

Plant Direct iT - the process control system

Plant Direct iT is an open, componentbased process control system focusing on the technological requirements of such a system. By combining the client/server architecture with an object-orientated class concept, it offers a secure, future-proof alternative for a conventionally programmed PLC with super-ordinated visualization.

Classes – Modules for plant-wide automation

The basic requirements for a control system are a secure process control combined with maximum transparency for the operator's personnel as well as efficient project planning, independent of whether it is used for a new plant, for expansions or for modification of existing plants.

Plant Direct iT allows for extensive parameterization of technological functionalities. Only specific functions need to be programmed. The class concept of Plant Direct iT ensures highest functional quality as similar objects are controlled and monitored just by one software module. Thus, re-usability is assured. If necessary, it facilitates the effective qualification of the system.

As a consequence operating expenses for validation can be reduced considerably.

Plant Direct iT provides maximum flexibility for interventions in running operations, cutting down on the frequency and duration of downtimes. The system permits modifications during running production operations without neglecting safety aspects, as all changes are logged in detail by the system. This applies for all operator interaction as well as to any intervention with the engineering of the system (Audit Trail).

Class structure

A class comprises a closed system consisting of three seamlessly integrated components.

The system has complete control over the function of a technical component (e.g. a valve) or an entire step-controlled sequence:

- Class description
- Operating dialog (class dialog)
- Control logic (class handler)

The class description is stored at the central database of the system server and includes a structured mapping of all properties of this class including all status information and the command set.

The operator dialogues are available to the user within the process graphics that provided via the clients. Via the operating dialogue every single object can be controlled and monitored.

The control logic is implemented in the PLC and controls the technical device (e.g. the valve) via the I/O system. All components form one functional unit. They synchronize status information and operating parameters.

These parameters can easily be changed during running operations. In this way, there is maximum flexibility with regard to the selection of changes to be transferred as well as the time of transfer. Where necessary, a single parameter for a specific object can be selected and changed during running operations.

The system standard already contains an extensive set of

- technical, and
- technological classes,

that are constantly being further developed. The great variety of technical basic classes includes largely equipment-neutral functionality such as valves, drives, measured values and closed-loop controllers, logical functions, and highly-qualified, equipment-specific functions, e.g. for the complete control of a certain model range of frequency converters. With the Sequence Controller and the Object Control Matrix (OCM) there are two powerful classes available for the mapping of complete processes. The system also supports the development and complete integration of additional classes or class libraries for a various applications. The required infrastructure including templates and documentation is available within the standard system.

Plant iT objects are cascadable and provide an API that allows to access them from conventional PLC code. Because the Plant iT system software and application-specific PLC programs can be run parallel in one controller, the system allows the implementation of very complex tasks.

Video Mode

The classes also support the Video Mode, a special function of Plant Direct iT. With the help of Visu Recorder past sequences can be replayed directly in the user interface to support the staff in error diagnosis.

Integration from valves to sequence control

Plant Direct iT does not only provide classes for technical objects. There are also classes for the parameterization of complete processes following different methods. In particular, continuous processes are often mapped by using interlock-based control. In addition to classes for automation objects, a logic function class is available. With its help the conditions for the activation and interlocking of each single object can be parameterized. The second method includes the mapping of processes by means of a step sequence and also for this Plant Direct iT provides the adequate classes:

The Object Control Matrix class (OCM) enables the user to parameterize the controlling and monitoring of a complete group of technical objects (actors, sensors) for a variety of activities that have to be carried out in the process sequence. In a matrix for each object is parametrized how it is to be treated if a specific activity is called (e.g. monitoring for “Off” and “Error” for activity “Inherently safe”). The activities defined by Creating master recipes by combining procedures with parameter sets an OCM can be called by superordinated sequential control in any possible combination. The class “Sequence Controller” allows the parameterization of step sequences including the required branch targets and transitions.

Calling OCM activities within these steps results in a completely parameterized sequential process control.

Efficient Source/destination handling

The use of sequence controller and OCM allows variable process control in respect of the allocated plant resources. The parameterization of the group of technical objects to be used by OCM is done by means of object lists, which then can be dynamically allocated to an OCM matrix. In this way, the activities for a specific process need to be parameterized only once. But by combining them with different object lists they can be executed for different resources (e.g. source tanks).

Recipe control

Plant Direct iT provides special functionality for recipe-controlled processes based on a simplified procedural model. Processes are described by means of procedures comprising one or more unit procedures which themselves consist of one or more operations. Each unit procedure equals one object of the class Sequence Controller and the steps defined for this object represent the operations. Master recipes can be created by combining such a procedure with different, equally structured parameter sets, e.g. for making different products using the same process. The system distinguishes between recipe and equipment parameters. For the recipe parameters different replacement methods are selectable which allow to define for each parameter, whether it is a constant with regards to the master recipe or it has to be defined individually each time the process is started. Equipment parameters are constant in relation to recipes, because they just describe product-independent, technical properties of plant components. Thus the process control system Plant Direct iT itself provides extensive possibilities for the automation of recipe-controlled processes.

Material-related process control

Plant Direct iT allows the implementation of material-related process control solutions. Plant iT material, the system component for process-orientated material management, can be accessed directly from process control level. With the help of system-internal standard functions transaction-accurate booking records can be generated for every single material movement out of the running process and almost real-time. In that way, material-related process control including inventory management and – in combination with a super-ordinated order management – also tracking and tracing is possible.

© 2010 ProLeiT B.V. - Concept, design en realisatie [1601.com](http://www.proleit.com)

<http://www.proleit.com/index.php?id=1062>