



SAGE RIO (SIX Series) INDUSTRIAL THERMAL MASS FLOW METER FOR GASES ATEX ZONE 1 APPROVED

SAGE RIO THERMAL MASS FLOW METER FOR GASES

The Sage Rio Thermal Mass Flow Meter provides the same levels of performance found in the popular Sage Prime with the added ATEX Zone 1 Flameproof approvals. The Rio features a bright, high contrast, photo-emissive OLED (Organic LED) display of Flow Rate, Total and Temperature in an explosion proof, dual-sided NEMA 4X enclosure. The Flow Rate is also displayed graphically in a horizontal bar graph format. The rear compartment is completely separated from the electronics, and has large, easy-to-access, well marked terminals, for ease of customer wiring. It is powered by 24 VDC (115/230 VAC optional). The power dissipation is under 2.5 watts (e.g. under 100 mA at 24 VDC).

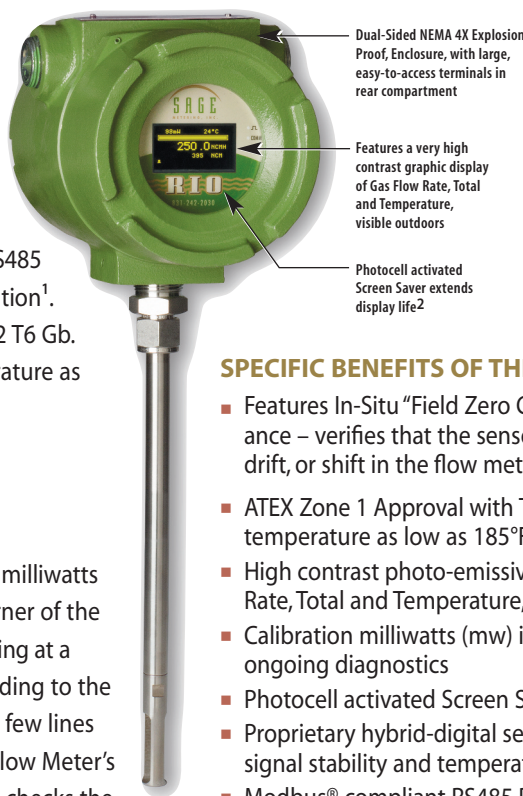
Standard outputs include 4–20mA, pulsed outputs of totalized flow and full Modbus compliant RS485 RTU communications or optional HART communication¹.

Sage Rio is Zone 1 approved: Ex II 2G Ex d IIB+H2 T6 Gb. T6 Rating is suitable for gases with ignition temperature as low as 185°F (85°C).

CONTINUOUS DIAGNOSTICS & FIELD CONFIGURABILITY

Rio has continuous diagnostics. The raw calibration milliwatts (mw) is always displayed in the upper left hand corner of the meter's display. At any time, you can check this reading at a "No Flow" (0 SCFM) condition, and compare the reading to the original reported "No Flow" value noted on the last few lines of your meter's Certificate of Conformance or the Flow Meter's data tag. This in-situ diagnostic procedure not only checks the sensor performance and the "Live Zero" calibration point, but it also verifies that the sensor is clean. It essentially provides a means to validate that the meter is operating properly, verifies that there is no shift or drift, and eliminates the need for annual factory calibrations. This simple field diagnostic procedure, in addition, verifies that the sensor is free from contamination, even without inspection.

Although Sage Rio is fully configured upon shipment for the pipe and process conditions requested, if changes are needed, Addresser software is optionally available.



MAJOR BENEFITS OF THERMAL MASS FLOW METERS

- Direct Mass Flow – No need for separate temperature or pressure transmitters
- High Accuracy and Repeatability – Precision measurement and extraordinary repeatability
- Turndown of 100 to 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 or waste energy
- No Moving Parts – Eliminates costly bearing replacements, and prevents undetected accuracy shifts
- Dirt Insensitive – Provides sustained performance
- Ease of installation and convenient mounting hardware

SPECIFIC BENEFITS OF THE SAGE RIO

- Features In-Situ "Field Zero Calibration Check" of sensor's performance – verifies that the sensor is clean, and assures that there is no drift, or shift in the flow meter
- ATEX Zone 1 Approval with T6 Rating suitable for gases with ignition temperature as low as 185°F (85°C). Also UL, CSA and CE approved
- High contrast photo-emissive OLED display with numerical Flow Rate, Total and Temperature, as well as Graphical Flow Indicator
- Calibration milliwatts (mw) is continuously displayed, providing for ongoing diagnostics
- Photocell activated Screen Saver to extend display life²
- Proprietary hybrid-digital sensor drive circuit provides enhanced signal stability and temperature compensation
- Modbus[®] compliant RS485 RTU communications (HART[®] optional)¹
- Isolated 4-20 mA³ output and pulsed output of Totalized Flow
- Heavy industrial packaging with easy terminal access
- Optional Remote Style with Lead-Length Compensation. Allows remote electronics up to 1000 feet from probe; Explosion Proof Junction Box has no circuitry, just terminals (suitable for harsh environments)
- Low power dissipation, under 2.5 Watts (e.g. under 100 ma at 24 VDC)
- Field reconfigurability via optional Addresser software
- Flow conditioning built into In-Line flow meters (1/2" and up)
- Captive Flow Conditioners for Insertion meter applications, if required

¹ Specify HART in the flow meter part number

² Note, a built-in photocell continuously monitors the ambient light, and adjusts the display brightness for optimum long-term life, and also senses motion which automatically switches display from Screen Saver mode to Normal mode

³ In optional HART enabled flow meter, the 4–20 mA **MUST** be externally powered. In the standard models, a jumper provides the option to either power the 4–20 mA from the flow meter or to externally power (loop power) the 4–20 mA

SAGE RIO STYLES AND SPECIFICATIONS

SAGE METERING is a manufacturer of high performance Thermal Mass Flow Meters which measure the flow rate and consumption of gases for multiple industrial applications. Frequently used for energy management systems to monitor and improve energy efficiency as well as for regulatory compliance in environmental systems including reporting of Greenhouse Gas Emissions.

TYPICAL APPLICATIONS include measurement and sub-metering of natural gas and compressed air for energy utilization and cost accounting within a facility. Measurement of combustion air flow can be used for improving efficiency in boilers

and furnaces. Environmental reporting of Greenhouse Gases from combustion sources as well as measurement for carbon credits are frequently encountered.

OTHER KEY environmental applications include flare gas flow measurement in the Oil and Gas Industry where thermal technology offers economic advantages over traditional flow measurement technology. To meet the regulatory requirements of periodic re-calibration or calibration verification, Sage Metering has developed a unique in-situ accuracy verification process to ensure the meter is performing within the original NIST traceable gas calibration while the process remains in operation.

SIX SERIES – INSERTION PROBES



SIX SERIES – IN-LINE PROBE



GENERAL INFORMATION

SENSOR

Two reference grade Platinum RTDs clad in 316SS sheath

MATERIAL

Welded metal components: 316SS

POWER

24VDC Standard (115/230VAC optional)

POWER DISSIPATION

<2.5 w (for 24VDC Models)

ELECTRONICS

Microprocessor based (Hybrid-Digital)

ELECTRONICS ENCLOSURE

Integral mount, Explosion Proof, Class I, Zone 1, Groups B, C, D, Type 4X, IP 66

DISPLAY

High contrast photo-emissive OLED graphical display (Flow Rate, Totalizer, Temperature)

TURNDOWN 100 to 1

RESOLUTION 1000 to 1

LOW END SENSITIVITY 5 SFPM

FIELD CALIBRATION CHECK

Yes – Digital system allows raw signal validation in milliwatts (In-Situ Calibration Check)

COMMUNICATIONS

Modbus[®] compliant RS485 RTU communications (HART[®] optional)

FLOW OUTPUT 4–20 mA¹

FLOW TOTALIZER

24VDC pulse for totalized value

TEMPERATURE OUTPUT

Through Modbus[®] or HART[®] only

FLOW ACCURACY

±0.5% of Full Scale ±1% of reading. (Enhanced accuracy optionally available with limited turn-down)

FLOW REPEATABILITY 0.2%

RESPONSE TIME 1 second time constant

GAS TEMPERATURE RANGE

–40° to 200°F (93°C) Standard. (For high-temperature options, contact Sage)

GAS PRESSURE

500 PSIG. (If higher pressure needed, contact Sage)

AMBIENT TEMPERATURE

–40°F (–40°C) to 122°F (50°C) for ATEX Rating

FIELD RECONFIGURABLE

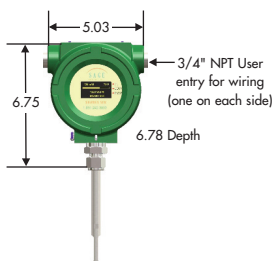
Optional with Sage Addresser

APPROVALS

ATEX Zone 1

Ⓔ II 2 G Ex d IIB+H2 T6 Gb; CSA; UL; CE

Note: T6 Rating is suitable for gases with ignition temperatures as low as 185°F (85°C)



STYLE

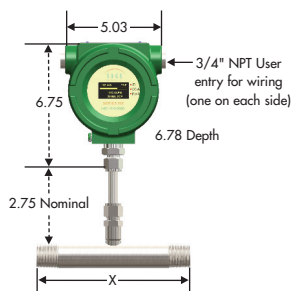
Insertion Mass Flow Meter

PROBE STYLE/LENGTH

1/2" OD Probe Lengths 6" to 36"

FLOW CONDITIONING

Captive Flow Conditioners available upon request with meter purchase



STYLE

In-Line Mass Flow Meter

FLOW BODY

316SS Schedule 40 Flow Bodies sized from 1/4" x 6" long to 4" x 12" long. Male NPT ends standard. (Flanges and other options available)

FLOW CONDITIONING

Flow conditioners are built in to In-Line Style Flow Bodies from 1/2" to 4"

REMOTE STYLE SRX

Optional Remote Styles available with lead-length compensation (up to 1000 ft). Contact Sage for further information.


¹ In optional HART enabled flow meter, the 4–20 mA **MUST** be externally powered. In the standard models, a jumper provides the option to either power the 4–20 mA from the flow meter or to externally power (loop power) the 4–20 mA.




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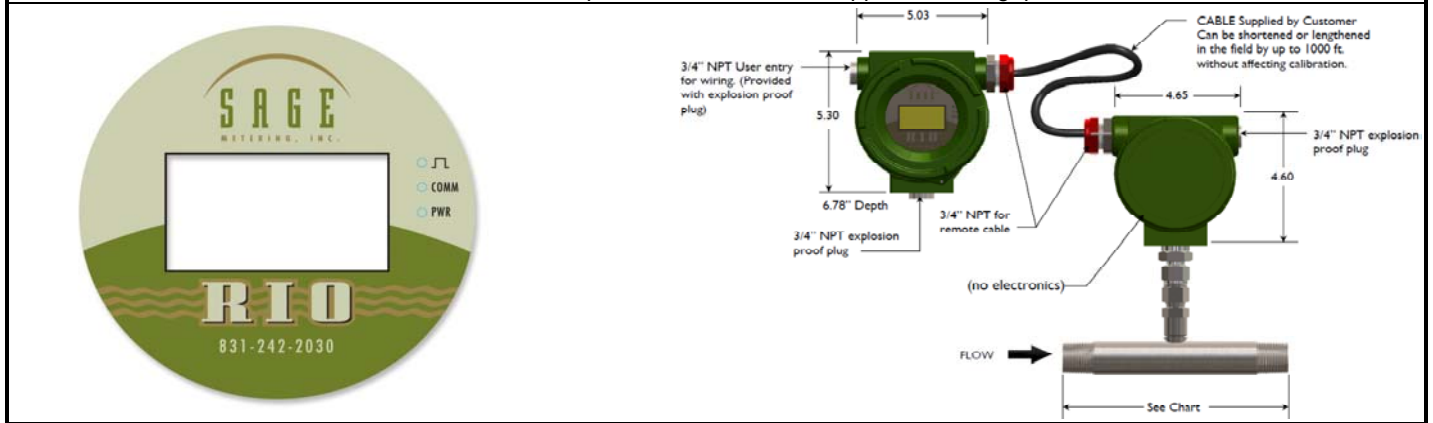


See Sage Metering Product Brochure for additional information and product benefits, or visit us

	INSTRUMENT DATA SHEET	DOCUMENT NO. 100-0190 Rev. 9
SAGE RIO THERMAL MASS FLOW METER	GAS MASS FLOW	SAGE SRX SPECIFICATIONS REMOTE STYLE ATEX IN-LINE MASS FLOW METER

GENERAL INFORMATION

STYLE:	Remote In-Line Mass Flow Meter
SENSOR:	Two reference grade platinum RTD clad in 316SS sheath
MATERIAL:	Wetted metal components: 316SS
POWER:	24VDC or 115/230VAC optional
POWER DISSIPATION:	<2.5 w (for 24VDC Models)
ELECTRONICS:	Remote-Style Microprocessor based
PROBE ENCLOSURE:	Junction Box is Explosion Proof, Class 1, Groups B, C, D; Class II, Groups, E, F, G; Class III, Type 4; Class I, Zone 1, AEX, d IIC, Ex d, IIC, IEC, 60526, IP66
TRANSMITTER ENCLOSURE:	Remote mount, Explosion Proof, Class I, Groups B, C, D, Class II, Groups E,F,G, Class III, Type 4X - Class 1, Zone 1, Group IIB+H2, IP66
DISPLAY:	High contrast photo-emissive OLED graphical display (Flow rate, Totalizer, Temperature)
TURNDOWN:	100 to 1
RESOLUTION:	1000 to 1
LOW END SENSITIVITY:	5 SFPM
FIELD CALIBRATION CHECK:	Yes - Digital system allows raw signal validation in milliwatts (In-Situ Calibration Check)
COMMUNICATIONS:	Modbus® compliant RS485 RTU communications
APPROVALS:	ATEX Zone I  II 2 G Ex d IIB+H2 T6 Gb Note: T6 Rating is suitable for gases with ignition temperatures as low as 185°F (85°C)
FIELD RECONFIGURABLE:	Yes - Sage Addresser or Sage Dongle
FLOW ACCURACY:	+/- 0.5% of Full Scale +/- 1% of reading (Enhanced accuracy optionally available with limited turn-down)
FLOW REPEATABILITY:	0.2%
RESPONSE TIME:	1 second
GAS TEMPERATURE RANGE:	-40° to 200°F (93°C) Standard (for higher temperature options, contact Sage)
GAS PRESSURE:	500 PSIG (if higher pressure needed, contact Sage)
FLOW OUTPUT:	4 to 20 mA for Rate; 24VDC pulse for Totalized value
TEMPERATURE OUTPUT:	Through Modbus® only
AMBIENT TEMPERATURE:	-40°F (-40°C) to 122°F (50°C) for ATEX Rating
FLOW BODY:	316SS Schedule 40 Flow Bodies sized from 1/4" x 6" long to 4" x 12" long. Male NPT ends standard (Flanges and other options available)
CABLE LENGTH:	25' Standard (max length 1000')
RELAYS:	N/A
FLOW CONDITIONING:	Flow Conditioners are built in to In-Line Style Flow Bodies from 1/2" to 4"
NOTES:	The unit is not provided with an ATEX approved cord grip





INSTRUMENT DATA SHEET

DOCUMENT NO. 100-0189 Rev. 9

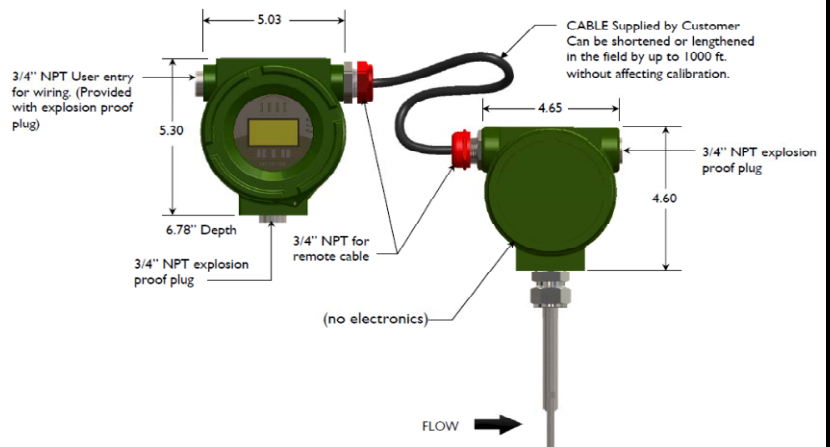
**SAGE RIO
THERMAL MASS FLOW
METER**


GAS MASS FLOW

**SAGE SRX SPECIFICATIONS
REMOTE STYLE ATEX
INSERTION MASS FLOW METER**


GENERAL INFORMATION

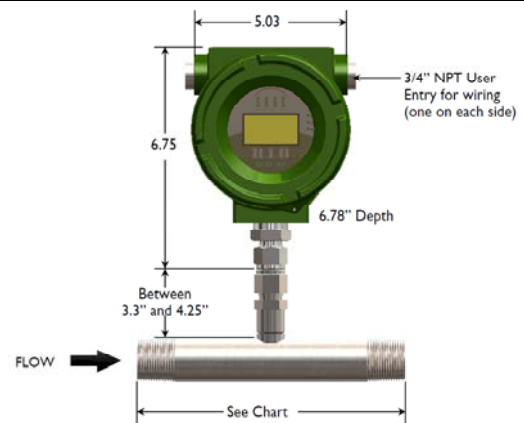
STYLE:	Remote Insertion Mass Flow Meter
SENSOR:	Two reference grade platinum RTD clad in 316SS sheath
MATERIAL:	Wetted metal components: 316SS
POWER:	24VDC or 115/230VAC optional
POWER DISSIPATION:	<2.5 w (for 24VDC Models)
ELECTRONICS:	Remote-Style Microprocessor based
PROBE ENCLOSURE:	Junction Box is Explosion Proof, Class 1, Groups B, C, D; Class II, Groups, E, F, G; Class III, Type 4; Class I, Zone 1, AEX, d IIC, Ex d, IIC, IEC, 60526, IP66
TRANSMITTER ENCLOSURE:	Remote mount, Explosion Proof, Class I, Groups B, C, D, Class II, Groups E,F,G, Class III, Type 4X - Class 1, Zone 1, Group IIB+H2, IP66
DISPLAY:	High contrast photo-emissive OLED graphical display (Flow rate, Totalizer, Temperature)
TURNDOWN:	100 to 1
RESOLUTION:	1000 to 1
LOW END SENSITIVITY:	5 SFPM
FIELD CALIBRATION CHECK:	Yes - Digital system allows raw signal validation in milliwatts (In-Situ Calibration Check)
COMMUNICATIONS:	Modbus® compliant RS485 RTU communications
APPROVALS:	ATEX Zone I II 2 G Ex d IIB+H2 T6 Gb Note: T6 Rating is suitable for gases with ignition temperatures as low as 185°F (85°C)
FIELD RECONFIGURABLE:	Yes - Sage Addresser or Sage Dongle
FLOW ACCURACY:	+/- 0.5% of Full Scale +/- 1% of reading (Enhanced accuracy optionally available with limited turn-down)
FLOW REPEATABILITY:	0.2%
RESPONSE TIME:	1 second
GAS TEMPERATURE RANGE:	-40° to 200°F (93°C) Standard (for higher temperature options, contact Sage)
GAS PRESSURE:	500 PSIG (if higher pressure needed, contact Sage)
FLOW OUTPUT:	4 to 20 mA for Rate; 24VDC pulse for Totalized value
TEMPERATURE OUTPUT:	Through Modbus® only
AMBIENT TEMPERATURE:	-40°F (-40°C) to 122°F (50°C) for ATEX Rating
PROBE STYLE / LENGTH:	1/2" OD Probe Lengths 6" to 36"
RELAYS:	N/A
CABLE LENGTH:	25' Standard (max length 1000')
FLOW CONDITIONING:	Captive Flow Conditioners available upon request with meter purchase
NOTES:	The unit is not provided with an ATEX approved cord grip




	INSTRUMENT DATA SHEET	DOCUMENT NO. 100-0188 Rev. 9
SAGE RIO THERMAL MASS FLOW METER	GAS MASS FLOW	SAGE SIX SPECIFICATIONS INTEGRAL STYLE ATEX IN-LINE MASS FLOW METER


GENERAL INFORMATION

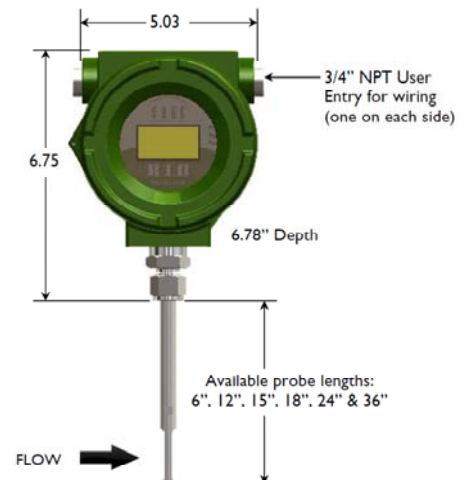
STYLE:	In-Line Mass Flow Meter
SENSOR:	Two reference grade Platinum RTD clad in 316SS sheath
MATERIAL:	Wetted metal components: 316SS
POWER:	24VDC Standard (115/230VAC optional)
POWER DISSIPATION:	<2.5 w (for 24VDC Models)
ELECTRONICS:	Microprocessor based
ELECTRONICS ENCLOSURE:	Integral mount, Explosion Proof, Class I, Groups B, C, D, Class II, Groups E,F,G, Class III, Type 4X - Class 1, Zone 1, Groups IIB+H2, IP66
DISPLAY:	High contrast photo-emissive OLED graphical display (Flow rate, Totalizer, Temperature)
TURNDOWN:	100 to 1
RESOLUTION:	1000 to 1
LOW END SENSITIVITY:	5 SFPM
FIELD CALIBRATION CHECK:	Yes - Digital system allows raw signal validation in milliwatts (In-Situ Calibration Check)
COMMUNICATIONS:	Modbus® compliant RS485 RTU communications
APPROVALS:	ATEX Zone I  II 2 G Ex d IIB+H2 T6 Gb Note: T6 Rating is suitable for gases with ignition temperatures as low as 185°F (85°C)
FIELD RECONFIGURABLE:	Yes - Sage Addresser or Sage Dongle
FLOW ACCURACY:	'+/- 0.5% of Full Scale +/- 1% of reading (Enhanced accuracy optionally available with limited turn-down)
FLOW REPEATABILITY:	0.2%
RESPONSE TIME:	1 second
GAS TEMPERATURE RANGE:	-40° to 200°F (93°C) Standard (for higher temperature options, contact Sage)
GAS PRESSURE:	500 PSIG (if higher pressure needed, contact Sage)
FLOW OUTPUT:	4 to 20 mA for Rate; 24VDC pulse for Totalized value
TEMPERATURE OUTPUT:	Through Modbus® only
AMBIENT TEMPERATURE:	-40°F (-40°C) to 122°F (50°C) for ATEX Rating
FLOW BODY:	316SS Schedule 40 Flow Bodies sized from 1/4" x 6" long to 4" x 12" long. Male NPT ends standard (Flanges and other options available)
RELAYS:	N/A
FLOW CONDITIONING:	Flow Conditioners are built in to In-Line Style Flow Bodies from 1/2" to 4"
NOTES:	The unit is not provided with an ATEX approved cord grip



	INSTRUMENT DATA SHEET	DOCUMENT NO. 100-0187 Rev. R10
SAGE RIO THERMAL MASS FLOW METER	GAS MASS FLOW	SAGE SIX SPECIFICATIONS INTEGRAL STYLE ATEX INSERTION MASS FLOW METER

GENERAL INFORMATION

STYLE:	Insertion Mass Flow Meter
SENSOR:	Two reference grade platinum RTD clad in 316SS sheath
MATERIAL:	Wetted metal components: 316SS
POWER:	24VDC Standard (115/230VAC optional)
POWER DISSIPATION:	<2.5 w (for 24VDC Models)
ELECTRONICS:	Microprocessor based
ELECTRONICS ENCLOSURE:	Integral mount, Explosion Proof, Class I, Groups B, C, D, Class II, Groups E,F,G, Class III, Type 4X - Class 1, Zone 1, Group IIB+H2, IP66
DISPLAY:	High contrast photo-emissive OLED graphical display (Flow rate, Totalizer, Temperature)
TURNDOWN:	100 to 1
RESOLUTION:	1000 to 1
LOW END SENSITIVITY:	5 SFPM
FIELD CALIBRATION CHECK:	Yes - Digital system allows raw signal validation in milliwatts (In-Situ Calibration Check)
COMMUNICATIONS:	Modbus® compliant RS485 RTU communications
APPROVALS:	ATEX Zone I  II 2 G Ex d IIB+H2 T6 Gb Note: T6 Rating is suitable for gases with ignition temperatures as low as 185°F (85°C)
FIELD RECONFIGURABLE:	Yes - Sage Addresser or Sage Dongle
FLOW ACCURACY:	+/- 0.5% of Full Scale +/- 1% of reading (Enhanced accuracy optionally available with limited turn-down)
FLOW REPEATABILITY:	0.2%
RESPONSE TIME:	1 second
GAS TEMPERATURE RANGE:	-40° to 200°F (93°C) Standard (for higher temperature options, contact Sage)
GAS PRESSURE:	500 PSIG (if higher pressure needed, contact Sage)
FLOW OUTPUT:	4 to 20 mA for Rate; 24VDC pulse for Totalized value
TEMPERATURE OUTPUT:	Through Modbus® only
AMBIENT TEMPERATURE:	-40°F (-40°C) to 122°F (50°C) for ATEX Rating
PROBE STYLE / LENGTH:	1/2" OD Probe Lengths 6" to 36"
RELAYS:	N/A
FLOW CONDITIONING:	Captive Flow Conditioners available upon request with meter purchase
NOTES:	The unit is not provided with an ATEX approved cord grip
ENCLOSURE DEPTH:	6.78"




Approvals

HAZARDOUS LOCATION APPROVALS

Sage Rio Gas Flow Meter Type SIX or SRX are ATEX approved.

Certification No.: **TÜV 12 ATEX 7167**

 II 2 G Ex d IIB+H₂ T6 Gb

T_{amb}=-20°C to +40°C

CONFORMANCE

EN 60079-0:2009

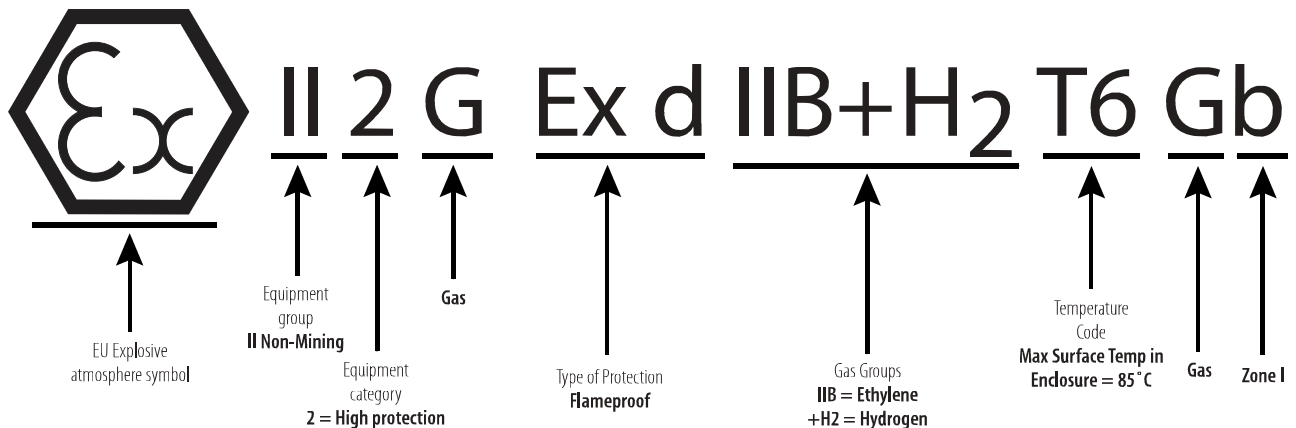
EN 60079-1:2007

REQUIREMENTS


The cable entry holes shall be fitted with suitably certified cable glands or suitably certified stopping plugs that are capable of maintaining the IP rating of the equipment.

- Do not open when energized.
- Do not open when an explosive atmosphere might be present.
- Customer repair of the product (or replacement of components) is not allowed.

ATEX CODES



○ SAGE METERING, INC.-MTRY. CA 93940/ Rio THERMAL MFM ○

CE0035 YEAR  II 2 G Ex d IIB+H₂ T6 Gb

MODEL #

SERIAL # mW0 =

DO NOT OPEN WHEN ENERGIZED.
DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MIGHT BE PRESENT.
T_{amb}=-20°C to +40°C
FOR USE IN HAZARDOUS LOCATIONS—CAUTION—DISCONNECT FROM POWER SUPPLY BEFORE OPERATING. KEEP COVER TIGHT WHILE CIRCUITS ARE ALIVE. CONDUIT SEALS MUST BE INSTALLED WITHIN 18" OF THE ENCLOSURE.
ATTENTION—OUVRIR LE CIRCUIT AVANT D'ENLEVER LE COUVERCLE GARDER LE COUVERCLE BIEN FERME TANT QUE LES CIRCUITS SONT SOUS TENSION.
○ UN SCÈLEMENT DOIT ÊTRE INSTALLÉ À MOINS DE 45CM DU BOÎTER. ○

TECHNICAL DATA FOR SAGE RIO MODELS SIX/SRX			
BRIDGE CIRCUIT	24 VDC	110 VAC	230 VAC
I max	100 mA	100 mA	100 mA
P max	2.4 watts	2.4 watts	2.4 watts
I nominal	64 mA	64 mA	64 mA
P nominal	1.5 watts	1.5 watts	1.5 watts
TOTAL METER POWER	24 VDC	110 VAC	230 VAC
I max	100 mA	88 mA	44 mA
P max	2.4 watts	10.1 watts	10.1 watts
I nominal	64 mA	54 mA	27 mA
P nominal	1.5 watts	6.2 watts	6.2 watts

(1) EC-TYPE EXAMINATION CERTIFICATE



- (2) Equipment and Protective Systems intended for use in Potentially Explosive Atmosphere - **Directive 94/9/EC**
- (3) EC-Type-Examination Certificate Number

TÜV 12 ATEX 7167 X

- (4) Equipment: **Sage Rio Gas Flow Meter SIX or SRX**
- (5) Manufacturer: **Sage Metering, Inc.**
- (6) Address: **8 Harris Ct. Bldg D1, Monterey, CA 93940, USA**
- (7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.
- (8) The TÜV Rheinland Notified Body for ex-protected products of TÜV Rheinland Industrie Service GmbH, Notified Body No. 0035 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmosphere, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report 557/Ex167.00/12

- (9) Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule of this certificate, has been assessed by reference to:

EN 60079-0: 2009

EN 60079-1:2007

- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.
- (11) This EC-Type-Examination Certificate relates only to the design and specification for construction of the equipment or protective system. It does not cover the process for actual manufacture or supply of the equipment or protective system, for which further requirements of the directive are applicable.
- (12) The marking of the equipment shall include the following:



II 2 G Ex d IIB + H2 T6 Gb

TÜV Rheinland Certification Body for explosion protected equipment

Cologne, 27th November 2012

Dipl.-Ing. Klauspeter Graff

(Translation)

This EC-Type-Examination Certificate without signature and stamp shall not be valid.
It may be circulated only without alteration.

Extracts or alterations are subject to approval by the:
TÜV Zertifizierungsstelle für Ex-Schutz-Produkte

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