



MODEL 6900 9 RANGE GAS MIXTURE ANALYZER



APPLICATION

The Model 6900 is designed for the measurement of gas mixtures produced in the industrial gas industry. The analyzer is designed to quickly (3 to 5 minutes) analyze a gas cylinder, without the use of calibration standards, wet chemicals, or special knowledge of gas analysis instrumentation. The analyzer is designed so that it may be used directly in the cylinder filling environment.

The analyzer may also be used to check gas mixing systems in the field. If desired, the analyzer may be ran continuously as an on-stream analyzer. A linear 4-20 mA output is available on all ranges.

The analyzer uses Thermco's patented* thermal conductivity detector/microprocessor technology to directly read-out numerous mixtures created for the welding, heat treating, and food packaging industries.

The analyzer contains 9 ranges, which are selected with the pushbuttons on the front of the analyzer. All 9 ranges are factory calibrated. A custom range for calibration by the user is also available.

COMMON MIXTURES MEASURED

| RANGE | MIXTURE EXAMPLE | APPLICATION |
|--|--|--|
| 0-100% CO ₂ in Ar | 5% CO ₂ in Ar 25% CO ₂ in Ar | MIG shield gas MIG shield gas |
| 0-100% O ₂ in Ar | 5% O ₂ in Ar | MIG shield gas |
| 0-100% He in Ar | 25% He in Ar | MIG, TIG shield gas |
| 0-100% He in Ar | 75% He in Ar | MIG shield gas |
| 0-100% H ₂ in Ar | 5% H ₂ in Ar 35% H ₂ in Ar | Plasma Cutting, Welding Plasma Cutting, Welding |
| 0-100% N ₂ in Ar | 10% N ₂ in Ar | Lamp Filling |
| 0-100% CO ₂ in N ₂ | 30% CO ₂ in N ₂ | Food Packaging |
| 0-100% O ₂ in N ₂ | 5% O ₂ in N ₂ | Special Atmosphere |
| 0-100% He in N ₂ | 10% He in N ₂ | Leak Detection |
| 0-100% H ₂ in N ₂ | 10% H ₂ in N ₂ 75% H ₂ in N ₂ | Furnace Atmosphere Furnace Atmosphere |

SPECIFICATIONS

RANGES

0-100% Carbon Dioxide in Argon
0-100% Oxygen in Argon
0-100% Helium in Argon
0-100% Hydrogen in Argon
0-100% Nitrogen in Argon
0-100% Carbon Dioxide in Nitrogen
0-100% Oxygen in Nitrogen
0-100% Helium in Nitrogen
0-100% Hydrogen in Nitrogen
Custom Range

ACCURACY, valid over 50°F to 90°F (10°C to 32°C) ambient temperature conditions.

± 0.3% of minor component over range of 0-10.0%, all ranges.
Example: for a 5% O₂ in Ar mixture, the analysis will be between 4.7 and 5.3% O₂.

±0.5% of minor component over a range of 10.1% to 30.0%, all ranges.
Example: for a 25% CO₂ in Ar mixture, the analysis will be between 24.5% and 25.5% CO₂.

±1% of minor component over a range of 30.1% to 60.0%, all ranges.
Example: for a 50% CO₂ in N₂ mixture, the analysis will be between 49.0% and 51.0% CO₂.

±2% of minor component over a range of 60.1% to 100.0%, all ranges, except CO₂ in Ar, which has an accuracy of ±8%.
Example: for a 75% He in Ar mixture, the analysis will be between 73.0% and 77.0% He.

MINIMUM/MAXIMUM OPERATING TEMP.

40°F to 100°F (4°C to 38°C)

RESOLUTION

0.1%

RESPONSE TIME

95% in 45 seconds for typical gas mixtures

UTILITIES REQUIRED

Reference Gas: Commercial grade argon or nitrogen (depending upon the base gas in range used) is required to flow continuously at 0.5 SCFH during analysis.

Sample Gas: Moisture and oil free sample gas is required to flow continuously at 1.0 SCFH during analysis.

Sample, reference gas pressure: 1-100 PSIG
Power: 115 VAC, 60 Hz., 1 Amp (220 VAC, 50/60 Hz. optional)

FREQUENCY OF CALIBRATION

Calibration is recommended once per year when used under spot checking conditions; if run continuously will depend on conditions and range.

WARM UP TIME

8 minutes under room temperature conditions

PHYSICAL SPECIFICATIONS

Size: 9" High, 11" Wide, 14" Deep (23 cm x 28 cm x 35.5 cm),
Weight: 22 lbs. (10 kg)

ALTITUDE

Sea level to 2000 ft. (Altitude above 2000 ft. will cause some inaccuracy; consult the factory)

ANALYZER OUTPUTS

Current: 4-20 mA, proportional to gas analysis range selected (available on all ranges). The 4-20 mA resolution equals display resolution of 0.1% gas analysis.

PRINCIPLES OF OPERATION

Each gas has the ability to conduct heat at a specific rate. This is known as the thermal conductivity of the gas. This property is utilized in the Thermco thermal conductivity detector. Heated metal filaments are exposed to the zero and sample gases. The amount of heat carried away by the gases changes the rate of cooling of the wire filament and, therefore, its temperature. This temperature change causes a resistance change. Since the filaments are arranged in a Wheatstone bridge, the resistance change can be converted to an electrical current that is read out on a meter.

Traditionally, a drawback to using the thermal conductivity method has been the non-linear signal created from virtually all binary gas mixtures. The user had to refer to a curve in order to correct for the non-linearity. The Model 6900 is a significant improvement in the technology of handling the signal from the thermal conductivity detector. The unique curves generated by the 9 binary gas pairs are each programmed at the factory into the microprocessor in the Model 6900. The user selects the range of interest from the front panel of the analyzer, and the analyzer is able to read out directly in the percent gas analysis for that particular gas mixture.

The calibration stability of the Model 6900 analyzer is exceptional, especially compared to infrared type or chemical cell type gas analyzers which may require recalibration on a daily basis. It is recommended that the calibration be checked once per year, if used on a spot checking basis.

CUSTOM RANGE

The user may encounter a gas mixture pair other than the nine standard ranges built into the analyzer. In this case, the user may perform an analysis by inputting his own calibration data into the analyzer. This can be accomplished by utilizing the pushbuttons on the front meter. Guidance is available from the factory concerning the thermal conductivity response of a wide variety of gas pairs.

3 GAS MIXTURES

Although the Model 6900 is not normally intended to measure a 3 part mixture, mixtures of Ar/CO₂/O₂ may be approximately measured if the user knows the oxygen level in the mix. Contact Thermco for details.

SERVICE

Thermco has been providing service for their analyzers since 1951. The Thermco repair department can normally complete repairs in two weeks.

NOTICE

The Model 6900 is not intended to measure oxygen/nitrogen mixtures for breathing air, oxygen purity, or other medical applications.

The Model 6900 is not designed to be used with toxic gases or gases corrosive to brass or nylon.

ACCESSORIES SUPPLIED

Along with the analyzer are supplied two 10 ft. lengths of tubing to run from the ports on the Model 6900 to cylinder regulators.

ORDERING INFORMATION

Orders may be placed through many local industrial gas suppliers. Orders may also be placed directly with the Thermco factory.

In the interest of continued product improvement, Thermco reserves the right to change design features without prior notice.

Sale of this equipment is under the terms of the Thermco warranty available on request.