

## 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 ( $L_0$ ) 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 <sup>1</sup>	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 <sup>1,2</sup>	

<b>Stem &amp; Mounting Material</b>	Brass or 316 Stainless Steel	
<b>Maximum Length</b>	48 inches (121.9 cm) - 21" (53.3 cm) Max on Bent Stem Versions (Consult Factory)	
<b>Mounting Position</b>	Vertical ±30° Inclination	
<b>Float Stops<sup>3</sup></b>	Brass Units: Beryllium Copper Grip Rings; Stainless Steel Units: S.S. ARMC0 PH-15-7MO Grip Rings	
<b>Max. Pressure Rating<sup>4</sup></b>	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).

Mounting Options and Float Selection on following pages.



## 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 in (mm)					
Part Number	<b>187553</b>	<b>39049</b>	<b>133764</b>	<b>145730</b>	<b>197732</b>
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 in (mm)					
Part Number	<b>60241</b>	<b>141750</b>	<b>156900</b>	<b>136550</b>	<b>158369</b>
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

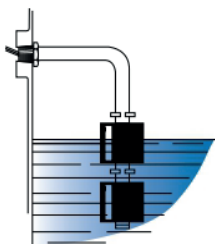
\* De-rated with increasing temperature above 70°F (21°C).

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

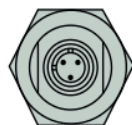
### Optional Mountings

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.

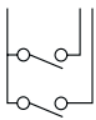
**Lead Wires:** 22 AWG, 24" L., PTFE.

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

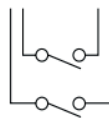
#### Typical Wiring Diagrams

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.

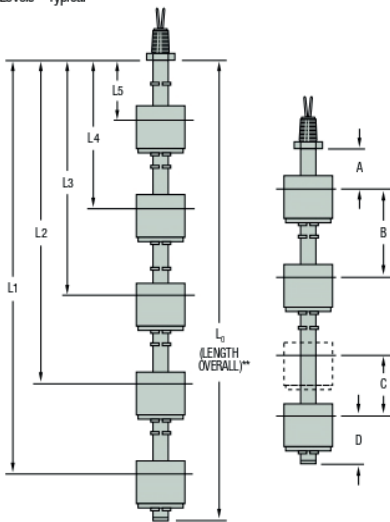
SPST Switches			
Wiring	Group I	Group II	
<b>Common Wire</b>	Black	None	
	NO/NC	SW Com.	NO/NC
L <sub>1</sub>	Red	Red	Red
L <sub>2</sub>	Yellow	Yellow	Yellow
L <sub>3</sub>	Blue	Blue	Blue
L <sub>4</sub>	Brown		
L <sub>5</sub>	Orange		

**Notes:**

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

### 4. Actuation Level Dimensions

Actuation Levels\* – Typical



\* Actuation level distances and L<sub>0</sub> (overall unit length) are measured from inner surfaces of mounting plug or flange.

\*\* Length Overall (L<sub>0</sub>) = L<sub>1</sub> + 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
<b>39049</b>	11/16" (17.5 mm)	1-5/8" (41.3 mm)	1/8" (3.2 mm) Min.	3/4" (19.1 mm)
<b>60241</b>	9/16" (14.3 mm)	1-15/16" (49.2 mm)		15/16" (23.8 mm)
<b>133764</b>	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.
<b>136550</b>	5/16" (7.9 mm)	1-7/8" (47.6 mm)		1-11/16" (42.9 mm)
<b>141750</b>	1/2" (12.7 mm)	1-9/16" (39.7 mm)		1-1/8" (28.6 mm)
<b>145730</b>	5/8" (15.9 mm)	1-3/8" (34.9 mm)		13/16" (20.6 mm)
<b>156900</b>	9/16" (14.3 mm)	1-9/16" (39.7 mm)		13/16" (23.8 mm)
<b>158369</b>	5/8" (15.9 mm)	1-7/8" (47.6 mm)		1-3/8" (34.9 mm)
<b>187553</b>	11/16" (17.5 mm)	1-7/16" (36.5 mm)		7/8" (22 mm)
<b>197732</b>	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 ±1/8" (3.2 mm).
3. For bent stem versions, please request drawing LS-77700.