

Specification for FLX Open Channel Flow Meter



Application

The FLX is made for continuous on-line measurement of liquid flow using a pressure sensor as a function of the liquid level in open channel flow configurations like weirs, flumes, etc. in municipal and industrial wastewater treatment plants.

Measuring Principle

The measuring principle should be based on the mathematical calculation of flow as a function of liquid level in open channels by means of a piezo-resistive pressure transducer.

Sensor

The sensor should be an immersion design, which means the pressure transducer should be integrated with an immersion pipe of 39.4" (1 m) length (or 19.7" (0.5 m) special length), which is intended for mounting in vertical position. Sensor should be supplied with 16' (5 m) of ventilated and shielded cable to a ventilated junction box with 33' (10m) of additional cable to control box. Measuring range should be 0-39.4" (0-1 m) with accuracy of 0.3% of FS. The sensor's membrane should be protected by polyurethane housing. The sensor should have temperature compensation from -4°F – +86°F (-20°C – +30°C) and built-in ventilation tube from sensor to junction box to compensate for atmospheric pressure changes.

Sensor should be zero calibrated in air and sensor span should be easily field-adjustable from the control box. Zero offset for sensor mounting is done in control box. Sensors requiring maximum flow calibration are not acceptable. Ultrasonic sensors will not be acceptable due to false readings from signals bouncing off of foam, drifting due to wind and special coaxial cable requirements.

Signal Processor Control Box

Control box to support two sensors, which can be either/or dissolved oxygen, suspended solids, pH, ORP, or open channel flow sensors and generate 2 independent and isolated 4-20 mA output signals. Control box to be designed for future upgrade to commonly used fieldbus protocols by

installing a protocol board. Microprocessor based control box with self-instructing menu, digital circuitry, and illuminated graphical LCD display. Graphic display shows liquid flow, liquid height and totalized flow in US or metric units. Alternate screen shows the date when the FLX flow sensor was last calibrated. The control box produces two linearized 4-20 mA, max 500 ohms galvanically isolated, output signals (12 bit resolution) proportional to suspended solids concentrations. Control box to have field adjustable contrast from front keyboard panel. Indicator light on front panel indicates state of alarm. To avoid fluctuating output signal, the control box should have a dampening feature or integration time, which can be set from 1 to 999 seconds. The enclosure should be watertight molded polycarbonate box, NEMA 4X (IP65). The power supply must be equipped with filter, fuse and varistors for protection against power surges. The control box should have EEPROM memory, so that following a power failure the control box should start up and resume measuring without requiring recalibration. Power supply is to be 110/1/60 or 220/1/50. Control box to be equipped with built-in heater on circuit board to maintain proper temperature inside control box down to -20 F outside temperature.

Programming Module

All programming and settings are performed from the outside of the transmitter by using a self-instructing menu controlled by three touch pad keys. The unit should be programmable to measure in US or metric units. Output should be programmable to send a pulse at specified volumes in increments of 1,000 gallons (KGA) or m³. The program should contain and use the actual calculation formulas for each flow configuration, as specified above. If multiple identical flumes or weirs are used with the same flow rate, then one sensor can be used and program should have option to multiply output flow by number of flumes or weirs, so screen shows combined flow rate.

Calibration should include: 1) zero calibrate in air for atmospheric pressure compensation, 2) field adjustable span using a liquid sample in the field and 3) zero offset for sensor mounting above or below zero point.

Each channel to be independently programmable for: “V” notch (Thompson), Parshall, Venturi, Sutros, Palmer & Bowlus, Rectangular Weir & Rectangular Weir Contracted, or Cipoletti. Each channel should be able to generate flow proportional pulses for external totalizer. The transmitter should have built-in batcher feature for each channel, sending pulses for operation of water samplers.

Self-Diagnostics

The software should be of Multi-task design. It should also contain a watch-dog function connected to the microprocessor. The software should inform the “watch-dog” at least once per second that the device is working properly. If it does not, then the “watch-dog” shall restart the processor in order for the unit to resume measuring.

Mounting

SS Slide Rail

Sensor to be supplied with SS slide rail (20” long) and two (2) SS sensor clips. Supply 304 SS L-Mounting 42” long w/ 6” lip x 4” wide x 1/4” thick with 20” long slide rail pre-attached for hanging from trough wall. The L bracket is to be attached to the trough wall with SS anchors supplied by the contractor.

Control Box Mounting

The control box to be pre-mounted to 1/8" thick aluminum mounting plate with opaque sun screen & SS hinge.

Warranty

The manufacturer shall warrant the equipment to be free of defects from workmanship and material for a period of one (1) year after shipment.

Supplier

Cerlic Controls, AB, Model – FLX/BB2, P/N 23010-20.
Phone 404-256-3097 or Fax 404-256-3094