

SYSTEM 3300

Diver Recall System



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TABLE OF CONTENTS

TOPIC:	PAGE:
TABLE OF CONTENTS	1
INTRODUCTION	2
SYSTEM DESCRIPTION	2
LL916C U/W TRANSDUCER DESCRIPTION	3
SPECIFICATIONS: LL916C TRANSDUCER	3
SPECIFICATIONS: PA300 SIREN	4
SAFETY MESSAGE TO INSTALLER/USERS	5
UNPACKING SYSTEM.	5
OPTIONAL BRACKET MOUNTING.	6
POWER CABLE INSTALLATION	6
SYSTEM OPERATION	6
BATTERY/CHARGING INFORMATION	7
PRECAUTIONS & MAINTENANCE	7
USES OF THE SYSTEM 3300	8
OBTAINING SERVICE	9
LIMITED WARRANTY	9

INTRODUCTION

Thank you for your purchase of the Lubell Labs 3300 Diver Recall System. The 3300 is ideal for recalling commercial and recreational divers back to the boat or habitat, and has a typical recall range of up to 500 meters. The system is easy to set up and operate, and operates off standard 12 volt marine batteries or connects to 12 volt electrical system of boats.

Only the highest grade materials are used in the manufacture of the Federal Siren and the Lubell underwater transducer. The system includes a Federal PA300 siren amplifier and a Lubell LL916C underwater transducer. The PA300 is used by thousands of police and fire departments because of its excellent performance and reliability. Lubell Labs performs circuit modifications, pots the circuit board, and adds rear panel connectors, making for a system that is equally dependable for diver recall.

Please read this manual and familiarize yourself with the features and capabilities of this system. If you have any questions, please call us at (614) 725-2701 between 9 AM - 5 PM eastern time, or e-mail us at sales@lubell.com.

SYSTEM DESCRIPTION

The Lubell Labs System 3300 consists of the Lubell Labs LL916C underwater transducer with attached 25' cable, and a modified Federal Model PA300 siren amplifier.

The system is intended for portable or permanent installation on Coast Guard ships and dive boats, and comes with a mounting bracket, rubber feet, hardware, and a fused power cable for connection to a portable 12V marine battery or the boat's electrical system.

The PA300's connections include a 3.5mm stereo speaker level input (for connection to 2-way marine radio for voice rebroadcast), a 1/4" mono phone jack output (for connection to the LL916C), and positive and negative power terminals (for connection to 12V battery via fused power cable).

The system provides wail, yelp, and priority siren tones, as well public-address (PA), radio rebroadcast and an air horn sound.

The siren may be installed in any boat with a 12-volt electrical system. It is protected against failure modes (including reversed polarity) by a fuse that is replaceable without tools.

A noise-cancelling microphone is attached to prevent loss or theft. It provides high quality voice reproduction without feedback "squeal". The microphone push-to-talk switch overrides any siren signal for instant PA use. PA and radio volume are adjustable by means of a front panel GAIN control, normally set to full CW position.

LL916C U/W TRANSDUCER DESCRIPTION

The Lubell Labs Model LL916C transducer was designed to meet the need for a durable high output unit, selling at a reasonable price. When attached to the PA300, it broadcasts recall tones in the 800Hz to 1700Hz range at a guaranteed SPL of 180dB/uPa/m. This level translates to a nominal 500 meter recall range in the open ocean, and up to several miles in channel conditions.

The LL916C transducer integrates features from LL Model I and LL Model II prototypes, and the LL900 series production transducers. The piston closure of the Model I provides ruggedness at a reasonable cost, while the improved acoustic design of the Model II enhances the quality and quantity of available sound. The protective enhancements of the LL900 series (including cage and EPDM redundant seals) make for an extremely durable commercial product.

The rigid casting, flanged piston design of the transducer makes possible the attainment of low Q in a small size underwater radiator, while the integral compliance element presents an optimum load to the driving element.

The shell of the LL916C is made up of two halves that serve the dual functions of piston radiator and water tight enclosure for driving element and electronics. Electrical variations are changed to force variations using the piezoelectric effect. The force variations move the opposing pistons in unison against the reaction of radiation resistance and mass. Because of the high impedance of aqueous media, small excursions of the pistons produce acoustic waves of considerable strength.

The LL916C's marine-grade aluminum pistons are protected against corrosion by virtue of a 150 mil PVC overmolding. A rugged PVC/stainless steel cage protects the transducer and it's coating against contact with the boat deck or hull. A 25' heavy duty cord is hardwired to the transducer and is fitted with a 1/4" phone plug for connection to the battery operated Federal PA300 siren only.

SPECIFICATIONS: LL916C U/W TRANSDUCER

Frequency Range725Hz-1800Hz

Maximum Voltage25V rms @ 725 Hz - 1800 Hz

Impedance 16 ohms +/- 2.5 ohms between 725 Hz - 1800 Hz

Directivity Omnidirectional

Output Level 180dB/uPa/m +/- 2dB

Operating Depth 6' (1.83m) minimum, 50' maximum

Dimensions (HWD).....11" x 11" x 7.8"

Net Weight17.6 lbs.

Shipping Weight20 lbs.

SPECIFICATIONS: PA300 SIREN

Input Voltage11VDC to 16VDC

Quiescent Current 120ma. max

Operating Current7 amperes, max.

Operating Temp. Range -30 degrees C to +65 degrees C.

Siren Frequency Range725 Hz to 1800 Hz

Cycle Rate Wail: 15 cycles/min.
Yelp: 220 cycles/min.
Priority: 1300 cycles/min.

Input Impedance 2500 ohms

Input Sensitivity 0.40 volts rms (20 volts rms out)

Voltage Output25V rms

Dimensions(HWD) 2.5" x 6.5" x 8.5" @ 4.5 lbs.

INSTALLATION OF PA300 SIREN

SAFETY MESSAGE TO INSTALLERS OF ELECTRONIC SIRENS

- Read and understand all instructions in manual before installation and operation of siren.
- Installation and testing to be performed by qualified electronic technician only. Product servicing on Federal siren to be performed by authorized service center; Servicing on Lubell transducer to be performed by Lubell Labs only.
- DO NOT connect this system to the positive terminal of the battery until installation is complete, and you have verified that there are no shorts to ground.
- When drilling into a vehicle structure, be sure that both sides of the surface are clear of anything that could be damaged.
- After testing is complete, provide a copy of this manual to all operating personnel.

UNPACKING THE SYSTEM

After unpacking the SYSTEM 3300, examine the siren and the transducer for damage that may have occurred in transit. If the equipment has been damaged, file a claim immediately with the carrier stating the extent of damage.

INSTALLATION: BRACKET MOUNTING SIREN

Because the electronic siren comes with rubber feet and a mounting bracket, it can be used portably or installed. The included U-bracket and hardware enables it to be mounted in a variety of positions. **IMPORTANT:** The PA300 siren must be mounted in a dry location within the cabin (along with loud hailer and 2-way radio) to prevent damage to the sensitive electronics. It is also important that the unit gets proper ventilation, to prevent overheating during use. To install the unit under/above the dash, determine the mounting location and proceed as follows:

1. Use the mounting bracket as a template and scribe two drill positioning marks at the selected mounting location under or above the dash.
2. Drill two 1/4-inch diameter holes at the drill positioning marks.
3. Secure the mounting bracket to the dash with (2 each) 1/4-20 x 3/4 hex head screws, 1/4 split lockwashers and 1/4-20 hex nuts.
4. Secure the electronic siren to the mounting bracket with 1/4-20 x 3/8 hex head screws and 1/4 split lockwashers.
5. Tilt the unit to the desired position. Tighten the 1/4-20 x 3/8 hex head screws.

INSTALLATION: POWER CABLE

The included power cable having black and red conductors is fitted with standard female Faston terminals for connection to the male Faston connectors on the back of the PA300 electronic siren. After siren is bracket mounted, install cable per following:

1. FASTON TYPE: Connect black negative wire (right Faston) to the negative (-) power supply buss, and the red positive wire (left Faston) to the positive (+) power supply buss.
2. MAKE SURE a 20A fuse is installed in the positive cable fuse holder, and that the circuit can safely provide 20 amps of current.

OPERATION OF SYSTEM 3300

1. Remove LL916C transducer from storage area and uncoil cable. Attach a rope **securely** to the decal indicated attachment point on the transducer cage. With boat anchored, lower transducer into the water to a 6' - 10' depth, and attach rope **securely** to a deck rail. Do not use the power cable to raise or lower the transducer as this will damage the cable.
2. Plug the transducer's 1/4" phone plug into the mating insulated phone jack on the rear panel of the PA300 siren (making sure that power is off). Route cable carefully to avoid trips.
3. If used portably, PA300 siren can be powered from 12V gel cell rated to handle 7A load. Attach fused power cord as follows: black wire to negative (-) terminal, then red wire to positive (+) terminal.
4. Relative PA Loudness Adjustment (skip this step if NOT connecting your 2-way marine radio to the PA300 radio input): Connect a patch cord between the existing marine radio speaker terminals, and the 3.5mm mini jack on the rear panel of the PA300 siren. Set siren Selector switch to MANUAL. Depress the microphone push-to-talk switch, speak in a normal voice, and adjust the GAIN control for the desired sound level under the water. Turn on the boat's two-way radio and adjust the volume to a comfortable listening level inside the cabin. Then set the Selector switch to RADIO. Now listen to the radio rebroadcast loudness under the water. If the sound level is too loud or too soft, *gently* adjust the PA300 siren's external trim control (R11 or R39) to the correct loudness using a plastic trim control screwdriver (or eye glasses screwdriver). After the adjustment is completed, the loudness of the underwater radio rebroadcast/public address may be varied with the front panel GAIN control on the PA300 siren.
5. For radio rebroadcast, turn siren SELECTOR switch to RADIO and turn on the 2-way radio.
6. For paging divers or swimmers, turn SELECTOR switch to MANUAL, rotate front panel gain control fully CW, press mic PTT switch, and speak in a normal voice with microphone against lips.
7. For diver recall, AIR HORN switch may be toggled for loud burst of sound, providing SELECTOR switch is in MANUAL position. Use other tones to indicate other situations.

BATTERY/CHARGING INFORMATION

Any 12V marine type storage battery may be used to power the System 3300. The battery should be kept fully charged for optimum performance. If the boat's onboard battery is used to power the system, be sure not to run the voltage so low that your motor will not restart. The boat's electrical system should keep the battery charged, however supplemental charging may be required if battery voltage does not return to normal (usually 12.7-volts).

An automatic 12V trickle charger such as the "Battery Tender Junior" (\$28 on Amazon.com) may be used to keep portable 12 volt marine batteries charged. Follow all battery and charger instructions carefully, as improper use can cause explosions and/or personal injury.

PRECAUTIONS AND MAINTENANCE

The Lubell Labs model LL916C underwater transducer and the Federal PA300 siren are precision instruments that deserve careful handling. Since there are no user serviceable parts in the siren or transducer, the following simple rules will serve as a guide to achieving maximum life:

1. Take good care of the LL916C underwater transducer cable! It is not covered under the warranty and if abused, will be the first place that the unit will fail. Do not use the cable to lift, lower, or support the unit. Instead attach a sturdy 1/4" nylon cord to the cage for this purpose. Inspect cable before each use, and coil neatly when transducer is put away. If cable needs replacement, return to factory.
2. To preserve the transducer's finish, rinse the speaker with tap water after each use to remove traces of salt water. You can use a sponge and detergent occasionally to remove any scum build up. Do not use silicone spray on transducer's PVC overmold or EPDM central seal, as these materials are impervious to damage from UV radiation and sea water. Sprays can attack the seal bond, leading to transducer failure.
3. Be careful not to scrape the black PVC coating on the LL916C transducer cage, as this coating is only 30 mils thick. The coating is primarily decorative, but also helps protect the 304 stainless steel against corrosion in harsh environments. Light cuts and blemishes in the PVC coating can be repaired by lightly sanding the immediate area, wiping with alcohol, and applying a liberal coating of Aquaseal wet-suit repair compound to the area. Allow to dry for 24 hours before use.
4. **WARNING:** Always remove the transducer from the water before moving the boat!
5. When not in use, store the underwater speaker in a cool, dark, equipment cabinet
6. Do not connect the LL916C transducer to anything besides the PA300 siren. Do not input broadband signals (such as music) to the PA300 siren or the LL916C transducer, as this will damage siren and transducer, and void the warranty. If you need to reproduce broadband, please order the Lubell modified TOA CA160R for connection to your LL916C transducer.

CAUTION: The System 3300 is designed for battery operation only.

If the preceding instructions are followed, your Lubell Labs underwater speaker will provide many years of sparkling, trouble free performance.

USES OF THE SYSTEM 3300

These remarkable sets are a decade ahead of their time. Many engineers and scientists working in the field of underwater acoustics are still unaware of the feasibility of compressing the size of a low frequency transducer without reducing it's efficiency. A partial list of current uses follows:

- Recall of scuba divers to excursion boat
- Recall of scuba divers to sunken habitat
- Paging of scuba divers & swimmers at popular resorts
- Swimming & Scuba Instruction
- Gunlap signal for competitive swimming
- False start signal for competitive swimming
- Public address at Neutral Buoyancy Labs
- Interrogation of suspicious or illegal divers by Coast Guard patrol boats
- Underwater cinematography
- Coordinating underwater work parties, exploration, and treasure hunts
- Training or communicating with aquatic mammals
- Dispelling waterfowl, aquatic vertebrate, cetacean mammals, and other species away from contaminated waters

OBTAINING SERVICE

Should your transducer, siren, or accessory require service, please repackage it securely in original shipping carton, and return via insured UPS to: Lubell Labs Inc., 712 S Yearling Road Columbus, Ohio 43213. Please let us know your return address and phone number so we can reach you with an estimate prior to repairs. Please call us at (614) 725-2701 with any questions.

LIMITED WARRANTY

Lubell Labs, warrants each new product to be free from defects in material and workmanship, under normal use and service, for a period of 2 years on parts replacement and 2 years on labor from the date of delivery to the first user-purchaser.

During this warranty period, the obligation of Lubell Labs is limited to repairing or replacing, as Lubell Labs may elect, any part or parts of such product which after examination by Lubell Labs discloses to be defective in material and/or workmanship.

Lubell Labs will provide warranty for any unit which is delivered, transported prepaid, to the Lubell Labs factory for examination and such examination reveals a defect in material and/or workmanship.

This warranty does not cover travel expenses, the cost of specialized equipment for gaining access to the product, or labor charges for removal and re-installation of the product. Not covered under the warranty are: Lamps, cords, water damage to amplifier, water damage to transducer as a result of coating or cable damage, coating damage on transducer or cage.

This warranty does not extend to any unit which has been subjected to abuse, misuse, improper installation, or which has been inadequately maintained; nor to units which have problems relating to service or modification at any facility other than the Lubell Labs Factory.

THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL LUBELL LABS BE LIABLE FOR ANY LOSS OF PROFITS OR ANY INDIRECT OR CONSEQUENTIAL DAMAGES ARISING OUT OF ANY SUCH DEFECT IN MATERIAL OR WORKMANSHIP.