

Broadband Refrigeration - BASIC^{EVO}

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^{EVO} can also be applied in food storage facilities, air conditioning systems and various areas of scientific research.

The BASIC^{EVO} 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^{EVO} 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)
	< 11 minutes (fade in finished)
	< 30 minutes (full specification)
Measuring response at R134a reference gas	
Response time (t_{90}):	appr. 60 s
Digital resolution (@ zero):	1 ppm
Detection limit (3σ):	≤ 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:	± 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. 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:

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

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

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For more information, please visit www.smartGAS.eu or contact us at sales@smartgas.eu

Please consult smartGAS sales for parts specified with other temperature and measurement ranges. At first initiation and depending on application and ambient conditions recalibration is recommended. Recurring cycles of recalibration are recommended.