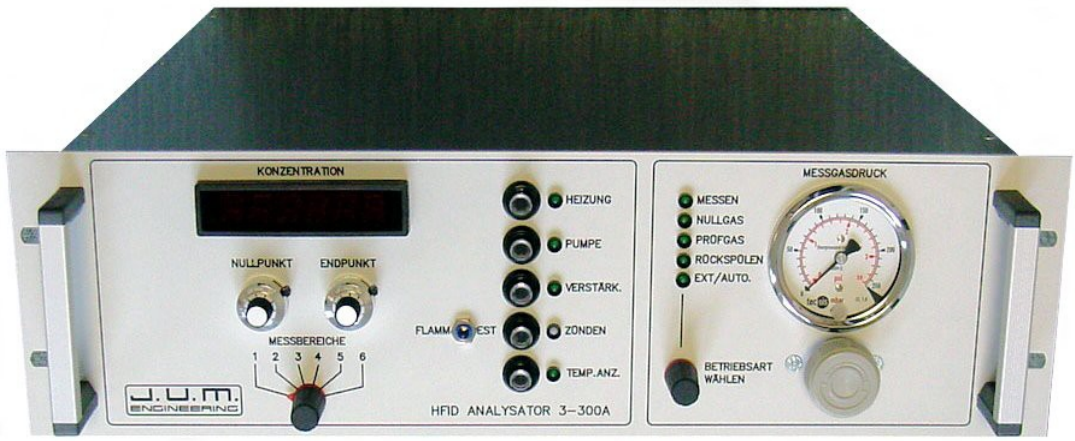
Rack Mount/Table Top TVOC Analyzer

THC Heated FID 3-300A

Space saving 19 Inch, 3 PU high space saving rack mount and table top heated emission analyzer for the continuous determination of the mass concentration of total gaseous organic carbon using the Flame Ionization Detector Method.

The 3-300A complies with QAL1 (EN 14181-EN ISO 14659), with EN 12619:2013, US EPA Method 25A and US EPA Method 303



Low cost of ownership. Low fuel gas consumption. The combustion air supply for the FID-detector built in. No external cylinder for synthetic air needed.
To prevent HC hang up (memory effect) and related drifting, the heated sample line can easily be connected inside of the heated oven. This prevents any cold spot and related hydrocarbon condensation. (Only with standard version)

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General:

Confirmed by TÜV-Nord to comply with QAL1 EN 14181 and EN ISO 14956 (EU). Fully complies with EN 12619:2013 (EU) and EPA Method 25A and Method 503 (USA)

With thousand's of units sold, the 3-300A is our second-mostly distributed, very forgiving, robust and cost effective heated FID analyzer in source and stack testing. Mostly integrated into smaller, space critical rack mount multi analyzer CEM' systems in the stack testing industry.

The J.U.M. Engineering HFID Model 3-300A is time proven in over 30 years as the space saving version of our rugged VE7 analyzer. It is a highly reliable and outstandingly forgiving and rugged 19" rack mount or table top heated total hydrocarbon (total gaseous organic carbon) 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 concentration levels of gaseous organic carbon contaminants in emissions, air and other gases and high purity gases.

All sample containing parts and components are discretely integrated into an easy to maintain heated chamber. The permanent heated sample filter is cleaned by back purging with compressed air or nitrogen. This allows nearly uninterrupted measurements during cleaning the sample filter. While back purging the sample filter, the connected heated sample line and sample probe is also cleaned. This is a very unique feature which makes separate cleaning of the sample line unnecessary The use of a stack probe filter is not necessary when the 3-300A FID is used in a stand alone mode.

The combustion air supply for the detector is built in. No expensive air generator or external cylinder for synthetic air is needed. The available 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 with the cover plate removed from the oven.

The 3-300A is a standard emissions analyzer and therefore optimized for the accordance with the European EN-12619:2013 specifications. Several different target optimizations for “non EN-12619:20136” applications are available. Contact us for clarification.

Analyzer Features

- Made in Germany
- ***1st Sampling Choice:*** Maintenance free, permanently installed sample filter back purge system allows filter to be cleaned without dismantling (automatic back purge optional)
- ***2nd Sampling Choice:*** **D**isposable sample filter which is easily accessible in the rear panel without special tools. This optional available feature is an approx. 20% price advantage.
- All components in contact with sample are fully heated and digitally maintained at 190°C
- Built-In sample pump
- Built-in combustion air pump and supply, no extra burner air bottle needed
- Permanent 2 micron stainless mesh sample filter to be cleaned by back purge with compressed dry air or nitrogen. Alternatively available 2 micron disposable sample filter
- "Overflow" calibration system for safe zero and span calibration
- Automatic flame out alarm contact and optional available fuel shut off valve
- Fast response less than 1 second @ sample inlet
- Low fuel consumption @ 100% or 40/60 mixed fuel gases
- 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

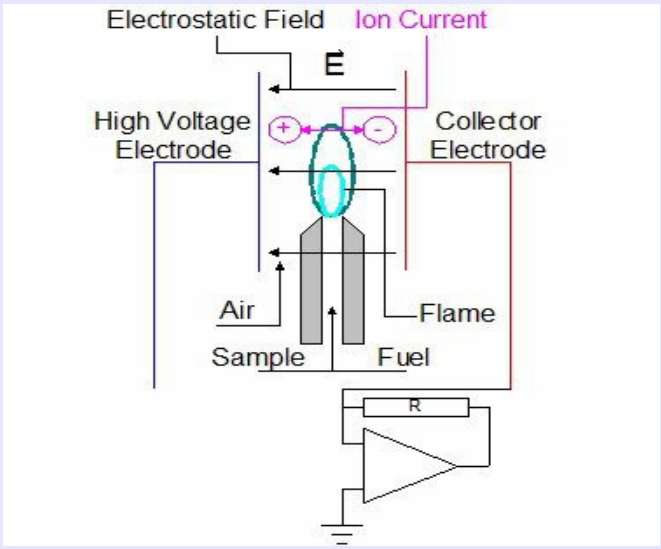
Applications

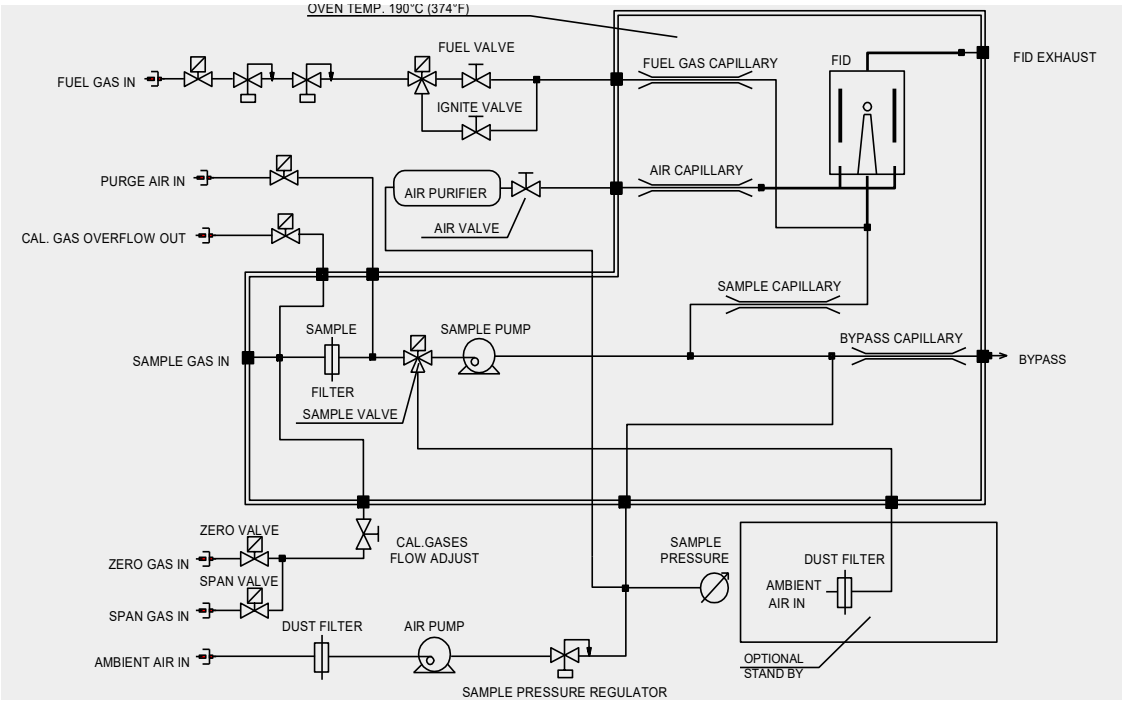
- Compliance monitoring of source hydrocarbons following European EN 14181/ EN ISO 14659, EN 12619:2013 regulations, US-EPA Method 25A and Method 503
- Stack gas hydrocarbon emissions monitoring
- Vent gas hydrocarbon emissions monitoring
- Fence line (perimeter) monitoring
- Solvent recovery monitor for carbon bed break through
- 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
- Detection of trace hydrocarbons in purity gases used in the semi conductor industry
- LEL monitor of solvent laden air

Principle of Operation

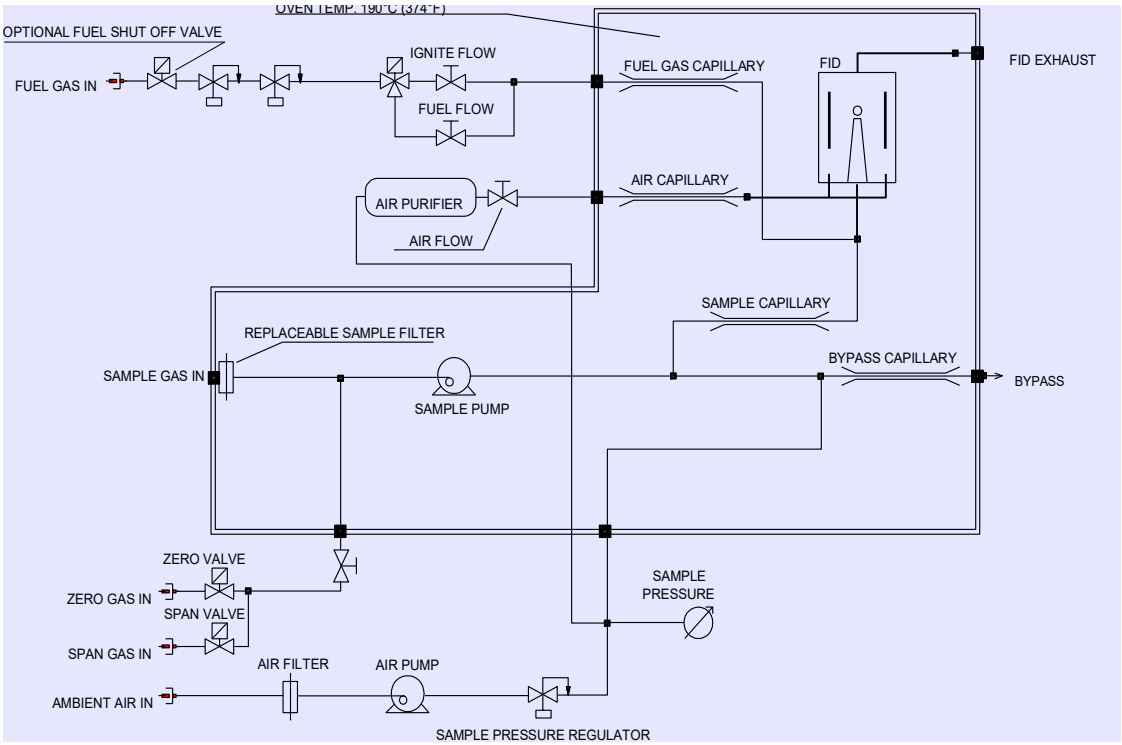
The Heated Flame Ionization Detection (HFID) method is used to determine the presence of total hydrocarbon concentrations in gaseous samples. Burning hydrocarbon-free hydrogen in hydrocarbon-free air produces a negligible number of ions in the detector. Once a sample which contains any organic carbon matter is introduced into this flame, a very complex ionization process is started. This process creates a large number of ions. A high polarizing voltage is applied between the two electrodes around the burner nozzle and produces an electrostatic field. Now negative carbon ions migrate to the collector electrode and positive hydrogen 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 a highly sensitive and stable electrometer amplifier unit.

Our proprietary sample pressure regulator provides a controlled sample pressure and flow which gives admittance of a constant sample flow rate to the FID burner. This technique of using our non sample contact regulator is time proven for over 40 years by J.U.M. Engineering to provide the highest possible sample low flow rate stability at the lowest maintenance. Our compactly designed flow control module for fuel, ignition and air flow rates via low thermal mass needle valves use high precision pressure regulators. The needle valves are factory adjusted and sealed to ensure the optimization of the burner.





Complete flow diagram shown with standard back purge sample filter



Complete flow diagram shown with alternative disposable sample filter Option OVE 33

Technical Specifications

Method	Heated Flame Ionization Detector (HFID)
Sensitivity	Max. 1 ppm CH_4 full scale
Response time	@ sample inlet <0.5 seconds
t_{90} time	@ sample inlet <1.2 seconds
t_{90} time including 4X6mm heated sample line	Including heated sample line (7.5m) and sample probe filter filter: less than 8 seconds
Zero drift	<2% full scale / 24h
Span drift	<2% full scale / 24h
Linearity	Up to 10.000 ppm full scale within 1.5%
Oxygen synergism	< 2% FSD
Measuring ranges (ppm)	0-10,100, 1.000, 10.000, 100.000, others on request. Front panel turn switch. Automatic or remote range change optional
Display	6- digit direct reading ppm units. High resolution of 24 bit. Capability to measure 3 overlapping ranges without range change
Signal outputs	0-10 VDC, 4-20 mA, including RS-232 data output
Display	6- digit direct reading ppm units capability to measure 3 overlapping ranges without range change
Total sample flow through	2.5 to 2.8 l/min capacity @ operating temp.
Sample filter	Permanent 2 micron mesh filter, cleaned by back purge with compressed dry air or N2. Alternatively disposable change filter in rear panel. Option OVE 33
Zero and Span gas	Front panel turn switch select and remote control, gas inlets on rear panel
Zero and span adjust	Manual duo dial on front panel
Fuel gas choice	✗ Standard 100% H2, consumption approx. 20 ml/min ✗ Optional 40%H2/60%He, consumption approximately 90 ml/min ✗ Optional 40%N2/60%He, consumption approximately 90 ml/min
Burner air consumption	Built in burner air supply. No external cylinder air needed. consumption approximately 130 ml/min @ 100% H2 fuel gas and approx. 220 ml/min at 40/60 mixed fuel gas
Oven temperature	190˚C (374˚F)
Temperature control	micro-processor PID controller
Power requirements	230VAC/50Hz, 850 W. 120 VAC/60Hz optional
Ambient temperature	5-43˚C (41-110˚F)
Dimensions (W x D x H)	19" (483 mm) x 460 mm x 132 mm
Weight	approx. 22 kg (50 lbs)

Available Options

OVE 33	Quick change disposable 2 micron sample filter housed in the heated oven in stead of back purge sample filter. ***A price advantage of about 20% over the standard back purge sample filter!***
AMU 33	Automatic controlled range change with range identification
APO 33	Automatic sample filter pack purge; EXTERNAL, easily programmable back purge timing system for back purge time and purge sequence sequence
AZM 33	Automatic flame ignition and re-ignition
DCC 33	Dual concentration alarm w. individual adjustable thresholds and alarm outputs
ENGA 33	6-digit engineering units display 0-100.000 ppm (or others) with RS232 data output. 24 bit resolution allows to digitally measure throughout 2 to 3 measuring ranges without range change
FOAS 33	Flame out control with automatic fuel shut off valve
LTO 33	Measurement of low trace hydrocarbon levels. Requires external, zero grade combustion air supply
MBP 33 **	Integrated heated bypass pump for very long sample lines. It also compensates sample pressure fluctuations at sample inlet of up to 2 bar. *The MBP Option allows to feed another gas analyzer in series with the FID analyzer (for example NOx). Call for more details.*
RCA 33	0-20mA analog output instead of 4-20mA
RCC 33	Remote controlled range change with range identification (dry contact)
RCI0 33	0-20 mA analog output, galvanic isolated
RCI4 33	4-20 mA analog output, galvanic isolated
TPR 33	External temperature controller for J.U.M. heated sample lines Model TJ 100 or other with “J” type thermocouple
FSS 33:	**Especially** Low pressure, 50 liter metal hydride hydrogen purifying fuel cartridge. Refill from large cylinder is safe and can be made with standard 0 to 10 bar (0-0,1 MPa) gas cylinder regulator. See inserted picture on 1st page of our data sheet
FDR 33	Pressure regulator with trending pressure gauge for FSS 9 purifying storage system mounted on Swagelok quick connector
UFS 33	Hydrogen Recharging Set; Pressure regulator for high pressure hydrogen cylinder equipped with Swagelok° flow through quick connector

For sporadic or short time measurement applications:
Low Pressure Metal 50 Liter Metal Hydride Fuel Gas Storage. See Questions & Answers Next Page:

Questions and Answers about the low pressure rechargeable Hydrogen gas filter and storage system

Q: Is the new fuel gas filter storage a high pressure cylinder?
A: Actually no, it is not! The new hydrogen FID Fuel Gas filter which stores Hydrogen as Metal Hydride. It is charged at a low pressure of 1 MPa (10 bar), operating at pressures below 0.08 MPa (8 bar). It purifies contaminated Hydrogen to a very high 5.0 gas purity (99.000) The gas filter is very safe and withstands pressures of over 200 bar.

Q: Is the used filter storage a pressurized gas tank?
A: No, it is not a pressurized gas tank. In this system hydrogen is purified and stored in form of solid metal powder which chemically reacts to metal hydride when it is contacted with hydrogen gas.

Q: How could I know when I used up the purified hydrogen, and need to recharge?
A: If the FSS 9 uses a pressure regulator pressure to indicate the outlet pressure on its miniature pressure gauge. If the system is used correctly without a leak. the pressure in the storage drops below 0.15 MPa (1.5 bar) after approx. 20 hours and the FID flame(s) slowly will go out. If no optional FDR 33 pressure regulator with pressure gauge is used, an elapse of approximately 20 hours after correct charging is a good indicator to recharge the system. Any pressure gauge in the fuel line can be used as an indicator.

Q: Can your new gas filter system store gases other than Hydrogen?
A: No, it is strictly designed to store and purify Hydrogen gas.

Q: What will happen if system is charged with other gases than Hydrogen?
A: In practice it will then work just like a pressurized tank. However, if the stored gas is another one than Hydrogen it will destroy the dense filling of metal alloy powder and the storage will no longer purify and hold hydrogen gas properly.

Q: Is a pressure regulator required while using your new hydrogen storage system?
A: Even though that the internal regulator of the analyzer can handle the raw cartridge pressure, we strongly suggest that the offered FDR 9 pressure regulator for the cartridge is always being used.

Q: How long does it take to charge/recharge an empty cartridge?
A: Recharging is simple and fast. Shortest case charge time is around 60 plus minutes to charge at a pressure of 10 to 12 bar (1 to 1.2 MPa) at ambient air temperatures. Best charging results are reached after a couple of hours when the cartridge has reached room temperature. Any standard hydrogen pressure regulator with an adjustable output range of 0 to 15 bar (0-15 MPa) or some higher can be used for charging.

Q: What is the typical life span of the hydrogen storage system?
A: As purer the charged hydrogen gas is as higher is the life span of the system. When it is always being charged with r higher quality purity hydrogen, the charge/discharge quantities can come to 9'000 cycles which count to less than 10% decay in storage capacity. In fact, it can be considered as a limitless refillable tool.

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