microFlow.net Gas

SSFG001 Issue/Rev. 0.1 (9/22)

Smith Meter® Electronic Flow Computer System

The Smith Meter microFlow.net gas electronic flow computer system is a microprocessor-based instrument with Ethernet capability. It is designed to monitor and control a single-meter flow stream. The unit can operate either as a stand-alone instrument or be part of system in which it communicates with an automation or supervisory control and data acquisition (SCADA) system.

Features

- Ethernet communications port
- Three multi-drop EIA-485 or EIA-232 communications ports
- Continuous monitoring of critical functions
- User-configurable inputs and outputs
- Configurable language and messages
- Event logging and audit trail
- Configurable batch report
- Calculations for American Gas Association (AGA) standards AGA-5, AGA-7, AGA-8, and International Organization of Standards (ISO) 6976

Features

- Ten-point meter factor curve
- Explosion proof
- Display backed-up per International Organization of Legal Metrology (OIML)
- Smith Meter MPU meter communications
- Three security levels
- Boolean and algebraic expressions
- Modbus remote terminal unit (RTU)
- Pulse security level B
- Adjustable display contrast
- Forward and reverse flow totalization
- Minimum 35-day flow data storage of hourly and daily records

Standard Features

Density Correction

The density correction feature provides customers with the ability to correct the volume of product delivered at varying densities. Density can be obtained through a 4-20 milliampere (mA) input or calculated according to AGA-8.

MPU Meter Interface

The microFlow.net supports an interface to MPU gas ultrasonic meters. The interface is either a pulse input connected directly, in which each pulse represents an increment of volume, or the volume is read directly from the meter using Modbus protocol over a serial-transmission control protocol/internet protocol (TCP/IP) connection. The Modbus port provides volume, temperature, pressure (read or write), flow rate, alarm status, and diagnostic data.

Dual-Pulse Security

Dual-pulse security provides continuous monitoring and error-indication alarms of pulse transmission for the meter according to American Petroleum Institute (API) Manual of Petroleum Measurement Standards (MPMS) Chapter 5.5, Level B and Institute of Petroleum (IP) standard IP 252/76, Part XIII, Section 1, Level B.

Sampler Operation

The microFlow.net supports samplers by providing a discrete input/output (I/O) output signal that produces a pulse of programmable width each time a sample is taken. The sampling frequency is configurable by either volume or time. The number of samples are kept in a running totalizer and stored in the microFlow. The total is automatically reset at the end of a batch.

Boolean and Algebraic Processing

The microFlow.net provides customers flexibility to set up inputs and outputs for tasks that are not standard in the unit. Through Boolean processing, relays can be turned on and off through equations and events set up by customers. For example, a relay is required to close when the flowrate is zero. This can be set up using Boolean processing and does not require special software from the manufacturer.

Customers also can use algebraic processing to do simple mathematical calculations not included in the unit. These calculations can then be used in configurable reports or delivery display for the current batch.

Communications

The microFlow.net is equipped with three standard programmable communication ports that can be configured to be either EIA-232 or EIA-485 compatible communication ports, with baud rates up to 38,400 bits per second (bps). In addition to these three communication ports, an Ethernet port is available to support Modbus and Smith minicomputer host protocols.

Applications

Applications for the microFlow.net include any size gas pipeline for single-product, single-meter flow. This self-contained, explosion-proof unit continuously computes, totalizes, and displays gross, gross-at-standard volume, mass, and energy. The microFlow.net also offers run-time displays, which provide all (rate, batch, temperature, etc.) critical flow information.

The microFlow.net calculates gas flow in accordance with American Gas Association (AGA) and API standards. It is capable of interfacing with a meter in the following ways:

- Pulse input only (used for any pulse-generating meter environments)
- Communications input only (serial TCP/IP Modbus) for MPU gas ultrasonic meters only
- Communications primary and pulse input backups for MPU gas ultrasonic meters only

The microFlow.net maintains archives based on API Chapter 21.1 requirements.

Hardware Options

OIML Display

The microFlow.net is designed with two display options. The standard display option operates until power is lost and then goes blank. The OIML display option is the same display, but when power is lost, the display maintains the data for reading by an operator for up to 15 minutes.

Specifications

The microFlow.net's stability is 0.1 degree Fahrenheit (°F) (0.06 degree Celsius (°C)) per year.

Flow totalization is within one pulse of input frequency.

Electrical Inputs

AC Instrument Input Power

Dual-voltage input: 115 or 230 VAC via switch, 50/60 hertz (Hz)

Power consumption: Approximately 9 watts (W)

Power interruption tolerance: Interruption of power greater than 0.05 seconds (typical) causes an orderly shutdown of the microFlow.net and the control valve is immediately signaled to close

Digital (Meter Signal) Pulse Inputs

Type: Optically-isolated, solid-state voltage sensors

Quantity: Two

Input voltage range: 5 to 28 volts direct current (VDC) compatible pickup

Voltage: 5 VDC minimum

Drop-out voltage: 1 VDC maximum

Current at maximum voltage: 20 mA maximum

Input level duration: 83 microseconds (µS) minimum

Digital Control Inputs

Type: Optically-isolated, solid-state voltage sensors

Quantity: Three

Input voltage range: 5 to 28 VDC compatible pickup

Voltage: 5 VDC minimum

Drop-out voltage: 1 VDC maximum

Current at maximum voltage: 20 mA maximum

Input level duration: 120 milliseconds (ms) minimum

Batch reset: Input must be held on high voltage for 300ms to ensure a reset state

Analog Inputs

Type: 20-bit analog-to-digital converters

Function: One resistance temperature device (RTD), one 4-20 mA

Temperature (RTD)

Type: Four-wire, 100-ohms platinum RTD with a temperature coefficient at 32 °F to be 0.00214 ohms per ohms °F (0.00385 ohms per ohms/°C)

Temperature range: -148 °F to +572 °F (-100 °C to +300 °C)

Temperature measurement accuracy: ±0.72 °F (±0.4 °C) over the specified range

Current (4-20 mA) Input

Type: Two-wire, 4-20 mA current loop receiver, programmable as to function

Span adjustment: Program adjustable

Input burden: 50 ohms

Accuracy: ±0.025% of range

Resolution: One part in 1,048,576

Voltage drop: Two volts max

Sampling rate: One sample per 300 ms minimum

Electrical Outputs

DC Power

12 VDC +/-5%, 180 mA maximum, short-circuit protected.

AC Digital Outputs

Type: Optically isolated, solid-state output, user-programmable as to function

Quantity: Four

Load voltage range: 90 to 280 VAC root mean square (RMS) 48 to 63 Hz

Steady-state load current range: 0.05amp (RMS) minimum to 0.50 amp (RMS) maximum into an inductive load

Leakage current at maximum voltage rating: 2.5 mA maximum at 240 VAC

On-state voltage drop: 2.0 VAC at maximum load

DC Digital Outputs

Type: Optically isolated, solid-state output, user-programmable as to function

Quantity: Two

Switch blocking voltage: 30 VDC maximum

Load current: 150 mA maximum with 0.6 volt drop; power down - normally open

Pulse Output

Type: Optically isolated, solid-state open-collector output; pulse-output units are program-selectable through the microFlow.net keypad or communications

Switch-blocking voltage (switch off): 30 VDC maximum

Load current (switch on): 10 mA with 0.6 volts drop

Frequency range: 0 to 3,000 Hz

Duty cycle: 50/50 (on/off)

Environmental

Ambient operating temperature: -13 to 140 °F (-25 to +60 °C)

Humidity: 5 to 95% with condensation

Enclosure: Explosion-proof (NEMA 7, Class I, Groups C and D) and watertight (NEMA 4X), IP 65

Electrical Safety Approvals

North American

UL/CUL Listed 557N 557N UL File E23545

Class I, Division 1, Groups C, and D; Class II, Groups E, F, and G

Class I, Zone 1, AEx d ib IIB T6

UL Enclosure 4X, CSA Enclosure

Global

Ex db ib IIB T6 Gb Tamb -25 °C + 60 °C IP65

ATEX: DEMKO 04 ATEX 0403315X

IEC: IEC Ex UL 04.0007X

UL Brazil: 19.0057X

Electromagnetic Compatibility

European Union: EMC Directive 2014/30/EU EN 61326-1 Electrical equipment for measurement, control, and laboratory use.

Communications

Number of ports: Three plus Ethernet

Configuration: EIA-485 Four-wire or two-wire multidrop network with optional termination resistor or EIA-232 three-wire communications link

Data rate: Programmable asynchronous data (baud) rate from 2,400 to 38,400 bps

Data format: Fixed at one start bit, one stop bit, eight data bits, and no parity

Line protocol: Full duplex, no echo character

Data structure: American Standard Code for Information Interchange (ASCII) character oriented, modeled after ISO Standard 1155

Protocol: Smith Meter ASCII longitudinal redundancy check (LRC), Smith Meter ASCII carriage return (CR), Smith Meter ASCII binary

Ethernet: 10/100 Base-T RJ-45 8- or 10-pin unshielded twisted pair (UTP) connector

Modeling Code

ML — XP — MFG — 1

Model Designation

Housing

XP—Explosion Proof/Flame Proof

Hardware Option

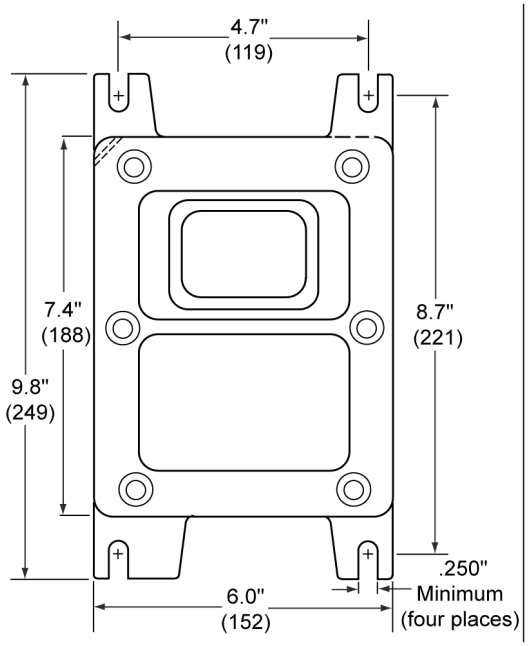
1—STD
2—OIML Display Option
3—STD (UL Brazil)
4—OIML Display Option (UL Brazil)

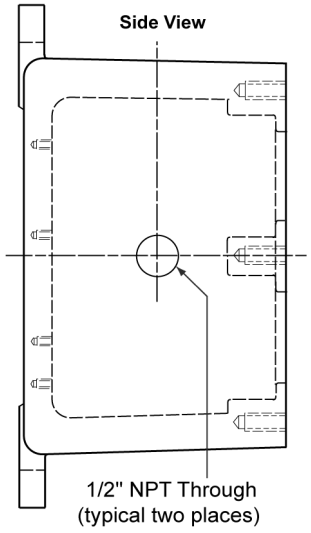
Firmware

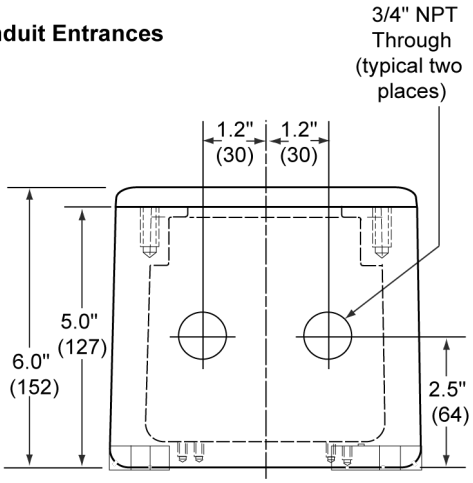
MFG—microFlow.net Gas

Dimensions

Inches are to the nearest tenth (millimeters (mm) to the nearest whole mm), each independently dimensioned from respective engineering drawings.







The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacture that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

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