AV17 Series
Switch-Tek Manual
Direct and Remote
Drum Mount Float Alarm
17 SEPT 08
Rev A

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Preface
This manual explains how to use the Switch-Tek series of horizontal and vertical floats.

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.

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, 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. 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 or replaced under this warranty will be warranted only for the remainder of the original warranty period.

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.

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Introduction

Flowline offers several level indication products designed specifically for standard 20-, 30- and 55-gallon drums. These level indicators will fit-up directly with standard 3/4" NPT bungs. This family of standard level switch (es) comes in low-level, high-level and multi-level designs, for both low-and high-level indication. The basic level switch uses an on-board battery supply as a power source. Alarms are available in either a fixed-mount (to the level switch) or a remote-mount design. This package provides both the level switch and the alarm with battery power for ease of use in remote sites where a power source is not readily available.

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. Care should be taken that switches are always operated within electrical ratings.

General Information:

- Available for high-level signal, low-level signal, or high and low level signals.
- Designed with liquid tight fittings, allowing for usage both indoors and outdoors.
- Optional alarm enclosures are available, see part number chart below.

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.

Installation

- Apply a suitable thread sealant to the threads.
- Tighten into 3/4" bung of drum, ½ turn beyond hand tight.

Alarm Enclosures:

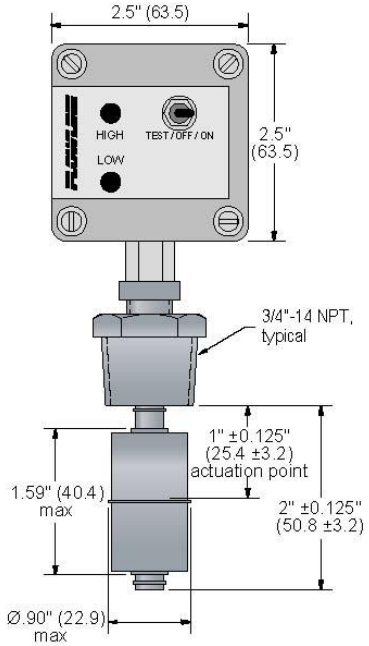
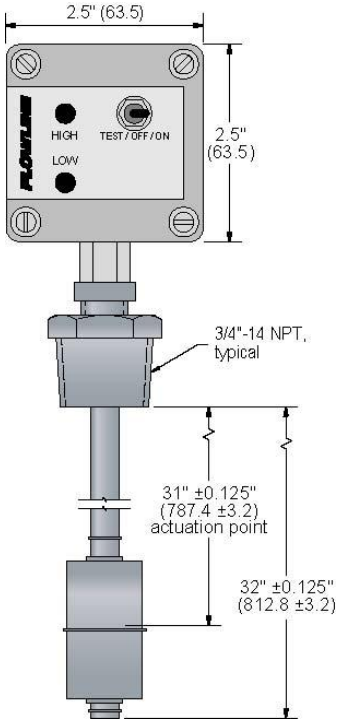
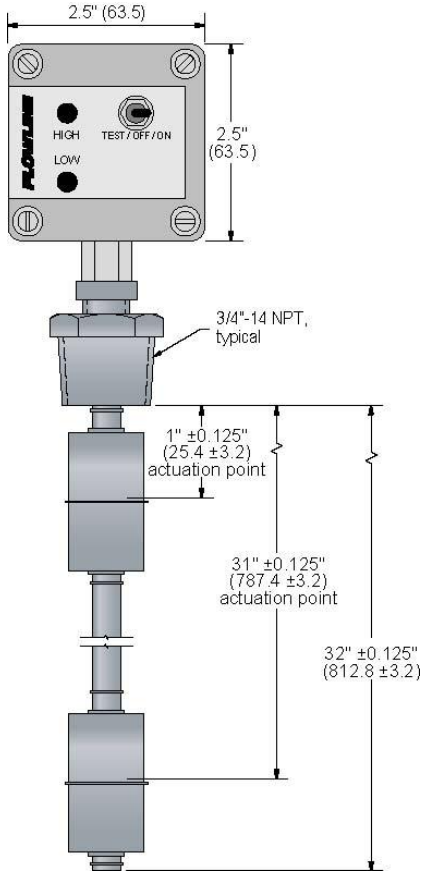
- *AV17-S101, AV17-S201 and AV17-S301*
  - Fixed mount design. Will be threaded onto the stem assembly during assembly.
  - Available in a High-Level, Low-Level or High and Low-Level, see part number chart below.
  - Standard design with LED's for alarm.
  - Top-level part, AV17-S101, AV17-S201 and AV17-S301, must be ordered with the alarm. The end user cannot install the Alarm.

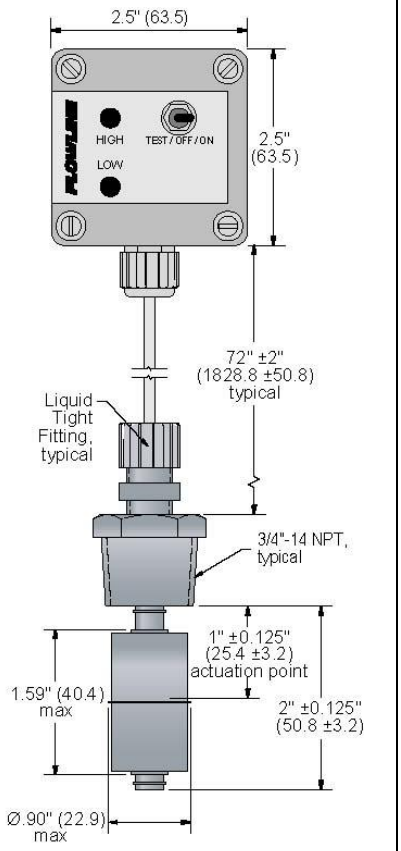
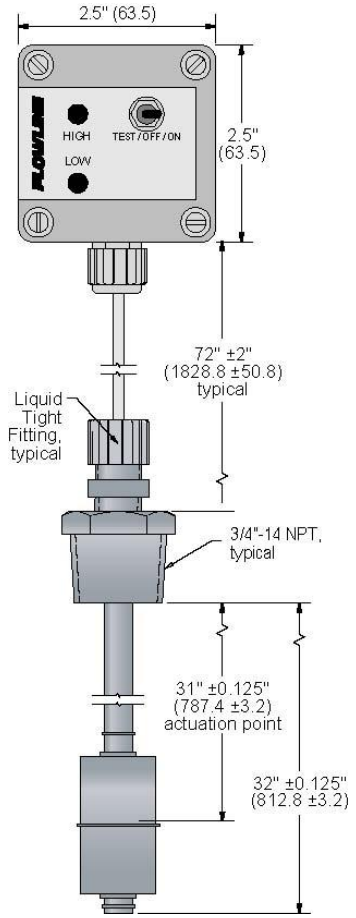
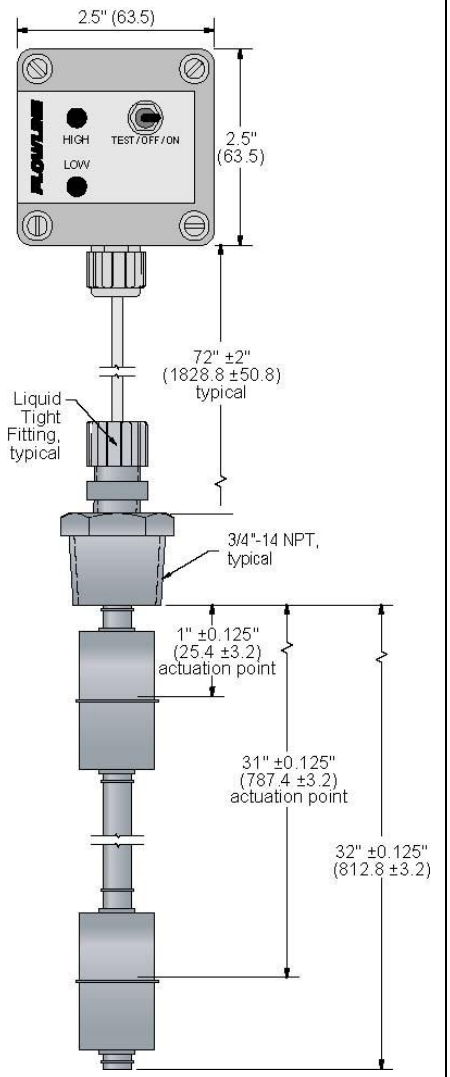
- *AV17-S401, AV17-S501 and AV17-S601*
  - Remote mount design. Uses liquid tight fitting to secure cable to enclosure.
  - Available in a High-Level, Low-Level or High and Low-Level, see part number chart below.
  - Standard design with LED's for alarm.
  - Top-level part, AV17-S401, AV17-S501 and AV17-S601, must be ordered with the alarm. The end user can remove the alarm enclosure.

Part Number	Operation (dry condition)	Function	Alarm Enclosure	Stem Length (inches)	20, 30, 55 Gallon Drum
AV17-S101	NO	High Level	Yes	2.00	20, 30, 55
AV17-S401	NO	High Level	Yes	2.00	20, 30, 55
AV17-S201	NC	Low level	Yes	32.00	55
AV17-S501	NC	Low level	Yes	32.00	55
AV17-S301	NO / NC	High level & Low level	Yes	32.00	55
AV17-S601	NO / NC	High level & Low level	Yes	32.00	55

Environmental

- **Dimensions**

Direct Drum Mount		
AV17-S101	**AV17-S201**	**AV17-S301**
		

Remote Drum Mount		
AV17-S401	**AV17-S501**	**AV17-S601**
		

- **Material Compatibility:**
  - All versions of the AV17 series have the stem, fittings and floats manufactured from 316 stainless steel (316 SS) and grip rings made of PH-15-7 Mo SS.
  - Direct Drum Mount designs (AV17-S101, AV17-S201 and AV17-S301) do not come with
    any exposed cable.
  - The Remote Drum Mount designs (AV17-S401, AV17-S501 and AV17-S601) come with 2 or 4-conductor, 22 AWG, Halar-jacketed; 72” length (±2”) cable.
  - 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 (858-589-9636).

Electrical Interface

- **Typical Current and Voltage Ratings**

Watts	Voltage	Amps (resistive)
30	240 VAC	0.14 A
30	120 VAC	0.28 A
30	120 VDC	0.07 A
30	24 VDC	0.28 A

- Note: The ratings above are for resistive loads only. For inductive loads, maximum switch life will
  be achieved if appropriate arc suppression is used.

Operation

Alarm box has two LED that indicate when an alarm occurs. The LED's are for High-Level and Low-Level.

- For models **AV17-S101** and **AV17-S401**, the Low-Level LED is not active
- For models **AV17-S201** and **AV17-S501**, the High-Level LED is not active

The Alarm Box also features a three position switch to Turn On, Turn OFF or Test the alarms

- **ON** – Activates the alarm(s). Use this setting for running the Drum Alarm
- **OFF** – Deactivates the alarm(s). Use this setting when changing the drum
- **TEST** – Used as a test to verify power and confirm the operation of the LED(s). This is moment position and will reset to OFF when released.

Specifications

Part Number	Description	Float Mat'l	Stem Mat'l	Max. Oper. Temp (°C)	Max Pressure (PSIG)	Float SG	Nominal VA	Fitting
Direct Drum Mount								
AV17-S101	High Alarm NO	316 SS	316 SS	150	250	0.73 (±0.02)	30	¾" NPT
AV17-S201	Low Alarm NC	316 SS	316 SS	150	250	0.73 (±0.02)	30	¾" NPT
AV17-S301	High Alarm NO & Low Alarm NC	316 SS	316 SS	150	250	0.73 (±0.02)	30	¾" NPT
Remote Mount								
AV17-S401	High Alarm NO	316 SS	316 SS	150	250	0.73 (±0.02)	30	¾" NPT
AZ17-S501	Low Alarm NC	316 SS	316 SS	150	250	0.73 (±0.02)	30	¾" NPT
AV17-S601	High Alarm NO & Low Alarm NC	316 SS	316 SS	150	250	0.73 (±0.02)	30	¾" NPT

Maintenance

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 ampmeter 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.

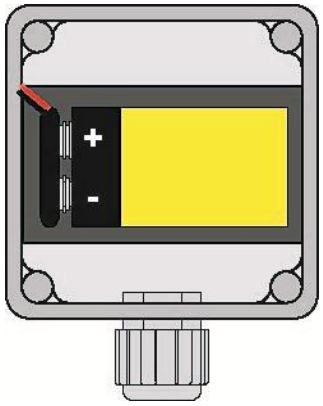
Cleaning procedure:

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 316 stainless steel 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.

Changing the Battery

The AV17 Series uses one 9 volt battery to provide power for the system. Periodically, the batteries will need to be replaced. Follow the instructions below to replace the batteries:

1. Turn the AV17 series OFF
2. Make sure the application is in a safe state before continuing.
3. Loosen the 4 screws with a flat head screw driver and remove the cover of the alarm box.
4. Remove the 9 volt battery.
5. Replace with one fresh battery. Make sure to observe polarity.
6. Replace cover and tighten the four screws.
7. Test the system with the TEST feature
8. Turn the AV17 ON.



AV17 shown with Cover Off