spirax /sarco

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 & HMI Software Available
- Remote Metering by Wireless or Modem

Specifications:

Environmental
Operating Temperature: 32 to 120 °F
Storage Temperature: -40 to 185°F
Humidity 0-95% Non-condensing
Materials UL, CSA, VDE approved

Display
Type: 2 lines of 20 characters
Types: Backlit LCD
Character Size: 0.2" nominal
User selectable label descriptors and units of measure

Keypad
Keypad Type: Membrane Keypad
Keypad Rating: Sealed to NEMA 4X
Number of keys: 16

Enclosure
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

Power Input
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.

Flow Meter 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 24VDC

Pulse Inputs:
Number of Flow Inputs: one
Input Impedance: 10 k Ω 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

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Flow Measurement

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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 aproximately 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

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Real Time Clock

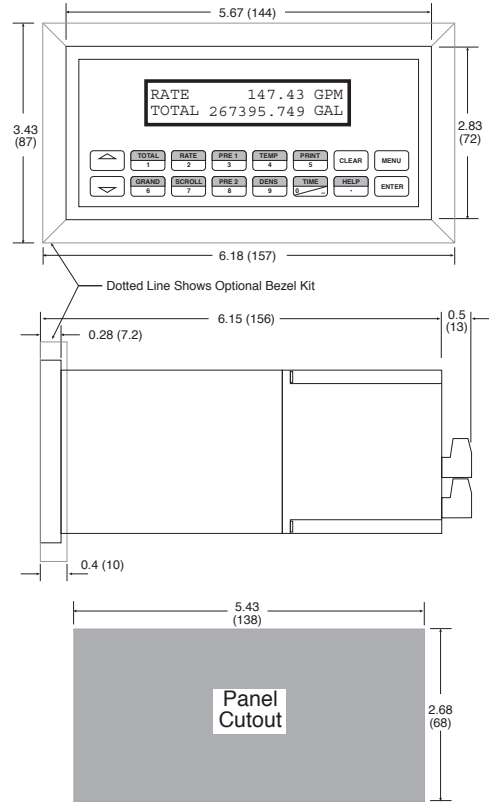The Flow Processor is equipped with a non-volatile real time clock with display of time and date.

Format:

24 hour format for time

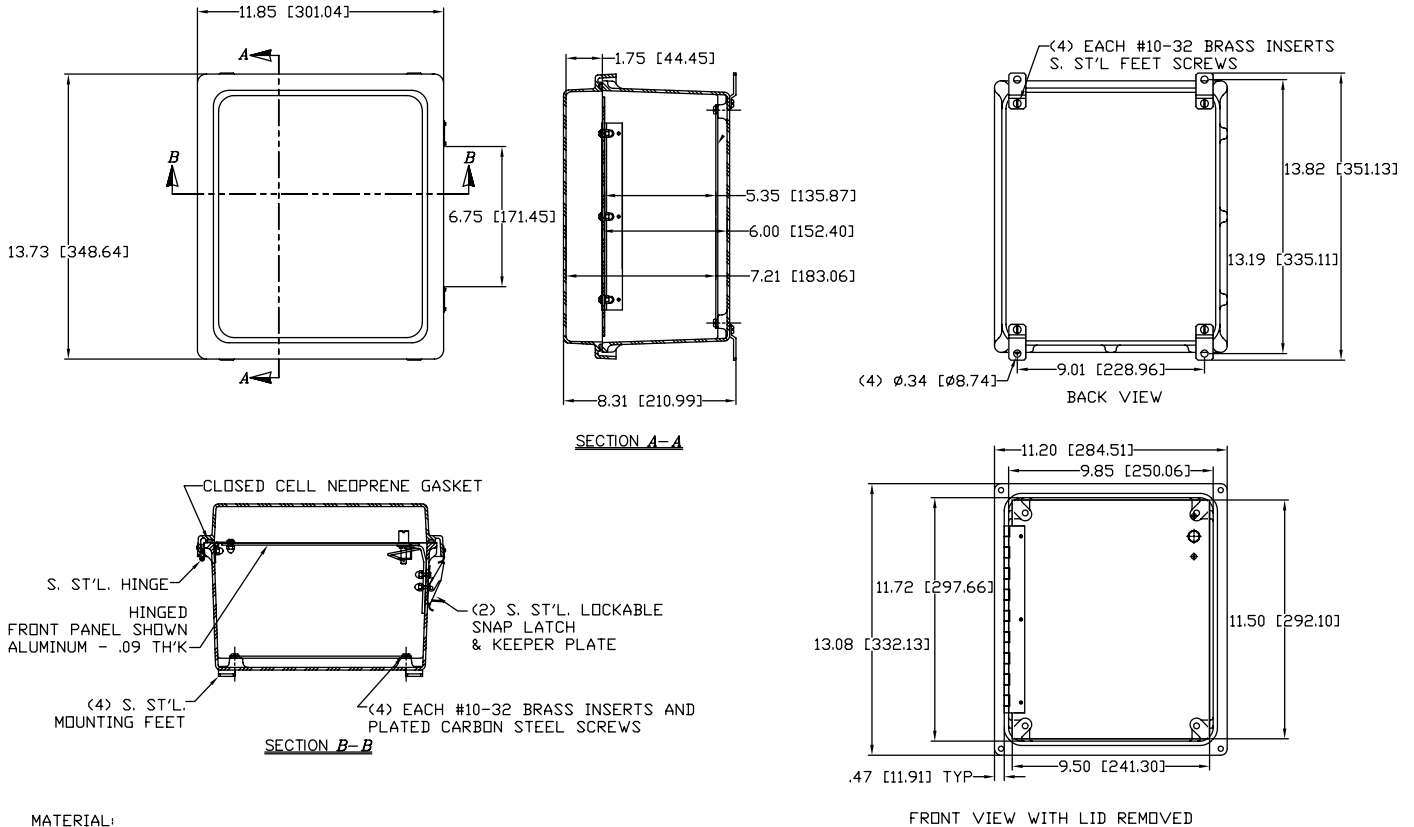Day, Month, Year for date

Optional Daylight Savings Time

Terminal Designations

1	DC OUTPUT	
2	PULSE IN	Vin (+) FLOW IN
3	- - - - - - - - -	Iin (+)
4	COMMON	
5	RTD EXCIT (+)	TEMPERATURE IN
6	RTD SENS (+)	
7	RTD SENS (-)	Iin (+)
8	DC OUTPUT	
9	RTD EXCIT (+)	PRESSURE (TEMP 2) IN
10	RTD SENS (+)	
11	RTD SENS (-)	Iin (+)
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
Panel Mount (option P)

RATE   147.43 GPM
TOTAL 267395.749 GAL

5.67 (144)

3.43 (87)

2.83 (72)

6.18 (157)

Dotted Line Shows Optional Bezel Kit

6.15 (156)

0.28 (7.2)

0.5 (13)

0.4 (10)

5.43 (138)

Panel Cutout

2.68 (68)

Dimensions are in inches (mm)

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Wall Mount (option N)

SECTION A–A

SECTION B–B

BACK VIEW

FRONT VIEW WITH LID REMOVED

CLOSED CELL NEOPRENE GASKET

S. ST'L. HINGE

HINGED FRONT PANEL SHOWN ALUMINUM – .09 TH'K

(4) S. ST'L. MOUNTING FEET

(2) S. ST'L. LOCKABLE SNAP LATCH & KEEPER PLATE

(4) EACH #10-32 BRASS INSERTS AND PLATED CARBON STEEL SCREWS

(4) EACH #10-32 BRASS INSERTS S. ST'L FEET SCREWS

MATERIAL:
BOX – COMPRESSION MOLDED FIBERGLASS REINFORCED POLYESTER
COVER – COMPRESSION MOLDED FIBERGLASS 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,

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Flow Measurement