

**Wire Float Level Sensor
Model TG-EL-WF-7-C
Model TG-EL-WF-12-C**

**Installation & Operation
Instructions**

Manual: SDI-TG-EL-WF-xx-C

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INTRODUCTION

This manual describes the installation and operation of a **TG-EL-WF-xx-C** Wire Float level sensor.

The **TG-EL-WF-xx-C** sensor transmits a 4-20 mA Ullage signal to a Preferred Instruments TG-EL-D4A or TG-EL-D5 tank gauge, and also to a wide variety of PLC, BAS, SCADA and other similar systems.

The **TG-EL-WF-7-C** has a 7 ft (84") range.
The **TG-EL-WF-12-C** has a 12 ft (144") range.

The TG-EL-WF-x-C is Intrinsically Safe when installed in a Class I, Zone 0, Group C or D Hazardous Location and connected to an Intrinsically Safe Associated Apparatus, such as the TG-EL-D4A or other I.S. devices or barriers.

WARNING

If this sensor will be located in a hazardous area, then you must follow all instructions in this manual in order to maintain the Intrinsically Safe design and ratings. Failure to follow all procedures voids the intrinsically safe design, and may create a hazardous condition

OPERATION

TG-EL-WF-x-C measures Ullage

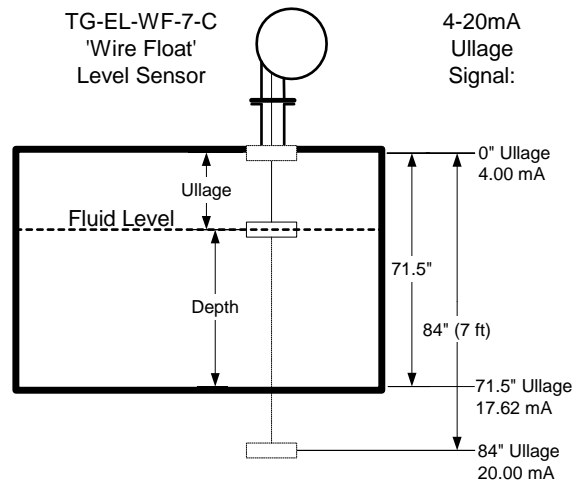
"Ullage" is the distance from the top of the tank to the top of the fluid. **TG-EL-WF-x-C** measures oil tank ullage, and the 4-20mA output is scaled to the ullage distance.

The 4-20 mA output is factory calibrated as shown below. The 4-20mA output is not intended to be custom calibrated to the inside height of each tank.

TG-EL-WF-x-C factory calibration

	Ullage mA	Ullage mA
TG-EL-WF-7-C	0" 4	84" 20
TG-EL-WF-12-C	0" 4	144" 20

The Preferred **TG-EL-D4A** or **TG-EL-D5** tank gauge (or other data acquisition system) scales the 4-20mA signal to inches (or cm) and then determines Fluid Depth as follows:
Fluid depth = Inside Height – Ullage.



INSTALLATION

Examine the Shipment

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, 3 butt splice crimp connectors, and epoxy filled waterproof splice kit. If any parts are missing contact the factory for replacements.

The cable storage pulley inside the sensor head has been restrained with a shipping screw and spring at the factory. **DO NOT LOOSEN THE "DRAG BRAKE SPRING SCREW" AT THIS TIME.**

Verify Job Match

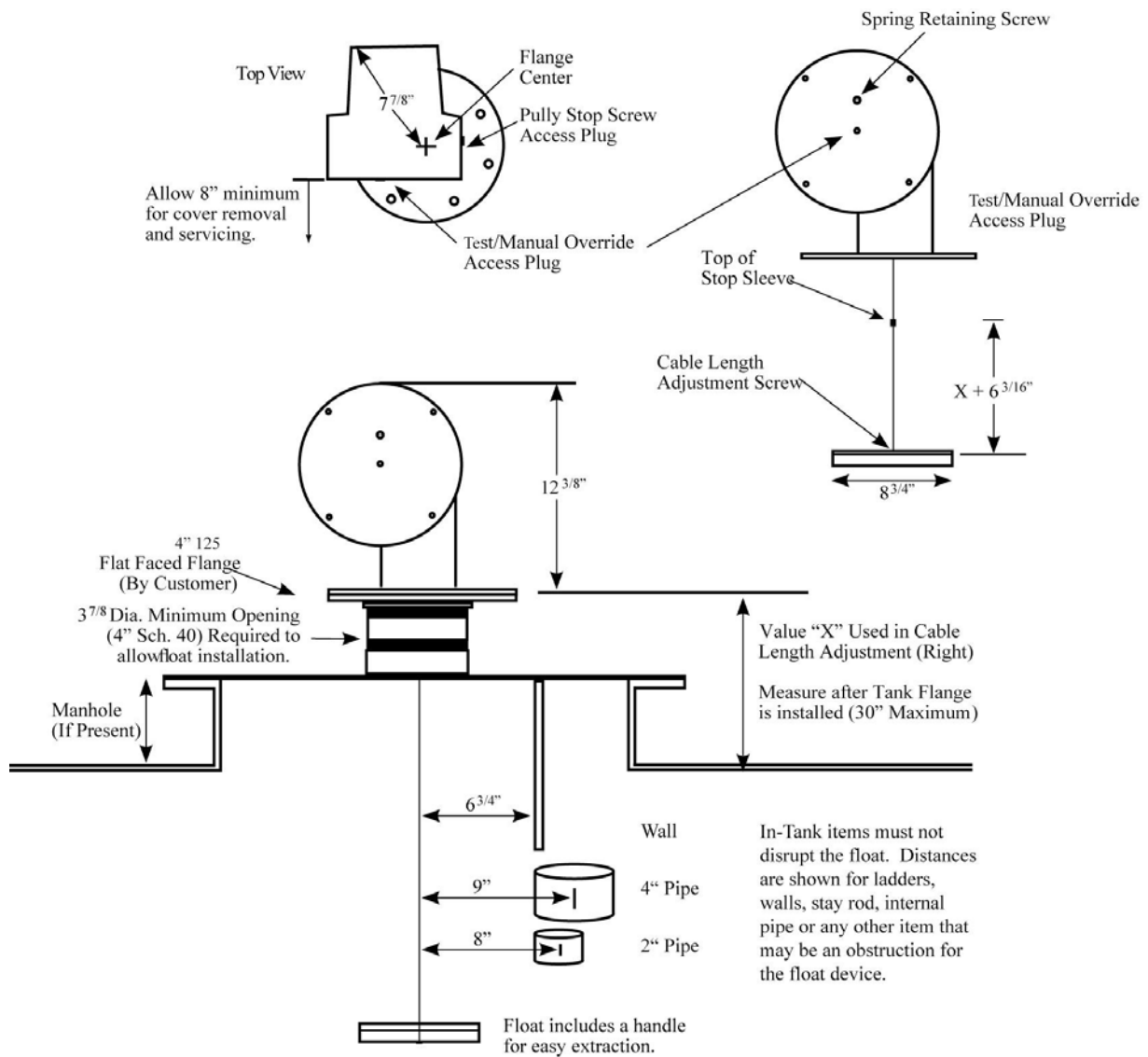
Verify that the tank height is compatible with the **TG-EL-WF-xx-C** range ratings:

TG-EL-WF-7-C	7 ft (84") range
TG-EL-WF-12-C	12 ft (144") range.

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.

Figure 1



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

Gently pull the cable from level sensor head until the stop sleeve is visible. 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.

Insert the cable through the center hole in the float. Then loop it back up and through the offset hole. Adjust the distance from top of the float to the top of the stop sleeve to ("X" + 6³/₁₆"), as shown in figure 1.

Wrap the cable 2 times clockwise around the binding screw on the float. Tighten the screw on the float to secure wire at proper length. **DO NOT** over tighten. Cut off excess wire.

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

Allowing the float to free-fall into the tank can permanently damage the internal sensor.

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** pull out the cable until the float is 1-2 ft above the fluid (or the bottom of the tank), and then place the sensor on the tank flange.

Slowly unscrew the spring retaining screw to allow the float to move the final 1-2 ft down to the fluid (or the bottom of the tank).

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

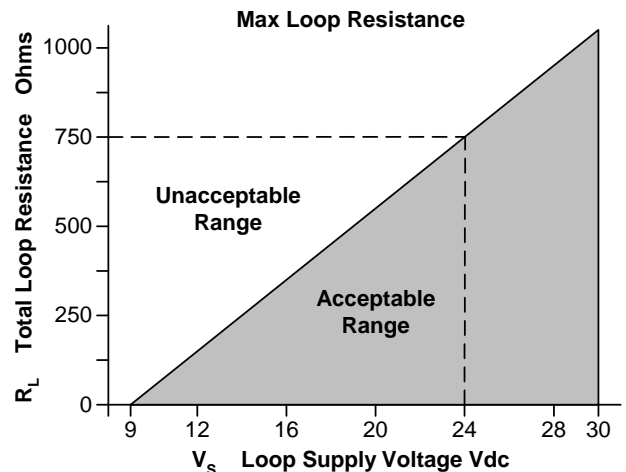
Tighten the tank flange bolts.

Wiring

The TG-EL-WF-xx-C is a 2 wire, loop powered, reverse polarity protected, 4-20 mA level xmtr. Maximum loop power supply voltage: 30 Vdc

White wire: + Black wire: -

See the diagram below for the maximum acceptable total 4-20mA loop resistance:



$$\text{Acceptable Total Loop Ohms: } R_L \leq ((V_S - 9V) / 0.020A)$$

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. Use the 190271 epoxy encapsulation wiring splice kit to water proof all cable splices in areas that may be wet or damp. Do not encapsulate the wiring splices until after all calibrations and tests are completed.

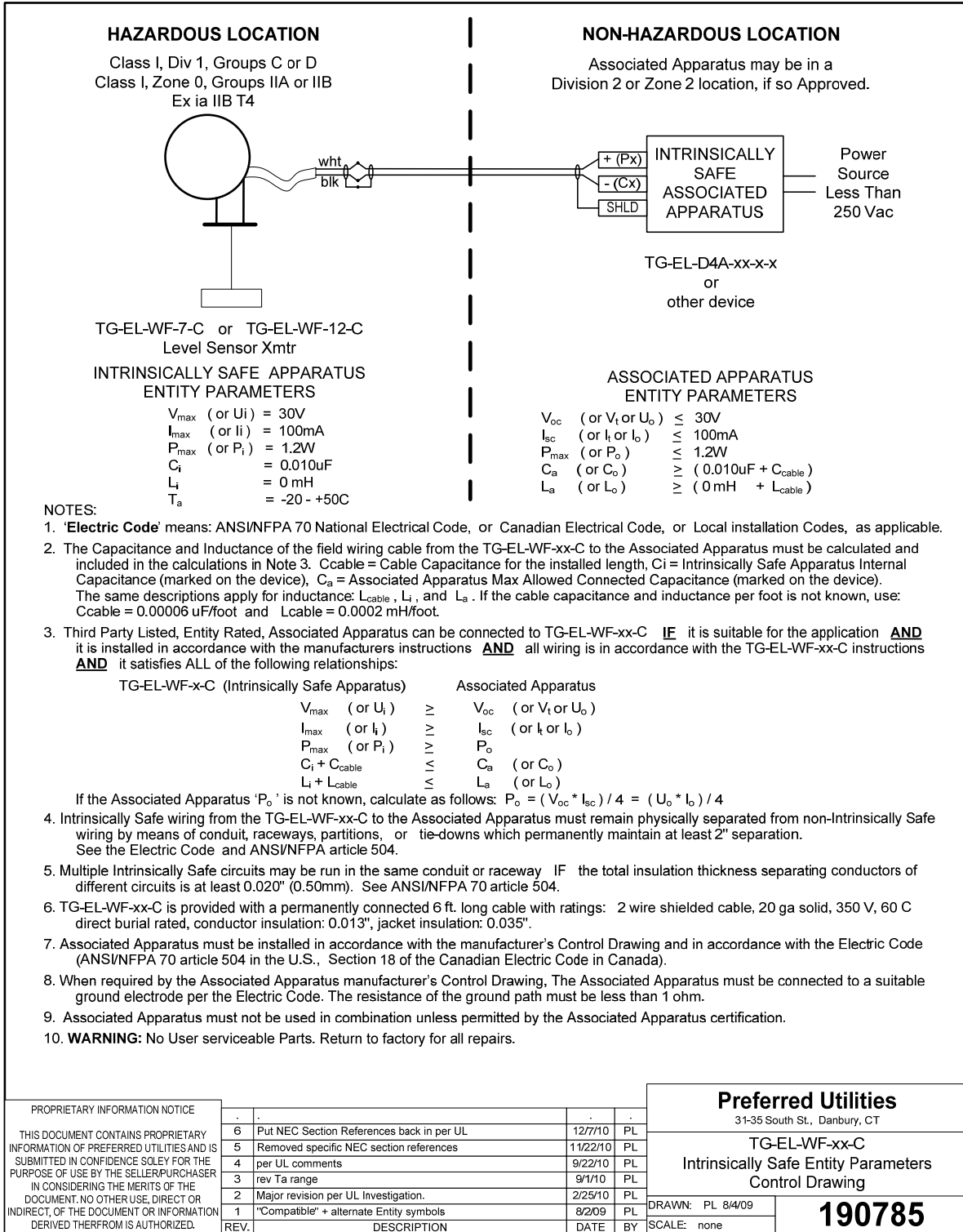
If mounted in a Class I, Zone 0, Group C or D Hazardous Location, the TG-EL-WF-xx-C is Intrinsically Safe **if all of the following are true:**

- 1) The TG-EL-WF-xx-C is connected to an Intrinsically Safe Associated Apparatus with I.S. Parameters specified on drawing 190785.
- 2) All other requirements of drawing 190785 are complied with.
- 3) All Installation requirements of the Associated Apparatus are complied with.

The Preferred TG-EL-D4A is a compatible Associated Apparatus.

WARNING Aluminum Housing:
Impact or Friction Spark Ignition Hazard

Mount the TG-EL-WF so that it is inaccessible to Impacts or Friction.
Use non-sparking tools when installing or servicing.



PROPRIETARY INFORMATION NOTICE

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REV.	DESCRIPTION	DATE	BY
6	Put NEC Section References back in per UL	12/7/10	PL
5	Removed specific NEC section references	11/22/10	PL
4	per UL comments	9/22/10	PL
3	rev Ta range	9/1/10	PL
2	Major revision per UL Investigation.	2/25/10	PL
1	"Compatible" + alternate Entity symbols	8/2/09	PL

Preferred Utilities
31-35 South St., Danbury, CT

TG-EL-WF-xx-C
Intrinsically Safe Entity Parameters
Control Drawing

DRAWN: PL 8/4/09
SCALE: none

190785

CALIBRATION

The 4-20 mA output is factory calibrated as shown below:

	Ullage	mA	Ullage	mA
TG-EL-WF-7-C	0"	4	84"	20
TG-EL-WF-12-C	0"	4	144"	20

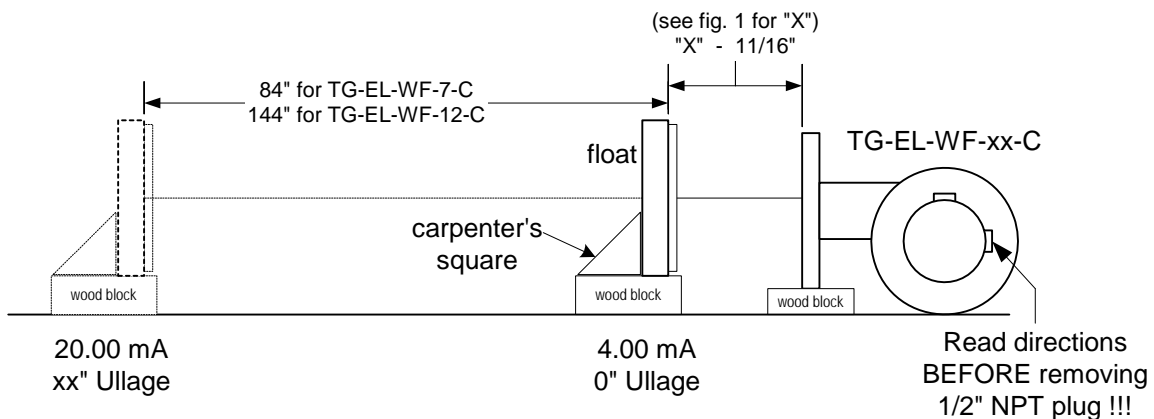
The 4-20mA output is not intended to be custom calibrated to the inside height of each tank. The 4-20mA output does not need to be calibrated during installation, and does not need routine re-calibration.

This procedure is provided for those who wish to check the calibration of the TG-EL-WF-xx-C. While re-calibration in the field can be accomplished, it is not normally required.

Test / Calibration Procedure:

1. Remove the **TG-EL-WF-xx-C** from the tank.
NOTE: Do not allow the **TG-EL-WF-xx-C** flange to rest on the wire cable for the float. This can put a 'kink' in the wire cable
2. Setup the **TG-EL-WF-xx-C** as shown below
3. Verify that the float is attached to the wire float cable as detailed in figure 1 in the installation section.

4. Connect the TG-EL-WF-xx-C to a 24Vdc power supply and a precision mA test meter.
5. Move the float to the 4mA and 20 mA positions and check the mA signal to determine if the mA output needs to be re-calibrated.
6. If re-calibration is required, re-check step 3.
7. Clean the area around the ½" pipe plug shown in the sketch. position a clean container under the pipe plug to catch the silicone oil that may flow out as the pipe plug is removed.
8. Remove the pipe plug to provide access to the 4-20mA calibration trim pots.
9. Position the float at the 4.00 mA position and adjust the "4" trimpot until the output is 4.00 mA.
10. Position the float at the 20.00 mA position and adjust the "20" trimpot until the output is 20.00 mA.
11. The 4 and 20 adjustments affect each other. Repeat steps 9 & 10 until both values are correct.
12. Pour the silicone oil back into the wire float and replace the plug. The oil should not fill the cavity, the level should be just above the cavity centerline.



NOTES

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