AUTOTRAC 101
TRACER GAS MONITOR

TRACERTECH

GESELLSCHAFT FÜR SPURENGASTECHNIK MBH

Tracer Gas Monitor AUTOTRAC 101

ADVANTAGE

There are problems which can only be solved by doing a tracer gas measurement. This is e.g. the determination of the air exchange rate in naturally ventilated rooms, the quantification of internal leakages inside an air conditioning unit, gas movements in the soil or the spreading of air or fume gases in the environment.

And there are physical measurements where a tracer gas measurement is just more precise, definite or cheaper as other methods. This could be the case for volume flow measurements in a duct network with many bends or in double façade buildings or the detection of contaminant spreading in buildings.

Especially for answering these questions the AUTOTRAC has been developed. Its typical application is in areas like

- Occupational health
- Building ventilation
- Building safety
- Emission and dispersal measurements
- Gas migration in the soil (mining, dumps, soil gas extraction)
- Volume flow measurements in gas pipelines, fume hoods, stacks or tunnels
- Headspace analysis with use of SF_6 as a tracer in the water path

Since 20 years AUTOTRAC tracer gas monitors are in operation worldwide and prove its accuracy, sensitivity, reliability and robustness in daily operations.

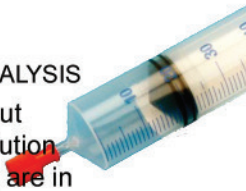
AUTOTRAC FUNCTION

The AUTOTRAC 101 is a gas chromatograph with Electron Capture Detector (ECD), which measures the tracer gas concentration down to the very low parts per trillion range. For most applications Sulphur Hexafluoride SF_6, is the best suited tracer gas. On demand also special perfluorocarbon tracer gases are detectable.

AUTOTRAC 101 is not just a gas analyser, it also contains all required functions to perform selfstanding tracer gas measurements to conduct field and lab tests in the same way as scientific evaluations as there are

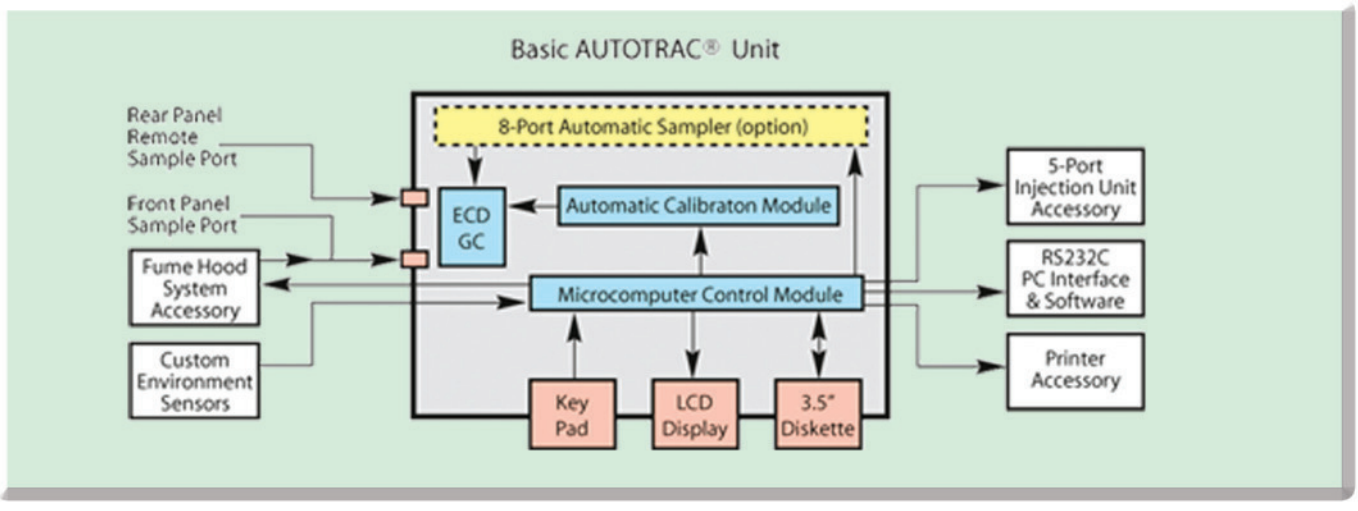
- Fully integrated sampling with the integrated 8-port multipoint sampler from up to 9 locations
- Automated conduction of standardized tracer gas measurements, evaluation of data, calculation, output and storage of data and results (e.g. calculation of air exchange rate, volume flow, fume hood efficiency, re-entrainment)
- Additional measurement of temperatures and weather data during a tracer gas measurement
- Control of automated injection of tracer gas for continuous air exchange rate or volume flow measurements.

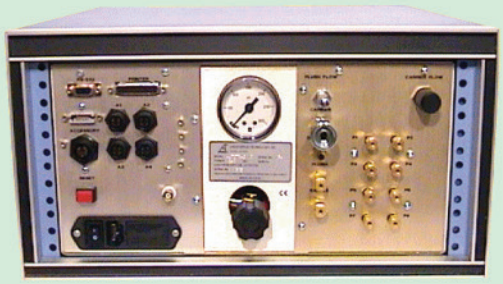
ADVANTAGE OF GC-ANALYSIS



The AUTOTRAC 101 is without competition where high dilution ratios are present, as they are in most environmental tests, high volume flows or the detection of smallest leakage rates, which could cause severe safety hazards.

But also in the building environment the AUTOTRAC 101 is highly superior compared to infrared analysis technology. The reasons are that





- Only small amounts of tracer gas and only 10 ml of sample volume are required for analysis. Injection and sampling can be performed by using 50ml syringes. E.g. a 50ml syringe filled with SF_6 is good for an ACR measurement in a 5.000m³ volume
- For most tracer gas measurements it is not necessary to route sampling tubes throughout a building, which is time consuming and sensitive to mistreatment. It is not even necessary to carry AUTOTRAC to the test site. For ACR measurements the injection and the sampling can be done by syringes with later analysis in the laboratory where AUTOTRAC is placed.
- According to *'VDI 4300, Part 7, Indoor air pollution measurement - Measurement of the indoor air change rate'* of July 2001 tracer gas measurements in occupied buildings using SF_6 are only allowed at concentrations below 100 ppb. This is just the upper limit of AUTOTRAC while most infrared analysers are already at their bottom end.
- Due to the low detection limit implying only small injection amounts the environment is preserved and tracer gas costs don't play a role within the whole measurement.

For long duration measurements, e.g. scientific applications, AUTOTRAC 101 performs the injection control and the sampling although the use of syringes for simple ACR measurements is more eco-omic.

IMPLEMENTED TRACER GAS TECHNIQUES

	DECAY	STEP-UP	STEP-UP/DECAY	CONSTANT-CONCENTRATION	VOLUME FLOW MEASUREMENTS	FUME HOOD TESTING
• Manual injection, sampling via syringes and subsequent manual analysis with AUTOTRAC	x	x			x	x
• Manual injection, automatic sampling via tubing from up to 9 locations[1]; possibility to assign multiple sample points to a room and calculation of the mean Air Exchange Rate resp. volume flow	x	x	x		x	x
• Automatic injection via an electric solenoid valve, which is controlled by AUTOTRAC; reading of the injection flow rate by AUTOTRAC from an electronic mass flow meter[2] with automatic sampling	x	x	x		x	x
• Automatic injection via 5-port automatic tracer gas injection unit with integrated gas supply[3]	x	x	x	x	x	
• Start of injection resp. sampling at a previously defined time	x	x	x	x	x	
• automatic repetition of a tracer test in previously defined time intervals	x	x	x	x	x	
• repetition of an Air Exchange Rate measurements possible after reaching a minimum tracer gas concentration in the room, such that continuous decay tests are possible	x					

For all tracer gas measurements data can be stored on a integrated diskette or MC card, routed to a connected printer or PC. The requested values are calculated and printed including graphs

[1] Two sampling ports are contained in the Basic AUTOTRAC version, via the optional 8-port automatic sampling module, which is integrated in AUTOTRAC, the number of sampling ports can be expanded to 9

[2] Solenoid and electronic mass flow meter are available as option in our 'Flow rate accessory kit'

[3] as option available

Technical Data

Measurement Technology	Electron Capture Detector[1)] with heated column and automatic back-flush
Detection Limit	5 x 10^{-12} parts SF_6 in air
Linear Dynamic Range	100 : 1 , typical range of e.g. 0,05 - 10 ppb, optional configurations permit ranges up to 100 ppb
Precision	± 3% of reading within linear dynamic range
Stability	Drift is negligible under typical operation with automatic calibration feature
Sample Methods	either manual injection of syringe in Autotrac's front port or with integrated pump via Autotrac's front and/or rear sample ports As option the rear ports can be expanded from one to 8 with the internal 8-port automatic sampling module. Pump power is good for approx. 100 m sample tube
Measurement Cycle Time	nominal 60 sec.; shorter cycle times on special order
Set-up, Configuration	Menu supported via 16-key keypad with storage on diskette for recall or via WIN95 Software (opt.)
Remote Control	Capability to control Autotrac functions from PC via RS232C interface
Modes	GC-Mode: manual or automatic sampling, analysis and data output without further evaluation Air Exchange modes (decay, step-up, step-up/decay, optional constant concentration with 5-port automatic tracer gas injection unit) Volume flow mode, fume hood mode (with flow rate accessory kit)
Output	32-character LCD panel display, RS232C to PC, PC compatible 3,5" diskette, 0-1V DC for strip recorder, HP compatible printer port
Carrier Gas	Oxygen free nitrogen, P10 resp. P5 (10% resp. 5% Methane in Argon)
Power Supply	220V, 50 Hz (optional 110V 60 Hz); 1,5 Amp.
Size	22,2 x 43,2 x 47,0 cm (H x W x D)
Weight	20,5 kg

[1)] For the operation of Autotrac 101 a permission from the national radiation protection authority is requested in the European Union due to the Tritium source in the Electron Capture Detector (11,1 GBq)

Options

8-Port Automatic Sampling Module	Extends the single sample port on the rear side of Autotrac to 8 rear sample ports; the 8-port sample module is integrated in Autotrac
2-Point-Calibration	For high precision measurements two calibration gas bottles are integrated in Autotrac, which increase the accuracy to <2% of the reading
2-Range Option	Optionally it is also possible to precisely measure in two different concentration ranges, e.g. range I from 0,05 - 50 ppb; range II from 0,2 bis 20 ppm. This option is useful for filter testing in nuclear power plants or everywhere, where on one hand high emission concentrations and at the same time low immission concentrations needs to be measured
Analog-Interface	4 analog input channels for sensors; with every concentration reading Autotrac also reads, prints and/or stores the analog channels (e.g. 0-5 V, thermistor, wind speed and direction, mass flows)
PFT - Tracer Gases	optionally Autotrac can be configured for one or more of the following Perfluorocarbon tracer gases PDCB, Perfluorodimethylcyclobutane (C_6F_{12}), detection limit 0,1 ppb PMCH, Perfluoromethylcyclohexane (C_7F_{17}), detection limit 1 ppb m-PMCH, Perfluoro-1,3-dimethylcyclohexane (C_8F_{16}), detection limit 1 ppb other PFT on request

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Technical specification subject to change