LIQUID LEVEL SWITCHES – SST Sensing Offers Customisation of Liquid Level Switches

SST Sensing provides sensing and control solutions that perform exactly to our customers' technical and commercial sensor needs.

We offer a vast range of standard optical liquid level switches, characterised by their miniature, solid-state design, that measures the presence or absence of fluid to trigger an alarm, a shutdown or other system response.

We also provide customisation of our liquid level switches to satisfy unique application requirements; whether required by peculiar operating conditions, intricate construction geometries, or distinctive design features.

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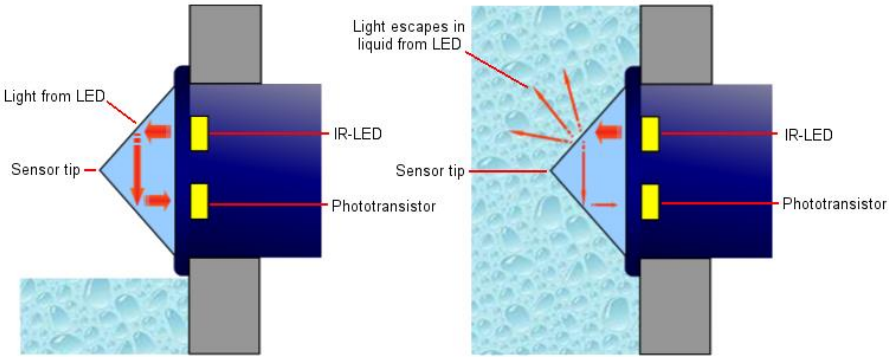
SST Optical Liquid Level Switch: How It Operates

An SST optical level switch consists of an infrared light source and optical detector, housed in either a polymer or glass sensor tip. The principle at the heart of the sensor's operation is that the infrared light is totally internally reflected back to the optical detector while in air, but will refract outwards when in a fluid. This phenomenon makes it possible to detect the presence or absence of almost any fluid.

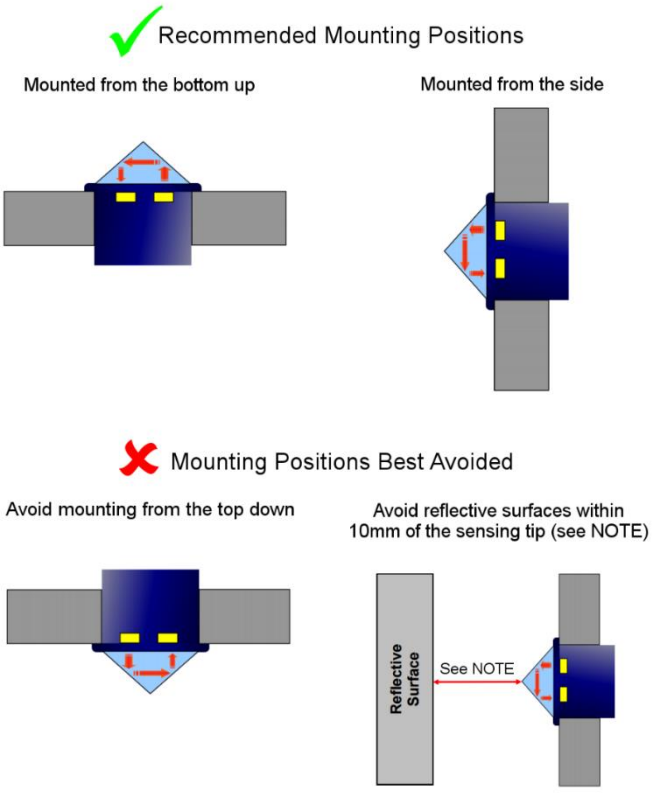


Features and Application of SST's Standard Optical Liquid Level Switches

SST's liquid level switches are solid-state, so there are no moving parts prone to failure. They can fit into small spaces due to their miniaturised design; they are sensitive to even the smallest amount of liquid, so react very quickly, and they can function in a wide range of operating temperatures and a broad variety of liquids resulting in a highly reliable sensor which is ideal for a multitude of applications.

For best results, SST's optical level switches should be mounted from the side or the bottom of the vessel or tank. Also, the environment in which the switch will operate, together with the product's material compatibility with the fluid to be detected will influence the choice of switch. Appropriate selection ensures the level switch does not fail prematurely.

SST offers a variety of sensor outputs depending on the switch type including: Push-Pull, PWM, P-type, N-type, and Digital.



Customisation for Liquid Level Switches

Where our standard liquid level switches do not match a customer's exact requirements, we offer a customisation service to design and manufacture products which are specific to their sensing and control needs.

Our process begins with understanding a customer's unique application, the environment in which the switch is expected to perform, and how the switch fits into the customer's overall system. We collaborate with the customer from initial design concept to the best solution for full production. At SST, we place a high value on maintaining excellent standards of customer service, technical support, and design & manufacturing capability.

Customisation for SST Liquid Level Switches

Elements of our liquid level switches that can be optimised to address our customers' application challenges are listed below:

- Modifying the sensor's internal firmware in order to alter its behaviour. For example, we can alter the sensitivity of the product to overcome the effect of bubbles or condensation at the sensor tip. We can add time delays to ensure the sensor does not react to brief changes in the liquid level, perhaps as a result of disturbances on the surface of a liquid in a moving tank.
- Adapting housings to account for the environment and operating conditions in which the sensor will be exposed.
- Modifying thread styles and sizes: to transform the product's dimensions in order to better fit an unusual, or existing, application or equipment.
- Modifying termination, connectors, and cabling in order to simplify installation for the customer.
- Including additional environmental protection to withstand the stresses of an application through a more robust design. This may also include electrical protection, e.g. against high-voltage transients, where connection to vehicle battery systems is involved.

Examples of Successful Customisations

1. Level switch for peristaltic pump

SST designed and manufactured a completely new liquid level switch, based on the customer's specification, to monitor the level of liquid in the pump's diaphragm assembly. If the small, non-invasive sensor attached to the reservoir's side detects the presence of fluid, this indicates that the pump diaphragm has failed. The pump immediately shuts down to avoid further loss of potentially aggressive or expensive fluid.

2. Level Switch for Automotive Header Tank

SST customised this liquid level switch to withstand the high vibration levels in the installation. A previous 1/4″ NPT plastic sensor had suffered frequent failures due to being over-torqued during installation. The solution was to change the design to a bespoke stainless steel housing which could be tightened to a much higher level., Also, we included a Packard automotive connector and modified the output so that failures such as broken wires can be detected by setting the high or low output voltages between the supply and gound [Vs = 5VDC, Output high = ~4VDC, Output low = ~1.5VDC].

3. Level Switch for Diesel Filter Bowl

The level switch in the diesel condensate trap on Compressed Natural Gas (CNG) powered vehicles. When not running on CNG, these vehicles are powered by diesel fuel. When reverting to CNG again, it is important that any diesel in the system is filtered out. This is done by way of a condensate trap and bowl. SST's custom designed liquid level switch indicates when the diesel level in the filter bowl is high and so should be emptied at the next service opportunity. The senosr is exposed to diesel fuel, high pressures (>120 bar burst pressure) and vibrations. SST customised this liquid level switch to withstand the harsh environment using a stainless steel housing with an M14x1.5 thread and a polysulfone sensor tip.

We used a DIN15170 3-pin automotive connector and provided a PWM output signal to the customer's ECU. This output ensures failsafe operation as it clearly indicates if the sensor has failed internally or if any of the sensor connections have been lost. We integrated transient overvoltage protection for the input, and short circuit protection for the output.

4. Level Switch for Underwater Gearbox

The sensor located in a boat's underwater gearbox indicates low oil levels to prevent a run-dry situation. The rear end of the sensor and cable termination are submerged 90% of the time in saltwater, and the cable is expected to move occasionally. SST customised this liquid level switch with an AMP Superseal 1.5 series connector. We used a 1m, 3-core cable with specially selected jacket material and protective corrugated outer conduit to withstand seawater, fuel, oil and abrasion. The switch provided a high in air output logic signal to the ECU of the boat.

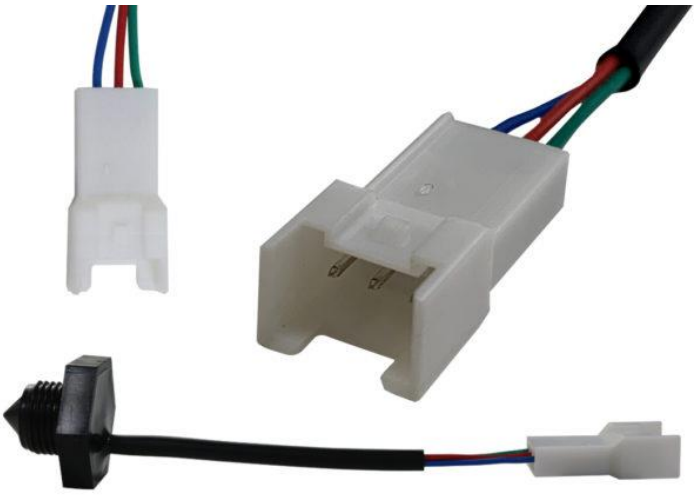
5. Coolant Level Sensor for Engine Radiator

SST designed this sensor to replace the 242985 GEMS capacitive coolant level sensor in the engine radiators of off-highway vehicles. The sensor is exposed to high temperatures up to 125 degrees Celsius, high vibrations, and sloshing liquid due to the moving reservoir.

SST customised this level switch using an integral 3-pin Deutsch DT04-3P connector and a 1/2″ NPT thread with brass housing. Equivalent to GEMS "Dry Sink" output, the customised sensor provided an N-Type, low in air, signal and was programmed with an actuation delay of 5 seconds to account for the coolant's movement.

6. Level Switch for Automated Cleaning Process

SST customised this level switch as a drop-in replacement for an obsolete sensor. The sensor, fitted into a very small space, was used to monitor oil and water levels during the external sterilization and gear lubrication process by an automated cleaning/maintenance machine for medical tools.



The customised level switch included a JST connector with a short cable, according to the customer's requirements and pinout. The switch provided a high-in-air output signal and was designed to operate reliably in the presence of reflective surfaces. We modified the entire design of the switch's electronics and shortened its housing to fit into the small available space.

Features and benefits of SST's Customised Optical Liquid Level Switches

1. They provide immediate liquid level notification to induce the appropriate response and prevent unnecessary downtime and costly equipment damage.

2. They ensure easy integration into customer's unique or existing application or equipment, generally saving them the painful step of product redesign.

3. Customised products perform exactly to customers' unique requirements by:
    - modifying electronics and software
    - changing outputs
    - adapting housing or thread styles
    - adding cabling
    - adding connectors
    - incorporating additional electrical and environmental protection

4. SST's optical liquid sensor technology offers:
    - High sensitivity resulting in a level sensor that can detect small amounts of fluid (<1ml).
    - Solid state design with no moving parts, and manufactured from high-speciation polymers or glass which can operate reliably and without degradation in a wide range of aggressive fluids.

SST is the preferred choice for liquid level sensing in industries such as agriculture, medical devices, aviation and transportation, including small to very large OEM customers. Our mission is to become a world leading designer and manufacturer of innovative liquid and oxygen sensing solutions and our almost two decades years of technical experience guides our process in helping clients solve their most challenging applications.

Our customised products are manufactured with SST's trademark precision, attention to detail and high quality levels. From problem formulation, to prototype design and testing, and through to ongoing technical support, SST provides a seamless process to deliver bespoke liquid level switches to our customers. Our products are designed and manufactured in our ISO 9001:2015 accredited factory in Scotland and have an impressive 98.5% on time delivery to customers, to whom we ship globally every day.

CAUTION	INFORMATION
Do not exceed maximum ratings and ensure sensor(s) are operated in accordance with their requirements. Carefully follow all wiring instructions. Incorrect wiring can cause permanent damage to the device. SST Sensing Ltd recommend using alcohol based cleaning agents. If your switch is Polysulfone or Trogamid®, do NOT use chlorinated solvents such as trichloroethane as these are likely to attack the switch material. **Failure to comply with these instructions may result in product damage.**	As customer applications are outside of SST Sensing Ltd.'s control, the information provided is given without legal responsibility. Customers should test under their own conditions to ensure that the equipment is suitable for their intended application. Before use, check that the fluid in which you wish to use these devices is compatible either with Polysulfone, Trogamid®, glass or stainless steel. For technical assistance or advice, please email: technical@sstsensing.com

General Note: SST Sensing Ltd. reserves the right to make changes to product specifications without notice or liability. All information is subject to SST Sensing Ltd.'s own data and considered accurate at time of going to print.

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