

**MR52**  
**1<sup>ST</sup> STAGE**

**mares®**

## MAINTENANCE PROCEDURES

### ► 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.

#### OTHERS TOOLS

- Flathead screwdriver
- Compressed air supply circuit or tank (180-200 bar)
- nylon brush
- 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 or LP pressure gauge to calibrate the intermediate pressure
- Thread compound (Loctite 422 INT connection type - Loctite 415 type for DIN connection)
- MR52 1st stage service kit (code INT – DIN 46201164, VITON 46201166)

(B-4) 5MM  
# 46106204



DIN

(B-21)  
#46106221



(B-6)  
# 46106206



(B-5)  
# 46106205



(B-14)  
#46106214



INT

(B-1) 25 mm  
# 46106201



INT

HEX WRENCH 4 mm



(B-13) 10 mm  
#46106213



(B-18) 14 mm  
#46106218



(B-42)  
# 46201042



B-8) 6mm  
# 46106208



DIN

## DISASSEMBLY

1. Loosen the dust cap (10) from the 1st stage, fully unscrewing the yoke knob (22).
2. Remove the hose protection from the body of the 1st stage.
3. Unscrew the hose using a 14-mm open end wrench (B18). Photo 1



Photo 1

4. Remove the cap 1st stage (44), using a flat head screwdriver (type USAG No. 322). Insert the screwdriver in correspondence with "M", (as shown in the picture 2) and penetrate between the plastic parts 44 and 38 with the screwdriver for at least 1 cm, then lever the screwdriver with caution until the release. Photos 2-3



Photo 2

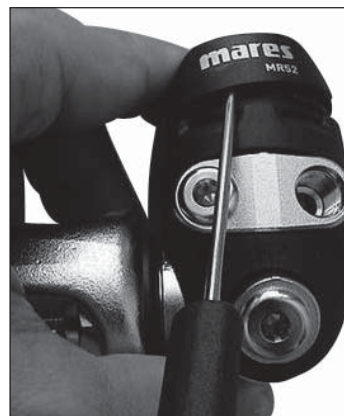


Photo 3

5. Take both shells out (38-39). Photo 4



Photo4

6. Using tool (B-8), unscrew the HP chamber plug (34), take off the HP Spring (36), the trimaterial valve (19), and the 28.3-mm Pin (1) from the first stage body.

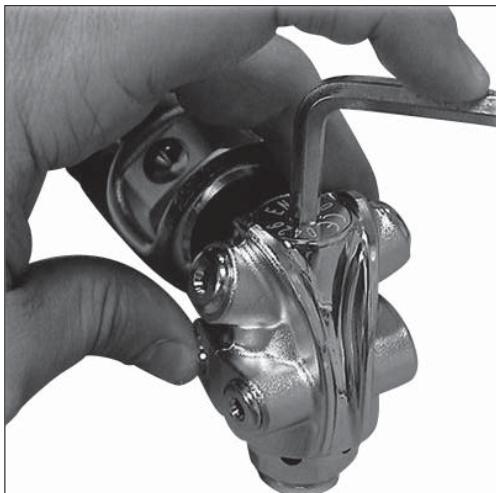


Photo 5

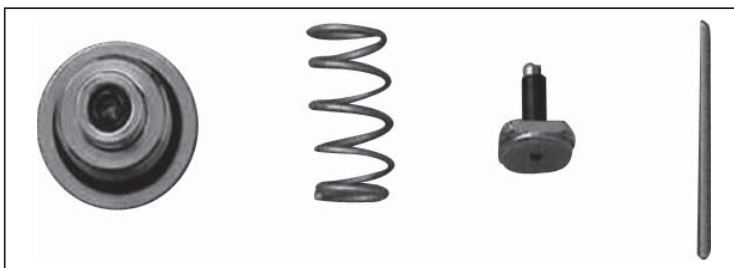


Photo 6

7. Extract the O-Ring (20) from the HP housing (34) and the back up ring (3) using a plastic or brass OR removal tool. Photos 7-8



**WARNING!**

DO NOT USE BLADES OR POINTED TOOLS MADE OF STEEL OR OTHER MATERIALS, WHICH CAN SCRATCH THE SURFACES.



Photo 7



Photo 8

8. Screw in the threaded bar tool (B5) to a 3/8" LP port to make it easier to remove the adjusting nut (18) and retaining nut (17) from the 1st stage. Photo 9



TO MAKE DISASSEMBLY EASIER, WE RECOMMEND THAT YOU PLACE THE FIRST STAGE IN A BENCH VISE (PHOTO 9).

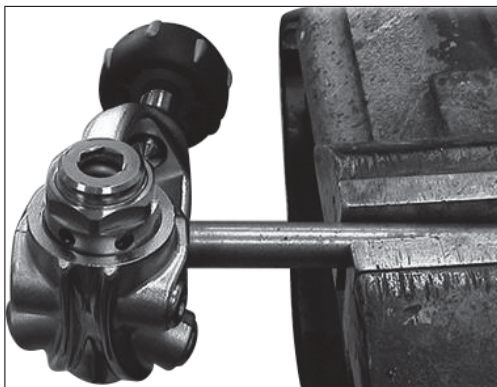


Photo 9

9. Using the Allen wrench (B-13), unscrew the adjusting nut (18) and pull out the spring (16). Photo 10



Photo 10

10. Unscrew the retainer nut (17) using the special 25-mm wrench (B1) and remove the Plate Spring Base (31). Photo 11

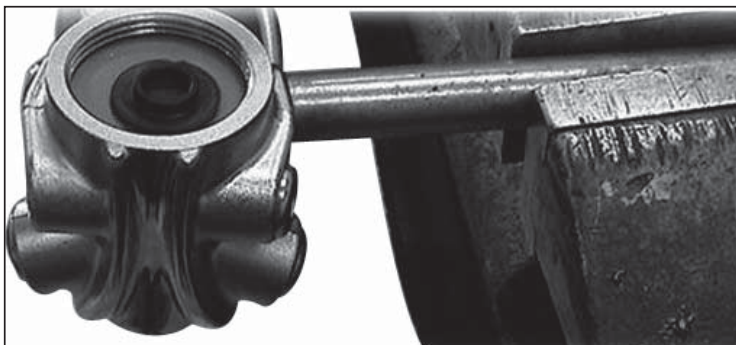


Photo 11

11. Remove the plastic washer ring (32).



**WARNING!**

DO NOT USE POINTED TOOLS TO REMOVE THE PLASTIC WASHER RING (32) IN ORDER TO AVOID DAMAGING THE DIAPHRAGM (30).



Photo 12

12. Turn upside down the 1st stage, Insert poppet pin (1) into poppet seat (33) using the special tool (B6) tool in chamber. Gently Press on the Pin with a plastic tool, to avoid damage to the profile of the HP seat (33), until complete removal of the components (28-30-35).



Photo 13

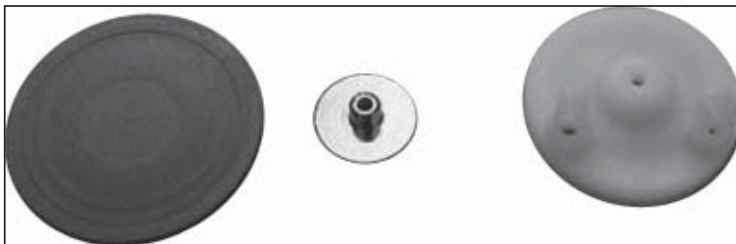


Photo 14

13. Use the special utensil special (B-41), inserting it in a hole of Diaphragm side and doing with it push on HP seat (33).
14. After removing the seat connector (33) from the 1st stage body, remove the O-Ring (27).
15. Unscrew the yoke retainer nut (23) using the special wrench (B1) and remove also the Spacer (37).

**NOTE** TO MAKE DISASSEMBLY EASIER, WE RECOMMEND THAT YOU PLACE THE FIRST STAGE IN A BENCH VISE (PHOTO 17).

16. Using the snap ring pliers (B14), pull out the snap ring (2), INT Filter (8) and the filter spring (12).



Photo 15



Photo 16



Photo 17



Photo 18



- I.** Unscrew the DIN OR seat (15) with a 4-mm Allen wrench.
- II.** Remove the O-Ring (25) from the OR seat (15).
- III.** Remove the sintered filter (7) from the DIN connector body (48), turning the first stage over.
- IV.** Insert an 5-mm Allen wrench (B4) inside the DIN fitting (24) and unscrew it completely. If necessary use also the wrench B1 for raise it easier.
- V.** Remove the DIN Body (24) and the DIN ring nut (11).
- VI.** Remove the O-Ring (26) from the DIN fitting body (24).



Photo 19



Photo 20

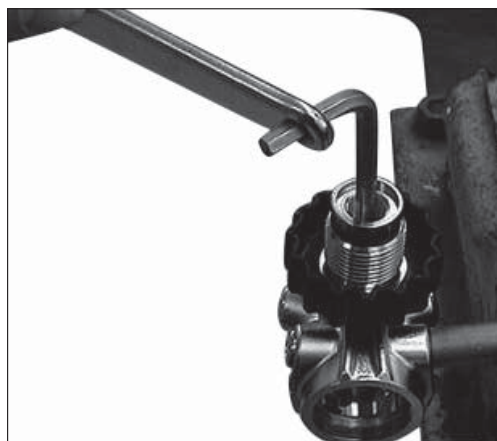


Photo 21



Photo 22



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

## ROUTINE MAINTENANCE



### WARNING!

CERTAIN KEY COMPONENTS OF THE FIRST STAGE SHOULD BE REGULARLY REPLACED AT EACH SCHEDULED OVERHAUL. LISTED BELOW ARE THE COMPONENTS INCLUDED IN THE MR52 1ST STAGE SERVICE KIT (CODE 46201164 INT- DIN):

### MR52 SERVICE KIT (INT-DIN: 46201164)

- ANTI-FRICTION RING
- SNAP RING (only INT conn.)
- SINTERED FILTERS (INT & DIN)
- BACKUP RING Parbak
- O-RINGS :
  - 3 106 O-RINGS
  - 2 108 O-RINGS
  - 1 2012 O-RING
  - 1 2031 O-RING
  - 1 3043 O-RING (for DIN only)
  - 1 2050 O-RING

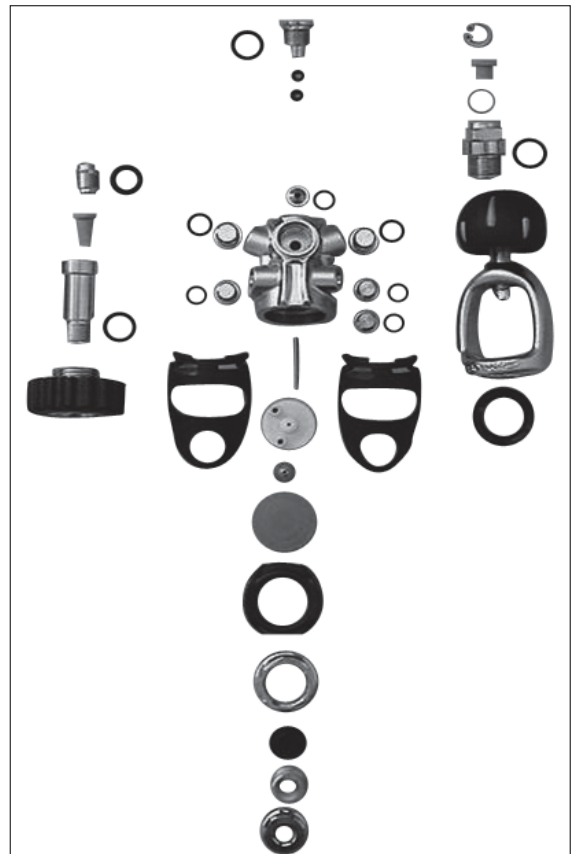


### WARNING!

IF THE 1ST 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.



## REASSEMBLY

17. Place the O-Ring (27) in the HP seat (33) and then correctly position the HP seat on the special tool (B21).
18. Pressing gently, insert the poppet seat (33) into position in the first stage body.



### WARNING!

TAKE SPECIAL CARE WHEN INSERTING THE POPPET SEAT. MAKE SURE THAT IT IS POSITIONED CORRECTLY. ONCE IT IS INSERTED CORRECTLY INTO THE FIRST STAGE, THE CONICAL SECTION WILL BE VISIBLE WHEN LOOKING FROM THE HIGH PRESSURE END.

19. Insert the backup ring (3) , the O-Rings (20) into the HP CHAMBER Plug (34) and the O-Ring (26).
20. Properly position poppet (19). Photo 25.
21. Place spring (36) over the poppet (19).  
Using the hex. tool (B8), tighten into the First Stage Hp chamber plug assembly (34).



MAKE SURE THAT ONCE INSERTED INTO THE BALANCING CHAMBER (34) THE BACKUP RING (3) HAS SIDE "A" FACING THE O-RING (20).

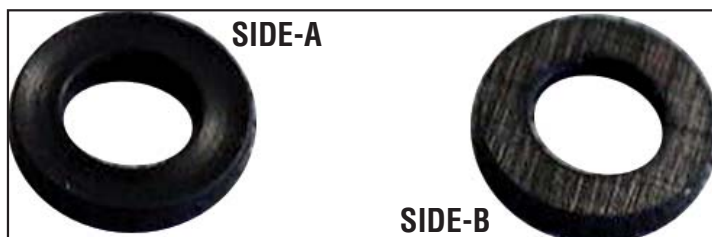


Photo 23



Photo 24



Photo 25



Photo 26

22. Rotate the first stage and correctly position the DFC washer (35) in the groove of the first stage body . Insert the pin (1) in the center hole in the DFC washer.
23. Position the poppet button (28) on the pin (1), and press on it to feel the "response" of the HP spring (36).
24. Place the diaphragm (30) in the retaining nut seat (17), making it adhere perfectly to the edges.

**NOTE** REINSTALL THE DIAPHRAGM (30) IN THE SAME POSITION FROM WHICH IT WAS REMOVED. NOTE THE IMPRESSION OF THE POPPET BUTTON (28) ON IT.

25. Correctly position the plastic washer ring (32) above the diaphragm (30).
26. Place the spring base plate (31) in the middle of the diaphragm (30).
27. Use a 25-mm wrench (B1) to fully tighten the retaining nut to the 1st stage body.

**NOTE** IF USING A TORQUE WRENCH, USE TIGHTENING TORQUE OF APPROXIMATELY 25N/M.



Photo 27



Photo 28

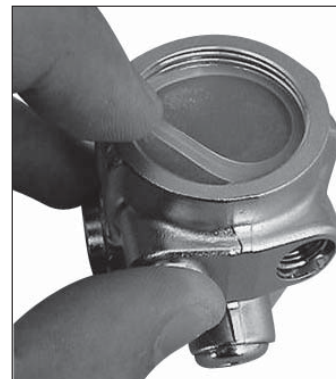


Photo 29

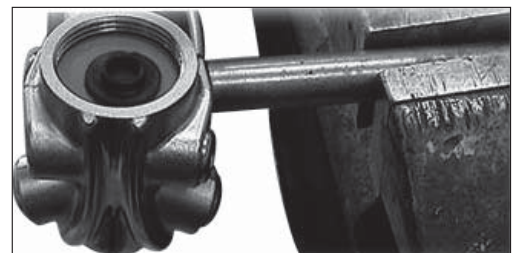


Photo 30

**28.** Position the spring (16) over the spring base plate (15).

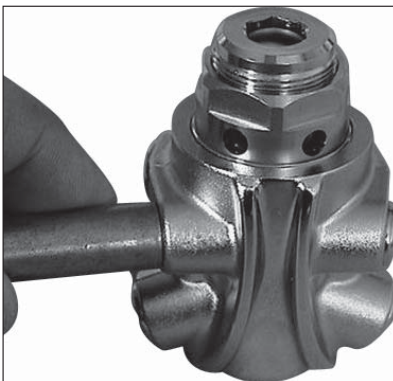


Photo 31

**29.** Screw the adjusting nut (18) 3 – 4 turns on the retaining nut (17) using a 10-mm Allen wrench (B13).



**ATTENZIONE!**

DO NOT OVER-TIGHTEN THE ADJUSTING NUT; THIS WILL CAUSE AN INCREASE IN INTERMEDIATE PRESSURE, INTERFERING WITH SUBSEQUENT ADJUSTMENTS AND MAY ALSO DAMAGE THE LP GAUGE.

**30.** Rotate the 1st stage body and insert the Spacer (37).

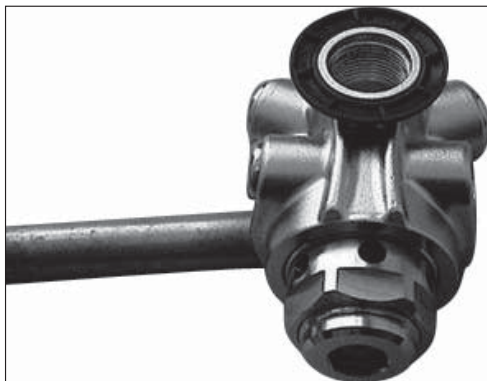


Photo 32

**31.** Assemble the filter spring (12) and the sintered filter (8) in the yoke retainer nut body (23).



Photo 33

**32.** Using the snap ring pliers (B14), fit the snap ring (2) in its position above the sintered filter (22).

**ROTATE THE SNAP RING TO CHECK ITS CORRECT POSITIONING.**

TO PREVENT THE YOKE RETAINER NUT FROM WORKING LOOSE ACCIDENTALLY, POUR ONE OR TWO DROPS OF THREAD COMPOUND (LOCTITE 422 TYPE) ONTO ITS THREADING. IT IS NECESSARY THAT THERE ARE NOT RESIDUALS OF OLD LOCTITE ON THE THREADS .

TO MAKE ASSEMBLY EASIER, WE RECOMMEND THAT YOU PLACE THE FIRST STAGE IN A BENCH VISE (PHOTO 32).

**33.** Position the yoke (21) with the knob (22) on the first stage body.

**34.** Using the wrench (B1), fully tighten the complete yoke retainer nut (23).

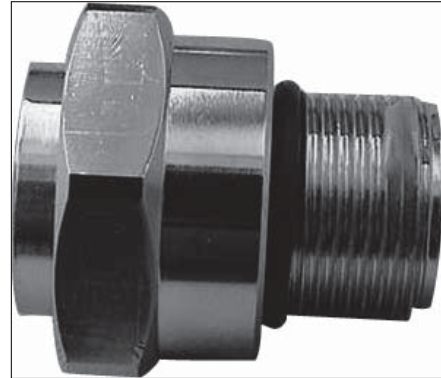


Photo 34

**NOTE** IF USING A TORQUE WRENCH, USE TIGHTENING TORQUE OF APPROXIMATELY 18-20 N/M.

**35.** Insert the DIN body (24) in the Threaded Locking ring (11).

**36.** Position the O-Ring (26) on the DIN body (24).

**NOTE** TO PREVENT THE DIN BODY (24) FROM WORKING LOOSE ACCIDENTALLY, APPLY ONE OR TWO DROPS OF THREAD COMPOUND (TYPE LOCTITE 415) ON THE FITTING THREAD ON THE PART FURTHEST FROM THE O-RING (26). DO NOT PUT THREAD COMPOUND ON THE O-RING. IT IS NECESSARY THAT THERE ARE NOT RESIDUALS OF OLD LOCTITE ON THE THREADS.



Photo 35

**37.** Insert the Spacer (37) in the 1st stage body as shown.

**38.** Using a 5-mm Allen wrench (B 4), tighten the DIN body (24) to the first stage body.

IF USING A TORQUE WRENCH, USE TIGHTENING TORQUE OF APPROXIMATELY 17 - 20 N/M.

**39.** Insert the conical filter (7) in the DIN body (24).

**40.** Position the O-Ring (25) on the DIN OR seat (15).

**41.** Screw the O-Ring housing (15) to the DIN body (24) with a 4-mm Allen wrench.

IF USING A TORQUE WRENCH, USE TIGHTENING TORQUE OF APPROXIMATELY 1.5-2 N/M.



Photo 36

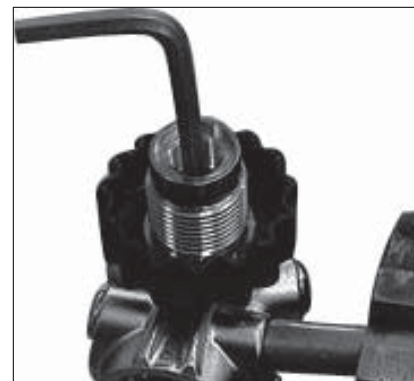


Photo 37



CONNECT THE FIRST STAGE TO A FULL TANK (AT LEAST 180 BAR) OR TEST BENCH, AND OPEN THE AIR VALVE SLOWLY TO EXPEL ANY FOREIGN MATTER FROM THE FIRST STAGE.

42. Remove the Tool B-5. Position the O-Rings (5 - 13) on the plugs (6 - 14).
43. Tighten the plugs (6-14) to the first stage body using a 4-mm Allen wrench and fit the flexible hoses in the corresponding ports on the first stage.



**WARNING!**

FOR CHECKS AND ADJUSTMENTS ON THE FIRST STAGE, CONSULT THE CORRESPONDING SECTION OF THE MAINTENANCE MANUAL : F 7-1.

44. Properly position body protections (39-38) on the first stage body and the 1° stage Cap (44) as shown.



Photo 38



Photo 39



Photo 40

Drawing  
No: E 117

## 1st STAGE MR 52 T

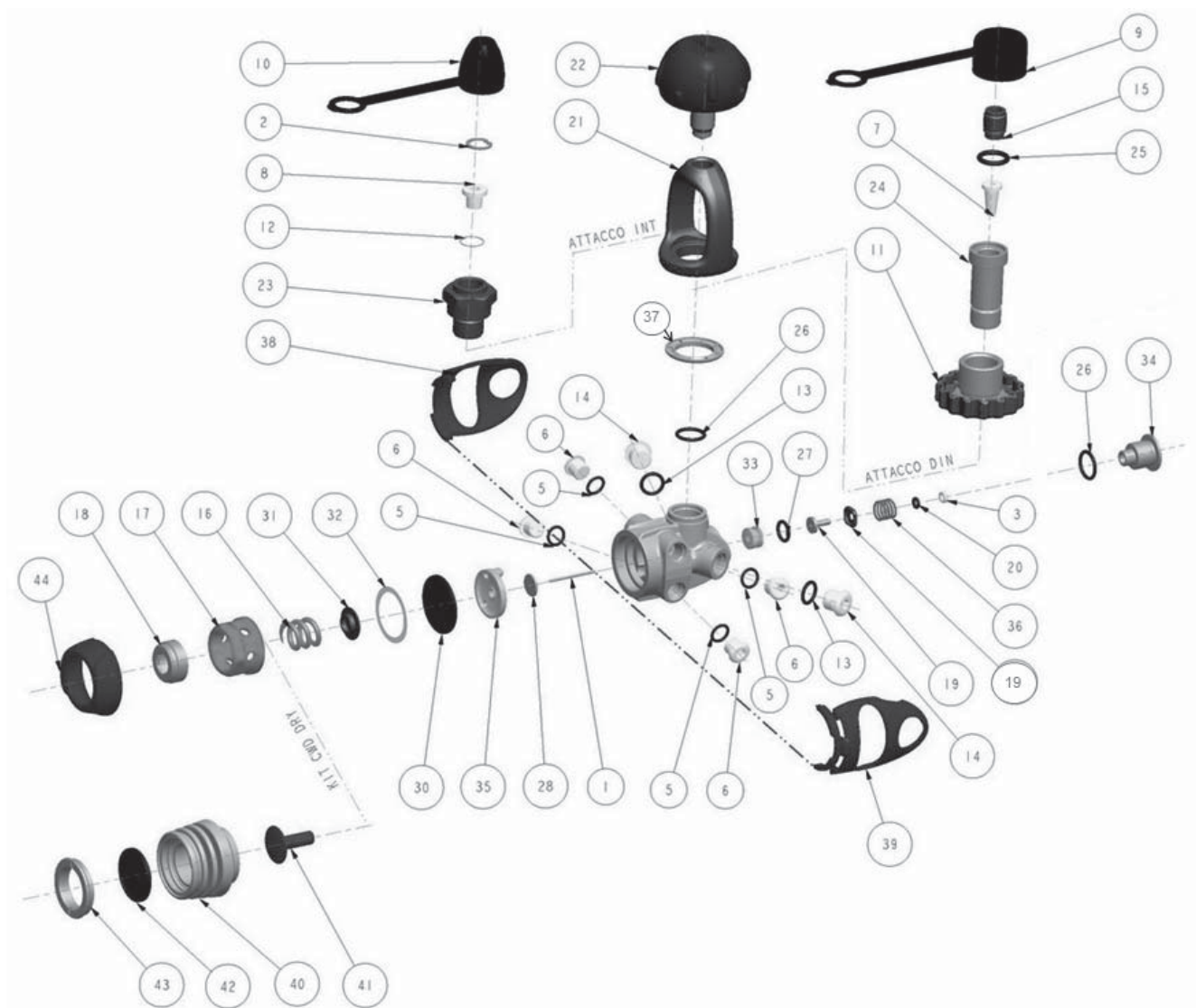
DRAWING UPDATED:  
23/01/2012



Table No: 40	<b>1st STAGE MR 52 T</b>	TABLE UPDATED ON: 14/03/2012
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REF	CODE	DESCRIPTION
1	46201124	PIN POPPET 28,3 MM
2	46185015	RETAINING RING, 1ST STG FILTER
3	46110506	BACKUP RING PK
4	46201107	FIRST STAGE 52
5	46110106	OR 106
5	46110402	OR 106 VITON
6	46184204	LP PLUG 3/8"
7	46200561	CONICAL FILTER, DIN
8	46186202	CONICAL FILTER INT
9	46200562	DUST CAP 300 BAR DIN
10	46185010	DUST CAP INT
11	46200546	THREADED LOCKING RING (300 BAR)
12	46185013	SPRING, FILTER 1ST. STAGE
13	46110108	OR 108
13	46110404	OR 108 VITON
14	46185205	HP PLUG 7/16"
15	46200547	O-RING SEAT DIN
16	46185023	SPRING DIAPHRAGM
17	46201118	RETAINING NUT
18	46201120	REGULATING NUT
19	46201132	POPPET 1° STG TRI-MATERIAL 10 PCS
20	46110101	OR 2012
20	46110401	OR 2012 VITON
21	46201074	YOKE K11
22	46184079	YOKE KNOB
23	46201100	NUT YOKE RETAINER
24	46201102	BODY, DIN CONNECTOR 300 BAR
25	46110247	OR 3043

REF	CODE	DESCRIPTION
25	46200620	OR 3043 VITON
26	46110211	OR 2050
26	46110413	OR 2050 VITON
27	46110107	OR 2031
27	46110403	OR 2031 VITON
28	46200545	BUTTON FIRST STAGE POPPET
30	46201112	DIAPHRAGM
31	46200582	PLATE SPRING BASE
32	46200581	ANTI-FRICTION RING
33	46186216	HP SEAT "MR"
34	46201116	HP CHAMBER PLUG
35	46201114	DFC WASHER 52
36	46185011	HP SPRING 1° STG
37	46201135	YOKE SPACER 1° STG
38	46201126	LEFT SHELL 52
39	46201128	RIGHT SHELL 52
40	<b>C</b>	CWD DRY BODY, 52
41	<b>C</b>	CWD DRY PISTON
42	46200558	CWD DRY DIAPHRAGM
43	46200566	HOCK CUP CWD DRY
44	46201127	1ST STG CAP 52
<b>ASSEMBLIES</b>		
<b>F</b>	416809	DIN CONNECTOR 300 BAR (9-7-11-15-24-25)
<b>C</b>	416857	KIT CWD DRY
<b>S</b>	46201164	SERVICE KIT MR52 INT/DIN
		(2-3-5-7-8-13-20-25-26-27-32)
<b>V</b>	46201166	SERVICE KIT MR52 INT/DIN (VITON)
		(2-3-5-7-8-13-20-25-26-27-32)