Heated FID OVF-3000

Portable THC/TVOC Analyzer

The OVF-3000 is light weight and portable, competitively priced and compact heated FID (HFID) total hydrocarbon analyzer for high accuracy, sensitivity and stability which can be carried over the shoulder.
In the EU the OVF-3000 complies with EN 14181,EN ISO 14659 and with EN 12619. In the USA with EPA Method 25A and Method 503.

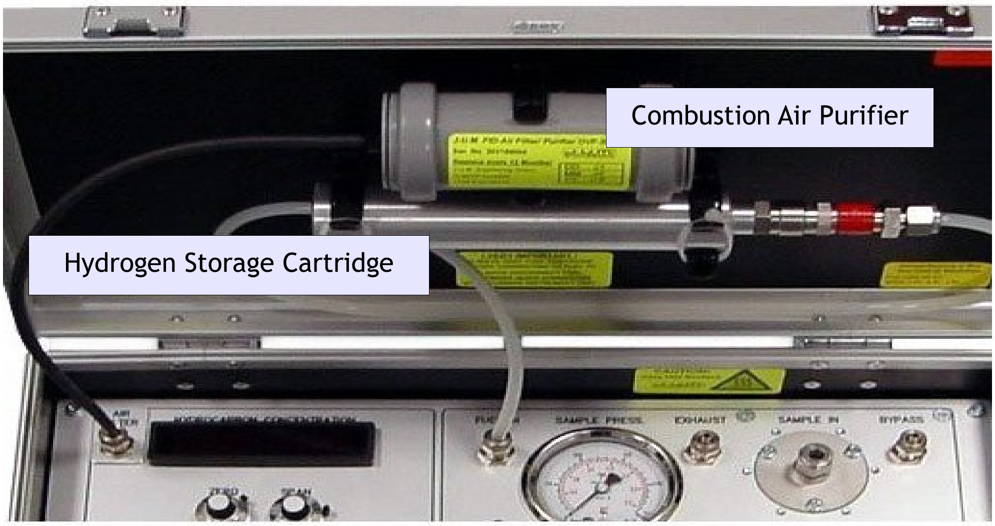
*Low cost of ownership. *Low fuel gas consumption. *The combustion air supply for the FID-detector built in. No external cylinder for synthetic air needed. *The standard safe, low pressure fuel gas cartridge stores Hydrogen as solid metal hydrid powder, not as a compressed gas. The stored and purified fuel gas is always 5.0 quality and sufficient to operate the FID analyzer for a good 40 to 45 hours continuously. Fuel gas refill from a master cylinder is safe and easy with a standard cylinder regulator output of 25 bar.

General:

Complies analytically with EN 12619, EN 14181/ EN ISO 14956, (EU) and with EPA Method 25A and Method 503 (USA)

The Model OVF-3000 uses our long time proven Vent-Down Hydrogen Flame Ionization Detector (FID). Including the detector and sample filter and sample pump, all parts which come in contact with sample are housed in a 180°C heated oven. This prevents the loss of high molecular weight hydrocarbons to ensure true results, fast response, fast set back to zero and very reliable performance in the analysis of low trace level, to high level total carbon concentrations of contaminants in stack emissions, vehicle emissions, process gases, air and other gases.

The disposable heated sample filter is easily accessible in the front panel. No special tools are required for a quick, safe and easy sample filter change. All sample wetted components are integrated into the heated chamber. The OVF-3000 uses a new high tech, low pressure solid metal fuel storage system which is kept inside of the hinged cover. The user can safely, legally and easily refill the fuel cartridge himself at low pressures from any hydrogen bottle. Low cost of ownership. Very low fuel gas consumption. The combustion air supply for the FID-detector is already built in. No external burner air generator or external high pressure cylinder for synthetic burner air is needed. No more dangerous refilling of high pressure cylinder for hydrogen is needed



Easily accessible air purifier and fuel cartridge

Analyzer Features

1. Made in Germany
2. Portable, convenient dimensions, light weight
3. Internal low pressure hydrogen fuel storage system holds enough fuel gas for over 40 to 50 hours of continuous operation. Hydrogen safety; maximum hydrogen filling pressure is only 20 to 25 bar
4. Storing Hydrogen fuel gas in metal hydrid is the guarantee for maximum safety and zero explosion risk.
5. Designed for continuous operation
6. All components which come in contact with sample are fully heated and temperature controlled at 180°C
7. Easy to change sample filter in the front panel. No special tools required for filter change
8. Long life FID ignition system
9. Diluted condensation free FID exhaust
10. Built in burner air generator, no external combustion air source needed
11. Built-in sample pump and sample pressure pumps
12. Automatic flame out alarm with fuel shut off
13. Fast response within 0.2 seconds
14. Low fuel consumption
15. Very selective to hydrocarbons
16. Excellent accessibility for easy maintenance and service

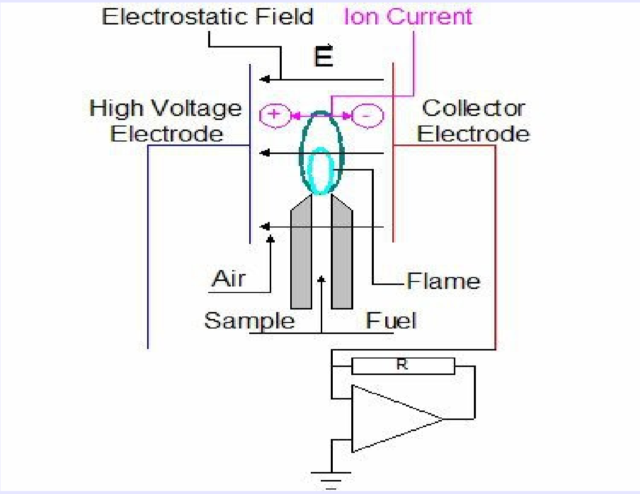
Applications

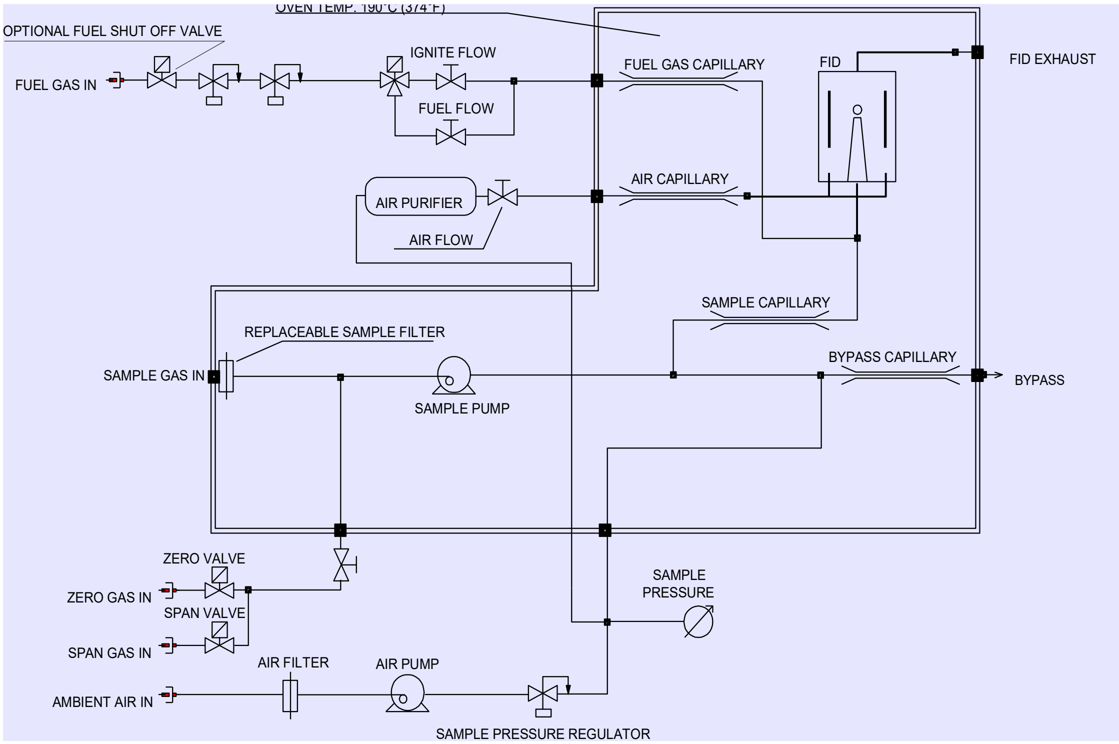
- Stack gas hydrocarbon emissions monitoring
- RDE Testing: Measuring raw exhaust total hydrocarbon car emissions during driving conditions
- RDE Testing: Small enough to be used in the trunk or back compartment of a car in addition to the typical $NO/NO_x/CO/CO_2$ monitoring systems which are mounted outside of the car
- Raw exhaust total hydrocarbon vehicle emissions analysis
- Catalytic converter testing
- Measuring engine combustion efficiency
- Hydrocarbon contamination monitoring in air and other gases
- Carbon adsorption regeneration control
- Indoor air quality monitoring
- 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 43 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

Hydrogen Storage Cartridge (Metal Hydride)
See questions & Answers on last page

Technical Specifications

Method	Heated Flame Ionization Detector (HFID)
Sensitivity	Max. 1 ppm CH_4 full scale (100 ppb lowest detectable)
Response time	@ sample inlet <0.2 seconds
t_{90} time	@ sample inlet <1.2 seconds
t_{90} time including 4X6mm 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)	Front panel turn switch: 0-10,100, 1.000, 10.000, 100.000, others on request.
Signal outputs	0-10 VDC, 4-20 mA, including RS-232 data output
Display	6- digit direct reading ppm units capability to measure up to three (3) overlapping measuring ranges without range change
Total sample flow through	2.5 to 2.8 l/min capacity @ operating temp.
Sample filter	Disposable change filter in rear panel. Option OVE 32
Zero and Span gas	Front panel switch selectable and remote control, gas inlets on rear panel
Zero and span adjust	Manual duo dial on front panel
Fuel gas	100% H2, consumption approx. 20 ml/min
Burner air consumption	Built in burner air supply. No external cylinder air needed. consumption approximately 130 ml/min, all mixed fuel gases approx. 220 ml/min
Oven temperature	180˚C (374˚F)
Temperature control	micro-processor PID controller
Power requirements	230VAC/50Hz, 850W (120 VAC/60Hz optional)
Ambient temperature	5-43˚C (41-110˚F)
Dimensions (W x D x H)	445 mm x 220 mm x 350 mm
Weight	approx. 13 kg

Available Options

ECB 3000	Calibration adapter box to be mounted on heated line inlet or sample inlet. Correct flow adjusted for a 1 bar calibration gas pressure
RCI4 3000	4-20 mA analog output, galvanic isolated
RCI0 3000	0-20 mA analog output, galvanic isolated, instead of standard 4-20 A
TPR 3000	External temperature controller for heated sample line, e.g. JUM TJ 100, “J” type thermocouple

Questions and Answers about the Hydrogen Storage System

Q: Is the new storage a high pressure cylinder?
A: Actually no, it is not. The new hydrogen FID Fuel Gas Storage System is charged at a low pressure of only 25 bar and is operating at pressures far below 8 bar (typically 3 to 5 bar). The tank withstands pressures of over 100 bar.

Q: Is the new hydrogen storage a gas tank?
A: No, it is not a gas tank. In this hydrogen fuel gas storage system, hydrogen is stored in form of solid metal powder which chemically reacts to metal hydride when hydrogen is fulled.

Q: How could I know when I used up hydrogen, and need to recharge it?
A: If the system is used correctly without a leak, the pressure in the storage drops below 1.5 bar after approx. 45 hours and the FID flame goes out. An elapse of 45 hours after correct charging is a good measure to recharge the system.

Q Can your new storage system store other gases?
A: No, it is strictly a hydrogen storage sytem.

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

Q: Is a pressure regulator required while using your new hydrogen storage system?
A: No, since the pressure in the storage remains almost constant until 98% of the gas is consumed, the internal regulator in our FID analyzer is all what you need.

Q: How long does it take to charge an empty hydrogen storage system?
A: Recharging is simple and fast. It only takes around 15 to 30 minutes to charge at a pressure of 25 bar at ambient air temperatures. All together charging takes about 60 minutes to reach equilibrium. Any standard hydrogen pressure regulator with an adjustable output range of 0 to 30 bar can be used.

Q: What is the typical life span of the hydrogen storage system?
A: If charged with 99.999% standard 5.0 qu or higher purity hydrogen, the charge/discharge life span comes to over 8000 cycles with less than 10% decay in storage capacity. In fact, it can be considered as a limitless hydrogen source.

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