



CRITICAL COMPONENTS  
GROUP

# Granville-Phillips® Series 354 Micro-Ion® Vacuum Gauge Modules

Advanced Vacuum Measurement Solutions

VACUUM PRODUCTS

## Benefits

- Compact, convenient, reliable, cost-saving vacuum measurement
- Vacuum pressure measurement to  $10^{-9}$  Torr ( $10^{-9}$  mbar,  $10^{-7}$  Pa)
- Dual filaments increase equipment uptime
- Ultra-clean construction allows rapid response during pumpdown
- Rugged, all-metal, RF and noise-immune module is CE compliant
- Optional local display aids in setup and diagnostics
- Digital interface version for use with computer controlled systems

Modular vacuum gauges are an ideal solution for applications that do not need front panel displays and controls. These compact, convenient, reliable, cost-saving modules have the control electronics mounted directly on the gauge. The all-metal package provides a rugged enclosure and a high level of immunity to electrical noise. When combined with Granville-Phillips® Mini-Convectron® Modules (described in a separate brochure) they provide a complete vacuum measurement system from atmosphere to  $10^{-9}$  Torr ( $10^{-9}$  mbar,  $10^{-7}$  Pa). Modules are available with analog output or RS-485 digital interface. The analog output version has a digital display option for convenient, point-of-use pressure readout.

## *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.

The compact size, high performance and rugged, all-metal package make the Micro-Ion Module a wise choice for many high vacuum applications.



Micro-Ion® Vacuum Gauge Modules

### Features and Benefits

**Wide Measurement Range:** Allows vacuum system performance to be monitored continuously from  $5 \times 10^{-2}$  to  $10^{-9}$  Torr ( $7 \times 10^{-2}$  to  $10^{-9}$  mbar,  $7$  to  $10^{-7}$  Pa).

**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.

**Ultra-Clean Construction:** Micro-Ion Gauges are designed, constructed and processed to minimize outgassing. All components are vacuum fired and assembled in a Class 100 cleanroom environment. This assures rapid, repeatable response during vacuum chamber pumpdown.

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

**Analog Output Version:** The basic version provides an easy-to-use analog output signal that is linear with the logarithm of the pressure. An optional large green LED display provides point-of-use pressure indication.

**Digital Interface Version:** Modules are available with an RS-485 interface for easy compatibility with computer controlled processes. The digital interface version has a setpoint relay allowing for control of other vacuum equipment or to provide a safety interlock.

**All-metal Package:** Provides high level of immunity to RF noise and is CE compliant.

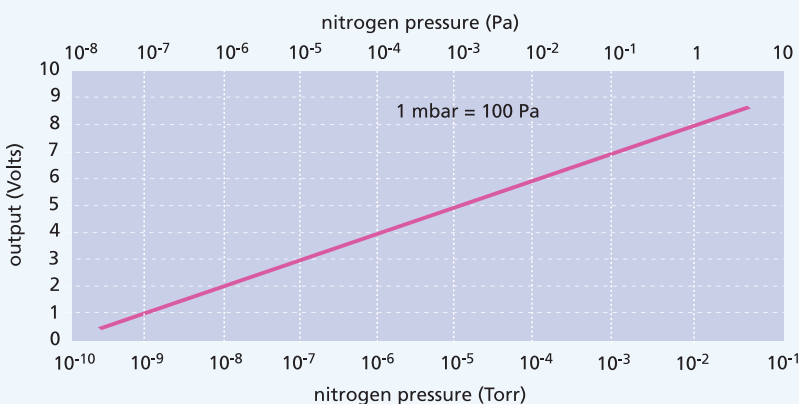
**Replaceable Gauge:** Gauge can be quickly and easily replaced using only a screwdriver.

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



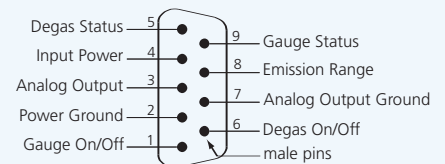
Granville-Phillips® Micro-Ion® Vacuum Gauge Module

### Analog Output Signal

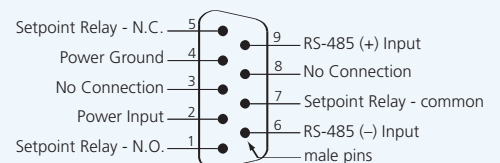


### Electrical Connectors

#### Analog Output Version, No Setpoints



#### Digital Interface Version, One Setpoint

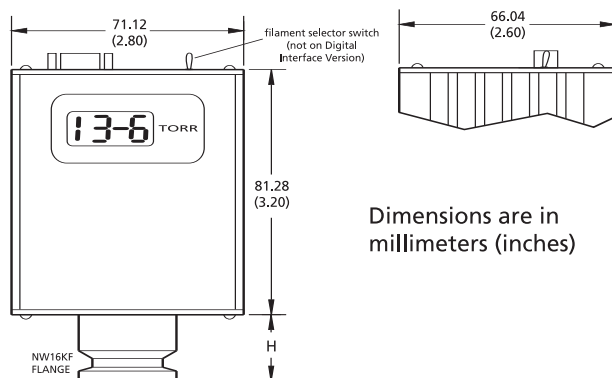


## Technical Specifications

Measuring range for air and N <sub>2</sub> (see notes 1, 2, 3 and 4, below)	
Torr	1 x 10 <sup>-9</sup> to 5 x 10 <sup>-2</sup>
mbar	1 x 10 <sup>-9</sup> to 7 x 10 <sup>-2</sup>
Pa	1 x 10 <sup>-7</sup> to 7
Emission current	0.1, 4 mA
Degas	Electron bombardment, 3 W with 2-minute timer
Overpressure protection	Gauge turns off at factory set upper pressure limit
Weight	370 gm (12 oz) with NW16KF flange
Power required	24 Vdc +15%, 12 W max
Operating temperature	0 °C to 40 °C ambient, non-condensing
Non-operating temperature	-40 °C to 70 °C
Case material	Aluminum extrusion
CE compliance	EMC Directive 89/336/EEC, EN 50081-2, EN 50082-2
Analog output version	1 Volt/decade, logarithmic, 0 to 9 V
Filament control	Toggle switch on top of module
Input signals	Filament on/off, degas on/off and emission current are set by continuity to ground
Output signals	Filament and degas on/off status are determined by an open collector transistor
Connector	9-pin D male
Display (option)	2 digits plus exponent, green LED
Digital interface version	RS-485 with one setpoint relay
Parameters adjustable	Filament on/off, degas on/off, emission current select, filament select, setpoint (value, direction, and hysteresis)
Baud rate	19200 Baud (default value)
Data format	ASCII, 8 data bits, one stop-bit, no parity, no handshake (default values)
Relay configuration	Single-pole, double-throw (SPDT)
Relay contact rating	1 A at 30 Vdc resistive load, 0.5 A at 125 Vac non-inductive
Connector	9-pin D male
<b>Micro-Ion Gauge</b>	
Sensitivity	20/Torr, 15/mbar, 0.15/Pa
X ray limit	< 3 x 10 <sup>-10</sup> Torr, < 4 x 10 <sup>-10</sup> mbar, < 4 x 10 <sup>-10</sup> 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 gauge volume	10.8 cm <sup>3</sup> (0.66 in. <sup>3</sup> ) to the port screen
Gauge bakeout temperature	200 °C maximum (with electronics removed)

- Measurements will change with different gases and mixtures. Correction parameters for common gases are provided in the instruction manual.
- Micro-Ion Gauges are not intended for use with flammable or explosive gases.
- 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.
- 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, including but not limited to H<sub>2</sub>O.

## Dimensions



Dimensions are in  
millimeters (inches)

Vacuum Connections	Dim. H
1/2 inch 8VCR-type female	58.4 (2.3)
1.33 inch (NW16CF) Conflat-type	43.2 (1.7)
2.75 inch (NW35CF) Conflat-type	43.2 (1.7)
NW16KF	20.3 (0.8)
NW25KF	20.3 (0.8)
NW40KF	20.3 (0.8)

Conflat is a registered trademark of Varian.  
VCR is a registered trademark of Cajon Company.

Ordering Information



Micro-Ion Modules

Choose a basic model, filament type, vacuum connection, and measurement unit to create your catalog number.

Analog output, no display	354001 - x	x - x
Analog output, 3-digit display	354002 - x	x - x
RS-485 Digital interface, no display (Torr units only)	354005 - x	x - T

Filament:

yttria-coated iridium	Y
tungsten	T

Vacuum Connection:

NW16KF	D
NW25KF	E
NW40KF	K
1.33 inch (NW16CF) Conflat-type	F
2.75 inch (NW35CF) Conflat-type	G
1/2 inch 8VCR-type male	H

Measurement units:

Torr	T
mbar	M
Pa	P

**Example:** To order a Micro-Ion Module with 3-digit display, analog output, yttria-coated iridium filaments, NW25KF fitting, and display in Torr: select catalog number 354002-YE-T

Replacement Gauges



Add the options below to create your catalog number.

354003 - x x

Filament:

yttria-coated iridium	Y
tungsten	T

Vacuum Connection:

NW16KF	D
NW25KF	E
NW40KF	K
1.33 inch (NW16CF) Conflat-type	F
2.75 inch (NW35CF) Conflat-type	G
1/2 inch 8VCR-type male	H

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).

*For more information, please contact your local Brooks Automation sales representative or visit [www.brooks.com](http://www.brooks.com).*

