Switch-Tek™

Horizontal, Vertical & Float-Point Float Switches

FLOWLINE™
LEVEL BEST

AV16, AV26, AV36, AV46, AV56, LH25, LH29, LH35, LV20, LV21, LV35 & LV36 Series Manual

Table of Contents

INTRODUCTION

1. Switches should be installed rigidly so the float or floats are free to move as the liquid level changes.
2. Switches should be mounted in a tank area free of severe turbulence or protected from such turbulence by appropriate and adequate slosh shields.
3. Vertical switch stems should be vertical for best results, but satisfactory operation is possible in most liquids with the stem at up to a 30° angle from vertical.
4. Side mount switch stems must be mounted with the arrow vertically either up or down depending on switch operation.
5. Care should be taken that switches are always operated within electrical ratings.
6. Orientation for standard Vertical switches can be changed from normally open to normally closed dry or vice versa by removing the float and reversing it on the stem, except with the LV20-2101, LV20-2201, LV21-1101 and LV21-1201.

TECHNOLOGY

Float switches consist of a float, magnet, reed switch and body/stem with mounting threads. When the probe is dry, the float rests on the bottom of the stem such that the magnet does not influence the reed switch. As the probe becomes immersed in liquid, the float becomes buoyant and the magnet elevates causing the reed switch to change state.

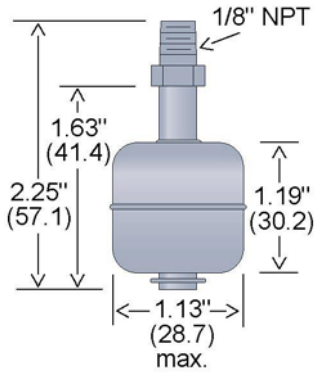
Operation is stated in the tank dry position.

- Vertical Mounted Switches:
  - NC Operation:
    - SS Floats: Witness mark (round circle) down.
    - Plastic Floats: Magnets up.
  - NO Operation:
    - SS Floats: Witness mark (round circle) up.
    - Plastic Floats: Magnets down.
    - *Note: LV20-2101, LV20-2201, LV21-1101 and LV21-1201 are not reversible. The LV20-2101 and LV21-1101 are Normally Closed. The LV20-2201 and LV21-1201 are Normally Open

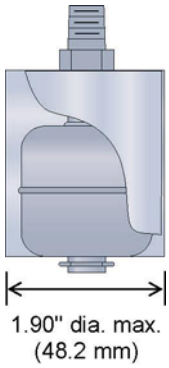
- Horizontal Mounted Switches:
  - NC Operation:
    - Arrow mounted vertically pointed down.
  - NO Operation:
    - Arrow mounted vertically pointed up.

DIMENSIONS

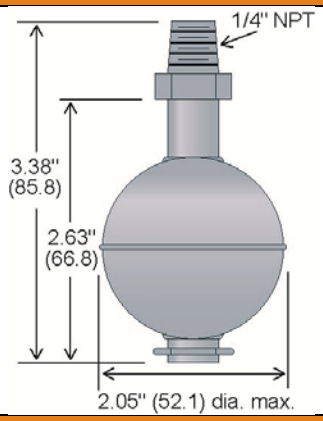
LV35-S201



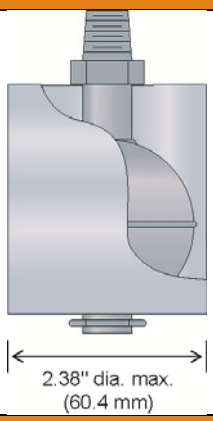
LV35-S401



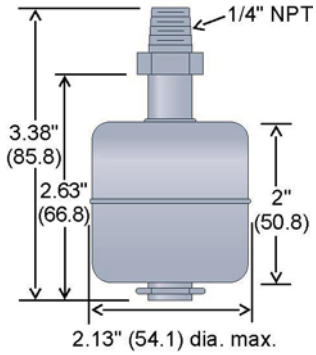
LV36-S201



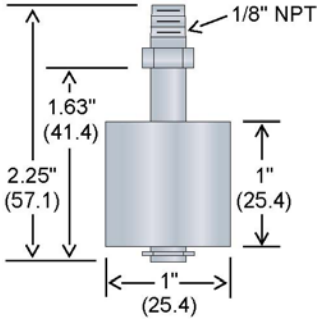
LV36-S401



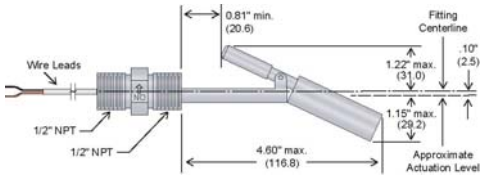
LV36-S501



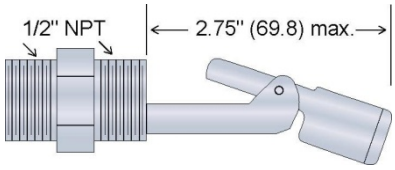
LV20-1501



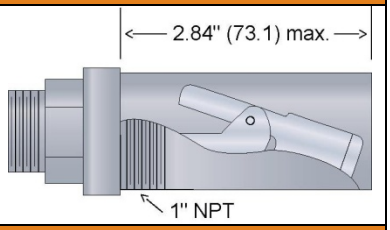
LH35-S201



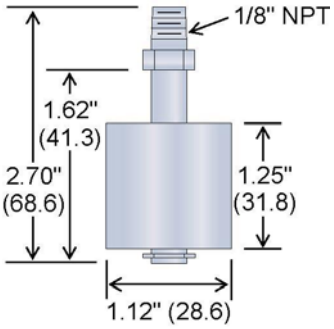
LH25-1201 & LH25-5201



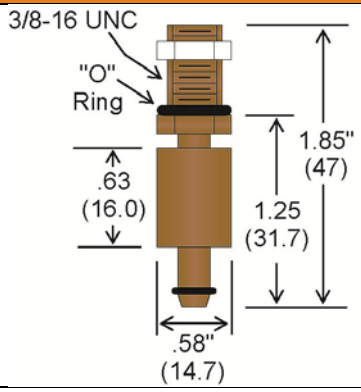
LH25-1401 & LH25-5401



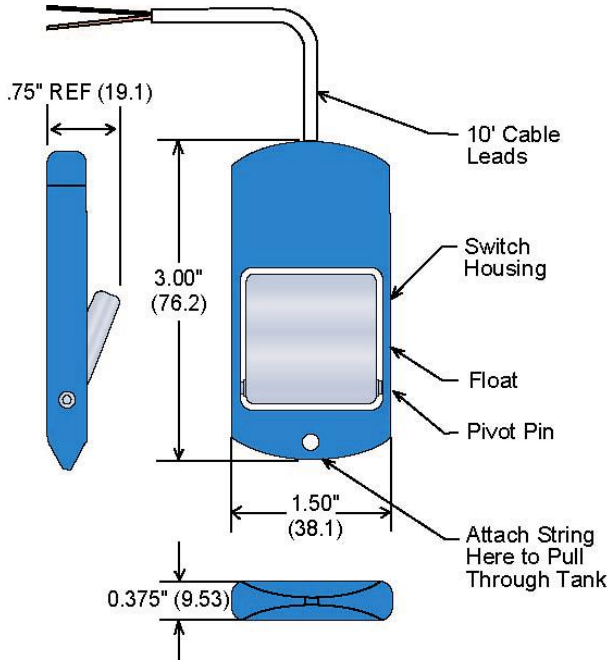
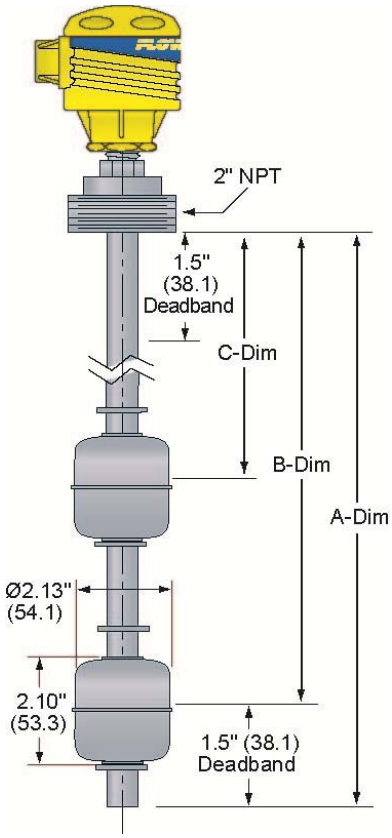
LV20-2101 & LV20-2201



LV21-1101 & LV21-1201



DIMENSIONS (CONTINUED)

LH29-1001	AV16-S243, AV26-S243, AV36-S243, AV46-S243 & AV56-S243
	 AV26-S243 Shown

MATERIAL COMPATIBILITY:

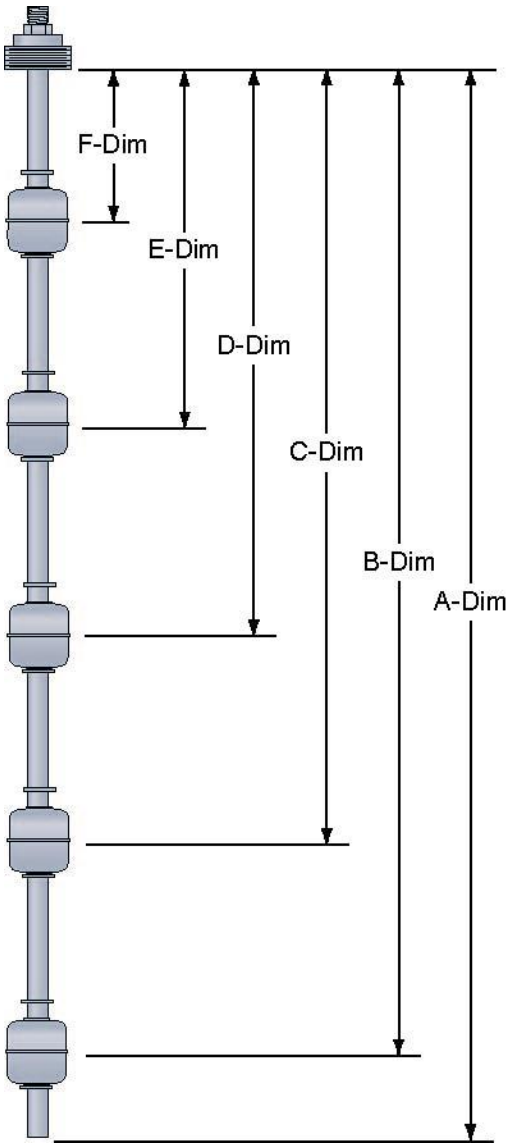
- The LV36-S201, LV36-S401, LV35-S201, LV35-S401, LH35-S201 and LV36-S501 are made of 316 stainless steel (316 SS) with 22 AWG, Teflon 24” wire.
- The LH25-1201, LH25-1401, LV21-1101, LV21-1201 and LV20-1501 are made of Polypropylene (PP) with 22 AWG, Teflon 24” wire.
- The LV20-2101 and LV20-2201 are made of Polytetrafluoroethylene (PTFE) with 22 AWG, Teflon 24” wire.
- The LH25-5201 and LH25-5401 are made of Polyvinylidene Fluoride (PVDF) with 22 AWG, Teflon 24” wire
- The LH29-1001 is made of Polypropylene (PP) with a Valox 420 stem and 22 AWG, HALAR jacketed 120” wire.
- The AV16-S243, AV26-S243, AV36-S243, AV46-S243 and AV56-S243 are made of 316 Stainless Steel (316 SS) with a Polypropylene (PP) enclosure.
- Make sure that the switch is compatible with the application liquids. To determine the chemical compatibility between the sensor and its application liquids, refer to the Compass Corrosion Guide, available from Compass Publications.

TYPICAL CURRENT AND VOLTAGE RATINGS

Watts	Voltage	Current Amps
15	240 AC 120 AC 100 DC 24 DC	- 0.12 0.10 0.30
30	240 AC 120 AC 120 DC 24 DC	0.14 0.28 0.07 0.28
60	240 AC 120 AC 120 DC 24 DC	0.40 0.50 0.20 0.50
100	240 AC 120 AC 120 DC 24 DC	0.40 1.00 0.40 1.00

- Note: The ratings above right are for resistive loads only. For inductive loads, maximum switch life will be achieved if appropriate arc suppression is used.
- The following part numbers; LV36-S201, LV36-S401, LV35-S201, LV35-S401, LV20-2101, LV20-2201, LV21-1101, LV21-1201, LH35-S201, LH25-1201, LH25-1401 and LH29-1001, are all two wire reed switch outputs where polarity does not matter.
- Part numbers LV36-S501 and LV20-1501 are reed switch outputs with three additional wires (there are 2 red-wires and 1 white-wire from the RTD) that are used to output the 100-ohm RTD used to measure the temperature of the environment.

AV_6 SERIES FLOAT AND WIRE KEY



SPST Switches	AV16-S243 (1) Switch	AV26-S243 (2) Switches	AV36-S243 (4) Switches	AV46-S243 (4) Switches	AV56-S243 (5) Switches
F-Dim					RED
E-Dim				RED	WHITE
D-Dim			RED	WHITE	BLUE
C-Dim		RED	WHITE	BLUE	GREEN
B-Dim	BLACK	BLACK	BLACK	BLACK	BLACK
A-Dim	Total Stem Length				

Note: *Each float will have a pair of colored wires for each level. For example, With a AV56-S243, the B-Dim float will have two black wires as the switch contact.*

SPECIFICATIONS

Part Number	Description	Float Mat'l	Stem Mat'l	Max. Oper. Temp (°C)	Max Pressure (PSIG)	Float SG	Nominal VA	Fitting
Standard Full-Size Vertical								
LV36-S201 LV36-S401	Vertical large Vertical large w/ slosh shield	316 SS 316 SS	316 SS 316 SS	200 200	500 500	0.70 0.70	100 100	¼" NPT ¼" NPT
LV35-S201 LV35-S401	Vertical small Vertical small w/ slosh shield	316 SS 316 SS	316 SS 316 SS	200 200	300 300	0.70 0.70	30 30	1/8" NPT 1/8" NPT
LV20-2101 LV20-2201	Teflon, NC Teflon, NO	PFTE PFTE	PFTE PTFE	150 150	25 25	0.69 0.69	60 60	1/8" NPT 1/8" NPT
LV21-1101 LV21-1201	Sub-miniature, NC Sub-miniature, NO	PP PP	PP PP	105 105	50 50	0.60 0.60	15 15	3/8-16 UNC 3/8-16 UNC
Standard Horizontal								
LH35-S201	Horizontal side mount	316 SS	316 SS	200	300	0.60	30	½" NPT
LH25-1201 LH25-1401	Horz. side mount Horz. side mount w/ slosh shield	PP PP	PP PP	105 105	100 100	0.60 0.60	30 30	½" NPT ½" NPT
LH25-5201 LH25-5401	Horz. side mount Horz. side mount w/ slosh shield	PVDF PVDF	PVDF PVDF	100 100	100 100	0.75 0.75	30 30	½" NPT ½" NPT
Vertical Floats with 100 Ohm RTD								
LV36-S501	Vertical SS	316 SS	316 SS	200	200	0.55	60	¼" NPT
LV20-1501	Vertical PP	PP	PP	105	100	0.85	30	1/8" NPT
Configured (Multi-Level) Vertical Assembly								
AV16-S243	1-point float system	316 SS	316 SS	200	200	0.55	60	2" NPT
AV26-S243	2-point float system	316 SS	316 SS	200	200	0.55	60	2" NPT
AV36-S243	3-point float system	316 SS	316 SS	200	200	0.55	60	2" NPT
AV46-S243	4-point float system	316 SS	316 SS	200	200	0.55	60	2" NPT
AV56-S243	5-point float system	316 SS	316 SS	200	200	0.55	60	2" NPT
Interstitial Switch								
LH29-1001		PP	Valox 420	105	50	0.85	30W	N/A

NOTES:

- Also applies to models with slosh shields
- The LV20-2101 and LV21-1101 are Normally Closed.
- The LV20-2201 and LV21-1201 are Normally Open.

Maintenance should consist of inspection to see that the float is free to move and not coated with any substance, which would change its weight or volume significantly. If this occurs, the float should be cleaned. This is easily accomplished without disturbing the installation. In addition, the stem may be wiped down to remove any build-up. The only repair possible in the field is replacement of either the float or stem. Dents or nicks on the float are usually of no consequence to operation.

CAUTIONS

Flowline manufactures a wide range of liquid level switches and technologies. While each of these switches are designed to operate in a wide variety of applications, it is the user's responsibility to select a switch 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.

1. The pressure, temperature and electrical limitations shown for the specified level switches must not be exceeded.
2. The pressures and temperatures must take into consideration possible surges in the temperature and pressure of the system.
3. The liquids used must be compatible with the materials of construction. Specifications of materials will be given upon request.
4. Life expectancy of the switch varies with applications. Contact the factory if life cycle testing is required.
5. Ambient temperature changes can affect switch set points, since specific gravities of liquids vary with temperature. Consult factory for assistance.
6. Level switches have been designed to be shock and vibration resistant. For maximum life, both shock and vibration should be minimized. Consult factory for assistance.
7. Excessive contaminants in fluid may inhibit float operation, and occasional wipe down may be necessary.
8. Level switches must not be field repaired
9. Physical damage to product may render product unserviceable.
10. Installation in a vessel made from magnetic materials may affect operation.

TESTING THE INSTALLATION:

1. Power: Turn on power to the controller and/or power supply.
2. Immersing the switch: Immerse the sensing tip 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 indicator light in the controller should turn on and off. If the controller doesn't have an input indicator, use a voltmeter or ammeter to ensure that the switch produces the correct signal.
4. Point of actuation: Observe the point at which the rising or falling fluid level causes the switch to change state, and adjust the installation of the switch if necessary.

CLEANING PROCEDURE:

1. Power: Make sure that all power to the switch, controller and/or power supply is completely disconnected.
2. Switch removal: If necessary, make sure that the tank is drained well below the switch prior to removal. Carefully, remove the sensor from the installation.
3. Cleaning the switch: Using a soft bristle brush and mild deter-gent, carefully wash the switch. Do not use harsh abrasives such as steel wool or sandpaper, which might damage the surface of the sensor. Do not use incompatible solvents, which may damage the sensor's PP or PVDF plastic body. Take particular care to remove any scaling from the float body and make sure that it moves freely.
4. Sensor installation: Follow the appropriate steps of installation as outlined in the Installation section of this manual.

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 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 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.)