**IRM-AT Methane infrared sensor – thermopile detector**

**Pin out details:**
1. Lamp return
2. Lamp +5V
3. Not connected
4. Detector output
5. Reference output
6. Thermistor output
7. OV supply

**Notes:**
1. Dimensions without tolerances are nominal
2. Recommended PCB socket: Wearnes Cambion Ltd. code: 450-3326-01-06-00
3. Weight: < 15g
4. Use antistatic precautions when handling
5. Do not cut pins
6. Do not solder directly to pins
7. We suggest this sensor is best used in a fixed site instrument where calibration and measurement can be carried out in-situ, and the sensor is not subject to acute mechanical stress or changes of temperature.

**Performance**
- Maximum power requirements: 5.0 VDC, 60mA max. (50% duty cycle source drive)
- Minimum operating voltage: 2.0 VDC, 20mA max. (50% duty cycle source drive)
- Source drive frequency: 3 Hz typical, 50% duty cycle
- Active/Reference output in air (peak-to-peak): 2 to 4 mV @ 3 Hz, 50% duty cycle
- Typical active signal change for 2.5% CH₄: 5% drop (typical) @ 5 V, 3 Hz, 50% duty cycle
- Typical active signal change for 100% CH₄: 30% drop (typical) @ 5 V, 3 Hz, 50% duty cycle
- Response time (t₉₀): < 40 s @ 20°C ambient
- Warm-up time: 30 minutes @ 20°C, 5 VDC

**Lifetime**
- MTBF @ 5 VDC: > 3 years

**Key Specifications**
- Temperature signal
- Operating temperature range: -20°C to +50°C (linear compensation from 0 to 40°C)
- Storage temperature range: -40°C to +75°C
- Humidity range: 0 to 95% rh non-condensing

<table>
<thead>
<tr>
<th>Range</th>
<th>0 – 2.5%</th>
<th>0 – 100%*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>&lt; ± 500ppm</td>
<td>&lt; ± 1% vol</td>
</tr>
<tr>
<td>Resolution at zero</td>
<td>&lt; 200ppm</td>
<td>&lt; 300ppm</td>
</tr>
<tr>
<td>Resolution at range</td>
<td>&lt; 400ppm</td>
<td>&lt; 2.5% vol</td>
</tr>
<tr>
<td>Zero repeatability</td>
<td>&lt; ± 500ppm</td>
<td>&lt; ± 1,000ppm</td>
</tr>
<tr>
<td>FS repeatability</td>
<td>&lt; ± 0.1% vol</td>
<td>&lt; ± 2% vol</td>
</tr>
<tr>
<td>Limit of detection</td>
<td>&lt; 500ppm</td>
<td>&lt;1,000ppm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Span coefficient</th>
<th>0.074 – 0.094</th>
<th>1.1 – 1.3 @ 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linearisation coefficient b</td>
<td>0.38</td>
<td>0.025</td>
</tr>
<tr>
<td>Linearisation coefficient c</td>
<td>0.98</td>
<td>0.553</td>
</tr>
</tbody>
</table>

For further information on the performance of this sensor, on other sensors in the range or any other subject, please contact Alphasense Ltd. or visit our website at "www.alphasense.com".
Technical specifications Version 1.0

Figure 1 Response up to 2.5% volume methane

Absorbance = \text{span} \times \left(1 - \exp(-b\times[\text{CH}_4]_c)\right)

Default span @ 2% vol = 0.084, b = 0.38, c = 0.98

Patented optical design gives repeatable and stable absorbancy, following the Beer-Lambert Law.
This allows universal linearisation, not reliant on custom EEPROMs.

Figure 2 Response up to 100% methane

Absorbance = \text{span} \times \left(1 - \exp(-b\times[\text{CH}_4]_c)\right)

Default span @ 95% vol = 1.2, b = 0.025, c = 0.553

This NDIR methane sensor responds up to 100% methane but the housing is plastic so is not Ex approved.
However, the sensor could be placed in an Ex approved housing for applications where an explosive atmosphere is present or could develop.

Figure 3 Calibration error to 2.5% methane

Using universal linearisations, the IRC-AT error is less than 0.05% methane.
Zero and 2% methane calibrations are required.

*Note: Due to the incandescent IR source within the sensor, this device should NOT be used for applications where there is a possibility of the presence or formation of an explosive mixture of methane and/or other flammable gases with an oxidant such as air.

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 Ltd. or its distributor for disposal instructions. NOTE: all sensors are tested at ambient environmental conditions unless otherwise stated. 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.

In the interest of continued product improvement, we reserve the right to change design features and specifications without prior notification. The data contained in this document is for guidance only. Alphasense Ltd accepts no liability for any consequential losses, injury or damage resulting from the use of this document or the information contained within.©ALPHASENSE LTD Doc. Ref. IRM-AT/SEP22

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

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