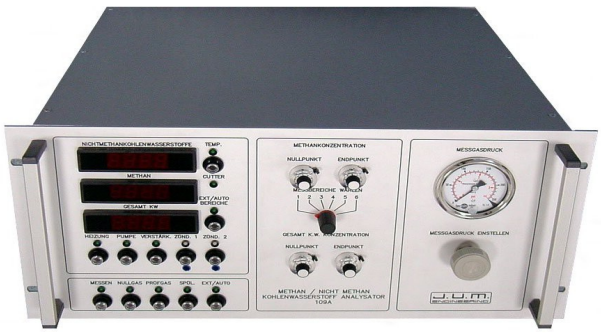
HIGH TEMPERATURE HEATED NON METHANE HYDROCARBON ANALYZER
109A Data Sheet

J.U.M. ENGINEERING
Since 1973



The THC channel fully complies with QAL1 according to EN 14181 and EN ISO 14956 (EU), with EN 12619, EN 13526 (EU) and EPA Method 25A and Method 503 (USA). CH4 channels are not yet regulated in the EU and USA!

The 109A is the only available heated NMHC FID-analyzer with an internal permanent sample filter to be cleaned by compressed air back purge. This feature at the same time cleans the sample line too. A stack filter probe is not required. This makes the 109A ideal CEM applications and for stack emissions testing companies.

The J.U.M. Engineering HFID Model 109A is a compact 19" rack mount and table top heated FID analyzer for the measurement of low to high concentrations of Non Methane Hydrocarbons (NMHC) in air and other gases. The 109A is on the FID market since 1990.

The Model 109A uses two hydrogen flame ionization detectors (one THC and one CH4 FID) in a heated oven to prevent the loss of high molecular weight hydrocarbons and to provide reliable performance in the analysis of trace level of contaminants in high purity gases, air and other gases.

All components in contact with sample are integrated into the heated chamber. The permanently installed heated sample filter is cleaned by back-purging with dry compressed air or Nitrogen using our proprietary high capacity stainless steel 2-micron mesh filter disc. The FID combustion air supply is built in. Therefore no extra bottles for burner air are needed.

Our special rear adapter plate system eliminates hang up from HC condensation on the sample inlet. It allows the cold-spot free coupling of a heated sample line inside the heated oven without the need of special tools. The fittings can be accessed through the right side panel. This feature is not available with the OVE option.

Analyzer Features

- Made in Germany
- Two independent FID detectors and electro-meters for THC and CH4
- ***1st Sampling Choice:*** Maintenance free sample filter back purge system allows filter to be cleaned without dismantling (automatic purge optional)
- ***2nd Sampling Choice:*** Disposable sample filter which is easily accessible in the rear panel without special tools
- All components in contact with sample are fully heated and controlled at 190°C
- Built-In sample pump
- Built-in combustion air supply, no extra burner air bottle needed
- Permanent 2 micron stainless mesh sample filter or 2 micron disposable sample filter
- "Overflow" calibration system for safe zero and span calibration
- Automatic flame out control with alarm and OPTIONAL fuel shut off valve
- Fast response less than 1 second
- Low fuel consumption and very selective
- Microprocessor PID type temperature controller
- Cold spot free coupling of a heated sample line inside the heated oven with optional Adapter Plate. Works not with OVE option
- Remote control for sample, zero gas, span gas and back purge is standard
- Automatic or remote range change optional

Applications

- EPA Method 25A compliance monitoring of source hydrocarbons
- Industrial backing oven optimization and emissions monitoring
- Stack gas hydrocarbon emissions monitoring
- Fence line (perimeter) monitoring
- Catalytic converter and thermal combustion testing
- Carbon adsorption regeneration control
- Measuring engine combustion efficiency
- Raw exhaust vehicle emissions analysis
- Hydrocarbon contamination monitoring in air and other gases
- Carbon adsorption regeneration control
- Detection of trace hydrocarbons in purity gases used in the semi conductor industry
- LEL monitor of solvent laden air

Principle of Operation

The Dual Flame Ionization Detection (FID) method is used to determine the continuously measured presence of the total hydrocarbon and of the non methane hydrocarbon concentration in a gaseous sample:

Burning hydrocarbon-free hydrogen flame in hydrocarbon-free air produces a negligible number of ions. Once a sample containing hydrocarbons is introduced into this flame a very complex ionization process is started. This process creates a large number ions. A high polarizing voltage is applied between the two electrodes around the burner nozzle and produces an electrostatic field. Now negative ions migrate to the collector electrode and positive ions migrate to the high voltage electrode. The so generated ionization current between the two electrodes is directly proportional to the hydrocarbon concentration in the sample that is burned by the flame. This signal is measured and amplified by our electrometer unit.

One of the two sample capillaries is connected in series to a high temperature catalyst module. This catalyst oxidizes all hydrocarbons except Methane. Both detectors are connected to individual electrometer amplifiers. From these two FID signals, total hydrocarbons from the detector without the catalyst and methane from the detector with the catalyst, the non methane hydrocarbon signals are generated via a differential amplifier. Thus resulting in the three continuous simultaneous signals shown on individual front paned displays. Three individual DC voltage and milliamp signals are available in the rear panel plus an optional RS 232 data output.

Technical Data

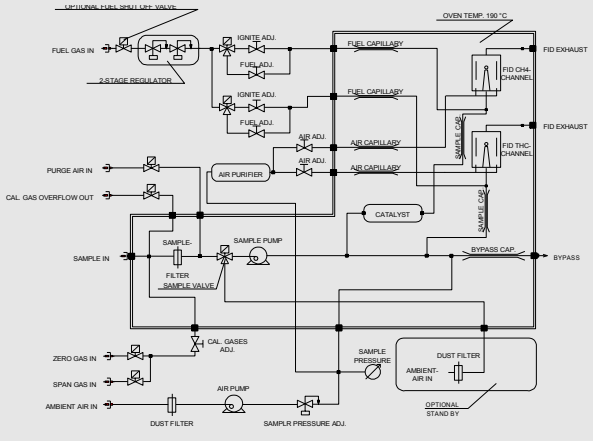
Method of analysis	Dual Flame Ionization Detectors
Sensitivity	Min. detectable 100 ppb, max. 1 ppm CH_4 full scale
Response time	< 0.2 seconds
T_{90} time	< 1.2 seconds
T_{90} time with heated line (7.5m) and filter	less than 8 seconds
Zero drift	<1.5% full scale / 24h
Span drift	<1.5% full scale / 24h
Linearity	Up to 10.000ppm within 1% FSD
Oxygen synergism	< 1.5% FSD
Measuring ranges (ppm)	0-10,100, 1.000, 10.000, 100.000, others on request
Analog outputs	0-10 VDC and 4-20 mA
Display	3 X 3 1/2 digit, 3 engineering displays optional
Sample pump	approx. 2.5 l/min capacity @ operating temp.
Zero and span adjust	Manual on front panel
Fuel consumption 100% H_2	approx. 40 ml/min @ 1.5 bar (22 psig)
Fuel consumption 40%H_2/60%He	approx. 240 ml/min @ 1.5 bar (22 psig)
Burner air consumption	Approx. 240 ml/min by built in burner air supply
Oven temperature	190°C (374°F)
Temperature control	µ-processor PID controller
Power requirements	either 230VAC/50Hz, 1250 W or 115VAC/60Hz, 850 W
Ambient temperature	5-43°C (41-110°F)
Dimensions (W x D x H)	483 mm x 460 mm x 132 mm
Weight	approx. 25 kg (55 lbs)

J.U.M. reserves the right, at any time and without notice, to change specifications presented in this data sheet and assumes no responsibility for the application or use of the devices described herein.

Available Options

OVE 9	Quick change disposable 2 micron sample filter housed in the heated oven in stead of back purge sample filter
OWM 9	Wall or Panel Mount Adapted System allows the analyzer to be installed on a wall, a panel, or inside of an outdoor or safety purged enclosure
AMU 9	Automatic controlled range change. Range changes at 0.5% low reading and at 95% high reading, all with range identification
RCC 9	Remote controllable measuring range change with range identification
APO 9	Internal automatic programmable back purge timing system system for the sample filter. This feature works not with the OVE option
AZM 9	Automatic FID flame ignition and re-ignition
ENGA 9	6-digit engineering units display 0-100.000 ppm with RS232 data output. No range change required to overlap up to 3 analog measuring ranges.
FOAS 9	FID flame out control with automatic fuel shut off valve
MBP 9	Integrated bypass pump for very long sample lines, also compensates sample pressure fluctuations at sample inlet
PDA 9	Sample pressure monitor with alarm
TPR 9	External temperature controller for heated sample lines, e.g. Model TJ 100
Important!	* HBPR cannot be combined with ICM or MBP ** ICM cannot be combined with LTO *** MBP cannot be combined with ICM

Rear Panel View



Complete Flow Diagram with Back Purge Sample Filter

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