

## Broadband Refrigeration - BASIC<sup>EVO</sup>

Broadband NDIR gas sensor for refrigerants – reference calibrated to R134a // TETRAFLUOROETHANE // 2000 ppm  
 smartGAS item number: B3-712205-03800

LOW DRIFT • GAS ENTRY BY DIFFUSION • LONG LIFE TIME • LOW MAINTENANCE COSTS



### IDEAL FOR:

**HOTEL AIR CONDITIONING**  
**FOOD STORAGE ROOMS**  
**INDUSTRIAL REFRIGERATION**  
**FOOD TRANSPORT**  
**SUPERMARKETS**

- R134a (Reference)
- R23
- R32
- R125
- R404a
- R407a
- R407f
- R410a
- R448a
- R449a
- R452a
- R455a
- R513a

Non Dispersive Infrared (NDIR) broadband gas sensor for ambient air monitoring using dual wavelength technology. Although designed especially for refrigeration leak detection in small concentration ranges (2000 ppm range) for wall mount detectors and room air monitoring devices the BASIC<sup>EVO</sup> can also be applied in food storage facilities, air conditioning systems and various areas of scientific research.

The BASIC<sup>EVO</sup> refrigerant broadband sensor is calibrated to R134a as reference and can easily be integrated into OEM systems, where long term stability, repeatability and reliable performance are required. It can be utilised as a refrigerants detector for R134a and up to 12 other gases (See list on the left side) in industrial refrigeration facilities but can also be used for ambient air monitoring in the field of air conditioning devices.

Other scopes of applications comprise continuous gas monitoring in controlled environment chambers and food storage rooms as well as usage for various areas of scientific research.

Special build-in solutions to provide IP54 protection and easy field gas-calibration are available.

Modbus ASCII or RTU data communication offers a variety of options to connect the BASIC<sup>EVO</sup> gas sensor to a controller.

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| General features  |   |
|---|---|
| Measurement principle:  | Non Dispersive Infra-Red (NDIR), dual wavelength  |
| Measurement range:  | 0 .. 2000 ppm Full Scale (FS)   |
| Gas supply:   | by diffusion (atmospheric pressure)   |
| Dimensions:   | 62 mm x 37 mm x 30 mm (L x W x H)   |
| Warm-up time:   | < 2 minutes (start up time)<br>< 11 minutes (fade in finished)<br>< 30 minutes (full specification) |
| Measuring response at R134a reference gas   |   |
| Response time ( $t_{90}$ ):   | appr. 60 s  |
| Digital resolution (@ zero):  | 1 ppm   |
| Detection limit ( $3 \sigma$ ):   | $\leq 10$ ppm   |
| Repeatability:  | $\leq \pm 20$ ppm   |
| Linearity error (straight line deviation):  | $\leq \pm 30$ ppm   |
| Long term stability (span):   | $\leq \pm 40$ ppm over 12 month period  |
| Long term stability (zero):   | $\leq \pm 30$ ppm over 12 month period  |
| Influence of T and P*   |   |
| Temp. dependence (zero):  | $\leq \pm 3$ ppm per °C   |
| Temp. dependence (span):  | $\leq \pm 6$ ppm per °C   |
| Pressure dependence:  | $\pm 0.100$ % of measurement value / hPa  |
| Electrical inputs and outputs   |   |
| Supply voltage:   | 3.3 V .. 6.0 V DC   |
| Supply current (peak):  | < 400 mA @ 3.3V, < 240mA @ 5.0 V  |
| Inrush current:   | < 600 mA  |
| Average power consumption:  | < 800 mW  |
| Digital output signal:  | Modbus ASCII / RTU via UART, autobaud, autoframe  |
| Calibration:  | zero and span by SW   |
| Climatic conditions   |   |
| Operating temperature:  | -20 .. + 40 °C  |
| Storage temperature:  | -20 .. + 60 °C  |
| Air pressure:   | 800 .. 1150 hPa   |
| Ambient humidity:   | 0 .. 95 % relative humidity (not condensing)  |
| * Typical values related to 1013 hPa and 22 °C for dry (not condensing) and clean sample gas.<br>Stated values exclude calibration gas tolerance. |   |

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| Broadband features cross-sensitivity |            |            |            |            |
|--------------------------------------|------------|------------|------------|------------|
| Gas:                                 | R125       | R404a      | R407a      | R410a      |
| Scaling factor (other than R134a):   | 0,639      | 0,773      | 0,852      | 1,017      |
| Scaling error (other than R134a):    | ≤ ± 80 ppm | ≤ ± 90 ppm | ≤ ± 50 ppm | ≤ ± 80 ppm |

| Broadband features cross-sensitivity |             |             |             |            |
|--------------------------------------|-------------|-------------|-------------|------------|
| Gas:                                 | R448a       | R449a       | R407f       | R513a      |
| Scaling factor (other than R134a):   | 0,851       | 0,843       | 0,941       | 0,735      |
| Scaling error (other than R134a):    | ≤ ± 270 ppm | ≤ ± 270 ppm | ≤ ± 230 ppm | ≤ ± 60 ppm |

| Broadband features cross-sensitivity |            |             |             |             |
|--------------------------------------|------------|-------------|-------------|-------------|
| Gas:                                 | R32        | R23         | R452a       | R455a       |
| Scaling factor (other than R134a):   | 1,701      | 1,292       | 0,614       | 2,681       |
| Scaling error (other than R134a):    | ≤ ± 75 ppm | ≤ ± 220 ppm | ≤ ± 175 ppm | ≤ ± 110 ppm |

### Application of scaling factors:

$$\text{Actual gas conc. (target gas)} = \text{Scaling factor} \times \text{Conc. reading (R134a)}$$

|                                       |   |
|---------------------------------------|---|
| <b>Actual gas conc. (target gas):</b> | Real gas concentration of the target gas                      |
| <b>Scaling factor:</b>                | Multiplier to correct the sensor readings                     |
| <b>Conc. Reading (R134a):</b>         | Sensor output reading referencing to R134a as calibration gas |

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