

SAL18 Series RF Admittance Point Level Sensor

Operation Manual

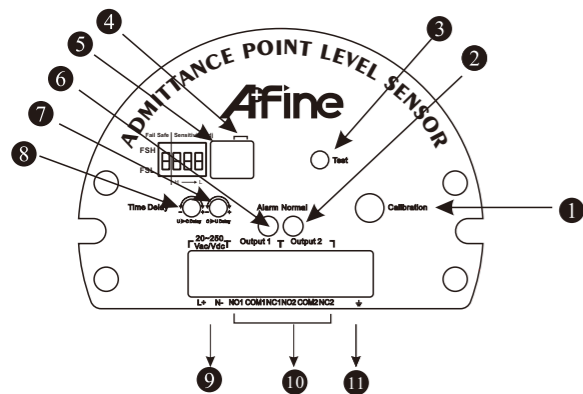


NEMA Enclosure types 4, 4X

Operating Principle

The SAL18 Series is an RF admittance point level sensor comprising an active probe section, guard section and grounding section with insulation sleeves between the sections. The SAL18 is designed to monitor for the presence or absence of a target material by detecting the change of admittance between the active and grounding sections, which is caused by the change from material presence to absence or the reverse. The SAL18 Series features automatic build-up immunity which is especially helpful with target materials that are sticky or pack between the vessel wall and the probe. The guard section is used to provide this immunity and is activated with the same RF signal as the active probe section. Since current cannot flow between the same potentials, the guard section effectively blocks the current flow from the active probe through the build-up to the grounding section at the vessel wall. Therefore, the guard section eliminates the sensing of the material build-up, ensuring the accuracy and application reliability of the sensor.

Operating Panel



- 1 Calibration-After installation is complete probe, In the empty bucket state, Pressed for more than 3 seconds, Will enter the calibration procedure (Red / Green LED will flash alternately)
- 2 Normal-Green Led-Under normal circumstances will light
- 3 Test: When you press the button, simulation alarm
- 4 Sensitivity: Sensitivity setting switch
- 5 Fail Safe: FSH: for high level use;FSL: for low level use
- 6 Alarm: Red Led-Lights in alarm
- 7 Time Delay-C to U Delay: Time Delay -Covered to uncovered delay, adjust delay time 0~30 seconds
- 8 Time Delay-U to C Delay: Uncovered to covered delay, Adjustment delay time 0~30 seconds
- 9 Power Supply: Wiring connections for 20~250 Vac/Vdc supply
- 10 Output1/Output2: Output Wiring
- 11 PE: Protective earth line

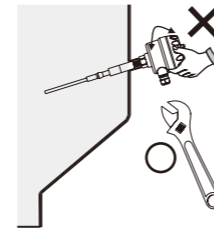
Fail Safe Function

Operation mode	Indicator LED	NPN/PNP Output	Relay Output
FSH	Normal/Green	COM. --- N.O.	COM. --- N.O.
	Alarm/Red	COM. --- N.O.	COM. --- N.C.
FSL	Normal/Green	COM. --- N.O.	COM. --- N.O.
	Alarm/Red	COM. --- N.O.	COM. --- N.C.

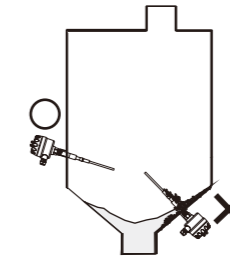
Specifications

Supply voltage	20~250Vac/Vdc, 50/60Hz
Power consumption	Max.15VA
Output rating	1. ONE Relay Output: 5A@240Vac/24Vdc (Option: TWO Relay) 2. ONE NPN/PNP Output: 400mA@60Vac/Vdc (Option: TWO NPN/PNP)
Fail safe	FSH/FSL
Delay time	0~30sec
Ambient temp.	-40°F~140°F(-40°C~60°C); UL number E484424 -40°F~176°F(-40°C~80°C)
Process temp.	Type A, D and F; -40°F~302°F (-40°C~150°C) Type B and E; -40°F~450°F (-40°C~232°C) Type C; -40°F~842°F (-40°C~450°C)
Pressure	290psi(20bar)
Normal indicator	Green LED
Alarm indication	Red LED
Housing material	Diecast Aluminum (powder coated)
Probe material	Type A, B, C and F; 304SS/316SS/316LSS Type D and E; 304SS
Insulator material	Type A, D, E and F; PTFE Type B; PEEK Type C; Ceramic

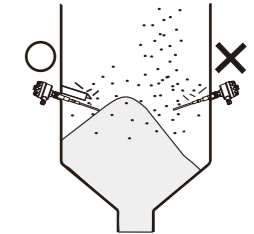
Pre-installation



- X: Do NOT use enclosure to thread probe into its process connection
- O: Thread probe into process connection by the hexagon neck using a wrench

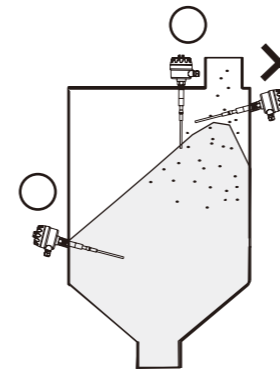


- X: Do NOT mount the sensor on a slanting wall like a bin cone section as shown
- O: For best performance in low level installations mount the probe in verticle bin walls

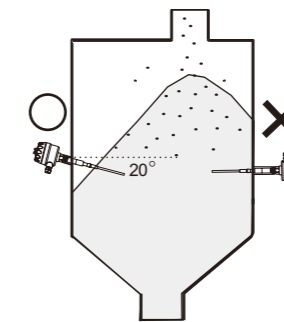


- X: Avoid mounting the probe in the direct path of falling material
- O: Installation of a protective baffle above the probe is recommended, especially with heavy material or when material might come in contact with the probe from above

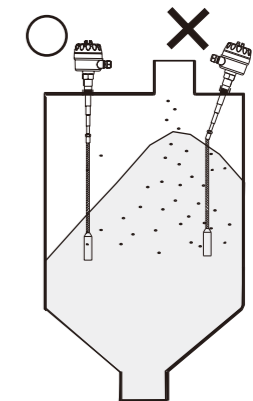
Pre-installation



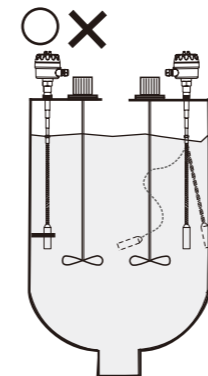
- X: Do NOT mount the sensor probe in the path of the incoming material flow
- O: For best performance it is recommended to use top mounting for high level and side mounting for low level applications



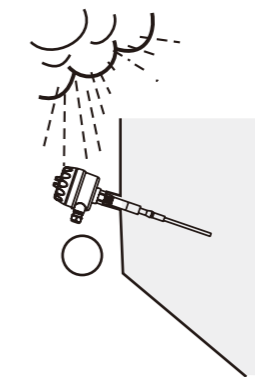
- X: Do NOT mount the sensor probe horizontally
- O: For best performance it is recommended to mount side mounted probes at 20° downward angle



- X: In top mounted installations, do not install at any angle as this can damage the cable extended probe
- O: In top mounted installations mount the cable extended probe plumb



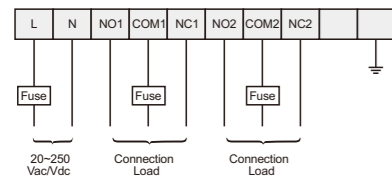
- X: Cable extended probes can become tangled with mixing equipment, exercise caution when choosing a mounting location
- O: For best performance it is recommended to secure cable extended probes using an insulated bracket



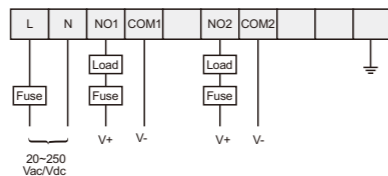
- O: When installing any probe make sure the conduit entrances are pointing down to eliminate potential damage to sensor from conduit draining into enclosure or in case conduit is loose

Wiring

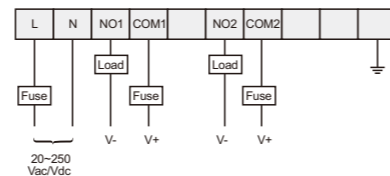
■ Relay:



■ NPN:



■ PNP:



*FUSE: 0.5A recommended for NPN/PNP output

Fuse rating for Relay output should be based on the lower of Load current draw or according to relay maximum current load specification.

Adjusting Time Delay

U->C Delay: A potentiometer is provided for setting the "on" time delay between 0~30 sec, labeled "-" (minimum) and "+" (maximum). The time delay is the time between when the material is sensed by the SAL18 capacitance point level sensor and when the relay and LED's change state.

C-> U Delay: A potentiometer is provided for setting the "off" time delay between 0~30 sec, labeled "-" (minimum) and "+" (maximum). The time delay is the time between when the material is sensed by the SAL18 capacitance point level sensor and when the relay and LED's change state.

Simulating Alarm Test

The SAL18 capacitance point level sensor includes an alarm test function that can be used to check the control function of your level control setup.

The test function simulates detection of the target material at the probe and press "TEST" button.

Example :

When setting FSL, the material doesn't contact the sensor, the red LED on, the green LED off, COM and NC terminals short circuit, or crystals (NPN / PNP output) COM and NO open. When the TEST button is pressed, the red LED off, green LED lights, output short circuit COM and NO, or crystals (NPN / PNP output) COM and NO short circuit.

Calibration

The SAL18 completely calibrated by factory, however due to environment change, may customer need to re-calibrate. Please follow these steps:

1. Confirm the sensor installed correctly
2. Empty calibration : The tank is empty or the material doesn't cover the probe/cable
3. Supply power
4. Long Press Calibration button for 3 seconds or more
5. When the sensor is in Calibration mode, the red LED (Alarm) and green LED (Normal) blink
6. The calibration complete when the red LED (Alarm) and green LED (Normal) stop blinking
 - FSH setting : green LED (Normal) on
 - FSL setting : red LED (Alarm) on

If calibration failure, green LED on, red LED continuously blink.

Maintenance

No periodic or preventive maintenance is required when the SAL18 capacitance point level sensor is properly applied and installed. Follow the below guidelines for periodic inspection:

1. Clean electrical connection terminals if necessary.
2. Inspect for any broken or damaged parts, replace or repair if necessary.
3. Maintain tight and sealed conduit connections in the proper orientation as previously discussed.

Sensitivity DIP witch Adjustment

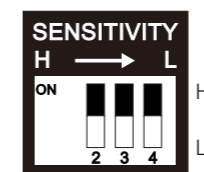


Fig. 1

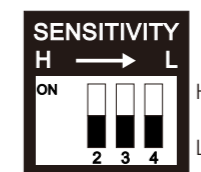


Fig. 2

Sensitivity Adjustment	4 Step DIP Switch				Note
	(1)	(2)	(3)	(4)	
1PF					Switch (2+3+4) OFF
2PF		●			Switch (2) ON ; Switch (3+4) OFF
3PF			●		Switch (3) ON ; Switch (2+4) OFF
4PF				●	Switch (4) ON ; Switch (2+3) OFF
5PF		●	●		Switch (2+3) ON ; Switch (4) OFF
6PF		●		●	Switch (2+4) ON ; Switch (3) OFF
7PF			●	●	Switch (3+4) ON ; Switch (2) OFF
8PF		●	●	●	Switch (2+3+4) ON

Example Dielectric Constants

Liquid Material	Dielectric Constants	Performance	Powder/Solid Material	Dielectric Constants	Performance
Water	81	Good	Rice	3	Good
Sulfuric Acid	84	Good	Flour	2.4	Good
Glycerol	37	Good	Corn	1.8	Good
Methanol	30	Good	Milk Powder	1.8	Good
Butanol	11	Good	Talcum Powder	1.8	Good
Ethanol	2.5	Good	Rice Bran	1.7	Good
Edible Oil	2.4	Good			
Diesel Fuel	2.1	Good			
Pentane	1.8	Good			



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