FloBoss™ 407 Flow Manager

The FloBoss 407 Flow Manager provides the functions required for measuring, monitoring, and managing flow on single or multiple meter runs. It is a flow computer that is ideally suited to applications requiring remote monitoring, gas flow calculations, data archival, supervisory setpoint control, and closed-loop control. It is available either in a standard version (Class I, Division 2 approval) or in a Measurement Canada version, which includes Class I, Division 2 approval.

The FloBoss 407 is housed in a weather-tight enclosure that contains a Liquid Crystal Display (LCD) readout, a covered keypad, a processor circuit board, and an Input/Output (I/O) circuit board. The I/O consists of two built-in process inputs, a Multi-Variable Sensor (MVS) port, and accommodations for up to four plug-in I/O modules, any of which can be a HART® Interface Module.

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FloBoss 407 Flow Manager

The FloBoss 407 consists of the components and features described in the following paragraphs:

- Microprocessor with one MB of memory storage.
- Extensive applications firmware.
- Two built-in process inputs and an MVS port.
- Sockets for four optional I/O modules.
- Built-in display and keypad.
- Operator interface port.
- EIA-232 communications port.
- Weather-tight enclosure.
- Optional MVS (integral or remote).
- Optional card for second communications port.

The FloBoss 407 comes standard with 512 KB of on-board, battery-backed random access memory (RAM) for storing data and user programs. It also has 512 KB of programmable read-only memory (flash ROM) for storing the operating system firmware, applications firmware, and configuration parameters.

The firmware provides American Gas Association (AGA) flow calculations (orifice or turbine[1] metering plus compressibility factors) for four separate flows; memory logging of alarms and events; archival of data for up to 50 history points; power cycling control for a radio (standard firmware only); Proportional, Integral, and Derivative (PID) feedback control for four loops; Spontaneous-Report-by-Exception (SRBX) alarm reporting; security access levels; and logic and sequencing control using up to four user-defined Function Sequence Table (FST) programs.

The firmware also provides an audit trail per American Petroleum Institute (API) Chapter 21.1.

Two built-in process inputs are provided for interfacing to measurement instrumentation. The first input is an analog input, and the second can be configured as an analog input or a pulse input.

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[1]For turbines, the flow calculation accepts a maximum pulse input frequency of 2.3 kHz.

A special serial interface port provides connections for as many as four Multi-Variable Sensors. In addition, four sockets for I/O modules are located on the I/O board. Any type and any combination of I/O modules can be plugged into the sockets. The MVS inputs and I/O modules are configured in the same manner as the built-in inputs.

The Local Operator Interface (LOI) port, located on the right-hand side of the enclosure, provides a direct, local link between the FloBoss 407 and a personal computer. In addition, a host computer can remotely configure the FloBoss 407 through a communications port.

With a personal computer running ROCLINK™ 800 Configuration Software, you can configure the functionality of the FloBoss 407 and monitor its operation.

Through the display and keypad on the front panel, you can enter a password and access the information stored in the FloBoss 407. If you have the proper security level, you can also perform calibration and configure numerical parameters from the keypad.

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AGA #1  372.91
Flow Today
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Sample FloBoss 407 Display

Two ports on the FloBoss 407 are intended for remote communications with either a host computer or peer devices. The first communications port has a built-in EIA-232 serial interface. The second port uses a communications card (see Options) to provide the type of remote communications suited to the site. Sockets on the processor board allow the optional communications card to be added easily.

Screw terminals on the I/O board provide terminations for input power, field I/O, and remote communications. Two diagnostic inputs are dedicated to monitoring input power and board temperature.

An LED (Light-emitting diode) indicator on the processor board shows the device status. Another LED on the I/O board indicates whether the input power is on or off.

The die-cast enclosure protects the electronics from physical damage and harsh environments. The upper and lower doors of the enclosure, as well as the keypad door, all have gasket seals. The enclosure can be fastened to a wall or panel, or mounted on a pipestand.

Options

The FloBoss 407 supports the following options:

- Remote Multi-Variable Sensor (MVS) unit.
- Communications card.
- I/O modules.

The MVS sensor is a high-accuracy device that can be integrally or remotely mounted. The MVS sensor measures differential pressure, static pressure, and temperature (requires RTD sensor accessories). Remote MVS units have an electronics head, which contains interface circuitry.

The **communications cards** provide an additional means for communicating with the FloBoss 407. One card of the following types can be accommodated:

- EIA-232 (RS-232) for asynchronous serial communications.
- EIA-422/EIA-485 (RS-422/RS-485) for asynchronous serial communications.
- Radio modem for communications to a radio.
- Leased-line modem for communications over customer-owned or leased lines.
- Dial-up modem for communications over a telephone network.

I/O modules can be added to satisfy a variety of field I/O requirements. The types of modules that can be used are:

- Analog Input (loop, differential, or source).
- Analog Output.
- Discrete Input (source or isolated).
- Discrete Output (source or isolated).
- Normal or Slow Pulse Input (source or isolated).
- Relay Output.
- RTD Input.
- HART Interface.
- Serial I/O (Gas Chromatograph application).

FloBoss 407 Flow Manager Specifications

PROCESSOR

NEC V25+ running at 10 MHz.

MEMORY

Program: 512 KB flash ROM (electrically programmable) for firmware, configuration, and such.

Data: 512 KB battery-backed SRAM.

Memory Reset: When used during power-up, Reset switch initializes communication port hardware and communications port processing for all ports.

TIME FUNCTIONS

Clock Type: 32 kHz crystal oscillator with regulated supply, battery-backed. Year/Month/Day and Hour/Minute/Second.

Clock Accuracy: 0.01%.

Watchdog Timer: Hardware monitor expires after 1.2 seconds and resets the processor. Processor restart is automatic.

DIAGNOSTICS

These values are monitored and alarmed: RAM validity/operation, analog input mid-scale voltage, power input voltage, and board temperature.

COMMUNICATIONS PORTS

Operator Interface: EIA-232 (RS-232D) format. Software configured; 300 to 19,200 bps rate selectable. Screw-cap protected connector.

COM1: EIA-232 (RS-232D) format for general use. Software configured; 300 to 9600 bps rate selectable. Eight-terminal connector provided on I/O board.

COM2: Serial or modem interface, with optional communications card. Nine-terminal connector provided on I/O board.

POWER

Input: 11 to 30 V dc. 0.8 W typical, excluding power for input sourcing, I/O modules, MVS, and communications card.

Loop/Source: Normally 23 V dc minimum provided for transmitter power at the "+T" terminals (25 mA maximum) and at the "A" terminals on the modular I/O channels. Can be 12 V dc by jumper setting.

ANALOG INPUTS (BUILT-IN)

Quantity/Type: 1 or 2 single-ended voltage-sense (current loop if scaling resistor is used).

Terminals: "+T" loop power, "+" positive input, "–" negative input (common).

ANALOG INPUTS (CONTINUED)

Voltage: 0 to 5 V dc, software configurable. 4 to 20 mA, with a 250 Ω resistor installed across terminals "+" and "–".

Accuracy: 0.1% over operating temperature range.

Impedance: One MΩ.

Filter: Double-pole, low-pass.

Resolution: 12 bits.

Conversion Time: 30 microseconds.

PULSE INPUT (BUILT-IN)

Quantity/Type: One high-speed source or isolated pulse counter input when PI jumper is set.

Terminals: "+T" source power, "+" positive input, "–" negative input (common).

Voltage: 8 to 30 V dc (ON state); 0 to 4 V dc (OFF state).

Frequency: 10 kHz maximum.

Sample Period: 50 milliseconds minimum.

MVS INTERFACE

Type: High-speed, multi-drop, serial interface with power for as many as four MVS units located up to 1220 m (4000 ft) from the FloBoss 407 unit.

Terminals: "A" and "B" for data; "+" and "–" for power.

Polling Period: 1 second maximum.

I/O MODULES (OPTIONAL)

Four slots provided for optional I/O modules. Any type and combination of I/O modules can be used.

FRONT-PANEL USER INTERFACE

Display: 2 line by 20 character LCD. Overall size is 19 mm by 82.6 mm (0.75 in by 3.25 in).

Keypad: 15 multi-function, membrane keys. Keys allow numerical entries.

ENVIRONMENTAL

Operating Temperature: –40 to 75°C (–40 to 167°F), excluding display, which is –20 to 70°C (–4 to 158°F).

Storage Temperature: –50 to 85°C (–58 to 185°F).

Operating Humidity: To 95% non-condensing.

Vibration: Less than 0.1% effect on overall accuracy when tested to SAMA PMC 31.1, Section 5.3, Condition 3.

EMC Emissions: Meets FCC Part 15 Class A and EN 50022 Level A in accordance with EN50081-2 (1993).

FloBoss 407 Flow Manager Specifications

DIMENSIONS

Overall: 305 mm H by 236 mm W by 112 mm D (12.0 in. H by 9.3 in. W by 4.4 in. D).

Wall Mounting: 71 mm W by 308 mm H (2.8 in. W by 12.1 in. H) between mounting hole centers. Mounting hole diameter is 9.4 mm (0.37 in.); each mounting hole is 15.5 mm (0.61 in.) long.

Pipestand Mounting: Mounts on 2-inch pipe with U-bolt mounting kit (included).

ENCLOSURE

Die-cast low-copper aluminum alloy with four 1/2-14 inch NPT holes in bottom. Single-piece gasketed doors. Coated with ANSI 61 gray polyurethane paint. Meets CSA Type 4X rating.

WEIGHT

FloBoss 407: 3.2 kg (7 lb).

APPROVALS

Standard Version: Approved by CSA for hazardous locations Class I, Division 2, Groups A, B, C, and D, T4, and C US.

Measurement Canada Version:

Approved by Measurement (Industry) Canada for gas custody transfer, in addition to approval by CSA for hazardous locations (see Standard Version). Note that I/O modules must not be used to supply flow inputs to the FloBoss in a Measurement Canada installation.
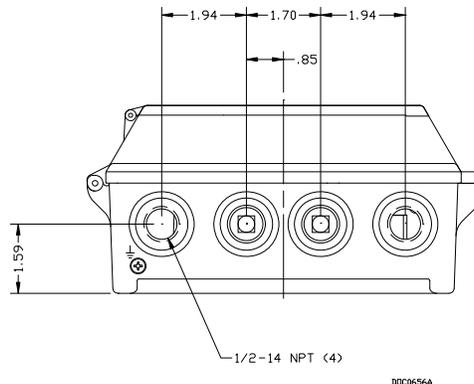
FloBoss 407 NPT holes

Padlock Adaptor

A kit is available for standard FloBoss 407 units that allows a padlock to be used to secure the electronics (upper) door. The adaptor is made of stainless steel and accommodates a 1/4-inch shank padlock that has a maximum body width of 1.5 inches.

Accessories

Accessory items are available for the FloBoss 407 that provide power, sensing, and other capabilities. They include an interface cable (needed for local configuration) and I/O channel Lightning Protection Modules. See your local sales representative for more information.

Emerson Process Management

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