



LEVEL SENSORS & SWITCHES

SELECTION GUIDE



Our wide range of technologies and materials allow us to offer solutions for the most demanding applications

Level Sensors are used in a wide variety of industries and applications. usually, the aim is to avoid overflow that would cause potentially hazardous situations, so accuracy and reliability are of paramount importance. Our level sensors are **designed, tested and manufactured to the highest standards** and trusted by our customers to measure and mitigate risk in applications as diverse as blood dialysis treatment, storage and transport of volatile fuel and food-safe vending machines.



A **float switch** is a type of level sensor, a device most commonly used to detect the level of liquid within a tank or other receptacle. A float switch is one of the most simple, reliable and well proven technologies for liquid level sensing and is available in many different types and configurations, each suited to different applications. For example, a float switch may be used as an alarm, as an indicator, to control a pump or to provide a signal to another device. Like other switch types, float switches can be electrically either Normally Open (NO) or Normally Closed (NC). They can also be configured to have either single or multiple switching points. For applications requiring a repeatable signal indicating that fluid has reached a predetermined level, the float switch is often an excellent solution. Take for example a tank containing a fluid that must be maintained between a minimum and maximum level. When the fluid level reaches the minimum level, a float switch can be used to signal a pump to operate and replenish the tank. When the fluid reaches the maximum level, a float switch can be used to signal the pump to stop working. In this way, the fluid in the tank remains within the required level range.

This is a very simple example and it should be noted that float switches can be specified to provide significantly more complex level control options. However, if the sensor is required to do more than simply initiate an action at a specific level (or levels), then a float switch (or any point level technology) may no longer be the best solution and then an hydrostatic sensor level is preferred since can supply the value of the level at any position through an analog output signal.

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APPLICATIONS



Applications for level switches and sensors are basically divided in 2 types: as a single or dual point level (maximum or minimum or both) and as a continuous level control to monitor and control the system based on the actual level value at any time. In the first case in which switches have to be used, there are relatively; those are relatively cost effective solutions that prevent dangerous situations like pump , like a pump running dry, loss of dangerous or valuable fluids, overspill, loss of service and downtime. In a case where continuous levels need to be controlled, level sensors like the hydrostatic can be used. Both situations can be found in the most typical applications for these products, which are endless. Below is a list of the most common markets and application examples.

- Medical (Dialysis, bedpan washer)
- Ink jet printers (Ink/solvent reservoir, colour reservoir)
- Vending (hot water level, cold water level)
- Transportation (Auto coach toilets)
- Professional kitchen equipment (refrigerators, nebulisers)
- Industrial dishwasher (water level)
- Food and beverage
- Water storage tanks

CONSIDERATIONS FOR PRODUCT SELECTION

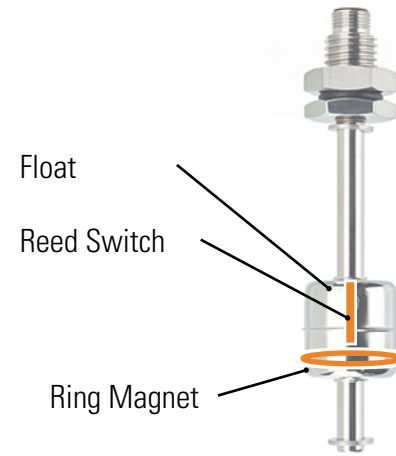
When considering what type of float switch to employ, it is vital to understand the application in which the switch is to be introduced. Important factors are:

- The fluid level state (or states) that require a signal from the float switch
- Electrical load to be switched: voltage, current, power, resistive, capacitive or inductive
- The fluid type (to ensure chemical compatibility). Sensata | Cynergy3 float switches and associated gaskets and seals are available in many materials to give a broad range of suitability
- Working temperature and pressure
- Mounting type: horizontal or vertical, external or internal. Space available within the tank
- Cable and connection: flying lead or connector, cable length and type
- Approvals required: WRAS, ATEX, UL, NSF, etc
- Likelihood of deposit build up
- Level sensor and float switch solutions for all types of liquid including foaming liquids and those containing particles or solids
- Customizable solutions designed to meet the size, shape, material and industry regulations your application requires
- Manufactured and 100% tested to meet the highest quality standards
- Made to last with some bespoke products still in service after over 20 years
- Wireless Level and Flow Switches available

FLOAT SWITCHES

VERTICAL

Vertical float switches have a magnet mounted within the float and a reed switch mounted within the body of the unit. The float fits around the stem and it rises and falls with the level of the liquid. When the float nears the reed switch, the magnetic force causes the switch to open or close. These switches can be mounted on the top or at the bottom of a container, making them the ideal solution also in cases where there is no side access to the tank.



HOW DO FLOAT SWITCHES WORK?

Float switch units rely on reed switch technology for their switching action. A magnet is mounted within the float and a reed switch is mounted within the body of the unit. When a change in fluid level moves the float and brings this magnet into close proximity with the reed switch, the switch will change state. If the reed switch is normally open, the magnet will close the switch. If the reed switch is normally closed, the magnet will open the switch. This

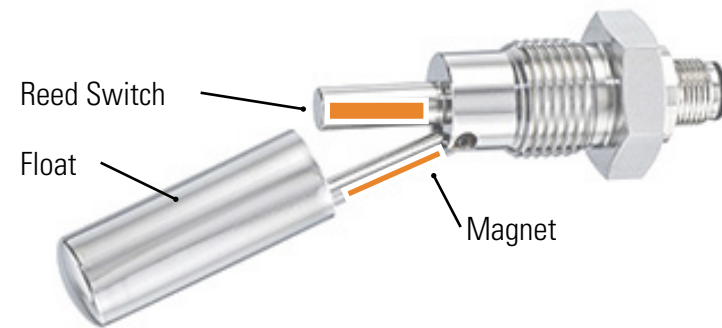
N/O or N/C option allows the user flexibility in their electrical circuit design. Float switches may have multiple floats and / or multiple reed switches. This allows the float switch to provide multiple switching actions within a single unit. For example, a single float twin switch or a twin float twin switch unit can provide both maximum and minimum level signals.

Series																		
	LLF50	LLF60	RSF50	RSF100	RSF150	RSF60	RSF160	SSF22	SSF23	SSF24	SSF25	SSF26	SSF28	SSF29	SSF50	SSF67	SSV66	FLPV
Switch Material	PPS	PPS (Buna float)	Nylon Polyprop PPS PVDF	Nylon Polyprop PPS PVDF	Nylon Polyprop PPS PVDF	PPS PP	PPS PP	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Mount	Internal	Internal	Internal	External	Internal	Internal	External	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	External AND Internal	External
Action	Single level	Single level	Single level	Single level	Single level	Dual level	Dual level	Single level	Single level	Single level	Single level	Single level	Single level	Single level	Single level	Dual level	Single level Dual level	Single level Dual level
No. of Outputs	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	2	1 OR 2	1 OR 2
Output type	SPNO or SPNC	SPNO or SPNC	SPNO or SPNC	SPNO or SPNC	SPNO or SPNC	SPNO AND/OR SPNC	SPNO AND/OR SPNC	SPNO or SPNC	SPNO or SPNC	SPNO or SPNC	SPNO or SPNC	SPNO or SPNC	SPNO or SPNC	SPNO or SPNC	SPNO or SPNC	SPNO AND/OR SPNC	SPNO AND/OR SPNC	SPNO AND/OR SPNC
Switching Voltage	240Vac/120Vdc	240Vac/120Vdc	240Vac/120Vdc 300Vac/dc max	240Vac/120Vdc	250Vac/120Vdc 300Vac/dc max	240Vac/120Vdc	240Vac/120Vdc	300Vac/dc max	300Vac/dc max	24Vac/dc	300Vac/dc max	300Vac/dc max	300Vac/dc max	300Vac/dc max	240Vac/200Vd	250Vac/120Vdc 300Vac/dc max	250Vac/120Vdc 300Vac/dc max	200Vac/120Vdc
Switching Power	25VA	25VA	25VA 100VA	25VA 100VA	25VA 100VA	25VA	25VA	50VA	50VA	50VA	50VA	50VA	50VA	50VA	50VA	25VA	25VA 50VA	10VA
Connection	Fly lead	Fly lead	Fly lead	Fly lead M12 conn	M12 conn	Fly lead M12 conn	Fly lead M12 conn	Fly lead	Fly lead M12 conn	Fly lead	M12 conn	Fly lead	Fly lead	Fly lead	Fly lead	Fly lead M12 conn	DIN43650 Fly lead M12 conn	Fly lead
Thread	M12 M16	M12 M16	1/8"NPT M12	M16	M16	M16	M16	1/8"BSP 1/8"NPT M12	M16	1/8"BSP	1/2"BSP	3/8"BSP	1/8"BSP	1/8"BSP	NA	M16	3/4"NPT G1" M16	1-1/4"BSP
Cable Material	PVC	PVC	ETFE PVC	PVC ETFE PTFE	NA	PVC	PVC	XLPE	XLPE	XLPE	XLPE	XLPE	XLPE	XLPE	FEP	ETFE	Silicone	PUR
Seal Material	Nitrile	Nitrile	Viton Nitrile	Nitrile Viton	Nitrile Viton	Nitrile	Nitrile	-	Silicon	-	Washer	Washer	Washer	Washer	Washer	Washer	Nitrile	Nitrile
Length	1m	1m	1m	1m	NA	1m	1m	1m	1m	1m	NA	1m	1m	1m	1m	1m	1m	3m
Approval	-	-	NSF UL WRAS	NSF UL WRAS	NSF UL WRAS	WRAS NSF	NSF UL WRAS	-	-	-	-	-	-	-	-	-	-	ATEX

FLOAT SWITCHES

HORIZONTAL

The horizontal / side mounting type switches normally has a fixed housing, passing through the sidewall of the tank and includes a hinged float attached to the housing. As with a vertical switch, the float rises and falls with the levels of the liquid. When the float nears the reed switch, it moves a magnet close to the switch and opens or closes the circuit. Horizontal Liquid Level Switches are side-mounted through a hermetically sealed hole on the side of a tank.



FLOW SWITCH MATERIALS

Offered in a wide range of materials, PPS, Polypropylene, Nylon, PVDF and stainless steel to suit almost all fluids and temperatures within food, chemical processing, oil & gas, marine and nuclear facilities. A float switch needs to be constructed from the right materials, ones which are compatible with the liquids and temperatures of the particular application. Component damage as a result of incorrect materials selection can ultimately cause failure of a float switch, which may have severe consequences.

Typical float switch materials include:

- **Nylon:** suitable for many oils, diesel, organic chemicals and MEK-based printing inks.
- **Polypropylene (PP):** suitable for many acids and alkali,

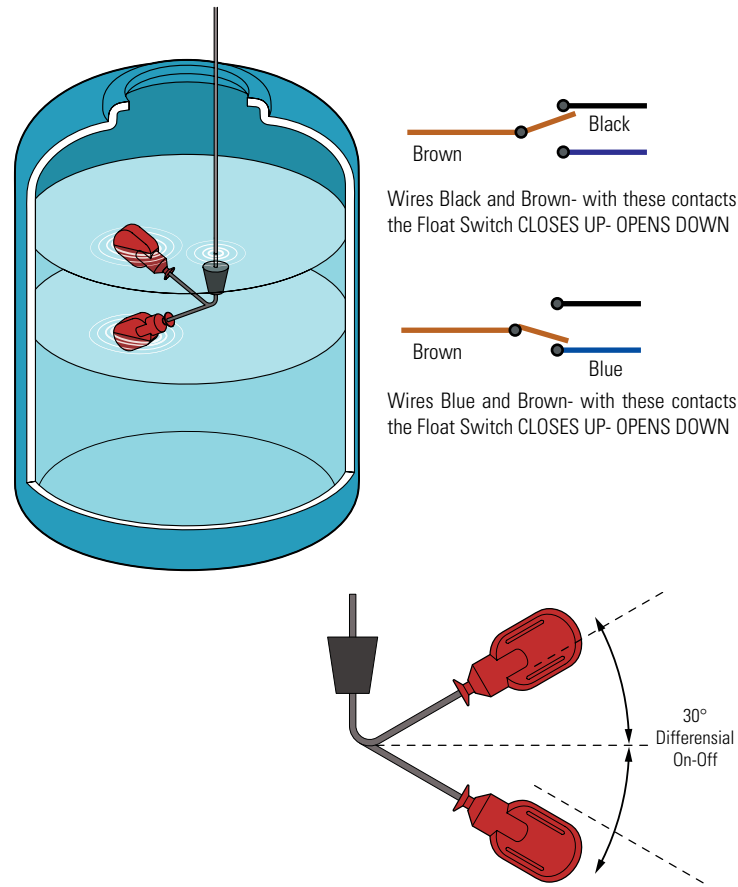
detergents, inorganic and organic chemicals, oils and water.






- **Polyphenylene sulphide (PPS):** suitable for many of the more aggressive chemicals and higher process temperatures, up to 120°C.
- **Buna:** suitable for many oils, diesel, petrol and water (non-potable applications).
- **Stainless steel:** suitable for most medical and food applications, chemicals, hydraulic fluids, fuel oils and applications with process temperatures up to 135°C. Selection of the most suitable materials for both float switch and gasket can be made by referring to a 'Chemical Compatibility' table. For some process liquids, it may be necessary to obtain a sample float switch to test the compatibility.

Series	LLF40	LLF70	RSF10	RSF124	RSF20	RSF30	RSF40	RSF70	RSF80	SH3	SH5	SH7	SSF210	SSH66	TSF40	TSF70	TSF80	TSSF
Switch Material	Nylon Polypr. Polyp.UL PPS PVDF	Nylon Plastic Polypr. Polyp.UL PPS PVDF	Polypr. Polyp.UL PPS	Polypr.	PPS	Nylon Polypr.	Nylon Polypr. Polyp.UL PPS PVDF	Nylon Polypr. Polyp.UL PPS PVDF	Nylon Polypr. Polyp.UL PPS PVDF	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Nylon Polypr. PPS	Nylon Polypr. PPS	Nylon Polypr. PPS	Stainless steel
Mount	Internal	External	Internal	Internal	Internal	Internal	Internal	External	External	External	Round External Flange	Square External Flange	Internal External	Internal External	Internal	External	External	External
Action	Single level	Single level	Single level	Single level	Single level	Single level	Single level	Single level	Single level	Single level	Single level	Single level	Single level	Single level	Single level	Single level	Single level	Single level
Output	SPNO SPNC	SPNO SPNC	SPNO SPNC	SPNO SPNC	SPNO SPNC	SPNO SPNC	SPNO SPNC	SPNO SPNC	SPNO SPNC	SPDT	SPDT	SPDT	SPNO or SPNC	SPNO or SPNC	Resistance + SPNO/SPNC	Resistance + SPNO/SPNC	Resistance + SPNO/SPNC	Resistance + SPNO/SPNC
Switching Voltage	240Vac/120Vdc 300Vac/dc	240Vac/120Vdc 300Vac/dc	240Vac/120Vdc 300Vac/dc	240Vac/120Vdc	240Vac/120Vdc 300Vac/dc	240Vac/120Vdc	240Vac/120Vdc 300Vac/dc	240Vac/120Vdc 300Vac/dc	240Vac/120Vdc 300Vac/dc	250Vac/120Vdc 400Vac/dc max	240Vac/120Vdc 400Vac/dc max	240Vac/120Vdc 400Vac/dc max	240Vac/dc 300Vac/dc	24Vac/dc 300Vac/350dc	240Vac/120Vdc 300Vac/dc	240Vac/120Vdc 300Vac/dc	240Vac/120Vdc 300Vac/dc	240Vac/120Vdc 300Vac/dc
Switching Power	25VA 100VA	25VA 100VA	25VA 100VA	25VA	25VA 100VA	100VA	25VA 100VA	25VA 100VA	25VA 100VA	60VA 1250VA	60VA 1250VA	60VA 1250VA	25VA 100VA	25VA 100VA	25VA 100VA	25VA 100VA	25VA 100VA	25VA 100VA
Connection	Fly lead M12 conn	Fly lead M12 conn	Fly lead M12 conn	Fly lead	Fly lead	Fly lead	Fly lead M12 conn	Fly lead M12 conn	Fly lead M12 conn	Terminal Block	Terminal Block	Terminal Block	Fly lead DIN43650 M12 conn	Fly lead DIN43650	Fly lead	Fly lead	Fly lead	Fly lead
Thread	M16	M16	M16	M12	M16	M12 M16	M16	M16	1/2"NPT	1.5"NPT 2"NPT	-	-	1/8"BSP 1/2" NPT	1/2"NPT 3/4"NPT	M16	M16	1/2"NPT	1/2"NPT
Cable Material	PVC	PVC	ETFE PVC	PVC	ETFE PVC	PVC	ETFE PVC	ETFE	ETFE PVC	-	-	-	XLPE	XLPE	ETFE	ETFE	ETFE	XLPE
Seal Material	Nitrile Viton Silicon EPDM	Nitrile Viton Silicon EPDM	Nitrile Viton	Nitrile	Nitrile Silicon Viton	Nitrile	Nitrile Silicon Viton	Nitrile Silicon Viton	-	-	-	Nitrile	-	-	Nitrile	Nitrile	-	-
Wire Length	1m	1m	1m	0.3m	1m	1m	1m	1m	1m	-	-	-	1m	1m	1m	1m	1m	1m
Approval	UL WRAS	UL WRAS	NSF UL WRAS	-	WRAS	WRAS	NSF UL WRAS	NSF UL WRAS	NSF UL WRAS	-	-	-	-	-	WRAS	WRAS	WRAS	-

CABLE END LEVEL SWITCHES

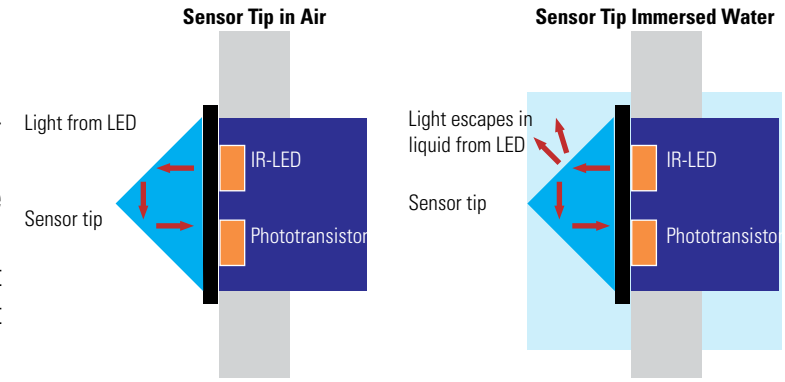
These submersible float switches, used mainly for sewer and industrial waste systems, are cable mounted and can have a normally open or normally closed configuration. These self-weighted cable end float switches are designed for use in turbulent industrial fluids and fluids with suspended agglomerates, such as sewer water. Version with Polyurethane cable are for use in fuel oils. The switch are water resistant up to a depth of 100m, and is insensitive to humidity and condensation, due to the particular design of the switch element. This makes it suitable for applications where there may be wide or rapid fluctuations in ambient or fluid temperatures. Switching capacity of these design is 10A or 20A.





Series						
	FFS	Little-EX	LM10	MC	MP1C	MS
Switch Material	HDPE	HDPE	HDPE Plastic	Stainless Steel	HDPE	HDPE
Mount	-	Cable	Cable	Cable	Cable	Cable
Action	Single level	-	-	-	Single level	Single level
Output	SPDT SPNO SPNC	SPDT	SPDT SPNO SPNC	SPNO SPNC	-	SPDT SPNO SPNC
Switching Voltage	-	9.6V max	-	60Vdc max	60Vac max	250Vac/110Vdc
Capacity	750VA	-	750VA	3VA	3VA	750VA 1500VA
Length	5m	5m 10m 20m 30m 40m	5m	5m	3m 5m	5m
Cable Material	PVC WRC	PU	WRC	PU Silicone XLPE	-	PU PVC WRAS
Approval	WRAS	ATEX	WRAS	-	-	WRAS

OPTICAL LEVEL SENSORS

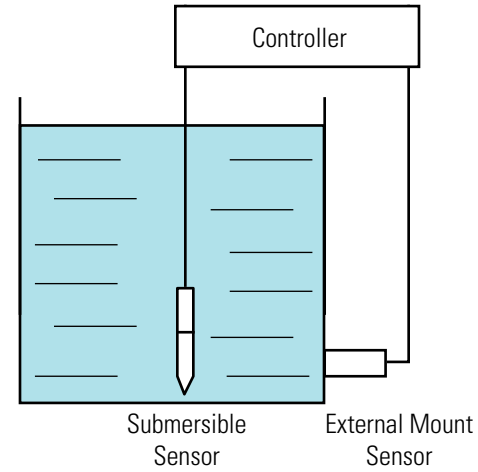
An optical liquid level sensor uses an infra-red LED and phototransistor accurately positioned at the base of the sensor's tip. When the tip is air, infra-red light reflects internally round the tip to the phototransistor providing good optical coupling between the two. When the sensor's tip, is immersed in liquid, the infra-red light escapes from the tip causing a change in the amount of light at the photo-transistor, which makes the output change state.









Series			
	OLS2	OLS5	OLS7
Mount	External	Internal	External
Switch Material	Polysulfone	Polysulfone	Polysulfone
Output	Low in air High in air	Low in air High in air	Low in air High in air
Switching Voltage	5 to 15Vdc 10 to 28Vdc	5 to 15Vdc	5 to 15Vdc 10 to 28Vdc
Connection	Fly lead	Fly lead	Fly lead

HYDROSTATIC LEVEL SENSORS

Hydrostatic level sensors are robust packages for sensing in various liquid including water, oil and non-aggressive chemicals. Sensata's portfolio features both external mount and submersible and is suited for a range of applications from measuring liquid level in small tanks to large tanks, rivers and reservoirs. Depending on the application pressure and accuracy requirements, piezo-resistive media-isolated silicon sensing with stainless steel diaphragm or ceramic sense elements are used. Sensata's hydrostatic level pressure sensors incorporate a ceramic or MEMs sensing element with the latest state of the art electronics in an IP68 stainless steel housing. Accurate and highly reliable Sensata's hydrostatic level pressure sensors are ideal for measuring a broad range of liquids and most hydrocarbon based



Series						
	SLP	ILS / ILSU	ILTS / ILTSU	ILLS / ILLSU	ILSE / ILSEU	P1L
Type	Level Switch	Level Sensor	Level Sensor	Level Sensor	Level Sensor	Level Sensor
Mounting	Submersible	Submersible	Submersible	Submersible	External Mount	Submersible
Technology	Float/Reed Switch	Silicon Piezo-Resistive	Silicon Piezo-Resistive	Silicon Piezo-Resistive	Silicon Piezo-Resistive	Ceramic Capacitive
Pressure Reference	N/A	Gauge (Vented) Absolute (restrictions apply)	Gauge (Vented) Absolute (restrictions apply)	Gauge (Vented) Absolute (restrictions apply)	Gauge (Vented) Absolute (restrictions apply)	Absolute
Pressure Range	N/A	1-100 mH ₂ O 40-4,000 inH ₂ O	1-10 mH ₂ O 40-400 inH ₂ O	1-10 mH ₂ O 40-400 inH ₂ O	1-10 mH ₂ O 40-400 inH ₂ O	~4 mH ₂ O
Accuracy	N/A	±0.10% BFSL	±0.10% BFSL	±0.10% BFSL	±0.25% BFSL	±0.75% BFSL
Electrical Output	Single Pole, Normally Open	4-20 mA	Dual 4-20mA	4-20 mA	4-20 mA	0-5 V ratiometric
Switching Voltage	240Vac/120Vdc	N/A	N/A	N/A	N/A	N/A
Cable Length	5-40 meters	1-110 meters	1-15 meters	1-15 meters	N/A	5-20 meters
Cable Type	PVC	PUR	PUR	FEP	N/A	PE-HD
Size (D x L)	35 x 160 mm	25 x 150 mm	25 x 195 mm	24 x 80 mm	30 x 112 mm	22 x 58 mm
Media		Water, Oil, and Non-aggressive chemicals	Water, Oil, and Non-aggressive chemicals	Water, Oil, and Fuels	Water, Oil, and Non-aggressive chemicals	Fuel, Oil, Non-potable water
Temperature Output	Not included	Not included	Included (Class B PT RTD)	Not included	Not included	Not included

CONTROL MODULES & ACCESSORIES

Model	Description
 FCTE	Pump dry running sensor
 SB20	Level controller with Alarm
 SM20	Level Control Module 2HP
 FCNM	Chamber Level Float Switch
 Tutor	Steering Control for cable end float switches
 RSF64EXS	Variable Insertion Depth Float Switches
 CW1	Counterweight for cable suspended switches
 CWM	Heavy Counterweight
 LC series	Cable sets with M12 connection
 EXT-ALL	Extension tubes for multi level float switches
 DT1200	Termination Enclosure
 SEALS	Seal kits
 LLPK1	Washer for OLS optical switches

CUSTOM ENGINEERED SOLUTIONS

The operating environment is critical to the choice of float switch. A water tank for an industrial process may only require a simple plastic float switch. However, if the application is in a hazardous area - a petrochemical storage tank where flammable gases, vapours or dust are present, for example - a stainless steel, explosion-proof float switch will be required.

Over the years, Sensata has custom engineered many variants of its float switches to match particular customer requirements in a wide range of industry sectors, including oil, gas and petrochemicals: food and beverage: chemicals and pharmaceuticals; water and wastewater; and process manufacturing. These solutions have been for all types of environment, including industrial process control, safe areas, intrinsically safe and hazardous areas (ATEX-certified), as well as WRAS-approved switches for drinking water applications.





Sensata
Technologies



ABOUT US

Sensata Technologies is one of the world's leading suppliers of sensing, electrical protection, control and power management solutions with operations and business centers in twelve countries. Sensata's products improve safety, efficiency and comfort for millions of people every day in automotive, appliance, aircraft, industrial, military, heavy vehicle, heating, air-conditioning and ventilation, data, telecommunications, recreational vehicles and marine applications. For more information please visit Sensata's website

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