

MADE IN GERMANY

## FLOW<sup>EVO</sup> / FLOW<sup>EVO</sup> Plus

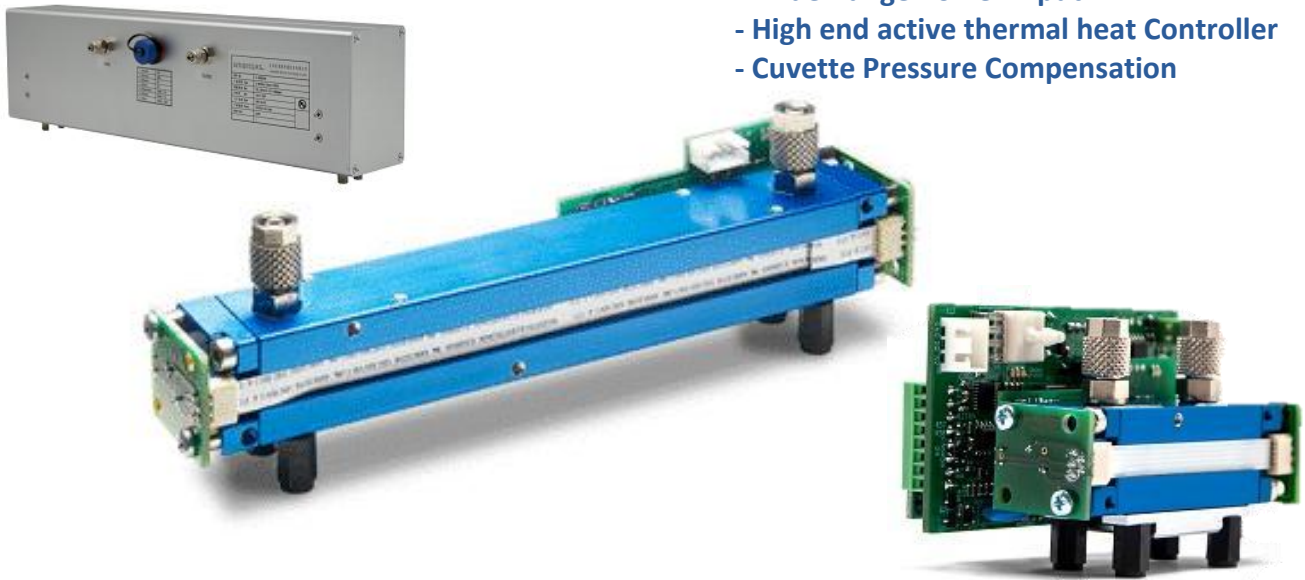
Infrared gas Sensor  
Carbon dioxide CO<sub>2</sub> 30 Vol.% in Argon  
smartGAS item number:  
F3-216307 / P3-216307.xxx

### Product features:

- "Ready to use" NDIR sensors
- Compact Design
- Low maintenance
- Low detection limits
- Selective against influencing gases
- Flexible interfaces
- Temperature and drift compensated
- Compact construction

### Product Features FLOW<sup>EVO</sup> Plus only

- Active Noise reduction Filter
- Low noise at lowest T90 time
- Low LDL
- High data frequency
- Wide Range Power Input
- High end active thermal heat Controller
- Cuvette Pressure Compensation



The **Flow<sup>EVO</sup>** sensors have a large spectrum of measurable gases and are especially convincing where it is important to have the highest precision and reliability. Different versions can be very easily combined, also facilitating complex measuring tasks. All **smartGAS** sensors are designated by low detection limits, very small drift, a large temperature range and a fast response time and markedly low operating and maintenance costs. Our NDIR sensors in the **Flow<sup>EVO</sup>** series combine measuring precision with compact design and simple handling.

#### Optional Accessories

- Case and thermal isolation
- Heater and heat controller
- USB Adapter
- CONNECT Interface
- Calibration/Data Logger software
- Calibration and test gases
- Gas Cooler, Filter, Pre-treatment
- Analog Interfaces (EVO<sup>Plus</sup>)

#### Support

- Design-In support
- Customization:
  - Software
  - Protocols
  - Measuring ranges
  - Background gas optimizing
  - Interfaces

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### General features

Measurement principle:	Non Dispersive Infra-Red (NDIR), dual wavelength	
Measurement range:	0 ... 30 Vol.% Full Scale [FS]	
Gas supply:	by flow (nearly atmospheric pressure)	
Mounting dimensions:	FLOW <sup>EVO</sup> F3- 76 mm x 30 mm x 50 mm (L x W x H)	FLOW <sup>EVO</sup> Plus P3-.xxx 76 mm x 30 mm x 55 mm (L x W x H)
Flow Rate:	0.1 ... 1.0 l/min	
Gas Cuvette Length/Material	40 mm / Alloy	
Cuvette Volume	≈ 2,01 cm <sup>3</sup>	
Gas Connections	5/3mm Rubber Tube Fitting (default)	
Warm-up time:	< 2 minutes (start-up time)   < 30 minutes (full specification)	

### Measuring response\*

Digital resolution:	0.01 Vol.%	
Response time (t90)	Standard	< 16 s (Standard Mode default)
0 .. 90%[FS]@0.7 l/min:	Fast Mode	< 1.6 s (Fast Mode)**
Detection limit (3 σ):	Standard	≤ 0.5 % [FS]
	Fast Mode	≤ 1.5 % [FS]
Repeatability:	≤ ± 0.5 % [FS]	
Linearity error (straight line deviation):	≤ ± 1 % [FS]	
Long term stability (zero):	≤ ± 1 % [FS] over 1000 h period	
Long term stability (span):	≤ ± 2 % [FS] over 1000 h period	

### Influence of T,P,flow rate,other\*

Temp. dependence (zero):	FLOW <sup>EVO</sup> F3- ≤ ± 0.2 % [FS] per °C	FLOW <sup>EVO</sup> Plus P3- Option: Constant heated 45 °C ±0.1 °C
Temp. dependence (span):	≤ ± 0.6 % [FS] per °C	Option: Constant heated 45 °C ±0.1 °C
Pressure dependence:	+ 0.156 % of actual reading / hPa	Option: Pressure Compensated
Flow rate dependence:	≤ ± 0.2 % [FS] per 0.1 l / min	
Cross sensitivity (zero) other gases:	Consult manufacturer	
Gas dew point requirement:	Not condensing, particle free and clean sample gas	

### Electrical parameters

Supply voltage:	FLOW <sup>EVO</sup> F3- 3.3V .. 6.0 VDC	FLOW <sup>EVO</sup> Plus P3- 10 .. 26 VDC recommend 24VDC
Supply current (peak):	< 400mA @ 3.3V, < 240mA @ 5.0V	< 8 W (while heater on)
Inrush current:	< 600mA	< 800mA
Average power consumption:	< 800mW	< 800 mW (at stabilized temperature)
Digital output signal:	Modbus ASCII / RTU 1 Wire TTL autobaud, autiframe	RS485/RS232 Modbus ASCII / RTU autobaud, autiframe, Free ASCII
Max read out data rate	2.5 Hz	10 Hz
Calibration:	zero and span by software	

### Climatic conditions

Operating temperature:	Operating : 0 .. + 50 °C   Storage : -20 .. + 60 °C
Air pressure:	800 .. 1150 hPa
Ambient humidity:	0 .. 95 % relative humidity (not condensing)

### Options\*\*\*\* FLOW<sup>EVO</sup> Plus P3-

P3-nnnnnn-1x1	Heater	Temp. : 45 °C (Default)
P3-nnnnnn-1x3	Heater and Pressure Sensor	Temp. : 45 °C (Default) and cuvette pressure compensation
P3-nnnnnn-11x	Analog Interface1	4-20mA Isolated (3kV/rms), max load 650Ω (not possible for cased version)
P3-nnnnnn-12x	Analog Interface2	0-20mA max load 600Ω   0-2/5/10 VDC   0.4-2/1-5/2-10 VDC min resistance load 2kΩ
P3-nnnnnn-1xx1	Cased 6/4mm tube	For case size please refer the drawing***
P3-nnnnnn-1xx2	Cased 5/3mm tube	For case size please refer the drawing***
P3-nnnnnn-1xx5	Cased 6/4mm tube with pump	
P3-nnnnnn-1xx6	Cased 5/3mm tube with pump	
P3-nnnnnn-1xxxp	Pin Configuration	,p' can be Pin configuration A/B/C/D/E (only for cased version)
P3-nnnnnn-1xxxxm	Communication mode	,m' the selected communication mode
P3-nnnnnn-1xxxxxc	Connected analog voltage output	,c' connected analog Voltage output 2/5/10VDC refer to Pin configuration

\* Typical values related to 1013 hPa, Ta = 22 °C, flow = 0.7 l / min for dry (not condensing) and clean sample gas. Stated values exclude calibration gas tolerance.

\*\* Adjustable only via smartGAS Calibration-Tool Software.

\*\*\* Case size may differ between version with and without pump

\*\*\*\* See also DS\_F3\_P3\_Options and FLOW<sup>EVO</sup> Plus Manual

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