Warranty, Service & Repair

To register your product with the manufacturer, go to the Flowline website for on-line registration. The website address is as follows:

www.flowline.com

On-line Warranty Registration can be found under Contact Us in the Navigation Bar along the side of the home page.

If for some reason your product must be returned for factory service, contact Flowline Inc. at (562)598-3015 to receive a Material Return Authorization number (MRA), 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®

Switch Pak™ w/ Compact Junction Box A _ 1 _ Series Owner's Manual

Version 0.1A

Manual # LM900006 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 wave 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 MERCHANT ABILITY 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:

Length:	6" to 10' (15 cm to 3m)
Switch point:	1 (set by factory)
Orientation:	± 30˚ vertical
Process temp.:	F: -40˚ to 194˚
	C: -40˚ to 90˚
Pressure:	AU1_: 150 psi (10 bar)
	AZ1_: 150 psi (10 bar)
	AV1_: 25 psi (1.7 bar)
Wetted material:	424_: PP
	524_: PVDF Kynar®
Process mount:	_243: 2" NPT
	_247: 1 1/2" G
Enclosure rating:	NEMA 4X (IP65)
Installed height:	3.6" (9.1 cm) above tank process mount
Encl. material:	PP, UL94VO
Conduit entrance:	Single, 1/2" NPT
Termination:	2-4 poles
CE compliance:	EN 50082-2 immunity
	EN 55011 emission
	EN 61010-1 safety

Sensor Technologies:

Ultrasonic (LU10 series)

Broadly applied in chemical, solvent, hydrocarbon and light weight oil media

Supply voltage:	12-36 VDC
Consumption:	25 mA maximum
Contact type:	(1) SPST relay
Contact rating:	GP: 120 VAC/VDC @ 1A
	IS: 32 VDC @ 0.5A
Contact output:	Selectable NO/NC
Classification:	Intrinsically safe

Buoyancy (LV10 series)

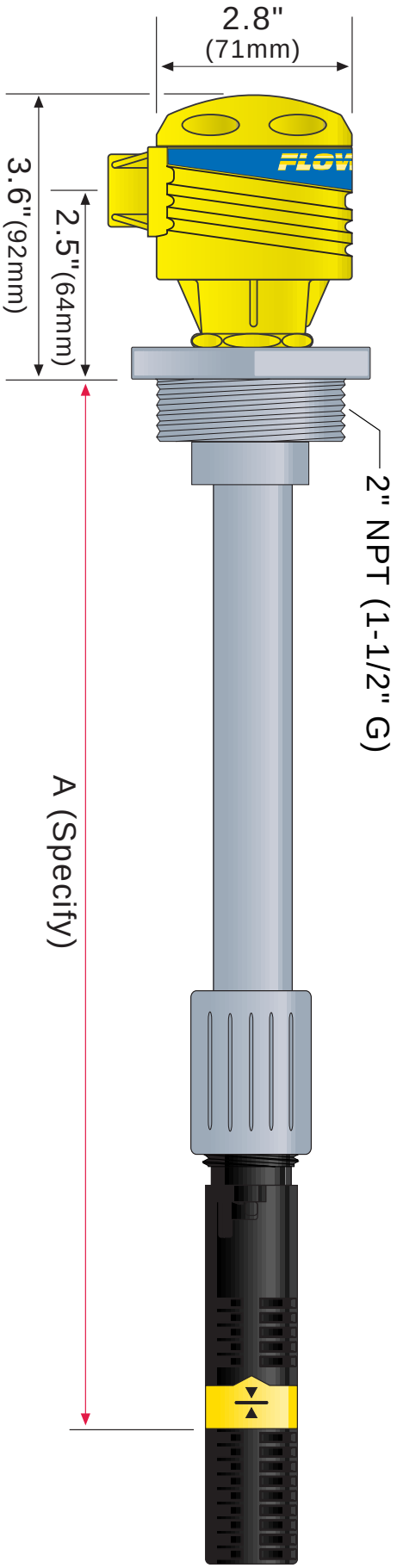
Best applied in clean water or water-like chemical media that is non-coating or scaling

Contact type:	(1) SPDT reed
Contact rating:	120 VAC/VDC @ 15 VA
Contact output:	Selectable NO/NC
Classification:	General purpose

Vibration (LZ10 series)

Typically applied in wastewater media with light coating and/or foaming characteristics

Supply voltage:	12-36 VDC
Consumption:	25 mA maximum
Contact type:	(1) SPST relay
Contact rating:	120 VAC/VDC @ 1A
Contact output:	Selectable NO/NC
Classification:	General purpose

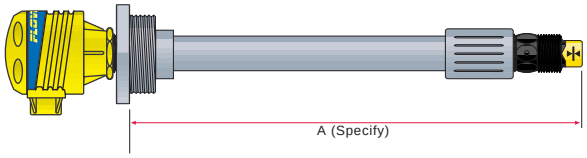


COMPONENTS

Step Two

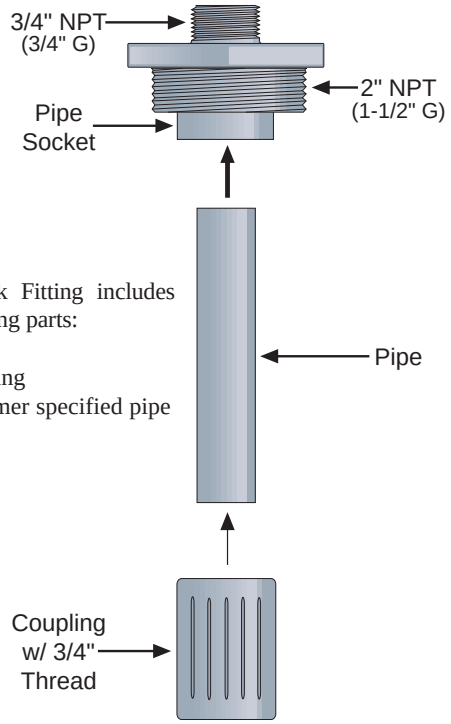
Standard Configuration:

(AU15-_24_, AV16-_24_ or AZ18-_24_)



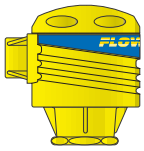
Ultrasonic	Buoyancy	Vibration
AU15-4243	**AV16-4243**	**AZ18-4243**
1 x LU10-1305	1 x LV10-1301	1 x LZ12-1405
1 x LM45-1001	1 x LM45-1001	1 x LM45-1001
1 x LC06-1001	1 x LC06-1001	1 x LC06-1001
AU15-4247	**AV16-4247**	**AZ18-4247**
1 x LU10-1325	1 x LV10-1351	1 x LZ12-1425
1 x LM45-1061	1 x LM45-1061	1 x LM45-1061
1 x LC06-1051	1 x LC06-1051	1 x LC06-1051
AU15-5243	**AV16-5243**	
1 x LU10-2305	1 x LV10-5301	
1 x LM45-5001	1 x LM45-5001	
1 x LC06-1001	1 x LC06-1001	
AU15-5247	**AV16-5247**	
1 x LU10-2325	1 x LV10-5351	
1 x LM45-5061	1 x LM45-5061	
1 x LC06-1051	1 x LC06-1051	

Component List:



Switch Pak Fitting includes the following parts:
- 1 Fitting
- 1 Coupling
- 1 Customer specified pipe

Switch Pak Fitting
P/N: LM45-1001, LM45-1061, LM45-5001 or LM45-5061



Compact Relay Controller
P/N: LC06-1001 or LC06-1051

Switch-Tek Level Switch
P/N: LU10-1305. LU10-1325, LU10-2305, LU10-2325 LV10-1301, LV10-1351, LV10-5301, LV10-5351, LZ12-1405 or LZ10-1425

SAFETY PRECAUTIONS

Step Three

⚠ **About this Manual:** PLEASE READ THE ENTIRE MANUAL PRIOR TO INSTALLING OR USING THIS PRODUCT. This manual includes information on the Switch Pak™ with Compact Relay Controller: AU15-_24_, AZ18-_24_ and AV16-_24_. The units are identical except for the material of construction and the sensors technology.

⚠ **User's Responsibility for Safety:** Flowline manufactures a wide range of liquid level sensors, controllers, and mounting systems. It is the user's responsibility to select components that are appropriate for the application, install them 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:** Use a proper sealant with all installations. Never overtighten the components. Always check for leaks prior to system start-up.

⚠ **Material Compatibility:**
Polypropylene (PP, a polyolefin): Sensor, Switch Pak™ fitting, Controller Housing.

Polyvinylidene Fluoride (PVDF): Sensor and SWitch Pak™ fitting.

Viton (a fluorocarbon): O-ring.

Make sure that the application liquids are compatible with the materials that will be wetted. To determine the chemical compatibility between the components and its application liquids, refer to the Compass Corrosion Guide, available from Compass Publications (phone 858-589-9636).

⚠ **Temperature and Pressure:** Switch Pak™ is designed for use in application temperatures up to 90° C (194° F). The Vibration and Ultrasonic packages are designed for pressurized applications up to 150 psi (10 bar) and the Buoyancy package is designed for use up to 25 psi (1.7 bar).

⚠ **Wiring and Electrical:** Electrical wiring of any liquid level control system should be performed in accordance with all applicable national, state, and local codes. Take care not to cut or break the outer insulation jacket of wiring that may be immersed while routing cables in the Switch Pak™ system. Such breaks of the liquid seal of the sensor system may lead to component failure.

⚠ **Flammable, Explosive and Hazardous Applications:** Switch Pak™ may be used within flammable or explosive applications only if the associated components are rated intrinsically safe for such use. In hazardous applications, use redundant measurement and control points, each having a different sensing technology.

⚠ **Make a Fail-Safe System:** Design a fail-safe system that accommodates the possibility of system or power failure. In critical applications, Flowline recommends the use of redundant back-up systems and alarms in addition to the primary system.

ASSEMBLY OF SWITCH PAK™

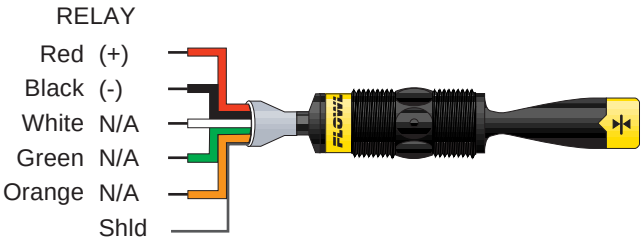
Step Four

About Switch Pak™: Flowline's Switch Pak™ with Compact Junction Box Assembly is an single-point mounting system for installing one level sensor vertically within a tank. The compact junction box features termination for the various wires from each level switch as well as a 1/2" conduit connection. Switch Pak™ mounts vertically through a standard 2" NPT tank adapter, or on a side mount bracket (such as the LM50-1001).

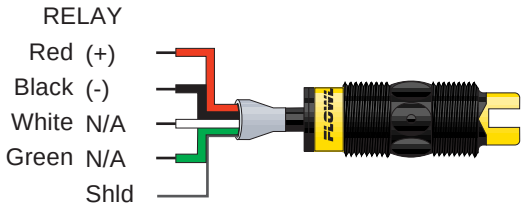
Level Switches: Switch Pak™ includes a single level switch used to identify it's own unique wet / dry condition. The technologies used to indicate level are either Ultrasonic, Buoyancy or Vibration. Each technology features a unique wiring/power configuration (Ultrasonic and Vibration technologies require 12 to 36 VDC power for operation, see below). The switch is terminated in the Compact Junction Box. The Compact Junction Box provides a 1/2" Conduit connection and 6 poles for wire termination.

Compact Junction Box (inside shown)

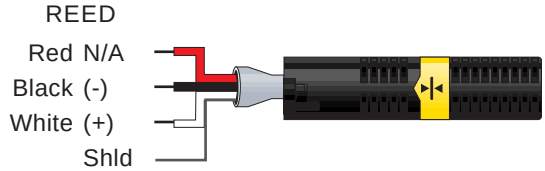
Vibration (LZ12-1405) Wire Configuration:



Ultrasonic (LU10-_305 or LU10-_325) Wire Configuration:



Buoyancy (LV10-_301 or LV10-_351) Wire Configuration:



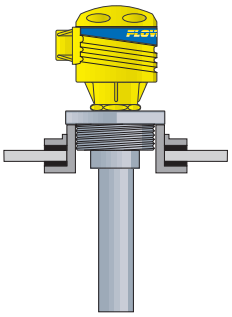
INSTALLATION

Step Five

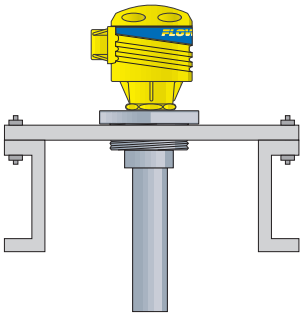
Switch Pak™, In-Tank Installation:

Flowline's Switch Pak™ mounting system is an in-tank fitting, which enables users to install any technology, along the entire length of track. Switch Pak™ may be installed thru the top wall of any tank or flange, using a standard 2" NPT tank adapter or blind flange. If tank top is not available, Flowline's side mount bracket, LM50-1001, enables Switch Pak™ to be installed directly to the side wall or lip of the tank.

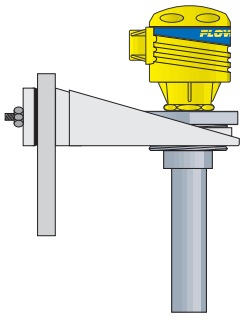
Tank Adapter:



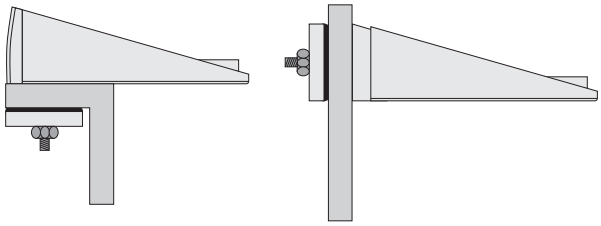
Flange Mounting:



Side Mount Bracket:



Lip of Tank **Side-Wall**



WIRING

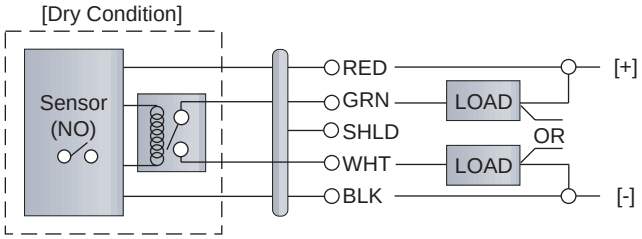
Step Six

Ultrasonic and Vibration Switches (LU10-1305, LU10-1325, LZ12-1405, LZ12-1425):

The LU10-13_5 and LZ12-14_5 switch can be wired normally open or normally closed for your application requirement. Each switch requires 12 - 36 VDC power to operate the sensor and switch the relay. The relay output can be wired as a dry contact. All illustrations below identify a Dry switch state as the normal position of the relay.

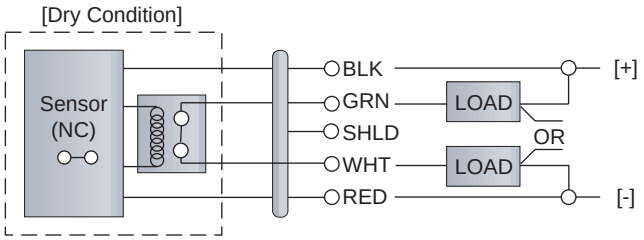
Switching a Normally Open DC Load:

The Red wire connects to Positive (+) of the power supply and the Black wire connects to Negative (-). The LOAD can be attached to either the Green or White wires. Complete the circuit by either connecting the Green to (+) VDC power or White to (-) VDC power (see illustration below).



Switching a Normally Closed DC Load:

The Black wire connects to Positive (+) of the power supply and the Red wire connects to Negative (-). The LOAD can be attached to either the Green or White wires. Complete the circuit by either connecting the Green to (+) VDC power or White to (-) VDC power (see illustration below).



Maintenance Alarm (LZ12 Vibration only):

For optimum performance and proactive maintenance, the sensor automatically adjusts for coating, and if necessary, outputs a preventative maintenance alarm. The Orange wire is a NPN transistor designed to switch when a build-up of material prevents the vibration switch from operating at its operational frequency. Use the Orange wire to identify when the Vibration switch requires cleaning (see the LZ12 manual for wiring information).

WIRING

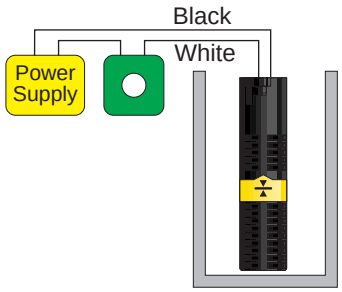
Step Seven

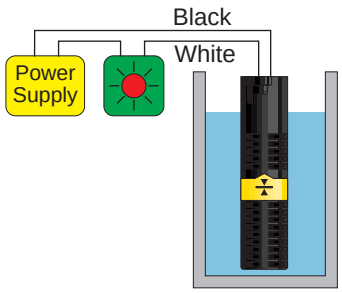
Buoyancy Level Switch (LV10-1301 & LV10-1351):

The LV10-13_1 switch can be wired normally open or normally closed for your application requirement.

Normally Open:

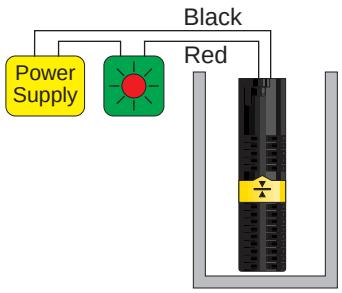
Use the Black and White wires for operating the LV10-_3_1 in a normally open state. Normally open is defined as the switch being open when the float is dry and closed when the float becomes submersed. This operation is typical for indicating a high level.

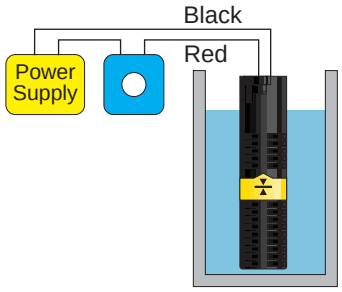




Normally Closed:

Use the Black and Red wires for operating the LV10-_3_1 in a normally closed state. Normally closed is defined as the switch being closed when the float is dry and open when the float becomes submersed. This operation is typical for indicating a low level.





MAINTENANCE

Step Eight

General: The Switch Pak™ with Compact Junction Box 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:

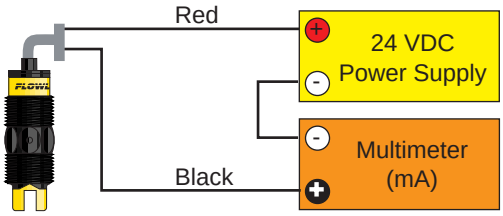
1. **Power:** Make Sure that all power to the sensor, controller and/or power supply is completely disconnected.
2. **Sensor Removal:** Make sure that the tank is in a state where it is safe to remove the sensors. Carefully, remove the Switch Pak™ from the installation.
3. **Cleaning the Sensor:** Use a soft bristle brush and mild detergent, carefully wash the Switch Pak™. 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 PP or Ryton plastic body.
4. **Sensor Installation:** Follow the appropriate steps of installation as outlined in the installation section of this manual.

Testing the installation:

1. **Power:** Turn on power to the switches and/or power supply.
2. **Immersing the switch:** Immerse the sensing tip of each switch in its application liquid, by filling the tank up to the switches point of actuation. An alternate method of immersing the switch during preliminary testing is to hold a cup filled with application liquid up to the switch's tip.
3. **Test:** With the switch being fluctuated between wet and dry states, the switch will open or close depending on wiring status. If the system doesn't have an input indicator, use a multimeter to ensure that the switch produces the correct signal.

Current Test (Ultrasonic and Vibration only):

Used to verify if the sensor is indicating a wet or dry condition. This test uses only two wires (Red and Black). The sensor draws 5 mA (ultrasonic) or 8 mA (vibration) when it is dry, and 19 mA when wet. The White and Green wires are not used.



Contact Test (Buoyancy only):

Used to verify if the reed switch is switching between dry (open) and wet (closed). Check for continuity across Black and White (open for dry and closed for wet). Checking across Black and Red will result in a closed when dry and open when wet condition.