**PID-HS Photo Ionisation Detector**

**Figure 1 PID-HS Schematic Diagram**

**PERFORMANCE**

- **Target gases**: VOCs with ionisation energies less than the lamp energy, see Table 1
- **Minimum resolution**: ppb isobutylene < 0.5
- **Linear range**: ppm isobutylene 5% deviation 3
- **Overrange**: ppm isobutylene 3
- **Sensitivity**: linear range mV / ppm isobutylene, see Table 1 for options > 500
- **Full stabilisation time**: minutes to 0.5 ppb time to full operation 20
- **Warm up time**: seconds 5
- **Offset voltage**: mV 70 to 200
- **Response time (t_{90})**: seconds diffusion mode < 10

**ELECTRICAL**

- **Power consumption**: 85 mW (max) at 3.2 V, 350 mW transient for 200 msec on switch-on
- **Output signal**: Offset voltage (minimum 70 mV) to V_{max}
  - (V_{max} = V_{supply} - 0.2 V when regulator is enabled)
- **Supply voltage**: 90 mW at 3.3 V, 460 mW transient for 200 msec on switch-on

**ENVIRONMENTAL**

- **Temperature range**: -40°C to +55°C (Intrinsically safe)
- **Temperature dependence**: Please refer to figures 2 and 3
- **Relative humidity range**: Non-condensing 0 to 99%

**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 < T_a < +55°C (< 10VDC supply)
- **Onboard filter**: To remove liquids and particulates
- **Lamp**: User replaceable
- **Electrode stack**: User replaceable
- **Error state signal**: Lamp out: n/a
  - Electronic error: < 50 mV
- **Weight**: < 8g
- **Position sensitivity**: None
- **Warranty period**: Electronics and housing: 24 months
  - Lamp and electrode stack are user replaceable, see Table 1

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**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 3.0 - 3.2 V or 3.2 - 3.6 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 approved) or 3.6 - 18V (not IS approved) will be required. These sensors will then be internally regulated to 3.3V.

**PID-HS2 shipped with regulator disabled.**

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<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
<th>Product code</th>
<th>Voltage regulator</th>
</tr>
</thead>
<tbody>
<tr>
<td>PID-HS2</td>
<td>3.2V to 3.6V certified</td>
<td>000-0028-HS2</td>
<td>Disabled</td>
</tr>
<tr>
<td>PID-HS3</td>
<td>3.0V to 3.2V certified</td>
<td>000-0028-HS3</td>
<td>Disabled</td>
</tr>
<tr>
<td>PID-HS4</td>
<td>3.6V to 10.0V certified</td>
<td>000-0028-HS4</td>
<td>Enabled</td>
</tr>
<tr>
<td>PID-HS5</td>
<td>3.6V to 18.0V non-certified</td>
<td>000-0028-HS2</td>
<td>Enabled</td>
</tr>
</tbody>
</table>
Figure 2 shows the deviation of the zero air baseline with temperature from a typical batch of sensors. The mean and ±95% confidence intervals are shown.

Figure 3 shows the variation of sensitivity with temperature from a typical batch of sensors. The mean and 95% confidence intervals are shown.

Table 1: PID replacements/consumables

<table>
<thead>
<tr>
<th>Lamp type</th>
<th>Product code</th>
<th>Minimum sensitivity mV/ppm</th>
<th>Minimum range ppm isobutylene</th>
<th>Lamp life lit hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.0 eV</td>
<td>001-0030-02</td>
<td>250</td>
<td>&gt; 6</td>
<td>5,000</td>
</tr>
<tr>
<td>10.6 eV (HPPM)</td>
<td>001-0019-04</td>
<td>500</td>
<td>3</td>
<td>5,000</td>
</tr>
<tr>
<td>10.6 eV (LLHS)</td>
<td>001-0030-01</td>
<td>500</td>
<td>3</td>
<td>5,000</td>
</tr>
<tr>
<td>11.7 eV</td>
<td>001-0019-03</td>
<td>TBD</td>
<td>TBD</td>
<td>200</td>
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<tr>
<td>Electrode stack</td>
<td>001-0018-03</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>Stack removal tool</td>
<td>001-0020-00</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
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<tr>
<td>Lamp spring</td>
<td>001-0023-00</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
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<tr>
<td>Lamp cleaning kit</td>
<td>001-0024-00</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
</tbody>
</table>

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”.

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