

Technical Data Combination Probe KS1D-Ex

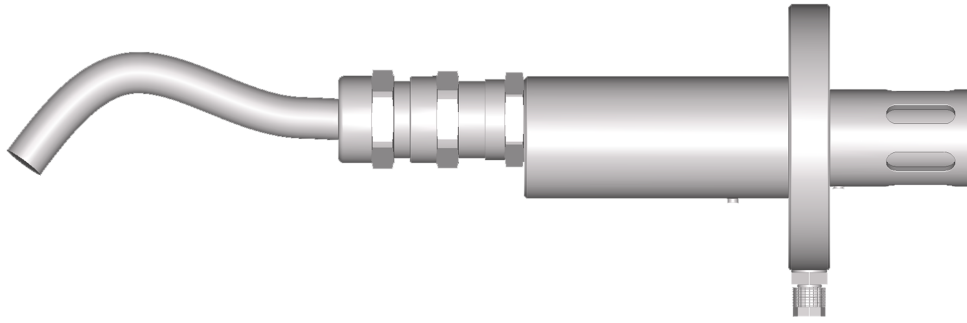


Fig. 1 Combination Probe KS1D-Ex

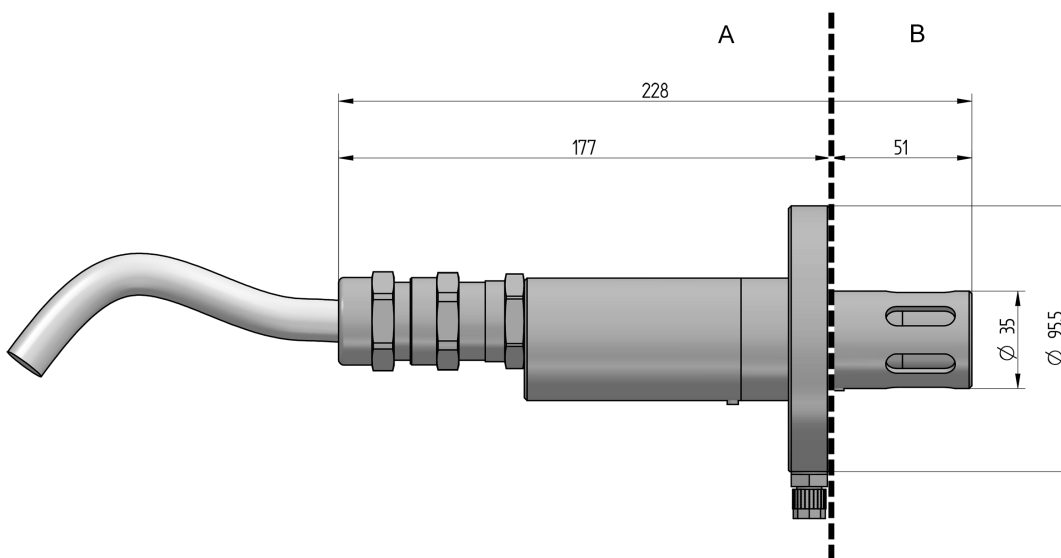


Fig. 2 Dimensional drawing Combination Probe KS1D-Ex (unit of measurement in mm)

- A** Outside
- B** Measuring gas side

Application:

- Flue gas temperatures: depending on material up to 1,400 °C | 2,552 °F at the GED FLEX
450 °C | 842 °F at probe head for LT2/LT3
- Flow velocities: 0,1 ... 30 m/s | 0.33 ... 98.43 ft/s
- Dust exposure: $\leq 1,000 \text{ mg/m}^3$


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Technical data	
Measuring range	O₂ : 0 - 21 % O ₂
	CO_e : 0 - 1,000 ppm (0 - 10,000 ppm upon request)
Measuring precision	O₂ : ± 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	O₂ : -30 ... +150 mV
	CO_e : -30 ... +800 mV
Response time	O₂ : 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)	O₂ : t ₉₀ : < 8 s
	CO_e : t ₉₀ : < 9 s
Offset to environment	O₂ : < 0.3 vol. %
	CO_e : < 2 ppm
Repeating precision	O₂ : < 0.1 % deviation from measured value
	CO_e : < 0.7 % deviation from measured value
Drift	O₂ : < 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)
Cross sensitivity	O₂ : to CO ₂ (15 vol. %) < 0.1 vol. % O₂ : to CO (874 ppm) < 0.1 vol. % O₂ : to CH ₄ (76 ppm) < 0.1 vol. % O₂ : to SO ₂ (76 ppm) < 0.1 vol. % O₂ : to NO (245 ppm) < 0.1 vol. % (Information assumes an operating gas composition of 5 vol. % O ₂ , rest is N ₂)
	CO_e : to CO ₂ (15 vol. %) < 26 ppm CO_e : to O ₂ (1 vol. %) < 38 ppm (Information assumes an operating gas composition of 5 vol. % O ₂ , 333 ppm CO _e , rest is N ₂ (333 ppm CO _e = 166.5 ppm H ₂ + 166.5 ppm CO))
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)

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Technical data	
Approval	According to EN 16340:2014 D
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	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.) 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.
Reference air supply	not required
Flange adapter	depending on the selected GED

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Environmental Conditions		
Probe head	Permissible flue gas temperature	< 450 °C 842 °F -20 ... +60 °C -4 ... +140 °F in the hazardous area
Operation	Mounting situation	Indoors or outdoors at any height
	Permissible temperature	-20 ... +60 °C -4 ... +140 °F on cable gland -20 ... +60 °C -4 ... +140 °F on connection cable
	Relative humidity	0 ... 100 %
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
Type of protection	 II2G Ex db (IIB+H2) T4 Gb II2D Ex Tb IIIC T135°C Db	Certificate number: IECEX EPS 23.0059X EPS 23 ATEX 1 226 X

NOTICE

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

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NOTICE



The measuring function of the probe is not part of the approvals.

NOTICE



The ignition protection only applies in the range of -40 ... +60 °C | -40 ... +140 °F.

If the measuring gas temperature exceeds this temperature range, the ignition protection for the measuring gas side of the probe is not applicable. See Dimensional drawing Combination Probe KS1D-Ex (unit of measurement in mm).

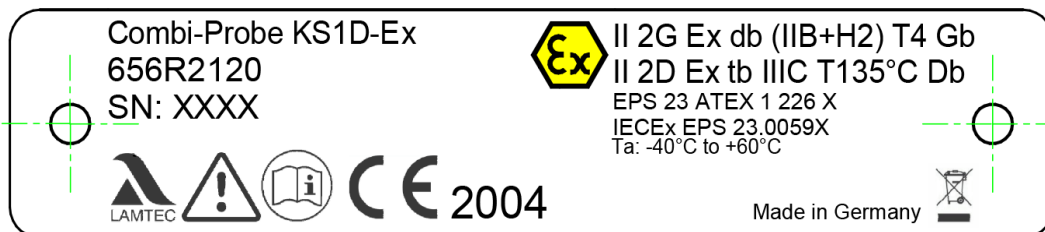




Fig. 3 Rating plate KS1D-Ex

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NOTICE



Description of the symbols on the type plate of the probe:

- ▶  Please read the manual before working on the probe.
- ▶  All described activities may only be carried out by qualified and authorised personnel in compliance with the requirements:

Order Information

Description / Type	Order no.
Combination Probe KS1D-Ex, cable length 3 m 9.84 ft	656R2120

The information in this publication is subject to technical changes.



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