

## Series 390

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### GRANVILLE-PHILLIPS®

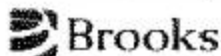
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## Installation Instructions

Instruction manual part number 390006  
Rev. 3 - January 2013



## Series 390

Granville-Phillips® Micro-Ion® ATM  
Four-Sensor Combination Vacuum  
Gauge with RS-485 Interface  
and Analog Output

### GRANVILLE-PHILLIPS®

Amanda  
Stole gauge  
#2 to test

## Installation Instructions

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## WARNING

Using the module to measure the pressure of flammable or explosive gases can cause a fire or explosion resulting in severe property damage or personal injury.

Do not use the module to measure the pressure of flammable or explosive gases.



## WARNING

Exposing the module to moisture can cause fire or electrical shock resulting in severe property damage or personal injury.

To avoid exposing the module to moisture, install the module in an indoor environment. Do not install the module in any outdoor environment.

### Pressure relief devices

Before you install the module, you should install appropriate pressure relief devices in the vacuum system. Brooks Automation does not supply pressure relief valves or rupture disks. Suppliers of pressure relief valves and rupture disks are listed in the *Thomas Register* under "Valves, Relief" and "Discs, Rupture."



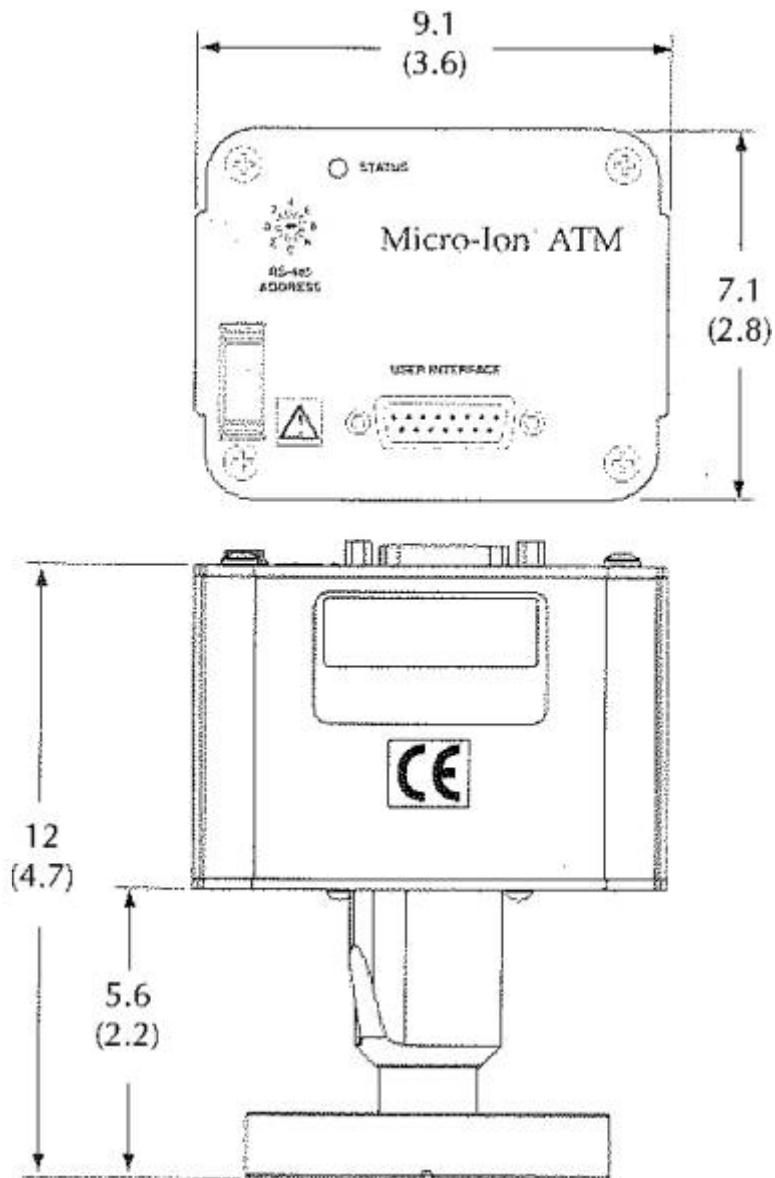
## CAUTION

Operating the module above 1000 Torr (1333 mbar, 133 kPa) true pressure could cause pressure measurement error or product failure.

To avoid measurement error or product failure due to overpressurization, install pressure relief valves or rupture disks in the system if pressure substantially exceeds 1000 Torr (1333 mbar, 133 kPa).

**Figure 1**    **Dimensions**

Dimensions in    cm  
                          (in.)



## Locating the module

To locate the module, refer to Figure 1 and follow the guidelines below.

- For greatest accuracy and repeatability, locate the module in a stable, room-temperature environment. Ambient temperature should never exceed 40 °C (104 °F) operating, non-condensing, or 85 °C (185 °F) non-operating. Bakeout temperature with the electronics removed from the module is 105 °C (221 °F).
- Locate the module away from internal and external heat sources and in an area where ambient temperature remains reasonably constant.
- Do not locate the module near the pump, where gauge pressure might be lower than system vacuum pressure.
- Do not locate the module near a gas inlet or other source of contamination, where inflow of gas or particulates causes atmospheric pressure to be higher than system atmosphere.
- Do not locate the module where it will be exposed to corrosive gases such as mercury vapor or fluorine.

## Attaching module to vacuum chamber

Attach the module vacuum chamber fitting to its mating fitting on the vacuum chamber.



### CAUTION

**Twisting the module to tighten the fitting to the vacuum chamber can damage the module's internal connections.**

- Do not twist the module to tighten the fitting.
- Use appropriate tools to tighten the fitting.

### VCR type fitting



- Remove the bead protector cap from the fitting.
- Place the gasket into the female nut.
- Assemble the components and tighten them to finger-tight.
- While holding a back-up wrench stationary, tighten the female nut 1/8 turn past finger-tight on 316 stainless steel or nickel gaskets, or 1/4 turn past finger-tight on copper or aluminum gaskets. *Do not twist the module to tighten the fitting.*

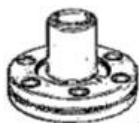
### KF flange



The KF mounting system requires O-rings and centering rings between mating flanges.

- Tighten the clamp to compress the mating flanges together.
- Seal the O-ring.

### ConFlat flange



To minimize the possibility of leaks with ConFlat® flanges, use high strength stainless steel bolts and a new, clean OFHC copper gasket. Avoid scratching the seal surfaces. To avoid contamination, install metal gaskets.

- Finger tighten all bolts.
- Use a wrench to continue tightening 1/8 turn at a time in crisscross order (1, 4, 2, 5, 3, 6) until flange faces make contact.
- Further tighten each bolt about 1/16 turn.

## Assembling and connecting wiring

Cable is user-supplied. Brooks Automation does not supply cable.

- CE Mark compliance requires metal connector housings and cable with a braided shield.
- To prevent ground loops, connect the shield only to the outer shell of the subminiature D connector on the module. Do not connect the shield to the receiver or output device.

Connect the power supply to terminals 5 and 8.

- Terminal 5 (ground) is negative (-).
- Terminal 8 (input) is positive (+).

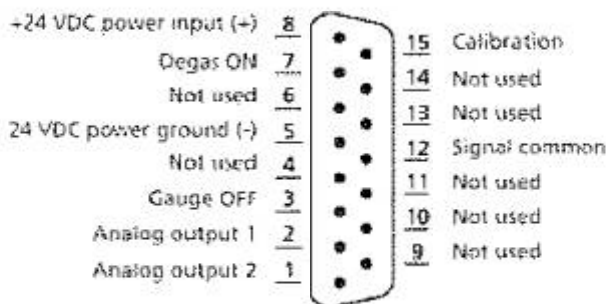
The power supply requirement is 24 Vdc +10% to -15%, 1 A, 22 W nominal. Maximum inrush current is 2 A, 48 W, for 0.5 seconds.

The Micro-Ion sensor will not activate and an emission error will occur if insufficient power is supplied during Micro-Ion sensor activation.

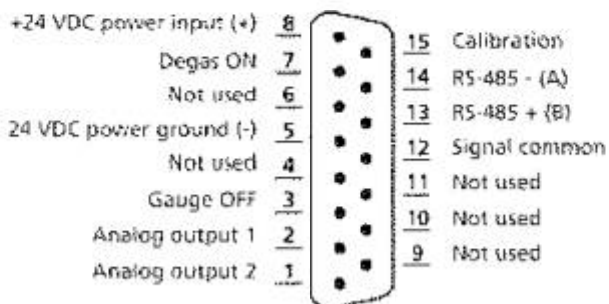
Install a switch between terminals 3 and 5 and between terminals 7 and 8 to enable Micro-Ion gauge degas and to switch the Micro-Ion gauge ON or OFF.

Wiring terminations depend on the output type.

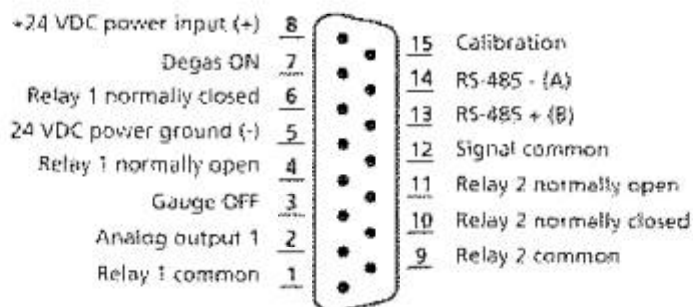
**Figure 2 Wiring terminals for module with two analog outputs, and no trip-point relays**



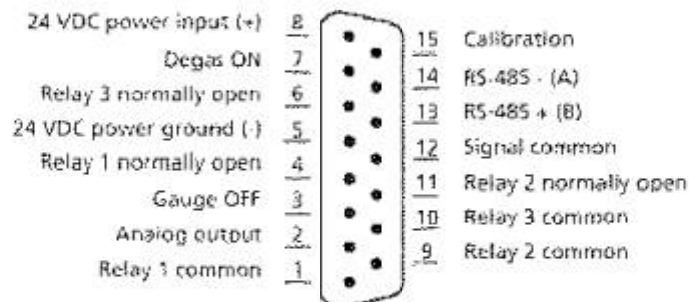
**Figure 3 Wiring terminals for module with RS-485 interface, two analog outputs, and no trip-point relays**



**Figure 4** Wiring terminals for module with RS-485 interface, one analog output, and two trip-point relays



**Figure 5** Wiring terminals for module with RS-485 interface, one analog output, and three trip-point relays



## WARNING

**Improper grounding could cause severe product failure or personal injury.**

Follow ground network requirements for the facility.

- Maintain all exposed conductors at earth ground.
- Ground the module housing to the vacuum chamber as illustrated below.
- Make sure the vacuum port to which the module is mounted is properly grounded.

If the module has a VCR type fitting or ConFlat flange, the module will be properly grounded via the vacuum chamber connection.

If the module has a KF flange, the module is shipped with a 3-foot length of braided copper wire, which has a screw lug on each end, and a screw and nut for connecting the copper wire to the gauge base. If a metal clamp and metal gasket will not be installed, follow this procedure to ground the module:

- a. The gauge base has a tab that allows a connection to the copper wire. Bend the tab outward from the gauge base (see Figure 6).
- b. Use the supplied screw and nut to connect one screw lug on the braided copper wire to the tab.
- c. Connect the other screw lug to an appropriately grounded point on the vacuum system.

**Figure 6 Vacuum chamber ground connections**

