

# INDEX

## MARES SERVICE MANUAL CONTENTS

		Last revision	Note		Last revision	Note
<b>INTRODUCTION</b>				<b>MR12 - MRX12 - V12 - MR12 LONG</b>		
GENERAL INTRODUCTION	I	1998		<b>FIRST STAGE SERVICE</b>		
MARES SERVICE MANUAL	I	1998		DISASSEMBLY	F 3-1	1998
<b>REGULATOR SERVICE</b>				<b>MR 12-V12 DIN VERSION / DISASSEMBLY</b>	F 3-1	1998
GENERAL	III	1998		CLEANING	F 3-2	1998
SERIALIZATION / WARRANTY	III	1998		INSPECTION	F 3-3	1998
ROUTINE CARE	III	1998		REASSEMBLY	F 3-4	1998
SERVICE REQUIREMENTS	IV	1998		<b>MR 12-V12 DIN VERSION REASSEMBLY</b>	F 3-5	1998
SET OF TOOLS FOR REGULATORS MAINTENACE	V	1998		MR12-V12 DRAWING AND PARTS LIST	F 3-6	1997
SPECIAL TOOL KIT	VI	1998		MR12-MRX 12 DRAWING AND PARTS LIST	F 3-7	2000
O-RING TABLE 1° E 2° STAGE	VI.a	2002	NEW	MR12-MRX 12 DRAWING	F 3-8	2002
O-RING TABLE H.U.B. AIR TRIM-PNEUMATICAL				MR12 - TABLE	F 3-9	2002
INFLATOR PNEUMATICAL DUMP VALVES	VI.b	2002	NEW	MR12 LONG DRAWING	F 3-10	2002
O-RING TABLE H.U.B. - HOSES/MANIFOLDS -				MR12 LONG TABLE	F 3-11	2002
ORAL INFLATOR - DEPTH GAUGE	VI.c	2002	NEW	<b>MR 10 FIRST STAGE SERVICE</b>		
O-RING TABLE BC - AIRLOCK	VI.d	2002	NEW	DISASSEMBLY	F 4-1	1998
O-RING TABLE VALVE SETS	VI.e	2002	NEW	MR 10 DIN VERSION DISASSEMBLY	F 4-1	1998
O-RING TABLE SPEARGUNS	VI.f	2002	NEW	CLEANING	F 4-2	1998
O-RING TABLE LIGHTS	VI.g	2002	NEW	INSPECTION	F 4-3	1998
<b>NITROX STATEMENT</b>				REASSEMBLY	F 4-3	1998
CONVERSION PROCEDURES	N 1-1	1998		MR 10 DIN VERSION REASSEMBLY	F 4-6	1998
DISASSEMBLY/CLEANING/DRYING/INSPECTING	N 1-2	1998		MR10 DRAWING AND PARTS LIST	F 4-7	1991
LUBRIFICATION/REASSEMBLY	N 1-3	1998		<b>MR 12 II FIRST STAGE SERVICE</b>		
ADJUSTMENT	N 1-4	1998		DISASSEMBLY	F 5-1	1998
<b>CWD KIT FIRST STAGE</b>				CLEANING / INSPECTION	F 5-2	1998
COLD WATER DIVING KIT (CWD)	K 1-1	1998		REASSEMBLY	F 5-3	1998
<b>RUBY-MR22-MR16-V16</b>	K 1-2	1998		MR 12 II DRAWING AND PARTS LIST	F 5-5	1997
<b>MR12-V12</b>	K 1-5	1998		<b>R1 - R2 FIRST STAGE SERVICE</b>		
<b>MR 22 - RUBY (TITANIUM) - ABYSS - V32</b>				DISASSEMBLY		
<b>FIRST STAGE SERVICE</b>				DISASSEMBLY (replacing stage 6)	F 6-1	1998
<b>TECHNICAL BULLETIN MARES 5</b>	BTM5	2002	NEW	CLEANING	F 6-1	1998
DISASSEMBLY	F 1-1	1998		INSPECTION	F 6-2	1998
<b>RUBY DIN VERSION / DISASSEMBLY</b>	F 1-3	1998		REASSEMBLY	F 6-3	1998
CLEANING	F 1-3	1998		<b>R1 - R2 DIN VERSION REASSEMBLY</b>	F 6-4	1998
INSPECTION	F 1-4	1998		R1 - R2 DRAWING AND PARTS LIST	F 6-5	1998
REASSEMBLY	F 1-5	1998		R2 DRAWING AND PARTS LIST	F 6-6	2000
<b>RUBY DIN VERSION / REASSEMBLY</b>	F 1-7	1998		R2 TABLE	F 6-7	2002
ADJUSTING INTERMEDIATE PRESSURE	F 1-7	1998		<b>FIRST STAGE ADJUSTMENT</b>		
MR22- RUBY DRAWING AND PARTS LIST	F 1-8	1998		<b>INTERMEDIATE PRESSURE</b>	F 7-1	2002
RUBY SCHEMATIC AND PARTS LIST	F 1-9	2000		<b>ADJUSTMENT IN DIAPHRAGM</b>	F 7-2	2002
RUBY DRAWING	F 1-10	2002		<b>ADJUSTMENT IN PISTON</b>	F 7-3	2002
RUBY TABLE	F 1-11	2002	NEW	<b>FIRST STAGE TROUBLE SHOOTING</b>	F 8-1	2002
ABYSS DRAWING AND PARTS LIST	F 1-12	2002		<b>RUBY-ABYSS-VOLTREX-ORBITER</b>		
ABYSS TABLE	F 1-13	2002	NEW	<b>SECOND STAGE SERVICE</b>		
V 32 DRAWING	F 1-14	2002	NEW	<b>TECHNICAL BULLETIN</b>	BTM3	2000
V 32 TABLE	F 1-15	2002	NEW	DISASSEMBLY	S 1-1	1998
<b>MR 16 - V 16 - VX 16 - TI PLANET</b>				CLEANING / INSPECTION	S 1-2	1998
<b>FIRST STAGE SERVICE</b>				REASSEMBLY	S 1-3	1998
DISASSEMBLY	F 2-1	1998		RUBY/ABYSS/VOLTREX		
<b>MR 16-V16 DIN VERSION / DISASSEMBLY</b>	F 2-2	1998		SECOND STAGE ADJUSTMENT	S 1-4	1998
CLEANING / INSPECTION	F 2-3	1998		FINAL ASSEMBLY	S 1-5	1998
REASSEMBLY	F 2-4	1998		R.A.V. DRAWING AND PARTS LIST	S 1-6	1998
<b>MR 16-V16 DIN VERSION / REASSEMBLY</b>	F 2-5	1998		RUBY-ORBITER DRAWING AND PARTS LIST	S 1-7	2000
MR 16 - V16 DRAWING AND PARTS LIST	F 2-7	1998		RUBY TABLE	S 1-8	2002
MR 16 - V16 DRAWING AND PARTS LIST	F 2-8	2000		ORBITER TABLE	S 1-9	2002
V 16 TABLE	F 2-9	2002	NEW	ABYSS-OCTOPUS ABYSS DRAWING AND PARTS LIST	S 1-10	2002
TI PLANET DRAWING AND PARTS LIST	F 2-10	2002		ABYSS - OCTOPUS ABYSS TABLE	S 1-11	2002
TI PLANET TABLE	F 2-11	2002	NEW			

# INDEX

## MARES SERVICE MANUAL CONTENTS

	Last revision	Note		Last revision	Note
<b>XTR-XL-AKROS-TI PLANET-EPOS SECOND STAGE SERVICE</b>			<b>AXIS - OCTOPUS AXIS SECOND STAGE SERVICE</b>		
DISASSEMBLY	S 2-1	1998	DISASSEMBLY	S 7-1	2002 NEW
CLEANING	S 2-2	1998	CLEANING	S 7-2	2002 NEW
INSPECTION	S 2-3	1998	INSPECTION	S 7-3	2002 NEW
REASSEMBLY	S 2-4	1998	REASSEMBLY	S 7-4	2002 NEW
<b>ADJUSTMENT AND FINAL ASSEMBLY</b>	S 2-6	1998	<b>FINAL ADJUSTMENTS</b>	S 7-6	2002 NEW
PROCEDURE A	S 2-7	1998	<b>ADJUSTING THE INTERMEDIATE PRESSURE</b>	S 7-7	2002 NEW
PROCEDURE B	S 2-8	1998	<b>FINAL ASSEMBLY</b>	S 7-8	2002 NEW
AKROS DRAWING AND PARTS LIST	S 2-10	1998	AXIS DRAWING	S 7-10	2002 NEW
AKROS TABLE	S 2-11	2002	AXIS TABLE	S 7-11	2002 NEW
XTR TABLE	S 2-12	2002			
XL TABLE	S 2-13	2002	<b>PROTON - PROTON XL SECOND STAGE SERVICE</b>		
TI PLANET DRAWING AND PARTS LIST	S 2-14	2002	DISASSEMBLY	S 8-1	2002 NEW
TI PLANET TABLE	S 2-15	2002	CLEANING	S 8-2	2002 NEW
EPOS DRAWING AND PARTS LIST	S 2-16	2002	INSPECTION	S 8-3	2002 NEW
EPOS TABLE	S 2-17	2002	REASSEMBLY	S 8-4	2002 NEW
			<b>ASSEMBLING THE DEMAND LEVER</b>	S 8-5	2002 NEW
			<b>FINAL ASSEMBLY</b>	S 8-7	2002 NEW
			<b>FINAL ADJUSTMENTS</b>	S 8-8	2002 NEW
			PROTON DRAWING	S 8-10	2002 NEW
			PROTON TABLE	S 8-11	2002 NEW
			PROTON XL DRAWING	S 8-12	2002 NEW
			PROTON XL TABLE	S 8-13	2002 NEW
<b>NIKOS SECOND STAGE SERVICE</b>			<b>SECOND STAGES FINAL CHECKS AND ADJUSTMENT</b>		
<b>TECHNICAL BULLETIN</b>	<b>BTM1</b>	2000		2002	
<b>TECHNICAL BULLETIN</b>	<b>BTM2</b>	2000	<b>SECOND STAGES TROUBLE SHOOTING</b>		
DISASSEMBLY	S 3-1	1998		2002	
CLEANING	S 3-2	1998	<b>LP INFLATOR SERVICE</b>		
INSPECTION	S 3-3	1998	GENERAL	VII	1998
REASSEMBLY	S 3-4	1998	SERIALIZATION	VII	1998
<b>ADJUSTMENT FINAL ASSEMBLY</b>	S 3-6	1998	WARRANTY	VII	1998
PROCEDURE A	S 3-7	1998	ROUTINE CARE	VII	1998
PROCEDURE B	S 3-8	1998	SERVICE REQUIREMENTS	VII	1998
NIKOS DRAWING AND PARTS LIST	S 3-9	1998	SPECIAL TOOL ERGO	VIII	1998
NIKOS 2000 DRAWING AND PARTS LIST	S 3-10	2000			
NIKOS TABLE	S 3-11	2002	<b>MULTI AIR - INTERNATIONAL INFLATOR</b>		
			DISASSEMBLING THE SECOND STAGE	B 1-1	1998
			DISASSEMBLING THE INFLATOR UNIT	B 1-1	1998
			<b>DISASSEMBLING THE QUICK COUPLING</b>	B 1-1	1998
			DISASSEMBLING THE DEFLATION GROUP	B 1-2	1998
			DISASSEMBLING THE LP INFLATOR C.G.	B 1-2	1998
			<b>DISASSEMBLING THE R.E. VALVE</b>	B 1-2	1998
			DISASSEMBLING THE CORRUGATED HOSE	B 1-2	1998
			CLEANING	B 1-3	1998
			INSPECTION	B 1-3	1998
			REASSEMBLY	B 1-5	1998
			ASSEMBLING THE LP INFLATOR C.G.	B 1-5	1998
			ASSEMBLING THE DEFLATION GROUP	B 1-6	1998
			ASSEMBLING THE COUPLING	B 1-6	1998
			ASSEMBLING THE R.E. VALVE GROUP	B 1-7	1998
			ASSEMBLING THE CORRUGATED HOSE	B 1-8	1998
			ASSEMBLING THE SECOND STAGE		
			(Multi Air version only)	B 1-8	1998
			ASSEMBLING THE CORR. HOSE ON THE BC	B 1-8	1998
			FINAL CHECKS	B 1-9	1998
			MULTI AIR - INT. INFLATOR DRAWING	B 1-10	1993
<b>BETA - MR10 SECOND STAGE SERVICE</b>					
DISASSEMBLY	S 6-1	1998			
CLEANING	S 6-2	1998			
INSPECTION	S 6-3	1998			
REASSEMBLY	S 6-4	1998			
BETA SECOND STAGE ADJUSTMENT	S 6-6	1998			
<b>CHANGING THE HOSE CONNECTION FROM RIGHT TO LEFT</b>	S 6-7	1998			
DISASSEMBLY	S 6-7	1998			
REASSEMBLY	S 6-8	1998			
BETA DRAWING AND PARTS LIST	S 6-10	1998			
MR10 DRAWING AND PARTS LIST	S 6-11	1998			

# INDEX

## MARES SERVICE MANUAL CONTENTS

		Last revision	Note		Last revision	Note
<b>ERGO LP INFLATOR</b>						
LP INFLATOR REMOVAL	B 2-1	1998		TRIGGER SENSITIVITY ADJUSTMENT	G 2-12	1998
DISASSEMBLY	B 2-1	1998		SAFETY INSPECTION	G 2-13	1998
CLEANING	B 2-3	1998		POWER REGULATOR INSPECTION	G 2-13	1998
INSPECTION	B 2-3	1998		SPEARGUN STEN (Pipin line) DRAWING AND PARTS LIST	G 2-11	1998
REASSEMBLY	B 2-4	1998		<b>SPEARGUN TROUBLESHOOTING</b>	G 3-1	2002
LP INFLATOR INSTALLATION	B 2-6	1998		<b>INTEGRATED SYSTEM H.U.B.</b>		2000
FINAL INSPECTION	B 2-7	1998		<b>TECHNICAL BULLETIN</b>	BTM4	2002
ERGO LP DRAWING AND PARTS LIST	B 2-8	1998		<b>DISASSEMBLIES</b>		<b>NEW</b>
ERGO INFLATOR ASSY WITH R.E. VALVE DRAWING AND PARTS LIST	B 2-9	2000	<b>NEW</b>	DISASSEMBLY OF THE 1 <sup>ST</sup> STAGE FROM INTEGRATED SYSTEM	H 1-1	2000
ERGO LP DRAWING	B 2-10	2002		DISASSEMBLY OF H.U.B. BAG	H 1-1	2000
ERGO INFLATOR ASSY WITH R.E. VALVE TABLE	B 2-11	2002		DISASSEMBLY OF 4-WAY MANIFOLD	H 1-1	2000
				DISASSEMBLY OF BACKPACK	H 1-2	2000
<b>TROUBLESHOOTING</b>				DISASSEMBLY OF 7-WAY MANIFOLD	H 1-2	2000
<b>MULTI AIR - INTERNATIONAL INFLATOR</b>	B 3-1	1998		DISASSEMBLY OF TANK SUPPORT PLATE	H 1-3	2000
<b>ERGO INFLATOR TROUBLE SHOOTING</b>	B 4-1	1998		DISASSEMBLY OF MECHANICAL OVERPRESSURE VALVES	H 1-3	2000
<b>GENERAL INFORMATION GUN SERVICE</b>				DISASSEMBLY OF INFLATING ORAL PIPE	H 1-4	2000
GENERAL	IX	1998		<b>DISASSEMBLY OF H.U.B. PNEUMATIC SYSTEM</b>		
SERIALIZATION	IX	1998		DISASSEMBLY OF PNEUMATIC CONTROL	H 1-4	2000
WARRANTY	IX	1998		DISASSEMBLY OF PNEUMATIC DUMP VALVES		
ROUTINE CARE	IX	1998		EXTERNAL BEZEL	H 1-5	2000
SERVICE REQUIREMENTS	X	1998		DISASSEMBLY OF PNEUMATIC SYSTEM		
SPECIAL TOOL KIT	XI	1998		INTERNAL SUPPORTS FROM BAG	H 1-6	2000
<b>CYRANO/SPARK/STEN 2001 PNEUMATIC SPEARGUNS</b>				DISASSEMBLY OF BOTTOM PNEUMATIC DUMP VALVE INTERNAL SUPPORT	H 1-6	2000
DISASSEMBLY	G 1-1	1998		DISASSEMBLY OF TOP PNEUMATIC DUMP VALVE INTERNAL SUPPORT	H 1-7	2000
CLEANING	G 1-4	1998		DISASSEMBLY OF PNEUMATIC CONTROL INTERNAL SUPPORT	H 1-7	2000
INSPECTION	G 1-4	2002		DISASSEMBLY OF PNEUMATIC SYSTEM INTERNAL SHEATHING	H 1-7	2000
REASSEMBLY	G 1-5	2002		<b>CLEANING</b>	H 1-8	2000
<b>TAHITIAN SHAFT SERVICE</b>	G 1-10	1998		<b>INSPECTION</b>	H 1-8	2000
DISASSEMBLY	G 1-10	1998		PNEUMATIC CONTROL	H 1-8	2000
REASSEMBLY	G 1-10	1998		PNEUMATIC VALVES	H 1-9	2000
<b>PRESSURIZING</b>	G 1-11	1998		7-WAY MANIFOLD/HOSES	H 1-10	2000
PRESSURIZING USING MARES				4-WAY MANIFOLD	H 1-10	2000
GUN CHARGING YOKE	G 1-11	1998		ORAL PIPE	H 1-11	2000
PRESSURIZING USING MARES HAND PUMP	G 1-12	2002		OVERPRESSURE VALVE	H 1-11	2000
<b>INSPECTION AND ADJUSTMENT</b>	G 1-13	1998		<b>REASSEMBLY</b>	H 1-11	2000
O-RING INSPECTION	G 1-13	1998		<b>PNEUMATIC SYSTEM REASSEMBLY</b>	H 1-12	2000
TRIGGER STROKE INSPECTION	G 1-13	1998		REASSEMBLY OF INTERNAL SHEATHING OF INTEGRATED SYSTEM	H 1-12	2000
TRIGGER SENSITIVITY ADJUSTMENT	G 1-14	1998		REASSEMBLY OF INTERNAL SUPPORT OF PNEUMATIC CONTROL	H 1-12	2000
SAFETY BAR INSPECTION	G 1-14	1998		REASSEMBLY OF INTERNAL SUPPORT OF TOP PNEUMATIC DUMP VALVE	H 1-12	2000
POWER REGULATOR INSPECTION	G 1-14	1998		REASSEMBLY OF INTERNAL SUPPORT OF BOTTOM PNEUMATIC DUMP VALVE	H 1-13	2000
CYRANO DRAWING AND PARTS LIST	G 1-15	1998		REASSEMBLY OF PNEUMATIC DUMP VALVES		
SPARK (Pipin line) DRAWING AND PARTS LIST	G 1-16	1998		EXTERNAL BEZEL	H 1-14	2000
STEN 2001 SERIES DRAWING	G 1-17	2002	<b>NEW</b>	REASSEMBLY OF PNEUMATIC CONTROL BODY	H 1-14	2000
STEN 2001 SERIES DRAWING	G 1-18	2002	<b>NEW</b>	REASSEMBLY OF PNEUMATIC CONTROL	H 1-16	2000
STEN 2001 SERIES TABLE	G 1-19	2002	<b>NEW</b>	REASSEMBLY OF BAG	H 1-16	2000
<b>COMPETITION PNEUMATIC SPEARGUN</b>				REASSEMBLY OF INFLATION PIPE	H 1-16	2000
DISASSEMBLY	G 2-1	1998		REASSEMBLY OF MECHANIC OVERPRESSURE VALVES	H 1-17	2000
CLEANING	G 2-4	1998				
INSPECTION	G 2-4	1998				
REASSEMBLY	G 2-5	1998				
<b>PRESSURIZING</b>	G 2-9	1998				
PRESSURIZING USING MARES						
GUN CHARGING YOKE	G 2-10	1998				
PRESSURIZING USING MARES HAND PUMP	G 2-10	1998				
<b>INSPECTION AND ADJUSTMENT</b>	G 2-11	1998				
O-RING INSPECTION	G 2-12	1998				
TRIGGER STROKE INSPECTION	G 2-12	1998				

# INDEX

## MARES SERVICE MANUAL CONTENTS

		Last revision	Note			Last revision	Note
REASSEMBLY OF TANK PLATE SUPPORT	H 1-18	2000		<b>ACCESSORIES</b>			
REASSEMBLY OF 7-WAY MANIFOLD SYSTEM	H 1-19	2000		<b>AIRLOCK</b>			
REASSEMBLY OF TANK PLATE SUPPORT + 7-WAY				DISASSEMBLY	I 1-1	2002	<b>NEW</b>
MANIFOLD ON INTEGRATED SYSTEM	H 1-20	2000		DISASSEMBLING THE AIRLOCK SYSTEM	I 1-1	2002	<b>NEW</b>
REASSEMBLY OF BACK PACK	H 1-20	2000		DISASSEMBLING THE QUICK COUPLING			
REASSEMBLY 4-WAY MANIFOLD AND				CHECK VALVE	I 1-4	2002	<b>NEW</b>
SECONDS STAGES	H 1-21	2000		CLEANING	I 1-4	2002	<b>NEW</b>
REASSEMBLY OF 1ST STAGE	H 1-22	2000		INSPECTION	I 1-5	2002	<b>NEW</b>
TESTS	H 1-22	2000		REASSEMBLY	I 1-6	2002	<b>NEW</b>
TEST OF PNEUMATIC SYSTEM	H 1-22	2000		<b>ASSEMBLING THE QUICK COUPLING</b>			
A) PNEUMATIC CONTROL BODY	H 1-22	2000		<b>CHECK VALVE</b>	I 1-6	2002	<b>NEW</b>
B) PNEUMATIC DUMP VALVES	H 1-23	2000		ASSEMBLING THE AIRLOCK SYSTEM	I 1-7	2002	<b>NEW</b>
TEST OF BAG	H 1-23	2000		<b>CHECKS AND INSPECTIONS</b>	I 1-10	2002	<b>NEW</b>
C) MECHANICAL OVERPRESSURE VALVES	H 1-23	2000		AIRLOCK DRAWING	I 1-12	2002	<b>NEW</b>
D) BAG	H 1-24	2000		AIRLOCK TABLE	I 1-13	2002	<b>NEW</b>
TEST OF INTEGRATED SYSTEM ASSEMBLY	H 1-24	2000					
TEST OF DISTRIBUTORS / HOSES	H 1-25	2000					
F) DISASSEMBLY	H 1-25	2000					
G) REASSEMBLY	H 1-26	2000					
H.U.B. MARES DRAWING AND PARTS LIST	H 1-27	2000					
H.U.B. MARES TABLE	H 1-28	2002					
H.U.B. MARES TABLE	H 1-29	2002	<b>NEW</b>				
PNEUMATIC DISCHARGE VALVE H.U.B.							
DRAWING AND PARTS LIST	H 1-30	2002					
PNEUMATIC DISCHARGE VALVE H.U.B. TABLE	H 1-31	2002	<b>NEW</b>				
PNEUMATIC CONTROL H.U.B. DRAWING AND							
PARTS LIST	H 1-32	2002					
PNEUMATIC CONTROL H.U.B. TABLE	H 1-33	2002	<b>NEW</b>				
H.U.B. CENTURY DRAWING	H 1-34	2002	<b>NEW</b>				
H.U.B. CENTURY TABLE	H 1-35	2002	<b>NEW</b>				
H.U.B. AVANTGARDE DRAWING	H 1-36	2002	<b>NEW</b>				
H.U.B. AVANTGARDE TABLE	H 1-37	2002	<b>NEW</b>				
H.U.B. AVANTGARDE PNEUMATIC							
CONTROL DRAWING	H 1-38	2002	<b>NEW</b>				
H.U.B. AVANTGARDE PNEUMATIC							
CONTROL TABLE	H 1-39	2002	<b>NEW</b>				

**FIRST STAGES**

**O-RING TYPE - REFERENCE**

2012 - 46110101



2018 - 46110203



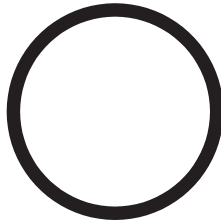
106 - 46110106



115 - 46110117



2100 - 46110224



**O-RING TYPE - REFERENCE**

2031 - 46110107



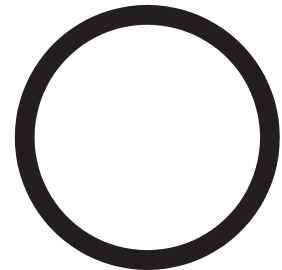
108 - 46110108



2050 - 46110211



3118 - 46110176



**SECOND STAGES**

**O-RING TYPE - REFERENCE**

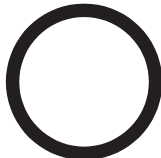
106 - 46110106



7x2 - 46200154



2068 - 46110225



2062 - 46110220



2037 - 46110110



**O-RING TYPE - REFERENCE**

2025 - 46110205



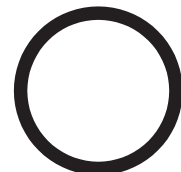
2043 - 46110215



2050 - 46110211



2075 - 46110243



**H.U.B. AIR TRIM - PNEUMATICAL INFLATOR**

**O-RING TYPE - REFERENCE**

2007 - 46110213



3x1 - 46200154



2015 - 46110102



2062 - 46110220

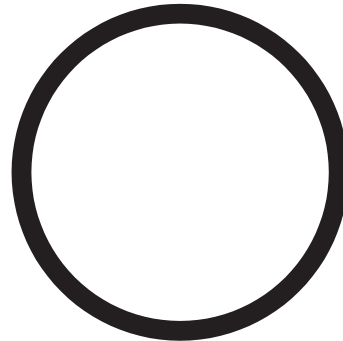


2050 - 46110211

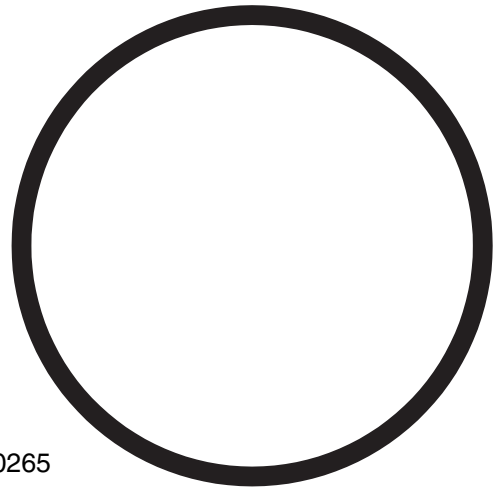


**O-RING TYPE - REFERENCE**

3156 - 47110270



3231 - 46110265



**H.U.B. AIR TRIM - PNEUMATICAL DUMP VALVES**

**O-RING TYPE - REFERENCE**

3x1 - 47110272



2015 - 46110102

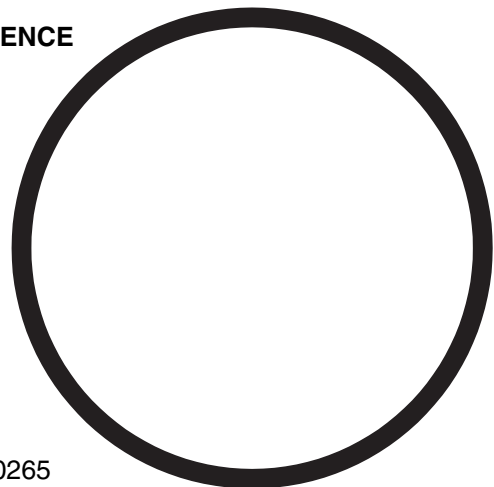


2037 - 46110110



**O-RING TYPE - REFERENCE**

3231 - 46110265



**H.U.B. - HOSES / MANIFOLDS**

**O-RING TYPE - REFERENCE**

2-003 - 46110242

2025 - 46110205

2031 - 46110107

2043 - 46110215



**O-RING TYPE - REFERENCE**

106 - 46110106

108 - 46110108

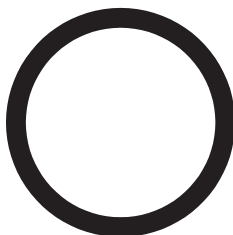
114 - 46110114



**H.U.B. - ORAL INFLATOR**

**O-RING TYPE - REFERENCE**

3100 - 47110271



**O-RING TYPE - REFERENCE**

2056 - 46110210



**DEPTH GAUGE**

**O-RING TYPE - REFERENCE**

108 - 46110108



**O-RING TYPE - REFERENCE**

2-003 - 46110242



**BUOYANCY COMPENSATORS**

**O-RING TYPE - REFERENCE**

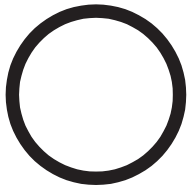
106 - 46110106



2-109 - 46110241



2081 - 46110221



**O-RING TYPE - REFERENCE**

2031 - 46110107



115 - 46110117



2056 - 46110210



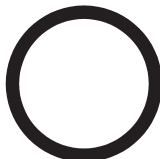
**AIRLOCK**

**O-RING TYPE - REFERENCE**

106 - 46110106



2068 - 46110225



**O-RING TYPE - REFERENCE**

2010 - 46110210



2025 - 46110205





**VALVE SETS**

**O-RING TYPE - REFERENCE**

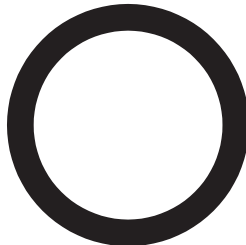
3050 - 46110119



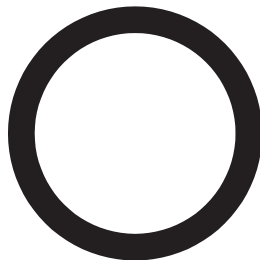
2056 - 46110210



4100 - 46110216



4106 - 46110216



**O-RING TYPE - REFERENCE**

2031 - 46110107



2025 - 46110205



2050 - 46110211



2043 - 46110211



117 - 46110300



2012 - 46110101



**SPEARGUNS**

**O-RING TYPE - REFERENCE**

**O-RING TYPE - REFERENCE**

2-003 - 46110242



2037 - 46110110



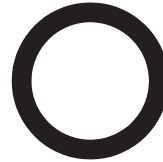
R/1 - 46110201



2007 - 46110213



3062 - 46110228



2015 - 46110102



106 - 46110106



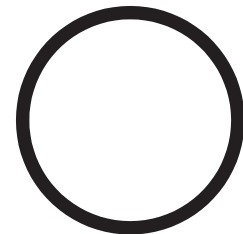
3056 - 46110227



2031 - 46110107



2106 - 46110245



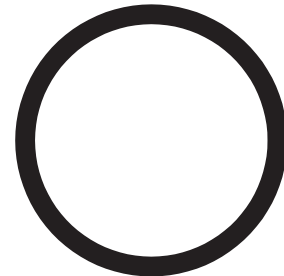
2062 - 46110220



122 BIS - 46110206

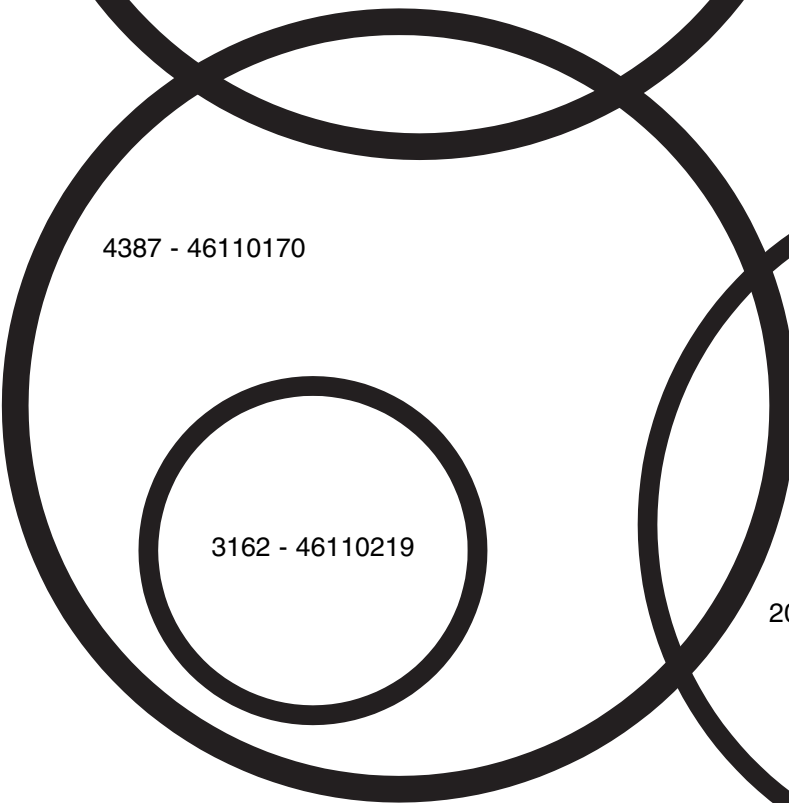
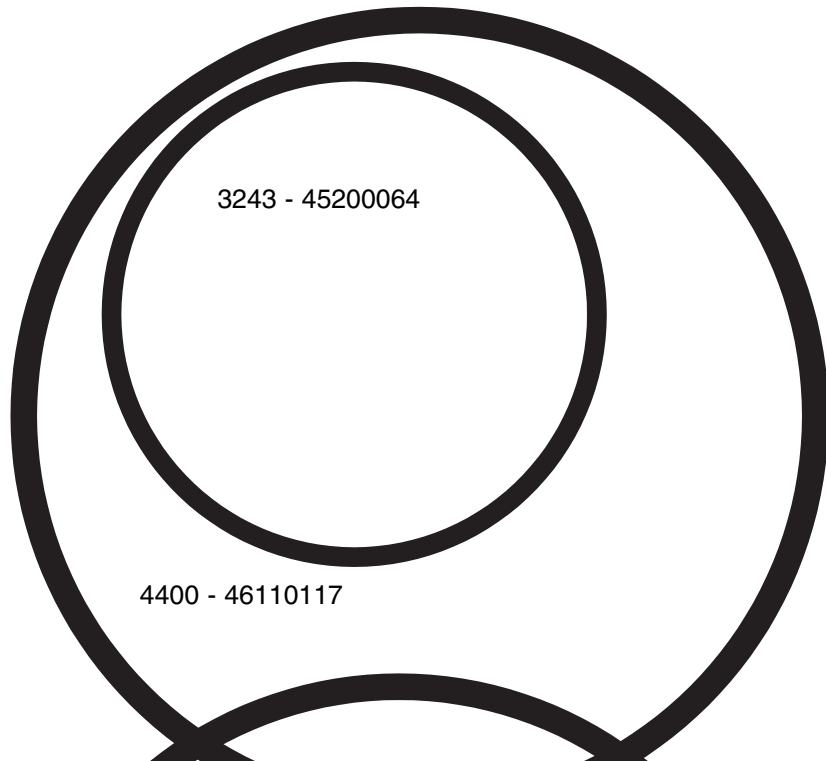


SPECIAL - 46110208



**LIGHTS**

**O-RING TYPE - REFERENCE**



**O-RING TYPE - REFERENCE**

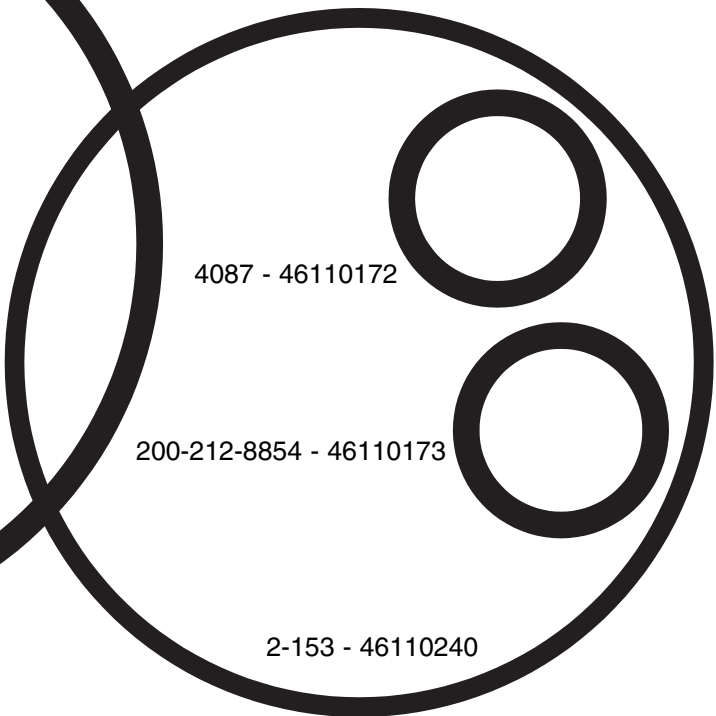
2025 - 46110205



2-109 - 46110241



2031 - 46110107



**MR22-RUBY TIT.  
ABYSS - V32  
FIRST STAGE**

**MR22 -RUBY(TITANIUM) -  
ABYSS -V32 FIRST STAGE**

**mares®**

**SUBJECT: ASSEMBLING - DISASSEMBLING THE V32  
1<sup>ST</sup> STAGE CAP (ref. Tab. n. 21of 14/03/02)**

**BTM5**

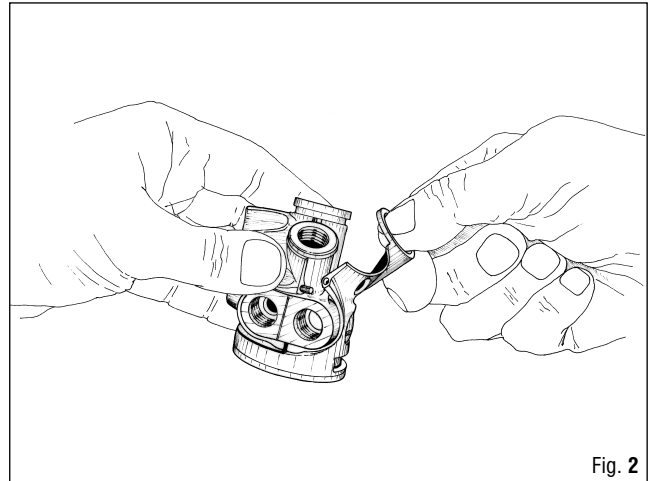
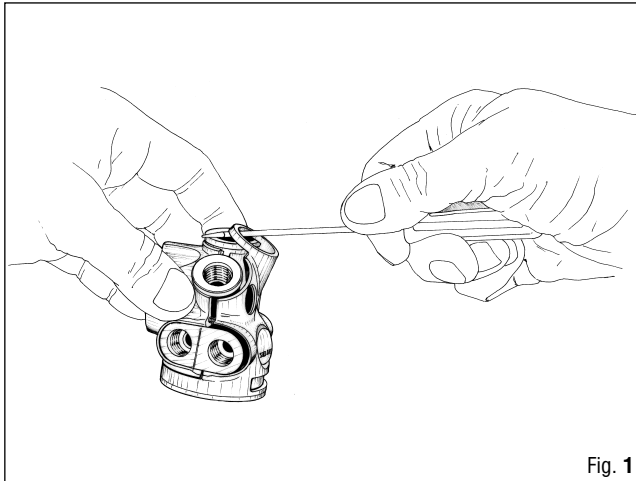
**NOTE** CARRY OUT THE FOLLOWING OPERATIONS BEFORE THE PROCEDURE DESCRIBED IN STEP 16 OF THE CORRESPONDING SERVICE MANUAL.

▶ **DISASSEMBLY**

1. REMOVE THE RING (SMALLER DIAMETER) OF THE RUBBER BOTTOM CASING (177) FROM ITS SEAT IN THE 1<sup>ST</sup> STAGE BODY (FIG. 1).
2. PULL THE RUBBER BOTTOM CASING (177) AWAY FROM THE THREADED PINS OF THE PLASTIC TOP CASING (178).

**⚠ CAUTION**

DURING THE OPERATIONS DESCRIBED IN STEP 2) DO NOT BEND THE RUBBER BOTTOM CASING EXCESSIVELY TO AVOID DEFORMING OR BREAKING IT.



3. REMOVE THE RING (LARGER DIAMETER) OF THE RUBBER LOWER CASING (177) FROM ITS SEAT IN THE 1<sup>ST</sup> STAGE BODY (FIG. 2) RELEASING THE PLASTIC TOP CASING (178).

**SUBJECT: ASSEMBLING - DISASSEMBLING THE V32 1<sup>ST</sup> STAGE CAP****BTM5****▶ ASSEMBLY**

**NOTE** CARRY OUT THE FOLLOWING OPERATIONS BEFORE THE PROCEDURE DESCRIBED IN STEP 1 OF THE CORRESPONDING SERVICE MANUAL.

1. CORRECTLY FIT THE PLASTIC TOP CASING (178) ON THE 1ST STAGE BODY.
2. CORRECTLY POSITION THE RING (LARGER DIAMETER) OF THE RUBBER BOTTOM CASING (177) ON THE CONNECTORS OF THE PLASTIC TOP CASING (178) (Fig. 2).
3. MATCH UP THE SEATS ON THE BOTTOM CASING (177) WITH THE THREADED PINS ON THE TOP CASING (178)

---

**△ CAUTION**

MAKE SURE THE THREADED PINS OF THE TOP CASING (178) HAVE BEEN CORRECTLY INSERTED INTO THEIR SEATS ON THE BOTTOM CASING (177).

---

4. CORRECTLY POSITION THE RING (SMALLER DIAMETER) OF THE RUBBER BOTTOM CASING (177) ON THE CONNECTORS OF THE PLASTIC TOP CASING (178) (Fig. 1).

---

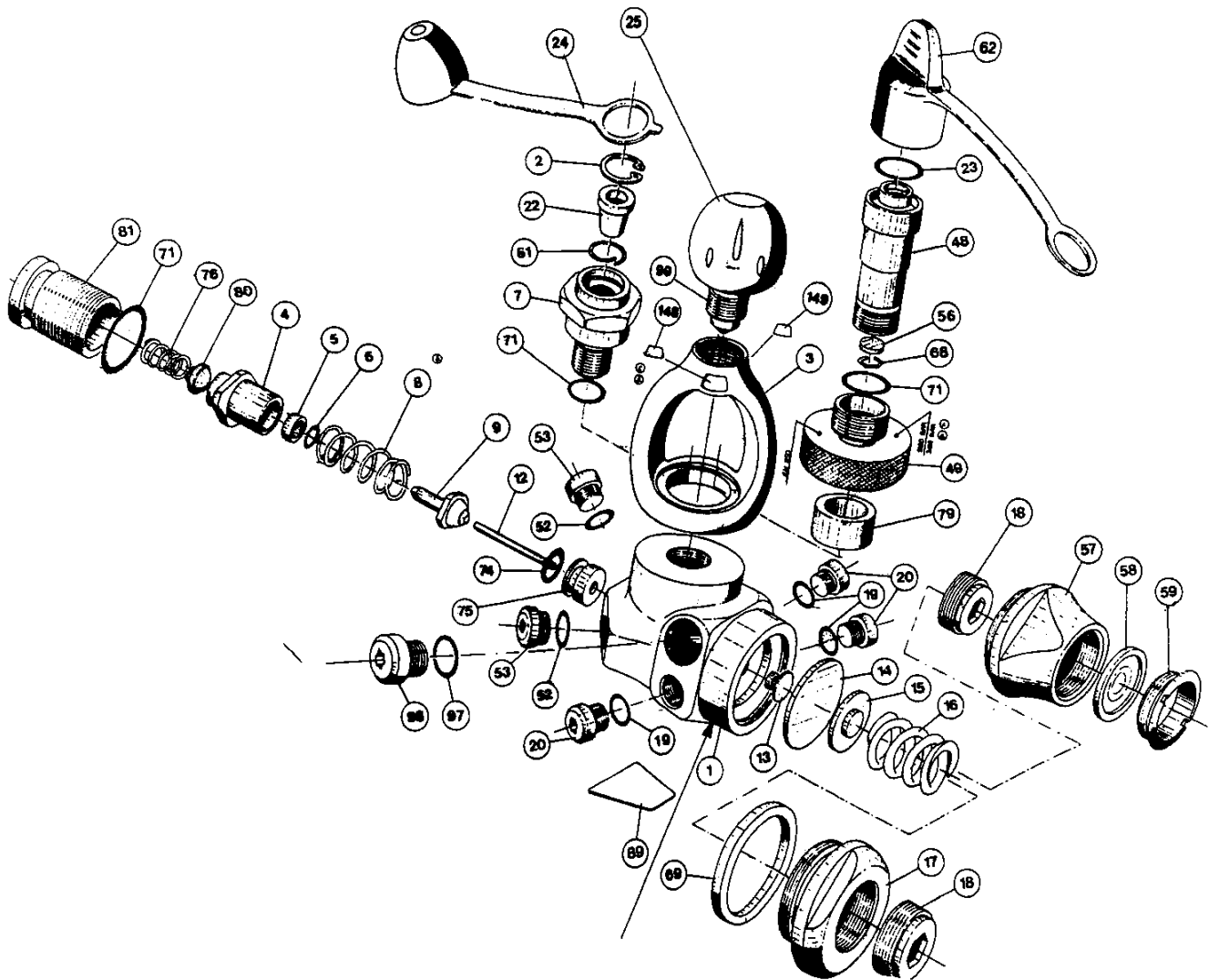
**△ CAUTION**

MAKE SURE THAT THE FIRST STAGE CAP IS CORRECTLY IN PLACE.

---

**FIRST STAGE RUBY**

Reference drawing No.: E 3 - Table NO. 2  
Updated to 03-04-2000



**DRAWING CONTINUED FROM PREVIOUS TABLE**

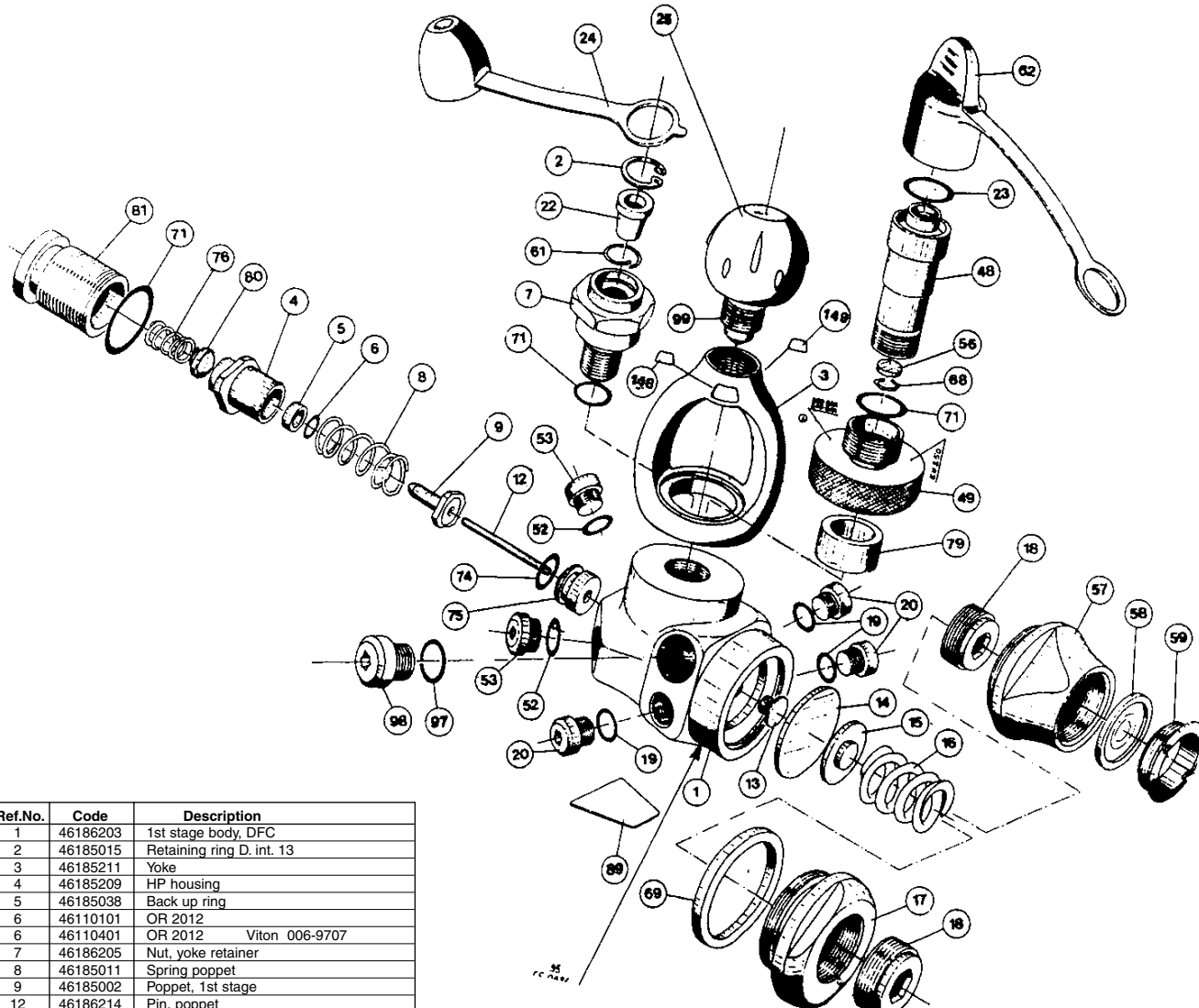
Table No. 2	<b>RUBY FIRST STAGE</b>	Drawing reference No.: E 3 Table updated on 30/10/2001
-------------	-------------------------	-----------------------------------------------------------

Ref. N.	Code	Description
1	A	1 <sup>ST</sup> Stage Body with DFC port
2	46185015	Snap ring Int. D. 13
3	46185211	Yoke
4	D	HP chamber
5	46185038	Backup ring
6	46110401	OR 2012 Viton 006-9707
7	46186205	Yoke retainer nut
8	46186306	RUBY poppet spring
9	46186250	RUBY 1 <sup>ST</sup> Stage Poppet
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	46110402	OR 106 Viton 610-9707
20	46185204	3/8" UNF Port plug
22	46186202	Tapered sintered filter
23	46110406	OR 115 Viton 614-9707
24	46185010	Dust cap
25	46184079	Yoke knob
48	F	200 BAR (DIN) connector body
48	F	300 BAR (DIN) connector body
49	F	(DIN) 200 BAR threaded locking ring
49	F	(DIN) 300 BAR threaded locking ring
52	46110404	OR 108 Viton 611-9754
53	46185205	7/16" HP port plug
56	46183053	DIN connector filter D. 9
57	I	C.W.D. body
58	46185301	C.W.D. Diaphragm
59	I	C.W.D. Locking ring

Ref. N.	Code	Description
61	46185013	Filter spring
62	46183013	DIN connector dust cap
68	46183052	Pentagonal spring for DIN connector D. 12
69	46186218	Shock ring
71	46110413	OR 2050 Viton 014-9707
74	46110403	OR 2031 Viton 011-9707
75	46186249	SCS poppet seat (RUBY)
76	46186210	HP chamber spring
79	F	DIN connector spacer bushing
80	46186206	Anti-drag head
81	46186208	Plug
89	46184309	RUBY Sticker
148	46184315	"EN 250 - 200 bar" Sticker
149	46184316	"MARES" Sticker
		<b>ASSEMBLIES</b>
A	46200104	Complete RUBY 1st Stage Assembly
D	46186259	HP Chamber assembly (4-5-6)
F	416800 200 NX	200 BAR DIN connector assembly (23-48-49-56-62-68-71-79)
F	416800 300 NX	300 BAR DIN connector assembly (23-48-49-56-62-68-71-79)
I	416851	C.W.D. KIT
***	46185167	RUBY INT. 1st Stage (VITON O-Ring) Service Kit (2-5-6-19-22-52-71-74)
***	46185168	RUBY DIN 1st Stage (VITON O-Ring) Service Kit (5-6-19-23-52-56-68-71-74)
		<b>ACCESSORIES</b>
98	46186207	1/2 UNF Port plug
97	46110415	OR 2043 V



**FIRST STAGE ABYSS** Reference drawing No.: E 2 - Table NO. 5  
Updated to 03-04-2000



Ref.No.	Code	Description
1	46186203	1st stage body, DFC
2	46185015	Retaining ring D. int. 13
3	46185211	Yoke
4	46185209	HP housing
5	46185038	Back up ring
6	46110101	OR 2012
6	46110401	OR 2012 Viton 006-9707
7	46186205	Nut, yoke retainer
8	46185011	Spring poppet
9	46185002	Poppet, 1st stage
12	46186214	Pin, poppet
13	46186213	Button, poppet
14	46185022	Diaphragm
15	46185034	Plate, spring base
16	46185023	Spring, diaphragm
17	46186219	Retaining ring
18	46185028	Regulating nut, spring
19	46110106	OR 106
19	46110402	OR 106 Viton 610-9707
20	46185204	Plug, 3/8" UNF
22	46186202	Conical sintered filter
23	46110117	OR 115
23	46110406	OR 115 Viton 614-9707
24	46185010	Dust cap
25	46184079	Knob assembly
48	46183050	DIN connector body 200 BAR
48	46183049	DIN connector body 300 BAR
49	46183006	DIN connector wheel 200 BAR
49	46183001	DIN connector wheel 300 BAR
52	46110108	OR 108
52	46110404	OR 108 Viton 611-9754
53	46185205	Plug, HP 7/16"
56	46183053	Filter, DIN connector D. 9
57	46185300	Body, CWD
58	46185301	Diaphragm, CWD
59	46185302	Bezel, CWD
61	46185013	Spring, filter
62	46183013	Dust cap, DIN connector
68	46183052	Spring, DIN connector D. 12
69	46186218	Shockproof ring
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707
74	46110107	OR 2031
74	46110403	OR 2031 Viton 011-9707

Ref.No.	Code	Description
75	46186216	1st stage poppet seat
76	46186210	Spring, HP housing
79	46183051	Spacer ring, DIN connector
80	46186206	Anti-trail head
81	46186208	1st stage plug
89	46184324	Label ABYSS
148	46184315	Label "EN 250 - 200 bar"
149	46184316	Label "MARES"
<b>ASSEMBLIES</b>		
A	46200106	1st stage assembly ABYSS 2000
A	46200107	1st stage assembly ABYSS J
A	46185988	1st stage assembly ABYSS DIN
A	46200108	1st stage assembly ABYSS CWD
D	46185210	HP housing assy (4-5-6)
F	416802 200	DIN connector assy 200 BAR (23-48-49-56-62-68-71-79)
F	416802 300	DIN connector assy DIN 300 BAR (23-48-49-56-62-68-71-79)
I	416850	CWD kit ABYSS
***	46186152	Maintenance kit, 1st stage ABYSS INT (2-5-6-19-22-52-71-74)
***	46186151	Maintenance kit ABYSS DIN (5-6-19-23-52-56-68-71-74)
<b>ACCESSORIES</b>		
	46186207	Plug, 1/2" UNF
	46110215	OR 2043

Table No.19	<b>ABYSS FIRST STAGE</b>	Drawing reference No.: E 2 table updated on 30/10/2001
-------------	--------------------------	--------------------------------------------------------------

Ref. N.	Code	Description
1	A	1 <sup>ST</sup> Stage body with DFC port
2	46185015	Snap ring Int. D. 13
3	46185211	Yoke
4	D	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	1 <sup>ST</sup> Stage poppet
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	F	200 BAR DIN connector body
48	F	300 BAR DIN connector body
49	F	DIN 200 BAR threaded locking ring
49	F	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	I	C.W.D. body
58	46185301	C.W.D. Diaphragm
59	I	C.W.D. 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	F	DIN connector spacer bushing
80	46186206	Anti-drag head
81	46186208	1 <sup>ST</sup> Stage port plug
89	46184324	ABYSS Sticker
148	46184315	"EN 250 - 200 bar" Sticker
149	46184316	"MARES" Sticker
		<b>ASSEMBLIES</b>
A	46200106	Complete ABYSS 1st Stage assembly
A	< 46185988 >	Complete ABYSS DIN 1st Stage Assembly
D	46185210	HP Chamber assembly. (4-5-6)
F	416800 200 NX	200 BAR DIN connector assembly (23-48-49-56-62-68-71-79)
F	416800 300 NX	300 BAR DIN connector assembly (23-48-49-56-62-68-71-79)
I	416851	C.W.D. KIT
** *	46186152	ABYSS INT. 1 <sup>ST</sup> Stage Service Kit (2-5-6-19-22-52-71-74)
** *	46186151	ABYSS DIN Service Kit (5-6-19-23-52-56-68-71-74)
** *	46185167	ABYSS INT. NITROX 1 <sup>ST</sup> Stage Service Kit. (VITON O-Ring) (2-5-6-19-22-52-71-74)
** *	46185168	ABYSS NITROX DIN 1 <sup>ST</sup> Stage Service Kit (VITON O-Ring) (5-6-19-23-52-56-68-71-74)
		<b>ACCESSORIES</b>
98	46186207	1/2 UNF Port plug
97	46110215	OR 2043

Drawing No E 12	<b>V 32 FIRST STAGE</b>	Drawing updated on at 05/12/2001
--------------------	-------------------------	-------------------------------------

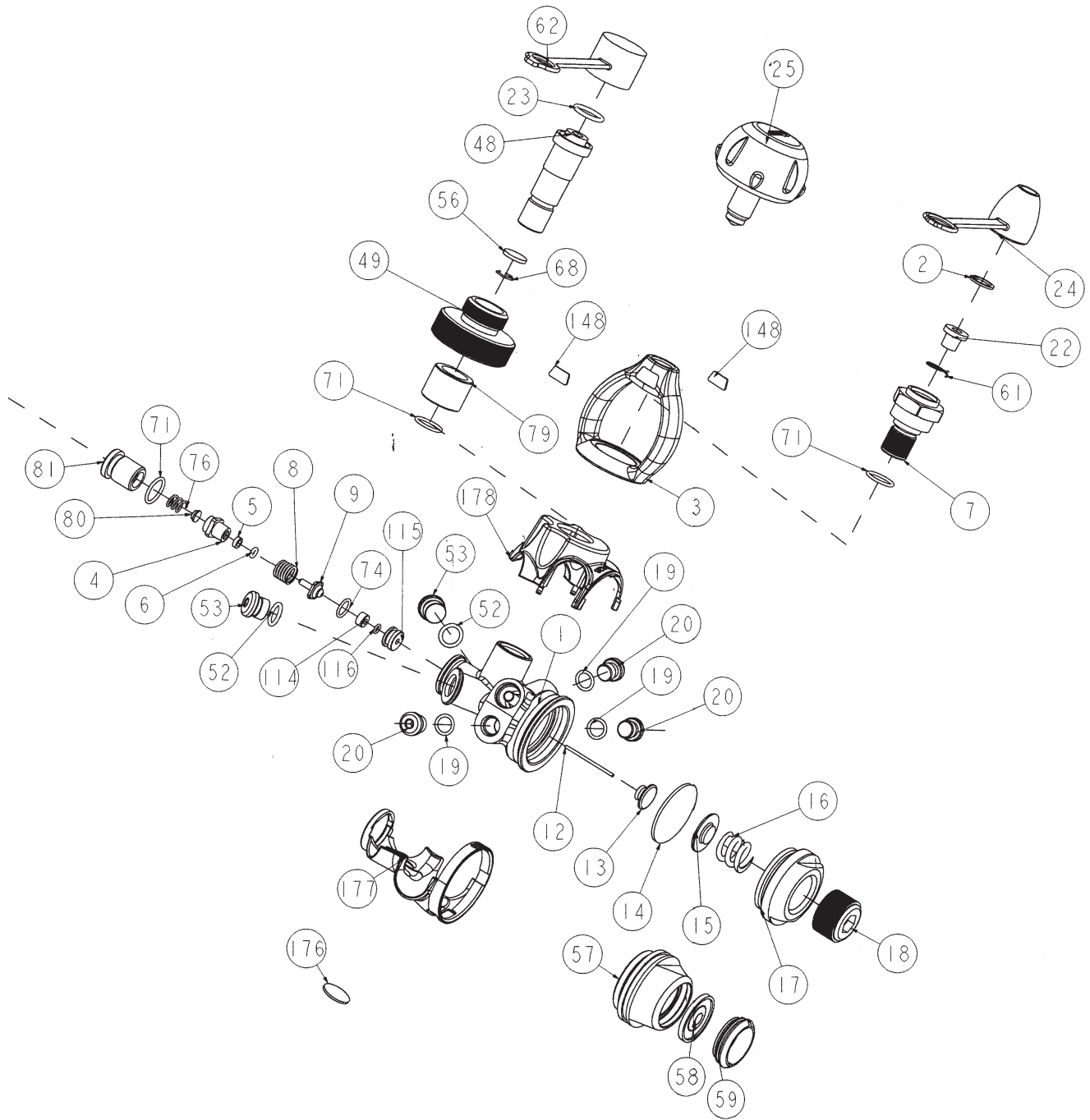


Table No 21	<b>V 32 FIRST STAGE</b>	Drawing reference No.: E 12 Table updated on 02/04/2002
-------------	-------------------------	------------------------------------------------------------

Ref. N.	Code	Description
1	A	V32 1st Stage Body with DFC port
2	46185015	Snap ring Int. D. 13
3	46186270	Sandblasted yoke
4	D	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	F	200 BAR DIN connector body
49	F	DIN 200 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	I	C.W.D. body
58	46185301	C.W.D. Diaphragm
59	I	C.W.D. 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
76	46186210	HP chamber spring
79	F	DIN connector spacer bushing
80	46186206	Anti-drag head
81	46186208	1st Stage port plug.
114	H	SCS poppet seat
115	H	Poppet seat retaining washer
116	46110405	OR 4 X 1
148	46184315	" EN 250 " Yoke sticker
176	46200351	Oval Sticker
177	46200368	V32 bottom casing
178	46200367	V 32 top casing
		<b>ASSEMBLIES</b>
A	46200405	V32 1st Stage assembly
D	46185210	HP Chamber assembly. (4-5-6)
H	46186249	SCS poppet seat
***	46186152	INT 1st Stage 32/22/16/TP Service Kit (2-5-6-19-22-52-71-74)
***	46186151	DIN 1st Stage 32/22/16/TP Service Kit (5-6-19-23-52-56-68-71-74)
***	46185167	INT VITON 1st Stage Ruby/32/22/16 Service Kit (2-5-6-19-22-52-71-74)
***	46185168	DIN VITON 1st Stage Ruby/32/22/16 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

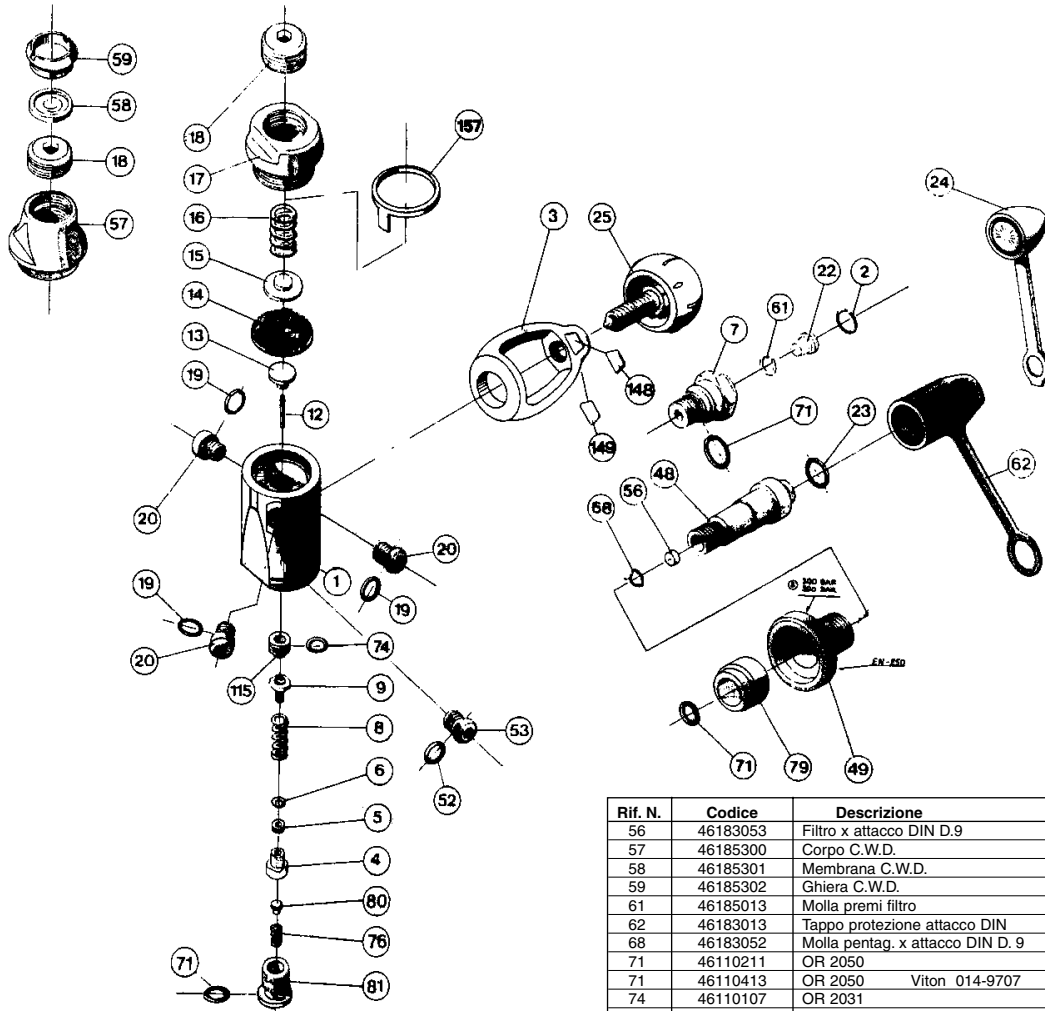
Table No. 8	<b>FIRST STAGE V 16 2000 - V 16 2000 NITROX - VX 16</b>	Drawing reference No.: E 6 Table updated on 30/10/2001
-------------	---------------------------------------------------------	-----------------------------------------------------------

Ref. N.	Code	Description
1	<b>A</b>	1st stage body DFC V 16
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 Valve Spring
9	46186304	1ST stage valve Titanium V16
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 nut
48	<b>F</b>	200 BAR DIN connector body
48	<b>F</b>	300 BAR DIN connector body
49	<b>F</b>	Blocking ring nut (DIN) 200 BAR
49	<b>F</b>	Blocking ring nut (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	H.P. chamber spring
79	<b>F</b>	DIN connector spacer bushing
80	46186206	Anti-drag head
81	46186208	Port plug
108	46185266	C.W.D. dust cap
109	46186239	V 16 SCS tampographic body protection
110	46186245	Tampographic dust 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	1st Stage assembly V 16
<b>D</b>	46185210	H.P. chamber assembly ( 4-5-6 )
<b>D</b>	46186259	Nitrox H.P. chamber assembly ( 4-5-6 )
<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	Connector Assembly DIN 300 BAR Nitrox ( 23-48-49-56-62-68-71-79 )
<b>I</b>	416851	AER KIT
***	46186152	Serv.kit. INT 1° STD 32/22/16/TP ( 2-5-6-19-22-52-71-74 )
***	46186151	Serv.kit. DIN 1° STD 32/22/16/TP ( 5-6-19-23-52-56-68-71-74 )
***	46185167	Serv.kit. INT VITON 1st STG Ruby/32/22/16 ( 2-5-6-19-22-23-52-56-68-71-74 )
***	46185168	Serv.kit. DIN VITON 1st STG Ruby/32/22/16 ( 5-6-19-23-52-56-68-71-74 )

**FIRST STAGE TI PLANET**

Reference drawing No. : E 1 - Table No. 1  
Update to: 03-04-2000



Rif. N.	Codice	Descrizione
1	46186240	Corpo 1° st. DFC V 16
2	46185015	Seeger D. int. 13
3	46185211	Brida V 16
4	46185209	Camera H.P.
5	46185038	Anello antiestrusione
6	46110101	OR 2012
6	46110401	OR 2012 Viton 006-9707
7	46186241	Esagono Trattenuta brida
8	46186306	Molla Valvola V 16
9	46186304	Valvola 1° st. Titanio V16
12	46186214	Spillo valvola
13	46185032	Disco spinta
14	46185022	Membrana
15	46185034	Piattello appoggio molla
16	46185023	Molla premi membrana
17	46186219	Dado di bloccaggio
18	46185028	Dado regolazione molla
19	46110106	OR 106
19	46110402	OR 106 Viton 610-9707
20	46185204	Tappo chiusura 3/8" UNF
22	46186202	Filtro sinterizzato conico
23	46110117	OR 115
23	46110406	OR 115 Viton 614-9707
24	46185010	Tappo protezione V 16
25	46184079	Manopola tiraggio brida V 16
48	46183036	Corpo attacco (DIN) 200 BAR
48	46183035	Corpo attacco (DIN) 300 BAR
49	46183006	Ghiera di blocc. (DIN) 200 BAR
49	46183001	Ghiera di blocc. (DIN) 300 BAR
52	46110108	OR 108
52	46110404	OR 108 Viton 611-9707
53	46185205	Tappo chiusura H.P. 7/16" UNF

Rif. N.	Codice	Descrizione
56	46183053	Filtro x attacco DIN D.9
57	46185300	Corpo C.W.D.
58	46185301	Membrana C.W.D.
59	46185302	Ghiera C.W.D.
61	46185013	Molla premi filtro
62	46183013	Tappo protezione attacco DIN
68	46183052	Molla pentag. x attacco DIN D. 9
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707
74	46110107	OR 2031
74	46110403	OR 2031 Viton 011-9707
75	46186249	Sede valvola SCS (V 16)
76	46186210	Molla premi camera H.P.
79	46183034	Boccola distanziale attacco DIN
80	46186206	Testa antistriscinamento
81	46186208	Tappo chiusura
108	46185266	Calotta di protezione C.W.D.
109	46186239	Protezione corpo V 16 SCS tampografata
110	46186245	Calotta di protezione tampografata
148	46184315	Etichetta "EN 250 - 200 bar"
149	46184316	Etichetta "MARES"
<b>COMPLETI</b>		
A	46200109	1° Stadio CPL. V 16 2000
A	46200110	1° Stadio CPL. V 16 2000 J
A	46200111	1° Stadio CPL. V 16 DIN 2000
D	46185210	Camera H.P. compl. (4-5-6)
D	46186259	Camera H.P. compl. (4-5-6) Nitrox
F	416803 200 NR	Attacco completo DIN 200 BAR (23-48-49-56-62-68-71-79)
F	416803 300 NR	Attacco completo DIN 300 BAR (23-48-49-56-62-68-71-79)
F	416803 200 NX	Attacco Compl. DIN 200 BAR Nitrox (23-48-49-56-62-68-71-79)
F	416803 300 NX	Attacco Compl. DIN 300 BAR Nitrox (23-48-49-56-62-68-71-79)
I	416851	KIT CWD V 16
***	46186152	Kit manutenzione 1° st. V 16 INT. ( 2-5-6-19-22-52-71-74 )
***	46186151	Kit manutenzione 1° st. V 16 - V 16 DIN (5-6-19-23-52-56-68-71-74)
***	46185167	Kit manutenzione 1° st. V 16 INT. Viton ( 2-5-6-19-22-23-52-56-68-71-74 )
***	46185168	Kit manut. 1° st. V 16 - V 16 DIN Viton (5-6-19-23-52-56-68-71-74)
<b>NOTE</b>		
Nel Kit (cod. 186151 e 186152) l'OR (74) della sede valvola è anche in Viton		

Table No. 1	<b>FIRST STAGE TI PLANET</b>	Drawing reference No.: E 1 Table updated on 30/10/2001
-------------	------------------------------	-----------------------------------------------------------

Ref. N.	Code	Description
1	<b>A</b>	Ti Planet 1st stage body
2	46185015	Snap ring INT.D. 3
3	46186500	Titanium 98 yoke
4	<b>D</b>	HP Chamber ( TI )
5	46185038	Backup ring
6	46110101	OR 2012
7	46186504	Yoke retainer nut
8	46186306	Poppet spring
9	46186304	Titanium 1st Stage poppet
12	46186505	Poppet pin
13	46186506	Poppet button
14	46185022	Diaphragm
15	46185034	Spring base plate
16	46185023	Diaphragm spring
17	46186507	Retaining nut
18	46186508	Spring adjuster nut
19	46110106	OR 106
20	46186509	3/8" UNF Port plug
22	46186202	Tapered sintered filter
23	46110117	OR 115
24	46185010	Dust cap
25	46186528	yoke nut ( TI )
48	<b>F</b>	300 BAR DIN connector body ( TI )
49	<b>F</b>	Blocking ring nut (DIN) 300 BAR ( TI )
52	46110108	OR 108
53	46186512	7/16" HP port plug UNF ( TI )
56	46183053	DIN connector filter D.9
57	<b>I</b>	C.W.D. body
58	46185301	C.W.D. diaphragm

Ref. N.	Code	Description
59	<b>I</b>	C.W.D. ring nut
61	46185013	Filter spring
62	46183013	DIN connector dust cap
68	46183052	Pentagonal spring for DIN connector D. 9
71	46110211	OR 2050
74	46110107	OR 2031
76	46186210	H.P. chamber spring
79	<b>F</b>	DIN connector spacer bushing
80	46186206	Anti-drag head
81	46186515	Port plug
115	46186559	Titanium 1st stage poppet seat
148	46184315	"EN 250 - 200 bar" Sticker
149	46184316	"MARES" Sticker
153	46110176	OR 3118
154	46187016	Plastic saddle
157	46186529	Protection ring
		<b>ASSEMBLIES</b>
<b>A</b>	46200100	1st Stage assembly TI PLANET
<b>D</b>	46186556	H.P. chamber assembly ( 4-5-6 )
<b>F</b>	46200103	300 BAR DIN connector assembly ( 23-48-49-56-62-68-71-79 )
<b>I</b>	416854	KIT CWD TI PLANET
***	46186152	Serv.kit. INT 1° STD 32/22/16/TP ( 2-5-6-19-22-52-71-74 )
***	46186151	Serv.kit. DIN 1° STD 32/22/16/TP ( 5-6-19-23-52-56-68-71-74 )

MR12 - MRX12 -  
V12 - MR12 LONG  
FIRST STAGE

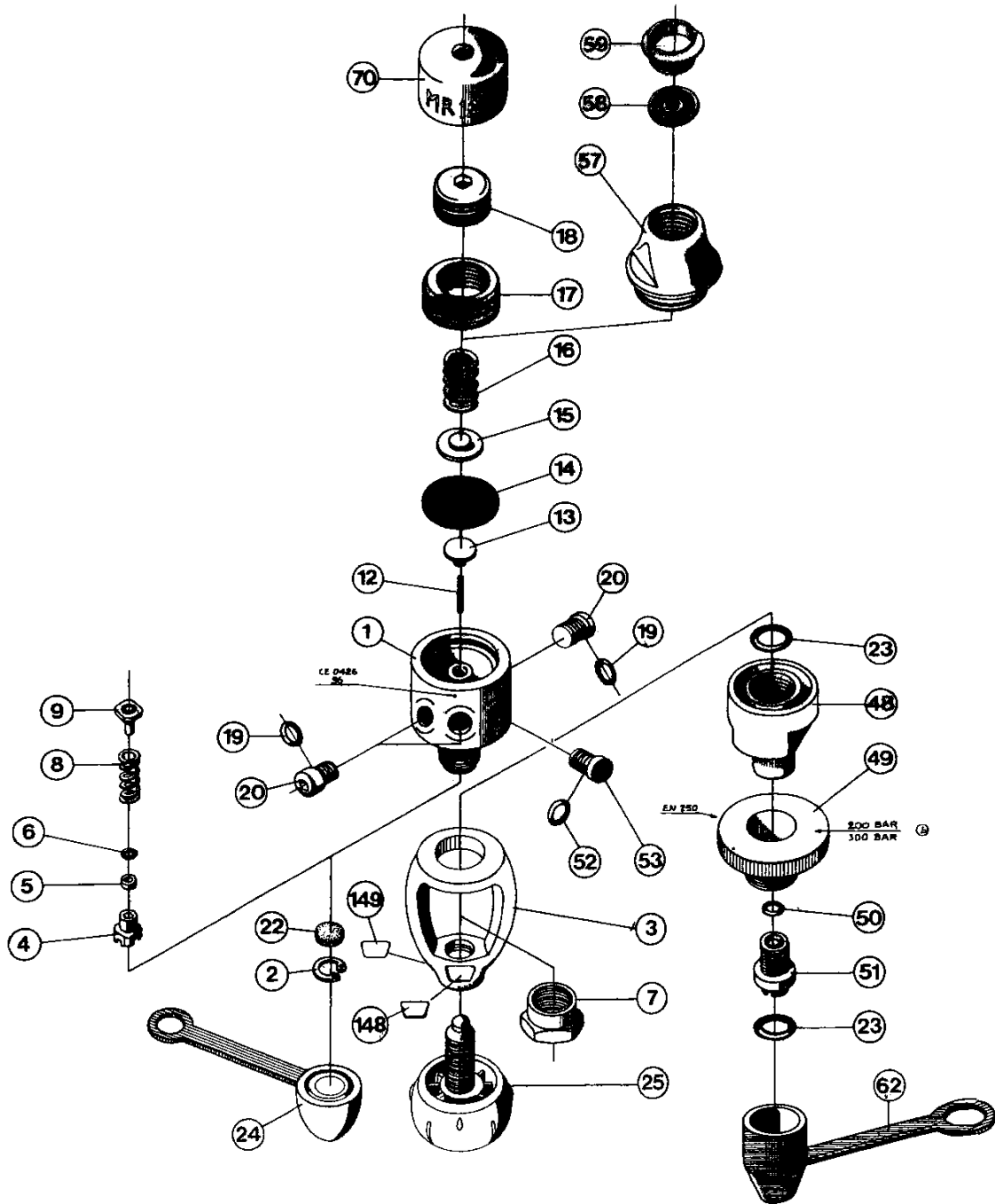
**MR12 - MRX12 - V12 -  
MR12 LONG FIRST STAGE**





**FIRST STAGE MR12 DFC 2000**  
**FIRST STAGE MR12 NITROX**  
**FIRST STAGE MRX12 DFC**

Reference drawing No. : E8 - Table No. 12-13  
Updated to 03-04-2000



**DRAWING CONTINUED FROM PREVIOUS TABLE**

Table No. 12	<b>MR 12 DFC FIRST STAGE MR 12 NITROX</b>	Drawing reference No: E 8 Table updated on 30/10/2001
--------------	-----------------------------------------------	----------------------------------------------------------

Ref.N.	Code	Description
1	<b>A</b>	MR 12 DFC 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	46185002	MR 12 first stage valve
12	46185206	MR 12 valve core
13	46185032	Poppet button
14	46185022	Diaphragm
15	46185034	Spring base plate
16	46185023	Diaphragm spring
17	46184510	Retaining nut
18	46184511	Spring adjustment nut
18	46185028	Spring adjustment 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 protection cap
25	46184079	MR12 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	<b>F</b>	Connector coupling (DIN) 200 BAR
51	<b>F</b>	Connector coupling (DIN) 300 BAR
52	46110108	OR 108
52	46110404	OR 108 Viton 611-9707
53	46185205	7/16" HP port plug
57	<b>I</b>	C.W.D. body

Ref.N.	Code	Description
58	46185301	C.W.D. Diaphragm
59	<b>I</b>	C.W.D. Locking ring
62	46183013	DIN connector dust cap
70	46184452	MR 12 cap
148	46184315	"EN 250 - 200 bar" Sticker
149	46184316	"MARES" Sticker
		<b>ASSEMBLIES</b>
<b>A</b>	46186286	1st Stage assembly MR 12
<b>D</b>	46185210	H.P. chamber assembly ( 4-5-6 )
<b>D</b>	46186259	Nitrox H.P. chamber assembly ( 4-5-6 )
<b>F</b>	416804 200 NX	Nitrox 200 BAR DIN connector assembly ( 23-48-49-50-51-62 )
<b>F</b>	416804 300 NX	Nitrox 300 BAR DIN connector assembly ( 23-48-49-50-51-62 )
<b>I</b>	416851	CWD Kit
<b>***</b>	46186150	Serv.kit. INT/DIN 1st STG 12/LONG ( 2-5-6-19-22-23-50-52-74 )
<b>***</b>	46186154	Serv.kit. INT/DIN VITON 1st STG 12/LONG ( 2-5-6-19-22-23-50-52-74 )
		<b>ACCESSORIES</b>
----	415861	INT/DIN yoke connector assembly (200 BAR)
---	46179258	INT/DIN nut connector assembly
---		Port plug external DIN thread
		<b>SAFE FIRST ACCESSORIES</b>
----	46200180	Extra 1st stage hose (Safe first)
----	46200241	1st stage cap Yellow
----	46200177	Swivel connector fixed part
----	46110215	OR 2043
----	46110205	OR 105
----	46200178	Swivel connector mobile part
----	46200176	Swivel connector cap

Drawing No. E 13	<b>MR 12 LONG FIRST STAGE</b>	Drawing updated on 21/12/2001
---------------------	-------------------------------	----------------------------------

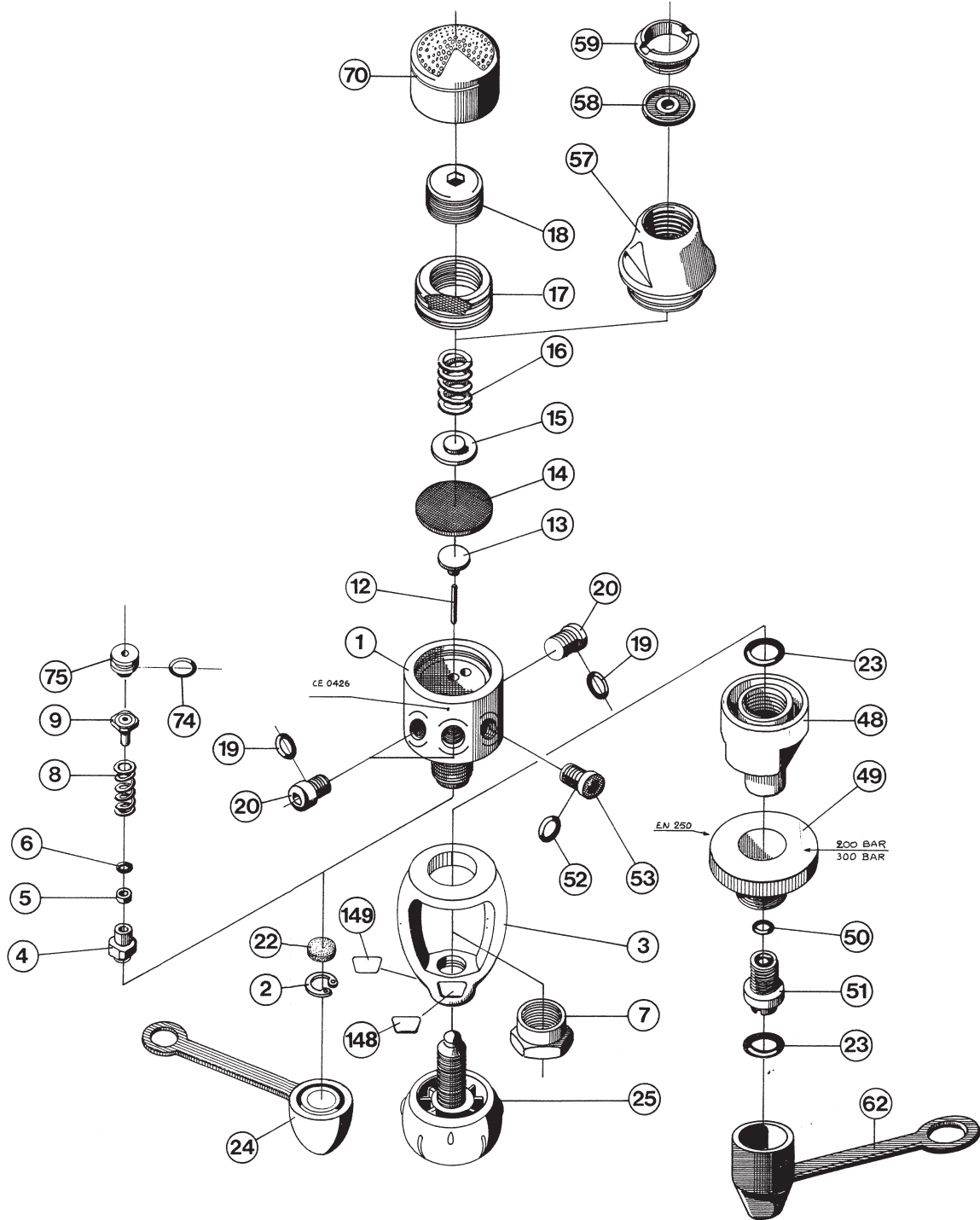


Table No. 22	<b>MR 12 LONG FIRST STAGE</b>	Drawing reference No: E 13 Table updated on 04/02/2002
--------------	-------------------------------	-----------------------------------------------------------

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	MR12 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	MR12 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	<b>F</b>	Connector coupling (DIN) 200 BAR
51	<b>F</b>	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>	C.W.D. body
58	46185301	C.W.D. Diaphragm
59	<b>I</b>	C.W.D. Locking ring
62	46183013	DIN connector dust cap
70	46200235	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	Nitrox H.P. chamber assembly ( 4-5-6 )
<b>F</b>	416804 200 NX	Nitrox 200 BAR DIN connector assembly ( 23-48-49-50-51-62 )
<b>F</b>	416804 300 NX	Nitrox 300 BAR DIN connector assembly ( 23-48-49-50-51-62 )
<b>I</b>	416851	CWD Kit
<b>***</b>	46186150	Serv.kit. INT/DIN 1st STD 12/LONG ( 2-5-6-19-22-23-50-52-74 )
<b>***</b>	46186154	Serv.kit. INT/DIN VITON 1st STG 12/LONG ( 2-5-6-19-22-23-50-52-74 )
		<b>ACCESSORIES</b>
----	415861	INT/DIN yoke connector assembly (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 30/10/2001
-----------------	-------------------------------------------------------	--------------------------------------------------------------

Ref. N.	Code	Description
1	A	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	F	Connector body (DIN) 200 BAR
48	F	Connector body (DIN) 300 BAR
49	F	DIN 200 BAR threaded locking ring
49	F	DIN 300 BAR threaded locking ring
50	46110203	OR 2018
50	46110409	OR 2018 Viton 008-9707
51	F	Connector coupling (DIN) 200 BAR
51	F	Connector coupling (DIN) 300 BAR
52	46110108	OR 108
52	46110404	OR 108 Viton 611-9707
53	46185205	H.P. 7/16" UNF closing plug

Ref. N.	Code	Description
61	46185013	Filter spring
62	46183013	DIN connector dust cap
82	46186221	Spring washer
84	46186228	Piston
85	46186225	Closing cap
86	46110224	OR 2100
86	46110419	OR 2100 Viton 022-9707
88	46186223	Piston seat
89	46184354	1st stage label R2
148	46184315	"EN 250 - 200 bar" Sticker
149	46184316	"MARES" Sticker
		<b>ASSEMBLIES</b>
A	46200112	CPL 1st Stage R2
F	416804 200 NX	Nitrox 200 BAR DIN connector assembly ( 23-48-49-50-51-62 )
F	416804 300 NX	Nitrox 300 BAR DIN connector assembly ( 23-48-49-50-51-62 )
***	46185323	INT/DIN 1st stage service kit ( 2-19-22-23-50-52-86-88 )
***	46186155	Nitrox(VITON O-Ring) INT/DIN 1st stage service kit ( 2-19-22-23-50-52-86-88 )

## ADJUSTING AND CHECKING THE INTERMEDIATE PRESSURE



**WARNING !**

DO NOT SUBMERGE THE INTERMEDIATE PRESSURE MEASURING GAUGE.

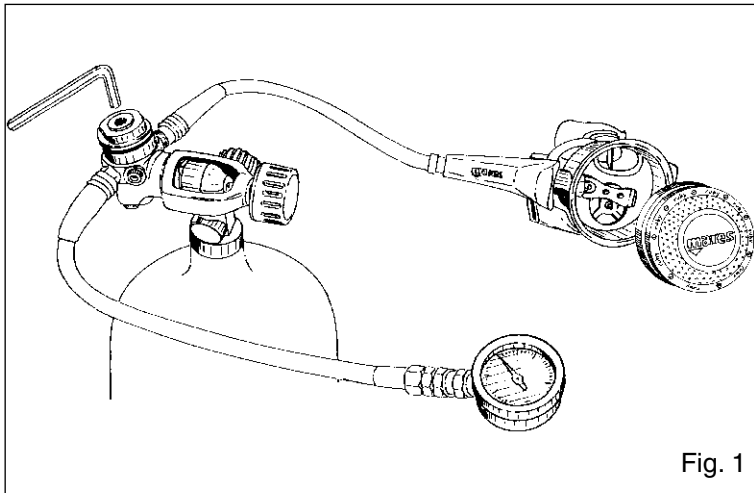


Fig. 1

**TABLE OF FIRST STAGE INTERMEDIATE PRESSURES**

MODEL	P.S.I.	BAR
RUBY	142 - 148	9,8 - 10,2
V 32	142 - 148	9,8 - 10,2
MR 22	142 - 148	9,8 - 10,2
MR 16	142 - 148	9,8 - 10,2
TI PLANET	142 - 148	9,8 - 10,2
V 16	142 - 148	9,8 - 10,2
MR 12	142 - 148	9,8 - 10,2
V 12	142 - 148	9,8 - 10,2
MR 12 II°	137 - 142	9,5 - 9,8
R 2 (with tank at 2900 p.s.i./200 bar)	142 - 152	9,8 - 10,5
MR 10 (with tank at 2900 p.s.i. / 200 bar)	123 - 130	8,5 - 9,0

**TABLE OF FIRST STAGE INTERMEDIATE PRESSURE WITH C.W.D. KIT**

MODEL	P.S.I.	BAR
RUBY	130 - 136	9 - 9,4
V 32	130 - 136	9 - 9,4
MR 22	130 - 136	9 - 9,4
MR 16	130 - 136	9 - 9,4
TI PLANET	130 - 136	9 - 9,4
V 16	130 - 136	9 - 9,4
MR 12	130 - 136	9 - 9,4
V 12	130 - 136	9 - 9,4
MR 12 II°	130 - 136	9 - 9,4

## ► PROCEDURE FOR ADJUSTING THE INTERMEDIATE PRESSURE IN DIAPHRAGM FIRST STAGES

1. Screw the intermediate pressure measuring gauge (cod. 106252) into one of the 3/8" low pressure ports, using the special wrench (B-18).
2. Using the wrench (B-18 or B-19), apply the hose with the partially assembled second stage to the port marked D.F.C.
3. Mount the regulator group on the control valve (of a tank or Test Bench).

---

### (Only for MR 10 version)

It is important for the pressure (of the tank or Test Bench) to be approximately 200 bar.

---

4. Holding down the second stage demand lever, slowly open the tank valve and, almost simultaneously, release the demand lever.
5. Read the value of the first stage adjustment on the pressure gauge, and proceed as follows (Fig. 1):
  - a. If the first stage pressure is greater than the required value (see table), use the wrench (B-13) to slowly back off the adjusting nut (16) until the required value is obtained.



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

- b. If the first stage pressure is lower than the required value (see table), slowly lock down the adjusting nut until the specified value is obtained.
6. Operate the second stage demand lever a few times, and check that the first stage pressure remains constant.
  7. After completing the second stage adjustments, remove the pressure gauge and screw on the corresponding port plug.

## ► PROCEDURE FOR ADJUSTING THE INTERMEDIATE PRESSURE IN PISTON FIRST STAGES (R1 - R2)

1. Screw the intermediate pressure measuring gauge (cod. 106252) into one of the 3/8" low pressure ports, using the special wrench (B-18).
2. Using the wrench (B-18), apply the hose with the partially assembled second stage to the port marked D.F.C.
3. Mount the regulator group on the control valve (of a tank or Test Bench).
4. Holding down the second stage demand lever, slowly open the tank valve and, almost simultaneously, release the demand lever.
5. Read the value of the first stage adjustment on the pressure gauge, and proceed as follows (Fig. 1):
  - A. If the pressure setting is greater than the required value (see table):
    - A. 1. Disassemble the regulator from the tank and proceed as described in points 1 and 2 of the disassembly operations.
    - A. 2. Remove one distance washer.
    - A. 3. Reassemble the components as described in steps 8.1 - 9 - 10 - 11 - 12 of the reassembly instructions.
    - A. 4. Proceed as described in steps 3 and 4 of the procedure for checking the intermediate pressure, reading out the value of the intermediate pressure on the gauge.

**NOTE** If there are no distance washers in the First Stage, it is necessary to replace the spring.

- B. If the first stage pressure is lower than the required value (see table):
  - B. 1. Disassemble the regulator from the tank and proceed as described in points 1 and 2 of the disassembly operations.
  - B. 2. Add one distance washer (up to a maximum of two) positioning it/them as described in step 8 of the reassembly operations.
  - B. 3. Reassemble the components as described in steps 9 - 10 - 11 - 12 of the reassembly instructions.
  - B.4. Proceed as described in steps 3 and 4 of the procedure for checking the intermediate pressure, reading out the value of the intermediate pressure on the gauge.

**NOTE** If there are no distance washers in the First Stage, it is necessary to replace the spring.

6. Operate the second stage demand lever a few times, and check that the first stage adjustment remains constant.
7. After completing the second stage adjustments, remove the pressure gauge and screw on the corresponding port plug.



► **FIRST STAGE TROUBLESHOOTING**

PROBLEM	MODEL	PROBABLE CAUSE	SOLUTION
<b>- 1 -</b> AIR LEAK FROM FIRST STAGE DIAPHRAGM RETAINING NUT	RUBY - MR22 MR16 - V16 MR12 - V12 MR12 II° - MR10 TI PLANET - V32	1) Retaining nut loose	1) Lock down the nut
		2) First stage diaphragm damaged	1) Replace the diaphragm
		3) First stage diaphragm seating surface damaged	1) Replace the first stage body
<b>- 2 -</b> AIR LEAK FROM THE FIRST STAGE PORT PLUGS AND/OR HOSE PORTS	RUBY - MR22 - MR16 - V16 - MR12 - V12 - MR12 II° - MR10 - R2 - TI PLANET - V32	1) O-Ring dirty or damaged	1) Clean the seat and replace the O-Ring
		2) Hose and/or port plug loose	1) Lock down
<b>- 3 -</b> AIR LEAK BETWEEN THE FIRST STAGE BODY AND THE INT OR DIN CONNECTOR	INT - DIN Version of RUBY - MR22 - MR16 - V16 MR10 - TI PLANET - V32	1) O-Ring seal dirty or damaged	1) Clean the seat and replace the O-Ring
		2) INT yoke fitting or DIN connector body loose	1) Lock down
	DIN version of MR12 - V12 - R2	3) DIN connector O-Ring seal dirty or damaged	1) Clean the seat and replace the O-Ring
		4) DIN connector body loose	1) Lock down
<b>- 4 -</b> AIR LEAK BETWEEN FIRST STAGE INLET AND TANK VALVE	RUBY - MR22 - MR16 V16 - MR12 - V12 MR12 II° - MR10 - R2 TI PLANET - V32	1) O-Ring seal of tank valve dirty or damaged	1) Clean the seat of the tank valve and replace the O-Ring
	RUBY - MR22 MR16 - V16 - MR10 V32 - TI PLANET	2) O-Ring sealing surface on the first stage damaged	1) (INT version) Replace the yoke retainer nut 2) (DIN version) replace the connector body
		MR12 - V12 - R2	3) O-Ring sealing surface on the first stage damaged
	MR12 II°		4) O-Ring sealing surface on the first stage damaged
<b>- 5 -</b> AIR LEAK FROM THE HP CHAMBER PLUG	RUBY - MR22 - MR16 - V16 - V32 - TI PLANET	1) O-Ring defective	1) Replace
<b>- 6 -</b> AIR LEAK FROM HOLES IN THE FIRST STAGE CAP	R2	1) Piston O-Rings defective	1) Replace the O-Rings
		2) Piston O-Ring sealing surfaces dirty or damaged	1) Clean or replace
		3) Inner surface of cap dirty or damaged	1) Clean or replace the cap
		4) Inner surface of first stage dirty or damaged	1) Clean or replace the first stage body

► **FIRST STAGE TROUBLESHOOTING**

PROBLEM	MODEL	PROBABLE CAUSE	SOLUTION
- 7 - (C.W.D. VERSION) OIL LEAK FROM THE DIAPHRAGM	RUBY - MR22	1) C.W.D. diaphragm damaged	1) Replace the A.E.R. diaphragm
	V12 - MR12 II°  TI PLANET	2) C.W.D. diaphragm retaining ring loose	1) Lock down correctly
- 8 - CONTINUOUS AIR DELIVERY FROM SECOND STAGE CHARACTERIZED BY AN INCREASE IN THE INTERMEDIATE PRESSURE	RUBY - MR22 - MR16 - V16 - MR12 - V12 MR12 II° - MR10 - R2 V32 - TI PLANET	1) Intermediate pressure too high	1) Adjust the intermediate pressure
	RUBY - MR22 - MR16 V16 - MR12 - V12 MR12 II° - MR10 - V32 TI PLANET	2) First stage poppet damaged	1) Replace
	R2	3) Piston friction lining damaged	1) Replace friction lining
	MR12 - R2	4) Seat connector in first stage defective	1) Clean or replace first stage body
	RUBY - MR22 - MR16 V16 - MR12 - MR10 MR12 II° - V32 TI PLANET	5) Seat connector defective	1) Clean or replace the seat
			2) Replace the O-Ring
RUBY - MR22 MR16 - V16 - MR12 V12 - MR12 II° V32 - TI PLANET	6) Defective HP chamber	1) Replace the O-Rings	
		2) Replace the backup ring	
		3) Clean or replace the HP chamber	

Table No. 101	<b>RUBY SECOND STAGE</b>	Drawing reference No.: E16 Table updated on 30/10/2001
------------------	--------------------------	--------------------------------------------------------------

Ref. N.	Code	Description
19	46110415	OR 2043 Viton 013-9754
21	< 46186023 >	Poppet seat
26	46184449	Black 1/2" super/flow hose
27	46110411	OR 2025 Viton 010-9754
28	46184282	Case assembly connector
29	46110413	OR 2050 Viton
30	46186024	Second stage poppet
31	46185057	Poppet spring
32	46186025	Second stage case
33	46185051	Demand lever nut
34	46185049	Washer
35	46185104	Demand Lever (C.W.D.)
36	46186029	Black diaphragm
37	46185073	Ring clamp
38	46185075	Ring clamp screw 3 x 16 stainless

Ref. N.	Code	Description
41	46186028	Exhaust tee 99
41	46186310	Exhaust tee 2000
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
		<b>ASSEMBLIES</b>
G	46186145	RUBY Second Stage Assembly
G	46186146	RUBY J. Second Stage Assembly
39	46186256	RUBY cover assembly
***	46185166	RUBY 2nd Stage Service Kit Viton
		( 19-27-29-33-40-43-47)

Table No. 103	<b>ORBITER SECOND STAGE</b>	Drawing reference No.: E16 Table updated on 30/10/2001
---------------	-----------------------------	-----------------------------------------------------------

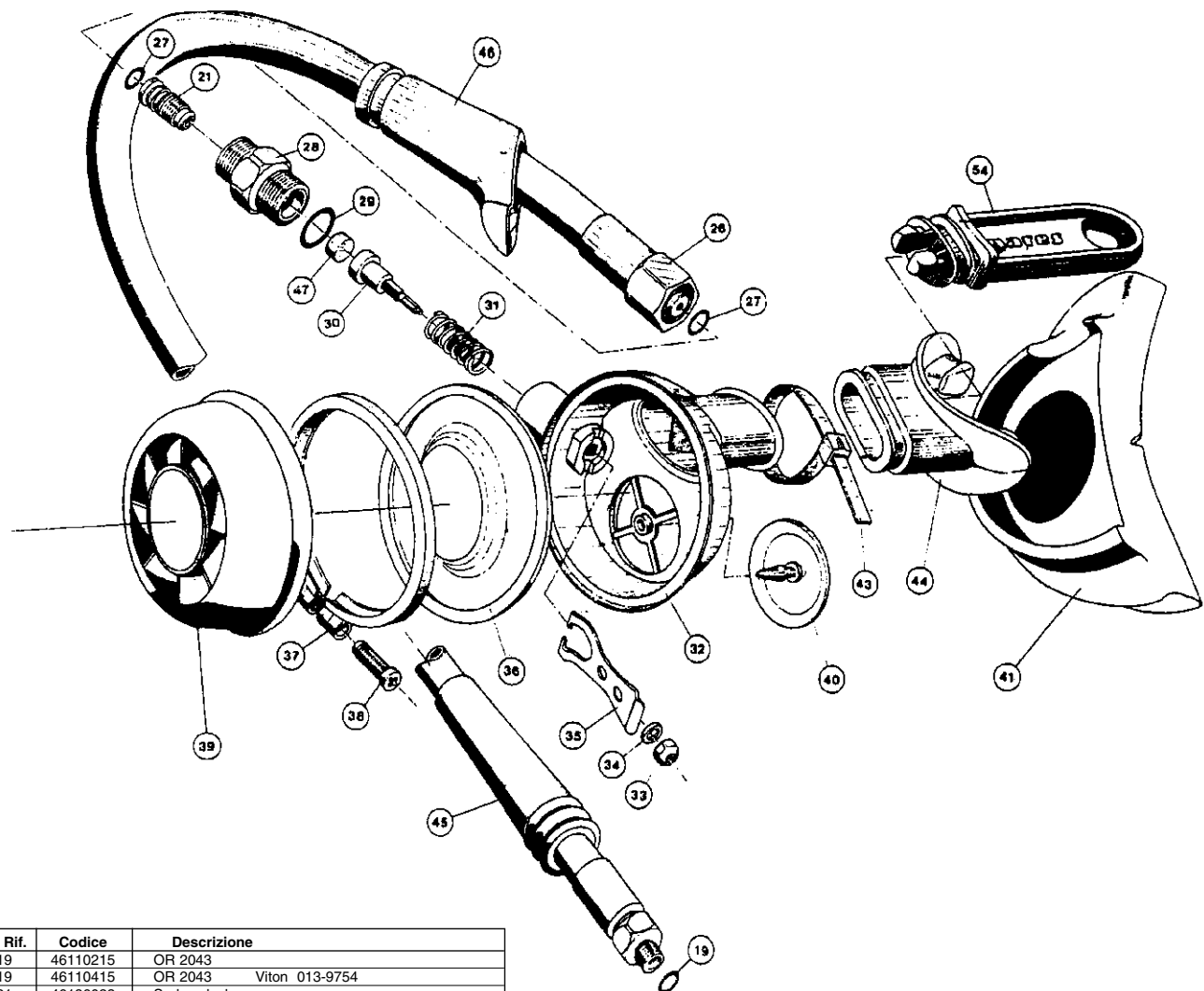
Ref. N.	Code	Description
19	46110106	OR 106 (VOLTREX)
19	46110402	OR 106 Viton 610-9754
21	<46186023>	Seat connector
26	46184450	Black super/flow hose
27	46110205	OR 2025
27	46110411	OR 2025 Viton 010-9754
28	46184282	Case assembly connector
29	46110211	OR 2050
29	46110413	OR 2050 Viton
30	46186024	Second stage poppet
31	46185057	Poppet spring
32	46186025	2 <sup>ND</sup> 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	< 46186028 >	Exhaust tee 99
41	46186310	Exhaust tee 2000
43	47157984	Mouthpiece clamp
44	46185086	Black mouthpiece
45	46179902	Black 1 <sup>ST</sup> stage hose protector
46	46186094	Black 2 <sup>ND</sup> stage hose protector
47	46184062	Poppet seat
		<b>ASSEMBLIES</b>
G	46186149	ORBITER Second Stage Assembly
39	46184279	ORBITER cover assembly
***	46186160	ORBITER 2nd Stage Service Kit ( 19-27-29-33-40-43-47)
***	46185166	ORBITOR Nitrox 2 <sup>ND</sup> Stage Service Kit (VITON O-Ring) ( 19-27-29-33-40-43-47)

**ABYSS 2000 SECOND STAGE  
OCTOPUS ABYSS 2000**

Reference drawing No.:E 19 - Table No. 104

Updated to 03-04-2000



N. Rif.	Codice	Descrizione
19	46110215	OR 2043
19	46110415	OR 2043 Viton 013-9754
21	46186023	Sede valvola
26	46184449	Manichetta 1/2" Abyss super/flow nera
26	46186093	Manichetta Octopus super/flow gialla
27	46110205	OR 2025
27	46110411	OR 2025 Viton 010-9754
28	46184282	Raccordo bocchettone manichetta
29	46110191	OR Parker 3-906
29	46110408	OR Parker 3-906 Viton 906-9754
30	46186024	Valvola chiusura
31	46185057	Molla valvola
32	46186025	Scatola 2° stadio
33	46185051	Dado fissaggio leva
34	46185049	Rondella
35	46185104	Leva erogazione (CWD)
36	46186029	Membrana nera
37	46185073	Fascetta di chiusura
38	46185075	Vite fascetta 3 x 16 inox
39	46186043	Coperchio cpl. Octopus ABYSS TF
39	46186049	Coperchio cpl. Nero ABYSS TF
40	46184006	Valvola scarico
41	46186310	Condotto scarico
43	47157984	Fascetta bocaglio
44	46185086	Bocaglio nero
45	46179904	Protezione manichetta nera 1° st.
46	46186094	Coprimanichetta nera 2° st.
47	46184062	Pasticca valvola
54	46186090	Tappo bocc. Octopus
		<b>COMPLETI</b>
G	46200121	Secondo Stadio cpl. ABYSS 2000
G	46200122	Secondo Stadio cpl. ABYSS 2000 J
***	46186160	Kit Manutenzione 2° st. ABYSS (19-27-29-33-40-43-47)

Table No. 104	<b>ABYSS T.F. SECOND STAGE OCTOPUS ABYSS</b>	Drawing reference No.: E19 Table updated at 30/10/2001
------------------	--------------------------------------------------	--------------------------------------------------------------

Ref.N.	Code	Description
19	46110215	OR 2043
19	46110415	OR 2043 Viton 013-9754
21	< 46186023 >	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	2 <sup>ND</sup> 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	Octopus mouthpiece plug
		<b>ASSEMBLIES</b>
G	46200121	ABYSS Second Stage assembly
39	46186043	ABYSS TF octopus cover assembly
39	46186049	Black ABYSS TF cover assembly
***	46186160	ABYSS 2 <sup>ND</sup> Stage Service Kit ( 19-27-29-33-40-43-47)
***	46185166	ABYSS Nitrox 2nd Stage Service Kit (VITON O-Ring) ( 19-27-29-33-40-43-47)

Table No. 111	<b>AKROS - OCTOPUS AKROS AKROS NITROX SECOND STAGE</b>	Drawing reference No.: E18 Table updated on 03/04/2000
------------------	------------------------------------------------------------	--------------------------------------------------------------

Ref.N.	Code	Description
19	46110106	OR 106
19	46110402	OR 106 Viton 610-97507
21	46186023	Seat connector
26	46186174	Black hi/flow hose
26	46186178	Yellow octopus hi/flow hose
27	46110205	OR 2025
27	46110411	OR 2025 Viton 010-9707
28	46184282	Case assembly connector
30	46184219	Valve stem
31	46185057	Plug poppet spring
32	46184239	Black Akros case
33	46185051	Demand lever nut
34	46185049	Washer
35	46185104	Demand lever CWD
36	46184225	Modular diaphragm
39	46184274	Cpl. black Akros cover
39	46184276	Cpl. yellow Akros octopus cover
39	46184278	Cpl. Akros Nitrox cover
40	46184006	Exhaust valve
41	46184438	Exhaust tee
42	46184235	Mobile deflector
43	47157984	Mouthpiece clamp
44	46185086	Black mouthpiece
45	46179902	Black 1st stage hose protector
46	46184210	2nd stage hose protector
47	46184062	Poppet seat
54	46186090	Octopus mouthpiece plug
63	46184289	Cover lock pin
64	46184234	Adjuster port plug
66	46110220	OR 2062

Ref.N.	Code	Description
66	46110417	OR 2062 Viton 016-9707
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707
72	46110215	OR 2043
72	46110415	OR 2043 Viton 013-9707
74	46184288	By pass Akros
75	46200154	OR 7 X 2
75	46200299	OR 7 X 2 Viton
78	46184224	Diaphragm retaining ring
83	46110225	OR 2068
83	46110420	OR 2068 Viton 017-9707
87	46184233	Adjuster access connector
90	46184223	Akros spacing ring
91	46184281	Akros lever port connector
92	46184221	2nd stage poppet body. Akros
95	46184236	Akros deflector pin
96	46184280	Bypass retainer ring
		<b>ASSEMBLIES</b>
G	46184298	Second stage assembly. Akros Black
G	46184299	Second stage assembly. Akros Black J.
G	46184295	Second stage assembly. Akros Nitrox
G	46184302	Second stage assembly. Akros Nitrox J.
***	46200152	AKROS P.F. 2nd stage case (32-42-95)
***	46186165	2nd Stage service kit Akros ( 19-27-33-40-43-47-66-71-72-75-83 )
***	46186169	Service kit 2nd stage Akros Nitrox ( 19-27-33-40-43-47-66-71-72-75-83 )

Table  
No. 109**XTR - XTR NITROX SECOND STAGE**Drawing reference No.: E18  
Table updated  
on 30/10/2001

Ref.N.	Code	Description
19	46110106	OR 106
19	46110402	OR 106 Viton 610-97507
21	< 46186023 >	Seat connector
26	46186174	Black hi/flow hose
27	46110205	OR 2025
27	46110411	OR 2025 Viton 010-9707
28	46184282	Case assembly connector
30	46184219	Valve stem
31	46185057	Plug poppet spring
32	- - -	Black XTR case
33	46185051	Demand lever nut
34	46185049	Washer
35	46185104	Demand lever CWD
36	46184225	Modular diaphragm
40	46184006	Exhaust valve
41	<46184438>	Exhaust tee
42	46184235	Mobile deflector
43	47157984	Mouthpiece clamp
44	46185086	Black mouthpiece
45	46179902	Black 1st stage hose protector
46	46184210	2nd stage hose protector
47	46184062	Poppet seat
63	46184289	Cover lock pin
64	46184234	Adjuster port plug
66	46110220	OR 2062
66	46110417	OR 2062 Viton 016-9707
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707

Ref.N.	Code	Description
72	46110215	OR 2043
72	46110415	OR 2043 Viton 013-9707
74	46184288	By pass
75	46200154	OR 7 X 2
75	46200299	OR 7 X 2 Viton
78	46184224	Diaphragm retainer ring
83	46110225	OR 2068
83	46110420	OR 2068 Viton 017-9707
87	46184233	Adjuster access connector
90	46184223	Spacing ring
91	46184281	Lever port connector
92	46184221	2nd stage poppet body
95	46184236	Deflector pin
96	46184280	Bypass retainer ring
		<b>ASSEMBLIES</b>
G	<46184300>	Second stage assembly. XTR
G	<46184303>	Second stage assembly. XTR Nitrox J.
- - -	46200152	AKROS P.F. 2nd stage case (32-42-95)
39	46184259	XTR assembly cover Black
39	46184264	XTR assembly cover Nitrox
***	46186165	2nd Stage service kit -XTR ( 19-27-33-40-43-47-66-71-72-75-83)
***	46186169	Service kit 2nd stage XTR Nitrox ( 19-27-33-40-43-47-66-71-72-75-83)

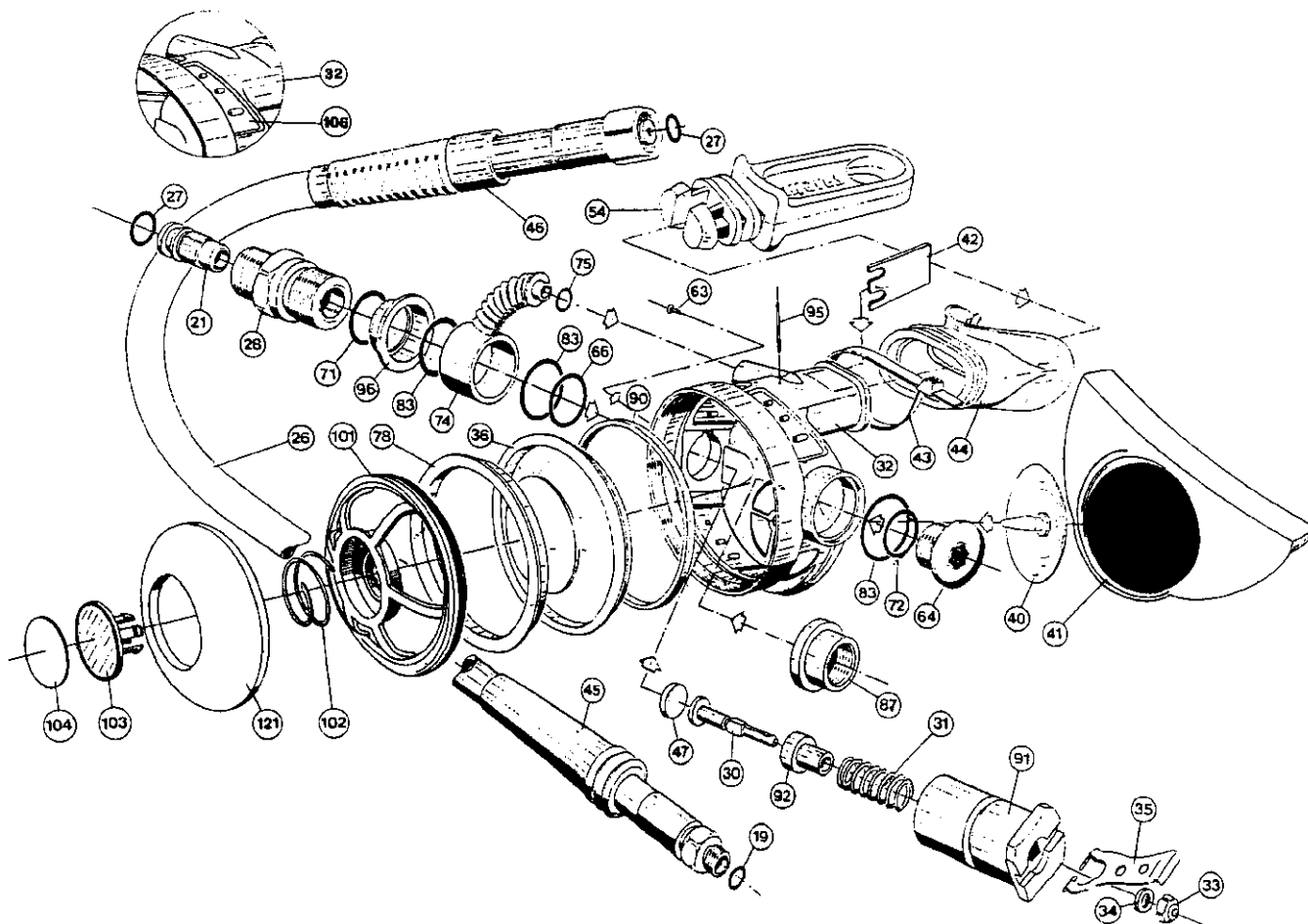


Table No. 110	<b>XL - OCTOPUS XL SECOND STAGE</b>	Drawing reference No: E 18 Table updated on 30/10/2001
---------------	-------------------------------------	-----------------------------------------------------------

Ref.N.	Code	Description
19	46110106	OR 106
19	46110402	OR 106 Viton 610-97507
21	< 46186023 >	Seat connector
26	46186174	Black hi/flow hose (XL)
26	46186178	Yellow octopus hi/flow hose
27	46110205	OR 2025
27	46110411	OR 2025 Viton 010-9707
28	46184282	Case assembly connector
30	46184219	Valve stem
31	46185057	Plug poppet spring
32	- - -	Black XL case
33	46185051	Demand lever nut
34	46185049	Washer
35	46185104	Demand lever CWD
36	46184225	Modular diaphragm
39	46184247	XL assembly cover
39	46184249	XL Octopus assembly cover
40	46184006	Exhaust valve
41	<46184438>	Exhaust tee
42	46184235	Mobile deflector
43	47157984	Mouthpiece clamp
44	46185086	Black mouthpiece
45	46179902	Black 1st stage hose protector
46	46184210	2nd stage hose protector
47	46184062	Poppet seat
54	46186090	Octopus mouthpiece cap
63	46184289	Cover lock pin
64	46184234	Adjuster port plug
66	46110220	OR 2062

Ref.N.	Code	Description
66	46110417	OR 2062 Viton 016-9707
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707
72	46110215	OR 2043
72	46110415	OR 2043 Viton 013-9707
74	46184288	By pass
75	46200254	OR 7 X 2
75	46200299	OR 7 X 2 Viton
78	46184224	Diaphragm retainer ring
83	46110225	OR 2068
83	46110420	OR 2068 Viton 017-9707
87	46184233	Adjuster access connector
90	46184223	Spacing ring
91	46184281	Lever port connector
92	46184221	2nd stage poppet body
95	46184236	Deflector pin
96	46184280	Bypass retainer ring
		<b>ASSEMBLIES</b>
G	<46184301>	Second stage assembly. XL
G	<46184052>	Second stage assembly. XL J
- - -	46200152	AKROS P.F. 2nd stage case
		(32-42-95)
***	46186165	2nd Stage service kit XL
		( 19-27-33-40-43-47-66-71-72-75-83 )
***	46186169	Service kit 2nd stage XL Nitrox
		( 19-27-33-40-43-47-66-71-72-75-83 )

**TI PLANET SECOND STAGE** Table No. E 15  
Updated to 03-04-2000



Ref.No.	Code	Description
19	46110106	OR 106
21	46186517	Poppet seat, 2nd stage (TI)
26	46184450	Hose super/flow, black
27	46110205	OR 2025
28	46186518	Hose connector
30	46186519	Poppet stem
31	46185057	Spring, poppet
32	46186524	2nd stage case TI PLANET
33	46185051	Retaining nut, lever
34	46185049	Washer
35	46185104	Lever CWD
36	46184225	Modular diaphragm
40	46184006	Exhaust valve
41	46186266	Exhaust tee
42	46184235	Pivoting vane
43	47157984	Mouthpiece clamp
44	46185086	Mouthpiece, black
45	46179902	Hose protector, 1st stage, black
46	46184210	Hose protector, 2nd stage, black
47	46184062	Poppet seat
63	46184289	Safety catch, cap
64	46186267	Regulating plug
66	46110220	OR 2062
71	46110211	OR 2050
72	46110215	OR 2043
74	46184288	By pass

Ref.No.	Code	Description
75	46110107	OR 2031
78	46184224	Locking ring, diaphragm
83	46110225	OR 2068
87	46184233	Plug seat
90	46184223	Spacer ring
91	46186520	Poppet housing
92	46184221	Body, poppet 2nd stage
95	46184236	Pin, vane
96	46184280	Retaining ring, bypass
102	46186032	Spring, button
103	46186027	Button
104	46186552	Button, plate
<b>ASSEMBLIES</b>		
G	46184296	Second stage assy TI PLANET
G	46200116	Second stage assy TI PLANET J
***	46186555	Cover assy TI PLANET (101-102-103-104-121)
***	46200153	Second stage case TI PLANET P.F. (32-42-95)
***	46186165	Second stage maintenance kit TI PLANET (19-27-33-40-43-47-66-71-72-75-83)
For components 121 and 101, see cover assy code 46186555 For component 106, see 2nd stage case assy code 46186524		

Table No. 100	<b>TI PLANET SECOND STAGE</b>	Drawing reference No.: E 15 Table updated on 30/10/2001
------------------	-------------------------------	---------------------------------------------------------------

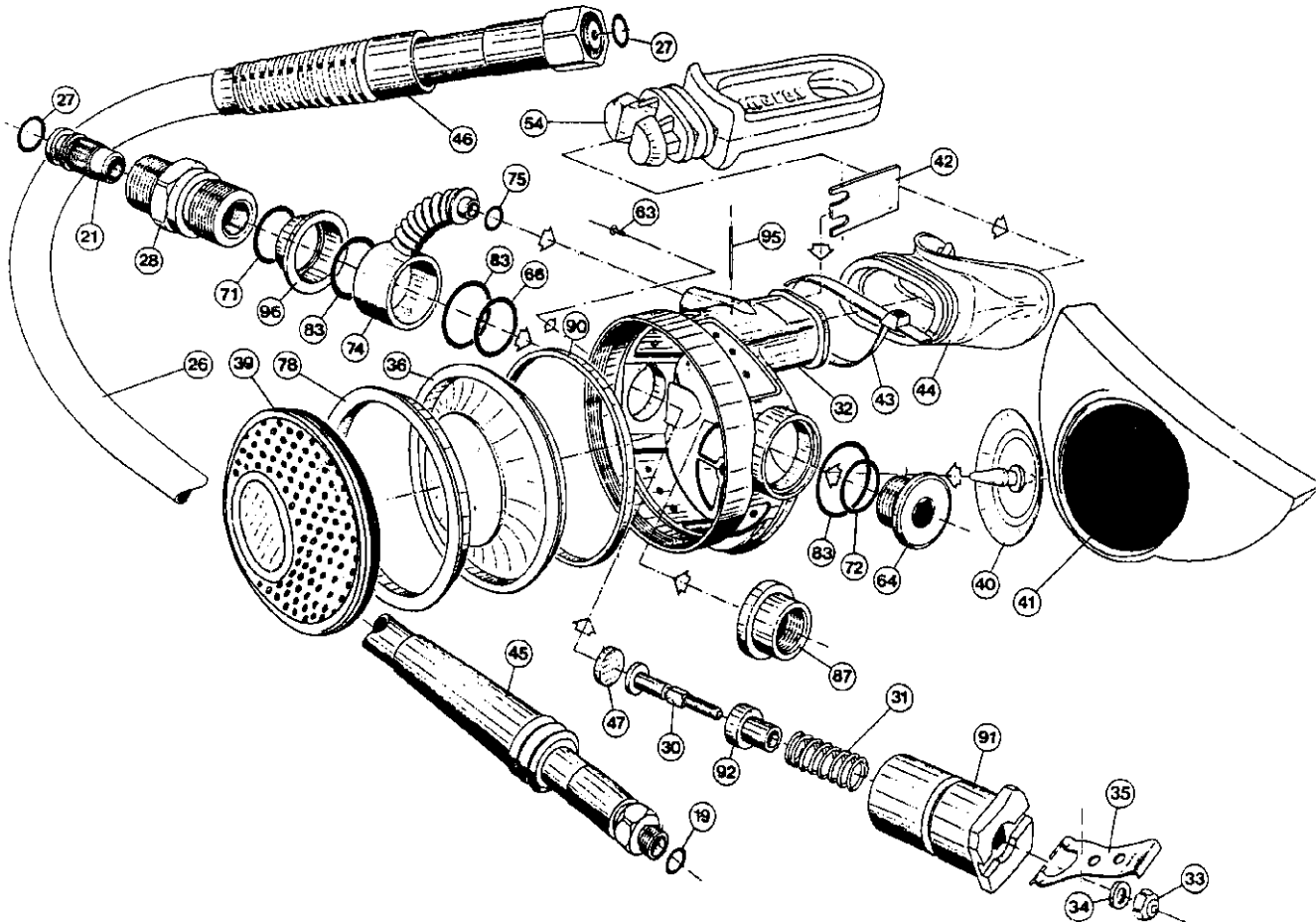
Ref.N.	Code	Description
19	46110106	OR 106
21	<46186517>	2nd stage poppet seat (TI).
26	46184450	Black Super/Flow hose
27	46110205	OR 2025
28	46186518	Case assembly connector
30	46186519	Valve stem
31	46185057	Plug poppet spring
32	- - -	TI PLANET 2nd stage case
33	46185051	Demand lever nut
34	46185049	Washer
35	46185104	Demand lever CWD
36	46184225	Modular diaphragm
40	46184006	Exhaust valve
41	46186266	Exhaust tee
42	46184235	Mobile deflector
43	47157984	Mouthpiece clamp
44	46185086	Black mouthpiece
45	46179902	Black 1st stage hose protector
46	46184210	2nd stage hose protector
47	46184062	Poppet seat
63	46184289	Cover lock pin
64	46186267	Adjuster port plug
66	46110220	OR 2062
71	46110211	OR 2050
72	46110215	OR 2043
74	46184288	By pass

Ref.N.	Code	Description
75	46200154	OR 7 X 2
78	46184224	Diaphragm retainer ring
83	46110225	OR 2068
87	46184233	Adjuster access connector
90	46184223	Spacing ring
91	46186520	Lever port connector
92	46184221	2nd stage poppet body
95	46184236	Deflector pin
96	46184280	Bypass retainer ring
102	+ + +	Push-button spring
103	+ + +	Push-button
104	46186522	Push-button disc
		<b>ASSEMBLIES</b>
G	416890	Second stage assembly. TI PLANET
+ + +	46186555	Assembly cover TI PLANET (101-102-103-104-121)
- - -	46200153	TI PLANET P.F. 2nd St case (32-42-95)
* * *	46186165	2nd Stage service kit TI PLANET ( 19-27-33-40-43-47-66-71-72-75-83 )
		<b>NOTES</b>
		For parts 121 and 101 see assembly cover cod. 46186555 For part 106 see second stage assembly case cod. 46186524

**EPOS SECOND STAGE  
EPOS NITROX SECOND STAGE**

Reference drawing No. : E 22 - Table No. 108

Updated to 01-04-98



Ref.No.	Code	Description
19	46110106	OR 106
19	46110402	OR 106 Viton 610-97507
21	46186023	Poppet seat
26	46186174	Hose hi-flow, black
27	46110205	OR 2025
27	46110411	OR 2025 Viton 010-9707
28	46184282	Hose connector
30	46184219	Poppet stem
31	46185057	Spring, poppet
32	46184230	2nd stage case Epos
33	46185051	Retaining nut, lever
34	46185049	Washer
35	46185104	Lever CWD
36	46184225	Modular diaphragm
40	46184006	Exhaust valve
41	46186266	Exhaust tee
42	46184235	Pivoting vane
43	47157984	Mouthpiece clamp
44	46185086	Mouthpiece, black
45	46179902	Hose protector, 1st stage, black
46	46184210	Hose protector, 2nd stage
47	46184062	Poppet seat
63	46184289	Safety catch, cover
64	46186267	Regulating plug
66	46110220	OR 2062
66	46110417	OR 2062 Viton 016-9707
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707
72	46110215	OR 2043
72	46110415	OR 2043 Viton 013-9707
74	46184207	By pass, grey, varnished

Ref.No.	Code	Description
75	46110107	OR 2031
75	46110403	OR 2031 Viton 011-9707
78	46184224	Locking ring, diaphragm
83	46110225	OR 2068
83	46110420	OR 2068 Viton 017-9707
87	46184233	Plug seat
90	46184223	Spacer ring
91	46184281	Poppet housing, Akros
92	46184221	Body, poppet 2nd stage Akros
95	46184236	Pin, vane Akros
96	46184280	Retaining ring, bypass
102	46186032	Spring, button
103	46186027	Button
104	46184370	Label, button
104	46184371	Label, button Nitrox
<b>ASSEMBLIES</b>		
G	46200117	Second stage assy Epos
G	46200118	Second stage assy Epos J.
G	46200119	Second stage assy Epos Nitrox
G	46200120	Second stage assy Epos Nitrox J.
39	46184228	Cover Epos assy (101-102-103-104-121-122)
39	46200124	Cover Epos Nitrox assy (101-102-103-104-121-122)
***	46200151	2nd stage case EPOS-EPOS NITROX P.F. (32-42-95)
***	46186165	Maintenance kit, 2nd stage Epos (19-27-33-40-43-47-66-71-72-75-83)
***	46186169	Maintenance kit, 2nd stage Epos (19-27-33-40-43-47-66-71-72-75-83)

Table No. 108	<b>EPOS SECOND STAGE EPOS NITROX SECOND STAGE</b>	Drawing reference No.: E 22 Table updated on 30/10/2001
---------------	-------------------------------------------------------	------------------------------------------------------------

Ref.N.	Code	Description
19	46110106	OR 106
19	46110402	OR 106 Viton 610-97507
21	< 46186023 >	Seat connector
26	46186174	Black hi/flow hose
27	46110205	OR 2025
27	46110411	OR 2025 Viton 010-9707
28	46184282	Case assembly connector
30	46184219	Valve stem
31	46185057	Plug poppet spring
32	- - -	Epos 2nd stage case
33	46185051	Demand lever nut
34	46185049	Washer
35	46185104	Demand lever CWD
36	46184225	Modular diaphragm
40	46184006	Exhaust valve
41	46186266	Exhaust tee
42		Mobile deflector
43	47157984	Mouthpiece clamp
44	46185086	Black mouthpiece
45	46179902	Black 1st stage hose protector
46	46184210	2nd stage hose protector
47	46184062	Poppet seat
63	46184289	Cover lock pin
64	46186267	Adjuster port plug
66	46110220	OR 2062
66	46110417	OR 2062 Viton 016-9707
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707
72	46110215	OR 2043
72	46110415	OR 2043 Viton 013-9707

Ref.N.	Code	Description
74	46184207	Gray painted bypass
75	46200154	OR 7 X 2
75	46200299	OR 7 X 2 Viton
78	46184224	Diaphragm retainer ring
83	46110225	OR 2068
83	46110420	OR 2068 Viton 017-9707
87	46184233	Adjuster access connector
90	46184223	Spacer ring
91	46184281	Akros lever port connector
92	46184221	2nd stage poppet body. Akros
95	- - -	Akros deflector pin
96	46184280	Bypass retainer ring
102	46186032	Push-button spring
103	46186027	Push-button
104	46184370	Button label
104	46184371	Nitrox button label
		<b>ASSEMBLIES</b>
G	46200117	Epos second stage assembly
39	46184228	Epos assembly cover (101-102-103-104-121-122)
39	46200124	Epos Nitrox assembly cover (101-102-103-104-121-122)
- - -	46200151	EPOS-EPOS NITROX P.F. 2nd stage case (32-42-95)
* * *	46186165	2nd Stage service kit Epos ( 19-27-33-40-43-47-66-71-72-75-83 )
* * *	46186169	Service kit 2nd stage Epos Nitrox (VITON O-Ring) ( 19-27-33-40-43-47-66-71-72-75-83 )

Table No. 112	<b>NIKOS - OCTOPUS NIKOS SECOND STAGE OCTOPUS NIKOS NITROX</b>	Drawing reference No.: E21 Table updated on 30/10/2001
------------------	--------------------------------------------------------------------	--------------------------------------------------------------

Ref.N.	Code	Description
19	46110106	OR 106
19	46110402	OR 106 Viton 610-9707
21	< 46186023 >	Seat connector
26	46186174	Black hi/flow hose
26	46186178	Yellow octopus hi/flow hose
27	46110205	OR 2025
27	46110411	OR 2025 Viton 010-9707
28	46184282	Case assembly connector
30	46184219	2nd stage poppet stem
31	46185057	Plug poppet spring
32	46184231	Black Nikos case
33	46185051	Demand lever nut
34	46185049	Washer
35	46185104	Demand lever CWD
36	46184225	Modular diaphragm
39	46184273	Assembly cover Nikos Nitrox
40	46184006	Exhaust valve
41	46186266	Exhaust tee
43	47157984	Mouthpiece clamp
44	46185086	Black mouthpiece
45	46179902	Black 1st stage hose protector
46	46184210	2nd stage hose protector
47	46184062	Poppet seat
54	46186090	Octopus mouthpiece cap
63	46184289	Cover locked pin
64	<46186267>	98 adjuster port plug
66	46110220	OR 2062

Ref.N.	Code	Description
66	46110417	OR 2062 Viton 016-9707
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707
72	46110215	OR 2043
72	46110415	OR 2043 Viton 013-9707
78	46184224	Diaphragm retainer ring
83	46110225	OR 2068
83	46110420	OR 2068 Viton 017-9707
87	46184233	Adjuster access connector
90	46184222	Akros spacing conveyor
91	46184218	Nikos lever port connector
92	46184220	Nikos 2nd stage poppet body
93	46184215	Yellow Nikos hose spacer
93	46184217	Black Nikos hose spacer
94	46184216	Nikos assembly coupler
		<b>ASSEMBLIES</b>
G	46184293	Second stage assembly. Nikos (x MR12)
G	46186184	Second stage assembly. Nikos Nitrox
39	<46184269>	Assembly cover Black Nikos
39	<46184272>	Assembly cover Yellow Nikos octopus
***	46186164	Nikos 2nd Stage service kit ( 19-27-33-40-43-47-66-71-72-83 )
***	46186166	Nikos Nitrox (VITON O-Ring) second stage service kit ( 19-27-33-40-43-47-66-71-72-83 )

**AXIS - AXIS OCTOPUS  
SECOND STAGE**

**mares®**

## ▶ DISASSEMBLY

1. Unscrew the hose from the first stage using the 14-mm open end wrench (B-18).
2. Remove the clamp (43) from the mouthpiece using a cutting nippers or a similar tool.

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

3. Remove the mouthpiece (44).
4. Remove the exhaust tee (41).
5. Shift the hose protector (46).
6. Using the two 17-mm open end wrenches (B-17) unscrew the hose from the 2nd stage.
7. Remove the O-ring (27) from the seat of the swivel hose coupling.
8. Unscrew the case assembly connector (28) using a 17-mm open end wrench (B-17).
9. Remove the O-Ring (71) from the case assembly connector (28).
10. Unscrew the seat connector (21) from the case assembly connector (28) using a 5-mm hex wrench (B-4).
11. Remove the O-ring (27) from the seat connector (21).

**NOTE** REMOVE THE CONNECTOR BUSHING (165) ONLY IN CASE OF NEED, WITH THE AID OF A SMALL FLAT BLADE SCREWDRIVER NECESSARY.

12. Remove the safety clip (63).
13. Unscrew the cover (101).

**NOTE** THE COMPLETE COVER ASSEMBLY (PURGE BUTTON, SPRING, COVER) ONLY NEEDS TO BE REMOVED IF THE COVER IS VERY DIRTY OR CRUSTED, OR IF THE BUTTON TENDS TO STICK WHEN IT IS PRESSED.

14. Remove the diaphragm retaining ring (78), the diaphragm (36) and the spacer ring (90) from the 2nd stage case (32).
15. Unscrew the case plug (64).
16. Remove the O-Ring (72) from the case plug.
17. Exerting a slight pressure, push the adjuster connector (87) inward and remove the O-ring (83) from its seat in the 2nd stage case (32).
18. Using the special wrench (B-12), back off the adjusting nut (33) from the poppet stem (30), removing the demand lever (35), the washer (34) and the spring (31) (Fig. 1).

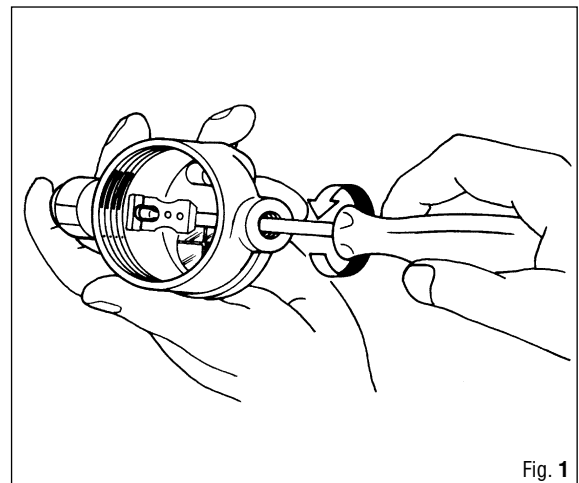


Fig. 1



**WARNING!**

TO PREVENT THE POPPET AND ITS SPRING BEING EJECTED FROM THE SECOND STAGE, USE A FINGER TO COVER THE OPENING OF THE CASE ASSEMBLY CONNECTOR.

---

19. Remove the poppet seat (47), pressing slightly on the poppet seat holder (92) in the direction of the threaded stem.
20. Pull the poppet seat holder (92) away from the 2nd stage poppet stem (30).
21. Remove the exhaust valve (40).



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

---

**▶ CLEANING****WARNING!**

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

---

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

---

**WARNING!**

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

---

## ► INSPECTION

Certain key components of the second stage should be routinely replaced at each scheduled overhaul. In addition, considering their relatively low cost, it is recommended to replace all the O-Rings.

Quantity	Ref. N.	Description	Code
2	(27)	O-Ring 2025	Cod. 46110205 - cod. Viton 46110411
1	(72)	O-Ring 2043	Cod. 46110215 - cod. Viton 46110415
1	(71)	O-Ring 3-906	Cod. 46110191 - cod. Viton 46110408
1	(83)	O-Ring 2068	Cod. 46110225 - cod. Viton 46110420
1	(19)	O-Ring 106	Cod. 46110106 - cod. Viton 46110402
1	(47)	2nd stage poppet seat	Cod. 46184062
1	(33)	Demand lever adjusting nut	Cod. 46185051
1	(40)	Exhaust valve	Cod. 46184006
1	(43)	Mouthpiece clamp	Cod. 47157984

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

## ► DO NOT USE PARTS WITH THE FOLLOWING DEFECTS:

Description	Ref. N.	Inspection
<b>2nd stage case</b>	(32)	Inspect the sealing surfaces for scratches or cracks.
<b>Seat connector</b>	(21)	Check that the sealing surface and the O-ring seat are intact.
<b>Diaphragm</b>	(36)	Check for tears or pinholes around the metal disk, deformation of the outer rim or signs of separation of the diaphragm from the metal disk.
<b>O-Ring</b>	(19-27-71-72-83)	Check for cuts, burrs or foreign particles. The presence of any of these defects may result in leakage.
<b>2nd stage poppet seat</b>	47)	Check for cuts, burrs or abrasion of the rubber.
<b>Poppet seat holder</b>	(92)	Check for cracks, cuts or deformation.
<b>Demand lever adjusting nut</b>	(33)	Verify its self-locking capacity and inspect for rust. It is recommended to replace it at each scheduled overhaul.
<b>Mouthpiece</b>	(44)	Inspect for cuts, tears or signs of wear.
<b>Exhaust tee</b>	(41)	Check that it is intact.
<b>Hose</b>	(26)	Inspect for splits, blistering or any other signs of damage.
<b>Spring</b>	(31)	Check for any split or broken coils.



## ► REASSEMBLY

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

### **! WARNING!**

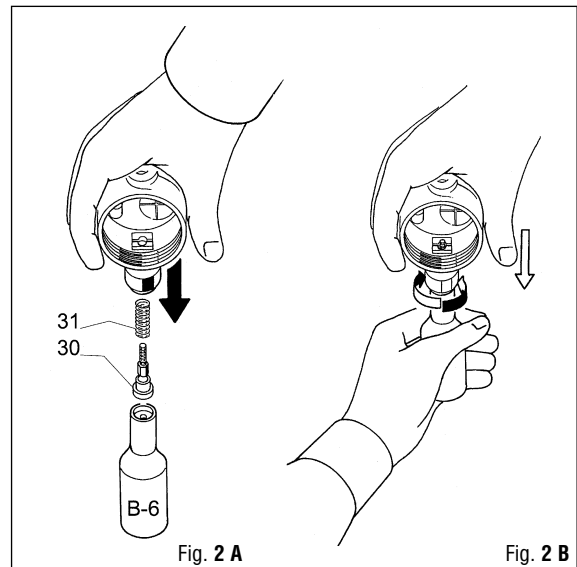
IF THE SECOND STAGE IS USED FOR DIVING WITH OXYGEN-RICH MIXTURES, IT MUST BE PERFECTLY CLEANED AND FREE OF ANY RESIDUAL SILICONE OR OTHER IMPURITIES. VITON O-RINGS MUST BE LUBRICATED WITH SPECIAL OXYGEN-COMPATIBLE GREASE. DO NOT USE SILICONE GREASE.

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

### **! WARNING!**

DO NOT PULL TOO HARD ON SILICONE STEM TO AVOID DAMAGING THE EXHAUST VALVE.

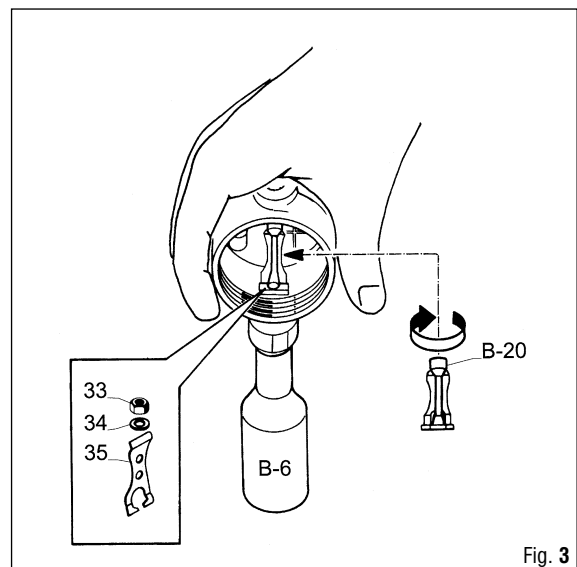
2. Using cutting nippers, cut the silicone stem by about 7 mm.
3. Reassemble the poppet seat holder (92) on the 2nd stage poppet stem (30).
4. Reassemble the poppet seat (47) on the poppet seat holder (92).
5. Place the 2nd stage poppet assembly (30-47-92) together with its spring (31) on the special tool (B-6).
6. Correctly insert the 2nd stage poppet with its spring inside the 2nd stage case, exerting a slight pressure (Fig. 2a).



### IMPORTANT

ROTATE THE SECOND STAGE CASE SLIGHTLY TO THE RIGHT AND LEFT TO OBTAIN CORRECT POSITIONING OF THE 2ND STAGE POPPET STEM (Fig. 2b).

7. Correctly position the demand lever (35) in the groove of the 2nd stage case (32).
8. Fit the washer (34) on the poppet stem and lock down the demand lever adjusting nut (33) using the special wrench (B-20) (Fig. 3).





AFTER LOCKING DOWN THE ADJUSTING NUT THROUGH 2 OR 3 TURNS, TO FACILITATE ASSEMBLY CONTINUE LOCKING IT DOWN USING THE SPECIAL WRENCH B-12.



CHECK THAT THE LEVER IS ABLE TO MOVE FREELY, BY OPERATING IT A FEW TIMES.

9. Correctly insert the spacer ring (90) in the 2nd stage case.
10. Correctly install the adjuster connector (87) in the hole of the 2nd stage case and, with the help of the special tool (B-6), fit the O-ring (83) in its seat.
11. Fit the connector bushing (165), if it was removed previously.
12. Fit the O-ring (27) in its seat in the case assembly connector (28).
13. Insert and lock down seat connector (21) into the case assembly connector (28) using the 5-mm hex wrench (B-4), so that it protrudes from the connector by about 3 mm.



**WARNING!**

THE POPPET SEAT SHOULD NOT PROTRUDE BY MORE THAN 3.8 mm FROM THE CASE ASSEMBLY CONNECTOR.

14. Fit O-Ring (71) in the seat of the case assembly connector (28)
15. Using a 17-mm open end wrench (B-17), fully lock down the case assembly connector on the 2nd stage case.



IF A TORQUE WRENCH IS USED, USE A TORQUE SETTING OF 8 - 8.5 N/M.

16. Fit the O-ring (27) in the seat on the swivel connector of the hose (26).
17. Screw the hose (26) onto the case assembly connector (28) with the help of two 17-mm open end wrenches (B-17).

## FINAL ADJUSTMENTS

To obtain a correct adjustment of the regulator

- A.** The repair shop should be equipped with a high and low pressure compressed air supply.
  - B.** It is necessary to have a pressure gauge for checking the intermediate pressure (the pressure gauge should have a full scale value MAX 30 - 40 BAR, for greater accuracy of adjustment).
- 1.** Screw the intermediate pressure measuring gauge into one of the 3/8" low pressure ports on the first stage, using the wrench (B-18).
  - 2.** Using the wrench (B-18), assemble the hose with the partially finished 2nd stage on the port marked D.F.C.
  - 3.** Mount the regulator group on the control valve (of a tank or Test Bench).
  - 4.** Depress the second stage demand lever, slowly open the tank valve and, almost simultaneously, release the demand lever.
  - 5.** Read the pressure gauge to check whether the 1st stage pressure adjustment is correct.



### **WARNING!**

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

---

## PROCEDURE FOR ADJUSTING THE INTERMEDIATE PRESSURE

### CAUTION

DUE TO THEIR SHAPE, THE DEMAND LEVER ON AXIS SECOND STAGES CAN BE ADJUSTED IN TWO DIFFERENT WAYS. BOTH METHODS ARE DESCRIBED BELOW.

#### ▶ METHOD "A"

- A.1 Rest the ends of the gauge (code 46106230) on the edge of the 2nd stage case (Fig. 4).
- A.2 Working through the hole in the second stage case, use the wrench (B-12) to lock down or back off nut (33) in order to adjust the demand lever (35).

### WARNING!

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

- A.3 Depress and trigger the demand lever a few times
- A.4 Fit the 2nd stage diaphragm (36) in the 2nd stage case.
- A.5 Fit the diaphragm retaining ring (78).
- A.6 Lock down the cover.

**NOTE** CONTINUE LOCKING DOWN THE COVER UNTIL THE TWO SEATS (ON THE CASE AND COVER) WHICH ACCOMMODATE THE SAFETY CLIP ARE ALIGNED.

- A.7 Insert the safety clip (63).

### WARNING!

CHECK THAT THE DEMAND LEVER (35) IS CORRECTLY ADJUSTED. AIR DELIVERY SHOULD BE TRIGGERED ABOUT MIDWAY ALONG THE PURGE BUTTON'S TRAVEL, AND THE SOUND OF THE DEMAND LEVER TOUCHING THE METAL DISK OF THE DIAPHRAGM ("TAPPING") SHOULD BE AUDIBLE WHEN THE SECOND STAGE IS SHAKEN UP AND DOWN.

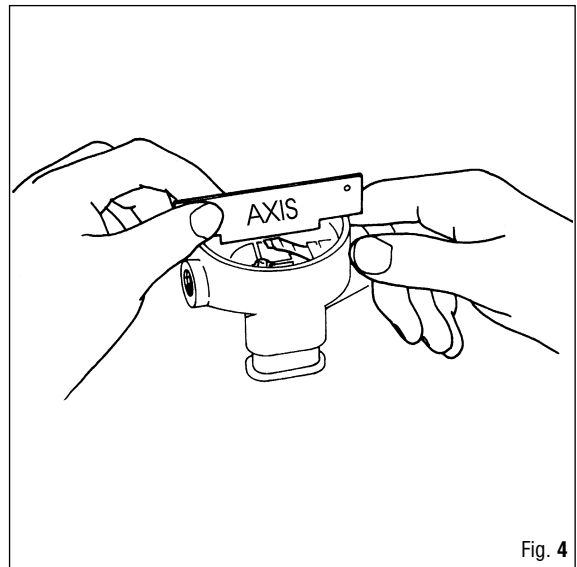


Fig. 4

## ▶ METHOD "B"

- B.1** Fit the 2nd stage diaphragm (36) in the 2nd stage case (32).
- B.2** Insert the diaphragm retaining ring (78).
- B.3** Screw on the cover.

### IMPORTANT

CONTINUE LOCKING DOWN THE COVER UNTIL THE TWO SEATS (ON THE CASE AND COVER) WHICH ACCOMMODATE THE SAFETY CLIP ARE ALIGNED.

- B.4** Insert the safety clip (63).
- B.5** Working through the hole in the second stage case, use the wrench (B-12) to lock down or back off nut (32) in order to adjust the demand lever (35).



### WARNING!

CHECK THAT THE DEMAND LEVER (35) IS CORRECTLY ADJUSTED. AIR DELIVERY SHOULD BE TRIGGERED ABOUT MIDWAY ALONG THE PURGE BUTTON'S TRAVEL, AND THE SOUND OF THE DEMAND LEVER TOUCHING THE METAL DISK OF THE DIAPHRAGM ("TAPPING") SHOULD BE AUDIBLE WHEN THE SECOND STAGE IS SHAKEN UP AND DOWN.

- B.6** Press the purge button a few times.

## FINAL ASSEMBLY

- 6.** Reassemble the O-ring (72) on the case plug (64)
- 7.** Using the hex wrench (B-8), screw the case plug (64) into the threaded bushing.



IF A TORQUE WRENCH IS USED, USE A TORQUE SETTING OF 90 N/ CM.

- 8.** Reposition the hose protector (46).
- 9.** Disassemble the control valve group.
- 10.** Disassemble the intermediate pressure measuring gauge and screw the port plug with its O-ring seal back on.
- 11.** Assemble the exhaust tee (41) on the support flange on the second stage case.





**WARNING!**

MAKE SURE THAT THE EDGE OF THE EXHAUST TEE IS CORRECTLY FITTED IN THE FLANGE. LIGHT LUBRICATION WITH LIQUID SOAP OR DETERGENT FACILITATES INSTALLATION. DO NOT USE SILICONE LUBRICANTS, AS THEY MAY DAMAGE CERTAIN COMPONENTS (DIAPHRAGMS) AND CAUSE THE EXHAUST TEE TO COME OUT OF ITS SEAT DURING USE.

---

12. Assemble the mouthpiece (44), securing it with a new mouthpiece clamp (43).



Drawing N.ro E 23	<b>AXIS SECOND STAGE - AXIS NITROX AXIS OCTOPUS</b>	Drawing updated on: 05/10/2000
----------------------	---------------------------------------------------------	-----------------------------------

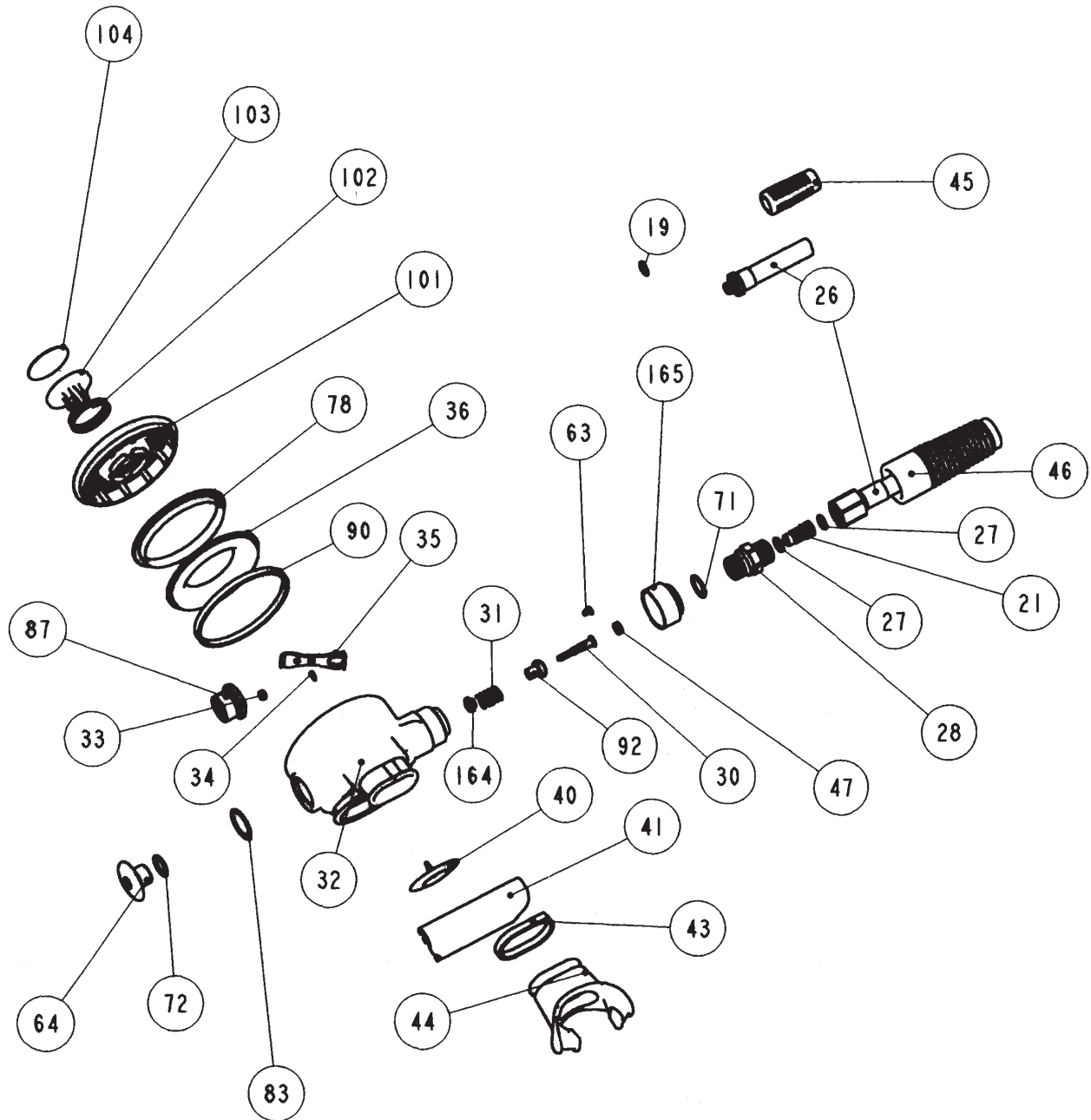


Table No. 113	<b>AXIS SECOND STAGE - AXIS NITROX AXIS OCTOPUS</b>	Drawing reference No.: E 23 Table updated on: 30/10/2001
---------------	---------------------------------------------------------	----------------------------------------------------------------

Ref.N.	Code	Description
19	46110106	OR 106
19	46110402	OR 106 Viton 610-97507
21	46200204	Seat connector
26	46186174	Black HI-FLOW hose
26	46186178	Yellow octopus HI-FLOW hose
27	46110205	OR 2025
27	46110411	OR 2025 Viton 010-9707
28	46184282	Hose-case assembly connector
30	46184219	Poppet stem
31	46185057	Poppet spring
32	- - -	Axis case
33	46185051	Demand lever nut
34	46185049	Demand lever washer
35	46185104	Demand lever
36	46184225	Diaphragm
40	46184006	Exhaust valve
41	46186266	Exhaust tee
43	47157984	Mouthpiece clamp
44	46185086	Mouthpiece
45	46179902	First stage hose protector
46	46184210	Hose protector
47	46184062	Poppet seat
63	46184289	Cover safety clip
64	46184234	Case plug
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707
72	46110215	OR 2043
72	46110415	OR 2043 Viton 013-9707
78	46184224	Diaphragm retaining ring
83	46110225	OR 2068

Ref.N.	Code	Description
83	46110420	OR 2068 Viton 017-9707
87	46184233	Adjuster connector
90	46184223	Spacer ring
92	46184221	Poppet seat holder
101	+++	Black Axis 2nd Stage cover
101	+++	Yellow Axis 2nd Stage cover
103	+++	Button spring
103	+++	Button
104	46200206	Button sticker
104	46200205	Nitrox button sticker
164	- - -	Rotation stop washer
165	46200213	Connector bushing
		<b>ASSEMBLIES</b>
G	46200294	Complete Axis second stage assembly
G	46200292	Complete Axis Nitrox second stage assembly
- - -	46200287	Axis Case P/F (32 - 164)
+ + +	46200200	Axis cover assembly (101-102-103-104)
+ + +	46200203	Axis Nitrox cover assembly (101-102-103-104)
+ + +	46200201	Axis Octopus cover assembly (101-102-103-104)
+ + +	46200202	Axis Nitrox Octopus cover assembly (101-102-103-104)
* * *	46200296	Axis 2nd Stage service kit (19-27-33-40-43-47-71-72-83)
* * *	46200297	Axis Nitrox 2nd Stage service kit (VITON O-Ring) (19-27-33-40-43-47-71-72-83)

**PROTON - PROTON XL  
SECOND STAGE**

**mares<sup>®</sup>**

## ▶ DISASSEMBLY

1. Unscrew the hose (26) from the first stage using the 14-mm open-end wrench (B-18) or the 17-mm open end wrench (B-17).
2. Remove the mouthpiece clamp (43) from the mouthpiece (44).

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

3. Remove the mouthpiece (44).
4. Remove the fixing pin (174) from the cap (41) of the exhaust tee (Fig. 1).

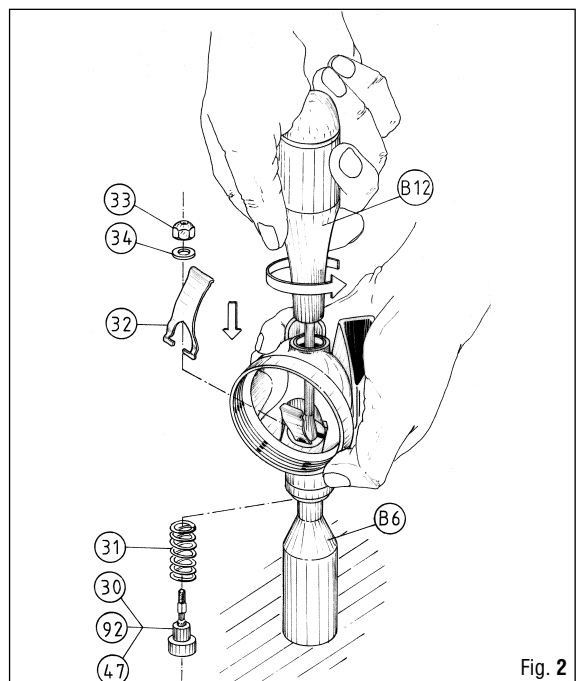
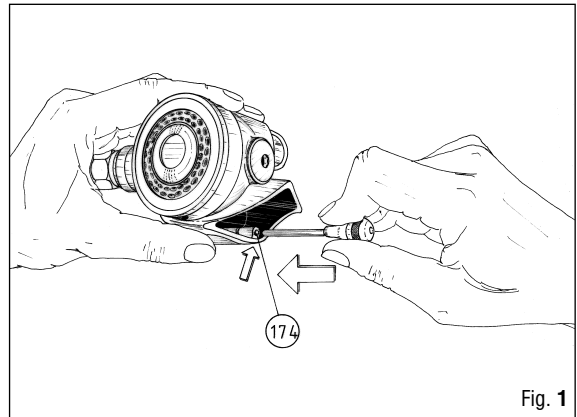
**NOTE** FOR THE OPERATION DESCRIBED IN STEP 4, IT IS RECOMMENDED TO USE A METAL PRICKER HAVING A MAX DIAMETER OF 2MM (Fig. 1).

5. Remove the inspection cap (41).
6. Shift the hose protector (46) along the hose (26).
7. Using the two 17-mm open-end wrenches (B-17) unscrew the hose (26) from the 2nd stage connector.
8. Remove the O-ring (27) and the O-ring (19) from the hose (26).
9. Unscrew the case assembly connector (28) using a 17-mm open-end wrench (B-17).
10. Remove the O-Ring (71) from the case assembly connector (28).
11. Unscrew the seat connector (21) from the case assembly connector (28) using a 5-mm hex wrench (B-4).
12. Remove the O-ring (27) from the seat connector (21).

## ▲ CAUTION

REMOVE THE CONNECTOR BUSHING (165) ONLY IF NECESSARY, AND IN THIS CASE USING PLASTIC TOOLS.

13. Remove the safety clip (63).
14. Unscrew the cover assembly.
15. Remove the diaphragm retaining ring (78) and the diaphragm (36) from the 2nd stage case (32).
16. Unscrew the case plug (64) using a 6-mm hex wrench (B-8).
17. Remove the O-Ring (171) from the case plug (64).
18. Position the 2nd stage case (32) on the special tool (B-6).
19. Exerting a slight pressure, back off the demand lever adjusting nut (33) using the special tool (B-12), and working through the hole in the 2nd stage case. (Fig. 2).



- 
20. Remove the demand lever adjusting nut (33), the washer (34), the 2nd stage poppet assembly and the spring (31) from the 2nd stage case (32) (Fig. 2)
- 

 **WARNING!**

DO NOT, UNDER ANY CIRCUMSTANCES, REMOVE THE ROTATION STOP WASHER (164) FROM THE SECOND STAGE CASE (32).

---

21. Remove the poppet seat (47) from the poppet seat holder (92).
22. Remove the poppet seat holder (92) from the 2nd stage poppet stem (30).
23. Remove the exhaust valve (40).

▶ **CLEANING**

---

 **CAUTION**

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

---

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

---

 **CAUTION**

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

---

## ► INSPECTION

Certain key components of the second stage should be regularly replaced at each scheduled overhaul. In addition, considering their relatively low cost, it is recommended to replace all the O-Rings.

Qty.	Ref. No.	Description	Code	Viton O-Ring Code
2	(27)	O-Ring 2025	46110205	46110411
2	(19-71)	O-Ring 2050	46110211	46110413
1	(19)	O-Ring 106	46110106	46110402
1	(171)	O-Ring 2037	46110110	46200298
1	(47)	2nd stage poppet seat	46184062	- - -
1	(33)	Demand lever adjusting nut	46185051	- - -
1	(40)	Exhaust valve	46184006	- - -
1	(43)	Mouthpiece clamp	47157984	- - -

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

## ► DO NOT USE PARTS WITH THE FOLLOWING DEFECTS:

Description	Ref. No.	Inspection
<b>2nd stage case</b>	(32)	Inspect the sealing surfaces for scratches or cracks.
<b>Seat connector</b>	(21)	Check that the sealing surface and the O-Ring seat are intact.
<b>Diaphragm</b>	(36)	Check for tears or pinholes around the metal disk, deformation of the outer rim or signs of separation of the diaphragm from the metal disk.
<b>O-Ring</b>	(19 - 27 - 71 - 171)	Check for cuts, burrs or foreign particles. The presence of any of these defects may result in leakage.
<b>2nd stage poppet seat</b>	47)	Check for cuts, burrs or abrasion of the rubber.
<b>2nd stage poppet seat holder</b>	(92)	Check for cracks, cuts or deformation.
<b>Demand lever adjusting nut</b>	(33)	Verify its self-locking capacity and inspect for rust. It is recommended to replace it at each scheduled overhaul and/or whenever it is disassembled.
<b>Mouthpiece</b>	(44)	Inspect for cuts, tears or signs of wear.
<b>Exhaust tee cap</b>	(41)	Check that it is intact.
<b>Hose</b>	(26)	Inspect for splits, blistering or any other signs of damage.
<b>Spring</b>	(31)	Check for any split, broken or misshapen coils.



## ► REASSEMBLY

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

---



### WARNING!

IF THE SECOND STAGE IS USED FOR DIVING WITH OXYGEN-RICH MIXTURES, IT MUST BE PERFECTLY CLEANED AND FREE OF OIL/SILICONE GREASE RESIDUES OR OTHER IMPURITIES. VITON O-RINGS MUST BE LUBRICATED WITH SPECIAL OXYGEN-COMPATIBLE GREASE.  
**DO NOT USE SILICONE GREASE !!!**

---

1. Install a new exhaust valve (40), carefully pulling its silicone stem through the center hole of the second stage exhaust valve support.
- 



### CAUTION

DO NOT PULL TOO HARD ON THE SILICONE STEM TO AVOID DAMAGING THE EXHAUST VALVE

---

2. Using cutting nippers, cut the silicone stem by about 7 mm.
  3. Reassemble the poppet seat holder (92) on the 2nd stage poppet stem (30).
  4. Reassemble the poppet seat (47) in the poppet seat holder (92).
- 



### CAUTION

ASSEMBLE THE BUSHING (165) IF IT WAS PREVIOUSLY DISASSEMBLED.

---



### CAUTION

ON PROTON SECOND STAGES IT IS POSSIBLE TO ASSEMBLE THE DEMAND LEVER IN TWO DIFFERENT WAYS. THE TWO ASSEMBLY PROCEDURES ARE DESCRIBED BELOW.

---

## ASSEMBLING THE DEMAND LEVER

### ▶ METHOD "A"

- A.1** Place the 2nd stage poppet assembly (30-47-92) together with its spring (31) on the special tool (B-6).
- A.2** Insert the 2nd stage case (32) on the poppet assembly with spring and exert a slight pressure so that the poppet protrudes from the 2nd stage case. (Fig. 3)

### ⚠ WARNING!

PRESS AND ROTATE THE 2ND STAGE CASE (32) SLIGHTLY TO THE RIGHT AND LEFT TO OBTAIN CORRECT POSITIONING OF THE 2ND STAGE POPPET STEM.

- A.3** Fit the washer (34) on the part of the poppet stem that protrudes inside the 2nd stage case and lock down the adjusting nut (33) through a few turns, using the special wrench (B-20) (Fig. 4).

### ⚠ WARNING!

IF THERE ARE DIFFICULTIES INSERTING AND/OR POSITIONING THE SPECIAL WRENCH (B-20) ON THE POPPET STEM DURING THE OPERATION DESCRIBED IN STEP -A.3- IT IS RECOMMENDED TO REDUCE THE PRESSURE EXERTED ON THE 2ND STAGE CASE SLIGHTLY UNTIL INSERTION AND/OR CORRECT ALIGNMENT IS ACHIEVED.

### ⚠ WARNING!

TO FACILITATE THE OPERATION DESCRIBED IN STEP -A.3-, AFTER LOCKING DOWN THE NUT THROUGH A FEW TURNS WITH SPECIAL WRENCH (B-20) IT IS RECOMMENDED TO FINISH LOCKING IT DOWN USING SPECIAL WRENCH (B-12).

### ⚠ CAUTION

TO FACILITATE THE SUBSEQUENT ASSEMBLY OPERATIONS, DURING STEP -A.3- IT IS ADVISABLE TO PERFORM ONLY AN APPROXIMATE (NOT FINAL) ADJUSTMENT OF NUT (33). THE RECOMMENDED APPROXIMATE ADJUSTMENT IS ACHIEVED WHEN THE POPPET STEM PROTRUDES FROM THE ADJUSTING NUT BY ABOUT 1 mm.

- A. 4** Keeping the special tool (B-6) positioned inside the case assembly connector of the 2nd stage (32), insert the demand lever (35) between the washer (34) and the seat in the 2nd stage case, proceeding as shown in (Fig. 5).

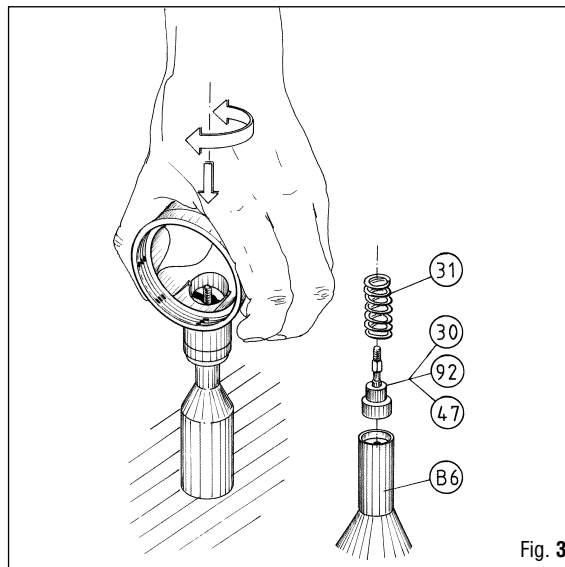


Fig. 3

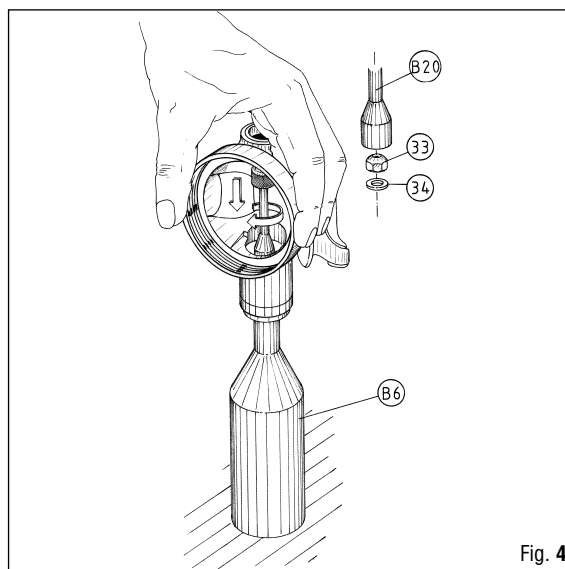


Fig. 4

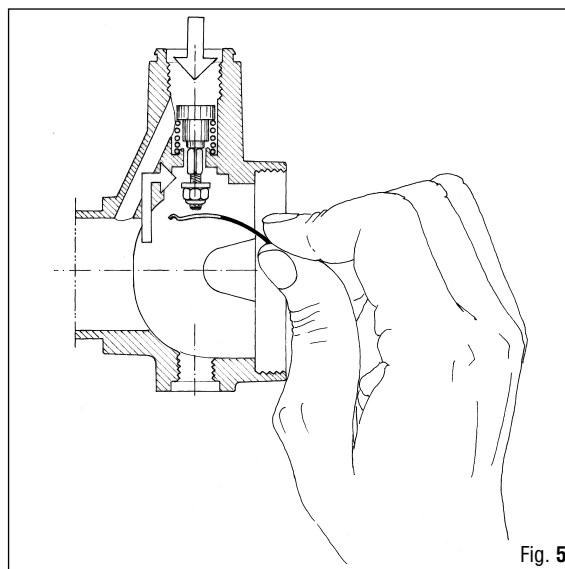


Fig. 5



**⚠ WARNING!**

USING THE SPECIAL TOOL (B-6) AND THE SPECIAL WRENCH (B-12), IT IS RECOMMENDED TO CONTINUE LOCKING DOWN THE NUT (33) TO ACHIEVE AN APPROXIMATE (NOT FINAL) ADJUSTMENT IN WHICH THE VALVE STEM (30) PROTRUDES BY ABOUT 3 mm.

**⚠ WARNING!**

TO CHECK THAT THE 2ND STAGE POPPET IS CORRECTLY POSITIONED, PUSH THE DEMAND LEVER A FEW TIMES, MAKING SURE IT IS ABLE TO MOVE FREELY.

**▶ METHOD "B"****⚠ WARNING!**

IF THE CONNECTOR BUSHING (165) COMES OUT DURING THE PROCEDURE DESCRIBED IN STEP B. 3, REASSEMBLE IT USING THE INSTRUCTIONS OF METHOD "A".

- B. 1** Position the spring (31) in the 2nd stage case assembly connector (Fig. 6).
- B. 2** Insert the 2nd stage poppet assembly (30-47-92) in the previously inserted spring (31) (Fig. 6).
- B. 3** Insert the special tool (B-36) (Cod. 46200383) into the 2nd stage case assembly connector until it engages the bushing (165) (Fig. 7).

**⚠ WARNING!**

PRESS AND ROTATE THE SPECIAL TOOL (B-36) SLIGHTLY TO THE RIGHT AND LEFT TO OBTAIN CORRECT POSITIONING OF THE 2ND STAGE POPPET STEM.

- B. 4** Fit the washer (34) on the poppet stem (30).
- B. 5** Using the special wrench (B-12), lock down the adjusting nut (33) on the poppet stem (30).

**⚠ WARNING!**

TO FACILITATE THE SUBSEQUENT ASSEMBLY OPERATIONS, DURING STEP -B.5- IT IS ADVISABLE TO PERFORM ONLY AN APPROXIMATE (NOT FINAL) ADJUSTMENT OF NUT (33). THE RECOMMENDED APPROXIMATE ADJUSTMENT IS ACHIEVED WHEN THE POPPET STEM PROTRUDES FROM THE ADJUSTING NUT BY ABOUT 1 mm.

- B. 6** Insert the demand lever (35) between the washer (34) and the seat in the 2nd stage case, proceeding as shown in the Figure. 5.

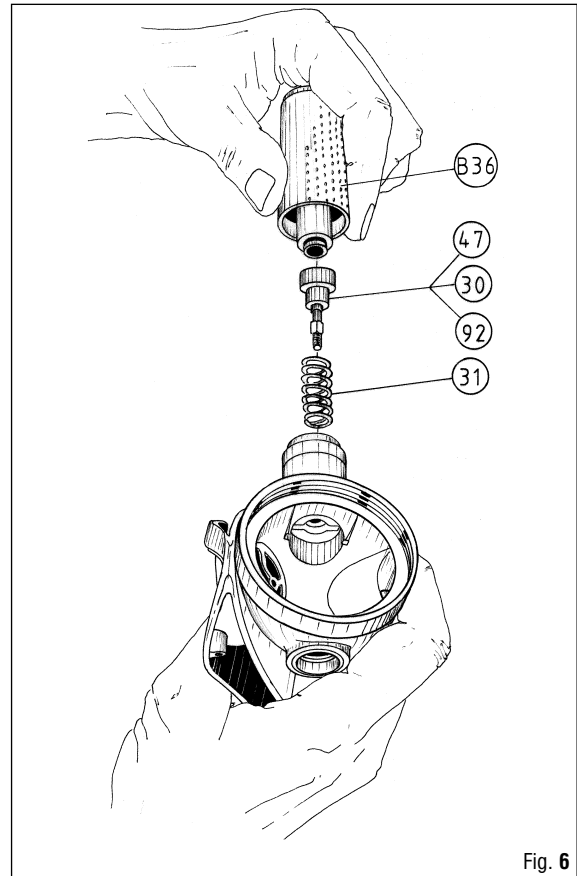


Fig. 6

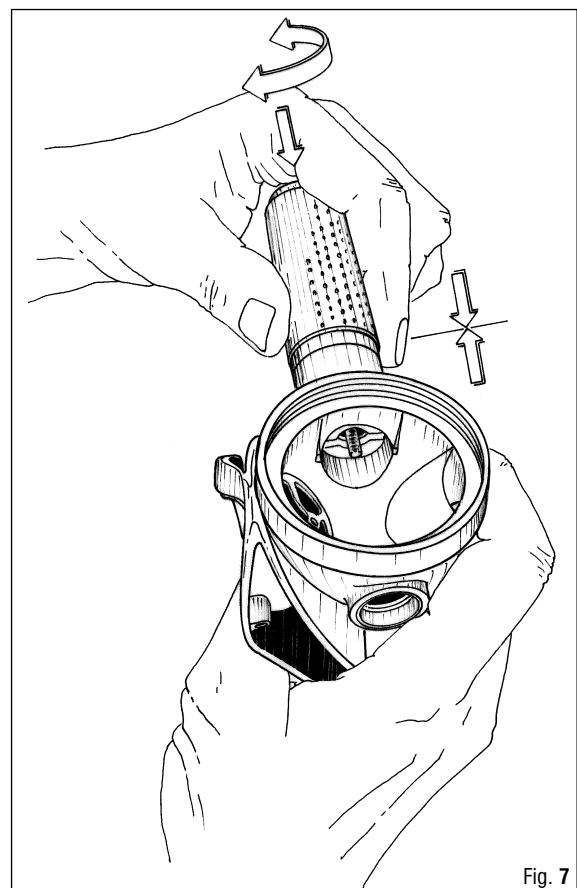


Fig. 7



**WARNING!**

USING THE SPECIAL WRENCH (B-12) IT IS RECOMMENDED TO FINISH LOCKING DOWN NUT (33) TO ACHIEVE AN APPROXIMATE (NOT FINAL) ADJUSTMENT IN WHICH THE VALVE STEM (30) PROTRUDES BY ABOUT 3 mm.

---

- B. 7** After having positioned the demand lever (35), remove the special tool (B-36) from the connector bushing (165).
- 



**WARNING!**

TO CHECK THAT THE 2ND STAGE POPPET IS POSITIONED CORRECTLY, PUSH THE DEMAND LEVER A FEW TIMES, MAKING SURE IT IS ABLE TO MOVE FREELY.

---

## FINAL ASSEMBLY

5. Fit the O-ring (27) in its seat in the seat connector (21).
  6. Insert and lock down seat connector (21) into the case assembly connector (28) using the 5-mm hex wrench (B-4), so that it protrudes from the connector by about 2 mm.
- 



**WARNING!**

THE POPPET SEAT SHOULD NOT PROTRUDE BY MORE THAN 3.8 mm FROM THE CASE ASSEMBLY CONNECTOR.

---

7. Fit the O-Ring (71) in the seat on the case assembly connector (28)
8. Using a 17-mm open-end wrench (B-17), lock down the case assembly connector into the 2nd stage case (32).



IF A TORQUE WRENCH IS USED, USE A TORQUE SETTING OF 8 - 8.5 N/M.

---



**WARNING!**

IF THE DEMAND LEVER MOVES DOWN CONSIDERABLY DURING THE PROCEDURE DESCRIBED IN STEP -8-, TO PREVENT IT FROM COMING OUT DURING THE SUBSEQUENT ASSEMBLY OPERATIONS, LOCK DOWN THE ADJUSTING NUT THROUGH A FEW TURNS USING THE SPECIAL WRENCH (B-12) AND WORKING THROUGH THE HOLE IN THE SECOND STAGE CASE.

---

9. Fit the O-ring (27) in the seat on the swivel coupling of the hose (26).
10. Screw the hose (26) into the case assembly connector (28) with the help of two 17-mm open-end wrenches (B-17).

## FINAL ADJUSTMENTS

To obtain a correct adjustment of the regulator:

- A. The repair shop should be equipped with a high and low pressure compressed air supply.
- B. It is necessary to have a pressure gauge for checking the intermediate pressure (the pressure gauge should have a full scale value MAX 30 - 40 BAR, for greater accuracy of adjustment).
  1. Screw the intermediate pressure measuring gauge into one of the 3/8" low pressure ports on the first stage, using the wrench (B-18).
  2. Assemble the hose with the partially finished 2nd stage on the D.F.C. port, locking it down with the 14-mm wrench (B-18) or with the 17-mm wrench (B-17).
  3. Mount the regulator group on the control valve (of a tank or Test Bench).
  4. Depress the second stage demand lever, slowly open the tank valve and, almost simultaneously, release the demand lever.
  5. Read the pressure gauge to check whether the 1st stage pressure adjustment is correct.



### WARNING!

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

6. Fit the 2nd stage diaphragm (36) in the 2nd stage case (32).
7. Insert the diaphragm retaining ring (78).
8. Screw on the cover.

### IMPORTANT

CONTINUE LOCKING DOWN THE COVER UNTIL THE TWO SEATS (ON THE CASE AND COVER), WHICH ACCOMMODATE THE SAFETY CLIP, ARE ALIGNED.

TO FACILITATE THIS OPERATION, USE THE GROOVE ON THE COVER AS A REFERENCE.

9. Insert the safety clip (63).
10. Working through the hole in the second stage case, use the wrench (B-12) to lock down or back off nut (33) in order to adjust the demand lever (35).





**WARNING!**

THE DEMAND LEVER (35) IS CORRECTLY ADJUSTED WHEN AIR DELIVERY IS TRIGGERED ABOUT 1mm FROM THE START OF THE PURGE BUTTON'S TRAVEL, AND IF THE SOUND OF THE DEMAND LEVER TOUCHING THE METAL DISK OF THE DIAPHRAGM ("TAPPING") IS AUDIBLE WHEN THE SECOND STAGE IS SHOOK UP AND DOWN.

---

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



**WARNING!**

IF A TORQUE WRENCH IS USED, USE A TORQUE SETTING OF 90 N/cm.

---

14. Position the hose protector (46).
15. Disassemble the control valve group.
16. Disassemble the intermediate pressure measuring gauge and screw in the port plug with its O-ring seal.
17. Assemble the mouthpiece (44), securing it with a new mouthpiece clamp (43).
18. Fit the exhaust tee cap (41) and secure it with the fixing pin (174).

Drawing No. E 24	<b>PROTON SECOND STAGE PROTON OCTOPUS</b>	Drawing updated on 14/12/2001
---------------------	-----------------------------------------------	----------------------------------

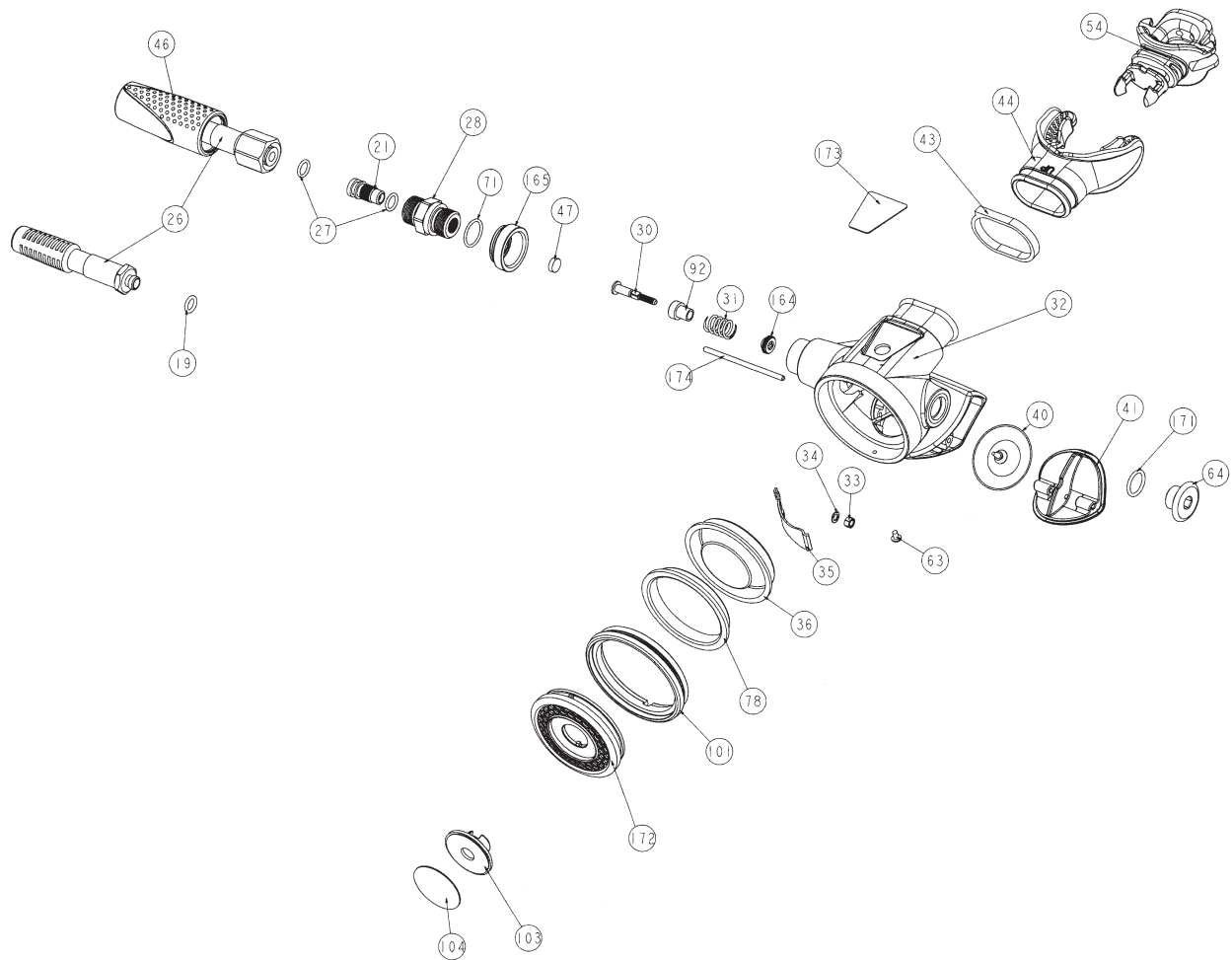


Table No. 114	<b>PROTON SECOND STAGE PROTON OCTOPUS</b>	Drawing reference No.: E 24 Table updated on 02/04/2002
---------------	-----------------------------------------------	------------------------------------------------------------

Ref.N.	Code	Description
19	46110106	OR 106
19	46110402	OR 106 Viton 610-97507
21	46200204	Seat connector
26	46200254	3/8 Soft Hose
26	46200349	3/8 yellow Soft Hose
27	46110205	OR 2025
27	46110411	OR 2025 Viton 010-9707
28	46184282	Hose case assembly connector
30	46184219	Poppet stem
31	46185059	Poppet spring
32	46200330	2nd stage case
33	46185051	Demand lever adjusting nut
34	46185049	Lever washer
35	46187027	Demand Lever
36	46200311	2nd stage diaphragm
40	46184006	Exhaust valve
41	46200315	Proton exhaust tee cap
43	47157984	Mouthpiece clamp
44	46200366	Mouthpiece 2nd St 2K2 (Proton - Proton XL)
44	46185086	Black mouthpiece (Proton octopus)
46	46200323	Proton hose protector
47	46184062	Poppet seat
54	46186090	Octopus mouthpiece cover
63	46184289	Cover safety clip
64	46200322	2nd stage case plug
71	46110211	OR 2050
71	46110413	OR 2050 Viton 014-9707
78	46200321	Diaphragm retaining ring

Ref.N.	Code	Description
92	46184221	Poppet seat holder
101	+++	Proton cover ring
103	+++	Proton cover button
104	46200339	Button sticker
164	46200211	Rotation stop washer
165	46200334	Connector bushing
171	46110110	OR 2037
171	46200298	OR 2037 Viton
172	+++	Rubber seal for Proton 2nd stage cover
172	+++	Rubber seal for Proton octopus 2nd stage cover
173	46200340	Proton case sticker
174	46200361	Exhaust cap fixing pin
		<b>ASSEMBLIES</b>
G	46200411	Complete Proton second stage assembly
G	46200412	Complete Proton NX second stage assembly
+++	46200416	Proton Cover assembly
		(101 - 103 - 104 - 172)
+++	46200415	Proton NX cover assembly
		(101 - 103 - 104 - 172)
+++	46200413	Proton Octopus cover assembly
		(101 - 103 - 104 - 172)
***	46200409	Proton/Proton XL 2nd stage service kit
		(19 - 27 - 33 - 40 - 43 - 47 - 71 - 171)
***	46200408	Proton NX/Proton XL NX 2nd stage service kit
		(19 - 27 - 33 - 40 - 43 - 47 - 71 - 171)

Drawing No. E 25	<b>PROTON XL SECOND STAGE</b>	Drawing updated on 08/11/2001
---------------------	-------------------------------	----------------------------------

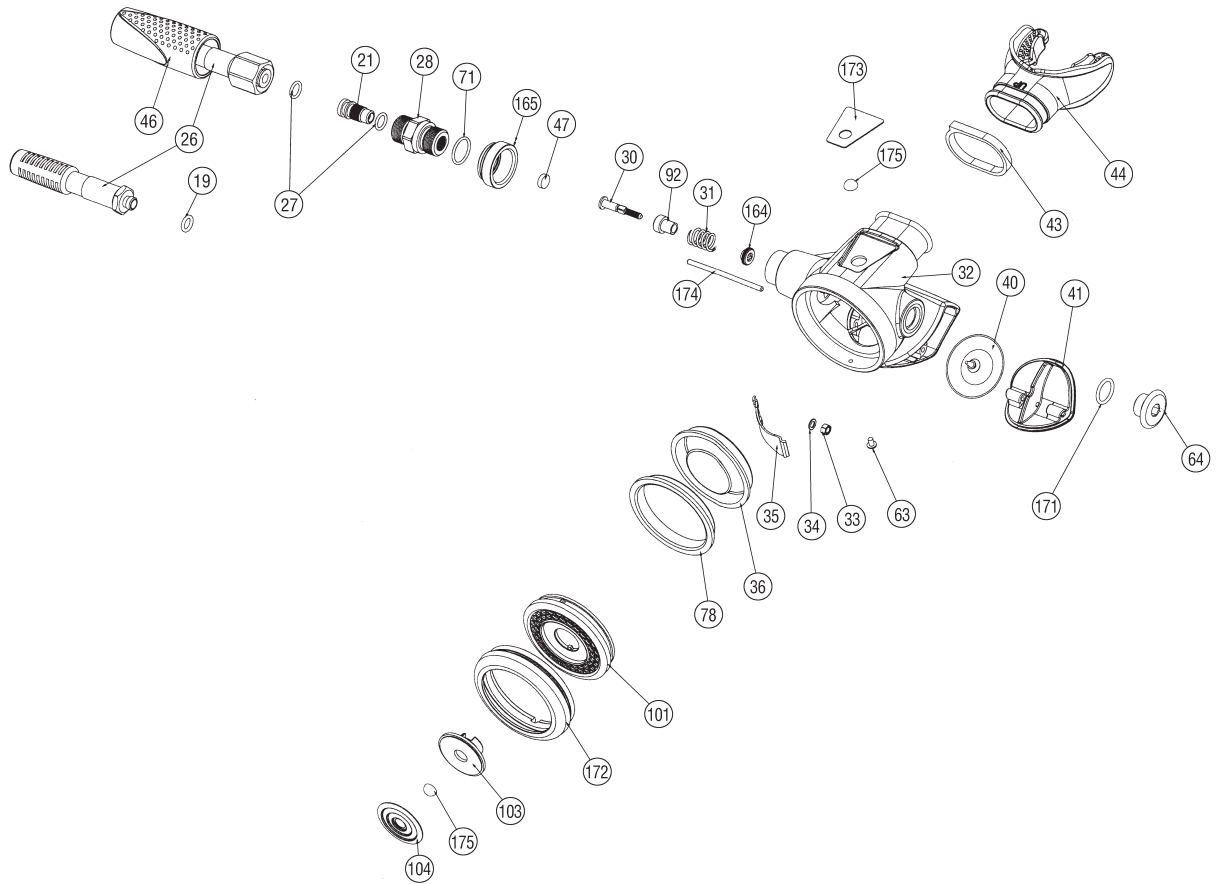


Table No. 115	<b>PROTON XL SECOND STAGE</b>	Drawing reference No: E 25 Table updated on 02/04/2002
---------------	-------------------------------	-----------------------------------------------------------

Ref.N.	Code	Description
19	46110106	OR 106
19	46110402	OR 106 Viton 610-97507
21	46200204	Seat connector
26	46200346	1/2 Soft Hose
27	46110205	OR 2025
27	46110411	OR 2025 Viton 010-9707
28	46184282	Hose Case Assembly Connector
30	46184219	Poppet stem
31	46185059	Poppet spring
32	46200330	2nd stage case
33	46185051	Demand lever adjusting nut
34	46185049	Demand lever washer
35	46187027	Demand Lever
36	46200311	2nd stage diaphragm
40	46184006	Exhaust valve
41	46200315	Proton case plug
43	47157984	Mouthpiece clamp
44	46200366	Mouthpiece 2nd St 2K2 (Proton - Proton XL)
44	46185086	Black mouthpiece (Proton octopus)
46	46200323	Proton hose protector
47	46184062	Poppet seat
54	46186090	Octopus mouthpiece cover
63	46184289	Cover safety clip
64	46200379	2nd Stage case plug
71	46110211	OR 2050

Ref.N.	Code	Description
71	46110413	OR 2050 Viton 014-9707
78	46200321	Diaphragm retaining ring
92	46184221	Poppet seat holder
101	+++	Proton cover ring
103	+++	Proton cover button
104	46200339	Button sticker
164	46200211	Rotation stop washer
165	46200334	Connector bushing
171	46110110	OR 2037
171	46200298	OR 2037 Viton
172	+++	Cover rubber seal
173	46200340	Proton case sticker
174	46200361	Exhaust cover fixing pin
175	46200320	Cabochon
		<b>ASSEMBLIES</b>
G	46200410	Complete Proton XL 2ns stage assembly
+++	46200414	Proton XL cover assembly (101 - 103 - 104 - 172)
***	46200409	Proton/Proton XL 2nd stage service kit (19 - 27 - 33 - 40 - 43 - 47 - 71 - 171)
***	46200408	Proton NX/Proton XL NX 2nd stage 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
SECONDO STADIO OCTOPUS	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 !

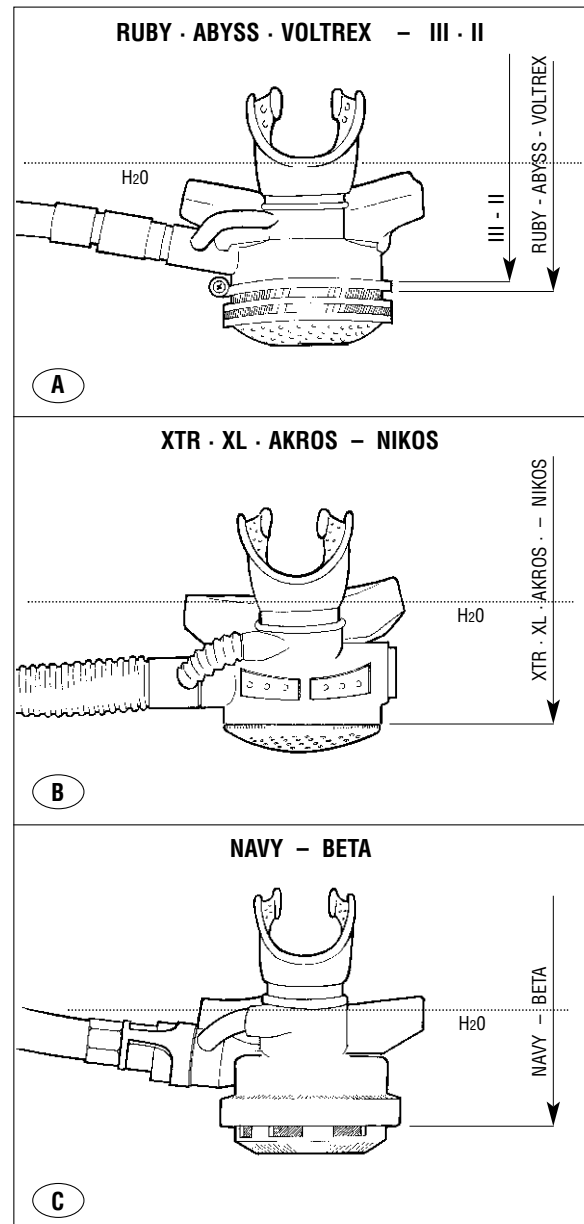
IN THE ABSENCE OF A TEST BENCH IT IS POSSIBLE TO RUN AN APPROXIMATE CHECK ON THE CRACKING PRESSURE USING A BASIN OF WATER AND FOLLOWING THE PROCEDURE BELOW:

- 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	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:
  - a. If the cracking pressure is greater, it is necessary to reduce the loading on the spring.

Fig. 1



- 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.

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.

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	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	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	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	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	1) Replace the spring or remove the washer if present
<b>- 3 -</b> CRACKING PRESSURE TOO LOW	RUBY - ABYSS VOLTREX AKROS - XTR - XL NIKOS - NAVY III° - II° - BETA AXIS - PROTON	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	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

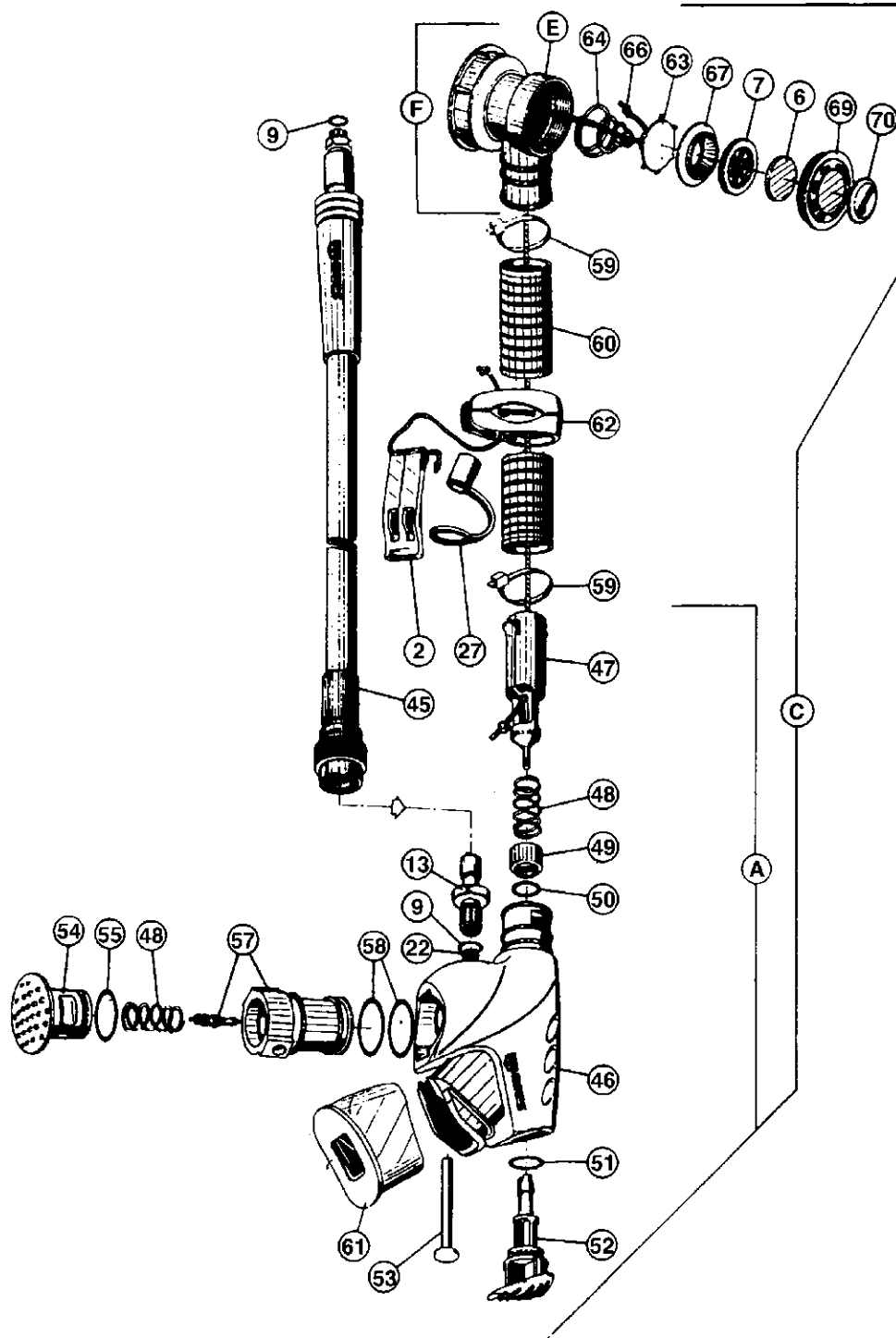
## ► SECOND STAGE TROUBLESHOOTING

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	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	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	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	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

**ERGO INFLATOR ASSY WITH R.E. VALVE** Reference drawing No.: J75 - Table No. 224  
Updated to 03-04-2000



**DRAWING CONTINUED FROM PREVIOUS TABLE**

Table No. 224	<b>ERGO INFLATOR ASSY WITH R.E. VALVE</b>	Drawing reference No.: J 75 Table updated on 30/10/2001
------------------	-------------------------------------------	---------------------------------------------------------------

Ref.N.	Code	Description
2	47159020	Two-tone whistle
6	47159070	LP inflator dump diaphragm
7	F	LP inflator diaphragm port
9	46110106	OR 106
13	47159659	LP quick coupling
22	47159146	LP filter
27	47159712	Ergo male connector dust cap
45	47159681	Int LP hose assembly
46	47159700	Ergo LP body
47	47159702	ERGO cord hook bushing
48	47185011	MR 12 1st stage spring
49	47159701	ERGO deflate OR bushing
50	46110241	OR 2-109
51	46110115	OR 115
52	47159717	ERGO 99 ARG deflate button
53	47159707	ERGO inflate button pin
54	47159716	ERGO 99 ARG inflate button
55	46110210	OR 2056
57	47159715	Bushing with ERGO poppet
58	46110221	OR 2081
59	45179863	Strap for corrugated D. 23
60	47159709	D. 23 corrugated hose

Ref.N.	Code	Description
61	47159705	ERGO LP mouthpiece
62	47159711	ERGO inflator assembly hose retainer
63	F	R.E. Valve poppet
64	F	Dump button spring
66	F	D. 1.75 black cord w/o core
67	47159133	R.E. Valve seal
69	F	R.E. Valve cap
70	46184322	Stereoscopic label for JKT 99
		<b>ASSEMBLIES</b>
A	47158504	LP inflator assembly ERGO w/o hose 99
C	47159729	ERGO corrugated assembly w/o hose 99
		( A -F -2-27-59-60-62)
C	47158507	ERGO corrugated assembly Crt w/o hse 99
		( A -F -2-27-59-60-62)
F	47159725	R.E. Valve assembly body
		(E-6-7-63-64-66-67-69-70)
***	47159719	ERGO service Kit
		(9-22-50-51-55-57-58-59)

**CYRANO - SPARK - STEN 2001  
PNEUMATIC SPEARGUNS**

**mares**<sup>®</sup>



46. Remove snap ring (72).



It is not necessary to remove the snap ring (72) during routine service, unless it or the barrel is to be replaced.

47. Remove barrel (26) from the jaws.

## ► CLEANING

The parts used to manufacture MARES spearguns do not require special cleaning. Acids or solvents should not be used to clean any speargun parts. A clean shop rag can be used to remove any oil or grease that remains on the parts prior to inspection.

## ► INSPECTION

All o-rings should be replaced during routine servicing (maintenance kit part # 164290). If the following parts are not replaced, they should be inspected with a jeweler's loop for the flaws listed below. Replace any part with these flaws.

<b>Barrel</b> (26 Cyrano - Spark - Sten 2001)	Inspect for any scratches or foreign material inside the barrel. Then check the outer surface for scratching and/or chipping around the O-ring sealing areas.
<b>Barrel bushing</b> (21 Cyrano - Spark - Sten 2001)	Inspect for any signs of cracking, distortion or brittleness.
<b>Snap ring</b> (72 Cyrano - Spark - Sten 2001)	Inspect for any signs of cracking, distortion or brittleness.
<b>Piston</b> (17 Cyrano - Spark) (N Sten 2001)	Inspect for any cracks or distortion.
<b>Oil wiper</b> (19 Cyrano - Spark) (N Sten 2001)	Inspect for any cuts, distortion or foreign material. Any of these flaws may cause leakage.
<b>Shock absorber</b> (2 Cyrano - Spark - Sten 2001)	Inspect for any signs of cuts or distortion.
<b>Shock absorber insert</b> (3 Cyrano - Spark - Sten 2001)	Inspect for any cracks or distortion.
<b>Power regulating block</b> (70 Cyrano - Spark) (D Sten 2001)	Inspect for any cracks or distortion.
<b>One-way seat</b> (68 Cyrano - Spark - Sten 2001)	Inspect for any signs of cuts or distortion.
<b>Power adjustment rod</b> (35 Cyrano - Spark) (L Sten 2001)	Inspect the surface of the rod for scratching, distortion or cracking. Also make sure that the O-Ring seat (39) is securely tightened on the power adjustment rod.
<b>Handle</b> (41 Cyrano - Spark) (H Sten 2001)	Inspect for any cracks or distortion. Check all O-ring seating surfaces for any signs of scratching, distortion or cracking.
<b>Connecting plunger</b> (45 Cyrano - Spark - Sten 2001)	Inspect the surface for distortion or scratching.
<b>Catch hook</b> (50 Cyrano - Spark - Sten 2001)	Inspect the surface of the catch hook that engages the piston for any signs of wear. Replace the catch hook if any signs of wear are present.
<b>Inlet valve</b> (32) (32 Cyrano - Spark) (M Sten 2001)	Inspect the seating and sealing surfaces for cracks, scratches, distortion or foreign material.

<b>Springs</b>	Inspect for any signs of distortion.
<b>O-Rings</b>	Inspect for any cuts, distortion or foreign material. Any of these flaws may cause leakage.
<b>Shaft</b>	Inspect the shaft for straightness and corrosion. Check the tapered shaft sleeve, washer and line retainer for wear and replace with original Mares parts if necessary.

**CAUTION !**

REPLACE ANY PARTS WITH DAMAGED THREADS. ALL THREADED PARTS MUST BE CLEAN AND IN GOOD CONDITION. INSTALLING ANY PART WITH DAMAGED THREADS MAY CAUSE IT TO CROSS-THREAD RESULTING IN DAMAGE TO THE SPEARGUN.

**► REASSEMBLY**

**NOTE** Before reassembly, lightly lubricate all o-rings with MARES grease (MOBIL PLEX 47 or equivalent). Lubricating o-rings before installation will minimize the risk of damage to the o-rings during reassembly.

1. Place the barrel in the 16 mm. jaws (A-1) (Fig. 3) and clamp into vise (Fig. 14).

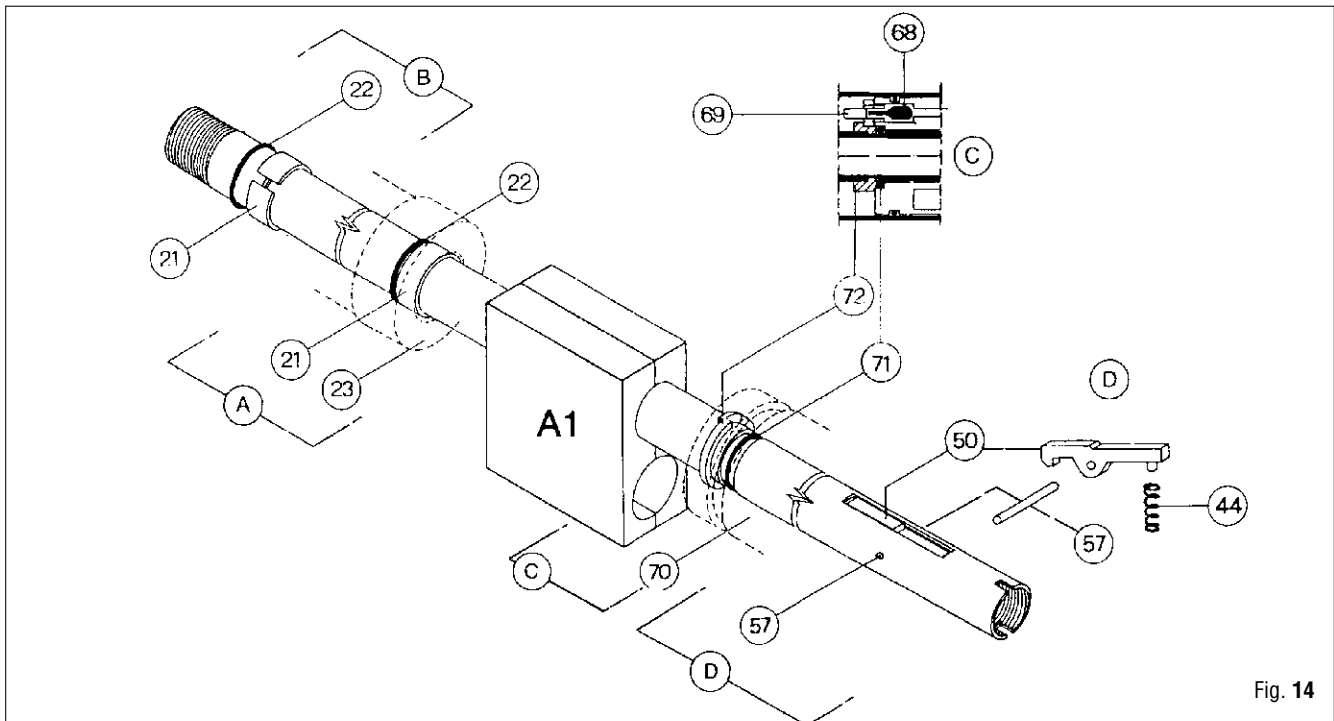


Fig. 14

2. Install one barrel bushing (21) in the inner groove of the barrel with tool A-7 (Fig. 14-A). (only Cyrano version)
3. Place one o-ring (22) against the barrel bushing (21) with tool A-7 (Fig. 14-A). (only Cyrano version)
4. Place o-ring (29) on the nose cone reinforcement (23). (only Cyrano version)

32. Insert bushing (47), O-ring (46) and guide bushing (51) (if any) into the handle (41). Gently tighten the bushing (47) into its housing in the handle with tool A-22 (Fig. 10).

**CAUTION !**

TORQUE BUSHING (47) TO 140 N/CM. (12.5 lbs. in. approx.) OVER TIGHTENING THE BUSHING MAY RESULT IN DAMAGE TO THE HANDLE CAUSING LEAKAGE.

33. Insert the rounded end of the connecting plunger (45) into the bushing (47) using a special tool A-13 (Ø 1.5 mm) or needle nose pliers.
34. Place o-ring (60) into groove of safety bar (59).
35. Insert the safety bar (59-60) into the handle from the opposite side that contains the power adjustment lever.
36. Align the safety bar retainer (58) and press it into the safety bar until the latch engages.
37. Install trigger adjustment screw (48) into trigger body (52) (Fig. 18-A). With a 6 mm wrench, tighten trigger adjustment screw (48) into trigger body (52), until it protrudes approximately 4 mm. (Fig. 18-B).
38. Align the hole in the trigger with the holes in the handle (41) and install trigger pin (53).
39. Position the grip (61) on the handle (41) and install grip pin (62), from the power adjustment lever side.
40. Pull trigger and remove shaft with piston (A-16) attached.
41. Remove piston (A-16, part # 164209) from the shaft.
42. Open the jaws and remove barrel (26).
43. With a rotating motion, install tank (25) using jaws (A-3) if necessary.
44. Fill the barrel (26) with oil according to the quantities shown in the table below.

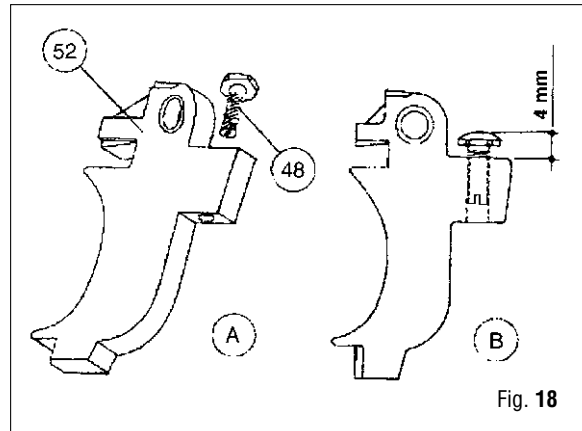


Fig. 18

**CAUTION !**

USE ONLY CORROSION AND RUST PREVENTING OILS, SUCH AS MOBIL DTE OIL LIGHT OR SAE 10 W OILS SUITABLE FOR USE IN HYDROPNEUMATIC SYSTEMS. DO NOT USE GRAPHITE BASE OILS! THE USE OF OILS NOT SPECIFIED FOR USE IN HYDROPNEUMATIC SYSTEMS MAY LEAD TO PREMATURE GUN DAMAGE DUE TO INTERNAL CORROSION.

SPEARGUN	OIL QUANTITY IN CC
CYRANO 550 - SPARK 550	20
CYRANO 700 - SPARK 700	25
CYRANO 850 - SPARK 850	25
CYRANO 970 - SPARK 970	30
CYRANO 1100 - SPARK 1100 Pipin	30

SPEARGUN	OIL QUANTITY IN CC
STEN MINIMINI	15
STEN MINIMINI	20
STEN MEDI	25
STEN	30
SUPER STEN	30

## ► PRESSURIZING USING MARES HAND PUMP (PART #691101)

### **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.

Drawing  
No. F 206

### STEN 2001 SPEARGUN

Drawing updated  
on 01/06/2001

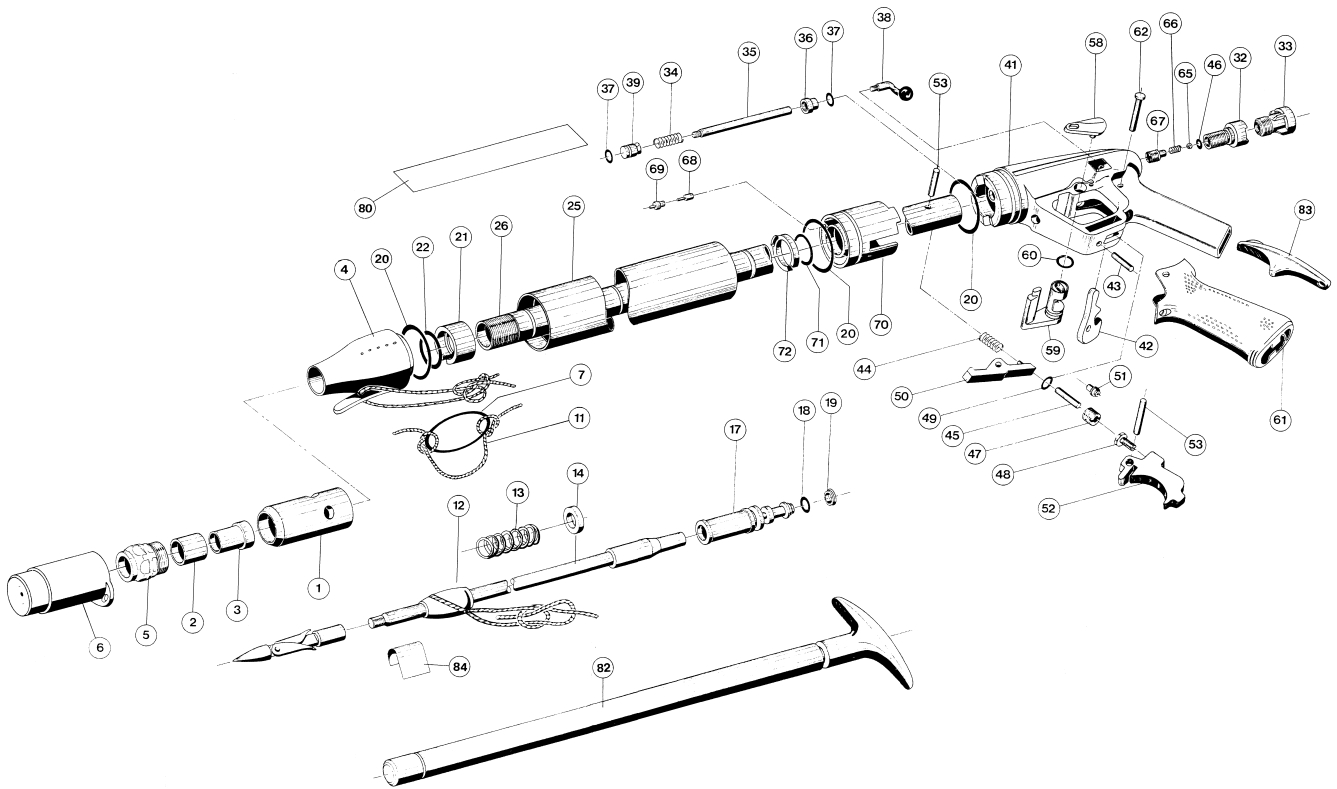




Table No. 504	<b>STEN 2001 SPEARGUN</b>	Drawing reference No.: F 206 Table updated on 30/10/2001
------------------	---------------------------	----------------------------------------------------------------

Ref. N.	Code	Description
1	A	Black Sten 2001 head body
2	43163856	Shock absorber , rubber
3	43163409	Shock absorber insert
4	43200093	Nose cone
5	43164016	Head ring nut
6	43164008	Black head cap
7	43163968	Rubber ring - shock
11	43169821	Shock line - m 3
11	43169818	Shock line - m 5
12	43163355	Shock line runner for rod D. 8
13	43163354	D. 8 Rod spring
14	43163505	D. 8 rod washer
17	N	Piston body
18	46110110	OR 2037
19	N	Oil wiper piston
20	46110208	Special OR
21	43163665	Bushing OR 87
22	46110206	OR 122 bis
25	43200069	Sten Minimini Tank
25	43200070	Sten Mini Tank
25	43200071	Sten Medi Tank
25	43200072	Sten Tank
25	43200073	Sten Super Tank
26	43200064	Minimisten Rod
26	43200057	Ministen Rod
26	43200059	Medisten Rod
26	43200063	Sten Rod
26	43200061	Canna Super Rod
32	M	Inlet valve body
33	43163563	White valve cap
34	L	Spring - power adjustment
35	L	Rod - power adjustment
36	L	Press OR power adjustment
37	46110102	OR 2015
38	L	Lever power adjustment
39	L	OR port for power adjustment
41	H	Mares Sten 2001 C/R handle
41	G	Mares Sten 2001 S/R handle
42	43163668	Line release, black
43	43163614	Pin - line release
44	43163313	Spring catch hook
45	43164282	Connection piston
46	46110201	OR 1
47	14364284	Connection piston bushing

Ref. N.	Code	Description
48	E	Trigger adjustment scre
49	46110242	OR 2-003 Apnea Syste
50	43163377	Catch hoo
51	43200095	Sten 2001 piston compas
52	E	Cyrano trigger bod
53	43163337	Pin 4 x 2
57	43200098	Pin 4 x 23.
58	43164237	Safety sto
59	43164236	Safety bod
60	46110106	OR 106
61	43164300	White heelplate
62	43164233	Cyrano heelplate fixing pin
65	M	Ball bearing - inlet valve
66	M	Spring - inlet valve
67	M	OR button inlet valve
68	43163635	Seat, one way valve
69	43163636	Housing, one way valve
70	D	Power regulator block
71	46110220	OR 2062
72	43163518	Elastic ring - block
80		Sten minimini label
80		Sten mini label
80		Sten medi label
80		Sten label
80		Sten super label
83	43160710	Hinge load 94
		<b>ASSEMBLIES</b>
82	416803	Screw injector
A	43200066	Sten 2001 assembly head ( 1-2-3-5 )
D	43163638	Adjustment block assembly ( 68-69-70 )
E	43164230	Cyrano trigger assembly (48-52)
G	43200097	S/Reg. handle Sten 2001 ( 41-42-43-46-47-49 )
H	43200096	C/Reg. handle Sten 2001 ( L- 38-41-42-43-46-47-49 )
L	43163937	Power adjustment assembly ( 34-35-36-37-39)
M	43163941	Inlet valve assembly ( 32-46-65-66-67 )
N	43163629	Piston assembly (17-18-19)
P	43163683	Minimisten sheathing assembly
***	43163979	Seal assembly series Sten 2001/Sten ( 18-19-20-22-37-46-49-60-71 )

► **SPEARGUN TROUBLESHOOTING**

PROBLEM	MODEL	PROBABLE CAUSE	SOLUTION
- 1 - AIR LEAK FROM THE MUZZLE	CYRANO SPARK STEN STEN 2001	1) Piston O-Ring dirty, defective or damaged	1) Replace the O-Ring
		2) Piston cap dirty, defective or damaged	1) Replace the piston cap
		3) Barrel scratched or damaged	1) Replace the barrel
- 2 - AIR LEAK FROM THE POWER REGULATOR	CYRANO SPARK STEN STEN 2001	1) Power control rod O-Ring dirty, defective or damaged	1) Replace the O-Ring
		2) Power control rod scratched or damaged	1) Replace the power control rod
		3) O-Ring seat in handle dirty, defective or damaged	1) Clean or replace the handle
- 3 - AIR LEAK FROM RECHARGE VALVE	CYRANO SPARK STEN STEN 2001	1) Foreign particles in recharge valve body	1) Clean the recharge valve body
		2) Recharge valve O-Ring dirty, defective or damaged	1) Replace the O-Ring
		3) Recharge valve ball defective or damaged	1) Replace the ball
		4) O-Ring seat in recharge valve dirty, defective or damaged	1) Clean or replace the valve body
- 4 - AIR LEAK FROM TRIGGER	CYRANO SPARK STEN STEN 2001	1) Connecting piston O-Ring dirty, defective or damaged	1) Replace the O-Ring
		2) Connecting piston scratched or damaged	1) Replace the connecting piston
		3) O-Ring seat in handle dirty, defective or damaged	1) Clean or replace the handle
- 5 - AIR LEAK BETWEEN TANK AND WISHBONE	CYRANO SPARK STEN STEN 2001	1) O-Ring dirty, defective or damaged	1) Replace the O-Ring
		2) Tank damaged	1) Replace the tank
		3) Wishbone O-Ring seat defective or damaged	1) Replace the wishbone
- 6 - AIR LEAK BETWEEN THE TANK AND HANDLE	CYRANO SPARK STEN STEN 2001	1) O-Ring dirty, defective or damaged	1) Replace the O-Ring
		2) Tank damaged	1) Replace the tank
		3) O-Ring seat in handle defective or damaged	1) Replace the handle
- 7 - INSUFFICIENT POWER	CYRANO SPARK STEN STEN 2001	1) Power regulator on "reduced pressure" setting	1) Change to "full power" setting
		2) Speargun pressure low	1) Inspect for leaks and repair and/or load the speargun
- 8 - SHAFT ACCIDENTALLY DISCHARGED WITHOUT PRESSING TRIGGER	CYRANO SPARK STEN STEN 2001	1) Trigger sensitivity too high	1) Correctly adjust trigger sensitivity



## ► SPEARGUN TROUBLESHOOTING

PROBLEM	MODEL	PROBABLE CAUSE	SOLUTION
- 9 - SHAFT NOT DISCHARGED WHEN TRIGGER IS PRESSED	CYRANO SPARK STEN STEN 2001	1) Trigger sensitivity low	1) Correctly adjust trigger sensitivity
- 10 - PRESSING TRIGGER WITH SAFETY CATCH ENGAGED RELEASES THE PISTON	CYRANO SPARK STEN STEN 2001	1) Safety catch damaged or defective	1) Replace the safety catch
		2) Trigger damaged or defective	1) Replace the trigger
- 11 - DIFFICULTY LOADING THE SPEARGUN	CYRANO SPARK STEN STEN 2001	1) Speargun excessively pressurized	1) Discharge the speargun re-pressurize correctly
		2) Piston damaged or defective	1) Replace the piston
		3) Shock absorber bushing damaged or defective	1) Replace the shock absorber bushing
		4) Spear shaft damaged or bent	1) Replace the spear shaft
- 12 - SPEAR SHAFT DOES NOT REMAIN INSIDE THE PISTON	CYRANO SPARK STEN STEN 2001	1) Spear shaft housing in piston damaged or defective	1) Replace the piston
		2) Spear shaft tailpiece damaged or defective	1) Replace the shaft tailpiece
		3) Non-original spear shaft	1) Replace with an original spear shaft

**SUBJECT: H.U.B. SWIVEL MAINTENANCE FOR AIRLOCK  
(REF. TO TAB. N. 232 OF 30/10/2001)**

**BTM4**

▶ **TOOLS:**

- 1 17 mm WRENCH (B-17).
- 1 14 mm WRENCH (B-18).
- 1 17 mm SPANNER.
- 1 PHILLIPS SCREWDRIVER (USAG 327 - PH 2X150 TYPE).

▶ **DISASSEMBLY**

1. REMOVE THE LP HOSE (56) FROM THE AIRLOCK QUICK COUPLING.
2. REMOVE THE AIRLOCK SYSTEM FROM THE H.U.B. RETAINER.
3. POSITION THE OPEN H.U.B. ON A CLEAN SURFACE WITH THE INTERNAL PART FACING UP.
4. REMOVE THE MIDDLE STRAPS.
5. UNSCREW THE FIVE SCREWS (3) AND REMOVE THE INTERNAL PART OF THE BACKPACK (43) FROM THE TANK PAD (15).
6. REMOVE THE LP HOSE (7) FROM THE PNEUMATIC COUPLING (A).
7. UNSCREW THE PNEUMATIC LP HOSE (7) FROM THE SWIVEL CONNECTOR PIN (72) USING TWO WRENCHES (b-17 AND B-18).
8. REMOVE THE LP HOSE (56) FROM THE RETAINER AND UNSCREW IT FROM THE SWIVEL CONNECTOR PIN (72).
9. UNSCREW THE LP HOSE (56) FROM THE SWIVEL CONNECTOR (72) USING THE WRENCH (B-18).
10. UNSCREW THE SWIVEL CONNECTOR PIN (72) FROM THE CONNECTOR (8) USING A 17 mm WRENCH (B-17) (OR 17 mm SPANNER).
11. REMOVE THE SPACER BUSHING (70) AND THE SWIVEL CONNECTOR (71) FROM THE SWIVEL CONNECTOR PIN (72).
12. REMOVE THE TWO O-RINGS (97) AND THE O-RING (55) FROM THE SWIVEL CONNECTOR PIN (72).

▶ **CLEANING AND CHECKING**

CLEAN AND CHECK THE UNIT FOLLOWING THE INSTRUCTIONS DESCRIBED IN THE MAINTENANCE MANUAL

**ASSEMBLY**

▶ **SWIVEL PRE-ASSEMBLY INSTRUCTIONS**

- a. POSITION THE O-RING (55) ON THE SWIVEL CONNECTOR PIN (72) NEXT TO THE THREADING.
- b. POSITION THE TWO O-RINGS (97) IN THE GROOVES OF THE SWIVEL CONNECTOR PIN (72).
- c. LUBRICATE THE O-RINGS WITH SILICON GREASE.
- d. POSITION THE SWIVEL CONNECTOR (71) ON THE PIN (72).
- e. INSERT THE SPACER BUSHING (70).

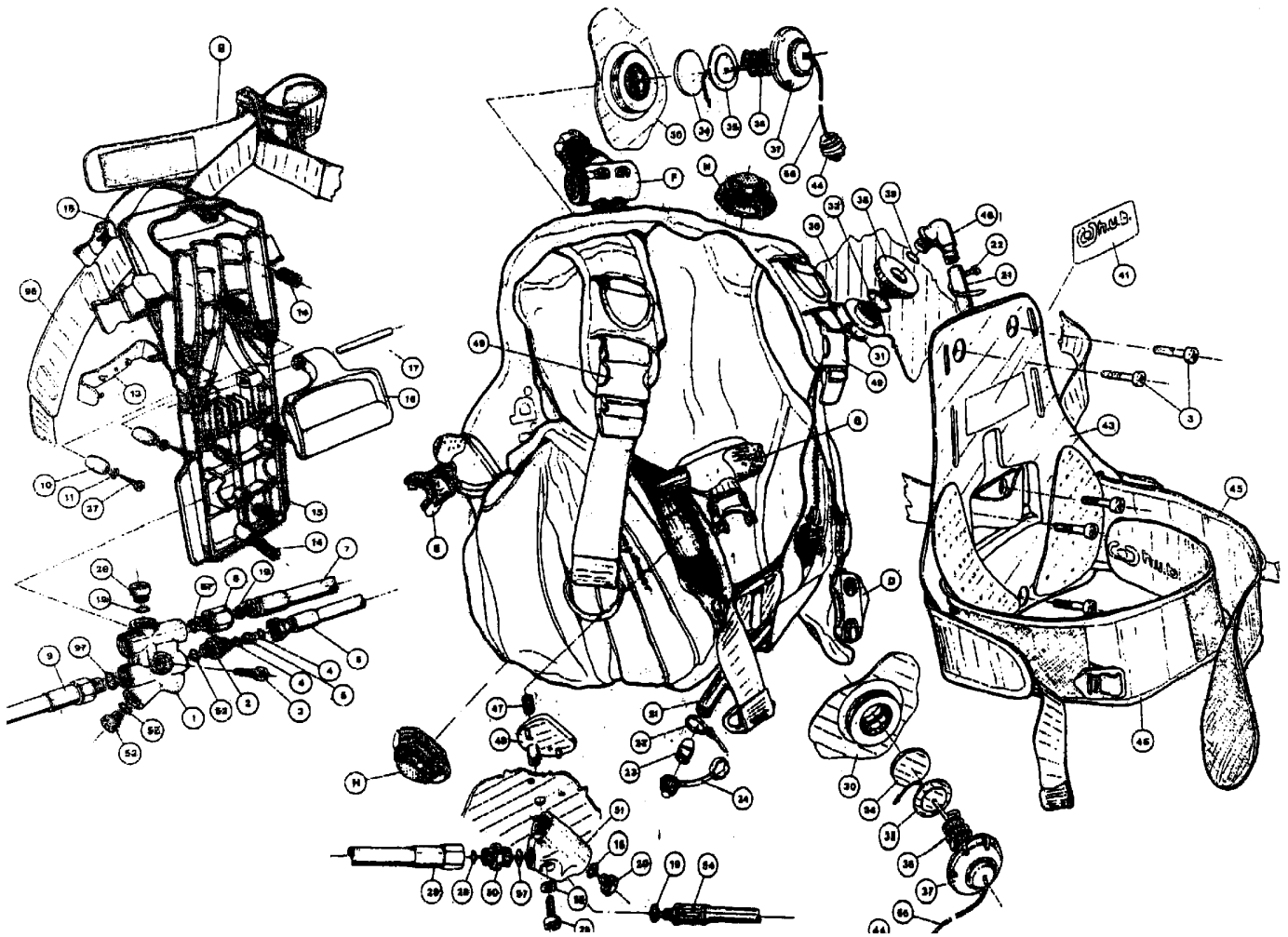
**SUBJECT: SWIVEL H.U.B. MAINTENANCE FOR AIRLOCK****BTM4****ATTENTION!**

INSERT THE SWIVEL CONNECTOR (71) ONTO THE PIN (72) FROM LEFT TO RIGHT LEANING TO THE LEFT (OF THE PERSON WATCHING).

**► ASSEMBLY**

1. SCREW THE CPL SWIVEL CONNECTOR PIN TO THE CONNECTOR (8) USING A 17 mm SPANNER (OR WRENCH B-17).
2. SCREW THE LP HOSE (7) TO THE SWIVEL CONNECTOR PIN (72) USING A WRENCH (B-18), PASSING IT UNDER THE HIGH PRESSURE (HP) HOSE.
3. SCREW THE HOSE (56) TO THE SWIVEL CONNECTOR (71) USING A 14 mm WRENCH (B 18).
4. INSERT THE HOSE (56) THROUGH THE STRAP RETAINER 2.a, PASSING IT UNDER THE HIGH PRESSURE (HP) HOSE.
5. PLACE THE INTERNAL PART OF THE BACKPACK (43) IN POSITION AND, USING A PHILLIPS SCREWDRIVER, SCREW THE FIVE SCREWS (3) THAT WILL FIX IT TO THE TANK PAD (15).
6. LINK THE LP HOSE (7) TO THE PNEUMATIC CONTROL (A).
7. INSERT THE MIDDLE STRAPS (45).
8. POSITION THE AIRLOCK STRAP AS DESCRIBED IN THE INSTRUCTIONS.
9. CONNECT THE HOSE (56) TO THE AIRLOCK LOCKING SYSTEM CONNECTOR.

**H.U.B. MARES** Drawing ref. No. J76  
Updated to 03-04-2000



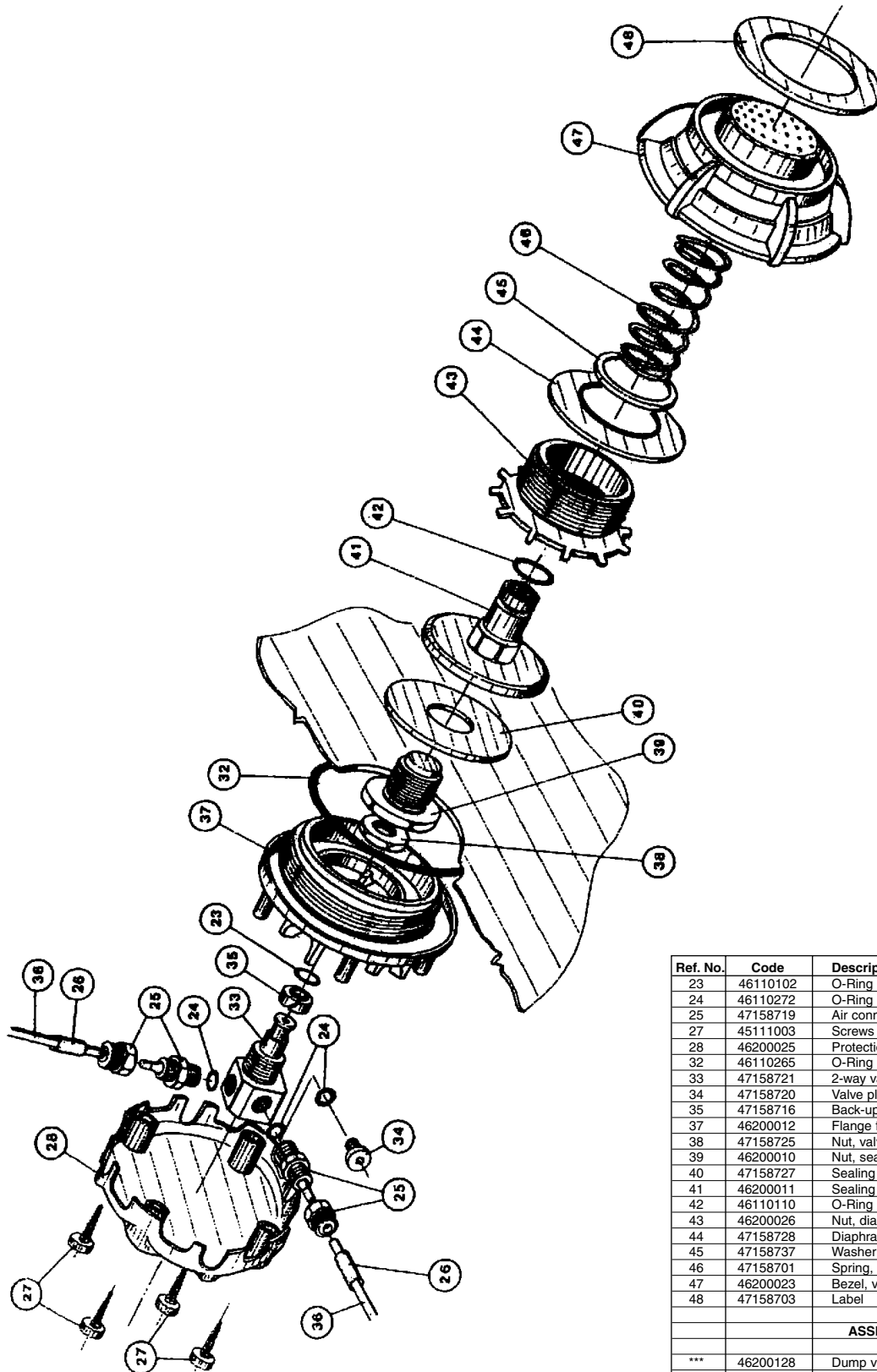
DRAWING CONTINUED FROM PREVIOUS TABLE

Table No. 225	<b>H.U.B. MARES</b>	Drawing reference No.: J 76 Table updated on 30/10/2001
------------------	---------------------	---------------------------------------------------------------

Ref.N.	Code	Description
1	47158706	7 way distributor
2	47158724	Connector 7/16" UNF
3	45111016	Screw M 5 x 20
4	46110242	O-Ring 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
13	46200015	Grip plate
15	46200009	Tank pad
16	46200008	Handle
17	47158715	Rod d. 5 x 80 mm
18	47200203	Positioning strap
19	46110106	O-Ring 106
20	46185204	Plug 3/8" UNF
21	x x x	Tube
22	45179863	Tube clamp
23	x x x	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 695471
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	47200021	Mares 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

Ref.N.	Code	Description
36	46159150	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	47158743	Sticker
43	46200024	Backpack
44	47159136	Black knob
45	47200229	Tank retaining band (size S - XL)
47	47158713	Tapex Connector 073M4
48	46200000	Support for distributor
49	47158562	Adj. Buckle Mares M logo (1065)
49	47158563	Adj. Buckle 50 F (6483)
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)
66	43169822	Cord
96	47159311	Tank protector
97	46110215	O-Ring 2043
		<b>Assemblies</b>
		MB Fixed backpack belt assembly
B	47159295	Mares H.U.B. interior distributor/hose Service Kit
***	46200148	(4-19-28-52-97-OR 114-OR 2031)
		H.U.B. Oral Inflator assembly
x x x	47200376	(21 - 22 - 23 - 31 - 33 - 38 - 39 - 40)
		H.U.B. pneumatic inflator ( tab. n. 233 drg. J 84)
D	----	NIKOS Octopus (table 112 drg. E21)
E	----	H.U.B. 1st Stage (table n.18 drg. E 9)
F	----	ORBITER 2nd Stage (table 103 drg. E 16)
G	----	Pneumatic discharge valve (tab. n. 227 drg. J78)
H	----	

**PNEUMATIC DUMP VALVE H.U.B.** Drawing ref. No. J 78  
Updated to 03-04-2000



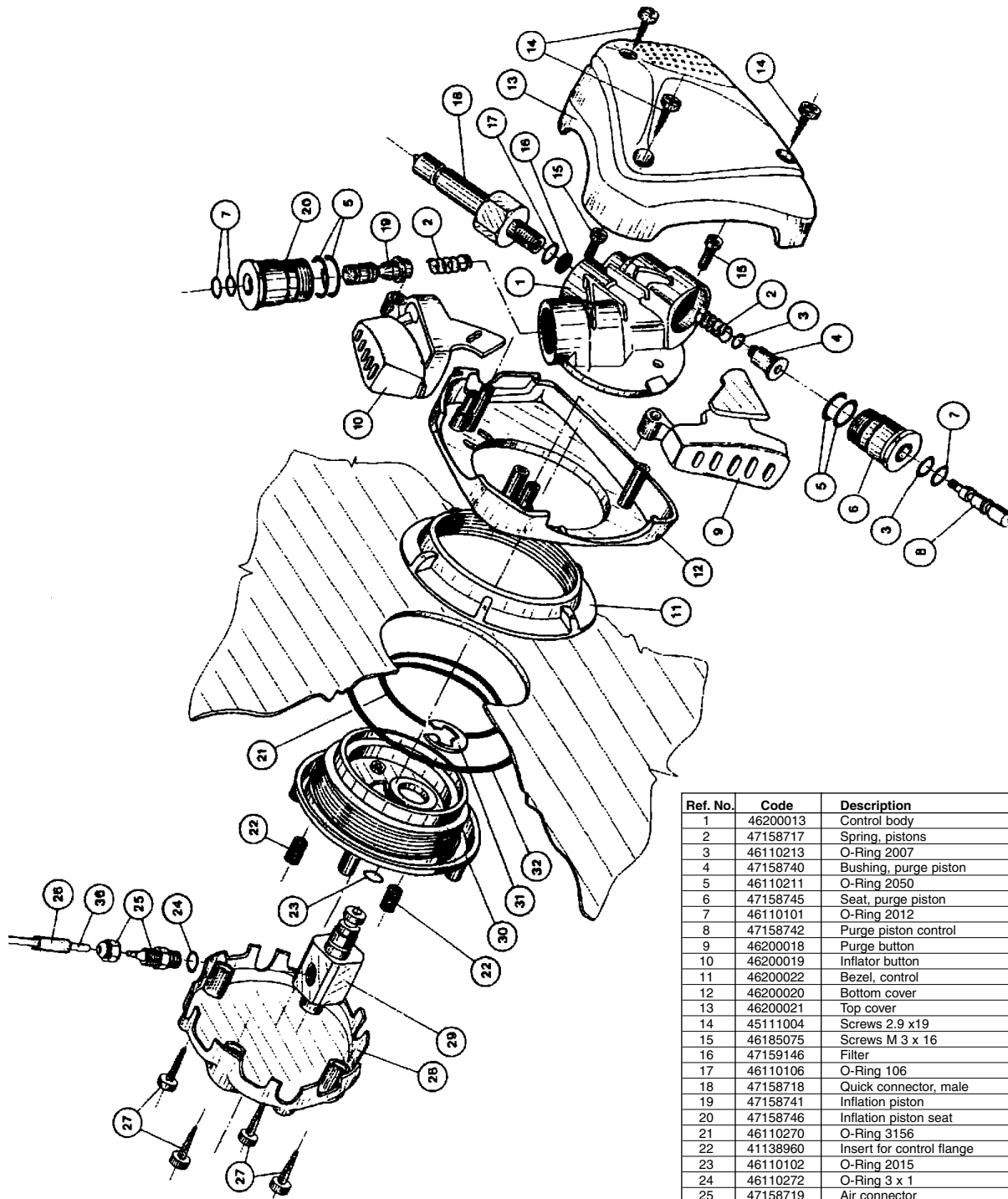
Ref. No.	Code	Description
23	46110102	O-Ring 2015
24	46110272	O-Ring 3 x 1
25	47158719	Air connector
27	45111003	Screws 2.9 x 9.5
28	46200025	Protection cap
32	46110265	O-Ring 3231
33	47158721	2-way valve shaft
34	47158720	Valve plug
35	47158716	Back-up ring
37	46200012	Flange for pneumatic valve
38	47158725	Nut, valve shaft
39	46200010	Nut, sealing plate
40	47158727	Sealing plate
41	46200011	Sealing plate support
42	46110110	O-Ring 2037
43	46200026	Nut, diaphragm
44	47158728	Diaphragm
45	47158737	Washer
46	47158701	Spring, pneumatic valve
47	46200023	Bezel, valve
48	47158703	Label
<b>ASSEMBLIES</b>		
***	46200128	Dump valve assy H.U.B. (23-27-28-33-35-37-39-40-41-44-45-46-47-48)
***	46200126	LP pipe assy H.U.B., long (24-25-26-36)
***	46200125	LP pipe assy H.U.B., short (24-25-26-36)
***	46200143	Maintenance kit pneumatic valve H.U.B. (23-24-32-33-35-39-42)

Table No. 227	<b>PNEUMATIC DISCHARGE VALVE H.U.B.</b>	Drawing reference No.: J 78 Table updated on 30/10/2000
------------------	-----------------------------------------	---------------------------------------------------------------

Ref.N.	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

Ref.N.	Code	Description
44	47158728	Diaphragm
45	47158737	Friction washer
46	47158701	Pneumatic valve spring
47	46200023	Valve ring
48	47158703	Sticker
		<b>Assemblies</b>
		H.U.B. discharge valve assembly
H	46200128	(23-27-28-33-35-37-39-40-41-44-45-46-47-48)
		H.U.B. long LP hose assembly
== =	46200126	(24-25-26-36)
		H.U.B. short LP hose assembly
== =	46200125	(24-25-26-36)
		Mares H.U.B. pneumatic valve Service Kit
***	46200143	(23-24-32 (tab. 225) -33-35-39 (tab. 225) -42)

**PNEUMATIC CONTROL H.U.B.** Drawing ref. No. J77  
Updated to 03-04-2000



Ref. No.	Code	Description
1	46200013	Control body
2	47158717	Spring, pistons
3	46110213	O-Ring 2007
4	47158740	Bushing, purge piston
5	46110211	O-Ring 2050
6	47158745	Seat, purge piston
7	46110101	O-Ring 2012
8	47158742	Purge piston control
9	46200018	Purge button
10	46200019	Inflator button
11	46200022	Bezel, control
12	46200020	Bottom cover
13	46200021	Top cover
14	45111004	Screws 2.9 x19
15	46185075	Screws M 3 x 16
16	47159146	Filter
17	46110106	O-Ring 106
18	47158718	Quick connector, male
19	47158741	Inflation piston
20	47158746	Inflation piston seat
21	46110270	O-Ring 3156
22	41138960	Insert for control flange
23	46110102	O-Ring 2015
24	46110272	O-Ring 3 x 1
25	47158719	Air connector
27	45111003	Screws 2.9 x 9,5
28	46200025	Protection cap
29	47158722	Valve shaft
30	46200014	Control flange
31	47158707	Retaining ring Ø 6
32	46110265	O-Ring 3231
<b>ASSEMBLIES</b>		
***	46200127	Pneumatic control assy H.U.B.
***	46200141	Internal gear assy, pneumatic control (1-2-3-4-5-6-7-8-15-16-17-18-19-20)
***	46200126	LP pipe assy H.U.B., long (24-25-26-36)
***	46200125	LP pipe assy H.U.B., short (24-25-26-36)
***	46200146	Maintenance kit pneumatic control H.U.B. Mares (3-5-7-17-21-23-24-32)



Table No. 226	<b>PNEUMATIC CONTROL H.U.B.</b>	Drawing reference No.: J 77 Table updated on 03/04/2000
------------------	---------------------------------	---------------------------------------------------------------

Ref.N.	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	Inserto per flangia comando
23	46110102	O-Ring 2015
24	47110272	O-Ring 3 x 1
25	===	Air connector
27	45111003	Screws 2.9 x 9.5

Ref.N.	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)
===	46200126	H.U.B. long LP tube assembly. (24-25-26-36)
===	46200125	H.U.B. short LP tube assembly. (24-25-26-36)
***	46200145	Mares H.U.B. pneumatic inflator Service Kit (3-5-7-17-21-23-24-32)
		<b>NOTE</b>
		In the event of having to replace one of the components marked with reference numbers 9-10-12-13 on this table, it is necessary to order all four components 9-10-12-13 which are shown in H.U.B. Pneumatic Inflator table n. 233

Drawing No. J 88	<b>H.U.B. MARES CENTURY</b>	Drawing updated on 08/10/2001
---------------------	-----------------------------	----------------------------------

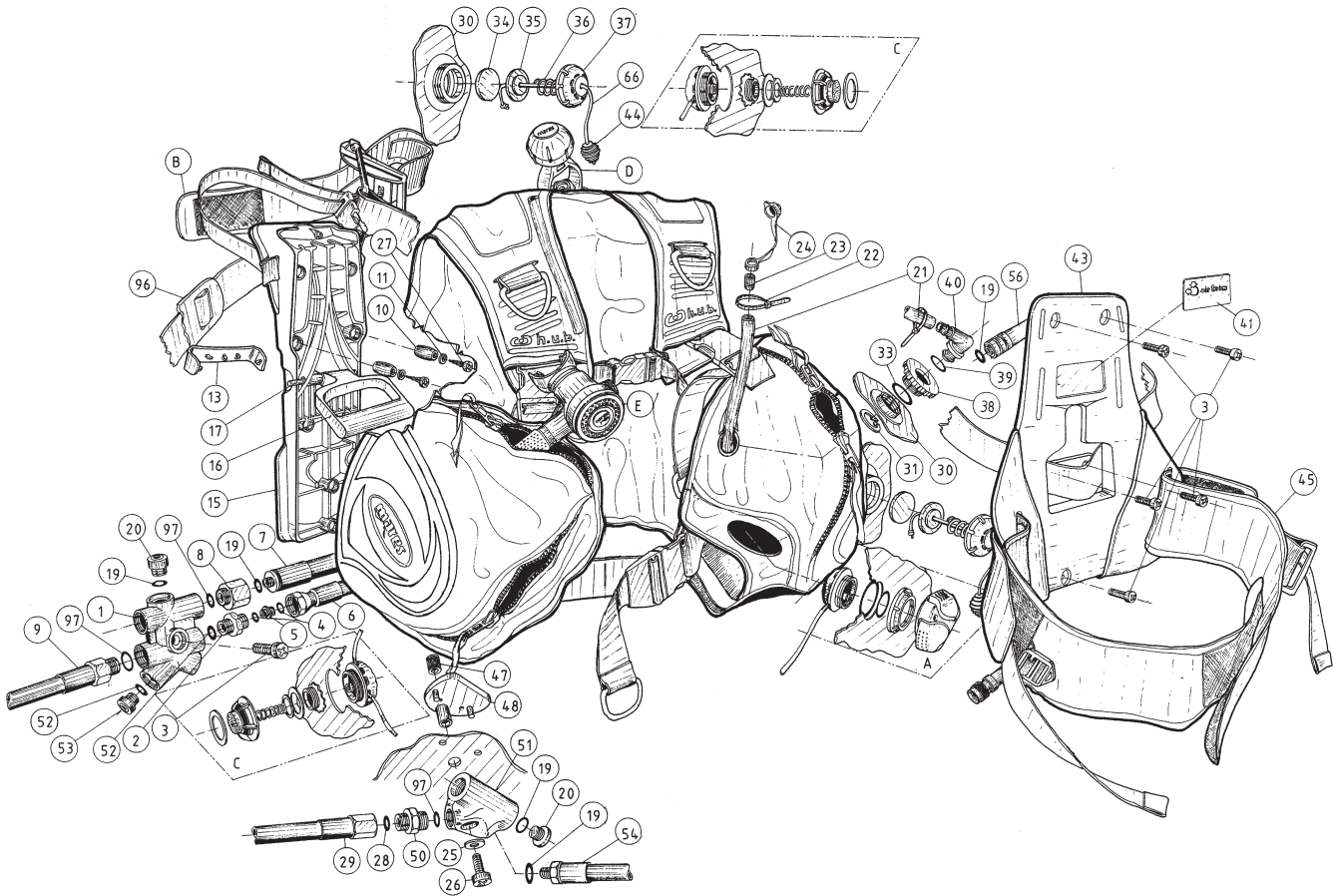


Table No. 236	<b>H.U.B. MARES CENTURY</b>	Drawing reference No.: J 88 Table updated on 02/04/2002
------------------	-----------------------------	---------------------------------------------------------------

Ref.N.	Code	Description
1	47158706	7 way distributor
2	47158724	Connector 7/16" UNF
3	45111016	Screw M 5 x 20
4	46110242	O-Ring 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
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	x x x	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 695471
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	Century 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

Ref.N.	Code	Description
36	46159150	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	Gray knob
45	47200206	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	46200254	Soft 3/8 Hose
56	47159681	Neutral LP hose assembly
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	----	PROTON Octopus (optional)
D	----	H.U.B. 1st Stage (table no.20 drg. E 11)
E	----	PROTON 2nd Stage (table 114 drg. E 24)
C	----	Pneumatic discharge valve (tab. n. 227 drg. J78)
B	47159295	MB Fixed backpack belt assembly

Drawing No. J 83	<b>H.U.B. MARES AVANTGARDE</b>	Drawing updated on 14/05/2001
---------------------	--------------------------------	----------------------------------

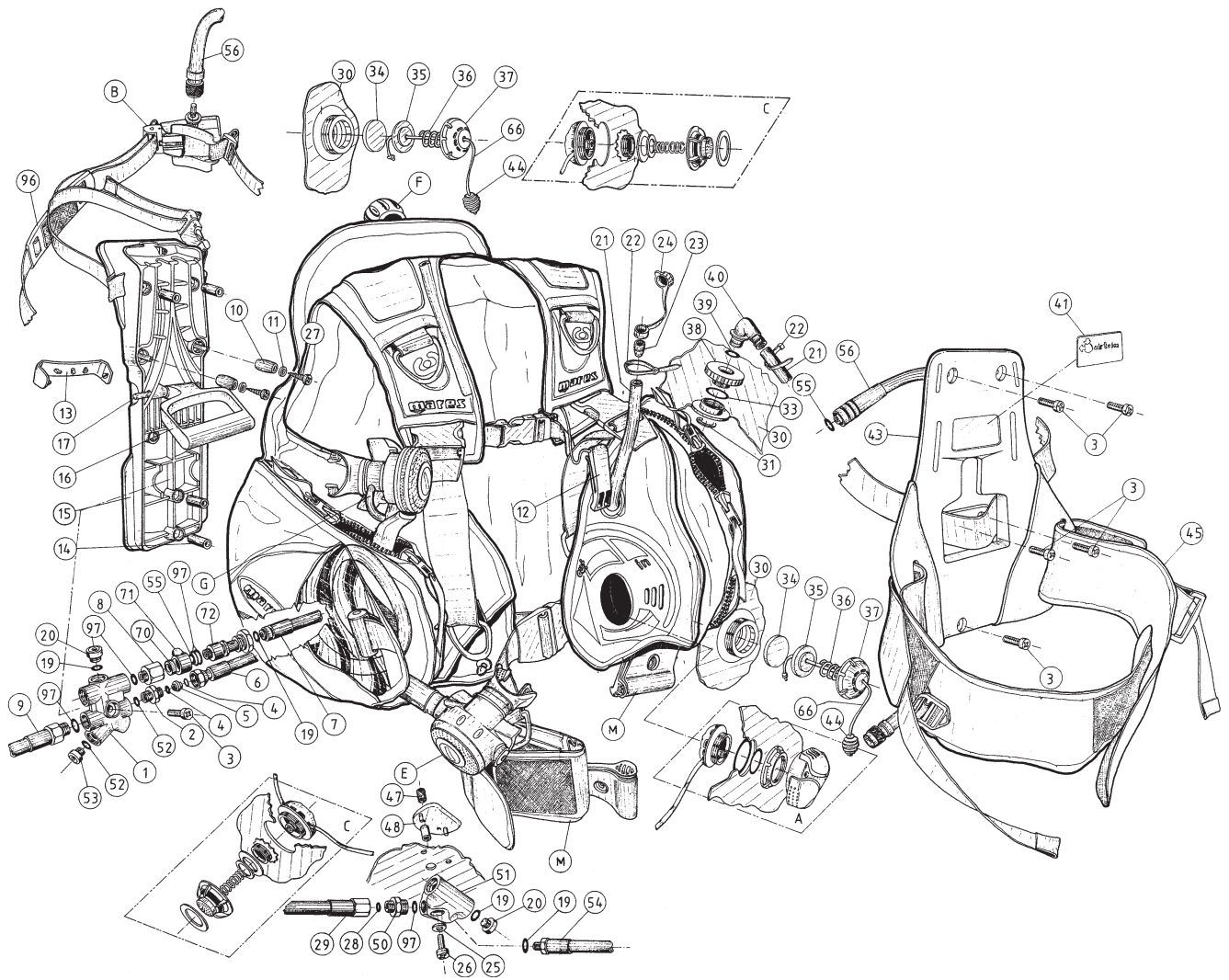


Table No. 232	<b>H.U.B. MARES AVANTGARDE</b>	Drawing reference No.: J 83 Table updated on 30/10/2001
------------------	--------------------------------	---------------------------------------------------------------

Ref.N.	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
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	x x x	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 695471
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	Avantgarde Mares 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

Ref.N.	Code	Description
39	46110210	O-Ring 2056
40	x x x	Swivel elbow fitting
41	47200095	Sticker
43	46200024	Backpack
44	47159136	Black knob
44	47158505	Gray 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	L 330 quick coupling LP hose
66	43169822	Cord
70	46200277	Swivel spacer bushing
71	46200189	D 20 sand-blasted swivel connector
72	46200267	Swivel connector pin
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)
E	----	AXIS Octopus (table 113 drg. E23)
F	----	H.U.B. 1st Stage (table no.20 drg. E 11)
G	----	ORBITER 2nd Stage (table 103 drg. E 16)
C	----	Pneumatic discharge valve (tab. n. 227 drg. J78)
B	----	AIR LOCK (table no. 235 drg. J 86)
M	417950	Pair of weight bag

Drawing No. J 84	<b>PNEUMATIC CONTROL H.U.B. AVANTGARDE</b>	Drawing updated on 08/10/2001
---------------------	--------------------------------------------	----------------------------------

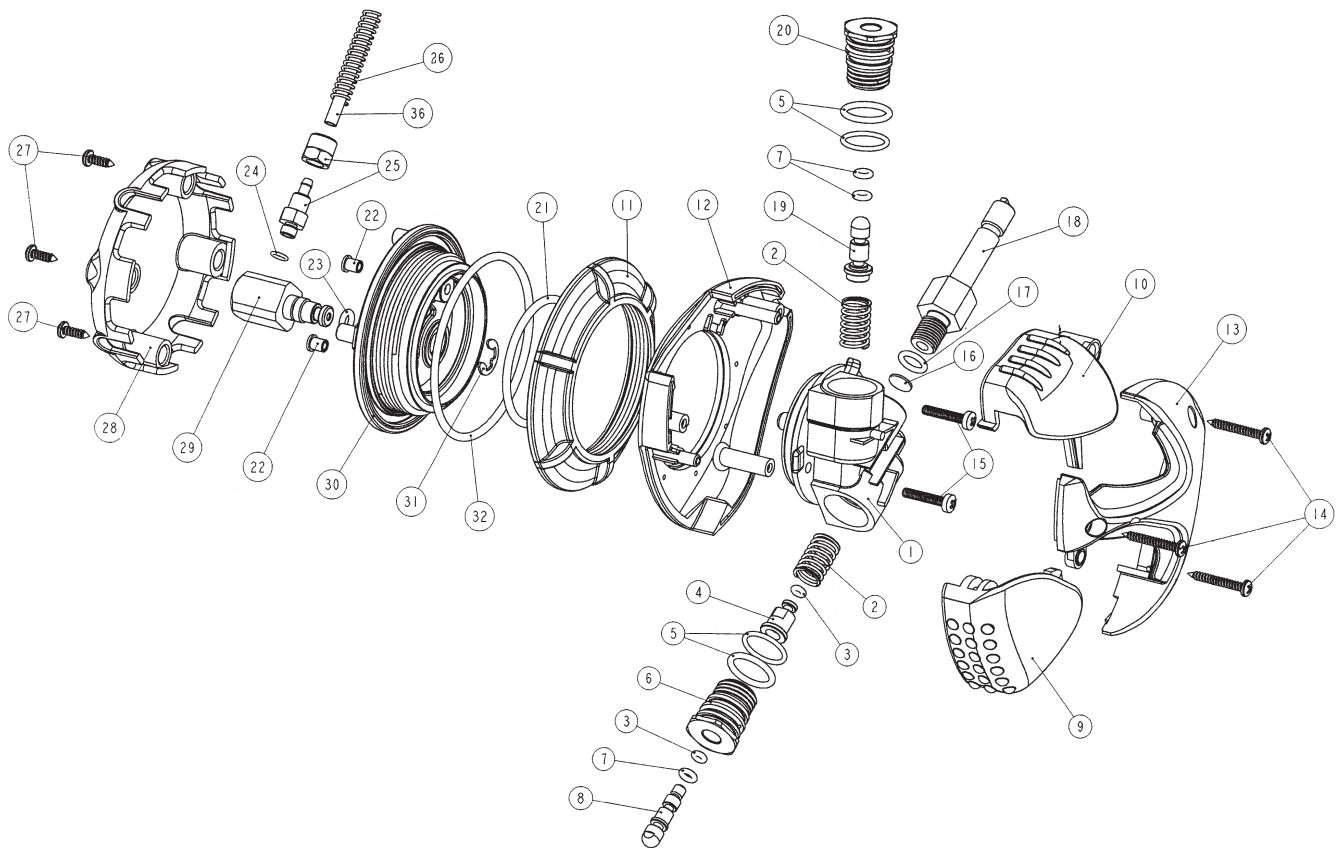


Table No. 233	<b>PNEUMATIC CONTROL H.U.B. AVANTGARDE</b>	Drawing reference No.: J 84 Table updated on 30/10/2001
------------------	--------------------------------------------	---------------------------------------------------------------

Ref.N.	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 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	Inserto per flangia comando

Ref.N.	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
29	47158722	Valve shaft
30	46200014	Inflator flange
31	47158707	Radial snap ring diam. 6
32	46110265	O-Ring 3231
		<b>ASSEMBLIES</b>
		Pneumatic inflator assembly H.U.B.
\$\$\$	46200127	Internal mechanism assembly Pneumatic inflator
###	46200141	(1-2-3-4-5-6-7-8-15-16-17-18-19-20) H.U.B. long LP hose assembly
===	46200126	(24-25-26-36) H.U.B. short LP hose assembly
===	46200125	(24-25-26-36) Serv.kit Mares H.U.B. pneumatic inflator
***	46200145	(3-5-7-17-21-23-24-32)

AIRLOCK

AIRLOCK

**mares**<sup>®</sup>



## ▶ DISASSEMBLY

### **WARNING !**

BEFORE ATTEMPTING ANY MAINTENANCE ACTION ON THE AIRLOCK SYSTEM, MARES RECOMMENDS:

- COMPLETELY DEFLATING THE BC.
- SEPARATING THE LOW PRESSURE HOSE FROM THE MALE COUPLING.
- DISASSEMBLING THE BC FROM THE TANK.
- CHECKING THAT THE AIRLOCK SYSTEM IS FULLY DEPRESSURIZED AND THAT THE TANK RETAINING BAND IS IN THE ALL-OPEN POSITION.

### ▶ DISASSEMBLING THE AIRLOCK SYSTEM

1. Pull the tank retaining band (35) completely out of the buckle (31).
2. Remove the traction tank pad (96) and the lock buckle (or triglide) (111) from the tank retaining band (35).
3. Disassemble the AIRLOCK system from the BC backpack.

**NOTE** MARES RECOMMENDS DISASSEMBLING THE TANK RETAINING BAND (35) FROM THE SHELL (32) ONLY IN CASE OF NEED.

**NOTE** BEFORE PROCEEDING WITH THE OPERATION DESCRIBED IN STEP - 4 - CHECK THAT THE HOLE IN BUCKLE (31) WHICH ACCOMMODATES THE STAINLESS STEEL ROD (33) IS COMPLETELY CLEAR OF THE SHELL (32) SEE FIG. 1).

4. Use a metal pointed tool (or special tool B-22, with max diameter 2 mm) to disassemble the stainless steel rod (33), releasing the buckle (34) (SEE Fig. 1).

### **WARNING !**

FOR DISASSEMBLING THE STAINLESS STEEL ROD (33) AS DESCRIBED IN STEP -4-IT IS POSSIBLE TO USE A PAIR OF PLIERS.

MARES RECOMMENDS TAKING GREAT CARE TO AVOID DEFORMING AND/OR DAMAGING THE STAINLESS STEEL ROD. (See Fig. 1).

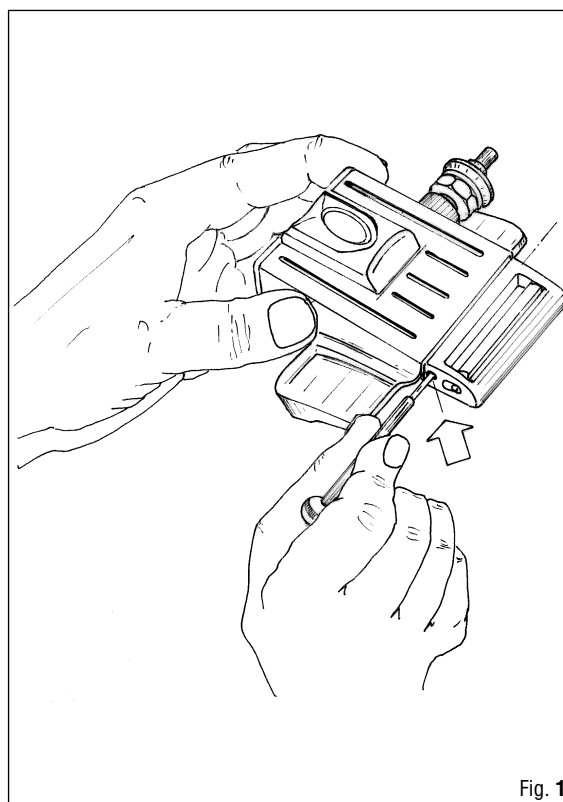


Fig. 1

**! WARNING !**

MARES ADVISES AGAINST DISASSEMBLING THE BUCKLE (34). IF THIS IS NECESSARY, REPLACE THE COMPLETE BUCKLE ASSEMBLY (CODE: 47200378).

5. Remove the stainless steel rack (29) from the piston shell (32).

**NOTE** IF THERE ARE DIFFICULTIES DISASSEMBLING THE RACK DURING THE OPERATION DESCRIBED IN STEP - 5 -, TRY OPERATING THE RELEASE LEVER (18).

6. Using a Philips screwdriver (type "USAG 323") back off the four screws (16) and remove the piston shell cover (15).
7. Remove the piston body (23) from the piston shell (32).
8. Use the special tool B-22 to remove the release lever pin (19).
9. Disassemble the release lever (18).
10. Remove the mechanical retainer (20).

**IMPORTANT**

DISASSEMBLE THE SPRING (21) FROM THE RETAINER (20) ONLY IF IT IS DAMAGED AND/OR DEFORMED.

**! WARNING !**

MARES DOES NOT RECOMMEND DISASSEMBLING THE SPRING PIN (112).

11. Use the special tool C-2 to fully back off the discharge valve (56) (See Fig. 2).

**! WARNING !**

MARES RECOMMENDS REPLACING THE VALVE (56) WHENEVER IT IS DISASSEMBLED OR AFTER 2 YEARS OF USE OR 200 HOURS OF DIVING.

12. Using the wrench B-18 (14 mm), unscrew the quick coupling assembly (7) from the piston body (23).

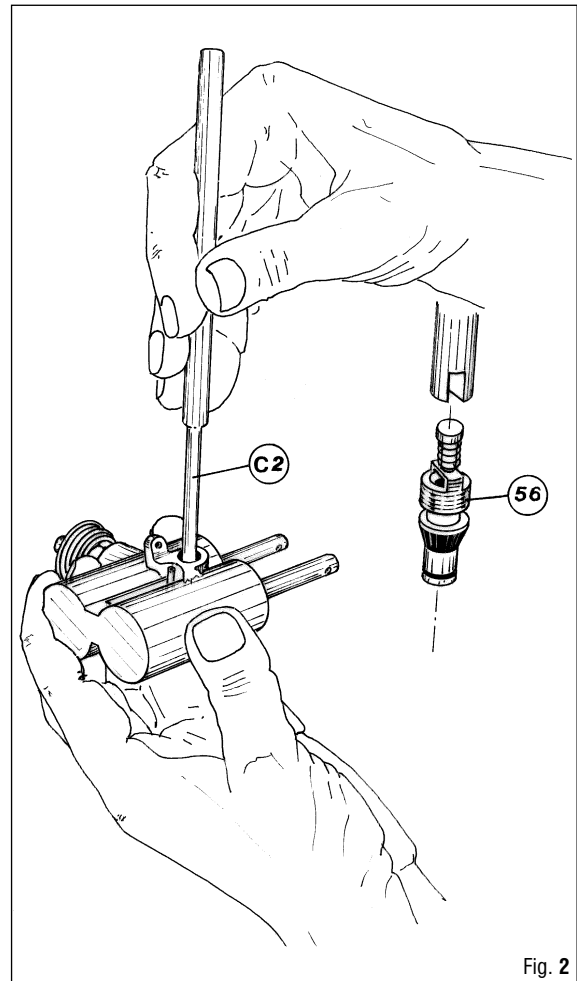


Fig. 2

**! WARNING!**

TO ENSURE PERFECT FUNCTIONING OF THE AIRLOCK SYSTEM, MARES RECOMMENDS REPLACING THE QUICK COUPLING ASSEMBLY (CODE: 47200377) WHENEVER THERE ARE ANY DEFECTS IN ITS OPERATION.

IF NECESSARY, IT IS POSSIBLE TO DISASSEMBLE ONLY THE CHECK VALVE OF THE QUICK COUPLING, PROCEEDING AS INSTRUCTED IN THE SECTION "DISASSEMBLING THE QUICK COUPLING CHECK VALVE".

13. Disassemble the O-ring (9) from the quick coupling assembly (7).
14. Remove the fabric filter (22) from the piston body (23).
15. Use the snap ring pliers B-14 to remove the snap ring (28).

**! WARNING!**

MARES RECOMMENDS TAKING GREAT CARE TO AVOID DEFORMING AND/OR DAMAGING THE SNAP RING.

16. Remove the piston (25) from the piston body (23) (See Fig. 3).

**! WARNING!**

MARES RECOMMENDS USING A STAINLESS STEEL ROD WITH A MAX DIAMETER OF 2 mm AND LENGTH 60 mm.

**! WARNING!**

DO NOT USE THE STAINLESS STEEL ROD (33) TO PERFORM THE OPERATION DESCRIBED IN STEP - 16 -.

17. Remove the piston cap (27) from the piston (25) (See Fig. 3).
18. Remove the O-Ring (24) from the head of the piston (25) (See Fig. 3).
19. Disassemble the outer O-ring (24) and the 2 inner O-Rings (26) from the piston cap (27). (See Fig. 3).

**△ CAUTION**

REPEAT THE OPERATIONS DESCRIBED IN STEPS - 15 - 16 - 17 - 18 - 19 - OF THE SECTION "DISASSEMBLING THE AIRLOCK SYSTEM" TO DISASSEMBLE THE SECOND PISTON.

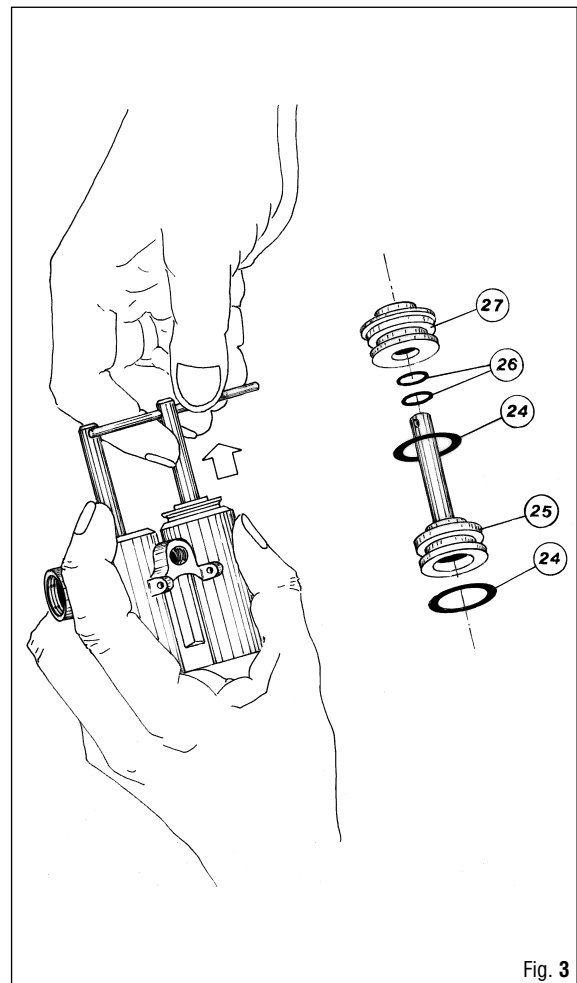


Fig. 3



## ▶ DISASSEMBLING THE QUICK COUPLING CHECK VALVE

### **! WARNING!**

TO ENSURE PERFECT FUNCTIONING OF THE AIRLOCK SYSTEM, MARES RECOMMENDS REPLACING THE QUICK COUPLING ASSEMBLY (CODE: 47200377) WHENEVER THERE ARE ANY DEFECTS IN ITS OPERATION, OR AFTER EVERY 2 YEARS OR 200 HOURS OF DIVING.

ONLY IF NECESSARY, IT IS POSSIBLE TO DISASSEMBLE THE CHECK VALVE FROM THE QUICK COUPLING, PROCEEDING AS INSTRUCTED IN THE SECTION "DISASSEMBLING THE QUICK COUPLING CHECK VALVE".

1. Hold the quick coupling (7) in place using wrench B-18 (14 mm), and use a 7-mm open end wrench to unscrew the check valve connector (13), removing the spring (12) and the ball (11) (See Fig. 4).
2. Remove the O-ring (10) from the quick coupling assembly (7) (See Fig. 4).

## ▶ CLEANING

### **! WARNING!**

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

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

### **! WARNING!**

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

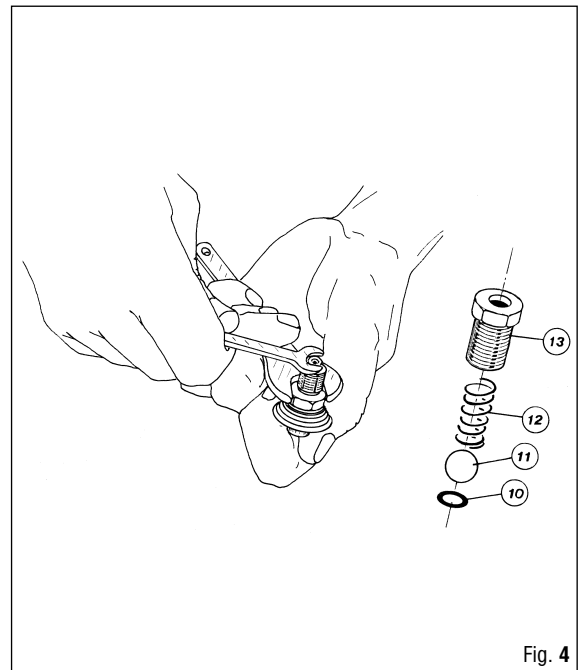


Fig. 4

## ► INSPECTION

Certain key components of the AIRLOCK system should be regularly replaced at each scheduled overhaul. In addition, considering their relatively low cost, it is recommended to replace all the O-rings every time.

Quantity	Table Reference Number	Description	Code
4	24	O-Ring 2068	46110225
4	26	O-Ring 2025	46110205
1	9	O-Ring 106	46110106
1	22	Filter	47159146
1	7	Quick coupling assembly	47200377
1	56	Valve	47158584

### CAUTION

MARES RECOMMENDS REPLACING THE O-RING (CODE: 46110107) INSIDE THE QUICK COUPLING OF THE LP HOSE.

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

## ► DO NOT USE PARTS WITH THE FOLLOWING DEFECTS:

Description	Table Ref. No.	Inspection
<b>Snap rings (circlips)</b>	28	Check for distortion, cracking or damaged edges.
<b>Piston cap</b>	27	Check for scratches and/or cuts on the O-ring seat or sealing surface.
<b>Piston</b>	25	Check for scratches and/or cuts on the O-ring seat or sealing surface.
<b>Piston assembly</b>	23	Check that the O-ring sealing surfaces are intact. Check for any signs of damage on the thread for the valve.
<b>Stainless steel rod</b>	33	Inspect for damage, distortion and/or deformation.
<b>Buckle assembly</b>	34	Check for cracks, cuts or deformation.
<b>Quick coupling assembly</b>	7	Check that the outer surface is not damaged, and that the chrome plating is intact. Check the functioning of the ring which operates the coupling.
<b>Valve</b>	56	Check for traces of rust and/or signs of damage.
<b>O-Ring</b>	10 - 24 - 26	Check for cuts, burrs or foreign particles. The presence of any of these defects may result in leakage.
<b>Springs</b>	12 - 21	Check for rust, and for any split, deformed or broken coils.
<b>Fabric filter</b>	22	Check that it is clean and unbroken.
<b>O-Ring seats</b>	- - -	Check for any scratches.
<b>Threads</b>	- - -	Check that they are perfectly clean and intact.

## ► REASSEMBLY

### CAUTION

BEFORE REASSEMBLING THE SYSTEM, MARES RECOMMENDS LIGHTLY LUBRICATING ALL THE O-RINGS WITH SILICONE GREASE (TYPE GENERAL ELECTRIC VERSALUBE G-322 OR EQUIVALENT).  
LUBRICATION REDUCES THE LIKELIHOOD OF DAMAGE DURING REASSEMBLY.

## ASSEMBLING THE QUICK COUPLING CHECK VALVE

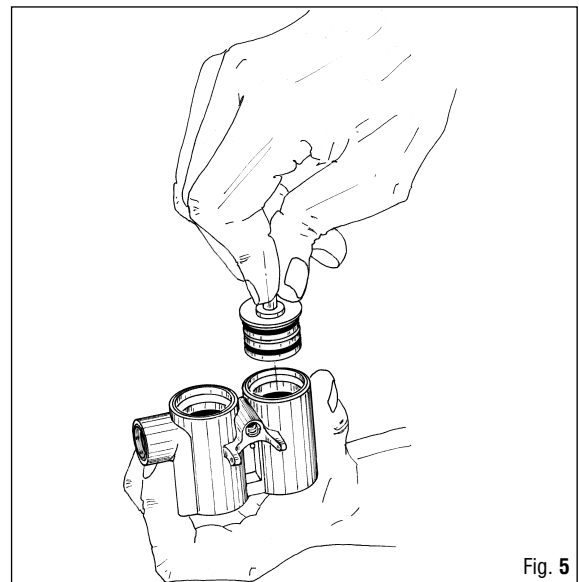
### WARNING!

REASSEMBLE THE QUICK COUPLING CHECK VALVE ONLY IF IT WAS PREVIOUSLY DISASSEMBLED.

1. Fit the O-ring (10) inside the quick coupling assembly (7), using the special tool (C-2) if necessary.

**NOTE** MARES RECOMMENDS USING THE SPECIAL TOOL C-2 TO CORRECTLY POSITION THE O-RING (10) INSIDE THE QUICK COUPLING (7).

2. Insert the spring (12) and ball (11) inside the valve connector (13).
3. Using the 7-mm and 14-mm wrenches B-18, lock down the valve connector (13) into the quick coupling assembly (7) (See Fig. 3).



## ▶ ASSEMBLING THE AIRLOCK SYSTEM

1. Position the O-ring (24) on the head of the piston (25).
2. Assemble the outer O-ring (24) on the piston cap (27) and the two O-rings (26) inside the piston cap (27).
3. Correctly fit the piston cap (27) on the piston (25) (See Fig. 5).

### WARNING!

IT IS RECOMMENDED TO SLIDE THE PISTON CAP (27) ALONG UNTIL IT COMES INTO CONTACT WITH THE PISTON HEAD (25) (See Fig. 5).

4. Insert the piston (25) with the cap (27) all the way into the piston body (23).

### WARNING!

MAKE SURE THAT THE PISTON CAP (27) HAS BEEN FITTED CORRECTLY.

5. Use the snap ring pliers B-14 to position the snap ring (28) in its seat in the piston body (23), on top of the piston cap (27).

### IMPORTANT

MAKE SURE THAT THE SNAP RING IS CORRECTLY INSERTED AND LIGHTLY LUBRICATE THE SNAP RING (28) AND THE PISTON CAP (27).

### CAUTION

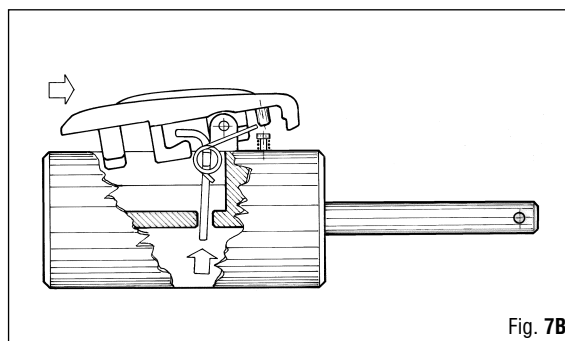
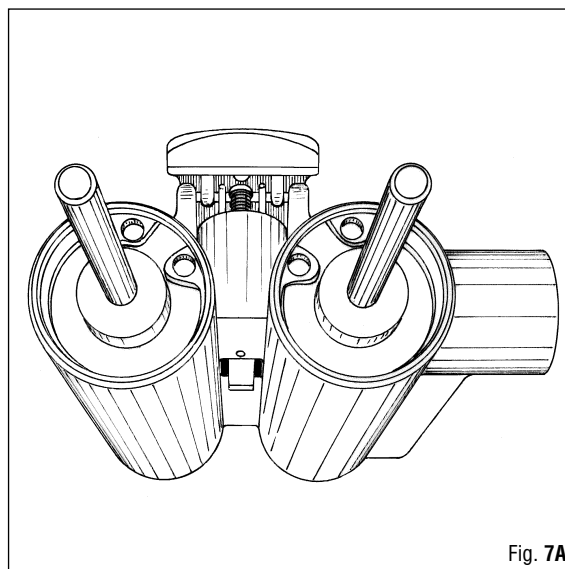
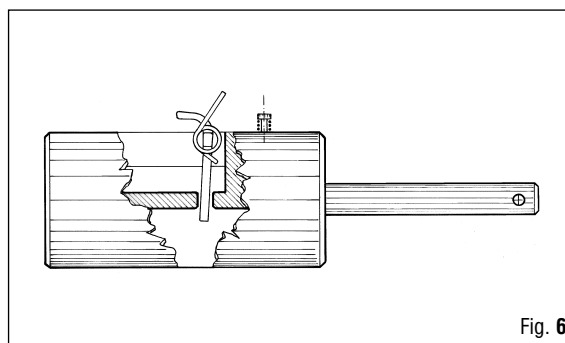
REPEAT THE OPERATIONS DESCRIBED IN STEPS - 1 - 2 - 3 - 4 - 5 - OF THE SECTION "ASSEMBLING THE AIRLOCK SYSTEM" TO ASSEMBLE THE SECOND PISTON.

6. Use the special tool C-2 to fully lock down the new discharge valve (56) (See Fig. 2).

### WARNING!

IF USING A TORQUE WRENCH, SELECT A TORQUE SETTING OF 80 N/cm.

7. Correctly position the mechanical retainer (20) in the slot in the piston body (23) (See Fig. 6).
8. Correctly fit the spring (21) (See Fig. 6).
9. Insert the release lever (18). (See Fig. 6 and Fig. 7).



**⚠ WARNING!**

MARES RECOMMENDS CHECKING WITH THE UTMOST CARE THAT THE SPRING (21) AND THE RETAINER (20) ARE CORRECTLY POSITIONED IN THEIR RESPECTIVE SEATS IN THE RELEASE LEVER (18) (See Fig. 6 and Fig. 7).

10. Fix the discharge lever (18) with its pin (19).

**⚠ WARNING!**

CHECK THE CORRECT POSITIONING AND OPERATION OF THE DISCHARGE SYSTEM BY OPERATING THE LEVER (18) A FEW TIMES AND ENSURING IT IS ABLE TO MOVE FREELY.

11. Insert the fabric filter (22) in the threaded seat in the piston body (23).
12. Fit the O-ring (9) on the quick coupling (7)
13. Screw the quick coupling assembly (7) into the seat in the piston body (23) and lock down lightly using the wrench B-18 (14 mm).

**⚠ CAUTION**

MARES RECOMMENDS CHECKING THE OPERATION AND THE TIGHTNESS OF THE SEALS AS DESCRIBED IN THE SECTION "CHECKS AND INSPECTIONS" BEFORE CONTINUING WITH THE SUBSEQUENT REASSEMBLY STEPS.

14. Correctly insert the piston body assembly (23) inside the piston shell (32).
15. Correctly fit the piston shell cover (15).
16. Lock down the 4 screws (16) using a Philips screwdriver (type "USAG 4").

**⚠ WARNING!**

THE HOLES ON BOTH PISTONS (25) SHOULD BE PERFECTLY ALIGNED BEFORE PROCEEDING TO REASSEMBLE THE BUCKLE (31). PERFECT ALIGNMENT IS ACHIEVED WHEN THE STAINLESS STEEL ROD (33) IS PUSHED INTO ONE OF THE TWO PISTON HOLES AND COMES OUT OF THE OTHER WITHOUT EXERTING FORCE.

17. Correctly insert the stainless steel rack (29) in its seat in the piston body (23) (see Fig. 8).
18. Connect the buckle (31) with the tank retaining band (35) to the stems of the two pistons (23) and to the stainless steel rack (29), inserting the stainless steel rod (33) into its holes (See Fig. 9).

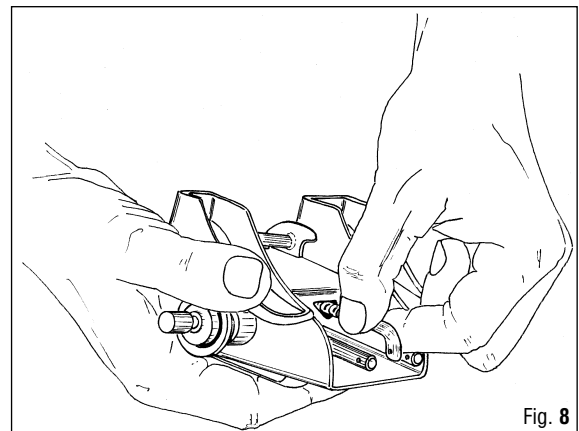


Fig. 8

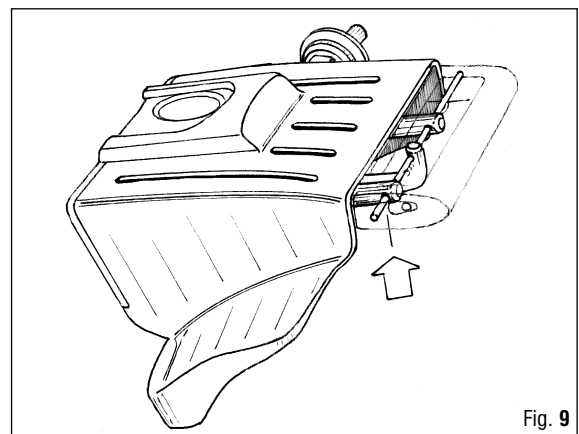


Fig. 9







**WARNING!**

BEFORE PROCEEDING WITH THE OPERATION DESCRIBED IN STEP - 21 - CHECK THAT THE HOLE IN BUCKLE (31) WHICH ACCOMMODATES THE STAINLESS STEEL ROD (33) IS COMPLETELY CLEAR OF THE SHELL (32). (SEE FIG. 9).

MARES RECOMMENDS TAKING THE UTMOST CARE TO AVOID DEFORMING AND/OR DAMAGING THE STAINLESS STEEL ROD.

19. Insert the tank retaining band (35) of the AIRLOCK system in the BC backpack.



**WARNING!**

MARE RECOMMENDS PLACING THE AIRLOCK SYSTEM NEAR THE BC BACKPACK WITH THE QUICK COUPLING FACING UPWARD.

20. Correctly insert the lock buckle (or triglide) (111) and the traction tank pad (96) on the retaining band (35).
21. Correctly insert the tank retaining band (35) in the buckle (31).



**CAUTION**

INSERT THE TANK RETAINING BAND (35) IN THE BUCKLE (31), PASSING IT AROUND THE CLAMPING LEVER (30) AND MATCHING UP THE MALE AND FEMALE VELCRO CLOSURES.

**IMPORTANT**

POSITION THE BC ON THE TANK AND PROCEED TO ASSEMBLE IT ON THE TANK AS DESCRIBED IN THE BC INSTRUCTION MANUAL.

## CHECKS AND INSPECTIONS



### WARNING

MARES RECOMMENDS CHECKING THE OPERATION OF THE SYSTEM AND THE TIGHTNESS OF THE SEALS, IN THE MANNER DESCRIBED BELOW, AFTER HAVING COMPLETED STEP - 13 - OF THE "REASSEMBLY" SECTION.

---

1. Connect the regulator, with its BC low pressure hose, to the tank control valve.
  2. Connect the low pressure hose of the BC to the quick coupling (7) of the AIRLOCK system.
  3. Open the tank control valve.
- 

### INSPECTION

SUBMERGE THE AIRLOCK SYSTEM IN FRESH WATER TO CHECK FOR ANY AIR LEAKS FROM THE QUICK COUPLING.

---

4. Operate the pneumatic locking system by pulling the ring (6).
- 

### INSPECTION

CHECK THE CORRECT AND SIMULTANEOUS MOVEMENT OF BOTH PISTONS.

SUBMERGE THE PRESSURIZED AIRLOCK SYSTEM IN FRESH WATER (FOR AT LEAST 30 MINUTES) TO CHECK FOR ANY AIR LEAKS FROM THE DISCHARGE VALVE AND PISTONS.

---

5. Operate the release lever (18).
- 

### INSPECTION

CHECK THAT THE RELEASE LEVER (18) IS ABLE TO MOVE FREELY.

CHECK THAT THE MECHANICAL RETAINER (20) IS RELEASED SIMULTANEOUSLY WITH THE DISCHARGE OF AIR FROM THE VALVE (56).

---



### WARNING!

IF THE RETAINER (20) IS RELEASED AFTER THE AIR IS DISCHARGED FROM THE VALVE (56), IT IS NECESSARY TO REPEAT THE MAINTENANCE AND INSPECTION OPERATIONS ON THE COMPONENTS IN QUESTION.

---

---

## **INSPECTION**

REPEAT THE OPERATIONS DESCRIBED IN STEPS - 4 - AND - 5 -  
A FEW TIMES TO CHECK THE PERFECT MOVEMENT OF THE  
PISTONS AND THE RELEASE LEVER.

---



## **WARNING!**

AFTER REASSEMBLING THE SYSTEM AND MOUNTING THE BC  
ON THE TANK, MARES RECOMMENDS OPERATING THE  
AIRLOCK SYSTEM AS DESCRIBED IN THE INSTRUCTION  
MANUAL TO CHECK THAT THE TANK IS FIRMLY SECURED.

---

Drawing No. J 86	<b>AIRLOCK</b>	Drawing updated on: 07/26/2001
---------------------	----------------	-----------------------------------

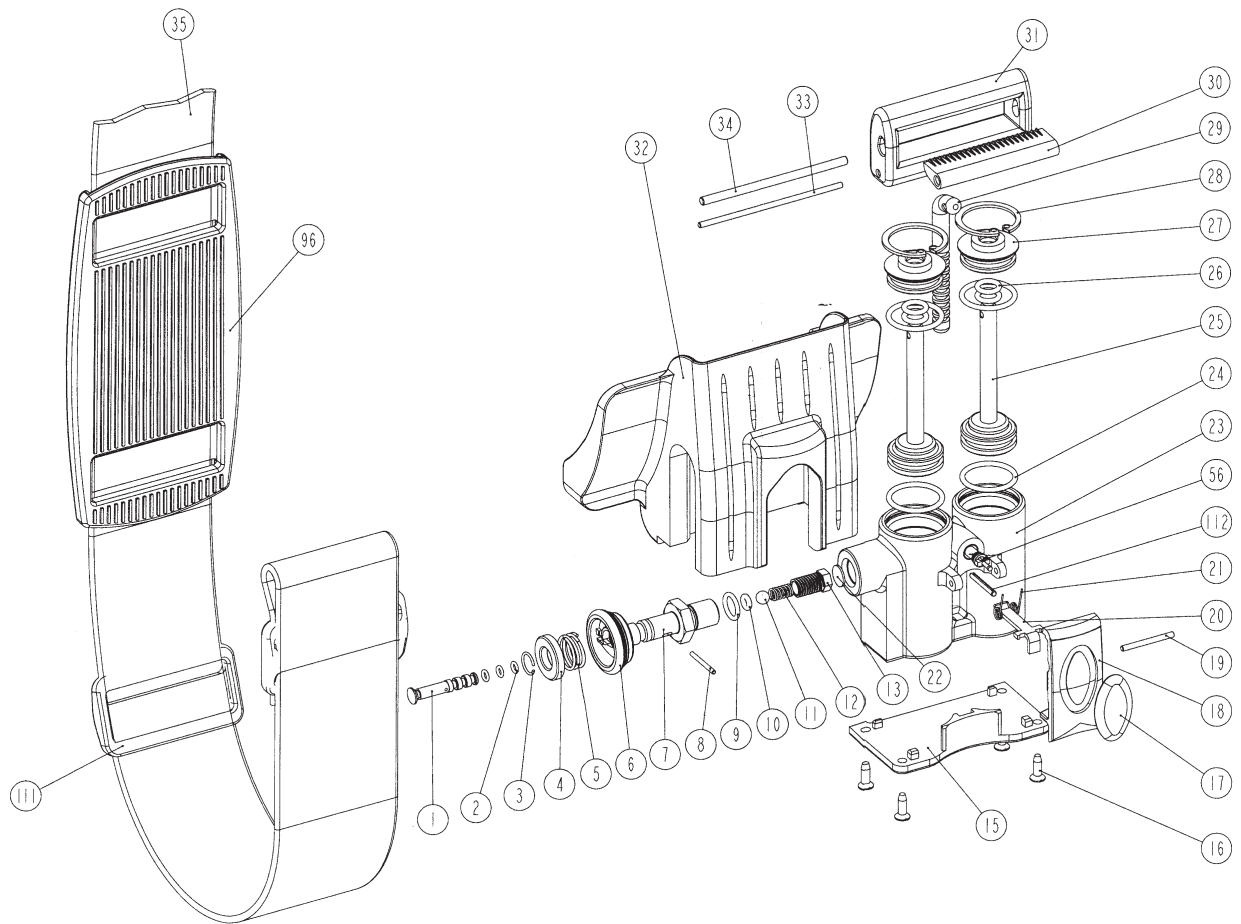


Table No. 235	AIRLOCK	Drawing reference No.: J 86 Table updated on: 12/18/2001
------------------	---------	----------------------------------------------------------------

Ref. N.	Code	Description
1	^^^	Positioning rod
2	^^^	O-Ring 0025 - I
3	^^^	Snap ring
4	^^^	Spring ring washer
5	^^^	Loading spring
6	^^^	Ring for operating quick coupling
7	^^^	Nickel-plated quick coupling
8	^^^	Positioning rod pin 1.5 x 14
9	46110106	O-Ring 106
10	46110210	O-Ring 2010
11	^^^	Ball 3/16
12	^^^	Check valve spring
13	^^^	Check valve connector
15	47200256	Piston shell cover
16	45111010	Screw 2.9 X 9.5
17	47200282	Mares logo
18	47200255	Release lever
19	47200274	Release lever pin 2 x 21
20	47200250	Mechanical retainer
21	47200248	Release lever spring
22	47159146	Nylon filter
23	47200239	Piston body
24	46110225	O-Ring 2068
25	47200278	Piston

Ref. N.	Code	Description
26	46110205	O-Ring 2025
27	47200281	Piston cap
28	47200249	Piston cap snap ring
29	47200277	Stainless steel rack
30	///	Clamping lever
31	///	Buckle for tank retaining band
32	47200254	Piston shell
33	47200275	Stainless steel rod for buckle 2 x 59
34	///	Buckle retainer 3 x 59
35	47200253	Tank retaining band
56	47158584	Discharge valve
96	47159311	Traction tank pad
111	45173130	Lock buckle (triglide)
112	47200300	Spring pin 2 x 16
		<b>ASSEMBLIES</b>
///	47200378	AirLock buckle assembly (30 - 31 - 34)
^^^	47200377	AirLock quick coupling assembly (1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 - 13)
	47200382	AirLock service kit (9 - 22 - 24 - 26 - 56 - ^^)