

**INSTINCT  
2<sup>ND</sup> STAGE**

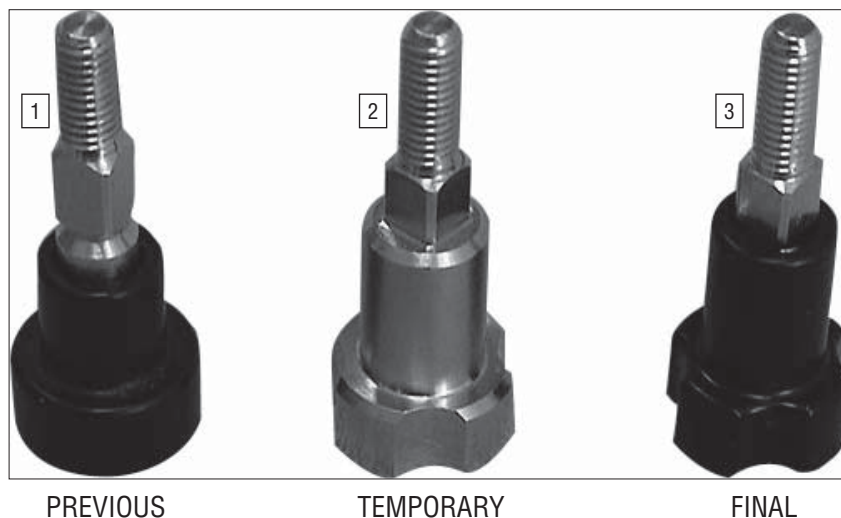
**mares<sup>®</sup>**

RE:  
**INSTINCT 2ND STAGE POPPET**

**BTM23**

TECHNICAL ASSISTANCE DEPT. OF MARES S.p.A. INFORMS ALL MARES LAB PARTNERS ABOUT AN IMPROVEMENT MADE TO THE INSTINCT SECOND STAGE: A NEW POPPET 2nd STAGE (#46201234 VERS.2) INITIALLY MADE COMPLETELY OF METAL BUT THE FINAL PART WILL BE MADE IN DUAL COMPONENTS (VERS. 3) AS THE PICTURE SHOWN. THE FEATURE OF NEW POPPET ARE 4 GROOVES ON THE HEAD THAT ALLOW FOR A MORE FLOW OF AIR, AND THEREFORE MORE COMFORTABLE BREATHING AT ALL DEPTHS AND DIVING CONDITIONS. IN VARIOUS CASES, THE NEW 2ND STAGE POPPET ALSO SOLVES POSSIBLE CASES OF VIBRATION THAT CAN OCCUR IN CERTAIN INSTINCT SECOND STAGES WITH A PREVIOUS VALVE (VERS. 1).

- PHOTO 1 -



\*INITIALLY THE NEW SECOND STAGE POPPET (VERS. 2) WILL BE ASSEMBLED ON THE FOLLOWING MODELS, BEGINNING WITH THE SERIAL NUMBERS (S/N) LISTED BELOW:

CODICE	DESCRIZIONE	S/N
416164	INSTINCT 12S INT	IS 13367
416134	INSTICT 52 SHE DIVES INT (JP)	JS 10289

\*FOR FURTHER INFORMATION ABOUT VERSION 3, PLEASE CONTACT TECHNICAL ASSITANCE ANYTIME.



**ATTENZIONE!**

PER LE PROCEDURE DI SMONTAGGIO, RIMONTAGGIO, REGOLAZIONE E CONTROLLO DELLA SCATOLA SECONDO STADIO , E' NECESSARIO CONSULTARE LA PROCEDURA DI MANUTENZIONE DEL SUDDETTO.  
IN MANCANZA DEL MANUALE SI' PREGA DI CONTATTARE LA MARES PRIMA D'EFFETTUARE QUALSIASI INTERVENTO DI MANUTENZIONE, REGOLAZIONE E CONTROLLO.

## MAINTENANCE PROCEDURE

### ► TOOLS NEEDED



#### WARNING!

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



ALL OPERATIONS MUST BE CONDUCTED STRICTLY IN THE ORDER DESCRIBED.

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

- Phillips head screwdriver
- Compressed air supply circuit or tank (180-200 bar)
- Cutting nippers
- O-Ring removal tool
- Silicone grease (General Electric Versalube G-322 type)
- Compressed air gun (8-10 Bar)
- Descaling solution (Deox Extra type) or ultrasound tank
- Test Bench
- Carbon/Prestige/Rebel 2nd stage maintenance kit (code 46200296 – 46200297 VITON O-RING)



(B-6)  
# 46106206



(B-17) 17mm (2)  
# 46106217



(B-18) 14mm  
#46106218



Pliers  
(type Usag 133)



(B-12) 5.5mm  
#46106212



(B-4) 5mm  
#46106204



(S-1)  
#41106000



Hex wrench 4mm

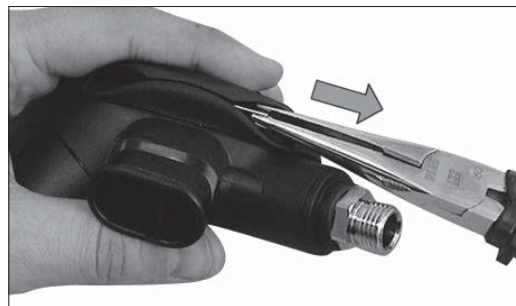
## DISASSEMBLY

**We recommend having the schematic to hand, to make the procedure easier.**

1. Remove the dust cap and move the hose cover from the 1st stage. Photo 1.
2. Unscrew the hose (26) using a 14-mm open end wrench (B18).
3. Move the 2nd stage side hose protector (46).
4. Remove the mouthpiece (44) using with care cutting nippers.



5. Remove the Pin Cover (38) using tool B-22.
6. Take the Pin off with a pliers.



**MAKE SURE TO REMOVE THE TOP PIN COVER (174) FROM THE HOSE CONNECTOR SIDE (28).**

7. Push down the button (104) and slightly raise the cover (39).



8. Using tool S-1, release definitively the cover (39) over the 2nd stage case (32).



9. Unscrew both screws (140) and remove the diaphragm Holder (78) and the diaphragm (142) too.



10. Remove the bottom Pin button (174) using tool B-22. Take the Pin off with a pliers.

**Make sure to remove the bottom Pin Button (174) as pictured.**

11. Unscrew the hose connector (28) using a 17-mm open end wrench (B-17), and then pull out the by-pass retainer ring (96).

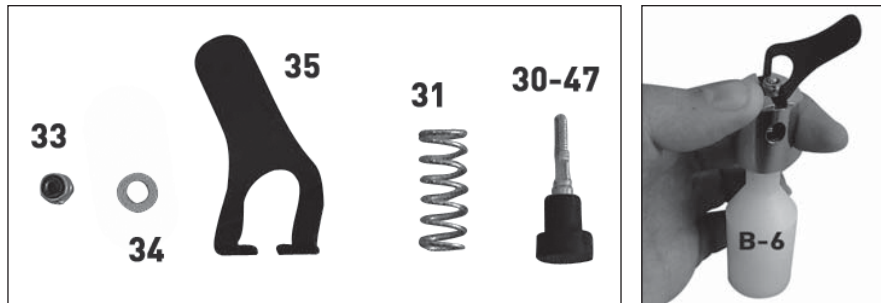


12. Gently press out the demand lever connector assembly into the case and remove the O-Ring (83) from its seat in the second stage case (32).

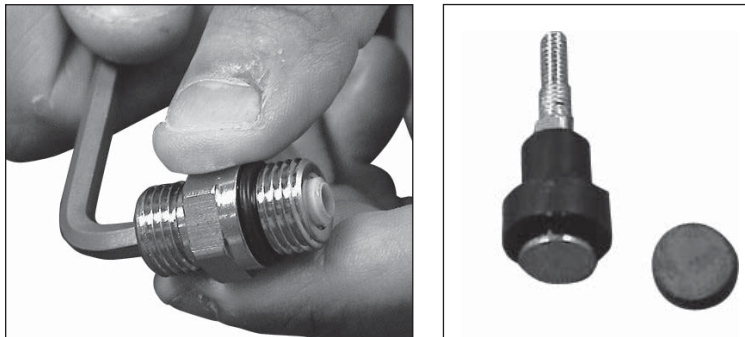
**NOTE** IT IS NOT ADVISABLE TO PULL IT OUT BY DEMAND LEVER (35).



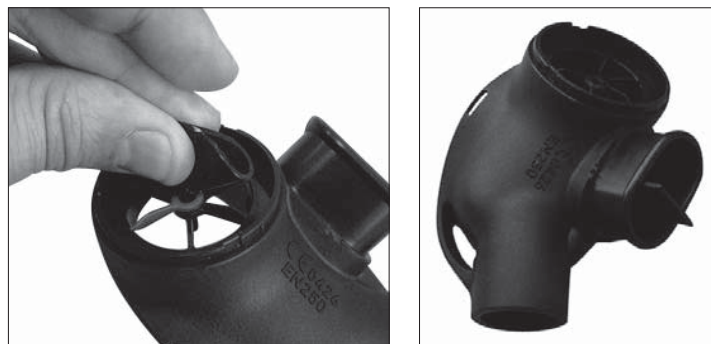
- 13.** Position the demand lever connector assembly on the special tool (B-6) and use the screwdriver (B-12) to unscrew the retaining nut (33) from the demand lever (35). Then remove the washer (34), the poppet assembly (30+47+92), and the spring (31).



- 14.** Remove the poppet seat (47), pressing slightly on the poppet seat holder (92) in the direction of the threaded stem. Remove the poppet seat holder (92) from the stem of the 2nd stage valve shaft (30).
- 15.** Unscrew the seat connector (21) from the case assembly connector (28) using a 5-mm hex wrench (B-4).



- 16.** Remove the O-Ring (71) from the hose connector (28) and the O-Ring (27) from the seat connector (21).
- 17.** Remove the exhaust tee (41) from the second stage case (32) and the exhaust valve (40) as well.
- 18.** Remove the deflector (50).



## CLEANING AND CHECKS

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



### **WARNING!**

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

Chrome-plated brass and stainless steel components can be cleaned using a nylon brush to remove any deposits, by immersing them in a fresh water ultrasound bath, or, if suitable equipment is not available, in a gentle acid solution (Deox Extra type) or white vinegar diluted with hot water.

Be sure to thoroughly rinse all parts in fresh water and dry with a jet of low pressure air at 8-10 bar before proceeding with reassembly.

## INSTINCT - ROUTINE MAINTENANCE



### **WARNING!**

**CERTAIN KEY COMPONENTS OF THE 2ND STAGE SHOULD BE REGULARLY REPLACED AT EACH SCHEDULED OVERHAUL. BELOW ARE LISTED THE COMPONENTS INCLUDED IN THE INSTINCT 2ND STAGE SERVICE KIT (#46201165 - #46201171 VITON O-RINGS):**

#### **► INSTINCT- INSTINCT OCTOPUS 2ND STAGE SERVICE KIT**

- DEMAND LEVER LOCK NUT (33)
- 2ND STAGE RUBBER PAD (47)
- EXHAUST VALVE (40)
- MOUTHPIECE CLAMP (43)
- O-RINGS :

- I. 1 O-RING 106 (19)**
- II. 2 O-RINGS 2025 (27)**
- III. 2 O-RINGS 2068 (83)**
- IV. 1 O-RING 2050 (71)**

## REASSEMBLY



### WARNING!

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



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

19. Place the Deflector (50) in the centre of the breathing tube as shown in the picture .
20. Install on exhaust valve (40) the Spoke (144), carefully pulling its silicone stem through the center hole of the second stage exhaust valve support. make sure that the Spoke (144).



### WARNING!

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

21. Use cutting nippers to cut the silicone stem at approximately half its length.



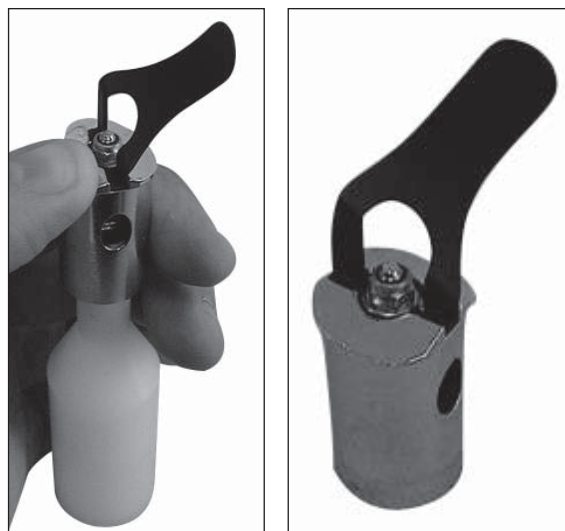
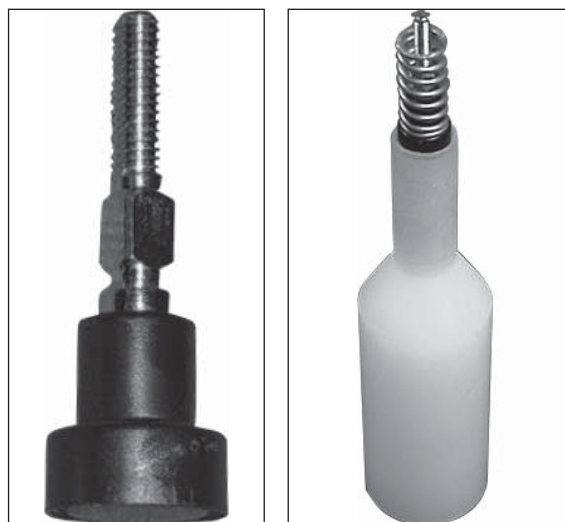
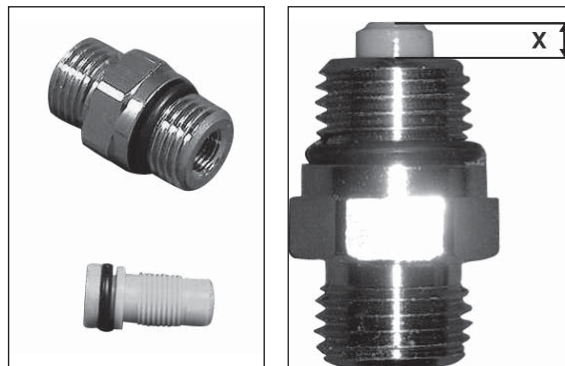


22. Fit the O-Ring (71) in the seat of the case assembly connector (28) and fit the O-ring (27) in its place in the seat connector (21).
23. Insert and screw the seat connector (21) into the case assembly connector (28) using the 5-mm hex wrench (B-4) until it protrudes about 3 mm.
24. Reassemble the poppet seat holder (92) on the 2nd stage poppet stem (30).
25. Reassemble the poppet seat (47) in the poppet seat holder (92).
26. Place the 2nd stage poppet assembly (30-47-92) together with its spring (31) on the special tool (B-6).
27. Pressing gently, correctly position the 2nd stage valve and its spring into the demand lever connector (91) and hold it in place.

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

28. Properly position the demand lever (35) with respect to the by-pass hole in the metal insert (91) channel.
29. Fit the washer (34) on the poppet stem and tighten the demand lever adjusting nut (33) 7 or 8 full turns using the special wrench (B-20).

**NOTE** PRESS THE DEMAND LEVER A FEW TIMES TO BE SURE IT IS ABLE TO MOVE FREELY.



- 30.** Correctly position the demand lever connector assembly (91) in the 2nd stage case (32).
- Move in the opposite position the demand lever (35) on the Insert (91).
  - Set up it as shown and rotate it (91) in the case (32).
- 31.** Hold the demand lever connector in place in the second stage case by hand, insert the O-Ring (83) into the seat between the 2nd stage case and the demand lever connector using the special wrench (B-6).
- 32.** Hold the demand lever connector in place in the second stage case by hand, insert the O-Ring (83) into the seat between the 2nd stage case and the demand lever connector using the special wrench (B-6).

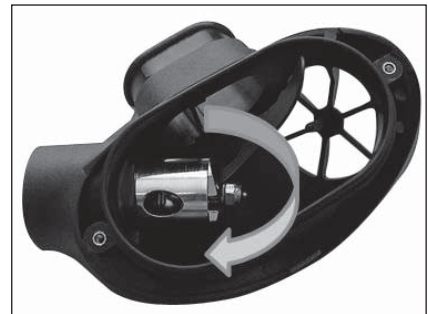


**IF USING A TORQUE WRENCH, USE TIGHTENING TORQUE OF 8 - 8.5 N/M.**

- 33.** Put the spacer ring (96) in place, and then use the 17-mm open-end wrench (B-17) to fully lock down the case assembly connector (28) in the 2nd stage case. Press the demand lever a few times.
- 34.** Fit the O-Ring (27) in the seat on the swivel connector of the hose (26) and the O-Ring (19) in the seat of the metal coupler that screws into the to first stage.
- 35.** Screw the hose (26) into the case assembly connector (28) using a 17-mm open end wrench (B-17).



I



II



## FINAL ADJUSTMENTS

To correctly adjust the regulator:

- a. The repair shop should be equipped with a high- and low-pressure compressed air supply.
- b. A pressure gauge is required for checking the intermediate pressure (the pressure gauge should have a full scale value MAX 30-40 BAR, for greater adjustment accuracy).
- I. Screw the intermediate pressure measuring gauge into one of the 3/8" low-pressure ports on the 1st stage, using the wrench (B-18).
- II. Mount the regulator group on the control valve (of the tank or test bench).
- III. Holding down the second stage demand lever, slowly open the tank valve and, almost simultaneously, release the demand lever.
- IV. Read the pressure gauge to check whether the 1st stage pressure is correct.



### WARNING!

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



### WARNING!

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

36. Assemble the button Spring (102) on the Ring Diaphragm (78) and over it place the button (104). Using the Pin (102) Fixed the Button (104) through right side.



37. Place the 2nd stage diaphragm (142) in the Ring Diaphragm (78).

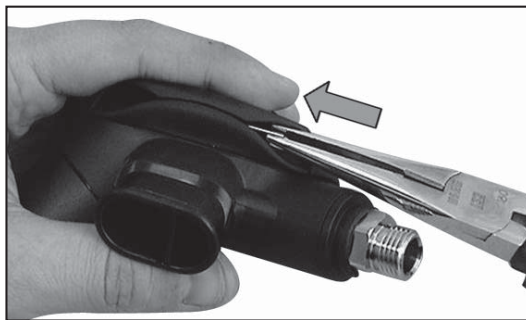
38. Fit both screws (140) on the Housing (32).



- 39.** Pushing down the button (104), insert Cover (39). Fix first its teeth (bottom), release the Button (104) set up the cover in the proper position.



- 40.** Assemble the Pin (102) Fixed the Cover (39) through right (hose connector) side.



- 41.** Gently move exhaust valve (40) and the Spoke (144). Working through the hole in the second stage case, use the wrench (B-12) to lock down or back off the demand lever nut (32) in order to adjust the demand lever (35).





**WARNING!**

THE DEMAND LEVER IS ADJUSTED CORRECTLY WHEN YOU CAN PRESS THE PURGE BUTTON ON THE COVER DOWN ABOUT 3MM BEFORE AIR BEGINS TO RELEASE. IN ADDITION, THE SOUND OF THE DEMAND LEVER TOUCHING THE METAL DISK OF THE SECOND STAGE DIAPHRAGM AS IT MOVES ("TAPPING") SHOULD BE AUDIBLE WHEN THE PRESSURIZED SECOND STAGE IS SHAKEN VIGOROUSLY UP AND DOWN.

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**42.** Make sure the Spoke (144) is returned to its proper position after lever height adjustment.

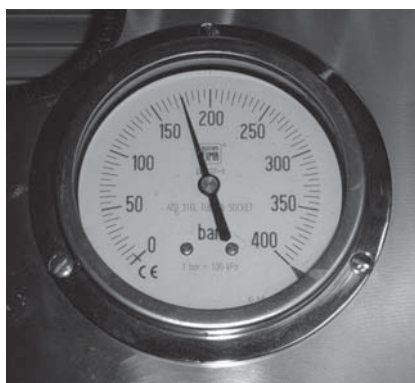


**OBJECT:  
REGULATORS TEST BENCH****INFORMAZIONI IMPORTANTI**

TO CHECK THE HIGH PRESSURE (2) MARES RECOMMEND HP AIR BETWEEN 150 TO 200 BAR!

CHECK THE INTERMEDIATE PRESSURE (IP), ON THE LP GAUGE AND ADJUST IT IF NECESSARY. TO DOWNLOAD THE AIR FROM REGULATOR THE “DISCHARGE LEVER” (5) CAN BE USED.

TANK PRESSURE



IP PRESSURE



DISCHARGE LEVER



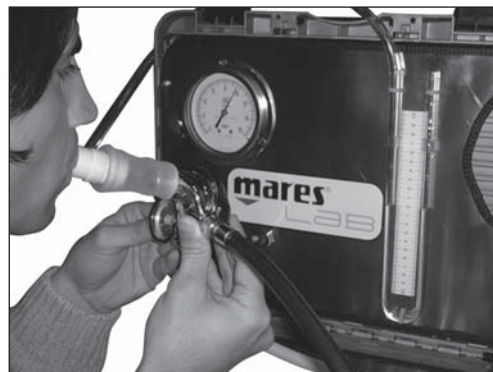
- INSTALL THE INHALING MOUTHPIECE (8) ON THE SECOND STAGE MOUTHPIECE TUBE.



- TO CHECK THE CRACKING EFFORT USING COLUMN WATER (SEE INFO TABLE).



...THE CRACKING EFFORT MUST BE READ IN THE MOMENT THAT THE VALUE OF INTERMEDIATE PRESSURE STARTS TO DECREASE...





## 2° STAGES CRACKING EFFORT

2° STADIO	cm of H <sub>2</sub> O	inch of H <sub>2</sub> O
PRIMARY	2.8- 3.2 ~	1,1-1.3
OCTOPUS	3.3-3.5	1,2-1,4

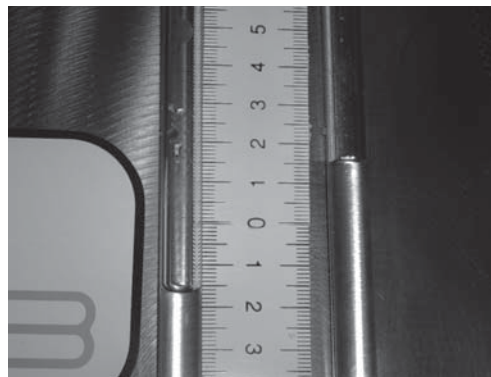


TO OBTAIN THE CRACKING EFFORT IT IS NECESSARY TO ADD THE VALUE OF COLUMN WATER THAT GOES UP WITH THE VALUE OF COLUMN WATER THAT GOES DOWN (OR REDOUBLE ONE OF THEM).



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

- CLOSE THE TANK VALVE (3) AND DISCHARGE THE RESIDUAL AIR, PUSHING ON THE SECOND STAGE BUTTON COVER OR THE DISCHARGE LEVER (5).
- CLOSE THE TEST BENCH VALVE (3) AND TRY TO INHALE DIRECTLY FROM THE SECOND STAGE (W/O INHALING MOUTHPIECE (8), IN ORDER TO DETECT LEAKAGE INSIDE OF THE CASE.



## FINAL ASSEMBLY



### WARNING!

FOR CHECKS AND ADJUSTMENTS ON THE SECOND STAGE, CONSULT THE CORRESPONDING SECTION OF THE MAINTENANCE MANUAL (S 9-1).

- 43.** Assemble the exhaust tee (41) on the support flange on the second stage.
- 44.** Carefully assemble the mouthpiece (44), securing it with a new mouthpiece clamp (43).





Drawing  
No: E 42

## 2nd STAGE INSTINCT

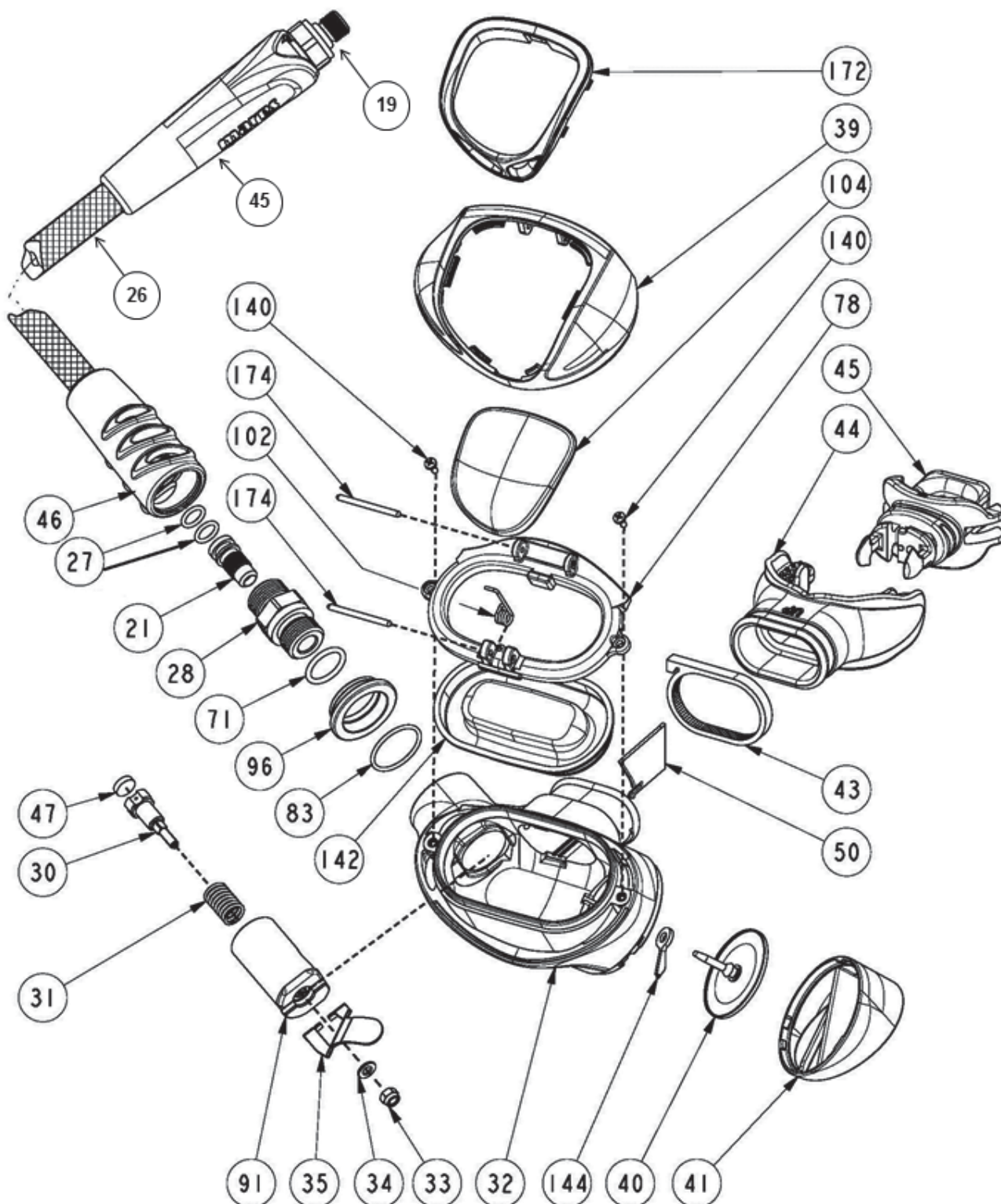
DRAWING UPDATED:  
01/10/2012

Table No: 132	<b>2nd STAGE INSTINCT</b>	TABLE UPDATED ON: 18/12/2012
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REF	CODE	DESCRIPTION
19	46110106	OR 106
19	46110402	OR 106 VITON 610-97507
21	46200204	POPPET SEAT
26	46201200	LP HOSE SFX BLACK 3/8" , 65 CM (26-45-46)
26	46200886	LP HOSE SFX YELLOW
27	46110205	OR 2025
27	46110411	OR 2025 VITON 010-9707
28	46184282	HOSE CONNECTOR
30	46201234	POPPET METAL BODY, INSTINCT
31	46185059	POPPET SPRING
32	46201204	2ND STAGE CASE, INSTINCT
33	46185051	LOCKNUT, DEMAND LEVER 2ND STAGE
34	46185049	WASHER, DEMAND LEVER
35	46201241	DEMAND LEVER, INSTINCT
39	46201203	COVER FOR 2° STG P. METAL
40	46201194	EXHAUST VALVE,D. 33
41	46201201	EXHAUST TEE INSTINCT
43	47157984	CLAMP BK
44	46200855	MOUTHPIECE BK (10 PICS)
45	46201077	HOSE PROTECTOR 1ST STG 2K9
46	46200768	HOSE PROTECTOR 2ND STG
47	46184062	RUBBER SEAT
50	46201199	DEFLECTOR

REF	CODE	DESCRIPTION
71	46110211	OR 2050
71	46110413	OR 2050 VITON 014-9707
78	46201198	RING-DIAPHRAGM
83	46110225	OR 2068
83	46110420	OR 2068 VITON
91	46201181	INSERT FOR DEMAND LEVER
96	46184280	SPACER RING BY-PASS BK
96	46187038	SPACER RING BY-PASS YL
102	46201138	BUTTON SPRING
104	46201197	BUTTON BLACK
104	46201208	BUTTON YELLOW
140	46187004	SCREW M2X5
142	46187009	OVAL DIAPHRAGM
144	46201196	EXHAUST VALVE SPOKE
172	46201195	COVER FRAME, CHROME
174	46201188	PIN BUTTON/COVER
<b>ASSEMBLED</b>		
S	46201165	SERVICE KIT 2ND STG INSTINCT
	46201171	SERVICE KIT INSTINCT VITON
		(19 - 27 - 33 - 40 - 43 - 47 - 71 - 83)
R	46200510	KIT RETROFIT (21-27-47)