

# Vacuum

# Gauging

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## Series 354

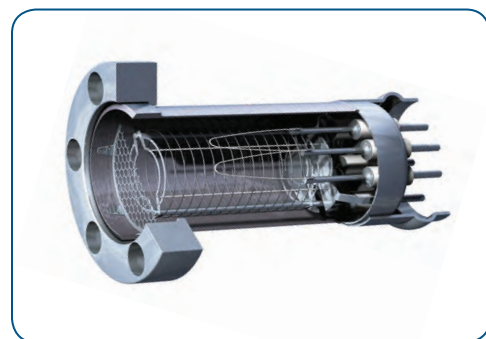
### MICRO-ION® VACUUM GAUGE MODULES

The MKS, Granville-Phillips® Division Micro-Ion® Gauge Module combines the world's smallest ionization gauge with the control electronics to create a compact, convenient, reliable, and cost-saving solution for many high vacuum applications. The Micro-Ion gauge includes many features that provide for a much more accurate and repeatable measurement than traditional Bayard-Alpert gauges from  $5 \times 10^{-2}$  Torr to  $10^{-9}$  Torr. The all-metal package provides a rugged enclosure and a high level of immunity to electrical noise. High performance in a small volume is achieved through a number of enhancements including a patented dual ion collector design that optimizes electron motion and ion collection.

Modules are available with analog output, RS-485 or DeviceNet interfaces. The analog output and DeviceNet versions have a digital display option for convenient, point-of-use pressure readout.

### Features & 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 pump down
- Rugged, all-metal, RF and noise-immune module is CE compliant
- Optional local display aids in setup and diagnostics
- RS-485 and DeviceNet digital interfaces available
- Provides increased long term stability over traditional designs



Cross section of the MKS, Granville-Phillips® Division Micro-Ion® Vacuum Gauge



## Description

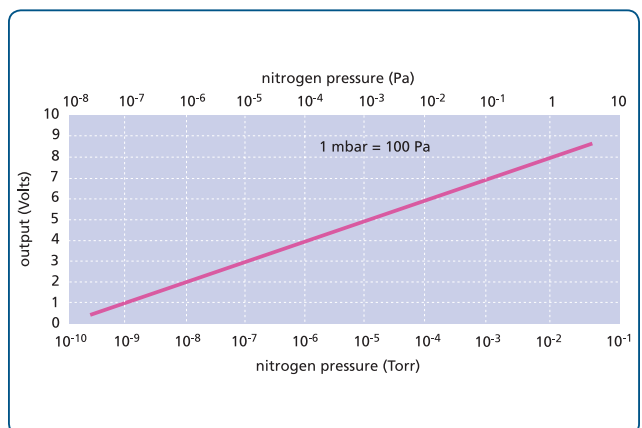
- **Wide Measurement Range:** Allows vacuum system performance to be monitored continuously from  $5 \times 10^{-2}$  to  $10^{-9}$  Torr ( $7 \times 10^{-2}$  to  $10^{-9}$  mbar, 7 to  $10^{-7}$  Pa).
- **Dual Filaments:** Dual, burn-out resistant yttria-coated iridium filaments provide long gauge 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 or DeviceNet interface for easy compatibility with computer controlled processes. The digital interface versions have 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.
- **Long Term Stability:** End caps which control ion flow, welding grid windings every  $180^\circ$ , and the all metal housing provide repeatable measurements over time.



MKS, Granville-Phillips® Division Micro-Ion® Vacuum Gauge Module



Replacement Gauge



Analog Output Signal



# Specifications

## Measurement Range for Air and N<sub>2</sub> See Notes (1), (2), (3)

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 or 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	2004/108/EC; EN61326-1
Low Voltage Directive	2006/95/EC; EN61010-1

## 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

## RS-485 Interface Version

Parameters Adjustable	RS-485 with one setpoint relay 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

## DeviceNet Interface Version

Messaging	Polled I/O and explicit
Data Rates	125, 250 or 500 kbaud, switch selectable
Address	0 to 63, selected by using the Low and High address switches

## Micro-Ion Gauge

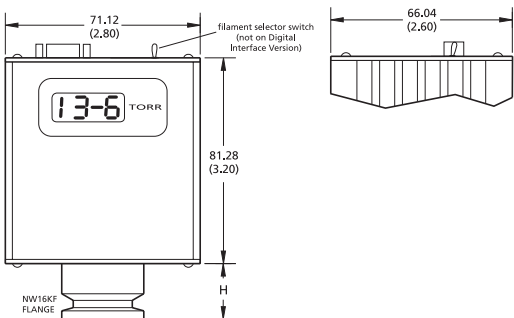
Sensitivity	20/Torr, 15/mbar, 0.15/Pa
X-ray Limit	< 3 x 10 <sup>-10</sup> Torr, < 4 x 10 <sup>-10</sup> mbar, < 4 x 10 <sup>-10</sup> Pa <small>See Note (3)</small>
Filament Materials	Yttria-coated iridium or tungsten <small>See Note (4)</small>
Other Materials Exposed to Gas	304 stainless steel, alumina, tantalum, tungsten, CuAg eutectic, Kovar <sup>®</sup>
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)

## Notes:

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



# Ordering Information

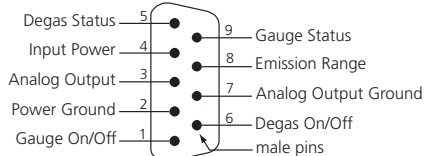


Vacuum Connection	Dim. H
1/2 inch 8 VCR-type female	58.4 (2.3)
1.33 inch (NW16CF) Conflat-type	43.2 (1.7)
2.75 inch (NW35CF) Conflat-type	43.2 (1.7)
NW16KF	20.3 (0.8)
NW25KF	20.3 (0.8)
NW40KF	20.3 (0.8)

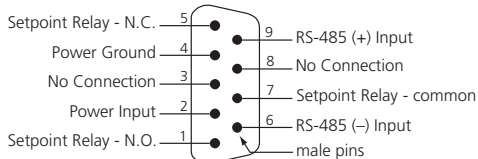
## Dimensional Drawing —

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

### Analog Output Version, No Setpoints



### Digital Interface Version, One Setpoint



## Electrical Connectors —

Analog Output and Digital Interface Versions

## Model Number Matrix

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

### Micro-Ion Modules:

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

### 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 8 VCR-type male	H

### Measurement Units:

Torr	T
mBar	M
Pascal	P

## Replacement Gauges

Add the options below to create your catalog number.

354003 - ##

### 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 8 VCR-type male	H



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