Pressure & Vacuum Measurement Solutions

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Series 475

CONVECTRON® VACUUM GAUGE CONTROLLER

The MKS Series 475 Convectron® Vacuum Gauge Controller combines with the industry-standard Series 275 Convectron gauge to provide high performance vacuum pressure measurement using a unique variation of thermal conductivity. The Convectron 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 $1x10^{-4}$ Torr ($1x10^{-4}$ mbar; 1 $x10^{-2}$ Pa) to atmosphere.

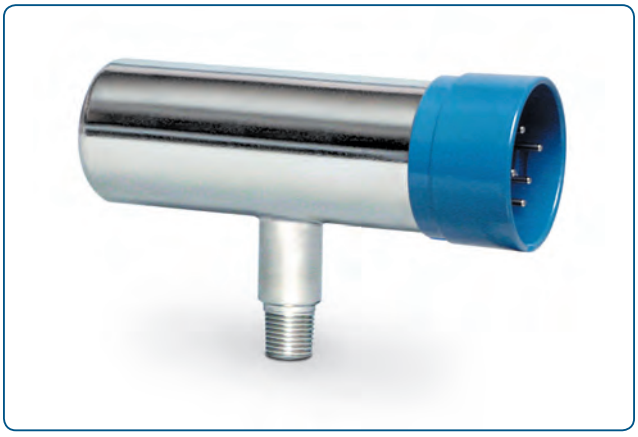
The Series 475 Convectron Controller is a third-generation RoHS compliant Convectron gauge controller that combines rugged reliability with key features for ease of use and system integration. It includes several features such as self-diagnostics, integrated Convectron gauge simulation, and built-in gas curves to adjust for various vacuum environments. The Series 475 is easy to use with a highly visible Vacuum Florescent 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 Convectron 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, setpoint relays and a serial communication interface. The compact packaging and innovative electronics make the Series 475 Convectron Controller and MKS Convectron 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 $1x10^{-4}$ Torr ($1x10^{-4}$ mbar, $1x10^{-2}$ Pa)
- Highly Visible Vacuum Fluorescent Display (VFD)
- Highly configurable I/O options including an analog output, setpoint relays, serial communication interface
- Pre-programmed gas curves for N_2, Ar, He, CO_2, and O_2
- Built-in Convectron gauge simulator
- Intuitive menu control for simplified configuration and parameter setup
- Self-diagnostics
- RoHS / CE Compliant

Convectron Gauge Technology

MKS 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 $1x10^{-4}$ Torr ($1x10^{-4}$ mbar, $1x10^{-2}$ 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 ($1x10^{-4}$ mbar, $1x10^{-2}$ 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 Setpoint 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 setpoint 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 and is RoHS / CE Compliant

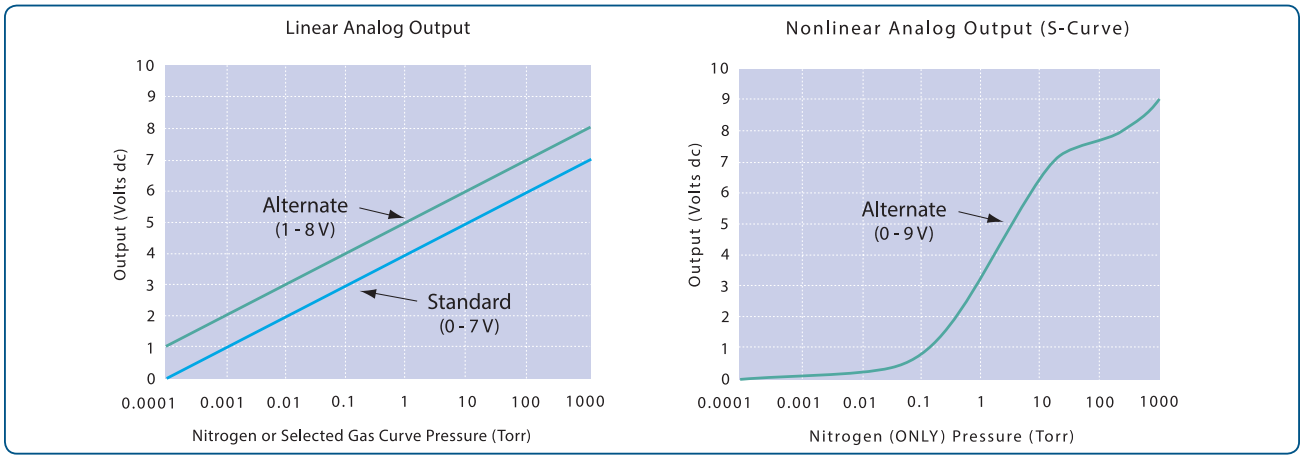
Specifications

Measurement Range for Air and N_2 [See Notes (1), (2)]	
Torr	$1x10^{-4}$ to atmosphere
mbar	$1x10^{-4}$ to atmosphere
Pa	$1x10^{-2}$ to atmosphere
Step Size at Minimum Pressure	$1x10^{-4}$ Torr, $1x10^{-4}$ mbar, $1x10^{-2}$ 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
CE Compliance	
EMC Directive	2004/108/EC; EN61326-1
Low Voltage Directive	2006/95/EC; EN61010-1
Environmental	RoHS compliant
Setpoint Relays (optional)	(2) single pole, double-throw (SPDT)
Contact Rating	5 A @ 250 VAC resistive load
Range	$1x10^{-3}$ to 1000 Torr, $1x10^{-3}$ to 1333 mbar, $1x10^{-1}$ 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)
Convectron 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^3 (2.14 $in.^3$)
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

Notes:

[1] Measurements will change with different gases and mixtures. Correction parameters for common gases are provided in the instruction manual.

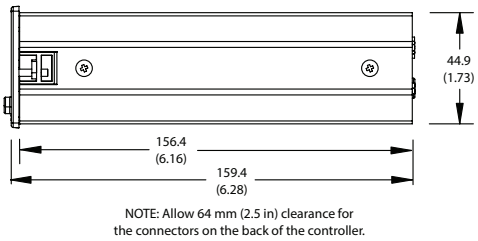
[2] Convectron Gauges are not intended for use with flammable or explosive gases.



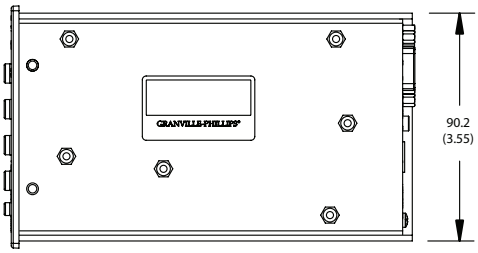
Analog Output Signals —

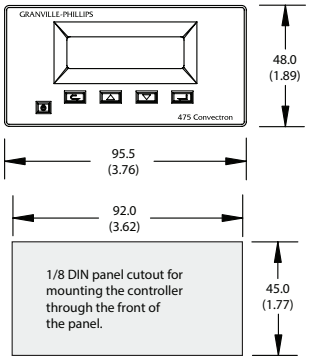
Standard analog output is 0 to 7 Volts that is linear in voltage with the log of pressure. Two alternate analog outputs can be selected using the front panel buttons: either 1 to 8 Volts that is linear in voltage with the log of pressure or 0 to 9 Volts that is non-linear with the log of pressure and 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
Setpoint Option (Slot Y)	
None	0
2 setpoints	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

Convectron 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

Convectron 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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