



InstruTech®

**Series 401 Hornet™ Hot Cathode Bayard-Alpert Miniature-Ionization Vacuum Gauge**

Wide measurement range  
1 x 10<sup>-9</sup> to 5 x 10<sup>-2</sup> Torr  
1.3 x 10<sup>-9</sup> to 6.7 x 10<sup>-2</sup> mbar  
1.3 x 10<sup>-7</sup> to 6.7 Pa

*Dual hot cathode design,  
rugged and compact metal  
construction*

Built-in digital display, set-point relay,  
log-linear analog output and RS485  
serial communication, are all  
standard features of the *Hornet™*

*Bright digital OLED graphical display  
allows for wide angle, greater  
viewing distance*

Also a lower cost, direct drop-in plug-  
compatible replacement for the  
Granville-Phillips® Micro-Ion®  
module

*Significant cost savings for you -  
use your existing control hardware,  
cables and software when replacing  
Micro-Ion® without need to change  
your vacuum system control*



**IGM401 sensor**

**IGM401 Built-in Controller & Display**

The IGM401 *Hornet* ionization gauge sensor assembly is a compact, all metal design with either dual yttria coated iridium or tungsten filaments available.

The IGM401 *Hornet* ionization vacuum gauge module (IGM) provides the basic signal conditioning required to turn the gauge into a complete measuring instrument. The built-in controller is offered with an easy to read, bright OLED display providing full programmability and a convenient user interface for setup and operation of the vacuum gauge.

For general vacuum applications, dual yttria coated filaments are offered for use with air and inert gases such as N<sub>2</sub>, argon, etc. Dual tungsten filaments are available for use with gases that may not be compatible with yttria coated filaments.

Emission current can be set to automatically switch between 100 µA and 4 mA. This results in optimal and stable pressure readings over the entire measurement range from low to high vacuum.

The gauge sensor assembly can be easily replaced in the field.

**Lower cost without sacrificing quality or functionality**

InstruTech continuously strives to enhance the design, reduce cost and improve the performance and reliability of the *Hornet* IGM. The electrometer circuit auto zeroes to ensure that the readings are not subject to temperature drift, eliminating the need for unnecessary, expensive circuitry which further reduces the cost.

Filament voltage and current, emission current and ion current can be monitored in real time using the research mode display screen. Sensitivity and degas time maybe adjusted by the user.

Service screens allow monitoring of filament operation. Error messages are displayed for several common fault conditions.

A programmable setpoint relay can also be toggled manually to allow testing for correct external system control wiring.

The *Hornet* operating system enables the user to select from 16 commonly used gases eliminating the need to manually apply correction factors to the displayed pressure reading.

**Also a direct drop-in plug-compatible replacement for the Micro-Ion®**

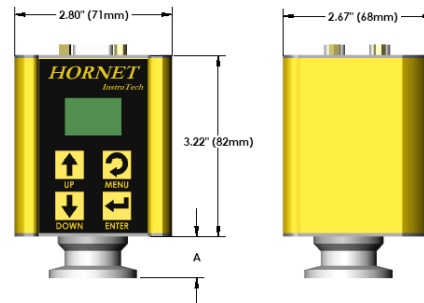
The IGM401 *Hornet* module will also directly replace various Granville-Phillips® 354 Micro-Ion® products. Measurement performance throughout the range of 1 x 10<sup>-9</sup> to 5 x 10<sup>-2</sup> Torr is equal to or better than similar vacuum gauge products in the marketplace.

An analog output voltage signal proportional to displayed pressure, one setpoint relay and RS485 serial communication are all included in the IGM401. All control functions are identical to corresponding 354 Micro-Ion® functions including software commands when using the RS485 serial interface.

## Specifications

measurement range	$1 \times 10^{-9}$ to $5 \times 10^{-2}$ Torr / $1.3 \times 10^{-9}$ to $6.7 \times 10^{-2}$ mbar / $1.3 \times 10^{-7}$ to 6.7 Pa
accuracy - N <sub>2</sub> (typical)	$1 \times 10^{-8}$ to $5 \times 10^{-2}$ Torr; $\pm 15\%$ of reading
repeatability - (typical)	$\pm 5\%$ of reading
display	bright OLED display, 3 digits plus 1 digit exponent, user-selectable units of Torr, mbar, or Pa
materials exposed to gases	dual filaments: yttria coated iridium or tungsten Ion collector: tungsten Grid: 304 Stainless Steel Others: 316/304 SS, glass, nickel
sensitivity	factory pre-set; also user adjustable between 2 to 99
x-ray limit	$< 5 \times 10^{-10}$ Torr, $< 6.7 \times 10^{-10}$ mbar, $< 6.7 \times 10^{-8}$ Pa
emission current	100 $\mu$ A, 4 mA, or automatically switch between 100 $\mu$ A and 4 mA (Auto-Ranging)
degas	3 W, electron bombardment
overpressure protection (IG)	gauge turns off at factory default setting of $5 \times 10^{-2}$ Torr; also user adjustable below 50 mTorr
internal gauge volume	1.0 in <sup>3</sup> (16.4 cm <sup>3</sup> )
temperature	0 to +40 °C operating; -40 to +70 °C storage
bakeout temperature	200 °C (sensor only - electronics removed)
humidity	0 to 95% relative humidity, non-condensing
weight	0.6 lb. (0.27 kg) with NW25 KF flange
housing (electronics)	aluminum extrusion
mounting orientation	any
serial communications	RS485 - ASCII protocol; minimum command interval: 50 ms
analog output	log-linear 0 to 9 Vdc, 1 V/decade
setpoint relay	one single-pole, double-throw (SPDT), 1 A at 30 Vdc resistive, or ac non-inductive
status outputs	degas and filament on/off status are determined by either front panel displayed messages, via an open collector transistor output or RS485 serial communications
input signal	degas, filament on/off and emission current are set by either continuous continuity to ground using digital inputs, RS485 serial communications or manually using front panel push buttons
filament selection	filament 1 or 2 selectable via front panel push buttons or RS485 commands
input power	20 to 28 Vdc, 30 W protected against power reversal and transient over-voltages
connectors	9-pin D-sub male for analog and 9-pin D-sub female for RS485
CE compliance	EMC Directive 2014/30/EU, EN55011, EN61000-6-2, EN61000-6-4, EN61326-1, EN61010-1
environmental	RoHS compliant

Fitting	dimension A
NW16KF	1.45 in. (37mm)
NW25KF	1.45 in. (37mm)
NW40KF	1.45 in. (37mm)
1 1/3 in. Mini-CF	1.85 in. (47 mm)
2 3/4 in. Conflat®	1.70 in. (43 mm)
3/4 in. Tube	2.16 in. (55 mm)
1/2 in. VCR	2.58 in. (65 mm)



## Ordering Information

## Part Numbers

IGM401 Fittings / Flanges	With Yttria Filaments	With Tungsten Filaments	Replacement / Spare Sensor - Yttria	Replacement / Spare Sensor - Tungsten
NW16KF	IGM401YBD	IGM401TBD	IG4YB	IG4TB
NW25KF	IGM401YCD	IGM401TCD	IG4YC	IG4TC
NW40KF	IGM401YDD	IGM401TDD	IG4YD	IG4TD
1 1/3 in. Mini-CF/NW 16CF Mini- Conflat®	IGM401YED	IGM401TED	IG4YE	IG4TE
2 3/4 in. CF / NW35CF Conflat®	IGM401YFD	IGM401TFD	IG4YF	IG4TF
3/4 in. Tube (3/4 in. O.D. O-ring compression)	IGM401YAD	IGM401TAD	IG4YA	IG4TA
1/2 in. Cajon® 8VCR® female	IGM401YHD	IGM401THD	IG4YH	IG4TH

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Conflat® is a registered trademark of Varian, Inc. / Agilent Technologies, Lexington, MA.

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