

**LAMTEC innovation**

## DIN EN 16340 New standard for “Exhaust gas sensors in heating engineering”.

LAMTEC is already meeting requirements with its LT3-F Lambda Transmitter KS1D Combination Probe sensor system.



Sensors and systems for combustion engineering

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With the new DIN EN 16340:2014-10 standard on sensors for the detection of gaseous combustion products in gas burners and gas devices, exhaust gas sensors can be tested and approved uniformly (and thus compared) for the very first time. In meeting the requirements of this standard, these sensors are conforming to a Europe-wide safety standard which helps to reduce the potential for unfair competition. Conformity to the standard will also make handling and maintenance easier in applications in which sensors by different manufacturers are used.

Until now, exhaust gas sensors for heating engineering have been developed by manufacturers to meet requirement criteria that in some cases were very different. Testing and certification were carried out by appropriate bodies based on standards which originated primarily from the field of emission control. This meant that in some cases, the requirements to be met were very much determined by national specifications. As a result, certifications had to be adapted accordingly, creating more work for manufacturers and hindering the spread of these advanced technologies.

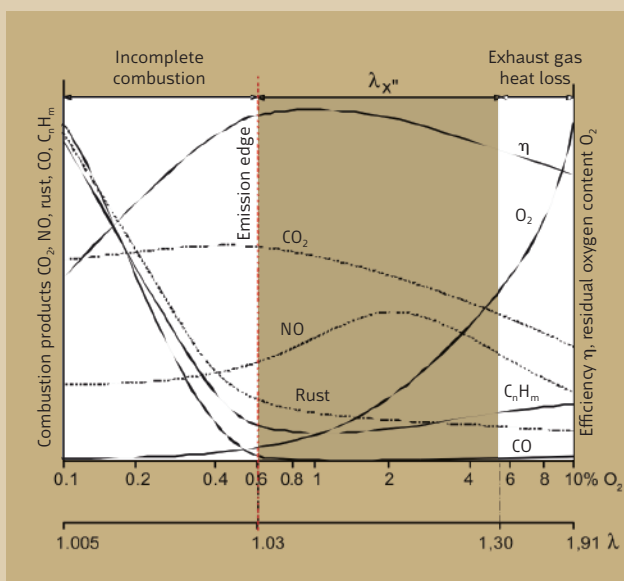
Today's typical exhaust gas sensors are used to optimise combustion and detect critical states. Europe-wide certification of exhaust gas sensors means that these products can be brought to market more easily and less expensively. This will help to save resources and protect the environment. During combustion optimisation, factors which could have a negative impact on the process (heat value, air temperature, air pressure, etc.), increasing the air required, are compensated. Effectiveness is increased whilst harmful emissions are reduced at the same time. As less fuel is needed, return on investment in these advanced exhaust gas sensors can be achieved more quickly. As safety-related components, exhaust gas sensors increase the already high

level of safety of gas applications as well as improving system availability and service life, even for complex thermal process installations.

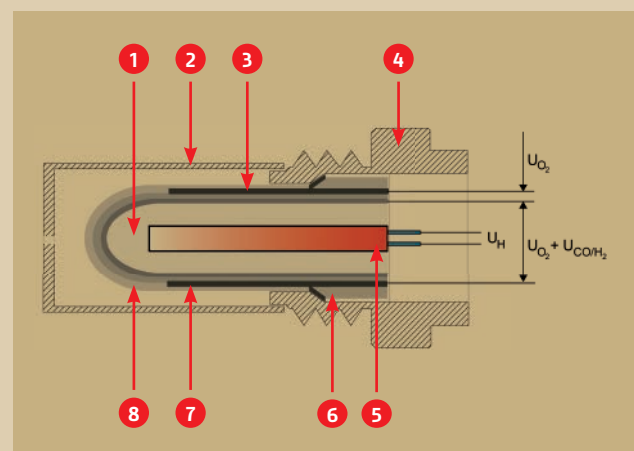
*LAMTEC is already meeting the requirements of this standard. The LT3-F Lambda Transmitter combined with the KS1D Combination Probe is the first sensor system to be approved in accordance with DIN EN 16340:2014-10. This achievement brings into sharp focus the innovative and pioneering nature of the products developed by LAMTEC.*

The LAMTEC KS1D Combination Probe is based on a heated electrochemical measuring cell made from zirconium dioxide ceramic. The probe is a zirconium dioxide ceramic tube that is sealed on one side. It protrudes into the combustion system's emissions channel and divides the reference gas compartment (air) from the measuring gas compartment (exhaust gas) so that no gas can escape. The reference electrode is located on the inner side of the zirconium dioxide ceramic in the reference gas compartment (air side). The two measuring electrodes for  $O_2$  and  $CO/H_2$  are located on the outer side of the ceramic in the measuring gas compartment. An integrated heater warms the probe to a temperature of around  $650\text{ }^\circ\text{C}$  and regulates this temperature at a constant level. At this temperature, the zirconium dioxide ceramic starts to conduct oxygen and the two sensor signal voltages  $U_{O_2}$  and  $U_{CO_e}$  form accordingly and can be measured.

This technology enables the  $O_2$  and  $CO/H_2$  content to be continuously measured and detected, with the corresponding information being forwarded to the burner control. The burner control regulates the fuel and air supply based on these results of these measurements.



Combustion efficiency and combustion products.



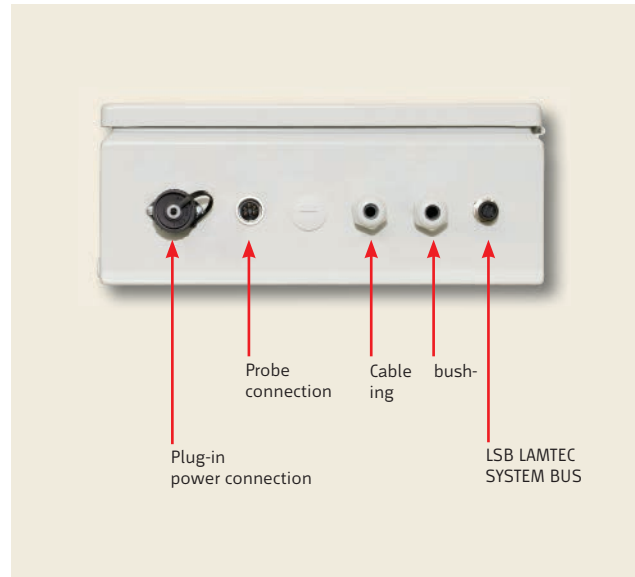
Design principle for the LAMTEC Combination Probe KS1D

- 1 Reference electrode
- 2 Cap with gas inlet
- 3  $O_2$  electrode
- 4 Housing
- 5 Heater
- 6 Functional ceramics
- 7  $CO_e$  electrode
- 8 Protective coating

# Approved measuring system LT3-F (electronics) and KS1D (sensor) as a system component of CO/O<sub>2</sub> control.



Lambda Transmitter LT3-F.



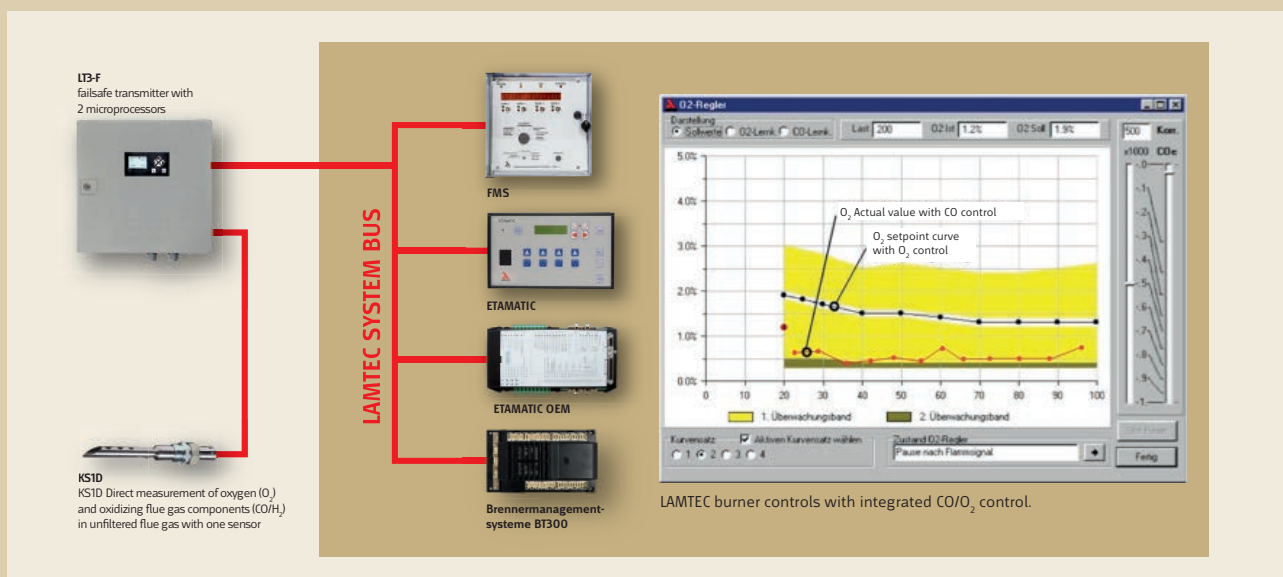
LT3 connections on the underside.

The LT3-F LAMTEC Lambda Transmitter is available exclusively with user interface. The user interface (UI) is attached to the front door and is equipped with the following functions:

- Display of O<sub>2</sub> and CO measured values
- Calibration of measurements
- Information about the operating state of the probe/measurement, the software version, CRC and serial number
- Password entry
- Settings, filter time, analogue output, probe replacement, display, maintenance mode

The following connections are located on the underside of the device:

- Mains connection
- KS1D probe connection (probe signal/probe heater)
- External LSB connection for the PC (use of LAMTEC remote software)
- Cable bushing for connecting the LAMTEC SYSTEM BUS to the LSB modules
- Cable bushing for analogue and digital inputs/ outputs



System overview of the LT3-F with burner control to regulate CO/O<sub>2</sub>.

# Various probe designs.

## LAMTEC Combination Probe KS1D

The LAMTEC KS1D Combination Probe is available in a number of designs and can be combined with the LT3-F Lambda Transmitter to suit any requirement.

### Combination Probe KS1D



#### Properties:

- Measurement directly in the moist flue gas up to 300 °C
- Protection rating IP42, the probe must be protected against water, snow, etc., if installed outside.

#### Applications:

- Natural gas, heating oil (extra light).

### Combination Probe KS1D in a housing with the GED and PIF



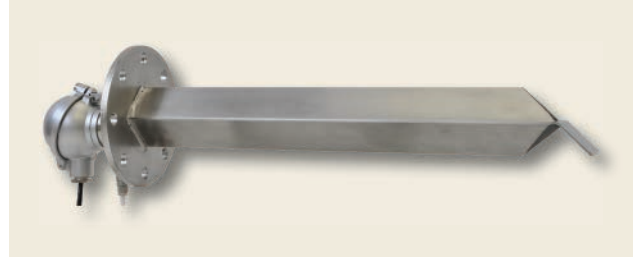
#### Properties:

- Measurement directly in the moist flue gas up to 300 °C
- Protection rating IP42, the probe must be protected against water, snow, etc., if installed outside.

#### Applications:

- Natural gas, heating oil (extra light), exhaust gases with low ash, solids and dust content.

### Combination Probe KS1D in HT design (high-temperature)



#### Properties:

- Measurement directly in the moist flue gas up to 1,200 °C
- Semi-automatic calibration following installation during combustion operation with test gas is supported.
- IP65 protection rating.

#### Applications:

- Natural gas, heating oil (extra-light), coal, particle-laden exhaust gases (available with optional compressed air cleaning).
- With purging: exhaust gases containing ash such as biomass, lignite, etc.



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