Sanitary Type
Electronic Level Switches

SL Series

Applications

- Universal High, Low Level
- Organics/Water Interface
- Emulsion from Organics/Water
- Air/Foam Interface
- Foam/Liquid Interface
- Solids detection in a Liquid
- Agitation Monitoring

Ameritrol, Inc.
Instruments and Controls

Features

- Most Versatile Level Switch Available
- No Moving Parts
- Suitable for CIP systems
- Temperatures to +350F
- Simple and Easy Field Calibration
- Explosion Proof Nema 4X Enclosure
- 316L Stainless Steel
- Sanitary Process Connections
- 3A Sanitary Design
- Special RA Polish & Electropolishing
- Top, Side, or Bottom Connection
- Field Programmable Relay Energization

SL-1005 (with 1.8” Insertion Length)

Optional Remote Mounted Electronics

Specifications

Sensor Head

Material of Construction:	316L Stainless Steel Standard Option Electropolished to 15Ra
Operating Temperature:	-50 to +350F (-46 to +177C) Standard
Operating Pressure:	Vacuum to 2000 PSIG (207 Bar)
Response Time:	From 3 Seconds
Repeatability:	± ⅛” at Sense Point
Process Connection:	1 ½”, 2” Tri-Clamp Cap Standard Option 3”, 4” Tri-Clamp Cap
Probe Length:	1.8”, 1.0”; Option Customer Specified

Electronics

Housing:	Powder Coated Explosion Proof, Nema 4X, UL/CSA Rated to Class 1, Div. 1 & 2, Group B,C,D; Class II, Div. 1 & 2, Group E,F,G; Class III. Option FM and Cenelec/ATEX
Temperature:	-50 to +150F (-46 to +65C)
Power Input:	120 VAC, 50/60 Hz, 4 Watts; Options: 24 VDC/VAC, 240VAC
Output:	SPDT 3 Amps Resistive Standard See page 4 for options
Electrical Connection:	1” FNPT
Shipping Weight:	5 lbs

Operation

The SL series sanitary level switch has been designed to meet the most critical liquid level detection applications in the food, pharmaceutical, biotechnology, and water treatment industries. Quick disconnect tri-clamp caps are standard with special finishes for 3A applications and polished/electropolished for biotechnology and pharmaceutical use.

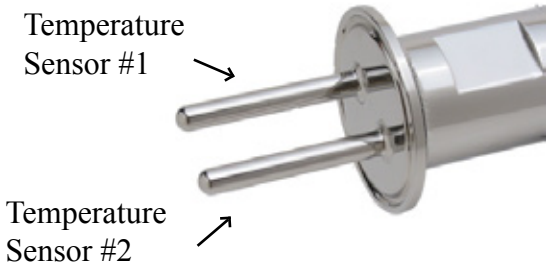
The thermal dispersion principle of operation features no moving parts exposed to the process. The instrument operates by measuring the temperature differential between a heated and a reference temperature sensor (see figure 1). An extremely low power heating element is attached to a temperature sensor and a second temperature sensor is isolated from the heater to provide compensation for changing process temperatures. The probe operates by sensing the thermal conductivity (not electrical conductivity) of the product surrounding the probe. All liquids that form an interface will have a difference in thermal conductivity that can be sensed.

With no moving parts exposed to the process users are provided an extremely reliable and repeatable instrument even in extremely viscous or corrosive applications.

Electronics are available with single or dual switch points. The dual switch point option allows one sensor to detect two different interfaces or one interface and another process variable such as fluid agitation.

Temperature monitoring is also available with either a switch output or a linear 4-20 mA output.

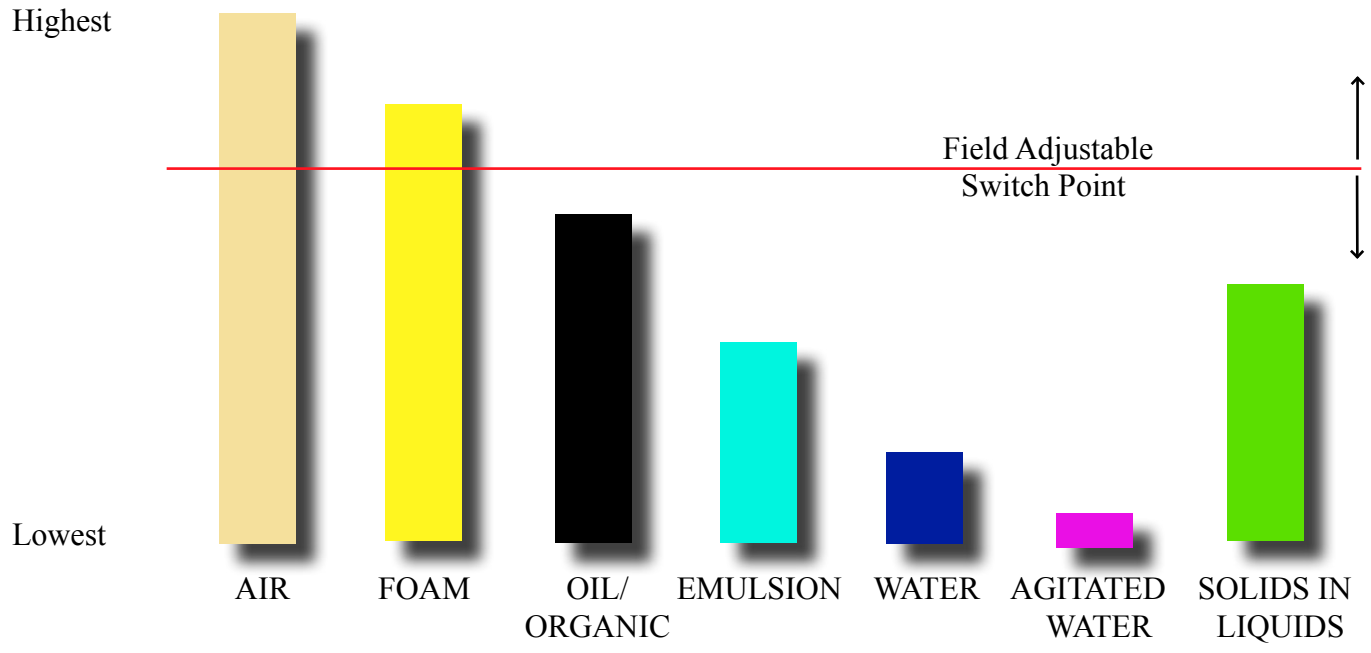
Relay outputs are standard and are offered with several different configurations and contact ratings. Remote mounting of the electronics is also available.



Temperature Differential = Temperature Sensor #1 Minus Temperature Sensor #2

Figure 1

Sensor Output (Temperature Differential) Based on Product Type



Circuit Board Options

Standard Single Switch Point Electronics

• SPDT relay output with 3 or 10 amp contacts

• DPDT relay option with 3 or 10 amp contacts

• Wide selection of power inputs including 24 VAC or VDC, 120 VAC, or 240 VAC

This circuit board is the standard used in the SL series level switches. The electronics offer constant current sensor excitation, precision signal amplification, and highly repeatable switching circuitry for reliable operation in even the most demanding applications.

Optional Dual Switch point Electronics

• Two separately adjustable switch points

• SPDT relay output for each set point with 3 or 10 amp contacts

• Power inputs include 24 VAC or VDC, 120 VAC, or 240 VAC

The optional dual set point electronics provide two independently adjustable set points and can be used to detect any two interfaces such as organics/water and organics/vapor.

Single Switch Point Electronics with Additional Temperature Transmitter

• Temperature transmitter (3 wire 100 Ohm platinum RTD sensor) with loop powered 4-20 mA output

• SPDT relay output for level switch with 3 or 10 amp contact rating

• Level switch power inputs include 24 VAC or VDC, 120 VAC, or 240 VAC

This option provides the user with a highly reliable level switch with an accurate temperature transmitter. The temperature transmitter provides a industry standard linearized 4-20 mA signal. The temperature output is loop powered and can operate from 8-36 VDC.

Single Switch Point Electronics with Additional Temperature Switch

• Temperature switch point available from -50F to +350F

• SPDT relay output for level and temperature with 3 or 10 amp contact rating

• Customer specified power inputs include 24 VAC or VDC, 120 VAC, or 240 VAC

This optional circuit board monitors two process variables, level and temperature, with one instrument. Cost savings are realized by the user since the instrument has only one process connection and one conduit run.

Optional Calibrator

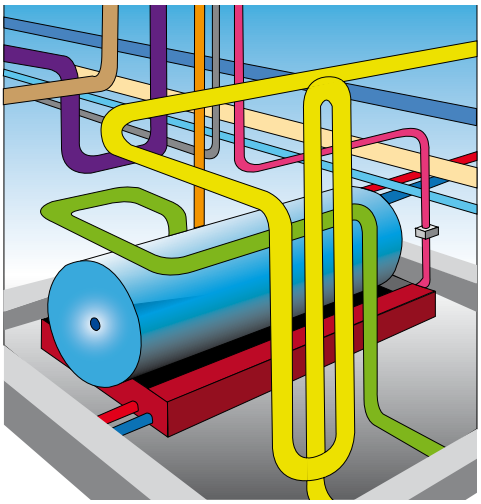
Level Switch Calibrator Model MC-5

- Displays mV output which is proportional to thermal conductivity of liquids, slurries or gases.
- Induces signal to electronics for setting specified switch point
- Allows periodic switch point verification

This tool is not needed for a vast majority of users. It is useful when a user has large quantity of units and requires periodic verification of switch point calibrations.

This easy to use hand held, self powered instrument can be used in conjunction with all single or dual switch point circuit boards. By simply plugging this instrument into the circuit board, the user can interrogate all functions of the level switch.

Level Switch Applications



- Suitable for CIP systems
- Electropolished sensors available
- Wet/Dry: Point sensor detects high and or low level of practically any liquid.
- Liquid to Liquid Interface: Detects any liquid to liquid interface
- Agitation Monitor: Detects the difference between agitated and non-agitated liquids or slurries.
- Overflow/Drainline Sensor: Capable of detecting liquid in partially filled lines.

- Redundant/diversified Level Indicator: Provides primary or secondary high or low level alarms to meet critical applications that require redundant/diversified technologies.
- Universal Level Switch: Detects liquids in low or high levels applications regardless of fluid dielectric properties.
- Foam Detector: Differentiates differences between foam and liquids or foam and gases.
- Emulsion Detector: Emulsions typically can be detected from their base liquids.
- Solids in Liquids: Detects solids surrounding sensor probe in settling tank applications.

PART NUMBER/ ORDER ENTRY SPECIFICATION

SL SERIES SANITARY LEVEL SWITCH

OPTIONS - NO ENTRY REQUIRED FOR BOXES WITH X

SL- [ ][ ][ ][ ] - [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

PROCESS CONNECTION

1 ½" Tri-Clamp Cap	**1**	**0**	**0**	**5**
2" Tri-Clamp Cap	**2**	**0**	**0**	**5**
3" Tri-Clamp Cap	3	0	0	5
4" Tri-Clamp Cap	4	0	0	5

INSERTION LENGTH			
• 1.8" STANDARD			X
• 1.0" OPTIONAL	1	.	0
• SPECIAL - SPECIFY LENGTH IN INCHES			
POWER INPUT			
• 117 VAC (90-132VAC)			X
• 24 VDC or VAC (+/- 10%)			D
• 200-240 VAC			E
PROCESS TEMPERATURE			
• -50F TO +350F			X
LOCAL ELECTRONICS			X
REMOTE ELECTRONICS			R
• CABLE TYPE PVC (200F)			H
• CABLE TEFLON (500F)			I
• CABLE LENGTH FT.			
RELAY OUTPUTS			
• SPDT 3 AMP RESISTIVE			X
• SPDT 10 AMP RESISTIVE			J
• DPDT 3 AMP RESISTIVE ①			K
• DPDT 10 AMP RESISTIVE ①			L
DUAL SWITCH POINTS ①			
• SPDT 3 AMP RESISTIVE			M
• SPDT 10 AMP RESISTIVE			N

ADDITIONAL TEMPERATURE SWITCH ①		
• SPDT 3 AMP RESISTIVE	T	1
• SPDT 10 AMP RESISTIVE	T	2
ADDITIONAL TEMPERATURE TRANSMITTER ①		
• MEASURED TEMPERATURE RANGE T T [ ] - [ ]		
• FAHRENHEIT (F) OR CELSIUS (C)		
SENSOR HEAD MATERIAL		
• 316L STAINLESS STEEL		X
HOUSINGS		
• UL/CSA APPROVED XP/NEMA 4X		X
• FM APPROVED XP/NEMA 4X		P
• CENELEC/ATEX APPROVED XP/NEMA 4X		Q
STAINLESS STEEL TAG		T
MILLIVOLT OUTPUT	m	V
Special Electropolishing (15 Ra)	E	P

Note ① Only one of these options can be selected.

Example: SL-1005
SL Series level switch with 1 ½" tri-clamp cap process connection, 1.8" insertion length, 117 VAC power input, -50 to +350 F process temperature, single switch point with SPDT 3 amp contact rating, UL/CSA approved explosion proof (XP)/NEMA 4X housing.

Example: SL-2005-DJTT0-100CEP
SL Series level switch with 2" tri-clamp cap process connection, 1.8" insertion length, 24 VDC or VAC power input, -50 to +350F process temperature, single switch point with SPDT 10 amp contact rating, additional temperature transmitter with range 0 to 100C, UL/CSA approved explosion proof (XP)/NEMA 4X housing, 316L stainless steel sensor head, with all wetted parts electropolished.

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