PRO Facemask Drink System
User Manual

Biomarine

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CONTENTS

WARNINGS

Please Read Carefully and Fully Understand

This manual is for use by personnel trained in the use and care of compressed oxygen, closed-circuit breathing apparatus, and **MUST NOT** be used as a s self-teaching guide by untrained users. Failure to understand or adhere to these instructions may result in injury or death.

Biomarine has taken great care to ensure that the information in the manual is accurate, complete and clear. However, **Training & Technical Support Services** will be pleased to clarify any points in the manual and answer questions concerning **Biomarine** products.

The following warnings are in accordance with certifying authority requirements and apply to the use of breathing apparatus in general:

- **Breathing apparatus users must be fully trained in the use and care of closed-circuit, self-contained, compressed oxygen breathing apparatus.**
- **Ensure that the selection of the apparatus type is sufficient for the tasks being undertaken and the hazards likely to be encountered. Please refer to National Regulations for guidance.**
- **Certain toxic substances which may occur in some atmospheres can be absorbed by the skin. Where these do occur, respiratory protection alone is not sufficient and the whole body should be protected.**
- **Ensure that a good seal can be obtained between the face and facemask. The wearing of beards, side-burns or spectacles may adversely affect the sealing of the facemask to the user's face.**
- **Failure to properly use and maintain this product could result in injury or death.**
- **Never substitute, modify, add or omit parts. Use only exact replacement parts in the configuration as specified by Biomarine.**
- **The Drink System is suitable for use only with the Biomarine BioPak 240R respirator and associated PRO Facemask with the proper drinking port installed.**
- **The Drink System components have not been evaluated for use in applications involving direct open flame or high radiant heat.**
- **The Drink System components have not been evaluated for use in applications that may expose the user to chemical, biological, radiological or nuclear agents (CBRN).**
- **DO NOT attempt to fit the Drink System to any other manufacture or model of respirator or facemask other than the BioPak 240R and PRO Facemask.**
- **The Drink System must be tested and serviced in accordance with this manual.**
- **Hydration of a user is critical when working in hot conditions or when experiencing heavy work loads. Biomarine makes no claim that the use of the Drink System will prevent a user from experiencing over-heating of core body temperature or preventing user dehydration.**
- **It is the sole responsibility of the user to adequately select and utilize the drinking fluid to be placed in the Drink System. The Drink System was designed for non-alcohol-based liquids.**

1.0 INTRODUCTION

1.1 Drink System Use

The Drink System is designed for use with the BioPak 240R closed-circuit respirator in combination with the PRO Facemask. The Associated PRO Facemask **must** be fitted with the proper drinking port as received from the factory.

The Drink System will permit the user to store up to 1.5-liters of drinkable liquid in a bladder system that is carried by the user. An interface hose will connect directly to the PRO facemask and provide the user with access to the drinking liquid without breaking to the seal of the BioPak breathing loop. This will allow for the user to be hydrated during missions without the worry of introducing the external atmospheres into the breathing gas supply while drinking.

The Drink System is supplied with a sealed quick disconnect in the feed tubing as well as in the PRO facemask. This permits disconnection of the storage bladder from the feed tubing or the feed tubing from the PRO facemask without inducing leaks into the BioPak breathing loop.

Liquid is supplied to the user from a storage bladder, through feed tubing, through the PRO facemask drinking port and into an internal mask supply tube. The supply tube will permit the passage of liquid through the facemask nose cup to a bite valve positioned in front of the mouth of the user. The user simply needs to position the supply tube bite valve into their mouths, bite down slightly and draw liquid from the supply bladder. When the bite valve is released, the flow of liquid to the user will end.

The Drink System **has not** been evaluated for use in applications that involve direct contact with open flame, high radiant heat or agents of mass destruction (CBRN agents).

1.2 Personnel Training

Personnel who use closed-circuit, self-contained, positive-pressure, compressed oxygen breathing apparatus must be fully trained in accordance with instructions and national regulations governing the use of such equipment.

These instructions cannot replace an accredited training course provided by qualified instructors in the proper and safe use of **Biomarine** breathing apparatus products.

Please contact **Training & Technical Support Services** or your local distributor for training course details.

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1.3 Servicing

The Drink System must be serviced after each use to provide disinfection and leak testing. This manual will provide full details of required servicing for the Drink System.

1.4 Spare Parts

Spare parts, general information and factory service can be obtained by contacting **Training & Technical Support Services** or your local distributor.

Reference details in this manual concerning spare part identification and factory service.

2.0 DESCRIPTION

2.1 Storage Reservoir

Up to 1.5-liters of liquid can be stored in the reservoir. The reservoir consists of a polyester skin covering a low density polyethylene liquid contact layer to provide odor-free and clean storage of liquids. The bladder is equipped with a threaded port for ease of filling and an exit feed tube constructed of silicone tubing capped with a sealed quick disconnect coupler.

The bladder is contained within a nylon pouch that provides the user with various connection point options to support mounting of the reservoir to the user.

2.2 Feed Tubing

All feed tubing is constructed of large bore silicon tubing and provides the route by which liquid is drawn from the reservoir to the facemask. The tubing is supplied with a sealed quick disconnect coupler and nipple to allow ease of removal from service while maintaining the BioPak breathing loop seal integrity.

2.3 Interface Connection

The interface connects the feed tubing to the PRO facemask drinking port via an o-ring sealed connection that is secured into position with a retaining clip. The connection will provide for rotation in the drinking port so as not to disrupt the seal against external atmospheres.

2.4 PRO Facemask

The PRO facemask is provided from the factory fitted with the required drinking port. The drinking port will provide a sealed pass through in the skirt of the facemask to allow liquid transfer to the user.

The PRO facemask must be factory supplied with the drink port installed. Field retrofit of the PRO facemask to add the drinking port requires special tools and knowledge and is not supported by Biomarine.

2.5 Supply Tube

The flexible supply tube is positioned internal to the facemask and connects directly to the internal side of the drinking port. The tube will provide passage of liquid through the facemask nose cup to the user. The tube is equipped with a bite valve that will control the flow of liquid out of the tube to the user.

3.0 PREPARATION FOR USE

3.1 Fitting

The Drink System must be fitted to each specific user in order to properly size the length of the supply tubing.

The user should first decide upon the method by which the reservoir will be carried. The reservoir can be slipped over the waist belt of the BioPak, as pictured below, or can be strapped elsewhere using the side rings of the pouch.

Install the interface connection into the drinking port of the PRO mask by uncapping to the drinking port cover, pressing the interface connector into the port and positioning the retaining clip into the locked position.

The user should don the BioPak, position the reservoir in the desired location and don the PRO mask. With assistance, route the feed tube from the reservoir in the desired position and determine the proper length of tubing required. It is not advisable to leave loops or dangling lengths of tubing that could become tangled or snagged on external objects during use. Mark the feed tube from the reservoir for the proper length.

Doff the equipment and trim the reservoir feed to length by removing the quick disconnect coupler, cutting the tube to length and reinstalling the quick disconnect coupler to the cut end of tube.

The Drink System is now ready for use.

3.2 Filling

Prior to filling or use, the entire Drink System shall have been fully serviced as per the maintenance procedures of this manual.

In a location free of containments, fill the reservoir with up to 1.5-liters of drinkable liquid as follows:

1. Open the flap of the pouch to access the bladder cap.
2. Remove the bladder cap by unthreading.
3. Fill the bladder with drinkable liquid up to 1.5-liters.

DO NOT fill the bladder with more than 1.5-liters of liquid to prevent bladder weakening or rupture.

It is advised to NOT utilize liquids containing a high amount of sugar or carbonated drinks.

4. Replace the bladder cap by threading into position.
5. Close the pouch flap.

3.3 Donning

1. Prior to donning the BioPak and PRO mask, install the Hydration interface connector into the drinking port of the PRO mask and secure with the retaining clip.

2. When ready for use, don the BioPak and PRO mask as per procedures set forth in the BioPak User Manual.
3. When the BioPak is fully donned and operating, position the Hydration reservoir where desired.
4. Route the Hydration feed tube to the interface connection and connect the components together via the quick disconnect coupler.

4.0 USE

4.1 Drinking

While under use, liquid is drawn from the reservoir by the user positioning the bite valve of the supply tube into the mouth and slightly biting down. This will open the bite valve and allow the user to draw liquid from the reservoir.

Purge the system of air prior to use to avoid a large draw to fill liquid to the bite valve. Purging is accomplished by slightly squeezing the reservoir while the bite valve is open until liquid is present at the bite valve.

When drinking is finished the user simply releases the bite valve.

4.2 Drink System Leaks

If at any time during a mission the Drink System develops a leak, the user should:

4.2.1 Immediately retire to a safe location to doff the BioPak, or,

4.2.2 Immediately disconnect the interface connection from the PRO mask if it is not desired to leave the mission. The PRO mask drinking port is supplied with an automatic shut off valve that will close upon removal of the interface connection.

4.3 Accidental Disconnect During Use

In the event that an accidental disconnect occurs during use, the user will be protected against the ingress of external toxins into the breathing by the automatic sealing valves. Accidental disconnect of the feed line quick disconnect coupler will result in automatic sealing of the end of the interface fitting nipple and the end of the feed tubing coupler. Disconnect of the interface fitting to the PRO mask will result in automatic sealing of the pass through fitting of the PRO mask.

4.4 Feed Line Severing

In the event that the feed line becomes severed during a mission the user should:

4.4.1 Disconnect the interface to the facemask.

4.4.2 Immediately retire to a safe location to doff the BioPak, or,

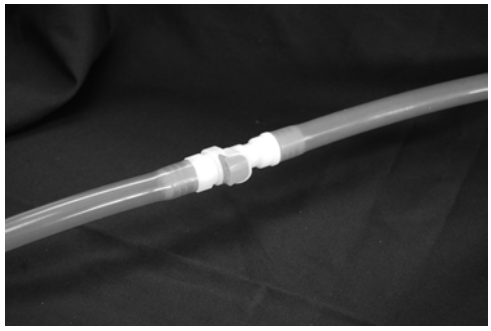
4.4.3 Immediately disconnect the interface connection from the PRO mask if it is not desired to leave the mission. The PRO mask drinking port is supplied with an automatic shut off valve that will close upon removal of the interface connection.

4.5 Reservoir Exchange During Mission

Should the user consume the contents of the reservoir during a mission, the reservoir can be replaced with a freshly filled reservoir without doffing the BioPak and with minimal breathing gas loss.

It is NOT recommended to exchange reservoirs during missions that are conducted in atmospheres that may contain toxic elements dangerous to human health that may become depositied on the quick disconnect fitting surfaces.

1. Disconnect the feed tubing by depressing the button on the quick disconnect coupler. The quick disconnect nipple will automatically seal against external atmospheres.



2. Remove the spent reservoir and replace with a fresh reservoir.
3. Route the reservoir feed tubing to the interface connector and connect the quick disconnect fittings together.

4.6 Doffing

When the mission is complete, the user shall retire to a known safe location to doff the BioPak as per procedures provided in the BioPak User Manual.

To assist in the doffing, disconnect the Drink System from the PRO facemask prior to doffing the BioPak either by disconnecting the feed line quick disconnect fittings, or, removing the interface connector from the PRO facemask drinking port.

After use, immediately conduct the washing and testing procedures on the Drink System as outlined in section 5.0 of this manual.

5.0 MAINTENANCE PROCEDURES

5.1 Cleaning

The Drink System should be cleaned after each use to prevent the transmission of germs or bacteria.

1. Remove all components of the Drink System from the PRO facemask and BioPak.
2. Wipe down the exterior of the components with a mild soap and water to remove accumulated dirt.
3. Open the reservoir pouch flap and remove the bladder from the pouch. Keep the feed tube and interface connector installed to the bladder.
4. Fill the bladder with ½ to 1 liter of warm water and add one cleaning tablet, part number B2-06-6001-74-0.
5. Replace the cap on the bladder and wait 15-30 minutes. During the waiting period shake the bladder often and allow some of the water to travel through the feed tube and interface connection.
6. After the 15-30 minute period, open the bladder and discard the wash water. Rinse the inside of the bladder, the feed tube and interface connection several times with clean potable water. Ensure that no tablet remnants remain in the bladder, tubing or interface connection.
7. Allow the system to air dry. Do not seal the reservoir until it is completely dry.
8. Reinstall the bladder into the pouch.
9. Submit to the testing procedure.

The PRO facemask shall be cleaned and serviced according to procedures provided in the BioPak Benchman Manual.

5.2 Testing Procedure

The Drink System should be tested after each cleaning procedure and prior to each use to verify proper function and leak tightness.

1. Inspect all components of the Drink System and replace any worn, damaged or suspect component.
2. Connect the large diameter tubing of the Hydration Test Fixture to the barbed fitting of the BioPak 240R Test Kit.
3. Install the interface connection of the Drink System to the drinking port of the PRO facemask and secure into position using the retaining clip.
4. Disconnect the supply tube from the internal side of the PRO facemask drinking port and connect the small diameter tubing of the Hydration Test Fixture to the drinking port barbed fitting.
5. Use the hand pump of the test fixture to pump the internal volume of the Drink System to 6-8 inches water column pressure as read by the pressure gauge of the test kit.

Hand Pump Operation

   a. Squeeze the large bulb while depressing on both sides of the “S” button to push air into he assembly.
   b. Depress both sides of the “A” button to admit additional air in the pump bulb.
   c. Repeat steps a and b multiple times until the proper pressure level is achieved.
   d. Once the proper pressure level is achieved, tightly close the pinch clamp located on the short tubing run of the test fixture to hold the pressure steady.
   e. To depressurize the assembly, open the pinch valve and remove the test fixture connection from the PRO facemask drinking port.

6. Note the pressure reading of the test kit gauge and allow the assembly to sit undisturbed for a 1-minute period. The pressure reading shall not drop by more than 0.40 inches water column in the 1-minute period to be considered leak-tight.
7. Should the Drink System indicate leakage, use Leak-Tek detection fluid, or submerge the entire assembly, to locate the leak point. Repair or replace components that show evidence of leakage.
8. When the leak test has passed, it is necessary to test the quick

disconnect. Disconnect the quick disconnect fittings of the feed tubes. Verify that the pressure gauge of the test kit is reading between 6-8 inches of water column pressure. Pump up the pressure if required.

9. Note the pressure reading of the test kit gauge and allow the assembly to sit undisturbed for a 1-minute period. The pressure reading shall not drop by more than 0.40 inches water column in the 1-minute period to be considered leak-tight. This verifies that the quick disconnect fitting of the interface connection is functioning properly.
10. When testing has completed, remove all test equipment and reestablish the supply connection to the PRO facemask drinking port barbed fitting.

6.0 SPECIFICATIONS

Reservoir Capacity:	1.5-liters
Reservoir Dimensions:	165 X 356 x 51 mm (6.5 x 14.0 x 2.0”)
Reservoir Weight, Empty:	368 grams (13 ounces)
Reservoir Bag Weight, Full (Water):	1.9 kg (4.2 pounds)
Interface Assembly Weight:	41 grams (1.5 ounces)
Operational Temperature Range:	2 to 43^{o}C (35 to 110^{o}F)
Storage Temperature Range:	-40 to +49^{o}C (-40 to +120^{o}F)
Materials of Construction	
Reservoir Assembly:	Pouch: Nylon, Acetal, Steel Bladder: Polyester, Polyethylene Tubing: Silicone Rubber Connectors: Acetal
Interface Connection:	Plastic: Flame-Rated Polycarbonate O-Ring Seal: EPDM Rubber Tubing: Silicone Rubber Metal: Stainless Steel

FEATURES:

- Provides zero residue taste or smell.
- Super-tough bladder construction results in maximum abrasion resistance.
- Quick disconnect tube assembly provides easy-on, easy-off functionality.
- Bladder protected by an antimicrobial formulation.
- Large 80mm **Rapid Fill™** bladder cap. **Rapid Fill™** is a trademark of the Nalgene Company.
- Bladder in compliance with FDA notification Number 193.
- Bladder EPA approved.

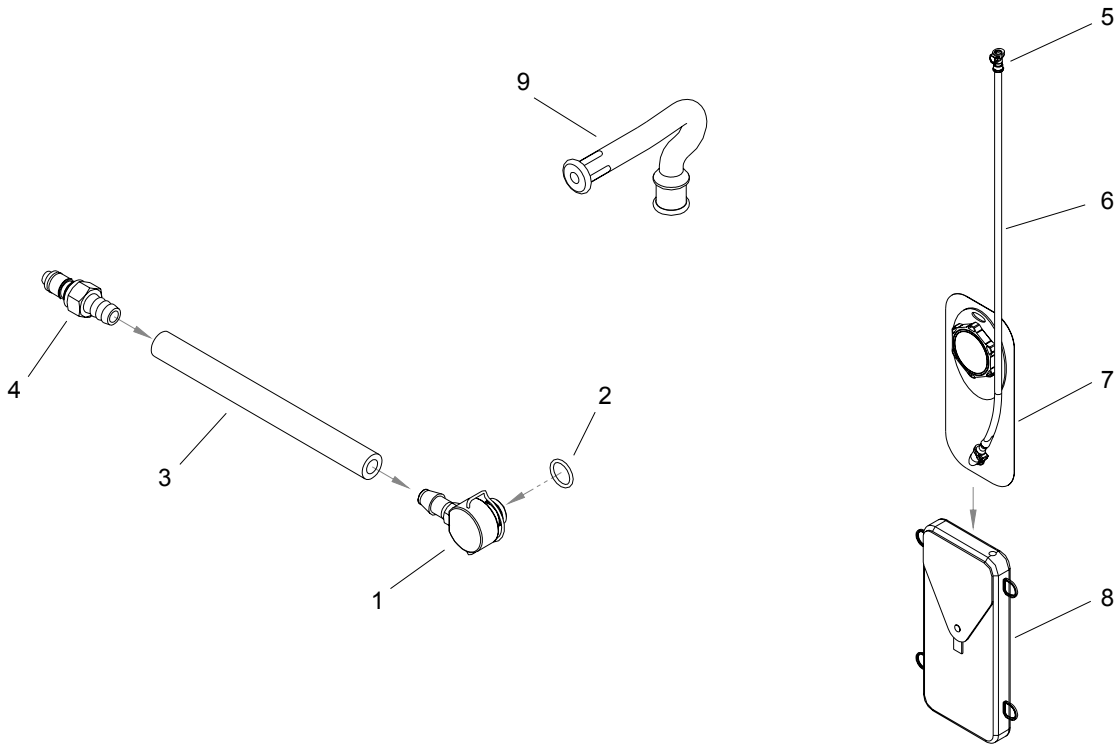
7.0 ILLUSTRATED PARTS LISTS

7.1 PRO Facemask Drink System

ITEM #	QTY.	PART NUMBER	DESCRIPTION
REF	-	B6-02-5003-17-0	PRO Mask Drink System-Complete[1]
REF	-	B6-02-5003-17-1	PRO Mask Drink System-Less Test Fixture[2]
REF	-	B6-02-5003-19-0	Interface Connection-Complete[3]
REF	-	B6-02-5002-70-1	Reservoir Assembly-Complete[4]
1	1	B6-02-5003-19-1	Interface Connection Fitting Assembly
2	1	B4-04-7070-18-0	Interface Connection O-Ring Seal[5]
3	1	B4-02-9563-00-0	Feed Tubing-Specify 6-inch length upon order
4	1	B4-03-4404-02-0	Quick Disconnect Nipple
5	1	B4-03-4404-01-0	Quick Disconnect Coupler
6	1	B4-02-9563-00-0	Feed Tubing-Specify 60-inch length upon order
7	1	B2-02-4001-40-0	Reservoir Bladder (located internal to pouch)
8	1	B2-02-4001-40-0	Reservoir Pouch
9	1	B2-06-6002-46-0	Supply Tube with Bite Valve[6]
10	2	B2-06-6001-74-0	Cleaning Tablet, Packet of 12 Tablets (not depicted)
11	1	B5-06-6000-42-0	Drink System User Manual (not depicted)

Note:

1. Includes full Drink System plus Test Fixture.
2. Includes full Drink System less Test Fixture.
3. Includes factory assembled items 1 through 4.
4. Includes factory assembled items 5 through 8.
5. O-ring, item 2, is to be lubricated using Dow-11 o-ring lubricant, part number B5-01-3000-11-0.
6. Supply Tube, item 9, installs onto barbed fitting of PRO Facemask drinking port.



7.2 PRO Facemask Drink System Test Fixture

ITEM #	QTY.	PART NUMBER	DESCRIPTION
REF	-	B5-02-5003-18-0	PRO Mask Hydration Test Fixture
1	1	B2-03-0002-00-0	Hand Pump
2	1	B3-04-0300-00-1	Securing Tie
3	1	B4-03-5404-02-0	Tube Adapter Fitting
4	1	B2-06-6001-75-0	Pinch Clamp
5	1	B4-02-9037-00-0	3/8” Tubing-Specify 6-inch length upon order
6	2	B4-03-4404-03-0	¼ Male Barb Fitting[1]
7	1	B4-03-4302-00-0	Street Tee Fitting[1]
8	1	B4-03-4404-00-0	1/8 Male Barb Fitting[1]
9	1	B4-02-6025-00-0	¼” Tubing-Specify 18-inch length upon order
10	1	B4-02-9037-01-0	3/8” Tubing-Specify 18-inches upon order

Note:

1. Indicated fittings require Teflon Thread Sealant Tape, part number B5-07-1000-00-0, be applied to male thread prior to assembly.