

# ES-762

- “EZ Setup”- Guided Setup for First Time Users
- Utility Metering of Steam and Heating or Cooling Water Energy
- Two Auxiliary 4-20mA Analog Inputs for Temperature, Pressure, Differential Pressure, %RH or Conductivity
- Four Auxiliary Pulse Inputs and Totalizers for Secondary Measurement of Total from other meters
- Menu Selectable Hardware & Software Features
- Internal Data Logging
- Isolated Pulse and Analog Outputs Standard
- RS-232 Port Standard, Provides Power for Modem
- RS-485 Modbus RTU
- Internal Communication Card Option  
Supports: BACnet IP, BACnet MS/TP, Metasys N2, Modbus TCP, AB Ethernet IP, AB DF1, LonWorks\*
- Windows™ Setup Software
- Supports Most Flowmeter Types

## Description:

The ES-762 Flow Computer primarily satisfies the instrument requirements for a variety of flowmeter types in liquid, steam and heat applications. Multiple flow equations are available in a single instrument with many advanced features. Two auxiliary current and four totalizer inputs are provided for secondary measurements.

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. Multichannel auxiliary inputs can gather other information from site.

## Applications Include:

Steam Mass, Steam Heat, Chilled Water Only, Heated Water Only including Low DeltaT cutoff.

The isolated analog output can be chosen to follow the volume flow, heat 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.

## Utility Metering Flow Computer with Multichannel Aux. Inputs & Totalizers



- Stacked DP Transmitters Supported
- DDE Server & HMI Software Available
- Remote Metering Solutions
- Optional - Attractive Wall Mount Enclosure

## 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 Mounting Styles  
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  
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, GilFlo, ILVA, Ultrasonic, Mass Flow and others  
Square Law: Orifice, Venturi, Nozzle, V-Cone, Wedge, Averaging Pitot, Target, Accelabar and others  
Multi-Point Linearization: May be used with all flowmeter types. Including: 16 point, UVC and dynamic compensation.

**Flow Inputs for Primary Flow Computations:****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  $\Omega$  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

**Secondary Totalizer Aux. Inputs:**

Input Type: Contact Closure / Pulse

Number of Contact Closure / Pulse Inputs: four (4)

Input Impedance: 4.7 k  $\Omega$  nominal

Trigger Level:

High Level Input

Logic On: 4 to 30 VDC

Logic Off: 0 to 1 VDC

Maximum Count Speed: 25 Hz

Excitation Voltage: 5 VDC

Overvoltage Protection: 30 VDC

User defined: units, scaling, rollover limit, labels

Uses: Cold Water, Natural Gas, Hot Water, Electric  
kW-Hr

**Temperature, Pressure, Density, and Aux 3/4 Inputs**

The compensation inputs usage are menu selectable for temperature, temperature 2, pressure, density or not used. In addition, two auxiliary inputs are provided for secondary measurements including %RH, Conductivity, Temperature, Pressure, Differential Pressure.

Calibration: Operator assisted learn mode

Operation: Ratiometric

Accuracy: 0.02% FS at 20° C (current input)

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 (menu selectable)

Current: 4-20 mA (4 inputs)

Resistance: 100 Ohms DIN RTD (2 inputs)

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

Accuracy: 0.5° C

**Stored Information (ROM)**

Steam Tables (saturated & superheated),

Fluid Properties: Water, or Generic with user entries of  
fluid properties

**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)

Units Selections (English/Metric)

**Excitation Voltage**

24 VDC @ 140 mA (fault protected)

**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), Aux.3, Aux.4, Wet Steam or General purpose warning (security).

Number of relays: 2

Contact Style: Form C contacts

Contact Ratings: 240 V, 5 amp

**Analog Outputs**

The analog outputs are menu assignable to correspond to the Uncompensated Volume Rate, Aux.3, Aux.4, Mass Rate, Heat Rate, Temperature, Density, or Pressure.

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 and communication with a computer. Power is provided for KEP's MPP2400N (modem) communication accessory.

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,  
Compatible with external dataloggers.

RS-485:

Device ID: 01-247

Baud Rates: 300, 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 records. This information can be used for later uploading or printing. Storage format is selectable for Comma-Carriage Return or Printer formats and accessed over RS-232 port.

**Isolated Pulse output**

The isolated pulse output is menu assignable to Uncompensated 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 battery backed non-volatile real time clock with display of time and date.

Format:

24 hour format for time

Day, Month, Year for date

## 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

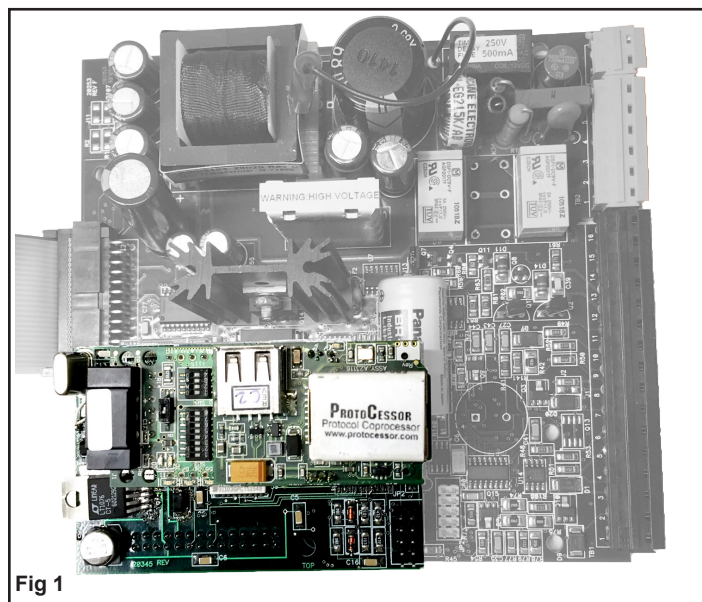


Fig 1

Top view of multi-protocol card installed on ES762 mother board

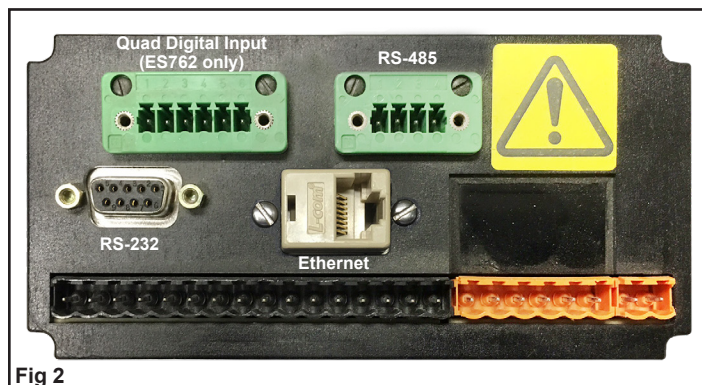


Fig 2

Rear view of ES762 case.

Communication ports are available for RS-485 and Ethernet

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



## Configuration Parameters

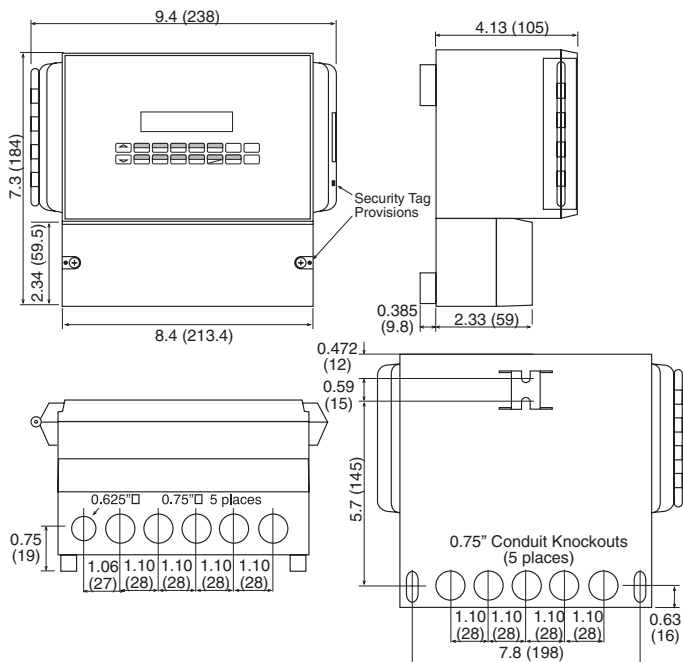
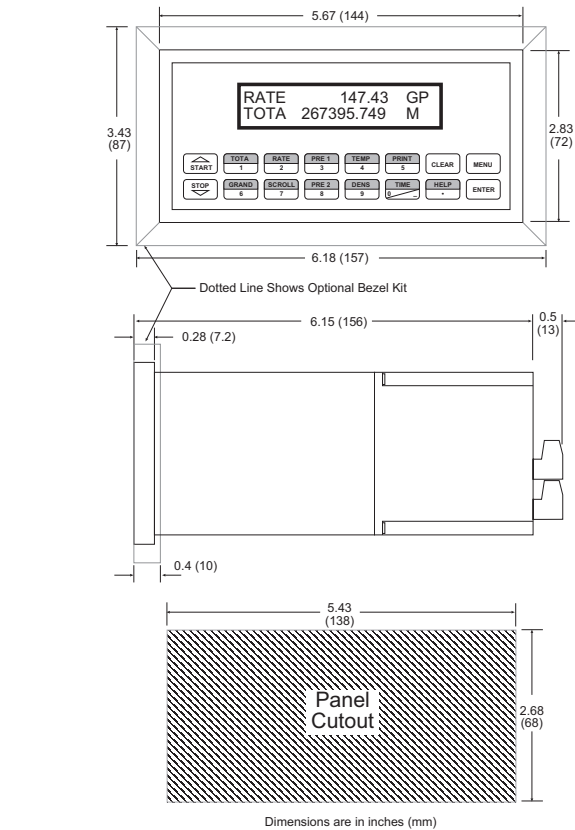
Parameter Name	Parameter Description	Value	
protocol_select	<b>Protocol Selector</b> Set to 1 for BACnet IP Set to 2 for BACnet MSTP Set to 3 for Metasys N2 Set to 4 for Modbus TCP Set to 5 for EtherNet/IP Set to 6 for DF1	<input type="text" value="1"/>	Submit
node_offset	<b>BACnet Node Offset</b> This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

## Active profiles

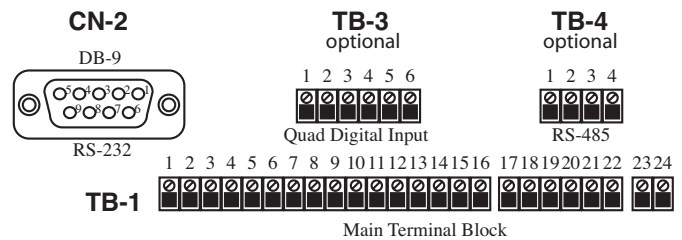
Nr	Node ID	Current profile	Parameters	
1	1	BAC_IP_SUPERtrol_II		Remove
Add				

Sample screen shot of web interface configuration





1	DC OUTPUT	FLOW IN
2	PULSE IN lin (+) VIn (+)	
3	----- lin (+)	AUX - 3
4	COMMON	
5	RTD EXCIT (+)	TEMPERATURE
6	RTD SENS (+)	IN
7	RTD SENS (-)	lin (+)
8	lin (+)	AUX - 4
9	RTD EXCIT (+)	PRESSURE
10	RTD SENS (+)	(TEMP 2)
11	RTD SENS (-)	lin (+)
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 (-)



Ex:	ES762ST2	L	1	1	P	13 TB QDI
<b>Series:</b>	ES762ST2 = Utility Metering Flow Computer					
<b>Display Type:</b>						
L= LCD						
O= OLED						
V= VFD						
<b>Input Type:</b>						
1= 85 to 276 VAC						
3= 24 VDC (16 to 48 VDC)						
<b>Network Card:</b>						
1= RS485/Modbus (standard)						
3= COM CARD with Multi-Protocol						
Specify protocol (example: <b>3 BAC/IP</b> )						
<b>BAC/IP</b> = BACnet IP						
<b>BACMS/TP</b> = BACnet MS/TP						
<b>MOD/IP</b> = Modbus TCP/IP						
<b>METASYS/N2</b> = Metasys N2						
<b>ABDF1</b> = AB DF1						
<b>ABETH/IP</b> = AB EtherNet/IP						
4= COM CARD with LonWorks Protocol						
Specify protocol (example: <b>4 LONWORKS</b> )						
Factory configuration of network card settings						
<b>Mounting:</b>						
P= Panel Mount						
*N= NEMA 4 Wall Mount (see NEMAtr0l & MS811)						
*W= NEMA 12/13 Wall Mount w/ Clear Cover						
<b>Options:</b>						
13 = Superchip; 2 relay, Positive heat only (standard)						
TB= RS485 Terminal Block standard for RS485/Modbus in						
Panel Mount (P) and NEMA4 Wall (N) Mounting Styles						
QDI=Quad Digital Input (standard)						

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-2400N  
 Serial printer available, see P20, P220, P295  
 Ethernet Port Server for RS-232 port available, see IEPS  
 RS-422/485 to RS-232 Communication Adapter available, see CA285  
 RS232 Extender Cable: P/N=13220-<length in inches>  
 TrollLink - Remote metering software for RS-232 port