

**mares**<sup>®</sup>

MANUALE D'ISTRUZIONI

USER'S GUIDE

BEDIENUNGSANLEITUNG

MANUEL D'UTILISATION

MANUAL DE INSTRUCCIONES

MANUAL DE INSTRUÇÕES

GEBRUIKERSHANDLEIDING

ANVÄNDARINSTRUKTIONER

ΟΔΗΓΙΕΣ ΧΡΗΣΗΣ

KÄYTTÄJÄN OPAS

INSTRUKCJA UŻYTKOWANIA

FELHASZNÁLÓI ÚTMUTATÓ

published in cooperation with MARES S.p.A. by

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**Airtrim Line**

# Buoyancy Compensator

AIRTRIMLINE

## WARNING

CAREFULLY READ THIS INSTRUCTION MANUAL BEFORE USE, AND KEEP IT FOR FUTURE REFERENCE.

## INTRODUCTION

Congratulations. You have purchased one of the finest, most dependable B/Cs available in the world today. The end result of years of "evolutioneering", your MARES B/C uses processes and materials that are the result of thousands of hours of research. This means reliability, a feature that's in high demand and found in EVERY MARES product.

This manual is intended as a guide for skilled technicians and not as an instruction book for beginners. It does not include every aspect of diving equipment repair. Technical training courses are offered periodically by MARES and provide up-to-date information and description of repair techniques. Before attempting any repair, you are advised to receive specific practical training in repairing MARES diving equipment.

Read all sections of this manual carefully before attempting any repairs.

### Important:

Any critical information or warnings that might affect the performance or result in the injury or death of the technician, B/C owner, or other persons are highlighted with the following symbols:

## DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

## WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

## CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

MARES reserves the right to modify any products, processes and manufacturing techniques at any time. It is the technicians' responsibility to acquire the latest information and parts from MARES for service and repairs to be performed.

## IMPORTANT:

Should any warnings or information contained in this manual be unclear or not fully understood, please contact MARES before using a MARES B/C or performing any repairs.

## WARNING

Carefully follow these and all the other instructions concerning your MARES B/C and all other SCUBA equipment. Failure to do so could lead to serious injury or death.

## WARNING

As with all SCUBA equipment, MARES B/Cs are designed to be used by trained, certified divers only. Failure to fully understand the risks of using such equipment may result in serious injury or death. DO NOT use this B/C or any SCUBA equipment unless you are a trained, qualified SCUBA diver.

## EN 250: 2000 CERTIFIED B/C

The PPE described in this instruction manual has been subjected to type approval testing and certified in accordance with the EN 250: 2000 standards (D.e. 89/686/EEC category III, as harness for SCUBA) and EN 1809 (D.e. 89/686/CEE category II, as buoyancy compensator) by Registered Test Center n° 0474 RINA, Via Corsica 12, 16128 GENOVA.

Model	EN 250: 2000	EN 1809	Marking
Dragon AT	0474	0474	CE0426
Vector 1000 AT	0474	0474	CE0426
Vector Chrome AT	0474	0474	CE0426

The number 0426 next to the CE mark refers to Registered Test Center n° 0426 ITALCERT, V.le Sarca, 336 - 20126 MILAN, authorized to run production checks according to art. 11.B D.e. 89/686/EEC only as regards products classified in category III (harness for SCUBA)".

## REFERENCES TO EN 250: 2000

### OBJECT - DEFINITIONS - LIMITS

- **Object:** The requirements and tests provided for in EN 250: 2000 are aimed at providing a minimum safety level for the operating of diving breathing apparatuses at a maximum depth of 50 m / 162 feet.
- **Scuba - Definition (EN 132):** Self-contained, open-circuit compressed air underwater breathing apparatus in an apparatus which has a portable supply of compressed air carried by the diver, allowing him to breathe underwater.
- **Scuba - Minimum equipment (EN 250: 2000):**
  - a) Air cylinder / cylinders.
  - b) Demand regulator.
  - c) Safety device, e.g. pressure gauge / computer or reserve or alarm.
  - d) Carrying frame or holding device for air cylinder(s) to mount the harness, or carrying system, e.g. backpack and/or straps, B/C harness.
  - e) Facepiece: mouthpiece assembly or full face mask or diving helmet.
  - f) Operating instructions.
- **Limits (EN 250: 2000) -** Maximum depth: 50 m / 162 feet.
- **SCUBA - Component units (EN 250: 2000):** The SCUBA equipment may consist of separate component units such as cylinders, regulator and pressure gauge. The MARES B/Cs described in this manual may be used with any SCUBA components certified in compliance with EC directive 89/686. The air contained in the cylinders must comply with the requirements for breathable air set forth in EN 12021.

## REFERENCES TO EN 1809

### OBJECTS - DEFINITIONS - LIMITS

- **Object:** The EN 1809 directive examines the minimum safety requirements and the performance of inflatable buoyancy compensator vests.
- **Buoyancy Compensator Vest - Definition (EN 1809):** A device allowing the diver to control his/her buoyancy during the dive.
- **Limits:** The object of the EN 1809 Standard does not cover the requirements for floating devices or safety jackets. A buoyancy compensator vest is not intended to guarantee, on the surface, a head-up position to an unconscious or a temporarily disabled diver.

### WARNING

Read this manual carefully. The improper use of any diving equipment can result in serious injury or death. SCUBA diving equipment should be used by certified divers only. Professional training should be obtained exclusively from a certified instructor. For your protection, your equipment should be serviced by MARES or a MARES AUTHORIZED SERVICE CENTER.

The BCs described in this manual have been tested and certified for temperatures between -20°C and +60°C.

The following warning label is stitched on the BC.

### IMPORTANT

Read the instructions carefully. The BC is not a life vest; it does not guarantee a head-up position of the diver on the surface. If the instruction manual is lost, it can be re-ordered from your MARES dealer.

Before use, check for any air leaks and make sure all the components of the BC are working correctly. Connect the LP hoses to a Low Pressure port of the 1st stage BEFORE connecting the regulator to the tank.

After use, rinse the inside and outside of the BC thoroughly with fresh water. This operation is particularly important after use in a swimming pool. Inadequate maintenance may result in damage to the BC or impair its operation. Inflate the BC slightly before storing.

Do not remove this label for any reason.

## TECHNICAL SPECIFICATIONS

Technical characteristics	DRAGON AT	VECTOR 1000 AT	VECTOR CHROME AT
Type	Dragon AT	Classic Aircell	Classic Aircell
Inflator	Air trim	Air trim	Air trim
Sealing	High frequency	High frequency	High frequency
Buoyancy bag material	Nylon 420/ Nylon 420	Nylon 420/ Nylon 420	Duroskin/ Nylon 420
Backpack	Vector	Vector	Vector
Maximum tank size	Single-tank set: Min/Max diameter 14.1/21.5 cm Max. Vol. 20 lt.	Single-tank set: Min/Max diameter 14.1/21.5 cm Max. Vol. 20 lt.	Single-tank set: Min/Max diameter 14.1/21.5 cm Max. Vol. 20 lt.
Weight (size L)	3.8 kg	3.9 kg	3.5 kg
M.R.S.	-	X (optional)	NO
M.R.S. Plus	X	-	-
Twin exhaust valves	2	2	1
Hand-operated valves	1	1	2

## SIZE TABLE

MODEL	SIZE	HEIGHT	WEIGHT	WAIST CIRCUMFERENCE	CHEST CIRCUMFERENCE	LIFT IN N
DRAGON AT	XS	<165	<55	70-90	<95	162
	S	165-175	50-70	75-95	85-105	162
	M	165-180	60-80	90-115	95-115	182
	L	170-185	70-90	100-120	105-120	196
	XL	>180	>80	110-140	>120	240
VECTOR 1000 AT	XS	<165	<55	<95	70-94	70
	S	165-180	50-70	85-105	70-94	90
	M	165-180	60-80	95-115	85-112	120
	L	170-185	70-90	105-120	96-121	140
	XL	>180	>80	>110	108-136	160
VECTOR CHROME AT	XS	<165	<55	<95	70-94	70
	S	160-175	50-70	85-105	70-94	90
	M	165-180	60-80	95-115	85-112	120
	L	170-185	70-90	105-120	96-121	140
	XL	>180	>80	>110	108-136	160

## AIRTRIM

The BC inflator provides an exceptional new solution for controlling the inflow and outflow of air.

Its innovative mechanism completely revolutionizes the ergonomics of using an inflator underwater.

In fact, on traditional BCs the inflator must be secured within easy reach by a retainer- but this does not always take place, making the inflator difficult to use.

The innermost end of the group is fitted with a quick coupling which can be manually detached in the event of a malfunction, to immediately shut off the flow of air.

## EXHAUST VALVES

The BC deflation button actuates an innovative "Twin Exhaust Valve System". These valves release air simultaneously, regardless of the diver's underwater swimming position.

This makes it extremely easy to adjust the buoyancy.

This new sophisticated valve system overcomes the limitations of traditional inflators, which require a specific diver position to facilitate air discharge.

### WARNING

The "Twin Exhaust Valve System" allows the user to control the air discharge rate.

To obtain a quick air dump, press and hold down the "OUT" button. To obtain gradual deflation, press the "OUT" button lightly and repeatedly.

All models also feature at least one mechanical quick air dump valve, operated by a pull cord with a knob, that also functions as an over-expansion relief valve.

## BUOYANCY BAG

First quality fabrics with multilayer polyurethane coating, sealed at high frequency, in a variety of styles to meet the needs of every diver.

## SOFT GRIP

Neutrally buoyant padding specifically designed to provide unparalleled comfort and ensure maximum adherence between the wetsuit and the BC.

## B.P.S. (Back Protection System)

A neutrally buoyant padding system that is both rugged and secure, thanks to a combination of materials with different mechanical properties. The capacity to absorb shocks is greatly superior to that of ordinary protection materials. What's more, the contoured cut and the special design of the seams ensure exceptional adherence between the wetsuit and BC.

## M.R.S. (Mechanical Release System), PATENTED

The most modern integrated weight release system. Simple, reliable and easy to use even underwater. The weight compartment, which can hold any type of weight, is mechanically connected to the BC and always readily accessible. The oversized release button is easy to use, even when wearing thick neoprene gloves.

## M.R.S. PLUS

M.R.S. Plus represents the evolution of the first mechanical-release weight system introduced on the market. Incorporating a newly designed buckle system, simply click the buckle in place for optimum security, one pull movement to release your weights.

## MOUTH INFLATION SYSTEM

The oral inflation system is located inside the pocket, and consists of a small a silicone tube fitted with a check valve.

## MATERIALS

- 1500 denier Cordura®, with triple polyurethane resin coating, extremely resistant to abrasion.
- 840 D nylon, with triple polyurethane coating, highly resistant to abrasion.
- High impact YKK® technopolymer zips.
- YKK® Vetro.
- Stainless steel or technopolymer rings.
- Valves, buckles and rings constructed from high impact technopolymer, resistant to knocks and to aging.
- Shoulder straps with quick-release "thumbledge" buckles, which can be instantly adjusted using only the thumb, permitting easy, quick and precise fitting of the BC on different body types. The buckle adjustment straps are finished with pull-rings which ensure a secure grip, even when wearing thick neoprene gloves.
- Quick-release waist strap with two-side adjustment.
- Adjustable quick-release chest buckle keeps the shoulder straps in the correct natural position and prevents them from slipping.
- Double seam construction using 100% polyester thread, for maximum durability.
- Practical swivel hose retainers ensure safe and optimal positioning of the octopus and console (Fig. 1).

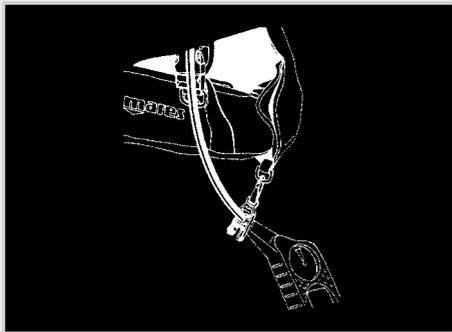


Fig. 1

- Dual-tone DIN safety whistle, unbreakable.

## INSTRUCTIONS FOR USE

Before using the B/C in open water conditions, carefully read the instructions for use provided in this manual, which can help ensure the life and safety of the equipment.

It is also recommended to try the B/C in a swimming pool first, donning full gear as for an open water dive, in order to become acquainted with this equipment which retains the shape and working principle of the traditional BC, but is used in a different way.

One recommended shallow water exercise, for example, is to practice controlling buoyancy while pivoting on the fins. This simple move helps the diver become familiar with the "IN - OUT" inflation and deflation buttons, experiencing their air flow rate and - most importantly - their ease of use.

The purpose of a B/C is to make diving easier by enabling the diver to maintain neutral buoyancy.

## M.R.S. - MECHANICAL RELEASE SYSTEM

### ASSEMBLING THE M.R.S. ON THE BC

- 1) Engage the locking pin in the base sewn on the BC (Fig. A). This can be done by inserting a tool (for example an Allen wrench or a small screwdriver) into the hole and turning through 90° until it is engaged.

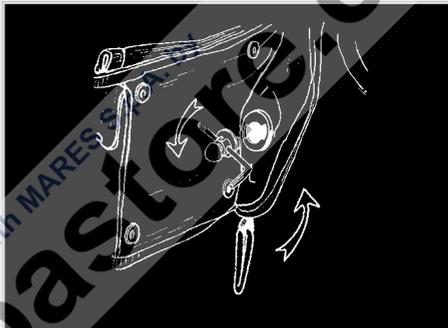


Fig. A

- 2) Place the desired weights (max 6 kg, 13 lb for each compartment) (Fig. B) inside the M.R.S. compartment. If only a small number of weights are being used, close the inner Velcro of the pocket, to prevent the weights from shifting during the dive. Close the outer Velcro flap.

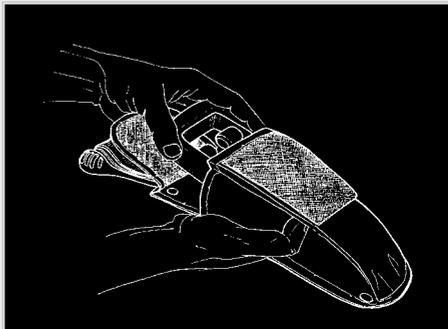


Fig. B

- 3) Place the M.R.S. compartment inside the special pocket in the BC, making sure that the fastener of slider A engages the seat B (Fig. C).

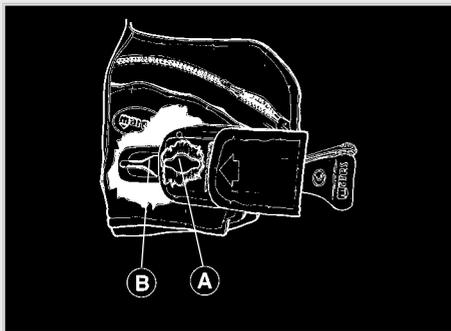


Fig. C

Press the release button C and (Fig. D) attach the handle to the locking pin. Release the button.

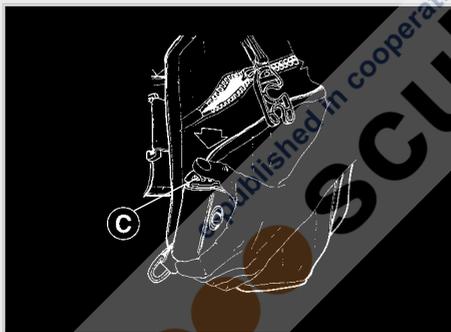


Fig. D

- 4) The system is ready for use.

### RELEASING THE M.R.S.

Press the release button C (Fig. D). Rotate the handle outward to release (Fig. E). Remove the M.R.S. (Fig. F).

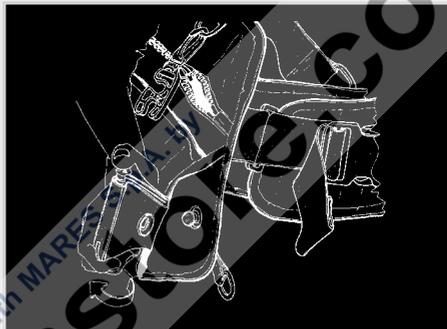


Fig. E

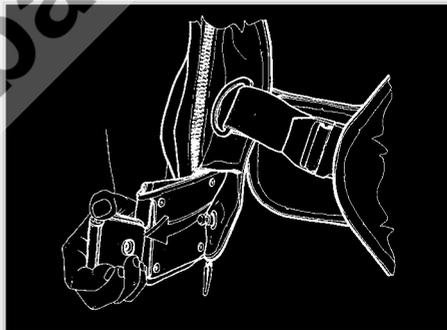


Fig. F

### **⚠ WARNING**

**MAKE SURE THAT THE SYSTEM IS CORRECTLY ASSEMBLED BEFORE STARTING THE DIVE.**

## M.R.S. PLUS

M.R.S. Plus represents the evolution of the first mechanical-release weight system introduced on the market. It introduces a newly-designed buckle system: simply click the buckle in place for optimum security, and a single outward pull releases your weights. Max load of 6 kg/13 lbs with most sizes. The interior is divided into multiple sections in the event you do not use the full capacity.

### ASSEMBLING THE INTEGRATED WEIGHT

Open the zipper and insert the desired quantity of weights, up to a maximum of 6 kg/13 lb in each container (Fig. 2).



FIG. 2

When using a limited quantity of weights, close the Velcro (A) inside the pocket to prevent the weights from shifting during the dive (Fig. 3). Close the zipper.



FIG. 3

### RELEASING THE M.R.S. PLUS FROM THE BC

Insert the M.R.S. Plus in the special housing inside the pocket of the deflated BC. Insert the male part of the buckle (A) of the M.R.S. Plus container into the female buckle (B) located inside the BC pocket, pressing until it clicks (Fig. 4).



FIG. 4

Make sure that the mechanism of the male buckle (A) is perfectly fastened to the female buckle (B) (Fig. 5).



FIG. 5

To release the M.R.S. Plus container from the BC, grasp the handle (C) of the M.R.S. Plus container (Fig. 6).



Fig. 6

Pull the handle (C) forward firmly to detach the male buckle (A) from the female buckle (B), and then pull out the whole container (Fig. 7).



Fig. 7

## POCKETS

The B/C pockets are of the bellows type for increased capacity and can be easily accessed with the opposite-side arm. Always remember to close the zip or the Velcro flap to avoid losing any objects contained in the pockets.

### WARNING

**USE OF BC POCKETS AS WEIGHT HOLDERS (TEARING POCKETS):** the pockets are not designed to hold excessive weight. They are intended exclusively to contain small objects. Inserting weights, stones, or sharp or pointed objects is considered improper use and will consequently invalidate the warranty that we offer.

## HIGH-VISIBILITY LOGOS

Silver-color bands and logos are attached on the B/C; they are made of a highly reflective material to provide good visibility even when visibility is low in typical dim underwater environments.

The reflective logos are located, anteriorly, on the shoulder straps (bands) and, at the back, on the bladder (MARES logos).

### CAUTION

Due to its highly technical properties, the reflecting material requires a special and difficult attachment procedure. Be careful, in particular, to avoid scratching your B/C against sand, rocks, stones etc.. MARES is not liable for partial or total detaching of these logos or parts thereof.

## ADJUSTING THE B/C

### CUSTOMIZING THE FIT

Before the B/C is used underwater, it must be adapted to the shape of the diver's body by making some adjustments.

If the cummerbund needs to be tightened or enlarged, remove it from both the left and right inner loops and then, using the adjusting strap with buckle, obtain the desired length by moving the Velcro-covered part backward or forward (Fig. 8).



Fig. 8

After completing the adjustment, replace the cummerbund inside its loops and check the resulting fit, taking into account the thickness of the wetsuit and ensuring that the two sides are exactly symmetrical.

The cummerbund is correctly adjusted when the Velcro flaps overlap each other at the center of the diver's waist.

After obtaining the desired girth, use the quick-adjusting shoulder straps on the left and right side to finish customizing the fit.

#### PRE-DIVE INSPECTION

- 1) Check that all fittings and valves are securely fastened and that the locking nuts are tightened.
- 2) Make sure that tank and backpack are properly connected (Fig. 9-10).

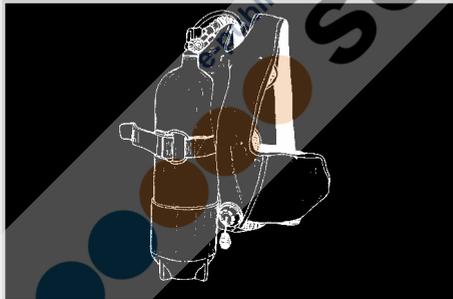


Fig. 9

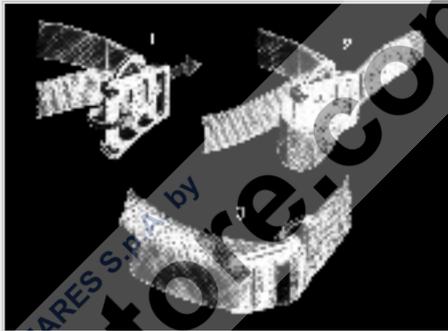


Fig. 10

- 3) Inflate the B/C and wait for approximately 15 minutes. If the B/C deflates at all, do not use it and bring it to a MARES Authorized Service Center for inspection.
- 4) Next, check the operation of the pneumatic inflation and deflation system by pressing the IN and OUT buttons.

Finally, check the oral inflation system using the silicone tube inside the pocket.

Fully extract the tube and blow into it to inflate the BC. Replace its cap and correctly reposition the tube inside the pocket.

#### **⚠ WARNING**

Your buoyancy compensator has been designed for use with the following tank sizes:

**Diameter:** Min. 14.1 cm. / 5.6 in. - Max. 21.5 cm. / 8.5 in.

**Volume:** Single tank set Max. 20 lt./4.4 gal. - Two-tank set Max. 2 x 10 lt./2.2 gal.

- 5) Operate the overpressure / rapid exhaust valve (Fig. 11) to be sure it is functioning properly.



Fig. 11

- 6) Do not leave the B/C in the sun and do not place or drag it on rough surfaces that might scrape or puncture it.

**⚠ WARNING**

WHEN USING A BC WITH INTEGRATED WEIGHTS, ALWAYS SECURE THE UNIT TO A LINE IF YOU ARE PLANNING TO PUT ON THE BC IN THE WATER. THIS IS BECAUSE, IN CERTAIN CASES, THE SCUBA UNIT CAN BE NEGATIVELY BUOYANT EVEN WITH THE BC FULLY INFLATED.

**⚠ WARNING**

Always soak the tank fastening straps before securing the B/C to the air tank. Failure to do so could allow the tank to slip out of the B/C strap, causing serious injury or death.

**⚠ WARNING**

Remember to fully extract the oral inflation tube before blowing inside.

**⚠ WARNING**

The rear pockets are sized to accommodate a maximum of 2 kg of weights each.  
Refer to your instructor for information about how to make the most of this feature.

## USING THE B/C UNDERWATER

To begin the descent, there is no need to raise your left arm as with traditional BCs: simply press the "OUT" button on the inflator unit, or operate one of the mechanical quick air dump valves by pulling its cord.

During the descent, compensate for the progressive loss of buoyancy by pressing the "IN" button with your thumb to inflate the BC.

## DURING THE ASCENT

To control the speed of ascent, it may be necessary to discharge some of the excess air.

Use the OUT button, pressing it briefly and repeatedly.

In the event of an excessively rapid ascent, a quick air dump can be obtained by holding down the OUT button.

**⚠ WARNING**

When ascending, your buoyancy must be controlled to avoid too rapid an ascent when approaching the surface. For information concerning a safe rate of ascent, refer to a certified diving instructor or your diving manual. Follow your decompression table or diving computer during the whole ascent. Failure to make a slow, controlled ascent could lead to serious injury or death.

**⚠ WARNING**

Do not use your B/C to lift objects in the water. Should you drop the object, you could become too buoyant and your rate of ascent could become too rapid and potentially dangerous and serious injury or death could result.

## ON THE SURFACE

After returning to the surface, inflate the BC to become positively buoyant.

**⚠ WARNING**

A B/C is not a safety jacket or personal floatation device and is not designed to keep the diver on the surface with head up should he/she become unconscious.

## END OF DIVE

Loosen the tank strap and remove the BC.

Completely discharge the air contained in the BC, by pulling one of the mechanical quick air dump valves.

Check that there is no water inside the BC.

### Discharge any water as follows:

- fully inflate the BC;
- position it to allow the water to flow into the front bag (Fig. 12);



FIG. 12

- turn the BC over so that the mechanical quick air dump valve is facing downward and discharge the water by pulling the valve cord (Fig. 13).



FIG. 13

Before storing the BC for prolonged periods, it is advisable to rinse the interior as follows:

- unscrew the rear mechanical quick air dump valve;
- fill the bag approximately a quarter full with fresh water through the valve opening;
- inflate the BC and shake it from side to side to circulate the water;
- allow the water to flow out through the valve opening;
- allow to dry completely.

## MAINTENANCE



**Do not use solvents or detergents for the cleaning and maintenance procedures. If any malfunctions or leaks are observed, always take the equipment to an authorized service center to avoid invalidating the product warranty.**

Proper maintenance will ensure long and trouble-free life to your B/C. For that reason, it is essential for you to follow the instructions listed below:

- 1) Avoid prolonged exposure to direct sunlight.
- 2) Do not leave any pointed or hard objects in or around the B/C.
- 3) Store the B/C only when completely dry. Store partially inflated in a cool, dry and dark place.
- 4) At the end of every open water or swimming pool dive, always rinse your B/C inside and out with fresh water.
- 5) Rinse thoroughly all hardware and accessories on the B/C.

## FREE-FLOW OF INFLATOR

In the event of the inflator unit free-flowing, the AIR TIM makes it possible to immediately shut off the air flow.

Place your right hand on the rear part of the inflator unit and release the quick coupling of the hose (Fig. 14).



FIG. 14

To inflate the BC, it will then be necessary to use the oral inflation system housed inside the pocket.

## USE OF THE BCS WITH OXYGEN RICH MIXTURES

### ⚠ WARNING

MARES buoyancy compensators are considered to conform to Directive 89/686/EEC when used with breathable air conforming to EN 12021/rev.1998.

The instructions for use are provided in the enclosed manual and refer to use of the BC with breathable air conforming to EN 12021/rev.1998 (oxygen content of  $21\pm 2\%$ ).

Because to date there are no regulations for verifying by means of adequate and meaningful tests, that the essential safety requirements prescribed by Directive 89/686/EEC have been met, this MARES BC is *not* to be considered EC Certified for use with oxygen rich mixtures ( $O_2 > 21\pm 2\%$ ) under Directive 89/686/EEC.

MARES supplies its authorized dealers with a kit for converting MARES BCs for use with oxygen rich mixtures (Nitrox - maximum oxygen content: 40%). If, after the conversion, the BC is used with normal compressed air, it will be necessary for a trained MARES technician to repeat the entire conversion procedure before using the BC with oxygen-rich mixtures again. This is because the BC may be contaminated with traces of hydrocarbons or other impurities which could spark combustion.

### ⚠ WARNING

MARES BCs are designed and constructed exclusively for use with compressed atmospheric air. Do not use this MARES BC with other gases or with oxygen-rich mixtures. Failure to observe this warning may result in premature wear of the equipment, defective operation or risk of explosion, resulting in potentially serious damage. The conversion of a MARES BC for use with oxygen-rich mixtures must be carried out exclusively by trained and qualified technicians who are perfectly familiar with all the cleaning and assembly procedures for high pressure oxygen systems (with oxygen content exceeding  $21\pm 2\%$ ).

### ⚠ DANGER

Do not use any MARES BC with oxygen rich mixtures (Nitrox - Maximum oxygen content: 40%) without having first received adequate training on their use; Failure to observe this warning may result in a serious accident.

WHEN REPAIR OR SERVICING IS REQUIRED, THIS SHOULD BE PERFORMED ONLY BY MARES OR BY A MARES AUTHORIZED SERVICE CENTER.

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