



SureSite®

Magnetic Liquid Level Indicator

Instruction Bulletin No. 177664-1 (Rev. E)

Section 1: Weldments

Thank you for purchasing the GEMS SureSite Magnetic Level Indicator. *Please read this document prior to installing your SureSite* and store it where it may be readily referred to for familiarization and maintenance purposes. If you require any additional information, you are welcome to call GEMS at the number shown below.

1-800-321-6070

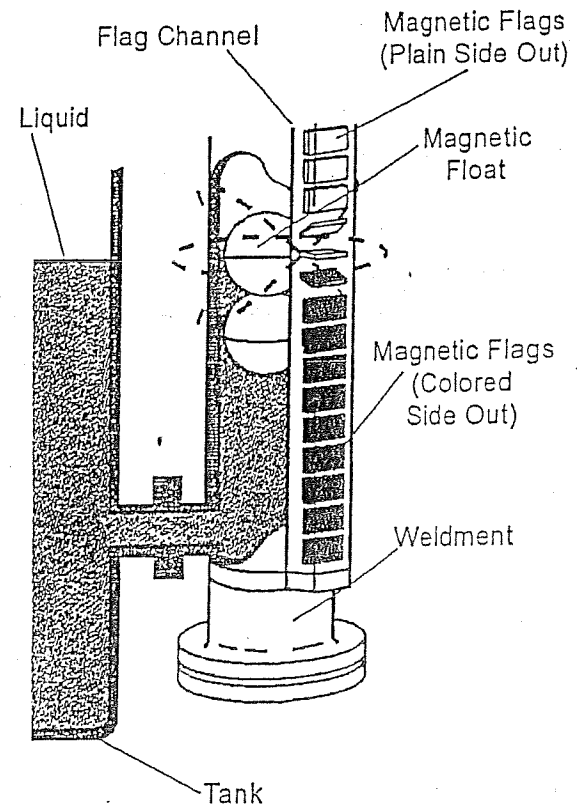
(Outside of the Continental U.S., call 860-747-3000)

Record the Part Number of your SureSite here to use when ordering spare or replacement parts:
Part Number: _____

SureSite Operating Principle

The liquid level of a tank is made visible, *even at great distances*, through the use of a shock and vibration-proof magnetic level indicator that employs "flags" arranged within a specially constructed external housing: *the flag assembly*. The two sides of each pivoting flag are marked with contrasting colors. A permanent magnet is encapsulated inside each flag and forms a secure magnetic interlock with the adjacent flags. As the liquid level rises, a float equipped with a permanent magnet causes each of the flags to begin rotating in turn. This action exposes the contrasting (fluid level indicating) color on the other side of the flag. As the float and liquid level rise, each flag below the level of the float completes a 180 degree rotation, while remaining magnetically interlocked with the other lower flags. Together, the rotated flags display a band or column of color, the height of which corresponds with the liquid level within the tank. An exclusive feature of the SureSite is the patented magnetic guide¹ that is integrated into the flag assembly. This magnetic attraction ensures that the float is always aligned for optimum performance and exactness, regardless of any shock, vibration, or rapid change to the level of fluid in the tank.

Standard and Mini-SureSites are supplied with the floats packed either separately, or securely strapped to the unit. Top-mounted SureSites are typically supplied with the floats installed and secured by a support tube. The float supplied with each unit has been designed to the specific gravity of the fluid being monitored, so that the permanent bar magnet will always seek and indicate the fluid surface. Because of the attraction of the permanent bar magnet in the float and the patented magnetic guide, the SureSite flag assembly can be rotated to a position which will allow for optimum viewing.



(See the Maintenance Section on page 5 for instructions on how to rotate your SureSite flag assembly.)

¹ Patent No. 4,457,171. The patented magnetic guide is singularly magnetized on each side and attracts the proper pole of the permanent bar magnet in the float.

Important!

Read the following instructions completely - BEFORE installing the SureSite.

Installation Precautions and Preparation

Failure to observe these precautions could affect the operation of your unit.

1. When locating the tank ports for the SureSite, make sure that no strong magnetic fields or magnetic materials (such as railings, protective cages, I-beams, etc.) will be any closer than 6 inches (153 mm) from the SureSite.
2. Make necessary efforts to ensure that all tank-side modifications and equipment; i.e., the mating flanges, NPT ports or shut-off valves (if used) will align properly with the SureSite connections. Improper alignment could cause distortion and may damage welds and compromise the integrity of the SureSite and/or the tank.
3. After any necessary tank modifications are completed, the tank should be cleaned to remove contaminants. This will ensure that the installation is free of foreign particles; especially those which could be magnetic and which could impair the performance of the SureSite.
4. Do not begin the installation of the SureSite until all necessary tools and materials are obtained. (Such as mating flange gaskets, bolting hardware, etc.)
5. Gasket material typically supplied with the standard SureSite unit is either Viton or nitrile rubber, Garlock 3000 style. Higher pressure units are typically supplied with Flexitallic™ gaskets. For replacement gaskets, please consult GEMS Sensors for your specific material type.
6. All supplied flag assembly clamps are intended to be installed with a torque on the clamp screw not to exceed 5 lb.-inches.

Installation

Caution

Handle the SureSite with care to avoid damaging the threaded areas, flange surfaces, etc.

Note

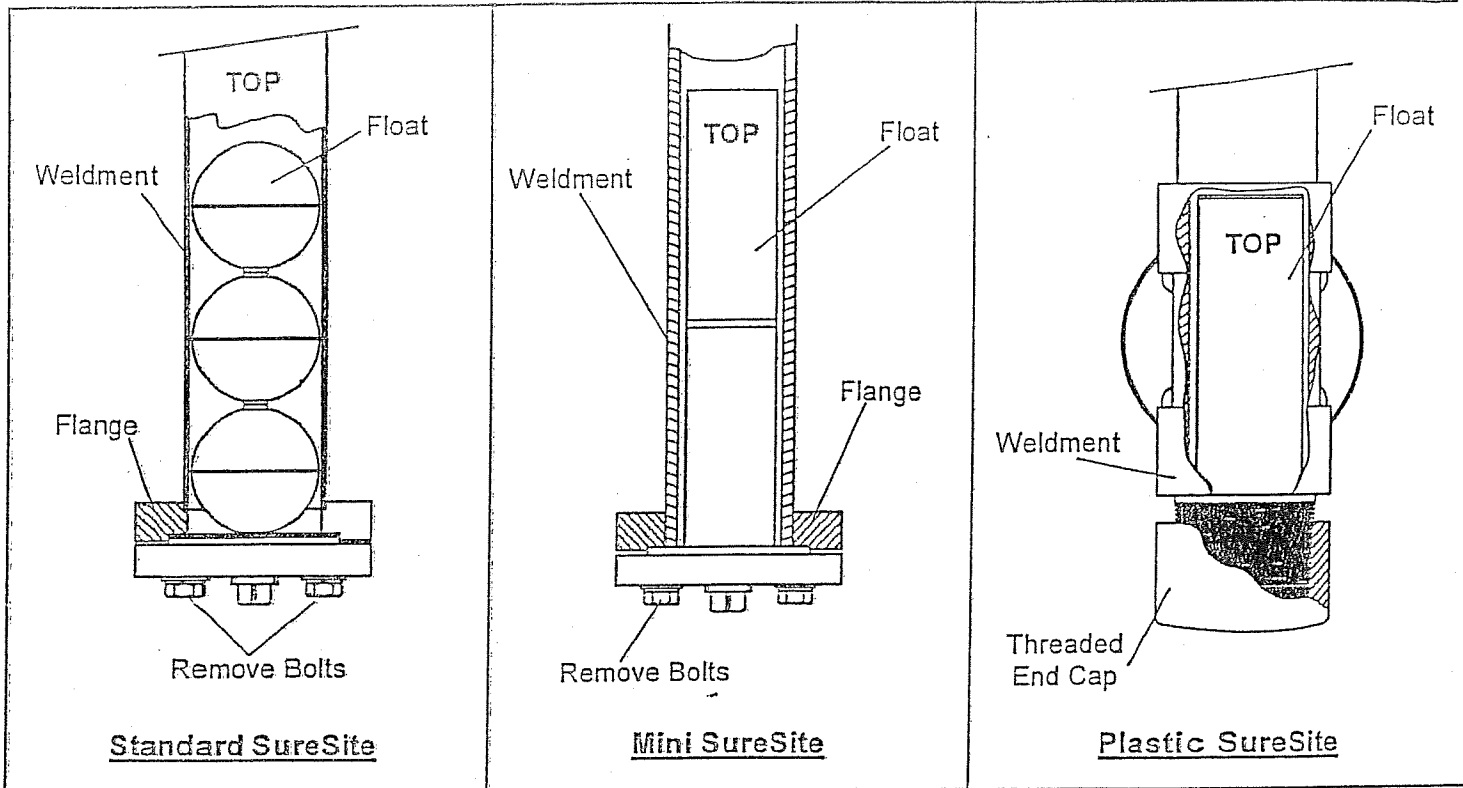
If you have a top-mounted alloy or top-mounted plastic SureSite, skip to Page 4 for instructions.

For Standard SureSites (Alloy, Mini and Plastic)

1. Remove the protective packing materials from your SureSite.
2. Position the unit horizontally on a level surface.
3. Unpack the float assembly or, with the aid of a wire-cutter or similar device, remove the strapping that secures the float to the exterior of the SureSite Unit.

Warning

DO NOT: 1) Hold the SureSite in a vertical position or 2) Drop the float assembly into the unit. Avoid this or any action which could damage or dent the float. Such damage could cause the float to crush under normal working pressures.



4. Remove the end cap or flange attaching bolts, as indicated in the appropriate drawing. Then remove the end cap or flange.
5. With the unit still in a horizontal position, insert the float assembly into the weldment, with the "TOP" indication on the float assembly moving in the same direction as the "UP" arrows that are located on each side of the externally mounted flag assembly.
6. With the gasket or O-ring properly positioned, reassemble the end cap or flange to the weldment. Tighten the end cap or flange bolts securely, using the proper recommended torque value as supplied in *Figure A, page 5*.
7. Slowly raise the top end of the SureSite, while the bottom end remains on the level surface, permitting the float to slowly slide to the bottom, avoiding any sudden impact damage to the float assembly.
8. Move the SureSite to the tank and position the unit with the end marked "TOP" pointing upwards. Install any necessary mounting gaskets or seals², and align the mating port flanges, NPT's or connections of the tank with those of the SureSite. DO NOT ATTEMPT TO FORCE ALIGNMENT. To do so may damage the welds or compromise the integrity of the SureSite. While following standard practices and procedures, tighten the flange bolts, NPT's or connections. Recommended torque values are supplied in *Figure A, page 5*.
9. **Before Filling the Tank** Be sure that the installation is free of foreign particles, especially any that are magnetic. Check that all connections are secure. A hydrostatic pressure test of the complete assembly is recommended.

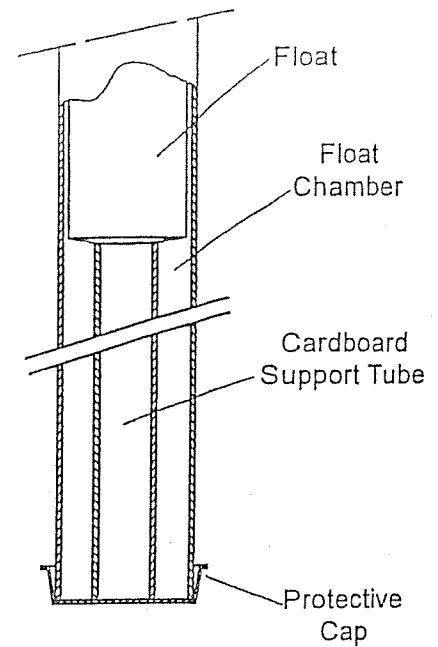
NOTE

GEMS recommends that you include at least one support bracket in your installation for SureSite units greater than 10 feet (120 inches, 3048 mm) in length. Depending on the specific installation, a load-bearing support at the base of the SureSite may be beneficial.

² Gaskets or seals for the port flanges are not supplied with the SureSite.

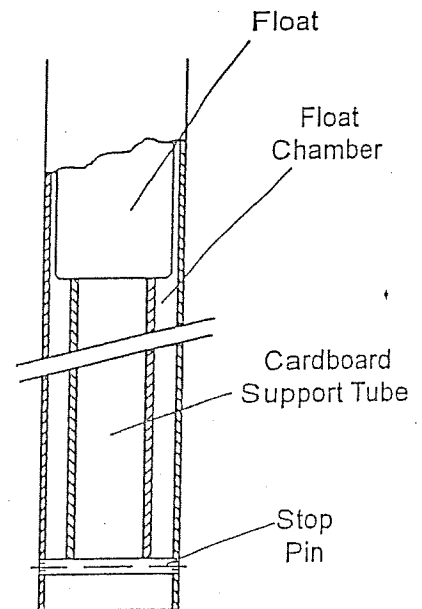
Installation for Top-Mounted Alloy SureSites

1. After removing any protective packing materials from your top-mounted SureSite and positioning it horizontally on a level surface, remove and discard the protective cap from the bottom of the SureSite and carefully withdraw the cardboard support tube.
2. Slowly raise the top end of the SureSite, while the bottom end remains on the level surface; permitting the float to slowly slide to the bottom and avoiding any sudden impact damage to the float assembly.
3. Position the necessary gasket or O-ring seal³ on the tank mounting flange and align the unit so that the bolt holes of the mating flange match. The indicating face of the flag assembly should be directed towards your desired point of observation. Do not attempt to force alignment. To do so may damage the welds or compromise the integrity of the SureSite.
4. While following standard practices and procedures, tighten the flange bolts with the recommended torque values as supplied in *Figure A, page 5*.



Installation for Top-Mounted Plastic SureSites

1. Remove the threaded stop pin from the bottom of the top-mounted SureSite and slowly withdraw the support tube. Reinstall the stop pin.
2. Slowly raise the top end of the SureSite, while the bottom end remains on the level surface; permitting the float to slowly slide to the bottom and avoiding any sudden impact damage to the float assembly.
3. Position the necessary gasket or O-ring seal³ on the tank mounting flange and align the unit so that the bolt holes of the mating flange match. The indicating face of the flag assembly should be directed towards your desired point of observation. Do not attempt to force alignment. To do so may damage the welds or compromise the integrity of the SureSite.
4. While following standard practices and procedures, tighten the flange bolts with the recommended torque values as supplied in *Figure A, page 5*.



³ Gaskets or seals for the port flanges are not supplied with the SureSite.

Figure A
(Recommended Torque Values are for Lubricated Threads, Only)

Indicator Type	Fastener Description	Nominal Size	Torque Value
Standard Alloy, Top-Mount Alloy	Bolt, Nut	3/8 Inch	70 - 80 Lb.-Inches NTE (Not to Exceed) 120 Lb.-Inches
		1/2 Inch	30 Lb-Feet
		5/8 Inch	60 Lb-Feet
		3/4 Inch	100 Lb-Feet
		7/8 Inch	150 Lb-Feet
		1 Inch	250 Lb-Feet
		1-1/8 Inch	350 Lb-Feet
Standard Plastic, Top-Mount Plastic	Bolt, Nut		15-20 Lb-Feet (Valid for bolts with flat washers under both bolt- heads and nuts)
Mini	Bolt, Nut	5/16 Inch	70 - 80 Lb-Inches

Flag Installation

General Notes

Under normal circumstances, it should not be necessary to reposition the flag assembly on your SureSite. However, if you find it desirable or necessary to reposition the flag assembly, we strongly recommend that you first mark the distance from the top of the weldment to the top of the flag assembly. Before securing the flag assembly in a new radial position, ensure that the distance from the top of the flag assembly to the top of the weldment is the same as the previously noted dimension. Making a temporary or permanent mark on the weldment can ease the process.

Maintenance

The only maintenance typically required is to ensure that the internal walls of the weldment and the float are free of foreign matter. This may be accomplished by removing the float assembly from the unit and wiping both the float and the inside wall of the float chamber or weldment. Any maintenance interval is to be established by the user of the SureSite and would depend upon the characteristics of the application. Maintenance could coincide with tank cleaning or flushing.

Float Installation

Mini SureSite Float: (To set magnet position, please go to page 8.)

To accomplish the removal and subsequent reinstallation of the float assembly, follow the appropriate instructions provided on *page 6* for the SureSite type and mounting configuration you have selected.

Caution

Make sure that the tank is depressurized and that liquid has been emptied prior to removal of the float assembly.

SureSite with Side Connections (Alloy, Mini and Plastic)

The float assembly can be removed without disturbing the mounting of the SureSite unit to the tank.

1. Carefully remove the end cap (access to the float assembly) which may be retained by bolts, NPT threads or held in place by setscrews. The float assembly should be resting on the end cap as it is being lowered. Support the float assembly while setting the end cap aside.

Note: For units supplied with top float access, the float assembly must be extracted from the top of the weldment by engaging the hooking ring provided on the top of the float.

2. Withdraw the float assembly from the unit, exercising caution not to damage the float. Note the "TOP" indication marking on the float assembly.
3. Wipe down the weldment and the float assembly with a clean, lint-free cloth.
4. Carefully reinsert the float assembly into the weldment, ensuring that the "TOP" indication marking on the float assembly is positioned in the same manner as when it was removed.
5. Remove the old gasket or O-ring from the end cap assembly and replace it with a new gasket or O-ring.
6. With the new gasket or O-ring properly positioned, reassemble the end cap assembly to the weldment. Tighten the end cap or secure flange fasteners, using the proper recommended torque value, as supplied in **Figure A -page 5**.

SureSite with Top and Bottom Connections (Alloy, Mini and Plastic)

The SureSite unit should be adequately supported when removing it from the tank.

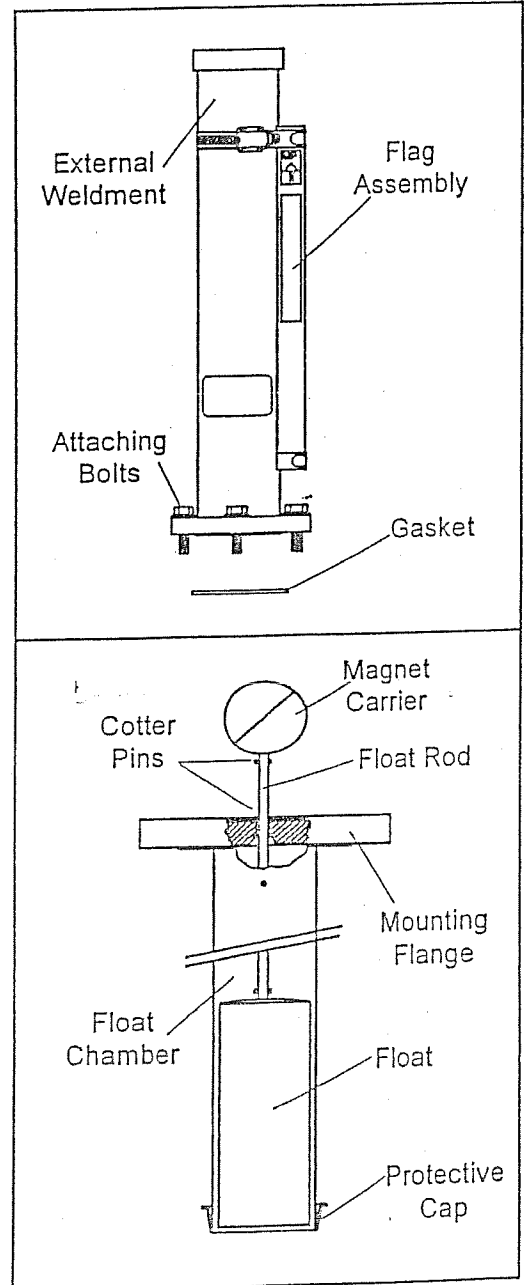
1. Disconnect the top and bottom flange/socket or NPT connections.
2. Remove any other fasteners that retain the unit and/or support bracket(s) to the tank.
3. Remove the SureSite unit from the tank, while avoiding any motion that will cause damage to the float assembly.
4. With the SureSite placed in a horizontal position on a level surface, remove the end cap or flange and withdraw the float assembly from the unit; noting the relative position of the portion of the float assembly marked "TOP".
5. Wipe down the weldment and the float assembly with a clean, lint-free cloth.
6. Carefully reinsert the float assembly into the bottom of the float chamber or weldment, ensuring that the "TOP" indication marking on the float assembly is positioned the same as when it was removed.
7. Remove the old gasket or O-ring from the end cap assembly and replace it with a new gasket or O-ring.
8. With the new gasket or O-ring properly positioned, reassemble the end cap assembly to the bottom of the weldment. Tighten the end cap or flange bolts securely, using the proper recommended torque value, as supplied in **Figure A, page 5**.
9. Complete installation of the unit by following the Installation Instructions for Standard SureSites (**Page 3, Steps 7, 8 and 9**).

SureSites Mounted on Top of Tank

The construction of top-mounted SureSites varies with the material selected, and each requires a slightly different procedure than those preceding for "wipe-down". It is advisable to mark or index mating flanges and other parts so that the relative positions of the components are maintained upon reassembly.

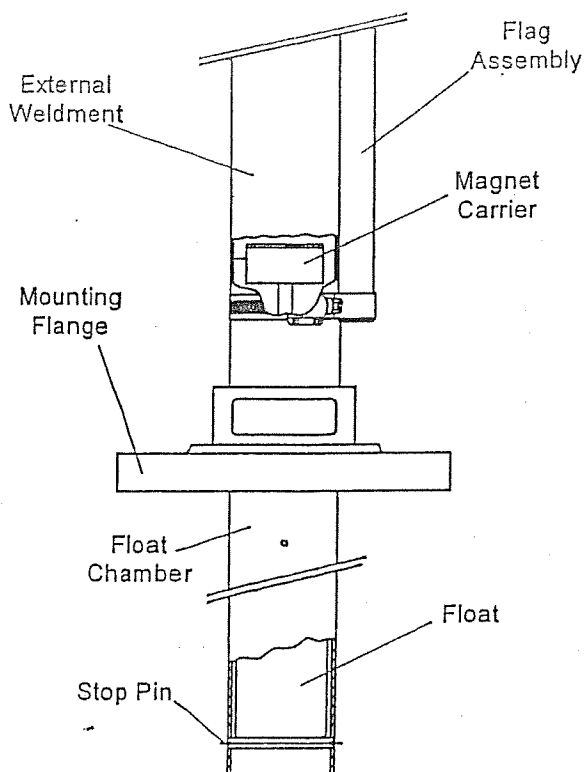
Alloy

1. Remove the attaching bolts that secure the SureSite unit to the top of the tank. **Lift the SureSite vertically from the tank and set it aside on a level work area, in horizontal position. Exercise caution so that the float assembly will not be dented or damaged.** Remove any gasket material from the tank and SureSite mounting flanges.
2. Remove the attaching bolts securing the external weldment (with the attached flag assembly) to the mounting flange that was secured to your tank, and carefully remove the weldment and gasket from the float chamber, taking care not to damage the sphere-shaped magnet carrier.
3. While lightly supporting the magnet carrier, remove the upper (first) cotter pin attaching it to the float rod. Set the magnet carrier and cotter pin aside.
4. Remove the lower (second) cotter pin from the float rod and set it aside.
5. Withdraw the float and float rod from the bottom of the float chamber.
6. Wipe the inside of the float chamber and the exposed float assembly with a clean, lint-free cloth.
7. After completing the "wipe-down" cleaning, the unit can be reassembled.
8. Obtain new gaskets for: a) Installation between the weldment and float chamber¹, and b) Installation between the mounting flange² of your tank and that of the unit. Obtain new cotter pins for the float rod.
9. Insert the float assembly and rod into the float chamber, passing the float rod up through the opening in the mounting flange. Secure the rod to the float chamber by installing a cotter pin in the lower (second) hole and securing it. Reinstall the magnet carrier to the float rod. Insert and secure a cotter pin in the upper (first) hole to retain it.
10. Complete the remainder of the reassembly and installation by reversing the process described in Steps 1 and 2. Refer to *Figure A, page 5* for recommended torque values for bolts. Use a new gasket: a) Between the weldment and mounting flange of the float chamber, and b) Between the mounting flange of your tank and that of the SureSite unit.



¹ Contact Gems Sensors for spare or replacement parts

² Customer-Supplied



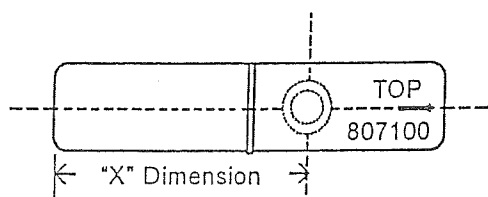
Hold the float vertical. A paper clip will attach to the magnet to show its position. Adjust the magnet position by gently tapping the end of the float.

Plastic

1. Remove the attaching bolts that secure the SureSite unit to the top of the tank and lift the indicator unit (with its float chamber) vertically from the tank. Set it aside on a level work area, horizontally. Handle the float assembly with care to prevent damage. Remove any gasket material from the tank and SureSite mounting flanges.
2. Unscrew and remove the stop pin from the bottom of the float chamber.
3. Carefully withdraw the float, float rod, and attached magnet assembly from the bottom of the float chamber.
4. Wipe the inside of the float chamber and the exposed float assembly with a clean, lint-free cloth.
5. After completing the "wipe-down" cleaning, the unit can be reassembled. Obtain a new gasket for installation between the mounting flange of your tank and that of the SureSite unit. Prepare the mating surfaces for reassembly.
6. Insert the float assembly and rod into the float chamber, passing the magnet assembly and float rod up through the bottom of the float chamber. Secure the float assembly and rod to the float chamber by reinstalling the stop pin.

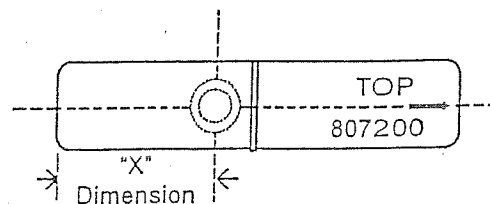
Basic Float Part No. 807100
(Liquid Specific Gravity Range: 0.8 to 1.2)

Float Part Number	Liquid Specific Gravity	"X" Dimension	Float Part No. W/Lift Ring
85206	0.8	5"	810919
83453	0.9	4.5"	810917
85208	1	4"	810916
85209	1.2	3.312"	810915
84158	0.85	4.75"	810918



Basic Float Part No. 807200
(Liquid Specific Gravity Range: 1.5 to 3.8)

Float Part Number	Liquid Specific Gravity	"X" Dimension	Float Part No. W/Lift Ring
88111	1.9	2"	810928
801708	1.5	2.6875"	810927



Troubleshooting

Condition	Possible Cause	Solution
No change in Media Level Indication	No Float	Install float
	Float sticking, due to contamination in the fluid level	Clean the float and weldment
	Float attracted, due to external ferrous materials within close proximity.	Remove the ferrous materials from close proximity
	The float is damaged	Replace the float
	Port is blocked	Remove blockage
Incorrect Fluid Level Indication	Float attracted, due to contamination in the media	Clean the float and weldment
	Float sticking, due to external ferrous materials within close proximity	Remove the ferrous materials from close proximity
	The float is damaged	Replace the float
	The float is upside down	Invert the float
Incorrect Color Indicating Fluid Level	Flag assembly is upside-down. (The wrong color is indicating the liquid level)	Rotate the flag assembly 180 degrees (with the end marked "TOP" uppermost)

Note: Increased viscosity increases the response time of the SureSite indicator

Warnings/Cautions

1. The SureSite Magnetic Level Indicator must be maintained and installed in strict accordance with this Instruction Bulletin. Failure to observe this warning could result in serious injuries or damages.
2. The liquids to be monitored must be compatible with the materials of construction. Specifications of these materials will be provided upon request.



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