



## FP 93B Flow Processor

### Description

The FP-93B Flow Processor satisfies the instrument needs for a variety of flowmeter types in steam, liquid, gas, and heat metering applications.



### Features

- "EZ Setup"- Guided Setup for First Time Users
- Liquid, Gas, Steam and Heat Flow Equations
- Utility Metering - Steam, Heating/Cooling, Chilled Water, Natural Gas, Compressed Air
- Menu Selectable Hardware & Software Features
- Internal Data Logging Standard
- Isolated Pulse, Analog and Relay Outputs Standard
- RS-232 Port Standard
- RS-485 Optional, Modbus RTU
- BACnet MS/TP and BACnet IP available as optional communications
- Windows™ Setup Software
- NX19 Gas Equations
- DDE, OPC Server and HMI Software Available
- Remote Metering by Wireless or Modem

## Specifications

<b>Environmental</b>	Operating Temperature:	32 to 120 °F
	Storage Temperature:	-40 to 185 °F
	Humidity	0-95% Non-condensing
	Materials	UL, CSA, VDE approved
<b>Display</b>	Type:	2 lines of 20 characters
	Types:	Backlit LCD
	Character Size:	0.2" nominal
	User selectable label descriptors and units of measure	
<b>Keypad</b>	Keypad Type:	Membrane Keypad
	Keypad Rating:	Sealed to NEMA 4X
	Number of keys:	16
<b>Enclosure</b>	Enclosure Options:	Panel, Wall, Explosion Proof
	Size:	See Dimensions
	Depth behind panel:	6.5" including mating connector
	Type:	DIN
	Materials:	Plastic, UL94V-0, Flame retardant
	Bezel:	Textured per matt finish
<b>Power Input</b>	The factory equipped power option is internally fused. An internal line to line filter capacitor is provided for added transient suppression. MOV protection for surge transient is also supported	
	Universal AC Power:	85 to 276 Vac, 50/60 Hz
	DC Power Option:	24 Vdc (16 to 48 Vdc)
	Power Consumption	
	AC Power:	6.5 V/A (6.5 W)
	DC Power:	300 mA max.

## Flowmeter types

Linear:	Vortex, Turbine, Gilflo, Gilflo 16 point, ILVA 16 Point Mass Flow and others
Square Law:	Orifice, Target and others
Multi-Point Linearization:	May be used with all flowmeter types. Including 16 point, UVC and dynamic compensation.

## Flow inputs

### Analog Input:

Accuracy: 0.02% FS at 68 °F

#### Ranges

Voltage: 0-10 Vdc, 0-5 Vdc, 1-5 Vdc

Current: 4-20 mA, 0-20 mA,

4-20 mA stacked, 0-20 mA stacked

Basic Measurement Resolution: 16 bit

Update Rate: 4 updates/sec

Automatic Fault detection: Signal over/under-range,

Current Loop Broken

Calibration: Operator assisted learn mode

Extended calibration: Learns Zero and Full Scale of each range

Fault Protection:

Fast Transient: 500 V Protection (capacitive clamp)

Reverse Polarity: No ill effects

Over-Voltage Limit: 50 Vdc Over voltage protection

Over-Current Protection: Internally current limited protected to 24 Vdc

### Pulse inputs

Number of Flow Inputs: one

Input Impedance: 10 k  $\Omega$  nominal

Trigger Level: (menu selectable)

High Level Input

Logic On: 2.5 to 30 Vdc

Logic Off: 0 to 2 Vdc

Low Level Input (mag pickup)

Selectable sensitivity: 10 mV and 100 mV

Minimum Count Speed: 0.25 Hz (to maintain rate display)

Maximum Count Speed: Selectable: 0 to 50 kHz

Overvoltage Protection: 50 Vdc

## Temperature, pressure, density inputs

The compensation inputs usage are menu selectable for temperature, temperature 2, pressure, density or not used.

Calibration: Operator assisted learn mode

Operation: Ratiometric

Accuracy: 0.02% FS at 68 °F

Basic Measurement Resolution: 16 bit

Update Rate: 2 updates/sec minimum

Automatic Fault detection:

Signal Over-range/under-range

Current Loop Broken

RTD short

RTD open

Reverse Polarity: No ill effects

Over-Current Limit

(current input) Internally limited to protect input to 24 Vdc)

Available Input Ranges

Current: 4-20 mA, 0-20 mA

Resistance: 100 Ohms DIN RTD

100 Ohm DIN RTD (DIN 43-760, BS 1904):

Three Wire Lead Compensation

Internal RTD linearization learns ice point resistance

1 mA Excitation current with reverse polarity protection

Temperature Resolution: 0.02 °F

Temperature Accuracy: 1.0 °F

### Stored information (ROM)

Steam Tables (saturated & superheated),

Fluid Properties: Water, Air, Natural Gas or Generic

### User entered stored information (EEPROM/Nonvolatile RAM)

Transmitter Ranges, Signal Types

Fluid Properties

(specific gravity, expansion factor, specific heat, viscosity, isentropic exponent, combustion heating value, Z factor)

Units Selections (English/Metric)

Language Translations (optional)

## Excitation voltage

24 Vdc @ 100 mA (fault protected)

## Relay outputs

The relay outputs usage is menu assignable to (Individually for each relay) Hi/Lo Rate Alarm, Hi/Lo Temperature Alarm, Hi/Lo Pressure Alarm, Pulse Output (pulse options), Wet Steam or General purpose warning (security).

Number of relays: 2 (3 optional)

Contact Style: Form C contacts

Contact Ratings: 240 V, 5 amp

## Analog outputs

The analog outputs are menu assignable to correspond to the Uncompensated Volume Rate, Corrected Volume Rate, Mass Rate, Heat Rate, Temperature, Density, Delta Temperature or Pressure.

## Number of outputs: 2

Type: Isolated Current Sourcing (shared common)

Available Ranges: 0-20 mA, 4-20 mA (menu selectable)

Resolution: 16 bit

Accuracy: 0.05% FS at 68 °F

Update Rate: 5 updates/sec

Temperature Drift: Less than 200 ppm/C

Maximum Load: 1000 ohms

Compliance Effect: Less than .05% Span

60 Hz rejection: 40 dB minimum

EMI: No effect at 3 V/M

Calibration: Operator assisted Learn Mode

Averaging: User entry of DSP Averaging constant to cause a smooth control action

**Listing:** CE Approved, UL/CSA Pending

## Serial communication

The serial port can be used for printing, datalog retrieval, modem connection and communication with a computer.

RS-232:

Device ID: 01-99

Baud Rates: 300, 1200, 2400, 9600

Parity: None, Odd, Even

Handshaking: None, Software, Hardware

Print Setup: Configurable print list and formatting

RS-485: (optional 2nd COM port)

Device ID: 01-247

Baud Rates: 300, 600, 1200, 2400, 4800, 9600, 19200

Parity: None, Odd, Even

Protocol: Modbus RTU (Half Duplex)

## Data logging

The data logger captures print list information to internal storage for approximately 5000 transactions. This information can be used for later uploading or printing. Storage format is selectable for Comma-Carriage Return or Printer formats.

## Isolated pulse output

The isolated pulse output is menu assignable to Uncompensated Volume Total, Compensated Volume Total, Heat Total or Mass Total.

Pulse Output Form (menu selectable): Open Collector NPN or 24 Vdc voltage pulse

Nominal On Voltage: 24 Vdc

Maximum Sink Current: 25 mA

Maximum Source Current: 25 mA

Maximum Off Voltage: 30 Vdc

Saturation Voltage: 0.4 Vdc

Pulse Duration: User selectable

Pulse output buffer: 8 bit

Fault Protection

Reverse polarity:

Shunt Diodes

Over-current Protected

Over-voltage Protected

## Real time clock

The Flow Processor is equipped with a non-volatile real time clock with display of time and date.

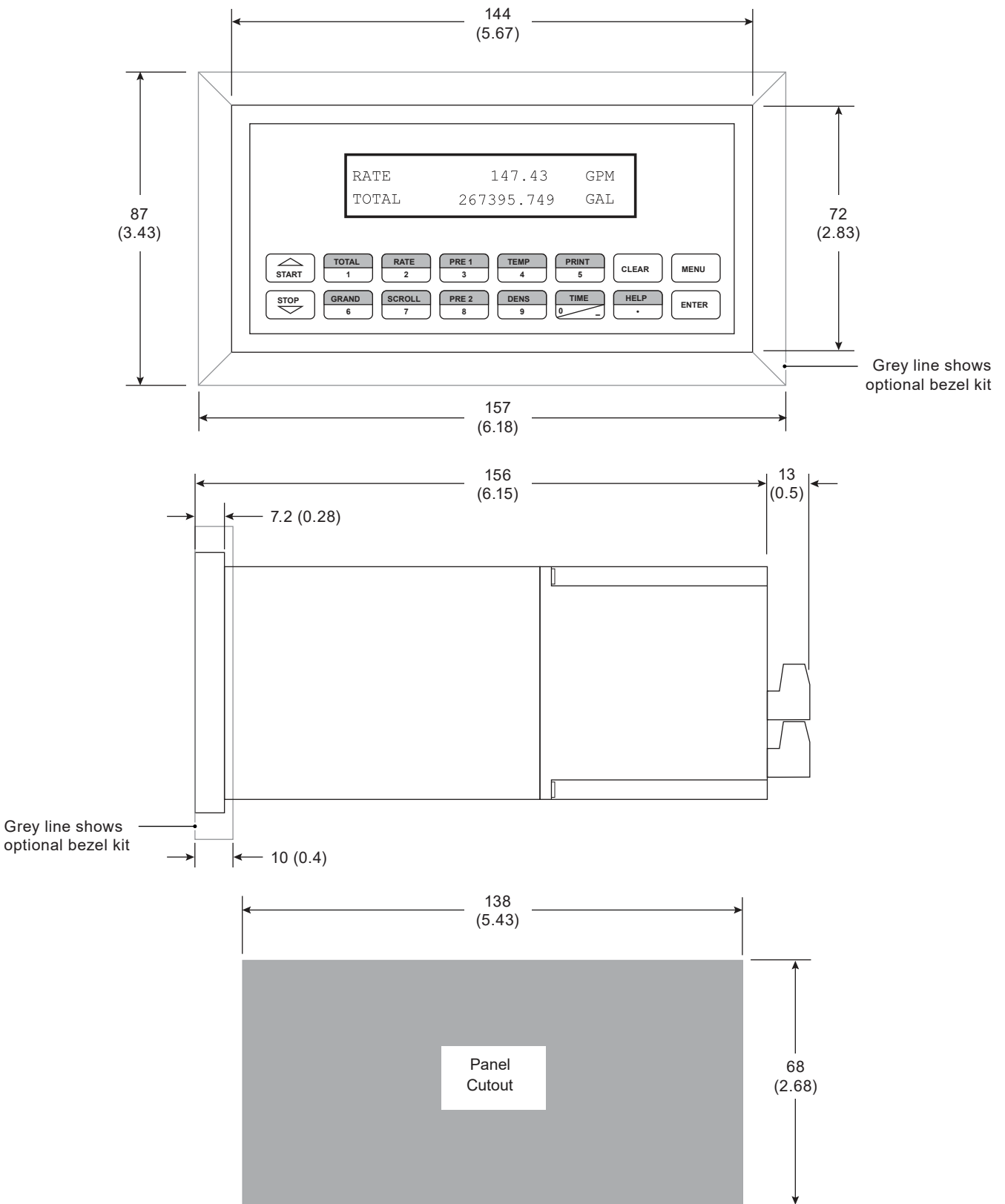
**Format:** 24 hour format for time  
 Day, Month, Year for date  
 Optional Daylight Savings Time

## Terminal designations

1	DC OUTPUT		
2	PULSE IN	Vin (+)	FLOW
3	-----	lin (+)	IN
4	COMMON		
5	RTD EXCIT (+)		TEMPERATURE
6	RTD SENS (+)		IN
7	RTD SENS (-)	lin (+)	
8	DC OUTPUT		
9	RTD EXCIT (+)		PRESSURE
10	RTD SENS (+)		(TEMP 2)
11	RTD SENS (-)	lin (+)	IN
12	PULSE OUTPUT (+)		
13	PULSE OUTPUT (-)		
14	ANALOG OUTPUT 1 (+)		
15	ANALOG OUTPUT 2 (+)		
16	ANALOG OUTPUT COMMON (-)		
17	NO		
18	COM RLY1		
19	NC		
20	NC		
21	COM RLY2		
22	NO		
23	AC LINE	DC (+)	POWER IN
24	AC LINE	DC (-)	

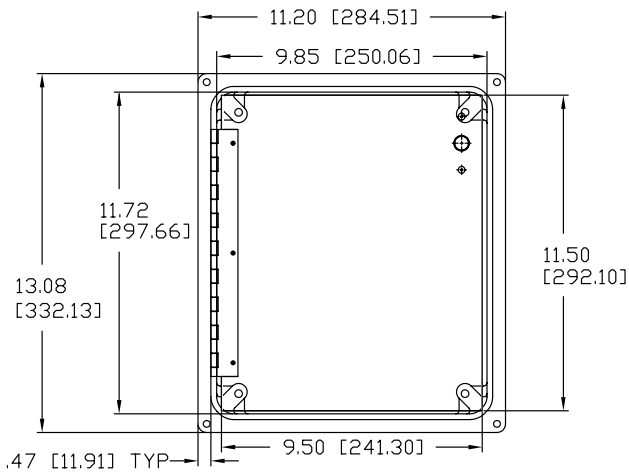
**Dimensions approximate in mm (inches)**

**Panel mount (option P)**

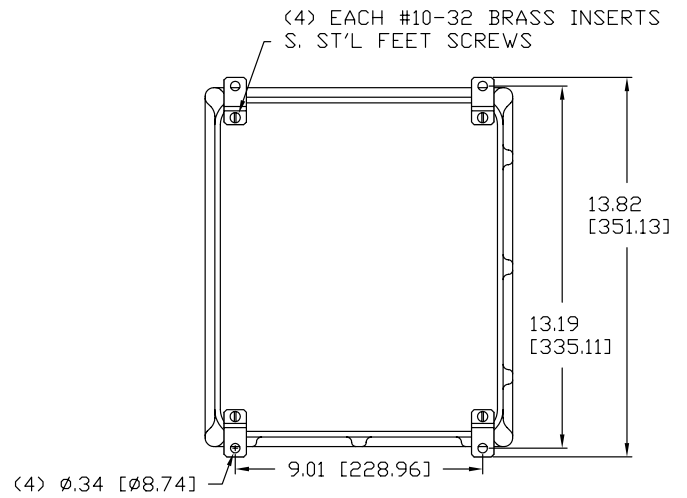


Dimensions approximate in mm (inches)

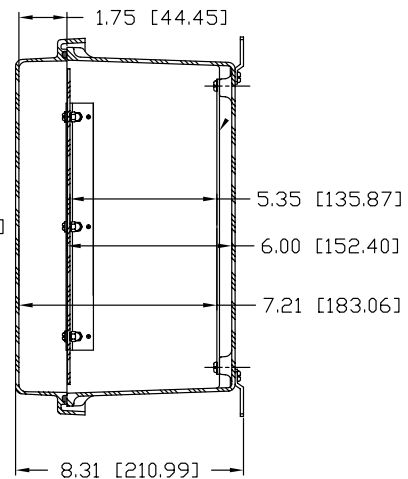
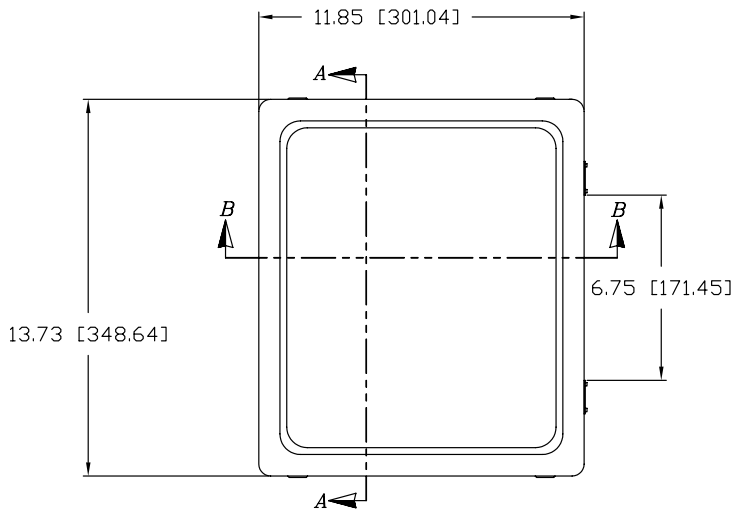
Wall mount (option N)



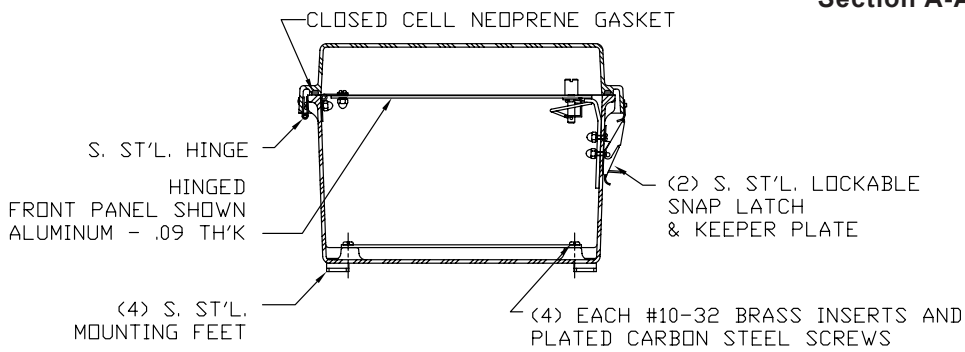
Front view with lid removed



Back view



Section A-A



Section B-B

Material

- Box** - Compression molded fibreglass reinforced polyester
- Cover** - Compression molded fibreglass reinforced polyester
- Windows** - Polycarbonate

## Model code

Category	Description	Suffix Codes					
Model	Microprocessor-based flow processor	FP-93B					
Display	LCD		L				
Power Supply	85 to 276 Vac 24 Vdc			1 3			
Network Card	None RS485/Modbus BACnet MS/TP RS485 BACnet IP				0 1 2 3		
Mounting	NEMA 4 Wall Mount Panel Mount					N P	
Options	RS485 Terminal Block Connector None						TB N

The standard unit includes: Peak Demand, AGA NX-19 calculation for natural gas, Stacked DP, Datalogger, Stack Emissions Controller and Manifold Flowmeter Controller.