

# 542 Programmable Gas Analyzer

**illinois**  
instruments

Capable of measuring almost any combination of gases; hydrogen, helium, oxygen, carbon dioxide, methane, carbon monoxide, argon, nitrogen and many others.



## Applications

Gas Mixing	Welding Gases	Heat Treatment Atmospheres
Hydrogen/Helium Purity	Food Packaging Gases	

## Features & Benefits

- Programmable for different gases
- Built-in linearization
- Fast response
- Excellent stability
- Built-in alarms and analog outputs
- Diagnostics
- Insensitive to sample flow
- Computer communications
- Autoranging electronics
- Built-in auto-calibration

The 542 is a versatile, programmable gas analyzer, based on the principles of thermal conductivity, capable of measuring almost any combination of gases. The instrument is especially suitable for measurements of mixtures containing hydrogen or helium.

With the use of sensitive floating circuits, the thermal conductivity analyzer can detect gases down to parts per million levels and up to full concentration. The analyzer is pre-programmed for a wide range of sample and reference gases, easily selectable from the simple front panel menu.

Calibration settings, for each combination of gases used, are stored in an internal memory and are recalled automatically every time a particular gas mix is required. This enables quick and easy switching between gas combinations.

Sophisticated microprocessor electronics enable the fastest possible response time, excellent stability and flexibility. Sample pressure and flow are internally controlled allowing connection to a wide range of pressurised samples. Automatic calibration is included as standard, when the instrument can be set to perform a zero and span calibration at timed intervals.

## Principle of Operation

All gases conduct heat at a specific rate, known as the thermal conductivity of the gas. Matched pairs of heated filaments are installed in a large thermal mass detection block, one set in the stable reference gas and the other in the measured sample gas.

Each of these detectors form part of a Wheatstone Bridge powered by a constant current source.

When the measured gas concentration changes, the sample detector will detect a change in the thermal conductivity and will cause an imbalance in the Wheatstone Bridge, resulting in a signal output proportional to the change in gas concentration. The signal is processed by state of the art digital electronics and the results shown on a high resolution digital LED display.

## Technical Specifications

Ranges	Dependent on selected gas mix. Adjustable, auto-ranging. Typical: 0-1000ppm (H <sub>2</sub> in N <sub>2</sub> ) 98-100% (O <sub>2</sub> in Ar)
Resolution	0.5% or better
Accuracy	± 2%
Response Time	90% of reading in 20 seconds
Calibration Range	0-100% of selected measure gas. Automatic timed calibration as standard. Auto zero.
Measuring Cell Type	Thermal conductivity/katherometer, ultra stable
Alarms	Two adjustable alarms with volt-free, change-over contacts Fully configurable over complete range. Contact rating 10A at 240V ac/30V dc
Analog Outputs	0-10V, 4-20mA (0-20mA) isolated. Max loop resistance 500 Ohms
Serial Interface	Allows connection to a computer

### Operating Conditions

Sample Inlet Pressure	1.0 to 7.0 Barg
Sample Flow Rate	Internally controlled (max 250ml/min)
Sample temperature	14 to 104°F (-10 to 40°C)
Ambient Temperature	23 to 122°F (-5 to 50°C)
Sample Connections	1/8" OD compression fittings (others on request)
Unsuitable gases	Corrosive gases (contact factory for alternatives)

### Power Requirements

Power Supply	230/115V ± 10%, 50/60Hz at 40VA
Display Type	4 digit high visibility LED and 12 digit alphanumeric

### Cabinetry and Mounting

Enclosure	Sheet steel
Installation	Bench or panel mounting
Dimensions	21.06W x 6.5H x 11.81D (inches) panel cutout 17.52W x 5.22D (inches)
Weight	26.4 lbs
Ingress Protection	IP40

### Options

Sample Gas Pump	Externally mounted
IP55 Enclosure	
Sealed Reference Gas	Dependent on application and range (contact factory for options)
Corrosive Gases	Contact Illinois for information on alternative options.

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