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MLT 3 Multi-Component Gas Analyzer for suppressed ranges - Gas Purity

APPLICATION

- CO₂ gas purity measurement
- Suppressed ranges
- 0 100 % CO₂ & 98 100 % CO₂
- · Research and development
- Gas producers

FEATURES

- MLT 3 analyzers and analyzer modules
- Multi-channel: MLT 3 up to 4 channels, NDIR, NDUV, VIS, O₂ and TC
- NDIR: Microflow sensor or solid-state detector
- NDUV/VIS: Semiconductor detector or vacuum diode
- O₂: Fast response paramagnetic or longterm stable electrochemical oxygen sensor
- TC: Thermo-conductivity, corrosion-resistant
- 4 ranges per channel
- Autocalibration via internal or external valve block, controlled by digital I/O, serial interface, network, time-programmed
- Automatic zero and span control by autozero and automatic span gas control
- Alternatively manual zero and span adjustment
- Table-top or rack-mountable analyzer
- Thermostat controlled bench (55 °C)
- Barometric pressure compensation
- Sample flow rate measurement
- Internal pressure regulator, filter and capillary
- Analog, digital and serial I/Os (SIO/DIO)
- Suppressed ranges for O₂, H₂, CO₂, NO, N₂O and CO









DESCRIPTION

Rosemount Analytical's NGA 2000 MLT Series of gas analyzers offers multi-component, multi-method analysis using infrared, ultraviolet, thermal conductivity, paramagnetic and electrochemical sensor technologies. Housed in a total 19-inch enclosure with thermostat control the NGA 2000 MLT 3 Gas Analyzer for CO_2 gas purity can measure CO_2 in two modes:

An absolute range of 0 - 100 % CO2 and a suppressed range of 98 - 100 %. The main advantage is that calibration can be done in the absolute range using pure nitrogen as zero gas and pure carbon dioxide as span gas thus avoiding zeroing with inaccurate zero gas for the suppressed range (98 % +-x%). Since suppressed ranges are depending much more on the influence of pressure, temperature and flow, special measures are necessary to keep those constant and run special compensation methods additionally (internal pressure regulator, capillary & pressure sensor; temperature & pressure compensation). Therefore the standard calibration interval has to be changed for the non-standard suppressed range. A daily calibration has to be carried out with 100 % N₂ and 100 % CO₂. Due to the big change from 98-100 % CO₂ to 100 % N₂ (0 % CO₂) a purge time of more than 240 seconds is required before running zero adjustment. The same purge time is necessary to switch over to span gas or sample gas. To achieve the best results sample, zero and span gases need to be kept to a constant temperature within the range of permissible ambient temperature.

For a complete overview of the NGA 2000 MLT 3. please refer to the MLT 3/4 product 6583.A01.



PERFORMANCE SPECIFICATIONS

	0 - 100 % CO ₂		98 - 100 % CO ₂
Detection limit	≤ 1 % ¹) ⁴)	Noise	≤ 2 % ^{8) 4)}
Linearity	≤ 1 % ^{1) 4)}	Linearity	≤ 2 % ^{8) 4)}
Zero-point drift	≤ 2 % per week 1) 4)	Zero-point drift	≤ 500 ppm per day 8) 4) 11)
Span (sensitivity) drift	≤ 0.5 % per week 1) 4)	Span (sensitivity) drift	≤ 500 ppm per day 8) 4) 11)
Repeatability	≤ 1 % ¹) ⁴)	Resolution	500 ppm
Response time (t ₉₀)	$3 \text{ s} \le t_{90} \le 30 \text{ s}^{-3(-5)}$	Response time (t ₉₀)	\leq 30 s $^{3) (13)}$
Permissible gas flow	0,2 - 1,5 l/min	Gas flow	defined by inlet pressure 14)
Influence of gas flow	-	Inlet pressure	constant: +- 1 psig) 9)
Max. pressure	≤ 1.500 hPa abs.	Min. Pressure	20 psig
Influence of pressure - At constant temperature	≤ 0,1 % per hPa ²⁾	Max. pressure Influence of atmospheric pressure,	25 psig ≤ +-2 % ^{8) 14)}
- With pressure compensation 10) Permissible ambient temperature	≤ 0,01 % per hPa ²⁾ + 5°C to + 40°C ⁷⁾	- 900 to 1100 hPa, at const. temp. with pressure compensation 10)	
Influence of temperature (at constant pressure)		Permissible ambient temperature (at constant pressure)	+ 20°C to + 30°C 7)
- On zero point	≤ 1 % per 10 K 1)	- On zero point	≤ +-2 % ⁸⁾
- On span (sensitivity)	$\leq 5 \% (+ 5 \text{ to } + 40^{\circ}\text{C})^{-1) 6}$	- On span (sensitivity)	≤ +-2 % ⁸⁾
Thermostat control 12)	55 °C	Thermostat control	55 °C
Warm-up time 12)	Approx. 50 minutes	Warm-up time	Approx. 55 minutes

- 1) Related to full scale
- 2) Related to measuring value
- 3) From gas analyzer inlet at 0.8 l/min gas flow
- 4) Constant pressure and temperature
- 5) Dependent on integrated photometer bench
- 6) Starting from 20°C (to +5°C or to +40°C)
- 7) Different ambient temperatures (15-35°C) on request 8) Related to suppressed range (98 100 % CO₂)
- Between min. and max. pressure
- 10) Barometric pressure sensor required
- 11) Daily calibration requested
- Thermostated box: 55 °C, warm-up time approx. 50 min. (ambient temperature: 20-30 °C)
- 13) Switch from absolute to supprezed range requires
- purge time of > 240 seconds
 14) Gas outlet open to atmosphere (tube 1/4", 3 m length)

Calibration Procedure

Calibration is carried out within the absolute range: 0 - 100 % CO₂ Run span gas calibration only after having carried out a zero calibration:

zero gas: $100 \% N_2$ span gas: $100 \% CO_2$

Zero and span calibration requires a certain purge time. After that the calibration routine with stability and averaging procedures takes place (calibration time). Purge time is also required after return to from zero or span to sample gas.

Calibration purge time is based on MLT 3 gas inlet (not including sample handling system time):

purge time: > 240 sec (from sample to zero gas; from zero to span gas)

calibration time: approx. 40 sec.

purge time: > 240 sec (from zero gas to span or sample gas; span to zero gas)

All calibration gases have to be kept to the same temperature as sample gas. Sample gas has to be conditionned to the ambient temperature of the analyzer.

General

Installation of the analytical equipment (gas analyzer, sample handling system and calibrationgases) should be in an air conditionned room or at least in a well ventilated housing.

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Emerson Process Management

GmbH & Co. OHG Industriestrasse 1 63594 Hasselroth • Germany T +49 (6055) 884-0 F +49 (6055) 884-209

http://www.emersonprocess.com

