LFE CONTHOS 3

Process TCD Gas Analyzer Series

MADE IN GERMANY

- **Quick response**
  Micro-miniaturized detector design
- **Excellent long-term stability**
- **Very low detection limits**
  Well below the thresholds of conventional TCD designs.
- **Flow-independent response**
- NAMUR-compliant user interface
- **Outstanding corrosion resistance**
  Detector constructed from premium materials: aluminum oxide (Al2O3), glass, and SiOx-coated platinum sensor filaments
- **Ideal for hydrogen purity monitoring**
  Suitable for a wide range of gases and concentration levels
- Thermostat-controlled TCD (50–180 °C)
- Comprehensive self-diagnostics

The **LFE CONTHOS 3 TCD family** consists of high-performance thermal conductivity gas analyzers engineered for **continuous, online monitoring** in demanding industrial environments. Combining a proven measurement principle with modern microprocessor control, they ensure stable, precise results around the clock.

Backed by **more than 40 years of TCD expertise**, LFE analyzers are built around a **highly stable detector** offering **fast response** and exceptional **corrosion resistance**. Whether used for hydrogen purity monitoring or advanced process control in steel, chemical, and other industries, CONTHOS 3 gas analyzers deliver the accuracy and long-term reliability that engineers and researchers rely on.

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LFE’s Advanced Thermal Conductivity Detector

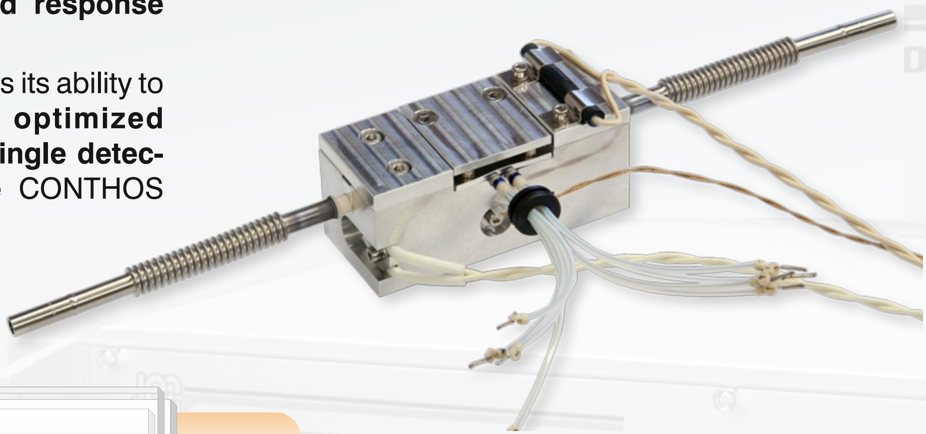
Conventional thermal conductivity analyzers use a heated element suspended in the sample gas. As electrical current warms the element, it reaches a thermal equilibrium determined largely by the gas’s thermal conductivity. The analyzer then infers gas composition from the resulting change in the element’s electrical resistance. While effective, this approach ties heating and temperature measurement to the same component, making the signal susceptible to drift, flow-rate effects, and convection.

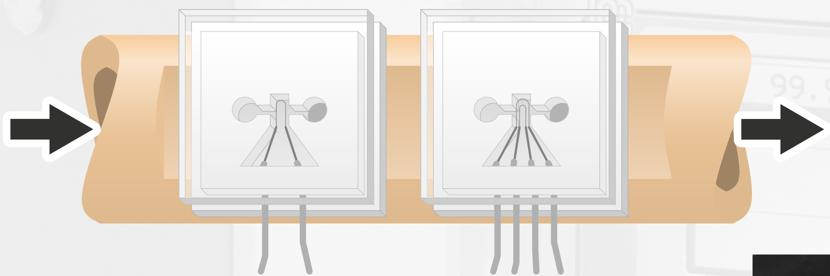
LFE’s detector refines this classical principle by **spatially and electrically separating the heating element from the temperature-sensing filament**. This innovative geometry, combined with precise thermal management, minimizes free and forced convection effects and greatly improves measurement stability. The result is a detector that provides **fast, highly stable readings without the usual trade-off between gas flow and response time**.

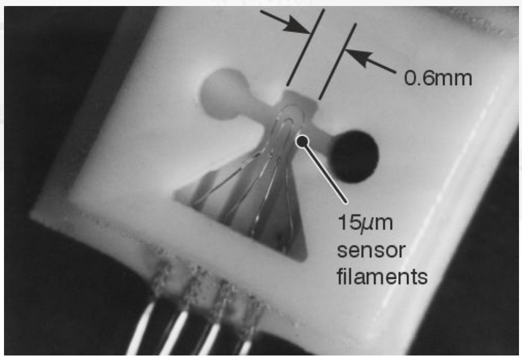
A further advantage of this design is its ability to support **multiple, physically optimized measurement ranges within a single detector**. For example, a triple-range CONTHOS system can measure 0–0.5 vol.% H_2 in O_2, 99.5% H_2 in O_2 (0–5000 ppm O_2 in H_2), and 0–100% H_2 — all using the same TCD unit.

Conventional TCD analyzers cannot offer this flexibility. Conventional systems configured for hydrogen purity measurement, for example, typically require helium as the bridge-balancing gas, which leads to signal drift and limits the usable measurement range. As a result, a conventional detector optimized for one end of the concentration spectrum cannot accurately measure at the other. LFE’s detector design avoids these limitations entirely, enabling stable, wide-range performance without dependence on balance gases.

This advanced detector architecture has been at the core of every CONTHOS TCD process gas analyzer since the early 1980s and remains fundamental to its industry-leading accuracy, stability, and application versatility.







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General Purpose Models

CONTHOS 3E - TCD

19" rack housing (3U / 84HP)
for mounting in 19" cabinet

IP-Rating:	IP40
Dimensions:	133 x 483 x 427 mm
Weight:	10 kg
Power:	100-240 VAC
	100VA max. (warm-up)

CONTHOS 3F - TCD

Purgeable field housing
for wall mounting

IP-Rating:	IP65
Dimensions:	434 x 460 x 270 mm
Weight:	25 kg
Power:	100-240 VAC
	100VA max. (warm-up)

Special Model

CONTHOS 3F - TCD HT

High temperature model
with heated gas paths up to 180°C

IP-Rating:	IP65
Dimensions:	502 x 460 x 270 mm
Weight:	25 kg
Power:	100-240 VAC
	130VA max. (warm-up)

Models for Hazardous Areas

CONTHOS 3F - TCD Ex p

ATEX-compliant Ex p enclosure for Ex Zones 1 and 2

Extremely low purge gas consumption

Hazardous area classification
Ex protective class: II 2 G, Ex p II T4

Dimensions:	490 x 460 x 270 mm
Weight:	30 kg
Power:	100-240 VAC
	100VA max. (warm-up)

CONTHOS 3 - TCD Transmitter Ex d

IECEx/ATEX compliant Ex d enclosure for Ex Zones 1 and 2 *

Hazardous area classification
Ex II 2 G Ex db IIC T5 Gb
Certificate number:

ATEX:	EPS 25 ATEX 1 294 X
IECEx:	IECEx EPS 25.0066X
Dimensions:	433 x 410 x 281 mm
Weight:	35 kg

* The transmitter requires a CONTHOS 3E or 3F control unit located in safe area.

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General Technical Data

Performance Specifications

Measuring principle	Difference in thermal conductivity ($\Delta\lambda$) of sample gases in binary and quasi-binary mixtures.	
Gas interference (Cross sensitivity)	In complex (non-binary) gas mixtures, measurement results may be affected by interfering components. Through the use of static or dynamic interference correction methods, the interference effects can be suppressed under certain circumstances.	
Measuring ranges	Up to 3 linearized, independently configurable, switchable ranges lowest range: 0 - 0.5% H_2 in N_2 or 99.5-100% H_2 in N_2 (or equiv. $\Delta\lambda$) largest range: 0 - 100% H_2	
Detector operating temperature	Depending on the application - factory set from 60 to 180°C.	
Response time T90	≤ 3 sec	
Detection limit *	≤ 0.5% of span	* Data valid for binary or quasi-binary gas mixtures at constant temperature and pressure
Linearity/ Accuracy *	≤ 0.5% of span	
Reproducibility *	≤ 0.5% of span	

Instrument Interface

User Interface	• LC display (40 characters x 16 lines) + bar graph • User interface based on NAMUR recommendation • Plaintext description of instrument status on the LC display as well as digital status output
Analog signal output	2 independently configurable, isolated analog outputs Available output levels: • 0-20 mA or 4-20mA • 0-20 mA limited (current limited from -0.2 to 21mA) • 4-20mA limited (current limited from 3.8 to 21mA) • 4-20mA with superimposed instrument status (NAMUR NE43-compliant) • Test signal levels: 0mA, 4mA, 10mA, 12mA & 20 mA
Standard digital outputs	Instrument status (NAMUR NE107-compliant) FAILURE | MAINTENANCE REQUIRED | FUNCTION CHECK
Options	
Analog inputs	3 isolated, configurable analog inputs for interference correction
Interference correction	3 correction channels for static and/or dynamic interference correction (dynamic correction only in conjunction with optional analog inputs or Modbus)
Digital I/O	Digital inputs: 8 configurable, optically isolated • remote range selection • remote triggering of zero and span calibration • remote triggering and cancelling of automatic calibration • switching of interference correction inputs to secondary input range Digital outputs: 7 configurable, floating relay contacts • threshold monitoring (1 threshold per measuring range) • feedback as to the current range • calibration gas selection
Modbus interface	Modbus RTU - RS485 or Modbus TCP

Note:
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