

# SPECIFICATIONS

## GENERAL SPECIFICATIONS FOR SAGE MASS FLOW METERS

### GENERAL

- **Function:** Microprocessor-based Insertion or In-Line Mass Flow Meters for gases
- **Flow Element:** Constant Temperature Thermal Mass Flow Element consists of two 316 SS clad platinum-wound RTDs
- **Flow Rate Output Signal<sup>7</sup>:** 4-20mA isolated linear flow signal on all products. Pulsed outputs optional<sup>8</sup>
- **Temperature Output Signal<sup>7</sup>:** 4-20mA isolated linear temperature signal from 40°F to 200°F (-40°F to 750°F optional) is second output on SIG & SRG Series; menu selectable in lieu of flow outputs on SIE & SRE Series. A second temperature output is also available on the SIL and SRL Series, but it is 0-5VDC linear instead of 4-20mA
- **Pulsed Outputs<sup>9</sup>:** Pulsed Outputs of Totalized Flow is software configurable on the SIL and SRL Series; Configurable off of the SIE and SRE Series Relay; and Configurable with optional Relays on the SIG and SRG Series
- **Relays:** Two 1-amp relay channels (each SPDT) optionally available on SIG & SRG Series. One 1-amp relay is standard on SIE & SRE Series. Menu configurable (see description under Sage Thermal Mass Flow Meters on page 3).
- **Communication:** RS232. (Ethernet pending)
- **Sensor Drive Circuit:** Proprietary Sensor Drive Circuit provides enhanced flow signal stability and insensitivity to process temperature changes
- **Display:** 2-line LCD back-lit Flow Rate (top line), Total and Temperature (bottom line) is standard on all Mass Flow Meters (except for SIL and SRL Series which have no displays)
- **Menu Navigation:** 4-Button Touch Display Screen<sup>8</sup> Keypad (except SIL & SRL) and RS232 with navigational software (Sage VIP) standard (software optional on SIL & SRL). With Touch Display Screen technology, the cover does not need to be opened to access Menuing System.
- **Multiple Channel Capability:** Up to four totally independent calibrations available on all products except SIL & SRL. Calibrate for four different gases, different sensitivities, and/or different configurations (Channels A-D). Channels can be keypad, laptop or externally selectable (via contact closures).
- **Power:** 24VDC (250 ma with back light off, 350mA max with back light on), 115VAC or 230VAC (Switchable) on SIG & SRG Series. 250mA max on SIE, SRE, SIL or SRL Series

### FLOW RANGE / SIZES

- **Units of Measurement:** Flow—SCFM, SCFH, SCCM, NCMH, NCMH, KG/S, KG/M, KG/H, KG/D, LBS/S, LBS/M, LBS/H,

LBS/D, SLPM, SLPH; **Velocity**—SFPM, SFPS, NMPM, NMPS, NMPH (other combinations available); **Temperature**—°C and °F

- **Insertion Meters:** Full Scale up to 35,000 SFPM (i.e., up to 12,000 SCFM in an 8" Sch. 40 Pipe). Higher velocities optionally available. Resolve as low as 10 SFPM. Standard probe is 1/2" diameter, with optional 3/4". Standard lengths are 6", 12", 15", 18" or 24" and optional up to 48"
- **In-Line Meters:** Full Scale up to 3150 SCFM (4" Flow Meter). Resolve as low as .003 SCFM (1/4" Flow Meter). Male NPT fittings standard. 150# and 300# flanged ends optional. (See chart below)

### PERFORMANCE

- **Standard Flow Accuracy<sup>6</sup>:** +/- 1% of Reading +0.5% of Full Scale over 100:1 turndown. (Contact Sage for special accuracy)
- **Repeatability:** 0.2% of Full Scale
- **Turndown:** 100:1 of Full Scale minimum (1000:1 with multiple channels)
- **Calibration:** Sage Metering's National Institute of Standards Traceable (NIST) calibration facility
- **Gas Temperature<sup>11</sup>:** Std.: -40°F to 200°F (-40°C to 93°C); HT01: 200°F to 300°F (93°C to 149°C); HT02: 300°F to 450°F (149°C to 232°C); HT03: 450°F to 750°F (232°C to 399°C)
- **Integral or Remote Enclosure Temperature:** 0° to 150°F (-18°C to 65°C). Contact Sage for lower temperature ranges.
- Note:** Remote Enclosure can be mounted up to 1000 feet away from sensor and its Junction Box in order to be located in a suitable temperature environment
- **Junction Box Temperature:** Suitable for harsh environments — contains no electronics
- **Pressure Rating:** 500 psig (1000 psig optional)
- **Response Time:** 1 second (each time constant) for flow change
- **Subsystem Interface:** Full duplex digital using SLIP protocol

### ENCLOSURES

Integral General Purpose, Integral Explosion Proof, Remote General Purpose, and Remote Explosion Proof. Remote styles do not require electronics at sensor Junction Box and can be located up to 1000 feet away from the sensor. (See dimensional drawings on page 5 for classifications.)

### DISPLAY / KEYPAD

General Purpose SIG & SRG Transmitter have large format 2 x 16 LCD back-lit display with large format 4-Button Keypad. Explosion Proof SIE & SRE Transmitter has 2 x 16 small format back-lit display with standard 4-Button Keypad. (SIL & SRL transmitter

are blind.) Keypad uses Touch Display Screen Technology on General Purpose Meters (SIG & SRG) and can be activated without removing cover.

### WETTED PARTS

316L Stainless Steel for Flow Bodies, Sensor Flow Elements and Flow Conditioners. Hastelloy (recommended for Chlorine Gas) and other materials optional.

### FLOW CONDITIONING

All In-Line Flow Meters 1/2 inch and above include built-in flow conditioning.

### AGENCY APPROVALS

CSA. Contact Sage or visit our website ([www.sagemetering.com](http://www.sagemetering.com)) for details. (UL and ATEX pending.)

### ETHERNET COMPATIBILITY

Pending. Contact Sage or visit our website ([www.sagemetering.com](http://www.sagemetering.com)) for details.

### LIMITED WARRANTY

Sage Metering's Series of Thermal Mass Flow Meters are warranted against faulty materials or workmanship for one year from the date of delivery to the buyer. After issuance of a Return Meter Authorization (RMA) by Sage, and upon receipt of the defective meter, Sage will either repair or replace the defective meter at its sole option and at no cost to the purchaser.

### PLEASE NOTE

Performance specifications are effective with date of issue and are subject to change without prior notice. The metering devices and other equipment pictured in this brochure are for identification and illustration purposes only. The appearance and dimensions of the actual products may differ slightly from those shown but will perform as represented. Sage Metering, Inc. reserves the right, at any time, to make such modifications and changes to the products shown herein as it deems appropriate, without prior notice to the customer.

Pipe Size x Flow Body Length <sup>1</sup> or Flange (Face-to-Face)	Model <sup>2</sup>	Minimum Resolution <sup>10</sup> (Standard Cubic Feet per Minute <sup>5</sup> )	Typical FS <sup>3</sup> (Standard Cubic Feet per Minute <sup>5</sup> )	Max FS <sup>4</sup> (Standard Cubic Feet per Minute <sup>5</sup> )
1/4" x 6"	S( __ )-025	0.003	3	8
3/8" x 6"	S( __ )-030	0.006	6	15
1/2" x 7"	S( __ )-050	0.013	13	30
3/4" x 7"	S( __ )-075	0.06	60	140
1" x 8"	S( __ )-100	0.09	90	200
1-1/4" x 10"	S( __ )-125	0.15	150	300
1-1/2" x 12"	S( __ )-150	0.20	200	470
2" x 12"	S( __ )-200	0.35	350	820
2-1/2" x 12"	S( __ )-250	0.50	500	1000
3" x 12"	S( __ )-300	0.75	750	1750
4" x 12"	S( __ )-400	1.35	1350	3150

- 1 Flow Conditioning Built in to Flow Meter Pipe Sizes 1/2" and up. Contact Sage for optional 1/4" tube flow body
- 2 ( \_\_ ) determined by Meter style and enclosure (i.e., SRG: Remote Style, General Purpose Enclosure)
- 3 Full Scale (FS) can be specified as low as 1/10 of typical full scale to retain 100:1 turn down. For example, a 3/4" Meter can be specified as high as 0-140 SCFM, or as low as 0-6 SCFM, or anything in between (i.e., 0-40 SCFM)
- 4 Max Full Scale available for many gases, such as pressurized Air or Nitrogen. Some gases such as Hydrogen may be limited to the Typical FS value. Calibrations above 500 SCFM may be extrapolated.
- 5 1 SCFM=1.7 NCMH. Sage standard conditions for calibration are 70°F and 29.92" Hg.

- 6 At zero or low flow, meter(s) may experience a slight pressure sensitivity
- 7 The SIL & SRL Series has two outputs, a 4-20mA and a 0-5VDC signal. They each can be configured for either flow or temperature
- 8 Touch Display Screen not available on SIE or SRE Series
- 9 The SIL and SRL Series pulses drive loads not to exceed 20 ma (e.g., TTL logic, opto-isolators and low power relays), however, the pulsed outputs on the SIE, SRE, SIG and SRG Series drive 1 amp Relays. See RELAYS
- 10 Minimum Resolution based on 15 SFPM, but can be resolved as low as 5 SFPM
- 11 HT01, HT02, and HT03 options apply to Remote Insertion Meters only