

Granville-Phillips Series 358 Micro-Ion[®] Vacuum Gauge Controller

*Compact, reliable,
rack-mount controller
for optimum Micro-Ion
Gauge performance*

*Vacuum pressure
measurement from
the 10^{-10} Torr range
(10^{-10} mbar, 10^{-8} Pa)*

*Convectron[®] Gauge
option extends pressure
measurement to atmosphere*

*Flexible design allows
for optional setpoint relays
and digital interfaces*

*Rugged metal enclosure
is noise immune and
CE compliant*

*Dual filaments increase
equipment uptime*

*Ultra-clean gauge
construction allows rapid
response during pumpdown*

Vacuum Gauge Controller

The Series 358 Controller is designed specifically to obtain the highest performance from the Granville-Phillips Micro-Ion Gauge. It is capable of measuring from a lower limit in the 10^{-10} Torr range (10^{-10} mbar, 10^{-8} Pa) to 5×10^{-2} Torr (7×10^{-2} mbar, 7 Pa). Pressure measurements can be extended to atmosphere with the Dual Convectron Gauge Option.



This reliable controller is compact and easy-to-use. The extruded aluminum, half-rack design fits easily into your control rack. Infrequently used controls are located behind the front panel door, providing an uncluttered appearance. Large, bright green, flicker-free LED digital displays make measurements easy to read, even from a distance.

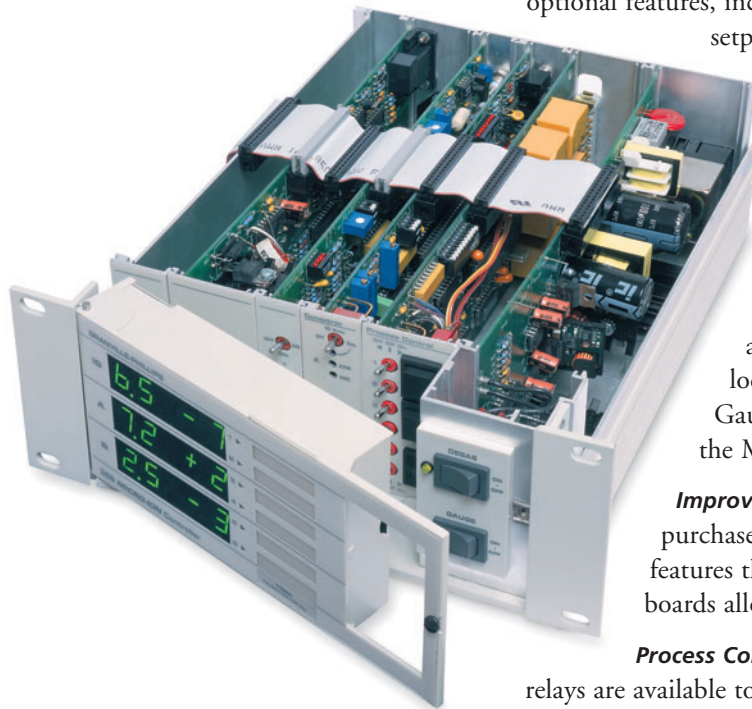
The Series 358 controller can be configured to meet your specific system requirements. Up to 6 setpoint relays can be used to control a variety of system functions such as switching valves, setting interlocks, and setting alarms. Integration into computer controlled systems is also possible through the use of RS-232 or RS-485/422 interface options.

Micro-Ion Gauge Technology

The Granville-Phillips Micro-Ion Gauge is the world's smallest ionization gauge where pressure measurement is based on the amount of ion current that is generated when energized electrons collide with gas molecules in the gauge. High performance in a small volume is achieved through a number of enhancements including its patented dual ion collector design that optimizes electron motion and ion collection. Dual filaments avoid unscheduled downtime since the second filament is used as a backup until the gauge is replaced during a regular maintenance procedure. Ultra-clean construction including vacuum firing of all components and assembly in a Class 100 cleanroom environment, assures rapid, repeatable response during vacuum chamber pumpdown.

HELIX

Series 358 Vacuum Gauge Controller
Features and Benefits



Optimized Micro-Ion Gauge Performance – Designed specifically to obtain optimum performance from a Micro-Ion Gauge. With the proper emission current settings, Micro-Ion Gauges can be operated from 5×10^{-2} Torr to the 10^{-10} Torr range (7×10^{-2} to 10^{-10} mbar, 7 to 10^{-8} Pa).

Convenient, Option-rich, Half-rack Controller – Half-rack design saves space in your control rack. The controller can be configured to your requirements with numerous optional features, including dual Convecatron Gauge readout, process setpoint relays, and digital interfaces. The extruded aluminum case provides a high level of immunity to electrical noise and is fully CE compliant.

3-Line Digital Display – Bright, easy-to-read, flicker-free, green LED displays allow the user to monitor all three pressure readings with one glance.

Dual Convecatron Option – Provides accurate and reliable vacuum pressure measurements from atmosphere to 10^{-4} Torr (10^{-4} mbar, 10^{-2} Pa) at two locations on your vacuum system. The Convecatron Gauge reading can be used to automatically turn on the Micro-Ion Gauge.

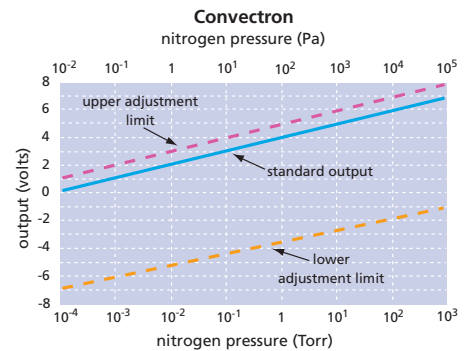
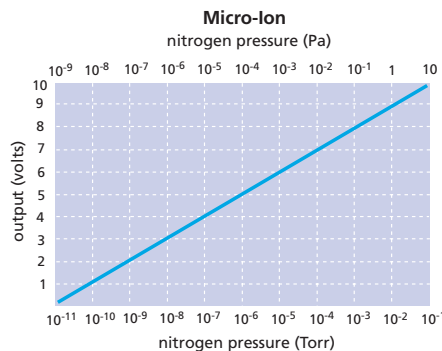
Improved Economy – Modular design enables users to purchase only the required capabilities without paying for features that are not needed or wanted. Field replaceable option boards allow easy upgrading as needs change.

Process Control Options – Up to six process control setpoint relays are available to control other vacuum equipment and provide safety interlocking. These digitally controlled relays are stable and easy to adjust. Manual override capability helps with system set-up and maintenance.

Computer Interface Options – RS-232 or RS-485/422 interface allows easy integration with computer controlled systems.

Universal Power Supply – Works with any AC supply voltage between 90 and 260 Volts.

Analog Output



The Micro-Ion Gauge analog output is proportional to the logarithm of the pressure indication with the scale of one volt per decade. An 11 Volt signal indicates that the gauge is off. The Convecatron Gauge analog output is also proportional to the logarithm of the pressure indication with the scale of one volt per decade. The dc offset for this output can be adjusted from -7 to +1 Volts by an internal adjustment on the option card. The factory setting is an offset of 0 Volts.

Technical Specifications

Measuring range for air and N ₂ (see notes 1 and 2 below)	
Torr	< 1x10 ⁻⁹ to 5x10 ⁻² (to 1000 Torr with Convecatron option)
mbar	< 1x10 ⁻⁹ to 7x10 ⁻² (to 1300 mbar with Convecatron option)
Pa	< 1x10 ⁻⁷ to 7 (to 130 kPa with Convecatron option)
Display	2 digits plus exponent, green LED
Update rate	Every 0.5 sec
Emission current	0.02, 1 or 4 mA, switch selectable
Filament selections	Filament 1, filament 2 or both, switch selectable
Degas	Electron bombardment, 3 W with 2-minute timer
Overpressure protection	Gauges turns off at factory set upper pressure limit
Micro-Ion analog output	1 Volt/decade, logarithmic, 0 to 10 V
Remote input/output signals	
Input signals	Gauge on/off and degas on/off, selected by momentary continuity to ground
Output signals	Gauge status indicated by a single-pole, double-throw relay rated at 1 A @ 30 Vdc resistive, AC non-inductive
Connector	9-pin subminiature-D male
Maximum Micro-Ion cable length	50 ft (15 m) with standard cable
Power required	100 to 250 Vac, 50 to 60 Hz, 50 W max
Operating temperature	0 °C to 40 °C ambient, non-condensing
Non-operating temperature	-40 °C to 70 °C
Weight	1.8 kg (4 lbs)
Case material	Aluminum extrusion
CE compliance	
EMC directive	89/336/EEC; EN 50081-2, EN 50082-2
Low voltage directive	73/23/EEC; EN 61010-1
Convecatron Option	
Operates 2 gauges	
Analog output	1 Volt/decade, logarithmic, 0 to 7 V, -7 to 1 V adjustable offset
Maximum cable length	500 ft (152.4 m)
Process control options	
6 channels max, 2 per gauge	
Configuration	Single-pole, double-throw (SPDT) relays
Contact rating	5 A at 30 Vdc, 5 A at 120 Vac, 4 A at 240 Vac, resistive load
Digital interface options	
RS-232 or RS-485/422	
Micro-Ion Gauge	
Sensitivity for N ₂ or Air	20 Torr ⁻¹ , 15 mbar ⁻¹ , 0.15 Pa ⁻¹
X ray limit	< 3x10 ⁻¹⁰ Torr, < 4 x10 ⁻¹⁰ mbar, < 4x10 ⁻⁸ Pa (see note 3 below)
Filament materials	Yttria-coated iridium or tungsten (see note 4 below)
Other materials exposed to gas	304 stainless steel, alumina, tantalum, tungsten, CuAg eutectic, Kovar
Internal volume	9.8 cc ³ (0.60 inch ³) to port screen
Gauge weight	113 gm (4 oz) with NW16KF fitting
Gauge bakeout temperature	200 °C maximum, non-operating, cable disconnected
Cable bakeout temperature	150 °C maximum
Convecatron Gauge	
Mounting position	Horizontal preferred
Sensor material	Gold-plated tungsten
Other materials exposed to gas	304 stainless steel, borosilicate glass, Kovar, alumina, NiFe alloy, polyimide
Internal volume	35 cc ³ (2.14 inch ³)
Gauge weight	85 grams (3 ounces) plus vacuum connection fitting
Gauge operating temperature	0 °C to 50 °C ambient, non-condensing
Gauge bakeout temperature	150 °C maximum, non-operating, cable disconnected
Cable bakeout temperature	105 °C maximum

Notes

1. Measurements will change with different gases and mixtures. Correction curves for common gases are provided in the instruction manual. Micro-Ion Gauges and Convecatron Gauges are not intended for use with flammable or explosive gases.
2. For measurements below 1x10⁻⁷ Torr (1x10⁻⁷ mbar, 1x10⁻⁵ Pa), either a ConFlat-type or VCR-type vacuum connection is recommended.
3. The x ray limit is the absolute lowest indication from the gauge. It is not practical to make repeatable measurements near the x ray limit.
4. Tungsten filaments are for applications involving gases containing fluorine, chlorine or other gas species that poison yttria-coated iridium filaments. Tungsten filaments are not recommended for general vacuum applications because they may burn out when exposed to high pressures.

Ordering Information



To specify a Series 358 Micro-Ion Vacuum Measurement System, select:

- A Micro-Ion Controller
- Rack-mount configuration *
- Up to three option cards **
- Measurement units display option
- Power cord option
- A Micro-Ion Gauge
- A Micro-Ion Gauge cable
- Convectron Gauges
- Convectron Gauge cable

Micro-Ion Vacuum Gauge Controller

Select the desired configurations and options to create your catalog number.

Series 358 Micro-Ion Controller

358 ### - # # # - # #

Configuration options *

controller, half-rack mount	501
controller, left-mount for 19-inch rack	502
controller, center-mount for 19-inch rack	503

Interface options (Slot X) **

None	0
RS-232	A
RS-485/422	B

Gauge options (Slot Y) **

None	0
Dual Convectron Gauge	1

Setpoint options (Slot Z) **

None	0
2 setpoint relays for Micro-Ion Gauge	A
6 setpoint relays, 2 per channel	B

Display options - Measurement units

Torr	T
mbar	M
Pa	P

Power cord options

North America 115V	1
North America 240 V	2
Universal Europe 220 V	3
United Kingdom 240 V	4

* **Configuration options:** To mount two units side-by-side in a 19 inch rack, order part number 307021. Rack mount kits can also be ordered separately for field installation.

** **Option cards:** Select up to three option cards – one for each slot. The controller will be assembled with the option cards installed. Option cards can also be ordered separately for field installation (see below).

Ordering Example

To order a Series 358 Micro-Ion Gauge Controller with half-rack mount, RS-485 interface, dual Convectron Gauge operation, 6 setpoint relays, display in Torr, and North America 115 V power cord, select catalog number 358501-B1B-T1

Option cards for field installation

RS-232 Interface	358007
RS-485/422 Interface	358006
Dual Convectron option	358002
2 setpoint relays for Micro-Ion Gauge	358004
6 setpoint relays, 2 per channel	358003

Ordering Information— Continued



Micro-Ion Vacuum Gauges

Select a filament type and vacuum connection to create your catalog number.

Filament type:		355001 - # #
dual yttria-coated iridium	Y	↑
dual tungsten	T	
Vacuum connection: *		↑
0.75 inch port compression	A	
1.0 inch port compression	J	
15 mm port compression	B	
18 mm port compression	C	
NW16KF	D	
NW25KF	E	
NW40KF	K	
1.33 inch (NW16CF) ConFlat-type	F	
2.75 inch (NW35CF) ConFlat-type	G	
1/2 inch VCR-type male	H	

* For measurements below 1×10^{-7} Torr (1×10^{-7} mbar, 1×10^{-5} Pa), either a ConFlat type or VCR-type vacuum connection is recommended.



Micro-Ion Gauge Cables

Select the desired length. One cable required.

10 ft (3 m)	358011-10
25 ft (7.6 m)	358011-25
50 ft (15.2 m)	358011-50



Convectron Vacuum Gauges

Select the desired vacuum connection.

1/8 NPT / 1/2 inch tubulation	275071
1/4 inch 4VCR-type female	275185
1/2 inch 8VCR-type female	275282
NW16KF	275203
NW25KF	275196
NW40KF	275316
1.33 inch (NW16CF) ConFlat-type	275256
2.75 inch (NW35CF) ConFlat-type	275238

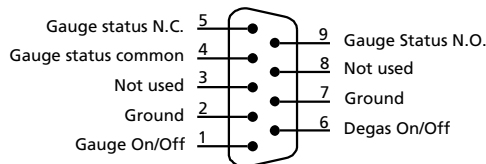


Dual Convectron Gauge Cables

Select the desired length. One cable assembly connects two gauges. A cable assembly has a single connection to the controller and two equal lengths of cable to the Convectron Gauges.

10 ft (3 m)	303040-10
25 ft (7.6 m)	303040-25
50 ft (15.2 m)	303040-50

Remote Input/Output Connector



N.C. = Normally Closed • N.O. = Normally Open

Micro-Ion Gauge
Features and Benefits

World's Smallest Ionization Gauge – Micro-Ion Gauges occupy less than 10% of the volume of conventional glass gauge or nude gauges, allowing easy installation in complex, tightly packed vacuum systems.

High Performance – Patented dual ion collector design increases electron path length and ion collection efficiency, providing high performance in a small volume.

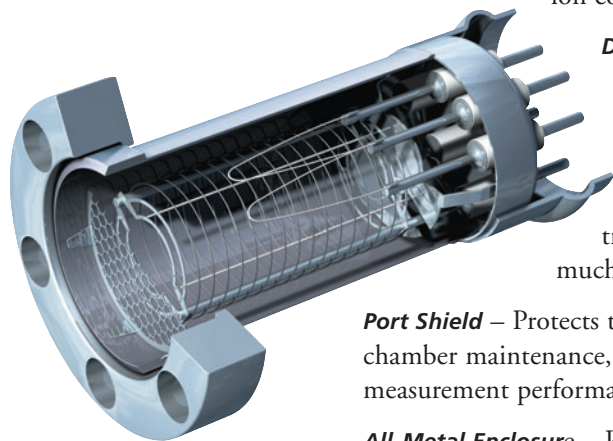
Dual Filaments – Dual, burn-out resistant yttria-coated iridium filaments provide long gauge life. Unscheduled downtime is avoided by using the second filament as a back-up until the gauge can be replaced during regular maintenance procedures.

Cooler Operation – At only 8% of the power consumption of a traditional glass or nude gauge, the Micro-Ion Gauge generates much less heat to disturb a process or experiment.

Port Shield – Protects the electrode assembly from damage during assembly or vacuum chamber maintenance, and provides a stable electrical environment for improved measurement performance.

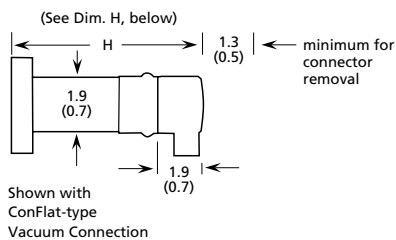
All-Metal Enclosure – Prevents grid and filament damage during mounting and eliminates the risk of glass breakage.

Wide Selection of Vacuum Fittings – Simplifies installation on your vacuum system.



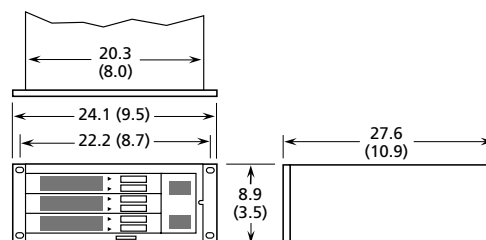
Dimensions

Micro-Ion Gauge



Vacuum Connections	Dim.
H	
0.75 diameter compression	9.4 (3.7)
NW16KF flange	7.3 (2.9)
1.33 inch (NW16CF) ConFlat-type	7.3 (2.9)

Micro-Ion Gauge Controller



All dimensions are shown in centimeters (inches)

Backed by GUTS®

All Granville-Phillips products are backed by the GUTS (Guaranteed Uptime Support) rapid response network, our comprehensive customer support program. When you call the GUTS service center, you are guaranteed immediate, competent response and action by a vacuum expert from our world-wide technical support staff. We're at work for you 24 hours a day, 365 days a year. 1-800-FOR-GUTS (800-367-4887).



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