TEKTROL

Technology Solutions

# TEK-SUB 4800E

## OEM Submersible Level Transmitter

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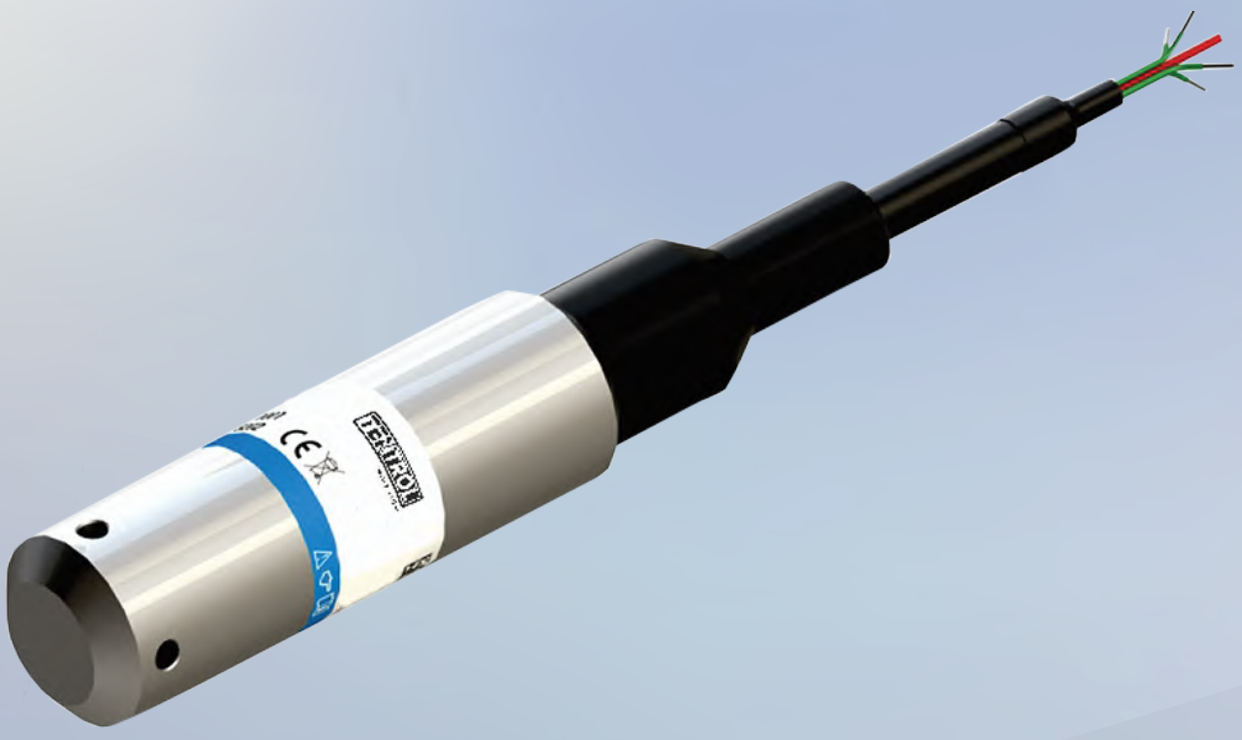
## Instruction Manual

**Document Number: IM-4800E**



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**NOTICE**
Read this manual before working with the product. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before installing, using, or maintaining this product.

For technical assistance, contact
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## Table of Contents

# 1 Safety Instructions

## 1.1 Intended Use

The Tek-Sub 4800E OEM Submersible Level Transmitter is used to calculate the level of liquid in a tank by measuring the hydrostatic pressure in the tank.

## 1.2 Safety Instructions from the Manufacturer

### 1.2.1 Disclaimer

The manufacturer will not be held accountable for any damage that happens by using its product, including, but not limited to direct, indirect, or incidental and consequential damages.

Any product purchased from the manufacturer is warranted in accordance with the relevant product documentation and our Terms and Conditions of Sale. The manufacturer has the right to modify the content of this document, including the disclaimer, at any time for any reason without prior notice, and will not be answerable in any way for the possible consequence of such changes.

### 1.2.2 Product Liability and Warranty

The operator shall bear authority for the suitability of the device for the specific application. The manufacturer accepts no liability for the consequences of misuse by the operator. Wrong installation or operation of the devices (systems) will cause the warranty to be void. The respective Terms and Conditions of Sale, which forms the basis for the sales contract shall also apply.

### 1.2.3 Information Concerning the Documentation

To prevent any injury to the operator or damage to the device it is essential to read the information in this document and the applicable national standard safety instructions. This operating manual contains all the information that is required in various stages, such as product identification, incoming acceptance and storage, mounting, connection, operation and commissioning, troubleshooting, maintenance, and disposal.

## 1.3 Safety Precautions

You must read these instructions carefully prior to installing and commissioning the device. These instructions are an important part of the product and must be kept for future reference. Only by observing these instructions, optimum protection of both personnel and the environment, as well as safe and fault-free operation of the device can be ensured. For additional information that are not discussed in this manual, contact the manufacturer.

**Warnings and Symbols Used**

The following safety symbol marks are used in this operating instruction manual and instrument.

**WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury

**CAUTION**

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

**NOTE**

Indicates that operating the hardware or software in this manner may damage it or lead to system failure.

## 1.4 Packaging, Transportation and Storage

### 1.4.1 Packaging

The original manufacturer's package consists of

1. Tek-Sub 4800E OEM Submersible Level Transmitter

### 1.4.2 Accessories

**Cable Strain Relief Camp**

### 1.4.3 Transportation

- Avoid impact shocks to the device and prevent it from getting wet during transportation.
- Verify local safety regulations, directives, and company procedures with respect to hoisting, rigging and transportation of heavy equipment.
- Transport the product to the installation site using the original manufacturer's packing whenever is possible.

### 1.4.4 Nameplate

The Nameplate lists the order number and other important information. Such as design details and technical data.

**NOTE**

Check the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.


Fig 1. Nameplate

# 2 Product Description

This Section covers the reference and specification data, as well as the ordering information.

## 2.1 Introduction

The Tek-Sub 4800E OEM submersible level transmitter is specifically designed for immersion-based hydrostatic level measurement in aggressive field conditions. Featuring a precision of ±0.25% FS, it supports continuous monitoring in depths up to 120 meters $H_2O$. The device complies with IP68 standards, ensuring long-term operational reliability in fully submerged installations.

## 2.2 Measuring Principle

The Tek-Sub 4800E OEM Submersible Level Transmitter consists of a sensor attached to a long cable, which is lowered to the bottom of a tank or well. The sensor operates by measuring the hydrostatic pressure of the liquid. Hydrostatic pressure (or head pressure) is the pressure exerted by the liquid in the tank or well. The hydrostatic pressure measured by the sensor is determined by two parameters: the density and height of the liquid. With liquid density remaining constant, changes in hydrostatic pressure necessarily reflect a difference in liquid level.

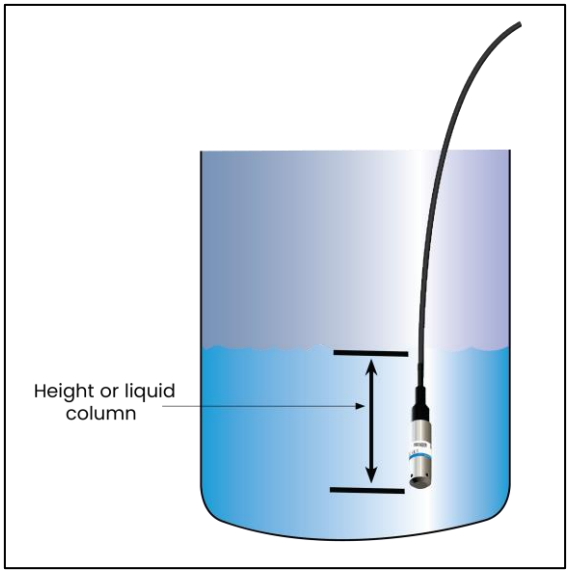



Fig 2. Measuring the Principle

## 2.3 Operations

The pressure at the bottom of the tank is related to the height of the liquid. This pressure is called hydrostatic pressure or head pressure. Typical units for measurement of hydrostatic pressure are inches, feet, or meters of water column. In a water column, the hydrostatic pressure of 27.7" w.c. is approximately equivalent of 1 PSI. The volume of water or shape of the tank or vessel does not affect the hydrostatic head pressure as it is height of water that affects the pressure. Whether it is in a large water tank or a small bucket of water, the hydrostatic pressure of 27.7" w.c. is the same. Modern PLC's and HMIs can

calculate the liquid level of a tank by entering the geometry of the tank and the specific gravity of the liquid.

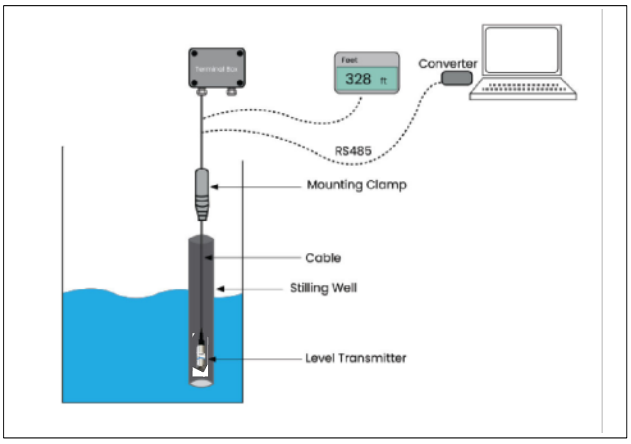



Fig 3. Mounting the Transmitter

## 2.4 Technical Specification

| | |
|---|---|
| **Nominal Pressure** | 1 to 30 Psi (0.7 to 21 mH2O) |
| **Accuracy** | 0.25%FS@25°C (Typ.) |
| **Operating Temperature** | -10 to 50°C |
| **Compensated Temperature Range** | -10 to 50°C |
| **Temperature Coefficient - Zero** | ±0.75 [Typ.], ±1.5 [Max.] |
| **Temperature Coefficient - Span** | ±0.75 [Typ.], ±1.5 [Max.] |
| **Long Term Stability** | 0.2% FS / Year |
| **Output Signal** | • 4-20MA<br>• DC 1.....5V30VDC<br>• DC 0.5....4.5V<br>• MODBUS RTU |
| **EMC Test** | IEC61000-6-2/IEC61000-6-3 |
| **Vibration** | 20g Force (20 to 2000 Hz) |
| **Operating Temperature** | 14°F to 140°F (-10°C to 60°C) |
| **Vibration** | 10g force (20 to 2000Hz) |
| **Shock** | 100g Force (10ms) |
| **Cycles** | $10x10^5$ Cycles |
| **Insulation Resistance** | 100 MΩ @ 100VDC |
| **Housing / Diaphragm** | 316 Stainless Steel |
| **Cable** | PUR, PE, PTFE |
| **Oil Filling** | Silicone Oil |
| **Protection** | IP68 |
| **Protection Cap** | Stainless Steel |
| **Reverse Polarity Protection** | No damage – no function |
| **Weight** | -250g (without cable) |

## 2.5 Dimensional Drawing

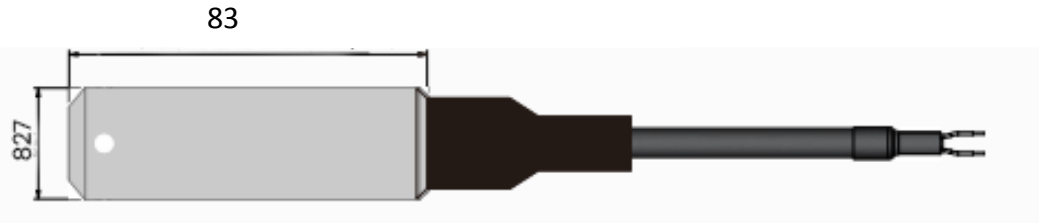



Fig 4. Dimensional Drawing

# 3 Installation

This section covers instructions on installation and commissioning. Installation of the device must be carried out by trained; qualified specialist authorized to perform such work.

**CAUTION**

- Installation must comply with local installation requirements and local electrical code.
- Do not switch on the power supply to the transmitter while installing it. It may cause injury to the operating personnel.
- Prevent mud and sand from accumulating on the sensor probe. Otherwise, the transmitter would be damaged.

## 3.1 Consideration would be taken before Installation

Before installation make sure that:

- The static pressure produced by the liquid at the installation site does not exceed the transmitter's FS range.
- The measuring liquid is compatible with the transmitter's construction material.
- While mounting the transmitter, avoid areas subject to electrical noise, excessive vibrations and radiant heat.

## 3.2 Installation Method

The Tek-Sub 4800E OEM Submersible Level Transmitter is suitable for static, as well as flowing liquid level measurement applications.

- Ensure that the measuring liquid is compatible with the transmitter's construction material.
- Insert the transmitter vertically down in the measurement container

- Ensure that the transmitter is completely immersed in the liquid for maximum accuracy.
- Ensure the protection cap holes are not blocked due to suspended particles in the measuring liquid.

### 3.2.1 Installation in the Static Liquid

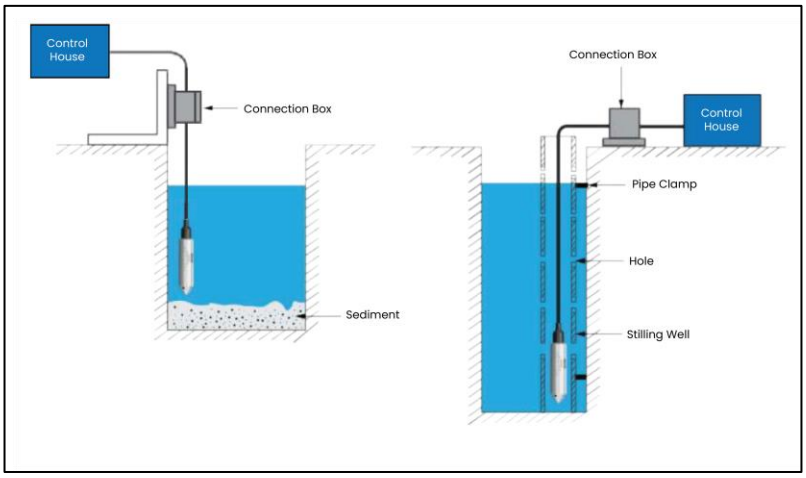



Fig 5. Installation in the Static Liquid

Place the transmitter away from liquid resource to avoid effects of vibration and pressure influence. A stilling well is recommended for the best results.

### 3.2.2 Installation in a Flowing Liquid

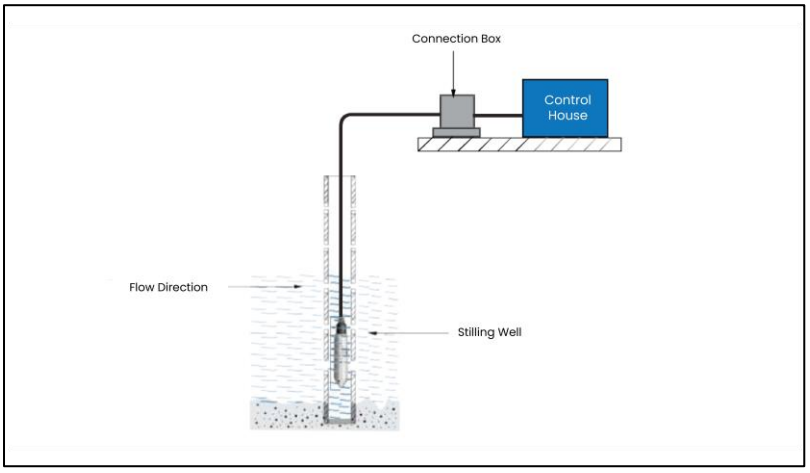



Fig 6. Installation in a Flowing Liquid

A stilling well is recommended when there is a flowing liquid. A stilling well will dampen disruptions and provide a steady level for an accurate measurement.

# 4 Electrical Installations

This section provides general information on the electrical connections of the Tek-Sub 4800E OEM Submersible Level Transmitter.

An external power supply delivering 12-36 VDC with minimum current capability of 40 mA DC (per transmitter) is required to power the control loop.

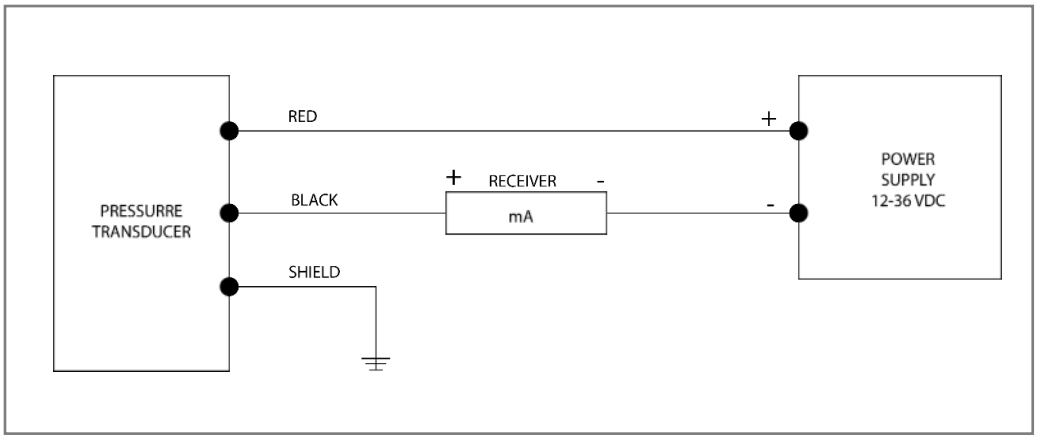



Fig 7. Power supply connections

The maximum receiver load resistance (RLmax) for the DC power supply voltage (Vs) is expressed as:

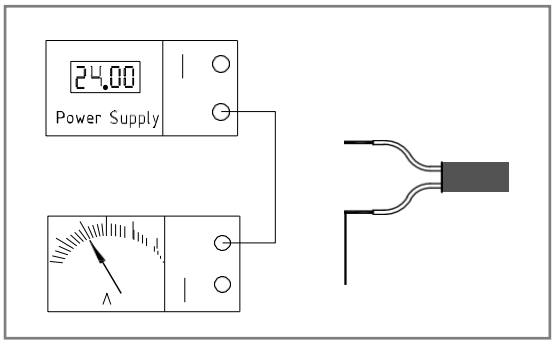
$$RLmax = Vs - 12V / 0.02A$$

Use of a shielded cable is recommended for control loop wiring.

Ensure proper ground connection. Improper grounding may lead to damage or poor signal integrity

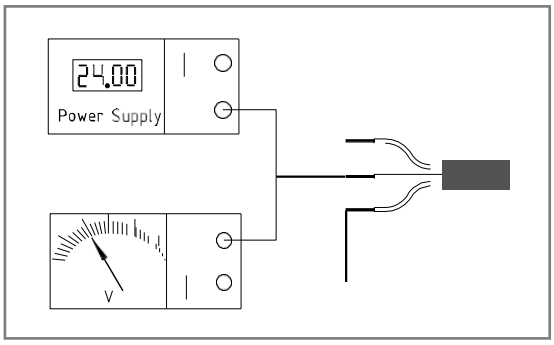
## 4.1 Wiring Diagram

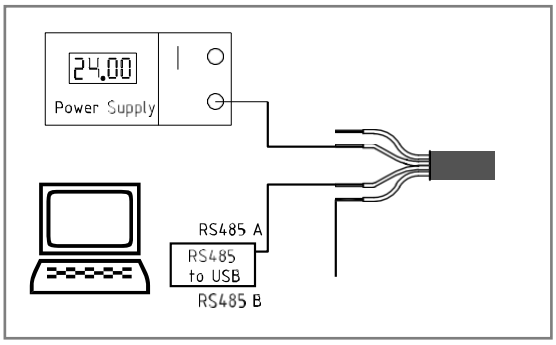
4~20mA/4~20mA+HART (2wire)
Power+: Red
Signal+: Green



0~5voc/1~5voc/0.5~4.5V/0~10VDC(3 wire)
Power+: Red
Gnd: Green
Signal+: Yellow

RS485 (4 wire)
Power+: Red
Gnd: Green
485 A: Yellow
485 B: Blue




| Cable Outlet | | | | |
|---|---|---|---|---|
| | 4...20mA 2-wire | 1...5VDC 3-wire | 0.5...4.5VDC 3-wire | RS485 4-wire |
| **+Vcc** | Red | Red | Red | Red |
| **OUT/RS485A/SDA** | Green | Green | Yellow | Yellow |
| **GND** | NA | Yellow | Green | Green |
| **RS485 B/SCL** | - | - | - | Blue |

**NOTE**

**Requirement for Electrical Connection**

- Cable diameter matches the cable bushing of the mating connector.
- Cable gland and Seals of the mating connector are correctly seated.
- Requirements for shielding and grounding. The instrument must be connected to the equipotential bonding of the plant. The connection is made via the process connection of the instrument.
- With cable outlets, no humidity can ingress at the cable end. Make sure that no moisture enters at the cable end.

# 5 Operation

This Section covers operations technique and guidelines.

- The Tek-Sub 4800E OEM Submersible Level Transmitter can be operated without any adjustment.
- Make sure that the installation and electrical connections are done properly before operations.
- Connect the excitation and operate.
- Wait for at least 30 minutes after connecting the excitation for reliable output signal.

# 6 Maintenance

This section covers maintenance techniques and guidelines.

The Tek-Sub 4800E OEM Submersible Level Transmitter does not require regular maintenance; however, the following points must be observed for better operations and reliability:

- Make sure that the wire connection is reliable.
- Make sure that the cable is not damaged.
- Clean the protection cap and diaphragm space regularly.
- Do not pull the cables violently or poke the diaphragm with metal objects.

# 7 Troubleshooting

| **Symptom** | **Corrective Action** |
|---|---|
| No Output or Low Output | Check the polarity of the terminals. Check for intermittent shorts, open circuits and multiple grounds. |
| | Check that the adequate voltage is supplied to the transmitter. The transmitter requires 12 to 36 VDC. |
| | Verify sensor positioning and consider sensor cleaning. |
| High Output | Check for dirty or defective terminals and interconnecting pins |
| | Check that the adequate voltage is supplied to the transmitter. The transmitter requires 12 to 36 VDC. |
| | Check the sensor limits to ensure that input to the sensor is within the range. |
| Erratic Output | Check that the adequate voltage is supplied to the transmitter. The transmitter requires 12 to 36 VDC. |
| | Check the polarity of the terminals. Check for intermittent shorts, open circuits and multiple grounds. |
| | Verify sensor positioning and consider sensor cleaning. |

If error persists, contact Tek-Trol representative immediately



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