



Medium Pressure and Convoluted Hose Shortening Instructions

Version 1.1
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1. Introduction


1.1 Reason for these instructions

When you have finished reading these instructions you will no doubt agree with us that shortening AP hoses is indeed simple, BUT “the devil is in the details”:

- Get the details (and tools) right, and you end up with a shorter hose that functions perfectly and is also safe;
- Get them wrong and you end up with a hose that might detach from its end fitting, or burst due to it becoming weak through using an incompatible / faulty combination of parts.

1.2 About “MP” and “HP” hoses

The abbreviation “MP” used in these instructions stands for “medium pressure”. ONLY MP hoses and convoluted hoses can be shortened “in the field” (i.e. outside the factory).

 High Pressure (HP) hoses **CANNOT** be shortened “in the field”. This is only possible in the factory, as it requires crimping the end fittings, which requires specialised factory-based equipment.

- “**Medium pressure**” is pressure typically in the working range of around 10 bar. MP hoses are typically used for inflators and regulators (between 1st and 2nd stage). The EN250:2014 norm (paragraph 5.8.4 and 5.8.6) specifies that the burst pressure of medium pressure hose assemblies shall withstand four times the rated working pressure or at least 100 bar, whichever is the higher, without leakage or burst.
- “**High pressure**” is pressure typically in the working range of 200 to 300 bar. HP hoses are typically used for high pressure gauges or filling whips, used for monitoring the remaining gas supply in diving cylinders or for filling diving cylinders. The EN250:2014 norm (paragraph 5.8.3 and 5.8.5) specifies that high pressure hose assemblies shall withstand a pressure of four times the rated working pressure without leakage or burst.

1.3 Servicing


Before servicing AP medium pressure or convoluted hoses you must receive instruction and certification in hose shortening and end fitting maintenance by AP Diving.

Without the correct training it is possible to shorten hoses or service end fittings in an unsafe manner.


The Inspiration range of closed circuit rebreathers’ CE certification to EN14143 is unaffected by properly shortened hoses, provided that the shorter hoses do not affect the operation (e.g. reachability of key components like inflators) or gas throughput and breathing resistance of the rebreather in any way.

The AP hoses meet the requirements of the Personal Protective Equipment Directive 89/686/EEC – CE certification when fitted to an AP Diving rebreather.

They also meet the requirements as specified in European norm EN250:2014.

 **WARNING:** when servicing AP hoses 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 hoses 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 servicing action.

 The numbers between brackets after the part names in the disassembly and assembly chapters correspond to the sequence numbers in the diagrams in chapter 2.

1.4 Copyright and Applicable Law

These instructions are 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.

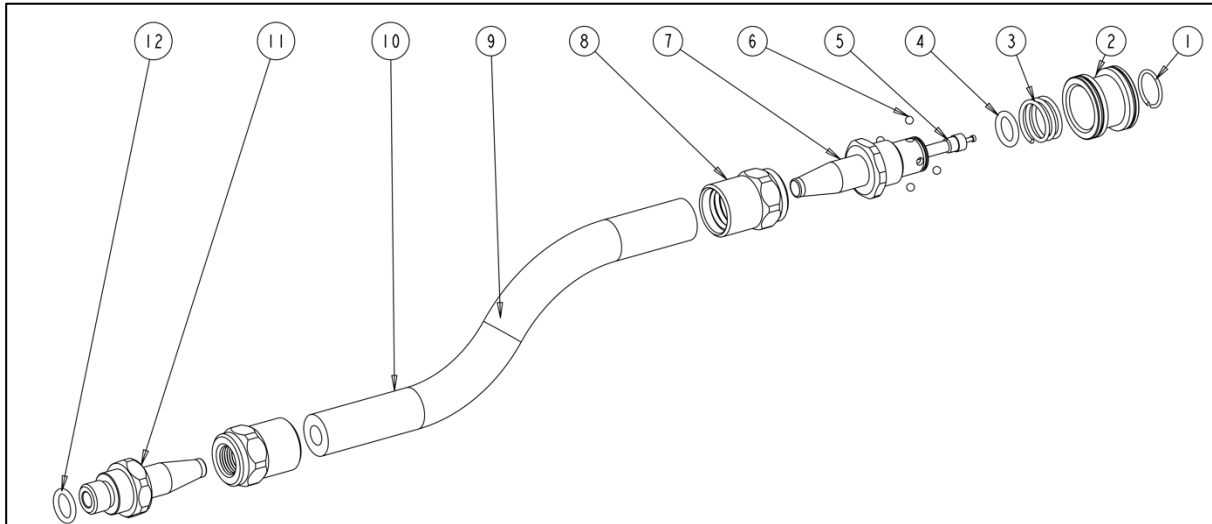
All products are sold on the strict understanding that only English Law applies in cases of warranty claims and product liability, regardless of where the equipment is purchased or used. Should a claim be made then the venue for this would be in Truro, England.

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Medium Pressure and Convolved Hose Shortening Instructions

2. Exploded Diagrams and Parts Lists

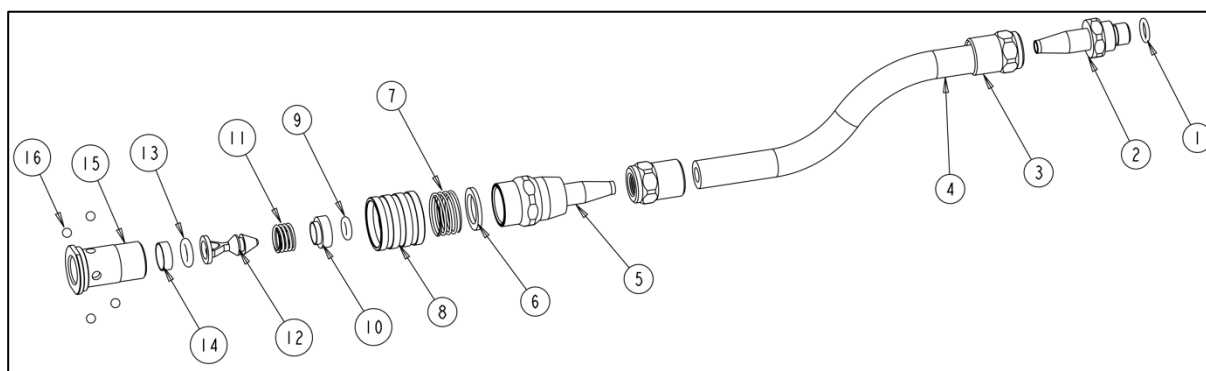
2.1 AP50 Inflator Hose Assembly



| NUMBER | DESCRIPTION | PART NUMBER | QUANTITY |
|---------------|-------------------------------|--------------------|-----------------|
| 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 |

AP50 hoses are used on the rebreather manual inflators, AP400 dry suit inflator and the AP200 BCD inflator (not the Auto Air).

2.2 EV50 Auto Air Hose Assembly (new model with standard hose)

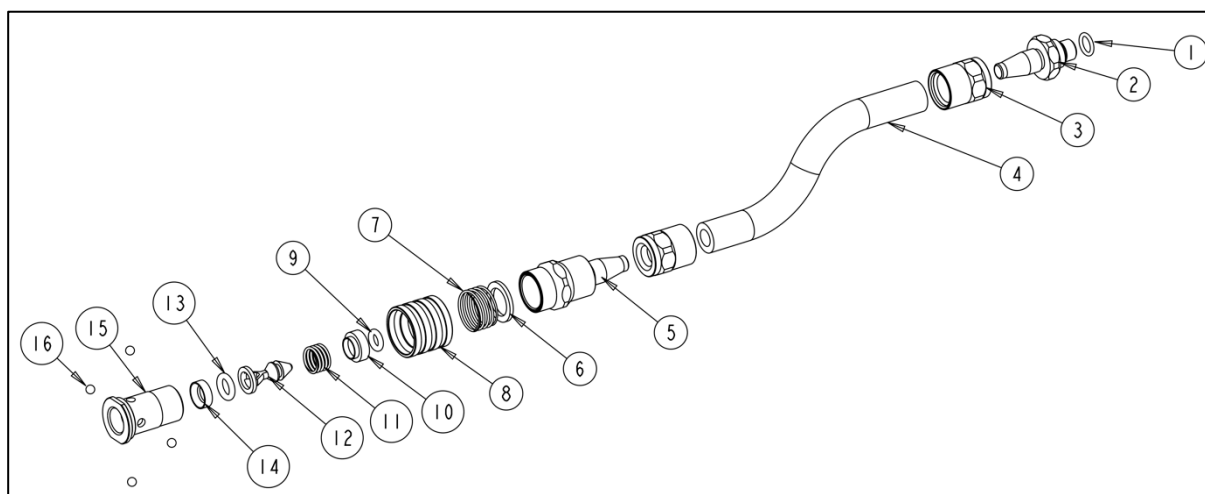


| NUMBER | DESCRIPTION | PART NUMBER | QUANTITY |
|--------|---------------------|----------------|----------|
| 1 | O-ring | BS-903-N70 | 1 |
| 2 | 3/8" UNF end | AP-50-P4 | 1 |
| 3 | Hose collar | AP-50-P3 | 2 |
| 4 | LP hose | AP-50-C | 1 |
| 5 | Coupling body | RB-70-30 | 1 |
| 6 | Blue moulded washer | AP-150-18 | 1 |
| 7 | Spring | AP-150-11 | 1 |
| 8 | Sliding collar | AP-150-12 | 1 |
| 9 | O-ring | BS-5.6x2.4-N70 | 1 |
| 10 | Funnel seat | AP-150-05 | 1 |
| 11 | Spring | AP-150-08 | 1 |
| 12 | Valve float | AP-150-6B | 1 |
| 13 | O-ring | BS-109-N70 | 1 |
| 14 | Guide washer | AP-150-10 | 1 |
| 15 | Valve sleeve | AP-150-14 | 1 |
| 16 | Ball bearing | AP-150-13 | 4 |

This hose is used on:

- All AP Evolution and Inspiration EVO rebreathers since 2005,
- All AP Evolution Plus and Inspiration EVP rebreathers,
- All AP Inspiration and Inspiration XPD rebreathers since 2008, and
- All AP BCD's and wings fitted with an Auto Air since February 2009.

2.3 AP150 Auto Air Hose Assembly (old model with bigger bore hose)

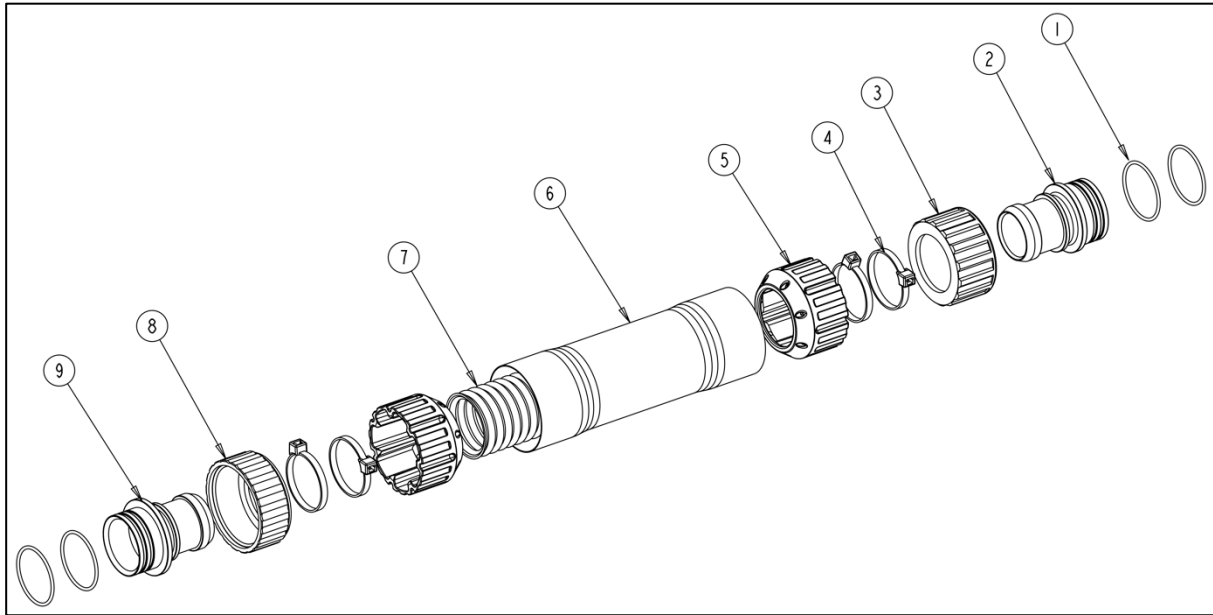


| NUMBER | DESCRIPTION | PART NUMBER | QUANTITY |
|---------------|---------------------|--------------------|-----------------|
| 1 | O-ring | BS-903-N70 | 1 |
| 2 | 3/8" UNF end | AP-150-01 | 1 |
| 3 | Hose collar | AP-150-02 | 2 |
| 4 | LP hose | AP-150-C | 1 |
| 5 | Coupling body | AP-150-04 | 1 |
| 6 | Blue moulded washer | AP-150-18 | 1 |
| 7 | Spring | AP-150-11 | 1 |
| 8 | Sliding collar | AP-150-12 | 1 |
| 9 | O-ring | BS-5.6x2.4-N70 | 1 |
| 10 | Funnel seat | AP-150-05 | 1 |
| 11 | Spring | AP-150-08 | 1 |
| 12 | Valve float | AP-150-6B | 1 |
| 13 | O-ring | BS-109-N70 | 1 |
| 14 | Guide washer | AP-150-10 | 1 |
| 15 | Valve sleeve | AP-150-14 | 1 |
| 16 | Ball bearing | AP-150-13 | 4 |

This hose was used on:

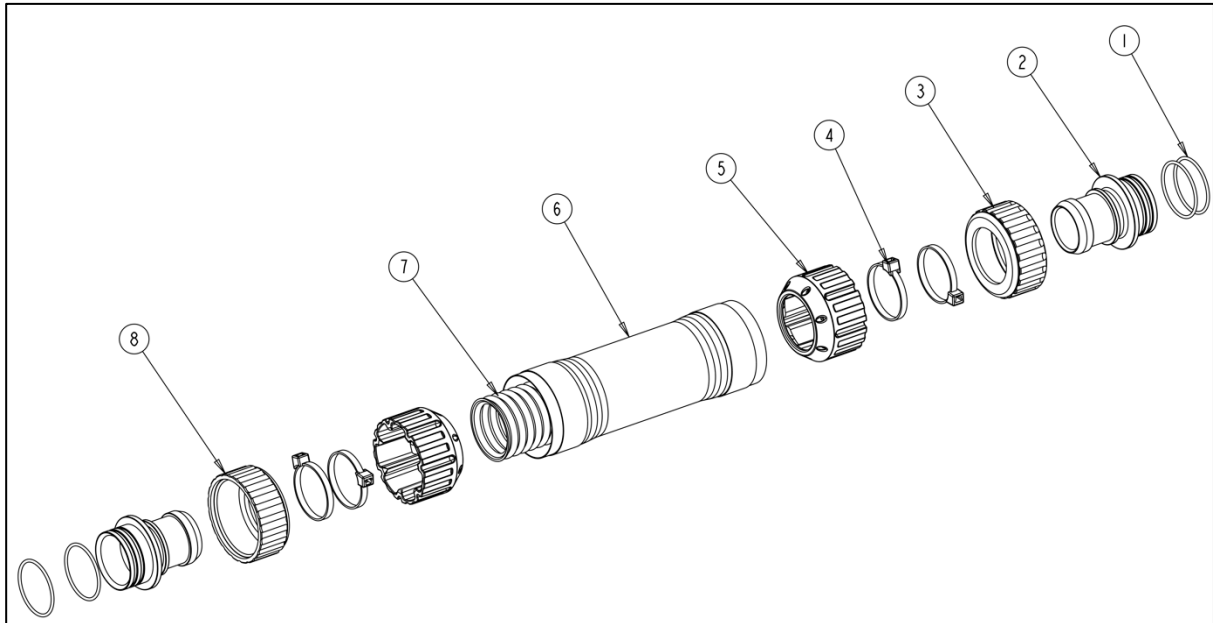
- All AP Evolution rebreathers until 2005,
- All AP Inspiration rebreathers until 2008, and
- All AP BCD's and wings fitted with an Auto Air until February 2009.

2.4 RB07B/01 Scrubber Canister Exhale Hose Assembly – New Ty-wrap version



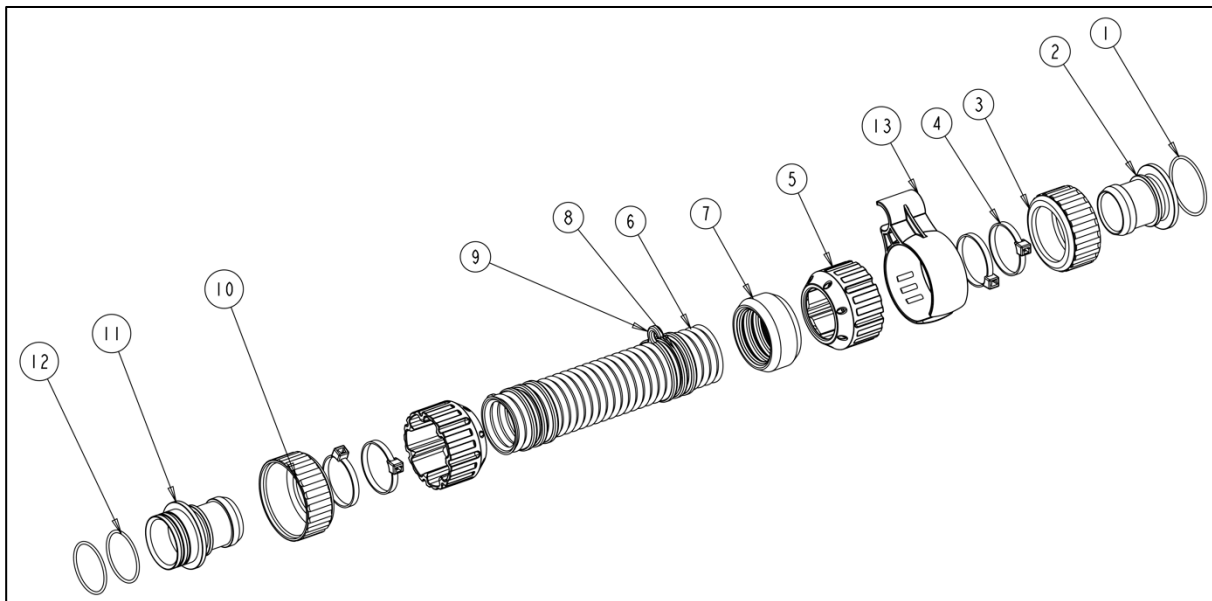
| NUMBER | DESCRIPTION | PART NUMBER | QUANTITY |
|---------------|------------------------|--------------------|-----------------|
| 1 | O-ring BS-027-N70 | BS-027-N70 | 4 |
| 2 | Swivel stem – modified | RB12-04-M | 1 |
| 3 | Canister locking ring | RB12-05 | 1 |
| 4 | Curved Ty-wrap | RBCT1 | 4 |
| 5 | Curved Ty-wrap cover | RB12-02-A | 2 |
| 6 | Exhale hose cover | RB08-B | 1 |
| 7 | Convoluted hose | RB07B | 1 |
| 8 | Exhale locking ring | RB12-03 | 1 |
| 9 | Swivel stem | RB12-04 | 1 |

2.5 RB07B/02 Scrubber Canister Inhale Hose Assembly – New Ty-wrap Version



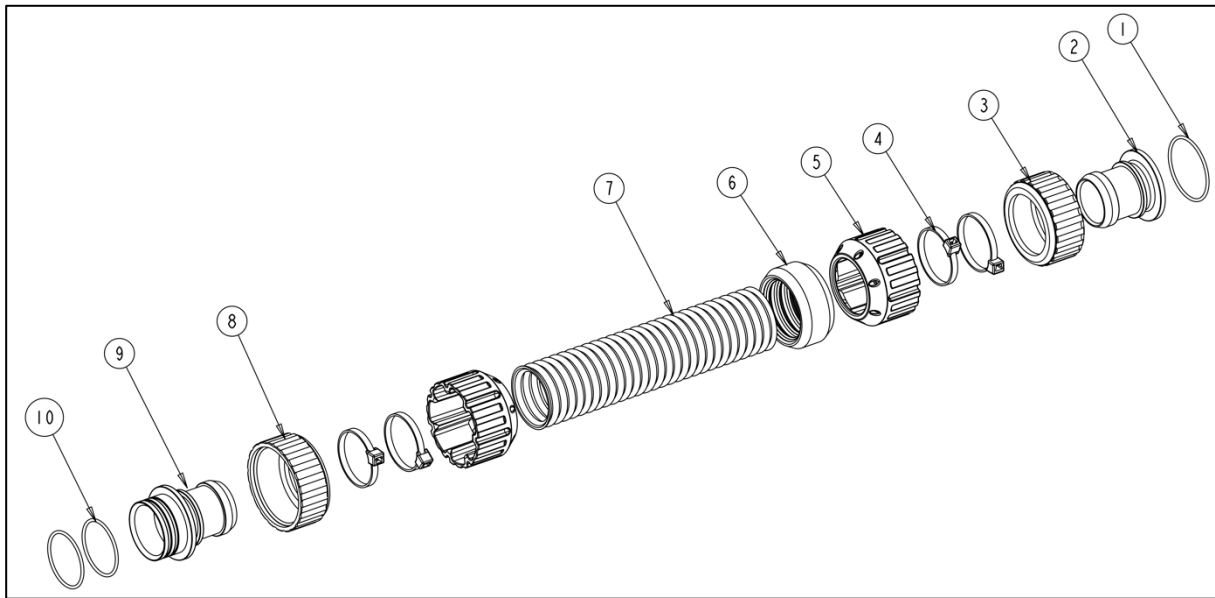
| NUMBER | DESCRIPTION | PART NUMBER | QUANTITY |
|---------------|------------------------------|--------------------|-----------------|
| 1 | O-ring BS-027-N70 | BS-027-N70 | 4 |
| 2 | Swivel stem | RB12-04 | 2 |
| 3 | Inhale locking ring - square | RB12-03-IN | 1 |
| 4 | Curved Ty-wrap | RBCT1 | 4 |
| 5 | Curved Ty-wrap cover | RB12-02-A | 2 |
| 6 | Inhale hose cover | RB08-A | 1 |
| 7 | Convoluted hose | RB07B | 1 |
| 8 | Exhale locking ring | RB12-03 | 1 |

2.6 RB07B/03 Mouthpiece Inhale Hose Assembly – New Ty-wrap Version



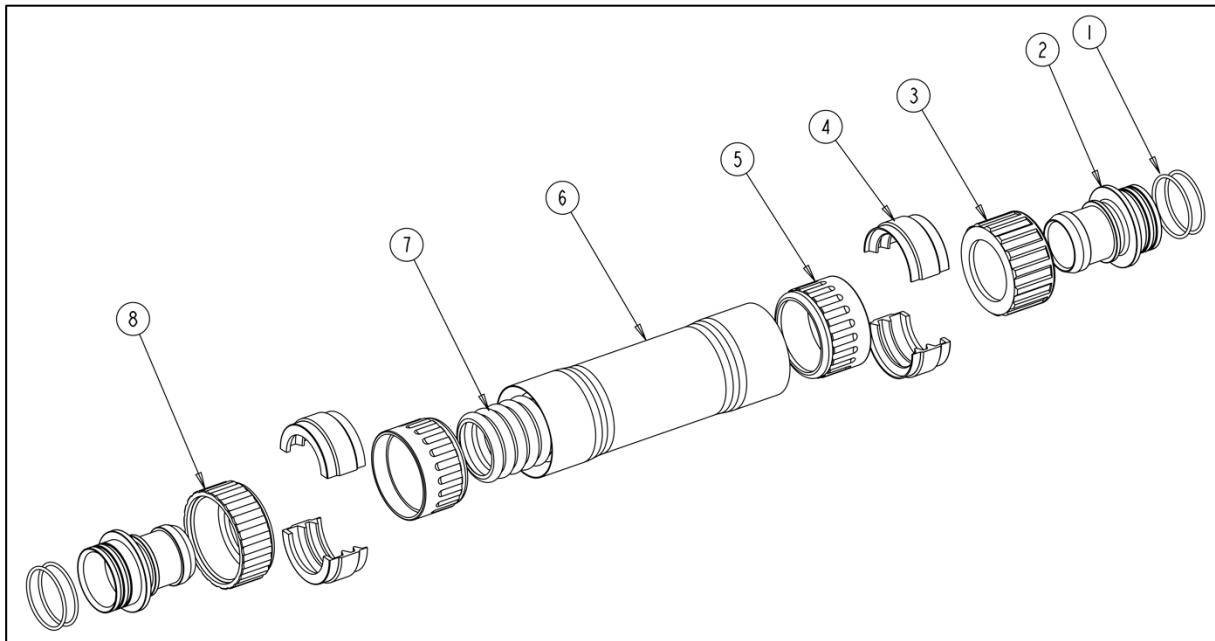
| NUMBER | DESCRIPTION | PART NUMBER | QUANTITY |
|---------------|------------------------------|--------------------|-----------------|
| 1 | O-ring BS-027-N70 | BS-027-N70 | 1 |
| 2 | Mouthpiece swivel stem | RB02-06 | 1 |
| 3 | Mouthpiece locking ring | RB02-09 | 1 |
| 4 | Curved Ty-wrap | RBCT1 | 4 |
| 5 | Curved Ty-wrap cover | RB12-02-A | 2 |
| 6 | Convoluted hose | RB07B | 1 |
| 7 | Counterweight | RB50-01 | 1 |
| 8 | Hose indicator | RB40-05 | 2 |
| 9 | HUD hose clip | RB80-06A | 4 |
| 10 | Inhale locking ring – square | RB12-03-IN | 1 |
| 11 | Swivel stem | RB12-04 | 1 |
| 12 | O-ring BS-027-N70 | BS-027-N70 | 2 |
| 13 | HUD clip | RB80-05M | 1 |

2.7 RB07B/04 Mouthpiece Exhale Hose Assembly – New Ty-wrap Version



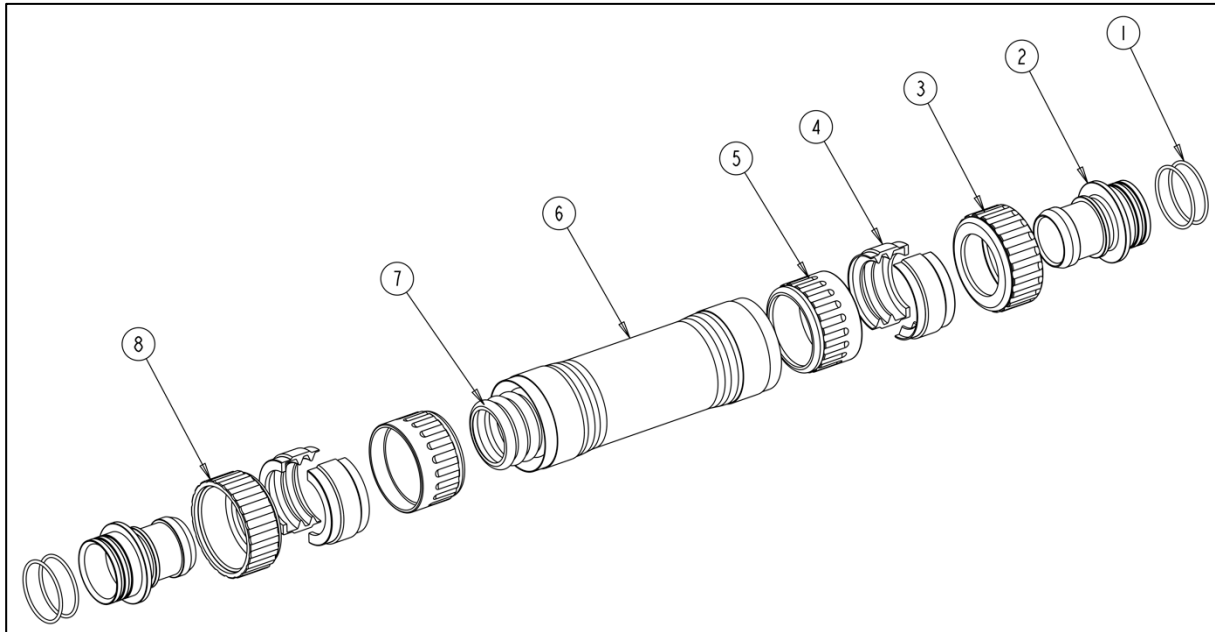
| NUMBER | DESCRIPTION | PART NUMBER | QUANTITY |
|---------------|-------------------------|--------------------|-----------------|
| 1 | O-ring BS-027-N70 | BS-027-N70 | 1 |
| 2 | Mouthpiece swivel stem | RB02-06 | 1 |
| 3 | Mouthpiece locking ring | RB02-09 | 1 |
| 4 | Curved Ty-wrap | RBCT1 | 4 |
| 5 | Curved Ty-wrap cover | RB12-02-A | 2 |
| 6 | Counterweight | RB50-01 | 1 |
| 7 | Convolved hose | RB07B | 1 |
| 8 | Exhale locking ring | RB12-03 | 1 |
| 9 | Swivel stem | RB12-04 | 1 |
| 10 | O-ring BS-027-N70 | BS-027-N70 | 2 |

2.8 RB07/01 Scrubber Canister Exhale Hose Assembly – Old Clamped Version



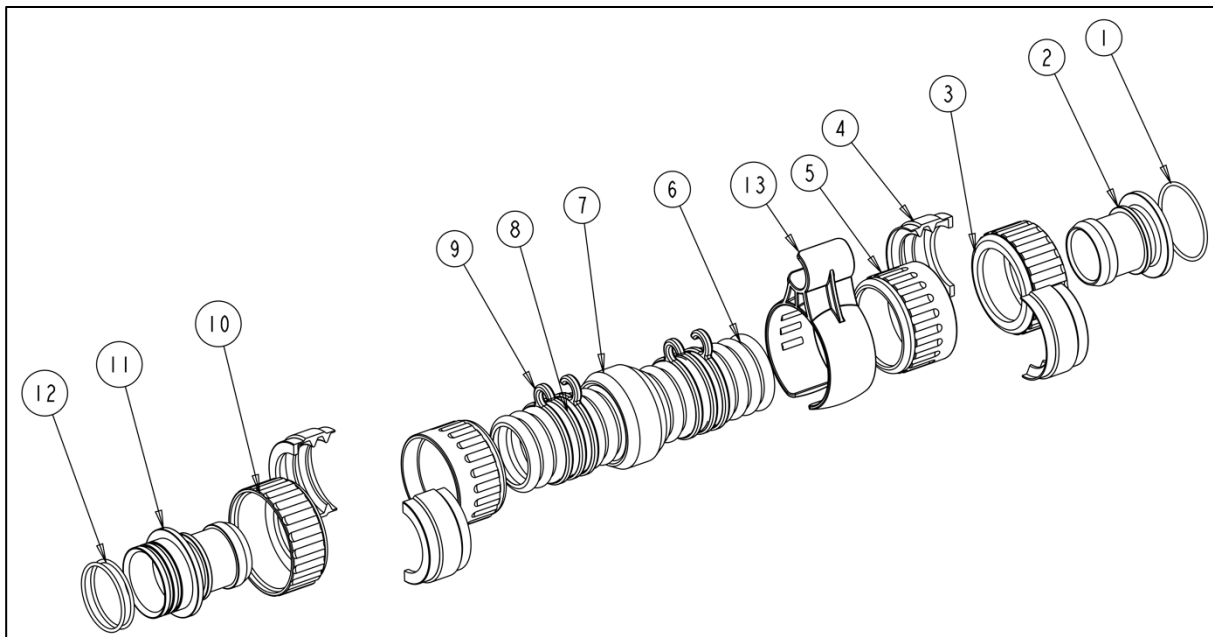
| NUMBER | DESCRIPTION | PART NUMBER | QUANTITY |
|---------------|-----------------------|--------------------|-----------------|
| 1 | O-ring BS-027-N70 | BS-027-N70 | 4 |
| 2 | Swivel stem | RB12-04 | 2 |
| 3 | Canister locking ring | RB12-05 | 1 |
| 4 | Hose clamp inner | RB12-01 | 4 |
| 5 | Hose clamp outer | RB12-02 | 2 |
| 6 | Exhale hose cover | RB08-B | 1 |
| 7 | Convoluted hose | RB07B | 1 |
| 8 | Exhale locking ring | RB12-03 | 1 |

2.9 RB07/02 Scrubber Canister Inhale Hose Assembly – Old Clamped Version



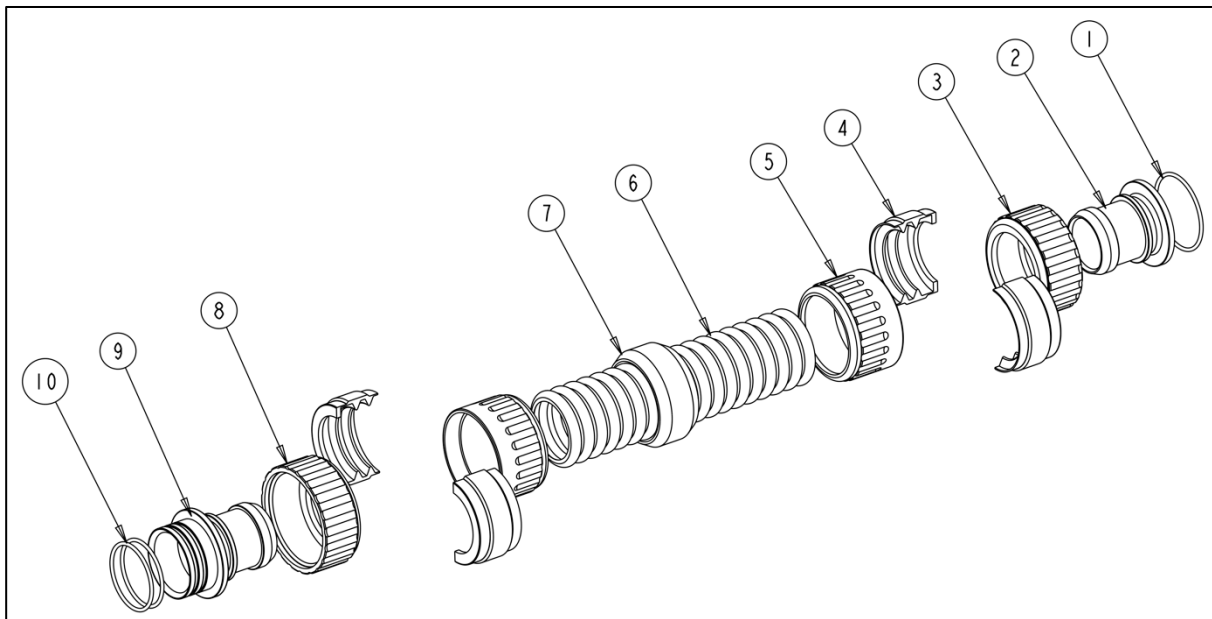
| NUMBER | DESCRIPTION | PART NUMBER | QUANTITY |
|---------------|------------------------------|--------------------|-----------------|
| 1 | O-ring BS-027-N70 | BS-027-N70 | 4 |
| 2 | Swivel stem | RB12-04 | 2 |
| 3 | Inhale locking ring - square | RB12-03-IN | 1 |
| 4 | Hose clamp inner | RB12-01 | 4 |
| 5 | Hose clamp outer | RB12-02 | 2 |
| 6 | Exhale hose cover | RB08-A | 1 |
| 7 | Convoluted hose | RB07B | 1 |
| 8 | Exhale locking ring | RB12-03 | 1 |

2.10 RB07/03 Mouthpiece Inhale Hose Assembly – Old Clamped Version



| NUMBER | DESCRIPTION | PART NUMBER | QUANTITY |
|---------------|------------------------------|--------------------|-----------------|
| 1 | O-ring BS-029-N70 | BS-029-N70 | 1 |
| 2 | Mouthpiece swivel stem | RB02-06 | 1 |
| 3 | Mouthpiece locking ring | RB02-09 | 1 |
| 4 | Hose clamp inner | RB12-01 | 4 |
| 5 | Hose clamp outer | RB12-02 | 2 |
| 6 | Convoluted hose | RB07B | 1 |
| 7 | Counterweight | RB50-01 | 1 |
| 8 | Hose indicator | RB40-05 | 2 |
| 9 | HUD hose clip | RB80-06A | 4 |
| 10 | Inhale locking ring – square | RB12-03-IN | 1 |
| 11 | Swivel stem | RB12-04 | 1 |
| 12 | O-ring BS-027-N70 | BS-027-N70 | 2 |
| 13 | HUD clip | RB80-05M | 1 |

2.11 RB07/04 Mouthpiece Exhale Hose Assembly – Old Clamped Version



| NUMBER | DESCRIPTION | PART NUMBER | QUANTITY |
|---------------|-------------------------|--------------------|-----------------|
| 1 | O-ring BS-029-N70 | BS-029-N70 | 1 |
| 2 | Mouthpiece swivel stem | RB02-06 | 1 |
| 3 | Mouthpiece locking ring | RB02-09 | 1 |
| 4 | Hose clamp inner | RB12-01 | 4 |
| 5 | Hose clamp outer | RB12-02 | 2 |
| 6 | Convoluted hose | RB07B | 1 |
| 7 | Counterweight | RB50-01 | 1 |
| 8 | Exhale locking ring | RB12-03 | 1 |
| 9 | Swivel stem | RB12-04 | 1 |
| 10 | O-ring BS-027-N70 | BS-027-N70 | 2 |

3. Tools

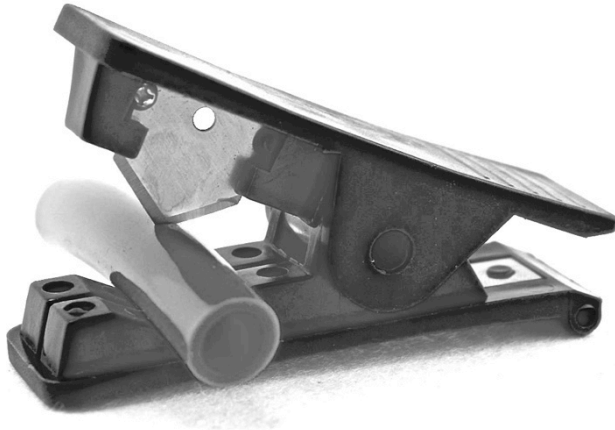
3.1 Special Tools needed

When shortening MP and Convoluted hoses, the following special tools are needed:

- **Hose cutting tool.**

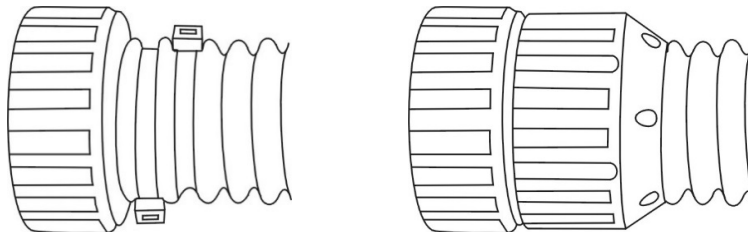
This generic tool can be found on the Internet on various places when entering the search string "nylon tube hose cutter up to 12 mm".

It is amongst others for sale at Amazon.co.uk for around GBP 5,--.



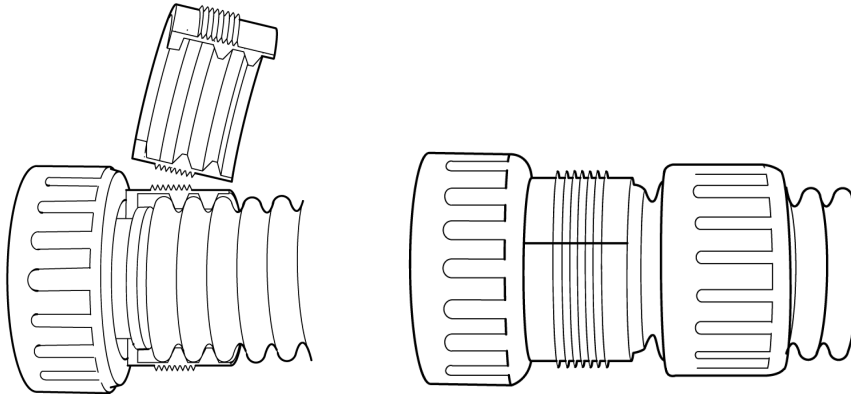
- **Cable Tie tension gun.**

This tool can be found amongst others at <http://www.rapidonline.com/Cables-Connectors/Cable-Ty-Tension-Gun-85-0285>). This tool is needed for the proper tensioning and cutting of the special rounded Ty-wraps that are used in the new type of convoluted hose ends, as shown below:



- **RBTOOL12 convoluted hose end holding tool.**

This tool can be bought from AP Diving. However it is only needed for shortening convoluted hoses with the old type of convoluted hose ends (pre 2009) that use locking rings and split rings, as shown below. These can be easily changed for the new Ty-wrap fittings RB12-02-A Hose Coupling Cover and RBCT1 Cable Ties that are also available from AP Diving. See chapter 6 for details on this new type of fitting.



3.2 Standard Tools needed

Besides the special tools mentioned above, the following standard tools are needed:

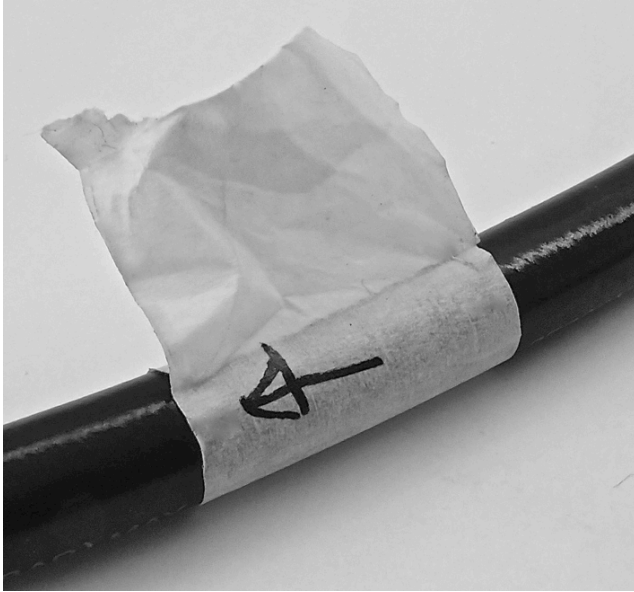
- 17, 19 and 22 mm wrenches
- 5 mm Allen key
- O-ring picking tools
- (Access to) an ultrasonic bath for cleaning the metal parts.

⚠ WARNING: Do NOT use aggressive chemicals. They might damage the metal plating of the hose ends. Use an ultrasonic cleaning bath with a suitable cleaning fluid. A very good cleaning fluid is Biox "O2" immersion fluid. See WWW.BIOXINT.COM for further information and distributors.

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

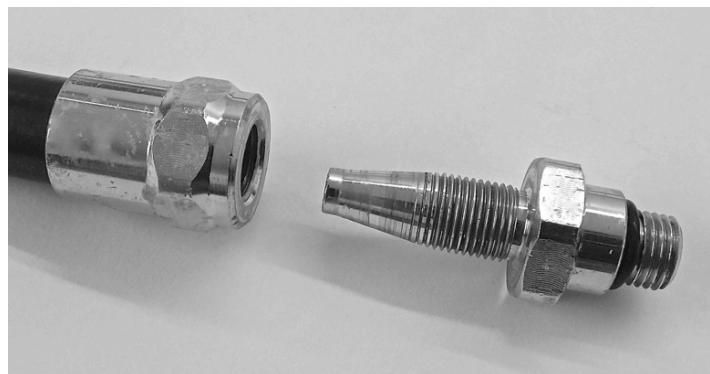
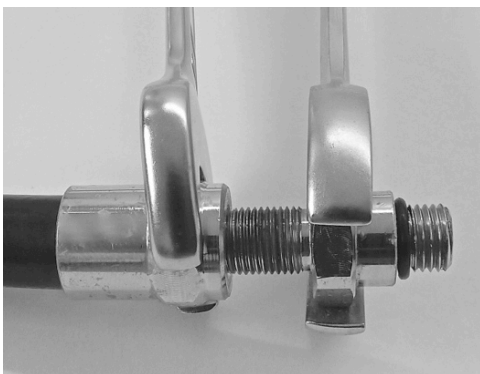
4. Shortening Medium Pressure (AP50) hoses (NOT Auto Air)

4.1 Mark where you want to cut the MP hose



4.2 Unscrew the 3/8" UNF hose end from the hose collar

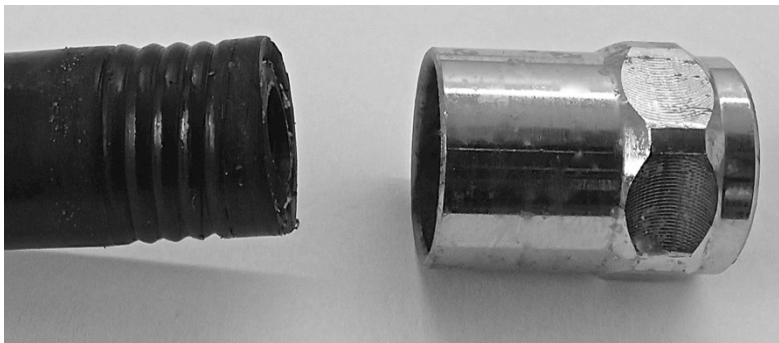
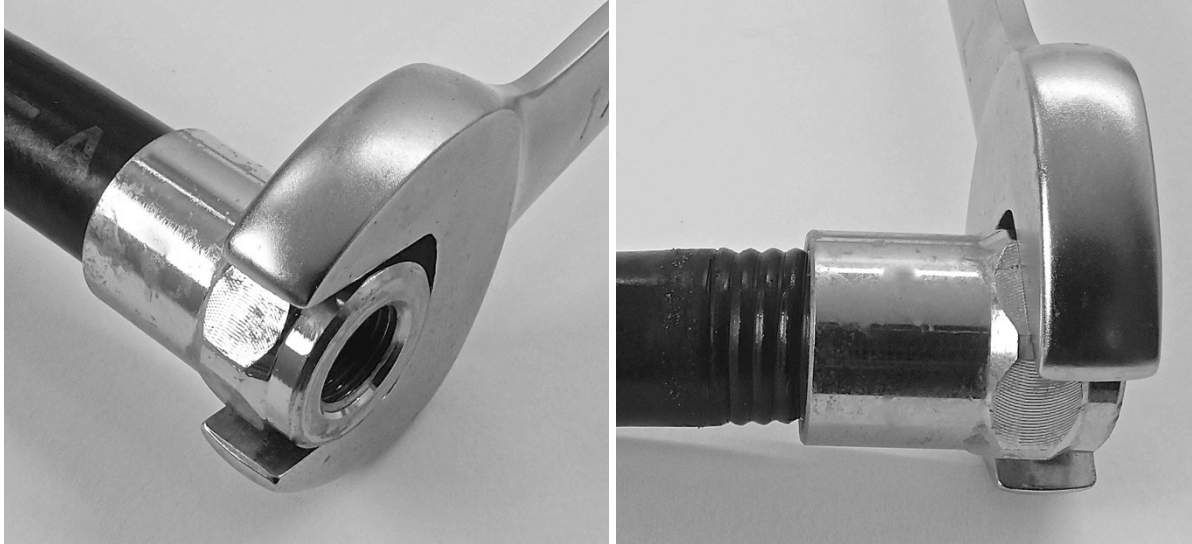
- Using 2 x 17 mm spanners, unscrew the hose end from the hose collar
- Unscrew anti-clock-wise.



4.3 Unscrew the hose collar from the MP hose

! **WARNING:** This has a Left Hand Thread, so in order to unscrew it, you need to unscrew clock-wise, NOT anti-clock-wise!

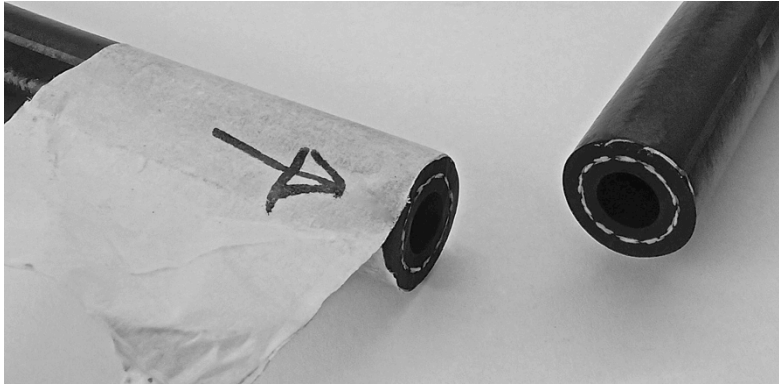
- Using a 17 mm spanner, unscrew the hose collar from the MP hose
- Unscrew clock-wise.



4.4 Use the hose cutter to cut the hose to the desired length.

- Use the hose cutter to cut the hose to the desired length.
- Use the indication you applied earlier as your guide.
- If you use a knife instead of a hose cutter make every effort to guarantee a “straight”, 90 degree cut.

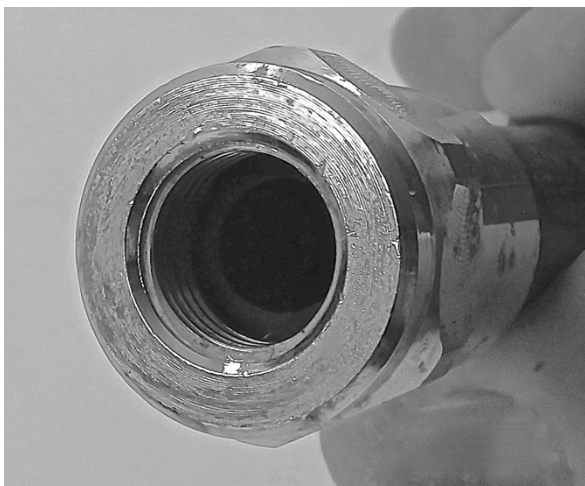
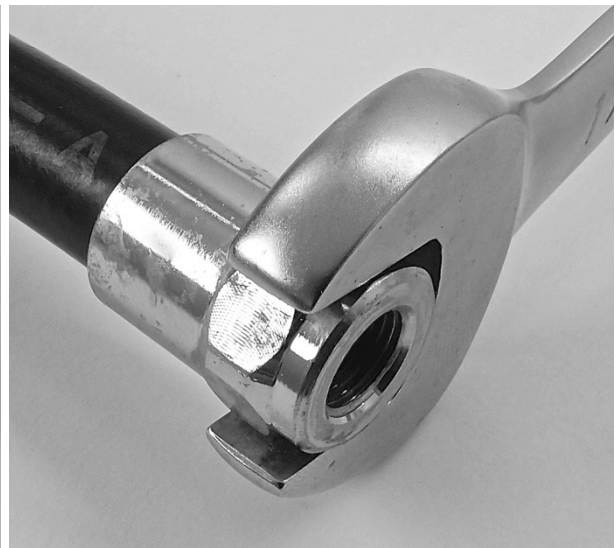
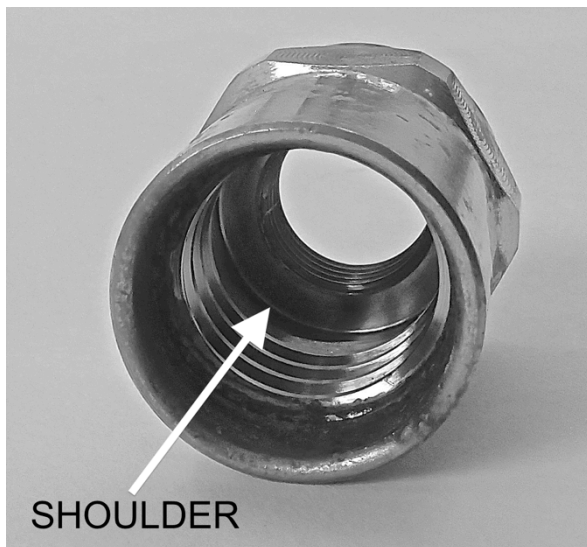




4.5 Screw the shortened MP hose back into the hose collar


⚠ WARNING: This has a Left Hand Thread, so in order to screw the hose in the hose collar, you need to screw anti-clock-wise, NOT clock-wise!

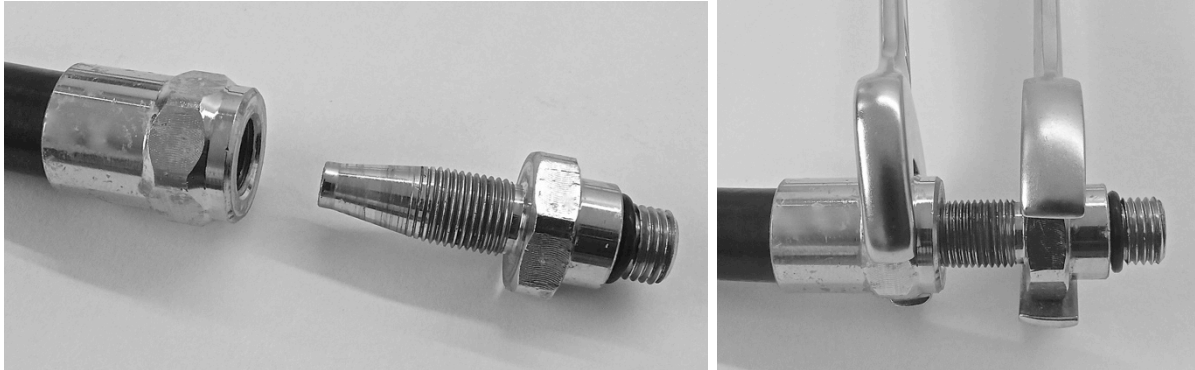
- Using a 17 mm spanner, screw the hose collar onto the MP hose.
- Screw anti-clock-wise.
- Screw the hose in until the hose JUST touches the shoulder on the inside of the hose collar.
- Once it touches the shoulder, back the hose out (i.e. unscrew) half a turn, clock-wise.



4.6 Screw the 3/8" UNF end back into the hose collar

- Using 2 x 17 mm spanners, screw the hose end into the hose collar
- Screw clock-wise until the shoulders touch. There is no need to over tighten!

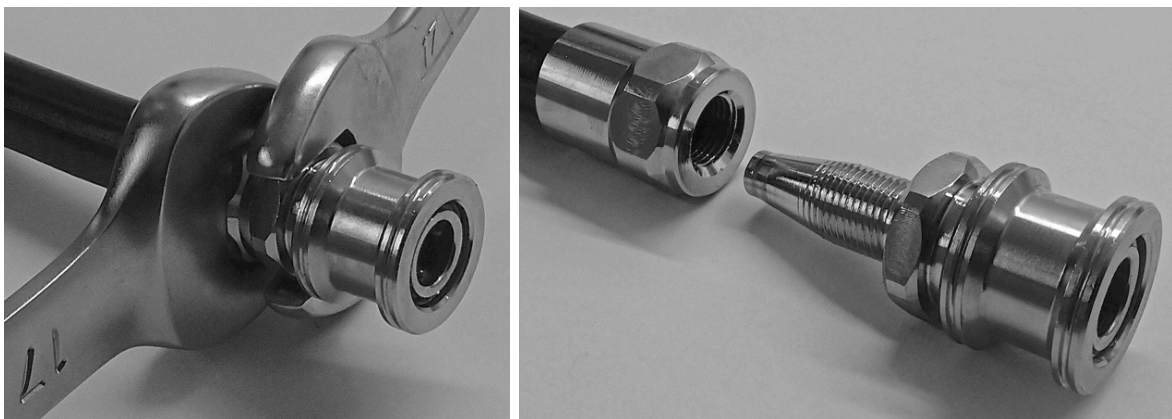
 TIP: Before screwing the hose end in, wet it with some soapy water. This makes the fitting slide into the rubber hose easier and avoids damaging the bore of the hose.



4.7 Shortening the hose on the snap connector end

Shortening a standard MP hose at the snap connector end is done essentially the same as described above:

- Instead of unscrewing the hose end from the hose collar, as described in paragraph 4.2, you now unscrew the complete snap connector assembly from the hose collar.
- Use 2 x 17 mm spanner.
- Unscrew anti-clock-wise.

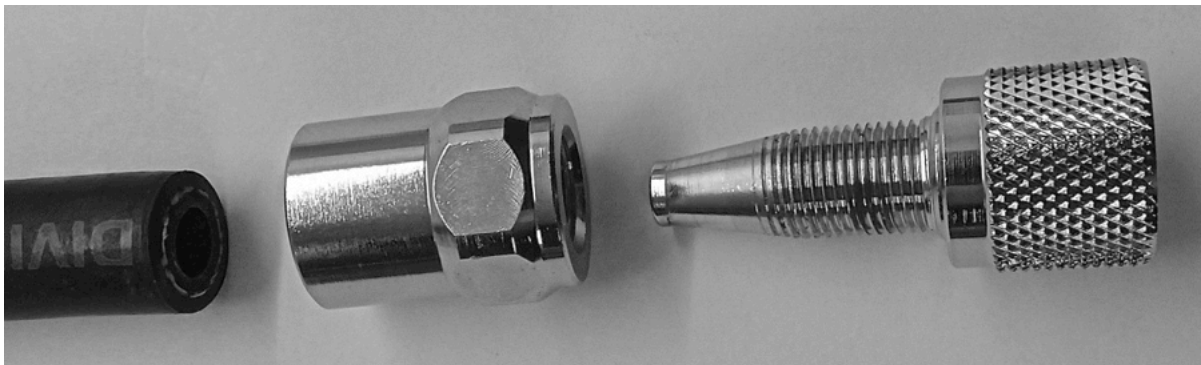


4.8 Shortening the ADV and OCB hoses on the latest screw connector end (AP300)

Pre June 2014, the 9/16" UNF female fitting or "screw connector" hose had a crimped fitting, and those hoses are only length adjustable at the other end of the hose by removing the 3/8" UNF end fitting. The "screw connector" type of fitting is used on all sports diving 2nd stage regulators and is also used on the Inspiration rebreather's ADV (auto diluent valve) and OCB (open circuit bailout valve) hoses.

Post June 2014 the ADV and OCB MP hoses also have removable screw connector ends. Shortening the ADV/OCB MP hose on the screw connector end is done essentially the same as described above:

- You now unscrew the complete screw connector part from the hose collar.
- Use a 17 mm spanner and a 5 mm Allen key.
- Unscrew anti-clock-wise.



- Re-assembly is done essentially the same way as described in paragraph 4.6, but using a 5 mm Allen key instead of a second spanner.

5. Shortening Auto Air Medium Pressure (MP) hoses

5.1 Important notice: beware: TWO types of hoses and connectors!

It is very important to know that over time AP has used two types of hoses for the Auto Air. The Auto Air is (also) a 2nd stage regulator, and as such fitted with a special connector and associated hose end that guarantees that the gas flow is high enough throughout its operating depth (according to EN250:2014). A normal MP snap connector, as used for BCD, wing, counterlung or drysuit inflators does not generally deliver sufficient flow.

- AP used a larger bore hose (AP150C) for the Auto Air, fitted to:
 - o All AP Evolution rebreathers until 2005,
 - o All AP Inspiration rebreathers until 2008, and
 - o All AP BCD's and wings fitted with an Auto Air until February 2009.
- After these dates the hose fittings were modified and the larger bore hose was replaced with the standard MP hose (AP50C), while still satisfying the requirements of the EN250 standard.

The net result is that "in the field" you may encounter TWO types of Auto Air hoses and subsequently different hose ends and snap connectors.

The hoses are different in outside diameter as well as bore:

- The older type Auto Air hose (AP150C) has a bore of around 7.9 mm (5/16") and an outside diameter of around 14 mm. It was used ONLY for the Auto Air.
- The new, standard type of MP hose (AP50C) has a bore of around 6.35 mm (1/4") and an outside diameter of around 13 mm. It is now used for both Auto Air and inflators, fitted to rebreathers as well as BCD's and wings.

These two types of hoses and their end connectors MAY NEVER be mixed:

- Using a large 14 mm diameter / 7.9 mm (5/16") bore hose with a normal diameter hose-end or snap connector will seriously damage the hose (as in: causing deep cuts into the outside of the hose) and as such will very likely result in a severely weakened hose that will burst sooner or later close to the fitting.
- Using a normal 13 mm diameter / 6.35 mm (1/4") bore hose with a large diameter hose-end or snap connector will create a hose that is too loose hooked into the hose-end, and as such is very likely to spontaneously come off, causing what effectively is a burst hose.

So always make sure you use the correct type hose end connector and diameter hose:

- The new AP50C MP hose goes with the new type smaller diameter connector, OR
- The older, larger diameter AP150C MP hose goes with the older type larger diameter connector.

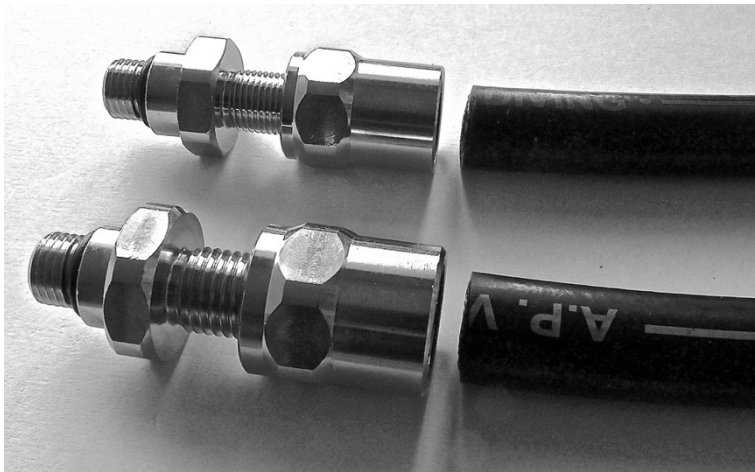


TOP:

AP50C 13 mm diameter /
6.35 mm (1/4") bore hose with
tapered snap connector

BOTTOM:

Larger diameter AP150C 14
mm diameter / 7.9 mm (5/16")
bore hose with straight snap
connector



TOP:
Standard AP50C hose with standard diameter hose end (13 mm diameter / 6.35 mm (1/4") bore hose with 16.5 mm diameter hose end fitting)

BOTTOM:
Larger diameter AP150C hose with larger diameter hose end (14 mm diameter / 7.9 mm (5/16") bore hose with 18.8 mm diameter hose end fitting)

5.2 How to distinguish the two types of hoses and connectors

As mentioned above, the two types of hoses have different diameters:

- The AP150C larger type measures 9/16 inch (a little over 14 mm) in diameter and has a bore of around 7.9 mm (5/16");
- The AP50C standard type measures 1/2 inch (almost 13 mm) in diameter and has a bore of around 6.35 mm (1/4").



Old Auto Air-only 14 mm diameter MP hose



New standard type 13 mm diameter MP hose



Old Auto Air 7.9 mm (5/16") bore MP hose

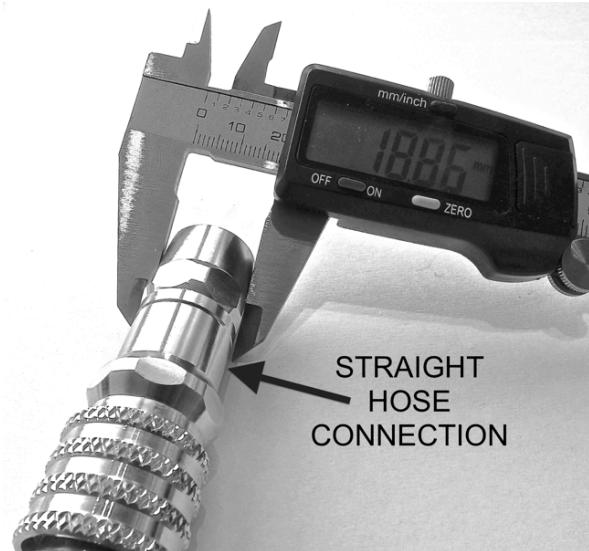


New standard type 6.35 mm (1/4") bore MP hose

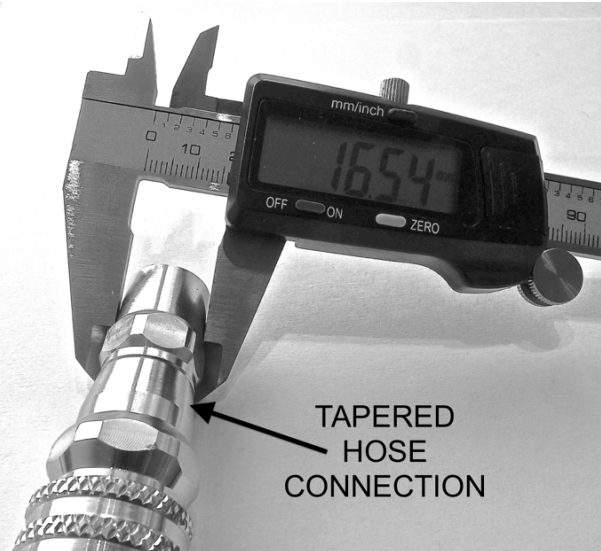
Of these two measurements, the bore is the more reliable. The outside diameter can vary from batch to batch but the bore should always be consistent.

The two types of Auto Air snap connectors are easy to distinguish:

- the older type (AP150) has a straight hose connection with a diameter of 18.8 mm
- the new type (EV50) has a tapered hose connection with a diameter of 16.5 mm.



Old type snap connector (AP150 hose):
Straight, 18.8 mm diameter



New type snap connector (EV50 hose):
tapered, 16.5 mm diameter

The hose ends have the same difference in diameter:



Old type hose end (AP150 hose):
18.8 mm diameter



New type hose end (EV50 hose):
16.5 mm diameter

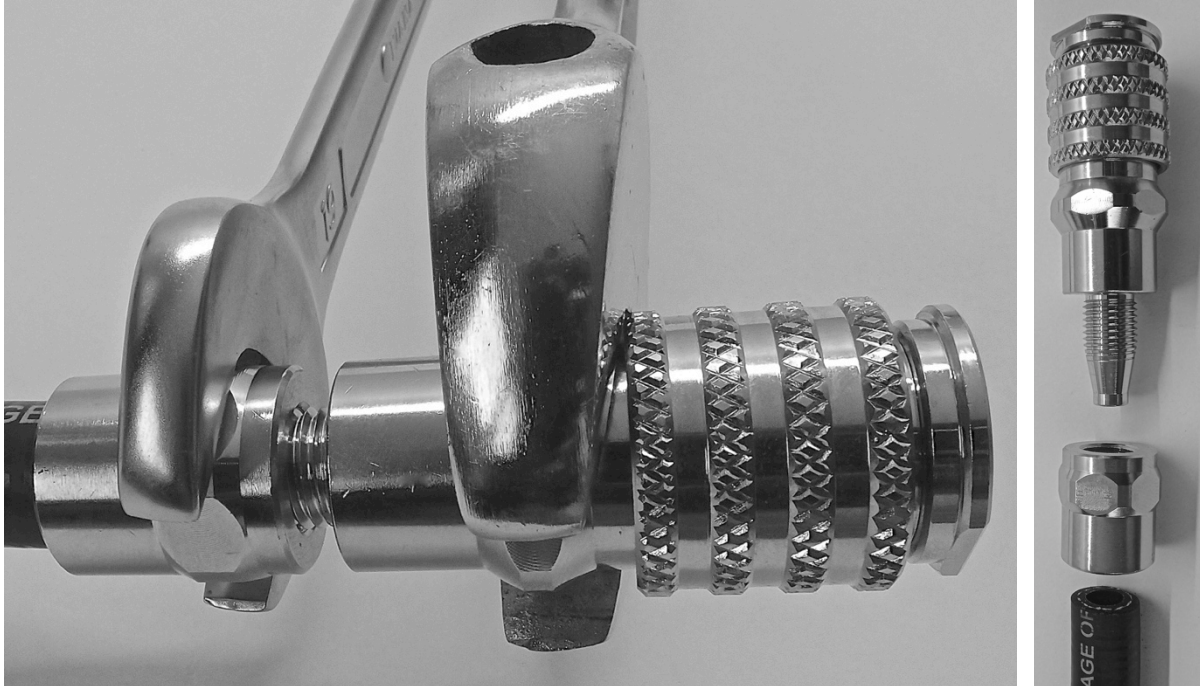
5.3 Shortening the hoses on 3/8"UNF end

The process of shortening the hoses is essentially the same as described in chapter 4. The difference is the spanner size you need: you need 2 x 19 mm spanner to handle the older type Auto Air hose (AP150), as the hose ends are larger. For shortening the hose on the 3/8"UNF end of the hose we refer to paragraphs 4.1 through 4.6.

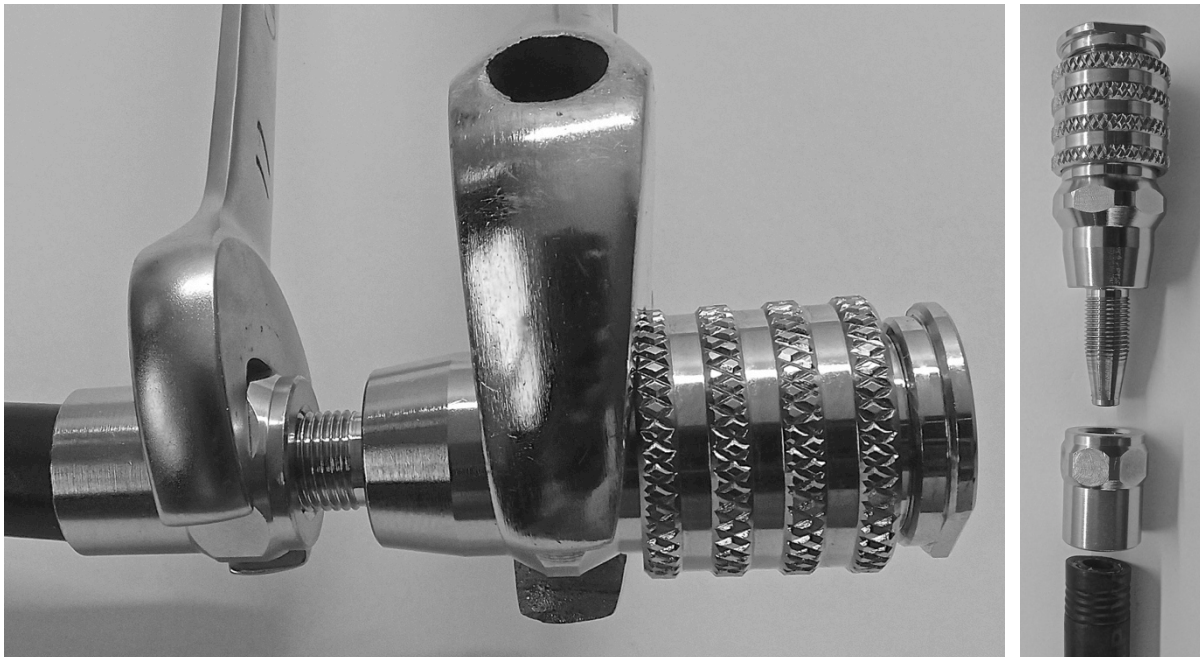
5.4 Shortening the hose on the snap connector end

Shortening the Auto Air MP hose on the snap connector end is done essentially the same as described in paragraphs 4.1 through 4.6:

- Instead of unscrewing the hose end from the hose collar, as described in paragraph 4.2, you now unscrew the complete snap connector part from the hose collar.
- Older type snap connector: use a 19 and 22 mm spanner.
- New type snap connector: use a 17 and 22 mm spanner.
- Unscrew anti-clock-wise.



Unscrewing the older type snap connector. Notice the straight diameter.

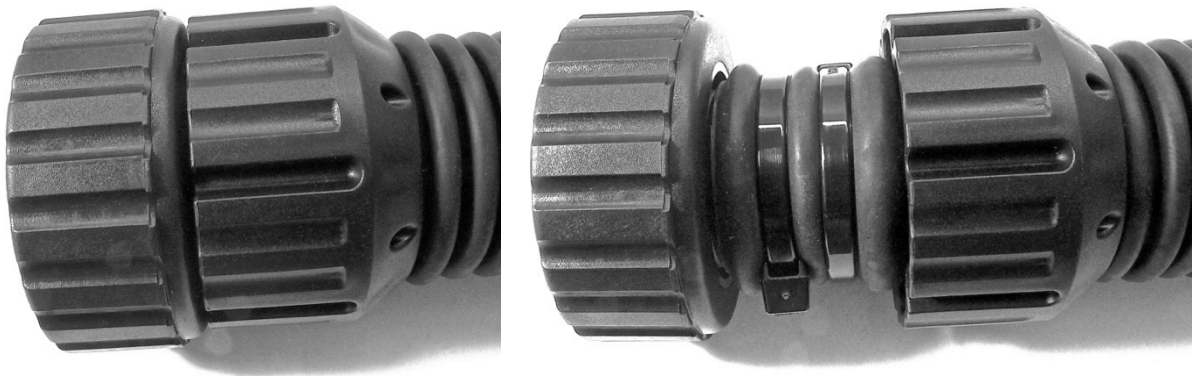
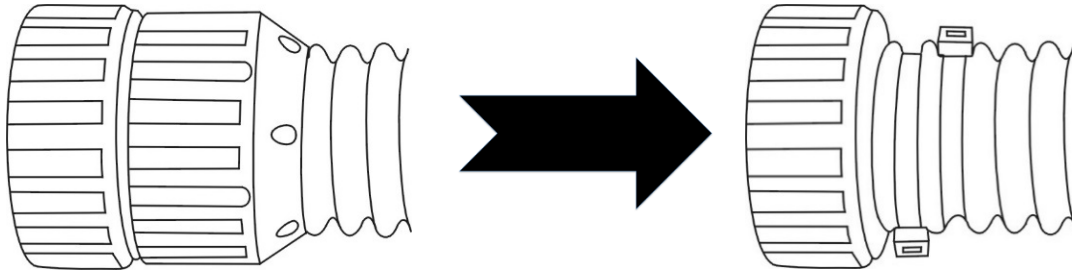


Unscrewing the new type snap connector. Notice the chamfered diameter.

6. Shortening convoluted hoses – new Ty-wrap type

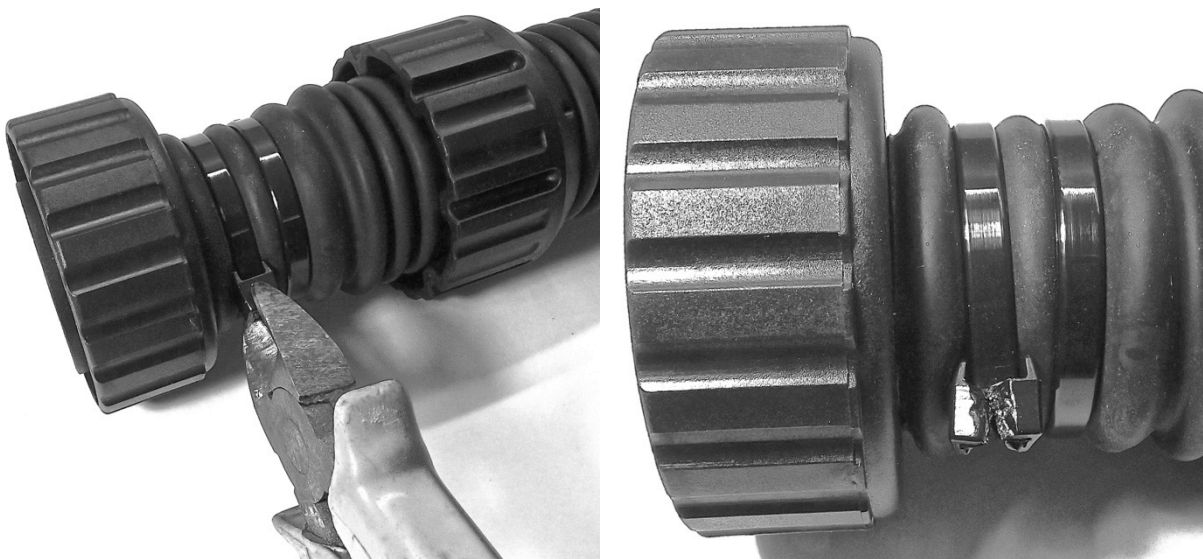
6.1 Pull the curved Ty-wrap cover down the convoluted hose

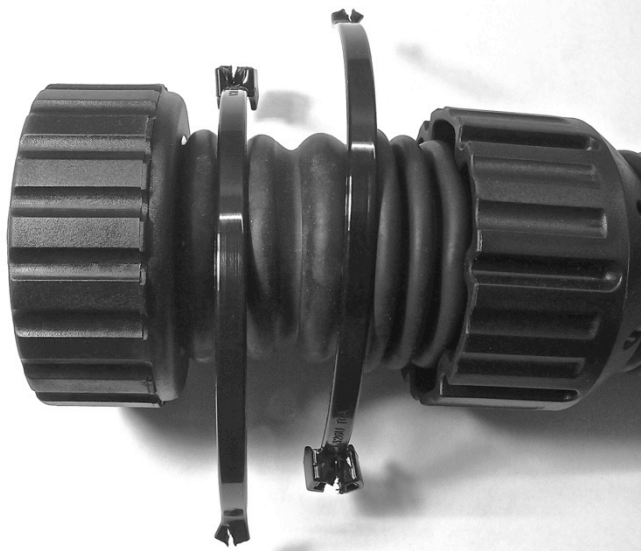
- Pull the curved Ty-wrap cover STRAIGHT down the convoluted hose.
- DON'T turn it: just pull it straight down.



6.2 Cut the two Ty-wraps

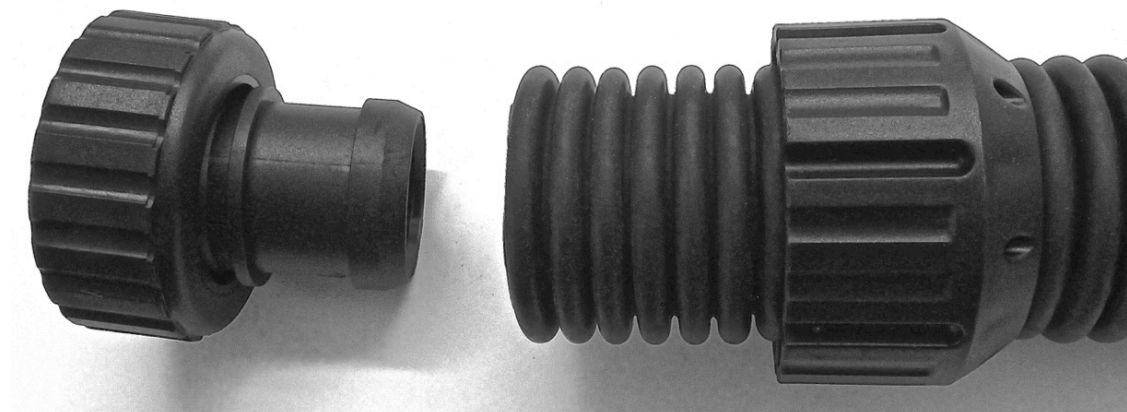
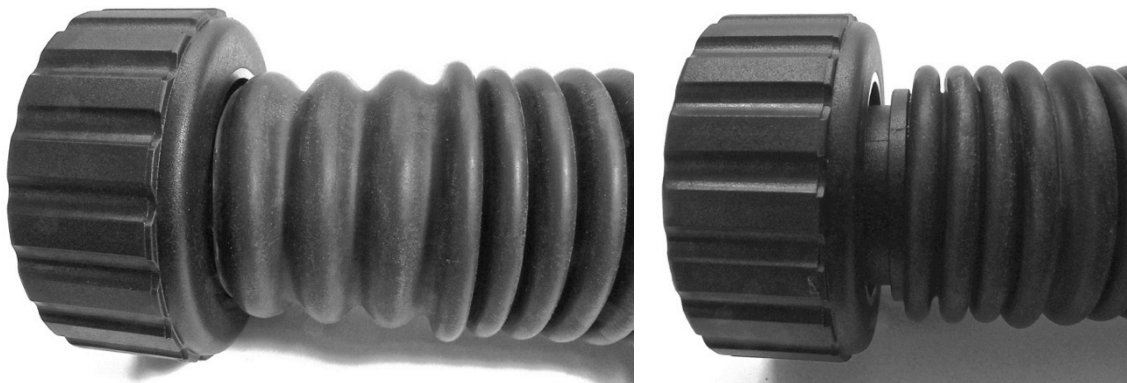
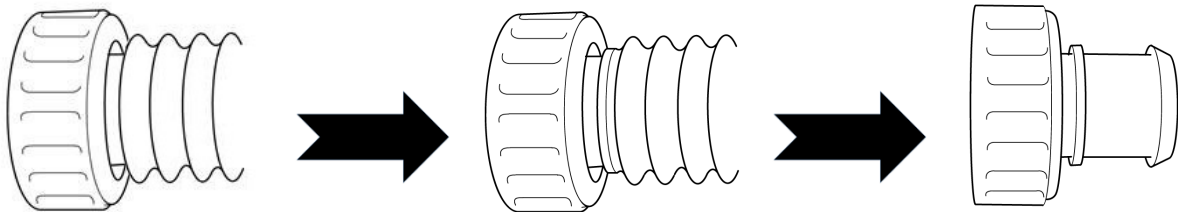
- Cut the two Ty-wraps by holding the cutter as indicated in the photo below.
- By cutting it this way there is no risk of damaging the convoluted hose in the process.





6.3 Pull the convoluted hose from the swivel stem

- Pull the convoluted hose STRAIGHT down the swivel stem.
- DON'T turn it: just pull it straight down.



6.4 Cut the convoluted hose to the desired length

- Preferably use a very sharp pair of scissors.
- Snip or cut into a valley of the convoluted hose, NOT into a rib.



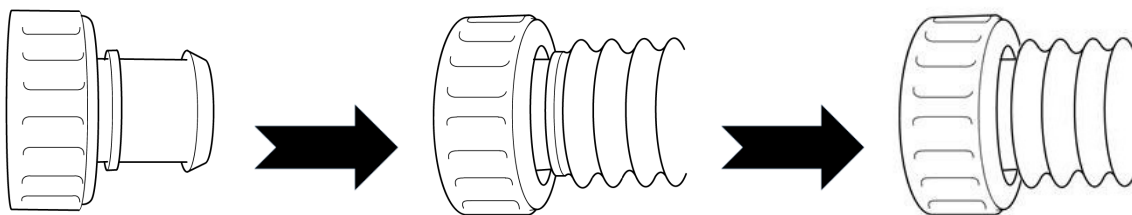
CORRECT: cut into a valley



WRONG: cut onto a rib

6.5 Push the convoluted hose back onto the swivel stem

- Push the shortened convoluted hose back onto the swivel stem.
- **!** **WARNING**: Make sure that the first convolution is pushed OVER the flange of the swivel stem.





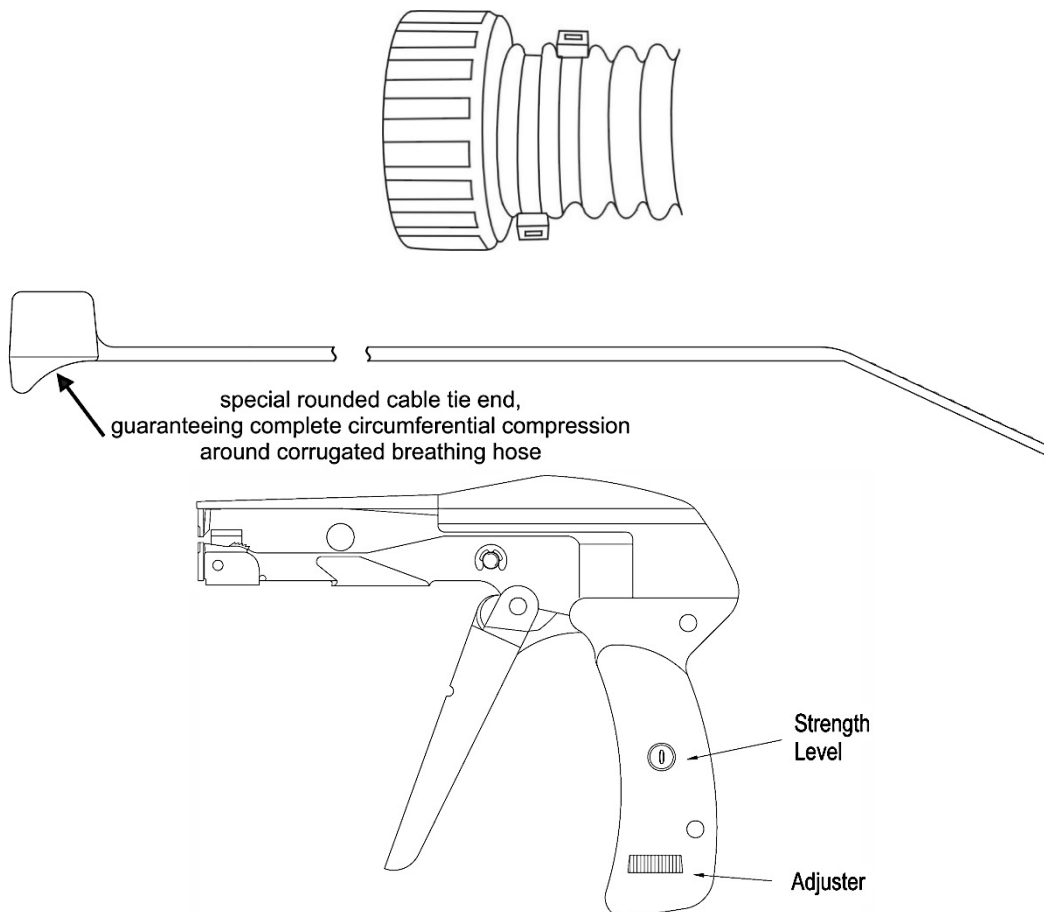
CORRECT: first ring is over the flange of the stem

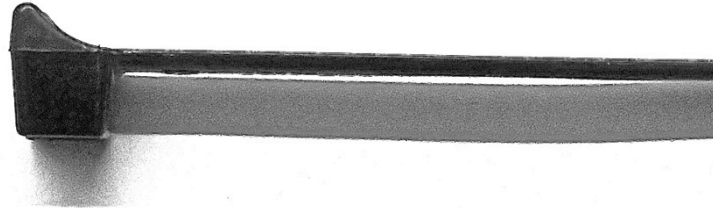


WRONG: first ring is NOT over the flange of the stem

6.6 Fit two new Ty-wraps onto convoluted hose

- Use a cable tie tension gun to fit two new Ty-wraps onto the convoluted hose.
- Set the cable tie tension gun to a strength level that matches a cable tie of 4.7 mm width. This typically amounts to a tension strength of 11 kilos.
 - o For the suggested Rapid HT-218 cable tie tension gun this results in an adjuster setting of 3.
- **!** **WARNING:** ONLY use the special AP cable ties with a rounded cable tie end (part number RBCT1) to ensure there is a guaranteed complete circumferential compression around the convoluted hose.
- Make sure the clasps of the two newly fitted Ty-wraps are at a 180 degree angle of each other, in the first and second rung of the convoluted hose.

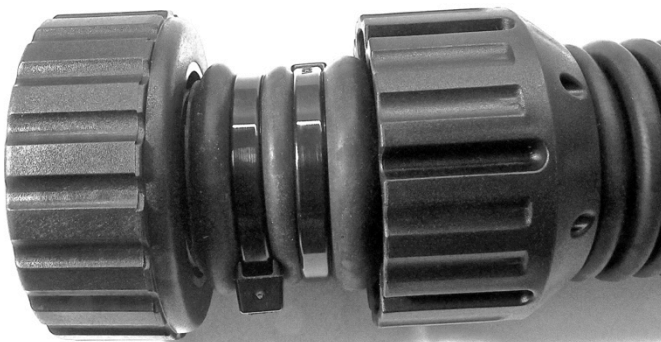
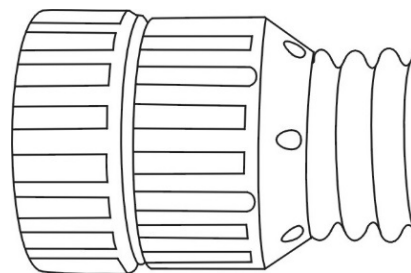
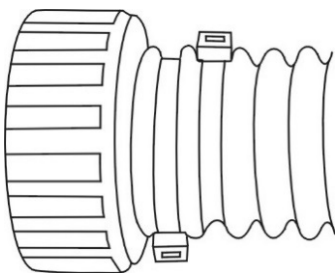




CORRECT: clasps of the newly fitted Ty-wraps are at a 180 degree angle of each other.

6.7 Push curved Ty-wrap cover back over the Ty-wraps

- Push the curved Ty-wrap cover STRAIGHT up on the convoluted hose.
- DON'T turn it: just push it straight up.



7. Shortening convoluted hoses – old split ring type

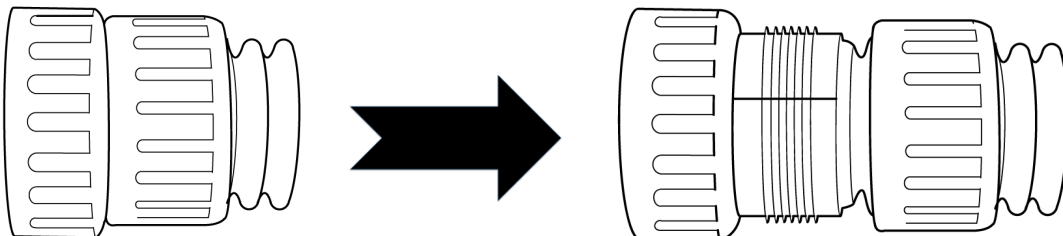
7.1 Hold the convoluted hose end with RBTOOL12 for better grip

- For better grip while unscrewing the outer hose clamp we recommend using RBTOOL12 or an equivalent tool. This allows e.g. for holding RBTOOL12 in a vice for easy handling.
- Make sure the two slots in the tool slide onto the lips on the inside of the swivel stem.



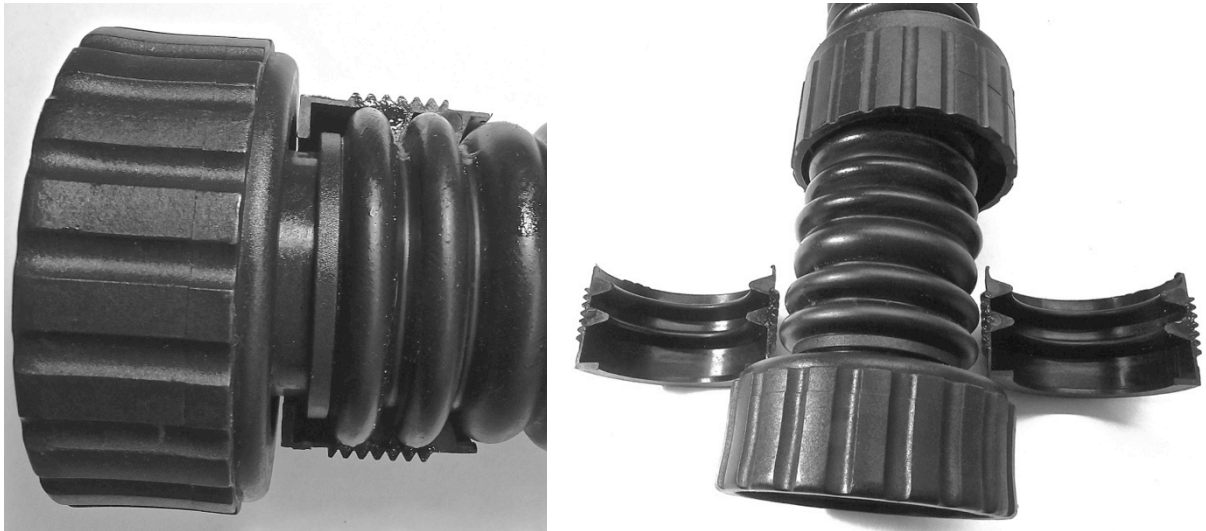
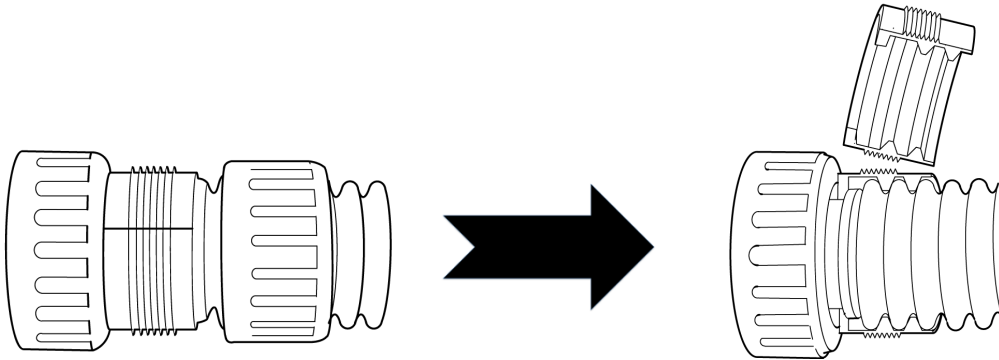
7.2 Unscrew outer hose clamp from split inner hose clamp halves

- Hold the swivel stem and hose fixed in place while unscrewing the outer hose clamp.
- Unscrew anti-clock-wise.

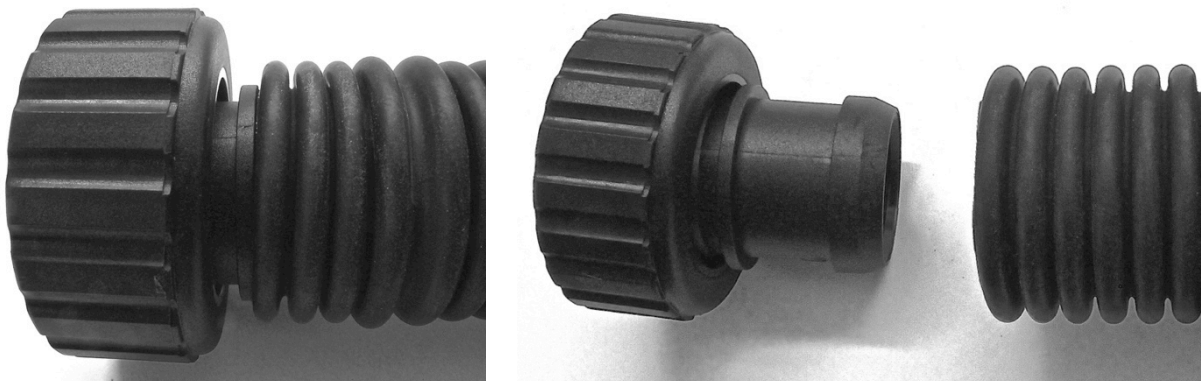
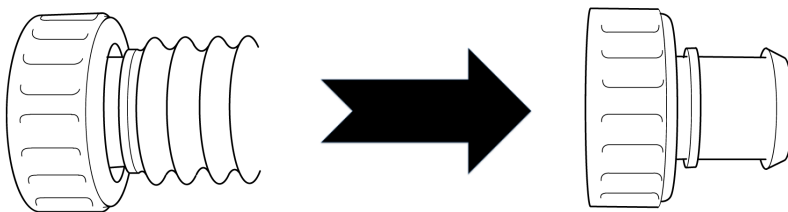


7.3 Remove the two split inner hose clamp halves from convoluted hose

- Lift the two halves that make up the inner hose clamp from the convoluted hose.

**7.4 Pull the convoluted hose from the swivel stem**

- Pull the convoluted hose STRAIGHT down the swivel stem.



7.5 Cut the convoluted hose to the desired length

- Preferably use a very sharp pair of scissors.
- Snip or cut into a valley of the convoluted hose, NOT into a rib.



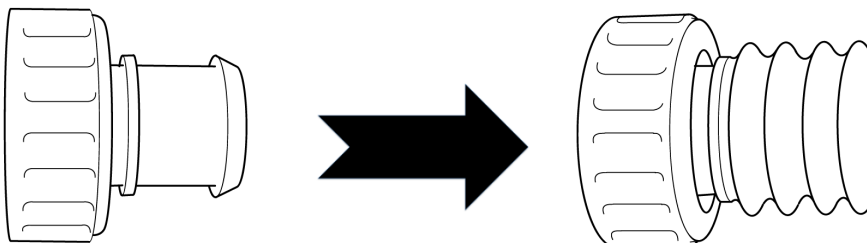
CORRECT: cut into a valley



WRONG: cut onto a rib

7.6 Push the convoluted hose back onto the swivel stem

- Push the hose STRAIGHT onto the swivel stem until the first convolution is AGAINST the flange of the swivel stem. Try to avoid rotating the hose while doing this.
- Do **NOT** pull the convolution OVER the flange of the swivel stem (as you would do with the new Ty-wrap type of convoluted hose ends, as described in chapter 6).

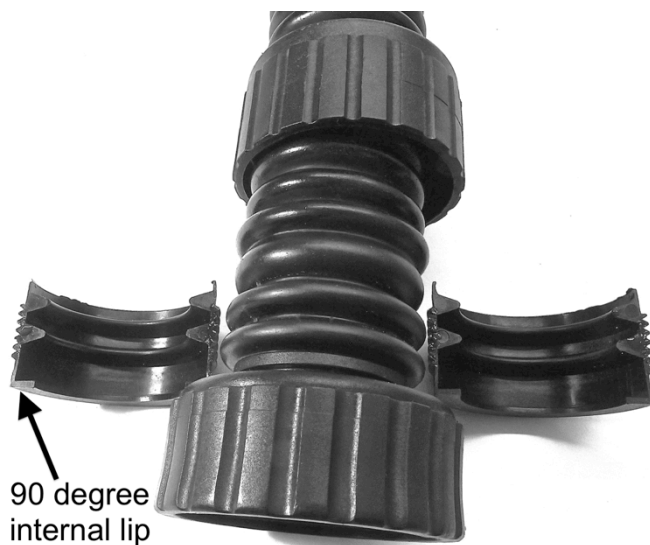
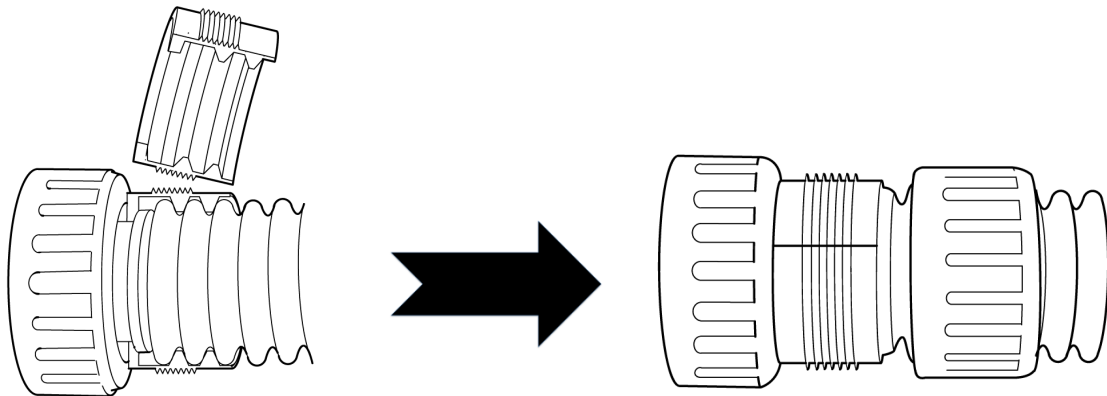




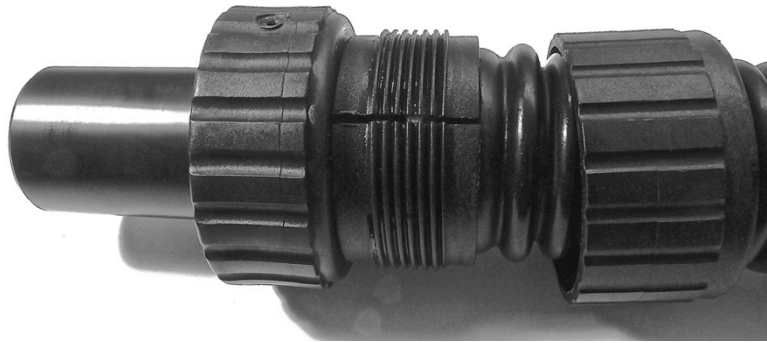
CORRECT: first convolution sits AGAINST the flange of the swivel stem, NOT over it.

7.7 Refit the two split inner hose clamp halves onto the hose

- The threaded two-part split inner hose clamp has a 90-degree internal lip that has to hook OVER the flange of the swivel stem.

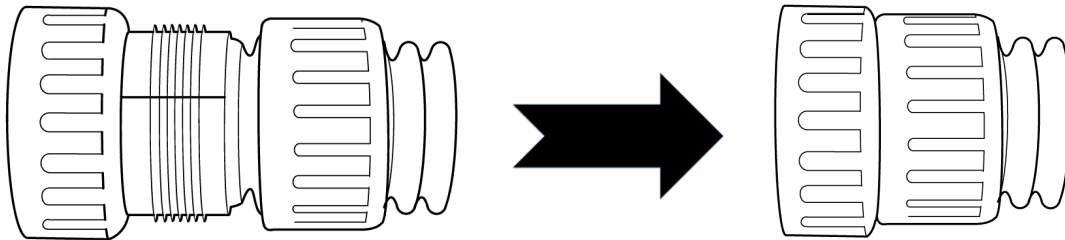


CORRECT: the 90-degree lip of the split ring hooks over the flange of the stem



7.8 Screw outer hose clamp back onto the split inner hose clamp halves

- Once both halves of the inner hose clamp are in position, screw the outer hose clamp back on while preventing the hose and swivel stem from turning.
- Optionally use RBTOOL12 to fix the swivel stem in place and prevent it from rotating.
- Screw clock-wise.



7.9 Updating the clamping System

The old style clamp fittings can simply be replaced by the new style Ty-wrap fittings, which are easier to fit. All that is needed for each end of the hose are:

- 2 x Ty-wraps (RBCT1),
- A new cover (RB12-02-A) and,
- A new inhale locking ring (square thread; RB12-03-IN) or exhale locking ring (RB12-03), depending on the type of hose you are updating.

The new version of the locking ring has a slightly smaller inside diameter that makes it easier to remove the hose from the T-piece.

All these parts are available from AP Diving.

8. Testing Instructions

8.1 Test for leaks and proper operation

1. Test all MP hoses after shortening under pressure (around 9 bar) while submerging them in water. Check for any bubbles, also when gently manipulating the hose and connector.
2. Next, hook the pressurized MP hose onto their intended device coupling: BCD, wing, counterlung, OCB, ADV, Auto Air or drysuit. Test the operation and verify gas flows as expected and with sufficient throughput. Submerge in water and check for bubbles.
3. Test all convoluted hoses in the usual way, while hooked to the rebreather and performing positive and negative leak tests.

8.2 Visual inspection

Visually inspect all hoses prior to use and if signs of damage are evident, postpone the dive until the hose can be repaired or replaced.