Operating Instructions

⚠ WARNING

This module is our effort to explain the operation, maintenance and use of the metal bottom end fiberglass and stainless steel helmets. WE DO NOT HEREIN MAKE ANY EFFORT TO TEACH THE PRINCIPLES OF DIVING. It is our assumption the reader is a qualified commercial diver. We highly recommend that all divers should receive proper training, under controlled conditions, in the use of any model of commercial diving helmet that they have not previously used or trained in, prior to use on the job.

Contents

1.1 Introduction

NOTE

All divers should be properly trained and certified prior to the use of any Kirby Morgan products.

The use of Kirby Morgan diving helmets will vary with the type of work and environmental conditions. The basic procedures of donning and doffing the helmets will be similar.

Divers that are familiar and trained in the use of previous Kirby Morgan helmets and BandMasks; i.e., Navy MK. 21 helmet or the SuperLite® helmets, will find that all Kirby Morgan diving helmets and BandMasks® have the breathing system controls located in the same position. The operation of these helmets will also be similar. The diver must be tended at the surface at all times by a trained, qualified commercial diving tender.

1.2 Design Purpose

All Kirby Morgan helmets are designed for surface supply umbilical use and are **not recommended to be used in SCUBA mode.**

⚠ WARNING

Kirby Morgan® diving helmets are not intended for use with a self contained gas supply (scuba). There is no provision for surface swimming once the scuba air supply is depleted. This could lead to suffocation or drowning, which could be fatal.

The umbilical is the diver's lifeline to the diving control station. The umbilical is usually composed of at least a gas supply, communications and strength member, with pneumofathometer and sometimes a hot water hose for cold water diving to form a single unit.

It is required that the air gas umbilical be married together in a manner that the strength member receive the strain and can meet the requirements in accordance with required by industry standards.

The diver must be tended at the surface at all times by a trained, qualified commercial diving tender.

The diving control station can be at the surface, in a diving bell, or in a submerged habitat. The diving control station manages the air/gas supply and communications with the diver.

The demand regulator and side block assemblies have been designed to operate in a large range of supply pressures. This wide operating range allows flexibility when using various gas supply pressures to the greatest range of depths.

When using a high-pressure console, for maximum breathing performance it is desirable to maintain a proper over bottom pressure for the depth. Follow the topside supply tables found in the Torque Specs & Supply Pressure Requirements module from our modular manual for the regulator being used. With the many different gas supply console configurations in use, it is important to ensure that the gas supply system used, is capable of supplying the helmet with the necessary pressure and flow of gas to allow the diver to work safely and efficiently.

⚠ WARNING

High pressure supply regulators and associated piping systems for surface supplied diving with Kirby Morgan helmets and masks must be capable of delivering a minimum of 2.6 acfm to the diver at depth. Only systems that can deliver the required gas flow should be used.

When using a low-pressure compressor (100–250 PSI (6.8–7.2 bar) follow the recommendations in "Supply Pressure Requirements & Tables" on page APNDX-4 for optimum performance.

In countries that have adopted CE standards only CE certified supply systems and components may be used in conjunction with the helmet.

⚠ WARNING

Decompression diving always involves the risk of decompression sickness. Omitted decompression due to loss of gas supply or other accidents can cause serious injury or death. The use of the Kirby Morgan® helmets and BandMasks cannot prevent this type of injury.

1.3 First Use of Your Kirby Morgan® Diving Helmet

When you first receive your Kirby Morgan diving helmet, carefully unpack it and examine it for any damage that may have occurred during shipment. The purchaser must contact the freight carrier and/or the KMDSI dealer if the helmet has been damaged in shipment.

Be sure to complete the enclosed warranty card and return it to KMDSI immediately. No warranty claims will be honored without a correctly completed warranty card on file at KMDSI.

1.4 Initial Adjustments to your Helmet

Before using any helmet it should be properly fitted and adjusted (Neck Dam, Neck Pad, Head Cushion) and all systems checked prior to entering the water. There are several adjustments that must be made to provide a more secure and comfortable fit when wearing the helmet.

The head cushion, head cushion foam spacer (HCFS) and chin cushion are easily removed.

1.4.1 Head Cushion

The fit of the helmet is primarily determined by the head cushion. Open cell foam is used to provide the support and padding and can be adjusted. Over a period of time use of the open cell foam may result in wear that will not provide a comfortable, snug fit. Inspection of the foam must be done from periodically to evaluate the condition of the foam.

The foam used in the center top/rear foam of the Kirby Morgan® head cushion is very dense to reduce compression and spring-back. This reduces the tendency of the helmet to ride up and down when underwater. Do not replace this dense foam with a soft foam. A softer foam is used on the sides and around the bottom of the head cushion.

The diver's head can be moved forward into the oral nasal mask by adding layers of additional

foam at the rear of the head cushion. The diver's head can be moved up or down in the helmet by decreasing or increasing the foam pads at the top of the head cushion. Usually, a diver with a small head will use all the foam, Head Cushion Foam Spacer and Chin Cushion that comes with a new helmet. A diver with a larger head will need to remove a layer of foam in the center top and back of the head cushion.

The chin cushion can also be used, if necessary, for sizing.

1.4.2 Trimming the Neck Dam

If your helmet is new, or any time you replace the neck dam, it must be properly fitted to the diver.

It is not possible to convert a small neck dam into a large by adding material.

⚠ WARNING

Never dive with a neck dam that is too tight. A neck dam that is too tight could cause the diver to pass out due to pressure on the carotid artery in the neck. This could lead to severe personal injury or death.

To properly trim the neck dam, use the largest, sharpest scissors available, in order to make as few cuts as possible. There must be no jagged edges on the neck dam or it may tear.

1) Start by trimming only a ¼ inch off the neck dam at a time. Trimming should be limited to a total length of 1". When you are done, the neck dam must be just tight enough so that it does not leak. This may feel a bit snug out of the water, but should be comfortable underwater.

Trimming the neck dam.

If you have a large neck, a neoprene neck dam may also need to be stretched for it to fit properly. This can be done by sliding it over a Scuba tank and allowing it to sit overnight. If the neck dam is still too tight, trim the neck dam until it is still snug Do not trim more than ¼ inch at a time.

⚠ WARNING

Avoid trimming neoprene neck dams too much. Neoprene neck dams will loosen over time as they are used and the cells of the foam neoprene break down. This is particularly true if the helmet is locked in and out of a bell or saturation system. If the neck dam is too loose it may leak leading to serious injury or death.

As the neoprene neck dam ages, it will become looser, due to a natural breakdown of the cells. This is particularly true if the helmet is locked in and out of a bell or saturation system. As the neck dam becomes worn it will need replacement to ensure that it seals properly. There should be no attempts to modify a worn neck dam into a tighter fitting neck dam. A WORN NECK DAM THAT NO LONGER SEALS AROUND THE DIVER'S NECK MUST BE REPLACED.

⚠ WARNING

There must be no holes or tears in the neck dam. If there are holes or tears in the neck dam the helmet could leak and flood. In addition, the demand regulator will not operate properly. Serious injury or drowning could result.

1.4.3 Adjusting the Neck Pad

The main component that secures the head in the helmet is the neck pad on the locking collar The neck pad must be adjusted to fit each diver. Two adjustment screws mount the neck pad to the locking collar. Use these screws to adjust the neck pad.

The following procedure requires a diver and tender. You do not need to have the air on to the helmet if you do not use the neck dam ring assembly. If the neck dam assembly is used, the diver must have air to the helmet to breathe.

1) With the neck ring assembly removed, slightly loosen the screws until the neck pad can slide back and forth and move it to the back position. Be sure each of the head cushion snaps are attached to their corresponding snap inside the helmet. The head cushion should already be fitted and installed.

2) Don the helmet so that the oral nasal is in the proper position on your face.

NOTE

If the Oral Nasal is not properly positioned on your face the Head Cushion may need to be adjusted first.

3) Rotate the locking collar closed and latched.

4) Standing upright and looking forward adjust the neck pad forward until it is snug and comfortable. Mark the position of the neck pad on the locking collar using a marker.

5) Remove the helmet. Position the neck pad on the locking collar at the marked position and tighten the adjustment screws on each side. Don the helmet again, and move your head in various positions to ensure the pad is adjusted correctly.

The helmet is now adjusted for your head. It should need no further adjustment unless another diver uses the helmet.

1.5 Pre Dress-In Procedure

Before dressing in for a dive, inspection of the helmet components must be made to ensure it is in proper functioning order. This should be done well in advance of the dive so any problems can be fixed. The following steps are part of the recommended daily maintenance.

1.5.1 Pre-Dive Visual Inspection

Follow A2.3 Helmet and Emergency Gas System Daily Set-Up and Functional Checklist. Visually inspect the exterior and interior of the helmet.

1) The demand regulator cover assembly should not be dented and the purge button must work.

2) The neck dam must not be torn or punctured, and must fit the diver properly.

⚠ WARNING

There must be no holes or tears in the neck dam. If there are holes or tears in the neck dam the helmet could leak and flood. In addition, the demand regulator will not operate properly. Serious injury or drowning could result.

3) Inspect the O-ring on the neck dam ring assembly. The O-ring must be in place, undamaged, and lubricated.

⚠ WARNING

The O-ring on the neck dam ring assembly must be in place and in good condition. It must be properly lubricated for smooth operation. Without a proper functioning O-ring the helmet will leak and possibly flood. Drowning could result.

4) Inspect the bent tube that supplies breathing gas to the regulator. There must be no dents or kinks in the assembly.

5) Inspect the face port. It must be in good condition.

6) Be sure the communications are hooked up and tested.

7) Inspect the oral/nasal mask. Make sure it is on the regulator mount nut properly and the valve is installed properly.

8) Inspect the sealed pull pin on each side of the helmet. They must engage and disengage properly.

9) Make sure the head cushion, chin cushion and chin strap are properly fastened inside the helmet.

1.6 Preparing the Helmet for Diving

1.6.1 Clean Face Port

Thoroughly clean the face port with a soft cloth and a mild liquid detergent solution. DO NOT USE ANY AEROSOL SPRAYS ON THE POLYCARBONATE PORT!

1.6.2 Fogging Prevention

Prior to the dive, a thin film of anti-fogging solution may be applied to the interior of the polycarbonate face port to help prevent fogging during the dive. Approved solutions include: mild dish soap and other commercially available anti-fogging solutions that are proven safe for use on polycarbonate.

1.6.3 Check Moving Parts

Check all moving parts, such as the regulator adjustment knob, the defogger control knob, emergency (EGS) knob, and the nose block device knob and all locking collar parts to ensure smooth and proper operation.

1.6.4 Check Communications

Check the communications system for proper operation. Put the helmet on and talk to an assistant to ensure proper functioning and volume levels. Check the fit and tightness of the communications module mount nut.

1.6.5 Check One Way Valve

The one way valve must be tested daily, prior to commencement of diving operations.

⚠ WARNING

The one way valve must be tested daily, prior to commencement of diving operations. Failure of the one way valve could cause serious injury or death.

1) With the main gas supply hose removed from the one way valve and the EGS gas supply attached, shut off the defogger control knob and screw in the adjustment knob on the regulator all the way.

2) Slowly pressurize the EGS system and open the EGS Valve. If any gas escapes out the end of the adapter on the one way valve, it is faulty and must be rebuilt or replaced. A one way valve repair kit is available for rebuilding these valves (Part # 525-330).

⚠ WARNING

Never dive if the one way valve is not operating properly. If the hose or breathing gas/air fitting breaks near the surface a serious injury could result to the diver's lungs and/or eyes. In extreme cases this could be fatal. The one way valve must be tested daily prior to the commencement of diving operations.

Checking the one way valve. With the bail-out bottle connected to the emergency valve, no gas should escape through the one-way valve when the EGS valve and cylinder valve are opened.

1.7 Emergency Gas System (EGS)

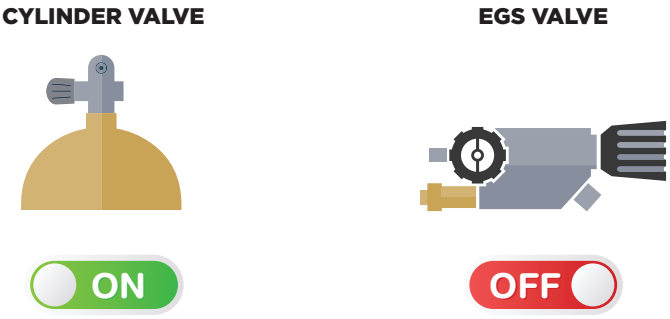
The configuration we recommend is as follows:

- Cylinder Valve Open
- EGS Valve on Helmet Closed

This is the only method that we recommend. The advantages of this method are as follows:

- You only need to open one valve to activate your emergency supply.
- There is little danger of flooding your first stage regulator and ruining it.

KMDSI believes that this method poses the least amount of risk for the diver.



If the diver's main gas supply fails, the diver must have another source of gas that will enable them to return to the dive station or to a point where a normal gas supply can be reestablished. For this reason, **an emergency gas supply (bailout) cylinder must be used on all dives**. The bailout cylinder is worn on the back using a combination backpack and lifting harness.

⚠ WARNING

Do not dive without a diver worn Emergency Gas System. If the main gas supply is lost, you will have nothing to breathe and may drown.

Most commercial divers wear a harness (separate from the weight belt) that is used for several purposes. The harness should be equipped with metal rings. These rings are used to connect the umbilical to keep any strain off the helmet. In addition, the rings are used to hang tools and other equipment and provide a means of lifting an unconscious diver from the water. A harness is the best method of securing the emergency breathing gas to the diver.

⚠ WARNING

Never dive without attaching the umbilical to a proper harness assembly that meets industry standards and can be used to safely lift an unconscious diver out of the water. The lift point must be done in a way so there is no pull on the divers helmet. Never allow the umbilical to pull on the helmet directly or the diver could suffer a neck injury.

When determining the size of the emergency gas cylinder to use, several factors must be considered. The divers depth, the length of time the

diver may be without the main gas supply, and the gas consumption rate. Regardless of the cylinder size used, it should be of sufficient volume to allow the diver to ascend at a normal rate or transit to a point where a normal gas supply can be reestablished.

Bail Out 1st Stage Regulator

The emergency gas supply must be fitted with a good quality first stage regulator that has an over pressure relief valve installed into one of the low pressure ports. The over pressure relief must be adjusted to relieve between 180-190 psig. The purpose of the relief valve is to allow pressure to vent off in the event the first stage regulator develops an intermediate pressure leak or creep. Without a pressure relief valve, the hose could rupture and the emergency gas supply would be lost.

⚠ WARNING

Never dive without an over pressurization relief valve installed on the EGS regulator (1st stage). Without the relief valve if the EGS regulator develops an internal leak, or carries-away, the full pressure of the EGS cylinder would be placed on the low-pressure EGS hose and the Emergency Valve. This could cause the low-pressure hose to burst resulting in the complete loss of the EGS system.

The first stage regulator should be set to between 135–165 psig over bottom. If quick disconnects are used on the first stage hose use a set of good quality quick disconnects with locking sleeves to the emergency valve assembly located on the side block.

An over-pressure relief valve must be installed on the first stage used for the Emergency Gas Supply.

To ensure no loss of emergency gas supply, make sure the emergency valve on the helmet is turned off, when diving under normal operation, this way the emergency gas supply will not be used up without the diver's knowledge. Once the emergency supply hose is connected, the **tank valve is turned on to pressurize the hose**. In the event of an emergency due to a loss of the main gas supply, the emergency valve knob located on the side block is turned on supplying gas to the side block assembly and the regulator.

⚠ WARNING

Some divers, keep the EGS gas cylinder valve shut during the dive. Their rationale being; in the event of an emergency, they will simply open the cylinder valve thus eliminating any EGS air/gas unknowingly being lost due to either a 1st stage failure or EGS hose failure.

KMDSI strongly recommends never diving with the cylinder valve shut. The reasoning behind this is twofold. First, with the cylinder valve open, gas is immediately available via the EGS valve on the side block. Secondly, and most importantly, if the EGS regulator (1st stage) is not pressurized, during descent it is possible that sea water will leak through the first stage intermediate circuit of the 1st stage regulator, that may cause failure of the EGS regulator resulting in possible injury or death.

⚠ WARNING

Never connect the main gas supply hose from the diving control station to the Emergency Gas valve assembly (EGS). If this is done there is no one way valve protection for the diver in the event of damage to the umbilical or related equipment. The diver could be exposed to a serious "squeeze". This can result in serious personal injury or death.

If the 1st Stage regulator floods and is not promptly serviced, it will not perform properly when you need it in an emergency. It's up to each individual to make an informed choice regarding how to configure your bail-out system.

KMDSI strongly recommends the use of a submersible pressure gauge with every bail-out system. Not only does this make it very easy to check your emergency gas pressure prior to diving, it also allows you, in most cases, to periodically check the pressure in your system while you dive. The diving supervisor should have the diver report the EGS pressure at least every 30 minutes. This reading should be logged. In this way, if you have a leak, you will be able to take appropriate action.

⚠ WARNING

A standard Scuba submersible pressure gauge must be connected to the high pressure port on the first stage so that the diver can monitor their emergency supply.

1.8 Setting Up to Dive

1.8.1 Flushing Out the Umbilical

Before connecting the umbilical to the helmet, the umbilical must be flushed out to remove any dirt, moisture, or other debris. Connect the topside umbilical end to the topside diver control console. Ensure there is no pressure in the divers umbilical.

Carefully uncap the helmet end of the umbilical and hold securely while pointing in a safe direction, then slowly bring up gas pressure to approximately 25-40 p.s.i.g. (1.7-2.7 bar). Allow the gas to flow for at least 15 seconds. If it is not going to be used immediately, the umbilical should be recapped.

1.8.2 Connecting the Umbilical to the Helmet

When connecting the hose to the helmet be sure to use a backup wrench to hold the adapter, or inlet fitting, and a second wrench to tighten the swivel fitting on the hose. If this is not done, the adapter will turn inside the one way valve. If this happens repeatedly the threads will wear and the valve will need to be replaced.

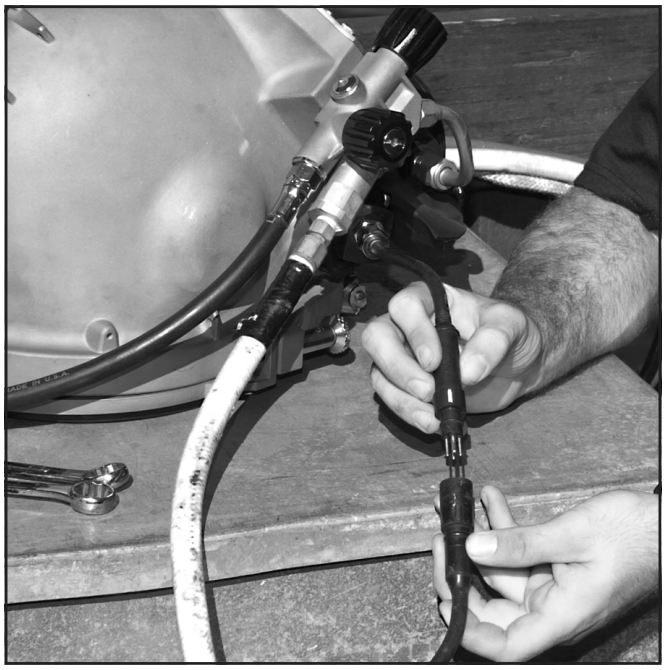
The connection between the hose and the helmet must only be made up "snug". Excessive force will deform and ruin the adapter. A second wrench must be used when the helmet is disconnected as well, otherwise the adapter and/or the one way valve assembly may become loose and fail to make a seal.

⚠ WARNING

If the one way valve or the adapter is loosened this will allow breathing gas to leak out of the breathing system. This could also result in a loss of all pressure to the helmet.

ALWAYS use two wrenches when connecting the umbilical to the helmet.

If you are using waterproof connectors for your communications, take extra care in handling. To connect the male and female waterproof connectors, align the large pin on the male connector with the large hole on the female connector. Press the two connectors together until you hear a distinct "pop". Do not twist the connectors. Tape the two connectors with a bit of electrical tape to prevent them from pulling apart.



Connecting the waterproof connectors.

To separate the connectors remove the tape, grasp them at the thickest part, push your thumbs against each other, and at the same time, pull apart until the connectors are disconnected.

Do not twist the connectors. Do not pull them apart by pulling on the wire part of the communication cable. Use the thick connector part of the communication cables to pull them apart.

1.8.3 Opening the Breathing Gas Supply to the Helmet

Prior to turning on the air supply for the helmet, check to see that the EGS valve and free flow valve are closed and the regulator adjustment knob is all the way in.

On the Kirby Morgan® SuperFlow® 450 and 455 Balanced regulators, when you turn the regulator knob all the way in, a clicking can be heard with each revolution of the knob when the knob has "bottomed out." This is an audible indication the adjustment spring tension is as tight as it will get. The adjustment knob will never stop turning in this direction, so listen carefully for this indicating click.

Slowly bring up the gas pressure to the helmet, see "Supply Pressure Requirements & Ta-

bles" on page APNDX-4. **Slowly back out on the regulator adjustment knob until a slight free flow develops, then turn the adjustment knob in (clockwise) until the free flow just stops.**

To properly check the breathing system you must completely don the helmet.

1.8.4 Fogging Prevention

A thin film of anti-fogging solution may be applied to the interior of the polycarbonate face port prior to the dive to help prevent fogging during the dive. A mild liquid dish washing detergent, or other commercially available anti-fogging solutions, may be applied with a soft rag or paper towel to the interior of the port.

Do not use an aerosol spray on the polycarbonate lens. The propellants in some aerosol dispensers cause damage to the lens.

⚠ WARNING

Never use aerosol-propelled sprays near the face port of the helmet or Band-Mask. The propellant used in these aerosols can invisibly damage the face port and cause it to shatter upon impact from any strong blow. If the face port fails underwater, the helmet will flood and drowning may result.

1.8.5 Donning the Metal Bottom End Helmets

All donning procedures must be done by the diver until they are thoroughly familiar with the helmet and this procedure. However, the tender must be present to assist the diver and check to ensure that the diver has properly donned their equipment. It is impossible for the diver to see whether they are properly dressed in once the helmet is on their head.

⚠ WARNING

The tender must always be present to assist the diver while dressing and whenever the diver has their helmet on their head while they are out of the water. It is difficult for the diver to walk while they are dressed in and they can stumble and fall, resulting in serious personal injury.

To dress in, the neck dam ring assembly must first be pulled down over the diver's head.

To don the neck dam, orientate the neck dam/ring assembly vertically, in front of your chest, so that the large end of the assembly where the pull strap is mounted is on top. The pull strap should be facing your chest. Lift the neck ring assembly over your head, grasping the sides of the neck ring assembly and the leading edge of the neck dam. Spread the opening wide and pull the neck dam down over your head. The neck dam leading edge should be as low as possible on your neck.

The neck dam is always turned up against the diver's neck. This is very important! With the neck dam turned down (or inside), the helmet will vent air from the neck dam causing the regulator to free flow. This will make the helmet very uncomfortable and waste breathing gas.

The neck ring assembly must be oriented so the "tongue" on the front of the neck dam ring assembly is pointed to the front of your body and below your chin.

Be sure to loosen the chin strap inside the helmet prior to donning the helmet.

With the diver holding the helmet, the tender should now connect the quick disconnect fittings for the bailout supply.

With the helmet face down, pull the sealed pull pins and to release the locking collar/neck pad assembly. Be sure the head cushion is properly fitted and attached to the helmet. Pull the nose block device knob out all the way.

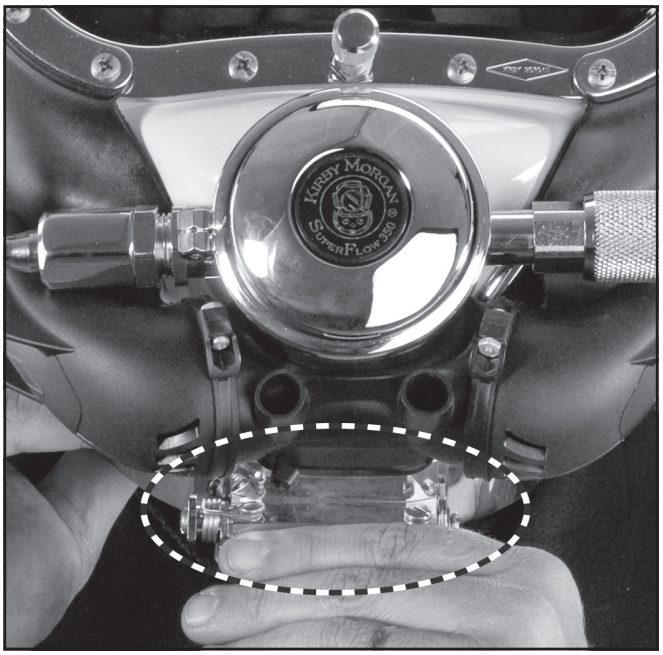
With the locking collar/neck pad assembly fully open, lift the helmet and place it over your head. Lower the helmet onto the back of your head

first, then pivot it forward until your face is correctly positioned in against the oral nasal mask. Release the locking collar/neck pad assembly, let it hang down behind your shoulders.

Open the locking collar/neck pad assembly fully.

Reach up inside the front of the helmet and tighten the chin strap until it is snug and comfortable. The chin strap tightens on the outside of the chin cushion, when the chin cushion is used.

Insert the tongue on the neck dam/ring assembly into the swing tongue catch on the bottom front of the helmet.



The diver inserts the tongue on the neck dam/ring assembly into the swing tongue catch. The tender must check to see that this is properly engaged.

Grasp the base of the helmet with your fingers and push the neck ring assembly up into the helmet ring on the base of the helmet, make certain that nothing (chin strap, head cushion, hair, etc.) is caught between the neck ring assembly and the base of the helmet to ensure a water tight seal. The neck ring assembly fits very snugly in the helmet ring. The diver then tilts their head and the helmet forward and swings the locking collar up over their shoulders.

Push the neck dam/ring up into the neck ring on the base of the helmet .

The sealed pull pins must be in the locking posi-

tion. If they are in the open position, rotate until they snap into the locking position. Rotate the Locking Collar/Neck Pad assembly closed, ensuring that the Sealed Pull Pins are fully engaged and in the closed positions.

⚠ WARNING

Both sealed pull pins must properly seat into position into the Locking Collar. If the pins are not engaged correctly the neck dam/ring assembly may not seal and the helmet could flood. The diver could drown as a result.

Rotate the sealed pull pins into the LOCKED position.

1.8.6 Testing the Breathing System

Test the defogger system by rotating the steady flow knob on and off a few times to confirm a strong flow of gas is present. **The regulator should be adjusted by turning the adjustment knob out until a slight steady flow starts, then back in until the flow just stops.**

Next, the demand regulator system is checked for proper function: breathe in and out. Inhalation and exhalation effort should be minimal. Press in on the purge button on the regulator cover. This should produce a strong burst of breathing gas.

1.8.7 Adjust Regulator for Work Rates

At very low work rates, such as when the diver is resting, or during in-water decompression, the diver's respiratory rate may be quite slow (10-15 breaths per minute). When this occurs, the diver's exhalations may not be sufficient to move enough breathing gas through the helmet exhaust to adequately wash out carbon dioxide (CO_2).

⚠ WARNING

Excess carbon dioxide (CO_2) is dangerous. Too much carbon dioxide in the diver's breathing system can cause the diver to feel that they cannot breathe for comfort. In extreme circumstances, carbon dioxide can cause unconsciousness. This could lead to suffocation and death.

In order to ensure that carbon dioxide does not accumulate in the helmet or BandMask®, divers who are at rest underwater should slightly open the steady flow valve so that there is a very slight, but noticeable hiss of air coming into the helmet. This should also be done when the diver is operating at heavy or extreme work rates. This will help to eliminate any excess carbon dioxide from the oral nasal mask and helmet..

1.8.8 Sealing Integrity Check

If there is any doubt that the helmet (neck dam) is sealing properly, perform the following test prior to diving.

1) To perform this test, the diver must have an assistant standing by. The assistant should be in control of the gas supply console in the event the diver needs air or they must be ready to lend a hand. The diver must be next to the dive control manifold so that the air may be turned on instantly, or the diver must be ready to run a hand between their neck and the seal of the neck dam in order to pull the neck dam away from the neck to allow breathing.

2) With the helmet donned, turn the supply gas off at the dive control system and bleed the umbilical.

⚠ WARNING

Do not perform this test unless the diver and their tender are stationed immediately adjacent to the diver's air manifold and you are certain the air is on to the manifold. If the diver is unable to flow air to the helmet, either through the umbilical or the bailout, they may not be able to remove the helmet easily.

To break the seal in this situation, the diver must put their hand between the neck dam and the neck, and pull the neck dam away from the neck. A tender must be standing by to assist the diver in removing the helmet if needed. Suffocation could result.

3) With the main air supply off, when the diver attempts to inhale, a suction on the neck dam is formed, indicating they are achieving a good seal. The diver's gas supply must immediately be turned on so that they can breathe. If the diver does not turn the air on they will not be able to breathe, unless the neck dam is pulled away from their neck or EGS is activated at the side block.

1.9 Removing the Helmet

Start by releasing the locking collar from the helmet ring by pulling out (forward) each sealed pull pin and turning the pull pin knob so that they remain in the open position. Tilt your head, and the helmet, forward and swing the locking collar assembly open and behind your shoulders.

Grasp the pull strap at the back of the neck dam assembly and pull down on it. This will remove the neck dam ring assembly from the helmet ring, breaking the seal. Once the seal is broken the neck ring assembly will come loose from the helmet.

Once the locking collar has been opened, you will need to grasp the pull strap and pull down on it in order to break the seal for the neck ring to remove the helmet.

Pull the nose block device knob out from your face and lift the helmet off of your head. A good tender will be prepared to help the diver with the removal of the helmet as required.

Doff the neck ring assembly in the reverse order of donning.

1.10 Diving Procedures

1.10.1 Standing By to Dive

The diver may wear the neck dam ring assembly without discomfort if they are standing by to make a dive. However, the helmet itself must always be the last thing put on before the diver enters the water. Everything else must be ready to go before the diver puts the helmet on so they do not have to support the weight of the helmet while out of the water.

1.10.2 Attaching the Umbilical to the Harness

The umbilical must be hooked to the diver's harness by means of a suitable clip that is bound to the umbilical strength member—NOT THE GAS SUPPLY HOSE! The securing of the umbilical to the harness keeps the pull of the hose at the diver's harness and not on the helmet.

⚠ WARNING

Never dive without attaching the umbilical to some type of harness. Never allow the umbilical to pull on the helmet directly or the diver could suffer a personal injury.

1.10.3 Diver Dons Helmet

The diver dons the helmet as per section "1.8.5 Donning the Metal Bottom End Helmets" on page OPIN-11.

1.10.4 Diver Check Gas Flow Systems

The diver must check the functioning of the breathing system themselves as the tender finishes dressing them. Operate the defogger valve, the demand regulator, and the purge button to assure proper operation before entering the water.

1.10.5 Communications Check

Check the communications system, sending and receiving, should be checked and volume level set at this point.

1.10.6 Diver Ready

The diver is now ready to enter the water. They should be assisted in and out of the water if needed. If a welding lens is being used, make sure it is hinged up all the way. **We do not recommend jump entries.** An overall inspection by the tender should be performed prior to giving the diver is given the OK.

1.10.7 Water Entry and Descent

The defogger valve should be turned on to slightly overpressure the helmet and prevent the possibility of water pressure, inverting the helmet exhaust valve when entering the water.

The diver must report to the surface immediately after the entry. It is a good policy to descend 1–2 feet, pause to check leaks and the regulator adjustment knob to ensure adjustment is optimal for supply pressure work rate and depth.

⚠ WARNING

Diving a KMDSI helmet or band mask with a bias setting greater than what is necessary to keep the demand valve from free flowing increases the work of breathing and reduces the diver's ability to perform heavy work.

If a closed bell is being used, the diver enters the water from the bell and pauses for a short time outside the trunk until they are sure all systems are operating properly.

During the decent the communications must be checked again and the diver supply pressure should be monitored and adjusted as necessary to maintain the required over-bottom pressure. It may be necessary for the diver to readjust the demand regulator by means of the adjustment knob once at the work site to compensate for the variation in umbilical supply pressure.

1.11 Emergency Procedures

1.11.1 Flooding

In the event of partial or complete flooding, the diver may clear the helmet quickly by tilting the helmet down and activating the defogger control knob. Pressing in on the manual purge button in the center of the regulator cover will evacuate water from the regulator, if any still remains.

The water dump valve for the SL 27 is located low on the left side of the helmet. By placing this valve in the lowest position on the helmet the water will exit more easily.

After purging/clearing the helmet, cautiously check for additional flooding. If the helmet continues to take on water, abort the dive and return to the diving station, swimming with the water dump valve positioned at the lowest part of the helmet: with the diver's face forward and slightly tilted down. Keep the steady flow valve on. This increases the air/gas pressure slightly over pressurizing inside the helmet and keeps the water out. Any incoming water is automatically purged.

1.11.2 Inhalation Resistance

If breathing becomes difficult, adjust the regulator, for easier breathing by rotating the adjust-

ment knob counter clockwise. If the breathing does not get noticeably better, press the purge button in the regulator cover. If a surge of gas does not flow, notify top side to see if they can quickly fix the problem and if not, open the EGS valve.

Notify topside that you are on emergency gas. Ensure your umbilical is clear and return to the stage or decent line. The diver should stay in communication with topside personnel and make preparations to abort the dive. The console operator should check to ensure the supply pressure to the diver is at the proper pressure.

1.11.3 Gas Flow Stops

A stop of flow in the demand regulator usually indicates that there is a problem with the main gas supply. The diver should first open the emergency valve by turning the EGS knob. If there is still no flow from the demand regulator, the defogger valve knob should be opened. *Keep in mind that if the defogger valve is left open, the bailout bottle will drain very quickly, particularly if the diver is deep.*

Immediately notify topside, check to ensure your umbilical is clear and return to the diving station using the emergency breathing supply. Avoid making a rapid ascent if at all possible.

Once at the surface, or inside the bell, the diver may remove the helmet if needed. Never ditch the helmet underwater unless conditions absolutely require that.

⚠ DANGER

Rapid ascent is dangerous. It can lead to air embolism or decompression sickness. Air/gas embolism can cause immediate loss of consciousness and/or death. Even on a no decompression dive, a rapid ascent may cause decompression sickness. A diver must only make a rapid ascent when they are in immediate danger of death by drowning or asphyxiation.

⚠ DANGER

Ditching the helmet underwater must be avoided. In many instances, even if the air supply is interrupted, topside will be able to get it back on line quickly. Do not ditch the helmet underwater.

1.11.4 Demand Regulator Free Flow

If the demand regulator free flows, adjust the knob in (clockwise) until it stops. If the free flow cannot be stopped, the dive should be aborted and the problem with the regulator corrected.

1.12 Post Dive Procedures

1.12.1 Removing the Equipment

After the diver is well clear of the water they may remove the helmet. If the diver is working out of a stage they must not remove the helmet until the stage is on deck.

⚠ WARNING

Never remove the diving helmet while you are in the stage. If you fall out of the stage with the helmet off but still attached to your harness it may be very difficult to swim. Drowning may result.

1.12.2 Disconnecting the Helmet

Remove the diver from the helmet by following section "1.9 Removing the Helmet" on page OPIN-14. A good tender will be prepared to help the diver with the removal of the helmet as required.

The emergency gas supply hose may be disconnected while the diver leaves the helmet on or while they hold the helmet after removal. The use of a quick disconnect fitting with the EGS can make this procedure very easy.

The tender should then unfasten the umbilical from the harness and take the helmet from the diver and set it aside. (Closing the locking collar/neck pad assembly onto the helmet before setting it down will help protect the helmet neck ring from damage). The harness and bailout bottle is then removed. Once the main gas supply

is closed off to the helmet the breathing system can be depressurized by opening the steady flow valve. When it is confirmed that no gas pressure remains in the system the main supply gas hose can be removed from the helmet.

1.12.3 Storage of the Helmet Between Dives

The helmet should be maintained per the checklists, available on the Kirby Mrgan website at: https://www.kirbymorgan.com/support/checklists.

If the helmet is not going to be used for a period of time, the head cushion, should be removed. The head cushion should be dried before storage. The regulator adjustment knob should be rotated all the way out (counterclockwise) until the next dive. When the helmet is completely dry, the helmet should be stored in the carrying bag to protect it. Refer to the post dive checklist for detailed instructions.

If the head cushion becomes wet it may be dried out by removing it from the helmet, rinsing with fresh water, squeezing excess water out, and letting the head cushion hang dry.

The pull strap on the neck ring assembly has a 1" Stainless Steel “D” ring to hang the neck ring assembly to allow proper drying.

The pull strap assembly has a 1" Stainless Steel “D” ring sewn on the end to hang the neck ring assembly to allow proper drying