

# User Guide For

## MK3-KMDSI Communicator

### Two-Diver Air Intercom

(Communicator P/N 415-107)



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**Document P/N 100-401**

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# WARRANTY



## *LIMITED WARRANTY*

The MK3-KMDSI is fully warranted against defects in materials and workmanship for a period of one (1) year from the time of purchase. Our obligation under this warranty is limited to the replacing of any part or parts which prove to our satisfaction to have been defective, and which have not been misused or carelessly handled. Labor is warranted for one (1) year from time of purchase. The complete unit and/or part must be returned to our factory, transportation charges prepaid. We reserve the right to decline responsibility where repairs have been made or attempted by other than an Ocean Technology Systems factory-trained service center or properly trained personnel. In no event shall Ocean Technology Systems be liable for consequential damages.

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# Definitions of Signal Words and Terms Used in this Guide

The original language of the Kirby Morgan Manuals is English. Translation into other languages will be provided upon request. KMDSI may charge a fee for these services.

Throughout this user guide we will use certain words to call your attention to conditions, practices or techniques that may directly affect your safety. Pay particular attention to information introduced by the following signal words:

## **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.**

This operation user guide contains important safety information and should always be available to those personnel operating this equipment. Read, understand, and retain all instructions before operating this equipment to prevent injury or equipment damage.

If you sell or loan this equipment to another person, be sure that this user guide accompanies the gear when you transfer possession to them.

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# Important Information—Please Read!

Your new MK3-KMDSI Two-Diver Air Intercom represents state-of-the-art technology and innovation—the choice of discriminating divers throughout the world. Please take the time to read this owner's manual. With proper care and use, your MK3-KMDSI will provide you with the ultimate in high-quality communications.

The following guidelines and illustrations are presented to assist you. If you still need additional information, do not hesitate to confer with your local KMDSI (Kirby Morgan Dive Systems, Inc.) dealer or representative. If you are not able to adequately obtain service, contact KMDSI, or Ocean Technology Systems, 3133 West Harvard Street, Santa Ana, CA 92704, Telephone (714) 754-7848, Fax (714) 966-1639, Email: [ots@otscomm.com](mailto:ots@otscomm.com) [www.oceantechnologiesystems.com](http://www.oceantechnologiesystems.com)

## Introduction

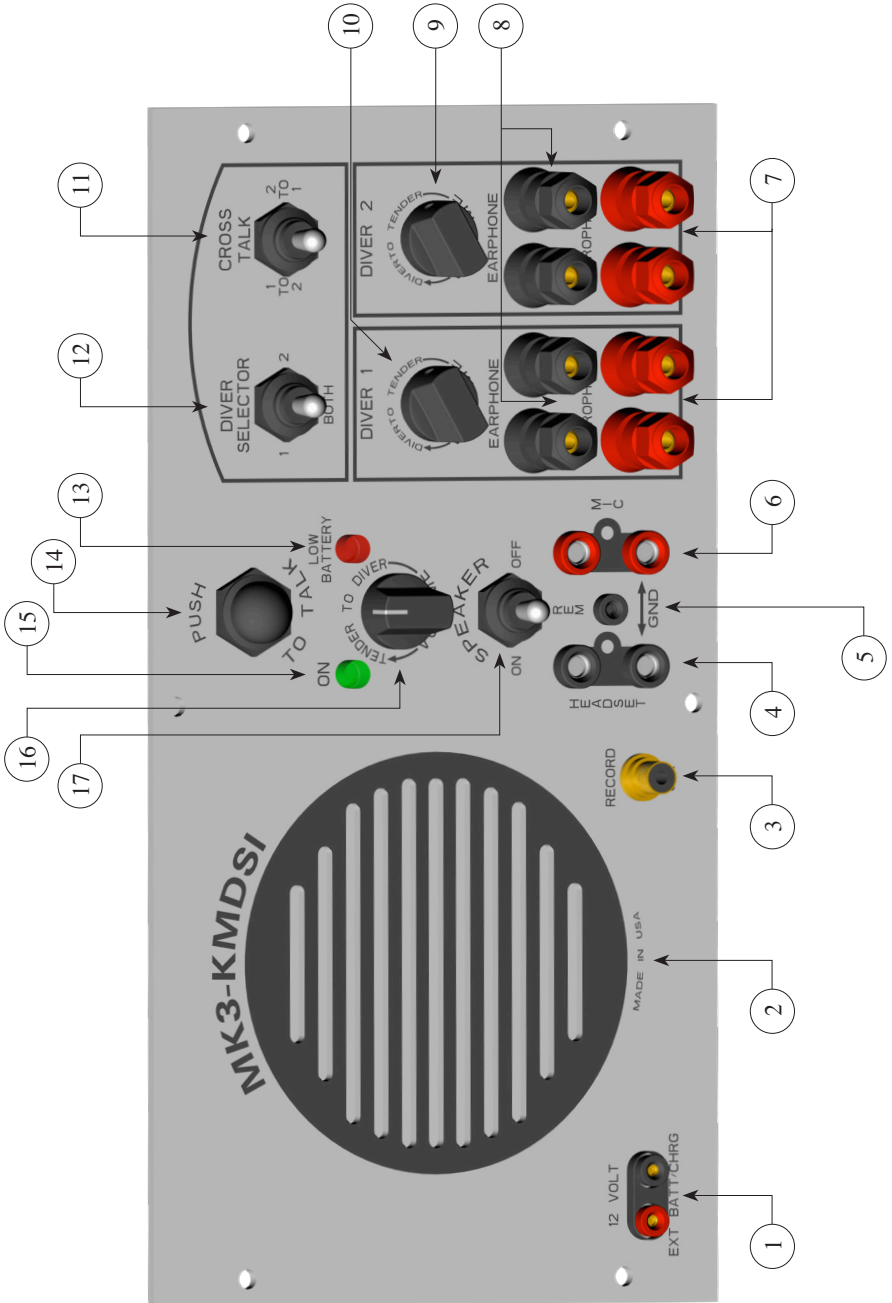
The MK3-KMDSI is a compact, self-contained, Two-Diver Air Intercom providing 2- or 4-wire communications between the operator and one or two divers. *Please note that standard 4-wire cable is necessary when using this product in the 4-wire mode.*

This manual covers Specifications, Operating Instructions, 2-Wire or 4-Wire Communications, Batteries, Helpful Hints, and Warranty Information.

## Equipment Specifications

<b>Battery Life:</b>	12 hours nominal (depending on the number of divers and/or volume levels)
<b>Battery Type:</b>	KMDSI supplied Gel-cel (contact KMDSI for further information)
<b>Power Output:</b>	20 Watts into 4 ohms
<b>Frequency Response:</b>	600 to 12,000 Hz
<b>Front Panel:</b>	½" aluminum, chemically-treated and coated with a tough, durable, urethane finish to withstand the marine environment
<b>Size:</b>	Width: 11 ¾" Height: 6 ⅛" Thickness: ½" aluminum 6061-T6

# Panel Functions



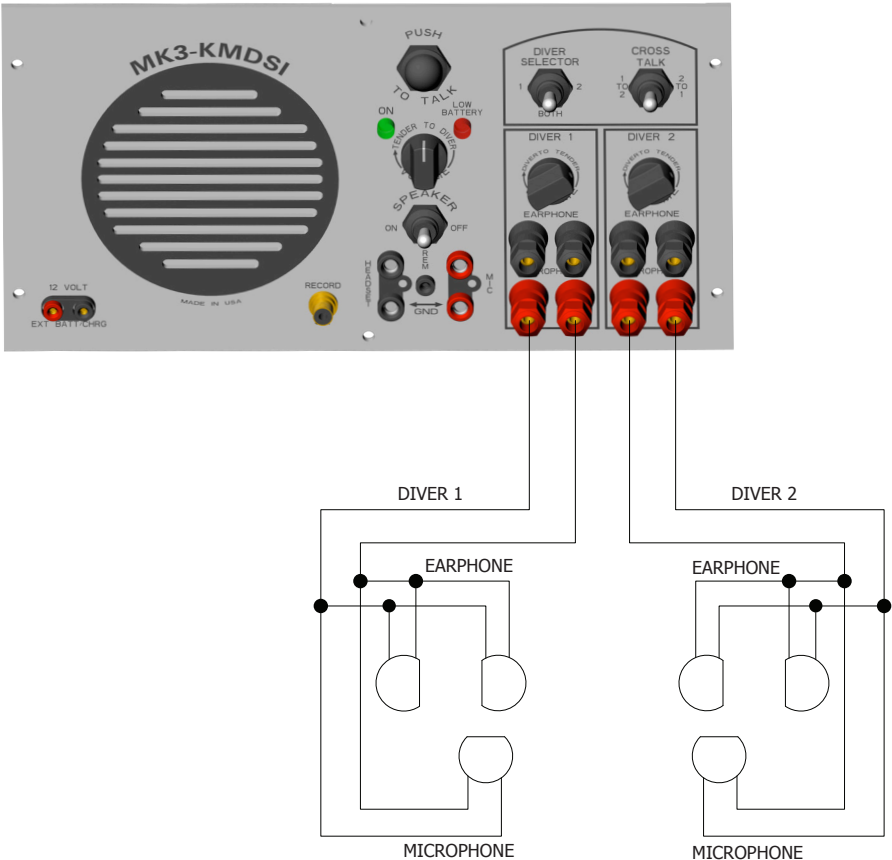


<b>1. External Battery/Charger 12 Volt</b>	Allows tender to use a 12-volt alternate source, or charge the rechargeable battery from the front panel.
<b>2. Panel Speaker</b>	Heavy-duty panel speaker provides maximum audio power for overriding surrounding noise.
<b>3. Recorder/Out</b>	Permits tender to record diving operations. Female RCA/phono connector.
<b>4. Headset</b>	Allows the use of a headset.
<b>5. REM/GND</b>	Remote push-to-talk receptacle (used with headset w/ptt).
<b>6. Mic</b>	Used with hand-held microphone or headset w/mic).
<b>7. Microphone</b>	Banana-style connectors. Permits hook-up for either 2-wire or 4-wire communications (see Fig 2 & 3).
<b>8. Earphone</b>	Allows tender to set intercom up for 4-wire (round-robin) mode (see Fig 3).
<b>9. Diver to Tender Volume 1</b>	Controls volume of diver #2 to tender.
<b>10. Diver to Tender Volume 2</b>	Controls volume of diver #1 to tender.
<b>11. Cross Talk</b>	Used in 2-wire mode to cross-talk divers.
<b>12. Diver Select</b>	Allows tender to control communications to either diver #1, diver #2, or both divers.
<b>13. Low Battery</b>	Low battery indicator.
<b>14. Push-to-Talk (PTT)</b>	Switch used in 2-wire mode by tender to talk to divers.
<b>15. Green LED</b>	Indicates power ON.
<b>16. Tender to Diver Volume</b>	<b>Turns unit ON</b> and controls tender volume down to both divers.
<b>17. Speaker On/Off</b>	Allows tender to turn front panel speaker ON or OFF.

# 2-Wire Mode

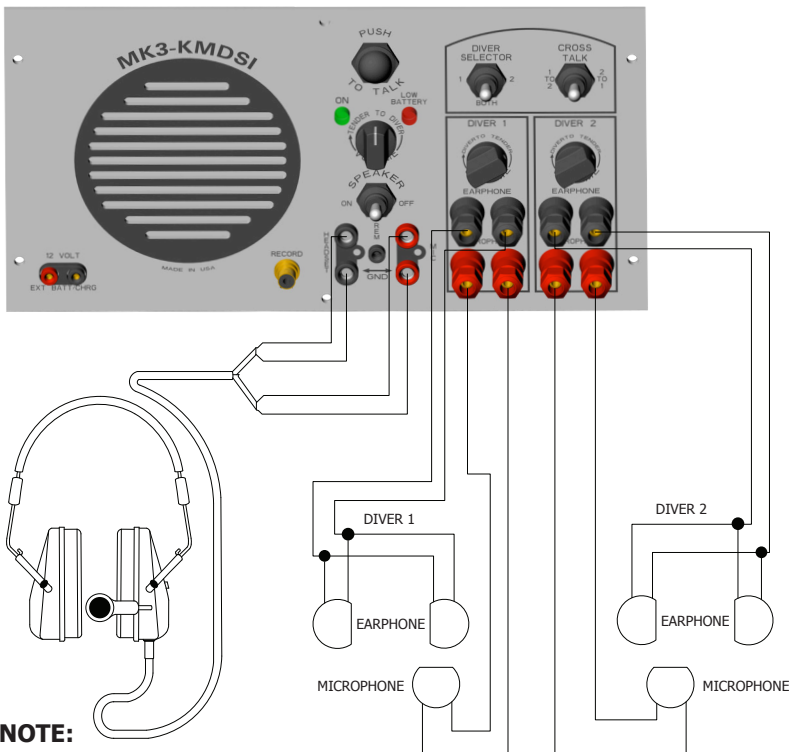
In normal 2-wire operations, the two wires within the diver communication cable is connected to the corresponding binding post (divers #1 and #2) on the surface unit. This allows the tender to talk to either diver individually, or both divers simultaneously. The divers may also communicate with each other when the tender engages the cross-talk switch. The surface unit speaker functions as speaker and microphone. When the system is used where conditions are noisy, the tender can switch off the speaker and use a headset and boom microphone; however, when using a headset with boom mic, the tender must still use the push-to-talk (PTT). The divers' communication is the primary signal. When the tender uses the PTT control, his signal becomes the primary signal.

If a speaker is located in a diving bell or recompression chamber, the MK3-KMDSI can be used as the communications link between the divers and the outside.



## 4-Wire Mode

The 4-wire mode provides continuous open-line communications between the tender and divers. In this mode (black), everyone hears each other simultaneously. Therefore, the earphones, speakers and microphones must be isolated to prevent feedback. All earphones are connected in parallel—four wires are required to connect all stations: two for the microphones, and two for the headset and earphones. The diver earphones should be connected to the earphones' mode (black) binding post and microphones to the mic (red) binding posts on the surface unit. The phone plug on the tenders' headset should be connected to the headset phone jack. The red plug (tender's microphone) should be connected to the microphone jack. The diver's microphone can also be connected to either diver #1 and diver #2 jacks. When set in the 4-wire mode, everyone is online together, similar to a telephone conference call, as long as the tender is using a headset mic combo. If this combo is not used, the tender will be required to use the Push To Talk button to communicate. **NOTE:** The DIVER SELECT switch must be in the "BOTH" position!



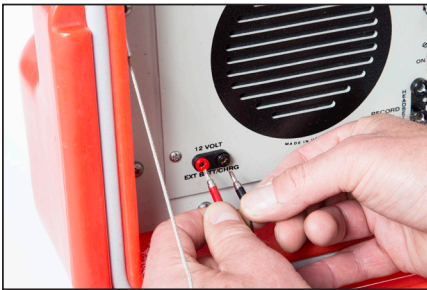
### NOTE:

In the four wire mode, the headset is mandatory, for **open line** communications. Not using a headset will require the tender to use the Push To Talk button.

## Charging the Batteries

The operating time for a fully charged battery is approximately 12 hours. The exact operating time depends on the age of the battery and the ambient temperature. Charging should be done with the unit turned off. Typical charge time from a low battery warning *when using the provided OTS charger connected to a secure AC power supply* is three to four hours. If connected to another source like a vehicle that has its engine running and the vehicle battery voltage is between 13.8 and 14.7 volts, it's about an 8 hour charge depending on the condition of the battery.

When charging the batteries the GREEN LED power light will turn on and remain on for the entire time the unit is plugged in. The charger is designed to remain plugged into the supplied power and connected to the battery for extended time without damaging the battery. It is recommended that charging time not exceed 12 hours. The batteries do not have memory and can be placed on charge at any time. The charger for the MK3-KMDSI is Kirby Morgan P/N 415-150. It is recommended to connect the two leads from the battery charger into the communicator first, and then followed by plugging the power cord from the charger into the supplied power second.



Match the Red and Black probes to the Red and Black receiving holes on the lower left panel of the communicator to connect the charge to the MK3-KMDSI communicator.

## Power Indicators

There are two LED lights on each side of the Tender to Diver Volume control knob. The LED on the left is the power on indicator and will emit a strong green color when turned on and when charging or operating from an external power supply. The green LED will remain green until the battery drops below 8 volts. The LED on the right side of the control knob is RED in color and is the low battery warning light. When the battery level drops to 8 volts, the red light will turn on (solid). There is also a tone every 30 seconds that will be heard. When the battery level drops below 7 volts, the red light will begin to blink. The tone will also continue to be heard every 30 seconds.

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 their 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 diver’s umbilical into the earphone jacks (Black) on the communicator. Plug the microphone connectors on the diver’s umbilical into the microphone jacks (Red) on the communicator. This will create a 4 wire system/round robin system. Test the system and adjust all volume controls.

Unplug the earphone connectors on the diver’s umbilical from the communicator and reinstall them in the connectors attached to the plugs for the microphone(stack the jacks). 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. If the KMACS 5 has been operating in a coastal environment, look for corrosion on the top side connectors which may interfere with the communications. If corrosion is evident, disassemble the connectors, clean, and retest. If corrosion is heavy, replace the top side connectors on the umbilical. Substitute other masks or umbilicals to test for failures in the microphones or umbilical. Substitute one piece of new gear at a time to track the fault down. 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 an umbilical connector plug and touch the other probe from the meter to the wires (or connector) at the opposite end of the diver's umbilical. Upon locating the other end of the same wire, the meter should indicate zero resistance, i.e., there is a complete, uninterrupted circuit. If touching none of the wires at the other end of the umbilical produces a zero reading, this indicates a complete break in the wire. If the reading is not a steady zero and the reading 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.

## 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 can have an excellent shelf life if properly charged prior to storage. However, it is imperative that they be charged after six to nine months of storage.



To replace the battery, remove the screws which hold the communicator panel 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 back into its normal position. Install the screws which hold the large panel in place and tighten them in a staggered pattern.

## Removing/Replacing the Communicator

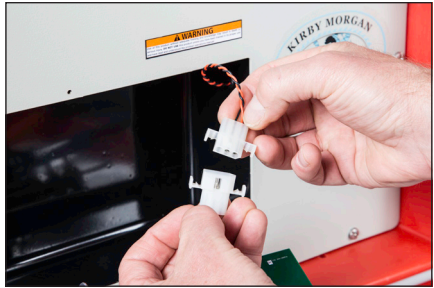
### Removing

Verify that the communicator is turned off and all connections from the umbilical and headset are removed. There are six screws that secure the MK3 communicator in place.



Remove the six screws using a #2 Phillips screwdriver and set aside in a safe place where they will not be lost.

Carefully pull the communicator slightly away from KMACS 5 top panel. The communicator is connected to the battery with a three pin connector and cannot be removed completely without disconnecting the connector.



Disconnect the battery connectors by simply pulling them apart and complete separation is possible.

## Replacing

When replacing a communicator verify the unit is in the off position. Bring the communicator close to the KMACS 5 top panel and either lay it down close to the panel or have someone hold the communicator while connecting the male and female together. Once the battery connection is made, fit the communicator into the appropriate slot ensuring that the battery cable is free from pinching. Using a #2 Phillips screwdriver, tighten screws in a staggered star pattern until all screws are secure.

## Helpful Hints

1. Before diving operations, check to be sure *microphone*, *earphones* and *wire connections* are functioning properly. Ninety percent (90%) of all problems in communications turn out to be a problem with one of the above.
2. When in 4-wire mode, you must use headset with boom microphone and the DIVER SELECTOR switch must be in the “BOTH” position, to have open communications between divers and the divers to topside. If feedback is present, switch the front panel SPEAKER to “OFF” (see Panel Functions 17 on page 5).
3. Avoid excessive tender-to-diver volume. Most of the time, when there is *too much volume*, the diver will hear distortion and ask for more volume.
4. Before diving operations always check the battery, a solid green LED light should be on, indicating a charged battery. The red colored LOW BATTERY LED indicator light (see Panel Functions 13 on page 5) indicates the battery needs to be charged or replaced. The charger for the MK3-KMDSI communicator is Kirby Morgan P/N 415-150.



5. Make certain all umbilical communication wires are secured into topside banana connectors. Verify that topside connectors are securely inserted into topside jacks and in the proper place.







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