

Technical Data Combination Probe KS1D-BF



Fig. 1 Combination Probe KS1D-BF

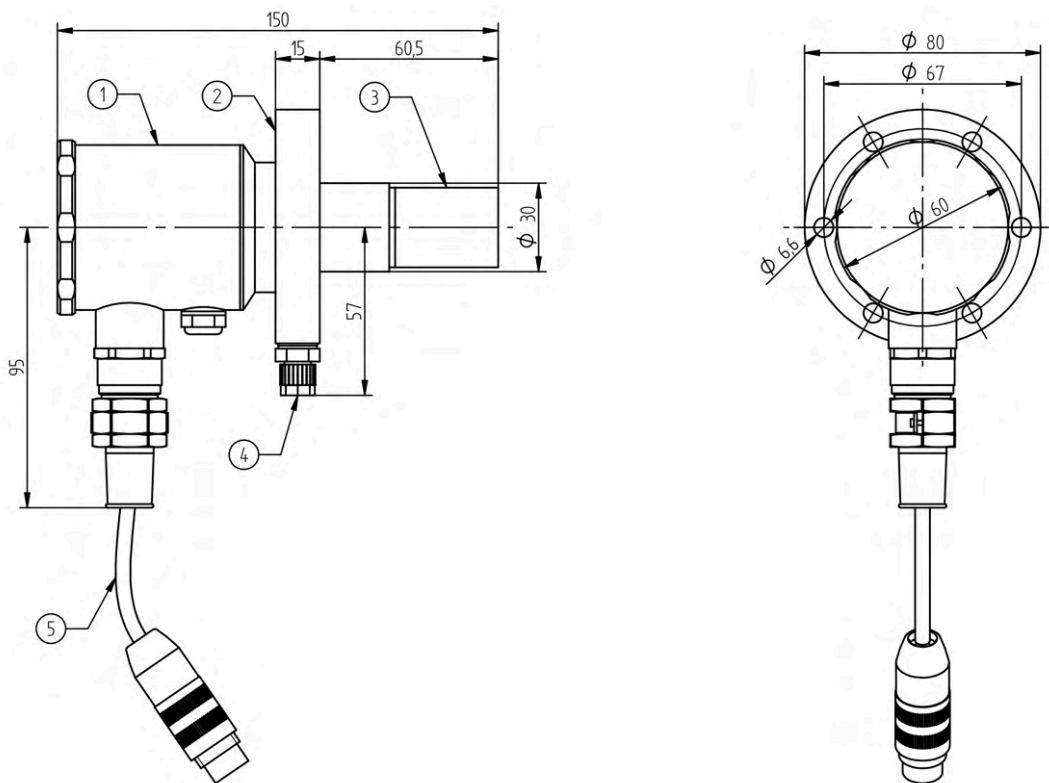
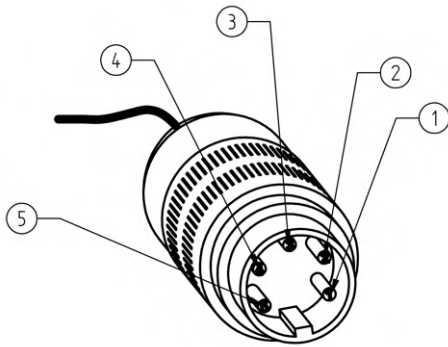


Fig. 2 Dimensional drawing Combination Probe KS1D-BF (dimensions in mm)

1	Junction box
2	Mounting flange
3	Max. measuring gas temperature at sintered metal filter
4	Hose connection
5	Connecting cable

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- 1 = (+) probe signal O₂/ CO_e (black)
- 2 = (-) probe signal CO_e (grey)
- 3 = probe heating (white)
- 4 = probe heating (white)
- 5 = (-) probe signal O₂ (red or blue)

Fig. 3 Pin assignment for plug

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

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Technical data	
Cross sensitivity	<p>O₂: to CO₂ (15 vol. %) < 0.1 vol. % O₂: to CO (874 ppm) < 0.1 vol. % O₂: to CH₄ (76 ppm) < 0.1 vol. % O₂: to SO₂ (76 ppm) < 0.1 vol. % O₂: to NO (245 ppm) < 0.1 vol. % (Information assumes an operating gas composition of 5 vol. % O₂, rest is N₂)</p> <hr/> <p>CO_e: to CO₂ (15 vol. %) < 26 ppm CO_e: to O₂ (1 vol. %) < 38 ppm (Information assumes an operating gas composition of 5 vol. % O₂, 333 ppm CO_e, rest is N₂ (333 ppm CO_e = 166.5 ppm H₂ + 166.5 ppm CO))</p>
Heating consumption	10 ... 25 W (at T _{gas} 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 ₂) potentiometric (voltage probe)
Approval	According to EN 16340:2014 D

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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)
Ideal measuring gas speed	<p>Without GED: $1 \text{ m/s} \leq X \leq 6 \text{ m/s}$ $3.28 \text{ ft/s} \leq X \leq 19.69 \text{ ft/s}$</p> <p>with GED BASE: $1 \text{ m/s} \leq X \leq 10 \text{ m/s}$ $3.28 \text{ ft/s} \leq X \leq 32.81 \text{ ft/s}$</p> <p>with GED FLEX: $0.1 \text{ m/s} \leq X$ depending on version $0.328 \text{ ft/s} \leq X$</p> <p>(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.)</p> <p>Attention: 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.</p>
Reference air supply	Not required
Flange adapter	Depending on the selected GED

Environmental Conditions

Probe head	permissible flue gas temperature	< 450 °C / 842 °F
Operation	permissible temperature	< 100 °C / 212 °F on cable gland < 100 °C / 212 °F on connection cable
Transport	permissible temperature	-20 ... +70 °C / -4 ... +158 °F
Storage	permissible temperature	-20 ... +70 °C // -4 ... +158 °F
Degree of protection	according DIN EN 40050	IP65

* According to DIN V 18160-1:2006-01, seal tightness towards environment through housing and fastening.

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Order Information

Combination Probe KS1D-BF for simultaneous measurement of oxygen (O₂) and unburnt residue (CO/H₂) in combination with GED FLEX or GED BASE

with connecting cable and connector

Description / Type	Order no.
Combination Probe KS1D-BF, cable length 2 m / 6.56 ft, IP65	656R2115

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 with 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 with 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 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
- Dedusting / purge unit, IP65, for T-adapter GED FLEX, order no. 657R0934
- Fully automatic calibration system, order no. 657R0940

- For measurements with purge operation (cyclic triggering) and fully automatic calibration
- Lambda Transmitter LT2, configured for KS1D in application "fully automatic calibration and purging" Order no. 657R102 / KS1D / VA / ...
- Gas extraction device GED FLEX, T-adapter for purge operation
- Dedusting / purge unit, IP65, for T-adapter GED FLEX, order no. 657R0934
- Fully automatic calibration system, order no. 657R0940

The information in this publication is subject to technical changes.



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