SOPRAS TEK

USER MANUAL

Introduction

Congratulations for the purchase of our SOPRAS TEK regulator. MERCURIO 1st St. together with VENERE 2nd St. (name of the MERCURIO ICE/VENERE ADJ) as well as PLUTONE 1st St. together with VENERE 2nd St. (name of the set PLUTONE ICE/VENERE ADJ) are both certified to 50 m (164 ft) in depth, as set forth in standard EN 250:2014 in accordance with EU regulation 2016/425 establishing marketing conditions and minimum essential safety requirements for Personal Protective Equipment (PPE) belonging to category III. For this reason our regulators bear the CE mark followed by the certifying agency identification number 2452 (identifying VTU - Vojenský technický ústav, s. p. Mladoboleslavská 944 Praha 9-Kbely 197 06, Czech Republic, that monitors its manufacturing pursuant to Form C2 of the EU 2016/425), the regulator serial number and the EN 250:2014 reference standard for PPE. Check the paragragh Marking and Abbreviations

Note: This is a SCUBA diving regulator used by divers only and is not supposed to be used for other purposes than underwater breathing to a maximum depth of 50 meters.

Main Components

Regulators serve to reduce the pressure of the compressed air contained in the cylinder to the same level as that in the environment, supplying breathable air when the diver needs it. Regulators are composed of a “1st stage”, working as the main pressure reducer to the so called I.P. (intermediate pressure), and a “2nd stage”, which adjusts the pressure precisely to the same value as that in the environment. Together with cylinder, valves and harness, the regulator is part of a complete underwater breathing system, known as “SCUBA” (Self Container Underwater Breathing Apparatus). This manuals describes our two regulators, composed by PLUTONE ICE or MERCURIO ICE as 1st stages coupled with VENERE ADJ as 2nd stage.

General Precautions & Warnings

▪ Before using this regulator, you must receive instruction and certification in SCUBA diving from a recognised training agency. Use of SCUBA equipment by uncertified or untrained persons is dangerous and can result in injury or death.

▪ This regulator is not configured for commercial use with surface supplied air.

▪ Always pressurize the regulator gradually by opening the cylinder valve SLOWLY.

▪ Unless instructed, NEVER apply any type of lubricant to any part of the regulator or cylinder valve.

▪ DO NOT apply any type of aerosol spray to the regulator. Doing so may cause permanent damage to certain plastic components, including the second stage housing.

▪ Factory prescribed service for this regulator must be performed at least once annually by a factory trained SOPRASTEK service technician who is employed by an authorised dealer. Disassembly, repair, or first stage adjustment must not be attempted by persons who are not factory trained and authorised by SOPRASTEK.

▪ DO NOT leave a cylinder standing unsecured with the regulator attached to the valve. Doing so may cause permanent damage to the regulator and cylinder valve if the cylinder falls over.

▪ DO NOT carry SCUBA equipment by the first stage when it is connected to a cylinder. Always carry the cylinder by the cylinder valve or an attached carrying device.

▪ Any equipment marked with the greater than 10° Celcius symbol; (> 10°C) is only suitable for water temperatures above 10°C or 50°F.

When configuring your regulator for use with emergency auxiliary Breathing systems (Octopus), the correct selection of equipment is required. Any equipment marked with EN250A is suitable for use with an octopus, however if SCUBA is configured for and used by more than one diver at the same time, then it shall not be used at depths greater than 30m and in water temperatures less than 10°C'.

1st Stages

MERCURIO ICE & PLUTONE ICE

PLUTONE ICE as well as MERCURIO ICE are balanced diaphragm first stages presenting a functioning mechanism arranged perpendicular to the air entry axis that thereby forms a "T" profile designed to guarantee perfect arrangement of the HP and LP hoses, avoiding interference with the equipment connected to the first stage. Both first stages provide outstanding respiratory performance, constant in any use condition, thanks to the compensated diaphragm mechanism that enables maximum respiratory comfort to be obtained during any dive phase, from the surface to maximum depths. In these first stages the flexible diaphragm protects and seals the mechanism inside the system and transmits pressure variations according to the water depth to the high pressure valve. In other words these regulators will give you a constant pressure regardless if you have full tanks or almost empty tanks or the depth you are at! Additionally the sealed environmental chamber will keep dry and protect the inside parts of the regulator from sand and dirt and will allow cold water diving to a minimum temperature of 4 degrees C (39 Fahrenheit). This helps prevent the creation of ice and also extends the life of the first stage membrane but will not completely prevent the second stage from icing. A transmission piston allows the outside pressure to be transferred on the membrane.
The EN 250: 2014 norm defines cold water anything under 10 degrees C and regulators certified for the use in cold waters are marked EN250A.

Please remember that the certification is 50m depth but recreational divers should not dive deeper than 40m.

SOPRASTEK regulators are supplied with NBR O-rings and all components are greased with appropriate oxygen compatible lubricants, which also protect from the corrosive sea water.

In EEC countries the regulators can only be used with air and for nitrox there is a need of a special connection M26x2 to avoid using the same regulator and tanks for nitrox and for air tanks.

As regards non EEC countries the maximum percentage of Oxygen is 40%. If it is your intention to

use your new Soprastek regulator with Nitrox EAN (O2 not to exceed 40%), it is imperative that you maintain the internal cleanliness of the regulator. If it is your intention to use the regulator interchangeably with breathing air, the breathing air should be oxygen-compatible or “hyperfiltered” where the condensed hydrocarbons do not exceed 0.1 mg/m3.

The pressure range for SOPRAS TEK second stages is 135-145 psi (9.2-10 bar) and using a 6mm HEX BIT SOCKET onto the SPRING ADJUSTER (15) the intermediate pressure can be adjusted.

! WARNING !

Intermediate pressure (I.P.) regulation should only be carried out by authorised SOPRASTEK centres and the calibration values CANNOT and MUST NOT be changed by the user, to avoid prejudicing the good working order of the regulator. We cannot be held in any way liable for any intervention carried out by staff unauthorised by SOPRASTEK.

Both models have 5 low pressure (LP) 3/8” ports and 2 high pressure (HP) 7/16” ports with a micrometric perforation for air release, ensuring maximum safety also in the event of accidental breakage of the high pressure hose, avoiding the risk of rapid tank emptying.

As for PLUTONE all LP ports are on the main body positioned and angled ideally for a single tank configuration as well as for Twin Tanks configuration. On MERCURIO LP ports are positioned around the turning head of the regulator making it adaptable to all needs from single tank, to Twin tanks but mainly making it the ideal regulator for Sidemount Diving.

2nd Stage - VENERE - ADJ

VENERE is a pneumatically balanced regulator that provides air on-demand, i.e. only when the

diver inhales through the mouthpiece, generating a slightly negative pressure inside the regulator. The diaphragm gets sucked back inside the casing and brings the central disc into contact with the new lever designed with revolutionary geometrics in order to enhance performance and drastically reduce friction. The lever is subsequently lowered and in doing so, opens the valve. VENERE is equipped with a pneumatically balanced piston with a hole of minimal diameter going through it lengthwise. The air from the first-stage comes through this hole and enters a small chamber (called the "balance chamber") positioned at the edge of the piston. The air contained in this chamber exercises a level of pressure which varies according to intermediate pressure and depth and pushes the closing piston towards the valve nozzle making it balanced and easy to breath regardless of the intermediate pressure and of the depth.
The ADJUSTING knob makes it possible to modify the inhalation effort thanks to the external metal knob, thus directly affecting inhalation resistance. In practice, screwing the external knob clockwise increases inhalation resistance whereas screwing it anticlockwise decreases inhalation resistance. This allows you to maintain peak performance throughout every dive, or to desensitise your regulator's opening effort at times when you are not breathing from it. Moreover a lever allows to "open" (+) or "close" (-) the regulator by changing the position of the deflector towards the diver's mouth or deflecting and stopping the Venturi effect. This switch allows the diver to control the venturi assist thereby reducing the sensitivity to free flow at the surface whilst the second stage is out of the mouth. Whilst diving the switch provides maximum airflow at depth.
To prevent the second stage from free-flowing, however, you should set the lever to the close (–) setting during entry or while swimming on the surface.

! WARNING !

This handbook does not replace a diving training course! All SOPRAS TEK devices must be used by divers who have attended regular courses taught by certified trainers. Using diving equipment without a licence or the necessary technical training may be dangerous for the diver's safety and can even be deadly. If you have any questions, or need more information, contact your SOPRAS TEK Scuba Sales Representative or SOPRAS TEK Customer Service. You can e-mail you technical questions to SOPRAS TEK'S mail box.

! WARNING !

It is important not to wet the regulator before use (it would then be exposed to an air temperature of potentially well under zero degrees). Do not use the purge button, particularly when the adjustable Venturi effect knob is in the "dive" position. If possible, keep the regulator in a warm environment before use

VENERE balanced second-stage regulators is connected to one of the 3/8" ports of the first-stage (MERCURIO or PLUTONE) via a new medium-pressure, high-capacity flexible hose in thermoplastic

SPECIFICATIONS

SOPRAS TEK COMPLETE REGULATORS MERCURIO/VENERE
AIR FLOW .....33 cu.ft.(935 liters)/min.@ 1 atmosphere
INHALATION RESISTANCE .....0.9" -2.0" (2.3 - 5.08 cm) w.c.@ 1 atmosphere (adjustable)
EXHALATION RESISTANCE .....0.6" (1.52 cm) w.c.max.@ 1 atm.
RECOMMENDED LUBRICANT LTI Christo-Lube MCG 111

SOPRAS TEK COMPLETE REGULATORS PLUTONE/VENERE
AIR FLOW ..... 33 cu.ft.(935 liters)/min.@ 1 atmosphere
INHALATION RESISTANCE ..... 0.9" -2.0" (2.3 - 5.08 cm) w.c.@ 1 atmosphere (adjustable)
EXHALATION RESISTANCE ..... 0.6" (1.52 cm) w.c.max.@ 1 atm.
RECOMMENDED LUBRICANT... LTI Christo-Lube MCG 111

SOPRAS TEK FIRST STAGE REGULATOR MERCURIO AND PLUTONE
TYPE ..... Balanced Diaphragm with or no - Dry Environmental Seal with Hydrostatic Transmitter
WEIGHT .....YOKE—(0.94 KG) DIN—(0.75 KG) for MERCURIO
YOKE—(0.98 KG) DIN—(0.80 KG) for PLUTONE
INTERSTAGE PRESSURE .....135-145 psi (9-10 bar)
LOW PRESSURE PORTS ..... 4 (3/8"-24 UNF)
HIGH PRESSURE PORTS ..... 2 (7/16"-20 UNF)
MATERIAL
Body -------- CDA-360 Brass,
O-rings ----- Viton

SOPRAS TEK 2nd stage VENERE

TYPE: Downstream valve, balanced diaphragm, Diver Adjustable Dive / Pre-Dive Venturi Lever and Resistance Control Knob
WEIGHT: 0.25 kg (w/o hose)
MATERIALS
Cover ---------- PU
Case ---------- ABS HI-IMPACT
Poppet Seat ----- SILICONE
O-rings ---------- VITON-N
Diaphragm ------- SILICONE
Exhaust Valve----- SILICONE
Mouthpiece ------ SILICONE

Torque Specifications:

Description	Item #	Torque
Hose outlet end		2-3 ft/lb (3-4 Nm)
Hose inlet end		2-3 ft/lb (3-4 Nm)

HANDLING TIPS

How your customers treat their regulators will directly influence the unit's function and durability. Following are a few tips that you can pass on to your customers to help assure the durability of their SOPRAS TEK Scuba Regulator.

PRE-DIVE CHECKS

Check the hoses and hose connections for cuts, abrasions or other signs of damage before mounting the regulator on the tank valve. Slide the hose protectors back to inspect the areas of the hose normally covered. Be sure all hose connections are tight.

Closely inspect the external sealing diaphragm for any signs of damage or deterioration that may cause leakage. Check to ensure that the retainer which holds the external diaphragm in place is tightly secured.

Just before mounting the regulator on the valve, always turn the valve on briefly to blow any trapped water out of the valve. There is often salty water trapped in the outlet side of the valve. This entrapped salt water being blown through the interior of the regulator is the number one source of internal corrosion and problems with Scuba regulators.

Before turning on the tank air valve, check to make sure that the yoke nut or DIN connection is tight and the regulator body is aligned properly, with no kinks in the hoses.

turn the inhalation control knob completely "out" (anticlockwise), and then back "in" (clockwise) until the regulator provides maximum ease of breathing with no leakage present.

Never lift the tank/BCD assembly by the regulator or hoses.

Surface-test the regulator by breathing lightly and deeply through the mouthpiece. The regulator must deliver enough air for you to breathe easily without noticeable resistance.

Check to ensure that the submersible pressure gauge is displaying an accurate measurement of the air pressure inside the cylinder.

Check to ensure that the Venturi lever is set to close (–) and gently turn the inhalation control knob completely "in" (clockwise), only until it stops. These settings will help to minimise any loss of your air supply during entry or while making a long surface swim. Adjustments can be made below the surface.

DURING DIVING

When you are ready to submerge, place the second stage in your mouth and set Venturi lever to open (+), then turn the inhalation control knob out (anti-clockwise) until the regulator breathes comfortably without leaking or being undesirably too sensitive.

As you descend, you may want to turn the inhalation control knob further out to make breathing easier. This will be particularly true on deep dives where the air density increases.

WARNING: Deep diving requires special training and equipment, and greatly increases your risk of decompression sickness and other serious diving injuries. If you attempt to dive beyond prescribed no-decompression limits without first obtaining sanctioned technical dive training, you risk serious injury and death.

COLD WATER DIVING

In water under 10°C (50°F) there is a risk of freeze-up; particularly in fresh water, which has a higher freezing point. Incidents of first or second stage freeze-up usually result in freeflow from the second stage, resulting in a rapid loss of air. Before attempting an unsupervised dive in cold water conditions, it is important for you and your buddy to obtain certified training in cold water diving techniques, and to use only equipment which has been specifically designed and maintained for such use. If these precautions are not taken, freeze-up can occur. Any equipment marked with the greater than 10°celcius symbol; (>10°C) are only suitable for water temperatures above 10°C or 50°F.

When diving in cold waters the following recommendations should be taken anyway:

1. The diver should be certified to dive in cold water diving
2. Protect the regulator from inside cold water before the dive and keep it in a warm dry place until just before the dive
3. Avoid breathing in cold air and pushing the purge button
4. As far as possible avoid consuming large amounts of air repeatedly inflating BCD or SMBs or dry suits or sharing air.
5. Make sure you dive with air satisfying the requirements of EN12021 and is free from excessive humidity
6. Avoid removing the regulator from your mouth during the dive. This will prevent cold water from entering the regulator's second stage.
7. As far as is possible, avoid heavy exertion during the dive in order to minimise the volume of air flowing through the regulator. Ensure the Venturi lever is set to OPEN (+) position while diving. Avoid discharges of air on the surface. Do not continually press the purge button.
8. Do not practice buddy breathing etc. Keep your regulator in your mouth . In an emergency offer or take a spare regulator.

NOTE: In order to undertake a dive in complete safety we recommend the use of two separate first stages.

POST-DIVE CARE

After the dive, blow all water out of the dust cap with clean dry air or dab the water out with an absorbent cloth and place the cap securely on the regulator inlet. On multiple tank dives, use great care to keep salt water out of the regulator inlet when tanks are changed. Neglecting these simple procedures is another great cause of corrosion and wear in Scuba regulators. Also make sure you open the valve to release a short burst of air and then immediately close the valve. This will clear any moisture that may have entered the valve opening. Immediately seal the protector cap.

With the dust cap securely in place, rinse the first and second stages in clean warm sweet water. DO NOT depress the purge button before or during rinsing since this may introduce water into the second stage and the low-pressure hose. Ideally rinsing should be done while the regulator is still pressurized this will effectively prevent the entrance of moisture and/or contaminants into the regulator while it soaks. While the regulator is soaking, move the Venturi lever back and forth several times. You may also turn the inhalation control knob slightly back and forth. This action will help to loosen any salt or mineral deposits that may remain lodged in the second stage. Shake or blow all excess water from the second stage and allow the entire regulator to air-dry before storing. Do not use any type of solvent or petroleum based substances to clean or lubricate any part of the regulator.
Store regulator in a clean bag or storage box, away from sunlight, excessive heat and humidity.

Regulator Service Guidelines

Every year or 100 dives: Take your SOPRAS TEK regulator to an Authorized Dealer for an Annual Regulator Inspection and/or Service. The results of the inspection may require certain parts be replaced or a complete overhaul. It cannot be assumed that a regulator is in good working order on the basis that it has received little use since it was last serviced. Remember that prolonged or improper storage can still result in internal corrosion and/or deterioration of O-rings.

Every two years or 200 dives: Take your SOPRAS TEK regulator to an Authorized Dealer for a complete regulator overhaul. This includes replacing all parts included in the Service Kit.

Please note if the regulator has been sitting on the shelf for longer than 2 years it should be tested before use, the o rings and soft parts might be damaged by ageing.

If the regulator is used for rental or training purposes, it will require complete overhaul and factory prescribed service every three to six months or 50 hours continual use. Chlorinated swimming pool water is an especially damaging environment for SCUBA equipment, due to the high levels of chlorine and pH balancing

DO NOT attempt to perform any disassembly or service of your regulator. Doing so may cause the regulator to malfunction, and will render the SOPRASTEK warranty null and void. All service must be performed by an authorised dealer.

Markings and Abbreviations

Demand valves which are intended to be used with an Octopus, shall be marked with EN250 followed by an ‘A’: EN250A.
If a demand valve is marked with EN250A, this demand regulator is suitable, tested and intended to be used in water temperatures below 10°C (50°F) and configured with an Octopus.

SoprasTek regulator are marked EN250A >4°C meaning they can be used with an Octopus with water above 4°C (39°F) but cold water precautions mut be followed anyway and the divers should be certified for cold water diving!
Assemblies which are not intended for cold water performance are marked with "> 10 °C".
You will also see CE2452. This denotes the identification number of the Notified body who has independently certified and examined your product (VTU - Vojenský technický ústav, s. p. Mladoboleslavská 944 Praha 9-Kbely 197 06, Czech Republic)
A serial number can also be found, usually comprising of eight characters, on both the first stage pressure reducer and second stage demand valve. The format of the marking is the following:

First stages
PLUTONE ICE - **PLU CE2452 EN250A >4°C** followed by the serial number with the format **YYMMXXXX** (manufacturing year and month and 4 digits number). Please note that **PLU** stands for **PLUTONE**
MERCURIO ICE: **MER CE2452 EN250A >4°C** followed by the serial number with the format **YYMMXXXX** (manufacturing year and month and 4 digits number). Please note that **MER** stands for **MERCURIO**

Second stages
VENERE ADJ stage: **VEN CE2452 EN250A >4°C** followed by the serial number with the format **YYMMXXXX** (manufacturing year and month and 4 digits number). Please note that **VEN** stands for **VENERE**
Further more the first stages will be marked with the working pressure and intermediate in the following way:
WP: 232Bar, IP: 9.2-10Bar

Hoses
The hoses we use are marked as SMOOTH PRO (marked on the fitting).
On the fitting you can find the model name (SMOOTH PRO), the production day and the year. Hoses are also marked with the maximum working pressure (35bars) and with the norm EN 250.

WARRANTY

The warranty of this regulator does not cover effects of or damage caused by normal wear or obsolescence of the flexible hose assembly and of any other part of this regulator.

All warranty transactions must be accompanied by proof of original purchase from an authorised dealer. Be sure to save your sales receipt, and present it whenever returning your regulator for warranty service. This warranty is extended only to the original purchaser for products purchased directly from an authorised dealer, and is not transferable.

WARNING: It is dangerous for untrained and uncertified persons to use the equipment covered by

this warranty. Therefore, use of this equipment by an untrained person renders any and all warranties null and void.

Restrictions

The following restrictions apply to this warranty:

1. This warranty does not cover normal wear. Factory prescribed service by an authorised dealer is required at least once annually.
2. This warranty does not extend to damages caused by improper use, improper maintenance, neglect, unauthorised repairs, modifications, accidents, fire, or casualty.
3. Cosmetic damage, such as scratches, dents and nicks are not covered by this warranty.
4. This warranty does not extend to equipment used for rental, commercial or military purposes.

Declaration of conformity

The declaration of conformity and the user manuals in pdf format can be found in our web site under the following address:
https://soprastek.com/manuals/

The PDF files are named:
Declaration of conformity for Plutone-Venere.pdf
Declaration of conformity for Mercurio-Venere.pdf
User manual plutone-mercurio-venere.pdf

SOPRAS TEK Team
Diveproduction s.r.o.
Cerveny Ujezd 267
273 51 Unhost
Czech republic
Tel.: +420 312 699 790
www.soprastek.com