Biofuel engineering software for plant builders and operators

Multi-platform process control – efficient engineering to cut project expenditure and save on personnel costs

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In South America, almost a dozen different and renewable fuel plants are automated with a process control system. Twenty years of software development experience over a wide range of applications have culminated in this open, PLC-based process control system. With a multi-platform concept the multi-platform provides decisive advantages for planners as well as operators of biofuel plants.

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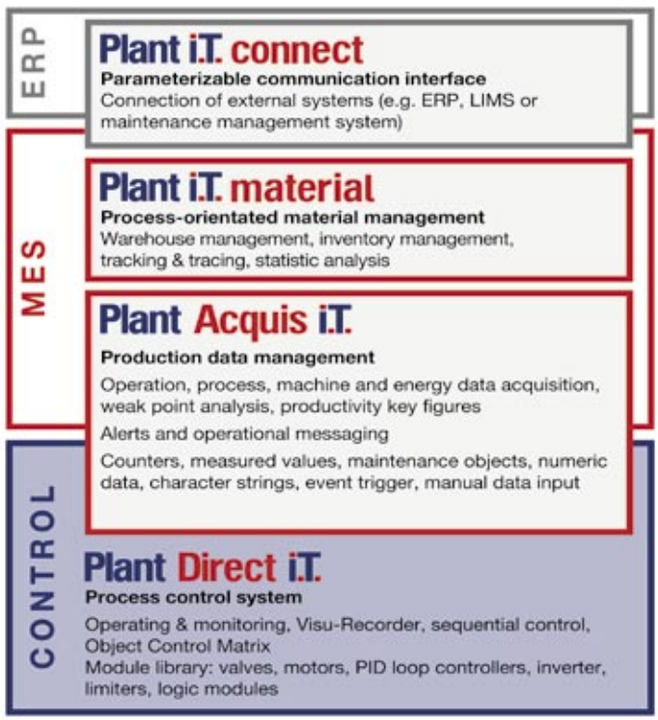
Traditional process control systems consist of a homogeneous unit with uniquely coordinated hardware and software. This means that they are technically intertwined so extensively that all flexibility is lost both for the plant builder and for the operator. However, plants manufacturing bioethanol and biodiesel need to adapt quickly to special requirements and the regional preferences of individual markets. As a result, truly open process control technology is needed which is totally independent of the individual hardware used. The process control system, which fulfils this need is Plant iT from ProLeiT. This flexible technology is available for the following leading controller hardwares: Siemens (Simatic S7), Mitsubishi Electric (Melsec System Q) and Rockwell (ControlLogix).



The Plant iT process control system is the system architecture to offer the lowest possible total costs of ownership.

The plant designer can now structure the hardware for a plant's automation solution that is geared to the specific demands of the market. The opportunity to adapt production processes flexibly is thereby available to the plant operator, independent of the control platform used.

Flexible production processes to reduce costs of ownership

In addition, existing automation systems can migrate across step-by-step, so that future investments always remain viable and secure. Existing automation systems that have to be retained can thus be integrated into Plant iT and controllers from various manufacturers and may also operate in parallel in a single plant. This ensures that the Plant iT process control system is the system architecture to offer the lowest possible total cost of ownership. Plant iT is designed as modules and consists of:

- the Plant Direct iT process control system
- the Plant Acquis iT production data management system
- the Plant iT material process-oriented inventory management system
- The Plant iT communications interface that can be connected to third-party systems such as ERP (Enterprise Resource Planning) or LIMS (Laboratory Information Management System).

All modules in the system feature a central engineering environment with a joint data inventory and integrated interface that can be freely adjusted. In this environment, it is therefore possible to access all system and planning data via a tree structure similar to that of Windows Explorer. User management, notification profiles, sets of graphic elements for visualization etc., are available right down to the individual actuators and sensors. These can be set using any cascading location keys. Even individual loops within a main process can be set up inclusively so that specific programming can be replaced by comprehensive setting of parameters.

Plant designers can port technological know-how with Plant iT

The planning of technical process functionality generally takes place independently of the selected control platform. A plant designer, therefore, has the advantage of only once having to engineer standard functions for the plants. Once this has been done, the specific service can be connected to the relevant, preferred control platform depending on the demands of the market or the requirements of the end-user. This ensures that standard applications fulfill quality assurance standards and the technological know-how can be applied around the globe, independent of the control platform used.

Based on the hardware of the local PLC favorite, the technological know-how acquired ›

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by the plant designer can therefore be applied to the relevant market. Compiling specific class libraries provides the plant constructor with a high degree of conceptional flexibility in the implementation of specific solutions. At the same time, the technological functionality flowing into the system's functions is an important quality and selection criteria for plant operators. For this reason, the Plant iT enhances efficient engineering to cut project expenditure sharply and save personnel costs

The safety and transparency that can be achieved in this way also reduces commissioning time as well as the number and duration of plant downtimes. Step-by-step implementation of Plant iT with or without the removal of existing systems is therefore carried out in a smooth and efficient changeover. Even parallel operation of different PLC platforms within a Plant iT system is possible. Standardized concepts can thus be used within a heterogeneous automation environment. Integrating existing automation systems enables the plant constructor to offer such cost-effective solutions.

The Plant iT process control system also has integrated and far-reaching MES functionality so it is possible for the plant constructor to satisfy increasing demands for complete and all-in-one solutions from a single source.

Flexibility and increased transparency in production data

Plant operators in the chemical industry are increasingly demanding MES functionality integrated into the process control technology. Operators of biofuel plants using Plant iT also have an accurate overview of their raw material inventories. A transaction-based online display of the movements of all materials required makes it possible to react quickly to changing process requirements or to fluctuations in the quality of the raw material.

In addition, recording and evaluation of operating, process, machine and energy data are directly integrated into Plant iT. Data is recorded without Plant iT-based process automation but nevertheless linked into Plant iT. This opens up the potential for a high degree of data transparency which includes related areas of discrete manufacturing. Plant iT is thus also the ideal solution for hybrid processes in other sectors.

Due to the multi-platform, the plant contractor can change over to Plant iT and can also retain existing PLC controllers and distributed I/O´s. Without having to refit hardware or alter cabling, this significantly reduces commissioning time and the risks that this can involve.

Reduced costs

There are also costs resulting from additional spare parts required for the PLC hardware. The technical personnel quickly familiarize themselves with the task in hand and can begin production work immediately. Know-how that has been gathered with the existing control hardware remains up to date. The training of technical personnel is limited to Plant iT and its applications and therefore shortens the changeover phase for technical personnel and ensures productive operations are quickly achieved.

Plant operators can also configure technical process changes themselves with Plant iT and implement these for flexible operations. The migration of existing automation systems into Plant iT with the flexible step concept only affects production marginally.

Plant iT in the European and South American biofuel market

South America is undoubtedly one of the main markets for biofuel plants in the world. An increasing number of plants installed are already automated with Plant iT. Here in Europe, the multi-platform software demonstrates its outstanding advantages where processes operate with controllers supplied by both Siemens and Rockwell.

In contrast, in Europe most bioethanol and biodiesel plants are generally equipped with Siemens controllers only. The newest example is the Plant iT process control system in the new Slovakian bioethanol plant Enviral A.S. in Leopoldov. GEA Wiegand GmbH was the plant supplier who commissioned ProLeiT to engineer and supply the process control system. From a hardware perspective, two Simatic S7s are in use as process-oriented controller components. About 700 analog signals, 200 software control loops and 550 motors and valves are controlled by this system with a server, an engineering station and two operator stations also being used. It has a planned annual production of 120,000 m^3 of bioethanol making the Enviral plant one of the largest in Europe while the Plant iT process control system ensures that it is also one of the most efficient. ■

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