FLUID ELECTRONICS
HYDROSTATIC BRINE RESERVOIR DUAL FLOAT SENSOR
MODEL FHRB 810

1. GENERAL DESCRIPTION

1.1. Fluid Electronics dual float (FHRB 810) sensor by Containment Solutions is designed for monitoring Hydrostatic Reservoirs of double-wall fiberglass tanks. This assembly is designed to operate in brine solution. It is installed in the reservoir at the top of the tank and consists of two floats on a stem, with two predetermined set points.

1.2. If the brine level within the reservoir changes beyond the two set points (high and low), an alarm will sound at the control panel.

1.3. The FHRB 810 sensor interfaces with CSI's Fluid Electronics' family of control panels and with most control panels, manufactured by other vendors.

2. FEATURES

2.1. The FHRB 810 Hydrostatic Reservoir Sensor consists of a sensor assembly and a riser cap.

2.2. The sensor assembly is constructed to withstand brine solutions provided by CSI and consists of:

2.2.1. Two floats constructed of Buna Nitrile, with magnets installed within the floats.

2.2.2. A float stem constructed of PVC, that houses:

2.2.2.1. Two reed switches that are hermetically sealed within the stem, at predetermined setpoints.

2.2.2.2. 16 feet of connector cable.

2.3. These items are placed within a sensor housing also constructed of PVC.

2.4. This housing protects the float assembly from damage and provides weight to the entire assembly so that it rests up-right in the reservoir. The housing is perforated so that liquid can move freely into the interior of the housing. There are enlarged "slots" next to each float so that the floats can be manually moved to demonstrate that they are in working condition.

2.5. The riser cap is constructed of PVC with internal threads. It attaches to the riser pipe (supplied by others) extending from the reservoir.

2.6. The cap has four vent holes in the sides and a compression fitting in its top so that the depth of the sensor can be adjusted depending on burial depth so the sensor is fully submerged in the reservoir.

2.7. The sensor maybe located up to 5000' from CSI Fluid Electronics CPF Control/Alarm Panel.

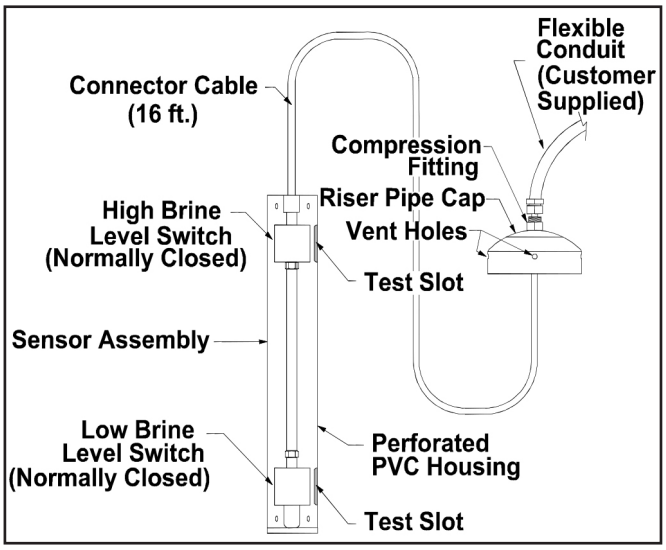
2.8. The FHRB 810 Sensor is intended to be used in conjunction with one of the following control/alarm panels:

2.8.1. Fluid Electronics (CSI) - CPF 1, 2, 3 & 4.

2.8.2. Pneumercator - LC 1000, E700-1, LDE-700, LDE-740, LDE-1000.

2.8.3. Veeder Root - TLS 250 or TLS 350.

Figure 2-1



3. SENSOR OPERATION

3.1. The FHRB 810 Hydrostatic Reservoir Sensor is designed for installation in the reservoir of a hydrostatically monitored underground double wall fiberglass tank. The sensor design allows a float to pass over either a high or low level switch as the brine level rises or falls due to a breach in either tank wall. As the float passes over the switch, the circuit is opened and a signal is sent to the control panel indicating an alarm condition. In normal operation of a Hydrostatic Monitoring System, the brine level within the system will fluctuate slightly due to changes in temperature and barometric pressure. The switches are located on the float stem so that these normal fluctuations do not trip the alarm. The switch is normally closed.

4. SPECIFICATIONS

Riser Cap	4" Dia. x 3" Height (Sch. 40 PVC)
Vent Fitting	1/8" Opening
Cable Clamp	3/8" NPT
Power Source	Provided by Alarm Panel
Sensor Housing	2 7/8" Dia. x 15" Height (Sch. 40 PVC)
Installation Distance	Up to 5000' from CSI's Fluid Electronics Control Panel
Sensors (High & Low)	Reed type Switches
High Level Set Point	13 5/16" from Base
Low Level Set Point	2 1/16" from Base
Set Point Tolerances	± 1/8"
Connector Cable	4 Conductor #20 in PVC sheath (16' maximum)
Floats (2)	Buna Nitrile

5. INSTALLATION

5.1. For detailed information of the installation and wiring of the sensor see Fluid Electronics Instructions Manual Pub No. 7047 - Installation and Operation Manual - CPF Series Intrinsically Safe Control Panels.

SENSOR PLACEMENT

5.2. The FHRB 810 sensor is intended to be placed in the hydrostatic reservoir with the connector cable extending through the riser cap and connected to an electrical junction box wired to an alarm panel. The reservoir must be prepared to receive the sensor. A four (4) inch riser or stand pipe (supplied by others) must be threaded into the four (4) inch fitting in the top of the reservoir (see Figure 5-1).

Figure 5-1

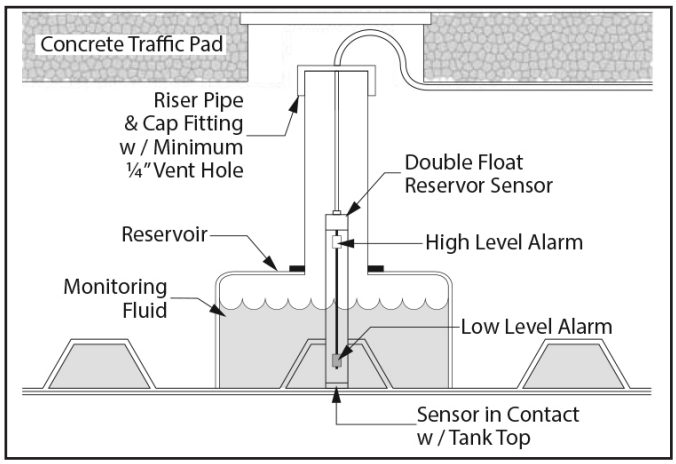
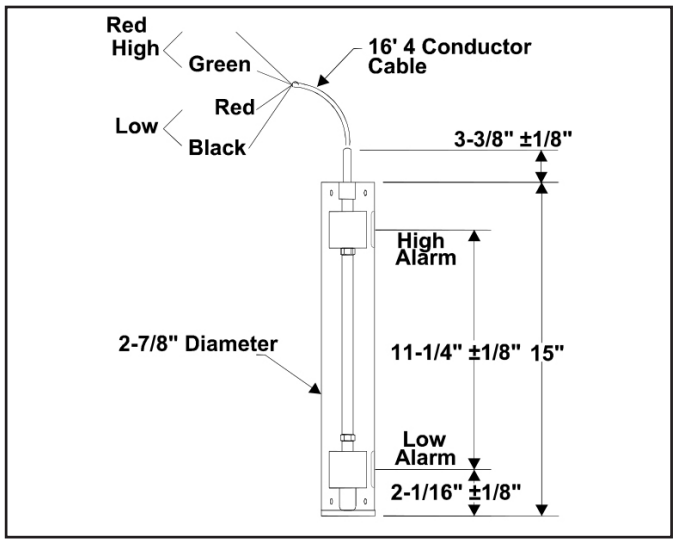


Figure 5-2



5.3. Installation of the sensor is accomplished as follows:

5.3.1. Insure that the monitoring fluid (brine) within the reservoir chamber is set per Table 5-1. Insert a tape measure, with water paste applied on the end, into the reservoir to determine the brine level. Add or remove brine as indicated by Table 5-1. During this step, note the length of the riser pipe.

Table 5-1

Tank Diameter & Capacity	Reservoir Fluid Level Measurement		
	Tank is Empty	Tank is Half Full	Tank is Full
4′ (1M and less)	5¼″	7″	8¾″
4′ (over 1M)	4¼″	4¾″	5″
6′ (6M and less)	4″	4¾″	5½″
6′ (over 6M)	3½″	4¾″	6″
8′ (6M and less)	4¼″	4¾″	5¼″
8′ (over 6M)	4¼″	5″	6″
10′ (12M and less)	4½″	5¼″	6″
10′ (13M - 20M)	5¼″	6½″	8″
10′ (21M - 35M)	3¾″	6½″	9½″
10′ (36M - 50M)	4″	5¾″	7½″
12′ (25M and less)	4″	6½″	9¼″
12′ (26M - 40M)	4¼″	5¾″	7¼″
12′ (41M - 50M)	3½″	5¾″	8″

5.3.2. Before placing the sensor in the reservoir, use the measurement of the riser pipe plus 2 feet, to place a mark on the sensor cable. Place the cable through the compression fitting in the riser cap. Tighten the compression fitting on the cable at the mark. This will assure that the sensor cable will not be dropped into the reservoir by accident.

5.3.3. Connect an Ohm meter to the sensor wires before installation and manually move the floats to set off the high and low level alarms.

5.3.4. Attach the sensor connector wire to the alarm panel wire in an acceptable electrical junction box (supplied by others), see the wiring instructions listed below.

5.3.5. Once the wiring connections have been completed, but before lowering the sensor into the reservoir, place the sensor in a bucket containing water and push the test buttons at the alarm panel to determine that the system is working properly. Follow the testing procedures listed below.

5.3.6. Lower the sensor into the riser pipe until it rests on the tank top.

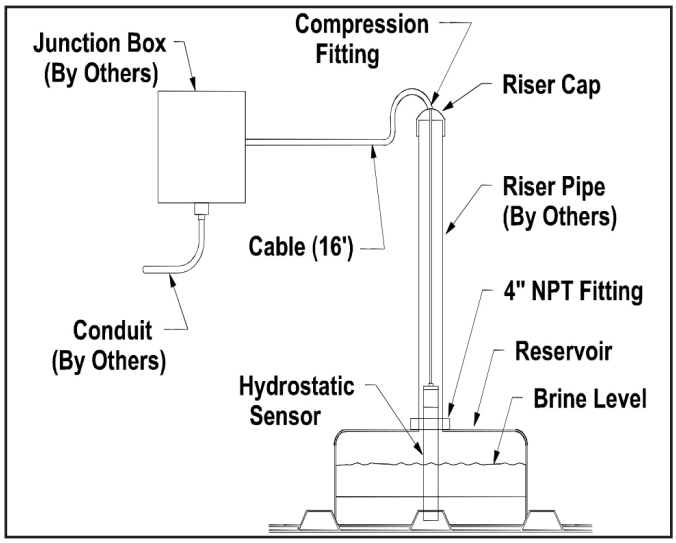
5.3.7. Place the riser cap onto the riser pipe and thread down firmly so that the cap fits tightly into place.

5.3.8. Pull any excessive connector cable through the cable clamp so that the sensor rests on the tank top. Tighten the cable clamp so that the connector wire does not slip through.

5.3.9. Check the alarm panel to determine if the status lights are working correctly.

NOTE: This system should not be used when the water table is expected to rise over the top of the riser cap. The cap is not watertight. If casual water enters the top vent hole of the controller cap, it may be necessary to run a separate vent line tube to the cap vent nipple to prevent the brine level from increasing. The annular space of the tank must remain vented to the atmosphere at all times.

Figure 5-3



WIRING

5.4. The sensor is wired differently for various alarm panels and must be connected correctly with the alarm panel in order for the system to operate properly. See control panel manufacturer instructions for type of wire to be used and for the most recent wiring diagrams. All conduit and electrical junction boxes must be watertight to prevent intrusion of groundwater or rainwater from entering conduits and junction boxes. Ensure that wiring meets all local, state and national codes.

5.5. Fluid Electronics CPF 2, 3 or 4 - Dual Alarm Configuration (See Figure 5-4).

5.6. Fluid Electronics CPF 1, 2, 3 or 4 (See Figure 5-5).

5.7. Pneumercator LC-1000, LDE-700 or 740 (See Figure 5-5).

5.8. Veeder Root TLS-250 or 350 - Single Alarm Configuration (See Figure 5-6).

Figure 5-4

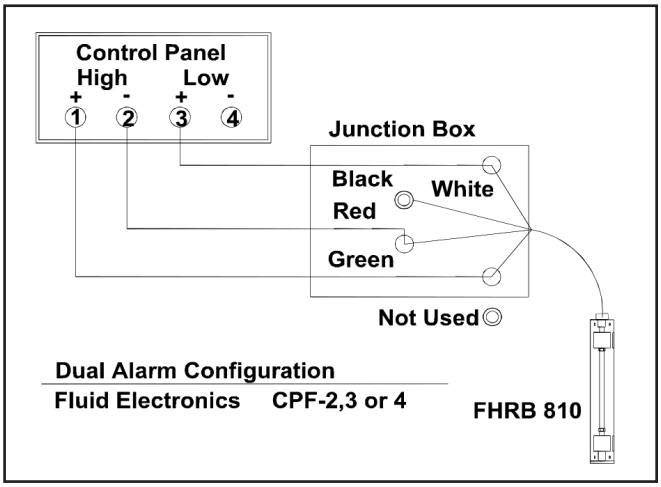


Figure 5-5

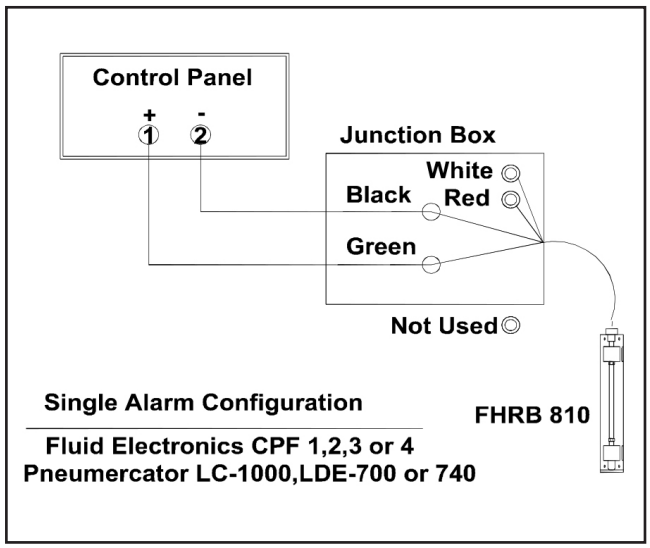
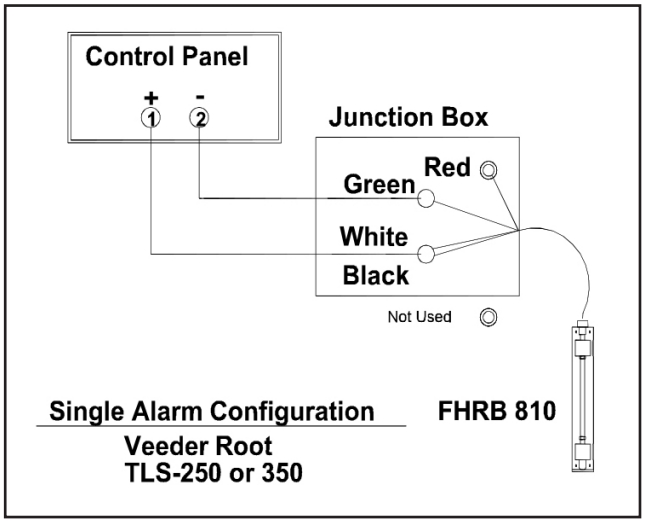


Figure 5-6



6. SENSOR TESTING AND MAINTENANCE

6.1. The sensor consists of two float activated reed type switches installed within a sensor housing. The high level set point is located 13 5/16" off the base. The low level set point is located 2 1/16" off the base. To test whether the float switches are functioning properly, these steps must be followed prior to installation, at least annually or when an alarm condition exists:

6.2. Prior to Installation

6.2.1. Connect the sensor to the control panel according to Section 5. Make sure the alarm panel is active.

6.2.2. Fill a bucket with water to a height of 14".

6.2.3. LOW LEVEL SWITCH - The "low level" red alarm indicator should be illuminated and the buzzer sounding when the bottom of the sensor is out of the liquid.

6.2.4. Place the sensor half way in the bucket. The low level alarm should be in a normal condition, red light not illuminated and buzzer not sounding.

6.2.5. HIGH LEVEL SWITCH - With the sensor half way in the water bucket the high level alarm should be in a normal condition, red light not illuminated and buzzer not sounding.

6.2.6. Place the sensor all the way into the bucket until it rests "up-right" on the bottom. The "high level" red alarm indicator should be illuminated and the buzzer sounding.

6.2.7. The sensor is ready to be installed according to Section 5. Reset the alarm panel once the sensor is in place.

NOTE: A measuring tape, with water paste applied on the first 24", should be placed in the reservoir to confirm the brine level.

6.3. Periodic Testing

6.3.1. Remove the sensor without damaging the sensor or the connector cable.

6.3.2. Repeat steps 2 thru 7 in "Prior to Installation" section.