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TDLAS — BM-H-3 BeamCell

Features

- Turnkey extractive gas analyzer solution
- Absolute gas quantification
- Calibration-free gas sensing
- Acid resistant materials in flow-chamber
- Digital and analog data interfaces
- IP68 grade mechanics
- Easy cleaning if needed

Description

The BM-H-3 BeamCell is a high-performance turnkey solution based on tunable diode laser absorption spectroscopy (TDLAS) for analysis of extracted/sampled gas. The BM-H-3 BeamCell is equipped with push-in gas connectors (G1/8) adapted by standard for 6-mm or 8-mm gas tubing.

By extracting gas in a parallel flow for analysis in the controlled environment of the BM-H-3 BeamCell, very high measurement accuracy can be achieved.

The analyzer can be placed in a cabinet that is easily accessible, out of explosion zones, and with our "FFCB-1 Safety Control", it is possible to monitor temperature, gas flow and ventilation in the cabinet to trigger an alarm if something malfunctions that can generate an explosion risk.

The analyzer is designed with user-friendliness in mind, both for integration in industrial settings into PLC systems and in research laboratories, where raw data and/or processed data can easily be exported and visualized for post-processing in third-party tools.

The robust and established TDLAS technology provides fast (100 µs) and highly sensitive (PPB-level) gas analysis.

The TDLAS technology is also inherently self-referencing and calibration-free, requiring little to no maintenance.

The analyzer can measure many common gases found in industry and laboratories, including greenhouse gases such as methane (CH_4). Other commonly analysed gases include O_2, CO_2, CO, N_2O, NH_3, NO_x, HF, H_2S and HCl, as well as hydrocarbons.

The highly energy-efficient design allows the BM-H-3 BeamCell to run for hours on batteries, making it well-suited for providing mobile analysis solutions at locations where there is no access to external power.

The calibration-free gas analyzer system is highly durable for use in heavy industries and extremely robust in harsh environments.

Examples of gases

Gas	Analyzer precision (ppm)[a]
O_2	30
HF	0.05
CO	1
CO_2	2.5
CH_4	1
H_2S	1.5
NO	1.5
NH_3	1
N_2O	10
H_2O	1

[a]Under standard test conditions: L = 0.2 m, t = 1 s, P = 1 atm, T = 300 K, largest of 1% relative and specified precision

Spectroscopy Characteristics

Parameter	Symbol	Min	Typical	Max
Data rate	f_R		1 Hz	10 kHz
Data sampling noise			0.1 µVrms*	
Low-light limit (10 s)	I_{LL}		1 nW	
Gas connector threading			G1/8	
Gas tube dimension			6 mm / 8 mm	

1 s sampling time

Interfaces

Interface	Model	Mounted	Quantity
USB	53398-0471 Communication, Data	Yes	2
USB	Mini USB, Firmware upgrade	Yes	2
RS-485	4 wire Full Duplex - protected	Yes	1
RS-485	4 wire Full Duplex - service data	Yes	1
RS-485	Half Duplex	Yes	1
Trig In	4-30 V	Yes	2
IO	0-12 V	Yes	2
IO Supply	12 V	Yes	1
Relay Output	G6K-2F-5DC, NC/NO	Yes	2
4-20 mA	Passive / Active	Expansion	2
Expansion connector	I²C, SPI, GPIO, ADC, Loop Relay, Sync, GND, PWM, UART, Relay, IO, 5 V, 2.5 V, 12 V, PWR_IN, 4-20 mA, 0-10 V	Yes	3
Sync signals	Daisy chain configuration	Yes	2
Master clk in / out	73412-0110	Yes	2

Electrical Characteristics

Parameter	Symbol	Min	Typical	Max
Supply voltage	V_{in}	15 VDC*	24 VDC	32 VDC
Power consumption			5 W**	
TEC driver power		0 W		3.56 W
Comm. link length				30 m
Startup-time (ambient)	t_{su}		5 s	

*Degraded noise performance if Vin < 15 V | **50 mA laser diode*

Other

Parameter	Symbol	Min	Typical	Max
Operating temperature	T_{op}	-10 °C		50 °C
Humidity (non-condensing)		40% @ 50 °C / 80% @ 30 °C		
IP classification		IP67		
Infrared laser		Laser Class I		
CE-marked EU directives		2014/35/EU, 2012/19/EU, 2011/65/EU, EN61000-6-2:2005, EN61000-6-2:2019, EN61000-6-4:2007, EN61000-6-4:2019		