

OPW-FMS Hydrocarbon Liquid Sensor with Water Indicator Procedure Guide

Part Number: M00-30-0234-HW-XX

Revision: 1



Hydrocarbon Liquid Sensor with Water Indicator

Smart Sensor Equipped with Intellisense™ Technology

30-0234-HW-06, -15, -20



Description

The primary function of the Hydrocarbon Liquid Sensor with Water Indicator is to monitor dry wells with groundwater tables that can change levels. This sensor uses a carbon/polymer material that changes its resistance when it is touched by liquid hydrocarbons. The device also has a water sensor that has conductive material to sense water. This lets the device tell the difference between hydrocarbon liquid and water.

The sensor can tell the system if there is water in a containment area. It can also tell the system if there are fuel leaks in a containment area. If there is a break in the cable it will cause an alarm condition in the system.

Specifications	
Primary Use:	Monitoring Wells
Detects:	Liquid Hydrocarbons and Water
Operating Temperature:	-40°C to +70°C (-40°F to 158°F)
Dimensions:	Length: 6' (1.9 m), 15' (4.6 m) or 20' (6.1 m) Diameter: 0.7" (1.8 cm)
Nominal resistance (uncontaminated)	Less than 3,000 ohms per foot
Nominal resistance (contaminated)	More than 30,000 ohms
Cable:	Belden #88760 or Alpha #55371
Maximum Wiring Length*:	1,000' (305 m) field wiring
Multi-Drop Restriction	ProGauge / Integra: 12 on each I.S. barrier channel (48 total per barrier) Nano: See Mixed Multi-Drop Installation in the M2010 Nano Installation Guide .
Connections:	Red = Power, Black = Signal, Shield = Ground



NOTE: *This is the maximum length of wire to be used to connect all sensors on one channel. This length includes the wire from the VSmart to each sensor board in the string.

Installation



WARNING: Make sure you read and fully understand the warnings and information found in the **Hazardous Areas** section of your console's Installation Guide before you install or do the servicing of this sensor.



IMPORTANT: This Smart Sensor must **ONLY** be connected to an (missing or bad snippet) 12V IS Barrier. This will make sure that operation conditions are safe.



CAUTION: ALWAYS obey Local and National Electrical Codes applicable to the installation location.

Make sure that the cables from the field wiring to the controller are in conduit that is dedicated to intrinsically safe wiring.

Use wire-nuts and epoxy-resin seal-packs for field connections (refer to [M00-390008 Waterproof Electrical Connections](#) for information).



IMPORTANT: This sensor can only be used with a 12V IS Module. Sensors can be connected in parallel up to a maximum of 12 sensors on each channel (48 total on each barrier). This Sensor **CANNOT** be connected in parallel with devices other than Smart Sensors. It cannot be mixed with non-Smart sensors.



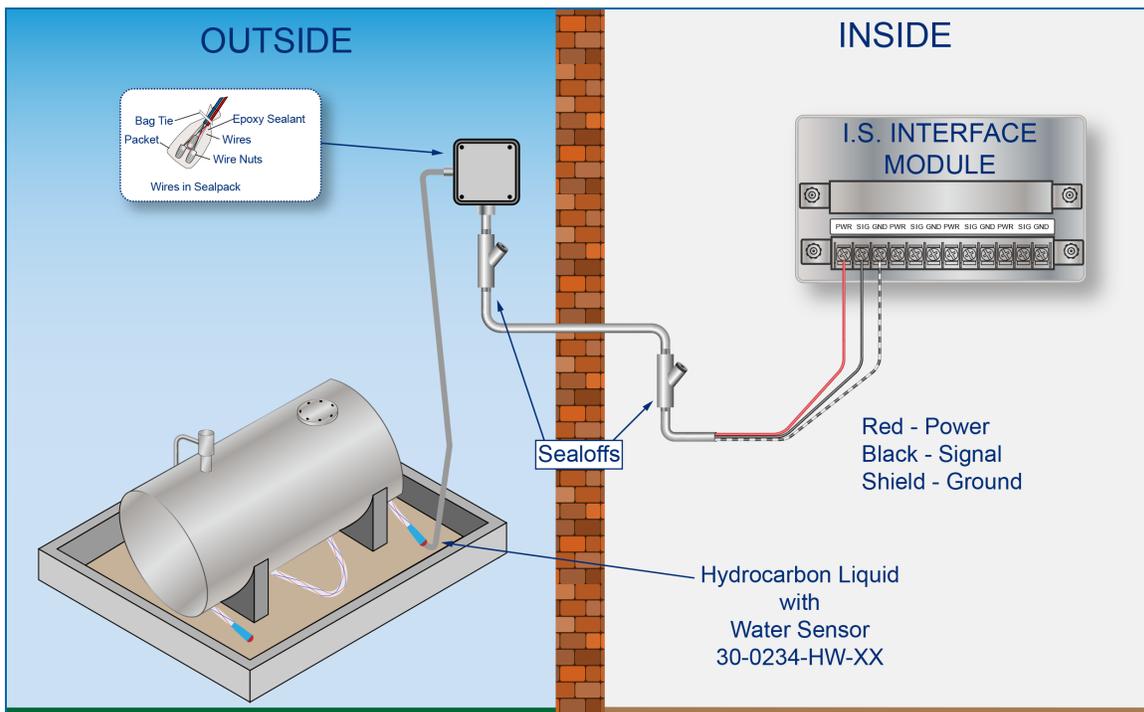
REMINDER: Hydrocarbons float on water. If the sensor is fully submerged in water, the polymer is unable to detect hydrocarbon liquid.

- This sensor uses ONE I.S. Module position
- Start with the Connections table and "Typical Installation" drawing below.
- Connect the sensor cable to the sensor.
- Connect the sensor wires to the field wires in the junction box. Use the supplied cable gland and silicon wire nuts.
- Seal the electrical connections with the epoxy seal packs (refer to [M00-390008 Waterproof Electrical Connections](#) for instructions).
- Install explosion-resistant sealing fittings at both ends of the conduit. Refer to the **Probe-Cable Seal-offs** section of the console's Installation Guide for instructions.

Connections

Sensor Wire Color	12V Smart Sensor Interface Channel
Red	Power
Black	Signal
Shield	Ground

Typical Installation Drawing



Controller Setup

The sensor must be **Auto Detected** on the console. Alarm thresholds are configured automatically through the *Intellisense* mechanism between the sensor and the console.

Hydrocarbon Liquid/Water Sensor - Functional Test and Remove Contamination



IMPORTANT: It is recommended to only do the procedures below when it becomes necessary and only as a last alternative. These procedures can cause a decrease in the original electrical resistance of the polymer. If possible, speak with a certified ProGauge technician before you do these procedures.



CAUTION: Use caution to prevent dangerous conditions when you do work in a hazardous area.

Make sure that the area has sufficient airflow when you do a test or remove contamination from the sensor. Make sure there are no open flames or hot surfaces near the work area.



NOTICE: Do not use fuel (gasoline, diesel etc.) to test or clean the sensor! Once the carbon/polymer material has touched liquid hydrocarbon, it is possible that the sensor will not return to its initial electrical resistance. This can have an unwanted effect on its operation. Replace the sensor if necessary. If you do not obey this instruction it can void your warranty.

Functional Test - Hydrocarbon Liquid Sensor of the Device

- Put the polymer fully into *Mineral Spirits* and wait approximately 10 minutes.
- Remove the sensor and let it hang to air dry for another 10 minutes.
- The test is satisfactory if an alarm condition or other event related to the hydrocarbon sensor of the device occurs. If the test results are unsatisfactory, replace the sensor.
- Disconnect the Hydrocarbon Sensor from the I.S. terminal strip in the controller. The test is satisfactory if an alarm condition occurs.
- Connect the sensor back to the I.S. terminal strip.
- Short across the power and signal terminals. This test is satisfactory if NO alarm condition occurs.

If the controller does not sense the alarm conditions simulated by these tests, look to see if the thresholds and alarms are correctly programmed in the system. A sensor or wiring fault will cause a system alarm. Do a continuity test in the wiring and junction boxes. Make sure there is continuity with no short circuits.

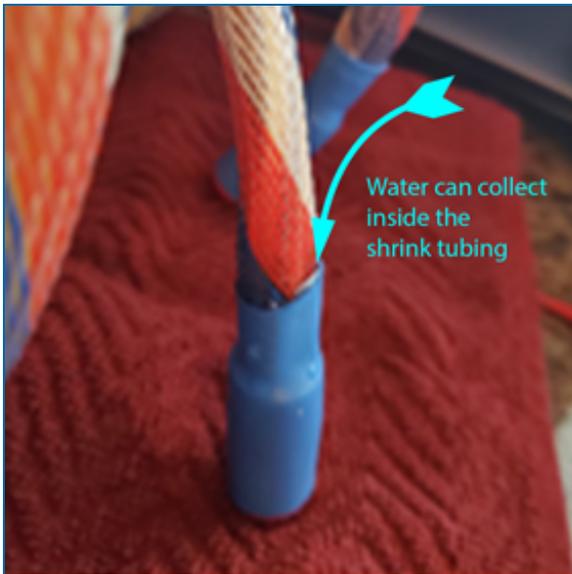
Functional Test - Water Sensor of the Device

- Put only the end of the sensor into *tap water*. The test is satisfactory if an alarm condition or other event related to the water sensor of the device occurs.
- Disconnect the Water Sensor from the I.S. terminal strip in the controller. The test is satisfactory if NO alarm condition occurs.
- Connect the sensor back to the I.S. terminal strip.
- Short across the power and signal terminals. This test is satisfactory if an alarm condition occurs.

If the controller does not sense the alarm conditions simulated by these tests, look to see if the thresholds and alarms are correctly programmed in the system. A sensor or wiring fault will cause a system alarm. Do a continuity test in the wiring and junction boxes. Make sure there is continuity with no short circuits.



IMPORTANT: During a Functional Test, liquid can collect inside the shrink tubing (see the image below). This can cause an unusually long time for the sensor to dry.



TIP: It is recommended to first pat the sensor dry with a soft, clean cloth. Then, fold the sensor over and hold it in place with a zip-tie to let any remaining liquid drip out of the sensor (see the image below). These steps can help reduce the drying time so the alarm condition can be cleared from 30-45 minutes to 2-10 minutes.



Clean the Hydrocarbon Sensor of the Device

If it is necessary to clean hydrocarbon contamination from the sensor after a test or actual use:

- Make sure the sensor is disconnected.
- Put the dirty part of the sensor fully into *denatured alcohol* for one (1) hour.
- Flush the sensor with water to remove all remaining contamination.
- Let the sensor dry in the air for one (1) hour.
- Reconnect the sensor.



NOTE: If the sensor does not return to near its original resistance after you do a functional test or contamination has been removed, it is recommended to replace the sensor.