



## Series 475

### CONVECTRON® VACUUM GAUGE CONTROLLER

The Series 475 Convector® Vacuum Gauge Controller combines with the industry-standard Series 275 Convector gauge to provide high performance vacuum pressure measurement using a unique variation of thermal conductivity. The Convector gauge is a convection-enhanced Pirani design that features individually calibrated gauges, temperature compensation and convection technology for increased accuracy and repeatable vacuum measurements over seven decades from  $1 \times 10^{-4}$  Torr ( $1 \times 10^{-4}$  mbar;  $1 \times 10^{-2}$  Pa) to atmosphere.

The Series 475 Convector Controller is a third-generation RoHS compliant Convector gauge controller that combines rugged reliability with key features for ease of use and system integration. It includes several features such as self-diagnostics, integrated Convector gauge simulation, and built-in gas curves to adjust for various vacuum environments. The Series 475 is easy to use with a highly visible Vacuum Fluorescent Display (VFD) and intuitive front panel controls that allow gauge calibration and adjustment of vacuum measurement parameters without the need for special tools. The Series 475 Convector Controller can be used as a simple readout device for basic vacuum system control or integrated into a more sophisticated control system. The Series 475 Controller provides a range of control I/O options including an analog output, set point relays and a serial communication interface. The compact packaging and innovative electronics make the Series 475 Convector Controller and Convector technology the ideal solution for today's vacuum measurement systems.

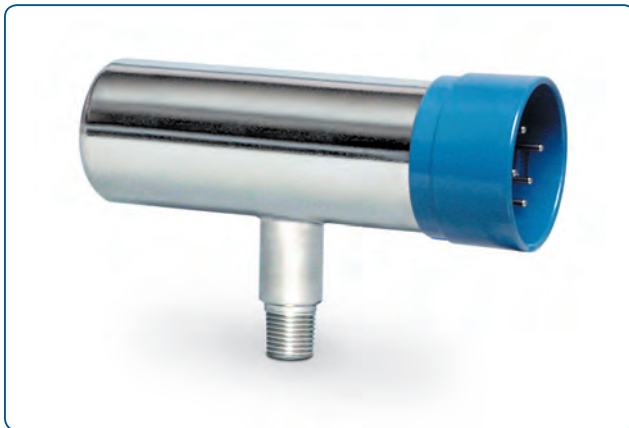
### Features & Benefits

- High-performance compact vacuum controller for bench top and panel mount applications
- Wide range vacuum pressure measurement from atmosphere to  $1 \times 10^{-4}$  Torr ( $1 \times 10^{-4}$  mbar,  $1 \times 10^{-2}$  Pa)
- Highly Visible Vacuum Fluorescent Display (VFD)
- Highly configurable I/O options including an analog output, set point relays, serial communication interface
- Pre-programmed gas curves for  $N_2$ , Ar, He,  $CO_2$ , and  $O_2$
- Built-in Convector gauge simulator
- Intuitive menu control for simplified configuration and parameter setup
- Self-diagnostics



## Convectron Gauge Technology

Convectron technology has become the industry-standard with over 35 years of unmatched performance, repeatability and reliability. To assure the highest level of accuracy and gauge-to-gauge reproducibility, each Convectron Gauge is burned-in for stability and individually calibrated for unmatched accuracy. As the industry standard, Convectron Gauges are in use today on hundreds of thousands of vacuum processes throughout the world, making Convectron technology the best choice for your vacuum measurement applications.



Convectron Gauge



Convectron Gauge Cable

## Description

- **Wide Measurement Range:** Vacuum system pressure can be monitored continuously from  $1 \times 10^{-4}$  Torr ( $1 \times 10^{-4}$  mbar,  $1 \times 10^{-2}$  Pa) to atmosphere.
- **High Measurement Resolution:** Designed to take full advantage of Convectron Gauge technology with 1 Torr (1 mbar, 0.1 Pa) resolution at atmosphere and 0.1 mTorr ( $1 \times 10^{-4}$  mbar,  $1 \times 10^{-2}$  Pa) resolution at low pressure.
- **Vacuum Fluorescent Display:** The VFD is easier to read from greater distances than other types of displays. The display is configurable to use scientific notation or two ranges (Torr and mTorr, mbar and  $10^{-3}$  mbar, or kPa and Pa) to provide a continuous measurement readout from atmosphere to low pressure.
- **Process Set Point Option:** Relay contacts allow control of other vacuum equipment, such as valves, pumps, heaters, alarms, and safety interlocking.
- **Multiple Gas Curves:** Selectable  $N_2$ , Ar, He,  $CO_2$ , and  $O_2$  gas curves are pre-programmed, eliminating the need for individual calibration when changing the process gas.
- **Push-Button Controls:** Calibration and set point settings are easy to adjust using intuitive front panel controls. No special tools are required.
- **Easy-to-use Analog Signals:** Provides a one volt per decade logarithmic signal (0-7V or 1-8V) or a selectable non-linear signal (0-9V) that is backwards compatible with older Convectron gauge controllers.
- **Serial Communication Interface Option:** RS-232 interface allows easy integration with computer controlled systems.
- **Built-in Convectron Gauge Simulator:** Simulates a Convectron gauge, which allows system diagnostics without the need of a vacuum system.
- **Self Diagnostics:** The A/D (Convectron gauge bridge voltage) and analog outputs are continuously monitored for erroneous readings.
- **Compact 1/8 DIN Controller:** Easy to install in space restricted locations.
- **Rugged All-Metal Package:** Provides a high level of immunity to RF noise



# Specifications

## Measurement Range for Air and N<sub>2</sub> See Notes (1), (2)

Torr	1x10 <sup>-4</sup> to atmosphere
mbar	1x10 <sup>-4</sup> to atmosphere
Pa	1x10 <sup>-2</sup> to atmosphere

**Step Size at Minimum Pressure** 1x10<sup>-4</sup> Torr, 1x10<sup>-4</sup> mbar, 1x10<sup>-2</sup> Pa

**Display** Vacuum Fluorescent

**Update Rate** Every 0.5 sec

**Input Power** 12 to 24 VDC, 6 W continuous

**Weight** 720 gm (25 oz)

**Operating Temperature** 0°C to 40°C ambient

**Non-Operating Temperature** -40°C to 70°C

**Set Point Relays (optional)** (2) single pole, double-throw (SPDT)

**Contact Rating** 5 A @ 250 VAC resistive load

**Range** 1x10<sup>-3</sup> to 1000 Torr, 1x10<sup>-3</sup> to 1333 mbar, 1x10<sup>-1</sup> Pa to 133 kPa

**Resolution** 2 significant digits

**Communication Interface (optional)** RS-232 or RS-485

**Data Format** ASCII, 8 data bits, one stop-bit, no parity, no handshake

**Baud Rate** 1200, 2400, 4800, 9600, 19200, 38400 (19200 Default) (software selectable)

**Address (RS-485 only)** 0 to 63 (software selectable)

## Convection Gauge

**Sensor Material** Gold-plated tungsten, platinum

**Other Materials Exposed to Gas** 304 stainless steel, borosilicate glass, Kovar, alumina, NiFe alloy, polyimide

**Internal Volume** 35 cm<sup>3</sup> (2.14 in.<sup>3</sup>)

**Weight** 85 grams (3 ounces)

**Gauge Operating Temperature** 0°C to 50°C ambient

**Gauge Bakeout Temperature** 150°C maximum, non-operating, cable disconnected

**Mounting Orientation** Horizontal preferred

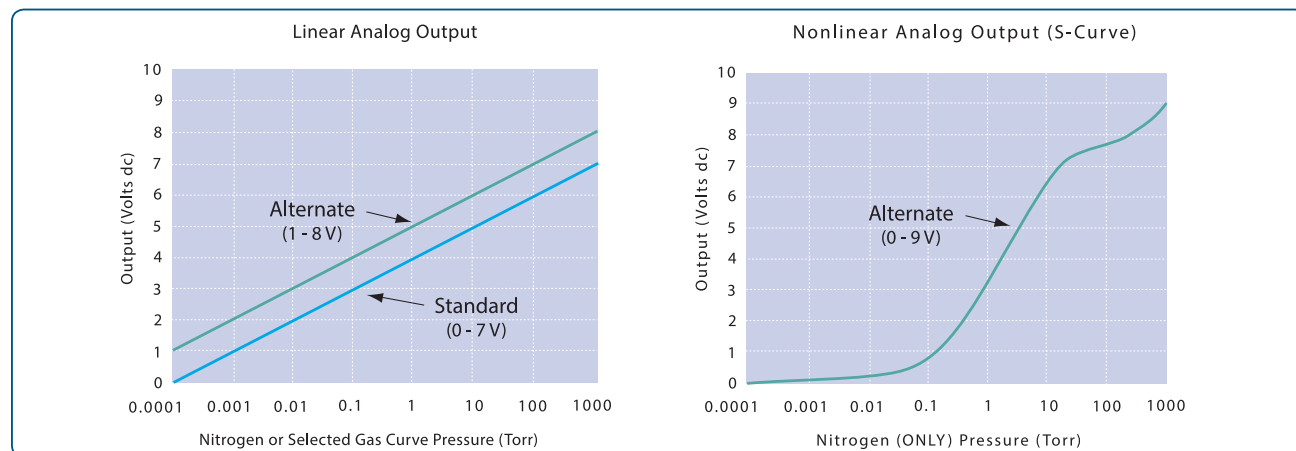
**Cable Bakeout Temperature** 105°C maximum

**Compliance** CE

## Notes:

<sup>1</sup> Measurements will change with different gases and mixtures. Correction parameters for common gases are provided in the instruction manual.

<sup>2</sup> Convection Gauges are not intended for use with flammable or explosive gases.

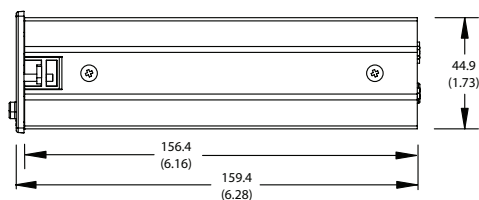


## Analog Output Signals —

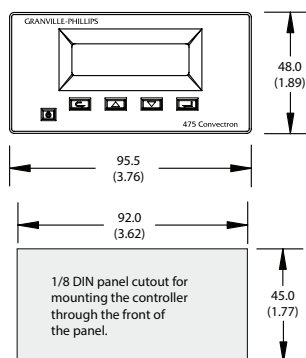
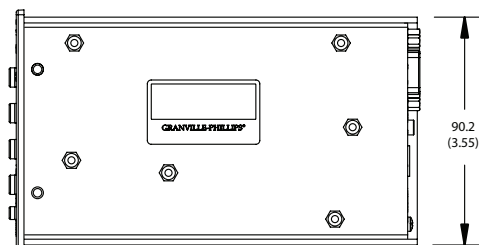
Standard analog output is 0 to 7 Volts that is linear in voltage with the log of pressure. Two alternate analog outputs can be selected using the front panel buttons: either 1 to 8 Volts that is linear in voltage with the log of pressure or 0 to 9 Volts that is non-linear with the log of pressure and mimics the output of older vacuum gauge controllers.



# Ordering Information



NOTE: Allow 64 mm (2.5 in) clearance for the connectors on the back of the controller.



## Dimensional Drawing —

Note: Unless otherwise specified, dimensions are nominal values in millimeters (inches referenced).

## Model Number Matrix

### Micro-Ion Modules:

1/8 DIN, panel mount with digital display	475001 - # - #
Interface Options: (Slot X)	
None	0
RS-232	A
RS-485	B
Set Point Option (Slot Y)	
None	0
2 set points	2
Measurement Units*:	
Torr	T
mBar	M
Pascal	P
* User configurable	

### Power Supplies:

Universal Power Supply	475008 - #
Power Cord Plug Type:	
North America 115 VAC & Japan 100 VAC	1
North America 240 VAC	2
Universal Europe 220 VAC	3
United Kingdom 240 VAC	4

### Convection Gauge Cables

10 feet (3 meters)	475012-10
25 feet (7.6 meters)	475012-25
50 feet (15.2 meters)	475012-50
100 feet (30.5 meters)	475012-100
200 feet (61 meters)	475012-200
500 feet (152.4 meters)	475012-500

### Convection Gauges (gold-plated tungsten)\*

1/8 NPT / 1/2 inch tubulation	275071
1/4 inch VCR® type female fittings	275185
1/2 inch VCR® type female fittings	275282
3/8 inch VCO® type male fitting	275233
1.33 inch (NW16CF) rotatable Conflat type flange	275256
2.75 inch (NW35CF) rotatable Conflat type flange	275238
NW16KF flange (welded)	275203
NW25KF flange (welded)	275196
NW40KF flange (welded)	275316

\* Platinum sensor gauges are available.



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Series 475 - 3/18  
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