



# SAGE "BASIC™" ECONOMICAL THERMAL MASS FLOW METERS FOR COMPRESSED AIR AND OTHER GAS FLOW APPLICATIONS

## SAGE "BASIC" COMPRESSED AIR FLOW MONITORING

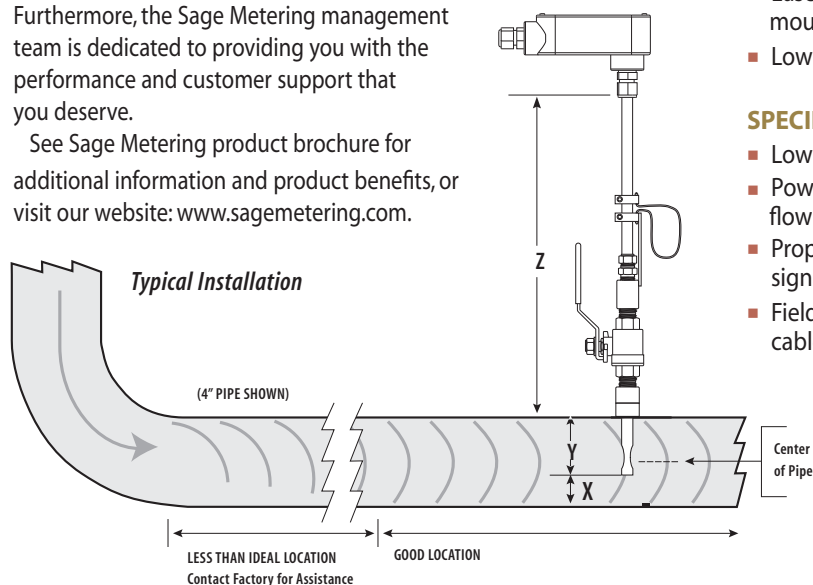
Compressed air generally uses more electricity than any other type of equipment. Sage Basic Insertion Style Thermal Mass Flow Meters can help identify leaks in a compressor system, track overall usage to improve plant efficiency, and help departments reduce consumption. Thousands of dollars can be saved; for example, if a compressor system running at 100 psi had leaks as small as .05 square inches, it would pass 100 CFM of unused compressed air. Based on 24 hours and 12 cents a KW/H, the annual wasted power would exceed \$20,000!

Sage Insertion Meters measure direct mass flow and have the sensitivity to detect even a few SCFM out of a thousand SCFM, so detecting leaks is an easy matter. The ease of installation and low cost, allow many check points in your compressed air piping. Simply insert the probe into the installed mounting hardware, such as a Sage Isolation Valve Assembly, to the recommended insertion depth. It has a 4-20mA output of Mass Flow Rate as well as a Pulsed Output of Totalized Flow. For additional information, contact Sage Metering at 866-677-7243 to assist you with your application.

## OTHER "BASIC" THERMAL MASS FLOW METER APPLICATIONS

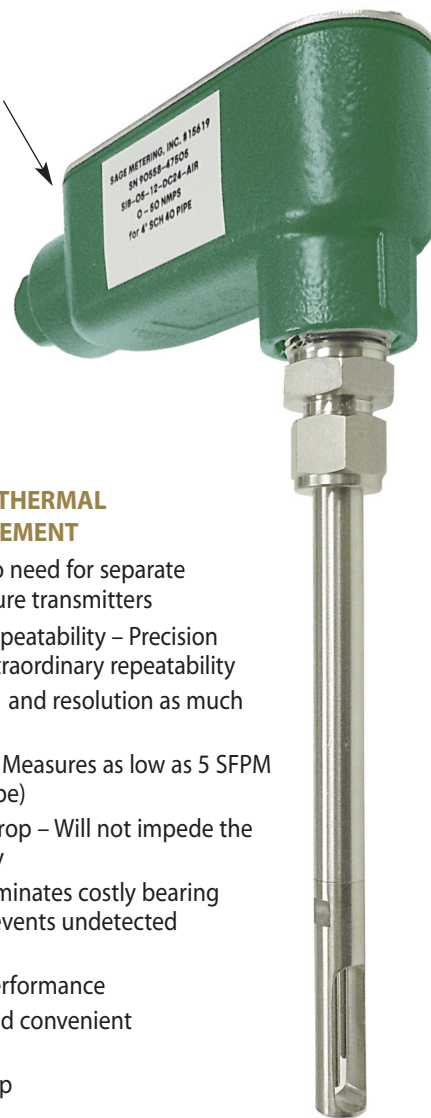
In addition to compressed air flow, other common Thermal Mass Flow applications in your manufacturing process include air injection, air purging, blow molding air, blower air, drying air flow, combustion air flow and vent air flow. Additional applications include natural gas boiler or furnace flow, natural gas for combustion control; and natural gas sub-metering for departmental billing, cost accounting, or monitoring production efficiencies. Many of these applications will help comply with environmental regulations, increase productivity, as well as reduce energy costs. Sage has over 10 years of experience in delivering high performance, NIST traceable, In-Line and Insertion Thermal Mass Flow Meters for a wide variety of industrial and environmental needs. Furthermore, the Sage Metering management team is dedicated to providing you with the performance and customer support that you deserve.

See Sage Metering product brochure for additional information and product benefits, or visit our website: [www.sagemetering.com](http://www.sagemetering.com).



NEMA Enclosure provides 4-20mA output of Mass Flow Rate and Pulsed Output of Totalized Flow

Rugged Reference Grade Platinum RTDs provide sustained performance and reproducibility



## MAJOR BENEFITS OF THERMAL MASS FLOW MEASUREMENT

- Direct Mass Flow – No need for separate temperature or pressure transmitters
- High Accuracy and Repeatability – Precision measurement and extraordinary repeatability
- Rangeable over 100: 1 and resolution as much as 1000 to 1
- Low-End Sensitivity – Measures as low as 5 SFPM (e.g. 1 SCFM in a 6" pipe)
- Negligible Pressure Drop – Will not impede the flow nor waste energy
- No Moving Parts – Eliminates costly bearing replacements and prevents undetected accuracy shifts
- Provides sustained performance
- Ease of Installation and convenient mounting hardware
- Low cost-of-ownership

## SPECIFIC BENEFITS OF SAGE THERMAL MASS FLOW METERS

- Low power dissipation, under 2.5 Watts (e.g. under 100 mA at 24 VDC)
- Powerful state-of-the-art microprocessor for high performance mass flow measurement and sustained performance
- Proprietary hybrid-digital sensor drive circuit provides enhanced signal stability and reproducibility
- Field reconfigurability via optional Addresser software and cable assembly



See Sage Metering Product Brochure for additional information and product benefits, or visit us at [www.sagemetering.com](http://www.sagemetering.com)

# SAGE "BASIC" STYLES AND SPECIFICATIONS

Sage Metering is your source for monitoring, measuring and controlling the gas mass flow in your industrial process, building management system or environmental application. Our high performance, NIST Traceable, Thermal Mass Flow Meters will help increase productivity, reduce energy costs, maximize product yields, and/or help reduce environmental insult. Sage provides high quality In-Line and Insertion Thermal Mass Flow Meters for a wide variety of industrial, commercial, and environmental monitoring needs.

Our experienced application engineers, many of whom have worked in the Thermal Mass Flow marketplace since its inception, will assist you with your flow meter application. Additionally, our Service staff stands ready to support you with any after-sale assistance that you may require.

## SAGE "BASIC" SIB SERIES SPECIFICATIONS

**STYLES:** In-Line or Insertion Integral

**INSERTION STYLE:** 1/2" SS Probe; Lengths 6" to 30". Minimum pipe size: 1"

**IN-LINE STYLE:** Flowbodies available from 1/4" to 4", with Flow Conditioners (1/2" or larger)

**SENSOR:** Two reference grade Platinum RTDs clad in 316SS sheath

**MATERIAL:** Wetted metal components: 316SS

**POWER:** 24VDC (100 mA max)

**POWER DISSIPATION:** <2.5 W

**ELECTRONICS:** Microprocessor based (Hybrid-Digital)

**ELECTRONICS ENCLOSURE:** NEMA 3R (Rainproof)

**TURNDOWN:** 100 to 1

**RESOLUTION:** 1000 to 1

**LOW END SENSITIVITY:** 5 SFPM

**FLOW ACCURACY:** +/- 0.5% of Full Scale +/- 1% of Reading

**FLOW REPEATABILITY:** 0.2%

**FLOW RESPONSE TIME:** 1 second time constant

**GAS TEMPERATURE RANGE:** -40° to 200°F

**GAS PRESSURE:** 500 PSIG

**FLOW OUTPUT:** 4 to 20 mA for Rate (Switchable between Internally or Externally Powered)

**TOTALIZER:** 24VDC Pulse for Totalized Value

**AMBIENT TEMPERATURE:** -40° to 150°F

**RECONFIGURABILITY AND/OR IN-SITU CALIBRATION CHECK:** See "OPTIONS"

## PRINCIPLE OF OPERATION OF THE THERMAL MASS FLOW METER

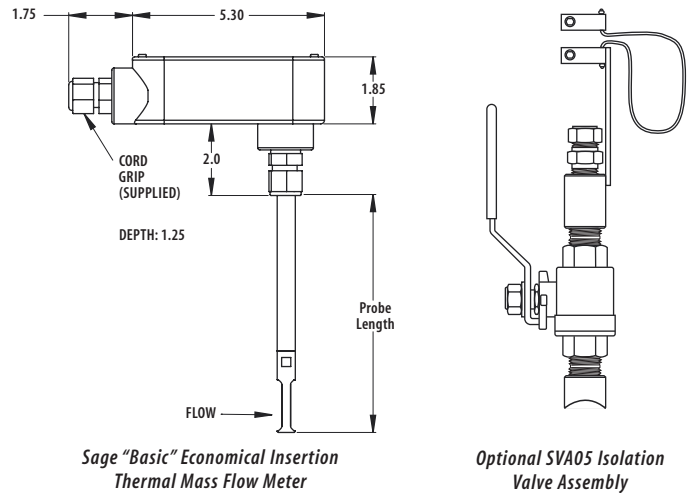
Sage Thermal Mass Flow Meters have two sensors featuring reference grade platinum windings (RTDs). The two RTDs are clad in a protective 316SS sheath and are driven by a proprietary sensor drive circuit. One of the sensors is self-heated (flow sensor), and the other sensor (temperature/reference sensor) measures the gas temperature. The pair is referred to as the sensing element, and is either installed in a probe as an Insertion style, or inserted into a pipe section as an In-Line style flow meter.

As gas flows by the flow sensor, the gas molecules carry heat away from the surface, and the sensor cools down as it loses energy. The sensor drive circuit replenishes the lost energy by heating the flow sensor until it is a constant temperature differential above the reference sensor. The electrical power required to maintain a constant temperature differential is directly proportional to the gas mass flow rate and is linearized to be the output signal of the meter.

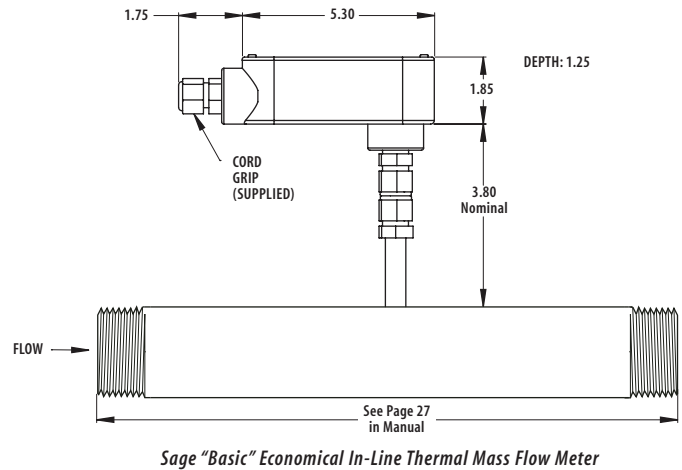
## OPTIONS

- Sage Basic Software and Cable Assembly (specify BASICCOM for Reconfigurability or Calibration Check)
- Flanged Ends for In-Line Flow Meters. Contact Sage
- Captive Flow Conditioners for Insertion Flow Meters. Contact Sage

## SIB SERIES - INSERTION



## SIB SERIES - IN-LINE



- 1 Enhanced accuracy available upon request, especially if turndown limited. Contact Sage
- 2 The 4-20mA Output is initially set up to be non-isolated (internally powered). If you require isolated outputs (externally powered), slide the selector switch and follow wiring instructions in manual.

## IMPORTANCE OF FLOW CONDITIONING Recommended Pipe Diameters Upstream

DISTURBANCE	WITHOUT FLOW CONDITIONING	WITH FLOW CONDITIONING*
	Minimum Industry Recommendation	Sage Recommendation
One 90° Elbow	15	3
Two 90° Elbows in the same plane	20	5
Two 90° Elbows in different planes	At least 40	9
4:1 Area Reduction	15	3
4:1 Area Expansion	At least 30	10
Multiple Disturbance	To Be Determined	To Be Determined

\* This column applies to In-Line Flow Meters, which come standard with built-in Flow Conditioners, as well as Insertion Meters, when provided with upstream Captive Flow Conditioners.