

## Technical Data Combination Probe KS1D without Housing



Fig. 1 KS1D Combination Probe without housing

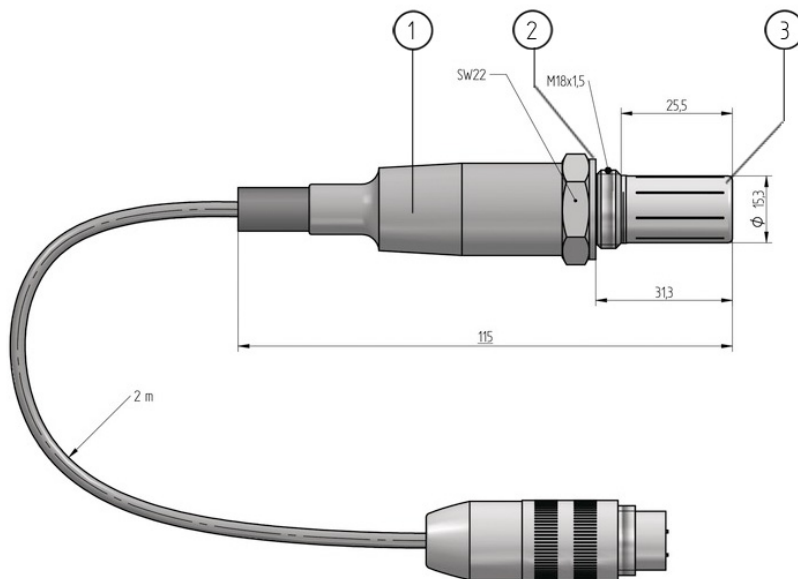


Fig. 2 Dimensional drawing KS1D Combination Probe without housing

- |   |  |          |
|---|--|----------|
| 1 | KS1D Combination Probe without housing | 656R2010 |
| 2 | sealing washer                         |          |
| 3 | probe head                             |          |

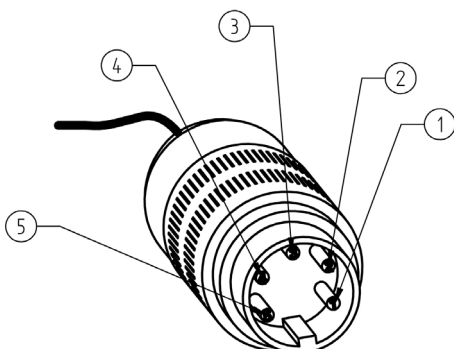


Fig. 3 Terminal assignment plug

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

## Technical Data Combination Probe KS1D without Housing

Technical data*	
Measuring range	<b>O<sub>2</sub></b> : 0 ... 21 % O <sub>2</sub> <b>CO<sub>e</sub></b> : 0 ... 1,000 ppm (0 ... 10,000 ppm upon request)
Measuring precision	<b>O<sub>2</sub></b> : ± 5 % of measured value - not better than ± 0.3 vol. % <b>CO<sub>e</sub></b> : ± 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	<b>O<sub>2</sub></b> : -30 ... +150 mV <b>CO<sub>e</sub></b> : -30 ... +800 mV
Response time	<b>O<sub>2</sub></b> : t <sub>60</sub> : < 3 s t <sub>90</sub> : < 9 s <b>CO<sub>e</sub></b> : 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)	<b>O<sub>2</sub></b> : t <sub>90</sub> : < 8 s <b>CO<sub>e</sub></b> : t <sub>90</sub> : < 9 s
Offset to environment	<b>O<sub>2</sub></b> : < 0.3 vol. % <b>CO<sub>e</sub></b> : < 2 ppm
Repeating precision	<b>O<sub>2</sub></b> : < 0.1 % deviation from measured value <b>CO<sub>e</sub></b> : < 0.7 % deviation from measured value
Drift	<b>O<sub>2</sub></b> : < 1.7 % from measured value (after 1000 h of operation in EL light fuel oil and 1004 switching cycles on/off) <b>CO<sub>e</sub></b> : < 18.4 % from measured value (after 1000 h of operation in EL light fuel oil and 1004 switching cycles on/off)
Cross sensitivity **	<b>O<sub>2</sub></b> : to CO <sub>2</sub> (15 vol. %) < 0.1 vol. % <b>O<sub>2</sub></b> : to CO (874 ppm) < 0.1 vol. % <b>O<sub>2</sub></b> : to CH <sub>4</sub> (76 ppm) < 0.1 vol. % <b>O<sub>2</sub></b> : to SO <sub>2</sub> (76 ppm) < 0.1 vol. % <b>O<sub>2</sub></b> : to NO (245 ppm) < 0.1 vol. % <b>CO<sub>e</sub></b> : to CO <sub>2</sub> (15 vol %) < 26 ppm <b>CO<sub>e</sub></b> : to O <sub>2</sub> (1 vol. %) < 38 ppm
Heating consumption	10 ... 25 W (according to design, measuring gas temperature, and measuring speed)
Lifetime	> 3 years (in case of light fuel oil and natural gas)
Weight	320 g / 0.71 lb
Material of probe housing	1.4571
Material of connecting line	nickel-plated copper strand FEP insulation
Operating temperature of the measuring cell (sensor) at 13 V heating voltage in the air (20 °C / '68 °F)	650 °C / 1,202 °F
Measuring principle	zirconium dioxide cell (ZrO <sub>2</sub> ) potentiometric (voltage probe)
Heating time	10 minutes until operating temperature is reached

\* Information according to EN 16340:2014 D

\*\* O<sub>2</sub>: Information assumes an operating gas composition of 5 vol. % O<sub>2</sub>, rest is N<sub>2</sub>  
CO<sub>e</sub>: 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)

## Technical Data Combination Probe KS1D without Housing

Conditions for use	
Mounting / measuring gas extraction device	directly in exhaust gas channel / in situ
Seal tightness	$q_L \leq 100 \text{ cm}^3/\text{h}^*$
Mounting position	horizontal to vertical
Permissible fuels	residue-free, gaseous hydrocarbons, light fuel oil **
Ideal measuring gas speed	1 m/s $\leq X \leq$ 6 m/s (deviating speeds on request)  (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.)
Reference air supply	not required
Flange adapter	Connection thread M18 x 1,5 (40 Nm)

### Environmental Conditions

<b>Probe head</b>	permissible flue gas temperature	$\leq 450 \text{ °C} / 842 \text{ °F}^{***}$
<b>Operation</b>	permissible temperature	< 300 °C / 572 °F on hexagon of probe housing < 200 °C / 392 °F on cable lead < 150 °C / 302 °F on connecting cable, up to 230 °C / 446 °F short termed
<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>	DIN EN 40050	IP42

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

\*\* EN 16340:2014 D approval (in connection with LT3-F) only with gaseous and liquid fuels

\*\*\* In Connection with LT3-F max. 300 °C permissible exhaust gas temperature on probe head.

### NOTICE

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

# Technical Data Combination Probe KS1D without Housing

## Order Information

**KS1D Combination Probe for simultaneous measurement of oxygen (O<sub>2</sub>) and unburnt residue (CO/H<sub>2</sub>)**  
with connecting cable and connector

Description / Type	Type
KS1D Combination Probe without housing, with FEP-connecting cable up to 450 °C / 842 °F, cable length 2 m, IP42	656R2010

Additional required:

- Lambda Transmitter LT2, conf. for KS1D in type "Standard"  
order no. 657R102 / KS1D / S / ...
- or
- Lambda Transmitter LT3-F in wall mounting housing (for CO/O<sub>2</sub> control)  
order no. 657R50
- or
- Lambda Transmitter LT3-F in wall mounting housing (for CO/O<sub>2</sub> monitoring)  
order no. 657R51
- none Gas extraction device (GED)
- none Probe installation fitting (PIF)

## Accessories

### Fitting for Gas Extraction Device GED ECO

Description / Type	Type
SEA screw-in adapter M18x1,5i / 3/4" a for KS1D without housing	655R1013

The information in this publication is subject to technical changes.



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