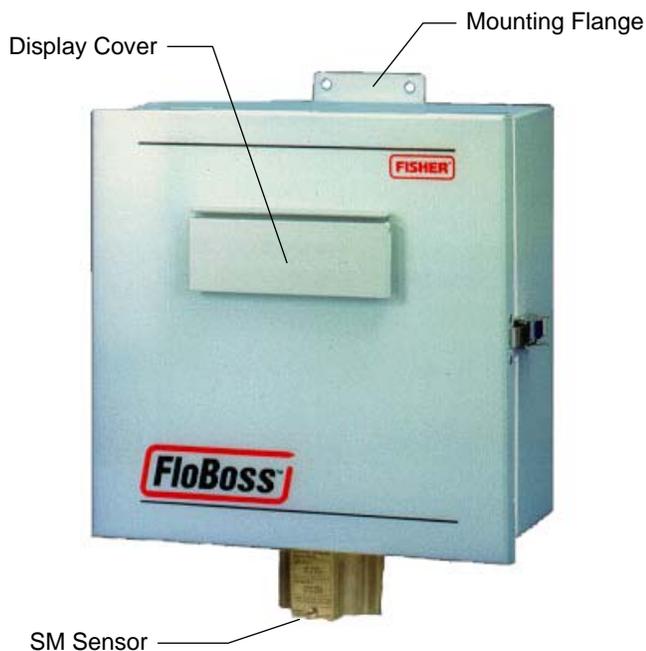


FloBoss™ 504 Flow Manager

The FloBoss™ 504 Flow Manager measures gas flow in turbine metering applications in which a single or dual pulse train generates 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 Liquid Crystal Display (LCD) protected by a weather shield cover. The enclosure contains a processor circuit board with built-in inputs/outputs (I/O) along with mounting provisions for batteries, a radio, optional communications cards, and optional I/O cards. Built-in I/O includes a Sensor Module (SM), a direct 4-wire Resistive Temperature Device (RTD) interface, and a discrete output (DO) capable of driving a sampler or odorizer.

The SM accumulates single or dual pulse counts from the turbine meter (typically via a pre-amp) while performing error checking and correction. Five levels of pulse integrity checking (level A through level E) are available with either calculation scheme. In addition, the SM has a static pressure sensor and an optional auxiliary pressure sensor built into it.



FloBoss 504 Flow Manager

The FloBoss 504 consists of the following components and features:

- 32-bit main microprocessor, with 512 KB of flash ROM and 512 KB 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.
- Local Operator Interface port (LOI).
- Port for optional host communications card (Comm1).
- Provision for optional I/O cards.

The FloBoss contains a 32-bit Complementary Metal Oxide Semiconductor (CMOS) microprocessor, which has multiple low-power operating modes. The FloBoss comes standard with 512 KB of built-in Static Random Access Memory (SRAM) for storing data and history. A super capacitor provides backup power for the SRAM. The FloBoss also has 512 KB 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 Data Terminal Ready (DTR) signal or switching feature of an EIA-232 (RS-232) communications card.
- Closed-loop Proportional, Integral, and Derivative (PID) control capabilities (up to three loops).
- Modbus slave protocol.
- Logic and sequencing control using two user-defined Function Sequence Table (FST) programs.
- Alarm call-in to a host using Spontaneous-Report-by-Exception (SRBX).
- Security access levels.

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 International Standards Organization (ISO) standards. The FloBoss performs 1996 AGA7 calculations, using 1992 AGA8 super compressibility. The FloBoss can also perform ISO 9951 calculations, using ISO 12213-2 super compressibility. 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 firmware also provides an audit trail per API Chapter 21.1.

The primary inputs for turbine flow calculations are the 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 SM, and the RTD probe provides the temperature input.

Use the ROCLINK™ 800 Configuration Software to view and configure the field I/O (including turbine-metering inputs), flow calculation, power control, and FST programmability.

The LOI port, 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 800 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 LCD display on the front panel, you can view selected data stored in the FloBoss unit. You can configure up to 16 items for viewing and 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. The enclosure 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:

- Communications Cards.
- I/O Cards.
- Low-Current Power Supply.
- Radio Bracket.
- Intrusion Switch.

The **FloBoss 500-Series Communication Cards** provide an interface for the host communications port (Comm1) on the FloBoss. The FloBoss can use one of any of the following types of cards:

- 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.

A **FloBoss 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 inputs, pulse inputs, discrete outputs, and analog inputs.

The internal **Low-Current Power Supply** converts Alternating Current (AC) line power to Direct Current (DC) power for use with the FloBoss and accessories. The power supply, which is installed in the left-most battery position, also functions as a battery charger.

The optional **Radio Bracket** allows a radio up to 57.15 millimeters (2.25 inches) high to mount securely above the battery compartment inside the FloBoss enclosure.

The **Intrusion Switch** provides a closed contact whenever the door is opened. A discrete input contact on the optional I/O card monitors and alarms the FloBoss unit.

Accessories

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

FloBoss 504 Flow Manager 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 four weeks.

Memory Reset: A reset jumper enables 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 one 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, and internal temperature.

COMMUNICATIONS

Operator Interface: EIA-232 (RS-232D) format. Software configured, 600 to 19,200 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 V dc (normally 10.8 V dc to start up). 0.35 W typical, excluding power for discrete output load, communications card, and I/O card.

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

Power Supply (Optional): 105 to 132 V ac or 207 to 264 V ac, 47 to 63 Hz.

LOCAL DISPLAY

Two line by 16 character LCD. Continually updates approximately every three seconds.

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 element with alpha of 0.00385.

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

Sensing Range: -50 to 100°C (-58 to 212°F).

Accuracy: $\pm 0.56^{\circ}\text{C}$ (1.0°F) over sensing range (includes linearity, hysteresis, repeatability).

Ambient Temperature Effects per 28°C (50°F): $\pm 0.50^{\circ}\text{C}$ (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 microseconds.

Sample Period: 1 second minimum.

DISCRETE OUTPUT (BUILT-IN)

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

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

Voltage: Same as applied to the 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)

Refer to Specifications Sheet 3:IOB1 or 3:IOB2.

ENVIRONMENTAL

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

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 4 kV Contact Discharge.

Radiated Immunity: Complies with requirements in CENELEC document EN61000-4-3 and complies with FCC Part 15, Class A.

FloBoss 504 Flow Manager Specifications

ENVIRONMENTAL (CONTINUED)

Conducted Emissions: Complies with requirements in CENELEC document EN55011, Class A.

Power Frequency Magnetic Field: Complies with requirements in CENELEC document EN61000-4-8, Class A.

Conducted Immunity: Complies with requirements in CENELEC document EN61000-4-6, 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.

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: 350 mm H by 72 mm W (13.80 in. H by 2.81 in. W) 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). Low-current 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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