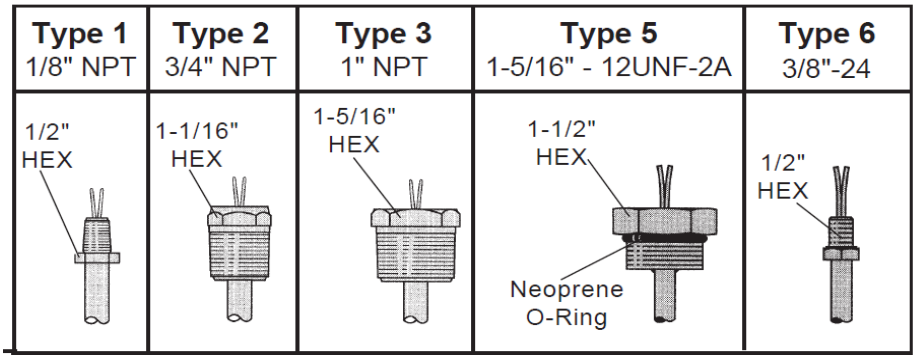
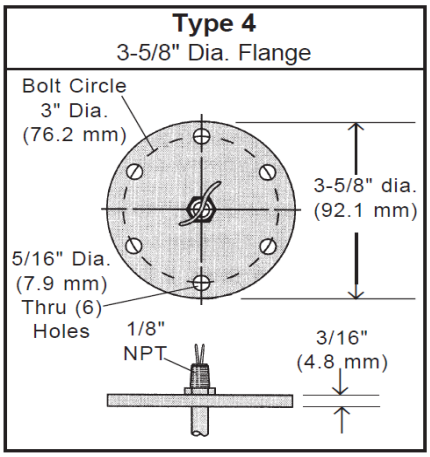
Instruction Bulletin No.
154474
Rev H

Series LS-700
Multi-Station Level Switches

Installation . . .
Install LS-700 Series switches vertically in tank top (mounting up) or in tank bottom (mounting down). Multi-station level switches will operate normally inclined up to 30°.

LS-700 Series Mounting Types . . .
Each mounting type can be configured with stem lengths (Lo) and float materials indicated in table below.

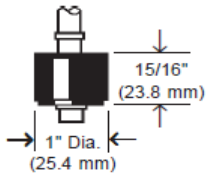
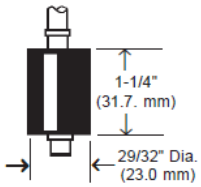
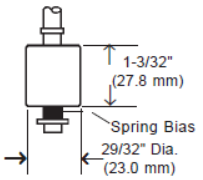
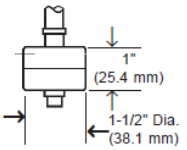




Stem and Mounting Material	Brass or 316 Stainless Steel	
Max. Length	48 Inches (121.9 cm)	
Mounting Position	Vertical ±30° Inclination	
Float Stops	Brass Units: Beryllium Cooper Grip Rings; Stainless Steel Units: S.S. ARMCO PH-15-7MO Grip Rings	
Pressure Rating, PSI, Max.*	See Float Values Below	50

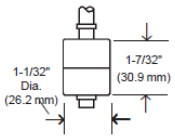
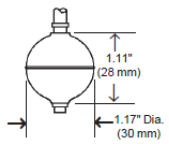
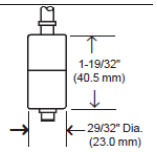
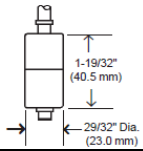
*Mounting only. Maximum pressure rating for complete unit will be the lower of this pressure or the selected float pressure. (See Float types, below)

Float types . . .LS-700 Series ONLY (A single float type is selected for use at all actuation points)

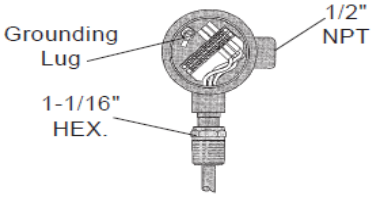
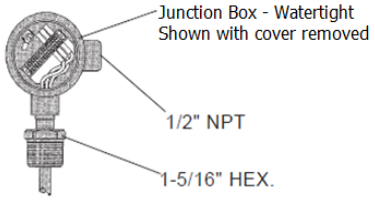
Float Material	**Buna N**		**Teflon–Spring Biased**	**316 Stainless Steel**
Compatible Mtg. Types	1, 3, 4, 5, 6	1, 2, 3, 4, 5, 6	1, 2, 3, 4, 5, 6	1, 4, 6
Float Dimensions				
Part Number	39049	138030	133764	60241
Operating Temp.	Water: to 180°F (82.2°C)		-40°F to +300°F (-40°C to +148.9°C)	-40°F to +300°F*** (-40°C to +148.9°C) 301°F to 500°F****
	Oil: -40°F to +250°F (-40°C to +121.1°C)	Oil: -40°F to +250°F (40°C to 121.1°C)		
Pressure, PSI, Max.	300*	250*	1000**	100
Min. Liquid S.G.	.45	.60	.65	.70

**Derated with Increasing Temperature ***Standard Construction ****Ceramic Potting Construction Required

Float Types (LS-700 Series–Cont.)

Float Material	316 Stainless Steel		304 Stainless Steel	
Compatible Mtg. Types	1, 3, 4, 5, 6	1, 4, 5, 6	1, 2, 3, 4, 5, 6	
Float Dimensions				
Part Number	141750	156900	158369	136550
Operating Temp.	-40°F to +300°F–Standard Construction 301°F to 500°F–Ceramic Potting Construction Required			
Pressure, PSI, Max.	275	600	150	400
Min. Liquid S.G.	.90	.90	.85	1.10

Mounting Types . . . LS-700 Junction Box Series

	Type 2 - 3/4" NPT	Type 3 - 1" NPT
Each mounting type can be configured with stem lengths (Lo) and float materials indicated in table below.		
Stem and Mounting Material	Brass or 316 Stainless Steel	
Max. Length (Lo)	48 Inches (121.9 cm)	
Mounting Position	Vertical ±30° Inclination	
Float Stops	**Brass Units:** Beryllium Copper Grip Rings **Stainless Steel Units:** ARMCO PH-15-7MO Grip Rings	
Pressure Rating, PSI, Max. (Mounting Only*)	See Float Value **(Chart Above)**	

***Maximum pressure rating for complete unit will be lower of this pressure or the selected float pressure. (See float types shown on chart above)

Typical Wiring Diagram

For clarity, only two actuation levels are show in each group.

Number of Actuation Levels And Electrical Specifications

Typically, one float is required for each point at which you need a switch action to occur. The number of actuation levels available depends on the Group Type wiring selected. (See Below)

LS-700 Series
Group I Wiring: 1 to 5 Actuation Levels
Group II Wiring: 1 to 3 Actuation Levels
Switch (SPST, N.O. or N.C.): 20/100 VA
Lead Wires: #22 AWG, 24"L., Teflon
Approvals: U.L. Recognized–File No. E45168:
CSA Listed–File No. 30200

LS-700 Junction Box Series
Switch (N.O. or N.C.): SPST–20 VA
Electrical Termination: Size 50 J-Box;
Watertight, with Terminal Strip

Actuation Level Dimensions

Switch actuation levels shown on are determined as follows: (Actuation Levels typical)**

A = Minimum distance to highest actuation level
B = Minimum distance between actuation levels
C = Minimum distance between two actuation levels
With one float (**Note:** One float for two levels can only be used when low level is N.C. dry and high level is N.O. dry.)
D = Minimum distance from end of unit to lowest level

LS-700 Dimensions				
Float P/N	**A**	**B**	**C**	**D**
39049	7/8"	1-3/4"	1/8" Min.	3/4"
156900	3/4"	1-7/8"		1-1/16"
138030	15/16"	2-1/16"		1"
60241	3/4"	1-13/16"		15/16"
141750	13/16"	2"		1-1/8"
158369	13/16"	2-7/16"		1-7/16"
136550	9/16"	2-7/16"		1-3/4"
133764	15/16"	1-7/8"		7/8" (N.O.) 1-3/16" (N.C.)

Note: A, B and D dimensions are based on a liquid specific gravity of 1.0.

Wiring Color Code

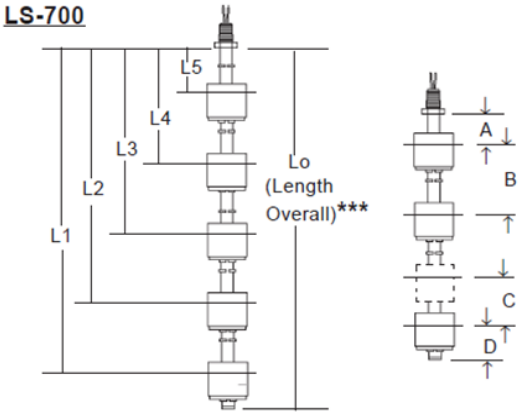
Tinted Area Designates U.L. Recognized Wiring Configurations

SPST Switches			
Wiring	Group I	Group II	
Common Wire	Black	None	
	NO/NC	Sw. Com.	Sw. Com.
L1	Red	Red	Red
L2	Yellow	Yellow	Yellow
L3	Blue	Blue	Blue
L4	Brown		
L5	Orange		

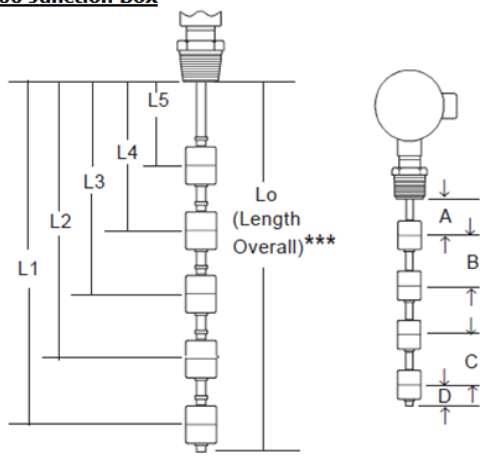
Notes

1. Units with 100 VA switches are not U.L. recognized.

LS-700



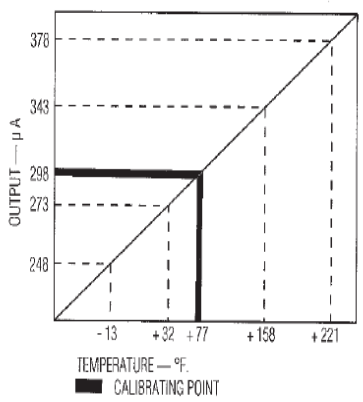
LS-700 Junction Box



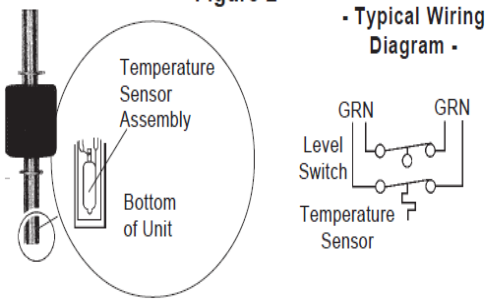
Notes

** Actuation level Distance and Lo (overall unit length) are measured from inner surfaces of mounting plug or flange.
*** Length Overall (Lo) = L1 + Dimension D. See Mounting Types for Maximum Length values.

- Figure 1 -



- Figure 2 -



Note: End of unit stem must be submerged a minimum of 2-3/4" for level switch actuation.

Integrated Temperature Sensors***

Transducer for Continuous Indication (See Figure 1)

Input: 4-30 VDC
Output: 298mA @ +77°F
Current Change: 1mA/1.8°F
Response Time: 150 Seconds (80% gradient in 60 Sec.)
Operating Range: +13°F to +221°F
Accuracy: ±2°F @ 77°F

Thermostat for Switch Actuation (See Figure 2)

Switch Ratings: 2.6A/120 V (inductive)
Contact Operation on Increasing Temperature:
"Opens" when set point reached -or- "Closes" when set point reached.
Standard Temperature Set Point (±10°F):
100°F, 125°F, 150°F, 175°F, 200°F or 225°F

Switch Ratings–Maximum Resistive Load (LS-700 and LS-700-EP Series)

VA	Volts	Amps (AC)	Amps (DC)
10 General Use	0-50	.2	.13
	120	.08	N.A.
	100	N.A.	.3
20 Pilot duty	0-30	.4	.3
	120	.17	.13
	240	.08	.06
50 General Use	0-50	.5	.5
	120	.4	.4
	240	.2	.2
100*	120	.8**	N.A.
	240	.4	N.A.

***Note: Please use caution when handling these units, as impact shock may damage the thermostat temperature setting.

*Level Switch units with 100 VA switches are not U.L. recognized

CE

This product is suitable for Class I and Class II applications only, per the requirements of standard EN60730 and any additional specific requirements for a particular application or medium being sensed. Class I compliance of metal bodied units requires a ground connection between the metal body and the earthing system of the installation. Class I compliance of plastic bodied units in contact with a conductive medium requires that the medium be effectively earthed so as to provide an earthed barrier between the unit and accessible areas. For class III compliance, a supply at safety extra-low voltage (SELV) must be provided. Please consult the Factory for compliance information on specific part numbers.

Important Points!

- Product must be maintained and installed in strict accordance with the National Electrical code and Gems technical brochure and instruction bulletin. Failure to observe this warning could result in serious injuries or damages.
- An appropriate explosion-proof enclosure or intrinsically safe interface device must be used for hazardous area applications involving such things as (*but not limited to)* ignitable mixtures, combustible dust and flammable materials.
- ***WARNING:** To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.
- Pressure and temperature limitations shown on individual catalog pages and drawings for the specified level switches must not be exceeded. These pressures and temperatures take into consideration possible system surge pressures/temperatures and their frequencies.
- Selection of materials for compatibility with the media is critical to the life and operations of Gems level switches. Take care in the proper selection of materials of construction: particularly wetted materials.
- Life expectancy of switch contacts varies with applications. Contact Gems if life cycle testing is required.
- Ambient temperature changes do affect switch set points, since the specific gravity of a liquid can vary with temperature.
- Level switches have been designed to resist shock and vibration; however, shock and vibration should be minimized.
- Liquid media containing particulate and/or debris should be filtered to ensure proper operation of Gems products.
- Electrical entries and mounting points may require liquid/vapor sealing if located in an enclosed tank.
- Level switches must not be field repaired.
- Physical damage sustained by the product may render it unserviceable.