

Model 5900 UHP Moisture Analyzer

FOR MOISTURE MEASUREMENT IN ULTRAHIGH PURITY GAS

The semiconductor industry knows the importance of measuring moisture in UHP gases. High moisture levels have been linked to reduced yields and variable device characteristics in most semiconductor technologies, and for most geometries. So, while the exact purity requirements for a 3 micron MOS device and a 0.35 micron CMOS ASIC are different, the need for specification purity gas is the same.

AMETEK Process Instruments' Model 5900 UHP moisture analyzer is specifically designed for semiconductor gas purity analysis. This leaflet describes many highlights. In addition, AMETEK has prepared a CD-ROM with comprehensive information about the 5900 UHP in semiconductor applications. Please contact AMETEK for your complementary copy.



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SUPERIOR BENEFITS

Multi-gas compatibility

The Model 5900 UHP is completely compatible with virtually all non-corrosive gases including inerts (He, Ar, Ne, Xe, Kr), O₂, H₂, N₂, NO, CO, hydrocarbons, air, and many specialty gases such as sulfur hexafluoride. Unlike some moisture analyzers that require special sensors for certain gases, the Model 5900 UHP uses a sensor that is not affected by the background gas. Changing gases is simple and quick.

Fast response speed

The Model 5900 UHP is capable of extremely rapid response to changes in moisture concentration, with the actual response determined by the powerful measurement averaging tools available through the analyzer's configuration menu. Typically configured, the Model 5900 UHP achieves 80% response to a ppb challenge in less than ten minutes. Because the analyzer employs unique non-equilibrium measurement techniques, the Model 5900 UHP delivers this exceptional response during dry-down as well as when wetting-up.

Exceptional accuracy

The Model 5900 UHP is ideal for all semiconductor moisture applications that require accurate results. At 95% confidence, accuracy is better than ± 4 ppb over the entire calibrated range, from single digit ppb to 170 ppb. AMETEK verifies analyzer accuracy using a NIST-traceable flow-bending calibration system. Remarkable analyzer-to-analyzer analytical consistency is a hallmark of the Model 5900 UHP.

Internal verification

The NIST-traceable internal moisture generator allows Model 5900 UHP users to quickly confirm analytical performance **at any time on your gas**. The generator adds a known amount of moisture to conditioned gas. The resulting known wet gas is then directed to the analyzer's sensor, verifying proper sensor and system operation. An alarm contact alerts the operator if the analyzer fails this verification process. The verification sequence may be started on programmable schedule or on manual demand.

PERFORMANCE SPECIFICATIONS

Compatible Gases: Inerts (He, Ar, Ne, Xe, Kr), O₂, H₂, N₂, NO, CO, hydrocarbons, air, and some specialty gases such as sulfur hexafluoride. CO₂ requires a custom measurement cell. (Contact the factory to confirm compatibility with other gases.)

Range: Calibrated from 0 to 170 ppbv. Operating range to 1000 ppbv. Display is software settable to show ppmv, ppbv, or dew point (requires pressure input).

Accuracy at 99.99% Confidence: ±10 ppbv or ±5% of the reading, whichever is greater

Accuracy at 95% Confidence: ±4 ppbv or ±1% of the reading, whichever is greater

Sensitivity: 2 ppbv or 0.5% of range, whichever is greater

Response Time: 80% of a step change in either direction in less than 10 minutes

Alarms: 3 system alarm, concentration or calibration alarm, and range or calibration alarm; 30 volt, 1 amp resistive, fail safe by default

Sample Flow Requirement: 200 sccm

Inlet Pressure: 103 to 1030 kPa (15 to 150 psig). Specified performance is obtained when the inlet gas pressure is maintained within ±65 kPa (±10 psi).

Inlet Gas Temperature: 0° to 100°C. Optimal results are obtained when the inlet gas temperature is maintained at 60°C.

Exhaust Pressure: Atmospheric

Ambient Operating Range: 59° to 81°F (15° to 27°C), 90% relative humidity, non-condensing, non-corrosive atmosphere. Optimal results are obtained when the ambient temperature is maintained within ±5°C.

Mounting Options: Bench-top or 19 in. rack

Power Requirements: 85 to 265 VAC, 47 to 63 Hz

Outputs:

Four-line by twenty-character vacuum fluorescent digital display

Two 4-to-20 mA into 1200 ohm load analog outputs, one autoranging

RS485 bi-directional serial port

Dimensions (W x H x D): 17 x 5.2 x 15 in. (43.2 x 13.2 x 38.1 cm)

Rack-mount Version: Same, except height is 8.71 in. (22.1 cm)

Net Weight: 18 lb. (8.2 kg)

Approvals and Certifications:

NEC/CEC Class I, Division 2, Groups A B C D, T3C

CE LVD EN61010-1/UL3101-1/CSA #1010.1

CE EMC EN50081-1, EN50082-1

Installation category II, Pollution degree 2

Gosstandart Pattern Approval No. 1407

TYPICAL APPLICATIONS

Continuous monitoring

Continuous moisture analysis is a valuable tool for quality assurance and process monitoring. As a quality assurance analyzer, the Model 5900 UHP verifies that specified gas purity levels are maintained at on-site separation, bulk delivery and distribution system transfer points, and, ultimately, at points of use. The Model 5900 UHP satisfies all the demands of continuous monitoring, principally low detection limit, high measurement accuracy, and internal verification.

Spot monitoring

The Model 5900 UHP is the perfect analyzer for temporary monitoring applications for verifying installation, maintenance, or repair of gas distribution systems. Such temporary, or spot, testing makes excellent use of the unique combination of capabilities provided by the Model 5900 UHP: very fast response speed, especially to decreasing moisture

concentrations for monitoring system dry-down; complete compatibility with O₂, H₂, and inerts; rapid start-up response; and the ability to quickly change from one gas to another.

Cylinder gases

As cylinders are emptied, the drop in gas pressure causes an increase in moisture content in the remaining product. Consequently, many users change cylinders based on remaining pressure or weight. Because neither method directly measures moisture content, either expensive gas is wasted or impure gas enters the distribution system. The Model 5900 UHP's low sample flow requirement and multigas compatibility ideally suits it for assessing the purity of cylinder gases.

These applications are examined in detail in AMETEK Process Instruments' new Semiconductor Moisture Analysis CD-ROM. Please contact AMETEK for your copy.

One of a family of innovative process analyzer solutions from AMETEK Process Instruments. Specifications subject to change without notice.



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