

High temperature O₂ + CO_e In-Line Flue gas probe AMS 3211-1600



The Application:

Complex combustion systems and processes require besides a fast In-Situ O₂- measurement to control the combustion, a quality measurement to adjust the combustion system at a level which avoids the generation of CO. The control level around the point of CO generation is the optimum of the combustion. AMS offers for this application the CO_e In-Line Flue gas probe AMS 3211-1600 with a dual sensor which allows the measurement of O₂ and unburnt Hydrocarbons. The unburnt Hydrocarbons are measured as CO equivalent (CO_e). Due to the fast response of the dual sensor the plant control can make use of the additional control value CO_e. The CO_e In-Line Flue gas probe AMS 3211-1600 can be operated with the Transmitter AMS 3220. The Transmitters is available as Twin-Version to supply separate signals for O₂ and CO_e.

The Measuring principle:

The Sensor of the COe In-Line Flue gas probe AMS 3211-1600 is made of a electrochemical solid electrolyte sensor of partially stabilised Zircon dioxide ceramic. The sensor has three electrodes:

- O₂-sensitive Platinum electrode
- CO / H₂-sensitive electrode made of Platinum / Precious metal alloy
- Platinum reference electrode

The measurement of COe with the COe In-Line Flue gas probe AMS 3211-1600 is not a CO measurement in the classical sense. The Flue gas probe AMS 3211-1600 measures in-situ the concentration of the sum of all combustible (oxidising) flue gas components such as CO and H₂. The result of the measurement is displayed as COe. In applications with a known fuel at a constant composition the true CO concentration can be determined within limits. The COe In-Line Flue gas probe AMS 3211-1600 can be used for the measurement of O₂ and COe in Natural gas, Fuel Oil # 4, Lignite and Hard coal. The measuring range of the component COe is 1000 PPMv. For a quality measurement this range is quite sufficient, since the main purpose of the measurement is to avoid the generation of Carbon Monoxide. Due to the physical dimensions the sensor for measurement of O₂ and COe can also be utilised with all other flue gas probes of AMS.

The measuring system:

The High temperature Flue gas probe AMS 3211-1600 can be operated with the Transmitter AMS 3220 and a Pneumatic unit. The Pneumatic unit is fitted with all necessary regulation and control instruments for the high-pressure air supply for the pneumatic pump. The power supply of the Flue gas probe and the Transmitter is also installed in the Pneumatic unit. The flue gas probe, the Transmitter and the Pneumatic unit are manufactured according to the protection class IP 65 for General Applications. Since all AMS Flue gas probes are manufactured according to customer specification, the selection of the probe material as well as dimensions and sizes can be made fitting to any application. Optional the High temperature Flue gas probe AMS 3211-1600 can be equipped with time controlled back purge for high dust applications and with Auto-calibration for the automatic, time controlled calibration. To replace an already existing continuous oxygen measuring system the High temperature Flue gas probe AMS 3211-1600 can be fitted with all flange sizes both in DIN and ANSI dimensions. To calibrate the COe In-Line Flue gas probe AMS 3211-1600 both components O₂ and CO have to be verified against a certified standard gas.

Technical Data

ZrO ₂ probe	AMS 3211-1600
Measuring principle	O ₂ -CO _e -Sensor
Application	Residual oxygen in flue gas
Construction	ZrO ₂ -CO _e -Sensor installed in the tip of the probe with stainless steel sintermetalfilter screwed on
Flue gas temp., max.	1100 °C
Dust content (flue gas)	max. 5 Gram/Nm ³
Flue gas velocity	< 20 m/s
Time for pre-heating	~ 10 Minutes
T90-Time	< 20 Seconds
Reaction time	< 5 Seconds
Probe length	150 – 1000 mm
Connecting flanges	DN 80 PN 16, DN 100 PN 16
Material	Ceramics, Kanthal
Installation in the stack	straight down
Protection	IP 65
Reference air supply	by separate pneumatic unit
Calibration gas supply	by separate pneumatic unit
Weight	ca. 6,5 kg
Flue gas temp., max.	1700 °C
Dust content (flue gas)	max. 5 Gram/Nm ³
Accessories	
Transmitter	AMS 3220 in housing IP 65 Transmitter in twin-configuration
Pneumatic unit	GRP housing, Dimensions: 800 x 600 x 300 mm Back purge, Auto-calibration
Version: AMS 3211-1600 E V-2013-07	

Specifications subject to change.