

## Multipoint Gas Calibrators

### Description

The **Multipoint Gas Calibrators** product line is designed to fit almost any type of application which needs **high precision gas mixtures generated at stable pressure & flow**. Three versions are available for enhanced integration into CEMS, AQMS and laboratories et up.

- Multipoint Dilution Calibration Station
- Multipoint Dilution Calibration Station with **Gas Phase Titration**
- Multipoint Permeation Calibrator

Each instrument is equipped with high performance communication interfaces (RS485, Ethernet) to create a very flexible gas network with local or central control.

Due to the software being focused on safety, automatic regulation and intuitive and reliable communications, the **Dilution and Permeation Multipoint Calibration Stations** are easy to install, reliable, safe and pleasant to operate.

### Permeation and Dilution based Systems

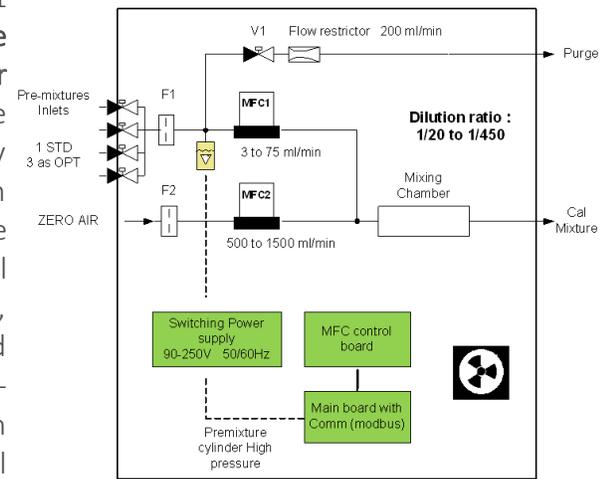


### KEY FEATURES

- Automatic calculations and delivery of specified gas concentrations mixtures at pre-set flowrate.
- Precise and Stable Ozone generation
- GPT method : Gas Phase Titration reaction chamber
- Manual and automated calibration sequences
- Optional integrated Zero Air Generator with built-in oil free compressor
- Easy and safe to operate, Remote control capabilities
- Powerful system interface with colour touchscreen
- Permeation and Dilution based Dynamic calibrators

# Multipoint Dilution Gas Calibrator

Based on the two calibration curves of MFC1 and MFC2, as well as the pre-mixture composition, the integrated microcontroller adjusts the MFCs' outflows to reach the expected final mixture. In order to supply MFC1 with fresh gas, before calibration phases, a purge cycle is processed. The Carrier gas, Zero Air, is generated from external source or internally (option). If it is internally, first AIR is compressed from ambient Air and then filtered from pollutants by a set of self-regenerative filters (PSA) and a catalysis oven (option). To monitor the pre-mixture internal cylinder pressure, a high pressure sensor is attached to it and the value is read and treated by the dilutor's electronics. In case of low pressure and lack of alimenting gases, the internal controller alarms the host system.



## Technical Specifications

### INTEGRATION

<b>Dimensions</b>	Rack unit 483x132x520mm (wxhxd)
<b>Weight</b>	25kg
<b>Outflows at 1013 mbar 20C</b>	<ul style="list-style-type: none"> <li>750 to 1500 Nml/min mixture during calibration phase</li> <li>100 to 1500 Nml/min Zero Air during Zero phase</li> </ul>
<b>Inlet concentration range</b>	From 1ppm to 100ppm
<b>Dilution Ratio</b>	1:20 to 1:450 by flow variation of diluted gases
<b>Precision</b>	Better than +/-1% relative
<b>Repeatability</b>	Better than +/- 0.7% relative
<b>Gas inlet pressure</b>	3 to 5 bar
<b>Number of ports</b>	2 inlets as standards
<b>Carrier Gas</b>	Zero Air from external generator.
<b>Options</b>	<ul style="list-style-type: none"> <li>Integrated Zero Air generator with built-in compressor</li> <li>Up to 4 gas inlets</li> <li>Catalyser oven for CO and Ch4 removal</li> </ul>

### ELECTRICAL UTILITIES

<b>Power supply</b>	90 - 240 VAC 47 / 63 Hz
<b>Consumption</b>	Max 400W (500W with internal ZAG and catalyser)
<b>Fittings</b>	Inlet:SS1/8" compression Outlet: PFA 1/4" compression

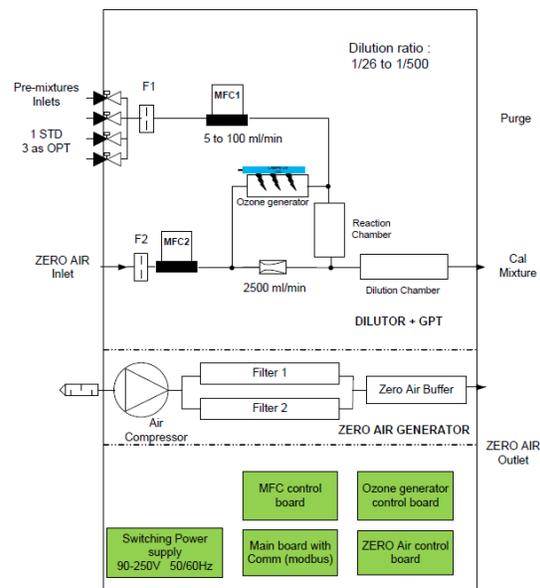
### INTERFACE

<b>Manual Control</b>	Through a 4.3" TFT-LCD colour display with touchscreen, located on the front panel. Display of major parameters, status and alarms conditions. Intuitive navigation to functions by menus and submenus.
<b>Remote Control</b>	USB, RS485 (Modbus) or Display Through optional Ethernet 10/100 <b>net-work</b> or WLAN Logbook available for download

# Multipoint Dilution Calibrator with Gas Phase Titration

This calibrator enables accurate and efficient dynamic calibrations of NO<sub>x</sub>, O<sub>3</sub>, SO<sub>2</sub>, CO, HC (...) analysers. This version is equipped with two MFC's, an Ozone generator and a Gas Titration Phase mixing chamber enabling fully automatic multipoint calibration sequences.

The temperature controlled UV based O<sub>3</sub> generator uses a photodiode to compensate for aging drift. During the Gas Phase Titration the O<sub>3</sub> and the NO are mixed in the GPT reaction chamber and then diluted with Zero Air. The dilution gas can be supplied from an external source or from the optional integrated Zero Air Generator with built-in compressor.



## Technical Specifications

### INTEGRATION

<b>Dimensions</b>	Rack unit 483x132x520mm (wxhxd)
<b>Weight</b>	25kg
<b>Outflows at 1013 mbar 20C</b>	<ul style="list-style-type: none"> <li>2600 Nml/min mixture during calibration phase</li> <li>2500 Nml/min Zero Air during Zero phase</li> </ul>
<b>Inlet concentration range</b>	From 1ppm to 250ppm
<b>Dilution Ratio</b>	1:25 to 1:500 by flow variation of diluted gases
<b>Precision</b>	Better than +/-1% relative
<b>Repeatability</b>	Better than +/- 0.1% relative
<b>Dynamic GPT</b>	1:55 to 1:500
<b>O3 concentration</b>	1 to 500ppm
<b>Gas inlet pressure</b>	3 to 5 bar
<b>Number of ports</b>	1 inlets as standards
<b>Carrier Gas</b>	Zero Air from external generator.
<b>Options</b>	<ul style="list-style-type: none"> <li>Integrated Zero Air generator with built-in compressor</li> <li>Up to 4 gas inlets</li> <li>Catalyser oven for CO and Ch4 removal</li> </ul>

### ELECTRICAL UTILITIES

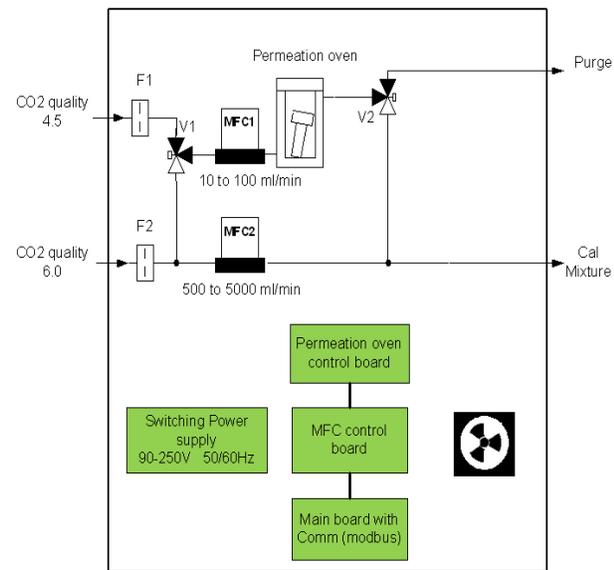
<b>Power supply</b>	90 - 240 VAC 47 / 63 Hz
<b>Consumption</b>	Max 400W (500W with internal ZAG and catalyser)
<b>Fittings</b>	Inlet:SS1/8" compression Outlet: PFA 1/4" compression

### INTERFACE

<b>Manual Control</b>	Through a 4.3" TFT-LCD colour display with touchscreen, located on the front panel.  Display of major parameters, status and alarms conditions. Intuitive navigation to functions by menus and submenus.
<b>Remote Control</b>	USB, RS485 (Modbus) or Display  Through optional Ethernet 10/100 <b>network</b> or WLAN  Logbook available for download

# Multipoint Permeation Gas Calibrator

In order to keep in equilibrium the permeation tube, the oven's temperature is regulated at  $\pm 0.05^{\circ}\text{C}$  and is under a constant flow (50 to 80 ml/min) of standard quality carrier gas made through MFC1. Between calibrations, the high concentration and low flow mixture is directed through a 3/2 valve (V2) to the purge outlet. Based on the two calibration curves of MFC1 and MFC2, as well as the tube's permeation rate, the integrated microcontroller adjusts the MFC2's outflow to reach the expected final mixture. In case of lack of carrier gas, eventual malfunctioning of the oven, the internal controller alarms the host system.



## Technical Specifications

### VERSIONS

<b>Dimensions</b>	Rack unit 220x127x350mm (wxhxd)
<b>Weight</b>	9.5kg
<b>Outflows at 1013 mbar 20C</b>	<ul style="list-style-type: none"> <li>500 to 5000 Nml/min mixture during calibration phase</li> <li>50 to 80 Nml/min in normal operation</li> </ul>
<b>Concentration</b>	From 10ppb to 500ppb depending on permeation tube
<b>Oven temp.</b>	Software adjustable from 35 to 80C - stable at $\pm 0.05^{\circ}\text{C}$
<b>Dynamic concentration</b>	10, by carrier gas flow variation (0.5 to 5 lpm)
<b>Precision</b>	Better than $\pm 1\%$ relative
<b>Repeatability</b>	Better than $\pm 0.7\%$ relative
<b>CO2 inlet pressure</b>	3 to 5 bar
<b>Input CO2</b>	Inlet1: quality 4.5 / inlet2: quality 6.0
<b>CO2 consumption</b>	<ul style="list-style-type: none"> <li>500 to 5000Nml/min during calibration</li> <li>50 to 80 Nml/min normal operation</li> </ul>

### ELECTRICAL UTILITIES

<b>Power supply</b>	90 - 240 VAC 47 / 63 Hz
<b>Consumption</b>	Max 60W
<b>Fittings</b>	Inlet: SS 1/8" compression Outlet: PFA or SS 1/4" compression

### INTERFACE

<b>Manual Control</b>	Through a 4.3" TFT-LCD colour display with touchscreen, located on the front panel. Display of major parameters, status and alarms conditions. Intuitive navigation to functions by menus and submenus.
<b>Remote Control</b>	USB, RS485 (Modbus) or Display Through optional Ethernet 10/100 <b>network</b> or WLAN Logbook available for download