

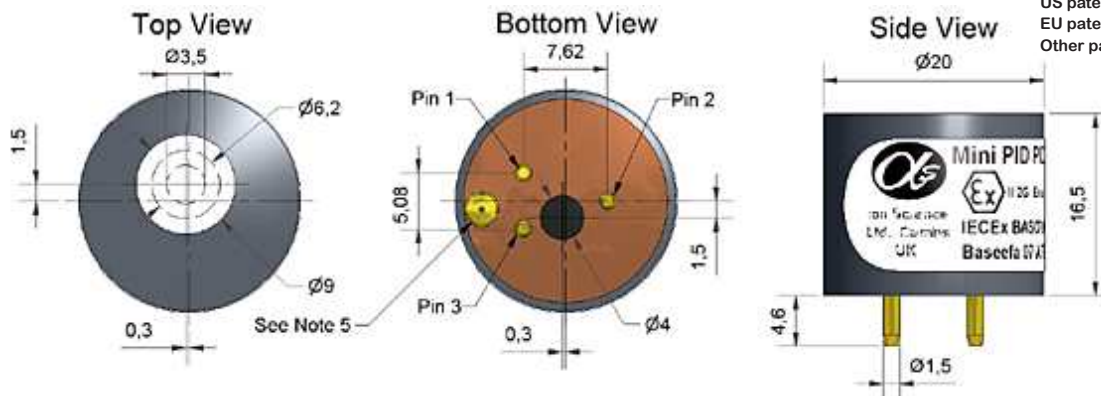


# PID-A1 Photo Ionisation Detector



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

**Figure 1 PID-A1 Schematic Diagram**



**Notes:**

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

**5. Input voltage selector hole:**

- When filled with solder the onboard regulator is disabled. A regulated supply of 3.2 - 3.6 V (typically 3.2 V) is then required.
- 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		< 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		50 to 59
Response time ( $t_{90}$ )	seconds	diffusion mode	< 3

**ELECTRICAL**

Power consumption	85 mW (max) at 3.2 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	3.2 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
	0 to 95% near zero

**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. 10.6eV lamp: 5,000 lit hours

**Technical Specification**



# PID-A12 Performance Data

**Technical Specification**

**Figure 2 Sensitivity Temperature Dependence**

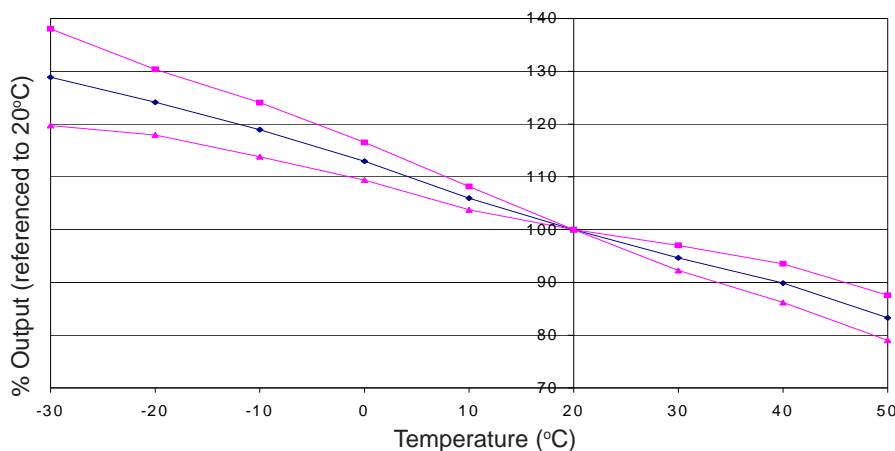
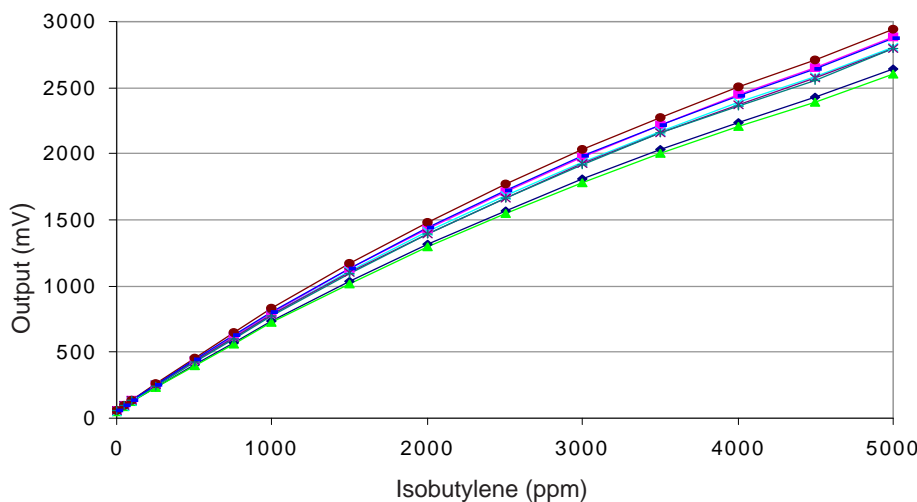


Figure 2 shows the temperature dependence, corrected for the gas law.

This data is taken from a typical batch of PID-A12 sensors tested with 100ppm Isobutylene.

The mean and ±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	9,000	5,000
10.6 eV (HPPM)	001-0019-04	0.3	6,000	5,000
10.6 eV (LLHS)	001-0030-01	0.8	2,000	5,000
Electrode stack	001-0018-01			
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.

**ApolloSense Ltd**