FloBoss™ 107 Flow Manager

The FloBoss™ 107 Flow Manager (FB107) is a microprocessor-based controller that monitors, measures, and controls equipment in a remote environment. Designed for expandability, the FB107 provides the functions required for a variety of field automation applications. You can use the FB107 for:

- Applications requiring flow computation.
- Control applications.
  - Proportional, Integral, and Derivative (PID) control loops.
  - Logic sequencing control using Function Sequence Tables (FSTs).
  - IEC-61131 programmed applications.
- Custom applications for measurement, communications, and control.

For detailed firmware capabilities, see *Product Data Sheet FB107:FW1*.

The FB107 is capable of measuring up to four meter runs through a variety of differential and linear meters. Meter inputs can utilize analog or digital transmitters, pulse inputs, or modbus variables. You can add an optional Multi-Variable Sensor (MVS) module to provide an interface to remote MVS transmitters for multiple run applications.

The FB107 has four slots on the main unit with four additional slots on the optional expansion rack. Slot 0 is for the central processing unit (CPU) module, which includes three communication ports, a resistance temperature detector (RTD)

input, power input, and loop output power. Optionally, the CPU module can include a 6-point configurable I/O assembly.

Slots 1 and 2 on the main unit can contain communication modules. Slots 1, 2, and 3 on the main unit and slots 4, 5, 6, and 7 on the optional expansion rack can contain input/output (I/O), MVS, and application modules.

Use ROCLINK™ 800 Configuration Software to configure the FB107, extract data, and monitor its operation.

The FB107 has the following features:

- Capable of measurement for differential pressure elements and linear meter applications.
- Expandable I/O – Six points on the optional CPU I/O assembly and up to six I/O modules (with expansion rack).
- Configurable operating speed to optimize low power consumption.
- Standard and extended history archiving.
- Field-side surge and short-circuit protection.
- Local storage of monitored, measured, and calculated data.
- Local control of field equipment, including valves and motors.
- Local and remote communication capabilities.
- High levels of data security.
- Battery backed memory and data configuration.
- *Wireless*HART™ support

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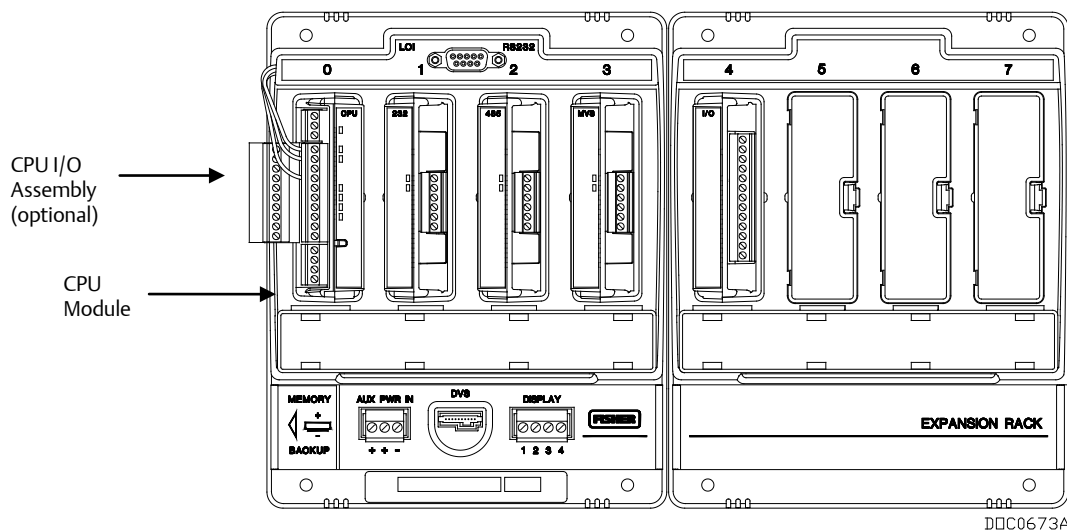
FloBoss 107 with optional Expansion Rack

Remote Automation Solutions

EMERSON™
Process Management

Hardware

Extensive use of the latest technology in short-circuit protection reduces the need for fuses on the I/O, application, MVS, and communications modules and decreases maintenance calls.

The FB107 is available with an isolated CPU. Isolation occurs between the CPU and the field logic. Four CPU options are available for the FB107:

- Non-isolated CPU with I/O
- Non-isolated CPU without I/O
- Isolated CPU with I/O
- Isolated CPU without I/O

The FB107's backplane provides connections for the CPU, I/O, MVS, application, and communication modules. You can add an expansion rack to increase I/O by four slots. The FB107 can have up to six optional I/O cards.

The CPU module is located in slot 0 of the main FB107 unit. An LED (light-emitting diode) indicator on the CPU shows the device power status.

You can configure the I/O on the optional CPU I/O assembly to set the loop output power to 10 volts dc or 24 volts dc. I/O modules support 24 volts dc loop output power.

The intent of the 24 volts dc loop output power is to power external devices that require 24 volts dc to ground. This allows the external device to send the FB107 a 4 to 20 mA signal based on pressure, temperature, or level.

The 10 volts dc loop output power is intended for low-power transmitters. The loop current is designed to deliver 80 mA to power field devices that connect back to the two analog inputs as 1 to 5 volts dc signals.

The resistance temperature detector (RTD) measures the flowing temperature. The RTD wires connect directly to the RTD connector on the CPU.

Using ROCLINK 800 software, you can write licenses to the FB107, providing extended functionality, such as the use of various user programs.

Memory

The FB107 has three types of memory:

- Boot Flash – System initialization and diagnostics.
- Flash ROM (Read-Only Memory) – Firmware image.
- SRAM (Static Random Access Memory) – Data Logs and configuration.

Communications

The FB107 supports up to four communication ports. The CPU module has three built-in communication ports:

- Local Operator Interface (RS-232) – LOI for asynchronous serial communication.
- EIA-485 (RS-485) – COM1 for asynchronous serial communication.
- EIA-232 (RS-232) – COM2 for serial communication.

The Local Operator Interface (LOI) port's DB9 connector provides an EIA-232 (RS-232) link between the FB107 and a personal computer.

LEDs display the RX (receive) and TX (transmit) signals for the LOI and COM2 ports on the CPU module. LEDs display the transmit (A) and receive (B) signals for the COM1 port on the CPU module.

The FB107 supports communication protocols, including ROC protocol and Modbus protocol. A FB107 can act as a Modbus slave device (ASCII or RTU) or it can function as a Modbus host on COM1 on the CPU module, COM2 on the CPU module, slot 1 of the device, and slot 2 of the device.

You can install an optional communication module in slot 1 or 2 on the main FB107. When a communication module is installed in slot 2, the communications port (COM2) on the CPU is redirected to this module. Optional communication modules include an EIA-232 (RS-232) module, EIA-485 (RS-485) module, dial-up modem module, Enhanced Communication Module (ECM module) with USB and Ethernet ports, IEC 62591 Interface Module, and the Network Radio Module.

The EIA-232 (RS-232) module provides point-to-point asynchronous serial communications. EIA-232 (RS-232) communications provide the physical interface for connecting serial devices, such as gas chromatographs and radios. For more information, refer to *Product Data Sheet FB107:COM*.

The EIA-485 (RS-485) module provides asynchronous serial communications for multi-drop units on a serial network over long distances using inexpensive twisted-pair cables. For more information, refer to *Product Data Sheet FB107:COM*.

The Dial-up Modem module provides communication over a Public-Switched Telephone Network (PSTN) at up to 2400 bits per second (bps). For more information, refer to *Product Data Sheet FB107:DIAL*.

The Enhanced Communication Module (ECM module) provides communications over one four-session Ethernet port and one Universal Serial Bus (USB) 2.0 port. For more information, refer to *Product Data Sheet FB107:ECM*.

The Network Radio Module (NRM) provides a wireless solution for importing and/or exporting over-the-air messages and information. For more information, refer to *Product Data Sheet FB107:NRM*.

Inputs and Outputs

You can install optional I/O modules in slots 1 through 3 on the main FB107 and in slots 4 through 6 on the expansion rack. You can install an optional I/O module in slot 7 on the expansion rack when a module other than I/O is installed in slot 1 on the main FB107.

The 6-point I/O assembly that installs on the CPU module and the 6-point I/O module provide the same selections for I/O. Five of the six points of I/O are software-selectable. The six points of I/O consist of:

- Two analog inputs or discrete inputs.
- One analog output or discrete output.
- One discrete output.
- Two pulse inputs or discrete inputs.

You can use analog current inputs of 4 to 20 mA when the 250-ohm resistor is selected in the AI configuration using ROCLINK 800 software.

The 8-point AI/DI module adds eight user-selectable analog input or discrete input channels to the FB107. For more information, refer to *Product Data Sheet FB107:AIDI*.

The 6-point AO/DO module adds six user-selectable analog output or discrete output channels to the FB107. For more information, refer to *Product Data Sheet FB107:AODO*.

The Discrete Output Relay module adds six channels of discrete outputs to the FB107. For more information, refer to *Product Data Sheet FB107:DOR*.

The Resistance Temperature Detector (RTD) module adds three channels with the ability to monitor various RTD sensors. For more information, refer to *Product Data Sheet FB107:RTD*.

I/O Interfaces

The Application module is preloaded with a specific application and has a RS-485 communications port. The module provides a way to add programs to the FB107 by simply installing a module that includes all point type information and screens required by the application. For more information, refer to *Product Data Sheet FB107:APP*.

The HART® (Highway Addressable Remote Transducer) module allows the FB107 to communicate with HART devices using the HART protocol. For more information, refer to *Product Data Sheet FB107:HART*.

An Multi-Variable Sensor (MVS) module can interface with up to six MVS transmitters on up to four meter runs. You can install the MVS module in slots 1 through 3 on the main FB107 and in slots 4 through 7 on the expansion rack, regardless of the position of any other type of module. For more information, refer to *Product Data Sheet FB107:MVS*.

A Dual-Variable Sensor (DVS) can be used to measure differential and static pressure if the FB107 is mounted in a FloBoss 107E enclosure. For more information, refer to *Technical Specification DVS205*.

A Pressure Module (PM) can be used to measure up to two pressure inputs if the FB107 is mounted in a FloBoss 107E enclosure. For more information, refer to *Product Data Sheet FB107:ENC*.

IEC 62591 Interface Module which connects to the Smart Wireless Field Link for radio connection to the *Wireless*HART™ field devices. For more information, refer to *Product Data Sheet FB107:62591*.

Enclosures

A steel enclosure and a polycarbonate enclosure are available for the FB107. Refer to *Product Data Sheet FB107:ENC* for more information about the available enclosures.

Measurement Canada

Measurement Canada approval is available on the FB107. The Measurement Canada version of the FB107 consists of a four-slot FB107 running Measurement Canada firmware and housed in a polycarbonate enclosure (without an external LOI port) with an LCD Touchpad (view only). For more information on the firmware, refer to *Product Data Sheet FB107:FW1*. For more information on the polycarbonate enclosure, refer to *Product Data Sheet FB107:ENC*.

Note: Analog inputs on the 6-point I/O CPU assembly and on the 6-point I/O module may **not** be used as AGA measurement inputs for Measurement Canada.

FloBoss 107 Flow Manager

CPU Module		
Processor		32-bit Renesas HD64F2378 processor with selectable clock rates of 29.4 Mhz, 14.7 Mhz and 3.7 Mhz.
Clock	Type	Real Time. Year/Month/Day and Hour/Minute/ Second. Backed up by the battery on the backplane and the super capacitor in the CPU module.
	Clock Accuracy	Within 13 seconds per month at –20°C to 70°C (–4°F to 158°F).
Diagnostics		These conditions are monitored and alarmed: RTD point fail, module integrity, logic voltage, battery voltage, charge in, and battery temperature.
Isolation (optional)		1500 Vdc
Light-Emitting Diodes (LEDs)	PWR:	Indicates power is applied properly to the FB107.
	Tx	Indicates if the FB107 is transmitting through an EIA-232 (RS-232) communication port.
	Rx	Indicates if the FB107 is receiving through an EIA-232 (RS-232) communication port.
	A	Indicates transmit status through an EIA-485 (RS-485) communication port.
	B	Indicates receive status through an EIA-485 (RS-485) communication port.
Communications		
Ports on CPU module	LOI (Local Operator Interface)	EIA-232 (RS-232) format. Software configurable, 300 to 115.2K bps rate selectable. DB9 connection.
	485 (COM1)	EIA-485 (RS-485) 300 to 115.2 K bps rate, serial interface. Standard for differential data transmission over distances of up to 1220 m (4000 ft).
	COM2 (232)	EIA-232 (RS-232) 300 to 115.2 K bps rate, host serial interface. Standard for single-ended data transmission over distances of up to 15 m (50 ft).
Communication Modules (optional)	EIA-232 (RS232)	For more information, refer to *Product Data Sheet FB107:COM*.
	EIA-485 (RS-485)	For more information, refer to *Product Data Sheet FB107:COM*.
	Dial-up Modem Module	Provides communication over a Public-Switched Telephone Network (PSTN) at up to 2400 bits per second (bps). For more information, refer to *Product Data Sheet FB107:DIAL*.
	Enhanced Communication Module	Provides communications over one four-session Ethernet port and one Universal Serial Bus (USB) 2.0 port. For more information, refer to *Product Data Sheet FB107:ECM*.
	Network Radio Module (NRM)	Provides a wireless solution for importing and/or exporting over-the-air messages and information. For more information, refer to *Product Data Sheet FB107:NRM*
Protocols		ROC or Modbus slave (ASCII or RTU) on all ports. Modbus host using COM1 or COM2 port on the CPU module or optional communication module installed in slot 1 or slot 2.
Inputs/Outputs		
RTD Input on CPU module	Quantity	1
	Type	3 or 4-wire RTD 100Ω platinum element with alpha of 0.00385.

Terminals	"SCR" current source, "RTD+" signal positive input, "RTD−" signal negative input, and "GND" negative ground return reference.	
Sensing Range[1]	−40 to 240°C (−40 to 464°F) (default).	
Accuracy[1]	±0.2°C (0.64°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 240°C (−40 to 464°F).	
Filter	Band-pass hardware filter	
Resolution	16 bits	
Sample Period	1 second minimum	

[1] The accuracy depends on the span calibrated for the sensing range of the RTD Input. The sensing range is the difference between the calibrated zero and calibrated span. The sensing range may be changed from the defaults during calibration. When the sensing range is less than or equal to 300°C, the accuracy is 0.2°C. When the sensing range is greater than 300°C, the accuracy is 0.5°C. Sensing range limits are −40 to 800°C.

6-Point I/O CPU Assembly (optional)	Two analog inputs or discrete inputs. One analog output or discrete output. One discrete output. Two pulse inputs or discrete inputs. For more information, refer to *Product Data Sheet FB107:IO1.*	
I/O Modules (optional)	6-Point I/O Module	Two analog inputs or discrete inputs. One analog output or discrete output. One discrete output. Two pulse inputs or discrete inputs. For more information, refer to *Product Data Sheet FB107:IO1.*
	8-Point AI/DI Module	Eight analog inputs or discrete inputs. For more information, refer to *Product Data Sheet FB107:AIDI.*
	6-Point AO/DO Module	Six analog output or discrete outputs. For more information, refer to *Product Data Sheet FB107:AODO.*
	Discrete Output Relay Module	Six channel discrete outputs. For more information, refer to *Product Data Sheet FB107:DOR.*
	Resistive Temperature Device (RTD) Module	Three channels for measuring the resistance of 2-wire, 3-wire, or 4-wire, 100-ohm, platinum RTD sensors. For more information, refer to *Product Data Sheet FB107:RTD.*
I/O Interfaces (optional)	Application Module	Module preloaded with a specific application and RS-485 communications port. The module provides a way to add programs to the FB107 by simply installing a module that includes all point types and screens that are part of the application. For more information, refer to *Product Data Sheet FB107:APP.*
	Dual-Variable Sensor (DVS)	A DVS can be used to if the FB107 is mounted in a FloBoss 107E enclosure. For more information, refer to *Technical Specification DVS205.*
	HART Module	Four software-selectable input/output channels. For more information, refer to *Product Data Sheet s FB107:HART.*
	IEC 62591 (*Wireless*HART) Interface Module	Supports up to 20 *Wireless*HART field devices. Provides both process variables and diagnostic data to the FB107 and supports HART Pass-Through to AMS Device Manager. For more information, refer to *Product Data Sheet FB107:62591.*

	Multi-Variable Sensor (MVS) Module	One MVS interface with up to six transmitters. For more information, refer to *Product Data Sheet FB107:MVS*.
	Pressure Module (PM)	A PM can be used to measure up to two pressure inputs if the FB107 is mounted in a FloBoss 107E enclosure. For more information, refer to *Product Data Sheet FB107:ENC*.

Power
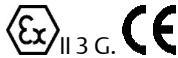
External Power Charging Input	8 to 30 Vdc, 3 A max, 33 W max, reverse polarity protection	
Input Power	Without CPU isolation and no I/O	280 mW
	Without CPU isolation, 6-I/O points, and Loop Output Power @ 80 mA	3.5 W
	With CPU isolation and no I/O	490 mW
	With CPU isolation, 6-I/O points, and Loop Output Power @ 80 mA	4.1 W
	With LCD Touchpad Display	100 mW standby
Backplane	65 mW	
Loop Output Power (on CPU module)	80 mA maximum @ 24 or 10 Vdc	

Physical

Dimensions	Base	204 mm H by 153 mm W by 140 mm D (8 in. H by 6 in. W by 5.5 in. D)
	Base plus Expansion Rack	204 mm H by 306 mm W by 140 mm D (8 in. H by 12 in. W by 5.5 in. D)
Weight	Base with CPU module	0.76 Kg (1.68 lbs)
	Expansion Rack (empty)	0.42 Kg (0.93 lbs)
Wiring	16 to 24 AWG at the removable terminal block.	
Enclosure (optional)	Refer to *Product Data Sheet FB107:ENC* for available enclosures.	

Environmental

Operating Temp	–40 to 75°C (–40 to 167°F)
Storage Temp	–50 to 85°C (–58 to 185°F)
Operating Humidity	5 to 95%, non-condensing
Radiated Emissions	Meets FCC Part 15, Class A
Vibration	Tested to ISA 75.13 1996 with an abbreviated endurance dwell test.

Approvals

Product Markings for Hazardous Locations	CSA C/US	Certified by CSA as Model W40155 (enclosure not supplied), Model W40168 (FB107E steel enclosure), and Model W40184 (FB107E polycarbonate enclosure) Class I, Division 2, Groups A, B, C, & D
	Evaluated per Approval Standards	CAN/CSA C22.2 No. 0-M91 (R2001) CAN/CSA C22.2 No. 94-M91 CSA C22.2 No. 142-M1987 CSA C22.2 No. 213-M1987 UL Std. No. 50, September 4, 2007 UL Std. No. 916, December 23, 1998 UL Std. No. 1604, April 28, 1994 ANSI/ISA 12.27.01-2003
	CE Marked	Certified by Sira as Model W40190. ATEX Cert Sira 10ATEX4059X IECEx Cert IECEx SIR 10.0028X Product Markings for Hazardous Locations: Ex nA IIC T4 Gc, −40°C ≤ Tamb ≤ 75°C
		II 3 G.
	Evaluated per Approval Standards	ATEX: EN 60079-0 (2006 & 2007 ed 5) EN 60079-15 (2005 ed 3)
		EMC: EMC Directive 2004/108/EC EN61000-4-2 (Electrostatic Discharge) EN61000-4-3 (Radiated Immunity) EN61000-4-4 (Fast Transients) EN61000-4-5 (Surges) EN61000-4-6 (Conducted RF) EN 55011 (Class B Emissions)
		IECEx: IEC 60079-0 (2007-10 ed 5) IEC 60079-15 (2005-03 ed 3)
	Australian C-Tick	Certified as Model W40190
Product Markings for Metrology	Measurement (Industry) Canada	Approved as Model W40184 (FB107E polycarbonate enclosure with no flow sensor attached) Approval No.: AG-0590C
		AGA8 (1992) Detail AGA8 (1992) Gross Method 1 AGA8 (1992) Gross Method 2 AGA7 Turbine meter AGA3 (1992) Orifice meter
		Notes: Analog inputs on the 6-point I/O CPU assembly and on the 6-point I/O module may **not** be used as AGA measurement inputs.

Miscellaneous Approvals	Spectrum Approval for the Network Radio Module	USA, Canada, Australia, New Zealand
	GOST	GOST-R Certificate Ex naL IIC T4
	INMETRO	Certified by INMETRO as Model W40190 NCC 12.1097 X Marking: Ex nA IIC T4 (-40°C ≤ Tamb ≤ 75°C) Gc Special conditions for safe use: As described in the certificate of conformity for the product.
	Nederlands Meetinstituut (NMi)	ISO 5167-2:2003 (Orifice plates) AGA3:1992 (Orifice metering in natural gas) AGA7 (Turbine meter) AGA8-DC92 (Gas compressibility) ISO 6976 (Gas characteristics)

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