

## Warranty, Service & Repair

To register your product with the manufacturer, fill out the enclosed warranty card and return it immediately to:

Flowline Inc.  
10500 Humbolt Street  
Los Alamitos, CA 90720.

If for some reason your product must be returned for factory service, contact Flowline Inc. to receive a Material Return Authorization number (MRA) first, providing the following information:

1. Part Number, Serial Number
2. Name and telephone number of someone who can answer technical questions related to the product and its application.
3. Return Shipping Address
4. Brief Description of the Symptom
5. Brief Description of the Application

Once you have received a Material Return Authorization number, ship the product prepaid in its original packing to:

Flowline Factory Service  
MRA \_\_\_\_\_  
10500 Humbolt Street  
Los Alamitos, CA 90720

To avoid delays in processing your repair, write the MRA on the shipping label. Please include the information about the malfunction with your product. This information enables our service technicians to process your repair order as quickly as possible.

# FLOWLINE®

## Horizontal Mini-Float Level Switch LH23 Series Owner's Manual



Version 4.1A

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Manual # LH900002

05/05

## 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 for a period which is equal to the shorter of one year from the date of purchase of such products or two years from the date of manufacture of such products.

This warranty covers only those components of the products which are non-moving and not subject to normal wear. Moreover, products which are modified or altered, and electrical cables which are cut to length during installation are not covered by this warranty.

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 thereof) which Flowline's examination proves to its satisfaction to be defective. FLOWLINE SHALL HAVE NO OBLIGATION FOR CONSEQUENTIAL DAMAGES TO PERSONAL OR REAL PROPERTY, OR FOR INJURY TO ANY PERSON.

This warranty does not apply to products which have been subject to electrical or chemical damage due to improper use, accident, negligence, abuse or misuse. Abuse shall be assumed when indicated by electrical damage to relays, reed switches or other components. The warranty does not apply to products which are damaged during shipment back to Flowline's factory or designated service center or are returned without the original casing on the products. Moreover, this warranty becomes immediately null and void if anyone other than service personnel authorized by Flowline attempts to repair the defective products.

Products which are thought to be defective must be shipped prepaid and insured to Flowline's factory or a designated service center (the identity and address of which will be provided upon request) within 30 days of the discovery of the defect. Such defective products must be accompanied by proof of the date of purchase.

Flowline further reserves the right to unilaterally waive this warranty and to dispose of any product returned to Flowline where:

- a. There is evidence of a potentially hazardous material present with product.
- b. The product has remained unclaimed at Flowline for longer than 30 days after dutifully requesting disposition of the product.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE OF THIS WARRANTY. This warranty and the obligations and liabilities of Flowline under it are exclusive and instead of, and the original purchaser hereby waives, all other remedies, warranties, guarantees or liabilities, express or implied. EXCLUDED FROM THIS WARRANTY IS THE IMPLIED WARRANTY OF FITNESS OF THE PRODUCTS FOR A PARTICULAR PURPOSE OR USE AND THE IMPLIED WARRANTY OF MERCHANTABILITY OF THE PRODUCTS.

This warranty may not be extended, altered or varied except by a written instrument signed by a duly-authorized officer of Flowline, Inc.

# SPECIFICATIONS

## Step One

### Specifications:

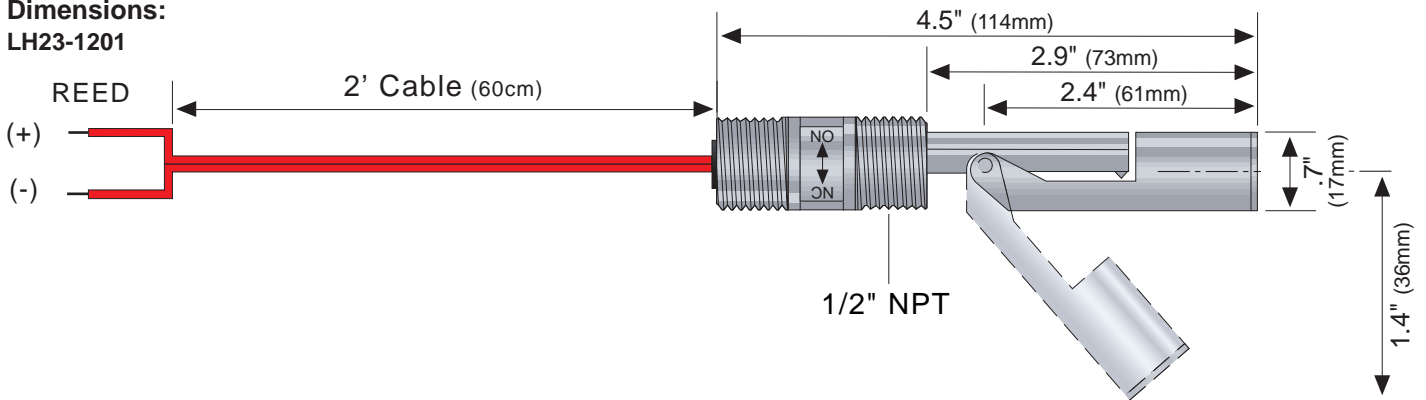
Accuracy:  $\pm 5$  mm in water  
 Repeatability:  $\pm 2$  mm in water  
 Extreme orientation:  $\pm 20^\circ$  from horizontal  
 Specific gravity: 0.55 minimum  
 Reed type: Dry contact SPST  
 Reed voltage: 120/240, 0-30 VDC @ 20 VA  
 (CE: 30 Vrms and 42.2 V peak or 60 Vdc)  
 Reed output: Selectable NO or NC  
 Temperature rating: F:  $-40^\circ$  to  $225^\circ$   
 C:  $-40^\circ$  to  $107.2^\circ$   
 Pressure rating: 100 psi  
 Probe material: Polypropylene (PP)  
 Mounting threads: 1/2" NPT  
 Cable length: 2 ft. (61 cm), 2-wire, 22 AWG  
 CE Compliance: EN 60730

**Switch Ratings  
- Maximum Resistive Load -**

VA	Volts	Amps AC	Amps DC
20	0-30	0.4	0.3
	120	0.17	0.13
	240	0.08	0.06

### Dimensions:

LH23-1201



## SAFETY PRECAUTIONS

### Step Two

#### **⚠ About this Manual:**

PLEASE READ THE ENTIRE MANUAL PRIOR TO INSTALLING OR USING THIS PRODUCT. This manual includes information on all models of horizontal mini-float level switches from FLOWLINE, LH23 series. Please refer to the part number located on the switch label to verify the exact model which you have purchased.

#### **⚠ User's Responsibility for Safety:**

FLOWLINE manufactures a wide range of liquid level sensors and technologies. While each of these sensors is designed to operate in a wide variety of applications, it is the user's responsibility to select a sensor model that is appropriate for the application, install it properly, perform tests of the installed system, and maintain all components. The failure to do so could result in property damage or serious injury.

#### **⚠ Proper Installation and Handling:**

Because this is an electrically operated device, only properly trained staff should install and/or repair this product. Use a proper sealant with all installations. Never overtighten the sensor within the fitting, beyond being hand tight. Always check for leaks prior to system startup.

#### **⚠ Material Compatibility:**

The LH23 series switch is available in one wetted material. Models LH23-1201 are made of Polypropylene (PP). Make sure that the model you have selected is compatible with the application liquid. To determine the chemical compatibility between the sensor and its application liquids, refer to an industry reference such as the Compass Corrosion Guide (available from Compass Publications, phone 858-589-9636).

#### **⚠ Temperature and Pressure:**

The LH23 series switch is designed for use in application temperatures up to 107.2 °C, and for use at pressures up to 100 psi.

#### **⚠ Wiring and Electrical:**

The supply voltage used for the LH23 series should never exceed 120/240 volts AC / 30 volts DC @ 20 VA. CE mark versions should never exceed 30 Vrms and 42.2 Vpeak or 60 VDC. Electrical wiring of the sensor should be performed in accordance with all applicable national, state, and local codes.

#### **⚠ Flammable, Explosive and Hazardous Applications:**

The LH23 series should not be used within flammable or explosive applications. In hazardous applications, use redundant measurement and control points, each having a different sensing technology. Refer to the National Electric Code (NEC) for all applicable installation requirements in hazardous locations.

### **⚠ WARNING ⚠**

Orientation of the switch is critical. Make sure the switch is positioned correctly.

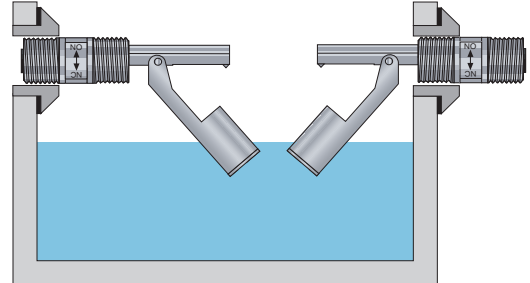
Avoid installing the LH23 series switch in ferromagnetic tanks. Doing so will activate the internal reed switch.

## INSTALLATION

### Step Three

#### **Through Wall Installation:**

FLOWLINE's LH23 series sensors may be installed through the side wall of a tank. The LH23-1201 has dual male 1/2" NPT threads for installation from the outside of the tank in or the inside of the tank out. If the LH23-1201 is installed in the Outside-In method, then the outer threads may be used for connection to conduit.



#### **Maintenance:**

The LH23 series sensor itself requires no periodic maintenance except cleaning as required. It is the responsibility of the user to determine the appropriate maintenance schedule, based on the specific characteristics of the application liquids.

#### **Cleaning Procedure:**

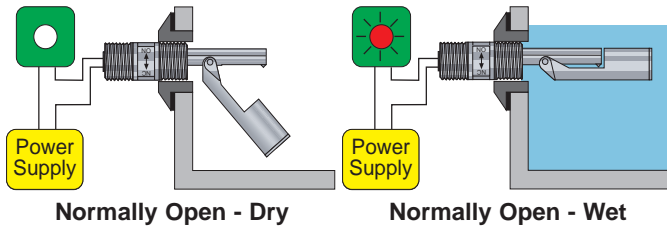
- 1. Power:** Make Sure that all power to the sensor, controller and/or power supply is completely disconnected.
- 2. Sensor Removal:** In all through-wall installations, make sure that the tank is drained well below the sensor prior to removal. Carefully, remove the sensor from the installation.
- 3. Cleaning the Sensor:** Use a soft bristle brush and mild detergent, carefully wash the LH23 series sensor. Do not use harsh abrasives such as steel wool or sandpaper, which might damage the surface sensor. Do not use incompatible solvents which may damage the sensor's Polypropylene plastic body.
- 4. Sensor Installation:** Follow the appropriate steps of installation as outlined in the installation section of this manual.

# ELECTRICAL

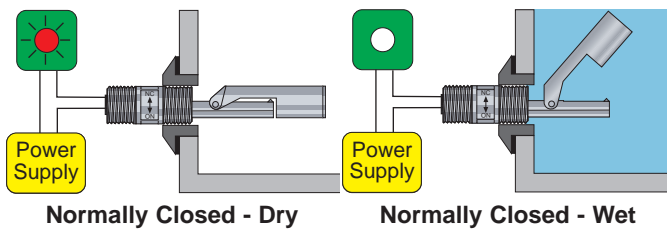
## Step Four

### Signal Outputs (Reed Switch):

**Normally Open Operation:** Orientate the switch such that float swings down when the switch is dry. In the dry state, the float rests in the lowest position and the circuit is open. As the switch becomes wet, the float becomes buoyant and circuit closes.



**Normally Closed Operation:** Orientate the switch such that float rests on top of the switch when the switch is dry. In the dry state, the float rests on the switch and the circuit is closed. As the switch becomes wet, the float becomes buoyant and circuit opens.

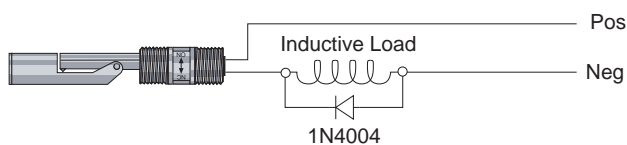


### Contact Protection (Reed Switch):

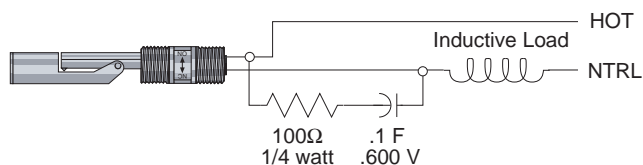
When current is interrupted, the inductance of the load generates a high frequency voltage, which appears across the switch contacts. If the voltage is large enough, it can cause arcing. Arcing can cause the contacts to weld to each other resulting in unreliable switching performance. It is essential to protect the circuit, by suppressing the voltage to prevent arcing.

This can be accomplished through the use of a diode for DC circuits and a resistor-capacitor network for AC circuits.

#### DC Contact Protection:



#### AC Contact Protection:

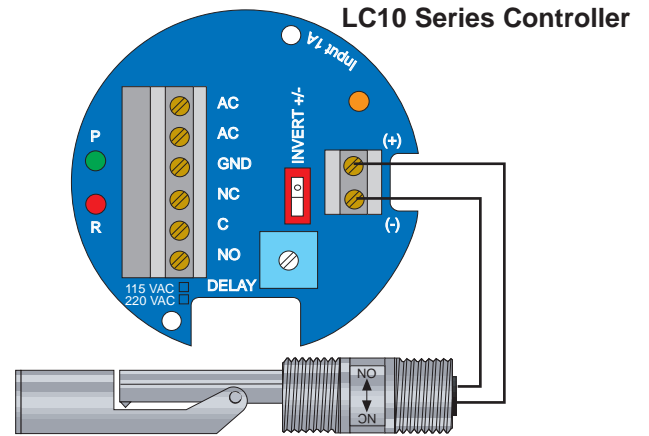


# WIRING

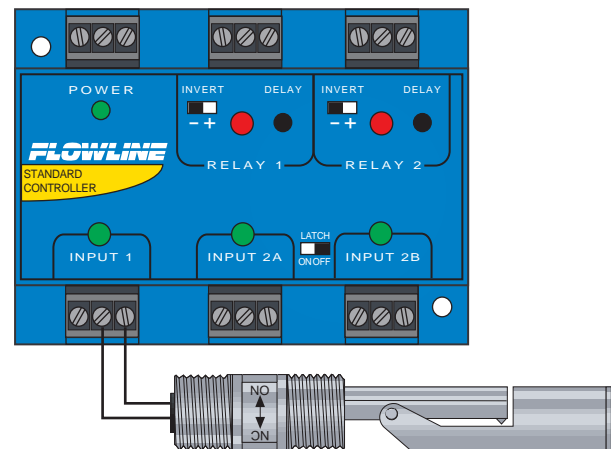
## Step Five

### Wiring to a FLOWLINE Controller:

FLOWLINE controllers have a built-in 13.5 VDC power supply which provides power to all of FLOWLINE's level switches. Alternative controllers and power supplies may also be used with the LH23 series switch.



### LC40 Series Controller



Note: The above wiring is for NO operation. For NC operation, rotate the switch 180 degrees.