

Thermal Dispersion Air/Gas Insertion Flow Meter



Model ST110 Features

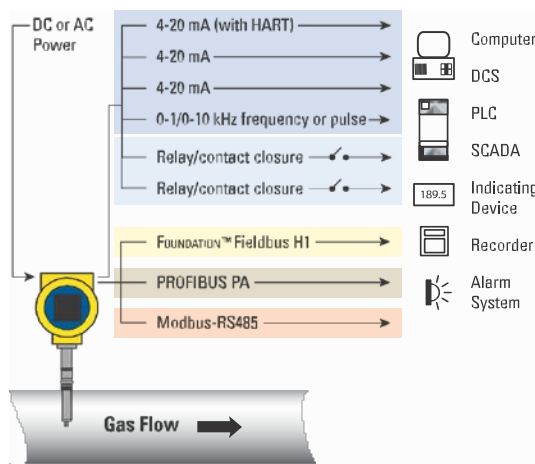
- Validate Performance On-Site in Minutes**
- Save Costs, No Need to Remove Flow Meter from Process**
- Comply with ISO and Local Regulations for Periodic Calibration Verification**
- Compatible with More than 200 Gases**
- Direct Mass Flow Measurement**
- Dual Function – Flow and Temperature**
- Temperature Service to 500 °F [260 °C]**
- No Moving Parts, Non-Clogging**
- Easy, Low Cost Single Point Insertion**
- Best-In-Class Digital/Graphical Readout**
- Multiple Analog Outputs**
- Extensive Bus Communications Options**
- Agency Approvals on Full Instrument**
- Provides In-Situ Flow Element Cleaning**
- On-Board Data Logger**

The Model ST110 flow meter combines a broad selection of insertion-type flow elements with best-in-class transmitter/electronics, superior and FCI's exclusive patented VeriCal system. VeriCal provides you with the ability to perform periodic field validation and verification of the flow measuring performance and calibration without extracting the flow meter the pipe or process.

Flow Element and Process Connections

- All welded construction
- 316L stainless steel or Hastelloy-C276
- Fast response and extra-rugged duty choices
- Variable (adjustable) and fixed insertion depths
- NPT, flanges, hot-tap retractable packing gland connections

Transmitter and Electronics



- All metal enclosure
- Four (4) conduit ports
- 2" x 2" [50 mm x 50 mm] backlighted LCD readout/display
- Flow, total flow and temperature
- Triple analog outputs with HART
- Foundation™ fieldbus, PROFIBUS PA, Modbus options
- Dual relays/alarms option
- Integral or remote mounting (up to 1000')
- AC or DC power
- FM, FMc, ATEX and IECEx approvals for Division 1, Zone 1 hazardous locations
- Standard and extended range temperature compensation
- Data logging to removable micro-SD card

Calibration

- Calibrated to your installation conditions and gas specifications on one of 18 precision, NIST traceable flow stands
- Up to five (5) unique calibrations stored onboard
- SpectraCal™ – 10 user selectable/changeable gases

Model ST110 Features

Four conduit ports provide greatest signal integrity and separation for power input, analog output lines, digital I/O, relays and/or auxiliary input signals; choice of NPT or M20 threads

AC or DC power supply

Weather-proof, ruggedized, Ex rated enclosures

- Choices for local or remote mounting
- NEMA 4X, IP67

Global agency approvals of entire instrument system for hazardous location installations:

FM, FMc, ATEX, IEC, NEPSI, CPA
NEPSI, CPA, Inmetro, GOST-R, GOST-K pending

Multiple calibrations

- Up to five independent, separate calibrations
- Multiple gases or mixed gas compositions
- Same gas, different flow range to optimize accuracy and extend turndown up to 1000:1

Precision calibration and calibration choices

- Specific gas and application matched calibration in FCI NIST traceable facility
- Exclusive patented SpectraCal gas equivalency calibration with ten (10) user selectable gases

Extensive analog and digital communications output choices

- Triple 4-20 mA with HART
- Foundation™ fieldbus H1
- PROFIBUS PA
- Modbus RS-485
- 0-1 kHz or 0-10 kHz frequency or pulse
- Dual relays
- USB port
- Ethernet

On-board data logger

Multi-function: measures mass flow rate and temperature

Four (4) optical touch buttons

- Proximity activation, no need to open enclosure
- Full instrument programmability
- Protected against unwanted activation

Comprehensive informational display

- Digital readout of all measured parameters: flow rate, total flow, temperature and pressure with engineering units
- Analog flow rate bar graph
- Alarm relay status indication
- Instrument fault indication
- User programmable 17 character field (example: display gas type, tag number or application/location)
- Display orientation rotates in 90° increments electronically
- Backlighted: auto-on activation via proximity sensor or set for always on

VeriCal or Normal Operation valve

Sonic nozzle

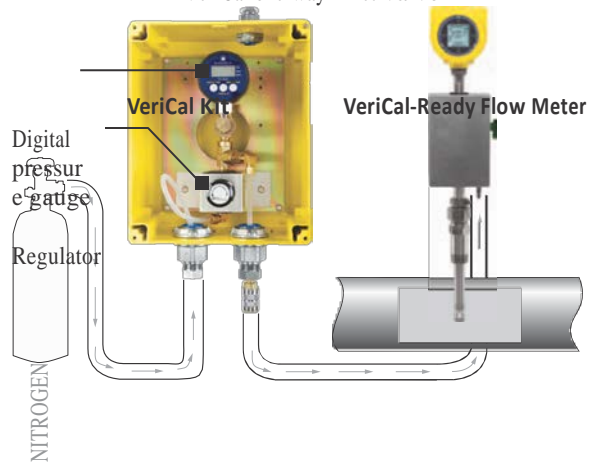
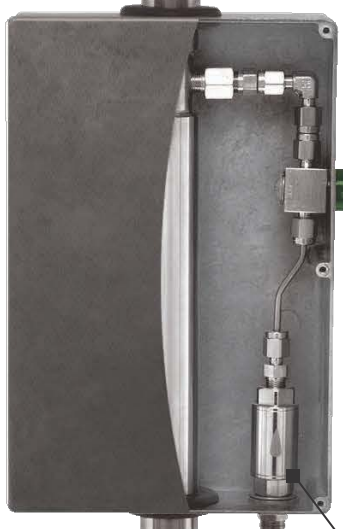
VeriCal one-way inlet valve



ST Series retractable flow element with VeriCal fittings

Stainless steel or Hastelloy-C276 wetted parts

All welded sensor elements for maximum service life and leak-proofing



Instrument

- ⌘ **Measuring Capability:** Flow rate, total flow and temperature
- ⌘ **Basic Style:** Insertion, single element with VeriCal™ capability
- ⌘ **Flow Measurement Range:** 0.25 SFPS to 600 SFPS [0,07 NMPS to 172 NMPS]
– Air at standard conditions; 70 °F and 14.7 psia [0 °C and 1013,25 bar (a)]
- ⌘ **Temperature Measurement Range:** Up to 500 °F [260 °C]
commensurate with element; *see operating temperature in flow element specification*
- ⌘ **Media:** All gases that are compatible with the flow element material
- ⌘ **Accuracy**
Flow:
Gas Specific Calibration: ±0.75% reading, ±0.5% full scale
SpectraCal™ Gas Equivalency: Typically ±4% reading, ±0.5% full scale; gas conditions specific to application will determine accuracy; *utilize FCI's online tool, AVAL, to evaluate your application and provide expected accuracy*
Temperature: ±2 °F [±1,1 °C] (display only, flow rate must be greater than 5 AFPS [1,5 m/sec])
- ⌘ **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 500 °F [±0.03% of reading / °C up to 260 °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]
- ⌘ **Agency Approvals**
FM, FMc (Canadian): Class I, Division 1, Hazardous Locations; Groups B,C,D,E,F,G
ATEX and IECEX: Zone 1, II 2 GD Ex d IIC T4
NEPSI, CPA, Inmetro, GOST-R, GOST-K pending
- ⌘ **Calibration:** Performed on NIST traceable equipment

Flow Element

- ⌘ **Material of Construction**
All-welded 316L stainless steel; Hastelloy-C optional
- ⌘ **Operating Pressure**
Fixed Connection NPT: 1000 psig [69 bar (g)]
Fixed Connection Flanged: per flange rating
- ⌘ **Operating Temperature (Process)**
-40 °F to 350 °F [-40 °C to 177 °C]
-40 °F to 500 °F [-40 °C to 260 °C]
- ⌘ **Process Connection**
Retractable Packing Glands
Low pressure 50 psig [3,5 bar (g)] or medium pressure (500 psig [34 bar (g)]) with graphite or Teflon packing material; 1 1/4" male NPT or ANSI or DIN flange
Teflon packing required when process media is ozone, chlorine or bromine
Fixed Fittings: 1" male NPT or ANSI or DIN flange
Insertion Length: Field adjustable lengths
1" to 6" [25 mm to 152 mm]
1" to 12" [25 mm to 305 mm]
1" to 21" [25 mm to 533 mm]
1" to 60" [25 mm to 1524 mm]
Fixed lengths from 2.6" to 60" [66 mm to 1524 mm]
- ⌘ **Remote Transmitter Configurations:** Transmitter may be mounted remotely from flow element using interconnecting cable (up to 1000' [300 m])

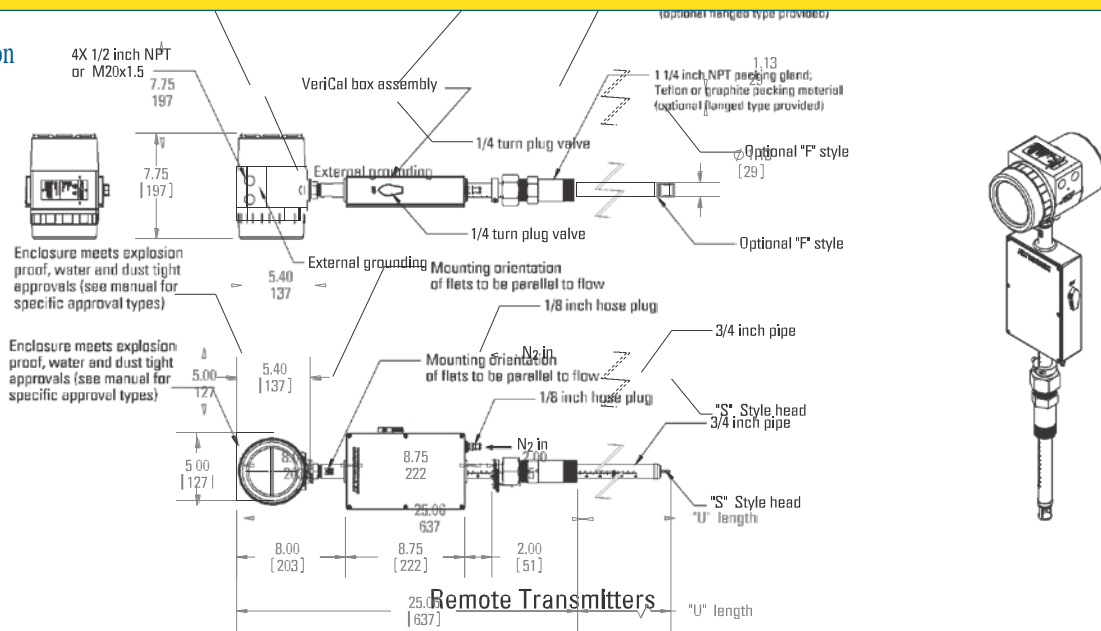
Flow Transmitter/Electronics

- ⌘ **Operating Temperature:** 0 °F to 150 °F [-18 ° to 65 °C]
 - ⌘ **Input Power**
AC: 85 Vac to 265 Vac
DC: 24 Vdc ±20%
 - ⌘ **Outputs**
Analog
Standard: Three (3) 4-20 mA*, 0-1kHz, or 0-10 kHz pulse/frequency
4-20 mA outputs are user assignable to flow rate, temperature and/or if so equipped, pressure; outputs are user programmable to full flow range or subsets of full flow range; pulse/frequency output is user selectable as pulse for external counter/flow totalizer, or as 0-1 kHz or 0-10 kHz frequency representing flow rate
* *Outputs are isolated and have fault indication per NAMUR NE43 guidelines, user selectable for high (>21.0 mA) or low (<3.6 mA)*
Optional: Standard output plus two (2) 2A SPDT relays
Relays independently user assignable to flow, temperature or pressure; user programmable for hi/lo trip, hysteresis from 00.0 to 99.9 counts and time delay from 00.0 to 99.9 seconds
 - Digital**
Standard: USB, Ethernet
Optional: HART (comes standard with analog outputs, V7 compliant) Foundation™ fieldbus H1, PROFIBUS PA or Modbus RS-485
 - ⌘ **Auxiliary Inputs**
Two 4-20 mA input channels; used for FCI administered special configurations to allow ST110 series to accept outputs from external devices such as gas analyzers, gas composition or pressure sensors
 - ⌘ **Enclosures**
Main Transmitter/Electronics:
NEMA 4X, IP67; polyester powder coated aluminum; 1 conduit port threaded as 1" NPT or M20x1.5; 5.40" x 4.82" [137.2 mm x 122 mm]
Local Enclosure (Remote Configuration):
NEMA 4X, IP67; polyester coated aluminum; 1 conduit port threaded as 1" NPT or M20x1.5; 5.40" x 4.82" [137.2 mm x 122 mm]
 - ⌘ **Data Logger**
User programmable for readings per time increment to a maximum of 1 reading/second; removable, circuit board-mountable 2GB micro-SD (secure digital) memory card supplied; stores approximately 21M readings in ASCII comma-separated format
 - ⌘ **Readout/Display and Optical Touch Buttons (Optional):**
 - Large 2" x 2" [50 mm x 50 mm] LCD; digital plus bar graph and engineering units
 - Digital displays of flow rate, total flow, temperature and pressure (with STP models); user selectable for engineering units
 - Analog bar graph of flow rate
 - Relay/alarm status indication
 - User programmable 17 alphanumeric character field associated with each calibration group
 - Set-Up & Service mode displays text and service codes
 - Backlighting – backlight activated by proximity motion detection, or user may set for always on
 - Four (4) optical touch buttons for user programming of instrument set-up and service interrogation
 - Optical touch button activation through front window – no need to open enclosure to access or activate
 - Display is electronically rotatable in 90° increments to optimize viewing angle
- Note: If readout/display not ordered, all user set-up and service interrogation must be done via computer link to bus comm and/or USB port.*
- Specifications at reference operating conditions of 70 °F, 14.7 psia [21.1 °C, 1.013 bar (a)] and straight pipe run 20d upstream, 10d downstream*
- FCI is a continuous improvement company; specifications subject to change without notice*

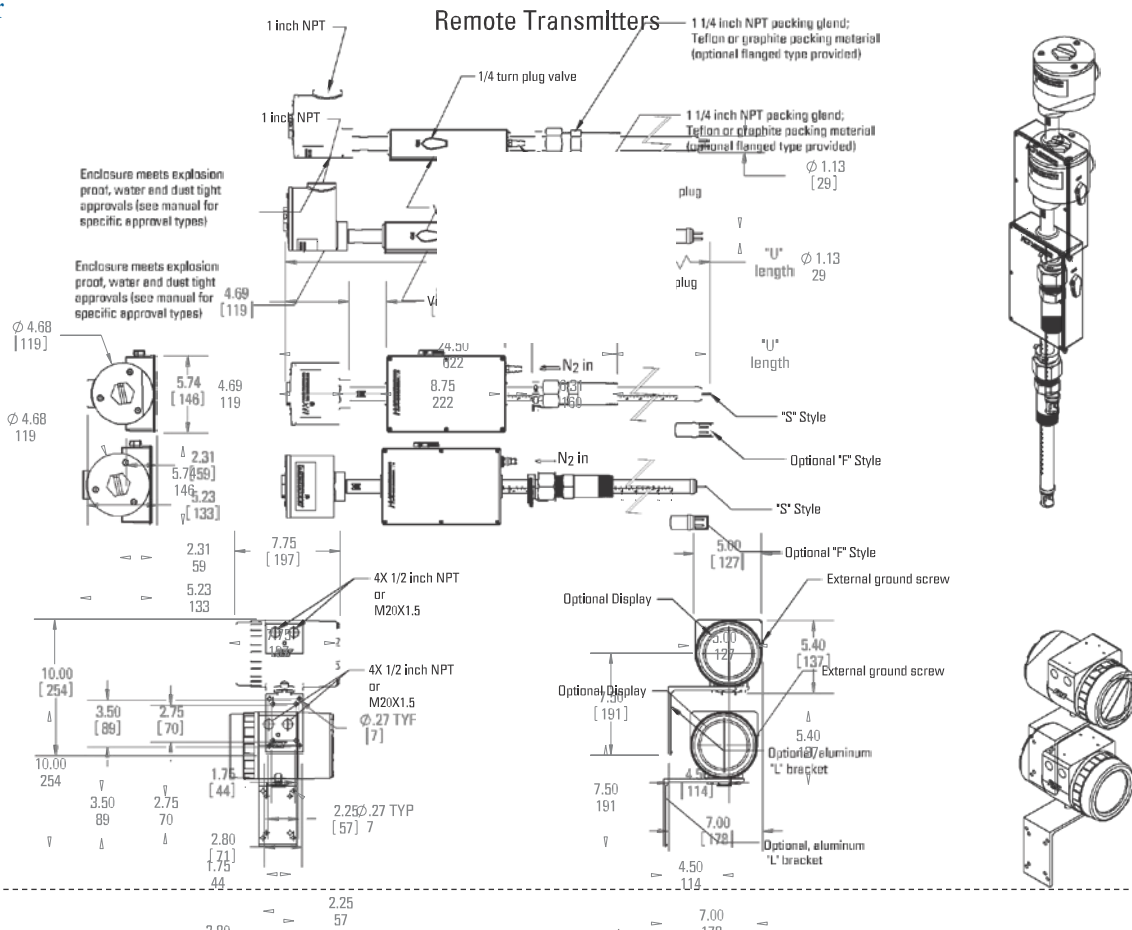
Insertion Mass Flow Meter Integral Configuration Models ST110 Single Point With Verical & ST112 Dual Point With Verical

Model ST110 Single-Point Insertion Mass Flow Meter

Integral Configuration



Remote Transmitter



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