

# Technical Data Combination Probe KS1D-HT



Fig. 1 Combination Probe KS1D-HT

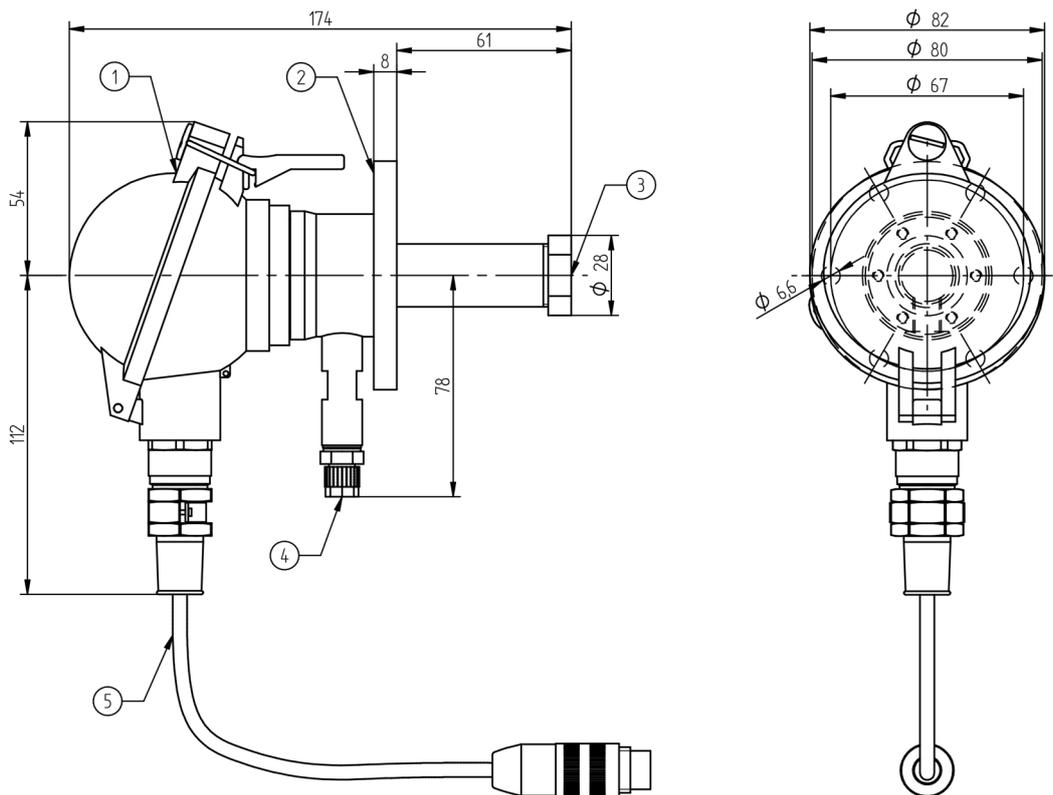
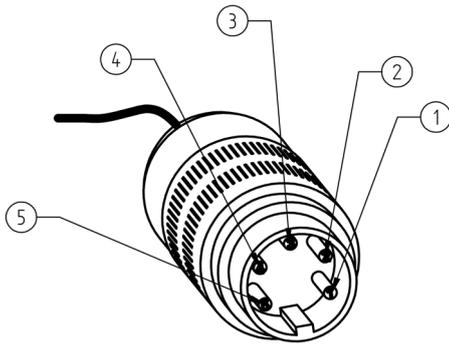


Fig. 2 Combination Probe KS1D-HT (dimensions in mm)

1	Junction box
2	Mounting flange
3	Filter disk
4	Hose connection 4/6 mm   0.16/0.24 "in for 7 Boiler wall (in this case with inner insulation) calibrating gas
5	Connecting cable, length 2 m   6.6 ft

# Technical Data Combination Probe KS1D-HT



- 1 = (+) probe signal O<sub>2</sub>/ CO<sub>e</sub> (black)
- 2 = (-) probe signal CO<sub>e</sub> (grey)
- 3 = probe heating (white)
- 4 = probe heating (white)
- 5 = (-) probe signal O<sub>2</sub> (red or blue)

Fig. 3 Pin assignment for plug

Technical data	
Measuring range	O <sub>2</sub> : 0 - 21 % O <sub>2</sub>
	CO <sub>e</sub> : 0 - 1,000 ppm (0 - 10,000 ppm upon request)
Measuring precision	O <sub>2</sub> : ± 5 % of measured value - not better than ± 0.3 vol. %
	CO <sub>e</sub> : ± 25 % of measured value- not better than ± 20 ppm after prior calibration under operating conditions with a CO reference measurement
	In measuring range ≤ 100 ppm: ± 10 ppm
Sensor signal	O <sub>2</sub> : -30 ... +150 mV
	CO <sub>e</sub> : -30 ... +800 mV
Response time	O <sub>2</sub> : t <sub>60</sub> : < 3 s t <sub>90</sub> : < 9 s
	CO <sub>e</sub> : t <sub>60</sub> : < 3 s (electronically filtered at the factory < 9 s) t <sub>90</sub> : < 4 s (electronically filtered at the factory < 13 s)
Relaxation time (measurement readiness after overload)	O <sub>2</sub> : t <sub>90</sub> : < 8 s
	CO <sub>e</sub> : t <sub>90</sub> : < 9 s
Offset to environment	O <sub>2</sub> : < 0.3 vol. %
	CO <sub>e</sub> : < 2 ppm
Repeating precision	O <sub>2</sub> : < 0.1 % deviation from measured value
	CO <sub>e</sub> : < 0.7 % deviation from measured value
Drift	O <sub>2</sub> : < 1.7 % from measured value (after 1000 h of operation in EL light fuel oil and 1004 switching cycles ON/OFF)
	CO <sub>e</sub> : < 18.4 % from measured value (after 1000 h of operation in EL light fuel oil and 1004 switching cycles ON/OFF)

## Technical Data Combination Probe KS1D-HT

### Technical data

Cross sensitivity	<p><b>O<sub>2</sub></b>: to CO<sub>2</sub> (15 vol. %) &lt; 0.1 vol. %  <b>O<sub>2</sub></b>: to CO (874 ppm) &lt; 0.1 vol. %  <b>O<sub>2</sub></b>: to CH<sub>4</sub> (76 ppm) &lt; 0.1 vol. %  <b>O<sub>2</sub></b>: to SO<sub>2</sub> (76 ppm) &lt; 0.1 vol. %  <b>O<sub>2</sub></b>: to NO (245 ppm) &lt; 0.1 vol. %</p> <p>(Information assumes an operating gas composition of 5 vol. % O<sub>2</sub>, rest is N<sub>2</sub>)</p> <hr/> <p><b>CO<sub>e</sub></b>: to CO<sub>2</sub> (15 vol. %) &lt; 26 ppm  <b>CO<sub>e</sub></b>: to O<sub>2</sub> (1 vol. %) &lt; 38 ppm</p> <p>(Information assumes an operating gas composition of 5 vol. % O<sub>2</sub>, 333 ppm CO<sub>e</sub>, rest is N<sub>2</sub> (333 ppm CO<sub>e</sub> = 166.5 ppm H<sub>2</sub> + 166.5 ppm CO))</p>
Heating consumption	10 ... 25 W (at T <sub>gas</sub> 350 °C / 662 °F approx. 18 W) (according to design, measuring gas temperature, and measuring speed)
Weight	1,300 g / 2.86 lb
Material of probe housing	1.4571
Material of connection housing	Aluminium
Material of connecting line	Nickel-plated copper strand FEP insulation
Measuring principle	Zirconium dioxide cell (ZrO <sub>2</sub> ) potentiometric (voltage probe)
Approval	According to EN 16340:2014 D

## Technical Data Combination Probe KS1D-HT

Operating Condition	
Lifetime	> 3 years (in case of light fuel oil and natural gas)
Heating time	10 min until operating temperature is reached
Operating temperature of the measuring cell (sensor) at 13 V heating voltage in the air (20 °C   68 °F)	650 °C   1,202 °F
Mounting / measuring gas extraction device	directly in exhaust gas channel / in situ
Seal tightness	$q_L \leq 100 \text{ cm}^3/\text{h}$ (According to DIN V 18160-1:2006-01, seal tightness towards environment through housing and fastening)
Mounting position	horizontal to vertical
Permissible fuels	residue-free, gaseous hydrocarbons, light fuel oil, heavy fuel oil (HFO), lignite and coal, biomass (according to design) (EN 16340:2014 D approval (in connection with LT3-F) only with gaseous and liquid fuels)
Ideal measuring gas speed	without GED: $1 \text{ m/s} \leq X \leq 6 \text{ m/s}$ $3.28 \text{ ft/s} \leq X \leq 19.69 \text{ ft/s}$ with GED BASE: $1 \text{ m/s} \leq X \leq 10 \text{ m/s}$ $3.28 \text{ ft/s} \leq X \leq 32.81 \text{ ft/s}$ with GED FLEX: $0.1 \text{ m/s} \leq X$ depending on version $0.328 \text{ ft/s} \leq X$  (Higher measuring gas speed increases the measurement error. Measured at measuring gas temperature 25 °C   77 °F. In case of smaller measuring gas temperatures it might be necessary to protect the probe from the incident flow.) <b>Attention:</b> For lengths of GED FLEX > 1 m, a higher measuring gas speed (> 30 m/s   98.42 ft/s) can lead to flutter and vibration of GED.
Reference air supply	not required
Flange adapter	depending on the selected GED

### Environmental Conditions

<b>Probe head</b>	permissible flue gas temperature	< 450 °C   842 °F (In connection with LT3-F max. 300 °C   572 °F permissible flue gas temperature on probe head. The flue gas temperature can be considerably higher since it is reduced by the correctly selected length of the GED.)
<b>Operation</b>	permissible temperature	< 100 °C   212 °F on cable gland < 100 °C   212 °F on connection cable
<b>Transport</b>	permissible temperature	-20 ... +70 °C   -4 ... +158 °F
<b>Storage</b>	permissible temperature	-20 ... +70 °C   -4 ... +158 °F
<b>Degree of protection</b>	according DIN EN 40050	IP65

### NOTICE

The limits of the technical data must be strictly adhered to.

# Technical Data Combination Probe KS1D-HT

## Order Information

### Combination Probe KS1D-HT for simultaneous measurement of oxygen (O<sub>2</sub>) and unburnt residue (CO/H<sub>2</sub>) in combination with GED FLEX or GED BASE

with connecting cable and connector

Description / Type	Order no.
Combination Probe KS1D-HT, cable length 2 m   6.56 ft, IP65, gasket for connecting head, Novaphit SSTC	656R2015
Combination Probe KS1D-HT, cable length 5 m   16.40 ft, IP65, gasket for connecting head, Novaphit SSTC	656R2018

Additional required: For measurements without purge operation, without fully automatic calibration

- Lambda Transmitter LT3-F, order no. 657R50 / ... or
- Lambda Transmitter LT3, configured for KS1D, order no. 657R51 / ...
- Gas extraction device GED BASE or GED FLEX

For measurements without purge operation (cyclic triggering)

- Lambda Transmitter LT2, configured for KS1D in application 'purge operation'  
Order no. 657R102 / KS1D / 3A / ...
- Gas extraction device GED FLEX, T-adapter for purge operation
- Dedusting / purge unit, IP65, for T-adapter GED FLEX, order no. 657R0934

For measurements without purge operation (manual triggering)

- Lambda Transmitter LT3-F, order no. 657R50 / ... or
- Lambda Transmitter LT3, configured for KS1D, order no. 657R51 / ...
- Gas extraction device GED FLEX, T-adapter for purge operation
- Dedusting / purge unit, IP65, for T-adapter GED FLEX, order no. 657R0934

For measurements with ejector

- Lambda Transmitter LT2, configured for KS1D in application 'fully automatic calibration'  
Order no. 657R102 / KS1D / V / ...
- Gas extraction device GED FLEX, T-adapter for ejector

For measurements with fully automatic calibration

- Lambda Transmitter LT2, configured for KS1D in application 'fully automatic calibration'  
Order no. 657R102 / KS1D / V / ...
- Gas extraction device GED BASE or GED FLEX
- Fully automatic calibration system, order no. 657R0940

The information in this publication is subject to technical changes.



### LAMTEC Meß- und Regeltechnik für Feuerungen GmbH & Co. KG

Josef-Reiert-Straße 26

D-69190 Walldorf

Telefon: +49 (0) 6227 6052-0

Telefax: +49 (0) 6227 6052-57

[info@lamtec.de](mailto:info@lamtec.de)

[www.lamtec.de](http://www.lamtec.de)

