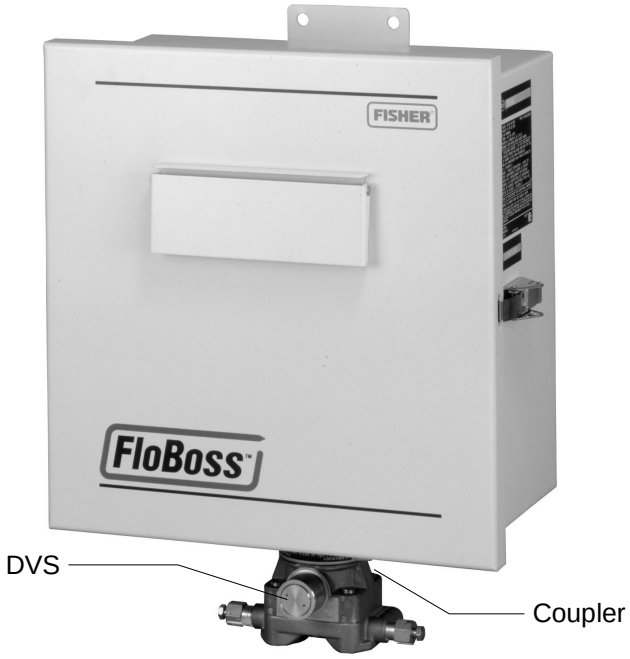
FloBoss™ 503 Flow Manager

The FloBoss 503 Flow Manager measures, monitors, and manages gas flow for a single meter run using orifice plate (differential pressure) techniques. This economical flow computer reliably and accurately performs gas flow calculations, data archival, and remote communications.

The FloBoss unit has a weather-tight enclosure with a cover-protected window for a LCD display. The enclosure contains a processor circuit board with built-in I/O, along with mounting provisions for batteries, a radio, and optional I/O and communication cards. The built-in I/O consists of a Dual-Variable Sensor (DVS) port, a direct 4-wire RTD interface, and a discrete output capable of directly driving a sampler or odorizer.

The FloBoss unit consists of the following components and features:

- A 32-bit main microprocessor, with 512KB of flash ROM and 512KB of static RAM storage.



FloBoss 503 Flow Manager

- Built-in RTD Input and Discrete Output.
- Extensive applications firmware.
- Weather-tight enclosure with covered display.
- Space for up to four 7-Amp-hour batteries.
- Local operator interface (LOI) port.
- Port for optional host communications card.
- Provision for optional I/O card.
- Optional Dual-Variable Sensor (DVS) for static pressure and differential pressure measurement.
- Optional bracket for internally mounted radio.
- Optional AC power supply and battery charger.

The FloBoss unit contains a 32-bit CMOS microprocessor, which has multiple low-power operating modes. The FloBoss unit comes standard with 512KB of built-in Static Random Access Memory (SRAM) for storing data and history. Backup power for the SRAM is supplied by a super capacitor, which never needs replacing. The FloBoss unit also has 512KB 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 (orifice metering plus compressibility factors) for a single meter run.
- Memory logging of 240 alarms and 240 events.
- Archival of data for up to 15 history points.
- Power cycling control for a radio through DTR signal or switching feature of EIA-232 (RS-232) communications card.
- Closed-loop PID control capabilities.
- Modbus slave protocol.
- Logic and sequencing control using 2 user-defined FST programs.
- Alarm call-in to a host, known as SRBX.
- Security access levels.

The firmware also provides an audit trail per API Chapter 21.1. For more information on the firmware, see Specification Sheet 3:FB5FW.

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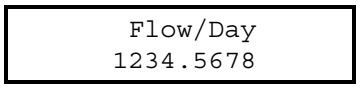
The FloBoss 503 unit calculates gas flow in accordance with the American Gas Association (AGA) and American Petroleum Institute (API). The FloBoss unit performs 1992 AGA3 orifice flow calculations, using AGA8 compressibility. Differential pressure and static pressure come from the DVS, and flowing temperature is acquired directly from an RTD probe.

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

The operator interface port (LOI), located on the bottom left-hand side of the enclosure, 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.

Through the display on the front panel, you can view selected data stored in the FloBoss unit. Up to 16 items can be configured for viewing. The display scrolls through the configured list of items.



Sample FloBoss Display

Screw terminals on the processor board provide terminations for dc power, the RTD input, a discrete output, and non-switched radio power. Three diagnostic inputs are dedicated to monitoring input power, battery voltage, and enclosure temperature.

The steel enclosure protects the electronics from physical damage and harsh environments. The enclosure has a hinged and gasketed door that is secured by a lockable hasp. It also has mounting flanges that allow the enclosure to be fastened to a wall or panel, or mounted on a pipestand. A swing-up cover protects the display.

Options

The FloBoss 503 unit supports the following options:

- 500-Series Communications Card.
- 500-Series I/O Card.
- Dual-Variable Sensor (DVS).
- AC Power Supply.
- Radio Bracket.
- Intrusion Switch.
- Remote Multi-Variable Sensor Interface.

The **500-Series Communication Cards** provide an interface for the host communications port on the processor board. One of any of the following types of cards can be accommodated (refer to Specification Sheet 3.3:COM for more information):

- EIA-232 (RS-232) for asynchronous serial communications, such as used with a radio.
- EIA-485 (RS-485) for asynchronous serial communications.
- Dial-up modem for communications over a telephone network.

The **500-Series I/O Cards** provide additional inputs and outputs for expanded monitoring and control applications. The boards contain analog inputs, discrete/pulse inputs, discrete outputs, and analog outputs. The IOB1 board has 10 points, and the IOB2 board has 24 points. For the quantity of each type of I/O and other details, see Specification Sheets 3:IOB1 and 3:IOB2.

The **DVS** uses Rosemount capacitance cell technology to sense differential pressure and piezo-resistive silicon sensor technology to sense static pressure. 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 may be factory-attached to the FloBoss enclosure, using a flanged coupler, or remotely mounted when Class I Div. 1 is required.

Using a CR1 communication package allows connection to an external **Remote MVS** sensor, instead of the integral DVS sensor. This allows measurement in hazardous Class I Div. 1 locations. For information on the Remote MVS sensor interface, refer to Specification Sheet 3.5:MVSI. For information on the Remote MVS sensor, refer to Specification Sheet 2.5:MVS205.

The internal **AC Power Supply** converts AC line power to DC power for use with the FloBoss unit and its accessories. The power supply, which is factory-installed in the left-most battery position, also functions as a battery charger. Refer to the low-current power supply in Specification Sheet 2.2:PS.

(Continued on Page 4)

Main Specifications

PROCESSOR INFORMATION

Motorola 32 bit, running at 14.7 MHz.

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

Data Memory: 512 KB SRAM, super capacitor-backed for up to 4 weeks.

Memory Reset: A reset jumper enables a cold start initialization when used during power-up.

TIME FUNCTIONS

Clock Type: 32 kHz crystal oscillator with regulated supply, super capacitor-backed. Year/Month/Day and Hour/Minute/Second, with Daylight Savings Time control.

Clock Accuracy: 0.01%.

Watchdog Timer: Hardware monitor expires after 1 second and resets the processor.

DIAGNOSTICS

These conditions are monitored and alarmed: SRAM validity/operation, sensor and RTD point fail, battery and charging voltages, internal temperature.

COMMUNICATIONS

Operator Interface: EIA-232 (RS-232D) format. Software configured, 600 to 19.2K bps baud rate (selectable). Screw-cap protected connector.

Host: Serial or modem interface, when optional communications card is installed.

POWER

Battery Input: 10 to 15 Vdc (normally 10.8 Vdc to start up). 0.2 W typical, including DVS power, but excluding power for discrete output load, communications card, and I/O Card.

Charging Input: 14 to 22 Vdc. Charge current internally limited to 1.0 Amp.

Power Supply (Optional): 105-132 or 207-264 Vac, 47 to 63 Hz. See Low-Current Power Supply in Specification Sheet 2.2:PS for more information.

LOCAL DISPLAY

2 line by 16 character LCD. Continually updates approximately every 3 seconds. See Environmental specification for operating temperature.

RTD INPUT (BUILT-IN)

Quantity/Type: Single input for a 2, 3, or 4-wire RTD element with alpha of 0.00385.

Terminals: "Ref" current source, "+" signal positive input, "-" signal negative input, and "Ret" return (common).

RTD INPUT (BUILT-IN) (CONTINUED)

Sensing Range: -50 to 100°C (-58 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: 16 bits.

Conversion Time: 100 µsec.

Sample Period: 1 sec minimum.

DISCRETE OUTPUT (BUILT-IN)

Quantity/Type: 1 sourced, high-side switched output.

Terminals: "+" positive output, "-" negative (common).

Voltage: Same as applied to Battery Input minus 0.7 volts.

Frequency: 1.5 Hz maximum.

Sample Period: 200 ms minimum.

Current Limit: 300 mA, automatic reset.

I/O CARD (OPTIONAL)

See Specification Sheets 3:IOB1 and 3:IOB2.

ENVIRONMENTAL

Operating Temperature: -40 to 75°C (-40 to 167°F), excluding LCD display, which is -25 to 70°C (-13 to 158°F).

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

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

Vibration: Tested to SAMA 31.1 Condition 3, with an abbreviated endurance dwell test.

Radiated/Conducted Transmissions: Complies with requirements for Class A Information Technology Equipment per EN 55022 (1995) and CISPR 22 (1993). Also complies with FCC Part 15 Class A.

Voltage Surge Immunity: Designed to meet IEC 801-4 and IEC 801-5, as required by EN 50082-2.

ENCLOSURE

Construction: Powder-coated 14-gauge carbon steel with lockable hasp and gasketed door. Coating is gray polyurethane paint. All unpainted hardware is stainless steel. Meets CSA Type 4 rating (NEMA 4 equivalent).

Wiring access: Three 0.88 in. pre-punched holes in bottom.

Main Specifications (Continued)

DIMENSIONS

Overall: 451 mm H by 350 mm W by 184 mm D (18.12 in. H by 13.80 in. W by 7.25 in. D). Height includes top mounting flange and sensor.

Wall Mounting: 72 mm W by 350 mm H (2.81 in. W by 13.80 in. H) between mounting hole (0.38 in. diameter) centers.

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

WEIGHT

13.0 kg (28.5 lb) nominal, including sensor and coupler, but excluding batteries (not supplied). AC Power Supply adds 0.82 kg (1.8 lb).

INTRUSION SWITCH (OPTIONAL)

SPST, normally-closed, hermetically-sealed. Uses discrete input on optional I/O Card.

APPROVALS

Approved by CSA as Model W40079 for hazardous locations Class I, Division 2, Groups A, B, C, and D, C US.

Dual-Variable Sensor (DVS) Specifications (Integral Only)

DIFFERENTIAL PRESSURE INPUT

Range*: 0 - 62.2 kPa (0 - 250 in. H_2O).

Reference Accuracy: ±0.075% of span with 10:1 of upper range limit turndown (includes linearity, hysteresis, and repeatability effects).

STATIC PRESSURE INPUT

Range*: Either Absolute or Gauge:
0 - 5516 kPa (0 - 800 psia/psig)
0 - 25,000 kPa (0 - 3626 psia/psig)

Reference Accuracy: ±0.075% of span with 6:1 of upper range limit 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.

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 stainless steel (CF8M).

ENVIRONMENTAL AND OTHER SPECS

Meets specifications described in the Main Specifications table.

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

Options (Continued)

The **Radio Bracket** allows a radio up to 2.25 inches high to be mounted securely above the battery compartment inside the FloBoss enclosure.

The **Intrusion Switch** provides a closed contact whenever the door is opened. The contact is monitored and alarmed by the FloBoss unit through a discrete input on the optional I/O Card.

Accessories

Accessories available for the FloBoss include the remote MVS interface and an operator interface cable (needed for local configuration). See your local sales representative for more information.

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