LASAL Engineering Tool
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The all-in-one engineering tool LASAL offers all the advantages of a modern and integrated engineering environment. Object-oriented programming with graphic representation is implemented according to the IEC 61131-3 standard and allows the fast and simple realization of machine concepts. In LASAL, development times and time-to-market cycles are reduced and mechatronic engineering simplified.

**All-in-one: One Tool for all Automation Tasks**

With LASAL, **you can easily implement all tasks** for the areas of: PLC programming, visualization, motion control, safety, service, diagnostics and remote maintenance. With the high operating comfort, you quickly reach your goal.

The project structure is clearly organized. The machine functions can be modularly combined in the toolkit, stored in libraries, reused, tested without hardware connected or distributed over work groups. In addition, industry-specific function modules can be used and various network topologies provide a high degree of freedom in project development. Efficient remote maintenance is possible through the web and VNC servers via smartphone or tablet.

- **LASAL CLASS**: Object-oriented programming with graphic representation
- **LASAL SCREEN**: Visualization with high operating comfort on all SIGMATEK display units
- **LASAL MOTION**: Motion control for regulation and control tasks in drive technology
- **LASAL SAFETY**: Safety programming/configuration
- **LASAL SERVICE**: Service and remote maintenance over Internet
Object Oriented Programming

LASAL is an innovative engineering tool: In 2000, SIGMATEK was the first company to integrate object oriented programming with graphic representation and client/server communication into automation technology. With object orientation, LASAL sets a new standard for modularity and reusability. Through the inheritance of class properties, a structure of program components in hierarchical levels is possible. The clear software structures simplify the development of applications. Through the modular structure, previously created application components can be changed or reused easily.

Clear Organization with Graphic Representation

Through the graphic representation of program components, the complexity of the program is encapsulated. This means that the program code is not visible at the first glance; rather the relationships between the program components as well as the most important data of a program section are shown. The developer can therefore get a quick overview of the project structure and the interconnection of the individual modules is clarified. Complex applications can also be displayed transparently and clearly organized. This simplifies the implementation and helps reduce the engineering and maintenance time. For service technicians, it is possible to diagnose an error in a machine quickly and easily.

Comprehensive and Future-proof

LASAL can be used on all platforms. The entire SIGMATEK product palette such as CPUs, terminals and industrial PCs are supported. In addition, the hardware platform can be changed without having to adapt the software. The automation system can therefore be easily expanded at any time; the user therefore has a future-proof system.
LASAL CLASS (Control Logic Application Software System) is the engineering tool to solve your automation tasks. With an integrated operating concept and clearly organized user interface, LASAL CLASS offers a comfortable design environment for object oriented programming - from the most simple machines to complex control tasks.

**Object Oriented Programming**

LASAL expands the **IEC 61131-3 Norm** with object oriented programming and ensures the **simple** and **clear development of applications**. Thanks to the modularity, reusability of the classes and the encapsulation of user programs, the application is more efficient and can be tested more easily. The **development time** is thereby **considerably shortened** and the **engineering costs are reduced**.

With object oriented programming, the various components of a machine or system are represented in the form of objects. Behind each object stands a class containing the program code and the corresponding data elements. The usual **separation of data and program code** with procedural programming **is eliminated**. Each class can assume a specific task, for example, the measurement and evaluation of a temperature or control of a valve.

The **classes** defined by the programmer are **stored in clearly organized libraries** (Class Library). For the exchange of information, defined interfaces are available in the library classes, which can send and receive data.
Object Network and Graphic Representation

Modern engineering tools such as LASAL support the programmer with the graphic representation of classes and objects. Using Drag & Drop, a class is linked to the network from the project tree and an instanced, real object is generated. The objects must only be connected to one another and an application is created. LASAL CLASS creates all declarations and function bodies automatically. The user only has to program the individual methods and does not have to worry about the declaration syntax, as with conventional systems.

With graphic representation and a comfortable debugger, programming applications are child’s play. A complete overview of the project, the functions, data traffic and interfaces is possible at a glance. Complex relationships are much more transparent and easier to test or change.
Inheritance, Aggregation and Creation of Complex Classes

LASAL CLASS supports the creation of complex classes through the object oriented concepts, inheritance and aggregation.

Using inheritance, an object class can be duplicated and refined. Inheritance describes the relationship between the general class (base class) and a derived class. The derived class inherits the properties of the base class but also contains additional information (attributes, operations, associations).

Through aggregation, several individual classes can be assembled into one complex class.

Previously tested classes can be easily combined into highly complex program structures using the toolbox principle.

With these programming techniques, it is possible to implement new machine properties with minimum programming.
Multilanguage Programming Tool

LASAL supports the most important programming languages. The application can be created using Structured text (ST), Instruction list (IL), Ladder diagram (LD) – all three meet the IEC 61131-3 Norm – Sequential function chart (Interpreter) and ANSI-C. The methods of object oriented programming are available as an integrated extension of trusted languages.

Example: The »Counter« class is labeled as the base class, the properties are then inherited by the »PieceCounter« class derived therefrom. Through aggregation, the classes »Ram« and »Trigger_plus« are also integrated in the complex class »PieceCounter«.

Creating a complex class through aggregation and inheritance

Representation of an instanced complex class in an object network
SFC Programming

LASAL also supports SFC programming. This **graphic sequential function** chart is especially suited for machine and process sequences that are repeated cyclically. An SFC diagram consists of connected step symbols and their attached actions/commands. The step sequence is triggered via transitions, which specify whether and when the next step is executed. Unlike in other languages, the **clear graphic representation** of the sequences allows the program code to be viewed with a double-click on the step symbol. Possible errors are therefore found faster and easier.

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Client-server Technology

The **communication** between the client and server functions like a PC network over a **Request/Response mechanism**. This means, the client requests a service that is provided or processed by the connected server. Read and write access occurs over a SINGLE connection. Through this technique, an **event-triggered system** can be realized: A program component is then only active when it is "initiated" (i.e. by writing a reference value in the visualization). The **CPU load** can therefore be **optimized considerably** in comparison with conventional systems.
Class Library

The classes can be managed centrally in a library. When importing a class, all required program components are loaded into the project tree by copying, linking or referencing. In LASAL CLASS, an extensive standard Class library is available, which provides numerous function classes such as Memory, Time and Date, Motion, Logic, Controllers, Triggers, etc.

Each user can create and use as many individual Class libraries as desired.

Real-time Multitasking System

The real-time operating system provides the user with three different task priorities (real-time, cyclic and background). The operating system maintains the control over the tasks to be processed (preemptive multitasking). Within a task priority, cooperative multitasking is used. Through this real-time multitasking system, the visualization and application can run on one processor.
Online Debugger

With the "Online Debugger", functions are provided such as breakpoints, conditional breakpoints, scan counters, single-step processing and forcing, with which program errors can be found quickly and easily.

![Online debugger with real-time values](image)

Real-time Data Analyzer

The Data Analyzer allows real-time representation of signal processes with an additional history function. The view can be switched between trend and the classic oscilloscope display (with or without tracing). Individual bits can also be recorded from bit fields. Enum variables are displayed numerically and with textual Enum entries. Start and stop triggers can also be set and a hold function is integrated.

![Real-time display of signal processes in the Data Analyzer](image)
Advanced Debugging Tools

LASAL provides comfortable tools for online diagnostics and testing.

- **File Commander**: File operations to/from the PLC
- **RAM Image**: Save and restore remanent data
- **Plc Trace View**: Recording of a project's time response
- **Plc Log Viewer**: Uploading and analysis of control log files
- **Plc Backup & Restore**: Save/restore files and remnant data in the control

![Recording the CPU tasks](image)

With the "PlcTraceView" tool, the time response of a project can be recorded. This tool is used for analysis, diagnostics or time measurement of the task response.

Version Management and Multi-user Project Structure

LASAL allows a simple connection to version management systems. All source code files are stored as pure ASCII files so that importing and exporting to other systems can be done easily. The version management allows multi-user project structures for cooperation in large engineering teams: modules and/or program components can be developed separately and then combined into an integrated whole. This increases the flexibility and the time-to-market cycles are shortened.

Scripting: Create Programs Automatically

The automatic generation and adaption of the machine software is made possible through the use of the scripting language Python. From a base project, various characteristics and types of a system can then be formed. A library with predefined classes is thereby accessed, which represents the various modules and components.

The developer can concentrate on the implementation of the new machine functions. Once these are completed, the project developer - similar to the generation of parts lists - can generate and define specific machines or systems with the push of a button.
CAM Designer

With the CAM Designer, **calculations for CAM couplings** can be made. Master and slave axes must be entered, as well as the desired number of end points for the interpolation. The result can simply be saved as a table in a class and used for further applications.

Online Help System

LASAL has an extensive help system, which describes all functions in detail. With the help of a **demo project**, a quick start in the system is guaranteed.

Hardware Editor Simplifies I/O Projects and Diagnostics

With the Hardware Editor, a flexible and comfortable tool is provided to **easily create, parametrize as well as diagnose hardware modules** (I/Os, interfaces,...) in the control. The Hardware Editor is an essential part of the LASAL CLASS development platform and is seamlessly integrated into the control concept using a tree representation. The tree representation is especially ideal, since the bus structures can be clearly shown in the tree topology. As part of the project development, the hardware configuration of the machine is mirrored in the tree.

The user no longer has to manually create and then parametrize an instance of the corresponding software component (class) for each hardware module. With the Hardware Editor, LASAL CLASS automatically performs these actions in the **background**. A module is located and added to...
the tree more easily, since only the modules allowed for the respective slot can be selected. In addition, they are divided into groups such as „Analog“, „Digital“, „Axes“ or „Safety“ and can be easily located by name with the „Device Searcher“. The module can also be deactivated.

**Module assignment in the Hardware Editor**

**The parametrization of modules** as well as individual I/Os is performed in the usual LASAL CLASS manner using the property browser. The user is also supported here with plausibility testing, which prevents the assignment of incorrect values. If the hardware assignment in a project must be changed, the Hardware Editor supports the Drag & Drop function: a module can therefore be simply assigned to a different slot. With object oriented programming using LASAL, specific I/O points and/or addresses are no longer anchored in the code, since there can be several objects with different I/O applications. The I/Os are assigned per object in the graphic view of LASAL CLASS, without affecting the class code.

**Configuration of individual I/Os**
The **Hardware Connection Manager** provides a **dialog function**, in which the connection of all I/O points to the user objects are listed in a table. An available I/O point can therefore be quickly and clearly assigned to an interface variable of an object.

For the I/O layout in the user software or if „rewiring“ is required, the user is supported with a clear dialog containing filter and sorting functions. In addition, „I/O names“ can be assigned in the connection dialog. These represent an interlayer between the physical I/O point of the hardware and the software usage in the application program, in order to encapsulate the hardware once more and allow I/O points to be assigned the same name in multiple projects.

The display can be grouped using various parameters, which can also be nested. Possible groupings are for example, the I/O name or hardware module. User-defined folders are can also be created and the connections simple moved into them.

A great feature of the Hardware Editor is provided in the online view when a connection to the control exists. The **Hardware Editor compares the configuration in the project with the actual hardware connected to the PLC and shows possible deviations, which indicate an incorrect project or incorrect wiring. The diagnostic statements can be made with the Hardware Editor during active operation.** Through the background color, the user can see at a glance which modules are in error status due to a disconnected voltage supply for example. The **online diagnosis is also possible down to the individual I/Os**: In analog I/Os, the actual values are displayed numerically. The I/O point of the digital signals is assigned a background color depending on the ON or OFF status.
Variant Editor

Various characteristics of a machine or several variants of an application sequence can be comfortably managed in a project with the Variant Editor - and via so-called Connection Files. The active variants are loaded into the control in their own file. Since the connections are generated when the application is restarted, the project does not have to be recompiles when a variant is changed: simply load the active variant and restart the application.

Visual Object View

With the visual object view (VOV), the graphic visualization objects from LASAL SCREEN can also be used directly in the programming environment of LASAL CLASS, for example, to set the parameters for individual system components offline or visualize and test over an online connection. The SIGMATEK library contains a selection of VOV files such as initial start-up or parameterization of axes, controllers and timers. These can be added to the existing visualization project or edited with a mouse click. Naturally, user-defined VOV elements can be easily created.

In the Visual Object View (VOV), visualization objects can also be inserted into LASAL CLASS.
Operating and monitoring are essential components of any automation task. With LASAL SCREEN, a comfortable tool for visualization design is provided. Visualizations can be created independent of the hardware and used in all SIGMATEK graphic display units. Intuitive operator guides for touch panels or function buttons with input terminals are easily implementable with LASAL SCREEN.

**Simple**

*Programming knowledge is not required* for creating the visualization. LASAL CLASS defines the variables available for the visualization. During the runtime, the visualization can access the variables of one or several controls directly.

**Graphic Objects**

LASAL SCREEN also offers the option to create graphic objects, which like in LASAL CLASS, can be combined into complex objects through aggregation. Each graphic object can be connected with an object in LASAL CLASS. Individually created graphic objects can be placed and scaled as desired, whereby each instance can be assigned a reference to a corresponding LASAL CLASS object. The display and operation of a temperature regulation zone, for example, is defined only once and then reused for any number of regulation zones.

- Simple operation, graphic standard functions
- Export/import of project components and graphics
- Alarm and event management
- Unicode support, unlimited language selection
Flexible Screen Creation

With LASAL SCREEN, screens can be comfortably created in the corporate design of the customer. For project development, integrated designs and a large graphic pool (library) are available. Naturally, user-defined graphics can also be imported.

With the definition of a global screen and the individual screens derived therefrom, the project development time can be significantly reduced. LASAL SCREEN supports all resolutions of the various SIGMATEK displays. In the target, the operating mode - touch screen, keyboard and/or mouse - can be selected. The operating mode can be changed individually at any time.

Several input elements are available, from direct value entry with upper or lower limit setting options to input elements with pull-down menus.

LASAL SCREEN also offers the user functions such as alarm and event management (logbook), trend display, bar diagrams, recipe management, etc.

A class, a graphic object - instanced as many times as needed: consistent object orientation in the LASAL system

Editor for creating screens
**Standard Graphic Functions**

For creating pictures, **several standard functions** for drawing, aligning, importing, translation, etc. are provided. In addition, existing graphics in standard formats (BMP and JPG) can be linked. This results in **significant time and cost savings**.

![Standard graphic tool bar](image)

**Language and Unit Conversion**

LASAL SCREEN can **manage any number of languages in one project**. Text information is entered in the form of ASCII or Unicode; all languages are thereby supported. Translation into a different language can be completely text-based or supported using the **LSE translation tool provided**.

To **ensure the clarity** of the text to be displayed, text lists can be created and assigned individual names. When compiling the visualization, the required language can be selected from the entire language pool. This reduces the amount of memory required in the target. Individual languages from this project can be installed later into an existing machine.

With the online conversion, **measurement units can also be converted**. For example, lengths can be converted from »mm« to »inches« automatically. The appropriate conversion type is selected during the project development directly. The programmer does not have to worry about unit conversion in LASAL CLASS, as all system values are available in the LASAL base unit.

![Unit and language conversion](image)
FDA Conformability

LASAL SCREEN offers integrated user and password management as well as the possibility to log data, conditions and events. The engineering tool thus meets the requirements of the American Food and Drug Administration FDA (21 CFR part 11) for machines in the pharmaceutical, food and beverage industries.

User-defined Graphic Area "MyIO"

In LASAL SCREEN, the user can define sections of the screen that are filled with contents from a program created in LASAL. The programmer is thereby supported with ready-made interfaces, which can be automatically called as needed (i.e. Touch-Events, Redraw-Methods, etc.). In the user program, all elements and information included and parametrized in LASAL SCREEN can be accessed.

Bubble Help

Each variable can be assigned an additional help text. When this variable is selected, additional information can be displayed in the form of bubble help text.

Exporting and Importing Project Components

LASAL SCREEN offers the possibility to selectively export or import project components such as pictures, text lists and variables. Since an additional SCREEN project is generated when exporting, the user can also create libraries with reusable elements here as well.
Visualization in Windows

With the DotNetKernel or „kernel“ in short, the user can visualize the individual machine data in Windows. The visualization project created in LASAL SCREEN can be interpreted by the kernel and then displayed.

All controls from the LASAL SCREEN Editor are supported by the DotNetKernel. The entire range of functions for Microsoft .Net frameworks is provided. The integration of user-defined controls and connection to networks, database, Microsoft Office, e-mail, Internet, etc. are easily possible.

No programming knowledge in LASAL CLASS is required for the adaptation or continuous development of visualization projects. Fundamental knowledge of .NET programming however, is an advantage. Visualization projects in the .NET environment of Windows programs can be thereby created and maintained. Special knowledge of PLC programming is not required.

DotNetKernel is widely implemented in C#, based on the .NET framework 3.5. As the graphics framework, the modern and powerful WPF (Windows Presentation Form) is used. The Microsoft Visual Studio (from version 2008) is used as the design environment. The PLC and the visualization communicate over Ethernet.
LASAL MOTION simplifies all drive technology tasks and is fully integrated into LASAL CLASS. The modular construction allows the efficient implementation of the drive concept. The project development and start-up software for SIGMATEK drives is integrated. A large drive library is also provided.

**Efficient Motion Control**

LASAL MOTION offers a large "construction kit" for motion control: all motion functions such as absolute positioning, relative positioning, endless positioning and CNC functions as well as coordinated movements and several referencing types are provided as standards.

**Axial movements** can be run without programming by using simple data inputs or instructions. LASAL CLASS contains the predefined parameter sets for SIGMATEK DIAS Drives and motors. **This simplifies and shortens the initial start-up, configuration and diagnosis.** In addition, **possible error sources are avoided.** As an alternative, user defined parameter sets can also be configured and stored, thereby ensuring the optimal fit for user-specific requirements.

- Comfortable Tool for complex tasks with axis control and regulation
- Extensive library with Standard Motion functions
- Axis movement without programming with simple input of data/instructions
Data Analyzer

The DIAS Drives contain an internal data analyzer, with which all drive configuration and controller data can be recorded up to a scan rate of 62.5 µs (corresponds to the cycle time of the controller). All data from the DIAS Drives can be displayed online for analysis and optimization of the controller response. Current, rotation speed and the position controller are represented graphically in the software and therefore ensure a quick overview at any time.

Graphic Representation of the Controller Start-up

All associated control parameters are visible at a glance and can be customized individually. Optimization of the controller is therefore fast and simple.
Central Management of Drive Parameters

The configuration data of the DIAS Drives is stored in the control system; the drive therefore always has the correct parameters. The servo amplifiers can thus be changed without additional labor and without a software tool.

Motion Control

The seamless integration of PLC and motion control results in improved synchronization of process and motion operations in the machine. The core is made up of motion control and technology functions. They cover a broad spectrum: from electronic CAM switches and measuring sensors over various positioning modes, synchronous speed and electronic CAMs to CNC functions, path and CNC control with transformations for various robot kinematics. With LASAL MOTION, the connection of virtual lead axes, the creation and execution of profiles, the coupling of several axes and multiple applications are simple to apply. All necessary motion functions for a production machine are provided from one source and range from simple one-axis to complex multi-axis applications. In addition to numerous basic functions, ready-made standard applications such as flying saw are available to make applying the most frequently occurring tasks as easy as possible for the user.
Seamlessly Integrated Safety with the LASAL SAFETY Designer

The full integration of the Safety Designer into the LASAL engineering toolkit simplifies programming and configuration of the Safety controller for the user. Logic connections and I/O configurations can be created comfortably.

Simply Integrate Safety

With the functions library, the user can easily create the logic connections of Safety-related procedures. In addition to standard function blocks, the library also provides Safety function blocks such as Emergency Stop, Two Hand Control or Guard Locking, which are based on the PLCopen standard.

In the integrated graphic editor, the function blocks as well as the in- and outputs can be easily placed with Drag & Drop and connected to the non-safe variables in the PLC. Downloading, online monitoring and debugging are performed over LASAL's online interface.

Per project, several Safety controllers can be used, whereby the program of each Safety controller can be distributed over any number of networks.

The ease of use and clear representation reduce labor for programming, troubleshooting and especially validation.

- Simple programming/configuration of Safety controllers
- Pre defined, certified function components
- Logic connections per Drag & Drop
- Download, online monitoring and debugging via online interface
LASAL SAFETY Designer User Interface

The LASAL SAFETY Designer offers the same operating comfort as LASAL, into which it is seamlessly integrated. Predefined function blocks simplify programming and maintenance.

Graphic Editor

In the graphic editor, the function blocks as well as the in- and outputs can be simply allocated from the project tree. Logic AND connections can be created directly in the input module.
Login and Program Download

The online actions for all Safe CPUs in the project are performed centrally in the Online-State dialog. This includes actions ranging from login over acknowledging errors to downloading and programming the SD card. In addition, status information from the Safe CPU and diagnostic messages for in- and outputs are displayed.

Debugger

The SAFETY Designer provides a comfortable debugger, which graphically displays all values, including the signal flow and allows the forcing of in/outputs and constant values.
Safety Function Blocks

The LASAL SAFETY Designer function block library contains, in addition to predefined and certified standard function blocks (logic blocks, timers, counters, etc.), numeric function blocks as well as function blocks based on the PLCopen standard:

- **Equivalent** - AND connection between 2 normally open inputs with time verification of the transition state
- **Antivalent** - AND connection of a safe normally open and normally closed input with time verification of the transition state
- **ModeSelector** - Selection of the system operation mode (e.g. manual, automatic, semi-automatic,...)
- **EmergencyStop** - Monitoring of an emergency stop switch and restart mechanism
- **GuardMonitoring** - Monitoring of protective equipment with 2 switches and a restart mechanism
- **TwoHandControl TypeII** - Implementation of a two-hand control
- **TwoHandControl TypeIII** - Implementation of a two-hand control with a predefined time difference of 500 ms
- **GuardLocking** - Controlling access to a dangerous area through a lockable protective device
- **TestableSafety Sensor** - Periodic testing of Safety sensors to avoid a dangerous failure
- **MutingSeq** - Suppression of the Safety functions, if the component moves into the danger zone, with 4 sequentially allocated sensors
- **MutingPar** - Suppression of the Safety functions, if the component moves into the danger zone, with 2 parallel allocated sensors
- **MutingPar_2Sensor** - Suppression of the Safety functions, if the component moves into the danger zone, with 2 parallel allocated sensors
- **EnableSwitch** - Evaluate the status of a release switch with 2 channels
- **SafetyRequest** - Request for the security function of an output and safe status monitoring
- **OutControl** - Combination of the control application with the Safety control to activate a safe output
- **EDM** - Activation of a safe output with monitoring of the output status using two feedback signals
- **DirectionMonitor** - Monitoring the value change of an input signal depending on the direction setting
- **LimitComparator** - Monitoring of the input signal value for an upper and lower limit setting
- **NumericSelector** - Select the operating mode of the system using SafeDINT values
- **RampMonitor** - Monitoring the speed reduction in the event of an emergency stop
- **SkewMonitor** - Monitoring the difference between two input values. The allowable difference can be set through calibration.
Fast and easy access worldwide with

LASAL SERVICE

The All-in-one Engineering Tool contains an extensive service package. To avoid downtimes, remote diagnosis and remote maintenance ensure global access. With LASAL SERVICE, data can be exchanged and software updates loaded safely and comfortably.

Web Server with LRMView

The web server in the control provides information on the Hypertext Transfer Protocol (HTTP). The websites created by the user must be written in HTML and located in a user-defined directory in the control. Using a browser (e.g. Internet Explorer), the website can be viewed. For remote maintenance, data in the PLC can be accessed regardless of where the active visualization is located.

LRMView is add-on software (Java-Applet) for the control system. It offers the possibility to display or control an on-site visualization through a standard web browser (password protection).

VNC Client and Server

With the VNC software, the screen content of a remote computer (server) can be displayed locally (client). VNC servers as well as client functions are supported by SIGMATEK controls. For tablets and smart phones, free VNC client apps are available. The VNC server for SIGMATEK controls have a repeater extension. This is used to create the connection to VNC servers (controls) that are not accessible in the network (located behind a firewall for example). Control with the VNC server and VNC clients from a connection to a repeater which performs data exchange.

- Global remote maintenance
- Global diagnostics
- Simulation and visualization tools
- Evaluation and analysis options for machine statuses
OPC Server

For fast and simple data exchange with Windows applications, an OPC server has a standardized interface. This server supports read and write access to the respective data server. The user therefore has the option, for example, to link process data in a visualization, guidance system or in Excel and create individual analyses without having to worry about proprietary data formats and protocols.

LASAL Remote Manager

The LASAL Remote Manager (LRM) is used for remote maintenance of machines. In addition to a tabular overview of user-defined machines (controls), this tool offers a remote view of the visualization. For data exchange between the PC and control, a control explorer is provided. Additional features: starting and stopping the application, CPU reboot, software updates (application and operating system), setting and reading application data, etc. The connection between the PC (LASAL Remote Manager) and the control can be made over RS232, CAN bus, Ethernet and modem.

LASAL Remote Server API

With the LRS API (Application Programming Interface), any type of remote maintenance or visualization tool can access the world of SIGMATEK controls online. The API is part of a Windows DLL. All communication interfaces such as RS232, CAN bus, Ethernet and Modem are supported.

USB Boot stick

With the Bootdisk Manager integrated into LASAL CLASS, updating the software version of a machine is child’s play: Simply configure the boot stick, insert it into the control or upload it during online maintenance and perform a reboot. Depending on the configuration, the application, visualization, operating system configuration or files can be loaded to the control using the update scripted from the boot stick without having to know the actual program in the machine.

LARS Simulation and Visualization Tool

LASAL Runtime Server (LARS) provides a Windows-based simulation of control programs and visualizations, with which LASAL applications can be run on a limited basis. This can be uses for various applications: developing visualization projects on the PC when the actual destination hardware is not available, or demo applications for presentation purposes. Additionally, values from LASAL applications can be visualized for remote maintenance.
**Integrated Engineering**

With LASAL, all automation tasks are comfortably realized: PLC, visualization, motion control, Safety, diagnosis and remote maintenance. An integrated and simple to operate tool is therefore provided for all phases of the development process: from creating the project over programming to the initial start-up and service of the machine in the field. The programming is extremely simplified and the development and maintenance times are reduced significantly.

**Efficient and Clearly Organized**

The object oriented programming with graphic representation allows the highest modularity, reusability and a clear software structure.

**Comfortable: Several Integrated Tools**

The rapid development and comprehensive analysis of programs are supported through an extensive collection of tools such as:

- Online debugger with all the functions that one expects from an integrated engineering environment
- Real-time data analyzer and real-time trend recording
- Time response analysis of the real-time multitasking operating system (PlcTraceView)
- Project comparison

**LASAL Reflects your machine**