

ELECTRONIC LEVEL

Switches

LX Series



Applications

- Universal High, Low Level
- Oil/Water Interface
- Emulsion from Oil/Water
- Air/Foam Interface
- Foam/Liquid Interface
- Solids detection in a Liquid
- Top Mounted Multiple Point Units
- Agitation Monitoring

Ameritrol, Inc.

Instruments and Controls

Operation

The LX series level switch is the most versatile instrument ever designed for level control. One unit can be field calibrated to detect the interface of air/foam, foam/liquid, oil/emulsion, emulsion/water, oil/water, and a solid in a liquid. It can also be used as a universal high level switch that will alarm if any type of liquid comes in contact with the probe.

The sensor head employs two temperature sensors with a constant very low power heating source physically attached to one of the temperature sensors (see figure 1). The second temperature sensor is isolated from the heating source and provides 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.

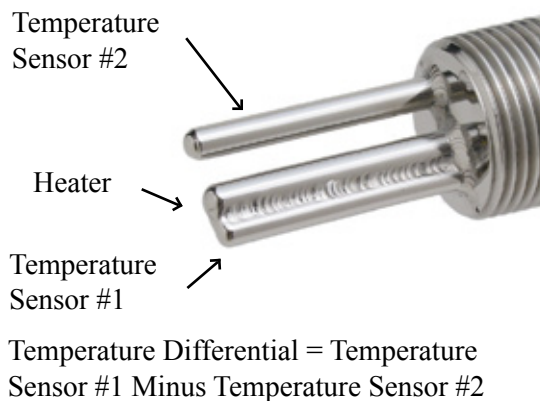
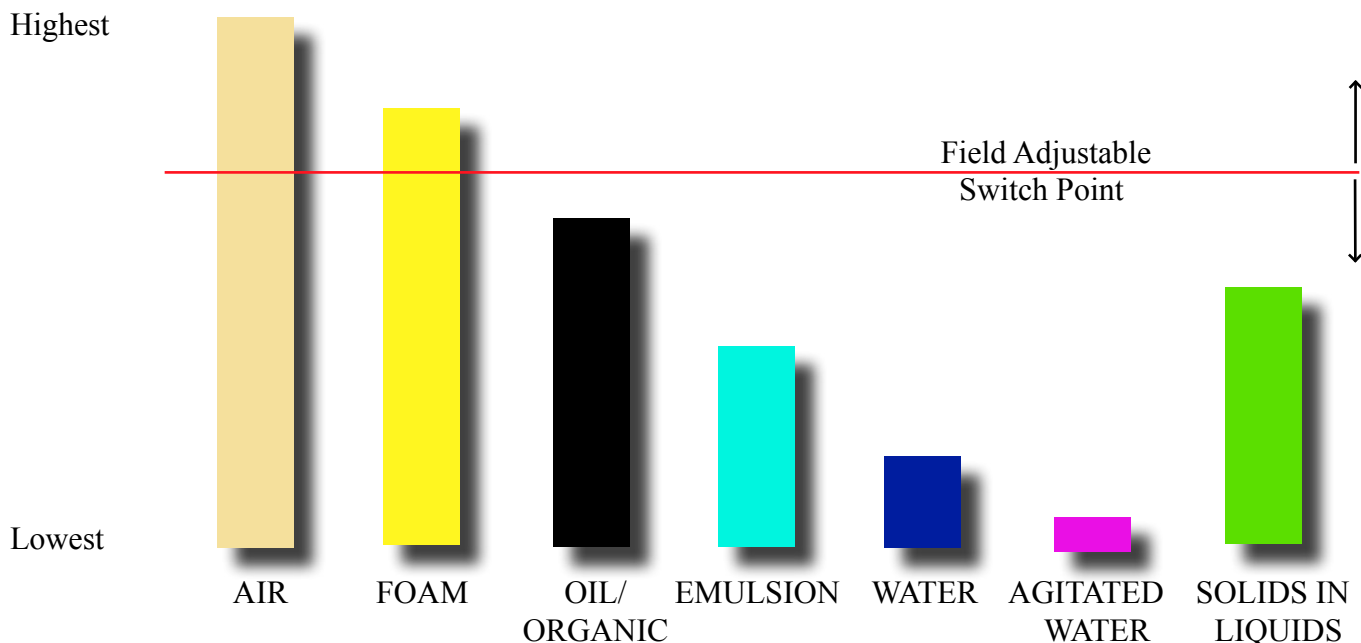


Figure 1

Sensor Output (Temperature Differential) Based on Product Type



Features

- Explosion Proof Enclosures
- Most Versatile Level Switch Available
- Threaded, Flanged, Retractable Probes
- Exotic Alloys for Corrosion Resistance
- Simple and Easy Field Calibration
- No Moving Parts
- 316L Stainless Steel Sensor
- Temperatures to 900F
- Pressures to 10,000 PSIG
- Field Programmable Relay Energization



Optional Remote Mounted Electronics



Optional Extended Sensor Head



Optional Flanged Sensor Head



Optional Retractable Sensor Head
(Isolation Ball Valve Not Shown)

Specifications

Sensor Head

Material of Construction:	316L Stainless Steel Standard Optional Exotic Alloys
Operating Temperature:	-50 to +350F (-46 to +177C) Standard Option -100 to +900F (-73 to +482C) Option -320 to +500F (-196 to +260C)
Operating Pressure:	Vacuum to 4000 PSIG (275 Bar) Option to 10,000 PSIG (689 Bar)
Response Time:	From 3 Seconds
Repeatability:	± 1/8" at Sense Point
Process Connection:	3/4" MNPT, 1" MNPT Standard Option Flanged, Retractable Probes, and 1/2", 1-1/4", 1-1/2", 2" MNPT
Probe Length:	1.8", 1.2"; 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: 12 VDC, 24 VDC/VAC, 240VAC
Relay Output:	SPDT 3 Amps Resistive Standard See page 4 for options
Electrical Connection:	1" FNPT
Shipping Weight:	5 lbs

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 12 VDC, 24 VAC or VDC, 120 VAC, or 240 VAC

This circuit board is the standard used in the LX 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 12 VDC, 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 oil/water and oil/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 12 VDC, 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, options to 900F
- SPDT relay output for level and temperature with 3 or 10 amp contact rating
- Customer specified power inputs include 12 VDC, 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

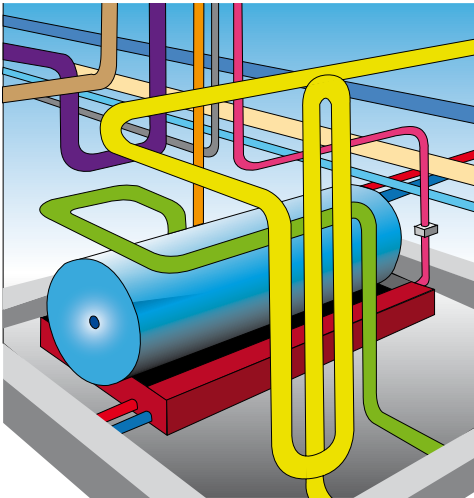
- Displays mV output which is proportional to thermal conductivity of liquids, slurries or gases.
- Induces signal to electronics for setting specified switch point
- Allows periodic switch point verification

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.

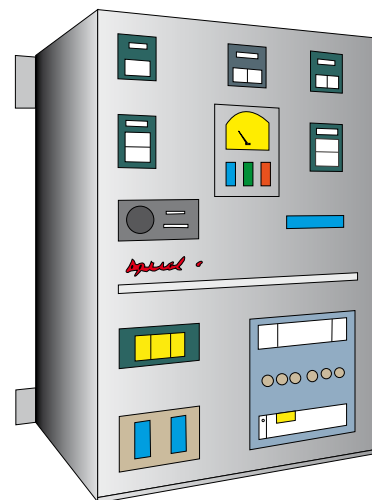


Level Switch Applications



- 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.
- Emulsion Detector: Emulsions typically can be detected from their base liquids.
- Solids in Liquids: Detects solids surrounding sensor probe in settling tank applications.

- 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.
- Flood alarm: Can be mounted in overflow collection basins to alarm when liquid is present. As little as 1/8" of liquid can be detected.
- Retractable Probe Mounting: Retractable probe mounting is available for an adjustable detection point in top mounted applications



PART NUMBER/ ORDER ENTRY SPECIFICATION

LX SERIES LEVEL SWITCH

OPTIONS - NO ENTRY REQUIRED FOR BOXES WITH X

LX - -

PROCESS CONNECTION THREADED	1/2" MNPT ⊕	0	5	0	0
	3/4" MNPT	0	7	5	0
	1" MNPT	1	0	0	0
	1-1/4" MNPT	1	2	5	0
	1-1/2" MNPT	1	5	0	0
	2" MNPT	2	0	0	0
	3/4" BSPT	0	7	5	1

PROCESS CONNECTION FLANGED	1" FLANGE	1	0
	1-1/4" FLANGE	1	2
	1-1/2" FLANGE	1	5
	2" FLANGE	2	0
	3" FLANGE	3	0
	4" FLANGE	4	0
	6" FLANGE	6	0

150# RATING	1
300# RATING	2
600# RATING	3
900# RATING	4
1500# RATING	5
2500# RATING	6

RAISED FACE 316L SS	1
RAISED FACE CS	2
FLAT FACE 316L SS	3
FLAT FACE CS	4
SPECIAL	5

INSERTION LENGTH		
• 1.8" STANDARD		X
• 1.2" OPTIONAL	1	. 2
• SPECIAL - SPECIFY LENGTH IN INCHES		

POWER INPUT		
• 117 VAC (90-132VAC)		X
• 12 VDC (+30%, -10%)		B
• 24 VDC or VAC (+/- 10%)		D
• 200-240 VAC		E

PROCESS TEMPERATURE		
• -50F TO +350F		X
• -320F TO +500F		F
• -100F TO + 900F		G

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 ⊕		K
• DPDT 10 AMP RESISTIVE ⊕		L

DUAL SWITCH POINTS ⊕		
• SPDT 3 AMP RESISTIVE		M
• SPDT 10 AMP RESISTIVE		N

ADDITIONAL TEMPERATURE SWITCH ⊕		
• SPDT 3 AMP RESISTIVE	T	1
• SPDT 10 AMP RESISTIVE	T	2
ADDITIONAL TEMPERATURE TRANSMITTER ⊕		
• MEASURED TEMPERATURE RANGE	T	T
• FAHRENHEIT (F) OR CELSIUS (C)		

SENSOR HEAD MATERIAL		
• 316L STAINLESS STEEL		X
• HASTELLOY C-276	A	D
• MONEL / ALLOY 400	A	M
• TITANIUM	A	T
• CARPENTER 20 / ALLOY 20	A	P
• OTHER ALLOYS CONSULT MANUFACTURER		

HOUSINGS		
• UL/CSA APPROVED EXPLOSION PROOF		X
• FM APPROVED EXPLOSION PROOF		Q
• CENELEC/ATEX APPROVED		S

• HIGH PRESSURE OPTION 10,000 PSIG		U
• RETRACTABLE PROBE 50 PSIG ⊕		V
• RETRACTABLE PROBE 500 PSIG ⊕		W
• STAINLESS STEEL TAG		Y
• MILLIVOLT OUTPUT	m	v

Example 1: LX-1000
 LX Series level switch with 1" MNPT process connection, 1.8" insertion length, 117 VAC power input, -50 to +350F process temperature, single switch point with SPDT 3 amp contact rating, 316L stainless steel sensor head.

Example 2: LX-1511-6DFRH10J
 LX Series level switch with 1-1/2" 150 # raised face 316L SS FLANGE process connection, 6" insertion length, 24 VDC or VAC power input, -320 to +500F process temperature, remote electronics, 10' teflon cable, single switch point with SPDT 10 amp contact rating, 316L stainless steel sensor head.

- Notes:
- ⊕ Maximum temperature +350F
 - ⊕ Only one of these options can be selected.
 - ⊕ Minimum 1" MNPT or 1 1/2" flanged process connection.

Ameritrol, Inc.