

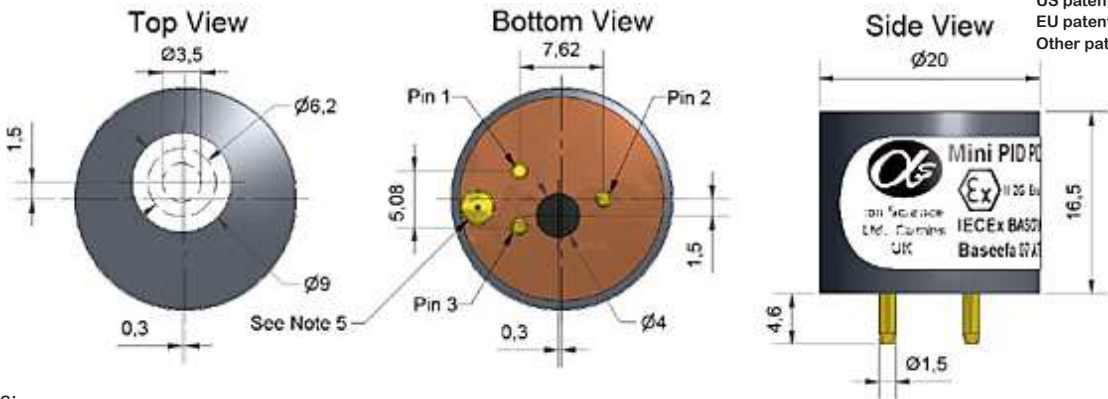


# PID-A1 Photo Ionisation Detector



US patent 7,046,012  
US patent 7,821,270  
EU patent 1474681  
Other patents

Figure 1 PID-A1 Schematic Diagram



Notes:

- 1. Do not obstruct  $\varnothing 3.5$  sensing area
- 2. Seal between  $\varnothing 6.2$  and  $\varnothing 9.0$  (if different to atmosphere)
- 3. Pin out details:
  - Pin 1: + V supply (See note 5)
  - Pin 2: Signal output
  - Pin 3: 0 V supply
- 4. All dimensions  $\pm 0.1$ mm unless otherwise stated

- 5. Input voltage selector hole:
    - a) When filled with solder the onboard regulator is disabled. A regulated supply of 3.0 - 3.6 V (typically 3.0 V) is then required.
    - b) When not filled with solder the onboard regulator is enabled. A regulated or unregulated supply between 3.6 - 10 V is then required for IS applications, or up to 18 V for non-IS applications. These sensors will be internally regulated to 3.3V
- Normally shipped with regulator disabled.**

PERFORMANCE

Target gases	VOCs with ionisation potentials < 10.6 eV		
Minimum resolution	(ppb isobutylene)	HPPM lamp (part #001-0019-02)	< 100
		LLHS lamp (part #001-0030-01)	< 50
Linear range	(ppm isobutylene)	(5% deviation)	300
Overrange	(ppm isobutylene)		6,000
Sensitivity	(linear range)	(mV / ppm Isobutylene, see Table 1 for options)	> 0.3
Full stabilisation time	(minutes to 100 ppb)		20
Warm up time	(seconds)	time to full operation	5
Offset voltage	(mV)		52 to 57
Response time ( $t_{90}$ )	(seconds)	diffusion mode	< 3

ELECTRICAL

Power consumption	70 mW (typical) at 3.0 V, 350 mW transient for 200 msec on switch-on 90 mW at 3.3 V, 460 mW transient for 200 msec on switch-on		
Supply voltage	3.0 to 3.6 VDC Ideally regulated $\pm 0.01$ V (onboard regulator disabled) 3.6 to 10 VDC (onboard regulator enabled) (maximum 10V for IS approval, maximum 18 V for non-IS)		
Output signal	Offset voltage (minimum 50 mV) to Vmax (Vmax = Vsupply - 0.1 V when regulator is enabled)		

ENVIRONMENTAL

Temperature range	-40°C to +55°C (Intrinsically Safe); -40°C to +65°C (non-IS)		
Temperature dependence	0°C to 40°C	90% to 100% of signal at 20°C	
		-20°C	140% of signal at 20°C
Relative humidity range	Non-condensing		
Humidity sensitivity	During operations: 0% to 75% rh transient		

KEY SPECIFICATIONS

Operating life	5 years (excluding replaceable lamp and electrode stack)		
IS Approval	IECEX Ex ia IIC T4; ATEX Ex ia II 1G -40°C < Ta < +55°C (< 10VDC supply)		
Onboard filter	To remove liquids and particulates		
Lamp	User replaceable		
Electrode stack	User replaceable		
Error state signal	Lamp out:	32 $\pm$ 4 mV	
		Electronic error: 22 $\pm$ 6 mV	
Weight	< 8g		
Position sensitivity	None		
Warranty period	Electronics and housing:	24 months	
		Lamp and electrode stack are user replaceable.	



# PID-A1 Performance Data

Figure 2 Sensitivity Temperature Dependence

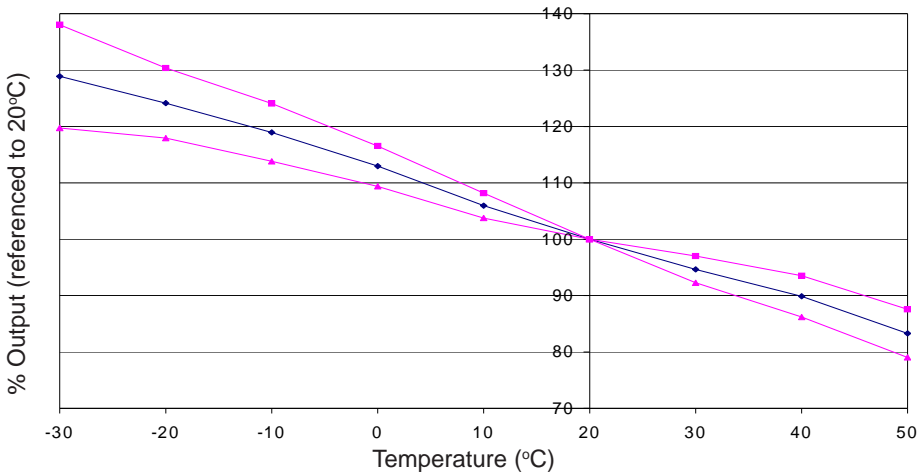
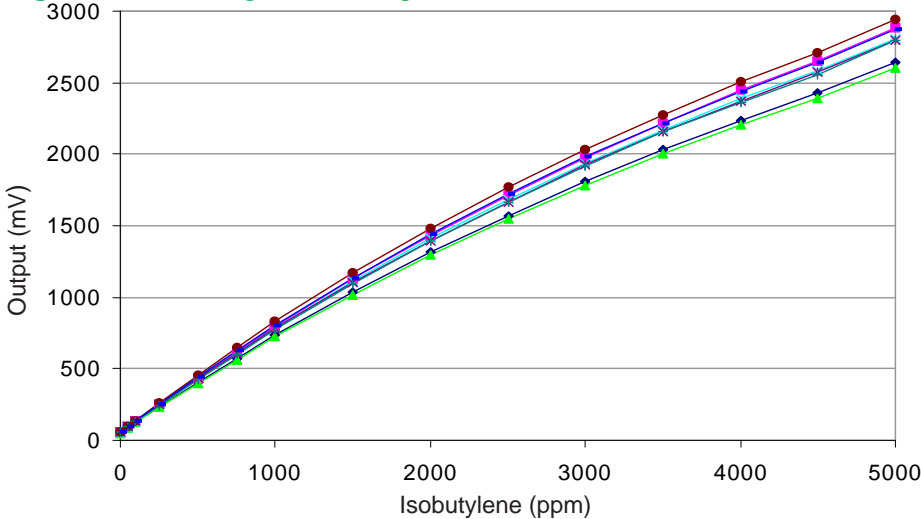


Figure 2 shows the temperature dependence, corrected for the gas law.

This data is taken from a typical batch of PID-A1 sensors tested with 100ppm Isobutylene.

The mean and  $\pm 95\%$  confidence intervals are shown.

Figure 3 Linearity to Isobutylene




PID output is non-linear at higher concentrations but is repeatable and can be corrected in software.

Non-linearity correction depends on the VOC being measured.

Table 1: PID Replaceable Parts/Consumables List

Lamp type	Product code	Minimum sensitivity mV/ppm	Minimum range ppm isobutylene	Lamp life lit hours
10.0 eV	001-0030-02	0.2	9000	5000
10.6 eV (HPPM)	001-0019-02	0.3	6000	2000
10.6 eV (LLHS)	001-0030-01	0.8	2000	5000
11.7 eV	001-0019-03			24
Stack removal tool	001-0020-00			
Lamp spring	001-0023-00			
Lamp cleaning kit	001-0024-00			

**NOTE:** all sensors are tested at ambient environmental conditions, unless otherwise stated. As applications of use are outside our control, the information provided is given without legal responsibility. Customers should test under their own conditions, to ensure that the sensors are suitable for their own requirements.

 At the end of the product's life, do not dispose of any electronic sensor, component or instrument in the domestic waste, but contact the instrument manufacturer, Alphasense or its distributor for disposal instructions.

For further information on the performance of this sensor, on other sensors in the range or any other subject, please contact Alphasense Ltd. For Application Notes visit "[www.alphasense.com](http://www.alphasense.com)".

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