SCUBATECH

Instructions for use

Demand regulators

Series models – R1, R2, R3,R5, V2

(ICE, PRO, TEC, SPECIAL, OCTO, MONO)

Issue 2015/1

Table of contents:

Copyright information

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Welcome to the world of Scubatech products.

Congratulations on the purchase of our demand regulator. We believe you can enjoy the parameters of our equipment developed together with our Customers and produced with the use of advanced technology.

We would like to thank for your choice and wish you many safe dives.

1. Introduction

Before the first use of Scubatech demand regulators you must read carefully and understand all information presented in these instructions. Please read, understand and conform to these instructions to use the products presented in these instructions in a safe manner and for many years.

We recommend keeping these instructions for the whole period of using the product. Scubatech demand regulators may be used only in the way presented in these instructions.

Scubatech demand regulator is a precise mechanism. It must be used with care due to its essential function performed during diving. The guidelines contained in these instructions must be observed to ensure the best efficiency and service life of this regulator.

The manufacturer believes that Scubatech demand regulators' utility values will make you very satisfied and you will enjoy diving even more.

SCUBATECH shall not be liable for damages caused by non-compliance with the instructions contained in this manual.

2. Important warnings

CAUTION
Diving is a potentially hazardous activity. The demand regulator's instructions for use shall not be a substitute of professional diving training carried out by a qualified instructor.

All demand regulators described in these Instructions were certified by the body notified by the Polski Rejestr Statków S.A. (Polish Register of Shipping) and they conform to the requirements of Directive 89/686/EEC and the standard PN-EN:2003/A1:2006 - Respiratory equipment — Open-circuit self-contained compressed air diving apparatus - Requirements, testing, marking. The CE mark denotes conformity to the requirements and the number 1463 next to the CE mark is an identification code of the Polish Register of Shipping.

CAUTION
In the non-member states of European Union, additional requirements regarding the use of demand regulators may apply. Before using Scubatech products, please check current requirements that are effective in the country where you intend to use them.

CAUTION
The content of these instructions is based on knowledge available upon its release for printing. Scubatech reserves the right to make modifications in any time.

CAUTION
Demand regulators were tested for conformity to the requirements of the standard EN 250:2003/A1:2006. Demand regulators are not designed for use by more than one person at the same time. Using demand regulators by more than one diver at the same time and in cold water conditions may cause the demand regulators' non-compliance with the requirements of the standard 250:2003/A1:2006 regarding respiratory parameters.

CAUTION
Scubatech demand regulators may be used only with diving cylinders holding verification certificates compliant with current requirements applicable in the country where you intend to use them.

CAUTION
Scubatech demand regulators may be supplied only with the air compliant with the requirements of the standard PN- EN 12021. If moisture accumulates in the diving cylinder, it may cause possible cylinder corrosion as well as freezing and malfunctioning of the regulator when diving at low temperatures (below 10°C (50°F)). Diving cylinders should be transported in compliance with local regulations for transport of hazardous products. The use of a cylinder is subject to gas and compressed air use regulations.

CAUTION
Please note that deep diving increases the risk of decompression sickness and other diving sicknesses. Generally, diving below the depth of 40m or decompression diving is not recommended. If you wish to do deep diving, you must have special training carried out by a suitable diving centre and have suitable equipment for this type of diving. Scubatech demand regulators ensure reliable operation up to the depth of 50m. Nonetheless, divers must conform to the limits prescribed by the local regulations that are effective at the place of diving.

3. Design and basic technical data

Scubatech demand regulators are two-staged diving regulators with pressure reduction stages separated by an interstage hose. They are composed of a first-stage pressure reduction (pressure reducing valve), interstage hose and a second-stage pressure reduction (diving regulator).

The first pressure reduction stages of demand regulators are pressure relief valves. They are equipped with 2 or 4 reduced pressure ports marked with the letters LP and 1 or 2 high pressure ports marked with the HP letters. The HP ports have larger diameter than medium pressure ports. The first pressure reduction stages of Scubatech demand regulators are also equipped with diaphragm, which protects operating environment of the high pressure valve and other valve components against external conditions. This solution allows for using the valve in extreme conditions and it is also designed for use by advanced divers.

The main task of the first pressure reduction stages of demand regulators is to reduce pressure in a diving cylinder (twinset) to the pressure value that corresponds to the total pressure of ambient pressure (hydrostatic pressure variable depending on depth) and constant overpressure of 0.9-0.95 MPa.

Figure 1. **The first pressure reduction stages of demand regulators**

The second pressure reduction stages of Scubatech demand regulators are based on a standard, concurrent relief pressure reducing system. They are equipped with a Venturi nozzle with a setpoint adjusted by a diver that allows delivery of maximum flow of breathing gases. Using an adjustable deflector that directs appropriately the breathing gas flow in combination with the Venturi nozzle reduces substantially breathing resistance when the breathing mixture flow increases during the increase of diving depth.

In addition to adjustment of the Venturi effect, the second pressure reduction stages of Scubatech demand regulators are equipped with a breathing resistance adjustment knob located on the opposite side of the interstage hose of the diving regulator's box. When the knob is set in a closed position, taking a breath requires more strength and the diving regulator is less sensitive to sudden changes of pressure. Breathing is easier when the knob is twisted off, as it requires less strength to take a breath. Adjustment is smooth and you can set the knob in the position that suits you the best. When storing a diving regulator equipped with a breathing resistance adjustment knob, the knob should be set in an open position which prevents against packing damage.

Figure 2. **The second pressure reduction stages of demand regulators**

Interstage hose - a medium pressure hose of operating pressure 1.7 MPa. Metal ends are connected to the hose with twisted connections that ensure high quality connection.

Basic technical data:

Maximum depth	- 50m
Maximum supply pressure	- 30 MPa
Reduced pressure	- 9.0 – 9.5 atm

Threads:	
Mounting ferrule	- DIN 5/8”
High pressure	- 7/16” (a number depends on a model)
Medium pressure	- 3/8” (a number depends on a model)

4. Intended use

Demand regulators presented in these instructions are diving air regulators used for recreational and professional diving. Demand regulators are used with a single diving cylinder or any air twinset of operating pressure up to 30 MPa (300 atm).

CAUTION
SCUBATECH shall not assume responsibility for malfunctioning of demand regulators if they have been used contrary to their purpose, if unoriginal spare parts have been used or if they have been serviced by an authorized person.

5. Using with nitrox

IMPORTANT
Important information regarding the use of demand regulators with nitrox mixtures are described below.

CAUTION
Diving with the use of nitrox mixtures requires completion of a specialist training carried out by a qualified instructor.

CAUTION
The maximum operating depth and the time of exposure to nitrox mixtures depend on oxygen concentration in the used mixture. High oxygen concentration reduces the use of mixtures with standard diving equipment and it requires application of materials and procedures that differ from those required by a user of standard compressed air.

Using demand regulators with nitrox mixtures outside the EU (European Union).

Standard Scubatech demand regulators sold to non-member EU countries are produced with the application of materials, assembly procedures and greases that ensure compatibility with nitrox mixtures of the maximum oxygen content of 40 %.

CAUTION
If before using with nitrox mixtures a demand regulator was used with standard compressed air, it is recommended to carry out a proper maintenance procedure. An authorized Scubatech serviceman should provide all required information.

Using demand regulators with nitrox mixtures in the EU (European Union) countries.

Scubatech offers additional models of demand regulators specially produced for use with nitrox mixtures of oxygen content over 21%, including the use of oxygen. The above products were tested in accordance with PN-EN 144-3:2005 standards Respiratory protective devices - Gas cylinder valves - Part 3: Outlet Connections for diving gases nitrox and oxygen and PN-EN 13949:2005 Respiratory equipment - Open-circuit self-contained diving apparatus for use with compressed nitrox and oxygen - Requirements, testing, marking.

Please contact an authorised salesperson of Scubatech products to receive more information regarding these models.

6. Using in cold water

CAUTION
Cold water diving requires completion of a specialist training carried out by a qualified instructor.

In accordance with European CEN standardization, the temperature of cold water is 10°C or lower. In such conditions, particularly in fresh water that has higher freezing point, the risk of freezing of a pressure reducing valve or diving regulator is high. The usual effects include a constant outflow of breathing gases, and their quicker loss as a result. The lower the ambient temperature is, the higher the risk of the above described situation is.

Demand regulators operating at low temperatures must be properly protected. Isolating a water chamber in a pressure reducing valve from the environment with the use of an antifreeze agent is the absolute minimum protection required. In the first stages of demand regulators R 2 ICE, R 2 ICE SPECIAL, R 2 TEC, R 5 ICE, R 5 ICE SPECIAL, R 5 TEC, V 2 ICE, V 2 ICE MONO a so-called dry chamber is used that reduces significantly the risk of freezing when diving. It is recommended to use the above system in pressure reducing valves used for diving at the depth below 30m.

To reduce the risk of freezing of a demand regulator, it is necessary to:

- avoid releasing breathing gases on the surface and underwater at the air temperatures around 0°C and below,
- not cause activation of a diving regulator,

- avoid simultaneous use of a buoyancy compensator and inflator of a dry suit,
- before and during diving stay on the surface as short as possible at the air temperatures around 0°C and below,
- avoid quicker use of breathing gases,
- not practice breathing in two persons with the use of a single demand regulator. Using an additional fully self-contained demand regulator is safer in emergency situations,
- use clean and dry cylinders filled only in places authorized for this purpose.

7. Preparing for use

IMPORTANT
Scubatech recommends delivering a demand regulator to an authorized seller for connecting accessories, such as: a pressure measurement device, medium pressure tubes and second pressure reduction stages of demand regulators. An authorized seller may also answer to questions regarding the issues presented in these instructions.

For proper preparing a demand regulator for use, the following steps must be performed:

- equip a demand regulator with a device monitoring air pressure in a cylinder/twinset,
- check if a demand regulator kit is complete,

IMPORTANT
Connecting medium pressure hoses to high pressure outputs and using any reductions on medium and high pressure hoses is forbidden.

- arrange properly medium pressure feeding hoses: buoyancy compensator, dry suit, etc.
- visually inspect the demand regulator's condition,
- check if all connections and a mouthpiece are fastened properly,
- test for tightness under negative pressure in the following way:
    - insert the mouthpiece of the second-staged demand regulator to your mouth,
    - clog the air inlet to the first-staged demand regulator,
    - take a breath through the second-staged demand regulator,
    - the demand regulators are tight only if taking a breath is impossible,

IMPORTANT
Before screwing down a demand regulator to a diving cylinder/twinset, a seat should be blown through with air. Check if the valve is unobstructed and clean.

Check if there is O-ring in the pressure reducing valve's ferrule and check its condition. If the seal is damaged or worn out, it must be obligatorily replaced.

- screw down the demand regulator to the diving cylinder's/twinset's seat, lightly tightening, AND NOT APPLYING TOO MUCH PRESSURE,
- slowly unscrew the cylinder's shut-off valve (valves),

CAUTION
When opening the cylinder's/twinset's shut-off valve, the front of the pressure gauge should not be directed towards a user or other persons in case of its malfunctioning.

- before diving, perform a routine check of the demand regulator,
- listen to all the demand regulator's connections for possible air outflow,
- check if the air feeding the regulator has an unpleasant smell,
- push the diving regulator's inflate button and check for air outflow that stops after releasing the inflate button,
- insert the diving regulator's mouthpiece to your mouth and take a few quick breaths, looking at the pressure gauge or other monitoring device. The monitoring device's indications should not change,
- test for water tightness, before submerging, insert the diving regulator's mouthpiece to your mouth, clench your teeth and then seal the connection between your oral cavity and a mouthpiece with your mouth.

8. The use during diving

- if the second-stage pressure reduction is equipped with Venturi effect's adjustment system, the adjusting knob must be set in the position MAX, DIVE or + during diving,
- during diving, breathe steadily and avoid quick and shallow breathing,
- the demand regulator's design allows good visibility even when air bubbles flow out from the diving regulator during exhalation. Except for the situation when, being underwater, a diver looks at the surface and exhales at the same time,
- whenever you take the diving regulator out of your mouth and then reinsert it, first exhale or push the diving regulator's inflate button. Otherwise, you can choke on water.

9. The use after diving, maintenance and storage

Once diving is finished, you must:

- take the diving regulator out of your mouth,
- remove remaining water from the diving regulator and clear it by pushing the inflate button,

- close the shut-off valve (valves) of the cylinder/twinset,
- using the inflate button, adjust pressure in the demand regulator to the ambient pressure,
- unscrew the pressure reducing valve from the cylinder/twinset,
- wash out the demand regulator in clean, fresh water, while clogging the pressure reducing valve's mounting ferrule's inlet. Please ensure that all HP and LP ports are plugged or connected properly. These steps are particularly important after diving in salt or chlorinated water. When rinsing do not push the constant flow button on the diving regulator. It will prevent ingress of water to the interstage hose or the pressure reducing valve,
- when rinsing the diving regulator, check if the breathing resistance adjustment knob is in a close position,
- after rinsing, reconnect the demand regulator to a pressure cylinder and then clear it, removing possible remaining water from the inside,
- in case of diving in salt or polluted water, rinsing itself is not enough to clean thoroughly the demand regulator, therefore soaking it in warm fresh water for at least 1 hour is recommended, if possible,
- using any aerosol spray may damage plastic elements,
- the cylinder/twinset should not be carried by holding on the pressure reducing valve, LP and HP hoses and the diving regulator,
- leaving the cylinder/twinset unsecured may cause its fall or damage to the shut-off valve or the pressure reducing valve.

Storage

- the demand regulator should be stored in dry, airy place, away from all sources of heat and not in direct exposure to sunlight and chemical agents,
- the demand regulator should be protected against gasoline, oils, alcohol and other chemicals vapours,
- the demand regulator should not be kept screwed down to the cylinder,
- the demand regulator's components should lie freely, in particular, the medium pressure hose should be loosely laid without any bends and twists,
- both during storage and use, the regulator should be protected against mechanical damages, and, in particular, against impacts,
- avoid crushes that deform the mouthpiece and other flexible components of the demand regulator,
- the demand regulator's parts that are subject to ageing should be replaced every year, irrespective of the frequency of use,
- when storing a diving regulator equipped with a breathing resistance adjustment knob, the knob should be set in an open position which prevents against packing damage.

Maintenance

- after diving, the demand regulator should be washed out in clean fresh water,
- silicone elements may be washed in water using mild detergent (e.g. soap),
- rinsing the silicone elements with alcohol and maintenance of the above elements with silicone agents (silicone oils and greases) is not permitted,
- for maintenance of rubber elements use silicone grease,
- the O-ring seal should be greased/polished with silicone grease,

- the diaphragm and the outlet valve should not be greased with silicone grease, as it may damage the parts,
- only original spare parts must be used during repairs and checks,
- demand regulators must have technical inspections carried out every year by authorized service centre,
- after a longer period of continuous use (the demand regulator may need more frequent service checks depending on frequency of operation and the environment of operation), inspection and maintenance of the demand regulator's assemblies together with the check of basic operating parameters are recommended,

IMPORTANT
Periodic inspections, repairs and any works that affect the work of a demand regulator must be carried out by a manufacturer or a service centre authorized by a manufacturer. Components and elements of a demand regulator must not be disassembled or assembled by unauthorized persons.

10.Warranty

In case of making claims under warranty, a proof of purchase issued by an authorized seller and a warranty card that includes the register of annual inspections should be always presented.

Scubatech guarantees to the original buyer that its product is free of any defects in materials or workmanship provided that guidelines regarding the use, maintenance or service are observed pursuant to following conditions.

The warranty is invalid in case of improper use, negligence, modification or unauthorised product's servicing.

The scope of the warranty is limited to the product's repair or replacement, depending on Scubatech's decision.

IMPORTANT
Under no circumstances should you try to repair the product yourself as it could invalidate the warranty or cause loss of life or damage to health.

WARRANTY CARD

SCUBATECH demand regulator, pressure reducing valve, diving regulator

SCUBATECH Sp. z o.o. warrants to the original owner proper operation of the demand regulator, pressure reducing valve and the diving regulator for a period of 10 years.

This warranty card is valid under the following conditions:

- purchase should be made in an authorized SCUBATECH store,
- the person listed on a warranty card is the owner of a demand regulator, pressure reducing valve and a diving regulator,
- servicing of a demand regulator, pressure reducing valve and a diving regulator must be carried out at least once a year,
- servicing activities must be carried out with the use of suitable service kits by a service centre authorized by SCUBATECH,
- the guidelines for use, operation and maintenance of a demand regulator, pressure reducing valve and a diving regulator must be observed.

IMPORTANT
The warranty is invalidated should any repairs or adjustments are done by persons who are not authorized to service SCUBATECH equipment and as a result of improper use of the product and mechanical damages.

The warranty is invalidated if inspections or servicing are carried out by unauthorised persons.

Owner's first name and surname .....

Address……

Model ……

…… ……
Purchase date Seller's stamp and signature

CONTROL INSPECTION CARD

Inspection date	Technical condition assessment	Serviceman's surname	Signature and stamp

11. Manufacturer information

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71-087 Mierzyn
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12. Notes

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