

# Model 4010M Gas Dilution Calibrator

## Overview

Users can easily perform precise gas dilution, ozone, and gas phase titration (GPT) calibrations with the Model 4010 Gas Dilution Calibrator. Enhanced with the latest technology, the Model 4010 was designed to set a new standard of quality and performance for a variety of applications in ambient air monitoring including trace levels, continuous emission monitoring (CEM), fugitive emissions, odor and process monitoring.

The Model 4010 calibrator uses embedded microprocessor technology to accurately deliver and control gas concentrations, along with multiple curve fits to linearize the desired output for the intended purpose. The unit can be operated manually or automatically to conduct calibrations or audits that exceed U.S. Environmental Protection Agency (EPA) method requirements.

Highly accurate mass flow controllers (MFC's) along with an optional ultraviolet (UV) ozone generator and photometer ensure reliable, repeatable gas (SO<sub>2</sub>, H<sub>2</sub>S, NO, CO, HC and O<sub>3</sub>) concentrations.

The Model 4010 can store 20 calibration sequences, with up to 20 concentration levels in each sequence. Local or remote operation is accomplished using the front panel keypad, external keyboard, RS-232 or Ethernet ports. Intuitive, menu driven software allows uncomplicated programmability and access to real-time diagnostics.

## Standard Features

### Pneumatics

- ▶ Diluent Mass Flow Controller, 0-10 SLPM
- ▶ Source Mass Flow Controller, 0-100 SCCM
- ▶ 4 Calibration Gas Input Ports and 1 Purge Port
- ▶ 5 Output Ports and 1 Vent Port
- ▶ 1 Diluent Gas Input Port

### Electronics

- ▶ Bright Color Display
- ▶ 47-Button Membrane Keypad
- ▶ 24 Digital Inputs/Outputs
- ▶ 2 Serial Ports, RS232, USB
- ▶ External PC Keyboard Input port
- ▶ Parallel Printer Port
- ▶ Air Source Control Port

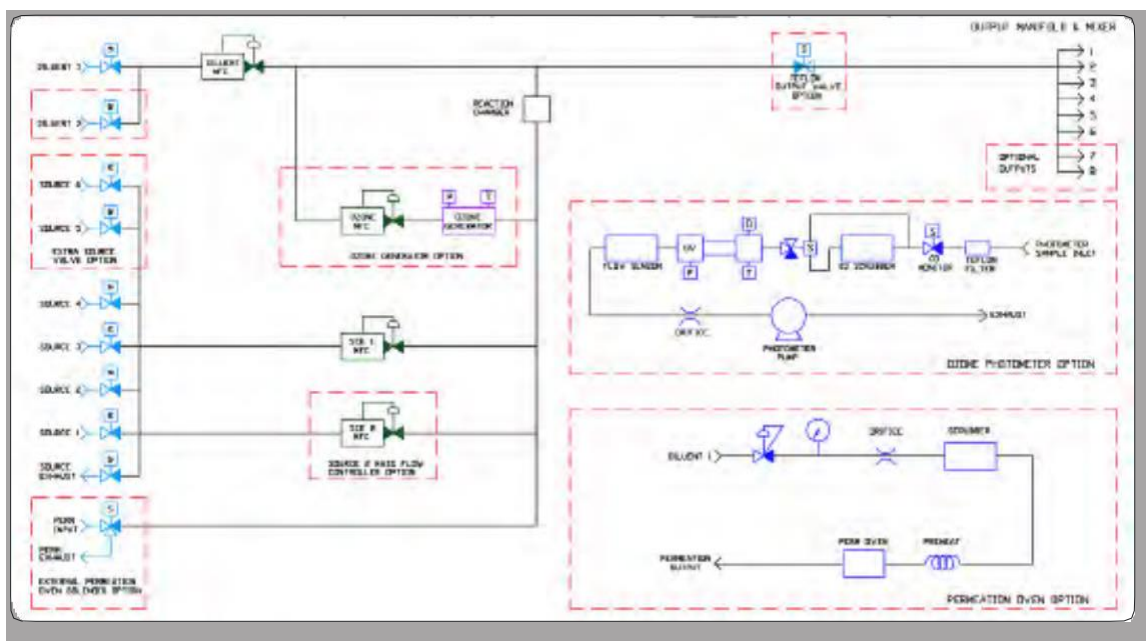
### Electrical

- ▶ Standard 90-264 VAC, 150-300 VA, 50/60 Hz



## Optional Features

- ▶ Alternate Diluent Mass Flow Controller, Ranges 1-20 SLPM
- ▶ Alternate Source Mass Flow Controller, Ranges 1-2 SLPM
- ▶ Second Source Mass Flow Controller, Ranges 1-2 SLPM
- ▶ Additional Calibration Gas Input Ports
- ▶ Multi-Source Blending
- ▶ Permeation Port
- ▶ Additional Output Ports
- ▶ Second Diluent Gas Input Port
- ▶ Internal Ozone Generator
- ▶ Ozone Generator UV Optical Servo Control Loop
- ▶ Internal Ozone UV Absorption Photometer
- ▶ Internal Permeation Oven
- ▶ Master Output Solenoid
- ▶ Internal Instrument Solenoid Driver for External Valve Control
- ▶ Rack Mount Kit
- ▶ Ethernet TCP/IP, Modbus, DOT Commands



<b>Specifications</b>	
<i>Specifications subject to change without notice</i>	
<b>Dilutions System</b>	
Input Dilution Gases	1 Standard (2 Optional)
Input Source Gases	4 Standard, 1 Purge, Optional 2 Additional
Dilution Mass Flow Controller	0-10 SLPM, Optional 0-20 SLPM
Source Mass Flow Controller	0-100 SCCM, 0-10,000 SCCM
2nd Source Mass Flow Controller	0-10,000 SCCM
Flow Accuracy	≤ ± 0.5% Full Scale
Flow Repeatability	≤ ± 0.15% Full Scale
Linearity	≤ ± 0.5% Full Scale
Input Pressure	10 SLPM @ 0-30 PSIG Optional ranges: 20 SLPM @ 30 PSIG
Output Manifold	6 Outputs Standard, Optional 2 Additional
<b>Optional Internal Ozone Generator</b>	
Output	0.01-1.0 ppm @ 4.5 SLPM
Accuracy	± 1% of Set Point or ± 2 ppb @ 5 SLPM
Nominal Flow	100 SCCM, ± 1 SCCM
UV Lamp Temp.	50° C, ± 0.1 ° C
<b>Optional Internal UV Absorption Photometer</b>	
Standard Ranges	0.05 – 1.5 ppm (selectable)
Linearity	± 1 ppb or ± 1% of full scale (greater of two)
Precision	± 1 ppb
Zero Drift	< ± 1.0 ppb for 24 hrs or 30 days

Flow Rate	1 Liter (nominal)
Analog Outputs	3 Ranges 5V, 1V, 100 mV
<b>Optional Internal Permeation Oven</b>	
Chamber Materials	Glass or Teflon
Chamber Size	1 Perm Tube (Any Size)
Adjustable Temperature	5° C Above Ambient Temperature to 65 °C
Temperature Accuracy	≤ ± 0.1 ° C
<b>Calibrator Interface</b>	
Operation	Manually (47-button keypad, keyboard, serial ports)
Calibration Definitions	20 factory-defined calibration sequences (< 20 points each)
Calibration Types	Gas Dilution, Ozone, GPT
Gas Definitions	2 Diluent Gases, 20 Source Gas
Auto Calibrations	20 timer driven cal routines that perform user-defined calibration sequences on a 7 day calendar of events
Digital Inputs	24 status I/O bits for calibrator functions
Digital Input Types	contact closure or TTL logic
Digital Outputs	24 status output bits for monitoring calibrator functions
Communications	RS232, Ethernet TCP/IP, USB device
<b>Calibrator System</b>	
Operating Temperature	5 deg. C to 50 deg. C
Dimensions	7.00" (17.8 cm) H x 17" (43.2 cm) W x 20" (50.8 cm) D
Base unit Weight	30 lbs. (13.6 kg)
Input Voltage	90- 264 VAC, 150-300 VA, 50/60 Hz operation