

Technical Data Combination Probe KS2DNO_x

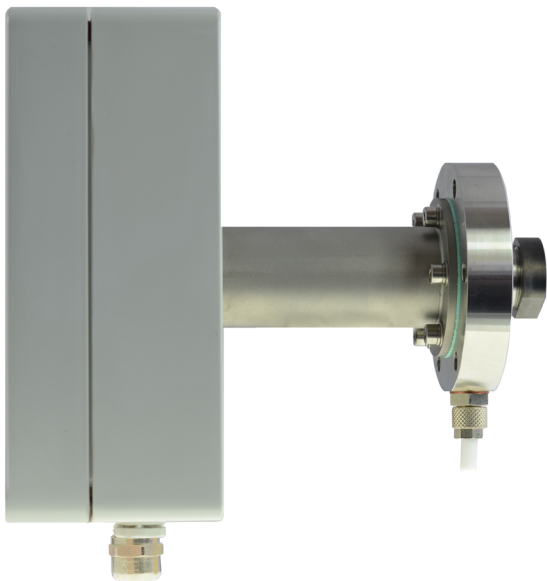


Fig. 1 Combination Probe KS2DNO_x

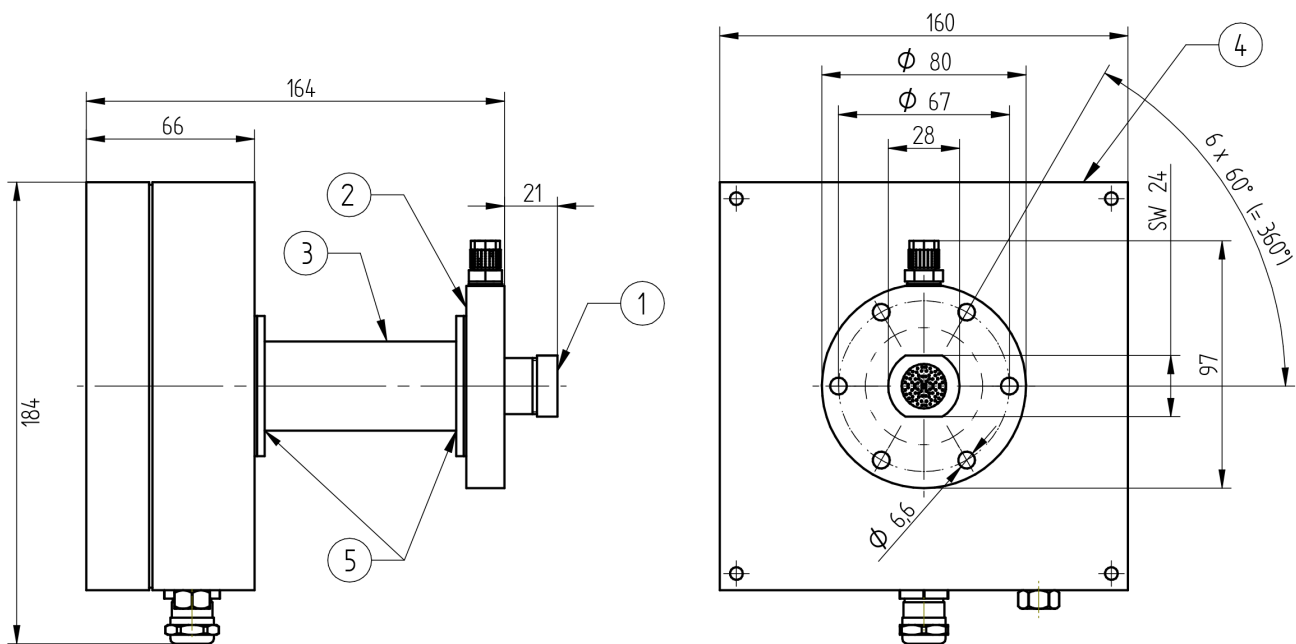


Fig. 2 Dimensional drawing Combination Probe KS2DNO_x

- 1 Filter cap
- 2 Probe flange with hose connection for calibrating gas
- 3 Intermediate piece
- 4 Connection housing
- 5 Seals for intermediate piece

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Fig. 3 Combination Probe KS2DNO_x with gas extraction device GED FLEX

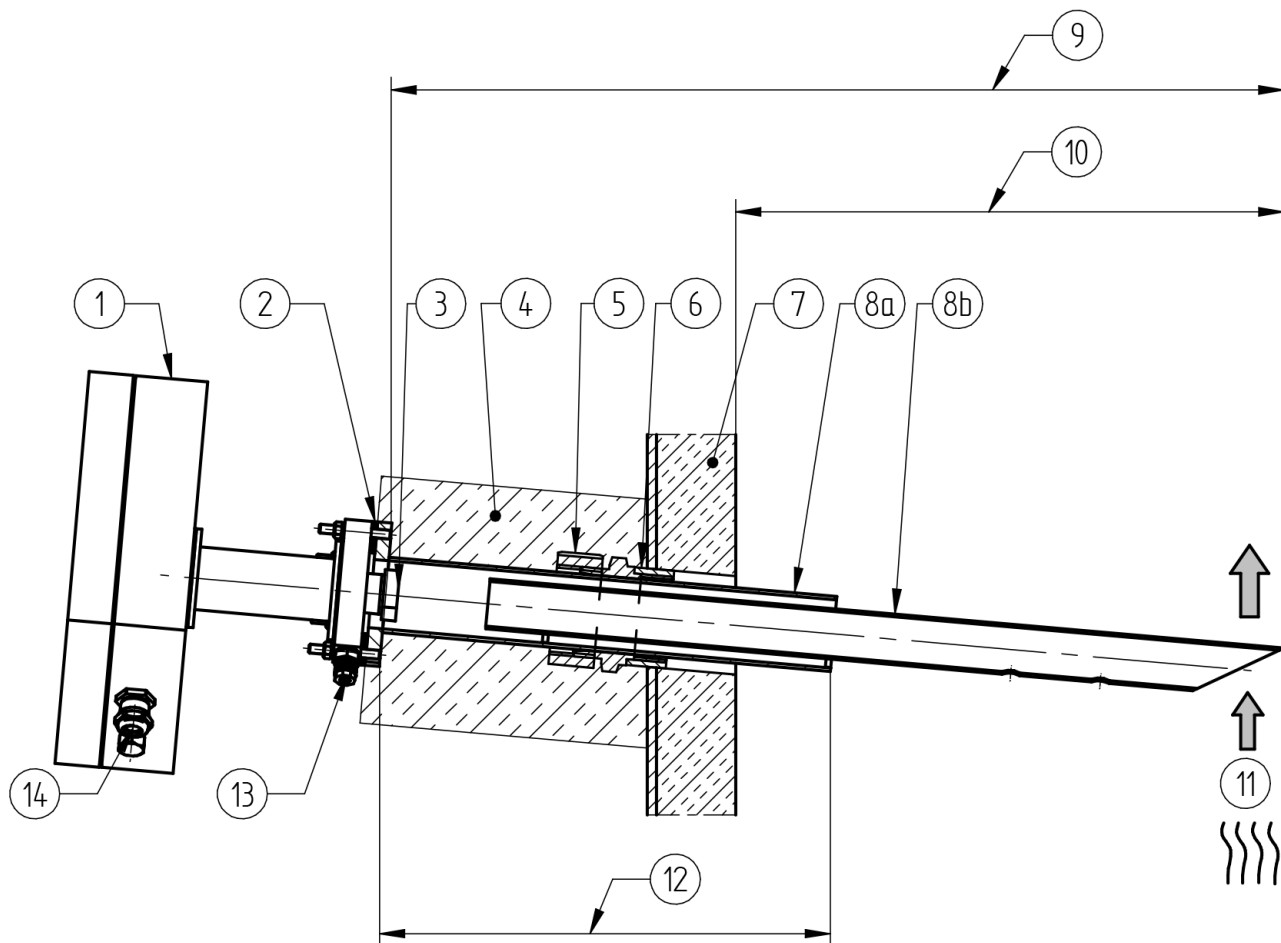


Fig. 4 Combination probe KS2DNO_x with GED FLEX made of Inconel (up to 950 °C / 1,742 °F) or stainless steel (up to 750 °C / 1,382 °F), without adapter

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| 1 Combination probe KS2DNO _x | 8a GED FLEX outer tube |
| 2 Graphite sealing type 656P0263 | 8b GED FLEX inner tube |
| 3 Maximum measuring gas temperature at probe head
300 °C / 572 °F in connection with LT3-F
450 °C / 842 °F in connection with LT2/LT3 and NT1 | 9 Length GED FLEX |
| 4 Insulation GED FLEX (depending on the measuring gas temperature) | 10 Immersion depth GED FLEX |
| 5 Screw-in connection | 11 Flow direction measuring gas |
| 6 Half sleeve | 12 Variable range immersion depth |
| 7 Boiler wall (in this case with inner insulation) | 13 Hose connection 4/6 mm / 0.16/0.24 "in for calibrating gas |
| | 14 Cable connection |

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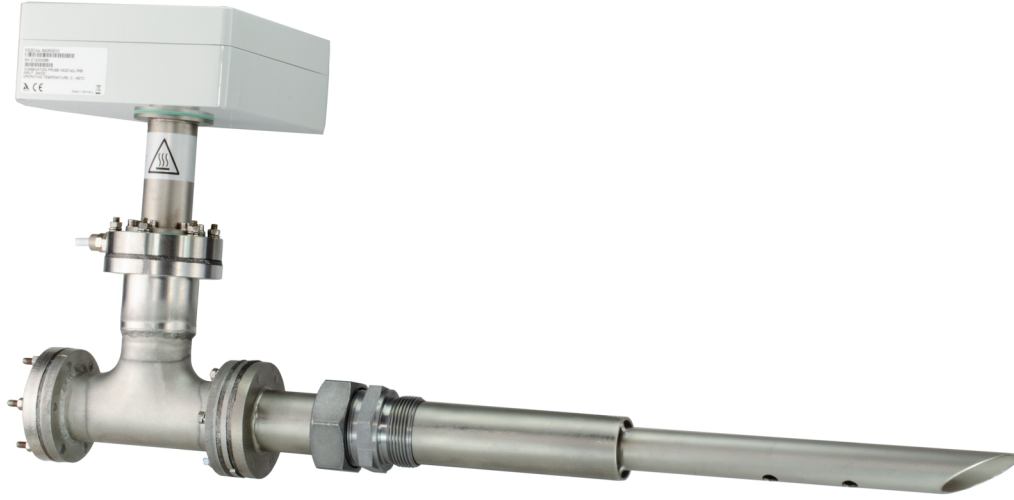


Fig. 5 Combination Probe KS2DNO_x with gas extraction device GED FLEX and T adapter

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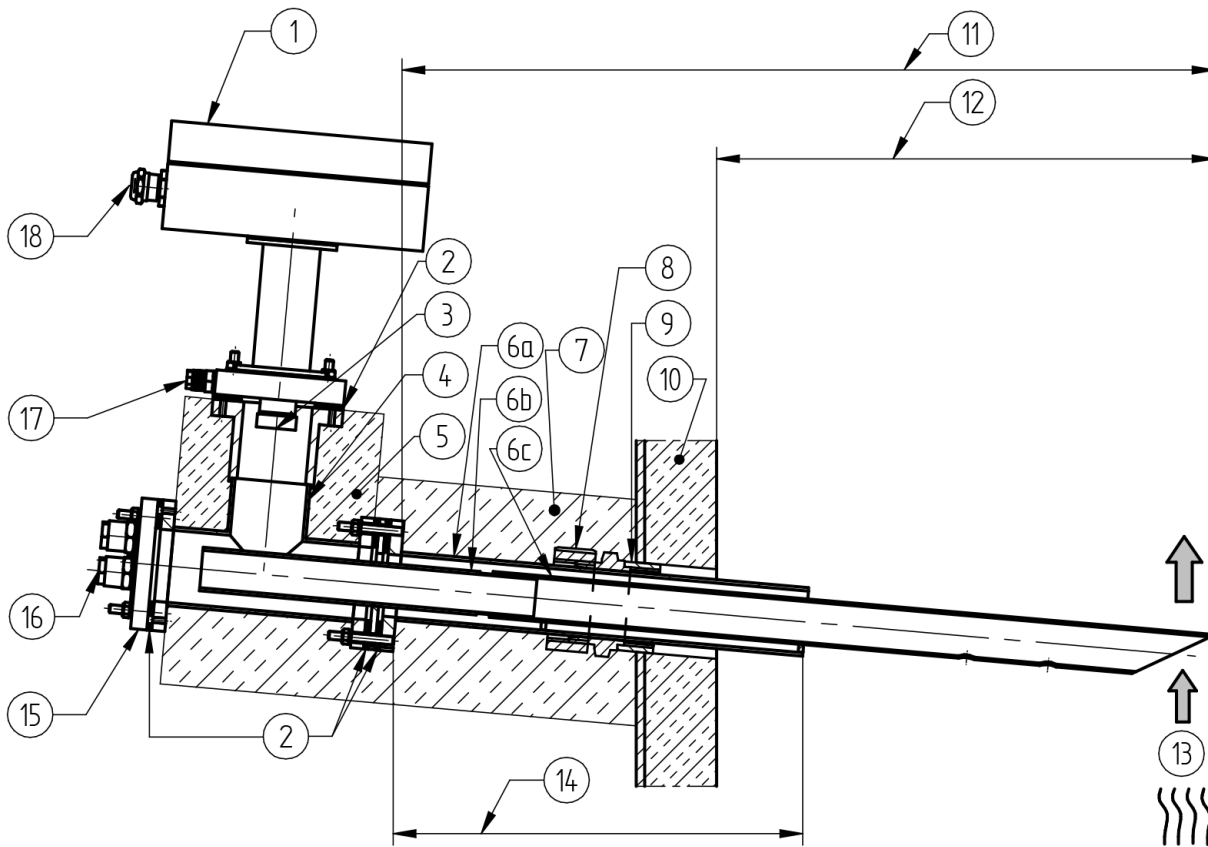


Fig. 6 Combination Probe KS2DNO_x with GED FLEX made of Inconel (up to 950 °C / 1,742 °F) or stainless steel (up to 750 °C / 1,382 °F), with T adapter

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|--|--|
| <p>1 Combination probe KS2DNO_x</p> <p>2 Graphite sealing type 656P0263</p> <p>3 Maximum measuring gas temperature at probe head:
300 °C / 572 °F in connection with LT3-F
450 °C / 842 °F in connection with LT2/LT3 and NT1</p> <p>4 T adapter for the probe holder type 655R1565 ... 68</p> <p>5 Insulation T adapter type 655R1569 (option, depending on the measuring gas temperature)</p> <p>6a GED FLEX outer tube</p> <p>6b GED FLEX extension inner tube (655R1574/ 655R1575)</p> <p>6c GED FLEX inner tube</p> <p>7 Insulation GED FLEX, on site (depending on the measuring gas temperature)</p> <p>8 Screw-in connection</p> <p>9 Half sleeve</p> | <p>10 Boiler wall (in this case with inner insulation)</p> <p>11 Length GED FLEX</p> <p>12 Immersion depth GED FLEX</p> <p>13 Flow direction measuring gas</p> <p>14 Variable range immersion depth</p> <p>15 Sealing flange/cleaning flange with pneumatic connections</p> <ul style="list-style-type: none"> – For T adapter type 655R1565: blind flange – For T adapter type 655R1566: cleaning flange with pneumatic connections (2x 12/10 mm / (0.47/0.39" in) – For T adapter type 655R1567: Ejector flange with pneumatic connection (6/4mm / 0.16/0.24" in) – For T adapter type 655R1568: Flange with all pneumatic connections <p>16 Pneumatic connection</p> <p>17 Hose connection 4/6 mm / 0.16/0.24" in for calibrating gas</p> <p>18 Cable connection</p> |
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Technical Data Combination Probe KS2DNO_x

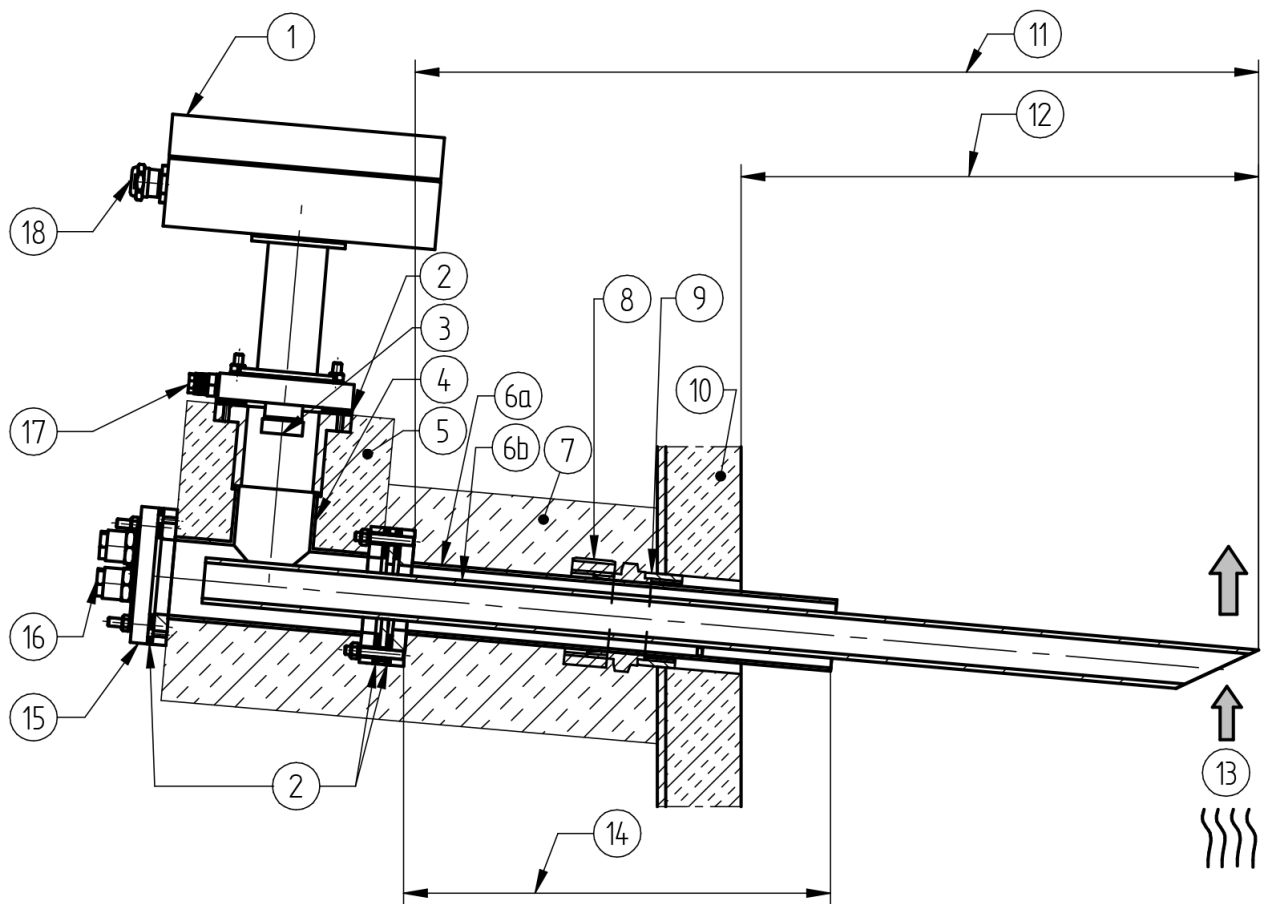


Fig. 7 Combination Probe KS2DNO_x with GED FLEX made of Kanthal (up to 1,200 °C / 2,192 °F) or AL203 (up to 1,400 °C / 2,552 °F) with T adapter

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|---|--|
| <p>1 Combination probe KS2DNO_x</p> <p>2 Graphite seal type 656P0263</p> <p>3 Max. measuring gas temperature on probe head:
300 °C / 572°F in combination with LT3-F
450 °C / 842 °F in combination with LT2/LT3</p> <p>4 T adapter for probe mount
for Injector Acceleration type 655R1565 ...68</p> <p>5 Insulation of T adapter type 655R1569
(optional, depending on the measuring gas temperature)</p> <p>6a GED FLEX outer tube</p> <p>6b GED FLEX inner tube</p> <p>7 Insulation of GED FLEX, provided by customer
(depending on the measuring gas temperature)</p> <p>8 Male coupling</p> <p>9 Half collar</p> <p>10 Boiler wall (in this case with inner insulation)</p> <p>11 Length GED FLEX</p> | <p>12 Immersion depth of GED FLEX</p> <p>13 Flow direction of measuring gas</p> <p>14 Variable range of immersion depth</p> <p>15 Sealing flange/cleaning flange with pneumatic connections</p> <p>End flange</p> <ul style="list-style-type: none"> – For T adapter type 655R1565: blind flange – For T adapter type 655R1566: cleaning flange with pneumatic connections (2x 12/10 mm / 0.47/0.39" in) – For T adapter type 655R1567: Ejector flange with pneumatic connection (6/4 mm / (0.16/0.24" in) – For T adapter type 655R1568: Flange with all pneumatic connections <p>16 Pneumatic connection</p> <p>17 Hose connection 4/6 mm (0.16/0.24" in) for calibration gas</p> <p>18 Cable connection</p> |
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Fig. 8 Combination Probe KS2DNO_x with gas extraction device GED BASE

Application:

- Flue gas temperatures: 550 °C (1022 °F) at GED BASE,
450 °C (842 °F) at probe head
- Ideal flow velocity: 1 ... 10 m/s (3.28 ... 32.8 ft/s)
- Dust exposure: $\leq 200 \text{ mg/Nm}^3$

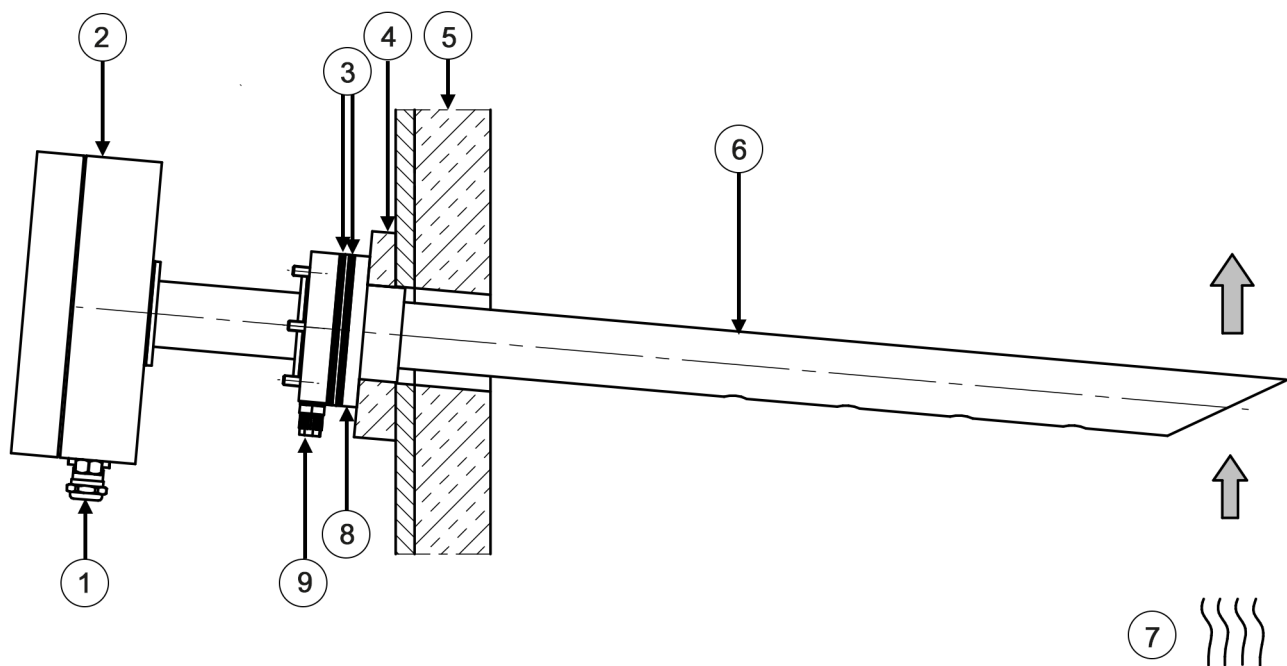


Fig. 9 Dimensional drawing Combination Probe KS2DNO_x with GED BASE

- 1 Screwed cable gland, probe connection
- 2 Combination Probe KS2DNO_x type 640R0010
- 3 Graphite sealing 656P0263
- 4 Outer insulation
- 5 Boiler wall (here internal insulation)
- 6 GED BASE type 655R1420 ... 1422
- 7 Flow direction
- 8 Counter flange 655R1450
- 9 Hose connection 4/6 mm (0.16/0.24 in) for calibrating gas

Technical Data Combination Probe KS2DNO_x

Technical Data *	
Measuring range	O₂ : 0 ... 21 Vol. %
	NO_x : 0 ... 3.100 ppm or 0 ... 6.374 mg/Nm ³
Measuring precision	O₂ : ± 8 % of measured value - not better than ± 0,2 Vol. % after prior calibration with a reference measurement
	NO_x : ± 10 % of measured value - not better than ± 3 ppm or 6 mg/Nm ³ after prior calibration with a reference measurement
Response time	O₂ : t ₆₀ : < 10 s
	NO_x : t ₆₀ : < 10 s
Offset to environment	O₂ : < 0,3 Vol. %
	NO_x : < 2 ppm or < 4 mg/Nm ³
Drift	O₂ : < 0,1 % / week
	NO_x : < 1 ppm / week
Lifetime	> 3 years (in case of light fuel oil and natural gas)
Dimension (WxHxD)	176 x 160 x 182 mm 6.93" x 6.30" x 7.17" in
Weight	1,850 g 4.08 lb
Material of probe housing	1.4571 / 1.4404
Material of connection housing	polycarbonate
Measuring principle	zirconium dioxide cell (ZrO ₂)
Heating time	– stand-by with restricted measuring accuracy after approx 3 min. – ready for measuring and calibration with specified measuring accuracy after approx. 7 min.
Operating Condition	
Mounting / measuring gas extraction device	directly in exhaust gas channel / in situ
Seal tightness	q _L ≤ 100 cm ³ /h*
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 m/s ≤ X ≤ 6 m/s 3.28 ft/s ≤ X ≤ 19.68 ft/s with GED BASE: 1 m/s ≤ X ≤ 10 m/s 3.28 ft/s ≤ X ≤ 32.8 ft/s with GED FLEX: 0,1 m/s ≤ X 0.33 ft/s ≤ X depending on version (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 length 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
Operation	permissible temperature	< 100 °C 212 °F on cable gland
Transport	permissible temperature	-40 ... +75 °C -40 +167 °F
Storage	permissible temperature	-40 ... +75 °C -40 +167 °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.

NOTICE

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

Order Information

Description / type	Order-no.
Combination Probe KS2DNO _x with calibration gas connection and connection housing IP65, incl. seal and mounting material	640R0010

Additional required:

- NO_x Transmitter NT1 Order no. 657R61/6264
- Gas extraction device GED BASE or GED FLEX

The information in this publication is subject to technical changes.



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