

**Tank Level Sensor
Model TG-EL-WF-xx**

**Installation & Operation
Instructions**

SDI-TG-EL-WF

March 6, 2006



Preferred Instruments

Danbury, CT USA

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INTRODUCTION

This manual is intended to describe the installation and operation of a **TG-EL-WF-xx** tank level sensor.

This manual is intended to be used by operators, instructors and service engineers.

The **TG-EL-WF-xx** sensor transmits a level signal to a Preferred Instruments TG-EL-Dx tank gauge.

WARNING

If this sensor will be located in a hazardous area, then you must follow all instructions in this manual AND in the TG-EL-D2, TG-EL-D3 or TG-EL-D5 instruction manual. Failure to follow all procedures in the appropriate TG-EL-Dx indicator instruction manual voids the intrinsically safe design, and may create a hazardous condition.

INSTALLATION

Examine the Shipment

Each system consists of two main components, which are packed separately, the level sensor assembly and the indicator unit. Make sure you have both parts. If cartons are missing or damaged have the fact noted on the delivery receipts to permit the claim to be filed against the transportation company.

The sensor consists of an aluminum head with 4" integral flange, a float attached to the head via a stainless steel cable, full-faced gasket, 6 butt splice crimp connectors, and epoxy filled waterproof splice kit. If any parts are missing contact the factory for replacements.

Match the level sensor Serial No. with the indicating unit Serial No. to insure compatibility and trouble free calibration. The sensor and indicator span has been factory calibrated as a matched pair. Failure to connect matching sensor and indicators will require field recalibration of the indicator span.

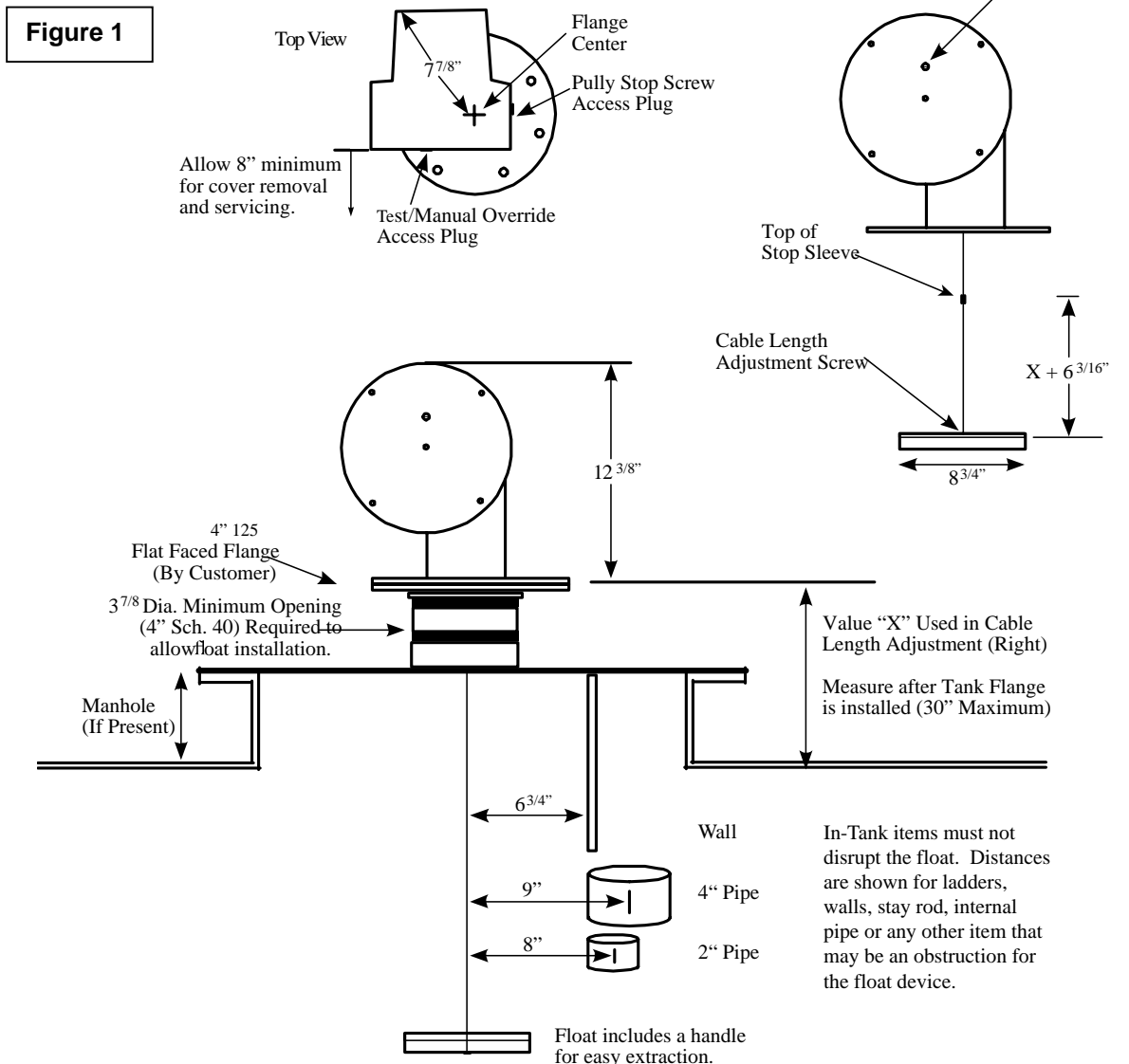
The cable storage pulley inside the sensor head has been locked in place with a shipping screw at the factory. **DO NOT PULL ON THE CABLE UNTIL THE SHIPPING SCREW HAS BEEN LOOSENED.** Do not loosen the shipping screw at this time.

Verify Job Match

Compare the actual tank dimensions and capacity with the tank dimensions and capacity on the packing slip and the transmitter mounting tag to insure compatibility.

Standard construction is suitable for most petroleum products.

For potentially corrosive liquids, verify the liquid's compatibility with stainless steel, aluminum, Teflon, nylon, and Buna N.



Select Installation location

The level sensor assembly should be installed through a 4" 125# flat faced flange (or 150# flange with raised face removed) in the top of the tank as shown in the figure below. It is recommended that a strike plate be situated directly below the coupling on the bottom of the tank. If the unit is to be standpipe mounted, the standpipe must be less than 30" above the tank I.D.

Sufficient clearance (14" min.) must be provided above the tank flange face to permit installation and removal of the level float assembly.

Make sure there is sufficient clearance inside the tank to prevent the float from touching any obstructions. See the figure below.

When the tank is underground, a suitable chamber and cover should be provided to permit installation and removal of the level sensor assembly. This is especially important when the tank is to be covered with pavement or concrete. Do not bury the level sensor.

Installation

Install a 4" 125# flat faced flange on the tank (flange, and bolts supplied by customer, full face gasket supplied with sensor).

After installing tank flange, measure distance "X" as shown on figure 1.

Pull cable from level sensor head until the stop sleeve is visible. Insert the cable through the float center hole. Pull cable, loop it up, and insert it through the offset hole. Adjust the distance from top of the float to the top of the stop sleeve to (x plus 6-3/16"), as shown in figure 1. Wrap cable 2 times clockwise around the binding screw on the float.

Tighten the binding screw on the float to secure wire at proper length. **DO NOT** over tighten. Cut off excess wire.

Put the sensor head on the ground close to the tank flange with the sensor flange facing up. Lay the gasket on the tank flange. While **slowly** pulling the cable out of the sensor head, lower the float into the tank. Continue to **slowly** lower the float until it reaches the fluid (or the bottom of the tank).

Allowing the float to free-fall into the tank can permanently damage the potentiometer inside the sensor housing.

WARNING: **DO NOT ALLOW THE FLOAT TO FREE-FALL INTO THE TANK!!**

Do not pull the cable out with rapid jerking motions. Do not allow the cable to snap back into the housing. Rapid movements in either direction may cause the cable to jump out of the pulley groves.

Unscrew and remove the spring retaining screw. Remove and discard **spring**. Securely reinstall the spring retaining **screw**.

Mount the sensor head on the tank flange and tighten the bolts.

Wiring

Follow all wiring instructions in the TG-EL-D2, TG-EL-D3 or TG-EL-D5 indicator instruction manual.

Failure to follow all procedures in the appropriate TG-EL-Dx indicator instruction manual voids the Intrinsically Safe design, and may create a Hazardous Condition.

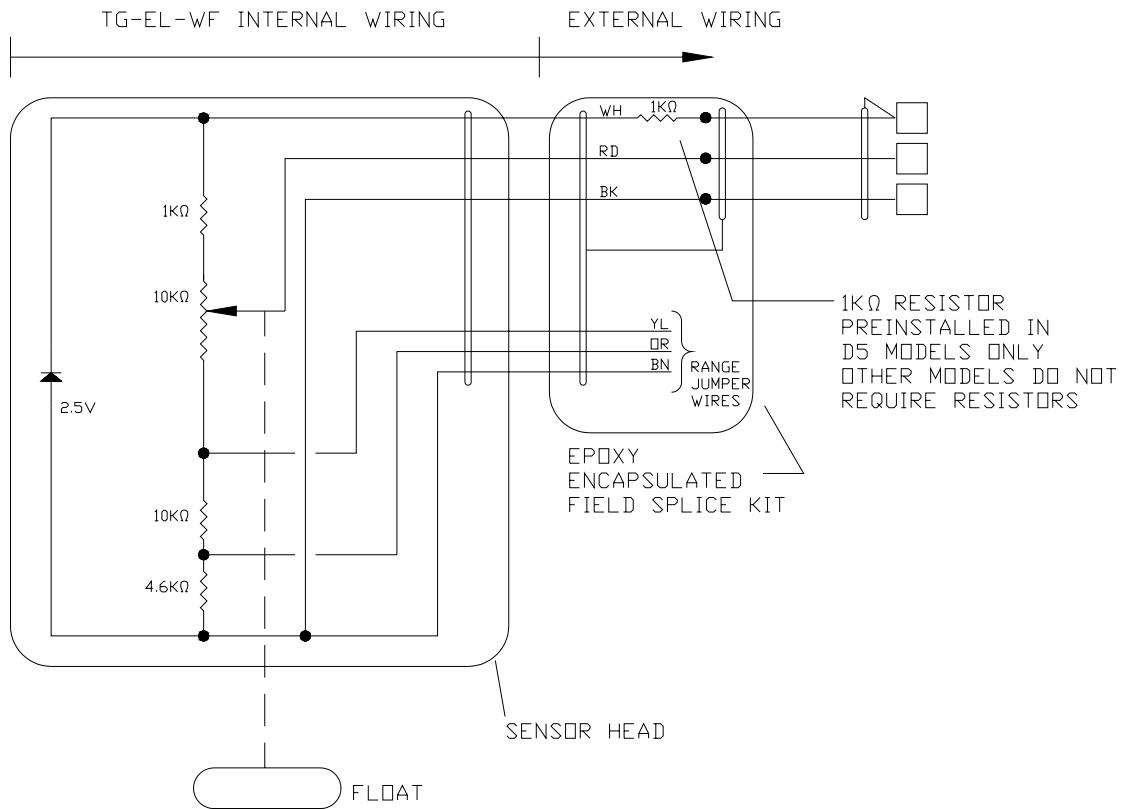
In addition to the standard signal wires, TG-EL-WF has three additional wires for range selection. These range selector wires are jumpered together in -D5 models. -D2 and -D3 models use the range jumpers for certain length tanks. These wires are not run all the way back to the indicator. These wires are either connected or insulated according to Figure 2 below, and then potted inside the epoxy splice kit at the wiring junction near the sensor head.

The shielded cable carries low voltage DC; do not run cable in conduits with AC wiring.

Water/Moisture must not contact any of the field wiring. It will cause incorrect readings. Follow the procedure to epoxy encapsulate the wiring splice as outlined in the indicator instruction manual. Make sure field wiring insulation is not 'nicked' when installing. Do not encapsulate the wiring splice until after all calibrations and tests are completed.

Power the indicator. Intrinsic safety barrier (cover) over TB3 in the TG-EL-D2 or TG-EL-D3 indicator must be installed before powering the indicator.

Figure 2



-D3, -D2 Jumpers per depth.

Tank Diameter		Range Jumper Connections:
TG-EL-WF-12	TG-EL-WF-7	
117-144"	71-84"	insulate yellow, orange, brown separately
94-117"	57-71"	connect orange to brown, insulate yellow
84-94"	41-57"	connect yellow to orange, insulate brown
all D5 levels	33-41"	connect yellow to orange to brown

CALIBRATION

In-Tank Calibration (-D2, -D3)

Stick the tank. Note the liquid depth. The level should be greater than 4" and less than 4" below full for trouble-free calibration.

Verify that the tank is set level. To obtain accurate readings from a tilted tank, the indicator should be calibrated based on the fluid level at the longitudinal center of the tank instead of the level at the dipstick location. If the tank is tilted, determine the elevation difference between the dip stick opening and at the longitudinal center of

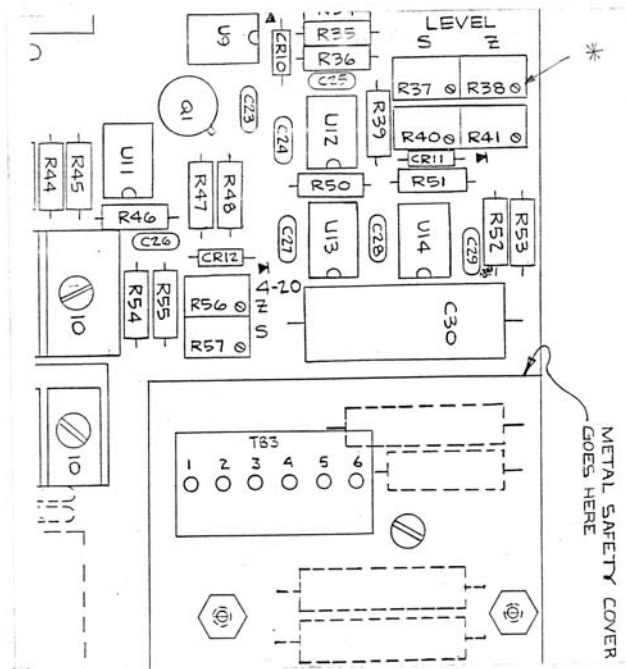
the tank to correct the stick reading when calibrating the indicator.

Press the "Liquid Depth" pushbutton on the indicator door. Adjust the "Level Z" trimpot (R38) on the main PC board until the display reads the same as the stick reading. See figure 3 for R38 location in the TG-EL-D indicator.

In-Tank Calibration (-D5)

Consult the -D5 manual for installation and calibration instructions.

Figure 3



Field Re-Calibration (-D2, -D3)

New TG-EL-D2 or D3/ TG-EL-WF system's are factory calibrated, and only require in-tank zero calibration adjustment to account for mounting height variations.

This procedure should only be used when it is not possible for the TG-EL-WF Level sensor to be factory calibrated to TG-EL-D2 or D3 indicator. This may occur after a system repair, after moving the sensor to a different tank, or if the system is ordered with incorrect tank information.

Complete all installation steps but do not lower the float sensor into the tank. Complete all wiring installation but do not power the indicator yet.

Set up the TG-EL-WF on the floor as shown in Fig. 4. Remove the shipping screw and spring.

Read the tank depth from the EPROM label and on the front door label. Verify that this is the correct tank inside height. With the float wire fully retracted onto the drum, and with the cable taut, and with the float positioned vertically, and square to the floor; align the bottom edge of the float to (Tank Depth + 2 1/2") on a tape measure. Align to within +/- 1/32" for full system accuracy. Secure the tape measure to the floor with weights, electrical tape, or other means to prevent movement for the rest of this procedure.

Move the bottom of the float to 3.0" on the tape measure. Press the DEPTH button on the front door, and adjust R38 (LEVEL Z) until the door displays 3.0. Use a square to insure that the float

is accurately positioned to within +/- 1/32" for full system accuracy.

Move the bottom of the float to (Tank Depth – 3.0") on a tape measure. Press the DEPTH button on the front door, and adjust R37 (LEVEL S) until the door displays (Tank Depth – 3.0"). Use a square to insure that the float is accurately positioned to within +/- 1/32" for full system accuracy.

Repeat both steps above until both values read correctly.

Complete normal installation, and then do the in-tank calibration described previously. In-tank calibration compensates for zero shifts due to mounting height variations.

Field Re-Calibration (-D5)

Complete all installation steps but do not lower the float sensor into the tank. Complete all wiring installation but don't power the indicator yet.

Set up the TG-EL-WF on the floor as shown in Fig. 4. Remove the shipping screw and spring.

Move the float to simulate an empty tank. Use a multimeter to measure voltage across the + to – on the analog input in the D5. Note this voltage and repeat for a full tank.

Enter these voltages into the calibration screen on the D5.

Verify proper operation by checking the depth at 25, 50, and 75 percent depths.

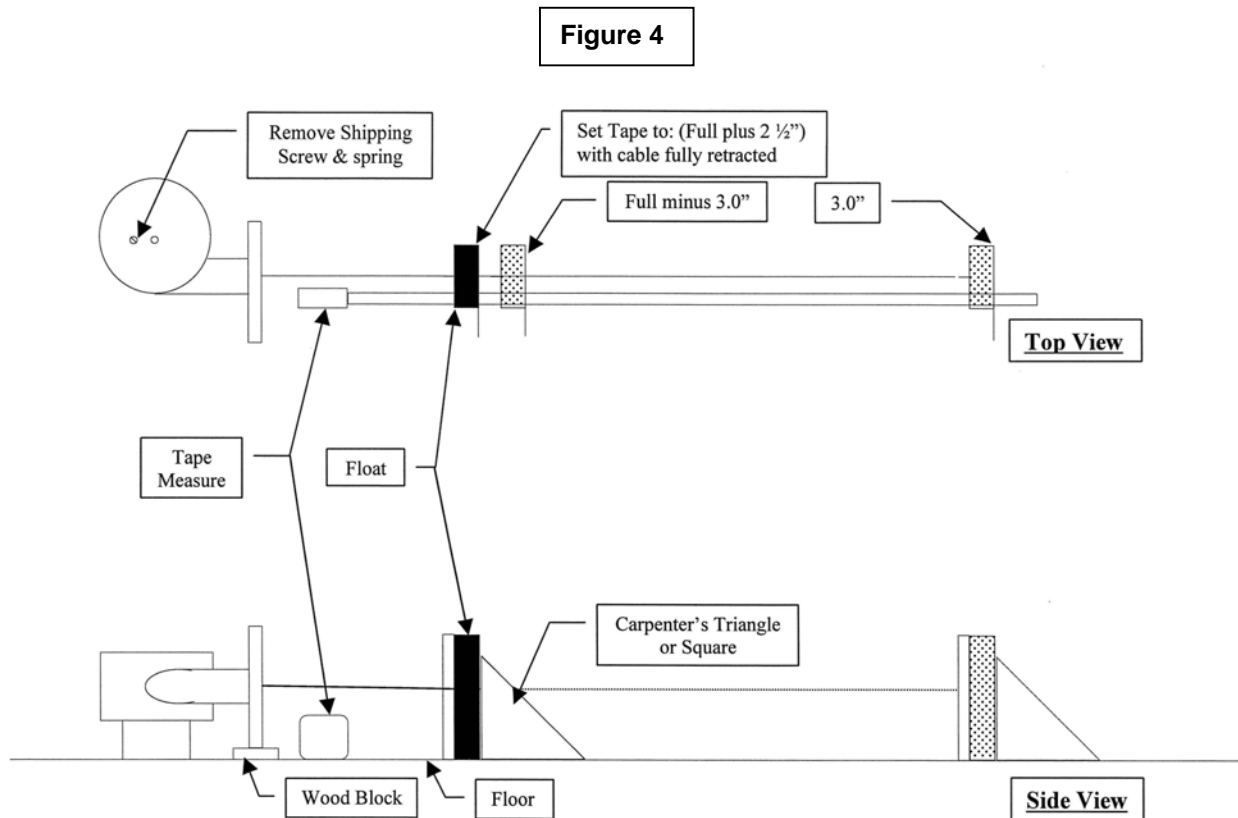
4-20 Ma Output Calibration

The TG-EL-D3 4-20 mA output can be calibrated by forcing the level input below empty and above full. This procedure is detailed in the troubleshooting section of the TG-EL-D3 instruction manuals. Please note, this procedure was written for TG-EL-LF and TG-EL-VF level sensors. However, the TG-EL-WF level sensor output signal and the mating TG-EL-D3 indicator input circuitry is opposite from the TG-EL-LF and TG-EL-VF.

Warning: Observe all precautions outlined in the TG-EL-D3 instruction manual before attempting this procedure.

For TG-EL-D3's with TG-EL-WF level sensors:
Short U13 pins 3&4 when adjusting the "Z" trim pot for 4.00 mA.
Short C30 when adjusting the "S" trim pot for 20.00 mA.

The TG-EL-D5 has an optional 4-20mA output signal. For more information, see the D5 Manual.



NOTE



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