ES-749

Utility Metering Flow Computer

- "EZ Setup"- Guided Setup for First Time Users

- Liquid, Gas, Steam and Heat Flow Equations

- Utility Metering - Steam, Heating/Cooling, Chilled Water, Natural Gas, Compressed Air

- Menu Selectable Hardware & Software Features

- Internal Data Logger

- Isolated Pulse and Analog Outputs Standard

- RS-232 Port Standard, Provides Power for Modem

- RS-485 Optional

- Windows™ Setup Software

- NX19 Gas Equations, Stacked DP Transmitters

- DDE Server & HMI Software Available

- Remote Metering by External Wireless or Modem

- Attractive Wall Mount Enclosure Available

Description:
The ES-749 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.

Applications Include:
Steam Mass, Steam Heat, Natural Gas, Fuel 0il, Compressed Air, Chilled Water Only, Heated Water Only including Low DeltaT Cutout.

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 Cosumption
    AC Power: 6.5 V/A
    DC Power: 300 mA max.

Flow Meter Types:

Linear: Vortex, Turbine, Positive Displacement, Magnetic, GilFlo, ILVA, Mass Flow and others

Square Law: Orifice, Venturi, Nozzle, V-Cone, Wedge, Averaging Pitot, Target, Verabar, Accelabar 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

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

Accuracy: 0.02% FS at 20° C

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

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 or Generic

User Entered Stored Information (EEPROM / Nonvolatile RAM)

Transmitter Ranges, Signal Types

Fluid Properties
(specific gravity, 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)

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
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, 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 Approved, UL/CSA 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, 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
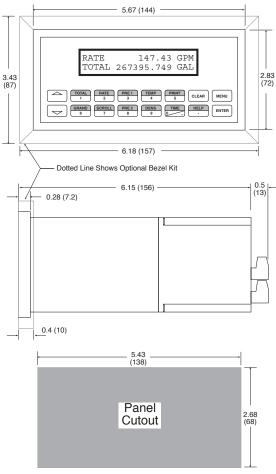   Over-current Protected
    Over-voltage Protected

Real Time Clock
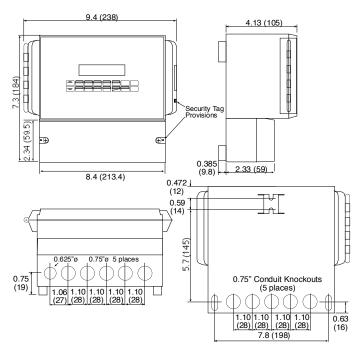The Flow Computer is equipped with a non-volatile real time clock with display of time and date.
Format:
    24 hour format for time
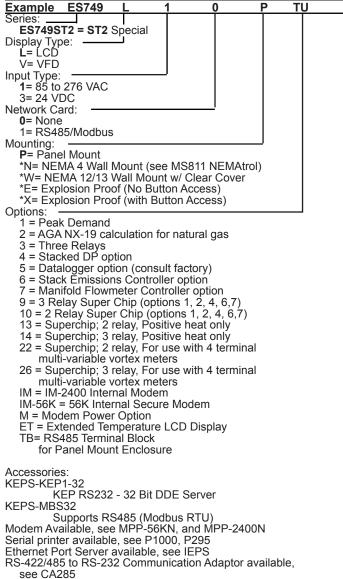   Day, Month, Year for date

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)

Panel Cutout

5.43 (138) · 2.68 (68)

Dimensions are in inches (mm)

Wall Mount (option W)

9.4 (238) · 4.13 (105) · 7.3 (184) · 2.34 (59.5) · 8.4 (213.4)

Security Tag Provisions

0.385 (9.8) · 2.33 (59)

0.472 (12) · 0.59 (14) · 5.7 (145)

0.625"ø 0.75"ø 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)

Terminal Designations

#	Designation	Group
1	DC OUTPUT	
2	PULSE IN — Vin (+) / Iin (+)	FLOW IN
3	-------------	
4	COMMON	
5	RTD EXCIT (+)	
6	RTD SENS (+)	TEMPERATURE IN / Iin (+)
7	RTD SENS (-)	
8	DC OUTPUT	
9	RTD EXCIT (+)	
10	RTD SENS (+)	PRESSURE (TEMP 2) IN / Iin (+)
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 / DC (+)	POWER IN
24	AC LINE / DC (-)	

Ordering Information

Example   ES749   L   1   0   P   TU

Series:
   ES749ST2 = ST2 Special

Display Type:
   L= LCD
   V= VFD

Input Type:
   1= 85 to 276 VAC
   3= 24 VDC

Network Card:
   0= None
   1= RS485/Modbus

Mounting:
   P= Panel Mount
   *N= NEMA 4 Wall Mount (see MS811 NEMAtrol)
   *W= NEMA 12/13 Wall Mount w/ Clear Cover
   *E= Explosion Proof (No Button Access)
   *X= Explosion Proof (with 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
   IM = IM-2400 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

Accessories:
KEPS-KEP1-32
           KEP RS232 - 32 Bit DDE Server
KEPS-MBS32
           Supports RS485 (Modbus RTU)
Modem Available, see MPP-56KN, and MPP-2400N
Serial printer available, see P1000, 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
ADAM-4572: Modbus RTU to Modbus TCP Converter