Quantus® HP100 Gas Analyzer

Reliable gas analysis for corrosive and non-corrosive process environments.

Real-Time Gas Analysis and Endpoint Detection with a Low Cost of Ownership

INFICON Quantus® HP100 gas analyzer is based on Self-Plasma Optical Emission Spectroscopy (SPOES) technology and is designed to provide real-time leak detection, endpoint detection, and process monitoring during semiconductor manufacturing. It has a much broader operational pressure range than its sister gas analyzer Quantus LP100+, which makes it compatible with most of the semiconductor processes at high pressure range, including CVD, ALD, and ALE. Quantus HP100 serves as a guard to the most critical processes, and is an excellent companion to advanced semiconductor equipment.

An Optical Gas Analyzer with Sub-PPM Detection Limit

The technology node in the semiconductor industry becomes smaller and smaller due to fast development of novel semiconductor tools, improved process controls, and strong market demands. This leads to stricter process control and tighter tolerance for any impurity and imperfection in many process chambers. Thus, more reliable, more sensitive gas analyzers are required during semiconductor device fabrication. Quantus HP100 is a newly designed gas analyzer under the INFICON optical gas analyzer portfolio that can work over a much broader pressure range, while maintaining excellent sensitivity. With its sub-ppm detection limit, Quantus HP100 can serve as an effective process monitor in most critical semiconductor chambers to minimize wafer scrap, improve throughput, and maximize yield.

Real-Time Leak Detection

One of the most important applications of Quantus HP100 is real-time leak detection. When air or other unexpected gas molecules leak into the process chamber, the chemistry in the chamber changes and can severely impact process quality. For Quantus HP100, a localized plasma is generated in the analyzer where impurity molecules are excited and/or ionized. The electron excitation and relaxation processes in the plasma generate optical emissions including the unique emission lines from the impurity molecules. Those emission lines are the fingerprints of the impurities and can be detected by an advanced spectrometer in the gas analyzer. With a

ADVANTAGES AT A GLANCE

- ✓ Operating range of 1 Torr to 450 Torr (tested for Ar, varies for other gas species)
- ✓ Excellent detection limits < 1 PPM
- ✓ Easy installation using a standard KF25 connection
- ✓ Fast sampling (20 Hz maximum)
- ✓ Small footprint: 162 mm H x 153 mm W x 210 mm L (6.4 in. x 6.0 in. x 8.3 in.)
- ✓ Low maintenance, no pumps required
- ✓ Convenient field-replaceable plasma cell
- ✓ Support by experienced field-trained INFICON engineers

fast sampling rate, Quantus HP100 is capable of doing real-time leak detection that is important to today's semiconductor fabrication industry.

Endpoint Detection

Another important application of Quantus HP100 is endpoint detection. Traditional endpoint detection by OES relies on observing the plasma in the process chamber, so the etch transition between different layers on a wafer can be detected. However, with the proliferation of remote plasma etching in advanced technology nodes, the etch chamber is dark and traditional OES does not work in such environments. Quantus HP100 solves this dilemma since it has a localized plasma generation component in the analyzer. This design unleashes the power of OES so the analyzer can work in dark chambers and in other dark locations, including, but not limited to, forelines and exhaust lines.

Gas Analysis Without Pumps

Unlike other gas analyzers in the market that require expensive pumping systems to provide gas analysis at higher pressure, Quantus HP100 natively supports up to 450 Torr for argon and 120 Torr for nitrogen, which makes it compatible with the majority of the processes in the cutting-edge tech node. This feature dramatically reduces the overall sensor size and the total cost of ownership since pump maintenance is not required.

Easy Installation

The slim design of Quantus HP100 and the standard KF25 port provide exceptional installation flexibility. The wide operational pressure range allows it to be installed on either a process chamber or on a pumping line. With its compact form factor, low weight, and simplified connections, one person with minimum training is capable of completing the sensor installation.

INFICON Expertise and Support

INFICON has worldwide application development teams and resources to provide professional evaluations and consultations. Our experienced field application teams can provide the most efficient and effective support for your critical needs.

SPECIFICATIONS	
PERFORMANCE	
Technology	Optical Emission Spectroscopy with integrated microwave microplasma, spectrometer, and RF power supply
Spectrometer Performance	200–850 nm wavelengths (UV-VIS) 16-bit full-scale resolution, 3648 pixels
Optical Resolution	1.34 nm
Exposure Time	Minimum of 1 ms
Sampling Frequency	Maximum of 20 Hz
Detection Limit	< 1 ppm levels (application dependent)
GAS SAMPLING INTERFACE	
Sampling Environment	1–450 Torr for argon and 1–120 Torr for nitrogen; operating range varies for other gas species
Vacuum Fitting	KF25
Serviceability	Sensor cell is field replaceable
Communication type	Ethernet cable connection
FACILITIES	
Operating Temp Range	0 to 50°C (non-condensing, sensor cell 80°C)
Power Requirements	24 V (dc) @ 2.5 A (AC/DC converter available)
Isolation Valve	Optional
APPROXIMATE DIMENSIONS AND WEIGHTS	
Dimensions	162 mm H x 153 mm W x 210 mm L (6.4 in. x 6.0 in. x 8.3 in.)
Weight	3.7 kg (8.2 lb.)

INFICON Inspired by visions. Proven by success.

www.inficon.com reach.us@inficon.com