Portable THC Analyzer

TVOC Heated FID 3-200

Transportable heated 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), with EN 12619:2013 and 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 available, safe, low pressure unit stores Hydrogen as solid metal hydrid powder, not as a compressed gas. Stored fuel gas is 5.0 quality and sufficient to operate the FID for over 45 hours continuously. Refill from a master cylinder is safe and easy with a standard cylinder regulator output of 25 bar.

General:

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

While several thousand's of analyzers sold, the 3-200 is a very widely distributed portable heated FID Analyzer. It is a very forgiving, very robust and cost effective heated FID analyzer, mostly used in stack 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 38 years as the identical but portable version of our rack mount analyzers; The 3-200, VE7 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” applications are available. Please contact us!

Analyzer Features

- Made in Germany
- ***1 st 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)
- ***2 nd Sampling Filter Choice:*** Disposable 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

Heated FID Continuous THC/TGOC Monitoring Solutions
Since 1973

- 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

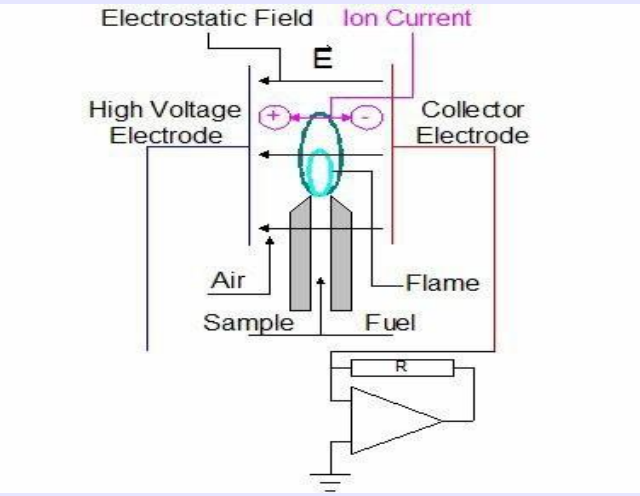
Applications

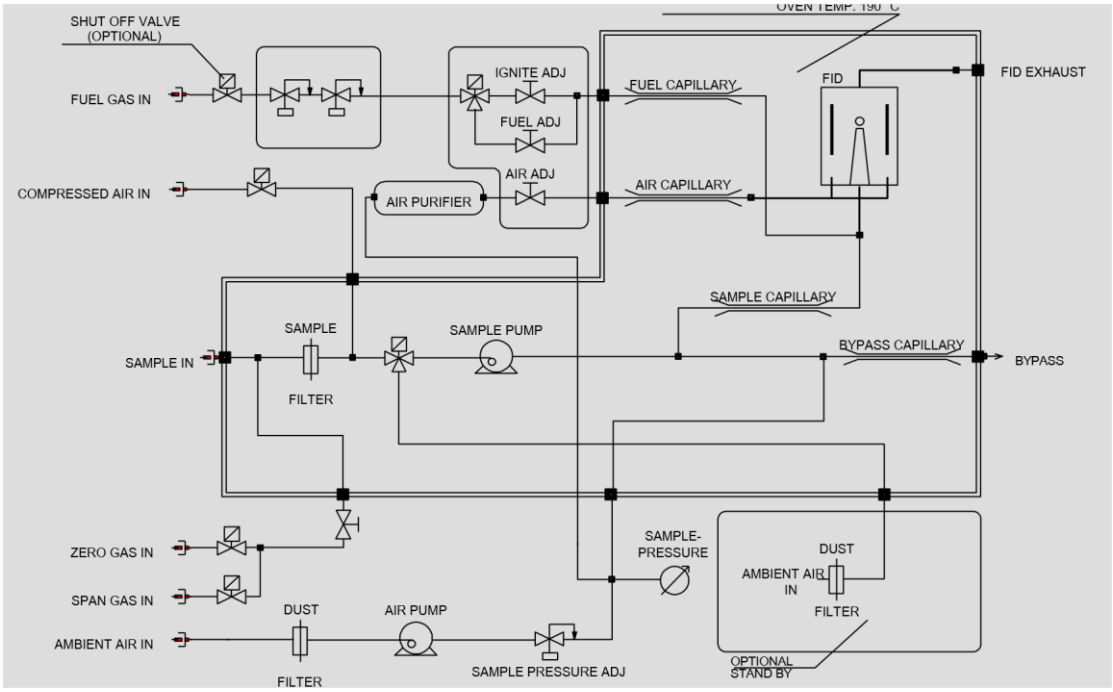
- Compliance monitoring of source hydrocarbons following European **EN 14181/ EN ISO 14659, EN 12619:2013, USA** EPA **regulations: Me**thod 25A and Method 503
- Stack gas hydrocarbon emissions monitoring
- Spray paint booth TVOC monitoring
- Fence line (perimeter) monitoring
- Solvent recovery monitor 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

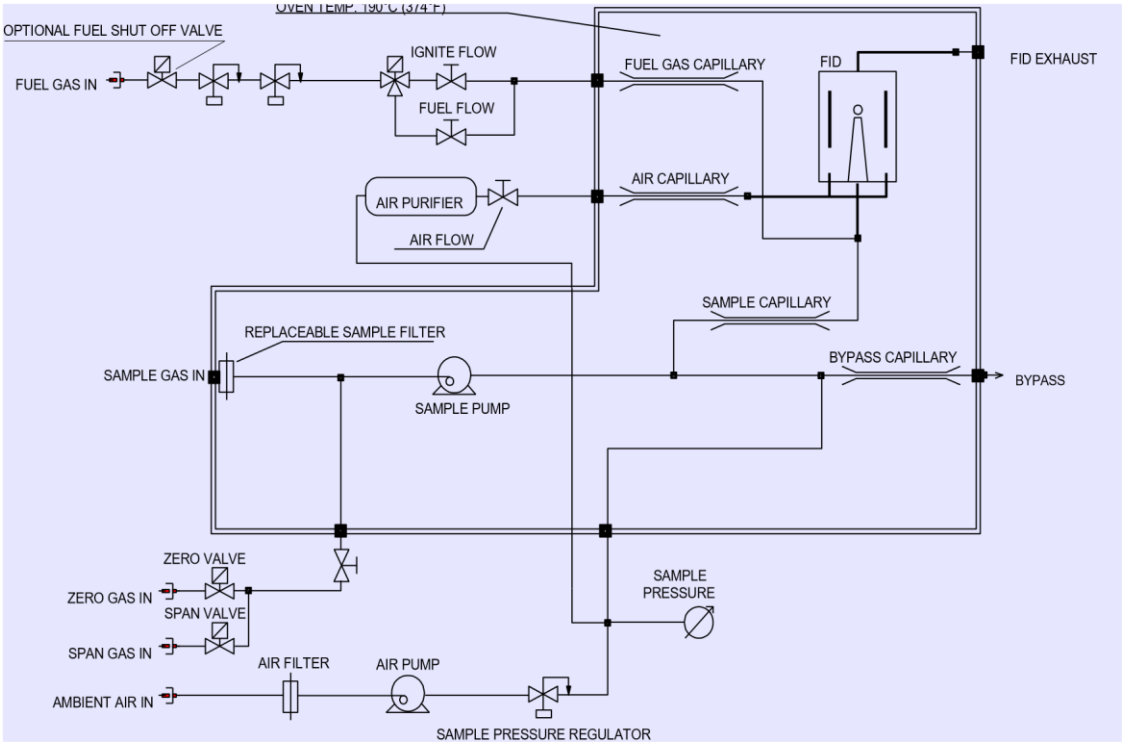
The Heated Flame Ionization Detection (HFID) method is used to determine the presence of total hydrocarbon concentrations in gaseous samples. Burning hydrocarbon-free hydrogen in hydrocarbon-free air produces a negligible number of ions in the detector. Once a sample which contains any organic carbon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

Technical Specifications

Method	Heated Flame Ionization Detector (HFID)
Sensitivity	Max. 1 ppm CH 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)	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 choice	1. Standard 100% H2, consumption approx. 20 ml/min 2. Optional 40%H2/60%He, consumption approximately 90 ml/min 3. 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, 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)**
AMU 32	Automatic controlled range change with range identification
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
ICM 32 *	Built-in NMHC Cutter, measure either THC or Methane-Only concentrations with one analyzer
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 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 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!	*1. ** ICM cannot be combined with LTO 2.* *** TPR cannot be combined with ICM*

Low Pressure Metal 50 Liter Metal Hydrid Fuel Gas Storage
See Questions & Answers Next Page:

Questions and Answers About the Low pressure Hydrogen Storage System

Q: Is the new fuel gas 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 below 8 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 filled.

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. 36 plus hours and the FID flame goes out. An elapse of 35 hours after correct charging is a good indicator to recharge the system. A pressure gauge in the fuel line can be used as an indicator.

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

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 30 plus 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 should be used for charging.

Q: What is the typical life span of the hydrogen storage system?
A: When always being charged with 99.999% standard 5.0 or higher quality 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.

J.U.M.® Engineering GmbH

Gauss-Str. 5, D-85757 Karlsfeld, Germany
Tel.: 49-(0)8131-50416, Fax: 49-(0)8131-98894
E-mail: info@jum.com
Internet: www.jum.com

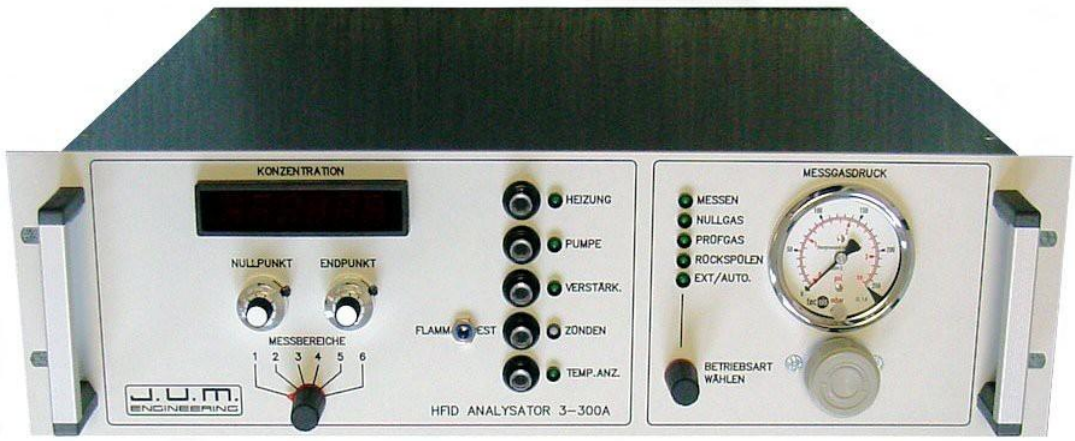
Update Published: June 2017, Print: 06-2017

Rack Mount/Table Top TVOC Analyzer

THC Heated FID 3-300A

Space saving 19"/3PU 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 any related HC condensation

Printed on 100% Recycled Paper

General:

Confirmed by TÜV-Nord to comply with 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.

The J.U.M. Engineering HFID Model 3-300A is time proven in 25 years as the space saving version of our 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 EN12619:20136” applications are available.

Heated FID Continuous THC/TGOC Monitoring Solutions
Since 1973

J.U.M. Engineering
Analyzer

3-300A Heated FID Total Gaseous Organic Carbon

Analyzer Features

1. Made in Germany
2. ***1 st Sampling Choice:*** Maintenance free, permanently installed sample filter back purge system allows filter to be cleaned without dismantling (automatic back purge optional)
3. ***2 nd 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.
4. All components in contact with sample are fully heated and digitally maintained at 190°C
5. Built-In sample pump
6. Built-in combustion air pump and supply, no extra burner air bottle needed
7. 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
8. "Overflow" calibration system for safe zero and span calibration
9. Automatic flame out alarm contact and optional available fuel shut off valve
10. Fast response less than 1 second @ sample inlet
11. Low fuel consumption @ 100% or 40/60 mixed fuel gases
12. Microprocessor PID type temperature controller
13. Cold spot free coupling of a heated sample line inside the heated oven with optional Adapter Plate (Works not with OVE Option)
14. Remote control for sample, zero gas, span gas and back purge is standard
15. Automatic or remote range change optional

Applications

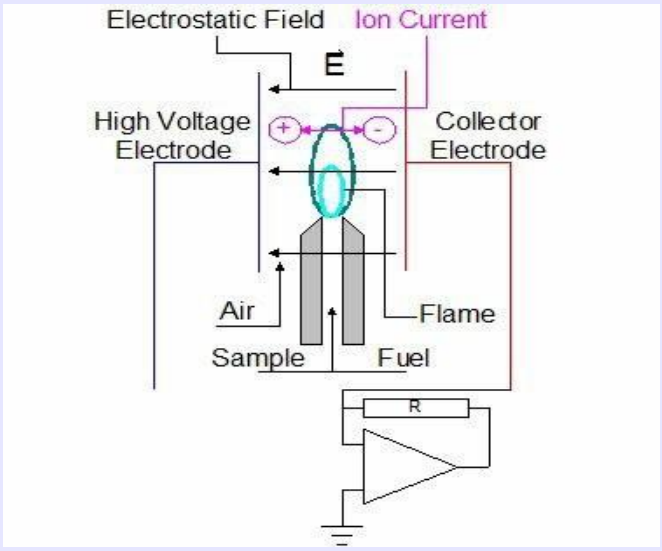
- Compliance monitoring of source hydrocarbons following European EN 14181/ EN ISO 14659, EN 12619:2013 regulations, US-EPA Method 25A and Method 503
- Stack gas hydrocarbon emissions monitoring
- Vent gas hydrocarbon emissions monitoring
- Fence line (perimeter) monitoring

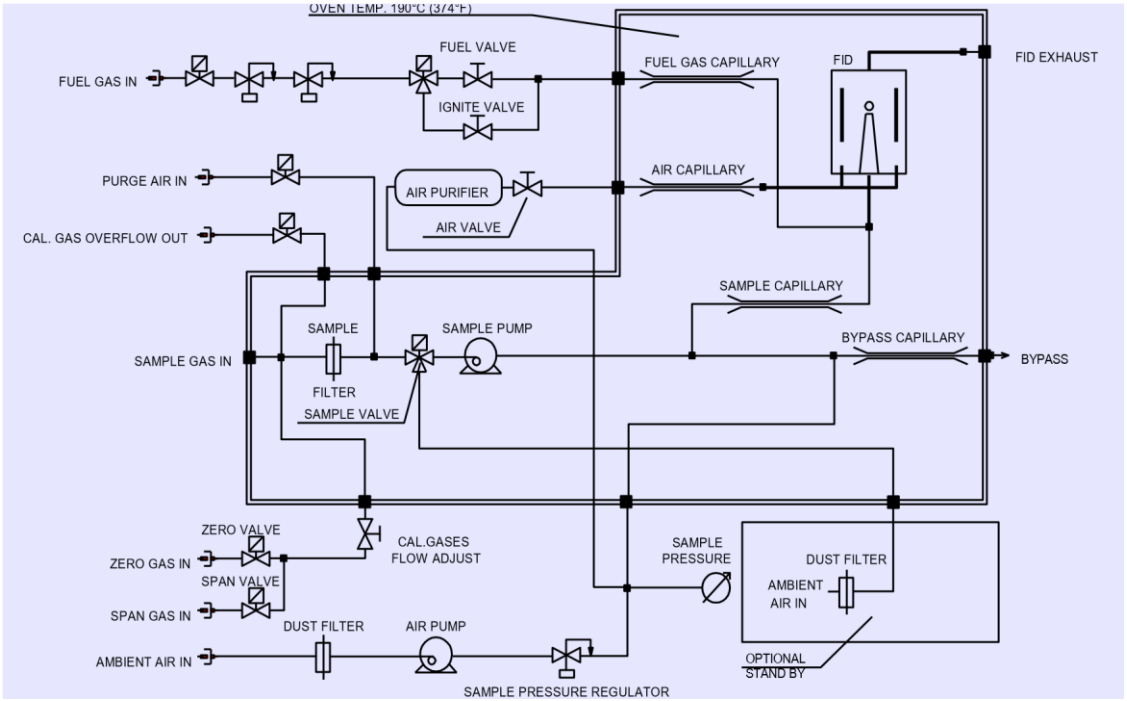
- Solvent recovery monitor for carbon bed break through
- Catalytic converter and thermal combustion testing
- Carbon adsorption regeneration control
- Measuring engine combustion efficiency
- Raw exhaust vehicle emissions analysis
- Hydrocarbon contamination monitoring in air and other gases
- Detection of trace hydrocarbons in purity gases used in the semi conductor industry
- LEL monitor of solvent laden air

Principle of Operation

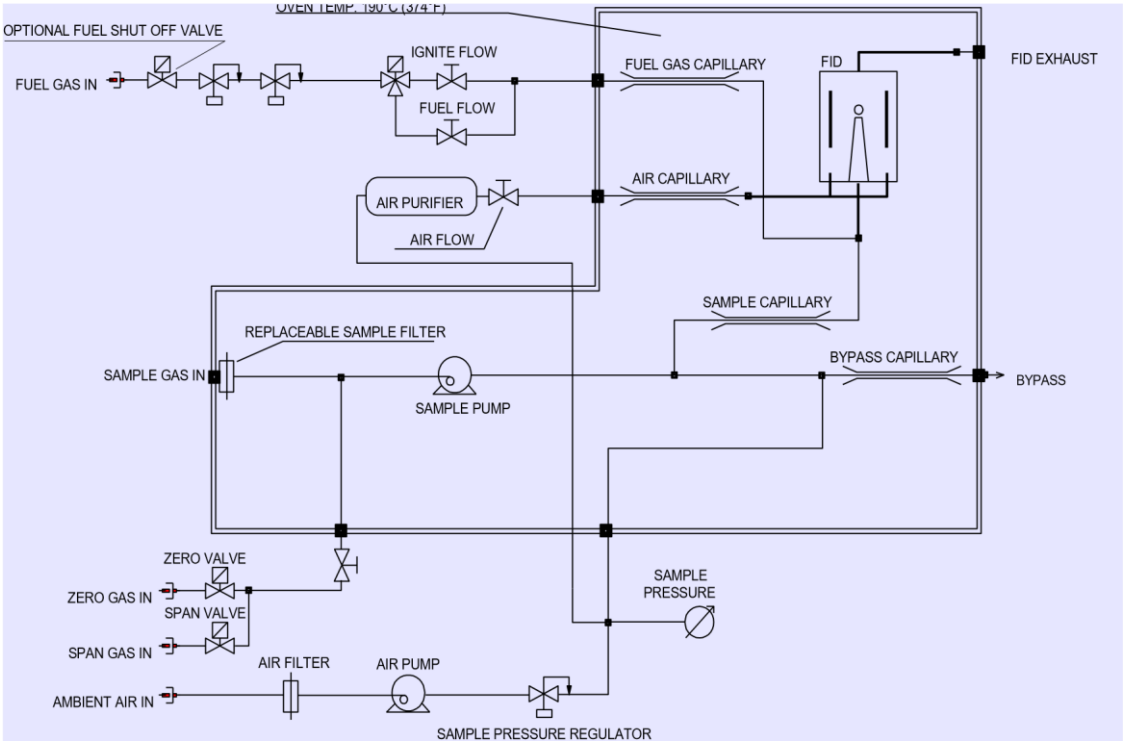
The Heated Flame Ionization Detection (HFID) method is used to determine the presence of total hydrocarbon concentrations in gaseous samples. Burning hydrocarbon-free hydrogen in hydrocarbon-free air produces a negligible number of ions in the detector. Once a sample which contains any organic carbon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


Electrostatic Field
Ion Current
E
High Voltage Electrode
Collector Electrode
Air
Flame
Sample
Fuel
R


OVEN TEMP. 190°C (374°F)
FUEL GAS IN
FUEL VALVE
IGNITE VALVE
FUEL GAS CAPILLARY
FID
FID EXHAUST
PURGE AIR IN
AIR PURIFIER
AIR VALVE
AIR CAPILLARY
CAL. GAS OVERFLOW OUT
SAMPLE CAPILLARY
SAMPLE
SAMPLE PUMP
SAMPLE GAS IN
FILTER
SAMPLE VALVE
BYPASS CAPILLARY
BYPASS
ZERO VALVE
ZERO GAS IN
CAL.GASES FLOW ADJUST
SPAN VALVE
SPAN GAS IN
DUST FILTER
AIR PUMP
AMBIENT AIR IN
SAMPLE PRESSURE
DUST FILTER
AMBIENT AIR IN
OPTIONAL STAND BY
SAMPLE PRESSURE REGULATOR

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 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 OW 7.
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	1. Standard 100% H2, consumption approx. 20 ml/min 2. Optional 40%H2/60%He, consumption approximately 90 ml/min 3. 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
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
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
ICM 33 *	Built-in NMHC Cutter, measure either THC or Methane-Only concentrations with one analyzer
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.*
PDA 33	Sample pressure monitor with alarm
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

Important!

1. ** ICM cannot be combined with LTO*
2. *** MBP cannot be combined with ICM*
3. **** When equipped with OWM 33, the analyzer design is upright. The dimensions are (W x D x H) 383 mm (19") x 132 mm x 700 mm*

J.U.M.® Engineering GmbH

Gauss-Str. 5, D-85757 Karlsfeld, Germany
Tel.: 49-(0)8131-50416, Fax: 49-(0)8131-98894
E-mail: info@jum.com Internet: www.jum-aerosol.com

Print Date: February 2016

Rack Mount/Table Top NMGOC Analyzer

Heated FID 109A

The 109A is a rack mount and table top heated emission analyzer for the continuous / simultaneous determination of the mass concentration of Non Methane Gaseous Organic Carbon using the Dual Flame Ionization Detector method. Throughout the EU the TGOC (TVOC) channel fully with complies with QAL1 (EN 14181-EN ISO 14659) and EN 12619:2013. In the USA full compliance with EPA Method 25A and Method 503

**Low cost of ownership. **Low fuel gas consumption. **The combustion air supply for the FID-detector is built in. No external cylinder for synthetic air is needed. **To prevent well known 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 any related HC condensation

Printed on 100% Recycled Paper

General:

The THC (TVOC) circuit of this analyzer fully complies with QAL1 (EN 14181-EN ISO 14659), with EN 12619:2013 and in USA with EPA Method 25A and Method 503

The 109A is the only available heated non methane gaseous organic carbon NMGOC (NMHC) FIDanalyzer with an internal permanently installed sample filter to be cleaned by pack purge with compressed air or nitrogen. This feature cleans the sample filter and sample line at the same time. A stack filter probe is not required when the analyzer is used as a "stand alone", or the stack probe is equipped with a solenoid valve to allow the back purged contamination to be vented downstream of the stack filter. This makes the 109A ideal for CEM applications with extremely low sample line drift (hang up)

The J.U.M. Engineering HFID Model 109A is time proven in nearly 20 years. It is a highly reliable and outstandingly rugged 19" rack mount or table top heated NMGOC (non methane gaseous organic carbon) analyzer. Built for very low drift, high accuracy, sensitivity and stability. The 109A uses two parallel operating hydrogen flame ionization detectors (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. One of the two sample capillaries is connected in series to a temperature controlled catalyst module. This catalyst oxidizes all hydrocarbons except Methane carbon. Both detectors are connected to two individual electrometer amplifiers. From these two FID signals, total organic gaseous carbon from the detector without the catalyst and methane carbon from the detector with the catalyst, the non methane organic carbon signals is generated via differential calculation Thus resulting in the three continuous simultaneous signals shown on individual front panel displays. Three individual DC voltage and 4-20 mA signals are available in the rear panel plus an optional RS 232 data output per signal. All sample containing parts and components are discretely 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 external sample line and sample probe is also cleaned. The use of a stack probe filter is not necessary when the FID is used in a stand alone mode. The combustion air supply for the detector is built in. No expensive zero gas generator or external cylinder for synthetic air is needed. The proprietary rear panel sample line adapterplate 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 a wrench port in the right side panel.

Analyzer Features

- Made in Germany
- ***1 st Sampling Choice:*** Maintenance free, permanently installed sample filter back purge system allows filter to be cleaned without dismantling (automatic back purge optional)
- ***2 nd Sampling Choice:*** Disposable sample filter which is easily accessible in the rear panel without special tools. This optional available feature reflects a 20% price advantage.
- All components in contact with sample are fully heated and digitally maintained at 190°C

- Built-In sample pump

Heated FID Continuous TGOC & NMGOC Monitoring Solutions, Since 1973

- Built-in combustion air supply, no extra burner air bottle needed
- Permanent 2 micron stainless steel wire mesh back purge 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 time
- Low fuel consumption @ 100% H2 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 (not available with OVE Option)
- Remote control for sample, zero gas, span gas and back purge is standard
- Automatic or remote range change optional

Applications

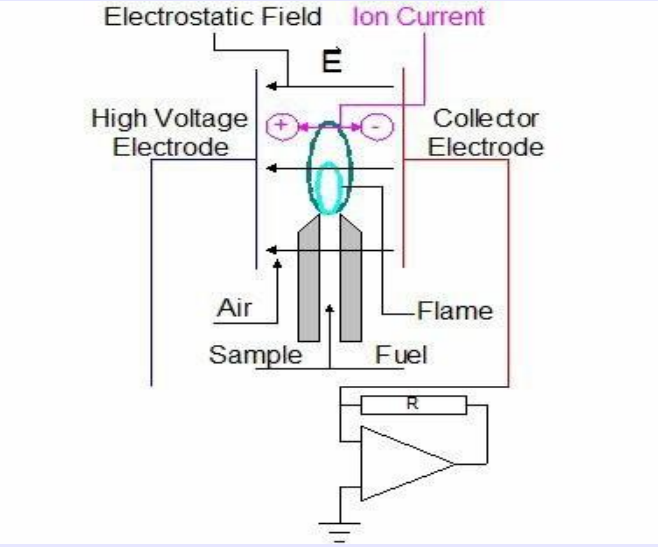
- Compliance monitoring of source total organic gaseous carbon, methane carbon and non methane organic gaseous carbon and with US EPA Method 25A and US IACA TCM-042
- VOC compliance stack emissions monitoring Industrial printing press dryer systems
- US EPA VOC compliance testing of bakery stack emissions
- Optimizing industrial bakery ovens
- Fence line (perimeter) monitoring
- Solvent recovery monitor for carbon bed break through
- Catalytic converter monitoring/ testing
- Thermal combustor monitoring/ testing
- Carbon adsorption regeneration monitoring and control
- Raw exhaust vehicle emissions analysis
- Hydrocarbon contamination monitoring in air and other gases

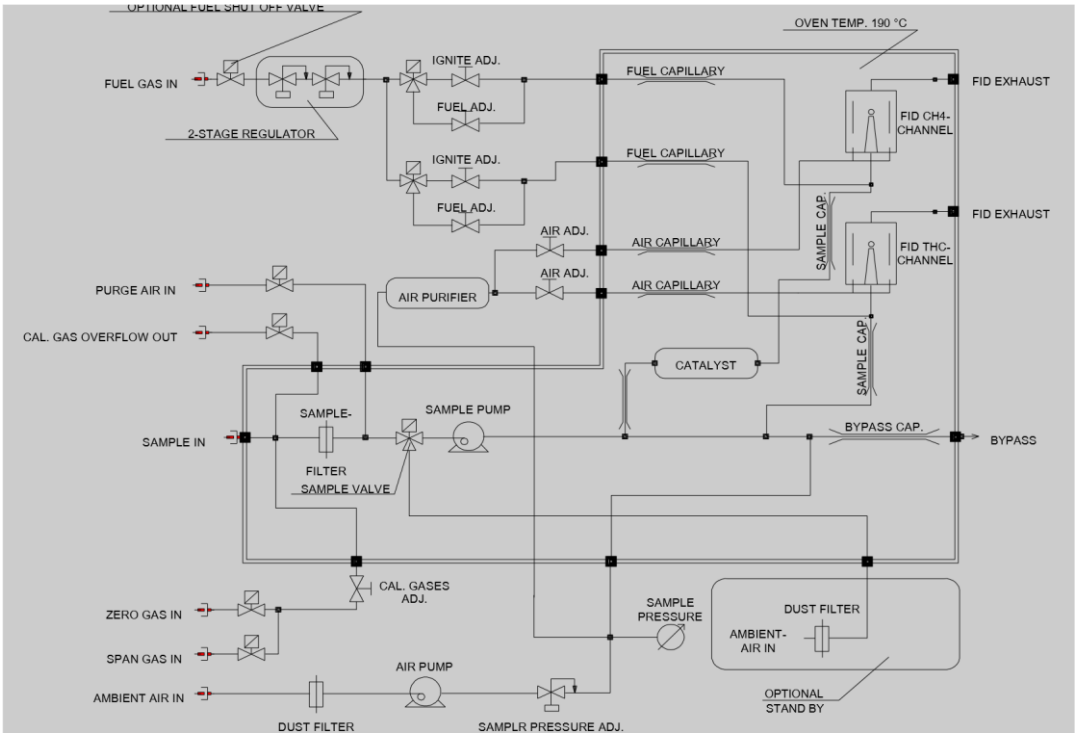
Principle of Operation

The Heated Flame Ionization Detection (HFID) method is used to determine the presence of total organic carbon concentrations in gaseous samples. Two detectors are used in parallel, one for TGOC and one for Methane Carbon (MC). 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 electro-meter-amplifier unit.

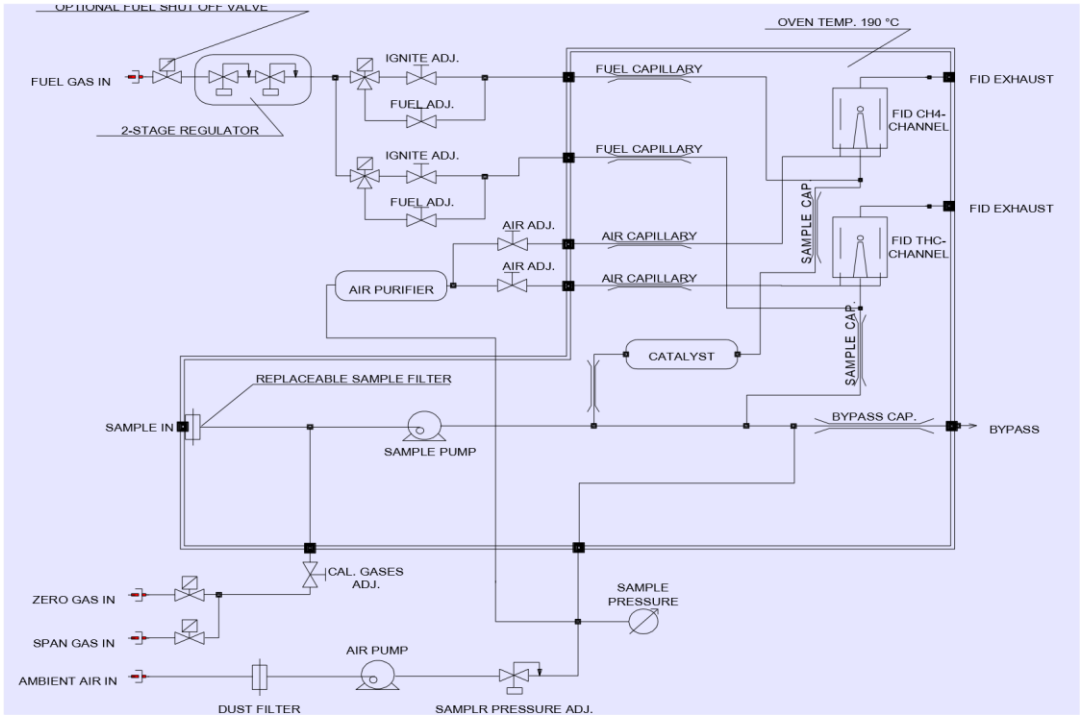
Our proprietary sample pressure regulator provides a controlled sample pressure and flow which gives admittance of a constant sample flow rate to the FID burner. This technique of using our non sample contact regulator is time proven for over 40 years by J.U.M. Engineering to provide the highest possible 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 9

Technical Specifications

Method	Dual heated Flame Ionization Detector (HFID) one for TGOC, one for MOC (CH_4)
Sensitivity	Max. 1 ppm CH full scale

Response time TGOC	<0.2 seconds @ sample inlet
Response time CH_4	< 15 seconds @ sample inlet **T time TGOC** < 1.2 seconds @ sample inlet $_{90}$
T time CH_4 $_{90}$	< 50 seconds @ sample inlet
Linearity	Up to 10.000 ppm full scale within 1.5%
Oxygen synergism	< 2.5% FSD
Measuring ranges (ppm)	0-10,100, 1.000, 10.000, 100.000, others on request. Front panel turn switch, automatic or remote control optional
Signal outputs	One each 0-10 VDC, 4-20 mA, RS-232 data output for TGHOC, MGO and NMGOC and
Display	6- digit direct reading ppm units capability to measure 3 overlapping ranges without range change **Total sample flow** 2.5 to 2.8 l/min capacity @ operating temp. **through**
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 9
Zero and Span gas	Front panel switch selectable and remote control, gas inlets on rear panel
Zero and span adjust	Manual duo dials on front panel
Fuel gas choice	1. Standard 100% H2, consumption approx. 40 ml/min 2. Optional 40%H2/60%He, consumption approximately 180 ml/min 3. Optional 40%N2/60%He, consumption approximately 180 ml/min
Burner air consumption	Built in burner air supply. No external cylinder air needed. consumption approximately 260 ml/min. At 40/60 mixed fuels. Air consumption is approx. 450 ml/min
Oven temperature	190°C (374°F)
Temperature control	micro-processor PID controller
Power requirements	230VAC/50Hz, 900 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 221 mm
Weight	approx. 24 kg (50 lbs)

Available Options

OVE 9	Quick change, disposable 2 micron sample filter housed in the heated oven in stead of back purge sample filter **(A 20% Price Advantage)**
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. Includes extractive FID exhaust. Only available on special request.
AMU 9	Automatic controlled range change with range identification

APO 9	Automatic sample filter pack purge; Internal, easily programmable back purge timing system for back purge time and purge sequence sequence
AZM 9	Automatic flame ignition and re-ignition
ENGA 9	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 9	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. Not available with PDA option
PDA 9	Sample pressure monitor with alarm
RCC 9	Remote controlled range change with range identification (dry contact)
RCI4 9	4-20 mA analog output, galvanic isolated
RCI0 9	0-20 mA analog output, galvanic isolated
TPR 9	External temperature controller for J.U.M. heated sample lines TJ 100 or other brand with “J” type thermocouple

Important! ** When equipped with OWM option the analyzer design is to be mounted upright with all gas and electrical connections on top. The dimensions are (W x D x H) 383 mm (19”) x 221 mm x 700 mm*

J.U.M.® Engineering GmbH

Gauss-Str. 5, D-85757 Karlsfeld, Germany
Tel.: 49-(0)8131-50416, Fax: 49-(0)8131-98894
E-mail: info@jum.com
Internet: www.jum-aerosol.com

1st Published: Nov. 2014, Print: March 201

GMS800 FIDOR®

Total hydrocarbon analyzer

Solution for continuous hydrocarbon measurements

- High availability (99.5 %)
- Convenient via ethernet, remote diagnosis and operation
- Minimum maintenance costs due to the absence of moving parts
- Replacement of complete assemblies and modules makes repairs easy
- Compatible with predecessor systems
- Hydrogen as fuel gas, expensive helium is not required
- Low operating costs

Endress+Hauser
People for Process Automation

Solution for continuous hydrocarbon measurements

The compact GMS800 FIDOR® extractive gas analyzer is the solution for continuous hydrocarbon measurements. Both the standalone and the integrated system versions combine rugged design, ease of operation, precision measuring, and modern interfaces to achieve very high availability of 99.5 %. This means more reliability and better measurement certainty when monitoring emissions of total hydrocarbon concentrations. Where operating costs are concerned, the GMS800 FIDOR® features low consumption of hydrogen as its fuel gas, compact dimensions, and maintenance-free ejector pump. The modular and simple construction inside the device allow for easy maintenance and servicing.

High measurement certainty The GMS800 FIDOR continuously measures hydrocarbon concentrations – without any moving parts featuring in the design of the analyzer. Wear and mechanical failures are not an issue. Another plus is that the ejector pump for the sample gas is maintenance-free. Stable measurement certainty is assured in the long term. The very high availability (99.5 %) of the hydrocarbon analyzer is a major factor in this regard. The GMS800 FIDOR can be relied upon to deliver valid measured values at all times.

Minimum maintenance required The GMS800 FIDOR has a certified maintenance interval of three months. Achieved due to the durability of the device, resulting in low cost of ownership.

High operational safety The GMS800 FIDOR is also capable of operation in an extended process gas pressure range of ± 120 mbar. Protective filters at all gas inlets provide increased protection against contamination and failure. As a result, the GMS800 FIDOR is able to achieve high levels of operational safety.

Cost-effective measuring The GMS800 FIDOR uses hydrogen for fuel gas and, at 30 ml/min (typical), consumption is low. An expensive hydrogen/helium mixture is not required. All this combined makes for efficient measuring.

Combining user-friendliness with convenient remote operation As standard, the basic control unit (BCU) for the GMS800 FIDOR is available directly on the device. Retrieving measured values or remote diagnosis can be carried out quickly and conveniently via optional remote control.

Fully tested for suitability inline with EN 15267-3 Having passed EN 15267-3 suitability testing and boasting outstanding performance figures, the GMS800 FIDOR guarantees availability of 99.5 %. The certification is valid for the entire system including analyzer, probe, heated sample gas inlet, and catalytic converter.

Versions: GMS800 FIDOR

GMS810 FIDOR: 19" design with integrated basic control unit (BCU)

In the compact 19" design, the GMS810 FIDOR with integrated basic control unit (BCU) features a user interface menu with password protected access to all relevant settings and diagnosis functions.

GMS811 FIDOR: 19" design with external basic control unit (BCU)

The GMS811 FIDOR comprises the 19" housing and the separate basic control unit (BCU). The BCU can be set up separately as a complete external unit including I/O signals and interfaces for convenient control and monitoring of the analyzer locally (in a maintenance control room, for example).

GMS840 FIDOR: wall housing (standalone) with integrated basic control unit (BCU)

The space-saving wall housing model GMS840 FIDOR for stand-alone operation. Enclosure rating class IP54 with purge gas and pneumatic hydrogen shutoff.

GMS800 FIDOR®:

Solution for continuous hydrocarbon measurements

Product description

A member of the innovative GMS800 analyzer family, the GMS800 FIDOR extractive gas analyzer is ideally suited for emission monitoring according to regulatory requirements (in waste incinerators, cement and/or power plants, for example). Based on the proven flame ionization detection principle, the GMS800 FIDOR measures total hydrocarbon concen trations in gases at both trace levels

and high concentration levels. The GMS800 FIDOR is available in three versions: the GMS810 FIDOR with integrated control unit (BCU), the GMS811 FIDOR with separate control unit (BCU) and the GMS840 FIDOR with a space-saving wall housing. The housing makes stand-alone operation and the integration into existing systems such as the MCS200 HW multicomponent analyzer very easy.

At a glance

- Standard 19" housing for easy integration into typical industrial systems
- Space-saving wall housing

(stand-alone)

- Virtually maintenance-free ejector pump for conveying sample gas
- Internal catalytic converter (option) for cleaning zero gas and combustion air
- Protective filter at sample gas inlet
- Automatic regulation and compensation of in-process pressure fluctuations
- High degree of linearity (≤ 2 %) for very low through high measuring ranges
- Suitability tested according to EN 15267 and EN 14181

Your benefits

- High availability (99.5 %)
- Convenient remote diagnosis and operation via ethernet using SOPAS-ET software
- Minimum maintenance costs due to the absence of moving parts
- Replacement of complete assemblies and modules makes repairs easy
- Compatible with predecessor systems
- Hydrogen as fuel gas, expensive helium is not required
- Low operating costs, e.g., due to low hydrogen consumption
- (typical 30 ml/min)
- The GMS811 FIDOR, on which the control unit (BCU) can be separated from the analyzer unit,

convenient control and monitoring from a central control room.

Fields of application

- Continuous monitoring of hydrocarbon emissions in raw gas and clean gas
- Emissions measurement in thermal, catalytic, and biological exhaust gas cleaning systems

supports

More Information online

For more information, enter the link or scan the QR code to get direct access to technical data, operating instructions, software, application examples, and much more.

www.endress.com/gms800fidor

Detailed technical data

GMS800 FIDOR

Sample quantity	≤ 120 l/h
Process temperature	≤ +230 °C
Process pressure	–120 hPa ... 120 hPa relative
Process gas humidity	Non-condensing
Ambient temperature	+5 °C ... +40 °C
Storage temperature	–20 °C ... +70 °C
Ambient pressure	hPa ... 1.100 hPa
Ambient humidity	≤ 95 % non-condensing
Electrical safety	CE
Electrical connection	
Voltage	... 240 V
Frequency	... 63 Hz
Power consumption	≤ 450 W
Auxiliaries	
Instrument air:	≤ 1.000 l/h Instrument air: 4±0.2 bar; particle size max. 1 µm; oil content max. 0.1 mg/m³; pressure condensation point max. –40 °C
Fuel gas:	Typical 30 ml/min Hydrogen: 5.0 or higher; 3±0.2 bar
Combustion air:	Typ. 250 ml/min Instrument air: 3±0.2 bar; measuring ranges below 300 ppm (500 mg/m³) require an internal or external catalytic converter
Zero gas:	≤ 500 l/h Instrument air: 3±0.2 bar; measuring ranges below 300 ppm (500 mg/m³) require an internal or external catalytic converter
Reference gas:	≤ 500 l/h Propane in synthetic air: 75 % of measuring range final value; 3±0.2 bar
Purge gas:	> 1.200 l/h Air for purging enclosure
Corrective functions	Adjustment with test gases
Test functions	Extended device diagnosis with SOPAS ET software
Scope of delivery	The scope of delivery depends on application and customer specifications

- Measurement of maximum workplace concentrations
- Process monitoring in process systems
- Laboratory applications, e.g., in research and development

Design GMS810

Description	19" rack housing with 4 rack units, for integration in cabinets
Enclosure rating	IP40
Dimensions (W x H x D)	483 mm x 177 mm x 485 mm (for details see dimensional drawing)
Weight	17 kg
Power supply	
Voltage	90 ... 240 V
Frequency	47 ... 63 Hz
Power consumption	≤ 450 W
Sample connections	Sample gas inlet: G 1/4"; G 1/8" double, no protection against kinking; G 1/8" no protection against kinking Exhaust gas outlet: 12 mm straight; 1/2" straight; 10 mm 90° bent
Auxiliary connections	Auxiliary gas inlet: Varies depending on type

Design GMS811

Description	19" rack housing with 4 rack units, for use with separate control unit (BCU), for integration in cabinets
Enclosure rating	IP40
Dimensions (W x H x D)	483 mm x 177 mm x 352 mm (for details see dimensional drawing)
Weight	17 kg
Power supply	
Voltage	90 ... 240 V
Frequency	47 ... 63 Hz
Power consumption	≤ 450 W
Sample connections	Sample gas inlet: G 1/4"; G 1/8" double, no protection against kinking; G 1/8" no protection against kinking Exhaust gas outlet: G 1/4"; G 1/8" double, no protection against kinking; G 1/8" no protection against kinking
Auxiliary connections	Auxiliary gas inlet: Varies depending on type

Design GMS840

Description	Closed steel sheet housing for wall mounting for use indoors
Enclosure rating	IP 54
Dimensions (W x H x D)	522 mm x 475 mm x 478 mm (for details see dimensional drawing)
Weight	20 kg
Power supply	
Voltage	90 ... 240 V
Frequency	47 ... 63 Hz
Power consumption	≤ 450 W
Sample connections	Sample gas inlet: screw-in fittings, 6 mm, G1/8", stainless steel Exhaust gas outlet: G 1/4"
Auxiliary connections	Varies depending on type

Analyzer unit FIDOR

Description	Flame ionization detector for measuring volatile organic components (VOC)
Measuring components	Total carbon (C_{org})
TÜV-approved measured values	Total carbon (C_{org})
Measurement principle	Flame ionization detection
Sample quantity	≤ 120 l/h
Measuring ranges	
C_{org}	0 ... 0.6 ppm / 0 ... 62,000 ppm A flame arrester must be provided by the customer when measuring gas concentrations above the lower explosion limit (LEL).
Certified measuring ranges	
C_{org}	0 ... 15 mg/m³ / 0 ... 50 mg/m³ / 0 ... 150 mg/m³ / 0 ... 500 mg/m³
Response time	≤ 2,5 s No sample gas line
Sensitivity drift	< 3 % within the maintenance interval, relative to measuring range final value
Zero point drift	< 3 % within the maintenance interval, relative to measuring range final value
Detection limit	C_{org}: 0,05 mg/m³
Electrical safety	CE

Basic control unit BCU

Description	The control unit serves as the user interface and is responsible for data processing and output as well as control and monitoring functions.
Display	Status LEDs: “Power”, “Maintenance”, and “Fault” LC display
Operation	Via LC display and membrane keyboard
Dimensions (W x H x D)	375 mm x 275 mm x 66 mm (with separate control unit (BCU); for details see dimensional drawings)

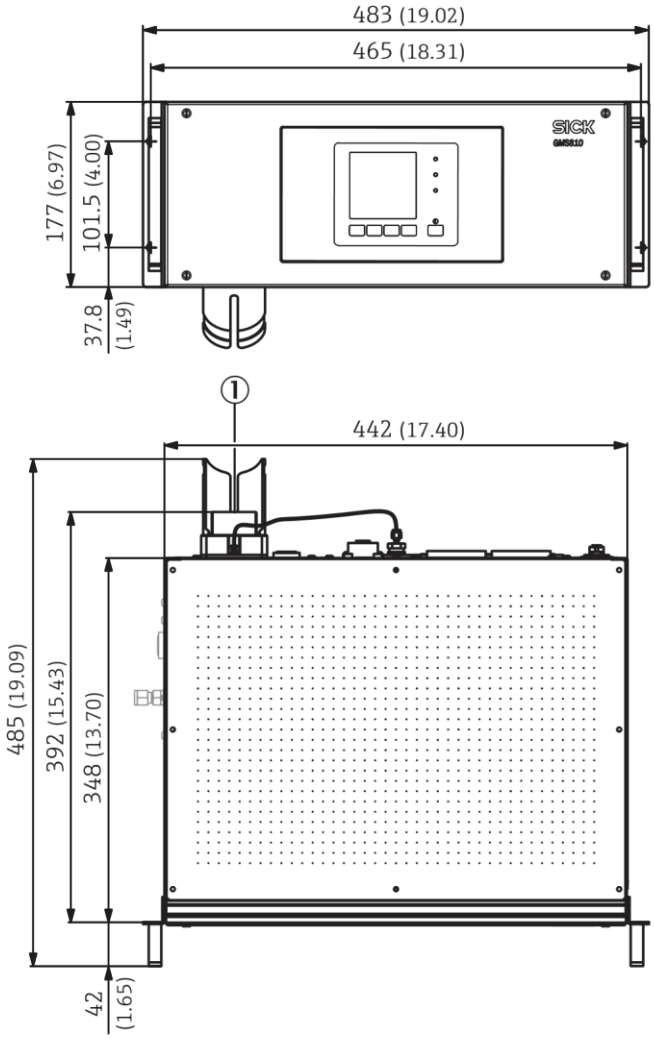
I/O module

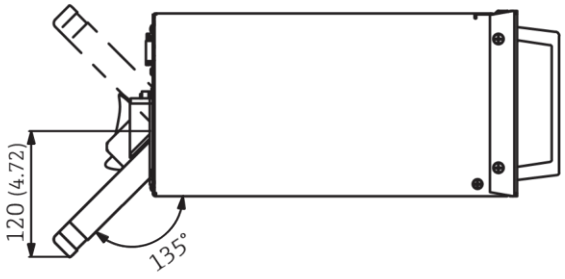
Description	Closed module with top-hat rail adapter or open module for integration into housing
Analog outputs	4 outputs: 0/2/4 ... 20 mA, 500 Ω, galvanically isolated
Analog inputs	2 inputs: 0/2/4 ... 20 mA, 500 Ω, not galvanically isolated
Digital inputs	8 inputs: + 42 V All inputs with common reference potential
Modbus	☐
Type of fieldbus integration	TCP RTU RS-485
Ethernet TCP/IP	☐
Function	Connection to SOPAS ET software or OPC server

Ordering information

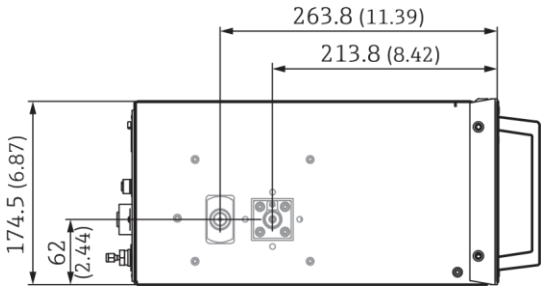
Our regional sales organization will help you to select the optimum device configuration.

Dimensional drawings



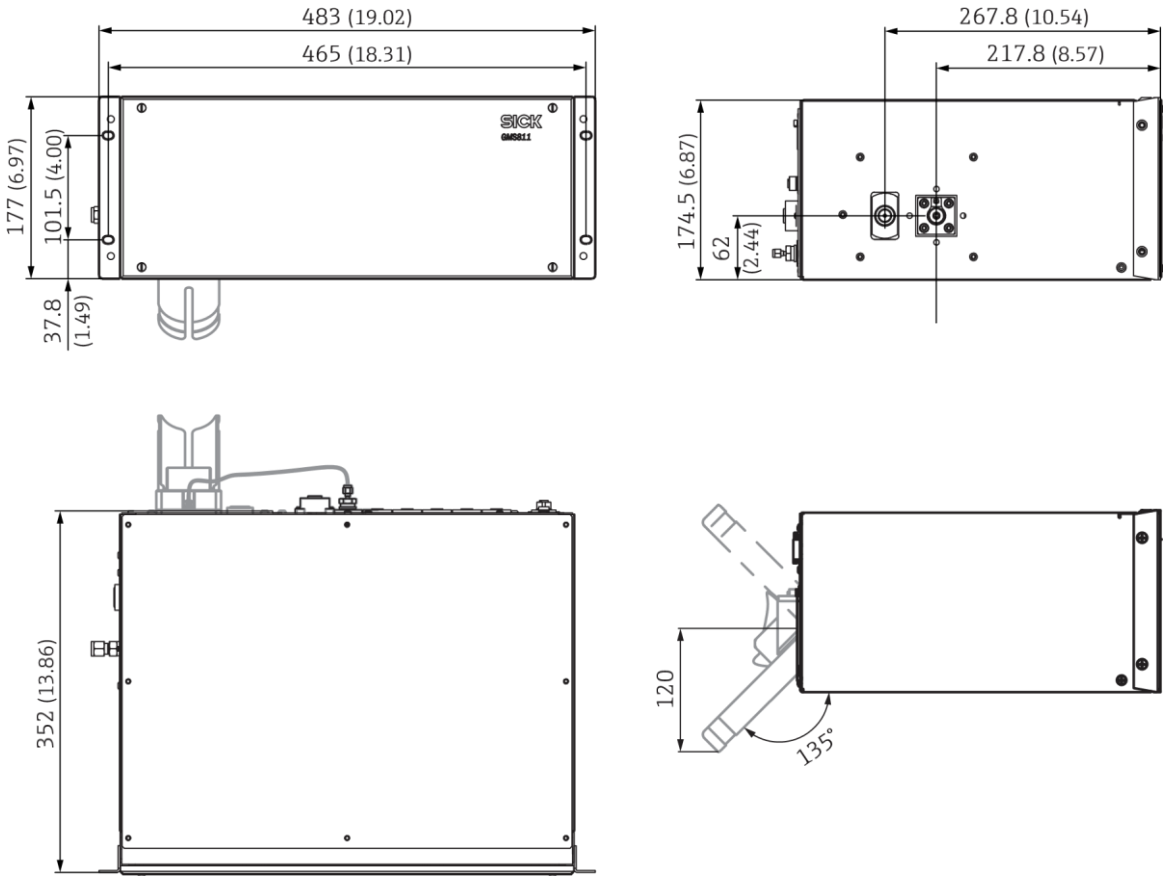


GMS810 FIDOR (dimensions in mm (inch))

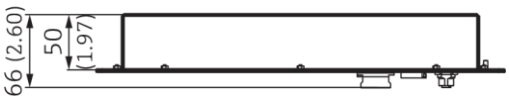


1 On the GMS810 FIDOR, the sample gas inlet can be located on the rear or on the side (shown in light grey).

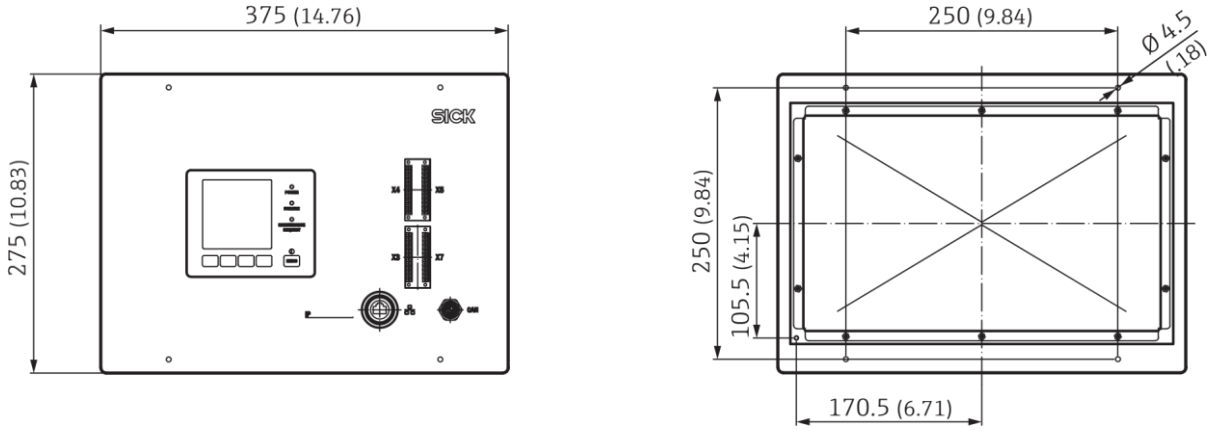
GMS811 FIDOR (dimensions in mm (inch))



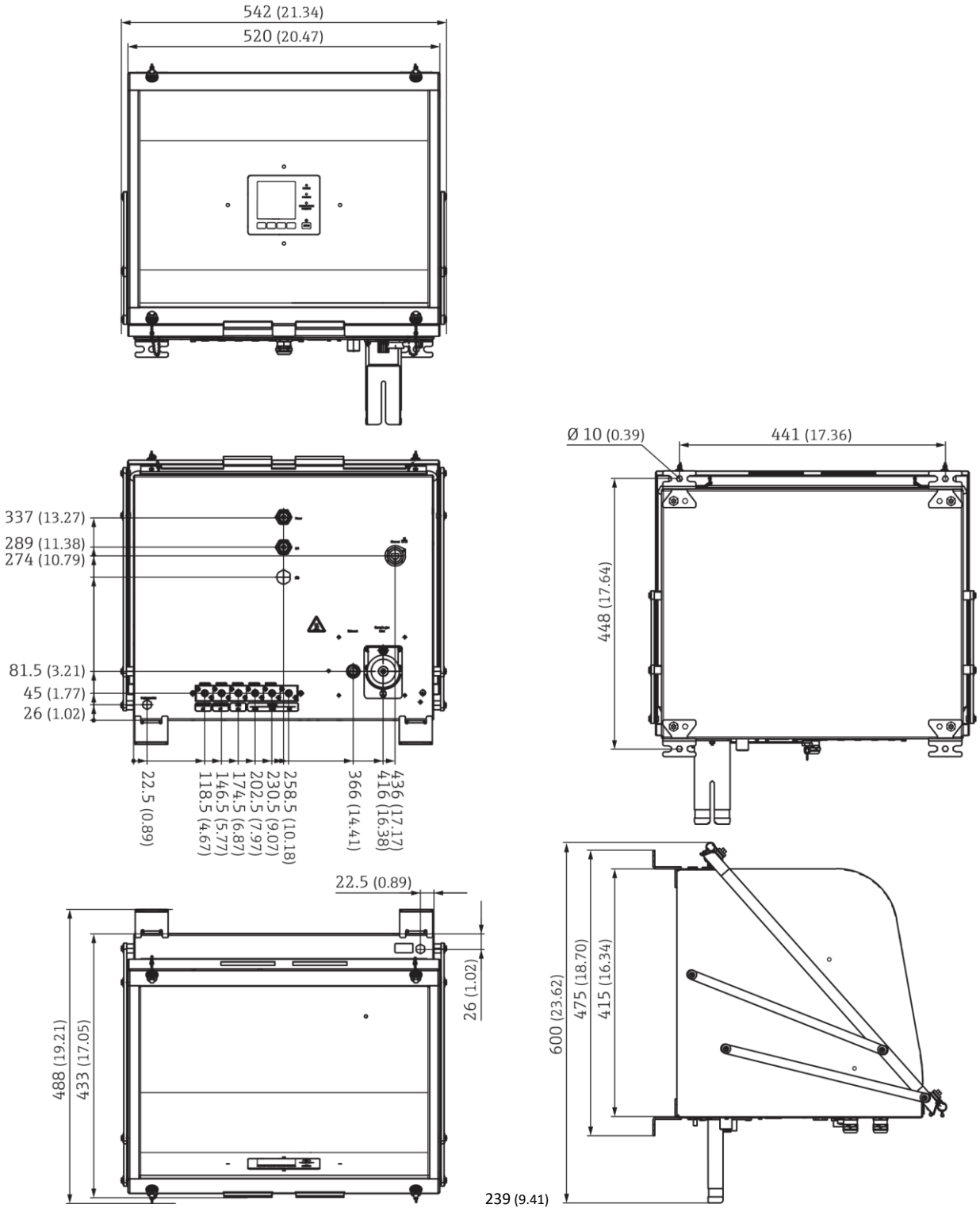
1 On the GMS811 FIDOR, the sample gas inlet can be located on the side or on the rear (shown in light grey).



Control unit BCU(dimensions in mm (inch)))

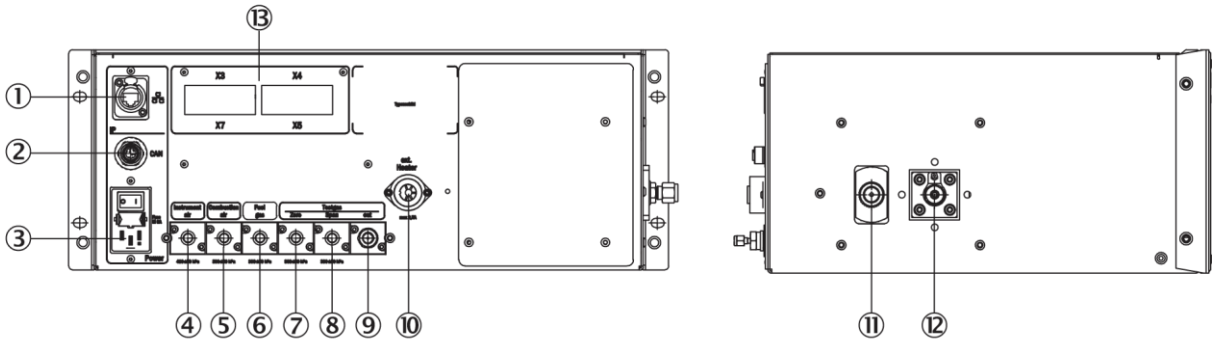


GMS840 FIDOR (dimensions in mm (inch))



Connection type

GMS810 FIDOR and GMS811 FIDOR: sample gas inlet on the side



① Ethernet
2 CAN
3 Line connection
4 Instrument air
5 Combustion air
⑥ Fuel gas
7 Zero gas
8 Reference gas 9 Test gas outlet
ß External heating
⑪ Exhaust gas outlet
á Sample gas inlet â I/O module

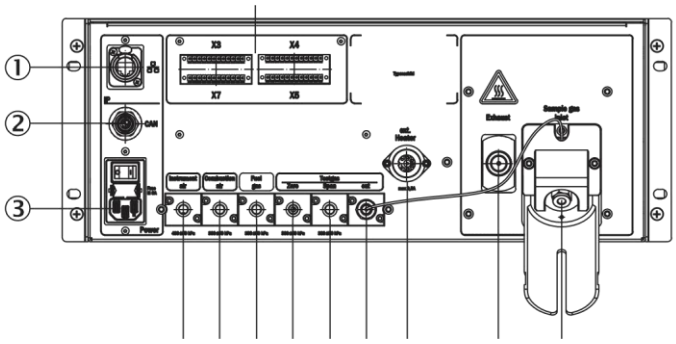
GMS810 FIDOR and GMS811 FIDOR: sample gas inlet on the rear

7 Zero gas

GMS840 FIDOR

ã

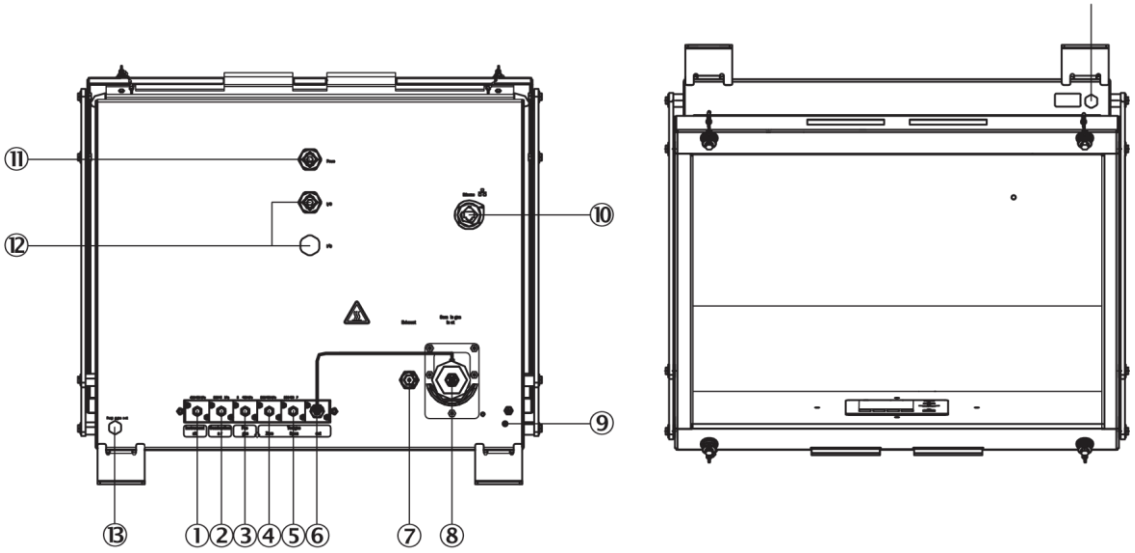
1 Instrument air
2 Combustion air
3 Fuel gas
4 Zero gas
5 Reference gas
6 Test gas outlet
7 Exhaust gas outlet
8 Sample gas inlet
9 PA (protective ground) ß I/O module
à Line connection supply
á Ethernet
â Air for purging enclosure, input ã Air for purging enclosure, output



① Ethernet
② CAN
③ Line connection
④ Instrument air
⑤ Combustion air

8 Reference gas 9 Test gas outlet ß External heating à Exhaust gas outlet
á Sample gas inlet
6 Fuel gas â

I/O module



Top view (left) and bottom view (right)

www.addresses.endress.com

IN8029985/EHS/EN/03.00

Heated FID Continuous TGOC & NMGOC Monitoring Solutions, Since 1973

Endress+Hauser

People for Process Automation