Gebrauchsanweisung – FTC130-OEM Englisch

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messkonzept ANALYTICAL TECHNOLOGY

FTC130-OEM

Fast Thermal Conductivity Analyzer

Operating Manual

Warning!
"Warning" draws attention to application errors or actions that can lead to safety risks including the injury to persons or malfunctions – possibly even destruction of the device.

Note!
"Note" indicates an additional function or hint.

1. Description

The FTC130-OEM is a highly precise and stable Thermal Conductivity Detector (TCD). It is designed for the use as an OEM detector. Since it is not equipped with housing it has protection class 00 and no electro-magnetic shielding. It is not designed for the use in hazardous areas. As it is true for any OEM product, all this is in the hands of our customers.
For indication of the signal a 0 to 10V analog output is provided. For internal calibration, configuration and digital indication of the signal a TTL-level RS232 communication is required. For testing purposes we offer a RS232 to TTL level converter as well as two small windows programs for a PC in order for perform Offset and Gain calibration.
The thermal conductivity of a gas mixture depends on the individual gas components and on the composition of the mixture. Under certain conditions, therefore, the concentration of individual gas components can be determined by measuring the thermal conductivity. In other cases the identification of certain properties of gases is of special interest e.g. for quality control or safety reasons. Often these properties are related to the thermal conductivity and thereby identified. The concentration can be determined with high precision if one of the following conditions is met:

- The gas mixture consists of only two components, for example measuring CO2 in N2 or H2 inN2.
- The gas mixture consists of more than two components but only concentrations of two components vary.
- The thermal conductivity of two of three constituents is similar, e.g. measuring H2 or He or CO2 in a mixture of O2 and N2.
- In case, a cross sensitive gas may be measured separately and the signal of this measurement is fed into FTC130 where an internal routine compensates the cross sensitivity.

2. EMC

The product FTC130-OEM does not meet EMC requirements without proper shielding and housing. Means for EMC must be performed by the customer.

3. Measuring gases and ranges

Measu-ring Gas	Carrier Gas	Basic range	Smallest range	Smallest suppressed zero range
H_2	N_2 or air	0% - 100%	0% - 0.5%	98% - 100%
H_2	Ar	0% - 100%	0% - 0.4%	99% - 100%
H_2	He	20% - 100%	20% - 40%	85% - 100%
H_2	CH_4	0% - 100%	0% - 0.5%	98% - 100%
H_2	CO_2	0% - 100%	0% - 0.5%	98% - 100%
He	N_2 or air	0% - 100%	0% - 0.8%	97% - 100%
He	Ar	0% - 100%	0% - 0.5%	98% - 100%
CO_2	N_2 or air	0% - 100%	0% - 3%	96% - 100%
CO_2	Ar	0% - 60%	0% - 10%	-
Ar	N_2 or air	0% - 100%	0% - 3%	96% - 100%
Ar	CO_2	40% - 100%	-	80% - 100%
CH_4	N_2 or air	0% - 100%	0% - 2%	96% - 100%
CH_4	Ar	0% - 100%	0% - 1.5%	97% - 100%
O_2	N_2	0% - 100%	0% - 15%	85% - 100%
O_2	Ar	0% - 100%	0% - 2%	97% - 100%
N_2	Ar	0% - 100%	0% - 3%	97% - 100%
N_2	CO_2	0% - 100%	0% - 4%	96% - 100%
NH_3	H_2	0% - 100%	0% - 5%	95% - 100%
CO	H_2	0% - 100%	0% - 2%	99% - 100%
SF_6	N_2 or air	0% - 100%	0% - 2%	96% - 100%

Other gases and ranges on request.

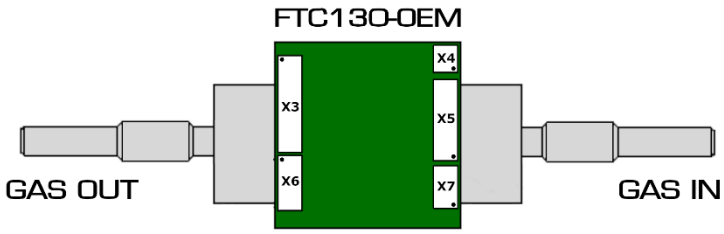
4. Scope of Delivery

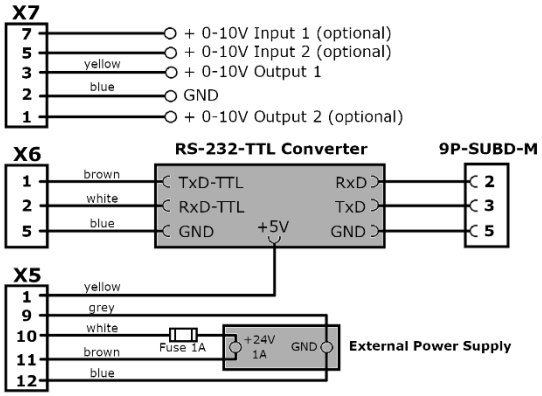
- FTC130-OEM TC-Detector
- 12 pole JST-Connector with 1m open end wires
- 8 pole JST-Connector with 1m open end wires
- 7 pole JST-Connector with 1m open end wires

- optional: RS232-TTL-converter and PC tools for calibration

5. Electrical Connection

Basic connection diagram





Connector X5:

Pin 01 – GND=Ground
Pin 02 – Power +24VDC = Power supply electronic, +24Volts
Pin 03 – Heater +24VDC = Power supply heater, +24Volts
Pin 04 – Heater GND
Pin 05 – GND
Pin 12 – +5VDC=+5Volts from internal voltage regulator

Connector X6:

Pin 07 – TxD-TTL = Serial TxD, TTL-level
Pin 08 – RxD-TTL = Serial RxD, TTL-level
Pin 04 – GND

Connector X7:

Pin 01 – AIn1 = Analog input, 0-10Volts, 50kOhm
Pin 02 – GND
Pin 03 – AIn2 = Analog input, 0-10Volts, 50kOhm
Pin 04 – GND
Pin 05 – AOut1 = Analog output, 0-10Volts, R_L>1kOhm
Pin 07 – AOut2 = Analog output, 0-10Volts, R_L>1kOhm

6. Pneumatic Connection

Looking at the FTC130-OEM on the side of gas tubes with the boards up, the gas inlet is on the right-hand side. Gas inlet and outlet tubes – as well as the body - are stainless steel (LF316ti). The outer diameters of the tubes are 6mm. The gas must not contain dust, condensate and potentially condensing matter. The inner gas duct is heated up to 63°C (hotter versions on demand) depending on mounting, thermal insulation and sample flow and temperature, condensation may occur from the actual ambient temperature up to 63°C. With proper heated lines and connections a dew point up to 55°C is permissible.

!!! Important Notice !!!
Condensate will destroy the sensing element immediately (condensate tolerant version on request).

Optimal flow is in between 60l/h and 80l/h. If the flow is kept stable during measurement as well as during calibration a range from 10l/h to 150l/h is possible.

7. Mounting

The bottom view of the FTC130-OEM shows four M3 thread holes that can be used for the fixation of the detector. Use insulating spacers (min. 4mm) and stainless steel screws in order to minimize heat flow from the 63°C hot detector body. For watertight bulkhead, mounting two spacer and two M8 nuts are available on request.

8. Communication with the FTC130-OEM

8.1. Remote Control via Serial Communication

The FTC130-OEM is equipped with a RS232-interface. A dedicated manual is available. Please ask Messkonzept for the manual “Remote Control via Serial Communication”.

8.2. SetApp2.0

Messkonzept offers a software for the operation of our devices. It enables monitoring of measuring values and managing the settings of the FTC devices. Especially for the OEM series, the SetApp2.0 makes calibration, setting thresholds and other configurations much easier. The SetApp2.0 is to be found on our website in the download section.[1]

[1] www.messkonzept.de

9. Specifications

Dimensions with connectors; (WxHxD in mm)	144x42x40
Weight	305 g
Power supply	24V DC (18V to 36V), 700mA
RS232 - Baudrate / Data	19200 / 8bit
Ambient temperature range	-5°C to 50°C, other on request
Linearity	< 1% of range
Warm up time	Approx. 20min; 1h for small ranges
Flow rate	10l/h-150l/h, recommended 60l/h to 80l/h
T90-time	<1sec at flow rate higher 60l/h
Noise	< 1% of smallest range
Drift at zero point	< 2% of smallest range per week
Repeatability	< 1% of range
Error due to change of ambient temperature	< 1% of smallest range per 10°C
Error due to change of flow at 80l/h	< 1% of smallest range per 10l/h
Gas pressure (absolute)	80kPa (0.8 bar) to 2000kPa (20bar)
Error due to change of pressure (above 800hPa)	< 1% of smallest range per 10hPa

Note: The values given above refer to H2 in N2, they may vary for other gas pairs.