

QUALITY

SAGE THERMAL MASS FLOW METERS

Sage Thermal Mass Flow Meters are designed for high performance mass flow measurement of flow rate and consumption of gases such as air, oxygen, natural gas, nitrogen, digester gas, bio gas, flare gas, hydrogen, argon, carbon dioxide and other gases and gas mixes. They are field rangeable and have a convenient user interface.

FEATURES AND BENEFITS

The innovative Sage design features an easy-to-use menuing system, a large format mass flow, total and temperature display, and easy-to-use, Touch Display Screen, 4-button keypad to integrate the functions of flow measurement with your specific needs. You will have the flexibility to use the local display/keypad, or a laptop, to change configurations or to conduct basic diagnostics, including a calibration self-check, with the Sage navigational software (Sage VIP). At any time you can use the convenient menuing system to change full scale values, digitally filter the flow signal, change decimal points, set zero cutoffs, check diagnostics, or reconfigure an insertion meter for a different pipe size.

In addition, you can order your meter configured for up to four different gas calibrations, and simply select the desired channel (A-D) at any time (e.g. four different gases, sensitivities, or configurations). Or you can order the meter calibrated for one gas (e.g. compressed air), but have it pre-configured for up to four different pipe sizes and full scales, so you can simply select the desired channel (A-D) based on the application. Channels are totally independent and each have their own full scale accuracy statement and settings.

There are numerous other features built in to most Sage Flow Meters. For example, continuous tracking of the highest and lowest mass flow rate with built in time and date stamps. This is a very practical feature for determining unusual peaks in a gas process, or for identifying excess usage by certain departments. Sage

meters provide the average flow rate for the prior hour at any time. If you require relay outputs, Sage offers the option of two independent, 1 amp SPDT relays on the SIG and SRG Series that can be configured by laptop or keypad for a variety of settings (one relay is standard on the SIE or SRE Series), including trip-high, trip-low (with or without delays), window alarms, pulsed outputs, timer outputs, etc.

The Series SRG includes a more robust latched 9.3"x7.3" Fiberglass Windowed Remote Enclosure that can be mounted 1000 feet away from the sensor's measurement point. The 6-conductor cable separating the sensor probe (or flow body) from the electronics is lead-length compensated, allowing the user to change wire length without affecting the meter's accuracy or performance. In addition, the probe has an Explosion Proof Junction Box that does not require any electronics (all the electronics, as well as the meter display and menuing Touch Display Screen keypad, are in the Remote Enclosure). Thus, this easy-to-wire Junction Box is suitable for harsh environments (see photo on page 2).

Sage also offers an OEM version of our proven, high performance gas mass flow meter product line (Series SIL or SRL). "Sage Lite" has many features of the standard product line, but does not have a display, does not have a menuing keypad, does not support multiple channels, and does not support relay outputs. However it has linear outputs of flow rate and temperature, and is configurable to have one output that provides pulsed outputs of totalized

flow. It is offered in a 5x5x4 NEMA 4X enclosure, or Explosion Proof Enclosure, or as a single circuit board for customized end-user packaging.

If there are any features that you require, or if you need application assistance, feel free to contact our local factory trained representative in your area. Visit us online at www.sagemetering.com, or telephone someone in the Sage Sales or Service Staff for assistance at (866-677-7243).



SIG Series Integral General Purpose Mass Flow Meter (In-Line Style shown).



PRINCIPLE OF OPERATION OF THE THERMAL MASS FLOW METER

Sage Thermal Mass Flow Meters have two sensors constructed of 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 sensor is self-heated (flow sensor), and the other (temperature/reference sensor) measures 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.

It is essential that this constant temperature differential be maintained, even if there are wide fluctuations in gas temperature. It is the "job" of the Sage proprietary sensor drive circuit to maintain the differential, whether or not the gas temperature changes, or however quickly molecules cool off the flow sensor. It is also necessary to properly calibrate the device with the actual gas (or close equivalent with certain gases), in the Sage National Institute of Standards certified (NIST) calibration facility. By accomplishing these two critical objectives, the Sage meters provide an extremely repeatable (0.2% of full scale) and accurate output directly proportional to the mass flow rate of the gas being measured.