

**DIMMABLE SOLID STATE
UNDERWATER LED LAMP**

**Q-LED III
120VAC/160VDC
220VAC/320VDC**

OPERATING AND MAINTENANCE MANUAL

SERIAL NUMBER: _____

SALES ORDER: _____



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WARRANTY

Remote Ocean Systems, Inc (hereinafter called "**ROS**") warrants its products as slated below to the conditions specified.

ROS warrants this product, when operated under normal conditions, to be free from defects in material or workmanship for a period of two years 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) **ROS** is properly notified of such defects by Purchaser, 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 in 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 charges.
- (d) This warranty shall be governed by the laws of the State of California.

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**'s discretion) the product of 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.

LIMITATION 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 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 products. 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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1 INTRODUCTION

This manual describes the installation and operation of the ROS Model Q-LED III underwater light. This lamp utilizes a high output LED light array. This product line represents the latest generation of LED array powered models. This version of the Q-LED has the same profile than the previous model with the exception that the connector is higher on the Q-LED III.

Like a conventional lamp, light dimming is achieved by decreasing or increasing the input source voltage. Lights powered by AC voltage can be dimmed using an AC phase control dimmer. If powered by DC voltage, Pulse Width Modulation (PWM) may be used to dim the light.

The lamp is designed as a zero maintenance product. For problems or questions not covered in this manual, please contact the factory or one of our authorized representatives.

ROS, Incorporated, reserves the right to change or modify designs or specifications as part of its continuing product improvement program.

2 GENERAL DESCRIPTION

The Q-LED III is designed to illuminate underwater scenes for video recording, and general underwater illumination. It is designed to run continuously underwater.

The Q-LED III provides a maximum light output of 9576 lumens, a typical color temperature of 5600°K, and consumes a maximum of 250 VA of power.

The housing, and all machined internal components of the Q-LED III are made of 6061-T6 aluminum, which is hard anodized for protection from corrosion followed by an external white enamel powder coating. Other external hardware, such as screws are provided in stainless steel.

Unlike conventional lamps, the Q-LED III uses a solid state LED light array.

The LED light engine is secured in the housing via a special assembly. The forward end of the Q-LED III is sealed with an o-ring between the housing and a deepwater-rated window. The rear side of the Q-LED III is sealed by the connector o-ring. Another o-ring seals the base to the main housing.

When operating the Q-LED III, a variable light intensity can be achieved by increasing or decreasing the input voltage just like any other conventional filament type lamp. Because the LED array requires a minimum driving voltage, dimming may not be linear at low levels. Additionally, the light output can be adjusted via an AC phase control dimmer if powered by AC power, or PWM if powered by DC power.

The Q-LED III can be used as a conventional ON/OFF lamp.

The electrical connection to the lamp is made via an underwater connector.

3 LAMP OPERATION

3.1 POWER

AC

Operation of the Q-LED III requires an input voltage between 0 – 120VAC 50/60Hz for the 120 VAC model or 0-220 VAC 50/60 Hz for the 220 VAC model. The lamp draws 250 VA of power at maximum light intensity. Maximum light intensity is measured at 120 VAC and 220 VAC respectively. They begin to output light at 70 VAC and 140 VAC (typical).

DC

Although the Q-LED is intended to be an AC powered light, it can also be powered by DC power. The 120 VAC version can run off of DC power from 0-160 VDC. The 220 version can run off of DC power from 0-320 VDC. Maximum light intensity is measured at 160 VDC and 320 VDC respectively. They begin to output light at 95 VDC and 200 VDC (typical).

3.2 TEMPERATURE PROTECTION

The Q-LED III is electronically protected from overheating via a thermal cut-off switch. The light will run for approximately 4 minutes in air (at an ambient temperature of 20°C (68°F)) before automatically powering down. There is no reset; the light will automatically re-illuminate once it has cooled to a safe operating temperature.

3.3 RECOMMENDED OPERATION

The thermal protection is intended as a failsafe feature to protect the light from unintentional damage from extended use in air. It is not recommended to intentionally run the light out of water for any extended period as it will reduce the product lifespan.

4 SPECIFICATIONS

4.1 ELECTRICAL

<i>Light Model</i>	<i>Operating voltage</i>	<i>Turn on voltage</i>
120 VAC version	0 - 120VAC 50/60Hz	70VAC
	0 – 160VDC	95VDC
220 VAC version	0 - 220VAC 50/60Hz	140VAC
	0 – 320VDC	200VAC
Operating Current:	2.1 A typical @ 120VAC	
	1.0 A typical @ 160VDC	
	1.1 A typical @ 220VAC	
	0.5 A typical @ 320VDC	

Power Consumption: AC powered - 250VA typical at full intensity
DC powered – 160W typical at full intensity

4.2 PERFORMANCE

Lamp Type: Ultra High-intensity White LED Array

Light Color Temperature: 5,600° K (typical)

Illumination Life: 50,000 hours at 100% intensity

After 50,000 hours of operation within specifications, the LED array will deliver a maximum of 70% of the original maximum output.

Dimming: AC Powered - Light is dimmed via input voltage or AC phase control

DC Powered – Light is dimmed via input voltage or PWM. A modulation frequency of 1 kHz or higher is recommended to avoid flicker on the video.

Thermal Protection: Auto-resetting

Light Output: 9576 Lumens (all output is directed within forward beam pattern) 3500 lux @ 1m (in air) typical

Beam Angle: 80° x 80°

Color Rendering Index: 70 (typical halogen light ~40; typical fluorescent light ~56)

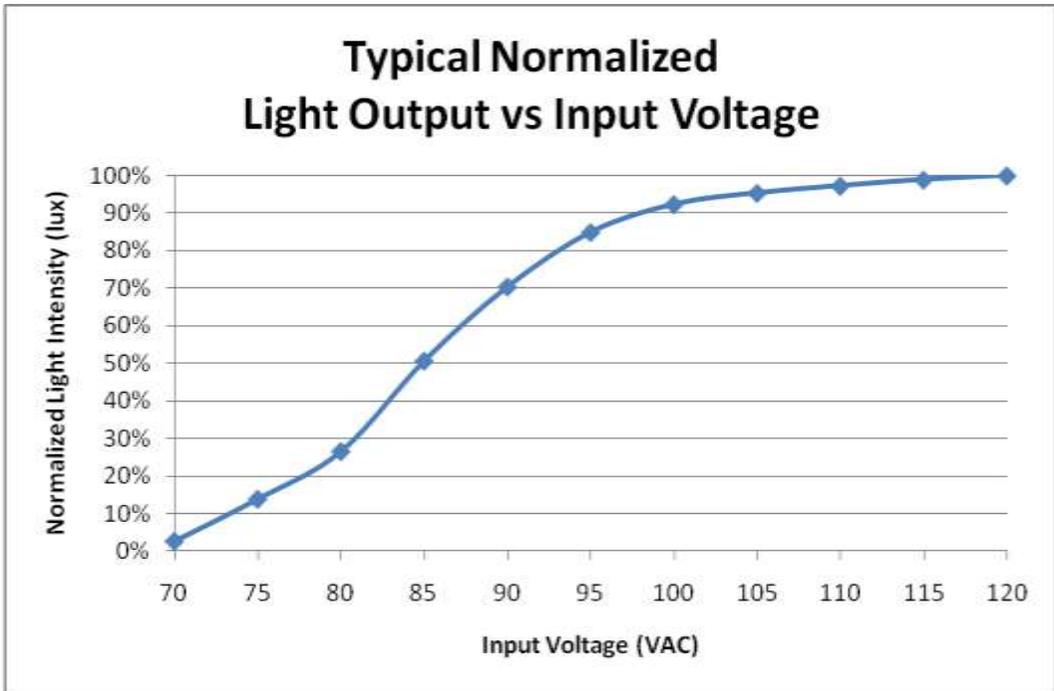


Figure 1: Typical 120 VAC Q-LED III Normalized Light Output vs. Input Voltage

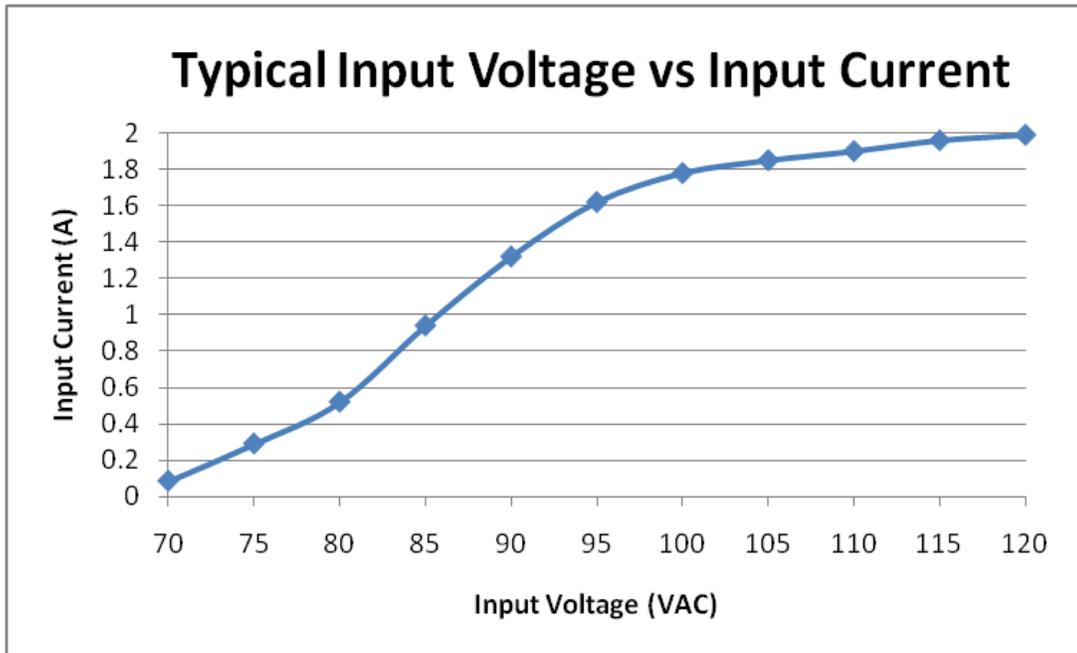


Figure 2: Typical 120 VAC Q-LED III Current vs. Input Voltage

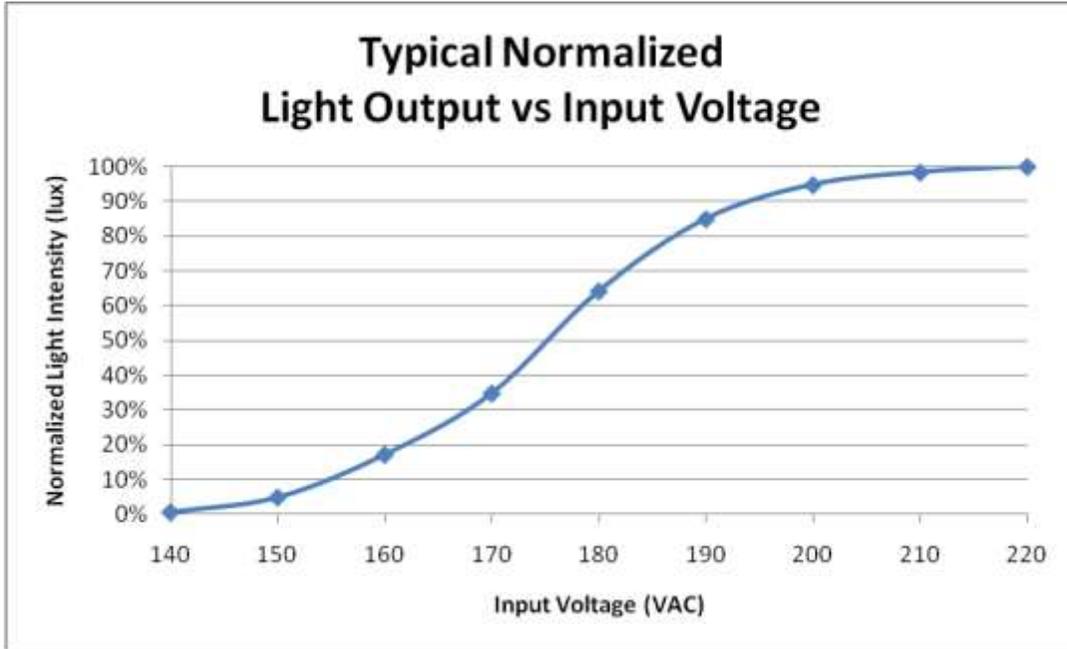


Figure 3: Typical 220 VAC Q-LED III Normalized Light Output vs. Input Voltage

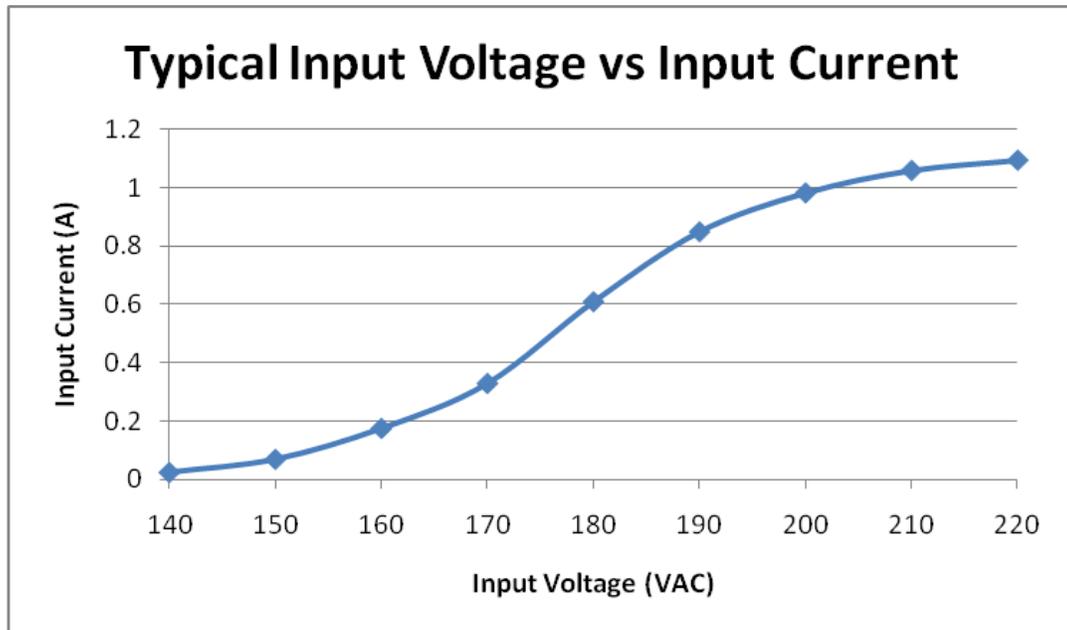


Figure 4: Typical 220 VAC Q-LED III Current vs. Input Voltage

4.3 MECHANICAL

Housing Material:	Anodized 6061-T6 Aluminum
Housing Finish:	White powder coated enamel finish
Operating Depth:	4,000m (~13,000 ft), (6,000m optional)
Operating Temperature:	Operates in water temperatures of -2 to 40°C (28.4 to 104°F)
Mounting:	Four ¼ -20 tapped holes in base on 2.0 in [50.8mm] bolt circle equally spaced at 90 degrees
Size (w/o connector):	7.61in [193.4mm] (H) x 2.50in [63.5mm] (W) x 2.50in [63.5mm] (D)
Standard connectors:	IERD2M-BC-4*, IESQ4M-BC-1, IE-5507-1503-BCR, LPBH-3-MP, BH-3-MP W/LOCK SLEEVE, MSAJ-3-BCR, CRE/SEACON MSAJ-3-BCR, MCBH-4-MP-1/2", RMG-3-BCL-SS, LPBH-3M-SS-1/2"AND CUSTOMER SPECIFIED OPTIONS

*Note: IERD2M-BC-4 requires no ground waiver

Window: Flat port

4.4 ENVIRONMENTAL

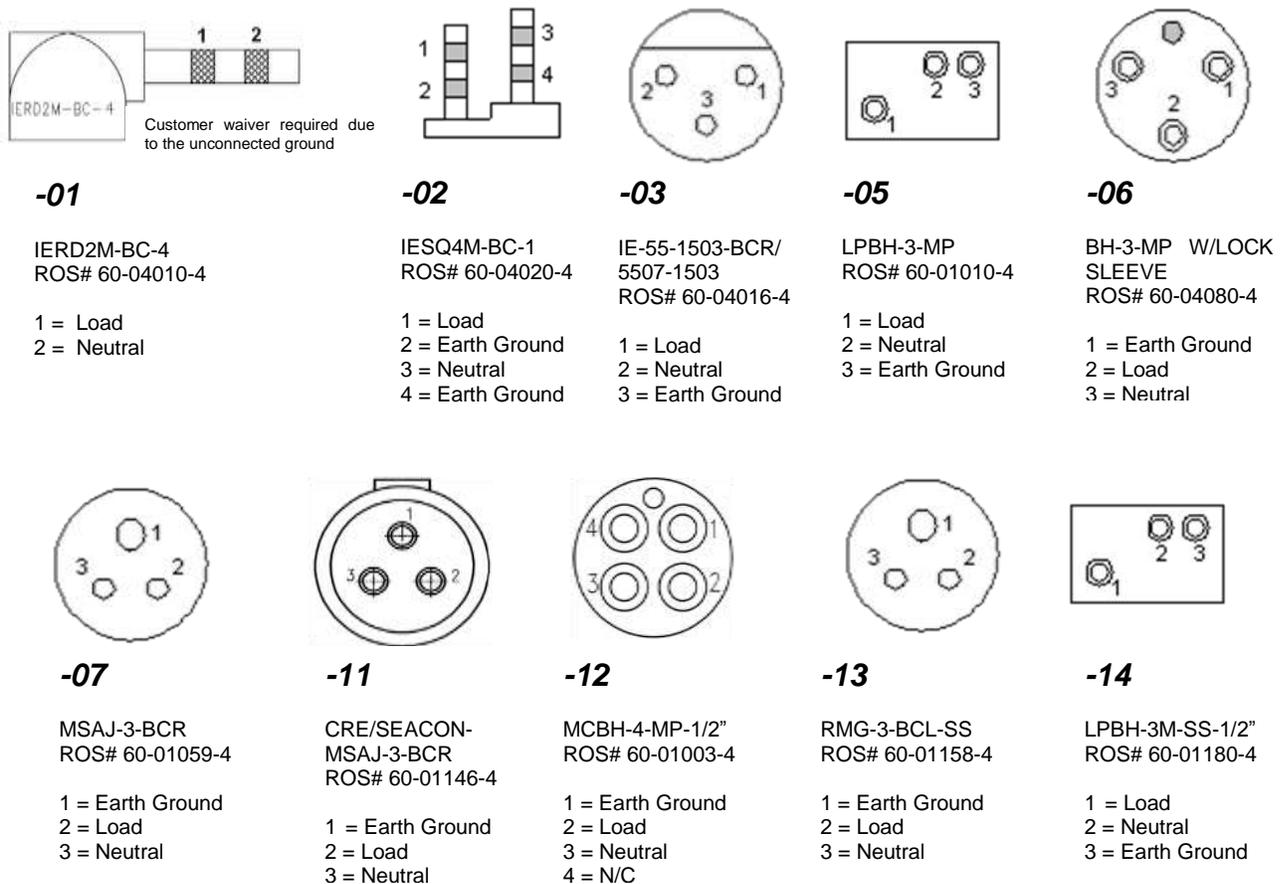
Weight in Air:	3.65 lb (1.66 kg)
Weight in Water:	1.93 lb (0.88kg)

5 VIDEO COMPATIBILITY

Although it is strongly suggested to match AC power frequency with video format frequency, the QLED III was specifically designed to be universally functional in all power/video combinations. This compatibility allows the light to perform in domestic and international applications.

6 CONNECTOR WIRING

The Q-LED III can be configured with any of the 10 standard underwater connector options. Alternate customer-specified connectors and wiring standards are available, and details of these configurations are normally included in a manual addendum.



Q-LED III 10-00350- 250 - 01 1 PIN, EIRD2M-BC-4
 02 2 PIN, IESQ4M-BC-1
 03 5507-1503
 04 NOT USED
 05 LPBH-3-MP
 06 BH-3-MP W/LOCK SLV
 07 MSAJ-3-BCR
 08 NOT USED
 09 NOT USED
 10 NOT USED
 11 CRE/SEACON MSAJ-3-BCR
 12 MCBH-4-MP-1/2"
 13 RMG-3-BCL-SS
 14 LPBH-3M-SS-1/2"
 CS CUSTOMER SPECIFIED

7 INSTALLATION AND OPERATION

When you receive your Q-LED III, carefully unpack it and inspect all components. Please contact the factory immediately if damage has occurred during shipping.

7.1 OPERATIONAL CHECK

After unpacking your Q-LED III, a brief operational check should be made prior to installation of the unit. The following procedure is recommended:

1. Place the light on a table with the connector up.
2. Make sure controller or power source is turned off.
3. Apply a small amount of silicone spray lubricant to the mating connector and carefully attach it to the bulkhead connector.
4. Apply 120VAC 50/60Hz (or 220 VAC 50/60 Hz depending on version) power and observe the lamp emit light.

NOTE: Applying 220 VAC to the 120 VAC model will damage the unit. Make sure the proper power is applied to the corresponding model.

5. If you notice any issues with the functionality of the light, please contact the factory immediately.

CAUTION: Do not look directly at the light. The light output from the array is powerful enough to cause pain and/or damage to the eyes.

7.2 INSTALLATION

The Q-LED III can be operated at any attitude. The unit should be installed by securely mounting the light housing to a stable surface. The threaded ¼- 20 tapped mounting holes are an integral feature of the Q-LED III; mounting clamps are not required. Refer to installation outline drawing (ROS P/N 10-00369) for specific installation dimensions. If mounting brackets are required for your application, QL brackets are available for purchase (ROS P/N 70-08251-01), and allow the light to easily be oriented in any direction.

7.3 INTERCONNECTION

Interconnection is made via the underwater connector. To mate the connector, **TURN POWER OFF**, clean both halves of the connector, lubricate the mating connector lightly with food grade silicone spray, and push together.

The other end of the cable attaches to the required power source

8 MAINTENANCE

The Q-LED III is designed as a zero maintenance lamp. Please contact ROS or an authorized sales rep. if you have any questions.

APPENDIX

10-00369
70-08251

Installation Outline Drawing, Q-LED III
Bracket, LED, QL, AI