

O₂ + Coe In-line Flue gas probe
AMS 3212-860/150 Ex Zone 1
AMS 3213-860/150 Ex Zone 2



The Application:

This In-Line Flue gas probe is equipped with a ZrO₂-COe-sensor located in the tip of the probe. The Flue gas probe can be used for the measurement of Oxygen and CO(e) in flue gases from gaseous, liquid and solid fuels and biomass in Ex-Zone 1 and 2. In Applications with solid fuels and biomass the In-Line Flue gas probe is equipped with an additional Stainless steel tube to protect the probe against abrasion.

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(e). The control level around the point of CO(e) generation is the optimum of the combustion. AMS offers for this application the COe In-Line Flue gas probe AMS 3212(3213)-860/150 with a dual sensor which allows the measurement of O₂ and unburnt Hydrocarbons (CO/H₂). The unburnt Hydrocarbons (CO/H₂) are measured as CO equivalent (COe). Due to the fast response of the dual sensor the plant control can make use of the additional control value COe. The COe In-Line Flue gas probe AMS 3212(3213)-860/150 can be operated with the Transmitter AMS 3220. The Transmitters is available as Twin-Version to supply separate signals for O₂ and COe.

The Measuring Principle:

The Sensor of the CO(e) In-Line Flue gas probe AMS 3212(3213)-860/150 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 CO(e) with the CO(e) In-Line Flue gas probe AMS 3212(3213)-860/150 is not a CO measurement in the classical sense. The Flue gas probe 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 CO(e). In applications with a known fuel at a constant composition the true CO concentration can be determined within limits. The CO(e) In-Line Flue gas probe AMS 3212(3213)-860/150 can be used for the measurement of O₂ and CO(e) in Natural gas, Fuel Oil # 4, Lignite and Hard coal. The measuring range of the component CO(e) is 3000 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 CO(e) can also be utilised with all other flue gas probes of AMS.

The Measuring System:

Typically continuous Oxygen measuring systems are consisting of a Flue gas probe with built in Zircon dioxide sensor, a Transmitter and a Pneumatic unit. The Pneumatic unit supplies continuously instrument air to the Zircon dioxide sensor which serves as Reference air. Via a second gas inlet port at the probe flange the Zircon dioxide sensor can be supplied with calibration gas to verify and correct the calibration of the sensor in regular intervals. The Pneumatic unit and the Flue gas probe are connected by two high pressure pneumatic hoses. A multi wire, protected cable connects the Transmitter to the Flue gas probe electronically. Due to the modular construction of the Oxygen measuring systems of AMS the Transmitter can be installed inside the housing of the Pneumatic unit. This reduces the required length of both high pressure pneumatic hose and protected cable. The power supply for the Transmitter and the Flue gas probe is also installed in the GRP-housing of the Pneumatic unit. The flue gas probe, the Transmitter and the Pneumatic unit are manufactured according to the protection class IP 65. To replace an already existing continuous oxygen measuring system the In-Line Flue gas probe AMS 3212(3213)-860/150 Ex can be fitted with all flange sizes both in DIN and ANSI dimensions.

Note: The probe is suitable for monitoring the existence of CO(e). Under addition of combustion air the probe could be used for the correction of the combustion under prevention for the generation of CO(e).

Technical Data

ZrO2 probe	AMS 3212-860/150 Ex Zone 1 AMS 3213-860/150 Ex Zone 2
Ex-classification	
Probe Ex-Zone 1	Ex II 2G EEx d IIB + H2 T3
Temperature Switch	Ex II (2) G
Probe Ex-Zone 2	Ex II 3G EEx d IIB + H2 T3
Measuring principle	ZrO2-COe- Sensor
Application	Residual oxygen in flue gas
Construction	ZrO2-COe-sensor installed in the tip of the probe with stainless steel sintermetalfilter screwed on, designed as a flame arrestor
Flue gas temp., max.	< 500 °C Zone 1 / < 1.100°C Zone 2
Dust content (flue gas)	max. 5 Gram/Nm3, if higher shield to protect against abrasion or separate protecting tube
Flue gas velocity	max. 20 m/Sec. or separate protecting tube
Time for pre-heating	~ 10 Minutes
T90-Time	O2 < 20 seconds, COe < 10 seconds
Reaction time	< 2 Seconds
Probe length	150 – 860 mm
Connecting flanges	DN 80 PN 40 (larger on request)
Material	Stainless steel 1.4571
Installation in the stack	pointing downward
Protection	IP65
Reference air supply	by separate pneumatic unit
Calibration gas supply	by separate pneumatic unit
Weight	ca. 10,5 kg
Accessoires	
Transmitter	AMS 3220 TWIN in housing IP 65 or Ex-d
Pneumatic unit	GRP housing, dimensions: 800 x 600 x 300 mm
Version: AMS 3212(3213)-860/150 E V-2022-01	

Specifications subject to change