

# Technical Data Combination Probe KS1D-K<sup>™</sup>



Fig. 1-1 KS1D-K / KS1D-KR



Fig. 1-2 KS1D-KHD



Fig. 1-3 KS1D-KAF

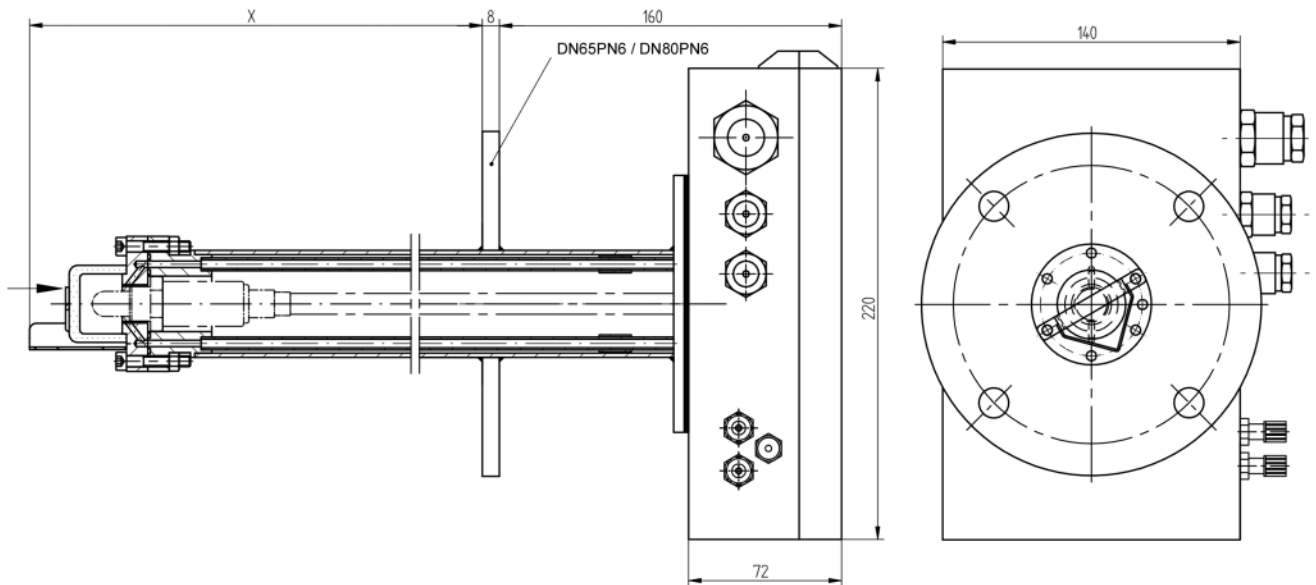


Fig. 1-4 Dimensional drawing KS1D-K / KS1D-KR / KS1D-KHD / KS1D-KAF combination probe

## Characteristics

Measuring range	<b>O<sub>2</sub></b> : 0 ... 18 Vol.% O <sub>2</sub> with restriction 0 ... 21 Vol.% O <sub>2</sub>
	<b>CO<sub>e</sub></b> : 0 ... 10.000 ppm CO <sub>e</sub>
Measurement accuracy	<b>O<sub>2</sub></b> : ± 5 % of the measured value, after previous calibration with test gas, - not better than ± 0,3 Vol.% O <sub>2</sub>
	<b>CO</b> : ± 25 % of the measured value - no more precise than ± 10 ppm on natural gas combustion, after previous calibration under operating plant conditions with a CO-reference measurement in measuring range 0 ... 100 ppm
Response time t <sub>60</sub> (60 % of end value)	<b>O<sub>2</sub></b> ≤ 10 s
	<b>CO<sub>e</sub></b> ≤ 5 s
Cross sensitivity	to SO <sub>2</sub> , NH <sub>3</sub> , NO, propane and aromatic hydrocarbons
Pressure influence of measuring gas	change of -1,6 mV/100 mbar
Internal resistance of probe R <sub>I</sub> with air at 20 °C (68 °F) and 21 W heating output (new probe)	15 ... 30 Ω – O <sub>2</sub> -electrode 15 ... 30 Ω – CO/H <sub>2</sub> -electrode
Probe voltage output	<b>O<sub>2</sub></b> : 150 ... -30 mV ⇔ 0 ... 21 Vol% O <sub>2</sub>
	<b>CO<sub>e</sub></b> : -30 ... 800 mV ⇔ 0 ... 10.00 ppm CO <sub>e</sub> resolution: 0,1 mV
Power consumption of heater	10 ... 25 W - depending on measuring gas temperature (at T <sub>Gas</sub> 350 °C approx. 18 W)

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<b>Characteristics</b>	
Power supply voltage of heater	AC/DC at P <sub>H</sub> 18 VA → 11,4 V at P <sub>H</sub> 20 VA → 12,34 V at P <sub>H</sub> 25 VA → 14,8 V
Heating current at P <sub>H</sub> 20 VA	approx. 1,6 A approx. 5 A short-term at heat up PTC-characteristics
Insulation resistance	>30 MΩ (between heater and probe connection)
Durability	≥ 2 years by using fuel and natural gas
Weight in [kg] [lb]	6,5 (14.3) to 500 mm (19.7 in.) length
Electrical connection	Terminal
Operating temperature of measuring cell (sensor) on 13 V heating voltage to air (20 °C) (68 °F)	650 °C (1202 °F)
Measurement principle	Zirconium dioxide cell (ZrO <sub>2</sub> ) potentiometric (voltage probe)
Heating-up time	20 min. up to operating temperature
Firing-rate point	semi-automatic with air and test gas (max. 0,3 bar) Possible with installed conditions and running combustion
<b>Operating condition</b>	
Mounting / measuring gas extraction device	Directly in exhaust gas channel / in situ
Mounting position	horizontal via vertical to horizontal
Permissible fuels	Residue-free, gaseous hydrocarbons, light fuel oil, lignite and coal, wood Direct measurements in fuel gases are not possible
Permissible continuous exhaust gas temperature on probe head	≤ 450 °C (842 °F) ≤ 200 °C (392 °F) type KS1D-KAF
Reference air supply	via reference pump 657R1060 (option LT2) alternative via instrument air on site 0,3 bar max. 100 l/h
Flange adapter	Probe type: KS1D-K, KS1D-KR, KS1D-KV DN65PN6 with pipe socket DN80, flange type 655R0179/655R0180 Probe type: KS1D-KA, KS1D-KAF, KS1D-KHD DN80PN6 with pipe socket DN125, flange type 657R3506/657R3507
<b>Environmental conditions</b>	
Ambient temperature	-20 ... +60 °C
Protection class	IP65

## Order Information

**Combination Probe for simultaneous measurement of oxygen (O<sub>2</sub>) and unburnt residue (CO/H<sub>2</sub>).**

### KS1D-K for flue gas temperatures up to 450 °C (842 °F)

with test gas connector for semi automatically calibration, electrical connection on screw terminals IP65

Description / Type	Order No.
Combi Probe KS1D-K, semi automatically calibration, immersion depth from flange 500 mm (1.6 ft.)	656R2030
Combi Probe KS1D-K, semi automatically calibration, immersion depth from flange 1,000 mm (3.3 ft.)	656R2031
Combi Probe KS1D-K, semi automatically calibration, immersion depth from flange 1,500 mm (4.9 ft.)	656R2032

### KS1D-KR for flue gas temperatures up to 450 °C (842 °F)

with test gas connector for semi automatically calibration and full automatically air stripping, for regeneration of Co-electrode with permanent CO concentration in flue gas, electrical connection on screw terminals IP65

Description / Type	Order No.
Combi Probe KS1D-KR full automatically air stripping, immersion depth from flange 500 mm (1.6 ft.)	656R2040
Combi Probe KS1D-KR full automatically air stripping, immersion depth from flange 1,000 mm (3.3 ft.)	656R2041
Combi Probe KS1D-KR full automatically air stripping, immersion depth from flange 1,500 mm (4.9 ft.)	656R2042

### KS1D-KHD for flue gas temperatures up to 450 °C (842 °F)

with test gas connector for semi automatically calibration, electrical connection on screw terminals IP65, incl. high dust protective pipe

Description / Type	Order No.
Combi Probe KS1D-KHD semi automatically calibration, immersion depth from flange 500 mm	656R2030/HD

### KS1D-KAF for flue gas temperatures up to 200 °C (392 °F)

with purging, filter floss and test gas connector for semi automatically calibration, electrical connection on screw terminals IP65

Description / Type	Order No.
Combi Probe KS1D-KAF, semi automatically calibration and purging incl. filter floss, immersion depth from flange 500 mm (1.6 ft.)	656R2030/AF
Combi Probe KS1D-KAF, semi automatically calibration and purging, incl. filter floss, immersion depth from flange 1,000 mm (3.3 ft.)	656R2031/AF
Combi Probe KS1D-KAF semi automatically calibration and purging, incl. filter floss, immersion depth from flange 1,500 mm (4.9 ft.)	656R2032/AF

### KS1D-KA for flue gas temperatures up to 450 °C (842 °F)

with purging and test gas connector for semi automatically calibration, electrical connection on screw terminals IP65

Description / Type	Order No.
Combi Probe KS1D-KA, semi automatically calibration and purging, immersion depth from flange 500 mm (1.6 ft.)	656R2030/A
Combi Probe KS1D-KA, semi automatically calibration and purging, immersion depth from flange 1,000 mm (3.3 ft.)	656R2031/A
Combi Probe KS1D-KA, semi automatically calibration and purging, immersion depth from flange 1,500 mm (4.9 ft.)	656R2032/A

### KS1D-KV for flue gas temperatures up to 450 °C (842 °F)

with test gas connector for full automatically calibration, electrical connection on screw terminals IP65

Description / Type	Order No.
Combi Probe KS1D-KV, full automatically calibration, immersion depth from flange 500 mm (1.6 ft.)	656R2050
Combi Probe KS1D-KV, full automatically calibration, immersion depth from flange 1,000 mm (3.3 ft.)	656R2051
Combi Probe KS1D-KV, full automatically calibration, immersion depth from flange 1,500 mm (4.9 ft.)	656R2052

The information in this publication is subject to technical changes.

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