

TELEDYNE ANALYTICAL INSTRUMENTS



MODEL 4020 *Total Hydrocarbon Analyzer*

Teledyne's Model 4020 utilizes a flame ionization detector (FID) for the continuous trace analysis of total hydrocarbons (THC) under a variety of different process conditions. The principle of operation is based on measuring the ion current generated when organic compounds are dissociated in an intense hydrogen flame.

The 4020 is ideal for monitoring hydrocarbon contamination in high purity bulk gases. When coupled with Teledyne's unique separation column, the 4020 is also diverse enough to be applied in hazardous locations for the detection of volatile hydrocarbons in cooling water for process leak detection and environmental compliance.

CONFIGURATION

The 4020 comes standard in a compact, 19" rack configuration. The built-in chassis sliders allow quick access to internal components. The pressure and flow control devices, used to regulate the flow of the support and sample gas streams, are at the front of the unit to simplify operation. Teledyne can also incorporate an optional auto-calibration valving manifold to facilitate the periodic calibration of the unit – an ideal feature for unmanned plant operating conditions.

MICROPROCESSOR BASED CONTROL

Model 4020 comes standard with (3) user programmable ranges, user selectable fixed or automatic range change capabilities, range ID contacts, two concentration output signals (current and voltage), an RS-232C bi-directional

serial interface, two configurable concentration alarms, a system failure alarm and user programmable auto-calibration capabilities. The software allows the user to establish their operating range as low as 0-100 ppb full-scale.

PRINCIPLE OF OPERATION

The heart of the 4020 is Teledyne's field proven flame ionization detector (FID). The sample and support gases are delivered to the FID tower under precisely controlled flow conditions. The sample gas entering the detector is heated in a hydrogen flame, which ionizes the hydrocarbons. The ionized hydrocarbons cause a current to flow between two electrode assemblies strategically placed in the flame path. The current generated under

these conditions is proportional to the concentration of hydrocarbons present in the sample gas. Teledyne's unique, precision electrometer amplifier processes the FID output and, in tandem with our proven electronics platform, provides the operator with meaningful display and concentration output signals under which the process can be properly controlled.

ELECTRONIC FLAME GUARD

Teledyne's "Flame Out" Guard Circuit is a standard safety feature on the 4020. This circuit utilizes a thermistor to continually monitor the condition of the flame within the tower. An indicator light, conveniently mounted on the front panel, confirms flame operation. In the event of a flame out or power failure, the flame guard circuit activates an alarm contact which will automatically close the fuel shut-off valve, thereby preventing potential fuel leaks.

GAS CONTROL SYSTEM

- Unique sintered stainless steel restrictors control the flow of the sample and support gases to provide a stable, reproducible signal.
- Temperature controlled and insulated sample analysis compartment enhances stable performance.
- Bypass regulator provides quick response to process changes and is strategically placed in the sample flow path to eliminate sample contamination issues.



4020 interior

Built for Reliability and Performance

MODEL 4020 TOTAL HYDROCARBON ANALYZER

FEATURES

- User programmable ranges
- Standard auto-calibration programming – ideal for unmanned plant conditions
- Enhanced temperature control of sample compartment for stable, reproducible results
- Electronic Flame Out Guard circuitry
- Stainless steel sample system with flexible design to handle either a 100% H₂, H₂ / N₂, or H₂ / He support gas fuel mixture
- Easily accessible pressure and flow control devices
- Slide out chassis design provides operators with easy access to internal components
- CE marked
- X-purged configurations for hazardous area installations available
- Multiple gas calibration not required
- Optional rear-mounted calibration valves and fuel solenoid for easy maintenance

SPECIFICATIONS

Ranges:	0-10, 0-100, 0-1000 ppm HC standard (CH ₄ equivalent, lower optional ranges available)
Sensitivity:	1% of full scale
Resolution:	10 ppb on 0–1 ppm range
Accuracy:	±2% of full scale at constant temperature
Response time:	90% in less than 15 seconds
Operating temp.:	41 - 110°F
Fuel:	Mixture of 40% hydrogen / 60% nitrogen recommended optional: 100% H ₂ or 40% H ₂ / 60% He (other mixtures possible – contact factory)
Sensor type:	Flame ionization detector with flame guard

APPLICATIONS

- Monitoring the purity of oxygen, argon, nitrogen and other blanketing gases in the manufacture of microcircuits
- Monitoring hydrocarbon contamination in air liquefaction and other gas production processes
- Gas purity certification
- Detecting trace hydrocarbons in ambient air
- Detecting atmospheric pollutants
- Hydrocarbons in cooling tower water for process control leak purposes
- Monitoring for fuel leakage or toxic solvents
- Monitoring hydrocarbons in CO₂ feed streams in the food / beverage industry

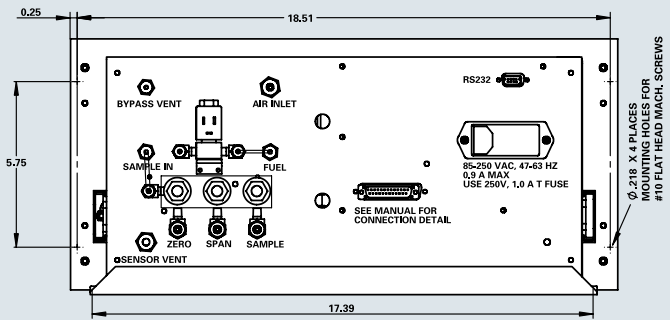
Alarms: 2 adjustable concentration alarm relays rated @ 3A, 250 VAC resistive and a system failure alarm

Max. load impedance: 4-20 mA isolated output 1000 ohms
System power requirements: 115 or 220 VAC, 50 / 60Hz
Max. power consumption: 90 VA
System enclosure: 19" rack mounted steel enclosure
19" W x 8.75" H x 15.5" D
(48.3 cm x 22.2 cm x 39.4 cm)

Validation reports available upon request



Shown with optional auto cal valves



Recommended panel cutout: 17.5" X 8.95" [445 mm X 227 mm]

TELEDYNE ANALYTICAL INSTRUMENTS

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Warranty

Instrument is warranted for 1 year against defects in material or workmanship

NOTE: Specifications and features will vary with application. The above are established and validated during design, but are not to be construed as test criteria for every product. All specifications and features are subject to change without notice.

