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, Analog and Relay 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. Includes equations for most flow meter types.

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 flowmeter type and 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, heat 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, ultrasonic, GilFlo, GilFlo 16 point, ILVA 16 Point Mass Flow and others
- Square Law: Orifice, Venturi, Nozzle, V-Cone, Wedge, Averaging Pitot, Target, Verabar, Accelebar 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°C

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, 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
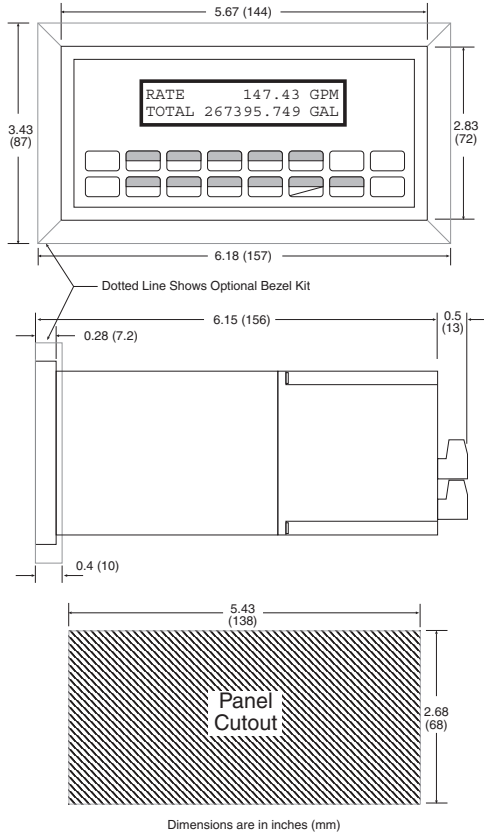   Over-current Protected
   Over-voltage Protected

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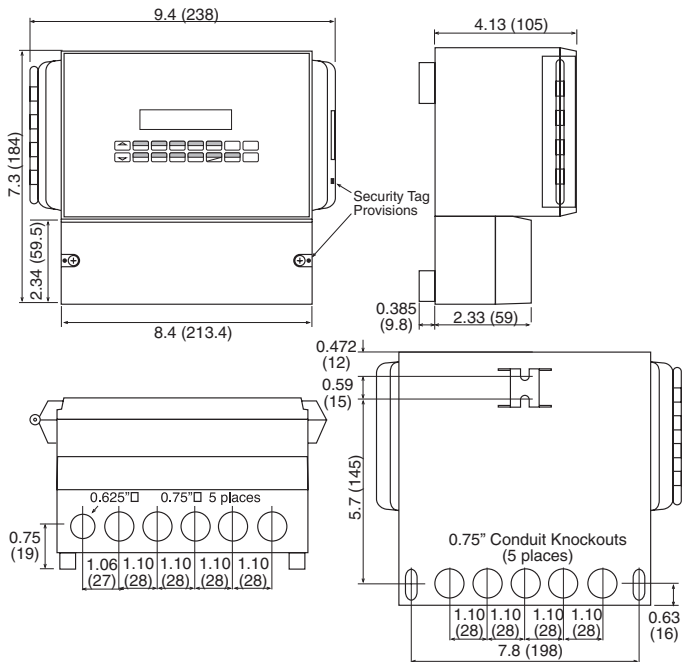The Flow Computer is equipped with a pseudo nonvolatile real time clock with display of time and date.
Format:
   24 hour format for time
   Day, Month, Year for date
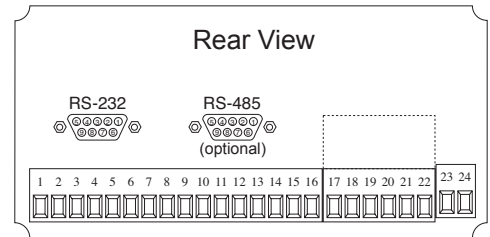   Optional Daylight Savings Time

Fig. 1: Standard Dimensions

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)

Terminal Designations

DC OUTPUT	PULSE IN	- - - - - - -	COMMON	RTD EXCIT (+)	RTD SENS (+)	RTD SENS (-)	DC OUTPUT	RTD EXCIT (+)	RTD SENS (+)	RTD SENS (-)	PULSE OUTPUT (+)	PULSE OUTPUT (-)	ANALOG OUTPUT 1 (+)	ANALOG OUTPUT 2 (+)	ANALOG OUTPUT COMMON (-)	NO	COM RLY1	NC	NC	COM RLY2	NO	AC LINE	AC LINE

FLOW IN: Vin (+), Iin (+)
TEMPERATURE IN: Iin (+)
PRESSURE (TEMP 2) IN: Iin (+)
POWER IN: DC (+), DC (-)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |

Terminal Layout

Rear View

RS-232   RS-485 (optional)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16   17 18 19 20 21 22   23 24

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 Tempertaure; -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

Accessories:
KEP RS232 DDE server for SUPERtrol.
Modbus RTU OPC/DDE server
Modem Available, see MPP-2400N (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
ADAM-4572: Modbus RTU to Modbus TCP Converter

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

9.4 (238)
7.3 (184)
2.34 (59.5)
8.4 (213.4)
4.13 (105)
0.385 (9.8)
2.33 (59)

Security Tag Provisions

0.472 (12)
0.59 (15)
5.7 (145)
0.625"☐   0.75"☐ 5 places
0.75 (19)
1.06 (27) 1.10 (28) 1.10 (28) 1.10 (28) 1.10 (28)

0.75" Conduit Knockouts (5 places)
1.10 (28) 1.10 (28) 1.10 (28) 1.10 (28)
0.63 (16)
7.8 (198)