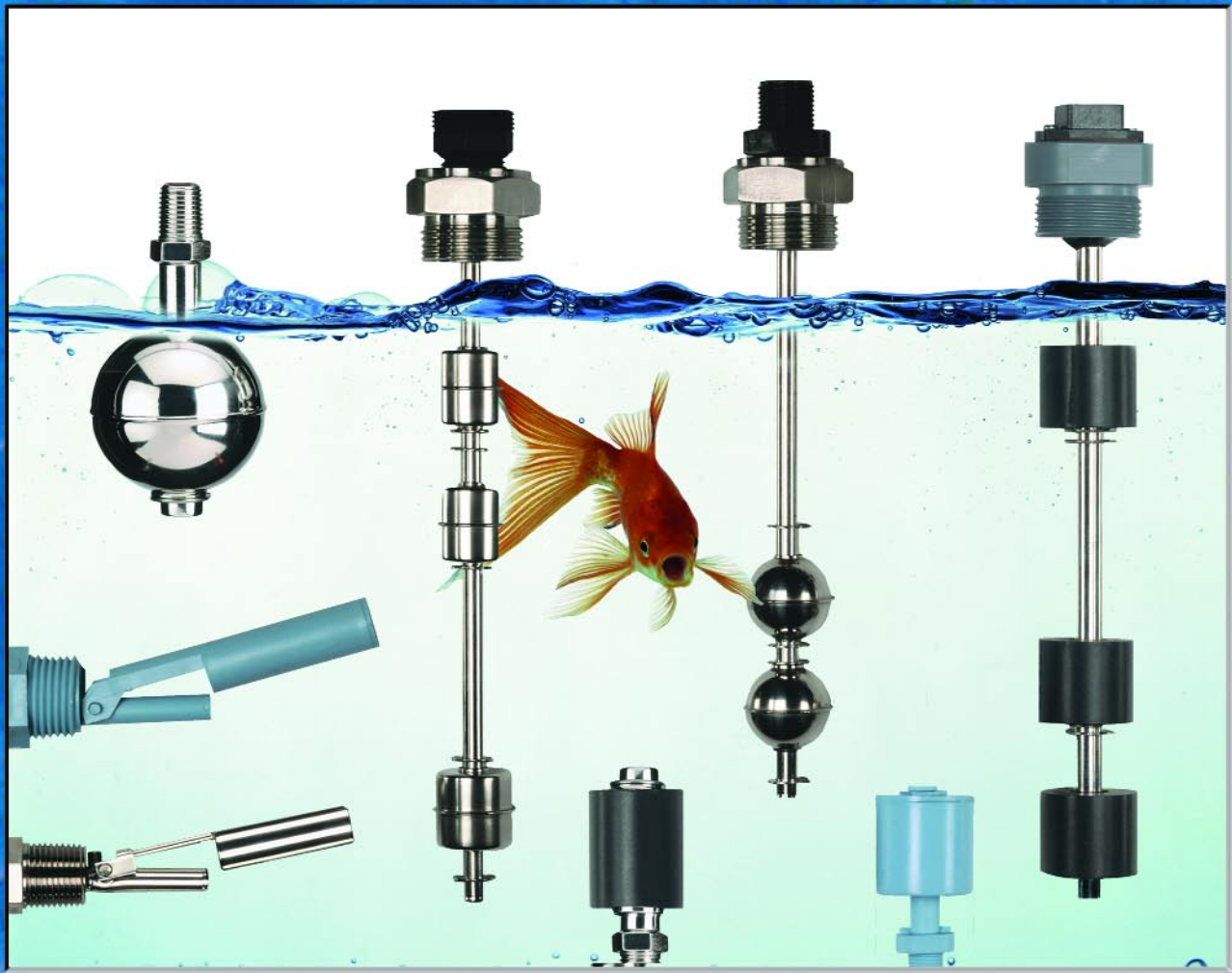


Innovative Solutions

Creative Solutions in Fluid SensingSM



LIQUID LEVEL & FLOW SWITCHES

***Design simplicity
and leading-edge
manufacturing
is how we create
the best value
in OEM switches***



Innovative Solutions' liquid level switches have been designed to deliver the best value to OEM switch users. Each individual switch utilizes market-tested, float-actuated technology that translates into simple, reliable, maintenance-free operation. Without the need for calibration, these simplified switches provide the long term, consistent accuracy that OEM's demand.

Innovative's product line has been designed to provide creative solutions to liquid level control applications where single or multiple-stage switching is required. Our four product groups are:

- Single-stage, Horizontal Mounting
- Single-stage, Vertical Mounting
- Multiple-stage, Standard Length
- Multiple-stage, Extended Length

We have also structured our product line so each product group provides a choice in performance options and price point. For example, you can benefit from the production economies inherent in molded thermoplastics, or, if required, select a switch whose stainless steel components provide unmatched tolerance to temperature and pressure

extremes. Whatever your level of performance or price point, Innovative Solutions has the switch that will work for you.

And, if you have an application whose solution is not readily found in the catalog pages ahead, call upon our company's engineering resources to create a custom switch for your level control application. Off-the-shelf or custom, we have the solution!



Innovative Solutions uses only the highest quality components in all its liquid level switches. The highly-polished precision floats pictured above, for example, are produced to exacting standards of quality and are inspected thoroughly prior to their assembly as a completed product.

Innovative Solutions
Creative Solutions in Level SensingSM

C o n t e n t s

Single Station Vertical Mount

P A G E

L001 & L002	2
L003 Series	3
L170/L175 Series.....	3
L180/L190 Series.....	4
L195 Series	4

Single Station Horizontal Mount

L007 Series	5
L070 Series	6
L090 Series	7

Multiple Station Vertical Mount — 1' to 11' Lengths

L312 Series.....	8-9
L500 Series	10-11

Conductivity-Based Level Control: Vertical Mount

C001 Series	12
-------------------	----

Ultrasonic Level Control

U001	13
------------	----

Flow Switches: Piston-Type, Compact & Sub-Compact Design

F001 & F002 Series	14
--------------------------	----

Accessories	15
--------------------------	----

Electrical Data	16
------------------------------	----

Value Added	16
--------------------------	----

Product Selection Guide	17-18
--------------------------------------	-------





Single-Stage Switches: **Vertical Mount**

**Innovative
Solutions**



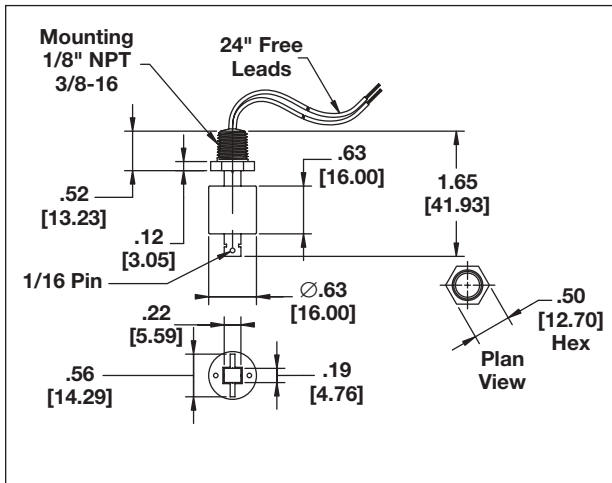
L001 & L002 Series: **Sub-Compact, Low-Cost Switches – Ideal for OEM Applications**

Key Features:

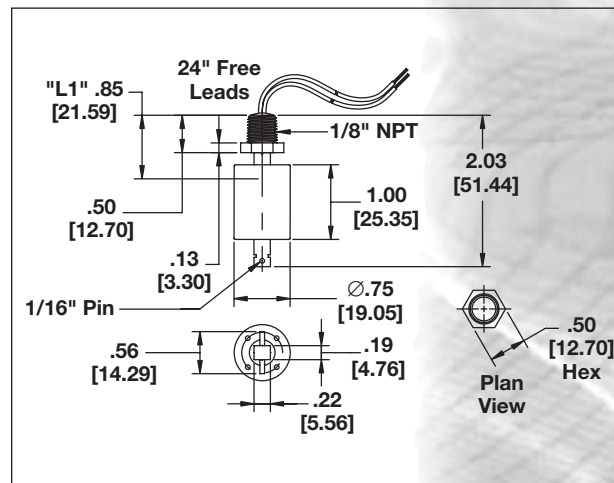
- Ideal for confined spaces
- Broad media compatibility
- All polypropylene construction
- Switch rating (see below)
- 24" lead wires
- FDA approved material



L002



L001



L002

Series	Mounting	Stem/Float Materials	SG	Temperature	Pressure	P/N	Switch
L001*	1/8" NPT	Solid/PP	1.0	-40° to +150° F	150 psig	L001-0102-0301	10 VA
L001*	3/8"-16	Solid/PP	1.0	-40° to +150° F	150 psig	L001-1702-0301	10 VA
L002	1/8" NPT	Solid/PP	0.8	-40° to +150° F	150 psig	L002-0102-0303	50 VA
L002	3/8"-16	Solid/PP	0.8	-40° to +150° F	150 psig	L002-1702-0303	50 VA

SG refers to recommended minimum liquid specific gravity

*When ordering please specify switch operation N.O. (Normally-Open) or N.C. (Normally-Closed) dry.



Single-Stage Switches: **Vertical Mount**

**Innovative
Solutions**

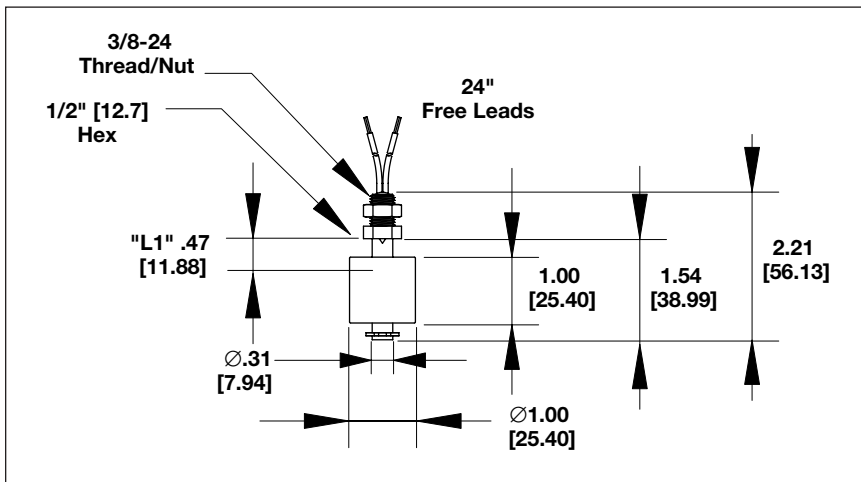


L003 Series

Compact, Low-Cost Switches – Ideal for High Volume Use

Key Features:

- Ideal for shallow tanks
- Broad media compatibility
- Selectable to Normally-Open or Normally-Closed operation by inverting the float
- 50 VA switch (standard)



Series	Mounting	Stem/Float Materials	SG	Temperature	Pressure	P/N
L003 Compact, Low-Cost Switches	1/8" NPT	Solid/PP	.90	-40° to +150° F	150 PSIG	L003-0102-0303
	3/8"-24	Solid/PP	.90	-40° to +150° F	150 PSIG	L003-1802-0303
	1/8" NPT	Hollow/PP	.70	-40° to +150° F	50 PSIG	L003-0102-0203
	3/8"-24	Hollow/PP	.70	-40° to +150° F	50 PSIG	L003-1802-0203
	1/8" NPT	PVC/PVC	.90	-40° to +140° F	50 PSIG	L003-0105-0503
	3/8"-24	PVC/PVC	.90	-40° to +140° F	50 PSIG	L003-1805-0503
	1/8" NPT	PVDF/PVDF	1.0	-40° to +150° F	50 PSIG	L003-0104-0403
	3/8"-24	PVDF/PVDF	1.0	-40° to +150° F	50 PSIG	L003-1804-0403
	1/8" NPT	Nylon/Buna	.80	-40° to +150° F	150 PSIG	L003-0118-2003
	3/8"-24	Nylon/Buna	.80	-40° to +150° F	150 PSIG	L003-1818-2003



Single-Stage Switches: **Vertical Mount**

**Innovative
Solutions**



L170/L175/L176/L177/L178 Series

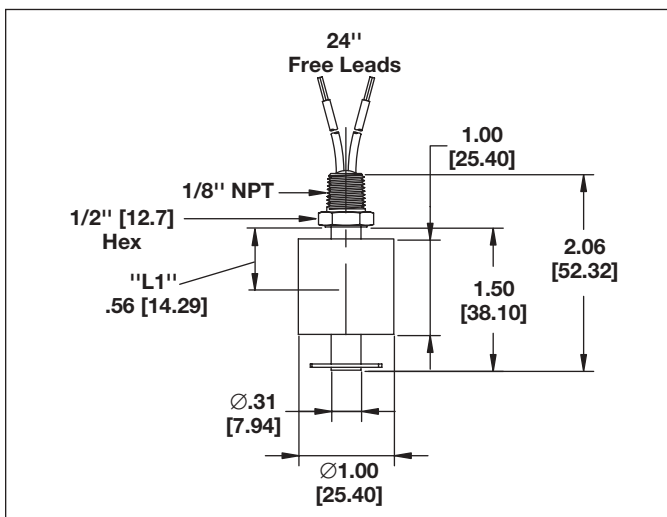
Compact Switches for Higher Temperatures and Pressures

Key Features:

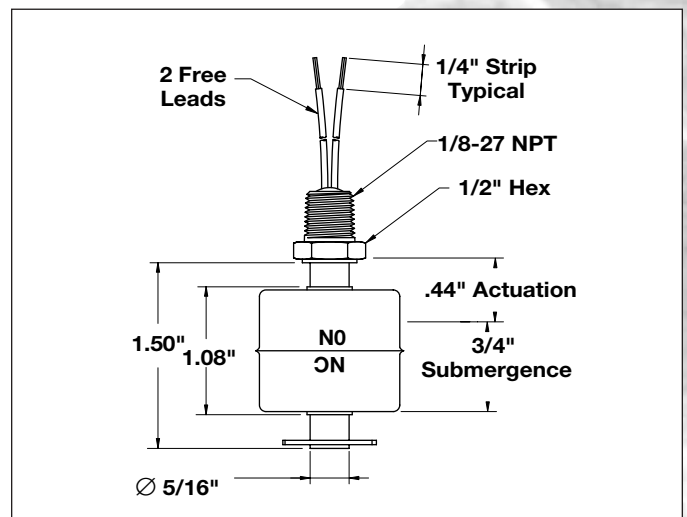
- Ideal for shallow tanks
- Selectable to Normally-Open or Normally-Closed operation by inverting the float
- Broad media compatibility
- 50 VA switch (standard)



L176



L170



L176

Compact Switches for Higher Temperature/Pressure

Series	Mounting	Stem/Float Materials	SG	Temperature	Pressure	P/N
L170	1/8" NPT	Brass/Buna	.80	-40° to +180° F	150 psig	L170-0101-2003
L170	1/8" NPT	SS/Buna	.80	-40° to +180° F	150 psig	L170-0108-2003
L175	1/8" NPT	Brass/SS	.70	-40° to +300° F	150 psig	L175-0101-0803
L175	1/8" NPT	SS/SS	.70	-40° to +300° F	150 psig	L175-0108-0803
L176	1/8" NPT	Brass/SS	.90	-40° to +300° F	400 psig	L176-0101-0803
L176	1/8" NPT	SS/SS	.90	-40° to +300° F	400 psig	L176-0108-0803
L177	1/8" NPT	Brass/SS	.90	-40° to +300° F	600 psig	L177-0101-0803
L177	1/8" NPT	SS/SS	.90	-40° to +300° F	600 psig	L177-0108-0803
L178	1/8" NPT	Brass/SS	.85	-40° to +300° F	275 psig	L178-0101-0803
L178	1/8" NPT	SS/SS	.85	-40° to +300° F	275 psig	L178-0108-0803

SG refers to recommended minimum liquid specific gravity



Single-Stage Switches: **Vertical Mount**

**Innovative
Solutions**



L180/L190 Series

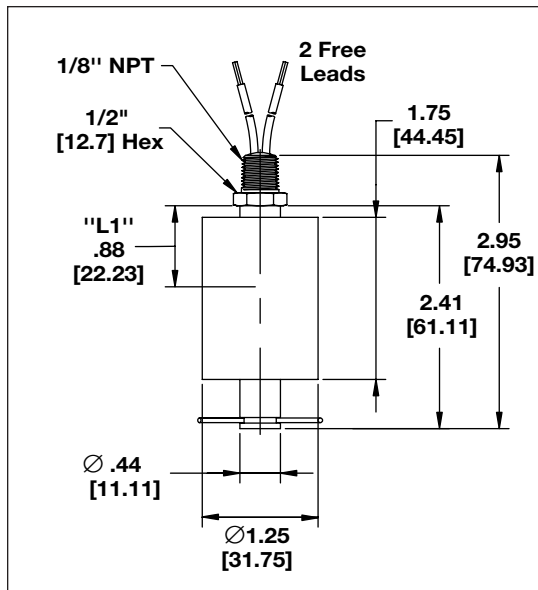
Intermediate and Large-Sized Buna-N Float Switches

Key Features:

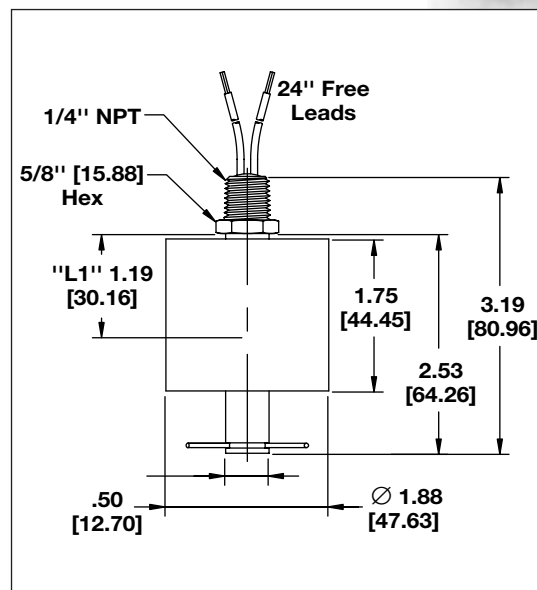
- Excellent in oils and water
- Broad media compatibility
- Series L190 for high-viscosity liquids
- Selectable to Normally-Open or Normally-Closed by inverting the float
- 50 VA SPST switch (standard)



L180



L180

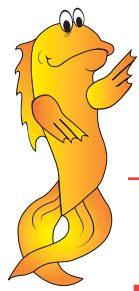


L190

Intermediate & Large-Sized Switches

Series	Mounting	Stem/Float Materials	Specific Gravity	Temperature	Pressure	Part Number
L180	1/8" NPT	Brass/Buna	.75	-40° to +180° F	150 PSIG	L180-0101-2003
L180	1/8" NPT	SS/Buna	.75	-40° to +180° F	150 PSIG	L180-0108-2003
L190	1/4" NPT	Brass/Buna	.65	-40° to +180° F	150 PSIG	L190-0201-2003
L190	1/4" NPT	SS/Buna	.65	-40° to +180° F	150 PSIG	L190-0208-2003

SG refers to recommended minimum liquid specific gravity



Single-Stage Switches: **Vertical Mount**

**Innovative
Solutions**



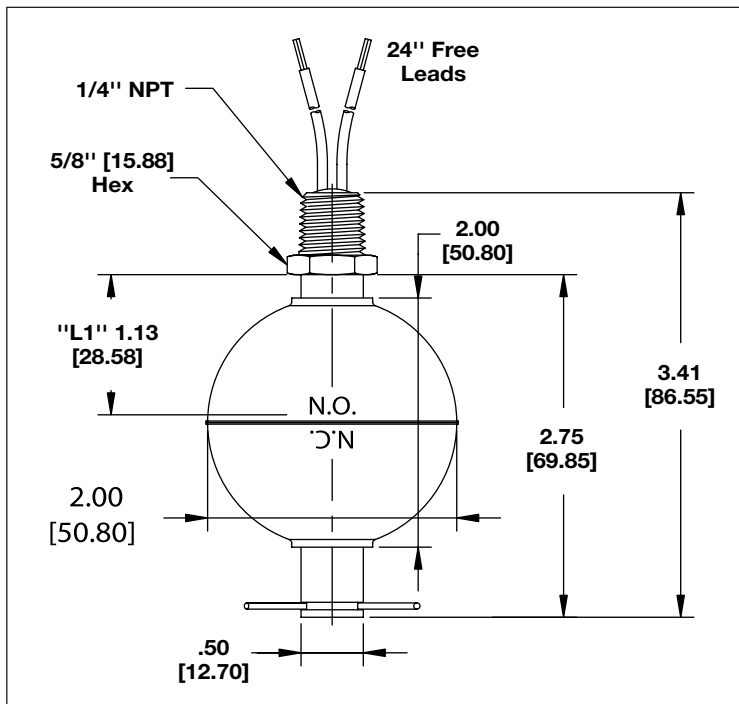
L195 Series All Stainless Steel Spherical Switches

Key Features:

- High-Temperature and High-Pressure performance
- Excellent in water, oils
- Selectable to Normally-Open or Normally-Closed by inverting the float
- 50 VA SPST switch (standard)



L195



Intermediate & Large-Sized Switches

Series	Mounting	Stem/Float Materials	SG	Temperature	Pressure	P/N
L195	1/4" NPT	SS/SS	.75	-40° to +300° F	750 PSIG	L195-0208-0803

SG refers to recommended minimum liquid specific gravity



Single-Stage Switches: **Horizontal Mount**

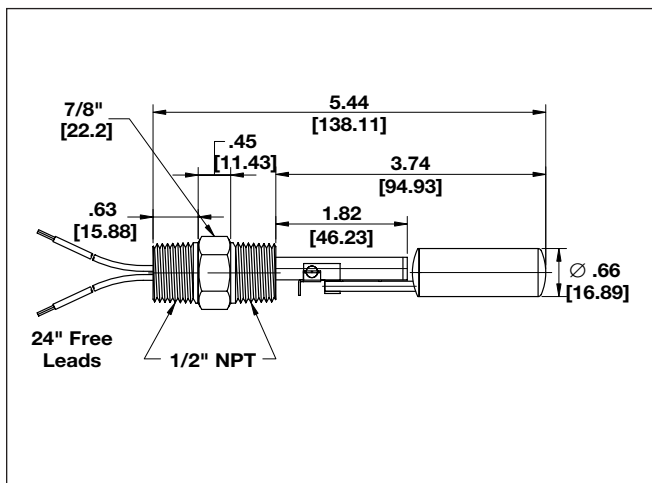
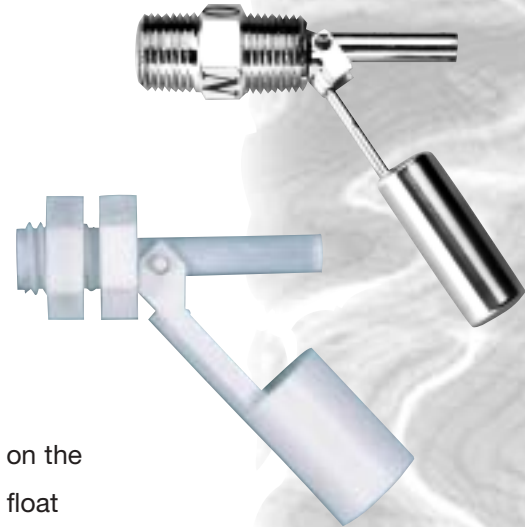
Innovative Solutions



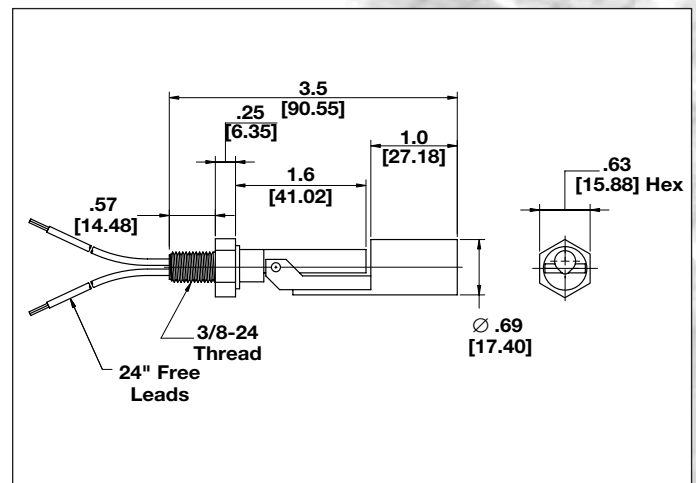
L007 Series **Compact, Low-Cost Switches**

Key Features:

- No-leak construction
- Ideal for small tanks
- Side-wall mounting: internal or external
- Broad media compatibility
- Operates on falling or rising level
- Extreme temperature/pressure model (316 SS)
- Floats can either rise or lower with the liquid level depending on the mounting position. In Normally-Open (shown in graphics) the float lowers with the level. In Normally-Closed, the float rises with the liquid level. Rotating the switch 180° will change the switch operation to Normally-Open or Normally-Closed
- 50 VA switch (standard)



L007 in 316 SS



L007 in Plastic (Internal Mount)

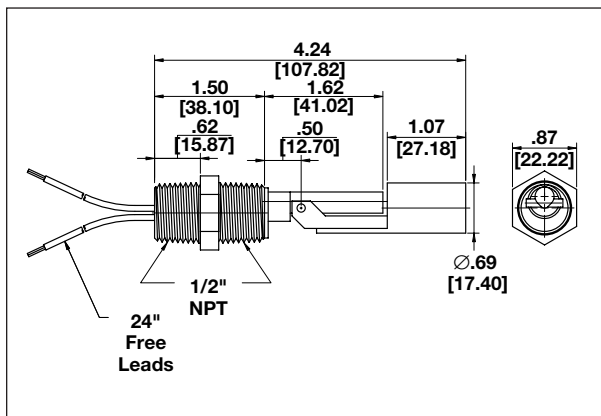


Single-Stage Switches: **Horizontal Mount**

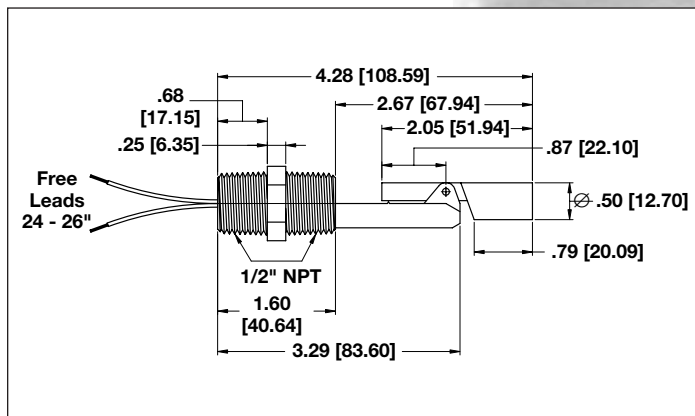
**Innovative
Solutions**



L007 Series **Compact, Low-Cost Switches**



L007 in Plastic (External Mount)



L007TT in Plastic (External Mount)

Intermediate & Large-Sized Switches

Series	Mounting	Materials	SG	Temperature	Pressure	P/N
L007 Compact, Low-Cost Switches	1/2" NPT	PVDF	.80	-40° to +250° F	100 PSIG	L007-0404-0403
	1/2" NPT	PP	.55	-40° to +150° F	100 PSIG	L007-0402-0203
	1/2" NPT	PVC	.65	-40° to +140° F	100 PSIG	L007-0405-0503
	1/2" NPT	SS	.80	-40° to +300° F	300 PSIG	L007-0408-0803
	3/8"-24	PVDF	.80	-40° to +250° F	100 PSIG	L007-1804-0403
	3/8"-24	PP	.55	-40° to +150° F	100 PSIG	L007-1802-0203
	3/8"-24	PVC	.65	-40° to +140° F	100 PSIG	L007-1805-0503
	3/8"-24	SS	.80	-40° to +300° F	300 PSIG	L007-1808-0803
	1/2" NPT	Polysulfone	.65	-40° to +225° F	100 PSIG	L007-0422-2203
	1/2" NPT	Nylon	.60	-40° to +250° F	100 PSIG	L007-0418-1803
	3/8"-24	Polysulfone	.65	-40° to +225° F	100 PSIG	L007-1822-2203
	3/8"-24	Nylon	.60	-40° to +250° F	100 PSIG	L007-1818-1803
	5/8"-11	Polypropylene	.55	-40° to +150° F	100 PSIG	L007-2202-0203
	5/8"-11	Nylon	.60	-40° to +250° F	100 PSIG	L007-2218-1803
	5/8"-11	Polysulfone	.65	-40° to +225° F	100 PSIG	L007-2222-2203

SG refers to recommended minimum liquid specific gravity

Miniature Float Side-Mount Switches

Series	Mounting	Materials	SG	Temperature	Pressure	P/N
L007T Miniature, Float, Side-Mount	1/2" NPT	Polypropylene	.65	-40° to +150° F	150 PSIG	L007T-0402-0203
	1/2" NPT	Polysulfone	.60	-40° to +225° F	150 PSIG	L007T-0422-2203
	5/8"-11	Polypropylene	.55	-40° to +150° F	150 PSIG	L007T-2202-0203
	5/8"-11	Polysulfone	.65	-40° to +225° F	150 PSIG	L007T-2222-2203



Single-Stage Switches: **Horizontal Mount**

Innovative Solutions



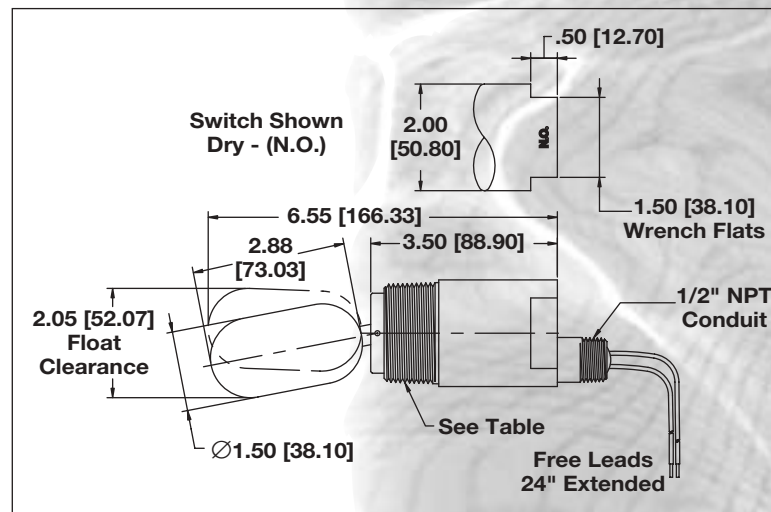
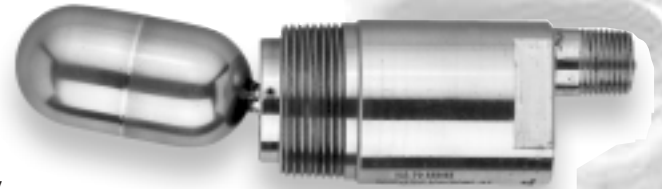
L070 Series

The L070 level switch is mounted in the horizontal orientation to monitor high and low liquid levels. The L070 provides a switch closure to activate alarms, send signals to an I/O card or PLC, and many other level monitoring and control functions.

The L070 level switch operates by the rising and falling liquid moving a magnet into close proximity of a hermetically sealed reed switch. The magnet is encapsulated in a float device. The float mechanism has an operating specific gravity of .40 but can be modified to monitor interface levels with a .10 differential. The switch can be installed in either normally-open or normally-closed orientation.

Key Features:

- Compact design
- All stainless steel
- May be used Normally-Open or Normally-Closed
- Interface capabilities
- Reliable reed switch action
- UL approved
- Operates on falling or rising level
- NEMA 4 with J-box
- Available with on-board 5 amp DPDT relay



Product Specifications:

Process Connection: 1 1/2" NPT (other connections available)
 Electrical Connection: 1/2" NPT (optional junction box)
 Electrical Rating: 100 VA SPST (240V AC/DC maximum voltage), resistance load (optional 100 W SPDT 240 V AC/DC maximum switching)
 Temperature Rating: -40° to +300° F
 Minimum Media Specific Gravity: .40

Wetted Materials: 316 SS — Housing, float assembly and pivot spacers
 18-8 SS — Float pivot pin
 Maximum Pressure: See table
 Approvals: UL (Underwriter's Laboratories)
 CUL (Canadian Underwriter's Laboratories)
 FM-EP* (Factory Mutual)

* CL I, II, III, Div. 1, Groups C, D, E, F & G hazardous locations

Series	Mounting	Materials	SG	Temperature	Maximum Pressure	P/N
L070 Horizontal Mounted Switches	1 1/2" NPT	Stainless steel	.40	-40° to +300° F	1500 psig	L070-0808-0803
	2" NPT	Stainless steel	.40	-40° to +300° F	1500 psig	L070-0908-0803
	2" 150# Flange	Stainless steel	.40	-40° to +300° F	175 psig	L070-7308-0803
	2 1/2" 150# Flange	Stainless steel	.40	-40° to +300° F	175 psig	L070-7408-0803
	3" 150# Flange	Stainless steel	.40	-40° to +300° F	175 psig	L070-7508-0803
	4" 150# Flange	Stainless steel	.40	-40° to +300° F	175 psig	L070-7608-0803
	2" 300# Flange	Stainless steel	.40	-40° to +300° F	455 psig	L070-8408-0803
	2 1/2" 300# Flange	Stainless steel	.40	-40° to +300° F	455 psig	L070-8508-0803
	3" 300# Flange	Stainless steel	.40	-40° to +300° F	455 psig	L070-8608-0803
	4" 300# Flange	Stainless steel	.40	-40° to +300° F	455 psig	L070-8708-0803

SG refers to recommended minimum liquid specific gravity



Single-Stage Switches: **Horizontal Mount**

Innovative Solutions



L090 Series Highly Buoyant, Low-Cost Switches

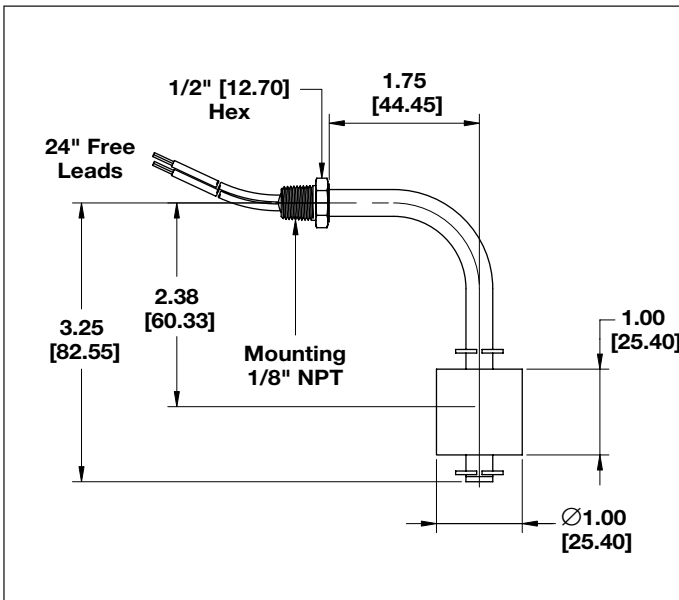
Key Features:

- No-leak construction
- Side-wall mounting: internal
- Broad media compatibility
- Operates on falling or rising level
- Selectable to Normally-Open or Normally-Closed operation by inverting the float
- Optional floats, mounts, and configurations available
- 50 VA SPST switch (standard)

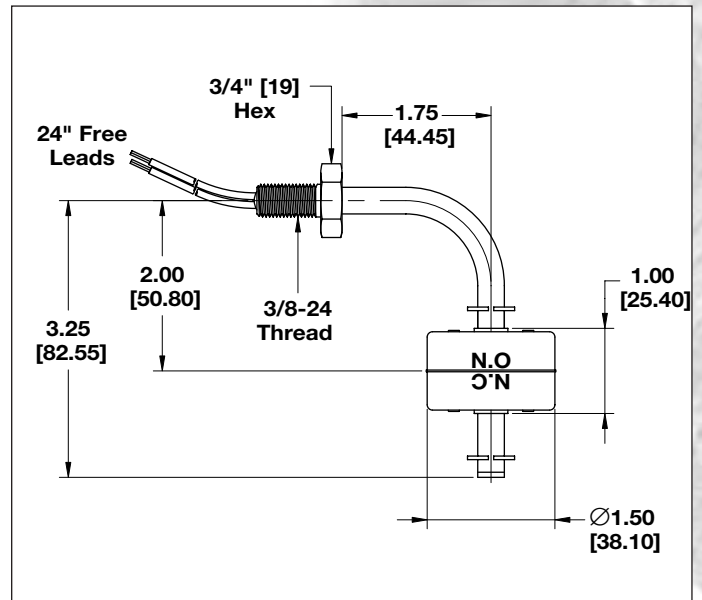


L090 with Buna-N Float

L090 with Stainless Steel Float



L090 with Buna-N Float



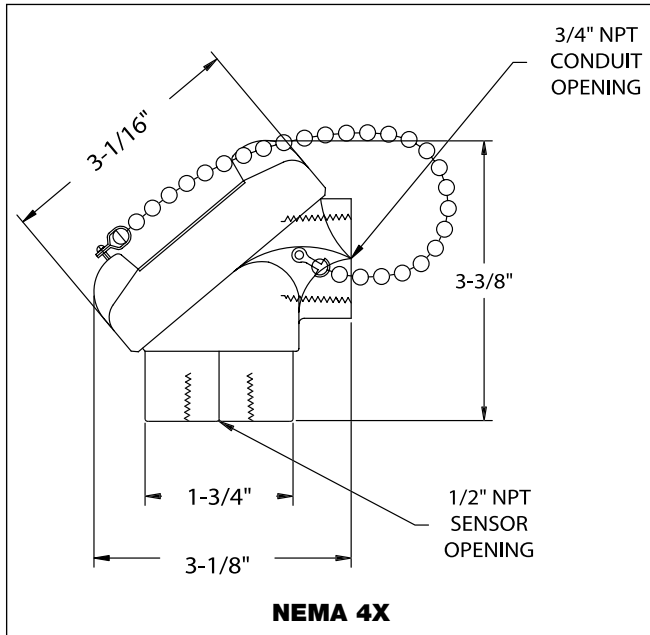
L090 with Stainless Steel Float

Series	Mounting	Stem/Float Materials	SG	Temperature	Pressure	P/N
L090 Highly Buoyant, Low-Cost Switches	1/8" NPT	Brass/Buna	.80	-40° to +180° F	150 PSIG	L090-0101-2003
	1/8" NPT	SS/Buna	.80	-40° to +180° F	150 PSIG	L090-0108-2003
	1/8" NPT	SS/SS	.70	-40° to +300° F	100 PSIG	L090-0108-0803
	3/8"-24	Brass/Buna	.80	-40° to +180° F	150 PSIG	L090-1801-2003
	3/8"-24	SS/Buna	.80	-40° to +180° F	150 PSIG	L090-1808-2003
	3/8"-24	SS/SS	.70	-40° to +300° F	100 PSIG	L090-1808-0803

SG refers to recommended minimum liquid specific gravity

This NEMA 4X

is recommended for use on the following product series: L007, L312, L500, L070 & U001

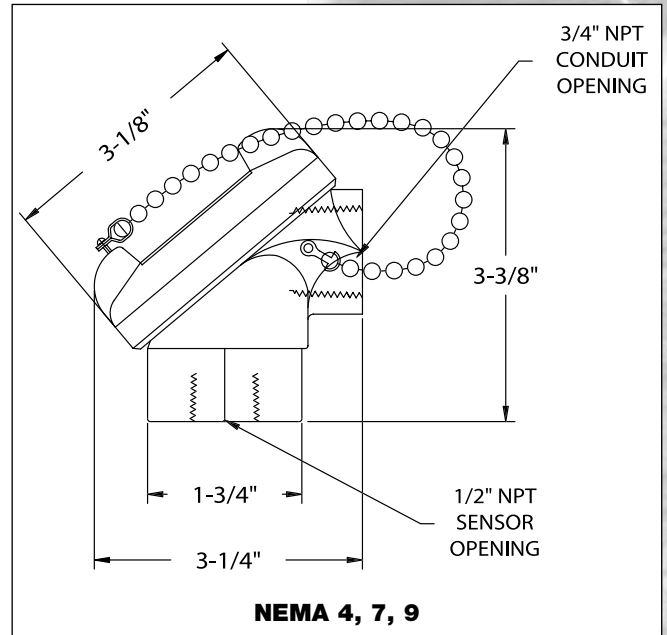


White Polypropylene

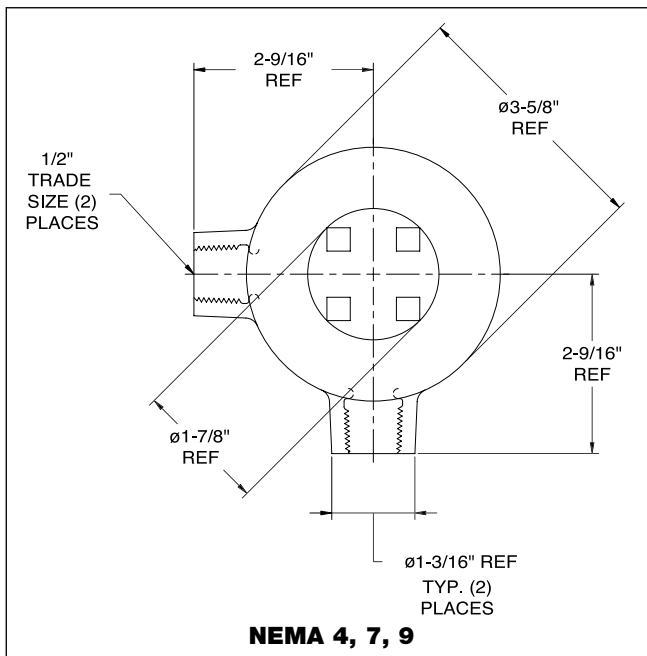
Excellent resistance to acids, alkalines, and many process chemicals. Temperature rating: 198° F

This NEMA 4, 7 & 9 J-Box

is recommended for use on the following product series: L007, L312, L500, L070 & U001



Die Cast Aluminum Cover w/Steel box



Malleable Iron

This NEMA 4, 7 & 9 J-Box

is recommended for use on the following product series: L312, L500 & L070

Switch Rating - Maximum Resistive Load

Watts	Volts	Amps AC	Amps DC
10 SPST	0-50	0.2	0.2
	100	0.08	NA
50 SPST	0-50	0.1	0.1
	120	0.4	0.4
100 SPST	120	0.8	NA
	240	0.2	0.2
30 SPDT	240	0.125	0.125
3 SPDT	0-24	NA	0.125

Note: Most applications involve inductive loads.

Contact Protection:

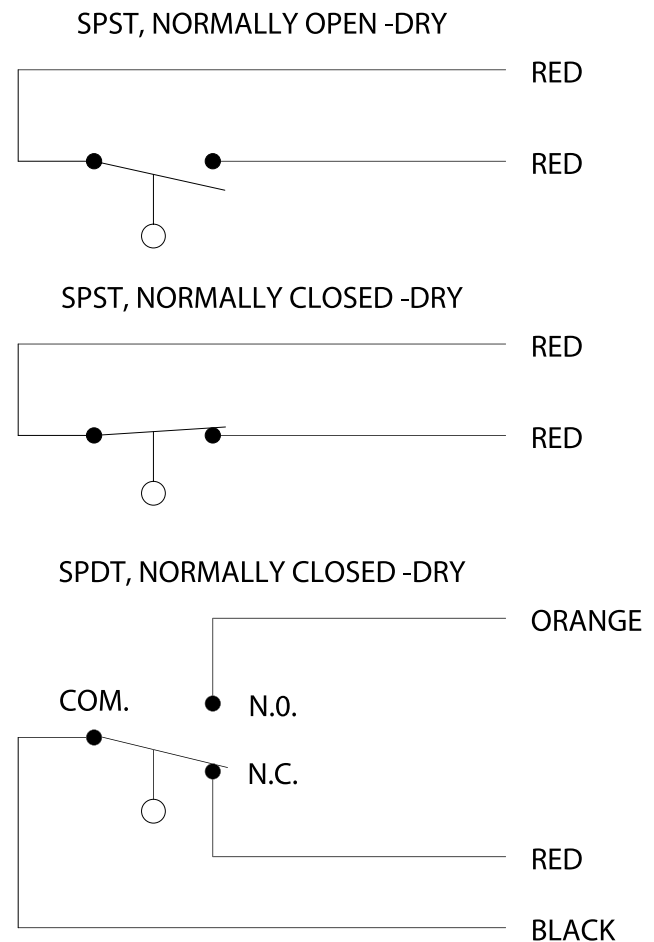
“In order to take advantage of the long life, highly reliable characteristics of a reed switch, it is important to provide protection when switching inductive loads.

When current is interrupted, the inductance of the load generates a high frequency voltage, which appears across the switch contacts. If the voltage is large enough, it can cause arcing. Arcing can cause the contacts to burn, weld together or stick; thus, giving unreliable performance. It is essential to protect the circuit by suppressing the voltage to prevent arcing. This can be accomplished through the use of a diode for DC circuits and a resistor-capacitor network for AC circuits. Consult factory for details.”

Value Added:

- 1. Laser Engraving:** ISI can permanently engrave your part number, special markings or your company logo on many metal parts. Consult factory for requirements.
- 2. Connectors:** Special connectors available on many products — please consult factory.

Typical Wiring Diagrams



ORDERING

Order One of Three Ways!

1 MAIL. Photocopy both sides of this form and fill-in the order information. Mail the form along with your company's purchase order (if applicable) to:

Innovative Solutions
60 Great Hill Road
Naugatuck, CT 06770 USA

2 FAX. After completing the form, fax it along with your purchase order to **203-729-6696**. Fax lines are open 24 hours every day, seven days a week.

3 PHONE. Place your order with a technical sales representative by calling **203-729-6434**. A rep is available weekdays from 8 a.m. to 4:00 p.m. (e.s.t.).

WARRANTY. Innovative Solutions warrants its liquid level sensing products to be free from defects in material and workmanship in normal use and service for a period of one year from the date of shipment. Innovative Solutions reserves the right to refund the purchase price in lieu of repair or replacement upon evaluation of the returned original part. Innovative Solutions makes no warranty of fitness for a part or an application.

SHIPPING. In-stock items are shipped UPS ground within 24 hours of receipt of order. Other shipping options are available upon request. All orders are shipped F.O.B. Naugatuck, CT.

Ship To: Company Name: _____

Street Address: _____

City/State/Zip: _____

Bill To: Company Name: _____

City/State/Zip: _____

Phone: _____ Fax: _____

Name: _____ Date: _____

This is a: R.F.Q. P.O.

Ref # _____

Quantity _____

Date Req'd _____

Application _____

Credit Card Orders: VISA MC AM EX Signature: _____

Number: _____ - _____ - _____ Exp Date: _____

Standard Product Ordering

Call for Current Pricing*

Part Number	Quantity	Description	Unit Price*	Amount

Sub Total

Applicable state tax must be added in CT, TX, NM and CA. **Sales Tax**

*Shipping charges will be added to your invoice. **Total**

Process Conditions	Nominal	Minimum	Maximum
Pressure, psig:			
Temperature: <input type="checkbox"/> F <input type="checkbox"/> C			
Specific Gravity:			
Viscosity, SSU:			

Other Process Conditions: _____

Media: 1 _____ 2 _____ 3 _____

Tank Material: _____ Tank Depth in inches: _____

Mounting Configuration: SIDE TOP BOTTOM

1. Series:

L312

L500

2. Mounting Type:

	No Mtg.		1/2" NPT
	1/8" NPT		1-1/4" NPT
	1/4" NPT		2" NPT
	3/8" NPT		3" 150#ANSI FLANGE
	3/4" NPT		
	1" NPT		
	1-1/4" NPT		

3. Stem & Mtg Material:

	Brass		Brass
	Polypropylene		316SS
	PVC		
	316SS		
	Teflon		
	Polysulfone		

4. Float Materials:

	Polypropylene (H)		Polypropylene (H)
	Polypropylene (S)		316SS
	PVC		Buna N
	316SS		
	Teflon (H)		
	Buna N		
	Polysulfone		

(H) = Hollow (S) = Foamed

L312

L500

5. Wiring Type:

<input type="checkbox"/>	SPST Group 1
<input type="checkbox"/>	SPST Group 2
<input type="checkbox"/>	SPDT Group 3
<input type="checkbox"/>	SPDT Group 4

<input type="checkbox"/>	SPST Group 1
<input type="checkbox"/>	SPST Group 2
<input type="checkbox"/>	SPDT Group 3
<input type="checkbox"/>	SPDT Group 4

6. Switch Rating:

<input type="checkbox"/>	3 VA SPDT
<input type="checkbox"/>	20 VA SPST
<input type="checkbox"/>	50 VA SPST

<input type="checkbox"/>	30 VA SPDT
<input type="checkbox"/>	50 VA SPST
<input type="checkbox"/>	100 VA SPST

7. Lead Wires:

<input type="checkbox"/>	12"
<input type="checkbox"/>	24"
<input type="checkbox"/>	Other

<input type="checkbox"/>	12"
<input type="checkbox"/>	24"
<input type="checkbox"/>	Other

8. Switch Actuation Level:

Actuation Level	Distance to Actuation Level in inches*	SPST Switch Operation** (Check Type)	
		Normally Open	Normally Closed
L6			
L5			
L4			
L3			
L2			
*** L1			
**** L0			

*Measured from the bottom of the mounting plug or flange.

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

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

****LO = Length overall, measured from the bottom of the mounting plug or flange to the end of the unit.

9. J-box Option:

(see page 15 for details)

<input type="checkbox"/>	3" Diameter box
<input type="checkbox"/>	3 5/8" Diameter box

Note: Lead wire length is 24" if not specified

Your Local Sales Office



Innovative Solutions
Creative Solutions in Level SensingSM

60 Great Hill Road • Naugatuck, CT 06770 - 2224 USA

Tel: 203-729-6434 • Fax: 203-729-6696

sales@innovativesensing.com • www.innovativesensing.com

© 2001 Innovative Solutions