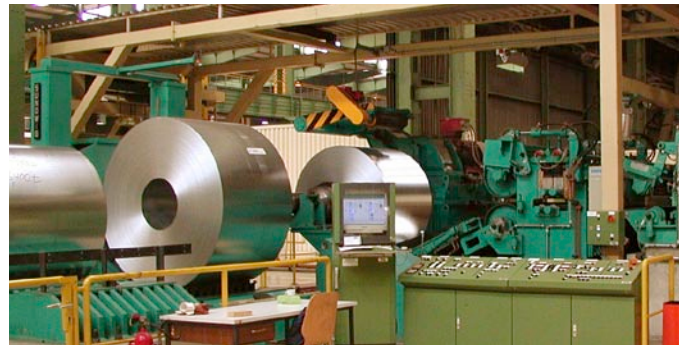




## **EuroFID Total Hydrocarbon Analyzer**

**Precise Determination of Total Hydrocarbons in Air  
for Corrosive as well as Condensing Gases**

# Proven Analyzer Technology



## Measuring total hydrocarbons

The EuroFID measures total hydrocarbons in air, in corrosive as well as in condensing gases at process temperatures up to 600 °C<sup>1)</sup>. In trace concentrations up to 100 vol%. EuroFID is modular and can be put together in a system using the best components (analyzer, terminal box, control unit) for the particular installation.

<sup>1)</sup> The temperature on entering the probe pipe of the in-line unit must not exceed 400 °C and the dew point temperature must not exceed 220 °C.



## Typical applications

- Exhaust gas measurement of hydrocarbon emissions in raw and clean gas
- Emission measurement in power stations and waste incineration plants
- Emission measurement after thermal, catalytic and biological oxidation units and after activated charcoal exhaust air cleaning systems
- Monitoring raw gas concentrations prior to exhaust gas cleaning units
- LEL measurement of potentially explosive gas mixtures during manufacturing of solvent-based products
- Cleanliness and quality control of solvent-based coated products
- Monitoring of workplace environments
- Monitoring carbon content in ambient air for leak detection from containers filled with solvent-based products
- Exhaust gas analysis from combustion engines



# Measuring Principle, Customer Advantages

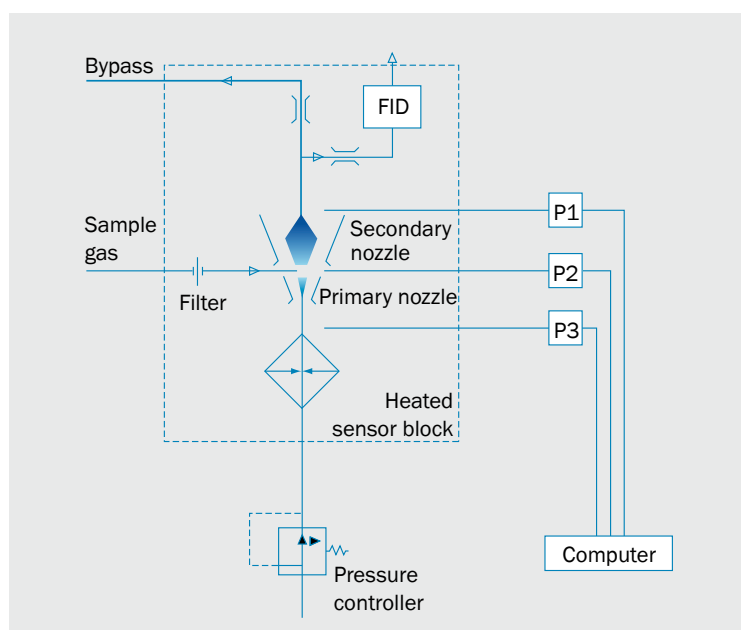


## Measuring principle

The gas concentration is converted into an electrical signal by means of a flame ionization detector (FID). In the FID a hydrogen flame burns in the presence of hydrocarbon-free combustion air. When the sample containing hydrocarbon molecules reaches the center of the flame, the molecules are cracked and stripped causing CH fragments to form. These fragments are oxidized by the oxygen in the combustion air and the CHO<sup>+</sup> ions form. The ion current is measured and is proportional to the carbon ratio in the organic compounds in the sample.

The sample gas is extracted from the process through the sample gas filter by means of a dual-stage jet. Sample gas is then diluted and compressed and passed on to the bypass. All parts in contact with the sample gas are heated in the sensor block to a constant temperature.

The dilution rate depends only on the pressures in the jet device. These values are measured continuously by pressure sensors P1, P2 and P3. The propellant pressure of the jet device is set to a specific value. An ejector characteristic field is used to calculate the dilution from the pressure ratios. A portion of the diluted sample gas flows to the FID detector which continuously measures the gas concentration.



## Key features and advantages:

- Integrated sample gas dilution**  
 reduces maintenance and increases up-time. This is especially important when measuring high concentration gas mixtures which, under normal conditions, can solidify causing clogging problems.
- No moving parts**  
 no wear and tear, through the use of an ejector pump instead of a mechanical diaphragm pump to transport sample gas.
- Low maintenance**  
 because only the easily accessible sample gas filter needs to be replaced.
- Ideal detector geometry**  
 rigid symmetrical construction of the jet and the cylinder limits the formation of deposits within the analyzer assembly to a large extent.
- Heating**  
 of all of the gas contacted parts insures the prevention of condensation within the analyzer assembly.
- EU Type Approval according to 94/9/EU**  
 as an on-site gas warning instrument to measure hydrocarbon and derivatives in a mixture together with air in the measuring range of 0 ... 100% LEL. BVS 05 ATEX G 005 X

# System Component Overview

## EuroFID modular system

The EuroFID system is both mechanically and electrically modular and comprises the analyzer unit, terminal box and control unit (optional: I/O terminal module).

### Analyzer unit

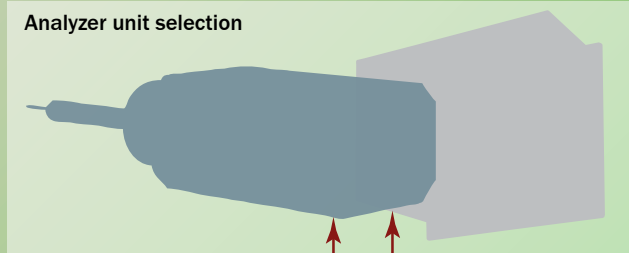


In-line version



Panel version (wall mounting)

### Analyzer unit selection



42 V AC

RS422

Terminal box



230/115 V AC

RS422

### Control unit



Power supply  
24 V DC

### I/O module



Digital and analog  
inputs/outputs

Power supply  
230/115 V AC

Analog inputs/outputs:  
4 x 0...10 V; 2 x 0/4...20 mA  
Digital inputs/outputs:  
3 x 24 V DC/10 mA;  
8 x 24 V AC/100 mA

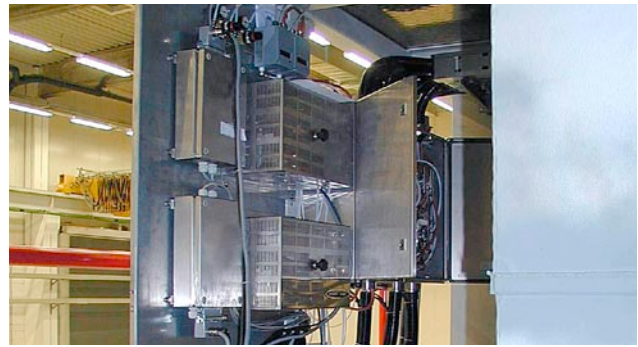
Process control system (Host)

RS232

Printer

RS232

# EuroFID Analyzer Unit



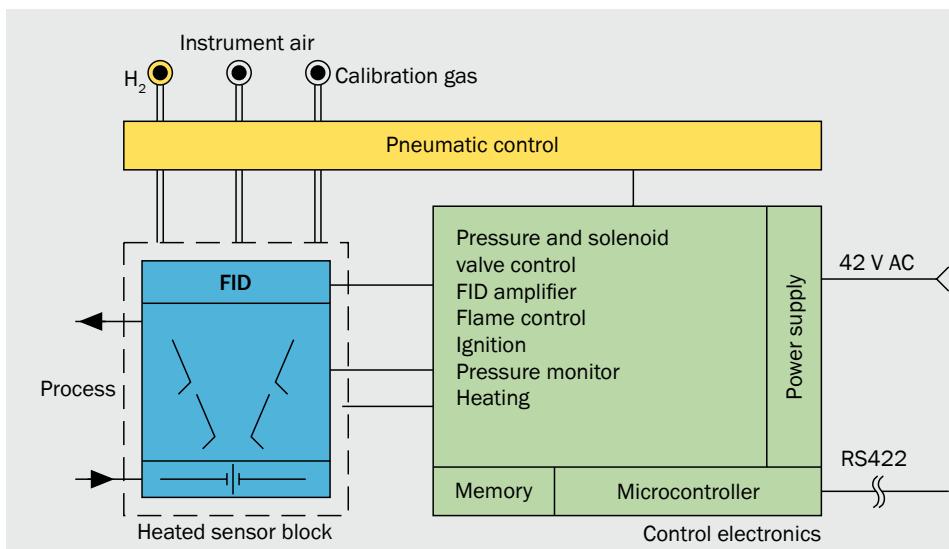
The analyzer unit contains the heated sensor block, pneumatic supply and control electronics. The pneumatic supply provides operating gases for ignition, ensures continuous operation of the detector flame and dilution of the sample gas as well as delivery of calibration gases to set

the zero and end points. The control electronics include an electrically isolated mains adapter that supplies the required operating voltages

The analog and digital input and output signals in the analyzer unit are processed by a micro-controller and

electronically isolated for data transfer via a serial RS422 interface.

All instrument-specific data from the analyzer unit such as the characteristic curve of the two-stage jet device is stored in the non-volatile memory. The analyzer unit is connected to the control unit via the serial interface.



## Analyzer unit in wall (panel) mounting enclosure

This type is usually fitted on the mounting plate inside of the measuring cabinet. Sample gas is supplied through a heated line. This configuration provides a cost-effective extractive emission measuring unit.



## In-line analyzer unit

The in-line version is flanged directly to the sampling point. All of the other "typical" sample conditioning components such as heated lines, gas sampling probe and filter are not required. Short gas paths provide a quick response time of < 1.5 seconds.



# Control Unit and Analyzer Unit in 19" Design

## Control unit

The control unit is designed according to the recommendations of the Standardization Commission of the European Chemical Industry (NAMUR). It combines all the required features such as self-explanatory menu controlled operation where additional information is available in clear text via the „help“ key. The large backlit liquid crystal display and four light-emitting diodes (Alarm, Failure, Maintenance and OK) provide the operator with a quick overview of the measured values and instrument status. Apart from the interface to the analyzer unit, the control unit also has three additional serial interfaces to connect the I/O terminal

strip and a laptop, a modem or any other computer or to another control unit.

The following operating modes are available for instrument functions:

- Manual operation
- Fully automatic operation
- External control via I/O terminal module

The control unit is mounted in a 19" rack with 3 height units (133.5 mm) or optionally a half-size 19" rack with 4 height units.



19" rack  
(3 HU)



Half-size 19"  
rack (4 HU)

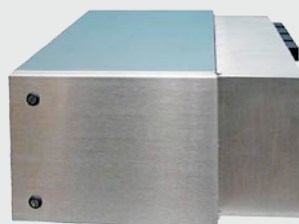
## Analyzer unit in 19" rack:

The analyzer unit is integrated in a 19" rack which can be fitted in "standard" system cabinets. Together with the terminal box integrated in the control unit, the overall height of the complete analyzer is 7 height units.



## Industrial housing for Ex Zone 1

The In-line EuroFID in stainless steel housing is approved for use in potentially explosive areas in Zone1 (II2G EEx p IIB+H2 XXX °C (XXX = 170....220 °C)). Terminal box, heating (optional) and /or process gas lock-out are integrated in the pressurized housing.



## Example: Standard system cabinet



# Technical Data Overview

EuroFID Technical Data				
Measured Data	Inline	Wall housing	19" rack	Industrial housing Ex Zone 1
Measurements	LEL Process, emission	Process emission	Process emission	Process LEL
Measured value display	4 ½ digit and analog as bar graph			
Measuring range: • Smallest measuring range • Largest measuring range	6 measuring ranges selectable 10 ppm relative to C <sub>3</sub> H <sub>8</sub> 100 vol%			
Linear range	Depends on measuring range, ±1 % within one decade, ±5 % over the whole measuring range.			
Detection limit	< 3 % of measuring range limit value <sup>1) 3)</sup>			
Response time (T <sub>90</sub> )	< 1.5 s (LEL); < 2.5 s (emission)	< 2.5 s	< 2.5 s	< 1.5 s
Zero drift	< 0.5 % of measuring range end value/month <sup>1)</sup>			
Sensitivity drift	< 3% of measuring range end value/month <sup>1)</sup>			
Flow <sup>2)</sup>	Min. 0.5 l/min, max. 6.2 l/min			
Connection	-	Stainless steel tube, OD 6 mm, ID 5 mm		-
Pressure range	Atmospheric, ± 50 hPa			
Protection class	IP 54 (outer housing)	IP 20	IP 20	IP 65
Approvals	Gas warning device BVS 05 ATEX G005 X 17 <sup>th</sup> BlmSchV	17 <sup>th</sup> BlmSchV (EN2000/76/EC)	17 <sup>th</sup> BlmSchV (EN2000/76/EC)	Gas warning device BVS 05 ATEX G005 X
EX approvals	-	-	-	II 2 G EEx p IIB+H2 XXX °C with XXX = 170 ... 220 °C
Influencing parameters				
Ambient pressure	< 0.5 % of measuring range end value <sup>1)</sup> /10 hPa			
Sample gas pressure	< 1.0 % of measuring range end value <sup>1)</sup> /10 hPa			
Zero point	< 2 % of measuring range end value <sup>1)</sup> /10 K			
Sensitivity	< 1 % of measuring range end value <sup>1)</sup> /10 K			
Start-up time	< 1.5 hours			
Analog outputs	2 outputs: 0/4 ... 20 mA potential-free, load resistance: 500 Ω maximum			
Auxiliary gases				
Calibration gas	Depending on the measuring task, approximately 80 % hydrocarbon concentration of the measuring range used relative to the propane equivalent in synthetic air			
	Pressure: 3,000 hPa <sup>2)</sup> , consumption <sup>2)</sup> : approx. 3 l/min (only during the calibration process)			
Instrument air	From compressed air lines with a residual hydrocarbon content < 1 % measuring range, max. 4 ppm, without variations, free of condensate. (Dew point at least 10 °C under the lowest possible outside temperature to avoid condensation in lines.)			
	Pressure: Min. 4,000 hPa ±500 hPa, consumption <sup>2)</sup> : min. 6 l/min, max. 17 l/min			
Fuel gas	Pure hydrogen H <sub>2</sub> or H <sub>2</sub> /He 5.0 or better; residual hydrocarbon content < 0.5 ppm			
	Pressure: 3,000 hPa; consumption: continuously approx. 1.8 l/h H <sub>2</sub> or 3.5 l/h H <sub>2</sub> /He			
Auxiliary gas connections	Clamping ring screw connection for 6 mm pipes			
Power supply	230 V AC/48 ... 63 Hz or 115 V AC/48 ... 63 Hz; Power inputs: Approx. 330 VA during start-up, 280 VA during continuous operation			

<sup>1)</sup> Measuring range limit value = 10 ppm C<sub>3</sub>

<sup>2)</sup> Depending on equipment fitted

<sup>3)</sup> Under field conditions

## ANALYZERS AND PROCESS INSTRUMENTATION

### AT HOME IN THE INDUSTRIAL SECTOR

We can build on years of experience in the field of Analyzers and Process Instrumentation. That is why we are at home in the world of cement and power plants as well as in the chemical and petrochemical sector. Be it emission control at the waste treatment or process optimization for steel manufacturing, SICK MAIHAK offers tailor-made solutions.



### WE OFFER YOU A CHOICE AROUND THE WORLD TO YOUR SERVICE

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