Panametrics
a Baker Hughes business

Application note

Multi-stream gas analysis in bio-methane upgrading

Benefits:

The advantages of using the Panametrics Thermoparamagnetic and thermal conductivity sensors are:

- Continuous measurement of all streams
- The sensors can be calibrated in minutes
- The rugged design means many years of service
- Global hazardous area certifications for all devices

Summary

Biogas is increasingly seen as a more renewable source of natural gas for injection into gas networks for home heating, cooking and fuel.

Application

The gas entering in the network must have a high calorific value, and therefore scrubbed of contaminants such as CO_2, O_2 and H_2S.

Challenge

Oxygen concentration is measured in the gas generated by the decomposition of waste. Methane is a flammable gas, and its flammable limits in air are 5% to 15%. In order to transport the biogas safely through pipelines, it is necessary to ensure that the oxygen content is less than 2%. The hydrogen sulfide must be scrubbed by carbon filters from the gas before entering the networks and needs to be <10 ppm.

Carbon Dioxide is measured as it is separated from the bio-methane and finally, the methane purity of the cleaned biogas needs to be measured before entry into the gas grid.

All of the measurements need to take place in hazardous area environments.

Solution

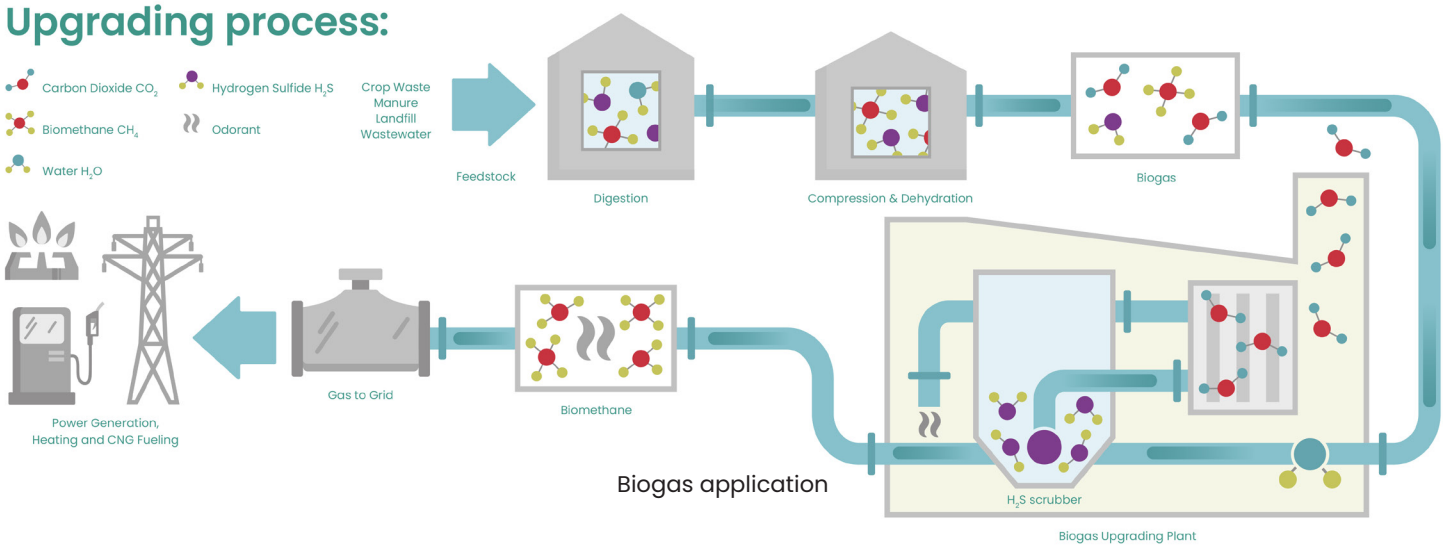
The Panametrics XMO2 transmitter utilizes thermoparamagnetic technology to measure the oxygen level and the Panametrics XMTC transmitter utilizes thermal conductivity technology to measure the carbon dioxide and methane. The H_2S is measured using fuel cell technology. These are all incorporated into a single sample system solution that regulates the pressure and flowrates of the gas streams ensuring accurate measurement of;

- Oxygen and Hydrogen Sulfide in the cleaned biogas stream
- Methane content in the CO_2 off gas
- CO_2 impurities in the methane stream
- Methane purity

Specifications

Oxygen content range:	0 - 2%
Carbon Dioxide content range:	90 - 100% against methane background
Methane content range:	90 - 100% against CO_2 background
Hydrogen Sulfide:	0 - 10 ppm
Operating temperature:	-5 °C (23 °F) to 50 °C (122 °F)
Operating pressure:	Regulated to 14.7 psia (101.3 kPa)

Upgrading process:



Panametrics, a Baker Hughes business, provides solutions in the toughest applications and environments for moisture, oxygen, liquid and gas flow measurement.

Experts in flare management, Panametrics technology also reduces flare emissions and optimizes performance.

With a reach that extends across the globe, Panametrics' critical measurement solutions and flare emissions management are enabling customers to drive efficiency and achieve carbon reduction targets across critical industries including: Oil & Gas; Energy; Healthcare; Water and Wastewater; Chemical Processing; Food & Beverage and many others.

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BHCS34767 (04/2023)

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