

High Performance Multi-Point Mass Flow Meter System For Large Ducts & Stacks

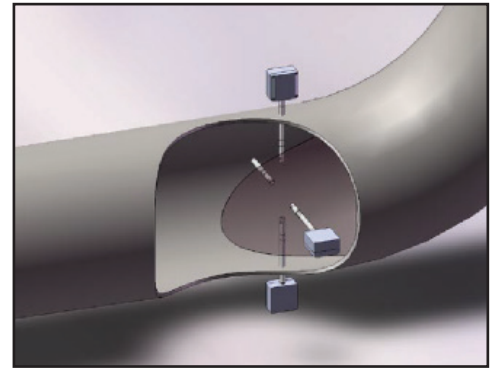
- Innovative and user-friendly HMI offers advances over industry- standard collector boxes and allows users to:
 - Average the flow of 3-4 meters (and removes meters from the average under alarm or user selected conditions)
 - Convert flow units
 - Set up the density of the gas for mass flow measurement
 - Easily configure the individual meters
 - Set up alarms
- Unique multiple transmitter approach allows individual points to be removed for service or repair without shutting down the system and allows users the ability to compensate for swirl
- Direct mass flow monitoring eliminates the need for separate temperature and pressure inputs
- Accuracy +/- 1 % of reading plus 0.5% of full scale
- Patented Dry-Sense™ technology eliminates sensor drift
- State-of-the-art calibration facility ensures a highly accurate calibration that matches the application
- High temperature option to 750 °F (400 °C) available
- Low pressure hot taps available



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Multi-Trak™ Model 670S



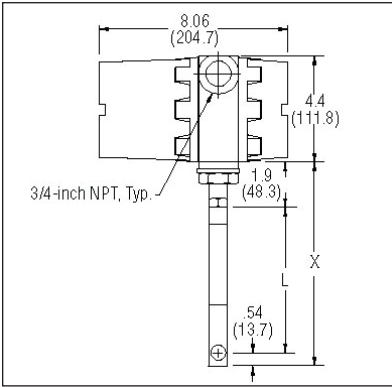
DESCRIPTION

Sierra's Multi-Trak™ Model 670S is an advanced state-of-the-art instrument for measuring mass flow rates in very large ducts or stacks that have non-uniform velocity profiles, high turn-down requirements, dirty gas streams, wide temperature ranges and fast velocity and temperature changes. The Multi-Trak™ dynamically compensates for changes in the flow profile by using up to four independent mass flow sensing points to measure the instantaneous average gas mass flow velocity. The Multi-Trak™ is commonly used in petrochemical refining, coal-fired electric power generation, steel manufacturing and many other industrial processes that face the challenge of accurate and repeatable gas mass flow measurement in very large pipes or ducts.

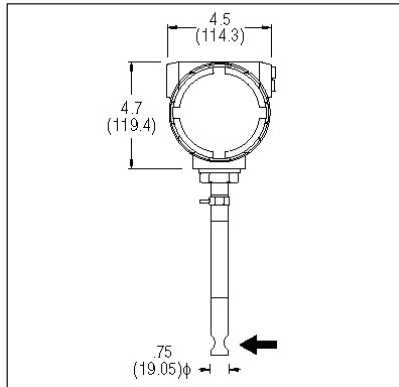
An innovative, versatile and user-friendly microprocessor-based Human Machine Interface (HMI) controls all functions of the Model 670S system. The HMI is used to collect, visualize and store flow data, as well as set up the individual sensor points, thus allowing the entire system to be easily configured in the field. The Multi-Trak™ HMI integrates the functions of flow measurement, flow-range adjustment, field validation and diagnostics, and displays mass flow rate and totalized flow, as well as other configuration variables. All of this data is easily programmable from the HMI's easy-to-use touch screen.

The Multi-Trak™ system has major advantages over other multipoint systems. Unlike single probe insertion sensors where each sensor point is on the same insertion probe, each Multi-trak™ sensor point is completely independent of the others, allowing for easy field swapout or cleaning of individual transmitters. Because of this, Multi-trak™ sensors do not have to be located on the same plane, and can be positioned to eliminate the effects of swirl.

Compression Fitting—Side View (E2)

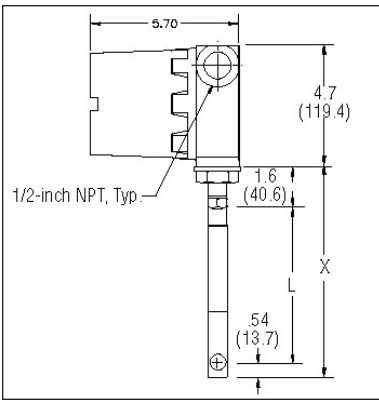


Compression Fitting—Front View (E2)

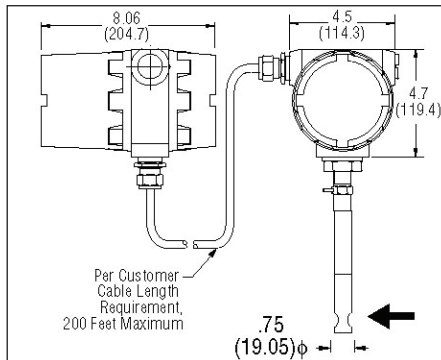


Length Chart (Compression Fittings)		
Code	L	X
L06	6.0 (152.4)	7.5 (190.5)
L09	9.0 (228.6)	10.5 (266.7)
L13	13.0 (330.2)	14.5 (368.3)
L18	18.0 (457.2)	19.5 (495.3)
L24	24.0 (609.6)	25.5 (647.7)
L36	36.0 (914.4)	37.5 (952.5)

Remote Mount Junction Box—Side View (E4)

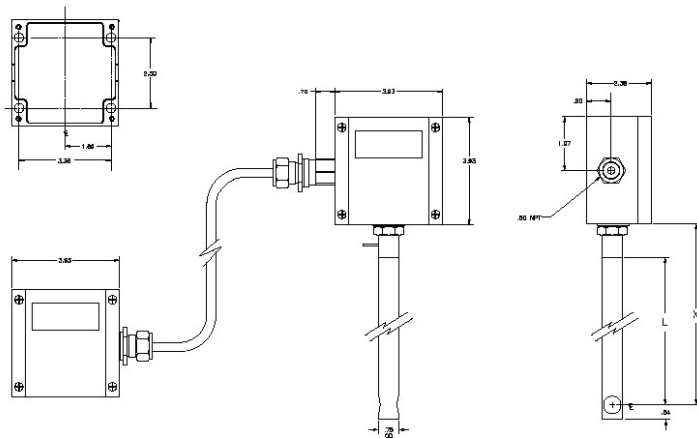


Remote Mount Junction Box—Front View (E4)

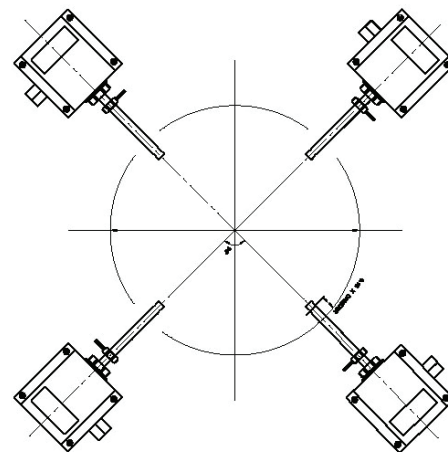


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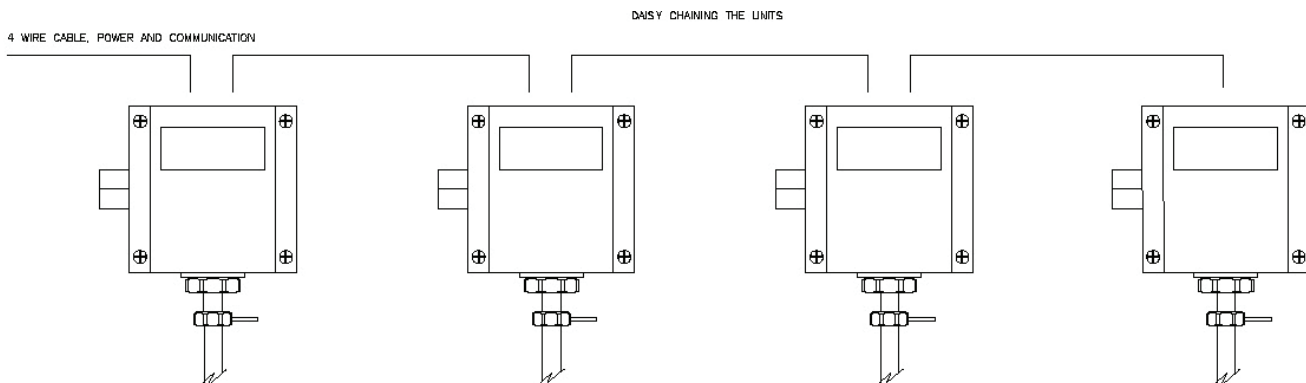
NEMA 4X Dimensional Specifications



NEMA 4X Representative Array



Representative Daisy Chaining Units



All dimensions are in inches with [mm] in brackets. Certified drawings are available on request.

PERFORMANCE SPECIFICATIONS

Accuracy of Point Velocity
 +/- 1% of reading + 0.5% of full scale

Repeatability
 +/- 0.2% of full scale

Temperature Coefficient
 +/- 0.02% of reading per °F within +/- 50° F of customer specified conditions
 +/- 0.03% of reading per °F within +/- 50° F to 100° F of customer specified conditions
 +/- 0.04% of reading per °C within +/- 25° C of customer specified conditions
 +/- 0.06% of reading per °C within +/- 25° C to 50° C of customer specified conditions

Pressure Coefficient
 .02% per psi for air, consult factory for other gases

Response Time
 One second to 63% of final velocity value

OPERATION SPECIFICATIONS

Gases
 Most gases compatible with 316 L stainless steel
 Hastalloy® available

Gas Pressure
 Gas Pressure
 Mechanical design pressure:
 Compression fittings: 500 psig (34 barg)
 1-inch 150 lb flange (-40° to 250° F): 185 psig (12.8 barg)
 Low Pressure Hot Tap: 150 psig (10 barg)
 High Pressure Hot Tap: 1000 psig (70 barg)

Pressure Drop
 Negligible for pipes three inches in diameter or larger

Gas & Ambient Temperature
 Gas -40° F to 350° F (-40° C to 177° C) Gas dependent.
 Ambient 40° F to 120° F (-40° C to 50° C)
 Optional: Up to 750° F (400° C) air only; consult factory for other gases

Leak Integrity
 5 x 10⁻⁹ cc/sec of helium maximum

Power Requirements
 18 to 30 VDC (regulated), 825 mA per point
 The HMI includes probe power supplies
 Note that only DC powered 640S meters can be used with the multipoint

Output
 Linear 4-20 mA proportional to grand-average flow signal

HMI



PHYSICAL SPECIFICATIONS

Wetted Materials
 316L stainless steel

Enclosure
 Hazardous-Area Location Enclosure (IP66) or NEMA 4X (IP65)
 Both are powder-coated cast aluminum

Electrical Connections
 Two 3/4 inch NPT: Hazardous-Area Location Enclosure (IP66)
 One 1/2 inch NPT: NEMA 4X Enclosure (IP65)

Mounting (optional)
 ANSI 1-inch 150 lb flange
 3/4-inch tube compression fitting with 1-inch male NPT
 Hot tap systems

Certifications
 CE (All enclosures)
 CSA (Explosion proof for Class I, Division 1, Groups B, C, D)
 ATEX (II 2 GD Ex d IIC T6 ... T2; IP 66 T70 °C ... T280 °C)
 FM (Explosion proof for Class I, Division 1, Groups B, C, D;
 dust-ignition proof for Class II, III, Division 1, Groups E, F, G)
 IP65, NEMA 4X T6 -40° C to 70° C ambient
 Chinese pattern approval
 GOST R/RTN (1ExdIICT6...T2)

HMI SETTINGS

Units: Set flow units of grand-average flow rate
 Density: Set gas density
 Average: Set which units contribute to the grand-average
 Output: Setup 4-20mA output for the grand-average
 Pipe ID: Set Pipe ID
 Alarm: Set low or high flow alarm for individual meters
 (will be removed from the grand-average flow rate under alarm conditions)

Advanced:
 Allows setting of K factors, User full scale and K factors for individual meters
 Gives meter setup information

HMI Equation for Grand-Average flow

$$Average = \left(\frac{X1 * Flow1 + X2 * Flow2 + X3 * Flow3 + X4 * Flow4}{4} \right) * K_{tot}$$

Where:
 X1 to X4: individual flow meter weighting factor
 (allows users to adjust the contribution of each individual meter to the grand-average flow rate)
 Flow1 to Flow4: individual point flow rate
 Xtot: Overall K-factor for grand-average flow
 Average: the grand-average flow rate

Parent

Parent Number

670S	Multi-Point System: Consists of multiple 640S probes calibrated in NMPS and Modbus communication and a electronics system that communicates with the 640S probes, converts the signals to any desired units (Mass flow) and averages the flow measured by the 640S probes. Load factors can be adjusted in the electronics. The standard system is designed for 4 x 640S probes, but consult factory for more or less points.
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