FloBoss™ 103 Flow Manager

The FloBoss™ 103 Flow Manager measures, monitors, and can provide control of gas flow for a single meter run, typically using an orifice plate. This economical flow computer reliably and accurately performs gas flow calculations, data archival, and remote communications.

The FloBoss 103 Flow Manager has an explosion proof, weather-tight enclosure, with an optional window and LCD display. This self-contained flow computer has a processor circuit board, internal batteries, a termination board, an integral Dual Variable Sensor (DVS), terminal wiring for a 2 or 3-wire RTD, optional I/O points, an optional communication card, and an optional radio interface.

The FloBoss unit consists of the following components and features:

- A 32-bit main microprocessor, with
  128 KB of flash boot ROM,
  2 MB for flash ROM, and
  512 KB of RAM data storage.
- Dual-Variable Sensor (DVS) for static pressure and differential pressure measurement.
- Support for a 100 ohm, platinum RTD.
- Weather-tight enclosure.
- Local Operator Interface port (LOI).
- EIA-485 (RS-485) Communications Port.

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FloBoss 103 Flow Manager

The FloBoss 103 utilizes a 32-bit microprocessor, which takes advantage of multiple low-power operating modes. The FloBoss 103 comes standard with 512 KB of built-in Random Access Memory (RAM) for storing data and history. Backup power for the RAM is supplied by a small lithium battery. The FloBoss unit also has 2 MB of programmable Read-Only Memory (flash ROM) for storing operating system firmware, configuration parameters, and applications firmware.

Firmware

The firmware provides the following functionality.

- 1992 AGA3 flow calculations (with user-selectable AGA8 compressibility: Detail, Gross I, or Gross II) for a single orifice meter run.
- 1996 AGA7 flow calculations (with user-selectable AGA8 compressibility) for a single turbine meter.
- Memory logging of 240 alarms and 240 events.
- Standard History Archival of 35 days of hourly values, 60 minute values, and min/max data for up to 35 points.
- Extended History Archival for up to 15 points at a configurable interval.
- Radio power control.
- Closed-loop Proportional, Integral, and Derivative (PID) control capabilities.
- Logic and sequencing control using two user-defined Function Sequence Table (FST) programs.
- Alarm call-out to a host, known as Spontaneous Report By Exception (SRBX).
- ROC and Modbus protocol support.
- User C programs support for alternate measurement standards and specialty applications. Contact your local sales representative for available programs.
- Pass-Through communications on multiple ports.

The FloBoss 103 unit calculates gas flow in accordance with the American Gas Association (AGA) and American Petroleum Institute (API). The FloBoss unit performs AGA3 or AGA7 flow calculations, using AGA8 compressibility methods. AGA7 calculations require the optional I/O with Pulse Input. For AGA3 calculations, differential pressure and static pressure come from the DVS, and flowing temperature is acquired directly from an RTD probe. The FloBoss 103 unit can perform gas flow calculations to GOST standards and ISO 5167 standards, using user C programs.

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The DVS uses the proven Rosemount capacitance cell technology to sense differential pressure. It also uses piezoresistive, silicon sensor technology to sense static pressure and provide extremely accurate, stable and repeatable readings. A dedicated microprocessor in the DVS linearizes and corrects the raw sensor signals using characterization data stored in non-volatile memory.

The DVS bottom consists of a Rosemount-designed Coplanar™ flange, which provides drain/vent valves and process connections. The DVS is factory-attached to the FloBoss 103 enclosure using a flanged coupler.

The field I/O, DVS inputs, flow calculation, history logging, and all other functions are accessed and configured using the ROCLINK™ for Windows Configuration Software (see Specification Sheet 4:RLFW).

The Local Operator Interface port (LOI) provides a direct, local link between the FloBoss unit and a personal computer. With the personal computer running ROCLINK software, you can configure the functionality of the FloBoss unit and monitor its operation. In addition, a host computer can remotely configure the FloBoss unit through the host communications port.

Terminals on the standard termination board provide terminations for the RTD input, the LOI communications port, the RS-485 communications port, the optional communications card, and a power supply. Three diagnostic inputs are dedicated to monitoring internal voltage, battery voltage, and enclosure/battery temperature.

The Class I Div. 1, explosion-proof, type 4 enclosure protects the electronics from physical damage and harsh environments. The caps at either end of the enclosure can be unscrewed to allow field maintenance. The enclosure has two ¾-inch pipe threaded holes for field wiring, communications or panel access. The DVS has bracket holes that allow the FloBoss 103 assembly to be mounted on a pipestand or mounting bracket.

Options

The FloBoss 103 unit supports the following options:

- Liquid Crystal Display (LCD)
- 4 Additional Points of I/O
- Dial-up Modem Card
- RS-232 Serial Communications Card.

Through the LCD display, you can view selected data stored in the FloBoss unit. The LCD displays two lines: the top line has 8 numeric characters and the bottom line has 5 alpha-numeric characters. The display scrolls through the configured list of items, when activated by the user.

Terminals on the optional termination board will include terminations for the optional I/O points. The four points of I/O consists of one Analog Input, one Analog Output, one Discrete Input, and one Discrete Output.

Optional communications cards will provide the ability to send and receive data remotely via either a dial-up modem card or a RS-232 serial communications card.

Accessories

Accessories available for the FloBoss include RTD accessories, a solar panel with mast and mounting hardware, a pipe mounting bracket, and a Local Operator Interface cable (required for local configuration). Contact your local sales representative for more information.

Main Specifications

PROCESSOR INFORMATION

32 bit, running at 3.68 MHz.

Program Memory: 2MB x 8 flash EPROM (programmable) for firmware and configuration.

Data Memory: 512 KB SRAM.

Boot Memory: 128 KB Flash EPROM.

TIME FUNCTIONS

Clock: Real Time. Year/Month/Day and Hour/Minute/Second. Battery Backed. Automatically adjusts for Daylight Savings Time.

DIAGNOSTICS

These conditions are monitored and alarmed: sensor and RTD point fail, battery and internal voltages, internal temperature.

COMMUNICATIONS

Local Operator Interface: EIA-232 (RS-232C) format. Software configured, 1200 to 9600 baud rate selectable.

RS-485: Software configured, 1200 to 9600 baud rate selectable.

Host: RS-232 or Modem interface, when optional communications card is installed.

Protocols: ROC or Modbus Slave (ASCII or RTU).

POWER

Internal Batteries: Lead-acid. Rechargeable. Nominal 6.2 Vdc, 2.5 Amp-hour.

Solar Charging Input: 8-12 Vdc (nominal).

External Power Charging Input: 12 Vdc (nominal).

Input Current: 5 mA nominal. 9.5 mA at 100% duty cycle.

With Internal Batteries: Maximum available wattage at the charge +/- terminal of the FloBoss 103 can not exceed 2W.
Maximum voltage at the charge +/- terminal of the FloBoss 103 can not exceed 20 Vdc.

Without Batteries Installed: Maximum voltage at the charge +/- terminal of the FloBoss 103 can not exceed 28 Vdc.

ENCLOSURE

Housing and Cap: Die-cast aluminum alloy with iridite plating and paint.

RTD INPUT

Quantity/Type: Single input for a 2 or 3-wire RTD element.

Terminals: "RTD+" current source, "RTD+" signal positive input, and "RTD RET" signal negative input.

Sensing Range: -40 to 100°C (-40 to 212°F).

Accuracy: ±0.56°C (1.0°F) over sensing range (includes linearity, hysteresis, repeatability).

Ambient Temperature Effects per 28°C (50°F): ±0.50°C (0.90°F) for process temperatures from -40 to 100°C (-40 to 212°F).

Filter: Band-pass hardware filter.

Resolution: 10 bits.

Sample Period: 1 sec minimum.

ENVIRONMENTAL

Operating Temperature: -40 to 75°C (-40 to 167°F).

LCD Display: -20 to 75°C (-4 to 167°F).

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

Operating Humidity: 5 to 95%, non-condensing.

Vibration: Meets SAMA PMC 31.1.

Radiated/Conducted Transmissions: Meets requirements of IEC 61326 Electrical Equipment for Measurement, Control and Laboratory Use.

Radiated Emissions: Meets FCC Part 15, Class A.

DIMENSIONS

Enclosure: 160 mm H by 150 mm W by 135 mm D (6.3 in H by 5.9 in W by 5.3 in D) excludes mounting flange and sensor.

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

WEIGHT

6.58 kg (14.5 lbs).

APPROVALS

Designed to meet CSA for hazardous locations Class I, Division 1, Groups C and D. To be certified by CSA as Model W40106.

Optional I/O Termination Points Specifications

ANALOG INPUT

Type: Single-ended, voltage-sense analog inputs (current loop if scaling resistor is used).
Signal: 1 to 5 Vdc, software configurable. 4 to 20 mA, with 250Ω resistor installed across "+" and "-" terminals.
Accuracy: 0.5% over -40 to 65°C (-40 to 149°F) range.
Isolation: none.
Input Impedance: 1 MΩ.
Filter: Single pole.
Resolution: 10 bits.
Sample Period: 1.0 second minimum.

ANALOG OUTPUT

Type: 1-5 V output, or 4-20 mA current control.
Terminals:
"+" positive voltage output and "-" common or
"IC" positive current point and "-" common.
Resolution: 10 bits.
Accuracy: 0.1% of full-scale output.
Reset Action: Output goes to last value (software configurable) on power-up (warm start) or on watchdog time-out.

DISCRETE INPUT

Type: Contact-sense discrete input.
Terminals**:** "+" positive input; "COM" negative input (common).
Current Rating: 35 µA in the active (on) state, 0 µA in the inactive (off) state.
Isolation: none.
Frequency: 0.5 Hz maximum.
Sample Period: 1.0 second minimum.

DISCRETE OUTPUT

Type: Solid-state switch.
Terminals: "+" normally-open contact; "-" common.
Switch Rating: 50 Vdc, 0.2 A maximum.
Isolation: 3000 V from processor.

DIMENSIONS

21 mm H by 137 mm W by 160 mm L (0.8 in. H by 5.4 in. W by 6.3 in. L).

CLASSIFICATION

FCC Class A and CISPR 22 computing device.

Dual-Variable Sensor (DVS) Specifications

DIFFERENTIAL PRESSURE INPUT

Range: 0 - 250 in. H_2O (0 - 62.2 kPa).
Reference Accuracy: ±0.075% of span with 10:1 turndown (includes linearity, hysteresis, and repeatability effects).

STATIC PRESSURE INPUT

Range*: Either Absolute or Gauge:
0 - 800 psia/psig (0 - 5516 kPa).
0 - 3626 psia/psig (0 - 25,000 kPa).
Reference Accuracy: ±0.075% of span with 5:1 turndown (includes linearity, hysteresis, and repeatability effects).
Stability: ±0.1% of upper range limit for 12 months.

PROCESS CONNECTIONS

1/4-18 NPT on 2-1/8 in. centers, located on bottom of Coplanar flange.

CONSTRUCTION

316 SST*. Wetted O-rings are glass-filled TFE. Coupler is cast aluminum.

ENVIRONMENTAL AND OTHER SPECS

Meets specifications described in the Main Specifications table.

*Consult factory for special ranges and materials that may be available.

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