



INSTRUMENT CORPORATION

THERMAL CONDUCTIVITY GAS ANALYZER

Model
7010
wall
mounted
analyzer
with
optional
alarm
package



Model
7000
panel
mounted
analyzer



APPLICATIONS

The continuous thermal conductivity analyzer has wide application in industry where it is desirable to analyze a two gas mixture. The thermal conductivity method is very stable in regards to span and zero drift. Applications include welding shield gas mixtures, food packaging mixtures, leak detection mixtures and heat treating atmospheres.

FEATURES

- rugged Thermco TC detector cell
- user programmable ranges with automatic linearization (digital models)
- built-in flow controls
- choice of panel or wall mount style

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 available as an output signal.

The digital versions of the analyzer contain a linearizer which allows for a digital readout and a 4-20 mA signal output.

TC GAS ANALYSIS AND THERMCO

Thermco has been manufacturing thermal conductivity gas analyzers since the establishment of Thermco in 1951. The complete process of manufacturing, starting with the production of the cell filaments, is performed at our factory in LaPorte, Indiana, U.S.A. Each step of the manufacturing process is planned to produce an analyzer that is rugged and highly accurate. Thermco detector cells are designed not to "burnout" under conditions where there is no gas flow through the cell. Analyzers which have been functioning for over 20 years without replacement of any major parts is common.

COMMON MIXTURES MEASURED

RANGE	MIXTURE EXAMPLE	APPLICATION
0-50% CO ₂ in Ar	5% CO ₂ in Ar	MIG shield gas
	25% CO ₂ in Ar	MIG shield gas
0-10 % O ₂ in Ar	5% O ₂ in Ar	MIG shield gas
0-50% He in Ar	25% He in Ar	MIG shield gas
0-100% He in Ar	75% He in Ar	MIG shield gas
0-50% CO ₂ in N ₂	30% CO ₂ in N ₂	food packaging
0-100% O ₂ in CO ₂	80% O ₂ in CO ₂	food packaging
0-20% H ₂ in N ₂	10% H ₂ in N ₂	furnace atmosphere
0-100% H ₂ in N ₂	75% H ₂ in N ₂	furnace atmosphere
0-50% N ₂ in Ar	8% N ₂ in Ar	lamp filling
	20% N ₂ in Ar	lamp filling
0-50% He in N ₂	25% He in N ₂	leak detection

SPECIFICATIONS

RANGE: Many ranges are available. Some common ranges are shown on reverse side. Consult the Thermco sales engineer for details.

ACCURACY:

- ±0.3% of minor component absolute over range of 0-10%, all ranges.
- ±0.5% of minor component absolute over a range of 10.1% to 30.0% all ranges.
- ±1.0% of minor component absolute over a range of 30.1% to 60.0% all ranges.
- ±2.0% of minor component absolute over a range of 60.1% to 100.0% all ranges except CO₂ in Ar, which has an accuracy of ±8%.

Example: For a 25% CO₂ in Ar mixture, the analysis will be between 24.5 and 25.5% CO₂.

This accuracy is valid over a temperature range of 50° to 90°F (10° to 32°C).

RESOLUTION: 0.1% for digital meter.

RESPONSE TIME: 95% in 45 seconds for typical gas mixtures.

MAXIMUM DRIFT: Zero, ±2% of full range per week; span, ±1% of full range per month. This applies to typical ranges.

FREQUENCY OF CALIBRATION: Calibration is recommended once per year when used under typical conditions.

AMBIENT TEMPERATURE LIMITS: -10°F to 110°F (-23°C to 43°C).

UTILITIES REQUIRED:

Reference gas: The background gas in the mixture is required to flow continuously at 0.5 SCFH. This should be a clean, dry, oil free gas. Gas pressure required is 1-150 PSIG.

Sample gas: The sample gas is required to flow continuously at 1.0 SCFH. This should be a clean, dry, oil free gas. Gas pressure required is 1-150 PSIG, except gases containing H₂ are 1-50 PSIG.

Power: 104-126 VAC, 50/60 Hz. 1 ampere standard; 204-240 VAC, 50/60 Hz. optional.

OUTPUT SIGNAL: 4-20 mA, proportional to gas analysis range selected. This output is isolated and self-powered with a compliance of 10 VDC. This output is not available on the analog meter versions.

ALARM RELAYS: 2 independent alarm relays, form C, with a rating of 5 amperes@120/240 VAC or 28 VDC (resistive). Alarms are not available on analog models. Note: When the alarm package is specified these alarm relays are utilized in the alarm package circuitry.

ENCLOSURE: Model 7000: General purpose indoor panel mount. Model 7010: NEMA 4 wall mount.

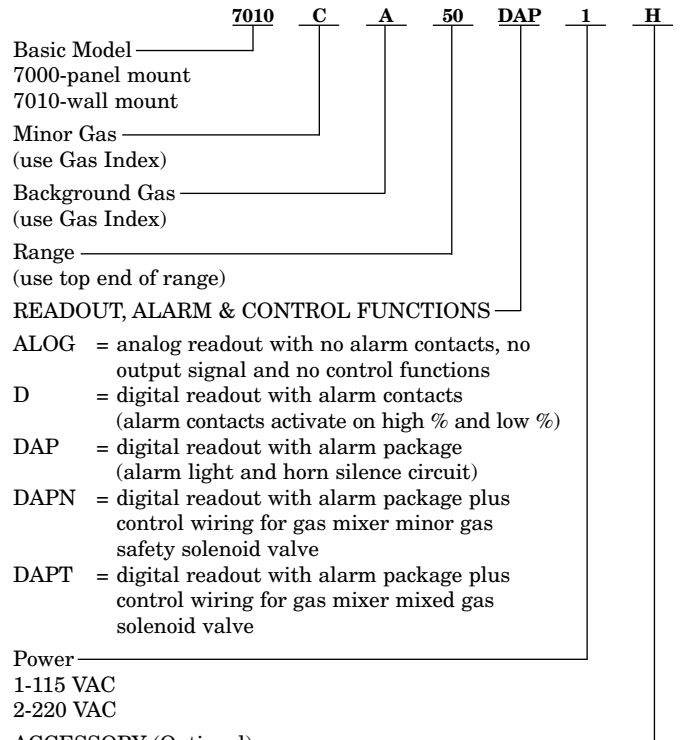
DIMENSIONS/WEIGHT: Model 7000: 15.5" high, 13.6" wide, 10.3" deep (39.4, 34.5, 26.2cm). Model 7010: 15.5" high, 13" wide, 10.3" deep (39.4, 33, 26.2cm). Weight: 44 lb. (20 kg.)

CELL/FILAMENT MATERIAL: Tungsten filaments with brass block and gold plated filament holder.

USER PROGRAMMABLE RANGES:

Linearization data for 6 standard ranges are built into the digital analyzers. These are 0-100% CO₂ in Ar, 0-100% O₂ in Ar, 0-100% He in Ar, 0-100% H₂ in Ar, 0-100% CO₂ in N₂, 0-100% H₂ in N₂. The user may reprogram the analyzer to any of these ranges, except non-H₂ ranges can not be converted to H₂ ranges. Single point recalibration will be required after a range change. The analyzer will be factory calibrated for the range selected. A custom range is available for binary gas mixtures not listed above. Data for the custom range may be programmed into the analyzer by the factory or the user.

MODEL NUMBER SYSTEM



ACCESSORY (Optional)

E-explosion hazard reduction. This is a 5 SCFH purge of N₂ or Ar which is required to purge into the enclosure for analyzers with H₂ in the sample gas.

F-filter (maximum sample pressure is 125 PSIG)

H-horn. The horn is shipped loose to be wired by user to alarm package.

P-pump (required for sample pressures less than 1 PSIG)

Note: All digital models include alarm relays, linearizer, and 4-20 mA signal output. Analog versions are only available for ranges 0-50% CO₂ in Ar and 0-10% O₂ in Ar. Analyzers with H₂ or exothermic gas must be ordered with the "E" option.

Gas Index

A=argon, Ai=air, C=carbon dioxide, E=exothermic gas, H=hydrogen, He=helium, N=nitrogen, O=oxygen, S=sulfur hexafluoride

WARNING

Improper use of this product can cause serious injury or property damage. Personnel dealing with this equipment should read and understand warning labels and instruction manuals provided by Thermco.

NOTICE

In the interest of continued product development, Thermco reserves the right to change design features without prior notice. Sale of this equipment is under the terms of the Thermco warranty available upon request.

ORDERING INFORMATION

Orders may be placed directly with Thermco or through many local gas suppliers. When ordering, please generate the proper model number.