

LED Matrix™ 1 SeaLite®

Technical Specifications

Operation and Maintenance Manual

(rev date September 8, 2010)



DEEPSEA POWER & LIGHT
4033 Ruffin Road
SAN DIEGO, CA 92123

PHONE: (858) 576-1261
FAX: (858) 576-0219

www.deepsea.com

TABLE OF CONTENTS

- 1.0 Introduction
 - 1.1 Description
 - 1.2 Specifications Overview
 - 1.3 Safety and Warnings
 - 1.4 Factory Acceptance Testing
- 2.0 Specifications
 - 2.1 General
 - 2.2 Mechanical
 - 2.2.1 Overall Dimensions including Mount Dimensions
 - 2.2.2 Connector Options
 - 2.3 Optical
 - 2.3.1 Beam Patterns
 - 2.3.2 LEDs
 - 2.4 Housing Materials
 - 2.5 Electrical
 - 2.5.1 Input Voltage
 - 2.5.2 Power Level and Control
 - 2.5.3 Driver Self-Protection Features
 - 2.6 Thermal Detection
- 3.0 Operation and Inspections
 - 3.1 General
 - 3.2 Wet/Dry Operation
 - 3.3 Pre-Dive Inspections
 - 3.4 Post-Dive Inspections
- 4.0 Troubleshooting and Maintenance
 - 4.1 Problems/Causes
 - 4.2 External Maintenance
 - 4.2.1 Recommended Spares
 - 4.2.2 Optional Spares
 - 4.2.3 Replacing the Zinc Anodes
 - 4.3 Internal Maintenance
 - 4.4 Ordering Replacement Parts
 - 4.4.1 Cross Section and Parts List
 - 4.4.2 Where to order Replacement Parts
 - 4.5 Technical Assistance
- 5.0 Returns/RMA

- 6.0 Limited Warranty
- 7.0 Terms and Conditions of Sale
- 8.0 Notices
- 9.0 Technical Publication Release Authorization

APPENDIX A: Electrical/PCB Schematics

APPENDIX B: Bill of Materials

APPENDIX C: Assembly Diagrams

APPENDIX A, B, C are distributed only to authorized repair and service facilities. If you have technical questions that exceed the scope of this manual, please contact DeepSea Power & Light for further assistance.

LED Matrix™ 1 SeaLite®

Owners Manual

DeepSea Power & Light, Inc.
4033 Ruffin Rd. San Diego, CA 92123 USA
Tel (858) 576-1261, Fax (858) 576-0219
E-mail info@deepsea.com, Web Page <http://www.deepsea.com>

1.0 INTRODUCTION

1.1 Description

Congratulations on your purchase of this **LED Matrix 1 SeaLite** from DeepSea Power & Light.

The **LED Matrix 1 SeaLite** is an elegant combination of cutting edge technology and proven engineering. An array of 32 high brightness LEDs, powered by DeepSea's proprietary drivers, ensures maximum light output and reliability. Designed with a scratch resistant sapphire crystal port, this tough-and-ready light is built to handle anything the harsh ocean environment throws at it, from the splash zone to the deep ocean abyssal plains. Both the light engine and driver electronics incorporate thermal protection so the hottest days on deck are no problem for your LED Matrix underwater light.

Pushing the design envelope even further, exclusive circuitry allows the **LED Matrix 1 SeaLite** to achieve smooth, no flicker, full range dimming with common Phase Control. Analog DC control and RS-485 will be available as alternative flicker-free dimming options in the near future.

1.2 Specifications Overview

- Virtually zero maintenance with 50,000-hour LED lifespan
- Surpasses light output of 150W HID or 500W Halogen
- Super rugged, solid state, resistant to shock and vibration
- Thermal monitoring allows operation in air or water
- Flicker-free, smooth, full range dimming using common Phase Control
- Remote ballast option is available
- 6000m depth rated
- Scratch resistant sapphire port
- thermal monitoring that protects the LEDs and drivers

- Mechanical
 - Body material: Hard anodized aluminum (7075-T6)
 - Window material: Sapphire
 - Mounts: Collar: hard anodized 6061-T6 aluminum
 - Yoke: 316 SS (passivated)
 - Air weight: 4.70 lbs (2.13kg)
 - Water weight (saltwater): 2.23 lbs (1.01 kg)
 - Implodable volume: ~24 in³ (~400cc)

• **Environmental**

- Depth rating: 6,000m (20,000-ft), 8,750-psi
- Test Pressure: 10,000psi
- Crush depth: 10,342m (34,128ft) – based on one sample only
- Min/Max Operating Temp.: -10°C to 40°C (14°F to 104°F)

• **Optical**

- Color: White, Cool (6900°K)
White, Warm (3500°K)
Blue (465-485nm)
Green (520-535nm)
Red (620-630nm)
- Lumens in the water¹: 5900 Lumens (White)
- Beam Patterns²: Flood (60°) Spot (17°)



• **Electrical**








- Input: 85-150VAC @ 60Hz/75-200VDC, 125W max
150VAC-250VAC @ 50Hz/200-300VDC, 125W max
- Power Factor: 0.75
- Dimming AC Dimming: Phase Control
- LED Lifespan: 50,000 hours

¹The amount of light leaving the fixture, as measured with a calibrated integrating sphere, calibration traceable to NIST.



²The beam angle measured to full width half power.

1.3 Safety and Warnings


-  Hazard Warning
-  High voltage or shock hazard


-  Do not run this **Matrix 1 SeaLite** outside the recommended voltage range.
-   Do not operate any high voltage electrical equipment without using a Ground Fault Interrupt circuit for safety, especially when divers are in the water!
-   Do not operate the lamp outside the recommended voltage range.
-  Do not remove the set screws in the collar on the **Matrix 1 SeaLite** body as these hold the light body and light head together.
-  **Warning:** After each deployment, carefully check to make sure the light has not flooded by shaking and listening for water, or visual inspection for moisture inside the LED window. Also look into the holes on the forward bracket and verify the head is tightly mated to the rear housing. It is possible for some lights to partially flood and then reseal themselves while underwater. Upon surfacing, the light would then be internally

pressurized, a potentially dangerous situation. Additionally, if the power remains on when the light has partially flooded, it is possible for electrolytic generation of an explosive mixture of hydrogen and oxygen gases. The Matrix-1 has a unique design to prevent possible internal pressure buildup in that the light head assembly will ‘pop’ slightly and relieve any internal pressures over 100 psi. If the head looks slightly askew be sure to investigate for possible leaks. If a light appears flooded upon removal from the water as evidenced by water or moisture on the inside of the window, it should be treated as potentially dangerous. Make sure that the power is disconnected as soon as a flooded condition is suspected. Point the light away from persons and valuable equipment and confirm whether or not it is internally pressurized by loosening the back connector two or three turns.

-   **Electrical Warnings:** A Ground Fault Interrupt should be used whenever high voltage lights are being utilized; when divers are in the water this is especially critical! **Do not operate AC-powered lights without a GFCI!** Additionally, all high voltage lights should be case grounded for safety.

This light uses a ‘high side driver’, which means the LED light engine is connected directly to the line. DO NOT allow personnel to come into contact with the LED connections while the light is energized as lethal voltages will be present. Contact DSPL for further information if this is not clear.

-  **Thermal Warning:** The **LED Matrix-1 SeaLite** has thermal protection designed into the LED light engine and the electronic driver. If the light is operated in air for an extended period of time the useful life the LED’s may degrade and the external temperature of the housing will reach temperatures that may be painful to human touch. If the light is operated briefly for testing purposes in air, be sure to let it cool down for a couple of minutes before immersing it in water to minimize thermal shock to the components. It is also a good idea to turn the light off a few seconds prior to removing it from the water as part of normal recovery procedures, as this will minimize buildup of scale on the LED window and housing components.

-  **Corrosion Warning:** The **LED Matrix-1 SeaLite** is made from superior strength aluminum alloy 7075 to make it as lightweight as possible. It has been hard anodized and fitted with strategically placed sacrificial zinc anodes to resist corrosion of the body. Be sure to regularly inspect these zincs for depletion and replace them before they are fully corroded. These lights are not designed for long term immersion of more than several weeks. Designers and end users must employ a system-wide corrosion prevention scheme that includes this strong, but less noble metal.

1.4 Factory Acceptance Testing

Each Matrix 1 SeaLite is subjected to the following quality control procedures and tests before shipment:

- Power-on operational testing (power on, dimming, thermal cut-out)
- High Pot testing of electronics to case

Ground bond testing of 3rd wire to case
High pressure cyclic housing test
Low pressure soak leak test
Overnight Operational Burn-in test

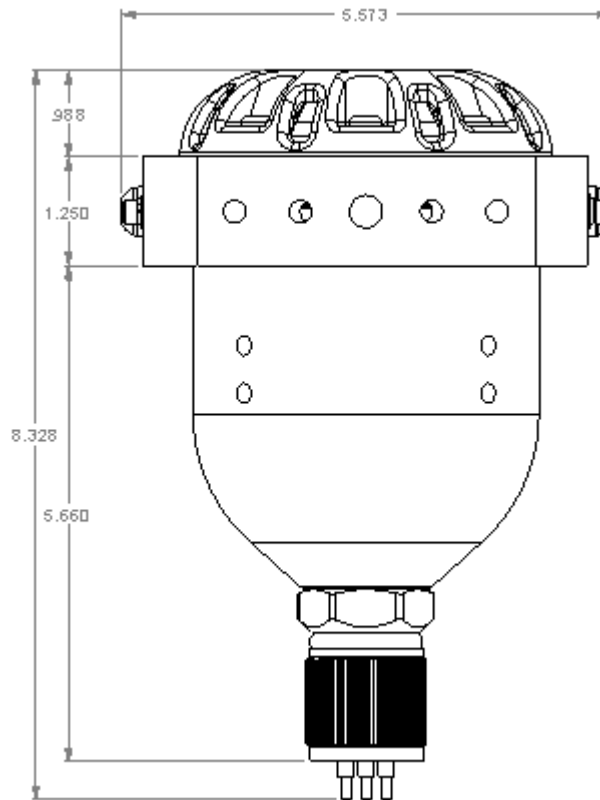
2.0 SPECIFICATIONS

2.1 General

- Virtually zero maintenance of light source with 50,000 hour LED lifespan.
- Surpasses a 150W HID or 500W Halogen Light.
- Super rugged, resistant to shock and vibration.
- Thermal monitoring allows operation in air or water.
- Flicker-free dimming using Phase control. (Other options available soon.)
- Remote Lighthouse Option is available.
- 6000m depth rated
- Available in cool white, warm white, blue, green, and red

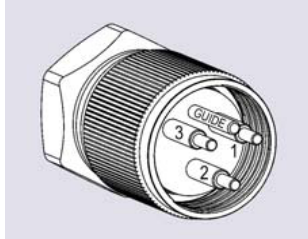
2.2 Mechanical

2.2.1 Overall Dimensions, including Mounting Dimensions

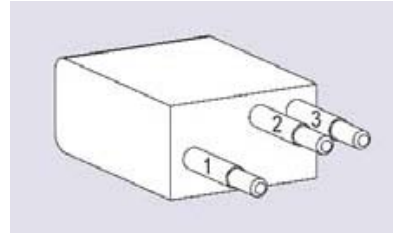


2.2.2 Connector Options

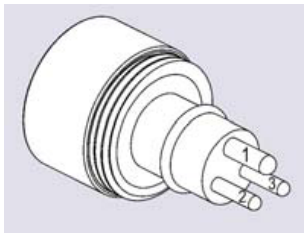
Four different industry standard underwater connectors can be used with the LED Matrix 1 SeaLite: BH3MP, LPBH3MP, XSG3BCL, and the Burton 1503. The standard connector pin-outs are illustrated below.



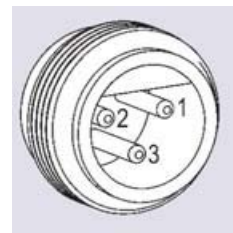
BH3MP
(1=Hot, 2=Neutral, 3=Ground to shell)



LPBH3MP
(1=Hot, 2=Neutral, 3=Ground to shell)



XSG3BCL
(1=Ground to shell, 2=Neutral, 3=Hot)



Burton 1503
(1=Hot, 2=Neutral, 3=Ground to shell)

2.3 Optical

2.3.1. Beam patterns (full angle measured to half power):

Flood: 70 degrees conical

Spot: 17 degrees conical

2.3.2. LEDs



Your **LED Matrix-1 SeaLite®** incorporates 32 ea Cree White XP-G LEDs, or color XP-E LED's, the brightest and most efficient LED on the market today. The Cree Semiconductor XLamp White XP-G LED is capable of 345 lumens at 105 lumens per watt when driven at 1 A, which is 46% brighter and 64% more efficient than the highest-performance XLamp XR-E LED at the same current. The XP-G features an electrically-isolated thermal path. Expected LED lifespan: 50,000-hours. Color XP-E LEDs have similar performance gains.

2.4 Housing materials

The housing is a super strong 7075-T6 Aluminum alloy, hard anodized for corrosion resistance. The window port is scratch resistant sapphire crystal, held in place with a titanium retaining ring. The bumper cowl is a tough polyurethane, captured by glass filled nylon threaded fasteners. Several anode grade zinc sacrificial anodes protect the housing from stray galvanic corrosion.

The sealing collar is anodized 6061-T6 Aluminum with recessed non-metallic set screws that drive non-metallic retention balls into detents. A 316SS mounting yoke provides pan-and-tilt adjustability. This assembly is electrically isolated from the light housing and cannot be used to ground the light housing for safety ground or galvanic corrosion control. The assembly has its own set of sacrificial anodes to protect against corrosion of the threaded areas.

2.5 Electrical

2.5.1. Input Voltage

85-150 VAC @ 50/60 Hz; 75-200VDC, 125W max
150-250VAC @ 50/60Hz; 200-300VDC, 125W max
Power Factor: 0.75 minimum


2.5.2 Power Level and Control

Smooth, flicker free dimming ratio of 400:1 (brightest to lowest) using a variety of controls:

AC Phase control
RS-485 (available soon)
Analog, 0-5vdc or 0-10vdc (available soon)

2.5.3 Driver self-protection features

Multiple circuits provide self-protection to the LED fixture from lightening strikes, transient voltages, in-rush current, over or under voltage, and reverse DC polarity. The output of the driver circuitry is also protected from short circuits, open circuit and reverse polarity hookup of the load.

-  Thermal protection: The **LED Matrix-1 SeaLite®** has thermal protection designed into the LED light engine and the electronic driver. If the light is operated in air for an extended period of time the useful life the LED's may degrade and the external temperature of the housing will reach temperatures that may be painful to human touch. If the light is operated briefly for testing purposes in air, be sure to let it cool down for a couple of minutes before immersing it in water to minimize thermal shock to the components. It is also a good idea to turn the light off a few seconds prior to removing it from the water as part of normal recovery procedures, as this will minimize buildup of scale on the LED window and housing components.

2.6 Thermal Detection

Thermal sensors individually protect both the driver board and LED light engine from excessive heat, the primary reason of LED failure. Operation in air is possible but not recommended as the light may reach temperatures that are harmful to human touch. Prolonged operation at elevated temperatures may also degrade long term lifetime of the LED's.

3.0 OPERATION AND INSPECTIONS

3.1 General


Your **LED Matrix-1 SeaLite®** should provide years of excellent service with very limited maintenance. Make sure the light is washed off in fresh water following every dive. Inspect the zinc anodes regularly to ensure they are clean and not depleted.

3.2 Wet/Dry Operation

Operation in air is possible but not recommended as the light may reach temperatures that are harmful to human touch. Prolonged operation at elevated temperatures may also degrade the life of the LED's. If operated in air for a long period of time, the light should be allowed to cool prior to immersing in water to minimize thermal shock of the components.

3.3 Pre-Dive Inspections

Each **LED Matrix-1 SeaLite®** is shipped ready for immediate use. To ensure that the light will continue to perform reliably, please observe the following maintenance guidelines:

1.  **Be certain the back connector is tight:** Occasionally twisting of the connector occurs when unscrewing the locking sleeve. This can cause the connector to loosen from the body. Should this occur, tighten the connector until you feel the connector body engage the housing, then apply additional light torque to fully seat. A loose connector may cause the light to flood.
2. When first mating the connectors, spray both connector halves with Food Grade silicone spray, then press together. Engage the locking sleeve and tighten to only finger tight. NEVER use a wrench.
3. Turn on light to check operation. Turn off after a few minutes and let cool before deployment.
4. Check condition of anodes. Clean and replace as needed.

3.4 Post-Dive Inspections

1. Rinse your underwater light with fresh water after every dive.
2. Check condition of anodes. Clean and replace as needed.
3. Wipe sapphire port with soft, clean towel.
4. Occasionally remove the crash guard and inspect for signs of corrosion or biofouling.
5. Grease threads of 316SS screws with Aqualube for improved corrosion resistance.

4.0 TROUBLESHOOTING AND MAINTENANCE

4.1 Problems / Causes

There are three main elements of your Matrix 1 LED to consider when a problem is detected.

1. Connector and cable
2. Driver and interface board, including the fuse
3. Light engine

If your **LED Matrix-1 SeaLite®** is not operational, make certain power is being delivered to the mating connector on the appropriate pins.

PROBLEM	POSSIBLE CAUSE	RECOMMENDED ACTION
Light doesn't turn on.	Not plugged in.	Secure all connections.
	GFCI tripped.	Check light for obvious problems, then reset GFCI.
	Cable defective	Check continuity from one end to the other. Meg test if possible.
	Insufficient voltage	Make sure input power is adequate. Check position of phase control dimmer.
	Fuse blown	Return to factory
	Interface board blown	Return to factory
	Driver board blown	Return to factory
Light flooded.	Water on interior	Check for internal pressure by loosening connector.
		Return to factory

4.2 External Maintenance

4.2.1 Recommended Spares

- 1 ea: O-ring service kit (lint-free wipes (Kimwipes), isopropyl alcohol, DC-111 Silicone grease, food grade spray silicone lubricant, Dust-off canned air, brass or plastic o-ring removal tool) ... User supplied
- 1 ea: tube, Aqualube... User supplied (from boating supply)
- 1 ea: Matrix 1 O-ring spares kit (DSPL p/n 712-025-607-0A-01)
- 1 ea: Matrix 1 Replacement Anode Set (DSPL p/n 712-025-608-0A-01)

4.2.2 Optional Spares

- 1 ea: crash guard (DSPL p/n 712-025-068-0A-01)

4.2.3 Replacing the Zinc Anodes

1. Tools Required: flat blade screwdrivers, Pliers

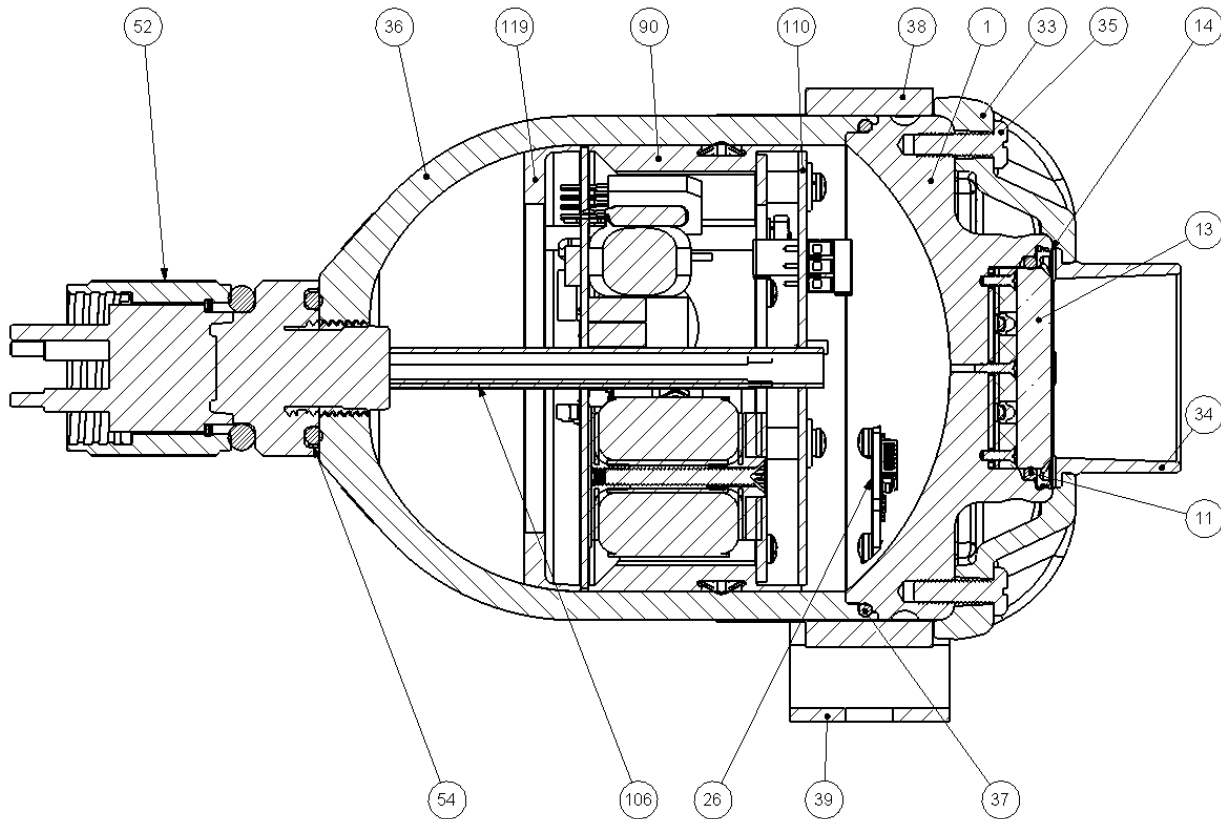
2. Be certain LED Matrix 1 is powered off.
3. Using flat blade screwdriver, remove 6 screws holding crash guard to body.
Remove crash guard.
4. Using pliers, unscrew worn anodes (2)
5. Clean surface of light body under anodes with soft cloth and isopropyl alcohol.
6. Using Aqualube, lube both sides of the nylon washers, external threads of the anode bolt, base of the anodes, internal threads of mounting hole on lighthouse, and the surface of the lighthouse under the anode.
7. Install anodes in lighthouse finger tight.
8. Using pliers on body of anode, apply LIGHT torque to slightly compress nylon washer. Don't worry about scratching the anode, it will corrode anyway.
If excess Aqualube is in the tapped hole, the anode bolt will go in slowly as the excess lubricant is displaced and squeezes out.
9. Lube 316SS tapped screw holes with Aqualube
10. Lube 316SS screws with Aqualube
11. Replace Crash Guard. Replace screws. Using flat blade screw driver, tighten to firm.

4.3 Internal Maintenance

There are no field serviceable repairs. Return light to the factory.

4.4 Ordering Replacement parts

4.4.1 Parts list



ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	712-025-053-0A	LIGHTHEAD-1X
11	1	2-129_E0603-70	ORING, 2-129_E0603-70
13	1	712-025-044-0A	SAPPHIRE PORT, LP-MNT
14	1	712-025-029-0A	WINDOW RETAINER
26	1	712-025-905-0A-01-P6	PCBA, THERMAL SENSE
33	1	712-025-068-0A	CRASH GUARD, 1X
34	1	712-025-083-0A	CUTOFF RING (Spotlight only)
35	6	430-00148	SCREW 10-32 x 5/8 PHS, GF NYLON, BLK
36	1	712-025-024-0A	HOUSING, 1X DRIVER
37	1	2-154 E0603-70	O-RING, 2-154 E0603-70, BLACK
38	1	712-025-059-0A	COLLAR BRACKET
39	1	712-025-067-0A	U-BRACKET
52	1	SEE OWNERS MANUAL	DW CONNECTOR
54	1	2-213 E0603-70	O-RING 2-213 EPDM 70 BLACK
90	1	712-025-074-0A-01	DRIVER MODULE 120VAC
90	1	712-025-074-0A-02	DRIVER MODULE 240VAC
106	1	712-025-077-0A	TUBE, WIRE-FEED
110	1	712-025-904-0A	LED INTERFACE PCBA
119	1	712-025-046-0A	DRIVER MOUNT END RING

4.4.2 Ordering replacement parts

Please contact DeepSea Power & Light Technical Sales or your local area DeepSea Sales representative.

Main Office

DeepSea Power & Light
4033 Ruffin Rd.
San Diego, CA 92123-1813, U.S.A.
Telephone: 858-576-1261
Toll Free: 1-800-ITS-DSPL (1-800-487-3775)
Fax: 858-576-0219

Hours of Operation

Monday to Friday, 7:30AM - 4:00PM (Pacific Standard Time)

Sales

1-800-ITS-DSPL (800-487-3775)
Telephone: 858-576-1261
Fax: 858-576-0219
E-mail Address: Sales@DeepSea.com

4.5 Technical Assistance

Please contact DeepSea Power & Light, and ask for “Tech Support”

5.0 RETURNS / RMA

5.1 All products to be accepted for return, repair or replacement must first obtain a Return Merchandise Authorization (RMA) number by contacting the factory.

5.2. RMA Contact

Telephone: 858-576-1261, request RMA
Toll Free: 1-800-ITS-DSPL (1-800-487-3775)
Fax: 858-576-0219
E-mail Address: RMA@DeepSea.com

Main Office

DeepSea Power & Light
4033 Ruffin Rd. San Diego,
CA 92123-1813, U.S.A.

Hours of Operation

Monday to Friday, 7:30AM - 4:00PM (Pacific Standard Time)

5.3 The following information will be required for an RMA number:

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.

5.4 New, unused, undamaged, fully operational, standard stock parts may be returned for credit, with prior written authorization, and will be subject to a \$30.00 or 15% minimum restocking fee, 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.

5.5 Any return, repair or replacement shall be subject to DeepSea Power & Light, Inc. Quality Assurance acceptability. Items determined by DeepSea Power & Light in its sole opinion as damaged beyond serviceability will be returned to the owner upon their request, freight collect.

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

6.0 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.

DeepSea is not responsible for warranty service should the product fail to be properly maintained or fail to function properly as a result of misuse, abuse, improper installation, neglect, improper shipping, damage caused by disasters such as fire, flood, and lightning, or unauthorized repair or modifications.

Custom or contract items may have a more limited warranty. (Contact DSPL for Details)

Should your DeepSea product prove defective during the warranty period, promptly notify DeepSea to obtain an RMA# (return material authorization number), and return product, freight prepaid. DeepSea will at its option repair or replace the product or defective portion without charge for parts or labor, or at DeepSea's option, refund purchase price. DeepSea will pay for return ground transportation on warranty repairs.

Products repaired or replaced under this warranty shall be warranted for the unexpired portion of the warranty applying to the original product(s).

No warranty or affirmation of fact, expressed or implied, other than as set forth in the limited warranty statement above is made or authorized by DeepSea. DeepSea disclaims any liability for product defect claims that are due to product misuse, improper product selection, or misapplication. DeepSea's liability in all events is limited to, and shall not exceed, the purchase price.

7.0 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.

8.0 NOTICES

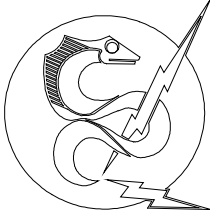
8.1 Notice of Sufficiency of Technical Data

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. Additional detailed engineering information may be available upon request. DeepSea Power & Light, Inc. assumes no responsibility for proper selection or installation of its products.

8.2 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.

9.0 TECH PUB RELEASE AUTHORIZATION



**DEEPSEA POWER
& LIGHT**

SAN DIEGO * CALIFORNIA * USA
PHONE: (858) 576-1261 FAX: (858) 576-0219

TECHNICAL PUBLICATION

**TECHNICAL SPECIFICATIONS, OPERATION AND MAINTENANCE MANUAL
FOR THE**

LED Matrix™-1 SeaLite®

PROJECT: LED Matrix 1 SeaLite	USED ON: LED Matrix 1 SeaLite	
DOCUMENT NAME: TECHNICAL SPECIFICATIONS MANUAL	NEXT ASSY: N/A	
DOCUMENT NUMBER: 712-025-01	REVISION HISTORY:	
REVISION LEVEL:		
REVISION NOTES:		ENGINEER: M. Olsson J. Sanderson S. Weston
		DATE (ORIG.): 11-18-09
	CHECK:	