

Model CSEN-8100-03X single-use flow sensor shown.
U.S. PATENTS 8404076 & 8887578. JAPANESE PATENT 5602884
OTHER PATENTS PENDING

SUMOflo[®]

SINGLE-USE CORIOLIS MASS FLOW METER

1/8" Barb Single-Use Sensor for 50 – 1500 g/min

Description

The Malema Sensors[®] SumoFlo[®] CPM-8100 series Single-Use Coriolis Mass Flow Meters are specifically designed for measuring liquids in bio-pharmaceutical and other applications that require all gamma-sterilizable wetted surfaces. The fluid contacting surfaces are made of unreinforced polyether ether ketone (PEEK) that meet USP Class VI, USP 661, and USP 788 standards.

The CE compliant SumoFlo[®] series Coriolis Mass Flow Meters include the single-use sensor assembly, supporting electronics, sensor mounting enclosure, and a graphical user interface (GUI). Optional temperature sensors provide feedback to the electronics that allow temperature compensation to ensure the mass flow accuracy regardless of temperature changes to the application fluid.

Measurement Principle

Fluid flows into the sensor consisting of two flow sensitive elements which are vibrated relative to one another – similar to the tines of a tuning fork. Fluid interacts with the sensor dynamically in such a way that the sensor's response is immune to the fluid's chemical and physical properties, flow regime, or variations in flow velocity profile. Fluid mass flow rate is determined by measuring the relative motion of the vibrating flow sensitive elements.

Applications

- Pure water or ultra high purity chemicals
- Chromatography
- Fluids with varying density or viscosity
- Depth Filtration
- Tangential Flow Filtration

Key Features

- Accuracy: $\pm 1\%$ of mass flow rate reading; unaffected by flow regime or variations to the velocity profile
- Fluid measurement performance is independent of fluid properties
- USP Class VI wetted materials
- PEEK sensor is gamma sterilizable to 50 kGy

* Other flow ranges available. Please consult Malema for more information

Measurement Specifications

Model	8100-031
Accuracy	$\pm 1\%$ of rate for 10% to 100% of full scale rated flow rate $\pm(1\%$ of rate + Z.O.S.) for < 10% of full scale rated flow rate
Temperature	Ambient: 0° – 50°C Fluid: 2° – 40°C
Operating Pressure	80 psig (max.)
Flow Range	50 – 1500 g/min
Zero Offset Stability (Z.O.S.)	0.75 g/min

* Pressure drop at max. flow range = 10 psi in water (1 cP)

Material Specifications

Model	8100-031
Process Connections	1/8" barb connection*
Wetted Materials	Unreinforced PEEK (Polyether ether ketone), Adhesive compliant with ISO 10993. All polymeric wetted materials are USP Class VI compliant.
Interconnecting Cable Length	Standard 3 m; Maximum up to 30 m
Ingress Rating For Connectors	IP65

*Consult the factory for other types of process connection options.

Electrical Specifications

Supply Voltage	24 VDC $\pm 10\%$
Power Consumption	Max 6 W
Programming	Operator Parameter configuration through configuration port with a PC
Analog Output Module	4–20 mA configurable as Mass Flow Rate or Volumetric Flow Rate*
Digital Input/Output Module	Configurable as Frequency or Digital I/O
Frequency Output	0 to 10 kHz proportional to flow rate
Digital Output over MODBUS**	Mass Flow Rate, Volumetric Flow Rate*, Density*, Temperature***

* In preparation

** Requires CELE-8100 model configured for MODBUS communications.

***Requires CELE-8100 and CSEN-8100 models configured for temperature compensation.

Certifications/Compliances

USP Class VI Material Certification	CE Compliance via the following testing: 1. EN61000-4-2: Electrostatic Discharge 2. EN61000-4-3: Radiated Immunity (and Radiated Emissions) 3. EN61000-4-4: Electrical Fast Transients 4. EN61000-4-5: Surge – Power Line 5. EN61000-4-6: Conducted Immunity
USP 661 for Containers/Plastics	
USP 788 for Containers/Plastics	
Directive 2011/65/EU (RoHS)	

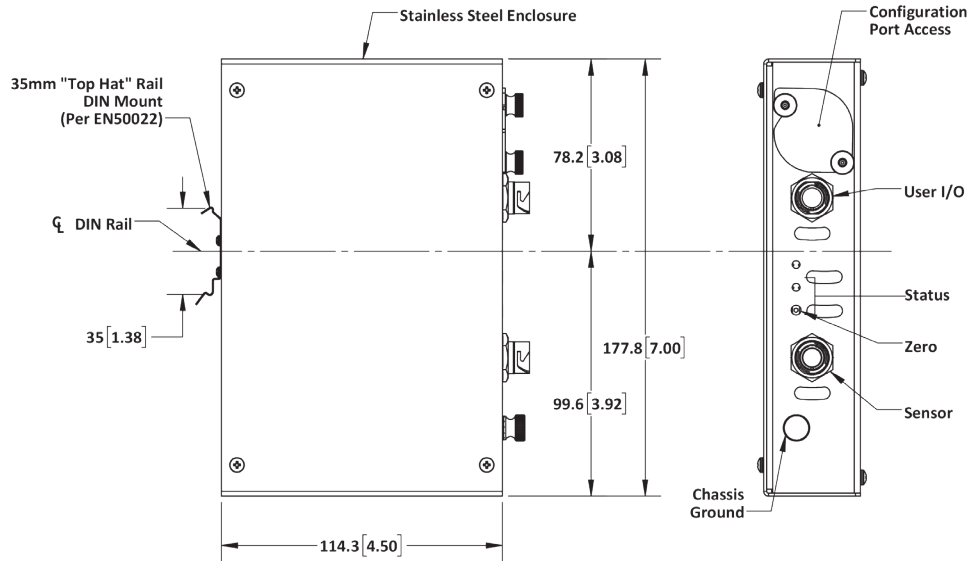
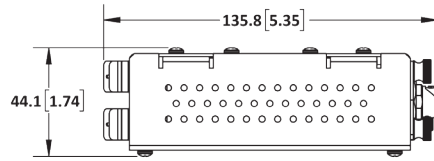
Mounting Orientation

The Malema Sensors® SumoFlo® series Coriolis mass flow meters can be mounted in any orientation. Mounting of the flow sensor in a stainless steel enclosure is required for CE compliance.

Dimensional Drawings

For reference only

Electronics

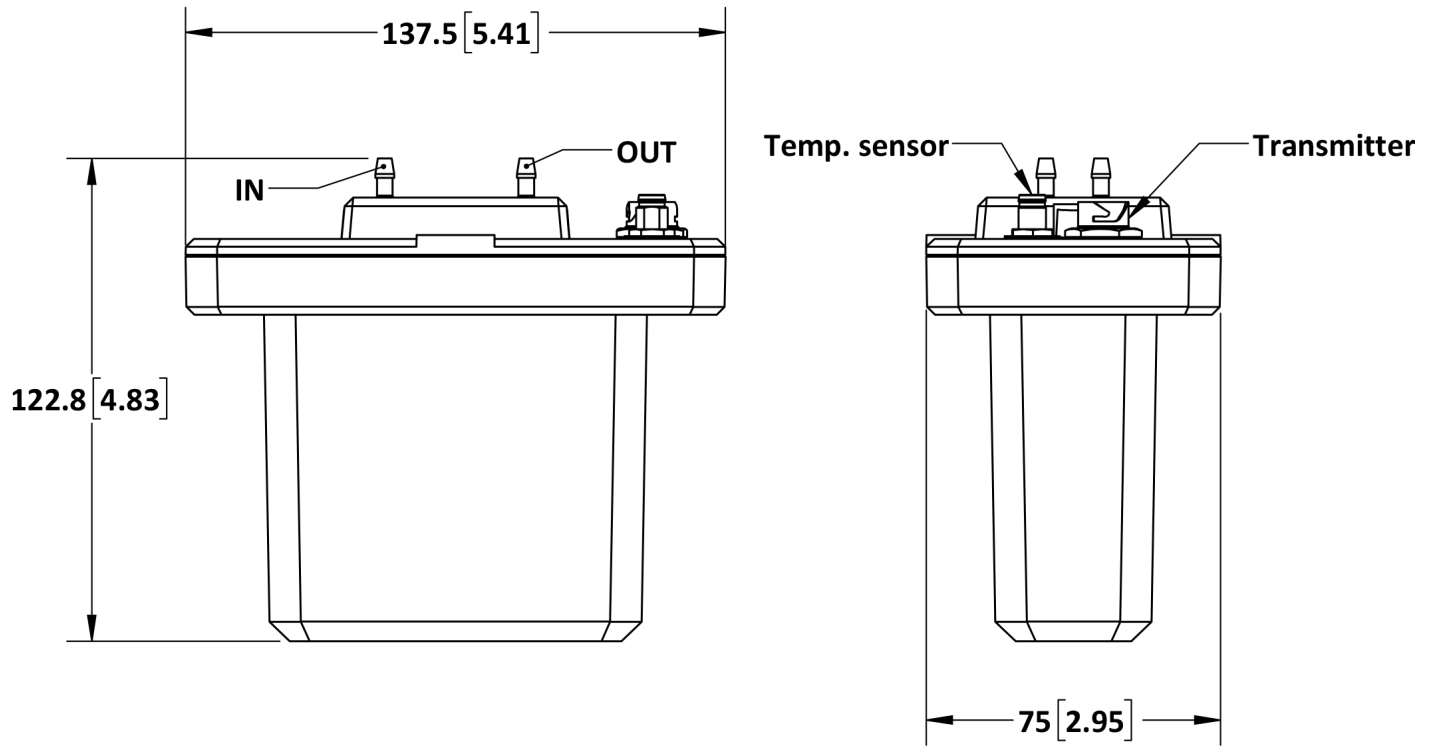


Dimensional Drawings

For reference only

Note: Mounting Cradle is required for CE compliance

Model 8100-031 Sensor (15 – 1500 g/min, 1/8" barb)



Pressure Drop in DI Water

Flow Rate	Pressure Drop
50 g/min	0.01 psi (0.08 kPa)
150 g/min	0.1 psi (0.69 kPa)
400 g/min	0.71 psi (4.90 kPa)
800 g/min	2.84 psi (19.61 kPa)
1200 g/min	6.40 psi (44.13 kPa)
1500 g/min	10.00 psi (68.95 kPa)

Ordering Information for Electronics

Model Ordering Code													Description					
CELE-8100	-	*	-	*	*	*	*	*	X	X	X	-	***	Transmitter				
		C											DIN Rail Mounting (Non Display Only; CE)					
		Z											Custom (Consult Factory)					
		-																
Temperature Compensation			N										Standard for Non-Temperature Comp Sensors					
			T										Use with Temperature Comp Sensors					
			Z										Custom (Consult Factory)					
Output			1										4-20mA, 1x D/O					
			2										4-20mA, 2x D/O					
			3										4-20mA, 1x D/O, MODBUS (RS485)					
			Z										Custom (Consult Factory)					
I/O Cable			0										Standard I/O Cable					
			Z										Custom (Consult Factory)					
I/O Cable Length			A										3 m					
			Z										Custom (Consult Factory)					
Interconnecting Cable Length			A										3 m					
			Z										Custom (Consult Factory)					
									X				Reserved for Factory					
										X				Reserved for Factory				
											X				Reserved for Factory			
												-						
													XXX				Unique PN Identifier	

CPFM-8100-031
Ordering Information for Sensors

Single-Use Coriolis Mass Flow Meter

Model Ordering Code											Description	
CSEN-8100	-	*	-	***	*	*	*	*	*	-	***	PEEK Sensor
Sensor Type	C											CE Compliant Sensor
			-									
Range Code	031											50 – 1,500 g/min
Temperature Sensor	S											Without Temp. Comp.; Temp. Sensor Not Required
Sterilization	0											No Sterilization
	1											Gamma Sterilized to 50 kGy
	Z											Other Requests (Consult Factory)
			A									1/8" Hose Barb
			B									1/8" Hose Barb with Tubing
			*									Other Options Available. Please Consult Factory
Mounting Orientation	H											Horizontal *
	V											Vertical (flow ports pointing upwards)
	A											Angled 45° (flow ports pointing downwards)
			X									Reserved for Factory
			-									
			XXX									Unique PN Identifier

* Factory recommended option

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