

## The Application Of PID Calibrator

(Product Part Number: 006-0100-000)

### 1. Description

This product has been specifically engineered for testing and calibrating Photo-Ionization Detection (PID) devices. It can continuously generate Volatile Organic Compound (VOC) equivalent to isobutylene at a desired concentration.

The essential components of the PID calibrator include:

- a diffusion tube comprising a vial containing chemical standards.
- a dilution chamber that houses the diffusion tube.
- a flow control system with ambient temperature display.

The output gas is isobutylene equivalent, with its concentration primarily determined by the diffusion tube, the adjustable flow rate through the gas flow meter, and the current ambient temperature displayed on the temperature indicator.

Each diffusion tube supplied with this product, whether shipped individually or as part of the package, is designed for a specific isobutylene equivalent concentration and is highly consistent.

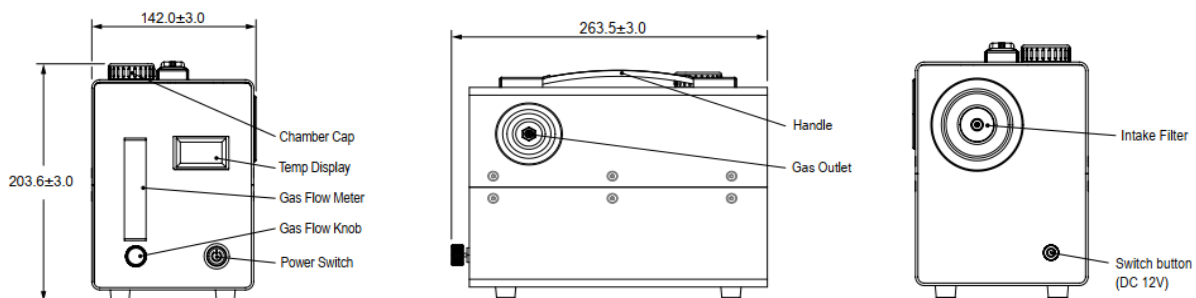
Each PID calibrator is accompanied by a unique chart indicating the required flow rate at the current ambient temperature for the calibrator to produce the specified isobutylene equivalent gas concentration. Due to the inconsistency of the gas flow meter, each PID calibrator must be used with its own chart, which is created based on extensive test data in the factory.

### 2. Technical Parameters

Gas concentration:	100 ppm (isobutylene response)
Working temperature:	0°C ~ 40°C
Flow rate range:	200 ~ 1,000 ml/min.
Accuracy (not certified):	+/- 10% (refer to Section 5 of this document)
Power supply:	12 VDC
Dimensions:	L 142 mm x H 204 mm x D 264 mm
Weight:	2.5 kg
Case material:	Aluminum



Figure 1



**3. Diffusion Tubes** (including vial containing chemical standards)

Part Number	Concentration Range	Generating Life
411-1000-100	100 ppm Isobutylene Equivalent	> 150 hours

The 100 ppm diffusion tube containing a fully loaded vial of chemical standards.

The chart below illustrates the flow rate settings for a 100 ppm diffusion tube at specific ambient temperatures as an example. Due to the inconsistency of the gas flow meter, each PID calibrator must be used with its own chart, which is created based on extensive test data in the factory.

Flow rate required for 100 ppm at different temperatures

Temperature(°C)	Temperature(°F)	Flow Rate(ml/min)
15	59.0	350
16	60.8	360
17	62.6	380
18	64.4	390
19	66.2	410
20	68.0	430
21	69.8	440
22	71.6	460
23	73.4	480
24	75.2	500
25	77.0	520
26	78.8	540
27	80.6	570
28	82.4	590
29	84.2	610
30	86.0	640

Caution: This table must be used for PID Calibrator S/N: 0060124AXXXX

**4. Operating Instructions**

**Safety Notes:** (1) This product must be operated in a ventilated hood to comply with safety regulations.  
 (2) This product is not designed or certified for operation in hazardous areas.  
 (3) This product should be operated in a temperature stable environment for better accuracy.

Step 1 Carefully loosening the cap of the vial that houses the chemical standards. Exercise caution to prevent any accidental spills. Once done, securely attach the diffusion tube to the vial.

Step 2. Unscrew the cap of the dilution chamber located atop the calibrator. Place the diffusion tube (opening up) with the vial slowly into the diffusion chamber and then replace the cap, ensuring it is tightly fastened.

**Caution:** Any spillage of chemical standards from the vial, even if it is minimal, inside the dilution

chamber will significantly impact the accuracy of the calibrator until the spill completely evaporates.

- Step 3. Power up the calibrator by pressing the power switch. This action activates the temperature display and initiates the air pump.
- Step 4. Refer to Table 1 to set the flow rate by adjusting the gas flow knob based on the current ambient temperature shown on the temperature display. The upper level of the float in the glass tube should be used to measure the flow rate with reference to the scale on the side of the rotameter.  
***Caution:*** *Maintaining a non-zero flow rate contributes to extending the lifespan of the pump.*
- Step 5. Allow the calibrator to operate freely for 10 minutes or longer before its initial use. After this period, the output gas concentration will stabilize, making it suitable for the calibration or bump test of PID monitors or sensors.
- Step 6. Connect a Teflon tube (not included) with the calibration cap, between the gas outlet on the right side panel of the calibrator and your PID device that needs to be calibrated or tested.
- Step 7. Start the calibration or test process.

After use and power off

- Step 8. Use a tweezer (shipped with the calibrator) to take out the diffusion tube with the vial from the dilution chamber.
- Step 9. Detach the vial from the diffusion tube, then screw the cap securely back onto the vial.
- Step 10. Properly store both the vial and diffusion tube for future use.
- Step 11. Allow the flow control system to operate for approximately 10 minutes to clear any remaining trapped gas before power off.
- Step 12. Power off

***Note 1:*** *Leaving the diffusion tube with the vial inside the dilution chamber after each use will result in the buildup of gas concentration within the diffusion chamber, prolonging the time it takes for the calibrator to stabilize the output gas concentration for the next use and shortening the generating life of the chemical standards inside the vial.*

***Note 2:*** *Do not block the intake filter on the back side of the calibrator. The filter needs to be checked periodically and replaced if it is dirty.*

***Note 3:*** *When the environmental relative humidity exceeds 60%RH, it is advised to install an filter or dehumidifier at the air inlet during operation.*

## 5. Certification Disclaimer

While lacking third-party certification to validate its accuracy, this product undergoes extensive testing by being compared to certified isobutylene calibration gas before shipment to guarantee its quality and precision. SemeaTech adheres rigorously to ISO 9001 procedures during the entire manufacturing process.

## 6. MSDS for Diffusion Tubes

Please visit SemeaTech website using the link provided below to view or download the MSDS in pdf format for this product: <https://semeatech.com/Products/Documentation/Safety%20Documents/>