MR 22

# DEALER MANUAL

# FIRST STAGE


mares®

## ☐ MR 22 FIRST STAGE SERVICE

### • Disassembly

1. Remove all hoses from the first stage except the hose attached to the DFC port (port equipped with depressor) and replace with port plugs.
2. Remove the hose protector (46) using two wrenches (B17) unscrew the hose (26) from the second stage (Fig 12).

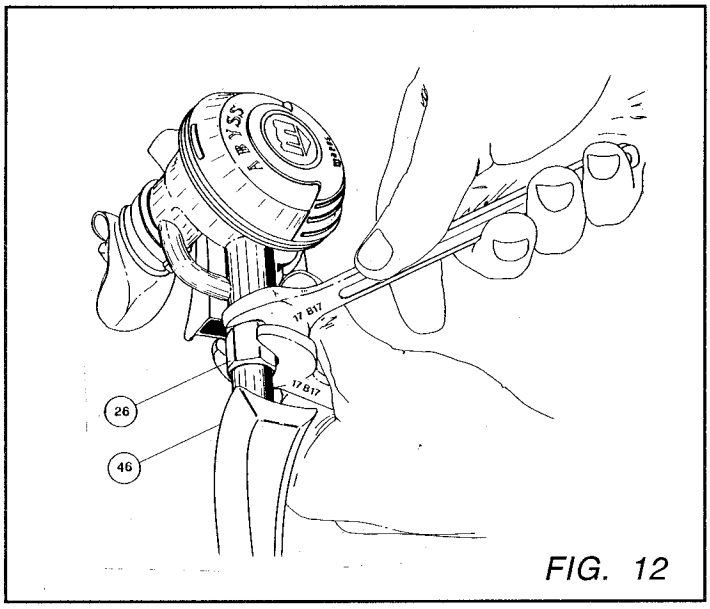



FIG. 12

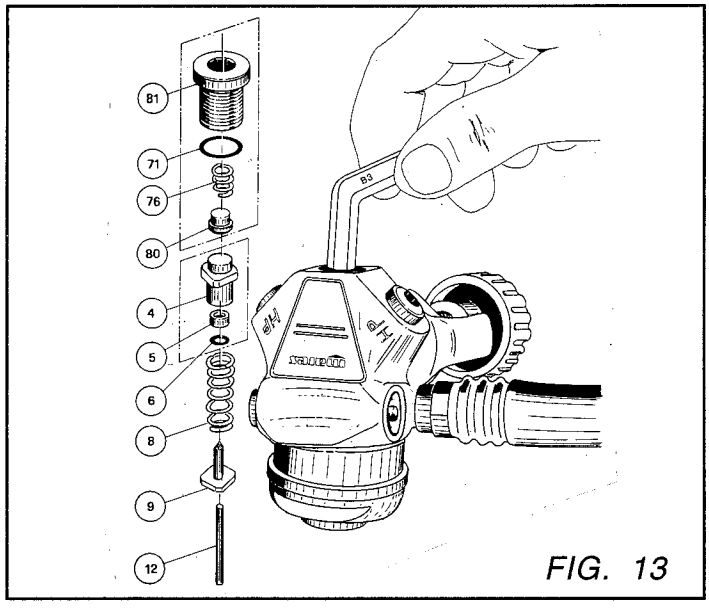



FIG. 13

3. Remove the first stage cover (81-71-76-80) using hex wrench (B3) (Fig. 13).

**NOTE**

**THERE WILL BE LIGHT SPRING TENSION AGAINST THE FIRST STAGE COVER. MAINTAIN A LIGHT GRIP ON THE FIRST STAGE COVER DURING REMOVAL.**

4. Remove locking head (80) and spring (76) from the first stage cover.
5. Remove poppet retainer assembly (4-5-6), spring (8), poppet (9) and poppet pin (12) from the first stage body (Fig. 13).
6. Remove o-ring (6) from poppet retainer.
7. Remove backup ring (5) from poppet retainer.
8. Place tool (B21) over the first stage poppet seat (75). While maintaining light pressure against the tool, pressurize the second stage hose with low pressure air (below 100 psi) (Fig. 14).

**NOTE**

**WHEN THE POPPET SEAT IS DISPLACED BY THE LOW PRESSURE AIR, GRADUALLY DECREASE PRESSURE ON TOOL (B21).**

**⚠ WARNING**

**NEVER ATTEMPT TO REMOVE THE POPPET SEAT WITH POINTED OR SHARP TOOLS. ANY SCRATCHES ON THE SURFACE OF THE POPPET SEAT MAY IMPAIR OPERATION. THE USE OF HIGH PRESSURE AIR (OVER 100 PSI) COULD CAUSE PARTS TO BE EXPELLED FROM THE REGULATOR. ALWAYS POINT THE REGULATOR AWAY FROM YOURSELF OR ANYONE ELSE WHILE REMOVING THE POPPET SEAT WITH PRESSURIZED AIR.**

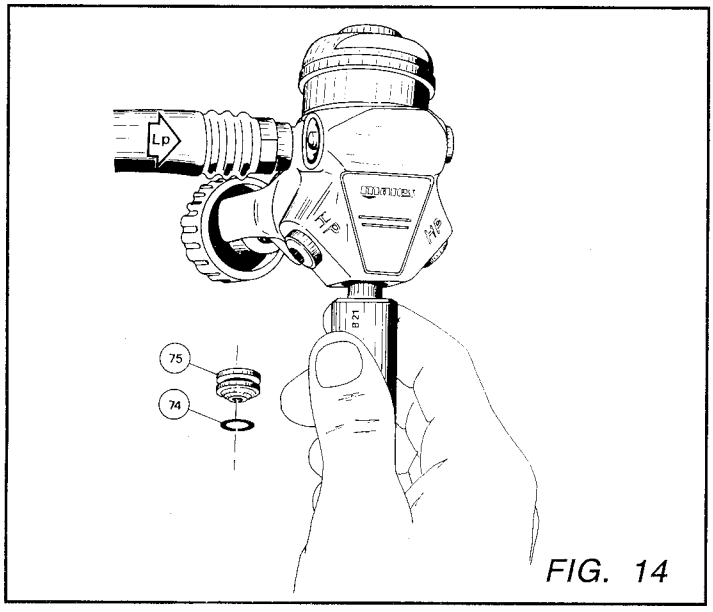


FIG. 14

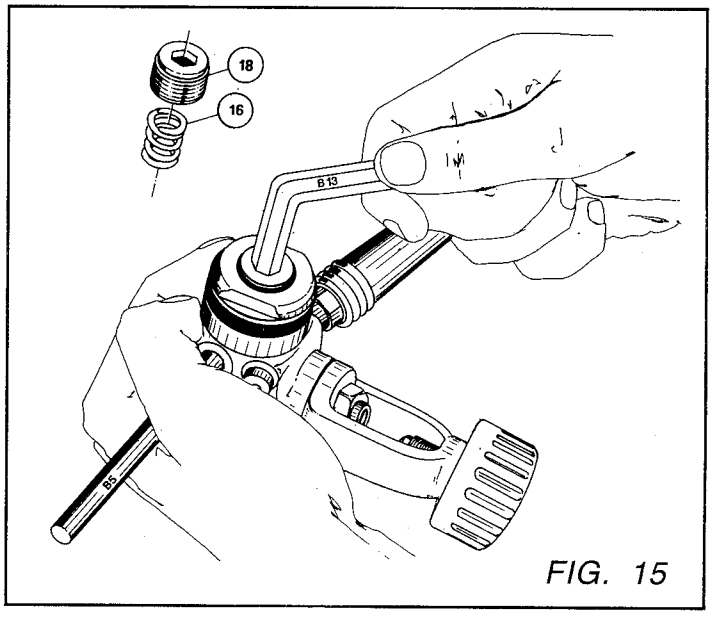


FIG. 15

9. Remove the poppet seat (75) from first stage.
10. Remove o-ring (74) from poppet seat.
11. Reinstall the first stage cover (81) and o-ring (71) into the first stage body using hex wrench (B3).
12. Remove one 3/8" LP port and insert first stage disassembly tool (B5).
13. Remove regulating nut (18) with hex wrench (B13) and remove diaphragm spring (16) (Fig. 15).
14. Remove retaining nut (17) with wrench (B16) and remove spring base plate (15) (Fig. 16).

## NOTE

**LIGHT PRESSURE IS ALL THAT IS REQUIRED TO REMOVE THE SHOCK RING (69) FROM THE RETAINING NUT.**

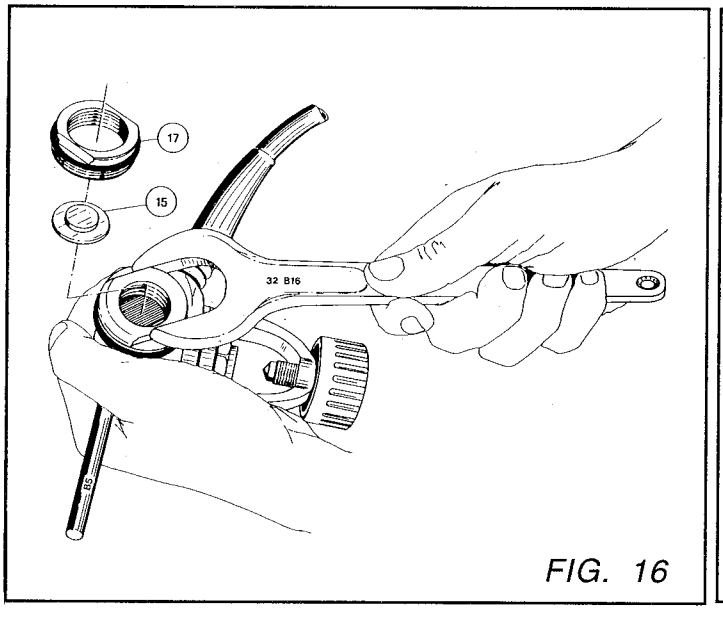


FIG. 16

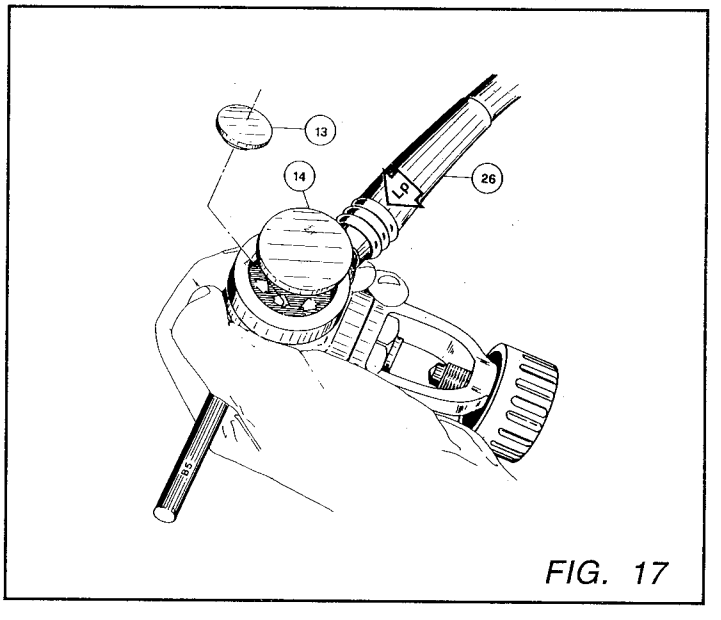


FIG. 17

15. While introducing low pressure air (below 100 psi) through the second stage hose, remove diaphragm (14) and poppet button (13) (Fig. 17).
16. Remove the first stage cover (81) and o-ring (71) from the first stage body using hex wrench (B3).
17. Remove o-ring (71) from first stage cover.
18. Remove second stage hose (26) using wrench (B17).

## ⚠ WARNING

**DO NOT ATTEMPT TO REMOVE THE DIAPHRAGM WITH ANY SHARP TOOLS. SCRATCHING OF THE DIAPHRAGM SEATING SURFACE COULD CAUSE LEAKAGE. THE USE OF HIGH PRESSURE AIR (OVER 100 PSI) COULD CAUSE PARTS TO BE EXPELLED FROM THE REGULATOR. ALWAYS POINT THE REGULATOR AWAY FROM YOURSELF OR ANYONE ELSE WHILE REMOVING THE DIAPHRAGM WITH PRESSURIZED AIR.**

19. Remove yoke retainer nut (7) with wrench (B1) then remove yoke (3) and yoke knob (25) (Fig. 18).
20. Remove o-ring (71) from yoke retainer nut.
21. Remove filter retaining ring (2) with snap ring pliers (Fig. 19).
22. Lift out sintered filter (22) and filter spring (61).
23. Remove disassembly tool (B5) from LP port.
24. Remove low (20) and high pressure (53) port plugs. Remove o-rings (19) and (52).

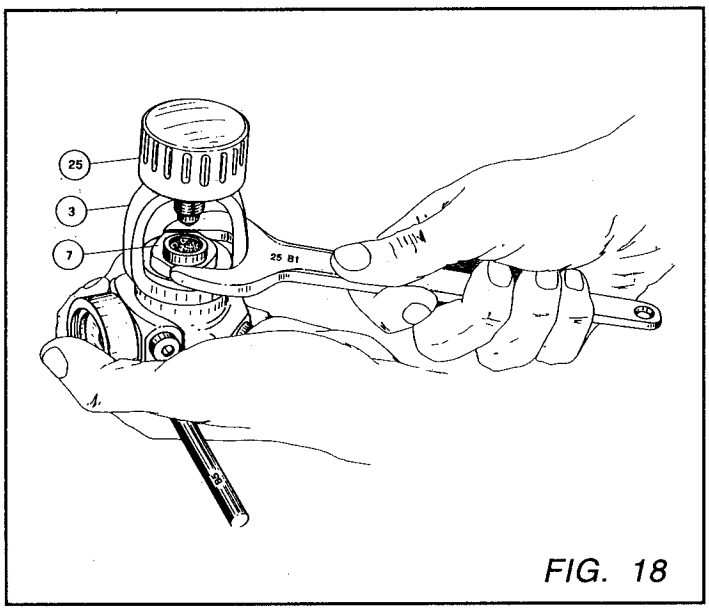



FIG. 18

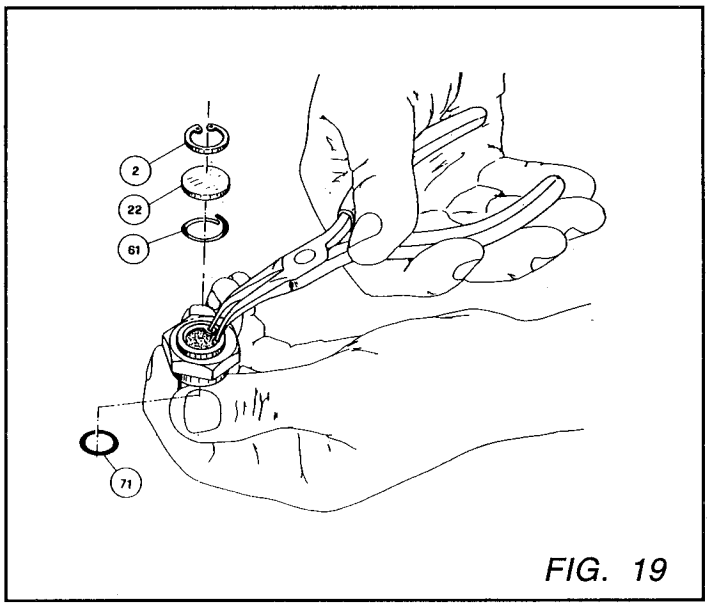



FIG. 19

- **Cleaning**

Cleaning requires all reusable rubber and plastic parts to be carefully cleaned by scrubbing with a soft brush in a mild detergent and water solution. Do not use solvents or acids on rubber or plastic parts. Metal parts should be cleaned in an ultrasonic cleaner with fresh water or a mild acid solution. (White vinegar diluted with warm water is recommended). Before reassembly make sure all parts have been carefully rinsed and dried.

## ⚠ WARNING

**CLEANING. DO NOT SOAK FIRST STAGE PORPET AND SINTERED FILTER IN ACID OR AN ULTRASONIC CLEANER. THIS MAY LEAD TO REGULATOR FAILURE RESULTING IN SERIOUS INJURY OR DEATH.**

## ⚠ WARNING

**PROTECT EYES AND SKIN ADEQUATELY WHEN WORKING WITH ANY KIND OF ACID. BEFORE CLEANING METAL PARTS, MAKE SURE THAT ALL RUBBER AND PLASTIC PARTS HAVE BEEN REMOVED. ACIDS OR OTHER SOLVENTS MAY DAMAGE RUBBER AND PLASTIC PARTS.**

## • INSPECTION

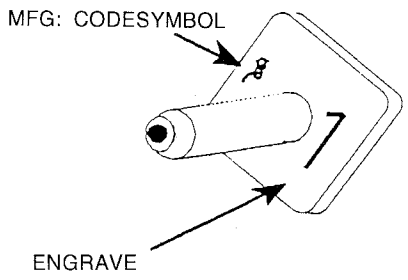
The following first stage components should be replaced during routine service.

| Description | Part Number | |
|---|---|---|
| Retaining ring | 185015 | |
| Filter | 185014 | |
| Poppet | 185002 | **(REPLACEMENT RECOMMENDED EVERY TWO YEARS OR EVERY 200 DIVING HOURS AT LEAST)** |
| O-ring LP ports | 110106 | |
| O-ring DFC port | 110215 | |
| O-ring HP ports | 110108 | |
| O-ring first stage cover | 110211 | |
| O-ring yoke retainer nut | 110211 | |
| O-ring poppet seat | 110107 | |
| O-ring poppet retainer | 110101 | |
| Backup ring | 185038 | |

### IMPORTANT! HIGH PRESSURE POPPET MARKING

With the introduction of the new "200 hour" Nickel-Plated high pressure poppet there may not be the need to replace this part during the service. Simple inspection, cleaning and reassembly is all that is required. There is a need however to indicate that the poppet has gone through an inspection as an aid for the repairman performing the next service. To indicate that a poppet has been through one service, use a dental pick or metal scribe on the back (stem) side of the poppet to inscribe a "1". If you encounter a "1" during service of a Mares regulator with a new poppet you will know that it has been through a service previously and therefore should be replaced.

FIGURE 1




If the following parts are not replaced, they should be inspected with a jewler's loop for the flaws listed below. Replace any part with these flaws.

*Poppet:* Inspect for cuts, nicks, rubber abrasion and separation of rubber from metal. Make sure that the hole through the poppet stem is open and not clogged with foreign matter.

*Poppet seat:* Inspect the tapered surface of the seat for any chipping and/or deep scratches. If the poppet seat is damaged replace it.

**NOTE**

**A SLIGHTLY ABRASIVE RUBBER (SUCH AS A CLEAN PENCIL ERASER) MAY BE USED TO CLEAN THE SEAT**

: for any entrapped foreign matter.
that it is properly positioned within the poppet retainer. Inspect its surface for
tion.

*Poppet retainer:* Inspect
*Backup ring:* Make sure
cuts or contamina

**NOTE**

**E BACKUP RING SHOULD ALWAYS BE REPLACED.**

**AFTER REMOVAL THI**

*Filter:* Inspect for sedimentation and rust. Rust deposits may indicate a deteriorated diving cylinder.
*Retaining ring:* Inspect for any distortion, cracks or damaged edges.

**NOTE**

**THE FILTER RETAINING RING SHOULD BE REPLACED EVERY TIME IT IS REMOVED FROM THE FIRST STAGE.**

*First stage diaphragm:* Inspect for cracking, brittleness and tears.
*Springs:* Inspect for cracking or broken coils.
*O-rings:* Inspect for cuts, tears, flat spots or contamination. The presence of any of these flaws may cause leakage.
*First stage body:* Inspect the depressor in the DFC port. Make sure that it is properly positioned and not deformed.
*O-ring seats:* Inspect all surfaces in contact with o-rings and other seals for chipping, scratches, deteriorated plating or contamination.

## • Reassembly

Before reassembly, lightly lubricate all o-rings with silicone grease (General Electric, Versalube G-322 or equivalent). Lubricating the o-rings before reassembly will minimize the risk of damage during reassembly.

1. Place o-ring (74) on poppet seat (75).
2. Place poppet seat onto tool (B21).

**NOTE**

**MAKE SURE THE TAPERED SURFACE OF THE POPPET SEAT IS FACING TOWARDS TOOL (B21).**

3. Using light pressure, press the poppet seat into position in the first stage body (Fig 20).
4. Insert poppet (9) into first stage body.
5. Place the poppet spring (8) over the poppet stem.

(4).

spring.

stage cover.

6. nsert new backup ring (5) into poppet retainer
7. Insert o-ring (6) into poppet retainer (4).
8. Place poppet retainer (4-5-6) in position over s
9. Place o-ring (71) on first stage cover (81).
10. Press locking head (80) into spring (76).
11. Insert the locking head and spring in the first

**OTE**

**EN END OF THE FIRST STAGE COVER. A SMALL NG HEAD AND SPRING INTO THE FIRST STAGE I**

**NO**

**THE LOCKING HEAD MUST BE FACING THE OP PLASTIC ROD CAN BE USED TO PRESS THE LOCKI COVER (FIG 21).**

nch (B3).
le in the first stage body.
n and depress it a few times to ensure that the

8" LP port.

12. Install first stage cover and tighten with hex wre
13. Insert the poppet pin (12) through the center ho
14. Place the poppet button (13) over the poppet pi poppet will move freely.
15. Install first stage diaphragm (14).
16. Insert first stage disassembly tool (B5) into a 3/
17. Place spring base plate (15) on diaphragm.
18. Place shock ring (69) onto retaining nut (17).

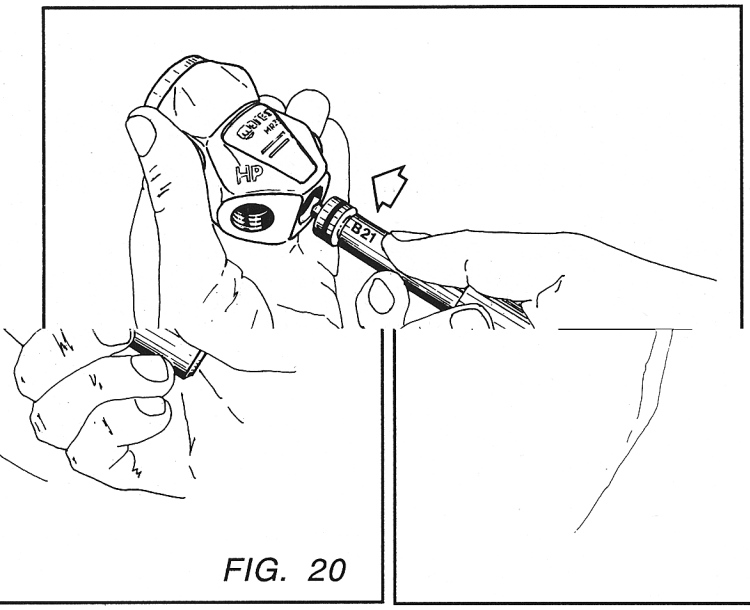



FIG. 20

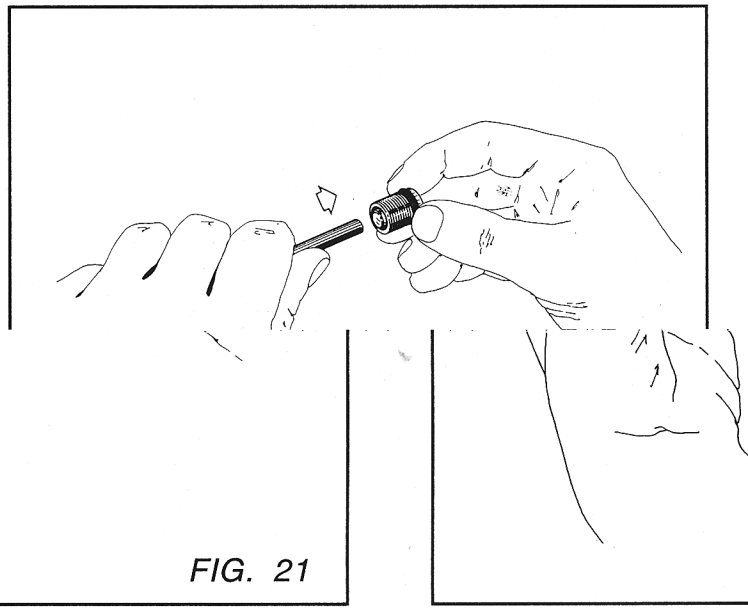


FIG. 21

sealing edge of retaining nut (17) and tighten into the first stage body until snug N/m.).

e base of the diaphragm spring (16) then place it on the base plate.

g nut (18) over the diaphragm spring. Using tool (B13) tighten regulating nut 2-3

**NOTE**

**HTEN REGULATING NUT. THIS WILL CAUSE INTERMEDIATE PRESSURE TO RFERE WITH LATER ADJUSTMENTS.**

yoke retainer nut (7).

1) into yoke retainer nut.

filter (22) onto the filter spring.

ning ring (2) with snap ring pliers and position the ring over the sintered filter.

red filter until the snap ring fits into the groove in the yoke retainer nut.

**NOTE**

19. Lightly lubricate the (19-22 Ft/lb. 25-30
20. Lightly lubricate the
21. Place the regulating turns.

**DO NOT OVER TIGI INCREASE AND INTE**

22. Place o-ring (71) on
23. Place filter spring (6
24. Place the sintered
25. Compress the retai Depress the sinte

## • Adjusting intermediate pressure

**DANGER**

**EXPLOSION HAZARD**

**DO NOT CONNECT THE INTERMEDIATE PRESSURE GAUGE TO THE HIGH PRESSURE PORT OF THE FIRST STAGE. CONNECTING THE INTERMEDIATE PRESSURE GAUGE TO THE HIGH PRESSURE PORT OF THE FIRST STAGE WILL CAUSE THE HOSE AND/OR INTERMEDIATE PRESSURE GAUGE TO EXPLODE AND COULD RESULT IN SERIOUS PERSONAL INJURY OR DEATH.**

2. Connect the second stage with the purge cover and diaphragm removed.
3. Attach the first stage to a full tank (2000-3000 psi Fig. 22).

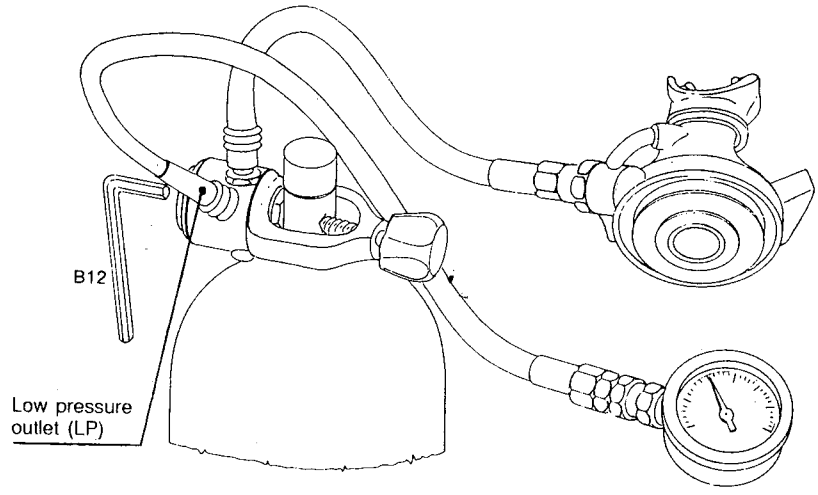



*FIG. 22*

4. Depress the second stage demand lever while slowly opening the tank valve. When air begins to flow from the second stage slowly release the demand lever and fully open the tank valve.

5. Read the intermediate pressure indicated by the gauge. Intermediate pressure specification for the MR 22 Abyss is 142-148 psi.

**NOTE**

**IF THE REGULATOR IS TO BE USED FOR COLD WATER DIVING (BELOW 47 F) OR IS EQUIPPED WITH A CWD KIT, REFER TO THE COLD WATER DIVING KIT SECTION OF THIS MANUAL FOR INSTALLATION/SERVICING OF THE CWD KIT AND INTERMEDIATE PRESSURE SPECIFICATIONS.**

a. If the intermediate pressure is greater than necessary, slightly loosen the regulating nut, using tool (B13), until the desired value is obtained.

**NOTE**

**WHENEVER INTERMEDIATE PRESSURE IS DECREASED, EXCESS AIR MUST BE EXHAUSTED BY DEPRESSING THE SECOND STAGE DEMAND LEVER TO OBTAIN THE CORRECT READING.**

b. If the intermediate pressure is lower than necessary, slightly tighten the regulating nut until the desired value is obtained.

6. Depress the second stage demand lever a few times to make sure that the intermediate pressure remains constant.
7. After first stage adjustment, depressurize the regulator and remove the intermediate pressure gauge and screw in the appropriate port plug.

**NOTE**

**DO NOT SUBMERGE THE INTERMEDIATE PRESSURE GAUGE. SUBMERGING THE INTERMEDIATE PRESSURE GAUGE MAY AFFECT GAUGE ACCURACY AND/OR DAMAGE THE GAUGE.**

- **Cold water diving kit (CWD)**

For use in cold water diving (below 47 F) we recommend that a Cold Water Diving Kit (CWD) be installed. The assembly of this kit must be preformed by a Mares authorized service center.

**WARNING**

**DIVING IN COLD WATER (BELOW 47 F) WITHOUT PROPER TRAINING CAN CAUSE SERIO INJURY. BEFORE DIVING IN COLD WATER SPECIAL TRAINING FROM A CERTIFIED INSTRUCT SHOULD BE OBTAINED.**
**ANY SCUBA DIVING REGULATOR, EVEN THOSE EQUIPPED WITH A CWD KIT CAN UNDER "FREEZE-UP" PHENOMENA. "FREEZE-UP" OF A REGULATOR IS DETRIMENTAL TO T EFFICIENCY OF A REGULATOR AND CAN CAUSE THEM TO FAIL, THUS INTERRUPTING A DELIVERY TO THE DIVER. THIS MAY CAUSE SERIOUS INJURY OR DEATH. TO MINIMIZE SU RISKS, DIVERS SHOULD BE PROPERLY TRAINED TO PREVENT OR BE ABLE TO COPE WI A REGULATOR AFFECTED BY "FREEZE-UP" PHENOMENA.**

## CWD

### MR REGULATOR PROTECTION KIT FOR COLD WATER DIVING

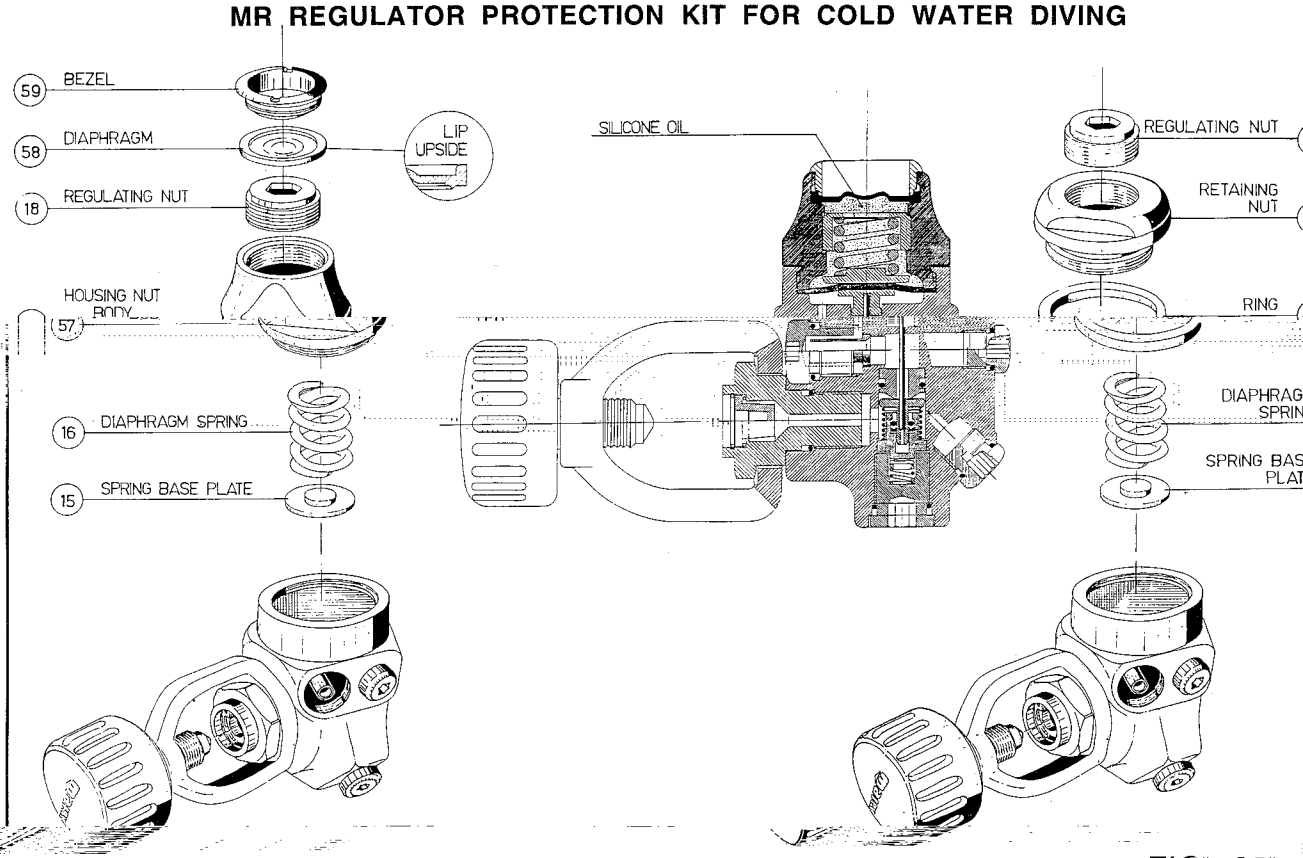



FIG. 23

## ☐ MR 22 CWD INSTALLATION

1. Insert the disassembling tool for the first stage (B5) into a LP port.
2. Remove regulating nut (18) with hex wrench (B13) and remove diaphragm spring (16) (Fig. 15).
3. Remove retaining nut (17) and shock ring (69) with wrench (B16) then remove spring base plate (15) (Fig. 16).
4. If the CWD kit is not being installed on a newly serviced first stage. Clean the first stage diaphragm with a damp cloth and wipe dry. Clean the diaphragm spring and spring base plate as described in the cleaning section of this manual.
5. Lubricate both sides of the spring base plate with the silicone oil provided in the CWD kit then place spring base plate (15) on diaphragm.
6. Lightly lubricate the sealing edge of retaining nut (17) with the silicone oil provided in the CWD kit and tighten into the first stage body until snug (Approx. 25 Ft/lb. 34 N/m.).
7. Lubricate the diaphragm spring (16) with the silicone oil provided in the CWD kit then place it on the base plate.
8. Place the regulating nut (18) over the diaphragm spring. Using tool (B13) tighten regulating nut until it is just below the inside shoulder of the retaining nut.
9. Remove the disassembling tool for the first stage (B5) from the LP port and install port plug.
10. Remove the second stage purge cover.

    a. Slide the second stage hose protector towards the hose until the clamp ring screw is exposed.
    b. Remove clamp ring screw.
    c. Expand the clamp ring until it will slide over the flange of the second stage body.
    d. Remove the second stage purge cover, diaphragm and clamp ring.

11. Connect an intermediate pressure gauge to a LP port on the first stage

⚠ DANGER

**EXPLOSION HAZARD**
**ECT THE INTERMEDIATE PRESSURE GAUGE TO THE HIGH PRESSURE PORT**
**T STAGE. CONNECTING THE INTERMEDIATE PRESSURE GAUGE TO THE HIGH**
**ORT OF THE FIRST STAGE WILL CAUSE THE HOSE AND/OR INTERMEDIATE**
**UGE TO EXPLODE AND COULD RESULT IN SERIOUS PERSONAL INJURY OR**

**DO NOT CONN**
**OF THE FIRST**
**PRESSURE PO**
**PRESSURE GA**
**DEATH.**

: stage to a full tank (2600-3000 psi Fig 22).
econd stage demand lever while slowly opening the tank valve. When air begins to
second stage slowly release the demand lever and fully open the tank valve.
mediate pressure indicated by the gauge. Intermediate pressure for the MR 22 Abyss
si.

termediate pressure is greater than specified, slightly loosen the regulating nut, using
3), until the desired value is obtained.

12. Attach the first
13. Depress the se
    flow from the
14. Read the interm
    is 128-132 p

    a. If the in
    tool (B1

NOTE

**EXHAUSTED BY**
**ADING.**

**WHENEVER INTERMEDIATE PRESSURE IS DECREASED, EXCESS AIR MUST BE**
**DEPRESSING THE SECOND STAGE DEMAND LEVER TO OBTAIN THE CORRECT REA**

egulating nut until
rmediate pressure
ever height gauge
ever height gauge

    b. If the intermediate pressure is lower than specified, slightly tighten the
    the desired value is obtained.
15. Depress the second stage demand lever a few times to make sure that the inte
    remains constant.
16. Adjust demand lever height using the demand lever height gauge. The demand
    sides are marked with the second stage model. Place the side of the demand
    marked with the corresponding model across the second stage case (Fig 24).

a. If the demand lever height is too low, tighten the demand lever lock nut until the demand lever contacts the lower edge of the gauge.
b. If the demand lever height is too high, loosen the demand lever lock nut until the demand lever contacts the lower edge of the gauge.

**C-SHAPED GAUGE FOR DEMAND LEVER HEIGHT INSPECTION**

For the correct adjustment stand the gauge on the Second Stage case and adjust lever height until it makes contact with the gauge.

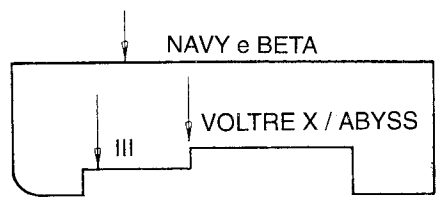
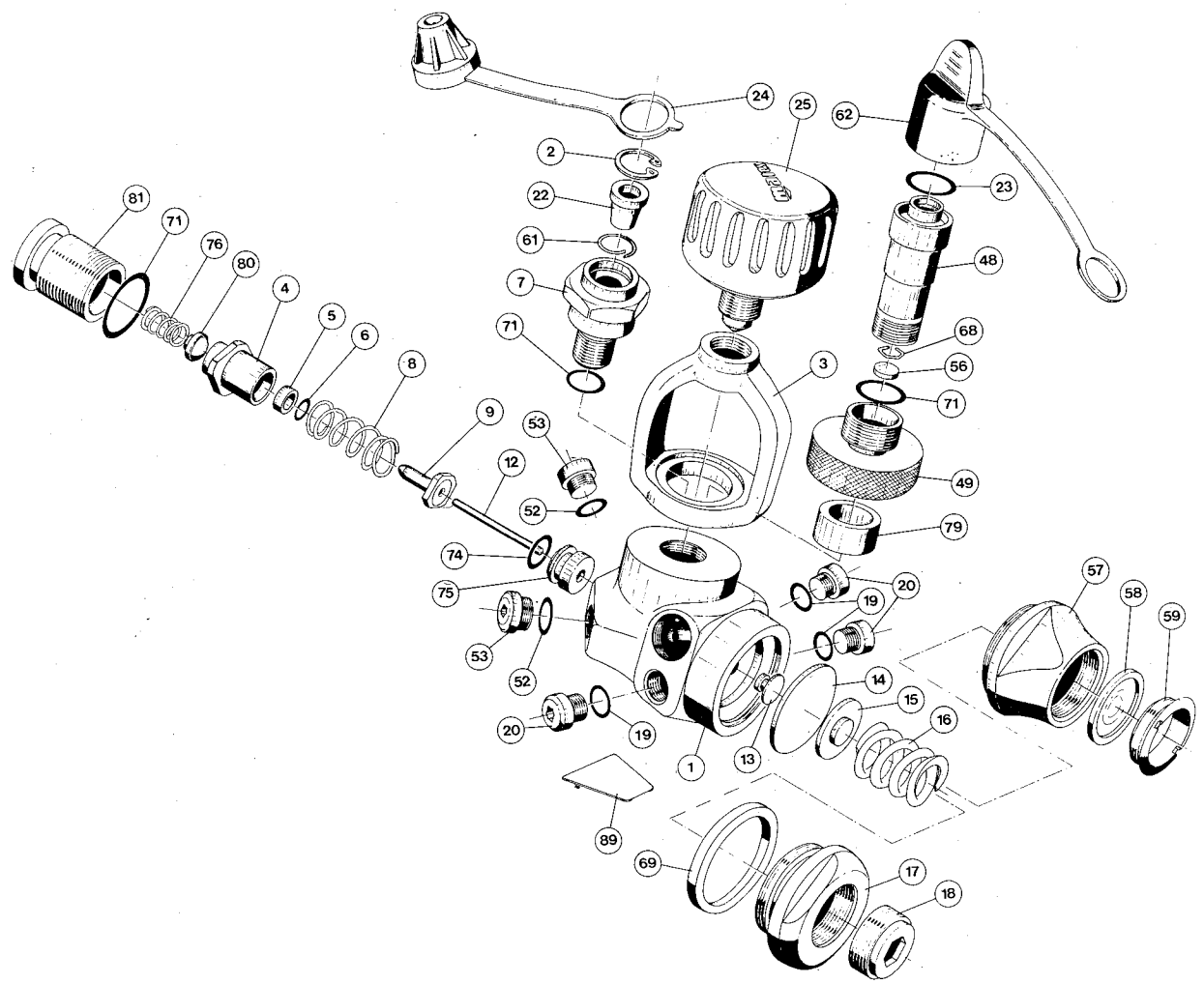



*FIG. 24*

17. Install the second stage purge cover

# FIRST STAGE MR 22 - DFC Dynamic Flow Control




| Ref. | Part. | Description |
|---|---|---|
| 1 | 186203 | Body |
| 2 | 185015 | Retaining ring Ø 13 |
| 3 | 185208 | Yoke |
| 4 | 185209 | Poppet retainer |
| 5 | 185038 | Back up ring |
| 6 | 110101 | O-Ring 2012 |
| 7 | 186205 | Yoke nut |
| 8 | 185011 | Spring, poppet |
| 9 | 185002 | Poppet |
| 12 | 186214 | Pin, poppet |
| 13 | 186213 | Button poppet |
| 14 | 185022 | Diaphragm |
| 15 | 185034 | Plate, spring base |
| 16 | 185023 | Spring, diaphragm |
| 17 | 186219 | Retaining nut |
| 18 | 185028 | Regulating nut |
| 19 | 110106 | O-Ring 106 |
| 20 | 185204 | Plug LP 3/8" |
| 22 | 185014 | Filter |
| 23 | 110117 | O-ring 115 |
| 24 | 185009 | Dust cup |
| 25 | 184076 | Knob |
| 48 | 183050 | DIN connector - 200 BAR |
| 48 | 183049 | DIN connector - 300 BAR |
| 49 | 183006 | DIN connector wheel - 200 BAR |
| 49 | 183001 | DIN connector wheel - 300 BAR |
| 52 | 110108 | O-ring 108 |
| 53 | 185205 | Plug HP 7/16" |
| 56 | 183053 | Filter for DIN connector 0 9 |
| 57 | 185300 | Body (CWD) |
| 58 | 185301 | Diaphragm (CWD) |
| 59 | 185302 | Bezel (CWD) |
| 61 | 185013 | Spring, filter |

| Ref | Part | Description |
|---|---|---|
| 62 | 183015 | Cap, DIN connector |
| 68 | 183052 | Spring, DIN connector Ø 12 |
| 69 | 186218 | Ring |
| 71 | 110211 | O-Ring 2050 |
| 74 | 110107 | O-Ring 2031 |
| 75 | 186216 | Poppet seat |
| 76 | 186210 | Spring, first stage cover |
| 79 | 183051 | Spacer ring, DIN connector |
| 80 | 186206 | HP housing button |
| 81 | 186208 | First stage cover |
| 89 | 184311 | Label |
| | | ASSEMBLIES |
| A | 185983 | First stage MR 22 assy |
| A | 185984 | First stage MR 22 assy |
| A | 185988 | First stage MR 22 DIN assy |
| A | 185993 | First stage MR 22 CWD assy |
| A | 185998 | First stage MR 22 DIN/CWD assy |
| D | 185210 | Poppet retainer, complete (4-5-69) |
| F | 183025 | DIN connector 200 BAR assy (23-48-49-56-62-68-71-79) |
| F | 183030 | DIN connector 300 BAR assy (23-48-49-56-62-68-71-79) |
| I | 185332 | CWD Kit MR 22 |
| - | 185322 | Maintenance Kit (2-5-6-19-22-52-71-74) |
| | | ACCESSORIES |
| | 186207 | Plug 1/2 UNF |
| | 110215 | O-Ring 2043 |