OCEAN TECHNOLOGY SYSTEMS

Guardian Full-Face Mask
Owner's Manual

- NOTICE -

This manual and the information contained herein are provided for use as a maintenance and operation guide. No license or rights to manufacture, produce, and/or sell either the manual or articles described herein are given. Undersea Systems International, Inc., dba Ocean Technology Systems hereinafter referred to as OTS, reserves the right to change specifications without notice. We recommend that all users read and fully understand this manual before using a Guardian full-face mask (GFFM).

All statements, technical information, and recommendations herein are based on tests we believe to be reliable, but the accuracy or completeness thereof is not guaranteed; and the following is made in lieu of all warranties, expressed or implied, including the implied warranties of merchantability and fitness for purpose: Seller's and Manufacturer's only obligation shall be to replace such quantity of the product proved to be defective. Before using, the user shall determine the suitability of the product for intended use, and the user assumes all risk and liability whatsoever in connection therewith. Neither Seller nor Manufacturer shall be liable either in tort or in contract for any loss or damage—direct, incidental, or consequential—arising from the use of or the inability to use the product. No statement or recommendation not contained herein shall have any force or effect unless it is in an agreement signed by officers of the Seller and Manufacturer.

- IMPORTANT SAFETY NOTICE -
(Please read before using product)

It is absolutely essential that all divers are certified divers in good standing, properly trained, equipped, and fully understand this user's manual before attempting to use the Guardian FFM. While the Guardian does provide the diver with outstanding underwater environmental protection, *it does not change or eliminate the potential hazards of diving!*

Refer to the Library page of our Web site, www.otscomm.com for a list of any changes made to this manual since its publication.

506129-000 (K)

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

INTRODUCTION

Congratulations on the purchase of your new OTS Guardian full-face mask! This full-face mask (FFM) is one of the few that has been designed from the ground up as a ***scuba diving*** mask. Years of experience has gone into the development and design of the Guardian and second stage regulator. It was designed with comfort, fit, and function in mind. Having been in the underwater communications business for over two decades, Ocean Technology Systems (OTS) has been deeply involved in the FFM industry due to the mating of our communications technology with most of the world's leading FFM producers. The Guardian FFM is the culmination of this experience combined with what we've learned from listening to the needs of our customers. For years, we at OTS talked about what was needed and wanted in a full-face diving mask. Our goal was to design a product that was comfortable, fit the vast majority of the diving population, was simple to use, and easy to maintain. More importantly, it had to be rugged and perform as well or better than anything on the market.

Today, OTS is proud to provide you with this advanced diving apparatus and hope you enjoy it as much as we do.

All who intend to use this FFM must read this manual carefully prior to preparing and using this equipment. Training must be obtained before using this or any other advanced diving equipment. Become familiar with emergency procedures and ensure you are equipped with proper bailout equipment appropriate for the type of diving you are performing. If you have any questions or don't fully understand this manual, please contact OTS directly or an authorized OTS service center (OTS contact information listed under the "Limited Warranty" on page 24).

CERTIFICATIONS

- OTS Guardian Full-Face Mask is tested and certified to a maximum diving depth of 50m according to EN 250:2000+A1:2014.
- OTS Guardian Full-Face Mask is designed for water temperatures below 10°C and is suitable for cold-water diving applications according to EN 250:2000+A1:2014.
- OTS Guardian Full-Face Mask is tested and certified for diving applications with breathing air according to EN 12021.
- OTS Guardian Full-Face Mask has been tested and certified according to the European standard EN 250:2000+A1:2014.

WARNINGS AND PRECAUTIONS

While reading and reviewing this manual, please note the following indicators for Warnings and Dangers:

 **Warning Note**	The “Warning” symbol indicates something that might cause damage to the equipment, or, if not properly performed, may lead to a hazardous situation that could cause injury or death.
 **Danger Note**	The “Danger” symbol indicates a most important point that if not avoided will result in a situation that causes injury or death.

 **Warning Note**

- Diving a Guardian full-face mask or any scuba diving equipment without proper training and experience can result in serious harm or death.
- This is an advanced piece of diving equipment that requires special training and practice prior to diving it in an open water environment. Proper maintenance and care of this equipment is essential for safe operation.
- Have your Guardian full-face mask and other equipment serviced on a regular basis. This should be at least annually, possibly more if your equipment is used extensively or in environments that would require decontamination. Do not dive any equipment that is not properly maintained, damaged, or worn.
- Always inspect the mask for damage prior to diving if you suspect it has been subjected to any abuse, tampering, or impact. If necessary, have it inspected by a certified OTS repair technician.
- It is YOUR responsibility to insure that your equipment is in good condition and operating properly. Remember, this is LIFE SUPPORT EQUIPMENT!
- Diving is an inherently dangerous sport. Participating in this activity puts you at risk of serious injury or even death.

DESCRIPTION

What is a “Full-Face Mask?”

The OTS Guardian FFM differs from standard scuba equipment in that the second stage regulator is incorporated into the mask and the mask covers your “full” face, hence the term.

There are four primary reasons to dive a Guardian FFM:

1. Environmental protection
2. Physiological considerations
3. Communications
4. For the fun of it

Environmental Protection

Anytime a diver is in water that would be considered less than healthy (e.g., biological/chemical contamination, extreme cold, etc.), protection is of the utmost importance. The Guardian FFM affords a significant protection advantage over that of standard bite mouthpiece regulators and masks. While not a substitute for full protection as required in hazmat diving, the Guardian FFM, along with dry gloves and a drysuit with attached latex hood, can afford protection from contaminated water that standard equipment cannot. This configuration is commonly seen in light commercial and public safety diving.

Physiological Considerations

The Guardian FFM protects the diver in other ways as well. If, for any reason, a diver were to become unconscious underwater, the Guardian FFM is able to maintain a breathable airspace in front of the diver’s nose and mouth assisting in survival (assuming the scuba tank has air). This aspect of the Guardian FFM is extremely useful for divers with TMJ, divers with dentures, disabled divers, and divers using high concentrations of oxygen (convulsion risk; special oxygen cleaning required).

Communications

For underwater communications, an airspace is required to allow for articulation and placement of a microphone. This is best accomplished with the Guardian FFM. The Guardian FFM has an oral/nasal cavity that provides optimal communications, while some FFMs have the nose separated from the mouth. This separation alters the voice slightly, as in pinching your nose when talking.

Training and Practice for Safety

As with any piece of high-tech equipment, the Guardian FFM does require additional training and practice. Air sharing in an out-of-air situation is more difficult, often requiring bailing out of the mask (depending on your gear configuration). See ***"Training & Emergency Procedures" on page 13 for detailed instruction on this topic.***

Anatomy of the Guardian Full-Face Mask

Front Aspect

KEY:

1. Upper Visor Clamp
2. Ambient Breathing Valve® (ABV®)
3. Oral/Nasal Cavity
4. Lower Clamp
5. Push-to-Talk (PTT) Communications Port
6. Hose Fitting (9/16" x 18)
7. Guardian Regulator
8. Exhaust Purge Cover
9. Inhalation Check Valve (2)
10. Visor
11. Buckle (5)

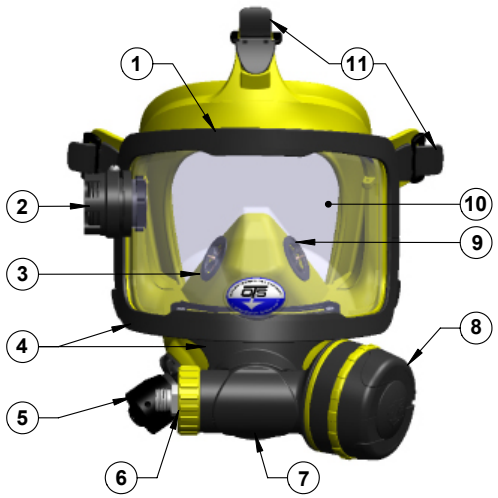

Figure 1: Front of Mask

Rear Aspect

KEY:

1. Tab (5)
2. Skirt (outer)
3. Quick-Release Button (red)
4. Regulator Port
5. Wire Form
6. Equalizing Block
7. Equalizing Insert
8. Skirt (inner)

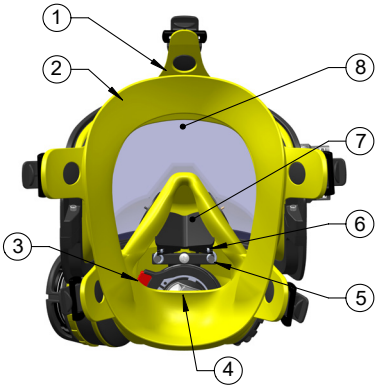

Figure 2: Back of Mask

Guardian Skirt

Figure 3: Double Seal

The skirt of the Guardian FFM is made of high grade (55-60 Shore A) liquid silicone with some unique features that add to its durability, comfort, and functionality. Inside you will notice we have designed the mask with a double-seal (Figure 3). The double-seal makes the mask more comfortable, but more importantly it assists in ***sealing*** the mask (especially at the temples—a common problem area for sealing on most FFMs). This unique design ensures the Guardian FFM will fit virtually every type face, small to large. Practically eliminated is the “burping” at the temples found in other masks.

Dives of extended lengths are made more gratifying with a properly fitting mask. Additionally, the tabs to the buckles are designed to minimize any damage resulting from improper donning of the mask. These tabs have “button-holed” buckles—meaning if the head harness is pulled too hard and out to the sides, the buckle will pull from the “button-hole.” While this will require reassembling the buckle onto the skirt, it helps prevent damage from occurring to the skirt. This is a common problem in other masks. The buckles are extremely rugged and made of nylon instead of metal, so they’re not prone to corrosion. If however, you break or lose one, they are easy to replace.

Visor, Frame, and Ambient Breathing Valve®

The Guardian FFM visor is constructed of high strength polycarbonate. Although scratch-resistant, it is not scratch-proof. Protect the mask when not diving by storing it in its bag. When diving, minor scratches on the outside of the visor are difficult, if not impossible, to see due to water filling the scratch. You should be most concerned with protecting the inside of the visor from scratches.

The visor is held in place with the visor frame. This frame consists of the upper and lower visor clamps. Constructed of glass filled nylon, these clamps are secured by a pair of stainless steel Allen head screws (6-32 x 1", 7/64" Hex), one on each side of the clamps. The upper visor clamp has a channel on the back that retains the cable for the left earphone when using an ear/microphone assembly (part No. 910369-000 w/ Hot-Mic® and 910379-000 w/ Super Mic®, available separately) for communications. The lower visor clamp contains the regulator port, regulator "quick-disconnect" (see Figure 4 on page 7) on the interior of the mask, and the inhalation vents.

The Ambient Breathing Valve® (ABV®) is designed to conserve the diver's air while on the surface. This is NOT a snorkel. Generally, when diving with a FFM, the diver is breathing off of a scuba bottle. With the ABV in the open position and on the surface, the diver is able to breathe ambient air ***without*** removing the FFM. There is a check valve on the inside of the ABV which allows ambient air to enter the valve only; air is exhaled out through the regulator. This also prevents air from escaping through the ABV should it be open underwater.

It is extremely important that the diver's air supply is turned on prior to diving. This may seem obvious; however, if the mask (with the regulator) is put on and the diver is breathing through the ABV, the diver could unknowingly enter the water without air. Upon surface entry, if positive buoyancy is not first established, with the diver's air off, the ABV only working above water, unable to inflate a BCD or dry suit, the diver could sink to the bottom with dire consequences.

Danger Note

ALWAYS ensure the diver's air supply is turned ON prior to entry into the water! CLOSE THE ABV, test breathe the mask and regulator with at least two full breaths and watch the submersible pressure gauge! There should be a slight drop and recovery of pressure. This will ensure the diver has the air supply turned on prior to diving. Add sufficient air to the BCD to have positive buoyancy upon entry. ***Make this a matter of routine prior to entry.*** Failure to do so can result in serious injury or death. Ensure clamp screws are in place and securely fastened before diving. If missing a screw, DO NOT DIVE FFM.

Operating the ABV is simple. If you rotate the valve counterclockwise, you will breathe ambient air. If you have the valve rotated fully clockwise, it will be closed and you will breathe off of your scuba bottle (assuming you have your scuba bottle air valve in the ON position).

It is extremely important to verify your ABV is closed (fully clockwise) before descending.

Regulator to Mask Interface and Air Flow

The Guardian Regulator is specifically designed for use with the Guardian FFM. The design allows inhaled air to flow in a directional manner through the mask. As the diver inhales, breathing air is injected through vents below the visor, flushing the mask with cool, dry air. This keeps the visor defogged, very much the same as the defogger in a car. The air is pulled through one-way (check) valves located in the oral/nasal cavity and inhaled by the diver. The diver then exhales through the diaphragm assembly of the regulator, resulting in a one-way flow of air through the system. There is virtually no “push-pull” of inhaled and exhaled air, resulting in extremely efficient CO2 washout. CO2 is what triggers your urge to breathe. Any accumulation of CO2 can cause an increased rate of breathing—thus higher air consumption.

Figure 4: Regulator Quick-Release Button

The Guardian Regulator is attached to the mask in the port of the lower clamp. There is a red “quick-release” button on the inside of the mask (Figure 4) that allows for both easy removal and positive locking of the regulator in the assembly. The regulator is keyed to ensure proper orientation when it is mounted to the mask with the low-pressure hose routed over the right shoulder.

The innovative quick-release allows the diver to disengage the regulator from the mask for storage and cleaning. The second stage can then remain with the first stage regulator, attached to the hose.

Warning Note

Prior to diving, verify the o-ring on the second stage is in place and free of debris. Insert the second stage into the regulator port in the front of the mask completely—you should hear a “click” when it locks. Ensure the second stage is positively locked in place by pulling on it. It should be tight with no movement and will not dislodge.

The Guardian Regulator is a balanced, downstream valve designed for excellent performance regardless of depth. The threads of the hose connector are SAE standard 9/16” x 18. Available from any dive shop, a standard 32” low-pressure hose is also included with the Guardian FFM

Head Harness Assembly

The Guardian FFM uses a five-point strapping system (Figure 5). Buckles are mounted by a button securely on tabs that are a part of the skirt. They are replaced easily by stretching the tab and either removing or replacing the button end of the nylon buckle.

Figure 5: Five-Point Strapping

PRE-DIVE SET-UP AND INSPECTION

Regulator Set-Up and Hose Configuration

Install the second stage low-pressure hose to the first stage regulator. This hose is intended to come over the right shoulder. The male end of the hose is best installed into a low-pressure port that allows for streamlining and cleanest routing to the second stage on the mask.

Remove the second stage from the mask by pressing the red button located on the inside of the oral/nasal cavity (Figure 4 on page 7) and pulling outward on the regulator (Figure 6).

Figure 6: Removing Regulator

Using two wrenches, attach the female end of the low-pressure hose to the second stage (Figure 7). OTS wrench (137053-000) is supplied with the Guardian FFM; use this on the second stage and another wrench on the hose fitting.

Warning Note

Do not tighten the hose with a single wrench—always use a back-up wrench. Improper tightening can damage the second stage's internal components, resulting in potential failure of the regulator.

You can now pressurize the system and check for leaks. Depress the purge cover and test for airflow. Air will be directed through the channel at the top of the regulator port insert. You are now able to insert the regulator into the regulator port of the lower clamp and test breathe the mask.

Figure 7: Fitting Hose to Regulator

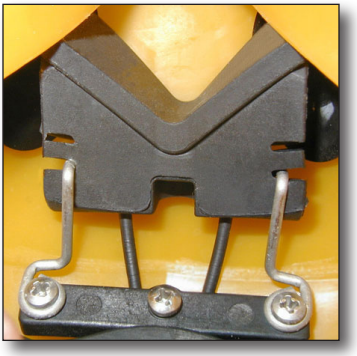

Figure 8: The Equalizing Assembly

Equalizing Assembly

The Guardian FFM has an equalizing block assembly and kit that allows the diver to equalize the ears. This kit consists of an adjustable, slotted, rubber base equalizing block mounted on a wire form (Figure 8), along with several inserts of varying thickness (Figure 9) that secure to the block with two pull-tabs which are installed through a pair of holes in the equalizing block. OTS provides an equalizing block without holes (to be used without inserts for lower settings), giving the diver even more options to choose from and an extra wire form of a different height. Additional wire forms are available by contacting your OTS dealer.

Figure 9: Inserts of Varying Thickness

Utilizing these components will allow you to vary the height of the equalizing assembly. This feature gives the Guardian FFM an increased range of comfort and performance for virtually any size face.

How does this work? The rubber, V-shaped equalizing block is designed to fit under your nose. Properly adjusted, you should be able to breathe through your nose with little, if any resistance. To equalize, you compress the mask enough to move the "V" up against your nostrils. This allows you to exhale against the block and equalize your ears.

Note: This adjustment has little to do with the size of your nose—it's the distance from the base of your nose to the bottom of your chin that is relevant. Since every face is different, it is very important that you take the time to determine which configuration is best for you, and that ***before diving*** *you make sure you can easily equalize.*

Installation of Communications

The Guardian FFM is designed to accept Ocean Technology Systems' (OTS) communications. There are two primary communication systems designed specifically for the mask: The Buddy Phone® *(see* ***"Buddy Phone® Installation Instructions" on page 20****)* and the OTS earphone and microphone assembly *(see* ***"EM-OTS-2 Installation Instructions" on page 21****).*

The Buddy Phone is a stand alone communication system designed with the transceiver mounted on the head harness located on the right side of the diver's head. The Buddy Phone has a built-in earphone.

The OTS earphone and microphone (EM) assembly is for all communications systems that require hard-wire connection to the diver's EM assembly, including Magnacom systems. Regardless of the system, the EM assembly mounts to the mask in the same manner.

Figure 10: The Blanking Plug

If the FFM was purchased without communications equipment, there will be a blanking plug installed in the communications port. This consists of a plug on the inside (of the mask) secured with a threaded, locking ring on the outside (Figure 10). To remove, use OTS wrench (P/N 137053-000) to unscrew the locking ring counterclockwise and remove the plug from the inside.

Preparation and Adjustment

Prior to diving the Guardian FFM, examine it for any damage and ensure proper assembly. Fully extend the head harness on all five (5) straps. ***Never*** pre-adjust the straps—they will need to be tightened every time the mask is donned. Move any communications equipment, such as a Buddy Phone or earphone holders (for an earphone and microphone assembly), to the rear of the harness. This will ensure proper tightening of the straps upon donning. Failure to do so may result in the buckles binding, not tightening.

Warning Note

ALWAYS inspect your diving equipment to ensure it is not damaged or defective and that it is fully functional. DO NOT dive the Guardian FFM or any other equipment if you have not verified that it is in good condition and working properly! If this equipment has been damaged, tampered with, or found to be defective, return it to OTS or have a qualified technician inspect it immediately.

DONNING

Overall Safety Inspection

Prior to donning your mask, examine the complete assembly as you would the rest of your gear to ensure that it is in dive-ready condition. You, the diver, are ultimately responsible for your equipment. Confirm that your air is turned on and examine the regulator assembly for leaks. Check all buckles, strap assembly, visor clamp assembly, visor, skirt, and second stage regulator and quick disconnect. Test that the regulator positively locks in place once inserted into the mask. Then, as previously mentioned, extend all straps and prepare to don the mask. Ensure you can equalize.

Hoods and Seals

To achieve the best seal, the mask skirt should be fitted ***directly*** onto the skin of the diver's face (Figure 11). Do not attempt to seal over or against a neoprene hood as this will result in leaking, excessive air consumption, and hood inflation. A neoprene hood can be trimmed to allow for the mask to seal properly against the face.

For dry suits that have latex seals, the mask may be worn directly over the hood. This type of hood allows for the mask to seal properly over the hood and the hood seals to the face.

Figure 11: Fit Mask Skirt onto Skin, Not Hood

Donning and Adjustment

Proper donning is crucial when using any piece of diving equipment, even more so with the Guardian FFM. An improperly adjusted mask will result in jaw fatigue, increased air consumption, leaking, and an overall poor fit.

Donning correctly starts with understanding how the mask fits. The mask comes in a single size designed to fit the widest range of facial dimensions possible. First and foremost, you have to start with the ***chin***. The mask has to be fitted to the chin first; the rest of the mask will seal to the face where it lays.

Figure 12: Open Lower Straps and Bring Over Head

With the mask straps fully extended, move the communications (either the Buddy Phone or earphone and microphone assembly) as far as possible to the rear of the straps to prevent them from binding against the buckles. Open the lower straps and bring the mask and harness over your head (Figure 12). Ensure the harness is straight and the center is low on the back of your head.

Hold the mask to your face with one hand and snug the lower (jaw) straps one at a time, switching hands to accommodate tightening the other. Pull the straps toward the back of your head, ***not*** out to the side. Attempt to tighten the straps evenly to prevent pulling the back of the head harness off center. Do not overtighten.

Figure 13: Snug Evenly

Next, snug the temple straps evenly as well. If necessary, tighten the top strap just enough to pull the top of the skirt snug to your forehead. DO NOT OVERTIGHTEN THE TOP STRAP! This can result in jaw fatigue after just a short period of time. Now, wiggle the mask on your face to ensure the mask is in proper position and centered with no stress points. Evenly snug the straps (Figure 13) to the desired tension, again not overtightening the straps. The mask should be comfortable on your face.

Overtightening the top strap will cause the center of the head harness to sit high on the back of the head. This results in the mask being pulled ***up*** on your face and not ***back***, as desired. Consequences of this error include leaking, jaw fatigue, and an uncomfortable dive. If you feel the need to tighten the top strap, pull down on the back of the head harness to ensure its proper positioning low on the back of the head. You can then tighten the top strap as necessary.

Finally, check that you can restrict your nostrils to equalize your ears. Experiment with what works best for you. Most will find that pushing up on the regulator at approximately 45° angle will work. For others, pushing in on the top of the visor will press the equalizing block to the nose, allowing equalization. If the pad is too high, you will not be able to breathe through your nose when wearing the mask. If the pad is too low, you will not be able to reach your nose to equalize. As previously shown, your Guardian mask comes with an equalizing assembly kit that will allow you to adjust the height of the pad. Each base pad (equalizing block) has two adjustment slots. (See ***www.otscomm.com/full-face-mask-training-videos/*** for demonstration.)

DIVING THE GUARDIAN

Pre-Dive

Once you have donned your mask and ensured your air is on, check the system by closing the ABV. The regulator should breathe easily and you will feel the air as it flows through the visor area of the mask. There should be very little exhalation resistance.

Prior to entering the water, close the ABV and check your submersible pressure gauge (SPG). This is done by taking two deep breaths through the mask while observing your SPG. You should see ***slight*** drop in pressure. If you see a significant drop in pressure, check that your air supply is working properly. If the gauge shows a drop, and your air supply is turned on correctly, have your equipment examined immediately for proper function.

Training & Emergency Procedures

Even if you have prior FFM diving experience, take some time to dive the mask in a pool or similar environment. Follow the guidelines in this manual and seek additional instruction if necessary. Learn how to dive the Guardian to a point that you feel ***completely*** comfortable with all aspects. In addition to how to use the equipment, there are emergency procedures for out-of-air (OOA) situations and possible equipment failure situations requiring bailout and switching to an alternate air source. Do not dive this or any equipment until you have properly learned these emergency procedures!

As part of your basic familiarization with the Guardian, bailout procedures are a ***required*** skill. In the event of an OOA situation, you must have an available source of back-up air. Whether it's a pony bottle or your dive buddy, it needs to be close by. A practice session should start in the shallow end of a swimming pool or similar environment, working either at the bottom or a fixed point so you do not lose control of your depth or position in the water column.

FOR BAILOUT PROCEDURES:

- ALWAYS have an available source of back-up air (pony bottle, dive buddy, etc.) and know its location.
- Do NOT hold your breath!
- Start practice sessions in shallow end of swimming pool or similar environment.
- During practice, work either at the bottom or a fixed point in the pool.
- It is recommended that you carry a spare visor-type mask.

First, know the location of your air supply, then start by removing the Guardian FFM. This is best done by grasping the bottom of the mask and placing your thumbs on the lower buckle tabs. Pull out on these tabs, loosening and rotating the mask forward and back over your head. Exhale slowly, do not hold your breath. Obtain your alternate air source, clear the regulator, and breathe normally. You can now don a spare mask, or terminate the dive without one.

This skill takes practice and preparation! Keep working on your bailout technique until you are comfortable and it becomes second nature.

Another important skill is donning the mask while underwater. Begin by setting up the mask as you would donning it on the surface (extending the straps, pulling any communications to the rear, etc.). Prepare yourself to be without air for the short time it takes to perform this exercise. Remove your spare mask, if you have donned one, as well as your alternate air source. Again, ***do not hold your breath***. Slightly exhale continuously. Drop the mask over your head and press the mask to your face.

There are a couple of ways to clear the mask. If you have sufficient air in your lungs, you can start to exhale as this will displace the water and clear the mask. At the same time, look up at about a 45° angle, pull out slightly on the bottom of the mask, then push the purge on the regulator. This will clear the mask of the majority of the water.

Next, take a cautious breath to ensure the mask has cleared and to prevent inspiring any residual water. After the first inhalation, look down and exhale ***forcefully*** to clear any remaining water. Repeat this forceful exhalation a few more times and you should have a fairly clear mask.

Again, practice this until it is second nature. If you have to bailout while under actual diving conditions, you will certainly be task-loaded with other issues. Competence with this technique will help you safely resolve any/all of these problems.

When you make your surface entry, ensuring the ABV is closed, secure the mask to your face with one hand as you normally would. Breathe normally and ***never*** hold your breath. Upon descending, equalize as previously described, early and often, prior to experiencing any pain or significant pressure. Stop descending if you cannot equalize or are experiencing pain, descending ***only*** if you can properly equalize. Again, breathe normally (never holding your breath!) and enjoy your dive.

If your mask requires adjustment while diving, snug the straps as required. Be careful not to overtighten. Upon surfacing, you may open the ABV to breathe surface air if necessary. The mask will need to be completely out of the water for the ABV to function. You may need to inflate your BCD and swim on your back if a surface swim is required. It is recommended that you remove your mask only after exiting the water, especially if you question the quality of water you are diving in.

Note: Plan your dive so you are back to the boat or beach while you still have air in your tank.

To remove the mask (Figure 14), grasp the regulator/bottom of the mask with both hands and thumb each of the lower buckle tabs on the sides. Then, pull the mask out and up off your head.

Figure 14: To Remove Mask, Grasp Bottom and Thumb Lower Buckle Tabs

Warning Note

If diving in an extreme cold environment, caution must be used to prevent ice build-up that could interfere with the function of the quick-release mechanism. If necessary, refrain from removing the regulator from the mask unless the mechanism is dry. Also, keep the inside of the FFM dry when possible.

Post-Dive Procedures

After you have completed your diving, remove the mask from the regulator (see “Regulator Set-Up and Hose Configuration” on page 8) by disengaging the regulator with the quick-release button on the inside of the mask. Thoroughly rinse the mask in clear, fresh water and pat it dry with a lint-free absorbent cloth. If necessary, a mild detergent may be used for cleaning the mask. ***Never*** use any harsh detergents, abrasives, or solvents on your Guardian FFM. Use caution when drying the visor after diving in a sandy environment to prevent any scratching of the lens. ***Do not use*** paper towels to dry or clean visor—they tend to scratch the lens.

Masks that are exposed to pathogens or shared between divers, should be disinfected with an appropriate cleaning solution. Disinfectants such as SaniZide, Advance TBE, Confidence Plus 2 or Steramine or similar products are acceptable. Follow the instructions as listed for each product. All solutions should be followed with a thorough freshwater rinse.

Warning Note

If the mask has been exposed to contaminated water it should be disassembled and cleaned by an OTS certified technician

Hang the mask upside down to allow for any trapped water to drain to the top of the skirt. Wipe out the excess water and allow the mask to air dry prior to storing in the mask bag. If traveling requires you to stow a damp mask, remove it from the bag as soon as possible and allow it to dry completely (to prevent any mold and mildew from forming).

Rinse the regulator as you normally would your regulator assembly. Flush the regulator with fresh water. Do not push the purge button when rinsing the second stage. Shake any remaining water from the regulator and stow it with the assembly.

Cold Water Diving

Cold water diving presents a set of challenges that are not seen in other diving disciplines. Specific training and preparation is necessary to safely dive in extreme cold water. Add to this, breathing compressed gas adds to the cold water effect to increase the likelihood of freezing through the adiabatic process of cooling of expanding gasses. Cold water diving is generally considered as 42F (5C) and below, although freezing/icing can occur in water as warm as 50F (10C).

Lock up or a regulator failing to deliver air due to freezing is an unusual event. To reduce or prevent freezing of a second stage regulator, it is important to limit the amount of moisture around the components of the

second stage regulator. Refer to OTS Technical Bulletin 507044-000 Rev. D, the Air Guide Check Valve, part number 883027-000, this component should be inspected and replaced if necessary prior to diving in cold water.

Insure that all components of the first stage and cylinder valve are dry on assembly of dive gear.

Know the air source, that the air is properly filtered, dried and tested regularly. All reputable dive shops follow guidelines to insure quality compressed air.

Insure the interior of the Guardian Full Face Mask is dry and keep it as dry as possible during the dive. Make sure the ABV is closed prior to entering the water.

Refrain from heavy purging of second stage, the primary and alternate regulators.

Make sure all equipment is properly maintained.

Most importantly, obtain proper training in cold water and full face mask diving and emergency procedures associated with these diving disciplines. This would include the ability to bailout of the full face mask, taking into consideration of cold water shock and secure an alternate air source to safely terminate the dive.

Danger Note

Diving in cold water environments is extremely dangerous. Proper training and techniques is required. While diving in cold water, the risk of catastrophic failure of SCUBA regulators is significant and may result in serious injury or death.

PART LISTS

Accessories Included

In addition to the Guardian FFM and Regulator, each Guardian FFM System comes with the accessories listed in Table 1.

Table 1: List of Accessories Included

Part Number	Description
134153-001	CASE, FULL-FACE MASK, CUSTOM OTS (“OTS Bag”)
604009-000	PSH-32, LOW PRESSURE, HOSE, SECOND STAGE, 32”
920010-000	OTS-ABV-2 (installed)
506129-000	MANUAL, OPERATION, OTS FFM (“Owner’s Manual”)
910385-000	EQUALIZING KIT, OTS, FFM
137053-000	WRENCH, VALVE BASE, REGULATOR (“OTS Wrench”)

Guardian FFM

Each consumer-removable item of the Guardian FFM listed in Table 2 and shown in Figure 15 on page 19.

Table 2: Guardian FFM Part List

Item	Part Number	Description
1	876001-000	PLUG, COMPORT, BLANKING
2	246025-001	NUT, COMPORT, BLANKING PLUG
3	872003-000	LOCK, BUCKLE, MASK STRAP
4	872001-000	BODY, BUCKLE, MASK STRAP
5	872006-000	STRAP, MASK
6	282035-000	DIAPHRAGM, ONE-WAY VALVE, OTS FFM
7	872004-000	SEAT, ONE-WAY VALVE, MASK

Regulator

Each consumer-removable item of the Guardian Regulator is listed in Table 3 and shown in Figure 16 on page 19.

Table 3: Guardian Regulator Part List

Item	Part Number	Description
1	604009-000	LPSH-32, LOW PRESSURE, HOSE, SECOND STAGE, 32”
2	940006-000	GUARDIAN REGULATOR, BLACK TRIM
	940006-010	GUARDIAN REGULATOR, BLUE TRIM
	940006-020	GUARDIAN REGULATOR, RED TRIM
	940006-030	GUARDIAN REGULATOR, PINK TRIM
	940006-050	GUARDIAN REGULATOR, YELLOW TRIM

Figure 15: Guardian FFM Exploded View

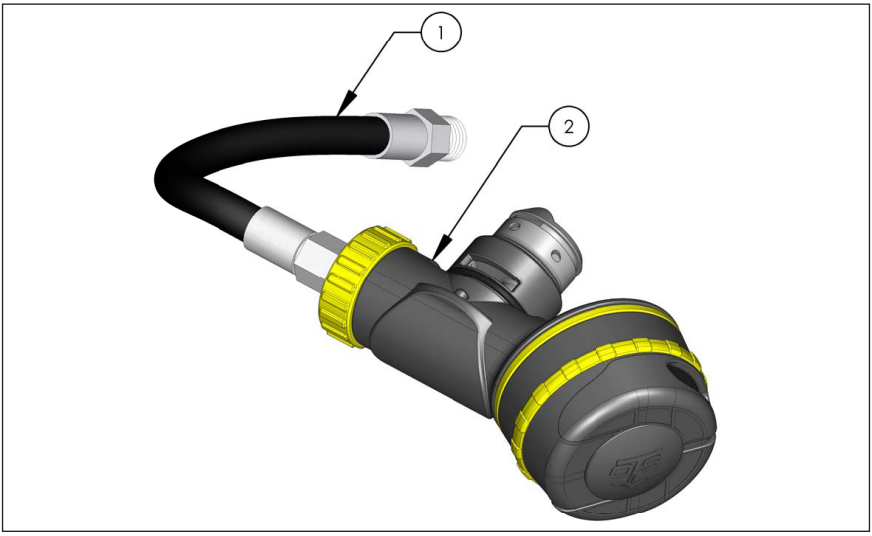

Figure 16: Guardian Regulator Isometric View

BUDDY PHONE® INSTALLATION INSTRUCTIONS

Refer to Figure 17 and proceed as follows:

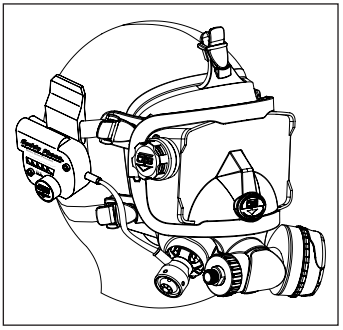

Figure 17: GFFM with Buddy Phone®

1. Locate the communications port on the right side of the mask. Unscrew (counterclockwise) the fastening nut from the plug using OTS wrench. Remove the plug and store for possible future use (Figure 10 on page 10).
2. Loosen (counterclockwise) the captive fastening nut on the microphone and push-to-talk (PTT) module of the Buddy Phone. Allow enough space between the fastening nut and the base of the module to accept the lip of the mask.
3. Insert the microphone and PTT module into the mask's right communications port. The nickel microphone wires may need to be bent slightly to install.
4. Continue inserting the microphone and PTT module into the communications port. The lip of the mask should go over the base of the module and rest between the base and the fastening nut.
5. The fastening nut is then screwed down clockwise until tight against the mask. The Buddy Phone cable should be pointing towards the Buddy Phone above the right ear.
6. Once the microphone is inside the port, carefully position it within 1/4" of the right corner of the diver's lips. The port accepts either the ME-16R Hot-Mic or Super Mic.
7. Fully insert the upper right head strap of the mask into the strap retainer slot on the OTS-BUD-D2 so that the Buddy Phone will be positioned above the right ear. Stretching the strap will make it easier to slip into the slot.
8. Before donning the mask, position the Buddy Phone as far back as possible to allow for tightening of the mask straps. Once fitted, adjust the Buddy Phone over the right ear as needed.

Note: In most cases of weak or bad communication, OTS has found that the microphone has been installed under the seal and toward the chin. The microphone needs to be clear of the seal and in the correct position for good, clear communications.

EM-OTS-2 INSTALLATION INSTRUCTIONS

Refer to Figure 18 and proceed as follows:

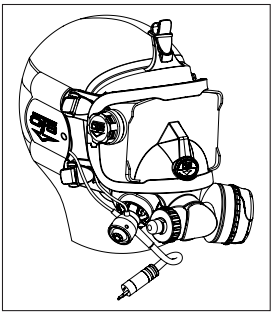

Figure 18: GFFM with EM-OTS-2

1. Locate the communications port on the right side of the mask. Using the OTS Wrench, unscrew (counterclockwise) the fastening nut from the plug and remove. Remove the plug from inside and store for possible future use (Figure 10 on page 10).
2. Loosen (counterclockwise) the captive fastening nut on the microphone and push-to-talk (PTT) module of the earphone and microphone assembly. Allow enough the base of the module to accept the lip of the mask.
3. Insert the microphone and PTT module into the mask's right communications port. The nickel microphone wires may need to be bent slightly to install.
4. Continue inserting the microphone and PTT module into the communications port. The lip of the mask should go over the base of the module and rest between the base and the fastening nut.
5. The fastening nut is then turned clockwise until tight against the mask.
6. Once the microphone is inside the port, carefully position it within 1/4" of the right corner of the diver's lips. The port accepts either the ME-16R Hot-Mic or Super Mic.
7. The left earphone cable travels snug up the right side of the visor and over the top by tucking the wire into the groove between the mask and visor.
8. Insert the temple and jaw mask straps through the top and bottom slots of each earphone holder, respectively. The snaps face toward the front of the mask with the OTS logo on each earphone holder upright. Reassemble the mask straps.
9. Insert the earphone into the earphone holder (on each side) past the snaps with the cable positioned below the snap. Secure the snap.
10. The earphone cable should exit the holder below the snap and run parallel with the mask straps.

Note: In most cases of weak or bad communication, OTS has found that the microphone has been installed under the seal and toward the chin. The microphone needs to be clear of the seal and in the correct position for good, clear communications.

NOTES:

NOTES:

Undersea Systems International, Inc.
dba
Ocean Technology Systems

LIMITED WARRANTY

The Guardian Full-Face Mask (GFFM) is fully warranted against defects in materials and workmanship, including labor, for a period of two (2) years from the time of purchase. Our obligation under this warranty is limited to the replacing of any part or parts which prove to our satisfaction to have been defective and which have not been misused or carelessly handled.

You must contact an official Ocean Technology Systems (OTS) Service Center or OTS directly to obtain service. If you elect to send the item/s to OTS, you must call and obtain an RMA number from our Repair department. The complete unit and/or damaged part shall be returned to our factory, transportation charges prepaid. We reserve the right to decline responsibility where repairs have been made or attempted by any party other than an OTS service factory trained center or properly trained personnel.

In no event shall OTS be liable for consequential damages related to our product/s.

OTS recommends that the Guardian Full-Face Mask and second-stage regulator be maintained on an annual basis. Warranty registration is required. OTS will replace routine maintenance parts and make appropriate adjustments. Any parts requiring replacement due to excessive wear or damage are not covered in this offer. Customer will be notified of any additional charges for worn or damaged components. The customer is responsible for shipping charges to the factory. OTS will pay shipping limited to the continental United States via UPS Ground service or equivalent. Any other shipping requirements are the responsibility of the customer.

Undersea Systems International, Inc.
dba
Ocean Technology Systems
3133 West Harvard St., Santa Ana, CA 92704 USA
Telephone: 714.754.7848 Fax: 714.966.1639
E-Mail: ots@otscomm.com
Web: www.otscomm.com