

MAX-Bev CO₂ Purity Monitoring System

The Thermo Scientific™ MAX-Bev™ CO₂ Purity Monitoring System is a fully integrated solution capable of measuring trace impurities in carbon dioxide (CO₂) gas down to single-digit parts-per-billion (ppb), as well as absolute purity. This system is based on the Thermo Scientific™ MAX-iR™ FTIR Gas Analyzer, which is capable of performing all relevant analytical measurements except oxygen. The analyzer incorporates a deuterated triglycine sulfate (DTGS) thermal detector, which has a spectral range of 600–5,000 cm⁻¹. This broad range allows for the measurement of all infrared-active impurities, as well as the direct measurement of absolute CO₂ purity, which eliminates the need for cumbersome wet methods (such as Zahm-Nagel purity testing). By using incredibly precise pressure and temperature controls, the MAX-Bev CO₂ Purity Monitoring System is capable of measuring CO₂ at 100 ± 0.02% simultaneously with trace impurities.

Sulfur impurity measurement

Within the MAX-Bev CO₂ Purity Monitoring System, an oxidizer module converts all reduced sulfur species to sulfur dioxide (SO₂), which is then measured by the MAX-iR Gas Analyzer to determine the total reduced sulfur impurity level in the carbon dioxide. This is a more reliable method compared to industry-standard UV fluorescence analyzers, which are prone to maintenance issues and extended downtime.

MAX-Analytical Software Suite

The entire MAX-Bev CO₂ Purity Monitoring System is controlled by Thermo Scientific™ MAX-Analytical™ STANDARD Software Suite, which allows you to control all aspects of data acquisition and analysis, view system diagnostics and alarms, and generate/print certificates of analysis (CoA) as well as historical reports.

An advanced version of the software is also available as a separate option. With the Thermo Scientific™ MAX-Analytical™ Advanced Software Suite, users have access to all the features available in the STANDARD Software package with the addition of the MAX Gas Reference Editor. **The MAX Gas Reference Editor is only available in the Advanced Software package** and includes traceability documentation for all gases in the library, automatic baseline correction of reference spectra, ability to define primary and secondary quantification regions, and the ability for users to add their own calibrations to the spectra library.

Features

Automated CO₂ purity monitoring

Meets requirements of the International Society of Beverage Technologists (ISBT) and European Industrial Gases Association (EIGA)

10 channel multiplexer

MFCs control sample flow and validation gas dilution for automated QA/QC

Optional zirconium oxide oxygen analyzer

Touch screen control

Works with MAX-Analytical STANDARD or Advanced Software Suite

SQLite historical database

Save and print customizable CoAs



MAX-Bev CO₂ Purity Monitoring System specifications
Multiplexer

Number of sample channels	10
Sample flow	7 L/min
Total analysis time	10 minutes

Gas requirements

Zero gas	Nitrogen, N3.0 or better, 80 psig
Clean dry air	Clean dry air, filtered and free of H ₂ O and hydrocarbons, 80 psig
CO ₂ reference gas	Research grade (99.9999%) CO ₂ , 80 psig
Impurities reference gas	Blend of 5 ppm COS, 10 ppm benzene and 75 ppm propane in N ₂ balance, 80-85 psig
O ₂ reference gas (optional)	50 ppm O ₂ in N ₂ balance, 20-30 psig

Facilities requirements

Environmental temperature range	20-30°C
Environmental relative humidity (RH)	10-90% RH, non-condensing
Power	208-240 VAC, 50/60 Hz, 20 A circuit (4 A typical, 16 A max.)
Dimensions (W x H x D)	651 x 1952 x 944 mm
Estimated weight	180 kg

Factory integration

Data outputs	Modbus TCP/IP
	Relay outputs (Form C)
	Analog outputs (4-20 mA)
	Digital outputs (24 V sourcing)
Data inputs	Modbus TCP/IP remote control
	Analog inputs (4-20 mA)
	Digital inputs (24 V) for remote start and stop
	Thermocouple inputs (Type K)

MAX-Bev CO₂ Purity Monitoring System analytical specifications

Compound	Calibration range	Detection limit
Acetaldehyde	ND-400 ppm	5 ppb
Acetone	ND-1000 ppm	20 ppb
Ammonia	ND-400 ppm	10 ppb
Benzene (total aromatic hydrocarbon)	ND-5 ppm	5 ppb
Carbon dioxide	90-100%	Matrix
Carbon monoxide	ND-55 ppm	120 ppb
Ethane	ND-500 ppm	20 ppb
Ethanol	ND-1000 ppm	20 ppb
Ethylene	ND-100 ppm	20 ppb
Methane	ND-65 ppm	5 ppb
Methanol	ND-750 ppm	10 ppb
Moisture	ND-100 ppm	1 ppm
Nitric oxide	ND-100 ppm	75 ppb
Nitrogen dioxide	ND-30 ppm	25 ppb
Oxygen	ND-500 ppm	1 ppm
Pentane	ND-500 ppm	100 ppb
Propane	ND-400 ppm	100 ppb
Total hydrocarbon	ND-1000 ppm	100 ppb
Total non-methane hydrocarbon	ND-1000 ppm	100 ppb
Total sulfur (SO ₂)	ND-20 ppm	10 ppb

 Learn more at thermofisher.com/max-bev

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