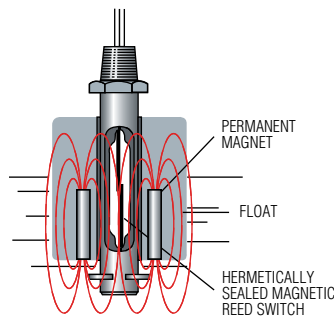


# Float Type Level Switches

## 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  $\pm 1/8$  inch. Multi-station versions use a separate reed switch for each level point being monitored.

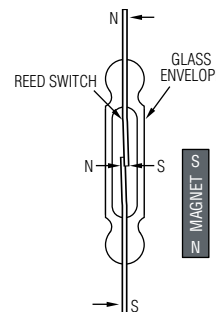


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Side-mounted units use different actuation methods because of their horizontal attitude. The basic principle, however, is the same: as a direct result of rising or falling liquid, a magnetic field is moved into the proximity of a reed switch, causing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



### Side Mounting



### Specialty



Additional technical information can be found in Appendix X.

## 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.

LEVEL SWITCHES – SINGLE POINT

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:

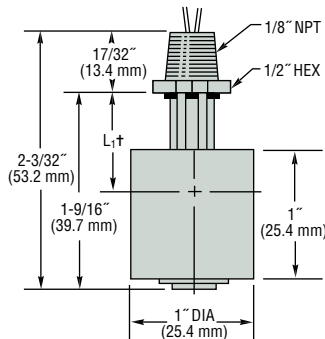
All LS-3 Series level switches featured on this page and the next are in compliance with EU-directive 2011/65/EC.

### 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<sub>1</sub> = Actuation Level (see chart on next page)

|                        | Alternate Mountings                                   |  |  |
|------------------------|---|--|--|
|                        | 3/8"-16<br>Straight Thread                            | G1/8"<br>1/8"-28 BSP                                   | M12x 1.75<br>Straight Thread                         |
| Electrical Termination | Lead Wires  | Cable  | Cable  |
|                        | <p>390° REF. (9.9mm)<br/>1/2" HEX<br/>14" (2.6mm)</p> | <p>315° REF. (8.0mm)<br/>9/16" HEX<br/>14" (3.6mm)</p> | <p>475° REF. (12mm)<br/>5/8" HEX<br/>20" (5.1mm)</p> |

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

| Stem and Mounting Material   | Float Material                                   | Float Dia. | Actuation Level <sup>1</sup> | 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                              | <b>42295</b> ⚡  |
| Polypropylene <sup>2</sup>   | 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                              | <b>142505</b> ⚡ |
|  |  |            |                              |                         |                                |  | 3/8"-16       | Lead Wires                              | <b>171517</b> ⚡ |
|  |  |            |                              |                         |                                |  | G 1/8"-28     | Cable                                   | <b>171518</b>   |
| Polypropylene <sup>3</sup> NSF Std. 169 (Kynar float retaining clip) | Polypropylene <sup>3</sup> (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)                | M12x1.75      | Cable                                   | <b>189739</b>   |
|  |  |            |                              |                         |                                |  | 1/8" NPT      | Lead Wires                              | <b>209475</b>   |
|  |  |            |                              |                         |                                |  | 3/8"-16       | Lead Wires                              | <b>209455</b>   |
| Polypropylene <sup>2</sup>   | 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                              | <b>116826</b> ⚡ |
|  |  |            |                              |                         |                                |  | 3/8"-16       | Lead Wires                              | <b>171514</b> ⚡ |
|  |  |            |                              |                         |                                |  | M12x1.75      | Cable                                   | <b>189787</b>   |
| 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                              | <b>162745</b> ⚡ |
|  |  |            |                              |                         |                                | -40°F to +176°F (water) (-40°C to +80°C [water]) | M12x1.75      | Cable                                   | <b>189786</b>   |
| 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 <sup>®</sup> Jacketed Lead Wires | <b>173250</b> ⚡ |

**Notes:**

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

⚡ – Stock Items.

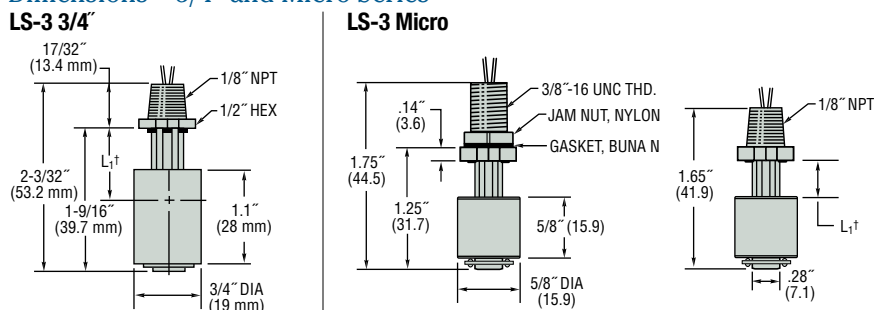
## Miniature and Micro Floats for Tiny Tanks

### 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.



#### Dimensions – 3/4" and Micro Series



† L<sub>1</sub> = Actuation Level (see chart below)

| Series                        | Stem and Mounting Material | Float Material         | Actuation Level <sup>1</sup> | Min. Liquid Sp. Gravity | Pressure Max. @ 70°F (21°C) | Operating Temperature                         | Electrical Termination          | Mounting Type    | Switch Logic           | Part Number   |
|-------------------------------|----------------------------|------------------------|------------------------------|-------------------------|-----------------------------|---|---------------------------------|------------------|------------------------|---------------|
| <b>LS-3 3/4"</b> <sup>2</sup> | Polypropylene <sup>2</sup> | 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.              | <b>201540</b> |
|                               | Nylon                      | Buna                   | 11/16" (17.5 mm)             | .85                     | 150 psi (10.3 bar)          | -40°F to +250°F (oil) (-40°C to +121°C [oil]) | Lead Wire                       |                  | Reverse Float Position | <b>177818</b> |
| <b>LS-3 Micro</b>             | 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.                   | <b>247135</b> |
|                               |                            |                        |                              |                         |                             |   |                                 | 3/8"-16 Straight | N.C.                   | <b>247137</b> |
|                               |                            |                        |                              |                         |                             |   |                                 |                  | N.O.                   | <b>246985</b> |
|                               |                            |                        |                              |                         |                             |   |                                 |                  | N.C.                   | <b>246986</b> |

**Notes:**

- Based on a liquid specific gravity of 1.0.
- Utilizes a Kynar<sup>®</sup> 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](mailto:Sales@cabriggs.com) - [www.cabriggs.com](http://www.cabriggs.com)

## Unique Features Make These LS-3 Models Special

These small switches feature unique configurations for special applications.

LEVEL SWITCHES – SINGLE POINT

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

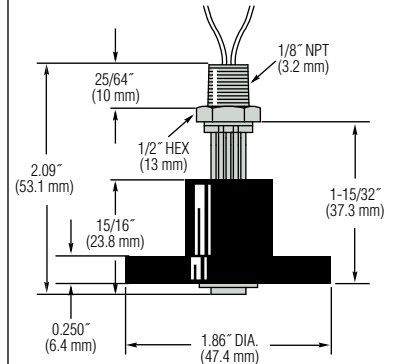
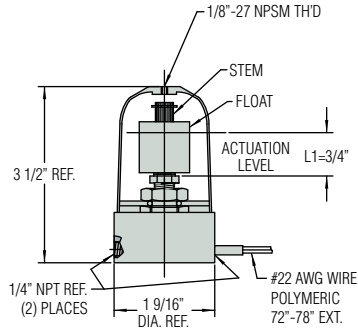
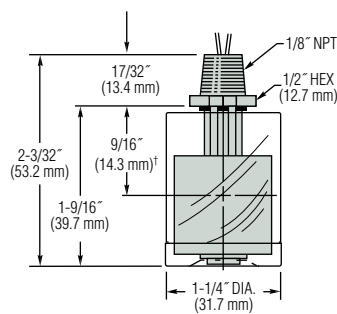


For external mounting on tanks too small to accommodate internally mounted switches. (See note below)

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 ⚡                            |
|--|--|--|------------------------------------|
| <b>Materials</b>                       |  |  |                                    |
| <b>Stem and Mounting</b>               | All Polypropylene (Including Shield <sup>4</sup> ) | Polysulfone                              | All Polysulfone (Including Collar) |
| <b>Float</b>                           | Polypropylene (Solid)                              | Polysulfone                              | Buna N                             |
| <b>Other Wetted</b>                    | —  | Brass, Aluminum, Polycarbonate, Viton A  | Epoxy                              |
| <b>Min. Liquid Sp. Gr.</b>             | .90  | .75                                      | —                                  |
| <b>Operating Temperature</b>           | -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) |
| <b>Pressure, PSI, Max.<sup>3</sup></b> | 150  | 50                                       |                                    |
| <b>Switch<sup>1</sup>, SPST</b>        | 20 VA, N.C./N.O. Dry <sup>2</sup>                  | 20 VA, N.C. Dry                          |                                    |
| <b>Electrical Termination</b>          | 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:

- 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.
- Maximum pressure at 70°F (21°C).
- Consult factory for other available materials.

† L<sub>1</sub> = 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.

## 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.

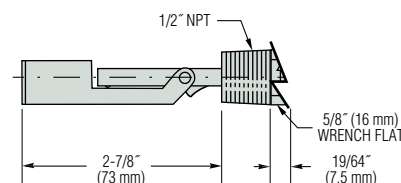
### Specifications

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

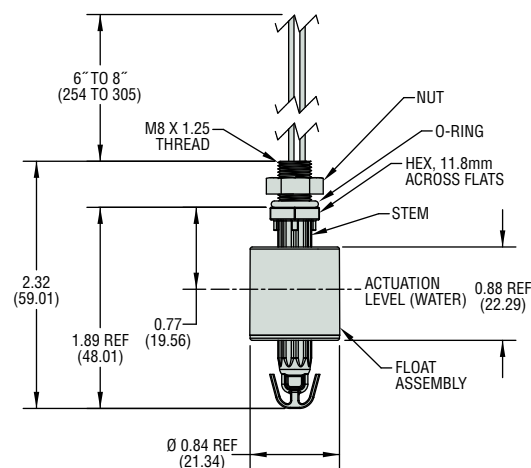
### Specifications

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

Order by Part Number: 602881



### Dimensions



# 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.

LEVEL SWITCHES – SINGLE POINT

| Type 3<br>Internal Mounting  | Type 5<br>External Mounting   | Type 7<br>External Mounting  |
|--|---|--|
| <p>Polypropylene, Nylon or Versaplast™.</p>  | <p>Polypropylene, Nylon or Versaplast™.</p>   | <p>Polypropylene or Nylon; conduit connection.</p>   |
| <p>ZIP CORD LEADWIRES, 24" EXTENDED<br/>3.84" (97.5 mm)<br/>GASKET (WHITE BUNA N INCLUDED)<br/>5/8"-11 THREAD<br/>LOCKING NUT (NYLON)<br/>2-3/4" (69.8 mm)</p> | <p>ZIP CORD STYLE 24" LEADWIRES<br/>4-1/4" (108 mm)<br/>5/8" (16 mm)<br/>2-7/8" (73 mm)<br/>5/8" HEX<br/>1/2" NPT</p> | <p>LEAD WIRES, 24" EXTENDED<br/>1/2" NPT<br/>4-1/2" (114 mm)<br/>5/8" (16 mm) WRENCH FLAT<br/>19/64" (7.5 mm)<br/>2-7/8" (73 mm)</p> |

### 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              |                           |                          |

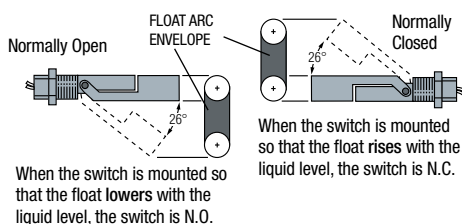
### Media Compatibility

| 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™           |

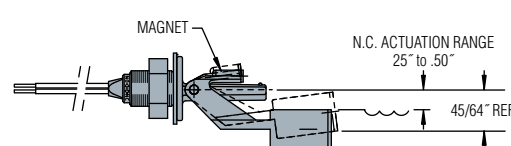
### Switch Operation

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).

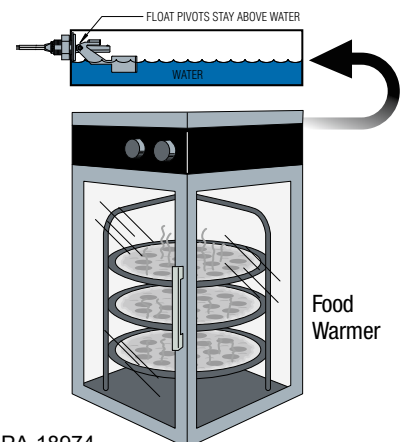
Types 3, 5, 7, 10 and 13






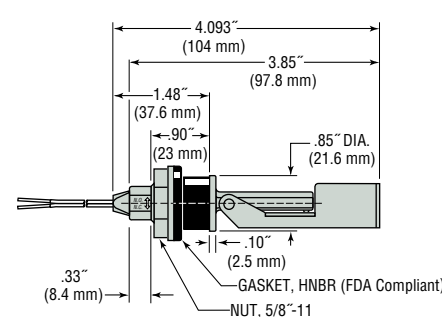
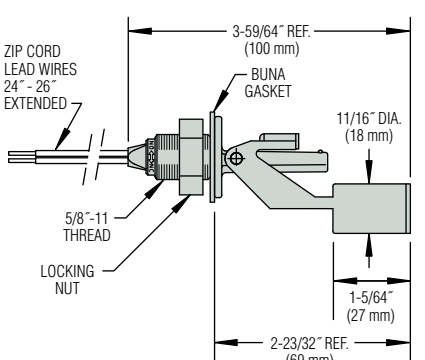
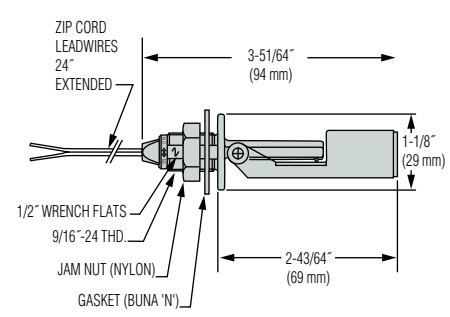
Type 12 – N.C. "Drop Float" Design



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.



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

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 |                                     |                                     |                                 |                    |             |
| 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     |         |                  | 164520 ⚡                            |                                     |                                 |                    |             |
|               | Versaplast™       |         |                  | 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             |         |                  | 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             |         |                  | 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             |         |                  | 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.

See alloy versions on next page.

⚡ – Stock Items.