



KRONES Botec F1
Process Control Technology

1. Process Control Technology with Botec

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Botec is the process control system by KRONES and stands for **Batch Oriented Technology** software. Botec systems have been in use in the world's brewing and beverage industry for more than 10 years. The system is configured flexibly and modularly. Its operation is simple and catered to the requirements of batch-oriented production.

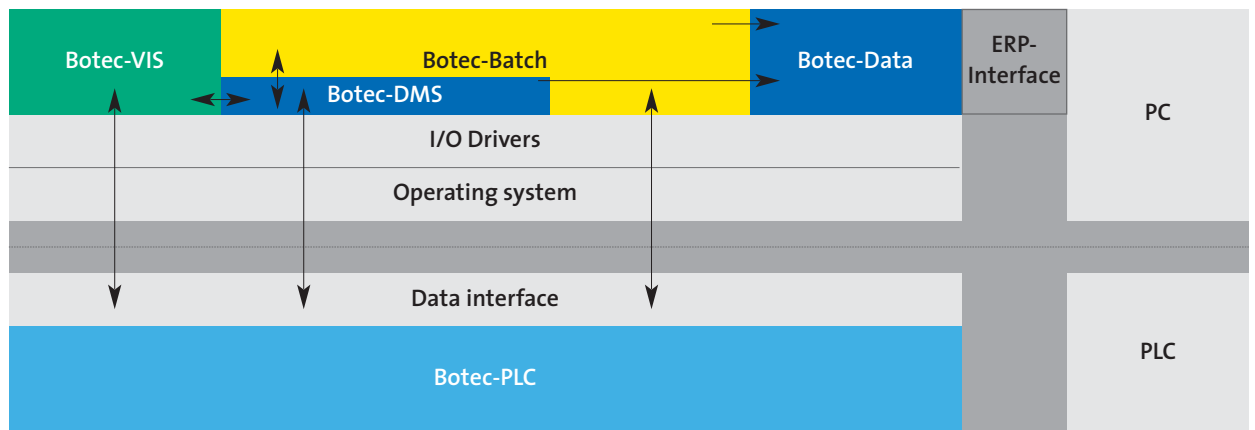
The KRONES company constantly cultivates and upgrades Botec. Besides being used to automate the production process Botec is also applied as batch and order-oriented module of the filling and packaging control centre. Among others, this is the basis for integrated batch tracing in production.

Botec is structured according to the latest demands on automation and IT, including the free choice of the merchantable Scada systems, for instance InTouch, WINCC or Iltis. This provides security for investments already made. Botec is based on the industry standard S88 which has already been applied in other industries for a long time and becomes more and more important in the beverage industry as well.

In the current version Botec F1, the system demonstrates its high flexibility in numerous projects world-wide. So, for example, use of the Scada systems WinCC, InTouch and Iltis is substantiated in the combination with the SPS systems Siemens S7 and ControlLogix by Allen Bradley.

2. Structure of Botec

Functional groups and software architecture



Botec – VIS (based on WinCC, InTouch)

- Process visualisation and operation
- Trend curves recording
- Alarm monitoring

Botec – Batch (based on Windows XP, Windows 2000)

- Recipe management
- Ordering system
- Batch management

Botec – DMS

- Real time data management system

Botec – Data (based on MS SQL Server, Oracle)

- Batch oriented protocolling
- Preparation of the data for batch tracing
- Interface to SAP R3
- Interface to MS Office
- Plant configuration
- System configuration
- Master recipes

Botec – PLC (Simatic S7, Allen Bradley Controllogix)

- Sequence control
- Locks
- Management of all objects (actuators, PIDs, inputs, outputs)
- Object functions such as manual/auto, open/closed, acknowledgement replies, runtime monitoring, enables
- Vessel balancing

The structure of Botec is based extensively on standard components. PLC systems from Siemens and Allen Bradley, industrial PCs, Ethernet network techniques and field techniques used in industry are employed as hardware. As software platform, conventional Scada systems such as WinCC, InTouch or Ittis may be implemented. On the basis of these standard products, Botec may also be equipped with branch specific technology modules. The external data bases of Botec are set up in MS SQL Server or in Oracle.

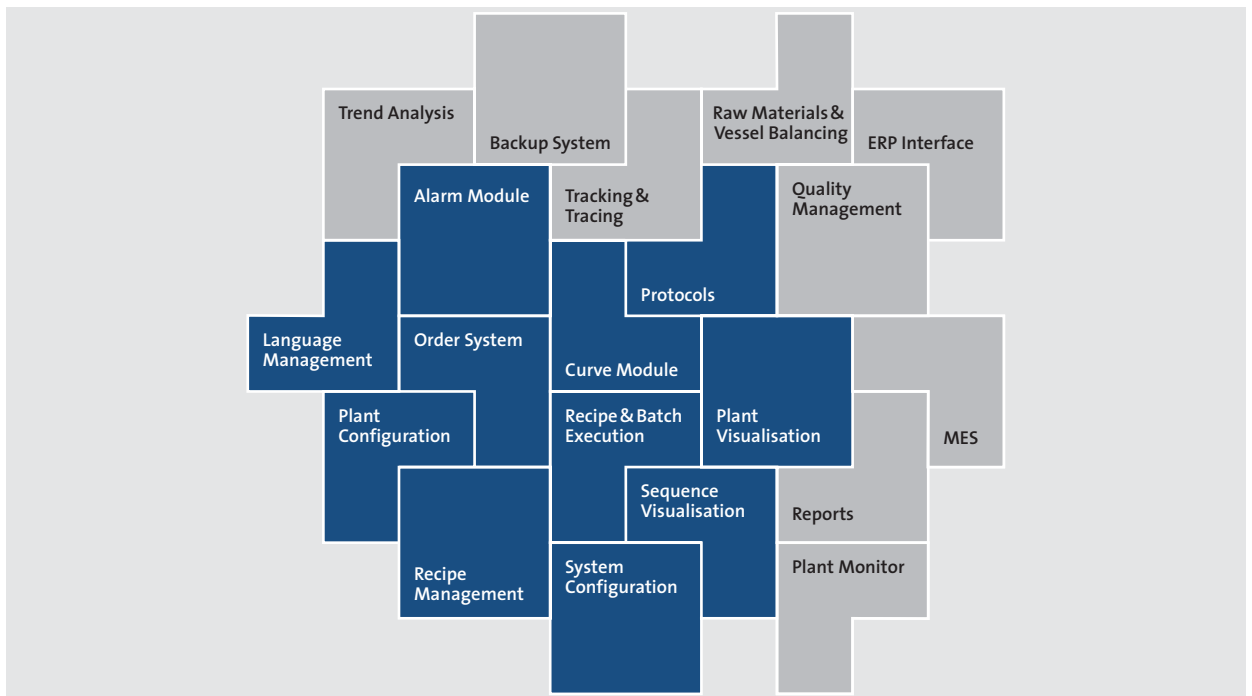
Botec Functional Groups and Software Architecture

Botec is designed in modular form and thus enables a structured and comfortable type of programming. The separation of visualisation and batch management from one another creates independence in the selection of visualisation systems. The main functions of the software are thus compatible to conventional Scada systems with only a few steps involved.

3. Description of the Functionality

Botec offers functional features that are clearly arranged and allocated to individual modules. This assures exact correlation with the requirements of the project and optimum guidance for the final user. Besides the Botec standard modules, there are also a number of supplementary modules that can be implemented as options.

Modules of Botec systems



Standard Modules

■ Plant Configuration

The plant configuration module is among the central components of Botec. With the aid of this module a plant is represented in a data model. Among others the following are configured: the process and batch areas, the units and their unit procedures, and phases and sub-phases. The configured model is stored in a data base (MS SQL Server, Oracle) and is available to all other modules. Simple copying functions facilitate the configuration or modification of the plant or individual components.



■ Recipe Management

The recipe management module enables the preparation of recipes based on process sequences. The plant configuration with the physical and functional elements of the plant serves as the source for the preparation of the recipes. The recipes are prepared from the defined process sequences of individual components of the plant (unit procedures) and marked with the phases of the corresponding set values. The use of copying functions and version controls assures the simple and clear preparation and modification of individual partial areas or complete recipes.

Ordering System

In the ordering system, orders for batches for various processing areas are set and the optimum sequential order for the processing of the batches is composed. The statuses of the individual processing orders are displayed graphically in Explorer style. If an overriding ERP system is used, planned orders can be broken down and taken over in the ordering system of Botec. The recipe and batch control module takes over the orders and executes them.

Batch No.	Start Order	Lot No.	Start	Recipe	Product	Unit
03-07-00001940	Läuterobch	1024	31.07.2003 08:17:00	Messebier [2] V 3.00	Bier	Läuterobch
03-07-00001941	Mühle	1025	31.07.2003 08:30:00	Messebier [2] V 3.00	Bier	Mühle
03-07-00001941	Läuterobch	1025	31.07.2003 08:33:00	Messebier [2] V 3.00	Bier	Läuterobch
03-07-00001942	Mühle	1026	31.07.2003 08:46:00	Messebier [2] V 3.00	Bier	Mühle
03-07-00001942	Läuterobch	1026	31.07.2003 08:48:00	Messebier [2] V 3.00	Bier	Läuterobch

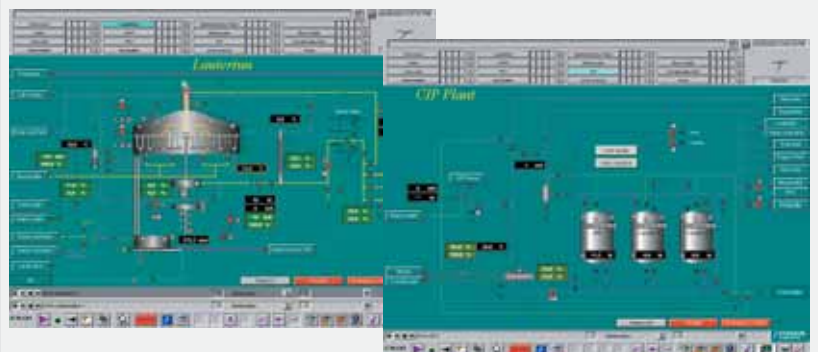
Sequence Visualisation

User-friendly surfaces are available to enable monitoring and operation of the batches during execution. Besides the visual check of the sequence steps it is also possible to alter various parameters. The changes are valid temporarily for the selected batch.



Plant Visualisation and Operation

Plant visualisation is that part of Botec, which renders the plant itself and the status of the technical process steps easy to grasp at a glance. Visualisation is divided into overall, process and detailed views. Navigation is possible in the respectively desired view, depending on the requirements. The user-friendly graphics permit safe operation of the plant by the operating personnel.

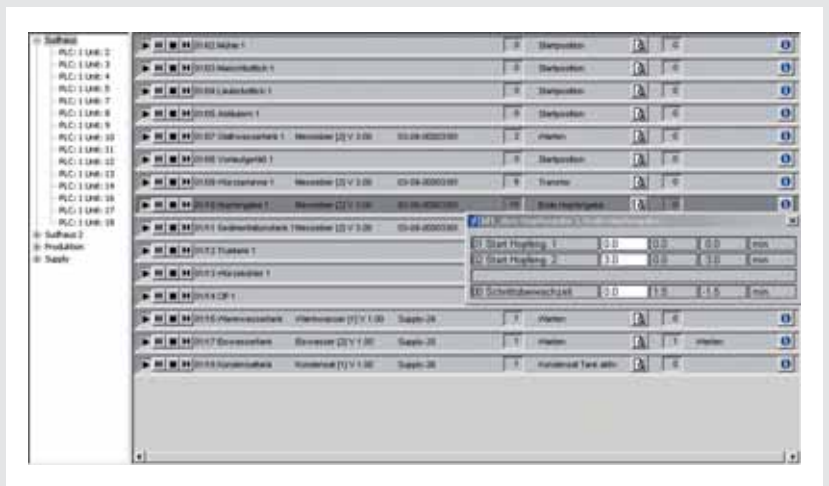


■ **Unit Visualisation**

All processes running in the plant are displayed in clear summarised graphics. Thus the plant operator has a total overview of the current processes in the production at a glance.

■ **Trend Analysis Module**

In the trend module, relevant process and quality data is displayed in the form of curves. These enable the visual assessment of the processes. This data is also available for other auxiliary evaluations.



■ **Message and Alarme Module**

The message and interference notices are displayed in a message line, which is shown in every process window. Special messages can be called by means of freely definable filters and then displayed in a message window. Selection may be effected both via the status of a message (e.g. acknowledged, not acknowledged) and via the message classification (e.g. alarm, process message...).

■ **Language Management with Online Language Switchover**

The language management module assures that operation of Botec can be effected in the respective language of the country of the user.

■ **Protocols**

For the analysis and optimisation of technological processes, the recording of the data that results is a great aid, for the documentation of the production it is indispensable. The batch protocol module is among the standard modules of Botec. The protocols of individual parameters can be activated simply by parameterisation. The process and batch area as well as the time window for the protocol can be selected in the menu strip. The selection and preparation of the protocol report itself is effected in Microsoft Excel.

Optional Modules

■ Reports

The report module enables the preparation of reports in arbitrary form. A series of Excel functions are available for the configuration of the reports, with the aid of which values can be read out of the data base (MS SQL Server, Oracle) and displayed. The report mask can be supplied with information and data by means of the criteria time, batch and process.

■ Raw Materials and Vessel Balancing

The filling and emptying of vessels is automatically recorded. With this recording the contents of the vessels and the raw materials contained in them can be accurately calculated.

■ Backup System

The backup manager enables safe long-term archiving of process relevant data. The storing procedures can be handled either manually or automatically via commands to the data base. The storing of the data is in any case complete.

■ ERP Interface

Botec has an interface to ERP systems, such as e. g. SAP/R3. If an overriding ERP system is used, planned orders can be broken down into individual processing orders and taken over in the ordering system of Botec. Furthermore, acknowledgement messages are sent by Botec to the overriding ERP system (alignment of core data, ERP recipe, etc.). The acknowledgement messages are parameterised directly from the recipe.

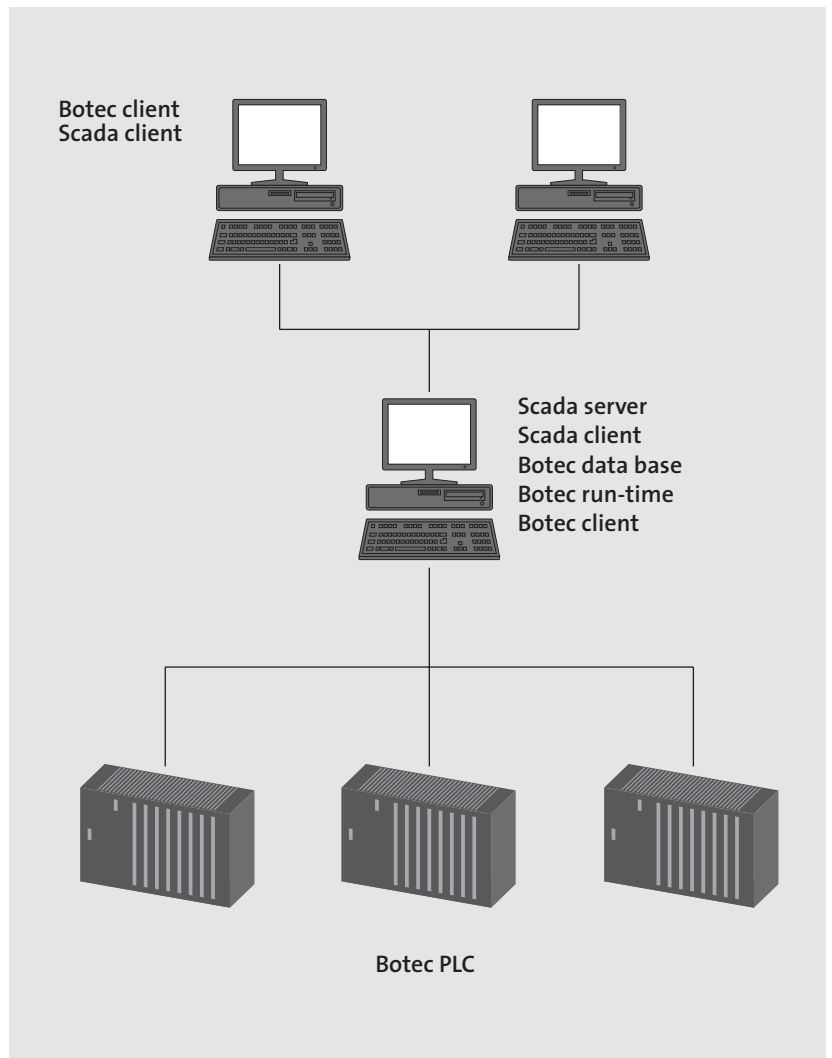
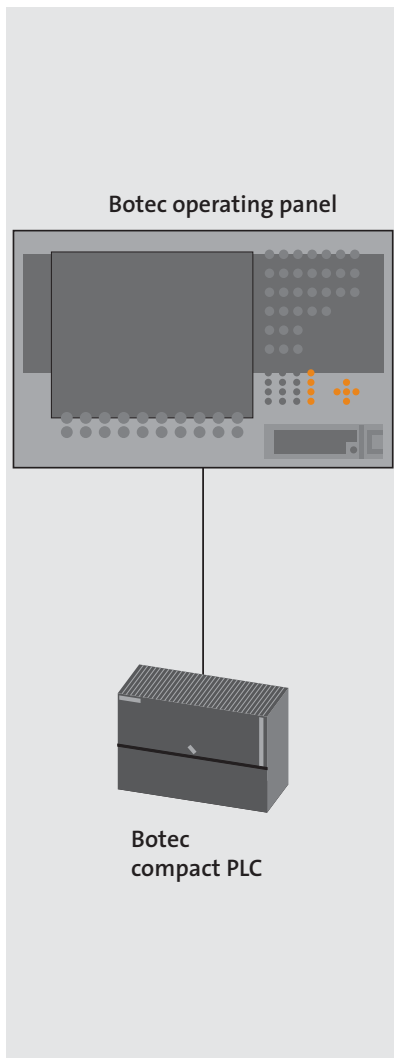
■ Batch Tracking & Tracing

Botec generates and manages the information necessary for KRONES's Tracking & Tracing. Among these are e. g. transfer telegrams, movement data, stock changes (entries and removals). With the aid of the data and of the Tracking & Tracing module, batch tracing according to EU directive 178/2002 regarding the traceability of food stuffs is possible.

■ MES module

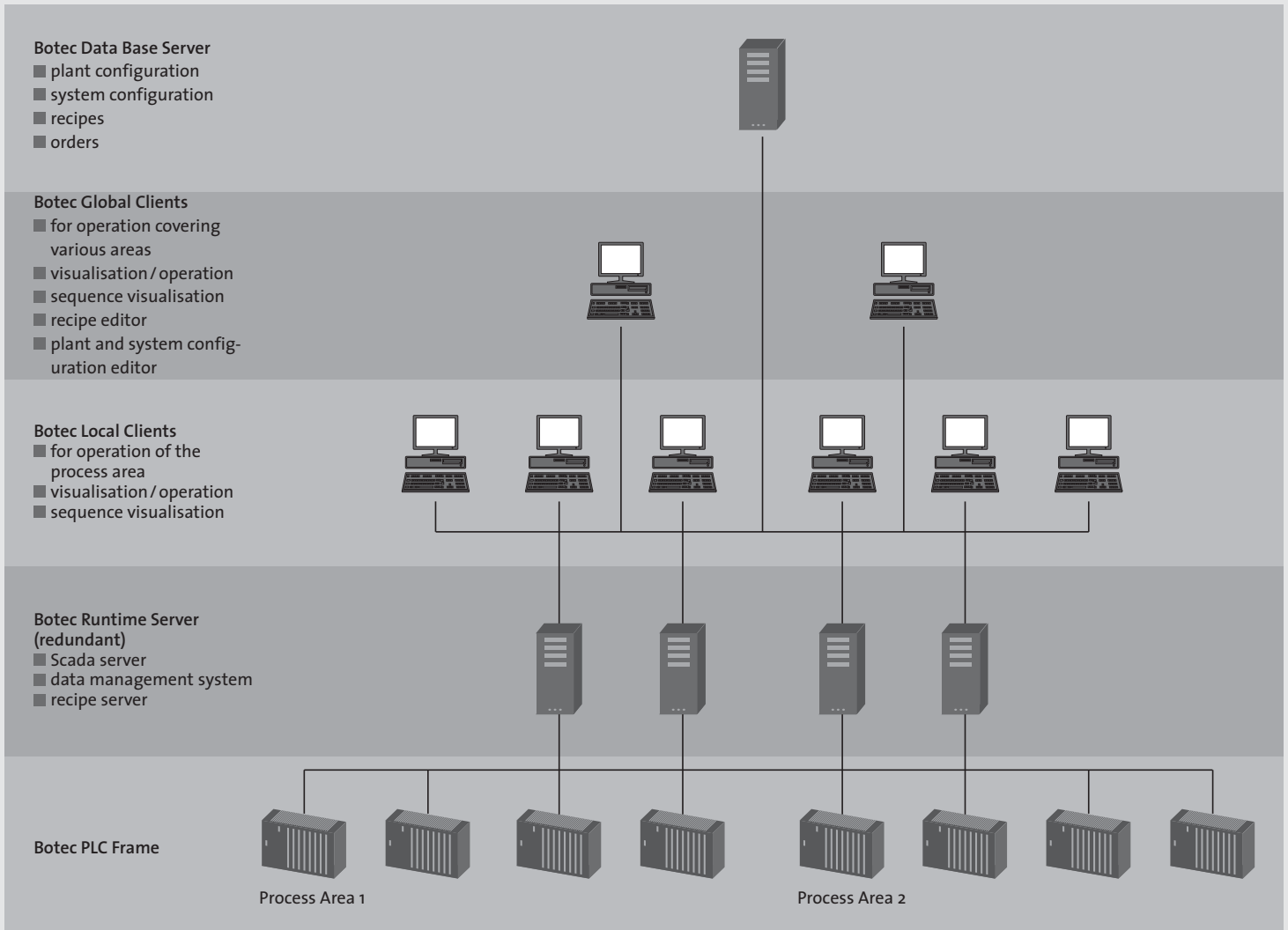
The Botec MES module collects information and process data from the control and makes them available to higher ranking MIS and MES functions. That way, the overlapping IT functionalities such as reporting and quality management are carried out.

4. Configuration and Scaling Feature



4.1. Individual vessel automation with the Botec compact control system
e. g. CIP, flash pasteuriser

4.2. Area automation with limited data
e. g. filter, brew house, bright beer tank cellar



4.3. Plant-wide automation solution
 e. g. beer production in a brewery,
 soft drinks plant, overall solution for
 manufacturing processes and filling

5. Specifications

Hardware:

PLC

- SIMATIC S7 300 and 400
- Allen Bradley Control Logix

PC

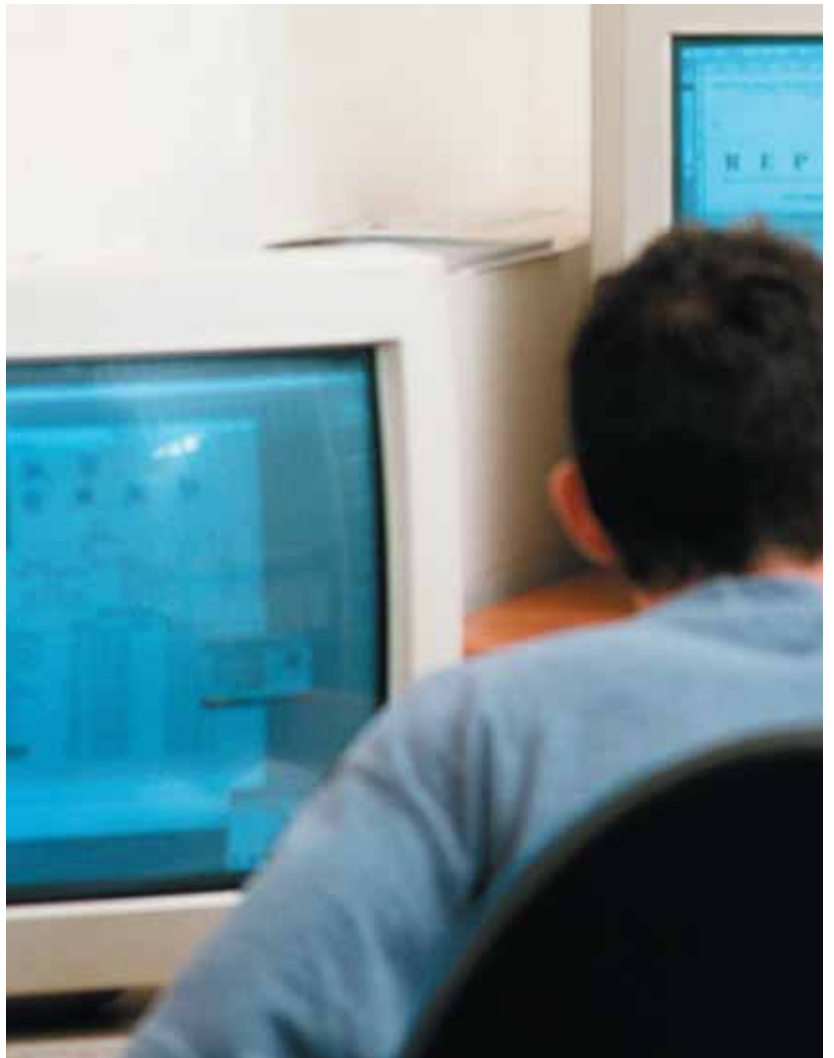
- Standard: Dell and Siemens
- Customer wishes can be accounted for after an in-house integration test

Software

- Operating systems Win 2000/2003 for Server/Clients and Windows XP for Clients
- MS SQL or Oracle for Botec data base
- Scada: WinCC, InTouch Iltis
- Software safety: ArcServe

Network

- PLC-Server Industrial Ethernet TCP/IP
- Server – Client Ethernet TCP/IP



6. Botec – Continuity and Innovation

Botec is a practice related process control system that during the course of the years has been able to incorporate a variety of customer suggestions and experiences within the system itself. Due to the continual process of optimisation and the coordination among software development, project engineering, commissioning and plant service, there has arisen an extremely sturdy and effective control system. Current requirements of the branch can be integrated in the system software without problems.

KRONES attaches great importance to continuity and compatibility of the versions. In this manner the step-by-step automation of a plant covering several project stages or the retrofitting of existing plants can be accomplished even after many years time. There are many reasons for the implementation of Botec as overriding control system. Botec is a tool for operators, technologists and service personnel as well as for engineers and planners.

Reasons for using Botec:

- Clearly structured plant and process overviews
- Simple operation
- Safety with respect to production
- Complete display of process techniques (ISA S88)
- Easy preparation of recipes
- Recipe versions possible
- Reproducibility of quality in the production department
- Information on the current batch at a glance
- Quality safety due to data recording and evaluation for the duplicating of the manufacturing process
- Increase in productivity
- Increase in flexibility

The facts speak for Botec:

- Simple operation and handling
- Short training period
- A product from technology experts for practical usage
- Widespread implementation in the international processing industry
- Standard components for system software and hardware
- Redundant system configuration possible
- Object oriented structure
- Technology modules for the beverage industry (SuperTrend, TopScan,...)
- Genuine online engineering
- Modular structure
- Teleservice & field operation
- ISA S88 Standard, FDA in preparation
- Flexible adaptation to customer wishes
- Clear and technologically sensible structures
- Clear process sequences
- Flexible for the requirements of very different processing areas



Automatically more.

Does the concept “automation” mean merely the independent running of a production plant? That would not be enough for us. By automation we mean much more: increases in productivity and transparency, quality assurance and above all cost savings.

That’s why KRONES’s personnel is a composite of many competent abilities. Which on the other hand opens possibilities for implementing effective processes in the areas of production, filling, packaging and logistics.

With the result that our customers thereby – “automatically” so to speak – receive more for their money.

KRONES is the solution company for

- process control technology, production automation
- production information and analyses
- production planning and optimisation
- storehouse management systems and material flow solutions