

# **SCUBATECH**

## **DEMAND REGULATORS**

**R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE**



**USER MANUAL**

**WARRANTY CARD**

**SERVICE BOOK**

## **INTRODUCTION**

**Read this manual thoroughly and carefully before using this demand regulator.**  
**This demand regulator's manual cannot be treated as a substitution for a specialized diving training conducted by a certified instructor.**  
**Scubatech demand regulators must be used only in the way as shown in the following manual.**

### **WARNING**

Our demand regulators were tested according to the requirements of EN 250:2003/A1:2006 norm. They are not designed to be used by more than 1 person at a time. Using the demand regulators by more than 1 person at a time in cold water may result in the fact that the regulators will not conform with the requirements of EN 250:2003/A1:2006 norm.

### **WARNING**

SCUBA diving may be potentially hazardous for the untrained individual. Therefore, before attempting to use any SCUBA equipment, an individual must receive training and certification.

### **WARNING**

Standard versions of our demand regulators cannot be used with gas mixtures with more than 40% of oxygen. Failure to adhere to this warning may result in serious deterioration of the equipment, user's serious injury or even user's death.  
It is possible to obtain special set of spare parts making it possible to use the regulators with pure oxygen or Nitrox.

## **TECHNICAL SPECIFICATIONS**

### **Threads:**

DIN retainer: 5/8"

High pressure: 1 or 2 ports 7/16"

Low pressure: 2 or 4 ports 3/8"

### **Parameters:**

Maximum recommended operating depth: 40m

Supply pressure: 30 MPa = 300 atm

Intermediate pressure: 9,0 – 9,5 atm

## OPERATION

Demand regulators are designed to serve as air regulators used for recreational and commercial diving.

They are designed to be used with air cylinder(s) with working pressure of up to 30 MPa (300 atm).

SCUBATECH is not responsible for malfunction of regulator if it was used in an improper way; if unoriginal spare parts were used for its servicing or if servicing was done by an unqualified person.

## CONSTRUCTION

Demand regulators are dive regulators made up of two stages (First Stage – reducing high pressure to intermediate pressure and Second Stage – demand valve, reducing intermediate pressure to ambient pressure) with LP hose in between.

**First Stages regulators R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE are all balanced diaphragm devices.** They are equipped with 2 or 4 low pressure ports (LP) as well as 1 or 2 high pressure ports (HP). HP ports have bigger diameter than low pressure ports. The diaphragm used in the first stages ensures that the environment of operating high pressure valve and the rest of first stage's components are separated from outer environment. This solution predisposes the above first stage regulators for using in extreme conditions and they are also designed for advanced divers.

The main function of the first stage is to reduce high pressure output of the scuba cylinder to constant overpressure of 9,0-9,5 Mpa overambient pressure (changeable, depending on the depth). With the growth of hydrostatic pressure during the dive, the regulator automatically keeps overpressure value (9,0 – 9,5 MPa) on the same level but increases absolute intermediate pressure proportionally to increasing hydrostatic pressure.



Figure 1: **First Stages: R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE**

**Second Stage regulators R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE** function on the basis of typical, concurrent downstream system. It is equipped with user adjustable Venturi vane, which makes it possible to obtain the maximum flow of breathing gas. The presence of deflector properly directing the flow of breathing gas in connection with Venturi vane cause considerable lowering of breathing resistance while the flow of breathing gas is higher when we dive deeper. Apart from the possibility to regulate the Venturi effect, the second stage of breathing apparatus R 2 ICE, R 2 Special, R 5 ICE,

R 5 TEC, V 2 ICE are equipped with adjustable inhalation resistance knob. When the knob is in a closed position, then the diver needs more effort to take a breath and the regulator is less sensitive to sudden changes of pressure. When the knob is in an open position, then breathing is easier. The regulation is smooth and anyone can adjust the knob to a needed position.



Figure 2: Second stages: **R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE**

Intermediate hose – high quality, low pressure hose with working pressure of 1,7 MPa. Joining the metal endings with the hose has been done with the help of twisted connectors which guarantee high quality joining.

#### **ALLOWABLE COMPONENTS**

- Demand regulators R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE can only be used with cylinders certified by local authorities.
- Demand regulators R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE can only be supplied with air compatible with demands of PN-EN 12021 norm.
- Demand regulators R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE are compatible with all devices monitoring cylinder air pressure for usage with first stages of R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE with thread connector 7/16”.
- LP ports are compatible with all types of Buoyancy Compensator Devices supplied by diving cylinder as well as other devices used with first stages of R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE with thread connectors 3/8”.
- LP ports are compatible with most of the available breathing apparatuses as well as full face masks Neptun II Nira, Space by Ocean Reef and Aga by Interspiro.

#### **PRE-DIVE PROCEDURES**

- Equip the demand regulators R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE with pressure gauge (device monitoring air pressure inside the cylinder). See: REQUIRED SAFETY DEVICES.
- Check the completeness of demand regulator.

### **WARNING:**

#### **DO NOT ATTACH A LOW PRESSURE HOSE TO A HIGH PRESSURE PORT AND DO NOT USE ANY REDUCTIONS ON LP OR HP HOSES.**

- Properly arrange hoses supplying: BCD, dry suit, etc.
- Inspect the demand regulator.
- Inspect hose(s) and hose connections. See if the mouthpiece is properly mounted.
- Test the under pressure tightness in the following way:
  - Put the mouthpiece of first stage of breathing apparatus R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE into the mouth;
  - Shut the air inlet on the first stages of R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE and take a breath through second stage of breathing apparatus R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE;
  - Only if it is impossible to take a breath, the demand regulator is tight.
- Before mounting the demand regulator to the cylinder blow through the valve of the cylinder with air from inside the cylinder.
- Make sure if the O-ring in cylinder valve is in good condition. If it is damaged or in bad condition, it is necessary to replace it with a new one.
- Hand tighten the demand regulator to the cylinder valve. **DO NOT TIGHTEN IT TOO STRONGLY.**
- Slowly open the cylinder valve – quick opening of the valve may result in shortening of life of pressure regulator seat.
- Check the functioning of demand regulator before diving:
  - Listen carefully to all connections on demand regulator and check whether the air is not coming out of it.
  - Check whether the air supplying the regulator does not smell in an unpleasant way.
  - Press the purge on the second stage regulator and make sure the air flows constantly until the purge is depressed.
  - Take several breaths from the regulator second stage in the same time observing the manometer or any other monitoring instrument. The indications on the monitoring device should not change.
  - Check the tightness in the water.
  - Before submerging, put the mouthpiece of the breathing apparatus into the mouth and make it tight with your teeth and mouth.
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### **REQUIRED SAFETY DEVICES**

- Before diving the demand regulator should be equipped with a manometer or some other device controlling the pressure inside the cylinder (for example a diving computer).
- The design of demand regulators R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE guarantees the user full safety during diving. It means that the breakdown of one of the regulator's components will not stop the flow of air to diver.

### **PROCEDURES DURING DIVING**

- It is recommended to breath steadily from the regulator and to avoid quick and shallow breathing.
- The regulator is designed in a way that the air bubbles flowing from it during the dive do not worsen visibility. The only exception is when the diver who is under water looks into the surface while exhaling at the same time.
- After each time when the regulator is taken away from the diver's mouth and then put inside the mouth again, it is necessary to first exhale the air from it or to depress the purge on the second stage regulator. Otherwise the diver can choke with water from the second stage regulator. It is a standard procedure for each type of breathing apparatus of this kind.

### **POST- DIVE PROCEDURES**

- Take the regulator out of the mouth.
- The air remaining in the regulator system must be removed by depressing the second stage purge.
- The cylinder valve must be closed.
- The pressure in the demand regulator must be made even with the ambient pressure. We do it by depressing the second stage purge.
- Remove the first stage regulator from the cylinder valve.
- Rinse the entire demand regulator in clean, fresh water shutting the entrance of DIN screw on the first stage. Check if all HP and LP ports are plugged or joined in a proper way. These procedures are especially crucial when diving in salt or chlorinated water. While cleaning the demand regulator DO NOT depress the purge on the second stage. If the purge is depressed water will enter the system possibly causing damage to the first and second stages.
- While rinsing the breathing apparatus it is necessary to check if the purge is in a closed position.
- After cleaning the system we should attach it to the cylinder valve once again and blow it with the air from inside the cylinder to remove any residual water.
- In case of dives in dirty or salty water, rinsing the demand regulator may not be enough to make it clean. In such cases it is advisable to rinse it in fresh, warm water for at least 1 hour.
- The regulator should be kept in a clean, dry area where it will not be exposed to rough handling, extreme heat, sun rays or chemical substances.

### **ADVICE ON OPERATING**

- Whether the regulator will be reliable and working properly mostly depends on the way that its owner cares about it.
- The demand regulator should be handled with in a careful way and it should not be exposed to unnecessary shaking or hitting. Chemical impurities or salt depositing inside the regulator may result in its improper functioning. To avoid this it is

recommended to rinse the regulator after each dive in fresh, warm water according to the regulator's manual.

- Using any type of spray may result in damaging the plastic parts of the regulator.
- Do not carry the cylinder holding the first stage. The cylinder's handle serves this function.
- Chlorinated water may cause quicker wear of some components of breathing apparatus.
- Leaving the cylinder unprotected may result in its falling down and damaging the valve or regulator's first stage.

### **DIVING IN COLD WATER**

European standard norms C.E.N. define cold water as 10°C or less. In such conditions, especially in fresh water (higher temperature of freezing) there is danger of freezing the pressure regulator or breathing apparatus. It can be most frequently observed by constant flow of breathing gas from the breathing apparatus and consequently its sudden loss. The lower the ambient temperature, the higher probability of such failure.

Demand regulators operating in low temperatures must be properly protected. The absolute minimum is to isolate the water chamber in the pressure regulator from the environment by non-freezing factor. In first stages of R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE we used the so called dry chamber, which significantly reduces the possibility of freezing during the dive. It is advisable to use the above mentioned system in first stages used for dives in deep water (below 30m).

To reduce the risk of freezing the demand regulator we should:

- With the air temperatures close to 0°C and less avoid operating the regulator out of water; avoid breathing or purging the regulator on the surface.
- With the air temperatures close to 0°C and less stay as short as possible on the surface before diving.
- Avoid quick breathing.
- Do not practice breathing in 2 persons from 1 demand regulator. In such situations it is better to use additional, fully independent regulator.

### **DIVING IN DEEP WATER**

It is worth remembering that diving in deep water enlarge the risk of decompression sickness as well as other sicknesses. Diving below 40 m is generally not recommended. Before attempting deep water diving you must receive training and certification from a recognized certification agency and own proper to such type of dives equipment. Demand regulators R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE provide unfailing operation up to the depth of 40m.

### **STORAGE**

- Do not store the regulator attached to the cylinder
- The regulator should be kept in a clean, dry area where it will not be exposed to rough handling, extreme heat, sun rays or chemical substances.
- The regulator's components should lay in a loose way, especially the hose, which shouldn't be bent or twisted.
- The demand regulator should be protected from gasoline vapors, oils, alcohol and other chemical substances.

- During both storage and operating, the regulator must be protected from mechanical damages.
- All folds deforming the mouthpiece or other elements of the regulator should be avoided.
- Parts of regulator undergoing the process of wearing must be replaced each year irrespectively of the frequency of operating.

### **MAINTENANCE AND REPARATIONS**

- After each dive, the regulator must be rinsed in clean, fresh water.
- Silicone parts may be cleaned in water with addition of mild detergent (for example soap).
- You **MUST NOT** clean silicone parts with alcohol as well as maintain them with silicone substances (oils and silicone grease).
- Use silicone oil for rubber elements' maintenance.
- O-rings should be greased with silicone grease.
- The membrane and exhaust valve cannot be greased with silicone grease as this could lead to their deterioration.
- Only original spare parts may be used for the reparation and service of equipment.
- The demand regulator should be serviced annually by an authorized service center.
- **BETWEEN THE DIVING SEASONS** or when the regulator was intensively used for a longer period of time it is advised to have it serviced, maintained and controlled (the regulator may require more often servicing depending on how often it is used and in which environment it operates).
- Periodical inspections, reparations and all other actions influencing the operation of demand regulator **MUST BE CONDUCTED BY THE MANUFACTURER OR AUTHORISED SERVICE CENTER.**
- Dismantling or assembling the components of the demand regulator must only be conducted by authorized persons.

### **WARRANTY**

All of the information on warranty of the SCUBATECH demand regulators can be found in the warranty card below. Inspections or servicing conducted by unauthorized persons lead to the loss of warranty.

### **FINAL REMARKS**

The demand regulators R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE are extremely precise mechanisms. Because of its crucial role they serve during the dive, they demand some minimal attention from the user. The user should follow the instructions in this user guide. The manufacturer hopes that the features of the demand regulators R 2 ICE, R 2 SPECIAL, R 5 ICE, R 5 TEC, V 2 ICE will give their users a lot of pleasure and will make diving more enjoyable.

SCUBATECH is not responsible for the damages resulting from failure to follow the above instructions .



**WARRANTY CARD**  
of SCUBATECH pressure regulator, breathing apparatus

The warranty coverage has a ten year warranty by SCUBATECH for the first user of the pressure regulator, breathing apparatus and ensures that it is free from production and material defects . The following requirements must be fulfilled for the validity of the warranty card:

1. The purchase must be made in a SCUBATECH authorized shop.
2. The owner of the pressure regulator, breathing apparatus is the person listed on the warranty card.
3. The servicing of pressure regulator, breathing apparatus must be conducted at least annually by an authorized SCUBATECH service center.
4. The instructions on how to use, operate and maintain the pressure regulator , breathing apparatus must be followed.

**IMPORTANT !**

Inspections or servicing conducted by unauthorized persons lead to the loss of warranty. Defects caused by improper operating or mechanical damages are not covered by the warranty.

HEADQUARTERS OF THE COMPANY:  
SCUBATECH LTD.  
DERDOWSKIEGO STREET 8  
71-087 SZCZECIN  
TEL/FAX: (004891) 453 00 17

The owner's name

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Adress

.....  
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Model

.....  
.....

Date of purchase:

Stamp and signature of seller:

**SCUBATECH Sp. z o.o.**

ul. Derdowskiego 8

71-047 Szczecin

tel.: 0 91 453 00 17

[scubatech@scubatech.pl](mailto:scubatech@scubatech.pl)

**ANNUAL INSPECTIONS AND INFORMATION ON INSPECTIONS**

DATE	SERVICE PERSON NAME	NOTES	STAMP AND SIGNATURE