



TEK-SUB 4800F

Flush Ceramic Submersible Level Transmitter

Instruction Manual

Document Number: IM-4800F



www.tek-trol.com

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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1 Safety Instructions

1.1 Intended Use

The Tek-Sub 4800F Flush Ceramic 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 4800F Flush Ceramic Submersible Level Transmitter



1.4.2 Accessories

Filter Element



By preventing dirt and moisture from infiltrating the venting tube, the filter element enhances durability, while the watertight diaphragm provides secure protection for the ceramic submersible-level transmitter.

Terminal Box



The Flush ceramic submersible level transmitter's electrical termination is guaranteed to be dry and secure thanks to the terminal box's IP 66 ingress protection and watertight ventilation feature. It is suggested that it be mounted within the switch cabinet or in a dry location.

Cable Strain Relief Clamp



The cable strain relief clamp ensures a secure and effortless attachment of the ceramic submersible pressure transmitter's cable at the measuring location. It helps guide the cable, preventing mechanical damage and reducing tensile strain.

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 4800F Flush Ceramic Submersible Level Transmitter features a ceramic capacitive pressure sensor housed in durable stainless steel. Designed for accuracy and versatility, it suits a wide range of level measurement tasks. Its waterproof cable is securely sealed with a vented tube, allowing for long-term use in water or other liquids. The transmitter's integrated design and standardized output signal ensure straightforward installation and reliable automation.

2.2 Measuring Principle

The Tek-Sub 4800F Flush Ceramic 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.

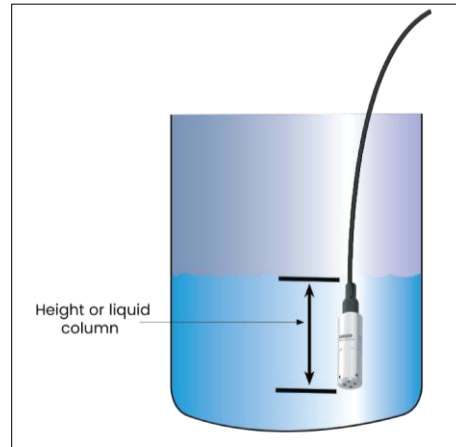


Fig 2. Measuring Principle

2.3 Operations

Typical Tek-Sub 4800F Flush Ceramic Submersible Level Transmitter.

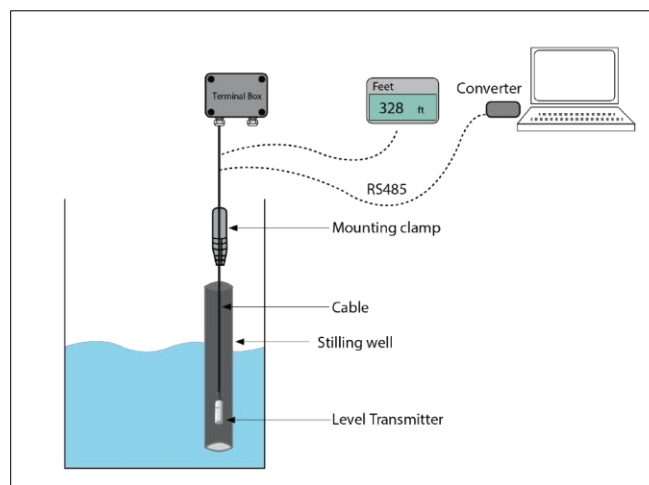


Fig 3. Mounting the transmitter

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 HMI's can calculate the liquid level of a tank by entering the geometry of the tank and the specific gravity of the liquid.

2.4 Technical Specification

Pressure Range	5 to 20 Psi (3.5 to 14 mH ₂ O)
Pressure Type	Gauge (Vented)
Overpressure	500% F.S.
Accuracy	±0.25 % F.S.
Temperature Coefficient - Zero	±0.75 F.S. (typ.), ±1.5 F.S. (Max) Over Compensated
Temperature Coefficient - Span	±0.75 F.S. (typ.), ±1.5 F.S. (Max) Over Compensated
Long Term Stability	0.2% FS
Output Signal	4-20 mA + HART, RS 485, 0.5-4.5 VDC
Power Supply (Vs)	12 to 36 VDC
Loop Resistance (R_L)	$R_L < (V_s - 12) / 0.02A$
Operating Temperature	114°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
Compensated Temperature Range	32°F to 140°F (0°C to 60°C)
Housing	316 Stainless Steel
Cable	PUR, PE, PTFE
Diaphragm	Ceramic
Seal Ring	Viton
Weight	~1.32 lbs (600 g) [without cable]

2.5 Dimensional Drawing

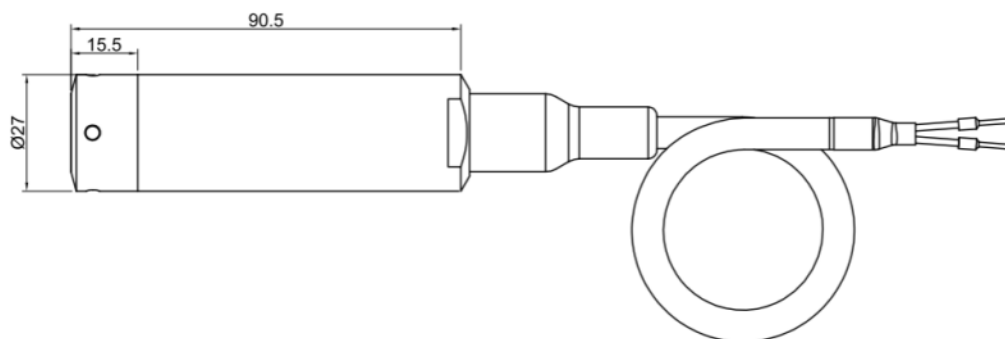


Fig 2. Dimensional Drawing

2.6 Model Chart

Example	Tek-Sub 4800F	05	43	05	P14	LP	Tek-Sub 4800F-05-43-05-P14-LP
Series	Tek-Sub 4800F						Flush Ceramic Submersible Level Transmitter
Range		05 10 15 20					5 psig (3.5 meters H2O) 10 psig (7 meters H2O) 15 psig (10.5 meters H2O) 20 psig (14 meters H2O)
Output			43 45 48 49				4-20mA, HART 0.5-4.5 VDC Low-Voltage Modbus (5 VDC) Modbus RS-485
Accuracy				05			0.25% FS
Cable Length and Type					P14 P20 P34 T14 T20 T34		40 Feet of Polyurethane Cable 60 Feet of Polyurethane Cable 100 Feet of Polyurethane Cable 40 Feet of PTEF Cable 60 Feet of PTEF Cable 100 Feet of PTEF Cable
Option						LP JB H	Lighting Surge Protection Box Mount Junction BOX Submersible Cable Hanger

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:

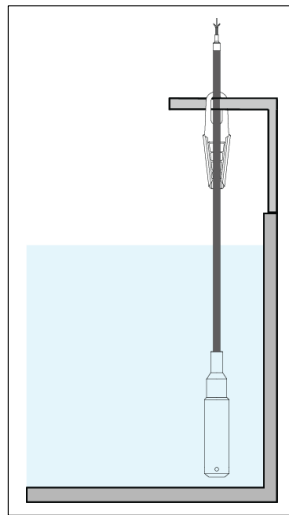
- The static pressure produced by the liquid at the installation site does not exceed the transmitter's FS range.
- The measuring liquid is compatible with the transmitter's construction material.
- While mounting the transmitter, avoid areas subject to electrical noise, excessive vibrations and radiant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

3.2 Installation Method

The Tek-Sub 4800F Flush Ceramic Submersible Level Transmitter is suitable for static, as well as flowing liquid level measurement applications. The transmitter is factory calibrated and ready for operation without adjustment.

- 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.

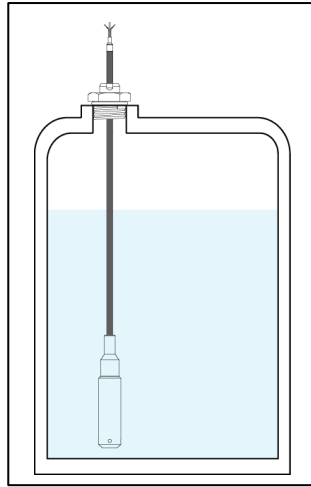
3.2.1 Installation with Cable Strain Relief Clamp



Mount the cable strain relief clamp.

- Consider both the device's and the extension cable's weight when choosing the attaching location.
- Press the clamping jaws up. Follow the graphic's instructions to position the extension cable between the clamping jaws.
- While holding the extension cable in place, press the clamping jaws. Drop back down. The clamping jaws can be fixed in position by lightly tapping them from above.

3.2.2 Installation with Screw Conditions for Suspension Cable



1. The transmitter FS range may be exceeded by the static pressure generated by the liquid in the installation location.
2. Does the measurement liquid work well with the material used to build the transmitter?
3. The protective cap's holes may or may not be sealed by the measuring liquid.
4. The transmitter is installed vertically downward.
5. The acted surface should be parallel to the direction of the water flow when it is flowing.

4 Electrical Installations

This section provides general information on the electrical connections of the Tek-Sub 4800F Flush Ceramic Submersible Level Transmitter.

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

Following Figure illustrates the connection of the power supply, transmitter and receiver.

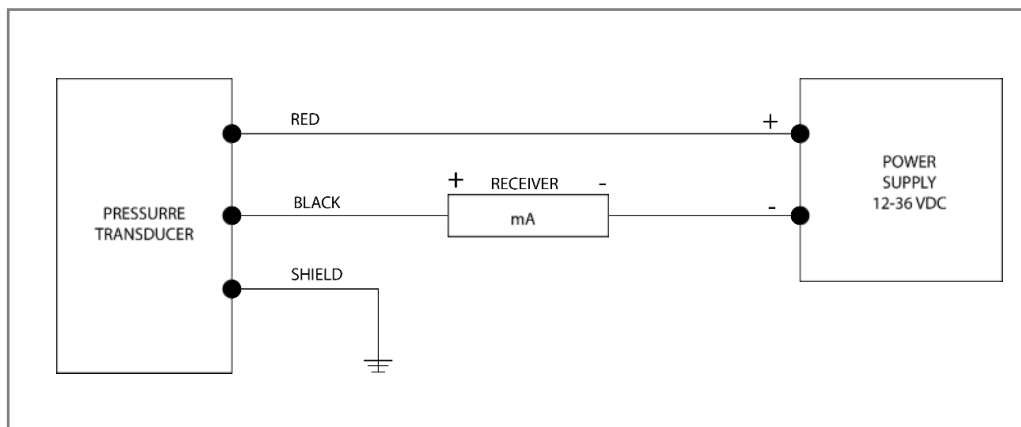


Fig.6. Power supply connections

The maximum receiver load resistance (RL_{max}) for the DC power supply voltage (V_s) is expressed as:

$$RL_{max} = V_s - 12V / 0.02A$$

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

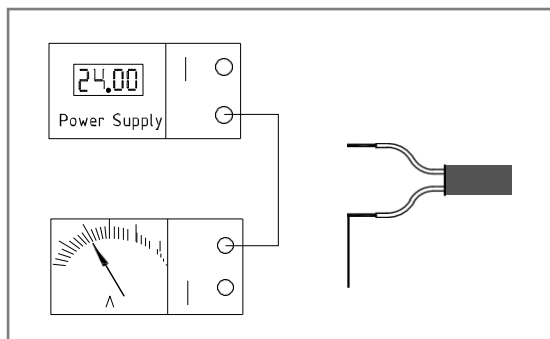
Ensure proper ground connection. Improper grounding may lead to damage or poor signal integrity

4.1 Wiring Diagram

4~20mA/4~20mA+HART (2wire)

Power+: Red

Signal+: Green

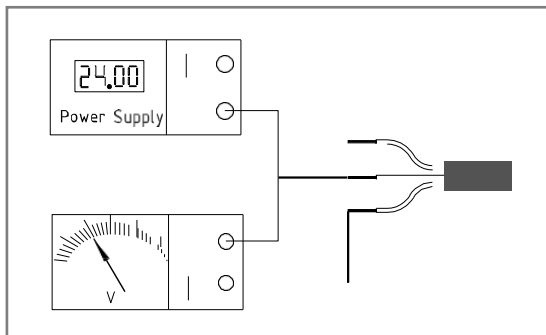


0~5voc/1~5voc/o.5~4.5V/0~10VDC(3 wire)

Power+: Red

Gnd: Green

Signal+: Yellow



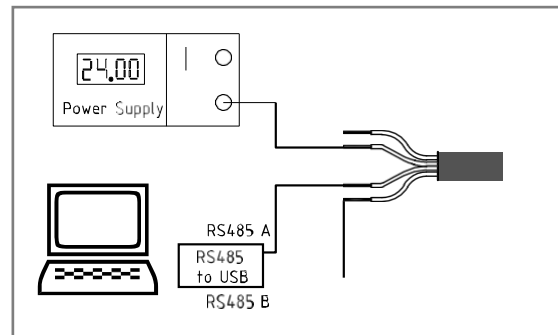
RS485 (4 wire)

Power+: Red

Gnd: Green

485 A: Yellow

485 B: Blue



Cable Outlet				
	2-wire system current output	3-wire system current output	4-wire system RS485 output	4-wire system I2C output
Supply+	Red	Red	Red	Red
Supply-	Green	Green	Green	Green
Signal+	-	Yellow	-	-
RS485 A	-	-	Yellow	-
RS485 B	-	-	Blue	-
SDA	-	-	-	Yellow
SCL	-	-	-	Blue

i 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.
- Requirement for shielding and grounding. The instrument must be connected to the equipotential bonding of the plant. The connector 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 4800F Flush Ceramic 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 4800F Flush Ceramic 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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