F-4300 Master Specification

Ultrasonic Flow Meter/Thermal Energy Measurement System

Clamp-on Transit Time Ultrasonic Flow and Thermal Energy Measurement System

Basis of Design: **ONICON Model F-4300 Series** Clamp-on Transit Time Ultrasonic Flow and Thermal Energy Measurement System.

Manufacturers approved to bid, subject to compliance with requirements include:

Insert additional MFG’s pre-approved to bid.

Description: Provide a clamp-on transit time ultrasonic flow meter complete with matched transducers, self-aligning installation hardware, triaxial transducer cables and calibration certificate. When provided with the energy option, the F-4300 shall also be provided with a matched pair of temperature sensors and temperature thermowells. Flow or thermal energy meter shall be configured for the specific application prior to delivery.

Application: This contractor shall be responsible for selecting the meter options submitted based on the application. The meter shall be constructed, calibrated, and scaled for the intended application in terms of pipe size, pipe material, installation requirements, expected flow and/or energy rate, ambient conditions and fluid characteristics which include, but are not limited to, type, pressure, temperature and viscosity.

Design: Flowmeter shall consist of a processor/transmitter, matched pair of transducers and mounting hardware including pipe clamps and mounting bracket for the line size and material specified. When provided with the energy option, the meter is also provided with a matched pair of temperature sensors and temperature thermowells specified for the application.

Flow Sensing Technology: Ultrasonic transit time velocity measurement utilizing non-wetted transducers matched for the specific application.

Temperature Sensing Technology: Wet calibrated, matched pairs of the following type specified for the application.

1. Matched pair of loop powered current (mA) based temperature sensors. Current (mA) signal shall be unaffected by wire by wire length.
2. Matched pair of 1000 Ohm platinum RTDs. Pipe sizes greater than two and one half inch must use 4-wire RTDs.

Process Temperature Range: 0 to 250 deg F

Accuracy:

1. Flowmeter shall provide calibrated outputs directly from the transmitter, throughout the operating range with the accuracy stated as follows:

Plus or minus 1.0% of flow rate from 1 to 20 ft/sec velocity.

1. Delta temperature accuracy with the specified temperature range shall be:
   * 1. Current (mA) based sensors: NIST traceable differential temperature uncertainty within the calibrated temperature range shall not exceed plus or minus 0.15 deg F.
     2. RTD sensors: Differential temperature uncertainty within the calibrated temperature range shall not exceed plus or minus 0.18 deg F. RTDs must meet EN1434/CSA C900.1 requirements for 3K sensors.

Calibration: Each meter shall be individually calibrated against a NIST traceable standard and receive a certificate of calibration. Each meter shall be factory programmed based on the application data specified at the time of order.

Transmitter and Display: Provide an operator interface consisting of five push-buttons. Display shall visually indicate instantaneous flow rate and total fluid volume. When provided with the energy option, the meter shall also display instantaneous energy rate and temperature data and totalized energy. Output signals shall be RS485 BACnet MS/TP or Modbus RTU native to the transmitter. Two programmable pulse outputs configured for totalizing flow, indicating flow direction, operating mode or alarm status shall also be provided along with a single analog output signal. When provided with the energy option, four (4) additional programmable pulse and two (2) additional analog outputs shall be provided along with three (3) auxiliary pulse inputs for totalization.

Options: Flow meter shall be capable of operating from 24V ac/dc or 120V ac mains power.

Listings and Certifications: Meter shall have CE approval.

Installation and Operating Instructions: Installation and operating instructions shall be provided for each flow meter.

Warranty: Each flow meter shall be covered by the manufacturer’s three year warranty.

**EXECUTION**

Installation:

1. Meters shall be installed per manufacturer’s recommendations.

Connections:

1. Install meters and transmitters/displays adjacent to machines and equipment to allow for service and maintenance.
2. This contractor shall be responsible for connection all meter system elements.
3. This contractor shall be responsible for connecting flow meter transmitters to meters.
4. When not provided with the energy option, this contractor shall be responsible for connecting thermal energy meter to flow meters.

Commissioning:

1. After installation, commission all meter according to the manufacturer’s written instructions.
2. Adjust faces of meters and transmitters/displays to proper angle for best visibility. Refer to manufacturer’s written instructions.

Schedule:

The following applications shall be provided with ultrasonic flow or energy meter where shown on the drawings:

Chilled water systems

Heating hot water systems

Domestic water systems

Condenser water, cooling tower systems

Condenser water (Heat loop) systems

Make-up water systems

Steam condensate return systems