



Series 999 Quattro™

MULTI-SENSOR VACUUM TRANSDUCER INCORPORATING HOT CATHODE TECHNOLOGY PROVIDES A WIDE MEASUREMENT RANGE AND ATMOSPHERIC PRESSURE SENSING

The Series 999 Quattro™ is the ultimate transducer solution, providing pressure measurement from 10^{-10} Torr to atmosphere, combined with atmospheric switching capabilities. The Quattro combines three of HPS' key technologies into an integrated gauge solution, and has the functionality of four sensors in one compact package. The Quattro includes the miniaturized hot cathode ionization sensor, the MEMS-based MicroPirani™ sensor and a unique piezo sensor, offering both differential and absolute sensor functions.

Features and Benefits

- Single transducer provides a wide measurement range of 10^{-10} Torr to atmosphere for high vacuum processes
- Accurate atmospheric pressure reading independent of gas type and barometric pressure changes
- Gas independent absolute measurement from 50 Torr to atmosphere (1% of reading above 50 Torr)
- 4-in-1 sensor eliminates complex manifold, wiring and control requirements
- Both analog and digital operation and communication
- Piezo and MicroPirani sensors are automatically calibrated during operation
- MicroPirani technology allows for hot cathode filament control at lower pressures for improved filament life
- Two yttria-coated iridium filaments, designed for extended life
- Includes a patented degas function
- Mountable in any orientation for easy installation
- Single selectable analog output (0.5 or 0.75 volts per decade)
- 3 user-configurable set point relays
- Microprocessor-based digital technology for real-time data access
- RoHS and CE compliant

Applications

The Series 999 Quattro is ideal for measuring a wide vacuum range from atmosphere to UHV, with atmospheric switching capabilities. Typical applications include semiconductor, thin film coating, analytical instrumentation and high energy physics. These applications require long term stability and accuracy and will benefit from the multi-sensor design and digital interface. The compact package makes the Quattro ideal for system integrators and equipment manufacturers in these markets.

Customers requiring both a power supply and display can use the 999 with the PDR900 Series 900 Controller.



Description

The unique design of the Quattro allows for a combined output providing accurate pressure measurement from 10^{-10} Torr to atmosphere without compromising the performance of the individual sensors. Incorporating piezo technology, the Quattro provides a patented, gas independent absolute pressure measurement from 50 Torr to atmospheric pressure with increased accuracy over thermal conductivity sensors.

Additionally, a differential piezo sensor ensures correct atmospheric pressure sensing under varying barometric pressure conditions, which is ideal for optimum load lock performance, or chamber venting. Piezo technology provides a direct pressure reading, allowing the measurement to be gas independent for increased accuracy and repeatability.

The Quattro includes the MEMS-based MicroPirani™ technology, which measures pressures two decades below a standard Pirani sensor. Using the extended measurement range, the transducer controls the ignition of the mini ionization gauge at lower pressures, extending the lifetime of the filament while minimizing the exposure of the hot filament to higher pressures. A second filament is incorporated inside the mini Bayard-Alpert sensor to prevent unnecessary down time in the event that a filament burns out.

With its unprecedented functionality, the Quattro has the ability to replace multiple sensors, including ionization and Pirani gauges, sub-atmospheric pressure switches and atmospheric switches. This enables the end user to save time, money and valuable tool space.

Interface

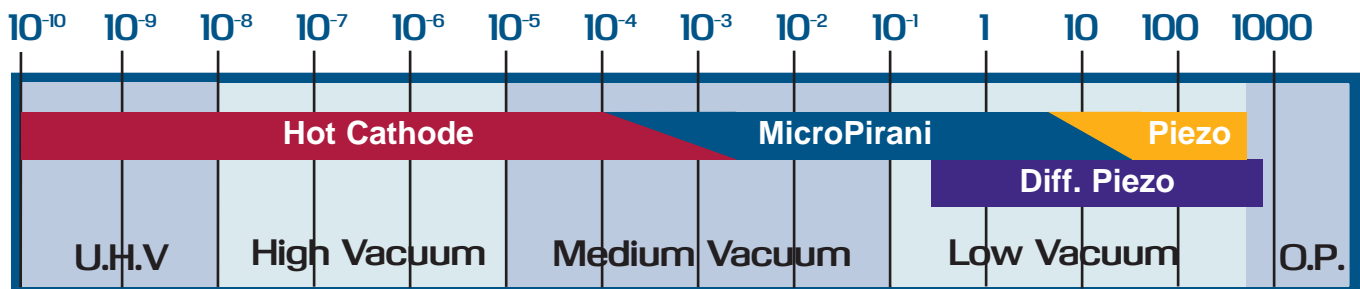
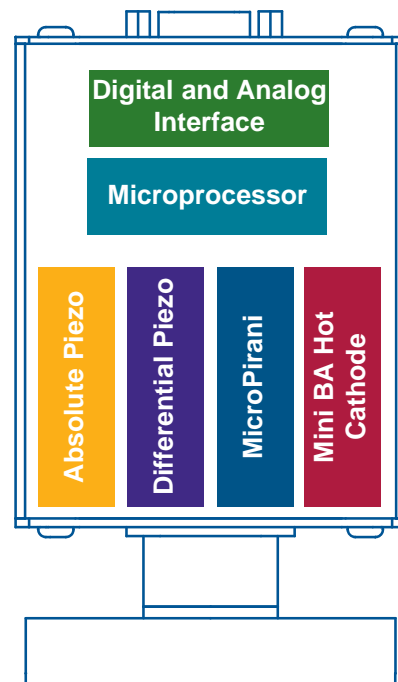
The Quattro can be operated via digital communication or as an autonomous analog unit. The digital communication allows for all adjustments to be delivered real time, via a host computer. All transducers include either RS485 or RS232 communication as a standard feature.

The Quattro also provides an analog output that is 0.5 volts per decade. Other analog outputs are available upon request. Degas and filament select functions can be controlled via digital communication, push button control from the top panel, or analog connections.

For process control, the Quattro has three independent set point relays. The set point pressure, hysteresis and direction can all be adjusted via the digital port. Alternatively, these values can be factory set prior to shipping. Each set point relay can be assigned to either the differential or the combined absolute measurement output.

Degas Cycle

After prolonged exposure to process gases, the degas function may be used to remove unwanted contamination from the sensor filament. The Quattro uses a patented electron bombardment degas function which will automatically stop and restart at preset pressures preventing the filament from shutting off. This allows for shorter degas cycles with no need for operator intervention to restart the gauge. Pressure measurement is not interrupted during the degas cycle. The degas function is initiated by user intervention and will shut off automatically after 30 minutes.

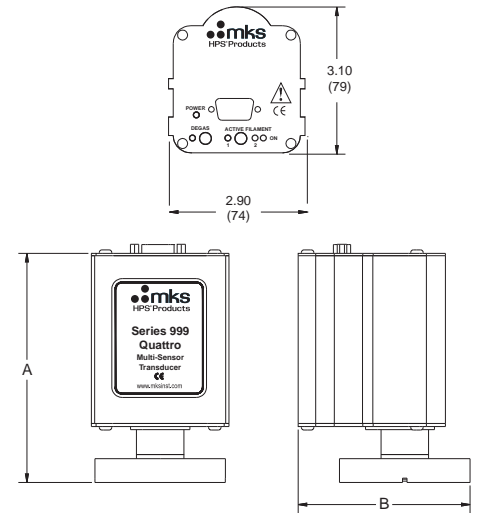


Dimensions & Specifications

Specifications

Sensor Type	Bayard-Alpert/MicroPirani/Piezo
Absolute Measurement Range	5 x 10 ⁻¹⁰ to Atmosphere
Differential Measurement Range	-760 to +100 Torr
Set Point Range - Absolute	5 x 10 ⁻¹⁰ to Atmosphere
Set Point Range - Differential	-760 to +100 Torr
Calibration Gas	Nitrogen
Operating Temperature Range	0° to 40°C (32° to 104°F)
Maximum Bakeout Temperature	85°C (185°F) non-operating
Communication	RS485 / RS232
Controls	Pressure units, baud rate, address, factory default, user tag, degas, RS485 test, gas correction, emission current, setpoint functions: value, hysteresis, direction, enable; filament functions: power, protect, selection, control setpoint, gas type
Status	Pressure reading and units, setpoint, filament, active filament, filament operating time, transducer temperature, user tag, model, device type, serial number, firmware and hardware versions
Analog Output	0.5 to 7 VDC, 0.5 V/decade
Relays	3 relays SPST
Relay Contact Rating	1A @ 30VAC/VDC, resistive load
Power Requirements	24 VDC, 15 Watts
Accuracy (Typical)	10 ⁻⁹ to 10 ⁻³ Torr ±20% of reading 10 ⁻³ to 50 Torr ± 5% of reading 50 to 1,000 Torr ± 1% of reading ± 100 Torr Diff <1% of reading
Repeatability (Typical)	1 x 10 ⁻⁹ to 10 ⁻³ Torr ±5% of reading 10 ⁻³ to 50 Torr ± 2% of reading 50 to 1,000 Torr ± 0.5% of reading ± 100 Torr Diff <0.5% of reading
Overpressure Limit	1,500 Torr
Degas	Electron Bombardment, 3 W max power
X-Ray Limit	3 x 10 ⁻¹⁰ Torr
Installation Orientation	Any
Internal Volume	25 cm ³
Materials Exposed to Vacuum	304 stainless steel, silicon, SiO ₂ , SiN _x , gold, Viton®, glass, tungsten, platinum clad molybdenum, yttria-coated iridium, Invar, Sn/Ni plating, Sn/Ag solder, epoxy
Electronic Casing	Aluminum
Weight (with KF Flange)	1.01 lbs. (460 g)
CE Certification	EMC Directive 2004/108/EC

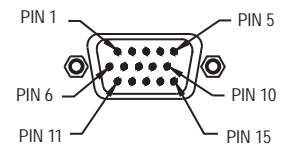
Dimensions



Flange	A	B
2.75" CF	4.82(122)	3.62(92)
1.33" CF	5.52(140)	2.91(74)
NW 16 KF	5.15(131)	2.83(72)
NW 25 KF	4.37(111)	3.03(77)
NW 40 KF	4.37(111)	3.33(85)

Dimensions: inch (mm)

Pinout



- | | |
|-------------------------|----------------------|
| 1 - RS485 (-); RS232 TX | 10 - Filament Select |
| 2 - RS485 (+); RS232 RX | 11 - Relay 2 Com |
| 3 - +24V | 12 - Relay 2 NO |
| 4 - Power Ground | 13 - Degas On |
| 5 - Analog Output (+) | 14 - Relay 3 Com |
| 6 - Analog Output (-) | 15 - Relay 3 NO |
| 7 - Relay 1 NO | |
| 8 - Relay 1 Com | |
| 9 - Degas Status | |



Ordering Information

Series 999 Quattro

Part Number	Description	Price
999-11	Series 999 Quattro Transducer, 1½" CF, RS232, 0.5 to 7 VDC	
999-12	Series 999 Quattro Transducer, 1½" CF, RS485, 0.5 to 7 VDC	
999-21	Series 999 Quattro Transducer, 2¾" CF, RS232, 0.5 to 7 VDC	
999-22	Series 999 Quattro Transducer, 2¾" CF, RS485, 0.5 to 7 VDC	
999-31	Series 999 Quattro Transducer, NW 16 KF, RS232, 0.5 to 7 VDC	
999-32	Series 999 Quattro Transducer, NW 16 KF, RS485, 0.5 to 7 VDC	
999-41	Series 999 Quattro Transducer, NW 25 KF, RS232, 0.5 to 7 VDC	
999-42	Series 999 Quattro Transducer, NW 25 KF, RS485, 0.5 to 7 VDC	
999-51	Series 999 Quattro Transducer, NW 40 KF, RS232, 0.5 to 7 VDC	
999-52	Series 999 Quattro Transducer, NW 40 KF, RS485, 0.5 to 7 VDC	

Computer Accessories

100012641	Power supply with cable, RS232, 120VAC, USA
100012664	Power supply with cable, RS232, 90-230VAC, Universal (UK, Continental Europe & Australia)
100012604	Setup and demonstration software

Display Accessories

PDR900-11-US	PDR900 Single Channel Controller, RS232/485, US power cord
100013620	Cable, PDR900 to 999, 10ft (3M), RS232
100013671	Cable, PDR900 to 999, 10 ft (3M), RS485

Accessories

100014510	NW16KF Centering ring with 100µm filter and Viton O-ring*
100014515	NW25KF Centering ring with 100µm filter and Viton O-ring*
100014520	NW40KF Centering ring with 100µm filter and Viton O-ring*

* Recommended on inlet flange of 999 to protect sensors from particulates when used in harsh environments. Other filter sizes available upon request.

PDR900 Series 900 Controller

The PDR900 power supply and readout unit is a stand alone, single channel controller for use with the Series 900 digital vacuum transducers. The instrument sets new standards for vacuum gauge controllers and can be used as a standalone power supply readout unit or as a tool for configuration, calibration and diagnostics of system integrated transducers in OEM applications.



MKS Global Headquarters

2 Tech Drive, Suite 201
Andover, MA 01810
Tel: (978) 645.5500
Tel: (800) 227.8766 (in USA)
Web: www.mksinst.com
Email: mks@mksinst.com

MKS Vacuum Technology

HPS® Products
5330 Sterling Drive
Boulder, CO 80301
Tel: (303) 449.9861
Tel: (800) 345.1967 (in USA)

MKS Denmark ApS

Ndr. Strandvej 119G
DK-3150 Hellebaek
Denmark
Tel: +45 4492 9299
Email: mksdenmark@mksinst.com

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