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RS-110 Regulator System

TUSA Regulators



SPECIFICATIONS & PERFORMANCE DESCRIPTION R-100 First Stage

WORKING PRESSURE: INTERMEDIATE PRESS CONNECTIONS: DIMENSIONS:	URE: LP: Four Length:		235 Bar 9.1-9.8 Bar HP: Two 7/16 UNF 46.5 MM
WEIGHT: (w/o hose)		1.35 LBS.	612 Gram
	S-10/S	S-10 Second Stag	e
DIMENSIONS:	Length:	2.91 IN. 3.8 IN. 3.94 IN.	74 MM 96.5 MM 100 MM
WEIGHT: (including hose HOSE: Length:	,	.73 LBS. 330 Gra 76 CM 33 IN.	

RS-130 Regulator System

TUSA Regulators



SPECIFICATIONS & PERFORMANCE DESCRIPTION R-100 First Stage

WORKING PRE INTERMEDIATE CONNECTIONS DIMENSIONS:	PRESSURE: : LP: Fou Length:	3400 PSI 130-140 PSI r 3/8-24 UNF 5.12 IN. 130M 1.83 IN.	HP: Two 7/16 UNF
WEIGHT: (w/o h	ose)	1.35 LBS.	612 Gram
	S-3	0 Second Stage	
DIMENSIONS:	Length:	2.91 IN. 4.27 IN. 108.5 3.86 IN. 98	MM
WEIGHT: (includ HOSE:	ling hose) Length: 30 IN.	.794 LBS. 76 C	360 Gram M

RS-230 Regulator System

TUSA Regulators



SPECIFICATIONS & PERFORMANCE DESCRIPTION R-200 First Stage

	PRESSURE: : LP: Fou Length:	3400 PSI 130-140 PSI r 3/8-24 UNF 5.12 IN. 130MM 3.9 IN.	235 Bar 9.1-9.8 Bar HP: Two 7/16 UNF 99 MM
WEIGHT: (w/o h	ose)	1.72 LBS.	780 Gram
	S-3	0 Second Stage	
DIMENSIONS:	Length:	4.27 IN. 108.5 M	74 MM IM IM
WEIGHT: (incluc HOSE:	ling hose) Length: 30 IN.	.794 LBS. 76 CM	360 Gram

RS-240 Regulator System

TUSA Regulators



SPECIFICATIONS & PERFORMANCE DESCRIPTION R-200 First Stage

WORKING PRESS INTERMEDIATE PF CONNECTIONS: DIMENSIONS:	RESSURE: LP: Fou	3/8-24 UNF 5.12 IN. 130N	HP:	9.8 Bar Two 7/16 UNF
WEIGHT: (w/o hose)	1.72 LBS.	780	Gram
	S-40	0 Second Stage	9	
DIMENSIONS:	Length:	2.91 IN. 4.27 IN. 108.5 4.06 IN. 103	5 MM	MM
WEIGHT: (including HOSE: Le	hose) ngth: 27.56 IN		410 CM	Gram

RS-340 Regulator System

TUSA Regulators



SPECIFICATIONS & PERFORMANCE DESCRIPTION R-300 First Stage

WORKING PRESSURE:3400 PSI235 Bar (300 bar DIN)INTERMEDIATE PRESSURE:130-140 PSI9.1-9.8 BarCONNECTIONS: LP: Three 3/8-24 UNF, One 1/2-20 UNF HP: Two 7/16-20UNFDIMENSIONS:Length:5.31 IN. 135 MM

Length: 5.31 IN. 135 MM Width: 1.35 IN. 80 MM

WEIGHT: (w/o hose)

2.2 LBS. 1000 Gram

S-40 Second Stage

DIMENSIONS: Height: 2.91 IN. 74 MM Length: 4.27 IN. 108.5 MM Width: 4.06 IN. 103 MM

WEIGHT: (including hose) 0.903 LBS. 410 Gram HOSE: Length: 27.56 IN. 70 CM

RS-350 Regulator System

TUSA Regulators



SPECIFICATIONS & PERFORMANCE DESCRIPTION R-300 First Stage

WORKING PRESSURE:3400 PSI235 Bar (300 bar DIN)INTERMEDIATE PRESSURE:130-140 PSI9.1-9.8 BarCONNECTIONS: LP: Three 3/8-24 UNF, One 1/2-20 UNF HP: Two 7/16-20UNFDIMENSIONS:Length:5.31 IN. 135 MM

Width: 1.35 IN. 80 MM

WEIGHT: (w/o hose)

2.2 LBS. 1000 Gram

S-50 Second Stage

DIMENSIONS: Height: 2.91 IN. 74 MM Length: 4.27 IN. 108.5 MM Width: 4.09 IN. 104 MM

WEIGHT: (including hose) 0.97 LBS. 440 Gram HOSE: Length: 27.56 IN. 70 CM



SPECIFICATIONS & PERFORMANCE DESCRIPTION R-400 First Stage

WORKING PRESSURE:3365 PSI230 Bar (300 Bar DIN)INTERMEDIATE PRESSURE:128-139 PSI9-9.8 BarCONNECTIONS:LP: Four 3/8 UNF HP: One 7/16 UNF

WEIGHT: INT: 24.5 OZ.694 Gram DIN 300: 22.5 OZ. 486 Gram

S-60 Second Stage

DIMENSIONS: Height: 2.91 IN. 74 MM Length: 4.27 IN. 108.5 MM Width: 4.09 IN. 104 MM

WEIGHT: (w/o hose) 5.3 OZ 150 Gram HOSE: Length: 29 IN. 74 CM

FOREWORD

Congratulations! You are now the owner of one of the many fine TUSA products. Your new regulator is built to exacting standards, using only the highest quality materials. For several years now TUSA has been developing PLATINA regulators at our R&D facility in Japan under the ISO9001 International Quality Assurance System. You have purchased the newest, the most advanced regulator for the Sport Scuba Market available today. The TUSA regulator is the first major improvement to the conventional down stream demand valve since 1988. The second stage is constructed of technologically advanced materials and the performance provides exceptional aspiration flow and allows fully adjustable performance to accommodate beginner and professional diver.

Before you use your new regulator, please read this manual carefully. The following warnings, cautions, and notes were written to make it possible for you to enjoy your diving experience with maximum safety.

We at TUSA want you to have many years of dependable service from your new equipment and have many memorable and safe dives.

Thank you for purchasing one of our high quality products.

WARNING:

THIS PRODUCT IS A SCUBA DIVING DEVICE AND REQUIRES PROPER TRAINING BEFORE USE.

Name of Regulator	1st Stage Model No.	2nd Stage Model No.
RS-110	R-100 (Yoke-Din)	S-10 Non Adjustable
RS-130	R-100 (Yoke-Din)	S-30 Adjustable
RS-230	R-200 (Yoke-Din)	S-30 Adjustable
RS-240	R-200 (Yoke-Din)	S-40 Adjustable
RS-350	R-300 (Yoke-Din)	S-50
RS-460	R-400 (Yoke-Din)	S-60

R-100: USA PAT No. 5509407

SECTION I

WARNING: READ CAREFULLY

Unless otherwise specified TUSA regulators should be used only with open circuit compressed air breathing equipment.

Before any attempt is made to use this regulator underwater, you MUST have received training and CERTIFICATION in the technique of sport diving from a recognized certification agency. Use of this equipment by a person who is not certified by a recognized agency shall render all warranties, express or implied, null and void. Use of regulators by uncertified or untrained persons is dangerous and can result in severe injury or death. This regulator is not intended for commercial use with surface supplied air.

Before each use, the regulator must be given a thorough visual inspection and functional test. NEVER dive with a regulator which shows signs of damage or provides substandard performance.

Repair, servicing, or addition of accessories (e.g. pressure gauge) to this regulator is to be performed ONLY by a qualified TUSA Service Facility. The HP and LP outlets of the first stage have intentionally been fitted with different threads to prevent the possibility of incorrect fitting of accessories.

Always apply pressure to the regulator gradually by opening the cylinder valve SLOWLY, NEVER lubricate any part of the regulator (especially the rubber O-ring seal between the cylinder valve and regulator) with a hydrocarbon-based lubricant.

Notice: Model RS-110 and 130 are restricted to be used above the water temperature 10° C and RS-350, 230, 240 and 460 can be used in any temperature when properly configured.

Maximum allowable working pressure for the RS-110, 130, 230, 240,and 350 is 3500 psi (235 bar). Maximum allowable working pressure for the RS-460 is 4350 psi (300 bar).

WARNING:

Model RS-460 may not fulfill the requirements of EN 250 for cold water and breathing performance if configured and used by more than one diver at the same time.

Model RS-460 in compliance with EN 250 standards is not intended to be configured and used by more than one user at the same time.

SECTION II DESCRIPTION AND OPERATION

2.0 GENERAL

TUSA Regulators are BALANCED PISTON and BALANCED DIAPHRAGM type SINGLE HOSE REGULATORS. The regulator reduces high pressure air from the scuba cylinder to ambient pressure suitable for breathing, through the operation of first and second stage regulators. The first stage regulator reduces incoming high pressure air to an intermediate pressure of approximately 135 psi (9.5bar). The second stage regulator, using a diaphragm operated demand valve, further reduces air from intermediate pressure to ambient pressure permitting normal breathing. The first and second stages of the regulator are connected by a low pressure hose. A swivel yoke (TYPE INT) on the first stage body secures the regulator to the cylinder valve, while an O-ring surrounding the outlet orifice on the cylinder valve ensures an airtight connection to the first stage.

2.1 FIRST STAGE

R-100 first stage

The R-100 first stage adopts a balance piston method to reduce the effects of changes in diving depth and cylinder pressure. As the piston is balanced through outside ambient pressure, your breathing efforts will be the same regardless of depth or residual tank pressure. A balanced regulator will ensure a constant and steady airflow.

The unique inline layout (PAT.) offers a more compact design weight of just 620g during actual use. This allows the R-100 to only be a total weight of just 970g for the first and second stages. Less parts also means easier maintenance.

R-200 first stage

With the R-200, TUSA now offers a first stage with the balanced diaphragm method. This method features minimum variation in intermediate pressure in response to changes in residual cylinder pressure and depth. The ports are in left-right symmetry (H.P.X2, L.P.X4) for easier attachment to tanks, even for beginners.

R-300 first stage

In order to achieve natural breathing, a dynamic flow hose with a large inner diameter increases the airflow. The R-300 is a balanced design, so it always supplies the diver with stable air flow at any tank pressure or depth, delivering maximum breathing ease and comfort for them.

R-400 first stage

The TUSA RS-400 offers a first stage with the balanced diaphragm method. This method features minimum variation in intermediate pressure in response to changes in residual cylinder pressure and depth. The R-400 is engineered for cold water diving (EN 250-2000). It also offers two high flow LP ports (HFP) that are close to the diaphragm to increase air flow by approximately 15%.

2.2 SECOND STAGE

Demand system

The demand lever features chrome-plating to significantly reduce rubbing resistance of moving parts and air resistance. The result is smoother and more natural valve opening/closing.

Light weight housing

The second stage main unit is smaller and lighter to reduce water resistance during diving, thus reducing the load on the face during use. The body materials are super-tough nylon (heat pliable polyamide resin) reinforced with glass fiber for outstanding hardness and shock resistance. The materials also offer superior tensile strength, dimensional stability, heat resistance, weather resistance and chemical resistance.

Unit structure

The second stage features a unit structure (PAT. P.) in which the demand housing, demand lever and deflector form a single unit. The individual sections use almost no special parts, thus offering easier disassembly and assembly. That halves the time required for regular checks, overhauls and other maintenance. The S-60 second stage features a structure that allows the technician to configure the LP hose on either the left or right side of the regulator.

Intake resistance

The second stage includes a director to forcibly guide air from the demand valve. That prevents free flow while significantly lessening intake resistance. The result is one of the lightest intake resistance values in the industry compared with products from other companies.

The S-60 second stage includes a deflector to guide air from the demand valve that prevents free flow while significantly lessening intake resistance. The result is one of the lightest intake resistance values in the industry compared with products from other companies. The deflector can be adjusted both in and out of the water. The unit provides the greatest flow in the "DIVE" position.

High density silicone mouthpiece (RS-110,RS-130, RS-460)

The high density silicone mouthpiece provides added comfort and reduced jaw fatigue.

New mouthpiece (RS-230, RS-240, RS-340, RS-350)

The new mouthpiece, developed on the basis of ergonomic engineering, further enhances the comfort of bite, fit, and stability. Even with a light bite, a high level of stability is achieved, so there is no fatigue from long periods of usage.

Dive/Surface Control (RS-460)

The RS-460 second stage features a control to increase or decrease the sensitivity of the air flow. Turn the adjustment to SURFACE before the dive or when using the second stage as an octopus. Turn the adjustment to DIVE to maximize sensitivity during the dive.

Adjustment knob (RS-130, RS-230, RS-240)

The adjustment knob also introduces a TUSA innovation, an "Easy touch" adjustment of the breathing resistance on demand. Ten full turns provides smooth, accurate adjustment for effortless breathing.

Swivel joint (RS-240, RS-350)

For optimum performance and comfort, a swivel joint is fitted between the second stage of the RS-240 and the joint section of the low pressure hose. The swivel joint allows flexibility of the hose for eliminate hose tension at the mouthpiece for a more natural and comfortable bite.

Air Refresher filter (RS-350)

There are two types of high tech filters built into the second stage. An active carbon filter cleans the air and absorbs smells, while a metal fiber filer eliminates particles as small as 100 microns. This makes sure that the cleanest and safest air is supplied to the diver.

SECTION III PRE-DIVE PROCEDURES

WARNING

Do not attempt to connect low pressure hoses to the high pressure ports with the use of an adapter. Improper connection will cause damage to the equipment and could result in serious personal injury. Low pressure components are not intended to withstand pressures greater than 400PSI (28bar) When installing your accessory hoses, avoid damaging the O-ring. Tighten gently, but firmly into the first stage housing.

PRE-DIVE OPERATING INSTRUCTIONS

- 1. Position the tank valve so the outlet points toward the diver.
- 2. Remove the dust cap from the first stage inlet and place the yoke in the center of the cylinder valve connection.
- 3. Position the first stage body so that the second stage hose goes over the right shoulder of the diver.
- 4. Hand-tighten the yoke screw.
- 5. Check all the hose connections to the first and second stages. If they can be loosened by hand, they should be tightened with a wrench before pressurizing.
- 6. Check the submersible pressure gauge to make sure it indicates zero pressure.
- 7. Open the tank valve slowly to gradually allow air into the regulator.

NOTE: During this operation, depress the second stage purge button to reduce shock to the valve mechanism. Do not perform this operation in a cold environment below 50°F(10°C). Performing this in a cold environment may cause "freeze-up" of the regulator which can lead it to free flow. If this occurs, you should contact a TUSA authorized service center.

- 8. Check the submersible pressure gauge to ensure that it indicates the proper tank pressure.
- Check the tank/regulator connection for leakage. If leakage exists, it may be caused by incorrect mounting of the regulator on the tank valve, or by a damaged O-ring in the tank valve.

- 10. To confirm that the regulator delivers air properly, first exhale through the mouthpiece to blow any foreign matter out of the second stage, then inhale. A few of these breathing cycles should immediately indicate proper function.
- 11. If you are using the second stage as an Octopus regulator, it is strongly recommended to utilize an Octopus plug to prevent any foreign matter from entering the second stage through the mouthpiece.
- 12. When the second stage is not in your mouth, uncontrolled air delivery can take place. This can be stopped by turning the second stage upside down and allowing it to fill with water. Should the air delivery continue, abort the dive and have the regulator inspected by a TUSA Authorized Service Center.

SECTION IV AFTER DIVE PROCEDURES

Providing the best possible preventative and routine maintenance before, after, and between dives will help to ensure the maximum life of your TUSA Regulator. To achieve this goal, there are a number of simple, yet important, routine maintenance procedures that should be followed by the diver after each use of the equipment. The following procedures should be diligently followed in order to obtain the maximum life and serviceability from your regulator.

- 1. After each day of diving, the regulator must be cleaned, inspected, and prepared for the next use, or for storage. As soon as the regulator is removed from the air cylinder, reinstall the dust cap over the regulator inlet port. This cap is normally attached to the First Stage and therefore has been under water. Be sure to dry all the water out of this cap before securing it over the inlet port. Ensure that the O-ring, if fitted, is in place inside the dust cap.
- 2. After diving, the regulator should be soaked in warm, not over 122°F (50°C) water to remove salt and mineral deposits as soon as possible. The preferred method is to attach the regulator to a charged air cylinder, open the cylinder valve, and thoroughly soak both the first and second stage regulators. Pay particular attention to directing water into the mainspring cavity of the first stage regulator, the second stage mouthpiece, and the holes in the second stage cover. Depress the purge button several times while the regulator is submerged in water. Dry the regulator by pressing on the purge button with the mouthpiece pointing down. Place the dust cap in position in the yoke, or over the DIN screw.

Soaking regulator parts in warm water will remove more salt and mineral deposits than will conventional rinsing. It will loosen deposits on interior components that rinsing will not (If no charged air cylinder is available, follow the above procedure but be very careful NOT to depress the purge button, or leave dust cap off, when the regulator is submerged in water. Failure to do this will allow water to enter bothregulator stages and may result in internal corrosion).

Simply soak the entire exterior of the first stage thoroughly, and proceed as above when cleaning the second stage.

- 3. Store in a clean equipment box, or as an alternative, seal inside a plastic bag. Store in a clean dry place.
- 4. Never store the regulator while it is still connected to the diving cylinder.
- 5. Do not use any type of solvent to clean any part of the regulator. Do not expose any part of the regulator to silicone spray, as some aerosol propellants attack or degrade rubber and plastic material.
- 6. Do not carry the diving cylinder by the regulator as such abuse will eventually damage the regulator or the cylinder valve. Do not expose the regulator to unnecessary shocks or impact.

SECTION V CONTAMINATED WATER DIVING

Sophisticated diving gear designed for use in contaminated water provides constant positive pressure inside the regulator case and utilizes redundant exhaust valve passages. TUSA regulators are not designed to provide this requirement and therefore are not recommended for use in contaminated water diving.

SECTION VI RS-350E/240E/230E/460 USE IN COLD WATER DIVING

This is important information. Be sure to read it.

WARNING:

This RS-350E/240E/230E/460 regulator for the European market has passed the cold water performance test (water temperature: 4°C) Specified by EN250. When using this RS-350E/240E/230E/460 regulator in cold water at temperatures of 10°C or below, be sure to observe the following notices.

General Caution Items

Before you use the regulator, be sure to receive specialized instruction on cold water diving from a diving instruction authority so that you learn the necessary skills and knowledge.

Be sure to receive orientation for the diving environment.

Be sure to obey the instructions of your instructors and guides.

Equipment Handling Caution Items

The conditions for freezing up of the regulator change in accordance with the breathing conditions of its user (breathing volume, breathing speed, number of breaths) and the environment conditions before and during use.

Do not take shallow, fast breaths. It makes freezing occur more easily.

Store the regulator at room temperature. When diving, store your regulator in its bag to keep it warm until just before use.

When waiting between dives, always keep your regulator warm. Do not leave it out in a cold environment.

Your regulator may freeze depending on the conditions. If your regulator freezes, it may free flow. If it does, use breathing technique for free flow conditions. When diving in water temperatures of 10°C or below, always swim at a safe depth from which you can perform an emergency swimming ascent.

NOTICE:

The regulator that has passed the cold water performance test is RS-350E/240E/ 230E. When using regulators other than RS-350E/240E/230E (including the previous specifications RS-230), be sure to use them in water temperatures of 10°C or above in accordance with the Instruction Manual.

SECTION VII SCHEDULED MAINTENANCE

- Do not assume that a regulator is in good working order because of storage or infrequent use. Prolonged or improper storage can still result in internal corrosion and/or deterioration of O-ring seals.
- 2. Have your regulator cleaned and adjusted frequently. The frequency will dependupon the amount of use given the regulator and the conditions of use. However, TUSA strongly recommends inspection, overhaul and scheduled parts replacement at least once a year in order to ensure the optimum functioning of the regulator.

Certain parts require replacement at specific intervals. This work must be carried

out by a certified TUSA repair facility. Frequent use such as rental equipment and/or in salt, chlorinated (swimming pool), or polluted fresh water might require cleaning and overhaul of the regulator every three to six months. Chlorinated water is an especially bad environment for regulators as the chlorine chemically deteriorates the neoprene rubber components.

 Regularly inspect the sintered filter in the inlet port of the first-stage. If it is discolored or corroded, replacement by trained personnel is required. Also, at this

point, the entire regulator may need a general overhaul with replacement of all softseals and non-reusable components. Rust or aluminum oxide (gray powder)

deposits on the sintered filter are usually an indication that salt water has entered

the air cylinder and caused internal corrosion. At this time you air cylinder(s) should be internally inspected by a qualified and competent service control facility and then cleaned, or hydrostatically tested as required.

4. Do not disassemble your regulator. There are no adjustments which can or need to be carried out by the user. Take the regulator to a qualified TUSA dealer or service facility for service. Ensure that only original parts are used to service your regulator.

FINAL NOTE

Service your Regulator often- your personal safety and the mechanical integrity of your regulator depend on it.

SECTION VIII

CONDITIONS OF REGULATOR LIFETIME WARRANTY

- 1. Warranty card must be returned to TUSA within 30 days from date of purchase.
- 2. Regulator must be serviced annually by a TUSA Dealer within 30 days of theanniversary date of purchase.
- 3. Ownership card must be presented with your TUSA Regulator for corrections and service to honor your lifetime warranty.
- 4. If there are no TUSA Dealers in your area contact your TUSA dealer for instruction.

SECTION IX LIMITED LIFETIME WARRANTY

- 1. Regulators are guaranteed against defects in material and workmanship.
- 2. The Lifetime Warranty is non-transferable and is valid for the original purchaser only.
- 3. The Lifetime Warranty does not cover damage resulting from improper usage,neglect, alteration, loss or unauthorized repairs.
- 4. The Lifetime Warranty does not cover the cost of inspection, preventative maintenance or labor necessary for repair.
- 5. TUSA or its dealers reserve the right to charge for replacement or repair if signs of abuse are evident.
- 6. The regulator must be inspected and serviced annually within 30 days of the anniversary date of purchase.
- 7. Replacement or repair of defective parts will be at the discretion of TUSA.

This Warranty is Void if:

- a. The regulator is not registered with TUSA within 30 days of purchase.
- b. The regulator is not serviced yearly by TUSA or an authorized dealer.
- c. Signs of abuse or neglect are apparent in examination.
- d. The regulator is not rinsed in fresh water after all usage, including chlorinated water.
- e. Rust has been introduced into the regulator from a diving cylinder.

SECTION X "Air Refresher" filter replacement (RS-350 only)

- 1. The timing for replacing the filter is the same as for the equipment overhaul. TUSA strongly recommends that you have your filter replaced every 100 dives, or a year after purchase or the last overhaul (or filter replacement) regardless of the conditions of use. The TUSA repair facility will replace the filter during the overhaul, so be sure to have your equipment overhauled at the specified interval. If you have already had your equipment overhauled and only wish to replace the filter, you must also have this work carried out at a specialist outlet or TUSA facility.
- 2. Never try to overhaul the equipment or replace the "Air Refresher" filter yourself, as it could cause a serious accident.

ddress:		



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