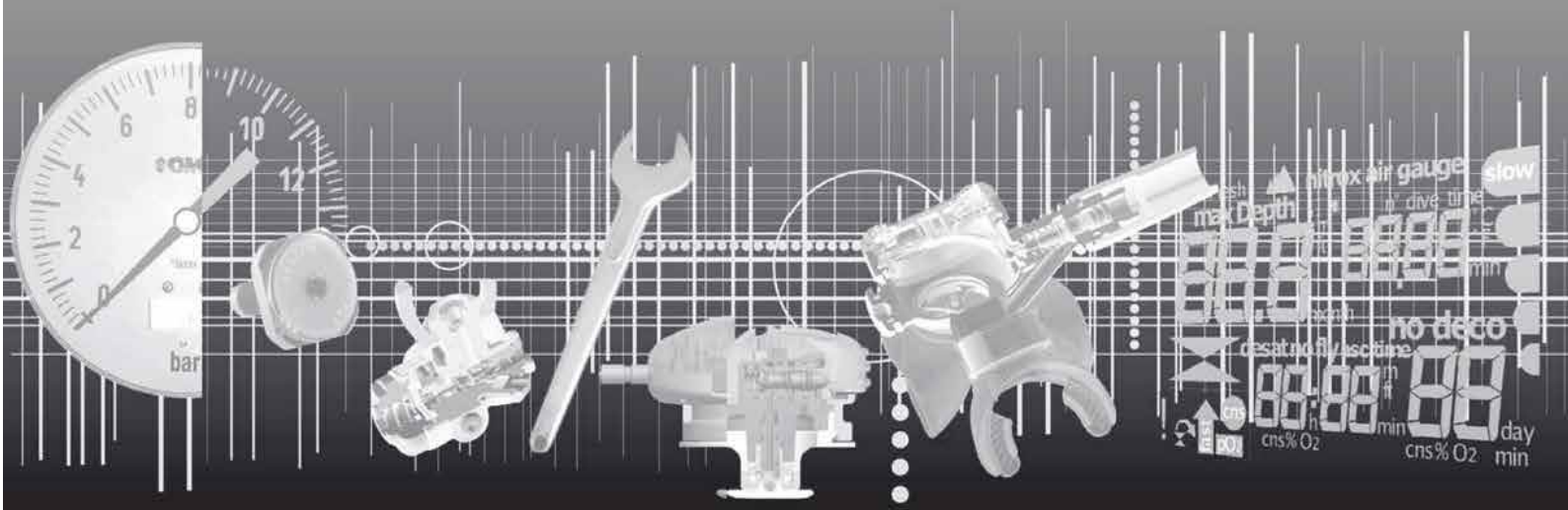


Service Technician Training Course

Student Version

For use ONLY during a MARES Service Technician Training Course

R2S
1ST STAGE

mares®

MAINTENANCE PROCEDURE

TOOLS NEEDED

WARNING !
ALL MAINTENANCE AND REPAIR PROCEDURES MUST BE PERFORMED BY A MARES AUTHORIZED SERVICE CENTER AND/OR DISTRIBUTOR. THEREFORE, THE INFORMATION PROVIDED BELOW IS INTENDED STRICTLY FOR TECHNICIANS AT SUCH CENTERS.

NOTE ALL OPERATIONS MUST BE CONDUCTED STRICTLY IN THE ORDER DESCRIBED.

IN ORDER TO ENSURE ADVANCED PERFORMANCE AND SAFETY DURING USE, AFTER 100 HOURS OF DIVING OR 1 YEAR WE RECOMMEND THAT THE REGULATOR BE CHECKED, AND ITS CRITICAL PARTS MUST BE INSPECTED AND REPLACED IF NECESSARY.

- Compressed air supply circuit or tank (180-200 bar)
- Nylon brush
- O-Ring removal tool
- Silicone grease (General Electric Versalube G-322 type)
- Compressed air gun (8-10 Bar)
- Descaling solution (Deox Extra type) or ultrasound tank
- Test Bench or LP pressure gauge to calibrate the intermediate pressure
- Thread compound (Loctite 422 type for INT connection - Loctite 415 type for DIN connection)
- R2S 1st st. service kit (code 46201130)

(B-23)
46106223

(B-5)
46106205

(B-18) 14 mm
46106218

(B-1) 25 mm
46106201

(B-4) 5 mm
46106204

Hex wrench 4 mm

(B-41)
41106000

(B-12) 5.5mm
46106212

(B-22)
46106222

DISASSEMBLY INT VERSION

1. Loosen the dust cap (REF. 10) from the 1st stage, fully unscrewing the yoke knob (16) (Fig. 1).
2. Unscrew the hose protection from the body of the 1st stage. (Fig. 2).

FIG. 1

FIG. 2

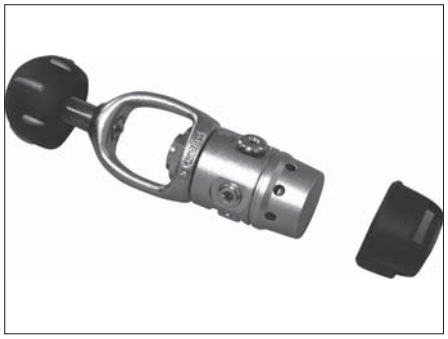
WARNING!
DO NOT USE BLADES OR POINTED TOOLS MADE OF STEEL OR OTHER MATERIALS, WHICH CAN SCRATCH THE SURFACES.

3. Unscrew the hose (26) using a 14-mm open end wrench (B-18) (Fig. 3).
4. Use the B-41 tool to remove the R2S Cap (Fig. 4).

FIG. 3

FIG. 4

FIG. 4



5. Screw the tool (B-5) to help disassemble the first stage into a 3/8 low pressure port (Fig. 5).
6. Using the Pin Wrench (B-13), unscrew the cap (19), and pull out the complete piston (18) and the spring (4) (Fig. 6).
7. Using the extraction tool (B-22), pull out the Piston Seat (Fig. 7).

FIG. 5

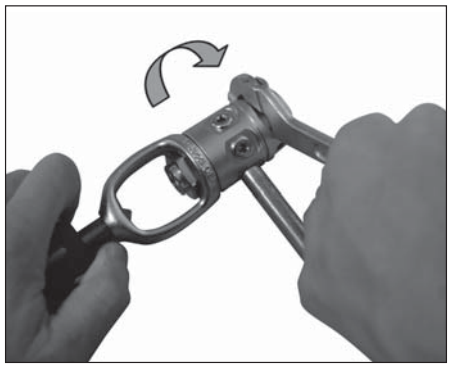


FIG. 6

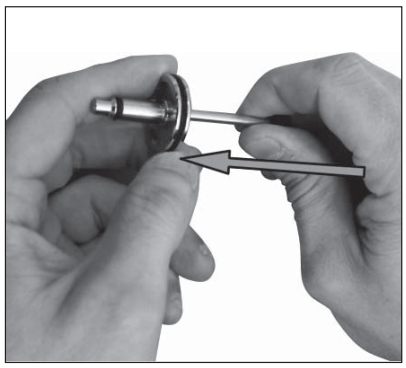


FIG. 7

8. Using the special 25-mm wrench (B-1), unscrew the Yoke retainer nut. (Fig. 8)

NOTE TO MAKE DISASSEMBLY EASIER, WE RECOMMEND THAT YOU PLACE THE FIRST STAGE IN A BENCH VISE.

9. Using the snap ring pliers (B-14), remove the Yoke retainer nut (23), the Snap ring (2), the Sintered filter (8), and the Filter spring (12) (Fig. 9).

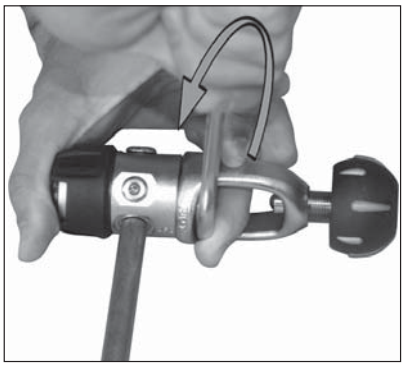


FIG. 8

FIG. 9

DISASSEMBLY DIN VERSION

1. Unscrew the DIN OR seat (15) from the DIN fitting (24) with a 4-mm Allen wrench (Fig. 1).
2. Remove the O-Ring (25) from the OR seat (15).
3. Remove the sintered filter (7) from the DIN connector body (24), turning the first stage over.

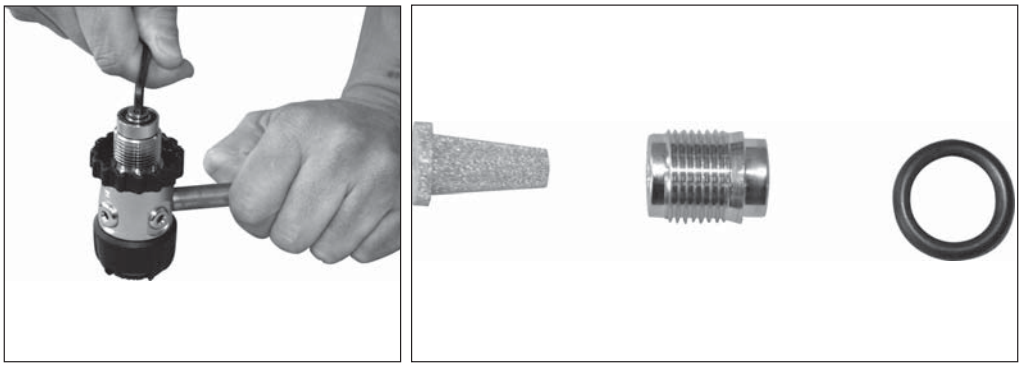


FIG. 1

NOTE DO NOT USE BLADES OR POINTED TOOLS MADE OF STEEL OR OTHER MATERIALS, WHICH CAN SCRATCH THE SURFACES.

NOTE TO MAKE DISASSEMBLY EASIER, MARES RECOMMENDS PLACING THE 5-mm ALLEN WRENCH (B-4) IN A BENCH VISE AS SHOWN IN THE PHOTO. (FIG. 3)

4. Insert an 5-mm Allen wrench (B-4) inside the DIN fitting (24) and unscrew it completely (Fig. 2).
5. Remove the DIN fitting (24) and the DIN ring nut (11).
6. Remove the O-Ring (26) from the DIN fitting body (24).

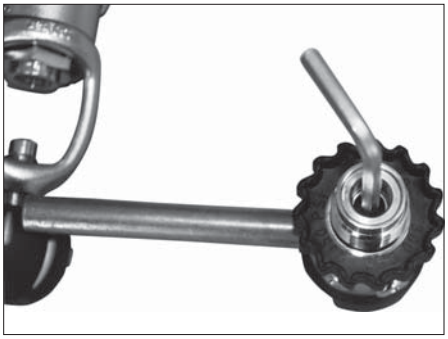


FIG. 2

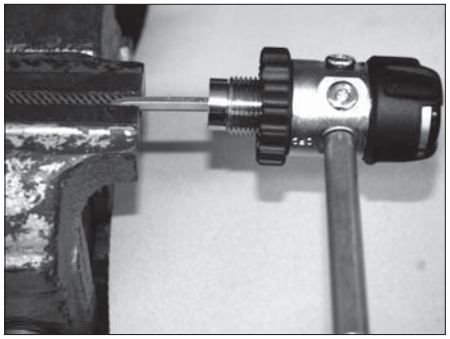


FIG. 3

CLEANING AND CHECKS

For routine cleaning of reusable rubber components, wash all parts in a mixture of hot water and mild detergent, scrubbing if necessary with a soft brush. Do not use solvents or acids on rubber components.

NOTE ACIDS OR OTHER SOLVENTS MAY DAMAGE PLASTIC AND RUBBER PARTS. BEFORE CLEANING METAL COMPONENTS, MAKE SURE THAT ALL SEALS AND OTHER PARTS SUBJECT TO DETERIORATION HAVE BEEN REMOVED.

DO NOT IMMERSE THE PISTON SEAT AND THE SINTERED FILTER IN AN ACID SOLUTION.

Chrome-plated brass and stainless steel components can be cleaned using a nylon brush to remove any deposits, by immersing them in a fresh water ultrasound bath, or, if suitable equipment is not available, in a gentle acid solution (Deox Extra type) or white vinegar diluted with hot water.
Be sure to rinse all parts in fresh water and dry with a jet of low pressure air at 8-10 bar before proceeding with reassembly.

WARNING!
CERTAIN KEY COMPONENTS OF THE FIRST STAGE SHOULD BE REGULARLY REPLACED AT EACH SCHEDULED OVERHAUL. LISTED BELOW ARE THE COMPONENTS INCLUDED IN THE R2S 1ST STAGE SERVICE KIT (CODE 46201108)

- R2S SERVICE KIT (INT/DIN: 46201108)
- VITON R2S SERVICE KIT (INT/DIN: 46201130)

I. SNAP RING (INT CONNECTIONS ONLY)
II. INT TAPERED SINTERED FILTER
III. DIN TAPERED SINTERED FILTER
IV. PISTON SEAT

V. 3 106 O-RINGS (LP Cap)
VI. 2 108 O-RINGS (HP Cap)
VII. 1 2018 O-RING (Piston Stem)
VIII. 1 3043 O-RING (O-Ring Housing)
IX. 1 2100 O-RINGS (Piston Head)
X. 1 2050 O-Ring (din fitting - Yoke retainer nut)

CLEANING AND CHECKS

SNAP RINGS	Check for distortion, cracking or damaged edges. It is advisable to always replace them with new ones.
PISTON	Check for scratches and/or grooves in the O-Ring sealing seats. Make sure that the hole through the stem is not obstructed by foreign bodies.
SINTERED FILTER	Inspect for sedimentation and rust. Rust deposits may indicate corrosion of the air tanks. Inspect for any cracks.
PISTON SEAT	Check that the sealing surfaces are not chipped or scratched and that there are no foreign particles. These types of defects can compromise operations.
NOTE THE PISTON SEAT MUST NOT BE FLIPPED OVER.	
O-RING	Check for cuts, deformation, or foreign particles. Any of these defects can cause leaks.
CAP	Check that there are no grooves or scratches on the sealing surface of the piston O-Rings.
FIRST STAGE BODY	Check that there are no grooves or scratches on the sealing surface of the piston (shaft), in the port plug seats, or on the sealing surface on the piston seat. Make sure there are no particles or foreign bodies inside the first stage.

REASSEMBLY

WARNING!
IF THE 1ST STAGE IS USED FOR DIVES WITH OXYGEN-ENRICHED MIXTURES, STRICTLY FOLLOW ALL THE INSTRUCTIONS PROVIDED IN THIS MAINTENANCE MANUAL IN THE NITROX CHAPTER (EN 13949) BEFORE BEGINNING REASSEMBLY!

NOTE BEFORE REASSEMBLING, LIGHTLY LUBRICATE ALL THE O-RINGS WITH SILICONE GREASE (TYPE GENERAL ELECTRIC VERSALUBE G-322). LUBRICATION REDUCES THE LIKELIHOOD OF DAMAGE DURING REASSEMBLY.

1. Place the yoke retainer nut (23), the filter spring (12), and the INT tapered sintered filter (8) in the body (Fig. 1 and Fig. 2).
2. Using the snap ring pliers (B-14), fit the snap ring (2) in its position above the sintered filter (8) (Fig. 3).


FIG. 1

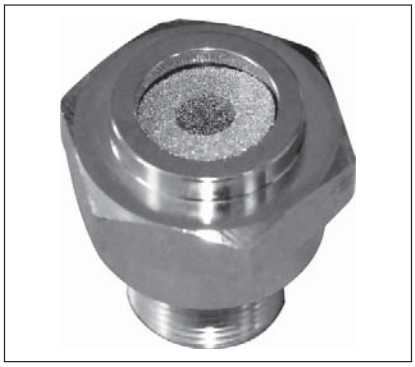


FIG. 2


FIG. 3


FIG. 4

NOTE ROTATE THE SNAP RING TO CHECK THAT IT IS POSITIONED CORRECTLY AS SHOWN IN THE PHOTO (FIG. 4).

NOTE TO PREVENT THE YOKE RETAINER NUT FROM WORKING LOOSE ACCIDENTALLY, POUR ONE OR TWO DROPS OF THREAD COMPOUND (LOCTITE 422 TYPE) ONTO ITS THREADING AS SHOWN IN THE PHOTO (FIG. 5).

3. Position the yoke (21) with the knob (16) on the first stage body.
4. Position the O-Ring 2050 (26) on the Yoke retainer nut (23).
5. Using the wrench (B-1), fully tighten the complete yoke retainer nut (7). (Fig. 6)

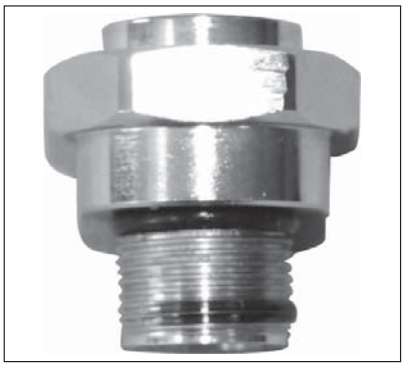


FIG. 5

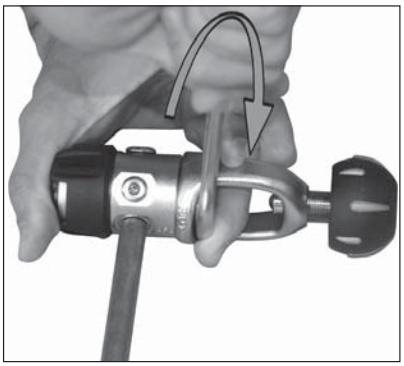


FIG. 6

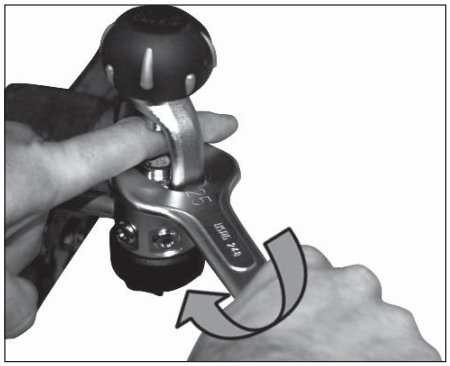


FIG. 7

NOTE TO MAKE DISASSEMBLY EASIER, WE RECOMMEND THAT YOU PLACE THE FIRST STAGE IN A BENCH VISE AS SHOWN IN THE PHOTO (FIG. 7).

NOTE IF USING A TORQUE WRENCH, USE TIGHTENING TORQUE OF APPROXIMATELY 18-20 N/M.

6. Reassemble the seat (27) and the O-rings (17) and (20) on the piston (18) (Fig. 8).
7. Place the piston unit inside the cap (19) (Fig. 9).
8. Position the tool (B-5) inside the first stage body (Fig. 10).


FIG. 8


FIG. 9


FIG. 10

9. Place any shim washers (maximum 2) to adjust the intermediate pressure (27) as follows: Shim washers: Place the first touching the piston head and the second in the seat of the first stage body (Fig. 9 and Fig. 10).

NOTE FOR CHECKS AND ADJUSTMENTS ON THE FIRST STAGE, CONSULT THE CORRESPONDING SECTION OF THE MAINTENANCE MANUAL: F 7-2

10. Grease the bases of the spring (4) and place it inside the cap (19) (Fig. 11).
11. Screw the cap (19) onto the first stage body (1) and tighten it down fully using the wrench (B-23) (Fig. 12).
12. Position the O-Rings 5 and 13 on the corresponding low (6) and high pressure port caps (14) and/or on the corresponding hoses.
13. Screw the caps and/or hoses into the appropriate seats on the first stage.

FIG. 11

FIG. 12

DIN REASSEMBLY

1. Install the O-Ring (26) on the DIN coupling (24) (Fig. 1).

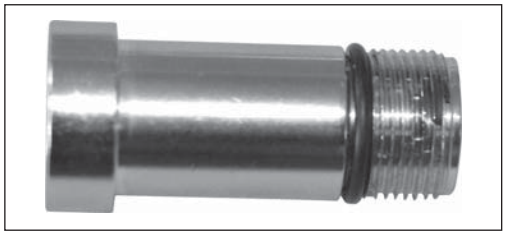


FIG. 1

NOTE TO PREVENT THE DIN FITTING BODY (26) FROM WORKING LOOSE ACCIDENTALLY, APPLY ONE OR TWO DROPS OF THREAD COMPOUND (TYPE LOCTITE 415) ON THE FITTING THREAD ON THE PART FURTHEST FROM THE O-RING.
DO NOT PUT THREAD COMPOUND ON THE O-RING.

2. Position the DIN ring nut (11) on the first stage body (1), and then fully screw down the coupling (24) using the 5-mm Allen wrench (B-4) (Fig. 2).

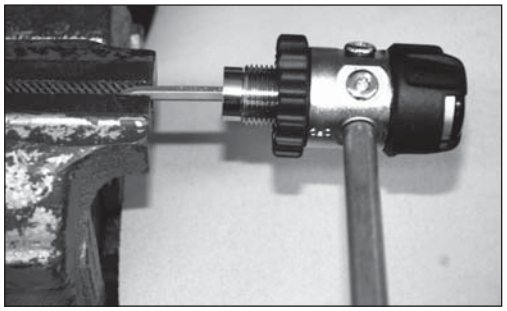


FIG. 2

WARNING!
MARES RECOMMENDS USING A TORQUE WRENCH. SET A TIGHTENING TORQUE OF APPROXIMATELY 18-20 N/M. (FIG. 3)

3. Insert the tapered filter (7) into the DIN connector. (Fig. 4)

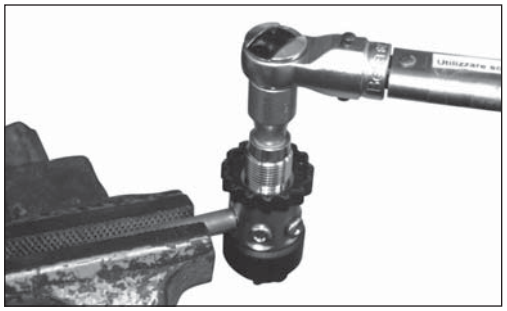


FIG. 3

4. Position the O-Ring (25) on the OR seat (15).

5. Screw the O-Ring housing (115) to the DIN coupling (24) with a 4-mm Allen wrench and unscrew the disassembly tool (B-5) from the first stage body. (Fig. 5)

NOTE IF USING A TORQUE WRENCH, USE TIGHTENING TORQUE OF APPROXIMATELY 1.5 - 2 N/M.

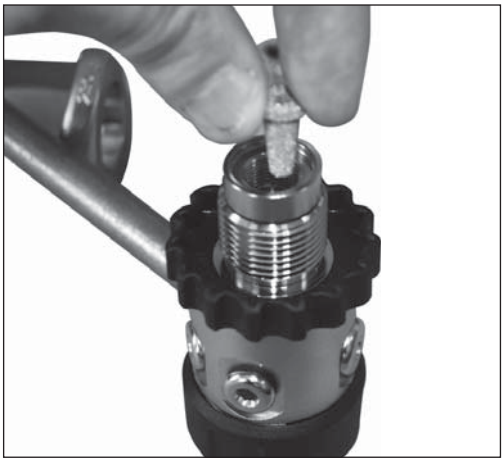


FIG. 4

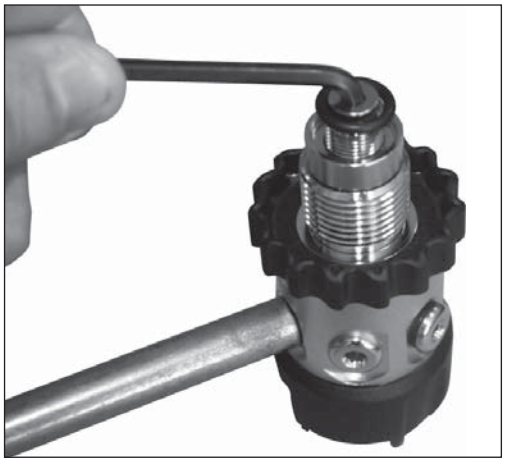


FIG. 5

WARNING!

Connect the first stage to a full tank (at least 180 bar) or test bench, and open the air valve slowly to expel any foreign matter from the first stage.

WARNING!

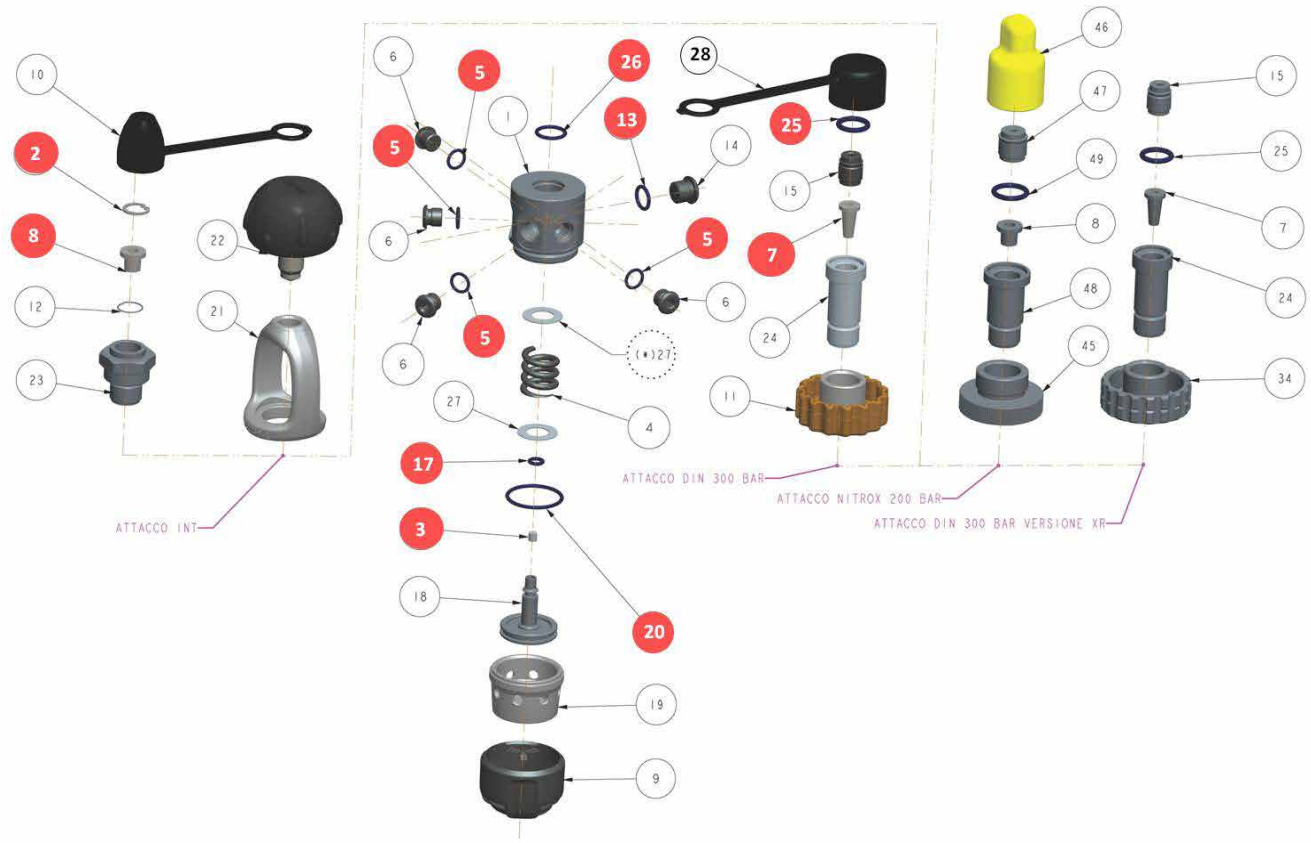
FOR CHECKS AND ADJUSTMENTS ON THE FIRST STAGE, CONSULT THE CORRESPONDING SECTION OF THE MAINTENANCE MANUAL : F 7-1 (2008).

FIG. 6

FIG. 7

FIG. 8

Drawing No. E 976	FIRST STAGE R2S	DRAWING UPDATED: 03/12/2015



52X
FIRST STAGE

ITM 37

PARBAK BACKUP RING

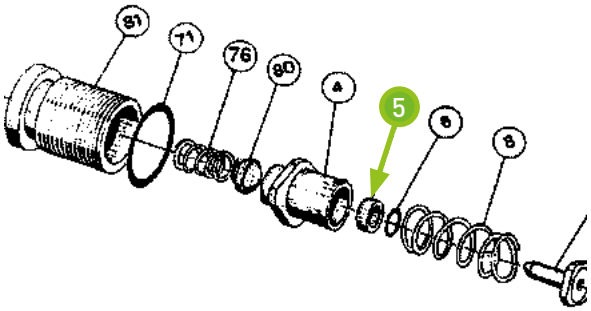
FEB. 24, 2015

WITH REFERENCE TO PREVIOUS ITM 24_R1, MARES TECHNICAL SERVICE IS PLEASED TO INFORM ALL MARES LAB PARTNERS THAT AFTER HAVING PERFORMED SEVERAL TESTS, PART NUMBER 46110506 PARBAK BACKUP RING WILL BE ASSEMBLED AS RUNNING CHANGE IN ALL NX REGULATORS AND VITON FIRST STAGE SERVICE KIT, STARTING FROM SEASON 2015.

THE TESTS PERFORMED SHOW THAT PARBAK BACKUP RING PROVIDES EXCELLENT PERFORMANCE EVEN USED WITH NX FIRST STAGES, ESPECIALLY DIVING IN EXTREMELY COLD WATER *(<= 0 °C).*

AS SHOWN IN PIC. 1, THE PARBAK BACKUP RING CAN BE EASILY IDENTIFIED, THANKS TO THE BLACK COLOR OF THE NEW MATERIAL.

-BACKUP RINGS CURRENTLY IN USE -		-HP CHAMBER BACKUP RING, PARBAK-	
FIG. 1		FIG. 2	
			
46185038	461105068	SIDE - A	SIDE - B



ASSEMBLY INSTRUCTIONS

MAKE SURE THAT ONCE INSERTED INTO THE BALANCING CHAMBER (4) THE BACKUP RING (5) HAS SIDE "A" (FIG. 2) FACING THE O-RING (6).

WARNING!

MAINTENANCE PROCEDURES MUST BE PERFORMED BY QUALIFIED PERSONNEL AT A MARESLAB TECHNICAL ASSISTANCE CENTER AND/OR AUTHORIZED MARES DISTRIBUTOR.
IN ORDER TO DISASSEMBLE AND REASSEMBLE THE SEAT FROM THE FIRST STAGE, IT IS NECESSARY TO CONSULT THE PROCEDURES DESCRIBED IN THE RELATED SECTION OF THE MARES MAINTENANCE MANUAL.
IN THE EVENT THAT THE UPDATED MANUAL, CONTAINING THE INDICATED SECTIONS IS UNAVAILABLE, OR IF THE INSTRUCTIONS ARE UNCLEAR OR NOT ENTIRELY UNDERSTANDABLE, PLEASE CONTACT MARES BEFORE PERFORMING ANY MAINTENANCE, ADJUSTMENT, OR CHECK.

ITM 40

ACT (Advanced Coating Technology) FIRST STAGE POPPET INFO

OCT. 08, 2015

MARES TECHNICAL DEPARTMENT IS PLEASED TO INFORM YOU THE NEW ACT POPPET (# 46201361) IS CURRENTLY ASSEMBLED ON ALL INLINE DIAPHRAGM FIRST STAGES WITH THE EXCEPTION OF THE ABYSS NAVY II. THERE WILL BE NO CHANGES MADE TO IT AT THIS TIME.

(SEE BTM 24)

THE REGULATOR MATERIAL NUMBERS WILL STAY THE SAME. THE REGULATORS ASSEMBLED WITH THE NEW ACT POPPET, WILL BE EASILY IDENTIFIED BY AN "X" PRINTED ON THE CARDBOARD BOX AND ALSO PLACED ON THE FIRST STAGE PLASTIC PROTECTION COVER.

EXAMPLE: ABYSS 22 = ABYSS 22X

THE MAIN FEATURES OF THE ACT POPPET ARE:

- MADE OF TWO MATERIALS:
  CHROME PLATED BRASS – LESS FRICTION OF THE STEM
- ACT COATING PROCESS

EFFECTIVE SEPTEMBER 2015, ALL 1ST STAGE SERVICE KITS INCLUDE THE ACT POPPET, EXCEPT FOR THE ABYSS 22 NAVY II SERVICE KITS (INT: # 46186152 / DIN: # 46200606) DUE TO US NAVY PROTOCOLS.

- FIRST STAGE 52X-22X-15X INT/DIN: # 46201355
- FIRST STAGE 52X-22X-15X INT/DIN VITON: # 46201358
- FIRST STAGE 12S INT/DIN: # 46201370
- FIRST STAGE 12S INT/DIN VITON: # 46201371



NOTE: SOME SERVICE KITS ARE USED FOR MULTIPLE FIRST STAGE MODELS. (I.E. KIT #46200906 (EXCLUDES POPPET) IS USED FOR THE 22, MR16, AND MR32). THESE SERVICE KITS WILL CONTINUE UNTIL THE CURRENT STOCK IS EXHAUSTED. AT THAT TIME, IT WILL BE REPLACED BY SERVICE KITS THAT WILL INCLUDE THE ACT POPPET. CHECK WITH MARES HQ FOR DETAILS).

NOTE: THE CURRENT MR UPGRADE KIT (#46200705) WILL BE DISCONTINUED AND REPLACED BY THE **ACT UPGRADE KIT (#46201386).**

NOTE

VALVE SEAT CODE# 46201139 (RO.15) IS NO LONGER AVAILABLE AND HAS BEEN REPLACED WITH THE VALVE SEAT CODE# 46186216 (RO.05) IN THE SPARE PARTS CATALOG. MARES TECHNICAL DEPARTMENT SUGGESTS THE USE OF THE NEW VALVE SEAT CODE# 46186216 IN ORDER TO PRODUCE OPTIMUM PERFORMANCE OF THE ACT FIRST STAGE POPPET, PARTICULARLY IN DIN (300 BAR) FIRST STAGES.

IMPORTANT

ALL SERVICE AND REPAIR PROCEDURES ON MARES PRODUCTS SHOULD BE PERFORMED BY QUALIFIED MARES SERVICE TECHNICIANS AT AUTHORIZED MARES SERVICE CENTER.
SERVICE TECHNICIANS SHOULD HAVE THE LATEST VERSION OF THE MARES SERVICE MANUAL AND SPARE PART CATALOG READILY AVAILABLE WHILE PERFORMING SERVICE PROCEDURES AND CLOSELY FOLLOW THE RECOMMENDED PROCEDURES AND GUIDELINE OUTLINED IN THESE MATERIALS.

BTM 25_R1

REGULATOR SERVICE GUIDELINE AND SERVICE INTERVALS

OCT. 27, 2015

Mares has revised the regulator service guidelines and service intervals. The new guidelines and intervals apply to all **in-line Mares diaphragm regulators** as of **September 1st 2015, except for the Abyss 22 NAVY II** regulator and octopus as noted below.

MARES REGULATOR SERVICE GUIDELINES AND SERVICE INTERVALS

PERFORM AN ANNUAL INSPECTION AND/OR SERVICE EVERY YEAR OR 100 DIVES

The Mares annual regulator inspection and/or service is performed by following the procedures and guidelines outlined on the annual inspection and/or service checklist (see attached). The results of the inspection may require a complete regulator overhaul.

A COMPLETE REGULATOR OVERHAUL MUST BE PERFORMED EVERY TWO YEARS OR 200 DIVES

A complete regulator overhaul must be performed per specifications every two years as outlined in the Mares Service Manual. This requires, at minimum, replacing all parts included in the service kit. Please see the annual regulator inspection and/or service checklist for details.

MARES ABYSS 22 NAVY II REGULATOR AND OCTOPUS

SERVICE PROCEDURES AND INTERVALS

Service procedures and intervals for the Abyss 22 Navy II Regulator and Octopus are different than those described above due to US Navy testing protocols. Below are the Service Guidelines for the Abyss 22 Navy II Regulator and Octopus:

Every Year or 100 Hours of use:
Mares recommends a complete overhaul every year or 100 hours of use.

Mares recommends the 1st Stage Tri-material Poppet be replaced every two years or 200 hours of use, OR when signs of wear are present.

NOTE

The ACT Poppet (Code #46201361) SHOULD NOT BE USED in the Abyss 22 Navy II 1st Stage. Abyss 22 Navy II Service Guidelines REQUIRE the use of the Tri-material Poppet (Code #46201132) in the 1st stage in order to conform to US Navy testing protocols. The Tri-material Poppet is NOT included in the Abyss 22 Navy II 1st Stage Service Kit. When ordering Abyss 22 Navy II 1st Stage service kits, please order the Tri-material Poppet as a separate line item.

IMPORTANT

All service and repair procedures on Mares products should performed by qualified Mares Service Technicians at authorized Mares Dealers and Service Centers. Service Technicians should have the Mares Service Manual and Spare Parts Catalog readily available for reference while performing service procedures and closely follow the recommended procedures and guidelines outlined in these materials.

ANNUAL REGULATOR INSPECTION CHECKLIST

OCT. 27, 2015

Date...../...../..... Make / Model ..... Serial #.....

Customer Name..... Purchase Date..... / ...../.....

TEST 1	**Inspect Filter**	□ Pass	□ Fail
	Check for debris or discoloration.		
TEST 2	**Inspect HP Chamber area**	□ Pass	□ Fail
	Inspect for dirty, rust, or corrosion.		
TEST 3	**Hose Inspection**	□ Pass	□ Fail
	Pull back hose protectors. Check that the hoses are secure in the hose crimp.		
TEST 4	**Inspect 2nd Stage Exhaust Valve**	□ Pass	□ Fail
	Check valve and sealing surface for cleanliness, shape, and seal.		
TEST 5	**Inspect Mouthpiece**	□ Pass	□ Fail
	Inspect for tears, cracks or holes. Replace if necessary.		
TEST 6	**2nd Stage Diaphragm Inspection**	□ Pass	□ Fail
	Attempt inhalation without pressurization. Check for perfect seal.		
TEST 7	**Intermediate Pressure Check**	□ Pass	□ Fail
	Check for stable IP. IP must be within acceptable range per Service manual.		
TEST 8	**Cracking Effort**	□ Pass	□ Fail
	Check CE. CE must be within acceptable range per Service Manual.		
TEST 9	**Pressurized Immersion test**	□ Pass	□ Fail
	Pressurize and immerse unit. Test for any leaks.		

IMPORTANT

1. **If the regulator fails Checklist Item 1, 2 or 9:**
   A complete Regulator Overhaul is required
2. **If the regulator fails Checklist Item 7 or 8:**
   If the regulator can be adjusted within specification, it passes. If not, a Complete Overhaul is required
3. **If the regulator fails Checklist Item 3, 4, 5,or 6:**
   The defective parts associated with the Checklist Item may be replaced,
   OR A Complete Regulator Overhaul maybe performed

IMPORTANT

All service and repair procedures on Mares products should performed by qualified Mares Service Technicians at authorized Mares Dealers and Service Centers. Service Technicians should have the Mares Service Manual and Spare Parts Catalog readily available for reference while performing service procedures and closely follow the recommended procedures and guidelines outlined in these materials.

52X. REQUIRED TOOLS AND SUPPLIES

Tool	Description	#Code
	B-18 (14mm)	46106218
	B-1 (25mm)	46106201
	Hex 4mm	No code
	B-6	46106206
	B-17 (17mm)	46106217
	B-5	46106205

Tool	Description	#Code
	B-4 (5mm)	46106204
	B-13 (10mm)	46106213
	Snap Ring Pliers (B14)	46106214
	B-21	46106221
	B-41	46201041
	O-Ring removal tool	46201387

- Compressed air supply circuit or tank (2600-2900 PSI/ 185-200 bar)
- Compressed air gun (120-145 PSI/8-10 bar)
- Ultrasonic cleaner & Descaling solution (e.g. Deox Extra type) or similar
- Loctite 415 or similar
- Test Bench (#416920) or Intermediate Pressure Gauge (46106252)
- Christo-Lube MCG 111 Lubrication Technology or equal
- Neoprene Workpad (449822)
- First Stage service kit # 46201355 INT / DIN - #46201358 INT / DIN Viton
- Nylon brush

52X. DISASSEMBLY

WARNING!

IF THE FIRST STAGE IS USED TO DIVE WITH OXYGEN-ENRICHED MIXTURES, STRICTLY FOLLOW ALL THE INSTRUCTION PROVIDED IN THE MAINTENANCE MANUAL, IN THE NITROX CHAPTER (EN 13949 FOR EUROPEAN COUNTRY) BEFORE BEGINNING DISASSEMBLY-REASSEMBLY-ADJUST.

1. Loosen the Dust Cap (10 INT- 9 DIN) from the First Stage.
2. Remove the Second Stage Hose using the 14mm wrench (B18).
3. Remove the First Stage Cap (44), using a flat head screwdriver (type USAG No. 322). Insert the screwdriver in correspondence with "M", (as shown in the picture) and penetrate between the plastic parts 44 and 38 with the screwdriver for at least 1cm, then lever the screwdriver with caution until the release.
4. Take both Shells out (38-39).
5. Insert the threaded bar Tool (B5) to a First Stage LP port.

NOTE

Place the threaded bar tool (B5) in a bench vise (if available) to hold the First Stage during the disassembly.

6. Using a 6mm Allen wrench (B-8), unscrew the HP Chamber (34), remove the Spring (36), the First Stage Valve (19), and the Pin 28,3mm (1) from the First Stage.
7. Extract the O-ring (20) and the Backup Ring (3) from the HP Chamber (34), using an O-ring removal Tool made in plastic or brass.
8. Remove the O-ring (10), and Washer (50) from the HP Chamber (34).

WARNING!

DO NOT USE SHARP OR POINTED TOOLS MADE OF STEEL OR OTHER MATERIALS, TO AVOID SCRATCHING THE SURFACES OF THE HP CHAMBER.

3.a


3.b


6a


6b


7-8

52X. DISASSEMBLY

9. Flip the First Stage over as shown in the picture. Unscrew the Regulating Nut (18), using a 10mm Allen wrench (B13) and remove the First Stage Diaphragm Spring (30) and the Spring Base Plate (31).

9.a

10. Unscrew the Retaining Nut (17) using a 25mm Allen wrench (B1).

11. Remove the First Stage Diaphragm (30), the Antifriction Ring (32), the DFC Washer (35), and the First Stage Poppet Button (28) following one of the two steps described below.

Option a – Insert the nozzle (#415724) of a low pressure compressed air gun into the First Stage HP Chamber. Use short bursts of low pressure air to dislodge the Diaphragm (30). Once the Diaphragm is dislodged, remove it and the Poppet Button (28). Be sure that all LP & HP plugs are assembled on first stage

9.b

Option b – Place the First Stage on a flat surface with the Diaphragm side facing down. Position the special Tool (B6) inside the First Stage HP Chamber and let the Poppet Pin (1) falling down through the tool and the HP Seat (33), so that it stays in its original position, in the First Stage Button (28). Remove the tool (B-6) from the HP Chamber, and gently press the Pin with the plastic end of Tool (B-41) to dislodge and remove the Poppet Button and Diaphragm.

Option b

WARNING!

DO NOT USE SHARP OR POINTED TOOLS TO REMOVE THE DIAPHRAGM. SCRATCHES ON THE SURFACES OF THE DIAPHRAGM MAY CAUSE HP LEAKING.

NOTE

If the Antifriction Ring (32) is still in its Seat after having completed step 11, remove it paying attention not to damage the First Stage Body.

WARNING!

DO NOT USE SHARP OR POINTED TOOLS TO REMOVE THE ANTIFRICTION RING (47). TO AVOID DAMAGING THE DIAPHRAGM.

12. Insert the special tool (B42) in the center hole of the First Stage Body (4) and remove the HP Seat (33).

12

13. Remove the O-ring (27) from the HP Seat (33).

52X. DISASSEMBLY

INT
(Section 14)

DIN/Nitrox
(Section 15)

52X. DISASSEMBLY INT

14.1 Unscrew the Yoke Retainer Nut (23) using the special tool 25mm (B1) and remove the Yoke Spacer (37), and Yoke assembly (21-22).

14.2 Disassemble the Retaining Ring (2) using the snap ring pliers (B14) and remove the Filter (8) and the Spring Filter (12).

14.3 Remove the O-ring (26) from the Yoke Retainer Nut (23).

14.1

WARNING!

BE CAREFUL TO AVOID DAMAGING THE CHROME PLATING ON THE NUT YOKE RETAINER (23) WHEN DISASSEMBLING.

14.2

14.4 Remove all LP Plugs (6) and HP Plugs (14) using a 4mm Allen wrench.

14.5 Remove the O-Rings (5) from the LP Plugs (6) and O-rings (13) from the HP Plugs (14).

52X. DISASSEMBLY DIN - NX

15.1 Unscrew the O-ring Seat (15– 47 NX) from the Body Din Connector (24 – 48 NX), using a 4mm Allen wrench.

15.2 Remove the O-ring (25 – 49 NX) from the O-ring Seat (15 – 47 NX).

15.3 Remove the Conical Filter (7 – 8 NX) from the Body Din Connector (24 – 48 NX), by turning the First Stage Body upside down.

15.4 Insert a 5mm Allen wrench (B4) inside the Body Din Connector (24 - 48 NX) and unscrew it completely. To make this step easier, a wrench (as shown in the picture) can help.

15.5 Remove the O-ring (26) from the Body Din Connector (24 – 48 NX).

15.6 Remove all LP Plugs (6) and HP plugs (14) using a 4mm Allen wrench.

15.7 Remove the O-rings (5) from the LP Plugs (6) and O-rings (13) from the HP Plugs (14).

15.1

15.2 - 15.3

15.4a

15.4b

52X. INSPECTION AND CLEANING

Reusable Rubber and Plastic Components

Inspection

Inspect all reusable rubber and plastic components for excessive wear and/or damage. Replace parts as necessary.

Cleaning

Clean all rubber and plastic components by washing them in a mixture of warm water and mild detergent. If necessary, scrub parts with a soft brush. Do not use abrasive cleaners, solvents or acids on rubber components.

WARNING!

SOLVENTS AND ACIDS MAY DAMAGE PLASTIC AND RUBBER PARTS. BEFORE CLEANING METAL COMPONENTS, MAKE SURE THAT ALL RUBBER AND PLASTIC PARTS HAVE BEEN REMOVED.

Metal Components

Inspection

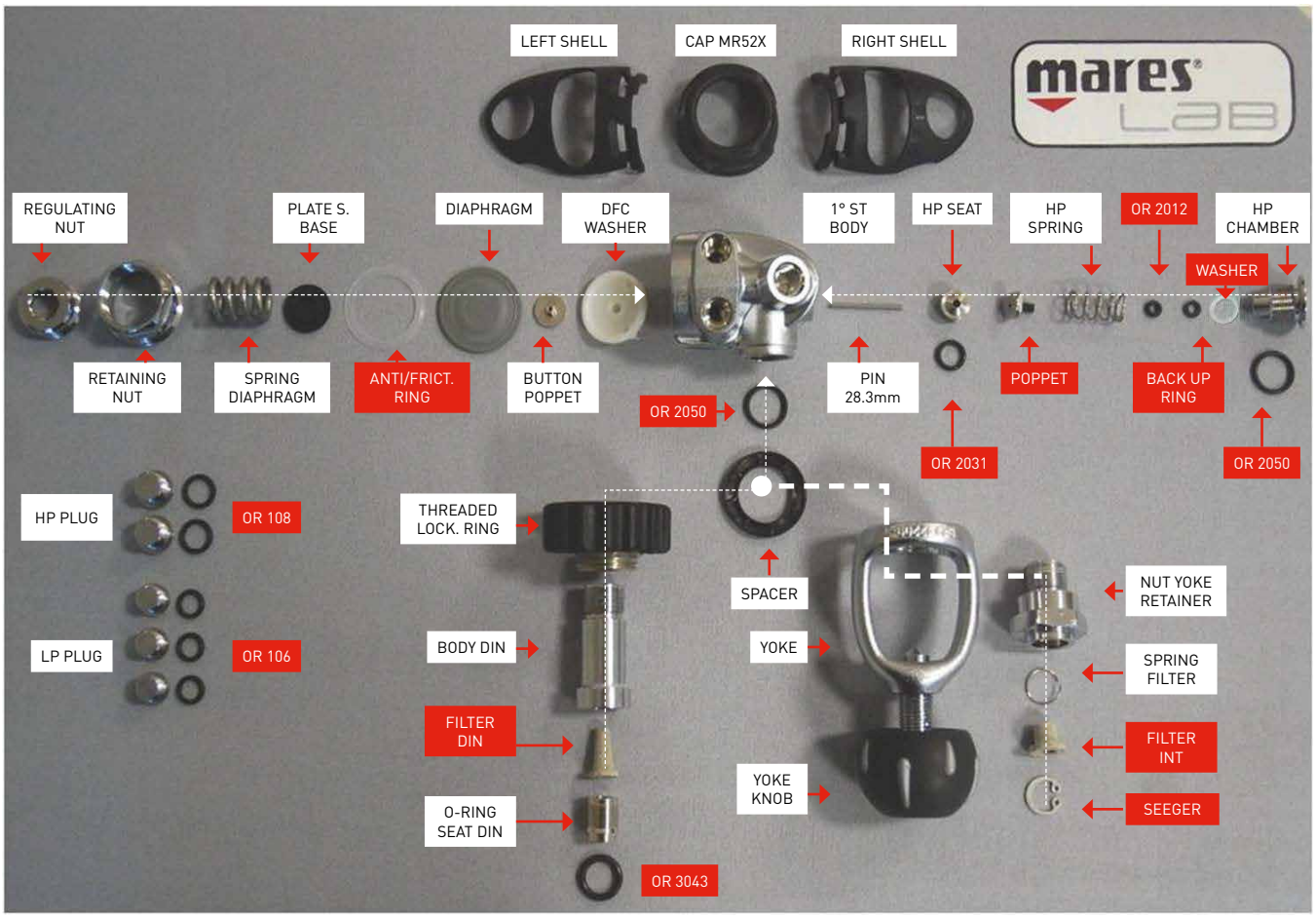
Inspect all parts for excessive wear and/or damage. Replace parts as necessary.

Cleaning

Chrome plated, brass, and stainless steel parts are cleaned by immersing them in an ultrasonic cleaner containing a de-scaling agent such as Deox Extra or a solution of white vinegar diluted with hot water. A nylon brush may be used to remove any stubborn deposits.

Be sure to rinse all parts in fresh water and allow to completely dry before proceeding with reassembly.

52X. FIRST STAGE SERVICE KIT



Certain key components of the First Stage should be replaced during the overhaul. These key parts are included in the 52X First Stage Service Kit (Code 46201355 INT/DIN – 46201444 NX) and are identified in the RED BOXES above.

SERVICE KIT # 46201355 INT / DIN – 46201444 NX

52X. REASSEMBLY

NOTE

Lubrication reduces the likelihood of damage during reassembly. Before beginning the reassembly procedure, lightly lubricate all O-rings with a high quality silicone grease.

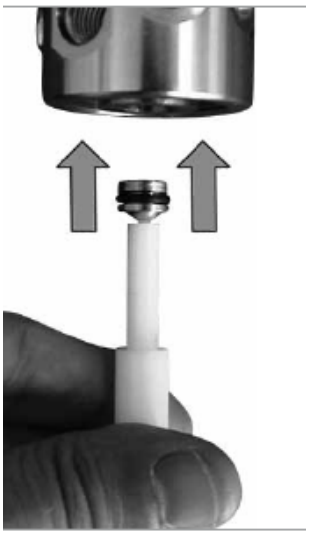
16. Install the O-ring (27) on the HP Seat (33), and position the Seat on the special tool (B21).
17. Insert the HP Seat (33) into the First Stage Body and gently press until the Seat is properly seated.

16

WARNING!

TAKE SPECIAL CARE NOT TO DAMAGE THE SEAT WHEN INSERTING IT. IT IS CORRECTLY SEATED IF THE CONICAL SECTION IS VISIBLE WHEN VIEWING IT FROM THE HIGH PRESSURE CHAMBER.

18. Correctly position the Backup Ring (3) and the O-ring (20) into the HP Chamber (34).



17

WARNING!

MAKE SURE THAT SIDE "A" OF THE BACK UP RING (3) IS FACING THE O-RING (9), AND SIDE "B" IS FACING THE BOTTOM OF THE HP CHAMBER (11).

19. Install the O-ring (26), and the Washer (50) on the HP Chamber (34).
20. Insert the First Stage Valve (19) inside the First Stage Body, with the flat part facing the Valve Seat 33).
21. Position the Spring (36) on the First Stage Valve (19) and tighten the HP Chamber (34) using a 6mm Allen wrench (B4).

20

52X. REASSEMBLY

22. Flip the First Stage Body over (as shown in the picture) and insert the DFC Washer (35) into the First Stage Body (4), and the Pin 28,3mm (1) in the center hole of the DFC Washer (35).

23. Position the First Stage Valve Button (28) on the First Stage Pin (1) and press it down to feel the "response" of the Spring (36).

24. Place the Diaphragm (30) in the First Stage Body, making sure is firmly seated in the Body.

22

NOTE

Note the impression of the poppet button (28) on the First Stage Diaphragm. When re-installing the Diaphragm (30), be sure to install it facing the same direction as disassembled.

24

25. Correctly position the Antifriction Ring (32) on the Diaphragm (30).

26. Place the Spring Base Plate (16) in the middle of the Diaphragm (30). Use a 25-mm wrench (B1) to fully tighten the Retaining Nut to the First Stage Body.

25

NOTE

If Using a Torque Wrench to tighten the Retaining Nut (17), use a tightening torque of approximately 25 Nm / 18 ft*lbf.

26.a

26.b

52X. REASSEMBLY

27. Place the Spring (16) on the Spring Base Plate (31).

28. Using the 10mm Allen wrench (B13), install the Regulating Nut (18) making 3 – 4 turns of the wrench only.

28

NOTE

Do not over-tighten the Regulating Nut. Doing so can cause an increase in Intermediate Pressure, which can damage the LP Gauge and interfere with the IP adjustment procedure.

52X. REASSEMBLY

INT
(Section 29)

DIN/Nitrox
(Section 30)

52X. REASSEMBLY INT

29.1 Rotate the First Stage and assemble the Yoke Spacer (37).

29.2 Assemble the Filter Spring (12) and the Filter (8) in the Yoke Retainer Nut (23).

29.3 Using the Retaining Ring pliers (B14), press down to fit the Retaining Ring (2) above the Filter (8) and in the Yoke Retainer Nut (23).

29.1

NOTE

The Retaining Ring should be positioned with the sharp side up and rounded side down. Once installed, rotate the Retaining Ring to ensure it is correctly positioned.

29.3

29.4 Install the O-ring (26) on the Yoke Retainer Nut (23).

29.5 Install the Yoke Knob (22) on the Yoke (21). Place the Yoke (21) on the First Stage Body.

29.6 Using a 25mm wrench (B1), fully tighten the Yoke Retainer Nut (23).

NOTE

If using a Torque Wrench, tighten to a torque of approximately 13-15 ft*lbf / 18-20 Nm.

29.4

WARNING!

TO PREVENT THE YOKE RETAINER NUT (7) FROM LOOSENING, APPLY ONE OR TWO DROPS OF THREAD LOCKING COMPOUND ONTO THE THREADS PRIOR TO INSTALLATION. REMOVE ANY RESIDUAL THREAD LOCKING COMPOUND PRIOR TO APPLYING ANY NEW COMPOUND (LOCTITE 415 OR SIMILAR).

29.6

29.7 Install the O-rings (13) on the HP plugs (14), and the O-rings (5) on the LP plugs (6).

29.8 Install all HP and LP plugs on the First Stage Body, leaving the DFC and one additional LP port open for the Second Stage and IP Gauge.

52X. REASSEMBLY DIN - NX

30.1 Insert the Body DIN Connector (24 – 48 NX) into the Threaded Locking Ring (11 – 45 NX).

30.2 Position the O-ring (26) on the Body Din Connector (24 – 48 NX).

30.3 Place the Yoke Spacer (37) on the First Stage Body.

30.4 Using a 5-mm Allen wrench (B 4), tighten the Body DIN Connector (24 – 48 NX) to the First Stage Body.

30.1 - 30.2

WARNING!

TO PREVENT THE BODY DIN CONNECTOR (24) FROM LOOSENING, APPLY ONE OR TWO DROPS OF THREAD LOCKING COMPOUND ONTO THE THREADS PRIOR TO INSTALLATION. REMOVE ANY RESIDUAL THREAD LOCKING COMPOUND PRIOR TO APPLYING ANY NEW COMPOUND (LOCTITE 415 OR SIMILAR).

30.3

NOTE

If using a Torque Wrench, tighten to a torque of approximately 15 ft*lbs / 20 Nm

30.5 Insert the Conical Filter (7– 8 NX) in the Body Din Connector (24 – 48 NX).

30.6 Place the O-ring (25 – 49 NX) on the Din O-ring Seat (15 – 47 NX).

30.7 Using a 4mm Allen wrench, tighten the Din O-ring Seat (15 – 47 NX) to the Body Din Connector (15– 47 NX).

30.4

NOTE

If using a Torque Wrench, tighten to a torque of approximately 1.1-1.5 ft*lbs / 1,5-2 Nm

30.8 Remove the Threaded Bar Tool (B-5) from the First Stage Body.

30.9 Install the O-rings (13) on the HP Plugs (14), and the O-rings (5) on the LP Plugs (6).

30.10 Install all HP and LP Plugs on the First Stage Body, leaving the DFC and one additional LP port open for the Second Stage and IP Gauge.

30.5

52X. ADJUSTMENT

NOTE

Connect the First Stage to a full tank (at least 2600 psi/180 bar) or test bench, and open the air valve slowly to expel any foreign matter from the First Stage.

31. Attach the intermediate pressure gauge (#46106252) or connect the LP Hose from the LP Port of aTest Bench to the open low pressure port.
32. Attach the Second Stage Hose to the port marked DFC (without the Second Stage cover installed).

NOTE

If using a Torque Wrench, tighten hoses to a torque of approximately 3-3.5 ft*lbs / 4-4,5 Nm.

TABLE 1: IP ADJUSTABLE RANGE

HP Air Supply	Intermediate Pressure (IP)
2900 psi	142 – 148 psi
200 bar	9.8 – 10.2 bar

33. Holding down the Second Stage Demand Lever, slowly open the tank valve and, almost simultaneously, release the demand lever. Read the value of the first stage adjustment on the pressure gauge, and proceed as follows:

IP

HP

52X. ADJUSTMENT

NOTE

No Second Stage free or intermittent air flow can occur during the IP adjustment procedure. If any such flow occurs, it will compromise the process and could cause the IP setting to be outside the acceptable range.

33.1 If the intermediate pressure is greater than the specified value (see table 1), use the 10mm Hex Wrench (B-13) to slowly loosen the Regulating Nut (18) until the specified value is obtained.

33.1

WARNING!

WHEN THE INTERMEDIATE PRESSURE IS REDUCED, IT IS NECESSARY TO VENT THE EXCESS AIR IN ORDER TO OBTAIN A CORRECT READING OF THE NEW VALUE.

33.2 If the first stage pressure is **lower** than the specified value (see table 1), slowly tighten the Regulating Nut (18) until the specified value is obtained.

33.2

NOTE

Once the intermediate pressure has been correctly set, operate the Second Stage demand lever two to three times to make sure the intermediate pressure remains constant for a few minutes.

NOTE

The Second Stage adjustment procedures may now be performed.

52X. ADJUSTMENT

34. Properly assemble the right and left Shells (39-38) on the First Stage Body (4), and the First Stage Cap (44) as shown.

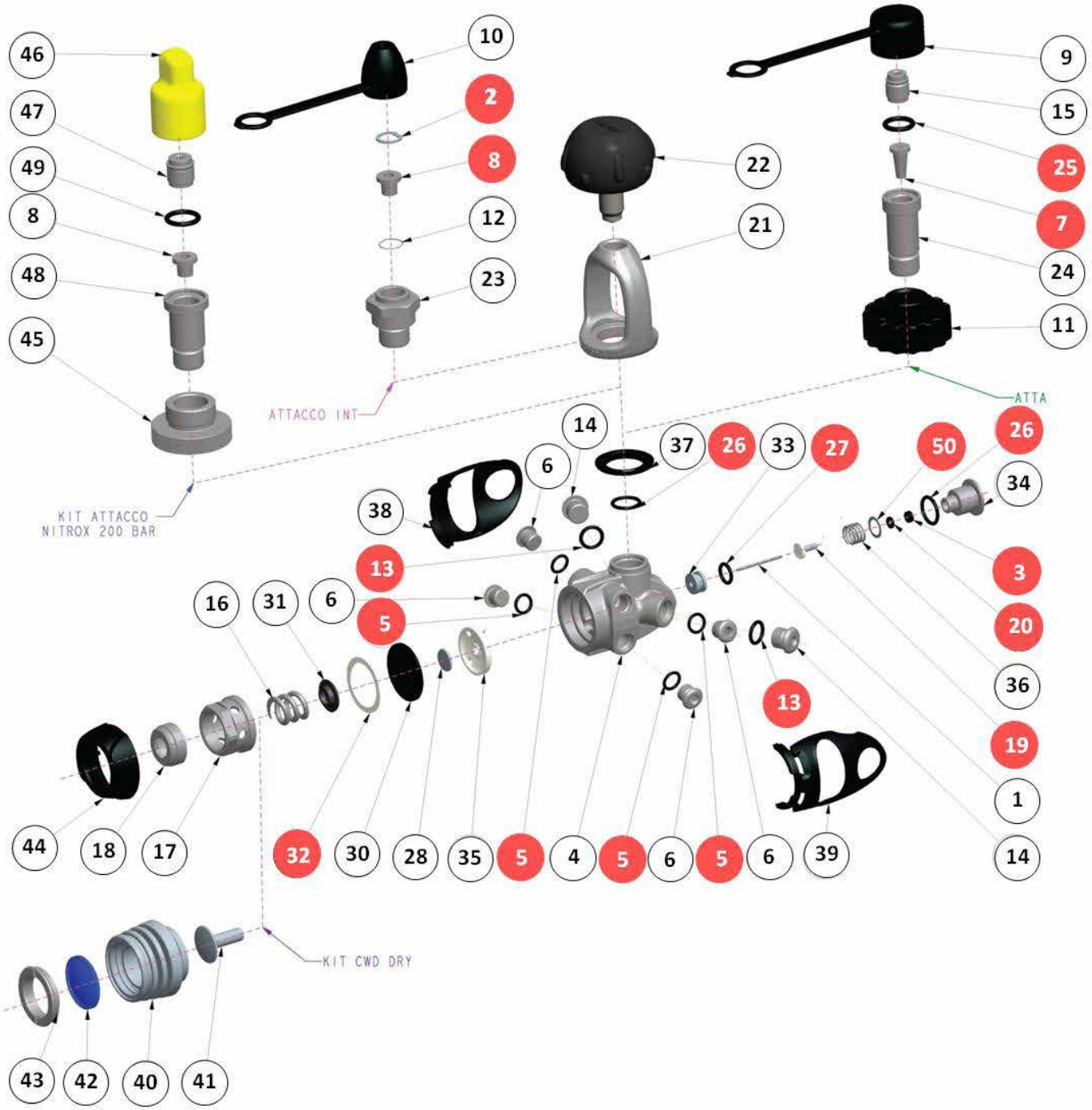
NOTE

The Second Stage adjustment procedures may now be performed.

52X. TROUBLESHOOTING

Problem	Probable Cause	Solution
CONTINUOUS AIR FLOW FROM SECOND STAGE (FREE FLOW) CAUSED BY: 1. AN INCREASE IN THE INTERMEDIATE PRESSURE, or 2. A CONTINUALLY INCREASING IP (IP CREEP)	1. Intermediate Pressure too high	Readjust IP per procedures
	2. Damaged First Stage Tri-material Poppet	Replace Tri-material Poppet
	2. Damaged Poppet Seat	Replace Poppet Seat
	2. Damaged HP Housing Assembly components or damaged HP Chanber	Check internal surfaces of HP Chamber. Clean or replace HP Chamber. Replace O-ring and/or Back Up Ring.
AIR LEAKS FROM FIRST STAGE DIAPHRAGM	Lose Locking Nut	Tighten CWD Kit Body
	First Stage Diaphragm damaged	Replace the Diaphragm
	First Stage diaphragm seating surface damaged	Replace the First Stage Body
AIR LEAKS FROM THE FIRST STAGE HP/LP PORT PLUGS AND/OR HOSE PORTS	Damaged O-ring – corrosion on metal surface	Clean the Seat and/or replace O-ring
	Lose hose and/or port plug	Tighten hose and/or plug
AIR LEAKS BETWEEN YOKE NUT RETAINER AND TANK VALVE	O-ring seal of tank valve corroded or damaged	Clean the Seat of the tank valve and replace the O-ring
	Yoke Nut (7) sealing surface damaged	Replace Yoke Nut
	O-Ring (71) damaged	Replace O-ring

52X. DRAWING E120 Updated: 03/12/2015



52X. CHART 40 Updated: 03/12/2015

CHART NO: 40		FIRST STAGE 52X/52X NX			UPDATED: 03/12/2015
REF	**CODE**	**DESCRIPTION**	**REF**	**CODE**	**DESCRIPTION**
1	46201124	PIN POPPET 28,3 MM	38	46201126	LEFT SHELL 52
2	46185015	RETAINING RING, FIRST STAGE FILTER	39	46201128	RIGHT SHELL 52
3	46110506	BACKUP RING PK	40	C	CWD DRY BODY, 52
4	F	FIRST STAGE 52	41	C	CWD DRY PISTON
5	46110106	OR 106	42	46200558	CWD DRY DIAPHRAGM
6	46185204	LP PLUG 3/8"	43	C	HOCK CUP CWD DRY
7	46200561	CONICAL FILTER, DIN	44	46201292	FIRST STAGE CAP 52X
8	46186202	CONICAL FILTER INT	45	N	NITROX LOCKING RING 200 Bar (EN13949)
9	46200562	DIN CONNECTOR DUST CAP	46	46200658	YELLOW DUST CAP, NITROX
10	46185010	DUST CAP INT	47	N	O-RING SEAT NITROX (EN13949)
11	46200546	THREADED LOCKING RING (300 Bar)	48	N	BODY, NITROX CONNECTOR 200 BAR (EN13949)
12	46185013	SPRING, FILTER 1ST. STAGE	49	46110227	OR 3056
13	46110108	OR 108	50	46201291	HP CHAMBER WASHER
14	46185205	HP PLUG 7/16"			
15	46200547	O-RING SEAT DIN	**ASSEMBLIES**		
16	46201285	SPRING DIAPHRAGM	F	416231	FIRST STAGE 52X ASSEMBLY (INT-DIN)
17	46201118	RETAINING NUT	---	46201262	RETAINING RING, FIRST STAGE FILTER (10 PCS)
18	46201120	REGULATING NUT	---	46201254	OR 106 (10 PCS)
19	46201361	FIRST STAGE POPPET ACT	---	46201266	CONICAL FILTER, DIN (10 PCS)
20	46110101	OR 2012	---	46201256	OR 108 (10 PCS)
21	46201333	YOKE K11	---	46201253	OR 2012 (10 PCS)
22	46184079	YOKE KNOB	---	46201259	OR 2050 (10 PCS)
23	46201100	NUT YOKE RETAINER	---	46201255	OR 2031 (10 PCS)
24	46201102	BODY, DIN CONNECTOR 300 BAR	---	416809	DIN CONNECTOR 300 BAR (9-7-11-15-24-25)
25	46110247	OR 3043	C	416857	KIT CWD DRY
26	46110211	OR 2050	---	46201355	SERVICE KIT FIRST STAGE 52X/22X/15X INT/DIN
27	46110107	OR 2031			
28	46200545	BUTTON FIRST STAGE POPPET	**NITROX VERSION**		
30	46201476	DIAPHRAGM	N	46201443	NITROX CONNECTOR 200 BAR (EN13949) - NBR ORINGS
31	46200582	PLATE SPRING BASE	---	46201444	SERVICE KIT NX 1ST 52/22 (EN13949) - NBR ORINGS
32	46200581	ANTI-FRICTION RING			
33	46186216	HP SEAT "MR"	**NOTE**		
34	46201275	HP CHAMBER PLUG	Parts highlighted in red are included in the service kits 46201355 As far as the first stages made before X series (2015), you can get the codes of the service kit Viton, Nitrox connector (Viton) and Service kit NX (Viton) in the previous Spare Part catalogue (2015 or before) or in the "Accessories 1" section of this Spare Part Catalogue		
35	46201114	DFC WASHER 52			
36	46201284	HP SPRING FIRST STAGE			
37	46201135	YOKE SPACER FIRST STAGE			

62X
FIRST STAGE

TB 42-BIS

NEW TRIMATERIAL POPPET 2K22

DEC 2022

The technical department of Mares S.p.A. would like to announce a Trimaterial Poppet modification.
The new Poppet is softer than the previous one, designed and tested to provide a better seal, especially in cold water. The new parts can easily be identified following the pictures below.

ACTUAL 30N VERSION	ACTUAL 50N VERSION
Poppet Trimat. 2k18 CPL COD. 46201575 Poppet Trimat. 2k18 CPL COD. **46201575** 	Poppet Trimat. 50N CPL COD. **46201784** 
NEW 30N VERSION 2k22	**NEW 50N VERSION 2k22**
Poppet Trimat. 2k22 30N CPL COD. **46201815** 	Poppet Trimat. 2k22 50N CPL COD. **46201816** 

NOTE

1) The new poppet will be assembled in other Mares 1st stages as a running change.

2) As a consequence of TB42, the new service kits will be:

46201784	Poppet Trimat 50N cpl>	will be replaced by>	**46201816**	Poppet Trimat 2k22 50N CPL
46201575	Trimaterial Poppet 2k18 cpl>	will be replaced by>	**46201815**	Poppet Trimat 2k22 30N CPL
46201355	Service Kit 22X INT-DIN >	will be replaced by>	**46201827**	Service Kit 22X 2k22
46201370	Service Kit 12S INT-DIN >	will be replaced by>	**46201828**	Service Kit 12S-2k22
46201572	Service Kit 75XR DIN >	will be replaced by>	**46201829**	Service kit 1st Stage 75XR-30N-2k22
46201580	Service Kit 52X-15X-25XR INT DIN >	will be replaced by>	**46201830**	Service Kit 52X-15X-25XR-30N-2k22
46201739	Service kit first stage 82X >	will be replaced by>	**46201831**	Service kit first stage 82X-30N-2k22
46201741	Service kit 1st stage 52X/25XR AST >	will be replaced by>	**46201832**	Service kit 1st stage 52X/25XR AST-30N-2k22
46201744	Service kit NX 1ST 52X AST (EN 13949) >	will be replaced by>	**46201833**	Service kit NX 1st 52X AST (EN 13949) 2k22
46201780	Service kit 1st stage 72X AST >	will be replaced by>	**46201834**	Service kit 1st stage 72X AST-30N-2k22
46201820	Service Kit 15X-HRZ-30N-AST >	will be replaced by>	**46201835**	Service Kit 15X-HRZ-30N-AST-2k22
46201792	Service Kit first stage 62X INT/DIN >	will be replaced by>	**46201836**	Service Kit 62X 2k22
46201787	Service kit first stage 82x-50N >	will be replaced by>	**46201837**	Service Kit 82X-50N-2k22
46201789	Service kit first stage 72x-AST-50N >	will be replaced by>	**46201838**	Service Kit 72X-50N-2k22
46201802	Service Kit first stage 15X-50N-AST>	will be replaced by>	**46201839**	Service Kit 15X-50N-AST 2k22
46201800	Service Kit first stage 15X-50N >	will be replaced by>	**46201840**	Service Kit 15X-50N 2k22
46201807	Service Kit first stage 15X-HRZ-50N-AST>	will be replaced by>	**46201841**	Service Kit 15X-HRZ-50N-AST 2k22
46201783	Service Kit first stage 28XR DIN/NX>	will be replaced by>	**46201860**	Service Kit 28XR-DIN-NX-2k22
46201818	Service Kit first stage 25XR-50N-TBP>	will be replaced by>	**46201862**	Service Kit 25XR-2k22

WARNING

All service and repair procedures on Mares products should be performed by qualified Mares Service Technicians at authorized Mares Dealers and Service Centers. Service Technicians should have the Mares Service Manual and Spare Parts Catalog readily available for reference while performing service procedures and closely follow the recommended procedures and guidelines outlined in these materials.

62X. REQUIRED TOOLS AND SUPPLIES

Tool	Description	#Code
	B-18 (14mm)	46106218
	B-48 (17mm)	46201440
	Hex 4mm	No code
	B-6	46106206
	B-16 (32mm)	46106216
	B-5	46106205
	B-51 AST Special Tool	46201551

Tool	Description	#Code
	B-8 (6mm)	46106208
	B-13 (10mm)	46106213
	B-21	46106221
	B-42	46201042
	B-47 O-ring removal Tool	46201387
	B-2 (28mm)	46106202

- Compressed diver grade air supply circuit or tank (2600-2900 PSI/ 185-200 bar)
- Compressed air gun (120-145 PSI/8-10 bar)
- Ultrasonic cleaner & Descaling solution (e.g. Deox Extra type) or similar
- Loctite 415 or similar
- Magnehelic gauge (416923 - 416924)
- Silicone grease Tribolube-71 Lubrification Technology or equal
- Neoprene Workpad (449822)
- First Stage service kit #46201792
- Nylon brush
- Torque Wrench

62X. DISASSEMBLY

WARNING

IF THE FIRST STAGE IS USED TO DIVE WITH OXYGEN-ENRICHED MIXTURES, IT MUST BE O2 CLEANED. MARES RECOMMENDS O2 CLEANING USING THE PROCEDURES OUTLINED IN THE MARES O2 CLEANING GUIDELINES, AND FOLLOWING THE DISASSEMBLY/REASSEMBLY/ADJUST PROCEDURES OUTLINED IN THIS MANUAL. OXYGEN ENRICHED MIXTURES IS DEFINED IN THE US AS OVER 40% O2. IN EU COUNTRIES IT IS DEFINED IN THE EN 13949 NORM.

1

1 Using a 6mm Allen wrench (B-8), unscrew the HP Chamber (1), remove the Spring (6), the Trimaterial Poppet (A), and the Pin 26,5mm (9) from the First Stage.

1a

2 Extract the O-ring (3) and the Backup Ring (2) from the HP Chamber (1) using an O-ring removal Tool made in plastic or brass.

3 Remove the O-ring (4) and Washer (5) from the HP Chamber (1).

WARNING

DO NOT USE SHARP OR POINTED TOOLS MADE OF STEEL OR OTHER MATERIALS TO AVOID SCRATCHING THE SURFACES OF THE HP CHAMBER.

2-3

4 Flip the First Stage over as shown in the picture. Unscrew the Regulating Nut (23) using a 10mm Allen wrench (B13) and remove the First Stage Diaphragm Spring (22) and the Spring Base Plate (21).

4

5 Unscrew the Retaining Nut (20) using a 17mm Allen Wrench (B48).

5

62X. DISASSEMBLY

6 Remove the First Stage Diaphragm (18), the Antifriction Ring (19) and the First Stage Poppet Button (17) following one of the two steps described below.

Option A – Insert the nozzle (#415724) of a low pressure compressed air gun into the First Stage HP Chamber. Use short bursts of low pressure air to dislodge the Diaphragm (18). Once the Diaphragm is dislodged, remove it and the Poppet Button (17). Be sure that all LP & HP plugs are assembled on the first stage

Option B – Place the First Stage on a flat surface with the Diaphragm side facing down. Position the special Tool (B6) inside the First Stage HP Chamber and let the Poppet Pin (9) fall down through the tool and the HP Seat (11), so that it stays in its original position. Remove the tool (B-6) from the HP Chamber, and gently press the Pin with the plastic end of Tool (B-41) to dislodge and remove the Poppet Button and Diaphragm.

Option b

WARNING

DO NOT USE SHARP OR POINTED TOOLS TO REMOVE THE DIAPHRAGM. SCRATCHES ON THE SURFACES OF THE DIAPHRAGM MAY CAUSE HP LEAKING.

7

NOTE

If the Antifriction Ring (19) is still in its Seat after having completed step 6, remove it paying attention not to damage the First Stage Body.

WARNING

DO NOT USE SHARP OR POINTED TOOLS TO REMOVE THE ANTIFRICTION RING (19) TO AVOID DAMAGING THE DIAPHRAGM

7 Insert the special tool (B42) in the center hole of the First Stage Body (12) and remove the HP Seat (11).

8 Remove the O-ring (10) from the HP Seat (11).

62X. DISASSEMBLY

INT
(Section 9)

DIN
(Section 10)

62X. DISASSEMBLY INT

9.1 Unscrew the Yoke Retainer Nut (24) using the special tool 25mm (B1) and remove the Yoke assembly (28-29).

9.2 Disassemble the AST (37) using the special tool 25mm (B-1) and the AST removal tool (B-51) and remove the Filter (25).

NOTE

If the AST (37) does not come out after 5/6 turns, push with a plastic tool from the filter side

9.3 Remove the O-ring (4) from the Yoke Retainer Nut (24) and the O-ring (37) from the AST (26).

WARNING

BE CAREFUL TO AVOID DAMAGING THE CHROME PLATING ON THE NUT YOKE RETAINER (24) WHEN DISASSEMBLING.

9.4 Remove all LP Plugs (16) and HP Plugs (14) using a 4mm Allen wrench.

9.5 Remove the O-Rings (15) from the LP Plugs (16) and O-rings (13) from the HP Plugs (14).

9.6 Remove the Threaded bar tool (B-5) from the LP port.

9.1

9.1A

9.2

9.2/9.3

62X. DISASSEMBLY DIN

10.1 Disassemble the AST System (34) using the AST Special Tool (B-51).

10.2 Remove the AST gasket (36) from the AST System (34).

10.3 Remove the O-Ring (33) and the Conical Filter (32) from the Body Din connector (31) by turning the First Stage Body upside down.

10.4 Insert a 5mm Allen wrench (B4) inside the Body Din Connector (31) and unscrew it completely.

10.5 Remove the O-ring (4) from the Body Din Connector (31).

10.6 Remove the Threaded Locking Ring (30).

10.7 Remove all LP Plugs (16) and HP Plugs (14) using a 4mm Allen wrench.

10.8 Remove the O-Rings (15) from the LP Plugs (16) and O-rings (13) from the HP Plugs (14).

10.9 Remove the Threaded bar tool (B-5) from the LP port.

10.1

10.2/10.3

10.4

10.5/10.6

62X. INSPECTION AND CLEANING

Cleaning

Clean the AST INT and AST DIN by blowing them with LP compressed air to remove possible dirt.

NOTE

To be sure the AST System is perfectly clean, the LP air must be blown in the same direction of the air flow under regular use.

Clean the metal part using a nylon brush and a small quantity of acid such as Deox Extra or a solution of white vinegar diluted with hot water (same percentage of dilution as the other metal part).

Be sure to rinse all parts in fresh water and allow them to dry completely before proceeding with reassembly.

Inspection

Inspect the AST System for dirt and excessive wear and/or damage with a magnifying glass. Replace parts as necessary.

Reusable Rubber and Plastic Components

Cleaning

Clean all rubber and plastic components by washing them in a mixture of warm water and mild detergent. If necessary, scrub parts with a soft brush. Do not use abrasive cleaners, solvents or acids on rubber components.

Inspection

Inspect all reusable rubber and plastic components for excessive wear and/or damage. Replace parts as necessary.

CAUTION

SOLVENTS AND ACIDS MAY DAMAGE PLASTIC AND RUBBER PARTS. BEFORE CLEANING METAL COMPONENTS, MAKE SURE THAT ALL RUBBER AND PLASTIC PARTS HAVE BEEN REMOVED.

Metal Components

Cleaning

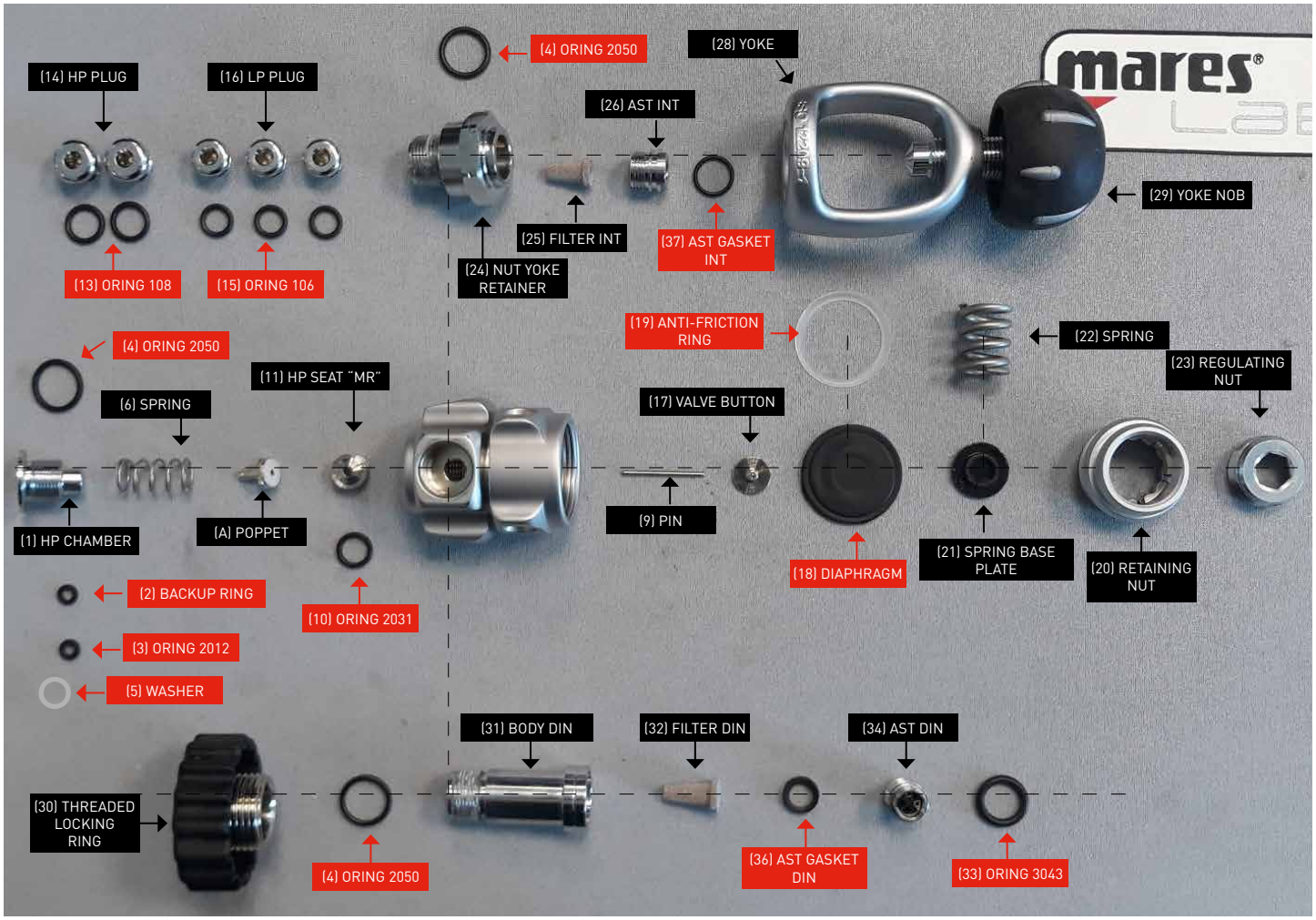
Chrome plated, brass, and stainless steel parts are cleaned by immersing them in an ultrasonic cleaner containing a de-scaling agent such as Deox Extra or a solution of white vinegar diluted with hot water. A nylon brush may be used to remove any stubborn deposits.

Be sure to rinse all parts in fresh water and allow to completely dry before proceeding with reassembly.

Inspection

Inspect all parts for excessive wear and/or damage. Replace parts as necessary.

62X. FIRST STAGE SERVICE KIT



Certain key components of the First Stage should be replaced during the overhaul. These key parts are included in the 62X First Stage Service Kit (Code 46201792) and are identified in the RED BOXES above.

SERVICE KIT #46201792

62X. REASSEMBLY

NOTE

Lubrification reduces the likelihood of damage during reassembly. Before beginning the reassembly procedure, lightly lubricate all O-rings with Tribolube-71 Lubrification Technology or equal.

11. Install the O-ring (10) in the HP Seat (11), and position the Seat on the special Tool (B-21).

12. Insert the HP Seat (11) into the First Stage Body (12) and gently press until the Seat is properly seated.


11

CAUTION

TAKE SPECIAL CARE NOT TO DAMAGE THE SEAT WHEN INSERTING IT. IT IS CORRECTLY SEATED IF THE CONICAL SECTION IS VISIBLE WHEN VIEWING IT FROM THE HIGH PRESSURE CHAMBER.


12

13 Correctly position the Backup Ring (2) and the O-ring (3) into the HP Chamber (1).

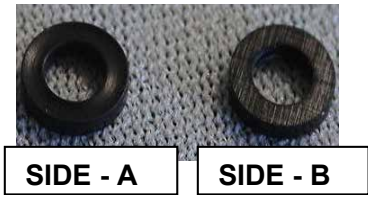
CAUTION

MAKE SURE THAT SIDE "A" OF THE BACK UP RING (2) IS FACING THE O-RING (3), AND SIDE "B" IS FACING THE BOTTOM OF THE HP CHAMBER (1)

14 Install the O-ring (4) and the Washer (5) on the HP Chamber (1).

15 Insert the Trimaterial Poppet (A) inside the First Stage Body (12), with the flat part facing the Valve Seat (11) and position the Spring (6) on the First Stage valve (A).

16 Tighten the HP Chamber (1) using a 6mm Allen wrench (B-4).



13


14


15


16

62X. REASSEMBLY

17. Flip the First Stage Body (12) over (as shown in the picture) and insert the Pin 26,5mm (9) in the center hole of the first stage body.
18. Position the First Stage Valve Button (17) on the First Stage Pin (9) and press it down to feel the "response" of the Spring (6).
19. Place the Diaphragm (18) in the First Stage Body, making sure is firmly seated in the Body.

17

NOTE

Note the impression of First Stage Valve Button (17) on the First Stage Diaphragm. When re-installing the Diaphragm (18), be sure to install it facing the same direction as disassembled.

18

20. Correctly position the Antirotation Ring (19) on the Diaphragm (18).
21. Insert the threaded bar Tool (B-5) in to a First Stage stage LP port.
22. Place the Spring Base Plate (21) in the middle of the Diaphragm (18). Use a 17-mm wrench (B-1) to fully tighten the Retaining Nut (20) to the First Stage Body (12).

19

WARNING

IF USING A TORQUE WRENCH TO TIGHTEN THE RETAINING NUT (20), USE A TIGHTENING TORQUE OF APPROXIMATELY 30 Nm / 22 ft lb

23. Place the Spring (22) on the Spring Base Plate (21).
24. Using the 10 mm Allen wrench (B-13), install the Regulating Nut (23) making 6 – 7 turns of the wrench only.

20

NOTE

Do not over-tighten the Regulating Nut. Doing so can cause an increase in Intermediate Pressure, which can damage the LP Gauge and interfere with the IP adjustment procedure.

23

62X. REASSEMBLY

INT
(Section 25)

DIN
(Section 26)

62X. REASSEMBLY INT

25.1 Install the O-ring (37) on the AST (26).

25.2 Insert the conical filter (25) in the Nut Yoke Retainer (24).

25.3 Install the AST (26) into the Yoke Retainer Nut (24) using a 25mm wrench (B-1) and the AST special tool (B-51).

25.3

NOTE

Press the AST (26) down till the O-ring is completely seated inside the Yoke Retainer Nut (24).

25.4 Install the O-ring (4) on the Yoke Retainer Nut (24).

25.5 Install the Yoke Knob (29) on the Yoke (28). Place the Yoke (28) on the First Stage Body.

25.6 Using a 25mm wrench (B-1), fully tighten the Yoke Retainer Nut (24).

25.5

WARNING

IF USING A TORQUE WRENCH, TIGHTEN TO A TORQUE OF APPROXIMATELY 18 ft lb / 25 Nm.

WARNING

TO PREVENT THE YOKE RETAINER NUT (24) FROM LOOSENING, APPLY ONE OR TWO DROPS OF THREAD LOCKING COMPOUND ONTO THE THREADS PRIOR TO INSTALLATION. REMOVE ANY RESIDUAL THREAD LOCKING COMPOUND PRIOR TO APPLYING ANY NEW COMPOUND (LOCTITE 415 OR SIMILAR).

25.6

62X. REASSEMBLY DIN

26.1 Insert the Body DIN Connector (31) into the Threaded Locking ring (30).

26.2 Position the O-ring (4) on the Body DIN Connector (31).

26.3 Using a 5-mm Allen wrench (B 4), tighten the Body DIN Connector (31) to the First Stage body.

26.3

WARNING

TO PREVENT THE BODY DIN CONNECTOR (31) FROM LOOSENING, APPLY ONE DROP OF THREAD LOCKING COMPOUND ONTO THE FIRST TWO THREADS PRIOR TO INSTALLATION. REMOVE ANY RESIDUAL THREAD LOCKING COMPOUND PRIOR TO APPLYING ANY NEW COMPOUND (LOCTITE 415 OR SIMILAR).

26.4

WARNING

USE A TORQUE WRENCH TO TIGHTEN TO A TORQUE OF 15 ft lb / 20 Nm

26.4 Insert the Conical Filter (32) in the Body DIN Connector (31).

26.5 Place the AST gasket (36) on the AST system (34).

26.6 Place the O-Ring (33) on the AST System.

26.7 Using the AST Special Tool (B-51), assemble the AST system (34) on the Body DIN Connector (31).

26.6

WARNING

USE A TORQUE WRENCH TO TIGHTEN TO A TORQUE OF 1.1-1.5 ft lb / 1,5-2 Nm.

26.7

62X. ADJUSTMENT

NOTE

Connect the First Stage to a full tank (at least 2600 psi/180 bar), and open the air valve slowly to expel any foreign matter from the first stage.

27 Attach the intermediate pressure gauge (#46106252) or connect the LP hose from the Magnehelic gauge to the open low pressure port.

28. Attach the Second Stage hose to the LP Port (without the 2nd Stage cover installed).

27

WARNING

USE A TORQUE WRENCH TO TIGHTEN TO A TORQUE OF 3-3.5 ft lb / 4-4.5 Nm

30

TABLE 1: IP ADJUSTABLE RANGE

HP Air Supply	Intermediate Pressure (IP)
2900 psi	142 – 148 psi
200 bar	9.8 – 10.2 bar

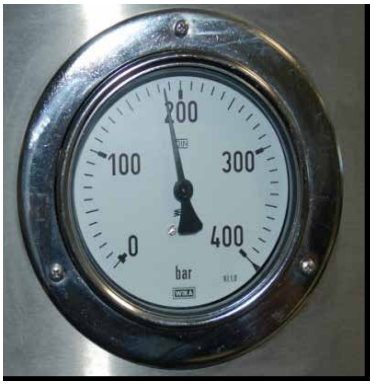
29. Holding down the Second Stage Demand Lever, slowly open the tank valve and, almost simultaneously, release the Demand Lever. Read the value of the First Stage adjustment on the pressure gauge, and proceed as follows:

IP

NOTE

No Second Stage free or intermittent air flow from the 2nd stage should occur during the IP adjustment procedure. If any such flow occurs, it will compromise the procedure and could cause the IP setting to be outside the acceptable range.

30. If the intermediate pressure is greater than the specified value (see table 1), use the 10 mm Hex Wrench (B-13) to slowly loosen the Regulating Nut (23) until the specified value is obtained.



HP

CAUTION

WHEN THE INTERMEDIATE PRESSURE IS REDUCED, IT IS NECESSARY TO VENT THE EXCESS AIR IN ORDER TO OBTAIN A CORRECT READING OF THE NEW VALUE

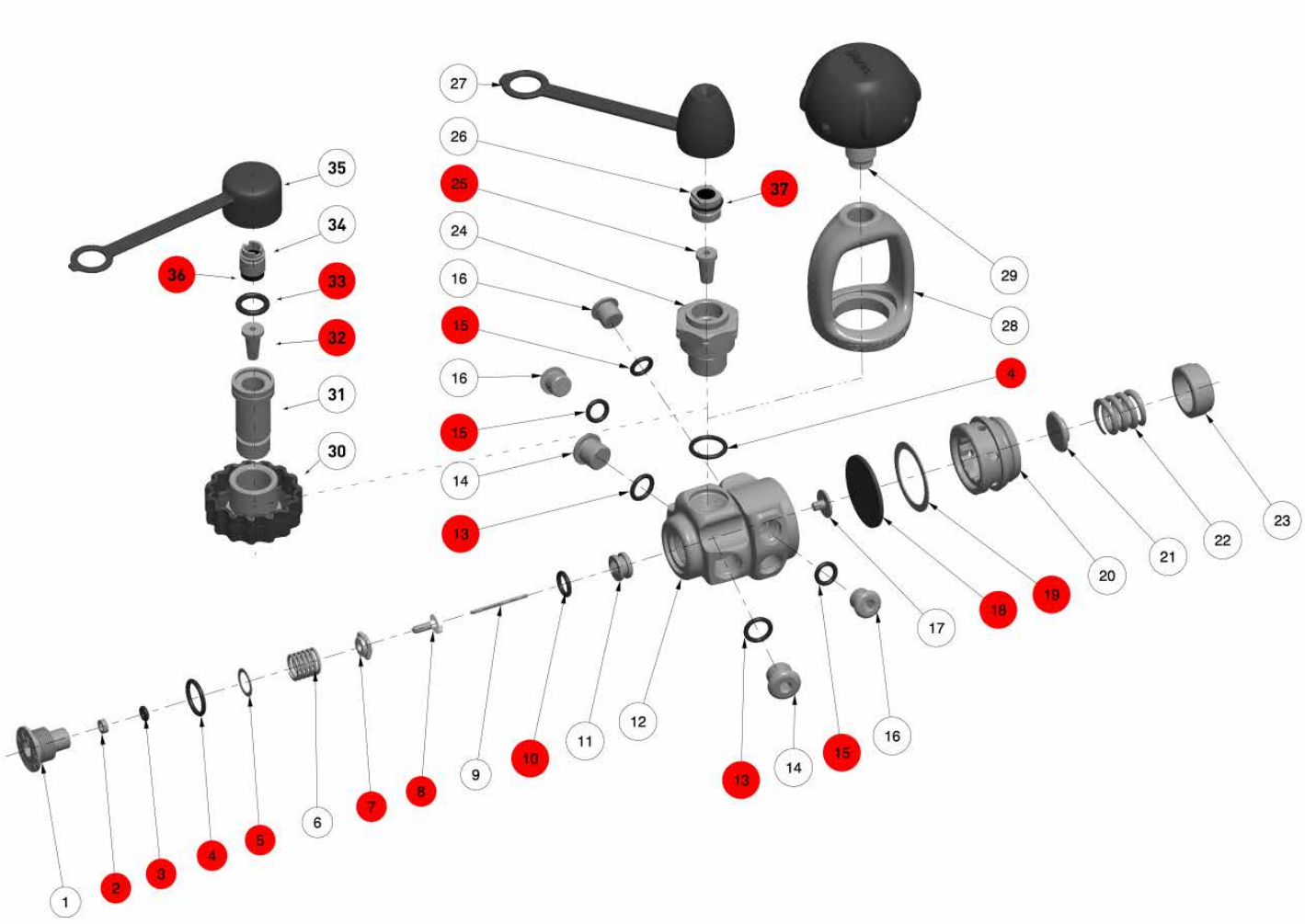
31. If the First Stage pressure is lower than the specified value (see table 1), slowly tighten the Adjusting Nut (23) until the specified value is obtained.

32 Disassemble the regulator from the tank valve and install the LP plug in to LP port.

62X. TROUBLESHOOTING

Problem	Probable Cause	Solution
CONTINUOUS AIR FLOW FROM SECOND STAGE (FREE FLOW) CAUSED BY: 1. AN INCREASE IN THE INTERMEDIATE PRESSURE, or 2. A CONTINUALLY INCREASING IP (IP CREEP)	Intermediate Pressure too high	Readjust IP per procedures
	Damaged First Stage Tri-material Poppet	Replace Tri-material Poppet
	Damaged Poppet Seat	Replace Poppet Seat
	Damaged HP Housing Assembly components or damaged HP Chanber	Check internal surfaces of HP Chamber. Clean or replace HP Chamber. Replace O-ring and/or Back Up Ring.
AIR LEAKS FROM FIRST STAGE DIAPHRAGM	Loose Locking Nut	Tighten CWD Kit Body
	First Stage Diaphragm damaged	Replace the Diaphragm
	First Stage diaphragm seating surface damaged	Replace the First Stage Body
AIR LEAKS FROM THE FIRST STAGE HP/LP PORT PLUGS AND/OR HOSE PORTS	Damaged O-ring – corrosion on metal surface	Clean the Seat and/or replace O-ring
	Loose hose and/or port plug	Tighten hose and/or plug
AIR LEAKS BETWEEN BODY DIN CONNECTOR AND TANK VALVE	O-ring seal of tank valve corroded or damaged	Clean the Seat of the tank valve and replace the O-ring
	Body Din Connector sealing surface damaged	Replace Body Din Connector
	O-Ring damaged	Replace O-ring

62X. DRAWING E 1266 Updated: 18/02/2021



62X. CHART XRF2 Updated: 05/02/2021

CHART NO: 44		FIRST STAGE 62X INT / DIN			
REF	**CODE**	**DESCRIPTION**	**REF**	**CODE**	**DESCRIPTION**
1	46202045	HP CHAMBER PLUG 50N	27	46185010	DUST CAP INT
2	46110506	BACKUP RING PK	28	46201333	YOKE K11
3	46110101	OR 2012	29	46184079	YOKE KNOB
4	46110211	OR 2050	30	46200546	THREADED LOCKING RING (300 Bar)
5	46202048	HP CHAMBER WASHER 50N	31	46201102	BODY, DIN CONNECTOR 300 BAR
6	46202047	HP SPRING FIRST STAGE - 50N	32	46200561	CONICAL FILTER, DIN
7	A	POPPET BASE PLATE	33	46110247	OR 3043
8	A	TRIMATERIAL POPPET	34	416812	AST DIN + GASKET
9	46201303	PIN 26,5	35	46200562	DIN CONNECTOR DUST CAP
10	46110107	OR 2031	36	46201581	AST GASKET DIN
11	46201541	HP SEAT "MR"	37	46201736	AST GASKET INT
12	---	1ST STAGE BODY 62X			
13	46110108	OR 108	**ASSEMBLIES**		
14	46185205	HP PLUG 7/16"	A	46201784	TRIMATERIAL POPPET 50N CPL
15	46110106	OR 106		46201792	Service Kit first stage 62X INT/DIN
16	46185204	LP PLUG 3/8"		416813	TWIN BALANCED PISTON DRY KIT 52X-15X-25XR
17	46202088	FIRST STAGE VALVE BUTTON 4mm		46201758	HP CHANBER CPL 50N (1+2+3+4)
18	46201667	DIAPHRAGM			
19	46200581	ANTI-FRICTION RING	**NITROX VERSION**		
20	46202008	RETAINING NUT	N	46201743	NITROX CONNECTOR 200 BAR AST (EN13949)
21	46200582	PLATE SPRING BASE			
22	46201285	SPRING	**NOTE**		
23	46201120	REGULATING NUT	Parts highlighted in red are included in the service kits 46201792		
24	46201493	NUT YOKE RETAINER			
25	46201536	AST INT FILTER			

PRESTIGE - ROVER SECOND STAGES

mares®

DISASSEMBLY

1. Move the hose cover off the 1st stage.

2. Unscrew the hose from the 1st stage and remove the O-ring (19).

3. Remove the clamp (43) from the mouthpiece using cutting nippers or a similar tool.

NOTE ONLY REMOVE THE CLAMP FROM THE MOUTHPIECE IF A REPLACEMENT PART IS AVAILABLE.

4. Remove the mouthpiece (44).

5. Remove the fixing pin (174) from the cap (41) of the exhaust tee (Fig. **1**).

NOTE FOR THE OPERATION DESCRIBED IN STEP 4, IT IS RECOMMENDED THAT YOU USE A METAL PRICKER HAVING A MAX DIAMETER OF 2 MM (FIG. **1**).

6. Remove the inspection cap (41).
7. Move the hose cover (46).
8. Using the two 17-mm open end wrenches (B-17), unscrew the hose from the 2nd stage connector.
9. Remove the O-ring (27) from the seat of the swivel hose coupling.
10. Unscrew the case assembly connector (28) using a 17-mm open end wrench (B-17).
11. Remove the O-Ring (71) from the case assembly connector (28).
12. Unscrew the poppet seat (21) from the case assembly connector (28) using a 5-mm hex wrench (B-4).
13. Remove the O-Ring (27) from the poppet seat (21).
14. Pull out the by-pass retainer ring (96).
15. Remove the safety clip (63).
16. Unscrew the cover (101).
17. Remove the button (103) from the cover (101).
18. Remove the diaphragm retaining ring (78) and the diaphragm (36) from the 2nd stage case (32).
19. Unscrew the case plug (64) using a 6 mm hex wrench (B-8).
20. Remove the O-ring (83) from the case plug.

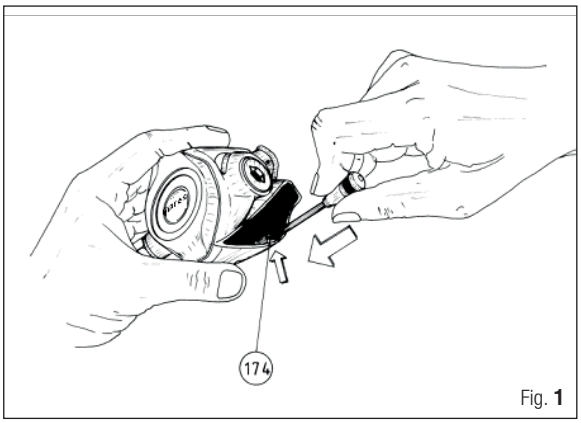


Fig. **1**

DPD VERSIONS

a. Remove the sticker (186) from the Dive/Pre Dive knob (184).
b. Use a Phillips head screwdriver (USAG 327 type) to unscrew the screw (185) and remove the DPD knob (184), the DPD clamp (183) and the spring (102) (Fig. **9**).

c. Remove the lever support (181) and the DPD lever (180) from the DPD body.
d. Remove the O-ring (6) from the DPD support lever (181).
e. Use the special wrench (B-37) to unscrew the DPD body (182) (Fig. **7**).
f. Remove the O-Ring (171) from the DPD body (182).

WARNING!
REMOVE THE DPD LEVER (180) FROM THE DPD SUPPORT LEVER (181) ONLY IF NECESSARY

21. Gently press the demand lever connector assembly into the case (Fig. **2**).

22. Remove the O-Ring (83) from its seat in the second stage case (32).

23. Position the demand lever connector assembly on the special tool (B-6) and use the screwdriver (B-12) to unscrew the retaining nut (33) from the demand lever (35). Then remove the washer (34), the poppet assembly (30+47+92), and the spring (31) (Fig. **5**).

24. Remove the poppet seat (47), pressing slightly on the poppet seat holder (92) in the direction of the threaded stem.

25. Remove the poppet seat holder (92) from the stem of the 2nd stage valve shaft (30).

26. Remove the exhaust valve (40). (40).

NOTE ONLY REMOVE THE EXHAUST VALVE IF A REPLACEMENT PART IS AVAILABLE.

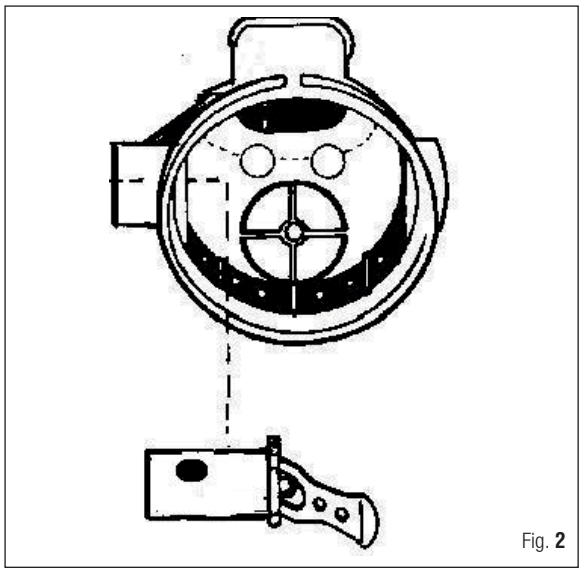


Fig. **2**

CLEANING

WARNING!
WHEN WORKING WITH ANY KIND OF ACID, WEAR ADEQUATE PROTECTIVE GEAR FOR EYES AND SKIN

For routine cleaning of reusable rubber components, wash all parts in a mixture of hot water and mild detergent. Make sure all the components have been thoroughly rinsed in fresh water before reassembling them. Chrome-plated brass and stainless steel parts can be cleaned with an ultrasonic cleaner in fresh water, or in a mild acid solution (for example white vinegar, diluted as necessary).

WARNING!

ACIDS OR OTHER SOLVENTS MAY DAMAGE PLASTIC AND RUBBER PARTS. BEFORE CLEANING METAL COMPONENTS, MAKE SURE THAT ALL SEALS AND OTHER PARTS SUBJECT TO DETERIORATION HAVE BEEN REMOVED

INSPECTION

Certain key components of the 2nd stage should be regularly replaced at each scheduled overhaul. Below is a list of components including in the Prestige 2nd stage and NTT 2nd stage (DPD) service kit.

SERVICE KIT

QUANTITY	REF.	DESCRIPTION	CODE
1	6 (DPD)	O-Ring 2012	Cod. 46110101 cod. Viton 46110401
2	27	O-Ring 2025	Cod. 46110205 cod. Viton 46110411
1	72 (DPD)	O-Ring 2043	Cod. 46110215 cod. Viton 46110415
1	71	O-Ring 2050	Cod. 46110211 cod. Viton 46110413
2	83	O-Ring 2068	Cod. 46110225 cod. Viton 46110420
1	19	O-Ring 106	Cod. 46110106 cod. Viton 46110402
1	171 (DPD)	O-Ring 2062	Cod. 46110220 cod. Viton 46110417
1	47	2nd stage poppet seat	Cod. 46184062
1	33	Demand lever adjusting nut	Cod. 46185051
1	40	Exhaust valve	Cod. 46184006
1	43	Exhaust valve	Cod. 47157984
1	63	Safety pin	Cod. 46184289

DO NOT USE PARTS WITH THE FOLLOWING DEFECTS:

2nd STAGE CASE	**(32)**	Check that sealing surfaces are free of scratches, cracks, or deformations. Check that the threads in the seats for the cover screws are perfectly clean.
POPPET SEAT	**(21)**	Check the integrity of the sealing surface and the O-ring seat.
DIAPHRAGM	**(36)**	Check for tears or pinholes around the metal disk, deformation of the outer rim or signs of separation of the diaphragm from the metal disk
POPPET SEAT HOLDER	**(92)**	Check for cracks, cuts or deformation
MOUTHPIECE	**(44)**	Inspect for cuts, tears or signs of wear
DPD SPRING	**(102)**	Check for any split or broken coils
SOFT HOSE	**(26)**	Inspect for splits, blistering or any other signs of damage. Check that the O-ring seat are intact
SPRING	**(31)**	Check for any split or broken coils

REASSEMBLY

Before reassembling, lightly lubricate all the O-rings with silicone grease (type General Electric Versalube G-322 or equivalent). Lubrication reduces the likelihood of damage during reassembly.

WARNING!
IF THE 2ND STAGE IS USED FOR DIVING WITH OXYGEN-RICH MIXTURES, IT MUST BE PERFECTLY CLEANED AND FREE OF ANY RESIDUAL SILICONE OR OTHER IMPURITIES. VITON ORINGS MUST BE LUBRICATED WITH SPECIAL OXYGENCOMPATIBLE GREASE. DO NOT USE SILICONE GREASE. YOU MUST CONSULT THE NITROX SECTION OF THE MAINTENANCE MANUAL FOR THESE PROCEDURES.

27. Install a new exhaust valve (40), carefully pulling its silicone stem through the center hole of the 2nd stage exhaust valve support.

WARNING!
DO NOT PULL TOO HARD ON SILICONE STEM AS THIS MAY DAMAGE THE EXHAUST VALVE.

28. Use cutting nippers to cut the silicone stem at approximately half its length.
29. Reassemble the poppet seat holder (92) on the 2nd stage poppet stem (30).
30. Reassemble the poppet seat (47) in the poppet seat holder (92).
31. Place the 2nd stage poppet assembly (30+47+92) together with its spring (31) on the special tool (B-6).
32. Pressing gently, correctly position the 2nd stage valve and its spring into the demand lever connector (91) (Fig. **4**).

IMPORTANT
ROTATE THE SECOND STAGE CASE SLIGHTLY TO THE RIGHT AND LEFT TO OBTAIN CORRECT POSITIONING OF THE 2ND STAGE POPPET STEM (FIG. **4**).

33. Correctly position the demand lever (35) in the 2nd stage metal insert (91).
34. Fit the washer (34) on the poppet stem and tighten the demand lever adjusting nut (33) 2-3 threads using the special wrench (B-12) (Fig. **5**).

NOTE PRESS THE DEMAND LEVER A FEW TIMES TO BE SURE IT IS ABLE TO MOVE FREELY. **CORRECTLY POSITION THE DEMAND LEVER CONNECTOR ASSEMBLY (91) IN THE 2ND STAGE CASE (FIG. 2)**

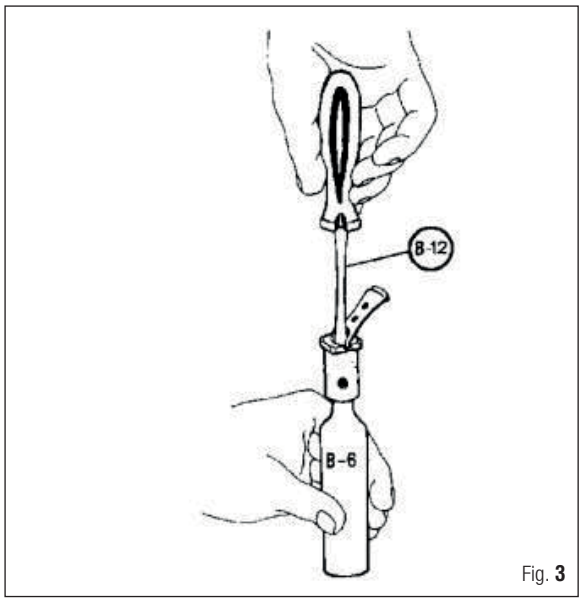


Fig. **3**

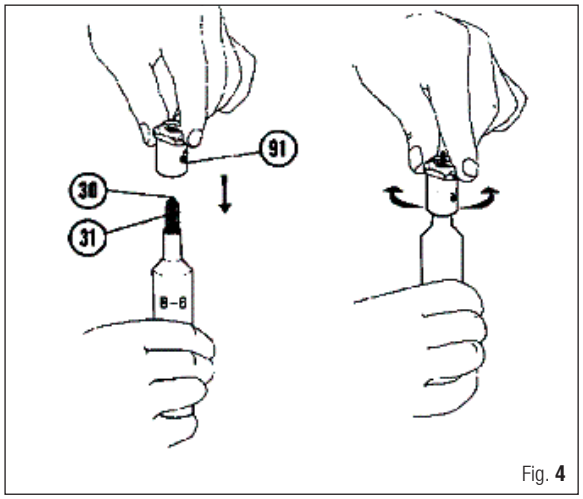


Fig. **4**

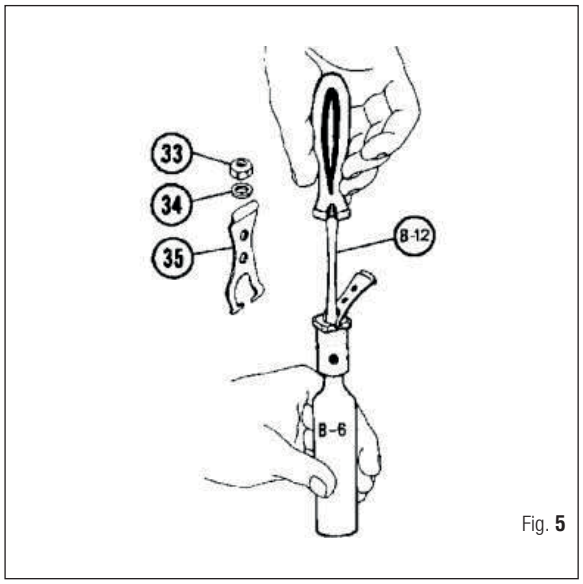


Fig. **5**

35. Place the O-Ring (83) in the seat between the 2nd stage case and the demand lever connector using the special tool (B 6) (Fig. **6**).

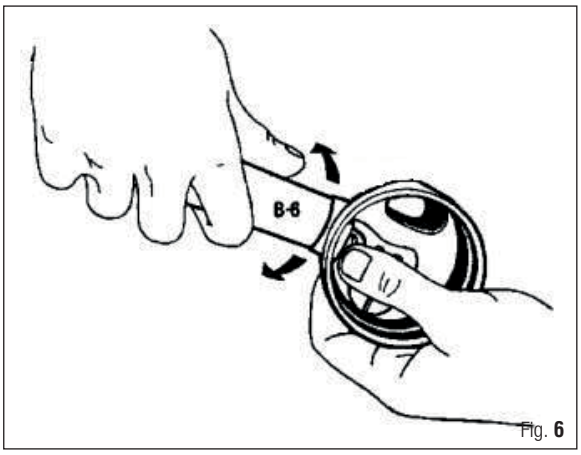


Fig. **6**

WARNING!
MAKE SURE THAT THE AIR HOLE IN THE DEMAND LEVER CONNECTOR (91) IS POSITIONED SO THAT IT IS ALIGNED WITH THE BY-PASS TUBE.

WARNING!
CHECK THAT THE DEMAND LEVER CONNECTOR HAS STAYED IN PLACE.

36. Fit the O-ring (27) in its seat in the seat connector housing (21).
37. Insert and lock down the seat connector (21) into the case assembly connector (28) using the 5-mm hex wrench (B-4) so that it protrudes from the connector by about 2.2-2.5 mm.
38. Fit the O-Ring (71) in the seat of the case assembly connector (28).
39. Put the spacer ring (96) in place, and then use the 17-mm open-end wrench (B-17) to fully lock down the case assembly connector in the 2nd stage case.

NOTE IF USING A TORQUE WRENCH, USE TIGHTENING TORQUE OF 8 - 8.5 N/m

40. Fit the O-ring (27) in the seat on the swivel connector of the hose (26) and the O-Ring (19) in the seat of the metal coupler that screws into the first stage.
41. Screw the hose (26) onto the case assembly connector (28) with the help of two 17-mm open end wrenches (B-17).

FINAL ADJUSTMENTS

To correctly adjust the regulator:

A. The repair shop should be equipped with a high- and lowpressure compressed air supply.
B. A pressure gauge is required for checking the intermediate pressure (the pressure gauge should have a full scale value MAX 30 - 40 BAR, for greater adjustment accuracy).

I. Screw the intermediate pressure measuring gauge into one of the 3/8" low-pressure ports on the 1st stage, using the wrench (B-18).
II. Assemble the hose with the partially finished 2nd stage on the port marked D.F.C., tightening it with the 14-mm wrench.
III. Mount the regulator group on the control valve (of the tank or test bench).
IV. Holding down the second stage demand lever, slowly open the tank valve and, almost simultaneously, release the demand lever.
V. Read the pressure gauge to check whether the 1st stage pressure is correct.

WARNING!
THE 1ST STAGE INTERMEDIATE PRESSURE MUST BE MEASURED WHEN THERE IS NO AIR COMING OUT OF THE 2ND STAGE. FOR ANY NECESSARY 1ST STAGE ADJUSTMENTS, REFER TO THE SEPARATE MANUAL.

PROCEDURE FOR ADJUSTING THE INTERMEDIATE PRESSURE

IMPORTANT!
ALL THE ADJUSTMENTS BELOW MUST BE MADE WITH THE SECOND STAGE CONSISTENTLY SUPPLIED WITH THE CORRECT INTERMEDIATE PRESSURE

A.1. Position the 2nd stage diaphragm (36) in the 2nd stage case.
A.2. Insert the diaphragm retaining ring (78).
A.3. Place the button (103) inside the cover (101).
A.4. Arrange the purge button (103) in the cover (104) and screw it to the 2nd stage body (32).

IMPORTANTE!
CONTINUE TIGHTENING THE COVER UNTIL THE TWO SEATS (ON THE CASE AND COVER) THAT ACCOMMODATE THE SAFETY CLIP ARE ALIGNED.

A.5. Insert the safety clip (63). Then lock down the clip all the way down to the cover.
A.6. Working through the hole in the second stage case, use the wrench (B-12) to lock down or back off the demand lever nut (32) in order to adjust the demand lever (35).

WARNING!
THE DEMAND LEVER (35) IS ADJUSTED CORRECTLY WHEN YOU CAN PRESS THE PURGE BUTTON ON THE COVER DOWN AT LEAST 1 MM BEFORE AIR BEGINS TO RELEASE, AND THE SOUND OF THE DEMAND LEVER TOUCHING THE METAL DISK OF THE SECOND STAGE DIAPHRAGM AS IT MOVES ("TAPPING") SHOULD BE AUDIBLE WHEN THE PRESSURIZED SECOND STAGE IS SHAKEN VIGOROUSLY UP AND DOWN.

A.7. Press the purge button a few times.
A.8. Reassemble the O-ring (72) on the case plug (64).
A.9. Using the hex wrench (B-8), screw the case plug into the threaded bushing.

FINAL ASSEMBLY (DPD VERSION ONLY)

a. Using the special wrench (B 37), screw the DPD body to the 2nd stage case (32).

WARNING!
THE DPD HOUSING (182) SHOULD BE SCREWED SNUGLY, CHECKING THAT THE GROOVE IS PERFECTLY ALIGNED WITH THE REFERENCE ON THE SECOND STAGE BOX (32) AS SHOWN IN FIG. **7**

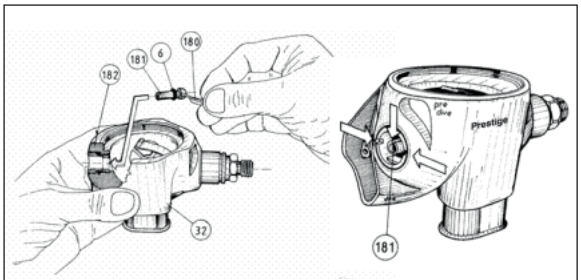


Fig. **7**

b. Position the O-ring (6) in the seat of the DPD lever support (181) (Fig. **8a**).
c. Insert the DPD lever support (181), complete with lever (180), into the DPD housing (182) (Fig. **8a**).

WARNING!
ENSURE THAT AT THE END OF THE OPERATION DESCRIBED ABOVE AT STEP "F" YOU HAVE:
1. THE DPD LEVER (180) POSITIONED WITH THE CONCAVE PART UPWARD
2. THE GROOVE OF THE DPD LEVER SUPPORT (181) FACING UPWARD (FIG. **8B**).

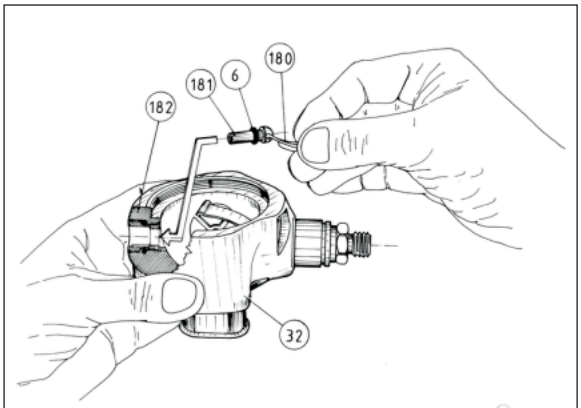


Fig. **8a**

d. Correctly insert the spring (102) into the DPD housing (182).

WARNING!
POSITION THE TAPERED SPRING CORRECTLY BY INSERTING IT INTO THE DPD HOUSING WITH THE NARROW END POINTING POINTING INSIDE THE SECOND STAGE CASE.

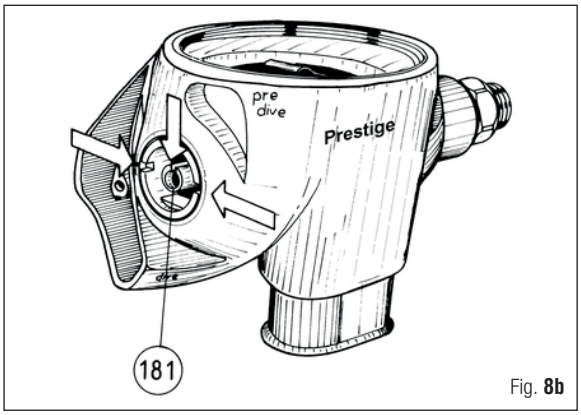


Fig. **8b**

e. Correctly position the DPD block (183) on the spring (102) (Fig. **9**).
f. Correctly insert the DPD knob (184) on the DPD housing (182) (Fig. **9**).

WARNING!
MARES SUGGESTS THAT WHILE CONDUCTING THE OPERATIONS DESCRIBED IN STEPS "G-H-I-J", YOU KEEP THE DPD LEVER (180) AND THE CORRESPONDING SUPPORT (181) IN POSITION INSIDE THE DPD HOUSING, USING YOUR FINGER IF NECESSARY.

g. Tighten the screw (185) on the DPD knob (184), using a Phillips head screwdriver (USAG type 327).

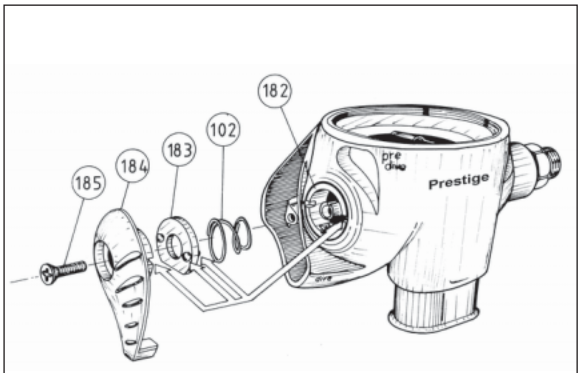


Fig. **9**

WARNING!
AFTER THE OPERATION DESCRIBED IN STEP "J" ENSURE THAT:
1. IN PRE-DIVE POSITION THE DPD LEVER PREVENTS THE DEMAND LEVER FROM MOVING (32).
2. IN DIVE POSITION, THE DEMAND LEVER (32) MOVES FREELY

h. Place the DPD knob sticker (186) on the DPD knob (184).

PROCEDURE FOR ADJUSTING THE PRESTIGE NTT (DPD) DEMAND LEVER

IMPORTANT!

ALL THE ADJUSTMENTS BELOW MUST BE MADE WITH THE SECOND STAGE CONSISTENTLY SUPPLIED WITH THE CORRECT INTERMEDIATE PRESSURE

B.1. Working through the hole in the second stage case, use the wrench (B-20) to lock down or back off the demand lever nut (33) in order to adjust the demand lever (35) (Fig. **10**).

WARNING!
THE DEMAND LEVER (35) IS CORRECTLY ADJUSTED WHEN IT JUST TOUCHES THE GAUGE BUT THERE IS NO AIR COMING OUT

B.2. Depress and trigger the demand lever a few times.

WARNING!
THE DEMAND LEVER (35) IS ADJUSTED CORRECTLY WHEN YOU CAN PRESS THE PURGE BUTTON ON THE COVER DOWN AT LEAST 1 MM BEFORE AIR BEGINS TO RELEASE, AND THE SOUND OF THE DEMAND LEVER TOUCHING THE METAL DISK OF THE SECOND STAGE DIAPHRAGM AS IT MOVES ("TAPPING") SHOULD BE AUDIBLE WHEN THE PRESSURIZED SECOND STAGE IS SHAKEN VIGOROUSLY UP AND DOWN.

i. Fit the 2nd stage diaphragm (36) in the 2nd stage case (32).
j. Insert the diaphragm retaining ring (78).
k. Arrange the purge button (103) in the cover (104) and screw it to the 2nd stage body (32).

B20- Cod. 46106220

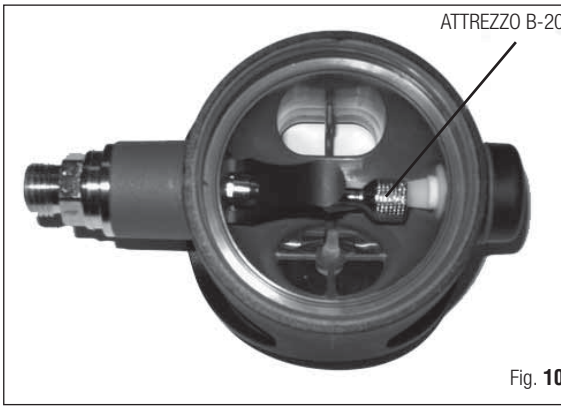


Fig. **10**

WARNING!
CONTINUE TIGHTENING THE COVER UNTIL THE TWO SEATS (ON THE CASE AND COVER) THAT ACCOMMODATE THE SAFETY CLIP ARE ALIGNED.
TO FACILITATE THIS OPERATION, USE THE GROOVE ON THE COVER AS A REFERENCE.

l. Insert the safety clip (63). Then lock down the clip all the way down to the cover.

ALL VERSIONS

42. Position the hose protector (46).
43. Disassemble the control valve unit.
44. Disassemble the intermediate pressure measuring gauge and screw the port plug with its O-ring seal back on.
45. Fit the inspection cap (41) and secure it with the fixing pin (174).
46. Assemble the mouthpiece (44), securing it with a new mouthpiece clamp (43).

WARNING!
FOR CHECKS AND ADJUSTMENTS ON THE SECOND STAGE, CONSULT THE CORRESPONDING SECTION OF THE MAINTENANCE MANUAL.

DRAWING N0 : E 38	2nd Stage - Octopus ROVER	UPDATED: 12/12/2008

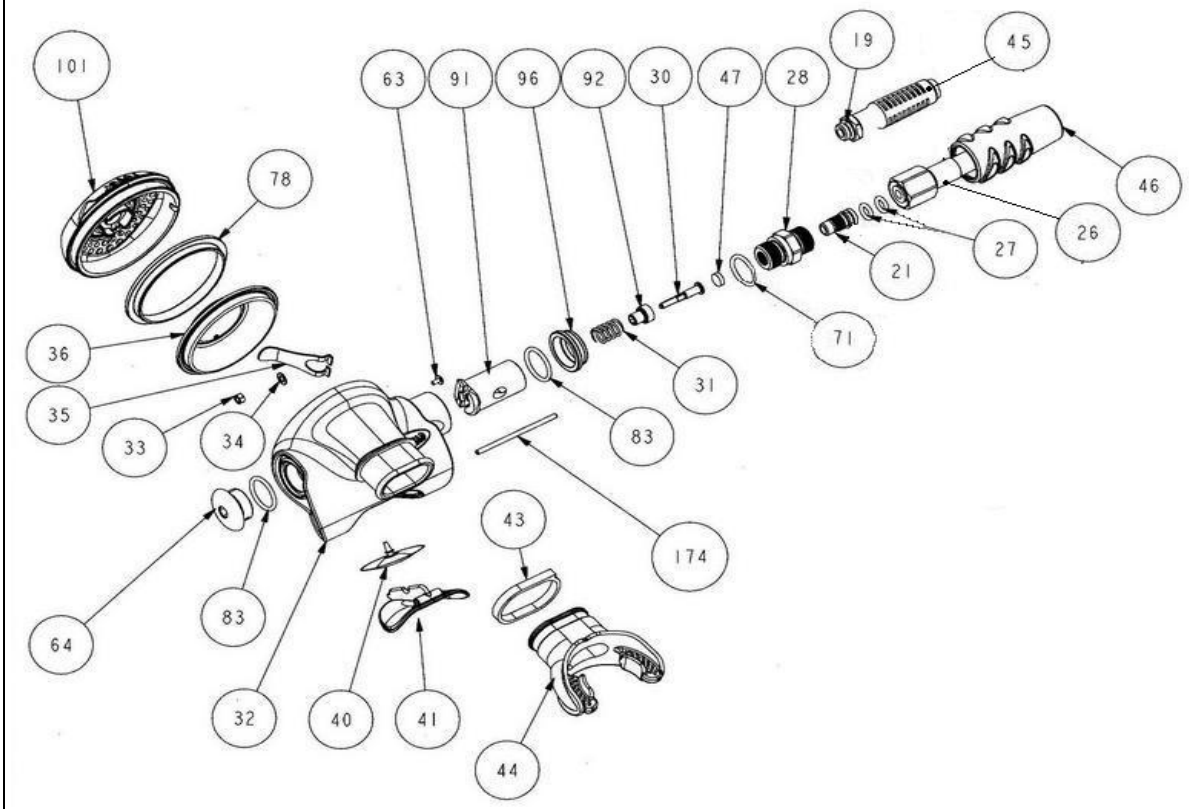


CHART NO : 128	2nd Stage - Octopus ROVER	UPDATE : 20/12/2012

REF	CODE	DESCRIPTION	€	REF	CODE	DESCRIPTION	€
19	46110106	OR 106		47	46184062	RUBBER SEAT 2ND STAGE	
19	46110402	OR 106 Viton 610-97507		63	46184289	PIN-COVER	
21	46200204	POPPET SEAT		64	46200772	2nd ST. ADJUSTMENT PLUG	
26	46200789	LP HOSE PRESTIGE 3/8 L 800		71	46110211	OR 2050	
26	46200790	LP HOSE PRESTIGE 3/8 L1000 YL		71	46110413	OR 2050 Viton	
27	46110205	OR 2025		78	46200773	DIAPHRAGM RING PRESTIGE	
27	46110411	OR 2025 Viton		83	46110225	OR 2068	
28	46184282	HOSE CONNECTOR		83	46110420	OR 2068 Viton	
30	46184219	POPPET METAL BODY REGS		91	46200992	INSERT FOR DEMAND LEVER	
31	46185057	POPPET SPRING 2ND STAGE		92	46184221	VALVE BODY, 2ND STAGE	
32	46200858	CASE 2nd STG ROVER		96	46200779	SPACER RING BY-PASS BK	
33	46185051	LOCKNUT, DEMAND LEVER		96	46200782	SPACER RING BY-PASS YL	
34	46185049	WASHER, DEMAND LEVER		101	46200871	COVER 2°nd STAGE Rover BLACK	
35	46201240	DEMAND LEVER PRESTIGE		101	46200872	COVER Octopus Rover	
36	46200771	DIAPHRAGM PRESTIGE		101	46200968	COVER NitroX Rover	
40	46184006	EXHAUST VALVE, 2ND STAGE		174	46200361	EXHAUST PLUG PIN	
41	46200769	INSPECTION PLUG				**ASSEMBLED**	
43	47157984	CLAMP		* * *	46200296	MAINTENANCE KIT REBEL/PRESTIGE	
44	46200855	MOUTHPIECE BK (10 pics)				(19- 27- 33 - 40- 43- 47 - 63 - 71-72 -	
45	46201077	HOSE PROTECTOR		* * *	46200297	MAINTENANCE KIT PRESTIGE(Viton O-Rings)	
46	46200768	HOSE PROTECTOR 2nd STG			46200510	KIT RETROFIT (21-27-47)	

DRAWING NO : E36	2nd Stage - Octopus PRESTIGE PRESTIGE SHE DIVES	UPDATE : 18/01/2012

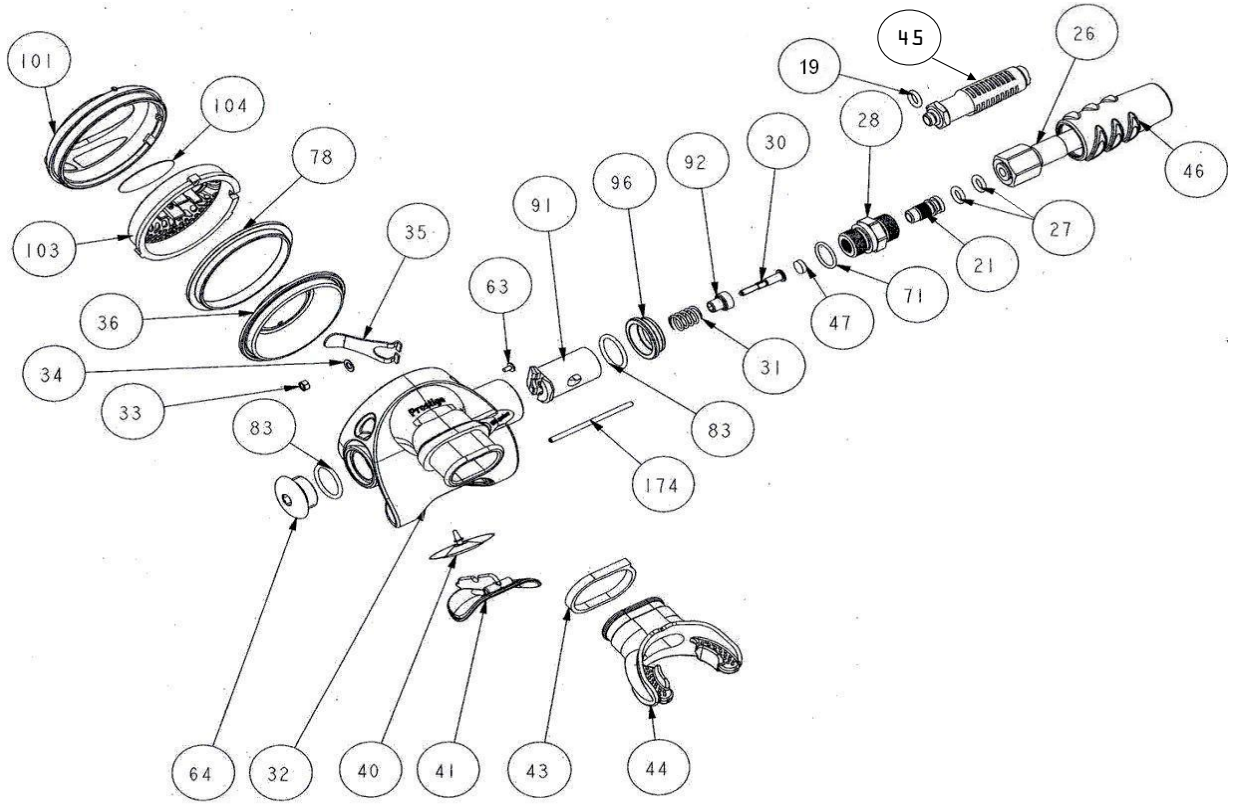


CHART NO : 126	2nd Stage - Octopus PRESTIGE PRESTIGE SHE DIVES	UPDATE : 20/12/2012

REF	CODE	DESCRIPTION	€		REF	CODE	DESCRIPTION	€
19	46110106	OR 106			63	46184289	PIN-COVER	
19	46110402	OR 106 Viton 610-97507			64	46200772	2nd ST. ADJUSTMENT PLUG	
21	46200204	POPPET SEAT			71	46110211	OR 2050	
26	46200998	LP HOSE PRESTIGE 3/8 L 800 SFX			71	46110413	OR 2050 Viton	
26	46200790	LP HOSE PRESTIGE 3/8 L1000 YL			78	46200773	DIAPHRAGM RING PRESTIGE	
27	46110205	OR 2025			83	46110225	OR 2068	
27	46110411	OR 2025 Viton			83	46110420	OR 2068 Viton	
28	46184282	HOSE CONNECTOR			91	46200992	INSERT FOR DEMAND LEVER	
30	46184219	POPPET METAL BODY REGS			92	46184221	VALVE BODY, 2ND STAGE	
31	46185057	POPPET SPRING 2ND STAGE			96	46200779	SPACER RING BY-PASS BK	
32	46200770	CASE 2nd STG PRESTIGE			96	46200782	SPACER RING BY-PASS YL	
32	46201045	CASE 2nd STG SHE DIVES			101	46200775	COVER 2nd STG PRESTIGE	
33	46185051	LOCKNUT, DEMAND LEVER			101	46200781	OCTOPUS COVER PRESTIGE	
34	46185049	WASHER, DEMAND LEVER			101	46201057	COVER SHE DIVES	
35	46201240	DEMAND LEVER PRESTIGE			103	46200776	BUTTON SND STAGE	
36	46200771	DIAPHRAGM PRESTIGE			104	46200794	STICKER	
40	46184006	EXHAUST VALVE, 2ND STAGE			174	46200361	EXHAUST PLUG PIN	
41	46200769	INSPECTION PLUG					**ASSEMBLED**	
43	47157984	CLAMP			* * *	46200296	MAINTENANCE KIT REBEL/PRESTIGE	
44	46200855	MOUTHPIECE BK (10 pics)					(19- 27- 33 - 40- 43- 47 - 63 - 71-72 - 83)	
45	46201077	HOSE PROTECTOR 2k9			* * *	46200297	MAINTENANCE KIT PRESTIGE(Viton O-Rings)	
46	46200768	HOSE PROTECTOR 2nd STG					(19 -27- 33 -40 - 43 - 47 -63-71- 72- 83)	
47	46184062	RUBBER SEAT 2ND STAGE				46200510	KIT RETROFIT (21-27-47)	

DRAWING NO : E 37	2nd Stage - Octopus PRESTIGE DPD	UPDATED : 20/01/2012

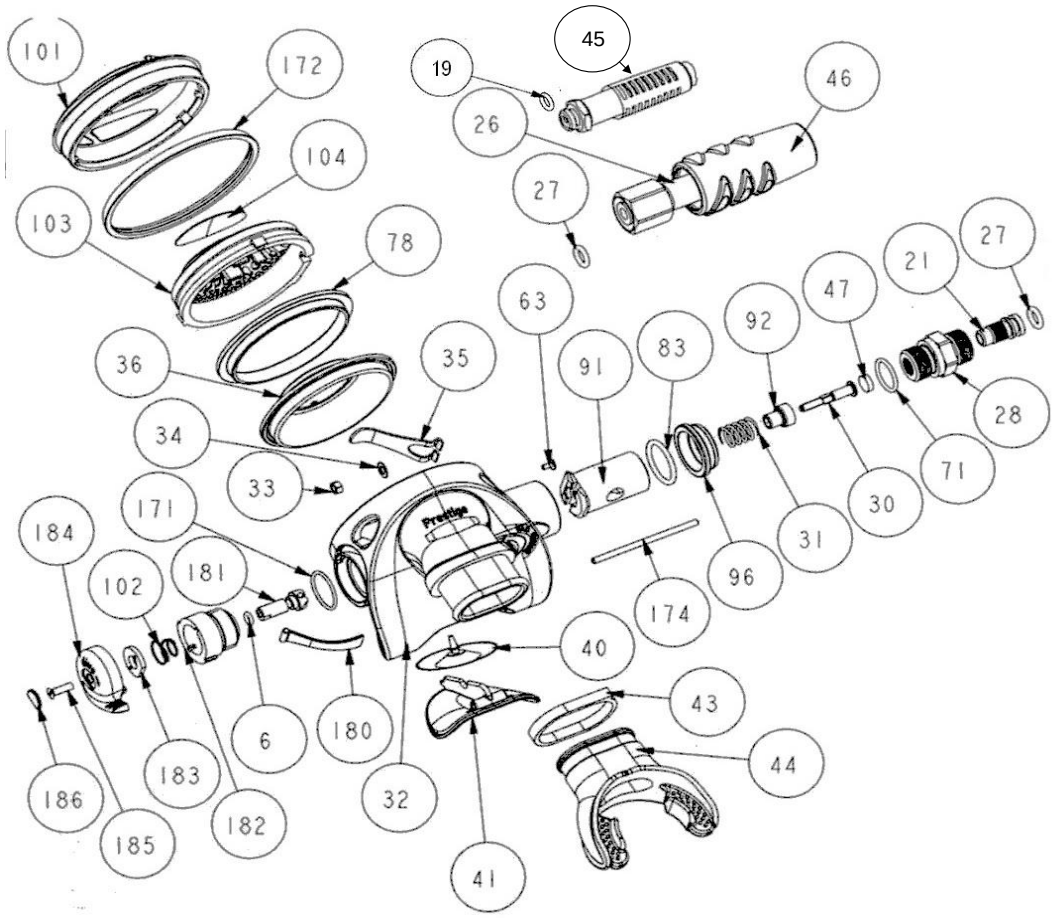


CHART NO : 127	2nd Stage - Octopus PRESTIGE DPD	UPDATED : 20/12/2012

REF	CODE	DESCRIPTION	€
6	46110101	OR 2012	
6	46110401	OR 2012 Viton 006-9707	
19	46110215	OR-2043	
19	46110415	OR-2043 Viton	
21	46200204	POPPET SEAT	
26	46200883	LP HOSE SFX 1/2" DPD	
26	46200886	LP HOSE SFX 3/8" Octopus DPD	
27	46110205	OR 2025	
27	46110411	OR 2025 Viton	
28	46184282	HOSE CONNECTOR	
30	46184219	POPPET METAL BODY REGS	
31	46185057	POPPET SPRING 2ND STAGE	
32	46201048	CASE 2nd STG DPD	
33	46185051	LOCKNUT, DEMAND LEVER	
34	46185049	WASHER, DEMAND LEVER	
35	46201240	DEMAND LEVER PRESTIGE	
36	46200771	DIAPHRAGM PRESTIGE	
40	46184006	EXHAUST VALVE, 2ND STAGE	
41	46200769	INSPECTION PLUG	
43	47157984	CLAMP	
44	46200855	MOUTHPIECE BK (10 pics)	
45	46201077	HOSE PROTECTOR 2k9	
46	46200768	HOSE PROTECTOR 2nd STG	
47	46184062	RUBBER SEAT 2ND STAGE	
63	46184289	PIN-COVER	
71	46110211	OR 2050	
71	46110413	OR 2050 Viton 014-9707	
78	46200773	DIAPHRAGM RING PRESTIGE	
83	46110225	OR 2068	

REF	CODE	DESCRIPTION	€
83	46110420	OR 2068 Viton	
91	46200992	INSERT FOR DEMAND LEVER	
92	46184221	VALVE BODY, 2ND STAGE	
96	46200818	SPACER RING BY-PASS	
101	---	COVER	
102	47159075	SPRING DPD	
103	46200776	BUTTON 2nd STG PRESTIGE	
104	46200825	LABEL DPD	
171	46110220	OR 2062	
171	46110417	OR 2062 Viton	
172	---	RING ANODIZED ALUMINIUM	
174	46200361	EXHAUST PLUG PIN	
180	46200814	LEVER DPD	
181	46200391	ADJ STEM DPD	
182	46200813	BODY DPD	
183	46200390	ADJ LOCK	
184	46200812	KNOB DPD	
185	46200395	INOX SCREW M 2x10	
186	46200802	STICKER D.9 DPD	
ASSEMBLED			
---	46200835	COVER ASSEMBLY DPD(101-172)	
---	46200952	COVER ASSEMBLY Octopus DPD (101-172)	
* * *	46200822	MAINTENANCE KIT PRESTIGE DPD	
		(6-19-27-33-40-43-47-63-71-83-171-186)	
* * *	46200823	MAINTENANCE KIT DPD (VITON O-Ring)	
	46200510	KIT RETROFIT (21-27-47)	
ACCESSORIES			
	46201046	ADJ. PLUG for DPD Case	

SXS
SECOND STAGE

SXS. REQUIRED TOOLS AND SUPPLIES

Tool	Description	#Code
	B-6	46106206
	Hex (1,5mm)	No code
	O-Ring removal Tool	46201387
	B-17 (17mm)	46106217

Tool	Description	#Code
	B-18 (14mm)	46106218
	B-4 (5mm)	46106204
	B-12	46106212
	B-8 (6mm)	46106208

- Compressed air diver grade supply circuit or tank (2600-2900 PSI/ 185-200 bar)
- Compressed air gun (120-145 PSI/8-10 bar)
- Ultrasonic cleaner & Descaling solution (e.g. Deox Extra type) or similar
- Magnehelic gauge (#416923 - #416924)
- Silicone grease (Tribolube-2080 Lubrification Technology or equal.)
- Neoprene Workpad (449822)
- Second Stage service kit # 46201811
- Nylon brush
- Nippers
- Torque Wrench

SXS. DISASSEMBLY

NOTE

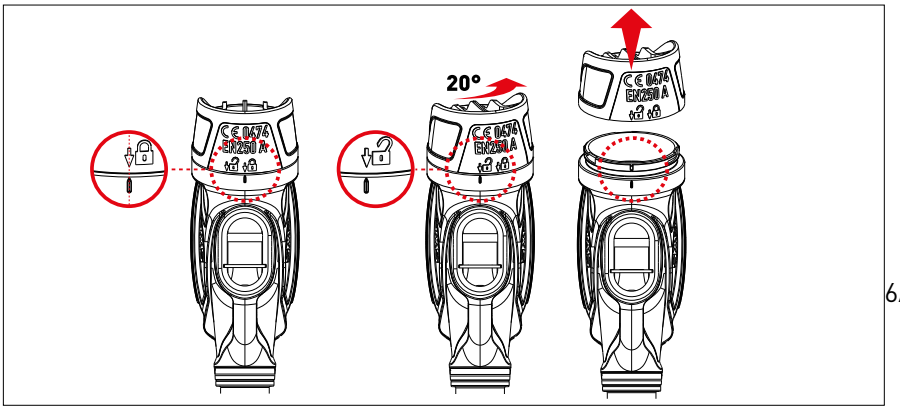
While performing maintenance procedures or overhauls, you must have the SXS maintenance manual available.

1. Remove the Dust Cap (INT version) and unscrew the Hose (34) using a 14-mm open end wrench (B18).
2. Remove the Hose Protector (18) from the second stage.
3. Using two 17mm open end wrenches (B-17), remove the Hose (34) from the Second Stage Hose Connection (14).
4. Remove the O-rings (17-35) from the end of the Hose (34).
5. Using cutting nippers (or pliers), cut the Mouthpiece Clamp (9), remove the Mouthpiece (10), remove the Deflector (8).

CAUTION

TAKE SPECIAL CARE TO AVOID DAMAGE TO THE MOUTHPIECE.

6. Locate the Lock/Unlock symbol on the Exhaust Cover (1). Twist the Exhaust Cover (1) to the unlock position and pull Exhaust Cover (1) off the 2nd Stage Body (7). Remove the O-ring (6) and the Exhaust Valve (5).



6A

NOTE

Take special care to avoid damaging the 2nd Stage Body (7) and the Exhaust Cover (1).

7. Using 1.5mm allen key, unscrew the 4 Hexagon Socket Screw SXS (32), remove the SXS Frame (30) with the Purge Cover (28).

NOTE

Take special care to avoid losing the 4 Nylon Washer button (29) and Metal Washer frame (31) .

8. Remove the Diahpragm Holder (27), using a flat head screwdriver (type USAG No. 322). Insert the screwdriver in the slot as shown in the picture 8 and penetrate between plastic parts Ring Diahpragm Holder (27) and 2nd Stage Body (7) with the screwdriver, then lift up on the Ring Diahpragm Holder (27) with caution until release from the 2nd Stage Body (7)

2

3

6B

7A

7B

8

8a

8b

SXS. DISASSEMBLY

9. Remove the Oval Diaphragm (26) from the Diaphragm Holder (27).
10. Place back pressure on the demand lever locknut, unscrew and remove the Hose Connection (14) using 17mm open end wrench (B-17), then remove the Spacer Ring (13).
11. Gently press the Demand Lever Connector Assembly into the Second Stage Case (7) and remove.
12. Remove from the Second Stage Case (7) the Adapter SXS (12).
13. Remove the Oring (11) from the Adapter SXS (12).
14. Remove the O-ring (15) from the Hose Connection (14). Next remove the poppet seat (16) from the Hose Connection. Insert a 5mm hex key into the short side of the Hose Connection to engage the poppet seat (16) Counter clockwise turn the hex key and unscrew the poppet seat (16) until the threads of the poppet seat (16) are completely disengaged from the internal threads of the Hose Connection (14). Using a soft/plastic tool or wooden dowel, insert it into the long end of the Hose Connection (14) and press the poppet seat (16) out of the short side of the Hose Connection (14).

9

10

10A

12-13

14

SXS. DISASSEMBLY

15. Position the demand Lever assembly on the special Tool (B-6) and use the special 5.5mm wrench (B-12) to unscrew the Demand Lever Locknut (19) from the Demand Lever (21). Press down the Lever Holder SXS (22) to put pressure on the Poppet Spring (23) and relieve the tension on the Demand Lever Locknut (19). While continuing to press down, use the special 5.5mm wrench (B-12) to remove the Demand Lever Locknut (19); then remove the Washer (20), and the Demand Lever (21).

NOTE

After removing locknut, washer, and demand lever, slowly release the pressure on the poppet spring while covering it with your hand. This will prevent an uncontrolled exit by the spring from the second stage case.

16. Remove the Rubber Seat (25) from the Poppet Body (24).

CAUTION

DO NOT USE SHARP OR POINTED TOOLS TO EXTRACT THE POPPET SEAT. SCRATCHES ON THE SEAT SURFACE MAY CAUSE AIR LEAKS.

15

16

SXS. INSPECTION AND CLEANING

Reusable Rubber and Plastic Components

Inspection

Inspect all reusable rubber and plastic components for excessive wear and/or damage. Replace parts as necessary.

Cleaning

Clean all rubber and plastic components by washing them in a mixture of warm water and mild detergent. If necessary, scrub parts with a soft brush. Do not use abrasive cleaners, solvents or acids on rubber components.

CAUTION

SOLVENTS AND ACIDS MAY DAMAGE PLASTIC AND RUBBER PARTS. BEFORE CLEANING METAL COMPONENTS, MAKE SURE THAT ALL RUBBER AND PLASTIC PARTS HAVE BEEN REMOVED.

Metal Components

Inspection

Inspect all parts for excessive wear and/or damage. Replace parts as necessary.

Cleaning

Chrome plated, brass, and stainless steel parts are cleaned by immersing them in an ultrasonic cleaner containing a de-scaling agent such as Deox Extra or a solution of equal parts of white vinegar and hot water. 50/50 ratio. A nylon brush may be used to remove any stubborn deposits.

Be sure to rinse all parts in fresh water and allow to completely dry before proceeding with reassembly.

SXS. SECOND STAGE SERVICE KIT

Some key components of the Second Stage should be replaced during the overhaul. These key parts are included in the SXS Second Stage Service Kit (Code 46201811) and are identified in the RED BOXES below.

SERVICE KIT # 46201811

SXS. REASSEMBLY

NOTE

Lubrication reduces the likelihood of damage during reassembly. Before beginning the reassembly procedure, lightly lubricate all O-rings with Tribolube-2080 Lubrification Technology or equal.

17. Carefully install new Exhaust Valve (6) by gently pulling the silicone valve stem through the hole of the Second Stage Exhaust Valve opening.

17A

17B

CAUTION

IN ORDER TO AVOID DAMAGING THE EXHAUST VALVE, DO NOT PULL THE STEM TOO HARD.

18. Use cutting nippers to cut the end section of the Exhaust Valve (6) stem at approximately half it's length.
19. Insert the Rubber Seat (25) on the Second Stage Poppet Body (24).

20

NOTE

To be sure that the Second Stage Poppet Body is correctly positioned into the Lever Holder hole, gently rotate the Lever Holder left and right on the B-6 Tool until the square shoulders of the Poppet Body is fully inserted into the square hole of the lever holder (Picture 20).

20. Place the Spring Second Stage (23) onto the Poppet Body (24). Place the assembly on the special Tool (B-6) as illustrated.
21. Correctly position the Second Stage Poppet Body (24) and its spring into the Lever Holder (22) and hold it in place by gently pressing it.

20A

SXS. REASSEMBLY

22. Properly position the Demand Lever (21) in the groove of the Lever Holder (22).

NOTE

The Demand Lever (21) nees to be positioned on the side of the Lever Holder (22) with the beveled edge, as shown in image 22.

22

23. Place the Washer (20) on the Poppet Stem and tighten the Demand Lever Locknut (19) 2 or 3 full turns using the special wrench (B-12).

WARNING

DEMAND LEVER (21) HEIGHT ADJUSTMENT REQUIRES THE USE OF SPECIAL TOOL B-12 (TYPE BETA 942BX5.5) OR A WRENCH WITH A HEAD DIAMETER OF NO MORE THAN 8.2mm /0.32 INCH.

23 A

WARNING

DO NOT OVER-TIGHTEN THE DEMAND LEVER LOCKNUT (19). DOING SO MAY RESULT IN A SECOND STAGE FREE FLOW, WHICH CAN INTERFERE WITH THE INTERMEDIATE PRESSURE ADJUSTMENT PROCEDURE.

NOTE

Press the Demand Lever a few times to be sure it moves freely.

23 B

SXS. REASSEMBLY

24. Install the O-Ring (15) on the Hose Connection (14) and the O-ring (17) on the Poppet Seat (16).

25. Insert the 5mm hex wrench (B-4) into the hex side of the Poppet Seat (16). Insert the tapered end of the Poppet Seat (16) into the short side of the Hose Connection (14) until it stops. The screw the Poppet Seat (16) clockwise until it stops (Do Not Overt Tighten). Then unscrew the Poppet Seat (16) (turn counter clockwise) the Poppet Seat 4 1/2 turns (For Primary second stage adjustment) & 4 counter clockwise turns for the Octopus.

24

CAUTION

THE POPPET SEAT SETTING DESCRIBED IN STEP 26 IS AN INITIAL ADJUSTMENT ONLY, AND SHOULD BE RESET IF IT IS DETERMINED THE CRACKING EFFORT IS NOT WITHIN THE ACCEPTABLE RANGE.

26

26. Install the O-Ring (11) on the Adapter SXS (12).

27. Install the Adapter SXS (12) on the Second Stage Body (7).

28. Correctly place the Demand Lever Holder assembly (22) in the Second Stage Case (7).

29. Place the Demand Lever Holder (22) in the Second Stage Body (7), facing the Purge Cover (28)

28

NOTE

The demand lever holder must be installed with the beveled edge facing the purge button, and the square side of the demand lever holder facing the back of the case

28

30. Install the Spacer Ring (13) on the Hose Connection (14).

31. Install the Hose Connection (14) on the second stage body (7) and tighten with the 17mm wrench (B-17).

31

WARNING

IF USING A TORQUE WRENCH TO TIGHTEN THE HOSE CONNECTION (14) USE A TIGHTENING TORQUE OF APPROXIMATELY 8 Nm/ 6 ft lb.

NOTE

To avoid any possible issues during the disassembly procedure, put a small quantity of silicone grease on the O-ring side threads of the Hose Connection (14).

32. Install the O-ring (17) in the second Stage end of the LP Hose (34) and the O-Ring (35) in the First Stage end of the Hose.

33. Using two wrenches (B-17), connect the Hose (34) to the Hose Connection (14).

DANGER

MAKE SURE THE HOSE CONNECTION IS SECURELY TIGHTENED BEFORE CONNECTING THE LP HOSE. FAILURE TO DO SO, MAY RESULT IN THE HOSE CONNECTION DISCONNECTING FROM THE SECOND STAGE CASE DURING USE.

SXS. REASSEMBLY

34. Connect the LP Hose (34) with the Second Stage attached (without the Second Stage cover installed).

WARNING

USE A TORQUE WRENCH TO TIGHTEN THE LP HOSE, USE A TIGHTENING TORQUE OF 3-3.5 ft lb / 4-4.5 Nm.

35

35 B

CAUTION

AT THIS POINT, CONNECT THE SECOND STAGE TO THE FIRST STAGE AND SET THE FIRST STAGE INTERMEDIATE PRESSURE AS DESCRIBED IN THE FIRST STAGE SERVICE MANUAL.

35. Insert the Oval Diaphragm (26) into the Diahpragm Holder (27).

36. Install the Diahpragm Holder (27) with the Oval Diaphragm (26) already assembled, on the second stage body, keeping the metal disk in contact with the Demand Lever.

36

NOTE

Make sure you have lined up the plastic tooth on the Diahpragm Holder with the seat on the second stage body in order to install the Diahpragm Holder in the correct position (as shown in picture 38.

37. Place the 4 Nylon Washers (29) in position.

38. Place the second stage Purge Cover SXS (28) plus the SXS Frame (30) in position.

39. Place the 4 Metal Washers (31) in position.

37

NOTE

Screw in the 4 Hexagon Socket Screw SXS following the order shown in pic. 41.

40. Fully thread the 4 Hexagon Socket Screw SXS (32) in the alternating pattern until fully seated as shown in picture 41.

38

WARNING

USE A TORQUE WRENCH TO TIGHTEN THE LP HOSE, USE A TIGHTENING TORQUE OF 0,8 ft lb / 10 cNm.

39

41

SXS. REASSEMBLY

41

CAUTION

ALL THE ADJUSTMENTS BELOW MUST BE MADE WITH THE SECOND STAGE CONSISTENTLY SUPPLIED WITH THE CORRECT INTERMEDIATE PRESSURE (IP).

41. Insert the B-12 wrench through the adjusting hole in the Second Stage Case and secure it to the Demand Lever Locknut (19). Tighten the Demand Lever Locknut (19) until free-flow and loosen it until it stops. Then, unscrew the Demand Lever Locknut (19) with the (B-12) wrench, turning it by about 1/3.

46

CAUTION

THE DEMAND LEVER IS ADJUSTED CORRECTLY WHEN THE LEVER IS SLIGHTLY LOOSE, AND AIR BEGINS TO FLOW WHEN THE PURGE COVER SXS IS DEPRESSED ABOUT 2MM. A TAPPING SOUND OF THE DEMAND LEVER TOUCHING THE METAL DISK OF THE SECOND STAGE OVAL DIAPHRAGM SHOULD BE AUDIBLE WHEN THE PRESSURIZED SECOND STAGE IS SHAKEN VIGOROUSLY UP AND DOWN.

42. Recheck the Intermediate pressure, must be the following before to proceed to the step 47.

TABLE - IP ADJUSTABLE RANGE

	Test Bench cm /H2O	Test Bench Inch/H2O	Magnehelic gauge Inches	Magnehelic gauge cm
SXS	**2.2 - 3.5**	**1.0 - 1.5**	**1.0 - 1.5**	**2.2 - 3.5**
OCT.SXS	**3 - 4.1**	**1.3 - 1.8**	**1.3 - 1.8**	**3 - 4.1**

43. Attach the Second Stage to a test bench or a Magnehelic gauge.
44. Measure the Second Stage Cracking Effort.

CAUTION

THE CRACKING EFFORT MUST BE READ THE MOMENT THE INTERMEDIATE PRESSURE STARTS TO DECREASE.

45. If the Cracking Effort is outside of the acceptable range, proceed as described below:
    - 45.1 Using two wrenches (B-17), unscrew the Hose (34) from the Hose Connection (14).
    - 45.2 If the Cracking Effort value is lower than the acceptable range, screw in the Poppet Seat (16), a ¼ turn at the time till the value is correct.
    - 45.3 If the Cracking Effort value is higher than the acceptable range, unscrew the Poppet Seat (16), a ¼ turn at the time till the value is correct.
    - 45.4 Check and adjust the height of the lever as described in point 41.
    - 45.5 Measure the Second Stage Cracking Effort.
46. Install the O-Ring (6) on the second Stage Body (7)
47. Assemble the Exhaust Cover (1) on the second stage, and secure it.
48. Carefully assemble the Deflector (8), and the mouthpiece (10), securing it with a new mouthpiece clamp (9).

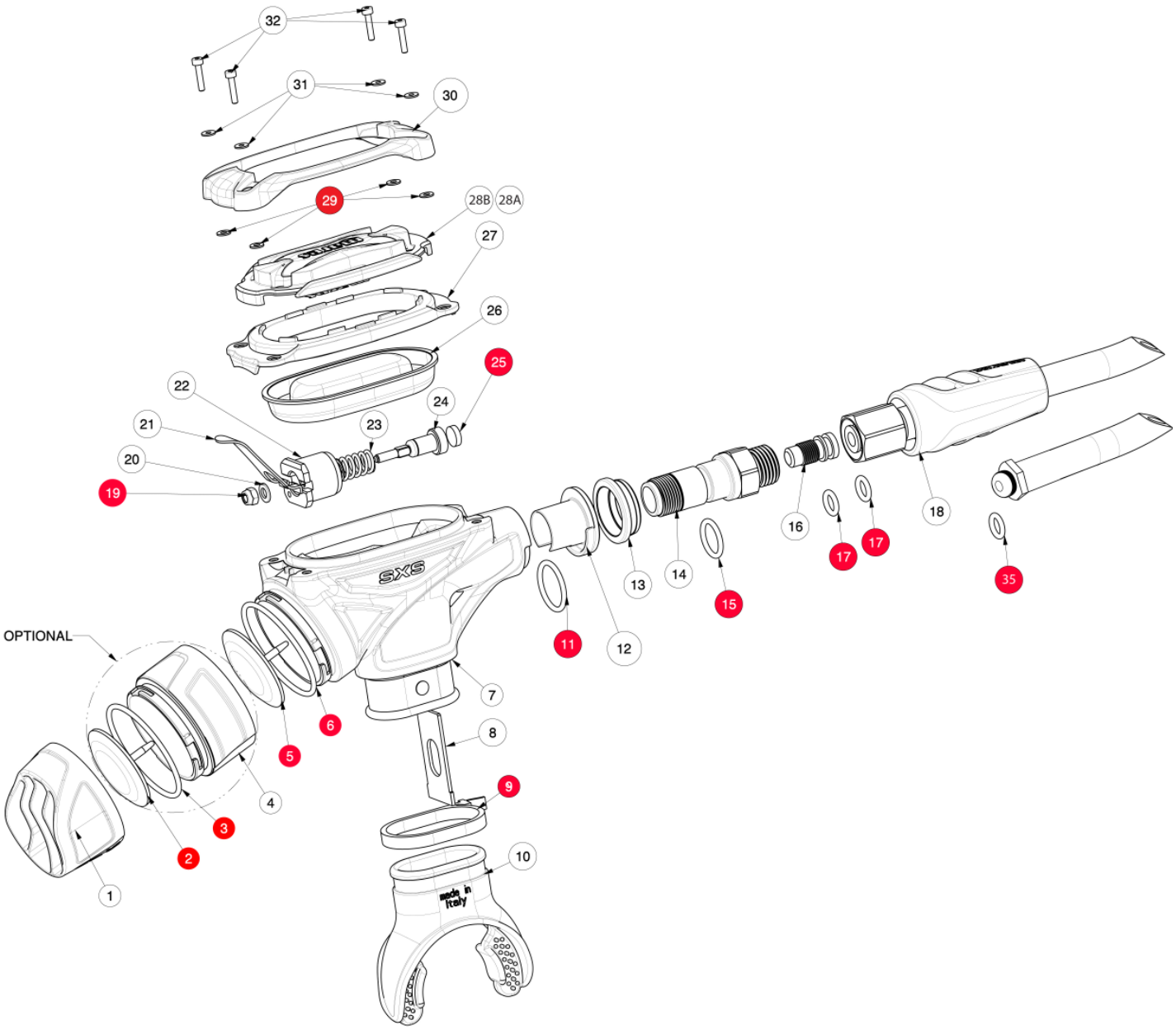
SXS. TROUBLESHOOTING

Problem	Probable Cause	Solution
Continuous or intermittent air flow from the Second Stage	Rubber Seat (25) Damaged	Replace Rubber Seat
	Sealing surface of the Poppet Seat (16) is dirty or damaged	Clean or replace Poppet Seat
	IP exceeds acceptable range	Adjust IP, please check step 45
	Demand Lever set too high	Adjust to correct height
	Poppet Spring (23) out of position or damaged	Position correctly or replace
	Incorrect Poppet Seat (16) adjustment (too low)	Adjust the seat
Cracking Pressure higher than acceptable range	Demand Lever set too low	Adjust to correct height
	IP outside of acceptable range	Adjust IP, please check step 45
	Tank valve not fully opened	Completely open the tank valve
	Second Stage Poppet Spring deformed or damaged	Replace Poppet Spring
	First Stage filter clogged	Overhaul First Stage and replace filter
	Incorrect Poppet Seat (16) adjustment (too high)	Adjust the seat
	High Poppet Spring tension	Replace Poppet Spring

SXS. TROUBLESHOOTING

Problem	Probable Cause	Solution
Cracking Pressure lower than acceptable range	IP outside of acceptable range	Adjust IP, please check step 45)
	Second Stage Poppet Spring deformed or damaged	Replace Poppet Spring
	Demand Lever set too high	Adjust to correct height
	Incorrect Poppet Seat (16) adjustment (too low)	Adjust the seat
Traces of water inside Second Stage	Ring Clamp (9) loose or damaged	Tighten or replace
	Exhaust Valve support dirty	Clean support
	Exhaust Valve (5) damaged	Replace Exhaust Valve
	Oval Diaphragm (26) dirty, damaged, or incorectly positioned	Clean, position correctly or replace
	Mouthpiece (10) loose or damaged	Replace the clamp; replace mouthpiece
Vibration sound from Second Stage during inhalation	Oval Diaphragm (26) incorrectly positioned	Check and position correctly
	Incorrect Demand lever adjustment	Check and adjust correctly
	Poppet Spring (23) damaged or incorreclty positioned	Check and Position correctly or replace

SXS. DRAWING E 1364 Updated: 04/08/2021



SXS. CHART 135 Updated: 16/03/2022

CHART NO: 135		SECOND STAGE SXS			UPDATED: 16/03/2022
REF	**CODE**	**DESCRIPTION**	**REF**	**CODE**	**DESCRIPTION**
1	46202139	EXHAUST COVER	23	46201404	SPRING SECOND STAGE
2	F	EXHAUST VALVE, SECOND STAGE	24	46201338	POPPET BODY
3	F	OR 2137	25	46184062	RUBBER SEAT SECOND STAGE
4	F	EXTENSION EXHAUST COVER	26	46187009	OVAL DIAPHRAGM
5	46201194	EXHAUST VALVE, SECOND STAGE	27	46202135	DIAHPRAGM HOLDER
6	44200914	OR 2137	28A	46202136	PURGE COVER SXS BK
7	----	2ND STAGE BODY	28B	46202144	PURGE COVER SXS YW (OCTOPUS)
8	46202158	DEFLECTOR WITH OPENING	29	46187008	NYLON WASHER BUTTON SXS
9	47157984	CLAMP MOUTHPIECE	30	46202137	SXS FRAME BK
10	E	MOUTHPIECE	31	46187005	METAL WASHER FRAME SXS
11	46110220	OR 2062	32	46202155	HEXAGON SOCKET SCREW SXS (M2x10)
12	46202166	ADAPTER SXS	34	46201379	LP HOSE 3/8" SFX BK 75 cm WO/HOSE PROTECTOR
13	46200779	SPACER RING	34	46201381	LP HOSE 3/8" SFX YW 100 cm WO/HOSE PROTECTOR
14	46202133	HOSE CONNECTION	35	46110106	OR 106
15	46110114	OR 114			
16	46200204	POPPET SEAT	**ASSEMBLIES**		
17	46110205	OR 2025	---	46201811	SERVICE KIT SECOND STAGE SXS
18	46201473	HOSE PROTECTOR SECOND STAGE	E	46200855	10 PACK BLACK MOUTHPIECES
19	46185051	LOCKNUT, DEMAND LEVER	F	416820	SXS - EXTENSION EXHAUST COVER DRY KIT
20	46185049	WASHER, DEMAND LEVER	**NOTE**		
21	46200778	DEMAND LEVER	Parts highlighted in red are included in the service kits 46201811		
22	46202157	LEVER HOLDER SXS			

ABYSS
SECOND STAGE

ITM 19 BIS

SECOND STAGE COVER ABYSS 08

AUG. 13, 2008

MARES TECHNICAL ASSISTANCE OFFICE HAS THE PLEASURE TO INFORM HIS MARES LAB CENTERS ABOUT THE SECOND STANGE COVER ABYSS UPGRADE.. THE RELEVANT CODES OF MODIFIED SPARE PARTS ARE: 46200849-46200850-46200851. THE IMPROVEMENT CONCERNS THE FIXING OF THE METAL FOIL (MESH GRID) TO THE COVER. THIS NEW SOLUTION PREVENTS THE FRONT COVER DETACHMENT CAUSED BY A STRONG IMPACT ESPECIALLY ON THE SURFACE.

THE NEW COVERS CAN BE IDENTIFIED BY TWO INNER HOOKS AS PER THE PHOTO PAGE 2.

ALSO ABYSS SECOND STAGES WITH NEW COVERS CAN BE IDENTIFIED BY THE PROGRESSIVE SERIAL NUMBER OF THE PRODUCT, STARTING FROM THE ONE MENTIONED IN TABLE N° 1.

PRODUCT CODE	DESCRIPTION	SERIAL NUMBER
416134	REG.ABYSS 22 INT - DIN	EA 13751
416133	REG ABYSS 42 INT - DIN	BM 13849
416504	OCTOPUS ABYSS	OY 11571
416134	REG. ABYSS 22 NITROX	ALL PRODUCTIONS
416504	. OCTOPUS ABYSS NITROX	ALL PRODUCTIONS
416134	REG.ABYSS 22 INT - DIN	EA 13751

WARNING!

ALL DISASSEMBLING, ASSEMBLING, REPLACING PROCEDURES MUST BE CARRIED OUT BY QUALIFIED PERSONNEL AT AN AUTHORIZED TECHNICAL ASSISTANCE CENTER AND/ OR AT AN AUTHORIZED MARES DISTRIBUTOR.

WE HIGLY RECOMMED TO CONSULT OUR MAINTENANCE MANUAL. IF YOU DON' T HAVE THE UPDATED VERSION PLEASE APPLY TO MARES BEFORE MAKING ANY MAINTENANCE, ADJUSTMENT AND CONTROL.

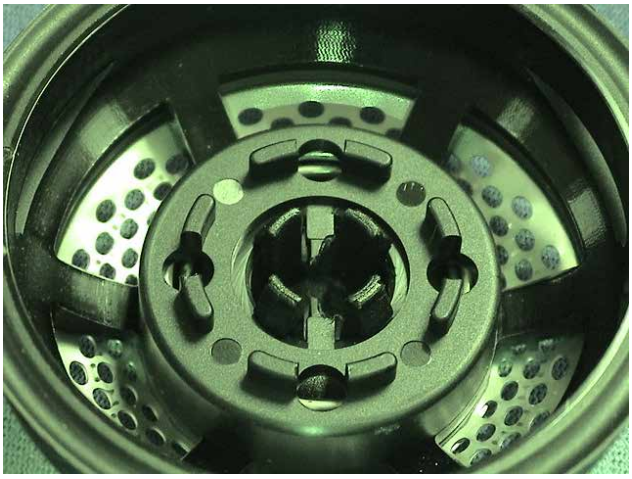
ITM 19 BIS

SECOND STAGE COVER ABYSS 08

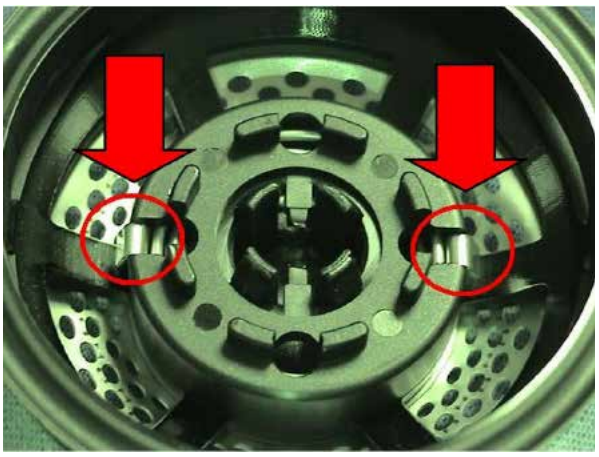
AUG. 13, 2008

PREVIOUS VERSION

NEW VERSION



PREVIOUS VERSION



NEW VERSION

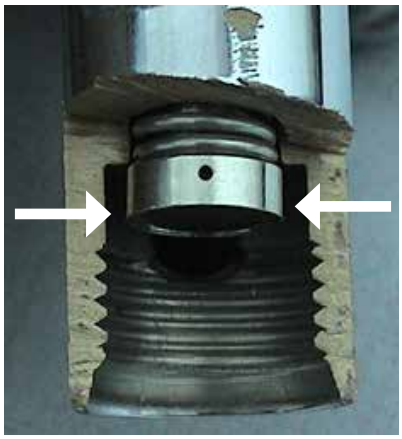
ITM 26

ABYSS SECOND STAGE CASE - ABYSS EXTREME/NAVY (CODE: 46201190-46201191)

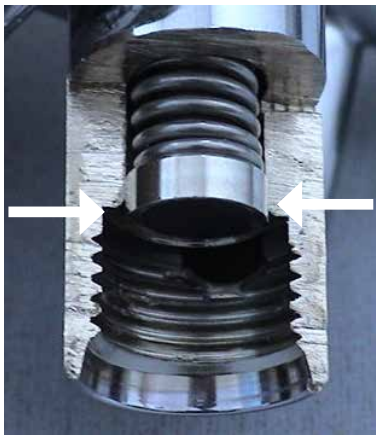
JUL. 27, 2012

MARES S.P.A. TECHNICAL SUPPORT ANNOUNCES THAT IT HAS FURTHER IMPROVED THE PERFORMANCE OF ABYSS, ABYSS EXTREME/NAVY SECOND STAGES. THE NEW SECOND STAGE CASE HAS A MODIFIED CASE INLET FITTING CONNECTOR THAT ALLOWS THE SECOND STAGE VALVE TO BE MORE "GUIDED" INSIDE THE INLET FITTING DURING USE (PHOTOS 1 & 2), MINIMIZING THE RISK OF FREEFLOW. THIS INNOVATION GUARANTEES GREATER RELIABILITY FOR THE REGULATOR, ESPECIALLY IN EXTREME CONDITIONS.

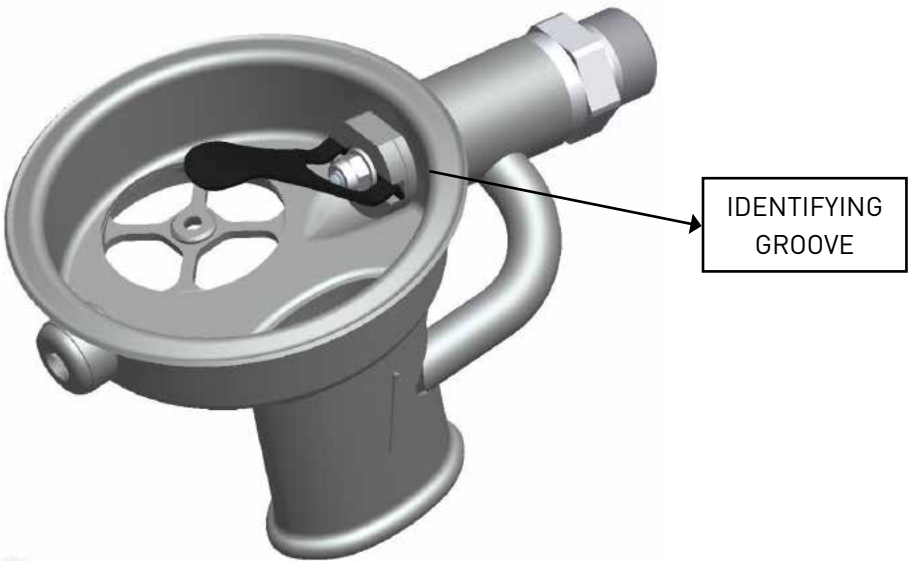
PREVIOUS



CURRENT



THE NEW SECOND STAGE CASES CAN BE RECOGNIZED BY AN IDENTIFYING GROOVE AS SHOWN IN THE PHOTO.



ITM 26

ABYSS SECOND STAGE CASE - ABYSS EXTREME/NAVY (CODE: 46201190-46201191)

JUL. 27, 2012

INITIALLY THE NEW SECOND STAGE CASE WILL BE ASSEMBLED ON THE FOLLOWING MODELS, BEGINNING WITH THE CONSECUTIVE SERIAL NUMBERS:

PRODUCT CODE	DESCRIPTION	SERIAL NUMBER
416227	SET ABYSS 22 DIN	STF 11893
416134	ABYSS 22 DIN	EA 32826
416163	ABYSS 52 INT	AQ 12046
416504	OCTOPUS ABYSS	OY 19953
416536	OCT ABYSS EXTREME	XA 11727
416158	ABYSS 22 NAVY	NV 11506

* FOR ADDITIONAL INFORMATION PLEASE CONTACT TECHNICAL SUPPORT.

SPARE PARTS INFORMATION!

THE NEW SECOND STAGE CASES CAN BE USED AS REPLACEMENTS IN PREVIOUS 46200811 & 46200895 MODELS, WHICH WILL BE SOLD WHILE SUPPLIES LAST.

WARNING!

TO DISASSEMBLE, REASSEMBLE, ADJUST, OR CHECK THE SECOND STAGE CASE, CONSULT THE CORRESPONDING MAINTENANCE MANUAL UNDER SECTION S 12-1 / S 12-7IF THE MANUAL IS UNAVAILABLE, PLEASE CONTACT MARES BEFORE PERFORMING ANY MAINTENANCE, ADJUSTMENT, OR TESTING PROCEDURE.

ABYSS. REQUIRED TOOLS AND SUPPLIES

Tool	Description	#Code
	Hex 4mm	No code
	B-6	46106206
	B-17 (17mm)	46106217
	B-4 (5mm)	46106204

Tool	Description	#Code
	B-12	46106212
	B-8 (6mm)	46106208
	O-Ring removal Tool	46201387

- Compressed air supply circuit or tank (2600-2900 PSI/ 185-200 bar)
- Compressed air gun (120-145 PSI/8-10 bar)
- Ultrasonic cleaner & Descaling solution (e.g. Deox Extra type) or similar
- Test Bench (#416920) or Magnehelic gauge and Intermediate Pressure Gauge (46106252)
- Christo-Lube MCG 111 Lubrication Technology or equal
- Neoprene Workpad (449822)
- Second Stage service kit # 46186160 / 46185166 Viton
- Nylon brush
- Phillips screwdriver (Usag 326 PH 0) or similar
- Nippers

ABYSS. DISASSEMBLY

1. Using cutting nippers (or pliers), cut the Mouthpiece Clamp (43) and remove the Mouthpiece (44).
2. Remove the Exhaust Tee (41) from the Second Stage Case (32).
3. Remove the Hose Protector (46) from the Cover Assembly (39) as illustrated using the S-1 Tool.

WARNING!

TAKE SPECIAL CARE TO AVOID BREAKING THE COVER PIN THAT ATTACHES THE HOSE PROTECTOR TO THE COVER ASSEMBLY. BREAKING THIS PIN WILL PREVENT THE HOSE PROTECTOR FROM PROPERLY CONNECTING TO THE COVER ASSEMBLY DURING ASSEMBLY.

4. Using two wrenches (B-17), remove the Hose (26) from the Second Stage Hose Connector (28).
5. Remove the O-rings (27 - 19) from each end of the Hose (26).
6. Remove the Hose Connector (28) from the second stage using the wrench (B-17). Remove the O-ring (29) from the Case.
7. Using the hex wrench (B-4), remove the Poppet Seat (21) from the Hose Connector (28). Remove the O-ring (27) from the Poppet Seat (21).
8. Remove the Clamp Screw (38) with a Phillips head screwdriver.
9. Spread the Ring Clamp (37) as illustrated and remove it from the Second Stage Case (32).
10. Remove the Cover Assembly (39) and the Diaphragm (36).

WARNING!

DON'T TWIST THE RING CLAMP OR YOU'LL IRREPARABLY DAMAGE IT.


3 a


3 b


4


6


8


9 a

9 b

ABYSS. DISASSEMBLY

11. Position the Special Tool (B-6) through the opening in the Second stage Case (32) and on the Poppet Stem as illustrated. Press down on the Case to put pressure on the Poppet Spring (31) and relieve the tension on the Demand Lever Locknut (33). While continuing to press down, use the special 5.5mm wrench (B-12) to remove the Locknut (33); then remove the Washer (34), and the Demand Lever (35).

11

WARNING!

AFTER REMOVING THE LOCKNUT, WASHER, AND DEMAND LEVER, SLOWLY RELEASE THE PRESSURE ON THE POPPET SPRING WHILE COVERING IT WITH YOUR HAND. THIS WILL PREVENT AN UNCONTROLLED EXIT BY THE SPRING FROM THE SECOND STAGE CASE.

WARNING!

DISASSEMBLING THE COVER ASSEMBLY (39) TO CLEAN THE COMPONENT PARTS (PURGE BUTTON, SPRING, AND DECAL) CAN CAUSE IRREPARABLE DAMAGE TO THE PARTS AND IS USUALLY UNNECESSARY. THE COVER ASSEMBLY CAN BE CLEANED WITH A NYLON BRUSH AND MILD DETERGENT SOLUTION. IF CLEANING DOES NOT REMOVE ALL DIRT AND ENCRUSTED MATERIAL, OR IF PURGE BUTTON MOVEMENT IS RESTRICTED IT IS RECOMMENDED THAT THE COVER ASSEMBLY BE REPLACED.

12 - 13 - 14

12. Remove the Poppet Body (30) and Poppet Spring (31) from the Second Stage Case.
13. Remove The Rubber Seat (47) from the Poppet Body (30).
14. Remove the Exhaust Valve (40).
15. Using a 4mm Allen wrench, remove the LP Plug (20) from the Second Stage Case (32) and remove the O-ring (19) from the Plug.

15

ABYSS. INSPECTION AND CLEANING

Reusable Rubber and Plastic Components

Inspection

Inspect all reusable rubber and plastic components for excessive wear and/or damage. Replace parts as necessary.

Cleaning

Clean all rubber and plastic components by washing them in a mixture of warm water and mild detergent. If necessary, scrub parts with a soft brush. Do not use abrasive cleaners, solvents or acids on rubber components.

WARNING!

SOLVENTS AND ACIDS MAY DAMAGE PLASTIC AND RUBBER PARTS. BEFORE CLEANING METAL COMPONENTS, MAKE SURE THAT ALL RUBBER AND PLASTIC PARTS HAVE BEEN REMOVED.

Metal Components

Inspection

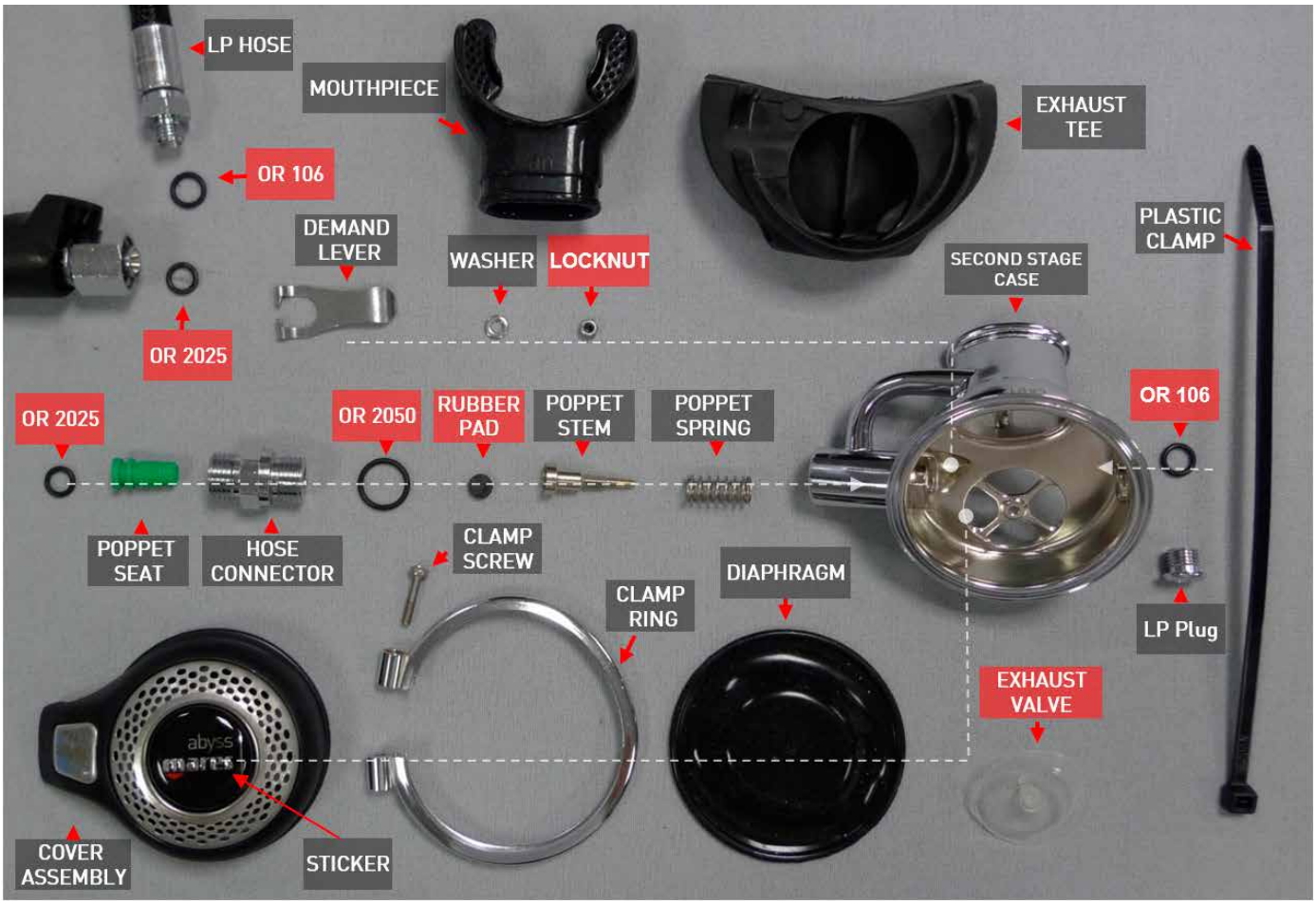
Inspect all parts for excessive wear and/or damage. Replace parts as necessary.

Cleaning

Chrome plated, brass, and stainless steel parts are cleaned by immersing them in an ultrasonic cleaner containing a de-scaling agent such as Deox Extra or a solution of white vinegar diluted with hot water. A nylon brush may be used to remove any stubborn deposits.

Be sure to rinse all parts in fresh water and allow to completely dry before proceeding with reassembly.

ABYSS. SECOND STAGE SERVICE KIT



Some key components of the Second Stage should be replaced during the overhaul. These key parts are included in the Abyss Second Stage Service Kit (Code 46186160 – 46185166 Viton) and are identified in the RED BOXES above.

SERVICE KIT # 46186160 - # 46185166 Viton

ABYSS. REASSEMBLY

NOTE

Lubrication reduces the likelihood of damage during reassembly. Before beginning the reassembly procedure, lightly lubricate all O-rings with a high quality silicone grease.

16. Carefully install a new Exhaust Valve (40) by gently pulling the silicone valve stem through the hole of the Second Stage exhaust valve opening.

WARNING!

PULLING TOO HARD ON THE STEM MAY CAUSE DAMAGE TO THE EXHAUST VALVE.

17. Use cutting nippers to cut the end section of the Exhaust Valve (40) stem at approximately half it's length.
18. Insert the Rubber Seat (47) in the Second Stage Poppet Body (30).
19. Place the Poppet Spring (31) onto the Poppet Body (30). Place the assembly on the special Tool (B-6) as illustrated.
20. Insert the assembled Poppet Stem and Spring into the Hose Connector opening of the Second Stage Case as illustrated. Press down on the Case to put pressure on the Poppet Spring (31).

NOTE

To correctly position the Poppet Body (30), slightly rotate the Case (32) left and right until it seats in its proper position.

19

20

ABYSS. REASSEMBLY

21. Correctly position the Demand Lever (35) in the groove of the Second Stage Case (32). Place the Demand Lever Washer (34) on the Poppet Stem and attach the Demand Lever Locknut (33) to the Stem. Using the special 5.5mm wrench (B-12), tighten the Locknut (33) 5 - 6 full turns of the wrench.

21 a

WARNING!

DEMAND LEVER (35) HEIGHT ADJUSTMENT REQUIRES THE USE OF SPECIAL TOOL B-12 (TYPE BETA 942BX5.5) OR A WRENCH WITH A HEAD DIAMETER OF NO MORE THAN 8.2MM /0.32 INCH.

NOTE

Do not over-tighten the Demand Lever Locknut (33). Doing so may result in a Second Stage free flow, which can interfere with the Intermediate Pressure adjustment procedure.

21 a

NOTE

Before continuing the reassembly procedure, press and release the Demand Lever few times to verify that it moves freely.

22. Install the O-ring (29) on the Hose Connector (28) opening of the Case. Use the large end of the Special Tool (B-6) to seat the O-ring.

23. Install the O-ring (27) on the Poppet Seat (21). Insert the Poppet Seat into the Hose Connector (28).

24. Using the 5mm hex wrench (B-4), screw the poppet seat (21) all the way into the Hose Connector (28) until it stops (Do not over tighten). Loosen (turn counter clockwise) the Poppet Seat 4 full turns or until it extends about 2.5~mm (x) from the Hose Connector.

24

ABYSS. REASSEMBLY

25. Insert the Hose Connector (28) into the Second Stage Case and tighten with the 17mm wrench (B-17).

25 a

25 b

NOTE

To avoid any possible issue during the disassembly procedures, put a small quantity of silicone grease on the O-ring side threads of the Hose Connector (28).

NOTE

If Using a Torque Wrench to tighten the Hose Connector (28), use a tightening torque of approximately 6 ft*lbf / 8 Nm.

26. Install the O-ring (27) in the Second Stage end of the LP Hose (26) and the O-Ring (19) in the First Stage end of the Hose.

27. Using two wrenches (B-17), connect the LP Hose (26) to the Hose Connector (28).

WARNING!

MAKE SURE THE HOSE CONNECTOR IS SECURELY TIGHTENED BEFORE CONNECTING THE LP HOSE. FAILURE TO DO SO, MAY RESULT IN THE HOSE CONNECTOR DISCONNECTING FROM THE SECOND STAGE CASE DURING USE.

28. Connect the LP Hose (26) with the Second Stage attached (without the Second Stage cover installed) to the First Stage LP Port marked DFC.

NOTE

If Using a Torque Wrench to tighten the LP Hose, use a tightening torque of approximately 3-3.5 ft*lbf / 4-4,5 Nm.

WARNING!

BEFORE GOING AHEAD WITH THE REASSEMBLYING PROCEDURES, SET THE INTERMEDIATE PRESSURE AS DESCRIBED IN THE FIRST STAGE SERVICE MANUAL.

WARNING!

ALL THE ADJUSTMENTS BELOW MUST BE MADE WITH THE SECOND STAGE CONSISTENTLY SUPPLIED WITH THE CORRECT INTERMEDIATE PRESSURE (IP).

ABYSS. REASSEMBLY

WARNING!

THE FIRST STAGE INTERMEDIATE PRESSURE MUST BE MEASURED WHEN THERE IS NO AIR COMING OUT OF THE SECOND STAGE. FOR ANY NECESSARY FIRST STAGE ADJUSTMENTS, REFER TO THE CORRESPONDING MANUAL.

WARNING!

HOLDING DOWN THE SECOND STAGE DEMAND LEVER, SLOWLY OPEN THE TANK VALVE AND, ALMOST SIMULTANEOUSLY, RELEASE THE DEMAND LEVER.

29. Insert the Diaphragm (36) into the Second Stage Case with the metal disk in contact with the Demand Lever.
30. Correctly Place the Cover Assembly (39) over the Diaphragm and on the Second Stage Case.
31. Orient the Ring Clamp (37) so that the Clamp Screw (38) opening faces up.
32. Tighten the Clamp Screw (38).
33. Insert the B12 wrench through the adjusting hole in the Second Stage Case and secure it to the Demand Lever Locknut. Tighten or loosen the Demand Lever Locknut (32) to properly adjust the Demand Lever (35).

NOTE

The Demand Lever is adjusted correctly when the Lever is slightly loose, and air begins to flow when the purge button is depressed about 2mm. A tapping sound of the demand lever touching the metal disk of the Second Stage Diaphragm should be audible when the pressurized Second Stage is shaken vigorously up and down.

34. Install the O-ring (19) on the LP plug (20).
35. Install the O-ring the LP plug (20) on the Second Stage Case (32).
36. Install the Exhaust Tee (41) on the exhaust tee support flange of the Second Stage.

NOTE

Place the Exhaust Tee in hot water for approximately 1 minute to make installation easier.

29

31

32

33

ABYSS. ADJUSTMENT

37. Recheck the Intermediate Pressure (9.8-10.2 bar/ 142-148 psi).

38. Attach the Second Stage to a test bench or a Magnehelic gauge.

39. Measure the Second Stage Cracking Effort.

WARNING!

THE CRACKING EFFORT MUST BE READ THE MOMENT THE INTERMEDIATE PRESSURE STARTS TO DECREASE.

	Test Bench cm /H_2O	Test Bench Inch/H_2O	Magnehelic gauge Inches	Magnehelic gauge cm
Abyss	2.8 - 3.3	1.1 - 1.3	2.8 - 3.3	1.1 - 1.3
Abyss Oct.	3.5 – 4.1	1.4 -1.6	3.5 – 4.1	1.4 -1.6

WARNING!

SOME TEST BENCHES REQUIRE THAT THE UP AND DOWN VALUES OF WATER COLUMN BE ADDED TO ARRIVE AT THE SUM TOTAL CM OR INCH/H_2O (EG. 1.5 CM +1.5 CM =3). OR, IN SOME CASES, THE CM OR INCH/H_2O OF WATER COLUMN IS ALREADY TOTALED (E.G. 1 REAL CM = 2 ON GRADUATION OF COLUMN WATER. THIS IS NOT AN ISSUE IF USING A MAGNEHELIC GAUGE.
PLEASE THE SPECS. OF YOUR TEST BENCH.

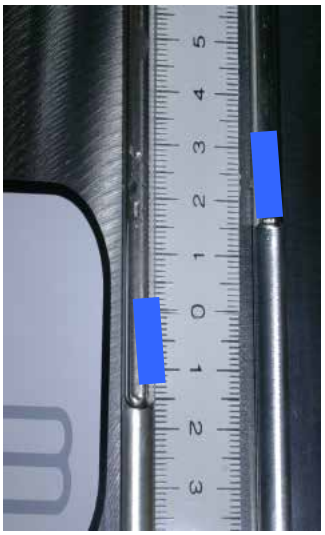
40. If the Cracking Effort is outside of the acceptable range, proceed as described below:

    40.1 Move the Second Stage side Hose Protector (46). Using two wrenches (B-17), unscrew the Hose (26) from the Hose Connector (28).

    40.2 If the Cracking Effort value is lower than the acceptable range, screw in the Poppet Seat (21), a ¼ turn at the time till the value is correct.

MAGNEHELIC GAUGE

TEST BENCH



ABYSS. ADJUSTMENT

40.3 If the Cracking Effort value is higher than the acceptable range, unscrew the Poppet Seat (21), a ¼ turn at the time till the value is correct.

40.4 Using two wrenches (B-17), connect the LP Hose (15) to the Hose Connector (14).

40.5 Put the Hose Protector (46) in place.

40.6 Check and adjust the height of the lever as described at point 35.

40.7 Measure the Second Stage Cracking Effort.

NOTE

FOLLOW THE STEPS DESCRIBED AT POINT 42 UNTILL THE ACCEPTABLE RANGE OF VALUE IS REACHED.

41. Shut off the HP air supply and purge all residual air.

42. Attempt to inhale directly from the Second Stage mouthpiece in order to detect any air leakeage from inside of the case.

ABYSS. REASSEMBLY

43. Carefully assemble the Mouthpiece (44), securing it with a new Mouthpiece Clamp (43).

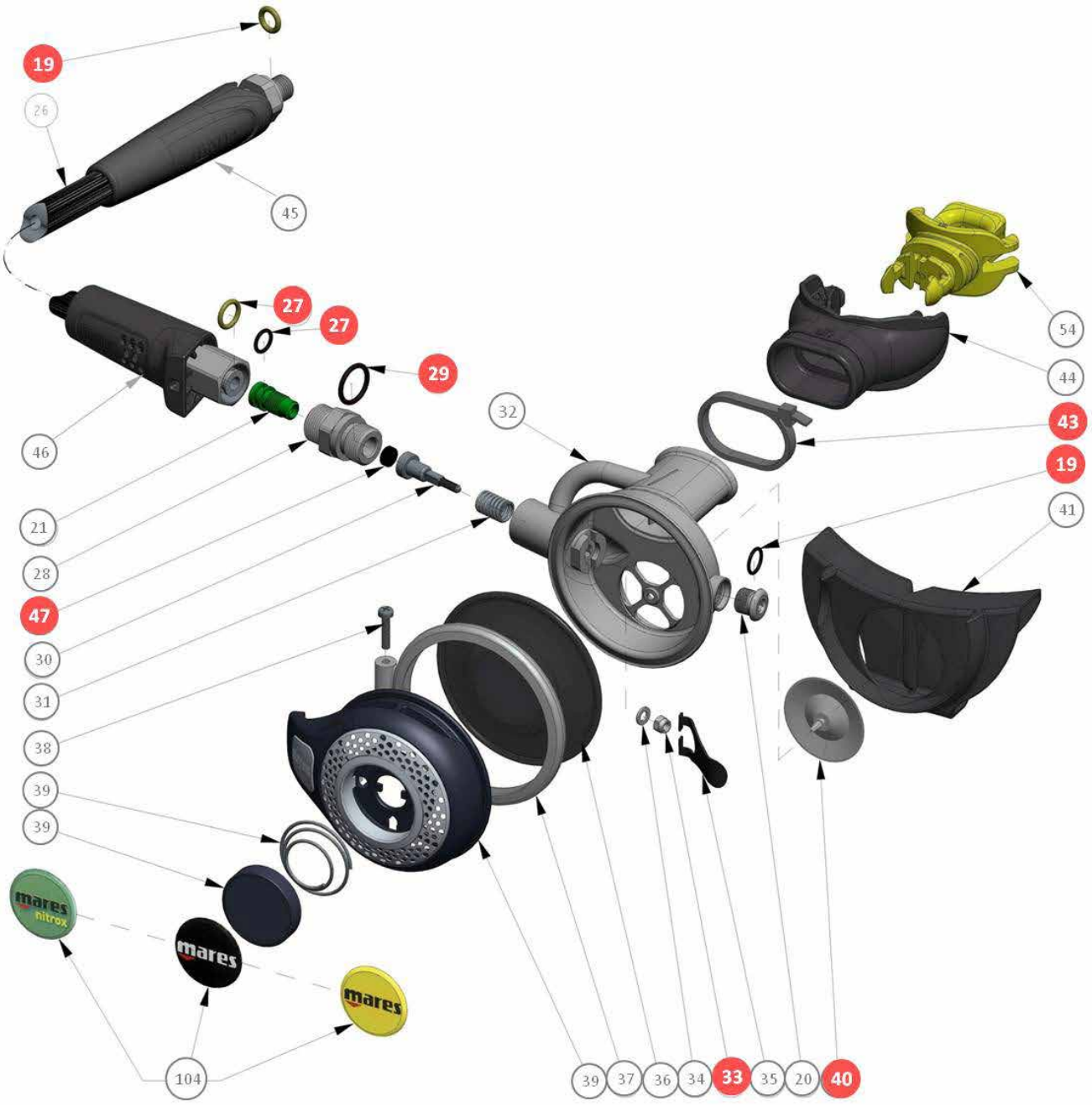
ABYSS. TROUBLESHOOTING

Problem	Probable Cause	Solution
Continuous or intermittent air flow from the Second Stage	Rubber Seat (47) Damaged	Replace Rubber Seat
	Sealing surface of the Poppet Seat (21) is dirty or damaged	Clean or replace Poppet Seat
	IP exceeds acceptable range	Adjust IP to (9.8 – 10.2 bar) (142 – 148 psi) Or Cold Water Kit (8.7 – 9.4 bar) (127 – 136 psi)
	Demand Lever set too high	Adjust to correct height
	Poppet Spring (31) out of position or damaged	Position correctly or replace
	Incorrect Poppet Seat (21) adjustment (too low)	Adjust to 4 ½ Turns/2,5mm
Cracking Pressure higher than acceptable range	Demand Lever set too low	Adjust to correct height
	IP outside of acceptable range	Adjust IP to (9.8 – 10.2 bar) (142 – 148 psi) Or Cold Water Kit (8.7 – 9.4 bar) (127 – 136 psi)
	Tank valve not fully opened	Completely open the tank valve
	Second Stage Poppet Spring deformed or damaged	Replace Poppet Spring
	First Stage filter clogged	Overhaul First Stage and replace filter
	Incorrect Poppet Seat (21) adjustment (too high)	Adjust to 4 ½ Turns/2,5mm
	High Poppet Spring tension	Replace Poppet Spring

ABYSS. TROUBLESHOOTING

Problem	Probable Cause	Solution
Cracking Pressure lower than acceptable range	IP outside of acceptable range	Adjust IP to (9.8 – 10.2 bar) (142 – 148 psi) Or Cold Water Kit (8.7 – 9.4 bar) (127 – 136 psi)
	Second Stage Poppet Spring deformed or damaged	Replace Poppet Spring
	Demand Lever set too high	Adjust to correct height
	Incorrect Poppet Seat (21) adjustment (too low)	Adjust to 4 ½ Turns/2,5mm
Traces of water inside Second Stage	Ring Clamp (37) loose or damaged	Tighten or replace
	Exhaust Valve support dirty	Clean support
	Exhaust Valve (40) damaged	Replace Exhaust Valve
	Diaphragm (36) dirty, damaged, or incorectly positioned	Clean, position correctly or replace
	Mouthpiece (44) loose or damaged	Replace the clamp; replace mouthpiece
Vibration sound from Second Stage during inhalation	Diaphragm (36) incorrectly positioned	Check and position correctly
	Incorrect Demand lever adjustment	Check and adjust correctly
	Poppet Spring (31) damaged or incorreclty positioned	Check and Position correctly or replace

ABYSS. DRAWING E 39 Updated: 20/12/2013



FUSION
SECOND STAGE

BTM 25_R1

REGULATOR SERVICE GUIDELINE AND SERVICE INTERVALS

OCT. 27, 2015

Mares has revised the regulator service guidelines and service intervals. The new guidelines and intervals apply to all **in-line Mares diaphragm regulators** as of **September 1st 2015, except for the Abyss 22 NAVY II** regulator and octopus as noted below.

MARES REGULATOR SERVICE GUIDELINES AND SERVICE INTERVALS

PERFORM AN ANNUAL INSPECTION AND/OR SERVICE EVERY YEAR OR 100 DIVES

The Mares annual regulator inspection and/or service is performed by following the procedures and guidelines outlined on the annual inspection and/or service checklist (see attached). The results of the inspection may require a complete regulator overhaul.

A COMPLETE REGULATOR OVERHAUL MUST BE PERFORMED EVERY TWO YEARS OR 200 DIVES

A complete regulator overhaul must be performed per specifications every two years as outlined in the Mares Service Manual. This requires, at minimum, replacing all parts included in the service kit. Please see the annual regulator inspection and/or service checklist for details.

MARES ABYSS 22 NAVY II REGULATOR AND OCTOPUS

SERVICE PROCEDURES AND INTERVALS

Service procedures and intervals for the Abyss 22 Navy II Regulator and Octopus are different than those described above due to US Navy testing protocols. Below are the Service Guidelines for the Abyss 22 Navy II Regulator and Octopus:

Every Year or 100 Hours of use:
Mares recommends a complete overhaul every year or 100 hours of use.

Mares recommends the 1st Stage Tri-material Poppet be replaced every two years or 200 hours of use, OR when signs of wear are present.

NOTE

The ACT Poppet (Code #46201361) SHOULD NOT BE USED in the Abyss 22 Navy II 1st Stage. Abyss 22 Navy II Service Guidelines REQUIRE the use of the Tri-material Poppet (Code #46201132) in the 1st stage in order to conform to US Navy testing protocols. The Tri-material Poppet is NOT included in the Abyss 22 Navy II 1st Stage Service Kit. When ordering Abyss 22 Navy II 1st Stage service kits, please order the Tri-material Poppet as a separate line item.

IMPORTANT

All service and repair procedures on Mares products should performed by qualified Mares Service Technicians at authorized Mares Dealers and Service Centers. Service Technicians should have the Mares Service Manual and Spare Parts Catalog readily available for reference while performing service procedures and closely follow the recommended procedures and guidelines outlined in these materials.

ANNUAL REGULATOR INSPECTION CHECKLIST

OCT. 27, 2015

Date...../...../..... Make / Model ..... Serial #.....

Customer Name..... Purchase Date..... / ...../.....

TEST 1	**Inspect Filter**	□ Pass	□ Fail
	Check for debris or discoloration.		
TEST 2	**Inspect HP Chamber area**	□ Pass	□ Fail
	Inspect for dirty, rust, or corrosion.		
TEST 3	**Hose Inspection**	□ Pass	□ Fail
	Pull back hose protectors. Check that the hoses are secure in the hose crimp.		
TEST 4	**Inspect 2nd Stage Exhaust Valve**	□ Pass	□ Fail
	Check valve and sealing surface for cleanliness, shape, and seal.		
TEST 5	**Inspect Mouthpiece**	□ Pass	□ Fail
	Inspect for tears, cracks or holes. Replace if necessary.		
TEST 6	**2nd Stage Diaphragm Inspection**	□ Pass	□ Fail
	Attempt inhalation without pressurization. Check for perfect seal.		
TEST 7	**Intermediate Pressure Check**	□ Pass	□ Fail
	Check for stable IP. IP must be within acceptable range per Service manual.		
TEST 8	**Cracking Effort**	□ Pass	□ Fail
	Check CE. CE must be within acceptable range per Service Manual.		
TEST 9	**Pressurized Immersion test**	□ Pass	□ Fail
	Pressurize and immerse unit. Test for any leaks.		

IMPORTANT

1. **If the regulator fails Checklist Item 1, 2 or 9:**
   A complete Regulator Overhaul is required
2. **If the regulator fails Checklist Item 7 or 8:**
   If the regulator can be adjusted within specification, it passes. If not, a Complete Overhaul is required
3. **If the regulator fails Checklist Item 3, 4, 5,or 6:**
   The defective parts associated with the Checklist Item may be replaced,
   OR A Complete Regulator Overhaul maybe performed

IMPORTANT

All service and repair procedures on Mares products should performed by qualified Mares Service Technicians at authorized Mares Dealers and Service Centers. Service Technicians should have the Mares Service Manual and Spare Parts Catalog readily available for reference while performing service procedures and closely follow the recommended procedures and guidelines outlined in these materials.

FUSION. REQUIRED TOOLS AND SUPPLIES

Tool	Description	#Code
	Hex 1,5mm	No code
	B-22	46106222
	Hex 4mm	No code
	B-6	46106206
	B-17 (17mm)	46106217
	B-43	46201360

Tool	Description	#Code
	B-18 (14mm)	46106218
	B-4 (5mm)	46106204
	Pliers (type Usag 133)	
	B-12	46106212
	B-8 (6mm)	46106208
	O-Ring removal Tool	46201387

- Compressed air supply circuit or tank (2600-2900 PSI/ 185-200 bar)
- Compressed air gun (120-145 PSI/8-10 bar)
- Ultrasonic cleaner & Descaling solution (e.g. Deox Extra type) or similar
- Test Bench (#416920) or Magnehelic gauge and Intermediate Pressure Gauge (46106252)
- Christo-Lube MCG 111 Lubrication Technology or equal
- Neoprene Workpad (449822)
- Second Stage service kit # 46201337
- Nylon brush
- Phillips screwdriver (Usag 326 PH 0) or similar
- Nippers

FUSION. DISASSEMBLY

NOTE

The Fusion Service Manual, should be readily available for reference while performing all maintenance and/or service procedures.

1. Remove the Dust Cap and move the hose cover away from the First Stage. Unscrew the Hose (15) using a 14-mm wrench (B18).
2. Using cutting nippers (or pliers), cut the Mouthpiece Clamp (43) and remove the Mouthpiece (44).

NOTE

Take special care to avoid breaking the Mouthpiece.

3. Remove the Exhaust Tee (1) and the Exhaust Valve (40).
4. Using a 1,5mm Allen wrench, remove the Setscrew (25).
5. Unscrew the Hose Protector.
6. Using two 17mm wrenches (B-17) remove the Hose (15) from the Second Stage Hose Connector (14).
7. Remove the O-rings (20 – 27) from each end of the Hose (15).
8. Remove the Hose Connector (14) from the Second Stage using the 17mm wrench (B17).
9. Using the hex wrench (B-4), remove the Poppet Seat (21) from the Hose Connector (14). Remove the O-ring (28) from the Poppet Seat (21).
10. Remove the Flex Ring and the ADJ VAD Knob from the Second Stage, and the O-ring (29) from the Case (16).
11. Using the special Tool (B22), extract the Pin 2X28 (23), and remove it with a pliers.
12. Press down the purge button, raise the Cover (C) from the by.-pass side, and remove it.

4


5

6

8

10

11.a


11.b


12

FUSION. DISASSEMBLY

WARNING!

DISASSEMBLING THE COVER ASSEMBLY AND PURGE BUTTON TO CLEAN THE COMPONENT PARTS (PURGE BUTTON, SPRING, AND DECAL) CAN CAUSE IRREPARABLE DAMAGE TO THE PARTS AND IS USUALLY UNNECESSARY. THE COVER ASSEMBLY AND PURGE BUTTON CAN BE CLEANED WITH A NYLON BRUSH AND MILD DETERGENT SOLUTION. IF CLEANING DOES NOT REMOVE ALL DIRT AND ENCRUSTED MATERIAL, OR IF PURGE BUTTON MOVEMENT IS RESTRICTED, IT HAS TO BE REPLACED.

13. Remove the Jaw Cover (2), by pulling it as shown in the picture. You can move one side of the Jaw Cover by using a small flat screwdriver.
14. Remove the Safety Pin Cover (63).
15. Using the special Tool (B43), unscrew and remove the Purge Button (B).
16. Remove the Diaphragm (36) and the Diaphragm Ring (78).
17. Remove the Second Stage Adjustment plug (64). Remove the O-ring (30) from the Second Stage Adjustment plug (64).
18. Position the Special Tool (B-6) through the opening in the Second Stage Case (16) and on the Poppet Body as illustrated. Press down on the Case to put pressure on the Poppet Spring (31) and relieve the tension on the Demand Lever Locknut (33). While continuing to press down, use the special 5.5mm wrench (B-12) to remove the Locknut (33); then remove the Washer (34), and the Demand Lever (35).

WARNING!

AFTER REMOVING LOCKNUT, WASHER, AND DEMAND LEVER, SLOWLY RELEASE THE PRESSURE ON THE POPPET SPRING WHILE COVERING IT WITH YOUR HAND. THIS WILL PREVENT AN UNCONTROLLED EXIT BY THE SPRING FROM THE SECOND STAGE CASE.

13

15

18

FUSION. DISASSEMBLY

19. Remove The Rubber Seat (47) from the Poppet body (32).

NOTE

It's not necessary to remove the Stick-on label (A). It can be left on the case during the cleaning operation. Be careful in case you decide to remove it, since you could break it.

FUSION. INSPECTION AND CLEANING

Reusable Rubber and Plastic Components

Inspection

Inspect all reusable rubber and plastic components for excessive wear and/or damage. Replace parts as necessary.

Cleaning

Clean all rubber and plastic components by washing them in a mixture of warm water and mild detergent. If necessary, scrub parts with a soft brush. Do not use abrasive cleaners, solvents or acids on rubber components.

WARNING!

SOLVENTS AND ACIDS MAY DAMAGE PLASTIC AND RUBBER PARTS. BEFORE CLEANING METAL COMPONENTS, MAKE SURE THAT ALL RUBBER AND PLASTIC PARTS HAVE BEEN REMOVED.

Metal Components

Inspection

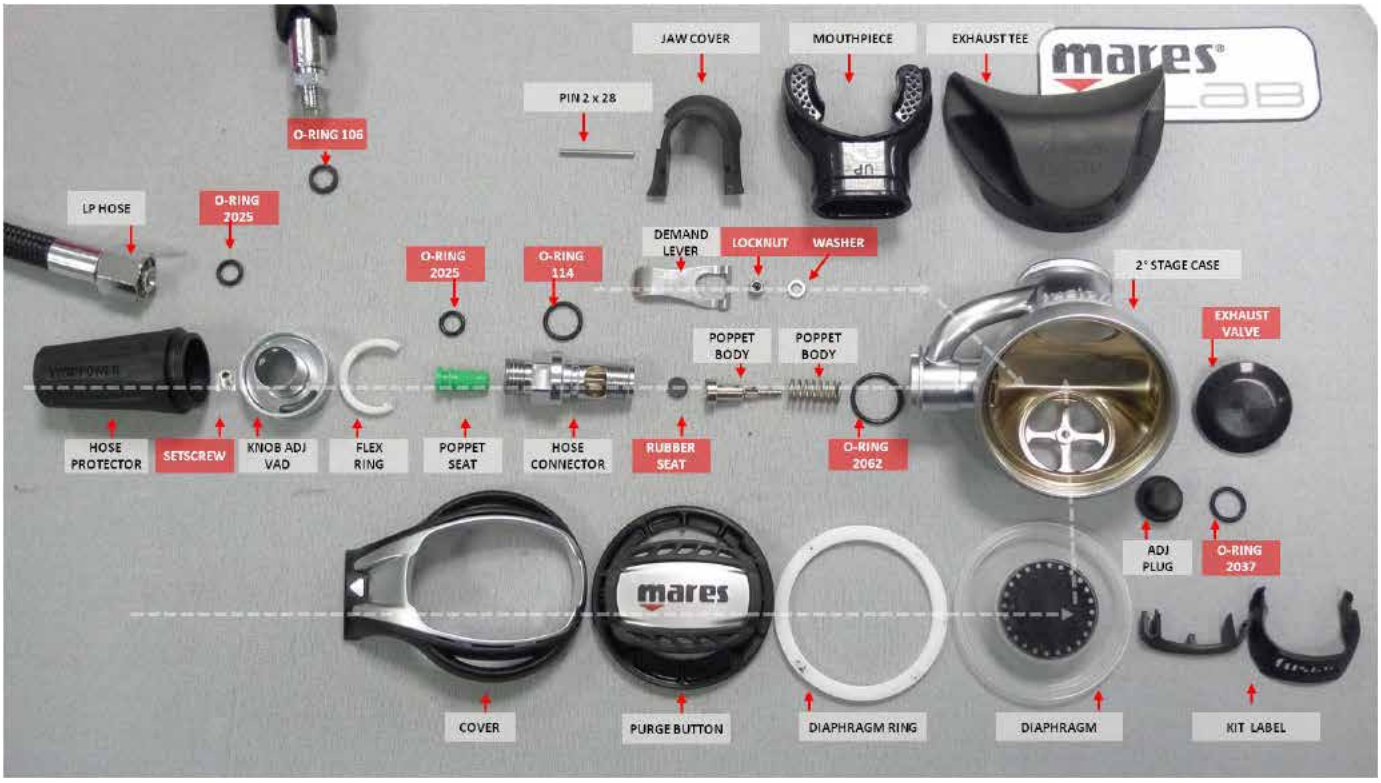
Inspect all parts for excessive wear and/or damage. Replace parts as necessary.

Cleaning

Chrome plated, brass, and stainless steel parts are cleaned by immersing them in an ultrasonic cleaner containing a de-scaling agent such as Deox Extra or a solution of white vinegar diluted with hot water. A nylon brush may be used to remove any stubborn deposits.

Be sure to rinse all parts in fresh water and allow to completely dry before proceeding with reassembly.

FUSION. GENERAL INFORMATION



Certain key components of the Second Stage should be replaced during the overhaul. These key parts are included in the Fusion Second Stage Service Kit (Code 46201337) and are identified in the RED BOXES above.

SERVICE KIT # 46201337

FUSION. REASSEMBLY

NOTE

Lubrication reduces the likelihood of damage during reassembly. Before beginning the reassembly procedure, lightly lubricate all O-rings with a high quality silicone grease.

20. Carefully install a new Exhaust Valve (40) by gently pulling the silicone valve Body through the hole of the Second Stage exhaust valve opening.

20

WARNING!

PULLING TOO HARD ON THE Body MAY CAUSE DAMAGE TO THE EXHAUST VALVE.

21. Use cutting nippers to cut the end section of the Exhaust Valve (40) Body at approximately half it's length.
22. Insert the Rubber Seat Holder (47) on the Second Stage Poppet Body (32).
23. Place the Poppet Spring (31) onto the Poppet Body (32). Place the assembly on the special Tool (B-6) as illustrated.
24. Insert the assembled Poppet Body and Spring into the Hose Connector opening of the Second Stage case as illustrated. Press down on the Case to put pressure on the Poppet Spring (31).

23

WARNING!

TO CORRECTLY POSITION THE POPPET BODY (30), SLIGHTLY ROTATE THE CASE (16) LEFT AND RIGHT UNTIL IT SEATS IN ITS PROPER POSITION.

24 - 25

FUSION. REASSEMBLY

25. Correctly position the Demand Lever (35) in the groove of the Second Stage Case (16). Place the Demand Lever Washer (34) on the Poppet Body and attach the Demand Lever Locknut (33) to the Body. Using the special 5.5mm wrench (B-12), tighten the Locknut (33) 5 - 6 full turns of the wrench.

Option a 24 - 25

WARNING!

DEMAND LEVER (35) HEIGHT ADJUSTMENT REQUIRES THE USE OF SPECIAL TOOL B-12 (TYPE BETA 942BX5.5) OR A WRENCH WITH A HEAD DIAMETER OF NO MORE THAN 8.2MM /0.32 INCH.

WARNING!

DO NOT OVER-TIGHTEN THE DEMAND LEVER LOCKNUT (33). DOING SO MAY RESULT IN A SECOND STAGE FREE FLOW, WHICH CAN INTERFERE WITH THE INTERMEDIATE PRESSURE ADJUSTMENT PROCEDURE.

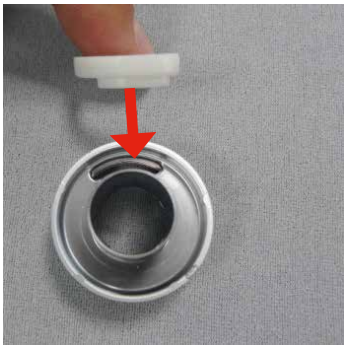
Option b 29 a

26. Install the O-ring (29) on the Hose Connector opening of the Case.

27. Install the O-ring (27) on the Poppet Seat (21). Insert the Poppet Seat into the Hose Connector (14).

28. Using the 5mm hex wrench (B-4), screw the poppet seat (21) all the way into the Hose Connector (14) until it stops (Do not over tighten). Loosen (turn counter clockwise) the Poppet Seat 5 1/2 turns (main Second Stage) or 5 turns (Octopus version).

29. Install the Flex Ring (3) on the Hose Connector opening following one of the two steps described below



29 b1

Option a – Install the Flex Ring (3) on the Hose Connector as shown in the picture

Option b – Install the Flex Ring (3) inside the ADJ VAD Knob (11)

30. Install and press down the ADJ VAD Knob (11) in the Hose Connector opening as shown in the picture, lining up the VAD hole with the by-pass.

29 b2

29 b3

FUSION. REASSEMBLY

31. Insert the Hose Connector (14) into the Second Stage Case and tighten with the 17mm wrench (B-17).

30

NOTE

To avoid any possible issue during the disassembly procedures, put a small quantity of silicone grease on the O-ring side threads of the Hose Connector (28).

NOTE

If using a torque wrench, use a tightening torque of approximately 8 Nm/ 6 ft*lbf.

32. Install the O-ring (27) in the Second Stage end of the LP Hose (15) and the O-Ring (20) in the First Stage end of the Hose.

33. Using two wrenches (B-17), connect the LP Hose (15) to the Hose Connector (14).

34

WARNING!

MAKE SURE THE HOSE CONNECTOR IS SECURELY TIGHTENED BEFORE CONNECTING THE HOSE PROTECTOR TO THE ADJUSTABLE VAD KNOB. FAILURE TO DO SO, MAY RESULT IN THE HOSE CONNECTOR DISCONNECTING FROM THE SECOND STAGE CASE DURING USE.

34. Screw the Hose Protector to the ADJ VAD Knob (11) and Screw the Setscrew (25) into the Hose Protector.

35. Connect the LP Hose (26) with the Second Stage attached (without the Second Stage cover installed) to the First Stage LP Port marked DFC.

35

NOTE

If Using a Torque Wrench to tighten the LP Hose, use a tightening torque of approximately 3-3,5 ft*lbf / 4 *4,5 Nm.

WARNING!

BEFORE GOING AHEAD WITH THE REASSEMBLYING PROCEDURES, SET THE INTERMEDIATE PRESSURE AS DESCRIBED IN THE FIRST STAGE SERVICE MANUAL.

WARNING!

ALL THE ADJUSTMENTS BELOW MUST BE MADE WITH THE SECOND STAGE CONSISTENTLY SUPPLIED WITH THE CORRECT INTERMEDIATE PRESSURE (IP).

FUSION. REASSEMBLY

WARNING!

THE FIRST STAGE INTERMEDIATE PRESSURE MUST BE MEASURED WHEN THERE IS NO AIR COMING OUT OF THE SECOND STAGE. FOR ANY NECESSARY FIRST STAGE ADJUSTMENTS, REFER TO THE CORRESPONDING SECTION OF THE RELATED SERVICE MANUAL.

WARNING!

HOLDING DOWN THE SECOND STAGE DEMAND LEVER, SLOWLY OPEN THE TANK VALVE AND, ALMOST SIMULTANEOUSLY, RELEASE THE DEMAND LEVER.

36. Insert the Diaphragm (36) into the Second Stage Case with the Ring (78) already assembled, plastic disk in contact with the Demand Lever.

37. Using the special Tool (B43), assemble the Purge Button (B) on the Second Stage Case (16).

NOTE

The purge button (B) is correctly assembled when the groove of the special Tool (B43) is aligned with the safety pin hose (pic 37.-b).

NOTE

If you have troubles to align the Safety Pin seat with the hole in the Second Stage case, you can use the Special Tool B-41. it will help you to find the right alignment.

38. Insert the Safety Pin (63).

39. To assemble the Cover (C):

    39.1 Hold the Second Stage, with the hose on your right side.

    39.2 Press and hold down the Purge Button (B).

    39.3 Connect the left side of the Cover (C) to the Purge Button (B).

    39.4 Position the right side of the Cover (C) on the Second Stage Case (16).

36

37.a

37.b

39.3

39.4

FUSION. REASSEMBLY

40. Assemble the Jaw Cover (2) on the Second Sage Case (16) and secure it with the Pin (23).

40.a

NOTE

Insert the Pin (23) from the Exhaust Valve side of the Second Stage as shown in the pic. 40.b. A plier can be used to press it down for half of its length. Hold the other side of the Jaw Cover (2) to align the holes, and insert the Pin (23) entirely into its seat.


40.b

41. Insert the B12 wrench through the adjusting hole in the Second Stage Case and secure it to the Demand Lever Locknut. Tighten or loose the Demand Lever locknut (32) to properly adjust the Demand Lever (33).


41

WARNING!

THE DEMAND LEVER IS ADJUSTED CORRECTLY WHEN THE AIR BEGINS TO FLOW WHEN THE PURGE BUTTON IS DEPRESSED ABOUT 4MM. A SLIGHT TAPPING SOUND OF THE DEMAND LEVER TOUCHING THE METAL DISK OF THE SECONDSTAGE DIAPHRAGM SHOULD BE AUDIBLE WHEN THE PRESSURIZED SECOND STAGE IS SHAKEN VIGOROUSLY UP AND DOWN.

42. Press the purge button a few times, and then reassemble the O-Ring (30) on the Second Stage Adjustment Plug (64).

43. Use the hex wrench (B-8) to fully tighten the Second Stage Adjustment Plug (64) assembly in the Second Stage Case (16).

TEST BENCH

FUSION. ADJUSTMENT

44. Recheck Intermediate Pressure (9.8-10.2 bar/ 142-148 psi).

45. Attach the Second Stage to a test bench or a Magnehelic gauge.

46. Measure the Second Stage Cracking Effort.

TEST BENCH

WARNING!

THE CRACKING EFFORT MUST BE READ THE MOMENT THE INTERMEDIATE PRESSURE STARTS TO DECREASE.

FUSION. ADJUSTMENT

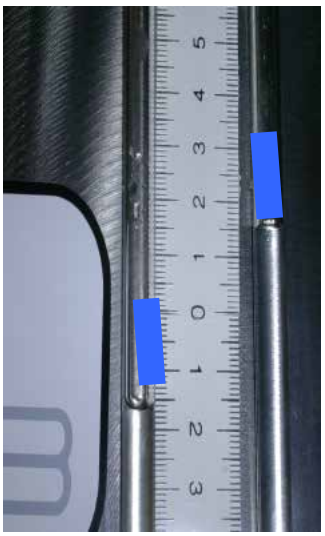
	Test Bench cm /H_2O	Test Bench Inch/H_2O	Magnehelic gauge Inches	Magnehelic gauge cm
Fusion	2.8 - 3.1	1.1 - 1.2	1.1 - 1.2	2.8 - 3.1
Oct. Fusion	3.5 - 3.8	1.4 -1.5	1.4 - 1.5	3.5 - 3.8

MAGNEHELIC GAUGE

WARNING!

SOME TEST BENCHES REQUIRE THAT THE UP AND DOWN VALUES OF WATER COLUMN BE ADDED TO ARRIVE AT THE SUM TOTAL CM OR INCH/H_2O (EG. 1.5 CM +1.5 CM =3). OR, IN SOME CASES, THE CM OR INCH/H_2O OF WATER COLUMN IS ALREADY TOTALED (E.G. 1 REAL CM = 2 ON GRADUATION OF COLUMN WATER. THIS IS NOT AN ISSUE IF USING A MAGNEHELIC GAUGE.
PLEASE THE SPECS. OF YOUR TEST BENCH.

TEST BENCH



47. If the Cracking Effort is outside of the acceptable range, proceed as described below:

    47.1 Using a 1,5mm Allen wrench, remove the Setscrew (25).

    47.2 Unscrew the Hose Protector (14).

    47.3 Using two 17mm wrenches (B-17) remove the Hose (15) from the Second Stage Hose Connector (14).

    47.4 If the Cracking Effort value is lower than the acceptable range, screw in the Poppet Seat (21), a ¼ turn at the time till the value is correct.

    47.5 If the Cracking Effort value is higher than the acceptable range, unscrew the Poppet Seat (21), a ¼ turn at the time till the value is correct.

FUSION. ADJUSTMENT

47.6 Using two wrenches (B-17), connect the LP Hose (15) to the Hose Connector (14).

47.7 Screw the Hose Protector to the ADJ VAD Knob (11).

47.8 Screw the Setscrew (25) into the Hose Protector.

47.9 Check and adjust the height of the lever as described at point 41.

47.10 Measure the Second Stage Cracking Effort.

NOTE

FOLLOW THE STEPS DESCRIBED AT POINT 47 UNTILL THE ACCEPTABLE RANGE OF VALUE IS REACHED.

48. Shut off the HP air supply and purge all residual air.

49. Inhale directly from the Second Stage Mouthpiece in order to detect any air leakage from inside of the case.

FUSION. REASSEMBLY

50. Assemble the Exhaust Tee (1) on the support flange on the Second Stage. The Exhaust Tee can be placed in hot water for approximately 1 minute to simplify installation.

51. Carefully assemble the Mouthpiece (44), securing it with a new Mouthpiece Clamp (43).

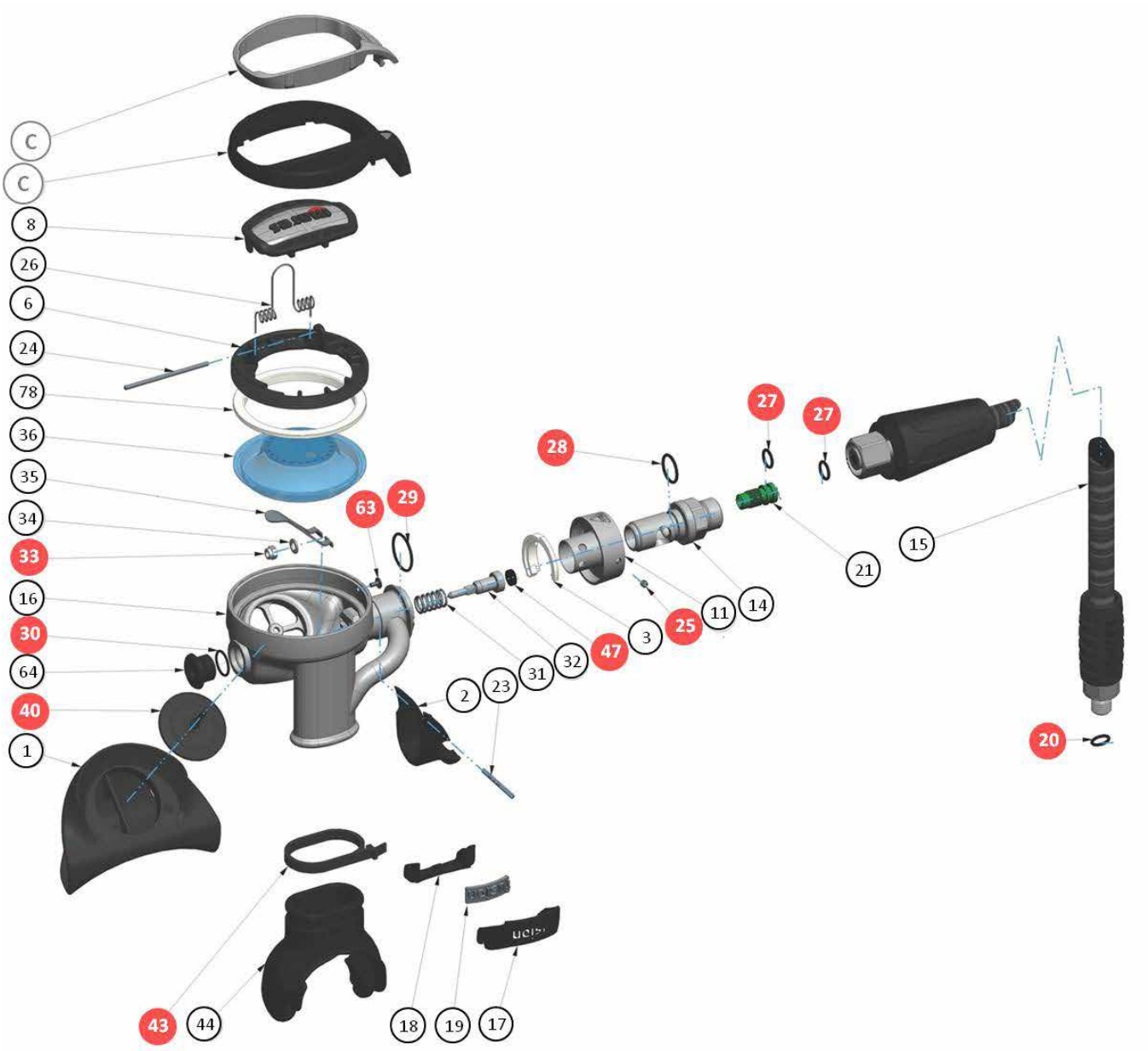
FUSION. TROUBLESHOOTING

Problem	Probable Cause	Solution
Continuous or intermittent air flow from the Second Stage	Rubber Seat (47) Damaged	Replace Rubber Seat
	Sealing surface of the Poppet Seat (21) is dirty or damaged	Clean or replace Poppet Seat
	IP exceeds acceptable range	Adjust IP to (9.8 – 10.2 bar) (142 – 148 psi) Or Cold Water Kit (8.7 – 9.4 bar) (127 – 136 psi)
	Demand Lever set too high	Adjust to correct height
	Poppet Spring (31) out of position or damaged	Position correctly or replace
	Incorrect Poppet Seat (21) adjustment (too low)	Readjust to 5 ½ turns
Cracking Pressure higher than acceptable range	Demand Lever set too low	Adjust to correct height
	IP outside of acceptable range	Adjust IP to (9.8 – 10.2 bar) (142 – 148 psi) Or Cold Water Kit (8.7 – 9.4 bar) (127 – 136 psi)
	Tank valve not fully opened	Completely open the tank valve
	Second Stage Poppet Spring deformed or damaged	Replace Poppet Spring
	First Stage filter clogged	Overhaul First Stage and replace filter
	Incorrect Poppet Seat (21) adjustment (too high)	Readjust to 5 ½ turns
	High Poppet Spring tension	Replace Poppet Spring

FUSION. TROUBLESHOOTING

Problem	Probable Cause	Solution
Cracking Pressure lower than acceptable range	IP outside of acceptable range	Adjust IP to (9.8 – 10.2 bar) (142 – 148 psi) Or Cold Water Kit (8.7 – 9.4 bar) (127 – 136 psi)
	Second Stage Poppet Spring deformed or damaged	Replace Poppet Spring
	Demand Lever set too high	Adjust to correct height
	Incorrect Poppet Seat (21) adjustment (too low)	Readjust to 5 ½ turns
Traces of water inside Second Stage	Ring Clamp (37) loose or damaged	Tighten or replace
	Exhaust Valve support dirty	Clean support
	Exhaust Valve (40) damaged	Replace Exhaust Valve
	Diaphragm (36) dirty, damaged, or incorectly positioned	Clean, position correctly or replace
	Mouthpiece (44) loose or damaged	Replace the clamp; replace mouthpiece
Vibration sound from Second Stage during inhalation	Diaphragm (36) incorrectly positioned	Check and position correctly
	Incorrect Demand lever adjustment	Check and adjust correctly
	Poppet Spring (31) damaged or incorreclty positioned	Check and Position correctly or replace

FUSION. DRAWING E 44 Updated: 20/12/2014



FUSION. CHART 134 Updated: 03/12/2015

CHART NO: 134		SECOND STAGE FUSION - OCTOPUS FUSION			UPDATED: 03/12/2015
REF	**CODE**	**DESCRIPTION**	**REF**	**CODE**	**DESCRIPTION**
1	46201309	EXHAUST TEE	33	46185051	LOCKNUT, DEMAND LEVER
2	46201310	JAW COVER, FUSION	34	46185049	WASHER, DEMAND LEVER
3	46201311	FLEX. RING	35	46200778	DEMAND LEVER
6	B	DIAPHRAGM HOLDER	36	46201364	DIAPHRAGM BLACK
8	B	PURGE BUTTON	40	46201194	EXHAUST VALVE, SECOND STAGE
9	C	COVER, FUSION	43	47157984	CLAMP MOUTHPIECE
10	C	FRAME COVER, FUSION	44	46200366	MOUTHPIECE BK
11	46201321	ADJ VAD KNOB	47	46184062	RUBBER SEAT SECOND STAGE
14	46201290	HOSE CONNECTOR FUSION	64	46200322	SECOND STAGE. ADJUSTMENT PLUG
15	46201379	LP HOSE 3/8" SFX black 75 cm WO/HOSE PROTECTOR	63	46184289	SAFETY PIN-COVER
15	46201381	LP HOSE 3/8" SFX yellow 100 cm WO/HOSE PROTECTOR	78	46200773	DIAPHRAGM RING
16	N/A	SECOND STAGE CASE	---	46201339	HOSE PROTECTOR SECOND STAGE
17	A			46201313	HOSE PROTECTOR SECOND STAGE OCTOPUS
18	A			46186190	OCTOPUS PLUG
19	A		**ASSEMBLIES**		
20	46110106	OR 106	A	46201353	KIT LABEL FUSION (17-18-19)
21	46200204	POPPET SEAT	B	46201352	PURGE BUTTON ASSEMBLY (6-8-24-26)
23	46201272	PIN 2x28	C	46201351	COVER ASSEMBLY (9-10)
24	B	PIN 2x45	---	46201337	SERVICE KIT SECOND STAGE FUSION
25	46201369	SETSCREW	---	46201254	OR 106 (10 PCS)
26	B	SPRING BUTTON	---	46201258	OR 2025 (10 PCS)
27	46110205	OR 2025	---	46200855	MOUTHPIECE BK (10 PCS)
28	46110114	OR 114	---	46201260	RUBBER SEAT SECOND STAGE (10 PCS)
29	46110220	OR 2062	---	46201264	LOCKNUT, DEMAND LEVER (10 PCS)
30	46110110	OR 2037	**NOTE**		
31	46201404	SPRING SECOND STAGE	Parts highlighted in red are included in the service kits 46201337		
32	46201338	POPPET BODY, FUSION			

ERGO LP INFLATOR

mares®

LP INFLATOR REMOVAL

1. Unscrew the rapid exhaust valve (RE) locking nut and remove the entire inflator system from the BC.
2. Remove the gasket from the BC collar.

DISASSEMBLY

1. Gently pry off the mouthpiece (61) (see numbered Ergo LP inflator diagram) using a slotted screwdriver.
2. Press the power inflate button (54). Insert a 1/8" pin punch into the small round hole near the manual quick disconnect (QD) fitting, then push the pin (53) until it comes out completely (Fig. 1).
3. Remove the inflate button (54) and 0-ring (55).
4. Remove 0-ring (55) from inflate button (54).
5. Remove spring (48).
6. Remove the valve holder unit by inserting flat-nose pliers into the notches of the valve holder (57). Pull the valve holder (57) straight out of the inflator body (Fig. 2 and 3).
7. Remove the two 0-rings (58) from the valve holder.
8. With suitable pliers, cut clamp (59) and remove the corrugated hose (60) from the inflator (46). By lightly clamping LP inflator (46) in a vice with plastic jaws, use two small screwdrivers to depress the two tabs on the anchoring bushing (47), then remove the anchoring bushing from the inflator body (Fig. 4).
9. Remove spring (48) from the anchoring bushing (47).
10. With special tool (P/N 106190 Fig. 5) or needle nose pliers, compress the deflate button retaining tabs and remove deflate button (52) from bushing (49) (Fig. 6).
11. Remove O-ring (50) from bushing (49).
12. Remove O-ring (5 1) from deflate button (52).
13. Remove the male QD cap (27) from the male QD (13) and using a 14 mm hex wrench, unscrew the male QD connector.
14. Remove O-ring (9) from the connector.
15. Remove the filter (22) from the inflator body.
16. Remove the male QD cap (27) and LP hose clip (62) from the corrugated hose (60) only if the male QD cap, LP hose clip or corrugated hose are to be replaced.
17. If the anchoring bushing (47), corrugated hose (60), RE valve plate (63) or actuating cable (66) are to be replaced, cut the cable near the anchoring bushing.

NOTE ONCE THE ACTUATING CABLE HAS BEEN CUT IT MUST BE REPLACED. THE ACTUATING CABLE SHOULD BE CUT ONLY IF THE ANCHORING BUSHING (47), CORRUGATED HOSE (60), RE VALVE PLATE (63) OR ACTUATING CABLE (66) ARE TO REPLACED.

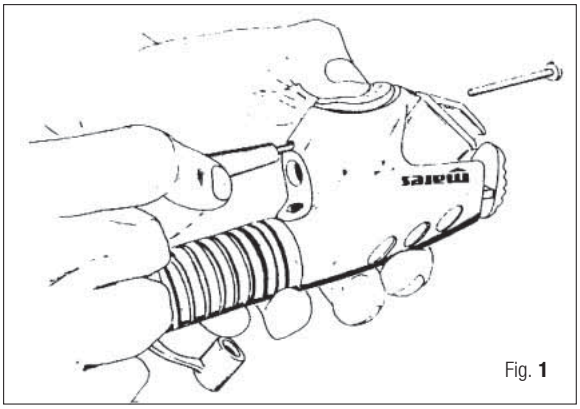


Fig. **1**

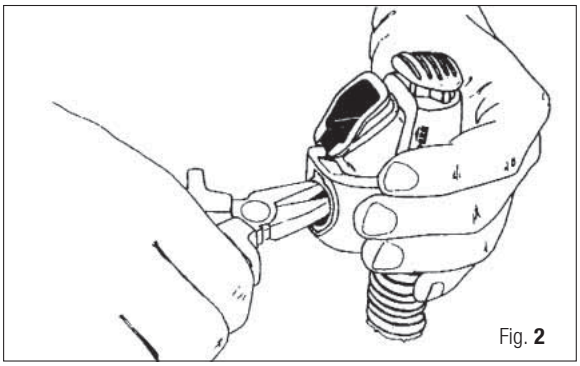


Fig. **2**

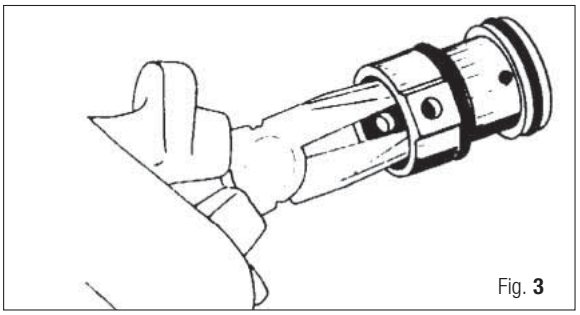


Fig. **3**

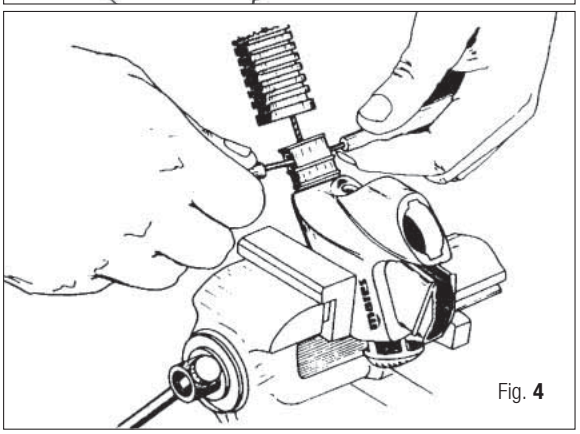


Fig. **4**

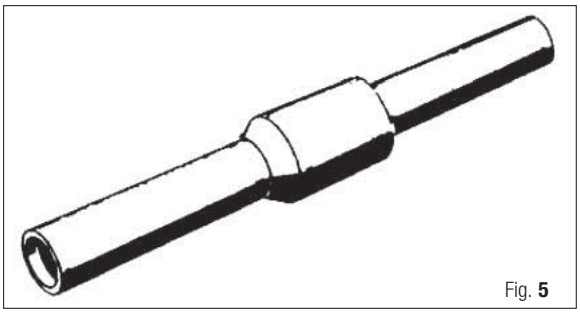


Fig. **5**

18. Remove anchoring bushing (47) from actuating cable (66).

19. With suitable pliers, cut clamp (59) and remove the corrugated hose (60) from the RE valve (F).

20. Unscrew the RE cap (69) and remove (Fig. 7).

21. Remove the exhaust diaphragm (6) and housing (7) from RE cap (69).

NOTE IT IS NOT NECESSARY TO REMOVE THE EXHAUST DIAPHRAGM (6) FROM THE HOUSING (7), UNLESS THE EXHAUST DIAPHRAGM OR HOUSING ARE TO BE REPLACED.

22. Remove gasket (67) from RE housing.

23. Remove the RE valve plate (63) from the RE housing and unthread the actuating cable (66), detaching it from RE valve plate (63).

24. Remove spring (64) from RE housing.

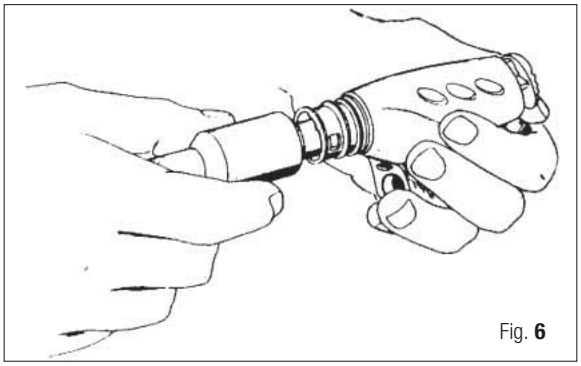


Fig. **6**

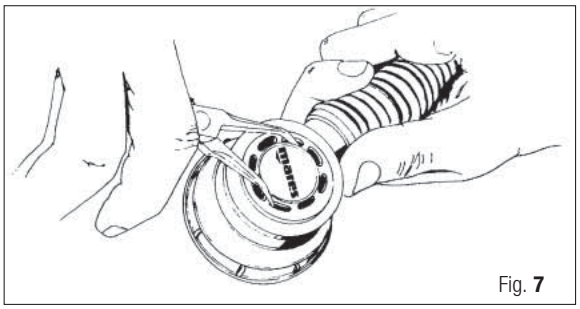


Fig. **7**

DISASSEMBLY RE VALVE 2K12

I. With suitable pliers, cut clamps (59) and remove the corrugated hose (60) from the RE valve (32).

II. Remove Spring Bearing(38) from RE valve body (32), using a small screwdriver.

III. Take the Gasket (34) out.

IV. Untie rope only in case Line(66) and/or Bushing (47) must be replace/s.


Photo 1

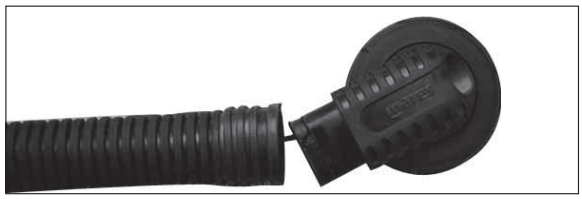


Photo 2

CLEANING

Cleaning requires all reusable rubber and plastic parts to be carefully cleaned by scrubbing with a soft brush in a mild detergent and water solution. Do not use solvents or acids on rubber or plastic parts. Metal parts should be cleaned in an ultrasonic cleaner with fresh water or a mild acid solution. (White vinegar diluted with warm water is recommended). Before reassembly make sure all parts have been carefully rinsed and dried.

WARNING!

ACIDS MAY CAUSE BURNS, OR SKIN, EYE OR RESPIRATORY IRRITATION. WHEN WORKING WITH ANY KIND OF ACID PROTECT EYES AND SKIN ADEQUATELY AND WORK IN A WELL VENTILATED AREA. ACIDS MAY DAMAGE RUBBER AND PLASTIC PARTS. BEFORE CLEANING METAL PARTS, MAKE SURE THAT ALL RUBBER AND PLASTIC PARTS HAVE BEEN REMOVED.

INSPECTION

The following components should be replaced during routine service.

Description	Part Number
Filter (22)	159146
0-ring, male QD (9)	110106
0-ring, bushing (50)	110241
0-ring, deflate button (51)	110117
0-ring, inflate button (55)	110210
0-ring, valve holder (58)	110221

If the following parts are not replaced, they should be inspected with a jeweler's loop or similar magnifying device, for the defects listed below. Replace any part with these defects.

Male OD fitting (13):	Inspect for wear, corrosion or loose plating.
Filter (22):	Inspect the filter surface for any foreign matter or deposits.
Inflator body (46):	Inspect the body for any signs of cracks and check all surfaces in contact with O-rings. Inspect the QD threads for any signs of damage.
Inflate button (54):	Inspect for wear or cracking.
Pin (53):	Inspect for wear or distortion.
Valve holder (57):	Inspect the valve for any signs of contamination or corrosion. Inspect the holder for any signs of scratches on O-ring surfaces or cracking. The valve and holder are replaced as an assembly.
Deflate button (52):	Inspect the deflate button retaining tabs for any signs of distortion or breakage.
Bushing (49):	Inspect for wear or cracking.

Anchoring bushing (49):	Inspect the locking tabs and actuating cable attaching hole for wear or cracking.
Actuating cable (66):	Inspect the knots for tightness and any signs of frayed cable.
Corrugated hose (60):	Inspect for wear or cracking.
RE housing (E):	Inspect the housing for cracks and all thread surfaces for damage.
RE valve plate (63):	Inspect for wear or scratches on the gasket sealing surface.
Gasket (67):	Inspect for cracking, brittleness and splits.
Exhaust diaphgram seat (7):	Inspect for wear or cracking.
Exhaust diaphgram (6):	Inspect for wear or cracking.
Cap (69):	Inspect threads for damage.
Springs:	Inspect for cracking or broken coils.
0-rings:	Inspect for cuts, tears, flat spots or contamination. The presence of any of these defects may cause leakage.
0-ring seats:	Inspect all surfaces in contact with 0-rings and other seals for chipping, scratches or contamination.

WARNING!

ACIDS MAY CAUSE BURNS, OR SKIN, EYE OR RESPIRATORY IRRITATION. WHEN WORKING WITH ANY KIND OF ACID PROTECT EYES AND SKIN ADEQUATELY AND WORK IN A WELL VENTILATED AREA. ACIDS MAY DAMAGE RUBBER AND PLASTIC PARTS. BEFORE CLEANING METAL PARTS, MAKE SURE THAT ALL RUBBER AND PLASTIC PARTS HAVE BEEN REMOVED.

REASSEMBLY

Before reassembly, slightly lubricate all 0-rings with silicone grease (General Electric, Versalukie G-322 or equivalent). Lubricating the 0-rings before reassembly will minimize the risk of damage during reassembly.

1. If the actuating cable (66) is to be replaced. cut the replacement cable to a length of 51 cm. (20 in.) and tie a knot at one end.
2. Thread the actuating cable (66) through the RE valve plate (63) so that the end of the actuating cable without the knot is protruding from the center hole of the RE valve plate. Pull the actuating cable through the center hole of the RE valve plate until the knot is fed into the seat of the RE valve plate.
3. Thread the actuating cable through the spring (64) so the smaller diameter of the spring faces the RE valve plate (63).

4. Thread the actuating cable through the RE housing (F), over the internal pin and out through the hose connector opening. Pull the loose end of the actuating cable until the Spring (64) and RE valve plate (63) are positioned inside the RE Valve body (E).

5. Install the exhaust diaphragm (6) onto the housing (7) and trim the exhaust diaphragm stem.

NOTE THE EXHAUST DIAPHRAGM (6) MUST BE AGAINST THE FLAT SMOOTH SIDE OF THE SEAT (7).

6. Insert the exhaust diaphragm (6) and housing (7) into the RE Valve cap (69) with the diaphragm facing the cap.

7. Position the gasket (67) onto the cap (69), with the stepped side of the gasket facing the cap.

8. Thread the cap (69) with the exhaust diaphragm (6), housing (7) and gasket (67) into the RE housing (F) and tighten.

V. Fit the Line (66) in the RE Valve Piston (35) only whether previously you untie that.

VI. Position the gasket (34) onto the Spring Bearing (35) as shown.

IF NECESSARY CLEAN THE GASKET WITH MILD DETERGENT AND WATER SOLUTION.

VII. Fix Spring Bearing + Gasket into the RE Valve Body.Slide the corrugated hose (60) onto the RE housing (32) and secure with clamps.

9. If the male QD cap (27) or LP hose clip (62) were removed from the corrugated hose (60) or if the corrugated hose was replaced, install the male QD cap and LP hose clip on the corrugated hose.

10. Thread the actuating cable through the corrugated hose (60).

11. Slide the corrugated hose (60) onto the RE housing (F) and secure with clamp (59).

12. Thread the actuating cable (66) through the anchoring bushing (47) and tie a knot in the actuating cable in a location that will allow the base of the anchoring bushing to just protrude from the corrugated hose.

13. Place o-ring (51) into the o-ring groove of the deflate button (52).

14. Insert the deflate button (52) with o-ring (51) into the inflator body (46).

15. Place 0-ring (50) on bushing (49).

16. With special tool (P/N 106190 Fig. 5) or needle nose pliers, insert bushing (49) with 0-ring (50), facing the deflate button, into the inflator body until the deflate button retaining tabs engage the bushing (Fig. 8-9).

17. Place the spring (48) on the anchoring bushing (47) and insert the anchoring bushing with spring into the inflator body until the locking tabs engage the inflator body. Depress the deflate button and release. The deflate button should return to its original position. If it does not return to its original position repeat steps 12-16 making sure all parts are in the correct location.

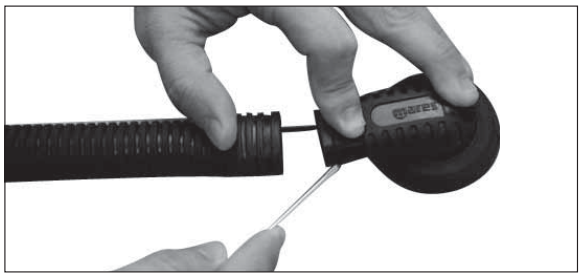


Photo 3

Photo 4

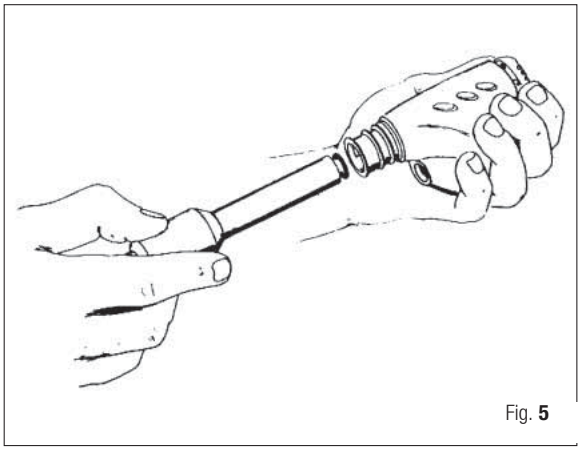


Fig. **5**

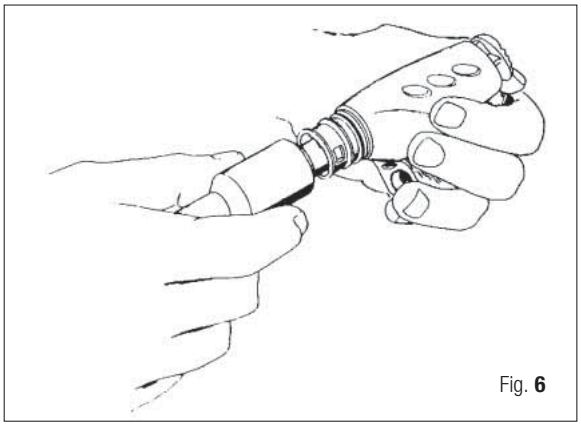


Fig. **6**

18. Slide the corrugated hose (60) onto the inflator body (46) and secure with clamp (59).

19. Insert filter (22) into the inflator body inlet.

NOTE A PLASTIC ROD MAY BE A USEFUL AID IN POSITIONING THE FILTER.

20. Place 0-ring (9) on male QD fitting (13).

21. Thread male QD fitting into inflator body (46) and gently tighten.

WARNING!
DO NOT OVER-TIGHTEN THE MALE QD FITTING. OVER-TIGHTENING OF THE MALE QD FITTING MAY DAMAGE THE THREADS IN THE INFLATOR BODY AND COULD RESULT IN LEAKAGE.

22. Install the two 0-rings (58) in the o-ring grooves of the valve holder (57).

23. Align the notches of the valve holder (57) and push the valve holder straight into the inflator body.

24. Position the spring (48) in the center of the valve holder.

25. Place 0-ring (55) into the 0-ring groove of the inflator button (54).

26. Position the inflate button (54) over the spring (48), align the hole in the inflator button with the holes in the inflator body. Press the inflator button and insert the pin (53) through the mouthpiece opening. Press the pin in the inflator body until its head makes contact.

27. Align the mouthpiece tab with the flange on the inflator body and press the mouthpiece (61) into place.

LP INFLATOR INSTALLATION

1. Place a new gasket in the BC collar.

2. Align the RE valve with the BC collar and tighten the RE valve locking nut.

FINAL INSPECTION

WARNING! EXPLOSION HAZARD

DO NOT CONNECT THE LP INFLATOR HOSE TO THE HIGH PRESSURE PORT OF THE FIRST STAGE. CONNECTING LP INFLATOR HOSE TO HIGH PRESSURE PORT OF THE FIRST STAGE WLLL CAUSE THE HOSE AND/OR LP INFLATOR TO EXPLODE AND COULD RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

3. Connect the Ergo LP hose (45) to a low-pressure (LP) port of the first stage.

4. Connect the female quick disconnect to the male quick connector (13) by pulling back the knurled flange of female quick disconnect with thumb and index finger, slide the female QD over the male connector and release the knurled flange.

5. Slowly open the air supply from the scuba cylinder. Minor leaks may be detected by submerging the LP inflator and/or BC in water or by using soapy water. When the air supply is turned on there should not be any air leakage or spontaneous BC inflation. If any air leakage or spontaneous BC inflation occur refer to the trouble shooting section of this manual.

6. Inflate the BC by Pressing the inflate button several times until the BC vest is fully inflated and the over-pressure valve begins to release excess air.

7. Press the deflate button several times, releasing a small amount of air each time and inspect for any signs of leakage. Re-inflate the BC if necessary.

8. Release a small amount of air by slightly pulling the corrugated hose several times, to release air through the rapid exhaust valve (RE) and inspect for any signs of leakage. Re-inflate the BC where necessary.

9. Fully inflate and deflate the BC several times using both the RE valve and the deflate button and inspect for any signs of leakage.

10. After service or repair, let the inflated BC set for approximately 1 hour. The BC should remain inflated without any pressure loss.

NOTE

IF ANY MALFUNCTION IS DETECTED WITH THE LP INFLATOR, REFER TO THE TROUBLESHOOTING SECTION OF THIS MANUAL. ANY CUTS OR HOLES IN THE BC SHOULD BE REPAIRED WITH A WATER PROOF RUBBER CEMENT PRIOR TO LEAK TESTING THE BC.

DRAWING NO : J107	ERGO INFLATOR ASSEMBLY 2k5 & 2k12	UPDATED: 26/11/2012

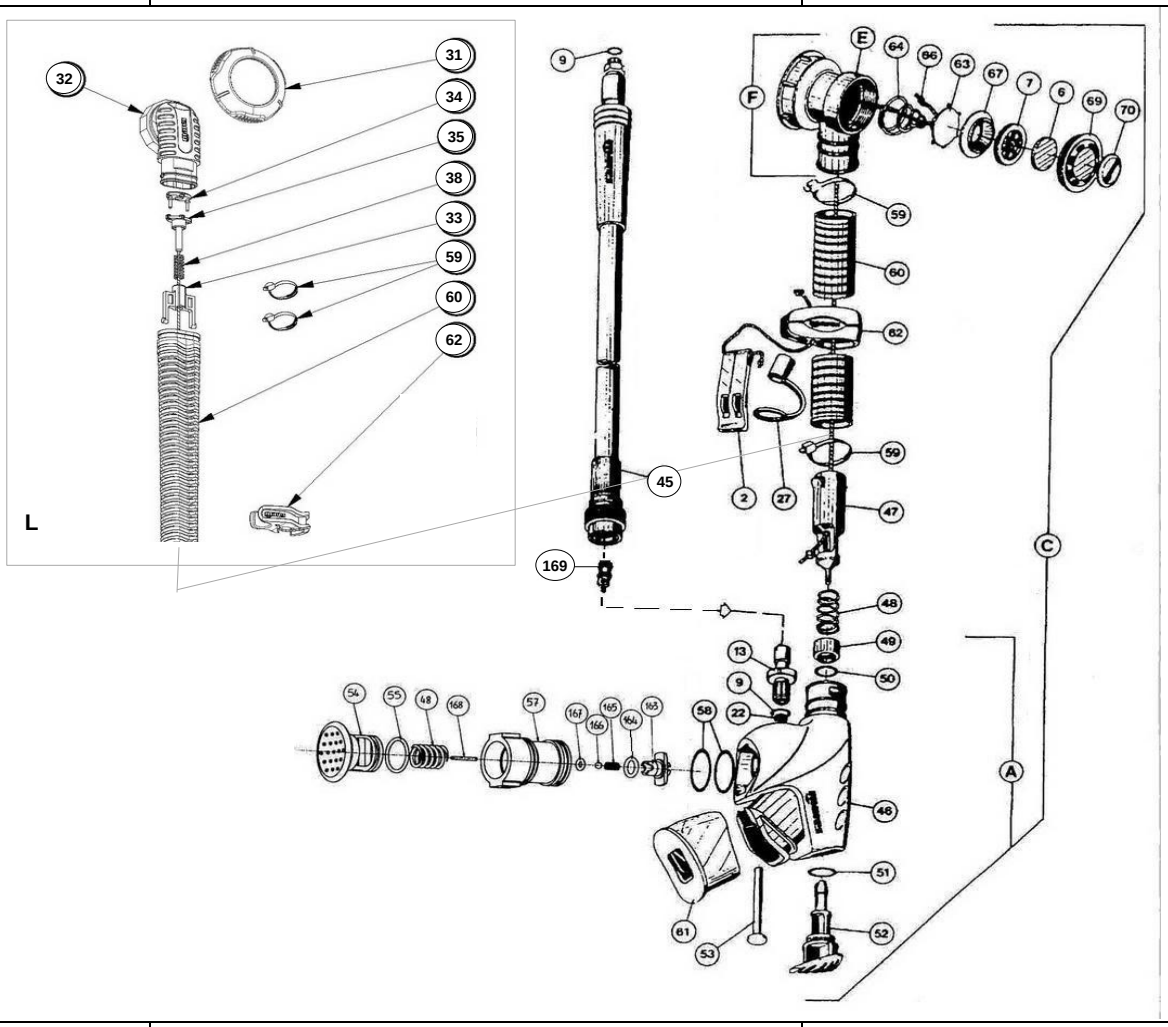


CHART NO : 255	ERGO INFLATOR ASSEMBLY 2k5 & 2k12	UPDATED: 10/12/2012

REF	CODE	DESCRIPTION	€
2	47159020	WHISTLE, B.C. VESTS	
6	47159070	EXHAUST DIAPHRAGM, LP INFLAT.	
7	F	DIAPHRAGM CASE Lp Inflator	
9	46110106	OR 106	
13	47159659	QUICK-CONNECTOR MALE	
22	47159146	FILTER, LP INFLATOR	
27	47159712	DUST CAP, ERGO INFLATOR	
31	L	RING NUT RE valve 2k10	
32	L	BODY RE valve 2k10	
33	L	SPRING BEARING	
34	47201064	RE Valve GASKET	
35	L	PISTON RE Valve	
38	L	SPRING, RE valve	
45	47159681	HOSE, ERGO LP INFLATOR	
46	47159700	INFLATOR BODY	
47	47159702	BUSHING, INFL. LINE RETAINER	
48	46185011	SPRING	
49	47159701	EXHAUST BUSHING, ERGO INFLATOR	
50	46110241	OR 2-109	
51	46110115	OR 115	
52	47159717	PURGE BUTTON ERGO 99 SILVER	
53	47159707	BUTTON PIN, ERGO INFLATOR	
54	D	INFLATIN BUTTON - RED	
55	46110210	OR 2056	
57	G	INFLATION VALVE	
58	46110221	OR 2081	
59	45179863	CLAMP CORRUGATED HOSE	
60	47159709	CORRUGATED HOSE, ERGO INFLATOR	

REF	CODE	DESCRIPTION	€
61	47159705	MOUTHPIECE, ERGO INFLATOR	
62	47159711	HOSE RETAINER	
63	F	RUBBER DISK	
64	F	SPRING, PURGE BUTTON	
66	F	LINE DIAM 1,75 black	
67	47159133	R.E. VALVE SEAL, B.C. VEST	
69	F	R.E. Valve cover	
70	46184322	LABEL	
163	G	O-Ring seat	
164	46110204	O-Ring 2021	
165	G	SPRING INFLATING VALVE	
166	G	STEEL BALL 3/16"	
167	46110101	OR 2012	
168	D	PIN ERGO 2K5	
169	46201002	VALVE ERGO 30 bar Pack. 10 pc	
		ASSEMBLIES	
A	47158504	ERGO LP INFLATOR WITHOUT HOSE	
C	47201121	ERGO INFLATOR w/o HOSE 2k5 (A - F - 2 - 27 - 59 - 60 - 62)	
C	47201122	ERGO INFLATOR w/o HOSE 2k12 (A - F - 2 - 27 - 59 - 60 - 62)	
D	47200808	INFLATING BUTTON assy (54 - 55 - 168)	
F	47158503	R. EXHAUST VALVE ASSEMBLY DIA 23	
		(E - 6 - 7 - 63 - 64 - 66 - 67 - 69 - 70)	
G	47200807	INFLATION VALVE (57 - 58 - 163 - 164 - 165 - 166 - 167)	
°°°	47200806	SERVICE KIT Ergo 2K5(9 - 22 - 50 - 51 - 55 - 58 - 59 - 164 - 167 - OR 2031)	
###	47200829	UPDATING KIT ERGO 2k5 (D-G-OR 2031 - 9 - 22 - 50 - 51 - 59)	
	46110107	O RING OR 2031 FOR HOSE QUICK CONNECTOR	
B	47201070	ERGO INFLATOR 2k10 W/OUT LP HOSE	
L	47201118	RE VALVE + CORRUGATED 2k10	

AIR CONTROL OCTOPUS

mares®

MAINTENANCE PROCEDURES

WARNING!

ALL MAINTENANCE AND REPAIR PROCEDURES MUST BE PERFORMED BY A MARES LAB AUTHORIZED SERVICE CENTER AND/OR DISTRIBUTOR. THEREFORE, THE INFORMATION PROVIDED BELOW IS INTENDED STRICTLY FOR TECHNICIANS AT SUCH CENTERS.

NOTE ALL OPERATIONS MUST BE CONDUCTED STRICTLY IN THE ORDER DESCRIBED.

IN ORDER TO ENSURE ADVANCED PERFORMANCE AND SAFETY DURING USE, AFTER 100 HOURS OF DIVING OR 1 YEAR THE REGULATOR MUST BE CHECKED, AND ITS CRITICAL PARTS MUST BE INSPECTED AND REPLACED IF NECESSARY.

- Small flathead screwdriver
- Compressed air supply circuit or tank (180-200 bar/2,646 - 2,940 psi)
- Cutting nippers
- Plastic or Brass O-Ring removal tool (Pin)
- Silicone grease (General Electric Versalube G-322 type/ Christo Lube 111)
- Compressed air gun (8-10 Bar / 116 - 145 psi)
- Descaling solution (Deox Extra type) or ultrasound tank
- Test Bench (code 416920 or code 416922)
- Octopus Service kit (code 46201064)

(B-6)
46106206

A-3 13 mm
46201071

B-18 14 mm
#46106248

(B-12) 5.5 mm
#46106212

(B-4) 5 mm
#46106204

(A-1)
46201039

(A-4) #46201073

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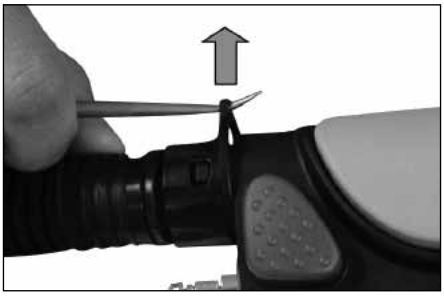
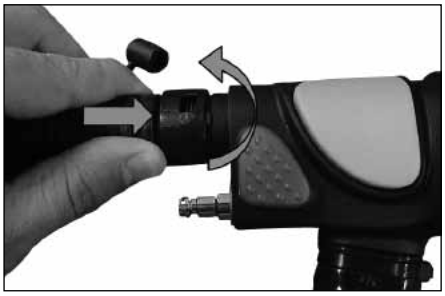
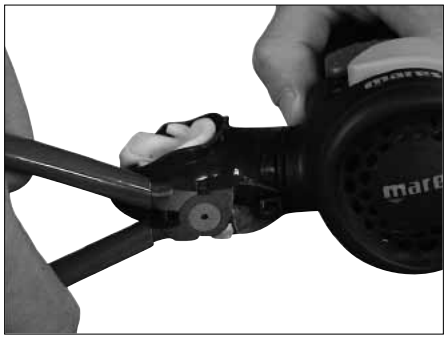
DISASSEMBLY

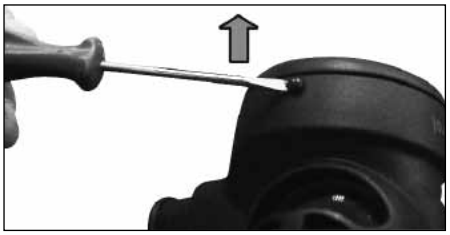
1. Disconnect the LP hose Quick Coupler (55) from the air control body (218), then remove the Plastic Seeger (208), along with the Inflator Adaptor (189) from the Air Control unit.

2. Remove the clamp (43) from the mouthpiece (44) using cutting nippers or a similar tool.



3. Using a flathead screwdriver, remove the pin-cover (63). Unscrew the cover (204). Remove the diaphragm plastic ring (78) and the diaphragm (36) from the Air Control Body (218).

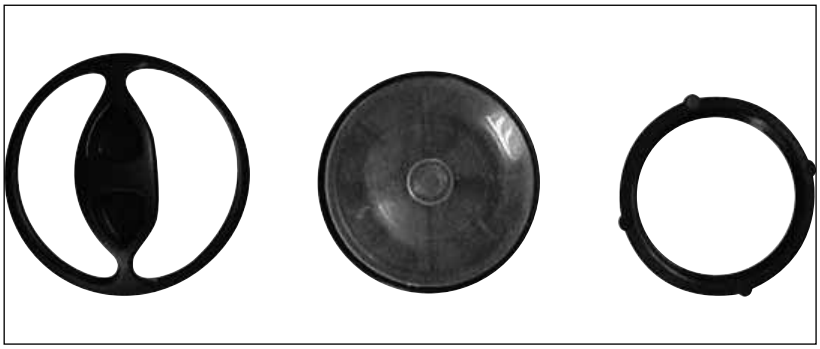



4. Remove the Retaining Ring (198) from the Male Connector (210) using a screwdriver.
5. Carefully press the Male Connector (210) out of the Main Air Control Body (218).

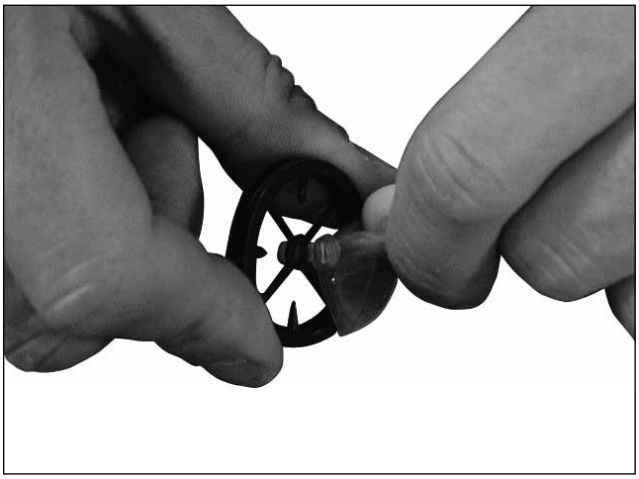


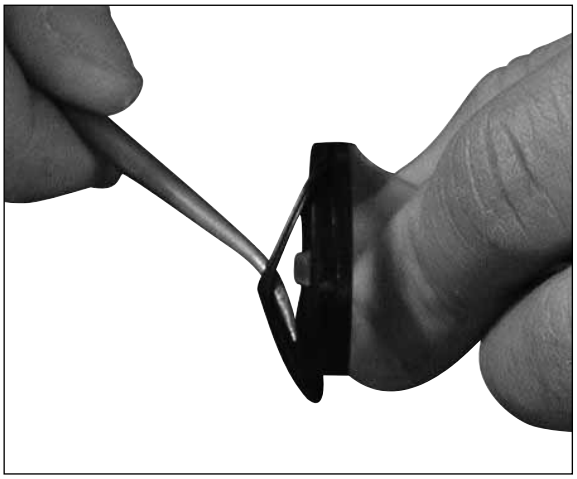
6. Using the special A-1 wrench, unscrew the Exhaust Valve Cap (211).

7. Remove the Exhaust Valve Seat (220) from the outside by pressing gently on it and then remove the Spacer Ring (222).

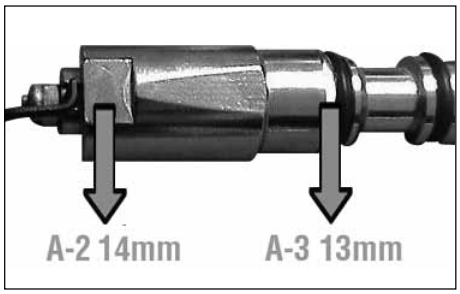


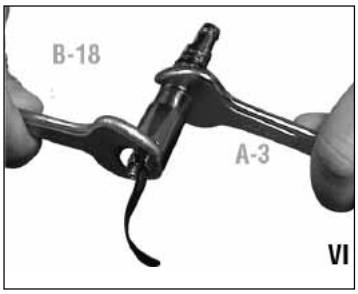
8. Remove the exhaust valve (221) and the O-ring (193) from the exhaust valve seat (220).

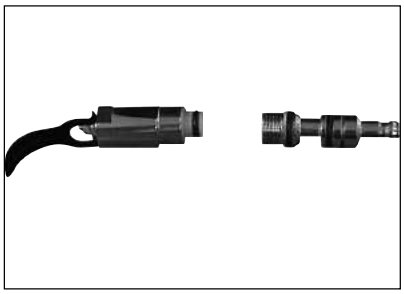




9. Using the B-18 (14mm) and A-3 (13mm) open end wrenches, carefully unscrew the Male Connector (210) from the Poppet Housing (205).

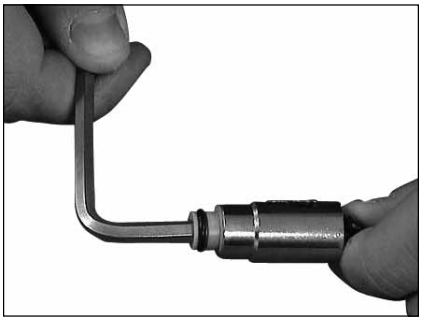




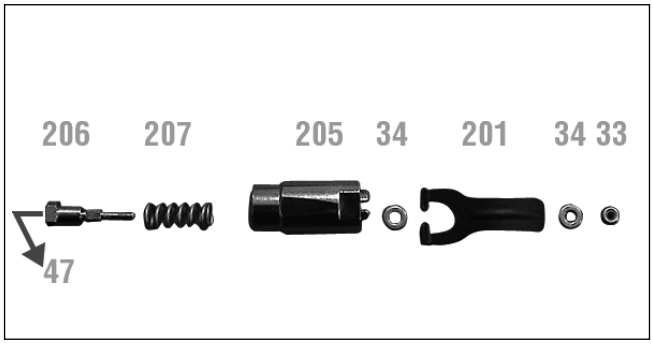


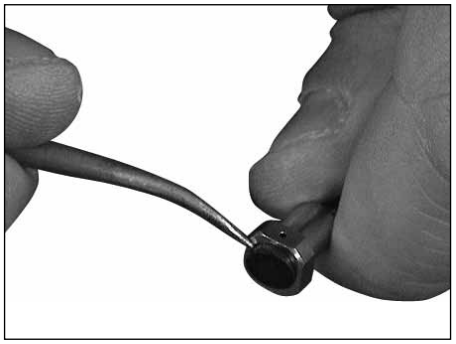
IMPORTANT INFORMATION!
THROUGH SERIAL NUMBER EC10473, MARES ASSEMBLED A POPPET HOUSING (205) THAT REQUIRED A 15 mm WRENCH INSTEAD OF A 14 mm WRENCH AS DESCRIBED IN STEP 9 IN ORDER TO BE REMOVED/REASSEMBLED.

10. Remove the O-Rings (171) from the Male Connector (210).
11. Use the hex wrench (B-4) to fully unscrew the poppet seat (209) from the Poppet Housing (205), then remove the O-Ring (19).



12. Position the Poppet Housing (205) on the Special Tool (B-6). Using the wrench (B-12), unscrew the demand lever locknut (33), pulling out the demand lever (201) located between the 2 Washers (34), the poppet metal body regs (206), and the spring (207).
13. Remove the rubber seat lll (47-46185060) from the 2nd stage poppet.





CLEANING AND CHECKS

For routine cleaning of reusable rubber and plastic components, wash all parts in a mixture of hot water and mild detergent, scrubbing if necessary with a soft brush.

WARNING!
ACIDS OR OTHER SOLVENTS MAY DAMAGE PLASTIC AND RUBBER PARTS.
BEFORE CLEANING METAL COMPONENTS, MAKE SURE THAT ALL SEALS AND OTHER PARTS SUBJECT TO DETERIORATION HAVE BEEN REMOVED.

Chrome-plated brass and stainless steel components can be cleaned using a nylon brush to remove any deposits, by immersing them in a fresh water ultrasound bath, or, if suitable equipment is not available, in a gentle acid solution (Deox Extra type) or white vinegar diluted with hot water (10-20%).
Be sure to thoroughly rinse all parts in fresh water and dry with a jet of low pressure air at 8 - 10 bar / 116 - 145 PSI before proceeding with reassembly.

WARNING!
CERTAIN KEY COMPONENTS OF THE AIR CONTROL SHOULD BE REGULARLY REPLACED AT EACH SCHEDULED OVERHAUL. BELOW ARE LISTED THE COMPONENTS INCLUDED IN THE SERVICE KIT FOR THE AIR CONTROL OCTOPUS (CODE 46201065):

N.	Code	Description
33	46185051	Demand Lever Locknut
19	46110106	OR 106
43	47157984	Mouthpiece clamp
47	46185060	Rubber Seat III
63	46184289	Pin Cover
171	46110110	OR 2037 (2)
193	46110175	OR 2125
198	46201007	Retaining Ring
221	46184006	Exhaust valve

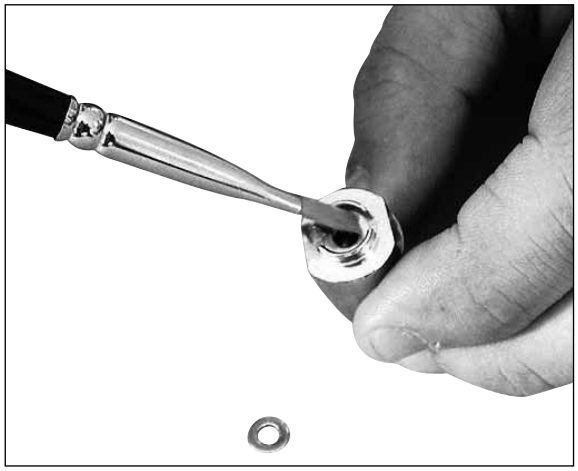
REASSEMBLY

NOTE BEFORE REASSEMBLING, LIGHTLY LUBRICATE ALL THE O-RINGS WITH SILICONE GREASE (TYPE GENERAL ELECTRIC VERSALUBE G-322 / CHRISTO LUBE 111). LUBRICATION REDUCES THE LIKELIHOOD OF DAMAGE DURING REASSEMBLY.

14. Reassemble the poppet seat (47) in the poppet seat holder (206)

15. Arrange the poppet metal body (206) with the corresponding spring (207) on the special tool (B-6).

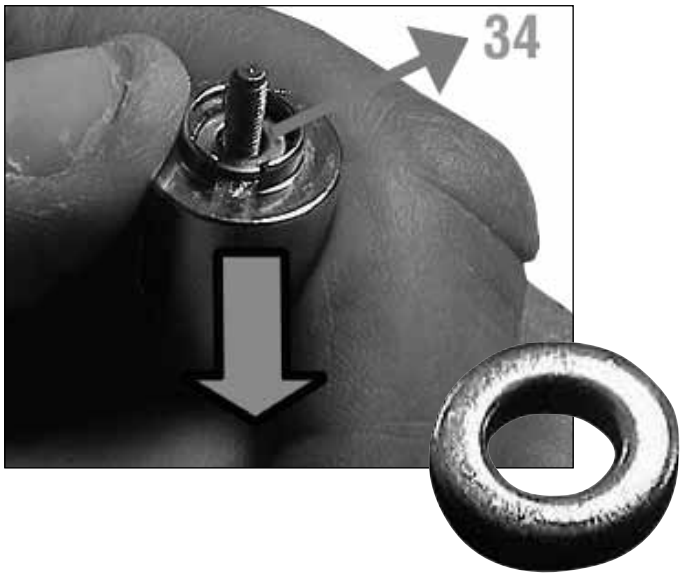
16. Pressing gently, correctly position the poppet metal body (206) in the demand lever air control (201).



WARNING!

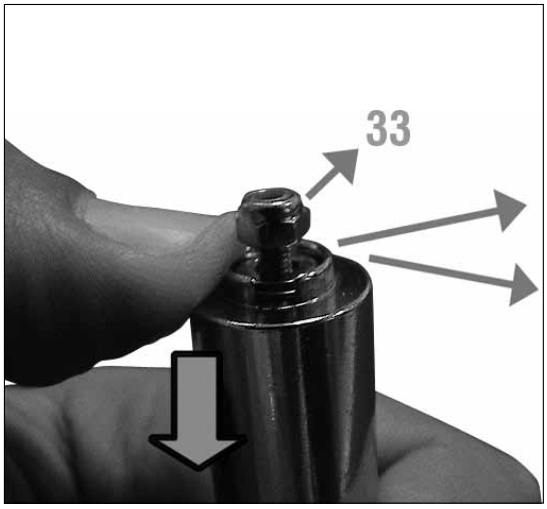
TO ENSURE THAT THE 2nd STAGE POPPET STEM IS POSITIONED CORRECTLY IN THE DEMAND LEVER CONNECTOR HOLE, GENTLY ROTATE THE CONNECTOR LEFT AND RIGHT ON THE B-6 TOOL.

17. Position the one washer (34) only after lightly coating the seat of the Poppet Housing (205) with silicone grease or christo lube 111.



18. Position the second Washer (34) on the stem of the Poppet Metal Body (206) and tighten the Demand Lever Locknut (33) at least one or two full turns on the Poppet Stem (206).

NOTE MARES RECOMMENDS THAT YOU PLACE THE TWO WASHERS (34) AS SHOWN IN IMAGE A.



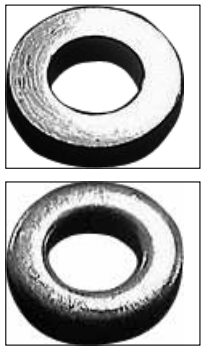
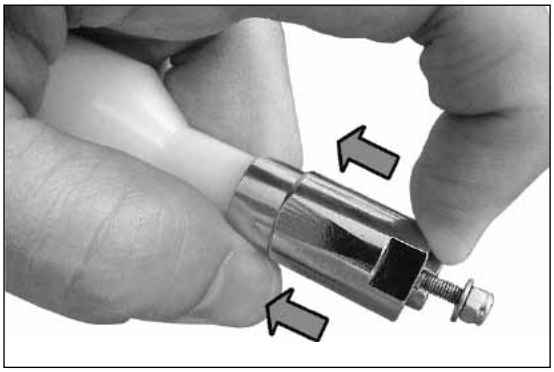
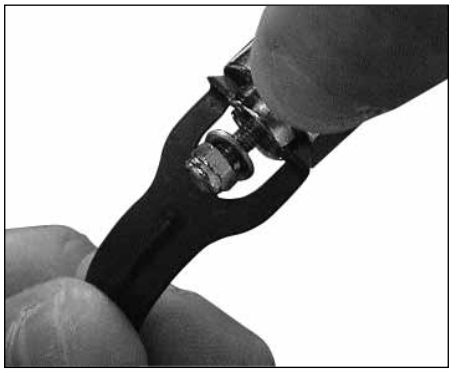


Fig. A

19. Lift the special tool (B-6) from the workbench, maintaining pressure on the Poppet Housing (205) in order to make the valve stem (206) stick out as far as possible. Insert the Air Control Demand Lever (201) between the (2) two washers (34).





20. Screw the demand lever locknut (33) approximately 5 full turns using the special wrench (B-12).

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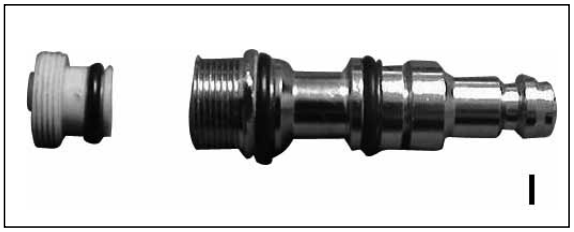
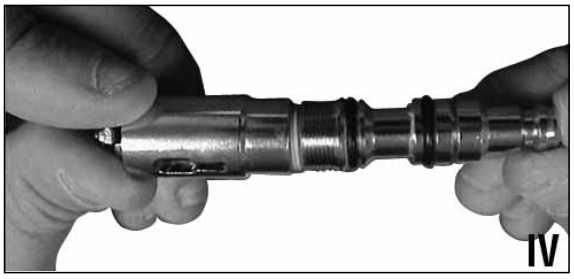
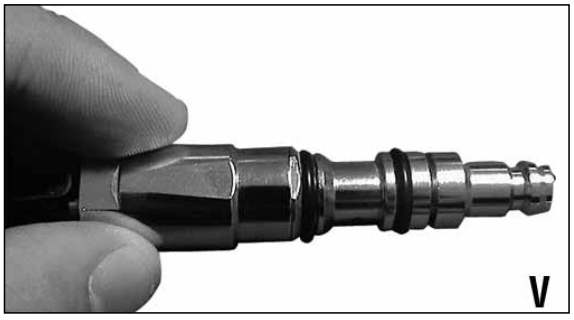
21. Install the O-Ring (19) in the Poppet Seat (209) and the two O-Rings (171) in the Male Connector (210) - I

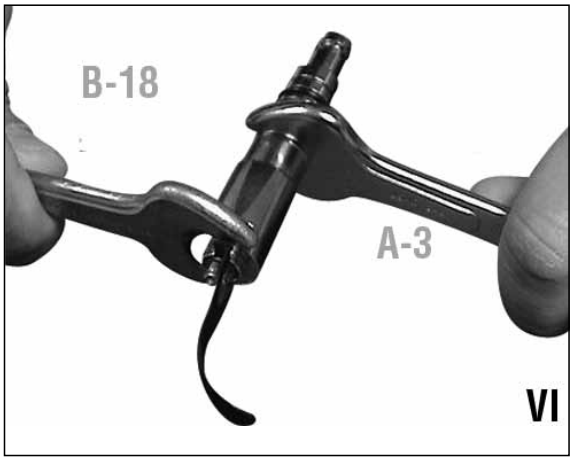
22. Place the Poppet Seat (209) on the Male Connector (210) as shown and fully screw them down on the Poppet Housing (205). Then tighten gently using the open end wrenches B-18 and A-3. II-III-IV-V-VI

NOTE IF USING A TORQUE WRENCH, USE TIGHTENING TORQUE OF 6 N/m



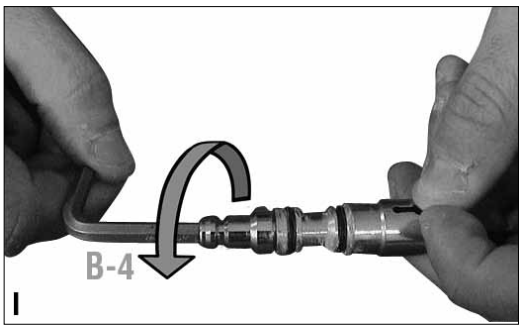


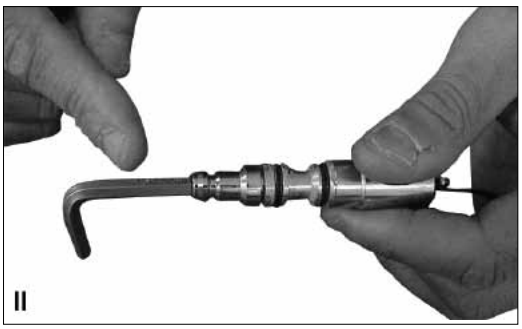




NOTE BEFORE MAKING ANY ADJUSTMENTS, WE RECOMMEND THAT YOU FULLY UNSCREW THE ADJUSTABLE POPPET SEAT (209) INTO THE POPPET HOUSING (205) USING A B-4 HEX WRENCH (I).

23. Turn about ¾ turn on adjustable poppet seat with the B-4 wrench. (II)





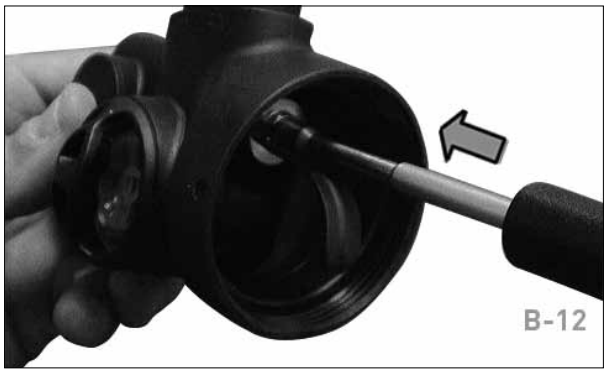
24. Insert the full Demand Lever connector inside the Air Control Body (218).

NOTE NOTE THAT THE FLAT SURFACE OF THE POPPET HOUSING (205) MUST BE INSERTED AGAINST THE FLAT SURFACE INSIDE THE AIR CONTROL BODY (218).

25. Carefully put the assembled connector in place using the special B-12 tool and push it into the body.

NOTE BE ESPECIALLY CAREFUL DURING INSERTION TO AVOID DAMAGING THE O-RINGS (171).

NOTE DO NOT FORCE THE DEMAND LEVER, WHICH COULD BEND.



26. Use the New Retaining Ring (198) to fasten the connector body to the Air Control Body (218).

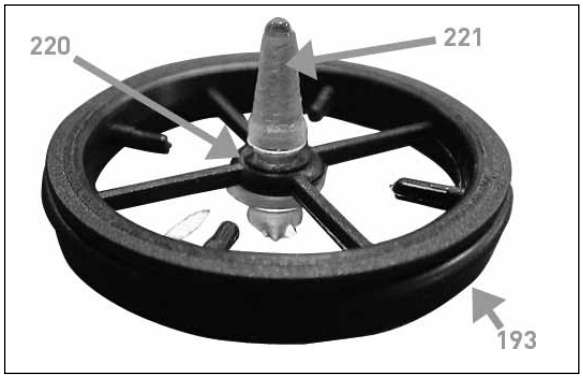
27. Place the O-Ring (193) in the seat of the exhaust valve seat (220).

WARNING!
MAKE SURE THAT THE EXHAUST VALVE (221) IS INSERTED FROM THE CORRECT SIDE INTO ITS SEAT (220).

28. Carefully install a new Exhaust Valve (221), pulling the silicone stem through the central hole in the Exhaust Valve Seat (220).

WARNING!
IN ORDER TO AVOID DAMAGING THE EXHAUST VALVE, DO NOT PULL TOO HARD ON THE STEM.

WARNING!
USE CUTTING NIPPERS TO TRIM THE EXHAUST VALVE TO APPROXIMATELY 3 mm.



29. Position the Spacer Ring (222) with the flat part facing up.

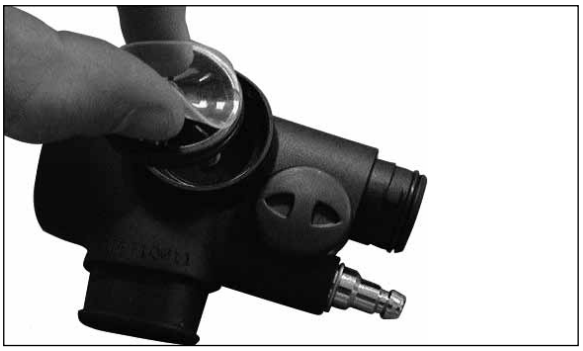
30. Set the Exhaust Valve Seat (220) in the Air Control Body (218) with the exhaust valve side facing outward and bring it into position, touching the edges of the Valve Seat (220).

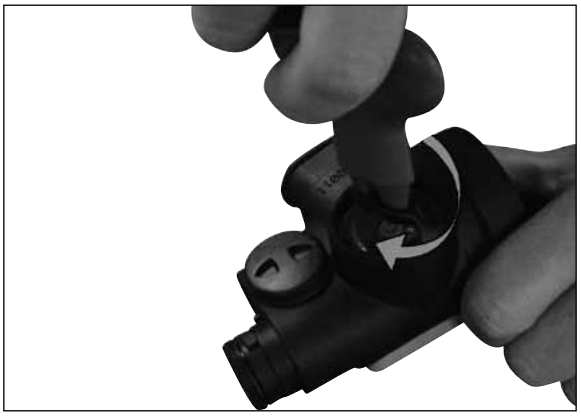
31. Screw the Exhaust Valve Cap (211) on to the Air Control Body (218), tightening gently with the A-1 tool.

32. Attach the Hose (55), complete with the Quick Coupler, to the Air Control unit.

33. Screw the hose (55) to an LP port on the 1st Stage Body using a 14 mm open end wrench (B-18).

NOTE IF USING A TORQUE WRENCH, SET A TIGHTENING TORQUE OF 4 - 4.5 N/m

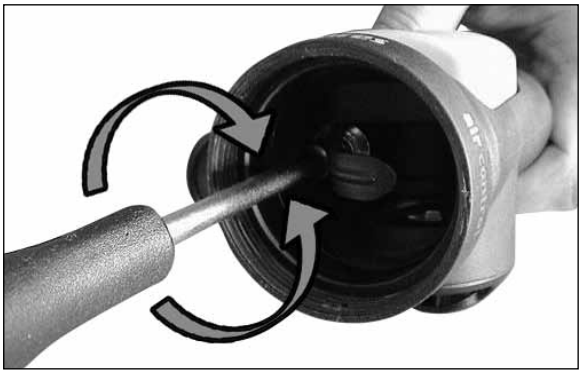




FINAL ADJUSTMENTS

TO CORRECTLY ADJUST THE REGULATOR:

A. The repair shop should be equipped with a high-and low-pressure compressed air supply.
B. A pressure gauge is required for checking the intermediate pressure (the pressure gauge should have a full scale value MAX 30-40 BAR / 440 - 590 psi, for greater adjustment accuracy).



I. Screw the intermediate pressure measuring gauge into one of the 3/8" low-pressure ports on the 1st stage, using the wrench (B-18).
II. Mount the regulator group on the control valve (of the tank or test bench).
III. Holding down the second stage demand lever, slowly open the tank valve and, almost simultaneously, release the demand lever.
IV. Read the pressure gauge to check whether the 1st stage pressure is correct (9,8 - 10,2 bar / 142 - 148 psi).

WARNING!
THE FIRST STAGE INTERMEDIATE PRESSURE MUST BE MEASURED WHEN THERE IS NO AIR COMING OUT OF THE 2nd STAGE. FOR ANY NECESSARY 1st STAGE ADJUSTMENTS, REFER TO THE CORRESPONDING MARES TECHNICAL SERVICE MANUAL.

IMPORTANT INFORMATION!
ALL OF THE ADJUSTMENTS DESCRIBED BELOW MUST BE PERFORMED WITH THE AIR CONTROL SUPPLIED WITH THE APPROPRIATE INTERMEDIATE PRESSURE (I.P.).

34. Place the Gauge (A-4) perpendicular to the edge of the second stage case.
35. Tighten or loosen the demand lever locknut (33), using the special wrench (B-12) to correctly adjust the height of the demand lever (201).

WARNING!
THE DEMAND LEVER IS CORRECTLY ADJUSTED WHEN IT JUST TOUCHES THE GAUGE (A-4) BUT THERE IS NO AIR COMING OUT.

36. Depress and trigger the demand lever a few times.
37. Insert the plastic ring (78) on the diaphragm (36) and place them inside the Air Control Body (218).
38. Twist the cover (204) until both seats line up (case and cover) to allow insertion of the Pin Cover (63).

OBJECT:
Regulator Test Bench - Final adjustment

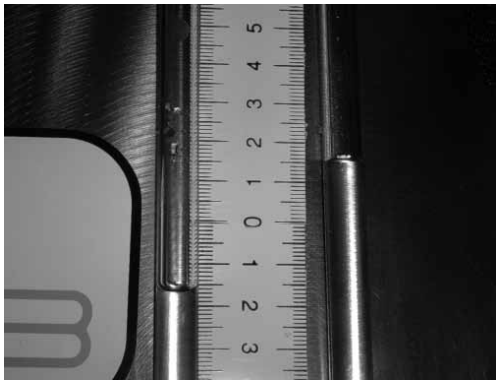
Install the Inhaling Mouthpiece (8) on the second stage mouthpiece tube.

To check the Cracking Effort using Column Water (see info table)

NOTE …THE CRACKING EFFORT MUST BE READ THE SAME MOMENT THAT THE VALUE OF INTERMEDIATE PRESSURE STARTS TO DECREASE…

AIR CONTROL CRACKING EFFORT

cm of H_2O	inch of H_2O
3.5-4	1,4-1,6



NOTE TO OBTAIN THE CRACKING EFFORT IS NECCESSARY TO ADD THE VALUE OF COLUMN WATER THAT GOES UP WITH THE VALUE OF COLUMN WATER THAT GOES DOWN (OR REDOUBLE ONE OF THEM).

NOTE SOMETIMES THE GRADUATION OF COLUMN WATER IS ALREADY REDOUBLED (1 REAL cm = 2 ON GRADUATION OF COLUMN WATER)

Close the Tank Valve, and discharge the residual air, by pushing on the second stage button cover or the Discharge Lever (5)

Close the Test Bench Valve, and try to inhale directly from the second stage (w/o the Inhaling Mouthpiece (8)), in order to detect leakeage inside of the case.

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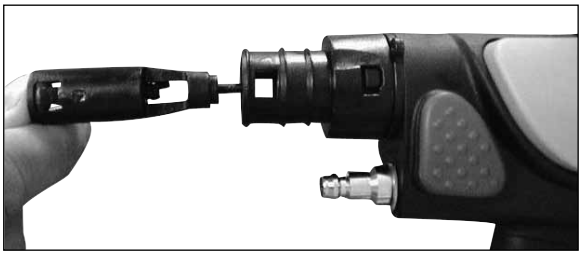
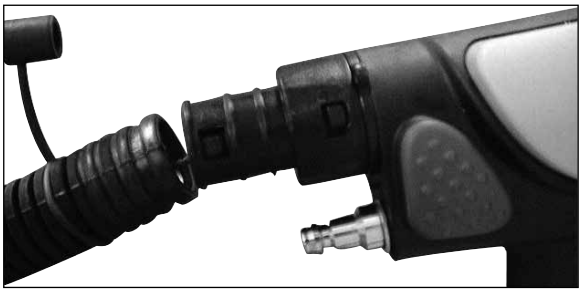
OPERATION CONCLUDED

Install the Proper Inflator Adaptor (189) on the Air Control Body (218).

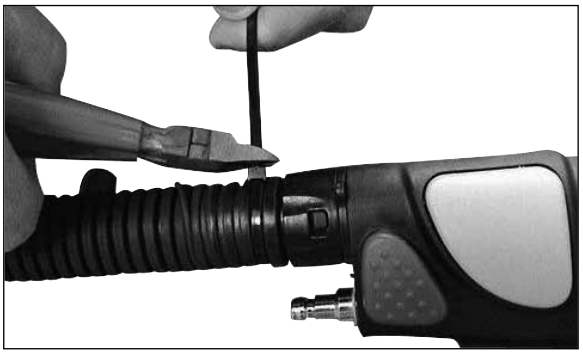
Fasten the Plastic Seeger (208) in place, and then attach the Fastening Sleeve (without spring) on the Air Control Body.



Insert the hose into its Adaptor and apply the Ring clamp / wire tie (42), trimming away the excess.



Connect the Quick Hose Coupler to the Air Control and bring the Hose cover into position. Carefully assemble the mouthpiece (44), securing it with a new mouthpiece clamp (43).



AIR CONTROL INFLATOR

mares®

MAINTENANCE PROCEDURES

WARNING!
ALL MAINTENANCE AND REP AIR PROCEDURES MUST BE PERFORMED BY A MARES LAB AUTHORIZED SERVICE CENTER AND/OR DISTRIBUTOR. THEREFORE, THE INFORMA TION PROVIDED BELOW IS INTENDED STRICTL Y FOR TECHNICIANS AT SUCH CENTERS.

NOTE ALL OPERATIONS MUST BE CONDUCTED STRICTL Y IN THE ORDER DESCRIBED.

IN ORDER TO ENSURE ADVANCED PERFORMANCE AND SAFETY DURING USE, AFTER 100 HOURS OF DIVING OR 1 YEAR THE REGULATOR MUST BE CHECKED, AND ITS CRITICAL PARTS MUST BE INSPECTED AND REPLACED IF NECESSARY.

- Small flathead screwdriver (Usage Type 322-0.4x2.5)
- Pliers (Usage Type 133)
- Compressed air supply circuit or tank (180-200 bar)
- Cutting nippers
- Plastic or Brass O-Ring removal tool (Pin)
- Silicone grease (General Electric Versalube G-322 type or Christo lube 111 (Nitrox))
- Compressed air gun (8-10 Bar)
- Descaling solution (Deox Extra type) or ultrasound tank
- Test Bench (code 416920 or code 416922)
- Inflator Service kit (code 46201064)

(B-12) 5.5mm
#46106212

(B-17) 17mm (2)
46106217

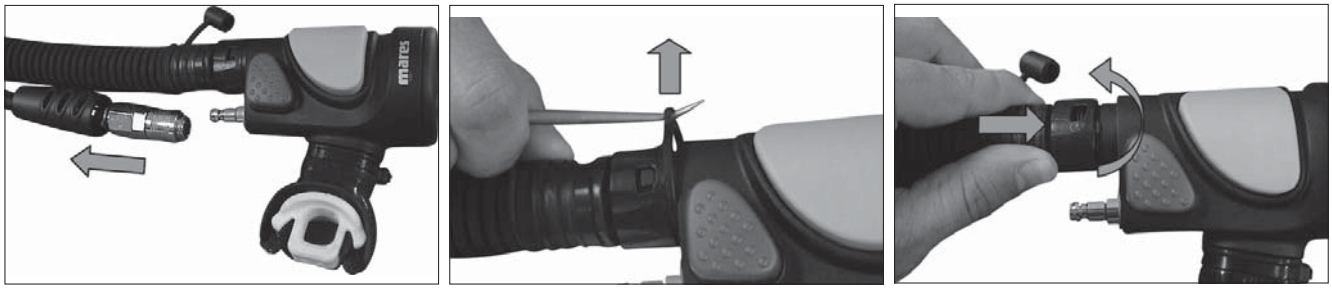
(B-18) 14mm
#46106218

4mm

(A-1)
46201039

DISASSEMBLY

1. Disconnect the Quick Coupler from the Hose (55), and, after removing the Plastic Seeger / locking clip (208), the Inflator Adaptor (189) from the Air Control unit.

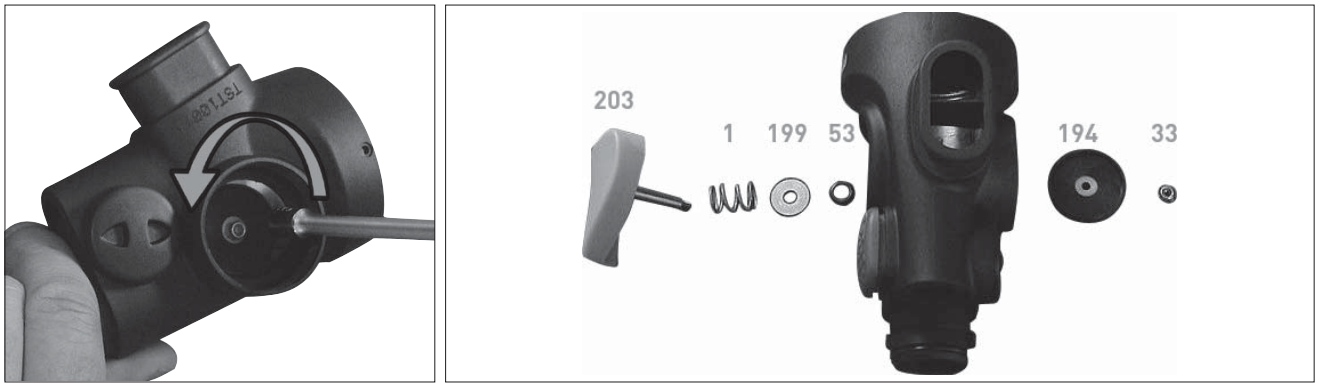


WARNING!

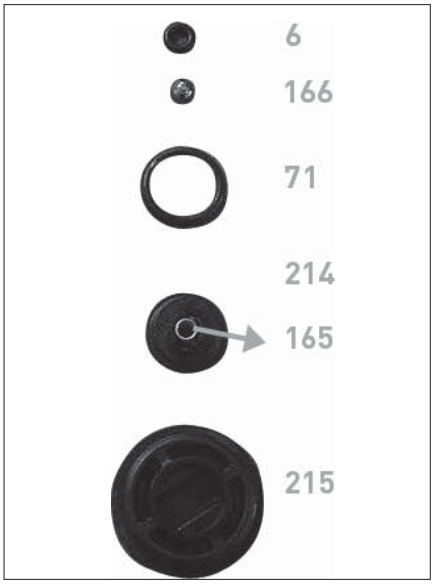
TO MAKE THESE OPERATIONS EASIER, YOU CAN REMOVE THE MOUTHPIECE (44) AND THE CLAMP (43) FROM THE AIR CONTROL UNIT. ONLY REMOVE THE CLAMP FROM THE MOUTHPIECE IF A REPLACEMENT P ART IS AVAILABLE.

2. Remove the exhaust valve cap w/tool (46201039) (New tool)

3. Carefully remove the Exhaust Valve Seat (220) from the outside by gently pulling up on it, and then remove the Spacer Ring (222). Remove the Demand Lever Locknut (33) using the B-12 (5 mm nut driver -46106212) , and remove all the Purge Button components from the Air Control body.

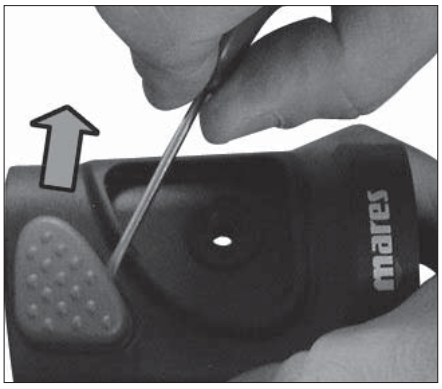


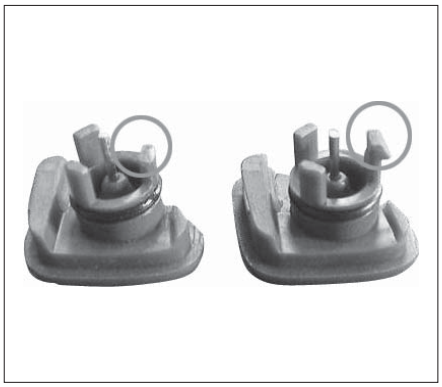
4. Using the special A-1 tool (46201039), unscrew the Inflating Plug (215).
5. Using Pliers, remove the O-Ring Seat (214) from the Air Control Body (218), and then remove the other components (6, 71, 165, 166).



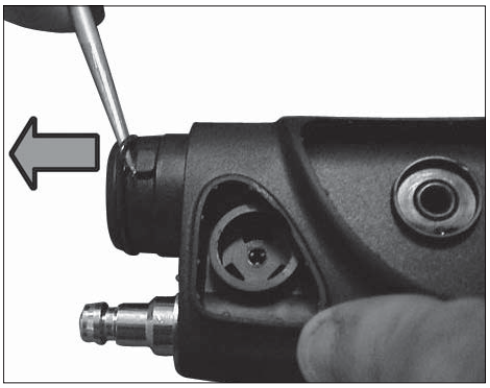
6. Rotate the Air Control Body and remove the Red Inflating Button (216), gently prying with a flathead screwdriver through the side (Use type 322 - 0.4 x 2.5).

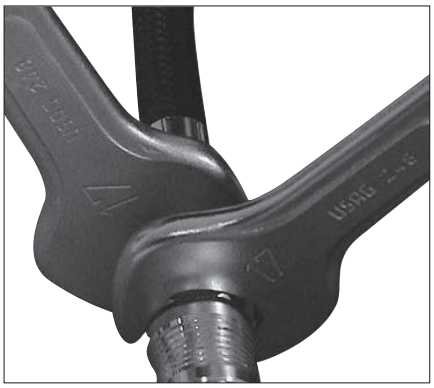
WARNING!
ONCE THE INFLATION BUTTON ASSEMBLY HAS BEEN REMOVED (REF . 72-168-216) CODE 46201067, IT CANNOT BE REUSED WHEN THE UNIT IS REASSEMBLED (FIG. 1). YOU WILL FIND THE REPLACEMENT P ART (46201067), IN THE MAINTENANCE KIT 46201065 (FIG. 2).



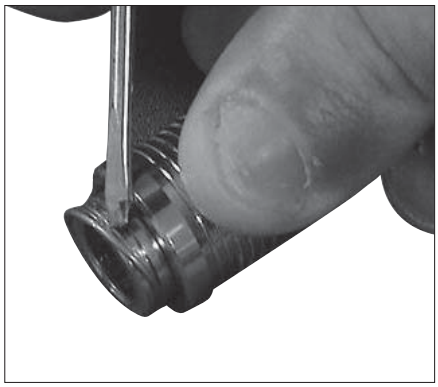


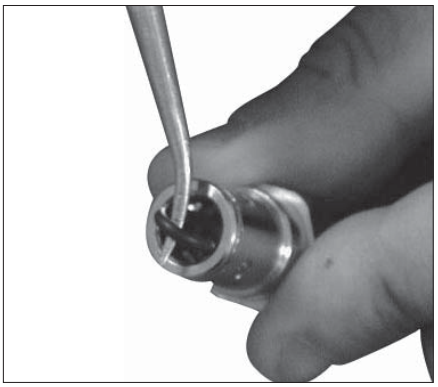
7. Lift the O-Ring (54) from Air Control Body (218).
8. Using 2 open-end wrenches (B-17), unscrew the Assembled Quick Connector, female (46201066) from the Hose (55).

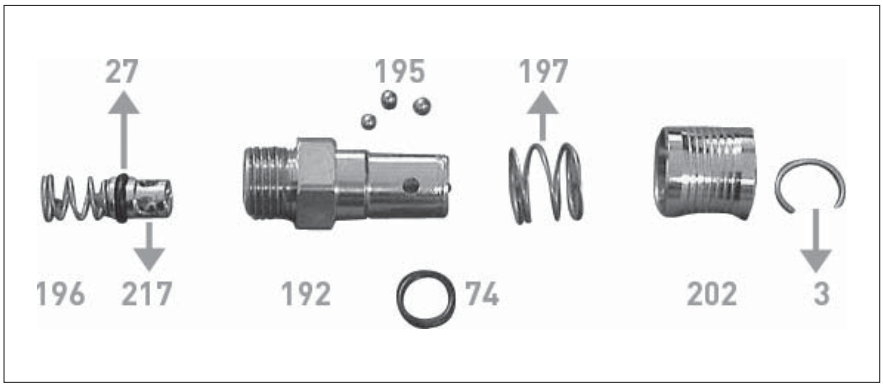




9. Using a flathead screwdriver, remove the Snap Ring (3) from its seat. Then remove all remaining components from it.
10. Remove the O-Ring (74) from the Quick Connector Body (192).







11. Remove the first stage connection side (19) and second stage swiveling connector (27) O-Rings from the Hose (55).

CLEANING AND CHECKS

For routine cleaning of reusable rubber and plastic components wash all parts in a mixture of hot water and mild detergent, scrubbing if necessary with a soft brush.

WARNING!

ACIDS OR OTHER SOL VENTS MA Y DAMAGE PLASTIC AND RUBBER P ARTS. BEFORE CLEANING MET AL COMPONENTS, MAKE SURE THAT ALL SEALS AND OTHER PARTS SUBJECT TO DETERIORATION HAVE BEEN REMOVED

Chrome-plated brass and stainless steel components can be cleaned using a nylon brush to remove any deposits, by immersing them in a fresh water ultrasound bath, or, if suitable equipment is not available, in a gentle acid solution (Deox Extra type) or white vinegar diluted with hot water (10-20%).
Be sure to thoroughly rinse all parts in fresh water and dry with a jet of low pressure air at 8-10 bar / 116 – 145 psi before proceeding with reassembly.

WARNING!

CERTAIN KEY COMPONENTS OF THE AIR CONTROL SHOULD BE REGULARLY REPLACED AT EACH SCHEDULED OVERHAUL. BELOW ARE LISTED THE COMPONENTS INCLUDED IN THE SERVICE KIT FOR THE AIR CONTROL INFLA TOR (CODE. 46201064) :

Air Control Exploded Diagram		
N.	**Code**	**Description**
6	46110101	O-Ring 2012
19	46110106	O-Ring 106
27	46110205	O-Ring 2025 (N°2)
33	46185051	Demand Lever Locknut
42	45179863	Clamp 3.6x200
53	46110204	O-Ring 2021
54	46200999	O-Ring 2081
71	46110211	O-Ring 2050
74	46110107	O-Ring 2031
C	46201067	Inflating Button Red assembled

REASSEMBLY

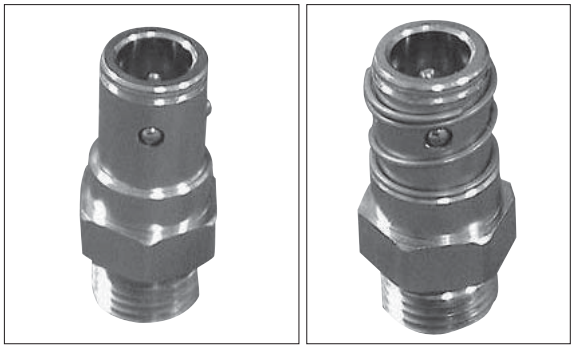
WARNING!
IF THE FIRST STAGE IS USED FOR DIVES WITH OXYGEN-ENRICHED MIXTURES, STRICTL Y FOLLOW ALL THE INSTRUCTIONS PROVIDED IN THIS MAINTENANCE MANUAL IN THE NITROX CHAPTER (EN 13949) BEFORE BEGINNING REASSEMBLY!

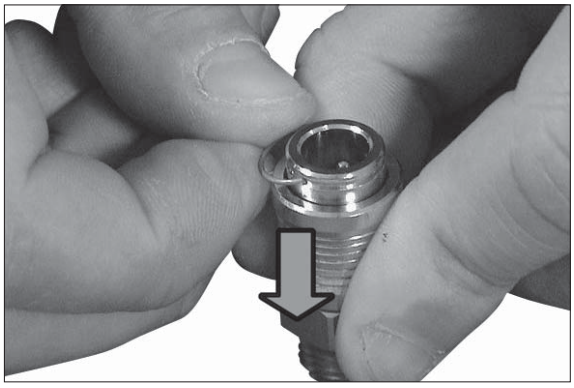
NOTE BEFORE REASSEMBLING, LIGHTL Y LUBRICA TE ALL THE O-RINGS WITH SILICONE GREASE (TYPE GENERAL ELECTRIC VERSALUBE G-322 OR CHRISTO LUBE 111). LUBRICA TION REDUCES THE LIKELIHOOD OF DAMAGE DURING REASSEMBLY.

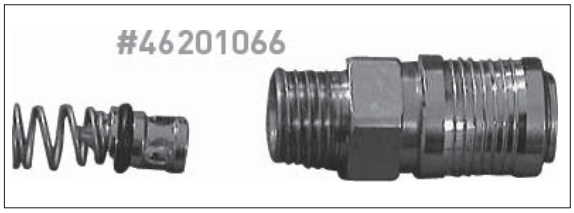
12. Insert the 4 Steel Balls (195) into the Quick Connector Body (192) and then insert the Spring (197), holding the components vertically to keep them inside.
13. Insert the Quick Connector Slider (202) in the correct position over the Spring (197).
14. Fasten the Quick Connector with the Snap Ring (3), holding down the Quick Connector Slider (202).
15. Insert the Quick Connector Shutter (217), including the O-Ring (27) and Conical Spring (196), in the Quick Connector Body (192).
16. Install the O-Rings on the first stage connection side (19) and the second stage swiveling connector (27) on the Hose (55).

NOTE IF USING A TORQUE WRENCH, SET A TIGHTENING TORQUE OF APPROXIMATELY 3 N/m.

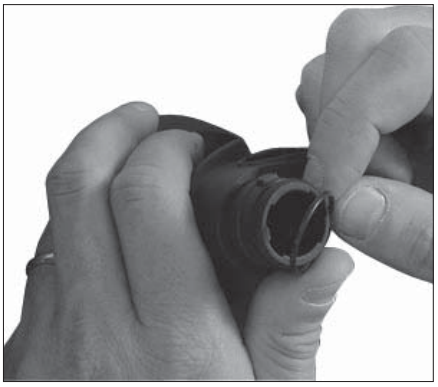
17. Using 2 17-mm wrenches (B-17), tighten the Assembled Quick Connector to the Hose (55).
18. Insert the O-Ring 2031 (74) in its seat inside the Quick Connector Body (192), bringing it into place using a pointed plastic or brass tool.







19. Lubricate and insert the O-Ring (54) in the seat of the Air Control Body (218).



20. Position the O-Ring (53) in the Purge Button seat, and then place the Metal Washer (199) and the Spring (1) on top of it. Insert the Purge Button (203).

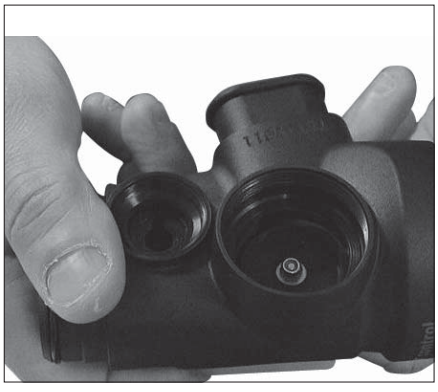
21. Rotate the Air Control Body, holding down the Purge Button (203) and insert the LP Inflator Exhaust Diaphragm (194) on the threaded stem of the Purge button.

WARNING!

MAKE SURE THAT THE LP INFLATOR EXHAUST DIAPHRAGM IS FACING THE RIGHT WAY UP.

22. Screw the Demand Lever Locknut (33) onto the LP Inflator Exhaust Diaphragm (194) using the B-12 tool.

NOTE IF USING A TORQUE WRENCH, SET A TIGHTENING TORQUE OF 80 N/cm.

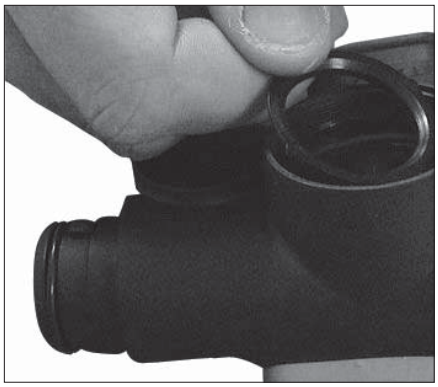


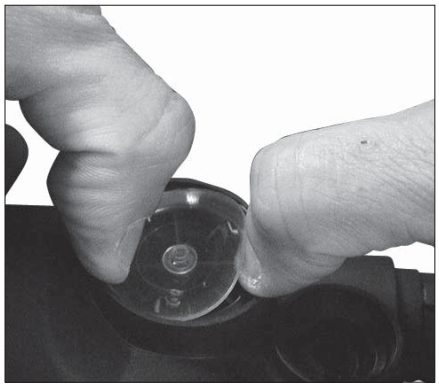
23. Place the Spacer Ring (222) with the flat part facing up.

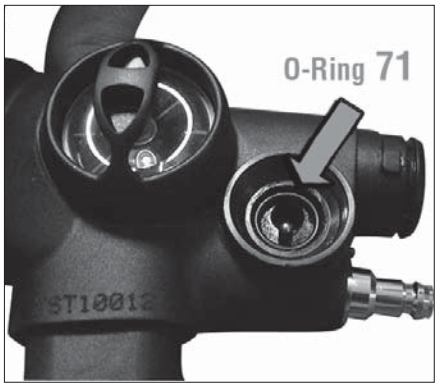
24. Set the Exhaust Valve Seat (220) in the Air Control Body (218) with the exhaust valve side facing outward and bring it into position, touching the edges of the Valve Seat (220).

25. Screw the Exhaust Valve Cap (211) onto the Air Control Body (218), tightening gently with the A-1 tool

26. Insert the O-Ring (6) in its seat, and then the Steel Ball (166). Position the O-Ring (71) as shown.



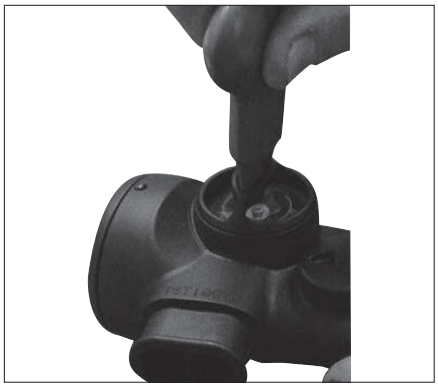


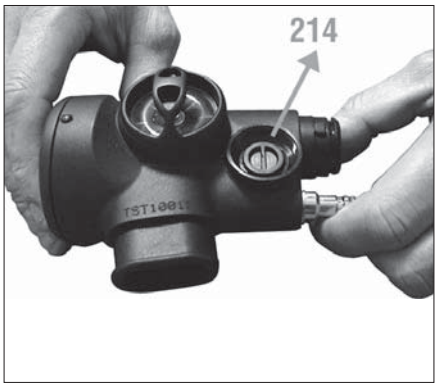


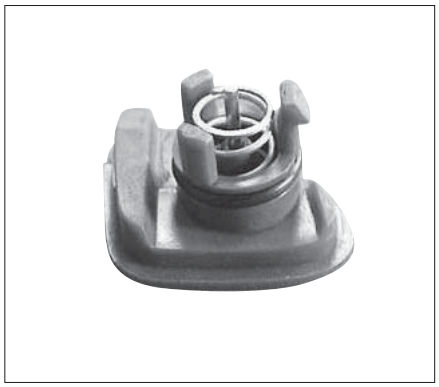
27. Place the O-Ring seat (214) in the correct position.

28. Screw the Inflating Plug (215) snug using the special A-1 tool.

29. Rotate the Air Control Body. Place the Spring (2) inside the Inflation Button assembly (C).





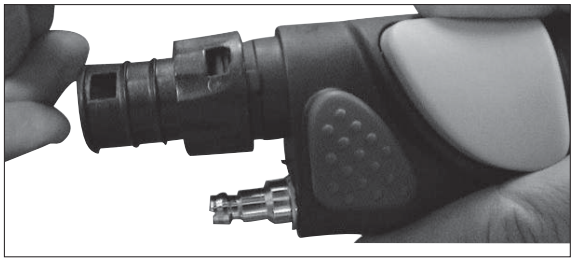


30. Insert the Inflation Button (C), pressing it all the way down until it fastens to the Air Control Body.

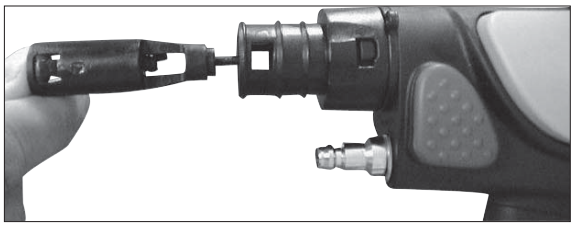
WARNING!

MAKE SURE THA T THE INFLA TION BUTTON W AS INSER TED CORRECTLY AND CHECK THA T IT IS F ASTENED. PRESS THE INFLATION BUTTON (C) A FEW TIMES TO CHECK THAT THE SPRING (2) HAS THE CORRECT "RETURN" MOTION.

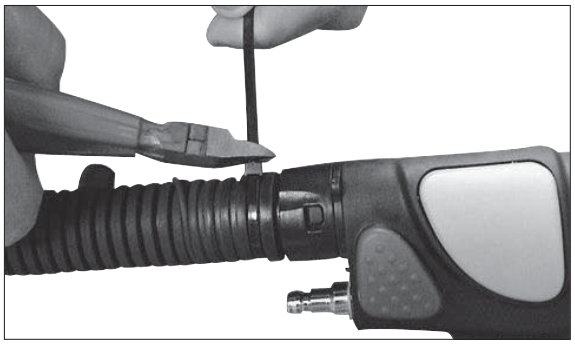
31. Install the 21-mm Inflator Adaptor (189) on the Air Control Body.



32. Fasten the Plastic Seeger (208) in place, and then attach the Fastening Sleeve on the Air Control Body.

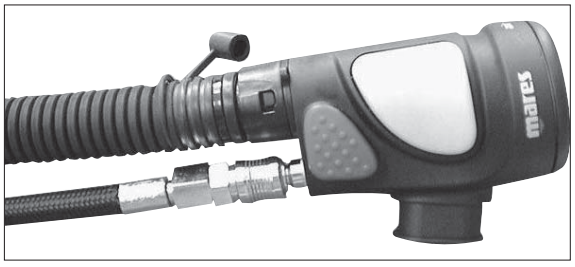


33. Insert the hose inside the 21-mm Adaptor (189) apply the Ring clamp 3.6x200 (42), trimming away the excess.



34. Connect the Quick Hose Coupler to the Air Control and bring the Hose cover into position.

35. Screw the Hose (55) to a Low-pressure (LP) port on the 1st stage using a 14-mm open end wrench (B-18). If you removed it previously, install the Mouthpiece (44) with a new Clamp (43).



NOTE IF USING A TORQUE WRENCH, USE TIGHTENING TORQUE OF 4 - 4.5 N/m.

Slowly open the tank valve, checking for any air leaks. Press the Inflation Button (216) until the BC fully inflates and the over-expansion relief valve opens.

Deflate the BC using the R.E. valve and the Purge Button (203). Repeat this operation a few times to make sure that the Air Control Unit functions properly.

DRAWING NO. E42	AIR-CONTROL	UPDATED: 02/02/2010

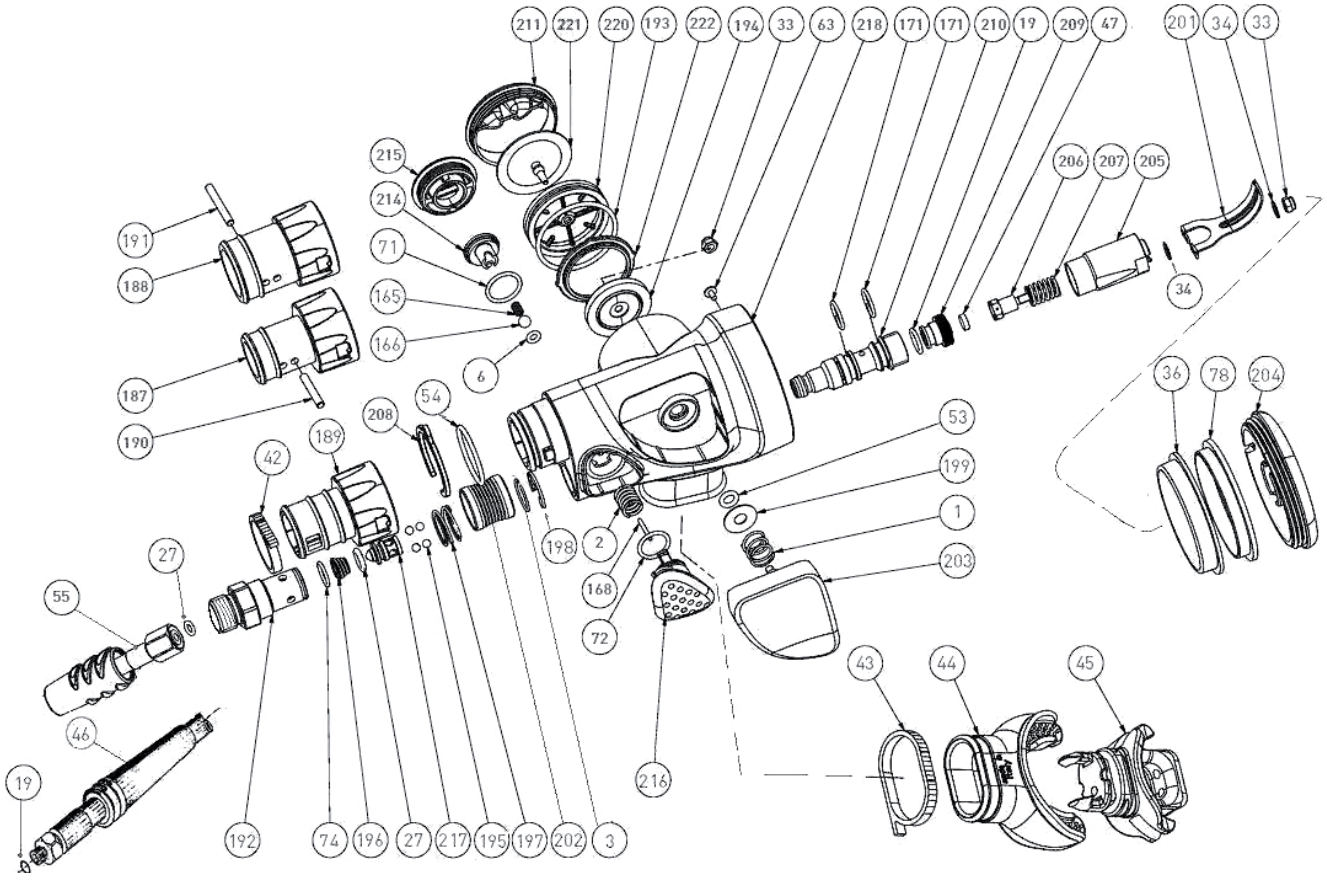


Table No 132	AIR-CONTROL	UPDATED: 14/12/2009

N. NO.	CODE	DESCRIPTION
1	46185011	Spring Deflate ButtonAIR 2k9
2	47200744	Spring Inflate ButtonAIR 2k9
3	46201040	Snap Ring
6	46110101	OR 2012
19	46110106	OR 106
27	46110205	OR 2025
33	46185051	Locknut, Demand Lever
34	46185049	Washer
36	46200311	DIAPHRAGM, 2ND STAGE REG.
42	45179863	Clamp 3,6x200
43	47157984	Mouthpiece Clamp
44	46200855	Mouthpiece BK (10 pics)
45	46186090	Octopus Plug
46	46179902	Hose Protector
47	46185060	Rubber Seat III
53	46110204	OR 2021
54	46110221	OR 2081
55	46200998	Hose SFX 3/8"
63	46184289	Pin-Cover
71	46110211	OR 2050
72	46110215	OR 2043
74	46110107	OR 2031
78	46200321	DIAPHRAGM Plastic RING
165	43163807	Spring Inflating Valve
166	47200807	Steel Ball 3/16"
168	---	Pin Ergo 2K5
171	46110110	OR 2037
187	A1	Inflator Adaptor 20 mm
188	A2	Inflator Adaptor 25 mm
189	46201036	Inflator Adaptor 21 mm
190	A1	Metal Pin 3x20
191	A2	Metal Pin 3x25
192	###	Quick Connector Body
193	46110175	OR 2125

N. NO.	CODE	DESCRIPTION
194	46201033	Exhaust Diaphragm LP Inflator
195	###	Steel Ball d3,2
196	46201009	Conical Spring
197	46201008	Quick Connector Spring
198	46201007	Retaining Ring
199	46201031	Metal Washer
201	46201044	Demand Lever AirControl
202	###	Quick Connector Slider
203	46201019	Purge Button Silver
204	46201029	Cover Air Control
205	46201028	Poppet Housing
206	46201027	Poppet metal body regs
207	46185059	Spring Regulator
208	46201026	Plastic Segeer
209	46201012	Poppet Seat
210	46201015	Male Connector
211	46201025	Exaust Valve Cap
214	46201024	O-Ring seat
215	46201023	Inflating Plug
216	---	Inflating Button Red
217	46201016	Quick Connector Shutter
218	46201021	Corpo AirControl
220	46187025	Exaust Valve Seat
221	46184006	Exaust Valve
222	46201020	Spacer Ring
		ASSEMBLIES
***	46201065	Service Kit Octopus (19-33-43-47-63-171-193-198-221)
°°°	46201064	Service Kit Inflator (3-6-19-27-33-42-53-54-71-72-74-216)
###	46201066	Quick Connector Assembled Female
		(3-27-74-192-195-196-197-202-217)
---	46201067	Inflating Button Red assembled (72-168-216)
A1	46201068	Adaptor d20 Air Control (42-54-187-190-208)
A2	46201069	Adaptor d25 Air Control (42-54-188-191-208)

DRAWING NO : J106	AIR DUMP VALVE 2k3	UPDATED: 04/02/2004

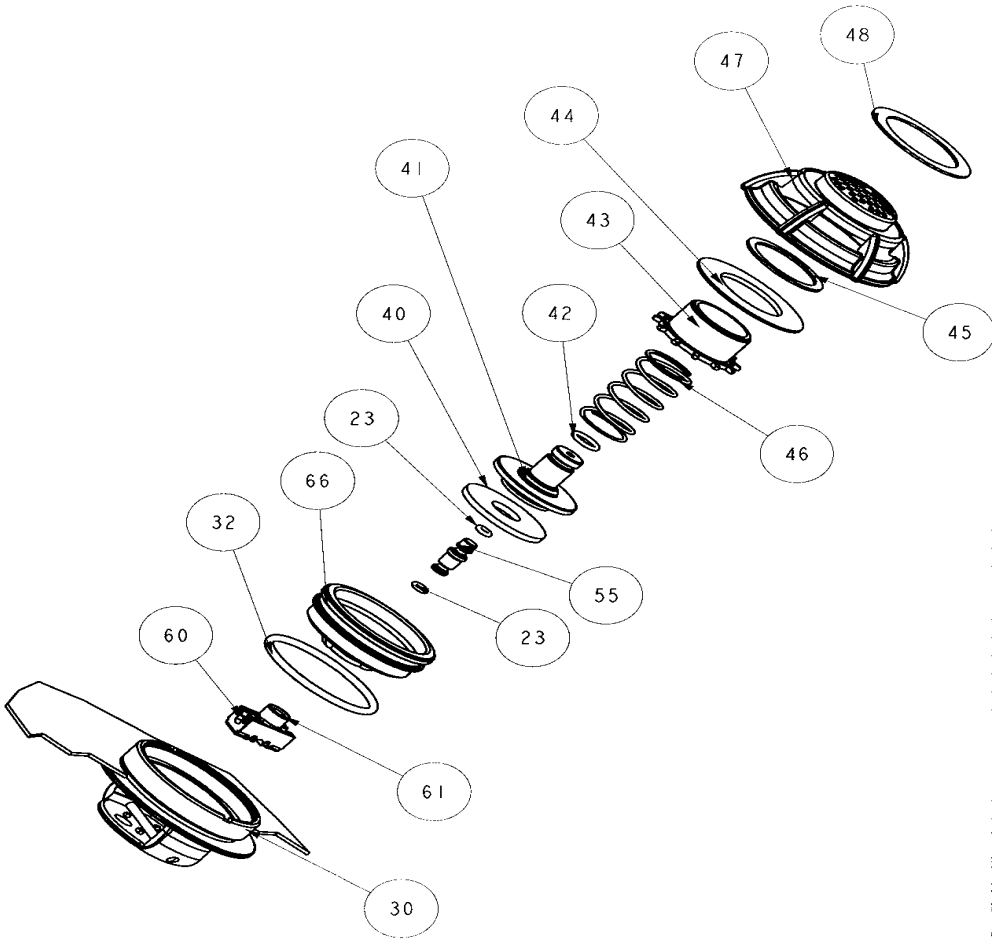


CHART NO : 254	AIR DUMP VALVE 2k3					UPDATED : 22/01/2007	
REF	CODE	DESCRIPTION	€	REF	CODE	DESCRIPTION	€
23	46110102	O-RING 2015		55	47200717	OR HOUSING SPLIDLE CPL	
30	N/A	BLADDER		60	47200710	LP ONE WAY INSERT	
32	47200723	O-RING 3175		61	47200709	LP TWO WAY INSERT	
40	47158727	SEALING PLATE (DISK)		66	47200711	VALVE SEAT 2003	
41	47200725	PISTON VALVE A.T. 2003					
42	46110110	O-R 2037				ASSEMBLIES	
43	46200026	NUT DIAPHRAGM		* * *	47200759	SERVICE KIT AIR DUMP VALVE 2003	
44	47158728	DIAPHRAGM				(23 - 32 - 42 - OR 2012 - OR 2056 - 3100)	
45	47158737	WASHER		= = =	47200734	LP PIPE ASSEMBLY 45 cms, (24-25-26-36)	
46	47158701	SPRING PNEUMATIC VALVE		= = =	47200735	LP PIPE ASSEMBLY 60 cms, AIRTRIM	
47	47200727	BEZEL POPPET (VALVE RING) 2003		= = =	47200736	LP PIPE ASSEMBLY 75 cms, AIRTRIM	
48	47200564	LABEL EXHAUST VALVE HUB		= = =	47200737	LP PIPE ASSEMBLY 120 cms, AIRTRIM	

ATLAS ADJ
SECOND STAGE

ATLAS ADJ. NECESSARY EQUIPMENT AND SUPPLIES

Tool	Description	Code
	Allen wrench (1.5 mm) B-46	46201388
	B-22	46106222
	Allen wrench (4 mm)	No code
	B-17 (17 mm)	46106217
	Allen wrench (2.5 mm) B-53	46201754

Tool	Description	Code
	B-18 (14 mm)	46106218
	B-4 (5 mm)	46106204
	Pliers (type Usage 133)	No code
	O-ring removal tool	46201387

- Circuit or tank for delivery of compressed air (185-200 bar)
- Compressed air gun (8-10 bar)
- Ultrasound cleaner and descaling solution (e.g., Deox Extra) or similar
- Test bench (no. 416920) or differential pressure gauge
- Triblolub 2080 silicone grease by Lubrication Technology or an equivalent
- Neoprene work mat (449822)
- Second stage maintenance kit no. 46201729
- Nylon brush
- Phillips screwdriver (Usag 326 PH 0) or equivalent
- Cutting nippers

ATLAS ADJ. DISASSEMBLY

NOTE

While performing maintenance procedures or overhauls, you must have the ATLAS ADJ maintenance manual available.

1. Remove the dust cap and move the hose cover away from the first stage. Unscrew the hose (34) with a 14-mm wrench (B-18).
2. Using cutting nippers (or pliers), cut the mouthpiece clamp (38) and remove the mouthpiece (37).

NOTE

Be especially careful to avoid breaking the mouthpiece.

3. Disconnect the Hose Cover from the 2nd stage.
4. With two 17-mm wrenches (B-17), remove the hose (34) from its second stage connector (31).
5. Remove the O-rings from each end of the hose (34).
6. Remove the exhaust tee (36) from the second stage case (17).
8. Remove the exhaust valve (35).
9. Remove the safety pin (18) from the purge button (C).
10. Unscrew the cover (26).

WARNING

DISASSEMBLING THE COVER UNIT AND THE PURGE BUTTON TO CLEAN THEIR COMPONENTS (PURGE BUTTON, SPRING, AND ADHESIVE) CAN CAUSE IRREPERABLE DAMAGE AND IS NOT USUALLY NECESSARY. THE COVER UNIT AND THE PURGE BUTTON CAN BE CLEANED WITH A NYLON BRUSH AND A GENTLE DETERGENT SOLUTION. IF ALL DIRT AND INCRUSTED MATERIAL CANNOT BE REMOVED THROUGH CLEANING, OR IF THE MOVEMENT OF THE PURGE BUTTON IS LIMITED, REPLACE THEM.

11. Remove the diaphragm (21) and its ring (22).
12. Using the 17-mm wrench (B-17), remove the hose connector (31) from the second stage case (17).
13. Remove the spacer ring (29) from the hose connector (31).

3

4


9


11


12


13

ATLAS ADJ. DISASSEMBLY

14. Remove the O-ring (27) from the second stage body (17).

WARNING

USE A PLASTIC TOOL TO REMOVE THE POPPET SEAT (33) FROM THE HOSE CONNECTOR (31), NOT A METAL ONE.

15. Remove the O-ring (30) from the hose connector (31). Next remove the poppet seat (33) from the hose connector. Insert a 5mm hex key into the short side of the hose connector to engage the poppet seat (33) Counter clockwise turn the hex key and unscrew the poppet seat(33) approsimately 15 to 20 full turns, or until the threads of the poppet seat (33) are completely disengaged from the internal threads of the hose connector (31). Using a soft/plastic tool or wooden dowel, insert it into the long end of the hose connector (31) and press the poppet seat (33) out of the short side of the hose connector (31). Remove the O-ring (32) from the poppet seat (33)
16. Remove the O-ring (30) from the hose connector (31).
17. Remove the O-ring (32) from the poppet seat (33).
18. Remove the label (1) from the knob.
19. With a 2.5-mm Allen wrench (B-53), unscrew the knob screw (2).
20. Remove the upper (3) and lower (4) part of the knob.
21. Remove the plastic clip (19) with a flathead screwdriver.

WARNING

THAT ONCE THE HOSE CONNECTOR IS REMOVED AND THE PLASTIC CLIP (19) IS REMOVED THE BALANCING TUBE ASSEMBLY CAN DISCHARGE UNEXPECTEDLY FROM THE SIDE OF THE 2ND STAGE CASE.


14


15


16/17


19


20


20.a


21

ATLAS ADJ. DISASSEMBLY

22. Pull out the adjustment/balancing system unit and the demand lever (20) from the case (17).

22

NOTE

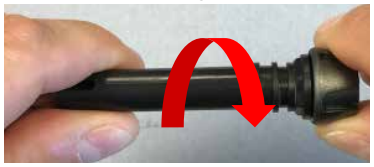
Press downward on the setting screw while unscrewing (23a).

23. Disassemble the setting screw (7). To do this, first rotate the lower section (4) of the knob clockwise until the setting screw (7) turns freely. Then, using a flathead screwdriver, finish unscrewing and press the setting screw (7) downward.

22.a

24. Remove the O-ring (6) from the balancing tube (5).

25. Using a 2.5-mm Allen wrench, detach the pre-setting screw (9) from the setting screw (7).



23

26. Remove the O-ring (8) from the setting screw (7) and the O-ring (10) from the pre-setting screw (9).

27. Completely disassemble the balancing system unit:

    27.1 Remove the LP chamber (11).

    27.2 Remove the first washer (12).

    27.3 Remove the spring (13).

    27.4 Remove the second washer (12) from the balancing piston (15).

    27.5 Remove the two O-rings from the balancing piston (15).

    27.6 Remove the rubber seat (16) from the balancing piston (15).

23.a

23.b

25/26

27

ATLAS ADJ. INSPECTION AND CLEANING

Reusable rubber and plastic components

Cleaning

Clean all rubber and plastic components by washing them in a solution of warm water and mild detergent. Scrub with a soft brush if needed. Do not use abrasive cleansers, solvents, or acids on rubber components.

Inspection

Check for any wear and/or excessive damage on all reusable rubber and plastic components. Replace as needed.

WARNING

SOLVENTS AND ACIDS CAN RUIN PLASTIC AND RUBBER PARTS. BEFORE CLEANING METAL COMPONENTS, MAKE SURE THAT ALL RUBBER AND PLASTIC PARTS HAVE BEEN REMOVED.

Metal parts

Cleaning

Chrome-plated, brass, and stainless steel parts should be cleaned by immersing them in an ultrasound cleaner containing a descaling agent such as Deox Extra or a solution of white vinegar diluted with hot water. To remove any stubborn deposits, a nylon brush may be used.

Before reassembling, make sure that you have rinsed all components in fresh water or a solution of equal parts of white vinegar and hot water 50/50 ratio and have left them to dry completely.

Inspection

Check for any wear and/or excessive damage on all components. Replace as needed.

ATLAS ADJ. SECOND STAGE MAINTENANCE KIT

Certain key components of the second stage must be replaced during the overhaul. These components are included in the Atlas ADJ second stage maintenance kit (code 46201729) and are marked with RED BOXES above.

MAINTENANCE KIT n. 46201729

ATLAS ADJ. REASSEMBLY

NOTE

Lubrication reduces the likelihood of damage during reassembly. Before beginning reassembly, lightly grease all the O-rings with Tribolube-2080 from Lubrification Technology or an equivalent.

28. Be careful when installing a new exhaust valve (35), gently pulling the silicone valve stem through the hole in the exhaust valve seat on the second stage.

WARNING

EXCESSIVE TRACTION ON THE BODY CAN DAMAGE THE EXHAUST VALVE.

29. With cutting nippers, cut the final section of the exhaust valve body (35) at approximately half its length.
30. Install the rubber seat (16) on the balancing piston (15).
31. Install the two O-rings (14) on the balancing piston (15).
32. Install the first washer (12) on the LP chamber (11).
33. Install the second washer (12) on the balancing piston (15).
34. Install the balancing piston spring (13) on the latter (15).
35. Install the LP chamber (11) on the balancing piston (15).
36. Install the O-ring (10) on the pre-setting screw (9).
37. Install the O-ring (8) on the setting screw (7).
38. Using a 2.5-mm Allen wrench, insert the pre-setting screw (9) onto the setting screw (7).

NOTE

Screw the pre-setting screw down fully.

39. With a 2.5-mm Allen wrench, replace the setting screw assembly in the balancing tube (5).

NOTE

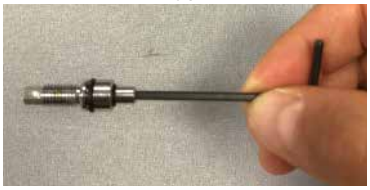
Screw the pre-setting screw down fully.

28

30/31

32-33-34

35



38

38.a

39

39.a

39.b

ATLAS ADJ. REASSEMBLY

40. Install the O-rings (6) in the balancing tube (5).

41. Insert the balancing piston unit in the balancing tube (5).

NOTE

The balancing piston unit must be inserted in the balancing tube (5) as shown in the figures (41.A).

42. Install the balancing tube (5) in the second stage case (17).

NOTE

The flat part of the balancing tube (5) must be installed facing upward, as shown in the figure (42).

43. Install the demand lever (20) on the balancing piston (15).

NOTE

The foot of the demand lever must be inserted in the grooves of the balancing tube (5), as in the figure (43).

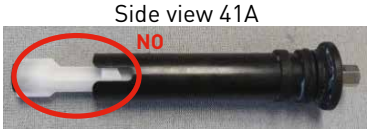
44. Press the balancing tube (5) into the second stage case (17) until fully inserted.

45. Block the balancing tube (5) with the plastic clip (19).

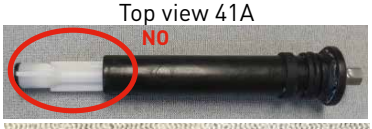
Side view 41A

Top view 41A

Side view 41A



Top view 41A



41.b

42.a

43

44/45

ATLAS ADJ. REASSEMBLY

46. Install the O-ring (27) on the second stage body (17).
47. Install the O-ring (32) on the poppet seat (33).
48. Install the O-ring (30) on the hose connector (31).
49. Insert the poppet seat (33) into the hose connector (31).
50. Insert the 5mm hex wrench (B-4) into the hex side of the poppet seat (16). Insert the tapered end of the poppet seat (16) into the short side of the hose connector (14) until it stops. The screw the poppet seat (16) clockwise until it stops (Do Not Overt Tighten). Then unscrew the poppet seat (16) (turn counter clockwise) the poppet seat 3 1/4 turns.
51. Insert the spacer ring (29) on the hose connector (31).
52. Insert the insert (28) on the first stage body (17).
53. Insert the hose connector (31) with the spacer ring (29) in the second stage case (17) and tighten with the 17-mm wrench (B-17).

46

47/48

49-50-51

52/53

ATLAS ADJ. REASSEMBLY

55

NOTE

To avoid any problems during reassembly, apply a small quantity of silicone grease on the O-ring-side threading of the hose connector (31).

WARNING

IF USING A TORQUE WRENCH, USE TIGHTENING TORQUE OF APPROXIMATELY 8 N/m.

54. Install the O-ring (32) on the end of the LP hose (34) that runs to the second stage, and the O-ring (8) on the one to the first stage.

55. With two wrenches (B-17), connect the LP hose (34) to the corresponding connector (31).

WARNING

BEFORE CONNECTING THE HOSE COVER TO THE VAD SYSTEM ADJUSTMENT KNOB, MAKE SURE THAT THE HOSE CONNECTOR IS FASTENED FIRMLY. IF IT ISN'T, IT COULD COME DISCONNECTED FROM THE SECOND STAGE CASE DURING USE.

56. Connect the LP hose (34) to the second stage (without cover) connected to the LP port on the first stage marked "DFC".

WARNING

IF USING A TORQUE WRENCH TO TIGHTEN THE LP HOSE, USE TIGHTENING TORQUE OF APPROXIMATELY 4 - 4.5 N/m.

WARNING

BEFORE PROCEEDING WITH REASSEMBLY, SET THE INTERMEDIATE PRESSURE AS DESCRIBED IN THE FIRST STAGE MAINTENANCE MANUAL.

WARNING

ALL THE ADJUSTMENTS INDICATED BELOW MUST BE PERFORMED WITH THE SECOND STAGE CONSTANTLY SUPPLIED WITH THE CORRECT INTERMEDIATE PRESSURE (IP).

ATLAS ADJ. REASSEMBLY

WARNING

THE FIRST STAGE INTERMEDIATE PRESSURE MUST BE MEASURED WHEN THERE IS NO AIR COMING OUT OF THE SECOND STAGE. FOR ANY ADJUSTMENTS TO THE FIRST STAGE, CONSULT THE CORRESPONDING SECTION OF THE APPROPRIATE MAINTENANCE MANUAL.

WARNING

HOLDING DOWN THE SECOND STAGE DEMAND LEVER, SLOWLY OPEN THE TANK VALVE AND, ALMOST SIMULTANEOUSLY, RELEASE THE DEMAND LEVER.

57. Insert the diaphragm (21) in the second stage case with the ring (22) already mounted with the plastic disk in contact with the demand lever.
58. Install the Purge Button assembly (C) on the second stage case (17).
59. Insert the safety pin (18).

57

63

ATLAS ADJ. ADJUSTMENT

60. Install the upper (3) and lower (4) sections of the knob on the setting screw unit (7).

61. Fully unscrew the lower section of the knob. Hold it firmly in position, and screw the pre-setting screw (9) 2 and ¼ turns (or 1/2 a turn for the octopus), accessing via the setting screw (7).

60

NOTE

Before verifying the cracking pressure, fully unscrew the knob unit.

61

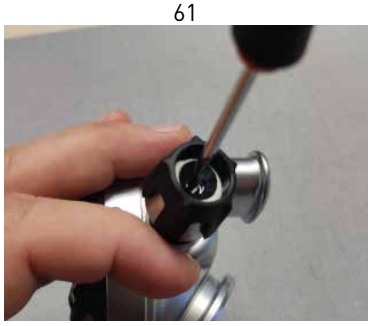
62. Recheck the intermediate pressure (9.8 - 10.2 bar).

63. Connect the second stage to a differential pressure gauge.

64. Measure the second stage cracking pressure.

WARNING

THE CRACKING PRESSURE SHOULD BE READ WHEN THE INTERMEDIATE PRESSURE BEGINS TO DROP.



65

	Test bench Differential pressure gauge cm/H_2O	Test bench Differential pressure gauge cm/H_2O *Tolerance*	Test bench Differential pressure gauge inches/H_2O	Test bench Differential pressure gauge inches/H_2O *Tolerance*
Atlas ADJ	**2.2 - 3.0**	**-0.5 / +1.4**	**1.0 - 1.3**	**-0.2 / +0.5**
OCT.Atlas ADJ	**2.5 - 3.2**	**-0.8 / +1.1**	**1.1 - 1.4**	**-0.3 / +0.4**

65. If the cracking pressure falls outside the acceptable interval, proceed as follows:

65.1 If the value of cracking pressure is lower, tighten the setting screw (7) ¼ a turn at a time. It's not generally necessary to turn more than 1 complete turn.

65.2 If the value of cracking pressure is higher, unscrew the setting screw (7) ¼ a turn each time. It's not generally necessary to back off more than half a turn.

NOTE

Follow the steps described below until you achieve the acceptable cracking pressure value.

NOTE

All adjustments to the setting screw (7) must be done with the lower section of the knob (4) completely unscrewed.

ATLAS ADJ. REASSEMBLY

66. Install the lower (4) and upper (3) sections of the knob on the setting screw unit.
67. Install the knob screw (2) and label (1).

67

NOTE

Fully unscrew the knob unit and affix the label as shown.

68. Disassemble the regulator from the tank knob.
69. Correctly assemble the mouthpiece (37), securing it with a new mouthpiece clamp (38).
70. Inhale directly from the second stage mouthpiece to reveal any leaks from inside the case.
71. Install the hose cover.

67.a

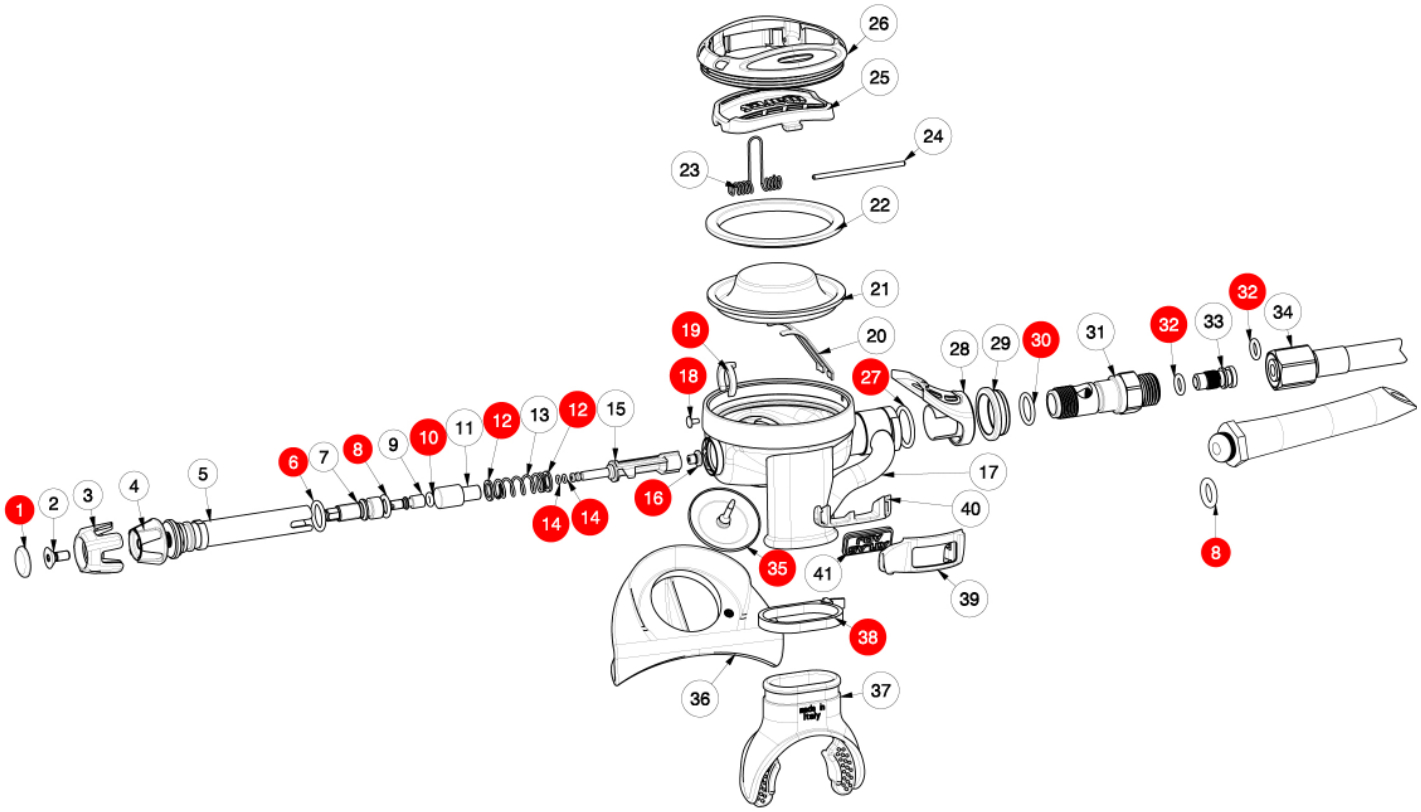
ATLAS ADJ. TROUBLESHOOTING

Problem	Probable Cause	Solution
Continuous or intermittent air leaks from the second stage	Rubber seat (16) damaged	Replace the rubber seat
	Sealing surface of poppet seat (33) dirty or damaged	Clean or replace the poppet seat
	The IP exceeds the acceptable interval	Adjust the IP to (9.8 - 10.2 bar)
	Demand lever set too high	Adjust it to the correct height
	Balancing piston spring (12) out of position or damaged	Position correctly or replace
	Incorrect adjustment of the setting screw (7) (too low)	Adjust correctly
Cracking pressure higher than acceptable interval	Demand lever set too low	Adjust it to the correct height
	IP outside acceptable interval	Adjust the IP to (9.8 - 10.2 bar)
	Tank valve not fully open	Fully open the tank valve.
	Second stage poppet spring deformed or damaged	Replace the poppet spring
	First stage filter clogged	Overhaul first stage and replace the filter
	Incorrect adjustment of the setting screw (7)	Adjust correctly

ATLAS ADJ. TROUBLESHOOTING

Problem	Probable Cause	Solution
Continuous or intermittent air leaks from the second stage	IP outside acceptable interval	Adjust the IP to (9.8 - 10.2 bar)
	Balancing piston spring (13) deformed or damaged	Replace it
	Demand lever set too high	Adjust it to the correct height
	Incorrect adjustment of the setting screw (7) (too low)	Adjust correctly
Traces of water inside the second stage	Exhaust valve support dirty	Clean the support
	Exhaust valve (35) damaged	Replace the exhaust valve
	Diaphragm (21) dirty, damaged, or positioned incorrectly	Clean, position correctly, or replace
	Mouthpiece (37) loosened or damaged	Replace the clamp; replace the mouthpiece
Vibration of the second stage during the inhale	Diaphragm (21) positioned incorrectly	Check and reposition correctly
	Incorrect adjustment of the demand lever	Check and adjust correctly
	Balancing piston spring (13) damaged or positioned incorrectly	Check and reposition correctly or replace

ATLAS ADJ. DRAWING E 1372 Updated: 24 Feb 2022



ATLAS ADJ. TABLE 137 Updated: 24 Feb 2022

TABLE N.: 137		ATLAS ADJ SECOND STAGE - OCTOPUS ATLAS ADJ			UPDATED: 24 Feb 2022
REF	**CODE**	**DESCRIPTION**	**REF**	**CODE**	**DESCRIPTION**
1	46201607	KNOB LABEL	27	46110220	OR 2062
2	46201612	KNOB SCREW	28	46202117	ATLAS SIDE ADAPTER
3	46201616	UPPER KNOB	29	46200779	SPACER RING
4	46201637	LOWER KNOB	30	46110114	OR 114
5	46201555	BALANCING TUBE	31	46201689	HOSE CONNECTOR
6	46110110	OR 2037	32	46110205	OR 2025
7	46201557	SETTING SCREW	33	46200204	POPPET SEAT
8	46110106	OR 106	34	46201379	LP HOSE 3/8" SFX black 75 cm WO/HOSE PROTECTOR
9	46201559	PRE-SETTING SCREW	34	46201381	LP HOSE 3/8" SFX yellow 100 cm WO/HOSE PROTECTOR
10	46110101	OR 2012	35	46201194	EXHAUST VALVE, SECOND STAGE
11	46201560	LP BALANCING CHAMBER	36	46201309	EXHAUST TEE
12	46201648	WASHER BALANCED PISTON	37	E	MOUTHPIECE
13	46201561	BALANCING PISTON SPRING	38	47157984	CLAMP MOUTHPIECE
14	46201606	OR 5-101	39	A	Label holder UPPER
15	46201604	BALANCING PISTON	40	A	Label holder lower
16	46201605	RUBBER SEAT	41	A	LABEL
17	----	SECOND STAGE BODY			
18	46184289	SAFETY PIN COVER			
19	46201563	PLASTIC CLIP			
20	46201564	DEMAND LEVER	**SETS**		
21	46201364	DIAPHRAGM, BLACK	---	46201729	E.U.D. ADJ SECOND STAGE MAINTENANCE KIT
22	46200773	DIAPHRAGM RING	E	46200855	PACKAGE OF 10 BLACK MOUTHPIECES
23	C	BUTTON SPRING	C	46201817	ATLAS CPL PURGE BUTTON
24	C	BUTTON PIN	**NOTE**		
25	C	BUTTON	The components marked in red are included in the maintenance kit 46201729.		
26	C	BUTTON RING			

ULTRA ADJ SECOND STAGE

ULTRA ADJ. REQUIRED TOOLS AND SUPPLIES

Tool	Description	#Code
	Hex 1,5mm B-46	46201388
	B-22	46106222
	Hex 4mm	No code
	B-17 (17mm)	46106217
	Hex 2,5 mm B-53	46201754

Tool	Description	#Code
	B-18 (14mm)	46106218
	B-4 (5mm)	46106204
	Pliers (type Usag 133)	No code
	O-Ring removal Tool	46201387

- Compressed air supply circuit or tank (2600-2900 PSI/ 185-200 bar)
- Compressed air gun (120-145 PSI/8-10 bar)
- Ultrasonic cleaner & Descaling solution (e.g. Deox Extra type) or similar
- Test Bench (#416920) or Magnehelic gauge
- Silicone grease Tribolube-2080 Lubrification Technology or equal
- Neoprene Workpad (449822)
- Second Stage service kit # 46201729
- Nylon brush
- Phillips screwdriver (Usag 326 PH 0) or similar
- Nippers

ULTRA ADJ. DISASSEMBLY

NOTE

The Ultra ADJ Service Manual, should be readily available for reference while performing all maintenance and/or service procedures.

1. Remove the Dust Cap and move the hose cover away from the First Stage. Unscrew the Hose (32) using a 14-mm wrench (B-18).
2. Using cutting nippers (or pliers), cut the Mouthpiece Clamp (22) and remove the Mouthpiece (25).

3

NOTE

Take special care to avoid breaking the Mouthpiece.

3. Using sing the special Tool (B-22), extract the Exhaust Plug Pin (33), and remove it
4. Remove the Inspection Plug (26) and the Exhaust Valve (43).
5. Using a 1,5mm Allen wrench, remove the Setscrew (30).
6. Unscrew the Hose Protector.
7. Using two 17mm wrenches (B-17) remove the Hose (32) from the Second Stage Hose Connector (40).
8. Remove the O-rings (8 – 46) from each end of the Hose (32).
9. Remove the Hose Connector (40) from the Second Stage using the 17mm wrench (B17).
10. Remove the O-rings (39) from the Hose Connector (40).

5

6

WARNING

GENTLY PRESS THE TOOL (B-4) TO DISLODGE THE POPPET SEAT (33).

7

11. Using the hex wrench (B-4), remove the Poppet Seat (29) from the Hose Connector (40).

9

WARNING

TO REMOVE THE POPPET SEAT (29) FROM THE HOSE CONNECTOR (40) USE A PLASTIC TOOL. DO NOT USE A METAL TOOL.

12. Remove the O-ring (46) from the Poppet Seat (29).
13. Remove the ADJ VAD Knob (21) and the Flex Ring (28) from the Second Stage, and the O-ring (45) from the Case (27).

13

ULTRA ADJ. DISASSEMBLY

WARNING

DISASSEMBLING THE COVER ASSEMBLY AND PURGE BUTTON TO CLEAN THE COMPONENT PARTS (PURGE BUTTON, SPRING, AND DECAL) CAN CAUSE IRREPARABLE DAMAGE TO THE PARTS AND IS USUALLY UNNECESSARY. THE COVER ASSEMBLY AND PURGE BUTTON CAN BE CLEANED WITH A NYLON BRUSH AND MILD DETERGENT SOLUTION. IF CLEANING DOES NOT REMOVE ALL DIRT AND ENCRUSTED MATERIAL, OR IF PURGE BUTTON MOVEMENT IS RESTRICTED, IT HAS TO BE REPLACED.

14. Remove the Insert (20), and the Side Adapter (35).
15. Remove the Safety Pin Cover (37).
16. Unscrew the Cover (C).
17. Remove the Diaphragm (17) and the Diaphragm Ring (42).
18. Remove the Knob Label (1).
19. Using a 2,5mm hex wrench (B-53), unscrew the Knob Screw (2), and release the Upper Knob (3) and the Lower Knob (4).
20. Remove the Plastic Clip (44), using a flat screwdriver.

14

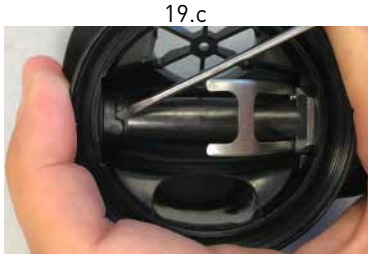
16

17

19.a

19.b

19.c



20

20.a

ULTRA ADJ. DISASSEMBLY

21. Take the Regulating/Balancing System complete and the Demand Lever (16) out form the Case (27).

22. Disassemble the Adjusting Screw (7). To do that, first use the Lower Knob (4), turning it clockwise until the Adjusting Screw (7) spins freely. Then use a flat screwdriver to finish unscrewing and press down the Adjusting Screw (7).

NOTE

Press down on the Adjusting Screw whilst unscrewing:

23. Disassemble O-ring (6) from the Balancing Tube (5)

24. Using a 2,5mm Allen wrench, disassemble the Pre-setting Screw (9) from the Adjusting Screw (7).

25. Disassemble O-ring (8) from the Adjusting Screw (7), and O-ring (10) form the Pre-setting Screw (9).

26. Completely disassemble the Balancing System Assy:

    26.1 Remove the LP Chamber (11)

    26.2 Remove the first Washer (34)

    26.3 Remove the Spring (12)

    26.4 Remove the second Washer (34) from Balancing Piston (13)

    26.5 Remove the two O-rings (14) from Balancing Piston (13)

    26.6 Remove the Rubber Seat (15) from Balancing Piston (13)

27. Remove the Balancing Tube Bushing (18)

21

22.a

22.b

22.c

24-25

26

ULTRA ADJ. INSPECTION AND CLEANING

Reusable Rubber and Plastic Components

Cleaning

Clean all rubber and plastic components by washing them in a mixture of warm water and mild detergent. If necessary, scrub parts with a soft brush. Do not use abrasive cleaners, solvents or acids on rubber components.

Inspection

Inspect all reusable rubber and plastic components for excessive wear and/or damage. Replace parts as necessary.

WARNING

SOLVENTS AND ACIDS MAY DAMAGE PLASTIC AND RUBBER PARTS. BEFORE CLEANING METAL COMPONENTS, MAKE SURE THAT ALL RUBBER AND PLASTIC PARTS HAVE BEEN REMOVED.

Metal Components

Cleaning

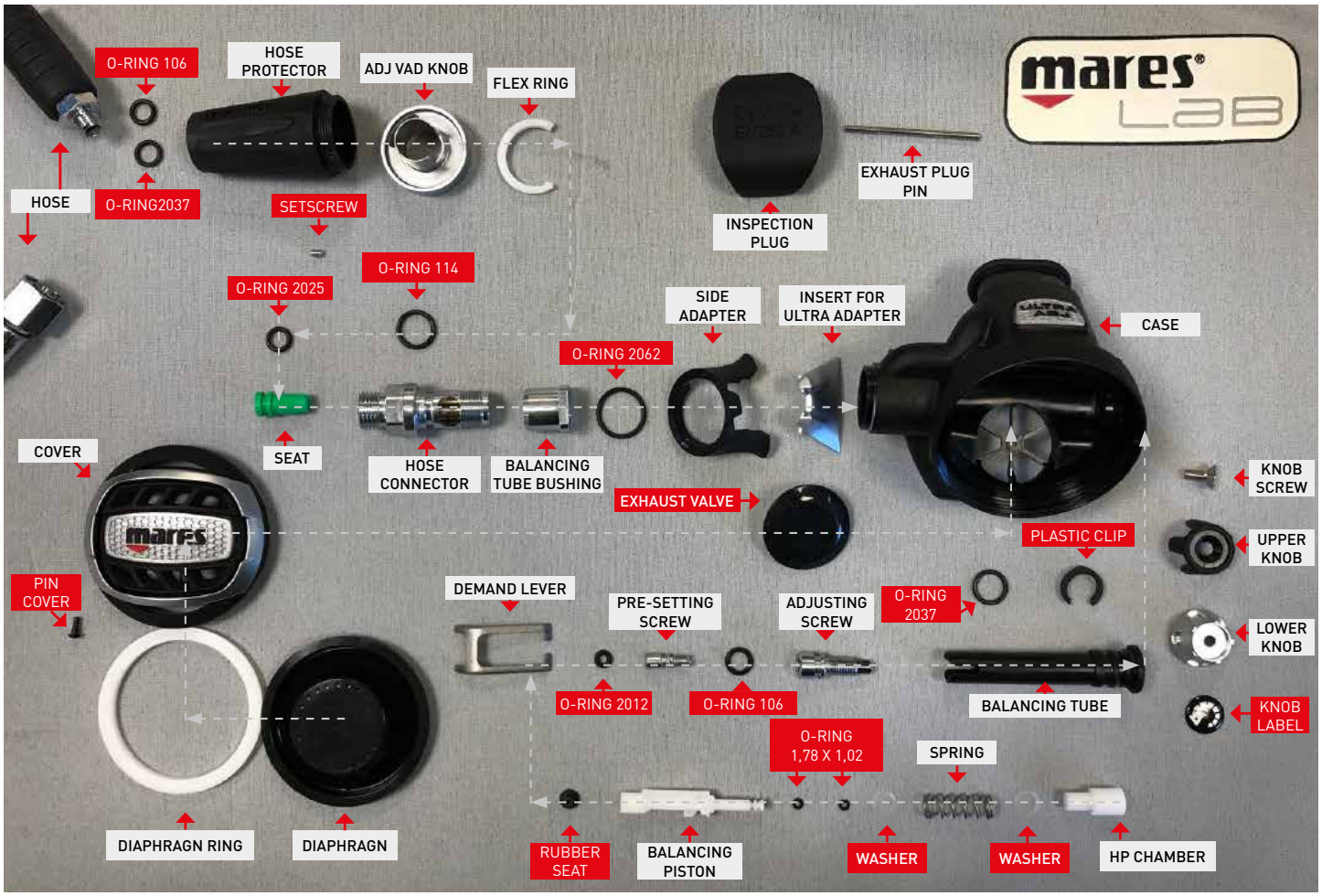
Chrome plated, brass, and stainless steel parts are cleaned by immersing them in an ultrasonic cleaner containing a de-scaling agent such as Deox Extra or a solution of white vinegar diluted with hot water. A nylon brush may be used to remove any stubborn deposits.

Be sure to rinse all parts in fresh water and allow to completely dry before proceeding with reassembly.

Inspection

Inspect all parts for excessive wear and/or damage. Replace parts as necessary.

ULTRA ADJ. SECOND STAGE SERVICE KIT



Certain key components of the Second Stage should be replaced during the overhaul. These key parts are included in the Ultra ADJ Second Stage Service Kit (Code 46201729) and are identified in the RED BOXES above.

SERVICE KIT # 46201729

ULTRA ADJ. REASSEMBLY

NOTE

Lubrication reduces the likelihood of damage during reassembly. Before beginning the reassembly procedure, lightly lubricate all O-rings with Tribolube-2080 Lubrification Technology or equal.

28. Carefully install a new Exhaust Valve (43) by gently pulling the silicone valve stem through the hole of the Second Stage exhaust valve seat.

WARNING

PULLING TOO HARD ON THE STEM MAY CAUSE DAMAGE TO THE EXHAUST VALVE.

29. Use cutting nippers to cut the end section of the Exhaust Valve Body (43) at approximately half it's length.
30. Install the Rubber Seat (15) on the Balancing Piston (13).
31. Install the two O-rings (14) on the Balancing Piston (13).
32. Install the first Washer (34) on the LP Chamber (11)
33. Install the second Washer (34) on the Balancing Piston (13).
34. Install the Balancing Piston Spring (12) on the Balancing Piston (13).
35. Assemble the LP Chamber (11) on the Balancing Piston (13).
36. Install the O-ring (10) on the Pre-setting Screw (9).
37. Install the O-ring (8) on the Adjusting Screw (7).
38 Using a 2,5mm Allen wrench, assemble the Pre-setting Screw (9) on the Adjusting Screw (7).

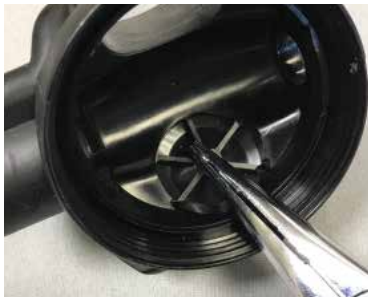
NOTE

Screw in the Pre-setting screw until it stops.

39. Using a 2,5mm Allen wrench, assemble the Adjusting Screw Assy in the Balancing Tube (5).

NOTE

Screw in the Adjusting Screw Assy until it stops


28


30-31

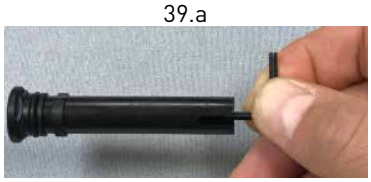

33-34


35


38.a


38.b


39.a


39.b


39.c

ULTRA ADJ. REASSEMBLY

40. Install the Balancing Tube Bushing (18) into the Second Stage Case (27).

41. Install O-rings (6) into the Balancing Tube (5)

42. Insert the Balancing Piston Assy into the Balancing Tube (5)

NOTE

The Balancing Piston Assy has to be assembled into the Balancing Tube (5) as shown by pics (42a)

43. Install the Balancing Tube (5) in the Second Stage Case (27)

NOTE

The flat part of the Balancing Tube (5) has to be installed facing up, as shown by pic (43a)

44. Install the Demand Lever (16) in the Balancing Piston

NOTE

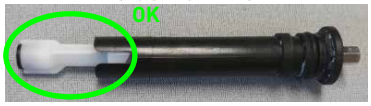
The feet of the Demand Lever must be inserted into the grooves of the Balancing Tube (5), pic (44)

45. Press the Balancing Tube (5) into the Second Stage Case (27) until it is seated in the Balancing Tube Bushing (18)

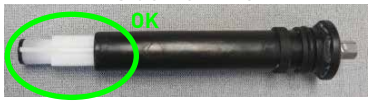
46. Lock the Balancing Tube (5) by using the Plastic Clip (44)

40

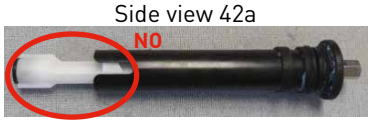
Side view 42a



Side view 42a



Side view 42a

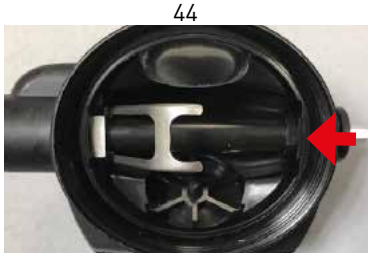


Side view 42a

43.a

43.b

44



46-46

ULTRA ADJ. REASSEMBLY

47. Install the O-ring (45) on the Hose Connector opening of the Case.
48. Install the Insert for Ultra Cover (20) on the Side Adapter Ultra (35), and assemble them on the Second Stage Case (27).
49. Install the O-ring (46) on the Poppet Seat (29)
50. Install the O-Ring (39) on the Hose Connector (40)
51. Insert the Poppet Seat into the Hose Connector (40).

WARNING

GENTLY PRESS THE TOOL (B-4) TO SCREW THE POPPET SEAT (29).

52. Using the 5mm hex wrench (B-4), screw the poppet seat (29) all the way into the Hose Connector (40) until it stops (Do not over tighten). Loosen (turn counter clockwise) the Poppet Seat 2 turns and 3/4
53. Install the Flex Ring (28) on the Hose Connector opening following one of the two steps described below:

    Option a – Install the Flex Ring (28) on the Hose Connector as show in the picture

    Option b – Install the Flex Ring (28) inside the ADJ VAD Knob (21)
54. Install and press down the ADJ VAD Knob (21) in the Hose Connector opening as shown in the picture, lining up the VAD hole with the by-pass

48.a

48.b

53.a

53.b

53.b

54

ULTRA ADJ. REASSEMBLY

55. Insert the Hose Connector (40) into the Second Stage Case (27) and tighten with the 17mm wrench (B-17).

55

NOTE

To avoid any possible issue during the reassembly procedures, put a small quantity of silicone grease on the O-ring side threads of the Hose Connector (40)

WARNING

IF USING A TORQUE WRENCH, USE A TIGHTENING TORQUE OF APPROXIMATELY 8 Nm/ 6 ft lb.

56. Install the O-ring (46) in the Second Stage end of the LP Hose (32) and the O-Ring (8) in the First Stage end of the Hose.

57. Using two wrenches (B-17), connect the LP Hose (32) to the Hose Connector (40).

57

NOTE

Completely unscrew the Knob Assy before checking the Cracking Effort.

WARNING

MAKE SURE THE HOSE CONNECTOR IS SECURELY TIGHTENED BEFORE CONNECTING THE HOSE PROTECTOR TO THE ADJUSTABLE VAD KNOB. FAILURE TO DO SO MAY RESULT IN THE HOSE CONNECTOR DISCONNECTING FROM THE SECOND STAGE CASE DURING USE.

58. Connect the LP Hose (32) with the Second Stage attached (without the Second Stage cover installed) to the First Stage LP Port.

WARNING

IF USING A TORQUE WRENCH TO TIGHTEN THE LP HOSE, USE A TIGHTENING TORQUE OF APPROXIMATELY 3-3,5 ft lb / 4 *4,5 Nm.

WARNING

BEFORE GOING AHEAD WITH THE REASSEMBLY PROCEDURE, SET THE INTERMEDIATE PRESSURE AS DESCRIBED IN THE FIRST STAGE SERVICE MANUAL.

WARNING

ALL THE ADJUSTMENTS BELOW MUST BE MADE WITH THE SECOND STAGE CONSISTENTLY SUPPLIED WITH THE CORRECT INTERMEDIATE PRESSURE (IP).

ULTRA ADJ. REASSEMBLY

WARNING

THE FIRST STAGE INTERMEDIATE PRESSURE MUST BE MEASURED WHEN THERE IS NO AIR COMING OUT OF THE SECOND STAGE. FOR ANY NECESSARY FIRST STAGE ADJUSTMENTS, REFER TO THE CORRESPONDING SECTION OF THE RELATED SERVICE MANUAL.

WARNING

HOLDING DOWN THE SECOND STAGE DEMAND LEVER, SLOWLY OPEN THE TANK VALVE AND, ALMOST SIMULTANEOUSLY, RELEASE THE DEMAND LEVER.

NOTE

If freeflow happens, please go to step 60. Completely unscrew the Lower Knob, hold it in place and screw in the presetting screw (9) until freeflow stops. You can then continue with step 55.

59. Insert the Diaphragm (17) into the Second Stage Case with the Ring (42) already assembled, plastic disk in contact with the Demand Lever.
60. Install the Cover (C) on the Second Stage Case (27).
61. Insert the Safety Pin (37).

59

60

61

ULTRA ADJ. ADJUSTMENT

62. Install the Upper Knob (3) and the Lower Knob (4) on the Adjusting Screw Assy (7).

63. Completely unscrew the Lower Knob, hold it in place still and then screw in the presetting screw (9) a half turn (or 3/4 times for the octopus) by entering via the Adjusting Screw (7)

64. Recheck Intermediate Pressure (9.8-10.2 bar/ 142-148 psi).

65. Attach the Second Stage to a Magnehelic gauge.

66. Measure the Second Stage Cracking Effort

	Test Bench Magnehelic gauge cm /H_2O	Test Bench Magnehelic gauge cm /H_2O *Tollerance*	Test Bench Magnehelic gauge Inch/H_2O	Test Bench Magnehelic gauge Inch/H_2O *Tollerance*
Ultra ADJ	**2.5 - 3.2**	**-0.5 / +1.4**	**1.0 - 1.3**	**-0.2 / +0.5**
OCT.Ultra ADJ	**2.8 - 3.5**	**-0.8 / +1.1**	**1.1 - 1.4**	**-0.3 / +0.4**

67. If the Cracking Effort is outside of the acceptable range, proceed as described below :

67.1 If the Cracking Effort value is lower, screw the Adjusting Screw (7) a ¼ of a turn at a time. Usually it is not necessary to screw it more than 1 complete turn.

67.2 If the Cracking Effort value is higher than the acceptable range, unscrew the Adjusting Screw (7) a ¼ of a turn at a time. It is not usually necessary to unscrew it more than half a turn.

67.3 Check and, if necessary, adjust the height of the lever by screwing/ unscrewing the Popper Seat (29).

67.4 Measure the Second Stage Cracking Effort.

NOTE

Follow the steps described above until the acceptable cracking effort value is reached.

NOTE

All the adjustment on the Adjusting Screw (7) must be done with the Lower Knob (4) completely unscrew.

62

63

ULTRA ADJ. REASSEMBLY

68

68. Screw the Hose Protector to the VAD Knob (21) and, using a 1,5mm Allen wrench, screw the Setscrew (30) into the Hose Protector without tightening it too much
69. Install the Lower Knob (4) and the Upper Knob (3) on the adjusting Screw assy
70. Install the Knob Screw (2) and the Knob Label (1).

NOTE

Unscrew the Knob Assy completely and attach the label as shown.

71. Assemble the Inspection Plug (26) on the Second Stage, and secure it with the Exhaust Plug Pin (33).
72. Disassemble the regulator from the tank valve.
73. Carefully assemble the Mouthpiece (25), securing it with a new Mouthpiece Clamp (22).
74. Inhale directly from the second stage mouthpiece in order to detect any air leakage from inside the case

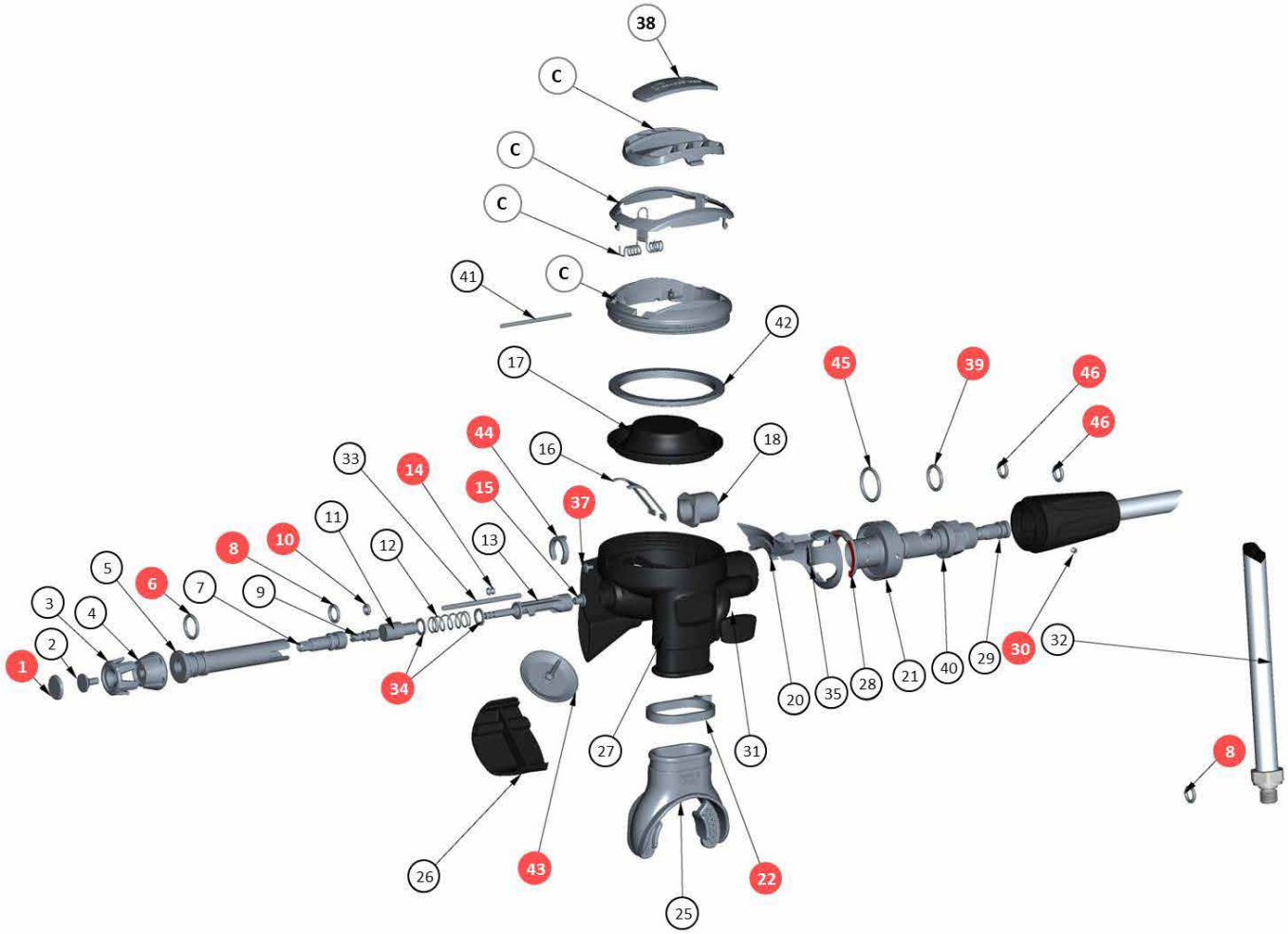
ULTRA ADJ. TROUBLESHOOTING

Problem	Probable Cause	Solution
Continuous or intermittent air flow from the Second Stage	Rubber Seat (15) Damaged	Replace Rubber Seat
	Sealing surface of the Poppet Seat (29) is dirty or damaged	Clean or replace Poppet Seat
	IP exceeds acceptable range	Adjust IP to (9,8 – 10,2 bar) (142 – 148 psi)
	Demand Lever set too high	Adjust to correct height
	Balancing Piston Spring (12) out of position or damaged	Position correctly or replace
	Incorrect Adjusting Screw (7) adjustment (too low)	Adjust properly
Cracking Pressure higher than acceptable range	Demand Lever set too low	Adjust to correct height
	IP outside of acceptable range	Adjust IP to (9,8 – 10,2 bar) (142 – 148 psi)
	Tank valve not fully opened	Completely open the tank valve
	Second Stage Poppet Spring deformed or damaged	Replace Poppet Spring
	First Stage filter clogged	Overhaul First Stage and replace filter
	Incorrect Adjusting Screw (7) adjustment	Adjust properly

ULTRA ADJ. TROUBLESHOOTING

Problem	Probable Cause	Solution
Continuous or intermittent air flow from the Second Stage	IP outside of acceptable range	Adjust IP to (9,8 – 10,2 bar) (142 – 148 psi)
	Balancing Piston Spring (12) deformed or damaged	Replace Balancing Piston Spring
	Demand Lever set too high	Adjust to correct height
	Incorrect Adjusting Screw (7) adjustment (too low)	Adjust properly
Traces of water inside Second Stage	Exhaust Valve support dirty	Clean support
	Exhaust Valve (43) damaged	Replace Exhaust Valve
	Diaphragm (17) dirty, damaged, or incorectly positioned	Clean, position correctly or replace
	Mouthpiece (25) loose or damaged	Replace the clamp; replace mouthpiece
Vibration sound from Second Stage during inhalation	Diaphragm (17) incorrectly positioned	Check and position correctly
	Incorrect Demand lever adjustment	Check and adjust correctly
	Balancing Piston Spring (12) damaged or incorreclty positioned	Check and Position correctly or replace

ULTRA ADJ. DRAWING E 1224 Updated: 24/08/2018



ULTRA ADJ. CHART 138 Updated: 21/12/2018

CHART NO: 138		SECOND STAGE ULTRA ADJ - OCTOPUS ULTRA ADJ			UPDATED: 21/12/2018
REF	**CODE**	**DESCRIPTION**	**REF**	**CODE**	**DESCRIPTION**
1	46201607	KNOB LABEL	31	C	ULTRA ADJ LABEL
2	46201612	KNOB SCREW	32	46201379	LP HOSE 3/8" SFX black 75 cm WO/HOSE PROTECTOR
3	46201616	UPPER KNOB	33	46200361	EXHAUST PLUG PIN
4	46201637	LOWER KNOB	34	46201648	WASHER BALANCED PISTON
5	46201555	BALANCING TUBE	35	46201632	SIDE ADAPTER, ULTRA
6	46110110	OR 2037	36	C	SPRING BUTTON
7	46201557	ADJUSTING SCREW	37	46184289	SAFETY PIN-COVER
8	46110106	OR 106	38	46201624	PURGE BUTTON LABEL ULTRA/ULTRA ADJ
9	46201559	PRE-SETTING SCREW	39	46110114	OR 114
10	46110101	OR 2012	40	46201290	HOSE CONNECTOR
11	46201560	LP CHAMBER	41	C	PIN 2x45
12	46201561	BALANCING PISTON SPRING	42	46200773	DIAPHRAGM RING
13	46201604	BALANCING PISTON	43	46201194	EXHAUST VALVE, SECOND STAGE
14	46201606	OR 1.78 X 1.02	44	46201563	PLASTIC CLIP
15	46201605	RUBBER SEAT	45	46110220	OR 2062
16	46201564	DEMAND LEVER	46	46110205	OR 2025
17	46201364	DIAPHRAGM BLACK	---	46201381	LP HOSE 3/8" SFX yellow 100 cm WO/HOSE PROTECTOR
18	46201627	BALANCING TUBE BUSHING	---	46186090	OCTOPUS PLUG
19	C	OUTER RING, ULTRA COVER	---	46201339	HOSE PROTECTOR SECOND STAGE OCTOPUS
20	46201634	INSERT FOR ULTRA ADAPTER	---	46201313	HOSE PROTECTOR SECOND STAGE
21	46201631	VAD KNOB, ULTRA/ULTRA ADJ			
22	47157984	CLAMP MOUTHPIECE	**ASSEMBLIES**		
23	C	FRAME ULTRA	C	46201735	COVER ASSEMBLY
24	C	PURGE BUTTON ULTRA	D	46201729	SERVICE KIT SECOND STAGE E.U.D. ADJ
25	E	MOUTHPIECE	E	46200855	10 PACK BLACK MOUTHPIECES
26	46201636	INSPECTION PLUG			
27	N/A	SECOND STAGE CASE			
28	46201311	FLEX. RING	**NOTE**		
29	46200204	POPPET SEAT	Parts highlighted in red are included in the service kits 46201729		
30	46201369	SETSCREW			

ULTRA
SECOND STAGE

ULTRA. REQUIRED TOOLS AND SUPPLIES

Tool	Description	#Code
	Hex 1,5mm	No code
	B-22	46106222
	Hex 4mm	No code
	B-6	46106206
	B-17 (17mm)	46106217
	O-Ring removal Tool	46201387

Tool	Description	#Code
	B-18 (14mm)	46106218
	B-4 (5mm)	46106204
	Pliers (type Usag 133)	
	B-12	46106212
	B-8 (6mm)	46106208

- Compressed air supply circuit or tank (2600-2900 PSI/ 185-200 bar)
- Compressed air gun (120-145 PSI/8-10 bar)
- Ultrasonic cleaner & Descaling solution (e.g. Deox Extra type) or similar
- Test Bench (#416920) or Magnehelic gauge
- Silicone grease Tribolube-2080 Lubrification Technology or equal
- Neoprene Workpad (449822)
- Second Stage service kit # 46201731
- Nylon brush
- Phillips screwdriver (Usag 326 PH 0) or similar
- Nippers

ULTRA. DISASSEMBLY

NOTE

The Ultra Service Manual, should be readily available for reference while performing all maintenance and/or service procedures.

1. Remove the Dust Cap (only Din version) and remove the hose cover from the First Stage. Unscrew the Hose (32) using a 14-mm wrench (B-18).
2. Using cutting nippers (or pliers), cut the Mouthpiece Clamp (35) and remove the Mouthpiece (14).

NOTE

Take special care to avoid breaking the Mouthpiece.

3. Using a 1,5mm Allen wrench, remove the Setscrew (30).
4. Unscrew the Hose Protector.
5. Using two 17mm wrenches (B-17) remove the Hose (32) from the Second Stage Hose Connector (37).
6. Remove the O-rings (38 - 34) from each end of the Hose (32).
7. Using the special Tool (B-22), extract the Exhaust Plug Pin (23), and remove it.
8. Remove the Inspection Plug (15).
9. Remove the Exhaust Valve (21).
10. Remove the Safety Pin Cover (26).
11. Unscrew the Cover (C).

WARNING

DISASSEMBLING THE COVER ASSEMBLY AND PURGE BUTTON TO CLEAN THE COMPONENT PARTS (PURGE BUTTON, SPRING, AND DECAL) CAN CAUSE IRREPARABLE DAMAGE TO THE PARTS AND IS USUALLY UNNECESSARY. THE COVER ASSEMBLY AND PURGE BUTTON CAN BE CLEANED WITH A NYLON BRUSH AND MILD DETERGENT SOLUTION. IF CLEANING DOES NOT REMOVE ALL DIRT AND ENCRUSTED MATERIAL, OR IF PURGE BUTTON MOVEMENT IS RESTRICTED, IT HAS TO BE REPLACED.

12. Remove the Diaphragm Ring (8) and the Diaphragm (6).

3


4

5


7

11


12

ULTRA. DISASSEMBLY

13. Using a 17mm wrenches (B-17) remove the Hose Connector (37) from the Second Stage Case (16)

13

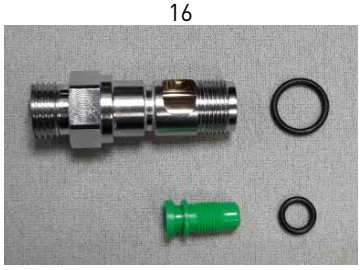
NOTE

Removing the Hose Connector may make the Lever Holder assy fall into the Second Stage Case (16).

15

14. Remove the Lever Holder assembly (4) from the Second Stage Case (16).
15. Remove the ADJ VAD Knob (29) and the Flex Ring (28) from the Second Stage, and the O-ring (25) from the Case (16).
16. Remove the Insert (10) and the Side Adapter (24).
17. Using a 4mm Allen wrench remove the Second Stage Plug Side Port (17). Remove the O-ring (38) from the Second Stage Plug Side Port (17).
18. Disassemble the Plastic Clip (19) and remove the Bushing (5), by pressing it from the inside of the Second Stage Case.
19. Remove the O-ring (7) from the Bushing (5).
20. Using the hex wrench (B-4), remove the Poppet Seat (18) from the Hose Connector (37).

16



20-21

WARNING

GENTLY PRESS THE TOOL (B-4) TO DISLODGE THE POPPET SEAT(18).

WARNING

TO REMOVE THE POPPET SEAT (18) FROM THE HOSE CONNECTOR (37) USE A PLASTIC TOOL. DO NOT USE A METAL TOOL.

21. Remove the O-ring (34) from the Poppet Seat (18) and the O-Ring (33) from the Hose Connector (37)

ULTRA. DISASSEMBLY

22. Position the Lever Holder assembly on the special Tool (B-6) and use the special 5.5mm wrench (B-12) to unscrew the Locknut (1) from the Demand Lever (3). Press down the Insert (4) to put pressure on the Spring Second Stage (31) and relieve the tension on the Demand Lever Locknut (1). While continuing to press down, use the special 5.5mm wrench (B-12) to remove the Locknut (1); then remove the Washer (2), and the Demand Lever (3).

22

WARNING

AFTER REMOVING THE LOCKNUT, WASHER, AND DEMAND LEVER, SLOWLY RELEASE THE PRESSURE ON THE POPPET SPRING WHILE COVERING IT WITH YOUR HAND. THIS WILL PREVENT THE UNCONTROLLED EXIT OF THE SPRING FROM THE SECOND STAGE CASE.

23. Remove the Rubber Seat (11) from the Poppet Body (22).

22.a

23

ULTRA. INSPECTION AND CLEANING

Reusable Rubber and Plastic Components

Cleaning

Clean all rubber and plastic components by washing them in a mixture of warm water and mild detergent. If necessary, scrub parts with a soft brush. Do not use abrasive cleaners, solvents or acids on rubber components.

Inspection

Inspect all reusable rubber and plastic components for excessive wear and/or damage. Replace parts as necessary.

WARNING

SOLVENTS AND ACIDS MAY DAMAGE PLASTIC AND RUBBER PARTS. BEFORE CLEANING METAL COMPONENTS, MAKE SURE THAT ALL RUBBER AND PLASTIC PARTS HAVE BEEN REMOVED.

Metal Components

Cleaning

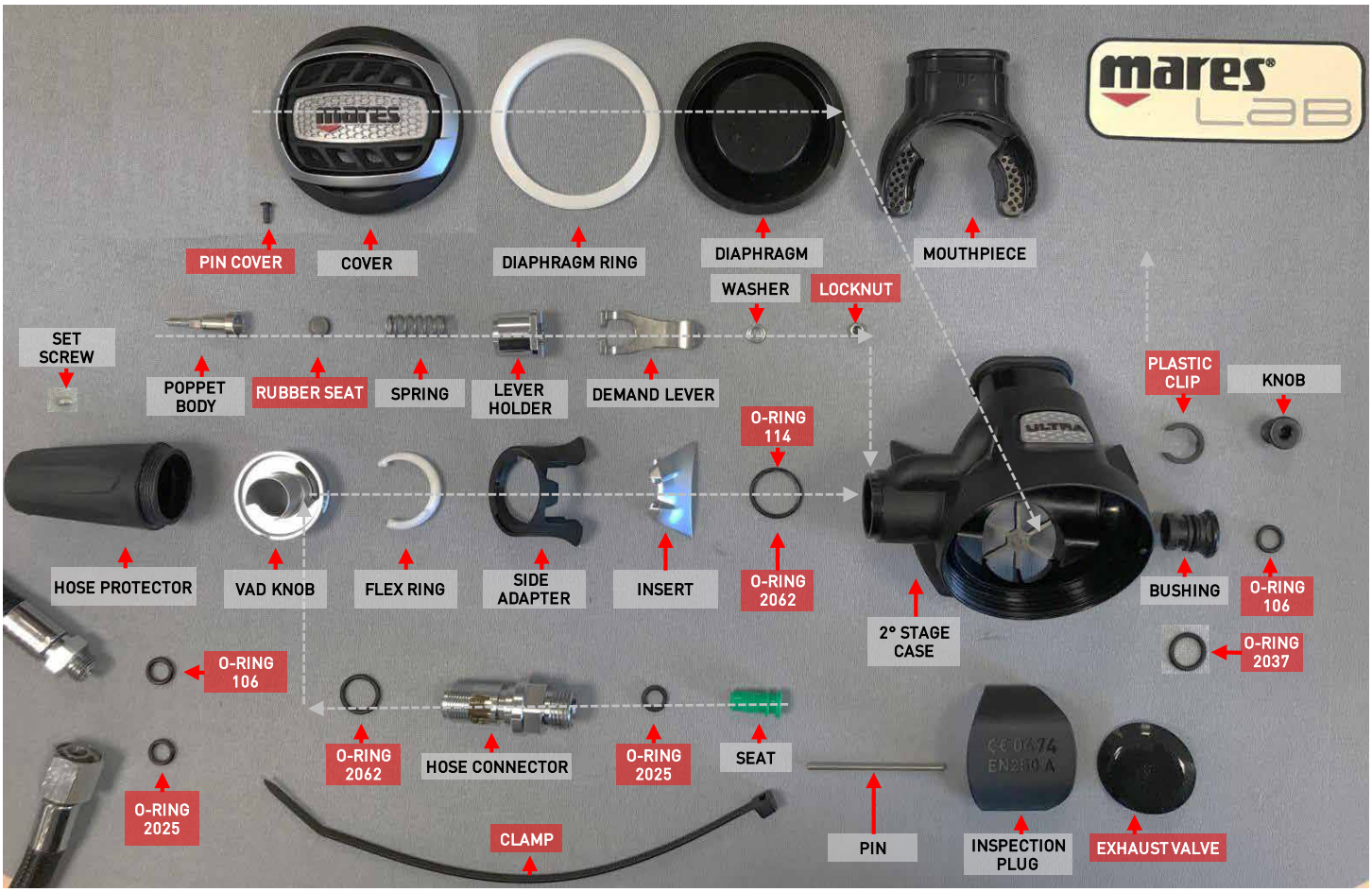
Chrome plated, brass, and stainless steel parts are cleaned by immersing them in an ultrasonic cleaner containing a de-scaling agent such as Deox Extra or a solution of white vinegar diluted with hot water. A nylon brush may be used to remove any stubborn deposits.

Be sure to rinse all parts in fresh water and allow them to dry completely before proceeding with reassembly

Inspection

Inspect all parts for excessive wear and/or damage. Replace parts as necessary.

ULTRA. SECOND STAGE SERVICE KIT



Certain key components of the Second Stage should be replaced during the overhaul. These key parts are included in the Ultra Second Stage Service Kit (Code 46201731) and are identified in the RED BOXES above.

SERVICE KIT # 46201731

ULTRA. REASSEMBLY

NOTE

Lubrication reduces the likelihood of damage during reassembly. Before beginning the reassembly procedure, lightly lubricate all O-rings with Tribolube-2080 Lubrification Technology or equal.

24. Carefully install a new Exhaust Valve (21) by gently pulling the silicone valve body through the hole of the Second Stage exhaust valve opening.

24

WARNING

PULLING TOO HARD ON THE STEM MAY CAUSE DAMAGE TO THE EXHAUST VALVE.

25. Use cutting nippers to cut the end section of the Exhaust Valve (21) Body at approximately half it's length.
26. Assemble the Inspection Plug (15) on the second stage, and secure it with the Exhaust Plug pin (23).
27. Insert the Rubber Seat (11) on the Second Stage Poppet Body (22).
28. Place the Spring Second Stage (31) onto the Poppet Body (22). Place the assembly on the special Tool (B-6) as illustrated.
29. Correctly position the Second Stage Poppet Body (22) and its spring into the Lever Holder (4) and hold it in place by gently pressing it.

26

NOTE

To be sure that the Second Stage Poppet Stem is correctly positioned into the Lever Holder hole, gently rotate the Lever Holder left and right on the B-6 Tool.

30. Properly position the Demand Lever (3) in the groove of the Lever Holder (4).

28

29-30

ULTRA. REASSEMBLY

31. Place the Washer (2) on the Poppet Stem and tighten the Locknut (1) 5 or 6 full turns using the special wrench (B-12).

WARNING

DEMAND LEVER (3) HEIGHT ADJUSTMENT REQUIRES THE USE OF SPECIAL TOOL B-12 (TYPE BETA 942BX5.5) OR A WRENCH WITH A HEAD DIAMETER OF NO MORE THAN 8.2mm /0.32 INCH.

WARNING

DO NOT OVER-TIGHTEN THE DEMAND LEVER LOCKNUT (1). DOING SO MAY RESULT IN A SECOND STAGE FREE FLOW, WHICH CAN INTERFERE WITH THE INTERMEDIATE PRESSURE ADJUSTMENT PROCEDURE.

NOTE

Press the Demand Lever a few times to be sure it moves freely.

32. Install the O-ring (34) on the Poppet Seat (18).
33. Install the O-Ring (33) on the Hose Connector (37)
34. Insert the Poppet Seat (18) into the Hose Connector (37).
35. Using the 5mm hex wrench (B-4), screw the poppet seat (18) all the way into the Hose Connector (37) until it stops (do not over tighten). Loosen (turn counter clockwise) the Poppet Seat 6-1/4 turns (main Second Stage) or 5-1/2 turns (Octopus version).

WARNING

THE POSITION OF THE POPPET SEAT MAY NOT BE DEFINITIVE AND CAN BE CHANGED IF THE VALUE OF THE CRACKING EFFORT IS NOT ACCEPTABLE.

36. Install the Insert (10) on the Side Adapter (24).
37. Position the Insert (10) and the Side Adapter (24) on the Second Stage Case (16).

31a

31b

36

37

ULTRA. REASSEMBLY

38. Install the O-ring (25) on the VAD Knob (29).

39. Install the Flex Ring (28) on the Hose Connector opening following one of the two steps described below.

    Option a – Install the Flex Ring (28) on the Hose Connector opening as shown in the picture.

    Option b – Install the Flex Ring (28) inside the ADJ VAD Knob (29).

40. Install and press down the ADJ VAD Knob (29) in the Hose Connector opening as shown in the picture, lining up the VAD hole with the by-pass.

38

Option a

Option b

40

ULTRA. REASSEMBLY

41. Correctly place the Lever Holder assembly (4) in the Second Stage Case (16).

42. While holding the Lever Holder (4), insert the Hose Connector (37) into the Second Stage Case and tighten with the 17mm wrench (B-17).

41

NOTE

To avoid any possible issues during the disassembly procedure, put a small quantity of silicone grease on the O-ring side threads of the Hose Connector (37).

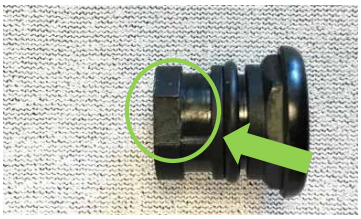
42

WARNING

IF USING A TORQUE WRENCH, USE A TIGHTENING TORQUE OF APPROXIMATELY 8 Nm/ 6 ft lb

WARNING

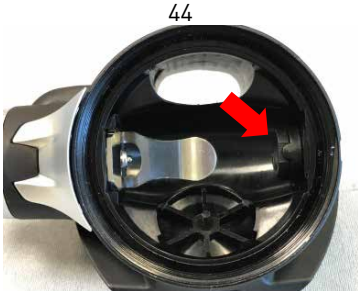
MAKE SURE THE HOSE CONNECTOR IS SECURELY TIGHTENED BEFORE CONNECTING THE HOSE PROTECTOR TO THE ADJUSTABLE VAD KNOB. FAILURE TO DO SO, MAY RESULT IN THE HOSE CONNECTOR DISCONNECTING FROM THE SECOND STAGE CASE DURING USE.



44

43. Install the O-ring (7) in the Bushing (5).

44. Install the Bushing (5) in the Second Stage case (16), and secure it with the Plastic Clip (19).



44.a

NOTE

The flat part of the Bushing (5) has to be installed facing up, as shown by pic (44).

45. Install the O-ring (34) in the Second Stage end of the LP Hose (32) and the O-Ring (38) in the First Stage end of the LP Hose.

46. Using two wrenches (B-17), connect the LP Hose (32) to the Hose Connector (37).

47. Connect the LP Hose (32) with the Second Stage attached (without the Second Stage cover installed) to the First Stage, using a 14-mm wrench (B-18).

WARNING

IF USING A TORQUE WRENCH TO TIGHTEN THE LP HOSE, USE A TIGHTENING TORQUE OF APPROXIMATELY 3-3,5 ft lb / 4 *4,5 Nm

ULTRA. REASSEMBLY

48

49-50

WARNING

BEFORE GOING AHEAD WITH THE REASSEMBLYING PROCEDURES, SET THE INTERMEDIATE PRESSURE AS DESCRIBED IN THE FIRST STAGE SERVICE MANUAL.

WARNING

ALL THE ADJUSTMENTS BELOW MUST BE MADE WITH THE SECOND STAGE CONSISTENTLY SUPPLIED WITH THE CORRECT INTERMEDIATE PRESSURE (IP).

WARNING

THE FIRST STAGE INTERMEDIATE PRESSURE MUST BE MEASURED WHEN THERE IS NO AIR COMING OUT OF THE SECOND STAGE. FOR ANY NECESSARY FIRST STAGE ADJUSTMENTS, REFER TO THE CORRESPONDING SECTION OF THE RELATED SERVICE MANUAL.

WARNING

HOLDING DOWN THE SECOND STAGE DEMAND LEVER, SLOWLY OPEN THE TANK VALVE AND, ALMOST SIMULTANEOUSLY, RELEASE THE DEMAND LEVER.

48. Insert the Diaphragm (6) into the Second Stage Case with the Ring (8) already assembled and plastic disk in contact with the Demand Lever.
49. Assemble the Cover assembly (C) on the Second Stage Case (16).
50. Insert the Safety Pin (26).
51. Insert the B-12 wrench through the adjusting hole in the Second Stage Case and secure it to the Demand Lever Locknut. Tighten the Demand Lever Locknut (1) until free-flow and loosen it until it stops. Then, unscrew the Demand Lever Locknut (1) with the (B-12) wrench, turning it by about 1/3.

WARNING

THE DEMAND LEVER IS ADJUSTED CORRECTLY WHEN THE AIR BEGINS TO FLOW WHEN THE PURGE BUTTON IS DEPRESSED BY ABOUT 4MM. THE SLIGHT TAPPING SOUND OF THE DEMAND LEVER TOUCHING THE METAL DISK OF THE SECOND STAGE DIAPHRAGM SHOULD BE AUDIBLE WHEN THE PRESSURIZED SECOND STAGE IS SHAKEN VIGOROUSLY UP AND DOWN.

ULTRA. ADJUSTMENT

MAGNEHELIC GAUGE

WARNING

ALL THE ADJUSTMENTS BELOW MUST BE MADE WITH THE SECOND STAGE CONSISTENTLY SUPPLIED WITH THE CORRECT INTERMEDIATE PRESSURE (IP).

52. Press the purge button a few times.
53. Recheck Intermediate Pressure (9.8-10.2 bar/ 142-148 psi).
54. Attach the Second Stage to a test bench or a Magnehelic gauge.

NOTE

During the check of the cracking effort, please be sure to close the bushing hole to avoid air infiltration.

55. Measure the Second Stage Cracking Effort.

WARNING

THE CRACKING EFFORT MUST BE READ THE MOMENT THE INTERMEDIATE PRESSURE STARTS TO DECREASE.

	Test Bench Magnehelic gauge cm /H_2O	Test Bench Magnehelic gauge cm /H_2O *Tollerance*	Test Bench Magnehelic gauge Inch/H_2O	Test Bench Magnehelic gauge Inch/H_2O *Tollerance*
Ultra	**2.8 - 3.5**	**-0.8 / +1.1**	**1.1 - 1.4**	**-0.3 / +0.4**
OCT.Ultra	**3 - 3.8**	**-1 / +0.8**	**1.2 - 1.5**	**-0.4 / +0.3**

56. If the Cracking Effort is outside of the acceptable range, proceed as described below :
    - 56.1 Unscrew the Hose Protector.
    - 56.2 Using two 17mm wrenches (B-17) remove the Hose (32) from the Second Stage Hose Connector (37).
    - 56.3 If the Cracking Effort value is lower than the acceptable range, screw in the Poppet Seat (21), a ¼ turn at a time until the value is correct.
    - 56.4 If the Cracking Effort value is higher than the acceptable range, unscrew the Poppet Seat (18), a ¼ turn at a time until the value is correct.
    - 56.5 Using two wrenches (B-17), connect the LP Hose (32) to the Hose Connector (37).
    - 56.6 Check and adjust the height of the lever as described in point 51.
    - 56.7 Measure the Second Stage Cracking Effort

NOTE

Follow the steps described at point 57 untill the acceptable range of value is reached.

ULTRA. REASSEMBLY

57. Shut off the HP air supply and purge all residual air.

58. Install the O-Ring (38) on the Plug Side Port (17).

62

62.a

WARNING

MAKE SURE THE HOSE CONNECTOR IS SECURELY TIGHTENED BEFORE CONNECTING THE HOSE PROTECTOR TO THE ADJUSTABLE VAD KNOB. FAILURE TO DO SO, MAY RESULT IN THE HOSE CONNECTOR DISCONNECTING FROM THE SECOND STAGE CASE DURING USE.

59. Assemble the Plug Side Port (17) , using a 4mm Allen wrench (B-8).

60. Screw the Hose Protector to the VAD Knob (29) and Screw the Setscrew (30) into the Hose Protector without tightening it too much.

61. Carefully assemble the Mouthpiece (14), securing it with a new Mouthpiece Clamp (35).

62. Disassemble the regulator from the tank valve.

63. Reinstall and tight the Dust Cup

64. Inhale directly from the Second Stage Mouthpiece in order to detect any air leakage from inside of the case.

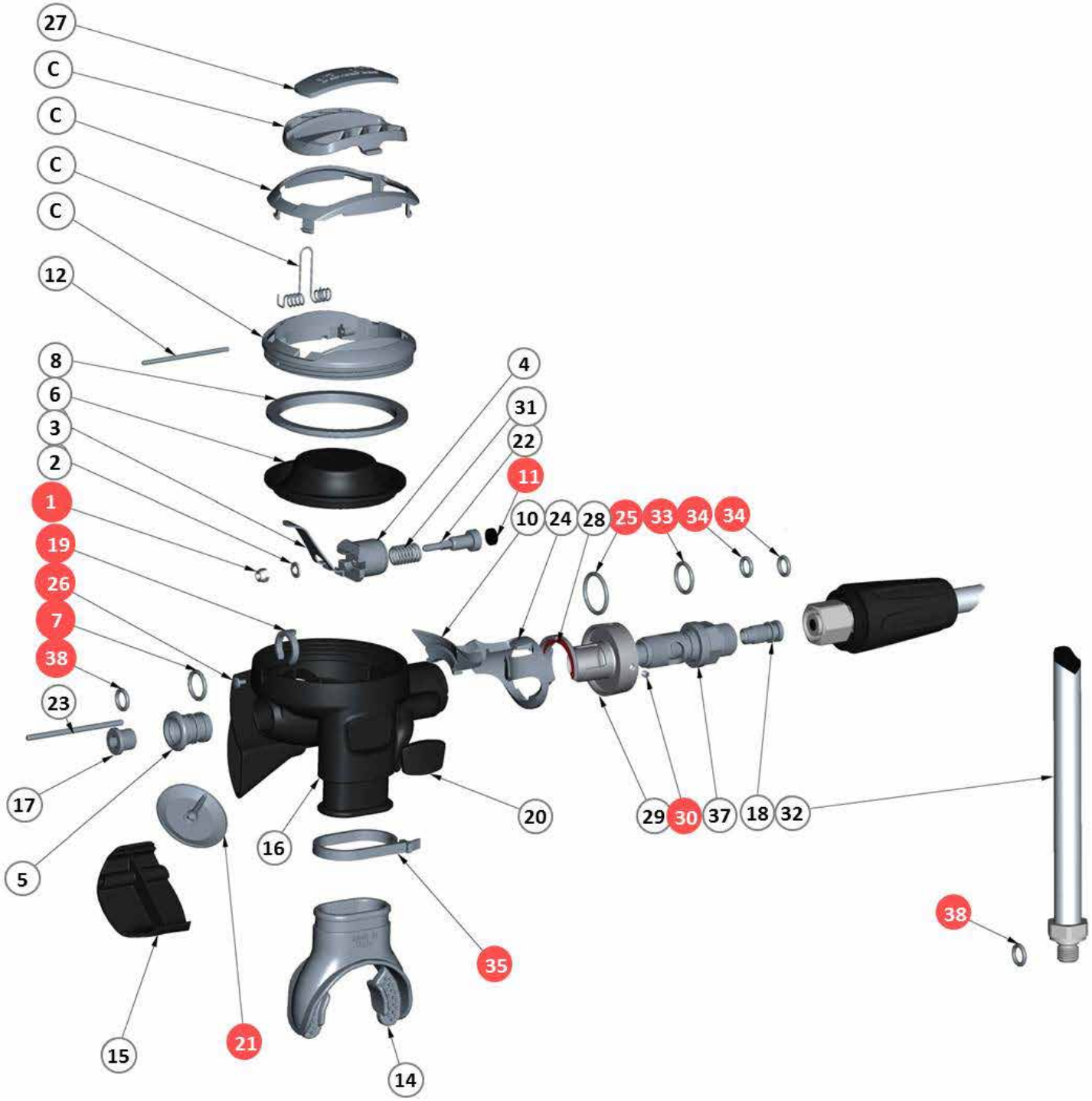
ULTRA. TROUBLESHOOTING

Problem	Probable Cause	Solution
Continuous or intermittent air flow from the Second Stage	Rubber Seat (11) Damaged	Replace Rubber Seat
	Sealing surface of the Poppet Seat (18) is dirty or damaged	Clean or replace Poppet Seat
	IP exceeds acceptable range	Adjust IP to (9.8 – 10.2 bar) (142 – 148 psi) Or Cold Water Kit (8.7 – 9.4 bar) (127 – 136 psi)
	Demand Lever set too high	Adjust to correct height
	Spring Second Stage (31) out of position or damaged	Position correctly or replace
	Incorrect Poppet Seat (18) adjustment (too low)	Readjust to 5 ½ turns
Cracking Pressure higher than acceptable range	Demand Lever set too low	Adjust to correct height
	IP outside of acceptable range	Adjust IP to (9.8 – 10.2 bar) (142 – 148 psi) Or Cold Water Kit (8.7 – 9.4 bar) (127 – 136 psi)
	Tank valve not fully opened	Completely open the tank valve
	Spring Second Stage (31) deformed or damaged	Replace Poppet Spring
	First Stage filter clogged	Overhaul First Stage and replace filter
	Incorrect Poppet Seat (18) adjustment (too high)	Readjust to 5 ½ turns
	High Poppet Spring tension	Replace Poppet Spring

ULTRA. TROUBLESHOOTING

Problem	Probable Cause	Solution
Cracking Pressure lower than acceptable range	IP outside of acceptable range	Adjust IP to (9.8 – 10.2 bar) (142 – 148 psi) Or Cold Water Kit (8.7 – 9.4 bar) (127 – 136 psi)
	Second Stage Poppet Spring deformed or damaged	Replace Poppet Spring
	Demand Lever set too high	Adjust to correct height
	Incorrect Poppet Seat (18) adjustment (too low)	Readjust to 5 ½ turns
Traces of water inside Second Stage	Exhaust Valve support dirty	Clean support
	Exhaust Valve (21) damaged	Replace Exhaust Valve
	Diaphragm (6) dirty, damaged, or incorectly positioned	Clean, position correctly or replace
	Mouthpiece (14) loose or damaged	Replace the clamp; replace mouthpiece
Vibration sound from Second Stage during inhalation	Diaphragm (6) incorrectly positioned	Check and position correctly
	Incorrect Demand lever adjustment	Check and adjust correctly
	Spring Second Stage (31) damaged or incorreclty positioned	Check and Position correctly or replace

ULTRA. DRAWING E 1225 Updated: 27/08/2018



ULTRA. CHART 140 Updated: 21/12/2018

CHART NO: 140		SECOND STAGE ULTRA - OCTOPUS ULTRA			UPDATED: 21/12/2018
REF	**CODE**	**DESCRIPTION**	**REF**	**CODE**	**DESCRIPTION**
1	46185051	LOCKNUT, DEMAND LEVER	28	46201311	FLEX. RING
2	46185049	WASHER, DEMAND LEVER	29	46201631	VAD KNOB, ULTRA/ULTRA ADJ
3	46200778	DEMAND LEVER	30	46201369	SETSCREW
4	46201625	LEVER HOLDER ULTRA/DUAL	31	46201404	SPRING SECOND STAGE
5	46201628	BUSHING ULTRA/DUAL	32	46201379	LP HOSE 3/8" SFX black 75 cm WO/HOSE PROTECTOR
6	46201364	DIAPHRAGM BLACK	33	46110114	OR 114
7	46110110	OR 2037	34	46110205	OR 2025
8	46200773	DIAPHRAGM RING	35	47157984	CLAMP MOUTHPIECE
9	C	OUTER RING, ULTRA COVER	36	C	SPRING BUTTON
10	46201634	INSERT FOR ULTRA ADAPTER	37	46201290	HOSE CONNECTOR
11	46184062	RUBBER SEAT SECOND STAGE	38	46110106	OR 106
12	C	PIN 2x45	39	C	FRAME ULTRA
13	C	PURGE BUTTON	---	46186090	OCTOPUS PLUG
14	E	MOUTHPIECE	---	46201381	LP HOSE 3/8" SFX yellow 100 cm WO/HOSE PROTECTOR
15	46201636	INSPECTION PLUG	---	46201339	HOSE PROTECTOR SECOND STAGE OCTOPUS
16	N/A	SECOND STAGE CASE	---	46201313	HOSE PROTECTOR SECOND STAGE
17	46201629	PLUG ULTRA/DUAL SIDE PORT			
18	46200204	POPPET SEAT	**ASSEMBLIES**		
19	46201563	PLASTIC CLIP	C	46201735	COVER ASSEMBLY
20	46201650	LABEL ULTRA	---	46201731	SERVICE KIT SECOND STAGE F.D.U.
21	46201194	EXHAUST VALVE, SECOND STAGE	E	46200855	10 PACK BLACK MOUTHPIECES
22	46201338	POPPET BODY, FUSION			
23	46200361	EXHAUST PLUG PIN			
24	46201632	SIDE ADAPTER, ULTRA			
25	46110220	OR 2062			
26	46184289	SAFETY PIN-COVER			
27	46201624	PURGE BUTTON LABEL ULTRA/ULTRA ADJ			

NOTE

Parts highlighted in red are included in the service kits 46201731

82X – 82X PVD FIRST STAGE

TB 37

REGULATOR SERVICE GUIDELINE AND SERVICE INTERVALS

MAR 23, 2020

This Technical Bulletin cancels and replaces BTM 25 released on October 10th 2015, and BTM25_R1 released on October 25th 2015, and the BTM 32 released on December 19th 2018.

Mares has revised the regulator service guidelines and service intervals. The new guidelines and intervals apply to all **in-line Mares diaphragm regulators** as of **September 1st 2015, except for the Abyss 22 NAVY II** regulator and octopus as noted below.

MARES REGULATOR SERVICE GUIDELINES AND SERVICE INTERVALS

PERFORM AN ANNUAL INSPECTION AND/OR SERVICE EVERY YEAR OR 100 DIVES

The Mares annual regulator inspection and/or service is performed by following the procedures and guidelines outlined on the annual inspection and/or service checklist (see attached). The results of the inspection may require a complete regulator overhaul.

A COMPLETE REGULATOR OVERHAUL MUST BE PERFORMED EVERY TWO YEARS OR 200 DIVES

A complete regulator overhaul must be performed per specifications every two years as outlined in the Mares Service Manual. This requires, at minimum, replacing all parts included in the service kit. Please see the annual regulator inspection and/or service checklist for details.

MARES ABYSS 22 NAVY II REGULATOR AND OCTOPUS

SERVICE PROCEDURES AND INTERVALS

Service procedures and intervals for the Abyss 22 Navy II Regulator and Octopus are different than those described above due to US Navy testing protocols. Below are the Service Guidelines for the Abyss 22 Navy II Regulator and Octopus:

Every Year or 100 Hours of use:
Mares recommends a complete overhaul every year or 100 hours of use.

Mares recommends the 1st Stage Tri-material Poppet (# 46200652) be replaced every two years or 200 hours of use, OR when signs of wear are present.

The Tri-material Poppet is **NOT** included in the Abyss 22 Navy II 1st Stage Service Kit. When ordering Abyss 22 Navy II 1st Stage Service Kit, please order the Tri-material Poppet as a separate line item.

NOTE

(In order to confirm to US Navy testing protocols, only service parts and procedures listed in the Abyss 22 Navy II schematics and service manual are to be used when servicing).

IMPORTANT

All service and repair procedures on Mares products should be performed by qualified Mares Service Technicians at authorized Mares Dealers and Service Centers. Service Technicians should have the Mares Service Manual and Spare Parts Catalog readily available for reference while performing service procedures and closely follow the recommended procedures and guidelines outlined in these materials.

ANNUAL REGULATOR INSPECTION CHECKLIST

MAR 23, 2020

Date...../...../..... Make / Model ..... Serial #.....

Customer Name..... Purchase Date..... / ...../.....

TEST 1	**Inspect Filter** Check for debris or discoloration.	□ Pass	□ Fail
TEST 2	**Inspect HP Chamber area** Inspect for dirty, rust, or corrosion.	□ Pass	□ Fail
TEST 3	**Hose Inspection (*)** Pull back hose protectors. Check that the hoses are secure in the hose crimp.	□ Pass	□ Fail
TEST 4	**Inspect 2nd Stage Exhaust Valve** Check valve and sealing surface for cleanliness, shape, and seal.	□ Pass	□ Fail
TEST 5	**Inspect Mouthpiece** Inspect for tears, cracks or holes. Replace if necessary.	□ Pass	□ Fail
TEST 6	**2nd Stage Diaphragm Inspection** Attempt inhalation without pressurization. Check for perfect seal.	□ Pass	□ Fail
TEST 7	**Intermediate Pressure Check** Check for stable IP. IP must be within acceptable range per Service Manual.	□ Pass	□ Fail
TEST 8	**Cracking Effort** Check CE. CE must be within acceptable range per Service Manual.	□ Pass	□ Fail
TEST 9	**Pressurized Immersion test** Pressurize and immerse unit. Test for any leaks.	□ Pass	□ Fail

(*): At the latest after five years of operation the flexible hose of your regulator should be taken out of service

IMPORTANT

1. **If the regulator fails Checklist Item 1, 2 or 9:**
   A complete Regulator Overhaul is required.
2. **If the regulator fails Checklist Item 7 or 8:**
   If the regulator can be adjusted within specification, it passes. If not, a Complete Overhaul is required.
3. **If the regulator fails Checklist Item 3, 4, 5,or 6:**
   The defective parts associated with the Checklist Item may be replaced,
   OR A Complete Regulator Overhaul may be performed

IMPORTANT

All service and repair procedures on Mares products should performed by qualified Mares Service Technicians at authorized Mares Dealers and Service Centers. Service Technicians should have the Mares Service Manual and Spare Parts Catalog readily available for reference while performing service procedures and closely follow the recommended procedures and guidelines outlined in these materials.

TB 38

SPRING 50N

SEPT 2020

The technical department of Mares S.p.A. announces a spring modification. The new spring is stronger than the previous, at 50N vs. 30N. The new spring is designed and tested to guarantee a better seal, especially in cold water.

The new 50N spring is longer and wider compared to the 30N spring, therefore it must be assembled **ONLY** with a new trimaterial Poppet and the new HP Chamber.

The new parts can easily be identified following the pictures below.

ACTUAL 30N VERSION	**NEW 50N VERSION**	IDENTIFICATION
SPRING 30N COD. **46201284** 	SPRING 50N COD. **46202047** 	- Longer: 24mm VS 20mm - Wider diameter: 9mm vs 8.5mm
Poppet Trimat. 2k18 CPL COD. **46201575** 	Poppet Trimat. 50NCPL COD. **46201784** 	- Bigger base: 12.2mm vs 11.5mm
HP Chamber COD. **46201275** 	HP Chamber 50N COD. **46202045** 	- Longer guide: 8.2mm vs 6mm - Wider diameter: 8.8mm vs 8.2mm

NOTE

1) The new parts already installed in the 62X and 28XR 1st stages

2) The new parts will be assembled in the 72X and 82X 1st stages as a running change

3) ONLY the 72X and the 82X can be updated with service Kit.: 46201791 Kit Upgrade First Stage 50N

4) As a consequence of point 3, the new service kits will be:

- 46201789 Service Kit first stage 72X-AST-50N

- 46201787 Service Kit first stage 82X-50N

WARNING

ALL SERVICE AND REPAIR PROCEDURES ON MARES PRODUCTS SHOULD BE PERFORMED BY QUALIFIED MARES SERVICE TECHNICIANS AT AUTHORIZED MARES DEALERS AND SERVICE CENTERS. SERVICE TECHNICIANS SHOULD HAVE THE MARES SERVICE MANUAL AND SPARE PARTS CATALOG READILY AVAILABLE FOR REFERENCE WHILE PERFORMING SERVICE PROCEDURES AND CLOSELY FOLLOW THE RECOMMENDED PROCEDURES AND GUIDELINES OUTLINED IN THESE MATERIALS.

TB 42-BIS

NEW TRIMATERIAL POPPET 2K22

DEC 2022

The technical department of Mares S.p.A. would like to announce a Trimaterial Poppet modification.
The new Poppet is softer than the previous one, designed and tested to provide a better seal, especially in cold water. The new parts can easily be identified following the pictures below.

ACTUAL 30N VERSION	ACTUAL 50N VERSION
Poppet Trimat. 2k18 CPL COD. 46201575 Poppet Trimat. 2k18 CPL COD. **46201575** 	Poppet Trimat. 50N CPL COD. **46201784** 
NEW 30N VERSION 2k22	**NEW 50N VERSION 2k22**
Poppet Trimat. 2k22 30N CPL COD. **46201815** 	Poppet Trimat. 2k22 50N CPL COD. **46201816** 

NOTE

1) The new poppet will be assembled in other Mares 1st stages as a running change.

2) As a consequence of TB42, the new service kits will be:

46201784	Poppet Trimat 50N cpl>	will be replaced by>	**46201816**	Poppet Trimat 2k22 50N CPL
46201575	Trimaterial Poppet 2k18 cpl>	will be replaced by>	**46201815**	Poppet Trimat 2k22 30N CPL
46201355	Service Kit 22X INT-DIN >	will be replaced by>	**46201827**	Service Kit 22X 2k22
46201370	Service Kit 12S INT-DIN >	will be replaced by>	**46201828**	Service Kit 12S-2k22
46201572	Service Kit 75XR DIN >	will be replaced by>	**46201829**	Service kit 1st Stage 75XR-30N-2k22
46201580	Service Kit 52X-15X-25XR INT DIN >	will be replaced by>	**46201830**	Service Kit 52X-15X-25XR-30N-2k22
46201739	Service kit first stage 82X >	will be replaced by>	**46201831**	Service kit first stage 82X-30N-2k22
46201741	Service kit 1st stage 52X/25XR AST >	will be replaced by>	**46201832**	Service kit 1st stage 52X/25XR AST-30N-2k22
46201744	Service kit NX 1ST 52X AST (EN 13949) >	will be replaced by>	**46201833**	Service kit NX 1st 52X AST (EN 13949) 2k22
46201780	Service kit 1st stage 72X AST >	will be replaced by>	**46201834**	Service kit 1st stage 72X AST-30N-2k22
46201820	Service Kit 15X-HRZ-30N-AST >	will be replaced by>	**46201835**	Service Kit 15X-HRZ-30N-AST-2k22
46201792	Service Kit first stage 62X INT/DIN >	will be replaced by>	**46201836**	Service Kit 62X 2k22
46201787	Service kit first stage 82x-50N >	will be replaced by>	**46201837**	Service Kit 82X-50N-2k22
46201789	Service kit first stage 72x-AST-50N >	will be replaced by>	**46201838**	Service Kit 72X-50N-2k22
46201802	Service Kit first stage 15X-50N-AST>	will be replaced by>	**46201839**	Service Kit 15X-50N-AST 2k22
46201800	Service Kit first stage 15X-50N >	will be replaced by>	**46201840**	Service Kit 15X-50N 2k22
46201807	Service Kit first stage 15X-HRZ-50N-AST>	will be replaced by>	**46201841**	Service Kit 15X-HRZ-50N-AST 2k22
46201783	Service Kit first stage 28XR DIN/NX>	will be replaced by>	**46201860**	Service Kit 28XR-DIN-NX-2k22
46201818	Service Kit first stage 25XR-50N-TBP>	will be replaced by>	**46201862**	Service Kit 25XR-2k22

WARNING

All service and repair procedures on Mares products should be performed by qualified Mares Service Technicians at authorized Mares Dealers and Service Centers. Service Technicians should have the Mares Service Manual and Spare Parts Catalog readily available for reference while performing service procedures and closely follow the recommended procedures and guidelines outlined in these materials.

82X. REQUIRED TOOLS AND SUPPLIES

Tool	Description	#Code
	B-18 (14mm)	46106218
	B-52 7/16"	46201746
	Hex 4mm	No code
	B-6	46106206
	B-16 (32mm)	46106216
	B-5	46106205
	B-50 AST Special Tool	46201551

Tool	Description	#Code
	B-8 (6mm)	46106208
	B-13 (10mm)	46106213
	B-21	46106221
	B-42	46201042
	B-47 O-ring removal Tool	46201387
	B-1 (25mm)	46106201

- Compressed diver grade air supply circuit or tank (2600-2900 PSI/ 185-200 bar)
- Compressed air gun (120-145 PSI/8-10 bar)
- Ultrasonic cleaner & Descaling solution (e.g. Deox Extra type) or similar
- Loctite 415 or similar
- Magnehelic gauge (416923 - 416924)
- Silicone grease Tribolube-71 Lubrification Technology or equal
- Neoprene Workpad (449822)
- First Stage service kit # 46201739
- Nylon brush
- Torque Wrench

82X. DISASSEMBLY

WARNING

IF THE FIRST STAGE IS USED TO DIVE WITH OXYGEN-ENRICHED MIXTURES, IT MUST BE O2 CLEANED. MARES RECOMMENDS O2 CLEANING USING THE PROCEDURES OUTLINED IN THE MARES O2 CLEANING GUIDELINES, AND FOLLOWING THE DISASSEMBLY/ REASSEMBLY/ADJUST PROCEDURES OUTLINED IN THIS MANUAL. OXYGEN ENRICHED MIXTURES IS DEFINED IN THE US AS OVER 40% O2. IN EU COUNTRIES IT IS DEFINED IN THE EN 13949 NORM.

1. Loosen the Dust Cap (13 INT- 19 DIN) from the First Stage.
2. Remove the Second Stage Hose using the 14 mm wrench (B18).
3. Remove the Cup 82X (10) by hand. Twist and pull it.
4. Take Shell 82X out (41).
5. Flip the First Stage over as shown in the picture. Unscrew the Regulating Nut (18), using a 10mm Allen wrench (B13) and remove the First Stage Diaphragm Spring (42) and the Spring Base Plate (35).
6. Unscrew the Retaining Nut (44) using a 25mm Allen wrench (B1)
7. Remove the First Stage Diaphragm (42), the Antifriction Ring (52), the Metal Disc (32), and the First Stage Poppet Button (14) following the procedure described below

   Insert the nozzle (#415724) of a low pressure compressed air gun into the First Stage HP Chamber. Use short bursts of low pressure air to dislodge the Diaphragm (42). Once the Diaphragm is dislodged, remove it and the Poppet Button (28). Be sure that all LP & HP plugs are assembled on the First Stage
8. Remove the metal disc (32)
9. Remove all LP plugs (12) and HP plugs (33) using a 4mm Allen wrench.
10. Remove the O-rings (17) from the LP plugs (12) and O-rings (28) from the HP plugs (33).
11. Insert the threaded bar Tool (B52) into one of the two First Stage HP ports

4

5

6 a

6 b

82X. DISASSEMBLY

NOTE

For best results, place the threaded bar Tool (B52) in a bench vise to hold the First stage during the disassembly.

12. Using a 32mm special tool (B-16), unscrew the Retaining Ring (50).
13. Remove the O-ring (38) from the 1st Stage Body (1).
14. Using the threaded bar Tool (B-5), and a 6mm Allen Wrench (B-8) disassemble the Swivel Turret (51) from the Retaining Ring (50), by unscrewing the Insert (43).
15. Remove the Rotating Turret Washer (24) from the Insert (43).
16. Remove the O-ring (46) from the Swivel Turret (51) and remove the threaded bar Tool (B-5)

12

14

15-16

82X. DISASSEMBLY

INT
(Section 17)

DIN/Nitrox
(Section 18)

82X. DISASSEMBLY INT

17.1 Unscrew the Yoke Retainer Nut (23) using the special tool 25mm (B1) and remove the Yoke Spacer (37), and Yoke assembly (21-22).

17.2 Remove the AST INT (49) using the special tool 25mm (B1) and the AST special tool (B-51).

17.3 Remove the AST Filter INT (30).

17.4 Remove the O-Rings (53) from the AST INT (49).

17.5 Remove the O-ring (26) the Yoke Retainer Nut (23).

17.1

17.2

17.3-17.4-17.5

82X. DISASSEMBLY DIN - NX

18.1 Remove the O-ring (27– 25 NX) from the AST DIN (39 – 31 NX).

18.2 Disassemble the AST DIN (39 – 31 NX) using the AST Special Tool (B51).

18.3 Remove the AST gasket (54 – 55 NX) from the AST System (39 – 31 NX).

18.4 Remove the Conical Filter (7 – 8 NX) from the Body Din connector (15 – 48 NX), by turning the First Stage Body upside down.

18.5 Insert a 5mm Allen wrench (B4) inside the Body Din Connector (15 – 48 NX) and unscrew it completely. To make this step easier, a wrench (as shown in the picture) can help.

18.6 Remove the O-ring (26) from the Body Din Connector (15 – 48 NX).

18.7 Remove the Threaded Locking Ring (11 – 47 NX).

18.2

18.5 a

18.5 b

82X. DISASSEMBLY

19. Using a 6mm Allen wrench (B-8), unscrew the HP Chamber (40), remove the Spring (36), the First Stage Valve (5), and the Pin 26,5 mm (2) from the First Stage.
20. Remove the O-ring (26), and Washer (9) from the HP Chamber (40).
21. Extract the O-ring (20) and the Backup Ring (3) from the HP Chamber (40), using an O-ring removal Tool made in plastic or brass.

19 a

WARNING

DO NOT USE SHARP OR POINTED TOOLS MADE OF STEEL OR OTHER MATERIALS, TO AVOID SCRATCHING THE SURFACES OF THE HP CHAMBER.

19 b

WARNING

DO NOT USE SHARP OR POINTED TOOLS TO REMOVE THE DIAPHRAGM. SCRATCHES ON THE SURFACE OF THE DIAPHRAGM MAY CAUSE LP LEAKING

20

NOTE

If the anti-rotation Ring (52) is still in its Seat after having completed step 20, remove it, paying attention to not damage the First Stage Body

WARNING

DO NOT USE SHARP OR POINTED TOOLS TO REMOVE THE ANTI-ROTATION RING (52). TO AVOID DAMAGING THE DIAPHRAGM

22. Insert the special tool (B-42) in the center hole of the First Stage Body (1) and remove the HP Seat (4).
23. Remove the O-ring (29) from the HP Seat (4).
24. Remove the threaded bar tool (B-52) from the HP port

22

82X. INSPECTION AND CLEANING

AST System

Cleaning

Clean the AST INT and AST DIN by blowing it with LP compressed air to remove possible dirt.

NOTE

To be sure the AST System is perfectly clean, the LP air must be blown in the same direction of the air flow under regular use.

Clean the metal part only using a nylon brush and a small quantity of acid such as Deox Extra or a solution of white vinegar diluted with hot water (with the same percentage of dilution as the other metal part).

Be sure to rinse all parts in fresh water and allow to completely dry before proceeding with reassembly.

Inspection

If, after having performed step 13.3 INT and 14.4 DIN, the filter shows excessive dirt, the AST System needs to be replaced

Reusable Rubber and Plastic Components

Cleaning

Clean all rubber and plastic components by washing them in a mixture of warm water and mild detergent. If necessary, scrub parts with a soft brush. Do not use abrasive cleaners, solvents or acids on rubber components.

Inspection

Inspect all reusable rubber and plastic components for excessive wear and/or damage. Replace parts as necessary.

CAUTION

SOLVENTS AND ACIDS MAY DAMAGE PLASTIC AND RUBBER PARTS. BEFORE CLEANING METAL COMPONENTS, MAKE SURE THAT ALL RUBBER AND PLASTIC PARTS HAVE BEEN REMOVED.

Metal Components

Cleaning

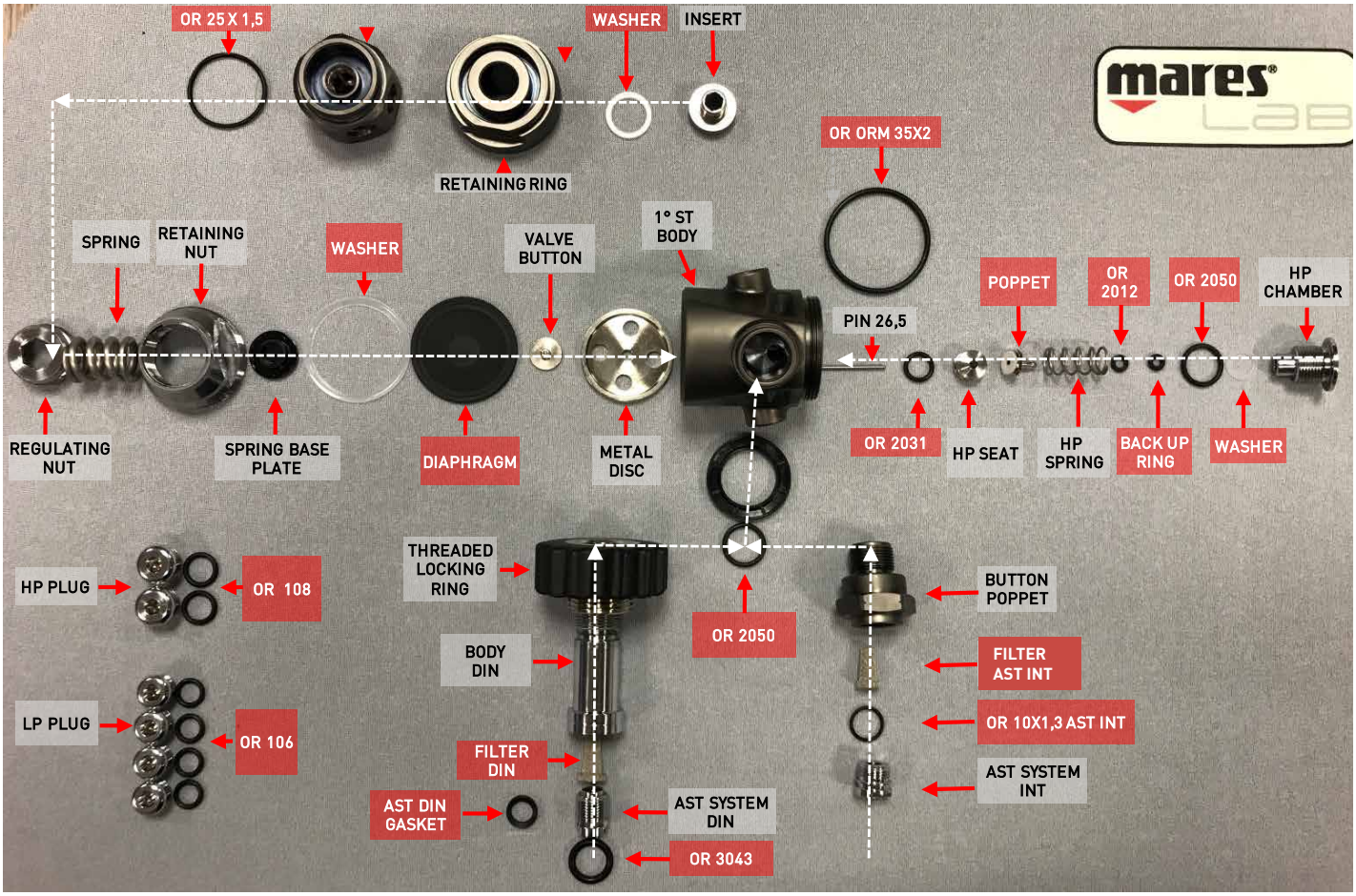
Chrome plated, brass, and stainless steel parts are cleaned by immersing them in an ultrasonic cleaner containing a de-scaling agent such as Deox Extra or a solution of white vinegar diluted with hot water. A nylon brush may be used to remove any stubborn deposits.

Be sure to rinse all parts in fresh water and allow to completely dry before proceeding with reassembly.

Inspection

Inspect all parts for excessive wear and/or damage. Replace parts as necessary.

82X. FIRST STAGE SERVICE KIT



Certain key components of the First Stage should be replaced during the overhaul. These key parts are included in the 82X First Stage Service Kit (Code 46201739) or 46201787 SERVICE KIT FIRST STAGE 72X-AST-50N and are identified in the RED BOXES above. Please refer to technical specification to the TB 38 SPRING 50N.

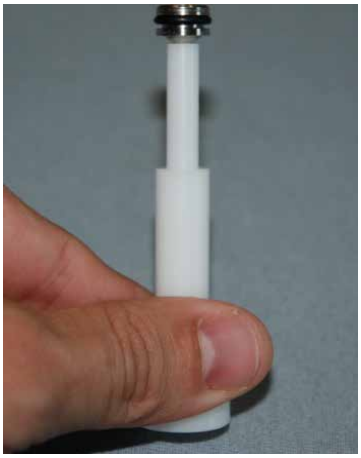
SERVICE KIT #46201739

82X. REASSEMBLY

NOTE

Lubrication reduces the likelihood of damage during reassembly. Before beginning the reassembly procedure, lightly lubricate all O-rings Tribolube-71 Lubrification Technology or equal.

25. Install the O-ring (29) on the HP Seat (4), and position the Seat on the special Tool (B-21).
26. Insert the HP Seat (4) into the First Stage Body (1) and gently press until the Seat is properly seated.



25

CAUTION

TAKE SPECIAL CARE NOT TO DAMAGE THE SEAT WHEN INSERTING IT. IT IS CORRECTLY SEATED IF THE CONICAL SECTION IS VISIBLE WHEN VIEWING IT FROM THE HIGH PRESSURE CHAMBER.

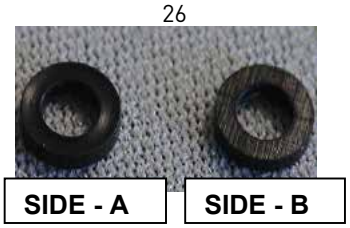
27. Correctly position the Backup Ring (3) and the O-ring (20) into the HP Chamber (40).

26

CAUTION

MAKE SURE THAT SIDE "A" OF THE BACK UP RING (3) IS FACING THE O-RING (9), AND SIDE "B" IS FACING THE BOTTOM OF THE HP CHAMBER (11)

28. Install the O-ring (26), and the Washer (9) on the HP Chamber (40).
29. Insert the First Stage valve (5) inside the First Stage Body (1), with the flat part facing the Valve Seat (4).
30. Position the spring (36) on the First Stage valve (5) and tighten the HP chamber (40) using a 6mm Allen wrench (B-4).
31. Install the O-ring (38) on the First Stage Body (1).



27

29

82X. REASSEMBLY

32. IInstall the O-ring (46) on the Swivel Turret (51).
33. Position the Retaining Ring (50) on the Swivel Turret (51).
34. Position the Rotating Turret Washer (24) in to the Retaining Nut (50).
35. Place the Insert (43) on the Retaining Ring (50)
36. Tighten the Insert (43) using the threaded bar Tool (B-5) and a 6mm Allen Wrench (B-8)

WARNING

IF USING A TORQUE WRENCH TO TIGHTEN THE RETAINING NUT (17), USE A TIGHTENING TORQUE OF APPROXIMATELY 12 Nm / 9 ft lb

NOTE

For best results, place the threaded bar Tool (B-5) in a bench vise to hold the First Stage during the assembly

37. Using a 32mm special tool (B-16), install the Retaining Ring (50) on the First Stage Body (1), using the threaded bar tool (B-52)

WARNING

IF USING A TORQUE WRENCH TO TIGHTEN THE RETAINING RING (50), USE A TIGHTENING TORQUE OF APPROXIMATELY 25 Nm / 18 ft lb

NOTE

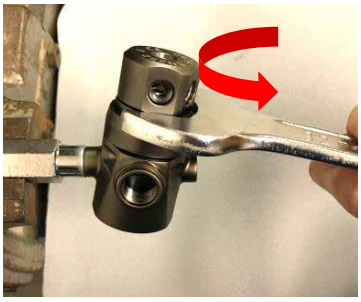
For best results, place the threaded bar Tool (B-52) in a bench vise to hold the First Stage during the assembly

32

33

35

36



37

82X. REASSEMBLY

38 Flip the First Stage Body over (as shown in the picture) and insert the Metal Disc (32) (with the bigger edge facing up) into the First Stage Body (1), and the Pin 26,5mm (2) in the center hole of the Metal Disc (32).

39. Position the First Stage Valve Button (14) on the First Stage Pin (2) and press it down to feel the "response" of the Spring (36).

40. Place the Diaphragm (42) in the First Stage Body, making sure is firmly seated in the Body.

38 a

NOTE

Note the impression of the poppet button (28) on the First Stage Diaphragm. When re-installing the Diaphragm (30), be sure to install it facing the same direction as disassembled.

38 b

41. Correctly position the Antifriction Ring (52) on the Diaphragm (42).

42. Place the Spring Base Plate (35) in the middle of the Diaphragm (42). Use a 25-mm wrench (B1) to fully tighten the Retaining Nut (44)to the First Stage Body.

WARNING

IF USING A TORQUE WRENCH TO TIGHTEN THE RETAINING NUT (44), USE A TIGHTENING TORQUE OF APPROXIMATELY 50 Nm / 37 ft lb

38 c

43. Place the Spring (16) on the Spring Base Plate (35).

44. Using the 10 mm Allen wrench (B13), install the Regulating Nut (18), turning the wrench 3 – 4 turns only.

NOTE

Do not over-tighten the Regulating Nut. Doing so can cause an increase in Intermediate Pressure, which can damage the LP Gauge and interfere with the IP adjustment procedure.

41

44

82X. REASSEMBLY

INT
(Section 45)

DIN/Nitrox
(Section 46)

82X. REASSEMBLY INT

45.1 Install the O-Rings (53) on the AST INT (49).

45.2 Assemble the AST Filter INT (30) in the Yoke Retainer Nut (23).

45.3 Place the AST INT (49) on the Yoke Retainer Nut (23), and gently press it down till the O-Ring is completely inside the Yoke Retainer Nut (23).

45.4 Tighten the AST INT (49) using the special tool 25mm (B1) and the AST special tool (B-51).

45.5 Install the O-ring (26) on the Yoke Retainer Nut (23).

45.6 Position the Yoke Spacer (37) on the First Stage Body (1).

45.7 Install the Yoke Retainer Nut (23) and the Yoke assembly (21-22) using the special tool 25mm (B1).

45.1

45.4

45.7

WARNING

TO PREVENT THE YOKE RETAINER NUT (7) FROM LOOSENING, APPLY ONE OR TWO DROPS OF THREAD LOCKING COMPOUND ONTO THE THREADS PRIOR TO INSTALLATION. REMOVE ANY RESIDUAL THREAD LOCKING COMPOUND PRIOR TO APPLYING ANY NEW COMPOUND (LOCTITE 415 OR SIMILAR).

WARNING

IF USING A TORQUE WRENCH, TIGHTEN TO A TORQUE OF APPROXIMATELY 18 ft lb / 25 Nm

45.8 Install the O-rings (13) on the HP plugs (14), and the O-rings (5) on the LP plugs (6).

45.9 Install all HP and LP plugs on the First Stage Body, leaving the DFC and one additional LP port open for the Second Stage and IP Gauge.

45.10 Install the Shell 82X (41) and the Cap 82X (10).

82X. REASSEMBLY DIN - NX

46.1 Insert the Body DIN Connector (15 – 48 NX) into the Threaded Locking Ring (11 – 47 NX).

46.2 Position the O-ring (26) on the Body Din Connector (15 – 48 NX).

46.3 Place the Yoke Spacer (37) on the First Stage Body (1).

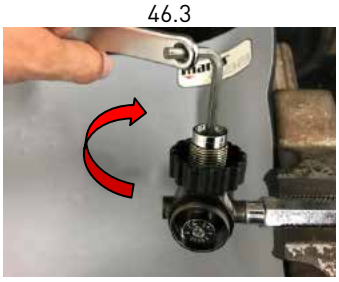
46.4 Using a 5-mm Allen wrench (B 4), tighten the Body DIN Connector (15 – 48 NX) to the First Stage Body.

46.1 - 46.2

46.3

WARNING

TO PREVENT THE BODY DIN CONNECTOR (24) FROM LOOSENING, APPLY ONE OR TWO DROPS OF THREAD LOCKING COMPOUND ONTO THE THREADS PRIOR TO INSTALLATION. REMOVE ANY RESIDUAL THREAD LOCKING COMPOUND PRIOR TO APPLYING ANY NEW COMPOUND (LOCTITE 415 OR SIMILAR).



46.4

WARNING

IF USING A TORQUE WRENCH, TIGHTEN TO A TORQUE OF APPROXIMATELY 15 ft lb / 20 Nm

46.5 Insert the Conical Filter (7– 8 NX) in the Body Din Connector (15 – 48 NX).

46.6 Place the AST gasket (54 – 55 NX) on the AST System (39 – 31 NX).

46.7 Install the AST System (39 – 31 NX) using the AST Special Tool (B51).

46.5

WARNING

IF USING A TORQUE WRENCH, TIGHTEN TO A TORQUE OF APPROXIMATELY 1.1-1.5 ft lb / 1,5-2 Nm

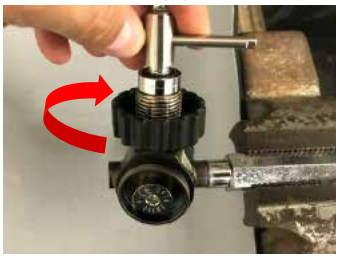
46.8 Remove the Threaded Bar Tool (B-52) from the First Stage Body.

46.9 Install the O-rings (28) on the HP Plugs (33), and the O-rings (17) on the LP Plugs (12).

46.10 Install all HP and LP Plugs on the First Stage Body, leaving the two LP ports open for the Second Stage and IP Gauge.

46.11 Install the Shell 82X (41) and the Cap 82X (10).

46.6



46.7

82X. ADJUSTMENT

NOTE

Connect the First Stage to a full tank (at least 2600 psi/180 bar), and open the air valve slowly to expel any foreign matter from the first stage.

47. Attach the intermediate pressure gauge (#46106252) or connect the LP hose from the Magnehelic gauge to the open low pressure port.

48. Attach the Second Stage hose to the LP Port (without the 2nd Stage cover installed).

WARNING

USE A TORQUE WRENCH, TIGHTEN HOSES TO A TORQUE OF 3-3.5 ft lb / 4 -4,5 Nm

TABLE 1: IP ADJUSTABLE RANGE

HP Air Supply	Intermediate Pressure (IP)
2900 psi	142 – 148 psi
200 bar	9.8 – 10.2 bar

49. Holding down the Second Stage Demand Lever, slowly open the tank valve and, almost simultaneously, release the Demand Lever. Read the value of the First Stage adjustment on the pressure gauge, and proceed as follows :

NOTE

No Second Stage free or intermittent air flow from the 2nd stage should occur during the IP adjustment procedure. If any such flow occurs, it will compromise the procedure and could cause the IP setting to be outside the acceptable range.

47

IP

HP

82X. ADJUSTMENT

50. If the intermediate pressure is greater than the specified value (see table 1), use the 10 mm Hex Wrench (B-13) to slowly loosen the Regulating Nut (19) until the specified value is obtained.

50

CAUTION

WHEN THE INTERMEDIATE PRESSURE IS REDUCED, IT IS NECESSARY TO VENT THE EXCESS AIR IN ORDER TO OBTAIN A CORRECT READING OF THE NEW VALUE

51. If the First Stage pressure is lower than the specified value (see table 1), slowly tighten the Adjusting Nut (19) until the specified value is obtained.

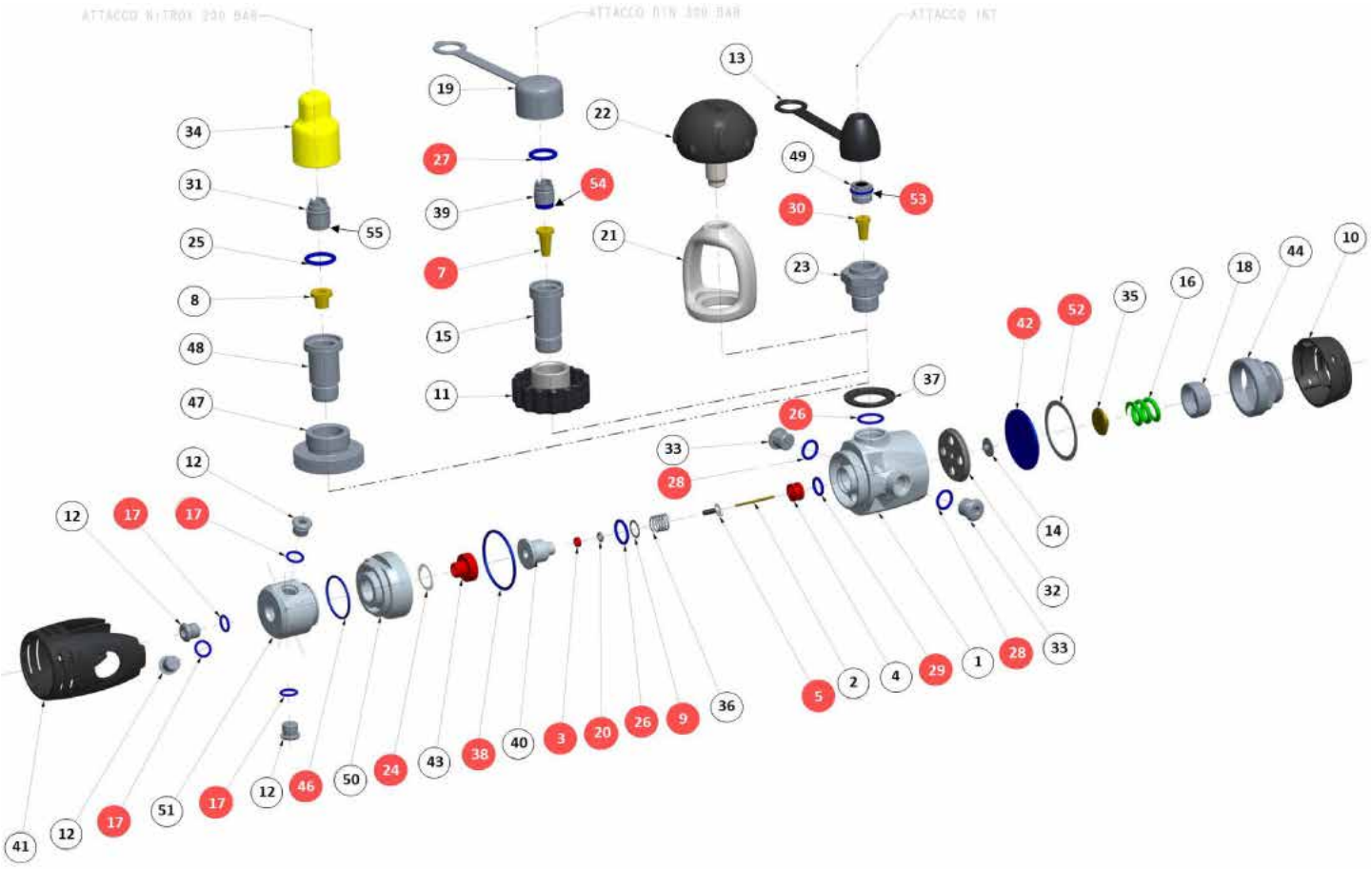
52. Disassemble the regulator from the tank valve and install the LP plug in to LP port

51

82X. TROUBLESHOOTING

Problem	Probable Cause	Solution
CONTINUOUS AIR FLOW FROM SECOND STAGE (FREE FLOW) CAUSED BY: 1. AN INCREASE IN THE INTERMEDIATE PRESSURE, or 2. A CONTINUALLY INCREASING IP (IP CREEP)	1. Intermediate Pressure too high	Readjust IP per procedures
	2. Damaged First Stage Tri-material Poppet	Replace Tri-material Poppet
	2. Damaged Poppet Seat	Replace Poppet Seat
	2. Damaged HP Housing Assembly components or damaged HP Chanber	Check internal surfaces of HP Chamber. Clean or replace HP Chamber. Replace O-ring and/or Back Up Ring.
AIR LEAKS FROM FIRST STAGE DIAPHRAGM	Lose Locking Nut	Tighten CWD Kit Body
	First Stage Diaphragm damaged	Replace the Diaphragm
	First Stage diaphragm seating surface damaged	Replace the First Stage Body
AIR LEAKS FROM THE FIRST STAGE HP/LP PORT PLUGS AND/OR HOSE PORTS	Damaged O-ring – corrosion on metal surface	Clean the Seat and/or replace O-ring
	Lose hose and/or port plug	Tighten hose and/or plug
AIR LEAKS BETWEEN BODY DIN CONNECTOR (15) AND TANK VALVE	O-ring seal of tank valve corroded or damaged	Clean the Seat of the tank valve and replace the O-ring
	Body Din Connector (15) sealing surface damaged	Replace Body Din Connector (15)
	O-Ring (26) damaged	Replace O-ring

82X. DRAWING E 1189 Updated: 23/11/2020



82X. CHART XRF2 Updated: 02/12/2020

CHART NO: 43		FIRST STAGE 82X/82X PVD - NX			
REF	**CODE**	**DESCRIPTION**	**REF**	**CODE**	**DESCRIPTION**
1	F	FIRST STAGE BODY	40.A	46201275	HP CHAMBER PLUG 30N
2	46201303	PIN POPPET 26,5	40.B	46202045	HP CHAMBER PLUG 50N
3	46110506	BACKUP RING PK	41	46201548	SHELL 82X
4	46201541	HP SEAT "MR"	42	46201429	DIAPHRAGM
5.A	46201575	TRIMATERIAL POPPET 2K18 CPL	43	46201423	INSERT
5.B	46201784	TRIMATERIAL POPPET 50N CPL	44	46201522	RETAINING NUT
7	46200561	CONICAL FILTER, DIN	46	46201426	OR 25 X 1.5
8	46186202	CONICAL FILTER INT	47	N	NITROX LOCKING RING 200 Bar (EN13949)
9.A	46201291	HP CHAMBER WASHER 30N	48	N	BODY, NITROX CONNECTOR 200 BAR (EN13949)
9.B	46202048	HP CHAMBER WASHER 50N	49	46201507	AST INT
10	46202001	CUP 82X	50	46201433	RETAINING RING
11	46200546	THREADED LOCKING RING (300 Bar)	50	46201609	RETAINING RING PVD
12	46185204	LP PLUG 3/8"	51	46201521	SWIVEL TURRET
13	46185010	DUST CAP INT	51	46201608	SWIVEL TURRET PVD
14	46200545	FIRST STAGE VALVE BUTTON	52	46201421	ANTI-ROTATION RING
15	46201102	BODY, DIN CONNECTOR 300 BAR	53	46201736	OR 10,0 X 1,3 AST INT
16	46201285	SPRING DIAPHRAGM	54	46201581	AST GASKET DIN
17	46110106	OR 106	55	46201737	AST GASKET NX
18	46201120	REGULATING NUT			
19	46200562	DIN CONNECTOR DUST CAP			
20	46110101	OR 2012	**ASSEMBLIES**		
21	46201333	YOKE K11		416860	TWIN BALANCED PISTON DRY KIT 82X
21	46201591	YOKE PVD		416859	KIT CWD OIL-FIRST STAGE 82X
22	46184079	YOKE KNOB		46185340	CWD OIL
23	46201493	NUT YOKE RETAINER	F	416248	FIRST STAGE 82X ASSEMBLY (INT-DIN)
23	46201601	NUT YOKE RETAINER PVD		46201739	SERVICE KIT FIRST STAGE 82X INT/DIN
24	46201424	ROTATING TURRET WASHER		46201787	SERVICE KIT FIRST STAGE 82X-50N
25	46110227	OR 3056		46201791	KIT UPGRADE FIRST STAGE 50N (5B-9B-36B-40B)
26	46110211	OR 2050		416809	DIN CONNECTOR 300 BAR (9-7-11-15-24-25)
27	46110247	OR 3043			
28	46110108	OR 108	**NITROX VERSION**		
29	46110107	OR 2031	N	46201743	NITROX CONNECTOR 200 BAR AST (EN13949)
30	46201536	AST INT FILTER			
31	46201422	AST NX + GASKET			
32	46201427	METAL DISC			
33	46185205	HP PLUG 7/16"			
34	46200658	YELLOW DUST CAP, NITROX			
35	46200582	PLATE SPRING BASE			
36.A	46201284	HP SPRING FIRST STAGE - 30N			
36.B	46202047	HP SPRING FIRST STAGE - 50N			
37	46201135	YOKE SPACER FIRST STAGE			
38	46201578	OR ORM 35X2			
39	416812	AST DIN + GASKET			

NOTE

Parts highlighted in red are included in the service kits 46201739

The codes **46201784** (Ref.5.B), **46202048** (Ref 9.B), **46202047** (Ref 36.B) and the code **46202045** (Ref.40B) must be assembled together and need to be serviced with the:

46201787 Service kit First stage 82X 50N.

Please refer to technical specification to the **TB 38 SPRING 50N**

15X
FIRST STAGE

ITM 37

PARBAK BACKUP RING

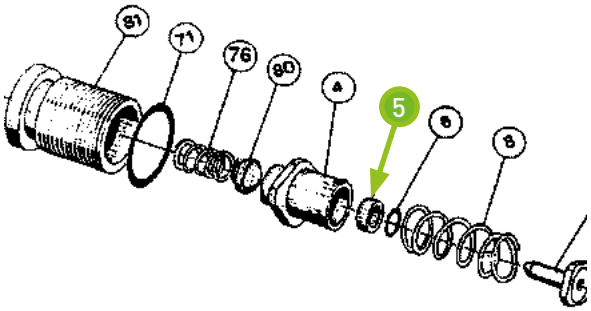
FEB. 24, 2015

WITH REFERENCE TO PREVIOUS ITM 24_R1, MARES TECHNICAL SERVICE IS PLEASED TO INFORM ALL MARES LAB PARTNERS THAT AFTER HAVING PERFORMED SEVERAL TESTS, PART NUMBER 46110506 PARBAK BACKUP RING WILL BE ASSEMBLED AS RUNNING CHANGE IN ALL NX REGULATORS AND VITON FIRST STAGE SERVICE KIT, STARTING FROM SEASON 2015.

THE TESTS PERFORMED SHOW THAT PARBAK BACKUP RING PROVIDES EXCELLENT PERFORMANCE EVEN USED WITH NX FIRST STAGES, ESPECIALLY DIVING IN EXTREMELY COLD WATER *(<= 0 °C).*

AS SHOWN IN PIC. 1, THE PARBAK BACKUP RING CAN BE EASILY IDENTIFIED, THANKS TO THE BLACK COLOR OF THE NEW MATERIAL.

-BACKUP RINGS CURRENTLY IN USE -		-HP CHAMBER BACKUP RING, PARBAK-	
FIG. 1		FIG. 2	
			
46185038	461105068	SIDE - A	SIDE - B



ASSEMBLY INSTRUCTIONS

MAKE SURE THAT ONCE INSERTED INTO THE BALANCING CHAMBER (4) THE BACKUP RING (5) HAS SIDE "A" (FIG. 2) FACING THE O-RING (6).

WARNING

MAINTENANCE PROCEDURES MUST BE PERFORMED BY QUALIFIED PERSONNEL AT A MARESLAB TECHNICAL ASSISTANCE CENTER AND/OR AUTHORIZED MARES DISTRIBUTOR.
IN ORDER TO DISASSEMBLE AND REASSEMBLE THE SEAT FROM THE FIRST STAGE, IT IS NECESSARY TO CONSULT THE PROCEDURES DESCRIBED IN THE RELATED SECTION OF THE MARES MAINTENANCE MANUAL.
IN THE EVENT THAT THE UPDATED MANUAL, CONTAINING THE INDICATED SECTIONS IS UNAVAILABLE, OR IF THE INSTRUCTIONS ARE UNCLEAR OR NOT ENTIRELY UNDERSTANDABLE, PLEASE CONTACT MARES BEFORE PERFORMING ANY MAINTENANCE, ADJUSTMENT, OR CHECK.

ITM 40

ACT (Advanced Coating Technology) FIRST STAGE POPPET INFO

OCT. 08, 2015

MARES TECHNICAL DEPARTMENT IS PLEASED TO INFORM YOU THE NEW ACT POPPET (# 46201361) IS CURRENTLY ASSEMBLED ON ALL INLINE DIAPHRAGM FIRST STAGES WITH THE EXCEPTION OF THE ABYSS NAVY II. THERE WILL BE NO CHANGES MADE TO IT AT THIS TIME.

(SEE BTM 24)

THE REGULATOR MATERIAL NUMBERS WILL STAY THE SAME. THE REGULATORS ASSEMBLED WITH THE NEW ACT POPPET, WILL BE EASILY IDENTIFIED BY AN "X" PRINTED ON THE CARDBOARD BOX AND ALSO PLACED ON THE FIRST STAGE PLASTIC PROTECTION COVER.

EXAMPLE: ABYSS 22 = ABYSS 22X

THE MAIN FEATURES OF THE ACT POPPET ARE:

- MADE OF TWO MATERIALS:
  CHROME PLATED BRASS – LESS FRICTION OF THE STEM
- ACT COATING PROCESS

EFFECTIVE SEPTEMBER 2015, ALL 1ST STAGE SERVICE KITS INCLUDE THE ACT POPPET, EXCEPT FOR THE ABYSS 22 NAVY II SERVICE KITS (INT: # 46186152 / DIN: # 46200606) DUE TO US NAVY PROTOCOLS.

- FIRST STAGE 52X-22X-15X INT/DIN: # 46201355
- FIRST STAGE 52X-22X-15X INT/DIN VITON: # 46201358
- FIRST STAGE 12S INT/DIN: # 46201370
- FIRST STAGE 12S INT/DIN VITON: # 46201371



NOTE: SOME SERVICE KITS ARE USED FOR MULTIPLE FIRST STAGE MODELS. (I.E. KIT #46200906 (EXCLUDES POPPET) IS USED FOR THE 22, MR16, AND MR32). THESE SERVICE KITS WILL CONTINUE UNTIL THE CURRENT STOCK IS EXHAUSTED. AT THAT TIME, IT WILL BE REPLACED BY SERVICE KITS THAT WILL INCLUDE THE ACT POPPET. CHECK WITH MARES HQ FOR DETAILS).

NOTE: THE CURRENT MR UPGRADE KIT (#46200705) WILL BE DISCONTINUED AND REPLACED BY THE **ACT UPGRADE KIT (#46201386).**

NOTE

VALVE SEAT CODE# 46201139 (RO.15) IS NO LONGER AVAILABLE AND HAS BEEN REPLACED WITH THE VALVE SEAT CODE# 46186216 (RO.05) IN THE SPARE PARTS CATALOG. MARES TECHNICAL DEPARTMENT SUGGESTS THE USE OF THE NEW VALVE SEAT CODE# 46186216 IN ORDER TO PRODUCE OPTIMUM PERFORMANCE OF THE ACT FIRST STAGE POPPET, PARTICULARLY IN DIN (300 BAR) FIRST STAGES.

IMPORTANT

ALL SERVICE AND REPAIR PROCEDURES ON MARES PRODUCTS SHOULD BE PERFORMED BY QUALIFIED MARES SERVICE TECHNICIANS AT AUTHORIZED MARES SERVICE CENTER.
SERVICE TECHNICIANS SHOULD HAVE THE LATEST VERSION OF THE MARES SERVICE MANUAL AND SPARE PART CATALOG READILY AVAILABLE WHILE PERFORMING SERVICE PROCEDURES AND CLOSELY FOLLOW THE RECOMMENDED PROCEDURES AND GUIDELINE OUTLINED IN THESE MATERIALS.

TB 37

REGULATOR SERVICE GUIDELINE AND SERVICE INTERVALS

MAR 23, 2020

This Technical Bulletin cancels and replaces BTM 25 released on October 10th 2015, and BTM25_R1 released on October 25th 2015, and the BTM 32 released on December 19th 2018.

Mares has revised the regulator service guidelines and service intervals. The new guidelines and intervals apply to all **in-line Mares diaphragm regulators** as of **September 1st 2015, except for the Abyss 22 NAVY II** regulator and octopus as noted below.

MARES REGULATOR SERVICE GUIDELINES AND SERVICE INTERVALS

PERFORM AN ANNUAL INSPECTION AND/OR SERVICE EVERY YEAR OR 100 DIVES

The Mares annual regulator inspection and/or service is performed by following the procedures and guidelines outlined on the annual inspection and/or service checklist (see attached). The results of the inspection may require a complete regulator overhaul.

A COMPLETE REGULATOR OVERHAUL MUST BE PERFORMED EVERY TWO YEARS OR 200 DIVES

A complete regulator overhaul must be performed per specifications every two years as outlined in the Mares Service Manual. This requires, at minimum, replacing all parts included in the service kit. Please see the annual regulator inspection and/or service checklist for details.

MARES ABYSS 22 NAVY II REGULATOR AND OCTOPUS

SERVICE PROCEDURES AND INTERVALS

Service procedures and intervals for the Abyss 22 Navy II Regulator and Octopus are different than those described above due to US Navy testing protocols. Below are the Service Guidelines for the Abyss 22 Navy II Regulator and Octopus:

Every Year or 100 Hours of use:
Mares recommends a complete overhaul every year or 100 hours of use.

Mares recommends the 1st Stage Tri-material Poppet (# 46200652) be replaced every two years or 200 hours of use, OR when signs of wear are present.

The Tri-material Poppet is NOT included in the Abyss 22 Navy II 1st Stage Service Kit. When ordering Abyss 22 Navy II 1st Stage Service Kit, please order the Tri-material Poppet as a separate line item.

NOTE

(In order to confirm to US Navy testing protocols, only service parts and procedures listed in the Abyss 22 Navy II schematics and service manual are to be used when servicing).

IMPORTANT

All service and repair procedures on Mares products should be performed by qualified Mares Service Technicians at authorized Mares Dealers and Service Centers. Service Technicians should have the Mares Service Manual and Spare Parts Catalog readily available for reference while performing service procedures and closely follow the recommended procedures and guidelines outlined in these materials.

ANNUAL REGULATOR INSPECTION CHECKLIST

MAR 23, 2020

Date...../...../..... Make / Model ..... Serial #.....

Customer Name..... Purchase Date..... / ...../.....

TEST 1	**Inspect Filter** Check for debris or discoloration.	□ Pass	□ Fail
TEST 2	**Inspect HP Chamber area** Inspect for dirty, rust, or corrosion.	□ Pass	□ Fail
TEST 3	**Hose Inspection (*)** Pull back hose protectors. Check that the hoses are secure in the hose crimp.	□ Pass	□ Fail
TEST 4	**Inspect 2nd Stage Exhaust Valve** Check valve and sealing surface for cleanliness, shape, and seal.	□ Pass	□ Fail
TEST 5	**Inspect Mouthpiece** Inspect for tears, cracks or holes. Replace if necessary.	□ Pass	□ Fail
TEST 6	**2nd Stage Diaphragm Inspection** Attempt inhalation without pressurization. Check for perfect seal.	□ Pass	□ Fail
TEST 7	**Intermediate Pressure Check** Check for stable IP. IP must be within acceptable range per Service Manual.	□ Pass	□ Fail
TEST 8	**Cracking Effort** Check CE. CE must be within acceptable range per Service Manual.	□ Pass	□ Fail
TEST 9	**Pressurized Immersion test** Pressurize and immerse unit. Test for any leaks.	□ Pass	□ Fail

(*): At the latest after five years of operation the flexible hose of your regulator should be taken out of service

IMPORTANT

1. **If the regulator fails Checklist Item 1, 2 or 9:**
   A complete Regulator Overhaul is required.
2. **If the regulator fails Checklist Item 7 or 8:**
   If the regulator can be adjusted within specification, it passes. If not, a Complete Overhaul is required.
3. **If the regulator fails Checklist Item 3, 4, 5,or 6:**
   The defective parts associated with the Checklist Item may be replaced,
   OR A Complete Regulator Overhaul may be performed

IMPORTANT

All service and repair procedures on Mares products should performed by qualified Mares Service Technicians at authorized Mares Dealers and Service Centers. Service Technicians should have the Mares Service Manual and Spare Parts Catalog readily available for reference while performing service procedures and closely follow the recommended procedures and guidelines outlined in these materials.

TB 40

SPRING 50N FOR 15X

MAR 2021

Mares S.p.A. introduces the new **15X Body***, suitable for the 50N Spring Upgrade Kit# 46201791.
The new spring is designed and tested to guarantee a better seal, especially in cold water.

HOW TO IDENTIFY WHICH 15X* FIRST STAGES ARE COMPATIBLE FOR:

BODY A
NO mark inside the body

BODY B*
mark inside the body

COLUM 1: SPRING 30N VERSION	COLUM 2: **SPRING 50N VERSION**	
The components listed in the column 1 can be installed on both Body A and Body B	**The components listed in the column 2 can be installed only on Body B**	COMPONENTS IDENTIFICATION
SPRING 30N COD. **46201284** 	SPRING 50N COD. **46202047** 	- Longer: 24mm VS 20mm - Wider diameter: 9mm vs 8.5mm
Poppet Trimat. 2k18 CPL COD. **46201575** 	Poppet Trimat. 50NCPL COD. **46201784** 	- Bigger base: 12.2mm vs 11.5mm
HP Chamber COD. **46201275** 	HP Chamber 50N COD. **46202045** 	- Longer guide: 8.2mm vs 6mm - Wider diameter: 8.8mm vs 8.2mm

WARNING

THE COMPONENTS LISTED IN COLUMN 1 CANNOT BE MIXED WITH THE COMPONENTS LISTED IN COLUMN 2.

NOTE

1) **Only 15X (with the 1st stage modified body Body B*) can be upgrade with the Kit: 46201791 Kit Upgrade First Stage 50N**
2) **As a consequence of point 1, the new Service Kits will be:**
   - **46201800 Service Kit first stage 15X-50N-INT/DIN**
   - **46201802 Service Kit first stage 15X-AST-50N-INT/DIN**

WARNING

ALL SERVICE AND REPAIR PROCEDURES ON MARES PRODUCTS SHOULD BE PERFORMED BY QUALIFIED MARES SERVICE TECHNICIANS AT AUTHORIZED MARES DEALERS AND SERVICE CENTERS. SERVICE TECHNICIANS SHOULD HAVE THE MARES SERVICE MANUAL AND SPARE PARTS CATALOG READILY AVAILABLE FOR REFERENCE WHILE PERFORMING SERVICE PROCEDURES AND CLOSELY FOLLOW THE RECOMMENDED PROCEDURES AND GUIDELINES OUTLINED IN THESE MATERIALS.

TB 42-BIS

NEW TRIMATERIAL POPPET 2K22

DEC 2022

The technical department of Mares S.p.A. would like to announce a Trimaterial Poppet modification.
The new Poppet is softer than the previous one, designed and tested to provide a better seal, especially in cold water. The new parts can easily be identified following the pictures below.

ACTUAL 30N VERSION	ACTUAL 50N VERSION
Poppet Trimat. 2k18 CPL COD. 46201575 Poppet Trimat. 2k18 CPL COD. **46201575** 	Poppet Trimat. 50N CPL COD. **46201784** 
NEW 30N VERSION 2k22	**NEW 50N VERSION 2k22**
Poppet Trimat. 2k22 30N CPL COD. **46201815** 	Poppet Trimat. 2k22 50N CPL COD. **46201816** 

NOTE

1) The new poppet will be assembled in other Mares 1st stages as a running change.

2) As a consequence of TB42, the new service kits will be:

46201784	Poppet Trimat 50N cpl>	will be replaced by>	**46201816**	Poppet Trimat 2k22 50N CPL
46201575	Trimaterial Poppet 2k18 cpl>	will be replaced by>	**46201815**	Poppet Trimat 2k22 30N CPL
46201355	Service Kit 22X INT-DIN >	will be replaced by>	**46201827**	Service Kit 22X 2k22
46201370	Service Kit 12S INT-DIN >	will be replaced by>	**46201828**	Service Kit 12S-2k22
46201572	Service Kit 75XR DIN >	will be replaced by>	**46201829**	Service kit 1st Stage 75XR-30N-2k22
46201580	Service Kit 52X-15X-25XR INT DIN >	will be replaced by>	**46201830**	Service Kit 52X-15X-25XR-30N-2k22
46201739	Service kit first stage 82X >	will be replaced by>	**46201831**	Service kit first stage 82X-30N-2k22
46201741	Service kit 1st stage 52X/25XR AST >	will be replaced by>	**46201832**	Service kit 1st stage 52X/25XR AST-30N-2k22
46201744	Service kit NX 1ST 52X AST (EN 13949) >	will be replaced by>	**46201833**	Service kit NX 1st 52X AST (EN 13949) 2k22
46201780	Service kit 1st stage 72X AST >	will be replaced by>	**46201834**	Service kit 1st stage 72X AST-30N-2k22
46201820	Service Kit 15X-HRZ-30N-AST >	will be replaced by>	**46201835**	Service Kit 15X-HRZ-30N-AST-2k22
46201792	Service Kit first stage 62X INT/DIN >	will be replaced by>	**46201836**	Service Kit 62X 2k22
46201787	Service kit first stage 82x-50N >	will be replaced by>	**46201837**	Service Kit 82X-50N-2k22
46201789	Service kit first stage 72x-AST-50N >	will be replaced by>	**46201838**	Service Kit 72X-50N-2k22
46201802	Service Kit first stage 15X-50N-AST>	will be replaced by>	**46201839**	Service Kit 15X-50N-AST 2k22
46201800	Service Kit first stage 15X-50N >	will be replaced by>	**46201840**	Service Kit 15X-50N 2k22
46201807	Service Kit first stage 15X-HRZ-50N-AST>	will be replaced by>	**46201841**	Service Kit 15X-HRZ-50N-AST 2k22
46201783	Service Kit first stage 28XR DIN/NX>	will be replaced by>	**46201860**	Service Kit 28XR-DIN-NX-2k22
46201818	Service Kit first stage 25XR-50N-TBP>	will be replaced by>	**46201862**	Service Kit 25XR-2k22

WARNING

All service and repair procedures on Mares products should be performed by qualified Mares Service Technicians at authorized Mares Dealers and Service Centers. Service Technicians should have the Mares Service Manual and Spare Parts Catalog readily available for reference while performing service procedures and closely follow the recommended procedures and guidelines outlined in these materials.

15X. REQUIRED TOOLS AND SUPPLIES

Tool	Description	#Code
	B-18 (14mm)	46106218
	B-1 (25mm)	46106201
	Hex 4mm	No code
	B-6	46106206
	B-17 (17mm)	46106217
	B-5	46106205

Tool	Description	#Code
	B-4 (5mm)	46106204
	B-13 (10mm)	46106213
	Snap Ring Pliers (B14)	46106214
	B-21	46106221
	B-42	46201042
	O-Ring removal tool	46201387

- Compressed air supply circuit or tank (2600-2900 PSI/ 185-200 bar)
- Compressed air gun (120-145 PSI/8-10 bar)
- Ultrasonic cleaner & Descaling solution (e.g. Deox Extra type) or similar
- Loctite 415 or similar
- Test Bench (#416920) or Intermediate Pressure Gauge (46106252)
- Christo-Lube MCG 111 Lubrication Technology or equal
- Neoprene Workpad (449822)
- First Stage service kit # 46201355 INT / DIN - #46201358 INT / DIN Viton
- Nylon brush

15X. DISASSEMBLY

WARNING

IF THE FIRST STAGE IS USED TO DIVE WITH OXYGEN-ENRICHED MIXTURES, STRICTLY FOLLOW ALL THE INSTRUCTION PROVIDED IN THE MAINTENANCE MANUAL, IN THE NITROX CHAPTER (EN 13949 FOR EUROPEAN COUNTRY) BEFORE BEGINNING DISASSEMBLY-REASSEMBLY-ADJUST.

1. Loosen the Dust Cap (31 INT- 37 DIN) from the First stage.
2. Remove the Second Stage Hose using the 14mm wrench (B18).
3. Remove the First Stage Protection Cap (24), by turning it a little bit right and left.
4. Remove all LP plugs (16) and HP plugs (14) using a 4mm Allen wrench.
5. Remove the O-rings (15) form the LP plugs (16) and O-rings (13) from the HP plugs (14).
6. Insert the threaded bar Tool (B5) to a First Stage stage LP port.

NOTE

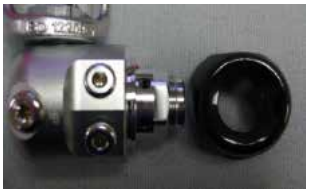
Place the threaded bar tool (B5) in a bench vise (if available) to hold the First Stage during the disassembly.

7. Using a 6mm Allen wrench (B-8), unscrew the HP chamber (1), remove the Spring (6), the First Stage Valve (P), and the Pin 26,5mm (9) from the First Stage.
8. Remove the O-ring (4), and Washer (5) from the HP Chamber (1).
9. Extract the O-ring (2) and the Backup Ring (3) from the HP Chamber (1), using an o-ring removal Tool made in plastic or brass.

WARNING

DO NOT USE SHARP OR POINTED TOOLS MADE OF STEEL OR OTHER MATERIALS, TO AVOID SCRATCHING THE SURFACES OF THE HP CHAMBER.

3.a



3.b

7

7

8-9

9.b

15X. DISASSEMBLY

10. Flip the First Stage over as shown in the picture. Unscrew the Regulating Nut (23), using a 10mm Allen wrench (B13) and remove the First Stage Diaphragm Spring (21) and the Spring Base Plate (20).

10.a

11. Unscrew the Retaining Nut (22) using a 25mm Allen wrench (B1).

12. Remove the First Stage Diaphragm (18) and the Antifriction Ring (19) following one of the two steps described below:

10.b

Option a – Insert the nozzle (#415724) of a low pressure compressed air gun into the First stage HP chamber. Use short bursts of low pressure air to dislodge the Diaphragm (18). Once the Diaphragm is dislodged, remove it and the Poppet Button (17). Be sure that all LP & HP plugs are assembled on First Stage.

Option b – Place the First Stage on a flat surface with the Diaphragm side facing down. Position the special Tool (B6) inside the First Stage HP chamber and let the Poppet Pin (9) falling down through the tool and the HP Seat (11), so that it stays in its original position, in the First Stage button (17). Remove the Tool (B-6) from the HP chamber, and gently press the Pin with the plastic end of tool (B-41) to dislodge and remove the Poppet Button and Diaphragm.

Option b

WARNING

DO NOT USE SHARP OR POINTED TOOLS TO REMOVE THE DIAPHRAGM. SCRATCHES ON THE SURFACES OF THE DIAPHRAGM MAY CAUSE HP LEAKING.

NOTE

If the Antifriction Ring (19) is still in its Seat after having completed step 12, remove it paying attention not to damage the First Stage Body.

WARNING

DO NOT USE SHARP OR POINTED TOOLS TO REMOVE THE ANTIFRICTION RING (19). TO AVOID DAMAGING THE DIAPHRAGM.

13. Insert the special Tool (B42) in the center hole of the First Stage Body (12) and remove the HP Seat (11).

13

14. Remove the O-ring (10) from the HP Seat (11).

15X. DISASSEMBLY

INT
(Section 15)

DIN/Nitrox
(Section 16)

15X. DISASSEMBLY INT

15.1 Unscrew the Yoke Retainer Nut (27) using the special Tool 25mm (B1) and remove the Yoke assembly (27-28-29-30).

15.2 Disassemble the Retaining Ring (30) using the snap ring pliers (B14) and remove the Filter (29) and the Spring Filter (28).

15.3 Remove the O-ring (4) from the Yoke Retainer Nut (27).

WARNING

BE CAREFUL TO AVOID DAMAGING THE CHROME PLATING ON THE NUT YOKE RETAINER (27) WHEN DISASSEMBLING.

15.1

15.2

15X. DISASSEMBLY DIN - NX

16.1 Unscrew the O-ring Seat (36) from the Body Din Connector (33), using a 4mm Allen wrench.

16.2 Remove the O-ring (35) from the O-ring Seat (36).

16.3 Remove the Conical Filter (34) from the Body Din connector (33), by turning the First Stage Body upside down.

16.4 Insert a 5mm Allen wrench (B4) inside the Body Din Connector (33) and unscrew it completely. To make this step easier, a wrench (as shown in the picture) can help.

16.5 Remove the O-ring (4) from the Body Din Connector (33).

16.1

16.3

16.4

15X. INSPECTION AND CLEANING

Reusable Rubber and Plastic Components

Inspection

Inspect all reusable rubber and plastic components for excessive wear and/or damage. Replace parts as necessary.

Cleaning

Clean all rubber and plastic components by washing them in a mixture of warm water and mild detergent. If necessary, scrub parts with a soft brush. Do not use abrasive cleaners, solvents or acids on rubber components.

WARNING

SOLVENTS AND ACIDS MAY DAMAGE PLASTIC AND RUBBER PARTS. BEFORE CLEANING METAL COMPONENTS, MAKE SURE THAT ALL RUBBER AND PLASTIC PARTS HAVE BEEN REMOVED.

Metal Components

Inspection

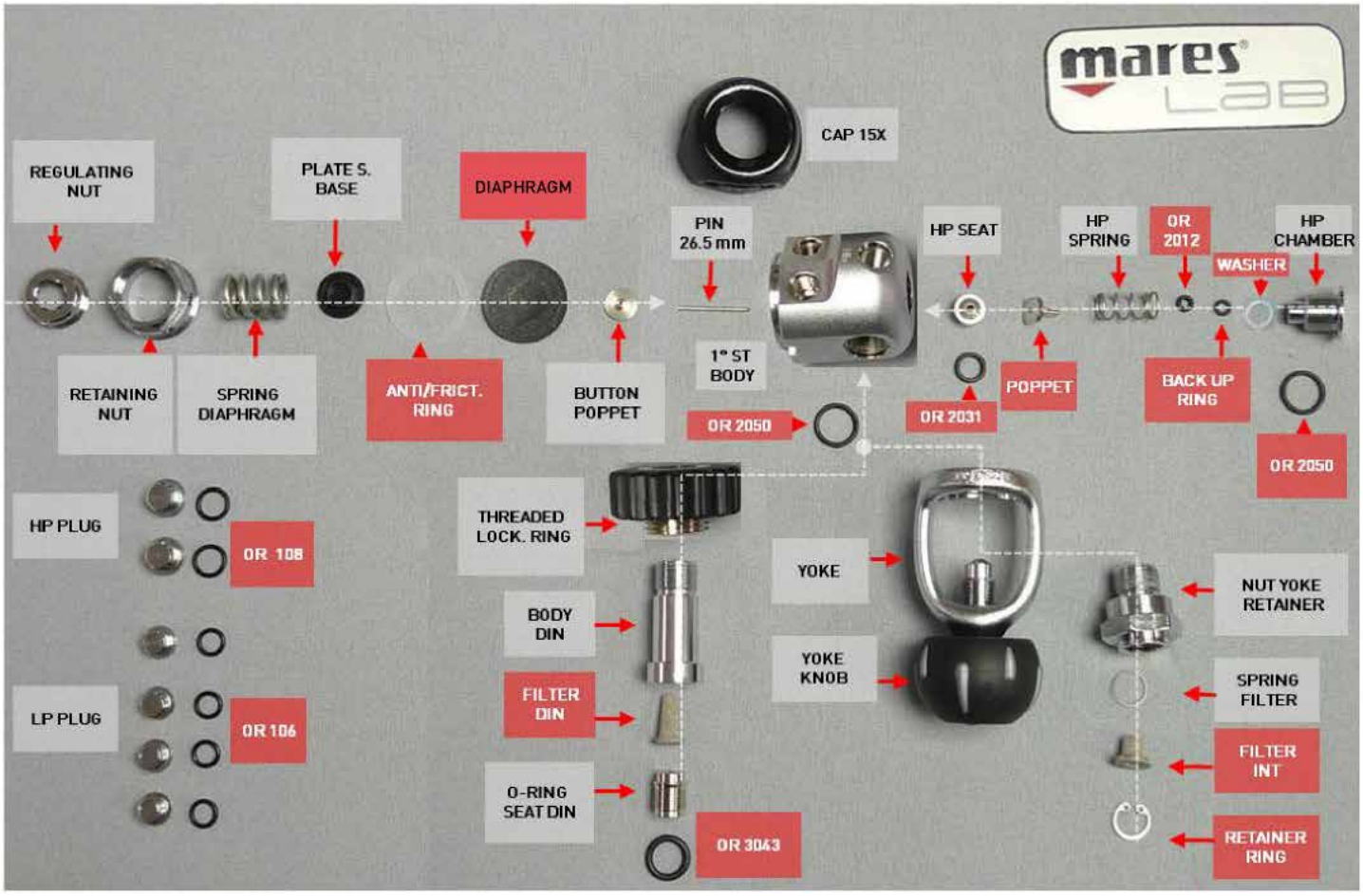
Inspect all parts for excessive wear and/or damage. Replace parts as necessary.

Cleaning

Chrome plated, brass, and stainless steel parts are cleaned by immersing them in an ultrasonic cleaner containing a de-scaling agent such as Deox Extra or a solution of white vinegar diluted with hot water. A nylon brush may be used to remove any stubborn deposits.

Be sure to rinse all parts in fresh water and allow to completely dry before proceeding with reassembly.

15X. FIRST STAGE SERVICE KIT



Certain key components of the First Stage should be replaced during the overhaul. These key parts are included in the 15X First Stage Service Kit (Code 46201580 INT/DIN) and are identified in the RED BOXES above.

SERVICE KIT # 46201580 INT / DIN

15X. REASSEMBLY

NOTE

Lubrication reduces the likelihood of damage during reassembly. Lightly lubricate each O-ring, as it is installed using Bluesil Vacuum GRS,Bluestar silicones, Christo-Lube MCG 111 Lubrication Technology, or an equivalent.

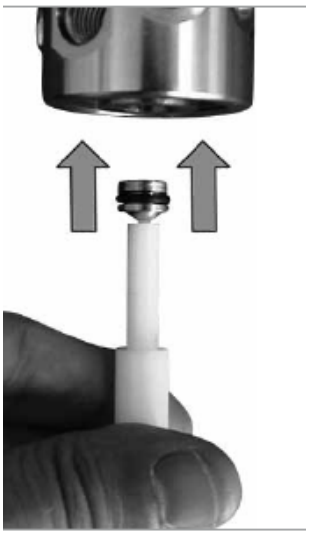
17. Install the o-ring (10) on the HP Seat (11), and position the Seat on the special Tool (B21).
18. Insert the HP Seat (11) into the First Stage Body and gently press until the Seat is properly seated.

17

WARNING

TAKE SPECIAL CARE NOT TO DAMAGE THE SEAT WHEN INSERTING IT. IT IS CORRECTLY SEATED IF THE CONICAL SECTION IS VISIBLE WHEN VIEWING IT FROM THE HIGH PRESSURE CHAMBER.

19. Correctly position the Backup Ring (3) and the O-ring (2) into the HP Chamber (1).

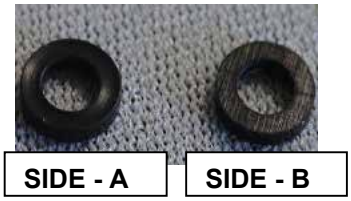


18

WARNING

MAKE SURE THAT SIDE "A" OF THE BACK UP RING (3) IS FACING THE O-RING (2), AND SIDE "B" IS FACING THE BOTTOM OF THE HP CHAMBER (1).

20. Install the O-ring (4), and the Washer (5) on the HP Chamber (1).
21. Insert the First Stage valve (P) inside the First Stage Body, with the flat part facing the Valve Seat (11).
22. Position the spring (6) on the First Stage valve (P) and tighten the HP chamber (1) using a 6mm Allen wrench (B4).



21

15X. REASSEMBLY

23. Flip the First Stage Body over (as shown in the picture) and insert the First Stage pin 26,5mm (9) in the center hole of the Body.
24. Position the First Stage valve button (17) on the First Stage Pin (9) and press it down to feel the "response" of the Spring (6).
25. Place the Diaphragm (18) in the First Stage Body, making sure is firmly seated in the Body.
26. Correctly position the Antifriction Ring (19) on the Diaphragm (18).
27. Place the Spring Base Plate (20) in the middle of the Diaphragm (18). Use a 25-mm wrench (B1) to fully tighten the retaining nut to the First Stage Body.

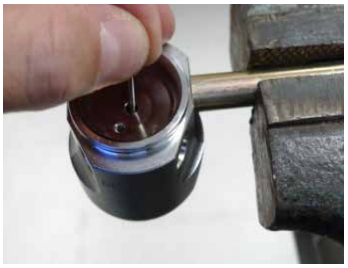
NOTE

If Using a Torque Wrench to tighten the Retaining Nut (22), use a tightening torque of 25 Nm / 18 ft lb.

28. Place the Spring (21) on the Spring Base Plate (20).
29. Using the 10mm Allen wrench (B13), Install the Regulating Nut (23) making 3 – 4 turns of the wrench only.

NOTE

Do not over-tighten the Regulating Nut. Doing so can cause an increase in Intermediate Pressure, which can damage the LP Gauge and interfere with the IP adjustment procedure.



23

25

26

27

29

15X. REASSEMBLY

INT
(Section 30)

DIN/Nitrox
(Section 31)

15X. REASSEMBLY INT

30.1 Rotate the First Stage as shown in the picture.

30.1

30.2 Assemble the Filter Spring (28) and the Filter (29) in the Yoke Retainer Nut (27).

30.3 Using the Retaining Ring pliers (B14), press down to fit the Retaining Ring (30) above the Filter (29) and in the Yoke Retainer Nut (27).

30.3

NOTE

The Retaining ring should be positioned with the sharp side up and rounded side down. Once installed, rotate the Retaining Ring to ensure it is correctly positioned.

30.4 Install the O-ring (4) on the Yoke Retainer Nut (27).

30.5 Install the Yoke Knob (26) on the Yoke (25). Place the Yoke (25) on the First Stage Body.

30.6 Using a 25mm wrench (B1), fully tighten the Yoke Retainer Nut (27).

30.4

NOTE

If using a Torque Wrench, tighten to a torque of approximately 13-15 ft lb / 18-20 Nm.

30.6

WARNING

TO PREVENT THE YOKE RETAINER NUT (27) FROM LOOSENING, APPLY ONE OR TWO DROPS OF THREAD LOCKING COMPOUND ONTO THE THREADS PRIOR TO INSTALLATION. REMOVE ANY RESIDUAL THREAD LOCKING COMPOUND PRIOR TO APPLYING ANY NEW COMPOUND (LOCTITE415 OR SIMILAR).

30.7 Install the O-rings (13) on the HP plugs (14), and the O-rings (15) on the LP plugs (16).

30.8 Install all HP and LP plugs on the First Stage Body, leaving the DFC and one additional LP port open for the Second Stage and IP Gauge.

15X. REASSEMBLY DIN

31.1 Insert the Body DIN Connector (33) into the Threaded Locking ring (32).

31.2 Position the O-ring (4) on the Body Din Connector (33).

31.3 Using a 5-mm Allen wrench (B 4), tighten the Body DIN Connector (33) to the First Stage body.

31.1-31.2

WARNING

TO PREVENT THE BODY DIN CONNECTOR (33) FROM LOOSENING, APPLY ONE OR TWO DROPS OF THREAD LOCKING COMPOUND ONTO THE THREADS PRIOR TO INSTALLATION. REMOVE ANY RESIDUAL THREAD LOCKING COMPOUND PRIOR TO APPLYING ANY NEW COMPOUND (LOCTITE 415 OR SIMILAR).

31.3

NOTE

If using a Torque Wrench, tighten to a torque of approximately 15 ft lb/ 20 Nm.

31.4 Insert the Conical Filter (34) in the Body Din Connector (33).

31.5 Place the O-ring (35) on the Din O-ring Seat (36).

31.6 Using a 4mm Allen wrench, tighten the Din O-ring Seat (36) to the Body Din Connector (33).

31.4

NOTE

If using a Torque Wrench, tighten to a torque of approximately 1.1-1.5 ft lb/ 1,5-2 Nm.

31.7 Remove the Threaded Bar Tool (B-5) from the First Stage Body. Install O-Rings (13 – 15) on all HP and LP Port Plugs (14 - 16).

31.6

15X. REASSEMBLY DIN

31.8 Install the O-rings (13) on the HP plugs (14), and the O-rings (15) on the LP plugs (16).

31.9 Install all HP and LP plugs on the First Stage Body, leaving the DFC and one additional LP port open for the Second Stage and IP Gauge.

15X. ADJUSTMENT

NOTE

Connect the First Stage to a full tank (at least 2600 psi/180 bar) or test bench, and open the air valve slowly to expel any foreign matter from the first stage.

32. Attach the intermediate pressure gauge (#46106252) or connect the LP hose from the LP port of a Test Bench to the open low pressure port.

33. Attach the Second Stage hose to the port marked DFC (without the 2nd Stage cover installed).

NOTE

If using a Torque Wrench, tighten hoses to a torque of 3-3.5 ft lb/ 4 -4,5 Nm.

15X. ADJUSTMENT

TABLE 1: IP ADJUSTABLE RANGE

HP Air Supply	Intermediate Pressure (IP)
2900 psi	142 – 148 psi
200 bar	9.8 – 10.2 bar


IP


HP

34 Holding down the Second Stage Demand Lever, slowly open the tank valve and, almost simultaneously, release the Demand Lever. Read the value of the First Stage adjustment on the pressure gauge, and proceed as follows:

NOTE

No Second Stage free or intermittent air flow can occur during the IP adjustment procedure. If any such flow occurs, it will compromise the process and could cause the IP setting to be outside the acceptable range.

34.1 If the intermediate pressure is greater than the specified value (see table 1), use the 10mm Hex Wrench (B-13) to slowly loosen the Regulating Nut (23) until the specified value is obtained.

34.1

WARNING

WHEN THE INTERMEDIATE PRESSURE IS REDUCED, IT IS NECESSARY TO VENT THE EXCESS AIR IN ORDER TO OBTAIN A CORRECT READING OF THE NEW VALUE.

34.2 If the First Stage pressure is lower than the specified value (see table 1), slowly tighten the Adjusting Nut (23) until the specified value is obtained.

NOTE

Once the intermediate pressure has been correctly set, operate the Second Stage demand lever two to three times to make sure the intermediate pressure remains constant for a few minutes.

34.2

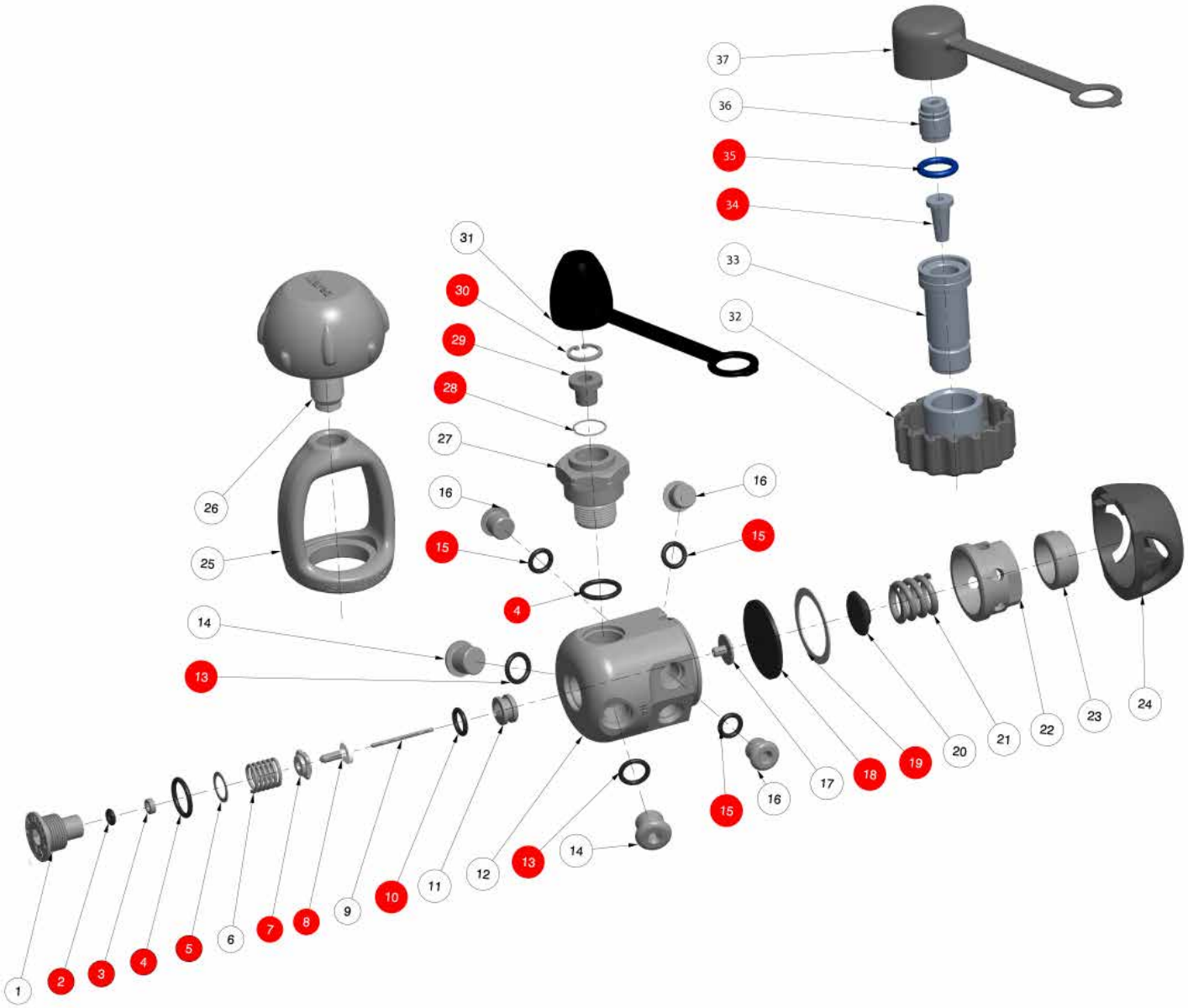
NOTE

The Second Stage adjustment procedures may now be performed.

15X. TROUBLESHOOTING

Problem	Probable Cause	Solution
CONTINUOUS AIR FLOW FROM SECOND STAGE (FREE FLOW) CAUSED BY: 1. AN INCREASE IN THE INTERMEDIATE PRESSURE, or 2. A CONTINUALLY INCREASING IP (IP CREEP)	1. Intermediate Pressure too high	Readjust IP per procedures
	2. Damaged First Stage Tri-material Poppet	Replace Tri-material Poppet
	2. Damaged Poppet Seat	Replace Poppet Seat
	2. Damaged HP Housing Assembly components or damaged HP Chanber	Check internal surfaces of HP Chamber. Clean or replace HP Chamber. Replace O-ring and/or Back Up Ring.
AIR LEAKS FROM FIRST STAGE DIAPHRAGM	Lose Locking Nut	Tighten CWD Kit Body
	First Stage Diaphragm damaged	Replace the Diaphragm
	First Stage diaphragm seating surface damaged	Replace the First Stage Body
AIR LEAKS FROM THE FIRST STAGE HP/LP PORT PLUGS AND/OR HOSE PORTS	Damaged O-ring – corrosion on metal surface	Clean the Seat and/or replace O-ring
	Lose hose and/or port plug	Tighten hose and/or plug
AIR LEAKS BETWEEN YOKE NUT RETAINER AND TANK VALVE	O-ring seal of tank valve corroded or damaged	Clean the Seat of the tank valve and replace the O-ring
	Yoke Nut (27) sealing surface damaged	Replace Yoke Nut
	O-Ring (4) damaged	Replace O-ring

15X. DRAWING E-1316 Updated: 19/11/2020



15X. CHART 42 Updated: 15/12/2022

CHART NO: 42		FIRST STAGE 15X			UPDATED: 15/12/2022
REF	**CODE**	**DESCRIPTION**	**REF**	**CODE**	**DESCRIPTION**
1.A	46201275	HP CHAMBER PLUG 30N	35	46110247	OR 3043
1.B	46202045	HP CHAMBER PLUG 50N	36	46200547	O-RING SEAT, DIN
2	46110506	BACKUP RING PK	37	46200562	DUST CAP DIN
3	46110101	OR 2012	**ASSEMBLIES**		
4	46110211	OR 2050		416813	TWIN BALANCED PISTON DRY KIT 52X-15X-25XR
5.A	46201291	WASHER, HP CHAMBER		416857	KIT CWD DRY (41-42-43-44-45)
5.B	46202048	HP CHAMBER WASHER 50N		416809	DIN CONNECTOR 200/300 BAR NO AST
6.A	46201284	SPRING, FIRST STAGE VALVE		416817	DIN CONNECTOR 200/300 BAR WITH AST
6.B	46202047	HP SPRING FIRST STAGE - 50N		46201362	HP CHAMBER CPL 30N
7	P	POPPET BASE PLATE		46201758	HP CHAMBER CPL 50N
8	P	TRIMATERIAL POPPET	P.1*	46201575	TRIMATERIAL POPPET 2K18 CPL
9	46201303	PIN 26,5	P.2*	46201784	TRIMATERIAL POPPET 50N CPL
10	46110107	OR 2031	P.1	46201815	POPPET TRIMAT 2K22 30N CPL
11	46201541	HP SEAT "MR"	P.2	46201816	POPPET TRIMAT 2K22 50N CPL
12	46201288	FIRST STAGE BODY		416237	FIRST STAGE 15X ASSEMBLY (INT-DIN)
13	46110108	OR 108		46201791	KIT UPGRADE FIRST STAGE 50N (1B-5B-6B-P2)
14	46185205	HP PLUG 7/16", FIRST STAGE		46201580	SERVICE KIT FIRST STAGE 52X/15X/25XR INT/DIN
15	46110106	OR 106		46201800	Service Kit first stage 15X-50N (INT/DIN)
16	46185204	LP PLUG 3/8", FIRST STAGE, REGS.		46201802	Service Kit first stage 15X-AST-50N (INT/DIN)
17	46202088	FIRST STAGE VALVE BUTTON		46201839	Service Kit first stage 15X-50N-AST 2k22
18	46201667	DIAPHRAGM		46201840	Service Kit first stage 15X-50N 2k22
19	46200581	ANTI-FRICTION RING		46201830	SERVICE KIT FIRST STAGE 52X/15X/25XR 30N 2k22
20	46200582	PLATE SPRING BASE, FIRST STAGE			
21	46201285	SPRING DIAPHRAGM FIRST STAGE	**NITROX VERSION**		
22	46201118	LOCKING NUT	N	46201743	NITROX CONNECTOR 200 BAR AST (EN13949)
23	46201120	REGULATING NUT, FIRST STAGE	---	46201444	SERVICE KIT NX 1ST 52/22 (EN13949) - NBR ORINGS
24	46201302	PROTECTION CAP 15X			
25	46201074	YOKE K11			
26	46184079	YOKE KNOB			
27	46201100	NUT,YOKE RETAINER			
28	46185013	SPRING, FILTER FIRST STAGE			
29	46186202	CONICAL FILTER, INT			
30	46185015	RETAINING RING, FIRST STAGE FILTER			
31	46185010	DUST CAP INT			
32	46200546	DIN 300 BAR THREADED LOCKING RING			
33	46201102	BODY, DIN CONNECTOR 300 BAR			
34	46200561	CONICAL FILTER, DIN			

NOTE

Parts highlighted in red are included in the service kits.
The codes 46202045 (Ref.1.B), 46202048 (Ref 5.B), 46202047 (Ref 6.B) and the code 46201784 (Ref.P.2) must be assembled together and need to be serviced with the:
46201800 Service kit First stage 15X-50N or 46201802 Service kit First stage 15X-AST-50N
Please refer to technical specification to the TB 38 BIS SPRING 50N
Please refer to technical specification to the TB 42-BIS NEW TRIMATERIAL POPPET
*(P1) TILL STOCK ENDS - IT WILL BE REPLACED BY 46201815
*(P2) TILL STOCK ENDS - IT WILL BE REPLACED BY 46201816