



Transpector[®] XPR3

Gas Analysis System

HIGH-SENSITIVITY *IN-SITU* GAS ANALYSIS
AT EXTENDED PRESSURES



PVD process monitoring without complex pressure conversion

LOWER COSTS, HIGHER PROFITABILITY

Process monitoring with Transpector XPR3 can provide you with real-time data on contamination levels, outgassing levels, gas purity and equipment operation. This information can be used to maximize throughput and yield, reduce waste by detecting and diagnosing problems, and increase tool uptime by making preventive maintenance programs more efficient and effective.

TRANSPECTOR XPR3 FEATURES AT A GLANCE

- Redesigned ion source minimizes contamination buildup for extended life and provides cleaner signals.
- New EM works at PVD process pressures, providing faster, cleaner data collection and eliminating FC to EM transitions for easier interpretation of data.
- New longer quadrupole permits improved filtering at the low mass range and improved abundance sensitivity, for better hydrogen detection sensitivity.

Transpector XPR3 is the next generation in high-pressure, quadrupole-based process gas analysis. It builds on the success of previous INFICON systems to allow monitoring of physical vapor deposition (PVD) processes with unprecedented sensitivity, accuracy and flexibility. A series of technological breakthroughs allow the compact Transpector XPR3 to operate from 20 mTorr to ultrahigh vacuum without the need for large, complex pressure conversion equipment.

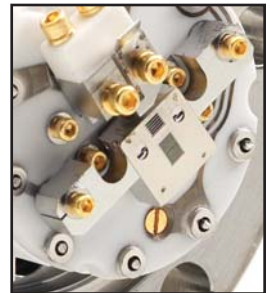
TRANSPECTOR XPR3 APPLICATIONS

- PVD process modules
- preclean modules
- non-cluster PVD tools
- clamped degas modules

ION SOURCE REDESIGNED FOR LONGER LIFE

The INFICON patented dual ion source's chambers have been reconfigured to minimize contamination buildup, thereby extending the source's lifetime.

The dual ion source supplies one ion stream to the quadrupole filter for partial pressure measurement and the second ion stream to a total pressure collector. That allows continuous total pressure measurement with accuracy comparable to an ion gauge. This innovative approach aids in

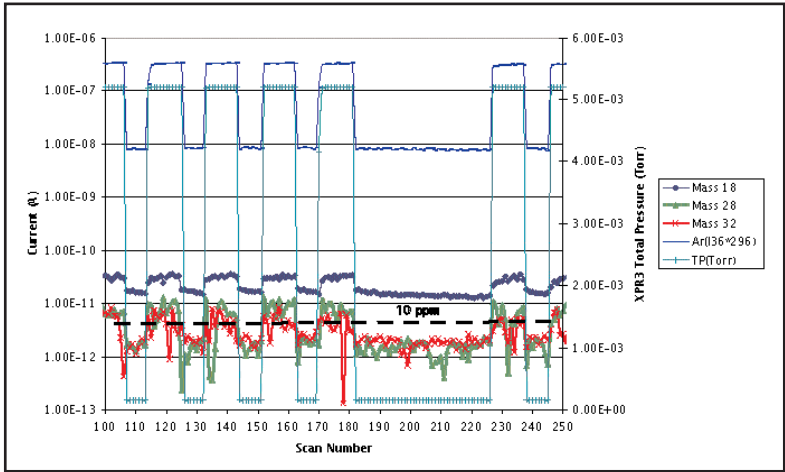


The new ion source in the Transpector XPR3 minimizes contamination and extends the life of the sensor.

measurement accuracy in the milliTorr range by correcting for high-pressure sensitivity loss. The unique interplay between the ion sources eliminates the problems of conventional single ion source sensors—nonlinear response and degradation of data quality at higher pressures. As a result of the new ion source, Transpector XPR3 delivers cleaner signals (higher signal-to-noise ratio).

NEW HIGH-PRESSURE ELECTRON MULTIPLIER YIELDS FASTER, CLEANER DATA

The new INFICON electron multiplier (EM) operates linearly all the way up to 10 mTorr (1.3E-2 mbar). This eliminates the need to use the Faraday cup (FC) for higher-pressure measurements. Since there's no switching between EM and FC modes, the transition between process monitoring and interwafer monitoring is completely smooth, which makes the data easier to interpret. Additionally, having the EM on throughout the process and during pumpdown provides cleaner signals at relatively fast dwell times.



Simulated PVD process showing 10 ppm detection of process contaminants during Argon ON time.

NEW QUADRUPOLE IMPROVES HYDROGEN DETECTION

The quadrupole is longer, which improves low-mass range filtering and abundance sensitivity, thereby reducing the zero blast and improving the hydrogen detection level.

An INFICON proprietary manufacturing process eliminates the mechanical assembly of the quadrupole's filter rods. That ensures exact alignment for excellent mass resolution without the false peaks and blending of peaks that can occur in lesser quadrupole designs.

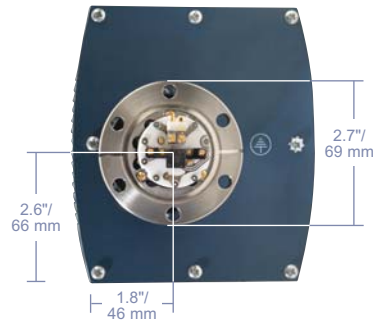
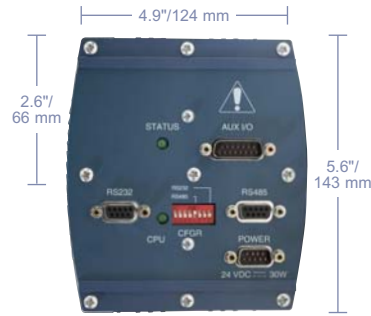
INTERLOCK PROTECTION

An INFICON Pirani gauge directly monitors pressure at the Transpector XPR3, protecting the filament by not allowing it to operate when pressures exceed the limit. It also provides the capability to automatically turn on the filament when the pressure is within a safe operating range.

TOTAL SUPPORT

As the world leader in semiconductor gas analysis instrumentation, INFICON has the resources to develop innovative, reliable monitoring systems that enhance yields, plus a global network of applications and support experts to provide assistance wherever and whenever it's needed.

DIMENSIONS



Dimensions do not include Pirani interlock (not shown).

SPECIFICATIONS

Mass Range (amu)	1–100
Resolution (per 1993 AVS Recommended Practice)	< 1 @ 10% measured at mass 4, 20, 28 and 40
Mass Filter Type	Quadrupole
Detector Type	Off-axis FC and microchannel plate EM
Temperature Coefficient (FC signal at 1E-4 Torr of Ar)	< 1% of peak height per °C
Mass Position Stability (FC signal at 1E-4 Torr of Ar with constant STP)	< 0.1 amu over 24 hours
Peak Ratio Stability (2/40, 4/40, 20/40, 28/40)	< 2% over 24 hours
Sensitivity (nominal) As FC at 40 eV/200 µA As EM at 40 eV/200 µA	≥ 4E-7 amps/Torr (3E-7 amps/mbar) ≥ 4E-3 amps/Torr (3E-3 amps/mbar)
Minimum Detectable Partial Pressure As FC at 40 eV/200 µA As EM at 40 eV/200 µA	≤ 1E-9 Torr (1.3E-9 mbar) ≤ 6E-12 Torr (8E-12 mbar)
Maximum Operating Pressure As FC or EM As FC or EM (linear operation)	20 mTorr (2.6E-2 mbar) 10 mTorr (1.3E-2 mbar)
Maximum Sensor Operating Temperature	150°C
Maximum Bakeout Temperature (electronics removed)	200°C
PPM Detectable Limit (at 1–5 mTorr process pressure)	10 ppm
Operating Temperature	20–50°C
Power Input	20–30 V DC, 9-pin male “D” connector, internally isolated from system ground
RS232 Serial Communications Interface	Nonisolated, baud selection 1200 through 9600, 9-pin female “D” connector
RS485 Addressable Communications Interface	Isolated, 57,600 fixed baud, half duplex, fixed address of 1–31, 9-pin female “D”
Relay Outputs	4 relays, 24 V at 0.5 A (1 for operational status, 3 for setpoint limits)
Inputs	2 nonisolated TTL inputs, contact closure; 2 differential analog inputs, 0–10 V DC

NOTES: All specifications after a 30-minute warm-up.

MDPP is calculated as the standard deviation of the noise (minimum detectable signal) divided by the sensitivity of the sensor measured at a four-second dwell time.



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