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Product Data Sheet
103-HFID
July 1997

Heated Flame Ionization Detection (HFID) Total Hydrocarbon Analyzer Module

- Heated Analyzer Designed to Operate from 200°F to 400°F
- Eliminates Loss of Hydrocarbons Due to Condensation
- Automatic Safety Purge Cycle and Flame Ignition
- Meets NFPA 496 Regulations for Continuous Dilution Purge
- Automatic Burner Fuel Safety Shutoff
- Fast Response – 90% Full-Scale Within 1.5 Seconds
- Remote Control and Automatic Calibration Capabilities
- On-Line Diagnostics

The NGA 2000 Next Generation Analysis Heated Flame Ionization Detection (HFID) Analyzer Module is the industry's first modular heated hydrocarbon analyzer. The HFID is designed to continuously measure total hydrocarbon concentration in sample gas at any user selectable temperature between 200°F and 400°F. The heated module eliminates typical measurement errors associated with the loss of hydrocarbon compounds due to condensation.

The HFID is an extremely versatile instrument due to its ability to accept hot gas sample. Applications such as internal combustion engine emissions (ICEE), ambient air safety monitoring, carbon bed absorber monitoring etc. can all benefit from increased accuracy and simplified sample handling requirements associated with the HFID analyzer module.

The NGA 2000 HFID analyzer module is a self-contained unit, complete with heated detector assembly and associated electronics. The modular design allows for easy system integration, expandability, and enough flexibility to reach well into the next century. The HFID module may be a "stand alone" instrument with the addition of our Input/Output (I/O) Module and Platform or it can be integrated into a sophisticated multicomponent analyzer network. (Please see the NGA 2000 Series brochure for system network capabilities.)

What makes the NGA 2000 Series Analyzer Modules unique are their built-in intelligence and their ability to share that intelligence. Embedded in the NGA 2000 architecture is an advanced digital communication network (LON) which allows interaction between other analyzer modules in the system. The network carries all pertinent analyzer outputs and diagnostic variables to a centralized display panel on the platform or to a remote PC. Because of this distinctive feature, the HFID Analyzer Module may either be incorporated into a panel/rack or it can be placed near the sample source up to a mile away, thereby further reducing sample handling requirements.

FEATURES

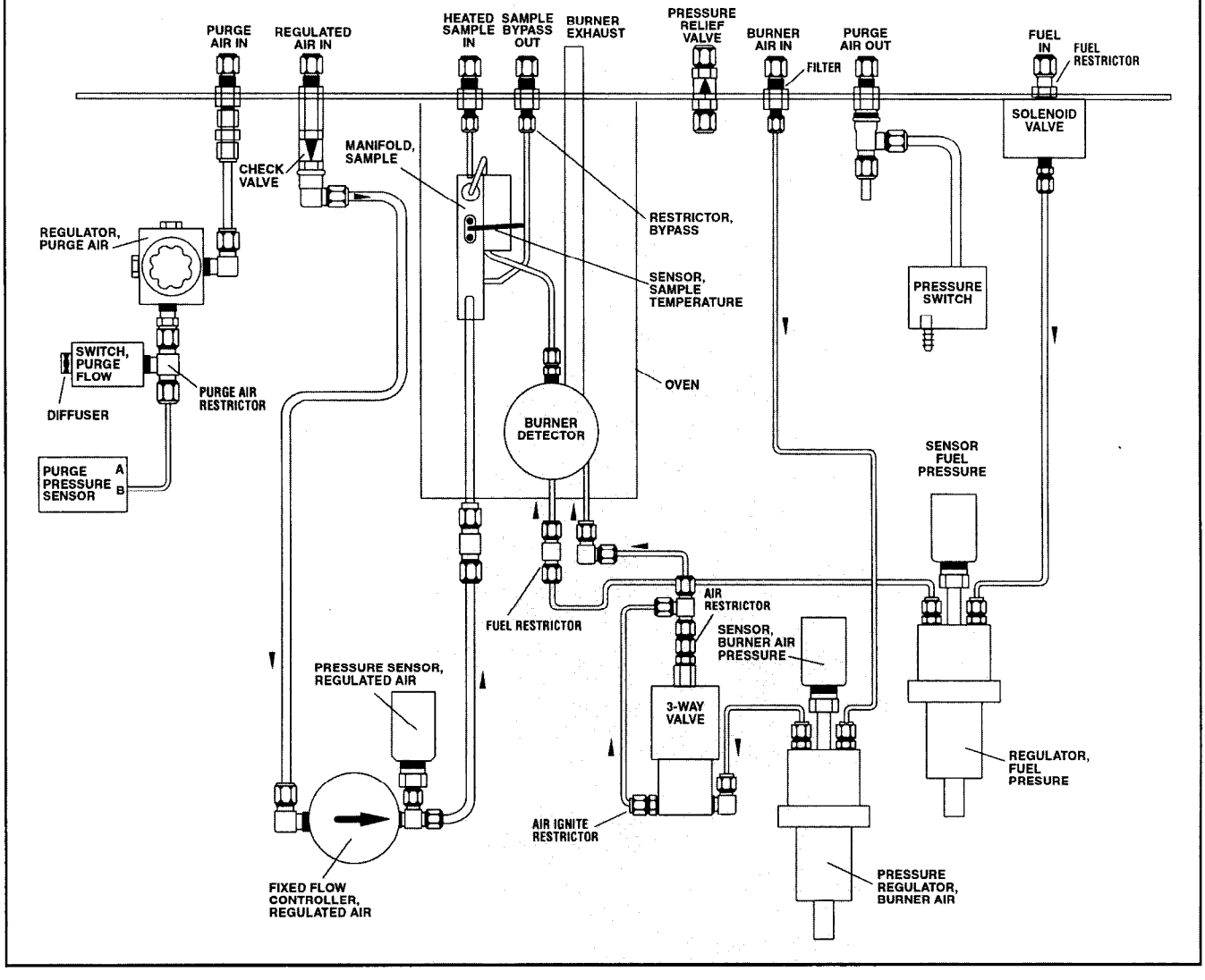
In our continuing effort to improve technology, Rosemount Analytical has integrated our superior flame ionization detection design into a heated analyzer module. In addition, the NGA 2000 HFID Analyzer Module contains a software independent safety design which creates a fully reliable shutdown system for plant and personnel safety. As required by Nationally Recognized Testing Laboratories (NRTL), the HFID is designed to meet NFPA 496 regulations via continuous dilution purge. This entails purging the analyzer with four times its volume prior to flame ignition and includes automatic fuel shutoff due to loss of flame or purge air. The HFID Analyzer Module is therefore truly designed to meet all of your safety requirements.

The NGA 2000 HFID Analyzer Module houses all components in contact with sample gas in an internal oven compartment. Oven temperature is maintained at any user selectable set point between 200°F and 400°F. Therefore, the HFID provides increased measurement accuracy over conventional FID analyzers because the elevated operating temperature prevents hydrocarbon compounds from condensing before they reach the detector.

The HFID Analyzer Module contains performance features as well as diagnostics that put it ahead of the competition via response time, accuracy, ease of service and maintenance. The microprocessor based operation of the NGA 2000 Series provides on-line diagnostics and network communication capabilities which reduce cost through centralized data processing and analyzer maintenance. Diagnostics can be monitored while the analyzer is in service allowing service requirements to be anticipated and downtime minimized.

The analyzer is equipped with four user selectable ranges and auto ranging capability. The analyzer can also be equipped with auto calibration cycle. The digital communication network (LON) allows communication of numerous physical parameters and diagnostic information like oven temperature, flame status, burner air and fuel pressure, safety purge status, etc. between the analyzer and a remote Platform or PC. In addition to network operation, digital I/O's are also available to monitor and control analyzer functions.

FLOW DIAGRAM

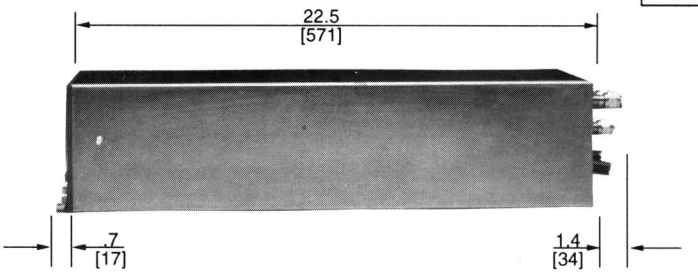


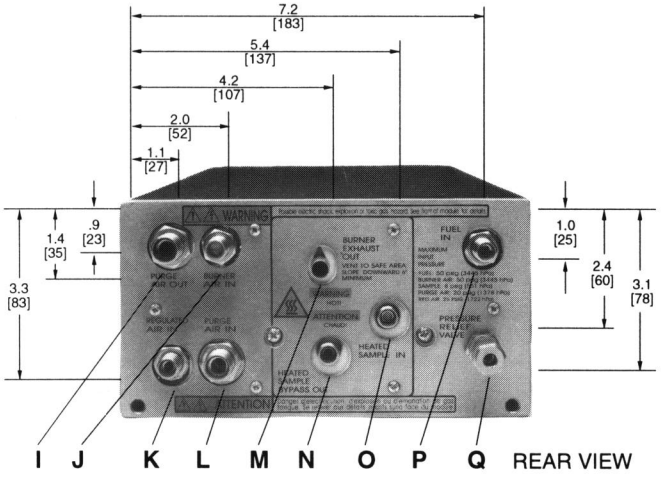
OUTLINE AND MOUNTING DIMENSIONS

A. Network Cable Connection to Platform
B. 24 VDC Power Connection to Platform
C. Fuse
D. Mounting Pins
E. LED Operating Status Indicators
F. Manual Ignition Override Switch
G. Fuel Pressure Adjustment
H. Burner Air Pressure Adjustment
I. Purge Air Out
J. Burner Air In
K. Regulated Air In
L. Purge Air In
M. Burner Exhaust Out
N. Bypass Out
O. Sample In
P. Fuel In
Q. Case Purge Pressure Relief Valve (No Connection)

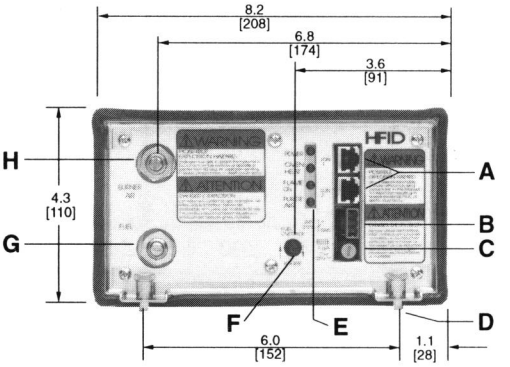
Dimensions: INCHES (MM)

SIDE VIEW

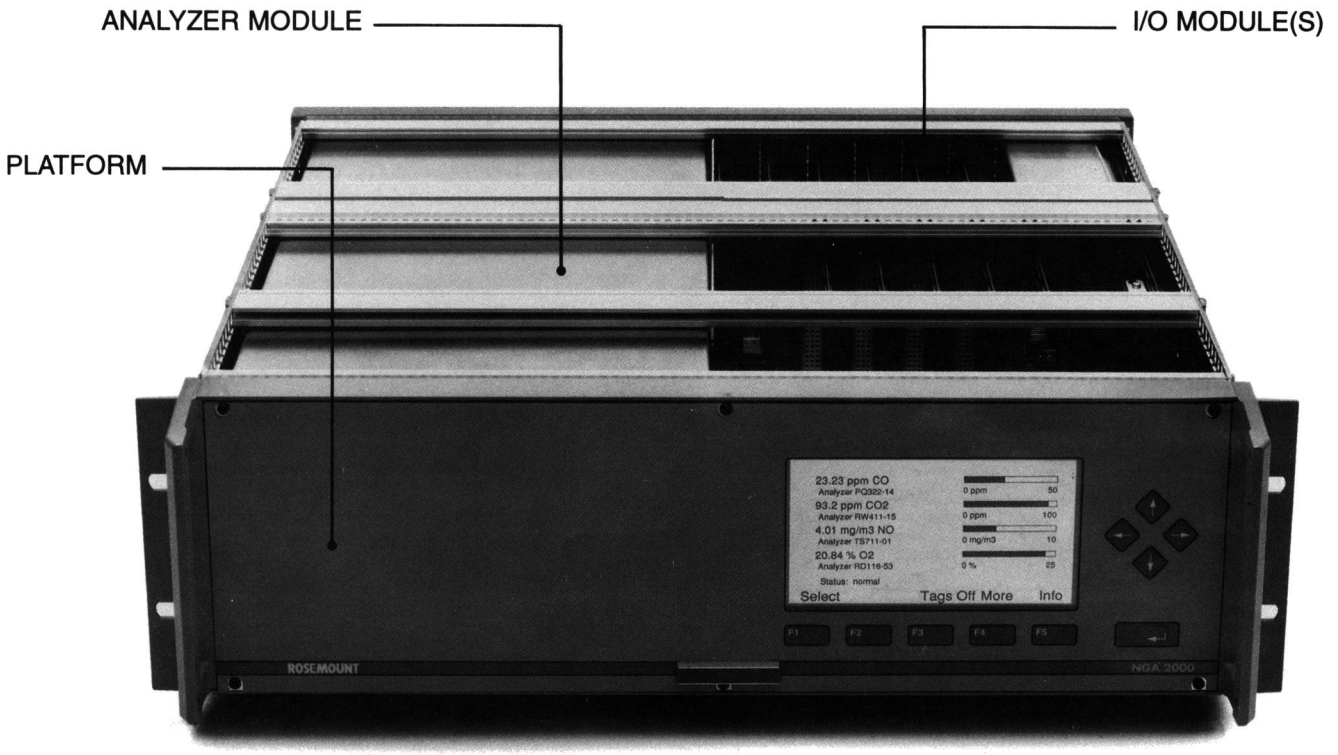




FRONT VIEW



Platform with Internal Analyzer Module Several Analyzer Modules may be integrated with a single Platform, either mounted inside or located externally. (Platform shown here with top removed.) See Platform Bulletin for more details.



PRINCIPLE OF OPERATION

The HFID Analyzer Module uses the flame ionization method of detection. The sensor is a burner in which a regulated flow of sample gas passes through a flame sustained by regulated flows of fuel gas (hydrogen mixture with helium) and air.

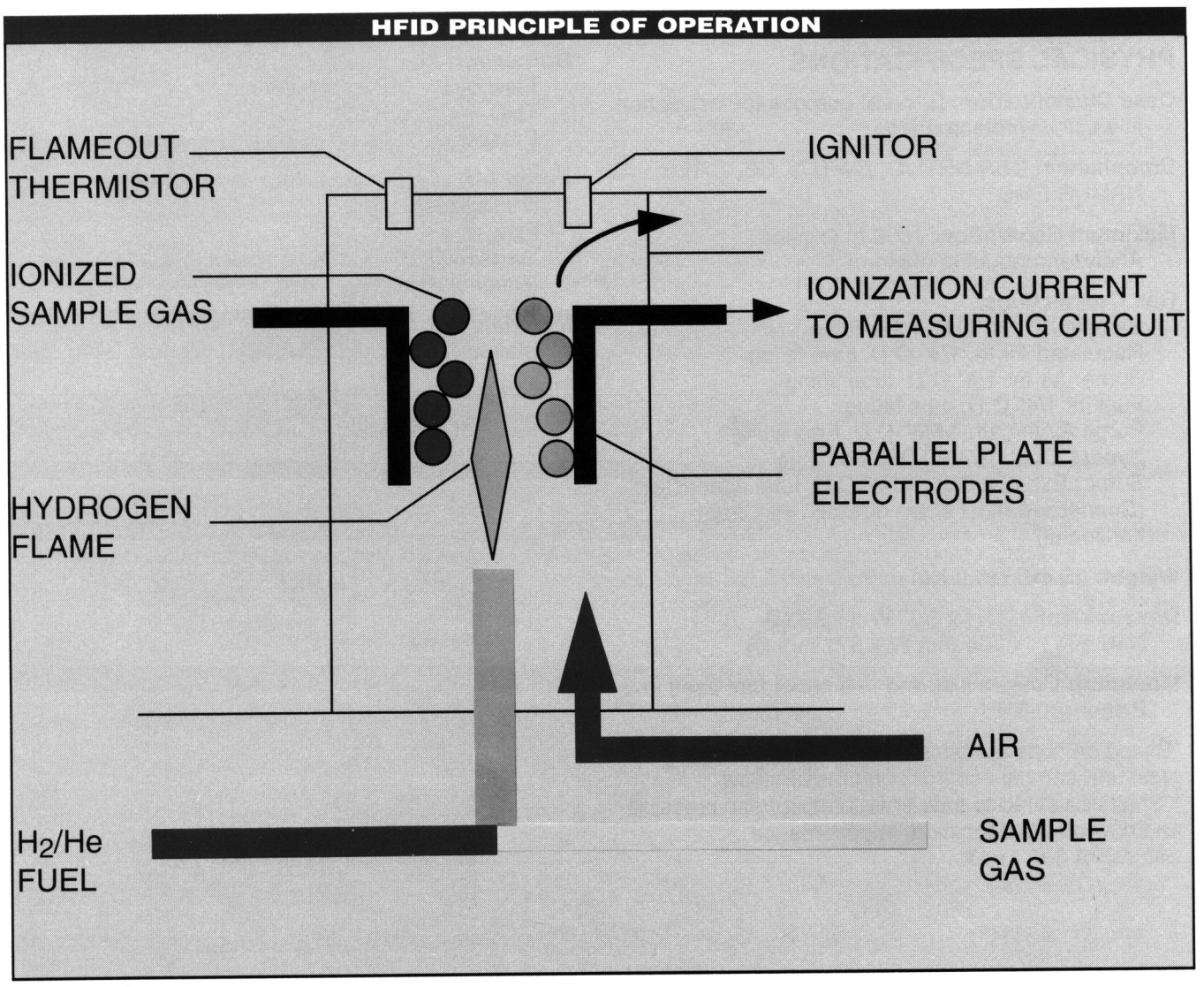
Within the flame, hydrocarbon components in the sample stream undergo a complex ionization that produces both positively and negatively charged ions. Parallel plate electrodes surround the combustion zone and create a magnetic field when voltage is applied. The potential difference between the electrodes cause ions in the combustion gas to collect on the electrodes. The collection of ions generates a current through the analyzer's measuring circuit.

The ionization current is proportional to the rate at which carbon atoms enter the burner, and is therefore proportional to the concentration of hydrocarbons in the sample gas. This measure of concentration is digitally transmitted on the LON network along with the analyzer's diagnostic information for display on the Platform, PC, or other data acquisition device.

TYPICAL APPLICATIONS

The NGA 2000 HFID Analyzer Module is designed to perform in a variety of applications. Typical applications include monitoring total hydrocarbons in:

- Internal Combustion Engine Exhaust, ICEE (Meets EPA regulations for heavy duty gasoline and diesel engine testing per 40CFR, Part 86)
- Contaminants in ambient air and other gases
- Process gases and heater combustion products for process control
- Emissions from carbon bed absorbers



GENERAL SPECIFICATIONS*

Measurement Species: Total Hydrocarbon THC

Ranges (H_2/He Fuel): Includes four (4) full-scale user selectable output ranges
Low Range: 0 to 10 ppm through 0 to 1%
Hi Range: 0 to 100 ppm through 0 to 5%
Measured as CH_4 equivalent at oven set point temperature between 113°C and 191°C

Analysis Temperature: Adjustable from 200°F to 400°F (93°C to 204°C). Maintained within +/- 11°F (+/- 6°C) from set point

Repeatability: < +/- 1% of full-scale

Minimum Detectable Level: 0.10 ppm CH_4 (H_2/He fuel)

Noise: < 1% of full-scale, peak to peak

Linearity: < +/- 1% of full-scale
< +/- 2% of data point

Response Time: < 1.5 second to 90% full-scale

Drift:
Zero and Span: < +/- 1% of full-scale/24 hours

Effect of Temperature: < +/- 2% of full-scale per 10°C temperature change, 10°C/hr change max

Ambient Temperature: 59 to 95°F (15 to 35°C)

PHYSICAL SPECIFICATIONS

Case Classification: General purpose for installation in weather-protected area

Compliance: CSA-NRTL/C, RWTÜV, CE, C-Tick, NAMUR EMC

Maximum Separation: 1600 m (1 mile)
Analyzer module to platform

Gas Connections:
Sample In: 1/4" O.D. tube fitting
Regulated Air In: 1/4" O.D. tube fitting
Burner Air In: 1/4" O.D. tube fitting
Fuel In: 1/4" O.D. tube fitting
Purge Air In/Out:** 3/8" O.D. tube fitting
Bypass Out:** 1/4" O.D. tube fitting
Burner Exhaust Out:** 3/8" O.D. tube connection (Connection must slope down 6° min. from horizontal)

Weight: 35 lbs. (15.9 Kg)

Dimensions: 4.3" H x 8.2" W x 22.5" D
(110 mm H x 208 mm W x 571 mm D)

Mounting: Custom installed in a panel (not used in a Platform)

*Based on constant temperature, burner fuel/air pressure, sample composition/pressure/flow.
**Shall be vented to safe area, atmospheric pressure and nonclassified location, in accordance with NFPA 496 1993.

ELECTRICAL SPECIFICATIONS

Supply Voltage and Frequency: DC: 24 VDC +/- 5%, 120 Watts max., direct to analyzer module

Ripple and Noise: < 100 mVpp
Line and Load Regulation: < +/- 1%

Output: Refer to I/O Module Bulletin for options

GAS REQUIREMENTS

Sample: Non-flammable, < 100% LEL
Flow rate – 1.0 to 2.5 L/min.
Pressure – 5 to 9 psig (345 to 620 hPa)
Temperature – 230°F to 446°F (110°C to 230°C)
< 20°C Variance/24 Hours
< 10°C Variance/Hour
Particulates – Filtered to < 2 microns
Dewpoint – > 15°C Below oven temperature set point

Fuel Gas: Premixed 40% H_2, 60% He
Flow rate – 80-100 cc/min.
THC – < 0.5 ppm CH_4
Pressure – 45 to 50 psig (3101 to 3446 hPa)

Regulated Air: Dry, filtered instrument air or nitrogen
Flow rate – 2 to 4 L/min.
THC – < 2 ppm CH_4
Pressure – 10 to 25 psig (689 to 1723 hPa)
Particles – Filtered to < 2 microns

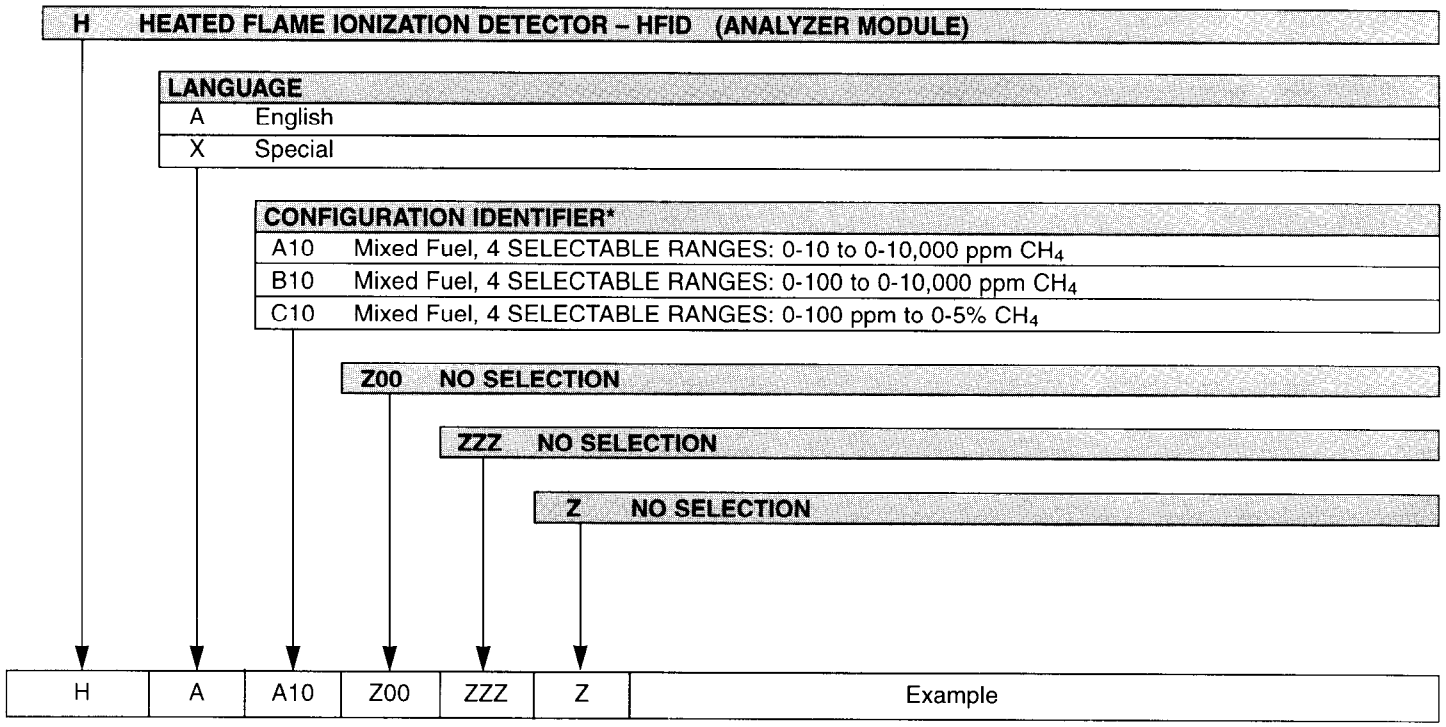
Burner Air: Zero grade air
Flow rate – 350 to 400 cc/min
THC – < 1 ppm CH_4
Pressure – 25 to 50 psig (1723 to 3446 hPa)

Purge Air: Dry, filtered instrument air, nitrogen, or nonflammable gas
Flow rate – 16 to 18 L/min
Pressure – 10 to 20 psig (689 to 1378 hPa)
(Refer to ANSI/NFPA 496 for requirements)

Materials in Contact with Sample Gas
Stainless Steel and glass filled Teflon*

*Teflon is a registered trademark of E.I. duPont de Nemours and Co., Inc.

ORDERING INFORMATION



NOTE: *Ranges indicated within the configuration identifier are standard. Non-standard ranges within the identifier can be changed by the user or factory calibrated.

ACCESSORIES:

Part Number	Description
748297	Manual, HFID

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