HAYWARD FLOW CONTROL
TLU SERIES LEVEL SENSORS
INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

PLEASE READ THE FOLLOWING INFORMATION PRIOR TO INSTALLING AND USING HAYWARD TLU SERIES LEVEL SENSORS. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PRODUCT DAMAGE, PROPERTY DAMAGE, PERSONAL INJURY, OR EVEN DEATH.

1. Hayward Flow Control (Hayward), a division of Hayward Industries, guarantees its products against defective material and workmanship only. Hayward assumes no responsibility for property damage or personal injury resulting from improper installation, misapplication, or abuse of any product.
2. Hayward assumes no responsibility for property damage or personal injury resulting from chemical incompatibility between its products and the process fluids to which they are exposed. Determining whether a particular PVC, CPVC, or PP product is suitable for an application is the responsibility of the user. Chemical compatibility charts provided in Hayward literature are based on ambient temperatures of 70°F and are for reference only.
3. Hayward products are designed for use with non-compressible liquids.

WARNING

Hayward PVC and CPVC products should NEVER be used or tested with compressible fluids such as compressed air or nitrogen. Use of PVC and CPVC products in compressible fluid applications may result in product damage, property damage, personal injury, or even death.

WARNING

The Series TLU Level Sensor is intended for use in liquid service only. Do not attempt to use this gauge for air or gases. Use of this product in air or gas service may result in product damage, property damage, personal injury, or even death.

4. The maximum recommended fluid velocity through any Hayward product is eight feet per second (8 ft/s). Higher fluid velocity can result in damage due to the water hammer effect.
5. Piping systems must be designed and supported to prevent excess mechanical loading on Hayward products due to system misalignment, weight, shock, vibration, and the effects of thermal expansion and contraction.
6. The effect of temperature on plastic piping systems must be considered when the systems are initially designed. The pressure rating of plastic systems must be reduced with increasing temperature. Maximum operating pressure is dependent upon material selection as well as operating temperature. Before installing any Hayward product, consult Hayward product literature for pressure vs. temperature curves to determine any operating pressure or temperature limitations.
7. PVC and CPVC plastic products become britTLUe below 40°F. Use caution in their installation and operation below this temperature.

WARNING

Hayward PVC and CPVC products should not be used in services with operating temperature below 34°F.

8. Due to differential thermal expansion rates between metal and plastic, transmittal of pipe vibration and pipe loading forces, **DIRECT INSTALLATION OF HAYWARD FLOW CONTROL PRODUCTS INTO METAL PIPING SYSTEMS IS NOT RECOMMENDED**. Wherever installation of plastic valves into metal piping systems is necessary, it is recommended that at least 10 pipe diameters in length of plastic pipe be installed upstream and downstream of the gauge to compensate for the factors mentioned above.
9. Published operating requirements are based on testing of new products using clean water at 70°F. Product performance is affected by many factors including fluid chemistry, viscosity, specific gravity, flow rate, and temperature. These should be considered when sizing Hayward products.
10. Systems should always be depressurized and drained prior to installing or maintaining any Hayward product.

WARNING

Failure to depressurize and drain system prior to installing or maintaining Hayward Flow Control products may result in product damage, property damage, personal injury, or even death.

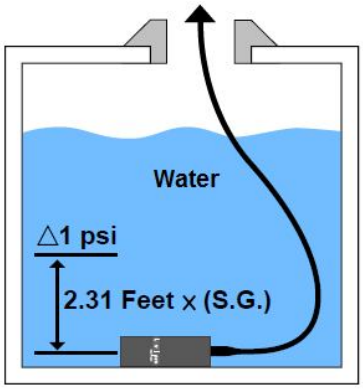
INSTALLATION:

TLU-Series Level Sensors are designed to be completely submersed within the application fluid. The transmitters can either rest along the bottom of the tank, or be suspended at any desired level within the tank.

NOTE: The physical location of the level sensor will indicate the lowest level of measurement within the tank (ie, the sensor will not measure liquid below the level of the sensor).

Converting ft. H_2O to PSI:

TLU-Series Level Sensors are rated to maximum tank level of water (eg. 0-14 ft. H_2O, 0-22 ft. H_2O, etc.). To convert ft. H_2O to psi; divide ft. H_2O by 2.31 (ie 1 psi = 2.31 ft. H_2O).



Accounting for specific gravity (SG) other than 1.0:

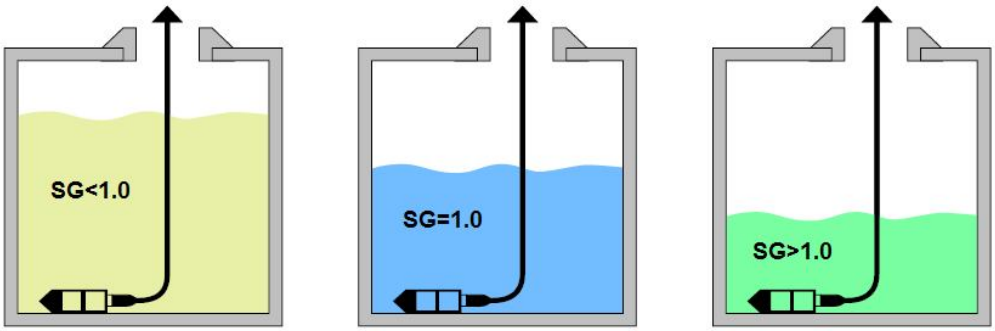
The specific gravity (SG) of a liquid will change the amount of pressure applied to the level sensor per foot of liquid above the sensor. As a result, the SG of the liquid being measured will affect the maximum liquid level that can be measured by the level sensor.

- Water has a SG = 1.0.
- A liquid with a SG < 1.0 will require a taller liquid column (higher tank level) than will be required with water in order to apply the same pressure to the level sensor.
- A liquid with a SG > 1.0 will require a shorter liquid column (lower tank level) than will be required with water in order to apply the same pressure to the level sensor.

To calculate the maximum tank level that can be read by the sensor, use the following formula:

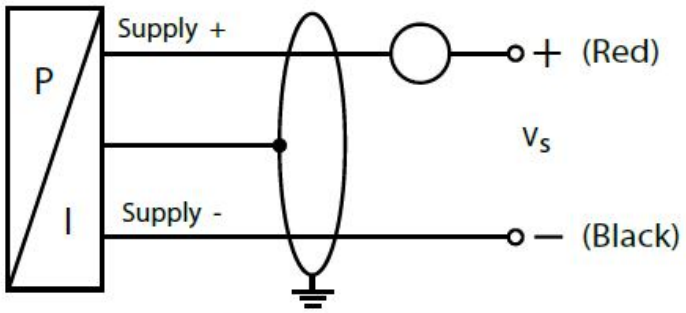
Maximum Tank Level (Feet Above Sensor) = Sensor Rating (in Feet) / SG

When the SG < 1.0; the maximum tank level will increase. When the SG > 1.0; the maximum tank level will decrease.



Wiring:

The TLU-Series Level Sensors operate on 8 - 32 VDC and provide 4 – 20 mA feedback. Shielded cable is recommended for all control loop wiring.



2-wire-system (current) 4-20mA

Level Sensor Output:

TLU-Series Level Sensors provide a 4-20 mA linear output based on tank level. The level sensor is configured so that 0 feet liquid (above sensor) = 4 mA, and maximum liquid level (calculated above) = 20 mA.

Installing Level Sensor into Tank:

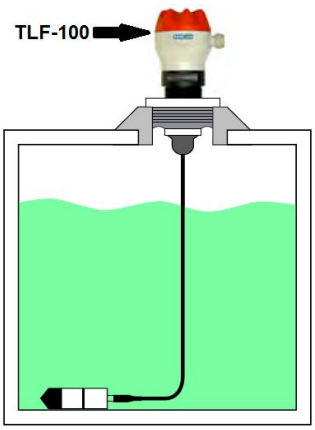
The TLU-Series Level Sensor is designed to operate while submerged in the application liquid.

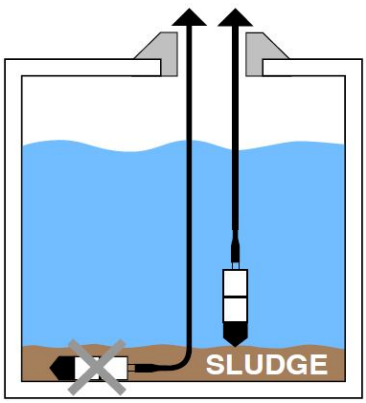
The sensor can be mounted via several methods. It can be suspended from the cable, it can be placed resting on the bottom of the tank (in either horizontal or vertical orientation), or it can be attached to a pipe. The cable for the level sensor is typically terminated at a junction box located on top of the tank / housing. The TLUF-100 conduit box can be used with a 2" threaded bulkhead fitting to hard wire the sensor on top of the tank / housing

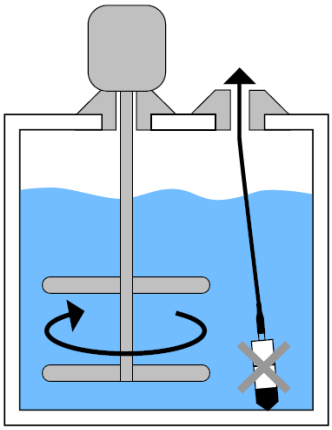
NOTE: The level sensor cable contains a vent tube that must be exposed to atmospheric pressure in order for the sensor to function properly. Use caution when sealing the cable at the top of the tank. The vent tube must be open and free to allow air to flow to the pressure diaphragm. Avoid blocking the vent tube by compressing the cable. Always keep the cable termination clean, dry, and free of moisture.

Avoid installing the level sensor along the bottom of the tank if materials such as sludge may build up and coat / cover the sensor (this also included any debris that may setTLUe along the bottom of the tank). In these installations, it is best to suspend the sensor above the highest level of sludge / debris that may occur.

Avoid installing the level sensor where other tank requirements (such as a mixer blade) will cause the transmitter to whip around within the tank. An alternative for these applications is to move the transmitter to a stable section of the tank or to install the sensor inside of a still well / drop tube.







PRODUCT SPECIFICATIONS:

Materials:	Housing:	PVC
	Seals:	FKM
	Diaphragm:	Ceramic Al_2O_3
	Cable:	PTFE Coated
Max. Temperature:	PVC:	140ºF
	PP:	170ºF
	PVDF:	195ºF
Ingress Protection:	IP68	
Accuracy:	± 0.5% of full scale	
Input:	8 – 32 VDC	
Output Signal:	4-20mA	

WARNING

The maximum recommended fluid velocity through any plastic piping system is eight feet per second (8 ft/s). Higher fluid velocity can create excess water hammer effect, resulting in property damage, personal injury, or even death.

CAUTION

Published operating requirements are based on testing of products using clean water at 70°F. Product performance is affected by many factors including fluid chemistry, viscosity, specific gravity, flow rate, and temperature. These should be considered when sizing Hayward products.

WARRANTY TERMS AND CONDITIONS:

TWO YEAR WARRANTY: All products manufactured by Hayward are warranted against defects in material or workmanship for a period of two years from date of shipment. Our sole obligation under this warranty is to repair or replace, at our option, any product or any part or parts thereof found to be defective. **HAYWARD MAKES NO OTHER REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** The warranty set forth above is the only warranty applicable to Hayward products and in no event shall Hayward be liable for any delay, work stoppage, cartage, shipping, loss of use of equipment, loss of time, inconvenience, loss of profits of any direct or indirect incidental resulting from or attributable to a breach of warranty. **The remedies under this warranty shall be the only remedies available. OUR MAXIMUM LIABILITY SHALL NOT IN ANY EVENT EXCEED THE CONTRACT PRICE FOR THE PRODUCT.**