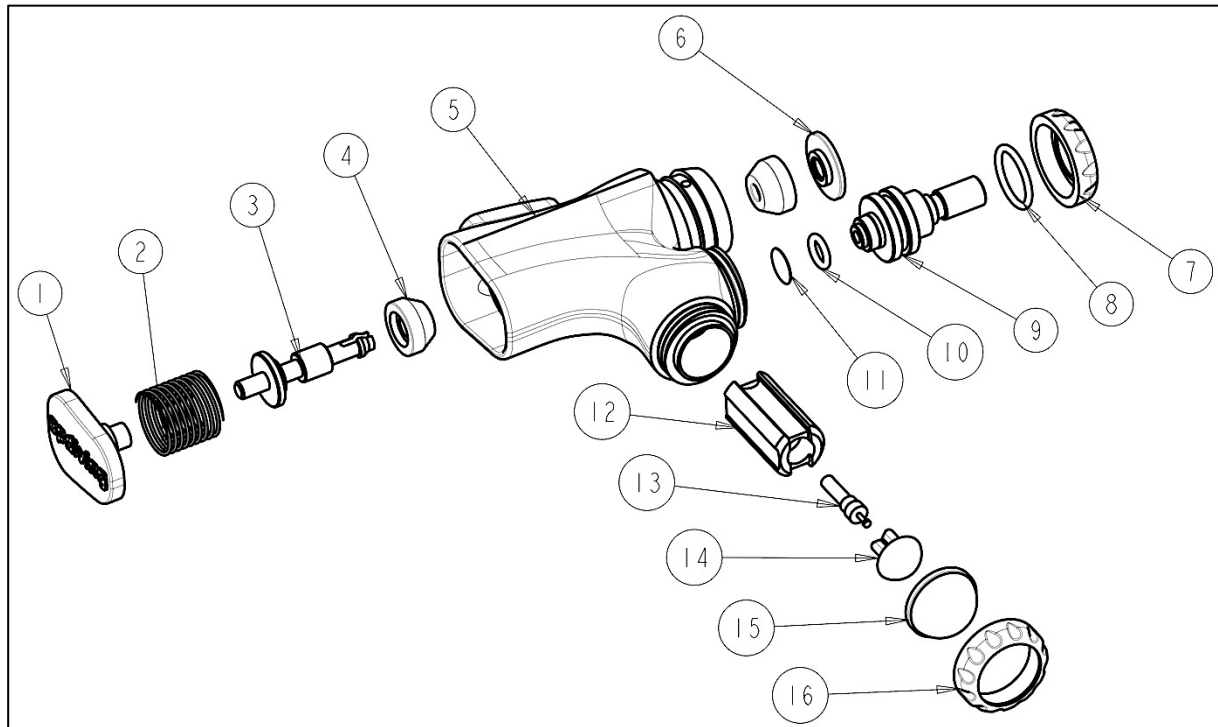
This Maintenance Manual is copyrighted, all rights reserved. It may not, in whole or in part, be copied, photocopied, reproduced, translated, or reduced to any electronic medium (including the Internet) or machine-readable form without prior consent in writing from AP Diving Ltd.

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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APV300 inflator Maintenance Manual

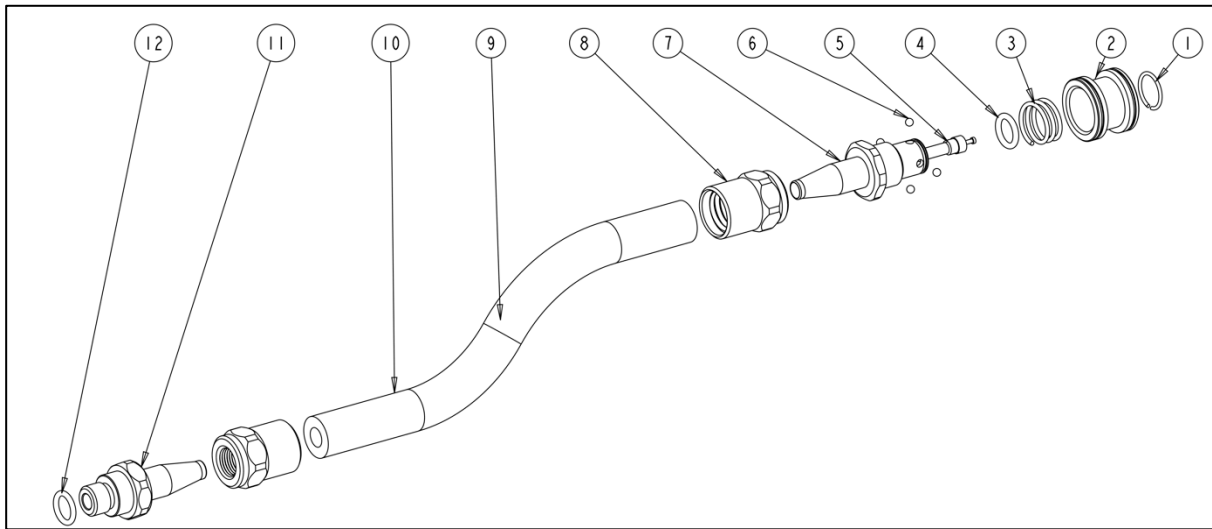
## 2. APV300 Inflator Exploded Diagram and Parts List

### 2.1 APV300 Inflator Main Assembly



<b>NUMBER</b>	<b>DESCRIPTION</b>	<b>PART NUMBER</b>	<b>QUANTITY</b>
1	Button	APV-100-31	1
2	Spring	AP-100-36	1
3	Stem	APV-300-2	1
4	Back end rubber	AP-100-38	2
5	APV300 moulded body	APV-300-1	1
6	Back end washer	AP-100-39	1
7	Stem retainer	APV-100-12	1
8	BS015 O-ring	BS-015-N70	1
9	Inlet stem	APV-200-10	1
10	BS010 O-ring	BS-010-N70	1
11	Mesh filter	AP-100-41	1
12	Direct feed body	AP-200-12-N	1
13	Core valve	APV-100-44	1
14	Direct feed button	AP-200-14N	1
15	Button cap	AP-100-14	1
16	Cap retainer	APV-100-13	1

**2.2 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 APV300 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 APV300 inflator has part number APV300A:

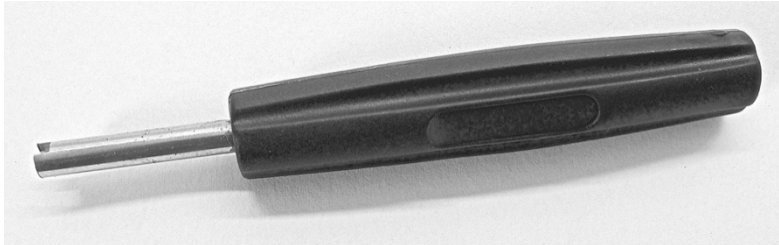
SERVICE KIT DESCRIPTION	PART NUMBER
<p>APV300 Inflator Service Kit</p> <p><b>⚠</b> This is the primary service kit with all parts that should be replaced during regular service</p>	<p>APV300A</p>



### 3.2 Special Tools needed

When servicing the APV300 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 APV300 inflator valve.

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 APV300 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 APV300 inflator is recommended to avoid rendering the APV300 inflator oxygen unclean due to human touch.



## 4. Disassembly Instructions

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

- Push the stainless 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 Unscrew stem retainer from main body

- Unscrew counter-clockwise.
- This retainer needs to be replaced during service.



### 4.3 Remove inlet stem from main body

- Pull it out straight.



### 4.4 Remove O-ring from inlet stem

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



### 4.5 Unscrew cap retainer from main body

- Unscrew counter-clockwise.
- This retainer needs to be replaced during service.



#### 4.6 Remove blue button cap

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



#### 4.7 Remove direct feed button from direct feed body

- Just pull it out.



#### 4.8 Remove direct feed body from main moulded body

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



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

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



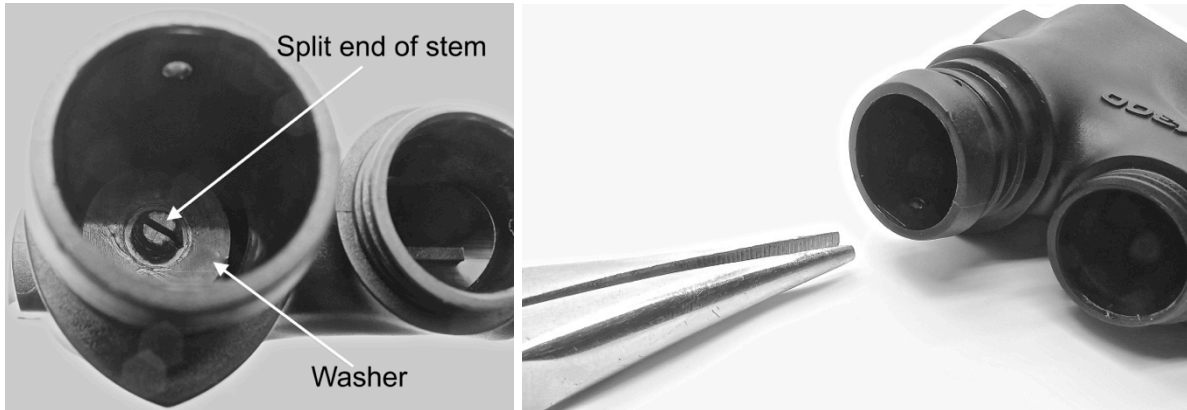
#### 4.10 Unscrew core valve from direct feed body

- 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.



#### 4.11 Remove back end washer from stem

- Use pliers to squeeze the split end of the stem together while simultaneously pushing it down, out of the washer that is holding it in place.
- If this doesn't work, use pliers to squeeze the split end together, and next push the stem out of the washer, using a blunt tool like the handle of a small screwdriver.
- The stem needs to be replaced during service, as it will likely get slightly damaged due to the removal action.



#### 4.12 Remove back end rubber from stem

- Once the stem has been pushed through the hole in the washer, both the washer and the white back end rubber can be pulled from the stem.



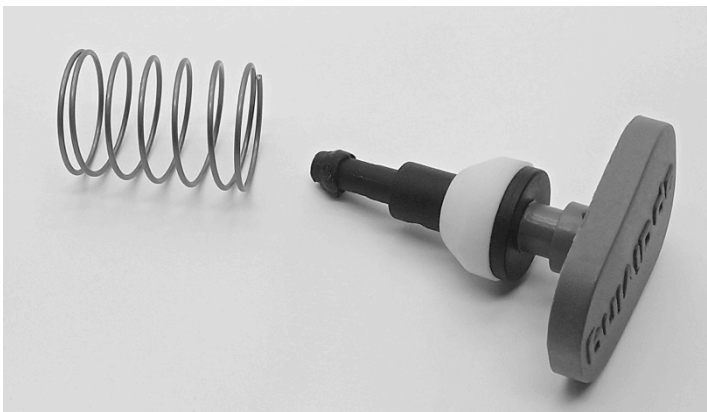
#### 4.13 Pull stem assembly out of moulded body

- Just pull it out.



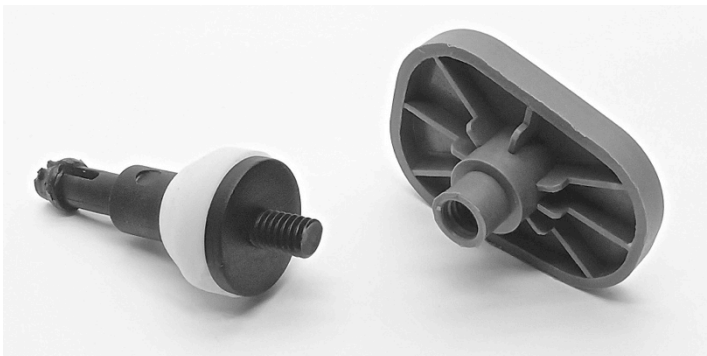
#### 4.14 Remove spring from stem assembly

- Take care not to damage the spring.



#### 4.15 Unscrew stem with back end rubber from button

- Unscrew counter-clockwise.
- Both the stem and the white back end rubber fitted to it need to be replaced during service.

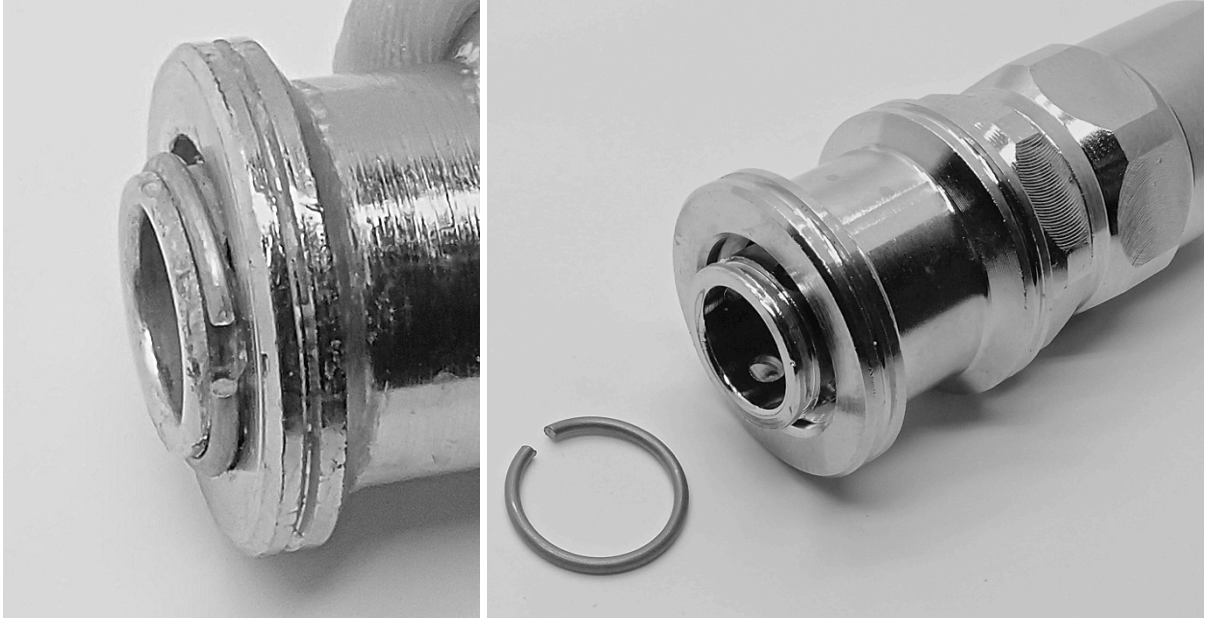


**This completes the disassembly of the APV300 inflator**

## AP50 Medium Pressure (MP) hose disassembly

### 4.16 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, otherwise it will not be usable again during assembly.



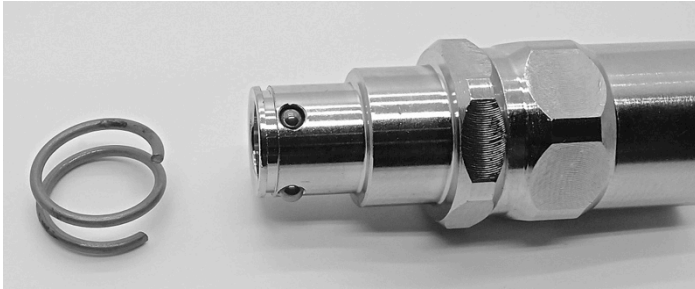
### 4.17 Remove sliding collar from snap connector body

- Just pull it off.



#### 4.18 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.



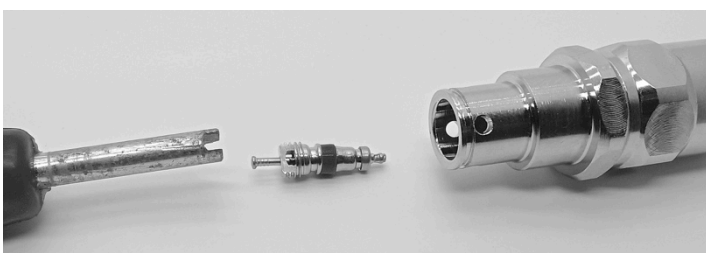
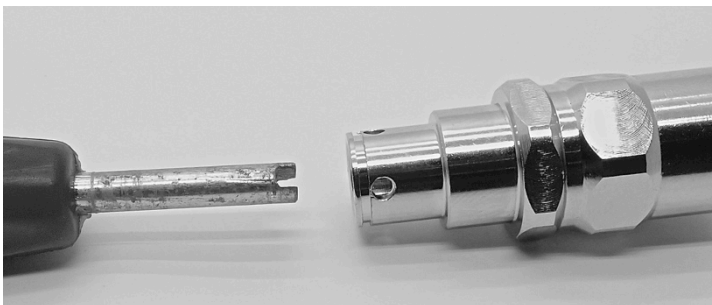
#### 4.19 Remove 4 ball bearings from snap connector body

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



#### 4.20 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.





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

- Carefully use a curved O-ring pick to remove this O-ring, taking care NOT to scratch the bore of the O-ring groove or valve body.
- 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

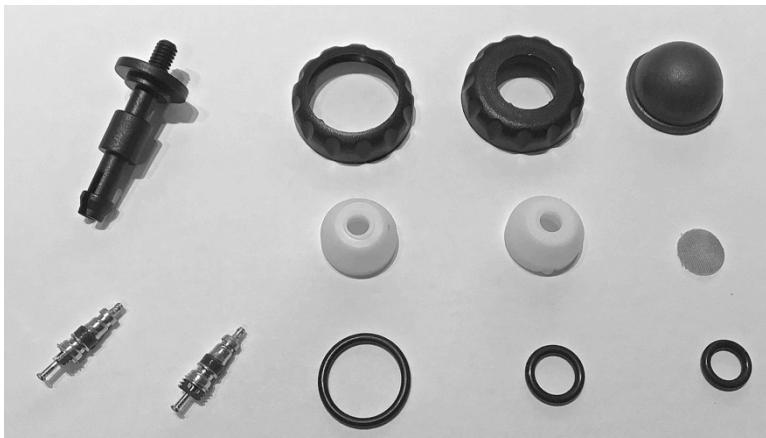
The servicing of the APV300 inflator contains 4 “action groups”:

1. Removing and binning all parts that should be replaced. This includes all O-rings.
2. Depending on the gas content the APV300 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 APV300 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 APV300 inflator with the correct tools. 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 APV300A Inflator Service Kit always need to be replaced when servicing the APV300 inflator. The service kit contents are:

<u>DESCRIPTION</u>	<u>PART NUMBER</u>	<u>QUANTITY</u>
Stem	APV-300-2	1
Stem retainer	APV-100-12	1
Cap retainer	APV-100-13	1
Button cap	AP-100-14	1
White back end rubbers	AP-100-38	2
Mesh filter for direct feed body	AP-100-41	1
Core valves (direct feed body and MP hose snap connector body)	APV-100-44	2
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
BS010 O-ring for direct feed body	BS-010-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 APV300 is highly recommended to avoid rendering the APV300 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 ensure 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 hardness (degrees Shore).

## 5.4 How to lightly grease O-rings

When greasing O-rings, make sure NOT to use too much grease.

Especially O2 compatible grease has the potential to become stiffer over time, which may cause a hardened clot of grease to become a source for leaking.

The best way to grease O-rings is using a simple "grease bag".

A grease bag is a clean and clear plastic bag, into which you put a small amount of grease. Optionally you can make two bags: one with O2 compatible grease, and one with normal silicone grease. Make sure you label them properly to avoid mixing them up! Also put a date on it, so you know how old your grease bag is. Don't use them longer than a year.

A nice advantage of using a grease bag is that you use only a tiny amount of grease for greasing many O-rings, so there is little waste.

We recommend that you use resealable bags, e.g. the ones with a plastic zipper, typically used for airtight food storage. This allows you to zip up the bag after use, keeping the contents clean for repeated use.

The simple steps are as follows:

- Take a plastic bag and deposit a SMALL amount of grease in it.



- Massage this grease all around the bag until it is evenly distributed over the inside surface area.
- Take the O-rings to be greased out of their storage container, either using gloves or using an O<sub>2</sub>-cleaned instrument like a dentist hook.



- Drop them in the grease bag, and from the outside of the bag move them around with your fingers, making sure they get in full contact with the grease.



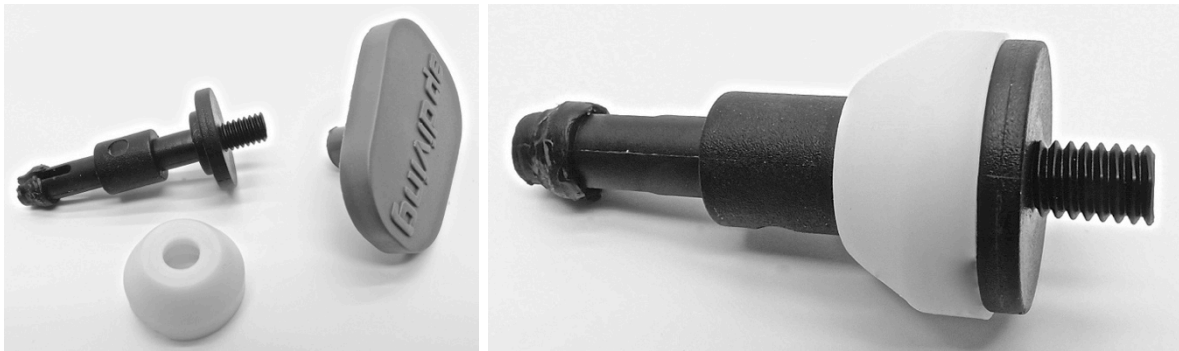
- Open the bag, and using a clean instrument like a dentist hook, take the now properly greased O-rings out.
- Inspect them to make absolutely sure that the grease is evenly and lightly distributed on the O-rings and that there are no areas of excess grease - no globs or strands.
- Fit them where they belong on your diving equipment, still making sure not to touch them with your bare hands.

## 6. Assembly Instructions

**⚠ WARNING:** When assembling the APV300 inflator, use rubber gloves to avoid polluting it while assembling, rendering not oxygen-clean.  
For photographic clarity no rubber gloves are worn on the photos in this manual.

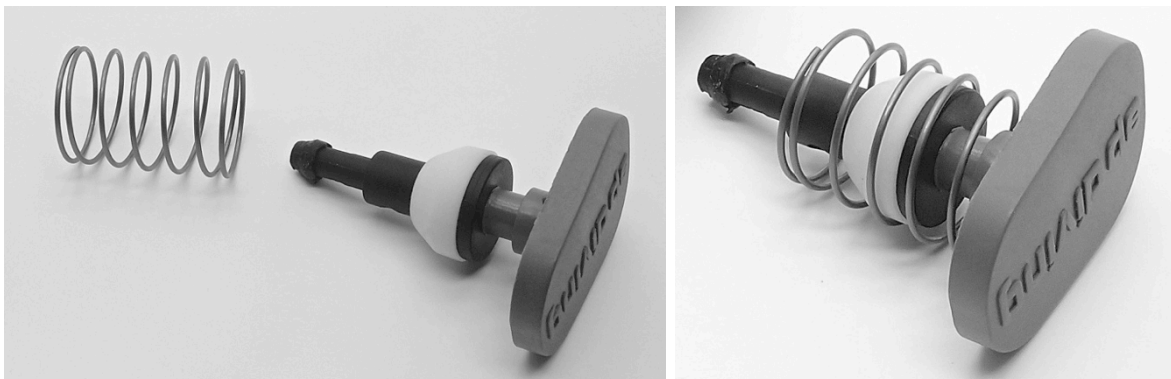
### 6.1 Screw new stem with new back end rubber into button

- Never reuse the old stem, as it is likely to have been slightly damaged in the removal process.
- Push the new white back end rubber onto the new stem, making sure it is pushed on all the way.
  - o Check this by rotating the white back end rubber on the stem.
- Next, screw the new stem with back end rubber into the grey button (with the AP Diving logo on it).
- Screw clockwise. Do NOT use tools or force, as it might damage the thread.



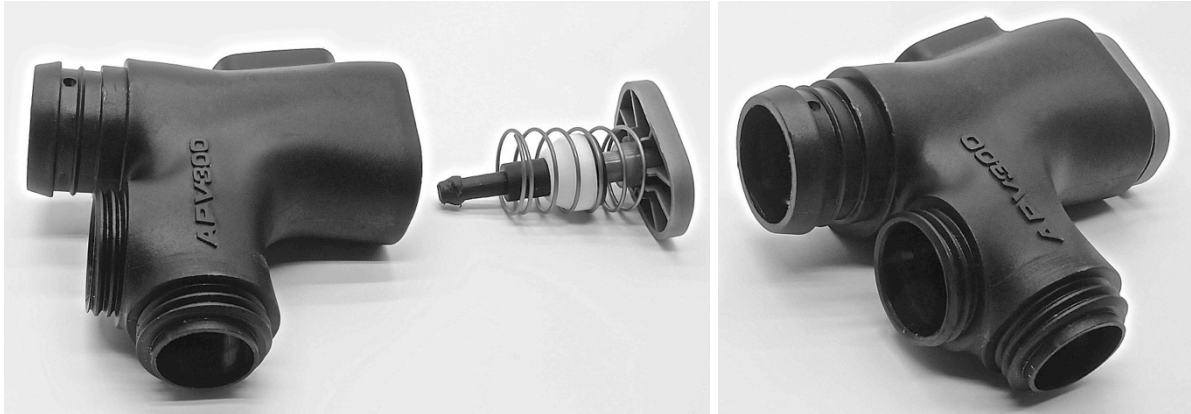
### 6.2 Fit spring to stem assembly

- Just push it on.



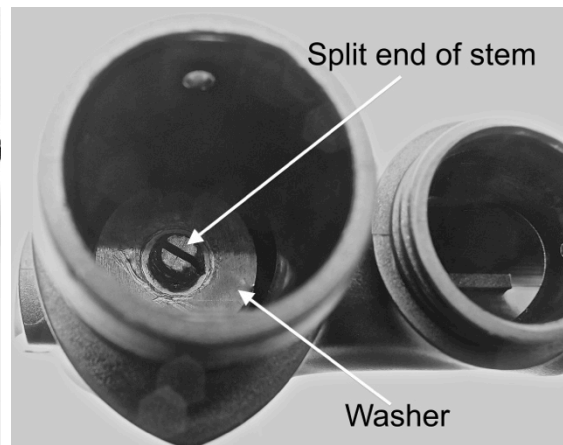
### 6.3 Push stem assembly into moulded body

- Just push it into the main body and keep it in place with your thumb against the force of the spring for the next action.



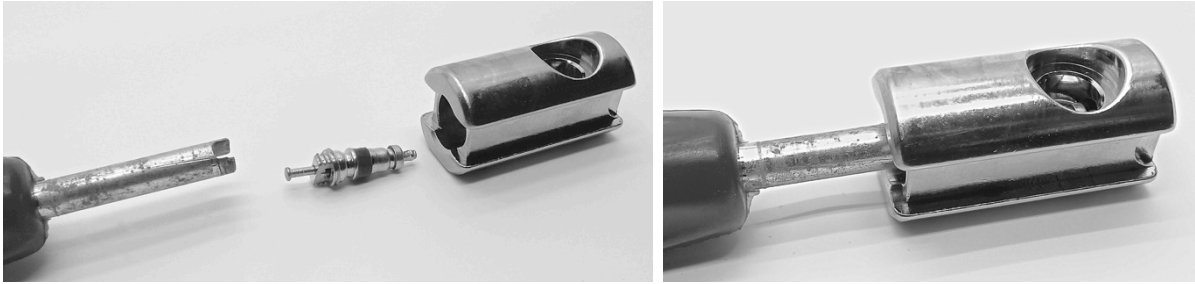
### 6.4 Push new back end rubber and back end washer onto stem

- Never re-use the old back end rubber.
- Use small pliers to fit the back end washer over the split end of the protruding stem.
- **⚠ WARNING:** Check if the washer is pushed far enough over the split end of the stem by trying to rotate it. It should be able to rotate.



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

- Use tool AP50E or equivalent to screw a new core valve into the direct feed body.
- Screw clockwise. Do not use force.



### 6.6 Put new O-ring and mesh filter into direct feed body

- Put a new mesh filter and slightly greased O-ring (in that order) into the direct feed body.



### 6.7 Put direct feed body into main moulded body

- Push it back in, making sure that the hole with the new mesh filter and O-ring are visible through the opening on the side (the hole for the inlet stem).



- Make sure that the end with the newly fitted core valve is facing the opening, so that the direct feed button can fit into it - in the next step.



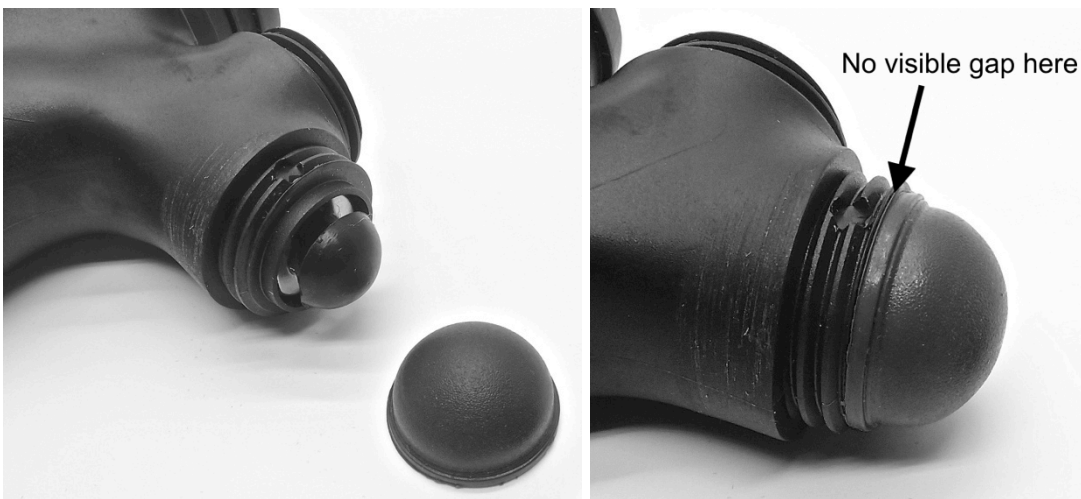
### 6.8 Put direct feed button into direct feed body

- Just push it in, over the visible exposed end of the core valve.



### 6.9 Fit new blue button cap

- Just push it back on, making sure it sits flush (without a gap) with the main body.





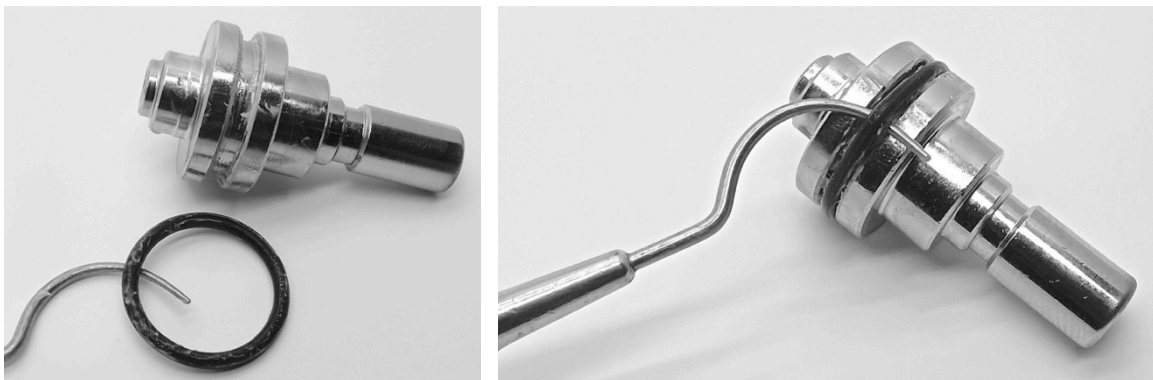
### 6.10 Screw new cap retainer onto main body

- 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.
- Check by trying to unscrew it by hand; if you can unscrew it – it needs to be tighter!



### 6.11 Put new O-ring onto inlet stem

- Slightly grease the new O-ring and fit it on the inlet stem.



### 6.12 Push inlet stem into main body

- Just push it straight in.
- It should sit flush with the main body, i.e. not sticking out of it.



### 6.13 Screw new stem 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.
- Check by trying to unscrew it by hand; if you can unscrew it – it needs to be tighter!



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

- Just push it back in.
- If a pull cord to a dumping elbow valve was used, make sure to thread the pin first through the loop in the end of the cord before pushing it back in place.

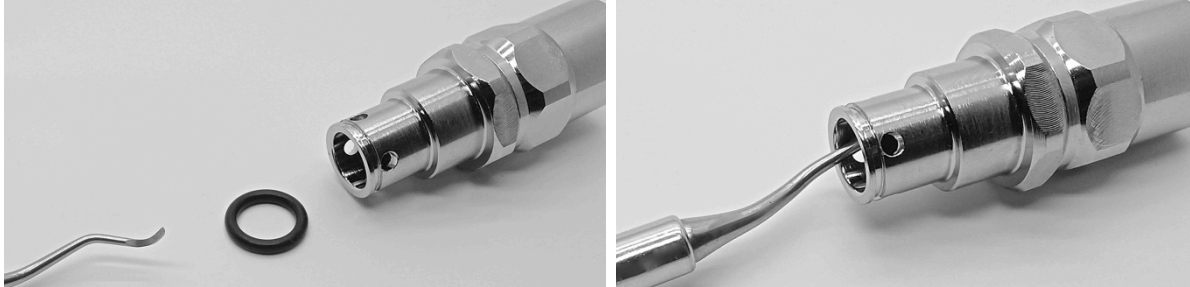


**This completes the re-assembly of the APV300 inflator**

## AP50 hose assembly

### 4.15 Fit new O-ring onto snap connector body

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



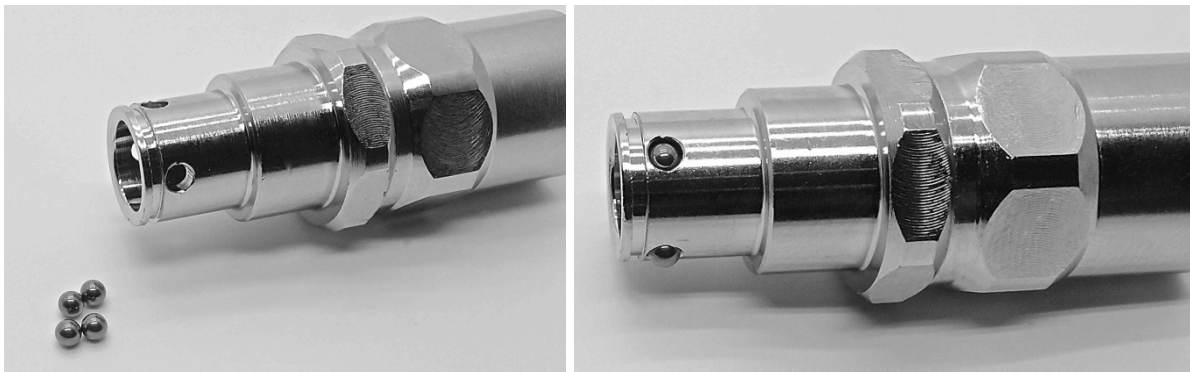
### 4.16 Screw new Schraeder valve into snap connector body

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



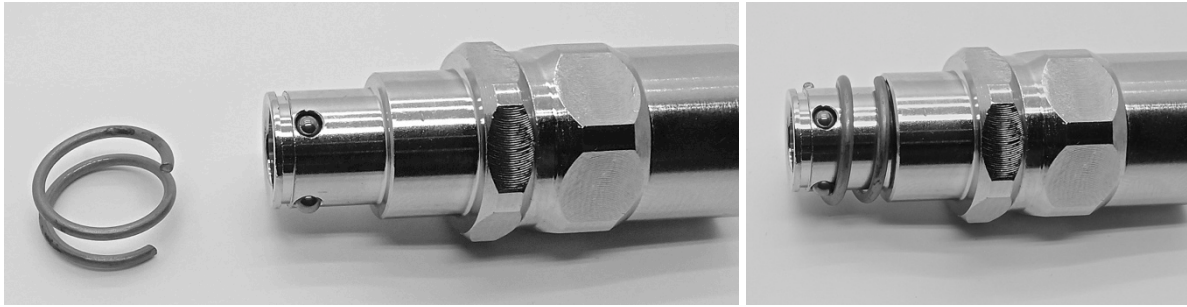
### 4.17 Push 4 ball bearings back into snap connector body

- 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.



#### 4.18 Put spring onto snap connector body

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



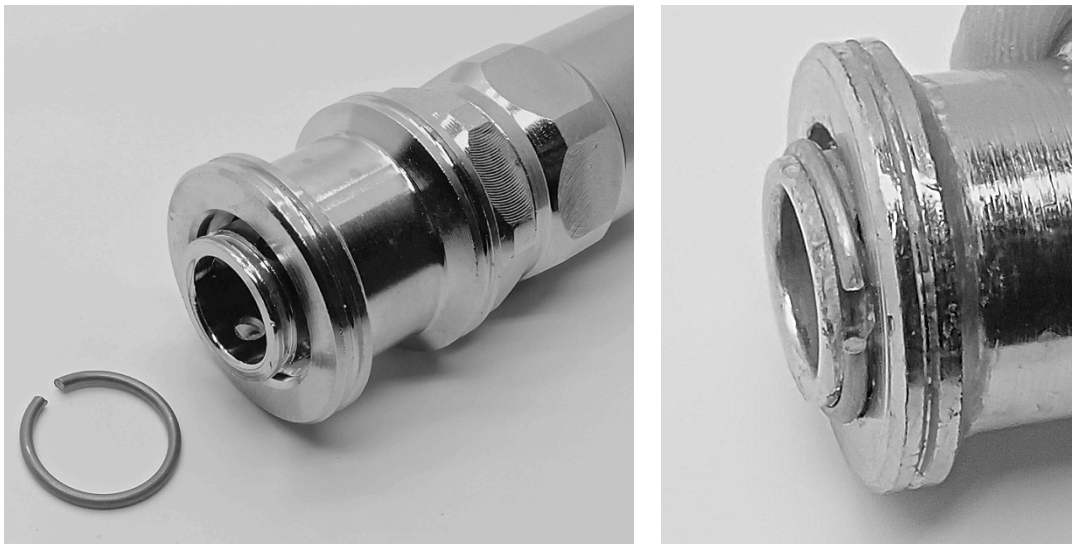
#### 4.19 Push sliding collar onto snap connector body

- 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 if it can rotate in its groove after fitting. It should rotate, but only with slight difficulty. If it rotates too easy, it may have become too wide. In that case remove it, tighten it up and refit it – or fit a new one.



**6.21 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.

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

## 7. Testing Instructions

### 7.1 Test for leaks and proper operation

1. Connect a pressurized MP hose to the inflator.
  - a) The MP should be around 9 bar.
2. Press the blue button. Check for gas coming out, and stopping again after button release.
3. Dip the inflator into water and check for any leaks. Remove from the water, operate the blue button again and re-submerge.
4. Assemble the inflator back onto the jacket or wing it was removed from prior to service.
5. Inflate the jacket orally and check that the jacket or wing maintains pressure and that there are no leaks. Submerge the inflator with the jacket/wing on maximum pressure to check for leaks. Leave inflated for at least 10 minutes to check if pressure is maintained.
6. Repeat the previous step, but this time inflate the jacket or wing mechanically, i.e. using the blue button.
7. Check if the air dumps ok by pressing the grey deflation button.