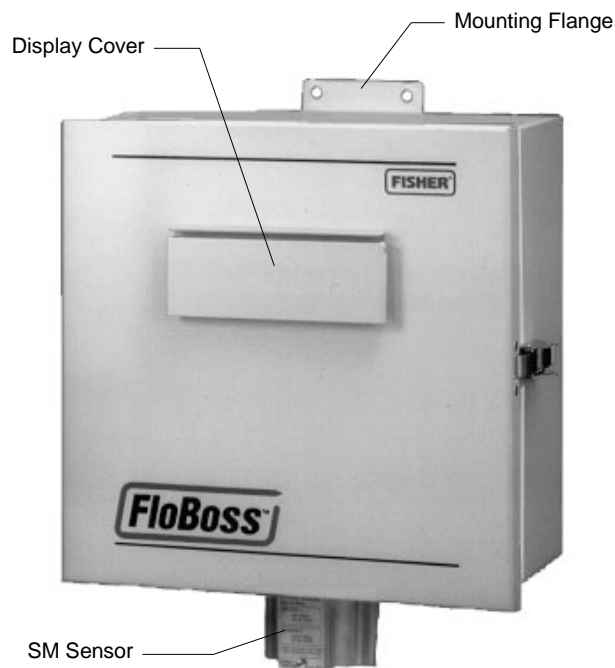


FloBoss™ 504 Flow Manager

The FloBoss 504 Flow Manager is designed for measuring gas flow in turbine metering applications in which a single or dual pulse train is generated from a single rotor. The FloBoss 504 is an economical flow computer that reliably and accurately performs gas flow calculations, data archival, and remote communications.

The FloBoss has a weather-tight enclosure with a window for a LCD display protected by a weather shield cover. The enclosure contains a processor circuit board with built-in I/O along with mounting provisions for batteries, a radio, and optional I/O cards. Built-in I/O includes a Sensor Module (SM), a direct 4-wire RTD interface, and a discrete output capable of driving a sampler or odorizer.

The SM sensor accumulates single or dual pulse counts from the turbine meter (typically via a pre-amp) and performs error checking/correction. In addition, the SM has a static pressure sensor and an optional auxiliary pressure sensor built into it. Refer to Specification Sheet 3.3:SM.



FloBoss 504 Flow Manager

The FloBoss 504 consists of the following components and features:

- ◆ A 32-bit main microprocessor, with 512KB of flash ROM and 512KB of static RAM storage.
- ◆ Pulse counters for sensing one or two pulse inputs from a turbine meter.
- ◆ Pressure sensors for measuring static pressure and optionally an auxiliary pressure.
- ◆ 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.
- ◆ Operator interface port.
- ◆ Port for optional host communications card.
- ◆ Provision for optional I/O cards.

The FloBoss contains a 32-bit CMOS microprocessor, which has multiple low-power operating modes. The FloBoss 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 also has 512KB of programmable Read-Only Memory (flash ROM) for storing operating system firmware, configuration parameters, and applications firmware.

The firmware provides:

- ◆ Flow calculations for a gas turbine meter in 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 an EIA-232 (RS-232) communications card.
- ◆ Closed-loop PID control capabilities (up to 3 loops).
- ◆ Modbus slave protocol.
- ◆ Logic and sequencing control using user-defined FST programs (up to 2 programs).
- ◆ RBX alarm call-in to a host.

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

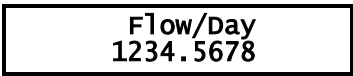
The FloBoss 504 calculates gas flow using inputs from a turbine meter in accordance with the American Gas Association (AGA), American Petroleum Institute (API), and ISO standards. The FloBoss performs 1996 AGA7 calculations, using 1992 AGA8 supercompressibility. The FloBoss can also perform ISO 9951 calculations, using ISO 12213-2 supercompressibility. Data transmission security Level A to E is met according to API Chapter 5 Section 5 and ISO 6551. Level A integrity, which uses two pulse streams and includes error correction, requires the use of a high-precision turbine (no more than one percent phase error between blades).

The primary inputs used for turbine flow calculations are pulse counter, static pressure, and temperature. The single or dual pulse-count inputs are taken from a single-rotor turbine meter, the static pressure input comes from a process connection to the Sensor Module (SM), and the temperature input is acquired directly from an RTD probe. For more information on the Sensor Module, refer to Specification Sheet 3.3:SM.

The field I/O (including turbine-metering inputs), flow calculation, power control, and FST programmability are configured and accessed using ROCLINK for Windows Configuration Software. Refer to Specification Sheet 4:RLFW for more information.

The operator interface port (LOI), located on the bottom left-hand side of the enclosure, provides a direct, local link between the FloBoss and a personal computer. With the personal computer running ROCLINK software, you can configure the functionality of the FloBoss and monitor its operation. In addition, a host computer can remotely configure the FloBoss through the host communications port.

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



Flow/Day
1234.5678

Sample FloBoss Display

Screw terminals on the processor board provide terminations for input power, battery power, RTD input, a discrete output, and radio power (non-switched).

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 ears 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 504 supports the following options:

- ◆ 500-Series Communications Card
- ◆ 500-Series I/O Cards
- ◆ AC Power Supply
- ◆ Radio Bracket
- ◆ Intrusion Switch

The **500-Series Communication Cards** provide an interface for the host communications port on the FloBoss. One of any of the following types of cards can be accommodated:

- ◆ 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.

A socket and mounting standoffs on the FloBoss processor board allow the communications card to be easily added or replaced. Refer to Specification Sheet 3.3:COM for more information.

A **500-Series I/O Card** provides either 10 or 24 additional inputs and outputs for expanded monitoring and control applications. The board contains analog inputs, discrete/pulse inputs, discrete outputs, and analog inputs. For the quantity of each type of I/O and other details, see Specification Sheet 3:IOB1 or 3:IOB2.

The internal **AC Power Supply** converts AC line power to DC power for use with the FloBoss 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.

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

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

Accessories

Accessories available for the FloBoss include RTD sensor assemblies and an operator interface cable (needed for local configuration). Contact your local sales representative for more information.

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: pulse integrity, SRAM validity/operation, SM analog inputs 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: 8 to 15 Vdc (normally 10.8 Vdc to start up). 0.35 W typical, 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.

TURBINE INTERFACE MODULE (BUILT-IN)

See Specification Sheet 3.3:SM.

RTD INPUT (BUILT-IN)

Quantity/Type: Single input for a 2, 3, or 4-wire RTD.
Terminals: "Ref" current source, "+" signal positive input, "-" signal negative input, and "Ret" return (common).
Sensing Range: -50 to 100°C (-58 to 212°F).

RTD INPUT (BUILT-IN) (CONTINUED)

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 (.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 Battery Input minus 0.7 volts.
Frequency: 1.5 Hz maximum.
Sample Period: 200 milliseconds minimum.
Current Limit: 300 mA, automatic reset.

I/O CARDS (OPTIONAL)

See Specifications Sheet 3:I0B1 or 3:I0B2.

ENVIRONMENTAL

Operating Temperature: -40 to 75°C (-40 to 167°F), excluding LCD display, which is -25 to 70°C (-13 to 158°F). See Specification Sheet 3.3:SM for pressure accuracy in Operating Temperature range.
Storage Temperature: -50 to 85°C (-58 to 185°F).
Operating Humidity: 5 to 95%, non-condensing.
Electrostatic Discharge: Complies with requirements in CENELEC document EN61000-4-2, Class A, withstanding 8 kV Air Discharge and 4kV Contact Discharge.
Radiated Immunity: Complies with requirements in CENELEC document EN61000-4-3. Also complies with FCC Part 15, Class A.
Conducted Emissions: Complies with requirements in CENELEC document EN55011, Class A.
Power Frequency Magnetic Field: Complies with requirements in CENELEC document EN6100-4-8, Class A..
Conducted Immunity: Complies with requirements in CENELEC document EN6100-4-6, Class A..

ENCLOSURE

Construction: Powder-coated (gray polyurethane) 14-gauge carbon steel with lockable hasp and gasketed door. 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.

Specifications (Cont'd)

DIMENSIONS

Overall: 420 mm H by 350 mm W by 184 mm D (16.56 in. H by 13.80 in. W by 7.25 in. D). Height includes top mounting flange and SM.

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

10.4 kg (23 lb) nominal, including SM, 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 an optional I/O Card.

APPROVALS

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

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