

# OX-AN<sup>®</sup> Flue Gas Monitoring System Operation Manual

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Issue 1.0

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## Principle of operation

The OX-AN flue gas analyser is designed to give a 4-20mA input signal to the building management system, BMS, for the concentration by volume of carbon dioxide CO<sub>2</sub> in the range of 0-30% and oxygen O<sub>2</sub> in the range of 0-25%.

A sample extraction and condensate removal system ensures a clean dry sample of flue gas is extracted from the boiler flue via the stainless steel tube which has the function of heat exchanger to condense the flue gas water vapour content to globules of water the coalescing filter can separate and the time controlled condensate pump can discharge from the cabinet to drain via the tundishes.

The interface to the BMS also allows a signal to be read to say the sample is valid and the system is not in its drain mode.

In the drain mode which occurs once every hour and lasts for 10 seconds, the sample pump supply is cut off and the condensate pump is activated for the 10 seconds. Water that may have collected in the coalescing filter housing is then extracted by the condensate pump.

This process repeats and occurs when the instrument is powered up.

The system is designed for continuous operation with service intervals of one year.

## Gas Detectors and calibration

The gas detectors are supplied with a steady flow of sample gas at a rate of 1.8 litres per minute from the sample extraction system.

The oxygen detector is an electro-chemical fuel cell with on board electronics to drive a 2 wire 4-20mA loop the power supply is loop powered with the range 18 – 30v dc but nominally 24 V dc. The range is 0 – 25% oxygen by volume.

The carbon dioxide detector is an infra-red device with on board electronics to drive a 3 wire 4-20mA loop the power supply is loop powered with the range 18 – 30v dc but nominally 24 v dc. The range is 0 – 30% carbon dioxide by volume.

The service interval for the gas detectors is one year from the commissioning date.

The oxygen sensor is changed annually and recalibrated using 5% O<sub>2</sub> in N<sub>2</sub> to give a signal to the BMS of 7.2mA ± 10%.

The carbon dioxide sensor is serviced annually with the in-line filter changed and recalibrated using 5% CO<sub>2</sub> in Air to give a signal to the BMS of 6.6mA ± 10%.

The calibration of the gas detectors requires specialist equipment and can only be undertaken by the manufacturers.

The special equipment mainly comprises a demand flow gas regulator that supplies the correct flow rate to the gas detectors without pressurizing the system and causing inaccurate readings.

A calibrated mA meter is also required.

The equipment can be hired from Raymond Coupland Ltd should the engineer wish to validate the readings to the BMS.

## Water trap

The water trap is designed for continuous operation with an element change only required at the annual service.

To change the filter element the system must be turned off and the clear polycarbonate plastic bowl dismantled from the housing, the element can then be removed and exchanged.

Ensure all the pipe connections are sound as a loose fitting may cause air to entrain into the system and give false readings.

This process should be undertaken before the recalibration so that the application of sample gas down the sample pipe will also validate the plumbing is sound and correct readings can be relied upon.

## Sample pump

The sample pump is designed to run continuously for a period of one year between service intervals.

At the service it is necessary to switch off the instrument and remove the pump to change the diaphragm and valve set.



On dismantling the pump it is important to observe the rotation of the pump head in relation to the inlet and outlet and also ensure the spacer is refitted.

The pump motor life is in excess of 5 years.

The ball bearing set on the end of the drive shaft should be changed every 2 years.

Ensure the push fit connections are fully fitted as air entrainment could invalidate the readings. This process should be undertaken before the recalibration so that the application of sample gas down the sample pipe will also validate the plumbing is sound and correct readings can be relied upon.

## Condensate pump

The condensate pump is designed for long life and requires no annual maintenance.

We recommend the pump be changed every 3 years.



To remove the pump turn off the instrument and remove the pump and refit in reverse order.

Ensure the push fit connections are fully fitted as air entrainment could invalidate the readings. This process should be undertaken before the recalibration so that the application of sample gas down the sample pipe will also validate the plumbing is sound and correct readings can be relied upon.

The pump is fitted with a timer, these are set up by the commissioning engineer, and these should not be adjusted.

### Spare parts list

Part description	Part No.	Quantity required
Oxygen sensor	7OX-V	1
Carbon dioxide filter	OX00901	1
Diaphragm pump repair kit	SO12	1
Filter element	CF00902	1
Condensate pump	CAPRD01	1
Complete kit of above	OXFGM00903	1