

Model 3050-AM Moisture Analyzer

Features

- II Quartz-crystal technology provides accuracy, speed, and calibration stability
- II On-line zero-gas verification confirms analytical stability
- II Intuitive, easy-to-use interface with keypad and display allows quick access to all operating variables
- II Multi-gas compatibility is ideal for periodic testing of multiple sample gases
- II Menu-driven gas selection eliminates all manual adjustments

AMETEK's Model 3050-AM sets the ease-of-use standard for accurate, ppmv moisture analysis. This analyzer offers a truly remarkable combination of performance features: exceptional accuracy, multi-gas compatibility, fast response speed, and wide measurement range.

The 3050-AM is ideal for process moisture measurement applications including process dryers, instrument air dryers, air separators, industrial gas production, and quality assurance. Equipped with an on-line verification system, this state-of-the-art analyzer is designed to rapidly build and maintain operator confidence in its analyses. The verification system allows you to challenge the analyzer's sensor at will using a zero gas to check its baseline stability to confirm the sensor's stability and sensitivity to sub-ppmv moisture concentrations.

Superior performance

Multi-gas compatibility

The Model 3050-AM combines the excellent multi-gas compatibility of the Model 2850 with a new, easy-to-use operator interface. It is completely compatible with virtually all non-corrosive gases including inerts (He, Ar, Ne, Xe, Kr), H₂, O₂, N₂, air, and many specialty gases such as sulfur hexafluoride. A single, simple menu selection is all that is needed to re-configure the 3050-AM for a new gas type. There are no other necessary adjustments on the analyzer.

So, if you want to analyze industrial, high purity, or semiconductor grade gases and need an instrument that is compatible with a wide range of gases, turn to the Model 3050-AM.

Exceptional accuracy

The Model 3050-AM is perfect for moisture applications that require accurate results. The accuracy of this analyzer, $\pm 10\%$ of reading, is exceptional when you consider that a new aluminum oxide sensor is typically specified with an accuracy of $+72\%/-57\%$ of reading (converted from the dew point specifications) for a moisture concentration of 0.1 ppmv at 14.7

psia. Quartz-crystal technology and an on-line verification system combine to constantly provide assurance that the analyzer is continuing to provide you with this superior level of performance.

On-line zero-gas verification confirms analytical stability

The on-line verification system in the 3050-AM uses an internal zero verification system. The zero verification system strips the moisture from the sample gas prior to analysis by the sensor. This allows you to verify the zero point of the sensor's calibration, enhancing accuracy and user confidence when monitoring in the critical 0 to 10 ppmv range. This system is entirely internal to the analyzer eliminating the need to break process connections along with the "wet-up" that would occur from ambient moisture. An alarm contact alerts the operator if the analyzer fails verification. The verification sequences can be started on a programmable schedule or on manual demand.

Fast response speed

The Model 3050-AM responds quickly to both increases and decreases in moisture concentration because the analyzer



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employs a unique non-equilibrium measurement technique. This technique continuously exposes the sensor to wet sample gas followed by dry sample gas to make its analysis. With this technique, the analyzer never needs to wait for the sensor to reach equilibrium to establish its accurate measurement. Importantly, this technique is based upon the defined, repeatable physical properties of moisture transport to/from the sensor's surface. This means that quartz-crystal technology never employs the questionable prediction software often used to "speed-up" other, more limited technologies.

AMETEK's unique technique makes possible accurate moisture readings far faster than would be possible under equilibrium, or continuous "wet" sample gas, operating conditions.

Wide measurement range

The Model 3050-AM accurately measures from 0.1 ppmv to 100 ppmv. While this is the recommended usable range, the analyzer will provide measurements up to 1000 ppmv so that you can capture the nature of a process upset.

Typical Applications

Industrial gas production and quality assurance

Compressed industrial gas suppliers need accuracy to certify compressed gas quality. They need fast dry-down response to ensure that the analyzer comes back on-line quickly after a slug of moisture, and they need complete multi-gas compatibility. Compare the performance of your present moisture analyzer with the Model 3050-AM: exceptional accuracy, less than five minute dry-down time in the 100 to 1 ppmv range, and compatibility with virtually all compressed gases, including carbon dioxide and oxygen. Finally, one analyzer which meets all your analytical and operational needs.

Cryogenic air separation

Cryogenic separation produces inherently dry gas, typically on the order of a few hundred ppbv. Suddenly increasing moisture is a widely used alarm condition because of the danger of catastrophic freeze-up and the downtime it causes. The Model 3050-AM answers this need

perfectly with excellent sensitivity, fast response to increasing moisture, and reliable measurement in the critical 100 ppbv to 1 ppmv alarm range.

Process dryers

Many industrial applications use desiccant dryers to remove moisture from process gases. Typically, these dryers operate in parallel; when the first dryer becomes saturated, the process gas is switched to the second while the first is regenerated. Used as the dryer outlet monitor, the Model 3050-AM provides internal measurement verification, fast wet-up response time, fast dry-down response time, wide measurement range, and superior accuracy. Plant operators can extend the dryer regeneration cycle, reducing regeneration costs, using the reliable, accurate Model 3050-AM.



The Quartz-Crystal Sensor

The heart of the 3050-AM analyzer is a quartz-crystal microbalance (QCM) sensor and analysis technique developed by AMETEK specifically for highly accurate moisture measurements. The sensor consists of a pair of electrodes that support the QCM sensor. When voltage is applied to the sensor, a very stable oscillation occurs.

The faces of the oscillator are covered with a hygroscopic polymer. As the amount of moisture sorbed onto the polymer varies, the mass of the QCM changes producing a corresponding change in the frequency of oscillation. These easily measurable changes have a direct relation to the moisture concentration of the sample gas.

Performance Specifications

Compatible Gases: Inerts (He, Ar, Ne, Xe, Kr), H₂, O₂, N₂, 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: 0.1 to 100 ppmv. Indicates trend to 1000 ppmv. Display is software settable to show ppmv, or dew point (requires pressure input).

Reference Dryer Life: Over 1,000,000 ppmv-hrs (eg. Dryer will last over 5 years with a 20 ppmv inlet moisture concentration.)

Limit of Detection: 0.1 ppmv

Accuracy: ±10% or 0.1 ppmv, whichever is greater

Response Time: 63% in 5 minutes (as measured for a 0 – 5 ppmv step change)

Inlet Pressure: 42 to 345 kPa (6 to 50 psig)

Exhaust Pressure: Atmospheric

Sample Flow Requirements:
Approximately 50 SCCM;
Approximately 900 SCCM @ 50psig inlet with Bypass Option

Sample Gas Temperature:
0° to 100°C (32° to 212°F)

Outputs

Four-line digital display

A fully programmable 4 to 20 mA analog output

RS-485/RS-232 serial communication

Alarms: Three independent contact closures of 30 VAC or 60VDC max., 50VA or 1A max., resistive for System Alarm, Moisture Concentration Alarm, and Data Valid. All are fail-safe by default. Alarms are available on RS-485 interface.

Software Features: Displays ppmv moisture reading or dew point, timer status, and instrument status

Environmental Conditions: 5° to 50°C (41° to 122°F), 90 percent relative humidity, non-condensing, noncorrosive atmosphere. Optimal performance in sub-ppmv applications is achieved when the ambient temperature is maintained within ±2°C.

Utility Requirements

120/240 VAC, 47 to 63 Hz, 185 W Max.

Instrument Air: 483-690 kPa (70-100 psig)

Mounting Configuration: 19-inch rack/bench-top installation

Dimensions (W x H x D):
48.3 x 13.3 x 41.9 cm
(19 x 5.25 x 16.5 in.)

Net Weight: 9.8 kg (22 lbs.)

Approvals and Certifications:

CE

MET Certified to:

UL/CSA General Safety Requirements

NEC/CEC Class I, Division 2, Groups A, B, C, D T4

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MOISTURE



455 Corporate Blvd., Newark, DE 19702
Ph. +1-302-456-4400, Fax +1-302-456-4444
www.ametekpi.com



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USA - Pennsylvania
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Shanghai / Tel: +86 21 6426 8111, Fax: +86 21 6426 7818

USA - Austin, Texas
Tel: +1-512-252-2440, Fax: +515-252-2430

FRANCE
Tel: +33 1 30 68 89 20, Fax: +33 1 30 68 89 99

GERMANY
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INDIA
Tel: +91 80 6782 3200, Fax: +91 80 6782 3232

SINGAPORE
Tel: +65 6484 2388, Fax: +65 6481 6588