HIGH TEMPERATURE HEATED TOTAL HYDROCARBON ANALYZER
3-300A DATA SHEET

J. U. M. ENGINEERING
Since 1973

QAL1 certified according to EN 14181 and EN ISO 14956 (EU). Fully complies with EN 12619 (EU) and EPA Method 25A and Method 503 (USA)

With many thousand's sold, the 3-300A is a well distributed, most compact, robust and cost effective heated FID analyzer in source and stack testing worldwide, preferably in integrated systems. The 3-300A is fully identical with our VE7 and 3-200 Analyzer, except the low profile and compact 19" rack mount design.

Originally designed for space saving systems integration the J.U.M. Engineering HFID Model 3-300A is an over 38 years time proven, highly reliable and outstandingly rugged 19" rack mount or table top heated total hydrocarbon analyzer. Built for very low drift, high accuracy, sensitivity and stability. The 3-300A uses a hydrogen flame ionization detector (FID) in a heated oven to prevent the loss of high molecular weight hydrocarbons and to provide reliable performance in the analysis of high concentrations down to very low trace levels of THC-contaminants in high purity gases, air and other gases.

All sample containing parts and components are integrated into the heated chamber. The permanent heated sample filter is cleaned by back purging with compressed air or nitrogen. This allows uninterrupted measurements during cleaning the sample filter. While back purging the sample filter, the sample line is also cleaned. The use of a stack probe filter is not necessary.

The combustion air supply for the detector is built in. No expensive external combustion air generator or external cylinder for synthetic air is needed.

The proprietary rear panel sample line adapter-plate system allows cold-spot free coupling of a heated sample line inside of the heated oven without the need of special tools. The fittings can easily be accessed through the opened FID oven. Not available with option OVE 33.

Our most complete list of optional available accessories allows this analyzer to be tailored to fit nearly all possible applications.

Analyzer Features

- Made in Germany
- ***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, optional Adapter Plate needed. (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
- Stack gas hydrocarbon emissions monitoring
- Fence line (perimeter) monitoring
- Solvent recovery monitor for carbon bed break through
- Catalytic converter 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 Flame Ionization Detection (FID) method is used to determine the presence of total hydrocarbon concentrations in a gaseous sample. Burning hydrocarbon-free hydrogen in hydrocarbon-free air produces a negligible number of ions.

Once a sample which is 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. Negative ions migrate to the collector electrode and positive ions migrate to the high voltage electrode. This so generated ionization current between the two electrodes is a directly proportional measure to the hydrocarbon concentration in the sample that is burned by the flame. This signal is measured and amplified by a variable and very sensitive electrometer unit.

A sample pressure regulator provides a controlled back pressure at the sample capillary which gives admittance of a constant sample flow rate to the FID burner. This technique without the use of a sample contacted conventional back pressure regulator or proportional valve is used by J.U.M. Engineering for over 40 years to provide the highest possible sample flow rate stability at a lowest maintenance. Our compactly designed flow control module for controlling the fuel, air and calibration gas flow rates via needle valves use high precision pressure regulators for long term stability. The needle valves are factory adjusted and sealed to ensure the optimization of the burner.

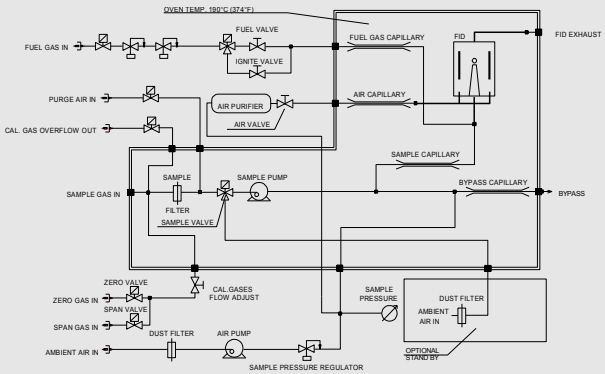
Technical Data

Method of analysis	Flame Ionization Detector
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 1/2 digit
Sample pump	approx. 2.5 l/min capacity @ operating temp.
Zero and span adjust	Manual on front panel
Fuel consumption 100% H_2	approx. 20 ml/min @ 1.5 bar (22 psig)
Fuel consumption 40%H_2/60%He	approx. 90 ml/min @ 1.5 bar (22 psig)
Burner air consumption	Approx. 120 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, 850 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)

Available Options

OVE 33	Quick change disposable 2 micron sample filter housed in the heated oven in stead of back purge sample filter
OWM 33	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. (Works only with OVE option
AMU 33	Automatic controlled range change
APO 33	External automatic programmable back purge system for the sample filter
AZM 33	Automatic flame ignition and re-ignition
DCC 33	Dual concentration alarm w. individual adjustable thresholds and alarm outputs
ENGA 3	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 33	Flame out control with automatic fuel shut off valve
HBPR 33 *	Fully heated sample back pressure regulator allows to run analyzer in closed loop sampling mode
LTO 33	Measurement of low trace hydrocarbon levels. Requires external, zero grade combustion air supply
MBP33 ***	Integrated bypass pump for very long sample lines, also compensates sample pressure fluctuations at sample inlet
PDA 33	Sample pressure monitor with alarm
RCA 33	0-20mA analog output instead of 4-20mA
RCC 33	Remote controlled range change
RCI0 33	0-20 mA analog output, galvanically isolated
RCI4 33	4-20 mA analog output, galvanically isolated
TPR 33	External temperature controller for heated sample lines, e.g. Model TJ 100

Rear Panel View



Complete Flow Diagram with Back Purge Sample Filter

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