

MARES SERVICE MANUAL

2003

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.

Table No. 12	MR 12 DFC FIRST STAGE MR 12 NITROX	Drawing reference No: E 8 Table updated on 01/09/2003
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Ref.N.	Code	Description
1	A	V 12 Body
2	46185015	Snap ring INT.D. 13
3	46185211	MR 12 Yoke
4	D	H.P. chamber
5	46185038	Backup ring
6	46110101	OR 2012
6	46110401	OR 2012 Viton 006-9707
7	46185212	Yoke retainer nut
8	46185011	MR 12 valve spring
9	46200276	Pebax 1st Stage poppet
12	46186303	V 12 poppet pin
13	46185032	Poppet button
14	46185022	Diaphragm
15	46185034	Spring base plate
16	46185023	Diaphragm spring
17	46184510	Retaining nut
18	46184511	Spring adjuster nut
18	46185028	Spring adjuster nut (C.W.D.)
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	MR 12 Dust cap
25	46184079	MR 12 yoke nut
48	F	Connector body (DIN) 200 BAR
48	F	Connector body (DIN) 300 BAR
49	F	DIN 200 BAR threaded locking ring
49	F	DIN 300 BAR threaded locking ring
50	46110203	OR 2018
50	46110409	OR 2018 Viton 008-9707
51	46179261	Connector coupling (DIN) 200 BAR
51	46183003	Connector coupling (DIN) 300 BAR

Ref.N.	Code	Description
52	46110108	OR 108
52	46110404	OR 108 Viton 611-9707
53	46185205	7/16" HP port plug
57	I	CWD body
58	46185301	CWD Diaphragm
59	I	CWD Locking ring
62	46183013	DIN connector dust cap
70	46200325	Proton 1st Stage cap
74	46110107	OR 2031
74	46110403	OR 2031 Viton 011-9707
75	46186216	1st stage poppet seat
148	46184315	EN 250 - 200 bar "Sticker"
149	46184316	"MARES" Sticker
		ASSEMBLIES
A	46200406	1st stage assembly MR 12 Long
D	46185210	H.P. chamber assembly (4-5-6)
D	46186259	H.P. chamber assembly (4-5-6) Nitrox
F	416804 200 NX	200 BAR DIN Nitrox connector assembly (23-48-49-50-51-62)
F	416804 300 NX	300 BAR DIN Nitrox connector assembly (23-48-49-50-51-62)
I	416851	CWD Kit
***	46186150	Service kit INT/DIN 1st St. 12/LONG/D12/S30 (2-5-6-19-22-23-50-52-74)
***	46186154	Service kit INT/DIN VITON 1st St. 12/LONG (2-5-6-19-22-23-50-52-74)
		ACCESSORIES
----	415861	CPL. INT/DIN yoke connector (200 BAR)
----	46179258	INT/DIN nut connector assembly
----		Port plug external DIN thread

Table No. 22	MR 12 LONG FIRST STAGE	Drawing reference No: E 13 Table updated on 01/09/2003
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Ref.N.	Code	Description
1	A	V 12 Body
2	46185015	Snap ring INT.D. 13
3	46185211	MR 12 Yoke
4	D	H.P. chamber
5	46185038	Backup ring
6	46110101	OR 2012
6	46110401	OR 2012 Viton 006-9707
7	46185212	Yoke retainer nut
8	46185011	MR 12 valve spring
9	46200276	Pebax 1st Stage poppet
12	46186303	V 12 poppet pin
13	46185032	Poppet button
14	46185022	Diaphragm
15	46185034	Spring base plate
16	46185023	Diaphragm spring
17	46184510	Retaining nut
18	46184511	Spring adjuster nut
18	46185028	Spring adjuster nut (C.W.D.)
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	MR 12 Dust cap
25	46184079	MR 12 yoke nut
48	F	Connector body (DIN) 200 BAR
48	F	Connector body (DIN) 300 BAR
49	F	DIN 200 BAR threaded locking ring
49	F	DIN 300 BAR threaded locking ring
50	46110203	OR 2018
50	46110409	OR 2018 Viton 008-9707
51	46179261	Connector coupling (DIN) 200 BAR
51	46183003	Connector coupling (DIN) 300 BAR

Ref.N.	Code	Description
52	46110108	OR 108
52	46110404	OR 108 Viton 611-9707
53	46185205	7/16" HP port plug
57	I	CWD body
58	46185301	CWD Diaphragm
59	I	CWD Locking ring
62	46183013	DIN connector dust cap
70	46200325	Proton 1st Stage cap
74	46110107	OR 2031
74	46110403	OR 2031 Viton 011-9707
75	46186216	1st stage poppet seat
148	46184315	EN 250 - 200 bar "Sticker"
149	46184316	"MARES" Sticker
		ASSEMBLIES
A	46200406	1st stage assembly MR 12 Long
D	46185210	H.P. chamber assembly (4-5-6)
D	46186259	H.P. chamber assembly (4-5-6) Nitrox
F	416804 200 NX	200 BAR DIN Nitrox connector assembly (23-48-49-50-51-62)
F	416804 300 NX	300 BAR DIN Nitrox connector assembly (23-48-49-50-51-62)
I	416851	CWD Kit
***	46186150	Service kit INT/DIN 1st St. 12/LONG/D12/S30 (2-5-6-19-22-23-50-52-74)
***	46186154	Service kit INT/DIN VITON 1st St. 12/LONG (2-5-6-19-22-23-50-52-74)
		ACCESSORIES
----	415861	CPL. INT/DIN yoke connector (200 BAR)
----	46179258	INT/DIN nut connector assembly
----		Port plug external DIN thread

SUBJECT: TECHNICAL UPDATE ON AXIS SECOND STAGES

BTM7

AXIS SECOND STAGE MAINTENANCE MANUAL REFERENCES: SECTION S-7

FINAL CHECKS AND ADJUSTMENTS MANUAL REFERENCES: SECTION S-9

BEGINNING MARCH 2003, THE HTM MARES SPORT DIVISION HAS FINE-TUNED A KIT FOR AXIS SECOND STAGE VERSIONS CONTAINING COMPONENTS WITH SEAL PROFILES AND SURFACES SPECIALLY DESIGNED TO GUARANTEE EVEN HIGHER LEVELS OF PERFORMANCE AND RELIABILITY. WHERE REQUIRED, HEREWITH YOU WILL FIND DESCRIPTIONS OF THE PROCEDURES REQUIRED TO UPDATE AND CORRECTLY ADJUST YOUR SECOND STAGES.



WARNING!

UPDATE PROCEDURES MUST BE PERFORMED BY QUALIFIED PERSONNEL AT A TECHNICAL ASSISTANCE CENTER AND/OR BY AUTHORIZED MARES DISTRIBUTOR.

FOR THE DISASSEMBLY, REASSEMBLY, ADJUSTMENT, AND CHECKS REQUIRED FOR UPDATING WITH COMPONENTS IN THE AXIS SECOND STAGE KITS, YOU MUST CONSULT THE PROCEDURES DESCRIBED IN THE MAINTENANCE MANUAL.

SHOULD THE UPDATED MANUALS CONTAINING THE SECTIONS INDICATED BE LACKING, OR IF THE INSTRUCTIONS ARE UNCLEAR OR NOT ENTIRELY UNDERSTANDABLE, PLEASE CONTACT HTM SPORT BEFORE PERFORMING ANY MAINTENANCE, ADJUSTMENT, OR CHECKS.

REQUIRED EQUIPMENT AND TOOLS	KIT COMPONENTS (CODE 46200510)
<ul style="list-style-type: none">- 1 6MM ALLEN WRENCH (B-8 CODE: 46106208)- 1 5MM ALLEN WRENCH (B-4 CODE: 46106204)- 2 17MM WRENCHES (B-17 CODE: 46106217)- 1 SPECIAL TOOL (B-12 CODE: 46106212)- 1 FLATHEAD SCREWDRIVER (USAG TYPE 323 0.4 x 2.5 x 75)	<ul style="list-style-type: none">- COMPLETE ADJUSTABLE SEAT CONNECTOR (COD: 46200204 + 46110205)- 2ND STAGE POPPET SEAT: (COD: 46184062)- INSTRUCTIONS



WARNING!

THE HTM MARES SPORT DIVISION RECOMMENDS THAT YOU PAY SPECIAL ATTENTION TO THE MAINTENANCE AND/OR ADJUSTMENT STEPS LISTED HERE DURING SECOND STAGE UPDATING PROCEDURES:

DISASSEMBLY:

DISASSEMBLE BY FOLLOWING THE PROCEDURES DESCRIBED IN STEPS: 5, 6 AND 10.

- 1) USING A PIN, REMOVE THE 2ND STAGE POPPET SEAT (47) FROM THE VALVE CASING (92).

CONTINUE DISASSEMBLY BY FOLLOWING THE PROCEDURES DESCRIBED IN STEPS: 12, 13, 14 AND 15.

REASSEMBLY:

- 2) INSERT THE NEW 2ND STAGE POPPET SEAT (47), TAKING CARE TO CHECK THAT IT IS WELL POSITIONED INSIDE THE VALVE CASING (92).
- 3) INSERT AND SCREW IN THE NEW SEAT CONNECTOR (21) IN THE COUPLER (28) WITH A 5 MM ALLEN WRENCH (B-4), ALLOWING IT TO PROTRUDE FROM THE COUPLING APPROXIMATELY 3MM (AS DESCRIBED IN STEP 13 OF THE REASSEMBLY PROCEDURES). CONTINUE WITH REASSEMBLY FOLLOWING THE INSTRUCTIONS IN STEPS: 15 AND 17.
- 4) INSPECT THE INTERMEDIATE PRESSURE VALUE IN THE FIRST STAGE AS INDICATED IN THE FIRST STAGES SECTION (F-7) AND ADJUST IF NECESSARY.

N.B: FOR INTENSIVE USE, AN INTERMEDIATE PRESSURE OF 9.8 -9.9 BAR (142 - 143 P.S.I.) IS RECOMMENDED.

- 5) AFTER ADJUSTING THE 2ND STAGE DEMAND LEVER, DESCRIBED IN THE ADJUSTMENT PROCEDURES IN THE MANUAL, YOU MUST CHECK THAT:

AIR DELIVERY MUST BE TRIGGERED ABOUT MIDWAY ALONG THE PURGE BUTTON'S TRAVEL, AND THE SOUND OF THE DEMAND LEVER TOUCHING THE METAL DISK OF THE SECOND STAGE DIAPHRAGM ("TAPPING") SHOULD BE AUDIBLE WHEN THE PRESSURIZED SECOND STAGE IS SHAKEN VIGOROUSLY UP AND DOWN.

- 6) WE RECOMMEND YOU CHECK THAT THE INITIAL CRACKING PRESSURE DESCRIBED IN THE "FINAL CHECKS AND ADJUSTMENTS" SECTION (S-9) FALLS WITHIN THE FOLLOWING VALUES:

AXIS: APPROXIMATELY 3 CM/H2O (FROM 3.0 TO 3.2 CM/H2O).

AXIS OCTOPUS VERSIONS: FROM 3.3 TO 3.5 CM/H2O.

N.B: IF THE INITIAL CRACKING PRESSURE DOES NOT FALL WITHIN THE VALUES INDICATED ABOVE, ADJUST THE PRESSURE AS DESCRIBED IN THE MANUAL IN THE "FINAL CHECKS AND ADJUSTMENTS" SECTION (S-9).

SUBJECT: MANUAL MAINTENANCE PROCEDURES - PROTON ICE VERSION

BTM6

MANUAL REFERENCE DISASSEMBLY REPLACES STEPS 4 - 5

MANUAL REFERENCE ASSEMBLY REPLACES STEP 18

REF. TAB. # 116 DRG. E 26

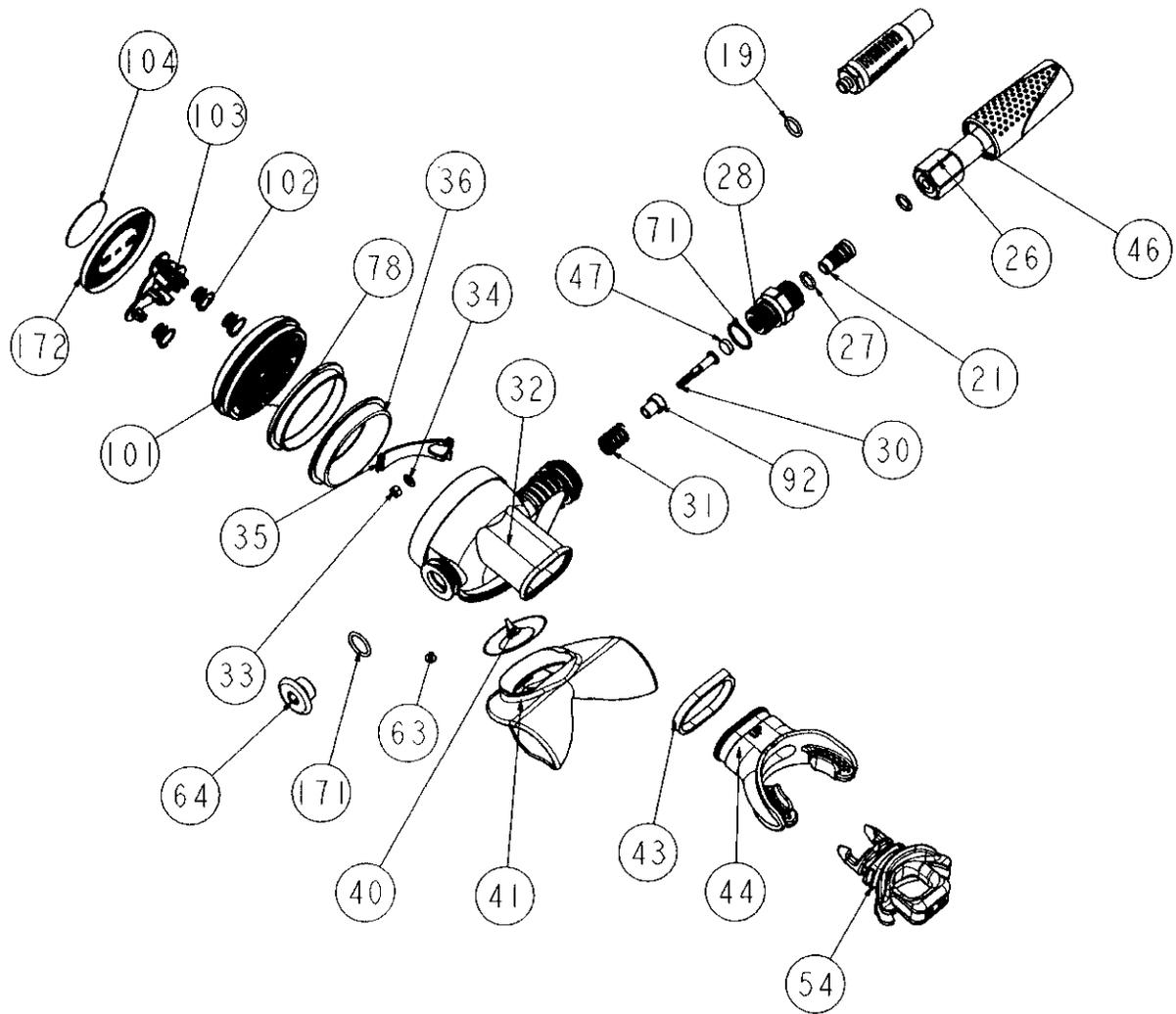
▶ **DISASSEMBLY**

4. REMOVE THE EXHAUST TEE (41).

▶ **REASSEMBLY**

18. CORRECTLY POSITION THE EXHAUST TEE (41) OVER THE SUPPORT FLANGE ON THE 2ND STAGE CASE.

Drawing No. E 26	PROTON ICE SECOND STAGE - PROTON ICE OCTOPUS	Drawing updated on 12/09/2002
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**AIR TRIM PNEUMATIC
SYSTEM**

mares[®]

AIR TRIM PNEUMATIC SYSTEM

**H.U.B. - H.U.B. AVANTGARDE - H.U.B. CENTURY
DRAGON FLY - DIAMANTE - PEGASUS
MORPHOS - MORPHOS TWIN**

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

▶ 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).
3. Take off the inflation (10) and deflation (9) buttons.

NOTE IN AIR TRIM VERSION WITH GREY AND YELLOW BUTTONS, IT IS RECOMMENDED THAT YOU REMOVE THE BUTTONS FROM THE UPPER COVER ONLY IF NECESSARY.

4. Using a Phillips head screwdriver (USAG type 322 PH 1), remove the screws (15) and remove the inflator body (1), the O-Ring (21), and the lower cover (12).

⚠ WARNING!

THE MARES HTM SPORT DIVISION RECOMMENDS THAT BEFORE DISASSEMBLING THE INFLATOR BODY ASSEMBLY (1) YOU IDENTIFY AND MARK THE POSITION OF THE MALE COUPLER (18) WITH RESPECT TO THE BUOYANCY BAG (FOR EXAMPLE, BY MARKING THE BAG WITH CHALK).

5. Remove the O-Ring (23) from the exhaust valve shaft (29).
6. Remove the O-Ring (23) from the inflator valve shaft (29).

NOTE REMOVE THE O-RING FROM THE VALVE SHAFT FOR THE INFLATION BUTTON, ONLY IF PRESENT.

7. Using a pin wrench (USAG type 282/58-62-65), remove the ring nut (11) (Fig. 1).

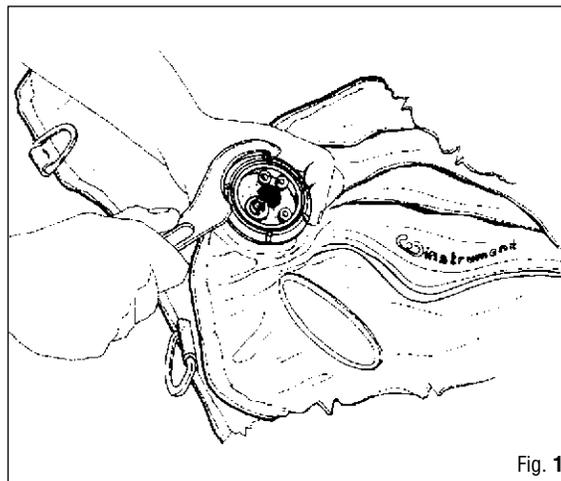


Fig. 1

WARNING!

WHEN UNSCREWING THE RING, HOLD THE INNER PART OF THE PNEUMATIC INFLATOR IN PLACE TO PREVENT THE INNER SUPPORT FROM ROTATING AND THEREBY DAMAGING THE TUBE INSIDE. (Fig. 1)

▶ A.1 - EXHAUST BUTTON DISASSEMBLY

8. Using a 17-mm open end wrench (B-17), remove the deflation piston seat (6).

NOTE THE DEFLATION PISTON (8) CAN BE IDENTIFIED BY ITS FINAL SECTION, WHICH PROTRUDES FROM THE SEAT (6) AND HAS TWO FLAT, PARALLEL SURFACES.

9. Remove the spring (2) and the O-Ring (3) from the deflation button bushing.
10. Secure the flat surfaces of the piston (8) that protrude from the deflation piston seat (6) with a vise.

CAUTION!

IN ORDER TO AVOID DAMAGE TO THE SURFACE OF THE PISTON, IT IS ADVISABLE TO COVER THE JAWS OF THE VISE WITH A CLOTH.

11. Using a 6-mm open end wrench, remove the deflation button bushing (4) (Fig. 2).
12. Extract the piston (8) and remove the O-Rings (7) and (3).

NOTE THE PISTON CAN BE REMOVED USING A PLASTIC ROD (MAX DIAMETER 4 MM) BY PRESSING OUTWARD FROM INSIDE THE SEAT.

13. Remove the O-Rings (5) from the deflation piston seat (6).

▶ A.2 - INFLATION BUTTON DISASSEMBLY

NOTE THE INFLATION PISTON HAS A COMPLETELY SPHERICAL END THAT EXTENDS OUT OF THE SEAT.

14. Using a 17-mm open end wrench (B-17), remove the inflation piston seat (20).
15. Remove the spring (2).
16. By pushing it outward, extract the inflation piston (19) from the inflation piston seat (20) and remove the two O-Rings (7).

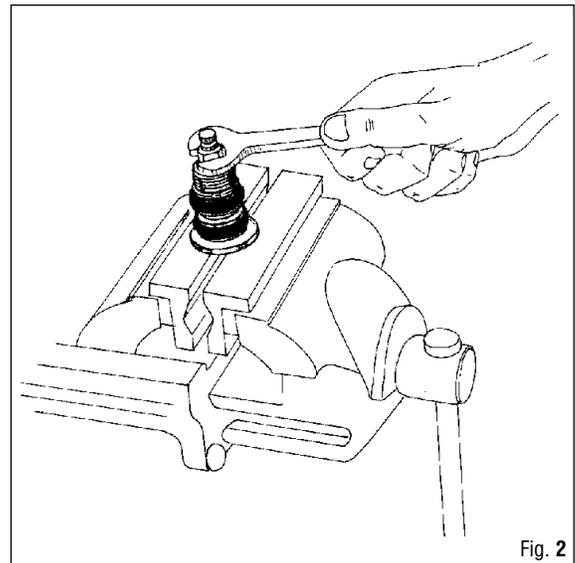


Fig. 2



THE PISTON CAN BE REMOVED USING A PLASTIC ROD (MAX DIAMETER 4 MM) BY PRESSING OUTWARD FROM INSIDE THE SEAT.

17. Remove the two O-Rings (5) from inflation piston seat (20).

▶ **A.3 - MALE QUICK COUPLING DISASSEMBLY**

18. Using a 14 mm open end wrench (B-18), remove the male quick coupling (18), thus freeing the filter (16).
19. Remove the O-Ring (17) from the seat on the male quick coupling (18).

▶ **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.

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



WARNING!

WHEN UNSCREWING THE RING, HOLD THE INNER PART OF THE PNEUMATIC VALVE IN PLACE TO PREVENT THE INNER SUPPORT FROM ROTATING AND THEREBY DAMAGING THE TUBE INSIDE.

21. Pull out the spring (46).
22. Remove the sealing disk support assembly (41) from the 2-way valve shaft.
23. Remove the O-rings (23) and the back-up ring (35) from the 2-way valve stem (33).

▶ **B.2 - DISASSEMBLY OF THE SEALING DISK ASSEMBLY**

24. Remove the sealing disk (40) and the O-Ring (42) from the sealing disk support (41).
25. Using the 22-mm open end wrench (B-9), and a 16-mm open end wrench if necessary, back off the valve shaft nut (39) from the sealing disk support (41).
26. Disassemble the sealing disk (40) from the sealing disk support (41).



IN VERSIONS OF THE BC THAT ALSO INCLUDE MANUAL OPERATION OF THE PNEUMATIC EXHAUST VALVE ("PNEU-MECHANICAL") AND IT IS 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**



CAUTION!

DISASSEMBLE THE DISCHARGE VALVE RING ONLY IF NECESSARY.

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

► C - DISASSEMBLY OF INTERNAL SUPPORTS

NOTE THE MARES HTM SPORT DIVISION RECOMMENDS THAT YOU ONLY DISASSEMBLE THE INTERNAL SUPPORT ASSEMBLIES WHEN NECESSARY.

▲ CAUTION!

IN ORDER TO CORRECTLY ASSEMBLE AND ENSURE THAT THE AIR TRIM SYSTEM FUNCTIONS PERFECTLY, MARES RECOMMENDS THAT BEFORE REMOVING THE TUBES FROM 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 AFTER AN INSPECTION, SIMPLY CONNECT THE NEW TUBE TO THE "GUIDE LINE" IN THE BUOYANCY BAG TO ALLOW FOR EASY AND CORRECT REASSEMBLY.

► C.1 - DISASSEMBLY OF THE BUOYANCY BAG INTERNAL SUPPORTS

29. Detach the internal supports assemblies from their housings in the buoyancy bag.

▲ CAUTION!

IN ORDER TO FACILITATE DISASSEMBLY OF THE INTERNAL SUPPORTS OF THE VALVES AND INFLATOR FROM THE BUOYANCY BAG, IT IS RECOMMENDED THAT YOU PLACE THE SUPPORTS IN A VERTICAL POSITION (PERPENDICULAR TO THEIR REGULAR OPERATIVE PLANE) (Fig. 3).

▲ CAUTION!

IN BC VERSIONS WITH INTERNAL BLADDERS (SUCH AS MORPHOS) IT IS ADVISABLE TO DISASSEMBLE THE INTERNAL SUPPORTS FIRST FROM THE INTERNAL BLADDER AND THEN FROM THE BUOYANCY BAG.

30. Remove the O-Rings (32) from the corresponding housings in the flanges of the discharge valves (37).
31. Remove the O-Ring (32) from the housing in the inflator flange (30).

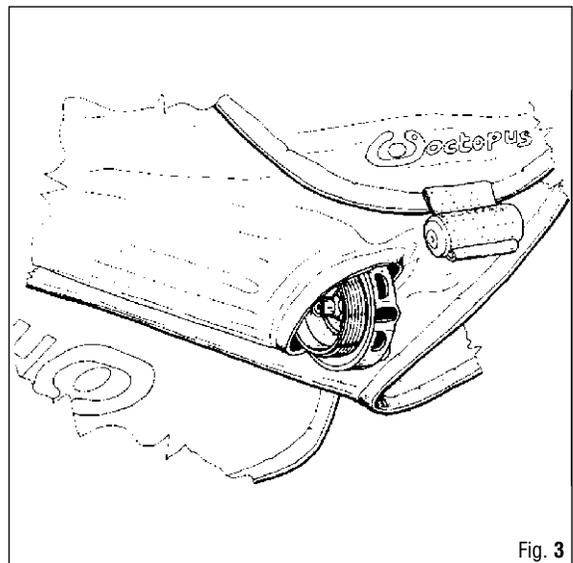


Fig. 3

 **CAUTION!**

IN ORDER TO FACILITATE OPERATIONS AND ALLOW FOR PROPER REASSEMBLY, BEFORE DISASSEMBLY (IF REQUIRED) MARES ADVISES THAT YOU IDENTIFY AND DRAW A DIAGRAM ON PAPER OF:

- THE EXIT POSITION OF THE LP TUBES FROM THE GROOVES IN THE PROTECTION CAP (28) OF THE INTERNAL SUPPORTS OF THE PNEUMATIC INFLATOR AND THE DISCHARGE VALVES.
 - THE POSITION OF THE INFLATION AND DISCHARGE SHAFT COUPLERS IN THE CORRESPONDING SEATS OF THE PNEUMATIC INFLATOR FLANGE.
 - THE EXIT DIRECTION OF THE INTERNAL TUBES OF THE RESPECTIVE FLANGES OF THE INFLATOR (30) AND DISCHARGE VALVES (37).
-

 **CAUTION!**

IN ORDER TO FACILITATE MAINTENANCE AND ENSURE THE PERFECT FUNCTIONING AND SAFETY OF THE AIR TRIM SYSTEM, IT IS ADVISABLE TO ALWAYS REPLACE THE INTERNAL TUBE ASSEMBLY IN THE EVENT OF WARPING AND/OR BREAKS.

 BEFORE DISASSEMBLING THE INTERNAL TUBES MAKE SURE THAT YOU HAVE REMOVED THE PROTECTION CAPS (28) FROM THE CORRESPONDING FLANGES IN QUESTION (OF THE INFLATOR AND THE VALVES) AND CONNECTED THE "GUIDE LINE".

▶ **C.1 - DISASSEMBLY OF THE PNEUMATIC INFLATOR INTERNAL SUPPORT**

32. Disassemble the protection cap (28) by removing the screws (27) using a Phillips head screwdriver (USAG type 322 PH1).
33. Using a small flathead screwdriver (USAG type 322), remove the snap ring (31) and slide out the exhaust valve shaft (29).
34. With an 8-mm open end wrench, loosen the air connector (25) of the tube coming from the first discharge valve.

 MARES RECOMMENDS THAT YOU USE AN OPEN END WRENCH WITH A MAXIMUM SIZE OF 3 MM.

35. Remove the O-Ring (24) from the air connector (25) of the exhaust tube.

 **CAUTION!**

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



PROCEED WITH DISASSEMBLY OF THE VALVE SHAFT FOR THE INFLATION BUTTON, ONLY IF PRESENT.

36. Using a small flathead screwdriver (USAG type 322), remove the snap ring (31) and slide out the inflator valve shaft (29).
37. With an 8-mm open end wrench, unscrew the air connector (25) from the inflator tube coming from the bag.

 **CAUTION!**

MARES RECOMMENDS THAT YOU USE AN OPEN END WRENCH WITH A MAXIMUM SIZE OF 3 MM.

38. Remove the O-Ring (24) from the air connector (25) of the inflator tube.

▶ **C.2 - DISASSEMBLY OF THE INTERNAL SUPPORT OF THE 1ST PNEUMATIC DISCHARGE VALVE (POSITION 1 - SEE TABLE "A")**

39. Remove the protection cap (28), unscrewing the screws (27) with a Phillips head screwdriver (USAG type 322 PH 1).
40. Using a 14-mm open end wrench (B-18) (or a 14-mm socket wrench if necessary), remove the valve shaft nut (38) and back off the pneumatic valve flange (37) from the 2-way valve shaft (33).
41. Using an 8-mm open end wrench, unscrew the air connector (25) from the discharge tube coming from the pneumatic inflator.

 **CAUTION!**

MARES RECOMMENDS THAT YOU USE AN OPEN END WRENCH WITH A MAXIMUM SIZE OF 3 MM.

42. Remove the O-Ring (24) from the air connector (25).
43. With an 8-mm open end wrench, loosen the air connector (25) of tube coming from the second pneumatic discharge valve.

 **CAUTION!**

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

▶ **C.3 - DISASSEMBLY OF THE INTERNAL SUPPORT OF THE 2ND PNEUMATIC DISCHARGE VALVE (POSITION 2 - SEE TABLE "A")**

 **NOTE** PROCEED WITH DISASSEMBLY OPERATIONS FOR THE INTERNAL SUPPORT FOR THE 2ND PNEUMATIC DISCHARGE VALVE IF PRESENT.

44. Remove the protection cap (28) by removing the screws (27) using a Phillips head screwdriver (USAG type 322 PH1).
45. Using a 14-mm open end wrench (B-18) (or a 14-mm socket wrench if necessary), remove the 2-way valve shaft nut (38) and back off the pneumatic valve flange (37) from the 2-way valve shaft (33).
46. Using an 8-mm open end wrench, unscrew the air connector (25) from the discharge tube coming from the pneumatic inflator

 **CAUTION!**

MARES RECOMMENDS THAT YOU USE AN OPEN END WRENCH WITH A MAXIMUM SIZE OF 3 MM.

47. Remove the O-Ring (24) from the air connector (25).
48. Using a 2.5 mm hex wrench, remove the cap (34) from the air connector (25) and remove the O-Ring (24).

 **CAUTION!**

BEFORE REMOVING THE TUBE FROM THE BUOYANCY BAG MAKE SURE YOU HAVE UNSCREWED BOTH AIR CONNECTORS LOCATED AT THE ENDS OF THE TUBES FROM THEIR RESPECTIVE VALVE SHAFTS AND THAT YOU HAVE CONNECTED A "GUIDE LINE" TO ONE END OF THE TUBE 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)	45	60	65	72	75	120
CODE	47200605	46200125	47200606	46200126	47200607	47200608
MORPHOS TWIN	1	2				3
MORPHOS				1		3
HUB		2 - 1 (S)	1 (M)	1 (L-XL)		
HUB AVANGARDE		2	1 (S-M)	1 (L)	1 (XL)	
HUB CENTURY		2	1 (S-M)	1 (L-XL)		
PEGASUS		2 1(XS-S)	1 (M)	1 (L-XL)		
DRAGONFLY		2 1 XS-S)	1 (M)	1 (L-XL)		
DIAMANTE		2 1(XS-S)	1 (M)	1 (L-XL)		

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, 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 performance.

The components recommended to replace are the following.

PNEUMATIC INFLATOR

Quantity	Reference Number	Description	Code
2	31	Radial snap ring (diameter 6)	47158707
2	3	O-Ring 2007	46110213
4	5	O-Ring 2050	46110211
3	7	O-Ring 2012	46110101
1	16	Fabric filter	47159146
1	17	O-Ring 106	46110106
1	21	O-Ring 3156	47110270
2	23	O-Ring 2015	46110102
1	24	O-Ring 3 x 1	47110172
1	32	O-Ring 3231	46110265

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

Description	Ref. No.	Inspection
Quick coupler	18	Check for possible scratches, corrosion, or damage to the chrome.
O-Rings	3-5-7-17 21-23-24-32	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.
Sheath assembly	36	Check that the spiral and the sheath have no warps or breaks.
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
2	23	O-Ring 2015	46110102
4	24	O-Ring 3 x 1	47110272
2	32	O-Ring 3231	46110265
2	33	O-Ring 3100	47110271
1	35	Backup ring	47158716
1	39	O-Ring 2056	46110210
2	40	Sealing disk	47158727
2	42	O-Ring 2037	46110110

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

Description	Ref. No.	Inspection
O-Rings	23-24-32 33-39-42	Check for cuts, burrs or foreign particles Any of these defects can cause leaks.
Sealing disk	40	Check that there are no splits, cracks, or foreign particles.
Backup ring		Check that there are no signs of deformation or foreign particles.
O-ring seats	35	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 PNEUMATIC 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.

C - REASSEMBLY OF INTERNAL SUPPORTS

 PROCEED WITH REASSEMBLY OF INTERNAL SUPPORTS ONLY IF THEY WERE PREVIOUSLY REMOVED.

1. Position the O-Ring (23) in the seat of the valve shaft for the exhaust button (29).
2. Position the O-Ring (23) in the seat of the valve shaft for the inflator button (29).
3. Position the backup ring (35) inside the corresponding valve stem seats (33) of the pneumatic discharge valves.
4. Fit the O-Ring (23) inside the corresponding valve stem seats (33) of the pneumatic discharge valves.
5. Position the O-Rings (24) in the corresponding seats of the air connectors (25) located at the ends of the tubes.

 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 HOUSING. THE TUBE IS POSITIONED CORRECTLY WHEN BOTH ENDS PROTRUDE FROM THE CORRESPONDING HOUSINGS.

 **CAUTION!**

IN ORDER TO AVOID DAMAGE AND ENSURE PERFECT FUNCTIONING, PULL THE "GUIDE LINE" OF THE INTERNAL TUBE OF THE INFLATOR SYSTEM SLOWLY AND WITHOUT FORCING IT, CONNECTING THE "GUIDE LINE" TO THE END WITH THE AIR CONNECTOR (25). THE END OF THE TUBE WITHOUT THE AIR CONNECTOR (25) MUST BE POSITIONED INSIDE THE BUOYANCY BAG AND ON THE OPPOSITE SIDE FROM THE PNEUMATIC INFLATOR.

▶ **C.1 - REASSEMBLY OF THE PNEUMATIC INFLATOR INTERNAL SUPPORT**

6. Screw the air connector (25) of the internal tube into the hole of the exhaust valve shaft (29), tightening with a 9-mm open end wrench.
7. Connect the valve shaft for the exhaust button (29) in the corresponding seat of the inflator flange (30).

 **CAUTION!**

ENSURE THAT THE POSITION OF THE EXHAUST VALVE SHAFT CORRESPONDS EXACTLY TO THAT RECORDED DURING DISASSEMBLY PROCEDURES.

8. Fasten the exhaust valve shaft (29) to the inflator flange (30) with the snap ring (31).

 **CAUTION!**

ENSURE THAT THE EXIT POSITION OF THE INTERNAL EXHAUST TUBE FROM THE FLANGE (30) CORRESPONDS TO THAT NOTED AND RECORDED DURING DISASSEMBLY PROCEDURES.

 **NOTE** PROCEED WITH ASSEMBLY OF THE VALVE SHAFT FOR THE INFLATOR BUTTON ONLY IF PRESENT, AND IF IT WAS PREVIOUSLY REMOVED.

9. Screw the air connector (25) of the internal tube into the hole of the inflator valve shaft (29), tightening with a 9-mm open end wrench.
10. Connect the valve shaft for the inflator button (29) in the corresponding seat of the inflator flange (30).

 **CAUTION!**

ENSURE THAT THE POSITION OF THE INFLATOR VALVE SHAFT CORRESPONDS EXACTLY TO THAT NOTED AND RECORDED DURING DISASSEMBLY PROCEDURES.

11. Fasten the inflator valve shaft (29) to the inflator flange (30) with the snap ring (31).

 **CAUTION!**

ENSURE THAT THE EXIT POSITION OF THE INTERNAL INFLATION TUBE FROM THE FLANGE (30) CORRESPONDS TO THAT NOTED AND RECORDED DURING DISASSEMBLY PROCEDURES.

12. Fit the protection cap (28) and tighten the screws (27) snugly, using a Phillips head screwdriver (USAG type 322 PH 1).

 **CAUTION!**

ENSURE THAT THE EXIT POSITION OF THE TUBES IN THE GROOVES OF THE PROTECTION CAP (28) CORRESPONDS EXACTLY TO THAT NOTED AND RECORDED DURING DISASSEMBLY PROCEDURES.

▶ **C.2 - REASSEMBLY OF THE INTERNAL SUPPORT OF THE 1ST PNEUMATIC DISCHARGE VALVE (POSITION 1 - SEE TABLE "A")**

13. Using a 9-mm open end wrench, tighten the end of the internal exhaust tube coming from the pneumatic inflator to the 2-way valve shaft (33).
14. Using a 9-mm open end wrench, tighten the end of the internal exhaust tube for the 2nd exhaust valve to the 2-way valve shaft (33).

 **CAUTION!**

PROCEED WITH ASSEMBLY OF THE INTERNAL TUBE FOR THE 2ND EXHAUST VALVE ONLY IF PRESENT, AND IF IT WAS PREVIOUSLY REMOVED.
IF THE 2ND EXHAUST VALVE IS NOT PRESENT, PROCEED AS INDICATED IN REASSEMBLY STEPS 15 AND 16.

15. Place the O-ring (24) on the plug for valve (34).
16. Screw the plug (34) into the corresponding hole in the 2-way valve shaft, using a 2.5 mm hex wrench.
17. Insert the pneumatic valve flange (37) into the 2-way valve shaft (33).

 **CAUTION!**

ENSURE THAT THE EXIT POSITION OF THE TUBES IN THE GROOVES OF THE FLANGE (37) CORRESPONDS EXACTLY TO THAT NOTED AND RECORDED DURING DISASSEMBLY PROCEDURES.

18. Tighten the nut (38) with a 14-mm open end wrench (B-18) (or a 14-mm socket wrench).

 IF USING A TORQUE WRENCH, SELECT A TORQUE SETTING OF 4 - 4.5 Nm.

19. Tighten the protection cap (28) with the screws (27), using a Phillips head screwdriver (USAG type 322 PH 1).

 **CAUTION!**

ENSURE THAT THE EXIT POSITION OF THE TUBES IN THE GROOVES OF THE PROTECTION CAP (28) CORRESPONDS EXACTLY TO THAT NOTED AND RECORDED DURING DISASSEMBLY PROCEDURES.

▶ **C.3 - REASSEMBLY OF THE INTERNAL SUPPORT OF THE 2ND PNEUMATIC DISCHARGE VALVE (POSITION 2 - SEE TABLE "A")**

 PROCEED WITH ASSEMBLY OPERATIONS FOR THE INTERNAL SUPPORT FOR THE 2ND PNEUMATIC DISCHARGE VALVE IF PRESENT, AND IF IT WAS PREVIOUSLY REMOVED.

20. Place the O-ring (24) on the plug for valve (34).
21. Screw the plug (34) into the corresponding hole in the 2-way valve shaft, using a 2.5 mm hex wrench.
22. Screw the end of the air connector (25) of the internal tube coming from the 1st exhaust valve to the 2-way valve shaft (33), tightening with a 9-mm open end wrench.
23. Insert the 2-way valve shaft (33) in the flange (37).

 **CAUTION!**

ENSURE THAT THE EXIT POSITION OF THE TUBES IN THE GROOVES OF THE FLANGE (37) CORRESPONDS EXACTLY TO THAT NOTED AND RECORDED DURING DISASSEMBLY PROCEDURES.

24. Fasten the 2-way valve shaft (33) with the nut (38), tightening it with a 14-mm open end wrench (B-18) (or a 14-mm socket wrench).

 **CAUTION!**

IF USING A TORQUE WRENCH, SELECT A TORQUE SETTING OF 4 - 4.5 Nm.

25. Position the protection cap (28) and tighten the screws (27), using a Phillips head screwdriver (USAG type 322 PH 1).
-

 **CAUTION!**

ENSURE THAT THE EXIT POSITION OF THE TUBES IN THE GROOVE OF THE PROTECTION CAP (28) CORRESPONDS EXACTLY TO THAT NOTED AND RECORDED DURING DISASSEMBLY PROCEDURES.

► **C.4 - REASSEMBLY OF THE BUOYANCY BAG INTERNAL SUPPORTS**

26. Place the O-Ring (32) in the seat of the pneumatic inflator flange (30).
 27. Arrange the O-Rings (32) in the seats of the pneumatic discharge valves flanges (37).
 28. Insert the internal support assemblies in the corresponding seats in the buoyancy bag.
-

 **WARNING!**

IN ORDER TO FACILITATE ASSEMBLY OF THE INTERNAL SUPPORTS OF THE VALVES AND INFLATOR OF THE BUOYANCY BAG, IT IS RECOMMENDED THAT YOU PLACE THE SUPPORTS IN A VERTICAL POSITION (PERPENDICULAR TO THEIR REGULAR OPERATIVE PLANE).

IN BC VERSIONS WITH AN INTERNAL BLADDER (SUCH AS MORPHOS), IT IS ADVISABLE TO CORRECTLY INSERT THE INTERNAL SUPPORTS OF THE VALVES AND THE INFLATOR IN THE BLADDER INSIDE THE BUOYANCY BAG. BEFORE ARRANGING THE EXTERNAL BUOYANCY BAG IN THE HOUSING MAKE SURE THAT THE BLADDER IS INSERTED PROPERLY. DO NOT REMOVE THE BLADDER THROUGH THE HOLE IN THE BUOYANCY BAG IN ORDER TO INSTALL THE SUPPORTS. (Fig. 3).

B - PNEUMATIC DISCHARGE VALVES REASSEMBLY

NOTE THE OPERATIONS DESCRIBED BELOW CAN BE USED TO REASSEMBLE BOTH THE PNEUMATIC DISCHARGE VALVES.

▶ B.1 - REASSEMBLY OF THE SEALING DISK (41)

NOTE IF THE PNEUMATIC/MANUAL DISCHARGE VALVE ("PNEU-MECHANICAL") IS PRESENT AND THE LINE WAS REMOVED, BEFORE ASSEMBLING A NEW LINE IT IS ADVISABLE TO TIE A DOUBLE KNOT AT ONE END, INSERT IT IN THE SEALING DISK SUPPORT (41), DRAW IT THROUGH ANY EYELETS IN THE BUOYANCY BAG, AND AFTER PLACING IT IN THE KNOB (44), FASTEN IT WITH A DOUBLE KNOT AT THE END.

29. Position the sealing disk (40) on the sealing disk support (41).
30. Using a 22-mm open end wrench (B-9) and, if necessary, a 16-mm wrench, fully lock down the disk nut (39) on the disk support (41) without exerting force.

△ CAUTION!

IF USING A TORQUE WRENCH, SELECT A TORQUE SETTING OF 0.6-0.8 Nm.

31. Place the O-Ring (42) in the seat of the sealing disk support (41).

▶ B.2 - REASSEMBLY OF THE VALVE RING (47)

NOTE ONLY PROCEED WITH THE OPERATIONS DESCRIBED BELOW IF THE VALVE RING WAS REMOVED PREVIOUSLY.

32. Place the diaphragm (44) on the diaphragm nut (43).
33. Install the friction washer (45) on the diaphragm (44).
34. Hand tighten the diaphragm nut snugly (43) to the valve ring (47).
35. Insert the sealing disk (41) on the 2-way valve shaft (33).

▶ **B.3 - REASSEMBLY OF THE EXTERNAL RING NUT OF THE PNEUMATIC DISCHARGE VALVES**

 **CAUTION!**

CHECK CAREFULLY THAT THE O-RING (32) IS PROPERLY POSITIONED INSIDE THE SEAT OF THE INNER SUPPORT, AND THAT THE THREADED PART IS COMPLETELY EXTERNAL TO THE BUOYANCY BAG.

36. Position the spring (46) on the sealing disk support (41).
 37. Tighten the valve ring assembly (47) onto the pneumatic valve flange (37), using the special tool (C-3).
-

 **WARNING!**

WHEN LOCKING DOWN THE RING, HOLD THE INNER PART OF THE PNEUMATIC VALVE IN PLACE, TO PREVENT THE INNER SUPPORT FROM ROTATING AND THEREBY DAMAGING THE TUBE INSIDE (Fig. 1).

 **CAUTION!**

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

A - REASSEMBLY OF THE PNEUMATIC INFLATOR

▶ A.1 MALE QUICK COUPLING REASSEMBLY

38. Position the O-ring (17) in the seat of the male quick coupling (18).
39. Arrange the filter (16) over the hole of the male quick coupling (18) and tighten the latter snugly in the central hole of the inflator body (1) using a 14-mm open end wrench (B-18).

CAUTION!

IF USING A TORQUE WRENCH, SELECT A TORQUE SETTING OF 4 - 4.5 Nm.

▶ A.2 - REASSEMBLY OF THE INFLATION BUTTON

 THE INFLATION PISTON CAN BE DISTINGUISHED FROM THE DISCHARGE PISTON BECAUSE ITS END IS COMPLETELY SPHERICAL.

40. Position the two O-Rings (7) in the seats of the inflation piston (19).
41. Place the two O-Rings (5) in the seats of the inflation piston seat (20).
42. Insert the inflation piston (19) in the inflation piston seat (20) making the rounded part of the piston come out of the upper hole in the inflation piston seat (20).
43. Fit the spring (2) on the piston.
44. Tighten the piston seat (20) snugly in the upper hole of the inflator body (1) using a 17-mm open end wrench (B-17).

CAUTION!

IF USING A TORQUE WRENCH, SELECT A TORQUE SETTING OF 4 - 4.5 Nm.

▶ REASSEMBLY OF THE EXHAUST BUTTON

 THE DISCHARGE PISTON CAN BE DISTINGUISHED FROM THE INFLATION PISTON BECAUSE ITS ROUNDED END HAS TWO FLAT, PARALLEL SURFACES.

45. Position the O-Rings (7) and (3) in the seats of the deflation piston (8).
46. Place the two O-Rings (5) in the housings of the deflation piston seat (6).

47. Slide the deflation piston (8) into the deflation piston seat (6) entering from the top hole. The rounded part of the piston will remain outside the hole.
48. Secure the flat surfaces of the piston (8) that protrude from the deflation piston seat with a vise. (fig. 3)
49. Fit the O-ring (3) in the seat of the bushing (4).

△ CAUTION!

APPLY A DROP OF THREAD COMPOUND (SUCH AS LOCTITE 415) ON THE THREADED POINT OF THE DEFLATION PISTON.

50. Screw the deflation button bushing (4) onto the deflation piston, using a 6-mm open end wrench.
51. Position the spring (2) on the bushing (4) and tighten the deflation piston seat (6) snugly in the lower hole of the inflator body (1), using a 17-mm open end wrench (B-17).

△ CAUTION!

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

▶ A.4 - REASSEMBLY OF THE INFLATOR BODY

52. Screw the ring nut (11) to the flange (30) without forcing.
53. Place, without fastening, the inflator body assembly on the flange (30), orienting it correctly.

△ CAUTION!

THE INFLATOR BODY ASSEMBLY MUST BE ORIENTED WITH THE INFLATOR BODY COUPLING (1) POSITIONED AS NOTED AND RECORDED DURING DISASSEMBLY PROCEDURES. (Fig. 4).

54. Keeping the inflator body in this position, tighten the ring nut (11) snugly with the pin wrench (USAG type 282/58-62-65).

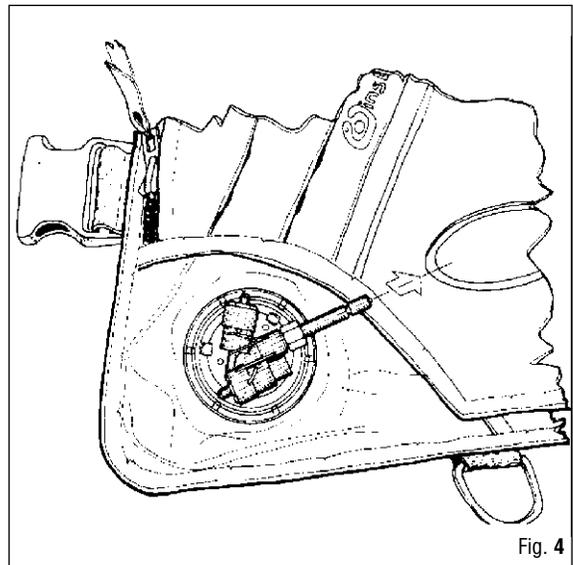


Fig. 4



WARNING!

WHEN SCREWING ON THE RING, HOLD THE INNER PART OF THE PNEUMATIC INFLATOR IN PLACE TO PREVENT THE INNER SUPPORT FROM ROTATING AND THEREBY DAMAGING THE TUBE INSIDE. (Fig. 1)

55. Remove the inflator body.
56. Insert the O-ring (21) in the flange housing (30).
57. Arrange the lower cover (12) on the ring nut (11) and screw the inflator body assembly on the flange (30) with the two screws (15) using a Phillips head screwdriver (USAG type 322 PH 1).
58. Position the inflation (10) and deflation (9) buttons.



IN AIR TRIM VERSIONS WITH GREY AND YELLOW BUTTONS, REASSEMBLE THE BUTTONS OF THE UPPER COVERING ONLY IF THEY WERE REMOVED PREVIOUSLY.

59. Position and tighten the upper cover (13) with the screws (14), using a Phillips head screwdriver (USAG type 322 PH 1).
60. Connect the LP hose to the male coupler (18) of the Pneumatic Inflator.

D - TESTING THE AIR TRIM PNEUMATIC SYSTEM

► PRE-TESTING THE PNEUMATIC INFLATOR



CAUTION!

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

- CP.1) Connect the male quick coupler (18) to a BC hose (INT model) mounted on a 1st stage adjusted to approximately 10 atm.
- CP.2) Open the tank valve.
- CP.3) Press the pistons (inflation and exhaust) to check that air comes out.
- CP.4) 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.

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:

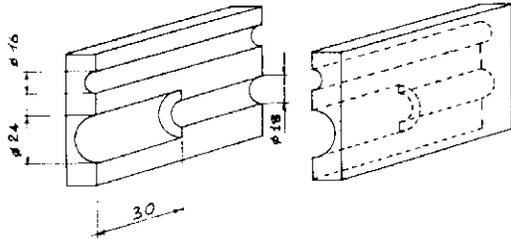
- THE CORRECT FUNCTIONING OF THE INFLATOR BUTTON
(INFLATION OF THE BC).
- THE PERFECT FUNCTIONING OF THE DISCHARGE VALVES
(OPENING AND CLOSING).
- THE SEAL OF THE AIR TRIM SYSTEM WITH THE BUOYANCY
BAG. (LEAVE THE BC INFLATED, AND AFTER ABOUT 2-3
HOURS CHECK WHETHER THERE HAVE BEEN ANY AIR
LEAKS.)

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

Set of special tools in case for repairing Mares Spearguns

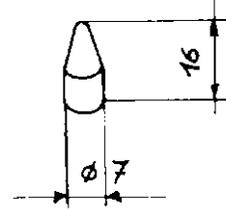
Code 413850

Head and barrel clamping jaws



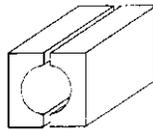
(A-1)
Code 43106101

O-Ring fitting cone
(power adjustment rods)



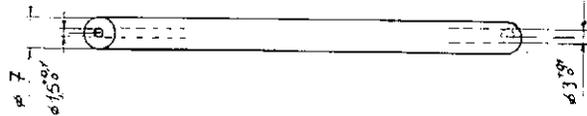
(A-12)
Code 43106112

Tank clamping jaws (all models)



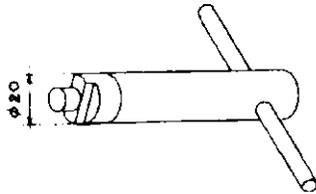
(A-3)
Code 43106103

Connecting plunger positioning rod



(A-13)
Code 43106113

Valve disassembling wrench



(A-4)
Code 43106104

Catch hook positioning rod



(A-16)
Code 43163608 Sten Line
Code 43164209 Cyrano Line

O-Ring fitting cone for spearguns
Insert for barrel plastic insert Cyrano



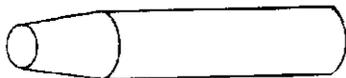
(A-7)
Code 43106107

Assembling tool to fit handle on barrel



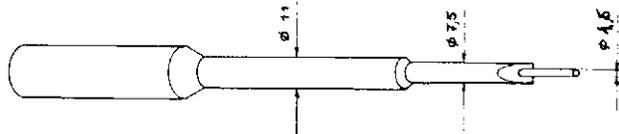
(A-18)
Code 43106118

O-Ring fitting cone for spearguns
Insert for barrel plastic insert
Sten



(A-9)
Code 43106109

Screwdriver for connecting plunger grup screw



(A-22)
Code 43106122

PRESSURIZING

Cyrano pneumatic spearguns can be pressurized using the Mares gun charging yoke (part # 413807) or a Mares hand pump (part # 413806).

POWER LOADER FOR MARES PNEUMATIC GUNS

1. Screw the open end of the high pressure hose into the high pressure port of a first stage regulator (Fig 1).
2. Mount the first stage regulator onto a scuba tank (Fig 2). The tank should be filled to a pressure of at least 30bar/425psi in order to reach the same pressure in the pneumatic gun. A lower tank pressure will result in a lower pressure in the pneumatic gun.



WARNING!

USE ONLY SCUBA TANKS FILLED WITH AIR.

3. Screw the threaded end of the main body of the power loader all the way (finger tight) onto the back of the pneumatic gun (Fig 3A).
4. If a power adjusting system is present, ensure that it is set to maximum power (Fig.3B).



WARNING!

WHEN LOADING THE PNEUMATIC GUN, IT IS VERY IMPORTANT THAT THE POWER ADJUSTING SYSTEM IS SET TO MAXIMUM POWER. NEVER EXCEED THE MAXIMUM PRESSURE OF 30BAR. A PRESSURE IN EXCESS OF 30BAR CAN LEAD TO SERIOUS INJURY OR DEATH AND/OR IT CAN LEAD TO DAMAGE TO THE EQUIPMENT.

5. Keep the power loader turned in such a way that the pressure gauge points away from you, then slowly open the valve on the scuba tank.



WARNING!

PNEUMATIC GUNS ARE PRESSURIZED SYSTEMS. NEVER POINT A PNEUMATIC GUN AT YOURSELF OR AT ANYONE ELSE. FAILURE TO DO SO MAY LEAD TO SERIOUS INJURY OR DEATH.

6. If you want to charge a gun to less than 30bar, close the tank valve when the pressure gauge reaches the desired pressure.
7. You will hear the air hissing as it is gradually charging the gun until the relief valve pops. Charging a 100cm gun takes approximately 30s, different lengths will take proportionally more (longer guns) or less (shorter guns).
8. When you have finished charging the gun, close the tank valve and unscrew the power loader from the back of the gun.



WARNING!

USE WITH MARES PNEUMATIC GUNS ONLY.

► PRESSURIZING USING MARES HAND PUMP (PART # 413806)

WARNING !

ALWAYS PRESSURIZE THE SPEARGUN WITH THE POWER ADJUSTMENT LEVER IN THE MAXIMUM "HIGH" POWER POSITION (FIG. 1). NEVER EXCEED THE MAXIMUM 30 BAR PRESSURE. FAILURE TO PRESSURIZE THE SPEARGUN IN THE MAXIMUM "HIGH" POWER POSITION OR OVER-PRESSURIZATION MAY CAUSE THE SPEARGUN TO RUPTURE WHICH MAY CAUSE SERIOUS INJURY OR DEATH.

1. Set the power adjustment lever (38) to maximum "high" power position (Fig. 2).
2. By hand, thread the hand pump into the inlet valve of the speargun, until the hand pump o-ring seals against the inlet valve body.
3. The following pressure table shows the approximate number of pump strokes required to obtain the pressure values listed.

CYRANO VERSION

DESCRIPTION	PRESSURE IN BAR				
	10	15	20	25	30
	NUMBER OF PUMP STROKES (APPROX.)				
CYRANO 550	125	185	250	330	410
CYRANO 700	150	230	310	390	480
CYRANO 850	210	330	450	580	710
CYRANO 970	260	395	575	755	925
CYRANO 1100	320	510	700	870	1055

SPARK VERSION

DESCRIPTION	PRESSURE IN BAR				
	10	15	20	25	30
	NUMBER OF PUMP STROKES (APPROX.)				
SPARK 550	181	268	363	479	595
SPARK 700	218	334	450	566	696
SPARK 850	305	479	653	841	1030
SPARK 970	377	573	834	1095	1341
SPARK 1100 Pipin	464	740	1015	1262	1530

STEN 2001 VERSION

DESCRIPTION	PRESSURE IN BAR					
	LENGTH (cm)	10	15	20	25	30
	NUMBER OF PUMP STROKES (APPROX.)					
STEN MINIMINI	42	60	130	170	210	240
STEN MINIMINI	58	140	220	340	450	550
STEN MEDI	70	200	280	440	560	700
STEN	84	270	430	580	750	1000
SUPER STEN	100	370	550	750	980	1300

WARNING !

THE NUMBER OF PUMP STROKES LISTED IN THE PRESSURE TABLE REFER TO A COMPLETELY EMPTY SPEARGUN TANK. IF IT IS NOT POSSIBLE TO DETERMINE THE EXISTING PRESSURE IN THE SPEARGUN, ALL PRESSURE MUST BE RELEASED FROM THE SPEARGUN PRIOR TO PRESSURIZING IT. IF THE EXISTING PRESSURE IN THE SPEARGUN IS KNOWN AND IT BECOMES NECESSARY TO ADD PRESSURE, ONLY INCREASE IT THE AMOUNT OF THE DIFFERENCE. FOR EXAMPLE, TO INCREASE THE PRESSURE OF A CYRANO 700 FROM 20 BAR TO 30 BAR, 170 PUMP STROKES ARE REQUIRED. NOT THE FULL 480 PUMP STROKES SHOWN IN THE TABLE. NEVER EXCEED THE MAXIMUM 30 BAR PRESSURE. OVER-PRESSURIZATION MAY CAUSE THE SPEARGUN TO RUPTURE WHICH MAY CAUSE SERIOUS INJURY OR DEATH. PNEUMATIC SPEARGUNS ARE HIGHLY PRESSURIZED. NEVER POINT THE SPEARGUN AT YOURSELF OR ANYONE ELSE. VIOLATION OF THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH.

4. Remove the hand pump from the inlet valve.

Table No. 500	CYRANO SPEARGUNS LINE	Drawing reference No.: F 205 Table updated on 01/09/2003
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Ref. No.	Code	Description
1	A	Head body
2	43163856	Shock absorber , rubber
3	43164207	Shock absorber insert
4	43164200	Nose cone
5	43164206	Head ferrule
6	43164008	Protective cap - head
7	43163968	Rubber ring - shock
8	43164201	Sight insert
11	43169821	Shock line - m 3
11	43169818	Shock line - m. 5
12	43164004	Line retainer for shaft D.
14	43163503	Washer for shaft D. 7
17	N	Piston body
18	46110107	OR 2031
19	N	Oil wiper piston
20	46110208	Special OR
21	43164204	OR bushing
22	46110228	OR 3062
23	43164202	Wishbone internal reinforcement
25	43164225	Cyrano 550 tank
25	43164226	Cyrano 700 tank
25	43164227	Cyrano 850 tank
25	43164228	Cyrano 970 tank
25	43164229	Cyrano 1100 tank
26	43164215	Cyrano 550 barrel
26	43164216	Cyrano 700 barrel
26	43164217	Cyrano 850 barrel
26	43164218	Cyrano 970 barrel
26	43164219	Cyrano 1100 barrel
29	46110245	OR 2106
32	M	Body - inlet valve
33	43164223	Valve cover cap
34	L	Spring - power adjustment
35	L	Rod - power adjustment
36	L	Power adjustment rod bushing
37	46110102	OR 2015
38	43164234	Lever power adjustment
39	L	Power adjustment rod OR comp.
41	H	Handle
42	43163668	Line release, black
43	43163614	Pin - line release

Ref. No.	Code	Description
44	43163313	Catch hook spring
45	43164282	Connecting plunger D. 1.5 - Apnea System.
46	46110201	OR R/1
47	43164284	Housing connecting plunger Apnea System
48	E	Trigger adjustment screw
49	46110242	OR 2-003 Apnea System
50	43163377	Catch hook
51	43164286	Spacing sleeve, Apnea System
52	E	Cyrano trigger body
53	43163337	4 x 23 Pin
57	43163338	4 x 20 Pin
58	43164237	Safety stop
59	43164236	Safety body
60	46110106	OR 106
61	43164232	Soft handle
62	43164233	Pin - handle
65	43163808	3/16 Ball bearing
66	43163807	Spring - inlet valve
67	43164220	Bushing - inlet valve
68	43163635	Seat, one way valve
69	43163636	Housing, one way valve
70	D	Power regulator block
71	46110227	OR 3056
72	43164212	Circlip D. 16 - power regulator
		ASSEMBLIES
A	43164210	Head assembly (1-2-3-5)
D	43164214	Power regulator assembly (68-69-70)
E	43164230	Trigger Assembly Apnea System (48-52)
H	43164287	Handle Assembly Apnea System (38-41-42-43-46-47-61-L)
L	43163937	Power adjustment assembly (34-35-36-37-39)
M	43164222	Valve Assembly Cyrano (32-46-65-66-67)
N	43164211	Piston body assembly D. 16 (17-18-19)
***	43164290	Cyrano/Spark/Stealth complete OR set (18-19-20-22-29-37-46-60-71)
		REMARKS
From registration #94336001 the Apnea System grip is applied For repairs apply new handle.		

Table No. 226	PNEUMATIC CONTROL H.U.B.	Drawing reference No.: J 77 Table updated on 01/09/2003
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Ref. No.	Code	Description
1	46200013	Inflator body
2	47158717	Spring for pistons
3	46110213	O-Ring 2007
4	47158740	Deflation button bushing
5	46110211	O-Ring 2050
6	47158745	Deflation piston seat
7	46110101	O-Ring 2012
8	47158742	Deflation piston
9	46200018	Deflation button
10	46200019	Inflation button
11	46200022	Inflator ring
12	46200020	Lower covering
13	46200021	Upper covering
14	45111004	Screws 2.9 x 19
15	46185075	Screws M 3 x 16
16	47159146	Filter
17	46110106	O-Ring 106
18	47158718	Male quick coupling
19	47158741	Inflation piston
20	47158746	Inflation piston seat
21	47110270	O-Ring 3156
22	41138960	Inflator flange connector
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
29	47158722	Valve shaft
30	46200014	Inflator flange
31	47158707	Radial snap ring diam. 6

Ref. No.	Code	Description
32	46110265	O-Ring 3231
		ASSEMBLIES
\$\$\$	46200127	H.U.B. pneumatic inflator assembly
###	46200141	Internal pneumatic inflator mechanism assembly
		(1-2-3-4-5-6-7-8-15-16-17-18-19-20)
===	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 inflator
		(3-5-7-17-21-23-24-32)
		NOTES
		In the event it becomes necessary to replace a component marked with reference numbers 9-10-12-13 in this table, it is necessary to request all four 9-10-12-13 components given in the H.U.B. Pneumatic Inflator table #233.

Table No. 236	H.U.B. MARES CENTURY	Drawing reference No.: J 88 Table updated on 01/09/2003
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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	47200301	H.U.B. Century 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

Ref.No.	Code	Description
36	47159150	Quick air dump valve
37	47159056	Overpressure cap
38	x x x	Flange for swivel elbow fitting
39	46110210	O-Ring 2056
40	x x x	Swivel elbow fitting
41	47200095	Sticker
43	46200024	Backpack
44	47159136	Black knob
44	47158505	Grey knob
45	47200206	A.T. 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	46200347	Soft 3/8 hose (80 cm)
56	47159681	LP hose assembly - neutral
66	43169822	Cord
96	47159311	Tank protector
97	46110215	O-R 2043
		ASSEMBLIES
***	46200148	Mares H.U.B. interior distributor/hose Service Kit (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)
A	----	H.U.B. pneumatic inflator (tab. no. 233 drg. J 84)
F	----	2 nd Stage Octopus (corresponding model table)
D	----	H.U.B. 1 st Stage (table no. 20 drg. E 11)
E	----	2 nd Stage (corresponding model table)
C	----	Pneumatic discharge valve (tab. n. 227 drg. J78)
B	47159295	MB Fixed backpack belt assembly

Table No. 233	PNEUMATIC CONTROL H.U.B. AVANTGARDE	Drawing reference No.: J 84 Table updated on 01/09/2003
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Ref.No.	Code	Description
1	46200013	Inflator body
2	47158717	Spring for pistons
3	46110213	O-Ring 2007
4	47158740	Deflation button bushing
5	46110211	O-Ring 2050
6	47158745	Deflation piston seat
7	46110101	O-Ring 2012
8	47158742	Deflation piston
9	47200298	Deflation button (yellow)
10	47200299	Inflation button (gray)
11	46200022	Inflator closure ring
12	47200297	Lower covering
13	47200296	Upper covering
14	45111004	Screws 2.9 x 19
15	46185075	Screws M 3 x 16
16	47159146	Filter
17	46110106	O-Ring 106
18	47158718	Male quick coupling
19	47158741	Inflation piston
20	47158746	Inflation piston seat
21	47110270	O-Ring 3156
22	41138960	Inflator flange connector
23	46110102	O-Ring 2015
24	47110272	O-Ring 3 x 1
25	===	Air connector
27	45111003	Screws 2.9 x 9.5

Ref.No.	Code	Description
28	46200025	Protection cap
29	47158722	Valve shaft
30	46200014	Inflator flange
31	47158707	Radial snap ring diam. 6
32	46110265	O-Ring 3231
		ASSEMBLIES
\$\$\$	46200127	H.U.B. pneumatic inflator assembly
###	46200141	Internal pneumatic inflator mechanism assembly (1-2-3-4-5-6-7-8-15-16-17-18-19-20)
===	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 inflator (3-5-7-17-21-23-24-32)