

PID+ User Guide  
Model Number 01-0190-AAB



## About this Manual

This document contains the information needed to install and operate the Owlstone PID+. Additional information, updates, and support may be obtained by contacting Owlstone.



It is essential that this user manual be read and understood before commencing any work with the system. Read and understand the various precautionary notes, signs, and symbols contained inside this manual pertaining to the safe use and operation of this product before using the device. Using the supplied equipment in a way that is not specified in this manual could be harmful to health of the operator and co-workers.

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# Notices

## Copyright and Trademarks

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## Disclaimer

All equipment and information supplied to the user is for evaluation purposes only. Owlstone makes no representations or warranties, either expressed or implied, with respect to the contents hereof and specifically disclaims any warranties, merchantability or fitness for any particular purpose. Furthermore, Owlstone reserves the right to revise this publication and to make changes from time to time to the contents hereof without obligation of Owlstone to notify any person of such revisions or changes.

## Notice of Proper Use

All supplied equipment is in compliance with all relevant governing regulations. However, if the equipment is used in a manner not specified by Owlstone, then the internal protections provided by the system could be impaired. The user should follow all procedures exactly and should never attempt to disassemble the system, which would void the terms of sale.

## Contacting Owlstone

Visit the Owlstone website for up-to-date information and support at: <http://www.owlstone.co.uk>. For general inquires, contact one of the offices listed below or email: [info@owlstone.co.uk](mailto:info@owlstone.co.uk).

### UK Office:

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Milton Road  
Cambridge CB4 0GD  
England

Tel: + 44 1223 428200  
Fax: + 44 1223 428201

### US Office:

400 Rella Boulevard  
Suite 160  
Suffern, NY 10901  
USA

Tel:+1 845 533 4225  
Fax: +1 845 533 4232

## Recycling and Disposal



All equipment has been designed and manufactured with high quality materials and components, which can be recycled and reused.

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC and thus should not be disposed of in normal waste. Please consult Owlstone for details on our recycling and disposal program for this product.

Users outside the European Union should consult local authorities for correct disposal procedures or, alternatively, contact Owlstone.

## Statement of Conformity

This is a demonstration product for evaluation use only. The supplied hardware may not fully conform to certain regulations intended for finished products. It is the responsibility of the end user to ensure that testing is completed in accordance with all applicable local and international laws.

## Safety Notices

Always observe the following safety precautions:

- Never store or operate the equipment at temperatures above 85 °C or below -40 °C.
- Avoid excessive heat, humidity, dust, and vibration.
- This equipment is for use under laboratory conditions only. Never use in damp or wet conditions or where the equipment may be subjected to dripping or splashing liquids.
- Always disconnect the equipment from the power supply before moving.

## Warning Symbols

The following symbols are used throughout this document.



Danger! Electrical shock hazard.



Danger! Hot surface.



Caution! Read related operating instructions carefully before use.

## Hazards

### Photoionization Source

The PID+ system contains a 10.6 eV photoionization source. The source lamp is fully contained within the unit to prevent the escape of harmful ionizing radiation. An access port on the side of the unit allow for removal of the lamp for cleaning or replacement should it become fouled. Removal of the lamp exposes a high voltage excitation electrode. For this reason, power should always be disconnected before any operation to remove or replace the lamp.



The PID+ prototype contains a 10.6 eV photoionization source. Never replace the lamp while power is connected. Doing so could expose the user to dangerous high voltages.



Some chemicals and environments can obscure the photoionization source leading to a noticeable degradation of performance. If contamination is suspected, please consult Owlstone for details on how to clean or replace the photoionization lamp and recondition the system.

## Chemical Compatibility

Check chemical compatibility: Materials in the flow path include PTFE, stainless steel, aluminum, gold, composite circuit board, and Viton®. Ensure that test atmospheres are neither corrosive nor reactive with materials in the flow path and can be safely operated up to the maximum test temperature. If in doubt, please contact an Owlstone representative for further information.



The PID+ system can be used with a wide range of chemical samples, some of which could be toxic or harmful. The PID+ system is not a fully sealed unit. For this reason it is essential that the user conduct a risk assessment for the substances to be used with the PID+ and establish appropriate safety protocols to cope with the release of such materials under the normal operation of the unit. These protocols must include installation in a suitable environment (e.g. in a fume cupboard, etc.) and operational procedures to protect the user.

## Evaluation Kit Contents

### Evaluation Kit Contents

The following items are supplied in the PID+ evaluation kit:

Item	Description	Quantity
1	PID+ unit	1
2	Swagelok UNF #10-32 to 1/8 inch tube fittings	2
3	M4x8 mounting screws	2

If any of these items are missing or damaged, then contact Owlstone immediately. Please retain all items and packaging for return to Owlstone for servicing. No responsibility for damage will be accepted arising from the use of non-approved packaging.

### User Supplied Items

The following items are also required. They must be supplied by the user:

Item	Description
1	Power supplies
2	Source of sample vapor with flow rate regulated to within 1%
3	All required tubing and fittings
4	Data logger
5	Cable to connect PID+ to data logger and power supplies
6	PC running data logger software
7	Cable to connect data logger to PC

The following items are optional. They can be used to operate the PID+ at elevated temperatures and under precise thermal control.

Item	Description
1	Environmental chamber
2	Thermocouples to record ambient and outlet airflow temperatures

## PID+ Instrument

Take a moment to familiarize yourself with the instrument after unpacking.

### Images



**Figure 1:** Front view of PID+ (note direction of flow)



**Figure 2:** Back view of PID+ showing lamp access



**Figure 3:** Top view of PID+ showing connector

## Pinout

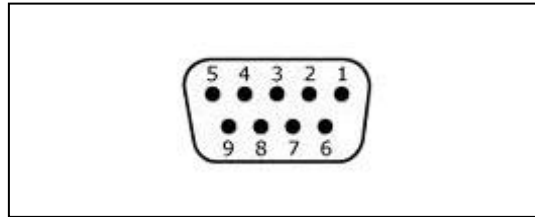


Figure 4: PID+ connector pin numbering

Pinout			
①	Lamp Supply	5 ... 8 V	50 mA
②	Positive Supply	5 ... 15 V	40 mA
③	Negative Supply	-5 ... -15 V	40 mA
④	Concentration Signal Output	-3 ... 3 V	10 mA
⑤	Composition Signal Output	-3 ... 3 V	10 mA
⑥	Ground		
⑦	Ground		
⑧	Ground		
⑨	Ground		

## Recommended Operating Conditions

Temperature	
Range	40 – 60 °C
Precision	1 °C

Flow Rate	
Range	1.5 – 1.75 L/min
Precision	1 %

Pressure	
Range	0.75 – 1.25 bar
Precision	1 %

## Installation

### Location

The supplied equipment is intended for use in a controlled laboratory like environment. Ensure that the PID+ instrument is installed in a location that is free from excess humidity, dust, heat, and vibration. The unit should be placed on a solid, level surface away from any flammable materials.



Before using the system, ensure that all cables are intact with no damaged insulation or frays.

### Instructions

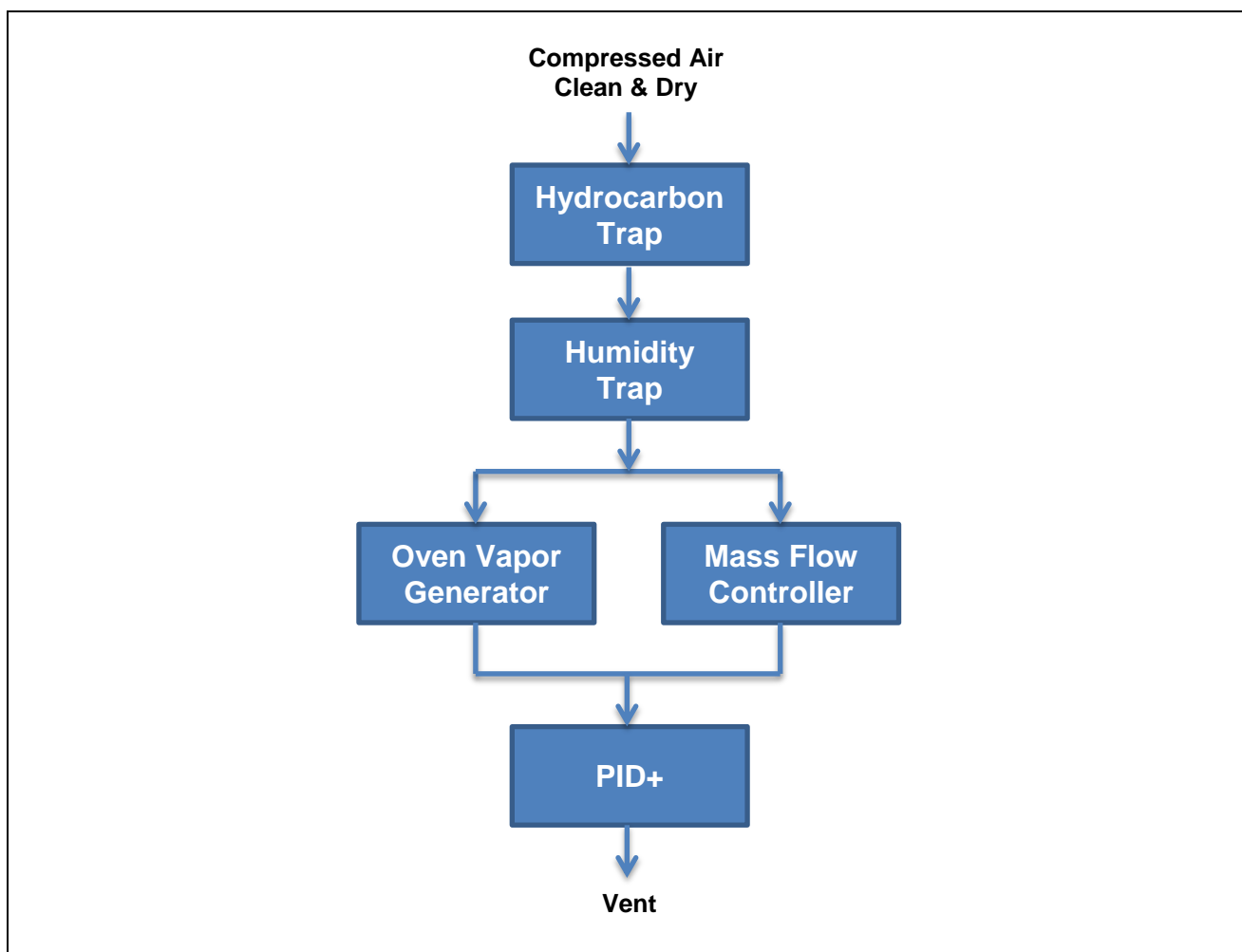
Installation involves mounting the instrument, connecting the regulated gas supply and vent lines, connecting the power and signal terminals of the PID+, and configuring the external data logger.

### Mounting

Attach the PID+ to a level surface using the two supplied mounting screws.

## Gas Connections

The PID+ unit includes a single gas inlet port and a single outlet port. Air or another carrier gas must be delivered to the instrument at a precisely controlled rate within the range and tolerance specified by this document. A mass flow controller (MFC) is required to achieve the necessary flow stability. The following configuration is recommended for evaluating the instrument.



**Figure 5: Recommended test configuration**



The pressure in any gas line connected to the system must not exceed 1.25 atm.



A separate exhaust line should always be connected to the exhaust outlet of the PID+ if potentially toxic samples are to be used. This line should be checked for chemical compatibility and it is recommended that it is exhausted to a hydrocarbon trap or to a fume hood.

## Electrical Connections

The PID+ is powered via its D-subminiature connector. The same connector provides the two voltage output signals corresponding to detected concentration and chemical composition. The pinout for these signals is shown in the preceding section. Always use an appropriately sized external fuse and/or other current limiting device for power supplies.

## Operation

During operation always apply the following precautions:

- Before using the system, ensure that all cables are intact with no damaged insulation or frays.
- Do not allow liquids or particulates to enter the system. Do not allow humidity to condense on the inside of the unit.
- Never attempt to open the PID+ unit. There is a risk of exposure to high voltages within the unit. Opening the unit also contradicts the terms of sale.

### General Considerations

- Because the PID+ uses a photoionization source, clean air is not ionized. The concentration signal therefore reads zero for clean air.
- The composition signal will be invalid for very small concentration values.
- The PID+ is an evaluation device and, as such, there are a few anomalies, which are expected to be eliminated in future versions. The user is cautioned to consider carefully the effects these anomalies may have on their experiment.
  - A small voltage offset is present on the concentration signal due to offsets within the internal circuitry. This offset will scale with operating temperature but will remain constant across all concentrations and may be mathematically subtracted from the signal at a given operating temperature.
  - If the composition signal goes out of range it will hit one of the supply rails. This will cause an additional voltage offset to be applied to the concentration signal. The composition signal should therefore be kept within range to ensure a valid concentration signal.
  - For best results, the user is advised to place the PID+ within an environmental chamber to ensure a constant temperature is maintained.

### Sampling Introduction

To provide useful information, a chemical sample must be introduced into the flow of gas entering the system. The sample may be introduced using several methods. It is recommended that an oven vapor generator be used during first tests, as this method produces a repeatable and precisely controlled chemical vapor. Contact Owlstone for further information on oven vapor generators.

### Collecting Data

Two voltage outputs are used to indicate the results of analysis. The first output (pin 4) indicates the detected concentration. The second output (pin 5) indicates the detected composition. These pins should be connected to a data recorder for measurement and processing.

## Servicing

This equipment contains no user-serviceable parts. Any repairs must be performed at Owlstone. Attempting to open the product case voids the warranty and violates the terms of sale.



Never attempt to open the PID+ casework. There is a risk of exposure to high voltages within the unit. Attempting to open the unit also violates the terms of sale.

It is highly recommended that the evaluation PID+ unit is returned to the factory every three months for servicing and calibration to factory acceptance standards. To arrange servicing, contact Owlstone to obtain a Return Merchandise Authorization (RMA) number, a decontamination certificate to be completed by the customer, and detailed shipping instructions with the correct shipping address.



Do not return the instrument to Owlstone without first obtaining an RMA number and filling in the decontamination certificate provided with the RMA. Owlstone cannot accept a returned PID+ unit without the correct paperwork.

## Troubleshooting

Symptom	Possible Cause/Remedy
Not reaching set flow rate	Inlet flow path restriction – check inlet flow path Exhaust path restriction – check exhaust flow path Inadequate pressure upstream of mass flow controller – Increase pressure
Contamination visible in data	Dirty tubing – replace with clean tubing Tubing leak – tighten connections and/or replace with new tubing Dirty air supply – service air supply and/or filters Memory effects – allow system and tubing to self-clean in clean flow of air

## Technical Specifications

Operating Condition	Description
Power Supplies	+/- 5 V – 15 V @ 40 mA max; 5 – 8 V @ 50 mA max
Operating Temperature	0°C to 60°C
Storage Temperature	-20°C to 85°C
Flow Range	1.25 – 2 L/min
Pressure Range	0.5 to 1.5 bar
Humidity Range	0% to 90% relative humidity
Electrical Connector	D-subminiature, 9-pin, female
Gas Ports	UNF #10-30 with adapters to accept 1/8 in. tubing
Weight	<0.5 kg