

# SUPERtrol-I

## Multi-Function Flow Totalizer, Ratemeter and Batcher

### Features

- “EZ Setup” Guided Setup for First Time Users
- Rate/Total and Batching Functions
- Menu Selectable Hardware & Software Features
- Environmental Compliance Monitoring and Report Generation
- Universal Viscosity Curve (UVC) and API Eq.
- Advanced Batching Features: Overrun Compensation, Print End of Batch, Slow Start of Batch Fill, Slow End of Batch Fill, 2 Stage Batching, Digital Control Valve
- Isolated Pulse, Analog and Relay Outputs Standard on AC Powered Models
- RS-232 Port Standard
- Modbus RTU RS-485 Optional
- Advanced Printing Capabilities
- Windows™ Setup Software
- DIN Enclosure with Two Piece Connectors
- On Board Data Logging (optional TROLlink)
- DDE Server & HMI Software Available
- Enhanced Modem Features for Remote Metering

### Description:

The SUPERtrol-I Flow Computer satisfies the instrument requirements for a variety of flowmeter types in liquid applications. Multiple flow equations and instrument functions are available in a single unit with many advanced features.

The alphanumeric display shows measured and calculated parameters in easy to understand format. Single key direct access to measurements and display scrolling is supported

The versatility of the SUPERtrol-I permits a wide measure of versatility within the instrument package. 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 isolated analog output can be chosen to follow volume flow, corrected volume flow, mass flow, temperature, or density by means of a menu selection. Most hardware features are assignable by this method.

The user can assign the standard RS-232 Serial Port for data logging, transaction printing, or for connection to a modem for remote meter reading. Remote metering software available.

A Service or Test mode is provided to assist the user during start-up system check out by monitoring inputs and exercising outputs and printing system setup.



### Specifications:

#### Flow Meters and Computations

Meter Types: All linear and square law meters supported including: vortex, turbine, magnetic, PD, target, orifice, venturi, v-cone and many others

Linearization: Square root, 16 point table or UVC table

Computations: Volume, Corrected Volume & Mass

Fluid Computations: Temperature, Density, Viscosity and API 2540 for petroleum.

#### Environmental

Operating Temperature: 0°C to +50°C

Storage Temperature: -40°C to +85°C

Humidity : 0-95% Non-condensing

Materials: U.L. approved

**Listing:** UL/C-UL Listed (File No. E192404), CE Compliant

#### Display

Type: 2 lines of 20 characters

Types: Backlit LCD, OLED and VFD ordering options

Character Size: 0.2" nominal

User programmable label descriptors and units of measure

#### Keypad

Keypad Type: Membrane Keypad with 16 keys

Keypad Rating: Sealed to NEMA 4X / IP65

#### Enclosure

Size: See Dimensions

Depth behind panel: 6.5" including mating connector

Type: DIN

Materials: Plastic, UL94V-0, Flame retardant

Bezel: Textured per matt finish

#### Real Time Clock

The SUPERtrol-I is equipped with a battery backed real time clock with display of time and date.

Format: 12 or 24 hour time display

Day, Month, Year date display

#### Power Input

The factory equipped power option is internally fused. An internal line to line filter capacitor and MOV are provided for added transient suppression.

110 VAC Power: 85 to 127 Vrms, 50/60 Hz

220 VAC Power: 170 to 276 Vrms, 50/60 Hz

DC Power: 12 VDC (10 to 14 VDC)

24 VDC (14 to 28 VDC)

Power Consumption:

AC: 11.0 VA (11W)

DC: 300 mA max.

## Flow Inputs:

### Analog Input:

Accuracy: 0.01% FS at 20° C

#### Ranges

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

Current: 4-20 mA, 0-20 mA

Basic Measurement Resolution:

16 bit

Update Rate: 4 updates/sec

Automatic Fault detection: Signal over/under-range,

Current Loop Broken

Calibration: Software Calibration (no trimmers) and Auto-zero Continuously

Extended calibration:

Learns Zero and Full Scale of each range using special test mode.

Fault Protection:

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 with or without quadrature or pulse security checking

Input Impedance: 10 K $\Omega$  nominal

Pullup Resistance: 10 K $\Omega$  to 5 VDC (menu selectable)

Pull Down Resistance: 10 K $\Omega$  to common

Trigger Level: (menu selectable)

High Level Input

Logic On: 3 to 30 VDC

Logic Off: 0 to 1 VDC

Low Level Input (mag pickup)

Sensitivity:

10 mV or 100 mV

Minimum Count Speed:

Menu selectable

Maximum Count Speed:

Menu Selectable: 40Hz, 3000Hz or 20 kHz

Overvoltage Protection: 50 VDC

## Auxiliary / Compensation Input

The auxiliary/compensation input is menu selectable for temperature, density or not used. This input is used for the compensated input when performing compensated flow calculations. It can also be used as a general purpose input for display and alarming.

Operation: Ratiometric

Accuracy: 0.01% FS at 20° C

Basic Measurement Resolution:

16 bit

Update Rate: 1 update/sec minimum

Automatic Fault detection:

Signal Over-range/under-range

Current Loop Broken

RTD short

RTD open

Fault mode to user defined default settings

Fault Protection:

Reverse Polarity: No ill effects

Over-Voltage Limit (Voltage Input): 50 VDC

Available Input Ranges

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

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: 0.01°C

Temperature Accuracy:  $\pm 0.25^\circ\text{C}$

## Control Inputs

Switch Inputs are menu selectable for Start, Stop, Reset, Lock, Inhibit, Alarm Acknowledge, Print or Not Used.

Number of Control Inputs: 3

Control Input Specifications

Input Scan Rate: 10 scans per second

Logic 1: 4 - 30 VDC

Logic 0: 0 - 0.8 VDC

Input Impedance: 100 K $\Omega$

Control Activation:

Positive Edge or Pos. Level based on product definition for switch usage.

## Excitation Voltage

Menu Selectable: 5, 12 or 24 VDC @ 100 mA (fault protected)

## Relay Outputs

The relay outputs are menu assignable to (Individually for each relay) Low Rate Alarm, Hi Rate Alarm, Prewarn Alarm, Preset Alarm or General purpose warning (security), low temperature/high temperature.

Number of relays: 2 (4 optional)

Contact Style: Form C contacts

Contact Ratings: 5 amp, 240 VAC or 30 VDC

## Serial Communication

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

RS-232:

Device ID: 01-99

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

Parity: None, Odd, Even

Handshaking: None, Software, Hardware

Print Setup: Configurable print list and formatting.

Print Out: Custom form length, print headers, print list items.

Print Initialization: Print on end of batch, key depression, interval, time of day, control input or serial request.

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 1000 transactions. This information can be used for later uploading or printing. Storage format is selectable for Comma-Carriage Return or Printer formats.

## Isolated Analog Output

The analog output is menu assignable to correspond to the Uncompensated Volume Rate, Corrected Volume Rate, Mass Rate, Temperature, Density, Volume Total, Corrected Volume Total or Mass Total.

Type: Isolated Current Sourcing

Available Ranges: 4-20 mA, 0-20 mA

Resolution: 12 bit

Accuracy: 0.05% FS at 20° C

Update Rate: 1 update/sec minimum

Temperature Drift: Less than 200 ppm/C

Maximum Load: 1000 ohms (at nominal line voltage)

Compliance Effect: Less than .05% Span

60 Hz rejection: 40 dB minimum

Calibration: Operator assisted Learn Mode

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



### Isolated Pulse output

The isolated pulse output is menu assignable to Uncompensated Volume Total, Compensated Volume Total or Mass Total  
 Pulse Output Form: Photomos Relay  
 Maximum On Current: 25 mA  
 Maximum Off Voltage: 30 VDC  
 Saturation Voltage: 1.0 VDC  
 Maximum Off Current: 0.1 mA  
 Pulse Duration: 10 mSec or 100 mSec (user selectable)  
 Pulse output buffer: 256  
 Fault Protection  
 Reverse polarity: Shunt Diode

### Terminal Designations

DC OUTPUT	FLOW IN	Vin +	COMP IN	SEE USER MANUAL	ANALOG OUTPUT + 4-20 mA	NC	COM RLY3	NC	COM RLY4	POWER IN
PULSE IN 1	IN	lin +	IN		ANALOG OUTPUT -	25	26	27	28	DC +
PULSE IN 2						COM RLY1	COM RLY2	COM RLY3	COM RLY4	DC -
COMMON						NO	NO	NO	NO	
5		Vin +								
6	RTD EXCIT +									
7	RTD SENS +									
8	RTD SENS -									
9	CNTR IN 1									
10	CNTR IN 2									
11	CNTR IN 3									
12	COMMON									
13	PULSE OUTPUT +									
14	PULSE OUTPUT -									
15	ANALOG OUTPUT +									
16	ANALOG OUTPUT -									
17	NC									
18	COM RLY1									
19	NO									
20	NC									
21	COM RLY2									
22	NO									
23	AC LINE									
24	AC LINE									

Fig. 1: Standard Dimensions

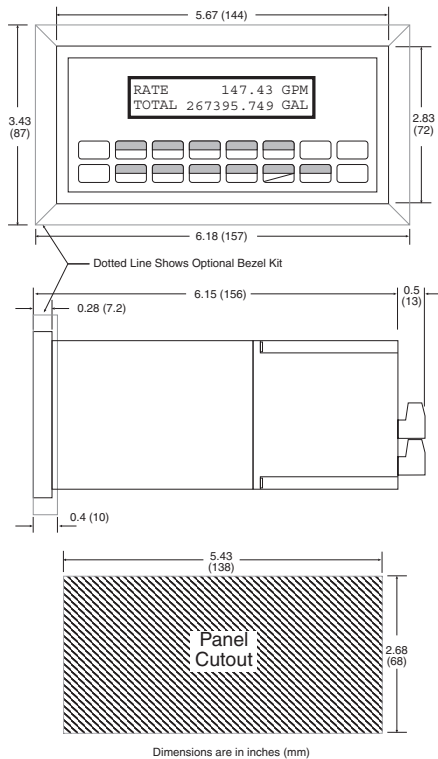
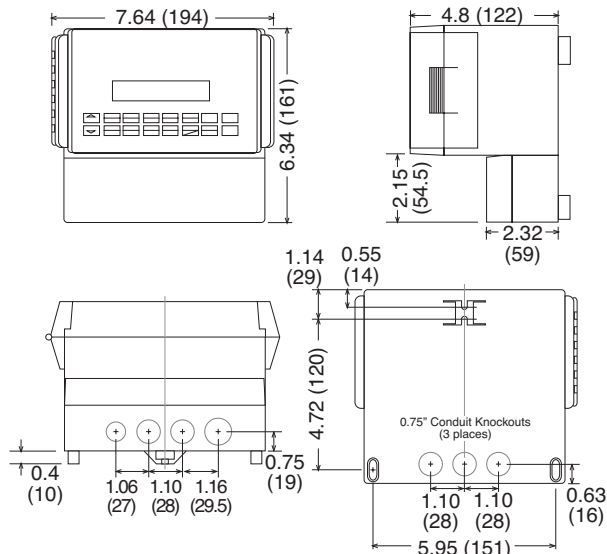


Fig. 2: Wall Mount (“W” mounting option) Dimensions



### Ordering Information

Example **ST1 L 1 A 0 P TB**

**Series:** ST1 = Supertrol-1  
**Display Type:** L = LCD, V = VFD, O = OLED  
**Input Type:** 1 = 110 VAC, 2 = 220 VAC, 3 = 12 VDC (10 to 14 VDC), 4 = 24 VDC (14 to 28 VDC)  
**Relays:** A = 2 SPDT Relays, B = 4 SPDT Relays  
**Network Card:** 0 = None (STD), 2 = RS485/Modbus (optional 2nd COM port)  
**Mounting:** P = Panel Mount (see Fig. 1), N = NEMA 4 Wall Mount (see NEMA Enclosures), W = NEMA 12/13 Wall Mount w/ Clear Cover (see Fig. 2), E = Explosion Proof (No Button Access) (see XHVD 7/4)

**Options:** TB = RS485 Terminal Block for Panel Mount Enclosure, ET = Extended Temperature LCD Display (-4°F to 131°F (-20°C to 55°C)), IM = Internal Modem, M = Modem Power Option

**Accessories:** OPC/DDE Server for RS232 Port available, see EX5-UCOND-NA00  
 OPC/DDE Server for Modbus Suite available, see EX5-MDBUS-NA00  
 Modem Available, see MPP-56KN and MPP-2400N  
 Serial printer available, see P20, P220, P295  
 Ethernet Port Server available, see IEPS  
 Ethernet Port Server Modbus TCP available, see ADAM4572  
 RS-422/485 to RS-232 Communication Adapter available, see CA285  
 RS232 Extender Cable: P/N=13220-*<length in inches>*  
 TROLlink Remote metering and data collection software.  
 Access meter readings for Windows PC.