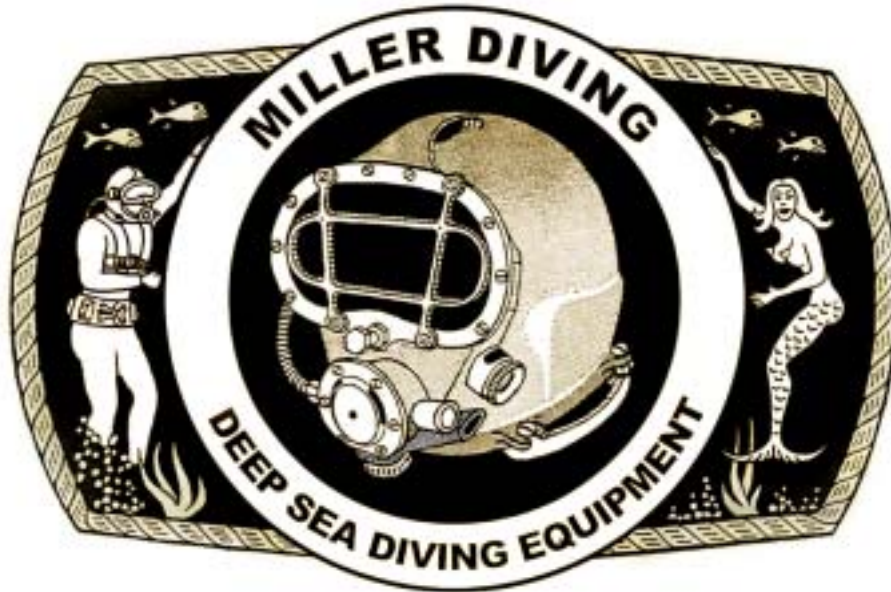


MILLER DIVING EQUIPMENT

INC.



# Miller 400 Diving Helmet Maintenance Manual

# MILLER 400 DIVING HELMET OPERATIONS AND MAINTENANCE MANUAL

Part # 100-900

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**DANGER: Diving with compressed breathing gas is a hazardous activity. Even if you do everything right there is always the potential for serious injury or death. No one piece of diving equipment can prevent the possibility that you may be injured or killed any time you enter the water. We do not herein make any effort to teach the principles of diving. It is our assumption the reader is a qualified diver.**

## Warranty Information

Miller Diving warrants every new helmet to be free from defects in workmanship for a period of ninety (90) days from date of purchase. This warranty does not cover rubber parts or communications components.


Should any part become defective due to workmanship during the warranty period, contact your nearest authorized Miller dealer. If there is no dealer in your area, contact Miller Diving directly at (805) 965-8538, Fax (805) 966-5761, or E-Mail: [Info@MillerDiving.com](mailto:Info@MillerDiving.com). You must have a return authorization number (RMA #) prior to the return of any item. Upon approval from Miller Diving, return the defective part, freight prepaid to: Miller Diving, 425 Garden Street, Santa Barbara, CA 93101, USA. The part will be repaired or replaced at no charge as deemed necessary.

**This warranty becomes null and void if:**


- 1. The product is not registered with Miller Diving within ten (10) days of purchase.**
- 2. The product has not been properly serviced and maintained according to this manual.**
- 3. Unauthorized modifications have been made to the product.**
- 4. The product has been abused or subjected to conditions which are unusual or exceed the product's intended service.**

## DEFINITIONS OF SIGNAL WORDS USED IN THIS MANUAL

For your protection, pay particular attention to items identified by signal words in this manual. These terms are identified as, CAUTION, WARNING AND DANGER. It is especially important for you to read and understand these signal words.

 **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.

 **DANGER:** This word indicates an imminently hazardous situation, which if not avoided, will result in death or serious injury.

If English is not your native language and you have any difficulty understanding the language of any warnings as they appear in the manual, please have them translated.

 **WARNING:** Este é um aviso importante. Queira mandá-lo traduzir.

 **WARNING:** Este es un aviso importante. Sirvase mandario traducir.

 **WARNING:** Quest è un avviso importante. Tradurlo.

 **WARNING:** Ceci est important. Veuillez traduire.

 **WARNING:** Diese Mitteilung ist wichtig. Bitte übersetzen lassen.

If you have any questions regarding the information in this manual, or the operation of your helmet, call Miller Diving at (805) 965-8538, fax (805) 966-5761

**IMPORTANT:** A Word about this manual. We reserve the right to make changes at any time, without notice, in prices, colors, materials, equipment, specifications, models and availability. Since some information may have been updated since the time of printing, please contact your local Miller Diving dealer if you have any questions.

## IMPORTANT SAFETY INFORMATION

This Miller 400 diving helmet is only intended for use by trained divers who have successfully completed a recognized training course in surface supplied diving.



**WARNING:** Follow all the instructions in this manual carefully and heed all safety precautions. Improper use of this diving helmet could result in serious injury or death.



**DANGER:** Miller Diving warns all divers who use Miller helmets to be sure to use only Miller Diving original spare parts from a Miller Diving authorized dealer. Although other parts, O-rings and fittings may appear to fit, they may not be manufactured to the same standards maintained by Miller Diving. The use of any parts other than Miller Diving original parts may lead to equipment failure and accidents.



**DANGER:** Diving in an environment that is chemically, biologically, or radiologically contaminated is extremely hazardous. Although Miller helmets may be adapted for use in some contaminated environments, special training, equipment, and procedures are necessary. Do not dive in a contaminated environment unless you have been thoroughly trained and equipped for this type of diving.

Read this manual before using or maintaining this equipment, even if you have experience with other similar demand mode masks or helmets. If you have purchased this helmet new from a dealer, be sure to send in the warranty registration card so we may keep you informed regarding any safety notices that affect this product. If you resell or loan this helmet to another diver, be sure this manual accompanies the helmet and that the person reads and understands the manual.



**DANGER:** Diving is a life threatening occupation. Even if you do everything right there is still the potential for serious injury or death. Diving a Miller Diving Helmet cannot prevent accidents, injuries, or death.



**WARNING:** This helmet was completely checked and should be ready to dive as it was shipped from the factory. However, it is always the diver's responsibility to check all the components of the helmet prior to diving.



**WARNING:** This manual is our effort to explain the operation, maintenance and use of the Miller 400. We do not herein make any effort to teach the principles of diving. It is our assumption the reader is a qualified diver. We highly recommend that all divers should train in the use of any model of commercial diving helmet, under controlled conditions, that they have not previously used or trained in prior to use on the job.

This manual is supplied to the original purchaser of this helmet. If you have any questions about the use of the helmet or you need another copy of this manual, Part Number 100-900, contact Miller Diving or your nearest Miller Diving dealer. If you have any questions regarding the use, maintenance, or operation of this helmet, contact Miller Diving at (805) 965-8538, fax: (805) 966-5761, or E-mail: Info@MillerDiving.com.



**DANGER: Miller helmets are not cleaned or lubricated for oxygen service. Using this helmet with oxygen percentages above 50% by volume may lead to fire or explosions which can result in serious injury or death.**

All Miller Diving helmets must not be used with oxygen breathing mixtures in excess of 50% by volume without first ensuring all gas transporting components have been cleaned and lubricated for oxygen service. Only oxygen compatible lubricants such as Krytox® and Christo lube® should be used. Lubricants must be used sparingly.

The information contained in this manual is intended to aid the user in optimizing the performance of this helmet. Some of the information will depend on the diving situation and the use of associated equipment. Many countries have specific laws and rules regarding commercial diving.

# SECTION 1

## GENERAL INFORMATION



### 1-A INTRODUCTION

This manual provides general information, operation and maintenance procedures to be used with the **MILLER 400 DIVING HELMET**.

The term gas shall be used as a general term throughout this manual for compressed air or mixed gas breathing media. No recommendations are made or implied for an appropriate breathing media.

This manual does not attempt to teach diving techniques or principles. It is intended as a maintenance guide for the Miller 400 Diving Helmet to be used by properly trained, qualified, commercial divers.

**! DANGER: 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. Use of a diving helmet cannot prevent this type of injury.**

**! WARNING: Gas systems used to supply Miller helmets must be capable of supplying gas to the diver at the required pressure and flow rates as stated in the operational specifications. The use of unregulated gas sources is extremely dangerous. The use of standard SCUBA type regulators is unacceptable, as there are no provisions for adjusting the intermediate pressure to the diver. Only proven systems that allow for varying the gas supply pressure to the diver should be used for umbilical diving.**

### 1-B GENERAL DESCRIPTION OF MILLER 400

The Miller 400 Diving Helmet is designed for use with a surface supplied life support system. Breathing gas and two way communication are routed from the surface to the diver via an umbilical, composed of a gas supply hose, a communication wire, and a small hose for a pneumofathometer.

The Helmet Shell, Regulator, Cams, Face and Neck Rings are constructed of solid bronze for a lifetime of service under constant hard use. The all metal Helmet provides the maximum in head protection. The Helmet moves with the diver's head without the need for an awkward crotch strap. It is secured with an internal, adjustable, padded neck strap. The Helmet has a free-flow control and a heavy duty Demand Regulator. An Oral-Nasal Mask reduces the possibility of CO<sub>2</sub> buildup; thus the Helmet can be used economically in the demand breathing mode for mixed gas diving. The Neck Ring comes with a wet-suit-type neckseal, but can be mated to practically any type diving suit, wet or dry. The rugged design and quality construction of the Miller Helmet result in a lifetime of service.



## SECTION 2

### OPERATING INSTRUCTIONS AND PROCEDURES

#### 2-A PRE-DIVE PROCEDURE:

1. Inspect Helmet shell for any damage or loose valves or fittings.
2. Inspect all rubber parts for wear, cracking, and proper installation.
3. Inspect exhaust valves to see that they are free of foreign matter and in good condition.
4. The Helmet should be hooked up to a suitable gas supply and all valves & exhausts checked for proper function as follows: Open Free-flow Valve to assure sufficient airflow. With Free-flow Valve closed, ascertain that the Demand Regulator is breathing properly. Inspect each exhaust valve by opening and closing it while Free-flow Valve is open.
5. Test radio communications by talking both to and from the diver.
6. Test Non-return Check Valve for proper function with at least one of the following :

**1st test:** This test must be made with Free-flow Valve open and the supply umbilical removed from Helmet. Place your mouth on inlet fitting and suck while placing tongue over orifice. The tongue should stick, due to the vacuum created if the check valve is operating properly. If the tongue does not stick, or air can be sucked out of valve, there is a leak and it must be corrected before diving.

**2nd test:** This test must be made with Free Flow Valve closed and the supply umbilical removed from Helmet. Disconnect the Demand Tube from Regulator Inlet Fitting. Attempt to blow in end of tube. It should be impossible if check valve works and all connections are tight.

**3rd test:** The Check Valve must be removed from the Helmet and supply umbilical. Test by attempting to blow against arrow direction. It should be impossible (no leakage) if valve is functioning correctly.

7. Verify emergency gas cylinder is full to rated capacity and is properly connected to Helmet.

8. To test for external water leaks: Connect Helmet to gas supply., Close both exhausts, lightly open Free Flow Valve , submerge Helmet, upside down in tank of water, just covering neck ring. Keep Neck Seal above water, pinched together with one hand. Rising air bubbles in the water will indicate any leaks. Correct with new O-ring and silicone sealant. A small leak from Exhaust Handle is normal.

**! WARNING:** In the event the Helmet is to be used with pure oxygen (such as O<sub>2</sub> decompression) the entire Helmet must be clean and free of any type oil or grease which could ignite. Only silicone type oxygen compatible lubricants may be used.

**NOTE:** It is recommended that the diver fully acquaint himself with all valves, components, and accessories in a training tank or shallow water, before making a working dive.

#### 2-B DRESSING INTO THE MILLER HELMET

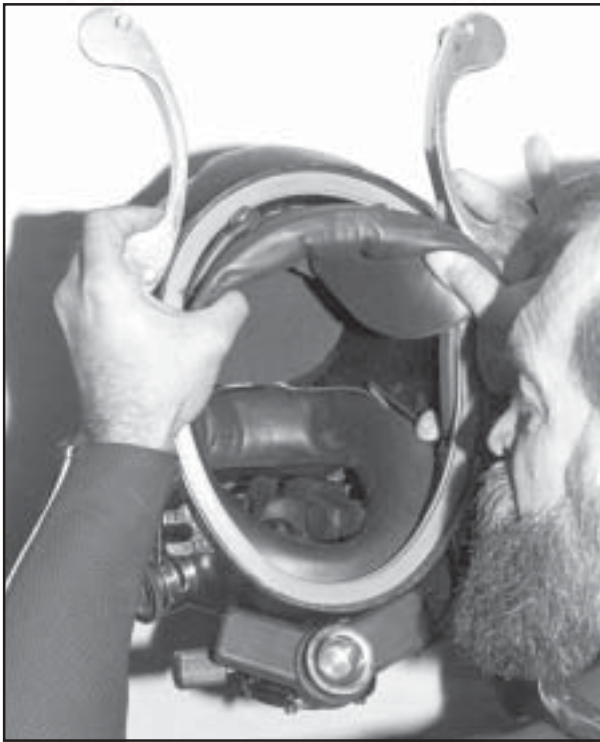
Check for proper adjustment. The Head Harness is easily adjusted by moving the Adjustment Buttons. Do not over tighten. The Upper Mounting Washer and Screw have three adjustment holes in the upper pad which will change the angle of position on the head.

Pull Neck Ring and Neck Seal over the head with-the Screw heads facing down. The Neck Seal should be turned down and may be tucked into the wet suit jacket.

With the tender holding the Helmet in a convenient position, the diver places both thumbs on the lower pad, stretching it back and open. The back of the head is inserted first and the Helmet is then rolled down over the face. The Neck Ring is inserted into the Helmet and the Cam Handles are closed. Then the buckle halves of the positive locking straps are pulled forward and snapped together, locking the cams.







*Stretch the Head Pad (106) with your thumbs while*

The entire dressing operation can be done by the diver without assistance. This should be practiced until the procedure becomes familiar.

#### **HELMET REMOVAL:**

Release and open the buckle of the Positive Locking Straps. Release the Neck Ring from the Helmet by fully opening the Cam Handles. The Helmet can then be removed by grasping the front (near the Regulator) and pushing out and up. Removal under normal conditions or in an emergency can be accomplished in less than five seconds.

#### **2-C OPERATING INSTRUCTIONS**

It is recommended that the diver fully acquaint themselves with all valves, components, and accessories in a training tank or shallow water before making a working dive.

A thin film of anti-fogging solution (such as liquid dish soap) may be applied to the inside of the Face Plate to prevent fogging.

The diver should test radio communications, the Free Flow and Demand breathing systems, just before the dive.

The -Regulator Adjustment Knob should be adjusted to prevent free flow.

The umbilical should be hooked to the diving harness with a suitable snap. (Miller Diving Equipment manufactures a full line of diving harness and backpacks). Do not attach the umbilical to the weight belt.

If it is necessary to jump off a high barge or boat, the side exhaust should be fully closed, the Regulator Exhaust partially closed, and a strong Free Flow turned on. Do not jump into the water using only the Demand System, as the impact could force water through the exhausts. Hold on to the Helmet securely with at least one hand when jumping.

Liberal use of Free Flow Valve will be much more comfortable to the diver in a hard working situation. However, using the demand system is much better for communication purposes and is essential for economical consumption if using a mixed gas breathing media.

The Helmet should be rinsed with fresh water after each dive and stored out of sunlight with good ventilation. Store the Neck Ring separately to allow Helmet to dry out completely.

#### **2-D EMERGENCY PROCEDURES:**

An **EMERGENCY GAS SUPPLY** should be used for all diving operations. The emergency gas should correspond to the breathing media being used for the dive. The supply should be adequate for a safe return to the surface or diving bell. This must be determined by the diver according to depth and duration of the dive. In most emergency situations, it is normally best **NOT** to remove the diving Helmet unless absolutely necessary. Communication with surface personnel may aid in rapid restoration of lost gas supply.

Several safety harness/back pack combinations are manufactured by Miller Diving Equipment for mounting emergency gas cylinders and attaching the main umbilical to the diver.

The gas cylinder must be equipped with a first stage regulator and a hose. The first stage regulator used on the emergency gas cylinder should be equipped with a pressure relief valve (pop off valve), in the event the first stage regulator develops a leak that could overpressure the hose leading to the Helmet.

The hose is connected to an Emergency Valve which is installed in the Emergency Valve Elbow on Free Flow Manifold Valve.



*Diver with emergency gas supply connected to the helmet.*

Prior to the dive, the emergency cylinder valve is turned on, pressurizing the first stage regulator and hose. The emergency on/off valve is closed. In event of an emergency (loss of main gas supply) the emergency valve is turned on, supplying emergency gas to the Helmet. Using only the Demand Regulator will conserve the limited emergency gas supply. The diver's weight belt may be dropped to assist in rapid ascent to the surface. The above recommendations are basic guidelines only. Diver preference and/or employer's regulations will best determine proper emergency procedures. Comprehensive emergency training is considered absolutely necessary for safe diving operations.

## **WATER LEAKAGE**

In the event of a small amount of water entering the interior of the Helmet or an emergency flooding, the clearing procedure is the same. Open the Free Flow Valve and close the Side Exhaust. This will force any water out the lowest part of the Demand Regulator through the Exhaust Valve.

Alternatively, the Regulator Exhaust should be closed and the side exhaust opened with the head tilted to the side, so Side Exhaust is lowest point in Helmet. Water is blown out with Free Flow Valve.

**! WARNING: Do not modify this helmet. Removal, modification or replacement of any MILLER component with non MILLER parts will make this helmet unsafe for diving. Use only genuine MILLER replacement parts!**

It can be determined if the Rubber Exhaust Valve is broken off or obstructed (open) with a foreign object, by shutting off Free Flow and very carefully attempting to breathe with the Demand System. If water enters, clear it out again with the Free Flow Valve. If the malfunction continues, the dive must be terminated and the problem corrected. Remember to inspect the diaphragm and neck dam for damage also.

If water remains in the rear of the Helmet:

The Side exhaust should be fully closed. The Regulator Exhaust should be partially closed, and the Free Flow Valve lightly turned on. This will overpressure the Helmet and force any water out of the lowest point, the Neck Seal. Hold securely on to the Helmet with at least one hand while attempting to blow out any water.

***NOTE: This is wet suit procedure only! Do not attempt this if Helmet is mated to a dry suit.***

## **2-E RECOMMENDED MATERIALS FOR MAINTENANCE**

### **SILICONE RUBBER SEALANT:**

Valve bodies, the Face Plate, and fittings are sealed and bonded to the Helmet Shell with Silicone Rubber Sealant.

### **WET SUIT GLUE:**

Rubber components are cemented to the Helmet Shell with Wet Suit Glue. A good rubber contact cement may be used if Wet Suit Glue is not available.

### **SILICONE GREASE:**

Threads, moving parts, O-rings and various rubber parts are lubricated with Silicone Grease. It should be a non-toxic, oxygen compatible formula.

**MARINE EPOXY PAINT:**

The Helmet coating can be refinished or nicks and scratches spot painted with Marine Epoxy paint. Available at yacht or boat supply shops.

**TEFLON TAPE:**

Fittings with tapered pipe thread (NPT) are sealed leak tight with Teflon Tape.

**BRASSO<sup>®</sup>:**

All brass and bronze parts with polished finish can be kept looking bright with Brasso<sup>®</sup> or other metal polish.

## SECTION 3

### DESCRIPTIONS, MAINTENANCE, AND REPLACEMENT


#### 3-A HELMET SHELL

##### DESCRIPTION:

The Helmet Shell is constructed from an approximately 1/4 inch thick, high strength, bronze alloy. The valves and fittings are all solidly mounted, metal to metal.

##### MAINTENANCE:

The Helmet should be rinsed off with fresh water after diving and stored away from the sun. Neck Ring should be removed to allow inner condensation to evaporate. Nicks and scratches in the Helmet coating can be spot repaired with a marine epoxy paint.

 **DANGER:** Never use any aerosol propelled sprays near the face port of any Miller diving helmet. The Freon propellant used in these aerosols can invisibly damage the Clear polycarbonate face port and cause it to shatter on impact from any strong blow. If the face port fails underwater the helmet will flood and drowning may result.

#### 3-B FACE PLATE AND FACE RING

##### DESCRIPTION:

The Face Plate is fabricated from 3/16 inch, Polycarbonate plate, which is highly impact resistant. Small exterior scratches tend to disappear under water. The Face Plate is secured by Screws to the Helmet by a bronze Face Ring with a molded recess for the plate. A silicone rubber sealant is used to bond the plate to the Helmet.

*NOTE: Certain chemicals and sprays propelled by Freon can injure and weaken the face plate material. Do not use solvent or degreaser for cleaning. Use only warm soapy water.*

##### REMOVAL AND REPLACEMENT:

1. Unscrew the Nose Device Knob.
2. Pull out Nose Device Rod from inside Helmet.
3. Remove the Slotted Nut and Washer.
4. Pull Oral Nasal free from Nose Device Housing .
5. Unscrew and remove Nose Device Housing from Helmet and Face Ring.
6. Remove all Screws and pry off Face Ring
7. Remove Face Plate from Face Ring.
8. Remove old rubber sealant from Face Ring and Helmet by scraping with a blunt screwdriver or scraper. It is important that these areas are free of old sealant and are very clean.
9. To install new Face Plate, remove paper from Face Plate and insert the new Face Plate into Face Ring.
10. Fill the gap between the side of the face plate and the face ring with silicone.
11. Apply an 1/8" thick bead of silicone sealant completely around the edge of the face plate.
12. Place Face Ring on Helmet and attach, beginning with Nose Device Housing. Next, insert one of the upper Screws, to align Face Ring. Insert all Screws, but do not tighten until all are in place. Excess sealant will squirt out on both the inside and outside of the Helmet when Face Ring is tightened. This excess sealant can be removed by allowing it to cure for about 20 minutes, then running a toothpick around the edge, cutting the sealant. It will then peel off easily.
13. Replace Oral Nasal, Washer, and secure with Slotted Nut.
14. Replace Nose Device Rod and secure with Nose Device Knob.

### 3-C NOSE CLEARING DEVICE

#### DESCRIPTION:

The Nose Clearing Device aids in equalizing the sinus and inner ears. During the diver's descent, the rod and pad extend into the interior, where the nose may be blocked for equalizing. The Nose Rod is sealed water tight by two O-rings which are housed in a Packing Nut. The rod is pushed in and out by the Nose Knob.

#### REMOVAL AND REPLACEMENT

1. Unscrew the Nose Device Knob.
2. Pull out Nose Device Rod from inside Helmet.
3. Remove Slotted Nut and Washer.
4. Pull Oral Nasal free from Nose Device Housing.
5. Unscrew and remove Nose Device Housing from Helmet and Face Ring.
6. Remove Packing Nut. Remove the two O-rings inside the Packing Nut.
7. Before replacing the two O-rings, lubricate them with Silicone Grease to allow the Nose Rod to slide in and out freely. Tighten Packing Nut snugly against the Housing.
8. To replace unit, screw Nose Device Housing onto Helmet and Face Ring. A small amount of Silicone Sealant should be applied to the hex and thread of the Nose Housing before its placement. Tighten Nose Housing securely.
9. Replace Oral Nasal on Nose Device Housing and secure with Slotted Nut and Washer.
10. Replace Nose Rod inside Helmet and secure with Nose Knob.

#### 3-1) ORAL NASAL MASK

#### DESCRIPTION:

The Oral Nasal is attached directly to the Demand Regulator. Inhaled gas passes from the Regulator through the Oral Nasal to the diver. Exhaled exhaust gas from the diver goes directly back through the Oral Nasal to the Regulator and out Regulator Exhaust. The Oral Nasal reduces dead air space to a minimum to prevent CO<sup>2</sup>

buildup. Gas from Free Flow Valve while on steady flow, passes into the Oral Nasal through the two inlet discs to the diver and out through the Regulator Exhaust.

#### REMOVAL AND REPLACEMENT:

1. Remove the Nose Rod and Nose Knob.
2. Remove Slotted Nut and Washer to release Oral Nasal from the Nose Device Housing.
3. Remove Microphone and Wire from Mask.
4. Pop the Mask out of the groove in Mount Fitting. Fitting may be removed if necessary by removing the six Screws which hold the Regulator Retainer Plate.
5. To replace Oral Nasal Mask install Mount Fitting with O-ring trapped between Regulator and Regulator Retainer Plate.
6. Install Microphone and Wire.
7. Pop the Oral Nasal tube into Fitting Groove with a blunt screwdriver.



*Pop the Oral Nasal tube into Fitting Groove with a blunt screwdriver.*

8. Push Oral Nasal onto Nose Device Housing.
9. Secure with Washer and Slotted Nut.
10. Install Nose Device Rod and secure Rod with Nose Device Knob.





**WARNING:** Never connect the main gas supply hose from the diving station/umbilical to the emergency valve. There is no one way valve in the emergency valve. If this mistake is made, any break in the supply hose could possibly result in a “squeeze”.

### 3-E FREEFLOW MANIFOLD

#### DESCRIPTION:

The Freeflow Manifold serves as an adjustable on/off valve, supplying gas to the interior of the Helmet. Opening the Freeflow Handle allows breathing gas to flow into the Helmet interior where the Freeflow Muffler directs it over the Face Plate to the diver and creates an anti-fogging action. An angular passage within the Freeflow Manifold allows the gas to bypass the on/off system and flow through the Demand Tube to the Demand Regulator, unobstructed and independent of the on/off valve system. Gas from either the supply umbilical or from an emergency gas supply follows this passage to the Demand Regulator.

#### MAINTENANCE AND REPLACEMENT:

Simple maintenance may be carried out on the Teflon Packing, Washers, Valve Stem without removing Manifold Body from Helmet.

1. Remove Screw, Handle, Packing Nut. Then, unscrew Stem and Packing.



*Remove the Valve Stem and Packing from the Manifold Body.*

2. Inspect all parts for wear.
3. Wash parts in soapy water. Rinse and air dry.
4. Lubricate threads with silicone grease.

5. Replace Teflon Packing or other worn parts.

6. To reassemble, screw Stem with Washers and Packing into Manifold Body, and secure with Packing Nut

7. Install the Handle on the Stem. Be sure the screw engages the hole in the Stem.

8. Tighten the Packing Nut so that some resistance is felt to rotation of Handle. Do not tighten excessively, but the Nut must be tight enough so that no gas escapes around Valve Stem. The Freeflow Muffler may be removed from the inside of Helmet, cleaned or replaced without difficulty. If necessary to remove the Manifold Valve Body from the Helmet, proceed as follows:

9. The Face Plate and Face Ring must be removed for access to Manifold Valve Nut and the small set screw located under the faceplate. See section 3-B.

10. Remove Muffler and unscrew Manifold Nut. Back out the set screw slightly, freeing the Manifold Body. The Manifold Body may now be removed.

11. Remove old sealant from Helmet area and Manifold Body.

12. Wash Manifold Body in warm soapy water, rinse and air dry.

13. Inspect Body, Threads, and Seat for wear.

14. To reassemble, install a new O-ring on body.

15. Apply an approximately 1/8 inch layer of silicone sealant over O-ring and base of thread area.

16. Install the Body in the Helmet. Run the Manifold Nut in snug, then tighten the set screw against the Body. Finish tightening the Manifold Nut.


17. Install Muffler. Be sure O-ring has not popped out of its groove.


### 3-F CHECK VALVE

#### DESCRIPTION:

Puncture or breakage of the supply umbilical or other surface support equipment could create a suction inside the Helmet which could result in serious injury to the diver. The Check Valve is used to prevent reverse flow


of gas from the Helmet, thus eliminating this possibility. The Check Valve is designed to assure a high flow rate of gas, low noise, and a high degree of reliability. It is easy to disassemble and inspect. The Valve is marked with an arrow to indicate flow direction.

 **WARNING: The one way valve must be tested daily, prior to the commencement of diving operations. Failure of one way valve could cause serious injury or death. Follow the procedures for testing the valve outlined in this manual.**

 **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.**

#### REMOVAL AND REPLACEMENT:

1. Remove Check Valve from Freeflow Manifold.
2. Use two wrenches to disassemble the two piece body.
3. Wash Valve Body and all internal parts in warm, soapy water, rinse and air dry.
4. Inspect internal parts for wear and replace if necessary.
5. Lubricate O-rings with silicone grease, then wipe clean to prevent foreign particles from sticking to the internal parts.
6. Assemble and test.

 **DANGER: 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, leaving the diver with nothing to breathe.**

#### 3-G EMERGENCY VALVE ASSEMBLY

The emergency valve assembly is not built into the side block. It is a separate component that can be removed and replaced, or disassembled in place on the side block assembly. *The Emergency valve control knob is not interchangeable with the defogger valve control knob.*

#### Disassembly of the Emergency Valve Assembly

Tools Required:

- 11/16 inch Open End Attachment on Torque Wrench
- 1 inch Open End Attachment on Torque Wrench
- 3/8 inch Slotted Flat Blade Screwdriver
- 8 inch Adjustable Wrench

- 1) Remove the lock nut, spring, and knob.
- 2) Undo the packing nut. When the packing nut is free of the threads of the emergency valve body, back out the stem until it is free of the emergency valve body.
- 3) Remove the packing nut, packing, and washer from the stem.

#### Cleaning and Lubricating

- 1) Clean all the metal parts in a 50/50 dilute solution of white vinegar/water. Rinse with fresh water. Clean all parts. See the cleaning instructions.
- 2) Inspect the packing and washer for wear and replace if necessary.
- 3) Inspect the stem seat for unevenness or wear and replace if necessary. It must also be replaced if the stem is bent.
- 4) Check the seat in the emergency valve body for wear or unevenness. Replace the body if necessary.
- 5) To remove the emergency valve body from the side block the one way valve assembly must first be removed.

#### Reassembly of Emergency Valve Assembly

Tools Required:

- 11/16 inch Open End & 1 inch Open End Attachments on Torque Wrench
- 3/8 inch Slotted Flat Blade Screwdriver
- Soft jaw vice

#### NOTE:

*The emergency valve does not have to be removed from the side block to be rebuilt. If the valve is to be removed, the one way valve should be removed first, allowing the emergency valve more clearance when rotating.*

- 1) With the exception of the tapered pipe thread end of the emergency valve body, lubricate all components with a light coating of silicone grease.



2) Place the new Teflon washer and new packing on the stem. *NOTE: There are two different packings and washers supplied in the kit, for rebuilding both the older style and the newer high flow emergency valve which is what all new Miller Helmets are equipped with. Match the removed packing and washer to the new ones supplied and discard the others.*

3) Holding these components in place on the stem, screw the stem into the emergency valve body.

4) Rotate the stem until it is seated all the way in.

5) Thread the packing nut onto the body. Run the nut in and tighten slightly with a wrench.

6) Place the knob onto the stem and rotate the stem all the way out, then back again. The rotation must be smooth. If “hard spots” or unevenness are felt during the rotation, the stem may be bent and could need replacement.

7) Tighten the packing nut with a wrench until moderate resistance is felt when turning the knob.

8) Place the spring, and locknut onto the stem securing the knob.

9) Tighten the locknut until it is flush with the knob. The assembly is now complete and ready for testing.

10) Test the valve by attaching it to an emergency air supply source. There must be no leakage of gas past the stem or through the packing nut. Turn on the bailout bottle and leave the supply on for several hours. There must be no drop in pressure in the system if the valve is operating properly.

11) If the emergency valve had been removed from the side block, ensure the pipe threads are clean and retape with teflon tape. Wrap the pipe threads starting two threads back, under tension, clockwise with 1½ wraps. Reinstall the emergency valve in the side block then reinstall the one way valve and torque to 240 inch lbs.

**! DANGER: Do not allow any excess Teflon tape to cover the end of the pipe thread fittings. Loose pieces of Teflon tape can interfere with the performance of helmet components and may block the diver's air supply. This could lead to death through suffocation.**

**! WARNING: A leaking emergency valve assembly can cause the diver to exhaust his entire emergency air supply (bailout) without his knowledge. This may lead the diver to mistakenly assume his bailout supply is available when it is not. This could lead to panic or drowning in an emergency. Any worn component that causes an emergency valve to leak must be replaced.**

**! CAUTION/WARNING: Never connect the main gas supply hose from the diving station/umbilical to the emergency valve. There is no one way valve in the emergency valve. If this mistake is made, any break in the supply hose could possibly result in a “squeeze”.**

**! WARNING: Be sure the Emergency air/gas first stage regulator is fitted with an overpressure relief valve. A leaky first stage can overpressure the hose, bursting it and causing a loss of the entire bailout supply and possible physical injury to the diver as the hose whips about. Do not use a high pressure hose as the system on the helmet is not designed for high pressure.**

### 3-H SIDE EXHAUST

#### DESCRIPTION:

The Side Exhaust consists of the Main Body held in place by a Retainer Plate. The Closeable Handle is secured by a Clip Ring. The Rubber Exhaust Valve is of the mushroom type. As a safety feature the exhaust can be fully closed. It also serves as a buoyancy control while using a dry suit. The primary function of the Valve is to exhaust gas from the main Helmet Shell when Freeflow is used.

#### MAINTENANCE AND REPLACEMENT:

1. To change the Rubber Exhaust Valve it is not necessary to remove the complete Side Exhaust Body from Helmet. Remove Handle by dislodging Exhaust Clip Ring from its retaining groove. Locate the end of the split Exhaust Clip Ring and dislodge by poking a small nail or sharp punch into one of the holes in the Exhaust Body and popping it out.

2. Grasp the Rubber Exhaust Valve and pull to remove.

3. The O-ring may be removed with a blunt screwdriver, being careful not to damage the inner surface of the Exhaust Body.

4. To remove brass Exhaust Body, unscrew the six Screws from inside the Helmet. Remove the Exhaust Retainer Plate. Push the body out from the inside.

5. Before replacing the Exhaust Body, clean any old silicone sealant from Helmet and Exhaust body.

6. Replace Body O-ring and coat base of Exhaust Body including O-ring with silicone sealant.

7. Place Exhaust Body in hole, making sure Ports are facing up and back.

8. Replace Exhaust Retainer Plate and fasten with the six Screws inside the Helmet. (Be certain that the O-ring has not popped out from its groove).

9. Excess silicone sealant should be removed by letting it cure for about 20 minutes, then run a toothpick around edge and peel it off.

10. Lightly lubricate new inner O-ring with silicone grease and install.

11. Lightly lubricate the tip of Rubber Exhaust Valve with silicone grease. Insert tip in hole and press firmly into place with thumb. (Be sure the tip exits on opposite side of Exhaust Body to lock in place).



*Press Rubber Exhaust Valve firmly into place with thumb. Be sure tip exits on opposite side.*

12. Place Split Clip Ring on Handle between threads and top.

13. Screw the Handle into the Exhaust Body, allowing 1/4 in. space between the Body and Handle top. Clip Ring may now be forced into the retaining groove in Exhaust Body using a blunt screwdriver. (The purpose of clip ring is to prevent the handle from unscrewing all the way out of the Exhaust Body).

### 3-I CAMS

#### DESCRIPTION:

The two Cam Handles lock the Neck Ring tight against the Neoprene Gasket with four points, for an effective water tight seal. The Cams are simple, rugged and designed for quick, jam-proof operation. They are easily adjusted with the Handle Screw and Cam Nuts.

#### MAINTENANCE AND REPLACEMENT

1. To remove handle, loosen Cam Lock Nut and unscrew the Handle Screw at the rear Helmet ear and remove the Cam.

2. To replace Cam Handle, install Cam on rear Helmet ear in this order:

3. Place Screw through ear, from top down.

4. Position Washers, usually three, under rear ear.

5. Install Cam Nut under Washers (not tight).

6. Place Cam on bottom and fasten with Screw until snug.

7. Tighten Cam Nut against Cam. The Screw, Cam Nut, and Cam are now locked together. The Cam Handle should swivel freely, without up and down play, on the rear Helmet ear.

8. The front ear tension adjusts with Screw and Lock Nut. **NOTE:** The amount of washers determines the amount of tension on rear ear, to lock the Neck Ring in place. Three Washers are normally used in both front and rear ear. Proper tension is achieved when pressure is sufficient to press Neck Ring into the Gasket and Dam approximately 1/16 of an inch.



*Adjust Cams with a wrench and screwdriver.*

### 3-J DEMAND REGULATOR

#### GENERAL DESCRIPTION:

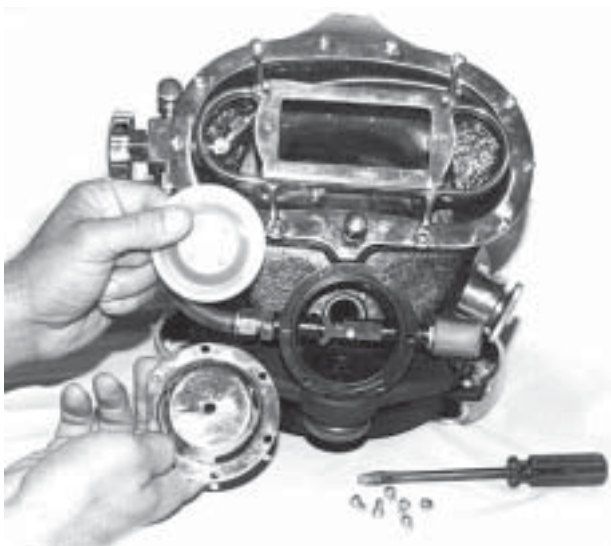
Miller has improved the standard Demand Regulator by encasing the internal working parts in a heavy duty, cast bronze housing and adding a closeable exhaust as a special safety feature. The closeable exhaust may be used to control buoyancy when using a dry suit without a valve system. The heavy duty housing protects the Demand Regulator parts from impact damage, thus saving the diver many extra hours of maintenance and replacement costs. Most important, the rugged housing helps protect from a possible mishap due to a blow to the regulator.

The diver has the option of using free flow gas or demand regulated gas, according to his needs. Demand breathing is better for communication purposes due to the reduction of gas noise. The Demand Regulator receives gas from the tube connected to the Free Flow Manifold.

#### GENERAL MAINTENANCE & REPLACEMENT:

1. Remove Regulator Cover by unscrewing six Screws.
2. Lift out Diaphragm.
3. Remove Demand Tube.

***NOTE: Normal maintenance does not require removal of Regulator Body from Helmet.***



*Cover and Diaphragm removed*

If it is necessary to remove the regulator:

4. Pop Oral Nasal Mask free from Fitting.
5. Remove the six Screws holding the Retainer Plate. The Regulator may now be pulled away from Helmet. The internal parts of the exhaust are removed and serviced, same as Side Exhaust. See section 3-G.
6. The Exhaust Deflector easily pops off and on.
7. When installing Regulator on the Helmet be sure to clean old silicone sealant from O-ring area.
8. Install new O-ring. Apply approximately 1/8" of silicone sealant all around O-ring area.
9. Insert the Regulator into Helmet. Be sure Oral Nasal Fitting and O-ring are installed on the Plate prior to assembly.
10. Install Retaining Plate with six Screws. Excess sealant can be picked off with a toothpick after curing 20 minutes.
11. Pop the Oral Nasal into the Mount Fitting groove with a blunt screwdriver.
12. Install Air Supply Tube. Snug the nuts with wrench, but do not over tighten.

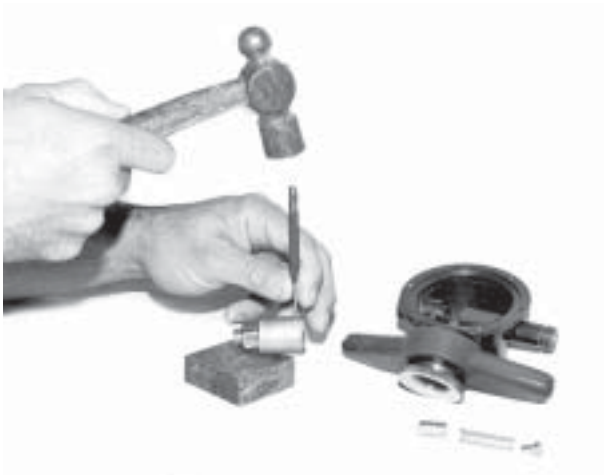
### MILLER-10 REGULATOR

#### DESCRIPTION:

Gas enters the Inlet Seat and is held back by the Disc and Retainer. When the diver inhales, the diaphragm draws against the Demand Lever. This action pulls the Disc and Retainer away from the Inlet Seat, allowing the gas to flow to the interior of the Regulator Body. Gas passes through the Mask to the diver. The Double Spring System work together in tandem to close the valve after each inhalation, preventing free flow of gas into the Helmet. The Adjustment Knob changes the spring tension which holds back the incoming gas supply until the diver inhales and allows the diver to adjust the resistance to free flow, according to the depth of the dive.

## MILLER-10 REGULATOR INTERNAL PARTS MAINTENANCE AND RE- PLACEMENT:

1. Unscrew Adjustment Knob as far out as possible.
2. Loosen Packing Nut with a wrench.
3. Remove the Adjustment Assembly, Shaft, Teflon Washer, O-ring, Packing Nut, and Knob completely from the Regulator.
4. To disassemble adjustment assembly, knock out pin with a 3/32", punch. Be sure to rest knob against solid support to avoid damage.



*Support the knob when driving the pin.*

5. Tilt the Regulator and shake out the Piston, Spring set, and Spacer.
6. Unscrew Nut from Inlet Valve. Keep Valve from rotating by inserting a small screwdriver into Inlet area.
7. Remove Spring, Washer, Inlet Valve, Rocker Lever and Spacer.
8. All metal and rubber parts may be cleaned in warm soapy water, rinsed and air dried.
9. Inspect Diaphragm for pinholes, cracks or other damage.
10. Inspect O-rings for damage.
11. Inspect Inlet Valve Seat for wear and deep groves in the rubber disc.

12. Inspect and replace all parts necessary.
13. Lubricate O-rings and threads lightly with silicone grease.
14. To reassemble, Slip Spring and Washer on shaft of Disc and Retainer. Insert all three parts into Regulator Body inlet.
15. Place Washer, Lever, Spacer, and Nut on the tip of Shaft which now protrudes into the interior of Regulator Body.
16. Tighten the Nut so that two threads protrude past the nut.
17. Install Inlet Seat with O-ring.
18. Install the Piston, Spring Set, and Spacer into the adjustment tube of Regulator Body.
19. Install Teflon Washer, O-ring, Packing Nut, and Adjustment Knob on Adjustment Shaft. Line up the holes in Knob and Shaft and tap in Pin with 3/32" punch.

20. Install the Adjustment Knob Assembly into Adjustment Tube. To Adjust the Regulator, first pressurize system with approximately 150 PSI. The Lever should be adjusted by Nut to have no more than 1/16 in. Free movement. The Lever should be even with the top of Regulator Body where the Diaphragm will almost touch it. If it is too high or too low the Lever should be bent to the correct position. The Adjustment Knob should be screwed in to stop free flow. If free flow cannot be stopped, the Nut is too tight.



*Check Free Movement and position of Lever (88).*




### 3-K FACESEAL

#### DESCRIPTION:

The Face Seal is fabricated from open cell polyfoam with a Neoprene skin and is glued into the Helmet with wet suit cement. The Face Seal provides comfortable support for the diver's face. Clear communications with the surface personnel results from the divers ears being separated from the noise generated by the Freeflow demand and exhaust systems, in front of the Face Seal.

#### REMOVAL AND REPLACEMENT:

1. Remove Face Seal being careful not to damage Helmet coating.
2. Remove as much of old glue and foam pieces as possible. Use blunt screwdriver and wire brush.
3. Position Speaker Wires allowing two to lead to rear of Helmet and one to front.
4. Apply glue to Face Seal. Apply glue in Helmet approximately 3" wide in Face Seal area and let dry several hours.
5. Reapply glue to Face Seal and Helmet area. Let dry until tacky (approximately 10 minutes).
6. Beginning with forehead, attach Face Seal to Helmet by slowly pressing down one side at a time, moving toward chin, slightly stretching as you go. (It can be helpful to place a piece of paper under opposite side while working to prevent premature contact).

 **WARNING: Wet suit glue does release dangerous fumes which could be hazardous to the diver. The Helmet should not be used for at least six (6) hours after gluing.**


### 3-L HEAD HARNESS


#### DESCRIPTION:

The Head Harness combines the function of a neck strap and head pad in one adjustable unit. Moving the two adjustment buttons in the Harness Body will fit a large or small head. Three adjustment holes for Screw are located in the crown of Harness Body. Moving the Screw and Mount Washer will change the ride (angle) of the Helmet on the diver's head.

### MAINTENANCE AND REPLACEMENT

1. To remove head harness remove, Screw and Mount Washer from crown of Helmet.
2. Remove Neck Bands by unbuttoning from Band Button .
3. Install new Head Harness by attaching crown to Helmet with Mount Washer and Screw.
4. Button Neck Bands to Band Button.

 **CAUTION/WARNING: Pulling the neck dam over the diver's head can be difficult. The neck dam should be powdered if dry. If wet, the diver should devise a system to get the seal over his head without excessive force. Stretching (expanding) the seal and placing part way over the head can help reduce the force needed to install the seal. Proper training is necessary to install the neck seal over the diver's head and onto his neck. Although the possibility is very remote, injury might result if this procedure is not done properly. If a diver does not know how to don the neck seal he should seek proper instruction before proceeding.**

 **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.**

### 3-M NECK RING

#### DESCRIPTION:

The Miller Neck Ring consists of two Mating Rings, fifteen Screws, a chin strap and the Neoprene Neck Seal Boot. The Neck Seal is conical shaped and is designed to seal on the diver's neck independent of any type of diving suit, thus the Helmet may be worn with a wet suit, coveralls or a bathing suit. The Neck Seal may be removed and the Neck Ring mated directly to a dry suit for a very effective combination in cold or contaminated water.

## REMOVAL AND REPLACEMENT:

To test the Neck Ring for flatness, which is critical for proper sealing, place the assembly with the screw heads up on a large, flat steel plate. Attempt to tip or rock the ring by pressing down one side, then the other. Do this all around the Ring. An up and down movement indicates the Ring is pivoting on a high spot. Locate and mark the spot (usually there will be 2 areas). Turn Ring upside down (screw heads down), and place two small, flat pieces of wood, one on each side of high spot, between plate and ring. Tap lightly with rubber or wooden mallet. Keep testing and tapping until Neck Ring sits perfectly flat.

To replace a worn or damaged Neck Seal Boot:

1. Remove all Screws.



*Trim excess rubber after installing new Neck Seal (18).*

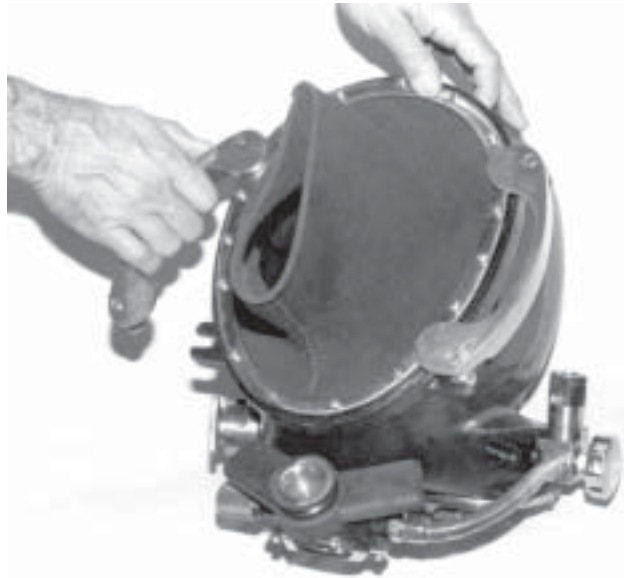
2. Remove old Neck Seal and insert new Neck Seal. Be sure sewing on Neck Seal and screw heads end up on the same side of Ring.

3. Insert Screws only a couple of turns until all screws are installed, then tighten. There will be approximately 1/4 in. of excess rubber material all around the outside of Neck Ring. This excess must be carefully cut off flush using a razor blade. Small holes or tears in Neck Seal can be repaired in the field with wetsuit glue.

## 3-N NECK RING GASKET

### DESCRIPTION:

The Neck Ring Gasket is constructed of oil-resistant Neoprene rubber. The Gasket is glued in the Helmet Dam area. The Helmet and Neck Ring, when mated together, are sealed watertight by the Neck Ring Gasket.



*Always install the Neck Ring with screw heads out.*

### REMOVAL AND REPLACEMENT:

1. Remove old Neck Ring Gasket and clean area thoroughly, using a screwdriver and wire brush, being careful not to damage Helmet coating.
2. Apply wet suit glue to both Neck Ring Gasket and Helmet. Allow to dry for several hours.
3. Apply second coat of glue to Helmet and to Neck Ring Gasket, letting glue dry until tacky (approximately 10 minutes).
4. Fit the gasket into the Helmet, making certain it is evenly distributed throughout and touches outer wall of Helmet Ring. Press down firmly.

**! WARNING: Wet suit glue does release dangerous fumes which could be hazardous to the diver. The Helmet should not be used for at least six (6) hours after gluing.**

### 3-O COMMUNICATIONS SYSTEM

#### DESCRIPTION:

Two way communications system consists of two Binding Posts, Speaker Wire, a Microphone mounted inside the Oral Nasal Mask and two Earphones mounted with Velcro for easy removal and inspection. All speakers are wired in parallel, which prevents the failure of one unit from affecting the performance of the others.

#### REMOVAL AND REPLACEMENT:

1. Remove Face Plate. Refer to section 3-B.
2. Binding Posts are located on the side of the Helmet just below the Freeflow Manifold. To remove Binding Post insert a small nail or pointed punch in wire hole (outside of Helmet) while turning nuts (inside of Helmet). This will keep post from rotating.
3. Remove Speaker Wire.
4. Push Binding Posts out through the holes.
5. Remove old silicone sealant from hole area.
6. Install new binding posts.

**NOTE: Do not use substitutes as Miller Binding Posts are fully insulated and designed specifically for the Miller Diving Helmet. Uninsulated substitute posts may short out communications after being in the water for a period of time.**

7. Apply thin coat of silicone sealant around the shaft prior to installing Post in the Helmet.
8. Replace nuts on inside of Helmet. Replace Speaker Wire securing Speaker Wire with 2nd nut. Prevent post from turning by securing with a small nail or pointed punch in wire hole.
9. The Ear phones and Microphone are easily replaced if necessary. They are attached to the Helmet with Velcro for easy adjustment and plug easily onto Speaker Wire Assembly.

**WARNING: Never dive without attaching the umbilical to some type of harness or clip on the diver's body. Never allow the umbilical to pull on the helmet directly or the diver could suffer a neck injury.**

### 3-P FACE GUARD (optional) WELDING SHIELD (optional)

The optional Face Guard protects the Face Plate from scratches as well as adding an attractive appearance. It also serves as a mount for the optional Flip-up Welding Shield. Both units are constructed of solid bronze for strength, yet are very light weight. A standard size Welding Lens mounts with two Screws to the Welding Shield.

**WARNING: Use only original Miller Diving replacement spares when repairing your helmet. The use of other manufacturer's parts will interfere with the performance characteristics of your life support equipment and may jeopardize your safety. Additionally, any substitutions will void all warranties offered by Miller Diving.**

### 3-Q PREVENTIVE MAINTENANCE

Frequency of Helmet maintenance must be determined by each diver, as amount and variation of use will change with each individual. Salt water use, hand jetting and working in contaminated water all mean more frequent maintenance.

Routinely inspect the Helmet for wear or damage. Follow pre-dive procedures. See Page 8.

Monthly, (or between jobs) maintenance is recommended. (see sections noted for details).

1. Inspect Face Plate for damage. Clean with warm, soapy water.
2. Remove Nose Device Rod, lubricate O-rings and check for smooth operation. See Page 13.
3. Clean and inspect Oral Nasal Mask for wear and damage. See Page 13.
4. Remove Valve Stem and Packing. Inspect, clean and lubricate all parts and Body. See Page 14.
5. Disassemble, inspect and clean Check Valve. Assemble and test. See Page 15.
6. Remove Side Exhaust Handle. Inspect, clean and lubricate Exhaust Valve and O-ring. See Page 16.



7. Remove Regulator cover. Inspect, clean and lubricate all internal parts. See Page 18.

8. Test Communications. Check for corrosion on Terminals. See Page 22.

9. Clean and inspect Face Seal for wear and separation from Helmet. See Page 20.

10. Clean and inspect Head Harness for wear. See Page 20.

11. Check for proper adjustment of Cams. See Page 17.

12. Clean and inspect Neck Ring Gasket for wear and damage. See Page 21.

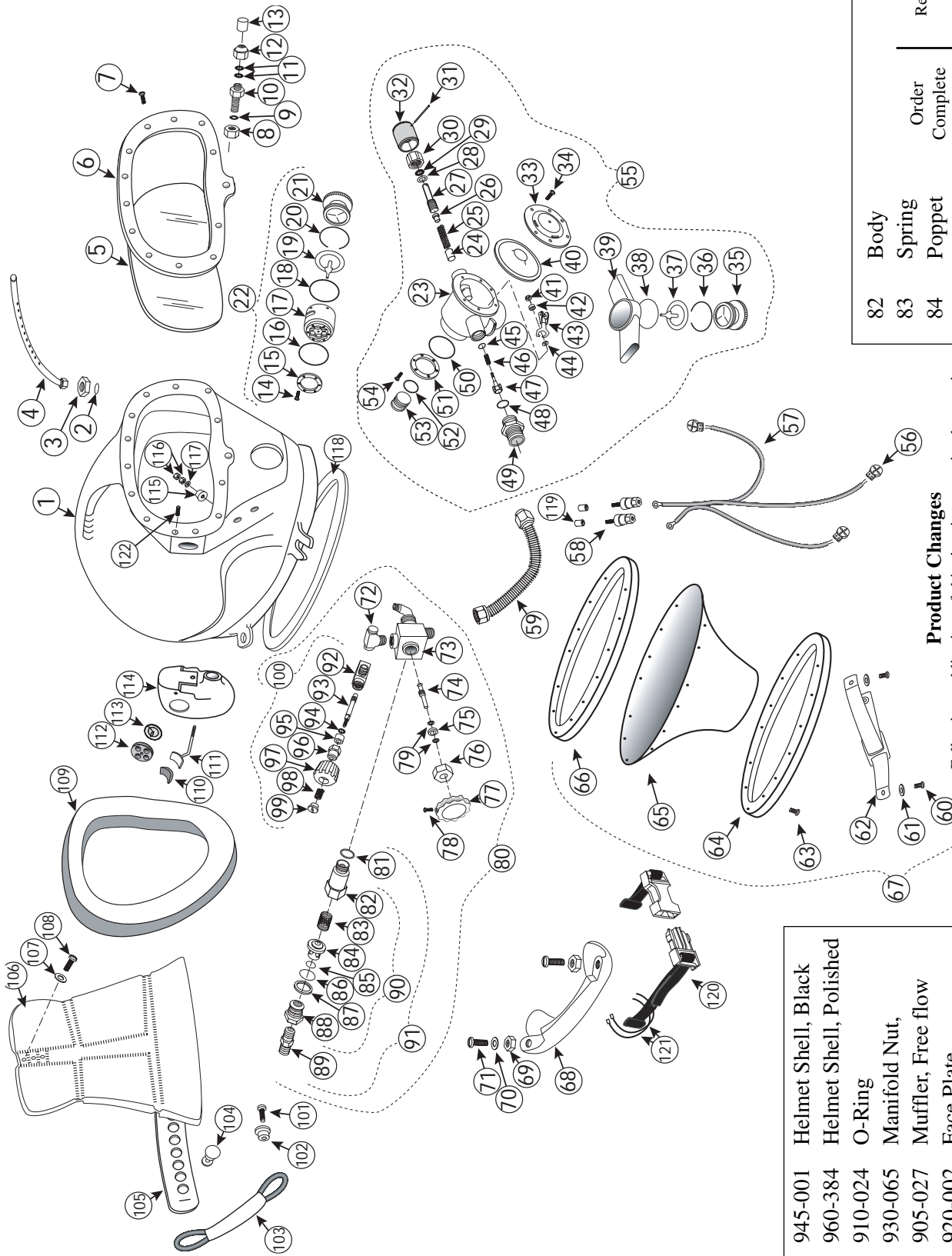
13. Inspect Neck Ring for flatness and Boot or wear and holes. See Page 20.

14. Inspect emergency valve for leaking. See Page 16.



**DANGER! Any helmet/dry suit system must be leak tested according to the manufacturer's instructions before EVERY dive in contaminated water!**

# MILLER 400 SERIES DIVING HELMET



	Order Complete sec Loc. # 90	For Replacement Parts Order Kit #525-330
82	Body	
83	Spring	
84	Poppet	
85	O-Ring	
86	O-Ring	
87	Wiper	
88	Seat	

### Product Changes

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

1	945-001	Helmet Shell, Black
	960-384	Helmet Shell, Polished
2	910-024	O-Ring
3	930-065	Manifold Nut,
4	905-027	Muffler, Free flow
5	920-002	Face Plate
6	960-003	Face Ring
7	930-017	Screw
8	930-075	Nut, Slotted
9	930-012	Washer
10	950-076	Nose Device Housing

11	510-008	O-ring	46	535-804	Spring	89	555-117	Adapter
12	950-078	Packing Nut, Nose Device	47	545-026	Inlet Valve	90	555-195	One Way Valve
13	550-065	Knob, Nose Device	48	510-014	O-ring	91	505-060	One Way Valve Assembly
14	930-047	Screw	49	950-082	Inlet Seat	92	950-348	Valve Body
15	950-100	Retainer Plate, Side Exhaust	50	910-058	O-Ring	93	550-138	Stem
16	910-101	O-Ring	51	950-057	Retainer Plate, Regulator	94	530-095	Washer
17	950-102	Side Exhaust Body	52	910-073	O-Ring	95	520-024	Packing
18	910-103	O-Ring	53	950-072	Mount Tube, Oral Nasal	96	550-254	Packing Nut
19	910-030	Exhaust Valve	54	930-017	Screw	97	520-025	Knob, Control
20	930-104	Clip Ring	55	905-140	Regulator Assembly (painted)	98	535-802	Spring
21	950-105	Exhaust Handle	56	905-340	Regulator Assembly (polished)	99	550-250	Lock Nut
22	905-133	Side Exhaust Assembly	57	915-036	Microphone / Earphone	100	905-348	Emergency Valve Assembly
23	945-080	Regulator Body, (Black)	57	915-034	Speaker Wire Assembly	101	930-017	Screw
	960-304	Regulator Body, (Polished)	58	915-033	Binding Post	102	950-110	Band Button
24	550-060	Piston	59	905-055	Demand Tube & Guard	103	905-108	Neck Band
25	535-807	Spring Set	60	930-112	Screw	104	950-107	Adjustment Button
26	550-059	Spacer	61	930-423	Washer	105	910-410	Adjustment Strap
27	550-058	Adjustment Shaft	62	905-323	Chin Strap	106	910-406	Head Harness
28	520-032	Washer, Teflon	63	930-017	Screw	107	930-109	Washer
29	510-011	O-Ring	64	960-016	Neck Ring, Lower	108	930-106	Screw
30	950-097	Packing Nut, Reg. Adj,	65	910-018	Neck Seal, Neoprene	109	910-005	Face Seal
31	530-601	Roll Pin	66	960-015	Neck Ring, Upper, Tapped	110	510-575	Nose Device Pad
32	950-098	Adjustment Knob	67	905-135	Neck Ring Assembly	111	545-015	Nose Device
33	960-046	Regulator Cover (Black)	68	960-006	Cam Handle	112	950-369	Valve Body, Oral Nasal
	960-414	Regulator Cover (Polished)	69	930-068	Nut	113	510-552	Valve Oral Nasal
34	930-047	Screw	70	930-012	Washer	114	910-070	Oral Nasal
35	950-105	Exhaust Handle	71	930-011	Screw	115	920-014	Neck Ring Gasket
36	930-104	Clip Ring	72	955-111	Elbow	116	530-308	Nut
37	910-029	Exhaust Valve	73	945-064	Manifold Valve Body	117	530-525	Washer
38	910-103	O-Ring	74	950-063	Valve Stem, Manifold Valve	118	915-447	Standoff
39	910-059	Deflector	75	920-062	Teflon Packing, Manifold Valve	119	915-445	Insulation Sleeve
40	910-081	Diaphragm	76	930-061	Washer	120	905-175	Positive Locking Assembly
41	530-303	Adjustment Nut	77	950-060	Packing Nut, Manifold Valve	121	530-049	Tie Wrap
42	550-052	Spacer	78	960-025	Handle, Manifold Valve	122	930-285	Set Screw
43	545-038	Roller Lever	79	930-017	Screw			
44	530-506	Washer, S.S.	80	905-134	Manifold Valve Assembly			
45	530-505	Washer, Brass	81	510-483	O-ring			



## MILLER COMMERCIAL WEIGHT BELT

The Miller Weight Belt is made from tough, long lasting materials, which require no maintenance. The black rubber belting has a 2 ply nylon carcass which will not rot or mildew.

The standard belt is 45" long x 4 1/2" wide x approximately 1/4" thick. Back-up plates, bolts and nuts are stainless steel. Adjustable for weight, waist size and shoulder strap length.

## MILLER QUICK RELEASE BUCKLE

The heart of the Miller Weight Belt is the quick release buckle, specifically designed for commercial diving. The all metal buckle is made from high strength bronze and stainless steel. The closing mechanism features a stainless steel torsion spring for positive, reliable operation.



## WEIGHT BELT MODELS

Three different model belts available.

<b>Heavy</b> .....	Four 8 lb. weights	(32 lb.)
<b>Standard</b> .....	Five 5 lb. weights	(25 lb.)
<b>Light</b> .....	Six 3 lb. weights	(18 lb.)

All available with or without shoulder straps.  
Additional 8 lb., 5 lb. and 3 lb. weights available.

## MILLER DIVING HARNESS

The materials used in the Miller Harness lines are specially selected for their high strength, corrosion resistance, and longevity. All stress points and joints are securely fastened with stainless steel rivets and large washer plates through triple layers of webbing. The D-rings and buckles are made of stainless steel. Over 12,000 various models of the Miller Harness are in service in the commercial diving industry and the U.S. Navy. **Small size...** fits approx .... 32"-42" chest. **Medium size...** fits approx .... 36"-46" chest. **Large size...** fits approx .... 43"-55" chest.

## BLACK - BLUE LINES

The models depicted below are available in both the original, heavy duty Black Line and a medium weight Blue Line. The Black nylon webbing is 3/16" thick x 2" wide. The Blue nylon webbing is 1/8" thick x 2" wide. Both lines have adjustable belts and fixed length shoulder straps, however strap adjusters are optional.

## MILLER STANDARD HARNESS

The Miller Standard Harness provides a rugged, economical unit for general surface diving operations. The harness features optional strap adjusters and two hook up D-rings in front for securing the diving hose to the body, eliminating direct hose strain on the Helmet or mask.

Black or Blue Line.



## MILLER BELL HARNESS

The Miller Bell Harness is designed for bell or saturation use. In addition to the two front hook up D-rings, the harness features an elevated strap with hook up D-ring, positioned in back, about shoulder level. Thus a limp or unconscious diver would be pulled into the bell head first.

Black or Blue Line. Optional jock strap and adjustable shoulder straps.



## MILLER BACKPACK

The Miller Backpack features a high strength, flexible nylon/rubber backpack for mounting an emergency gas supply, in addition to providing two hook up D-rings in front. The unit is very comfortable, worn with or without cylinders.

Black or Blue Line.



## MILLER BELL/BACKPACK

The Miller Bell/Backpack combines the features of the bell harness, having an elevated rear hook up D-ring, with the backpack for mounting an emergency gas cylinder, in addition to providing two hook up D-rings in front. Designed for surface or bell diving or saturation use, with or without cylinders.

Black or Blue Line. Optional jock strap.



## NORTH SEA BELL/BACKPACK

For the ultimate in safety and comfort, the North Sea Line features a built-in Double Jock Support System with waist, shoulder and double jock adjusters standard. Combining the features of both the Miller Bell Harness and the Miller Backpack, this unit is very comfortable worn with or without cylinders. Designed for surface or bell diving, or saturation use.

Blue Line only.





# MILLER 400 DIVING HELMET

All-Metal Helmet Shell, High Strength Bronze with Black Epoxy Coating.

Face & Neckrings, Handles, Valves, & Accessories are Polished Brass.

MILLER Regulator are High Strength Bronze Castings W/Closable Exhausts.

Two Adjustable Exhausts, One on the Helmet, One on the Regulator.

Jam-Proof, Locking Neck Ring System, Adaptable to Wet or Dry Suit.

Rugged, Simple Design, for Low Maintenance.

Comms System with Binding Posts, Microphone, and Two Earphones.

Compressed Air, Mixed Gas, and Saturation Diving Capability.

All Valve Hardware and Fasteners are Stainless Steel or Solid Brass.

Lightweight, Approximately 27 LBS. Neutrally Buoyant

Internal, Adjustable Neckstrap-Headpad Combination.

Polycarbonate Faceplate, Oral Nasal Mask System and Nose Device, Standard.

No special tools needed, just a screwdriver and wrenches.

## OPTIONS:

Spare Parts Kit, 400 SERIES.

Special Finish, All Polished Bronze.

Padded Helmet Bag with Straps.

Bronze Face Guard and Welding Shield

For complete descriptions, photos and details on the  
MILLER 400,  
see maintenance sections 1,2 & 3.

[www.MillerDiving.com](http://www.MillerDiving.com)