

***C460***

***Ultra-Low Light***

***Monochrome Camera***

**OPERATION AND MAINTENANCE MANUAL**



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52-51392 REV A

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## **WARRANTY**

ROS, Inc. (hereinafter called "**ROS**") warrants its products as stated below subject to the conditions specified.

**ROS** warrants its products, when operated under normal conditions, to be free from defects in material or workmanship for a period of one year from the date of purchase provided that inspection by **ROS** discloses that such defects developed under normal and proper use. **ROS** products repaired or replaced pursuant to this warranty shall be warranted for the unexpired portion of the warranty applying to the original product. The liability of **ROS** under this warranty shall exist subject to the following conditions:

- (a) Purchaser properly notifies ROS of such defects and the defective product is returned to ROS, transportation charges paid by Purchaser.
- (b) ROS shall be released from all obligations under its warranty in the event repairs or modifications are made by persons not authorized by ROS.
- (c) Representations and warranties made by any person, including distributors and representatives of ROS, which are inconsistent or conflict with the terms of this warranty, shall not be binding upon ROS unless reduced to writing and approved by an officer of ROS. ROS shall in no event be liable for other direct, special, incidental, consequential, indirect or penal damages.
- (d) The laws of the State of California shall govern this warranty.

In the event the defect is determined to be within the terms of this warranty then **ROS** agrees to repair and/or replace (at **ROS**' discretion) the product or defective portion at no charge to the Purchaser. This warranty does not apply to expendable items or to normal wear-and-tear, and is conditional upon performance of normal preventative maintenance procedures.

Our commitment to quality and customer service directs us to constantly strive to improve our products. The materials and specifications presented in our manuals and data sheets are correct and accurate to the best of our knowledge, and are presented in good faith. However, the information is not guaranteed and is subject to change without notice.

### **LIMITATIONS OF REMEDIES**

Purchaser assumes all risk and liability for results obtained in any installation, operation, or use of the product. Purchaser's sole remedy for any breach of warranty by vendor shall be limited to the "express remedies" set forth above. Otherwise, in no event shall vendor, its agents, or employees be liable to the original purchaser or any third party for any consequential or incidental damages or expenses of any nature arising directly out of or in connection with the use of vendor projects, even if vendor has been advised of the possibility of such damages or expenses. In any event, unless otherwise contrary to state law, vendor liability under this limited warranty shall not exceed the purchase price of the product.

## CUSTOMER ASSISTANCE

ROS, Inc. uses a worldwide network of stocking distributors and representatives who are familiar with our products and are able to provide assistance during installation and/or operation of these products.

If you have any questions or problems with this product that are not covered by this manual or instruction, please contact our agent in your area, or contact us directly by phone or FAX or e-mail.

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## CHANGE RECORD

<u>REV</u>	<u>DESCRIPTION</u>	<u>DATE</u>
A	PRODUCTION RELEASE (EC-2489)	14APR16

## 1 WARNINGS



**WARNING:** Assembly, disassembly, connecting cables, or disconnection of cables, must only occur when the C460 Camera is disconnected from the power source.

- When handling the cables, do not pull or tug on the cables more than necessary. Connector or cable damage through cutting of the jacket may result.

## 2 DESCRIPTION

The Remote Ocean System C460 Ultra Low Light Monochrome Camera is ideally suited to output video in harsh extreme low light level environments. The C460 is rated to operate in both air and water with depths to 6000MSW (8700 psi). The C460 is a standard definition black and white fixed focal length camera, with EIA and CCIR versions available. The C460 operates over a wide supply voltage range, 12 to 36 VDC, with a maximum current draw of 200mA.

**Table 1. Configuration Descriptions**

Part Number	Connector Option
52-51377-01	SubConn 75CXBH6MSS
52-51377-02	SubConn MCBH-6-MP

### 3 PRODUCT SPECIFICATIONS

<b>Electronics</b>	
Resolution	570 TVL
Minimum Scene Illumination	.000005 Lux
Sensor Type	1/3" CCD II
Power Input	12-36 VDC
Video Output	Composite, 1.0 V p-p into 75 ohm
<b>Optical</b>	
Focus Control	Fixed, 6.0 in (152mm) to infinity
Field of View in Air	77° diagonal
Field of View in Water	77° diagonal
<b>Mechanical</b>	
Housing Material	6AL4V Titanium
View Port	BK-7 Optical Glass
Length (w/o connector)	10.1 in (257mm)
Weight in Air	8.0 lb (3.6 kgf)
Weight in Water	4.3 lb (2.0 kgf)
Connector	MCBH-6-MP (Standard)
<b>Environmental</b>	
Operating Depth	19600FSW (6000MSW)
Operating Temperature	23° to 122°F (-5° to 50°C)
Storage Temperature	14° to 140°F (-10° to 60°C)

**Table 2, Specifications**

## 4 SET UP

Connect output cable to video display and 12-36 VDC source. Do not apply power at this time.

Connect output cable to camera connector and install locking sleeve. Locking sleeve should only be hand tight. Do not over tighten locking sleeve.

## 5 OPERATION

The C460 is designed for the ultimate simplicity of operation. Once the C460 has been setup with the cable, video display and VDC source it is only necessary to apply power. There is no ON/OFF switch; the system will be ON whenever power is applied. To turn the system OFF, simply remove power with the source.

## 6 MAINTENANCE

The C460 is intended to be maintenance free. The C460 is purged with dry Nitrogen to eliminate moisture which prevents problems with corrosion and condensation.

Though the C460 is constructed of highly corrosion resistant materials, corrosion of all components can further be minimized by applying a fresh water rinse after being immersed in saltwater. Additionally, we recommend careful handling procedures be used to prevent deep scratches or dents which can create and accelerate localized corrosion.

In the event the camera stops working, please see section 7 for troubleshooting. If this does not resolve your issue, then please contact ROS customer service.

**Note: The C460 contains no user serviceable components.**

## 7 TROUBLESHOOTING

This section provides information on trouble shooting the C460.

The information presented in this section is designed to provide a guide for isolating the source (root) of any problems that may be observed during the operation of the C460.

Failure modes, causes, and corrective action are listed in Table 3, Trouble Shooting.



**WARNING:** Connection of cables, or disconnection of cables, must only occur when the C460 is disconnected from the power source.

Prior to performing any fault isolation procedure the system should be



inspected for any signs of visible damage. These may include denting, discoloration, corrosion, or flooding. All connectors should be inspected to ensure that pins are straight and no damage has occurred that could allow misalignment or flooding.

<b>Problem</b>	<b>Typical Cause</b>	<b>Corrective Action</b>
No video image	Power not supplied	Disconnect the C460 from the VDC source. Test power source. Reconnect the C460 as appropriate.
	Video Display	Disconnect the C460 from the Video Display. Validate that another camera can output video to display. Reconnect the C460 as appropriate.
	Cable malfunction	Replace cable
	Seal Failure	Return to ROS
Poor Image - Flickering	Video Format	Verify that Video Display is compatible with C460 format (NTSC/EIA or PAL/CCIR)
Poor Image - Blurry	Video Display	Verify that Video Display has a minimum of 500TVL
Poor Image – Noise	Loose connection	Check all cable connections. Secure as required.
	Cable malfunction	Replace cable

**Table 3, Trouble Shooting**

The general steps for trouble shooting should proceed as follows assuming that the camera has been setup according to previous instructions and no video image is displayed on the monitor:

1. If possible, replace the interconnecting cable and check functionality.
2. If possible, replace the C460 camera and check functionality.
3. Verify that there is voltage from the source using a multi-meter. The system should function over a range of 10 to 36 VDC.
4. Verify that the system is drawing current from the supply. The camera will draw from 100mA to 200mA depending on the input voltage.
5. If the voltage and current are measured and in the correct ranges, then it is likely that there is a problem with the monitor.
6. If the camera is not drawing current from the power supply, then there is a problem with the camera module. Return C460 to ROS.