AMETEK® PROCESS INSTRUMENTS

TRACE ANALYTICAL™

ta3000 Gas Analyzers

Trace Level Gas Monitoring for Bulk Gas, Environmental and Research Laboratory Applications

The Trace Analytical™ ta3000 series, manufactured by AMETEK Process Instruments, is a family of instruments designed to monitor trace levels of specific impurities in bulk gases, environmental applications and research applications. All ta3000 instruments include a dedicated sample processing system, a single high sensitivity detector, and on-board analysis electronics. There are two models of ta3000. Containing a different detector, each model is used to monitor a different selection of impurities.

Features

- High sensitivity
- Broad detection range
- Cost efficient maintenance and operation
- Best value and performance
- Expandable with Multipoint Stream Selector

- ta3000R

  Detects H_2, CO and Unsaturated Hydrocarbons

  RGD (Reduction Gas Detector)

  Detection limit 10 ppb*

- ta3000F

  Detects CO_2, Methane and Non-Methane Hydrocarbons

  FID (Flame Ionization Detector)

  Detection Limit 10 ppb*

* *Detection limits may vary with each application*

Tradition of Excellence

Following a tradition of excellence in trace level gas detection, the ta3000 delivers analytical solutions for environmental monitoring, industrial process control and high purity gas monitoring applications.

The ta3000 is equipped with an internal sample processing channel followed by either a Reduction Gas Detector (RGD) or Flame Ionization Detector (FID). The RGD configuration is a worldwide standard for determination of hydrogen and carbon monoxide in air research, environmental samples, process control and bulk gas purification facilities. The RGD is also used as an ambient air monitor for unsaturated hydrocarbons such as isoprene, ethylene or ethylene oxide. The FID configuration is widely used for determination of CO_2, methane and non-methane hydrocarbons (NMHC) in ambient air, water headspace, bulk gases or process gas streams.

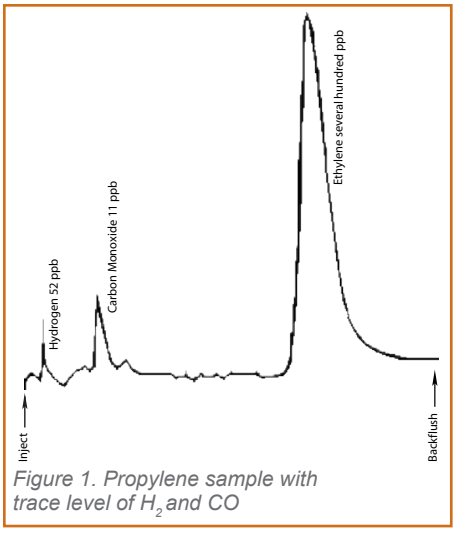

Figure 1. Propylene sample with trace level of H_2 and CO

Advanced Detector Technology

The ta3000 Gas Analyzer is an isothermal gas chromatograph configured with either a Reduction Gas Detector or Flame Ionization Detector. The chromatographic hardware of the ta3000 is available in several configurations, each of which enables the instrument to perform a highly specialized task.

The RGD has unique characteristics when compared to traditional gas chromatography detectors. Developed and patented by Trace Analytical, the RGD can selectively detect “reducing” compounds. The operating principle of the RGD is based upon the strong absorption of UV light by mercury vapor. As a reducing species passes through a heated mercuric oxide bed in the detector, mercury vapor is released in direct proportion to its concentration in the sample gas.

The FID detector is the most widely used detector in GC. This detector responds to molecules with carbon-hydrogen bonds. The gas eluent from the GC column is mixed with hydrogen to support a flame that burns the C-H and forms ions. The ions are collected on a biased electrode and produce an electrical signal. The generated current is proportional to the concentration in the sample.

Unique System Combination

Extreme sensitivity from parts per million (ppm) down to low parts per billion (ppb) levels and negligible matrix effects from permanent gases are the primary strengths of the ta3000 detectors. This sensitivity combined with the separating power of gas chromatography makes for a truly unique system. Modern user interface features make the ta3000 the analyzer of choice for selective measurements of impurities in air, for pure gas quality control and research and for numerous other gas monitoring applications.

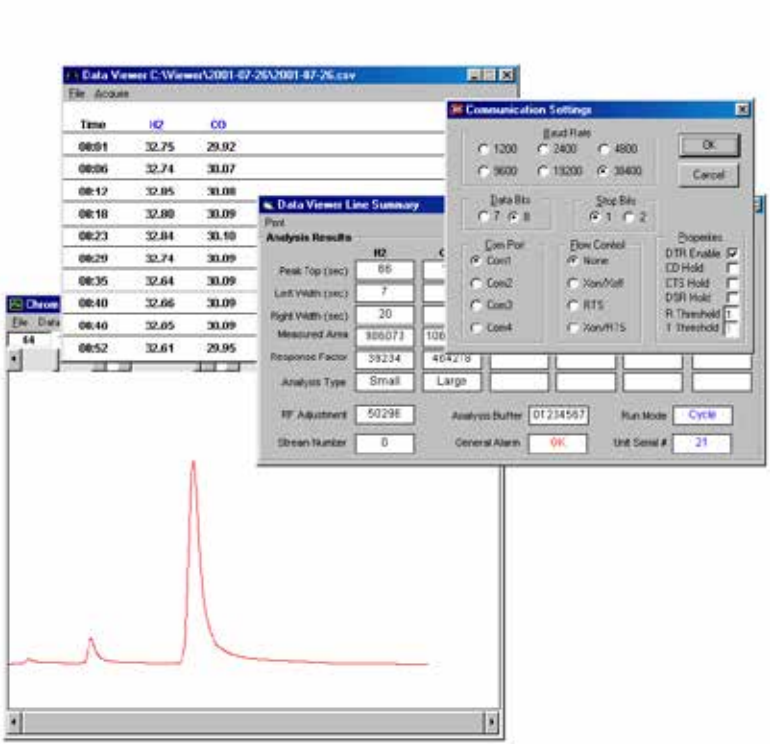

Figure 2. ta Series Data Collection and Viewer Software (Optional).

Effective Monitoring Technology

Since the mid-1980s, Trace Analytical products have led the way for effective measurement of impurities in industrial gases and in air research. The ta3000 is designed for continuous operation. Configured for a traditional 19-inch industrial rack installation, its sturdy construction also makes this highly versatile gas analyzer suitable for transport to the field for surveys and spot tests.

The ta3000 Gas Analyzer can also monitor several sampling points when interfaced with the Sigma4000 Multipoint Stream Selector. The on-board microprocessor controls the stream selector, stored calibration parameters and processes data in a variety of formats. Trace Viewer Software formats data, reports, alarm status and stores chromatograms on a local PC. The MGB1000 Micro Gas Blender is a complimentary accessory for low concentrations and analyzer performance validation.

TYPICAL APPLICATIONS

REDUCTION GAS DETECTOR

- Trace level detection of CO in the atmosphere
- Measurement of dissolved hydrogen in water
- Bulk gas certification
- Monitoring of ethylene in ambient air
- Measuring safe levels of ethylene oxide in air
- Certification of gas purifier efficiency

FLAME IONIZATION DETECTOR

- Trace methane, CO_2 and non-methane hydrocarbons in inert gas streams
- Measurement of hydrocarbons in air
- Hydrocarbons in water headspace
- Monitoring hydrocarbon impurities in Oxygen or CDA

ta3000R RGD Specifications

Every Trace Analytical™ ta3000R includes: an on-board electronic pressure regulator, multipoint diaphragm valve, proven chromatography, and Reduction Gas Detector (RGD). Lower detection limits may vary depending on application. Contact AMETEK Process Instruments for information about your specific application. Not all models and applications are listed below.

Applications	Lower Detection Limit	Analysis Time
Dissolved H_2 in water headspace	50 ppb H_2	2 minutes
CO in air	10 ppb CO	2.5 minutes
Ethylene in air	10 ppb C_2H_4	5 minutes
Ethylene oxide in air	30 ppb EtO	10 minutes
CO in ethylene / propylene / propane	10 ppb CO	7.2 minutes
CO + H_2 in methane	10 ppb CO; 25 ppb H_2	2 minutes
H_2 and CO in bulk gas: oxygen, inerts and air	10 ppb CO; 25 ppb H_2 *	6 minutes

**A factory certified LDL of 25 ppb H_2 inhelium sample gas can be provided using a helium carrier gas.*

Performance

Accuracy	Greater of ± 10 ppb H_2; ± 5 ppb CO; ± 10% of reading
Range	0 to 3 ppm (Higher is available as an option)
Response Time	Length of analysis is dependant on application. Response time is independent of sample concentration.
Ambient Operating Temperature	50° to 90°F (10° to 32°C)
Sample Compatibility	Specific models available for various applications
Resolution, Display	0.1 ppb
Resolution, Communication Ports	0.01 ppb

Carrier Gas Supplies (On-Line Installation)

Inlet Pressure Range	70 to 90 psig (4.8 to 6.2 bar)
Inlet Pressure Stability	± 2%, regulator required
Return Pressure	Atmospheric vent is optimal, ± 0.5 psig (± 0.035 bar) maximum
Flow Rate	20 cc/min minimum, bypass at 50 cc/min
Temperature	60° to 100°F (16° to 38°C), optimum when maintained ± 3.6°F (± 2°C)
Maximum Impurity Levels	Varies by application, external purifier may be required

Support Gases

Carrier Gas	Nitrogen (typical)
Carrier Gas Purity	99.99999% (external purifier may be required)

Gas Ports

Sample Inlet	1/16-inch VICI compression
Carrier	1/16-inch VICI compression
Sample Vent	1/16-inch VICI compression
Aux	1/16-inch VICI compression

Sample Gas

Inlet Fitting	1/16 - inch VICI compression fitting
Flow Rate	20 - 100 sccm minimum
Inlet Pressure Stability	± 2%, UHP regulator required
Vent Pressure	Atmospheric pressure vent is optimal, ± 0.5 psig (± 0.035 bar) maximum

Calibration Gas

Inlet Fitting	Sample Gas Inlet (1/16 - inch VICI compression fitting)
Cylinder Concentration	Depends on application
Blender Recommended	AMETEK's Trace Analytical MGB1000 Micro Gas Blender

Chassis

Dimensions	7" H x 16.8" W x 26.5" D (18cm x 43cm x 67cm)
Weight	35 lb. (15.9 kg)
Power	100 - 120 VAC, 50/60 Hz; 200 - 240 VAC, 50/60 Hz

ta3000F FID Specifications

Every Trace Analytical™ ta3000F includes: an on-board electronic pressure regulator, multipoint diaphragm valve, proven chromatography, and Flame Ionization Detector (FID). Lower detection limits may vary depending on application. Contact AMETEK Process Instruments for information about your specific application. Not all models and applications are listed below.

Applications	Lower Detection Limit	Analysis Time
Bulk Gas: Inerts	10 ppb CO_2; 10 ppb CH_4; 25 ppb NMHC	10 minutes
Bulk Gas: Oxygen, Inerts, or Air	10 ppb CO_2; 10 ppb CH_4; 25 ppb NMHC	10 minutes
Bulk Gas: Hydrogen	10 ppb CO_2; 10 ppb CH_4; 25 ppb NMHC	10 minutes
Water Headspace	CH_4, C_2H_2, C_2H_4, C_2H_6, CO_2: Range 0.25 to 200 ppm	4 minutes
Air Sampling	CH_4, NMHC: Range 0.25 to 200 ppm	5 minutes
Hydrogen (CO Only)	10 ppb CO	10 minutes

Performance

Precision	±1 x LDL or ± 10% of reading, which ever is greater
Accuracy	±1 x LDL or ± 10% of reading, which ever is greater
Range	0 to 5 ppm (Higher is available as an option)
Response Time	2 to 10 minutes to 99% response (varies with application) Response time is independent of sample concentration.
Ambient Operating Temperature	50° to 90°F (16° to 32°C)
Sample Compatibility	Specific models available for various applications
Resolution, Display	0.1 ppb
Resolution, Communication Ports	0.01 ppb

Carrier Gas Supplies (On-Line Installation)

Inlet Pressure Range	70 to 90 psig (4.8 to 6.2 bar)
Inlet Pressure Stability	± 2%, regulator required
Return Pressure	Atmospheric vent is optimal, ± 0.5 psig (± 0.035 bar) maximum
Flow Consumption	50 cc/min minimum, bypass at 50 cc/min
Temperature	60° to 100°F (16° to 38°C), optimum when maintained ± 3.6°F (± 2°C)
Maximum Impurity Levels	Varies by application, external purifier may be required

Support Gases

Carrier Gas	Nitrogen (typical)
Carrier Gas Purity	99.99999% (external purifier may be required)
FID Air Purity	< 1ppm hydrocarbons, dewpoint < -40°C (-40°F)
FID Hydrogen Fuel Purity	Hydrocarbons, CO, CO_2 <1ppm

Gas Ports

Sample Inlet	1/16-inch VICI compression	FID Air	1/16-inch VICI compression
Carrier	1/16-inch VICI compression	Sample Vent	1/16-inch VICI compression
FID H_2	1/16-inch VICI compression	Aux	1/16-inch VICI compression
		FID Shut-Off	1/8-inch VICI compression

Sample Gas

Inlet Fitting	1/16-inch VICI compression fitting;	Inlet Pressure Stability	± 2%, UHP regulator required
Flow Rate	20 - 100 sccm minimum;	Vent Pressure	Atmospheric pressure vent is optimal, ± 0.5 psig (± 0.035 bar) maximum

Calibration Gas

Inlet Fitting	1/16-inch VICI compression fitting
Cylinder Concentration	Depends on application
Blender Recommended	AMETEK's Trace Analytical MGB1000 Micro Gas Blender

Chassis

Dimensions	7" H x 16.8" W x 26.5" D (18 cm x 43 cm x 67)
Weight	35 lb. (15.9 kg)
Power	100 - 120 VAC, 50/60 Hz; 200 - 240 VAC, 50/60 Hz

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REGISTERED ISO 9001 MANAGEMENT SYSTEM

F-0190 Rev. 5 (0714)

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

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