



EchoSonic® II

Ultrasonic Level Transmitter

LU27 Series Quick Start

NEMA 4X Enclosure



QS300116 Rev C
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10500 Humbolt Street, Los Alamitos, CA 90720 USA
Tel: 562.598.3015 • Fax: 562.431.8507 • www.flowline.com

Welcome to the EchoSonic® II Quick Start

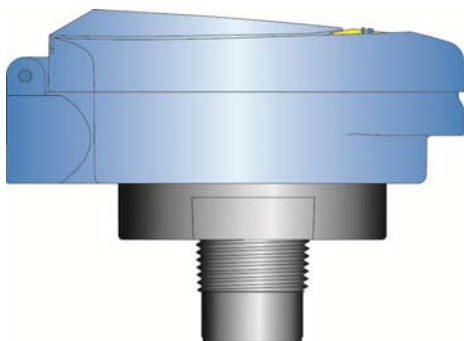
The EchoSonic® II quick start is meant to show some of the more common setup solutions to getting the EchoSonic® II up and running quickly. If you run into an issue that is not addressed here or wish to install or set up with a non-standard configuration, please address the EchoSonic® II Manual or refer to the Flowline website at www.flowline.com.

We Do Your Level Best

Thank you for purchasing Flowline's EchoSonic® II. This general purpose ultrasonic sensor provides non-contact detection up to 9.8' (3m) powered by the 4-20 mA loop. This quick start includes everything you'll need to get the sensor up and running. For complete information, please refer to EchoSonic® II documentation located at www.flowline.com.

Components

Depending on how the sensor model that was shipped, you should have the EchoSonic® II and Viton® gasket which are required to install the EchoSonic® II. Some models will have the USB® Key Fob (LI99-1001) included with the EchoSonic® II. Other will require the separate purchase of the Fob. A LI99-1001 Fob is required to interface to WebCal® and configure the sensor.



EchoSonic® II
LU27-40, LU27-41
LU27-50, LU27-51



Viton® gasket (1")
P/N: 200128



USB® Key Fob
P/N: LI99-1001

Configuring the EchoSonic® II

Configuration of your sensor should be performed prior to mounting, since it requires connection to your PC.

Step 1: Install the WebCal Software

Download WebCal from www.flowline.com onto a PC with the following minimum specifications:

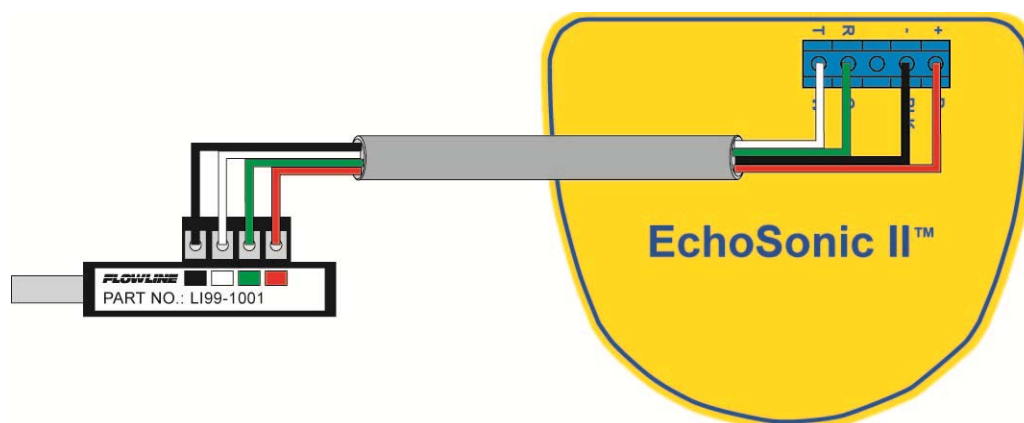
Windows® 2000/XP/Vista/7/8, 10 MB storage space, 256 MB RAM, 1 USB 2.0 port

Double-click the WebCal icon to install before proceeding to Step 2. You must have an active Internet connection to install WebCal, as it will automatically verify driver updates.

Step 2: Connect the USB Fob

NOTE: Do not connect the Fob until after you've installed WebCal.

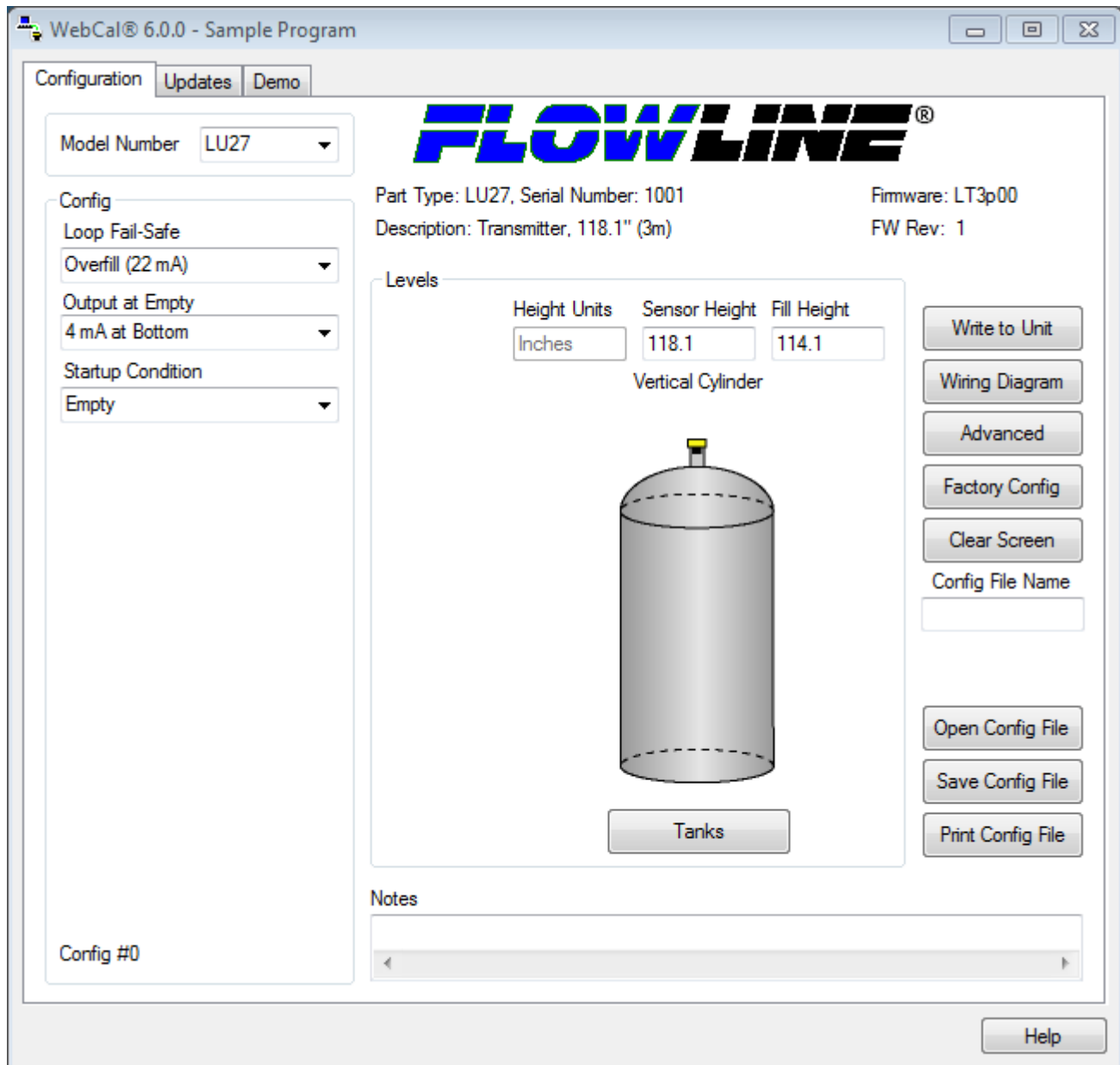
The sensor communicates to its configuration software through the USB Fob. Prior to connecting the Fob, ensure that all external power is disconnected from the EchoSonic® II as power is provided through the PC's USB 2.0 port. Do not use a cable connecting the sensor to the Fob any longer than 15 feet.



- 1) Connect the red, green, white, and black wires from the EchoSonic® II to the corresponding colored terminals on the Fob (as shown in the diagram).
- 2) Tighten the terminal screws with a slotted screwdriver.
- 3) Plug the Fob into your PC's USB port.

Step 3: Configure through WebCal

These instructions will walk you through configuration of the sensor through WebCal. For more information, click the WebCal **HELP** button in the lower right corner or anywhere on the WebCal screen or refer to the EchoSonic® II manual found at www.flowline.com.



The image shows the WebCal 6.0.0 - Sample Program interface. The window has a title bar with standard OS controls. Below the title bar are three tabs: Configuration (selected), Updates, and Demo. The main area is divided into several sections. On the left, under the 'Configuration' tab, there is a 'Model Number' dropdown set to 'LU27'. Below this is a 'Config' section with three dropdowns: 'Loop Fail-Safe' set to 'Overfill (22 mA)', 'Output at Empty' set to '4 mA at Bottom', and 'Startup Condition' set to 'Empty'. In the center, the 'FLOWLINE' logo is displayed. To its right, the 'Part Type: LU27, Serial Number: 1001' and 'Firmware: LT3p00' are shown. Below the part information, the 'Description: Transmitter, 118.1" (3m)' and 'FW Rev: 1' are listed. The 'Levels' section contains three input fields: 'Height Units' set to 'Inches', 'Sensor Height' set to '118.1', and 'Fill Height' set to '114.1'. Below these fields is a 'Vertical Cylinder' diagram. To the right of the diagram is a 'Tanks' button. On the far right, there is a vertical stack of buttons: 'Write to Unit', 'Wiring Diagram', 'Advanced', 'Factory Config', 'Clear Screen', 'Config File Name' (with a text input field), 'Open Config File', 'Save Config File', and 'Print Config File'. At the bottom left, there is a 'Notes' section with a text area and a 'Config #0' label. A 'Help' button is located at the bottom right of the window.

WebCal® 6.0.0 - Sample Program

Configuration Updates Demo

Model Number LU27

Config

Loop Fail-Safe

Overfill (22 mA)

Output at Empty

4 mA at Bottom

Startup Condition

Empty

FLOWLINE®

Part Type: LU27, Serial Number: 1001

Description: Transmitter, 118.1" (3m)

Firmware: LT3p00

FW Rev: 1

Levels

Height Units Sensor Height Fill Height

Inches 118.1 114.1

Vertical Cylinder

Tanks

Write to Unit

Wiring Diagram

Advanced

Factory Config

Clear Screen

Config File Name

Open Config File

Save Config File

Print Config File

Notes

Config #0

Help

WebCal Configuration Screen

Config

Loop Fail-Safe
Overfill (22 mA) ▼

Output at Empty
4 mA at Bottom ▼

Startup Condition
Empty ▼

Config #0

Using the drop-down menus on the left of the WebCal screen set the configuration for your application requirements. When a selection does not apply to your application, "Not Applicable" will appear in the drop-down. Make sure all drop-downs are set appropriately for your application before moving to the Tank Level section.

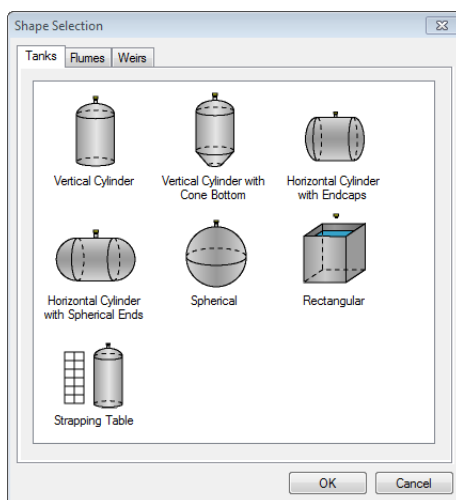
- **Loop Fail Safe.** Use this setting to choose the output level should the sensor not receive an echo.
- **Output at Empty.** Use this setting to change the 4-20 mA setting from its default.
- **Startup Condition.** During the 15-20 seconds during which the EchoSonic® II starts up, this describes the level at which it will begin searching for the contents of the tank.

NOTE: If you would like to start over, click the **Clear Screen** button on the right.

A New feature of WebCal 6.0 is the ability to configure the sensor in volumetric units (Gallons or Liters) or in the existing Distance (Height of Liquid) units (inches, cm, feet or meters). To change the actual units or to change from Distance to Volume, press the Tanks button located near the center of the window.

Shape Selection Window:

This window will show the different options for tank shapes available in WebCal.



Dimensional Entry Window:

Enter the dimensional information for the tank. You must enter all of the fields shown.

Dimensional Entry - Vertical Cylinder

Sensor Output Units
☐ Distance
☒ Volume Gallons ▼

Dimensions Units: Inches ▼

S - Sensor Height 118.1
F - Fill Height 114.1
R - Riser Height 0.0
H - Tank Height 114.1
D - Diameter

Dimensional Entry - Vertical Cylinder

Sensor Output Units
☒ Distance
☐ Volume ▼

Dimensions Units: Inches ▼

S - Sensor Height 118.1
F - Fill Height 114.1
R - Riser Height 0.0

- **Sensor Height:**
- **Fill Height:**
- **Riser Height:**
- **Tank Height:**
- **Diameter:**

Note: Not all of the fields apply for every tank configuration.

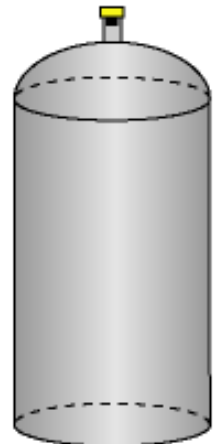
Enter the appropriate tank level set points for your application.

- **Units.** Display measurements in inches or centimeters.
- **Sensor Height.** Distance measured from the bottom of the empty tank to the bottom of the transducer. Under factory configuration, this becomes the 4 mA set point.
- **Fill Height.** Distance measured from the bottom of the empty tank to the maximum fill height within the tank. Under factory configuration, this becomes the 20 mA set point.

Levels

Height Units	Sensor Height	Fill Height
Inches	118.1	114.1

Vertical Cylinder



Tanks

Tank Level Settings

The options on the right of the WebCal screen to finalize the configuration.

- **Write to Unit.** Send your configuration into EchoSonic® II.
- **Wiring Diagram.** Open PDF wiring schematic of your configuration.
- **Advanced.** Configure advanced settings. Read the section below on advanced setting options
- **Factory Config.** Return EchoSonic® II to the original factory configuration.
- **Clear Screen.** Clears the screen of configuration settings.
- **Config File.** Name, save, open or print your configuration for later use.

Write to Unit

Wiring Diagram

Advanced

Factory Config

Clear Screen

Config File Name

Open Config File

Save Config File

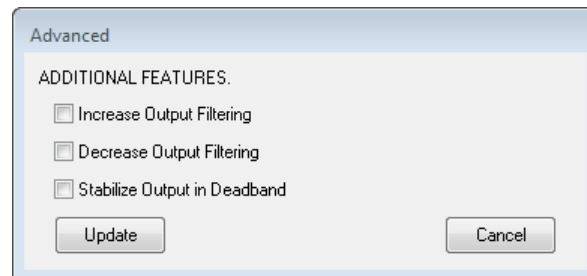
Print Config File

Finalize Settings

The **Advanced** button is used for options available when setting up the sensor with special, non-standard features. Many of these features are available for specific applications that may change from time to time. Consult WebCal's **HELP** file for the latest information on the use of any of these features.

The more commonly used Advanced features are the Invert Relay and Increase Output Filtering described below.

- **Increase Output Filtering.** Select this radio button to add additional filtering to the 4-20 mA output.
- **Decrease Output Filtering.** Select this radio button to remove all output filtering on the 4-20 mA output.



Advanced Settings

Before configuration can be completed:

- You must click the **Write to Unit** button to save the settings to the unit.
- Then, click **Wiring Diagram** for a hard copy of the sensor's settings.
- Finally, enter the file name under which you wish to save the configuration file and click **Save Config File**.

Configuration is now complete.

Disconnect the USB Fob before continuing to the next step: Mounting the EchoSonic® II.

For updates to WebCal, or to make sure you're using the most up-to-date version available, click the **Update** tab on the top of the WebCal screen.

Mounting the EchoSonic® II

The sensor should always be mounted perpendicular to the liquid surface using the provided Viton® mounting gasket. Insure that there are no restrictions or obstacles in the path of the ultrasonic signal. Further mounting information can be found on the Flowline website at www.flowline.com.

The EchoPod® has a 1" NPT or G fitting and requires more care in mounting to reduce any coupling of the ultrasonic signal to the mounting structure. The below listed fittings are recommended.

For installations in existing 2" fittings:

- 1) Use a LM52-1400 2" thread x 1" thread adapter (shown to the right) or a LM52-1410 2" slip x 1" thread adapter. (An adapter with an air gap around the 1 inch threads as shown is recommended)



For installations in plastic tanks (use one of the following):

- 1) Use a 1" Bulkhead fitting, such as the LM52-1890 Bulkhead fitting.
- 2) Use a larger Bulkhead fitting, such as the LM52-2890 in combination with a reducer bushing such as the LM52-1400.
- 3) Weld a plastic 1" half coupling to the tank top.



For installations in metal tanks (use one of the following):

- 1) Use the recommended bulkhead fittings as shown above.
- 2) Use a flange with a 1" riser, such as the LM52-1850 (the thread is above the plane of the flange). **Do not use a blind flange with a tapped 1" thread.**
- 3) Use a larger flange with a 2" thread and add a reducer bushing such as the LM52-1200.



Note: While installations directly into a 1" metal fitting are not recommended, acceptable results may be obtained if the 1" fitting is a half coupling in form and the outer diameter of the coupler is tightly wrapped in vinyl tape to dampen vibrations.

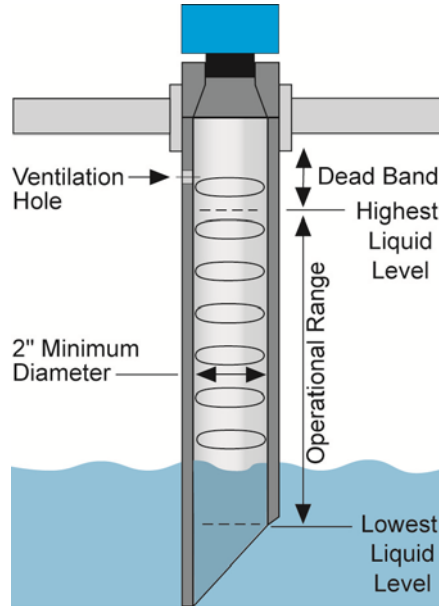
For installations in open tanks and sumps:

- 1) Use Flowline's LM50-1001-1 side mount bracket.



Mounting with a Stand-Pipe:

A stand-pipe may be used to dampen turbulence, separate surface foam from the point of measurement or increase performance in heavy vapor. When mounting the sensor in a stand-pipe, the minimum diameter of the pipe is 2". Larger diameter pipes can be used. The pipe should be attached with a coupling and reducer bushing. The pipe length should run the measurement span and the bottom of the pipe should remain submerged at all times to prevent foam from entering the pipe. Cut the bottom end of the pipe at 45° and drill a 1/4" pressure equalization hole high in the dead band. The pumps should not drive liquid past the open end of the standpipe which causes the liquid in the pipe to oscillate.



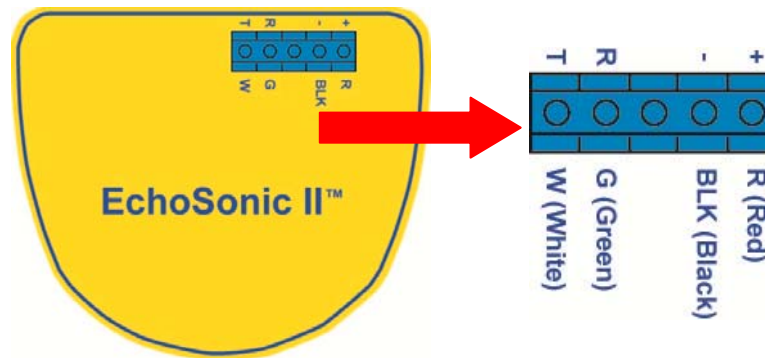
Stand-Pipe Mounting

IMPORTANT MOUNTING GUIDELINES:

- 1) Never mount the sensor at an angle.
- 2) Liquid should never enter the dead band.
- 3) Mount at least 3" from the side wall.
- 4) Never mount in a vacuum.
- 5) Do not obstruct the sensor's beam width.

Wiring the EchoSonic® II

After mounting the sensor, make the necessary electrical connections. A wiring diagram with specific recommendations for the sensor's configuration can be printed from the WebCal program. A typical wiring diagram is shown on the next page.



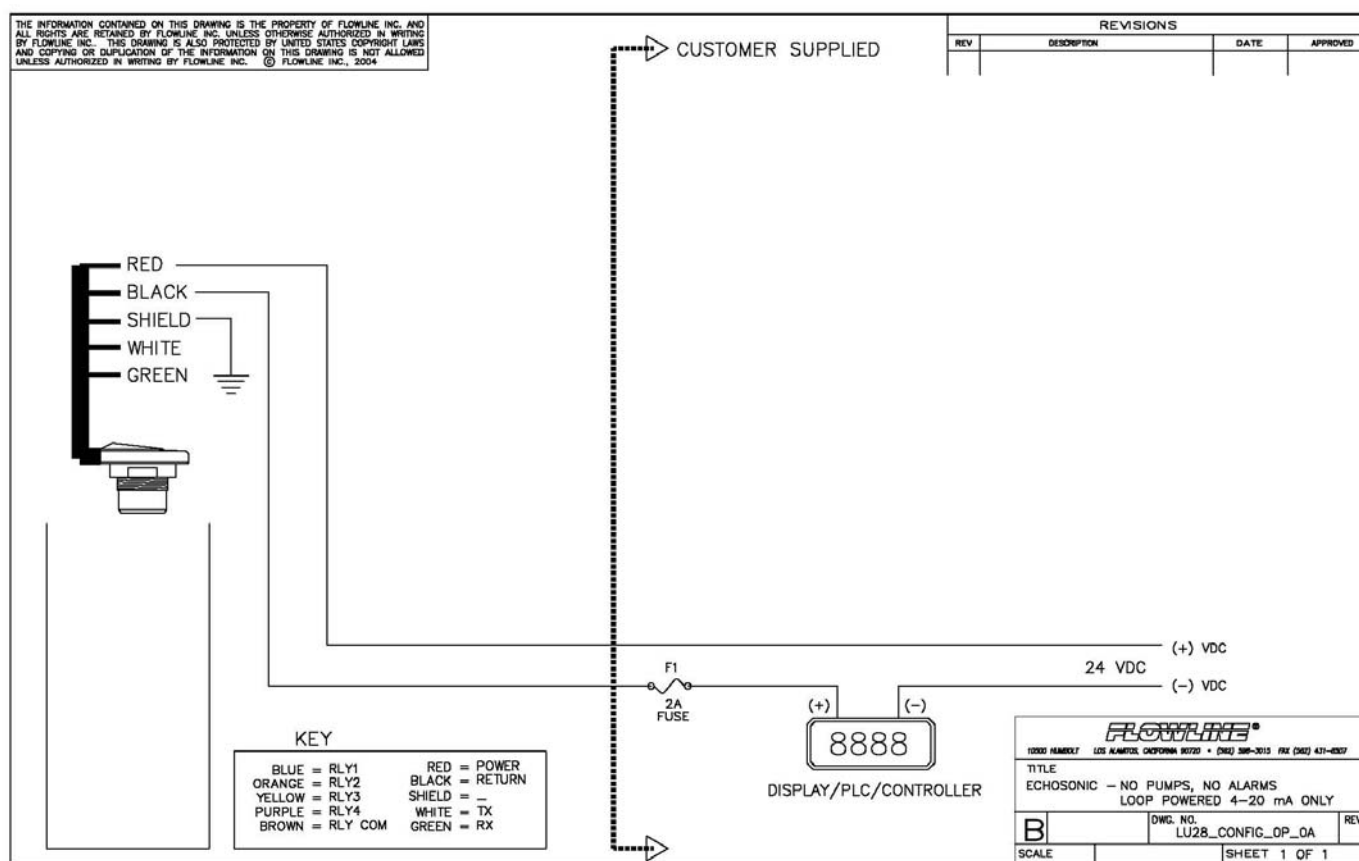
Red (Power) and **Black** (Return) leads are for connection to a 24 VDC power supply or to a 4-20 mA loop power source. The red and black wires can be extended more than 1000 feet using 22-gauge or larger wire, however do not extend the green and white wires.

White (Tx) and **Green** (Rx) leads are reserved for use with WebCal and should not be connected during usage in the application. These wires should not be connected to WebCal while power is supplied from any source other than the LI99-1001 Fob.

Never allow the white or green wires to touch any power supply.

Wiring the EchoSonic® II

The following wiring diagram can be used when wiring to the EchoSonic® II relays.



Typical Wiring Diagram
Your WebCal Wiring Diagram may vary.

General notes for electrical connections, usage and safety:

- Where personal safety or significant property damage can occur due to a spill, the installation must have a redundant backup safety system installed.
- Wiring should always be completed by a licensed electrician.
- Supply voltage should never exceed 28 VDC.
- Protect the sensor from excessive electrical spikes by isolating the power, whenever possible.
- The sensor materials must be chemically compatible with the liquids to be measured.
- Design a fail-safe system for possible sensor and/or power failure.
- Never use the sensor in environments classified as Hazardous.

Warranty

Flowline warrants to the original purchaser of its products that such products will be free from defects in material and workmanship under normal use and service in accordance with instructions furnished by Flowline for a period of two years from the date of manufacture of such products. Flowline's obligation under this warranty is solely and exclusively limited to the repair or replacement, at Flowline's option, of the products or components, which Flowline's examination determines to its satisfaction to be defective in material or workmanship within the warranty period. Flowline must be notified pursuant to the instructions below of any claim under this warranty within thirty (30) days of any claimed lack of conformity of the product. Any product repaired under this warranty will be warranted only for the remainder of the original warranty period. Any product provided as a replacement under this warranty will be warranted for the full two years from the date of manufacture.

Returns

Products cannot be returned to Flowline without Flowline's prior authorization. To return a product that is thought to be defective, go to www.flowline.com, and submit a customer return (MRA) request form and follow the instructions therein. All warranty and non-warranty product returns to Flowline must be shipped prepaid and insured. Flowline will not be responsible for any products lost or damaged in shipment.

Limitations

This warranty does not apply to products which: 1) are beyond the warranty period or are products for which the original purchaser does not follow the warranty procedures outlined above; 2) have been subjected to electrical, mechanical or chemical damage due to improper, accidental or negligent use; 3) have been modified or altered; 4) anyone other than service personnel authorized by Flowline have attempted to repair; 5) have been involved in accidents or natural disasters; or 6) are damaged during return shipment to Flowline. Flowline reserves the right to unilaterally waive this warranty and dispose of any product returned to Flowline where: 1) there is evidence of a potentially hazardous material present with the product; or 2) the product has remained unclaimed at Flowline for more than 30 days after Flowline has dutifully requested disposition. This warranty contains the sole express warranty made by Flowline in connection with its products. ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY DISCLAIMED. The remedies of repair or replacement as stated above are the exclusive remedies for the breach of this warranty. IN NO EVENT SHALL FLOWLINE BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND INCLUDING PERSONAL OR REAL PROPERTY OR FOR INJURY TO ANY PERSON. THIS WARRANTY CONSTITUTES THE FINAL, COMPLETE AND EXCLUSIVE STATEMENT OF WARRANTY TERMS AND NO PERSON IS AUTHORIZED TO MAKE ANY OTHER WARRANTIES OR REPRESENTATIONS ON BEHALF OF FLOWLINE. This warranty will be interpreted pursuant to the laws of the State of California. If any portion of this warranty is held to be invalid or unenforceable for any reason, such finding will not invalidate any other provision of this warranty.

For complete product documentation, video training, and technical support, go to www.flowline.com.

For phone support, call 562-598-3015 from 8am to 5pm PST, Mon - Fri.

(Please make sure you have the Part and Serial number available.)