

## Thermal Mass Flow Meters & Controllers with a Water Resistant Housing for OEM's



# Rock solid **repeatability** with a water resistant housing.

## HIGHLIGHTS

- MEMS technology
- Multigas
- Accuracy:
  - +/- 0.3% of full scale
  - +/- 0.5% of reading
- IP67 / NEMA 6 Rating
- ATEX approvals
- Compact footprint
- No-drift sensor warranty
- Array of communication protocols
- NIST Calibration

Engineers in the biopharmaceuticals industry require precise control of the gases used in bioreactors. Sierra's RedyIndustrial thermal mass flow meter delivers optimized microbial growth that ensures exact mixing and distribution of the biomass.

Food and beverage manufacturers can expect the same precision. In fact, the RedyIndustrial provides all of the proven features of Sierra's RedySmart with the addition of a water-resistant housing that allows you to hose it down.

The economical Redy-Industrial meters and controllers contain no moving parts and are unaffected by upstream temperature and pressure fluctuations. The resulting accuracy and repeatability make them the ultimate MFC for OEM applications.



Benefit from a compact footprint, IP67 and ATEX approvals, and a wide array of communications protocols.

## No one makes **YOU Smarter**

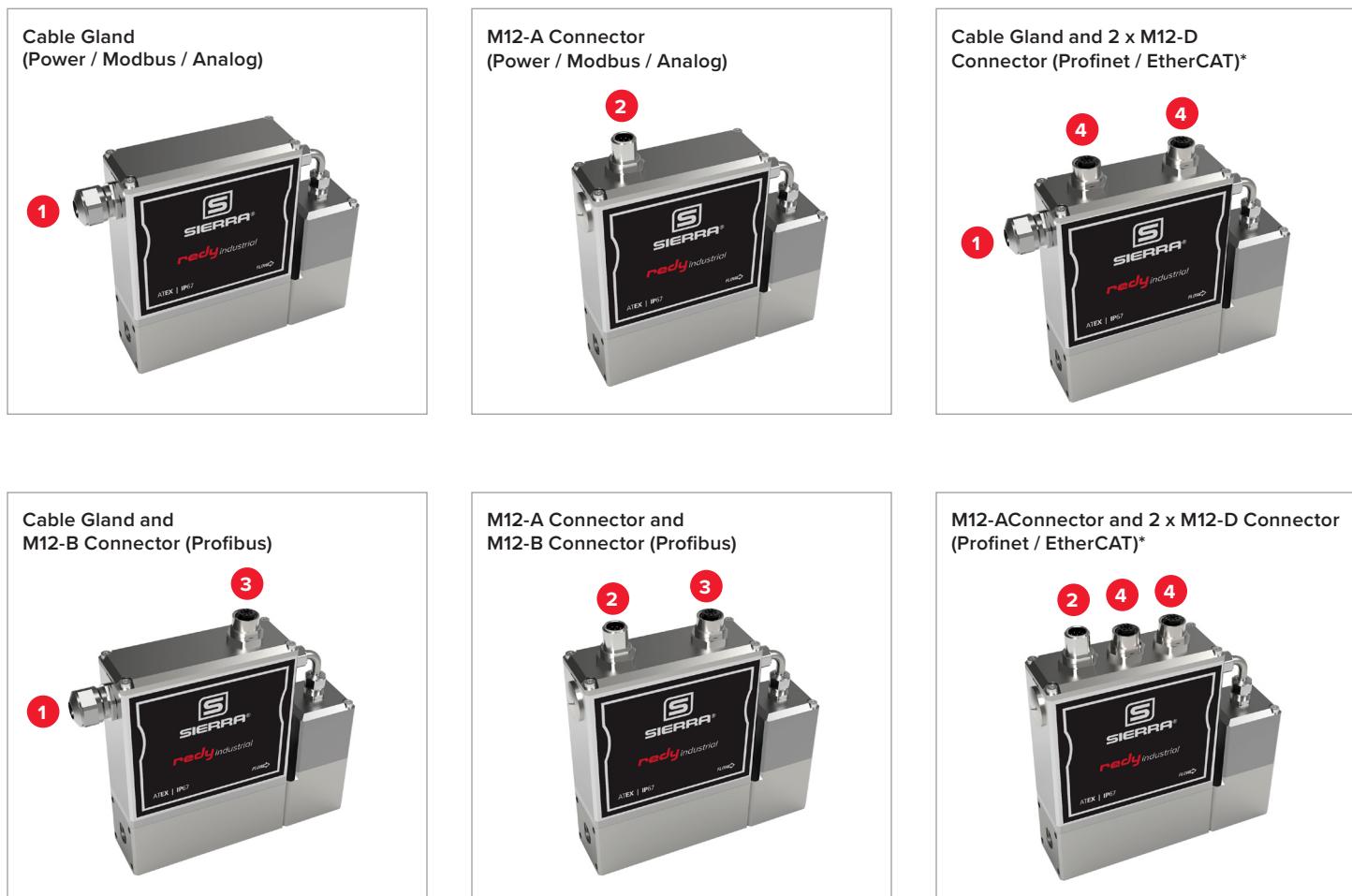
RedyIndustrial's Lifetime No-Drift Sensor Warranty employs high-precision MEMS (Micro-Electro-Mechanical Systems)

technology. It utilizes an advanced, ultra-stable no-drift CMOS (Complementary Metal Oxide Semiconductor) sensor.

MEMS techniques allow both electronic circuits and mechanical devices to be manufactured on a silicon chip, similar to the process used for integrated circuits.



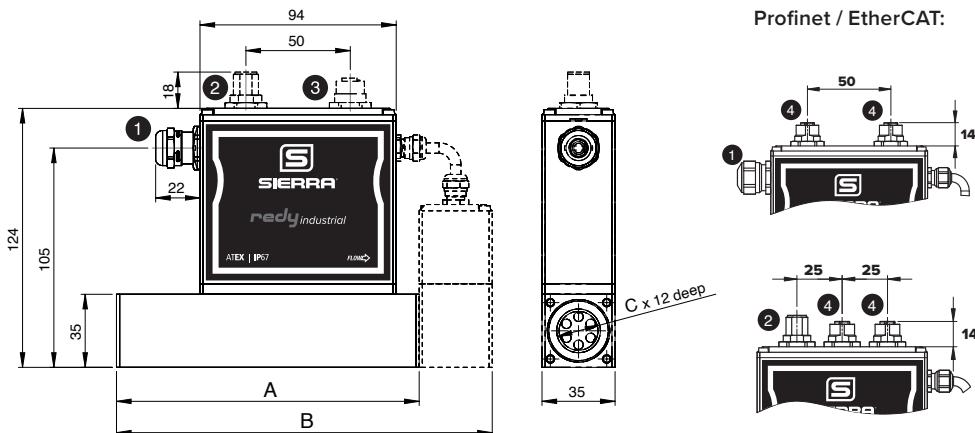
## Available Connections RedyIndustrial Series



Electrical Connection	
1	Cable gland / cable diameter 6-8mm
2	M12 connector A-Coding 8pol male
3	M12 connector B-Coding 5pol female
4	M12 connector D-Coding 4pol female

\*IP-67 only / Profinet RT & EtherCAT option not yet ATEX certified. Please contact your sales partner for further information.

## Dimensions RedyIndustrial Series



Profinet / EtherCAT:

Type	Length (mm)		Process Connection
	A	B	
GIM-A	94	-	G1/4"
GIM-B	94	-	G1/4"
GIM-C	94	-	G1/4"
GIM-D	145	-	G1/2"
GIC-A	-	134	G1/4"
GIC-B	-	134	G1/4"
GIC-C	-	134	G1/4"
GIC-D	-	198	G1/2"

# TECHNICAL DATA

## INSTRUMENT TYPES



**Industrial Meter GIM**  
Thermal Mass Flow Meter



**Industrial Controller GIC**  
Thermal Mass Controller



**Industrial Controller GIE**  
Thermal Mass Controller with External Valve

## ACCURACY

### <Standard>

The economic solution

Accuracy:  $\pm 1.0\%$  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:  $\pm 0.3\%$  of full scale +  $\pm 0.5\%$  of reading(1)  
Turndown ratio: 1: 100  
1An additional error of  $\pm 0.25\%$  may apply for analogue signals

## MEASURING RANGES

### (Air/Full Scale Freely Selectable)

RedyIndustrial Meter GIM

#### Type

GIM-A from 0 ... 25 mln/min  
GIM-B from 0 ... 600 mln/min  
GIM-C from 0 ... 6 ln/min  
GIM-D from 0 ... 60 ln/min

to 0 ... 600 mln/min  
to 0 ... 6000 mln/min  
to 0 ... 60 ln/min  
to 0 ... 450 ln/min

#### Process Connection

G $\frac{1}{4}$ "  
G $\frac{1}{4}$ "  
G $\frac{1}{4}$ "  
G $\frac{1}{2}$ "

RedyIndustrial Controller GIC

GIM-A from 0 ... 25 mln/min  
GIM-B from 0 ... 600 mln/min  
GIM-C from 0 ... 6 ln/min  
GIM-D from 0 ... 60 ln/min

to 0 ... 600 mln/min  
to 0 ... 6000 mln/min  
to 0 ... 60 ln/min  
to 0 ... 450 ln/min

G $\frac{1}{4}$ "  
G $\frac{1}{4}$ "  
G $\frac{1}{4}$ "  
G $\frac{1}{2}$ "

## PERFORMANCE DATA

### Gases (real gas calibration)

Air, O<sub>2</sub><sup>(2)</sup>, N<sub>2</sub><sup>(2)</sup>, He, Ar, CO<sub>2</sub>, H<sub>2</sub>, CH<sub>4</sub>, C<sub>3</sub>H<sub>8</sub> (other gases and gas mixtures on request)  
<sup>2</sup>O<sub>2</sub> & N<sub>2</sub> are calibrated with Air

### Response Time

Meter (GIM):  $\pm 80\text{ms}$ (3); Controller (GIC):  $\pm 500\text{ms}$ (3)

3depending on device configuration & according to SEMI standard E17-1011, 5-100% of range  
under optimized conditions

### Repeatability

$\pm 0.2\%$  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. 100mA; 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 N<sub>2</sub>)

### TemperatureSensitivity

Less than 0.025% FS per °C (typical N<sub>2</sub>)

### Warm-up Time

<1 sec. for full accuracy

## MATERIALS

### Body

Stainless steel 316L (see operating instructions for wetted parts)

### Electronic Housing

Aluminum

### Seals

EPDM (FDA), optional FKM and 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

G $\frac{1}{4}$ " (BSPP(4) female) up to 60 ln/min, G $\frac{1}{2}$ " (BSPP(4) female) up to 450 ln/min  
4British Standard Pipe Parallel

### Inlet Section

None required

### Electrical Connection

Cable gland with compression fitting M16x1.5 / Option: M12 plug (DIN-standard)  
(both connection IP67 protected)

### Mounting Orientation

All orientations are possible. We recommend horizontal mounting.  
Please contact the manufacturer for further information.

## SAFETY

### Test pressure

16 bara

### Leak rate

<1 x 10-6 mbar l/s He

### Ingress Protection Class

IP67 (conforms to NEMA 6)

### EMC

CE EN 61326-1

### ATEX Certification<sup>(5)</sup>

Ex II 3G nA IIC T4 Gc (Category 3 / Zone 2) Ex II 3D Ex tc IIIC T100°C Dc (Category 3 / Zone 22)

<sup>5</sup> Profinet RT & EtherCAT option not yet ATEX certified. Please contact your sales partner for further information.

# RedyIndustrial Series

Instrument Type	RedyIndustrial Series (Gas)	G	I
Function	Meter	M	
	Controller	C	
	Controller with External Valve	E	
Full Scale of Measuring Range (Air) Defined By Manufacturer	Customer-specific (Divide A, up to 600 mln/min) Customer-specific (Divide B, up to 6000 mln/min) Customer-specific (Divide C, up to 60 ln/min) Customer-specific (Divide D, up to 450 ln/min)	A X B X C X D X	
Instruments Version	Standard ( $\pm 1.0\%$ full scale, 1: 50) Hi-Performance ( $\pm 0.3\%$ full scale, $\pm 0.5\%$ reading, 1: 100) Customer-specific / OEM		S T K
Connection / Materials (body, seals)	Cable Gland / Stainless Steel / EPDM (FDA)** M12 plug / Stainless steel / EPDM (FDA) Cable gland / Stainless steel / FKM M12 plug / Stainless steel / FKM Customer-specific / OEM		S T U V K
Analog Signals (output)	Current 4..20 mA** Current 0..20 mA Voltage 0..5 V Voltage 1..5 V Voltage 0..10 V Voltage 2..10 V G Customer-specific / OEM		B C D E F G K
Analog Signals (input)	Current 4..20 mA** Current 0..20 mA Voltage 0..5 V Voltage 1..5 V Voltage 0..10 V Voltage 2..10 V G Not Defined Customer-specific / OEM		B C D E F G N K
Control Valve (integrated) Defined by Manufacturer	Type 0.1 Type 0.2 Type 0.5 Type 1.2 Type 4.5 Type 8.0 Valve Mounted Customer-specific / OEM No valve		2 1 2 2 2 3 2 6 1 2 1 3 9 5 9 9 0 0
Type Code		G	I

\*\*standard



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