SL9000/SL9100/SL9200

Flow Computers for Liquid, Steam or Gas Applications

Description

The SL9100 Flow Computer is an advanced instrument for liquid flow applications. It has many programmable features to serve a variety of flow control functions. The various hardware inputs and outputs can be “soft” assigned to meet a variety of common application needs. The user “soft selects” the usage of each input/ output while configuring the instrument. The multiple output types allow tremendous flexibility in setting up the SL9100 for batch control, rate alarming, and/or transmission of process variables. The two-line, 20-character vacuum fluorescent display shows measured and calculated parameters in an easy to understand format. The SL9200 Flow Computer adds the capabilities for a variety of flowmeter types in liquid, gas, steam and heat applications. Multiple flow equations are available in a single instrument with many advanced features. The SL9000 Flow Computer is a lower cost unit with an LCD display and reduced available features.

Application

The SL9000 Series is designed for use on volumetric flow applications. The SL9100 Series is designed for use on liquid flow service and may be configured for either volumetric or compensated mass flow applications. The SL9200 Series is designed for use on liquid, gas, steam and heat flow service and may be configured for a variety of flow applications.

Features

For SL9000/SL9100/SL9200

- Volumetric flow options
- Batch control (not available for SL9200)
- Pulse inputs — isolated pulse outputs
- Two-line vacuum fluorescent display (LCD for SL9000)
- Menu-selectable hardware and software
- DIN enclosure with two piece wiring connector
- 16-point linearization
- Relay contact control outputs
- Enclosure options: panel, wall
- RS-232 port or optional RS-485

SL9000/SL9100/SL9200 Series
Flow Computers for Liquid, Steam or Gas Applications

For SL9100/SL9200 add

- Analog & RTD inputs
- User-selectable analog & pulse outputs
- Custody transfer with audit trail
- Compensated temperature or compensated density mass Flow options
- Windows™ Setup Software

For SL9200 add

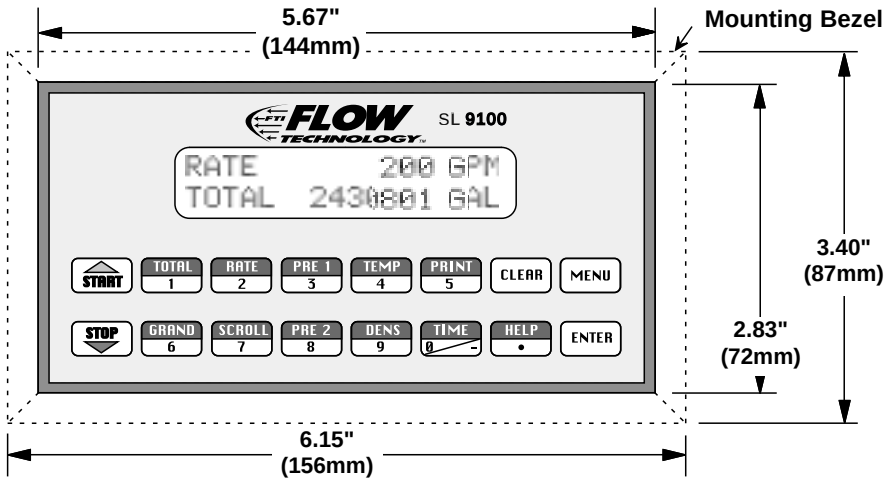
- Liquid, gas and steam equations
- Heat flow equations
- Foreign language options

Principle of Operation

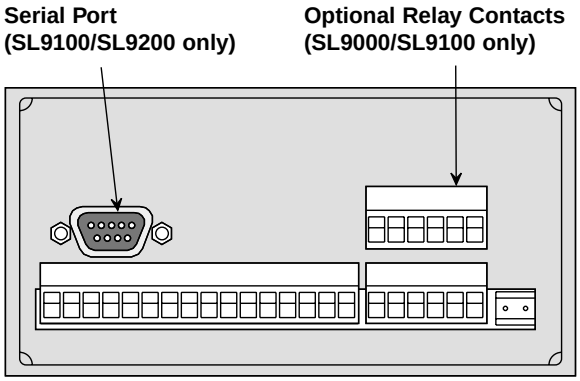
The SL9000 Flow Computer receives a flow input signal from a pulse producing flowmeter. The SL9100 Flow Computer receives a flow input signal from a pulse or analog producing flowmeter. The user programs the SL9100 to condition the incoming flowmeter signal and compute the flow rate and flow totalization. A wide variety of user programmable functions can then be performed such as flow rate alarming, single-or two-stage batch control, and/or transmission of volumetric, compensated volumetric or mass flow. The SL9200 adds the ability to compensate for temperature, density and viscosity. A RS-232 serial port and Windows™ based software provide an important link to secondary devices for printing, data logging, or networking functions for the SL9100 and SL9200.

Dimensions

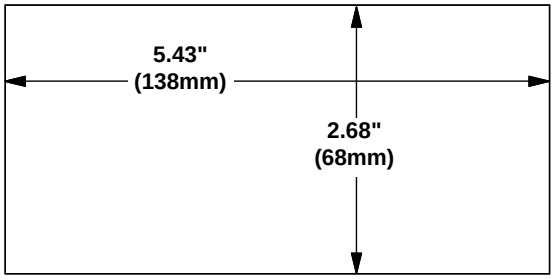
Front



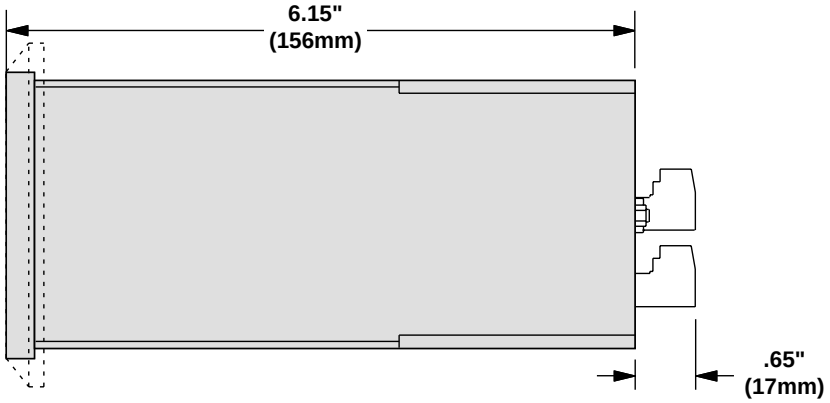
Back



Panel Cut-out



Side Panel



Specifications

Display

	2-line, 20-character backlit, 0.3" high
SL9000	LCD Display
SL9100/SL9200	Vacuum Fluorescent Display

Power

SL9000/SL9100	110VAC 220VAC, 12VDC, 24VDC,
SL9200	85–276VAC, 24VDC

Environmental *

Operating temperature *	
Standard:	32° F to +122° F (0° C to +50° C)
Optional:	-4° F to 131° F (-20°C to 55° C)
Storage Temperature	-40° F to 185° F (-40° C to +85° C)
Humidity	0-95% Non-condensing Materials: U.L., CSA, VDE approved

Serial Port

9-Pin Connector RS-232 Port Standard for Bidirectional Communications with Standard PC or Optional RS-485

Inputs

Analog (SL9100/SL9200 only)

Ranges:	Voltage: 0–10 VDC, 0–5 VDC, 1–5 VDC
Current:	4–20 mA, 0–20 mA
Basic Measurement Resolution:	16-bit
Calibration:	Self Calibration & Auto-zero Continuously

Pulse

Number of Flow Inputs:	one
Input Impedance:	10 k normal
Pull Up Resistance:	10 k to 5 VDC
Pull Down Resistance:	10 k to common
Minimum Count Speed:	User-selectable
Maximum Count Speed:	0 to 50 kHz
Overvoltage Protection:	50 VDC
Fast Transient:	Protected to 500 VDC

Compensation: (SL9100/SL9200 only)
(selectable for temp., density, or not used)

Operation:	Ratiometric
Accuracy:	0.01%FS
Thermal Drift:	Less than 50 ppm/°C
Basic Measurement Resolution:	16-bit
Update Rate:	1 update/sec minimum
Automatic Fault Detection:	
Transient Protection:	500 V
Reverse Polarity:	No ill effects
Over-Voltage Limit (Input):	50 VDC
Available Input Ranges:	
Voltage:	0–10 VDC, 0–5 VDC, 1–5 VDC
Current:	4–20mA, 0–20mA
Resistance:	100 Ohms DIN RTD (3-wire)

Control Inputs

Input Scan Rate	30 scans per second
Logic 1	4–30 VDC
Logic 0	0–0.8 VDC
Transient Suppression	500 V fast transient
Input Impedance	100 k
Pull Down Resistance	10 k soft selectable

Excitation Voltage

Menu assignable	5, 12 or 24 VDC @ 100mA (SL9200: 24 VDC)

Outputs

Relay Outputs
(Batch control not available for SL9200)
(Menu-assignable to Low Rate Alarm, Hi Rate Alarm, Prewarn Alarm, Preset Alarm, Pulse Output or General Purpose Warning)

Number of Relays	
SL9000/SL9100:	2 Standard
SL9200:	2 Standard, 2 Additional Optional
Contact Style	Form C contacts
Contact Ratings	240 V, 5 amp; 30 VDC @ 5 amps
Fast Transient Threshold	1000 V

Analog Outputs (SL9100/SL9200 only)

(Menu-assignable to correspond to the Uncompensated Volume Rate, Corrected Volume Rate, Mass Rate, Temperature, Density. SL9200: adds Pressure)

Type	Isolated Current Sourcing
Isolated I/P/C	500 V (SL9200: 1000 V)
Available Ranges	0–20 mA, 4–20 mA (menu-selectable)
Resolution	16-bit
Accuracy	0.05% FS at 20°C
Update Rate	1 update/sec (SL9200: 5 update/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 smooth control action

Isolated Pulse Output

(Menu assignable to Uncompensated Volume Total, Compensated Volume Total or Mass Total.)

Isolation I/O/P	500 V (SL9200: 1000 V)
Pulse Output Form	Open Collector
Maximum On Current	0.25 Amps
Maximum Off Voltage	30 VDC
Saturation Voltage	1.0 VDC (SL9200: 0.4 VDC)
Maximum Off Current	0.1 mA
Pulse Duration	User-Selectable
Pulse Output Buffer	16-bit (SL9200: 8-bit)
Pulse Rate Averaging	Standard
Fault Protection	
Reverse Polarity:	Shunt Diode
Over-current Protected	
Over-voltage Protected	
Transient Protection:	500 VDC

Approvals

CE marked compliant w/ EMC directive 89/336/EEC (1989) Light Industrial Class 1

Enclosures

NEMA 4X, Waterproof enclosures

NEA1287JFG	One or two controller mounting
NEA18149JFG	Up to three controller mounting

*An extended lower operating temperature of 40° F (-40° C) is available with certain configurations. Consult factory for details.

Model Numbering System

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Flow Computer

90 = SL9000
91 = SL9100

Operating Voltage

1 = 110 VAC *
2 = 220 VAC
3 = 12 VDC
4 = 24 VDC

Control Outputs

A = 2 Form C; SPDT Relays *
B = 4 Form C; SPDT Relays
C = 2 Form A; Solid State Relays

Options

Blank = Standard
2 = RS-485 Modbus

* Standard Configuration

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Flow Computer

SL9200 Series *

Operating Voltage

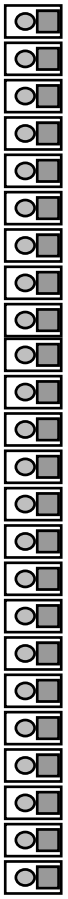
1 = 85–276 VAC
3 = 24 VDC

Options

Blank = Standard *
1 = RS-485 Modbus

Note: RS-232 multidrop not available with 4 relay version

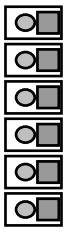
Rear Panel Terminal Allocation



1 DC Output
2 Pulse In 1 or Voltage In +
3 Pulse In 2 or Current In +
4 Common
5 - Voltage In +
6 RTD EXCIT +
7 RTD SENS +
8 RTD SENS - or Current In +
9 Control In 1
10 Control In 2
11 Control In 3
12 Common
13 Pulse Output 1
14 Pulse Output 2
15 Analog Output +
16 Analog Output -
17 NC
18 COM RLY1
19 NO
20 NC
21 COM RLY2
22 NO
23 AC Line (or +DC)
24 AC Line (or -DC)

SL9100/ SL9200 only

SL9000/SL9100



25 NC
26 COM RLY3
27 NO
28 NC
29 COM RLY4
30 NO

Specifications are for reference only and are subject to change without notice.

Local Representative:

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ISO 9001 REGISTERED

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DB 65126 Rev B