## User Guide For

# Balanced Scuba Regulator


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# WARRANTY

## USE ONLY KIRBY MORGAN® GENUINE PARTS

Kirby Morgan Dive Systems Inc., (KMDSI) warrants every new helmet, BandMask®, Full Face Mask, SCUBA regulator or air control system (KMACS 5) (each, a Product) to be free from defects in workmanship for a period of three hundred sixty five (365) days from the date of purchase from a KMDSI authorized dealer. This warranty covers all metal, fiberglass, and plastic parts, but does NOT cover rubber parts, communications components, head cushions, chin cushions, or foam spacers.

Any defect of the product in workmanship or material covered by this warranty discovered within three hundred sixty five (365) days from the date of purchase must be promptly communicated in writing to the nearest authorized KMDSI dealer or (if no such dealer in the buyer's country) contact KMDSI directly at (805) 928-7772. No Product returns will be accepted by KMDSI without a returned merchandise authorization (RMA) number from KMDSI. Upon receipt of the RMA from KMDSI, the buyer should return the defective Product or part, freight prepaid, to an authorized KMDSI dealer or the KMDSI plant, as directed by the RMA department. KMDSI will repair or replace the Product at no charge, within a reasonable time, as it deems necessary.

### THIS WARRANTY IS NULL AND VOID IF:

1) The Product is not registered with KMDSI within ten (10) days of purchase, or

2) The Product has not been properly serviced and/or maintained by KMDSI factory trained/approved personnel, according to factory recommended procedures provided in the manual, along with the KMDSI Appendices Checklists, and/or Product updates have not been performed as recommended by KMDSI, or

3) Unauthorized attachments or modifications have been made to the Product, or

4) The Product has been used for purposes other than those for which it was designed, or otherwise has been abused, misused, or subjected to unusual conditions, or the Product's intended service has been exceeded.

**EXCEPT AS SPECIFICALLY PROVIDED HEREIN, THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES FOR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE HELMETS, BANDMASKS AND AIR CONTROL SYSTEMS COVERED BY THIS WARRANTY ARE MARKETED AND SOLD BY KMDSI SOLELY FOR COMMERCIAL OR INDUSTRIAL USE AND ARE NOT A CONSUMER PRODUCT INTENDED FOR PERSONAL, FAMILY, OR HOUSEHOLD USE.**

In purchasing any Product subject to this warranty, the buyer agrees that its sole and exclusive remedy and KMDSI's entire obligation in contract, tort, or otherwise under this contract will be repair or replacement at KMDSI's option of the Product or any parts which KMDSI determines during the applicable warranty period are defective in workmanship or material covered by this warranty. All exchanged parts are the property of KMDSI. The buyer's exclusive remedy and KMDSI's entire liability in contract, tort, or otherwise is the payment by KMDSI of the buyer's actual damages up to but not to exceed the amount paid by the buyer for the Product.

In no event shall KMDSI be liable to the buyer for indirect, special, incidental or consequential damages (including, but not limited to, damages for lost profits, lost sales, loss of business opportunity, or for injury to persons or property arising out of the use of the Products). Any claim or action for breach of warranty must be commenced within one year following delivery of the Product to the buyer.

Buyer acknowledges that this warranty is the sole and exclusive warranty of the Product and that it supersedes any and all oral or written representations and undertakings between KMDSI, its dealers, and the buyer relating to the Products. This warranty allocates the risks of product failure between KMDSI and the buyer, which allocation is recognized by both parties and is reflected in the price of the goods. The buyer acknowledges that they have read this agreement, understand it, and are bound by its terms.

**IMPORTANT:** Please register your purchase online at **www.kirbymorgan.com/support/product-registration-form**. If you have a problem with the online registration, please contact your Kirby Morgan dealer, or Kirby Morgan directly by calling (805) 928-7772, or email sales@kirbymorgan.com.

**Kirby Morgan® thanks you for your purchase.**

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# Definitions of Signal Words and Terms Used in this Guide

The original language of the Kirby Morgan Manuals is English. Translation into other languages will be provided upon request. KMDSI may charge a fee for these services.

**⚠ CAUTION**

**This word 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.**

**⚠ WARNING**

**This word indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.**

**REMARKS: Operating or descriptive information which will help you make the best use of your regulator.**

This user guide contains important safety information and should always be available to those personnel using this equipment. Read, understand, and retain all instructions before using this equipment to prevent injury or equipment damage.

If you sell or loan this equipment to another person, be sure that this manual accompanies the gear when you transfer possession to them.

## Product Changes

Following publication of this booklet, certain changes in standard equipment, options, prices and the like may have occurred which would not be included in these pages. Your Authorized KMDSI dealer is your best source for up-to-date information on any of these products. Kirby Morgan Dive Systems Inc. reserves the right to change product specifications at any time without incurring obligations.

In order to use this regulator assembly, it is essential to complete a training course and receive certification, issued by a recognized national SCUBA training organization, confirming your ability to dive.

## ⚠ CAUTION

**By using this equipment the diver acknowledges that he has read and completely understands the instruction manual provided with it, and hereby agrees to hold harmless Kirby Morgan Dive Systems, inc. from any accident, malfunction, or other event arising from the misuse of the equipment, or from any lack of, or incomplete understanding of its operation and function.**

## ⚠ WARNING

**The first stage SCUBA regulator has not been designed or tested for use with breathing gas mixtures containing greater than 23% oxygen.**

**Do not use the first stage or the regulator assembly with second stage with breathing gases containing more than 23% oxygen. Use with gas mixtures containing in excess of 23% oxygen could lead to fires or explosions.**

## ⚠ WARNING

**The maximum approved depth for the use of this equipment is 50 meters (164 FSW) @ 62.5 RMV (heavy work load). Do not exceed this limit. The use of open circuit SCUBA at depths below 164 FSW poses extreme risks including out-of-air emergencies and decompression sickness, which can lead to serious personal injury or death.**

## ⚠ WARNING

**Never use solvents or aerosol sprays on our around the regulator assembly. Certain solvents and propulsion agents attack and damage rubber and certain plastics. This could lead to regulator failure. Drowning could result.**

This user guide gives basic daily operational information for the Kirby Morgan Balanced SCUBA Regulator assembly.

Before each use the regulator assembly should be carefully checked and submitted to the operational tests. Never dive with a regulator showing any signs of deterioration or a below normal performance.

Only original Kirby Morgan hoses should be used as replacements.

- HP thread 7/16" - 20 UNF
- LP thread 3/8" - 24 UNF

**⚠ CAUTION**

**Always allow pressure to build up slowly in the regulator by turning on the cylinder valve slowly.**

Use only Christo-Lube® on the rubber components. Never grease the parts of your regulator with a lubricant containing hydrocarbons, household oil, or motor oil.

# Cold Water Diving

Before diving in cold water (water temperature below 10 °C/50 °F), the diver should be trained and have mastered the techniques of cold water diving, learning techniques and all precautions necessary to avoid freezing of the regulator. All of this is included in the training programs of organizations offering courses in diving in cold water or under ice. You should also use equipment intended for this purpose.

In order to reduce the risks of regulator freezing when diving in cold water (below 10 °C), consider doing the following:

1. Protect your regulators from any water entering the first or second stages.

2. Protect your equipment from cold before the dive. Keep your regulator and all its accessories in a warm dry place.

3. Carry out all pre-dive checks of your equipment in a warm dry place if necessary, before even going to the dive site.

4. Avoid breathing through the regulator or pressing the purge button in very cold air before entering the water.

5. Check that the air used to fill your cylinder is dry. The water vapor contained in this air should have a condensation point below -54°C. Excess water vapor can freeze, causing a free flow, or blocking the air flow completely.

# 2nd Stage Regulator Serial Number Location

The serial number is printed on the top part, near the mouth piece, on the 2nd stage regulator.


# 1st Stage SCUBA Regulator and 2nd Stage Regulator Maximum Work Pressure

| REGULATORS | PSI | BAR |
|---|---|---|
| 1st Stage | 145 | 9.99 |
| 2nd Stage | 150 | 10.34 |

# Divers Work Rate Expressed as Respiratory Minute Volume (RMV)*

| WORK LOAD | RMV | CUBIC FEET/ MINUTE (CFM) | EQUIVALENT LAND BASED EXERCISE |
|---|---|---|---|
| Rest | 7–10 RMV | 0.2 - 0.35 CFM | |
| Light Work | 10–20 RMV | 0.35 - 0.7 CFM | Walking 2 miles per hour |
| Moderate Work | 20–37 RMV | 0.7 - 1.3 CFM | Walking 4 miles per hour |
| Heavy Work | 37–54 RMV | 1.3 - 1.9 CFM | Running 8 miles per hour |
| Severe Work | 55–100 RMV | 1.94 - 3.5 CFM | |

* source: U.S. Navy Diving Manual

# Regulator Transport and Storage

## 2nd Stage

- The kind of package is a plastic bag that is sealed;
- The weight of the bag is usually 0.75 pounds (0.35 Kg);
- The package dimension is 8 × 10 inches (203.2 × 254 mm);
- One regulator and hose protector is packed per bag;
- The regulators are sent to dealers by air or truck, depending on dealer request.

## 1st and 2nd Stage Regulators when purchased together

- The kind of package is a cardboard box with cardboard inserts to stabilize the regulators;
- The weight of the box is usually 3.7 pound (1.67 Kg);

- The package dimension is 13 × 9 ½ × 4 ¼ inches (330.2 × 241.3 × 107.95 mm);
- One 1st Stage and one 2nd Stage regulator is packed per box;
- The regulators are sent to dealers by airfreight or truck. Depending on how the dealer wants it sent.

*Packaging Step 1*

*Packaging Step 2*

*Packaging Step 3*

*Packaging Step 4*


*Packaging Step 5*

# Kirby Morgan Balanced SCUBA Regulator Assembly

Thank you for choosing a Kirby Morgan regulator.

Your new regulator assembly has been designed and manufactured with pride, according to Kirby Morgan's world renowned exacting standards for quality and performance. The Kirby Morgan Balanced SCUBA Regulator is a high performance regulator which was designed for the professional SCUBA diver. The second stage is a modified version of the same regulator used on the Kirby Morgan 97 helmet and stand alone 455 balanced regulator. Many of the parts used in this Balanced Scuba Regulator are identical to those used on the KM 97 helmet and 455 balanced regulator. This is helpful to dealers in stocking parts for service and repair.

The first stage used on the SuperFlow regulator is known as our HiVent first stage. This regulator was developed from the technology used in our Kirby Morgan Air Control Systems. It offers an exceptionally high flow of air with a minimum pressure drop.

Provided it has been purchased new from an authorized KMDSI Dealer, your regulator assembly is covered by KMDSI's Limited Warranty. Be sure to read and fill out the warranty card completely and register your purchase online at www.kirbymorgan.com within ten (10) days of purchase. Also save your sales receipt. A copy of your receipt must be presented whenever obtaining warranty service.

Perhaps more than any other piece of diving equipment, your regulator's function and performance relies greatly on the care and maintenance it will receive, in addition to regularly scheduled dealer service. Before you dive with your new Kirby Morgan regulator, it is important to read this guide in its entirety; to become familiar with its features, as well as the correct procedures for setup, pre-dive inspection, and post-dive maintenance.

# General Precautions and Warnings

Before using this regulator assembly, you must have successfully received training and certification in the technique of SCUBA diving from a recognized certification agency (or any Military or government operated diving school).

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 SCUBA equipment by uncertified, or untrained persons, is dangerous and can result in serious injury or death.

**⚠ WARNING**

**Never lubricate any part of the regulator or cylinder valve with any lubricant. Lubrication must only be performed by a KMDSI factory trained technician. Improper lubrication can lead to regulator malfunction. Drowning can result.**

**⚠ CAUTION**

**Do not use the regulator first stage as a carrying handle when lifting or transporting the cylinder. Always lift the cylinder by the cylinder valve handle without the regulator attached. The regulator can be damaged if you use it to lift the cylinder.**

**⚠ CAUTION**

**Factory prescribed service for this regulator assembly must be performed at least once each year by a factory trained technician who is employed by an Authorized KMDSI Dealer. Repair, service, disassembly, or first stage adjustment must not be attempted by persons who are not factory trained and authorized by KMDSI.**

**⚠ CAUTION**

**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 against the first stage.**

# Preparation and Setup

KMDSI recommends that you bring your regulator assembly to your Authorized KMDSI Dealer for the installation of any accessory items, including instrumentation, LP quick disconnect hoses, and alternate air sources. Your dealer can also answer any questions you may have pertaining to the information in this guide.

1. If the adjustment knob has been turned "out" (counter-clockwise), turn it "in" (clockwise) until a clicking noise can be heard. This indicates full spring pressure has been achieved.

2. If you are using a standard cylinder with a yoke connector valve, inspect the cylinder valve O-ring for any wear or damage.

## Mounting the First Stage Onto the Cylinder Valve (Yoke Connector)

1. Partially unscrew the yoke screw of the first stage regulator so that the dust cap can be removed from the filter and air inlet.

2. With the cylinder valve facing away from you, release a small amount of air from the cylinder. When air is heard exiting, immediately close the valve. This will clear any moisture or debris that may be inside the cylinder valve outlet opening.

3. Place the first stage regulator over the cylinder valve so that the inlet fitting aligns with the O-ring of the cylinder valve, and the LP hose of the primary second-stage will be routed over the right shoulder. While holding the first stage in place, turn the yoke screw clockwise. Ensure that the yoke screw mates into the small dimple on the backside of the cylinder valve, and tighten finger tight only.

4. If a submersible pressure gauge is attached to the first stage, ensure that the gauge is facing away from you. Pressurize the regulator by slowly turning the cylinder valve handwheel counter-clockwise. Continue turning the cylinder valve hand wheel counter-clockwise until it is fully open, and then turn back clockwise ¼–½ turn.

5. Listen near the first stage to check for any leakage. If leakage is detected, immerse the first stage and cylinder valve while pressurized to determine the source.

6. If leakage has been detected, follow the procedure for removing the regulator from the cylinder valve. If air was leaking between the first stage and cylinder valve, replace or reseat the cylinder valve O-ring as needed and repeat the above procedure. If leakage persists, do not dive with the regulator! Return the regulator to a KMDSI Dealer.

# Balance Purge Tube and Regulator Installation

**Tools and Components required:**

- Pliers or Tie Wrap Gun rated at 50 pounds/22.6 kg
- Side Cutter Pliers
- Thin Nylon Rope (e.g., Paracord) or equivalent *(for Pull Test)*
- 25 pound (11 kg) weight or a filled 50 cu. ft. aluminum scuba tank *(for Pull Test)*

This regulator was specifically designed to work with the M-48 SCUBA pod assembly as well as being a standalone scuba regulator.

The Sleeve P/N 220-057, Purge Tube P/N 220-087, and Tie Wrap P/N 520-038 will be used to replace the original Tilt to Purge valve. Using the new parts will eliminate the need to manually purge any accumulated water from inside the pod. This will now become an automatic function.

1. After removing the regulator from the POD, clean and carefully inspect the pod assembly for damages such as cuts in the rubber, cracked or broken parts. Replace as necessary. Remove the tie wrap from around the tilt to purge valve and remove the plastic tilt valve assembly P/N 805-047, as well as the small internal valve body insert and its exhaust valve as a unit. Inspect the valve and valve body for damages, Clean and replace as necessary. Also make sure the sealing surfaces of the pod, where the valve will insert, have been thoroughly cleared.

2. Reinstall ONLY the valve body insert with its valve, back into the water dump tube on the POD. Push it in all the way. YOU WILL NO LONGER NEED THE TILT TO PURGE VALVE ASSEMBLY.

## ⚠ WARNING

**Only the KMDSI mouthpiece, P/N 810-022L, will function correctly in your SCUBA POD. Do not attempt to use any other manufacturer's mouthpiece. Doing so could result in death by drowning**

## ⚠ WARNING

**Never dive the mask without a mouthpiece installed in the POD. A mouthpiece allows use of the POD even if the POD is not sealed to the mask. Buddy breathing cannot be readily accomplished without a mouthpiece installed. Use of the mask without the mouthpiece could result in death by drowning.**

3. Insert the KMDSI mouthpiece P/N 810-022L from inside the POD; into the opening so that the bite end extends into the cavity and the other end is flush with the POD opening.

4. Insert, the Sleeve P/N 220-057 into the Purge Tube P/N 220-087 as shown. Make sure the direction of insert is correct and pushed in all the way.

5. Insert these two parts together into the tube of the POD as one unit until they are against the exhaust valve and body. The outside of the tube should **NOT** be bulged out or displaced if the tube has been installed properly. Align the tube to point upwards.

6. Make certain that the regulator mount tube is clean and free of ANY lubricants. Insert the regulator into the mouthpiece opening and fit it so that the mouthpiece and POD opening are fully seated on the demand regulator. Be certain everything is lined up straight.

## ⚠ WARNING

**Use only a tie wrap rated for a minimum pull of 50 pounds. Use of a weaker tie wrap, or one that is "LOW PROFILE" could become loose and allow the regulator to pull out of the POD. This could lead to flooding of the POD and death by drowning.**

7. Fit the longer tie wrap P/N 520-039 into position. Ensure the joint of the tie wrap will sit in the "center of the side" of the mouth opening as shown. Pull as tight as possible by hand or use a tie wrap installation tool.

8. Cut off excess tie wrap material flush with the joint lock of the tie wrap. There should be no sharp edges.

9. Pull the mouthpiece and the demand regulator in opposite directions with enough force to ensure that they are both securely mounted to the POD.

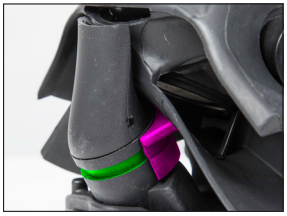
**NOTE**

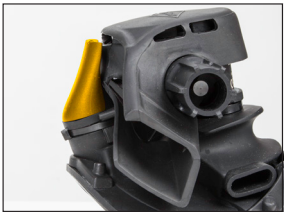
If the mouthpiece or demand regulator pulls off the POD, even partially, it MUST be remounted.

10. If the mouthpiece or demand regulator pulls off the POD, even partially, it must be remounted!

11. Align the "Saddle" on the exhaust cover, over the area of the Purge Tube P/N 220-087. You will see that the grooves on the tube will align to the saddle.

12. Ensure the purge tube is still pointing up and install the shorter tie wrap P/N 520-038. The open end of the purge tube should line up evenly with the face of the regulator tube.





NOTE

It is recommended that any time a user is in doubt as to the integrity of the "component to POD" fit in question or before each dive, a simple pull test is performed by the end user or installer.

# Pull Test After Initial Assembly

**⚠ WARNING**

**A properly secured mouthpiece and regulator should be able to withstand a pull force of 25 pounds minimum (111 Newtons). If in doubt a pull test should be conducted by securing a 25 pounds (11 Kg.) weight to the regulator and allowing the full force of the weight to be applied for a minimum of three seconds.**

NOTE

It is recommended that anytime a user is in doubt about the "component to POD" fit, a simple pull test be performed by the end user or installer. Before testing, make careful note of the mouthpiece and POD positions in order to check for movement later.

1. Attach a 25 pound (11 kg) weight or a filled 50 cu. ft aluminum scuba tank to the demand regulator using string or tie wraps in the manner shown on this page.

2. Suspend the weight for three–five seconds from the POD with the POD mounted on a stable device if available, allowing the full weight to pull on the demand regulator.

3. Check the position relationship of the mouthpiece and POD to be certain they have not moved.

# Pre-Dive Checkout

Before each use, the regulator assembly must be given a thorough visual inspection and functional test. NEVER dive with a regulator that shows signs of damage, or provides substandard performance until it has received complete inspection and service from an Authorized KMDSI.

## Inspection Checklist

1. Remove the dust cap and closely inspect the condition of the first stage filter. It should appear clean and free of any corrosion or discoloration. If a green residue is visible on the surface of the filter, moisture has entered the first stage and may have caused corrosion to begin forming inside which can seriously impair the regulator's performance.

Other colored residue may indicate that the regulator has been used with an internally corroded aluminum (white/ gray powder) or steel (rust) cylinder. In this event, the cylinder in question should be returned to the dive store for internal visual inspection.

**⚠ WARNING**

**If discoloration or contaminant residue is found to be present on the surface of the first stage filter, do not dive with the regulator until it has received factory prescribed service from an Authorized KMDSI Dealer. The presence of contaminants could cause the regulator to malfunction, leading to serious personal injury or death.**

2. Prior to each use, the regulator assembly must be given a thorough visual inspection and functional test. Carefully inspect all hoses at their fittings to ensure they are securely connected into their respective ports on the first stage.

If hose protectors are present, slide the protectors back to expose the hose fittings, and inspect the fittings. Inspect the length of each hose to ensure that the hoses are not blistered, cut, or otherwise damaged.

3. Visually inspect both the first and second stage regulators for any signs of external damage.

4. Slowly back out on the demand regulator adjustment knob counter clockwise until a slight free flow develops, then slowly rotate the adjustment knob in (counterclockwise) until the free flow stops. Depress the front cover of the regulator while slightly blocking the mouthpiece to prevent freeflow of the regulator. At this point the regulator is set for the least amount of breathing effort. Test breathe by taking several shallow and deep breaths to ensure the regulator breathes properly.

Turn the adjustment knob in (clockwise) at least three turns. This will prevent the regulator from free flowing if you enter the water without the regulator in your mouth. Readjust the regulator when in the water.

## During the Dive

1. This demand regulator can be adjusted by the diver during the dive by simply rotating the spring bias adjustment OUT (counter clockwise) to make the demand valve more sensitive or IN (clockwise) to make the demand valve less sensitive. In normal operation the demand adjustment should be set at the easiest breathing setting by rotating the adjustment knob OUT (counterclockwise) until a slight free flow develops and then rotate it in until the free flow stops. At this point the diver will be taking full advantage of the demand valve's performance.

NOTE

Before entering the water, it is best to turn the adjustment knob in (clockwise) at least 3 full turns or until an audible “click” is heard. Doing this, as well as slightly covering the mouthpiece, should eliminate the possibility of free flow from sudden water force on the diaphragm. This regulator does NOT have a “Pre-Dive/Dive” mechanism/ vane. If the regulator does free flow, slight blockage of the mouthpiece opening will stop any flow.

**⚠ WARNING**

**The Balanced Scuba Regulator can not be used by more than one diver at a time.**

**⚠ WARNING**

**Diving an adjustable demand regulator that is adjusted to breathe with heavy resistance could cause the diver to become exhausted. This could lead to drowning. Always adjust the demand regulator for the easiest breathing.**

# After the Dive

If fresh water is available, rinse your regulator completely while it is still connected to the tank before depressurizing it. This helps to prevent any contaminants from entering sealing surfaces inside the regulator. If this is not possible, follow the procedure for removing the regulator assembly from the cylinder valve per "Removal of the Regulator Assembly from the Cylinder Valve" on page 21 and then rinse.

Store dry, properly post-dived regulators in a cool, dry place away from direct light.

It is recommended that the temperature not exceed: 90 °F (32 °C) and not go below +14 °F (-10 °C) in storage.

## Removal of the Regulator Assembly from the Cylinder Valve

1. Shut off the cylinder air supply by turning the cylinder valve hand wheel clockwise until it stops.

2. While observing the submersible pressure gauge, depress the purge button of the second-stage. When the gauge reads zero and airflow can no longer be heard from the second stage, release the purge button.

3. Turn the yoke screw counter-clockwise to loosen it and remove the first stage from the cylinder valve.

4. Dry the dust cap with a towel or other lint-free cloth. While you may use air from your tank valve to blow the water off the dust cap, you run the risk of blowing out the dust cap O-ring and losing it.

5. Place the dust cap over the first stage inlet fitting and seal it securely in place by tightening down the yoke screw. Do not overtighten the cap.

# Safety Precautions

**⚠ WARNING**

**Use only genuine Kirby Morgan replacement parts.**

**NOTE**

The second stage regulator can be used with 50% oxygen, provided it's kept clean.

To ensure the best possible regulator performance and to avoid damage to regulator components, use only KMDSI original factory replacement parts.

To avoid damage to regulator components, only the correct size and type of tools should be used. The use of adjustable wrenches should be avoided whenever possible to avoid damage to soft brass parts.

Should you encounter technical difficulties in servicing a Kirby Morgan regulator, please contact Kirby Morgan or Dive Lab directly for assistance.

# Specifications

**Second Stage Type:** Downstream, balanced bias adjustable.

**Second Stage Body:** Glass fiber reinforced thermoplastic

**Work of Breathing:** 0.87/0.90 (AU) joules/liter at 62.5 RMV at 132 FSW

**Work of Breathing:** 1.0/1.1 (AU) joules/liter at 62.5 RMV at 165 FSW

# Routine Maintenance

Routine maintenance is the best way to ensure long regulator assembly life and optimum performance. All end users should be instructed in the proper procedures for regulator care.

## Daily Pre-Dive Maintenance

1. Check the maintenance log to insure the regulator has been overhauled during the past 12 months.
2. Visually inspect the first and second stage to insure all ports are plugged and the regulator shroud/exhaust cover is secure.
3. Visually inspect all hoses for signs of damage such as cracking, fitting slippage, cuts or abrasions.
4. Visually inspect all regulator components including submersible pressure gage, inflator hose and other components.
5. Visually inspect the first stage filter in the yoke for signs of dirt and corrosion.
6. Rotate the adjustment knob in clockwise, then attach the regulator to a fully charged SCUBA cylinder and slowly open the cylinder valve.
7. Check for proper demand function and purge operation. Listen for the sounds of air leaks. Perform accessory checks as necessary for the equipment in use.

## Post Dive Maintenance

1. Secure the cylinder valve, depressurize the regulator assembly and remove it from the cylinder.
2. Whenever the Regulator is removed from the SCUBA Cylinder, the Dust Cap should be dried and installed over the First Stage Inlet Port. It is very important to dry the Dust Cap to prevent water from the cap from entering the First Stage. Screw the regulator set screw down until snug and the rubber dust cap is slightly compressed.
3. At a minimum, the entire regulator should be thoroughly rinsed with fresh clean water after every dive. Mild hand washing type dish soap can be used to remove grime.

**⚠ CAUTION**

**During rinsing, do not depress the Purge Button on the Second Stage. Pressing the Purge Button can allow water to enter the Inlet Valve and balance chamber .**

4. If possible, the entire regulator should be soaked in fresh warm water, between 70–120 °F, for 15 minutes or longer. Soaking in warm water

will remove salt and mineral deposits more effectively than a fresh water rinse alone.

**⚠ CAUTION**

**During soaking do not depress the Purge Button on the Second Stage.**

5. Allow the regulator to dry completely before storage. Remove the exhaust cover, diaphragm retaining ring and diaphragm, and allow to dry then reassemble the regulator. Do not leave the regulator sitting in direct sunlight. Shake the second stage to help remove water trapped inside. Clean, oil-free, low-pressure (<30 psig) (1.8 bar) air can be directed into the first stage sensing holes to help displace water. This is helpful if the regulator is to be packed for travel.

6. Screw the second stage regulator adjustment knob all the way out, away from the second stage body. This will lengthen the life of the regulator seat considerably.

7. Insure the regulator is completely dry before storing. Store only in a clean, cool, dry place, away from direct light.

**⚠ CAUTION**

**Never store the Regulator while still connected to a SCUBA tank.**

**⚠ WARNING**

**DO NOT carry a SCUBA Cylinder by the Regulator or Hose. This abuse will lead to damage of the Regulator or Hose failure. Hose failure can result in personal injury.**

**⚠ WARNING**

**DO NOT use cleaning solvents on any parts or components of this Regulator. The use of solvents may lead to failure of the Regulator parts.**

**⚠ WARNING**

**NEVER pressurize the First Stage Regulator without having a Second Stage attached.**

# Scheduled Maintenance

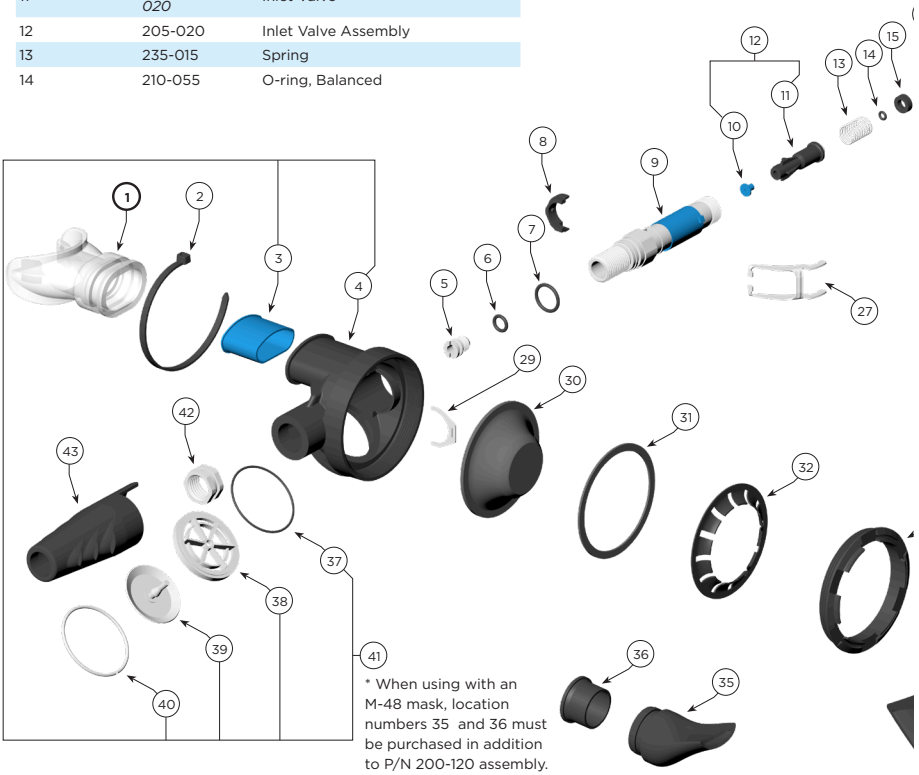
Do not assume that a Regulator is in good working order because of infrequent use. Prolonged or improper storage can result in O-ring deterioration or internal corrosion that may result in poor performance.

1. The minimum maintenance suggested for all regulators is an annual inspection/soft goods overhaul by a qualified KMDSI technician. However, regulators that are used more than 20 times a month or under severely harsh environmental conditions should be serviced more often. For example, a regulator used as a rental or for training purposes may require service every two to three months or more. Whenever a regulator has been inactive for longer than three months, it should be carefully inspected and surface function checked prior to use.

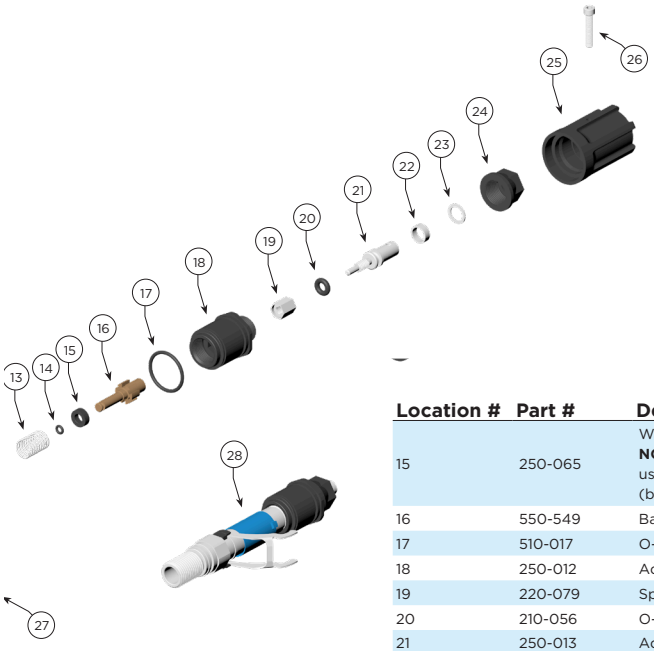
2. The first stage sintered filter, located in the yoke assembly, should be visually inspected on a regular basis. If a visual inspection reveals discoloration or obvious signs of dirt or corrosion, the regulator should be thoroughly serviced. In addition, the SCUBA cylinders used must be internally inspected and cleaned if necessary.

# Balanced SCUBA Regulator Assembly

| Location # | Part # | Description |
|---|---|---|
| 1 | 310-278 | Mouthpiece |
| 2 | 520-039 | Tie Wrap |
| 3 | 220-086 | Flow Baffle |
| 4 | 220-041 | Regulator Housing |
| 5 | 250-031 | Adjustable Nipple |
| 6 | 510-010 | O-ring |
| 7 | 510-015 | O-ring |
| 8 | 220-056 | Lever Bearing Clip |
| 9 | 250-059 | Main Tube |
| 10 | 210-060 | Valve Seat |
| 11 | *Order 205-020* | Inlet Valve |
| 12 | 205-020 | Inlet Valve Assembly |
| 13 | 235-015 | Spring |
| 14 | 210-055 | O-ring, Balanced |




* When using with an M-48 mask, location numbers 35 and 36 must be purchased in addition to P/N 200-120 assembly.





| Location # | Part # | Description |
|---|---|---|
| 15 | 250-065 | Washer<br>**NOTE**: This washer to be used ONLY with 550-549 (brown) Balance Spacer |
| 16 | 550-549 | Balance Spacer |
| 17 | 510-017 | O-ring |
| 18 | 250-012 | Adjustment Guide Insert |
| 19 | 220-079 | Spring Seat |
| 20 | 210-056 | O-ring |
| 21 | 250-013 | Adjustment Shaft |
| 22 | 220-080 | Spacer |
| 23 | 220-031 | Thrust Washer |
| 24 | 220-021 | End Cap Packing Nut |
| 25 | 220-085 | Adjustment Knob |
| 26 | 230-017 | Adjustment Knob Screw |
| 27 | 240-008 | Lever Arm |
| 28 | 205-030 | Main Tube Assembly<br>*(Includes loc. # 5–24 and 27)* |
| 29 | 240-009 | Packing Lock Clip |
| 30 | 210-041 | Diaphragm |
| 31 | 220-032 | Diaphragm Washer |
| 32 | 220-034 | Diaphragm Surge Dam |
| 33 | 220-033 | Diaphragm Retainer Ring |
| 34 | 220-042 | Regulator Shroud/Exhaust Cover |
| 35 | *220-087 | Purge Tube, Balanced |
| 36 | *220-057 | Purge Sleeve, Balanced |
| 37 | 510-019 | O-ring |
| 38 | 520-022 | Exhaust Valve Insert |
| 39 | 510-776 | Exhaust Valve |
| 40 | 540-012 | Retaining Ring |
| 41 | 205-025 | Regulator Body Assembly |
| 42 | 250-058 | Jam Nut |
| 43 | 220-088 | Hose Protector |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