



TLH Hydrostatic Liquid Level Transmitter



Instruction Manual



Trumen Technologies Pvt. Ltd.

39 Mangal Nagar, Behind Sai Ram Plaza, Near Rajiv Gandhi
Circle, AB Road, Indore, MP 452 001, India
Phone: +91-731-497 2065

Customer Support

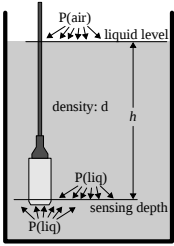
Phone: +91-731-656 2425
email: sales@trumen.in
email: support@trumen.in
web: www.trumen.in

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Operating Principle



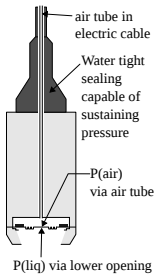
Pressure $P(liq)$ on any surface and container walls at depth h , by the liquid of density d , is:

$$P(liq) = d \times g \times h + P(air)$$

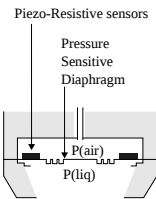
where $P(air)$ is the air pressure and g is the acceleration due to gravity (constant for a given place) at the place of liquid container. Replacing constants the equation becomes:

$$P(liq) - P(air) = K \times h$$

in short: Pressure difference represents liquid level. One convenient unit that clubs pressure with level is mH₂O (pressure felt at depth in meters while being immersed in water)

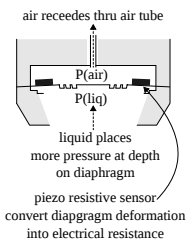


Trumen hydrostatic pressure transmitter utilizes pressure exerted by liquid $P(liq)$ and subtract it by air pressure $P(air)$ using a single pressure sensitive diaphragm and air-vent in connection cable.



As Trumen hydrostatic pressure transducer is immersed deeper in the liquid, the $P(liq)$ becomes higher than $P(air)$ and the diaphragm minutely deforms.

This diaphragm deformation can't be seen visibly, but it is caught by piezo-resistive sensors secured on the sensitive diaphragm.



Thus pressure exerted by liquid is sensed by Trumen hydrostatic sensor which is directly denotes the depth from the surface of liquid.

Technical Specification

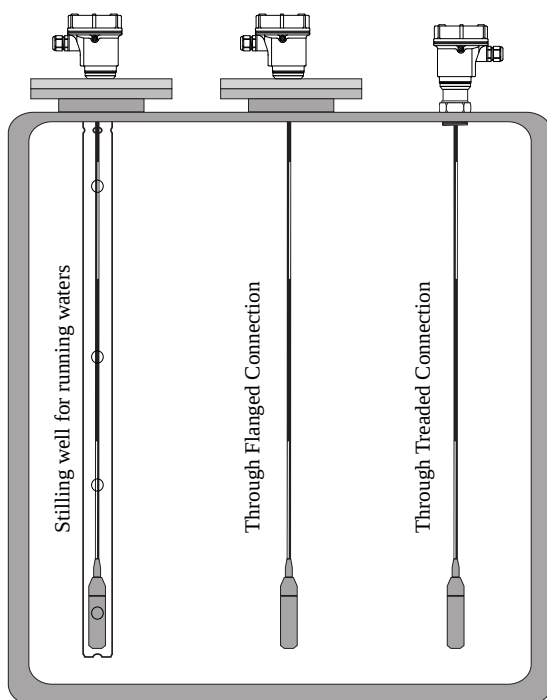
Features

1. Compact size
2. 4-core, ϕ shielded cable with vent hose which is mechanically strong enough for deep submersible liquid level measurements.
3. Wide range industrial dc power supply (14 to 36 VDC).
4. Loop powered device (true-two wire)
5. No calibration required
6. Customized process connections like Threaded / Flanged / Hygienic etc
7. Accuracy +/- 0.25% of FS
8. Remote Process Indicator Controller available on request

Applications

1. TLH is a pressure sensor for hydrostatic level measurement
2. Drinking water, dam water, bore well, well etc
3. Hydraulic monitoring in rivers and sea
4. Muddy liquid level measurement
5. Water treatment
6. Water diversion project
3. Suitable for top mounting
4. Process temperature max. 80°C
6. Process pressure max. 200 mH₂O
7. Suitable for corrosive liquids

Typical Mountings



Specifications

Sensor Supply:	14 to 36VDC
Output:	4-20mA
Load:	250 Ohm @14V to 1100 Ohm @ 36V
Insulation Resistance:	100M Ω @50Vdc
Max Measurement	1: 180mm 2: 480mm
Water Level Range	3: 980mm 4: 1,980mm 5: 4,980mm 6: 9,980mm 7: 1,9980mm 8: 49,980mm 9: 9,9980mm 10: 199,980mm
Accuracy	\pm 0.25% (standard) \pm 0.5% minimum % of Full Scale
Long-Term Stability:	< \pm 0.5% of Full Scale per Year
Response Time:	<2 mili seconds
Temperature	
1. Operating Temp. Range	0 to +70°C
2. Storage	-40°C to +125°C
3. Usable	0°C to +80°C
4. Compensated	0°C to +60°C
5. Vibration	10g(20 to 2000Hz)
6. Shock	100g(10ms)
7. Cycles	10x10 ⁶ cycles
Physical Specifications	
1. Housing	SS 304
2. Sense Diaphragm Material	SS316L
3. Seal Ring	Viton or NBR
4. Oil Filling	Silicone oil
5. Submersible Protection Class	IP68
Wetted Sensor Material	SS316
Cable Insulation	Polycarbonate/Polyurathene
Protection Head	
1. Material	Aluminum Pressure Die-Cast
2. Paint	Eopxy Polyurathene Coated
3. Protection Class	IP-68
4. Process Connection	Threaded: NPT/BSP 1" to 2" Flanged: ANSI/JIS/DIN/ASA

Specifications are subject to change without prior notice

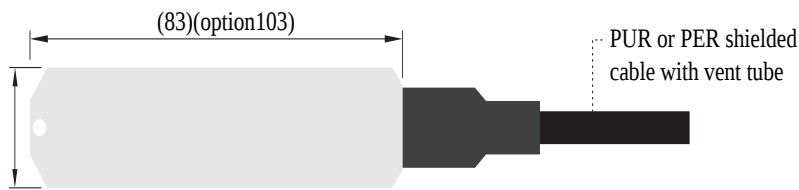
1. Safety Instructions

- 1.1 To avoid operator hazards and damages of the device, the following instructions have to be worked out by qualified technical personnel.
- 1.2 By non-observance of the operating manual, inappropriate use, modification or damage, no liability is assumed and warranty claims will be excluded.
- 1.3 Permissible media are liquids (no solids and frozen media), specified in the data sheet. In addition it has to be ensured, that this medium is compatible with the media wetted parts.
- 1.4 Install the device only when depressurized and currentless.
- 1.5 Handle this high-sensitive electronic precision measuring device with care, both in packed and unpacked condition.
- 1.6 There is a plastic tube (the reference tube) in the special transmitter cables to connect the atmosphere. In installation and operation, connect the reference tube with the atmosphere unobstructed and prevent mud and sand stopping up the reference tube, especially water or other liquid. Otherwise, the transmitter would be destroyed.

2. General information

1. TLH series level transmitters make use of high-performance silicon piezoresistive pressure sensor as sensing element. The transmitter measures the vertical depth of a column of liquid and converts this depth into the standard amplified analog signals.
2. TLH series level transmitters feature a fully-sealed structure and are made from 304 stainless steel. The cable used in these transmitters is anti-oil, water-proof and electromagnetic effect shielded PE&PUR cable with vent hose for atmospheric pressure in. The environment protection grade of these transmitter is IP68.
3. TLH is of integrated structure with sensing element and signal conditioning circuit located and sealed in the probe housing. In application the transmitter is merged in the measured liquid. No external adjustment or calibration is needed.

Dimensions (in mm)



A. Mechanical Installation

A.1 Check before Installation

Attention before transmitter installation:

1. The static pressure produced by the liquid in the installation place may exceed the transmitter FS range.
2. The measuring liquid is compatible with the transmitter construction material or not.
3. The measuring liquid may stop up the holes on the protection cap or not.

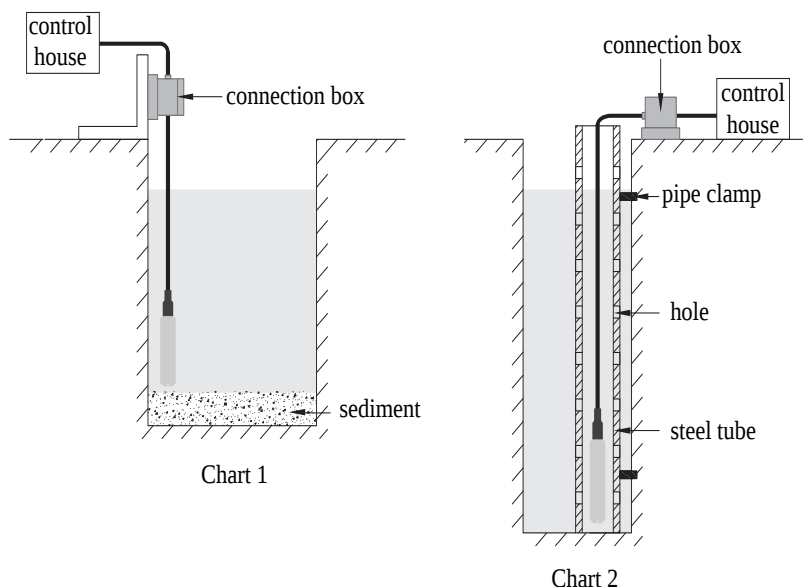
A.2 Installation Methods

1. The installation direction of transmitter is vertical down.
2. In the water flowing condition, the acted surface should be parallel with the water flowing direction.

A.2.1 Installation in the Static Water

1. The installation method in the static water indicated as chart 1.

To prevent shaking or destroying the transmitter when pumping, the transmitter should be put away from the liquid resource. Otherwise it should be installed to see chart 2, protected by steel tube.



A.2.2 Installation in Flowing Water (e.g. river channel, reservoir area)

The water-calming equipments are required.

1. Method one: Insert a steel tube in the water channel (chart 3).

The steel tube wall should be thicker, and several holes should be made on different heights of the tube to damp waves and clear the water pressure influence.

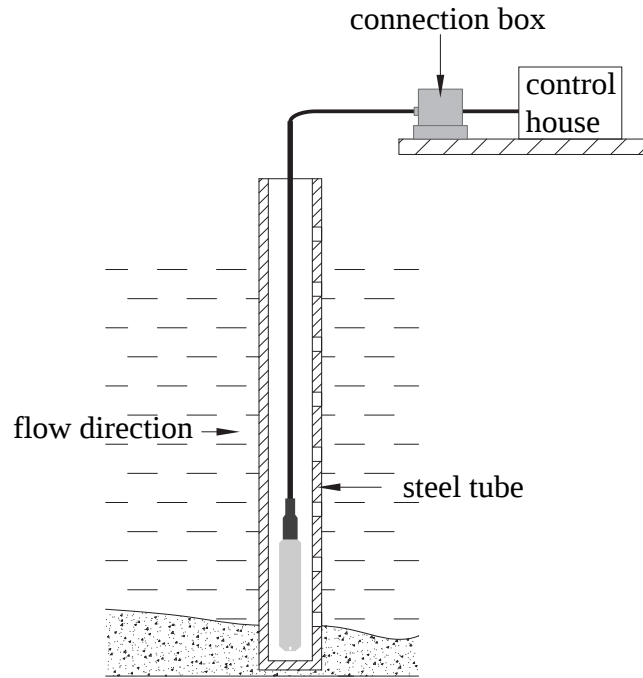


Chart 3

2. Method two: Superficial burying is better in the sand and stone channel (chart 4). This method not only can clear water flowing pressure and wave influence, but also can filter the sand and mud.

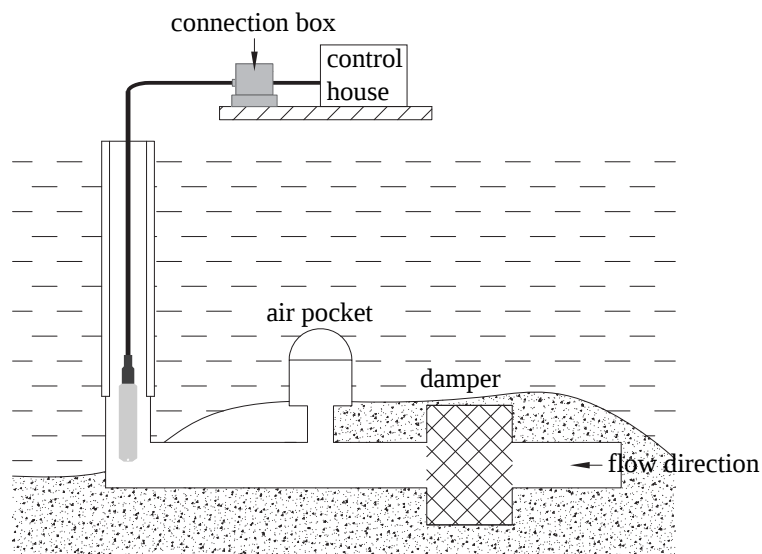


Chart 4

A. Operation

1. The customer could operate the transmitter without adjustment.
2. Please be sure that the installation and electrical connection are correct or not before operation.
3. Connect the excitation and operate.
4. The transmitter connected with excitation could work at once, but the output signal could be more reliable after 30 minutes.

B. Maintenance

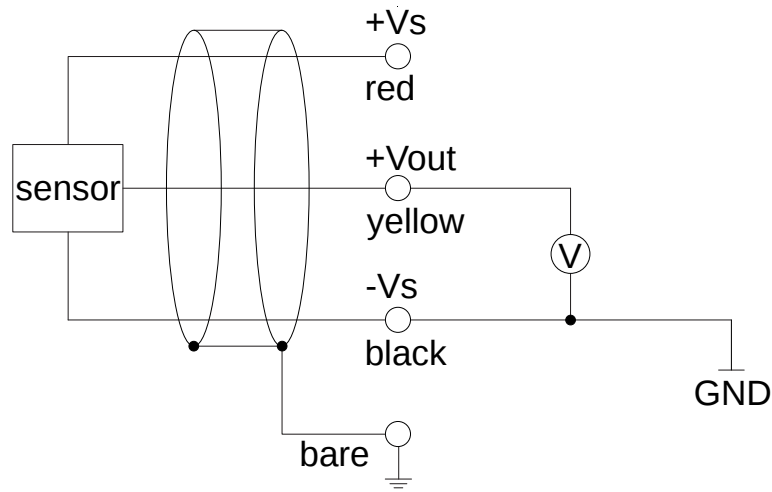
1. TLH level transmitter needs not to be maintained regularly, but please pay attention to items as follow for better operating effect and reliability.
2. Check wire connection is reliable or not, and the cable is aged or not.
3. Clean the protection cap and diaphragm space regularly(take care!).
4. Ban to pulling cables violently or poking the diaphragm with metal still objects.

C. Failure Identification

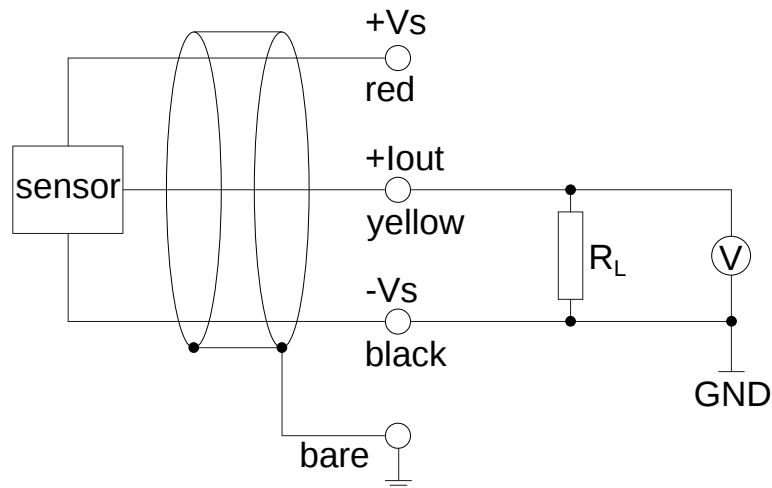
1. TLH level transmitter is integrated full-sealed construction without movable parts inside, owning long-term stability and reliability.
2. If some emergencies occur, such as no output, output too little, output too large or output unreliable, please turn off the excitation firstly, then check the installation and wire connection conform the operation menu or not, the excitation is correct or not and the reference tube is unobstructed or not.
3. If unsuccessful, the transmitter may be destroyed, please contact with our company.

Electrical Connections

0...10V, 1...5V Output



0...20mA Output



4...20mA Output

