Internal CO$_2$ Sensor for Automotive Applications

NDIR CO$_2$ Single Channel, Diffusion Sampling Method

The Telaire Internal Carbon Dioxide (CO$_2$) Sensor is a nondispersive infrared (NDIR) CO$_2$ sensor that implements a single channel diffusion sampling method for automotive HVAC applications, including automatic fresh air control and safety sensing for CO$_2$ refrigerants.

Along with the patented ABC Logic™ lifetime calibration warranty, its low power consumption, compact design and simple product integration, make this an affordable gas sensing solution.

**Benefits**
- Safety - Measure and control in-cabin CO$_2$ levels to prevent driver drowsiness.
- Energy Savings - Reduce variations in heating and cooling in-cabin through demand control ventilation.

**Applications**
- Automotive HVAC - In-cabin air quality and comfort control.
- CO$_2$ refrigerant leak detection

**Features**
- ABC Logic™ - Lifetime calibration warranty
- Lin 2.0 output
- Low power consumption
- Selectable power modes
- Mode-based sampling rate
- Compact design
- Wide temperature range

Amphenol
Advanced Sensors
Internal CO₂ Sensor Specifications

**General Performance:**

**ABC Logic**
This sensor implements an algorithm to self-calibrate to its ambient environment. The sensor uses readings during fresh air conditions to make the correction. ABC Logic corrects for a variety of use factors including transitions to new environments, change in altitudes, mishandling and aging of the sensor. Data for the algorithm is gathered during normal use of the sensor and corrections are implemented every 504 hours of continuous use.

**Accuracy and Measurement Range:**
- 400 to 5,000 ppm CO₂: +/-200 ppm
- 5,000 ppm to 4% CO₂: +/- 10% of the reading
- 4% to 6.5%: accuracy not specified
- Temperature Dependence (outside 0°C to 50°C): +/- 0.5% of the reading

**Measurement and Sample Rate Characteristics:**
- Active Mode: 5 seconds sample rate
- Low Power Mode: 15 seconds sample rate
- Sleep Mode: 5 minute sample rate
- Warm-up mode: 5 seconds after power up
- Warm-up time to full accuracy: 2 minutes

**Mechanical:**

**Enclosure**
- PBT GF15 Black

**Weight**
- 5g

**Conformal Coating**
- Electronic components are conformal coated.

**Environmental:**

**Operating Temperature Range**
- -40°C to + 90°C

**Storage Temperature Range**
- -40°C to +110°C

**Relative Humidity**
- 0-95% non-condensing

**Electrical Characteristics:**

**Voltage Ratings**
- Input Voltage: 9VDC - 16VDC
- LINbus Voltage: 9VDC - 40VDC

**Current Consumption**
- Active Mode Current (average): 20mA
- Low Power Mode Current (average): 15mA
- Sleep Mode Current (no measurement): 25uA
- Peak Current (max): 120mA
Internal CO₂ Sensor Specifications (cont.)

**Cable and Connector**

**Connection**

<table>
<thead>
<tr>
<th>Mating Connector</th>
<th>TE AMP 4-1718346-1</th>
</tr>
</thead>
</table>

**Socket Configuration**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>~ Ground (Common)</td>
<td>~ LIN</td>
<td>~ Supply +V</td>
</tr>
</tbody>
</table>

**PCB Pads**

1 ~ Supply +V (Square pad)
2 ~ LIN
3 ~ Ground (Common)

**Available Models**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Sampling Method</th>
<th>Range</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>T6743-40K-E</td>
<td>Diffusion</td>
<td>0-40,000 ppm</td>
<td>Sensor with Enclosure</td>
</tr>
<tr>
<td>T6743-40K</td>
<td>Diffusion</td>
<td>0-40,000 ppm</td>
<td>No Enclosure, PCBA only</td>
</tr>
</tbody>
</table>

**PIN LAYOUT**

**LIN Interface**

The sensor implements a LIN interface defined by a generic LDF file.

**LIN Output Signals**

**Carbon Dioxide**

CO₂ Concentration: 1 ppm Resolution

**Alarm Output**

Limit-based threshold alarm signal with hysteresis.

**Error Response**

Indicates when a node or frame error is detected.

**Diagnostics**

Flag used to indicate a diagnostic issue to the host.

**Device Ready**

Indicates when the sensor is ready to take a measurement.
Amphenol: T6743-40K-E