RJE International, Inc.
Irvine, California

# TECHNICAL MANUAL
# ULB-364 SERIES
# UNDERWATER ACOUSTIC BEACON

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REV 02

RJE International, Inc.
15375 Barranca Pkwy, Ste B-107
Irvine, CA 92618
Tel: (949) 727-9399 Fax: (949) 727-0070
E-mail: sales@rjeint.com Web Page: www.rjeint.com

**This manual should be read in its entirety prior to operation of the ULB-364 Series Beacon**



# SECTION VII
# WARRANTY

RJE International warrants that this equipment (referred to as the unit) will be free from defects in materials and workmanship, when used under normal operating conditions as determined solely by RJE International, for a period of one (1) year from the date of shipment from RJE International.

As the sole remedy for breach of the foregoing warranty, RJE International shall repair or replace, at RJE International's option, any unit, component or part thereof found defective or nonconforming within said one (1) year period from the date of shipment. Customer shall give RJE International notice of any defect or nonconformity and, if so instructed by RJE International, customer shall, at its expense, ship the unit, component or part to RJE International. If RJE International determines that the unit, component or part is actually defective or nonconforming, it shall, at its expense, ship a new or a rebuilt unit, component or part to the customer. The customer shall be responsible to perform, at its own expense, any necessary installation work related to any defective or nonworking unit, component or part. The functionality and operational aspects of the unit is determined by the unit operating within the specifications and is dependent of proper maintenance as required to be performed by the customer.

RJE International shall not be liable for any expense or damages resulting from interruptions in the operation of the unit.

RJE International shall not be liable for the cost of any repairs undertaken by the customer or any third party without RJE International prior written authorization.

RJE International shall not be liable for any incidental, special consequential or exemplary damages arising out of the installation, use, testing, servicing or maintenance of any unit, component or part. This warranty is given in lieu of all other warranties, expressed or implied, including the warranties of merchantability or fitness for a particular purpose.

RJE International's total liability under this warranty is limited to the remanufacture or replacement of the unit, component or part.

# SECTION VI
# RETURN PROCEDURES

If you need to return this device for service, battery replacement, or disposal, contact RJE International for a Return Material Authorization number and shipping Instructions.

RJE International, Inc.
Tel: 949-727-9399
Fax: 949-727-0070
E-mail: sales@rjeint.com

You will need to provide the following information to receive a Return Material Authorization:

- Reason for return
- Number of beacons to be returned
- Serial number of each unit
- Shipping method, if applicable

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**NOTE: Do not ship a beacon without a Return Material Authorization**

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# SECTION I
# INTRODUCTION

**1.1. GENERAL.** This manual contains the description, operation, theory and maintenance procedures for the Underwater Acoustic Beacon Model ULB-364 and ULB-364/EL, hereafter referred in this manual as the Model ULB-364.

**1.2. SYMBOLS AND ABBREVIATIONS.** All symbols and abbreviations used in this manual are in accordance with the ANSI Y14.15 and MIL-STD-12, respectively.

## 1.3. ULB-364 MODELS AND PHYSICAL CHARACTERISTICS.

1.3.1. The ULB-364. It is a durable underwater acoustic beacon housed in a watertight aluminum hard coat anodized case. Designed for deep water applications, the beacon is capable of operation at depths of up to 1250 meters (4100 feet) and can withstand pressures up to 1750 psi. The beacon is activated by immersion with the water switch in either fresh or salt water, or by battery installation depending on beacon configuration and intended use. Two off-the-shelf 9 Volt alkaline or lithium batteries are used to power the ULB-364 and will sustain the beacon operation for long periods of time depending on the acoustic output selected e.g. 1/8 watt, 1/2 watt or 2 watts.

1.3.2. ULB-364/EL. Same as the standard ULB-364 but has a longer case which holds six 9 Volt alkaline or lithium batteries substantially increasing the days of life of the beacon for operations that require longer deployment time. See FIGURE 1.

1.3. 2.1. Any 9 Volt alkaline or lithium battery may be used, but extended service will be obtained by the use of premium batteries such as lithium. For complete beacon specifications and battery days of life refer to Table 1.1. and Table 1. 2.

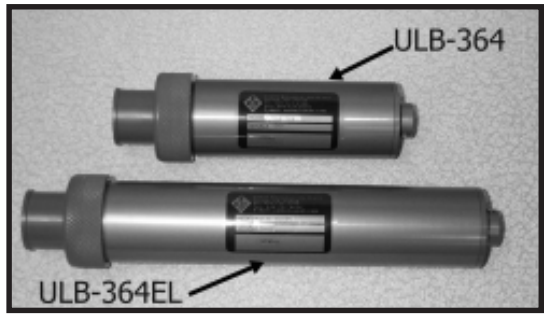



**FIGURE 1. UNDERWATER ACOUSTIC BEACON MODEL ULB-364**

## TABLE 1.1. ULB-364 BEACON SPECIFICATIONS

Frequency.....27kHz, 37kHz, 45kHz,
(Preset at the Factory)
Acoustic Output……....1/8 Watt, 1/2 Watt, 2 Watt
(User Selectable)
Pulse Width..... 5 ms ± 10%
Pulse Repetition Rate..... 1 Sec ± 10%
Power Source..... Alkaline or Lithium Battery
Activation..... Water Switch (Fresh or Salt Water)
or Battery Installation
Size:
ULB-364 (short case)..…..... 2.5 in.Diameter x 12.686 in. Length
(6.35 cm x 32.2 cm.)
ULB-364/EL (Long case)..... 2.5 in. Diameter x 8.386 in.
Length (6.35 cm. x 21.3 cm.)
Operating Depth..... 4100 Feet (1250 Meters)
Case Material..... Hard Coat Anodized Aluminum
Weight
ULB-364.....……..... 1.5 lb. (700 gr.) Without Batteries.
ULB-364/EL....…….....2.2 lb. (1000 gr.) Without Batteries.

## TABLE 1.2. BEACON OPERATING LIFE IN DAYS WITH ALKALINE BATTERIES

| | 1/8 Watt | 1/2 Watt | 2 Watt |
|---|---|---|---|
| ULB-364 | 50 | 20 | 6 |
| ULB-364/EL | 150 | 60 | 18 |

## TABLE 1.3. BEACON OPERATING LIFE IN DAYS WITH PREMIUM LITHIUM BATTERIES

| | 1/8 Watt | 1/2 Watt | 2 Watt |
|---|---|---|---|
| ULB-364 | 150 | 45 | 16 |
| ULB-364/EL | 350 | 130 | 48 |



**WARNING**
**DO NOT ACTIVATE BEACON OUTSIDE ITS CASE**

### 5.3. WATER SWITCH PIN REPLACEMENT

Inspect and clean the water switch pins (if so equipped). If excessive corrosion of the water switch pins is observed they should be replaced. Using a flat blade screwdriver unscrew the damaged pin and replace it following the procedure packed with the Water Switch Pin replacement kit.

### 5.4. BEACON CLEANING

The ULB Beacon is constructed of corrosion-resistant materials and will withstand prolonged exposure to salt water. However, after each usage clean the beacon with a soft cloth and mild detergent, rinse the entire body of the Beacon with fresh water to avoid accumulation of salt or other contaminants, then wipe thoroughly with a clean dry cloth. Clean the water switch frequently to prevent leakage currents from occurring across the switch, which will affect the battery life.

### 5.5. STORAGE

When long term storage of the ULB-364 Beacon is required, clean and dry the unit, remove the batteries and place the Beacon in the original shipping container (or similar). Make sure it is stored in a cool dry environment.

### 5.6. PRECAUTIONS

5.6.1. The ULB-364 Beacon must not be exposed to temperatures in excess of 160°F (71°C).

5.6.2. Avoid any situation that could possibly crush or penetrate the case of the Beacon.

5.6.3. The lanyard end on the ULB-364 must not be removed and must remain in place at all times.

# SECTION V
# MAINTENANCE

**5.1. GENERAL** This section contains the battery change, cleaning, storage procedures and precautions .

## 5.2. BATTERY REPLACEMENT

5.2.1. Always perform the battery change procedure in a clean and dry environment.

5.2.2. The batteries are accessible in the ULB-364 by removing the slip ring nut on the top of the case (transducer end). To unscrew the ring nut rotate it counter-clockwise then pull out the module to expose the exhausted batteries as shown in FIGURE 3. Snap type connectors facilitate change of batteries and prevents reversal of polarity.

5.2.3. Ensure that a good contact is made with the battery snaps, then reinsert fresh batteries into the battery holders.

5.2.4. Prior to reassembling the ULB-364 Beacon, make sure the o-ring on the transducer turret is seated properly in its groove. Also, make sure that both the threads and the o-ring are properly greased and free from debris. Replace the o-ring if necessary, then tighten the slip ring nut securely. A good seal will prevent unit from leaking.

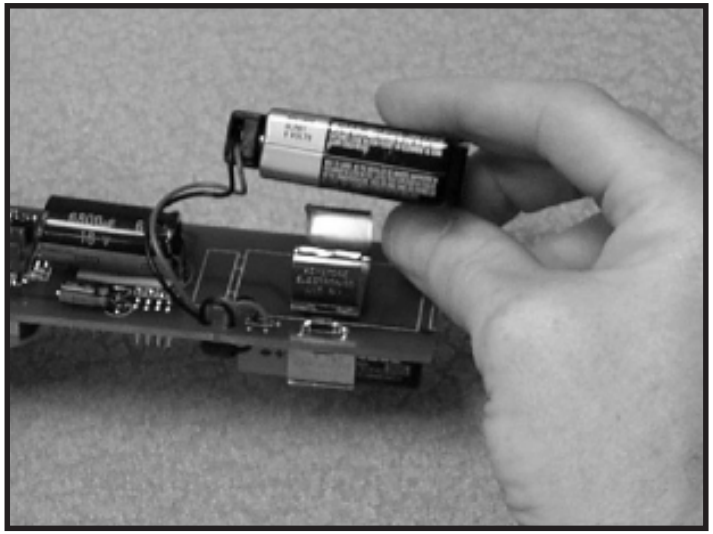


**FIGURE 3. BATTERY CHANGE**



# SECTION II
# OPERATION

## 2.1. THEORY OF OPERATION.

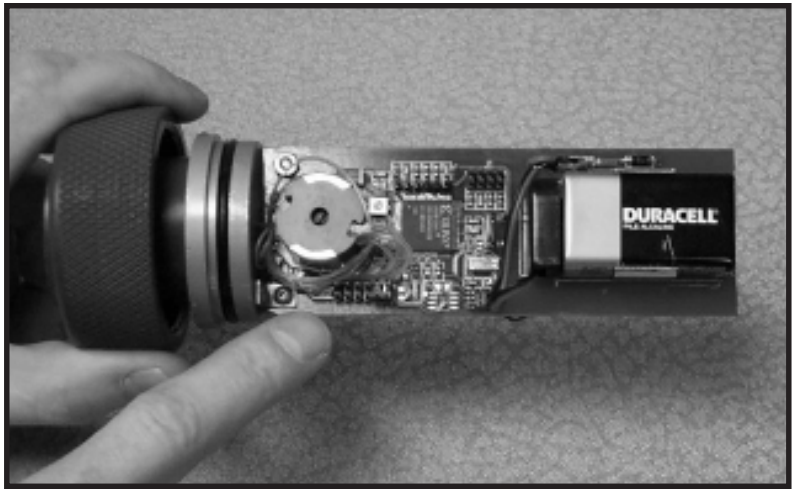
2.1.1. The ULB-364 is a battery operated Underwater Acoustic Beacon that is activated by user selectable water switch or with battery installation.

2.1.2. When the beacon is activated the output voltage of the oscillator is coupled to the piezo-ceramic transducer ring. The resultant mechanical motion is transmitted to the PVC case of the beacon which, radiates acoustic energy into the surrounding water at frequencies of 27kHz, 37kHz or 45kHz. The pulses generated are approximately 5 ms in duration and occur about once per second in water.

# SECTION III
# OUTPUT POWER SELECTION

**3.1. GENERAL.** To select the desired acoustic output, remove the transducer and electronic board assembly from the ULB-364 case to access the output power block selector. Insert a pair of jumpers according to the three available configurations as shown in FIGURE 2.

3.1.1. The acoustic output options are 1/8 watt (163 dB), 1/2 watt (167dB) and 2 watts (174dB).



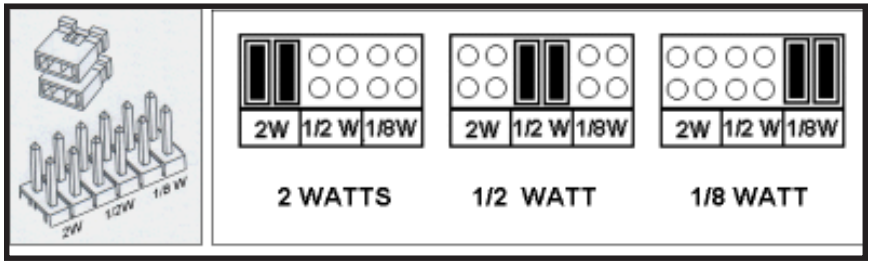




**FIGURE 2. OUTPUT POWER SELECTION**



# SECTION IV
# BEACON TESTING

**4.1. GENERAL.** The ULB-364 Beacon should be tested prior to submersion. Make sure that the beacon case is clean and dry before testing.

**4.2. OPERATIONAL TESTING.** Since the 27kHz, 37kHz and 45kHz pulses are out of the audible range, an acoustic test set should be used to perform the operational test of the ULB-364 Beacon. The UT-100 test set or a beacon receiver can be used for in air testing.

4.2.1. Activate the water switch on the beacon using a shorting tab assembly or wet sponge, then listen for Beacon operation. Acoustic pulses for 27kHz, 37kHz, or 45kHz should be clearly audible. The 5 ms output pulse should have a repetition rate of approximately once per second. If this is the case, the beacon is operational.