RedySmart®

Thermal Mass Flow Meters
& Controllers for OEM's

Modular. Stable. Cost-effective.

The Ultimate OEM - MFC.

Engineers in the Biopharmaceuticals industry require precise control of the gases used in bioreactors to optimize microbial growth and ensure proper mixing and distribution of the biomass.

In addition, precision burner control is needed in order to produce the glass ampules, vials and bottles that are used to properly package the resulting biopharmaceuticals.

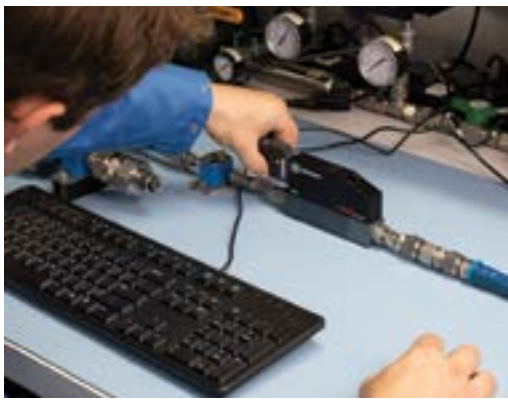
Combining superior physics, high reliability and unparalleled flexibility, RedySmart stands apart from competitive offerings.

RedySmart thermal mass flow devices contain no moving parts and are unaffected by upstream temperature and pressure fluctuations, resulting in exceptional accuracy and repeatability.

With a compact footprint, easy integration onto a cost-effective gas mixing block, and a wide array of communications protocols, Sierra can produce a mass flow meter or controller to meet your specific requirements.

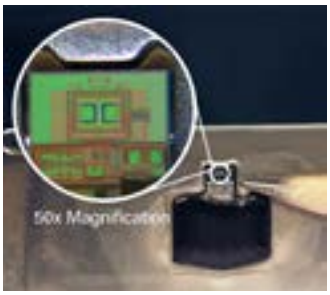
Superior Physics for Lifetime No-Drift Warranty

Our Lifetime No-Drift Sensor Warranty is made possible because RedySmart employs high-precision MEMS (Micro-Electro Mechanical Systems) technology utilizing an advanced, ultrastable no-drift CMOS (Complementary Metal Oxide Semiconductor) sensor.
The use of MEMS techniques allow both electronic circuits and mechanical devices to be manufactured on a silicon chip, similar to the process used for integrated circuits.



Making the Ultimate Biopharm OEM Mass Flow Controller

At the macro level, RedySmart can be conceptualized in five core technologies, each of which contributes to unparalleled accuracy, adaptability and reliability.



Gas Mass Flow Sensor

Accurate and Reliable MEMS Technology

Our Lifetime No-Drift Sensor Warranty is backed by high-precision MEMS technology utilizing an advanced CMOS sensor for stable gas mass flow rate measurement.

Communications

Human & System Interface

An available local display readout communicates key flow data while each device can be configured in the field with a free software app. Connect to the network through Modbus RTU and analog outputs, industrial ethernet (EtherCAT and Profibus).

Modularity

Customize to Needs

An easy-connect communication and power cable system has been designed for ultimate flexibility. Numerous mass flow controllers can be mounted on a single flow block to minimize space in multiple gas mixing applications. Connect hundreds of units via daisy-chain as needed.

Control

Precision Valve

A precision electromagnetic control valve allows the valve seat to assume the exact height above the valve orifice necessary to maintain flow to the set point.

Cutaway View

3 Unit Mixing Block

Advanced Calibration

NIST-Traceable

Each unit is calibrated over its entire flow range using real gas to assure accuracy and repeatability over the life of the device. A fully automated system capable of calibrating hundreds of units at once eliminates any human error during the calibration process.

Auto-Calibration System

REDYSMART HIGHLIGHTS

Modular
Sierra will customize a solution to fit specific application needs for footprint or electrical connections.

Built-in Display (top)
Integrated display shows mass flow rate, totalizer, unit of measure & set point control (controller only).

Operating Status Indication
All devices have a built-in LED status indicator.

Ethernet
Industrial ethernet provides ease of connection to the top of the device with available ProfiNet RT and EtherCAT.

Standard Digital & Analog Outputs
All devices have a digital Modbus RTU and analog interface standard.

Software App
Get efficient device management with our software app:
- View gas mass flow rate & temperature
- Datalogging
- Gas Mixing
- Change set points
- Select measured gas
- Adjust control parameters
- Adjustment/Calibration

Fast Set Point Control
Response times as fast as ± 80ms.

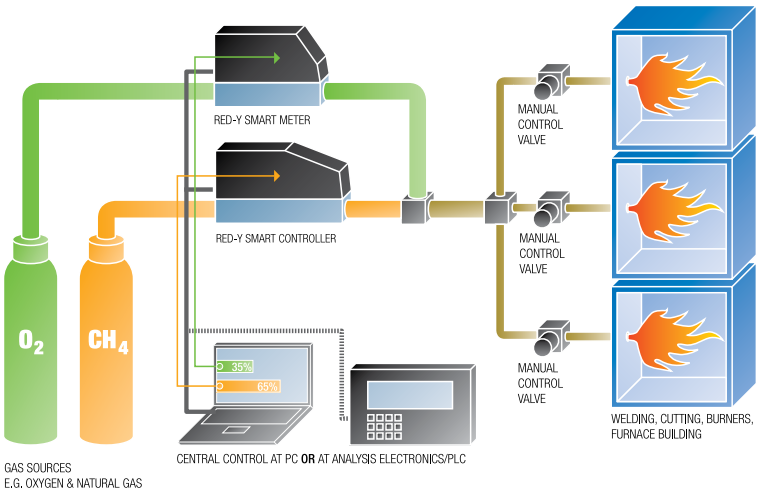
Communications
Standard Modbus RTU, Optional: EtherCat, Profibus and ProfiNet.

No-Drift Warranty
Lifetime No-drift Sensor Warranty. If drift occurs, instrument will be repaired or replaced
free of charge.

Lifetime **NO-DRIFT** Sensor Warranty

Warranty
3-year operating warranty.

Bioreactors
In a typical bioreactor, microbes are used to produce pharmaceutically active compounds. Vaccines, blood and/or blood components, allergenics, somatic cells, gene therapies, tissues, recombinant therapeutic protein and living cells are all produced as biopharmaceuticals. Bioreactors require precision mass flow control of the gases used to feed the biomass and to ensure proper mixing and distribution. This ensures healthy fermentation. RedySmart delivers.



Burner Control
High accuracy and stable gas mass flow rate control are critical to ensure precise temperature control and the highest quality glass used for pharmaceutical packaging, such as ampoules and vials. RedySmart provides an accurate, stable and highly modular cost-effective solution for this application.

TECHNICAL DATA

INSTRUMENT TYPES

Smart Meter GSM
Thermal Mass Flow Meter

Smart Controller GSC
Thermal Mass Controller

OEM Version
For customer-specific requirements

ACCURACY

‹Standard› The economic solution	Accuracy: ± 1.0% of full scale(1) Turndown ratio: 1 : 50
‹High Accuracy› With highest accuracy and turndown ratio (available for GIM < 200 ln/min / GIC < 150 ln/min (air)	Accuracy: ± 0.3% of full scale + ± 0.5% of reading[1] Turndown ratio: 1 : 100 [1]An additional error of ±0.25% may apply for analogue signals

MEASURING RANGES

(Air/Full Scale Freely Selectable)	Type	Measuring Range (Air)		Process Connection
RedyIndustrial Meter GIM	GIM-A	from 0 ... 25 mln/min	to 0 ... 600 mln/min	G¼"
	GIM-B	from 0 ... 600 mln/min	to 0 ... 6000 mln/min	G¼"
	GIM-C	from 0 ... 6 ln/min	to 0 ... 60 ln/min	G¼"
	GIM-D	from 0 ... 60 ln/min	to 0 ... 450 ln/min	G½"
RedyIndustrial Contoller GIC	GIM-A	from 0 ... 25 mln/min	to 0 ... 600 mln/min	G¼"
	GIM-B	from 0 ... 600 mln/min	to 0 ... 6000 mln/min	G¼"
	GIM-C	from 0 ... 6 ln/min	to 0 ... 60 ln/min	G¼"
	GIM-D	from 0 ... 60 ln/min	to 0 ... 450 ln/min	G½"

PERFORMANCE DATA

Gases (real gas calibration)	Air, O2[2], N2[2], He, Ar, CO_2, H_2, CH_4, C3H8 (other gases and gas mixtures on request) [2]O_2 & N_2 are calibrated with Air
Response Time	Meter (GIM): ± 80ms[3]; Controller (GIC): ± 500ms[3] [3]depending on device configuration & according to SEMI standard E17-1011, 5-100% of range under optimized conditions
Repeatability	± 0.2% of full scale (according to SEMI standard E56-0309)
Longterm Stability	< 1% of measured value / year
Power Supply	24 Vdc (18 – 30 Vdc), 15 Vdc on request
Current Consumption Standard	Meter (GIM): max. 100mA; Controller (GIC): max. 250mA (GIC with valve type 8 max. 490mA)
Current Consumption Profinet RT / EtherCAT	Meter (GIM): max. 125mA; Controller (GIC): max. 340mA (GIC with valve type 8 max. 560mA)
Operation Pressure	0.2 – 11 bar a (GIC with valve type 4.5 and 8 max. 8 bar a)
Temperature (Environment/Gas)	0 – 50°C
Pressure Sensitivity	Less than 0.2% RD per bar (typical N2)
TemperatureSsensitivity	Less than 0.025% FS per °C
Warm-up Time	< 1 sec. for full accuracy

MATERIALS

Body	Anodized aluminium, optional stainless steel electropolished
Seals	FKM, EPDM, optional FFKM

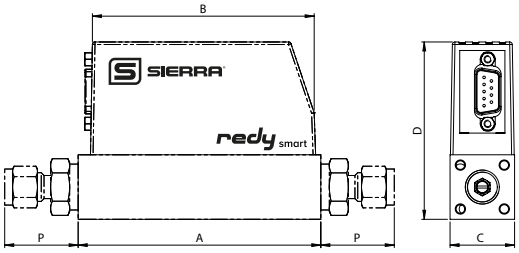
INTEGRATION

In- / Output Signals Analog	0..20 mA, 4..20 mA, 0..5 V, 1..5 V, 0..10 V, 2..10 V
In- / Output Signals Digital	RS-485; Modbus RTU 2 wire (Slave); Lab View-VIs available Option: ProfiBus DP-V0, DP-V1 / Profinet RT / EtherCAT
Process Connection	G¼" (BSPP[4] female) up to 60 ln/min, G½" (BSPP[4] female) up to 450 ln/min [4]British Standard Pipe Parallel
Inlet Section	None required
Electrical Connection	Sub D plug, 9 pole Option ProfiBus: Sub D 9 pole / Option Profinet RT or EtherCAT: 2x RJ45 (IN/OUT)
Mounting Orientation	Any position (consult manufacturer above 5 bar or vertical mounting)

SAFETY

Test pressure	16 bara
Leak rate	< 1 x 10-6 mbar l/s He
Ingress Protection Class	IP-50
EMC	EN 61326-1

DIMENSIONS



Dimensions in mm	A	B	C	D[5]	D[6]
GSM G¼"	94	87	25	69	87
GSM G½"	145	87	35	79	97
GSC G¼"	124	117	25	69	87
GSC G½"	170	117	35	79	97
GSC G½" valve type 8	186.4	117	35	79	97

[5]Standard version
[6]Profinet RT / EtherCAT version

REDYSMART SERIES

TYPE CODE

Instrument Type	RedyIndustrial Series (Gas)	G S	
Function	Meter		M
	Controller		C
Full Scale of Measuring Range (Air) Defined By Manufacturer	Customer-specific (Divider A, up to 600 mln/min)		A X
	Customer-specific (Divider B, up to 6000 mln/min)		B X
	Customer-specific (Divider C, up to 60 ln/min)		C X
	Customer-specific (Divider D, up to 450 ln/min)		D X
Instruments Version	Standard (±1.0% full scale, 1 : 50)		S
	Hi-Performance (±0.3% full scale, ±0.5% reading, 1 : 100)		T
	Customer-specific / OEM		K
Materials (body, seals)	Aluminium, FKM**		A
	Aluminium, EPDM		B
	Stainless steel, FKM		S
	Stainless steel, EPDM		T
	Customer-specific / OEM		K
Analog Signals (output)	Current 4..20 mA**		B
	Current 0..20 mA		C
	Voltage 0..5 V		D
	Voltage 1..5 V		E
	Voltage 0..10 V		F
	Voltage 2..10 V G		G
	Customer-specific / OEM		K
Analog Signals (input)	Current 4..20 mA**		B
	Current 0..20 mA		C
	Voltage 0..5 V		D
	Voltage 1..5 V		E
	Voltage 0..10 V		F
	Voltage 2..10 V		G
	Not Defined		N
	Customer-specific / OEM		K
Control Valve (integrated) Defined by Manufacturer	Type 0.1		2 1
	Type 0.2		2 2
	Type 0.5		2 3
	Type 1.2		2 6
	Type 4.5		1 2
	Type 8.0		1 3
	Valve Not Defined		8 8
	Valve Mounted		9 5
	Customer-specific / OEM		9 9
	No valve		0 0
Type Code		G I - -	

****standard**

sierrainstruments.com

GLOBAL EMAIL: INFO@SIERRAINSTRUMENTS.COM

NORTH AMERICA

5 Harris Court, Building L / Monterey, CA 93940 / USA

831.373.0200

EUROPE

Bijlmansweid2 / 1934RE Egmond aan den Hoef / The Netherlands

ph +31 72 5071400

ASIA-PACIFIC

Second Floor Building 5 / Senpu Industrial Park

25 Hangdu Road Hangtou Town / Pu Dong New District

Shanghai, P.R. China Post Code 201316

ph +8621 5879 8521/22