

## Optimized production processes

### Production data acquisition and energy management from one source

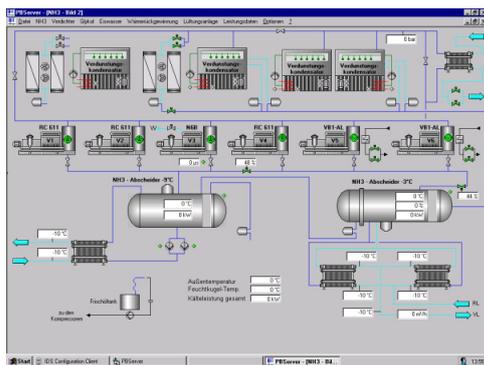
For the large dairy production plant of the dairy Alois Müller GmbH & Co. KG in Aretsried the process control system Plant iT of ProLeiT AG performs more than one task: on the one hand the modern control of the refrigerating plant enables an efficient energy management; on the other hand the Müller-management gets automatically all relevant data thanks to PDA.

A small place for big products:

In the quiet small town of Aretsried, situated in the German administrative district „Allgäu“ the dairy Alois Müller GmbH & Co. produces not only yoghurt but also the brands Müller milk, Müller rice pudding and Müller buttermilk. Within the last two decades the company changed to an ultra-modern large production plant. 370 employees are processing today in Aretsried appr. 200 Mio. l of milk per year for milk fresh products.

### Expansion of the Refrigerating Plant

Continuous increasing production capacities and a thus rising need for refrigeration caused the Müller dairy to extend their refrigerating plant. For the modernization and extension of this refrigerating plant the already proven system for the production area - the process control system Plant iT of ProLeiT AG - should serve as a basis. So far the existing refrigerating plant disposed of 4 compressors. The level of automation was low and production data could only be acquired manually. Without PDA a control of production as well as cost comparisons can only be realized with difficulties.



Overview of NH<sub>3</sub>-cycles

Data of electric power consumption, temperature variations, running times of pumps, valves and of the compressor are necessary in order to permanently ensure optimum production processes and consistent product quality. This does also apply for questions concerning load management as regards current consumption.

### Consistent Process Control System

Therefore the responsible Müller employees decided in favor of the consistent process control system of ProLeiT AG. The decision was also based on the experiences with the installation of the Plant iT system in Leppersdorf, where energy data is already acquired and recorded and serves for the analysis of processes. Moreover, substituting the existing system in the production area led to consistent software structures for parameterizing and programming for the complete plant in Aretsried.

Additionally ProLeiT - as long-year supplier - already convinced the Müller company of the operating efficiency of its modular system software and its engineering performance. The existing control was partially substituted or modified to fit into the new structures. For the realization the process control system ProLeiT Plant iT with the proven operation system Windows NT and the database management system SQL-Server has been used. The control units are Simatic S7-416. The process control system with its complete integration in the production area and the refrigerating plant offers the possibility to the operating staff to detect troubles as soon as possible and to prevent production breaks effectively.

Connection of the peripheral devices, motors, valves, instrumentation and controller outputs is effected via Profibus DP with decentral ET 200 modules and with central in- and output modules in the PLC.

Coupling to the process control level is effected with H1-Bus and the already existing cabling. All controller functions and controllers are realized as SW-controllers. The quantity structure of the refrigerating plant comprises

### INFO



<b>Company:</b>	Molkerei Alois Müller GmbH & Co. KG
<b>Sector:</b>	Dairy
<b>Location:</b>	Aretsried
<b>Country:</b>	Germany

90 motors and valves with feedback signal, 65 analog measured values and 12 complex sequences.

### Self-sustaining Automation Processes

From the beginning the project was very demanding: all automation processes should work self-sustainingly with as little operator interferences as possible in order to guarantee efficient production.

High expectations were also put to the performance of the controller functions and the process data acquisition. The most important aspects were automatic data supply and easy operator functions from the PC.

Moreover, the task was highly complex since two refrigerating systems - for process cooling (-9°C) and ice water (-3°C) - had to be linked. With the aim to achieve an effective, energetically optimized operation of both plant parts with a maximum security of supply.

Today this is no longer a challenge for the Müller dairy. The production plant has been extended to 6 compressors and runs very efficiently - due to its low-load functions.

Fault switchovers and intelligent power control-

# application profile

Dairy // Müller

lers are implemented. An ice buffer suppresses the power consumers' load peaks and is loaded in accordance with the load situation. Controller structures with 3 step controller and 11 analog control loops act together in a complex manner. This enables the operator to optimize the plant easily by means of free parameterization directly at the PC.

Thus values such as temperature and pressure can be kept automatically constant in case of control deviations because of disturbances. All relevant parameters of the plant such as times, controller setpoints and limited values can be parameterized at the operator stations with the corresponding user rights.

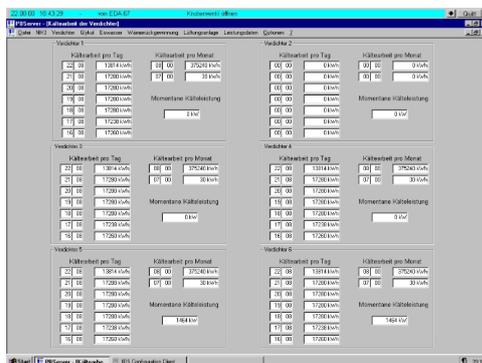
Also the complete operation of the compressors, pumps, frequency converters and motor valves is exclusively effected from the PC - in manual or automatic mode. The process control level enables partial manual mode. E.g. for maintenance works without functional limitations for those parts in automatic mode. The desire for a fully self-sustaining operation of the plant in automatic mode has been completely fulfilled. For the Müller dairy this means increasing efficiency and productivity, minimized maintenance costs, higher reliability and lower operating costs.

to production and enables a more effective use of resources. In case of deviations fast reaction is possible. Besides the current production data, access to archived production data makes trouble shooting much easier and serves to improve quality assurance for the Müller dairy. Parameterized maintenance messages for motors and valves announce forthcoming maintenance works on time. Thus the maintenance staff can plan process modifications at an early stage. At the same time this tool enables a quick overview of operating hours and outstanding or already performed maintenance and repair measures.

A coupling to the energy-management enables today automatic load interruptions in case of power peaks of the electric power consumption. The mandatory cooling demands are considered automatically. A special window for the input of time-dependant functions enables defrosting for the cooling systems or ice storage loading capacities by specifying variable ice intensities.

## The Production Plant in Leppersdorf

The Sachsenmilch AG in Leppersdorf disposes of a production capacity of 1,2 billion litres of milk per year and is counted among the state-of-the-art milk production plants in Europe. The range of production comprises almost all dairy products. The milk is processed in five interlinked production areas.



Cooling processes of the compressor

## Provide all Relevant Data

The process data acquisitions system supplies all relevant data of the production process automatically: energy consumption, cooling, operating hours, water and oil consumption as well as operating cycles can be balanced easily and thus be used for plant optimization. All measured values, fault and operating messages are recorded, archived and can be analysed comfortably in form of graphics or tables with easy-to-use tools. This brings more transparency