Technical Specification

Instrument

- **Flow Range**
  - **ST98 Insertion Flow Element**: 0.75 SFPS to 600 SFPS (0.21 NMPS to 172 NMPS)
  - **ST98L In-Line Flow Accessory**: 0.0062 SCFM to 1850 SCFM (0.01 Nm3/h to 3,140 Nm3/h)
  - Air at standard conditions: 70 °F and 14.7 psia (0 °C and 1013.25 bar [a])

- **Media**: All gases that are compatible with the flow element material

- **Accuracy**
  - Flow: ± 1% reading, 0.5% full scale standard accuracy
  - Temperature: ± 2 °F (± 2 °C) (display only, flow rate must be greater than 5 AFPS [1.5 m/sec])
  - Special higher accuracy calibration options available; contact FCI

- **Repeatability**
  - Flow: ± 0.5% reading
  - Temperature: ± 1 °F (± 1 °C) (flow rate must be greater than 5 AFPS)

- **Temperature Coefficient**
  - With optional temperature compensation. Valid from 10% to 100% of full scale calibration.
  - Flow: Maximum ± 0.015% of reading / °F up to 850 °F (± 0.03% of reading / °C up to 454 °C)

- **Turndown Ratio**
  - Standard: Factory set and field adjustable from 10:1 to 100:1 within calibrated flow range

- **Temperature Compensation**
  - Standard: ± 30 °F (± 16 °C)
  - Optional: ± 100 °F (± 55 °C)

- **Calibration**: Performed on NIST traceable equipment

- **MTBF (calculated)**: 110 years

Flow Element

- **Material of Construction**
  - All-welded 316L stainless steel; Hastelloy-C optional

- **Operating Pressure**
  - Metal ferrule: 250 psig (17 bar [g])
  - Teflon ferrule: 150 psig (10 bar [g])

- **Operating Temperature (Process)**
  - **ST98 Insertion Style**: -40 °F to 350 °F [-40 °C to 177 °C] (optional) -40°F to 500 °F [-40 °C to 260 °C]
  - **ST98HT Insertion Style** (High Temperature Service): *†
    - -40 °F to 850 °F [-40 °C to 454 °C]
  - **ST98L In-Line Style**: -40 °F to 257 °F [-40 °C to 125 °C]

- **ST98 Insertion Flow Element**
  - Process Connection: 3/4” or 1” male NPT stainless steel compression fitting: adjustable Teflon ferrule; 150 psig [10 bar (g)] and 200 °F [93 °C] max., or metal ferrule; 250 psig [17 bar (g)] and 350 °F [177 °C] max.; thread-on flange optional; 1 1/4” male NPT or flanged retractable packing gland optional*
  - Insertion Length: Field adjustable lengths –
    - 1” to 6” [25 to 152 mm]
    - 1” to 12” [25 to 305 mm]
    - 1” to 21” [25 to 533 mm]
  - Custom lengths optional*

- **ST98L In-Line Flow Tube**
  - Insertion flow element is threaded and keyed in an in-line flow tube, calibrated and supplied as a spool-piece; accessories include low flow injection tubes and built-in Vortab flow conditioners for optimum low flow rangeability and performance
  - Size: 1” diameter tubing; 1”, 1 1/2” or 2” schedule 40 pipe
  - Length: 9 nominal diameters
  - Process Connection: Female NPT, male NPT, ANSI or DIN Flanges
  - Option: Flanges sized for flow tube

- **Remote Transmitter Configuration**: Transmitter may be mounted remotely from flow element using interconnecting cable (up to 1000’ [300 m])*

Flow Transmitter

- **Operating Temperature**: 0 °F to 140 °F [-18 ° to 60 °C]

- **Input Power**: 85 Vac to 265 Vac or 22 Vdc to 30 Vdc, 7 Watts maximum, 230 mA maximum

- **Outputs**
  - Analog: Single output selectable as 4-20 mA** (700 Ω max. load), 1-5 Vdc, 0-10 Vdc or 0-5 Vdc. (Vdc: 100K Ω min. load)
  - ** With fault indication per NAMUR, NE43 guideline: field selectable for high (≥21.6 mA) or low (≥3.75 mA) output signal is isolated from input power on AC Powered mode only**
  - **Digital**: Standard: RS232C Serial I/O
  - Optional: HART, full two-way communications*; PROFIBUS, DP Profile 3 (Certification #Z01212)
  - **Digital Display (optional)**: LCD, 2 line/16 character per line, indicating flow rate and process temperature and/or totalized flow
Approvals

**Agency Approvals**

- **FM, ATEX, CSA, CRN, IEC, CPA, NEPSI, GOST/RTN, CE, PED (system approvals)**

  **FM/CSA** – Nonincendive
  
  - Class I, Division 2, Groups A, B, C, D
  - Class II and III, Division 2, Groups F and G

  **Explosion Proof** Class I, Division 1, Groups B, C, and D
  
  - Electronics enclosure: T6 at 40°C or T5 at 60°C
  - Sensing Element: T4 at 40°C or T2A at 177°C

  **Dust-Ignitionproof** Class II and III, Groups E, F, and G

  **Indoor and Outdoor** Type 4 and 4X

  **ATEX**
  
  - I 2 G Ex d IIC T6 \ldots T1
  - II 2 D Ex tD A21 IP6X T85 °C \ldots T450 °C

  **Electronics enclosure:**
  
  - T6/T85°C, Tamb -40°C to +40°C
  - T5/T100°C, Tamb -40°C to +60°C

  **Sensing Element:**
  
  - T4/T135°C, Tamb -40°C to +40°C
  - T2/T300°C, Tamb -40°C to +177°C
  - T1/T450°C, Tamb -40°C to +450°C

  **IECEx**
  
  - Ex d IIC T6 or T5

  **Amb (Housing):**
  
  - -40°C to +40°C, T6
  - -40°C to +60°C, T5

  **Tp (Sensing Element):**
  
  - -40°C to +177°C
  - Tp = Process temperature

*Some configuration restrictions apply to ST98HT configured for 850 °F [454 °C] service. These include, but may not be limited to the following: Must select remote transmitter configuration. Insertion element is fixed length with 1” male NPT or adjustable with selection of packing gland. Contact FCI for more information.*