

# Kirby Morgan Air Control System 5 Manual

**KMDSI Part #100-075**  
**Patented, patents pending, foreign patents apply**



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## **▲ WARNING**

**Diving with compressed breathing gas is a hazardous activity. Even if you do everything correctly there is always the danger that you may be injured or killed. No piece of diving equipment can prevent the possibility that you may be injured or killed any time you enter the water.**

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## Warranty Information

**NOTE:** Be sure to complete the enclosed warranty card and return it immediately, or you may register your purchase online at [www.kirbymorgan.com](http://www.kirbymorgan.com)—go to Support.

KMDSI warrants every new Mask, Helmet, Scuba Regulator, Manifold Block or Kirby Morgan Air Control System 5 (KMACS 5) (each, a Product) to be free from defects in workmanship for a period of three hundred sixty five (365) days from the date of purchase from a KMDSI authorized dealer. This warranty covers all metal and plastic parts, but does NOT cover rubber parts, communications components, or head and chin cushions. In addition, due to the electrolytic nature of underwater cutting and welding, chrome plating cannot be warranted when the diver engages in these activities.

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

This warranty is null and void if:

- 1) The Product is not registered with KMDSI within ten (10) days of purchase, or
- 2) The Product has not been properly serviced and/or maintained according to KMDSI factory recommended procedures described in the manual or Product updates have not been performed as recommended by KMDSI, or
- 3) Unauthorized attachments or modifications have been made to the Product, or
- 4) The Product has been used for purposes other than those for which it was designed, or otherwise has been abused, misused, or subjected to unusual conditions, or the Product's intended service has been exceeded.

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

In purchasing any Product subject to this warranty, the buyer agrees that its sole and exclusive remedy and KMDSI's entire obligation in contract, tort, or otherwise under this contract will be repair or replacement at KMDSI's option of the Product or any parts which KMDSI determines during the applicable warranty period are defective in workmanship or material covered by this warranty. All exchanged parts are the property of KMDSI. The buyer's exclu-

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sive remedy and the KMDSI's entire liability in contract, tort, or otherwise is the payment by KMDSI of the buyer's actual damages up to but not to exceed the amount paid by the buyer for the Product.

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

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

### **WARNING**

**Diving with compressed breathing gas is a hazardous activity. Even if you do everything in the proper manner 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. The information in this manual is intended for users of the KMACS-5 and persons that maintain or service the KMACS-5.**

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# Definition 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 sections.

## **DANGER**

This word indicates an imminently hazardous situation, which if not avoided, could result in death or serious injury.

## **WARNING**

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

## **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.

## **NOTICE**

This word is used to address practices not related to personal 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.

**IMPORTANT:** A word about this manual. We have tried to make this manual as comprehensive and factual as possible. We reserve the right, however, 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 KMDSI dealer if you have any questions. Periodically KMDSI Operations and Maintenance Manuals are reviewed. Any updates/changes will be posted on the KMDSI website and may be downloaded for insertion/correction.

**IMPORTANT SAFETY INFORMATION:** This Kirby Morgan Air Control System 5 is 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 equipment could result in serious injury or death.**

**⚠ WARNING**

**Kirby Morgan Dive Systems, Inc. (KMDSI) warns all divers who use Kirby Morgan diving equipment to be sure to use only KMDSI original parts from a KMDSI authorized dealer. Although other parts, O-rings and fittings may appear to fit your Kirby Morgan equipment, they may not be manufactured to the same standards maintained by KMDSI. The use of any parts other than KMDSI original parts may lead to equipment failure and accidents.**

**⚠ WARNING**

**Diving in waters that are chemically, biologically, or radioactively contaminated is extremely hazardous. Although Kirby Morgan surface supplied diving systems 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 the KMACS-5, even if you have experience with other surface supplied diving systems. **If you have purchased the KMACS-5 new from a dealer, be sure to send in the warranty registration card so we may keep you informed of any safety notices that affect this product.** If you resell or loan this equipment to another diver, be sure this manual accompanies the equipment and that the person reads and understands the manual. In addition to the manual, a log book should be used to log all repairs, maintenance and use.

**⚠ WARNING**

**This KMACS-5 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 KMACS-5 prior to diving.**

**⚠ WARNING**

**Diving is a life threatening occupation. Even if you do everything correctly you can still be injured or killed. None of the Kirby Morgan equipment can prevent accidents, injuries or death due to improper training, poor-health, improper supervision, improper job requirements, improper maintenance or acts of God.**

## **⚠ WARNING**

**Never use the equipment without first completing all pre-dive maintenance and set up procedures. Failure to complete all pre-dive checks could result in equipment failure due to problems with the incorrect set-up of the equipment. This could lead to serious personal injury or death.**

## **⚠ WARNING**

**Always read the Material Safety Data Sheet (MSDS) for any chemical - adhesive, cleaning agent, or lubricant - used on your KMACS-5. Some of these chemicals may cause serious bodily injury or death if used improperly or without the proper personal protective equipment.**

Diving operations should only be conducted within the limits of the operational specifications, and in accordance with the rules and regulations established by the governing authority in the specific country or geographical location where the diving operations are being conducted. If you have any questions concerning this manual or the operation of your equipment, contact KMDSI (805) 928-7772 or at [KMDSI@KirbyMorgan.com](mailto:KMDSI@KirbyMorgan.com) or Dive Lab Inc. (850) 235-2715 or at [divelab@divelab.com](mailto:divelab@divelab.com)

## **⚠ WARNING**

**Some of the procedures shown in this manual are for illustration purposes only. When using chemicals or materials that require the use of hand or eye protection, always wear the appropriate personal protective equipment. Failure to use personal protective gear may result in serious personal injury.**

This manual is supplied to the original purchaser of this equipment. If you have any questions about the use of the equipment or you need another copy of this manual, contact KMDSI or your nearest KMDSI dealer. It may also be downloaded free from the KMDSI website at [www.KirbyMorgan.com](http://www.KirbyMorgan.com).

If you have any questions regarding the use, maintenance, or operation of this equipment, contact KMDSI at (805) 928-7772, fax: (805) 928-0342, or e-mail: [kmcsi@kirbymorgan.com](mailto:kmcsi@kirbymorgan.com).

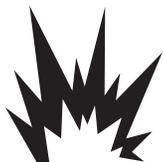
Components requiring lubrication, should only be lubricated with oxygen compatible lubricants such as Christo Lube®, Flourolube®, or Krytox® or equivalent. Lubricants must be used sparingly and should not be mixed with other lubricants.

## **⚠ WARNING**



**Kirby Morgan “High Pressure Components” (greater than 250 p.s.i.g., 17.24 bar) must not be used with pure oxygen, Nitrox, or any breathing gas mixtures with oxygen content greater than 21% by volume. Using oxygen enriched mixtures in excess of 21% oxygen by volume may lead to a fire or explosion, which could result in serious injury or death.**

## **⚠ WARNING**



**The KMACS-5 has not been designed or cleaned for 100% oxygen or enriched oxygen use. The KMACS-5 is intended for air use only when supplying the box with a high pressure gas source. Supplying the KMACS-5 with high pressure of oxygen or oxygen enriched breathing gas may lead to a fire or explosion, which could result in serious injury or death.**

*Kirby Morgan Air Control System 5 with communicator.*



*Kirby Morgan Air Control System 5 without communicator.*

# Chapter 1

## General Information

### 1.1 Definitions

The following terms may be unfamiliar to the reader.

They are defined as they relate to this manual and diving. All parts locations are referenced by LETTER in the diagram on page 13.

**KMACS-5—Kirby Morgan Air Control System 5:** The Trademark name of the device this manual describes. The KMACS-5 contains the features necessary to properly control and monitor surface supplied air dives. Included in the KMACS-5 is a two-way voice communicator for talking between the KMACS-5 operator and the diver(s), or diver-to-diver. The communicator operates in both the two wire and four wire mode.

**Scuba:** Self Contained Underwater Breathing Apparatus.

**SSAir Diving—Surface Supplied Air Diving:** Diving operation where the diver is supplied breathing air by way of a hose from the surface, which is part of the divers' umbilical. The source of the breathing air can be a compressor and compressed air tanks on the surface can also be used.

**Divers' Umbilical:** Several components run together from the KMACS-5 to the diver. These components are joined together or twisting and forming the umbilical. The most common components used in the divers' umbilical are: (1) a hose through which the breathing air flows to the diver; (2) a multiconductor wire for communications transmission; (3) another (smaller) hose which is used to show the divers' depth on the pneumofathometer (*see pneumofathometer, this section*); (4) a strong line used as a strength member to prevent strain on the other components of the umbilical. It is recommended the diver's umbilical is marked in ten-foot increments with colored tape to indicate the length of hose from the snap shackle to 100 feet and fifty foot increments thereafter.

**H.P.—High pressure:** Usually any pressure over 300 psi. (20.7 bars).

**L.P.—Low pressure:** Usually any pressure under 300 psi. (20.7 bars).

**High Pressure (H.P.) Hose:** A flexible hose designed to carry a working pressure of gas (or air) of more than 300 pounds (20.7 bars) per square inch. The rated working pressure is usually indicated on the hose and must not be exceeded. The working pressure of the high pressure system on the KMACS-5 is 3500 psi (240 bars)

**Whip:** A hose complete with fittings at each end for use in hooking up two pieces of deck equipment for gas (or air) flow. For instance, the hoses and fittings used to connect the KMACS-5 to the high pressure tanks are called "high pressure whips."

**Pneumofathometer:** (pronounced "new-mo-fathometer") This device measures the divers' depth. A small hose which is part of the divers' umbilical runs from the KMACS-5 to the diver. The hose is open at the divers' end and attaches with a fitting to a gauge at the KMACS-5. The gauge is calibrated in feet and meters of sea water. A valve is installed on the upstream side of the gauge so the operator can use a small amount of breathing air to purge the water from the hose. When the hose has been purged of water and the valve is closed the excess air remains at the end of the hose at the diver's end. The air left in the hose will be at the pressure of the water column and will show the exact depth of the diver on the diver's pneumo gauge.

**Pneumo:** Short for pneumofathometer. Used such as "pneumo-gauge," "pneumo-valve," "pneumo-hose", to describe the parts that make up the pneumofathometer subsystem.

**Dressed-in:** A commercial divers' suit was originally called a "dress." Although the name changed to "suit" the term "dressed-in" has remained to describe putting the suit on. A diver who is "dressed-in" has a suit on. The term is also used to describe a diver who, in addition to his suit, has more, or all of his/her equipment on.

**Bailout Bottle:** This is the diver's emergency tank of breathing gas.

The bailout bottle is an independent air source connected directly to the divers' mask or helmet via a first stage scuba regulator and hose. The first stage regulator must be equipped with an overpressure relief valve (Part #200-017). The overpressure relief valve will vent pressure in the event of a first stage leak and prevent the low pressure hose from rupturing, causing a complete loss of the divers' bailout supply. The bailout bottle is worn on the divers' back, mounted to a harness. **The diver's umbilical should be attached to this harness to prevent a direct pull on the diver's mask or helmet.**



*Divers with all of the gear they need to dive.*

## 1.2 Design Purpose and General Description

The KMACS-5 components are housed in a durable polyethylene case. However, caution should be used in transporting the KMACS-5. Rough handling will rarely cause damage to the case, but it is possible to damage the calibrated pneumatic gauges and/or the electronic components. The KMACS-5 should be treated as you would any expensive life support equipment.

The Kirby Morgan Dive Control System 5 (KMACS-5) is designed to provide a central control center for the operator/diver supervisor during a surface-supplied air dive. Provisions for the control of the breathing air supply, diver depth monitoring, and voice communications are all located on a simple panel. The KMACS-5 is a full service control system for all surface supplied air diving operations.

The KMACS-5 is fitted with shut off valves on the divers' air supply. The shut off valves are designed to allow air to be shut off on either or both of the divers' umbilicals. When the handles of the valves are vertical (flags up) the valves are open and air is flowing to the divers. When the valve handles are horizontal (flags down) the valves are shut and the air to the divers' umbilicals is off.

By having total control located at one panel, the KMACS-5 operator can rapidly respond to the divers' needs without leaving the control station. In a standard commercial surface supplied air (SSAir) diving operation the KMACS-5 provides a backup air supply system which the operator can activate in the event of the main air supply failure (such as compressor malfunction). This can be accomplished without leaving the control panel, which allows the operator to inform the diver and continuously monitor umbilical supply pressure and depth at the same time.

In addition to its compact size, the ability of the KMACS-5 to use high pressure air allows SSAir diving from small boats or remote locations where transportation and setup of a compressor would be impractical. Two or more standard scuba bottles can be used as the breathing air supply.

For example, when commercial divers are working on an offshore rig, a common SSAir diving job is the inspection and cleaning of a propeller on a crew boat. This job can be performed easily and simply with the KMACS-5, a couple of scuba bottles, a full face mask or helmet, and an umbilical. Transportation to the job site is simple and a large surface support vessel is not needed. At the dive site, full communications, backup breathing supply, pressure readouts, and depth monitoring are provided by the KMACS-5.

This is one of many situations where the KMACS-5 can be used to provide the safe and efficient operation of SSAir diving.

## 1.3 Specifications

**Use:** The KMACS-5 is not oxygen cleaned and should not be used with 100% Oxygen. Gas mixtures above 21% PPO<sub>2</sub> should be connected into the LP inlet ONLY.

**⚠ WARNING**

Pure oxygen is a potential fire hazard; its use can lead to an explosion of the KMACS-5. Pure oxygen can also present a physiological hazard to the diver.

**1.4 General Description**

**Outer Dimensions:** Length = 21 inches  
Width = 18 inches  
Height = 11 ½ inches

**Weight:** 54 pounds. (24.5 kilos)

**Shipping Weight:** 60 pounds. (27 kilos)

**⚠ CAUTION**

Decompression and other human limits must be observed. Decompression diving should not be conducted with the KMACS-5 unless a properly equipped recompression chamber facility with oxygen is immediately available at the dive site. In-water decompression is not recommended.

**Recommended Maximum Dive Support Depth:** 130 fsw (feet of sea water) (40 meters).

**High Pressure Supply Pressure Recommended Maximum:** 3500 psi. (240 bars) using the DIN fitting 3500 psi (240 bars) using the yoke

**NOTICE**

Although the high pressure gauges on the KMACS-5 are rated to 5000 psi (345 bars), this is a safety precaution only. The regulator on the KMACS-5 is not designed to operate at pressures greater than 3500 psi (240 bars).

**Low Pressure Supply Pressure Maximum:** 250 pounds per square inch. (15.5 bars)

**Umbilical Pressure Range:** 115-225 pounds per square inch. (8-15.5 bars)

**Regulator Output:** 40 SCFM at 2500 psi (172 bars) supply pressure with 150 psi (10.3 bars) delivery pressure.

**Relief Valve:** Set at 300 psi (20.7 bars).

**Pneumofathometer Range:** 0-250 FSW (feet of sea water) (0-76 meters).

**1.5 Principle Operating Features****1. Main Control Panel (A)**

The main panel is the frame to which the functional components are mounted. In addition, the component names and some instructions are on the panel. The blue and orange lines (L, R) on the panel represent the flow paths of supply air from the two high pressure hoses/yokes (T).

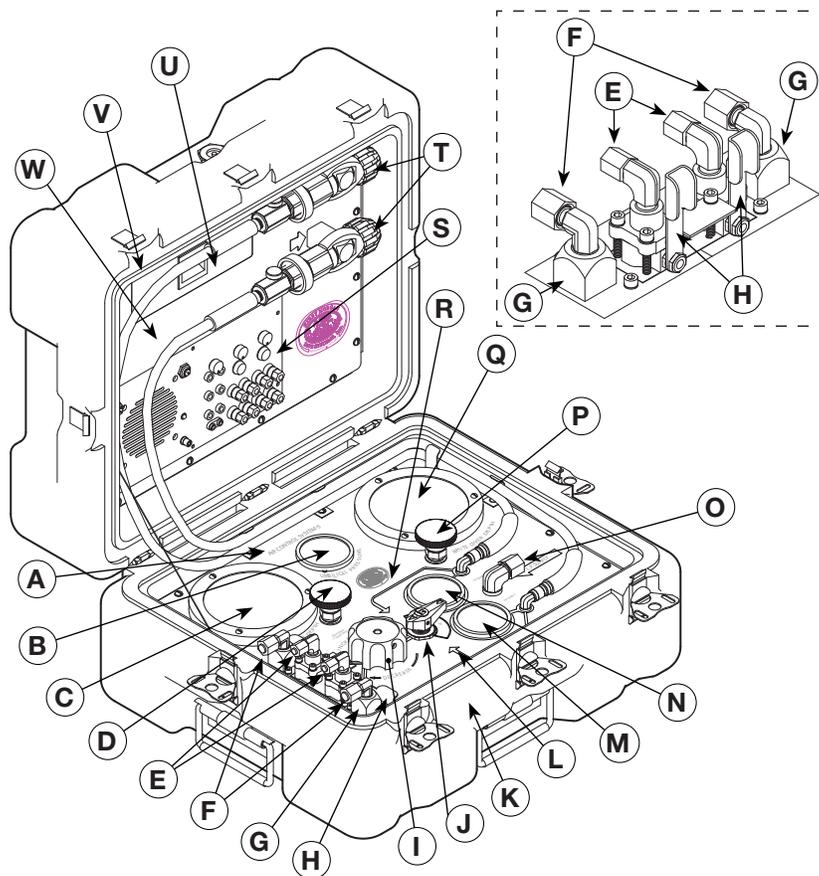
**2. Red Diver Depth Gauge (C) (Pneumofathometer)**

This gauge indicates the “red” diver depth. The red diver pneumo valve knob (D), is turned to supply a small volume of air to the small pneumo hose that is part of the divers’ umbilical. The gauge reads the pressure of the air in the pneumo hose. This pressure, measured in feet (or meters) of sea water, equals the water pressure at the divers’ depth. The divers’ pneumo hoses are attached to the matching color side fittings (F). Red diver to red pneumo fitting.

**3. Umbilical Pressure Gauge (B)**

This gauge (B) is connected to the low pressure air supply system that supplies both umbilical fittings. It indicates the breathing air pressure that is in both the “red” and “white” diver umbilicals. When the air supply is from high pressure tanks (such as scuba tanks) the umbilical hose

- A** Main Control Panel
- B** Umbilical Pressure Gauge
- C** Red Diver Depth (Pneumo) Gauge
- D** Pneumo Valve Handle, Red
- E** Divers Umbilical Hose Attachment Fittings (#6 JIC Male)
- F** Pneumo Hose Attachment Fittings (#4 JIC Male)
- G** Pneumo Blocks (2)
- H** Shut-off Valves (2)
- I** Regulator Adjustment Knob
- J** Air Supply Selector Valve Handle
- K** Case
- L** Orange Air Supply Flow Line
- M** Orange H.P. Air Supply Gauge
- N** Blue H.P. Air Supply Gauge
- O** Low Pressure Inlet Fitting (#8 JIC Male)
- P** Pneumo Valve Handle, White
- Q** White Diver Depth Pneumo Gauge
- R** Blue Air Supply Flow Line
- S** Communicator
- T** Yokes w/DIN Fittings for H.P. Cylinder Attachment
- U** Access door for storage compartment.
- V** O-ring Seal
- W** Communicator Panel



pressure can be varied by turning the regulator adjustment knob (I)



#### 4. White Diver Depth Gauge (Q) (Pneumofathometer)

This gauge indicates the “white” diver depth. The white diver pneumo valve knob (P), is turned to supply a small volume of air to the small pneumo-hose that is part of the divers’ umbilical. The gauge reads the pressure of the air in the pneumo-hose. This pressure, measured in feet (or meters) of sea water, equals the water pressure at the divers’ depth. The divers’ pneumo hoses are attached to the matching side fittings (F). White diver to white pneumo fitting.



## 5. Breathing Air Subsystem (T)

The divers' breathing air subsystem starts with the supply tank yokes (T) and connects to the divers' supply manifold. The high pressure hoses with the yokes are stored for transit by connecting them to the posts on the panel inside the lid of the KMACS-5. The knurled knobs on the yokes should be tightened until just snug. Excessive force should not be applied.



## 6. Blue Air Supply Flow Indicator Line (R)

The "BLUE" air supply flow indicator line (R) indicates the flow path of breathing air from entry into the KMACS-5 to exit to the divers' umbili-

als at the fittings on the manifold (E). There are two high pressure whips which are color coded BLUE and ORANGE.

Starting from the high pressure air tank, the BLUE air supply flows through the whip into the KMACS-5. Following the BLUE flow indicator line (R) it shows the flow to the BLUE Breathing Air Supply Pressure Gauge (N), then to the Breathing Air Supply Selector Valve which is controlled by the Breathing Air Selector Valve Handle (J). The Selector Handle (J) must be turned all the way "UP" until it stops for the BLUE supply. This places the selector valve handle in line with the flow path indicating the "BLUE" air supply (R). The ORANGE supply is off when the Selector Handle is in the up position.

After flowing through the Selector Valve the BLUE air supply enters the Breathing Air Supply Regulator (I) which reduces the high pressure breathing air to an adjustable range between 115-225 pounds per square inch (psi) (8-15.5 bars). The BLUE air supply then goes to both divers' umbilicals through the fittings on the manifold (E).



## ⚠ CAUTION

**When using H.P. air, the selector handle must be turned up until it stops for BLUE supply or down until it stops for Orange supply. Never allow the selector handle to stay in the marked "H.P. OFF ZONE". Both high pressure air supplies are off in the yellow striped H.P. OFF ZONE".**

## 7. Orange Air Supply Flow Indicator Lines (L)

The “ORANGE” air supply flow indicator line indicates the flow path of breathing air from entry into the KMACS-5 to exit to the divers’ umbilicals at the fittings on the manifold (E). The second high pressure whip is color coded ORANGE.

Starting from the high pressure air tank, the ORANGE air supply flows through the whip into the KMACS-5. Following the ORANGE flow indicator line (L) it shows the flow to the ORANGE Air Supply Pressure Gauge (M), then to the Air Supply Selector Valve which is controlled by the Breathing Air Selector Valve Handle (J). The Selector Handle must be all the way “DOWN” until it stops for the ORANGE supply. The BLUE supply is off when the Selector Handle is in the down position.

After flowing through the Selector Valve the ORANGE air supply enters the Breathing Air Supply Regulator (I) which reduces the high pressure breathing air to an adjustable range between 115–225 psi (8–15.5 bars). Then the ORANGE air supply goes to both divers’ umbilicals through the fittings on the manifold (E).

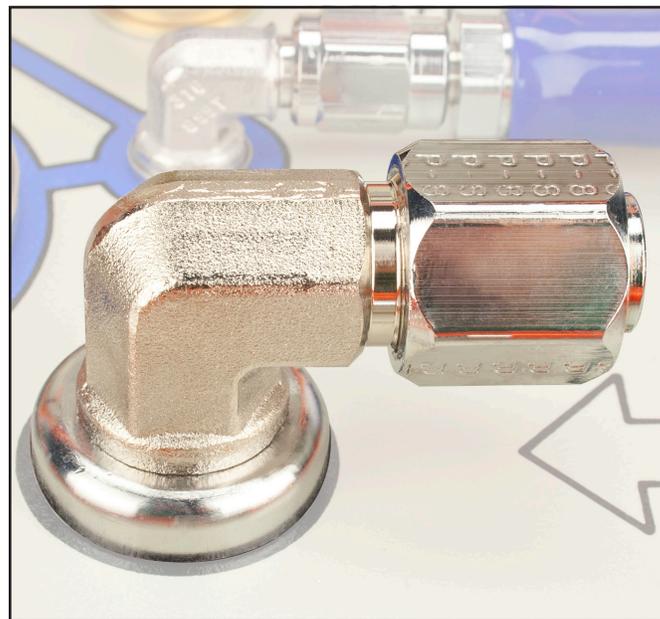
The air supply to both divers can be controlled by shut-off valves located on the manifold (H). When the valve handles are up (vertical), the valves are open. When the valve handles are down (horizontal), the valves are closed.



## 8. Low Pressure Inlet Fitting (O)

The low pressure inlet fitting is positioned between the connections for the two H.P. supply

hoses. It is a male #8 JIC 37° Flare ½" fitting and marked by the arrow containing the words “L.P. Supply.” Low pressure supply breathing air, usually from a compressor (with volume tank) is supplied through a whip (low pressure hose and fittings) that attaches here. When the low pressure supply is the operating air source, the supply pressure will be indicated on the umbilical pressure gauge (B). In the low pressure supply mode, the selector/valve handle will be positioned in the H.P. OFF ZONE.



## 9. Blue Breathing Air Supply Pressure Gauge (N)

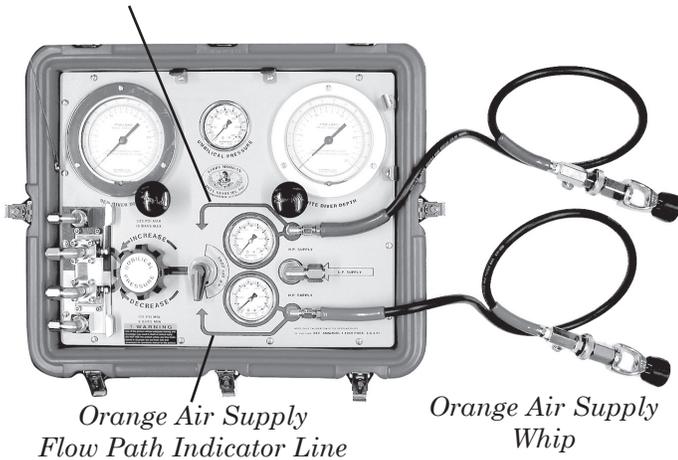
The Blue H.P. supply pressure gauge (N) indicates the pressure remaining in the “BLUE” high pressure tank.



Both divers are supplied by the same selected high pressure supply

**NOTE**

Blue Air Supply  
Flow Path Indicator Line



Orange Air Supply  
Flow Path Indicator Line

Orange Air Supply  
Whip

Air flow paths from the H.P. cylinders.

### 10. Yokes For High Pressure Cylinder Attachment (M)

The yoke fittings (M) provided have standard U.S. scuba cylinder attachments as well as DIN Fittings. Each H.P whip has a bleeder valve to vent the remainder of the pressure in the whip when changing out scuba bottles. The yokes attach to posts mounted on the panel in the lid of the KMACS-5 for storage and transport. The H.P. whips should **ONLY** be removed from the KMACS-5 for service and or replacement.



### 11. Case (T)

The Dive Control panel assembly is attached to the bottom half of the case (T). The top half of the case contains the yoke blocks and the communicator, if installed. If there are no communications there are only the yoke blocks. (see picture in front of manual).

### 12. Case (K)

The Dive Control panel assembly is attached to the bottom half of the case (K). The top half of the case contains the yoke blocks and the communicator, if installed. If there are no communications there are only the yoke blocks. (see picture in front of manual).

### 13. Breathing Air Supply Selector Valve Handle (J)

This handle (J) controls the three position Air Supply Selector Valve and allows uninterrupted diving operations while full air supply tanks replace expended tanks. The selector valve controls **ONLY the high pressure air supply**. It is **NOT** possible to shut off the low pressure supply connected to the low pressure inlet fitting (O), at the KMACS-5.



When changing out the H.P. air supply cylinders, always observe the divers' umbilical pressure gauge (B) for any sudden fall in pressure. Should this occur, it may indicate that the cylinder in use has mistakenly been turned off or breathed dry. If so, immediately turn the cylinder back on and move the selector valve handle to select the full cylinder and change out the expended cylinder.

Due to the construction of the selector valve, **IT IS NOT POSSIBLE** for gas to back-flow from one cylinder to the other.

**⚠ CAUTION**

When using H.P. air, the selector handle must be turned up until it stops for BLUE supply or down until it stops for ORANGE supply. Never allow the selector handle to stay in the marked “H.P. OFF ZONE” if supplying the divers with air from the H.P. whips. Both high pressure air supplies are off in the yellow striped H.P. OFF ZONE”.

**14. Regulator Adjustment Knob For Umbilical Pressure (I)**

The regulator Adjustment Knob (I) allows the operator to adjust the umbilical pressure within a range of 115 psi to 250 psi (8–17 bars) when supplying the diver with an HP gas source. The regulator has no function in the H.P. off zone. The L.P. source can not be regulated by the KMACS-5 regulator. Incoming high pressure air from the ‘ORANGE’ or ‘BLUE’ supply is reduced by the internal regulator. The Adjustment Knob controls the regulator. Turning the Knob clockwise decreases the umbilical pressure; counterclockwise increases it.

**15. Outlet Manifold Including Divers’ Umbilical Fittings (G)**

The “WHITE DIVER” and “RED DIVER” air supply hoses are connected to the KMACS-5 at the manifold (E). The standard fittings coming out of the KMACS-5 are male #6 JIC ( $\frac{3}{8}$ ", 37°) flared fittings—other fittings for other umbilicals may also be used. The divers’ air supply hoses must

have matching female fittings. Shut-off valves are positioned between the manifold and the divers’ air fittings. The air is on when the valve handle is vertical (flag up) and is off when the valve handle is horizontal (flag down).

The “WHITE DIVER” and “RED DIVER” pneumo hoses are also connected to the KMACS-5 at the manifold (F). The fittings coming out of the KMACS-5 are male #4 JIC ( $\frac{1}{4}$ ", 37°) flared fittings. The divers’ pneumofathometer hoses must have matching female #4 JIC ( $\frac{1}{4}$ ", 37°) flared fittings with swivel nuts—other fittings may also be used.

**16. Pneumo Valve Knob, White Diver (P)**

The Pneumo Valve Knob, White Diver turns on and off the air supply to the “WHITE” pneumofathometer system. The Pneumo Valve can be used when the shut off valve to the diver's umbilical is closed (flag down).



### 17. Pneumo Valve Knob, Red Diver (D)

The Pneumo Valve Knob, Red Diver turns on and off the air supply to the “RED” pneumofathometer system. The Pneumo Valve can be used when the shut off valve to the diver's umbilical is closed (flag down).



### 18. O-ring Seal (V)

The O-ring seal helps keep dust and moisture out of the KMACS-5 when the case is closed. The O-ring seal is not pressure proof; however, and the KMACS-5 case will flood if the box is submerged.

## 19. Communicator Panel (W)

The divers' electronic communicator (S) is attached to the communicator panel. The battery for the communicator is located behind this panel.

## 20. Communicator (S)

The KMACS-5 communicator is a standard open circuit/round robin divers' communicator, which functions like a telephone. It can also be used as a 2 wire, “push-to-talk” system. It is connected to the divers' umbilicals by either two bare wires or “banana jack” fittings on the communicator. The communicator is mounted on the communicator panel. You should read and understand the accompanying radio operations manual supplied with the unit before using the unit. Improper use or connections could damage the radio.



### ⚠ CAUTION

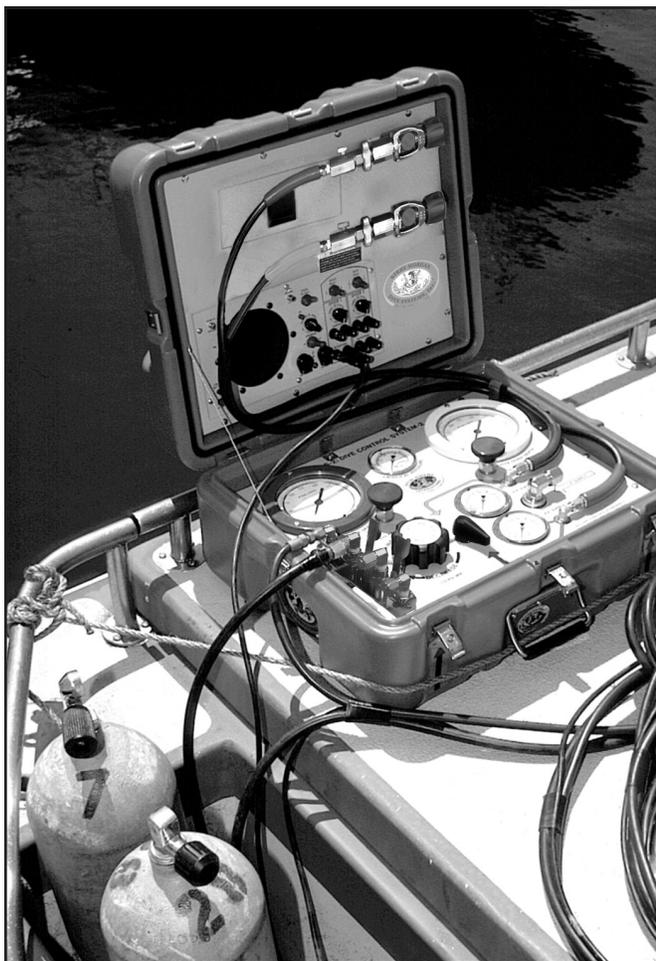
Never connect the charger during a dive or when anyone is in contact with connected equipment. Although electrical shock danger is remote, connection of the recharging cord should only be done when the KMACS-5 is not in use.

## Chapter 2 Operating Instructions

### 2.1 Unpacking The KMACS-5

When you first receive your KMACS-5, carefully unpack it and examine it for any damage that may have occurred during shipment. Be sure to complete the enclosed warranty card and return it to KMDSI immediately. No warranty claims will be honored without a satisfactorily completed warranty card on file at KMDSI. You may also register your purchase for warranty online at [www.kmdsi.com](http://www.kmdsi.com). Under "Support" see Product Registration Form.

Visually check the KMACS-5 to ensure that it has not been damaged in transport.

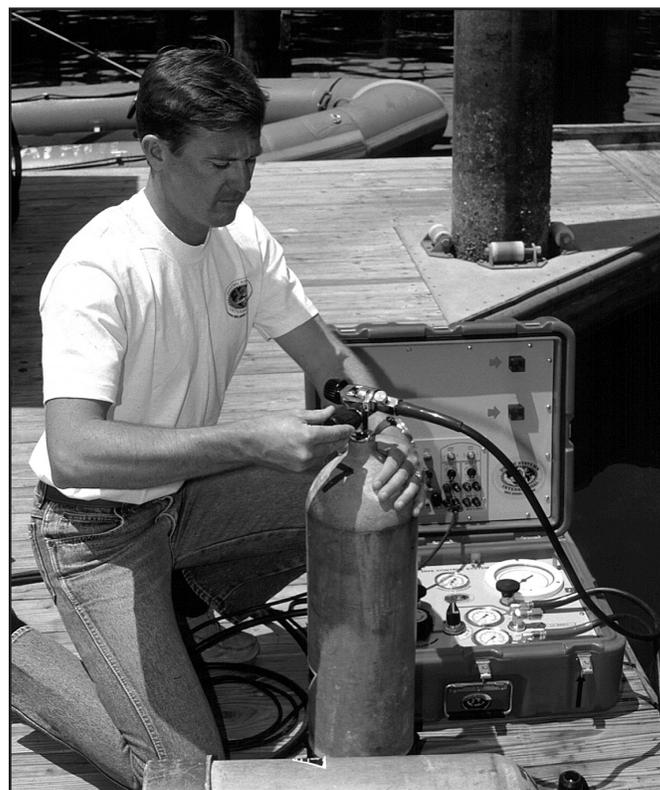


*Note the line which passes through the handle of the KMACS-5 and is secured to the rail to prevent the KMACS-5 from moving about.*

### 2.2 First Use Of The KMACS-5

Place the Air Control System on a firm surface. The KMDSI logo should be right side up. Release the latches and lift up the lid to expose the panels.

When using the KMACS-5 aboard a vessel subject to waves or swell, be sure the KMACS-5 is secured. Tie back the lid of the KMACS-5 as well to prevent damage or injury.

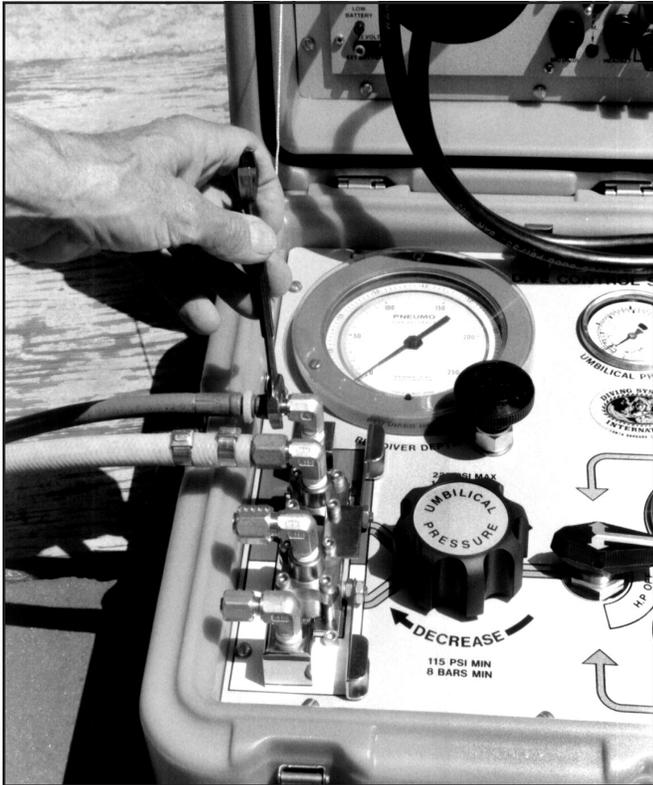


*Connecting a scuba air supply to the KMACS-5.*

### 2.3 Connecting The Air Supply

Loosen the knurled knobs which secure the yokes to their storage posts in the KMACS-5 and remove the yokes (T) from the blocks. Attach each yoke to a high pressure cylinder as you would connect a scuba regulator to a tank. The knobs on the yoke should be screwed down finger tight. Do not apply excessive force to the knobs; air pressure from the tanks will create a good seal. Be sure the bleed valve on each yoke is in the

closed position. Do not turn the cylinders on at this time.



*Always use the right size wrench to connect the hoses to the KMACS-5.*

Check the function of the selector handle to ensure smooth operation.

### **⚠ CAUTION**

**Low pressure compressors used for breathing air should be specifically designed for diving. Paint compressors or similar equipment are unacceptable for diving applications.**

### **⚠ DANGER**

**If a low pressure compressor is used, the intake must be at a sufficient distance from and upwind of the exhaust. If exhaust gas is sucked into the intake, the diver will suffer from carbon monoxide poisoning. This can be fatal.**

Anytime the L.P. inlet is used, the source hose should be flushed with air to make sure no foreign matter is in the hose. Flow air through the source hose for at least one minute. Attach the low pressure hose to the low pressure inlet fitting (O) and screw the fitting down finger tight.

While using one wrench to hold the low pressure inlet fitting tighten the hose fitting with a second wrench. Do not use excessive force as this will only damage the fitting and cause it to leak.

## **2.4 Connecting Divers' Hoses To The KMACS-5**

Each divers' umbilical should be color coded with plastic tape to identify each individual hose. This action will not only serve to make it easier to connect the hoses, but will also serve to differentiate between hoses for purposes of inspection or repair.

Remove the protective caps from the outlets of the manifold (E, F) on the console. Connect the divers' umbilical hose fittings (air supply hose and pneumo) to the KMACS-5. Remove the end caps from the hoses themselves and while firmly holding the end of the hose, blow out the lines before connecting the hoses to the mask or helmet, (refer to the manual for the mask or helmet for the proper connection procedures for your life support equipment). This action will prevent any foreign matter from entering the helmet or mask breathing system. Once the hose is blown out, immediately connect the fitting on the hose to the fitting on the mask or helmet.

Connect the communications portion of the divers' umbilical to the communications fittings on the communicator and to the mask or helmet. Be sure the proper connection is made with the correct communications line for each diver. The wires in the umbilicals should be marked so it is easy to identify which plug connects to the ear-phone terminals and which plug connects to the microphone terminals.

## **2.5 Pre-Dive Check**

Prior to EVERY dive, the following should be checked:

With the steady flow shut and the regulator adjustment knob turned all the way in, turn on the air supply at each of the air cylinders. During operation with H.P. bottles as the main supply, the selector valve handle must be FULLY up or FULLY down. Fully up turns the "BLUE" supply on and the "ORANGE" supply off. Fully down turns the "ORANGE" supply on and the "BLUE" supply off.

Note the air pressure in each cylinder by reading the gauges (M, N). The low pressure supply should be switched “OFF” at the source at this time. A check valve in the low pressure system prevents back flow out of the L.P. inlet fitting.

Both cylinders should be full prior to diving. Load the regulator on the KMACS-5 using the regulator adjustment knob (I). Observe the umbilical hose pressure (B) which should be set to the closest value found in the Supply pressure module for the intended depth and regulator being used. The regulator used in the KMACS-5 is a non-venting regulator. If the regulator has been left set at a higher pressure setting than is presently desired, the operator must turn the regulator adjustment knob (I) clockwise **and vent air from the system by bleeding either the pneumo system or divers’ breathing apparatus.**

As the diver descends, the KMACS-5 operator should increase the regulator pressure to the closest value found in the "Supply Pressure Requirements & Tables" module for the operational depth and regulator being used.

### 2.5.1 Testing L.P. Supply

With the air on at the bottles and the communications switched on, check the regulator function. The diver should insert his face into the mask/helmet and take several breaths to test the demand regulator.

To test the low pressure supply, place the selector valve handle (J) in the “H.P. OFF” zone and the console will be running off the low pressure supply only. Observe the umbilical pressure gauge (B). As the compressor cycles, the gauge will rise and fall as the compressor’s volume tank fills and empties. The maximum pressure for the L.P. inlet should be 225 psi. Again, check the mask/helmet function which will also confirm the low pressure supply routing.

### 2.5.2 Testing Communications

Test the communications between the diver and the KMACS-5. With the communicator (S) switched on, turn the speaker switch to “on” and adjust the volume to a comfortable level for both the diver and the KMACS-5 operator. In the 2 wire mode and the 4 wire mode without headset and boom microphone, the communicator functions similarly to a citizens band radio; i.e., the

KMACS-5 operator must depress the push to talk switch to speak to the diver. In the 4 wire mode, **with headset and boom microphone**, the communicator functions like a telephone conference call; i.e., everyone on the line can hear and speak to everyone else. In either mode, for the diver to talk top side, it is only necessary for him to speak into the oral/nasal microphone in his mask or helmet. If two divers will be working together using 2 wire mode, test the cross-talk functions at this time as well.

To extend the life of the battery, it is recommended that the communications be used in the 4 wire mode. Operation as a 2 wire system uses relays inside the unit which will cause a higher battery drain.

**⚠ CAUTION**

**In the 2 wire mode, when the push-to-talk switch is depressed, the KMACS-5 operator should keep all of his communications short (10-15 seconds) at any one time. This allows the diver to call for assistance if necessary.**

Plug the earphone connectors on the divers’ umbilical into the earphone jacks on the communicator. Plug the microphone connectors on the umbilical into the microphone jacks on the communicator. This will create a 4 wire system/round robin system. Test the system and adjust all volume controls.



*Preliminary testing of the umbilical with a volt-ohm meter to check for continuity.*

Unplug the earphone connectors on the divers’ umbilical from the communicator and reinstall them in the connectors attached to the plugs for

the microphone. This will change the communicator to a 2 wire system. Test this system and adjust volumes.

If there are no communications, recheck all of the connections to ensure they are tight at each junction. Look for corrosion on the top side connectors which may interfere with communications. If corrosion is evident, disassemble the connectors, clean, and retest. If corrosion is heavy, replace the top side connectors.

If a failure is detected, you may substitute other masks/helmets or umbilicals to track the fault down. Substitute one piece of new gear at a time. If the fault is in the mask or helmet, replace the earphones or microphones as needed.

If the fault is in the umbilical, disconnect the umbilical and carefully inspect its length for damage. Look for obvious nicks or cuts.

If there is physical damage to the outside of the communications wire, there probably is a break on the inside too. Test the continuity of the wire end-to-end with a volt-ohmmeter.

Uncoil the umbilical and lay it out flat with the two ends close to each other. Set the volt-ohmmeter to resistance (ohms) and hold one probe to one prong on the umbilical connector plug and touch the other probe from the meter to each of the wires (or connector) at the opposite end of the divers' umbilical. Upon contact with the other end of the same wire, the meter should indicate zero resistance, i.e., there is a complete, uninterrupted circuit. If none of the wires at the other end of the umbilical produces a zero reading, and instead all readings are infinity ( $\infty$ ), this indicates a complete break in the wire. If the reading is somewhere between zero and infinity, and changes as the umbilical is moved, this indicates a partial break, and communications will be intermittent. In either case, a waterproof splice must be made in the wire.

Repeat the check procedures described above for each prong on the umbilical plug.

### 2.5.3 Testing The Pneumo

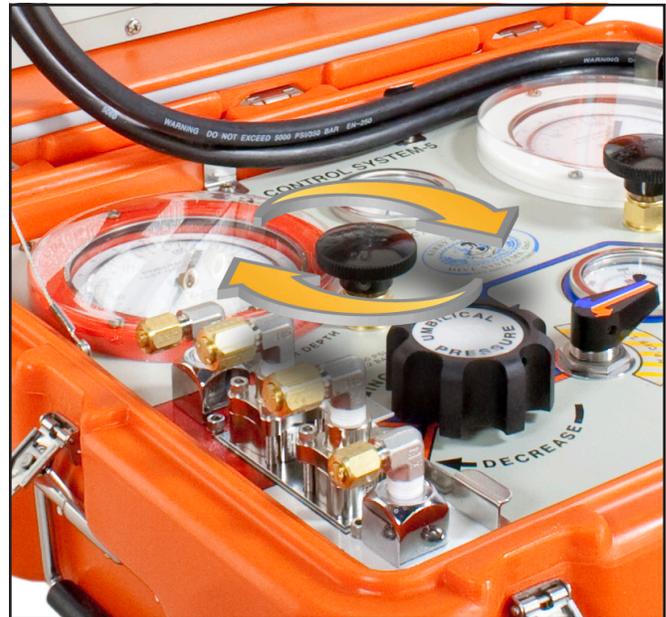
The pneumo supply may be tested in either the high pressure supply mode or the low pressure supply mode. To test the pneumo, select either mode and pinch the open end (divers' end) of the

red diver pneumo hose. With the hose crimped tightly shut, slowly open the red pneumo valve (D) momentarily,  $\frac{1}{4}$  turn, and observe the needle's response on the red diver depth pneumo gauge (C).

## NOTICE

**Do not "peg" the needle on the depth/pneumo gauge with a maximum reading. A test of pressure equal to 50 feet (15 meters) on the gauge is satisfactory to ensure correct operation.**

Close the valve after observing correct operation and release the end of the pneumo hose. The gauge needle should return to zero. Repeat this procedure for the white diver.



*Carefully test the pneumo prior to every dive.*

## WARNING

**The KMACS-5 operator must not leave the dive control system unattended while the diver is in the water. The KMACS-5 operator is directly responsible for the divers' safety and well being.**

## 2.6 Descent

Upon entering the water, the diver should immediately recheck communications with top side and ensure that the mask or helmet is working correctly. When ready to descend, the diver noti-

ties the KMACS-5 operator by saying, "Leaving the surface."

Once the diver has entered the water, monitor his descent rate using the pneumo valve (D, P) and gauge (C, Q). The divers' descent rate should not exceed 75 feet (23 meters) per minute.

As the diver descends the KMACS-5 operator should monitor the air supply pressure and ensure the proper pressure for the divers depth, work rate and regulator being used. If using the KMACS-5 H.P. supply system the operator should slowly increase the supply pressure as the diver descends and slowly decrease the pressure as the diver ascends. The KMACS-5 operator should try to keep the supply pressure within the minimum and maximum parameters in accordance with the values found in the "Supply Pressure Requirements & Tables" module.

To operate the pneumo, turn the knob for the appropriate diver, counter clockwise, until the indicator needle on the depth gauge starts moving. When the depth gauge for the individual diver indicates a depth that is known to be deeper than the diver, the knob is turned clockwise until it is off. The indicator needle on the depth gauge will move shallower as the air bubbles leave the open end of the pneumo hose at the diver. When the needle stops, that is the divers' actual depth.

## 2.7 Diver At Depth

Once the diver reaches the bottom, or his maximum planned depth, the diver should inform the KMACS-5 operator that he is, "On the bottom." At this time, the KMACS-5 operator should ensure that he gets an accurate depth reading. The KMACS-5 operator should inform the diver that he is "Taking a pneumo...", when he opens the pneumo purge valve. The diver should observe the end of the pneumo hose and immediately inform top side that, "I have...". Once the diver has a flow of bubbles at the end of the hose, the pneumo valve (D, P) should be closed immediately.

## 2.8 Changing Out High Pressure Cylinders

The KMACS-5 operator should continuously monitor the divers' air supply at the two high pressure gauges (M,N) when diving with high pressure air as the primary supply. When the initial supply source pressure drops to between 300

and 500 psi (20.7 and 34.5 bars), depending upon depth, the diver should be switched over to the second air source using the selector valve handle (J). While the diver is breathing off the secondary source a fresh cylinder should be put on line immediately.

To change out high pressure cylinders, first close the cylinder valve on the tank which is low. Once the valve is closed, open the bleeder valve on the yoke (T) and allow the pressure to bleed from the line. The high pressure whips are color coded to help the KMACS-5 operator to ensure he is selecting the correct one. Always observe the umbilical pressure gauge (B) carefully during this procedure. If the KMACS-5 operator is not careful he may accidentally turn off the high pressure cylinder supplying the divers' breathing air. If the umbilical pressure gauge (B) needle starts to "fall", turn the cylinder back on immediately and double check to ensure the correct cylinder is being changed.

When the high pressure whip is empty, unscrew the knurled knob on the yoke (T) and attach the yoke to a fresh cylinder. Tighten the yoke knob finger tight, close the bleeder valve, and slowly open the cylinder tank valve. Read the new pressure on the appropriate gauge (M, N).

## 2.9 Procedures During The Diver's Ascent

The KMACS-5 operator must monitor the diver's rate of ascent carefully, observing his watch and the pneumo gauge (C, Q). There is no need to pneumo the diver as he ascends because the air in the pneumo hose will automatically expand and vent the hose as the diver approaches the surface.

## 2.10 Completion Of Diving Operations

Immediately following the completion of diving operations the dive station should be disassembled and the KMACS-5 protected from the weather.

Both high pressure and low pressure air supplies should be turned off at their source. Bleed the air from the divers' umbilical(s) by opening the free flow valve(s) on the divers' mask/helmet(s). Disconnect the mask/helmet(s) from the umbilical and the umbilical from the KMACS-5. Un-

plug the communications connectors and turn off the communicator (S). Plug both ends of the hose and cap the outlet manifold (E, F) nipples on the KMACS-5 to prevent foreign matter from entering either.



*All of the outlet fittings on the KMACS-5 must be capped prior to storage.*

Open the bleed valves on the HP yokes (T) to allow any remaining pressure to vent and replace the yokes on their storage posts. Disconnect the low pressure air source if used and cap the low pressure inlet (O) to prevent foreign substances from entering the KMACS-5.

If the KMACS-5 has been used on the ocean the panels should be wiped down with a clean rag dampened with fresh water. The O-ring seal (V) on the case may be periodically treated with Armor-All or other rubber protection.

Place the KMACS-5 in a dry area and recharge the communications.

## Chapter 3

# KMACS-5 Maintenance

### 3.1 Recommended Maintenance Of The KMACS-5

The KMACS-5 requires very little user maintenance. With proper care, the KMACS-5 should last for years and give excellent service.

On a daily basis, the KMACS-5 operator should inspect the high pressure whips attached to the yokes (T) for signs of wear.

After each use, the case, interior panels and high pressure hoses should be wiped down with a rag which has a small amount of Armor-All. Never spray cleaners directly on the KMACS-5.

For more on daily inspection, see Checklists under Support, then choose KMACS-5 on our website [www.kirbymorgan.com](http://www.kirbymorgan.com)

For minimum monthly inspection maintenance, go to our website [www.kirbymorgan.com](http://www.kirbymorgan.com). Under Support go to Checklists.

Approximately every six months, the high pressure hoses should be treated with Armor-All or similar protection.

Once a year, or sooner if daily or monthly inspections indicate, the A2.1 Annual Inspection should be completed.

### 3.2 Replacing The Battery

The battery used with the KMACS-5 communicator is very reliable and will offer many years of service. However, storing the KMACS-5 with the battery drained can cause the battery to fail. ***The battery should be completely charged before storage.*** Gel cell batteries have an excellent shelf life if properly charged prior to storage.

To replace the battery, remove the screws which hold the communicator panel (W) into the top of the KMACS-5 box. Do not remove the screws which secure the communicator to the larger panel. Tilt the panel out but do not remove it from the lid. The battery is held in place by brackets and “Velcro” strips on the back of the large panel.

Reach behind the panel and support the battery. Lift the panel and battery out as a unit.

Replace the old battery with a new unit. Position the new battery on the back of the large panel using the “Velcro” strips to hold it in place. Connect the leads back to the battery and push the communicator panel (W) back into its normal position. Install the screws which hold the large panel in place and tighten them in a staggered pattern.

## Chapter 4 Troubleshooting the KMACS-5 System

### 4.1 General

The KMACS-5 is an extremely simple system which should not malfunction if the instructions in this manual are followed. Most problems encountered in using the system can be easily remedied. The following information covers the common operating difficulties.

### 4.2 No Communications

Symptoms	Probable Cause	Remedy
No sound at either KMACS-5 or diver's mask.	Speaker turned off	Turn speaker on
	Communication power not on	Activate switch and adjust volume
	Communications incorrectly hooked up.	Switch terminal wires
	Communications not hooked up	Plug into terminals
Battery light does not power up	Battery low or dead.	Charge or replace battery
Communications weak or broken up	Terminals covered with corrosion	Clean Terminals with wire brush to bright shiny metal
	Loose or nearly broken wires	Trim back wires to full thickness
Communications interrupted when umbilical is moved	Headset not working	Clean Terminals with wire brush to bright shiny metal
	Short in internal wiring	Trim back wires to full thickness
Communications interrupted when umbilical is moved	Break in diver's communication wire	Splice wire if damage is minor. Replace wire if damage is major.
Communications interrupted when waterproof connector is moved	Break in splice at waterproof connector or failure of connector. Test with VOM	Replace splice or connector

### 4.3 No Pneumo Reading

Symptoms	Probable Cause	Remedy
No air to diver's end of pneumo	Pneumo hose not connected	Attach fittings to KMACS-5
	Pneumo plugged	Flush hose with air to clear
Gauge reads sustained pressure at surface.	Pneumo crimped or plugged	Check entire length of hose. Relieve any restrictions

Symptoms	Probable Cause	Remedy
Hose will not hold pressure and gauge needle will not rise	Pneumo fitting cracked or loose	Check fittings at console with soap and water solution. If fittings bubble, either tighten or replace as necessary
Needle will not respond properly to flow	Hole in pneumo hose	Check hose; replace or splice as necessary
	Gauge mechanism damaged	Replace or repair gauge. Return to dealer
Air can be heard escaping into console interior.	KMACS-5 internal plumbing may be cracked or broken	Return to dealer for service

### 4.4 No Air To Diver

Symptoms	Probable Cause	Remedy
No hose pressure in diver's umbilical	Primary air source not connected	Connect proper hose to console
	Valve closed at low pressure and H.P. source	Open valve at low pressure compressor and H.P. supply cylinders
No gauge reading on high pressure gauge	Valve closed at high pressure source	Open valve at high pressure source
	H.P. cylinders are empty	Secure full cylinders to H.P. whips
Low hose pressure in diver's umbilical	Regulator not properly loaded	Rotate adjustment wheel in appropriate direction
	Low H.P. supply	Switch over to full tank
Air can be heard escaping from hose	Fitting loose on diver's hose, or fittings damaged.	Tighten fittings until snug. Do not over tighten. Replace fittings if damaged
Umbilical registers pressure at console gauge, but no flow at mask	Mask improperly serviced	Clean and adjust mask
	Blockage in supply hose	Clear blockage from hose
Air can be heard escaping into console interior	Leakage in KMACS-5 plumbing	Return KMACS-5 to dealer for service
Umbilical hose pressure and supply pressure drops rapidly	Diver's Umbilical cut or severed	Replace diver's hose.

<b>Symptoms</b>	<b>Probable Cause</b>	<b>Remedy</b>
With high pressure air on and regulator loaded, no umbilical pressure	Regulator malfunction	Return KMACS-5 to dealer for service

## Chapter 5 Appendix

### 5.1 Communications Wiring Schematics

If your KMACS-5 has communications, refer to the radio manual, P/N 100-401 MK3-KMDSI Communicator Two-Diver Air Intercom user guide, which would have shipped with the KMACS-5. (Also online at [www.kirbymorgan.com](http://www.kirbymorgan.com))

### 5.2 Exploded Views & Parts Lists

The following parts are not shown on the blow apart drawing and are listed for reference only.

Location	Part #	Description
Not Shown	420-101	Case, KMACS-5
Not Shown	415-030	Battery Charger Assembly

\* The following parts in the interior plumbing require the use of Conical Seals, # 455-135. The conical seals are provided with the items listed below.

Location	Part #	Description
95	405-105	High Pressure Inlet Tube (Blue)
95	405-105	High Pressure Inlet Tube (blue)
84	405-106	High Pressure Regulator Inlet Tube

# KMACS-5 Dive Log

Diver: \_\_\_\_\_ Date: \_\_\_\_\_

Stand By Diver: \_\_\_\_\_

KMACS-5 Operator: \_\_\_\_\_

Dive Location: \_\_\_\_\_

Purpose of Dive: \_\_\_\_\_

Diver Bail out cylinder size/pressure: \_\_\_\_\_

Stand by Diver: \_\_\_\_\_

Low Pressure Air Source Pressure: \_\_\_\_\_

High Pressure Air Source Pressure: \_\_\_\_\_

CYLINDER #	START	FINISH
1		
2		
3		
4		
5		
6		

## Dive Times

Diver Left Surface: \_\_\_\_\_

Diver Reached Bottom: \_\_\_\_\_

Diver Left Bottom: \_\_\_\_\_

Maximum Depth: \_\_\_\_\_

Diver Reached Surface: \_\_\_\_\_

Total Bottom Time: \_\_\_\_\_

Repetitive Group: \_\_\_\_\_

Decompression Required?  Yes  No

Decompression Schedule: \_\_\_\_\_

Diver's Signature \_\_\_\_\_

KMACS-5 Operator \_\_\_\_\_

# Chapter 6 Umbilical Supply Pressure Requirements & Tables

You need to have the proper supply pressure to get the required volume to the diver. To achieve the maximum performance capabilities of the KMACS-5, users should use the air supply information found in the "Supply Pressure Requirements & Tables" module and listed below. When using L.P. compressors, the user must know what the compressor is capable of delivering to the divers at depth before the diving operation begins.

## 6.1 High Pressure Bank Supply

KMACS-5 Recommended Umbilical Supply Pressure (Surface Gauge Reading) when the source gas is H.P.

Depth		Umbilical Supply Pressure in P.S.I.G.		Umbilical Supply Pressure in BAR	
FSW	MSW	Minimum P.S.I.G.	Maximum P.S.I.G.	Minimum Bar	Maximum Bar
0-60	0-18	120	160	8.3	11
61-100	19-30	160	200	11	13.8
101-132	31-40	200	250	13.8	17.2

The HP supply table reflects the pressures required when being supplied by HP banks at a minimum HP pressure of 500 psig.

Performance is based on a minimum of 75 RMV to 165 FSW (50 MSW) and 62.5 RMV to 220 FSW (67 MSW) using a 3/8" (9.5 mm) umbilical 600 foot (183 meters) long, made up of two 300 foot (91 meter) sections.

## 6.2 Low Pressure Compressor Supply

Minimum Pressure (Surface Gauge Reading) and volume at depth for two divers based on a maximum respiratory work rate of 50 RMV. Using 3/8" I.D. umbilical up to 300 feet (91 meters) in length.

Depth		Minimum Pressure (Surface Gauge Reading)		Volume At Depth	
FSW	MSW	Minimum Pressure P.S.I.G.	Minimum Pressure BAR	Minimum CFM At Depth	Minimum LPM at Depth
0-60	0-18	120	160	12	338
61-100	19-30	160	200	17	483
101-132	31-40	200	250	21	600

The Low Pressure supply table reflects the minimum surface supply pressure and volume to enable two divers to work at a maximum respiratory work rate of 50 RMV.