FLOW MEASUREMENT FOR LIQUIDS & GASES

Industrial & Environmental Applications

PROVIDING FEATURES THAT OFFER VALUE ADDED BENEFITS

KEY FEATURES	BENEFITS FOR THE END USER
■ Totally unobstructed flow path using in-line style sensor	■ Unimpeded flow with negligible pressure drop & no clogging concerns
■ Accurate & repeatable over entire calibrated flow range	■ Allows for consistent control of any process for maximized throughput
■ No field configuration or calibration required	■ Offers true “plug & play” installation with operation in minutes
■ Designed for years of reliable uninterruptible operation	■ Low cost of ownership with no downtime costs
■ Single piece machined insertion probe	■ Facilitates easy & quick installation in a robust design
■ Single instrument design with mass flow measurement	■ Cost savings due to no additional instruments of temperature or pressure

Thermal Instrument COMPANY

THERMAL MASS FLOW TECHNOLOGY

There are two RTD sensors: one is self-heated and the other one measures the media temperature. The pair comprise the sensing section and mount either in an insertion probe or an in-line flow design. When any thermally conductive liquid or gas media flows past the heated RTD the molecules of that media carry heat away from the surface, and the sensor cools down as it dissipates energy. The driving circuit of that heated sensor replenishes the lost energy by heating it until it is a constant temperature difference above the second RTD sensor. The electrical current required to maintain this constant temperature differential is directly proportional to the mass flow rate.

PLUG & PLAY TRANSMITTER DESIGNS

- Direct Measurement of Mass Flow on Liquids & Gases
- Flow Transmitter or Switch design
- Various Signal Outputs for Rate & Totalizer
- HART Communications
- Highly Visible LED Readout

INSERTION PROBE DESIGNS

- Various Mounting Connections
- Single Piece & Twin Tip Probe
- Unique Sensing Array with Dual Redundancy
- Wide Dynamic Turn Down Ratio 100:1+
- Low Flow Sensitivity for Leak Detection

IN-LINE FLOW STYLE SENSORS

- Completely Unobstructed Flow Path
- Various Tube & Pipe Finishes
- Multiple Connections (ANSI Flange, VCO, VCR)
- Sanitary & Ultra High Pure Styles

SOME OF THE MANY LIQUIDS & GASES

- Diesel Fuel
- Liquid Nitrogen
- Chilled Water
- Solvents / Acids
- Liquid Ammonia
- Methane
- C2—C6 Hydrocarbons
- Helium
- Argon
- Natural Gas

VERSATILE, ROBUST DESIGNS PROVIDE PROVEN LONG LASTING PERFORMANCE

SPOTLIGHT APPLICATIONS

- Flare Gas at Well Sites
- Green House Gas Emissions Monitoring
- Landfill Gas for Compliance & for Carbon Credits
- Industrial Pure Gases
- Natural Gas for Boilers
- Compressed Air Monitoring & Leak Detection
- Aeration Control
- Digester Gas
- Hydrogen Lines
- Sub-Metering within Universities, Hospitals, & Industrial Complexes
- Chilled Water & Ultra High Purity Water
- Air in Large Ductwork
- Low Flow for Liquids
- Nitrogen Blanket control
- Air Flow to Heat Treatingfurnaces

KEY PRODUCT FEATURES

- Liquids, Slurries, Air, & Gases
- Wide Dynamic Flow Ranges for Greater Applicability
- Excellent Low Flow Sensitivity for Leak Detection Applications
- Various Mounting Connections & Surface Finishes
- Probe & In-Line Flow Sensors
- No Moving Parts to Wear Out or Maintain/Replace
- Dual Redundancy Sensors
- Rugged Single Piece Insertion or Twin Tip Sensitive Probe Designs

GENERAL PRODUCT SPECIFICATIONS

TRANSMITTER (9500P)

Display: 2-Line, 8 Digit Highly Visible LED for Flow Rate & Totalized Flow

Outputs: One or Two 4-20 mADC (flow rate/ temperature); Isolated Pulse output 0-12 Vdc at 20 mS on time (1 pulse per unit of flow) for totalizer; Relays (5 Amp dry contact)

Accuracy: + 0.5% of Full Scale, or 2% of reading

Repeatability: + 0.2% of Actual Rate

Serial Communications: HART Protocol and RS485 Modbus

Input Power: 85-245 VAC, 50/60 Hz, 24 VDC (1 Amp)

Enclosure: Cast Aluminum, Epoxy Painted NEMA 4X/7/9 Explosion Proof with optional window (Class I, II, III, Division 1 & 2, Groups B, C, & D)

Temperature: -40F to +158F (-40C to +70C)

Location: Integral or Remote (up to 4000 feet with 18 gauge, 2-pair shielded)

Electrical Conduit: Two - 3/4" FNPT for power & output signal

Configurability: Factory Programmed (Locally via Menu Driven 3- Button style or via laptop with software)

IN-LINE STYLE FLOW SENSOR

Flow Rate Capabilities*: Gases - 0.01 to 2000 SCFM; Liquids - 0.00002 to 400 GPM

**Note: Flow range capability dependent upon tube/pipe size and the flowing media*

Design Pressure Extremes*: up to 10,000 PSIG **Note: Line size dependent*

Design Temperature Extremes*:
-40F to 350F (-40C to 177C) Std.
-40F to 800F (-40C to 427C)
**Note: Calibration Temperature Capability is –200F to 800F (-129C to 427C) - Application Dependent*

Response Time: Gases - 1 to 2 seconds, Liquids - 0.5 seconds

Viscosity: up to 5000 Centipoise (cps)

Wetted Parts*: 316SS, Hastelloy C, Monel, Titanium, Tantalum, Alloy 20, Teflon Coated **Note: Can also offer polished finishes*

Process Connections: Threaded NPT, Flanged, Victaulic, Sanitary, Welded, and more

INSERTION PROBE SENSOR

Flow Rate Capabilities*: Gases - 0.3 to 500,000+ SCFM (1-1/2" up to 72" pipe sizes), Liquids - 0.33 to 190,000 GPM (1-1/2" up to 72" pipe sizes) **Note: Flow range capability dependent upon tube/pipe size and media*

Design Pressure Extremes*: up to 10,000 PSIG, **Note: Line size dependent*

Design Temperature Extremes: Gases & Liquids - -40F to 350F (-40C to 177C) Std., - 40F to 500F (-40C to 260C) Opt., **Note: Calibration Temperature Capability is –200F to 800F (-129C to 427C) - Application Dependent*

Response Time: Gases - 1 to 2 seconds, Liquids - 0.5 seconds

Viscosity: up to 5000 Centipoise (cps)

Wetted Parts*: 316SS, Hastelloy C, Monel, Titanium, Tantalum, Alloy 20, Teflon Coated **Note: Can also offer polished finishes*

Process Connections: Threaded NPT, Flanged, Welded, Packing gland, Tri-Clover, High Pressure Retractor, and more

ONE HALF-CENTURY+ OF PROVEN FLOW SOLUTIONS

Thermal Instrument Company has been providing reliable thermal mass flow meters for liquids and gases for more than 50 years to the industrial & environmental markets. As a small company, we have the flexibility & versatility of offering standard flow solutions or custom engineered designs. Whether your application requires a flow solution for process control, flow monitoring for regulatory emissions reporting, or indication of flow status, our flow meters will perform reliably and provide years of accurate service. And all aspects of our designs are "Made in the USA".

FACTORY OR FIELD CALIBRATIONS TO NIST TRACEABLE STANDARDS

- Multiple NIST Traceable Calibration Stands (Liquids, Gases, and Air)
- Convenient Flow Meter Loaner Program
- Official Calibration Certificate Provided
- In-House Factory Re-calibration Services
- Professional Field Services Available

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