

MARES SERVICE MANUAL

2004

mares[®]

The Mares logo consists of the word "mares" in a bold, lowercase, sans-serif font. Below the letter "a" is a red downward-pointing chevron shape.

C.W.D. KIT INSTALLATION



WARNING!

FOR REFERENCES USED IN THIS MANUAL CONSULT THE TABLES FOR THE APPROPRIATE MODELS



IT IS RECOMMENDED THAT YOU REMOVE ALL HOSES CONNECTED TO THE 1ST STAGE.

1. Insert the disassembly tool for the first stage (B5) in an LP port.
2. Remove the dust cap (110). (Version 16)
3. Remove the first stage cap (70). (Version 12)
4. Unscrew the adjusting nut (18) using the wrench (B13) and remove the diaphragm spring (16).
5. Remove the retaining nut (17) and the shock ring (69) (Version 32-Ruby-Abyss-22) and the spring base plate (15).
6. If the C.W.D. kit is not installed on the regulator, clean the first stage diaphragm with a damp cloth and dry it. Clean the diaphragm spring and the base plate following the instruction in the "Cleaning" section of this manual.
7. Oil both sides of the base plate (15) with the silicone oil supplied with the C.W.D. kit, and position it on the diaphragm.
8. Lightly oil the edge of the C.W.D. body (57) with the silicone oil provided in the C.W.D. kit and screw it to the first stage body until it is fastened correctly (see load in N/m for diaphragm retaining nut).
9. Oil the diaphragm spring (16) with the silicone oil and place it on the spring base plate.
10. Arrange the nut (18) over the spring. Using the tool (B13), tighten the nut until it is positioned over the internal edge of the C.W.D. body (57).
11. Remove the disassembly tool for the first stage (B5) from the LP port and screw on the closure cap.
12. Connect a submersible pressure gauge to check the intermediate pressure to an LP port on the first stage and the second stage to the DFC port.



DO NOT SUBMERGE THE PRESSURE GAUGE WHEN CALIBRATING THE INTERMEDIATE PRESSURE. THIS CAN AFFECT ITS PRECISION AND/OR DAMAGE IT.

⚠ DANGER ! RISK OF EXPLOSION

DO NOT CONNECT AN INTERMEDIATE PRESSURE GAUGE TO AN HG PRESSURE PORT ON THE FIRST STAGE. THIS WILL CAUSE THE HOSE AND/OR GAUGE TO EXPLODE AND POSSIBLY CAUSE GRAVE INJURY.

13. Connect the first stage to a full tank (2600 - 3000 psi / 185 - 210 bar) (Fig. 2).
 14. Read the intermediate pressure indicated on the submersible pressure gauge and adjust it, following the instructions shown in the table in the "First Stage Adjustment" section, C.W.D. version.
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⚠ WARNING!

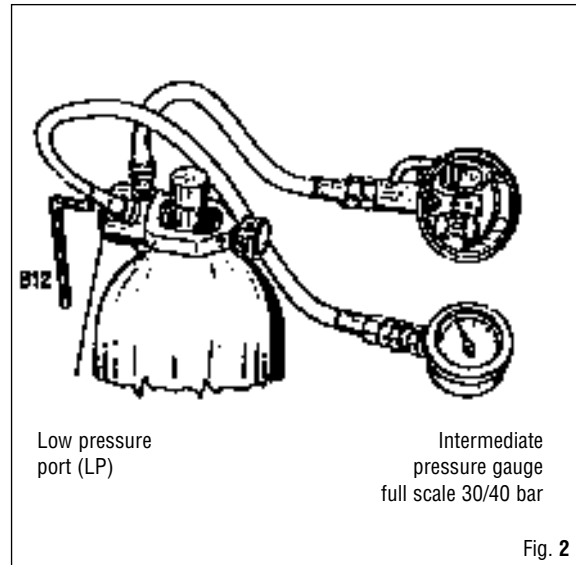
AFTER CALIBRATING THE FIRST STAGE IT MAY BE NECESSARY TO ADJUST THE SECOND STAGE DEMAND LEVER. PERFORM ANY ADJUSTMENTS OR TESTS REQUIRED FOLLOWING THE PROCEDURES INDICATED IN THE MAINTENANCE MANUAL IN THE SECTION CONCERNING YOUR SECOND STAGE MODEL.

15. After adjusting the second stage if required, close the tank valve, release the air using the second stage purge button, and remove the pressure gauge and the second stage.
 16. Set the first stage in an inclined position (5-10 degrees) with the open end of the retaining nut facing upward.
 17. Fill the C.W.D. unit and adjusting nut almost entirely full with the silicone oil supplied with the kit.
 18. Turn the first stage unit counter-clockwise, lightly tapping the sides of the C.W.D. unit with a plastic or wooden object (e.g. a screwdriver handle) to eliminate any bubbles in the silicone oil.
 19. Install the diaphragm (58) with the rectangular edge facing upward (Fig. 1).
 - a. Lift the upper end of the diaphragm, pressing lightly on the center to allow air to escape.
 - b. The diaphragm should be completely submerged in the oil.
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⚠ WARNING!

PAY STRICT ATTENTION AND MAKE SURE THAT THERE IS ABSOLUTELY NO AIR UNDER THE DIAPHRAGM. IN THE EVENT THAT AIR REMAINS, REPEAT STEPS **a.** AND **b.**

20. Install the C.W.D ring (59) and tighten it with the tool provided in the kit. The edge of the ring must touch the adjusting nut (18).



21. Pour surplus oil into a special container. Eliminate residual oil from the first stage with water. Ensure that the first stage protection cap is in place and is correctly tightened before rinsing.
22. Install the C.W.D. protection cap (108). (Version 16).



DO NOT TOUCH THE C.W.D. KIT DIAPHRAGM WITH SHARP INSTRUMENTS OR WITH THE FINGERS, AND DO NOT DIRECT ANY POWERFUL JETS OF WATER ONTO IT (e.g.: FROM A HOSE). PERFORATION OR MOVEMENT OF THE DIAPHRAGM MAY CAUSE OIL TO LEAK AND ALLOW INFILTRATION OF WATER.

23. Screw the 1st stage to the DFC port and the submersible pressure gauge to check the intermediate pressure.
24. Connect the first stage to a full tank (2600 - 3000 psi / 185 - 210 bar) (Fig. 2).

**WARNING!**

IF THE CHANGE IN INTERMEDIATE PRESSURE IS GREATER THAN + 0.4 BAR COMPARED TO THAT SET PREVIOUSLY, REPEAT THE INSTALLATION OF THE CWD KIT.

25. Remove the LP pressure gauge.

► INSPECTION

Some important “key instruments” of the First Stage should be regularly replaced at each revision. Moreover, all O-rings should be replaced. They are:

- Retaining ring	(2)	- code. 185015	
- Conical sintered filter	(22)	- code. 186202	
- Plane sintered filter	(22)	- code. 185014	
- O-ring Bp	(19)	- code. 110106	code. Viton 110402
- O-ring Hp	(52)	- code. 110108	code. Viton 110404
- O-ring HP housing	(6)	- code. 110101	code. Viton 110401
- O-ring First Stage cover	(71)	- code. 110211	code. Viton 110413
- O-ring poppet seat	(74)	- code. 110107	code. Viton 110403
- O-ring yoke retainer nut	(71)	- code. 110211	code. Viton 110413
- O-ring DIN connector (only DIN version)	(23)	- code. 110117	code. Viton 110406

If the above-mentioned parts are not replaced, they should be inspected with a jeweler's loop for the flaws listed below.

► REPLACE ANY PART WITH THESE FLAWS:

Retaining ring:	Inspect for distortions, cracking or damaged edges. It's advisable to replace them with new ones.
First stage valve (RUBY):	Make sure that the hole through the poppet stem is not obstructed by foreign matter.
First stage valve (MR 22):	Inspect for cuts, nicks, abrasion or separation of the rubber from the valve. Make sure that the hole through the poppet stem is not obstructed by foreign matter.
First stage valve (Pebax): (MR 22)	Inspect for cuts, nicks, abrasion deformations, or impurities. Make sure that the hole through the poppet stem is not obstructed by foreign matter.
Conical sintered filter:	Inspect for sedimentation and rust. Rust deposits may indicate a deteriorated diving cylinder. Check possible cracking.
Hp chamber:	Inspect for foreign matter or particles.
Back-up ring:	Make sure that it is properly positioned within the Hp chamber. Inspect its surface for cuts or contamination.



WARNING !

AFTER REMOVAL, THE BACK-UP RING SHOULD ALWAYS BE REPLACED.

O-rings:	Inspect for cuts, tears or contamination. The presence of any of these flaws may cause leakage.
First Stage diaphragm:	Inspect for cracking, brittleness and tears.
First Stage body:	Inspect for scratches on the diaphragm surface, in the cap and poppet seats.
Poppet seat:	Inspect for chipping and/or scratches on the surface and in the O-ring seat.
O-rings seat:	Inspect all metal surfaces in contact with O-rings and other seals for chipping, scratches, deteriorated plating or contamination.
Springs:	Inspect for cracking or broken coils.

▶ INSPECTION

Some key parts of the First Stage should be replaced routinely whenever inspection is performed. In addition, considering their low price, all O-rings should be replaced.

It is recommended to replace the following parts:

- Retaining ring	(2)	- code 185015	
- Filter	(22)	- code 185014	
- LP O-rings	(19)	- code 110106	Viton code 110402
- HP O-rings	(52)	- code 110108	Viton code 110404
- Poppet retainer O-ring	(6)	- code 110101	Viton code 110401
- Seat connector O-ring (V12)	(74)	- code 110107	Viton code 110403
- DIN connector O-ring (DIN model)	(50)	- code 110203	Viton code 110409
- Cap O-ring (DIN model only)	(23)	- code 110117	Viton code 110406

If these parts are not replaced, they should at least be inspected with a jeweler's loupe to identify any of the flaws listed below.

▶ DO NOT USE PARTS WITH ANY OF THE FOLLOWING DEFECTS:

Retaining rings:	Check for any distortion, cracks or damaged edges. It is recommended to always replace them.
First stage poppet:	(MR12) Inspect for cuts, nicks, abrasion of rubber and separation of rubber from metal. Make sure that the hole through the poppet stem is not clogged with foreign matter.
First stage poppet (Pebax):	(MR12) Inspect for cuts, nicks, abrasion, deformations, or impurities. Make sure that the hole through the poppet stem is not clogged with foreign matter.
First stage poppet:	(V12) Inspect for chipping and/or scratching on the seating surface. Make sure that the hole through the poppet stem is not clogged with foreign matter.
Filter:	Inspect for sediment or rust. Rust deposits may be indicative of a deteriorated air cylinder. Check for any cracks.
HP poppet retainer:	Inspect for any foreign matter or particles inside it.
Back-up ring:	Make sure that it is properly positioned inside the HP poppet retainer and that its surface is not distorted, nor contaminated with foreign matter.



WARNING !

REPLACE THE BACK-UP RING WHENEVER IT HAS BEEN REMOVED FROM THE HP POPPET RETAINER.

O-rings:	Inspect for cuts, tears, flat spots or contamination. The presence of any of these flaws may cause leakage.
First stage diaphragm:	Inspect for cracking, brittleness, tears or gross surface distortion.
First stage body:	(MR12) Inspect for chipping and/or scratching of the plug seats, diaphragm sealing surface and seat connector sealing surface.



For accurate cleaning of the First Stage Seat Connector, a slightly abrasive rubber can be used.

First stage body:	(V12) Inspect for chipping and/or scratching of the plug seats, diaphragm sealing surface and seat connector sealing surface.
Seat connector:	(V12 only) Inspect for chipping, scratching and/or contamination on the sealing surface and on the O-ring sealing surface.
Metal sealing surfaces:	With all metal surfaces which make contact with O-rings or other seals, inspect for nicks, scratches, loose plating or contamination.

Table No. 16	FIRST STAGE R2 DFC - FIRST STAGE R2 NITROX	Drawing reference No.: E 7 Table updated on 01/15/2004
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Ref. No.	Code	Description
1	A	1 st Stage Body
2	46185015	Snap ring D. 13
3	46185211	Yoke
7	46185212	Yoke retainer nut
8	46186220	Piston spring
19	46110106	OR 106
19	46110402	OR 106 Viton 610-9707
20	46185204	3/8" UNF Port plug
22	46185014	Sintered filter
23	46110117	OR 115
23	46110406	OR 115 Viton 614-9707
24	46185010	Dust cap
25	46184079	Yoke knob
48	F	Connector body (DIN) 300 BAR
49	F	DIN 300 BAR threaded locking ring
50	46110203	OR 2018
50	46110409	OR 2018 Viton 008-9707
51	46183003	Connector coupling (DIN) 300 BAR
52	46110108	OR 108
52	46110404	OR 108 Viton 611-9707
53	46185205	7/16" UNF HP port plug

Ref. No.	Code	Description
61	46185013	Filter spring
62	46183014	DIN connector dust cap
82	46186221	Spring washer
84	46186228	Piston body
85	46186225	Closing cap
86	46110224	OR 2100
86	46110419	OR 2100 Viton 022-9707
88	46186223	Piston seat
89	46184354	1 st st. sticker R2
148	46184315	EN 250 - 200 bar "Sticker"
149	46184316	"MARES" Sticker
		ASSEMBLIES
A	46200112	1 st stage assembly R2
F	416804 300 NX	300 BAR DIN Nitrox connector assembly (23-48-49-50-51-62)
***	46185323	Service kit for 1st St. R2/D2/S10 (2-19-22-23-50-52-86-88)
***	46186155	Nitrox INT/DIN 1 st st. (VITON O-Ring) service kit (2-19-22-23-50-52-86-88)

Drawing N.ro E 27	AXIS PRO SECOND STAGE - AXIS PRO NITROX OCTOPUS AXIS PRO	Drawing updated on: 10/28/2003
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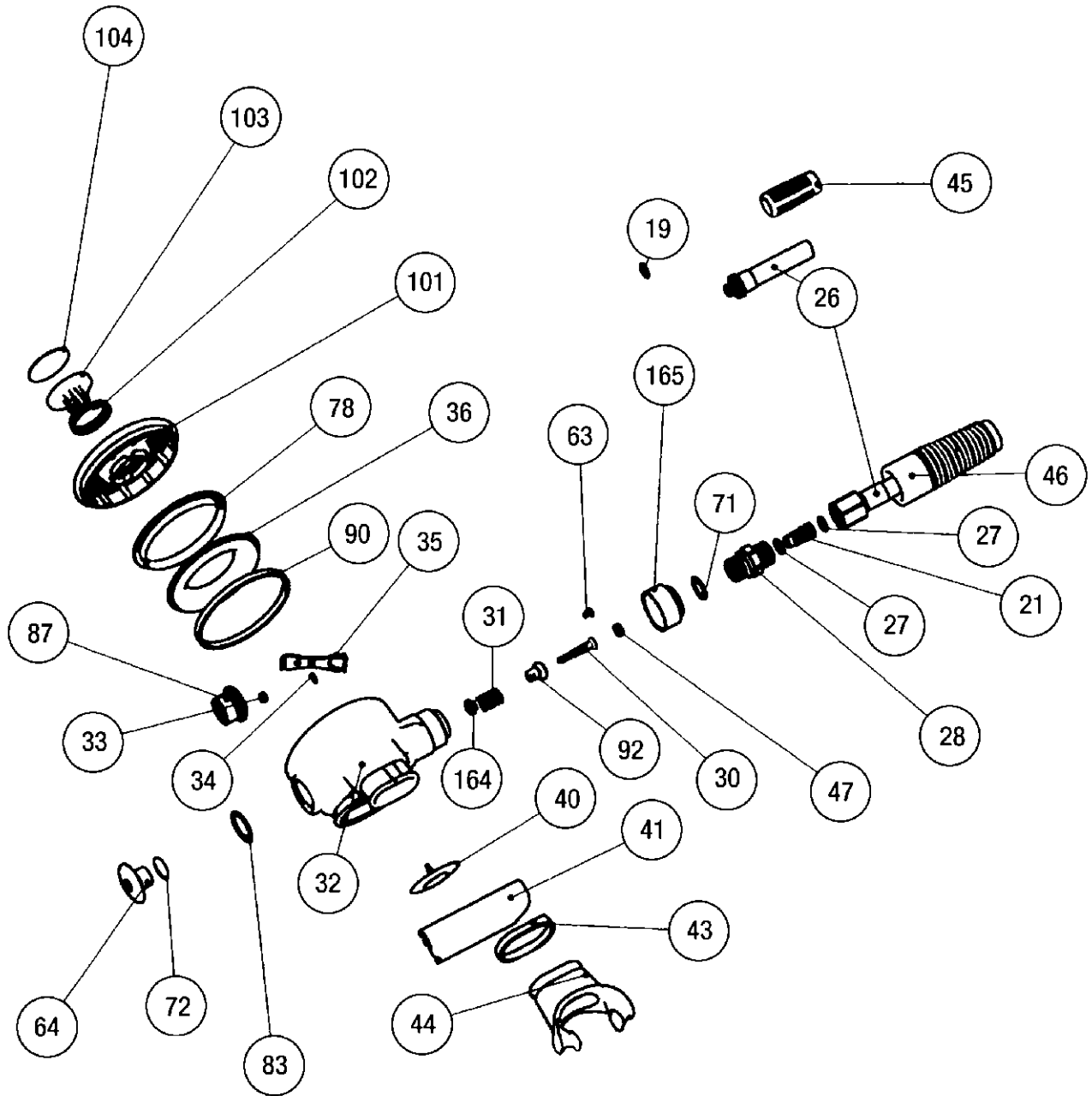
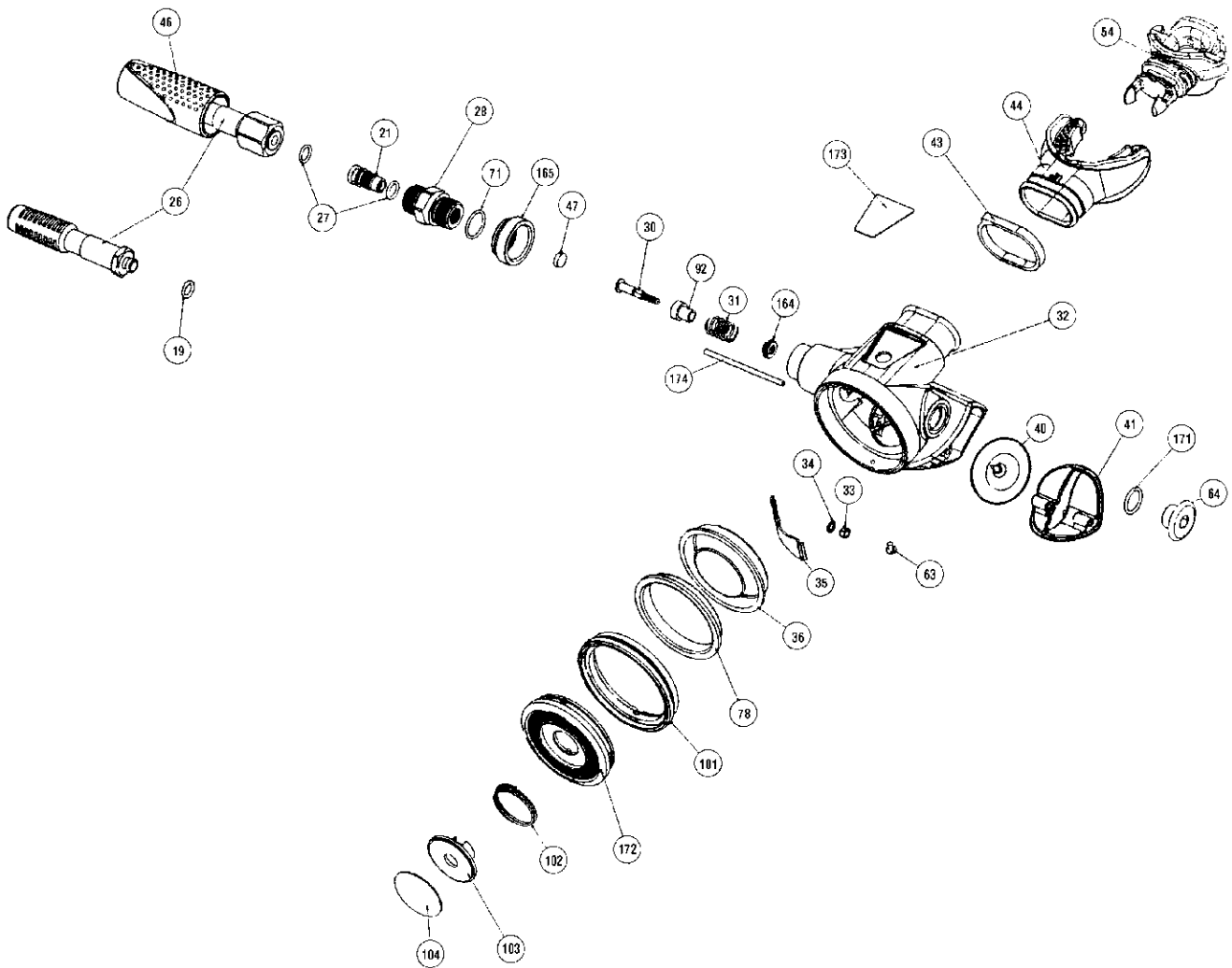


Table No. 117	AXIS PRO SECOND STAGE - AXIS PRO NITROX OCTOPUS AXIS PRO	Drawing reference No.: E 27 Table updated on: 01/15/2004
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Ref. No.	Code	Description
19	46110106	OR 106
19	46110402	OR 106 Viton 610-97507
21	46200204	Seat connector
26	46200452	soft yellow hose - 3/8" 1000
26	46200522	soft black hose - 3/8" 800
27	46110205	OR 2025
27	46110411	OR 2025 Viton 010-9707
28	46184282	Hose-case assembly connector
30	46184219	Poppet stem
31	46185057	Poppet spring
32	- - -	Axis case
33	46185051	Demand lever nut
34	46185049	Demand lever washer
35	46185104	Demand lever
36	46184225	Diaphragm
40	46184006	Exhaust valve
41	46186266	Exhaust tee
43	47157984	Mouthpiece clamp
44	° ° °	Mouthpiece
45	46179902	First stage hose protector
46	46184210	Hose protector
47	46184062	Poppet seat
63	46184289	Cover safety clip
64	46184234	Case plug
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707
72	46110215	OR 2043
72	46110415	OR 2043 Viton 013-9707
78	46184224	Diaphragm retaining ring
83	46110225	OR 2068

Ref. No.	Code	Description
83	46110420	OR 2068 Viton 017-9707
87	46184233	Adjuster connector
90	46184223	Spacer ring
92	46184221	Poppet seat holder
101	+++	Black Axis 2 nd Stage cover
101	+++	Yellow Axis 2 nd Stage cover
103	+++	Button spring
103	+++	Button
104	46200517	Button sticker
104	46200205	Nitrox button sticker
164		Rotation stop washer
165	46200213	Connector bushing
		ASSEMBLIES
G	46200294	Complete Axis Pro second stage assembly
G	46200292	Complete Axis Pro Nitrox second stage assembly
- - -	46200287	Axis P/F Axis Pro Case (32 - 164)
+ + +	46200200	Axis Pro cover assembly (101-102-103-104)
+ + +	46200203	Axis Pro Nitrox cover assembly (101-102-103-104)
+ + +	46200201	Axis Pro Octopus cover assembly (101-102-103-104)
+ + +	46200202	Axis Pro Nitrox Octopus cover assembly (101-102-103-104)
* * *	46200296	Axis 2 nd Stage service kit (19-27-33-40-43-47-71-72-83)
* * *	46200297	Axis Nitrox 2 nd Stage service kit (Viton O-Ring) (19-27-33-40-43-47-71-72-83)

Drawing No. E 24	PROTON SECOND STAGE PROTON OCTOPUS	Drawing updated on 10/08/2003
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Drawing No. E 25	PROTON XL SECOND STAGE	Drawing updated on 10/08/2003
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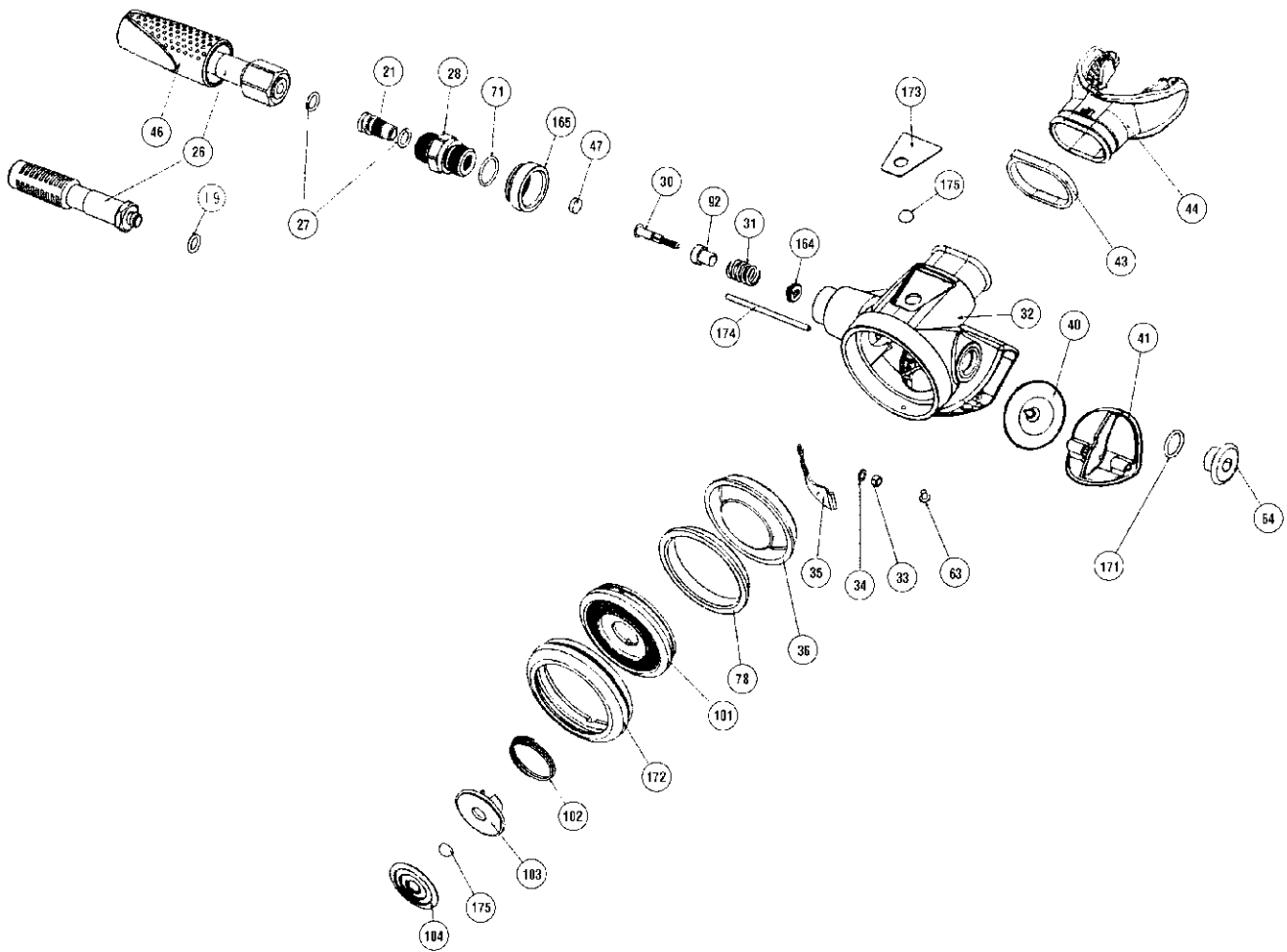
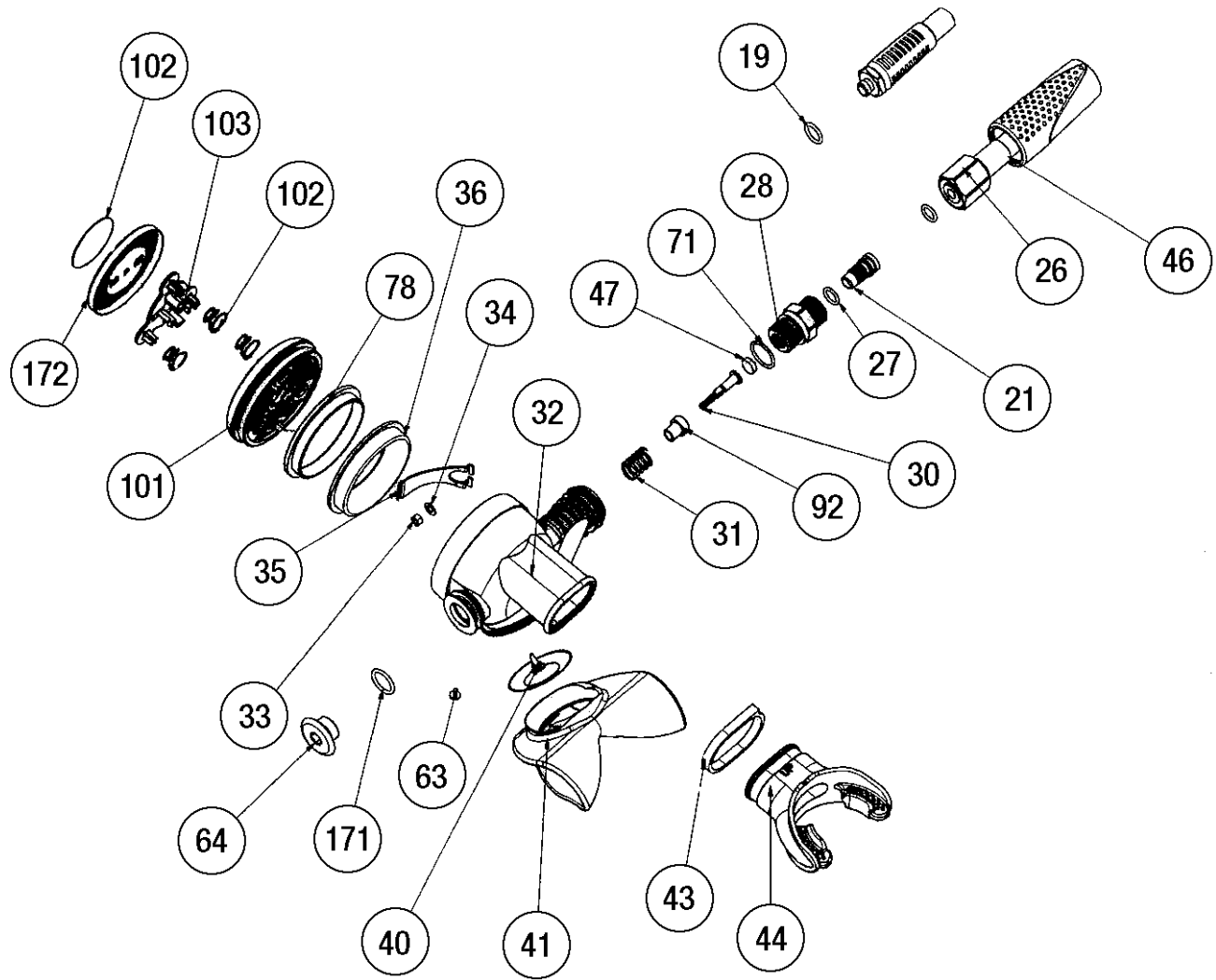


Table No. 116	PROTON ICE SECOND STAGE PROTON ICE OCTOPUS	Drawing reference No: E 26 Table updated on 01/15/2004
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Ref. No.	Code	Description
19	46110106	OR 106
19	46110402	OR 106 Viton 610-97507
21	46200204	Seat connector
26	46200346	Soft hose - 1/2" 800
26	46200452	Soft yellow hose - 3/8" 1000
27	46110205	OR 2025
27	46110411	OR 2025 Viton 010-9707
28	46184282	Case assembly connector
30	46184219	Valve shaft
31	46185059	Poppet spring
32	46200462	2nd stage case
33	46185051	Demand lever nut
34	46185049	Lever washer
35	46187027	Demand lever
36	46200311	2nd st diaphragm
40	46184006	Exhaust valve
41	46200456	Exhaust tee
43	46200458	Mouthpiece clamp
44	46200459	Mouthpiece
46	46200323	Proton hose protector
47	46184062	Poppet seat
54	46186090	Octopus mouthpiece plug
63	46184289	Cover safety catch

Ref. No.	Code	Description
64	46200322	2 nd St. adjustment plug
64	46200460	Octopus 2nd St. adjustment plug
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707
78	46200321	Diaphragm holding ring
92	46184221	Valve body
101	+++	Proton Ice 2nd St. Cover
102	+++	Spring
103	+++	Proton Ice cover button
104	46200447	Proton Ice cover sticker
171	46110110	OR 2037
171	46200298	OR 2037 Viton
172	+++	Proton Ice front
		ASSEMBLIES
G	46200465	Proton Ice second stage assembly
+++	46200464	Proton Ice assembly cover
		(101 - 102 - 103 - 104 - 172)
***	46200409	Proton series 2 nd stage service kit
		(19 - 27 - 33 - 40 - 43 - 47 - 71 - 171)
***	46200408	Proton NX series 2 nd stage service kit
		(19 - 27 - 33 - 40 - 43 - 47 - 71 - 171)

Drawing No. E 28	PROTON METAL SECOND STAGE	Drawing updated on 10/08/2003
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SUBJECT: IDENTIFYING THE NEW AIR TRIM 2003 SYSTEM

BTM9

THE MARES HTM SPORT DIVISION HAS CREATED A NEW AIR TRIM SYSTEM WHICH, WHILE MAINTAINING UNCHANGED THE TECHNICAL CHARACTERISTICS OF THE PREVIOUS VERSION, NOW MAKES IT POSSIBLE TO FURTHER SIMPLIFY MAINTENANCE AND GENERAL OVERHAUL PROCEDURES.

THE MAIN CHARACTERISTIC ARE THE INTERNAL RING NUTS HEAT-SEALED TO THE BUOYANCY BAG (OR THE AIR CHAMBER IN THE MORPHOS TWIN VERSION).

THE BCS THAT USE THE NEW AIR TRIM SYSTEM CAN BE QUICKLY IDENTIFIED, WITHOUT ANY NEED TO DISASSEMBLE COMPONENTS, BY CHECKING THE SERIAL NUMBER PROVIDED BOTH ON THE LABEL OF THE PACKAGING AND STAMPED ON THE PRODUCT.

SERIAL NUMBERS IDENTIFYING THE NEW AIR TRIM ARE CHARACTERIZED BY A 9-CHARACTER NUMBER INSTEAD OF 7, AS SHOWN IN THE EXAMPLE HERE:

MT 10001 (TRADITIONAL AIR TRIM)

03 MT 10001 (AIR TRIM 2003)



REGARDING COMPONENTS, THOSE OF THE NEW AIR TRIM SYSTEM ARE NOT INTERCHANGEABLE WITH THE PREVIOUS VERSION, SO TO ORDER AND USE THE COMPONENTS, YOU MUST REFER TO THE SPARE PARTS TABLES ATTACHED AND INCLUDED IN THE SPARE PARTS LIST REFERENCE AND MAINTENANCE MANUAL.

**2003 AIR TRIM
PNEUMATIC SYSTEM**

mares®

AIR TRIM PNEUMATIC SYSTEM

NOTE TO IDENTIFY THE VERSION OF THE AIR TRIM SYSTEM ON THE BC CONSULT BTM 9.

NOTE BEFORE DISASSEMBLING THE AIR TRIM PNEUMATIC SYSTEM, IT IS RECOMMENDED THAT YOU PLACE THE FULLY DEFLATED BC OPEN ON A FLAT SURFACE.

CAUTION!

TO AVOID DAMAGE TO THE PARTS AND COMPONENTS INVOLVED, BEFORE USING ANY PLIERS (USAG TYPE 133 - 160-MM L.) IT IS RECOMMENDED THAT YOU COVER THE METALLIC POINTS WITH THIN PROTECTION (FOR EXAMPLE, ADHESIVE TAPE).

▶ **A - PNEUMATIC INFLATOR DISASSEMBLY**

1. Unhook the LP hose from the male coupling (18) of the Pneumatic Inflator.
2. Using a Phillips head screwdriver (USAG type 322 PH 1), remove the screws (14) and take off the upper cover (13).

NOTE IT IS RECOMMENDED THAT YOU DISASSEMBLE THE BUTTONS FROM THE UPPER COVER ONLY IF NECESSARY.

3. Use the special wrench (C-4) (or a 12-mm open end wrench) to unscrew the male quick coupling (18) and extract the fabric filter (16).
4. Remove the O-Ring (17) from the male coupling (18).
5. Using a pin wrench if necessary (USAG type 282/58-62-65), unscrew the lower casing (12) (Fig. 1).

CAUTION!

WHILE UNSCREWING THE LOWER CASING, IT IS RECOMMENDED THAT YOU BLOCK THE INNER PART OF THE PNEUMATIC INFLATOR (Fig. 1).

6. Remove the inflator assembly (1) from the heat-sealed flange in the buoyancy bag (30).
7. Remove the O-Ring (32) from the inflator body (1) (or from the seat in the heat-sealed ring nut (30)).
8. Disassemble both the OR housing perforated spindles (57) from the inflator body (1).

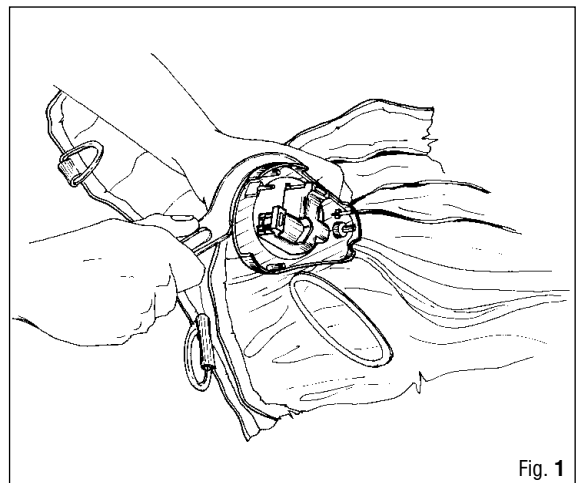


Fig. 1

△ CAUTION!

IN ORDER TO AVOID DAMAGING THE PERFORATED SPINDLES (57) AND/OR OTHER COMPONENTS, DURING DISASSEMBLY OPERATIONS IT IS ADVISABLE THAT YOU NOT USE METAL TOOLS SUCH AS PLIERS.

9. Remove the O-Rings (23) from the OR housing perforated spindles (57).

△ CAUTION!

TO AVOID DAMAGING THE O-RING SEATS IN THE PERFORATED SPINDLES (57) DURING DISASSEMBLY OPERATIONS IT IS ADVISED THAT YOU NOT USE POINTED OR METAL TOOLS.

▶ A.1 - DISASSEMBLY OF THE DISCHARGE BUSHING (see Fig. 2)

10. Remove the fastening fork (59), using a pair of pliers if necessary (USAG type 133 - 160 L.), or with a small flathead screwdriver (USAG type 323).
11. Pull out the discharge bushing assembly (52) from the inflator body (1) and pull out the spring (2).

NOTE IT IS RECOMMENDED THAT YOU DISASSEMBLE THE DISCHARGE BUSHING BY INTRODUCING LOW-PRESSURE AIR FROM THE HOUSING OF THE MALE COUPLING IN THE INFLATOR BODY (see Fig. 2).

12. Remove the three O-Rings (50) from the external seats of the discharge bushing.

△ CAUTION!

TO AVOID DAMAGING THE O-RING SEATS IN THE DISCHARGE BUSHING (52) DURING DISASSEMBLY OPERATIONS IT IS ADVISED THAT YOU NOT USE POINTED OR METAL TOOLS.

⚠ WARNING!

DO NOT ATTEMPT TO DISASSEMBLE THE PISTON FROM THE DISCHARGE BUSHING, PERFORM A COMPLETE REPLACEMENT.

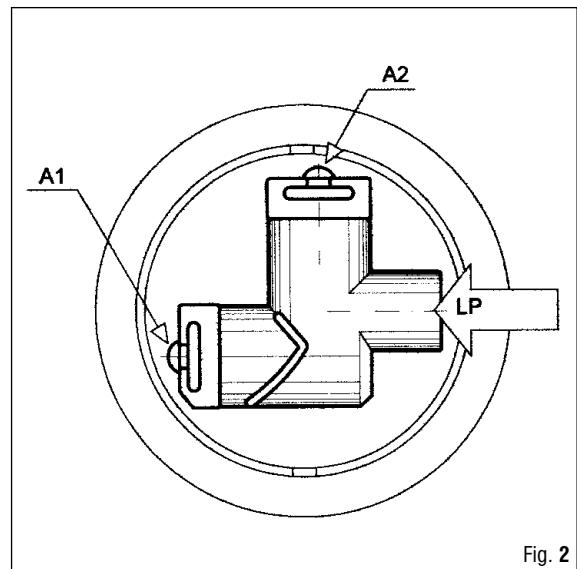


Fig. 2

▶ **A.2 - DISASSEMBLY OF THE INFLATION SOCKET (see Fig. 2)**

13. Remove the fastening fork (59), using a pair of pliers if necessary (USAG type 133 - 160 L.), or with a small flathead screwdriver (USAG type 323).
14. Pull the inflation socket assembly (20) out from the inflator body (1) and remove the spring (2).



IT IS RECOMMENDED THAT YOU DISASSEMBLE THE INFLATION SOCKET BY INTRODUCING LOW-PRESSURE AIR FROM THE HOUSING OF THE MALE COUPLING IN THE INFLATOR BODY (SEE Fig. 2)

15. Remove the three O-Rings (50) from the external seats of the inflation socket.



CAUTION!

TO AVOID DAMAGING THE O-RING SEATS IN THE INFLATION SOCKET (20) DURING DISASSEMBLY OPERATIONS IT IS ADVISED THAT YOU NOT USE POINTED OR METAL TOOLS.

16. Pull out the inflation button (19) from the socket (20).



THE INFLATION BUTTON CAN BE REMOVED USING A PLASTIC ROD (MAX DIAMETER 4 MM) TO PUSH ON THE PART OF THE BUTTON THAT PROTRUDES FROM THE SOCKET.

17. Remove the two O-Rings (7) from the seats in the inflation button (19).



CAUTION!

TO AVOID DAMAGING THE O-RING SEATS IN THE INFLATION BUTTON (19) DURING DISASSEMBLY OPERATIONS IT IS ADVISED THAT YOU DO NOT USE POINTED OR METAL TOOLS.

▶ B - PNEUMATIC DISCHARGE VALVES DISASSEMBLY

▶ B.1 - DISASSEMBLY OF THE EXTERNAL RING NUT OF THE PNEUMATIC DISCHARGE VALVES



THE OPERATIONS DESCRIBED BELOW MAY BE USED TO DISASSEMBLE THE EXTERNAL RING NUTS OF THE PNEUMATIC DISCHARGE VALVES.

18. Back off the valve ring (47) using the special tool (C-3).



WARNING!

IN ORDER TO AVOID DAMAGE, IT IS RECOMMENDED THAT YOU BLOCK THE INTERNAL PART OF THE PNEUMATIC DISCHARGE VALVE.

19. Pull out the spring (46).
20. Pull out the AT (AirTrim) valve piston assembly (41) from the seat connector (66).

▶ B.2 - DISASSEMBLY OF THE AT PISTON VALVE (Air Trim)

21. Remove the O-Ring housing spindle (55) from the AT piston valve (41).
22. Remove the two O-Rings (23) from the O-Ring housing spindle (55).



CAUTION!

TO AVOID DAMAGING THE O-RING SEATS IN THE PERFORATED SPINDLES (55) DURING DISASSEMBLY OPERATIONS IT IS ADVISED THAT YOU DO NOT USE POINTED OR METAL TOOLS.

23. Remove the O-Ring (42) from the AT piston valve (41).
24. Remove the sealing disk (40) from the AT piston valve (41).



CAUTION!

CHECK THE SEALING DISK, AND REPLACE IT IF ANY DEFORMATIONS, WEAR AND/OR DAMAGE ARE FOUND.



IN VERSIONS OF THE AIR TRIM THAT ALSO INCLUDE MANUAL OPERATION OF THE PNEUMATIC DISCHARGE VALVE ("PNEU-MECHANICAL"), WHEN IT BECOMES NECESSARY TO REPLACE THE LINE, IT IS RECOMMENDED THAT YOU UNTIE THE DOUBLE KNOT AT THE KNOB END (44) AND SLIDE IT OUT OF ANY GUIDE EYELETS ON THE BUOYANCY BAG AND THE SEALING DISK SUPPORT. BEFORE REPLACING, CHECK THE TOTAL LENGTH OF THE LINE.

▶ **B.3 - DISASSEMBLY OF THE VALVE RING ASSEMBLY COMPONENTS (47)**



CAUTION!

DISASSEMBLE THE DISCHARGE VALVE RING COMPONENTS ONLY IF NECESSARY.



THE OPERATIONS DESCRIBED BELOW MAY BE USED TO DISASSEMBLE THE RING NUT COMPONENTS OF THE PNEUMATIC DISCHARGE VALVES.

25. Unscrew the diaphragm nut (43) from the valve ring (47).
26. Pull out the friction washer (45) and the diaphragm (44) from the diaphragm nut (43).

► C - DISASSEMBLY of HEAT-SEALED FLANGE INTERNAL COMPONENTS

NOTE THE MARES HTM SPORT DIVISION ADVISES THAT YOU DISASSEMBLE THE INTERNAL COMPONENTS OF THE HEAT-SEALED FLANGES ONLY WHEN NECESSARY.

△ CAUTION!

THE COLOUR INDICATES THE TYPE OF LOW PRESSURE INSERT (LP)

WHITE COLOR: LP 1-WAY INSERT (60)

GREEN COLOR: LP 2-WAY INSERT (61)

△ CAUTION!

DO NOT, UNDER ANY CIRCUMSTANCES, ATTEMPT TO REMOVE THE METAL PIN INSIDE THE HEAT-SEALED FLANGE.

△ CAUTION!

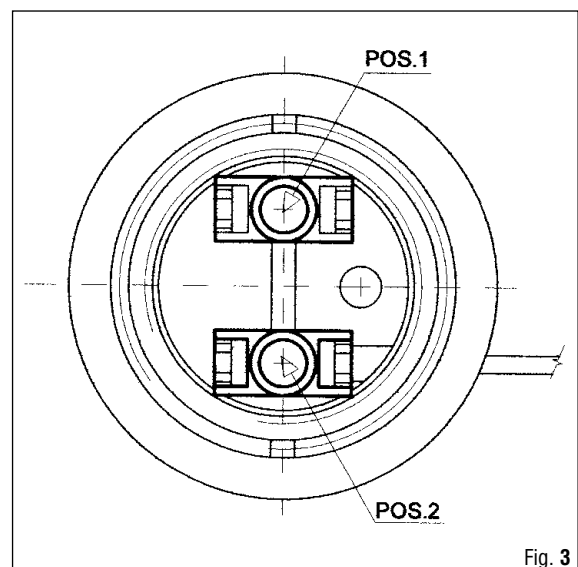
IN ORDER TO CORRECTLY ASSEMBLE AND ENSURE THAT THE AIR TRIM SYSTEM FUNCTIONS PERFECTLY, MARES RECOMMENDS THAT FROM INSIDE THE BUOYANCY BAG, YOU CONNECT THE ENDS OF THE TUBES TO A "GUIDE LINE" APPROXIMATELY 30/40 CM LONGER THAN THE TUBE IN QUESTION (SEE MEASUREMENTS TABLE). IN THE EVENT IT BECOMES NECESSARY TO REPLACE THE TUBE AND/OR REASSEMBLE IT, SIMPLY CONNECT THE NEW TUBE TO THE "GUIDE LINE" IN THE BUOYANCY BAG TO ALLOW FOR EASY AND CORRECT REASSEMBLY.

► C.1 - DISASSEMBLY OF HEAT-SEALED PNEUMATIC INFLATOR INTERNAL COMPONENTS

27. Remove the 1-way insert (60) of the exhaust button (Fig. 3 Position 2) from the metal pin of the flange.
28. Pull out the internal tube from the 1-way insert (60 - POS. 2) and remove the O-ring. 2012.
29. Remove the 1-way insert (60) of the inflation button (Fig. 3 Position 1) from the metal pin of the flange.

NOTE PROCEED WITH DISASSEMBLY OPERATIONS FOR THE INTERNAL TUBE FROM THE UPPER 1-WAY INSERT OF THE INFLATION BUTTON, ONLY IF PRESENT.

30. Pull out the internal tube from the 1-way insert (60 - pos. 1) and remove the O-ring. 2012



▶ **C.3 - DISASSEMBLY OF HEAT-SEALED FLANGE INTERNAL COMPONENTS 1ST PNEUMATIC VALVE (TABLE "A" - POSITION 1)**

△ CAUTION!

THE VECTOR CHROME AIR TRIM 2004 VERSION (CODE: 417216) ONLY FEATURES THE PNEUMATIC DISCHARGE VALVE, AND THEREFORE THE 2-WAY LP INSERT (61 - GREEN) IS REPLACED WITH THE 1-WAY LP INSERT (60 - WHITE).

31. Unscrew the seat connector (66) with the special wrench (C-4). (SEE Fig. 4)
32. Remove the O-Ring (32) from the seat connector (66).
33. Remove the central 2-way insert (61) from the metal pin of the flange.
34. Remove the internal tube coming from the pneumatic inflator from the central 2-way insert (61) and remove the O-Ring 2012.
35. Remove the internal tube coming from the second upper pneumatic valve (if present) from the central 2-way insert (61) and remove the O-Ring 2012.

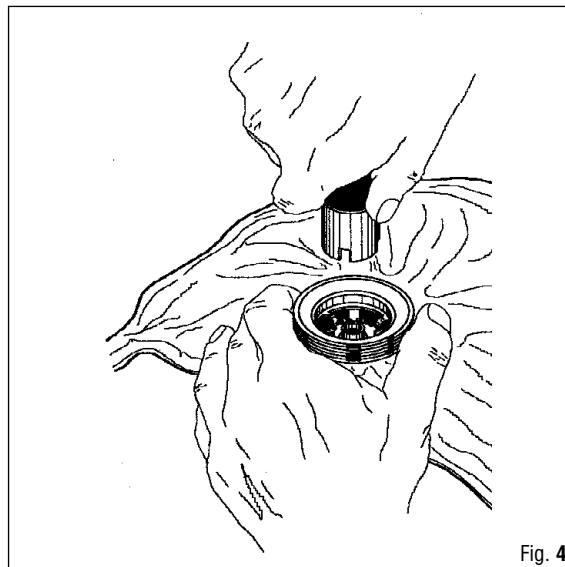


Fig. 4

△ CAUTION!

BEFORE REMOVING THE TUBE FROM THE BUOYANCY BAG, MAKE SURE YOU HAVE UNSCREWED BOTH AIR CONNECTORS LOCATED AT THE END OF THE TUBE FROM THEIR RESPECTIVE INSERTS AND THAT YOU HAVE CONNECTED A "GUIDE LINE" THAT IS APPROXIMATELY 30/40 CM LONGER THAN THE TUBE (SEE TABLE A FOR MEASUREMENTS).

▶ **C.3 - DISASSEMBLY OF HEAT-SEALED FLANGE INTERNAL COMPONENTS 2ND PNEUMATIC VALVE (TABLE "A" - POSITION 2)**

NOTE PROCEED WITH DISASSEMBLY OPERATIONS OF THE HEAT-SEALED FLANGE COMPONENTS FOR THE 2ND PNEUMATIC DISCHARGE VALVE IF PRESENT.

36. Unscrew the seat connector (66) with the special wrench (C-4). (See Fig. 4)
37. Remove the O-Ring (32) from the seat connector (66)
38. Pull out the internal tube from the 1-way insert (60) and remove the O-ring 2012.

△ CAUTION!

BEFORE REMOVING THE TUBE FROM THE BUOYANCY BAG, MAKE SURE YOU HAVE UNSCREWED BOTH AIR CONNECTORS LOCATED AT THE END OF THE TUBE FROM THEIR RESPECTIVE INSERTS AND THAT YOU HAVE CONNECTED A "GUIDE LINE" THAT IS APPROXIMATELY 30/40 CM LONGER THAN THE TUBE (SEE TABLE A FOR MEASUREMENTS).

TABLE "A"**TABLE "A" - INTERNAL TUBE SIZES AND USE**

THE NUMBER CORRESPONDS TO THE POSITION OF THE TUBE INSIDE THE BUOYANCY BAG.
THE SIZES IN WHICH THEY ARE USED ARE INDICATED IN PARENTHESES TO THE SIDE.

POSITION 1: FROM INFLATOR TO 1ST DISCHARGE VALVE

POSITION 2: FROM 1ST DISCHARGE VALVE TO 2ND DISCHARGE VALVE

POSITION 3: CONNECTED ONLY TO INFLATOR

LENGTH (CM)	CODE	MORPHOS TWIN	MORPHOS PRO	VECTOR 1000	VECTOR CHROME
45	47200734	1	1		
			2		
60	47200735	2		1 (XS)	1 (XS-S-M)
				2	
75	47200736			1 (S-M-L-XL)	1 (L-XL)
120	47200737	3	3		

CLEANING**WARNING!**

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

NORMAL CLEANING OF THE RUBBER COMPONENTS MUST BE PERFORMED BY WASHING ALL PARTS IN A MIXTURE OF HOT WATER AND DELICATE DETERGENT, AND SCRUBBING THEM, IF NECESSARY, WITH A SOFT BRUSH. DO NOT USE ACIDS AND/OR SOLVENTS ON PLASTIC AND/OR RUBBER COMPONENTS. CHROME-PLATED BRASS AND STAINLESS STEEL PARTS CAN BE CLEANED WITH AN ULTRASONIC CLEANER IN FRESH WATER (OR SPECIAL SOLUTION) OR, IF THE NECESSARY EQUIPMENT IS NOT AVAILABLE, IN A MILD ACID SOLUTION (FOR EXAMPLE WHITE VINEGAR, DILUTED WITH HOT WATER AS NECESSARY). MAKE SURE TO RINSE ALL PARTS WITH FRESH WATER AND DRY THEM BEFORE REASSEMBLING.

**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

There are certain integrated system components that must be replaced regularly during each inspection in order to avoid compromising functioning and to guarantee peak performance. The components recommended for replacement are the following.

PNEUMATIC INFLATOR

Quantity	Reference Number	Description	Code
1	32	O-Ring 3181	47200723
5	50	O-Ring 114	46110114
2	7	O-Ring 2012	46110101
1	16	Fabric filter	47159146
1	17	O-Ring 106	46110106
4	23	O-Ring 2015	46110102

If these components are not replaced, they should at least be carefully inspected with a jeweler's magnifying glass for the following defects.

Description	No. Ref	Inspection
Quick coupler	18	Check for possible scratches, corrosion, or damage to the chrome.
O-Rings	7-17-23-32-50	Check for cuts, burrs or foreign particles. Any of these defects can cause leaks.
Fabric filter	16	Check that there are no deposits of dirt on the surface.
O-ring seats		Inspect all surfaces in contact with the O-rings, and check for scratches, chipping, deteriorated plating or foreign particles.
Internal Tube assembly		Check that the sheath is not deformed or broken.
Spring	2	Check for any split, deformed or broken coils.
Threaded components		Check that the threads are in perfect condition, cleaning them carefully (with low pressure air and/or a soft brush) to remove any metallic residue (shavings).

PNEUMATIC VALVES

Quantity	Reference Number	Description	Code
4	23	O-Ring 2015	46110102
2	42	O-Ring 2037	46110110
2	32	O-Ring 3175	47200723
2	40	Sealing disk	47158727

If these components are not replaced, they should at least be carefully inspected with a jeweler's magnifying glass for the following defects.

Description	No. Ref	Inspection
O-Rings	23-32-42	Check for cuts, burrs or foreign particles. Any of these defects can cause leaks.
Sealing disk	40	Check that there are no deformations, splits, cracks, or foreign particles.
Seat connector	66	Check that the sealing surface and the external O-Ring seat are perfectly intact and clean.
O-ring seats		Inspect all surfaces in contact with the O-rings, and check for scratches, chipping, deteriorated plating or foreign particles.
Diaphragm	44	Check that there are no significant deformations, splits, cracks, or foreign particles.
Friction washer	45	Check that there are no significant signs of deformation or foreign particles.
Spring	46	Check for any split, deformed or broken coils.
Threaded components		Check that the threads are in perfect condition, cleaning them carefully (with low pressure air and/or a soft brush) to remove any metallic residue (shavings).

REASSEMBLY OF THE AIR TRIM SYSTEM

CAUTION!

BEFORE BEGINNING REASSEMBLY PROCEDURES, LIGHTLY OIL ALL THE O-RINGS WITH SILICONE GREASE (GENERAL ELECTRIC VERSALUBE G-322 TYPE OR EQUIVALENT.) OILING WILL REDUCE TO A MINIMUM THE RISK OF DAMAGE DURING ASSEMBLY.



PROCEED WITH REASSEMBLY OF THE INTERNAL TUBES REMOVED PREVIOUSLY BY INSERTING THEM CAREFULLY AND CORRECTLY IN THE APPROPRIATE PART OF THE BUOYANCY BAG (SEE TABLE "A").

CAUTION!

IN ORDER TO AVOID DAMAGE AND TO ENSURE PERFECT FUNCTIONING OF THE AIR TRIM SYSTEM, WHEN REASSEMBLING THE INTERNAL TUBES IN THE BUOYANCY BAG IT IS NECESSARY TO SLIDE THE "GUIDE LINE" SLOWLY INSIDE THE BUOYANCY BAG. PULL THE "GUIDE LINE" SLOWLY AND WITHOUT FORCING IT UNTIL THE END CONNECTED TO THE LINE COMES OUT OF THE CORRESPONDING FLANGE. THE TUBE IS POSITIONED CORRECTLY WHEN BOTH ENDS PROTRUDE FROM THE FLANGES.

CAUTION!

IN ORDER TO AVOID DAMAGE AND ENSURE PERFECT FUNCTIONING, PULL THE "GUIDE LINE" OF THE INTERNAL TUBE OF THE INFLATOR SYSTEM (MORPHOS) SLOWLY AND WITHOUT FORCING IT, CONNECTING THE "GUIDE LINE" AT THE END WITH THE TUBE TERMINAL. THE END OF THE TUBE WITHOUT THE TERMINAL MUST BE POSITIONED INSIDE THE BUOYANCY BAG AND ON THE OPPOSITE SIDE FROM THE PNEUMATIC INFLATOR.

▶ C - REASSEMBLY OF HEAT-SEALED FLANGES INTERNAL COMPONENTS

NOTE REASSEMBLE THE INTERNAL COMPONENTS OF THE HEAT-SEALED FLANGES IF PREVIOUSLY DISASSEMBLED.

CAUTION!

PLACE ALL THE O-RING (7) IN THE CORRESPONDING SEATS OF THE TERMINALS AT THE ENDS OF THE INTERNAL TUBES.

▶ C.1 - REASSEMBLY OF HEAT-SEALED PNEUMATIC INFLATOR INTERNAL COMPONENTS

1. Insert the terminal of the internal tube into the 1-way insert (60) of the discharge system.
2. Correctly position the lower 1-way insert (60) inside the heat-sealed flange of the pneumatic inflator (see Fig. 3).

CAUTION!

MAKE SURE THAT THE LOWER 1-WAY INSERT IS PERFECTLY POSITIONED AND SNAPPED ONTO THE METAL PIN INSIDE THE HEAT-SEALED FLANGE.

NOTE PROCEED WITH ASSEMBLY OF THE INTERNAL TUBE IN THE UPPER 1-WAY INSERT OF THE INFLATION BUTTON, ONLY IF PRESENT AND PREVIOUSLY DISASSEMBLED.

3. Insert the terminal of the internal tube into the 1-way insert (60) of the inflation system.
4. Correctly position the upper 1-way insert (60) on the metal pin inside the heat-sealed flange of the pneumatic inflator. (see Fig. 3)

CAUTION!

MAKE SURE THAT THE UPPER 1-WAY INSERT IS PERFECTLY POSITIONED AND SNAPPED ONTO THE METAL PIN INSIDE THE HEAT-SEALED FLANGE.

▶ **C.2 - REASSEMBLY OF INTERNAL COMPONENTS OF THE PNEUMATIC INFLATOR HEAT-SEALED FLANGE (POSITION 1 SEE TABLE "A")**

 **CAUTION!**

THE VECTOR CHROME AIR TRIM 2004 VERSION (CODE: 417216) ONLY FEATURES THE PNEUMATIC DISCHARGE VALVE, AND THEREFORE THE 2-WAY LP INSERT (61 - GREEN) IS REPLACED WITH THE 1-WAY LP INSERT (60 - WHITE).


5. Insert the terminals of the internal tubes in the 2-way insert (61).
6. Correctly position the 2-way insert (61) inside the heat-sealed flange of the pneumatic inflator.

 **CAUTION!**

MAKE SURE THAT THE 2-WAY INSERT IS PERFECTLY POSITIONED AND SNAPPED ONTO THE METAL PIN INSIDE THE HEAT-SEALED FLANGE.

7. Arrange the O-Ring (32) in the corresponding housing of the seat connector (66).
8. Using the special tool (C4), tighten the seat connector (66) to the heat-sealed flange.

▶ **C.3 - REASSEMBLY OF INTERNAL COMPONENTS OF THE PNEUMATIC INFLATOR HEAT-SEALED FLANGE (POSITION 2 SEE TABLE "A")**

 **NOTE** PROCEED WITH ASSEMBLY OPERATIONS FOR THE HEAT-SEALED FLANGE COMPONENTS FOR THE 2ND PNEUMATIC DISCHARGE VALVE IF PRESENT.

9. Insert the terminal of the internal tube in the 1-way insert (60).
10. Correctly position the 1-way insert (60) inside the heat-sealed flange of the pneumatic inflator.
11. Arrange the O-Ring (32) in the corresponding housing of the seat connector (66).
12. Using the special tool (C4), tighten the seat connector (66) to the heat-sealed flange.

▶ B - PNEUMATIC DISCHARGE VALVES REASSEMBLY

▶ B.3 - REASSEMBLY OF THE VALVE RING ASSEMBLY COMPONENTS (47)

WARNING!

THE EXTERNAL RING NUT ON THE DISCHARGE VALVE IS NOT INTERCHANGEABLE WITH THE PREVIOUS VERSION.

CAUTION!

PROCEED WITH REASSEMBLY OF THE DISCHARGE VALVE RING NUT COMPONENTS ONLY IF PREVIOUSLY DISASSEMBLED.

NOTE THE OPERATIONS DESCRIBED BELOW MAY BE USED TO ASSEMBLE THE EXTERNAL RING NUTS OF THE PNEUMATIC DISCHARGE VALVES.

13. Position the diaphragm (44) and the friction washer (45) on the diaphragm nut (43).
14. Lock down the diaphragm nut (43) in the valve ring (47).

▶ B.2 - REASSEMBLY OF THE AT PISTON VALVE (Air Trim)

NOTE THE OPERATIONS DESCRIBED BELOW MAY BE USED TO ASSEMBLE BOTH THE AT VALVE PISTONS.

15. Position the O-Ring (42) in the seat of the AT piston valve (41).
16. Arrange the sealing disk (40) in the corresponding housing of the AT piston valve (41).
17. Position the two O-Rings (23) in the corresponding seats of the spindle (55).
18. Correctly insert the O-Ring housing spindle (55) in the AT piston valve (41) (see Fig. 5).

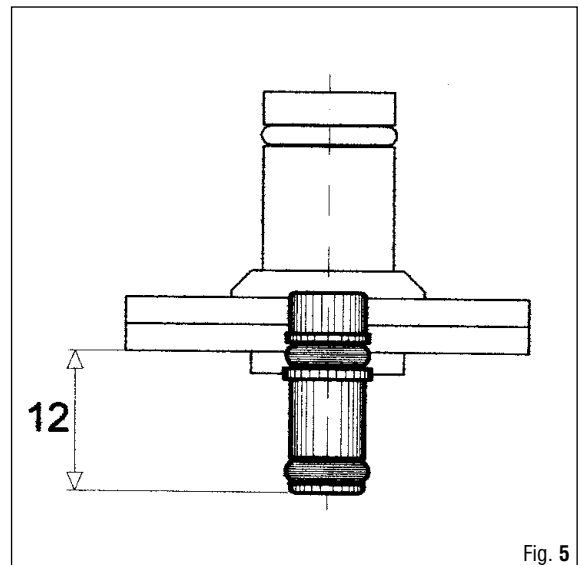


Fig. 5

REASSEMBLY OF THE EXTERNAL RING NUT OF THE PNEUMATIC DISCHARGE VALVES



WARNING!

THE EXTERNAL RING NUT OF THE AIR TRIM SYSTEM IS NOT INTERCHANGEABLE WITH THE PREVIOUS VERSION.



CAUTION!

THE OPERATIONS DESCRIBED BELOW MAY BE USED TO ASSEMBLE BOTH THE EXTERNAL RING NUTS OF THE PNEUMATIC DISCHARGE VALVES.

THE VECTOR CHROME AIR TRIM 2004 VERSION (CODE: 417216) ONLY FEATURES THE PNEUMATIC DISCHARGE VALVE, AND THEREFORE THE 2-WAY LP INSERT (GREEN) IS REPLACED WITH THE 1-WAY LP INSERT (WHITE).

19. Insert the A.T. valve piston (41) assembly in the seat of the 2-way insert (61) of the lower pneumatic discharge valve.
20. Insert the A.T. valve piston (41) assembly in the seat of the 1-way insert (60) of the upper pneumatic discharge valve.
21. Position the spring (46) on the valve piston (41).
22. Using the special tool (C3), screw the valve ring assembly (47) to the heat-sealed flange.



WARNING!

IN ORDER TO AVOID DAMAGE, IT IS RECOMMENDED THAT YOU BLOCK THE INTERNAL PART OF THE PNEUMATIC DISCHARGE VALVE.



WARNING!

FOR SUBSEQUENT SEAL TIGHTNESS CHECKS, REFER TO THE SPECIFIC INSTRUCTIONS UNDER THE "INSPECTIONS" SECTION OF THE SERVICE MANUAL.

▶ A - PNEUMATIC INFLATOR ASSEMBLY

▶ A.2 - INFLATION SOCKET ASSEMBLY (see Fig. 2)

23. Position the two O-Rings (50) in the corresponding external grooves of the inflation socket (20).
24. Arrange the two O-Rings (7) in the seats of the inflation button (19).
25. Correctly insert the inflation button assembly (19) in the inflation socket (20).

NOTE MAKE SURE THAT THE INFLATION BUTTON (19) IS CORRECTLY INSERTED IN THE INFLATION SOCKET (20), USING A PLASTIC ROD IF NECESSARY (MAX 8 mm).

26. Position the spring (2) on the inflation button (19) inside the inflation socket (20).
27. Insert the complete inflation socket (20) inside the inflator body (1) and block it with the fastening fork (59) (Fig. 6).

⚠ WARNING!

CAREFULLY CHECK THAT THE POINTS OF THE FORK ARE INSERTED WELL INTO THE SEATS OF THE INFLATOR BODY (FIG. 6).

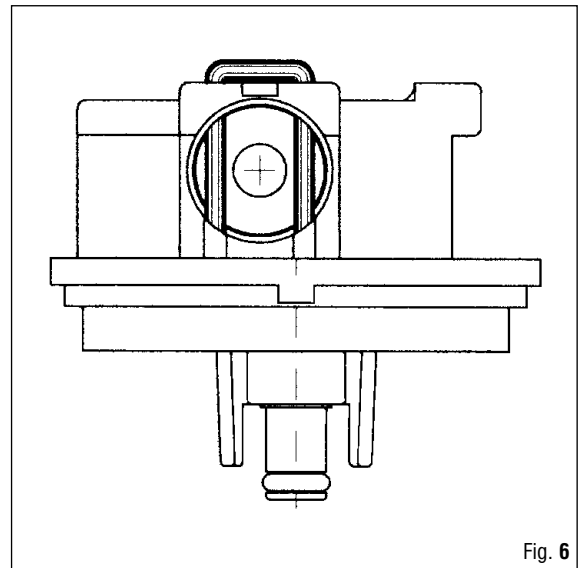


Fig. 6

▶ **A.1 - DISCHARGE SOCKET ASSEMBLY (SEE Fig. 2)**

28. Position the 3 O-Rings (50) in the seats of the discharge bushing (52).
29. Position the spring (2) on the discharge button inside the discharge bushing (52).
30. Insert the discharge bushing (52) in the inflator body (1) seat and fasten with a fastening fork (59). (Fig. 6)
31. Position the O-Rings (23) in the seats of the perforated O-Ring housing spindles (57).
32. Correctly insert the O-Ring housing spindles (57) in the seats of the inflator body (1). (Fig. 7).
(FOR TESTING THE INFLATOR BODY ASSEMBLY CONSULT THE "INSPECTIONS" SECTION.)
33. Position the O-Ring (32) in the seat of the inflator body(1).
34. Correctly position the inflator body assembly (1) in the heat-sealed flange, inserting the O-Ring housing spindles (57) in the seats of the LP 1-way inserts (60). (Fig. 8)
35. Using a pin wrench (USAG type 282/58-62-65) if necessary, tighten the lower casing (12) to the heat-sealed flange.

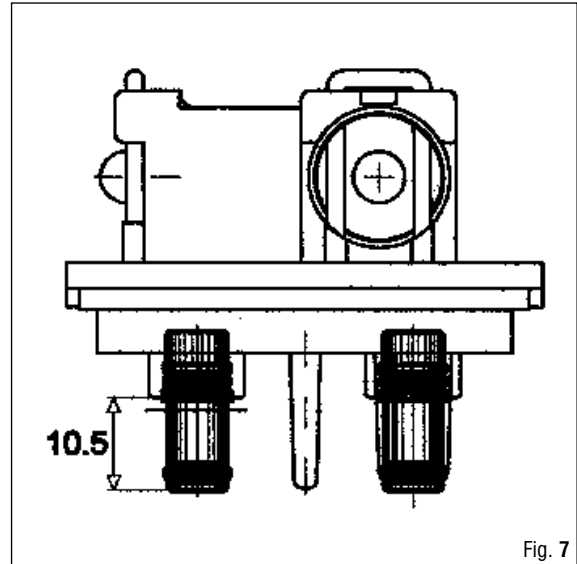


Fig. 7

CAUTION!

ALIGN THE QUICK-COUPLER SEAT (18) OF THE LOWER CASING (12) WITH THE QUICK-COUPLER SEAT (18) OF THE INFLATOR BODY (1).

WARNING!

WHEN SCREWING DOWN THE LOWER CASING IT IS RECOMMENDED THAT YOU BLOCK THE INTERNAL PART OF THE PNEUMATIC INFLATOR. (Fig. 1)

36. Insert the fabric filter (16) in the seat of the quick coupler.

CAUTION!

CORRECTLY POSITION THE FABRIC FILTER INSIDE THE INFLATOR BODY USING A PLASTIC ROD.

37. Position the O-Ring (17) in the seat of the quick coupler (18).
38. Using the special wrench (C4) or a 12-mm open end wrench, snugly tighten the quick coupling (18) to the inflator body (1).

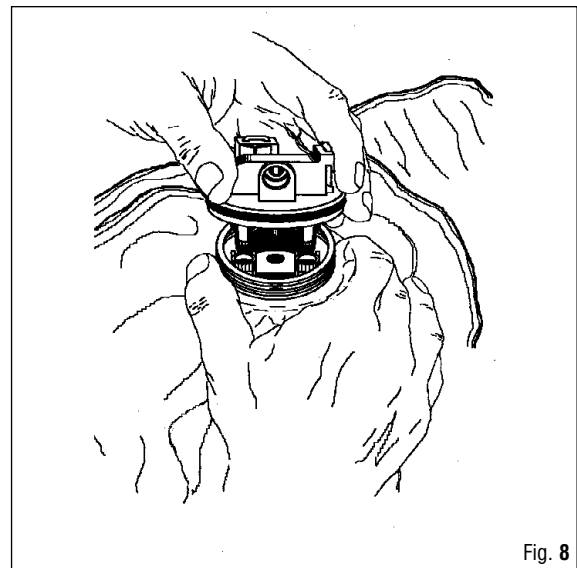


Fig. 8



PROCEED WITH REASSEMBLY OF THE BUTTONS (9) AND (10) ON THE UPPER COVER (13) IF DISASSEMBLED PREVIOUSLY.

39. Position and tighten the upper cover (13) with the screws (14), using a Phillips head screwdriver (USAG type 322 PH1).
40. Connect the LP hose to the quick coupler (18) of the pneumatic inflator.
(FOR TESTING THE COMPLETE AIR TRIM SYSTEM CONSULT THE "INSPECTIONS" SECTION)

▶ D - TESTING THE AIR TRIM PNEUMATIC SYSTEM

▶ A) PRE-TESTING THE PNEUMATIC INFLATOR

CAUTION!

THE OPERATIONS DESCRIBED BELOW MUST BE PERFORMED BEFORE INSTALLING THE INFLATOR BODY ON THE INTERNAL SUPPORT.

- CP.1) Insert the filter (16) inside the inflator body (1) and tighten the quick coupling (18) using the special C4 wrench or a 12-mm open end wrench.
- CP.2) Connect the male quick coupler (18) to a BC hose (INT model) mounted on a 1st stage adjusted to approximately 10 atm.
- CP.3) Open the tank valve.
- CP.4) Press the pistons (inflation and exhaust) to check that air comes out.
- CP.5) Submerge the inflator body in a basin of water to check for air leaks.

CAUTION!

IF ANY MALFUNCTIONS AND/OR AIR LEAKS ARE OBSERVED, CONSULT THE "TESTING" SECTION OF THE MANUAL.

- CP.6) Using the special C 4 wrench or a 12-mm open end wrench, unscrew the quick coupling (18) from the inflator body (1) and remove the filter (16).

AT) AIR TRIM SYSTEM TEST

- AT.1) Open the tank valve, while keeping the regulator 2nd stage purge button pressed.
- AT.2) Inflate the integrated system by pressing the pneumatic inflation button (10).
- AT.3) Deflate the integrated system by pressing the deflation button (9).

CAUTION!

IN BC VERSIONS THAT ALSO INCLUDE A PNEUMATIC DISCHARGE VALVE THAT CAN ALSO BE OPERATED MANUALLY ("PNEU-MECHANICAL") DEFLATE THE BC A FEW TIMES ALSO USING THE LINE CONNECTED TO THE VALVE.

CAUTION!

REPEAT THE OPERATIONS DESCRIBED IN STEPS AT.2 AND AT.3 A FEW TIMES, CHECKING:

- THE CORRECT FUNCTIONING OF THE INFLATOR BUTTON (INFLATION OF THE BC)
- THE PERFECT FUNCTIONING OF THE DISCHARGE VALVES (OPENING AND CLOSING)
- THE SEAL OF THE AIR TRIM SYSTEM WITH THE BUOYANCY BAG. (LEAVE THE BC INFLATED, AND AFTER ABOUT 2-3 HOURS CHECK WHETHER THERE HAVE BEEN ANY AIR LEAKS.)

IF ANY MALFUNCTIONS AND/OR AIR LEAKS ARE OBSERVED, CONSULT THE "TESTING" SECTION OF THE MANUAL.

Drawing No. J 106	2003 PNEUMATIC INFLATOR ASSEMBLY	Drawing updated: 02/04/2004
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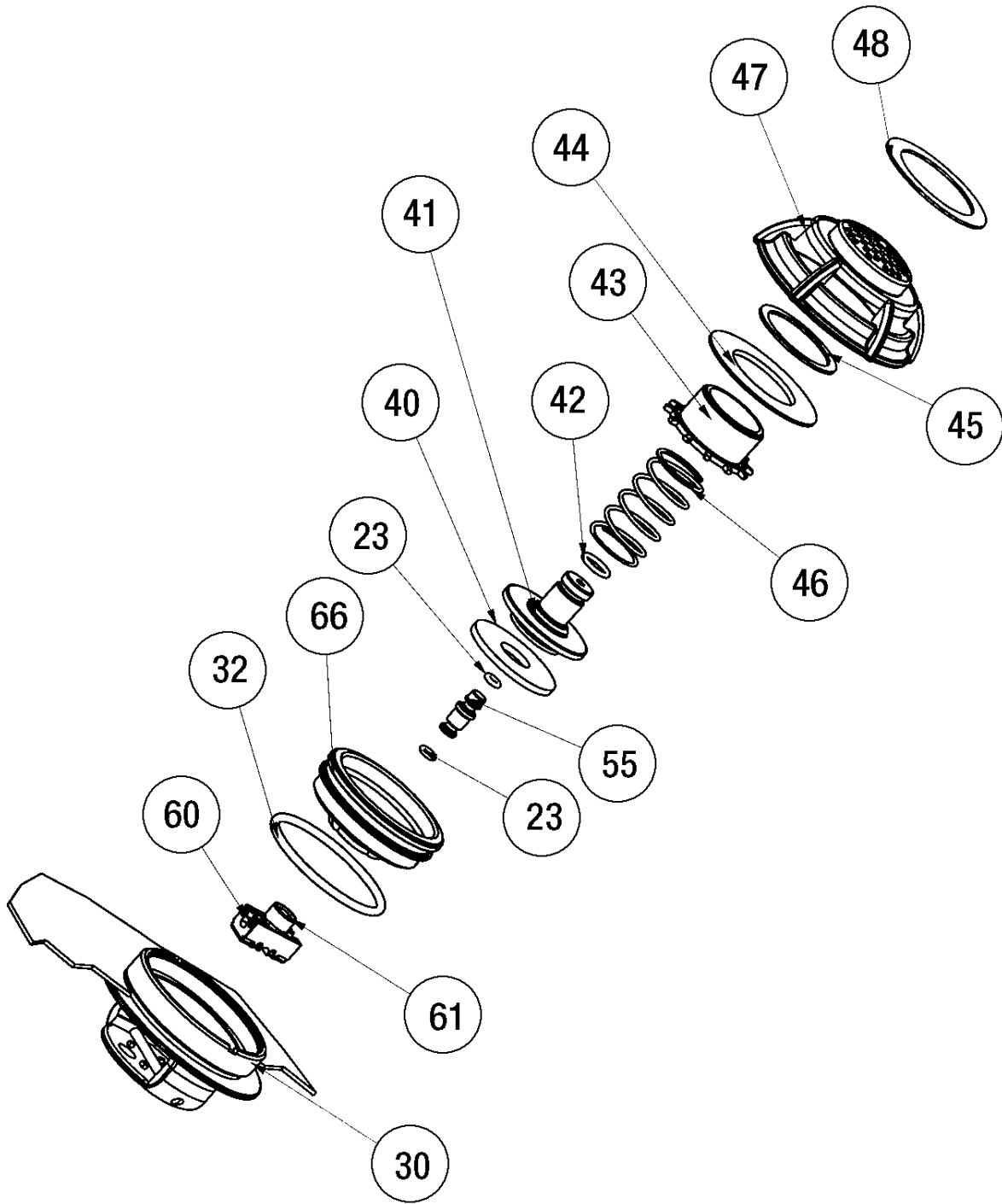


Table No. 504	STEN 2001 SPEARGUN	Drawing reference No.: F 206 Table updated on 01/15/2004
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Ref. No.	Code	Description
1	A	Black Sten 2001 head body
2	43163856	Shock absorber , rubber
3	43163409	Shock absorber insert
4	43200093	Nose cone
5	43164016	Head ring nut
6	43164008	Black head cap
7	43163968	Rubber ring - shock
11	43169821	Shock line - m 3
11	43169818	Shock line - m 5
12	43163355	Shock line runner for rod D. 8
13	43163354	D. 8 Rod spring
14	43163505	D. 8 rod washer
17	N	Piston body
18	46110110	OR 2037
19	N	Oil wiper piston
20	46110208	Special OR
21	43163665	Bushing OR 87
22	46110206	OR 122 bis
25	43200069	Sten Minimini Tank
25	43200070	Sten Mini Tank
25	43200071	Sten Medi Tank
25	43200072	Sten Tank
25	43200073	Sten Super Tank
26	43200064	Minimisten Rod
26	43200057	Ministen Rod
26	43200059	Medisten Rod
26	43200063	Sten Rod
26	43200061	Canna Super Rod
32	M	Inlet valve body
33	43163563	White valve cap
34	L	Spring - power adjustment
35	L	Rod - power adjustment
36	L	Press OR power adjustment
37	46110102	OR 2015
38	43164234	Lever power adjustment
39	L	OR port for power adjustment
41	H	Mares Sten 2001 C/R handle
41	G	Mares Sten 2001 S/R handle
42	43163668	Line release, black
43	43163614	Pin - line release
44	43163313	Spring catch hook
45	43164282	Connection piston
46	46110201	OR 1
47	14364284	Connection piston bushing

Ref. No.	Code	Description
48	E	Trigger adjustment scre
49	46110242	OR 2-003 Apnea Syste
50	43163377	Catch hoo
51	43200095	Sten 2001 piston compas
52	E	Cyrano trigger bod
53	43163337	Pin 4 x 2
57	43200098	Pin 4 x 23.5
58	43164237	Safety sto
59	43164236	Safety bod
60	46110106	OR 106
61	43163540	White heelplate
62	43164233	Cyrano heelplate fixing pin
65	M	Ball bearing - inlet valve
66	M	Spring - inlet valve
67	M	OR button inlet valve
68	43163635	Seat, one way valve
69	43163636	Housing, one way valve
70	D	Power regulator block
71	46110220	OR 2062
72	43163518	Elastic ring - block
80		Sten minimini label
80		Sten mini label
80		Sten medi label
80		Sten label
80		Sten super label
83	43160710	Hinge load 94
		ASSEMBLIES
82	416803	Screw injector
A	43200066	Sten 2001 assembly head (1-2-3-5)
D	43163638	Adjustment block assembly (68-69-70)
E	43164230	Cyrano trigger assembly (48-52)
G	43200097	S/Reg. handle Sten 2001 (41-42-43-46-47-49)
H	43200096	C/Reg. handle Sten 2001 (L- 38-41-42-43-46-47-49)
L	43163937	Power adjustment assembly (34-35-36-37-39)
M	43163941	Inlet valve assembly (32-46-65-66-67)
N	43163629	Piston assembly (17-18-19)
P	° ° °	Minimisten scabbard ass.
***	43163979	Sten 2001/Sten/Rafal complete OR set (18-19-20-22-37-46-49-60-71)

Drawing
No J 78

PNEUMATIC DISCHARGE VALVE H.U.B.

Drawing updated
on 09/01/2203

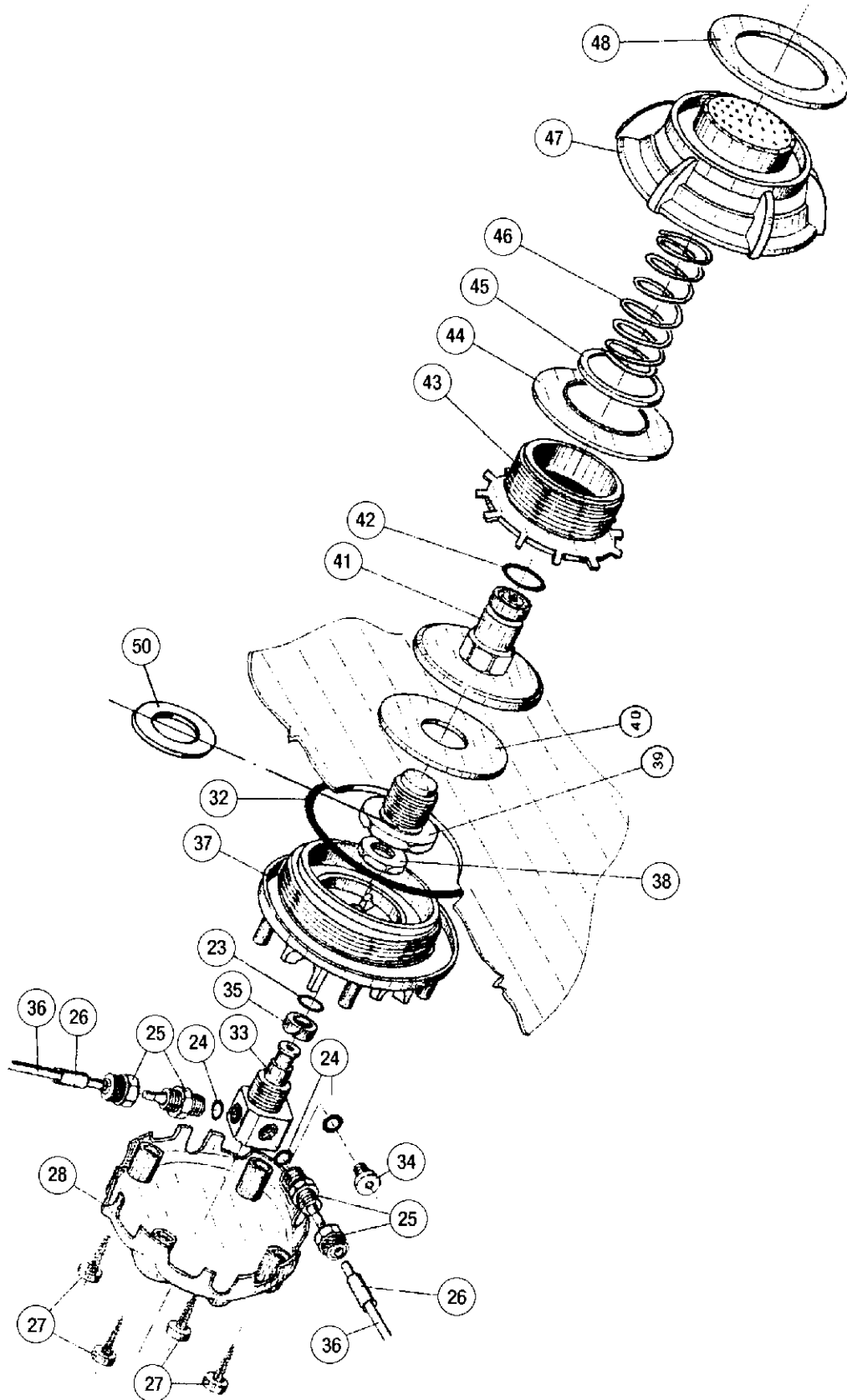


Table No. 227	PNEUMATIC DISCHARGE VALVE H.U.B.	Drawing reference No.: J 78 Table updated on 01/15/2004
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Ref. No.	Code	Description
23	46110102	O-Ring 2015
24	47110272	O-Ring 3 x 1
25	===	Air connector
27	45111003	Screws 2.9 x 9.5
28	46200025	Protection cap
32	46110265	O-Ring 3231
33	47158721	2 way valve shaft
34	47158720	Plug for valve
35	47158716	Dash backup ring
37	46200012	Pneumatic valve flange
38	47158725	Valve shaft nut
39	46200010	Sealing disk nut
40	47158727	Sealing disk
41	46200011	Sealing disk support
42	46110110	O-Ring 2037
43	46200026	Diaphragm nut
44	47158728	Diaphragm
45	47158737	Friction washer
46	47158701	Pneumatic valve spring
47	46200023	Valve ring
48	47158703	Sticker

Ref. No.	Code	Description
50	47200706	Distance washer
		(Morphos - Morphos Twin version)
		ASSEMBLIES
H	46200128	H.U.B. discharge valve assembly
		(23-27-28-33-35-37-39-40-41-44-45-46-47-48)
===	47200605	45-cm LP Tube assembly
		(24-25-26-36)
===	46200125	60-cm LP Tube assembly
		(24-25-26-36)
===	47200606	65-cm LP Tube assembly
		(24-25-26-36)
===	46200126	72-cm LP Tube assembly
		(24-25-26-36)
===	47200607	75-cm LP Tube assembly
		(24-25-26-36)
===	47200608	120-cm LP Tube assembly
		(24-25-26-36)
***	46200145	Service kit A.T. Pneumatic valves
		(23-24-32 - OR 3100 -35-OR 2056 -42)

Table No. 232	H.U.B. MARES AVANTGARDE	Drawing reference No.: J 83 Table updated on 01/15/2004
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Ref. No.	Code	Description
1	47158706	7 way distributor
2	47158724	Connector 7/16" UNF
3	45111016	Screw M 5 x 20
4	46110242	O-R 2-003
5	44172073	Pressure gauge swivel coupling
6	47158736	H.P. hose 55 cm
7	47158735	L.P. hose 3/8" - BC quick coupling 50 cm
7	47158734	L.P. hose 3/8" - BC quick coupling 45 cm
8	47158726	Connector 1/2 UNF 3/8"
9	47158729	L.P. Hose 1/2" - 1/2" (swivel)
10	46200007	Roller
11	45111017	Washer D. 4.3 UNI-6593 DIN-126
12	47159020	Two-tone whistle
13	46200015	Grip plate
15	46200009	Tank pad
16	46200008	Handle
17	47158715	Rod d. 5 x 80 mm
19	46110106	O-R 106
20	46185204	Plug 3/8" UNF
21	x x x	Tube
22	45179863	Tube clamp
23	46200016	Halkey Roberts 730 ROA valve
24	46200017	Halkey 736 ACU4 valve cover
25	45111018	Washer D. 5.3 UNI 6592 DIN 125/A
26	45111015	Screw M 4 x 14 TCC
27	45111003	Screw 2.9 x 9.5 UNI 6954 71
28	46110205	O-Ring 2025
29	47158731	L.P. Hose 1/2" - 9/16" L-XL (50 cm)
29	47158730	L.P. Hose 1/2" - 9/16" S-M (43 cm)
30	47200265	Mares Avantgarde H.U.B. buoyancy bag (size S-XL)
31	47158708	Snap ring diam. 18
33	47110271	O-Ring 3100
34	47159125	Over-expansion relief valve seal
35	47159054	Spring base disk
36	46159150	Quick air dump valve
37	47159056	Overpressure cap
38	x x x	Flange for swivel elbow fitting
39	46110210	O-Ring 2056

Ref. No.	Code	Description
40	x x x	Swivel elbow fitting
41	47200095	Sticker
43	46200024	Backpack
44	47159136	Black knob
44	47158505	Grey knob
45	47200269	Tank retaining band (size S - XL)
47	47158713	Tapex Connector 073M4
48	46200000	Support for distributor
50	47158723	Connector 1/2 UNF 9/16"
51	47158705	4 way distributor
52	46110108	O-Ring 108
53	46185205	Plug 7/16" UNF
54	47158732	L.P. hose 3/8" - 9/16" (70 cm soft)
55	46110106	O-R 106
56	47200283	LP hose quick-coupler L 330
66	43169822	Cord
70	46200277	Swivel spacer bushing
71	46200189	Swivel connection D. 20 sandblasted
72	46200267	Swivel connection pin
96	47159311	Tank protector
97	46110215	O-R 2043
		ASSEMBLIES
***	46200148	H.U.B. interior distributor/hose Service Kit. Mares (4-19-28-52-97-OR 114-OR 2031)
x x x	47200376	H.U.B. Oral Inflator assembly (21 - 22 - 23 - 31 - 33 - 38 - 39 - 40)
***	46200407	Swivel Airlock Kit (19 - 56 - 70 - 71 - 72 - 97)
D	-----	H.U.B. pneumatic inflator (tab. no. 233 drg. J 84)
G	-----	Octopus (corresponding model table)
A	-----	H.U.B. 1st Stage (table no.20 drg. E 11)
G	-----	2nd Stage (corresponding model table)
H	-----	Pneumatic discharge valve (tab. n. 227 drg. J78)
K	-----	AIR LOCK (table no. 235 drg. J 86)
P	417950	Pair of weight pockets complete

SUBJECT: REPLACING EXTERNAL PART OF AIR TRIM PNEUMATIC INFLATOR
(REFERENCE TABLES 226 OF 03/04/00 - 233 OF 30/10/01)

ITM1

TOOLS:

- PHILLIPS HEAD SCREWDRIVER (USAG TYPE 322 PH 1)

DISASSEMBLY OF GREY PNEUMATIC INFLATOR (REF. TABLE 226)

1. USING A PHILLIPS HEAD SCREWDRIVER, UNSCREW THE 3 SCREWS (14) AND REMOVE THE UPPER COVER (13).
2. TAKE OFF THE INFLATION (10) AND DEFLATION (9) BUTTONS.
3. WITH A PHILLIPS HEAD SCREWDRIVER, UNSCREW THE 2 SCREWS (15) AND PULL OUT THE INFLATOR BODY ASSEMBLY (1), THE LOWER COVER (12), AND REMOVE THE O-RING (21).

PNEUMATIC INFLATOR ASSEMBLY (REF. TABLE 233)

1. INSERT THE O-RING (21) IN THE FLANGE HOUSING (30).
2. POSITION THE INFLATOR BODY ASSEMBLY (1) INSIDE THE NEW LOWER COVER (12).

 **CAUTION!**

POSITION THE MALE COUPLING (18) OF THE INFLATOR BODY ASSEMBLY INSIDE THE CORRESPONDING SHAPE IN THE LOWER COVER.

3. ARRANGE THE INFLATOR BODY ASSEMBLY (1) ALONG WITH THE LOWER COVER (12) IN THE SUPPORT (30).

 **WARNING!**

FOR PROPER OPERATION OF THE AIR TRIM PNEUMATIC SYSTEM IT IS NECESSARY TO CAREFULLY INSPECT THAT THE O-RING (23) OF THE VALVE SHAFT (29) IS INSERTED CORRECTLY IN THE CORRESPONDING SEAT OF THE INTERNAL MECHANISM (HOLE WITH LARGER DIAMETER).

4. USE A PHILLIPS HEAD SCREWDRIVER TO TIGHTEN THE 2 SCREWS (15) TO FASTEN THE INFLATOR BODY ASSEMBLY (1).
5. CORRECTLY INSERT THE DISCHARGE BUTTON (9) AND THE INFLATION BUTTON (10) IN THE UPPER COVER (13).

 **WARNING!**

BEFORE ASSEMBLING THE UPPER COVER MAKE SURE THAT THE BUTTONS FUNCTION PROPERLY.

PNEUMATIC INFLATOR ASSEMBLY (REF. TABLE 233)

6. CORRECTLY POSITION THE UPPER COVER (13) WITH THE CORRESPONDING BUTTONS.

 **WARNING!**

FOR PROPER ASSEMBLY OF THE UPPER COVER, WE SUGGEST YOU REFER TO THE SHAPE OF THE MALE COUPLING SET INTO THE UPPER COVER, ENSURING THAT THE TWO PINS/GUIDE (A) OF THE LOWER COVER (12) ARE PERFECTLY INSERTED IN THE SEATS OF THE UPPER COVER (13).

7. WITH A PHILLIPS HEAD SCREWDRIVER SCREW THE 3 SCREWS (14) TO FASTEN THE UPPER COVER (13).

SUBJECT: TECHNICAL UPDATE FOR PHOS TRONIC LIGHT SWITCH

ITM2

SPARE PARTS LIST REFERENCE: DRAWING T 156 - TABLE 404

BEGINNING WITH THE 2003 COLLECTION, THE MARES HTM SPORT DIVISION HAS DESIGNED A NEW SWITCH WITH A LARGER SHAPE; THIS SHAPE MAKES OPERATING THE SWITCH BUTTON EASIER, EVEN WHEN WEARING GLOVES. WHEN YOU FEEL IT IS NECESSARY TO OVERHAUL THE LIGHT WE RECOMMEND THAT YOU PROCEED AS INDICATED BELOW.



WARNING!

THE OPERATIONS DESCRIBED BELOW MUST BE CARRIED OUT BY A QUALIFIED TECHNICIAN AT AN AUTHORIZED MARES SERVICE CENTRE.

REQUIRED EQUIPMENT AND TOOLS	COMPONENTS TO USE
<ul style="list-style-type: none">- PHILLIPS HEAD SCREWDRIVER (USAG TYPE 327 PH 0 x 60)- FLATHEAD SCREWDRIVER (USAG TYPE 323 0.4 x 2.5 x 75)	<ul style="list-style-type: none">- 1 BUTTON (CODE: 45200179 NEW TYPE)- 1 SWIVELING DISPLAY PROTECTION (CODE: 45200182 NEW TYPE)- 1 LOWER CASING (CODE. 45200181 NEW TYPE)- 1 UPPER CASING (CODE 45200180 NEW TYPE)

PROCEDURE:

1. USING A PHILLIPS HEAD SCREWDRIVER, UNSCREW THE TWO SCREWS (REF. 7 CODE 44200062).
2. SEPARATE THE UPPER CASING (REF. 6 CODE 45200180) FROM THE LOWER CASING (REF. 5 CODE 45200181), FREEING THE SWIVELING DISPLAY PROTECTION (REF. 4 CODE 45200182).
3. REMOVE THE IGNITION BUTTON BLOCK (REF. 3 CODE 45200177), USING A SMALL FLATHEAD SCREWDRIVER IF NEEDED.
4. PULL OUT THE PHOS IGNITION BUTTON (REF. 2 CODE 45200179).
5. POSITION THE NEW PHOS IGNITION BUTTON (REF. 2 CODE 45200179), IDENTIFIABLE BY ITS LARGER SIZE, ON THE SILICONE RIDGE IN THE BUTTON SEAT.



WARNING!

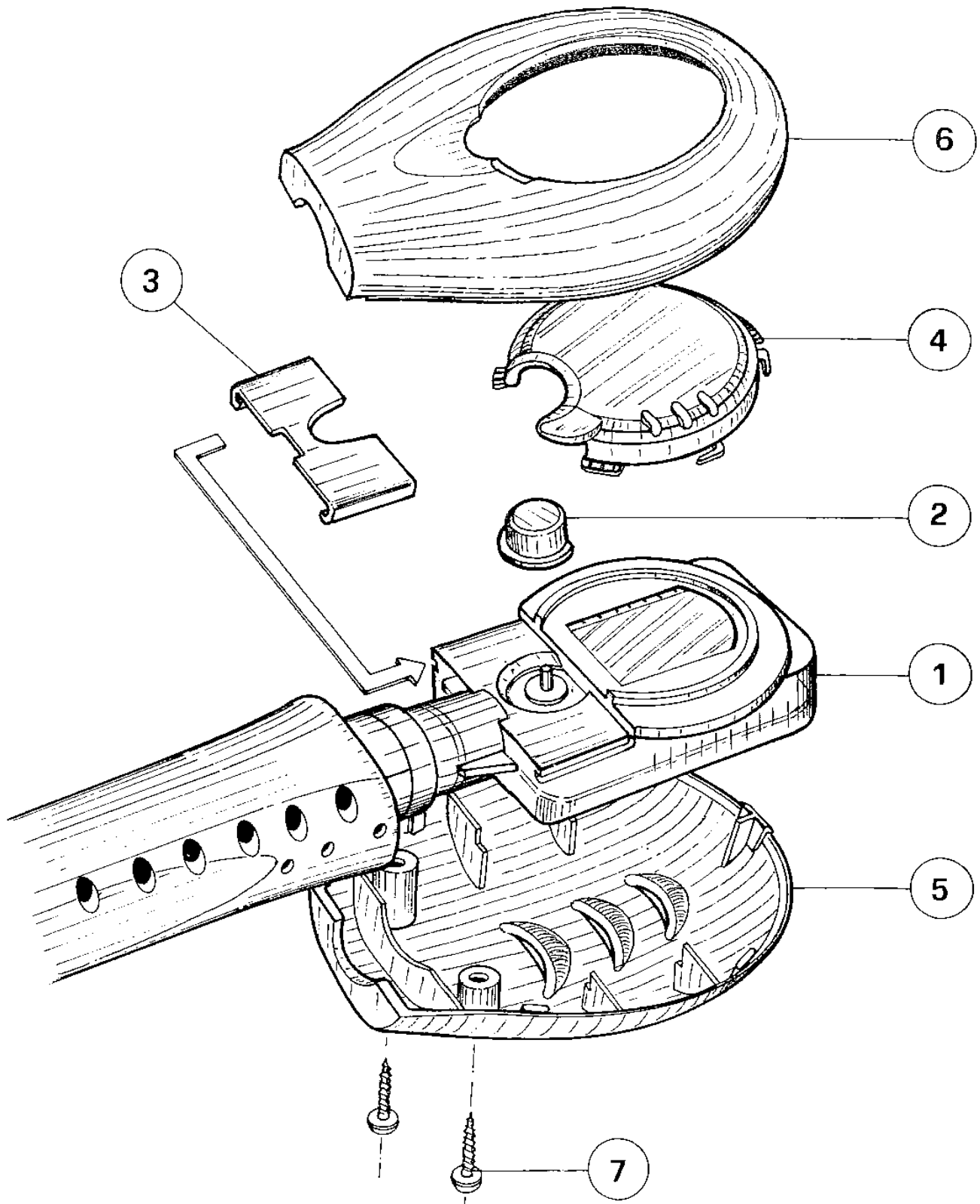
THE FLAT SURFACE OF THE SEAT IN THE PHOS IGNITION BUTTON MUST REST AGAINST THE DISPLAY.

6. USE LIGHT PRESSURE TO HOOK THE IGNITION BUTTON BLOCK TO POSITION THE PHOS IGNITION BUTTON.
7. CORRECTLY ARRANGE THE NEW SWIVELING DISPLAY PROTECTION (REF.4 CODE 45200182) INSIDE THE UPPER CASING.
8. CORRECTLY POSITION THE NEW UPPER CASING WITH THE SWIVELING PROTECTION, ON THE LIGHT DISPLAY.



THE PHOS IGNITION BUTTON MUST MOVE FREELY IN THE HOUSING OF THE SWIVELING DISPLAY PROTECTION; IF THE IGNITION BUTTON IS NOT ALIGNED, ROTATE THE DISPLAY PROTECTION.

9. ARRANGE THE NEW LOWER CASING SO THAT THE TABS HOOK TO THE UPPER CASING, POSITIONED PREVIOUSLY.
10. USE A PHILLIPS HEAD SCREWDRIVER TO TIGHTEN THE TWO SCREWS.



SUBJECT: REPLACEMENT OF TECHNOMAD SERIES BAG WHEELS

ITM3

DISASSEMBLY

NOTE THE OPERATIONS GIVEN BELOW CAN BE USED TO DISASSEMBLE BOTH WHEELS.

1. FULLY OPEN THE MAIN ZIPPER ON THE BAG AND POSITION THE UPPER SECTION ON ONE SIDE.
2. FULLY OPEN THE ZIPPER OF THE MESH DIVIDER AND POSITION IT ON ONE SIDE.
3. MOVE THE GREY INSULATOR TO THE SIDE.

NOTE TO PERFORM THE OPERATIONS PROVIDED BELOW, ARRANGE THE BAG IN THE POSITION BEST SUITED TO YOUR NEEDS.

4. USE AN 8-MM OPEN END WRENCH (USAG TYPE 285) TO BLOCK THE SMALL NUT.
5. USING A PHILLIPS HEAD SCREWDRIVER (USAG TYPE 322 PH 1), LOOSEN THE SCREWS, THUS FREEING THE NUT AND THE WASHER.
6. PULL THE SCREWS AND WASHER COMPLETELY OUT OF THE BAG.

NOTE REPEAT THE OPERATIONS DESCRIBED IN STEPS 4 - 5 - 6 TO DISASSEMBLE THE OTHER SCREWS.

7. PULL OUT THE PLASTIC BASE CONTAINING THE WHEEL FROM THE HOUSING ON THE BAG.

REASSEMBLY

NOTE THE OPERATIONS GIVEN BELOW CAN BE USED TO REASSEMBLE BOTH WHEELS.

8. INSERT THE NEW PLASTIC BASE CONTAINING THE WHEEL IN THE HOUSING ON THE BAG.
9. INSERT THE FOUR SCREWS WITH THE WASHERS IN THE HOLE OF THE PLASTIC BASE

NOTE MAKE THE SCREWS EXIT COMPLETELY INSIDE THE BAG TO CORRECTLY POSITION THE PLASTIC BASE.

10. POSITION THE WASHER IN THE PROTRUDING PORTION OF SCREW INSIDE THE BAG.
11. TIGHTEN THE NUT 2 OR 3 TURNS.
12. SNUGLY TIGHTEN THE SCREW USING A PHILLIPS HEAD SCREWDRIVER (USAG TYPE 322 PH1), KEEPING THE NUT BLOCKED WITH AN 8-MM OPEN END WRENCH (USAG TYPE 285).

NOTE REPEAT THE OPERATIONS DESCRIBED IN STEPS 10 - 11 - 12 TO ASSEMBLE THE OTHER SCREWS.

13. CORRECTLY POSITION THE GREY INSULATING MATERIAL.
14. FULLY CLOSE THE MESH DIVIDER ZIPPER.
15. COMPLETELY CLOSE THE ZIPPER OF THE UPPER SECTION OF THE BAG.

SUBJECT: REPLACING X-VISION MASK LENSES

ITM4

DISASSEMBLY

1. INSERT THE SPECIAL FRAME AND GLASS HOLDER TOOL AS SHOWN IN THE FIGURE, FIRST FROM ONE SIDE AND THEN FROM THE SYMMETRICALLY OPPOSITE SIDE, PRYING TO RELEASE THE HOLDING TEETH.
2. STILL USING THE SPECIAL TOOL, REPEAT THIS OPERATION TO FREE THE FRONT TWO HOOKING TEETH.
3. REPEAT THE OPERATION ON THE SIDES TO FREE THE SIDE HOOKING TEETH.
4. GENTLY GRASP THE GLASS HOLDER AND PULL IT OUTWARD TO FREE IT COMPLETELY FROM THE FRAME.
5. AT THIS POINT REMOVE THE GLASS AND REPLACE WITH THE CORRECTIVE LENSES.

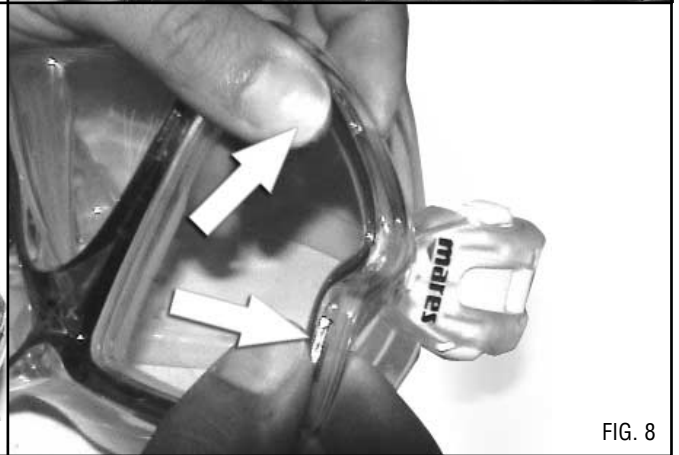
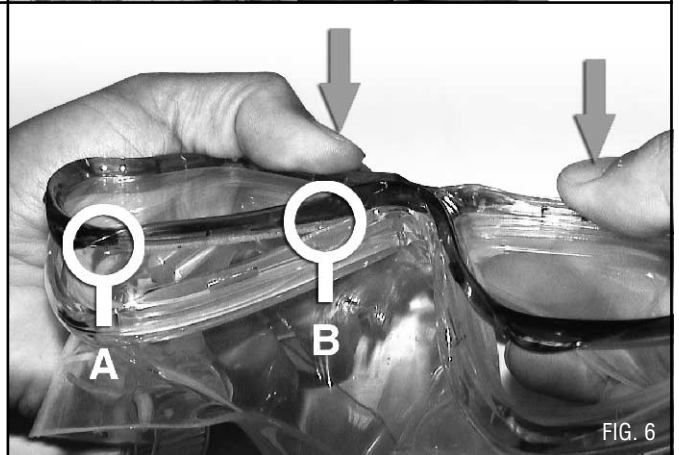
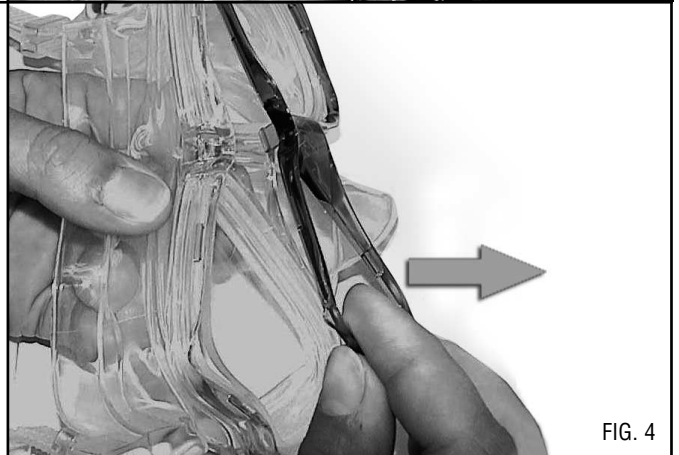
REASSEMBLY



WARNING!

THE GLASS MUST BE FULLY INSERTED IN ITS SEAT, AND BE KEPT THERE UNTIL THE GLASS-HOLDING RING HAS BEEN REPLACED.

6. REST THE GLASS-HOLDER ON THE FRAME, INSERT THE CENTRAL PART (ABOVE THE NOSE) IN THE SEAT, AND PRESS TO SNAP IN THE UPPER SIDE TEETH (FOREHEAD AREA). THEN BE CAREFUL THAT THE A AND B PINS SHOWN IN THE FIGURE CORRESPOND WITH THEIR HOUSINGS ON THE FRAME.
 7. HAVING CHECKED THESE ITEMS, PRESS TO SNAP INTO PLACE THE TWO HOOKING TEETH AT THE SIDES OF THE NOSE AND THE ONE LOCATED IN THE MIDDLE OF THE FOREHEAD.
 8. SNAP IN THE SIDE HOOKING TEETH ON BOTH SIDES.
-



**SUBJECT: GENERAL INFORMATION FOR PHOS 2K2
PHOS 2K2 TEST PROCEDURES
PHOS 2K2 TROUBLESHOOTING**

ITM5

REGARDING GENERAL INFORMATION, TESTS, AND TROUBLESHOOTING FOR THE PHOS 2K2, CONSULT THE FOLLOWING PAGES.

GENERAL INFORMATION PHOS 20/35

STANDARD TEST PROCEDURES CONDUCTED ON RETURNS OF MARES PHOS MODEL LIGHTS 20/35:

WARNING!

IN THE EVENT THAT DEFECTS ARE DETECTED THAT ARE DEFINITELY ATTRIBUTABLE TO MANUFACTURING DEFECTS IN COMPONENTS PROCEED WITH REPAIR UNDER WARRANTY WITH CORRESPONDING REPLACEMENT OF DEFECTIVE PARTS.

IT IS ADVISED THAT YOU FIRST OBTAIN A COPY OF THE WARRANTY CERTIFICATE AND/OR FISCAL RECEIPT TO ATTACH TO THE DEFECTIVE COMPONENT IN THE EVENT IT IS REQUESTED BY HTM SPORT S.P.A FOR TECHNICAL VERIFICATION AND/OR CONFIRMATION OF THE VALIDITY OF THE REPAIR UNDER WARRANTY PERFORMED.

WARNING!

THE BURN-TIME OF THE RECHARGEABLE BATTERY PACK INDICATED IN THE TECHNICAL CHARACTERISTICS OF THE INSTRUCTION BOOKLET IS GUARANTEED FOR SIX MONTHS. IT MAY BE INFLUENCED BY CERTAIN FACTORS, SUCH AS:

- OPERATING TEMPERATURE
 - TEMPERATURE AT WHICH IT WAS STORED
 - PERIOD FOR WHICH THE LAMP WAS NOT USED
 - NUMBER OF CHARGE AND DISCHARGE CYCLES.
-

HOW TO CORRECTLY DISCONNECT THE PHOS 20/35 BATTERY PACK

TO REPLACE THE BATTERY IT IS NECESSARY TO UNSCREW THE BODY FROM THE BASE AND PULL OUT THE TUBE. THIS EXPOSES THE BATTERY AND THE REFLECTOR HOLDER. THE BATTERY IS CONNECTED TO THE ELECTRONIC CONTROL CIRCUIT, INCORPORATED INTO THE BASE, THROUGH THREE CONNECTORS. SIMPLY PULL IT OUT FROM THE BOTTOM TO REMOVE (FIG. 1).



REMOVE THE REFLECTOR HOLDER AND THE BULB, WHICH MUST BE AFFIXED TO THE NEW BATTERY.

WARNING!

REMOVE THE BATTERY PACK WITH GREAT CARE.

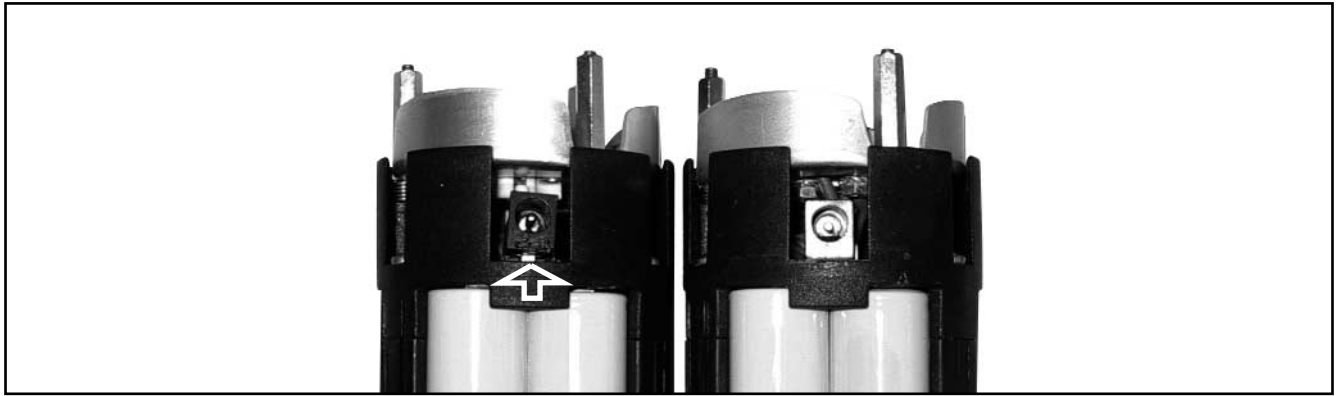
THE BATTERY PACK CONTAINS THE TEMPERATURE CONTROL CIRCUIT, CONNECTED BY MEANS OF A CABLE TO THE MAIN CIRCUIT FIXED TO THE BASE. THEREFORE, IF THE BATTERY PACK IS REMOVED FORCEFULLY, THE CONNECTION BETWEEN THE TWO ELECTRONIC CIRCUITS MAY BE DAMAGED.

TO REASSEMBLE, REPLACE THE TEMPERATURE CONTROL CIRCUIT INSIDE THE NEW BATTERY PACK, THEN FIT THE CENTERING PIN AND PLUG IN THE CONNECTORS.

THE PIN ALSO SERVES TO PREVENT INCORRECT INSERTION.

STANDARD PHOS 20/35 TESTS

N	TEST DESCRIPTION	DESCRIPTION OF OPERATIONS	NOTES	POSSIBLE SOLUTION
01	CONSULT ANY INDICATIONS FROM THE CLIENT			
02	ENSURE THAT THE WARRANTY PERIOD HAS NOT EXPIRED		IF SUBSEQUENT TECHNICAL CHECKS SHOULD REVEAL DEFECTS CAUSED BY IMPROPER USE OF THE PRODUCT, THE WARRANTY IS INVALIDATED	
03	VISUAL CHECK TO IDENTIFY IF THE LIGHT IS FLOODED	1) IF LIGHT IS FLOODED, CHECK THE SEALS IN THE TRIAL CHAMBER	CAREFULLY REMOVE THE BATTERY PACK FROM INSIDE IN ORDER TO AVOID DAMAGING THE PRINTED CIRCUIT BOARD	
		2) CHECK THE O-RING SEALS		REPLACE O-RINGS (CODE: 45200064)
04	CHECK THAT THERE ARE NO LOOSE OBJECTS (SCREWS, NUTS)	REMOVE	THEY MAY GENERATE FALSE CONTACTS	
05	CHECK THE BATTERY CHARGER VOLTAGE	USING A TESTER, CHECK THE BATTERY CHARGER OUTPUT VOLTAGE	CHECK THAT THE BATTERY CHARGER OUTPUT VOLTAGE IS 12V	REPLACE BATTERY CHARGER (CODE: 45200154)
06	CHECK THAT THE CHARGING SOCKET ON THE BATTERY PACK IS NOT DAMAGED (NOT SOLDERED)	(SEE PHOTO 02)		REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200167)
07	RECHARGE THE LIGHT	1) CHECK THAT THE GREEN LED STAYS LIT	IF THE GREEN LED DOES NOT ACTIVATE, TRY TO DISCONNECT AND RECONNECT THE BATTERY CHARGER PLUG.	REPLACE BATTERY CHARGER (CODE: 45200154)
		2) CHECK THAT THE YELLOW LED STAYS LIT	IF THE YELLOW LED DOES NOT ACTIVATE OR IF IT TURNS OFF AFTER A FEW MINUTES, TRY TO DISCONNECT AND RECONNECT THE BATTERY CHARGER PLUG	REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200167)
			IF CHARGING FAILS, REPLACE THE BASE ASSEMBLY WITH ANOTHER THAT IS KNOWN TO FUNCTION PROPERLY	REPLACE BASE ASSEMBLY (CODE: 45200208)
			IF CHARGING FAILS, REPLACE THE BATTERY PACK WITH ANOTHER THAT IS KNOWN TO FUNCTION PROPERLY	REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200167)
08	DISCHARGE THE LIGHT IN THE WATER WARNING!: DO NOT USE THE LIGHT OUT OF THE WATER	1) CHECK THAT THE TEMPERATURE SENSOR IS WORKING PROPERLY	1) SWITCH THE LIGHT OFF AND ON A FEW TIMES APPROXIMATELY MIDWAY THROUGH THE EXPECTED DISCHARGE TIME CHECKING THAT THE LIGHT TURNS BACK ON NOTE: SWITCH THE LIGHT OFF AND ON AGAIN WHEN THE LIGHT INTENSITY IS AT THE MAXIMUM (BRILLIANT)	IF THE LIGHT DOESN'T TURN BACK ON, THE BATTERY PACK ASSEMBLY MUST BE REPLACED (CODE: 45200167)
			2) CHECK THAT IT DOES NOT TURN OFF WHEN THE LIGHT INTENSITY IS AT THE MAXIMUM (BRILLIANT)	IF THE LIGHT TURNS OFF, THE BATTERY PACK ASSEMBLY MUST BE REPLACED (COD: 45200167)
		2) CHECK THE BURN-TIME OF THE BATTERY PACK	CHECK THE BURN-TIME AT THE POINT IN WHICH THE LIGHT TURNS OFF	IF THE BURN-TIME DIFFERS NOTICEABLY FROM THE DECLARED FIGURE, REPLACE THE BATTERY PACK (COD: 45200167) - SEE BATTERY PACK USAGE CONDITIONS
		3) CHECK DEPLETION OF THE BATTERY PACK	IF THE LIGHT INTENSITY DECREASES DURING THE DISCHARGE PHASE, THIS INDICATES THAT THE BATTERY PACK IS DEPLETING	REPLACE THE BATTERY PACK ASSEMBLY (COD: 45200167) - SEE BATTERY PACK USAGE CONDITIONS



DETECTIVE

OK

fig. 2

PHOS 20/35 TROUBLESHOOTING

N	PROBLEM	PROBABLE CAUSE	TEST	SOLUTION	NOTES
01	CHARGING FAILS	A) BATTERY CHARGER	USE A TESTER TO CHECK THAT IT SUPPLIES 12V OUTPUT	REPLACE BATTERY CHARGER ASSEMBLY (CODE: 45200154)	WHEN CONNECTING THE SOCKET THE GREEN LED DOES NOT LIGHT UP
		B) BATTERY PACK CHARGING SOCKET	CHECK THE INTEGRITY OF THE CHARGING SOCKET	REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200167)	SEE PHOTO 2
		C) ELEMENT OF THE BATTERY PACK NOT CORRECTLY ACTIVATED	IF THIS IS THE FIRST RECHARGE, REPEAT THE CHARGE OR THE BATTERY IS FULLY DISCHARGED	REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200167)	WHEN CONNECTING THE SOCKET, THE YELLOW LED DOES NOT LIGHT UP OR TURNS OFF ALMOST IMMEDIATELY
		D) BATTERY PACK ELEMENT DAMAGED		REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200167)	
		E) BATTERY PACK PRINTED CIRCUIT BOARD IS DAMAGED		REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200167)	TAKE CARE WHEN DISASSEMBLING THE BATTERY PACK
		F) PRINTED CIRCUIT BOARD IN THE BOTTOM IS DAMAGED		REPLACE THE BOTTOM ASSEMBLY (CODE: 45200208)	TAKE CARE WHEN DISASSEMBLING THE BATTERY PACK
02	DOES NOT TURN ON	A) BATTERY DISCHARGED	RECHARGE		WHEN CONNECTING THE SOCKET, THE YELLOW LED DOES NOT LIGHT UP OR TURNS OFF ALMOST IMMEDIATELY
		B) LIGHT BULB DAMAGED		REPLACE BULB (CODE: 45171679 / 6V-20 W)	DO NOT TOUCH THE BULB WITH YOUR FINGERS
03	BURN-TIME NOTICEABLY LOWER THAN VALUE INDICATED	A) CHECK BURN-TIME OUT OF THE WATER	IMMERSE THE LIGHT IN WATER AND CHECK THE BURN-TIME	REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200167)	SEE BATTERY PACK USAGE CONDITIONS
		B) CHECK THE BURN-TIME IMMEDIATELY AFTER RECHARGING	WAIT APPROXIMATELY 30 MINUTES	REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200167)	SEE BATTERY PACK USAGE CONDITIONS
		C) DEFECTIVE TEMPERATURE SENSOR	1) THE LIGHT TURNS OFF WITH THE LIGHT INTENSITY STILL AT THE MAXIMUM	REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200167)	
			2) IF THE LIGHT IS SWITCHED OFF AT APPROXIMATELY MIDWAY THROUGH THE BURN-TIME, IT DOESN'T TURN BACK ON	REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200167)	
D) BATTERY PACK DEPLETING	3) IF THE LIGHT INTENSITY DECREASES DURING THE BURN-TIME TEST IT IS AN INDICATION THAT THE BATTERY PACK IS DEPLETING	REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200167)	SEE BATTERY PACK USAGE CONDITIONS		
04	WATER SEEPAGE	A) O-RING SEALS DIRTY OR DAMAGED	CHECK CLEANLINESS AND INTEGRITY	REPLACE THE O-RING 3243 (CODE: 45200064)	
		B) O-RING SEAL FOR BOTTOM IS DAMAGED		REPLACE THE BOTTOM ASSEMBLY (CODE: 45200208)	

**SUBJECT: PHOS TRONIC GENERAL INFORMATION
PHOS TRONIC TEST PROCEDURES
PHOS TRONIC TROUBLESHOOTING**

ITM6

REGARDING GENERAL INFORMATION, TESTS, AND TROUBLESHOOTING FOR THE PHOS TRONIC, CONSULT THE FOLLOWING PAGES.

GENERAL INFORMATION PHOS TRONIC

STANDARD TEST PROCEDURES CONDUCTED ON RETURNS OF MARES PHOS TRONIC MODEL TORCHES:

WARNING!

IN THE EVENT THAT DEFECTS ARE DETECTED THAT ARE DEFINITELY ATTRIBUTABLE TO MANUFACTURING DEFECTS IN COMPONENTS PROCEED WITH REPAIR UNDER WARRANTY WITH CORRESPONDING REPLACEMENT OF DEFECTIVE PARTS.

IT IS ADVISED THAT YOU FIRST OBTAIN A COPY OF THE WARRANTY CERTIFICATE AND/OR FISCAL RECEIPT TO ATTACH TO THE DEFECTIVE COMPONENT IN THE EVENT IT IS REQUESTED BY HTM Sport S.p.A FOR TECHNICAL VERIFICATION AND/OR CONFIRMATION OF THE VALIDITY OF THE REPAIR UNDER WARRANTY PERFORMED.

WARNING!

THE BURN-TIME OF THE RECHARGEABLE BATTERY PACK INDICATED IN THE TECHNICAL CHARACTERISTICS OF THE INSTRUCTION BOOKLET IS GUARANTEED FOR SIX MONTHS. IT MAY BE INFLUENCED BY CERTAIN FACTORS, SUCH AS:

- OPERATING TEMPERATURE
- TEMPERATURE AT WHICH IT WAS STORED
- PERIOD FOR WHICH THE LAMP WAS NOT USED
- NUMBER OF CHARGE AND DISCHARGE CYCLES.

HOW TO CORRECTLY OPEN THE PHOS TRONIC

WARNING!

TO AVOID DAMAGE TO THE DISPLAY, WITH CONSEQUENT WATER SEEPAGE, WHEN UNSCREWING THE LAMP BODY TO REPLACE THE BATTERY PACK AND/OR FRONT WITH CRYSTAL FOR RECHARGE, MARES RECOMMENDS THAT YOU DO NOT GRASP AND PUSH ON THE DISPLAY (FIG. A), BUT INSTEAD GRASP THE BOTTOM (FIG. B) OR THE RIGID GRIP AREA (FIG. C).



fig. A

fig. B

fig. C

HOW TO CORRECTLY REPLACE THE PHOS TRONIC BATTERY PACK

TO REPLACE THE BATTERY IT IS NECESSARY TO UNSCREW THE BODY FROM THE BASE AND PULL OUT THE TUBE. THIS EXPOSES THE BATTERY AND THE REFLECTOR HOLDER. THE BATTERY IS CONNECTED TO THE ELECTRONIC CONTROL CIRCUIT, INCORPORATED INTO THE BASE, THROUGH FOUR POWER CONNECTORS A, B, C, D, WHICH ALSO HAVE A SUPPORTING FUNCTION, AND THROUGH A FLAT CABLE E WHICH CARRIES THE SIGNALS MONITORED ON THE BATTERY (FIG. 1).

CAREFULLY SEPARATE THE BATTERY FROM CONNECTORS A, B, C, D. DISCONNECT THE CABLE E ON THE BATTERY SIDE, BY UNPLUGGING CONNECTOR F (FIG. 2).

REMOVE THE REFLECTOR HOLDER AND THE BULB, WHICH MUST BE FITTED ON THE NEW BATTERY.

TO REASSEMBLE, PLUG CABLE E BACK INTO CONNECTOR F, THEN FIT THE CENTERING PIN G (FIG. 3) AND PLUG IN THE CONNECTORS.

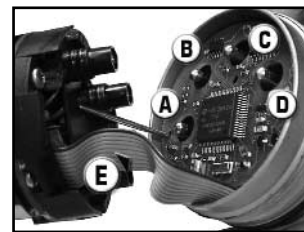


fig. 1

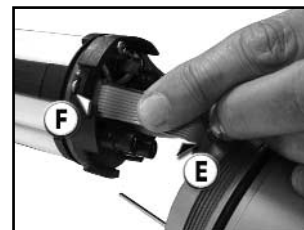


fig. 2

WARNING!

MAKE SURE THAT CONNECTOR F IS PLUGGED THE RIGHT WAY ROUND INTO CONNECTOR H ON THE ELECTRONIC CIRCUIT BOARD OF THE BATTERY BACK (FIG. 4).

IT IS IMPORTANT FOR THE POWER CONNECTORS A, B, C, D TO BE CORRECTLY INSERTED IN THEIR SOCKETS, THE CENTERING PIN G SHOULD PREVENT INCORRECT INSERTION.

REPLACE THE BULB AND THE REFLECTOR HOLDER AND SCREW THE ALUMINUM BODY ONTO THE BASE.



fig. 3

WARNING!

TAKE PARTICULAR CARE WHEN CLEANING THE O-RING SEAT AND THE THREADS. ENSURE THAT THEY ARE FREE OF IMPURITIES (SAND, SALT, ETC.). APPLY A FILM OF SILICONE GREASE ON THE SEALS.

WARNING!

IF THE BATTERY IS REMOVED AND DISCONNECTED FROM THE ELECTRONIC CIRCUITS, WHEN IT IS SUBSEQUENTLY REPLACED THE INFORMATION ON THE PERCENTAGE STATE OF BATTERY CHARGE WILL BE LOST. THE DISPLAY WILL SHOW A BURN-TIME OF ZERO MINUTES. IT WILL BE NECESSARY TO RECHARGE THE BATTERY.

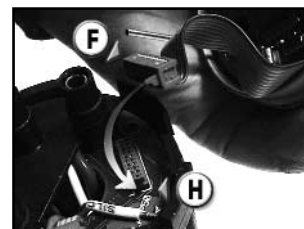


fig. 4

RECHARGEABLE BATTERY WARRANTY

THE RECHARGEABLE BATTERIES ARE GUARANTEED AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF 6 MONTHS FROM THE DATE OF PURCHASE.

STANDARD PHOS TRONIC TESTS

N	TEST DESCRIPTION	DESCRIPTION OF OPERATIONS	NOTES	POSSIBLE SOLUTION
01	CONSULT ANY INDICATIONS FROM THE CLIENT			
02	ENSURE THAT THE WARRANTY PERIOD HAS NOT EXPIRED		IF SUBSEQUENT TECHNICAL CHECKS SHOULD REVEAL DEFECTS CAUSED BY IMPROPER USE OF THE PRODUCT, THE WARRANTY IS INVALIDATED	
03	VISUAL CHECK TO IDENTIFY IF THE LIGHT IS FLOODED	1) IF LIGHT IS FLOODED, CHECK THE SEALS IN THE TRIAL CHAMBER	CAREFULLY, IN ORDER TO AVOID DAMAGING THE PRINTED CIRCUIT BOARD, REMOVE THE BATTERY PACK FROM INSIDE	
		2) CHECK THE ENTIRE HANDLE FOR POSSIBLE DAMAGE (SEE PHOTO 5)	REMOVE THE PROTECTIVE SHELL AND CHECK THE DISPLAY AT THE LEVEL OF THE O-RING SEALS	REPLACE THE HANDLE ASSEMBLY (CODE: 45200325)
		3) CHECK THE O-RING SEALS		
04	CHECK THAT THERE ARE NO LOOSE OBJECTS (SCREWS, NUTS)	REMOVE	THEY MAY GENERATE FALSE CONTACTS	
05	CHECK THE BATTERY CHARGER VOLTAGE	USING A TESTER, CHECK THE BATTERY CHARGER OUTPUT VOLTAGE	CHECK THAT THE BATTERY CHARGER OUTPUT VOLTAGE IS 12V	REPLACE O-RINGS (CODE: 45200034)
06	CHECK THAT THE CHARGING SOCKET ON THE BATTERY PACK IS NOT DAMAGED (NOT SOLDERED)	(SEE PHOTO 6)		REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200185)
07	USING THE TEST FUNCTION INCLUDED IN THE PHOS TRONIC (SEE USER'S MANUAL) CHECK FOR POSSIBLE DEFECTS		(CONSULT TABLE 1)	
08	RECHARGE THE LIGHT	RUN A QUICK CHARGE	1) IF CHARGING FAILS, REPLACE THE BATTERY PACK WITH ANOTHER THAT IS KNOWN TO FUNCTION PROPERLY	REPLACE THE BATTERY PACK ASSEMBLY (COD: 45200185) WARNING!: IF THE BATTERY PACK IS REPLACED, RECHARGE INDICATIONS WILL BE MORE CORRECT AFTER IT IS RECHARGED A FEW TIMES
			2) IF CHARGING FAILS, REPLACE THE HANDLE ASSEMBLY WITH ANOTHER THAT IS KNOWN TO FUNCTION PROPERLY (THE CIRCUIT WAS PROBABLY DAMAGED DUE TO INCORRECT EXTRACTION OF THE BATTERY PACK)	REPLACE THE HANDLE ASSEMBLY (CODE: 45200325)
09	DISCHARGE THE LIGHT IN THE WATER WARNING!: DO NOT USE THE LIGHT OUT OF THE WATER		CHECK THE BURN-TIME WHEN SWITCHING OFF NOTE: NEAR THE END OF CHARGING, THE LIGHT SWITCHES AUTOMATICALLY FROM MAXIMUM POWER TO MINIMUM POWER	IF THE BURN-TIME DIFFERS NOTICEABLY FROM THE DECLARED FIGURE, REPLACE THE BATTERY PACK (CODE: 45200185) WARNING!: IF THE BATTERY PACK IS REPLACED, DISCHARGE INDICATIONS WILL BE MORE CORRECT AFTER IT IS DISCHARGED A FEW TIMES
10	CHECK THE INFORMATION SHOWN ON THE DISPLAY		IF ABNORMAL INFORMATION IS DISPLAYED (PERMANENT DISPLAY OF THE CHARGE MAINTENANCE ICON, ETC.) REMOVE THE BATTERY PACK, WAIT 30 SECONDS, AND REINSERT IT	CONSULT THE USER'S MANUAL FOR THE CORRECT PROCEDURES

TABLE 1

N	DESCRIPTION OF DEFECT	OPERATION	NOTES
1	BATTERY CHARGER VOLTAGE LOW	CHECK VOLTAGE WITH THE TESTER (12V) OR RECHARGE WITH ANOTHER BATTERY CHARGER	RUN A FEW RECHARGE CYCLES, CHECKING THAT THE DURATION OF THE BATTERY FALLS WITHIN THE NORM
16	LAMP SWITCHES ITSELF OFF DUE TO EXCESSIVE TEMPERATURE INSIDE THE BATTERY PACK	DO NOT USE THE LAMP OUT OF THE WATER AND IF THE DEFECT PERSISTS, REPLACE THE BATTERY PACK ASSEMBLY	RUN A FEW DISCHARGE AND CHARGE CYCLES IN THE WATER
2	POWER REDUCTION UPON REACHING THE FIRST BATTERY POWER DISCHARGE THRESHOLD	IF THE BURN-TIME DIFFERS NOTICEABLY FROM THE DECLARED FIGURE, REPLACE THE BATTERY PACK ASSEMBLY	RUN A FEW DISCHARGE AND CHARGE CYCLES IN THE WATER. AFTER 2/3 CYCLES, THE BURN-TIME SHOULD FALL WITHIN THE NORM
6	LAMP SWITCHES ITSELF OFF ON REACHING THE MINIMUM BATTERY POWER LEVEL THRESHOLD	IF THE BURN-TIME DIFFERS NOTICEABLY FROM THE DECLARED FIGURE, REPLACE THE BATTERY PACK ASSEMBLY	CHECK IF DEPLETION OF THE BATTERY IS DUE TO USAGE TIME BY CONSULTING THE DATE SHOWN ON THE WARRANTY SLIP AND/OR THE VISUAL CONDITIONS IF THE BATTERY IS PACK IS NEW OR NEARLY NEW, RUN A FEW DISCHARGE AND CHARGE CYCLES IN THE WATER. AFTER 2/3 CYCLES, THE BURN-TIME SHOULD FALL WITHIN THE NORM
8	INDICATION OF A FAULT IN SOME COMPONENT OF THE BATTERY PACK	REPLACE THE BATTERY PACK ASSEMBLY	RUN A FEW DISCHARGE AND CHARGE CYCLES IN THE WATER. AFTER 2/3 CYCLES, THE BURN-TIME SHOULD FALL WITHIN THE NORM
32	THE BULB IS BURNT OUT	REPLACE THE BULB	

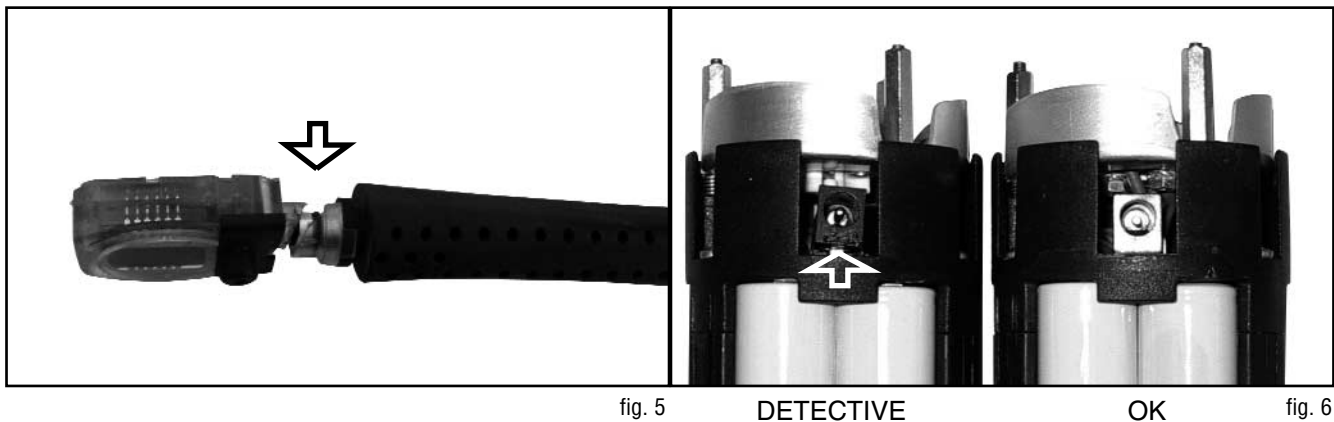


fig. 5

DETECTIVE

OK

fig. 6

PHOS TRONIC TROUBLESHOOTING

N	PROBLEM	PROBABLE CAUSE	TEST	SOLUTION	NOTES
01	CHARGING FAILS	A) BATTERY CHARGER	USE A TESTER TO CHECK THAT IT SUPPLIES 12V OUTPUT	REPLACE BATTERY CHARGER ASSEMBLY (CODE: 45200155)	AUTO-TEST: 1
		B) BATTERY PACK CHARGING SOCKET	CHECK THE INTEGRITY OF THE CHARGING SOCKET	REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200185)	
		C) ELEMENT OF THE BATTERY PACK NOT CORRECTLY ACTIVATED	IF THIS IS THE FIRST RECHARGE, REPEAT THE CHARGE	REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200185)	
		D) BATTERY PACK ELEMENT DAMAGED		REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200185)	
		E) PRINTED CIRCUIT BOARD OF THE HANDLE IS DAMAGED		REPLACE THE HANDLE ASSEMBLY (CODE: 45200235)	
02	DOES NOT TURN ON	A) BATTERY DISCHARGED	RECHARGE		
		B) LIGHT BULB DAMAGED		REPLACE BULB (CODE: 45171681 / 12V - 50 W)	
03	BURN-TIME NOTICEABLY LOWER THAN VALUE INDICATED	A) CHECK BURN-TIME OUT OF THE WATER	IMMERSE THE LIGHT IN WATER AND CHECK THE BURN-TIME	REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200185)	
		B) CHECK THE BURN-TIME IMMEDIATELY AFTER RECHARGING	WAIT APPROXIMATELY 30 MINUTES	REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200185)	
		C) DEFECTIVE TEMPERATURE SENSOR		REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200185)	
		D) BATTERY PACK ELEMENT DAMAGED		REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200185)	AUTO-TEST: 8
04	WATER SEEPAGE	A) DISPLAY UNIT DAMAGED	REMOVE THE TWO PROTECTIVE SHELLS AND CHECK THE INTEGRITY OF THE DISPLAY AT THE LEVEL OF THE TWO O-RING SEALS	REPLACE THE HANDLE ASSEMBLY (CODE: 45200235)	
		B) O-RING SEALS DIRTY OR DAMAGED	CHECK CLEANLINESS AND INTEGRITY	REPLACE THE O-RING 3243 (CODE: 45200034)	
		C) HANDLE NOT PERFECTLY SEALED WITH THE BOTTOM		REPLACE THE HANDLE ASSEMBLY (CODE: 45200235)	
05	DISPLAY SHOWS ABNORMAL INFORMATION		REMOVE THE BATTERY PACK, WAIT 30 SECONDS, AND REINSERT IT	REPLACE THE BATTERY PACK ASSEMBLY (CODE: 45200185)	SEE USER'S MANUAL FOR CORRECT BATTERY PACK INSERTION

N	DESCRIPTION OF DEFECT	OPERATION	NOTES
1	BATTERY CHARGER VOLTAGE LOW	CHECK VOLTAGE WITH THE TESTER (12V) OR RECHARGE WITH ANOTHER BATTERY CHARGER	
16	LAMP SWITCHES ITSELF OFF DUE TO EXCESSIVE TEMPERATURE INSIDE THE BATTERY PACK	REPLACE THE BATTERY PACK ASSEMBLY	DO NOT USE THE DIVING LAMP OUTSIDE THE WATER
2	POWER REDUCTION UPON REACHING THE FIRST BATTERY POWER DISCHARGE THRESHOLD	IF THE BURN-TIME DIFFERS NOTICEABLY FROM THE DECLARED FIGURE, REPLACE THE BATTERY PACK ASSEMBLY	
6	LAMP SWITCHES ITSELF OFF ON REACHING THE MINIMUM BATTERY POWER LEVEL THRESHOLD	IF THE BURN-TIME DIFFERS NOTICEABLY FROM THE DECLARED FIGURE, REPLACE THE BATTERY PACK ASSEMBLY	
8	INDICATION OF A FAULT IN SOME COMPONENT OF THE BATTERY PACK	REPLACE THE BATTERY PACK ASSEMBLY	
32	THE BULB IS BURNT OUT	REPLACE THE BULB	

SUBJECT: REPLACING BUTTONS FOR M1 - M1 RGBM COMPUTER

ITM7

1. USING A POINTED METAL TOOL (TOOL TYPE B-22), REMOVE THE PIN (2) THAT SECURES THE SHORT PART OF THE STRAP (4) TO THE COMPUTER, AND PULL IT OUT WITH PLIERS.
2. REMOVE THE SHORT STRAP SECTION (4).
3. REPEAT THE OPERATION DESCRIBED IN STEPS 1 AND 2 TO EXTRACT THE SECOND PIN (3) THAT SECURES THE LONG PART OF THE STRAP (5).
4. STARTING FROM THE UPPER SECTION, REMOVE THE BLACK PRINTED OUTER SHELL (1).

NOTE THE TWO PARTS OF THE PRINTED SHELL THAT MUST BE LIFTED FOR REMOVAL ARE LOCATED AT THE BACK OF THE COMPUTER, WHERE THE STRAP ATTACHES.

5. USING A SMALL FLATHEAD SCREWDRIVER (USAG 323 TYPE), DISASSEMBLE THE BUTTON BLOCK DRAWER (6) THAT KEEPS THE TWO BUTTONS LOCKED IN THEIR SEATS (7 - 8).
6. REMOVE THE BUTTONS (7 - 8).
7. CORRECTLY POSITION THE NEW BUTTONS (7 - 8).

NOTE THE BUTTONS ARE POSITIONED CORRECTLY IF THE MODE BUTTON IS ON THE LEFT WHEN LOOKING AT THE COMPUTER.

8. CORRECTLY BLOCK THE BUTTONS WITH THE BUTTON BLOCK DRAWER (6).

NOTE THE BUTTON BLOCK DRAWER MUST SNAP INTO THE PLASTIC SHELF PROTRUDING FROM THE COMPUTER HOUSING.

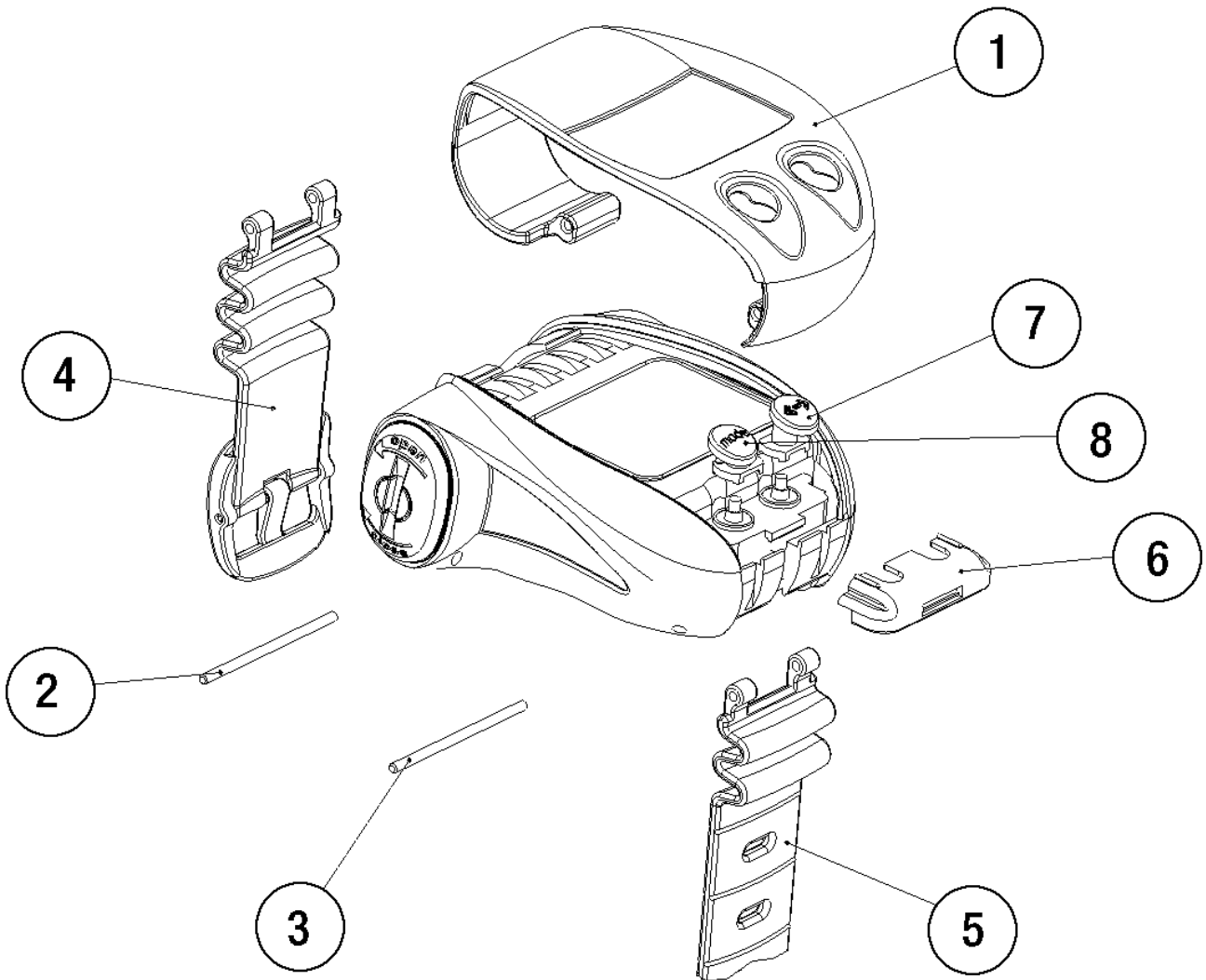
9. CORRECTLY REASSEMBLE THE BLACK PRINTED OUTER SHELL (1).

NOTE BEGIN ASSEMBLY OF THE COVER (1) STARTING FROM THE BOTTOM, FITTING THE ENDS INTO THE SEAT LOCATED AT THE BACK OF THE COMPUTER (WHERE THE LONG PART OF THE STRAP ATTACHES (5)).

NOTE CHECK THAT THE COVER (1) FITS PERFECTLY INSIDE THE OUTER SHELL.

NOTE AFTER ASSEMBLING THE COVER (1), CHECK THAT THE BUTTONS (7 - 8) ARE POSITIONED CORRECTLY.

10. CORRECTLY POSITION THE SHORT PART OF THE STRAP (4) IN ITS SEAT AND ATTACH IT WITH THE FASTENING PIN (2).
11. CORRECTLY POSITION THE LONG PART OF THE STRAP (5) IN ITS SEAT AND ATTACH IT WITH THE FASTENING PIN (3).



**SUBJECT: REPLACEMENT OF OR 2012 AND
VITON 75 AIRLAB QUICK-COUPLER GASKET**

ITM8

TOOLS:

- 14 mm OPEN END WRENCH
- 13 mm OPEN END WRENCH
- 15 mm OPEN END WRENCH
- PLASTIC ROD



TO PERFORM THE OPERATIONS DESCRIBED BELOW REFER TO FIGURE 1.

DISASSEMBLY OF AIRLAB QUICK-COUPLER

1. DISASSEMBLE THE AIRLAB FROM THE REGULATOR FIRST STAGE.
2. MOVE THE HOSE PROTECTOR FROM THE FEMALE ASSEMBLY QUICK-COUPLER.
3. USING A 15 mm OPEN END WRENCH (USAG 285 type) AND A 14 mm OPEN END WRENCH (B 18), REMOVE THE FEMALE AIRLAB QUICK-COUPLER ASSEMBLY FROM THE HOSE.
4. USING A 14 mm OPEN END WRENCH (B 18) AND A 13 mm OPEN END WRENCH (USAG 285 type), UNSCREW THE QUICK-COUPLER BUSHING (1) FROM THE QUICK-COUPLER SPRING HOUSING (8).



CAUTION!

SEPARATING THE QUICK-COUPLER BUSHING (1) FROM THE QUICK-COUPLER SPRING HOUSING (8) WILL FREE THE BALL.



IF THE BALL REMAINS INSIDE THE BUSHING USE A PIN TO PUSH IT OUT.

5. PULL THE PLASTIC-COVERED QUICK-COUPLER (2) OUT OF THE SPRING HOUSING (8).
6. USING A PIN, PUSH THE O-RING (3) FROM THE OUTSIDE INWARD, THUS FREEING THE VITON 75 GASKET (5), THE WASHER (4) AND THE O-RING (3).

ASSEMBLY OF AIRLAB QUICK-COUPLER

7. CORRECTLY POSITION THE NEW O-RING (3) INSIDE THE QUICK-COUPLER BUSHING (1).



CORRECTLY POSITION THE O-RING (3) USING, FOR EXAMPLE, A PLASTIC ROD.

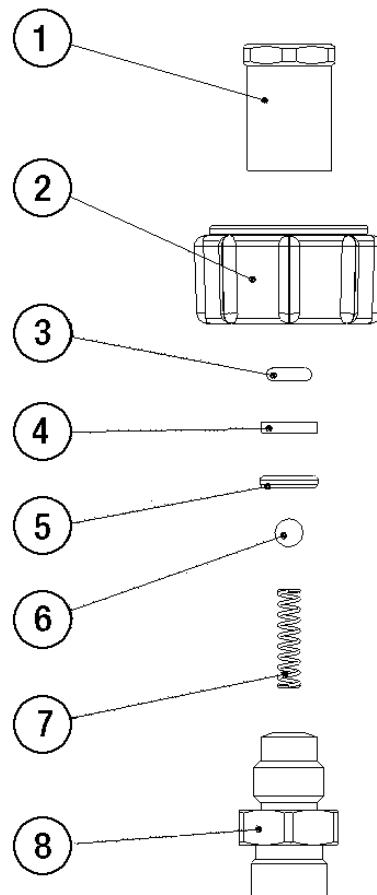
8. CORRECTLY ARRANGE THE QUICK-COUPLER WASHER (4) AND THE NEW QUICK-COUPLER GASKET (5) INSIDE THE BUSHING, OVER THE O-RING (3).



WARNING!

CORRECTLY POSITION QUICK-COUPLER WASHER (4) AND THE NEW QUICK-COUPLER GASKET (5), USING, FOR EXAMPLE, A PLASTIC ROD.

9. POSITION THE QUICK-COUPLER PLASTIC COVER (2) ON THE SPRING HOUSING (8).
10. POSITION THE BALL (6) ON THE SPRING (7) ARRANGED INSIDE THE SPRING HOUSING (8).
11. USING A 14 mm OPEN END WRENCH (B 18) AND A 13 mm OPEN END WRENCH (USAG 285 TYPE), SNUGLY SCREW THE BUSHING COMPLETE WITH O-RING (3), WASHER (4) AND VITON GASKET (5).
12. USING A 14 mm OPEN END WRENCH (B 18) AND A 15 mm OPEN END WRENCH (USAG 285 TYPE), SCREW THE FEMALE QUICK-COUPLER ASSEMBLY TO THE HOSE.



PROCEDURE FOR REPLACING THE BATTERY

ITM9



THE BATTERY MUST BE REPLACED BY AN AUTHORIZED MARES SERVICE CENTER, AND CONSEQUENTLY THE INFORMATION BELOW IS INTENDED EXCLUSIVELY FOR USE BY THE SERVICE TECHNICIAN.

IT IS GOOD PRACTICE TO PERFORM THE OPERATIONS DESCRIBED BELOW WITH THE NEMO PLACED ON A SOFT SURFACE (SUCH AS A NEOPRENE SHEET), WHICH IS CLEAN AND NON-ABRASIVE, TO AVOID DAMAGING THE LENS FACE.



PERFORM ALL THE STEPS IN THE PROCEDURE STRICTLY IN THE ORDER SHOWN, TAKING EVERY PRECAUTION TO AVOID DAMAGING ANY OF THE MECHANICAL, ELECTRONIC OR AESTHETIC COMPONENTS, IN ORDER TO ASSURE CONTINUED CORRECT FUNCTIONING OF THE PRODUCT.

TOOLS NEEDED

- 2 mm FLAT-BLADE WATCHMAKER'S SCREWDRIVER (TYPE USAG 342-60)
- FINE-POINT TWEEZERS
- SILICONE SPRAY (TYPE TKN CHEM SYMBOL HQ SIL L 630)
- SOFT ANTISTATIC CLOTH
- 3 VOLT LITHIUM REPLACEMENT BATTERY, TYPE CR 2430 OR DL 2430 - (CODE: 44200496) (RECOMMENDED DURACELL DL 21430)
- O-RING (5 PIECE KIT - CODE: 44200495)



WARNING!

UNDER NO CIRCUMSTANCES USE:

- COMPRESSED AIR
- CHEMICAL SOLVENTS
- ABRASIVE PASTES
- MINERAL OILS OR GREASE
- ELECTRIC SCREWDRIVERS
- BLADES OR POINTED TOOLS OTHER THAN THOSE SPECIFIED IN THE PROCEDURE.



MANUAL OPERATION



WARNING!!! EXERCISE CAUTION WHEN USING THE SCREWDRIVER!!!




USE OF THE SOFT ANTISTATIC CLOTH



CAREFULLY INSPECT THE SPECIFIED PARTS






USE OF THE SILICONE SPRAY

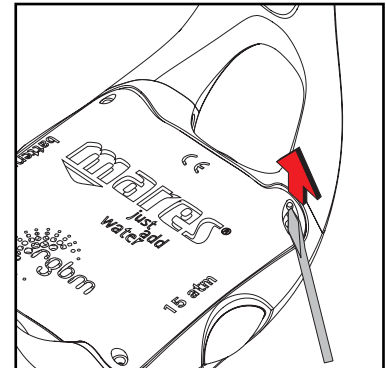
- 1)  BEFORE PROCEEDING WITH DISASSEMBLY, USE THE SOFT CLOTH TO CAREFULLY WIPE THE COVER AND THE SEAM BETWEEN THE CASE AND COVER.


NOTE IF THE NEMO IS VERY DIRTY OR ENCRUSTED WITH SALT CRYSTALS, WASH IT FIRST IN FRESH WATER AND ALLOW IT TO DRY COMPLETELY BEFORE BEGINNING DISASSEMBLY PROCEDURES.

WARNING!

UNDER NO CIRCUMSTANCES SHOULD DIRT OR WATER BE ALLOWED TO PENETRATE THE CASE, AS THIS MAY PERMANENTLY DAMAGE THE ELECTRONICS.

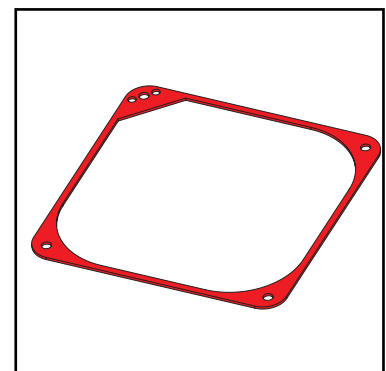
- 2)  USING THE FLATHEAD SCREWDRIVER, LOOSEN EACH OF THE FOUR SCREWS IN THE COVER ONE HALF TURN.
- 3)  THEN, USING THE FLATHEAD SCREWDRIVER, COMPLETELY UNSCREW THE FOUR COVER SCREWS, REMOVE THEM FROM THEIR SEATS USING TWEEZERS, AND PUT THEM IN A CLEAN PLACE.
- 4)  REMOVE THE COVER, USING THE SCREWDRIVER OR THE TIP OF THE TWEEZERS AS A LEVER IN THE SIDE HOLE NEAR THE SEAT OF SCREW NUMBER 1.




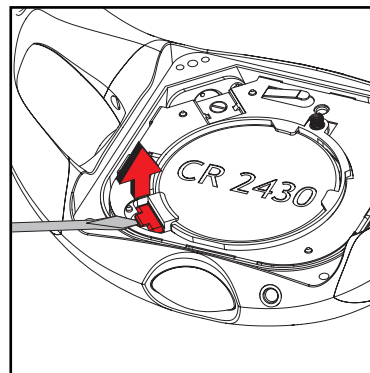
- 5)  REMOVE THE O-RING, PINCHING IT WITH YOUR FINGERS.


WARNING!

IF YOU USE TOOLS TO COMPLETE THE OPERATION DESCRIBED IN STEP 5, PROCEED VERY CAREFULLY TO AVOID IRREPARABLY DAMAGING THE SEAT.



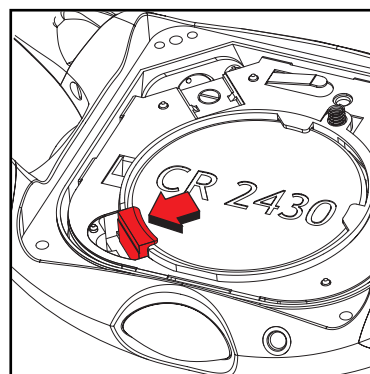
- 6)  REMOVE THE BATTERY HOLDER, PRYING IT OUT OF ITS HOUSING WITH THE SCREWDRIVER AS SHOWN IN THE FIGURE.



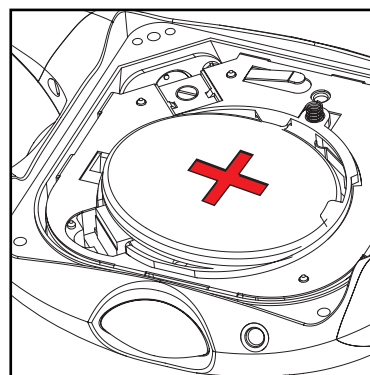
- 7)  REMOVE THE OLD BATTERY, MOVING THE TAB IN THE DIRECTION SHOWN BY THE ARROW IN THE DIAGRAM.

NOTE

DO NOT DISCARD THE OLD BATTERY IN THE ENVIRONMENT. MARES ADOPTS A POLICY OF RESPECT FOR THE ENVIRONMENT, AND URGES USE OF THE APPROPRIATE SEPARATED WASTE COLLECTION SERVICE.



- 8)  INSERT THE NEW LITHIUM BATTERY (TYPE 2430 3V) IN THE HOUSING WITH THE POSITIVE POLE "+" FACING UP.




WARNING!

DO NOT PRESS THE TAB WITH THE BATTERY, BECAUSE IT COULD BREAK. USE THE SCREWDRIVER TO MOVE THE TAB IN THE DIRECTION SHOWN IN THE PREVIOUS DIAGRAM, AND THEN INSERT THE BATTERY.

- 9)  SECURE THE BATTERY IN PLACE BY FITTING THE BATTERY HOLDER REMOVED PREVIOUSLY.


NOTE


IF NECESSARY, USE THE SCREWDRIVER TO ASSIST IN THIS OPERATION, PROCEEDING WITH THE UTMOST CARE.

- 10)   CLEAN BOTH O-RING HOUSINGS ON THE CASE AND COVER USING THE SOFT CLOTH.

WARNING!

IT IS ESSENTIAL THAT THE SURFACES BE VERY CLEAN. BE CAREFUL NOT TO LEAVE RESIDUES SUCH AS FIBERS OR DUST ON EITHER O-RING SEAT.

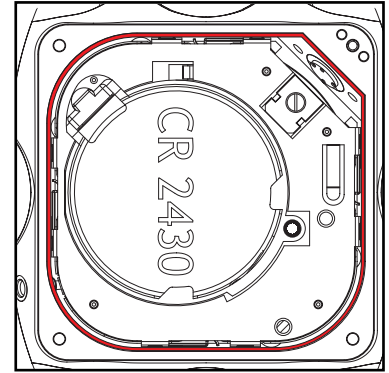
- 11)  REPLACE THE O-RING WITH A NEW ONE (MARES SPARE PART CODE 44200496).


- 12)  LUBRICATE BOTH SIDES OF THE O-RING WITH THE SILICONE SPRAY.

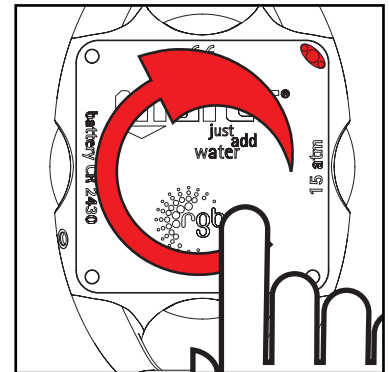
- 13)   PLACE THE O-RING IN ITS SEAT ON THE CASE.

 **WARNING!**

MAKE SURE THAT THE INNER EDGE OF THE O-RING IS ENTIRELY CONTAINED INSIDE THE RIM.



- 14)  REPLACE THE COVER, MATCHING UP THE SENSOR CIRCULATION HOLES. LIGHTLY PRESS DOWN THE COVER WITH A LIGHT, CIRCULAR MOTION OF THE FINGERS, TO SETTLE THE O-RING IN ITS SEAT.

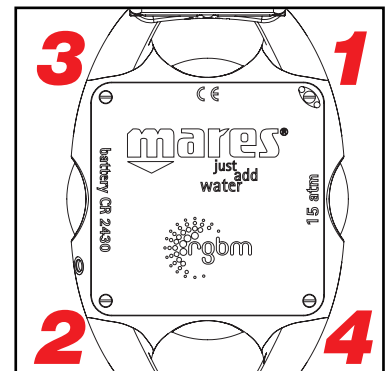


- 15)  INSERT THE SCREWS INTO THEIR HOUSINGS, BEING CAREFUL NOT TO LIFT UP THE COVER.

- 16)  TIGHTEN THE SCREWS, FOLLOWING THE ORDER INDICATED IN THE FIGURE, UNTIL THE HEADS TOUCH THE COVER.


NOTE

DO NOT FULLY LOCK DOWN ANY ONE SCREW: THE COVER SHOULD NOT BECOME MISALIGNED.



 **WARNING!**

MAKE SURE THAT THE INNER EDGE OF THE O-RING IS ENTIRELY CONTAINED INSIDE THE RIM.

-
- 17)  ONCE ALL THE SCREWS ARE IN PLACE, FINISH LOCKING THEM DOWN IN THE EXACT ORDER SHOWN IN THE PREVIOUS FIGURE.




ALTERNATE BETWEEN SCREWS, TIGHTENING EACH ONE HALF A TURN AT A TIME UNTIL THEY ARE ALL FULLY TIGHTENED.

-
- 18)  WAIT 15 MINUTES AND REPEAT STEP 17).
THIS DELAY IS NECESSARY TO ALLOW THE O-RING TO EXPAND INSIDE ITS SEAT.



IN SOME CASES, DUE TO A VARIETY OF FACTORS, REPEATING STEP 17) WILL NOT PRODUCE ANY FURTHER TIGHTENING.

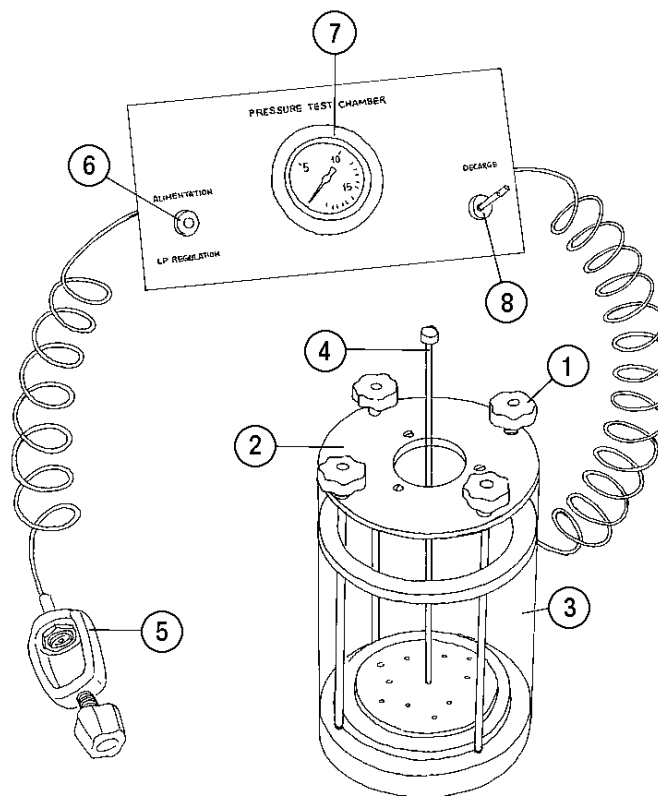
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- 19)  CAREFULLY CLEAN THE NEMO WITH AN ANTISTATIC CLOTH TO REMOVE ANY STAINS OR FINGERPRINTS FROM THE GLASS AND CASE.
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IN A TESTING CHAMBER, TEST FOR WATER SEEPAGE AFTER REPLACING THE BATTERY

NOTE BEFORE PERFORMING THE OPERATIONS DESCRIBED BELOW, CAREFULLY READ THE USAGE MANUAL PROVIDED WITH THE TESTING CHAMBER (CODE 414991)

NOTE MARES CONDUCTS THE WATER SEEPAGE TEST USING SPECIALLY DEDICATED AND EXTREMELY ADVANCED EQUIPMENT. A METHOD IS DESCRIBED BELOW THAT WILL YIELD SIMILAR RESULTS DESPITE USING DIFFERENT EQUIPMENT.

- 1) IMMERSE NEMO IN WATER INSIDE A TESTING CHAMBER AS SHOWN IN THE FIGURE (CODE 414991). SET THE PRESSURE VALUE TO 1 BAR AND MAINTAIN THIS PRESSURE FOR 5 MINUTES. THEN, INCREASE THE PRESSURE TO A VALUE GREATER THAN 3 BAR AND MAINTAIN FOR 2 MINUTES.



- 2) REMOVE THE NEMO FROM THE TESTING CHAMBER AND PLACE IT UNDER A LAMP (MAX 50 WATT) AT A DISTANCE OF APPROXIMATELY 30 CM. WHEN THE TEMPERATURE ON THE NEMO DISPLAY REACHES 50 °C (122 °F) CHECK FOR POSSIBLE CONDENSATION FORMED ON THE GLASS. THE FORMATION OF LIGHT CONDENSATION, INDICATED BY A SLIGHT OPAQUE QUALITY TO THE GLASS, INDICATES MINIMAL WATER SEEPAGE. NEMO MUST BE OPENED AGAIN AS DESCRIBED ABOVE, REMOVING THE BATTERY AND O-RING, AND THEN PLACED BACK UNDER THE LAMP TO ALLOW IT TO DRY. REPEAT THE STEPS TO CLOSE THE COMPUTER AND TEST FOR SEEPAGE.

WARNING!

IF THE GLASS IS VERY OPAQUE, THERE HAS BEEN SIGNIFICANT WATER SEEPAGE. IN THIS CASE THE NEMO MUST BE SENT TO MARES.

SUBJECT: ACTIVATING NEMO AFTER IMMERSION IN OFF MODE

ITM10

NEMO DIVE COMPUTERS WITH REGISTRATION NUMBERS EQUAL TO OR GREATER THAN 6748 MUST BE PUT IN THE WATER SWITCHED ON, OTHERWISE THE COMPUTER WILL NOT DISPLAY THE DIVE DATA ON THE SCREEN, ALTHOUGH SAID DATA WILL BE STORED. ANYONE BEGINNING A DIVE (WHO FALLS INTO THE RANGE ABOVE) WITH THE COMPUTER TURNED OFF MUST RESURFACE AND COMPLETE THE FOLLOWING OPERATIONS OUT OF THE WATER:

1. HOLD DOWN THE "ESC" BUTTON FOR 4 SECONDS.
2. WAIT 2 SECONDS.
3. PRESS THE "ESC" BUTTON TWICE.
4. PRESS THE "+" BUTTON ONCE.
5. PRESS THE "ENTER" BUTTON ONCE.
6. WAIT 2 SECONDS.



IF THE DISPLAY DOES NOT ACTIVATE AFTER COMPLETING THE OPERATIONS DESCRIBED ABOVE, REPEAT THE OPERATIONS.