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## MARES SERVICE MANUAL CONTENTS

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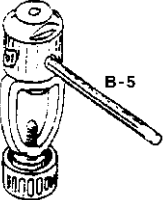
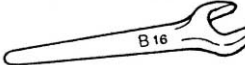

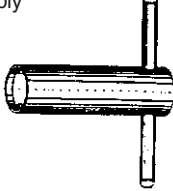


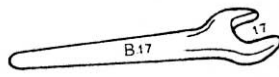
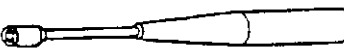

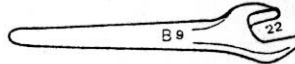

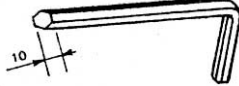
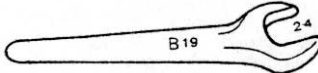
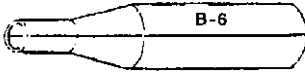
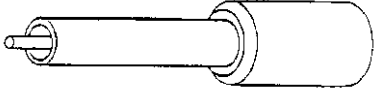
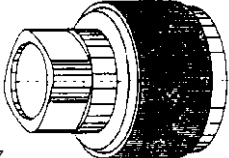
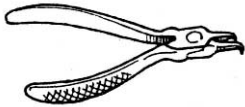
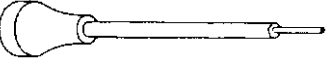
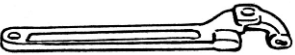

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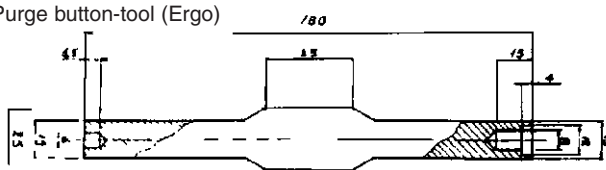
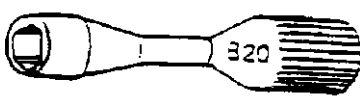
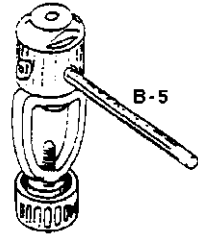
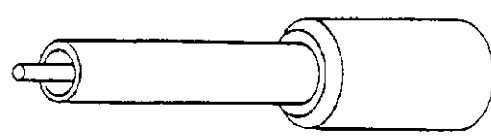

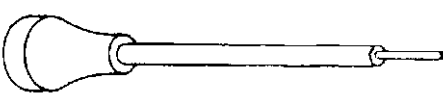
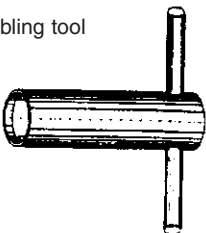
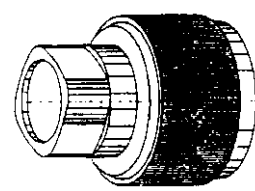


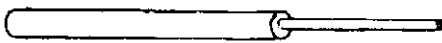
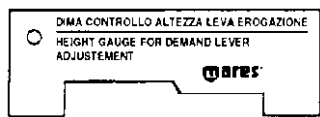

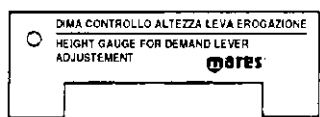
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<p>1<sup>st</sup> stage disassembling tool</p>  <p>(B-5) Code 46106205</p>		<p>Wrench for 1<sup>st</sup> stage diaphragm retaining nut</p>  <p>(B-16) Code 46106216</p>	
<p>MR 02-1<sup>st</sup> stage seat connector disassembly</p>  <p>(B-11) Code 46106211</p>		<p>Wrench for 1<sup>st</sup> stage hose connector</p>  <p>(B-18) Code 46106218</p>	
<p>Voltrex 2<sup>nd</sup> stage adjustment tool</p>  <p>(B-4) Code 46106204</p>	<p>Wrench for 2<sup>nd</sup> stage connector and hose (n°2)</p>  <p>(B-17) Code 46106217</p>	<p>Demand lever adjustment tool</p>  <p>(B-12) Code 46106212</p>	
<p>Wrench first stage plug MR 22</p>  <p>(B-8) Code 46106208</p>	<p>Wrench 2nd stage hose connector Nikos</p>  <p>(B-9) Code 46106209</p>	<p>Demand lever adjustment tool</p>  <p>(B-20) Code 46106220</p>	
<p>1<sup>st</sup> stage adjustment tool Beta 2nd stage plug</p>  <p>(B-13) Code 46106213</p>	<p>Wrench 2nd stage hose connector BETA (n°2)</p>  <p>(B-19) Code 46106219</p>	<p>2<sup>nd</sup> stage demand lever assembling tool inserter OR</p>  <p>(B-6) Code 46106206</p>	
<p>HP seat-disassembling tool MR 22</p>  <p>(B-21) Code 46106221</p>	<p>Cover disassembly tool Akros-Nikos 2<sup>nd</sup> stages</p>  <p>(B-7) Code 46106207</p>	<p>Snap ring plier 1<sup>st</sup> stage</p>  <p>(B-14) Code 46106214</p>	
<p>R 2 piston seat-disassemblg tool</p>  <p>(B-22) Code 46106222</p>	<p>Wrench for R 2 first stage cap</p>  <p>(B-23) Code 46106223</p>	<p>Special tool for mounting the Proton 2<sup>nd</sup> stage valve</p>  <p>(B-36) Code 46200383</p>	

Set of special tools in case for repairing regulators and BCs.		Code 416901
<p>Purge button-tool (Ergo)</p>  <p>Code 47106190</p>	<p>Demand lever adjustment tool</p>  <p>(B-20) Code 46106220</p>	
<p>1st stage disassembling tool</p>  <p>(B-5) Code 46106205</p>	<p>HP seat-disassembling tool MR 22</p>  <p>(B-21) Code 46106221</p>	
<p>2nd stage demand-lever assembling tool Insert O-ring</p>  <p>(B-6) Code 46106206</p>	<p>R 2 piston seat disassembling tool</p>  <p>(B-22) Code 46106222</p>	
<p>MR 02-1st stage seat connector disassembling tool</p>  <p>(B-11) Code 46106211</p>	<p>Cover disassembling tool Akros-Nikos</p>  <p>(B-7) Code 46106207</p>	
<p>Demand lever adjustment tool</p>  <p>(B-12) Code 46106212</p>	<p>Gauge for demand lever Akros-Nikos</p>  <p>Code 46106230</p>	
<p>Special tool for LP inflator valve</p>  <p>(B-12) Code 46106212</p>	<p>Gauge for demand lever Voltrex-Beta</p>  <p>Code 46106231</p>	
<p>Special tool for mounting the Proton 2<sup>nd</sup> stage valve</p>  <p>(B-36) Code 46200383</p>	<p>Gauge for demand lever 2<sup>nd</sup> stage Abyss Turbo Flow</p>  <p>Code 46200260</p>	



## 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 retaining nut (17) 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 retaining nut (17).
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.



**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.

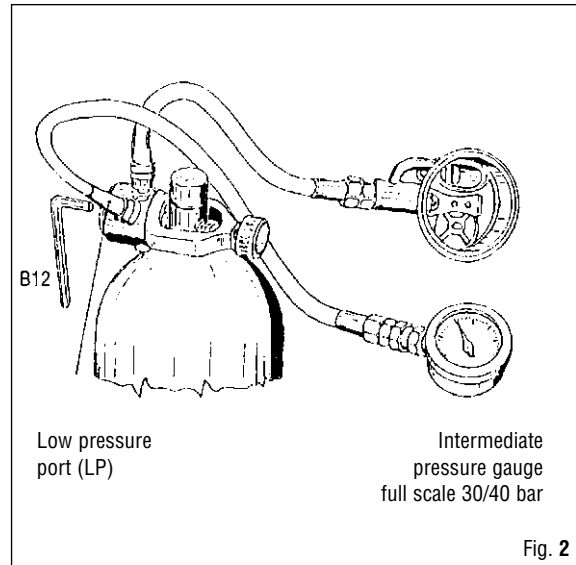
15. After adjusting the second stage if required, close the tank valve, release the air using the second stage purge button, and remove the pressure gauge and the second stage.
16. Set the first stage in an inclined position (5-10 degrees) with the open end of the retaining nut facing upward.
17. Fill 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.



**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).

**NOTE !**

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 WITH THE PRESSURE SET PREVIOUSLY, REPEAT CWD KIT INSTALLATION PROCEDURES.

25. Remove the LP pressure gauge.

Table No.19	<b>ABYSS FIRST STAGE</b>	Drawing reference No.: E 2 table updated on 01/09/2003
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Ref. N.	Code	Description
1	<b>A</b>	1st Stage body with DFC port
2	46185015	Snap ring Int. D. 13
3	46185211	Yoke
4	<b>D</b>	HP chamber
5	46185038	Backup ring
6	46110101	OR 2012
6	46110401	OR 2012 Viton 006-9707
7	46186205	Yoke retainer nut
8	46185011	Poppet spring
9	46200276	1st stage poppet (Pebax) 2001 ass.
12	46186214	Poppet pin
13	46186213	Poppet button
14	46185022	Diaphragm
15	46185034	Spring base plate
16	46185023	Diaphragm spring
17	46186219	Retaining nut
18	46185028	Spring adjusting nut
19	46110106	OR 106
19	46110402	OR 106 Viton 610-9707
20	46185204	3/8" UNF Port plug
22	46186202	Tapered sintered filter
23	46110117	OR 115
23	46110406	OR 115 Viton 614-9707
24	46185010	Dust cap
25	46184079	Yoke knob
48	46183050	200 BAR DIN connector body
48	46183049	300 BAR DIN connector body
49	<b>F</b>	DIN 200 BAR threaded locking ring
49	<b>F</b>	DIN 300 BAR threaded locking ring
52	46110108	OR 108
52	46110404	OR 108 Viton 611-9754
53	46185205	7/16" HP port plug
56	46183053	DIN connector filter D. 9
57	<b>I</b>	CWD body
58	46185301	CWD Diaphragm
59	<b>I</b>	CWD Locking ring
61	46185013	Filter spring
62	46183013	DIN connector dust cap

Ref. N.	Code	Description
68	46183052	Pentagonal spring for DIN connector D. 12
69	46186218	Shock ring
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707
74	46110107	OR 2031
74	46110403	OR 2031 Viton 011-9707
75	46186216	1st Stage poppet seat
76	46186210	HP chamber spring
79	<b>F</b>	DIN connector spacer bushing
80	46186206	Anti-drag head
81	46186208	1st Stage port plug
89	46184324	ABYSS Sticker
148	46184315	"EN 250 - 200 bar" Sticker
149	46184316	"MARES" Sticker
		<b>ASSEMBLIES</b>
<b>A</b>	46200106	1st stage assembly ABYSS 2000
<b>A</b>	< 46185988 >	1st stage assembly ABYSS DIN
<b>D</b>	46185210	HP Chamber assembly (4-5-6)
<b>F</b>	416800 200 NX	200 BAR DIN connector assembly (23-48-49-56-62-68-71-79)
<b>F</b>	416800 300 NX	connector assembly DIN 300 BAR (23-48-49-56-62-68-71-79)
<b>I</b>	416851	ABYSS CWD KIT
<b>** *</b>	46186152	Service kit INT 1st Stage 2/22/16/TP/D16/S40 (2-5-6-19-22-52-71-74)
<b>** *</b>	46186151	Service kit DIN 1st Stage 32/22/16/TP/D16 (5-6-19-23-52-56-68-71-74)
<b>** *</b>	46185167	Service kit Ruby INT VITON 1st Stage/32/22/16/D16 (2-5-6-19-22-52-71-74)
<b>** *</b>	46185168	DIN VITON 1st Stage Ruby/32/22/16/D16 Service Kit (5-6-19-23-52-56-68-71-74)
		<b>ACCESSORIES</b>
98	46186207	1/2 UNF Port plug
97	46110215	OR 2043

Table No 21	<b>V 32 FIRST STAGE</b>	Drawing reference No.: E 12 Table updated on 01/09/2003
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Ref.N.	Code	Description
1	<b>A</b>	V 32 1st Stage Body with DFC port
2	46185015	Snap ring Int. D. 13
3	46186270	Sandblasted yoke
4	<b>D</b>	HP chamber
5	46185038	Backup ring
6	46110101	OR 2012
6	46110401	OR 2012 Viton 006-9707
7	46186205	Yoke retainer nut
8	46186306	Poppet spring
9	46200175	SCS 1st Stage poppet
12	46186214	Poppet pin
13	46186213	Poppet button
14	46185022	Diaphragm
15	46185034	Spring base plate
16	46185023	Diaphragm spring
17	46186268	Sandblasted retaining nut
18	46185028	Spring adjusting nut
19	46110106	OR 106
19	46110402	OR 106 Viton 610-9707
20	46185204	3/8" UNF Port plug
22	46186202	Tapered sintered filter
23	46110117	OR 115
23	46110406	OR 115 Viton 614-9707
24	46185010	Dust cap
25	46184079	Yoke knob
48	46183050	200 BAR DIN connector body
48	46183049	300 BAR DIN connector body
49	<b>F</b>	DIN 200 BAR threaded locking ring
49	<b>F</b>	DIN 300 BAR threaded locking ring
52	46110108	OR 108
52	46110404	OR 108 Viton 611-9754
53	46185205	7/16" HP port plug
56	46183053	DIN connector filter D. 9
57	<b>I</b>	CWD body
58	46185301	CWD Diaphragm
59	<b>I</b>	CWD Locking ring
61	46185013	Filter spring
62	46183013	DIN connector dust cap

Ref.N.	Code	Description
68	46183052	Pentagonal spring for DIN connector D. 12
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707
74	46110107	OR 2031
74	46110403	OR 2031 Viton 011-9707
75	46186249	SCS poppet seat
76	46186210	HP chamber spring
79	<b>F</b>	DIN connector spacer bushing
80	46186206	Anti-drag head
81	46186208	1st Stage port plug
148	46184315	" EN 250 " Yoke sticker
176	46200351	Oval Sticker
177	46200368	V 32 bottom casing
178	46200367	V 32 top casing
		<b>ASSEMBLIES</b>
<b>A</b>	46200405	V 32 1st Stage assembly
<b>D</b>	46185210	HP Chamber assembly (4-5-6)
<b>F</b>	416800 200 NX	200 BAR DIN connector assembly (23-48-49-56-62-68-71-79)
<b>F</b>	416800 300 NX	300 BAR DIN connector assembly (23-48-49-56-62-68-71-79)
<b>I</b>	416851	CWD KIT
<b>***</b>	46186152	Service kit INT 1st Stage 2/22/16/TP/D16/S40 (2-5-6-19-22-52-71-74)
<b>***</b>	46186151	Service kit DIN 1st Stage 32/22/16/TP/D16 (5-6-19-23-52-56-68-71-74)
<b>***</b>	46185167	Service kit Ruby INT VITON 1st Stage/32/22/16/D16 (2-5-6-19-22-52-71-74)
<b>***</b>	46185168	Service kit Ruby DIN VITON 1st Stage/32/22/16/D16 (5-6-19-23-52-56-68-71-74)
		<b>ACCESSORIES</b>
98	46186207	1/2 UNF Port plug
97	46110215	OR 2043

Table No. 8	<b>FIRST STAGE V 16 - V 16 NITROX</b>	Drawing reference No.: E 6 Table updated on 01/09/2003
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Ref. N.	Code	Description
1	<b>A</b>	DFC V 16 1st St. body
2	46185015	Snap ring Int. D. 13
3	46185211	V 16 Yoke
4	<b>D</b>	H.P. chamber
5	46185038	Backup ring
6	46110101	OR 2012
6	46110401	OR 2012 Viton 006-9707
7	46186241	Yoke retainer nut
8	46186306	V 16 Poppet spring
9	46200175	SCS 1st Stage poppet
12	46186214	Poppet pin
13	46185032	Poppet button
14	46185022	Diaphragm
15	46185034	Spring base plate
16	46185023	Diaphragm spring
17	46186219	Retaining nut
18	46185028	Spring adjuster nut
19	46110106	OR 106
19	46110402	OR 106 Viton 610-9707
20	46185204	3/8" UNF Port plug
22	46186202	Tapered sintered filter
23	46110117	OR 115
23	46110406	OR 115 Viton 614-9707
24	46185010	V 16 Dust cap
25	46184079	V 16 Yoke knob
48	46183036	200 BAR DIN connector body
48	46183035	300 BAR DIN connector body
49	<b>F</b>	Threaded locking ring (DIN) 200 BAR
49	<b>F</b>	Threaded locking ring (DIN) 300 BAR
52	46110108	OR 108
52	46110404	OR 108 Viton 611-9707
53	46185205	H.P. 7/16" UNF Port plug
56	46183053	DIN connector filter D.9
57	<b>I</b>	C.W.D. body
58	46185301	C.W.D. diaphragm
59	<b>I</b>	C.W.D. ring nut

Ref. N.	Code	Description
61	46185013	Filter spring
62	46183013	DIN connector dust cap
68	46183052	Pentagonal spring for DIN connector D. 9
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707
74	46110107	OR 2031
74	46110403	OR 2031 Viton 011-9707
76	46186210	HP chamber spring
79	<b>F</b>	DIN connector spacer bushing
80	46186206	Anti-drag head
81	46186208	Port plug
108	46185266	C.W.D. Protection cap
109	46186239	Tampographed V 16 SCS unit protection
110	46186245	Tampographed protection cap
115	46186249	SCS poppet seat (V 16)
148	46184315	"EN 250 - 200 bar" Sticker
149	46184316	"MARES" Sticker
		<b>ASSEMBLIES</b>
<b>A</b>	46200109	V 16 1st Stage assembly
<b>D</b>	46185210	H.P. chamber assembly (4-5-6)
<b>D</b>	46186259	H.P. chamber assembly (4-5-6) Nitrox
<b>F</b>	416803 200 NX	Connector assembly DIN 200 BAR Nitrox ( 23-48-49-56-62-68-71-79 )
<b>F</b>	416803 300 NX	300 BAR DIN Nitrox connector assembly ( 23-48-49-56-62-68-71-79 )
<b>I</b>	416851	CWD KIT
***	46186152	Service kit INT 1st Stage 2/22/16/TP/D16/S40 ( 2-5-6-19-22-52-71-74 )
***	46186151	Service kit DIN 1st Stage 32/22/16/TP/D16 ( 5-6-19-23-52-56-68-71-74 )
***	46185167	Service kit Ruby INT VITON 1st Stage/32/22/16/D16 ( 2-5-6-19-22-23-52-56-68-71-74 )
***	46185168	Service kit Ruby DIN VITON 1st Stage/32/22/16/D16 ( 5-6-19-23-52-56-68-71-74 )

Table No. 12	<b>MR 12 DFC FIRST STAGE MR 12 NITROX</b>	Drawing reference No: E 8 Table updated on 01/09/2003
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Ref.N.	Code	Description
1	<b>A</b>	V 12 Body
2	46185015	Snap ring INT.D. 13
3	46185211	MR 12 Yoke
4	<b>D</b>	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	<b>F</b>	Connector body (DIN) 200 BAR
48	<b>F</b>	Connector body (DIN) 300 BAR
49	<b>F</b>	DIN 200 BAR threaded locking ring
49	<b>F</b>	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	<b>I</b>	CWD body
58	46185301	CWD Diaphragm
59	<b>I</b>	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
		<b>ASSEMBLIES</b>
<b>A</b>	46200406	1st stage assembly MR 12 Long
<b>D</b>	46185210	H.P. chamber assembly ( 4-5-6 )
<b>D</b>	46186259	H.P. chamber assembly ( 4-5-6 ) Nitrox
<b>F</b>	416804 200 NX	200 BAR DIN Nitrox connector assembly ( 23-48-49-50-51-62 )
<b>F</b>	416804 300 NX	300 BAR DIN Nitrox connector assembly ( 23-48-49-50-51-62 )
<b>I</b>	416851	CWD Kit
<b>***</b>	46186150	Service kit INT/DIN 1st St. 12/LONG/D12/S30 ( 2-5-6-19-22-23-50-52-74 )
<b>***</b>	46186154	Service kit INT/DIN VITON 1st St. 12/LONG ( 2-5-6-19-22-23-50-52-74 )
		<b>ACCESSORIES</b>
----	415861	CPL. INT/DIN yoke connector (200 BAR)
----	46179258	INT/DIN nut connector assembly
----		Port plug external DIN thread

Table No. 22	<b>MR 12 LONG FIRST STAGE</b>	Drawing reference No: E 13 Table updated on 01/09/2003
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Ref.N.	Code	Description
1	<b>A</b>	V 12 Body
2	46185015	Snap ring INT.D. 13
3	46185211	MR 12 Yoke
4	<b>D</b>	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	<b>F</b>	Connector body (DIN) 200 BAR
48	<b>F</b>	Connector body (DIN) 300 BAR
49	<b>F</b>	DIN 200 BAR threaded locking ring
49	<b>F</b>	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	<b>I</b>	CWD body
58	46185301	CWD Diaphragm
59	<b>I</b>	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
		<b>ASSEMBLIES</b>
<b>A</b>	46200406	1st stage assembly MR 12 Long
<b>D</b>	46185210	H.P. chamber assembly ( 4-5-6 )
<b>D</b>	46186259	H.P. chamber assembly ( 4-5-6 ) Nitrox
<b>F</b>	416804 200 NX	200 BAR DIN Nitrox connector assembly ( 23-48-49-50-51-62 )
<b>F</b>	416804 300 NX	300 BAR DIN Nitrox connector assembly ( 23-48-49-50-51-62 )
<b>I</b>	416851	CWD Kit
<b>***</b>	46186150	Service kit INT/DIN 1st St. 12/LONG/D12/S30 ( 2-5-6-19-22-23-50-52-74 )
<b>***</b>	46186154	Service kit INT/DIN VITON 1st St. 12/LONG ( 2-5-6-19-22-23-50-52-74 )
		<b>ACCESSORIES</b>
----	415861	CPL. INT/DIN yoke connector (200 BAR)
----	46179258	INT/DIN nut connector assembly
----		Port plug external DIN thread



Table No. 16	<b>FIRST STAGE R2 DFC - FIRST STAGE R2 NITROX</b>	Drawing reference No.: E 7 Table updated on 01/09/2003
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Ref. N.	Code	Description
1	<b>A</b>	1st 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	<b>F</b>	Connector body (DIN) 200 BAR
48	<b>F</b>	Connector body (DIN) 300 BAR
49	<b>F</b>	DIN 200 BAR threaded locking ring
49	<b>F</b>	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
52	46110108	OR 108
52	46110404	OR 108 Viton 611-9707
53	46185205	7/16" UNF HP port plug

Ref. N.	Code	Description
61	46185013	Filter spring
62	46183013	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	1st st. sticker R2
148	46184315	EN 250 - 200 bar "Sticker"
149	46184316	"MARES" Sticker
		<b>ASSEMBLIES</b>
<b>A</b>	46200112	1st stage assembly R2
<b>F</b>	416804 200 NX	200 BAR DIN Nitrox connector assembly ( 23-48-49-50-51-62 )
<b>F</b>	416804 300 NX	300 BAR DIN Nitrox connector assembly ( 23-48-49-50-51-62 )
<b>***</b>	46185323	Service kit for 1st St. R2/D2/S10 ( 2-19-22-23-50-52-86-88 )
<b>***</b>	46186155	Nitrox INT/DIN 1st Stage (VITON O-Ring) service kit ( 2-19-22-23-50-52-86-88 )

Table No. 104	<b>ABYSS T.F. SECOND STAGE OCTOPUS ABYSS</b>	Drawing reference No.: E19 Table updated on 01/09/2003
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Ref.N.	Code	Description
19	46110215	OR 2043
19	46110415	OR 2043 Viton 013-9754
21	46200204	Seat connector
26	46184449	Black 1/2" Abyss super/flow hose
26	46186093	Yellow octopus super/flow hose
27	46110205	OR 2025
27	46110411	OR 2025 Viton 010-9754
28	46184282	Case assembly connector
29	46110211	OR 2050
29	46110413	OR 2050 Viton
30	46186024	Second stage poppet
31	46185057	Poppet spring
32	46186025	2nd stage case
33	46185051	Demand lever nut
34	46185049	Washer
35	46185104	Demand lever (CWD)
36	46186029	Black diaphragm
37	46185073	Ring clamp
38	46185075	Ring clamp screw 3 x 16 stainless

Ref.N.	Code	Description
40	46184006	Exhaust valve
41	46186310	Exhaust tee
43	47157984	Mouthpiece clamp
44	46185086	Black mouthpiece
45	46179902	Black 1st stage hose protector
46	46186094	Black 2nd Stage hose protector
47	46184062	Poppet seat
54	46186090	mouthpiece plug Octopus
		<b>ASSEMBLIES</b>
<b>G</b>	46200121	Second Stage Assembly ABYSS
<b>39</b>	46186043	Cover assembly ABYSS TF Octopus
<b>39</b>	46186049	Cover assembly Black ABYSS TF
<b>***</b>	46186160	2nd St service kit AVO/Classic Pro/Tech ( 19-27-29-33-40-43-47)
<b>***</b>	46185166	ABYSS Nitrox 2nd Stage Service Kit (VITON O-Ring) ( 19-27-29-33-40-43-47)

**AXIS SERIES SECOND  
STAGES**

**mares<sup>®</sup>**

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

 **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).

**PROTON SERIES  
SECOND STAGES**

**mares<sup>®</sup>**

**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.



Table No. 114	<b>PROTON SECOND STAGE PROTON OCTOPUS</b>	Drawing reference No.: E 24 Table updated on 01/09/2003
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Ref. No.	Code	Description
19	46110106	OR 106
19	46110402	OR 106 Viton 610-97507
21	46200204	Seat connector
26	46200254	Soft 3/8 hose
26	46200349	Soft 3/8 hose - yellow
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	46200330	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	46200315	Proton inspection cap
43	47157984	Mouthpiece clamp
44	46185086	Proton octopus black mouthpiece
44	46200366	2k2 Mouthpiece
46	46200323	Proton hose protector
47	46184062	Poppet seat
54	46186090	mouthpiece plug Octopus
63	46184289	Cover safety catch
64	46200322	2nd St. adjustment plug
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707
78	46200321	Diaphragm holding ring

Ref. No.	Code	Description
92	46184221	Valve body
101	+++	Proton cover nut
103	+++	Proton cover button
104	46200339	Button sticker
164	---	Rotation stop washer
165	46200334	Case assembly bushing
171	46110110	OR 2037
171	46200298	OR 2037 Viton
172	+++	Proton octopus 2nd st. rubber cover
172	+++	Proton octopus 2nd st. rubber cover
173	46200340	Proton case sticker
174	46200361	Exhaust tee cap fastening pin
		<b>ASSEMBLIES</b>
<b>G</b>	46200411	Proton Second Stage Assembly
<b>G</b>	46200412	Proton NX 2nd stage assembly
	415335	2K2 regulator mouthpiece kit
+++	46200416	Proton assembly cover
		(101 - 103 - 104 - 172)
+++	46200415	Proton NK assembly cover
		(101 - 103 - 104 - 172)
+++	46200413	Proton octopus assembly cover
		(101 - 103 - 104 - 172)
***	46200409	Proton/Proton XL/Ice 2nd St service kit
		(19 - 27 - 33 - 40 - 43 - 47 - 71 - 171)
***	46200408	Proton NX/Proton XL NX/Ice NX 2nd St. service kit
		(19 - 27 - 33 - 40 - 43 - 47 - 71 - 171)

Table No. 115	<b>PROTON XL SECOND STAGE</b>	Drawing reference No: E 25 Table updated on 04/02/2002
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Ref.N.	Code	Description
19	46110106	OR 106
19	46110402	OR 106 Viton 610-97507
21	46200204	Seat connector
26	46200346	Soft 1/2" hose
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	46200330	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	46200315	Proton inspection cap
43	47157984	Mouthpiece clamp
44	46200366	2k2 Mouthpiece
46	46200323	Proton hose protector
47	46184062	Poppet seat
54	46186090	mouthpiece plug Octopus
63	46184289	Cover safety catch
64	46200379	2nd St. adjustment plug
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707

Ref.N.	Code	Description
78	46200321	Diaphragm holding ring
92	46184221	Valve body
101	+++	Proton cover nut
103	+++	Proton cover button
104	46200339	Button sticker
164	---	Rotation stop washer
165	46200334	Case assembly bushing
171	46110110	OR 2037
171	46200298	OR 2037 Viton
172	+++	Rubber cover
173	46200341	Proton case sticker
174	46200361	Exhaust tee cap fastening pin
175	46200320	Cabochon
		<b>ASSEMBLIES</b>
<b>G</b>	46200410	Proton XL 2nd stage assembly
	415335	2K2 regulator mouthpiece kit
+++	46200414	Proton XL assembly cover
		(101 - 103 - 104 - 172 - 175)
***	46200409	Proton/Proton XL/Ice 2nd St service kit
		(19 - 27 - 33 - 40 - 43 - 47 - 71 - 171)
***	46200408	Proton NX/Proton XL NX/Ice NX 2nd St. service kit
		(19 - 27 - 33 - 40 - 43 - 47 - 71 - 171)

Drawing No. E 26	<b>PROTON ICE SECOND STAGE - PROTON ICE OCTOPUS</b>	Drawing updated on 12/09/2002
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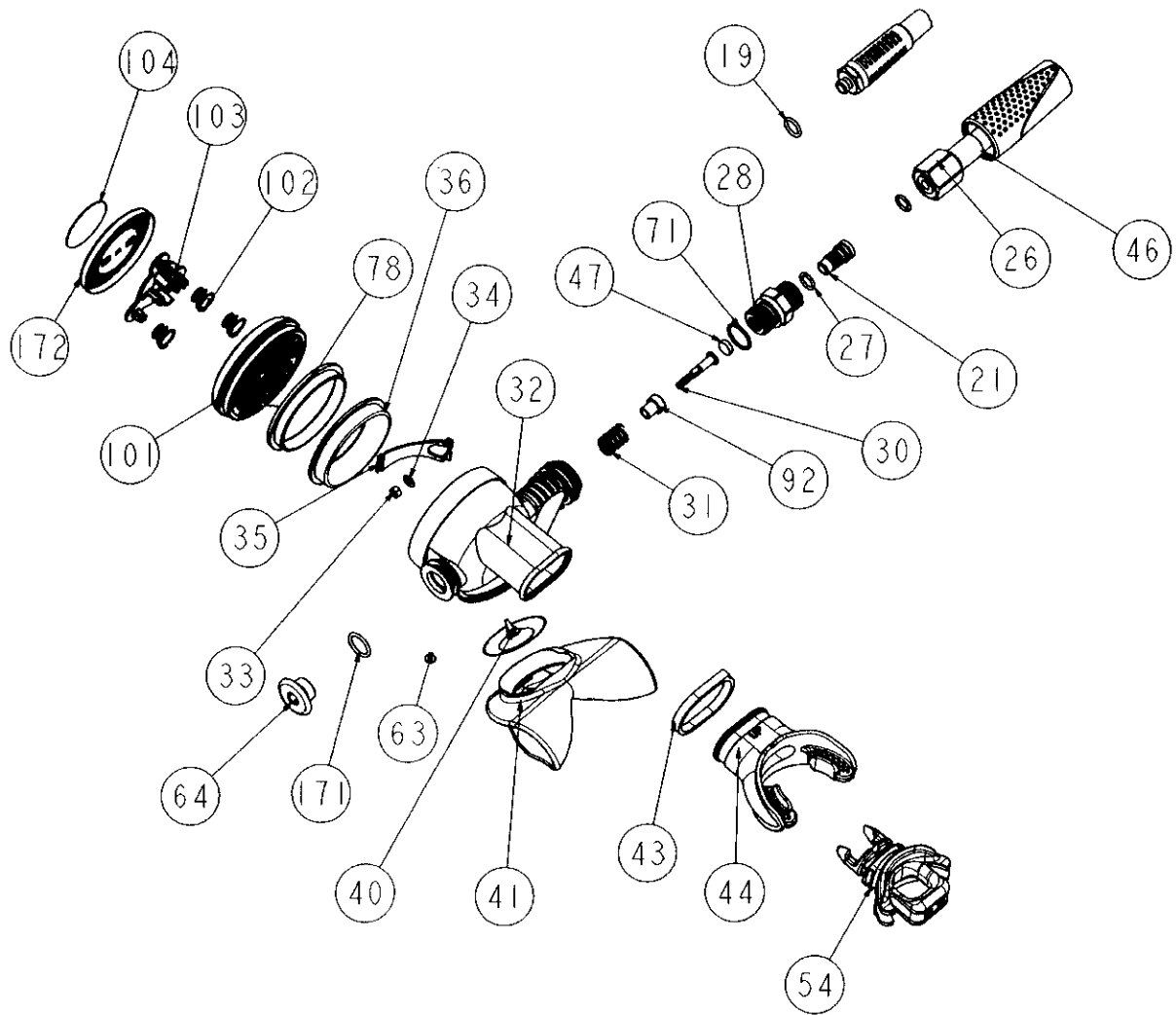


Table No. 116	<b>PROTON ICE SECOND STAGE - PROTON ICE OCTOPUS</b>	Drawing reference No: E 26Table updated on 01/09/2003
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Ref. No.	Code	Description
19	46110106	OR 106
19	46110402	OR 106 Viton 610-97507
21	46200204	Seat connector
26	46200346	Soft 1/2" hose
26	46200349	Soft 3/8" hose - yellow
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	46185083	Octopus mouthpiece plug
63	46184289	Cover safety catch

Ref. No.	Code	Description
64	46200322	2nd 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
		<b>ASSEMBLIES</b>
<b>G</b>	46200465	Proton Ice second stage assembly
<b>+++</b>	46200464	Proton Ice assembly cover
		(101 - 102 - 103 - 104 - 172 )
<b>***</b>	46200409	Proton/Proton XL/Ice 2nd St service kit
		(19 - 27 - 33 - 40 - 43 - 47 - 71 - 171)
<b>***</b>	46200408	Proton NX/Proton XL NX/Ice NX 2nd St. service kit
		(19 - 27 - 33 - 40 - 43 - 47 - 71 - 171)

## FINAL CHECKS AND ADJUSTMENTS

The checks described below are designed to verify the perfect operation of the regulator. The specified values are applicable to regulators subject to annual service.

(Fig. 1)

CRACKING PRESSURE VALUES FOR SECOND STAGES		
MODEL	Inch of H <sub>2</sub> O	cm of H <sub>2</sub> O
PRIMARY SECOND STAGE	1 - 1.5	2.5 - 3.8
OCTOPUS SECOND STAGE	1.2 - 1.6	3.0 - 4

1. Position the regulator on the air valve (of a test bench or tank).
2. Using the laboratory Test Bench (cod. 416921) or the portable Test Bench (cod. 416922), after calibrating the first stage, breath in through the mouthpiece and read the "cracking" pressure (value required to trigger air delivery) on the U gauge, at the instant when the gauge detects a drop in the intermediate pressure.

### WARNING !

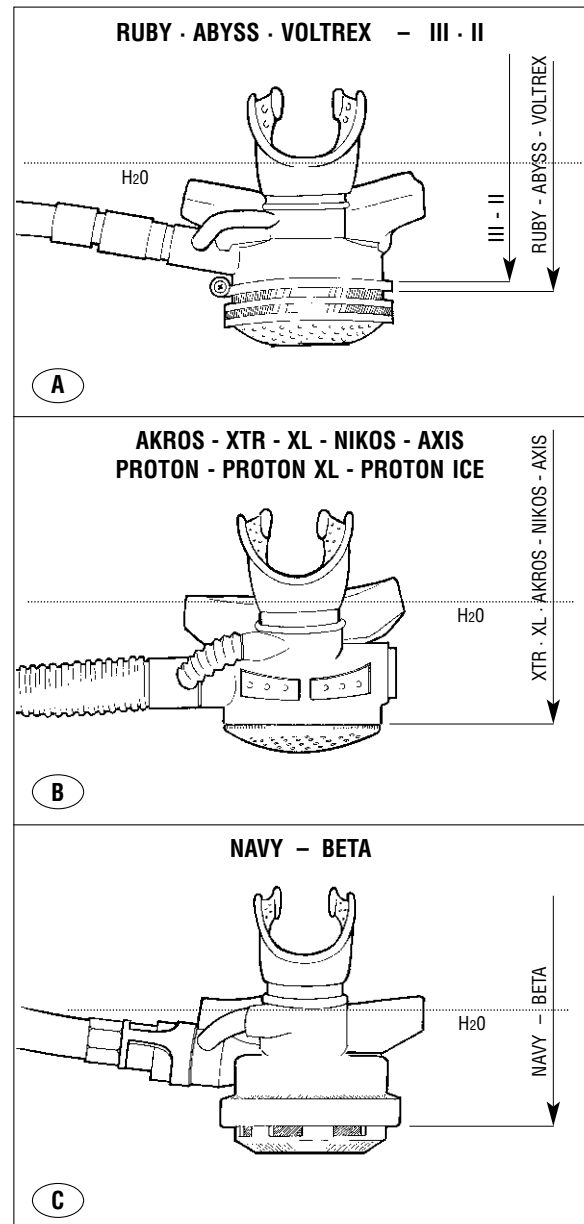
IN THE ABSENCE OF A TEST BENCH IT IS POSSIBLE TO RUN AN APPROXIMATE CHECK ON THE CRACKING PRESSURE USING A BASIN OF WATER AND FOLLOWING THE PROCEDURE BELOW:

- a. Slowly submerge the second stage in the water with the mouthpiece facing up, without allowing water to go inside.
- b. When the water level, measured on the mouthpiece connector with reference to the point indicated in the diagram (Fig. 2), falls between the cracking values indicated in the table (Fig. 1), the air must start to flow.

SECOND STAGE MODEL	POINT OF REFERENCE
RUBY - ABYSS - VOLTREX	STARTING FROM AND INCLUDING THE RING CLAMP (37) (A)
AKROS - XTR - XL - NIKOS - AXIS - PROTON - PROTON XL - PROTON ICE	STARTING FROM THE SECOND STAGE CASE (32) (B)
III° - II°	STARTING FROM AND EXCLUDING THE RING CLAMP (37) (A)
NAVY - BETA	STARTING FROM AND INCLUDING THE COVER RING (60) (C)

3. If the cracking pressure does not fall between the values specified in the table, proceed as follows:

Fig. 1



- a. If the cracking pressure is **greater**, it is necessary to reduce the loading on the spring.
  - If the second stage is equipped with the connector (28) with adjustable seat (21), reduce the projection using Allen wrench (B-4).
  - If the second stage does not permit adjustment of the loading, the spring (31) must be replaced.
  
- b. If the cracking pressure is **lower**, it is necessary to increase the loading on the spring.
  - If the second stage is equipped with the connector (28) with adjustable seat (21), increase the projection (max. 3.8 mm) using an Allen wrench (B-4).
  - If the second stage does not permit adjustment of the loading, the spring (31) must be replaced.

**WARNING!**

AFTER CARRYING OUT THE OPERATIONS DESCRIBED IN STEP (3), ALWAYS REPEAT THE ADJUSTMENT OF THE DEMAND LEVER (35) AS DESCRIBED IN THE MANUALS.

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4. Submerge the second stage in water with the mouthpiece facing up, allowing water to enter the exhaust tee and keeping it in the water for about 30 seconds.
5. Remove the second stage from the water and then turn the mouthpiece downward.
6. Check for any traces of water.

**WARNING!**

IF MORE THAN A FEW DROPS OF WATER COME OUT OF THE SECOND STAGE, CHECK WATERTIGHTNESS OF THE MOUTHPIECE CLAMP, THE EXHAUST VALVE AND THE RIM OF THE DIAPHRAGM.

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7. Press the purge button, making sure that it operates smoothly and does not jam.
8. Completely submerge the second stage in water (allowing water to enter the mouthpiece) and check for any air leaks.



► **SECOND STAGE TROUBLESHOOTING**

PROBLEM	MODEL	PROBABLE CAUSE	SOLUTION
<b>- 1 -</b> CONTINUOUS OR INTERMITTENT AIR LEAKS FROM THE SECOND STAGE	RUBY - ABYSS VOLTREX AKROS - XTR - XL NIKOS NAVY - BETA III° - II° AXIS - PROTON - PROTON XL - PROTON ICE	1) Second stage poppet seat dirty or damaged	1) Clean, invert or replace
		2) Sealing surface of seat connector dirty or damaged	1) Clean or replace
		3) Intermediate pressure too high	1) Adjust the intermediate pressure
		4) Demand lever set too high	1) Adjust correctly
		5) Poppet spring incorrectly positioned or damaged	1) Position correctly or replace
	RUBY - ABYSS VOLTREX - AKROS - XTR - XL NIKOS - AXIS - PROTON - PROTON XL - PROTON ICE	6) Adjustable seat O-ring in connector dirty or damaged	1) Clean or replace
		7) Adjustable connector seat too low	1) Adjust correctly
	NAVY - BETA	8) Seat connector O-ring dirty or damaged	1) Clean or replace
		9) Spacer ring missing or damaged	1) Position correctly or replace
<b>- 2 -</b> CRACKING PRESSURE TOO HIGH	RUBY - ABYSS VOLTREX - AKROS - XTR - XL NIKOS - NAVY - BETA III° - II° AXIS - PROTON - PROTON XL - PROTON ICE	1) Demand lever set too low	1) Adjust correctly
		2) Intermediate pressure too low	1) Adjust correctly
		3) Hole for 2nd stage poppet in the 2nd stage case obstructed	1) Clean carefully
		4) Tank control valve not fully opened	1) Open the tank valve completely
		5) Second stage spring deformed and/or damaged	1) Replace
		6) First stage filter clogged	1) Overhaul first stage and replace the filter
	AKROS - XTR - XL	7) Pivoting flow vane dirty and/or damaged	1) Clean and/or replace the damaged components
	RUBY - ABYSS VOLTREX - AKROS XTR - XL - NIKOS AXIS - PROTON - PROTON XL - PROTON ICE	8) Poppet spring loading too high	1) Adjust correctly and if necessary replace the spring
		NAVY - BETA - III° - II°	9) Poppet spring loading too high
<b>- 3 -</b> CRACKING PRESSURE TOO LOW	RUBY - ABYSS VOLTREX AKROS - XTR - XL NIKOS - NAVY III° - II° - BETA AXIS - PROTON - PROTON XL - PROTON ICE	1) Intermediate pressure too high	1) Adjust correctly
		2) Second stage spring deformed and/or damaged	1) Replace
	RUBY - ABYSS VOLTREX - AKROS NIKOS - XTR - XL AXIS - PROTON - PROTON XL - PROTON ICE	3) Poppet spring loading too low	1) Adjust correctly and if necessary replace the spring
	NAVY - BETA	4) Poppet spring loading too low	1) Add a distance washer (max one) or replace the spring
	III° - II°	5) Poppet spring loading too low	1) Replace the spring

## ► SECOND STAGE TROUBLESHOOTING

PROBLEM	MODEL	PROBABLE CAUSE	SOLUTION
- 4 - AIR LEAK BETWEEN SWIVEL HOSE COUPLING AND SECOND STAGE CONNECTOR	RUBY - ABYSS VOLTREX AKROS - XTR - XL NIKOS - NAVY III° - II° - BETA AXIS - PROTON - PROTON XL - PROTON ICE	1) Swivel hose coupling O-Ring defective	1) Replace the O-Rings
		2) Sealing surface of hose connector O-Ring dirty or damaged	1) Clean or replace the hose connector
	NAVY - BETA	3) Seat connector O-Ring dirty or damaged	1) Clean or replace
		4) Seat connector dirty or damaged	1) Clean or replace
- 5 - TRACES OF WATER INSIDE THE SECOND STAGE	RUBY - ABYSS VOLTREX AKROS - XTR - XL NIKOS - NAVY - BETA - III° - II° AXIS - PROTON - PROTON XL - PROTON ICE	1) Exhaust valve dirty, incorrectly positioned or damaged	1) Clean, position correctly or replace
		2) Exhaust valve support dirty or damaged	1) Clean or replace the second stage case
		3) Diaphragm dirty, incorrectly positioned or damaged	1) Clean, position correctly or replace
		4) Mouthpiece loose or damaged	1) Replace the clamp and tighten or replace the mouthpiece
	RUBY - ABYSS VOLTREX AKROS - XTR - XL NIKOS - NAVY - BETA - III° - II° AXIS - PROTON - PROTON XL - PROTON ICE	5) Seat connector O-Ring defective	1) Replace
	RUBY - ABYSS VOLTREX - III° - II°	6) Cover ring clamp loose or damaged	1) Tighten or replace
	AKROS - XTR - XL - NIKOS - AXIS	7) Spacer ring incorrectly positioned or damaged	1) Correctly position or replace the spacer ring
		8) Spacer ring incorrectly positioned or damaged	1) Correctly position or replace the spacer ring
		9) Cover incorrectly clamped	1) Correctly lock down the cover and secure with the pin
		10) Sealing surfaces and O-rings of the plug, between the threaded connector and the second stage case and between the case assembly connector and the second stage case	1) Inspect and clean the sealing surfaces, replacing the O-Rings and the defective components
	AKROS - XTR - XL	11) Defective O-Ring seals or seats between the by-pass and the second stage case assembly connector	1) Inspect and clean the sealing surfaces, replacing the O-Rings and the defective components
	NAVY	12) Defective seal between the by-pass and the second stage case	1) Replace with second stage case already complete with by-pass
		13) O-Ring seal between by-pass and case assembly connector dirty or damaged	1) Clean and replace the O-Ring
	NAVY - BETA	14) Cover ring clamp loose	1) Tighten the ring clamp
		15) Seat connector O-Ring defective	1) Replace the O-Ring
	BETA	16) O-Rings in case assembly connector and plug dirty or damaged	1) Clean the seats and replace the O-Rings

▶ **SECOND STAGE TROUBLESHOOTING**

PROBLEM	MODEL	PROBABLE CAUSE	SOLUTION
- 6 - COVER PURGE BUTTON JAMMED	RUBY - ABYSS - VOLTREX - AKROS - XTR - XL - NIKOS - NAVY - BETA - III° - II° - AXIS	1) Purge button seat dirty	1) Clean
		2) Defective spring	1) Replace the spring
- 7 - VIBRATIONS DURING THE INHALATION PHASE	RUBY - ABYSS - VOLTREX - AKROS - XTR - XL - NIKOS - NAVY - BETA - III° - II° - AXIS - PROTON - PROTON XL - PROTON ICE	1) Diaphragm incorrectly positioned	1) Position correctly
		2) Demand lever incorrectly adjusted	1) Adjust correctly
		3) Poppet spring incorrectly positioned or damaged	1) Position correctly or replace

Table No. 224	<b>ERGO INFLATOR ASSY WITH R.E. VALVE</b>	Drawing reference No.: J 75 Table updated on 01/09/2003
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Ref. N.	Code	Description
2	47159020	Two-tone whistle
6	47159070	Lp Inflator exhaust diaphragm
7	<b>F</b>	Lp Inflator diaphragm compartment
9	46110106	OR 106
13	47159659	Male Lp quick-coupler
22	47159146	Lp filter
27	47159712	Ergo male coupler dust cap
45	47159681	Lp Int. hose assembly
46	47159700	Ergo Lp body
47	47159702	ERGO cord attachment bushing
48	46185011	MR 12 1st stage spring
49	47159701	ERGO exhaust OR bushing
50	46110241	OR 2-109
51	46110115	OR 115
52	47159717	ERGO 99 ARG Exhaust button
53	47159707	ERGO inflation button plug
54	47159716	ERGO 99 ARG inflation button
55	46110210	OR 2056
57	47159715	ERGO valve bushing
58	46110221	OR 2081
59	45179863	Clamp ring for D. 23 corrugated hose

Ref. N.	Code	Description
60	47159709	D. 23 corrugated hose
61	47159705	ERGO Lp Mouthpiece
62	47159711	Ergo Inflator hose holder
63	<b>F</b>	R.E. valve poppet body
64	<b>F</b>	Purge button spring
66	<b>F</b>	Black line w/o core D. 1.75
67	47159133	R.E. Valve gasket
69	<b>F</b>	R.E. Valve cover
70	46184322	Stereoscopic sticker for JKT 99
		<b>ASSEMBLIES</b>
<b>A</b>	47158504	Lp command assembly for ERGO w/o hose 99
<b>C</b>	47159729	Corrugated ERGO assembly w/o hose 99 ( A -F -2-27-59-60-62)
<b>C</b>	47158507	Corrugated ERGO assembly - short w/o hose 99 ( A -F -2-27-59-60-62)
<b>F</b>	47159725	R.E. Valve body assembly (E-6-7-63-64-66-67-69-70)
<b>* * *</b>	47159719	Corrugated hose service kit (9-22-50-51-55-57-58-59)

**AIR TRIM PNEUMATIC  
SYSTEM**

**mares<sup>®</sup>**

## 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).

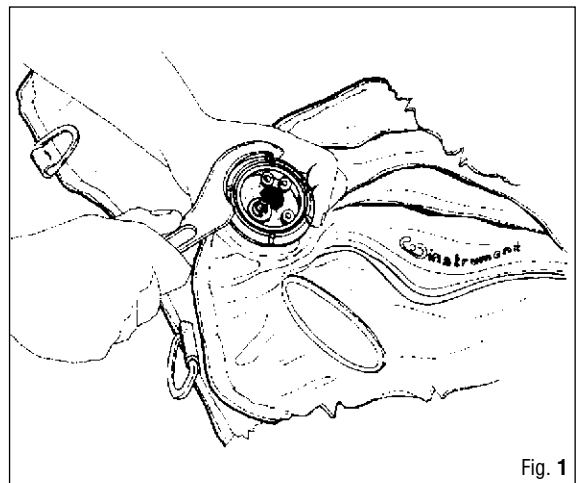


Fig. 1

## 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).

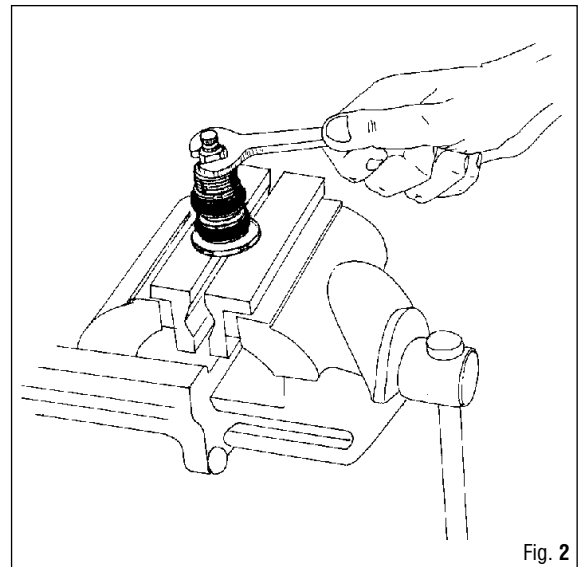


Fig. 2



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).

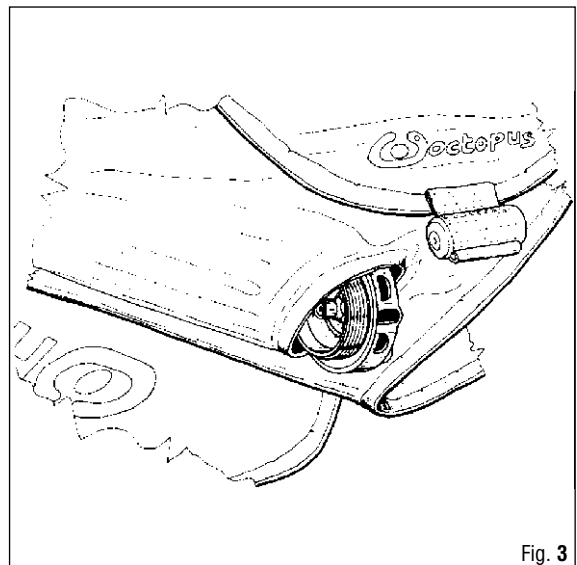


Fig. 3

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 **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).
- 

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 **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.

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 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).

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 **NOTE** 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.

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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).

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▶ **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

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 **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).

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## 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
<b>Quick coupler</b>	18	Check for possible scratches, corrosion, or damage to the chrome.
<b>O-Rings</b>	3-5-7-17 21-23-24-32	Check for cuts, burrs or foreign particles. Any of these defects can cause leaks.
<b>Fabric filter</b>	16	Check that there are no deposits of dirt on the surface.
<b>O-Ring seats</b>		Inspect all surfaces in contact with the O-rings, and check for scratches, chipping, deteriorated plating or foreign particles.
<b>Sheath assembly</b>	36	Check that the spiral and the sheath have no warps or breaks.
<b>Spring</b>	2	Check for any split, deformed or broken coils.
<b>Threaded components</b>		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
<b>O-Rings</b>	23-24-32 33-39-42	Check for cuts, burrs or foreign particles Any of these defects can cause leaks.
<b>Sealing disk</b>	40	Check that there are no splits, cracks, or foreign particles.
<b>Backup ring</b>		Check that there are no signs of deformation or foreign particles.
<b>O-ring seats</b>	35	Inspect all surfaces in contact with the O-rings, and check for scratches, chipping, deteriorated plating or foreign particles.
<b>Diaphragm</b>	44	Check that there are no significant deformations, splits, cracks, or foreign particles.
<b>Friction washer</b>	45	Check that there are no significant signs of deformation or foreign particles.
<b>Spring</b>	46	Check for any split, deformed or broken coils.
<b>Threaded components</b>		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

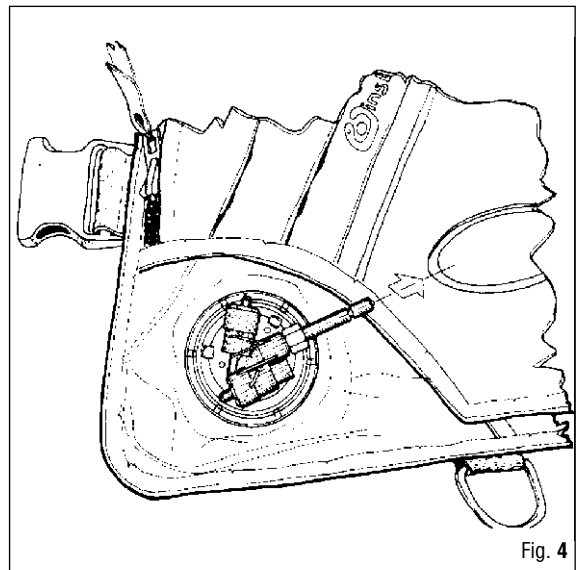
#### **▶ A.4 - REASSEMBLY OF THE INFLATOR BODY**

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).





**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.)

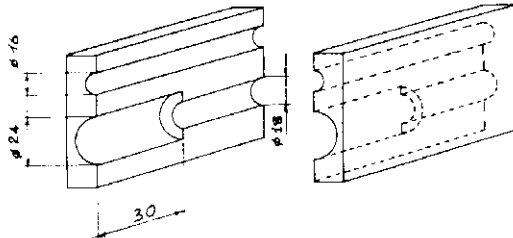
IF ANY MALFUNCTIONS AND/OR AIR LEAKS ARE OBSERVED, CONSULT THE "TESTING" SECTION OF THE MANUAL.

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Set of special tools in case for repairing Mares Spearguns

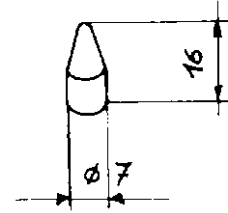
Code 413850

Head and barrel clamping jaws



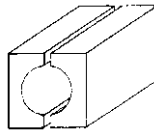
(A-1)  
Code 43106101

O-Ring fitting cone  
(power adjustment rods)



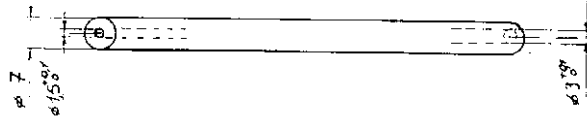
(A-12)  
Code 43106112

Tank clamping jaws (all models)



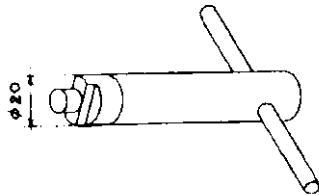
(A-3)  
Code 43106103

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



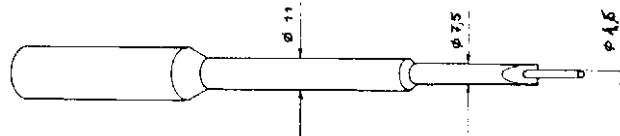
(A-18)  
Code 43106118

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).



### WARNING !

ALWAYS PRESSURIZE THE SPEARGUN WITH THE POWER ADJUSTMENT LEVER IN THE MAXIMUM "HIGH" POWER POSITION (FIG. 2). 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.

---

### ► PRESSURIZING USING MARES GUN CHARGING YOKE (PART # 413807)

1. Set the power adjustment lever (38) to maximum "high" power position (Fig. 2).
2. Connect the yoke to the valve of a scuba cylinder.
3. By hand, thread the pressure gauge body into the inlet valve of the speargun, until the pressure gauge body o-ring seals against the inlet valve body. Do not tighten with a wrench.
4. Close the purge valve by rotating the thumb wheel clockwise.
5. Slowly open the valve on the scuba cylinder and read the pressure value on the pressure gauge. When the desired value is reached, close the valve on the scuba cylinder.



### WARNING !

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.

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6. Open the purge valve by rotating the thumb wheel clockwise and allow any residual air to escape from the hose.
7. Remove the pressure gauge body from inlet valve.
8. Remove the yoke from the valve of the scuba cylinder.

## ► 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. 504	<b>STEN 2001 SPEARGUN</b>	Drawing reference No.: F 206 Table updated on 01/09/2003
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Ref. N.	Code	Description
1	<b>A</b>	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	<b>N</b>	Piston body
18	46110110	OR 2037
19	<b>N</b>	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	Miniministen Rod
26	43200057	Ministen Rod
26	43200059	Medisten Rod
26	43200063	Sten Rod
26	43200061	Canna Super Rod
32	<b>M</b>	Inlet valve body
33	43163563	White valve cap
34	<b>L</b>	Spring - power adjustment
35	<b>L</b>	Rod - power adjustment
36	<b>L</b>	Press OR power adjustment
37	46110102	OR 2015
38	<b>L</b>	Lever power adjustment
39	<b>L</b>	OR port for power adjustment
41	<b>H</b>	Mares Sten 2001 C/R handle
41	<b>G</b>	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. N.	Code	Description
48	<b>E</b>	Trigger adjustment scre
49	46110242	OR 2-003 Apnea Syste
50	43163377	Catch hoo
51	43200095	Sten 2001 piston compas
52	<b>E</b>	Cyrano trigger bod
53	43163337	Pin 4 x 2
57	43200098	Pin 4 x 23.
58	43164237	Safety sto
59	43164236	Safety bod
60	46110106	OR 106
61	43164300	White heelplate
62	43164233	Cyrano heelplate fixing pin
65	<b>M</b>	Ball bearing - inlet valve
66	<b>M</b>	Spring - inlet valve
67	<b>M</b>	OR button inlet valve
68	43163635	Seat, one way valve
69	43163636	Housing, one way valve
70	<b>D</b>	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
		<b>ASSEMBLIES</b>
<b>82</b>	416803	Screw injector
<b>A</b>	43200066	Sten 2001 assembly head ( 1-2-3-5 )
<b>D</b>	43163638	Adjustment block assembly ( 68-69-70 )
<b>E</b>	43164230	Cyrano trigger assembly (48-52)
<b>G</b>	43200097	S/Reg. handle Sten 2001 ( 41-42-43-46-47-49 )
<b>H</b>	43200096	C/Reg. handle Sten 2001 ( L- 38-41-42-43-46-47-49 )
<b>L</b>	43163937	Power adjustment assembly ( 34-35-36-37-39)
<b>M</b>	43163941	Inlet valve assembly ( 32-46-65-66-67 )
<b>N</b>	43163629	Piston assembly (17-18-19)
<b>P</b>	43163683	Miniministen scabbard ass.
<b>***</b>	43163979	Sten 2001/Sten/Rafal complete OR set ( 18-19-20-22-37-46-49-60-71 )

Drawing No. F 205	<b>CYRANO SPEARGUNS LINE</b>	Drawing updated on 04/01/1998
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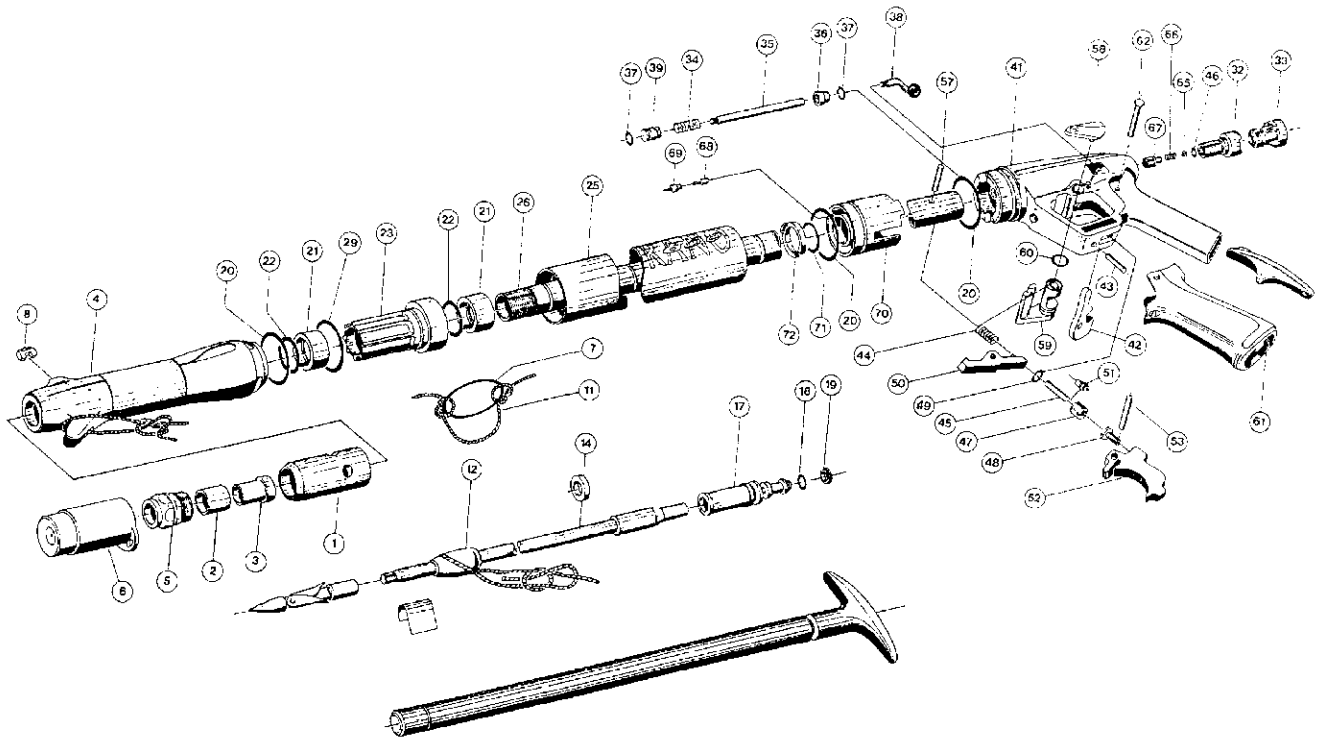




Table No. 500	<b>CYRANO SPEARGUNS LINE</b>	Drawing reference No.: F 205 Table updated on 01/09/2003
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Ref. No.	Code	Description
1	<b>A</b>	Head body
2	43163856	Shock absorber , rubber
3	43164207	Shock absorber insert
4	43164200	Nose cone
5	43164206	Head 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	<b>N</b>	Piston body
18	46110107	OR 2031
19	<b>N</b>	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	<b>M</b>	Body - inlet valve
33	43164223	Valve cover cap
34	<b>L</b>	Spring - power adjustment
35	<b>L</b>	Rod - power adjustment
36	<b>L</b>	Power adjustment rod bushing
37	46110102	OR 2015
38	43164234	Lever power adjustment
39	<b>L</b>	Power adjustment rod OR comp.
41	<b>H</b>	Handle
42	43163668	Line release, black
43	43163614	Pin - line release

Ref. No.	Code	Description
44	<b>43163313</b>	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	<b>E</b>	Trigger adjustment screw
49	46110242	OR 2-003 Apnea System
50	43163377	Catch hook
51	43164286	Spacing sleeve, Apnea System
52	<b>E</b>	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	<b>D</b>	Power regulator block
71	46110227	OR 3056
72	43164212	Circlip D. 16 - power regulator
		<b>ASSEMBLIES</b>
<b>A</b>	43164210	Head assembly ( 1-2-3-5 )
<b>D</b>	43164214	Power regulator assembly ( 68-69-70 )
<b>E</b>	43164230	Trigger Assembly Apnea System ( 48-52 )
<b>H</b>	43164287	Handle Assembly Apnea System ( 38-41-42-43-46-47-61-L )
<b>L</b>	43163937	Power adjustment assembly ( 34-35-36-37-39 )
<b>M</b>	43164222	Valve Assembly Cyrano ( 32-46-65-66-67 )
<b>N</b>	43164211	Piston body assembly D. 16 ( 17-18-19 )
<b>***</b>	43164290	Cyrano/Spark/Stealth complete OR set ( 18-19-20-22-29-37-46-60-71 )
		<b>REMARKS</b>
		From registration #94336001 the Apnea System grip is applied For repairs apply new handle.

Drawing No. F 208	<b>SPARK SPEARGUNS SPARK 110 - (Pipin line)</b>	Drawing updated on 04/01/1998
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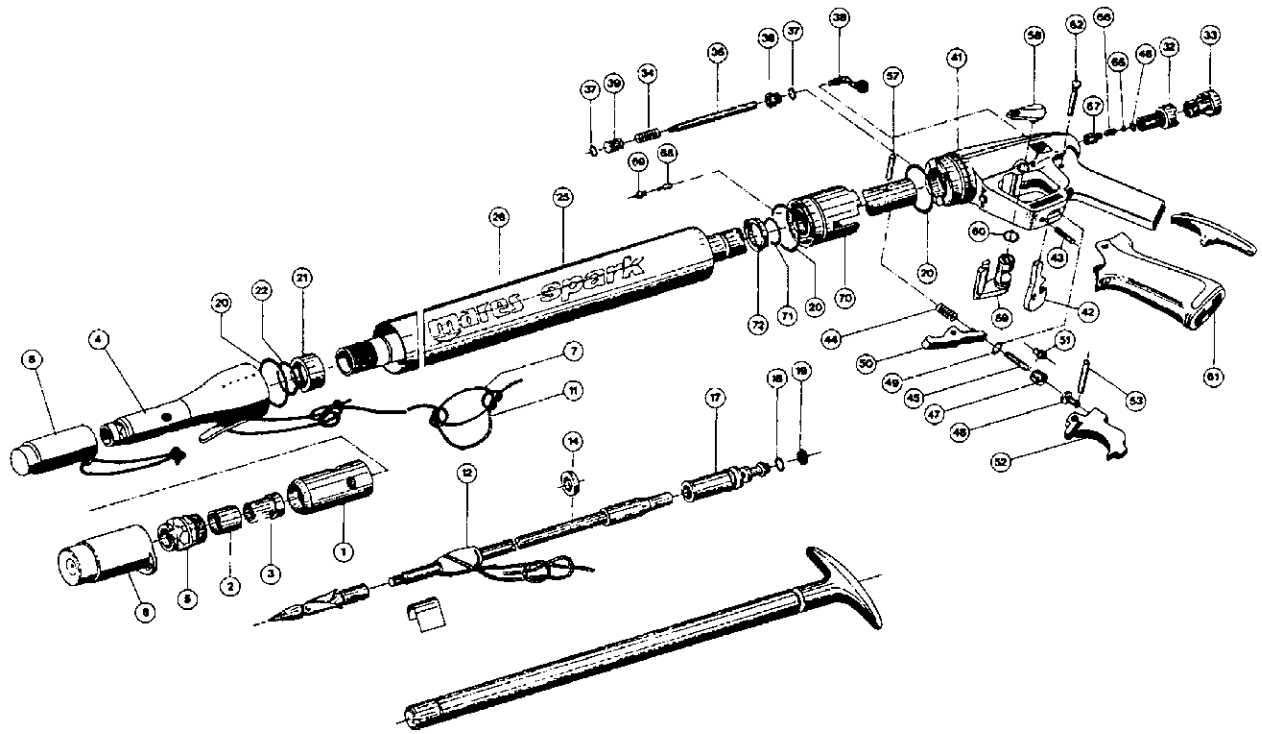


Table No. 501	<b>SPARK SPEARGUNS SPARK 110 - (Pipin line)</b>	Drawing reference No.: F 208 Table updated on 01/09/2003
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Ref. No.	Code	Description
1	<b>A</b>	Head body
2	43163856	Shock absorber, rubber
3	43164207	Shock absorber insert
4	43164301	Nose cone
5	43164206	Head ferrule
6	43164008	Protective cap - head
7	43163968	Rubber ring - shock
11	43169821	Shock line - m. 3
11	43169818	Shock line - m. 5
12	43164004	Line retainer for shaft D. 7
14	43163503	Washer for shaft D. 7
17	<b>N</b>	Piston body
18	46110107	OR 2031
19	<b>N</b>	Oil wiper piston
20	46110208	Special OR
21	43164204	OR bushing
22	46110228	OR 3062
25	43164302	Spark 550 Tank
25	43164303	Spark 700 Tank
25	43164304	Spark 850 Tank
25	43164305	Spark 970 Tank
25	43164306	Spark 1100 Tank (Pipin line)
26	43164215	Spark 550 Barrel
26	43164216	Spark 700 Barrel
26	43164217	Spark 850 Barrel
26	43164218	Spark 970 Barrel
26	43164219	Spark 1100 Barrel (Pipin line)
32	<b>M</b>	Body - inlet valve
33	43164311	Cap - inlet valve yellow
33	43164325	Cap - inlet valve blue (Pipin line)
34	<b>L</b>	Spring - power adjustment
35	<b>L</b>	Rod - power adjustment
36	<b>L</b>	Power adjustment rod bushing
37	46110102	OR 2015
38	<b>L</b>	Lever power adjustment
39	<b>L</b>	Power adjustment rod OR comp.
41	<b>H</b>	Handle
42	43163668	Line release, black
43	43163614	Pin - line release
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

Ref. No.	Code	Description
48	<b>E</b>	Trigger adjustment screw
49	46110242	OR 2-003 Apnea System
50	43163377	Catch hook
51	43164286	Spacing sleeve, Apnea System
52	<b>E</b>	Trigger
53	43163337	4 x 23 Pin
57	43163338	4 x 20 Pin
58	43164310	Safety stop Spark yellow
58	43164324	Safety stop Spark blue (Pipin line)
59	43164309	Safety body Spark yellow
59	43164323	Safety body Spark blue (Pipin line)
60	46110106	OR 106
61	43164300	Handle Spark yellow
61	43164326	Handle Spark black (Pipin line)
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 pin, one way valve
70	<b>D</b>	Power regulator block
71	46110227	OR 3056
72	43164212	Circlip D. 16 - power regulator
		<b>ASSEMBLIES</b>
<b>A</b>	43164210	Head assembly ( 1-2-3-5 )
<b>D</b>	43164214	Power regulator assembly ( 68-69-70 )
<b>E</b>	43164230	Spark Trigger assembly ( 48-52 )
<b>H</b>	43164308	Spark Handle assembly ( 38-41-42-43-46-47-61-L )
<b>H</b>	43164322	Spark Handle assembly (Pipin line) ( 38-41-42-43-46-47-61-L )
<b>L</b>	43163937	Power adjustment assembly ( 34-35-36-37-39 )
<b>M</b>	43164222	Spark valve assembly ( 32-46-65-66-67 )
<b>N</b>	43164211	Piston assembly D. 16 ( 17-18-19 )
<b>***</b>	43164290	Complete set of Spark O-rings ( 18-19-20-22-29-37-46-60-71 )
		<b>REMARKS</b>
N.B.: The Spark OR series is the same as Cyrano		

Table No. 227	<b>PNEUMATIC DISCHARGE VALVE H.U.B.</b>	Drawing reference No.: J 78 Table updated on 01/09/2003
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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

Ref. No.	Code	Description
48	47158703	Sticker
		<b>ASSEMBLIES</b>
<b>H</b>	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. 226	<b>PNEUMATIC CONTROL H.U.B.</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
		<b>ASSEMBLIES</b>
\$\$\$	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)
<b>NOTES</b>		
<p>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.</p>		

Table No. 236	<b>H.U.B. MARES CENTURY</b>	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
		<b>ASSEMBLIES</b>
***	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 <sup>nd</sup> Stage Octopus (corresponding model table)
D	----	H.U.B. 1 <sup>st</sup> Stage (table no. 20 drg. E 11)
E	----	2 <sup>nd</sup> Stage (corresponding model table)
C	----	Pneumatic discharge valve (tab. n. 227 drg. J78)
B	47159295	MB Fixed backpack belt assembly

Table No. 232	<b>H.U.B. MARES AVANTGARDE</b>	Drawing reference No.: J 83 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	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
		<b>ASSEMBLIES</b>
** *	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 H.U.B. 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

Table No. 233	<b>PNEUMATIC CONTROL H.U.B. AVANTGARDE</b>	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
		<b>ASSEMBLIES</b>
\$\$\$	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)