

ta7000 Series UHP Gas Purity Monitors

At the critical link in your manufacturing process

Features / Benefits

ta7000 sets the new standard for UHP trace gas monitoring:

- || Highest sensitivity
- || Broadest detection range
- || 24/7/365 reliability
- || Cost-efficient maintenance and operation
- || Best value and performance
- || On-board gas regulation
- || Carrier gas purifier
- || Rotorless valves
- || Proven chromatograph
- || Internal calibration system
- || RGD Reduction Gas Detector (ta7000R)
- || FID Flame Ionization Detector (ta7000F)
- || Preconfigured for use on specific types of gas



UHP Bulk Gases:

N₂
Ar
He
H₂
O₂

Common Impurities:

H₂
CO
CO₂
CH₄
NMHC

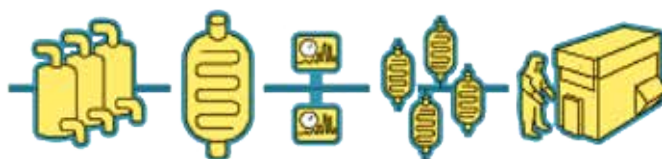
The ta7000 platform includes a dedicated sample processing system, a single high sensitivity detector and on-board data analysis electronics. Two distinct models are available and each is equipped to detect a wide range of common gas impurities:

- || ta7000R: H₂ and CO
RGD (Reduction Gas Detector)
Detection limit below 500 ppt
- || ta7000F: CO₂, CH₄ and non-methane hydrocarbons
FID (Flame Ionization Detector)
Detection limit below 500 ppt

AMETEK Trace Analytical™ is well known in the UHP gas industry as a leader in detector technology and for innovative gas analyzer design.

When Your Product is on the Line

As semiconductor technology advances, wafer fabrication processes become more complex and vulnerable to disruption. To protect product quality and maintain yield, process engineers require their UHP gas distribution systems to comply with ever more stringent purity standards. The ta7000 gas purity monitors are designed specifically to meet the newest challenges faced by the semiconductor industry.



Ultimate Protection

Over time, gas distribution systems are susceptible to upsets due to expiration of flow components, component outgassing, and accidental purifier overload. It is crucial to detect contamination before it is spread through the vast network of gas piping runs.

Continuous monitoring of UHP gas identifies an upset before it becomes a crisis. The table on this page illustrates that it is not enough to monitor just for oxygen and moisture. The first breakthrough contaminants released by purifiers are hydrogen, carbon monoxide, carbon dioxide and methane. ta7000 monitors are the only instruments capable of selectively and automatically measuring all of these impurities in UHP bulk gases.

Advanced Detection Technology

The EDL integration mode is one of the many enhancements that lend the ta7000 analyzers their unparalleled sensitivity during continuous operation. EDL employs an advanced algorithm to isolate measurement signals while filtering out random electronic noise. The result is an accurate and highly precise profile of the quality of your bulk gas.

Contamination Downstream of the Purifier				
Causes of Contamination	HC	CO	CO ₂	H ₂
Dead Leg in Plumbing				✓
Outgassing from Hardware	✓	✓	✓	✓
Inlet Gases Out of Specs	✓	✓	✓	✓
Purifier End of Life	✓	✓	✓	✓

Quality Control Tool

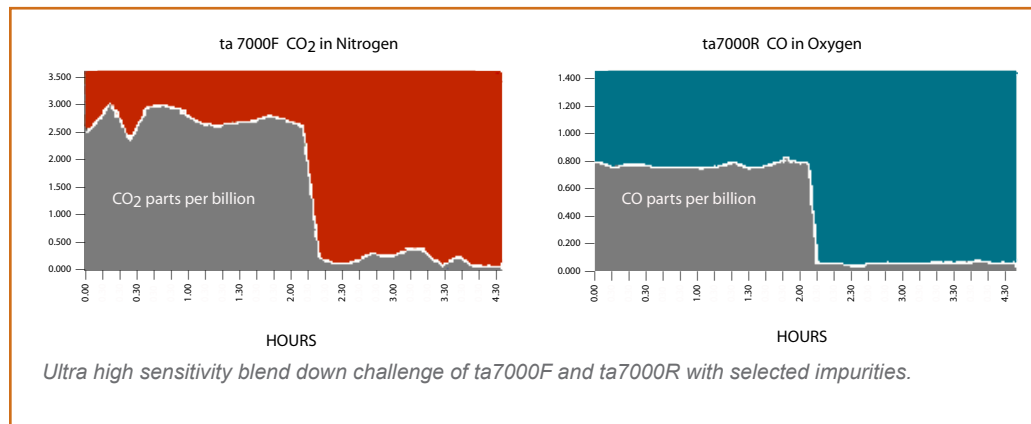
A ta7000 system provides assurance that your house gases comply with specifications where it matters most—at the source of the UHP gas distribution system. By monitoring this point of reference you can continuously validate and defend the quality of purified gas at this most critical juncture.

You Can Expect More from Trace Analytical

Every ta7000 Gas Purity Monitor is manufactured and tested to the same standards of quality and performance you have come to expect from Trace Analytical. Since 1989 we have supplied the semiconductor industry with high purity gas monitors known for their extreme sensitivity and long term dependability.

A Tradition of High Quality Support & Service

AMETEK Process Instruments, the manufacturer of Trace Analytical products, combines technical innovation with a corporate commitment to excellence in support. We focus on a responsive, partner-oriented relationship with our customers. This includes regularly scheduled training and worldwide post-installation support that is unexcelled in the industry. Our mission: to give our customers complete confidence in our systems and the people who support them.



Model Designation and Detection Limit Specifications

SAMPLE GAS	MODEL	Lower Detection Limit*	
		H ₂ ppb	CO ppb
Nitrogen	ta7000R - N ₂	< 0.5	< 0.5
Argon	ta7000R - Ar	< 0.5	< 0.5
Helium	ta7000R - He	< 0.5	< 0.5
Oxygen	ta7000R - O ₂	< 0.5	< 0.5

*Improved detection limits may be available as an option upon request.

Performance

Accuracy, EDL Mode: Greater of ± 0.25 ppb H₂; ± 0.25 ppb CO; $\pm 10\%$ of reading

Range: 0 to 199.9 ppb

Response Time: 5 minutes to 99% response; 30 minutes to 75% response in EDL mode. Response time is independent of sample concentration.

Ambient Operating Temperature: 60 to 90°F (16 to 32°C)

Sample Compatibility: Specific models available for N₂, Ar, He, or O₂ analysis

Resolution, Display: 0.1 ppb

Resolution, Communication Ports: 0.01 ppb

Sample Gas Supplies

Inlet Pressure Range: 70 to 90 psig (4.8 to 6.2 bar)

Inlet Pressure Stability: $\pm 2\%$, regulator required

Return Pressure: Atmospheric vent is optimal; ± 0.5 psig max.

Flow Rate: 300 cc/min minimum; sample bypass at 50 cc/min.

Temperature: 60 to 100°F (16 to 38°C), optimum when temperature maintained $\pm 2^\circ\text{C}$

Maximum Impurity Levels: 200 ppb moisture, CO₂, Hydrocarbons

Chassis

Dimensions: (HxWxD) 7 x 16.8 x 26.5 in. (18 x 43 x 67 cm)

Weight: 35 lb. (15.9 kg)

Power: 100 - 120 VAC, 50/60 Hz; 200 - 240 VAC, 50/60 Hz

Gas Ports

Carrier/Sample Inlet: 1/4-inch face seal fitting

Actuator Air: 1/8-inch VICI compression

Sample Outlet: 1/16-inch VICI compression

Aux (Calibration): 1/16-inch VICI compression

Outputs

Display: LCD graphics, backlit, 100mm x 150mm

Printer Port: Concentration, chromatogram, and diagnostic reports

Serial PLC Port: Concentration data and alarms via RS-232

4 to 20mA (optional): Concentration signals and status relay contacts

SAMPLE GAS	MODEL	Lower Detection Limit*		
		CH ₄ ppb	CO ₂ ppb	NMHC ppb
Nitrogen	ta7000F - N ₂	< 0.5	< 1.0	< 2.0
Argon	ta7000F - Ar	< 0.5	< 1.0	< 2.0
Helium	ta7000F - He	< 0.5	< 1.0	< 2.0
Oxygen	ta7000F - O ₂	< 1.0	< 2.0	< 2.0
Hydrogen	ta7000F - H ₂	< 1.0	< 1.0	< 2.0

Performance

Accuracy, EDL Mode: Greater of ± 0.25 ppb CH₄; ± 0.5 ppb CO₂; ± 1.0 ppb NMHC; $\pm 10\%$ of reading; ± 1.0 ppb CO

Range: 0 to 199.9 ppb

Response Time: 10 minutes to 99% response. 60 minutes to 75% response in EDL mode. Response time is independent of sample concentration.

Ambient Operating Temperature: 60 to 90°F (16 to 32°C)

Sample Compatibility: Specific models available for N₂, Ar, He, O₂, or H₂ analysis

Resolution, Display: 0.1 ppb

Resolution, Communication Ports: 0.01 ppb

Sample Gas Supplies

Inlet Pressure Range: 70 to 90 psig (4.8 to 6.1 bar)

Inlet Pressure Stability: $\pm 2\%$, regulator required

Return Pressure: Atmospheric vent is optimal, ± 0.5 psig maximum

Flow Rate: 300 cc/min minimum, sample at 50 cc/min.

Temperature: 60 to 100°F (16 to 38°C), optimum when temperature maintained $+ 2^\circ\text{C}$

Maximum Impurity Levels: 200 ppb Moisture, CO₂, Hydrocarbons

Chassis

Dimensions: (HxWxD) 7 x 16.8 x 26.5 in. (18 x 43 x 7 cm)

Weight: 35 lb. (15.9 kg)

Power: 100 - 120 VAC, 50/60 Hz; 200 - 240 VAC, 50/60 Hz

Gas Ports

Carrier/Sample Inlet: 1/4-inch face seal fitting

Sample Inlet: 1/4-inch face seal fitting (H₂ and O₂ models only)

FID Air: 1/16-inch VICI compression

FID H₂: 1/16-inch VICI compression

AUX (Calibration): 1/16-inch VICI compression

Sample Outlet: 1/16-inch VICI compression

FID H₂ Shut-Off: 1/8-inch VICI compression (Supplied at 57 psi (3.9 bar))

Actuator Gas: 1/8-inch VICI compression

Outputs

Display: LCD graphics, backlit, 100mm x 150mm

Printer Port: Concentration, chromatogram, and diagnostic reports

Serial PLC Port: Concentration data and alarms via RS-232

4 to 20ma (optional): Concentration signals and status relay contacts

Installation Requirements ta7000R and ta7000F

Sample Gas

Inlet Fitting	1/4-inch face seal fitting*
Inlet Pressure Range	70 to 90 psig (4.8 to 6.2 bar)
Inlet Pressure Stability	± 2%, UHP regulator required
Vent pressure	Atmospheric pressure vent is optimal, + 0.5 psig maximum
Flow Rate	300 cc/min minimum, sample bypass at 50 cc/min

Calibration Gas

Inlet Fitting	1/16-inch VICI compression fitting
Cylinder Concentration	5 to 10 ppm H ₂ , CO, CH ₄ , CO ₂ , and ethane (C ₂ H ₆), balance nitrogen
Cylinder Volume	100 cubic feet minimum (2800L)
Supply Pressure	80 to 90 psig (5.5 to 6.2 bar)
Consumption	Approximately 1.0 L per calibration (4 to 8 L/month), automatic shut off between calibrations

* 1/4-inch face seal x 1/16-inch adapter fittings are available from Trace Analytical.

ta7000F - Additional Requirements

FID Hydrogen

Inlet Fitting	1/16-inch VICI compression fitting
Inlet Pressure Range	50 to 60 psig (3.4 to 4.1 bar)
Inlet Pressure Stability	± 2%, UHP regulator required
Flow rate	35 cc/min
Purity	Hydrocarbons, CO, CO ₂ < 1 ppm

FID Air

Inlet Fitting	1/16-inch VICI compression fitting
Inlet Pressure Range	50 to 60 psig (3.4 to 4.1 bar)
Inlet Pressure Stability	± 2%, regulator required
Flow Rate	250 cc/min
Purity	< 1 ppm total hydrocarbons, dew point < - 65°C

Nitrogen Carrier Gas (for Oxygen and Hydrogen models only)

Inlet Fitting	1/4-inch face seal fitting*
Inlet Pressure Range	70 to 90 psig (4.8 to 6.2 bar)
Inlet Pressure Stability	± 2%, UHP regulator required
Flow Rate	300 cc/min
Purity	99.9999% (< 1 ppm total impurity content)

* 1/4-inch face seal x 1/16-inch adapter fittings are available from Trace Analytical.



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



© 2014, by AMETEK, Inc.
All rights reserved. Printed in the U.S.A.
F-0192 Rev. 5 (12/14)

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

SALES, SERVICE AND MANUFACTURING:

USA - Pennsylvania
150 Freeport Road, Pittsburgh PA 15238 • Tel: +1-412-828-9040, Fax: +1-412-826-0399

USA - Delaware
455 Corporate Blvd., Newark DE 19702 • Tel: +1-302-456-4400, Fax: +1-302-456-4444

Canada - Alberta
2876 Sunridge Way N.E., Calgary AB T1Y 7H2 • Tel: +1-403-235-8400, Fax: +1-403-248-3550

WORLDWIDE SALES AND SERVICE LOCATIONS:

USA - Houston, Texas
Tel: +1-713-466-4900, Fax: +1-713-849-1924

BRAZIL
Tel: +55 19 2107 4100

CHINA
Beijing / Tel: +86 10 8526 2111, Fax: +86 10 8526 2141
Chengdu / Tel: +86 28 8675 8111, Fax: +86 28-8675 8141
Shanghai / Tel: +86 21 6426 8111, Fax: +86 21 6426 7818

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

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

GERMANY
Tel: +49 21 59 91 36 0, Fax: +49 21 59 91 3639

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

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