

O C M III

Open Channel Flow Monitor

Part 1. General

1.1 Scope

- A.** This section describes the requirements for an ultrasonic flow transmitter with sensor and temperature compensation probe.
- B.** Under this item, the contractor shall furnish and install the OCM III as indicated on the plans and as herein specified.

1.2 Submittals

- A.** The following information shall be included in the submittal for this section:
 - 1. Data sheets and catalog literature for OCM III.
 - 2. Interconnection and dimensional drawings.
 - 3. Spare parts list and optional accessories.

Part 2. Products

2.1 Ultrasonic Flow Transmitter and Sensor

- A.** The flow transmitter shall be an ultrasonic microprocessor based echo-time measuring type providing an electrical output signal proportional to the flow rate, head, velocity or temperature as may be required. It shall consist of a non-contacting transducer and a transmitter connected by coaxial cable.
- B.** Transducer
 - 1. Operating principle:

Acoustic impulses emitted from an ultrasonic sensor are reflected back from the liquid surface and are received by the sensor. The transit time of pulse travel for generation to echo is measured. This

elapsed time is proportional to the distance between the sensor and liquid surface.

2. Primary Sensor:

The acoustic sensor/transducer shall have polarized zirconium crystal with acoustic impedance matching face and transformer.

The transducer shall be approved by FM for Class I and Class II hazardous locations. A separate temperature probe shall be provided for temperature compensation.

The transducer shall be a Milltronics Echomax model XRS-5.

3. Mounting

A one inch NPT fitting per manufacturers recommendations.

4. Operating Temperature:

-40° F to 200 ° F

C. Transmitter

1. Enclosure

Nema 4X Polycarbonate

2. Power Supply

110/115/200/230 VAC +/- 15%, 50/60 Hz @ 13 VA max, 9-30 VDC @ 8 Va max.

3. Power consumption

13 VA max

4. Operating Temperature

-4 ° F to 140 ° F

5. Outputs

Analog 4-20 mADC or 0-20 mADC, operator selectable, into 1000 ohms isolated

3 output relays, rated @ 8A, SPDT, 250 VAC, non-inductive

6. Communications

5 language selectable

User interface via detachable IR keypad programmer

RS 232C compatible serial port-general purpose port for programming or extraction of program data or log data, capable of periodic input to serial printer with selectable baud rates of 300, 600, 1200, 2400, 4800, 9600 or 19200

Bi-Polar 20mA current loop

7. Software

Software shall be provided to permit user interface with IBM compatible computers to enable programming, extraction of program data to a file, downloading of data log to a file and conversion of data to a text or spreadsheet format.

8. Controls

All data and operating parameters may be entered via the detachable IR keypad or from a remote computer via the RS 232C port.

D. Sensor and Transmitter Performance

1. Range

1 - 10 feet

2. Accuracy

Range sensor error: +/- 1.0 mm/m

Calculation error: less than 0.02%

3. Resolution

0.2 mm

Current output 5 ua, 12 bit

4. Separation

Maximum distance of 600' between electronics and transducer without additional equipment.

E. Display

Two line alphanumeric LCD type with LED backlighting, displaying the following:

1. Current head in selected units
2. Current flowrate in selected units
3. Total flow in selected units
4. Velocity (If velocity sensor attached)
5. Current temperature
6. Max and Min temperatures
7. Max and Min flowrates
8. Relay status
9. Logged data
10. Day, Date and Time
11. All operational parameters

Sensor and Transmitter shall be Milltronics Open Channel Monitor OCM III with XRS-5 Echomax Transducer as manufactured by Milltronics Inc.

Part 3. Operator Functions

3.1 Calibration

- A. Calibration of the flow transmitter shall be accomplished by the entry of all operating data through the detachable IR keypad or with a remote computer via the RS232C port. Access to the parameters shall be protected by a customer programmable security code number.

- B.** Internal self-diagnosis shall be available to assist in maintenance of the flow transmitter. Diagnostics shall be accessible through the RS 232C port.
- C.** The flowmeter shall be capable of providing for the simulation of head heights and correlating flowrate to ensure that operating parameters are in accordance with the owners/manufacturers primary element flowrate chart.
- D.** The flowmeter shall be capable of monitoring flow through any primary device utilizing the ratiometric or absolute method of calculation or by use of a customer definable flow calculation program using a cubic spline curve.
- E.** The flowmeter, when required, shall be capable of taking an input from a velocity sensor and calculating flow based on area/velocity.
- F.** The flowmeter shall be capable of taking a 0-5 VDC input from an auxiliary device other than its own transducer to calculate and log flow data.

3.2 Transmitter Function Details

- A.** Log data at customer selectable fixed or variable logging rates of 1 minute to a maximum of 24 hours for a minimum of 31 days up to 2.2 years.
- B.** Log average flowrate at interval selected. In addition to flowrate, log flow total for 24 hour period, high and low flows and time of events, site identification number and date & time. Log format shall be ASCII or data base manager (spread sheet compatible).
- C.** The flowmeter shall be capable of programming a variable rate log to increase the log rate due to preset flowrate increases and return to original rate when flows return to normal.
- D.** All data and operational parameters shall be protected to prevent loss should a power failure occur by a dual back-up system utilizing a super capacitor for up to 10 hour protection and a lithium battery for long term protection.
- E.** Unit shall provide for automatic restart after power is restored without operator assistance.

Part 4. Execution

4.1 Installation

- A. Follow manufacturers recommendation for the minimum separation between the sensor and maximum expected liquid level.
- B. Mount the sensor to ensure a clear path to the liquid surface.
- C. The sensor may be flange mounted if a stilling well is required.
- D. Wiring between the sensor and transmitter shall be routed in grounded metal conduit. Use cable type and procedures as manufacturers recommendations.

Part 5. Warranty

5.1 Terms

- A. The manufacturer of the above specified equipment shall guarantee for twenty four (24) months from equipment startup or thirty (30) months from date of shipment, whichever occurs first, that the equipment shall be free from defects in design, workmanship or materials.
- B. In the event a component fails to perform as specified or is proven defective in service during the warranty period, the manufacturer shall promptly repair or replace the defective part at no cost to the owner.

Part 6. Options

6.1 Related Equipment

- A. Velocity Sensor
- B. The Probe
- C. RG62U cable for transducers

Part 7. Spare Parts

7.1 Recommended Spare Parts

- A. Box of 5 fuses
- B. Battery
- C. Calibrator