

# Installation Instructions for Standard and Extended Temperature Optomax Series Liquid Level Sensors

## GENERAL DESCRIPTION

The liquid level sensor provides single point liquid detection via a TTL compatible push pull output. An infra-red LED and phototransistor accurately positioned at the base of the sensing tip ensure good optical coupling between the two when the sensor is in air. When the sensing tip is immersed in liquid, the infra-red light escapes from the cone causing a change in the amount of light present at the phototransistor which makes the output change state.

## CLEANING

Proper fluids should be selected based on type of contamination to be removed. SST Sensing recommends freon and alcohol based solvents. DO NOT use chlorinated solvents such as trichlorethane as these are likely to attack the sensor material.

## Liquid Media Compatibility

Before use check that the fluid in which you wish to use these devices is compatible either with polysulphone or trogamid.

## ELECTRICAL SPECIFICATIONS

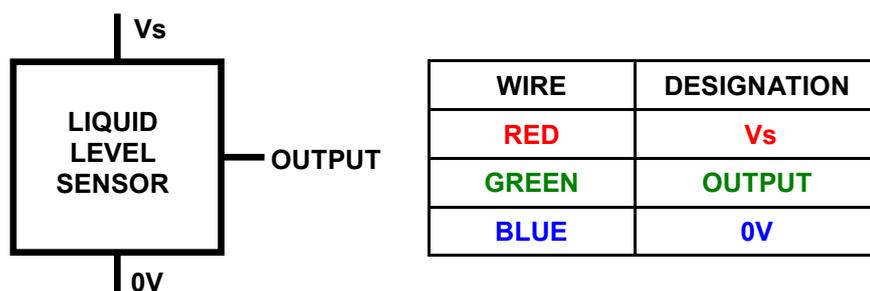
Supply Voltage (Vs)	+4.5 Vdc to +15.4Vdc	Output Voltage (Vout) Iout = 100mA	<b>Output High</b> Vout = Vs - 1V Max <b>Output Low</b> Vout = 0V + 0.5V Max
Supply Current (Is)	Max 2.5mA (Vs = 15.4Vdc)		
Output Type	An "L" in the part number after D3 indicates that the sensor output will be low in air. Otherwise the output will be high in air.	Output Voltage (Vout) Iout = 0mA	<b>Output High</b> Vout = Vs - 0.3V Max <b>Output Low</b> Vout = 0V + 0.1V Max
Output Sink and Source Current (Iout)	100mA		
Operating Temperatures	-25°C to +80°C (Standard) -40°C to +125°C (Extended)		
Storage Temperatures	-30°C to +85°C (Standard) -40°C to +125°C (Extended)		

## MOUNTING AND HOUSING TYPES

Housing Series	200 and 210 SH Series	500 and 510 Series	600 and 610 SH Series	700 and 710 SH Series
Thread	M12x1x8g with Hex Nut*	M10x1	½" SAE with O-Ring*	¼" NPT
Tightening Torque	1.5 N m/13.26 in lb max.			
Pressure (when correctly sealed)	7 bar max	20 bar max	7 bar max	7 bar max
Mounting Hole	Ø12mm	Ø10mm	Ø ½ Inch	¼" NPT Threaded
Housing Material	Polysulphone or Trogamid			
Sensor Termination	24AWG, 250mm PTFE Wires, 8mm Tinned			

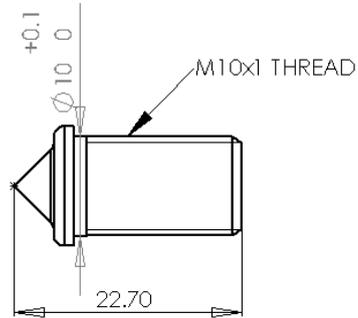
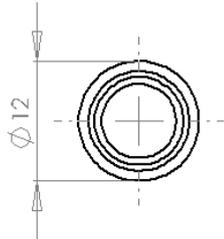
\* Hex nut and o-ring sold separately, please contact us for details. NPT version can be sealed with PTFE tape.

## Sensor Output Wiring

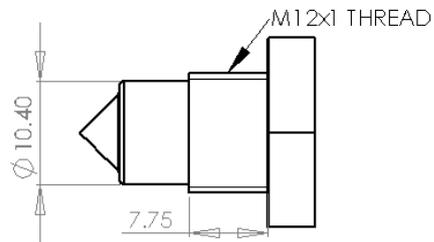
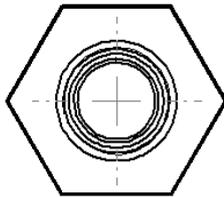


**PRODUCT DIMENSIONS**  
(All dimensions in mm)

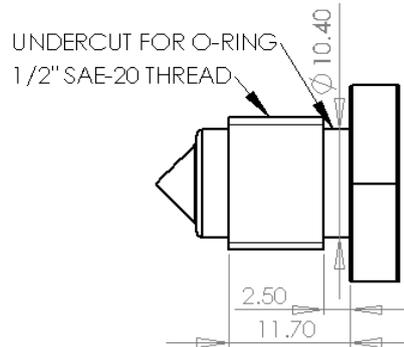
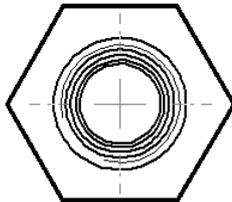
**500 and 510 Series (Mounted from Inside)**



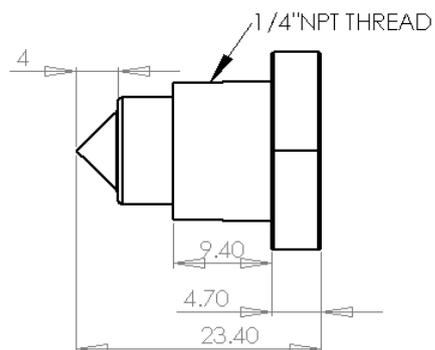
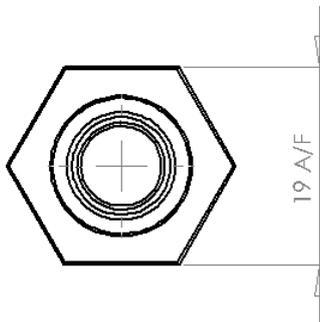
**200 and 210 SH Series (Mounted from Outside)**



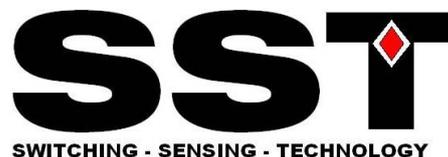
**600 and 610 SH Series (Mounted from Outside)**



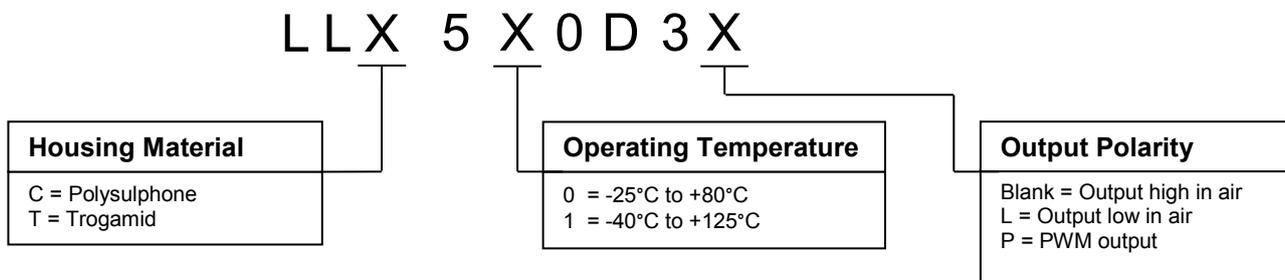
**700 and 710 SH Series (Mounted from Outside)**



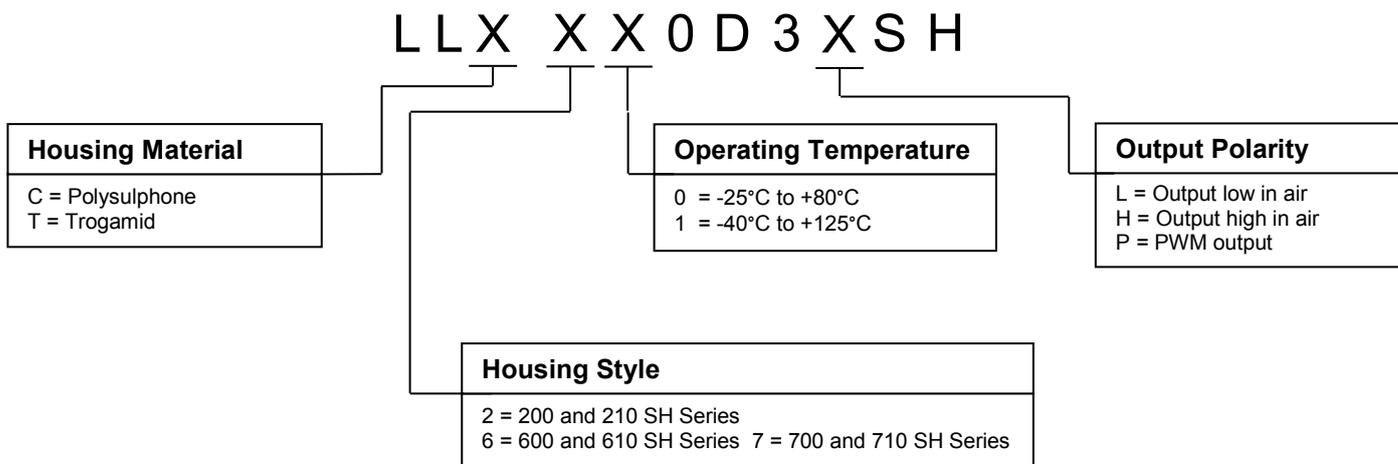
**PART NUMBERING SYSTEM**



SENSOR MOUNTED FROM INSIDE VESSEL



SENSOR MOUNTED FROM OUTSIDE VESSEL



## PWM output option overview.

Both the Optomax series and the Industrial variant of SST's liquid level sensors have the option to output a pulse width modulated (PWM) signal rather than a straightforward digital output. The sensors will output a PWM with a 25% duty cycle in air and a 75% duty cycle in liquid.

This is desirable in situation where a fault tolerant system is required. To illustrate. In the unlikely even of a failure of a sensor with a digital output, the output state may be in either a high or low condition, meaning that it may not be immediately apparent that there has been a fault.

With a PWM output however this will not be the case since the output would normally be connected to an RC network which will give an output proportional to the duty cycle. See below;

In air with a duty cycle of 25% and a supply voltage of 5v the output will be;

$$V_o = (V_s - \text{diode drop}) \times (0.25) = (5 - 0.32) \times (0.25) = 1.17\text{v}, \text{ similarly in liquid the output would be;}$$

$$V_o = (5 - 0.32) \times (0.75) = 3.51\text{v}$$

Note: The diode drop from the schottky diode was measured to be 0.32v.

Therefore it follows that if a failure occurred the chances that the output would be "stuck" at one of the PWM generated analogue voltages are extremely unlikely.

It is also possible that the PWM output may be measured directly. In which case it will be immediately apparent if a fault occurs since the output will no longer pulse.

## Considerations of a suitable RC network.

An RC network will invariably have some ripple on the output. This however can be minimised by choosing a value of R and C which will have a larger  $T_{90}$ . For example under test it was found that a 2.2 $\mu$ F capacitor and a 10k $\Omega$  resistor had a ripple of 76mV in air and a ripple of 79mV in liquid. Increasing either R or C will reduce this at the expense of response time.

### WARNING

All SST Sensing Ltd products are tested under nominal operating conditions during the production process. Applications for our products are varied and, as these are outside our control, specification information provided is given without legal responsibility. Customers should test under their own conditions, to ensure that the sensors are suitable for their intended application.

### CAUTION

Do not exceed maximum ratings.  
Carefully follow all wiring instructions, incorrect wiring can cause permanent damage to the device.  
Do not use chemical cleaning agents.

**Failure to comply with these instructions may result in product damage.**

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