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PRODUCT DATASHEET

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Product Data Sheet
PDS 103-490.A01
March, 2008

FID Hydrocarbon Analyzer Module

- Fast response – 90% fullscale within 1 second
- Automatic flame ignition under safe conditions
- Built-in independent safety shutoff
- Designed to meet NFPA 496 regulations for continuous dilution purge and automatic fuel shutoff
- Improved stability and signal-to-noise ratio
- Modular design allows custom mounting near sample source
- Advanced diagnostic capabilities
- Sample flow measurement included as standard

The NGA FID Hydrocarbon Analyzer Module is the industry's first modular total hydrocarbon analyzer. It is a self-contained unit, complete with detector and electronics. The analyzer module's expandability allows for system integration. The FID Analyzer Module can be part of a sophisticated network or a "stand alone" analysis instrument when combined with the NGA Platform and Input/Output (I/O) Module.

What makes the family of NGA Analyzer Modules unique is its advanced communication network which allows identification of and interaction with other modules in the analytical system. Because of this unique feature, the FID Analyzer Module may be incorporated either into a panel/rack or placed near the sample source up to a mile away, thereby reducing sample handling requirements.

Designed for continuous measurement of hydrocarbon gas concentration, the NGA FID Analyzer Module delivers unmatched measurement accuracy, reliability, ease of use, simplified maintenance, advanced communication capability and flexibility. Key to these attributes is the detector assembly which utilizes Flame Ionization Detection (FID) technology. This methodology achieves hydrocarbon measurement from 0 to 1 ppm methane (CH_4) to 0 to 5% methane (CH_4) with the accuracy of ± 1% of fullscale. This array of ranges provides great versatility.

FEATURES

In a continuing effort to improve technology, Rosemount Analytical has achieved superior flame ionization detector design. In addition, the NGA FID Analyzer Module contains a software-independent safety design which creates a fully reliable shutdown system for plant and personnel safety. As recommended by Nationally Recognized Testing Laboratories (NRTL), the FID Analyzer Module is designed to meet NFPA 496 regulations via continuous dilution purge. This entails purging the analyzer module with four times its volume prior to flame ignition and automatic fuel shutoff for loss of flame or purge air. The FID Analyzer Module can also be provided without a purge.

The FID 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. Additionally, the FID Analyzer Module is truly designed to meet all of your safety needs.

Performance capabilities consist of full dynamic range control by software via operator interface; response time of less than 1 second for 90% of fullscale; auto ignition available for initial ignition of burner; automatic shutoff of burner fuel (pure H_2) at low sample pressure for increased burner life; corrosion resistant, stainless steel components as standard.

ROSEMOUNT® Analytical

EMERSON™ Process Management

TYPICAL APPLICATIONS

The NGA FID Analyzer Module is designed to perform a variety of functions across many applications such as:

- Measures hydrocarbons in exhaust emissions from internal combustion engines
- Detects trace levels of hydrocarbon contaminants in pure gases used in the semiconductor industry
- Monitors hydrocarbon contaminants in ambient air and other gases
- Monitors engine combustion efficiency
- Monitors hydrocarbons in cryogenics/air liquefaction processes

DIAGNOSTIC CAPABILITIES

Diagnostic capabilities consist of the following measurements:

- Temperature of case, preamplifier and burner
- Pressure of burner fuel, burner air, sample and purge air
- Flow of purge air (via flow switch) and sample bypass (continuous indication)
- Polarizing voltage to burner
- Power supply voltages
- Status of safety system components
- Status of the heater and fan
- Status of air solenoid valve

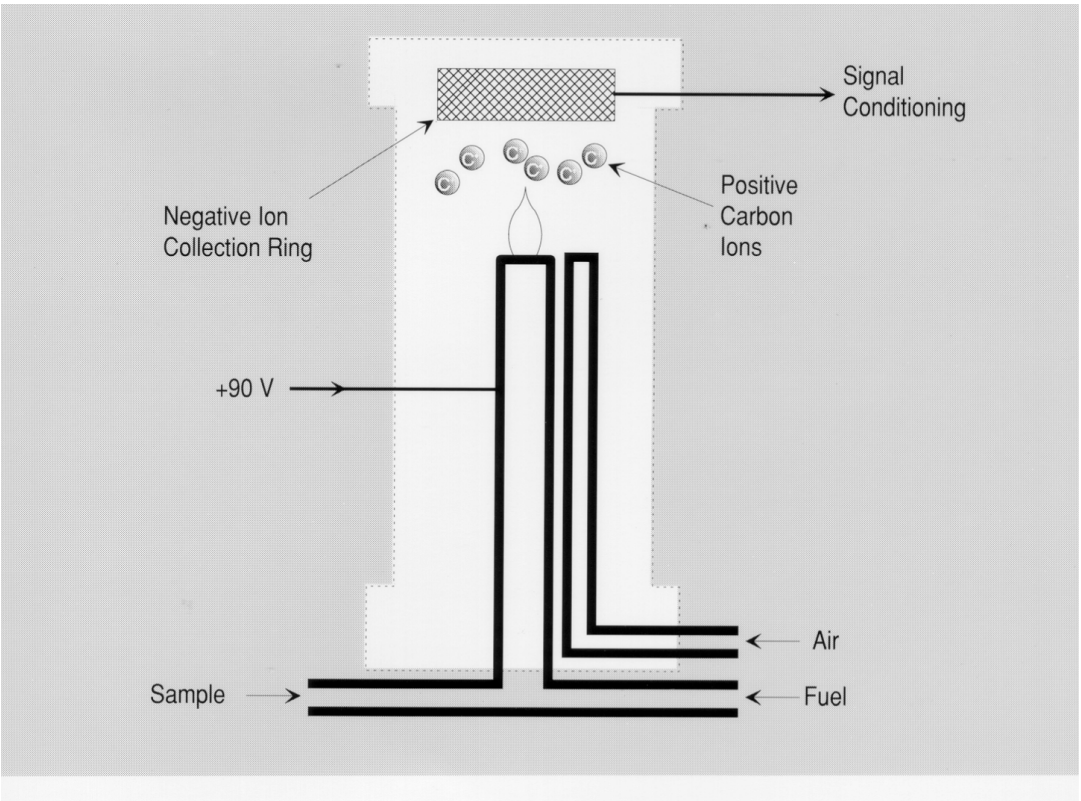
PRINCIPLE OF OPERATION

The FID 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 a fuel gas (hydrogen or a hydrogen/diluent mixture) and air.

Within the flame, the hydrocarbon components of the sample stream undergo a complex ionization that produces electrons and positive ions which are collected by an electrode causing current to flow through a measuring circuit.

The ionization current is proportional to the rate at which carbon atoms enter the burner and is therefore a measure of the concentration of hydrocarbons in the sample. This measurement of concentration is placed on the network, where it can be shown on the platform display or on other data acquisition devices.

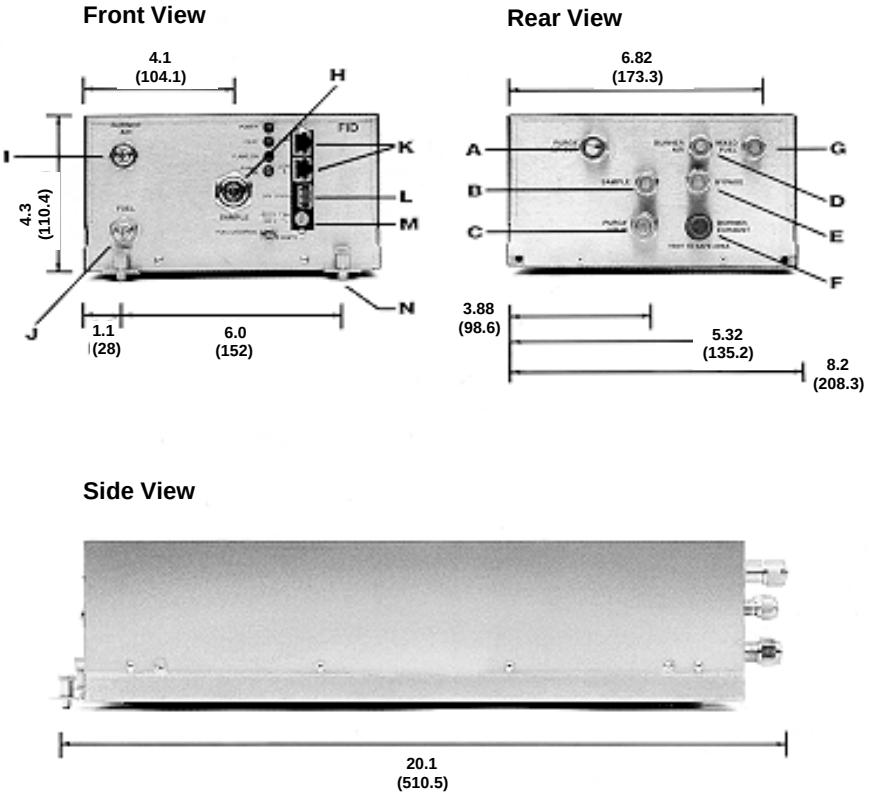
NGA FID BURNER



OUTLINE AND MOUNTING DIMENSIONS

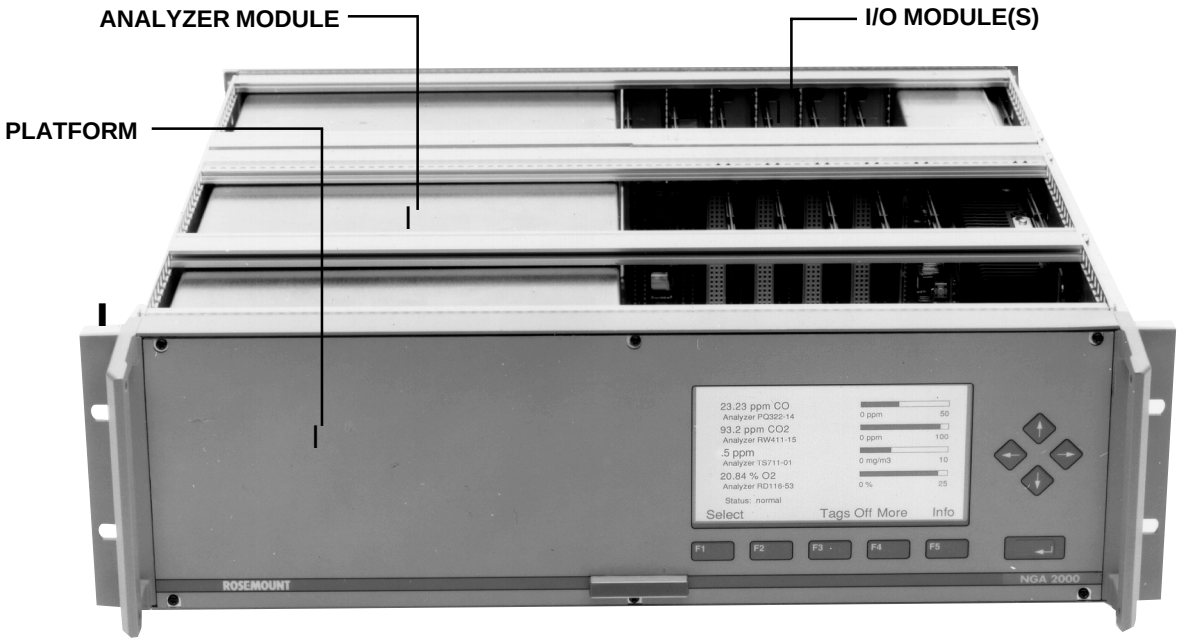
A. Purge air out: 3/8" O.D. tube fitting
B. Sample in: 1/4" O.D. tube fitting
C. Purge air in: 3/8" O.D. tube fitting
D. Burner air in: 1/4" O.D. tube fitting
E. Bypass out: 1/4" O.D. tube fitting
F. Burner exhaust out: 1/2" O.D.
G. Fuel in: 1/4" O.D. tube fitting
H. Sample regulator adjustment
I. Burner air adjustment
J. Fuel adjustment
K. Network cable connection to platform
L. 24 VDC power connection to platform
M. Fuse
N. Mounting pins

Dimensions in inches
(Millimeters in parenthesis)



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.



FID ANALYZER MODULE SPECIFICATIONS*

GENERAL SPECIFICATIONS [1]

Measurement Species: Total Hydrocarbons (THC)

Ranges: Mixed Fuel: 0 to 4 ppm as CH_4 through 0 to 5% as CH_4 Pure H_2 fuel: 0 to 1 ppm as CH_4 through 0 to 2% as CH_4

Repeatability: < +/- 1% of fullscale

Minimum Detectable Level: 0.04 ppm H_2/He fuel
0.01 ppm H_2 fuel

Noise: < 1% of fullscale, peak to peak

Linearity: +/- 1% of fullscale for H_2/He fuel and pure H_2 fuel

Response Time: < 1 second for 90% of fullscale based on bypass flow equal to 0.5 l/min.

Drift:

Zero and Span: < +/- 1% of fullscale/24 hrs.
< +/- 2% of fullscale/week

Warm Up Time: < 60 min.

Effect of Temperature Change on Drift: < +/- 2% of fullscale over any 10°C change, maximum rate of change 10°C/hour

Ambient Temperature: 0° to 45°C (32° to 113°F)

PHYSICAL SPECIFICATIONS [2]

Case Classification: General purpose for installation in weather-protected area – IP 20 equipment

Compliance: FM, CSA, CE, C-TICK

Maximum Separation: 1600 m (5280 ft.)

Gas Connections:

- Sample 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/ Purge Air Out: [2] 3/8" O.D. tube fitting
- Bypass Out: [2] 1/4" O.D. tube fitting
- Burner Exhaust Out: [2] 1/2" O.D. tube fitting

Weight:

- Analyzer Module: 10.5 kg (23 lbs.)
- With Platform: 20.5 kg (45 lbs.)

Dimensions:

- Analyzer Module: 110.0 mm x 208.3 mm x 467.8 mm (4.33" x 8.20" x 18.41") HWD
- Analyzer Module With Platform: 133.4 mm x 482.8 mm x 510.5 mm (5.25" x 19.0" x 20.10") HWD

Mounting: Inside a platform (19.0" rack mountable) or custom installed in a panel

ELECTRICAL SPECIFICATIONS

Supply Voltage and Frequency: AC 85 to 264 VAC, 47 to 63 Hz.,150 watts maximum via platform or DC; 24 VDC +/- 5%, 120 watts maximum, direct to analyzer module
Ripple and noise: <100 mVpp
Line and Load regulation: <+/- 1%

Output: Refer to I/O Module bulletin and analyzer module matrix

GAS REQUIREMENTS [3]

Sample Gas: Flow rate – 0.5 to 2.0 l/min
Pressure – 1495 hPa to 2046 hPa (7 to 15 psig)
Temperature – 0° to 55°C (32° to 131°F)
Particulates – filtered to < 2 microns

Standard Fuel Gas: Type – premixed 40% H_2/60% He
or
premixed 40% H_2/60% N_2 (consult factory for performance specs.)
Flow rate – 75 to 80 ml/minimum
THC – < 0.5 ppm CH_4
Pressure - 3425 hPa to 4458 hPa (35 to 50 psig)

Hydrogen Pure Fuel Gas: Type-zero grade H_2
Flow rate – 35 to 40 ml/minimum
THC-<0.5 ppm CH_4
Pressure – 3425 hPa to 4458 hPa (35 to 50 psig)

Burner Air: Type – zero grade air
Flow rate – 350 to 400 ml/minimum
THC – < 1 ppm CH_4
Pressure – 2735 hPa to 4458 hPa (25 to 50 psig)

Purge Air: Type – dry, filtered instrument air or nitrogen
Flow rate – 15 to 20 l/minimum
Pressure – 2391 hPa to 2735 hPa (20 to 25 psig)

Materials in Contact With Sample Gas:
STANDARD
Stainless steel, Teflon, glass filled Teflon [4], brass and neoprene
OPTIONAL
Stainless steel, Teflon, glass filled Teflon, Kynar [5]

[1] Specifications based on constant temperature, fuel pressure, burner air pressure, sample pressure and sample flow.

[2] Shall be vented to safe area in accordance with NFPA 496 1993.

[3] Safety design basis presumes no sample gas with LEL less than hydrogen.

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

[5] Kynar is a registered trademark of the Pennwalt Co.

ORDERING INFORMATION

Model	Description
FID	Process Total Hydrocarbon Analyzer Module (FID)

Level 1	Language
0	English
1	German
2	French

Level 2	Software
2	Software 2.x
3	Software 3.3.x
6	Software 3.6.x
7	Software 3.7.x (till September 2005)
9	Actual Standard Software 3.9.x

Level 3	Configuration
A	Mixed fuel, calibrated ranges: 0-10, 0-25, 0-100, 0-250 ppm (Methane)
B	Mixed fuel, calibrated ranges: 0-10, 0-30, 0-100, 0-300 ppm (Methane)
C	Mixed fuel, calibrated ranges: 0-4, 0-10, 0-40, 0-100 ppm (Methane)
D	Hydrogen Fuel, Calibrated Ranges: 0-1, 0-2.5, 0-10, 0-25 ppm (Methane)
E	Mixed fuel, calibrated ranges: 0-250, 0-1000, 0-2500, 0-10000 ppm (Methane)
F	Mixed fuel, calibrated ranges: 0-300, 0-1000, 0-3000, 0-10000 ppm (Methane)
G	Mixed fuel, calibrated ranges: 0-1000, 0-2500, 0-10000, 0-25000 ppm (Methane)
X	Special (consult factory)

Level 4	Materials
1	Brass and Neoprene Back Pressure Regulator – 5 psi
2	Brass and Neoprene Back Pressure Regulator – 2 psi
3	Stainless Steel and Viton Back Pressure Regulator – 5 psi
4	Stainless Steel and Viton Back Pressure Regulator – 2 psi

Level 5	Flow Path
1	Standard (No Flow Sensor)
2	Integral flow sensor (400-2000 cc/min)

Level 6	Special
0	None Required
01	Without purge (no CSA certificate)
G1	Customer Option (fuel restrictor 100 cc/min at 30 psig, consult factory)
M1	Mounted without purge with vented cooling fan in lower compartment of MLT 2 (power supply included, no CSA certificate)
M2	Mounted without purge with internal cooling fan in lower compartment of MLT 2 (power supply included, no CSA certificate)
XX	Special (consult factory)

Level 7	External Power Supply
0	None Required
1	UPS, 230 or 120 VAC, 5 A, 24 VDC, table-top version
2	UPS, 230 or 120 VAC, 5 A, 24 VDC, ¼ - 19" rear panel version
3	UPS, 230 or 120 VAC, 5 A, 24 VDC, ¼ - 19" rear panel version
4	PS, 10 A, 24 VDC, for cabinet mounting on supporting rails TS35
5	PS, 10 A, 230 VAC, 24 VDC, table-top version
6	PS, 10 A, 230 VAC, 24 VDC, rear panel rack-mount
7	PS, 10 A, 120 VAC, 24 VDC, table-top
8	PS, 10 A, 120 VAC, 24 VDC, rear panel rack-mount
A	PS, 5 A, 24 VDC, for cabinet mounting on supporting rails TS35
B	PS, 5 A, 230 VAC, 24 VDC, table-top version
C	PS, 5 A, 230 VAC, 24 VDC, rear panel rack-mount
D	PS, 5 A, 120 VAC, 24 VDC, table-top
E	PS, 5 A, 120 VAC, 24 VDC, rear panel rack-mount
F	PS, 20 A, 120 VAC, 24 VDC, for cabinet mounting on supporting rails
G	PS, 20 A, 120 VAC, 24 VDC, for cabinet mounting on supporting rails

Level 8	Power Supply Cable	
	0	None Required
	5	Connection of AM with table-top/rack PS, 1 m
	6	Connection of AM with table-top/rack PS, 2 m
	7	Connection of AM with cabinet PS, 1.5 m
	8	Connection of AM with UPS, 1 m
	9	Connection of AM with UPS, 2 m

Accessories	
1101588-002ENG	Tag SS (engraved)

Option Notes	
Level 3:	Option: A, B, C, D, E, F, G Ranges indicated within the configuration identifier are standard. Non-standard ranges within the identifier can be changed by the user or factory calibrated for an additional charge. Indicate an "X" in the last position and specify ranges.
Level 7:	Option: 0 Cabinet Power Supply, 10 A, manual switch: 120 VAC or 230 VAC Power Supply, 20 A, Cabinet mount: BxHxT=227 mm x 125 mm x 103 mm Power Supply, Rack-mount: 3 HU, B = 141.9 mm

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