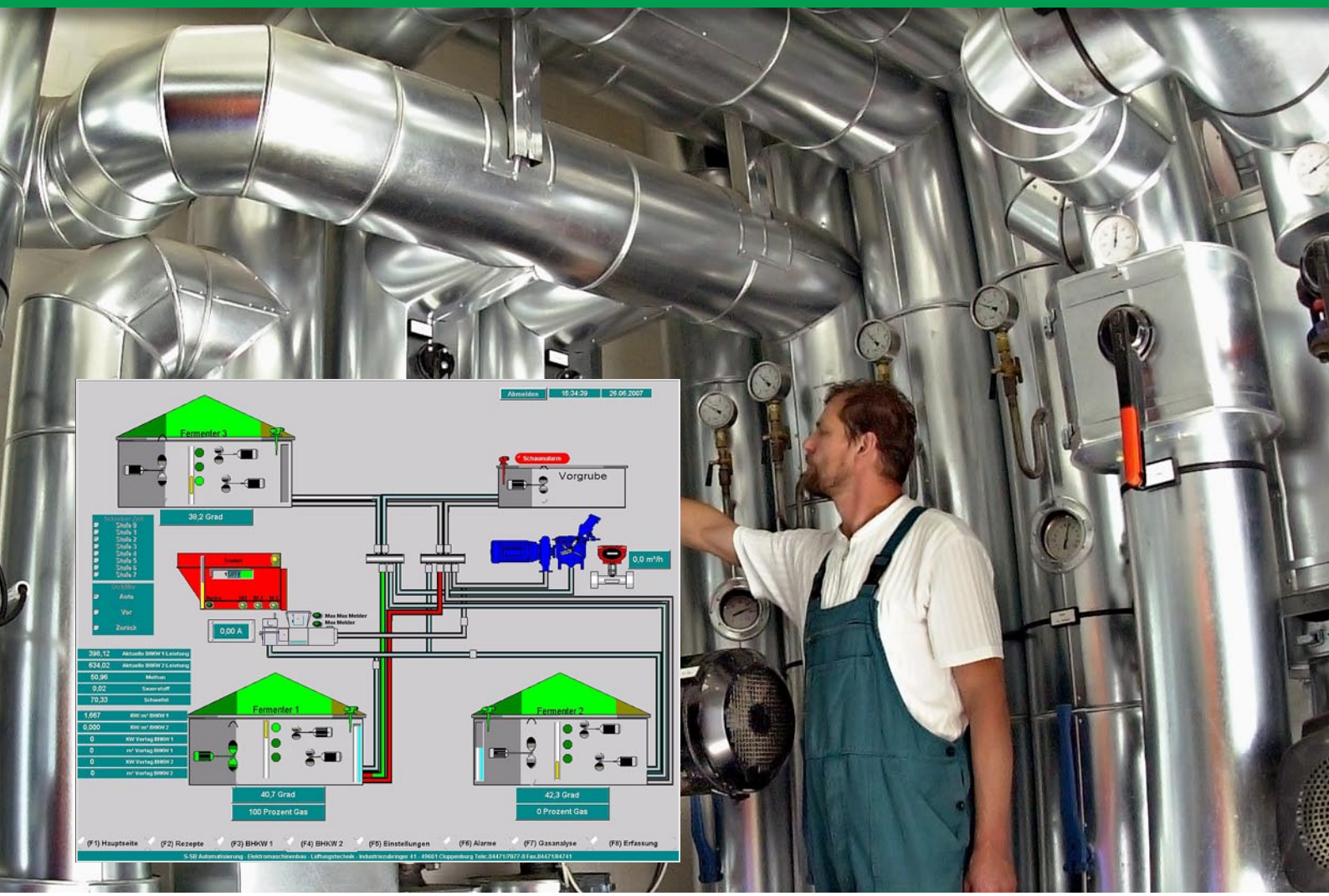


For the Right Fermentation

Biogas Plants with Moeller Technology

A biogas plant may seem to the layman to have a simple design, especially since it based on biological processes: Anaerobic bacteria produce a gas mixture when organic matter is degraded under airtight conditions. This mixture is made up of two thirds methane and one third carbon dioxide, with a small amount of hydrogen sulphide. However, a biogas plant is based on a complex technology and only operates economically when all operating conditions in the process are at optimum levels, whilst the possibility of decentralised management is also important. For this S.-S.B. Elektromaschinenbau und Automatisierung GmbH & Co. KG, a company based in Cloppenburg, uses Moeller automation equipment and switchgear.

THE COMPANY

S.-S.B. Elektromaschinenbau und Automatisierung GmbH & Co. KG, a company based in Cloppenburg, offers professional service for electrical and friction drum motors, gears, generators and pumps for the food industry.
Its portfolio includes the planning, implementation and maintenance of automated control systems for extensive production plants. The company handles the entire electrical installation of biogas plants, produces and supplies the necessary switchboard systems including process visualization. (www.s-sb.de)

MOELLER

We keep power under control.

Several factors are critical for optimum biogas production. Several bacterial strains are involved in the production of the biogas, and only generate biogas under optimum thermal conditions. For this an average temperature of 35°C must be maintained, which is regulated in the fermenter heating system. This process itself requires between 20 and 40 percent of the gross generated energy, depending on the type of plant, vessel, surface, number and size of the fermenters. Furthermore, an adequate amount of slurry and biomass must be supplied. For example, the operation of a 500 KW biogas plant annually requires 240 hectares of maize, grass, rye or sunflowers. This is the equivalent surface area of around 220 football pitches.

The biomass is therefore pumped regularly as solid matter to the feed systems for biogas fermenters, where it is cut up and pumped into the fermenter. In this process, stirrers ensure a thorough mixing. The formation of foam has to be prevented here since the bursting bubbles place considerable stress on the cells which then block the waste air filter.

Everything under control

S.-S.B. uses Moeller technology for controlling biogas plants. For example, the XC200 modular PLC, DS6 soft starters, PKZ4 motor-protective circuit-breakers, DV6 frequency inverters, EMT6 thermistor overload relays, ESR safety relays, ETR timing relays, DILM contactors, NZM circuit-breakers, xPole miniature circuit-breakers, RMQ control circuit devices as well as the SASY 60 busbar trunking system are all used.

The operating data, such as temperatures, filling levels, output data of the CHP are relayed to the XI/OC I/O modules of the XC200 modular PLC. The XC200 is ideally suited to the process control of a biogas plant: It offers a cycle time of 0.05 ms for 1 K instructions (bit, byte), a 512 Kbyte program and 32 K retentive data memory as well as a battery-backed real-time clock. The CPU module comes with eight digital inputs and six short-circuit-proof outputs. Four are designed as interrupt inputs and allow a direct reaction to events, irrespective of the cycle time. The modular PLC can be expanded locally with up to 15 XIOC I/O modules. A wide range of digital, analog or communication modules with screw or cage clamp termination are available for use. The XC200 is provided with a slot for multimedia memory cards (MMC) and a USB interface. These can store programs or recipe data which can be read into the PLC. A freely programmable serial interface, a CANopen fieldbus master as well as a 100Mbit Ethernet interface also come as standard features. The Ethernet connection is also used for programming access, effective networking between the PLCs and IPC. The OPC server integrated in the PLC handles the data exchange with the SCADA system. This is where the data can be visualised, such as in the form of trend displays, in which the alarm management, recipe management and the automatic tracing of various operating data are also carried out. Password-protected remote access is implemented via an ISDN connection. Remote Desktop allows worldwide remote visualisation and operation for a plant. An automatic dialler forwards any fault alarms directly to the fixed phone numbers and thus enables a direct reaction.

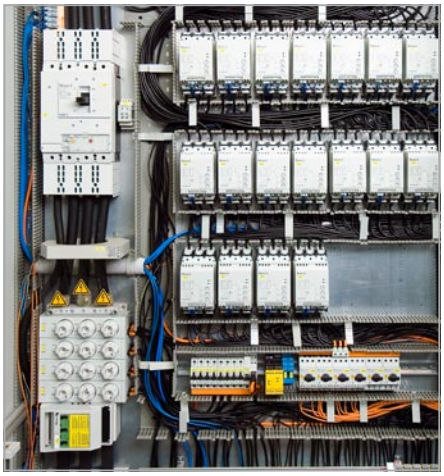
XC200 modular PLC with XIOC I/O modules

The PLC itself is programmed with the Moeller easySoft-CoDeSys programming system in accordance with IEC61131-3. A number of features simplify the creation of applications and reduce costly design times.

Starting softly

The economical operation of a biogas plant not only requires process know-how. Mechanical and electrical components that are durable and robust are essential. All the pumps and stirrers in the fermenters are therefore no longer started with star-delta starters but exclusively with Moeller DS4 and DS6 compact soft starters. Their gentle acceleration and startup prevent sudden load changes on all stirrer elements such as gears or stirrer blade. This saves parts and ensures long-term functional reliability.

Moeller offers DS6 soft starters for motor ratings from 18.5 to 110 KW. Microprocessors and thyristors control the start and operation of the asynchronous three-phase motors automatically and without any parameterisation required. The soft starters are connected to the motor in series and are used in combination with the PKZ4 motor-protective circuit-breaker. The acceleration and coasting ramps can be set separately via three potentiometers. The motor voltage is increased on the DS6-340-...-MX with phase control from a selected start value, with an adjustable ramp time up to the full mains voltage (Ue = 208 ... 460 V ± 10 %, 50/60 Hz). The asymmetrical trigger control, a patent from Moeller, prevents DC components as well as the formation of elliptical rotation fields. In compliance with product standard IEC/EN 60947-4-2, the DS6 soft starters thus enable ten starts per hour, for example, with three times the starting current for five seconds.



DS4 and DS6 soft starters ensure smooth starting for all stirrer elements in the fermenter.

International certification in compliance with CE, UL, CSA, CCC and the wide mains voltage range offered by Moeller components provide the optimum basis for the worldwide use of the biogas plants.

Quicklink ID:

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