

Valuable Waste

In biogas upgrading plants of Purac Puregas Turck's I/O-system excom enables convenient maintenance directly in zone 1

A Almost every human activity creates waste. But waste can be a valuable resource. Excess agricultural produce, manure, wastewater sludge, household and restaurant waste are perfect raw materials for biogas production. The biogas can be upgraded

to pure biomethane, which is used as vehicle fuel or for injection into the natural gas grid. The digestion of organic solids produces raw biogas that contains 50 - 70 % biomethane, 30 - 50 % carbon dioxide and traces of sulphur, nitrogen and oxygen.

The whole biogas plant consists of three modules





Through the window in the excom metal cabinet all status LED are visible directly in the compressor room



With its gas company Purac Puregas the Swedish Läckby Water Group offers biogas upgrading plants. The Purac Puregas gas plants take this raw biogas and upgrade it to practically pure bio methane. With its chemical absorption process, called CAPure, the plants remove carbon dioxide and hydrogen sulfur (H₂S) from the raw biogas. That increases the efficiency of the biogas plant and improves its ecobalance. The system ensures that 99,9% of the methane in the raw biogas is upgraded to biomethane for commercial use. For big producers of natural waste like local waste management enterprises biogas production can be a useful renewable energy source.

▶ Quick read

The Swedish Purac Puregas company is an expert for biogas upgrading plants, which can upgrade biogas from fermented household garbage and other organical waste very efficiently into methane and CO₂. Purac Puregas recently improved the maintenance work for its gas plants with a new remote I/O system that met all their demands: Turck's excom system for use in hazardous and non hazardous areas.



“The well visible LEDs and the easier maintenance through hot swap in run were our main reasons for excom. Besides that, excom matches aesthetically. We try to build everything in stainless steel.”

Anders Rosengren,
Purac Puregas

Purac Puregas has found a way to limit the startup costs for biogas plants with a modular approach. Usually when customers want to enlarge their plant they have to build a complete second plant with a second control system and other elements doubling the existing plant. With the modular concept the customer only invests in the startup once. To enlarge the biogas plant later they add more gas skid modules to their existing plant. The skids are hooked up the existing plant and connected to the PLC-system and its Profibus. The single skids can be shipped like a container. By the current state Purac Puregas is the only biogas plant manufacturer with such a modular concept.

excom for compressor room

For the gas plant of a local energy company in Savsjo Purac Puregas looked for a better remote I/O solution for its biogas plant skids. In the compressor room of every plant module a remote I/O system in zone 1 collects all sensor and other signals from the hazardous areas. The former remote I/O could not be operated directly in zone 1. For maintenance, the customers always had to shut down the plant module and de-gas the compressor room. A lot of time, work and money were required - often for minor problems like, for example, a wire break.

Convenient maintenance

Turck introduced its remote I/O system excom to Purac Puregas. Unlike the system being used, excom can be mounted directly in zone 1. Additionally, the excom status LEDs are easily visible through the window of the stainless steel box the excom is mounted in. The electrical staff of the local waste company, for example, can now easily identify potential problems. And if necessary, the customer can get simple remote support just by calling Purac Puregas and describing what the status LEDs are signaling or the diagnostic messages show.

Most of the time Turck's or Purac Puregas' support staff can tell what the cause of the error is just by interpreting the LED signals. With the old I/O system a service engineer from Purac Puregas had to work on site. Today a phone call instead of a long distance maintenance visit is a very efficient way to solve problems. In case of a defect module, excom supports hot swap in run to change modules without downtime. This allows a defect module to be changed while the plant is still running quickly and efficiently; another feature the old remote I/O could not offer. Despite all those features Turck's excom still equals the price level of the customer's former I/O system.



In the hazardous CApure room the BL67 is connecting all sensors to the Profibus

According to Anders Rosengren, senior electrical engineer at Purac Puregas, the easy maintenance of excom was the major reason for the system change: "The well visible LEDs and the easier maintenance through hot swap in run were our main reasons for excom. Besides that, excom matches aesthetically. We try to build everything in stainless steel. With its designated stainless steel housing excom fits like a hand in a glove."

BL67 withstands swedish winters

During the project Purac Puregas found other solutions in the Turck portfolio to enhance their gas plant. In the outdoor parts of the plant, at the CO₂-absorption tower, a fieldbus system has to connect several valve indicators to the Profibus of the PLC. Turck's modular fieldbus I/O system BL67 with a temperature range up to -40 °C can be used outdoors even in harsh swedish winters. The Profibus is connected to the PLC via the same node as excom. The Turck segment couplers SC12 provide the intrinsically safe Profibus. The direct outdoor mounting of the BL67 saves Purac Puregas the construction of a preheated control cabinet and that accounts for the energy efficiency of the gas plant as the preheaters would use energy themselves.

Another BL67 station connects digital and analog signals from several sensors and indicators in what is called the CApure room. BL67 could score especially with its modular architecture: If the plant is enlarged and sensors or actuators have to be added, the system can be extended easily. Another point is the easy connection of the periphery with ready-made cables with premoulded M12 connectors. No wiring or connection with a cable clamp or screw terminal is needed equaling more security and time efficiency. A sensor can be practically replaced within a few seconds.

Resume

This project demonstrates how a solution provider can win customers over. Starting with one product other helpful solutions come in sight. Today Purac Puregas is using Turck products in three automation layers. Beginning with sensors over the connectivity to segment couplers and also the fieldbus remote I/O solutions including BL67 and excom. For Purac Puregas, export projects using the excom solution is a useful improvement. Whether in gas plants in Germany, Switzerland or other European countries: within one day the customer can get a Turck exchange product if needed. And in the future the company will also install Turck's DSU35 inductive dual sensors for rotary actuators for their valve indication. ■



Keeping cool: With a temperature range up to -40 °C Turck's BL67 I/O system resists even Swedish winters