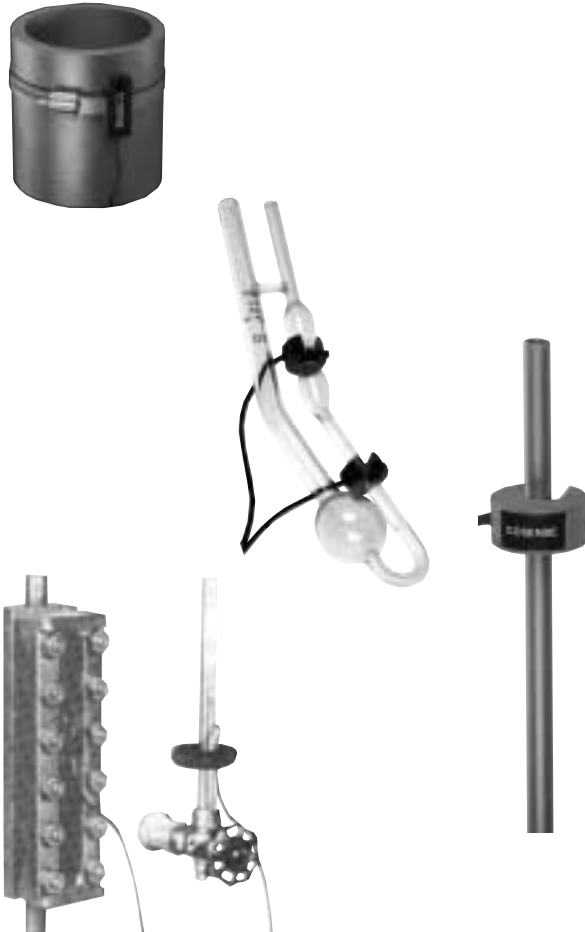


# User's Guide



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**LVUN-600**  
**Non-invasive Ultrasonic Point Level Switches**



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The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

**WARNING:** These products are not designed for use in, and should not be used for, human applications.



## UNPACKING INSTRUCTIONS

### **UNPACKING INSTRUCTIONS**

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Remove the Packing List and verify that you have received all equipment, including the following (quantities in parentheses):

Ultrasonic Level Switch (1)

Operator's Manual (1)

If you have any questions about the shipment, please call the OMEGA Customer Service Department. When you receive the shipment, inspect the container and equipment for signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

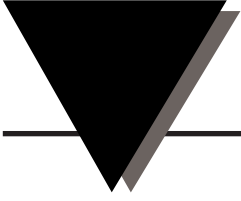
*Note:*

*The carrier will not honor damage claims unless all shipping material is saved for inspection. After examining and removing contents, save packing material and carton in the event reshipping is necessary.*



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## SYSTEM DESCRIPTIONS



.....

### **GENERAL DESCRIPTION**

The LVUN-600 Series Liquid Level Detection system is an ideal, low cost ultrasonic liquid level detection system for many applications. It operates in a broad spectrum of viscous to light liquids.

## PRINCIPLES OF OPERATION



.....

### **PRINCIPLES OF OPERATION**

The LVUN-600 Series operates using ultrasonic sound wave propagation. Ultrasonic sound waves are greatly attenuated when transmitted through air. Conversely, when liquid is present, transmission of the sound waves is greatly enhanced. The electronic control unit, either integral or remote to the sensor, generates electrical signals that are converted to bursts of ultrasonic energy at the sensor. The ultrasonic bursts are transmitted across the liquid sensing gap of the sensor. Upon receipt of a valid signal at the receiver, the solid state electronics generate a "data enable" condition indicating liquid is present. This signal energizes a relay and provides an output condition.



# 3

## INSTALLATION

### GENERAL INSTALLATION

All units are easy to install. The sensor with its remote electronic control unit can be mounted in any position or orientation desired.

Make sure that all wiring, conduit and electrical fittings conform to local electrical codes for the location selected.

### VISUAL INSPECTION

Unpack the control unit and sensor assemblies. Visually inspect them for any damage. Advise Cosense immediately if either assembly is damaged.

### PRELIMINARY OPERATIONAL CHECK

Before installing the unit, a simple operational checkout should be performed as follows:

**WARNING: In a hazardous environment never open the housing cover or connect the power leads without first disconnecting the electrical power at its source.**

1. Fill a container with liquid.
2. Open the control unit housing cover and connect the power to the control unit (see wiring diagram).
3. Apply power from the source.
4. Place the sensor in the liquid. The relay should energize.
5. Remove the sensor from the liquid. The relay will de-energize indicating that the system is functioning properly.
6. Disconnect the power to the control unit.
7. Proceed to final installation.

### NON-INVASIVE / CLAMP-ON TIME

Refer to the typical installation diagram and follow the instructions below.

1. Clean the mounting surface of the pipe or vessel.
2. Coat the sensor faces and the area on the pipe or vessel where sensors are to be mounted liberally with coupling compound (silicone grease or heat sink compound).
3. Clamp the sensor assembly on the pipe or vessel. Tighten the clamp assembly on the vessel until the sensor assembly is firmly mounted against the sensor wall. Do not over tighten.
4. Run the cable to the control unit assembly.



## INSTALLATION

# 3

### **CONTROL UNIT**

Refer to the typical installation diagram and control unit dimensions when installing the control unit.

### **CALIBRATION PROCEDURE**

After the installation is complete, the system must be calibrated for proper operation.

1. Connect the sensor cable to electronics as shown in wiring diagram.
2. Connect power as per wiring diagram.
3. Turn the power on.
4. Allow the liquid to rise above the sensing point until the relay is energized.
5. Allow the liquid to fall below the sensing point, relay should de-energized.
6. Repeat steps 4 and 5.
7. Unit is now calibrated. When the liquid level is above the sensing point, the relay will be energized. When the liquid level is below the sensing point, the relay will be de-energized.

### **MAINTENANCE**

#### **PREVENTIVE MAINTENANCE**

Electronics are constructed with solid state components. Periodically, check and clean the sensor(s) when used with liquids which cause a coating to build up on the sensor. No other maintenance is required.

#### **CLEANING**

If the pipe or vessel to which the sensor is mounted is to be steam cleaned or cleaned with abrasive detergents, remove the entire unit before cleaning by:

1. Disconnecting the power at source.
2. Opening the housing cover.



# 3

## INSTALLATION

3. Removing power and control wiring cables.
4. Unthreading the sensor.

To reinstall, follow Installation Procedure

### **SYSTEM MALFUNCTION**

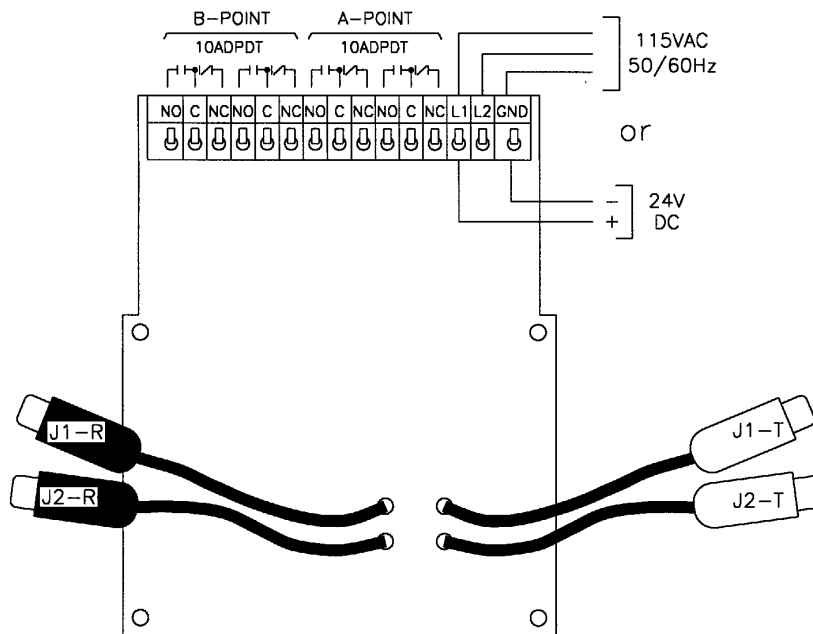
Should the system malfunction, notify OMEGA immediately



# SYSTEM WIRING DIAGRAM



## WIRING DIAGRAM Two Channel



DUAL SENSOR  
FOR  
HIGH GAIN  
CONNECTION

J1-R - J1-T  
J2-R - J2-T

SINGLE SENSOR  
STANDARD  
CONNECTION

J1-R  
J2-R

SENSING POINTS  
RELAY OUTPUT  
10A SPDT

A  
B

### AutoFill / AutoEmpty Operation

Function	Alarm Relay Output	Control Relay Output
Dual Point	A point	B Point



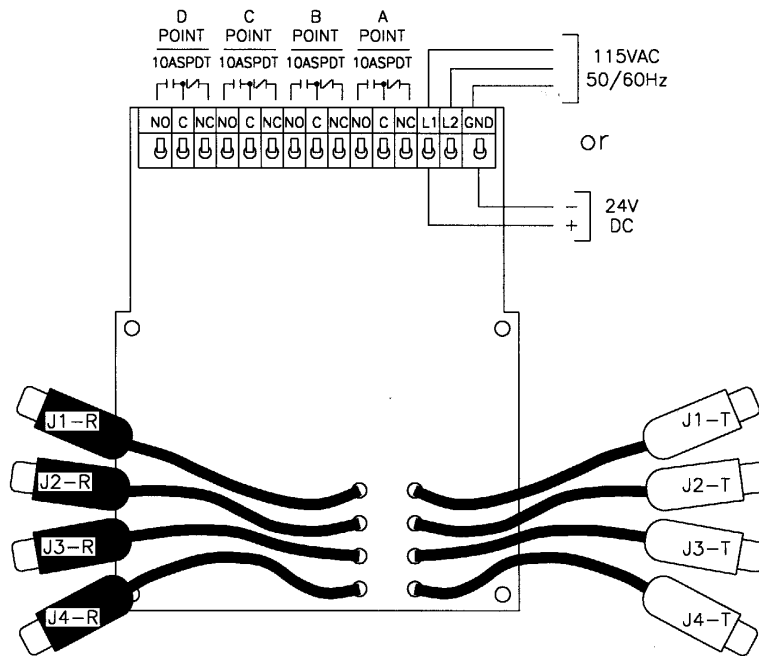
# SYSTEM WIRING DIAGRAM

## WIRING DIAGRAM

Multi Channel:

Four Channel:

Three Channel:



DUAL SENSOR  
FOR  
HIGH GAIN  
CONNECTION

SINGLE SENSOR  
STANDARD  
CONNECTION

SENSING POINTS  
RELAY OUTPUT  
10A SPDT

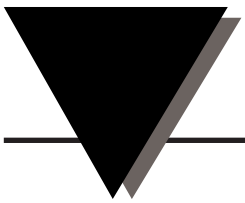
J1-R - J1-T  
J2-R - J2-T  
J3-R - J3-T  
J4-R - J4-T

J1-R  
J2-R  
J3-R  
J4-R

A  
B  
C  
D

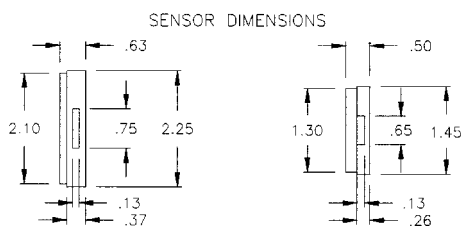
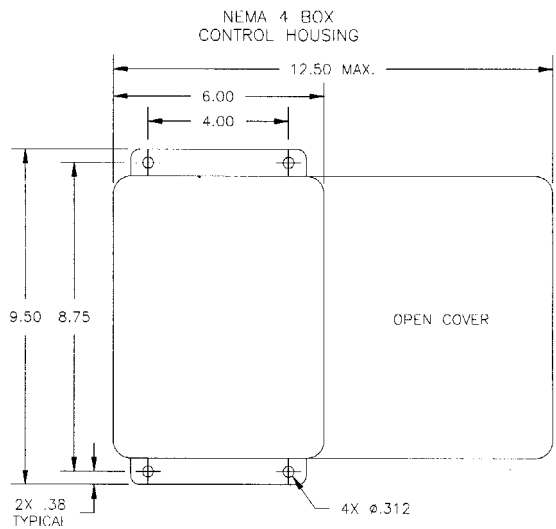
### AutoFill / AutoEmpty Operation

Function	Alarm Relay Output	Control Relay Output
Three Point	A & B Points	C Point
Four Point	A, B & D Points	C Point



DIMENSIONAL DRAWINGS **5**

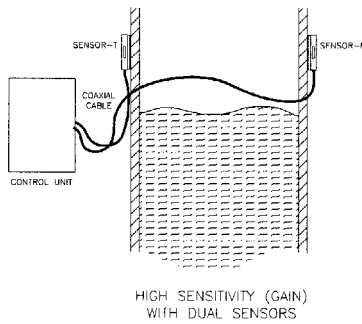
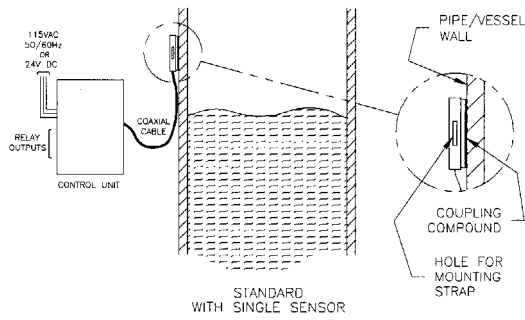
**ENCLOSURE DIMENSIONS**





# 5 DIMENSIONAL DRAWINGS

## TYPICAL APPLICATION









## WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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## RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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