

- Sampling Conditioning Systems
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- FTIR-Analyser

gas analysers

HYDROCARBON ANALYSER

Thermo-FID PT



FEATURES

- ◆ Automatic start up
- ◆ Automatic flame ignition
- ◆ Automatic flue shut off
- ◆ Automatic calibration
- ◆ Built-in catalyst for burner air
- ◆ Built-in zero gas
- ◆ Very low maintenance
- ◆ TÜV and MCERTS approved

The portable Model Thermo-FID PT all in one analyser is a microprocessor based high temperature flame ionisation detector (FID) that continuously measures total hydrocarbons (THC) concentration under a wide variety of different applications. The PT uses an unique FID sensor design which allows an accurate and linear response due to precisely controlled mass flow conditions of sample gas and support gases such as hydrogen and burner air. The sample gas passes through a heated detector containing a hydrogen flame which burnes and ionises the hydrocarbons. An electrometer measures the resulting current flow. This ionisation current will be amplified and displayed either in ppm or mg/m3.

The instrument is approved according TÜV 17. BlmSchV, Mcerst and is compliant to EN 14181. The PT is designed for portable application and is suitable for monitoring hydrocarbons from sub ppb level up to 100.000 ppm. The PT comes standard in a

compact light weight configuration with an integrated bottle holder and two pressure regulators for span gas and for fuel gas. An internal catalyst produces the burner air and the zero gas. The sensor and pneumatic assembly are fully heated up to 200°C to avoid any condensation. The sensor features a pump for superior efficiency and long life time. An additional integrated temperature controller can be used to control an external heated line with integrated filter. The PT is almost independant of pressure fluctuation from the process stream in the range from approximately 800 to 1200 mbar absolute. A sophisticated built in microprocessor controls the analyser, offers full diagnostic capabilities, fully automatic calibration, automatic start up, automatic flame ignition and automatic fuel shut off system. In addition alarm display for error, maintenance request and status are included. The analyser features high performance, very low maintenance and a long life time. As an option a datalogger can be integrated.

Thermo-FID PT - General Information

GENERAL FEATURES

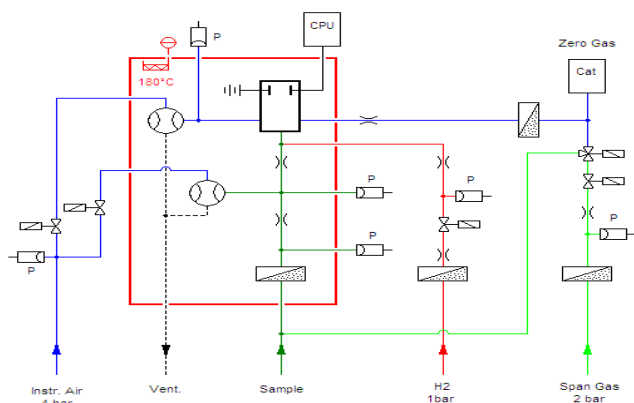
The Thermo-FID is used in a variety of industrial applications, environmental measurement systems and R&D projects. Typical use of the Thermo-FID are LEL control, flue/exhaust gas at waste incinerators or the petro/chem-industry, ambient air analysis, work place control MAK/TRK-limits and process control optimisation.

The microprocessor controlled Thermo-FID provides menu driven 'clear text' user friendly interface information on an alphanumeric display. All operational and self diagnostic data are also available on RS232 and/or analog/digital outputs (status alarm PCB, optional). Additional application oriented functions can be integrated or/and added to the standard analyser. A fully automated and continuous self diagnostic and log book entries for all operation and calibration data guarantees an optimum analyser up time. The unique close couple detector design (no cables, etc.) provides a low drift operation and a wide dynamic range with always optimum signal noise ratio.

All digital input features are designed according NAMUR guidelines, all digital outputs are potential free contacts.

Analog output signals are offered as standard 1 x 0/4-20 mA, 600 Ohm load (not galvanic isolated), optional 4 x 0/4-20 mA optical galvanic isolation available on the status & alarm card. Instrument operation and configuration by remote control is also available on 2 x RS232.

FLOW CHART



PRINCIPLE OF OPERATION

The measurement principle of the Thermo-FID is based on the ionization of hydrocarbons in a hydrogen flame.

Since the pure hydrogen flame creates only a very small basic the burning of hydrocarbons results in an ionisation current being decades higher than one created by the pure hydrogen flame.

Thus an exceptional constant sample gas flow and a constant hydrogen stream are drawn to the burner nozzle which being on a negative potential (approx. - 80 to - 400 VDC) measured by the close coupled detector. In the temperature controlled burning chamber, the mixture is burned by adding hydrocarbon free air in relation of approx. 10 : 1.

The resulting ions are collected on a polarized electrode, amplified and put to display. Best measurement performance is provided by offering a very constant sample mass flow and pressure conditions to the chamber. Due to the optimum design of the instrument, pressure variation at the sample point are allowed between 800 mbar abs. up to 1600 mbar abs. without lack of performance.

The Thermo-FID features two separate microprocessor controlled pressure compensations in order to avoid any influence from environmental or sample conditions to the measurement.

Instead of using conventional heated sample pumps, instrument air driven heated ejector pumps (except portable version) are used providing trouble free, maintenance free and exceptional stable sample flow conditions. Very fast response time is achieved by an optimum sample loop and minimum dead volume design. The sample flow can be set between 2 and 90 NI/hr depending on customers response time expectation or/and application needs (i.e. LEL, flue gas conditions etc.). The standard sample flow is between 10 and 25 NI/hr.

The Thermo-FID is equipped with a flame trap also used as a heated sample inlet filter. All material in contact with the sample gas as well as the measuring chamber are heated between 120°C and 200°C in order to avoid any kind of condensation or/and corrosion.

Thermo-FID PT - Accessories



HEATED SAMPLE LINE WITH INTEGRATED FILTER

Material in contact with sample are: Hasteloy C4, PTFE, CrNI, Monell 400

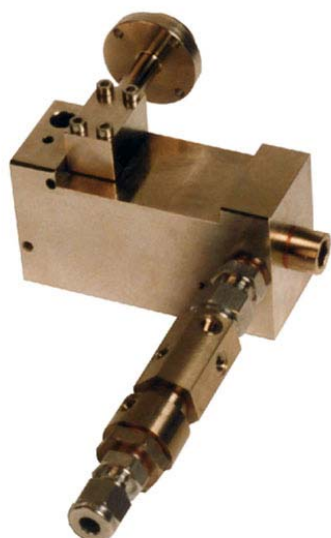
Standard length is 3 or 5m long, comes with a PT100 temperature sensor and the line is heated up to 190° C. The temperature controller is built in into the Thermo-FID as a standard.



STATUS BOARD

Status signals all isolated, potential free

- 4 0/4...20mA isolated outputs
- 4 isolated alarm relays
- 2 analogue inputs to control gas supply
- 2 digital outputs 24V DC/0.5A
- 2 digital inputs free selectable
- 1 digital output 24V=0.5A, controlled via timer for automatic back purge of sample filter



METHANYSER

Features the conversion of CO and at the temperature of 350-370°C into Methane at the presence of Hydrogen. The catalyst is in front of the sample input to the detector. Best catalyst performance is guaranteed by controlling the catalyst temperature at $\pm 1^{\circ}\text{C}$.

METHAN / NON METHAN CATALYST

Catalyst for conversion of total org. C, with exception of Methane, into CO_2 and H_2O for samples with a minimum oxygen concentration of 8 Vol. %.

TECHNICAL DATA

SPECIFICATIONS	
Range	0 ... 1 ppm / 0 ... 100.000 ppm
Resolution	< 10 ppb in smallest range
Linearity	Within +/- 1 % of full scale
Selectable units	ppm, mg/m ³ , Vol%, %LEL
Repeatability	Within 1 % of full scale reading
Linearity	Within 1 % of full scale reading
Response time	< 1 sec at sample gas inlet
Flow rate	2, 5, 25 or 90 l/h @ 1013 mbar
Sample pressure	800 ... 1200 mbar absolute
Cell temperature	Adjustable up to 200°C
Flame ignition	Automatic after warm up
Safety	Flame out alarm and fuel shut off
Alarm function	Free adjustable alarms
Analog output	4-20 mA, max. 600 Ω load, non isolated

SPECIFICATIONS	
Digital outputs	RS232C, 422 (optional), printer
Fuel requirements	UHP H ₂ , @ 1 barg. 40 cc/min
Compressed air	4 barg instrument grade; -30°C PDP
Air consumption	2 Nm ³ /h @ 4 barg
Span gas	Known concentration @ 2 barg
Burner air	Built in, made via internal catalyst
Zero gas	Built in, made via internal catalyst
Warm up time	< 30 minutes
Ambient temp.	- 5 ... +40°C (others on request)
Approvals	TÜV, MCERTS and LEL approved
Protection class	IP45; IP65 optional
Power supply	115 or 230 V/50 or 60 Hz, 250 VA
Dimensions	342 X 266 X 271 mm (w x H x D)
Weight	17 kg (incl. two 1l bottles)

APPLICATION
Emission monitoring for stack gas, Scrubber efficiency, Vehicle emission, Process gas analysis, Leak detection, Solvent recovery, Painting streets, Monitoring volatile organic, Abatement equipment, Carbon absorbers, Safety monitoring LEL, Coating process control, Monitoring of traces in cooling tower Monitoring of purity in O ₂ , N ₂ , Ar, H ₂ , CO ₂ HC Monitoring in steam

FEATURES & BENEFITS
Automatic start up / ignition Built in zero gas Built in burner air Microprocessor controlled sample gas flow Integrated flame arrestor Ex siIC Heated sampling line Heated sampling probe No moving sample pump ejector Automated adjustment of flow Automatic fuel shut off system Independent of sample pressure fluctuation Unique sample flow control Remote control and remote service (optional) Automatic ranging (optional) Built-in data logger (optional)

ACCESSORIES
Hydrogen generator to reduce bottles Hydrogen or Span gas bottles Alarm and Status Board, 4 x 4-20 mA isolated output Portable heated sampling probe Heated sampling line Methan/NON Methan modul

