

FloBoss™ 103 Flow Manager

The FloBoss 103 Flow Manager measures, monitors, and manages gas flow for a single meter run 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 optional communication card, an optional radio interface, an integral Dual Variable Sensor (DVS), terminal wiring for a 2 or 3-wire RTD, and optional I/O points.

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.



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FloBoss 103 Flow Manager

- ◆ Local Operator Interface port (LOI).
- ◆ EIA-485 (RS-485) Communications Port.

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 2MB of programmable Read-Only Memory (flash ROM) for storing operating system firmware, configuration parameters, and applications firmware.

The firmware provides:

- ◆ 1992 AGA-3 flow calculations (with user-selectable AGA8 compressibility Detail, Gross I, or Gross II) for a single meter run.
- ◆ Memory logging of 240 alarms and 240 events.
- ◆ Standard History Archival of 35 days of hourly data for up to 35 points.
- ◆ Extended History Archival for up to 15 points at a configurable interval.
- ◆ Power control (wake up & on ring) on optional internal modem.
- ◆ Closed-loop PID control capabilities.
- ◆ Logic and sequencing control using 2 user-defined Function Sequence Table (FST) programs.
- ◆ Alarm call-in to a host, known as Spontaneous Report By Exception (SRBX).
- ◆ ROC/Modbus Protocol.
- ◆ 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 1992 AGA3 orifice flow calculations, using AGA8 compressibility. Differential pressure and static pressure come from the DVS, and flowing temperature is acquired directly from a RTD probe.

It also maintains API Chapter 21.1 compliant historical archives.

Specification Sheet

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™ 800 Configuration Software (see Specification Sheet 4:RL800).

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 EIA-485 (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 temperature.

The explosion-proof, type 4 enclosure protects the electronics from physical damage and harsh environments. The enclosure has a Class I Div. 1 rating when properly installed with plug in top of housing and conduit seals. When the optional solar panel mast is attached, the enclosure has a Class I Div. 2 rating. 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 FloBoss 103 assembly has bracket holes that allow the FloBoss 103 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.
- ◆ EIA-232 (RS-232) Serial Communications Card.
- ◆ Logic/Radio Interface.
- ◆ Solar Panel mast assembly.
- ◆ Internal, rechargeable, lead-acid batteries.
- ◆ Blank plate.

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.

The optional termination board has 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 provide the ability to send and receive data remotely via either a dial-up modem card or an EIA-232 (RS-232) serial communications card.

An optional logic card and radio interface provide the ability to send and receive data remotely via radio. The radio interface mounts inside the FloBoss 103 enclosure. The user-supplied antenna may be mounted externally.

An optional solar panel with mast and mounting hardware provide 2 Watts of power for the FloBoss 103. As shown on page 1, the solar panel mast assembly mounts to the top of the FloBoss enclosure.

The optional internal batteries provide 6.2 Volts DC to the FloBoss 103 unit. The batteries are rechargeable by means of the charger board.

An optional blank plate that fits on the bottom of the FloBoss 103 unit is available when no DVS sensor is required. It also provides mounting.

Accessories

Accessories available for the FloBoss include RTD accessories, 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 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 19,200 bps rate selectable.
EIA-485 (RS-485): Software configured, 1200 to 19,200 bps rate selectable.
Host: EIA-232 (RS-232) or Modem interface, when optional communications card is installed.
Protocols: ROC or Modbus Slave or optional Host (ASCII or RTU).
Radio: Spread-spectrum wireless radio, when optional logic card and radio are installed.

POWER

Internal Batteries: Lead-acid. Rechargeable. Nominal 6.2 Vdc, 2.5 Amp-hour. Battery life with no charging input and no communications: 3 weeks.
Charging Input from optional Solar Panel: 8-10 Vdc (nominal).
External Power Charging Input: 8-28 Vdc.
Input Current: 5 mA nominal. 9.5 mA at 100% duty cycle (battery charging not included).

ENCLOSURE

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

WEIGHT

6.58 kg (14.5 lbs).

SOLAR PANEL (OPTIONAL)

Output: 2 Watts, 9 Volts nominal.
Size: 114 mm by 159 mm (4.5 in. by 6.25 in.).

RTD INPUT

Quantity/Type: Single input for a 2 or 3-wire RTD element with alpha of 0.00385.
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).

APPROVALS

Evaluated per the following European standards:
 EN 50014 (1998)
 EN 50018 (2000).
 Evaluated per the following North American standards:
 CSA C22.2 No. 30
 CSA C22.2 No. 213
 UL 1203
 UL 1604.
 Product Markings for Hazardous Locations:
 Class I, Division 1, Groups C & D, Explosion-proof
 Class I, Division 2, Groups A, B, C & D T3.
 EEx d IIB T5 (T_{ambient}=75°C).

Optional I/O Termination Points Specifications

<p>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.</p> <p>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: 8 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.</p>	<p>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.</p> <p>DISCRETE OUTPUT Type: Solid-state switch. Terminals: “+” normally-open contact; “-” common. Switch Rating: 50 Vdc, 0.2 A maximum. Isolation: 3000 V from processor.</p> <p>CLASSIFICATION FCC Class A and CISPR 22 computing device.</p>
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Dual-Variable Sensor (DVS) Specifications

<p>DIFFERENTIAL PRESSURE INPUT Range*: 0 - 250 in. H₂O (0 - 62.2 kPa). Reference Accuracy: ±0.075% or ±0.10% of span with 10:1 turndown (includes linearity, hysteresis, and repeatability effects).</p> <p>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% or ±0.10% of span with 6:1 turndown (includes linearity, hysteresis, and repeatability effects). For spans with more than 6:1 turndown, contact factory. Stability: ±0.1% of upper range limit for 12 months.</p>	<p>PROCESS CONNECTIONS 1/4-18 NPT on 2-1/8 in. centers, located on bottom of Coplanar flange.</p> <p>CONSTRUCTION 316 SST (standard)* or optional Hastelloy C. Wetted O-rings are glass-filled TFE.</p> <p>ENVIRONMENTAL AND OTHER SPECS Meets specifications described in the Main Specifications table.</p>
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*Consult factory for special ranges and materials that may be available.

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