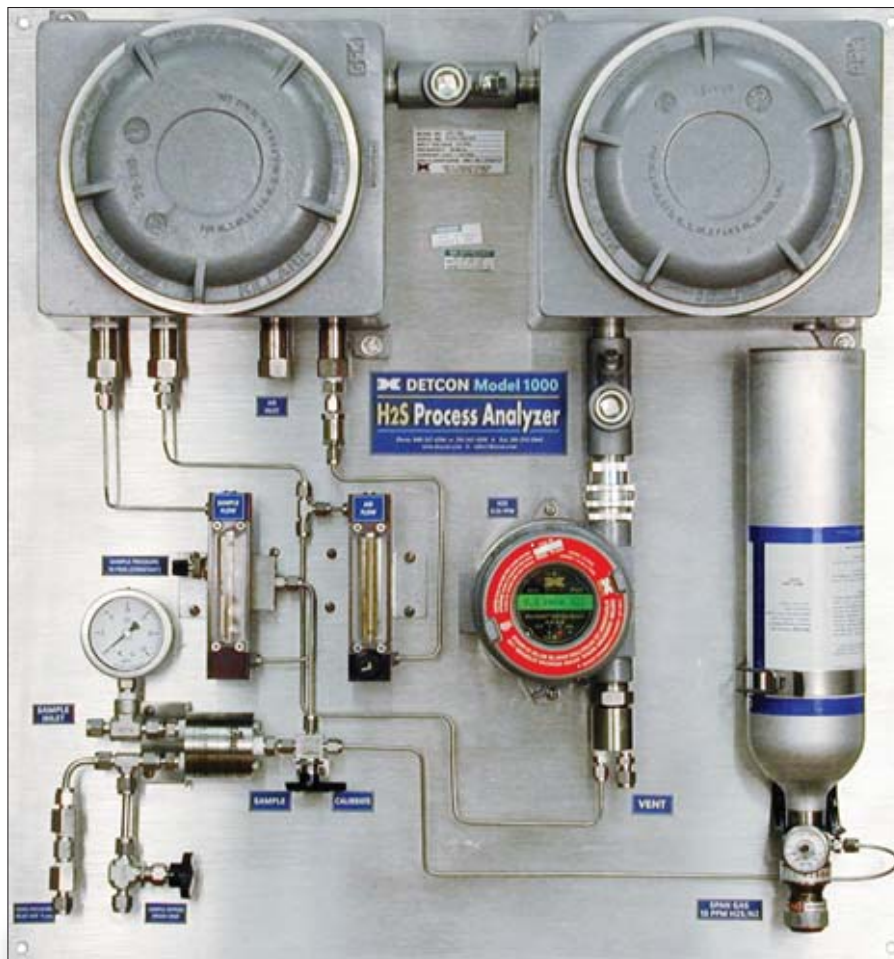


# MODEL 1000 Process Gas Analyzers

For H<sub>2</sub>S, CO<sub>2</sub>, Mercaptans...& beyond



***“Process Gas Analysis for Industrial Applications”***

**ISO 9001:2000 • Certified**

**sales@detcon.com  
www.detcon.com**



**PO Box 8067  
The Woodlands, TX 77387**

**888-367-4286  
281-367-4100  
fax 281-292-2860**

# Product Overview

# Company Overview

**The Detcon Model 1000** family of process analyzers has been designed to provide accurate and continuous measurement of target gas concentrations in all types of process gas streams. Model 1000 analyzers offer the end-user a space-efficient modular design, simple field calibration, and minimal maintenance over a wide variety of target gas applications. The applications flexibility of this analyzer family comes from utilization of a variety of proven sensor technologies. This in turn allows customization according to the needs of the process.

In the Model 1000, Detcon's long history of gas monitoring sensor research and manufacturing is combined with a field-tested pedigree in sample systems design and operation. The result is a simple and economical, yet powerful analytical tool offering capabilities equivalent to those of analyzer technologies costing many times more.

**Detcon Inc.** has manufactured high quality ambient air gas sensors and control electronics equipment since its inception in 1985. It has historically been recognized for its rugged modular designs, unparalleled warranty/service policies, and its applications expertise in matching gas sensor technology to industrial applications.

Detcon provides detailed engineering review of all potential gas analysis applications to assure that the correct gas sensor technology is selected and properly packaged. Success in process gas analysis is heavily dependent on proper sample conditioning techniques. Our applications engineering expertise is available to provide turnkey sample conditioning packages or to assist the customer in their own design.

Detcon's ISO 9001 Quality System controls the design and manufacture of each Model 1000 analyzer delivered. An extensive quality checkout procedure includes a 5 day burn-in test and factory calibration to NIST traceable gas standards. Each Model 1000 Process Analyzer arrives on-site ready to measure.

## Model 1000 Process Analyzer Applications

### Natural Gas Pipelines

- ▶ H<sub>2</sub>S content to specification
- ▶ CO<sub>2</sub> content to specification
- ▶ Mercaptan content and additive injection control
- ▶ Custody transfer quality control

### Natural Gas Production

- ▶ Well Testing
- ▶ H<sub>2</sub>S and CO<sub>2</sub> content to specification
- ▶ Gas transfer corrosion control

### Amine and Caustic Treaters

- ▶ H<sub>2</sub>S removal efficiency (inlet/outlet)
- ▶ H<sub>2</sub>S to final specifications

### Plant Process Gas Streams

- ▶ Plant recycle gas quality control
- ▶ Scrubber / absorber H<sub>2</sub>S removal efficiency
- ▶ Content of Chlorine, Ammonia, SO<sub>2</sub>, NO<sub>x</sub>, & other toxics

### Environmental Monitoring

- ▶ Food storage and handling areas
- ▶ Stack gas / flue gas emissions

### Pulp and Paper Processing

- ▶ H<sub>2</sub>S content

## Sensor Technologies Employed



### Metal Oxide Semiconductor

- ▶ Highly accurate H<sub>2</sub>S measurement
- ▶ Ranges from 2 PPM up to 10,000 PPM H<sub>2</sub>S
- ▶ Extremely rugged / very long service life
- ▶ Field replaceable
- ▶ Warranties up to 10 years



### Electrochemical (Toxic Gases)

- ▶ Highest measurement accuracy and repeatability
- ▶ Effective for monitoring a broad range of toxic gases
- ▶ Field replaceable
- ▶ Excellent portable application characteristics



### Non-Dispersive Infrared (NDIR)

- ▶ Highly accurate CO<sub>2</sub> and combustible hydrocarbon gas measurement
- ▶ CO<sub>2</sub> ranges from 3,000 PPM up to 100%
- ▶ Extremely rugged / very long service life
- ▶ Field replaceable
- ▶ Warranties up to 5 years

# Primary Features

# Design Approach

- ▶ Continuous measurement with superior uptime
- ▶ Simple to operate
- ▶ Calibration maintenance only
- ▶ Low cost of ownership
- ▶ No hazardous waste disposal
- ▶ Sample gas upset protection standard
- ▶ Standard outputs:  
4-20mA, RS-485, and 3 relays
- ▶ Class I, Div. 1, Groups C, D rated

**The Model 1000** design is based on three factors: High accuracy, simple field serviceability, and fail-safe operation.

**Accuracy:** Detcon's field proven MicroSafe™ sensor technologies have been combined with high-precision gas conditioning and flow control components to achieve accurate and repeatable measurement.

**Servicability:** The Model 1000 uses a very simple and accessible modular design. All components are assembled on a flat panel following a simple flow pattern, making easy work of service and trouble-shooting.

**Fail-safe Operation:** All Model 1000s are equipped with liquid-rejection membrane filters and over-pressure relief protection. Flow fault detection and alarms are available as options. The entire assembly is both explosion proof and weatherproof.

## "Anatomy of a Model 1000"

### X-Proof Housing

- ▶ Continuous service air pump
- ▶ Optional low flow fault alarms
- ▶ Activated carbon scrubber

### X-Proof Housing

- ▶ 24 VDC power supply
- ▶ Wire terminal PCB

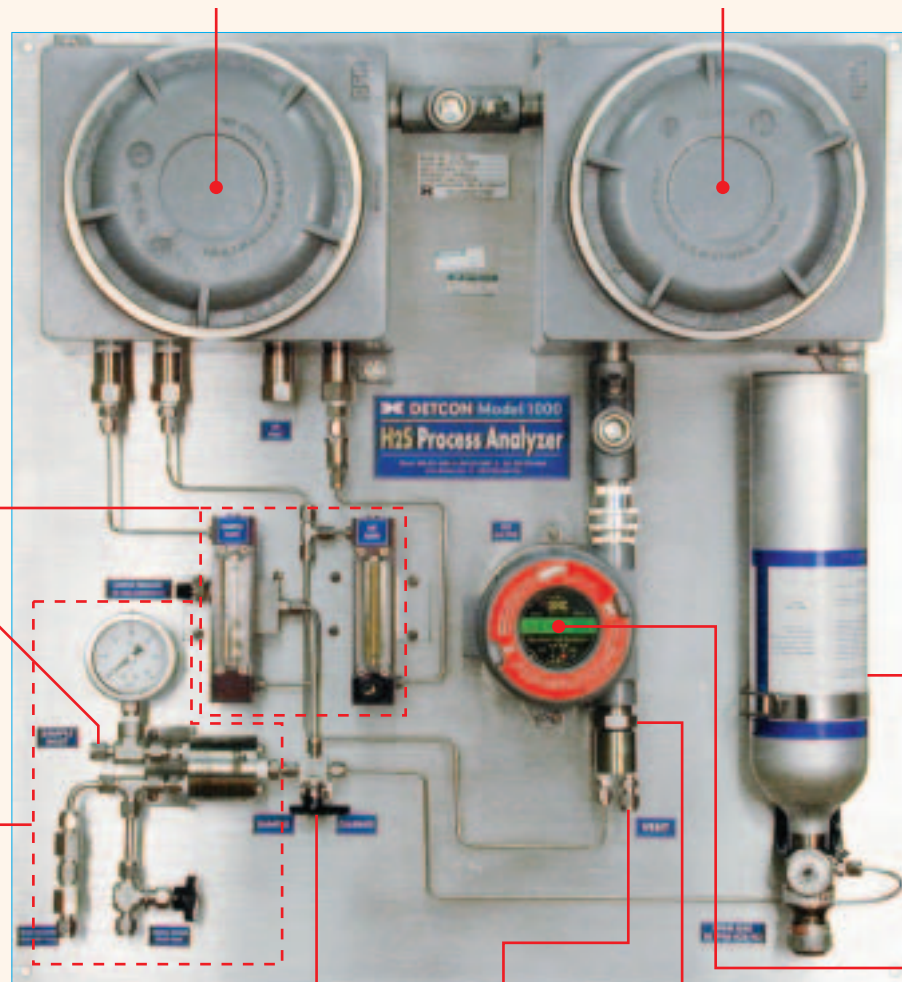
### Sample & Air Control

- ▶ Mass flow controller & rotameter for sample
- ▶ Rotameter with flow valve for air

- ▶ Sample Inlet (10 psig dry sample)

### Sample Pre-Conditioning

- ▶ Pressure gauge
- ▶ Liquid rejection filter
- ▶ Over-pressure relief valve
- ▶ Sample bypass valve



- ▶ Customer I/O connections

- ▶ Optional NEMA 4X enclosure

- ▶ On board calibration gas with fixed flow regulator

- ▶ Local Display

- ▶ Manual calibration span/sample valve

- ▶ Analyzer vent

- ▶ Sensor Housing

# Model 1000-H2S • Hydrogen Sulfide • Process Analyzer

## Applications

- ▶ Natural Gas Pipelines
- ▶ Custodial Transfer Checking
- ▶ Natural Gas Production
- ▶ Amine and Caustic Treaters
- ▶ Catalyst Protection
- ▶ Scrubber Efficiency
- ▶ Tail Gas Lines
- ▶ Sulfur Recovery Units
- ▶ Reformer Cycle Gas
- ▶ Environmental Monitoring

## Specifications

### Sensor Type

Solid State Metal Oxide Semiconductor

### Measurement Range

0-10 ppm up to 0-10,000ppm  
Other ranges available on request

### Accuracy/Repeatability

±10% of reading  
or ±2.5% of range  
whichever is greater

### Response/Clearing Time

T50 <90 seconds  
T80 <4 minutes  
Max output to over-range gas: <10 seconds

### Operating Temperature Range

-40°F to +167°F; -40°C to +75°C

### Operating Pressure Requirements

Inlet: 10 ±2 psig  
Vent: Atmospheric ±1 psig

### Outputs

Linear 4-20 mA DC  
RS-485 Modbus™  
3 Relays (alarm 1, alarm 2, & fault)  
Contacts rated 5 amps

### Power Input

117/220 VAC  
22-24 VDC

### Electrical Classification

Explosion proof  
Class 1, Division 1, Groups C, D

### Sensor Life/Warranty

Sensor: 10 year conditional warranty  
Transmitter: 2 year warranty

### Analyzer Weight

80 lbs.

### Shipping Weight

140 lbs

### Dimensions

29" x 29" x 8"



## Description

Detcon Model series 1000-H2S process analyzers provide continuous, real-time measurement of H2S concentrations in natural gas pipelines, tail gas lines, SRU overhead gas lines, as well as other applications. Available ranges are from 0-10 ppm up to 0-10,000 ppm (1%). Other ranges are available on request. The system can be provided with on-board manual calibration. The design employs Detcon's proprietary solid state MOS sensor element with a ten-year conditional warranty. The analyzer features a microprocessor-based signal-conditioning transmitter with local digital display, fault supervision, calibration mode indicator, alarm relays and an RS-485 serial port. The instrument package is rated for use in electrically classified areas: Class I; Division 1; Groups C, and D. Line power, battery and solar powered models are available.

**NOTE:** Sample conditioning requirements are handled separately.

# Model 1000-CO2 • Carbon Dioxide • Process Analyzer

## Specifications

### Sensor Type

Non-dispersive Infrared

### Measurement Range

0-0.3/1.0/3.0/5.0%/20%/50%

Higher ranges available on request

### Accuracy/Repeatability

The greater of:  $\pm 10\%$  of reading  
or  $\pm 2.5\%$  of range

### Response/Clearing Time

T50 <30 seconds, T80 <60 seconds

### Operating Temperature Range

-40°F to +167°F; -40°C to +75°C

### Operating Pressure Requirements

Inlet: 10  $\pm 2$  psig

Vent: Atmospheric  $\pm 1$  psig

### Outputs

Linear 4-20 mA DC, RS-485 Modbus™

3 Relays (alarm 1, alarm 2, & fault)

Contacts rated 5 amps

### Power Input

117/220 VAC, 22-24 VDC

### Electrical Classification

Explosion proof

Class I, Division 1, Groups C, D

### Sensor Life/Warranty

Sensor: 5 year conditional warranty

Transmitter: 2 year warranty

### Analyzer Weight

80 lbs.

### Shipping Weight

140 lbs

### Dimensions

29" x 29" x 8"

**NOTE:** Sample conditioning requirements are handled separately.

## Applications

- ▶ CO2 Measurement in Natural Gas
- ▶ Custodial Transfer Checking
- ▶ Natural Gas Production

## Description

Detcon Model 1000-CO2 process analyzers provide continuous, real-time measurement of CO2 concentrations in natural gas pipelines, gas treating plants, SRU overhead gas lines, as well as other applications. Available ranges are from 0-3,000 ppm up to 0-50%. The system can be provided with optional on-board manual calibration. This design employs Detcon's sub-miniature NDIR optical sensor element with a five-year conditional warranty. The analyzer features a microprocessor-based signal-conditioning transmitter with local digital display, fault supervision, calibration mode indicator, alarm relays and an RS-485 serial port. The instrument package is rated for use in electrically classified areas: Class I; Division 1; Groups C, and D. Line power, battery and solar powered models are available.



(0-20% Range Pictured Above)

# Model 1000 Dual • H2S/CO2 • Process Analyzer

## Specifications

### Sensor Type

Solid state MOS for H2S

Non-dispersive Infrared for CO2

### Measurement Range

0-10 ppm up to 0-10,000 ppm for H2S

0-0.3/1.0/3.0/5.0%/20% for CO2

Higher ranges available on request

### Accuracy/Repeatability

The greater of:  $\pm 10\%$  of reading  
or  $\pm 2.5\%$  of range

### Response/Clearing Time

T50 <90 seconds, T80 <4 minutes for H2S

Max output to over-range gas: <10 seconds

T50 <30 seconds, T80 <60 seconds for CO2

### Operating Temperature Range

-40°F to +167°F; -40°C to +75°C

### Operating Pressure Requirements

Inlet: 10  $\pm 2$  psig

Vent: Atmospheric  $\pm 1$  psig

### Outputs

Linear 4-20 mA DC, RS-485 Modbus™

3 Relays (alarm 1, alarm 2, & fault)

Contacts rated 5 amps

### Power Input

117/220 VAC, 22-24 VDC

### Electrical Classification

Explosion proof

Class I, Division 1, Groups C, D

### Sensor Life/Warranty

Sensor: 10 year H2S, 5 year CO2 conditional

Transmitter: 2 year warranty

### Analyzer Weight

80 lbs.

### Shipping Weight

140 lbs

### Dimensions

29" x 29" x 8"

**NOTE:** Sample conditioning requirements are handled separately.

## Applications

- ▶ Natural Gas Pipelines
- ▶ Custodial Transfer Checking
- ▶ Natural Gas Production
- ▶ Amine and Caustic Treaters

## Description

Detcon Model 1000-H2S/CO2 dual process analyzers provide simultaneous and continuous measurement of both H2S and CO2 concentrations. Available ranges for H2S are from 0-10 ppm up to 0-10,000 ppm. Available ranges for CO2 are from 0-0.3% up to 0-20%. CO2 detection is made using Detcon's sub-miniature NDIR optical sensor element with a five-year conditional warranty. H2S detection is made using Detcon's proprietary solid-state MOS H2S sensor element with a 10-year conditional warranty. The analyzer features a microprocessor-based signal-conditioning transmitters with local digital display, fault supervision, calibration mode indicator, alarm relays and an RS-485 serial port. The instrument package is rated for use in electrically classified areas: Class I; Division 1; Groups C, and D. Line power, battery and solar powered models are available.



# Other Model 1000 Analyzers Available

- ▶ **Mercaptan Analyzer**
- ▶ **H2S/Mercaptan (simultaneous) Analyzer**
- ▶ **Ethylene Analyzer**

**Detcon Research & Engineering** continues to expand the Model 1000 product offerings. Consult the Detcon Sales team to discuss your individual process analyzer application requirements.

## Sample Conditioning

**Model 1000** Process Analyzers require a  $10 \pm 2$  psig dry sample gas. Every Model 1000 Analyzer has standard built-in protection against condensed liquids and over-pressurization. Also standard is a bypass valve for fast-loop sampling. In some applications, these standard features are not enough to provide a properly conditioned gas sample. In these cases, external gas sample conditioning components are required. These components and their associated packaging can be provided by the customer using technical guidance from Detcon. However, Detcon also provides turn-key sampling system design services. Sample conditioning components include but are not limited to:

- ▶ **Pressure Regulators**
- ▶ **In-situ Pipeline Sample Probe Membrane Filters**
- ▶ **In-line Membrane Filters**
- ▶ **Nafion Membrane H2O Dryers**
- ▶ **Heat Tracing Tape and Controllers**
- ▶ **Ex-Proof Sample Pressure Boosting Pump**
- ▶ **Coalescing Filters with Drains**
- ▶ **Drip Pots**
- ▶ **Multi-streaming Valves**

## Options and Accessories

- ▶ **Nema 4 Weather-Proof Enclosure**
- ▶ **Nema 4 Stainless Steel Enclosure**
- ▶ **Analyzer Mounting Stands**
- ▶ **Low Flow Alarm Relays**
- ▶ **On-Board Manual Calibration**
- ▶ **Calibration Gas & Accessories**
- ▶ **Solar/Battery Power**
- ▶ **Wireless Communications**
- ▶ **Datalogging Software**

## Ordering Information

The **Detcon** Analyzer "Application Data Sheet" must be filled out and submitted for applications engineering review. This process assures that each customer's application will be matched up with the appropriate Model 1000 Analyzer. The Analyzer "Application Data Sheet" can be requested from Detcon or accessed online at [www.detcon.com](http://www.detcon.com) on the Process Analyzer page.

## Dimensions/Mounting Detail

