

## Technical Data Combination Probe KS2DNO<sub>x</sub>



Fig. 1 Combination Probe KS2DNO<sub>x</sub> with gas extraction device GED FLEX



Fig. 2 Combination Probe KS2DNO<sub>x</sub> with gas extraction device GED FLEX and T adapter

## Technical Data Combination Probe KS2DNO<sub>x</sub>

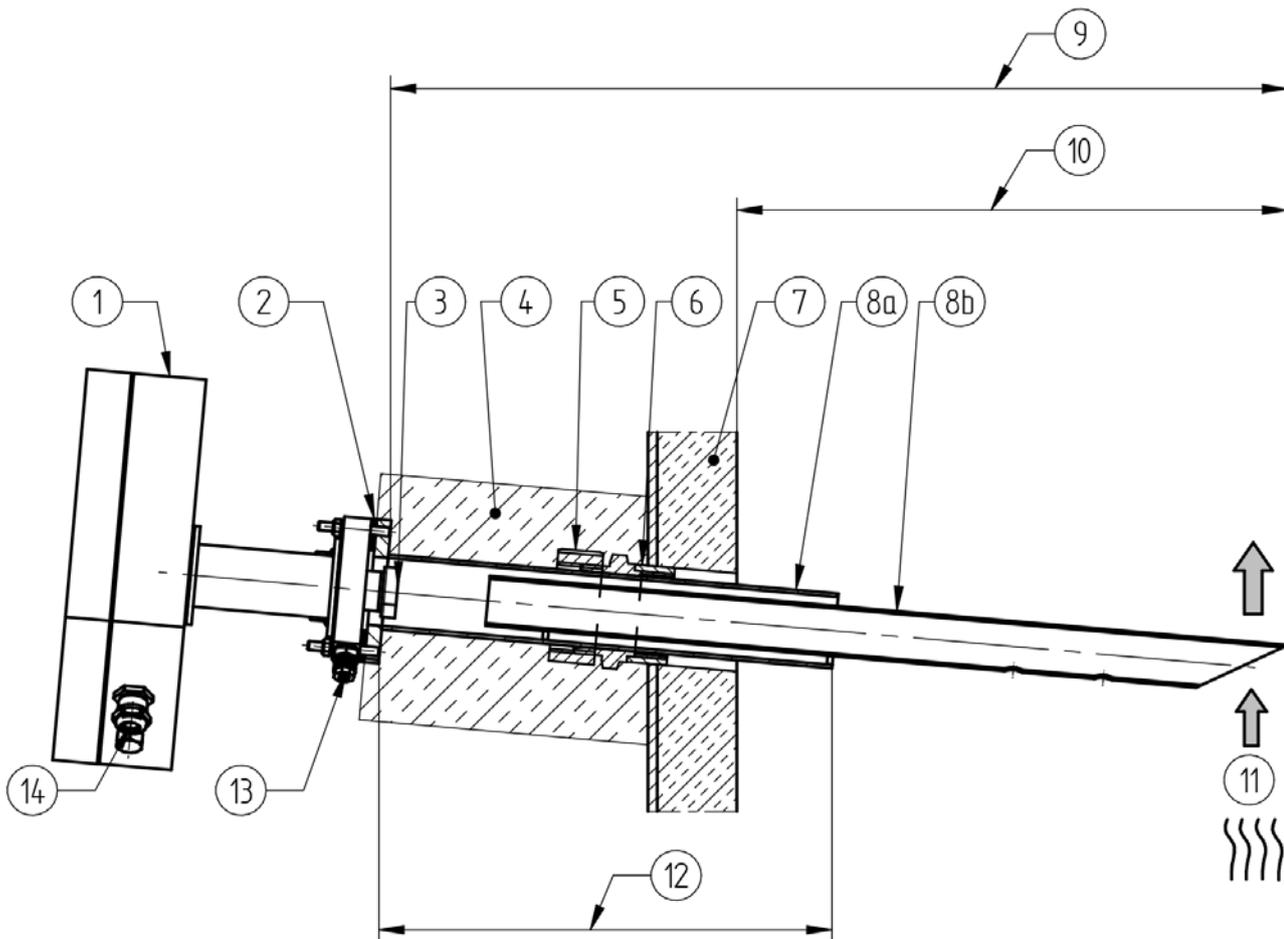


Fig. 3 Combination probe KS2DNO<sub>x</sub> with GED FLEX made of Inconel (up to 950 °C / 1,742 °F) or stainless steel (up to 750 °C / 1,382 °F), without adapter

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

## Technical Data Combination Probe KS2DNO<sub>x</sub>

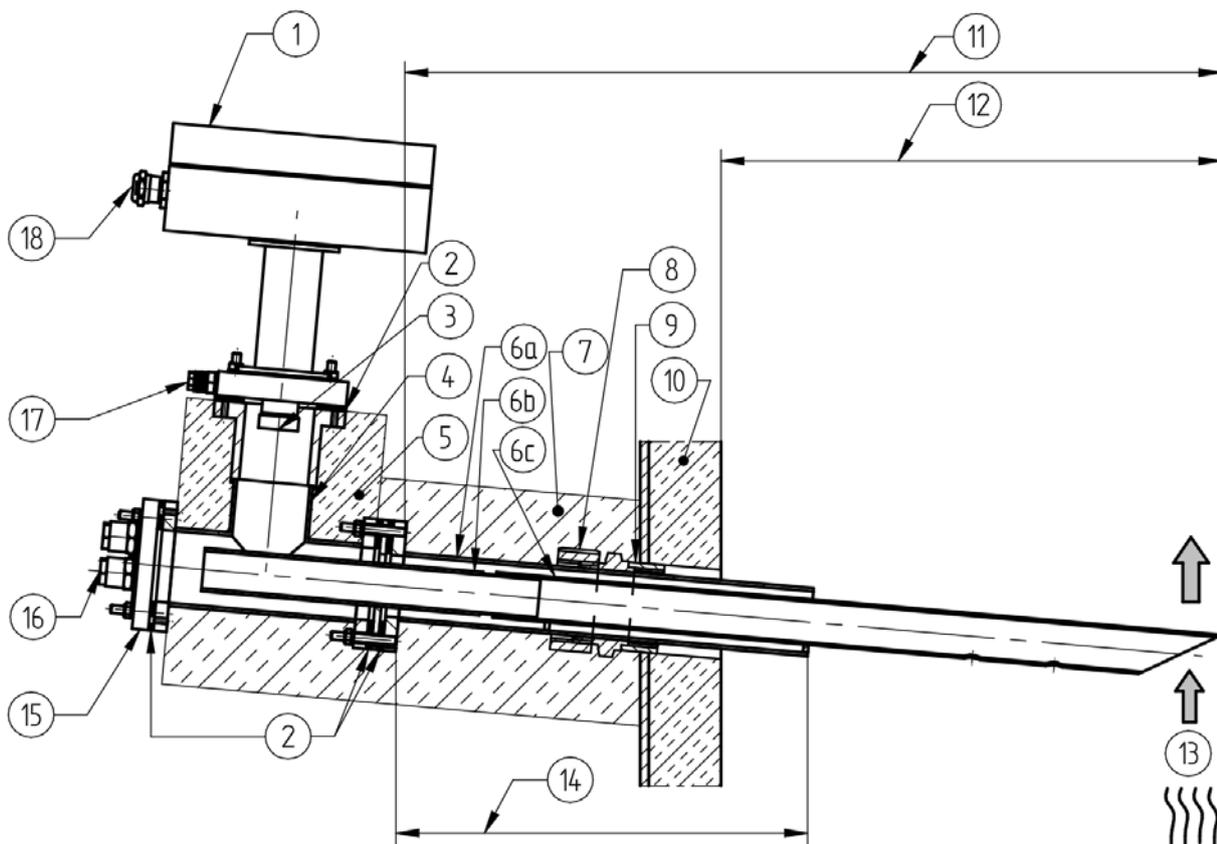


Fig. 4 Combination Probe KS2DNO<sub>x</sub> with GED FLEX made of Inconel (up to 950 °C / 1,742 °F) or stainless steel (up to 750 °C / 1,382 °F), with T adapter

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| <p><b>1</b> Combination probe KS2DNO<sub>x</sub></p> <p><b>2</b> Graphite sealing type 656P0263</p> <p><b>3</b> Maximum measuring gas temperature at probe head:<br/>300 °C / 572 °F in connection with LT3-F<br/>450 °C / 842 °F in connection with LT2/LT3 and NT1</p> <p><b>4</b> T adapter for the probe holder type 655R1565 ... 68</p> <p><b>5</b> Insulation T adapter type 655R1569<br/>(option, depending on the measuring gas temperature)</p> <p><b>6a</b> GED FLEX outer tube</p> <p><b>6b</b> GED FLEX extension inner tube (655R1574/<br/>655R1575)</p> <p><b>6c</b> GED FLEX inner tube</p> <p><b>7</b> Insulation GED FLEX, on site (depending on the measuring gas temperature)</p> <p><b>8</b> Screw-in connection</p> <p><b>9</b> Half sleeve</p> | <p><b>10</b> Boiler wall (in this case with inner insulation)</p> <p><b>11</b> Length GED FLEX</p> <p><b>12</b> Immersion depth GED FLEX</p> <p><b>13</b> Flow direction measuring gas</p> <p><b>14</b> Variable range immersion depth</p> <p><b>15</b> Sealing flange/cleaning flange with pneumatic connections</p> <ul style="list-style-type: none"> <li>– For T adapter type 655R1565:<br/>blind flange</li> <li>– For T adapter type 655R1566:<br/>cleaning flange with pneumatic connections (2x 12/10 mm / (0.47/0.39" in)</li> <li>– For T adapter type 655R1567:<br/>Ejector flange with pneumatic connection (6/4mm / 0.16/0.24" in)</li> <li>– For T adapter type 655R1568:<br/>Flange with all pneumatic connections</li> </ul> <p><b>16</b> Pneumatic connection</p> <p><b>17</b> Hose connection 4/6 mm / 0.16/0.24" in for calibrating gas</p> <p><b>18</b> Cable connection</p> |
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## Technical Data Combination Probe KS2DNO<sub>x</sub>

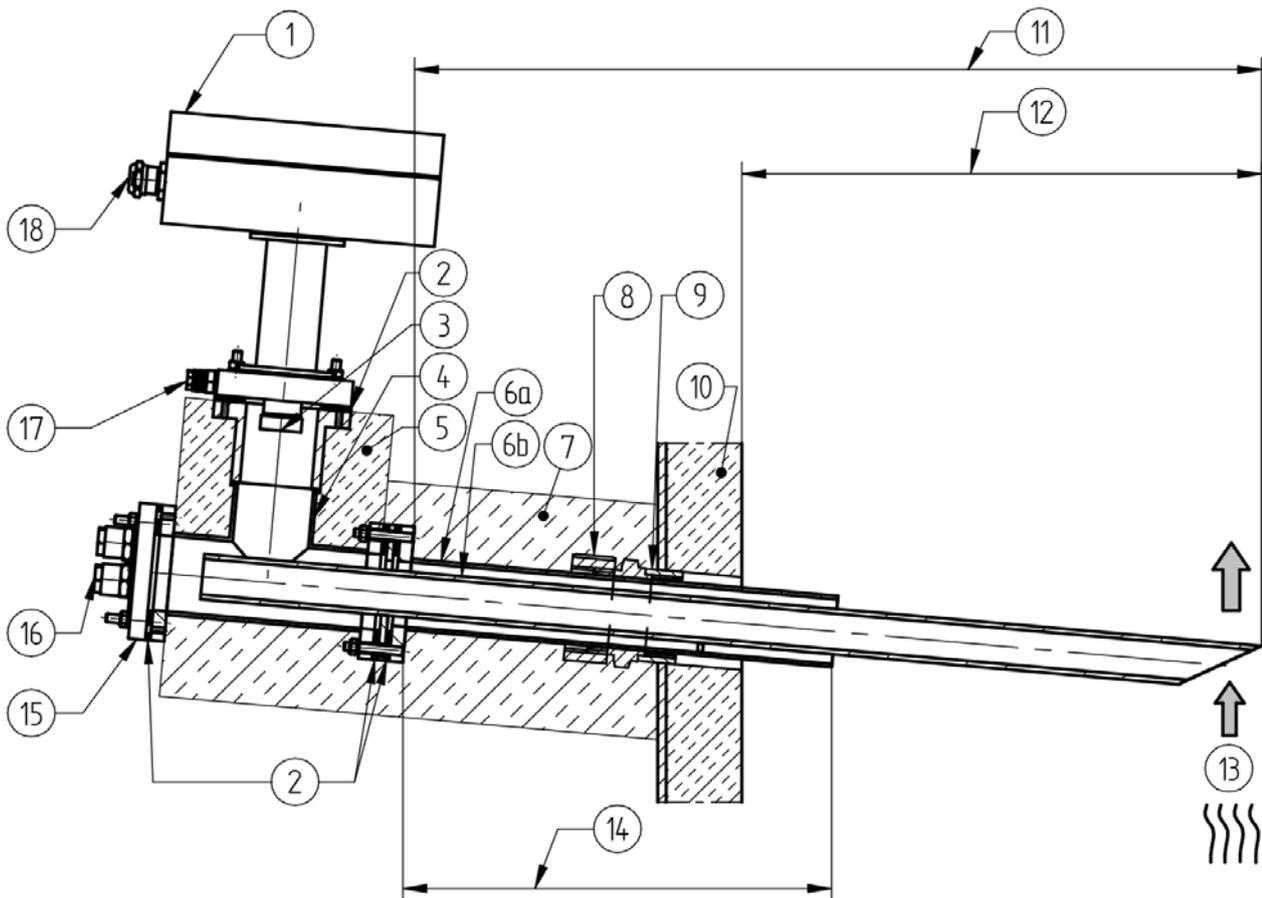


Fig. 5 Combination Probe KS2DNO<sub>x</sub> with GED FLEX made of Kanthal (up to 1,200 °C / 2,192 °F) or AL203 (up to 1,400 °C / 2,552 °F), with T adapter

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|---|---|
| <p><b>1</b> Combination probe KS2DNO<sub>x</sub></p> <p><b>2</b> Graphite seal type 656P0263</p> <p><b>3</b> Max. measuring gas temperature on probe head:<br/>300 °C / 572°F in combination with LT3-F<br/>450 °C / 842 °F in combination with LT2/LT3</p> <p><b>4</b> T adapter for probe mount<br/>for Injector Acceleration type 655R1565 ...68</p> <p><b>5</b> Insulation of T adapter type 655R1569<br/>(optional, depending on the measuring gas temperature)</p> <p><b>6a</b> GED FLEX outer tube</p> <p><b>6b</b> GED FLEX inner tube</p> <p><b>7</b> Insulation of GED FLEX, provided by customer<br/>(depending on the measuring gas temperature)</p> <p><b>8</b> Male coupling</p> <p><b>9</b> Half collar</p> <p><b>10</b> Boiler wall (in this case with inner insulation)</p> <p><b>11</b> Length GED FLEX</p> | <p><b>12</b> Immersion depth of GED FLEX</p> <p><b>13</b> Flow direction of measuring gas</p> <p><b>14</b> Variable range of immersion depth</p> <p><b>15</b> Sealing flange/cleaning flange with pneumatic connections</p> <p>End flange</p> <ul style="list-style-type: none"> <li>– For T adapter type 655R1565: blind flange</li> <li>– For T adapter type 655R1566: cleaning flange with pneumatic connections (2x 12/10 mm / 0.47/0.39" in)</li> <li>– For T adapter type 655R1567: Ejector flange with pneumatic connection (6/4 mm / (0.16/0.24" in)</li> <li>– For T adapter type 655R1568: Flange with all pneumatic connections</li> </ul> <p><b>16</b> Pneumatic connection</p> <p><b>17</b> Hose connection 4/6 mm (0.16/0.24" in) for calibration gas</p> <p><b>18</b> Cable connection</p> |
|---|---|

## Technical Data Combination Probe KS2DNO<sub>x</sub>



Fig. 6 Combination Probe KS2DNO<sub>x</sub> 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:  $\leq 200 \text{ mg/Nm}^3$

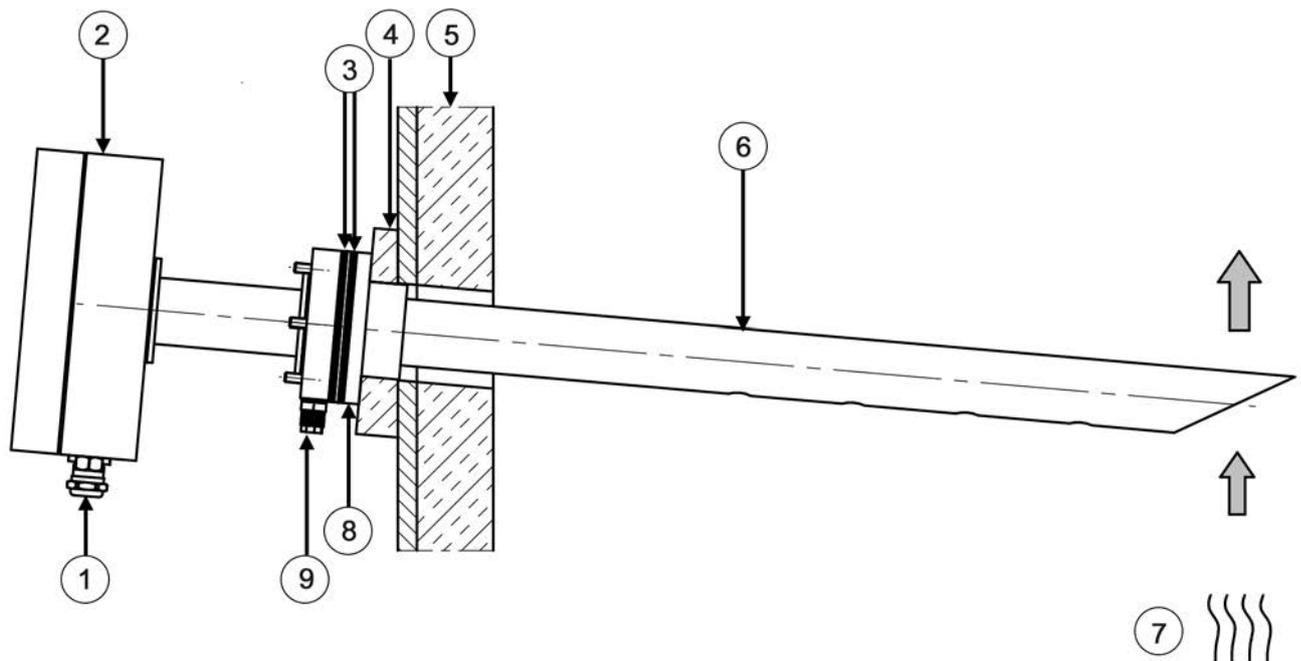


Fig. 7 Dimensional drawing Combination Probe KS2DNO<sub>x</sub> with GED BASE

- 1 Screwed cable gland, probe connection
- 2 Combination Probe KS2DNO<sub>x</sub> 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<sub>x</sub>

Technical Data *	
Measuring range	<b>O<sub>2</sub></b> : 0 ... 21 Vol. % <b>NO<sub>x</sub></b> : 0 ... 3.100 ppm or 0 ... 6.374 mg/Nm <sup>3</sup>
Measuring precision	<b>O<sub>2</sub></b> : ± 8 % of measured value - not better than ± 0,2 Vol. % after prior calibration with a reference measurement <b>NO<sub>x</sub></b> : ± 10 % of measured value - not better than ± 3 ppm or 6 mg/Nm <sup>3</sup> after prior calibration with a reference measurement
Response time	<b>O<sub>2</sub></b> : t <sub>60</sub> : < 10 s <b>NO<sub>x</sub></b> : t <sub>60</sub> : < 10 s
Offset to environment	<b>O<sub>2</sub></b> : < 0,3 Vol. % <b>NO<sub>x</sub></b> : < 2 ppm or < 4 mg/Nm <sup>3</sup>
Drift	<b>O<sub>2</sub></b> : < 0,1 % / week <b>NO<sub>x</sub></b> : < 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	polycarbonat
Measuring principle	zirconium dioxide cell (ZrO <sub>2</sub> )
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 <sub>L</sub> ≤ 100 cm <sup>3</sup> /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 with GED BASE: 1 m/s ≤ X ≤ 10 m/s with GED FLEX: 0,1 m/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.) <b>Attention:</b> 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

# Technical Data Combination Probe KS2DNO<sub>x</sub>

## Environmental Conditions

<b>Probe head</b>	permissible flue gas temperature	< 450 °C / 842 °F
<b>Operation</b>	permissible temperature	< 100 °C / 212 °F on cable gland
<b>Transport</b>	permissible temperature	-40 ... +75 °C / -40 .... +167 °F
<b>Storage</b>	permissible temperature	-40 ... +75 °C / -40 .... +167 °F
<b>Degree of protection</b>	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 <sub>x</sub> with calibration gas connection and connection housing IP65, incl. seal and mounting material	640R0010

Additional required:           - NO<sub>x</sub> Transmitter NT1 Order no. 657R61/6264  
   - Gas extraction device GED BASE or GED FLEX

## GED FLEX

**Application up to 750 °C / 1382 °F, inner tube material 1.4571, outer tube material 1.4571**

Designation / Type	Order no.
GED FLEX for HT/EX applications up to 750 °C / 1382 °F, stainless steel 1.4571 material, L 500 mm / 19.69 "in	655R1520
GED FLEX for HT/EX applications up to 750 °C / 1382 °F, stainless steel 1.4571 material, L 1000 mm / 39.37 "in	655R1521
GED FLEX for HT/EX applications up to 750 °C / 1382 °F, 1.4571 stainless steel material, L 1500 mm / 59.06 "in	655R1522
GED FLEX for HT/EX applications up to 750 °C / 1382 °F, 1.4571 stainless steel material, L 2000 mm / 78.74 "in	655R1523

**Application up to 950 °C / 1742 °F, inner tube material INCONEL, outer tube material INCONEL**

Designation / Type	Order no.
Measuring flue gas extraction tube flue gas extraction tube for HT/EX applications up to 950 °C / 1742 °F, INCONEL material, L 500 mm / 19.69 "in	655R1530
GED FLEX for HT/EX applications up to 950 °C / 1742 °F, INCONEL material, L 1000 mm / 39.37 "in	655R1531
GED FLEX for HT/EX applications up to 950 °C / 1742 °F, INCONEL material, L 1500 mm / 59.06 "in	655R1532
GED FLEX for HT/EX applications up to 950 °C / 1742 °F, INCONEL material, L 2000 mm / 78.74 "in	655R1533

## Technical Data Combination Probe KS2DNO<sub>x</sub>

**Application up to 1200 °C / 2192 °F, inner tube material KANTHAL, outer tube material INCONEL**

Designation / Type	Order no.
GED FLEX for HT/EX applications up to 1200 °C / 2192 °F, KANTHAL material, L 500 mm / 19.69 "in	655R1540
GED FLEX for HT/EX applications up to 1200 °C / 2192 °F, KANTHAL material, L 1000 mm / 39.37 "in	655R1541
GED FLEX for HT/EX applications up to 1200 °C / 2192 °F, KANTHAL material, L 1500 mm / 59.06 "in	655R1542
GED FLEX for HT/EX applications up to 1200 °C / 2192 °F, KANTHAL material, L 2000 mm / 78.74" in	655R1543

**Application up to 1400°C / 2552 °F, inner tube material Al<sub>2</sub>O<sub>3</sub>, outer tube material INCONEL**

Designation / Type	Order no.
GED FLEX for HT/EX applications up to 1400 °C / 2552 °F, aluminium oxide material Al <sub>2</sub> O <sub>3</sub> , L 500 mm / 19.69 "in	655R1550
GED FLEXGED FLEX for HT/EX applications up to 1400 °C / 2552 °F, aluminium oxide material Al <sub>2</sub> O <sub>3</sub> , L 1000 mm / 39.37 "in	655R1551
GED FLEX for HT/EX applications up to 1400 °C / 2552 °F, aluminium oxide material Al <sub>2</sub> O <sub>3</sub> , L 1500 mm / 59.06 "in	655R1552

### Counter flanges

Description / Type	Order no.
Counter flange, inside tube diameter 80 mm / 3.15" in, tube length 70 mm / 2.756" in, Material: steel, EPD black, int. hole diameter in acc. to DN65 PN6	655R0179
Counter flange, inside tube diameter 80 mm / 3.15" in, special length up to 500 mm / 19.69" in, material: steel, EPD black, int. hole diameter in acc. to DN65 PN6	655R0179/S
Counter flange, inside tube diameter 80 mm / 3.15" in, tube length 70 mm / 2.756" in, Material: stainless steel 1.4571, int. hole diameter in acc. to DN65 PN6	655R0180
Counter flange, inside tube diameter 80 mm / 3.15" in, special length up to 500 mm / 19.69" in, material: stainless steel 1.4571, int. hole diameter in acc. to DN65 PN6	655R0180/S
Sealing for counter flange DN65 PN6, 3 mm / 0.118" in, material: graphite	655P4211

### T-adapter for probe reception and accessories GED FLEX

Description / Type	Order no.
T-adapter, incl. blind flange and seal, 1.4571/1.4404	655R1565
T- Adapter for purge operation* with compressed air, inside/outside, stainless steel 1.4571/1.4404, incl. seal, hose connection 2x 12/10 mm	655R1566
T- Adapter for injector acceleration with compressed air, stainless steel 1.4571/1.4404, incl. seal, hose connection 6/4 mm	655R1567
T- Adapter for injector acceleration and purge operation* stainless steel 1.4571/1.4404, incl. seal, hose connection for purge operation 2x 12/10 mm hose connection for injector acceleration 6/4 mm	655R1568
Inner tube extension GED FLEX 655R152... in combination with T-adapter	655R1574
Inner tube extension GED FLEX 655R153... in combination with T-adapter	655R1575

\* Dedusting / purge unit, IP65, for T-adapter GED FLEX must be ordered separately, order no. 657R0934

# Technical Data Combination Probe KS2DNO<sub>x</sub>

## Counter Flange

Description / Type	Order no.
Counter flange	655R1450
Mounting flange for GED BASE, stainless steel 1.4571/1.4404, incl. sealing 655P4211, 3 mm, graphite	655R1451

## Gas Extraction Device (GED BASE)

Description / Type	Order no.
Gas Extraction Device GED BASE for HT- and NO <sub>x</sub> applications up to 550 °C /1,022 °F, material stainless steel 1.4571/1.4404, L 200 mm / 7.87 "in	655R1420
Gas Extraction Device GED BASE for HT- and NO <sub>x</sub> applications up to 550 °C /1,022 °F, material stainless steel 1.4571/1.4404, L350 mm / 13.78 "in	655R1421
Gas Extraction Device GED BASE for HT- and NO <sub>x</sub> applications up to 550 °C /1,022 °F, material stainless steel 1.4571/1.4404, L 500 mm / 19.69 "in	655R1422

The information in this publication is subject to technical changes.



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