**924-ST2 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 and Analog 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

**Description:**
The 924-ST2 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. Consider the following illustrative examples.

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

**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, GilFlo, GilFlo 16 point, ILVA 16 Point and others
- Square Law: Orifice, Venturi, Nozzle, V-Cone, Wedge, Averaging Pitot, Target 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 kΩ 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°

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, datalogging, modem connection, two way paging and 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: 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
Fig. 1: Standard Dimensions

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

Terminal Designations

Terminal Layout

Ordering Information

Example 924-ST2 L 1 0 P 10

Series:

924-ST2 = Flow Computer
Display Type:
L = LCD
V = VFD
Input Type:
1 = 85 to 276 VAC
3 = 24 VDC
Network Card:
0 = None
1 = RS-485/Modbus
Mounting:
P = Panel Mount
N = NEMA 4 Wall Mount
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
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
Accessories:
KEPS-KEP1-32 = 32 Bit OPC/DDE Server for KEP RS-232 Protocol
KEPS-MBS-32 = 32 Bit Modbus RTU OPC/DDE server
TWP = Industrial Two Way Pager Transceiver
MPP200N = Industrial Wall Mount Modem
P1000 = Hand Held Printer
CA-285 = RS-232 to RS-485 Converter

Dimensions are in inches (mm)