

# SUPERtrol II

## Multi-Function Flow Computer

- “EZ Setup”- Guided Setup for First Time Users
- Liquid, Gas, Steam and Heat Flow Equations
- Utility Metering
- Menu Selectable Hardware & Software Features
- Internal Data Logging Option
- Isolated Pulse and Analog Outputs Standard
- RS-232 Port Standard, Modbus RTU RS-485 Optional
- Windows™ Setup Software
- NX19 Gas Equations, Stacked DP Transmitters
- DDE Server & HMI Software Available
- Remote Metering by Wireless or Modem and TROLlink Remote Metering Software Available

### Description:

The SUPERtrol II Flow Computer satisfies the instrument requirements 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 alphanumeric display offers measured parameters in easy to understand format. Manual access to measurements and display scrolling is supported

The versatility of the Flow Computer 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. Consider the following illustrative examples.

The isolated analog output can be chosen to follow the volume flow, corrected volume flow, mass flow, temperature, pressure, 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 external data logging, transaction printing, or for connection to a modem for remote meter reading.

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

### Specifications:

#### Environmental

Operating Temperature: 0 to +50 C  
Storage Temperature: -40 to +85 C  
Humidity : 0-95% Non-condensing  
Materials: UL, CSA, VDE approved

#### Display

Type: 2 lines of 20 characters  
Types: Backlit LCD and VFD ordering options  
Character Size: 0.3” nominal  
User selectable label descriptors and units of measure



### Keypad

Keypad Type: Membrane Keypad  
Keypad Rating: Sealed to Nema 4  
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 Vrms, 50/60 Hz  
DC Power Option: 24 VDC (16 to 48 VDC)

### Power Consumption

AC Power: 6.5 V/A (6.5W)  
DC Power: 300 mA max.

### Flow Meter Types:

Linear: Vortex, Turbine, Positive Displacement, Magnetic, GilFlo, GilFlo 16 point, ILVA 16 Point and others

Square Law: Orifice, Venturi, Nozzle, V-Cone, Wedge, Averaging Pitot, 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 20° C

#### 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  
 Update Speed: 1 update/sec.

**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  
 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  
 Accuracy: 0.02% FS at 20° C

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: 0.1°C  
 Temperature Accuracy: 0.5°

**Stored Information (ROM)**

Steam Tables (saturated & superheated),  
 Fluid Properties: Water, Air, Natural Gas, A Variety of User  
 Entered Industrial Fluids or Generic

**User Entered Stored Information (EEPROM / Nonvolatile RAM)**

Transmitter Ranges, Signal Types  
 Fluid Properties  
     (reference density, 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 with self resetting fuse)

**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 (Form A with 3 relay option)  
 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, Pressure or Delta Temperature.

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 20 Degrees C  
 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 Compliant, UL/C-UL Pending

**Serial Communication**

The serial port can be used for printing, datalogging, modem connection, two way paging 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  
 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.

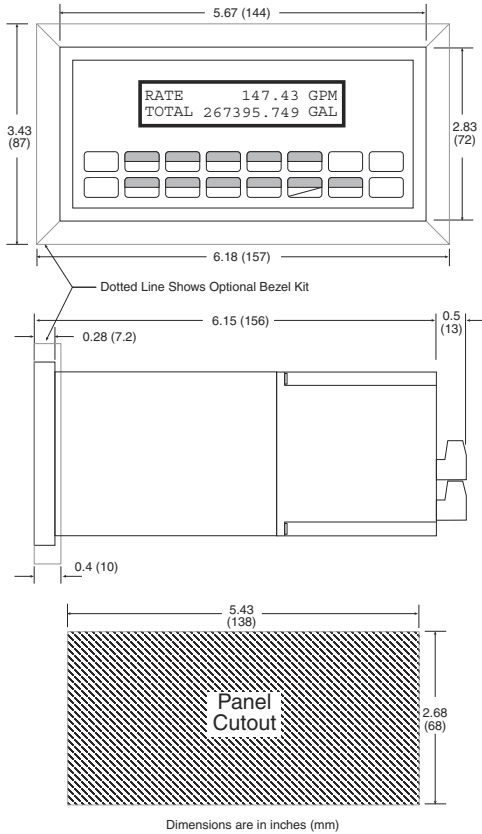
**Isolated Pulse output**

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

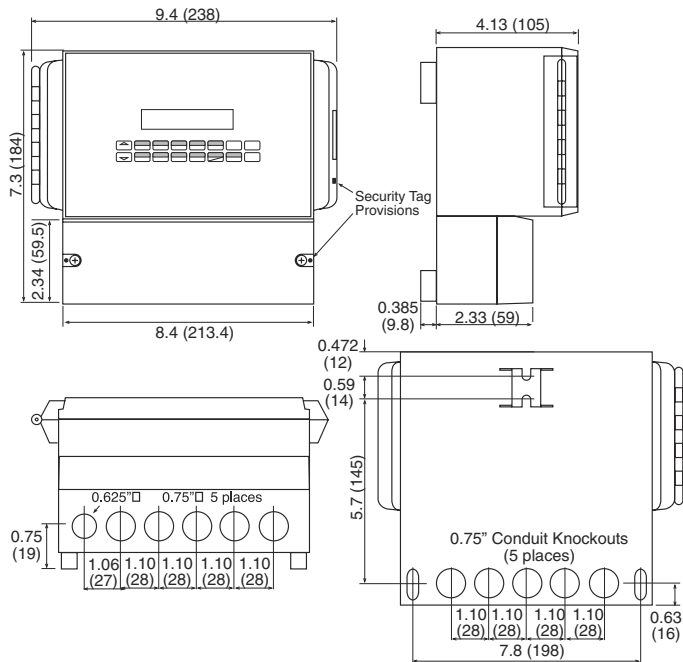
**Real Time Clock**

The Flow Computer is equipped with a pseudo nonvolatile real time clock with display of time and date.  
 Format:  
     24 hour format for time  
     Day, Month, Year for date

**Fig. 1: Standard Dimensions**



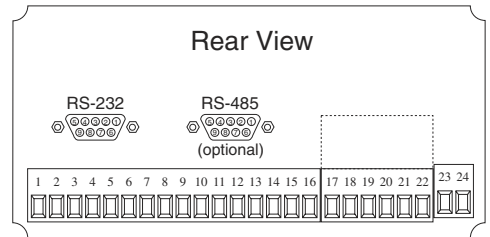
**Fig. 2: Wall Mount (“W” mounting option) Dimensions**



**Terminal Designations**

1	DC OUTPUT	FLOW IN	TEMPERATURE IN	PRESSURE (TEMP 2) IN	ANALOG OUTPUT 1 (+)	ANALOG OUTPUT 2 (+)	ANALOG OUTPUT COMMON (-)	NO	COM RLY1	NC	COM RLY2	NO	AC LINE	DC (+)	POWER IN				
2	PULSE IN	Vin (+)	lin (+)	lin (+)	lin (+)	lin (+)	lin (+)	PULSE OUTPUT (+)	PULSE OUTPUT (-)	ANALOG OUTPUT 1 (+)	ANALOG OUTPUT 2 (+)	ANALOG OUTPUT COMMON (-)	NO	COM RLY1	NC	COM RLY2	NO	AC LINE	DC (-)
3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
4	COMMON	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
5	RTD EXCIT (+)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
6	RTD SENS (+)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
7	RTD SENS (-)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
8	DC OUTPUT	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
9	RTD EXCIT (+)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
10	RTD SENS (+)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
11	RTD SENS (-)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
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	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
24	AC LINE	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

**Terminal Layout**



**Ordering Information**

**Example** ST2 L 1 0 P M

**Series:** ST2 = Flow Computer

**Display Type:** L = LCD, V = VFD

**Input Power:** 1 = 85 to 276 VAC, 3 = 24 VDC (16 to 48 VDC)

**Network Card:** 0 = None, 1 = RS485/Modbus (optional 2nd COM port)

**Mounting:** P = Panel Mount (see Fig. 1), N = NEMA 4 Wall Mount (see NEMAtrolST4X), W = NEMA 12/13 Wall Mount w/ Clear Cover (see Fig. 2), E = Explosion Proof (No Button Access) (see XHVD 7/4), X = Explosion Proof (with Button Access) (see XTROL 7/4)

**Options:** 1 = Peak Demand, 2 = AGA NX-19 calculation for natural gas, 3 = Three Relays, 4 = Stacked DP option, 5 = Datalogger option (consult factory), 6 = Stack Emissions Controller option, 7 = Manifold Flowmeter Controller option, 9 = 3 Relay Super Chip (options 1, 2, 4, 6,7), 10 = 2 Relay Super Chip (options 1, 2, 4, 6,7), 13 = Superchip; 2 relay, Positive heat only, 14 = Superchip; 3 relay, Positive heat only, ET = Extended Temperature; -4°F to 131°F (-20°C to 55°C), IM = Internal Modem, M = Modem Power Option, TB = RS485 Terminal Block for Panel Mount Enclosure, TU = Translation Utility Disk

**Accessories:**  
 KEPS-KEP1-32 = KEP RS232 DDE server for SUPERtrol.  
 KEPS-MBS32 = Modbus RTU OPC/DDE server  
 Modem Available, see MPP-2400 and MPP-2400N (requires M option)  
 Two Way Pager Available, see MPP-TWP (requires M option)  
 Serial printer available, see P1000, P295  
 Ethernet Port Server available, see IEPS  
 RS-422/485 to RS-232 Communication Adaptor available, see CA285  
 Remote metering and data collection software available, see TROLlink