

# Multi-Gas Calibrator

AIR QUALITY MONITORING SYSTEMS

The MGC101 system automatically performs zero, precision, span and multi-point calibrations using NO, NO<sub>2</sub>, SO<sub>2</sub>, CO, O<sub>3</sub>, hydrocarbons and other gases of interest. It meets all U.S. environmental protection agency requirements.



## SPECIFIC FEATURES:

- User-friendly interactive software with plain language prompts is simple to use, reducing technician training time and virtually eliminating error
- Automatic calculation of dilution and span gas flows, based on commanded concentration, eliminates the need for any manual computation and allows rapid transition from point to point
- Internally-stored mass flow controller calibration data improves accuracy (factor of ten) and simplifies field recalibration
- Simultaneous connection from 1 to 4 gas cylinders (option for 5)
- Easy programming with keyboard and pop-up menu
- Automatic calibration sequences programming
- LCD screen (4 lines / 20 characters)

Multi-gas calibrator for ambient air gas analyzer calibration



MGC 101 - internal view

## MAIN APPLICATIONS:

- > Air quality monitoring stations and mobile laboratories for manual, automatic or remote calibration
- > Used as a reference calibrator in central station
- > Test of analyzers: Automatic zero, precision, span, multi-point calibration and gas phase titration (GPT)



MEETS ALL U.S. EPA  
REQUIREMENTS

# Multi-Gas Calibrator MGC101

## PRINCIPLE OF OPERATION:

The MGC101 consists of a single chassis supporting 2 thermal mass flow controllers, an ozone generation module, a mixing zone, a reaction chamber for gas phase titration, and control electronics. The mass flow controllers are calibrated to a NIST (National Institute of Standards and Technology) traceable primary standard. The calibration data consists of a comparison of desired versus actual flow over the full dynamic range of the instrument with linear interpolation between points. Calibration data is stored in non-volatile memory and may be updated by the user with a suitable standard.

The MGC101 ozone generator is factory calibrated using a NIST traceable ozone standard. This temperature controlled, ultra-violet (UV) based ozone generator includes a precision photo-optical feedback circuit to compensate for lamp aging effects. The MGC101 is available in either a standard rack mount or portable configuration.

## TECHNICAL SPECIFICATIONS

Flow accuracy	± 1% of the full scale (F.S)
Flow repeatability	± 0.05% of the full scale (F.S)
Linearity of flow measurement	+/- 0.5% FS
Dilution ratio	- dilution mode: from 1/12 to 1/900 - TPG mode: from 1/56 to 1/500
Ozone generator concentration range	0.05 ppb to 0.5 ppm at 5 - 10 slpm
optional range	0.05 ppb to 5 ppm at 5 - 10 slpm (upon request)
Pre-heating time	30 minutes
Response time	2 min for an accuracy of 1%
Inlet flow range of gases cylinder:	0 to 100 cc/min or higher
Zero air inlet	1 external (1/4" Swagelok)
Gas inlet	4 external (1/4" Swagelok)
Gas outlet	1 external (1/4" Swagelok)
Operating pressure (zero air & span gas)	- 1.72 bars (recommended) - 1.38 bar (minimum) - 2.07 bars (maximale)
Display	alphanumeric LCD 20 characters and 4 lines
Housing	19" - 4U standard rack / portable
Dimensions (W x D x H)	483 x 380 x 177 mm / 432 x 380 x 177
Weight	10 to 15 Kg (according to options)
Power supply	230 V, 50 Hz or 115 V, 60 Hz
Consumption	250 VA
Operating temperature	0°C to + 50°C
Optional photometer	measurement range 0.1-5ppm precision 1ppb linearity 0.3% F.S.O
Microprocessor-based operations	
RS232 serial data interface (specific protocol)	
Remote control using dry contacts	
Programmable Inputs/outputs (8 I/8O)	
Front panel keypad	

## MAIN OPTIONS:

- Build-in permeation benches, for most of the certified permeation tubes disposable type (SO<sub>2</sub>, NO<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>,...)
- Other dilution ratios upon request
- 3rd mass flow controller
- UV Photometer
- Solenoid valve on the outlet
- Additional gas inlet

## STANDARD FUNCTIONS:

**Blend:** the calibrator automatically calculates and delivers the specified concentrations at the required flow rate.

**Ozone generation:** allows precise and stable ozone generation.

**Gas Phase Titration (GPT):** the GPT method is based on the reaction: NO + O<sub>3</sub> ⇌ NO<sub>2</sub> + O<sub>2</sub>. The method of Gas Phase Titration recommended by ENVEA is the excess nitric oxide Transfer Standard Procedure (GPT-NO).

**Manual:** allows user to manually command a desired rate of flow for each mass flow controller.

**Display:** allows user to monitor flow rates for each mass flow controller separately, provides ozone oven block temperature during ozone generation and gas phase titration routines.

**RDM calibration:** multi-point calibration.

**Ozone generator calibration:** performed using 7 up to 11 points for an improved linearity. **MFC output flow rate check:** used when a reference flow rate is connected to the inlet of MGC101.

**Settings:** date, time, screen contrast, RS232 parameters...

MGC101 - Operating Principle

