smartGAS.

MADE IN GERMANY

FLOW^{EVO} / FLOW^{EVO} Plus

Infrared gas Sensor
Formic acid HCOOH 5 Vol.%
smartGAS item number:
F3-282506 / P3-282506-xxx

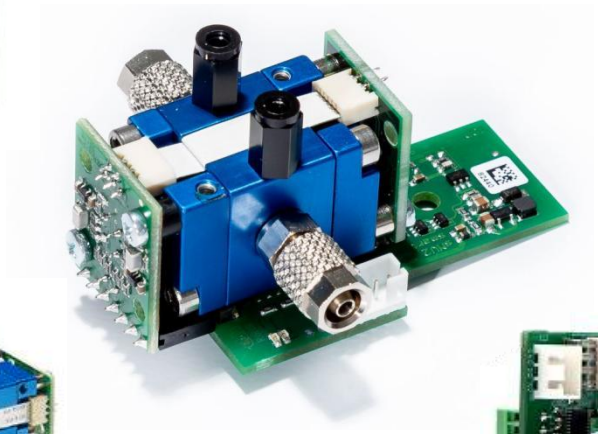
Product features:

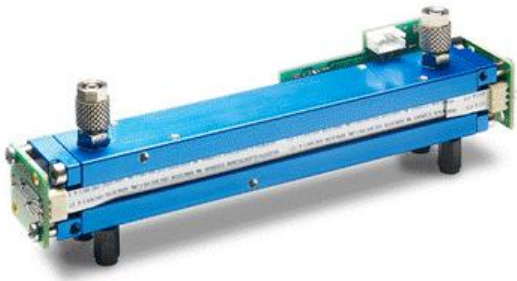
- "Ready to use" NDIR sensors
- Compact Design
- Low maintenance
- Low detection limits
- Selective against influencing gases
- Flexible interfaces
- Temperature and drift compensated
- Compact construction

Product Features FLOW^{EVO} 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









The **Flow^{EVO}** 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^{EVO}** 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^{Plus})

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

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FLOW^{EVO} / FLOW^{EVO} Plus | Formic acid HCOOH| F3-282506 / P3-282506-xxx

Release date: 11 Jul 2026

General features

Measurement principle		Non Dispersive Infra-Red (NDIR), dual wavelength	
Measurement range		0 ... 5 Vol.% HCOOH Full Scale (FS)	
Gas supply		by flow (nearly atmospheric pressure)	
		FLOW^{EVO} F3-	**FLOW^{EVO} Plus P3-xxx**
Mounting dimensions		T-III 70 mm x 60 mm x 40 mm (L x W x H)	T-III 78 mm x 62 mm x 70 mm (L x W x H)
Flow Rate		0.1 ... 1.0 l/min	
Gas Cuvette Length/Material		8,6 mm / Alloy gold coated (or stainless)	
Cuvette Volume		≈ 0,43 cm³	
Gas Connections		5/3mm Rubber Tube Fitting (default)	
Warm-up time		< 2 minutes (start-up time) | < 30 minutes (full specification	
Safety Notice	⚠	Any condensing of HCOOH inside the Sensor will damage the optical System. This must be prevented under all circumstances. It is strongly recommended to heat the sensor.	

Measuring response*

Factory Calibration		7000 ppm R1234ze $C_3H_2F_4$ Tetrafluoropropene in N_2 equivalent 5 Vol.% HCOOH in N_2	
Digital resolution		0.01 Vol.%	
		FLOW^{EVO} F3-	**FLOW^{EVO} Plus P3-**
Response time (t90)	Standard	< 16.5 s (Standard Mode default)	< 1.8 s
0 .. 90%[FS]@0.7 l/min	Fast Mode	< 1.8 s (Fast Mode)**	-/-
Detection limit (3 σ)	Standard	≤ 1 % [FS]	≤ 0.8 % [FS]
	Fast Mode	≤ 2 % [FS]	-/-
Repeatability		≤ ±1 % [FS]	
Linearity error (straight line deviation)		≤ ±2 % [FS]	
Long term stability (zero)		≤ ±2 % [FS] over 1000 h period	
Long term stability (span)		≤ ±10 % [FS] over 1000 h period	

Influence of T,P,flow rate,other*

	FLOW^{EVO} F3-	**FLOW^{EVO} Plus P3-**
Temp. dependence (zero)	≤ ± 0.5 % [FS] per °C	Option: Constant heated 45 °C ±0.1 °C
Temp. dependence (span)	≤ ± 1.5 % [FS] per °C	Option: Constant heated 45 °C ±0.1 °C
Pressure dependence	+ 0.156 % of actual reading / hPa | Cuvette Pressure compensation is not available for CHOOH	
Flow rate dependence	≤ ± 0.5 % [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

	FLOW^{EVO} F3-	**FLOW^{EVO} Plus P3-**
Supply voltage	3.3V .. 6.0 VDC	10 .. 26 VDC reinkommend 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, autoframe	RS485/RS232 Modbus ASCII / RTU autobaud, autoframe, 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^{EVO} Plus P3-

P3-nnnnnn-1x1	Heater	Temp. : 45 °C (Default)
P3-nnnnnn-1x3	Heater and Pressure Sensor	No available for HCOOH Sensors
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-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

Integrated Pump is not available for CHOOH

* 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^{EVO} Plus Manual

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