ELF Series Flow Sensor

Installation Guide

Introduction:

Creative Sensor Technology's ELF (Enhanced Low Flow) sensor is a patented impeller type flow measuring device. The term sensor is used rather than meter because it provides an accurate, digital output signal to another control or monitoring device rather than displaying rate of flow or total flow itself. Two outputs are available. The first is a frequency output producing a square wave digital signal, proportional to the velocity of the liquid flowing through the device. This signal is converted to flow rate by the receiving monitor or controller using calibration constants (K and Offset numbers) supplied by CST. The second output is a scaled pulse output producing a pulse scaled to a unit of volume, i.e. 1 pulse per gallon.

The sensor circuit contains a pre-amplifier allowing the signal to travel up to 2,000 feet using shielded, twisted cable. The scaled pulse sensor is available in two and three wire versions for connection to different control devices.

The flow sensor housing, held in place with a retaining nut, contains the detection circuitry and carries the unique four-bladed impeller on a transverse axle. The housing and mounting tee are custom molded to form an integrated measurement chamber resulting in highly accurate, repeatable flow measurements through a wide range of velocities. The axle and impeller along with the sealing o-ring are replaceable in the field.

Sensor electronic housings are interchangeable, eliminating the requirement to recalibrate after replacement or service.

Mechanical Installation– Location and Orientation:

1. The unique design of the flow sensor mounting tee, serves as a flow conditioner, measuring chamber and mount for the flow sensor housing. This sensor design does not require straight lengths of pipe upstream and downstream of the sensor. Therefore, changes in pipe size or direction may be immediately before or after the sensor. In fact, solenoid valves, used as master valves may be threaded onto the downstream side of the mounting tee.

2. Always install the short side of the mounting tee in the downstream direction.

3. Allow 3 ½" clearance to remove flow sensor housing from tee for service. The tee is usually installed with the housing up in the vertical or 12:00 O clock position. However, if necessary, it may be installed with sensor housing at an angle from vertical to provide clearance. Flow sensors may be installed inside a building, outside above grade or underground. If installed above grade, consider security issues to prevent

3. Flow sensors are most typically installed below grade in a horizontal section of pipe with the sensor housing up. Do not direct bury the flow sensor. Provide a meter pit or valve box of adequate size and drainage to service the sensor. Provide a service loop in the wire connections to allowing the sensor housing to be brought above grade.

4. Flow sensors may be installed on vertical sections of pipe providing that the piping is full and does not contain trapped air. A vertical pipe with rising flow is preferred over falling flow. The sensor housing may be oriented in any direction radially around the pipe.

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Mechanical Installation– Installing sensor in the pipe

1. Disassemble the flow sensor before joining the tee to the piping system. Remove the flow sensor housing from the tee by loosening the retaining nut turning it counter-clockwise and pulling the housing straight out of the tee. It is sealed to the mounting tee with an o-ring, so it will offer some resistance.

CAUTION: Do not pull on the wire leads!

IMPORTANT: Install sensor tee with the short side downstream

2. The white PVC flow sensor tee features socket ends intended for solvent welding into PVC piping systems. Use Best Industry Practices to install the sensor in the correct position with strong permanent joints.
   - Use appropriate tools to cut the pipe. Remove all chips, filings or cuttings from the pipe.
   - Solvent weld the tee to the pipe using manufacturer's recommendations.
3. The black Noryl flow sensor tee features male pipe threads. Make threaded connections using a Teflon paste joint sealant.
4. After the pipe connections are completed, re-attach the sensor housing to the tee. Make sure the housing and tee are clean and free from dirt or debris. Align the arrow on the top of the housing with the downstream direction. Slide the retaining nut over the wire leads and hand tighten by turning clockwise until the insert flange touches the top of the mounting tee. If the o-ring is dry, lubricate with silicone grease.

Do not use sealant or Teflon tape on the retaining nut threads!

Electrical Wiring

Do not connect flow sensor to Power or Valve circuits!

1. Use a shielded Direct Burial cable with a twisted pair or trio of conductors . Use #20 AWG or larger stranded copper wire conductors to extend the distance up to 2,000 feet.
2. Use proper sized wire nuts and waterproof the splices with epoxy or water displacing silicon connectors.
3. Before making splices, make sure the retaining nut is on the wire leads.
4. Provide a service loop in the cable to allow the sensor housing to be brought above grade for servicing.
5. Avoid making splices in the direct burial cable.

Two Wire Sensors—The **RED** lead from the sensor is the **+ (Positive)** lead and the **BLACK** lead from the sensor is the - **(Negative)** lead. .

Three Wire Sensors- **RED** lead from the sensor is **24 V Power +. White** lead is sensor **Common –. Blue** lead is **Sensor** or **Signal Input.**

Observe polarity when extending these conductors.

To Program Frequency Sensors (2wire - using l/m, l/s)	**For Scaled Pulse Sensors (3wire)**
RainBird espME3 & LX Controllers	**1 pulse = 1 gallon for T10 Model**
K=0.153, Offset 1.047	**1 pulse = 0.1 gallon for T75 Model**

Operation

1. Make sure the flow sensor is assembled and the retaining nut is tightened (hand tight) before pressurizing system.
2. Fill pipeline and eliminate trapped air.
3. Flow sensor should begin transmitting flow immediately, however most monitors and control devices have a flow averaging routine that requires several seconds before the device begins to display flow.
4. Always wait for flow to stabilize before setting control limits

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