**PSG** BIOTECH

SumoFlo® Single-Use Coriolis Flow Meter
CPFM-8103 Series

**User Manual**
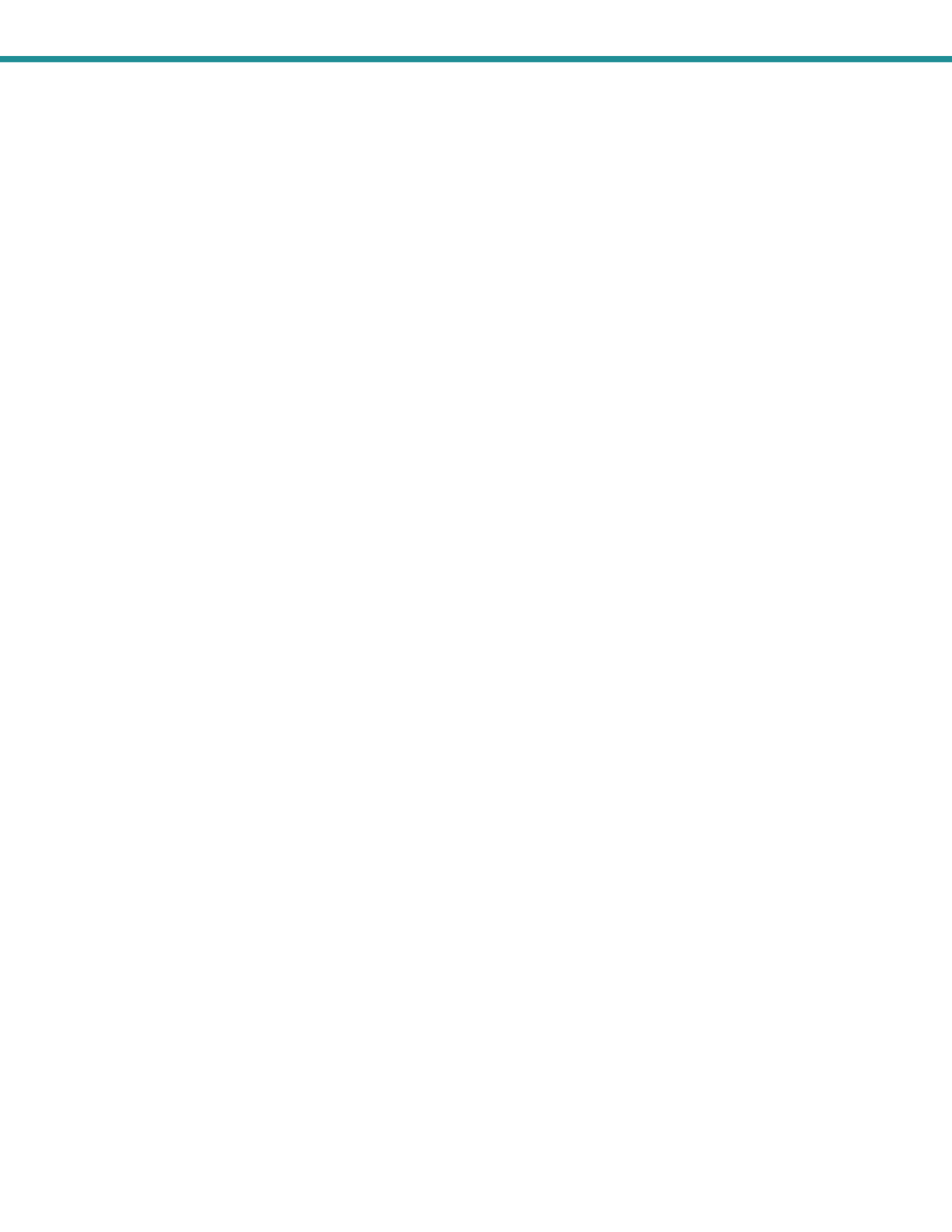
## Copyright

## Subject to Technical Changes

Owing to our policy of continuous product development, the illustrations and technical data contained in this document may differ slightly from the current version of the device.

## Legal Manufacturer

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**Email:** sales@malema.com

## Certifications/Compliances

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

# Index

# 1.00 Introduction

## 1.01 Safety Precautions

- Turn off and lockout / tag-out the electrical supply and any hazardous chemical sources to the tool during the installation.
- Flush the flow path (pumps, piping, tubing) with water prior to disconnecting any plumbing.

## 1.02 Overview

The SumoFlo® CPFM-8103 series Single-Use Coriolis Flow Meter from PSG Biotech is specifically designed for measuring liquids in bio-pharmaceutical and other applications that require all gamma-stable wetted surfaces. The fluid contacting surfaces are made of unreinforced polyether ether ketone (PEEK) that meets USP Class VI, USP 661, and USP 788 standards.

A SumoFlo® Coriolis flow meter consists of three components: the single-use Coriolis flow sensor, the durable transmitter, and the durable mounting cradle. When properly installed in the mounting cradle, the SumoFlo® flow meter meets CE specifications.

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.

Inlet and outlet of the tubes vibrate in phase when there is no flow present.

When flow is present, the inlet and outlet ends of the tube vibration is out of phase. The degree of phase shift is proportional to mass flow rate.

## 1.03 Storage Conditions

Store the product under packed conditions in an anti-static bag. The storage place should be free from moisture, mechanical shock and vibration. The storage temperature should be between 10°C and 35°C and the humidity between 5% and 80% R.H. without condensation.

If the sensor has been gamma irradiated, do not open the inner bag until ready to install in the single-use assembly.

## 1.04 Unpacking and Product Inspection

Upon delivery, inspect the product for damage. Confirm that the model code on the label matches the specification in the purchase order.

# 2.00 Installation

The following must be considered when selecting the installation location of the flow sensor:

1. Ambient temperature: 0°C to 50°C (32°F to 122°F), protected from direct sunshine.
2. Free from electromagnetic interference. Keep away from such heavy inductive devices as motors, pumps, power-relays and solenoid valves.
3. Free from vibrational interference. Keep away from sources of vibration such as motors, pumps, actuators, or vehicular traffic.
4. The location must be protected from water jets or corrosive gases.
5. The location should allow easy access for maintenance.

## 2.01 Mounting of Flow Sensor

1. Place the sensor inside the cradle. Use the clamps to secure the sensor.
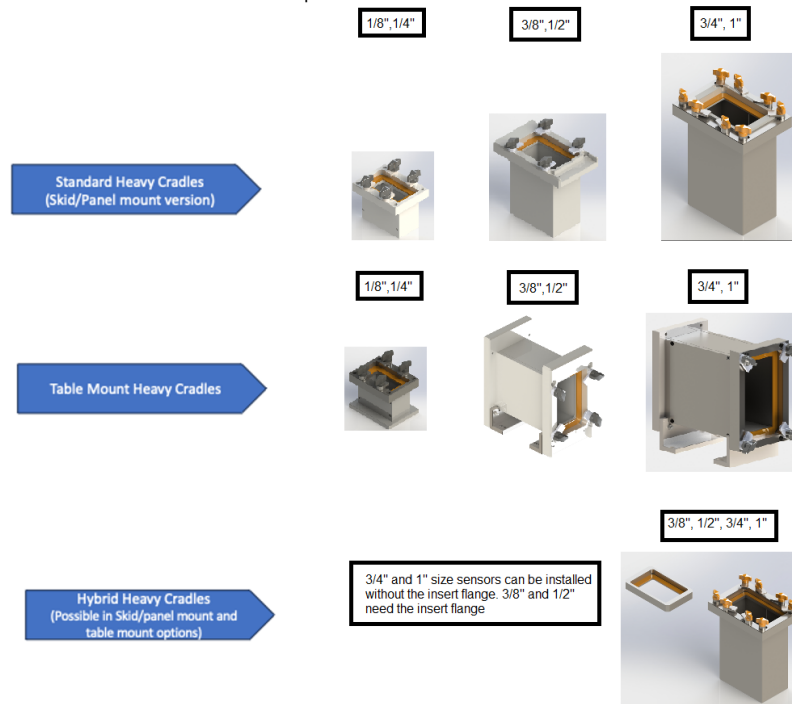


## 2.02 Plumbing Connections

1. Attach tubing to the inlet and outlet barbs on the sensor. Make sure that the barb size on the sensor matches the tubing. Typical sizes are 1/4", 1/2" and 3/4".
2. Tighten all connections with either cables ties or hose clamps.

# 2.00 Installation

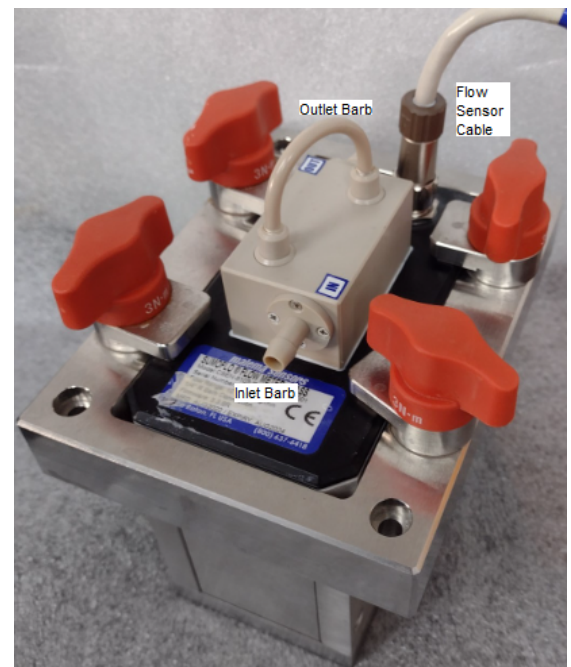| ⚠️ CAUTION |
|---|
| To avoid stress on the flow tube/housing interface, follow the precautions below:<br><br>• Tube should be held firmly while working on the hose barb fittings during installation.<br>• There should not be any relative displacement/movement between the tube and the housing at any point in time.<br>• Do not overtighten hose clamps, as this may cause damage. |

## 2.03 Electrical connections of CELE-8103-C with DIN rail mounting

**Analog Output:** Analog output for flow rate is 4-20 mA by default and on pins 12 and 11.

**Remote Zero:** To zero the meter remotely, momentarily connect, or short, pin 3 (ZERO) to pin 1 (24V+). Wait 10 seconds for this procedure to complete and for the LEDs to stop blinking before continuing operation. PLC digital outputs can be used to perform remote zeroing.

**PC GUI:** The Configuration Port is for GUI communication via CBL- CS2-006.

**Chassis Ground:** CE Compliance requires the transmitter chassis be connected to earth ground. The screw near the bottom of the transmitter is available for this purpose.

### Maintenance

Single-Use Coriolis flow sensor requires no daily maintenance since it has no moving parts that can be subject to wear and tear. However, we recommend the following checks to ensure smooth and reliable operation.

### Connection of Flow Detector

1. Check for leakage around pipe connections or liquid penetration into Flow Detector tube.
2. Check for any loose nuts.
3. Make sure that the connection ports are leak free.

### Connection of Flow Detector

1. Check for mechanical stress to the single use flow sensor caused by possible warping of connecting pipes or loose connections caused by heavy pipe vibration.
2. Check to ensure tube movement caused by pumps or other equipment is not transferred to the flow sensor.

CONFIGURATION PORT ACCESS

STATUS LEDS

ZERO

SENSOR

CHASSIS GROUND
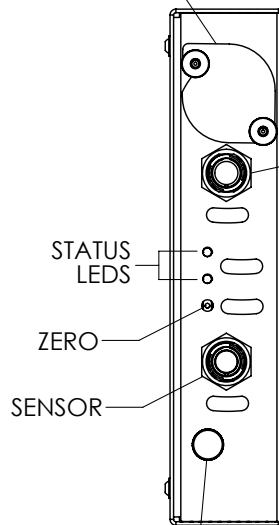
**CONNECTION DETAIL [1 ANALOG, 1 or 2 D/O]**

CELE-8103-C-T1
CELE-8103-C-T2

| PIN | WIRE COLOR | FUNCTION |
|---|---|---|
| 1 | RED | POWER +24V |
| 2 | BLACK | POWER GND |
| 3 | PINK | REMOTE ZERO |
| 4 | GRAY | DIO OUT 1 |
| 5 | BLUE | DO NOT CONNECT |
| 6 | WHITE | DIO GND |
| 7 | RED/BLACK | DIO IN 1+ |
| 8 | WHITE/BLACK | DIO OUT 2 |
| 9 | YELLOW | DIO IN 1- |
| 10 | BROWN | ALARM OUT O/C |
| 11 | GREEN | CL- |
| 12 | VIOLET | CL+ |

MALEMA  LABEL-CMETER 022

**CONNECTION DETAIL [1x ANALOG, 1x D/O, MODBUS]**

CELE-8103-C-T3

| PIN | WIRE COLOR | FUNCTION |
|---|---|---|
| 1 | RED | POWER +24V |
| 2 | BLACK | POWER GND |
| 3 | PINK | REMOTE ZERO |
| 4 | GRAY | DIO OUT 1 |
| 5 | BLUE | DO NOT CONNECT |
| 6 | WHITE | DIO GND |
| 7 | RED/BLACK | RS485 A+ |
| 8 | WHITE/BLACK | RS485 GND |
| 9 | YELLOW | RS485 B- |
| 10 | BROWN | ALARM OUT O/C |
| 11 | GREEN | CL- |
| 12 | VIOLET | CL+ |

MALEMA  LABEL-CMETER 021

**CONNECTION DETAIL [4x ANALOG OPTION]**

CELE-8103-C-T7

| PIN | WIRE COLOR | FUNCTION |
|---|---|---|
| 1 | RED | POWER +24V |
| 2 | BLACK | POWER GND |
| 3 | PINK | REMOTE ZERO |
| 4 | GRAY | ALARM OUT O/C |
| 5 | BLUE | VOL FLOW 4-20 mA (-) |
| 6 | WHITE | VOL FLOW 4-20 mA (+) |
| 7 | RED/BLACK | DENSITY 4-20 mA (-) |
| 8 | WHITE/BLACK | DENSITY 4-20 mA (+) |
| 9 | YELLOW | TEMP 4-20 mA (-) |
| 10 | BROWN | TEMP 4-20 mA (+) |
| 11 | GREEN | MASS FLOW 4-20 mA (-) |
| 12 | VIOLET | MASS FLOW 4-20 mA (+) |

MALEMA  G11-CS1-003

**CONNECTION DETAIL [2x ANALOG, 1x D/O, MODBUS]**

CELE-8103-C-T8

| PIN | WIRE COLOR | FUNCTION |
|---|---|---|
| 1 | RED | POWER +24V |
| 2 | BLACK | POWER GND |
| 3 | PINK | REMOTE ZERO |
| 4 | GRAY | ALARM OUT O/C |
| 5 | BLUE | ANALOG 1 4-20mA (-) |
| 6 | WHITE | ANALOG 1 4-20mA (+) |
| 7 | RED/BLACK | RS485 A+ |
| 8 | WHITE/BLACK | RS485 GND |
| 9 | YELLOW | RS485 B- |
| 10 | BROWN | DIO 1 (REF PWR GND) |
| 11 | GREEN | ANALOG 0 4-20mA (-) |
| 12 | VIOLET | ANALOG 0 4-20mA (+) |

MALEMA  G11-CS3-003

**CONNECTION DETAIL [3x ANALOG, 1x DIGITAL]**

CELE-8103-C-T9

| PIN | WIRE COLOR | FUNCTION |
|---|---|---|
| 1 | RED | POWER +24V |
| 2 | BLACK | POWER GND |
| 3 | PINK | REMOTE ZERO |
| 4 | GRAY | ALARM OUT O/C |
| 5 | BLUE | ANALOG 1 4-20mA (-) |
| 6 | WHITE | ANALOG 1 4-20mA (+) |
| 7 | RED/BLACK | ANALOG 2 4-20mA (-) |
| 8 | WHITE/BLACK | ANALOG 2 4-20mA (+) |
| 9 | YELLOW | DO NOT CONNECT |
| 10 | BROWN | DIO 1 (REF PWR GND) |
| 11 | GREEN | ANALOG 0 4-20mA (-) |
| 12 | VIOLET | ANALOG 0 4-20mA (+) |

MALEMA  G11-CS2-003

# 2.00 Installation

## 2.04 Electrical connections of CELE-8103-D with Display
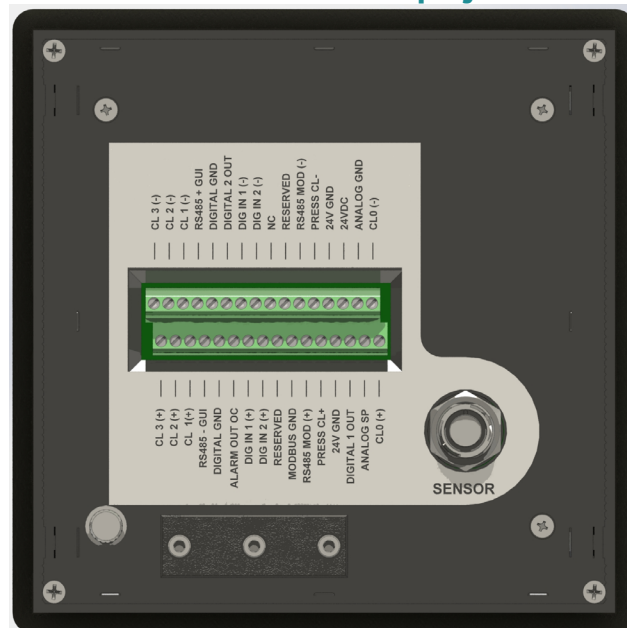


1. All electrical connections use the terminal block mounted in the rear of the transmitter.



Pin 1
Pin 2
Pin 31
Pin 32
Sensor Connector
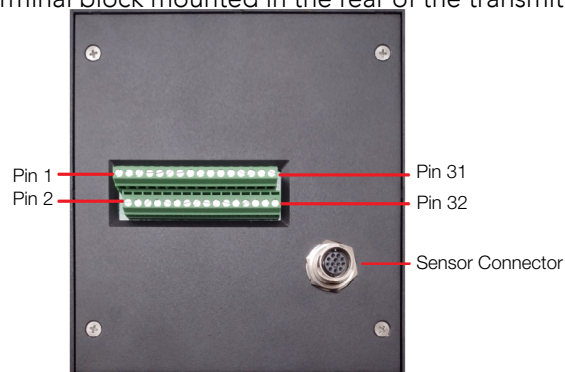
2. Refer to Appendix I for pin-out and description.
3. Recommend using 24AWG wire for all connections.
4. Connect power to the transmitter. (+24Vdc) to pin 27 and (Ground) to pin 25.



GND    +24V
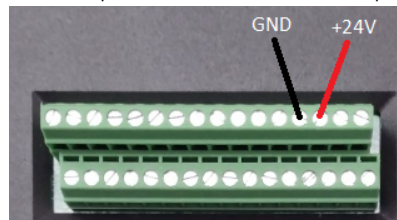
5. If monitoring the analog 4-20 mA output (CL0), connect +(4-20mA) to pin 32, (4-20mA) to pin 31 to a multimeter or analog input module.



-4-20mA output
+4-20mA output
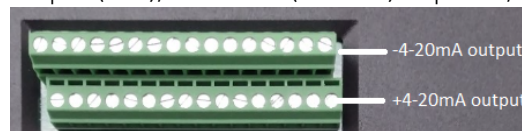
6. Connect the flow sensor cable, CABLE-CMETER 047. The female end on the cable goes to the sensor. The male end on the cable goes to the electronics. Follow the connector labels on both the sensor and electronics.
7. Connect the appropriate temperature sensor cable, if applicable. This cable must be connected for the Temperature Compensation algorithm to work properly. This **cable is reusable and not single-use.**
8. An external converter is needed for communication with the PC GUI. If you do not have a preferred model, PSG Dover recommends ULinx model USOPTL4 that can be ordered.
   Configure dipswitch settings of USOPTL4 as shown.

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# 2.00 Installation

## 2.04 Electrical connections of CELE-8103-D with Display (continue)



9. Connect the GUI communication cable to the connector on the rear panel to an RS-485/USB adapter, TDA(-) to pin 8, TDB(+) to pin 7, GND to pin 10.

**Note:** Hardware internally configured for RS485 by default, must specify for RS232.
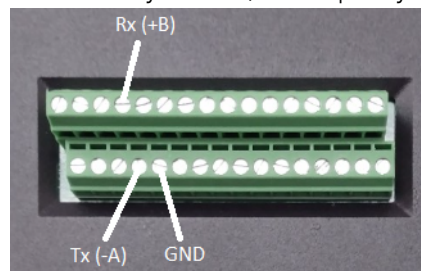


10. Turn power ON to the flow meter (i.e. the electronics) after priming to ensure the sensor is filled with liquid. The red and green status LEDs will blink during initialization. When initialization is complete, the green LED will remain ON while the red LED will turn OFF.



11. After initialization the display should display Flow, Total, Temp, Density (if enabled).



**Note:** Allow 30 minutes for the sensor and transmitter to warm-up.

## 2.05 PC Software/GUI Communication

If using the Malema, a PSG brand, Coriolis GUI to monitor or log flow meter performance, follow the following steps:

1. Make sure the converter is installed on the PC by checking its COM port in Device Manager. If there is a yellow exclamation mark on the device in Device Manager, install the proper driver from the device manufacturer. The driver package for Ulinx USOPTL4 driver is available for download from the web.
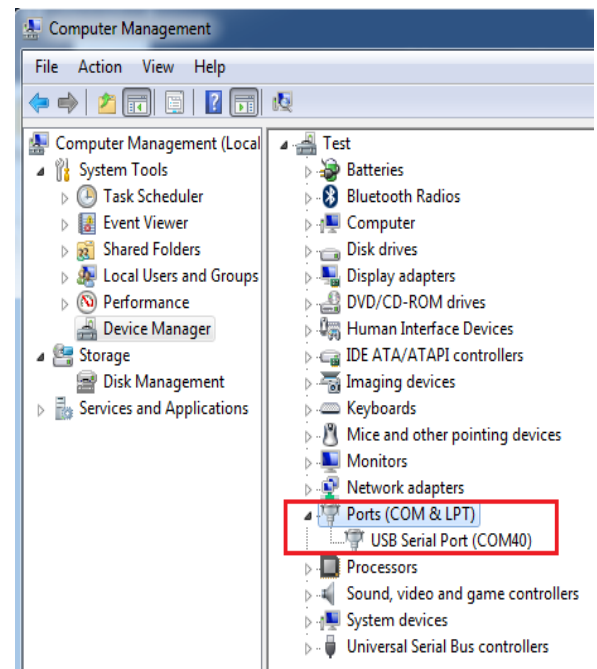
# 2.00 Installation

## 2.05 PC Software/GUI Communication (Continue)

2. Copy the PSG Dover Malema software GUI (an .exe executable file) to a folder on the local drive. The software GUI is available for download.
3. Double-click the .exe to open the GUI. A COM port should appear in the upper-right box.
4. Double-click the COM port to connect to the flow meter. If the connection is successful, the Main GUI window will appear.
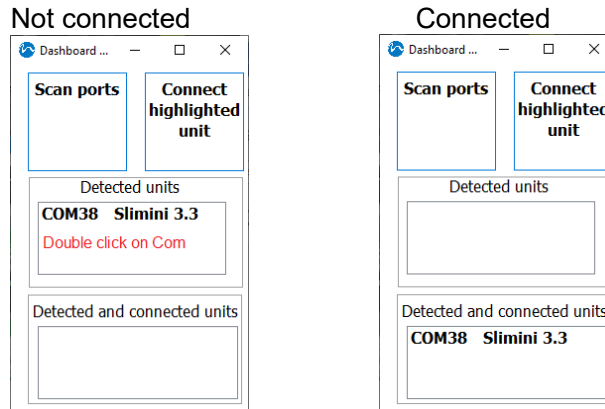


5. Main GUI window.
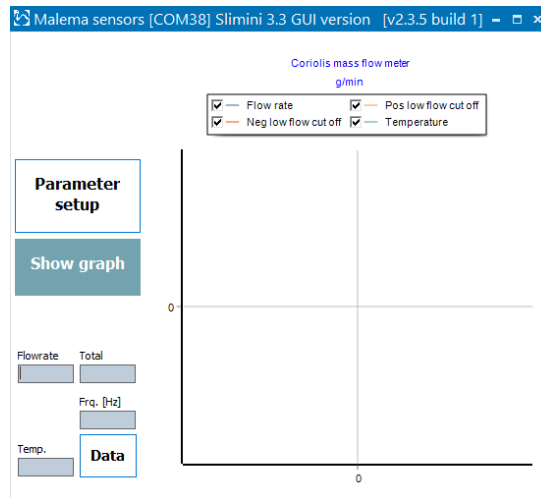


6. Click the "Data" button to start monitoring the flow rate.
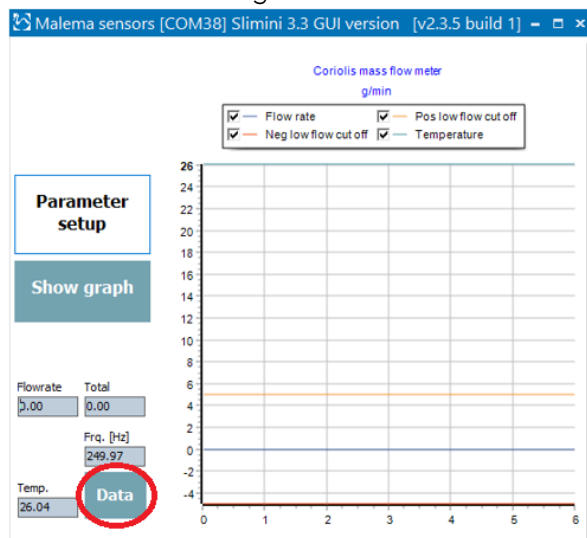
# 2.00 Installation

## 2.05 PC Software/GUI Communication (Continue)

7. RS-485 / MODBUS COMMUNICATION



- An external converter is needed for communication for Modbus – USOPTL4.
- Connect pin 22 of the User I/O cable to the TDB+ terminal of your RS-485 module.
- Connect pin 21 of the User I/O cable to the TDA- terminal of your RS-485 module.
- Connect pin 20 of the User I/O cable to the GND terminal of your RS-485 module.

- Recommend the 2 terminal wires (B+,A-) are twisted pair.

8. Modbus feature must be activated in the Factory GUI for Modbus operation.
9. For Modbus operation, refer to Malema Modbus Description 1.0F for Modbus protocol.
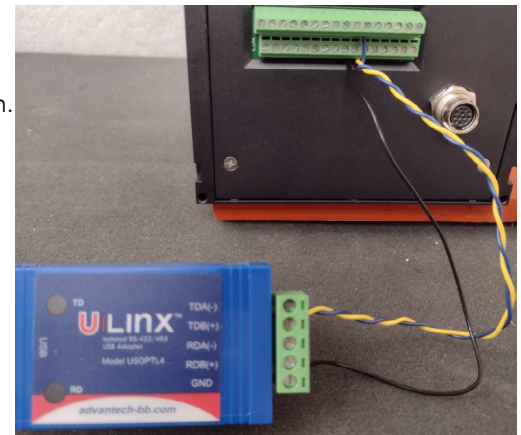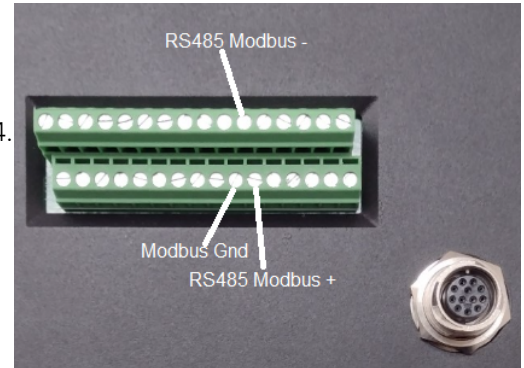


## 2.06 Start Up

The SumoFlo® series Coriolis flow meter system requires a full tube of liquid medium at rest before a successful startup can be completed.

### Preliminary Checks:

1. Make all the necessary electrical connections as per the connection details above.
2. Ensure that the power supply rating is 24 V DC ± 10%, 300 mA.
3. Confirm that the inlet and outlet ports are connected to the tubing reflecting the physical flow direction.

### Start Up Process:

1. Turn on the power. The instrument will go through initialization process and start measuring flow.

**Note:** It is not necessary to power cycle the transmitter after changing a single-use sensor.
2. Please allow the instrument to warm up for about 45 minutes only on initial startup or when starting cold.
3. Verify that the flow tube is full of stationary liquid without bubbles in the flow sensor.
4. Perform a ZERO RESET if necessary (Refer to Section **Zero Set**).
5. The flow meter is now ready for making valid measurements.

# 2.00 Installation

## 2.07 Zero Reset

1. Purge all air in the sensor and the hoses by running the pump at a high flow rate (ex. 50% of flow range).
2. Turn off the pump and close all valves, if possible, to ensure no actual flow.

**Note:** Whenever the measured flow rate is below a "low-flow threshold" (typically 2% of flow range) the Coriolis Meter will perform zero-flow calibrations automatically, if Autozero is enabled. Autozero is enabled by default.

**Note:** Fluid flowing through the sensor (or air pockets in the sensor) while performing a zero flow calibration will result in an inaccurate zero setting and therefore, inaccurate flow rate readings. Make sure there is no fluid flow in the sensor during zeroing.
If the application does not permit closing an upstream or downstream valve to obtain an accurate zero flow calibration, there may be a possibility that fluid may flow even though its value is below the factory preset low flow cutoff. In such situations, an incorrect zero-flow value can result, and it may be desirable to disable the "autozero" feature. Zero flow calibration updates may be required in the field if an application's fluid varies significantly with temperature.

3. Perform a zero calibration by pressing the "zero cal" button on the electronics or clicking the "Re-zero the unit" button in the left side of the GUI (shown below). Zero calibration may also be performed remotely by momentarily touching the pink wire (pin 3) to +24V (pin 1).

   Zero the meter from GUI

   Zero the meter from transmitter front panel button

- Press the up/down button until "Zero Meter" is displayed, press CR ↵



- Press the ACK button.



- Enter password



- Click the left button 2 times.
- Click the ACK button.
- Click the right button 2 times.
- Displays show zeroing.



Zero meter using digital input terminal.
- Set digital input 2 to "Force auto zero on 1 to 0 transition".
- Connect ground to pin 15 Digital input 2 (-).
- Momentarily connect +24Vdc to pin 16 Digital input 2 (+)

Zero the meter through Modbus.
- Refer to Malema Modbus Description 1.0F for Modbus protocol.

4. This zero-calibration procedure will take 10 seconds to complete. During calibration, the red status LED on the electronics will be blinking. The red LED will turn off when calibration is complete.
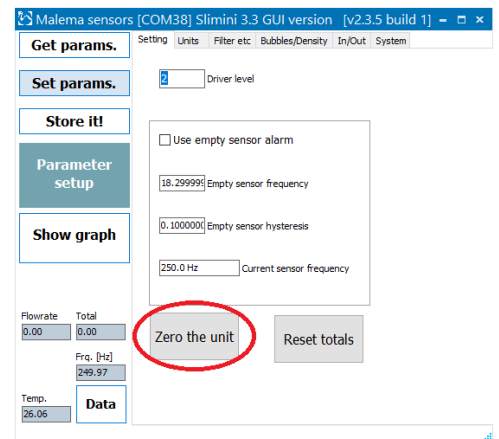
# 2.00 Installation

## 2.08 Hot Swappable Sensors

Changing flow sensors by turning power OFF to the transmitter or disconnecting the sensor cable with power ON, either is acceptable. The new flow sensor shall initialize the transmitter when the sensor is connected or when power is turned ON to the transmitter. This is to ensure all settings are loaded into the transmitter when the new sensor is installed.

Display shows when sensor is disconnected.



## 2.09 Appendices

**APPENDIX I    CELE-8103-D transmitter connector pin out**

| Pin # | Signal name | Pin # | Signal name |
|-------|-------------|-------|-------------|
| 1 | CL3- | 2 | CL3+ |
| 3 | CL2- | 4 | CL2+ |
| 5 | CL1- | 6 | CL1+ |
| 7 | RS485 + GUI | 8 | RS485 - GUI |
| 9 | DIO GND | 10 | DIO GND |
| 11 | DIO Out  2 | 12 | Alarm Out OC |
| 13 | DIO In 1 (-) | 14 | DIO In 1 (+) |
| 15 | DIO In 2 (-) | 16 | DIO In 2 (+) |
| 17 | N/C | 18 | Reserved |
| 19 | Reserved | 20 | Modbus Gnd |
| 21 | RS485 - Mod | 22 | RS485 + Mod |
| 23 | Press CL- | 24 | Press CL+ |
| 25 | 24V Gnd | 26 | 24V Gnd |
| 27 | 24Vdc | 28 | DIO 1 Out |
| 29 | Analog GND | 30 | Analog SP |
| 31 | CL0- | 32 | CL0+ |

**Analog Outputs**

The analog output signal can be set for Mass, Volumetric, Density, Temperature, or Pressure (controller series only)

Analog output CL0 is normally set for 4-20 mA , Mass flowrate by default and on pins 31 and 32.

All 4 analog outputs (CL0, CL1, CL2, and CL3) are configurable for 4-20mA, 0-5V, 0-10V, 1-5V. Analog output CL0 is the only output which supports passive output.

Additional analog output CL1,CL2, and CL3 are optional. Please consult Malema PSG Dover Sales Rep for details.

# 2.00 Installation

## 2.09 Appendices (Continue)

**APPENDIX 2 LED Status Lookup Table - Display Version Only**

| Meaning | Red | Green | Blue |
|---|---|---|---|
| Power up: Initialization | Blink | Blink | OFF |
| Normal operation | OFF | ON | OFF |
| Forced auto zeroing | OFF | OFF | Blink |
| Sensor disconnected | ON | OFF | OFF |
| Cable error or other | Blink | OFF | OFF |

**APPENDIX 3 Setup Digital Inputs/Outputs**

Digital outputs 1 and 2 are set as open collector, not configurable.

Click "Set params." to activate any changes then click "Store it! " to save to non-volatile memory".

**Selecting Digital outputs 1 and 2**
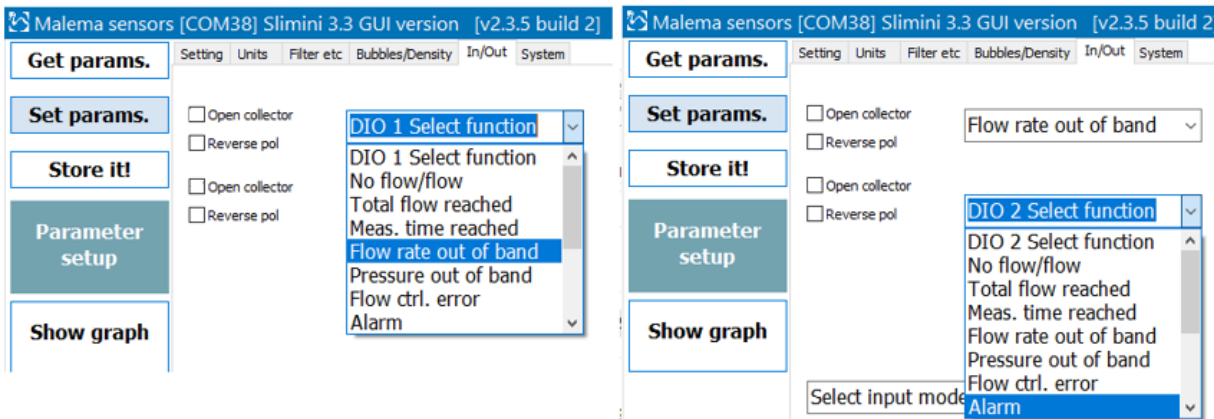


**Selecting Digital inputs 1 and 2**
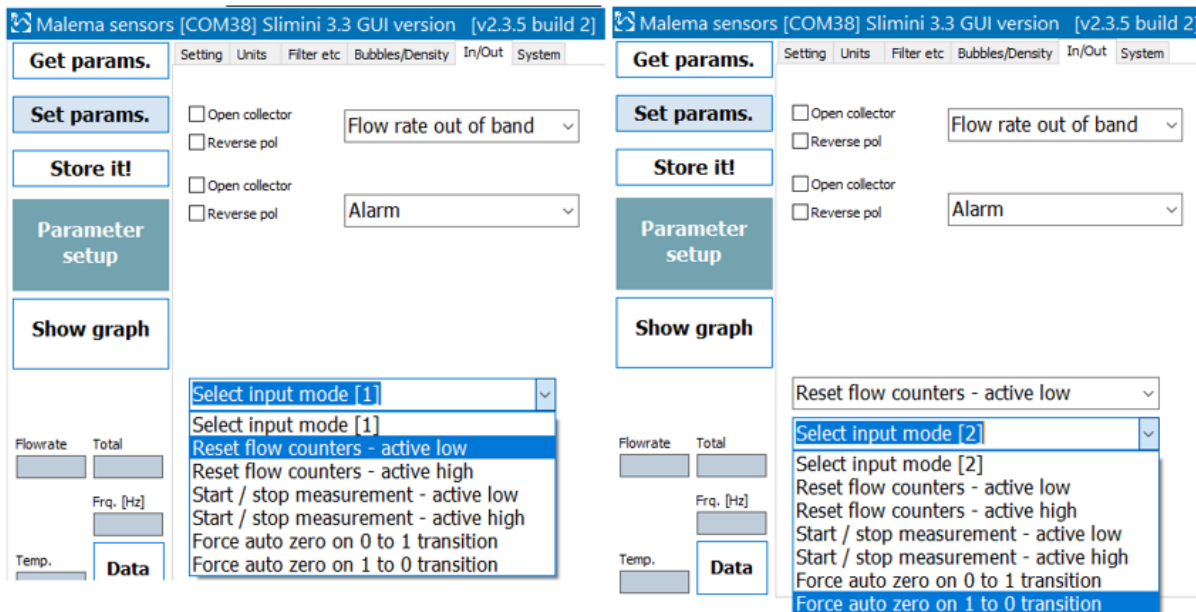
# 2.00 Installation

## 2.10 Electrical Wiring

**Analog 4-20 mA active current output:**
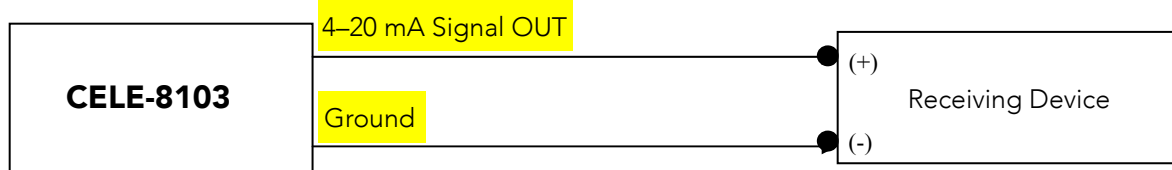


**Digital output (Alarm or Pulse):**
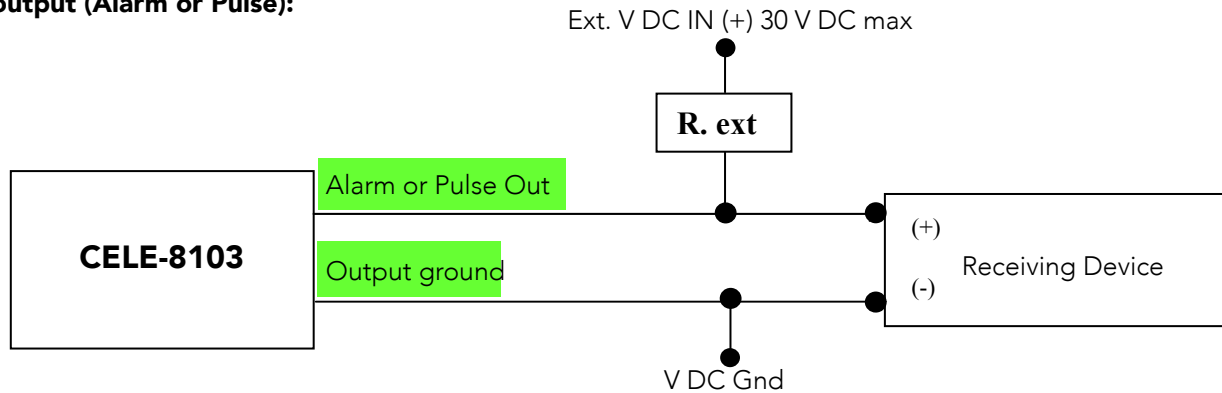


R. ext is an external resistor that may be needed for some installations.

Choose R. ext so that the maximum current through the terminal does not exceed 200 mA.

R. ext can be calculated as follows:

R. ext (kΩ) = Ext. V DC IN / Max. current (mA)

**Remote Zero IN:**
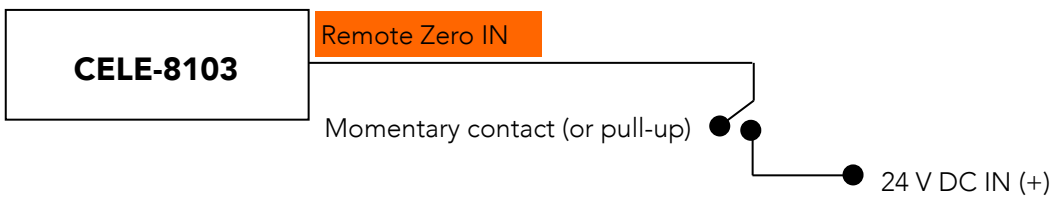
# 2.00 Installation

## 2.11 Block Diagram

PLC/RECEIVING DEVICE.

REMOTE ZERO,
MODBUS OVER
RS485

FLOW READING
OVER 4-20 mA,
DIGITAL OUTPUT,
ALARMS,
MODBUS OVER RS485

PC

SUMOFLO® TRANSMITTER
CELE-8103

OPTIONAL USB-TO-MODBUS
OVER RS485,
FOR DIAGNOSTICS

SUMOFLO® SENSOR
CSEN-8103

FLOW OUT

FLOW IN

SUMOFLO® MOUNTING
CRADLE ENCL-MOUNT-8103
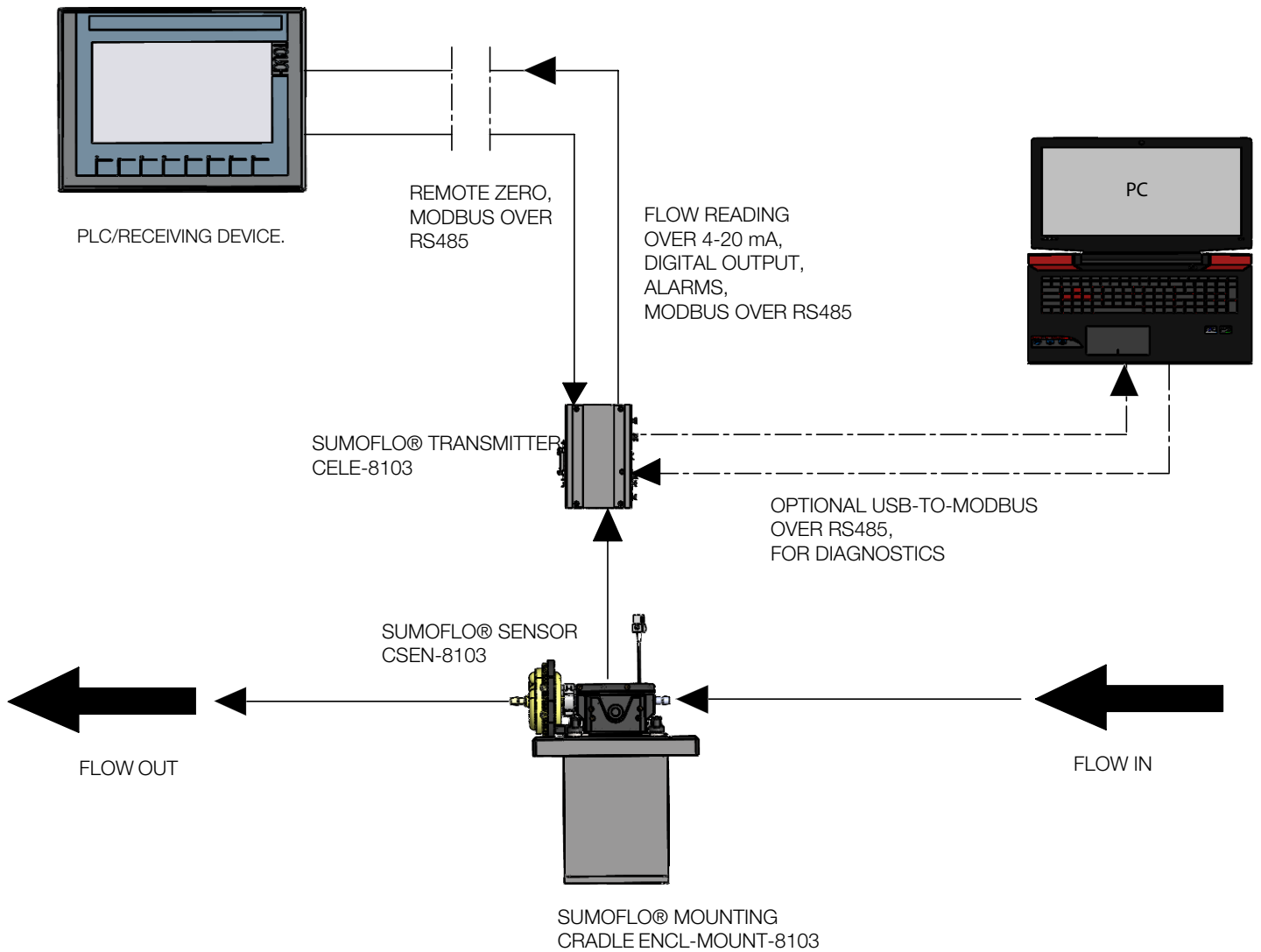
A SumoFlo® CPFM-8103-series Coriolis flow meter consists of three components: the single-use Coriolis flow sensor, the durable transmitter, and the durable mounting cradle, as well as the durable cables to connect the transmitter to the sensor and the transmitter to the system control device. When properly installed in the mounting cradle, the SumoFlo® flow meter meets CE specifications.

Optional durable components include RS485-to- USB connecter, and a Windows 10 Pro Laptop Computer running the PSG Biotech Coriolis GUI. Stand-alone remote displays are also available. Contact PSG Malema for additional information if needed.

| Sensor Style | Description | Electrical Connections | Fluid Connections |
|---|---|---|---|
| C-031 | 1/8" Cradle-Mount Sensor | Top (same side as fluid connections) | Vertical |
| C other | Cradle-Mount Sensor | Top (same side as fluid connections) | 6° from vertical |
| P | Panel-Mount Sensor | Bottom (opposite side as fluid connections) | 6° from vertical |
| R | Standard Inline Sensor | Either top or bottom | Inline (90° from vertical) |
| T | Tall Inline Sensor | Bottom | Inline (90° from vertical) |

# 3.00 Specification

| Measurement Specification | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Model CSEN-8103-*** | **-031** | **-062** | **-063** | **-082** | **-151** | **-152** | **-153** |
| Accuracy | ±1% of rate for 5% to 100% of full scale rated flow rate<br>±(1% of rate + Z.O.S) for < 5% of full scale rated flow rate | | | | | | |
| Temperature | Ambient: 0°–50°C<br>Fluid: 2°–40°C | | | | | | |
| Operating Pressure | 30 psig (207 kPa gauge) max. | 80 psi (550 kPa gauge) max. | | | | | |
| Flow Range * | 0.05 – 1.5 kg/min (l/min) | 0.25 – 5 kg/min (l/min) | 0.45 – 9 kg/min (l/min) | 1 – 20 kg/min (l/min) | 2 - 40 kg/min (l/min) | 3 – 60 kg/min (l/min) | 5 – 100 kg/min (l/min) |
| Zero Offset Stability (Z.O.S.) | 0.75 g/min | 2 g/min | 4 g/min | 10 g/min | 20 g/min | 20 g/min | 40 g/min |
| *Check page 20 for special flow ranges for R & T style sensors. | | | | | | | |

| Material Specification | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Model CSEN-8103-*** | **-031** | **-062** | **-063** | **-082** | **-151** | **-152** | **-153** |
| Process Connections * | 1/8" barb | 1/4" barb | 3/8" barb<br>3/8" Mini TC | 1/2" barb<br>1/2" Mini TC | 3/4" barb<br>3/4" Mini TC | 3/4" barb<br>3/4" Mini TC | 1" barb<br>1"-1.5" TC |
| Wetted Materials | Unreinforced PEEK (Polyether ether ketone), 316L Stainless Steel (for temperature sensor only), Silicone.<br>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 Specification | |
|---|---|
| Supply Voltage | 24 V DC ±10% |
| Power Consumption | Max 6 W |
| Programming | Operator Parameter configuration through configuration port with a PC |
| Analog Output Module | 1x 4–20 mA, 2x 4–20 mA, or 4x 4–20 mA |
| Digital Input/Output Module | 0x D/O, 1x D/O, or 2x D/O; 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 *** |
| *Requires CELE-8103 model configured for MODBUS communications. | |
| **Requires CELE-8103 and CSEN-8103 models configured for density measurement. | |
| ***Requires CELE-8103 and CSEN-8103 models configured for temperature compensation. | |

# 4.00 Dimension Drawing

## 4.01 CELE-8103-D Display

PANEL MOUNTING
SNAP-LOCK

$\begin{bmatrix} 6.15 \end{bmatrix}$
156.2

$\begin{bmatrix} 5.91 \end{bmatrix}$
150.0

$\begin{bmatrix} 7.05 \end{bmatrix}$
179.2

$\begin{bmatrix} .26 \end{bmatrix}$
6.5

SumoFlo®

PSG BIOTECH

$\begin{bmatrix} 5.91 \end{bmatrix}$
150.0

$\begin{bmatrix} 5.34 \end{bmatrix}$
135.6

ACK
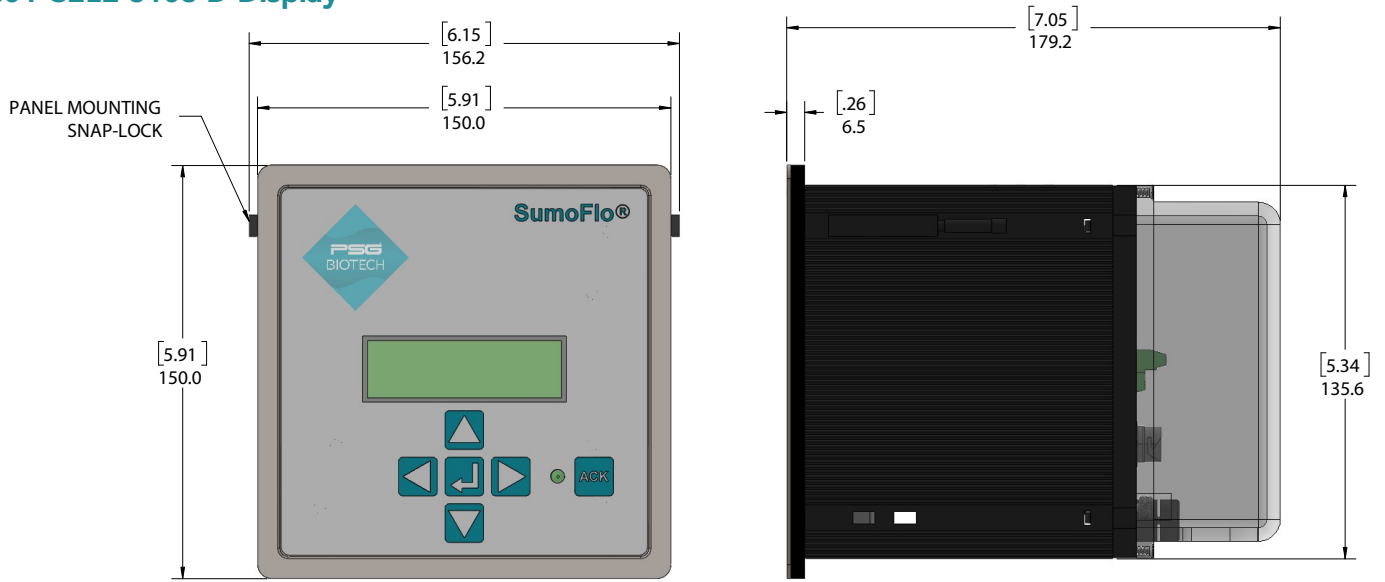
DIMS ARE IN: MM [IN]

## 4.02 Transmitter Dimension

**For Reference Only**

### CELE-8103-C Transmitter

138.5 $\begin{bmatrix} 5.45 \end{bmatrix}$

42.6 $\begin{bmatrix} 1.68 \end{bmatrix}$

DIN Mount
Latch Release

Stainless Steel Enclosure

VENTING - KEEP CLEAR

35mm "Top Hat" Rail
DIN Mount
(Per EN50022)

Configuration
Port Access

78.2 $\begin{bmatrix} 3.08 \end{bmatrix}$

User I/O

⌀ DIN Rail

177.8 $\begin{bmatrix} 7.00 \end{bmatrix}$

Status

35 [1.38]
When Installed

Zero

99.6 $\begin{bmatrix} 3.92 \end{bmatrix}$

Sensor

VENTING - KEEP CLEAR

Chassis
Ground

114.3 $\begin{bmatrix} 4.50 \end{bmatrix}$
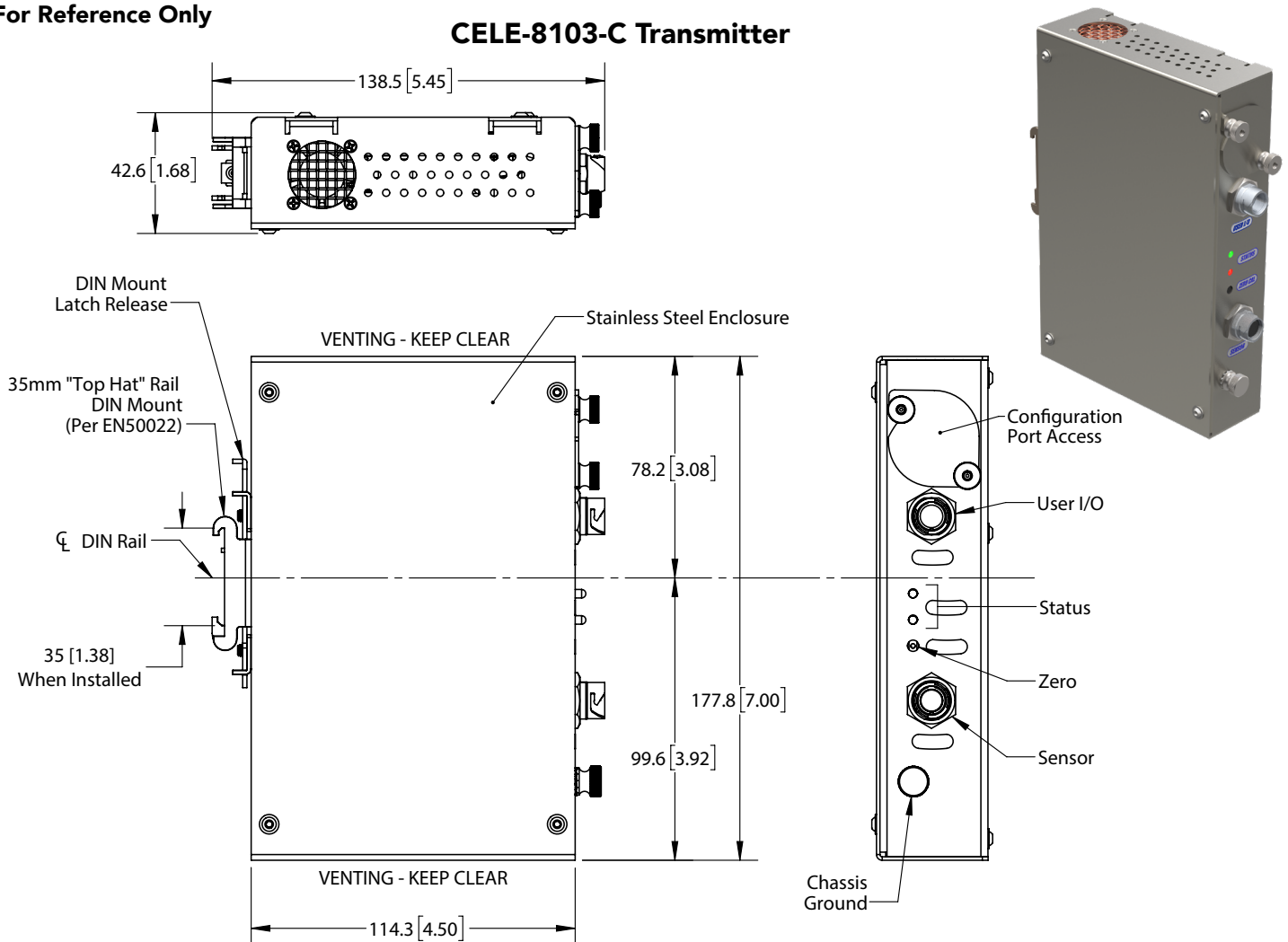
# 4.00 Dimension Drawing

## 4.03 Single-Use Sensor Dimensions

**For Reference Only**
**Note:** Mounting Cradle is required for CE compliance.

### CSEN-8103-RA031 Sensor - 3mm
1/4" Barb Connections, Standard Inline Configuration

(137.4[5.41])    130.3[5.13]

(74.9[2.95])

(19.3[.76])

1/4" BARB IN        1/4" BARB OUT

TRANSMITTER CONNECTION

(83[3.27])

(39.8[1.57])

166[6.54]

(94.8[3.73])
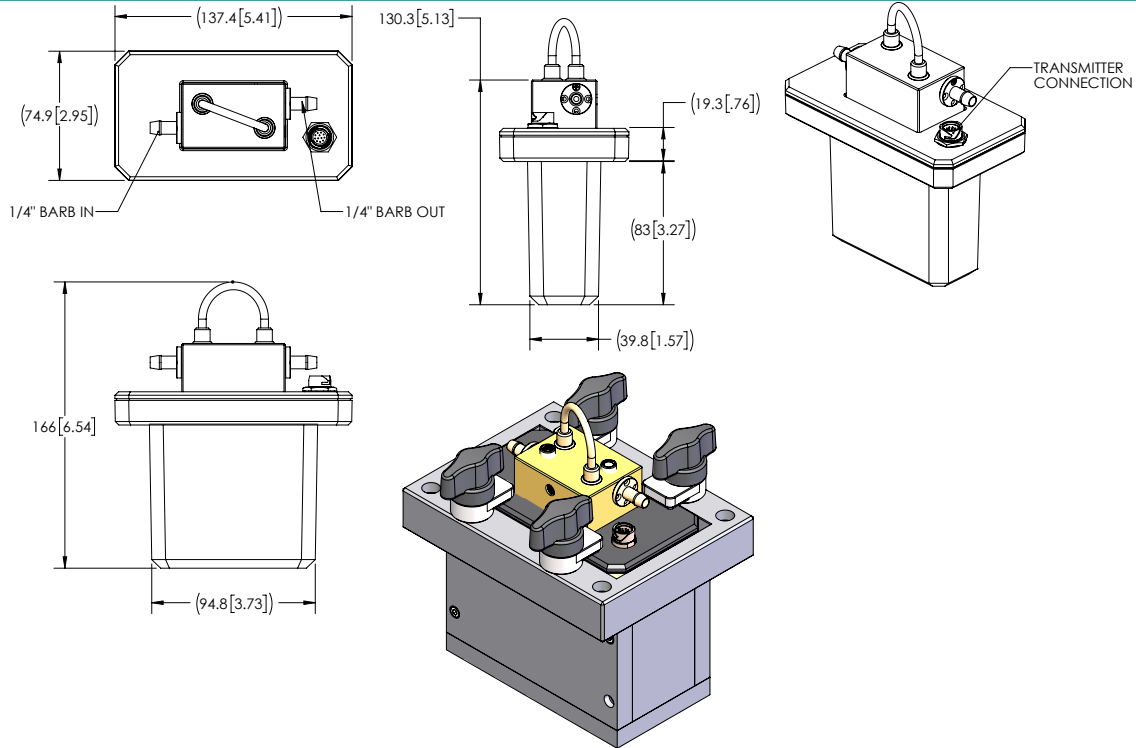
### CSEN-8103-R-062 Sensor (0.15 – 5 kg/min or l/min, 1/4")
1/4" Barb Connections, Inline Configuration

**216.0[8.50]**

**179.6[7.07]**

**115.0[4.53]**

**1/4" Barb In**

**1/4" Barb Out**

**2X 26.8[1.05]**

**Power & I/O Connection**

**Millimeters [Inches]
Not to scale**

**275.8[10.86]**

# 4.00 Dimension Drawing

## 4.03 Single-Use Sensor Dimensions (Continued)

**For Reference Only**
**Note:** Mounting Cradle is required for CE compliance.

### CSEN-8103-R-063 Sensor (0.18 – 9 kg/min or l/min, 3/8")
3/8" Barb Connections, Inline Configuration

212.0 [8.35]
179.6 [7.07]
115.0 [4.53]

3/8" Barb In

3/8" Barb Out

2X 26.8 [1.05]

Power & I/O Connection

Millimeters [Inches]
Not to scale

275.8 [10.86]

### CSEN-8103-R-082 Sensor (0.4 – 20 kg/min or l/min, 1/2")
1/2" Barb Connections, Inline Configuration

213.4 [8.40]
179.6 [7.07]
115.0 [4.53]

1/2" Barb In

1/2" Barb Out

2X 26.7 [1.05]

Power & I/O Connection

Millimeters [Inches]
Not to scale

275.8 [10.86]

# 4.00 Dimension Drawing

## 4.03 Single-Use Sensor Dimensions (Continued)

**For Reference Only**
**Note:** Mounting Cradle is required for CE compliance.

### CSEN-8103-R-152 Sensor (3 – 60 kg/min or l/min, 3/4")
3/4" Barb Connections, Inline Configuration

277.8 [10.94]
220.3 [8.67]
135.0 [5.31]
3/4" Barb In
36.6 [1.44]
3/4" Barb Out
Power & I/O Connection
348.5 [13.72]

**Millimeters [Inches]**
**Not to scale**

### CSEN-8103-R-153 Sensor (5 – 100 kg/min or l/min, 1")
1" Barb Connections, Inline Configuration

288.6 [11.36]
220.3 [8.67]
135.0 [5.31]
1" Barb In
36.6 [1.44]
1" Barb Out
Power & I/O Connection
348.5 [13.72]

**Millimeters [Inches]**
**Not to scale**

21

# 4.00 Dimension Drawing

## 4.03 Single-Use Sensor Dimensions (Continued)

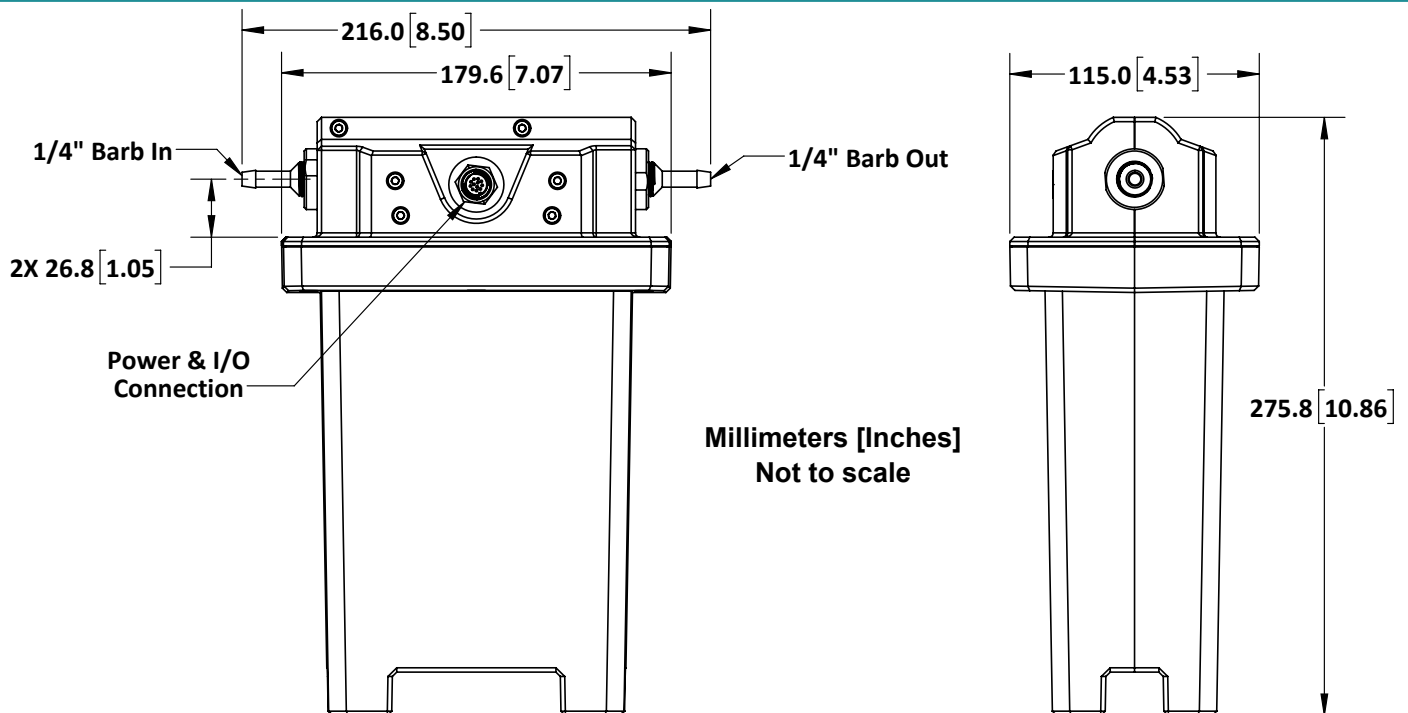**For Reference Only**
**Note:** Mounting Cradle is required for CE compliance.

### CSEN-8103-CA031 Sensor - 3mm
1/4" Barb Connections, Standard Vertical inlet Configuration

(137.4[5.41])
(74.9[2.95])
1/4" BARB IN
1/4" BARB OUT
162.7[6.41]
19.3[.76]
130.3[5.13]
(83[3.27])
(39.8[1.57])
(94.8[3.73])
TRANSMITTER CONNECTION

### CSEN-8103-C-031 Sensor (0.05 – 1.5 kg/min or l/min, 1/8" barb)
1/8" Barb Connections, Standard Vertical Inlets Configuration
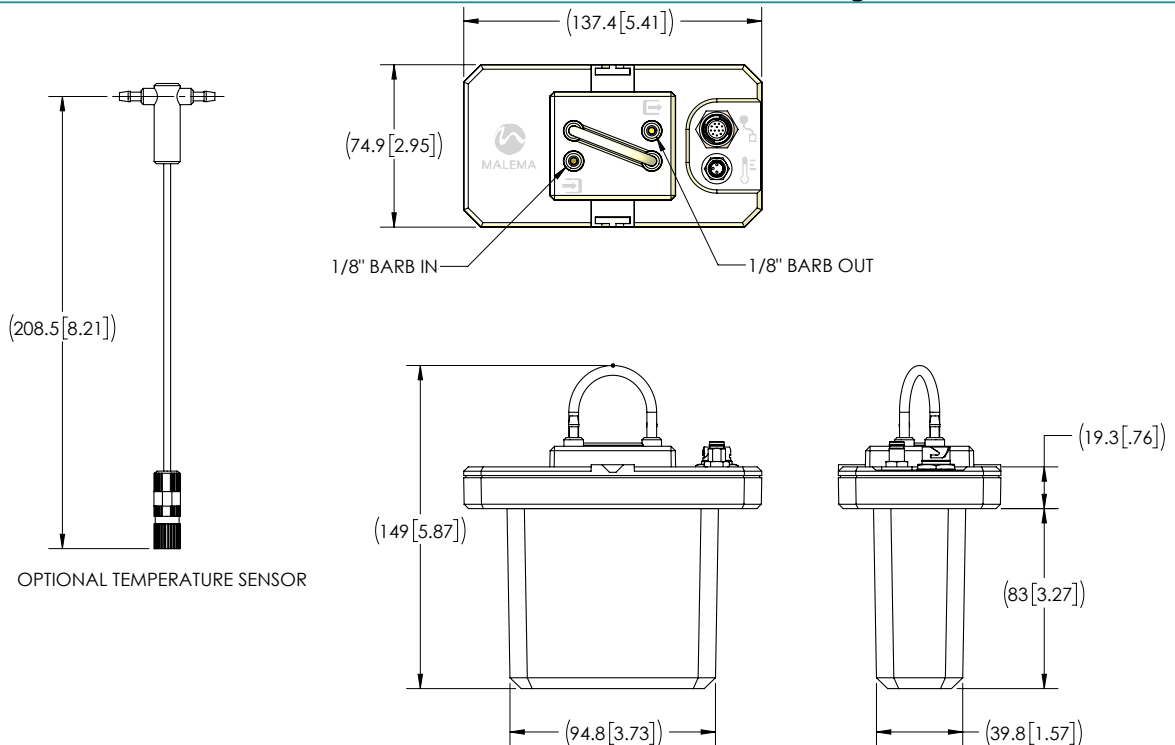
(137.4[5.41])
(74.9[2.95])
MALEMA
1/8" BARB IN
1/8" BARB OUT
(208.5[8.21])
OPTIONAL TEMPERATURE SENSOR
(149[5.87])
(19.3[.76])
(83[3.27])
(94.8[3.73])
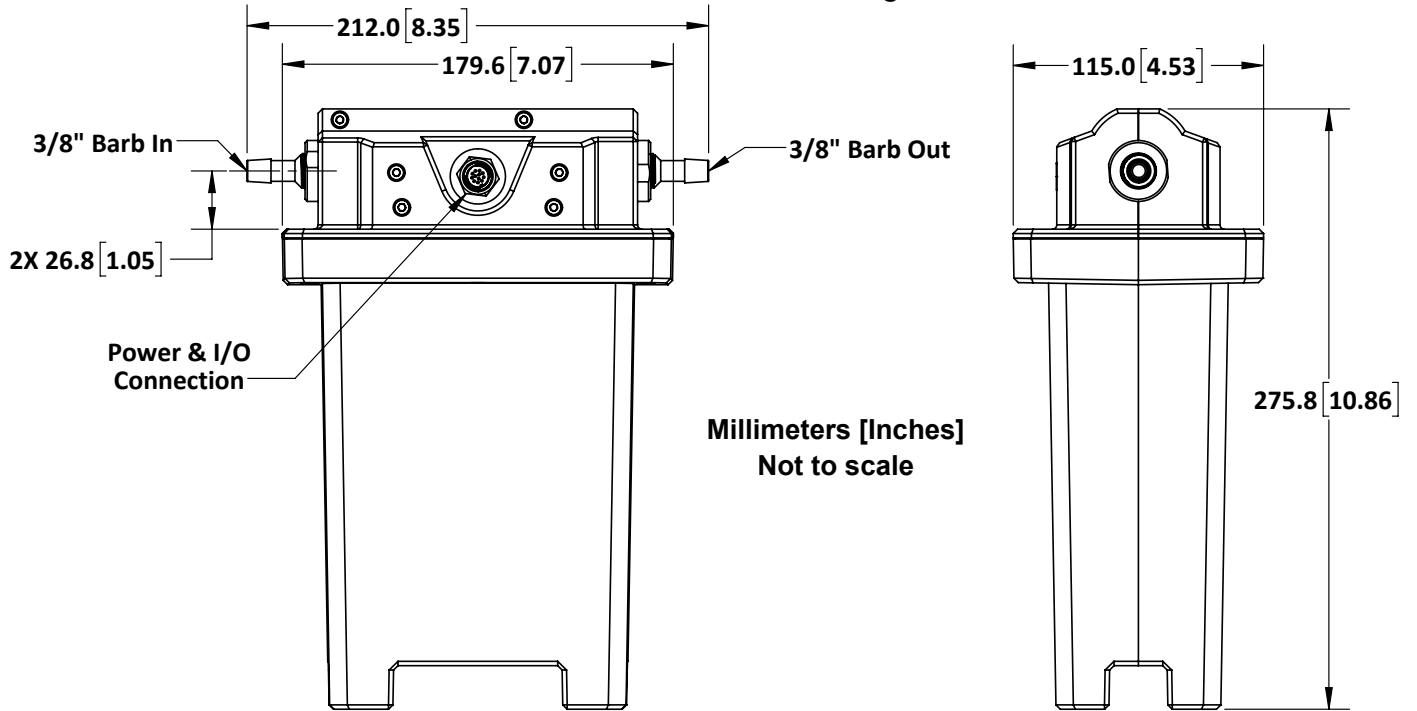(39.8[1.57])

# 4.00 Dimension Drawing

## 4.03 Single-Use Sensor Dimensions (Continued)

**For Reference Only**
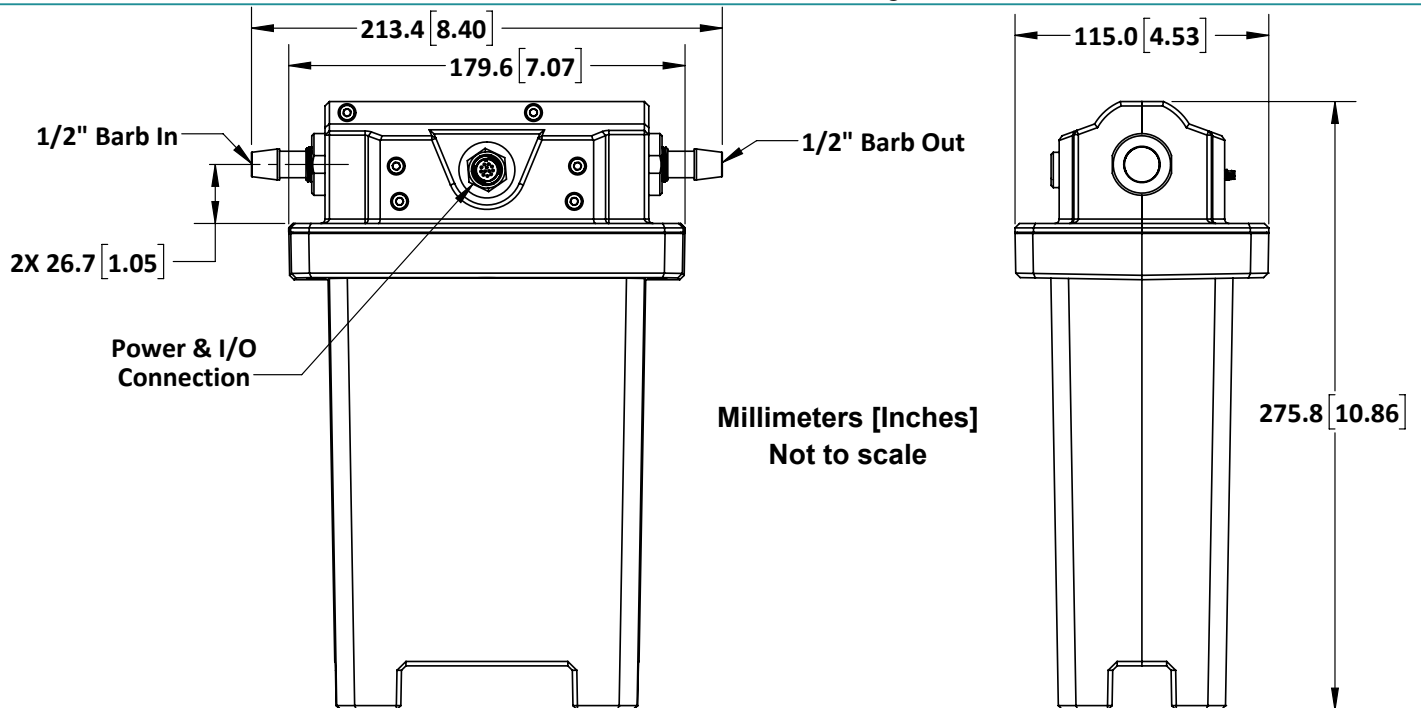**Note:** Mounting Cradle is required for CE compliance.

### CSEN-8103-C-062 Sensor (0.25 – 5 kg/min or l/min, 1/4" barb)
1/4" Barb Connections, Standard Vertical Inlets Configuration

179.5[7.07]

1/4" Barb Out

115[4.53]

Millimeters [Inches]
Not to scale

1/4" Barb In

Power & I/O Connection

2X 55.6[2.19]
Barb Height

276.1[10.87] Nominal
Overall Height

220.5[8.68]

### CSEN-8103-C-063 Sensor (0.45 – 9 kg/min or l/min, 3/8" barb)
3/8" Barb Connections, Standard Vertical Inlets Configuration

179.5[7.07]

3/8" Barb Out

115.0[4.53]

Millimeters [Inches]
Not to scale

3/8" Barb In

Power & I/O Connection

60.1[2.37]

280.7[11.05]
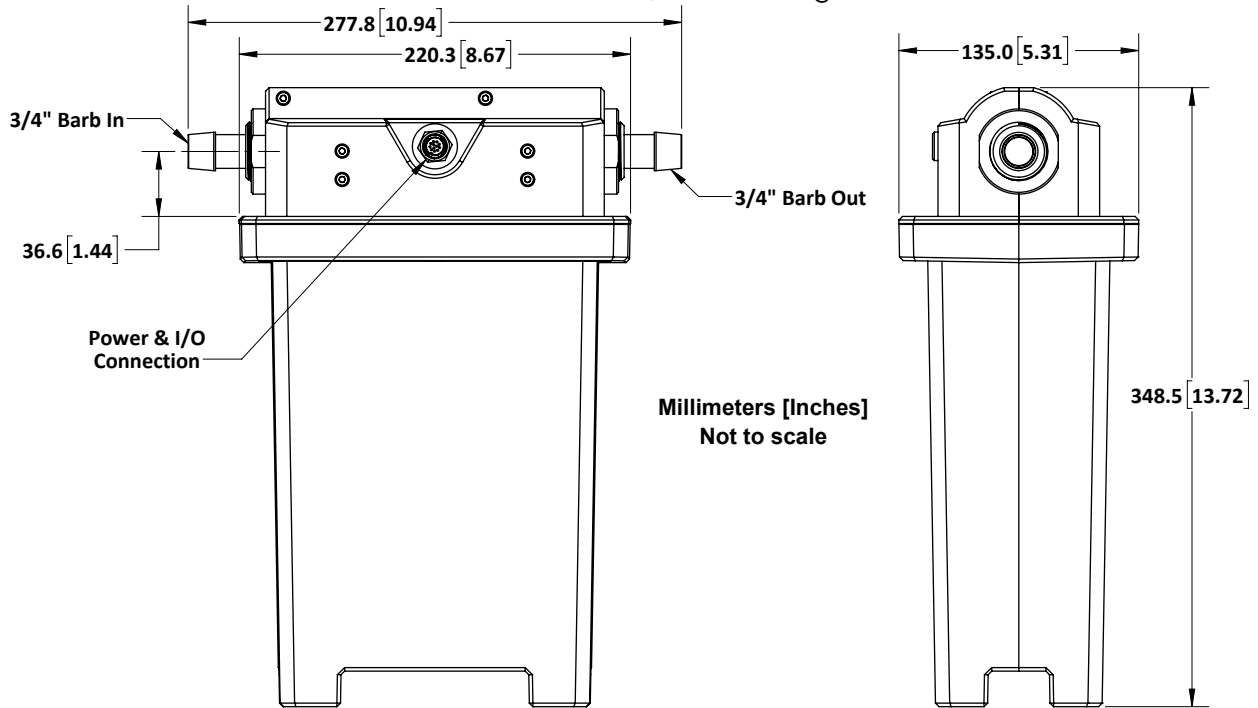Overall Height

220.5[8.68]

# 4.00 Dimension Drawing

## 4.03 Single-Use Sensor Dimensions (Continued)

**For Reference Only**
**Note:** Mounting Cradle is required for CE compliance.

### CSEN-8103-C-082 Sensor (1 – 20 kg/min or l/min, 1/2" MiniTC)
1/2" Mini-Tri-Clamp Connections, Standard Vertical Inlets Configuration

179.5 [7.07]   115.0 [4.53]

Transmitter

OUT

IN

271.1 [10.67]

### CSEN-8103-C-082 Sensor (1 – 20 kg/min or l/min, 1/2" barb)
1/2" Barb Connections, Standard Vertical Inlets Configuration

179.5 [7.07]

1/2" Barb Out

115.0 [4.53]

Millimeters [Inches]
Not to scale

1/2" Barb In

Power & I/O Connection

62.7 [2.47]

283.2 [11.15]
Overall Height

220.5 [8.68]

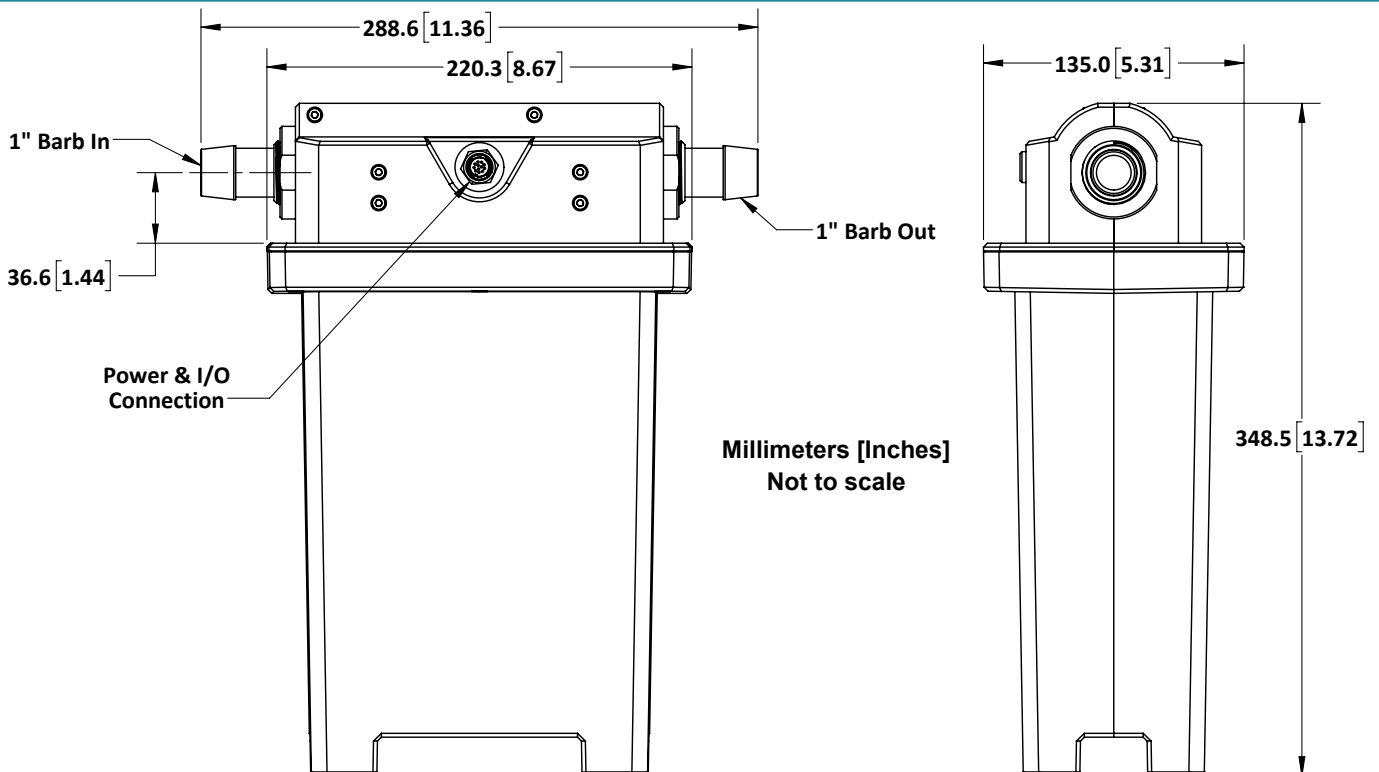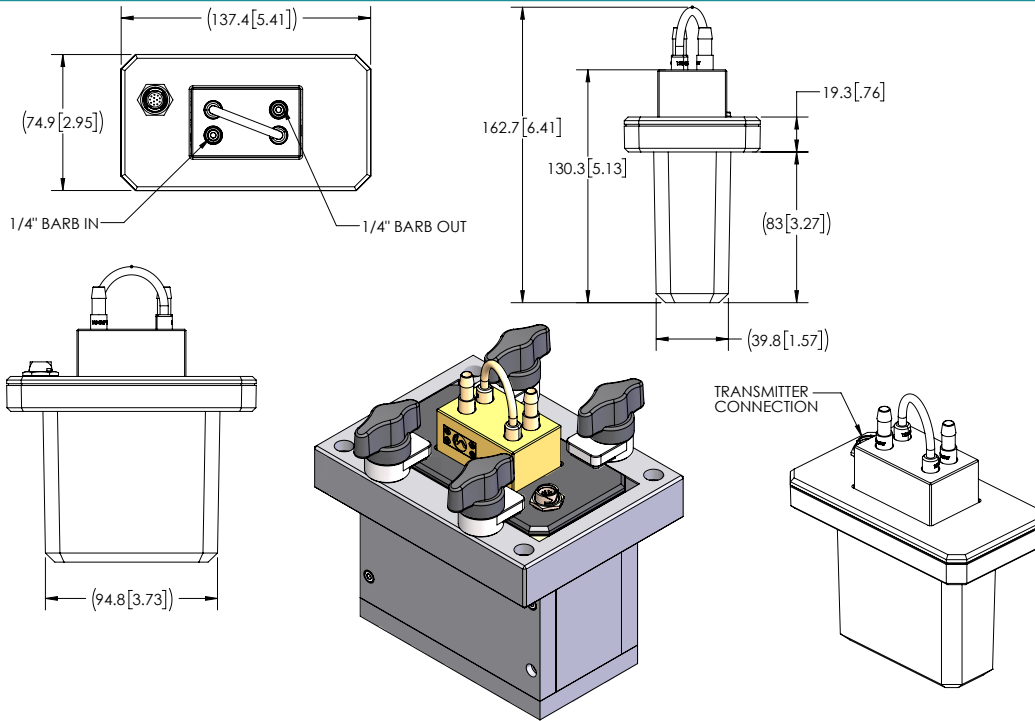# 4.00 Dimension Drawing

## 4.03 Single-Use Sensor Dimensions (Continued)

**For Reference Only**
**Note:** Mounting Cradle is required for CE compliance.

### CSEN-8103-C-152 Sensor (3 – 60 kg/min or l/min, 3/4" MiniTC)
3/4" Mini-Tri-Clamp Connections, Standard Vertical Inlets Configuration

219.8 [8.66]    135.0 [5.31]

Transmitter

IN    OUT

337.3 [13.28]

### CSEN-8103-C-152 Sensor (3 – 60 kg/min or l/min, 3/4" Barb)
3/4" Barb Connections, Standard Vertical Inlets Configuration
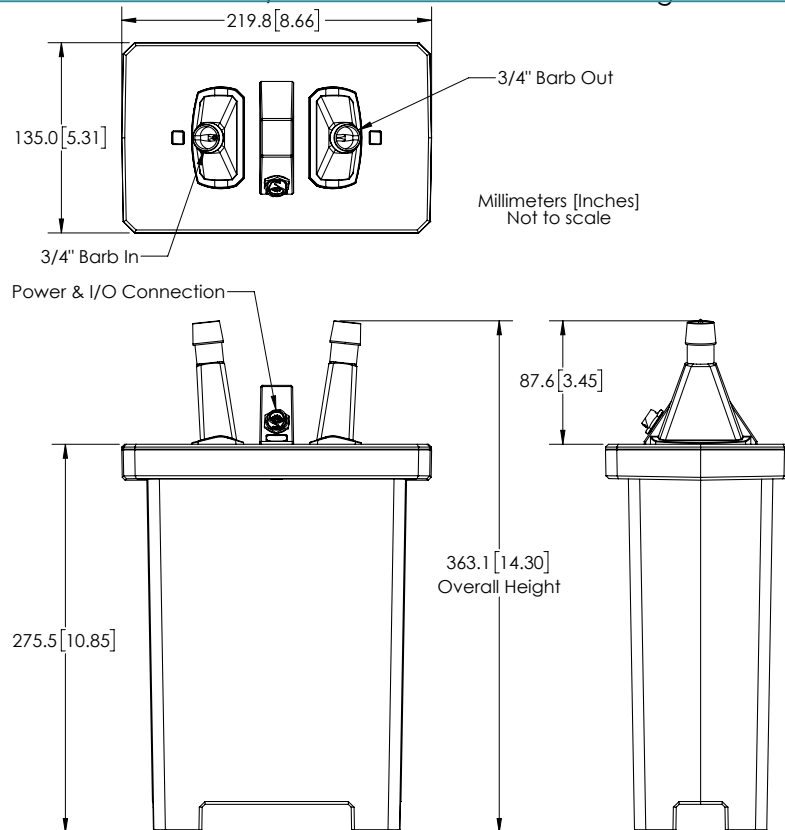
219.8 [8.66]

3/4" Barb Out

135.0 [5.31]

Millimeters [Inches]
Not to scale

3/4" Barb In

Power & I/O Connection

87.6 [3.45]

363.1 [14.30]
Overall Height

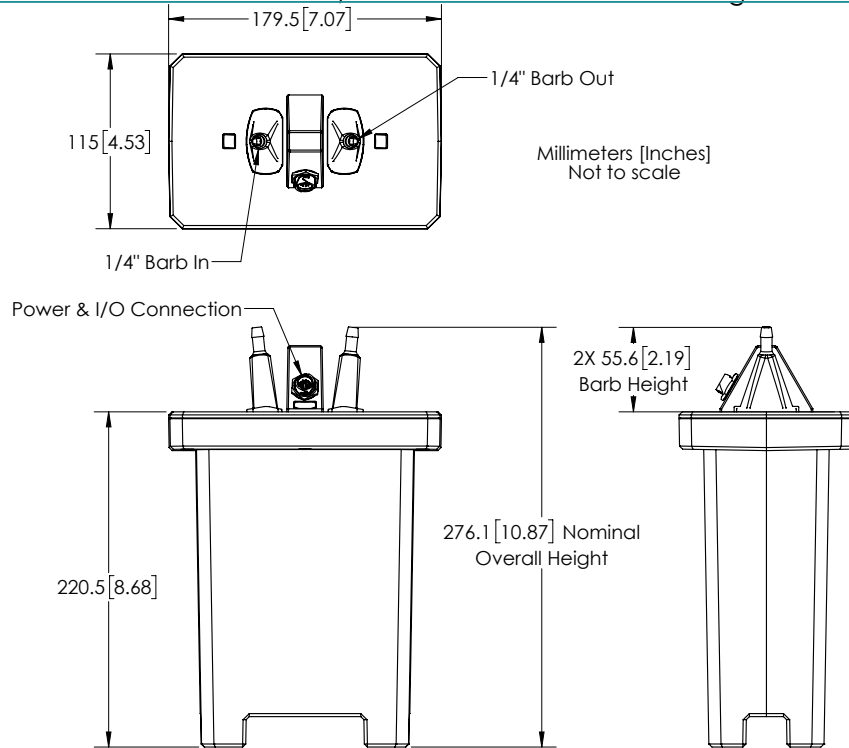275.5 [10.85]

# 4.00 Dimension Drawing

## 4.03 Single-Use Sensor Dimensions (Continued)

**For Reference Only**
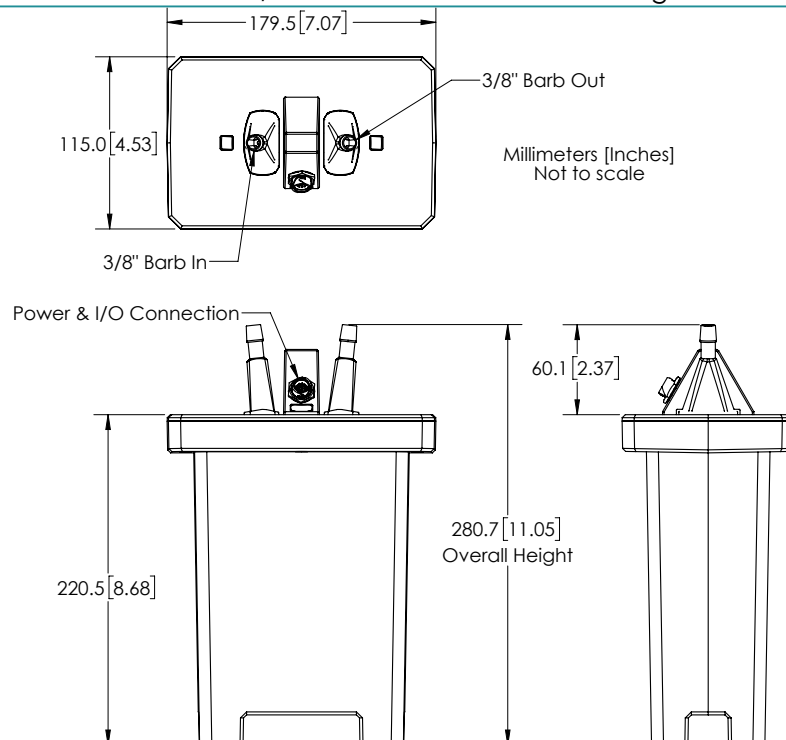**Note:** Mounting Cradle is required for CE compliance.

### CSEN-8103-C-153 Sensor (5 – 100 kg/min or l/min, 1" TC)
1" - 1 1/2" Tri-Clamp Connections, Standard Vertical Inlets Configuration

219.8 [8.66]

Transmitter

IN          OUT

135.0 [5.31]

350.3 [13.79]

### CSEN-8103-C-153 Sensor (5 – 100 kg/min or l/min, 1" Barb)
1" Barb Connections, Standard Vertical Inlets Configuration

1" Barb Out

Millimeters [Inches]
Not to scale

1" Barb In

Power & I/O Connection

88.4 [3.48]

363.9 [14.33]
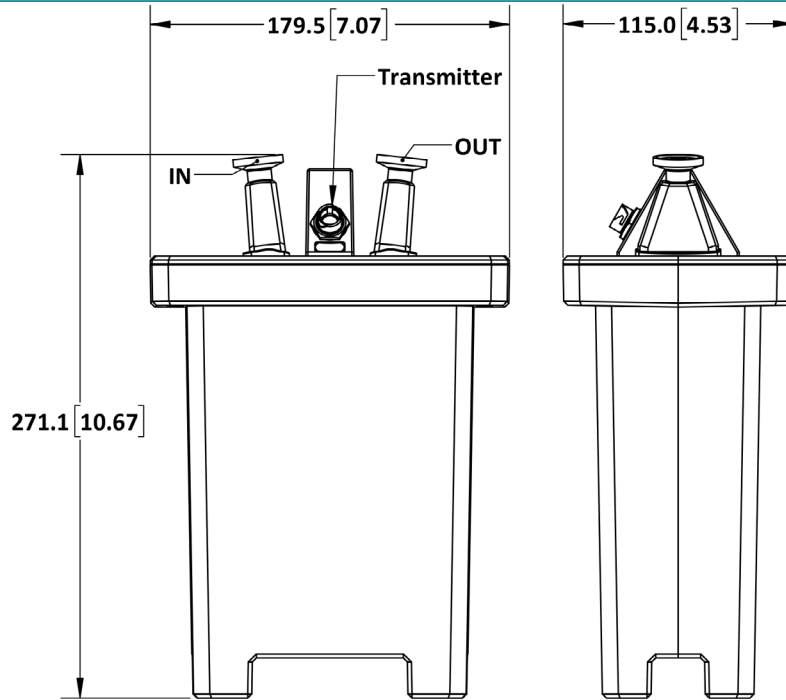Overall Height

275.5 [10.85]

26

# 4.00 Dimension Drawing

## 4.03 Single-Use Sensor Dimensions (Continued)

**For Reference Only**
**Note:** Mounting Cradle is required for CE compliance.

### CSEN-8103-P-062 Sensor (0.25 – 5 kg/min or l/min, 1/4")
1/4" Barb Connections, Panel Mount Configuration

179.5[7.07]

1/4" Barb Out

115[4.53]

Millimeters [Inches]
Not to scale

1/4" Barb In

2X 55.6[2.19]
Barb Height

276.1[10.87] Nominal
Overall Height

220.5[8.68]

Power & I/O Connection

### CSEN-8103-P-063 Sensor (0.45 – 9 kg/min or l/min, 3/8")
3/8" Barb Connections, Panel Mount Configuration

179.5[7.07]

3/8" Barb Out

115[4.53]

Millimeters [Inches]
Not to scale

3/8" Barb In

2X 60.1[2.37]
Barb Height

280.7[11.05] Nominal
Overall Height

220.5[8.68]

Power & I/O Connection

# 4.00 Dimension Drawing
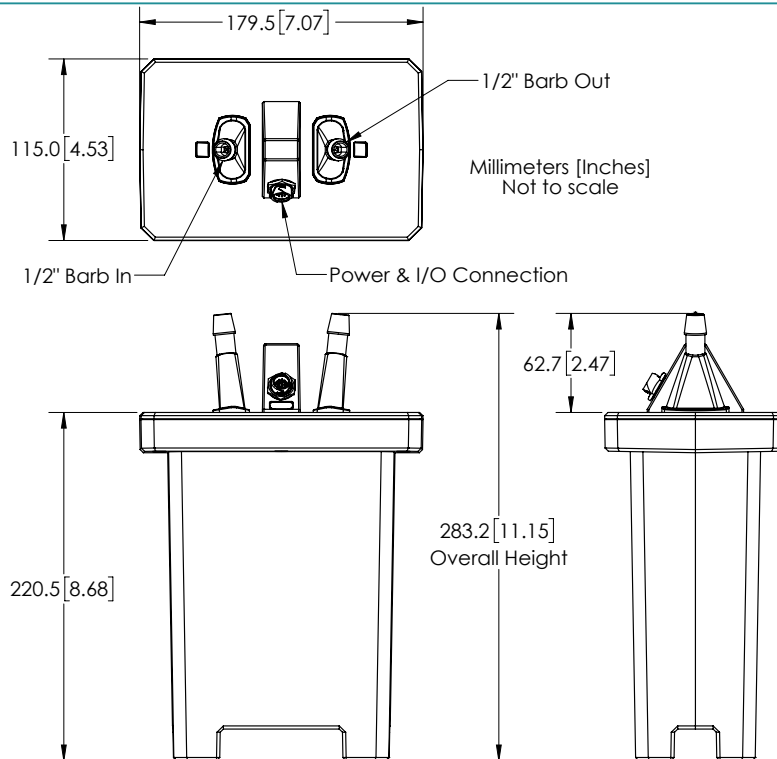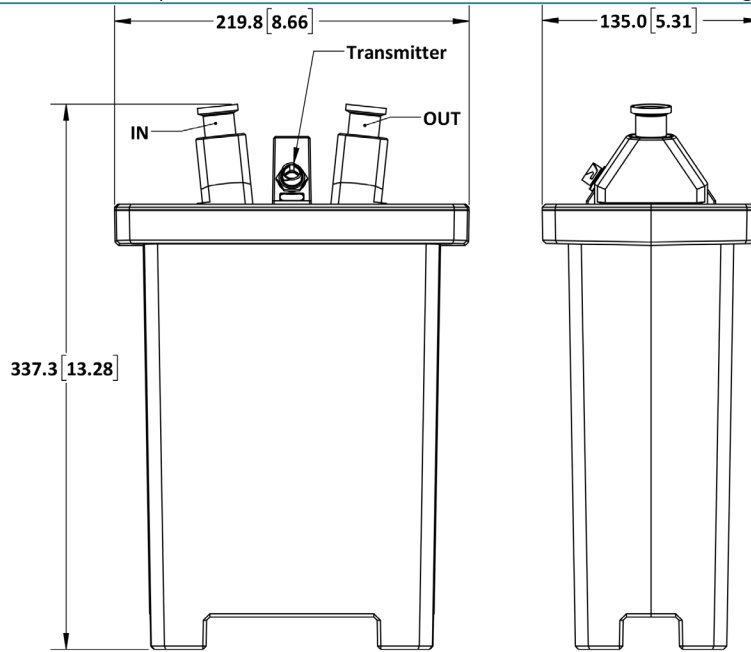
## 4.03 Single-Use Sensor Dimensions (Continued)

**For Reference Only**
**Note:** Mounting Cradle is required for CE compliance.

### CSEN-8103-P-082 Sensor (1 – 20 kg/min or l/min, 1/2")
1/2" Barb Connections, Panel Mount Configuration

179.5[7.07]

1/2" Barb Out

115.0[4.53]

Millimeters [Inches]
Not to scale

1/2" Barb In

62.7[2.47]

283.2[11.15]
Overall Height

220.5[8.68]

Power & I/O Connection
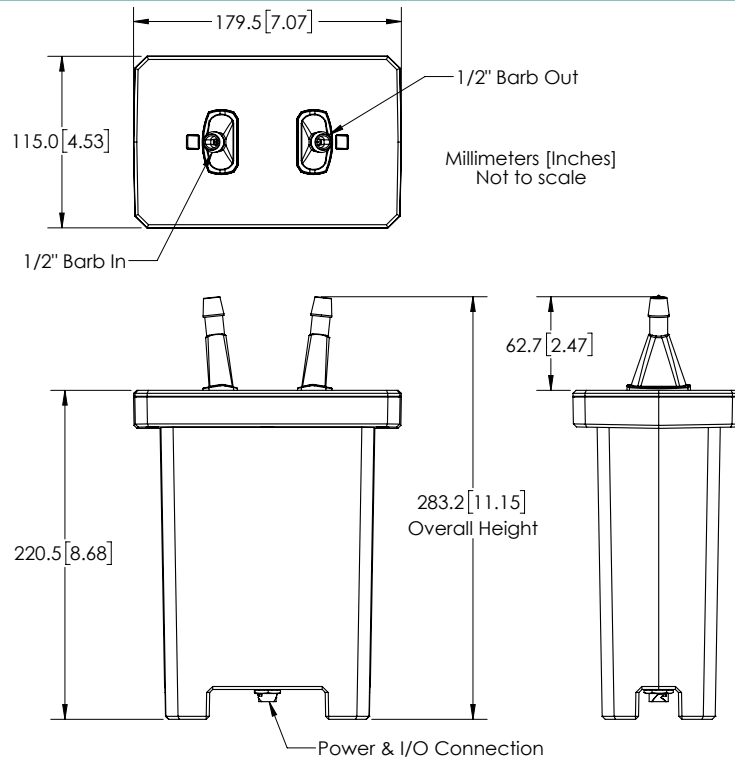
### CSEN-8103-P-152 Sensor (3 – 60 kg/min or l/min, 3/4")
3/4" Barb Connections, Panel Mount Configuration
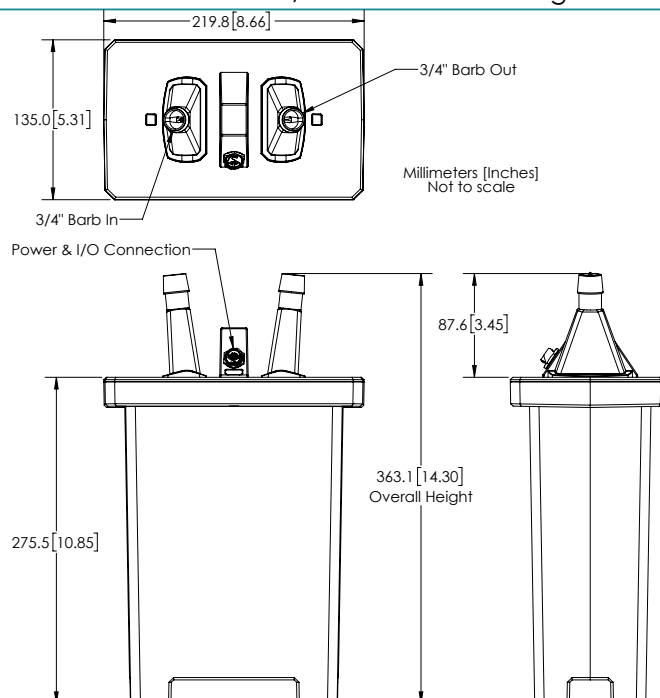
219.8[8.66]

3/4" Barb Out

135.0[5.31]

Millimeters [Inches]
Not to scale

3/4" Barb In

Power & I/O Connection

87.6[3.45]

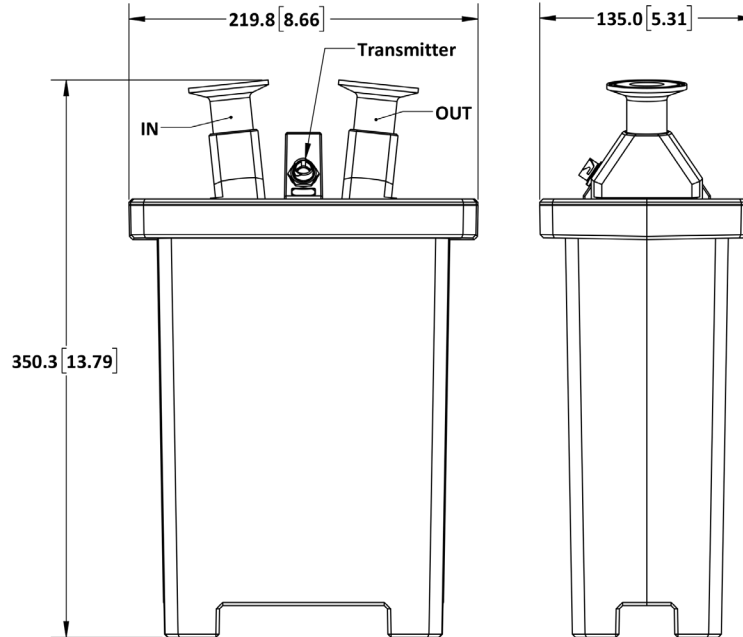363.1[14.30]
Overall Height

275.5[10.85]

# 4.00 Dimension Drawing

## 4.03 Single-Use Sensor Dimensions (Continued)

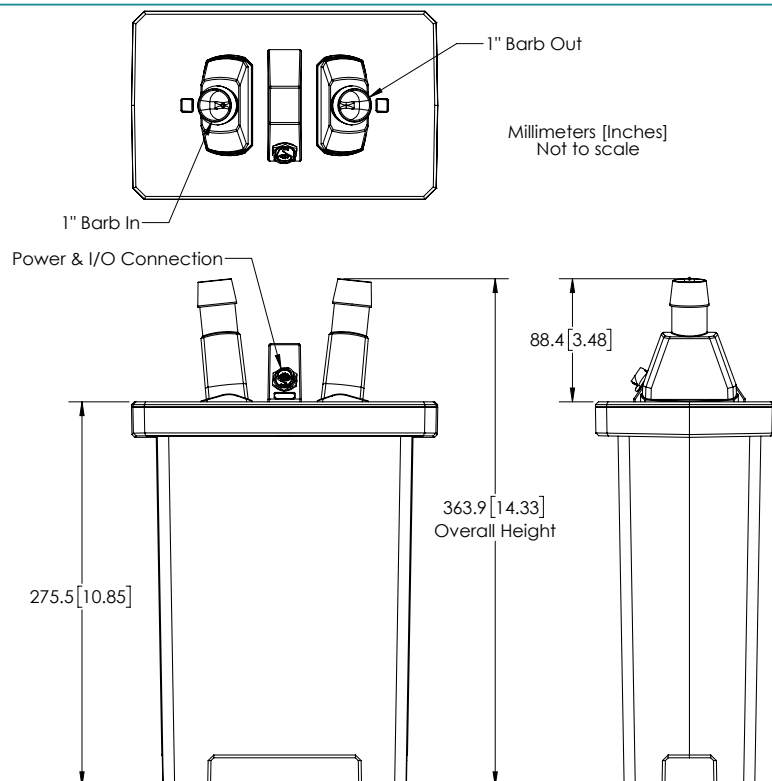**For Reference Only**
**Note:** Mounting Cradle is required for CE compliance.

### CSEN-8103-P-153 Sensor (5 – 100 kg/min or l/min, 1")
1" Barb Connections, Panel Mount Configuration

1" Barb Out

Millimeters [Inches]
Not to scale

1" Barb In

88.4[3.48]

363.9[14.33]
Overall Height

275.5[10.85]

Power & I/O Connection
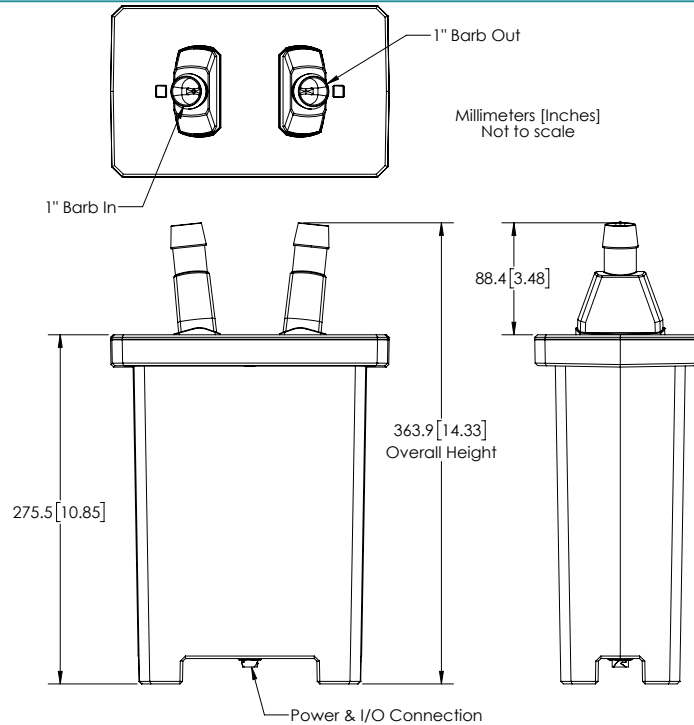
### CSEN-8103-T-063 Sensor (0.18 – 9 kg/min or l/min, 3/8")
3/8" Barb Connections, Added height Inline Configuration
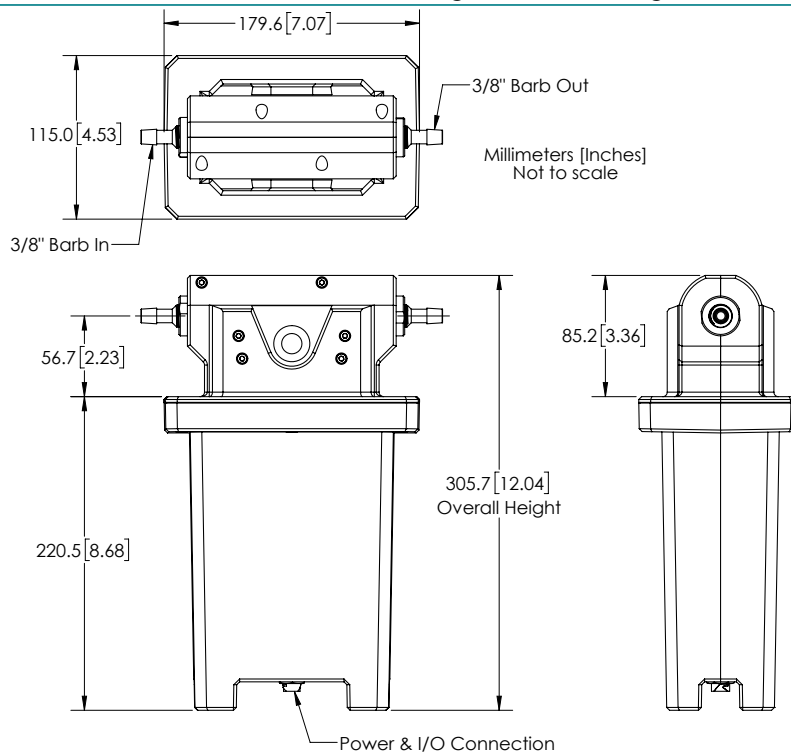
179.6[7.07]

3/8" Barb Out

115.0[4.53]

Millimeters [Inches]
Not to scale

3/8" Barb In

56.7[2.23]

85.2[3.36]

305.7[12.04]
Overall Height
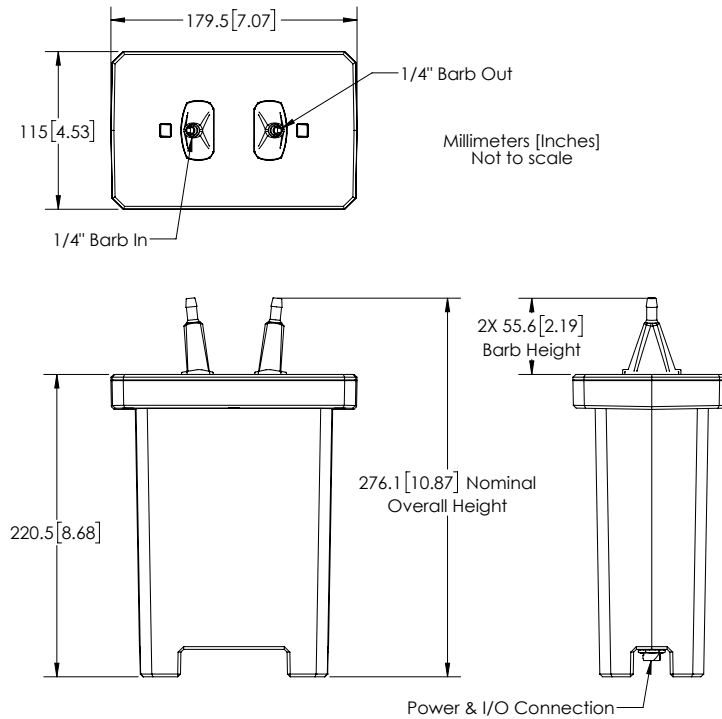
220.5[8.68]

Power & I/O Connection

# 4.00 Dimension Drawing
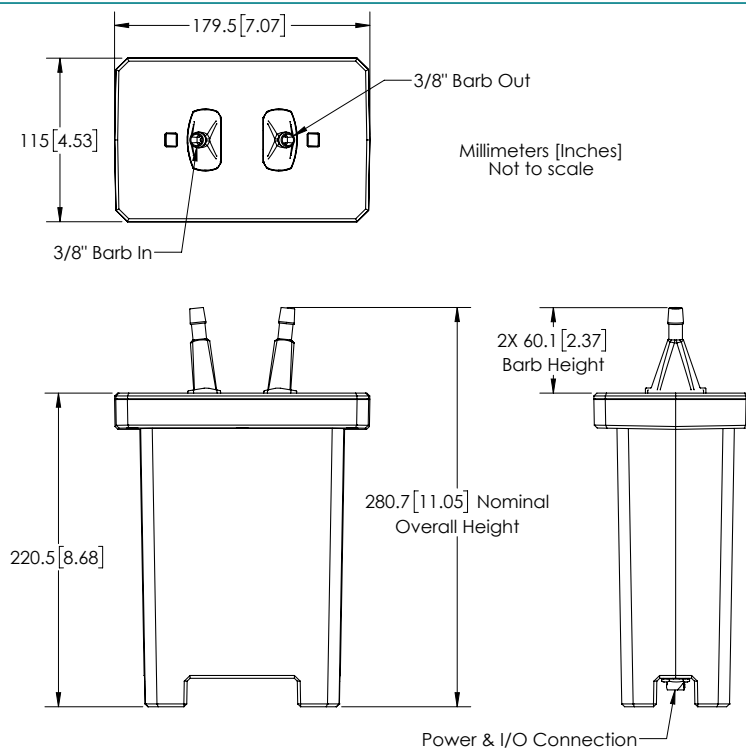
## 4.03 Single-Use Sensor Dimensions (Continued)

**For Reference Only**
**Note:** Mounting Cradle is required for CE compliance.

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### CSEN-8103-T-082 Sensor (0.4 – 20 kg/min or l/min, 1/2")
1/2" Barb Connections, Added height Inline Configuration
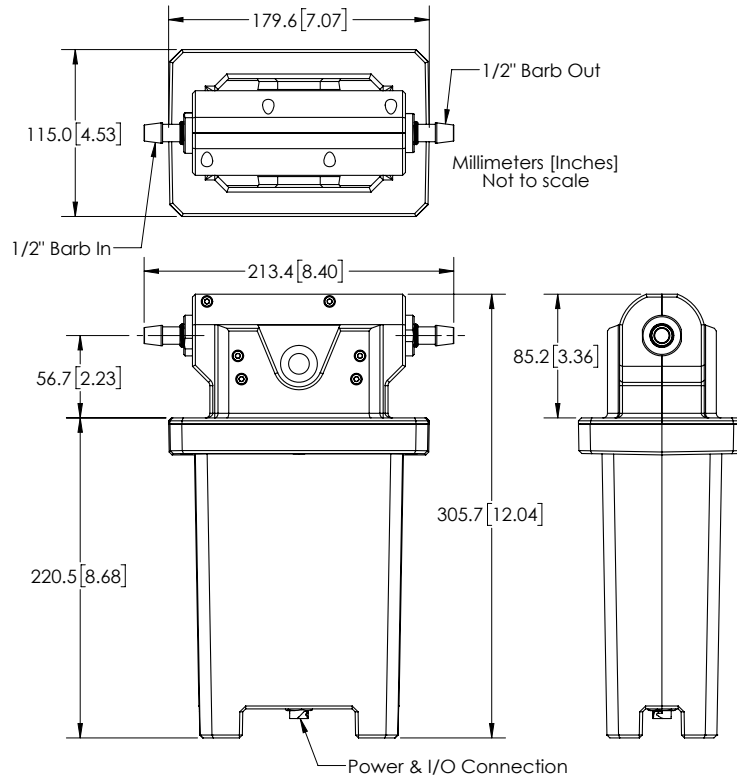
179.6[7.07]

1/2" Barb Out

115.0[4.53]

Millimeters [Inches]
Not to scale

1/2" Barb In

213.4[8.40]

85.2[3.36]

56.7[2.23]

305.7[12.04]

220.5[8.68]

Power & I/O Connection

# 4.00 Dimension Drawing

## 4.04 Mounting Cradle Dimensions

**FOR REFERENCE ONLY**
**Note:** Mounting Cradle is required for CE compliance.

### ENCL-MOUNT-8103-03HC-001
Mounting Cradle for 1/8" sensors
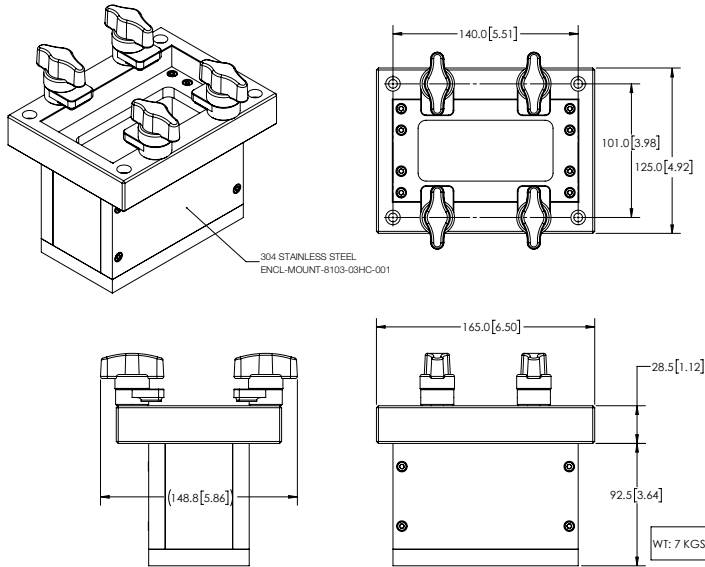


### ENCL-MOUNT-8103-08HC-001
Standard Mounting Cradle for 1/4, 3/8, and 1/2" sensors
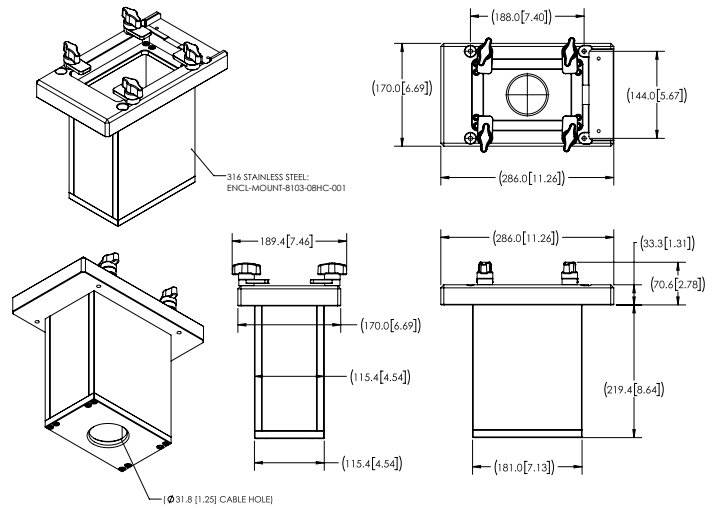


### ENCL-MOUNT-8103-08HC-002
Standard Mounting Cradle for 1/4, 3/8, and 1/2" sensors



### ENCL-MOUNT-8103-08HC-002
Standard Mounting Cradle for 1/4, 3/8, and 1/2" sensors



31

# 4.00 Dimension Drawing

## 4.04 Mounting Cradle Dimensions

**FOR REFERENCE ONLY**
**Note:** Mounting Cradle is required for CE compliance.

### ENCL-MOUNT-8103-15HC-004
Mounting Flange for 3/4" and 1" sensors



SHEET METAL ENCLOSURE
NO HOLE ON THE BOTTOM

[.35]
4X Ø9.00
PANEL MOUNTING HOLE
FOR M8 SCREW
THESE HOLES MATCHED THE
GASKET SCREW HOLES
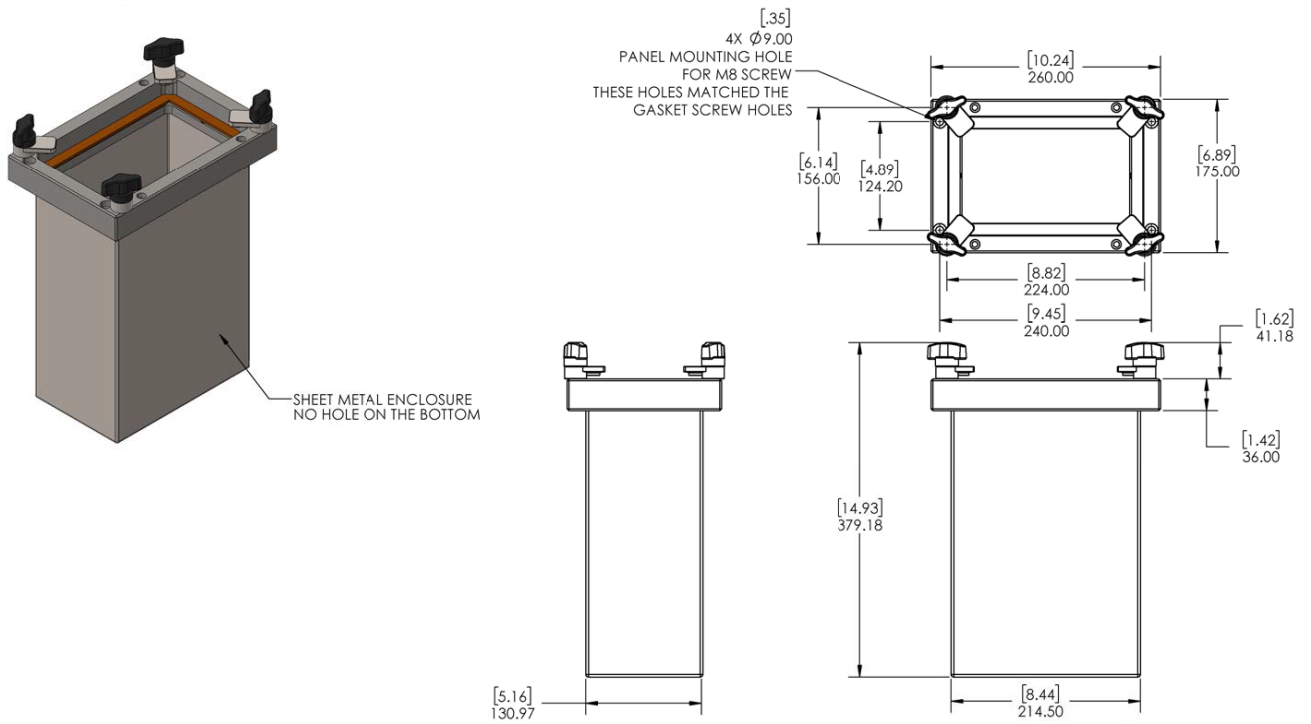
# 5.00 Testing

## 5.01 Pressure Drop in DI Water

**Test Conditions: DI Water at 25°C**

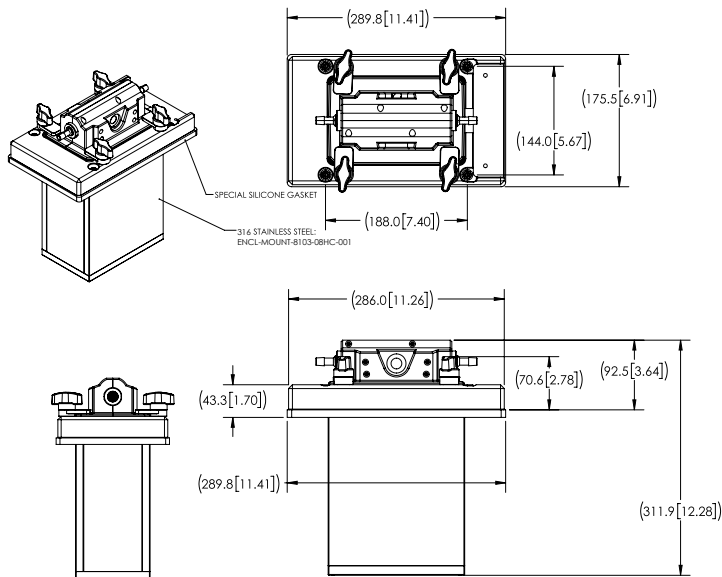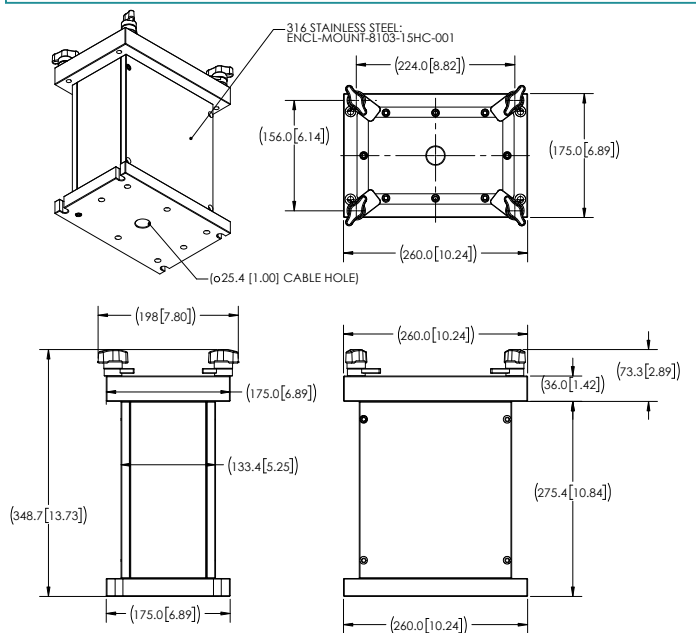| Sensor Range Code 031 (1/8" barb) | |
|---|---|
| **Flow Rate** | **Pressure Drop** |
| 50 g/min | 0.01 psi (0.08 kPa) |
| 150 g/min | 0.10 psi (0.69 kPa) |
| 400 g/min | 0.71 psi (4.90 kPa) |
| 800 g/min | 2.84 psi (19.61 kPa) |
| 1200 g/min | 6.40 psi (44.13 kPa) |
| 1500 g/min | 10.00 psi (68.95 kPa) |

| Sensor Range Code 062 (1/4" barb) | |
|---|---|
| **Flow Rate** | **Pressure Drop** |
| 500 g/min | 0.10 psi (0.69 kPa) |
| 750 g/min | 0.23 psi (1.55 kPa) |
| 1500 g/min | 0.90 psi (6.21 kPa) |
| 2500 g/min | 2.50 psi (17.24 kPa) |
| 3750 g/min | 5.63 psi (38.78 kPa) |
| 5000 g/min | 10.00 psi (68.95 kPa) |

| Sensor Range Code 063 (3/8" barb) | |
|---|---|
| **Flow Rate** | **Pressure Drop** |
| 900 g/min | 0.10 psi (0.69 kPa) |
| 1688 g/min | 0.35 psi (2.42 kPa) |
| 3375 g/min | 1.40 psi (9.70 kPa) |
| 5063 g/min | 3.16 psi (21.82 kPa) |
| 6750 g/min | 5.63 psi (38.78 kPa) |
| 9000 g/min | 10.00 psi (68.95 kPa) |

| Sensor Range Code 082 (1/2" barb) | |
|---|---|
| **Flow Rate** | **Pressure Drop** |
| 2000 g/min | 0.10 psi (0.69 kPa) |
| 5000 g/min | 0.63 psi (4.31 kPa) |
| 7500 g/min | 1.41 psi (9.70 kPa) |
| 10000 g/min | 2.50 psi (17.24 kPa) |
| 15000 g/min | 5.63 psi (38.78 kPa) |
| 20000 g/min | 10.00 psi (68.95 kPa) |

| Sensor Range Code 151 & 152 (3/4" barb) | |
|---|---|
| **Flow Rate** | **Pressure Drop** |
| 6000 g/min | 0.10 psi (0.69 kPa) |
| 12000 g/min | 0.40 psi (2.76 kPa) |
| 21000 g/min | 1.23 psi (8.45 kPa) |
| 35000 g/min | 3.40 psi (23.46 kPa) |
| 50000 g/min | 6.94 psi (47.88 kPa) |
| 60000 g/min | 10.00 psi (68.95 kPa) |

| Sensor Range Code 153 (1" barb) | |
|---|---|
| **Flow Rate** | **Pressure Drop** |
| 10000 g/min | 0.10 psi (0.69 kPa) |
| 20000 g/min | 0.40 psi (2.76 kPa) |
| 50000 g/min | 2.50 psi (17.24 kPa) |
| 75000 g/min | 5.63 psi (38.78 kPa) |
| 87000 g/min | 7.57 psi (52.19 kPa) |
| 100000 g/min | 10.00 psi (68.95 kPa) |

| Part Number | Hold Up Volume |
|---|---|
| CSEN-8103-RC031 ¼" | 6 ml |
| CSEN-8103-Rx062 ¼" | 25 ml |
| CSEN-8103-Rx063 3/8" | 25 ml |
| CSEN-8103-Rx082 ½" | 52 ml |
| CSEN-8103-Rx152 ¾" | 249 ml |
| CSEN-8103-Rx153 1" | 261 ml |

# 6.00 Troubleshooting

| Problem Statement: No analog flow output even with physical flow running | | |
|---|---|---|
| **Noted Symptom** | **Possible Cause** | **Follow up checks and possible fix** |
| **Flow readings on Malema GUI are zero** | Incorrect flow direction | Ensure physical flow direction is in accordance with the labels on the flowmeter. |
| | Huge zero offset | Zeroing must be done properly - zeroing should be done with any liquid (DI Water or WFI for example), preferably without bubbles in the line. Refer to Section **Zero Reset**. |
| | Incorrect parameters | Ensure sensor parameters have not been accidentally changed. If needed, contact PSG Biotech for factory parameters and reset the parameters. |
| | Faulty Electronics | Open Malema GUI and monitor Flow readings. If readings drop to zero sporadically (intermittent readings), check and record a sequence of events how such drop occurs and how it recovers, e.g. flow rate change, pump speed change, liquid temperature change, power cycle, etc. and communicate to PSG Biotech for further guidance. |
| **Flow readings on Malema GUI shows valid and stable flow rates** | Analog output wiring connection is incorrect | Check analog output wiring to tool's input/output interface. Make sure wiring is connected correctly and all terminals are clean and secured. **Note** - If the analog output is wired incorrectly, permanent damage can be caused to the sensor circuit board. |
| | Load resistance or impedance of input/output terminal not within specification | Confirm if load resistance or impedance of external input/output terminal is within specification. Max. Load < 900 ohms in case of current output and min. impedance > 10 K Ohm in case voltage output. |
| | Analog output of the transmitter is bad | Check analog signal directly on analog output wires of the transmitter (with the wires not connected to tool's input/output interface). Please consult factory if the analog output is bad or incorrect. |
| **Flow readings on Malema GUI shows an unstable flow rate** | Bubbles in the line | Check for large bubbles in the line (in excess of 30% by volume) and if needed purge the line. |
| | Actual flow is unstable | Check flow and pressure stability and take necessary actions to fix it |
| | Electrical noise in tool analog input/output board | Check signal with oscilloscope; if noisy, find source of noise and repair |
| | Issues with Power supply | Make sure power supply is able to supply required current; 24 V DC supplied is stable and clean; if required repair or replace power supply |
| **Problem Statement: Accuracy is off - unacceptable difference between flow readings and observed flow rate** | | |
| **Flow readings on GUI are different from what's transmitted to tool software interface** | Analog output wiring connection is incorrect | Check analog output wiring to tool's input/output interface. Make sure wiring is connected correctly and all terminals are clean and secured. **Note** - If the analog output is wired incorrectly, permanent damage can be caused to the sensor circuit board. |
| | Load resistance or impedance of input/output terminal not within specification | Confirm if load resistance or impedance of external input/output terminal is within specification. Max. Load< 900 ohms in case of current output and min. impedance> 10 K Ohm in case voltage output. |
| | Analog output of the flowmeter is bad | Check analog signal directly on analog output wires of the meter (with the wires not connected to tool's input/output interface).Please consult factory if the analog output is bad or incorrect. |
| | Wrong parameter settings | Check parameter settings of the meter such as full scale and flow unit, flow meter analog output specification (e.g. voltage vs. current outputs), scaling setting on tool's software, etc. |
| **Flow readings on GUI are identical to what's transmitted to tool software interface** | Huge Zero offset | Zero must be done properly - zeroing should be done with any liquid (DI Water or WFI for example), preferably without bubbles in the line. See page 7 for zeroing procedure. |

# 7.00 Order Information

## 7.01 Electronics

| Model Ordering Code | | | | | | | | | | | | | | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CELE-8103 | - | * | - | * | * | * | * | * | X | X | X | - | *** | **Transmitter** |
| | | D | | | | | | | | | | | | Panel out display |
| | | C | | | | | | | | | | | | DIN Rail Mounting (Non Display Only; CE) |
| | | Z | | | | | | | | | | | | Custom (Consult Factory) |
| | | | - | | | | | | | | | | | |
| **Temperature Compensation** | | | | T | | | | | | | | | | Use with Temperature Comp Sensors |
| **Temperature Compensation** | | | | Z | | | | | | | | | | Custom (Consult Factory) |
| **Output** | | | | | 1 | | | | | | | | | 1x 4-20mA, 1x D/O* |
| **Output** | | | | | 2 | | | | | | | | | 1x 4-20mA, 2x D/O* |
| **Output** | | | | | 3 | | | | | | | | | 1x 4-20mA, 1x D/O, MODBUS (RS485)* |
| **Output** | | | | | 7 | | | | | | | | | 4x 4-20mA, 0x D/O* |
| **Output** | | | | | 8 | | | | | | | | | 2x 4-20mA, 1x D/O, MODBUS (RS485)* |
| **Output** | | | | | 9 | | | | | | | | | 3x 4-20mA, 1x D/O* |
| **Output** | | | | | D | | | | | | | | | 32-pin connector, available on Display version only |
| **Output** | | | | | Z | | | | | | | | | Custom (Consult Factory) |
| **I/O Cable** | | | | | | 0 | | | | | | | | Standard I/O Cable |
| **I/O Cable** | | | | | | Z | | | | | | | | Custom (Consult Factory) |
| **I/O Cable Length** | | | | | | | A | | | | | | | 3 m |
| **I/O Cable Length** | | | | | | | Z | | | | | | | Custom (Consult Factory) |
| **Interconnecting Cable Length** | | | | | | | | A | | | | | | 3 m |
| **Interconnecting Cable Length** | | | | | | | | Z | | | | | | Custom (Consult Factory) |
| **Measurement** | | | | | | | | | X | | | | | For Use with Sensors Calibrated for Mass Flow Rate Only |
| **Measurement** | | | | | | | | | D | | | | | For Use with Sensors Calibrated for Density and/or Volumetric Flow Rate |
| | | | | | | | | | | X | | | | Reserved for Factory |
| | | | | | | | | | | | X | | | Reserved for Factory |
| | | | | | | | | | | | | - | | |
| | | | | | | | | | | | | | XXX | Unique PN Identifier |

* Only available with DIN rail mounting option.

# 7.00 Order Information

## 7.02 Mounting Cradle

| Model Ordering Code | | | | Description |
|---|---|---|---|---|
| ENCL-MOUNT-8103 | - | ** | - | ** | Mounting Cradle |
| **Size** | | U08 | | For use with Sensor Range Code 031 |
| | | 08 | | For use with Sensor Range Code 061, 062, 063, 082 |
| | | 15 | | For use with Sensor Range Code 152, 153 |
| | | | xz- | |
| | | | | XXX | Unique PN Identifier |

## 7.03 Sensor

| Model Ordering Code | | | | | | | | | | | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CELE-8103 | - | * | - | *** | * | * | * | * | * | - | *** | **PEEK Sensor** |
| **Sensor Type** | R | | | | | | | | | | CE Compliant Sensor with inline fluid ports |
| | | - | | | | | | | | | |
| **Range Code** | | | 031 | | | | | | | | 50 – 1,500 g/min |
| | | | 062 | | | | | | | | 250 - 5,000 g/min |
| | | | 063 | | | | | | | | 450 - 9,000 g/min |
| | | | 082 | | | | | | | | 1 - 20 kg/min |
| | | | 151 | | | | | | | | 2 - 40 kg/min |
| | | | 152 | | | | | | | | 3 - 60 kg/min |
| | | | 153 | | | | | | | | 5 - 100 kg/min |
| **Temperature Sensor** | | | | I | | | | | | | Integrated Internal Temp Sensor (Range codes 062, 063, 082, 152, and 153 only) |
| **Sterilization** | | | | | 0 | | | | | | No Sterilization |
| | | | | | 1 | | | | | | Gamma Irradiated to 40 kGy |
| | | | | | Z | | | | | | Other Requests (Consult Factory) |
| **Output** | | | | | | A | | | | | 1/8" Hose Barb (Range code 031) |
| | | | | | | B | | | | | 1/8" Hose Barb with Tubing (Range code 031) |
| | | | | | | E | | | | | 1/4" Barb (RC 031 & 062) |
| | | | | | | F | | | | | 1/4" Barb with Tubing (RC 031 & 062) |
| | | | | | | H | | | | | 3/8" Barb (RC 063) |
| | | | | | | J | | | | | 3/8" Barb with Tubing (RC 063) |
| | | | | | | L | | | | | 1/2" Barb (RC 082) |
| | | | | | | M | | | | | 1/2" Barb with Tubing (RC 082) |
| | | | | | | N | | | | | 1/2" to Mini TC (RC 082) |
| | | | | | | P | | | | | 3/4" Barb (RC 151 & 152) |
| | | | | | | Q | | | | | 3/4" Barb with Tubing (RC 151 & 152) |
| | | | | | | R | | | | | 3/4" to Mini TC (RC 151 & 152) |
| | | | | | | S | | | | | 1" Barb (RC 153) |

# 7.00 Order Information

## 7.03 Sensor (Continued)

| Model Ordering Code | | | | | | | | | | | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CELE-8103 | - | * | - | *** | * | * | * | * | * | - | *** | PEEK Sensor |
| **Output** | | | | | T | | | | | | | 1" Barb with Tubing (RC 153) |
| | | | | | U | | | | | | | 1" to Laddish TC (RC 153) |
| | | | | | Z | | | | | | | Custom fluid connection (please consult factory) |
| **Mounting Orientation** | | | | | | H | | | | | | Horizontal mount with fluid ports in the vertical plane, flow upwards |
| | | | | | | V | | | | | | Vertical mount with fluid ports in the horizontal plane |
| **Calibrations and Outputs** | | | | | | | 1 | | | | | Calibrated for Mass Flow Rate Only |
| | | | | | | | 2 | | | | | Density Measurement Enabled, Analog Output for Volumetric Flow Rate |
| | | | | | | | 3 | | | | | Density Measurement Enabled, Analog Output for Density |
| | | | | | | | 4 | | | | | Density Measurement Enabled, Analog Output for Mass Flow Rate |
| **Firmware** | | | | | | | | D | | | | Compatible with firmware versions 3.3.5R, 3.3.6R, 3.3.7R, and 3.3.8R. For others, please consult the factory |
| | | | | | | | | | - | XXX | | Unique PN Identifier |

# 8.00 Warranty

PSG Biotech warrants to the buyer that its products are free from defects in materials and workmanship at the time of shipment and during the WARRANTY PERIOD. Seller's obligation under this warranty is limited to the replacement of the product(s) by same product(s) manufactured by PSG or repair of the product(s) at the facility.

PSG Biotech products are sold with the understanding that the buyer has determined the applicability of the product(s) to its intended use. It is the responsibility of the buyer to verify acceptability of performance to the actual conditions of use. Performance may vary depending upon these actual conditions.

**Warranty Period**
This warranty is in effect for twelve (12) months from the date of shipment from PSG manufacturing location.

**Warranty Claim**
If PSG Biotech products are found to be defective in materials or workmanship within twelve (12) months of the date of shipment, they will be repaired or replaced with same product at the discretion of PSG at its place of business at no charge to the buyer.

# 9.00 Service Contacts

For service support or technical assistance, please contact the PSG Biotech Technical Support Team at:

**Telephone:** +1 (800) 637-6418
            +1 (408) 970-3419
**E-mail:** Malema.technicalsupport@psgdover.com

# 10.00 Service and Repair

To return the products, please obtain an RMA number for the product by contacting PSG Biotech, San Jose, California, USA, at +1 (800) 637-6418 or +1 (408) 970-3419, or email [Malema.technicalsupport@psgdover.com](mailto:Malema.technicalsupport@psgdover.com)

Unless otherwise specified with the RMA number, all equipment must be returned to the following address:

PSG San Jose
2329 Zanker Road
San Jose, CA 95131, USA

**Note:** Flow sensors cannot be returned once exposed to gamma radiation.

PSG Biotech, 1815 S.Meyers Road
Oakbrook Terrace, IL 60181
USA

**Telephone**: +1 (630) 487-2240
**Fax:** [biotech@psgdover.com](mailto:biotech@psgdover.com)

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