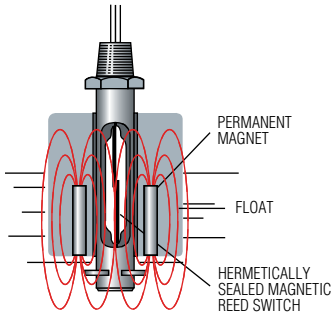
Float Type Level Switches

Single Point

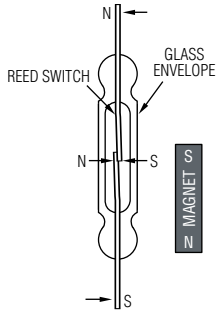


GEMS Level Switches operate on a direct, simple principle. In most models, a float encircling a stationary stem is equipped with powerful, permanent magnets. As the float rises or lowers with liquid level, the magnetic field generated from within the float actuates a hermetically sealed, magnetic reed switch mounted within the stem. The stem is made of non-magnetic metals or rugged, engineered plastics. When mounted vertically, this basic design provides a consistent accuracy of ±1/8 inch. Multi-station versions use a separate reed switch for each level point being monitored.

Side-mounted units use different actuation methods because of their horizontal attitude. The basic principle, however, is the same: as a direct result of rising or falling liquid, a magnetic field is moved into the proximity of a reed switch, causing its actuation.

Reed Switch Reliability

The durable construction of these reed switch designs ensures long, trouble-free service. Because the effects of shock, wear and vibration are minimized, these hermetically sealed switches provide precise repeatability with no more than 1% deviation. The switch actuation points remain constant over the life of the unit. See “Reed Switch Protection” in Appendix X for information on extending the life of GEMS Level Switches.



Wide Variety

Top/Bottom Mounting


LS-3


LS-1700

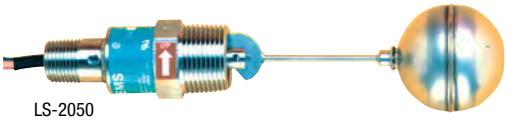

LS-1950


LS-1900TFE

Side Mounting


LS-7 Plastic


LS-7 Alloy


LS-2050

Specialty



Bottles



Slosh Shield


Leak Detector

Additional technical information can be found in Appendix X.

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Small Size – Engineered Plastics

LS-3 Series – Offers High Reliability, Compact Size and Low Costs in NPT, Straight and Metric Threads

Ideal for shallow tanks or restricted spaces, or for any low-cost, high volume use.
LS-3 Series are available in FDA compliant materials, consult GEMS for details.

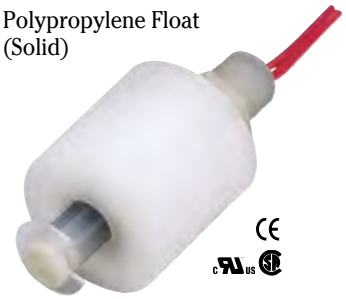
Polysulfone Float

For water based liquids, with limited use in oils and chemicals.

Polypropylene Float (Hollow)

Features a low specific gravity float offering broad chemical compatibility.

Polypropylene Float (Solid)



With Polypropylene stem and float, switch offers broad chemical compatibility.

Buna N Float

Ideal for oils and fuels.

ALL-PVDF

Stem and float of corrosion-resistant PVDF for ultra-pure applications.

New 3/4″ Polypropylene Float

See next page for details.

RoHS Compliant:

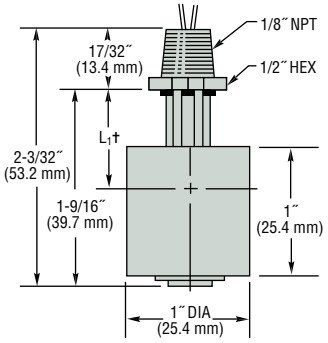
All LS-3 Series level switches featured on this page and the next are in compliance with EU-directive 2011/65/EC.

Common Specifications

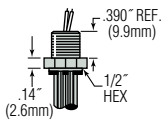
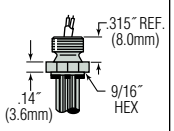
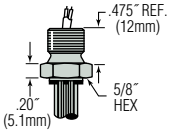
Approvals: U.L. Recognized – File No. E45168; CSA Listed – File No. 30200. CE Declaration Available Upon Request.
NSF materials are NSF 169 Standard compliant. For NSF approved level switches contact Gems.
RoHS – In compliance with EU-directive 2011/65/EC requirements for chemicals and substances.

Switch SPST: 20 VA, 120-240 VAC. Units are shipped N.O. unless otherwise specified. Selectable, N.O. or N.C., by inverting float on unit stem.
For LS-3 Micro: 20 VA, 140 VAC/200 VDC

Dimensions – 1″ Float Models only



† L_1 = Actuation Level (see chart on next page)

	Alternate Mountings		
	3/8″-16 Straight Thread	G1/8″ 1/8″-28 BSP	M12x 1.75 Straight Thread
			
Electrical Termination	Lead Wires	Cable	Cable

How To Order – Select Part Number based on specifications required.

Stem and Mounting Material	Float Material	Float Dia.	Actuation Level[1]	Min. Liquid Sp. Gravity	Pressure Max. @ 70°F (21°C)	Operating Temperature	Mounting Type	Electrical Termination	Part Number
Polysulfone	Polysulfone	1″	3/4″ (19.0 mm)	.75	50 psi (3 bar)	-40°F to +225°F (-40°C to +107°C)	1/8″ NPT	Lead Wires	**42295** ⚡
Polypropylene[2]	Polypropylene (Hollow)	1″	13/16″ (20.6 mm)	.60	50 psi (3 bar)	-40°F to +225°F (-40°C to +107°C)	1/8″ NPT	Lead Wires	**142505** ⚡
							3/8″-16	Lead Wires	**171517** ⚡
						-40°F to +176°F (-40°C to +80°C)	G 1/8″-28	Cable	**171518**
							M12x1.75	Cable	**189739**
Polypropylene[3] NSF Std. 169 (Kynar float retaining clip)	Polypropylene[3] (Hollow) NSF Std. 169	1″	13/16″ (20.6 mm)	.60	50 psi (3 bar)	-40°F to +225°F (-40°C to +107°C)	1/8″ NPT	Lead Wires	**209475**
							3/8″-16	Lead Wires	**209455**
							G 1/8″-28	Lead Wires	**209460**
							M12x1.75	Lead Wires	**209465**
Polypropylene[2]	Polypropylene (Solid)	1″	9/16″ (14.3 mm)	.90	150 psi (10 bar) @ 68°F (20°C)	-40°F to +150°F (-40°C to +66°C)	1/8″ NPT	Lead Wires	**116826** ⚡
							3/8″-16	Lead Wires	**171514** ⚡
						-40°F to +176°F (-40°C to +80°C)	M12x1.75	Cable	**189787**
Nylon	Buna	1″	13/16″ (20.6 mm)	.45	150 psi (10 bar)	-40°F to +250°F (oil) (-40°C to +121°C [oil])	1/8″ NPT	Lead Wires	**162745** ⚡
						-40°F to +176°F (water) (-40°C to +80°C [water])	M12x1.75	Cable	**189786**
PVDF	PVDF	1″	1/2″ (12.7 mm)	.86	50 psi (3 bar)	-40°F to +250°F (-40°C to +121°C)	1/8″ NPT	Teflon® Jacketed Lead Wires	**173250** ⚡

⚡ – Stock Items.

Notes:
1. Based on a liquid specific gravity of 1.0.
2. All Polypropylene units carry a Kynar® retaining clip. Accessories Available in OEM Quantities: Jam Nut, Gaskets, and Slosh Shields.
3. NSF 169 Approved unit, for water use only.

Miniature and Micro Floats for Tiny Tanks

Our smallest LS-3 Series switches yet!

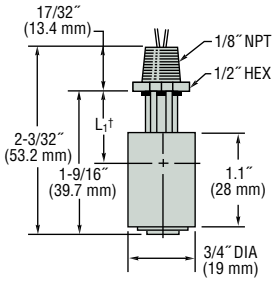
Small yes, but with BIG performance. No other miniature float switches match our LS-3 specs. These units are ideal for potable water, medical devices and other compact appliances, such as printers. Gems proprietary float enables use in lighter-than-water fluids. Switches are made from FDA compliant materials.

LS-3 3/4″

LS-3 Micro

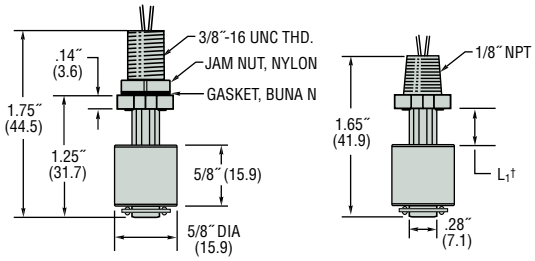
Dimensions – 3/4" and Micro Series

LS-3 3/4″



† L_1 = Actuation Level (see chart below)

LS-3 Micro



Series	Stem and Mounting Material	Float Material	Actuation Level[1]	Min. Liquid Sp. Gravity	Pressure Max. @ 70°F (21°C)	Operating Temperature	Electrical Termination	Mounting Type	Switch Logic	Part Number
LS-3 3/4″[2]	Polypropylene[2]	Polypropylene (Solid)	7/16″ (11.1 mm)	.95	100 psi (6.9 bar)	-40°F to +212°F (-40°C to +100°C)	Lead Wires or Cable	1/8″ NPT	N.C./N.O. Reverse Float Position	**201540**
	Nylon	Buna	11/16″ (17.5mm)	.85	150 psi (10.3 bar)	-40°F to +250°F (oil) (-40°C to +121°C [oil])	Lead Wire			**177818**
LS-3 Micro	Polypropylene	Polypropylene (Hollow	3/8″ (9.5 mm)	.95	50 psi (3 bar)	-40°F to +176°F (-40°C to +80°C)	PVC Jacketed Lead Wires 24″-26″	1/8″ NPT	N.O.	**247135**
									N.C.	**247137**
								3/8″-16 Straight	N.O.	**246985**
									N.C.	**246986**

Notes:
1. Based on a liquid specific gravity of 1.0.
2. Utilizes a Kynar® retaining clip.

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Unique Features Make These LS-3 Models Special

These small switches feature unique configurations for special applications.

Part No. 142545
With Slosh Shield

Cut-away version shown

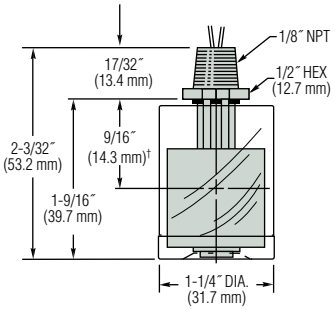
Compact, all-polypropylene switch with slosh shield is ideal for use with turbulent liquids in small tanks. FDA compliant materials.

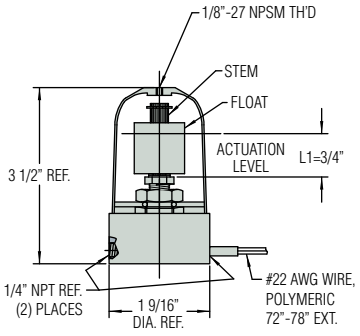
Part No. 46999
Bottle Level

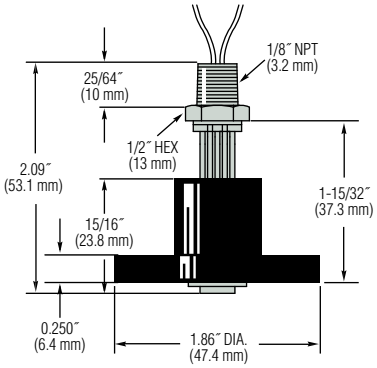
For external mounting on tanks too small to accommodate internally mounted switches. (See note below)

Part No. 76707
For Low Level

For detecting levels as low as 5/8″ from tank bottom. Use in water, some oils and chemicals.







Order By Part Number	142545 ⚡	46999 ⚡	76707 ⚡
Materials			
Stem and Mounting	All Polypropylene (Including Shield[4])	Polysulfone	All Polysulfone (Including Collar)
Float	Polypropylene (Solid)	Polysulfone	Buna N
Other Wetted	—	Brass, Aluminum, Polycarbonate, Viton A	Epoxy
Min. Liquid Sp. Gr.	.90	.75	—
Operating Temperature	-40°F to +150°F (-40°C to +65.6°C)	-40°F to +120°F (-40°C to +48.9°C)	-40°F to +180°F (-40°C to +82.2°C)
Pressure, PSI, Max.[3]	150	50	
Switch[1], SPST	20 VA, N.C./N.O. Dry[2]	20 VA, N.C. Dry	
Electrical Termination	No. 22 AWG, 22″ L., PVC Lead Wires	No. 22 AWG, 72″ L., Polymeric Lead Wires	No. 22 AWG, 72″ L., PVC Lead Wires

Notes:
1. See "Electrical Data" on Page X-5 for more information.
2. Switch operation is selectable, N.O. or N.C., by inverting the float on the unit stem.
3. Maximum pressure at 70°F (21°C).
4. Consult factory for other available materials.

† L_1 = Switch actuation level, nominal (based on a specific gravity of 1.0).

Note: LS-3 Series Bottle Level Switch is also available with any of the float materials shown on opposite page. Contact GEMS for correct part number.

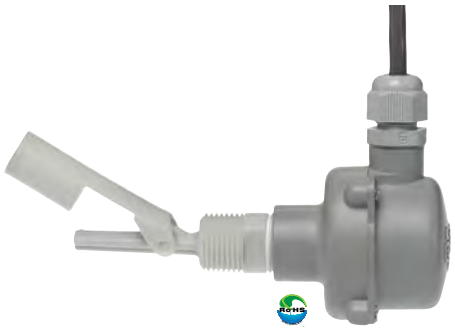
⚡ – Stock Items.

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

LS-7 with 5 Amp Relay

- O-Ring Sealed, Water Resistant J-Box

An SPDT relay enables this LS-7 to control two independent loads up to 5 amps each. Switching N.O. for one load and N.C. for the other. This unit is designed to operate with a load connected to each of the two outputs. These loads must be 10 watts, minimum, for correct SPDT switching. One load used alone must be connected to the N.O. terminal. With this load, which may be less than 10 watts, the unit will operate the same as an SPST unit.

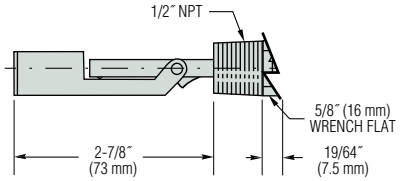


Specifications

Wetted Materials	Polypropylene
Min. Liquid Specific Gravity	0.55
Operating Temperature	-40°F to +250°F (-40°C to +121°C)
Operating Pressure	100 psi @ 70°F, max.
Float Arc Envelope	1.50˝
J-Box with 5A Relay	120 VAC 50/60 Hz Contacts: 5A – 240 VAC Res 1/3 HP – 120 VAC 5A – 28 VDC Res

Order by Part Number: 181291

Dimensions



LS-1 – Miniature Level Switch

- Extremely Compact
- Easy Installation
- Low Cost

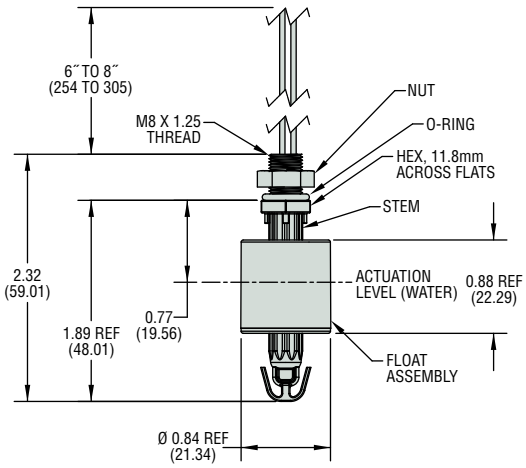
This miniature level switch feature an all-polypropylene stem and float construction for broad chemical compatibility. Fluted stem resists solids build-up. Float is held in place with integral stem tangs, which simultaneously eliminates a separate retaining ring and makes inverting the float for reversing switch actuation very easy.

Specifications

Wetted Materials	
Stem and Float	Polypropylene
O-Ring	EPDM
Mounting Threads	M8 x 1.25˝
Min. Liquid Specific Gravity	0.70
Operating Temperature	0°F to 175°F (-17°C to +79°C)
Operating Pressure	0 to 5 psig (0 to 0.3 bar)
Electrical Termination	22 AWG, 6˝-8˝ PVC Jacketed Lead Wires (Black)
Switch Operation	N.O. Dry (May be converted to N.C. Dry by inverting float on stem)
Mounting Attitude	Vertical with lead wires up.

Order by Part Number: 602881

Dimensions



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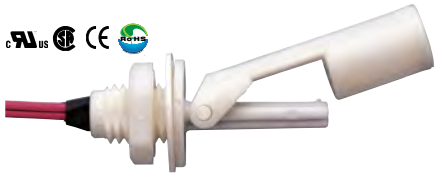
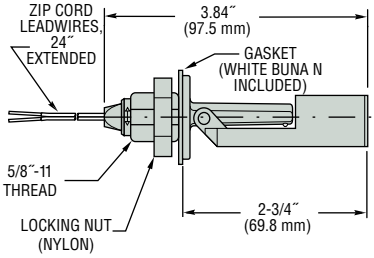
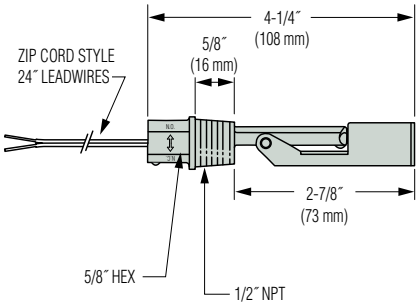
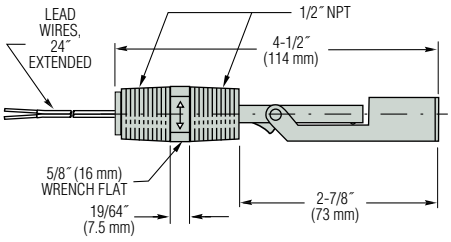
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Small Size – Engineered Plastics

LS-7 Series–Compact Side Mounts are the Solution to Many Small Tanks

These low-cost units are ideal for high volume use in small tanks and vessels. Engineered plastics construction offers broad compatibility in water, oils and chemicals.

Type 3 Internal Mounting	Type 5 External Mounting	Type 7 External Mounting
		
Polypropylene, Nylon or Versaplast™.	Polypropylene, Nylon or Versaplast™.	Polypropylene or Nylon; conduit connection.
		

Common Specifications

Switch Rating*: SPST, 20VA

Lead Wire Gauge: No. 22 AWG

Mounting Attitude: Horizontal.

RoHS: In compliance with EU-directive 2011/65/EC requirements for chemicals and substances.

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

Approvals

Material	CE	UL Recognized File No. E45168	cUL Recognized	CSA Listed-File No. 30200	NSF Listed Mat. Std. 169
Nylon	X	X	X	X	
Polypropylene	X	X	X	X	X
Noryl®	X	X	X		X
Versaplast™	X	X	X		

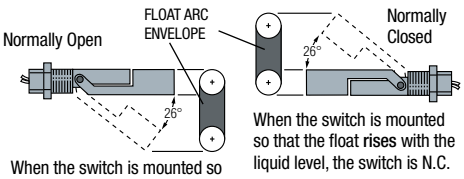
Media Compatibility

Media	LS-7 Compatible Types
Oil, Fuel, Hydrocarbons	Nylon
Broad Range of Chemicals and Water	Polypropylene
Limited Chemicals and Water	Noryl®
Oil, Antifreeze, High Temperatures, Corrosive Fluids, Various Chemicals	Versaplast™

Switch Operation

Depending on the mounting position, the float on these switches can rise or lower with the liquid level. By rotating the switch 180°, the switch operation can be Normally Open or Normally Closed (except Type 12).

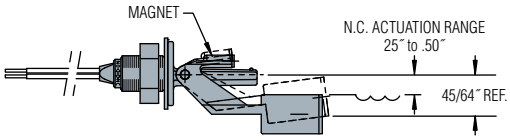
Types 3, 5, 7, 10 and 13



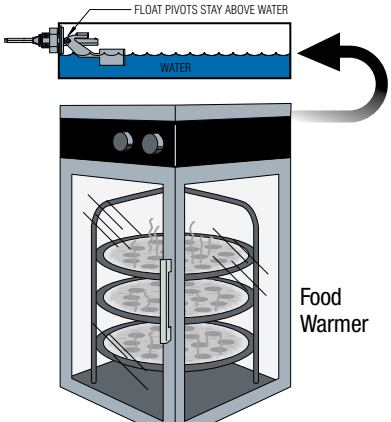
When the switch is mounted so that the float **lowers** with the liquid level, the switch is N.O.

When the switch is mounted so that the float **rises** with the liquid level, the switch is N.C.

Type 12 – N.C. "Drop Float" Design



The LS-7 Type 12 is ideal for use on food warmers, hot water heaters, steam cookers, small boilers or wherever water evaporation occurs. The switch is used effectively for either high fluid level alarms or water make up systems. The units are made of Noryl®, which carries NSF approval for use in potable water, and are supplied with FDA-approved Buna gaskets.



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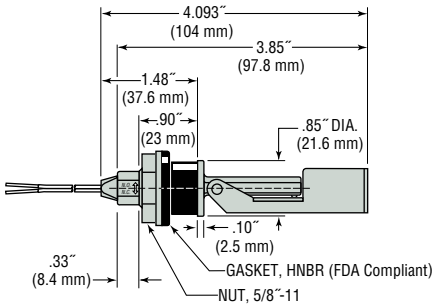
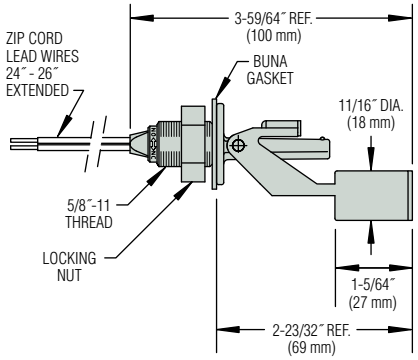
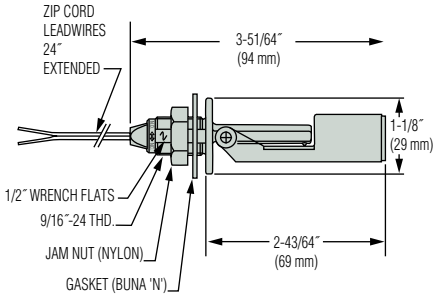
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

- Nylon is ideal for oils and fuels.
- NSF Standard 169 polypropylene is ideal for potable water and broad chemicals.
- Versaplast™ is ideal for corrosive fluids, hot water, antifreeze, chemicals and oils.

Type 10 External Mounting	Type 12 Internal Mounting	Type 13 Internal Mounting
		
Externally mounts through and seals non-threaded holes using a HNBR compression gasket.	Side mount "Drop Down" design for calcifying hot water applications. NSF compliant Noryl®.	Polypropylene or Nylon.
		
Note: Recommended hole size = 7/8″ dia. x 1/32″ - 5/32″ thick panel.		

How To Order – Select Part Number based on specifications required.

Mounting Type	Materials* Stem and Mounting	Materials* Float	Materials* Lead Wire Jacket	Min. Liquid Sp. Gr.	Operating Temperature	Operating Pressure, Max.	Float Arc Envelope	Part Number
3	Nylon		TPE†	.65	-40°F to +250°F (-40°C to +121.1°C)	100 psi @ 70°F (6.8 bar @ 20°C)	2.20	**165570** ⚡
	Polypropylene			.55	-40°F to +225°F (-40°C to +107.2°C)			**164520** ⚡
	Versaplast™			.80	-40°F to +250°F (-40°C to +121.1°C)			**182600**
5	Polypropylene		TPE†	.55	-40°F to +225°F (-40°C to +107.2°C)	100 psi @ 70°F (6.8 bar @ 20°C)	1.25	**131100** ⚡
	Nylon			.65	-40°F to +250°F (-40°C to +121.1°C)			**140620** ⚡
	Versaplast™		Teflon®	.80	-40°F to +300°F (-40°C to +148.9°C)			**177100** ⚡
5 - BSP	Versaplast™		TPE†	.80	-40°F to +250°F (-40°C to +121.1°C)	100 psi @ 70°F (6.8 bar @ 20°C)	1.25	**189422**
7	Polypropylene		TPE†	.55	-40°F to +225°F (-40°C to +107.2°C)	100 psi @ 70°F (6.8 bar @ 20°C)	1.50	**160450** ⚡
	Nylon			.65	-40°F to +250°F (-40°C to +121.1°C)			**160460** ⚡
10	Polypropylene		TPE†	.55	-40°F to +225°F (-40°C to +107.2°C)	50 psi @ 70°F (3.4 bar @ 20°C)	2.08	**165800** ⚡
	Nylon			.65	-40°F to +250°F (-40°C to +121.1°C)			**165900**
12	Noryl®		TPE†	.80	-40°F to +225°F (-40°C to +107.2°C)	100 psi @ 70°F (6.8 bar @ 20°C)	.70	**191080** ⚡
13	Polypropylene		TPE†	.55	-40°F to +225°F (-40°C to +107.2°C)	100 psi @ 70°F (6.8 bar @ 20°C)	2.20	**197050**

* Polysulfone and Ryton® R-4 are available upon request.
† Thermoplastic Elastomer Zip Cord, 22 AWG.
Note: NSF 169 Versions available. Contact factory.

⚡ – Stock Items.

See alloy versions on next page.

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Small Size - Alloys

LS-7 Series
Compact Alloy and Alloy/Plastics Side Mounts

Built for durability, our LS-7 Series switches utilize stainless steel, or zinc bodies. Ideal for any small tank or vessel destined for a rugged environment. All-stainless steel material of construction of Types 9 and 11 is generally recognized as safe with FDA for food contact regulations.

Common Specifications

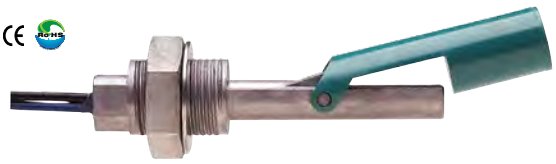
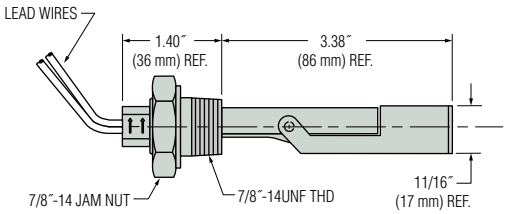
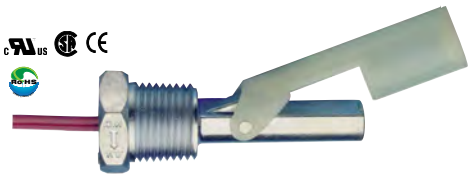
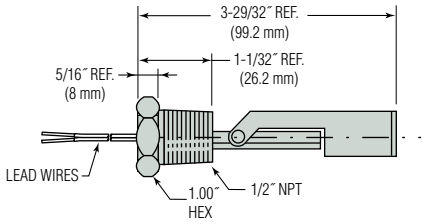
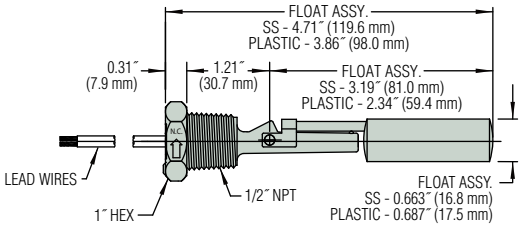
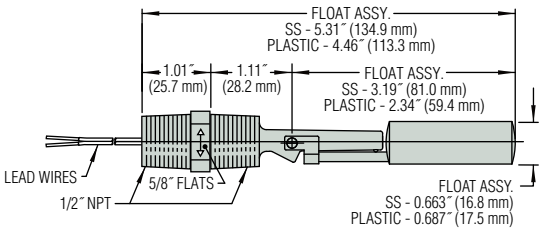
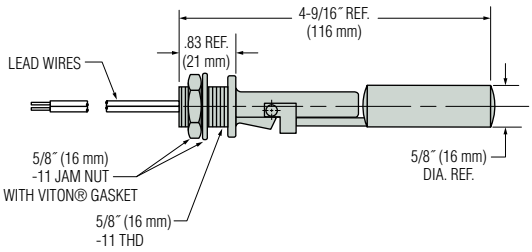
Switch Rating*: SPST, 20VA

Lead Wire: 22 AWG, 24″-27″ Extended

Mounting Attitude: Horizontal.

RoHS: In compliance with EU-directive 2011/65/EC requirements for chemicals and substances.

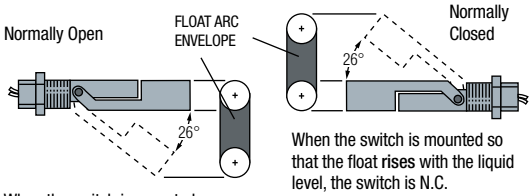
*See "Electrical Data" on Page X-5 for more information.

Type 6 External Mounting	 Zinc alloy body with polypropylene or nylon float. SAE Mounting.	
Type 8 External Mounting	 Zinc alloy body with nylon or polypropylene float.	
	 316 Stainless Steel body with 316 SS, nylon or polypropylene float.	
Type 9 External Mounting	 316 Stainless Steel body with 316 SS, nylon or polypropylene float.	
Type 11 Internal Mounting	 316 Stainless Steel body with 316 S.S. float.	

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Switch Operation

Depending on the mounting position, the float on these switches can either rise or lower with the liquid level. By rotating the switch 180°, the switch operation can be Normally Open or Normally Closed.



When the switch is mounted so that the float **lowers** with the liquid level, the switch is N.O.

When the switch is mounted so that the float **rises** with the liquid level, the switch is N.C.

How To Order – Select Part Number based on specifications required.

Mounting Type	Materials			Min. Liquid Sp. Gr.	Operating Temperature	Operating Pressure, Max.	Float Arc Envelope	Part Number
	Stem and Mounting	Float	Lead Wire Jacket					
6	Zinc Alloy*	Nylon	TPE†	.65	-40°F to +250°F (-40°C to +121°C)	100 psi @ 70°F	1.36	**155660** ⚡
		Polypropylene		.75	-40°F to +225°F (-40°C to +107°C)	100 psi @ 70°F	1.36	**179870**
8	Zinc Alloy*	316 S.S.	TPE†	.80	-40°F to +250°F (-40°C to +121°C)	300 psi @ 70°F	1.43	**249315**
		Nylon		.65	-40°F to +250°F (-40°C to +121°C)	100 psi @ 70°F	1.40	**160950** ⚡
		Polypropylene		.55	-40°F to +225°F (-40°C to +107°C)	100 psi @ 70°F	1.40	**162795** ⚡
	316 Stainless Steel	316 S.S.	TPE†	.80	-40°F to +250°F (-40°C to +121°C)	300 psi @ 70°F	1.43	**249315**
		Nylon		.65	-40°F to +250°F (-40°C to +121°C)	100 psi @ 70°F	1.40	**247390**
		Polypropylene		.55	-40°F to +225°F (-40°C to +107°C)	100 psi @ 70°F	1.40	**247380**
9	316 Stainless Steel	316 S.S.	TPE†	.80	-40°F to +250°F (-40°C to +121°C)	300 psi @ 70°F	1.43	**164870** ⚡
		Nylon		.65	-40°F to +250°F (-40°C to +121°C)	100 psi @ 70°F	1.40	**164850** ⚡
		Polypropylene		.55	-40°F to +225°F (-40°C to +107°C)	100 psi @ 70°F	1.40	**164860** ⚡
11	316 Stainless Steel		Teflon®	.80	-40°F to +250°F (-40°C to +121°C)	300 psi @ 70°F	1.65	**179445**

†Thermoplastic Elastomer Zip Cord.

⚡ – Stock Items.

***Zinc Alloy Material Note:**
When mounted in certain cathodic metals, including stainless steel, and used in water-based liquids, galvanic corrosion may occur. Consult factory for information.

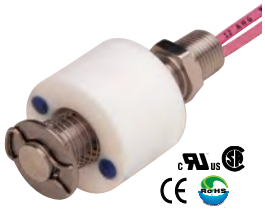
Small Size – Alloys

Rugged Durability, With Broad Heat and Pressure Capabilities, are Hallmarks of These Compact Switches

Ideal for shallow tanks or restricted spaces, or for low-cost, high volume use.

LS-1700 Series – Buna N Float

LS-1700 Series – Teflon® Float



LS-1750 Series – All Stainless Steel

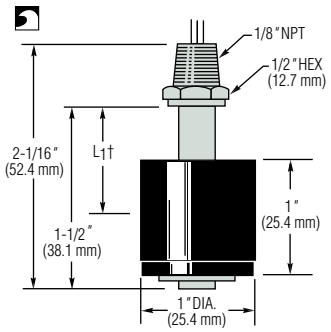
LS-1755 Series – All Stainless Steel

Offer broad chemical compatibility for general purpose use. Also ideal for oils and water.

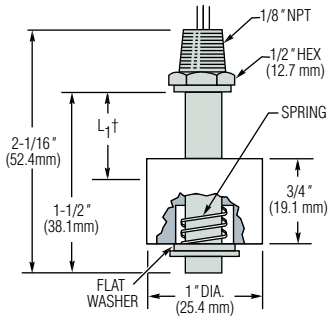
Rugged construction suitable for most corrosive liquids, and for high temperatures and pressures. Stainless steel is generally recognized as safe (GRAS) with FDA for food contact regulations.

Dimensions

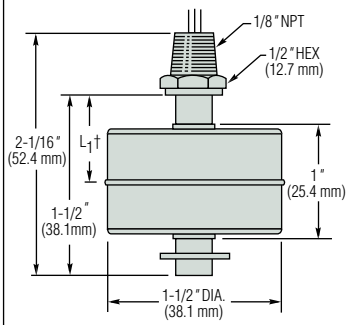
LS-1700 Series		LS-1750 Series	LS-1755 Series
Buna N Float	Teflon® Float	Stainless Steel Float and Stem	



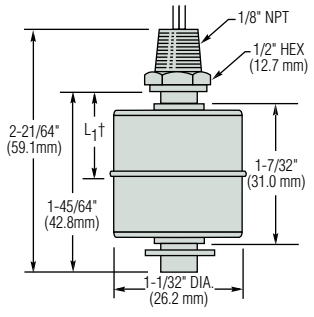
L_1 = 9/16″ (14.2 mm) N.O.; 13/16″ (20.6 mm) N.C.



L_1 = 1/2″ (12.7 mm) N.O. and N.C.



L_1 = 5/8″ (15.7 mm) N.O.; 3/4″ (19.1 mm) N.C.



L_1 = 37/64″ (14.5 mm) N.O.; 53/64″ (20.8 mm) N.C.

†L_1 = Switch actuation level, nominal (based on a liquid specific gravity of 1.0).

Common Specifications

Electrical Termination: No. 22 AWG, 24″ L., Polymeric Lead Wires, (except Part No. 79990 which has Teflon® Lead Wires).

Approvals: Series Nos. LS-1700, LS-1750 and LS-1755 are U.L. Recognized – File No. E45168 and CSA Listed – File No. 30200. RoHS – In compliance with EU-directive 2011/65/EC requirements for chemicals and substances.

Switch Operation: Units are shipped N.O. unless otherwise specified. Selectable, N.O. or N.C., by inverting float on unit stem (except for LS-1700 Series switches with Teflon® Floats; see selection in "How to Order" table).

How To Order – Select Part Number based on specifications required.

	Material							
Series Number	Stem and Mounting	Float	Other Wetted	Min. Liquid Sp. Gr.	Operating Temperature	Pressure, PSI, Max.**	Switch* SPST	Part Number
LS-1700	Brass	Buna N	316 S.S., Epoxy	.45	Water: to 180°F (82.2°C) Oil: -40°F to +300°F (-40°C to +149°C)	300	20 VA	**01701**
	316 S.S.						20 VA	**01702**
	316 S.S.	Teflon®		.85	-40°F to +250°F (-40°C to +121.1°C)	1000	20 VA, N.O.	**26791**
							20 VA, N.C.	**27980**
LS-1750	316 S.S.	316 S.S.	316 S.S.	.70	-40°F to +300°F (-40°C to +148.9°C)	100	20 VA	**01750**
					-40°F to +480°F (-40°C to +204.4°C)		20 VA	**79990**
LS-1755	316 S.S.	316 S.S.	316 S.S.	.90	-40°F to +300°F (-40°C to +148.9°C)	275	20 VA	**01755**

* See "Electrical Data" on Page X-5 for more information.
** Higher pressures are temperature dependent.

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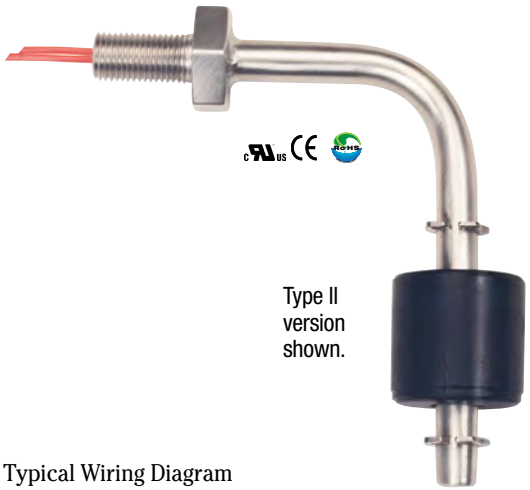
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

LS-77700 Series – Bent Stem Switches Provide Greatest Buoyancy Of Any Side Mount Version

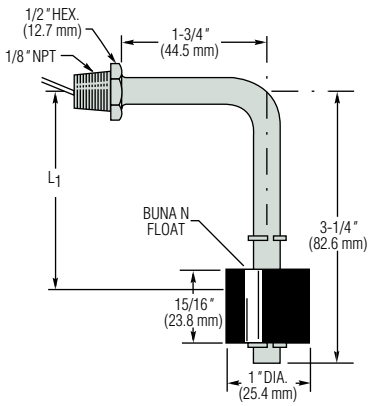
These units perform in liquids with specific gravities as low as .45; switches protrude into tank less than 3 inches.



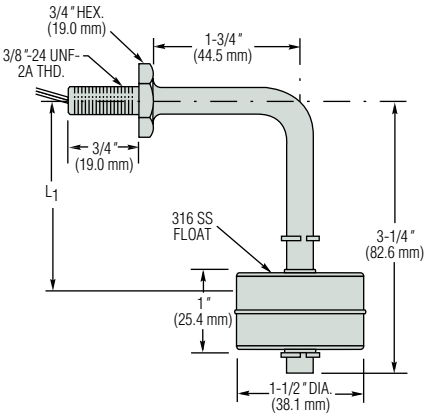
Type II version shown.

Dimensions

Type I – 1/8″ NPT



Type II – 3/8-24″ Thread

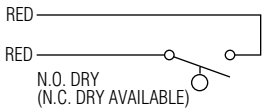


L_1 Dimension (based on liquid specific gravity of 1.0):

Buna N Float: 2-3/8″ (60.3 mm) ± 3/16″

Stainless Steel Float: 2″ (50.8 mm) ± 3/16″

Typical Wiring Diagram



When mounted "stem up," units are N.C. dry.

Common Specifications

Electrical Termination: No. 22 AWG, 24″ L., Teflon® Lead Wires

Approvals: U.L. Recognized – File No. E45168
RoHS – In compliance with EU-directive 2011/65/EC requirements for chemicals and substances.

Switch* SPST: 20 VA, 120-240 VAC. Switch is N.O. (Dry), but available N.C. (Dry).

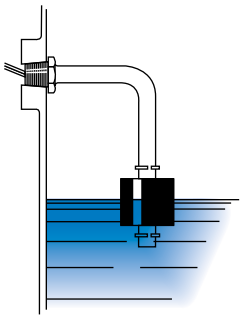
Mounting Attitude: Vertical ± 30°.

Other Wetted Materials: Float Stop is Berylium Copper or PH-15-7-MO Stainless Steel.

Grooved Stem Option: Stem may be grooved to prevent accidental or vibrational movement of float stops (grip rings).

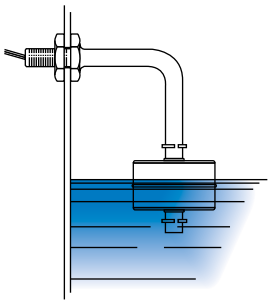
Typical Installation

Type I



Shown with Buna N float. Threads into NPT boss.

Type II



Shown with stainless steel float. Mounts directly through tank wall.

How To Order – Select Part Number based on specifications required.

Type	Materials: Stem and Mounting	Materials: Float	Min. Liquid Sp. Gr.	Operating Temperature	Pressure, PSI, Max.	Part Number
I	Brass	316 Stainless Steel	.70	-40°F to +300°F (-40°C to +149°C)	100	**117711**
	316 Stainless Steel					**117712** ⚡
	Brass	Buna N	.45	Water: to 180°F (82°C) Oil: -40°F to +300°F (-40°C to +149°C)	300	**118125** ⚡
	Stainless Steel					**118126**
II	Brass	316 Stainless Steel	.70	-40°F to +300°F (-40°C to +149°C)	100	**117715**
	316 Stainless Steel					**117716** ⚡
	Brass	Buna N	.45	Water: to 180°F (82.2°C) Oil: -40°F to +300°F (-40°C to +149°C)	300	**118127** ⚡
	Stainless Steel					**118128**

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

⚡ – Stock Items.

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Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Large Size – Engineered Plastics

Select from these Engineered Plastics for Aggressive or Ultra-Pure Liquids

Each of these series offers unique features. Choose from this selection when all-plastic material is desirable and tank space is not restricted.

LS-74780 – All CPVC

Particularly well suited for rough service. Ideal for use in chemical and plating applications.

LS-1900TFE

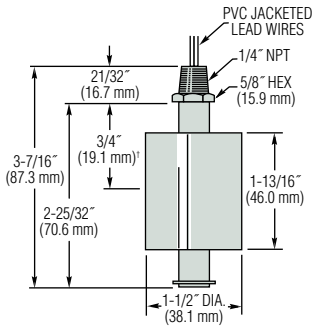
Resists build-up of foreign material or sticky media. Float travel remains uninhibited in viscous or corrosive liquids. SPDT switch.

LS-1700TFE

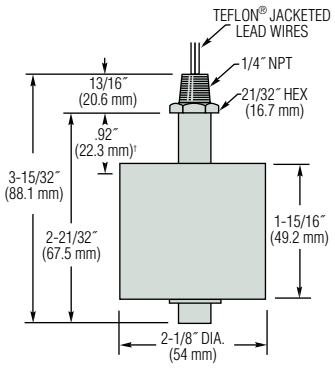
A medium-size solution for ultra-pure liquid level sensing. Made of corrosion resistant PTFE for low particle generation.

Dimensions

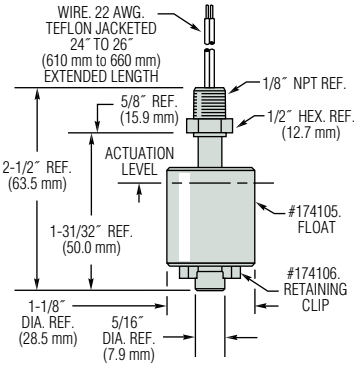
LS-74780



LS-1900TFE



LS-1700TFE



†L_1=Switch actuation level, nominal (based on a liquid specific gravity of 1.0 and N.O. dry circuit–dimension will vary for N.C. circuit).

Common Specifications

Electrical Termination: No. 18 AWG, 24˝ L., Lead Wires
(Jacket material is indicated on dimensional drawings, above).

RoHS: In compliance with EU-directive 2011/65/EC requirements for chemicals and substances.

How To Order – Select Part Number based on specifications required.

Series Number	Materials: Stem, Mounting and Other Wetted	Materials: Float	Min. Liquid Sp. Gr.	Operating Temperature	Pressure, PSI, Max.	Switch*	Part Number: Mounting Size 1/4˝ NPT	Part Number: Mounting Size 1/8˝ NPT
LS-74780	CPVC		.85	-40°F to +180°F (-40°C to +82.2°C)	15	SPST, 20 VA	**74780**** ⚡	—
LS-1900TFE	Teflon®		.80	-40°F to +300°F (-40°C to +148.9°C)	30	SPDT, 20 VA	**133299** ⚡	—
LS-1700TFE	PTFE		.86	+32°F to +212°F (0°C to +100°C)	25	SPST, 20 VA, N.O.	—	**174100** ⚡
						SPST, 20 VA, N.C.	—	**174200** ⚡

* See "Electrical Data" on Page X-5 for more information.
** Switch operation is selectable, N.O. or N.C., by inverting the float on the unit stem. Units are shipped N.O. unless otherwise specified.
†† 100 VA switches are not U.L. Recognized.

⚡ – Stock Items.

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Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Large Size – Alloys

LS-1800 and LS-1900 Series are a Step Above Our Plastic Units for Pressure Capabilities

Excellent stability for general use in oils and water.

LS-1800 Series – Buna N Float

LS-1800 Series – Teflon® Float

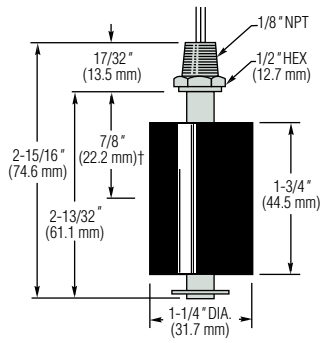
LS-1900 Series – Buna N Float

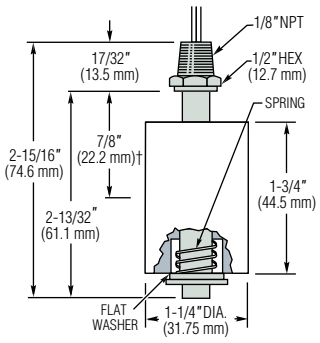
Intermediate in size, LS-1800 switches provide long life and dependability to meet a broad range of requirements.

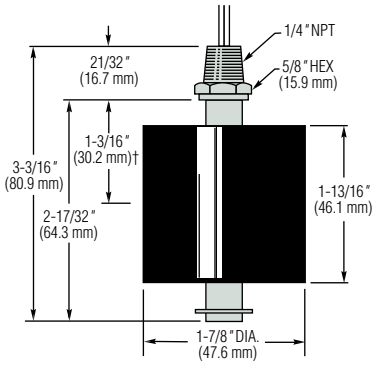
With large float displacement, switch withstands rough service; is suitable for high viscosity liquids.

Dimensions

LS-1800 Series		LS-1900 Series
Buna N Float	Teflon® Float	Buna N Float







†L_1 = Switch actuation level, nominal (based on a liquid specific gravity of 1.0).

Common Specifications

Electrical Termination: No.18 AWG, 24˝ L., Polymeric Lead Wires.

Approvals: All Switches on this page are U.L. Recognized – File No. E45168, and are CSA Listed – File No. 30200.
RoHS – In compliance with EU-directive 2011/65/EC requirements for chemicals and substances.

Switch Operation: Selectable, N.O. or N.C., by inverting float on unit stem (except for LS-1800 Series switch with Teflon® float). Units are shipped N.O. unless otherwise specified.

How To Order – Select Part Number based on specifications required.

	Material							
Series Number	Stem and Mounting	Float	Other Wetted	Min. Liquid Sp. Gr.	Operating Temperature	Pressure, PSI, Max.	Switch* SPST	Part Number
LS-1800	Brass	Buna N	316 Stainless Steel, Hysol	.75	Water: to 180°F (82°C) Oil: -40°F to +230°F (-40°C to +110°C)	150	20 VA	**01801**
							100 VA**	**35651**
	316 Stainless Steel	Buna N		.75			20 VA	**01807**
							100 VA**	**35657**
		Teflon®		.65	-40°F to +250°F (-40°C to +121°C)	300	20 VA, N.O.	**01811**
LS-1900	Brass	Buna N	316 Stainless Steel, Hysol	.55	Water: to 180°F (82°C) Oil: -40°F to +230°F (-40°C to +110°C)	150	20 VA	**01901**
							100 VA***	**35676**
	316 Stainless Steel			.55			20 VA	**01907**
							100 VA	**35682**

*See "Electrical Data" on Page X-5 for more information.
**LS-1800 100 VA switches are not U.L. Recognized.
*** LS-1900 100VA unit is UL Resistive Rated.

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

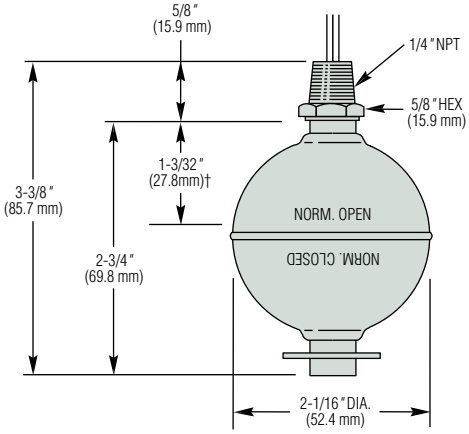
Large Size – Alloys

LS-1950 – All Stainless Steel For High Pressure and Temperature

For high performance applications, the LS-1950 provides high temperature and pressure capabilities. Materials of construction comply with FDA food contact regulations.

Exceptionally accurate and rugged for higher temperatures and in pressurized or corrosive liquids.
For oils, water and chemicals.

Dimensions



†L_1 = Switch actuation level, nominal (based on a liquid specific gravity of 1.0 and N.O. dry circuit – dimension will vary for N.C. circuit).

Common Specifications

Electrical Termination: No. 18 AWG, 24˝ L., Polymeric Lead Wires (except Part No. 79999 which has Teflon® lead wires).

Approvals: LS-1950 Series switches are U.L. Recognized – File No. E45168 and are CSA Listed - File No. 30200
RoHS – In compliance with EU-directive 2011/65/EC requirements for chemicals and substances.
(Part No. 79999 is U.L. Recognized RoHS Compiant only).

Switch Operation: Selectable, N.O. or N.C., by inverting float on unit stem. Units are shipped N.O. unless otherwise specified.

How to Order – Select Part Number based on specifications required.

Series Number	Materials: Stem and Mounting	Materials: Float	Min. Liquid Sp. Gr.	Operating Temperature	Pressure, PSI, Max.	Switch[1]	Part Number
LS-1950	316 Stainless Steel		0.75	-40°F to +300°F (-40°C to +149°C)	750	SPST, 20 VA	**01950** ⚡
						SPST, 100 VA[2]	**26717** ⚡
				-40°F to +480°F (-40°C to +249°C)		SPST, 20 VA	**79999** ⚡

Notes
1. See "Electrical Data" on Page X-5 for more information.
2. UL Resistive Rated

⚡ – Stock Items.

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Large Size – Alloys

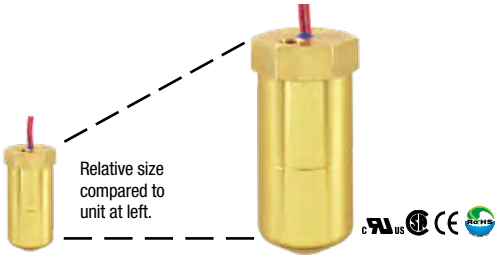
When a Switch Won't Fit In the Tank, Use a Non-Intrusive Bottle Type

Bottle type level switches are ideal for large or small tanks or where access to the inside is impractical or impossible. These units mount completely outside of the tank, at the level actuation point.

LS-800-5 Series – Single Level, Brass or Stainless Steel Housing

3/4″ NPT Ports

LS-159000 Series – Low Cost, Compact Aluminum Housing



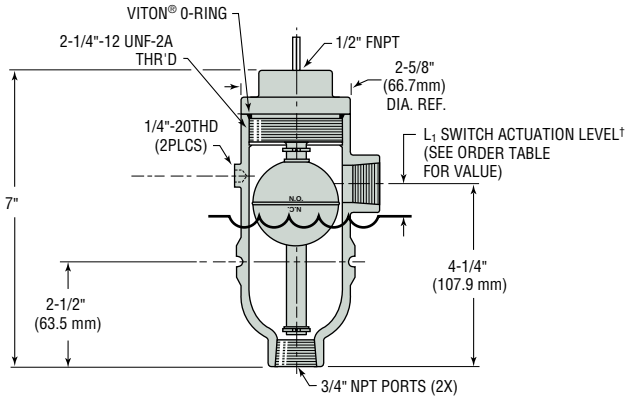
Inline NPT Ports

For Remote Alarms – See Page E-27

- Adjustable Volume
- Indoor Outdoor
- Solid-State

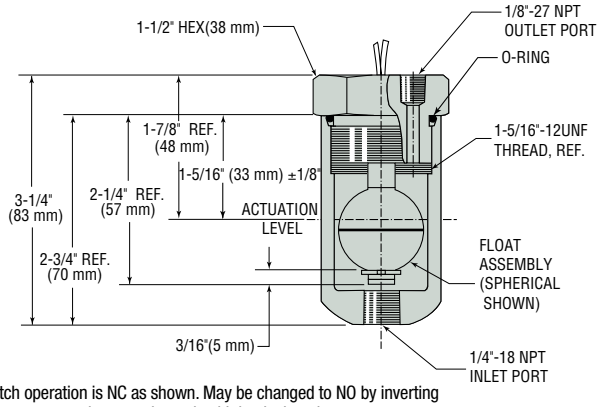
Dimensions

LS-800-5 – Brass and Stainless Steel



†L_1 = Switch actuation level, nominal (based on a liquid specific gravity of 1.0).

LS-159000



Switch operation is NC as shown. May be changed to NO by inverting float on stem, or by mounting unit with lead wires down.

Common Specifications

Electrical Termination: No. 18 AWG, 24″ L., Polymeric Lead Wires (LS-800-5) / No. 22 AWG, 24″ L., Polymeric Lead Wire (LS-159000).

Approvals: Series Nos. LS-800-5 and LS-159000 are U.L. Recognized – File No. E45168 and CSA listed – File No. LR-30200. RoHS (except for LS-800-5 in Brass, part numbers 172625, 172986, and 172988) – In compliance with EU-directive 2015/863/EU requirements for chemicals and substances.

Switch Operation: Selectable, N.O. or N.C., by inverting float on unit stem.

Mounting Attitude: Vertical with lead wires up.

How To Order - Select Part Number based on specifications required.

Series Number	Materials: Housing	Materials: Stem and Mounting	Materials: Float	Materials: Other Wetted	Min. Liquid Sp. Gr.	Pressure, PSIG, Max.	Operating Temperature	L_1	Switch*	Part Number
LS-800-5	Brass		316 Stainless Steel	Beryllium Copper	.75	500 @ 70°F	-40°F to +300°F (-40°C to +148.9°C)	3/4″ (19 mm)	SPST, 20 VA	**172625** ⚡
									SPST, 100 VA	**172986**
									DPDT	**172988**
	316 Stainless Steel			S.S. ARMCO H-15-7 MO		750		7/16″ (11 mm)	SPST, 20 VA	**172635** ⚡
									DPDT	**172987**
LS-159000	Aluminum	Brass	316 S.S.	Beryllium Copper	.90	600 @ 70°F	-40°F to +300°F (-40°C to +148.9°C)	See Dimensions	SPST, 20 VA	**144080**
			Buna N	Viton®	.50	250 @ 70°F	-40°F to +250°F (oil); +180°F (water) (-40°C to +121°C [oil]; +82°C [water])			**160405**

*See "Electrical Data" on Page X-5 for more information. DPDT relay information is with Dimensions above.

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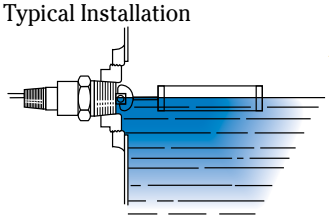
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Large Size – Alloys

Side Mounting Switches Solve the Problem of Inaccessible Tank Tops & Bottoms

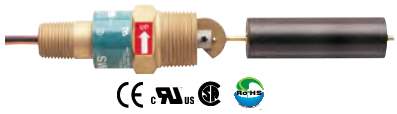
These units solve the problem of point level sensing in tanks with inaccessible tops or bottoms, or at intermediate locations in larger tanks. Operation is positive and dependable. The float pivots with changing liquid level, displacing a shuttle which magnetically actuates a hermetically sealed switch within the unit. Installation is through the tank side at the detection point.

Typical Installation



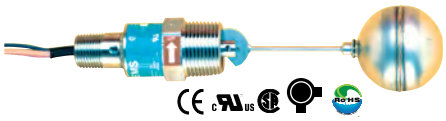
UL Approved Explosion-Proof

LS-2050 Series – Brass and Buna N



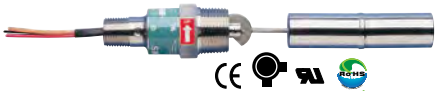
General purpose materials designed to provide reliable service in oils and water.

LS-2050 Series – All-Stainless Steel



Ultimate strength: for pressures to 900 PSIG and temperatures to 300°F (148.9°C). Explosion-proof models available.

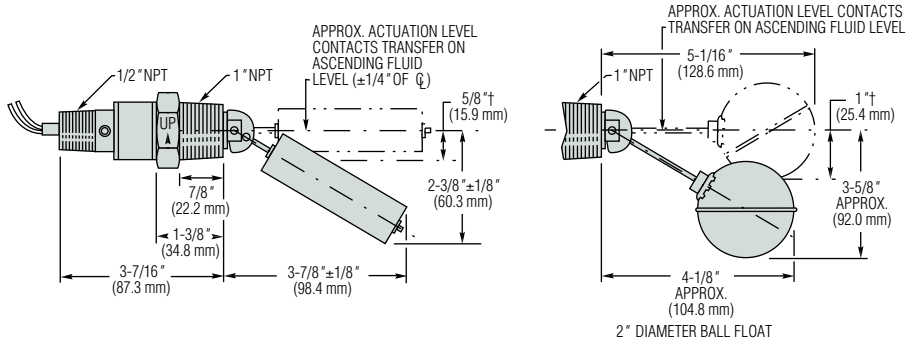
LS-52100 Series – All Stainless Steel



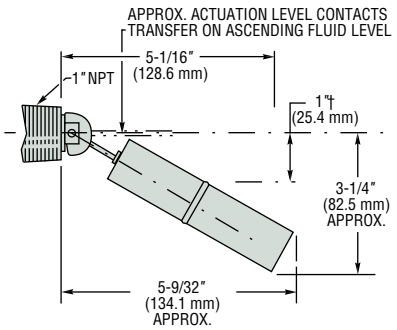
Rugged, all-stainless steel unit offers broad chemical compatibility at temperatures to 300°F (148.9°C). Explosion-proof models available.

Dimensions

LS-2050 Series



LS-52100 Series



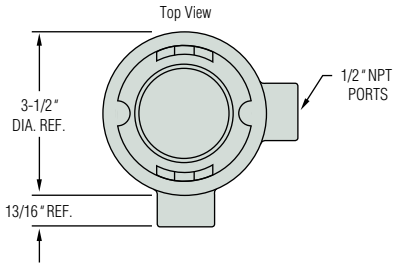
†Approximate de-actuation level, nominal (based on a liquid specific gravity of 1.0).

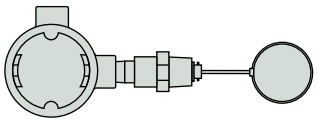
* Switch Mounting dimensions are the same as shown on the LS-2050 Series drawing (far left).

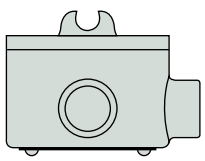
Explosion-Proof Versions

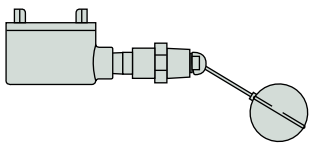
CSA or FM Approved versions are available in all-stainless steel configurations only.

Typical Example (P/N 55690 Shown):









For Remote Alarms – See Page E-27

- Adjustable Volume
- Indoor Outdoor
- Solid-State

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

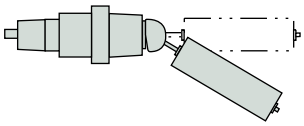
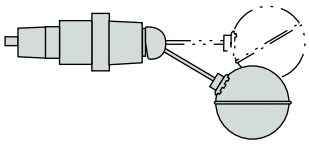
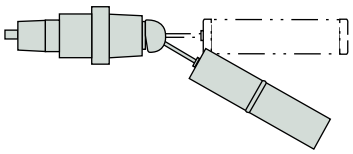
Common Specifications

Electrical Termination: No.18 AWG, 24˝ L., Polymeric Lead Wires.

Approvals: LS-2050 Series Switches are U.L. Recognized – File No. E45168 and are CSA Listed. Explosion-proof units are approved for Class I, Division 1, Group D hazardous areas.
RoHS – In compliance with EU-directive 2011/65/EC requirements for chemicals and substances.

Mounting Attitude: Horizontal, ±15°.

Performance

	LS-2050 Series		LS-52100 Series
	Brass Mounting/Buna-N Float	All-Stainless Steel	
			
Operating Temperature	Water: to +180°F (82.2°C) Oil: -40°F to +250°F (-40°C to +121°C)	-40°F to +300°F (-40°C to +148.9°C)	
Pressure, PSIG Max. @ 70°F	150	900	500
Min. Liquid Sp. Gr.	.8	.9	.85
Switch Differential in Liquid	1/2" Minimum	Approximately 3/4"	

How To Order – Select Part Number based on specifications required.

Series Number	Materials			Switch[1]	Part Numbers		
	Stem and Mounting	Float	Other Wetted		Standard Versions	With Bellows (Details Below)	Explosion-Proof FM CSA
LS-2050	Brass	Buna N	316 Stainless Steel, Beryllium Copper, Teflon®, Ceramic	SPDT, 20 VA	**30288** ⚡	—	—
	316 Stainless Steel	316 Stainless Steel	Stainless Steel, Teflon®, Ceramic	SPDT, 20 VA	**30290** ⚡	**175650**	**55690**
				SPST, 100 VA, N.O.[2,4]	**48068**	—	—
				SPST, 100 VA, N.C.[2,4]	**48069**	—	—
LS-52100	316 Stainless Steel	304 Stainless Steel	430 Stainless Steel, Teflon®, Ceramic	SPDT, 20 VA	**52100** ⚡	—	**121753**
				SPST, 100 VA, N.O.[3]	**116971**	—	—
				SPST, 100 VA, N.C.[3]	**116972**	—	—

Notes
1. See “Electrical Data” on Page X-5 for more information.
2. Not CSA Approved.
3. Not U.L. Recognized or CSA Approved.
4. UL Resistive Rated

⚡ – Stock Items.

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Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Large Size – Alloys

FABRI-LEVEL™ Components and Kits Build Into Custom Switches in Minutes

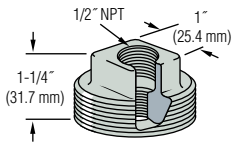
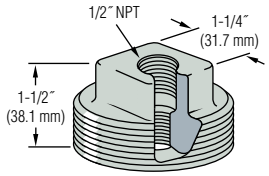
GEMS FABRI-LEVEL™ units can be custom-assembled in minutes from standard components, right in your plant. Simple instructions are furnished with kits.

FABRI-LEVEL™ Components

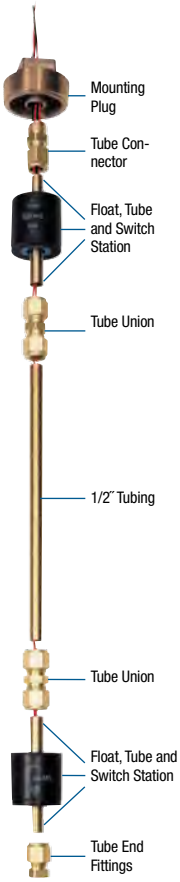
How to Order: Specify Part Number and quantity of each component required.

Mounting Types

Provides clearance for inserting unit in tank. 2˝ NPT Mounting must be used with stainless steel floats.

	1-1/4˝ NPT	2˝ NPT
		

Material	Part Numbers	
Brass	26034	24408 ⚡
316 Stainless Steel	26033	24407 ⚡



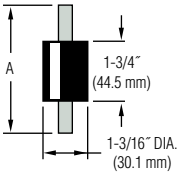
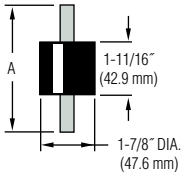
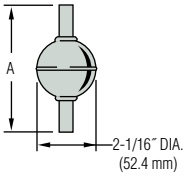
RoHS Compliant:

All LS-3 Series level switches featured on this page and the next are in compliance with EU-directive 2011/65/EC.

Level Station Assemblies

Each Station is comprised of a float, tube section and switch.

Lead Wires: SPST: #18 AWG, 60˝ L., Teflon®; **SPDT:** #22 AWG, 60˝ L., Teflon®

Float Material			Buna N				316 Stainless Steel	
Compatible Mounting Type			1-1/4˝ NPT		2˝ NPT			
Float Dimensions								
Operating Temperature			Water: to +180°F (+82°C); Oil: -40°F to +230°F (-40°C to +110°C)				-40°F to +275°F (-40°C to +135°C)	
Pressure, PSI, Max.			150				750	
Min. Media Specific Gravity			.75		.55		.75	
Mounting Size	Switch Type	Tubing Material	Part Number	A Dim.	Part Number	A Dim.	Part Number	A Dim.
1-1/4˝ NPT	SPST 20 VA	Brass	26609	4˝ (101.6 mm)	—	—	—	—
		Stainless Steel	26608					
	SPDT 20 VA	Brass	26737	4-29/64˝ (113.0 mm)				
		Stainless Steel	26738					
2˝ NPT	SPST 20 VA	Brass	—	—	24410	4˝ (101.6 mm)	—	4-1/4˝ (107.9 mm)
		Stainless Steel			25328		24411 ⚡	
	SPDT 20 VA	Brass			24578	4-29/64˝ (113.0 mm)	—	4-29/64˝ (113.0 mm)
		Stainless Steel			25329		24579	

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

⚡ – Stock Items.

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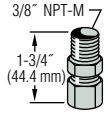
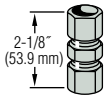
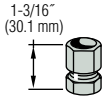
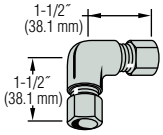
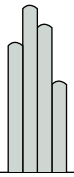
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Fittings and Tubing

Description (1/2˝ Fittings)	Tube Connector	Tube Union	Tube End Fitting	90° Elbow	1/2˝ O.D. Tubing	
					10˝ Length	36˝ Length
Function	Connects tube to mounting plug, mounts unit from inside of tank.	Connects level stations or extension tubes.	Seals end of unit.	For side entry into tank	For extending units or level station spacing.	
						
Material	**Part Numbers**					
Brass (Nylon Ferrule)	**24633** ⚡	**24412** ⚡	**24553** ⚡	**24631**	**25199** ⚡	**24637**
All-316 Stainless Steel	**24634** ⚡	**24413** ⚡	**24554** ⚡	**24632**	**25204**	**24638**

FABRI-LEVEL™ Kits

FABRI-LEVEL Switch Kits contain all components for complete assembly of a 1- or 2-station level switch unit for pipe-plug mounting in your tank. Kits are available in several material and size combinations. N.O. or N.C. operation of the SPST switch is selectable by inverting the float(s) on the unit stem. Two 10˝ (254 mm) lengths of tube are furnished to space level stations as desired. Components available for custom-building other configurations are listed on the facing page and above.

Specifications

Kits use the components listed individually on the facing page and above. Please review for performance and dimensional data.

RoHS: In compliance with EU-directive 2011/65/EC requirements for chemicals and substances.

Each Kit Contains:

1 Tube Connector
1 Mounting Plug
2 Level Stations (Switch, Tube, Float)
2 Extension Tubes
1 Tube End Fitting
3 Tube Unions

How To Order

Specify Kit Number and quantity.

Materials		Mounting NPT	Kit Number
Fittings	Floats		
Brass	Buna N	1-1/4˝	**26128** ⚡
		2˝	**24576** ⚡
316 Stainless Steel	Buna N	1-1/4˝	**26130**
		2˝	**26675**
316 Stainless Steel		2˝	**24577** ⚡

Warning: Improper application, assembly or installation of FABRI-LEVEL™ Kits or components may result in injuries to personnel or damages.

⚡ – Stock Items.

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Specialty Switches

GEMS Excels in Switches for Special Requirements

The products below are examples of the custom engineering GEMS can provide to meet specific application needs. These units are ideal for use in oils and water.

TH800 SeriesTemperature/ Level Switch

Level monitoring and temperature switch in a single unit. Intermediate in size; single-setting temperature sensor is in bottom of stem.

LS-38760 Series – Cushioned Float

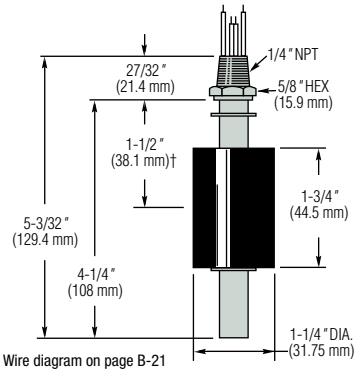
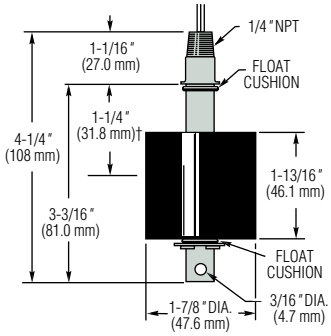
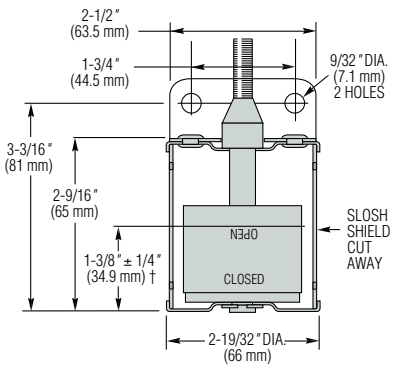
Cushioned float and switch for turbulent liquids or excessive vibration. Easily grounded. Ideal for tank trucks, construction equipment or mobile applications.

LS-270 Series – Bracket Mounting Slosh Shield

U.L. Recognized – File No. E45168

Small, lightweight, and extremely stable in nonstatic, highly contaminated liquids. Slosh shielding minimizes effects of turbulence and helps prevent interference by foreign material. Bracket-mounted to any convenient surface.

Dimensions

TH800 Temperature/Level Switch	LS-38760 Series	LS-270 Series
 Wire diagram on page B-21		
Electrical Termination	18 AWG, 24" L., Polymeric Lead Wires	18 AWG, 36" L., Polymeric Lead Wires	18/2 Cable, 6 ft. L., Neoprene with waterproof connection

†L_1 = Switch actuation level, nominal (based on a liquid specific gravity of 1.0).
LS-270 Series Note: Installed vertically with cable upward. Caution: Elastomer seals in the sensor and cable are subject to deterioration and aging, and therefore need to be checked regularly. Life expectancy of seals varies with application.

How To Order – Select Part Number based on specifications required.

Series	Material			Min. Liq. Sp. Gr.	Operating Temperature	Pressure PSI, Max.	Switch[1]		Part Number
	Stem and Mounting	Float	Other Wetted				Level SPST	Temperature[3]	
TH800 Temp./ Level	Brass	Buna N	Beryllium Copper, Hysol	.75	Water: to 180°F (82°C) Oil: -40°F to +230°F (-40°C to +110°C)	150	20 VA, N.O.	N.C., open on +150°F ±10°F, incr.	**57143** ⚡
								N.O., close on +150°F ±10°F, incr.	**57144** ⚡
LS-38760	Aluminum	Buna N	S.S., Hysol	.55	-40°F to +180°F (-40°C to +82°C)	150	20 VA, N.C.	—	**38760**
LS-270	316 S.S.	Buna N	Beryllium Copper, Copper Nickel, Polycarb. 304 S.S.	.55	-40°F to +140°F (-40°C to +60°C)	150	20 VA, N.O.	—	**43765** ⚡
							20 VA, N.C.		**43760** ⚡
							50 VA[2], N.O.		**43980** ⚡
							50 VA[2], N.C.		**43982** ⚡

Notes:
1. See "Electrical Data" on Page X-5 for more information.
2. Switches are not U.L. Recognized or CSA Listed.
3. See Page B-21 for thermostat ratings and wiring diagram. Other temperature settings are available; consult factory.

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Specialty Switches – Continued

Portable Level Switch — Integral Mounting Magnet

Precisely monitors liquid level and is ideal for controlling filling operations and preventing overflows. Permanent magnet attaches unit securely to steel tank wall at exact level required.

LS-750 Series — Weighted for Suspension Cable

With a compact-sized float, slosh shield and weighted collar, the LS-750 provides liquid level detection for a wide variety of applications. Suspend in stand pipes or sumps for leak detection duty, or drop into wells for ground-water monitoring. Supplied with 25 feet of waterproof cable.

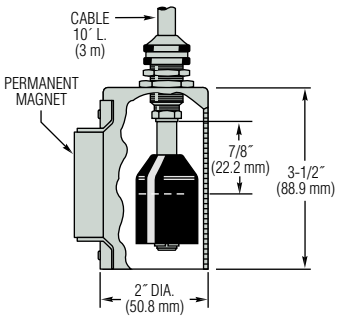
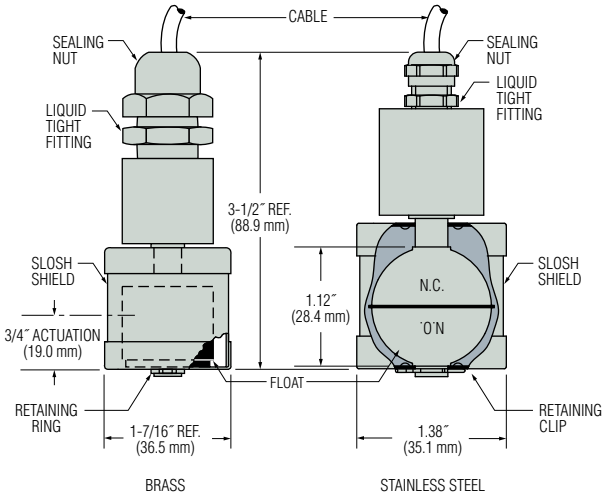
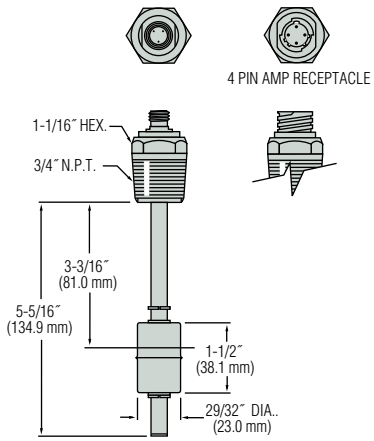
U.L. Recognized— File No. E-45168. CSA Listed-File No. LR-30200.

LS-700F Series

Overfill Protection for Refrigerant Tanks.The LS-700F enables safe compliance with EPA directives to recover refrigerants. These units are designed to fit standard 30# and 50# D.O.T. approved refrigerant tanks. They provide 80% full shutoff capability when used as an integral part of a recovery system.

U.L. Recognized— File No. SA8857. CSA Listed-File No. LR-30200-31.

Dimensions

Portable Level Switch	LS-750	LS-700F
		
SJO, 18/2 10´L., Neoprene	22 AWG, 2-Wire Cable	3- or 4-Pin, Quick-Connect Receptacle

†L_1 = Switch actuation level. In liquid with specific gravity of 1.0, switch actuation is approximately half the distance from end of stem to mounting, or at the halfway point of float travel.

How To Order — Select Part Number based on specifications required.

Series	Material			Min. Liquid Sp. Gr.	Operating Temperature	Pressure PSI, Max.	Switch*	Electrical Termination Option	Part Number
	Stem and Mounting	Float	Other Wetted						
Portable	Brass	Buna N	Aluminum, 316 S.S.	.85	Oil: -40°F to +230°F (-40°C to +110°C) Water: to 180°F (82°C)	10	SPST, 20 VA N.O., Dry	—	**15208**
LS-750	Brass	Buna N	Nylon, PVC, Beryllium Copper	.45		150	SPST, 20 VA N.C., Dry	PVC Cable Jacket	**149350** ⚡
	316 S.S.**	316 S.S.	PVDF, Viton®	.65	-40°F to 212°F (-40°C to +100°C)	375	SPST, 10 VA N.C., Dry	Teflon® Cable Jacket	**197433**
LS-700F	Brass	304 S.S.	—	.98	-40°F to +221°F (-40°C to +105°C)	400	SPST, 20 VA N.C., Dry	3-Pin	**128500** ⚡
								4-Pin	**144900** ⚡

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

⚡ – Stock Items.

** Stainless steel is generally recognized as safe (GRAS) with FDA for food contact regulations.

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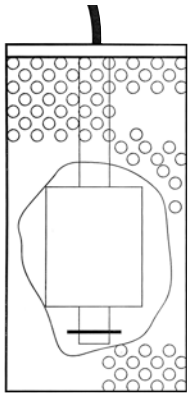
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Leak Detection Sensors

- Compact Size
- Low Cost
- Reliable
- Hydrocarbon Detection

Warrick® Leak Detection Sensors are designed for single wall piping, sump alarms and other small areas. Combine with Warrick Monitoring Panels for complete leak detection systems.

DLP-1 & DLP-2



Designed to detect presence of liquid in sumps, attached access pipes, annular spaces, or locations requiring a small float-operated sensor. Two models to fit 1-1/2″ and 2″ standard piping.

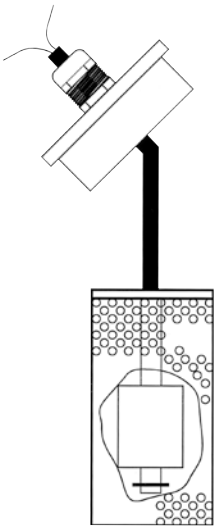
DWP-25

Designed for use in the annular space of double wall fiberglass tanks to detect the presence of conductive liquid. When combined with Warrick DMS or TA alarm panel, DWP-25 sensors can detect the presence of water or other conductive liquids in normally dry annular spaces.

DFP-25

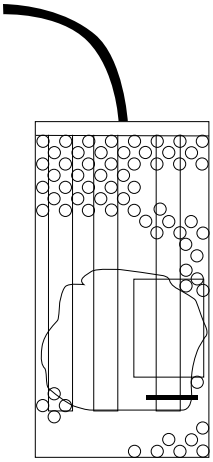
Designed for use in the annular space of double wall fiberglass tanks to detect hydrocarbon liquids. When hydrocarbons are present, a hydrocarbon wax pellet dissolves and closes a springloaded switch to signal a leak. This sensor is not reuseable after exposure to hydrocarbons.

SVP-2



Designed to monitor hydrocarbon vapors in wells or sumps by absorbing the vapors and triggering a switch. Should not be used where vapors are continuously present. Fits in standard 2″ pipe with cover.

DSP-2



Utilizes conductivity probes and a reed switch based float switch to detect the presence of liquid and differentiate between hydrocarbons and water. When combined with Warrick DMS or TA two- channel alarm panel, the DSP-2 can discriminate between water and hydrocarbon liquids causing fault condition.

How to Order

Order by Part Number (same as Series Name for these products).

Series	Body Components	Number of Sensor Wires	Wire Length	O.D.	Part Number
DLP-1*	Buna-N float, Stainless Steel and plastic housing	2 (N.O. in resting position)	16 ft.	1.22″	**DLP-1**
DLP-2*				1.88″	**DLP-2**
DSP-2*					**DSP-2**
DWP-25	Stainless Steel probes in plastic housing	2	25 ft.	.625″	**DWP-25**
DFP-25	Spring-loaded switch, plastic housing, wax pellet	2	25 ft.	.625″	**DFP-25**
SVP-2	Chemical-resistant plastic and Stainless Steel housing	2	16 ft.	2″	**SVP-2**

* EPA Approved when used with Warrick TA or DMS panel. See pages E-27 and E-28 respectively.

Applications

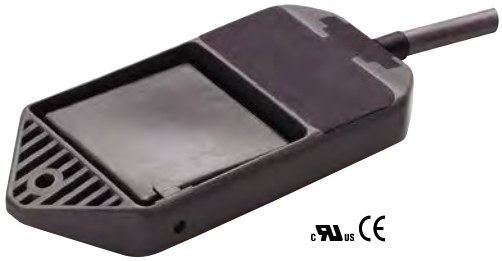
- Above Ground Storage Tanks
- Underground Storage Tanks
- Sumps
- Dry Annular Spaces

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

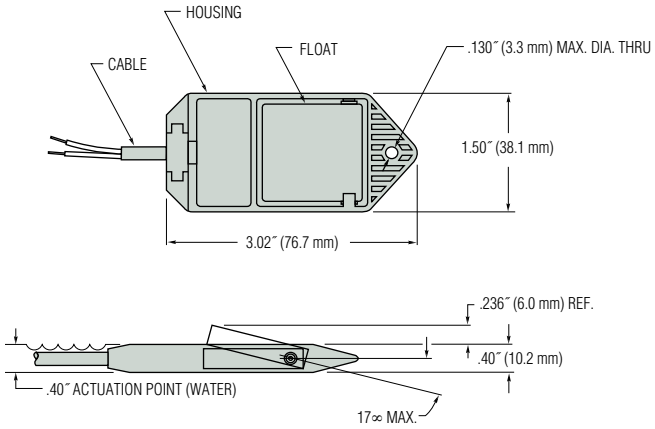
LS-10 Series – Slim Profile for Interstitial Liquid Sensing

The Gems LS-10 liquid sensor accurately detects the presence of liquid in fiberglass double-wall tanks, containment sumps and double-wall pipes. Dry contact switching ensures dependability throughout its long service life. This reusable sensor easily fits small, interstitial spaces and senses liquid hydrocarbons or water. The unit is unaffected by hydrocarbon vapor, thereby reducing the risk of false alarms.

The LS-10 sensor's rounded design makes it easy to remove, clean and reinstall after an alarm condition is triggered, or for maintenance.



Dimensions



Specifications

Wetted Materials:

Housing: Valox®

Float: Foamed Polyethylene with Solid Polyethylene Pin

Tape: UHB Double-Sided 3M Tape

Cable: PVC

Pressure: Atmospheric

Operating Temperature: -40°F to +176°F (-40°C to +80°C)

Accuracy: ±1/8 inch

Switch Rating: 10W, 50-100 VDC Resistive Only, N.C. (opens on rising)

Cable: Two (2) Conductor PVC Jacketed 25 ft. Extended

Approvals: UL Recognized

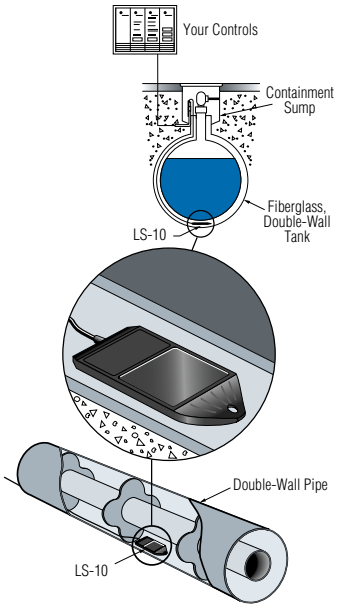
How to Order – Select Part Number based on mounting option

Series Number	Mounting Option	Part Number
LS-10	25´ PVC Jacketed Cable	**156000** ⚡

Note: The LS-10 sensor is a non-voltage producing device and does not contain energy storing components. However, since primary use is in hazardous locations, an appropriate intrinsically safe interface device is required for its use.

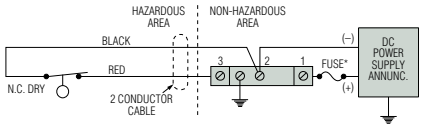
Typical Applications

- Fiberglass Double-Wall Tanks
- Double Wall Pipes
- Containment Sumps
- Piping Sumps

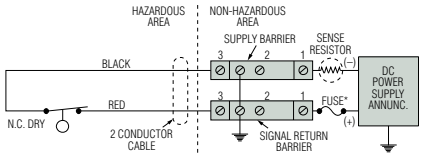


Typical Wiring Diagrams

Non-Isolated System–Single Zener Barrier

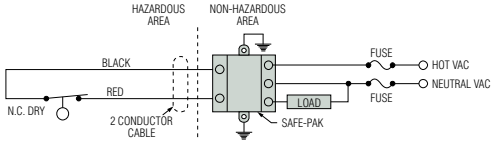


Isolated System - Dual Zener Barrier



If two signal lines must be maintained above ground potential, an individual zener barrier is required per single line.

Single Safe-Pak® Relay



Safe-Pak® is an intrinsically safe, solid state relay

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Series M
Mechanical Tilt Float Level Switch

- Non-Mercury Switch
- Sealed Cable
- Impact & Corrosion Resistant ABS Shell
- N.O., N.C., SPDT Contacts
- Various Cable Lengths
- Color Coded Body

Designed for level control and alarm applications in difficult liquids such as sewage and waste water. Series M mechanical tilt floats are ideal for applications where the presence of mercury is a concern. Series M Switches have impact resistant ABS shell and neoprene jacketed cable.

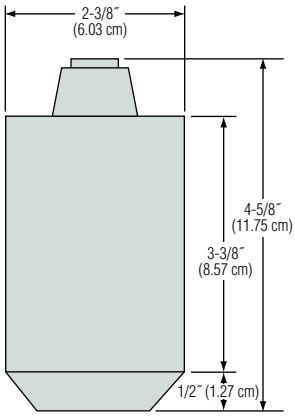
Specifications

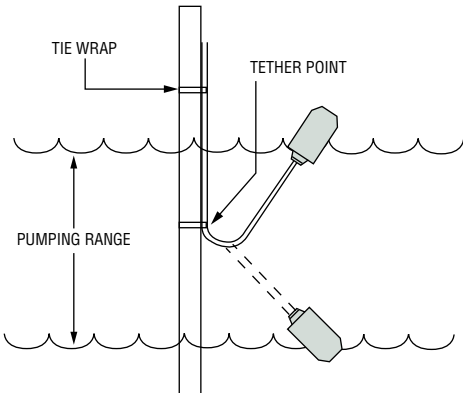
Cord	2 or 3 conductor 16 AWG wire SJOW Oil Resistant CPE
Contact Rating	13 amp @ 120/240 VAC 1/2 hp
Contact Design	SPST, Normally Open or Normally Closed Common with N.O. & N.C. (form C)
Temperature Rating	
Dry	32°F to 194°F (0°C to 90°C)
Water Resistant	32°F to 140°F (0°C to 60°C)
Overall Weight	1.0 lbs. (not including weight)
Tether Method	Tie-wrap nylon, weight: 2.5 lbs.
Approvals	U.L. Recognized, CSA Cert. RoHS – In compliance with EU-directive 2011/65/EC requirements for chemicals and substances

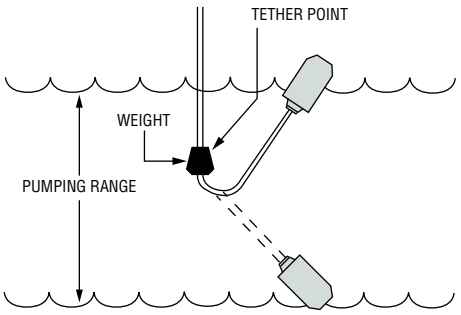
Applications

- Level Control
- Alarms
- Sewage Lift Systems
- Slurries
- Drainage Sumps
- Wastewater Treatment
- Holding Tanks

Dimensions







How to Order

Use the **Bold** characters from the chart below to construct a product code.

M XXX XX X

Series
M

Contact Configuration
BLU – SPST, Normally Open, narrow angle[1]
YEL – SPST, Normally Closed, narrow angle[1]
RED – SPST, Normally Open, wide angle[2]
WHI – SPST, Normally Closed, wide angle[2]
GRE – SPDT, Form C, wide angle[2]

Length
40 – 40 feet (12.19 m)

Tether Method
T – Tie
W – Weight

Tether Method	Part Number
Tie Wrap	**7762360**
Weight	**7762381**

Notes:
1. Narrow angle pumping range approximately 2 in. to 8 in.
2. Wide angle pumping range approximately 5 in. to 18 in.

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Electro-Optic Level Switches

Single Point

- Small size
- Economically priced
- Built-in, solid-state electronics
- No moving parts
- Simple, one-unit installation

ELS Series Level Switches are low cost, compact, optical level sensors with built-in switching electronics. With no moving parts, these small units are ideal for a variety of point level sensing applications — especially where dependability and economy are a must.

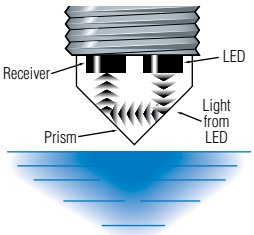
Level switches are suitable for high, low or intermediate level detection in practically any tank, large or small. Installation is simple and quick through the tank top, bottom or side. Solid state-switching ensures dependability over long service life.

The sensor offers ±1mm repeatability and broad liquid compatibility. They are not recommended for use in any liquid that crystallizes or leaves a solid residue.

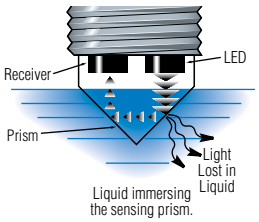
General Operating Principle

The electro-optic sensor contains an infrared LED and a light receiver. Light from the LED is directed into a prism which forms the tip of the sensor.

With no liquid present, light from the LED is reflected within the prism to the receiver. When rising liquid immerses the prism, the light is refracted out into the liquid, leaving little or no light to reach the receiver. Sensing this change, the receiver actuates electronic switching within the unit to operate an external alarm or control circuit.



Liquid below the sensing prism.



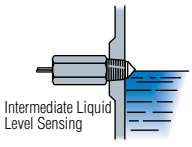
Liquid immersing the sensing prism.

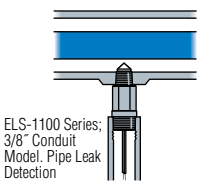
Reflective Surface

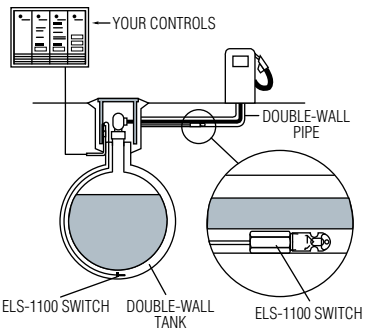
Any optical sensor may be affected by reflective surfaces. Consult Gems if prism is to be less than 2 inches from any reflective surface.

Typical Applications

Medical laboratory • Food and beverage systems • Pharmaceuticals • Petrochemicals • Leak detection • Hydraulic reservoirs • Machine tools







Industry's Largest Selection!

ELS-950

ELS-1100

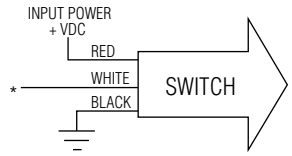
ELS-1100HTS

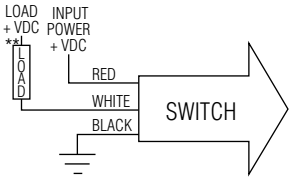
ELS-1150
Stainless Steel

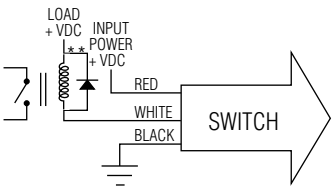
ELS-1100FLG

ELS-1100TFE

Typical Wiring Diagrams - For all electro-optic units not otherwise specified.







*** TTL/CMOS Output-For levels greater than 5 volts, a 10K pull-up resistor is required at the output.**
**** Maximum load=40mA @ 30VCD.**

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

ELS-950 Series
Rugged Electro-Optic Level Sensors

The ELS-950 Series represents Gems' smallest electro-optic level sensors developed to monitor a broad range of media including OHV type fluids.

Our UL-approved design features a TPE over-molded electronics insert, TPE insulated wires, and fluorocarbon o-ring seals that create a watertight, environmentally resistant assembly, ideally suited for use in harsh environments offering excellent temperature and pressure capabilities.

The ELS-950 is excellent for industrial OEMs requiring a solid-state sensor for small space and high temperature environments.

File No. E108913

Specifications

Materials	
Housing	Polysulfone (Contact Gems for alternative material types)
Prism	Polysulfone
O-Ring	Fluorocarbon (1/4˝ MNPT - None)
Electronics	Over-molded TPE
Operating Pressure	0 to 250 PSI (0 to 17 bar) maximum
Operating Temperature*	-40°F to +230°F (-40°C to 110°C)
Current Consumptions (No Load)	
5 VDC	4 mA No Load
12 VDC	10mA No Load
Output	Sink 40 mA max., up to 30 VDC
Repeatability	±1 mm
Lead Wires	3x TPE Insulated; 22 AWG
Approvals	CE, UL file No. E108913
	IP66/67 Rating
	ROHS Compliant

* These switches are not for use in freezing liquids or steam/high condensation environments. Contact Gems for alternative solutions.

How To Order

Specify Part Number based on Input and Output Condition required.

Input Power	Actuation Condition	Lead Wire Length	Mounting Type		
			1/4˝ MNPT	1/2˝- 20UNF-2B*	M12x1-8*
5 VDC ±10%	Wet	6 inches	**224504** ⚡	**224501** ⚡	**224508** ⚡
		2 meters	**226545**	**226541**	**226549**
	Dry	6 inches	**224505**	**224502** ⚡	**224509**
		2 meters	**226546**	**226542**	**226550**
12 VDC ±10%	Wet	6 inches	**224506** ⚡	**224503** ⚡	**224510** ⚡
		2 meters	**226547**	**226543**	**226551**
	Dry	6 inches	**224507** ⚡	**223625** ⚡	**224511** ⚡
		2 meters	**226548**	**226544**	**226552**

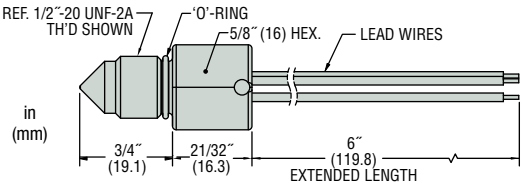
* Supplied with standard fluorocarbon o-ring.

⚡ – Stock Items.

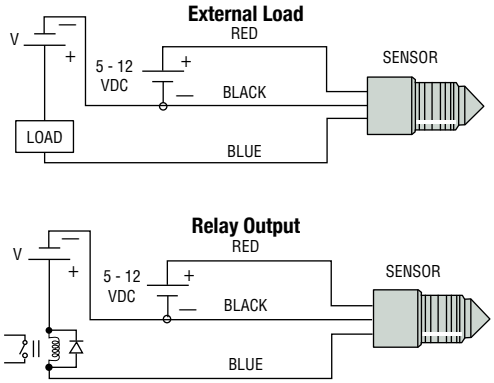
Typical Applications

- Coolant reservoir monitoring and warning
- Medical diagnostic, sterilizer, washers and dialysis equipment
- Low lubricant warning on machine tools, generator sets, on- or off-highway vehicles
- Low level warning in hydraulic reservoirs
- Plastic over flow bottles, plastic radiators
- Leak detection for drip pans

Dimensions



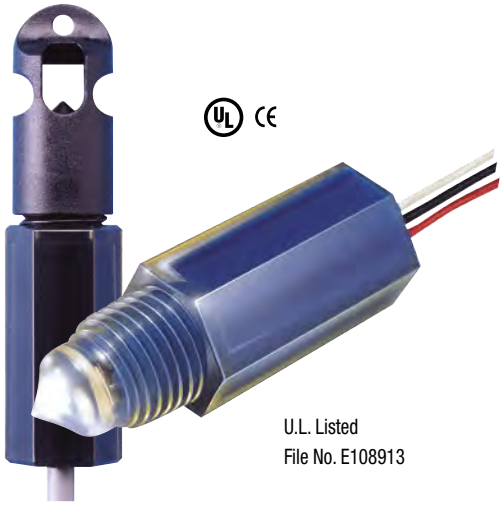
Wiring Diagrams



Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

General Purpose ELS –1100 Series Satisfies Most Applications

These polysulfone units are both compact and economical. They feature a variety of mountings, power requirements and electrical terminations to make it easy to find a perfect match for your application.



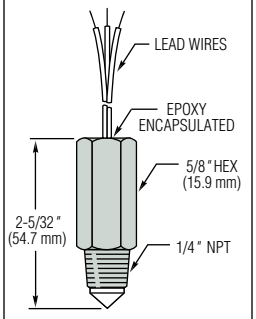
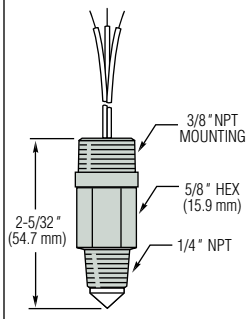
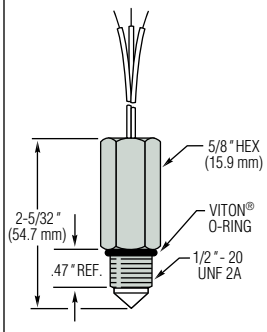
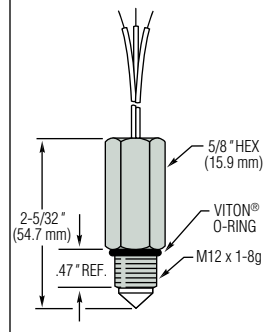
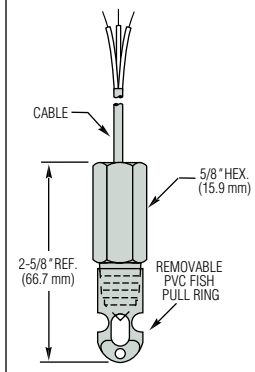
U.L. Listed
File No. E108913

Specifications

Materials	
Housing and Prism	Polysulfone or Nylon
Operating Pressure	0 to 150 PSI, Maximum
Operating Temperature*	0°F to 176°F (-17.8°C +80°C)
Current Consumption	18 mA, Approximately
Output†	TTL/CMOS Compatible. Open Collector Output May Sink 40 mA UP TO 30 VDC.
Repeatability	±1 mm
EMI Susceptability	Meets (MIL-STD-461B Part 2 Modified) Specification of 10 V/M for Frequency Range 30 to 1000 MHz (Except 609 MHz = 9 V/M and 679 MHz = 7.5 V/M).

* These switches are not for use in freezing liquid or steam/high condensation environments. Contact Gems for alternative solutions.

Dimensions

	1/4˝ NPT Mounting	1/4˝ NPT Mounting with 3/8˝ Conduit	1/2˝ Straight Thread Mounting with O-Ring	M12x1-8g Straight Thread with O-Ring	"Fish" Pull Ring
					
Electrical Termination	Lead Wires, 22 AWG, PVC Jacketed, 12˝ to 14˝ Extended				25´ Cable, 22 AWG, PVC Jacketed

How To Order

Specify Part Number based on Mounting Type, Input Power and Output Condition required.

Input Power	Probe Condition at Current Sink	Mounting Type					
		1/4˝ NPT	1/4˝ NPT & 3/8˝ Conduit		1/2˝ Straight Thread	M12x1-8g Straight Thread	"Fish" Pull Ring
		Polysulfone	Polysulfone	Nylon	Polysulfone	Polysulfone	Polysulfone
5 VDC	Wet	**138167**	**144225**	**175631**	**144235**	**166541**	—
10-28 VDC	Wet	**142700** ⚡	**143585** ⚡	**157750**	**143580**	**169555** ⚡	**143577**
	Dry	**143570** ⚡	**143590** ⚡	**175632**	**143575**	**169556**	**148973** ⚡

⚡ – Stock Items.

Intrinsically-Safe Versions

GEMS ELS-1100 Switches may be rendered intrinsically-safe for Class I, Division 1, Group C & D when used with appropriate GEMS Zener Barriers. Call Gems Sensors for special ELS-1100-IS (intrinsically-safe) part numbers and Installation Bulletins 148745 and 148744, File No. E44570.

Extended Power and Switching Capabilities of 12 VDC Models with Gems.

Converts TTL output signal to 5 Amp relay output. Available as open circuit board or mounted in a NEMA 4X enclosure (pictured). See Page A-33.

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

ELS –1100HT
Handles Temperatures to 212°F

Slightly larger than the ELS-1100, the "HT" or High Temperature version is made from high performance Isoplast® plastic. While maintaining broad chemical compatibility, these units also handle fluid temperatures to 212°F. They feature 3/8˝ NPT mountings and the shortest of any of our plastic electro-optic switch bodies – HTS versions are a mere 1/2˝ long!

ELS-1100HT

UL File No. E108913

"Short" HTS Version

ELS-1100HTS

UL File No. E108913

Typical Applications

- Coolant reservoir monitoring
- Medical diagnostic and sterilizer equipment
- Low lubricant warning on machine tools
- Low level warning in hydraulic reservoirs

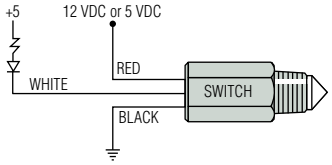
Specifications

Materials	
Housing and Prism	Isoplast®
Operating Pressure	0 to 150 PSI, Maximum
Operating Temperature*	-40°F to +212°F (-40°C +100°C)
Current Consumption	45 mA, Approximately
Output	TTL/CMOS Compatible. Transistor Output with 10K Pull Up Resistor May Sink 18 mA. 12 VDC input power units switch a maximum 5 VDC on output
Repeatability	±1 mm

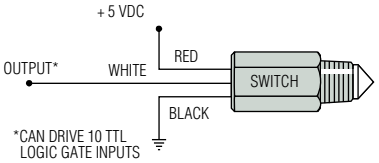
* These switches are not for use in freezing liquids or steam/high condensation environments. Contact Gems for alternative solutions.

Wiring Diagrams

Transistor Output



TTL Compatible Output



How To Order

HT Series

Specify Part Number based on Input and Output Condition required.

	Probe Condition at Current Sink	
Input Power	**Wet**	**Dry**
5 VDC	**153061**	**153062**
12 VDC*	**153063**	**153064**

*12 VDC input power units switch a maximum 5 VDC on output.
Note: Extend the power and switching capabilities of 10-28 VDC models with Gems Opto-Pak Controllers.

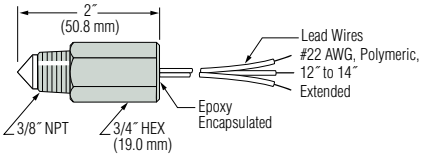
HTS Series - 5 VDC Input Only

Specify Part Number based on Wet or Dry switch actuation and mounting type.

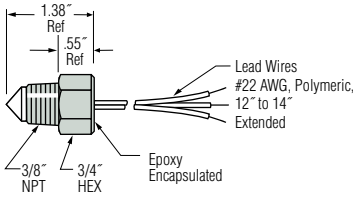
	Probe Condition at Current Sink	
Mounting Type	**Wet**	**Dry**
3/8˝ NPT	**181674**	**181675**
M16x2	**191341**	**191342**

Dimensions

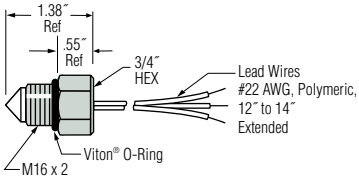
HT Series



HTS Series
3/8˝ NPT Mounting



M16 x 2 Straight Thread
Mounting with O-Ring



Extended Power and Switching Capabilities of 12 VDC Models with Gems.

Converts TTL output signal to 5 Amp relay output. Available as open circuit board or mounted in a NEMA 4X enclosure (pictured). See Page A-33.

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Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

ELS-1100TFE Teflon®
For Ultra-Pure or Aggressive Fluids

When high purity or resistance to chemical attack is vital, ELS-1100TFE sensors are the ultimate solution. They feature a pure Teflon® body and prism construction. Even the Hypalon® vapor barrier and Teflon® coated lead wires give evidence to the care we've taken to make this the perfect liquid level sensor for pharmaceuticals, semiconductor manufacturing, food and beverage, chemical processing, or anywhere purity or chemical resistance is the major criteria.

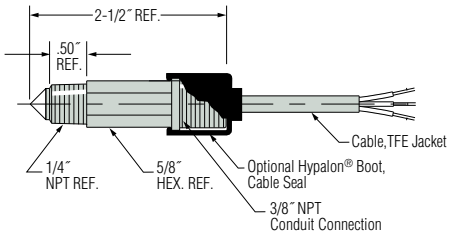
Specifications

Materials	
Housing and Prism	Teflon®
Operating Pressure	0 to 150 PSI, Maximum
Operating Temperature*	0°F to 176°F (-17.8°C +80°C)
Input Voltage	10 - 28 VDC
Current Consumption	18 mA, Approximately
Output†	TTL/CMOS Compatible. Open Collector Output May Sink 40 mA Up to 30 VDC.
Repeatability	±1 mm
EMI Susceptability	Meets (MIL-STD-461B Part 2 Modified) Specification of 10 V/M for Frequency Range 30 to 1000 MHz (Except 609 MHz = 9 V/M and 679 MHz = 7.5 V/M).

* These switches are not for use in freezing liquid or steam/high condensation environments. Contact Gems for alternative solutions.

† See Page A-25 for Wiring Diagrams

Dimensions



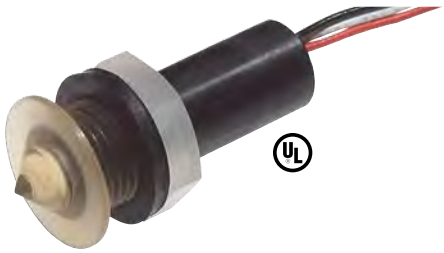
How To Order

Specify Part Number based on Output Condition and Boot Option.

Probe Condition at Current Sink	Part Number	
	With Cable Boot	No Cable Boot
Wet	**187595**	**173800**
Dry	**185600**	**173700**

ELS-1100FLG Flange Mounting for Installations Without Threaded Holes

The easy solution for thin wall tanks (≤1/4˝ thick): ELS-1100FLG Series. No threads needed with these flanged units. Slip through a .75˝ hole and tighten the jam nut; Viton® gasket forms a tight seal. Ideal for sheet metal, molded plastic tanks and medical applications where elimination of exposed threads removes potential bacterial breeding grounds.



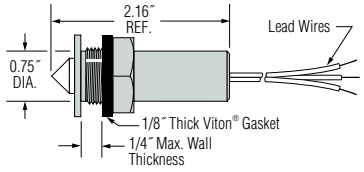
Specifications

Materials	
Housing and Prism	Polysulfone
Operating Pressure	0 to 150 PSI, Maximum
Operating Temperature*	0°F to 176°F (-17.8°C +80°C)
Input Voltage	10 - 28 VDC
Current Consumption	18 mA, Approximately
Output†	TTL/CMOS Compatible. Open Collector Output May Sink 40 mA Up to 30 VDC.
Repeatability	±1 mm
EMI Susceptability	Meets (MIL-STD-461B Part 2 Modified) Specification of 10 V/M for Frequency Range 30 to 1000 MHz (Except 609 MHz = 9 V/M and 679 MHz = 7.5 V/M).

* These switches are not for use in freezing liquid or steam/high condensation environments. Contact Gems for alternative solutions.

† See Page A-25 for Wiring Diagrams

Dimensions



How To Order

Specify Part Number based on Input Power and Output Condition Required.

	Probe Condition at Current Sink	
Input Power	**Wet**	**Dry**
5 VDC	**187575**	**187590**
10-28 VDC	**187585**	**187580**

Extended Power and Switching Capabilities of 12 VDC Models with Gems.

Converts TTL output signal to 5 Amp relay output. Available as open circuit board or mounted in a NEMA 4X enclosure (pictured). See Page A-33.

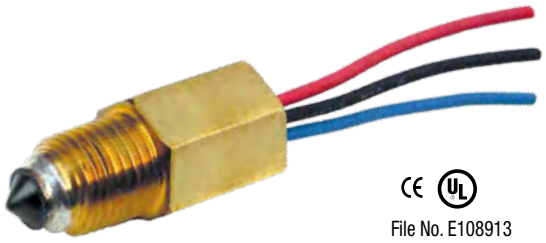
Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

NOTES

ELS-950M Series
Rugged Electro-Optic Level Sensors

The ELS-950M Series represents Gems' most compact alloy-housed electro-optic level sensors. They monitor a broad range of media including OHV type fluids.

Our UL-approved design features a brass housing, fused glass prism, and TPE insulated wires. They provide a durable, watertight, and environmentally resistant assembly, ideally suited for use in harsh environments including outdoors and engine bays. They offer excellent temperature and pressure capabilities. The ELS-950M is excellent for industrial OEMs requiring a solid-state sensor for small space and high temperature environments.



File No. E108913

Specifications

Materials	
Housing	Brass
Prism	Fused Glass
O-Ring	Fluorocarbon (1/4˝ MNPT - None)
Electronics	Over-molded TPE
Operating Pressure	0 to 250 PSI (0 to 17 bar) maximum
Operating Temperature*	-40°F to +230°F (-40°C to 110°C)
Current Consumptions (No Load)	
5 VDC	4 mA No Load
12 VDC	10mA No Load
Output	Sink 40 mA max., up to 30 VDC
Repeatability	±1 mm
Lead Wires	3x TPE Insulated; 22 AWG
Approvals	CE, UL file No. E108913
	IP66/67 Rating

* These switches are not for use in freezing liquids or steam/high condensation environments. Contact Gems for alternative solutions.

How To Order

Specify Part Number based on Input and Output Condition required.

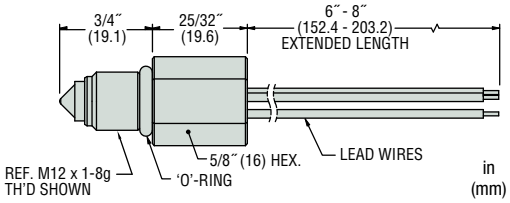
Input Power	Actuation Condition	Lead Wire Length	Mounting Type		
			1/4˝ MNPT	1/2˝- 20UNF-2B*	M12x1-8*
5 VDC ±10%	Wet	6 inches	**232175**	**232171**	**232179**
	Dry	6 inches	**232176**	**232172**	**232180**
12 VDC ±10%	Wet	6 inches	**232177**	**232173**	**232181**
	Dry	6 inches	**232178**	**232174**	**232182**

* Supplied with standard fluorocarbon o-ring.

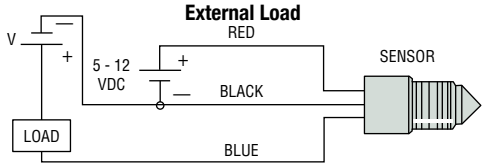
Typical Applications

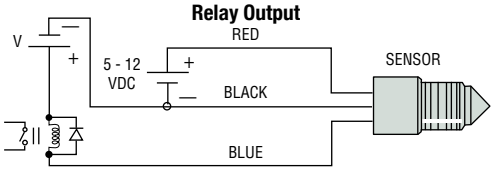
- Coolant reservoir monitoring and warning
- Low lubricant warning on machine tools, generator sets, on- or off-highway vehicles
- Low level warning in hydraulic reservoirs
- Leak detection for drip pans

Dimensions



Wiring Diagrams





Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

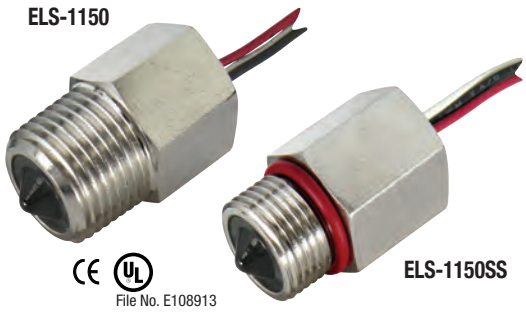
ELS-1150

Compact Electro Optic Level Switch available in Nickel-Plated Steel or Stainless Steel

The enhanced ELS-1150 series is the highest performing electro optic level switch from Gems Sensors. At just 1.38" long, the ELS-1150 has been upgraded with a micro processor board design to provide a wide range of capabilities including sinking and sourcing and time delay outputs. The strong fused glass prism eliminates leak potential and is capable of handling extreme temperature and pressure applications up to 2500 psi. The ELS-1150 explosion-proof series is available in versions with wide voltage ranges (see ELS-1150XP). Built with solid state reliability, the sensor is available at an affordable price in Nickel-Plated Carbon Steel or Stainless Steel. The compact size of the sensor makes them ideal candidates for monitoring the small, pressurized vessels found in HVAC, refrigeration and hydraulic applications in Oil and Gas. The sensors are most commonly used for low, high and intermediate level detection in a variety of media.

The stainless steel version (ELS-1150SS) is excellent for application requiring corrosion resistance and is ideal for acids, solvents and dielectric water applications. An explosion proof version, ELS-1150XP, is excellent for applications in Oil & Gas that require small, accurate level sensing of constant media (ie. hydraulic fluid or coolant).

* Higher temperature versions available up to 125ºC.
Contact our factory experts for additional ordering information.



Applications

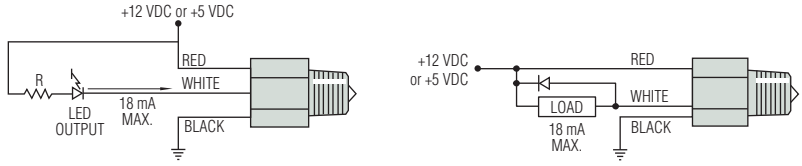
- Hydraulic and lubricating oil reservoirs
- Critical fluid level monitoring on machine tools, compressors, chillers and other industrial OEM equipment
- Corrosive liquids such as: acids, solvents, and dielectric water applications
- Medical Equipment; Anesthesia, Histology

Specifications

Mounting	1/2˝ NPT, 3/4˝-16 Straight Thread
Materials	
Housing	Nickel-Plated Carbon Steel or Stainless Steel
Prism	Fused Glass
Operating Pressure	0 to 2500 PSI, Maximum
Operating Temperature*	-40°F to +212°F (-40°C to +100°C)
Current Consumption	~45 mA
Output	Open Collector Output, 18 mA Sink, Max.
Electrical Termination	22 AWG, Polymeric, 12˝ to 14˝ Extended Lead Wires
Repeatability	±1 mm
Approvals**	CE, UL File No. E108913, CUL

* These switches are not for use in freezing liquid or steam/high condensation environments. For higher temperature versions up to 257°F (125°C), and for other alternate requirements, contact Gems factory.
** Carbon Steel model only.

Wiring Diagrams - Typical



Note: Inductive loads must be diode suppressed.

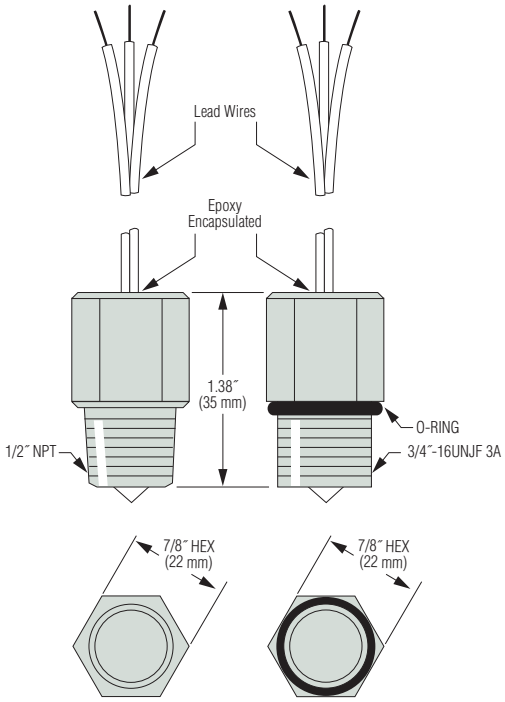
How To Order

Specify Part Number based on Input Power/ Output Condition and material required.

Input Power	Probe Condition at Current Sink	Nickel-Plated Steel Housing		Stainless Steel Housing
		1/2˝ NPT Mounting	3/4˝ – 16 Straight Thread	1/2˝ NPT Mounting
5 VDC	Wet	194469 ⚡	195201	205486
	Dry	194470	195202	205487
12 VDC	Wet	194471 ⚡	195203	205490 ⚡
	Dry	194472 ⚡	195204	205495

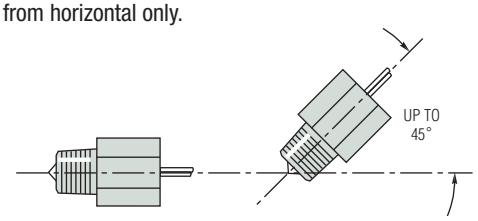
Dimensions

1/2˝ NPT Mounting **3/4˝ - 16 Straight Thread Mounting**



Mounting Attitude

These units must be mounted horizontally or up to 45° from horizontal only.



Extended Power and Switching Capabilities of 12 VDC Models with Gems.

Converts TTL output signal to 5 Amp relay output. Available as open circuit board or mounted in a NEMA 4X enclosure (pictured). See Page A-33.

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

ELS-1150XP
FM-Approved Explosion-Proof

The explosion-proof ELS-1150XP series is designed for use in areas containing flammable bases or vapors in quantities sufficient to produce explosive or ignitable mixtures. It is FM-Approved for use with virtually all hydrocarbon based liquids, as well as with combustible atmospheres containing dusts of coal, coke, flour, starch of other grain.

These solid-state level sensors are available in nickel-plated carbon steel or stainless steel. The strong fused glass prism eliminates leak potential and is capable of handling high temperature and pressure applications up to 5000 psi. The compact size of the sensor makes them ideal candidates for monitoring the small, pressurized vessels found in oil, gas and petrochem environments.

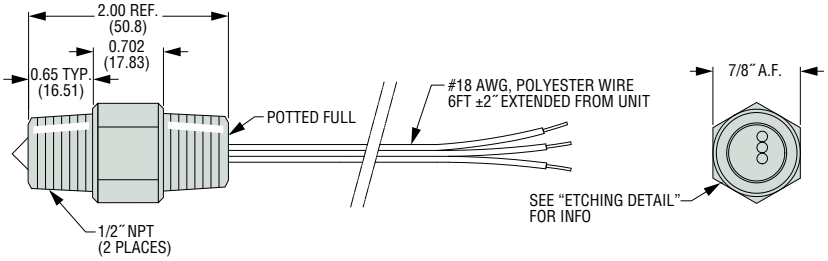
Applications

- Storage Tank Level Monitoring
- Chemical Injection
- Remote Level Monitoring
- Well Head Automation

Specifications

Mounting	1/2˝ NPT
Materials	
Housing	Nickel-Plated Carbon Steel or Stainless Steel
Prism	Fused Glass
Operating Pressure	0 to 5000 PSI, Maximum (10000 PSI Proof)
Operating Temperature	-40°F to +257°F (-40°C to +125°C)
Input Voltage	5-28 VDC ±5%
Current Consumption	~1 mA
Output	Open Collector Output, 100 mA Sink @ 30VDC, Max.; 100 mA Source, Max.
Electrical Termination	18 AWG, Polyester, 6ft ±2˝ Extended Lead Wires
Approvals	FM Approved Class I, Div. I Groups A, B, C, D Class II/III, Groups E, F, G

Dimensions



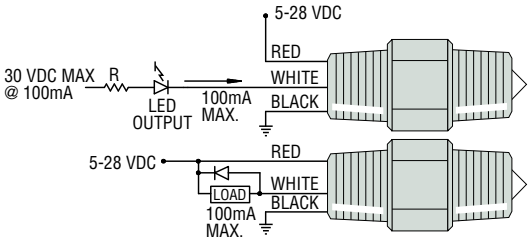
How To Order

Specify Part Number based on Output Logic State and material required.

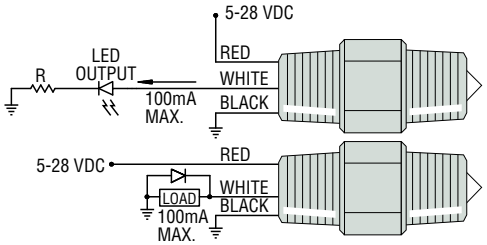
Output Logic State	Nickel-Plated Steel Housing	Stainless Steel Housing
Wet - Sink	**227201**	**227257**
Dry - Sink	**227202**	**227256**
Wet - Sourcing	**227203**	**227255**
Dry - Sourcing	**227204**	**227254**

Wiring Diagrams - Typical

Sinking



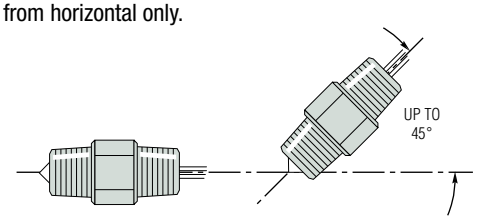
Sourcing



Note: Inductive loads must be diode suppressed.

Mounting Attitude

These units must be mounted horizontally or up to 45° from horizontal only.



Extended Power and Switching Capabilities of 12 VDC Models with Gems.

Converts TTL output signal to 5 Amp relay output. Available as open circuit board or mounted in a NEMA 4X enclosure (pictured). See Page A-35.

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Opto-Pak® Controllers for GEMS Electro-Optic Switches

Extend power and switching capabilities of 12 VDC Electro-Optic switches

- Converts TTL output signal to an SPDT 5 Amp relay output.
- Operates with 12 VDC ELS-1100, ELS-1100HT*, ELS-1150, ELS-1200* and ELS-300 Series Electro-Optic Switches.
- Available as open board or mounted in NEMA 4X junction box.

GEMS Opto-Pak Controllers convert standard 110 VAC line current to the 12 input power required for ELS-1100 and ELS-300 operation, and provide an SPDT, 5 Amp relay output for direct control of moderate loads. Two models are available: an open circuit board Opto-Pak Controller for incorporation into custom enclosures, and the self-contained, NEMA 4X model pictured here.

*12 VDC versions only.

Green and Red LEDs indicate power and output status.

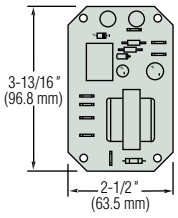
Specifications

Voltage Input	115 VAC ±10%, 50/60 Hz
Maximum Current Draw	70 mA @ 120 VAC
Relay Output	SPDT; 5 Amps @ 115 VAC, 5 Amps @ 30 VDC
Operating Temperatures	-13°F to + 158°F (-25°C to + 70°C)
Electrical Connections	1/4″ Male Spade Terminals*

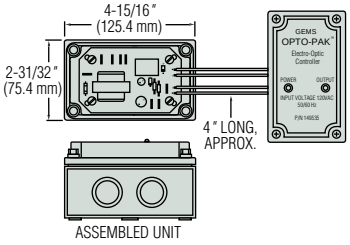
*Ten (10) 1/4″ female spade connectors (not shown) shipped loose with each unit.

Dimensions

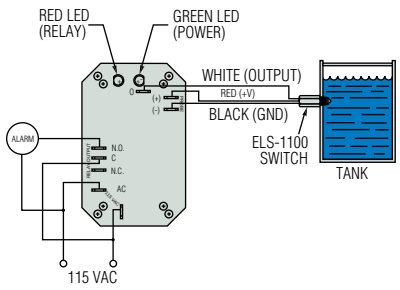
Open Circuit Board Type



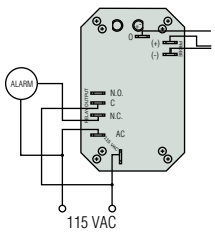
NEMA 4X Type



Typical Wiring
Normally Open



Normally Closed



Typical Applications

Works with 12V units:

- ELS-1100
- ELS-1100HT
- ELS-1200
- ELS-1100FLG
- ELS-1150
- ELS-950

Output Light State When Liquid is Present

Wet Sink	OFF
Dry Sink	ON
Sensor Not Connected	ON

How To Order

Specify Opto-Pak™ Controllers by Part Number.

Description	Part Number
Open Board	**149536**
NEMA 4X Enclosure	**149535** ⚡

⚡ – Stock Items.

Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

ExOsense™ Piezo-Resonant Sensors

- Non-Intrusive
- Repeatable
- Easy to Install – Easy to Use

ExOsense™ is the first affordable, non-intrusive liquid level sensor for plastic fluid containers. ExOsense™ sensors adhere to the outside of tanks, bottles and vessels, and are unaffected by the color or transparency of the plastic. Liquids inside the bottle are untouched, so with ExOsense™ there is no issue of material compatibility or contamination. Best of all, ExOsense™ sensors fit any size and shape vessel, from small containers to large tanks.

U.S. Patent 7,360,417

Specifications

Compatible Plastic Bottle Materials	Polyethylene (PE), Polypropylene (PP) Polycarbonate (PC), ABS, Styrene, PVC, and others
Bottle Materials Not Recommended	Teflon® family, or Any Foamed Core Plastics
Min. Bottle Diameter for Round Bottles	3˝ (76.2 mm)
Bottle Wall Thickness	0.04˝ to 0.15˝ (1.0 mm to 3.8 mm)
Termination of Sensor	Mini USB Style Connector to Electronics
Input Power Supply (volts)	4.75 to 5.25 VDC (Optional Voltage Regulator available for 6 to 32 VDC.)
Power Consumption (current)	<40mA Typ. @ 5 VDC
Calibration	No User Calibration Required. Pre-configured for Container Materials, Wall Thickness, & Output Options. Works on Bottle Materials or Wall Thickness Without User Input.
Output Configuration	Open Collector; 40 mA, Max.
Switch Condition	Normally Open/Normally Closed
Standard Response Time	2 msec.
Delay Range	0 to 60 Seconds, Standard is No Delay, Optimal is 0 to 60 Seconds.
RFI/EMI Susceptibility	3v/m
Agency Approvals	UL 508 Listed (File E 305671), CE & IEC 61326 (RFI/EMI)
Operating Temperature	
Sensor	32°F to158°F (0°C to 70°C)
Electronics	32°F to149°F (0°C to 65°C)
Repeatability	±0.039˝ (±1 mm)
Accuracy	±0.063˝ (±1.6 mm)
Sealing Capability	IP65

Typical Applications

Fluid Monitoring:

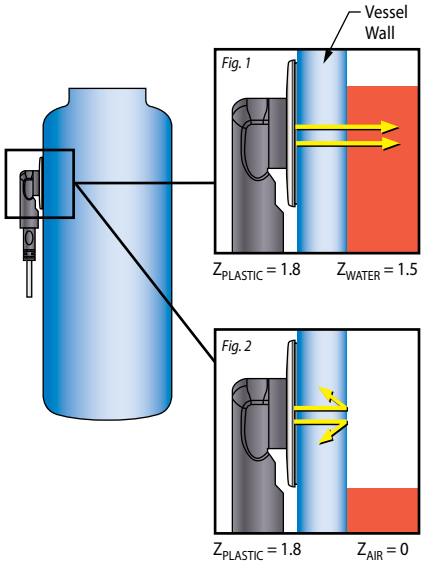
- Ink handling systems
- Water purification systems
- Pesticide management and usage
- Water treatment systems
- Fluid storage tanks
- Coolant
- Saline
- Nuclear liquid wastes
- Containment systems
- Oil water separation systems
- Semiconductor fabrication
- Waste
- Chemicals
- Detergent/wash

Operating Principle

Our sensor incorporates proprietary transducer technology employing piezoelectric material. When piezoelectric material is excited, it creates an acoustic signal as a function of the natural resonance of the material. ExOsense™ sensors generate this acoustic signal, direct it through the bottle wall and sense the reflected pulse.

The amount of energy that is reflected is determined by the “acoustic impedance* mismatch” of the materials in use. For example, if sound passes through two materials with similar acoustic impedances (figure 1), very little energy will be reflected. If sound passes through two materials with dissimilar impedance values (figure 2), the majority of the acoustic energy will be reflected. This acoustic impedance mismatch provides the basis for the detection of liquid level.

* Acoustic Impedance: a material property defined as the product of sound velocity and material density. The relative transmission and reflection at an interface are governed in part by the acoustic impedances of the materials on each side of the interface. The letter Z is used for acoustic impedance and is expressed in [kg/s m2] = 1 Rayl: Water Z = 1.5 MRayls; Air Z = 0 MRayls



Z = Acoustic Impedance

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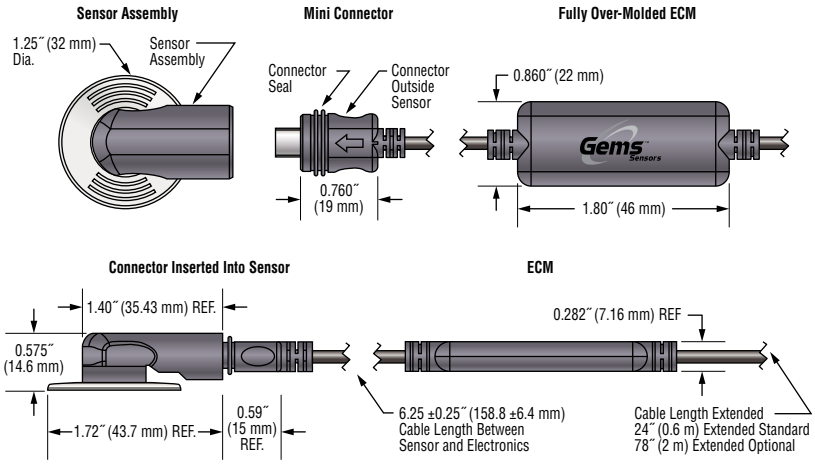
Super Simple Installation

1. Peel & Stick
Peel the adhesive cover off the sensor and stick it on the bottle where you want to indicate the level.

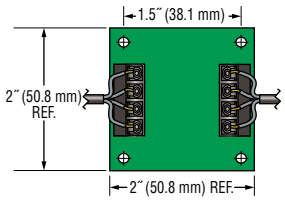
2. Connect
Connect the sensor to the ECM using the mini connector.

3. Sense
Apply power and sense the fluid level.

Dimensions



Optional Voltage Regulator 8-30V Input / 5V Output



Connection Type	Part Number
Header	219445
Solder	218699

Features

- Non-Intrusive, stays outside the container
- Simple installation
- No calibration needed
- No long-term drift
- ±1.6 mm Accuracy
- Very small footprint
- Robust design for rough handling
- Mini, moisture-resistant connector for ease of use
- Fully scaled, over molded ECM

Benefits

- Never contacts hazardous fluids
- Eliminates fluid contamination
- Repeatable liquid level sensing
- Easy to use
- Eliminates fluid compatibility issues
- Improves instrument uptime
- Maximizes tank volume
- Improves systems reliability
- No special mounting required
- Eliminates testing for media compatibility

How To Order

Use the matrix below to select a Part Number based on Container Material, Container Thickness and Sensor Condition @ Current Sink.

Container Material	Part Numbers							
	Container Thickness							
	.04" to .062" (1.02 to 1.57 mm)		.058" to .082" (1.47 to 2.08 mm)		.08" to .102" (2.03 to 2.59 mm)		.01" to .125" (2.54 to 3.18 mm)	
	N.O Wet Sink	N.C Dry Sink	N.O Wet Sink	N.C Dry Sink	N.O Wet Sink	N.C Dry Sink	N.O Wet Sink	N.C Dry Sink
HDPE	219005	219013	219005	219013	219005	219013	219005	219013
LDPE	219002	219010	219002	219010	219008	219016	219008	219016
Polypropylene	219001	219009	219004	219012	219004	219012	219004	219012
Polycarbonate	219006	219014	—	—	—	—	219004	219012
Polystyrene	219005	219013	219005	219013	219005	219013	219005	219013
Polysulfone	219007	219015	NR	NR	NR	NR	NR	NR
PVC	219003	219011	219003	219011	219003	219011	219003	219011
Polyester	—	—	219002	219010	—	—	219006	219014
ABS	219001	219009	219001	219009	219001	219009	219001	219009

Note: All p/n above includes ExOsense sensor plus standard 5 VDC electronic control module, no delay 24" cable.
Consult factory for combinations not listed above.

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Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

WIF-1250 Water in Fuel Sensor

- Designed for OHV and Generator Set applications
- Compact size, easy to install
- Operates in plastic or metal tanks
- Reliable and affordable OEM solution
- Solid-State – no moving parts

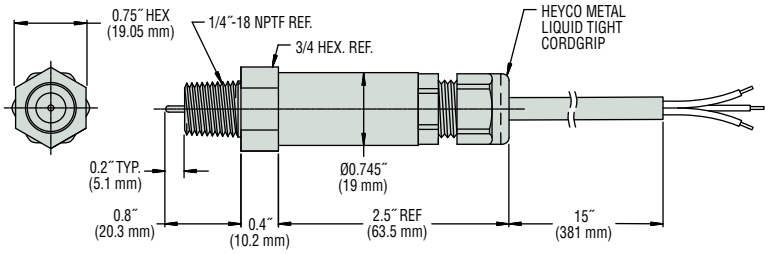
The WIF-1250 sensor is an innovative, no-moving-parts solution specifically designed to detect the presence of water in fuel. The sensor is an ideal solution for OEM's of off-highway vehicles, locomotive and generator sets. It is also ideal for use with fuel filters. Based on reliable conductivity technology, WIF-1250 sensors are built from robust nickel plated steel for compatibility with temperatures up to 257°F (125°C), and are suited for the most challenging environments or applications. A 5-second delay circuit prevents "slosh" actuation. The sensor is easily mounted in any position.

Specifications

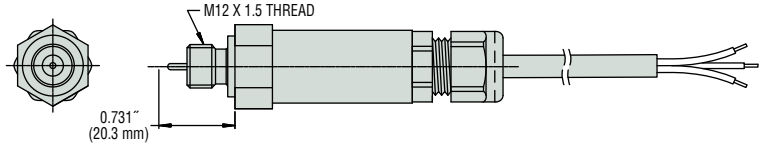
Housing Materials	Nickel plated steel, electrolytic nickel plated & fused glass conductivity pin insulator
Sensing Element Length	0.2″ (5.1 mm)
Operating Pressure	750 PSI (51.7 bar) @ 70°F (21°C)
Operating Temperature	-40°F to 257°F (-40°C to 125°C)
Sensitivity	10,000 Ohms (fluid resistance)
Slosh Dampening	5 seconds
Supply Voltage	8 to 32 V DC
Current Consumption	<20 mA
Output	Open collector, sinking output
Output Load Capability	250 mA max.
Electrical Connection	20 AWG 3-Conductor Cable, 15″ (381 mm)
Approvals	CE

Dimensions

1/4″ NPT Mounting



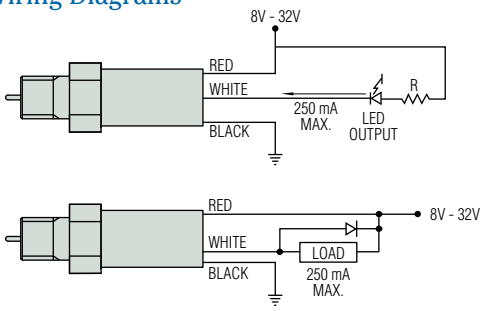
M12x1.5 Mounting



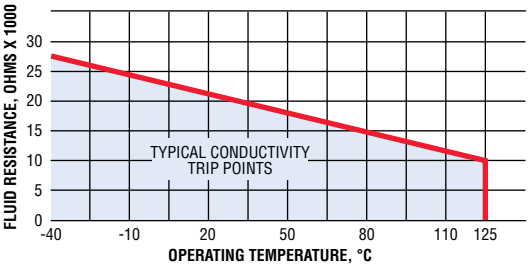
Typical Applications

To detect water in:
- Fuel filters
- Diesel fuel storage tanks

Wiring Diagrams



Resistance vs. Operating Temperature



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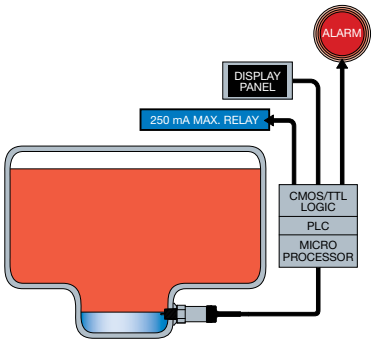
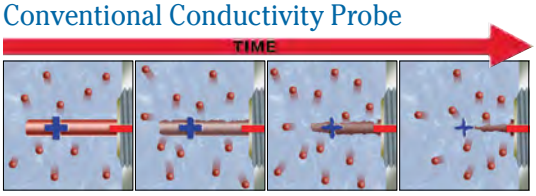
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

Operating Principle

WIF-1250 liquid level sensors are solid-state devices designed to detect the presence or absence of water in fuel. Each sensor contains integral, high-temperature-rated electronics that generate an alternating voltage to a probe tip. The presence of water completes the circuit which, in turn, changes the condition of the transistor output. Output options vary and can be used to actuate relays, indicator lights or LEDs, as well as to interface with CMOS/TTL logic, PLCs or microprocessors.

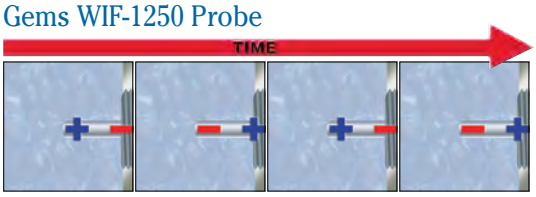


Conventional Conductivity Probe



When a single potential (DC Voltage) is applied to a probe submerged in conductive liquid, metal from that probe will be lost over time via electrolysis.

Gems WIF-1250 Probe



Gems applies extra circuitry to produce an alternating potential (alternating +/- DC square wave). Metal lost in one state is retrieved in the alternating state, resulting in virtually zero probe material loss.

How to Order

Select Part Number based on Mounting Thread and Switch Logic.

Probe Condition at Current Sink	Part Numbers	
	1/4˝ NPT	M12x1.5
Wet	**238737**	**238856**
Dry	**238773**	**238855**

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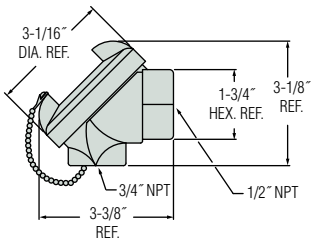
Junction Boxes

GEMS offers optional CSA Listed and FM Approved, explosion-proof junction boxes for many level switch models. Compatible level switches are indicated throughout this catalog by the small icon–

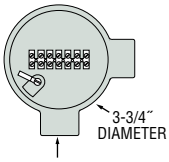
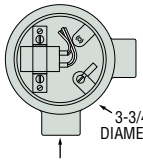
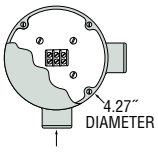
NOTE: Explosion-proof ratings are available only when J-boxes are part of factory assembled sensor unit. J-boxes below, when ordered separately, do not carry explosion-proof ratings.

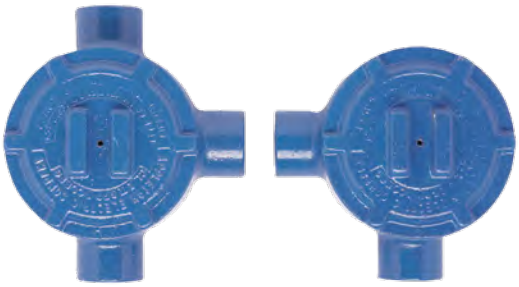
Explosion-Proof J-Boxes



	Aluminum	Iron
Materials	Die Cast Aluminum	Cast Iron
	Stainless Steel Chain and Pin	
	EPDM Rubber Gasket (300°F/149°C Max. Service Temp.)	
Finish	Polished	Electroless Nickel Plate
Weight (approx.)	.62 lbs.	.62 lbs.
NEMA Rating	4, 13	4
Part Number	**192147**	**198848**

Non-Explosion Proof J-Boxes

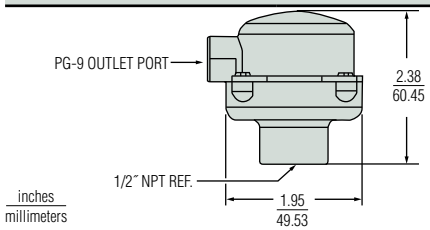
	Alloy			Plastic	
	 3-3/4″ DIAMETER 1/2″ TRADE SIZE (2 PORTS)		 3-3/4″ DIAMETER 1/2″ TRADE SIZE (2 PORTS)	 4.27″ DIAMETER 1/2″ NPT 2 PORTS	
Type	3-pin	7-pin	DPDT Relay	3-pin	7-pin
Part Number	**113873** ⚡	**113877**	**75980**	**113850**	**118828**



Junction boxes are CSA and FM approved for explosion proofing in Class I, Division 1, Groups B, C, D, E, F, G

⚡ – Stock Items.

Conduit/Cable Gland Connections



	Standard	5-Amp Relay
Specifications	Empty enclosure for lead wire splice connections.	120 VAC 50/60 HZ Contacts: 5A – 240 VAC Res 1/3 HP – 120 VAC 5A – 28 VDC Res.
Part Number	**181410**	**180417**

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Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

CAP-100 Series – Non-Contact, Capacitive Level Sensor

- For non-metallic containers
- Easy external mounting
- Compact – 30x45 mm (1.18˝ x 1.77˝)
- Potentiometer for sensitivity adjustment
- Power on and signal LED indicators

The CAP-100 series offers a unique level sensing solution for a wide variety of bottle types including plastic, glass and fiberglass. The non-contact sensor is ideally suited for medical applications such as waste, reagent or diluent liquids as well as dark, sticky or viscous fluids. The easy-to-calibrate sensor is available in both aqueous and non-aqueous versions and can be delivered with factory preset sensitivity for quick installation for OEM orders. The CAP-100 may also be used as a proximity sensor to detect the presence of solids such as paper or pulp.

Specifications

Performance	
Nominal Sensing Distance, Sn	0.39˝ (10mm)
Sensing Range	0-0.39˝ (0-10mm)
Repeat Accuracy - (% of Sn)	<10%
Hysteresis - (% of Sn)	<20%
Mechanical	
Enclosure Ratings	IP67, NEMA 1,3,4,6,13
Operating Temperature Range	-13°F to +158°F (-25°C to +70°C)
LED Signal Indicator	Yellow
Power On LED Indicator	Green
Potentiometer	Yes
Sensor Type	
Unshielded	L-Type, Non-Embeddable
Shielded	D-Type, Embeddable
Sensor Material	Glass Filled Nylon
Cable	78.74˝ (2 meter), 3 Wire PVC
Shock	30g, 11ms
Vibration	55Hz, 1mm amplitude in all planes
Electrical	
Supply Voltage	5-48 VDC
Continuous Switching Current	300 mA
Voltage Drop	<2 VDC
Current Consumption	<10 mA
Switching Frequency	100 Hz
Transient Protection	2kV, 1ms, 1 kOhm
Overload Protection	Yes
Short Circuit	Yes
Reverse Polarity Protection	Yes
Approvals	CE (Except at Frequency 803-805 MHz), RoHS

How To Order

Select a Part Number based on Fluid Properties and Sink State.

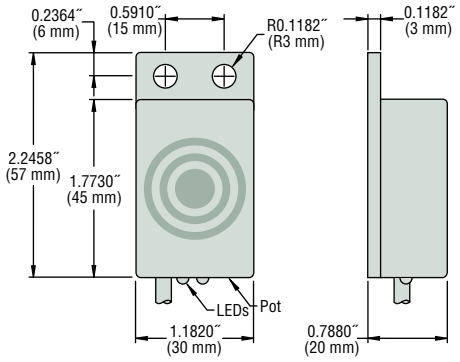
Fluid Properties	Max. Container Wall Thickness	Wet/Dry Sink	Part Number
Water Based, Conductive (unshielded sensor)	5/8˝	Wet	**230079**
		Dry	**230081**
Non-Water Based, Not Conductive (shielded sensor)	3/8˝	Wet	**228830**
		Dry	**229855**

Typical Applications

Fluid Monitoring:

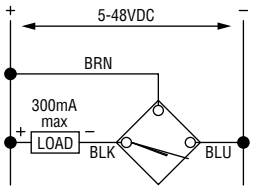
- Waste
- Reagents
- Diluent
- Detergent/Wash
- Coolant
- Printing Ink

Dimensions

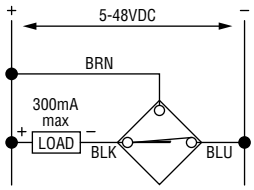


Wiring Diagram

Wet Sink



Dry Sink



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Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

CAP-150 Series – Capacitive Level Sensor

- For non-metallic containers
- Non-intrusive level sensing
- Optional Sight Glass Bracket
- Potentiometer for sensitivity adjustment

The CAP-150 series offers a unique level sensing solution for a wide variety of bottle types including plastic, glass and fiberglass. The non-contact sensor is ideally suited for medical applications such as waste, reagent or diluent liquids as well as dark, sticky or viscous fluids. The easy-to-calibrate sensor is available in both aqueous and non-aqueous versions and can be delivered with factory preset sensitivity for quick installation for OEM orders. The CAP-150 may also be used as a proximity sensor to detect the presence of solids such as pulp & paper.

Specifications

Performance	
Nominal Sensing Distance, Sn	0.2″ (5mm)
Repeat Accuracy - (% of Sn)	<2%
Hysteresis - (% of Sn)	<20%
Mechanical	
Enclosure Ratings	IP67, NEMA 1,3,4,6,13
Operating Temperature Range	-13°F to +158°F (-25°C to +70°C)
LED Signal Indicator	Yellow
Power On LED Indicator	Green
Potentiometer	Yes
Termination	78.74″ (2 meter), 3 Wire PVC
Shock	30g, 11ms
Electrical	
Supply Voltage	5-48 VDC
Continuous Switching Current	300 mA
Voltage Drop	<2 VDC
Current Consumption	<10 mA
Switching Frequency	100 Hz, maximum
Overload Protection	No
Short Circuit	Yes
Reverse Polarity Protection	Yes
Approvals	CE

How To Order

Select a Part Number based on Fluid Properties and Sink State.

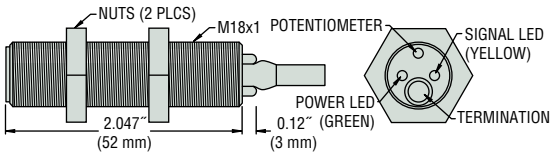
Fluid Properties	Sensor Material	Flush Mountable	Sensing Range	Shielded	Sink/ Source	Logic	Part Number
Aqueous, Conductive (Unshielded Sensor)	Delrin® Body with Valox® Sensor Face	No	2-8mm	No	Sink	Wet	**239890**
						Dry	**239891**
					Source	Wet	**241366**
						Dry	**241367**
Non-Aqueous, Non-Conductive (Shielded Sensor)	Ni-Plated Brass Body with Valox® Sensor Face	Yes	1-5mm	Yes	Sink	Wet	**240607**
						Dry	**240612**
					Source	Wet	**241368**
						Dry	**241369**

Typical Applications

Fluid Monitoring:

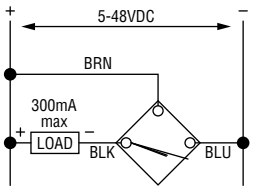
- Waste
- Reagents
- Diluent
- Detergent/Wash
- Coolant
- Printing Ink

Dimensions

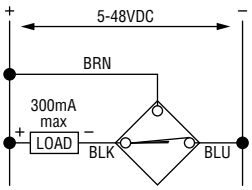


Wiring Diagram

Wet Sink



Dry Sink

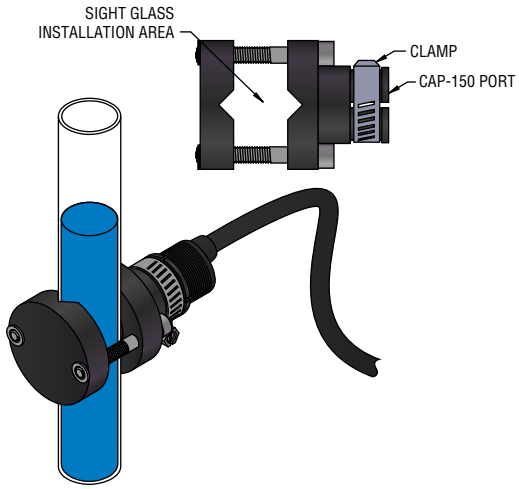


Convert Simple Sight Glass into Switch Actuation Device

- For glass tubing 1/4″ to 1″ Dia.

Use this easy-to-install clamp with the CAP-150 to provide liquid level sensing and switch actuation along the length of sight glasses 1/4″ to 1″ in diameter.

Part Number: 240836



Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

CAP-200 Series – Compact, 1/2″NPT Mount

- For metallic and non-metallic containers
- Food grade plastic housing
- No sensor well required
- Potentiometer for sensitivity adjustment

The CAP-200 Series is easily threaded directly into 1/2″ NPT fittings for an easy level sensing solution within a wide variety of metal and non-metal tanks. The highly accurate sensor is built from durable Delrin® material, and is available in both aqueous and non-aqueous versions. The easy to calibrate sensor can be delivered with factory preset sensitivity for quick installation by OEM. The CAP-200 may also be used as a proximity sensor to detect the presence of solids such as paper or pulp.

Specifications

Performance	
Nominal Sensing Distance, Sn	0.118″ (3mm)
Sensing Range	0-0.118″ (0-3mm)
Repeat Accuracy - (% of Sn)	<10%
Hysteresis - (% of Sn)	<20%
Mechanical	
Enclosure Ratings	IP67, NEMA 1,3,4,6,13
Operating Temperature Range	-13°F to +158°F (-25°C to +70°C)
LED Signal Indicator	Yellow
Power On LED Indicator	Green
Potentiometer	Yes
Sensor Type	
Unshielded	L-Type, Non-Embeddable
Shielded	D-Type, Embeddable
Barrel Material	Delrin®
Termination	78.74″ (2 meter), 3 Wire PVC
Shock	30g, 11ms
Vibration	55Hz, 1mm amplitude in all planes
Max. Pressure	150 psi (10.3 bar)
Electrical	
Supply Voltage	5-48 VDC
Continuous Switching Current	300 mA
Voltage Drop	<2 VDC
Current Consumption	<10 mA
Switching Frequency	100 Hz
Transient Protection	2kV, 1ms, 1 kOhm
Overload Protection	Yes
Short Circuit	Yes
Reverse Polarity Protection	Yes
Approvals	CE (Except at Frequency 803-805 MHz), RoHS

How To Order

Select a Part Number based on Fluid Properties and Sink State.

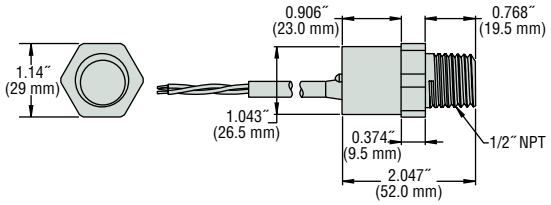
Fluid Properties	Container Material	Wet/Dry Sink	Part Number
Water Based, Conductive (unshielded sensor)	Non-Metallic	Wet	**230077**
		Dry	**230078**
Non-Water Based, Not Conductive (shielded sensor)	Non-Metallic or Metallic	Wet	**230082**
		Dry	**230083**

Typical Applications

Fluid Monitoring:

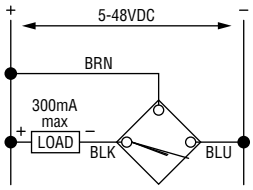
- Waste
- Reagents
- Diluent
- Detergent/Wash
- Coolant
- Printing Ink

Dimensions

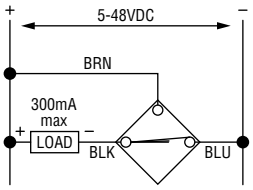


Wiring Diagram

Wet Sink



Dry Sink

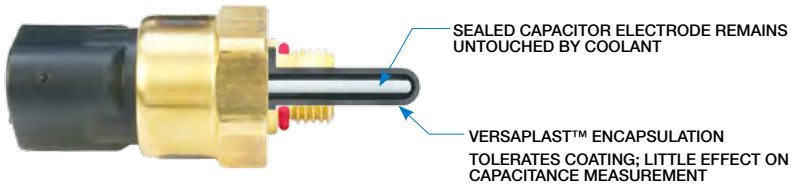


Order from: C A Briggs Company; 622 Mary Street; Suite 101 - Warminster, PA 18974
Phone: 267-673-8117 - Fax: 267-673-8118; E-Mail: Sales@cabriggs.com - www.cabriggs.com

CAP-300 Series – Capacitive Level Sensor

- Durable sealed design – IP67
- Developed for the most rugged aqueous applications
- Tolerates coolant coating
- Small size – 2″ (51 mm) long
- Available in Stainless Steel for Food & Beverage Applications

The CAP-300 capacitive level sensor is one of our most durable and reliable point level sensors. The versatile CAP-300 is the ideal OEM solution for power generation equipment, off-highway vehicles, generators, Food & Beverage, Medical, Rail and HVAC applications, and excels in coolant monitoring. With nearly zero maintenance, the sensor mounts in any position, is compact, tolerates coating, remains reliable even in standby mode, and is compatible with temperatures up to 257°F (125°C). For use where sloshing occurs, or the reservoir's attitude changes frequently, Gems offers a variety of actuation delays.



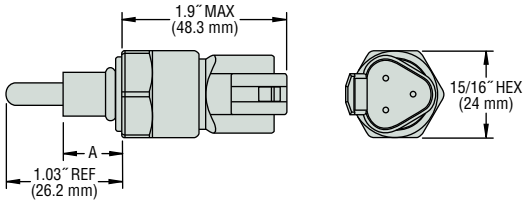
Specifications

Mountings	1/4″ NPT, 1/2″-20 per SAE J1926-3, M12x1.0-8g, M12x1.5 ISO 6149-3, 1/2″ NPT
Materials	
Housing	Brass or 316L Stainless Steel*
O-Ring	EPDM
Probe Tip	Versaplast™
Operating Pressure	Up to 100 PSIG
Operating Temperature	
Common	-40°F to +257°F (-40°C to +125°C)
Cable Versions	-4°F to +158°F (-20°C to +70°C)
Supply Voltage	9 to 32 VDC
Current Consumption	15mA max. (no load)
Output	Open collector, sinking or sourcing output, 9-32 VDC, 30mA max.
Electrical Termination	3-pin Deutsch, 18 AWG Type SXL flying leads or 18 AWG PVC Cable
Sensing Element Length	1.03″ (26.2mm) Max. (including thread length)
Approvals	CE, IP67, RoHS

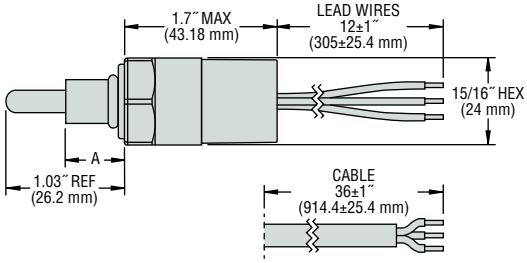
* NSF Approved material of construction

Dimensions

Deutsch® Connector



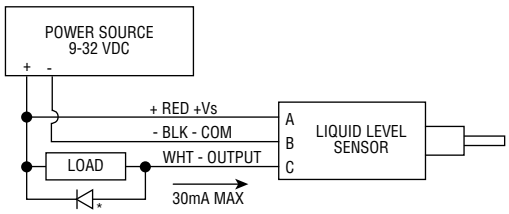
Lead Wires or Cable



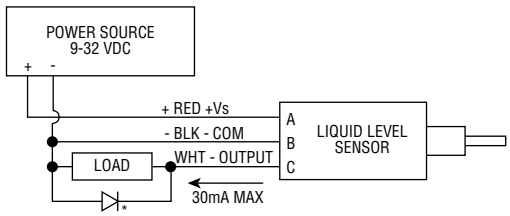
		A DIM. REF.	EPDM O-Ring
Thread Sizes	1/2″-20	0.43″ (10.9 mm)	3-905
	M12x1-8g	0.54″ (13.5 mm)	2-110
	M12x1.5	0.53″ (15.2 mm)	9.3 x 2.2 mm
	1/4″-18NPT	0.62″ (15.7 mm)	None
	1/2″-14NPT	0.62″ (15.7 mm)	None

Wiring Diagram

Sinking



Sourcing



* For inductive loads, use diode suppression.

How To Order

Select a Part Number based on mounting type, connection and actuation condition.

Actuation Condition	Electrical Connection	Thread Sizes						
		Brass					316L Stainless Steel	
		1/4″-18 NPT (male)	1/2″-20 per SAE J1926-3	M12x1.5 Stud End Per ISO6149-3	M12x1.0-8g	1/2″-14 NPT (male)	1/4″-18 NPT (male)	1/2″-14 NPT (male)
Wet Sink	Integral 3-pin Deutsch® DT04-3P Connector	240640	240700	240800	240900	242970	244510	244540
	12″ 18 AWG SXL Flying Leads	240660	240720	240820	240920	242975	244515	244545
	36″ PVC Cable	240680	240740	240840	240940	242980	244520	244550
Dry Sink	Integral 3-pin Deutsch® DT04-3P Connector	240650	240710	240810	240910	242985	244525	244555
	12″ 18 AWG SXL Flying Leads	240670	240730	240830	240930	242990	244530	244560
	36″ PVC Cable	240690	240750	240850	240950	242995	244535	244565
Wet Source	Integral 3-pin Deutsch® DT04-3P Connector	240645	240705	240805	240905	242971	244511	244541
	12″ 18 AWG SXL Flying Leads	240665	240725	240825	240925	242976	244516	244546
	36″ PVC Cable	240685	240745	240845	240945	242981	244521	244551
Dry Source	Integral 3-pin Deutsch® DT04-3P Connector	240655	240715	240815	240915	242986	244526	244556
	12″ 18 AWG SXL Flying Leads	240675	240735	240835	240935	242991	244531	244561
	36″ PVC Cable	240695	240755	240855	240955	242996	244536	244566

Optional Delay

Delays are useful when the liquid being sensed is subject to frequent sloshing or the reservoir's attitude changes significantly. For low quantities, Gems offers a 5- and 10-second delay (±1/2 second). Gems will customize the delay up to 99 seconds for large volume OEM applications. Please call Gems for more information.

XLS-1 — Ultrasonic Level Sensor

- No Moving Parts
- Zero Maintenance
- Ignores Condensation on Sensor
- Will Not Sense Foam as Liquid
- Microcontroller-Based Electronics

XLS-1 ultrasonic level sensors are compatible with water-based and hydrocarbon-based liquids, and are perfect for applications where condensation may affect other sensing technologies. The XLS-1 is an ideal solution for sensing liquid level in generators, water tanks, radiators, printers, and other industrial applications. XLS-1 ultrasonic level switches expand the Gems catalog of solid-state level sensors.

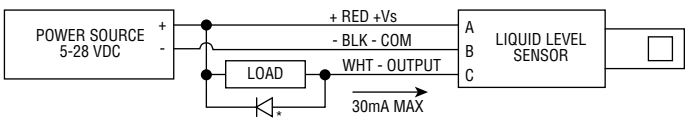
Specifications

Probe Length	1.25″ (including threads)
Fluid Compatability	Water, Water-based medias, Hydrocarbon-based chemicals, not compatible with high-viscosity liquids
Materials	
Housing	316L Stainless Steel
O-Ring Seal*	EPDM; NBR, Silicon, Kalrez® or Chemraz® available (Consult Factory)
Connector Housing	30% Glass-filled Polyester
Performance	
Accuracy	±1 mm from centerline
Repeatibility	±1 mm
Temperatures	
Fluid	-40°F to +257°F (-40°C to +125°C)
Ambient	-40°F to +185°F (-40°C to +85°C)
Pressures	
Operating	0 to 250 psig
Burst	1000 psig
Environmental	
Ingress	IP67 Per IEC60529 IP6K9K Per DIN40050-9 (sensor only)
Vibration	Per IEC 60068-2-6; 20 m/s², 10-55 Hz; MIL-STD-202G, Method 204D, 10G, 57-2000 Hz
Shock	Per IEC 60068-2-27; 15G, 11ms
Audio Frequency Immunity	Per MIL 461D, CS101
EMC Immunity	IEC 61326-1; EN61000-4-(2 thru 6)
Input Power	5-28 VDC regulated power, max supply current 20 mA
Outputs	Open collector, sinking or sourcing output Open collector specs 30 VDC, 30mA max
Electrical Interface	3 Pin Deutsch DT Series Connector, 18 AWG wire or cable
Mechanical Interface	1/4″ NPT, 1/2″ NPT, M12x1.0, M12x1.5, 1/2″-20, G1/4″, others available upon request
Mounting Orientation	Mounted Horizontally ±60 degrees
Approvals	CE (EMC 2004/108/EC) and RoHS, UL/cUL Recognized
Calibration	None required

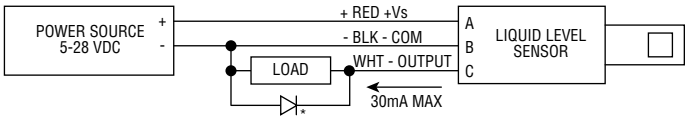
* Where applicable.

Wiring Diagram

Sinking



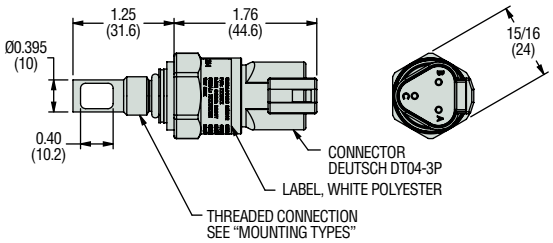
Sourcing



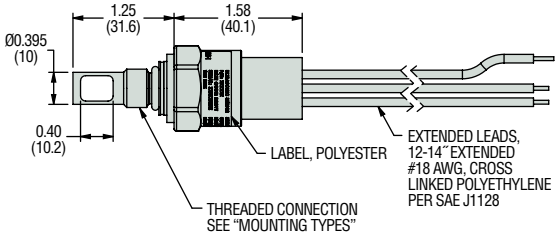
* For inductive loads, use diode suppression.

Dimensions

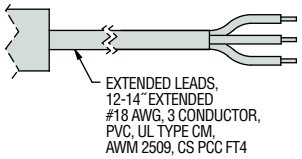
3-PIN Deutsch Connector



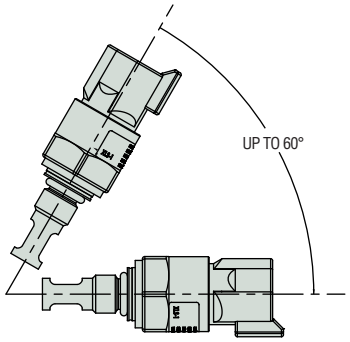
3-Wire Output



PVC Cable



Mounting Attitude



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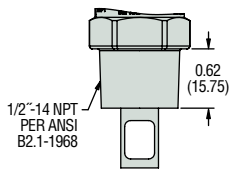
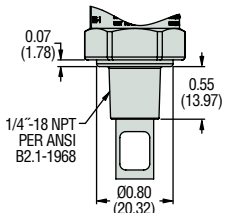
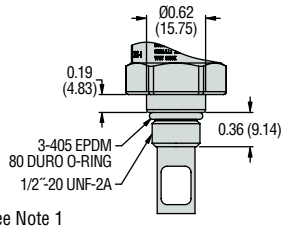
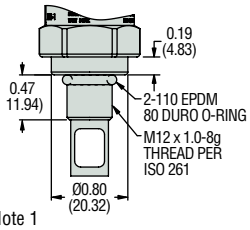
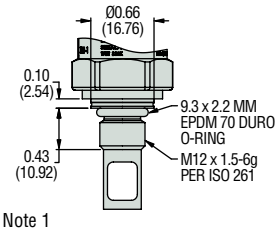
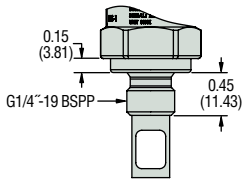
Mounting Types

SAE

1/2″-14 NPT	1/4″-18 NPT	1/2″-20 per SAE J1926-3
		
		See Note 1

BSP & Metric

M12 x 1.0	M12 x 1.5 per ISO6149-3	G1/4″-19 BSPP
		
See Note 1	See Note 1	See Note 2

inch
(mm)

How To Order

Select a Part Number based on mounting type, connection and actuation condition.

Actuation Condition	Electrical Connection	Mounting Type					
		M12 x 1.0 (TYPE 10)[1]	1/2″-14 NPT (TYPE 12)	1/4″-18 NPT (TYPE 14)	M12 x 1.5 per ISO6149-3 (TYPE 15)[1]	1/2″-20 per SAE J1926-3 (TYPE 20)[1]	G1/4″-19 BSPP (TYPE 24)[2]
Wet Sink	Integral 3-pin Deutsch® Connector	247670	247690	247700	247680	247660	250010
	18 AWG, 12″-14″ Extended Flying Leads	247740	247780	247800	247760	247720	250020
	12″-14″ PVC Cable	247750	247790	247810	247770	247730	250030
Dry Sink	Integral 3-pin Deutsch® Connector	247675	247695	247715	247685	247665	250005
	18 AWG, 12″-14″ Extended Flying Leads	247745	247785	247805	247765	247725	250015
	12″-14″ PVC Cable	247755	247795	247815	247775	247735	250025
Wet Source	Integral 3-pin Deutsch® Connector	250830	250820	250840	250850	250870	250890
	18 AWG, 12″-14″ Extended Flying Leads	250930	250920	250940	250950	250970	250990
	12″-14″ PVC Cable	251030	251020	251040	251050	251070	251090
Dry Source	Integral 3-pin Deutsch® Connector	250835	250825	250845	250815	250875	250895
	18 AWG, 12″-14″ Extended Flying Leads	250935	250925	250945	250855	250975	250995
	12″-14″ PVC Cable	251035	251025	251045	250915	251005	250955

Notes:
1. Supplied with EPDM O-ring. Consult factory for alternate O-ring materials.
2. Designed for use with Dowty Bonded Seal. Not supplied.

CAP-300 Series – Capacitive Level Sensor

- Durable sealed design – IP67
- Developed for the most rugged aqueous applications
- Tolerates coolant coating
- Small size – 2″ (51 mm) long
- Available in Stainless Steel for Food & Beverage Applications

The CAP-300 capacitive level sensor is one of our most durable and reliable point level sensors. The versatile CAP-300 is the ideal OEM solution for power generation equipment, off-highway vehicles, generators, Food & Beverage, Medical, Rail and HVAC applications, and excels in coolant monitoring. With nearly zero maintenance, the sensor mounts in any position, is compact, tolerates coating, remains reliable even in standby mode, and is compatible with temperatures up to 257°F (125°C). For use where sloshing occurs, or the reservoir's attitude changes frequently, Gems offers a variety of actuation delays.

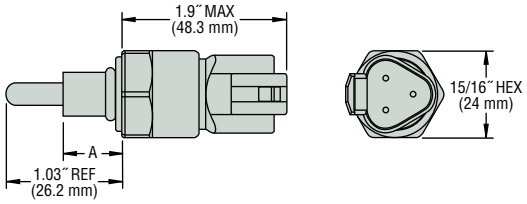
Specifications

Mountings	1/4″ NPT, 1/2″-20 per SAE J1926-3, M12x1.0-8g, M12x1.5 ISO 6149-3, 1/2″ NPT
Materials	
Housing	Brass or 316L Stainless Steel
O-Ring	EPDM
Probe Tip	Versaplast™
Operating Pressure	Up to 100 PSIG
Operating Temperature	
Common	-40°F to +257°F (-40°C to +125°C)
Cable Versions	-4°F to +158°F (-20°C to +70°C)
Supply Voltage	9 to 32 VDC
Current Consumption	15mA max. (no load)
Output	Open collector, sinking or sourcing output, 9-32 VDC, 30mA max.
Electrical Termination	3-pin Deutsch, 18 AWG Type SXL flying leads or 18 AWG PVC Cable
Sensing Element Length	1.03″ (26.2mm) Max. (including thread length)
Approvals	CE, IP67, RoHS

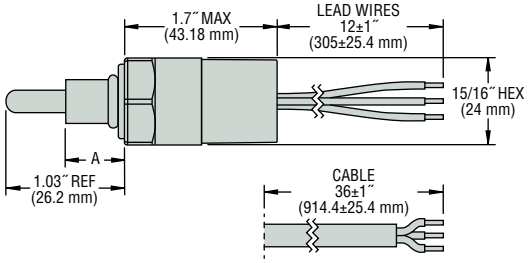
For NSF certified product options, contact Gems.

Dimensions

Deutsch® Connector



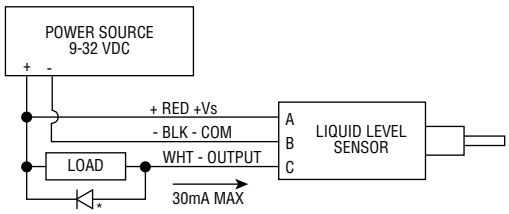
Lead Wires or Cable



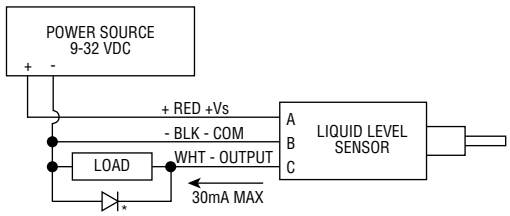
		A DIM. REF.	EPDM O-Ring
Thread Sizes	1/2″-20	0.43″ (10.9 mm)	3-905
	M12x1-8g	0.54″ (13.5 mm)	2-110
	M12x1.5	0.53″ (15.2 mm)	9.3 x 2.2 mm
	1/4″-18NPT	0.62″ (15.7 mm)	None
	1/2″-14NPT	0.62″ (15.7 mm)	None

Wiring Diagram

Sinking



Sourcing



* For inductive loads, use diode suppression.

How To Order

Select a Part Number based on mounting type, connection and actuation condition.

Actuation Condition	Electrical Connection	Thread Sizes						
		Brass					316L Stainless Steel	
		1/4″-18 NPT (male)	1/2″-20 per SAE J1926-3	M12x1.5 Stud End Per ISO6149-3	M12x1.0-8g	1/2″-14 NPT (male)	1/4″-18 NPT (male)	1/2″-14 NPT (male)
Wet Sink	Integral 3-pin Deutsch® DT04-3P Connector	240640	240700	240800	240900	242970	244510	244540
	12″ 18 AWG SXL Flying Leads	240660	240720	240820	240920	242975	244515	244545
	36″ PVC Cable	240680	240740	240840	240940	242980	244520	244550
Dry Sink	Integral 3-pin Deutsch® DT04-3P Connector	240650	240710	240810	240910	242985	244525	244555
	12″ 18 AWG SXL Flying Leads	240670	240730	240830	240930	242990	244530	244560
	36″ PVC Cable	240690	240750	240850	240950	242995	244535	244565
Wet Source	Integral 3-pin Deutsch® DT04-3P Connector	240645	240705	240805	240905	242971	244511	244541
	12″ 18 AWG SXL Flying Leads	240665	240725	240825	240925	242976	244516	244546
	36″ PVC Cable	240685	240745	240845	240945	242981	244521	244551
Dry Source	Integral 3-pin Deutsch® DT04-3P Connector	240655	240715	240815	240915	242986	244526	244556
	12″ 18 AWG SXL Flying Leads	240675	240735	240835	240935	242991	244531	244561
	36″ PVC Cable	240695	240755	240855	240955	242996	244536	244566

Optional Delay

Delays are useful when the liquid being sensed is subject to frequent sloshing or the reservoir's attitude changes significantly. For low quantities, Gems offers a 5- and 10-second delay (±1/2 second). Gems will customize the delay up to 99 seconds for large volume OEM applications. Please call Gems for more information.

ULS-200

Solid-State Point-Level Sensor

Data Sheet No. 263795 Rev. E

Contents

1. About This Document

1.1 Function

This instruction provides the information required for mounting, connection, setup, maintenance, and resolving faults. Please read this information before installing the sensor and putting the instrument into operation and keep this manual accessible. All performance characteristics within this document are at a set of standard conditions, and user experience may differ depending on varying application conditions.

1.2 Document Online Location

https://www.gemssensors.com/uls-200-datasheet

1.3 Symbols Used

INFORMATION, NOTE, TIP:
This symbol indicates helpful additional information and tips for successful work.

NOTE:
This symbol indicates notes to prevent failures, malfunctions, damage to devices or plants.

CAUTION:
Non-observance of the information marked with this symbol may result in personal injury.

WARNING:
Non-observance of the information marked with this symbol may result in serious or fatal personal injury.

DANGER:
Non-observance of the information marked with this symbol results in serious or fatal personal injury.

EX APPLICATIONS:
This symbol indicates special instructions for Ex applications.

BATTERY DISPOSAL:
This symbol indicates special information about the disposal of batteries and accumulators.

2. Safety

2.1 Personal Protective Equipment (PPE)

Personal protective equipment should always be worn when working with the sensor.

2.2 Appropriate Use

Note the following:

WARNING: GEMS PRODUCTS MAY ONLY BE USED FOR THE APPLICATIONS DESCRIBED IN THIS DOCUMENT. IF PRODUCTS AND COMPONENTS FROM OTHER MANUFACTURERS ARE USED, THESE MUST BE RECOMMENDED OR APPROVED BY GEMS. PROPER TRANSPORT, STORAGE, INSTALLATION, ASSEMBLY, COMMISSIONING, OPERATION AND MAINTENANCE ARE REQUIRED TO ENSURE THAT THE PRODUCTS OPERATE SAFELY AND WITHOUT ANY PROBLEMS. THE PERMISSIBLE AMBIENT CONDITIONS MUST BE COMPLIED WITH. THE INFORMATION IN THE RELEVANT DOCUMENTATION MUST BE OBSERVED.

2.3 Incorrect Use

Incorrect or inappropriate use of this sensor can increase the likelihood of application hazards not limited to vessel overfill, damage to property, environmental contamination, and damage to the sensor itself.

3. Product Description

The Gems' ULS-200 Solid-State Point-Level Sensor works with a wide variety of media. It eliminates failure caused by moving parts and works well in high-viscous, high-pressure, humid, and reflective applications. It does not rely on specific gravity or conductivity.

- Compact design
- Accurate and repeatable electronic point level switching
- Durable all 316L stainless steel or brass housing with IP6k9k rating
- Wide media range

Applications

- Construction
- Water & Wastewater
- Emergency Vehicles
- Power Generation
- Renewable Energy
- Buses & Recreational
- HVAC
- Semiconductor
- Agriculture
- Oil & Water TCUs
- Medical & Laboratory
- General Industrial

3.1 Specifications

MEDIA		Aqueous, Oil & Hydrocarbon-Based Liquids, Dielectric > 2.2
MOUNTING		1/4"-18 NPT, 1/2"-14 NPT, G1/4"-19 B, M12x1.5-6g
WETTED MATERIALS	**HOUSING**	Brass, 316L Stainless Steel
	O-RING	Buna-N
	PROBE TIP	PVDF (Aqueous) or PBT (Hydrocarbon)
OPERATING PRESSURE		Up to 300 PSIG (20.7 bar)
OPERATING TEMPERATURE		-40° F to +257° F (-40° C to +125° C)
SUPPLY VOLTAGE		9-32 VDC
CURRENT CONSUMPTION		6mA Max. (No Load)
OUTPUT		Solid-State, Sinking or Sourcing Output, 9-32 VDC, 300mA Max.
ELECTRICAL TERMINATION		3-pin Deutsch DT04-3P
TIME DELAY		No Delay, 3 Sec, 5 Sec, 10 Sec
INGRESS PROTECTION		IPX7 & IP6K9K
APPROVALS		CE, RoHS

Reference Operating Conditions: Ambient Temperature: 20°C (68°F) ±5°C; Media Temperature: 20°C (68°F) ±5°C; Process Pressure: 1 Bar (14.5 PSI); Media Type: Water; Humidity: <60% RH Non-condensing

3.2 Part Number Nomenclature

ULS200	X	X	X	X	X	XX	XX
SERIES	**HOUSING MATERIAL**	**ACTUATION CONDITION**	**THREAD SIZE**	**INTEGRAL CONNECTOR**	**MEDIA BASED SENSING TYPE**	**TIME DELAY (INCREASING LEVEL)**	**TIME DELAY (DECREASING LEVEL)**
	S - 316 S.S.	A - Wet Sink†	1 - 1/4" NPT†	Y - Deutsch DT04-3P†	W - Water†*	00 -No Delay†	00 -No Delay†
	B - Brass†	B - Dry Sink	2 - 1/2" NPT		H - Hydrocarbon	03 - 3 sec.	03 - 3 sec.
		C - Wet Source	3 - M12x1.5			05 - 5 sec.	05 - 5 sec.
		D - Dry Source	4 - G1/4-19			10 - 10 sec.	10 - 10 sec.

†Standard Configuration
**Please consult the factory for application review assistance for media with dielectric constants < 40.*

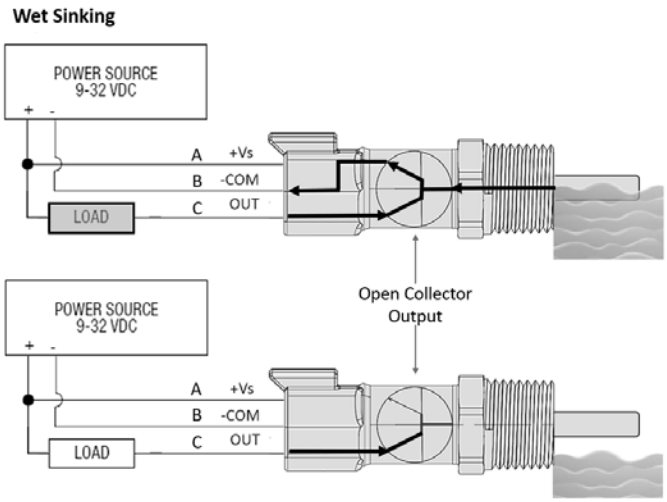
3.3 Sensor Labels

Product Label

Package Label

3.4 Operating Principle

The ULS-200 uses a solid-state switching output. It can be configured from our factory to switch to a positive "true" signal in either wet or dry condition. It can also be configured with a built in delay on rising, falling, or both. Diagram example is shown below (signal "true" when wet).

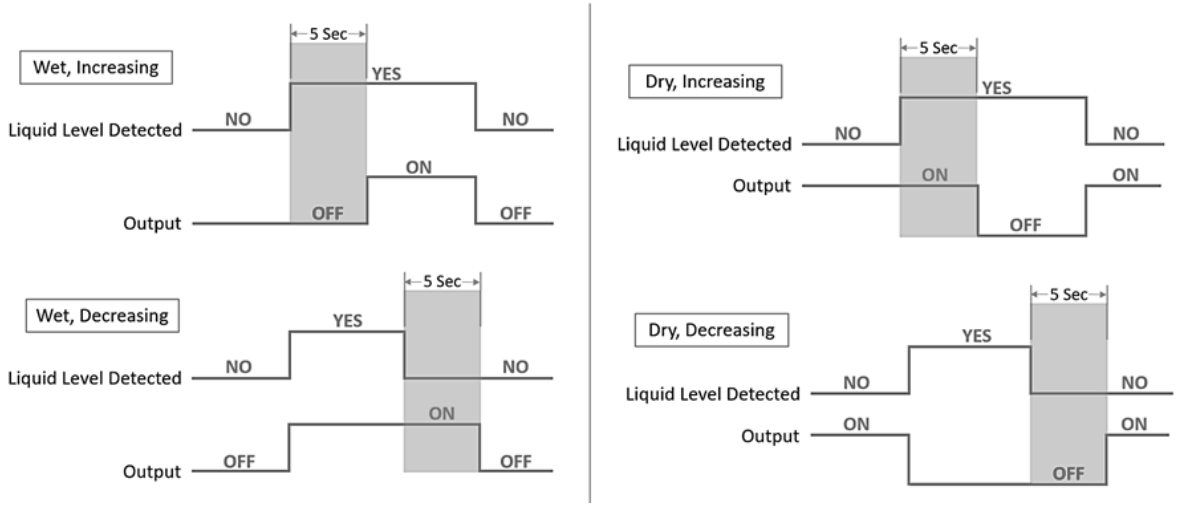


3.5 Sensor Technology

The ULS-200 uses capacitive sensing technology to detect the presence or absence of high (water-based) or low (oil-based) dielectric liquid media.

More on Capacitive sensing can be found here: https://www.gemssensors.com/resource-center/operating-principles-installation-and-maintenance/level/capacitive-level-switch-operating-principle

3.6 Time Delays



4. Installation

4.1 Torque Specifications

1/4" NPT	1 to 2 Turns Right Hand-Tight
1/2" NPT	1 to 2 Turns Right Hand-Tight
M12x1.5	14.5 - 16.5 ft/lb
G1/2-19	25 - 27.5 ft/lb

4.2 Orientation

Sensor may be mounted in any position. Optimal performance is with sensor in horizontal position. The sensing probe should be kept at least 0.50" (12.7 mm) away from any surface.

5. Electrical Connection

5.1 Safely Connect

All electrical connections should be carried out by qualified personnel.

⚠ **WARNING: GEMS PRODUCTS MUST BE MAINTAINED AND INSTALLED IN STRICT ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE APPLICABLE GEMS PRODUCT DATASHEET THAT COVERS INSTALLATION, OPERATION, AND PROPER MAINTENANCE. FAILURE TO OBSERVE THIS INFORMATION MAY RESULT IN SERIOUS INJURY OR DAMAGES. ELECTRICAL CONNECTIONS SHOULD ONLY BE CARRIED OUT BY TRAINED, AUTHORIZED PERSONNEL. IF OVERVOLTAGE SURGES ARE POSSIBLE, PROPER SURGE PROTECTION SHOULD BE INSTALLED.**

5.2 Water Ingress Protection

⚠ **WARNING: ALTHOUGH THE ULS-200 COMES WITH IP6K9K RATING, THAT DOES NOT INCLUDE THE ELECTRICAL MATING CONNECTION. TO INSURE BETTER PROTECTION FROM MOISTURE INGRESS, PLEASE CONSIDER THE FOLLOWING MEASURES:**

- **FIRMLY INSERT THE MATING CABLE UNTIL FULLY SEATED**
- **PATH THE CONNECTION CABLE OR WIRES DOWNWARDS**

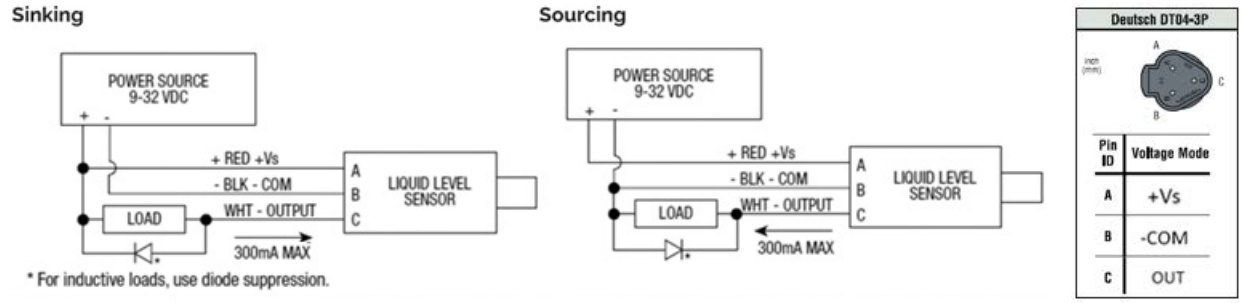
5.3 Voltage Supply

SUPPLY VOLTAGE	9-32 VDC
CURRENT CONSUMPTION	6mA Max. (No Load)

5.4 Wiring

OUTPUT	Solid-State, Sinking or Sourcing Output, 9-32 VDC, 300mA Max.

Wiring Diagram



More information on sinking vs sourcing found here:

- https://article.gemssensors.com/knowledge/sinking-or-sourcing-general-overview
- https://article.gemssensors.com/knowledge/how-to-choose-between-wet-sink-or-dry-sink
- https://article.gemssensors.com/knowledge/how-to-choose-between-wet-source-or-dry-source

6. Maintenance

6.1 Basic Maintenance

Only use cleaning agents that are compatible with the sensor's materials. Use proper care when cleaning, and only use methods that do not exceed the housing protection rating.

- Electrical entries and mounting points in an enclosed tank may require liquid/vapor sealing.
- Our sensors must not be field-repaired.
- Physical damage sustained by product may render it unserviceable.

6.2 Basic Troubleshooting

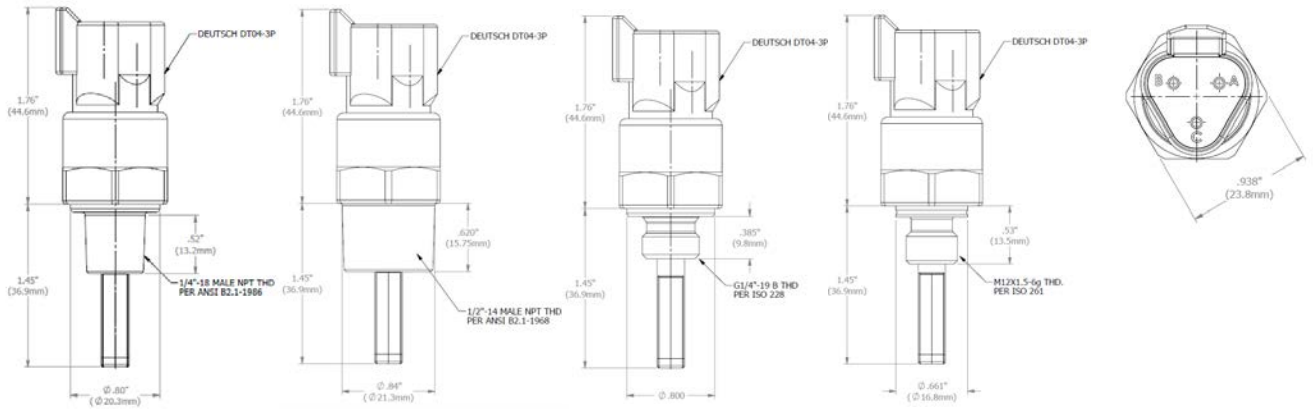
Is the power supply correct?	• Standard sensors require a 9 to 32 VDC input. Use a known good power supply as well as a known good voltmeter and see if the sensor responds to media.
Is the wiring correct?	• Wiring schematics can be found in section 5.4 of this document.
Did you inspect the sensing element?	• Make sure the sensing probe is clean without dried-on debris that could cause a false reading, and the probe should be kept at least 0.50" (12.7 mm) away from any surface.
Have you tested the sensor?	• Remove the sensor completely from your mechanical and electrical system. This will isolate any variable in the circuitry. Test with room temp tap water or engine oil. This way, it is a good known target fluid
Have you reviewed the mounting and switch point location?	• The sensor should not be mounted in a port or tube where media can get trapped. It should not be mounted at the top vertically or at a severe angle. Best mounting practice is horizontal direct into tank wall.
Is the dielectric constant outside of the sensor's range?	• Please confirm the dielectric constant of the media. For dielectric constants < 40, please consult the factory for application review assistance.

Also see our guide on electrical noise here: https://article.gemssensors.com/knowledge/electrical-noise-various-causes-and-how-to-avoid-effects

6.3 Returns

Standard terms & conditions of sale apply. Refer to the document located online at https://www.gemssensors.com/docs/default-source/resource-files/terms-conditions/gems-customer-terms. All RA activity must go through the Gems quality services team. To initiate an RA please go to https://ecatalog.gemssensors.com/support/ra

7. Mechanical Construction



8. Certificates & Approvals

8.1 Certificates, Approvals & Ratings

IPX7 & IP6K9K per ISO 20653

Application of EU Directive(s):

- 2014/30/EU Electromagnetic Compatibility
- 2011/65/EU Restriction of Hazardous Substances in Electrical and Electronic Equipment and subsequent amendment 2015/863/EU

Harmonized Standard(s) to which Conformity is declared:

- EN IEC 61326-1:2021
- EN IEC 61326-2-3:2021
- EN IEC 63000:2018

9. Contact Information

Toll Free: 1-855-877-9666
Outside the US: 860-747-3000
Contact Email: is@gemssensors.com

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