923-ST1NET FC

- Displays Supply, Return and Net Rate/Total
- Supports Pulse Producing Flowmeters Turbine, Positive Displacement, Coriolis
- Volume, Corrected Volume or Mass Equation
- Universal Viscosity Curve (UVC) and Strouhal/ Roshko Advanced Linearization Methods
- API 2540 Equations for Petroleum Fluids
- User Entry of Fluid Properties (10 Selectable)
- Menu Selectable Hardware & Software Features
- Data Logging of Net Rate/Total
- Two Line LCD, OLED or VFD Display
- Isolated Pulse and Analog Outputs Standard

**Net Liquid Application**

**Measurements:**
Flowmeter sensors measure the actual flow in the supply and return liquid lines. A temperature sensor can also be installed to correct for UVC or STRO linearization of turbine flowmeters.

**Calculations:**
- Supply and return flow is calculated using the flowmeter frequency output and the user entered K-Factor.
  Net Flow = Supply Flow – Return Flow
  NOTE: Additional calculations are used for Corrected Volume and Mass applications

**Output Results:**
- Display Results
  Supply, Return, Net Flow Rates, Resettable Totals, Non-Resettable Totals
- Analog Output
  Net Rate or Net Total
- Pulse Output
  Net Total
- Relay Outputs
  Net Rate or Net Total Alarms

**Applications:**
The Flow Computer can monitor actual net flow and total of any liquid. (Common applications include boiler and diesel engine fuel consumption measurement)
Flow alarms are provided via relays and datalogging is available via analog (4-20mA) and serial outputs.

**Calculations**

- **Pulse Input; Average K-Factor**
  \[
  \text{Supply or Return Flow} = \frac{\text{input frequency} \times \text{time scale factor}}{\text{K-Factor}}
  \]
- **Net Flow**
  \[
  \text{Net Flow} = \text{Supply Flow} - \text{Return Flow}
  \]
Specifications:
Flow Meters and Computations
   Meter Types: Supports pulse producing meters including:
   vortex, single rotor turbine, magnetic, PD flowmeter, Coriolis
   Linearization: 40 point table, UVC table or Strouhal/Roshko
   Computations: Volume, Corrected Volume & Mass
   Fluid Computations: Density, Temperature, Viscosity in Supply
   and Return
Environmental
   Operating Temperature: 0°C to +50°C
   Storage Temperature: -40°C to +85°C
   Humidity: 0-95% Non-condensing
   Materials: U.L. approved
Approvals: CE Compliant, UL/CUL Listed
Display
   Type: 2 lines of 20 characters, Backlit LCD, OLED or VFD
   Character Size: 0.2” nominal
   User programmable label descriptors and units of measure
Keypad
   Keypad Type: Membrane Keypad with 16 keys
   Keypad Rating: Sealed to NEMA 4X / IP65
Enclosure
   Size: See Dimensions
   Depth behind panel: 6.5” including mating connector
   Type: DIN
   Materials: Plastic, UL94V-0, Flame retardant
   Bezel: Textured per matt finish
Fluid Types
   General Purpose, User entry of fluid properties for up to 10
   fluids.
Real Time Clock
   The 923-ST1-NET-FC is equipped with a battery backed real
   time clock with display of time and date.
   Format:
   12 or 24 hour time display
   Day, Month, Year date display
Excitation Voltage
   Menu Selectable: 5, 12 or 24 VDC @ 100 mA (fault protected
   with self resetting fuse)
Relay Outputs
   The relay outputs are menu assignable to (Individually for each
   relay) Low Rate Alarm (net rate or net total), Hi Rate Alarm (net
   rate or net total), Temperature, Density or General purpose
   warning (security).
   Number of relays: 2 (4 optional)
   Contact Style: Form C contacts
   Contact Ratings: 5 amp, 240 VAC or 30 VDC
   Capabilities: Alarm Delay, Setpoint, Hysteresis, Duration
Power Input
   The factory equipped power option is internally fused. An
   internal line to line filter capacitor and MOV are provided for
   added transient suppression.
   110 VAC Power: 85 to 127 Vrms, 50/60 Hz
   220 VAC Power: 170 to 276 Vrms, 50/60 Hz
   DC Power:
   12 VDC (10 to 14 VDC)
   24 VDC (14 to 28 VDC)
   Power Consumption:
   AC: 11.0 VA (11W)
   DC: 300 mA max.
Flow Inputs:
Pulse Inputs:
   Number of Flow Inputs: 2, one for supply and one for return
   Input Impedance: 10 KΩ nominal
   Pullup Resistance: 10 KΩ to 5 VDC (menu selectable)
   Pull Down Resistance: 10 KΩ to common
   Trigger Level: (menu selectable)
      High Level Input
      Logic On: 3 to 30 VDC
      Logic Off: 0 to 1 VDC
   Low Level Input (mag pickup)
      Sensitivity:
      10 mV or 100 mV
   Minimum Count Speed:
      Menu selectable: 1-99 seconds
   Maximum Count Speed:
      Menu Selectable: 40Hz, 3000Hz or 20 kHz
   Overvoltage Protection: 50 VDC
Control Inputs
   Switch Inputs are menu selectable for Reset, Lock, Inhibit,
   Alarm Acknowledge, Print, Aux. Energy Total input or Not Used.
   Control Input Specifications
   Number of Control Inputs: 3
   Input Scan Rate: 10 scans per second
   Logic 1: 4 - 30 VDC
   Logic 0: 0 - 0.8 VDC
   Input Impedance: 100 KΩ
   Control Activation:
      Positive Edge or Pos. Level based on product definition for
      switch usage.
Auxiliary / Compensation Inputs
The auxiliary/compensation inputs are menu selectable for supply temperature, return temperature or not used. These inputs are used for the compensated inputs when performing compensated flow calculations. They can also be used as a general purpose input for display and alarming.
Number of inputs: 2

Operation: Ratiometric
Accuracy: 0.02% FS at 20° C
Basic Measurement Resolution: 16 bit
Update Rate: 1 update/sec minimum
Automatic Fault detection:
- Signal Over-range/under-range
- Current Loop Broken
- Fault mode to user defined default settings

Fault Protection:
- Reverse Polarity: No ill effects
- Over-Voltage Limit (Voltage Input): 50 VDC

Available Input Ranges
- Current (Two): 4-20 mA, 0-20 mA
- RTD: (One) 100 Ohm DIN RTD Standard Three Wire
- Thermistor (One) - Consult Factory

Isolated Analog Output
The analog output is menu assignable to correspond to the Net Rate/Total, Supply Temperature, Supply Density.
Type: Isolated Current Sourcing
Available Ranges: 4-20 mA, 0-20 mA
Resolution: 12 bit
Accuracy: 0.05% FS at 20° C
Update Rate: 1 update/sec minimum
Temperature Drift: Less than 200 ppm/C
Maximum Load: 1000 ohms (at nominal line voltage)
Compliance Effect: Less than .05% Span
60 Hz rejection: 40 dB minimum
Calibration: Operator assisted Learn Mode
Averaging: User entry of damping constant to cause a smooth control action

Isolated Pulse output
The isolated pulse output is menu assignable to Net Total.
Pulse Output Form: Photo MOS Relay
Maximum On Current: 100 mA
Maximum Off Voltage: 30 VDC
Saturation Voltage: 1.0 VDC
Maximum Off Current: 0.1 mA
Pulse Duration: 10 mSec or 100 mSec (user selectable)
Pulse output buffer: 256
Fault Protection
- Reverse polarity: Shunt Diode

Serial Communication
The serial port can be used for printing, data recording, and/or 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: 2400, 4800, 9600, 19200
- Parity: None, Odd, Even
- Protocol: Modbus RTU (Half Duplex)

Setup Diskette Capabilities
Capabilities include: View Live Results Configure unit, Upload and Download to unit, Load and Save to file, Print Setup,

Data Logging Capabilities
Capabilities:
- Permits unit to automatically gather data during use.
- Data Log List:
- Data Log Event Trigger:
  - selectable: includes interval, time of day, front key, external contact, end of batch
- Data Log Format:
  - selectable: Printer format, Database CSV format
- Data Transmission:
  - Selectable: Output may be transmitted immediately or held in data log for later polling
- Remote Request Capabilities include:
  - Send data log, clear data log

External Modem Support Capabilities:
Compatibility: Hayes Compatible
Polling Capabilities:
- Answers incoming calls, responds to requests for information of action
Call Out Capabilities:
- Can initiate call on user selectable event condition, or upon error
Error Handling:
- Supports multiple retry, automatic disconnect upon loss of line or remote inactivity
Terminal Designations

Example 923-ST1NETFC L 1 A 0 P TB

Series:

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

Input Type:
- 1 = 110 VAC
- 2 = 220 VAC
- 3 = 12 VDC (10 to 14 VDC)
- 4 = 24 VDC (14 to 28 VDC)

Relays:
- A = 2 SPDT Relays
- B = 4 SPDT Relays (optional)

Network Card:
- 0 = None (STD)
- 2 = RS485/Modbus (optional 2nd COM port)

Mounting:
- P = Panel Mount (see Fig. 1)
- W = NEMA 12/13 Wall Mount with Clear Cover (see Fig. 2)
- E = Explosion Proof (No Button Access)

Options:
- TB = RS485 Terminal Block for Panel Mount Enclosure
- ET = Extended Temperature
  - -4°F to 131°F (-20°C to 55°C)
- IM = Internal Modem
- M = Modem Power Option

Accessories:
- 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-56KN and MPP-2400N
- Serial printer available, see P1000, P295
- Ethernet Port Server available, see IEPS
- Ethernet Port Server Modbus TCP available, see ADAM4572
- RS422/485 to RS-232 Communication Adapter available, see CA285
- RS232 Extender Cable: P/N=13220<length in inches>