Portable TGOC (THC) Analyzer

Heated FID 3-200

THC/Methane only (NMHC) Optional

Transportable heated FID gas emission analyzer for the continuous determination of the mass concentration of total gaseous organic carbon using the Flame Ionization Detector Method. Non Methane Hydrocarbon Option available

Throughout the EU the 3-200 fully complies with QAL1 (EN 14181-EN ISO 14659), EN 12619 and EN 13526 (optional with EN 12619:2013. In the USA with EPA Method 25A and Method 503

Shown with optional metal hydride fuel purifier storage

Very robust analyzer for harsh environments. Low cost of ownership. Low fuel gas consumption. Integral air supply for FID detector. No external cylinder for synthetic air needed. Optional. Available, very safe low pressure metal hydride cartridge purifies and stores Hydrogen as solid metal hydride, not as a compressed gas. Stored fuel gas is 5.0 quality and sufficient to operate the FID for about 35 hours continuously. Refill from a master cylinder is safe and easy with a standard cylinder regulator output of 10 bar (mPa).

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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 several thousand's of analyzers sold, the 3-200 is a very widely distributed portable heated FID Analyzer. Being the most rugged portable FID, It is a very forgiving, very robust and cost effective heated FID analyzer, mostly used in stack monitoring, certification, temporary source and stack compliance testing. Very good for difficult to reach testing locations. ***The most typical use of the 3-200*** *is the employment by stack testing laboratories/companies and OEM's to optimize emissions treatment systems.*

The Model 3-200 is time proven in over 40 years as the identical but portable version of our rack mount analyzers; The VE7, 3-500 and 3-300A are identical analyzers and are TÜV confirmed to fully comply. The 3-200 is a highly reliable and outstandingly forgiving and rugged transportable heated total hydrocarbon (total gaseous organic carbon) FID analyzer. Built for low drift, high accuracy, high sensitivity and stability. The 3-200 uses our proprietary 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, 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 feature allows nearly uninterrupted measurements during cleaning the sample filter. While back purging the sample filter, the connected heated sample line and sample probe are 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 3-200 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. Lower price version with disposable sample filter available. See options list.

The 3-200 is a standard analyzer and therefore optimized in accordance with the European EN-12619:2013 specifications. For numerous other applications different target optimizations are available for “non EN-12619:20136, like EN 12619 and EN 13526” applications are available. Please contact us!

Features

- Made in Germany

- ***1st Sampling Filter Choice:*** Maintenance free, permanently installed sample filter back purge system allows filter to be cleaned without dismantling. Does not interrupt analyzing (automatic back purge optional)
- ***2nd Sampling Filter Choice:*** **D**isposable sample filter which is easily accessible in the rear panel without special tools. This optional available feature reflects 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 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 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
- Remote control for sample, zero gas, span gas and back purge is standard
- Automatic or remote range change optional

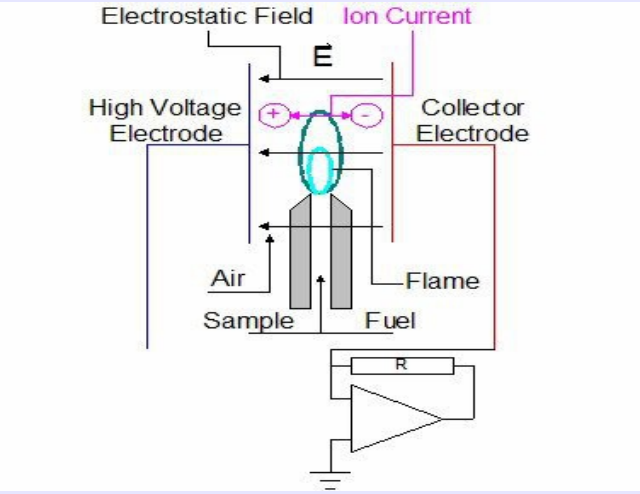
Applications

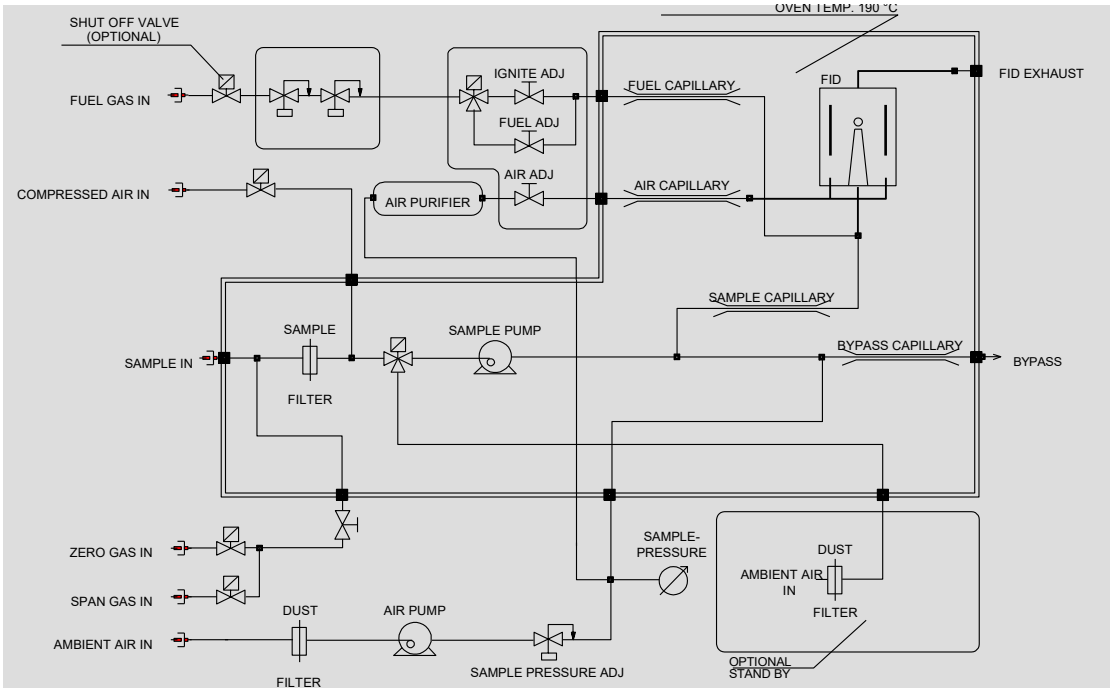
- Compliance monitoring of source hydrocarbons following European **EN 14181/ EN ISO 14659, EN 12619:2013, USA** EPA **regulations: Me**thod 25A and Method 503
- Stack gas hydrocarbon emissions monitoring
- RDE Testing: Measuring TGOC (total hydrocarbon) automobile exhaust emissions during driving conditions. Alternating total hydrocarbon and Methane only as an option, so to say non Methane hydrocarbon determination (not simultaneous)
- Spray paint booth TVOC 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 high purity gases used in the semi conductor industry
- LEL monitor of solvent laden air (Spray paint Booth, Paint Manufacturing, Decrease of metal parts, Printing and coating industry and many more)

Principle of Operation

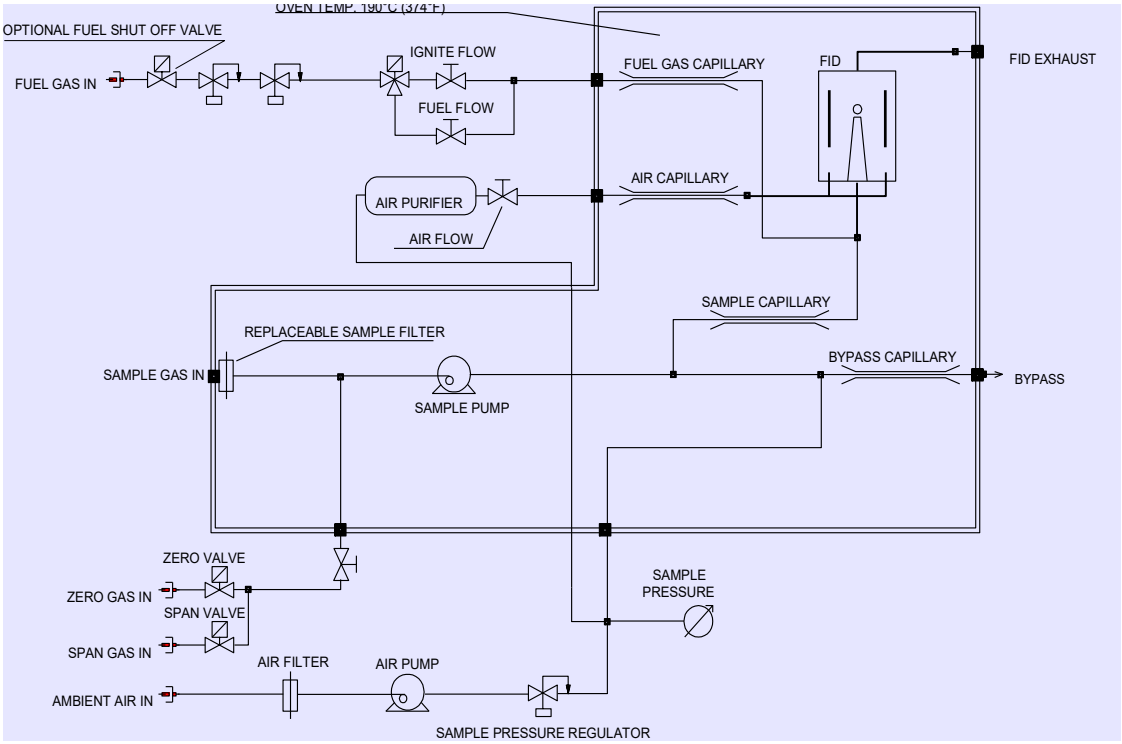
The Heated Flame Ionization Detection (HFID) method is used to determine the presence of total hydrocarbon concentrations in gaseous samples. Burning hydrocarbon-free hydrogen in hydrocarbon-free air produces a negligible number of ions in the detector. Once a sample which contains any organic carbon 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 OVE 32 option; Disposable sample filter

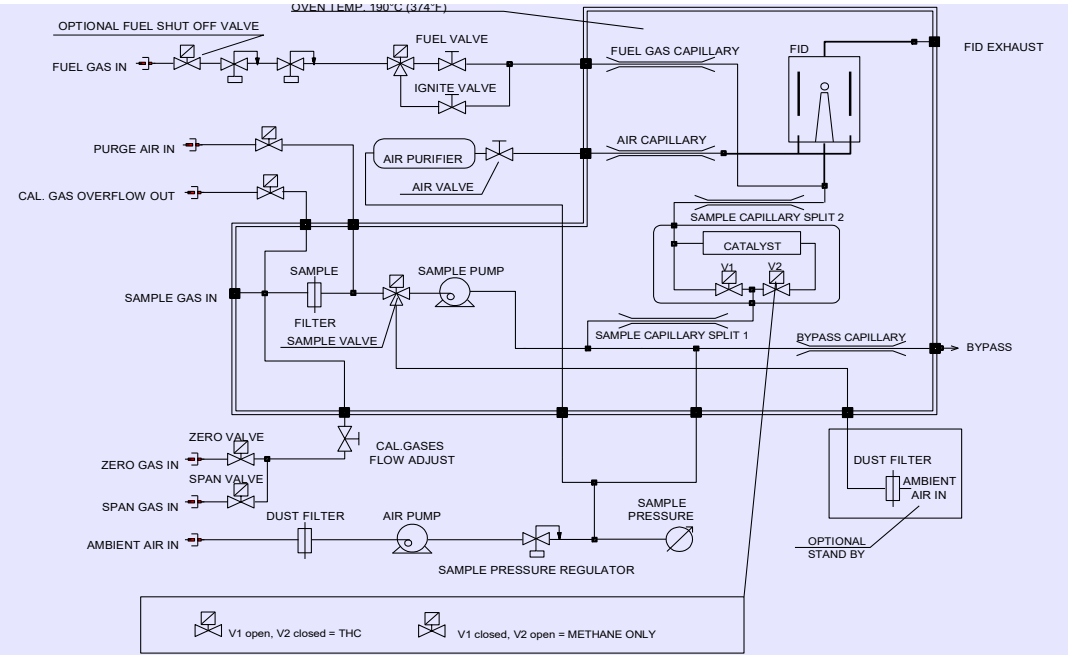
Optional NMHC Catalytic Converter for the selected measurement of Total Hydrocarbons or Methane only

The available Option ICM 32 is an internal Non Methane Hydrocarbon Cutter (NMHC) to measure alternately either THC or Methane-Only (Total Gaseous Organic Carbon or Methane Carbon) concentrations with the 3-200 analyzer

The proprietary NMHC catalytic cutter converts organic carbon into CO2 + H2O. Thus at a presence of minimum 8% Oxygen content in the sample gas. The catalyst is positioned upstream the sample input into the detector. Measurements are performed by passing through the catalyst or by bypassing the the catalyst, Selected by manually switching between the two modes. The sample flow is altered between the two streams of passing the catalyst or bypassing the catalyst via two 2/2 way direct acting solenoid valves with a minimum cycle time of 45 seconds per each stream. The cycle time is an operational parameter which can be performed manually by using a rear panel toggle switch or by using an available external timing device which can be programmed by the operator between minimal 45 seconds to maximal 24 hours. Optimal catalyst performance is guaranteed by using a microprocessor controlled temperature stabilization to ±1°C. Zero calibration must be performed by using a zero grade Nitrogen gas. Span calibration is performed by using a Methane in Air as Span Gas.

Technical Details ICM-32

- Maximum sample inlet concentration should be less than 1000 ppm CH4 equivalent. For higher concentrations consult manufacturer.
- Lower Detection Limit (LDL) +/-5% of range
- Response time T90 THC at sample inlet: <1,2 seconds
- Response time T90 CH4 with cutter at sample inlet: <40 seconds



Complete flow diagram shown with ICM-32 NMHC cutter option in standard analyzer

Technical Specifications

Method	Heated Flame Ionization Detector (HFID)
Sensitivity	Max. 1 ppm CH_4 full scale (100 ppb lowest detectable)
Lower Detection Limit (LDL)	+/-5% of range
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
t_{90} time with CH4 with NMHC cutter	<40 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 optional, and
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 standard. Alternatively 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 choices	✗ Standard 100% H2, consumption approx. 20 ml/min ✗ Optional 40%H2/60%He, consumption approximately 65 ml/min ✗ Optional 40%N2/60%He, consumption approximately 65 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	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)	300 mm x 580 mm x 204 mm
Weight	approx. 18 kg (39 lbs)

Available Options

OVE 32	Quick change disposable 2 micron sample filter housed in the heated oven in stead of back purge sample filter **(A 20% price advantage)**
ICM 32 *	Built-in NMHC Cutter, measure either THC or Methane-Only concentrations with one analyzer
APO 32	Automatic sample filter pack purge; EXTERNAL, easily programmable back purge timing system for back purge time and purge sequence sequence. (Does not work with OVE 32)
AZM 32	Automatic flame ignition and re-ignition
ENGA 32	6-digit engineering units display 0-100.000 ppm (or other units) with RS232 data output. 24 bit resolution allows to digitally measure throughout 2 to 3 measuring ranges without range change
FOAS 32	Flame out control with automatic fuel shut off valve
PDA 32	Sample pressure monitor with alarm
RCA 32	0-20mA analog output instead of 4-20mA
RCI0 32	0-20 mA analog output, galvanic isolated
RCI4 33	4-20 mA analog output, galvanic isolated
TPR 32	Built in temperature controller for J.U.M. heated sample lines Model TJ 100 or other lines with "J" type thermocouple
FSS 32:	Low pressure, 50 liter metal hydride hydrogen fuel filter/storage cartridge including mounted pressure regulator and pressure gauge on female 1/4" Swagelok quick connector. Refill from large cylinder is safe and can be made with any standard 0 to 30 bar gas cylinder regulator. See inserted picture on 1st page of our data sheet
UFS 32	Hydrogen Recharging Set; Pressure regulator for high pressure hydrogen cylinder equipped with Swagelok° flow through quick connector
TJ 100	Heated Sample Line: 1, 3, 5 and 10 Meters of Length. Ask for data sheet!
Important!	✗ *** ICM cannot be combined with LTO* ✗ **** TPR cannot be combined with ICM*

Low Pressure Metal 50 Liter Metal Hydride Fuel Gas Filter/Storage
See Questions & Answers Next Page:

Questions and Answers about the low pressure rechargeable Hydrogen gas filter/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 9 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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