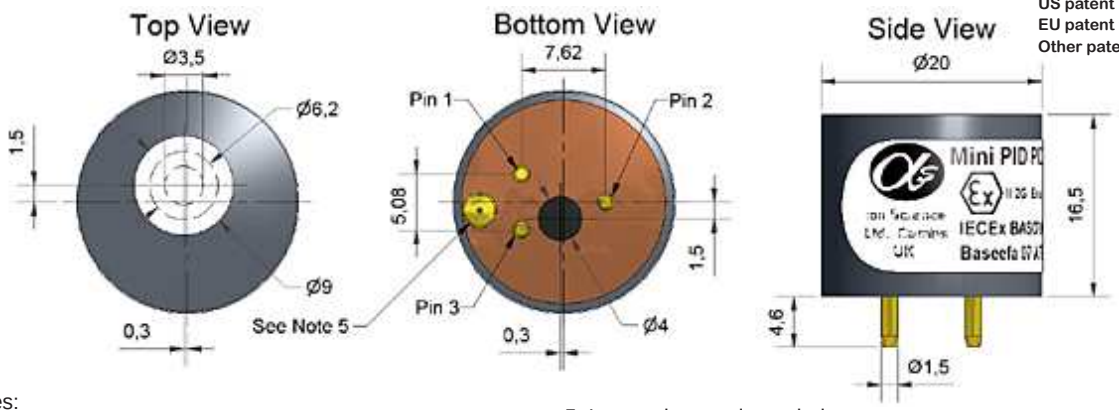
PID-A12 Photo Ionisation Detector

Technical Specification

Figure 1 PID-A12 Schematic Diagram

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



Notes:
1. Do not obstruct Ø3.5 sensing area
2. Seal between Ø6.2 and Ø9.0 (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 ±0.1mm unless otherwise stated

5. Input voltage selector hole:
a) 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.
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 (using 10.6 eV lamp 001-0019-04)

Target gases	VOCs with ionisation potentials < 10.6 eV		
Minimum resolution	ppb isobutylene		< 50
Linear range	ppm isobutylene	5% deviation	200
Overrange	ppm isobutylene		4,000
Sensitivity	linear range	mV / ppm Isobutylene, see Table 1 for options	> 0.6
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 ±0.01V (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 -0.15 V when regulator is enabled)

ENVIRONMENTAL

Temperature range	-40ºC to +55ºC (Intrinsically Safe); -40ºC to +65ºC (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	0 to 95%
Humidity sensitivity	During operations: 0% to 75% rh transient	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 -40ºC < Ta < +55ºC (< 10VDC supply)
Onboard filter	To remove liquids and particulates
Lamp	User replaceable
Electrode stack	User replaceable
Error state signal	Lamp out: 32 ±1 mV Electronic error: 27 ±1 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

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PID-A12 Performance Data

Technical Specification

Figure 2 Sensitivity Temperature Dependence

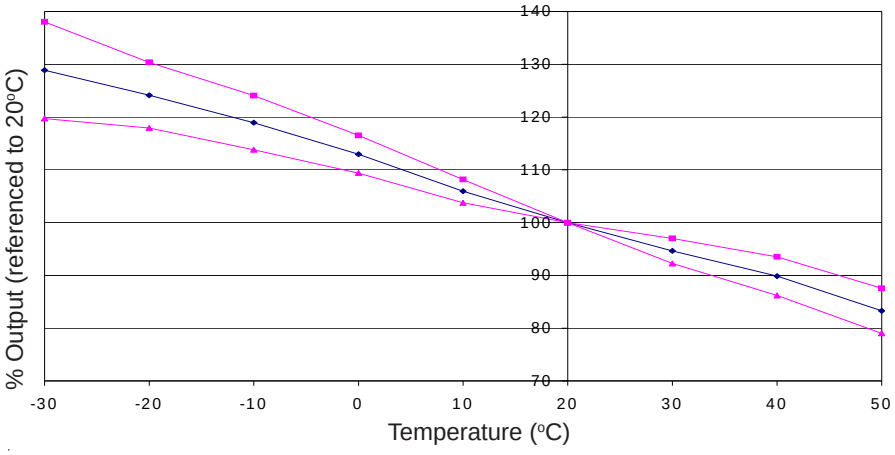
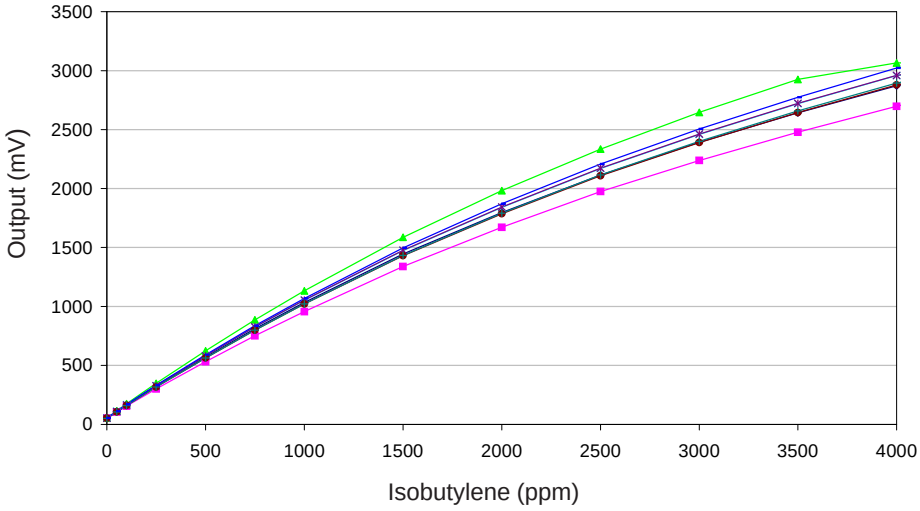


Figure 2 shows the temperature dependence, corrected for the gas law.

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
9.6 eV	001-0030-00	0.25	8,000 (est)	TBD
10.0 eV	001-0030-02	0.15	> 20,000	5,000
10.6 eV (HPPM)	001-0019-04	0.60	4,000	5,000
10.6 eV (LLHS)	001-0030-01	0.60	4,000	5,000
Electrode stack	001-0018-02			
Stack removal tool	001-0020-00			
Lamp spring	001-0023-00			
Lamp cleaning kit	001-0024-00			

Part No	Regulator	Lamp	Usage voltage	Certified
PID-A12	Disabled	HPPM 10.6 eV	3.2 to 3.6	Yes
PID-A12	Enabled	HPPM 10.6 eV	3.6 to 10 **(10.1 to18)**	Yes **(NO)**
PID-A120	Disabled	LLHS 10.6 eV	3.2 to 3.6	Yes
PID-A120	Enabled	LLHS 10.6 eV	3.6 to 10 **(10.1 to18)**	Yes **(NO)**
PID-A129	Disabled	9.6 eV	3.2 to 3.6	Yes
PID-A129	Enabled	9.6 eV	3.6 to 10 **(10.1 to18)**	Yes **(NO)**
PID-A12X	Disabled	10.0 eV	3.2 to 3.6	Yes
PID-A12X	Enabled	10.0 eV	3.6 to 10 **(10.1 to18)**	Yes **(NO)**

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".