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, Provides Power for Modem
- RS-485 with Modbus RTU Optional
- Internal Communication Card Option
  Supports: BACnet IP, BACnet MS/TP, Metasys N2, Modbus TCP, AB Ethernet IP, AB DF1, LonWorks*
- 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, OLED and VFD ordering options
  Character Size: 0.2" nominal
  User selectable label descriptors and units of measure

Keypad
  Keypad Type: Membrane Keypad with 16 keys
  Keypad Rating: Sealed to NEMA 4X / IP65

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.

* LonWorks protocol requires a different module assembly from the other available protocols. LonWorks is not field selectable.

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

Terminal Designations

1	DC OUTPUT		FLOW IN
2	PULSE IN	Vin (+)	
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 (-)	

Internal Multi-protocol Communication Card Option

FEATURES

- Internal communication card eliminates the need for external protocol converters.
- Supports: BACnet IP, BACnet MS/TP, Metasys N2, Modbus TCP, AB Ethernet IP, AB DF1, LonWorks*
- Easy to configure via the Web Interface.
- Dedicated internal LonWorks is also available
- Dedicated internal RS485 Modbus RTU is also available

DESCRIPTION

The multi-protocol communication card is an internal, high performance, Building Management System communication solution for the ST2 flow computer family. The card provides an instant interface, enabling the KEP flow computers to communicate with multiple BMS protocols, including:

- BACnet MS/TP
- BACnet IP
- Modbus TCP
- Metasys N2
- AB DF1
- AB EtherNet/IP
- LonWorks*

CONFIGURATION

Use a web browser to locate the internal web page and configure the settings. The detailed settings vary with the different communication protocols. Only one communication port/protocol can be used. A web browser is also used to configure the site specific settings for each instrument
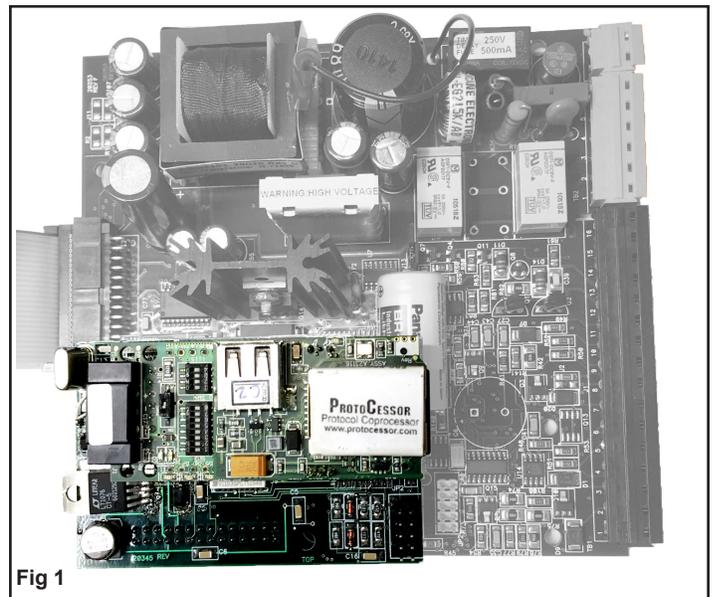

Fig 1

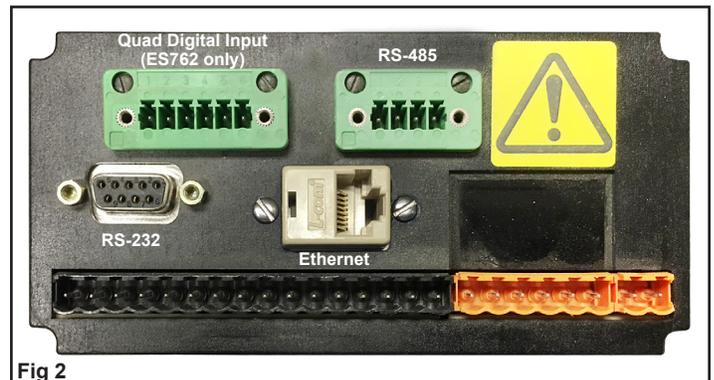*Top view of multi-protocol card installed on ES749 mother board*

Fig 2

Rear view of ES749 case.
Communication ports are available for RS-485 and Ethernet

The Web Interface makes it easy to configure.

Configuration Parameters

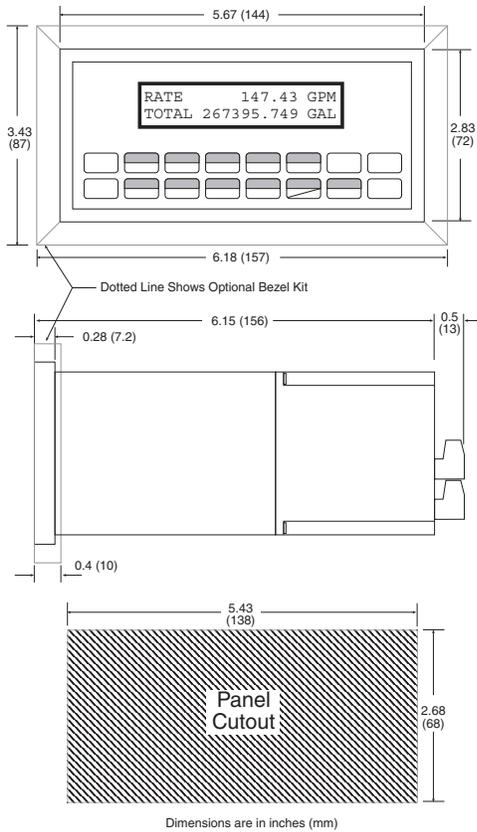| Parameter Name	Parameter Description	Value	
protocol_select	**Protocol Selector** Set to 1 for BACnet IP Set to 2 for BACnet MSTP Set to 3 for Metasys N2 Set to 4 for Modbus TCP Set to 5 for EtherNet/IP Set to 6 for DF1	1	Submit
node_offset	**BACnet Node Offset** This is used to set the BACnet device instance. The device instance will be sum of the Modbus device address and the node offset. *(0 - 4194303)*	50000	Submit
bac_ip_port	**BACnet IP Port** This sets the BACnet IP port of the Gateway. The default is 47808. *(1 - 65535)*	47808	Submit
bac_cov_option	**BACnet COV** This enables or disables COVs for the BACnet connection. Use COV_Enable to enable. Use COV_Disable to disable. *(COV_Enable/COV_Disable)*	COV_Disable	Submit
bac_bbmd_option	**BACnet BBMD** This enables BBMD on the BACnet IP connection. Use BBMD to enable. Use - to disable. The bdt.ini files also needs to be downloaded. *(BBMD/-)*	-	Submit

Active profiles

Nr	Node ID	Current profile	Parameters	
1	1	BAC_IP_SUPERtrol_II		Remove
Add				

Sample screen shot of web interface configuration

Fig. 1: Standard Dimensions

Dotted Line Shows Optional Bezel Kit

Panel Cutout

Dimensions are in inches (mm)

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

Security Tag Provisions

0.625"□   0.75"□ 5 places

0.75" Conduit Knockouts (5 places)
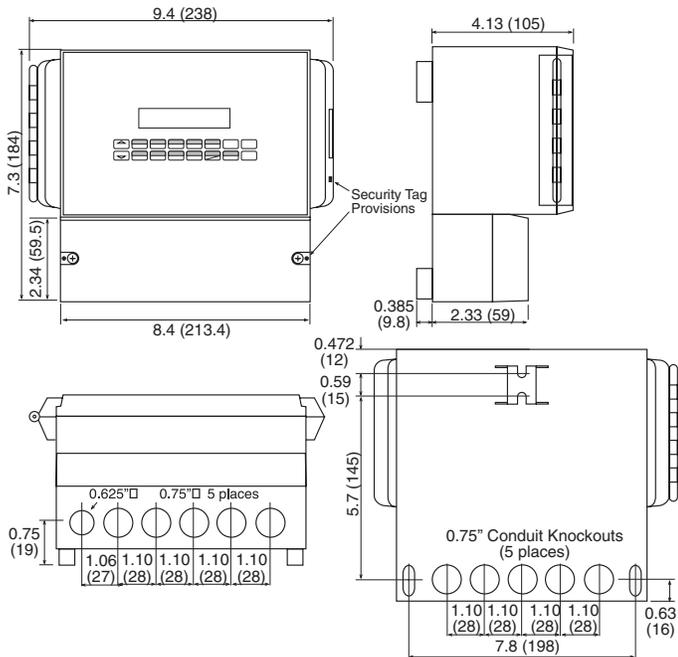
Ordering Information

Example	ST2		L	1	0		P	M

Series:
  ST2 = Flow Computer

Display Type:
  L= LCD
  O= OLED
  V= VFD

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

Network Card:
  0= None
  1= RS485/Modbus
  3= COM CARD with Multi-Protocol
    Specify protocol (example: **3 BAC/IP**)
    BAC/IP = BACnet IP
    BACMS/TP = BACnet MS/TP
    MOD/IP = Modbus TCP/IP
    METASYS/N2 = Metasys N2
    ABDF1 = AB DF1
    ABETH/IP = AB EtherNet/IP
  4= COM CARD with LonWorks Protocol
    Specify protocol (example: **4 LONWORKS**)
  Factory configuration of network card settings

Mounting:
  P= Panel Mount
  N= NEMA 4 Wall Mount (see MS811)
  W= NEMA 12/13 Wall Mount w/ Clear Cover
  E= Explosion Proof (No Button Access)

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
  22 = Superchip; 2 relay, For use with 4 terminal multi-variable
    vortex meters
  26 = Superchip; 3 relay, For use with 4 terminal multi-variable
    vortex meters
  TM = Trap monitor RS485 network card
  IM = Internal Modem
  IM-56K = 56K Internal Secure Modem
  M = Modem Power Option
  ET= Extended Temperature LCD Display
  TB= RS485 Terminal Block for Panel Mount Enclosure
  TU = Translation Utility Disk

Accessories:
ST2 SETUP PRO - Advanced setup software for ST2 family
OPC/DDE Server for RS232 Port available, see KWP-UCOND0-PRD
OPC/DDE Server for Modbus Suite available, see KWP-MDBUS0-PRD
Modem Available, see MPP-56KN, MPP-2400 and MPP-2400N
Serial printer available, see P20, P220, P295
Ethernet Port Server available, see IEPS
RS-422/485 to RS-232 Communication Adaptor available, see CA285
RS232 Extender Cable: P/N=13220-<length in inches>
Remote metering and data collection software available, see TROLlink