

FLOAT TYPE

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-25 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.

Factory Mutual Approved Explosion Proof

LS-700-EP Series offers 1 to 5 actuation levels with lengths to 48" for use in hazardous locations. Call Gems factory for details.



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LEVEL SWITCHES – MULTI POINT

1. Mounting Types

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

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

Type 1 1/8" NPT	Type 2 3/4" NPT ¹	Type 3 1" NPT ¹	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 and Mounting Material	Brass or 316 Stainless Steel	
Max Length	48 inches (121.9 cm) – 21" Max On Bent Stem Versions (Consult Factory)	
Mounting Position	Vertical \pm 30° Inclination	
Float Stops ³	Brass Units: Beryllium Copper Grip Rings; Stainless Steel Units: S.S. ARMCO PH-15-7MO Grip Rings	
Pressure Rating, PSI, Max. ⁴	See Float Value on Following Page	50

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).

Mounting Options and Float Selection on following pages.

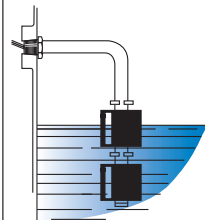


Optional Mountings

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.

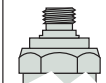


Integral Receptacle

2-5 Pin miniature receptacle for mounting



Type 2 or Type 3; eliminates splicing and eases connections.

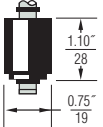
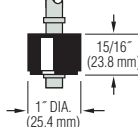
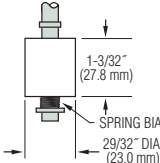
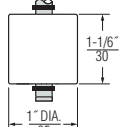


Conduit Adapter

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

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
Float Dimensions				
Part Number	187553	39049	133764	145730
Operating Temperature	Water: to 180°F (82.2°C)		-40°F to +300°F (-40°C to +149°C)	-40°F to +225°F (-40°C to +107°C)
	Oil: -40°F to +300°F (-40°C to 149°C)			
Pressure, PSI, Max.	300*		1000*	50 PSI @ 70°F*
Min. Liquid Specific Gravity	0.65	0.45	0.65	0.65

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

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.

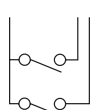
Lead Wires: #22 AWG, 24" L., PTFE.

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

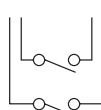
Typical Wiring Diagrams

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
L1	Red	Red	Red
L2	Yellow	Yellow	Yellow
L3	Blue	Blue	Blue
L4	Brown		
L5	Orange		

Notes:

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



Factory Mutual Approved Explosion-Proof

For Hazardous areas give Gems a call and ask about the LS-700-EP Series. These custom-length sensors provide up to 5 actuation levels, with lengths up to 48". Multiple mounting, float and material options. **800-378-1600**



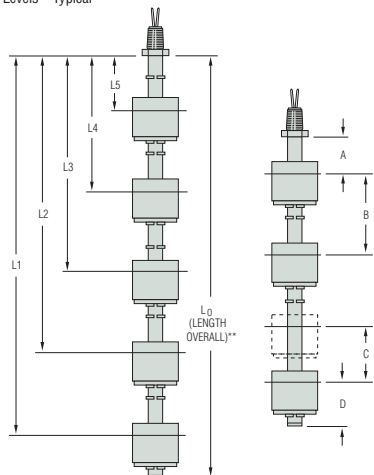
FLOAT TYPE

Polypropylene	316 Stainless Steel**				
1, 2, 3, 4, 5, 6, 7	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
197732	60241	141750	156900	136550	158369
-40°F to +250°F (-40°C to +121°C)	-40°F to +300°F (-40°C to +149°C)**				
100	100	275	600	400	150
0.95	0.70	0.85	0.90	1.10	.85

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

4. Actuation Level Dimensions

Actuation Levels*—Typical



* Actuation level distances and L_6 (overall unit length) are measured from inner surfaces of mounting plug or flange.

** Length Overall (L_6) = 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 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:

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

LS-700 Types Custom Length Float Type Level Switches

Application Environmental Conditions

This information is essential to the accurate and proper operation of your GEMS configurable sensors. Please complete fully and accurately.

1. **Liquid Media:** _____
2. **Pressure:** Minimum _____ psig Maximum _____
3. **Temperature:** Minimum _____ °F Maximum _____
4. **Specific Gravity:** Minimum _____ Maximum _____

5. **Viscosity:** _____ SSU

6. **Tank Material:** _____

Tank Depth: _____

7. **Unit is Mounted In:** ☐ Tank Top ☐ Tank Bottom

1. Series Type:

- ☐ LS-700 ☐ TH-700 (Thermostat Equipped)
☐ TM-700 (Thermistor Equipped)

2. Mounting Type and Materials:

A. Mounting Type:

- ☐ Type 1 ☐ Type 2 ☐ Type 3 ☐ Type 4
☐ Type 5 ☐ Type 6 ☐ Type 7

B. Mount and Stem Material:

- ☐ Brass
☐ 316 Stainless Steel

3. Float Part Number: _____

Matching floats will be used at each actuation level specified.

4. Switch Type and Rating:

A. ☐ Group I ☐ Group II

B. ☐ SPST

C. ☐ 20 VA ☐ 100 VA

Please indicate if using microprocessor/PLC load: ☐ Yes ☐ No

5. Switch Actuation Level

Actuation Level	Distance to Actuation Level – Inches*	SPST Switch Operation** (Check Type)	
		N.O.	N.C.
L5			
L4			
L3			
L2			
L1***			

* Measured from inner surface of mounting plug or flange.

** Switch position is "normal" with unit dry (tank empty).

*** L1 is the distance to the lowest actuation level with mounting "up," and is the distance to the highest actuation level with mounting "down."

B. Length Overall (L₀) _____ inches.

6. Lead Wire Length:

☐ 12" ☐ 24" ☐ Other: _____ inches.

7. Options:

☐ Temperature Switch Settings (°F): ☐ 100 ☐ 125 ☐ 150
☐ 175 ☐ 200

On rising temperature, switch... ☐ Opens ☐ Closes

☐ Slosh Shield ☐ Collars

☐ 1/2" NPT Conduit Connection (available for Types 2, 3 & 7)

J-box Electrical Connection

☐ Explosion Proof Type (FM/CSA) ☐ NEMA 4 Type