

Micro-SeaCam 2050
User Manual
740-03714
(Preliminary)



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1. Introduction

Congratulations on your purchase of the DeepSea Power & Light MSC-2050 camera. The MSC-2050 contains a 1/3-inch color CCD video camera that provides high resolution and sensitivity. Housed in a Delrin (acetal plastic) housing and blue neoprene boot with an acrylic port, the camera's only external metal piece is a stainless steel snap ring used for final assembly.

1.1 Installation and Operation:

The Micro-SeaCam 2050 utilizes a color CCD video camera and a 3mm lens. The camera and lens are packaged in a Delrin housing and blue neoprene boot with a scratch resistant SAR acrylic front port. The Micro-SeaCam 2050 has been pressure tested to 3000 psi and is shipped ready for use. Make proper connections per section 1.2 then, power up power supply and monitor to observe video picture on monitor from camera.

The camera is reverse voltage protected, accidental application of reverse polarity voltage will not damage the camera.

1.2 Cable Connections:

WARNING: Whenever AC or DC power is used in the vicinity of water, we **strongly** recommend that a Ground Fault Interrupt (GFI) equipped power strip or other safety device be utilized to minimize the chance of electric shock due to a short circuit.

First, plug the 12 volt DC power supply into the GFI (make sure the switch on the power supply is in the OFF position). Plug the red (positive 12V) and black (12V return (-)) banana plugs of the camera cable into their respective jacks on the power supply. Plug the BNC connector on this end of the cable into the monitor or VCR video-in jack (a BNC to RCA adaptor may be required by the monitor/VCR in use). Plug the four-pin female underwater connector on the other end of the cable into the male bulkhead connector on the back of the camera (refer to the figure below for bulkhead connector pinout). Screw the locking sleeves together firmly (hand tight--do not use tools). The camera is now ready for operation; switch the power supply ON to power the camera. The camera draws approximately 300 mA of current during operation, and will work when supplied between 11-30 volts.

Pin 1:	Ground
Pin 2:	+12 volts
Pin 3:	Video
Pin 4:	No Connection

See 4.0 Drawings for other connector pin-outs

1.3 Camera Flooding Emergency Procedure:

WARNING: In certain rare instances, a pressure case can flood and then reseal itself which may result in internal pressurization. Additionally, if the power is applied while water is present inside the case, hydrogen and oxygen can be generated by electrolysis, forming an explosive mixture.

- 1) Immediately turn off the power to the unit.
- 2) Remove rear retaining ring and slide assembly out of housing. Slide out by pulling straight back with a slight twisting motion. Push on front window if needed.
- 3) Disconnect three wires from camera to PCB you now have two separate pieces. Next remove the covers from the camera. Be careful to save the small screws.
- 4) Thoroughly rinse the components in fresh water. Be careful not to lose the small screws during this phase.
- 5) Allow the parts to dry in air or use an oven set to 100°F to dry.
- 6) Loosely assemble the camera, call DeepSea for an RMA#, and return camera to DEEPSEA.

2. Specifications

MECHANICAL

Housing:	Delrin (acetal plastic)
Port:	Flat, optically clear SAR Acrylic
Outer Diameter:	50 mm (1.98 in.)
Overall Length:	104 mm (4.10 in.) excluding connector
Weight in Air:	330 g (12 oz.)
Weight in Freshwater:	210 g (7.6 oz.)
Weight in Seawater:	203 g (7.4 oz.)

OPTICAL

Lens:	3 mm, f3.5, wide angle
Focus:	Fixed focus, wide angle (factory set)
Depth of Field:	10 cm (4 in.) to infinity
Field of View:	
Air:	108° (H) x 92° (V) x 120° (D)
Water:	75° (H) x 65° (V) x 81° (D)

VIDEO

Image Sensor:	1/3-inch CCD image sensor
Number of Pixels:	768 (H) x 494 (V) (NTSC) 752 (H) x 582 (V) (PAL)
Resolution (TV lines)	460 (H) x 400 (V) (NTSC) 450 (H) x 450 (V) (PAL)
Scene Illumination:	5 Lux at F=1.4 (AGC on)
Signal to Noise:	50 dB (AGC off)
Video Output:	1.0 volt peak-to-peak at 75 ohm
Video Format:	NTSC, PAL

ELECTRICAL

Power:	11-30 volts DC
Current:	300 mA
Connector:	BH4M, LPBH4M, MSAJ-9-BCR

ENVIRONMENTAL

Depth:	2,000 meters (6,500 feet)
Operating Temperature:	-10 deg. C to +50 deg. C

3. Terms and Conditions of Sale

No terms or conditions, other than those stated herein, whether contained in customer's purchase order or shipping forms or elsewhere, and no agreement or understanding, oral or written, in any way purporting to modify or negate these terms and conditions shall be binding on DeepSea Power & Light, Inc.

Acceptance of Orders

- A. Acceptance of binding purchase orders are subject to final written approval by DeepSea Power & Light, Inc.
- B. DeepSea Power & Light, Inc. will accept orders and bill in accordance with list prices and terms, even though incorrect list prices, discounts and terms may appear on the Purchase Order.

Terms

Upon approved credit the following terms will apply:

- A. Standard terms are net cash 30 days from date of invoice, unless otherwise specified. Invoices bear the date of shipment and are mailed from San Diego, CA within one business day of the shipment.
- B. Any portion of the Invoice amount which has not been paid within 30 days of the invoice date will accrue a monthly service charge equal to the maximum rate permitted under Section 1, Article XV of the California Constitution as amended by Proposition 2 effective November 7, 1979 (i.e., Federal Reserve discount rate plus five (5) percent per annum) commencing 31 days after the invoice date. In the event of any litigation arising out of this contract or any efforts by seller to enforce any of the terms of this contract, or to receive payment of any sum under this contract, the prevailing party shall be entitled to recover its reasonable attorney's fees and costs. This contract shall be interpreted in accordance with the laws of the State of California and venue for any dispute arising out of this contract shall be San Diego County, California.

Title and Risk of Loss

- A. Unless otherwise specified in accepted purchase order, all products are shipped F.O.B. DeepSea Power & Light, Inc. plant, San Diego, CA and title to the property passes to the buyer at the time of shipment. Buyer assumes all risk of damage to or loss or destruction of said property and no loss, injury or destruction of said property shall release buyer from the obligation to pay for this shipment.
- B. Unless otherwise specified in accepted purchase order, DeepSea Power & Light, Inc. shall have the option of partial or complete shipment of orders, and shall have the right to select the date of shipment, type of carrier, and routing of shipment on behalf of Customer. DeepSea Power & Light, Inc. will make best efforts to meet quoted shipment dates, but does not guarantee to ship products within the time quoted. DeepSea Power & Light, Inc. shall not be held responsible for any failure to make delivery of all or any part of product or nonperformance of services attributable to governmental action, strike or other labor dispute, riots, storm, flood, epidemic, fire damage to or destruction in whole or in part of products, lack of or inability to obtain raw materials, labor fuel, or supplies, or any act of God or other cause, contingency or circumstances within or without the United States not subject to DeepSea Power & Light, Inc.'s control which prevents or hinders manufacture or delivery of product or performance of services.

Termination

Purchase Orders accepted by DeepSea Power & Light, Inc. are not cancellable by Buyer unless all details are agreed upon in writing by DeepSea Power & Light, Inc. and Buyer, including Buyer's agreement to assume termination charges required by DeepSea Power & Light, Inc.

Returns

- A. No product will be accepted for return, repair or replacement without first obtaining a Return Merchandise Authorization (RMA) number.

The following information will be required:

1. Date of Shipment
 2. Invoice Number and Sales Order Number
 3. Customer Purchase Order Number
 4. Any relevant technical data for failure description and circumstances.
- B. New, unused, undamaged, fully operational, standard stock parts may be returned for credit, only with prior written authorization, and will be subject to a \$30.00 or 15% minimum handling charge, whichever is greater. Items must have shipped from DeepSea Power & Light, Inc. no more than 30 days prior to requesting an RMA. Return freight charges shall be paid for by Customer. Non-standard or used parts are not returnable.
 - C. Any return, repair or replacement shall be subject to DeepSea Power & Light, Inc. Quality Assurance

acceptability.

- D. Buyer assumes all risk of damage or loss or destruction of the property which is accepted for return, repair, or replacement as provided above. It is expressly agreed that all risks of loss are borne by Buyer from and after the time of shipment from Seller to Buyer.

Notice

The technical drawings and data published in our manual, bulletins or literature is not guaranteed. It is considered sufficient technical data to allow proper identification of equipment type, size and use for ordering purposes. All drawings and measurements are approximate and not to scale. Performance and function for which the product is intended will depend upon lighting conditions, visibility, cable size and termination. Technical data is subject to change without notice. Detailed engineering information is available upon request. DeepSea Power & Light, Inc. assumes no responsibility for proper selection or installation of its products.

Fair Labor Practices

We hereby certify that products and services are produced in compliance with all applicable requirements of Sections 6, 7 and 12 of the Fair Labor Standards Act of 1938 as amended, and of regulations and orders of the United States Department of Labor issued under Section 14 thereof. DeepSea Power & Light, Inc. complies with Executive Order 11256 prohibiting discrimination in employment because of race, creed, sex, color, or national origin.

Limited Warranty

Seller warrants that the goods (except internal electronic components) sold under this contract will be free from defect in material and workmanship for a period of one year from the date of shipment from the factory, if they have been properly used. Internal electronic components are warranted for 90 days from the date of shipment from the factory, if they have been properly used. This warranty will be limited to the repair or replacement of parts and the necessary labor and services required to repair the goods. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY. This warranty is the exclusive and only warranty to pass with the goods under this contract. No agent, employee, or representative of the Seller has any authority to bind Seller to any information, representation, or warranty concerning the goods sold under this contract, and unless an affirmation, representation, or warranty made by an agent, employee, or representative is specifically included within this contract, it will not be enforceable by Buyer. If notice of defect is given to DeepSea Power & Light, Inc. within such 90 day or one year warranty period, the sole obligation of DeepSea Power & Light, Inc. shall be to furnish new or repaired parts free of charge in exchange for parts which have been proved defective and does not include any other costs such as the cost of removal of the defective part, installation, labor, or consequential damages of any kind, the exclusive remedy being to require DeepSea Power & Light, Inc. to furnish such new parts. Under no circumstances shall the Buyer be entitled to recover any incidental damages as that term is defined in Commercial Code §2715.