Gas Sampling with PIDs

The PID-A1 and PID-AH have a very small sample volume, so this family of PIDs has fast response in both diffusion or pumped gas modes. This sensor has different gas sampling rules than other sensors (see AAN-010 on the Alphasense website for other sensor gas sampling rules). Therefore, do not degrade the fast response time and long term performance of these PIDs.

When designing the gasket between the PID and your gas sampling/ diffusion access, consider the following rules:

1. Diffusion mode is ideal for this sensor design.
2. Seal around the gas access port (with the white dust filter) using a gasket with an inner diameter of 6mm and an external diameter of 9.0mm (see data sheet). The inner diameter can be reduced to 4mm to further increase response time, but careful alignment is required.
3. Use the correct sealing material: the gasket should be closed cell foam or moulded rubber which does not adsorb the VOCs you will be measuring. Preferred materials are fluoroelastomers and fluorosilicones (beware of outgassing if pellistors are nearby), but lower cost seals may be adequate.
4. Do not seal on the external diameter of the PID (20mm diameter). This gives water access to the electrode stack/ PID cell seal, encourages turbulence, increases gas volume (reducing response time) and compresses the outside diameter of the PID, which is designed for compression near the gas access, not at the external diameter.
5. Avoid pressure differentials. The PID allows clearance and gas access between the lamp and PID cell, so if the sensing area above the cell is positively pressurised, then sampled gas will be forced past the lamp, encouraging contaminant deposition on the outside of the lamp, reducing lamp intensity and hence reducing sensitivity.
6. Since the gas access port is off-center and to avoid shear forces on the seal, do not seal using a screw-down fitting which shears the gasket, but compress the gasket with a fitting and then use screws to fix the fitting in place: keying of the fitting is good practice.
7. The white dust filter on the top of the PID allows maximum VOC access. If you will be operating in atmospheres with high aerosol/ particulate concentration, then consider an additional filter. Contact Alphasense for advice.
8. For pumped systems, flow rate should be 300sccm (0.3L/m). If there is no pressure differential between ambient pressure and the pressure in the cell and the flow is across the sensor, encouraging laminar flow, then flow rate can be increased to 500sccm (0.5 L/m).
   If the pump is upstream of the PID, this will generate turbulent flow, which should be considered in your design. Always try to achieve flow across the membrane to minimise shear velocity at the membrane and maximise laminar flow. HINT: minimise the restriction between the PID and ambient gas.

When calibrating, ensure that the gas carrier (e.g. nitrogen cylinder or compressed air) is clean - defined as “zero air”. Lubricating oils in compressed air lines should be avoided as they will foul PIDs if exposed to this gas stream for extended times.

T: +44 (0)1376 556700 **E:** sensors@alphasense.com **W:** www.alphasense.com

Sensor Technology House, Skyline 120, Great Notley, Braintree, Essex CM77 7AA, UK