



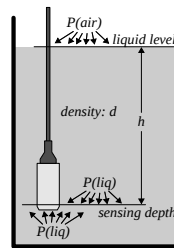
## TLH Hydrostatic Two Wire Level Transmitter



### Product Overview

Trumen hydrostatic two wire level transmitter model TLH is made from high-quality silicon piezoresistive sensor. The piezoresistive sensor is packaged in stainless steel housing. The TLH is precision engineered to fit most level measurement. The water-proof cable connects with housing sealed, with vented tube putting in, the transmitter could be used in the water or liquid in a long time. Integrated construction and standard output signal could provide easy operation and good automatic control.

### Operating Principle



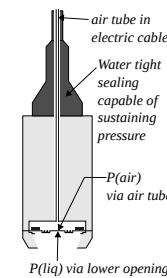
Pressure  $P(liq)$  on any surface and container walls at depth  $h$ , by the liquid of density  $d$ , is:

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

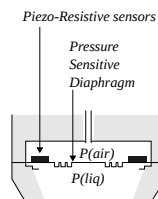
where  $P(air)$  is the air pressure and  $g$  is the acceleration due to gravity (constant for a given place) at the place of liquid container. Replacing constants the equation becomes:

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

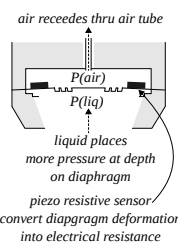
in short: Pressure difference represents liquid level. One convenient unit that clubs pressure with level is  $mH_2O$  (pressure felt at depth in meters while being immersed in water)



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.

### Applications

- Hydrostatic level transmitter is used in different applications like
  - Level measurement
  - Hydraulic monitoring in rivers and sea
  - Muddy liquid level measurement
  - Water treatment
  - Water diversion project
  - Sewage treatment plant
  - Diesel
  - Oil
  - Sea water

### Features

- Compact Size
- Liquid inventory assessment
- Easy Installation
- Measuring ranges from  $1mH_2O$  to  $200mH_2O$
- Accuracy:  $\pm 0.25\%FSO$  or  $\pm 0.5\%FSO$
- Calibrated and temperature compensated
- Stainless steel construction
- Piezoresistive pressure sensor design
- Variety of Pressure & Electrical connections
- Output 4...20mA, 0...10V, 0...5V, ModBus RS485

### Connection Diagram

#### Cable outlet

|         | 2-wire(current) | 3-wire(voltage) |
|---------|-----------------|-----------------|
| Supply+ | red             | red             |
| Signal+ | yellow          | yellow          |
| Gnd     | -               | black           |



## Performance Specifications

| Parameter | Value |
|-----------|-------|
|-----------|-------|

### General

|                |                   |
|----------------|-------------------|
| Pressure Range | 0-1,....,200 mH2O |
| Overpressure   | 1.5xFS            |

### Environmental

|                               |                           |
|-------------------------------|---------------------------|
| Operating Temperature Range   | -20 to +70 °C             |
| Compensated Temperature Range | 0 to +70 °C               |
| Storage Temperature Range     | -40 to +125 °C            |
| Vibration                     | 10 g                      |
| Shock                         | 100 g                     |
| Cycles                        | 10x10 <sup>6</sup> cycles |

### Electrical @ 25°C(77°F)

|                       |   |            |            |            |                           |
|-----------------------|---|------------|------------|------------|---------------------------|
| Output Signal         | 4...20mA  | 0...5Vdc   | 1...5Vdc   | 0...10Vdc  | 0.5...4.5Vdc(ratiometric) |
| Power Supply(Vs)      | 12...36Vdc  | 12...36Vdc | 12...36Vdc | 15...36Vdc | 5Vdc                      |
| Load Resistance       | <(Vs-12)/0.02A (For current output), >10kΩ (For voltage output) |            |            |            |                           |
| Insulation Resistance | 100MΩ @50Vdc  |            |            |            |                           |

### Physical Specifications

|                     |  |
|---------------------|--|
| Media Compatibility | All media compatible with 316L stainless steel |
| Housing             | 304 stainless steel                            |
| Diaphragm           | 316L stainless steel                           |
| Seal Ring           | Viton or NBR                                   |
| Oil Filling         | Silicone oil                                   |
| Protection          | IP68   |
| Net Weight          | Approx. 225g                                   |

| Parameter | Minimum | Typical | Maximum | Units | Notes |
|-----------|---------|---------|---------|-------|-------|
|-----------|---------|---------|---------|-------|-------|

### Performance

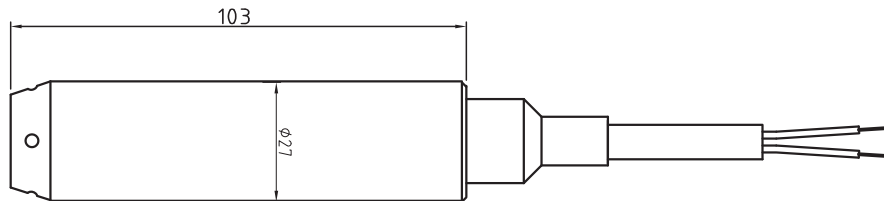
|                     |     |       |      |           |     |
|---------------------|-----|-------|------|-----------|-----|
| Accuracy            | 0.1 | 0.25  | 0.5  | %FSO      | 1,2 |
| Temp Coeff - Zero   |     | ±0.75 | ±1.5 | %FSO      | 3   |
| Temp Coeff - Span   |     | ±0.75 | ±1.5 | %FSO      | 3   |
| Long-Term Stability |     | ±0.2  | ±0.3 | %FSO/year | 1   |

### Notes

1. All values measured at 25°C(77°F)
2. Including non-linearity, hysteresis and repeatability.
3. 0°C to 70°C(32°F to 158°F) with reference to 25°C(77°F).

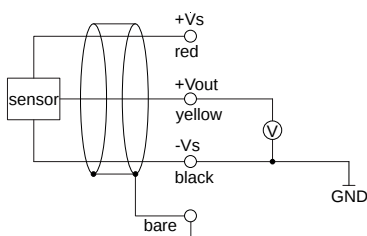
The listed specifications and dimensions are subject to change without prior notice.

### Dimensions (in mm)

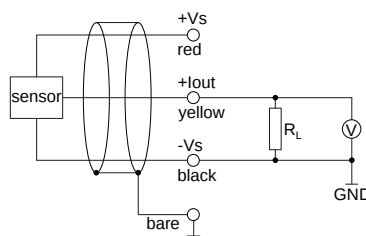


## Electrical Connections

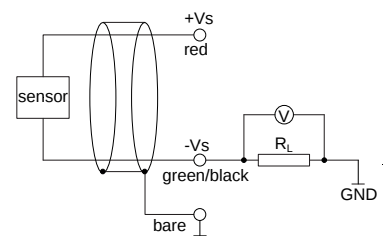
### 0...10V, 1...5V Output



### 0...20mA Output



### 4...20mA Output

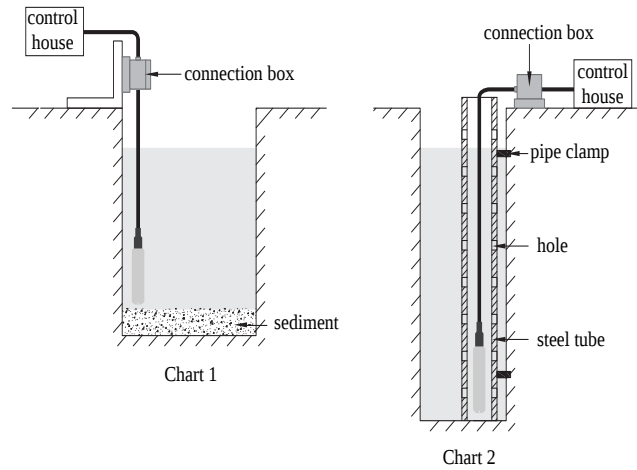


## Mechanical Installation

### A. Installation in the Static Water

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.

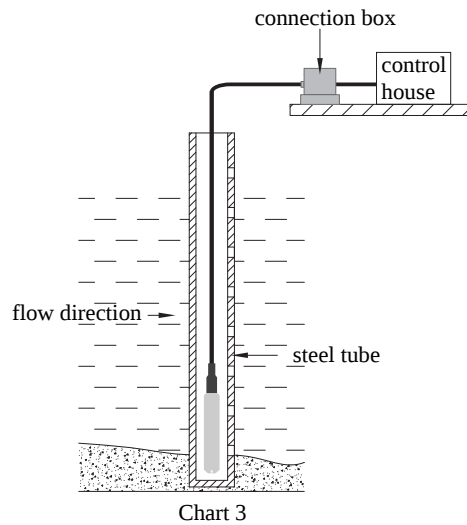


### B. Installation in Flowing Water (e.g. river channel, reservoir area)

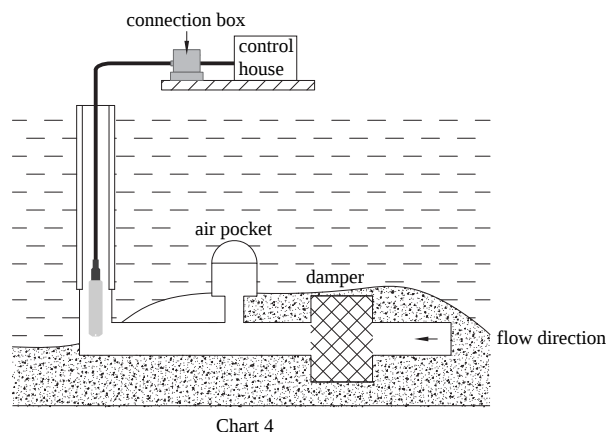
The water-calming equipments are required

- 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.



- 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.



# TLH: Hydrostatic Two Wire Level Transmitter

## Ordering Information

TLH **Hxx** - **Pxx** - **Cx** - **Dxx** - **Bxxx** - **Lxxxx**

### Enclosure

**HAN:** Aluminum Non-Hazardous IP-67 / 68  
**HPN:** Polycarbonate (Plastic)

### Process Connection Type

**PB1:** 1" BSP  
**PB2:** 1-1/2" BSP  
**PB4:** 1-1/4" BSP  
**PB5:** 2" BSP  
**PN1:** 1" NPT  
**PN2:** 1-1/2" NPT  
**PN4:** 1-1/4" NPT  
**PN5:** 2" NPT  
**PFL:** Flanged Type (Fxxx)  
**F001:** 1/2" B16.5 ANSI/ASA 150#RF  
**F002:** 3/4" B16.5 ANSI/ASA 150#RF  
**F003:** 1" B16.5 ANSI/ASA 150#RF  
**F004:** 1-1/4" B16.5 ANSI/ASA 150#RF  
**F005:** 1-1/2" B16.5 ANSI/ASA 150#RF  
**F006:** 2" B16.5 ANSI/ASA 150#RF  
**F007:** 2-1/2" B16.5 ANSI/ASA 150#RF  
**F008:** 3" B16.5 ANSI/ASA 150#RF  
**F009:** 4" B16.5 ANSI/ASA 150#RF  
**F010:** 5" B16.5 ANSI/ASA 150#RF  
**F011:** 6" B16.5 ANSI/ASA 150#RF  
**PCS:** Special Process Connection

### Process Connection Material

**C4:** SS 304  
**C6:** SS 316  
**CL:** SS 316L  
**CS:** Special Surface

### Cable Length

### Pressure Range in Meters

**B1:** 0...1mH<sub>2</sub>O  
**B2:** 0...2mH<sub>2</sub>O  
**B3:** 0...3mH<sub>2</sub>O  
**B4:** 0...4mH<sub>2</sub>O  
**B5:** 0...5mH<sub>2</sub>O  
**B6:** 0...6mH<sub>2</sub>O  
**B7:** 0...7mH<sub>2</sub>O  
**B8:** 0...8mH<sub>2</sub>O  
**B9:** 0...9mH<sub>2</sub>O  
**B10:** 0...10mH<sub>2</sub>O  
**B11:** 0...11mH<sub>2</sub>O  
**B12:** 0...12mH<sub>2</sub>O  
**B13:** 0...13mH<sub>2</sub>O  
**B14:** 0...14mH<sub>2</sub>O  
**B15:** 0...15mH<sub>2</sub>O  
**B20:** 0...20mH<sub>2</sub>O  
**B25:** 0...25mH<sub>2</sub>O

### Output Options

**DLP:** DC Loop Powered 4-20mA  
**DVO:** DC Powered 0...10Vdc  
**DMB:** DC Powered ModBus Over RS485