

Многоточечные переключатели уровня LS

Технические характеристики

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Small Size – Engineered Plastics

LS-300 Engineered Plastics Series Brings Multi-Point Switching to Shallow Tanks

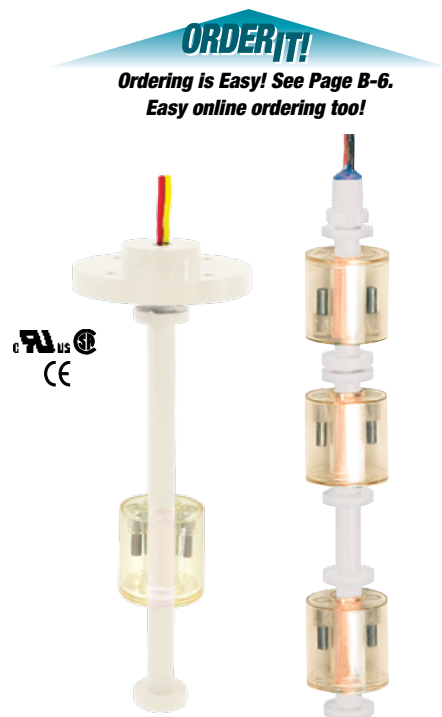
Your most complete line of small, polysulfone liquid level switches...all from Gems Sensors.

- ▶ All-Plastic Wetted Parts
- ▶ 1 to 4 Actuation Levels
- ▶ Lengths to 20 inches (50cm)
- ▶ U.L. Recognized; CSA Listed Versions Available

Designed for the high quantity needs of the OEM, LS-300 Series Switches are the ideal level sensor for shallow tanks and reservoirs. Compact and versatile, these low-cost, plastic level switches offer a broad choice of mountings and float materials. The following pages illustrate the various design parameters available to configure custom LS-300 Series Switches.

1. Mounting Types

Each mounting type can be configured with stem lengths (L_0) and float materials indicated in this bulletin.





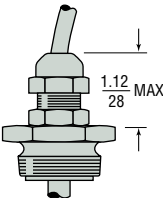
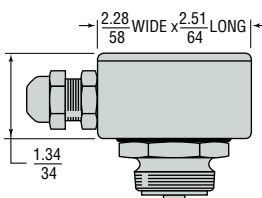
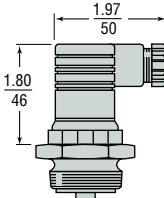
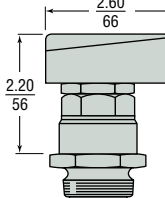
NPT Threads		Straight Threads		
Type 21 1/8" NPT	Type 22 1" NPT	Type 31 3/8" – 24	Type 32 1-5/16" – 12	Type 33 5/8" – 11
Metric Threads		Compression Types		
Type 41 G 1/4" (1/4" – 19 BSP)	Type 42 G 1" (1" – 11 BSP)	Type 51 M12 x 1.5 Straight Thread	Type 71 ¹ 5/8" – 11	Type 11 No Mounting
Flange Mountings ²				
Type 61 2" O.D. Flange		Type 63 Pop Flange		

Stem, Mounting and Collar Material	Polysulfone, Noryl®
Max Length (L_0)	20 inches (50 cm) Tolerance of $L_0 = \pm 1/16"$ (2 mm)
Mounting Position	Vertical $\pm 30^\circ$ Inclination

Notes:
1. Type 71 mounting to be used with 3/4" diameter float only.
2. Not recommended for pressure applications.

Dimensions expressed as: $\frac{\text{inches}}{\text{millimeters}}$

2. Electrical Connections

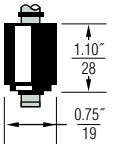
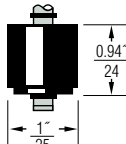
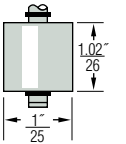
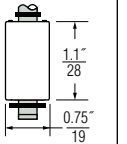
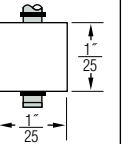
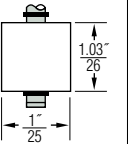
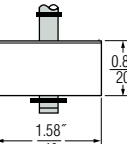
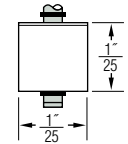
	Type 1 Leadwire	Type 2 Cable	Type 3 Liquid-Tight Cable	Type 4 Junction Box Assembly	Type 5 DIN43650 Plug	Type 6 DIN43651 Plug
						
Compatible Mounting Type(s)	All		42		42	42
Protection Rating	IP64		IP68	IP65		
Extended Leads	#22 AWG PVC Wire, 24" (610mm) Min.	#22 AWG PVC Jacketed Cable, 24" (610mm) Min.		Terminal Box (7 Terminals)	3 Poles	6 Poles
Max. Number of Levels						
Group I	4				2	4
Group II	2				1	2

* Not CSA Approved

** Not UL or CSA Listed

3. Float Types

A single float type is selected for use at all actuation points.

Float Material	Buna N		Polysulfone	Polypropylene				PVDF
	3/4"	1"		Solid Foamed		Hollow – 20% Glass Filled		1"
Compatible Mounting Types	11, 21, 22, 31, 32, 33, 41, 42, 51, 61, 63, 71	11, 21, 22, 31, 32, 33, 41, 42, 51, 61, 63	11, 21, 22, 31, 32, 33, 41, 42, 51, 61, 63	11, 21, 22, 31, 32, 33, 41, 42, 51, 61, 63, 71	11, 21, 22, 31, 32, 33, 41, 42, 51, 61, 63	11, 21, 22, 31, 32, 33, 41, 42, 51, 61, 63	11, 21, 31, 33, 41, 51	11, 21, 22, 31, 32, 33, 41, 42, 51, 61, 63
Float Dimensions								
Part Number	187553	39049	39005	197732	119455	145730	239292	174515
Float Material Suitable for...	Oil, Fuels		Water-based Liquids	Broad Chemical Use		Low Specific Gravity Liquids		Highest Temperature
Operating Temperature ¹	Water: to 180°F (80°C)		-40°F to +221°F (-40°C to +105°C)	-40°F to +212°F (-40°C to +100°C)		-40°F to +221°F (-40°C to +105°C)		-40°F to +250°F (-40°C to +121°C)
	Oil: to 221°F (105°C)	Oil: -40°F to +221°F (-40°C to +105°C)						
Pressure, psi (bar) Max. ²	300 (21)	250 (17)	50 (3.5)	100 (6.9)	150 (10)	50 (3.5)	100 (7)	50 (3.5)
Min. Media Specific Gravity	0.70	0.50	0.75	0.95	0.90	0.60	0.37	0.86

Notes:

1. Operating temperature range based on float ratings.

2. When used with mounting Type 21, 32 or 22 only; Mounting Type 61, and 63 are not recommended for pressure applications. Pressures are derated with increasing temperature above 70°F

Dimensions expressed as: $\frac{\text{inches}}{\text{millimeters}}$

4. 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.

Group I Wiring: 1 to 4 Actuation Levels.

Group II Wiring: 1 or 2 Actuation Levels.

Switch (SPST, N.O. or N.C.): 10/20/50/100 VA.

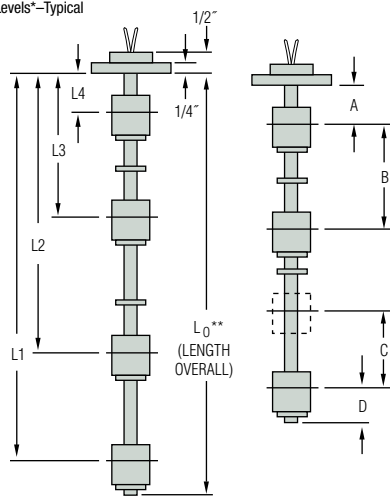
Approvals: LS-300 Series switches are U.L. Recognized – File No. E45168; CSA Listed – 30200.

Notes:

- Units with 50 and 100 VA switches are not U.L. Recognized or CSA Listed.
- Other wiring options available. Consult factory.
- Consult Factory for load information.

6. Actuation Level Dimensions

Actuation Levels—Typical



* Actuation level distances and L₀ (overall unit length) are measured from inner surfaces of mounting plug or flange. See mounting types on Page B-3 for L₀ reference point.

** Length Overall (L₀) = L₁ + Dimension D. See Mounting Types for Maximum Length values.

5. Wiring Group

Electrical Connection	Group 1	Group 2
Lead Wire (*)		
Cable (*)		

*Pin correlation of plug connectors shown in parenthesis.

Switch actuation levels are determined following the guidelines below.

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 be used only when low level is N.C. dry and high level is N.O. dry).

D = Minimum distance from end of unit to lowest level.

Float Type	Dimensions			
	A	B	C	D
Buna N – 0.75" (P/N 187553)	11/16" (17 mm)	1-7/16" (11.1 mm)	1/8" (3 mm) Minimum	7/8" (22 mm)
Buna N – 1" (P/N 39049)	.69" (18 mm)	1.5" (38 mm)		.81" (21 mm)
Polysulfone (P/N 39005)	.56" (14 mm)			0.95" (24 mm)
Solid P.P. – 0.75" (P/N 197732)	0.5" (13 mm)			1.19" (30 mm)
Solid P.P. – 0.97" (P/N 119455)	0.43" (11 mm)			1.13" (29 mm)
Hollow P.P. – 1" (P/N 145730)	0.62" (16 mm)			0.88" (22 mm)
Hollow P.P. – 1.58" (P/N 239292)	0.63" (16 mm)	1.70" (43 mm)		0.98" (25 mm)
PVDF (P/N 174515)	0.63" (16 mm)	1.5" (38 mm)		1.13" (29 mm)

Notes:

- Actuation levels are calibrated on ascending fluid level with water, specific gravity 1.0, as the calibrating fluid, unless otherwise specified.
- Tolerance on actuation levels is $\pm 1/8"$ (3 mm).

Small Size – Engineered Plastics

LS-300TFE Series – All-PTFE Wetted Parts for Ultra-Pure Fluids

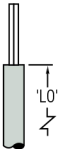
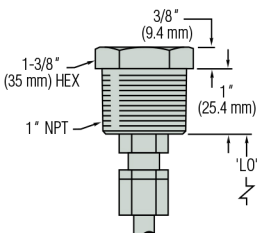
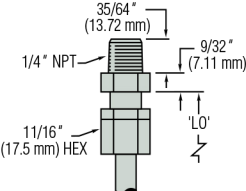
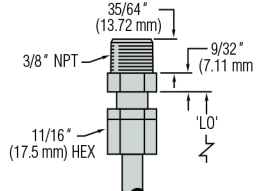
- ▶ Low Particle Generation-One piece Molded Design
- ▶ Corrosion Resistant
- ▶ 1 to 4 Actuation Levels in a Single Unit
- ▶ Lengths to 24 Inches

Typical Applications

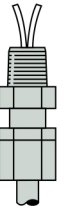
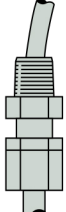
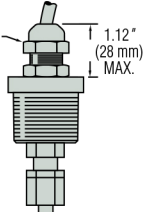
- Semiconductor Process Equipment
- Pure Chemical Delivery System
- Wafer Cleaning and Etching Systems
- Cabinet Leak Sensing

1. Mounting Types

Each mounting type can be configured with stem lengths (L_0) and float materials indicated in this bulletin.

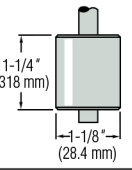
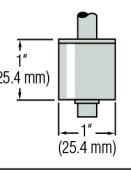
Type 11, No Mounting	Type 22, 1" NPT	Type 24, 1/4" NPT	Type 25, 3/8" NPT
			

2. Electrical Connections

Type 1 Leadwire	Type 2 Cable	Type 3* Liquid-Tight Cable
		
Extended Leads	#22 AWG Teflon• Wire or #24 AWG PVC Jacketed Cable	

* Available on Mounting Type 22 only.

3. Float Types

Float Material	PTFE	PVDF
Float Dimensions		
Operating Temperature	+32°F to +212°F (0°C to 100°C)	-40°F to +250°F (-40°C to 121°C)
Pressure, PSIG (bar), Max. at Ambient Temperature	25 (1.7)	50 (3.4)
Min. Liquid Specific Gravity	0.90	0.86

Note: A single float type is selected for use at all actuation points.

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Easy online ordering too!



4. 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.

Group I Wiring: 1 to 4 Actuation Levels.

Group II Wiring: 1 or 2 Actuation Levels.

Switch (SPST, N.O. or N.C.): 10/20/50/100VA.

Notes:

1. Other wiring options available. Consult factory.
2. Consult Factory for load information.

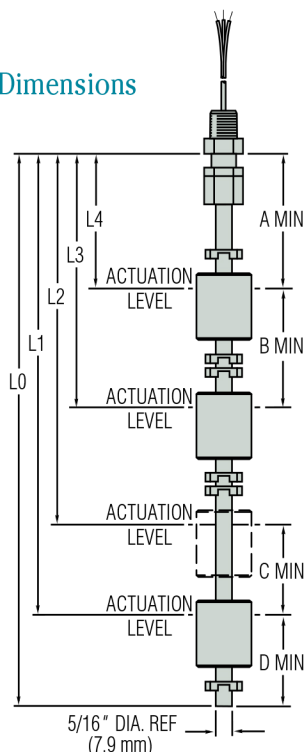
Electrical Connection	Group 1	Group 2
Lead Wire (*)		
Cable (*)		

* Pin correlation of plug connectors shown in parenthesis.

5. Actuation Level Dimensions

* Actuation level distances and L_0 (overall unit length) are measured from inner surface of mounting. See mounting types on opposite page for L_0 reference point.

** Length Overall (L_0) = L_1 + Dimension D.
 $L_{0max.} = 24"$.



Switch actuation levels are determined following the guidelines below.

A = Minimum distance from highest actuation level to bottom of mounting.

B = Minimum distance between actuation levels.

C = Minimum distance between two actuation levels with one float (Note: One float for two levels can be used only when low level is N.C. dry and high level is N.O. dry).

D = Minimum distance from end of unit to lowest level.

Float Material	Dimensions			
	A	B	C	D
PTFE	$\frac{1-3/4}{44.5^*}$	$\frac{2}{50.8}$	$\frac{1/8}{3.2}$	$\frac{1-5/8}{41.3}$
PVDF	$\frac{1-3/4}{44.5^*}$	$\frac{2}{50.8}$	$\frac{1/8}{3.2}$	$\frac{1-7/16}{36.5}$

inch
mm

*Mounting Type 22 (1" NPT) requires a minimum "A" dim. of 2-1/16" (52.4mm)

LS-350 Series

Combination Siphon and Level Sensor

- ▶ Multi-Level Switch Options
- ▶ Up to 4 Actuation Points
- ▶ Integral Siphon or Fill Tube
- ▶ Customized Mountings
- ▶ Custom Configurable

Save valuable space and costly installation/maintenance time with these highly customizable sensors. LS-350 units combine a siphon tube and up to four liquid level sensors as a single component. The complete unit installs through a single opening in the fluid container.

Simple and clean — a single component that enables remote monitoring of a tank's fluid content while allowing access for container filling and draining. These units are custom configured to fit the container of your choice, with a wide range of mountings, fluid and electrical connectors, materials and lengths.

Typical Applications

- Immuno-Chemistry/Cytology
- Hematology
- Automated Urine Analysis
- Laboratory Automation

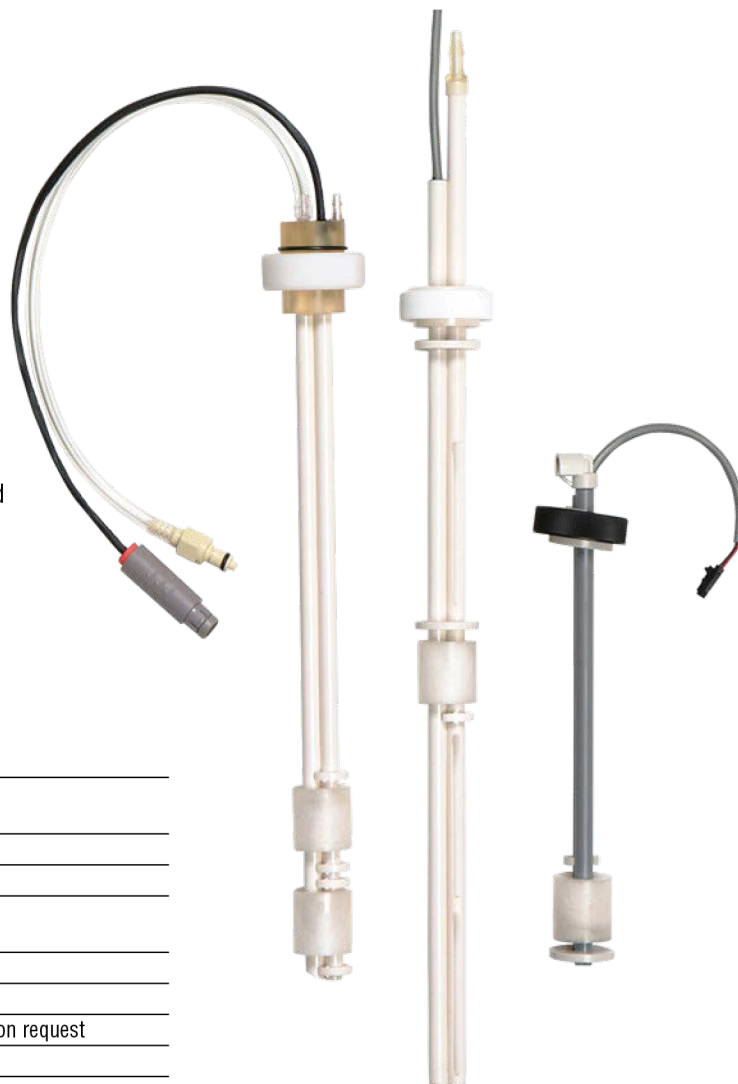
Specifications

Materials	
Stem and Mounting	Polysulfone or Noryl®
Floats	Polypropylene or Buna N
Gasket	Buna N
Operating Temperature	
Buna N Float	221°F (105°C) Max.
Polypropylene Float	210°F (99°C) Max.
Switch	SPST
Length	15" (380 mm) Max., Longer units available on request
Mounting Attitude	±30° from vertical
Actuation Level Points	6 Max.

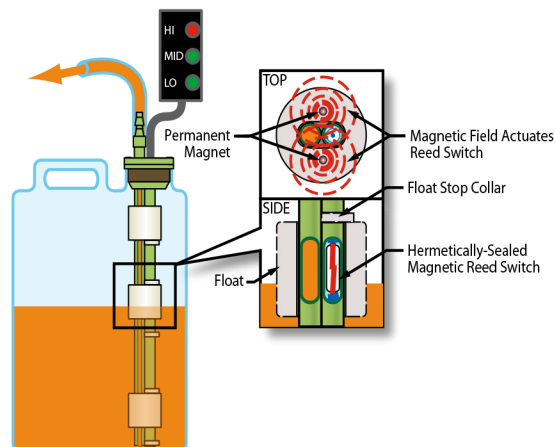
Operating Principle

The LS-350 Series provides two functions: liquid level monitoring and fluid fill or extraction access. The latter function is accomplished with an integrated siphon tube that runs parallel to the float sensor stem and through the top mounting; it is commonly topped with a barb (or customer specified) fitting for the connection of flexible tubing. Fluid level sensing is accomplished with magnetic reed switch technology. One or more floats encircling a stationary stem are equipped with powerful, permanent magnets. As a float rises or lowers with liquid level, the magnetic field generated from within the float actuates a hermetically sealed magnetic reed switch mounted inside the stem. The switch actuation may be used for alarm, solenoid, pump or other fluid control operations.

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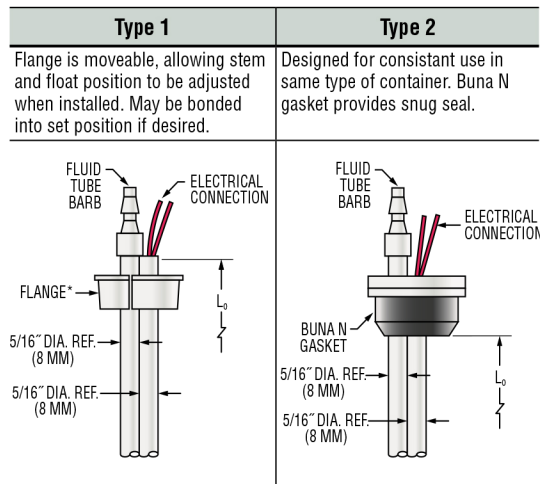


LEVEL SWITCHES – MULTI POINT



1. Mounting Types

Each mounting type can be configured with stem lengths (L_0) and as indicated below.



Mounting Hole Dia.	1.20~1.25" (30.5 mm/31.75 mm)	1.31~1.32" (33.3 mm/33.5 mm)
Stem, Mounting and Collar Material	Polysulfone	Polysulfone with Buna N Gasket
Pressure Rating (mounting)	Atmosphere (Not recommended for pressurized applications)	
Fluid Barb	Compatible 3/16" I.D. Hose (Options available)	
Max Length (L_0)	15 inches (38 cm) \pm 1/16" (2 mm)	
Mounting Position	Vertical \pm 30° Inclination	
Mounting Compatibility	Cubitainer® Style Opening	Tank Wall Thickness 1/32"~1/8"

* Orientation of slot in flange is not critical.

2. Float Types

A single float type is used for all actuation points.

	Buna N	Polypropylene
<p>VIEW WITH FLOAT REMOVED BOTH TYPES</p>		
Part Number	128642	130893
Liquid Suitability	Oil-Based	Water-Based
Min. Media Specific Gravity	0.75	0.98
Operating Temperature	Oil: -40°F to +221°F (-40°C to +105°C) Water: to 180°F (82°C)	-40°F to +210°F (-40°C to +99°C)

3. 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.

Group I Wiring: 1 to 4 Actuation Levels.

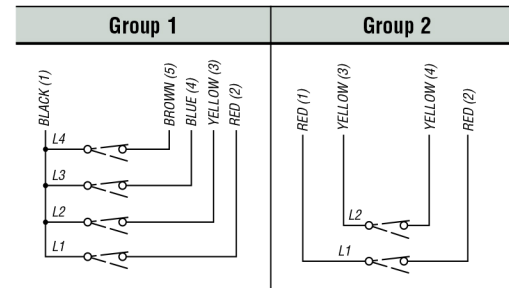
Group II Wiring: 1 or 2 Actuation Levels.

Switch (SPST, N.O. or N.C.): 10/20/50/100 VA.

Notes:

1. Other wiring options available. Consult factory.
2. Consult Factory for load information.

4. Wiring Group



5. Electrical Connections

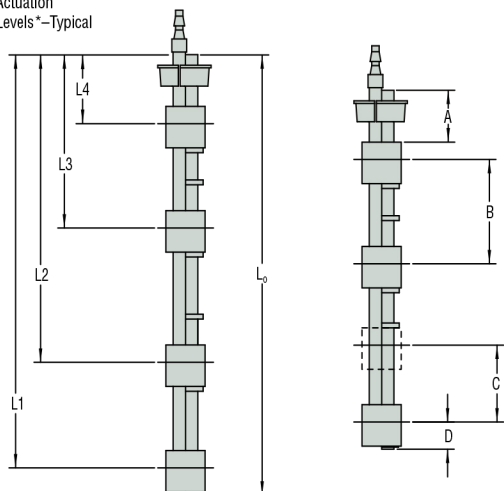
Type 1: Lead Wires, 24" to 26" (610 mm, Min.)

Type 2: Cable, 24" to 26" (610 mm, Min.)

6. Actuation Level Dimensions

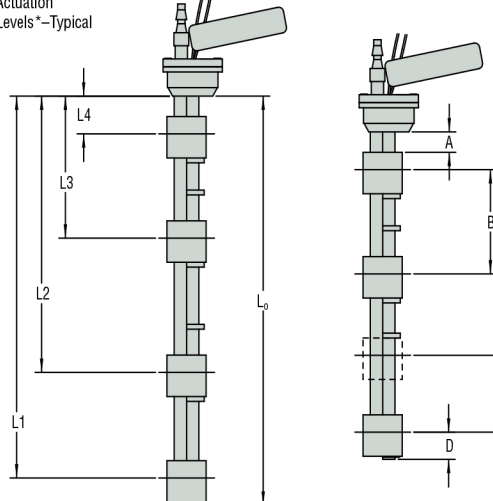
Type 1

Actuation
Levels*—Typical



Type 2

Actuation
Levels*—Typical



* Actuation level distances and L_0 (overall unit length) are measured from inner surfaces of mounting plug or flange. See mounting types on page B-11 for L_0 reference point.

** Length Overall (L_0) = L_1 + Dimension D. See Mounting Types for Maximum Length values.

Switch actuation levels are determined following the guidelines below.

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 be used only when low level is N.C. dry and high level is N.O. dry).

D = Minimum distance from end of unit to lowest level.

Float Type	Dimensions				
	A		B	C	D
	Type 1 Mount	Type 2 Mount			
Buna N	3/4" (19 mm), Min.	3/4" (19 mm)	1-3/4" (45 mm)	1/8" (3 mm) Minimum	15/16" (24 mm)
Polysulfone	1/2" (13 mm), Min.	1/2" (13 mm)	1-3/4" (45 mm)		1-3/16" (30 mm)

Notes:

1. Actuation levels are calibrated on ascending fluid level with water, specific gravity 1.0, as the calibrating fluid, unless otherwise specified.
2. Tolerance on actuation levels is $\pm 1/8"$ (3 mm).

Small Size – Alloys

LS-700 Series Combines Durability of Metal With a Compact Design for Restricted Spaces

- ▶ Stainless Steel or Brass Mountings and Stems
- ▶ 1 to 5 Actuation Levels
- ▶ Lengths to 48 inches

These compact units feature the rugged durability of stainless steel or brass construction in a lightweight package. Ideal for tanks less than 4 feet.

LS-700 Series switches are exceptionally versatile because of the many useful options available. Described briefly below, these options can extend the functionality of your GEMS LS-700 Series custom switch.

Temperature Sensing

To save space and simplify wiring, GEMS can incorporate a temperature sensor in the end of the float stem on any model type LS-700. Two sensor types are available: Transducers for continuous output, and Thermostats for switch actuation. See Page B-23 for details.



Solid-State Relays

Control motors, pumps, valves and other “load” devices with GEMS Solid-State Relays. Intrinsically-safe relays and barriers allow safe operation of level switches in hazardous areas. See Section I for details.

1. Mounting Types

Each mounting type can be configured with stem lengths (L_s) and float material indicated in this table.

Note: Sanitary flange mountings are also available, but not shown. Please contact factory.

in
(mm)

Type 1 1/8" NPT	Type 2 3/4" NPT ¹	Type 3 1" NPT	Type 4 3-5/8" Dia. Flange
Type 5 1-5/16-12UNF-2A	Type 6 3/8-24	Type 7 1-1/4" NPT ^{1,2}	

Stem & Mounting Material	Brass or 316 Stainless Steel		
Maximum Length	48 inches (121.9 cm) - 21" (53.3 cm) Max on Bent Stem Versions (Consult Factory)		
Mounting Position	Vertical $\pm 30^\circ$ Inclination		
Float Stops ³	Brass Units: Beryllium Copper Grip Rings; Stainless Steel Units: S.S. ARMCO PH-15-7MO Grip Rings		
Max. Pressure Rating ⁴	See Float Value on Following Page		50 psi (3.5 bar)

Notes:

1. Mounting Types 2, 3 & 7 are available with a 1/2" MNPT conduit adaptor. This option can be selected on the checklist.
2. Mounting Type 7 is not U.L. Approved.
3. In some instances, concentrations of chlorine and other corrosive compounds in the media require the use of collar type float stops. Consult factory for details.
4. Mounting only. Maximum pressure rating for complete unit will be the lower of this pressure or the selected float pressure (see Float Types, on next page).

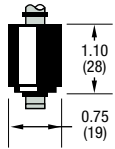
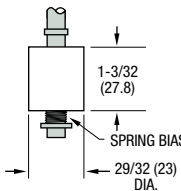
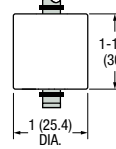
ORDER IT!

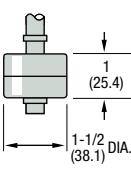
Ordering is Easy! See Page B-15.
Easy online ordering too!



2. Float Types

A single float type is selected for use at all actuation points.

Float Materials	Buna-N		PTFE – Spring Biased	Polypropylene	
Compatible Mounting Types	1, 2, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 2, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 2, 3, 4, 5, 6, 7
Float Dimensions					
Part Number	187553	39049	133764	145730	197732
Operating Temperature	Water: to 180°F (82.2°C) Oil: -40°F to +300°F (-40°C to 149°C)		-40°F to +300°F (-40°C to +149°C)	-40°F to +225°F (-40°C to +107°C)	-40°F to +250°F (-40°C to +121°C)
Max. Pressure	300 psi (20.7 bar)*		1000 psi (69 bar)*	50 psi (3.5 bar) @ 70°F*	100 psi (6.9 bar)
Min. Liquid Specific Gravity	0.65	0.45	0.65	0.65	0.95

Float Materials	316 Stainless Steel**				
Compatible Mounting Types	1, 4, 6	1, 3, 4, 5, 6, 7	1, 4, 5, 6, 7	1, 2, 3, 4, 5, 6, 7	1, 2, 3, 4, 5, 6, 7
Float Dimensions					
Part Number	60241	141750	156900	136550	158369
Operating Temperature	-40°F to +300°F (-40°C to +149°C)**				
Max. Pressure	100 psi (6.9 bar)	275 psi (19 bar)	600 psi (41.4 bar)	400 psi (27.6 bar)	150 psi (10.3 bar)
Min. Liquid Specific Gravity	0.70	0.85	0.90	1.10	0.85

* De-rated with increasing temperature above 70°F (21°C).

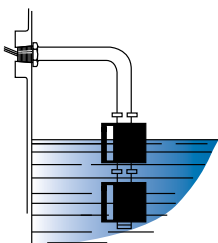
** 316 Stainless Steel floats are available with ceramic potting that allows temperatures to 400°F (204°C); contact factory for these high-temperature applications.

Optional Mountings

Please contact Gems Sensors about these mountings or other requirements not seen here.

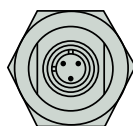
Bent Stem (LS-77700)

Used when tank top or bottom is inaccessible.



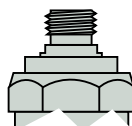
Integral Receptacle

2–5 Pin miniature receptacle for mounting Type 2 or Type 3; eliminates splicing and eases connections.



Conduit Adapter

A 1/2" MNPT conduit is available for Mounting Type 2 & 3. Select from list of options on the Check List.



3. 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.

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.

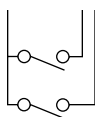
Lead Wires: 22 AWG, 24" L., PTFE.

Approvals: LS-700 Series switches are U.L. Recognized – File No. E45168; CSA Listed – 30200.

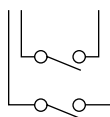
Typical Wiring Diagrams

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

**GROUP I
SPST**



**GROUP II
SPST**



Wiring Color Code

Tinted area designates U.L. Recognized wiring configurations.

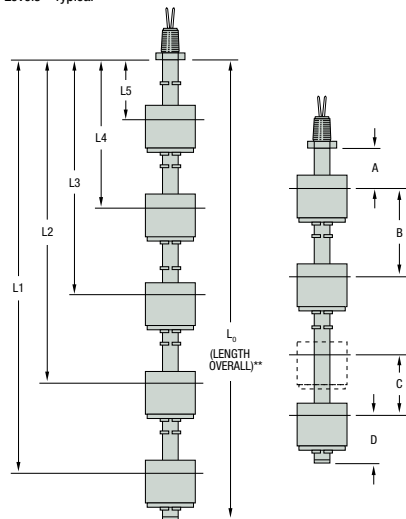
SPST Switches			
Wiring	Group I	Group II	
Common Wire	Black	None	
	NO/NC	SW Com.	NO/NC
L ₁	Red	Red	Red
L ₂	Yellow	Yellow	Yellow
L ₃	Blue	Blue	Blue
L ₄	Brown		
L ₅	Orange		

Notes:

- Units with 100 VA switches are not U.L. Recognized or CSA Listed.
- See "Electrical Data" on Page X-5.

4. Actuation Level Dimensions

Actuation Levels—Typical



* Actuation level distances and L₀ (overall unit length) are measured from inner surfaces of mounting plug or flange.

** Length Overall (L₀) = L₁ + Dimension D. See Mounting Types for Maximum Length values.

Switch actuation levels are determined following the guidelines below.

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 be used only when low level is N.C. dry and high level is N.O. dry).

D = Minimum distance from end of unit to lowest level.

Float Part Number	Dimensions			
	A	B	C	D
39049	11/16" (17.5 mm)	1-5/8" (41.3 mm)	1/8" (3.2 mm) Min.	3/4" (19.1 mm)
60241	9/16" (14.3 mm)	1-15/16" (49.2 mm)		15/16" (23.8 mm)
133764	3/4" (19.0 mm)	1-1/2" (38.1 mm)		7/8" (22.2 mm), N.O. 1-3/16" (30.2 mm), N.C.
136550	5/16" (7.9 mm)	1-7/8" (47.6 mm)		1-11/16" (42.9 mm)
141750	1/2" (12.7 mm)	1-9/16" (39.7 mm)		1-1/8" (28.6 mm)
145730	5/8" (15.9 mm)	1-3/8" (34.9 mm)		13/16" (20.6 mm)
156900	9/16" (14.3 mm)	1-9/16" (39.7 mm)		13/16" (23.8 mm)
158369	5/8" (15.9 mm)	1-7/8" (47.6 mm)		1-3/8" (34.9 mm)
187553	11/16" (17.5 mm)	1-7/16" (36.5 mm)		7/8" (22 mm)
197732	1/2" (12.7 mm)	1-3/8" (34.9 mm)		1" (25.4 mm)

Notes:

- A, B and D dimensions based on a liquid specific gravity of 1.0.
- Tolerance on actuation levels is ±1/8" (3.2 mm).
- For bent stem versions, please request drawing LS-77700.

Large Size – Alloys

LS-800 Series

The General Purpose Workhorse for Water and Oils

- ▶ Stainless Steel or Brass Mountings
- ▶ 1 to 6 Actuation Levels
- ▶ Lengths to over 11 feet (3.4 m)
- ▶ CSA Listed

Rugged construction and multiple options provide the LS-800 Series with exceptional versatility. Longer and more substantial than other metallic models, the LS-800 is capable of supporting larger, more buoyant floats, and is physically stronger for better reliability in contaminated or turbulent media. This series offers SPST or SPDT switches, and a choice of mountings, floats and materials that can be configured for a wide range of applications in water, oils, chemicals and corrosive liquids.

Temperature Sensing

To save space and simplify wiring, GEMS can incorporate a temperature sensor in the end of the float stem on any model type LS-800. Two sensor types are available: Transducers for continuous output, and Thermostats for switch actuation. See Page B-23 for details.



Adjustable Mounting

Allows stem to travel up and down for fine tuning your actuation points. See next page.



LS-800 switches are U.L. Approved for Class I, Division 2, Groups B, C, D hazardous locations

1. Mounting Types

Each mounting type can be configured with stem lengths (L_0) and float material indicated in the table below. Mountings are also continued on following page.

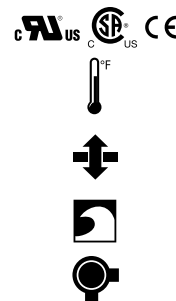
Note: Sanitary flange mountings are also available, but not shown. Please contact factory.

	Type 1 1/2" NPT	Type 8 1" NPT	Type 2 1-1/4" NPT	Type 3 2" NPT	Type 4 3", 150# Dia. Flange
in (mm)					
Stem & Mounting Material	Brass or 316 Stainless Steel				Flange: Carbon Steel or 316 S.S. Stem: 316 S.S.
Max. Length (L_0)	36 inches (91.4 cm)	60 inches (152.4 cm)		140 inches (355.6 cm)	
Mounting Position	Vertical $\pm 30^\circ$ Inclination				
Float Stops*	Brass Units: Beryllium Copper Grip Rings; Stainless Steel Units: S.S. ARMC0 PH-15-7MO Grip Rings				

* Units greater than 72" overall length are supplied with collars with setscrews (made of same material as stem and mounting) in place of float-stop rings. Collars are optional on units less than 72" overall length. Units requiring 316 SS float stops must be special ordered with 316 SS collars instead of grip rings. In some instances, concentration of chlorine and other corrosive compounds in the media require the use of collar type float stops. Consult factory for details.

ORDER IT!

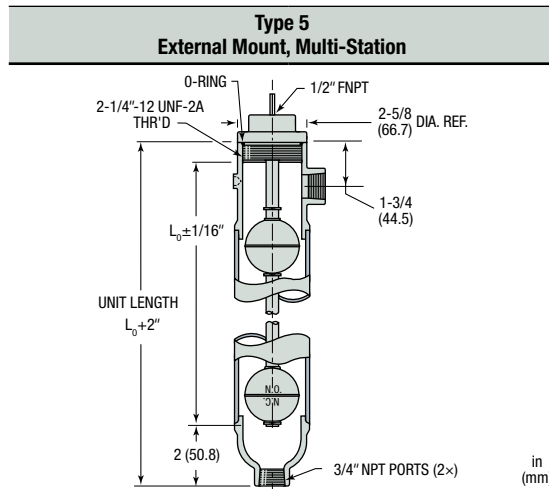
Ordering is Easy! See Page B-24.
Easy online ordering too!



LS-800 Series – Continued

1. Mounting Types – continued

Type 5 External Mounting units are ideal for tanks with limited access to tops or bottoms.



Housing Material	Brass	316 Stainless Steel
Stem & Mounting Material	Brass	316 Stainless Steel
Port Sizes	3/4" NPT	
Maximum Length (L₀)	120 inches (305 cm)	
Float Stops*	Beryllium Copper	S.S. ARMCO PH-15-7MO

* Units greater than 72" overall length are supplied with collars with setscrews (made of same material as stem and mounting) in place of float-stop rings. Collars are optional on units less than 72" overall length. Units requiring 316 SS float stops must be special ordered with 316 SS collars instead of grip rings. In some instances, concentration of chlorine and other corrosive compounds in the media require the use of collar type float stops. Consult factory for details.

2. Float Types

A single float type is selected for use at all actuation points. Be sure, by reviewing the table below, that the desired float is compatible with the Mounting Type selected in Step 1.

Float Material	Buna-N				316 Stainless Steel		
Compatible Mounting Types	1, 2, 3, 4, 8	2	1, 3, 4, 5	3, 4, 5 (Units >72")	1, 3, 4, 5 (Units ≤72")	3, 4, 5 (Units >72")	1, 3, 4
Float Dimensions							
Part Number	253644	26032	10558	24864	14569	15666	138935
Operating Temperature	Water: to 180°F (82°C) Oil: -40°F to +230°F (-40°C to +110°C)				-40°F to +300°F (-40°C to +149°C)		
Min. Media Specific Gravity	0.55	0.75	0.55	0.55	0.75	0.75	0.80

Maximum Pressure Ratings Chart

Maximum Pressure Ratings Chart			Float Part Number					
			253644	26032	10558	24864	14569	15666
Mounting Type	1, 2, 3		150 psi (10.3 bar)			750 psi (51.7 bar)	300 psi (20.7 bar)	180 psi (12.4 bar)
	4		150 psi (10.3 bar)					180 psi (12.4 bar)
	5	Brass	100 psi (6.9 bar) @ 70°F (21°C)					
		316 S.S.	150 psi (10.3 bar)			750 psi (51.7 bar)	300 psi (20.7 bar)	120 psi (8.3 bar)

Review the Compatible Mounting Type row in the "Float Types" table above this matrix for produceable mounting/float combinations. Not all combinations implied by this Pressure Rating Chart are possible or recommended.

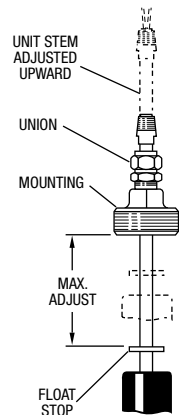
LS-800-A Series

Adjustable Mounting

Available for LS-800 Series Mounting Types 2, 3 and 4.

Special cinch-nut on mounting allows stem to travel up or down for fine tuning the actuation points. The extent of adjustment depends on unit length and distance from mounting to highest float stop. When ordering, specify "LS-800-A" as Series Type.

Note: Maximum overall length is limited to 72" with this option.



Intrinsically-Safe Relays

Using Gems SAFE-PAK® relays and barriers, these switches provide automatic refills/pumpdown and are intrinsically-safe without explosion-proof housing and piping.



See Section L

3. Electrical Specifications

Switch (N.O. or N.C.):

SPST: 20 VA or 100 VA

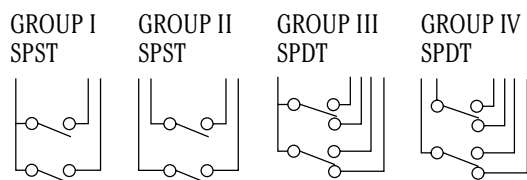
SPDT: 20 VA

Lead Wires: 18 AWG, 24" L., Polymeric (except as noted in Wiring Color Code chart at right).

Approvals: LS-800 Series switches are U.L. Recognized – File No. E45168; CSA Listed – File No. 30200

Typical Wiring Diagrams

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



Wiring Color Code

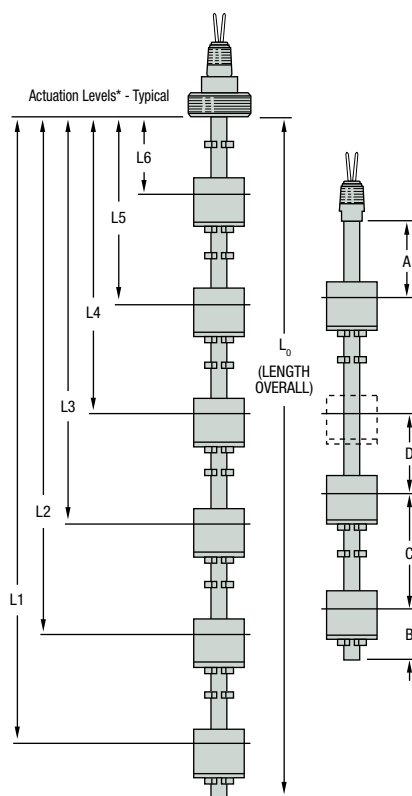
Tinted area designates U.L. Recognized wiring configurations.

SPST Switches				SPDT Switches 20 VA				
Wiring	Group I	Group II		Group III		Group IV		
Com. Wire	Black	None		Black		None		
	NO/NC	SW. Com.	NO/NC	NO	NC	SW. Com.	NO	NC
L ₁	Red	Red	Red	Red	Wh/Red	Red	Wh/Red	Wh/Blk/Red
L ₂	Yellow	Yellow	Yellow	Yellow	Wh/Yel	Yellow	Wh/Yel	Wh/Blk/Yel
L ₃	Blue	Blue	Blue	Blue	Wh/Blue	Blue	Wh/Blue	Wh/Blk/Blu
L ₄	Brown	Brown	Brown	Brown	Wh/Brn	Brown	Wh/Brn	Wh/Blk/Brn
L ₅	Orange	Orange	Orange	Orange	Wh/Orn	Orange	Wh/Orn	Wh/Blk/Orn
L ₆	Gray	Gray	Gray	Gray	Wh/Gra	Gray	Wh/Gra	Wh/Blk/Gra

Notes:

1. Non-U.L. Recognized units (white areas) use 22 AWG, 24" L., PTFE Lead wires.
2. Units with 100 VA switches are not U.L. Recognized or CSA Listed.
3. See "Electrical Data" on Page X-5 for more information.

4. Actuation Level Dimensions



* Actuation level distances and L₀ (overall unit length) are measured from inner surfaces of mounting plug or flange.

** Length Overall L₀ = L₁ + Dimension B.

See Mounting Types for Maximum Length values.

Switch actuation levels are determined following the guidelines below.

All units 72" or less L₀ with Stainless Steel or Buna-N floats. Also any unit over 72" L₀ with Buna-N floats:

A = 1-1/2" (38.1 mm) minimum distance to highest level (2", Type 5 only).

B = 2" (50.8 mm) minimum distance from end of unit to lowest level.

C = 3" (76.2 mm) minimum distance between levels.

D = 1/4" (6.3 mm) minimum distance between actuation levels (Note: One float for two levels can be used only when low level is N.C. dry and high level is N.O. dry).

Types 1, 3, 4, and 5 units with stainless steel float, Part Number 15666:

A = 1-5/8" (41.3 mm) minimum distance to highest level (2", Type 5 only).

B = 2-1/2" (63.5 mm) minimum distance from end of unit to lowest level.

C = 4" (101.6 mm) minimum distance between level.

D = 1/4" (6.3 mm) minimum distance between actuation levels (Note: One float for two levels can be used only when low level is N.C. dry and high level is N.O. dry).

Notes:

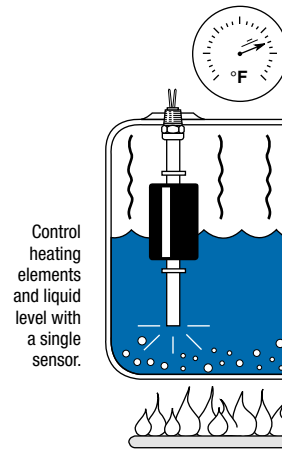
1. A, B and C dimensions based on a liquid specific gravity of 1.0.
2. One float for two levels can be used only when 20 VA switch is used.
3. Actuation levels are calibrated on descending fluid level, with water as the calibrating fluid, unless otherwise specified.
4. Tolerance on actuation levels is $\pm 1/8"$ (3.2 mm).
5. TH (Temperature option) makes "B" dimension a minimum of 2.75" (69.8 mm).

Optional Integrated Temperature Sensors

- ▶ Compatible with LS-700 and LS-800 Series Units
- ▶ Thermostat Switches or Thermistor Versions

Advantages of integrated temperature sensors:

- Space Saving.
- Fewer intrusions into the tank.
- Electrical wiring emanates from a single source – eliminate multiple conduits.
- Economical – typically less expensive than separate sensors.



Thermistor for Continuous Indication – TM-800 and TM-700

- ▶ Excellent repeatability

Value: 10,000 ohms @ 77°F (25°C)

Tolerance: $\pm 0.2^{\circ}\text{C}$ from 32°F to 158°F (0°C to 70°C)

Operating Temperature: 302°F (150°C), Max.

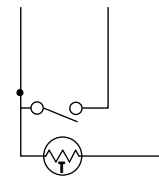
Alpha @ 25°C: $-4.39\%/^{\circ}\text{C}$

Dissipation Constant: 1mW/°C in Still Air;
8mW/°C in Oil Bath.

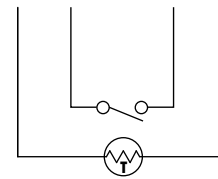
How to Order

Temperature thermistors are available on LS-700 Series units with up to three actuation levels, and on LS-800 Series units with up to five actuation levels. To have thermistor added, order model TM-800 or TM-700.

Note: This option is not CE Approved.



GROUP I



GROUP II

Thermostat for Switch Actuation

- Standard Settings from 100°F to 200°F.
- Open or close switch on increasing temperature.

Use these switches to set off High/Low temperature alarms. Or, combine with GEMS relays to control tank heating and cooling, motor-operated valves, etc.

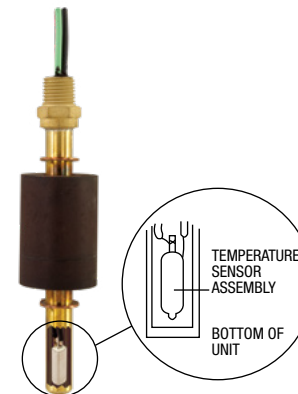
To designate the thermostat switch option, order model TH-700 or TH-800.

Also specify the choice from selections A, B and C below.

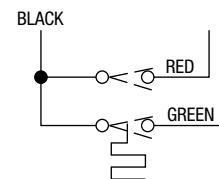
- Switch Rating:**
For LS-800 Series: 6A/120V, 4A/240V, 100VA (non-inductive).
For LS-700 Series: 2.6A/120V (inductive).
- Contact Operation on Increasing Temperature:**
“Opens” when Set Point reached or “Closes” when Set Point reached.
- Standard Temperature Set Point ($\pm 7.2^{\circ}\text{F}$; $\pm 4^{\circ}\text{C}$):**
100°F (37.7°C), 125°F (51.6°C), 150°F (65.6°C), 175°F (79.4°C), 200°F (93.3°C)

Notes:

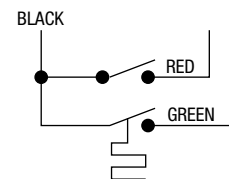
- Other temperature settings and tolerances available; 25 piece minimum order quantity applies. Please call GEMS Sensors Inc. for more information.
- This option is not CE Approved.



Typical Wiring Diagram



GROUP I



GROUP II

Large Size – Engineered Plastics

LS-800PVC Series – Our Most Economical Large Size Unit


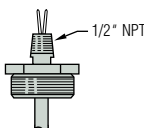
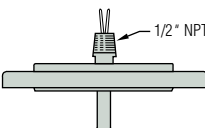
- ▶ 1 to 7 Actuation Levels
- ▶ Lengths to 60 inches

Inexpensive, all-PVC LS-800PVC Series switches bring reliable level sensing to corrosive liquids. These durable, yet economical, switches use the same high-quality, dependable reed switches found in GEMS' LS-800 model.

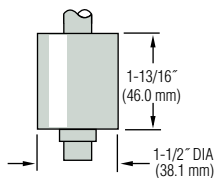
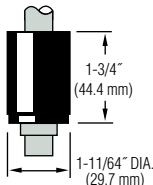


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1. Mounting Types

	Type 1 1/2" NPT	Type 3 2" NPT	Type 4 3", 150# Flange
			
Mounting and All Wetted Parts	PVC		
Operating Temperatures	0°F to 125°F (-17.8°C to 51.7°C)		
Pressure, PSI, Max.	15 @ 70°F (21°C)		
Max. Length (Lo)	60 inches (152.4cm)		
Mounting Position	Vertical ±30° Inclination		

2. Float Type

Float Material	PVC	Buna N
Float Dimensions		
Float Part Number	16306	142251
Min. Liquid Specific Gravity	0.85	0.80

LS-800PVC Series – Continued

3. 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 type of wiring selected. See below.

Group I Wiring: 1 to 7 Actuation Levels

Group II Wiring: 1 to 4 Actuation Levels

Group III Wiring: 1 to 3 Actuation Levels

Group IV Wiring: 1 to 2 Actuation Levels

Switch (N.O. or N.C.):

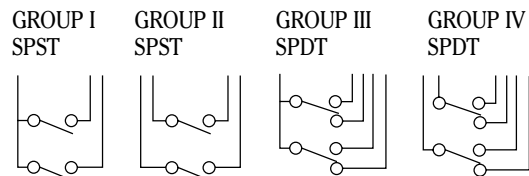
SPST: 20 VA or 100 VA

SPDT: 20 VA

Lead Wires: #22 AWG, 24" L., PVC

Typical Wiring Diagrams

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

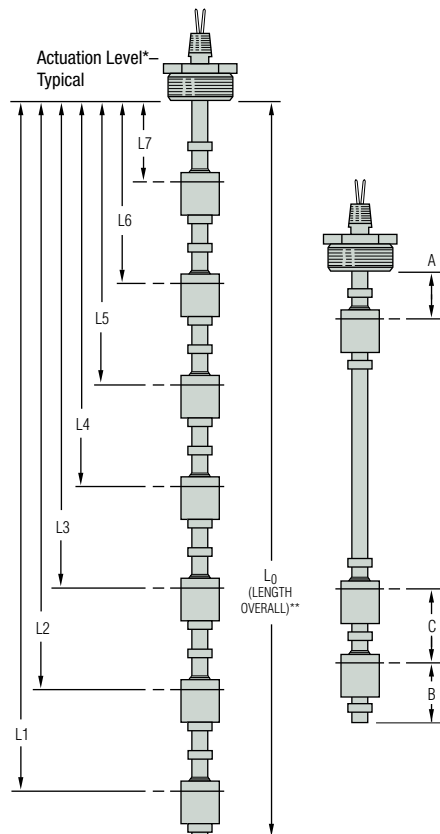


Wiring Color Code

SPST Switches				SPDT Switches 20 VA				
Wiring	Group I	Group II		Group III		Group IV		
Com. Wire	Black	None		Black		None		
	NO/NC	SW. Com.	NO/NC	NO	NC	SW. Com.	NO	NC
L1	Red	Red	Red	Red	Wh/Red	Red	Wh/Red	Wh/Blk/Red
L2	Yellow	Yellow	Yellow	Yellow	Wh/Yel	Yellow	Wh/Yel	Wh/Blk/Yel
L3	Blue	Blue	Blue	Blue	Wh/Blue			
L4	Brown	Brown	Brown					
L5	Orange							
L6	Gray							
L7	White							

Notes: See "Electrical Data" on Page X-5 for more information.

4. Actuation Level Dimensions



Switch actuation levels are determined following the guidelines below.

A = 1-1/2" (38.1 mm) Minimum distance to highest actuation level.

B = 2" (50.8 mm) Minimum distance from end of unit to lowest actuation level.

C = 3" (76.2 mm) Minimum distance between actuation levels.

Notes:

1. Actuation levels are calibrated on descending fluid level, with water as the calibrating fluid, unless otherwise specified.
2. A and B dimensions based on a top mounted unit.
3. Float stops are permanently cemented in place.
4. Tolerance on actuation levels is $\pm 1/8"$ (3.2 mm).
5. Dimensions based on a liquid specific gravity 1.0.

* Actuation level distances and L_0 (overall unit length) are measured from inner surfaces of mounting plug or flange.

** Length Overall (L_0) = L_1 + Dimension B. See Mounting Types for Maximum Length values.

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