

1.1 Saia PG5® Controls Suite: Engineering & programming

1.1.1 Saia PG5® Core – everything you need at all times

The Saia PG5® Core is central key element of Saia PG5® Controls Suite. It is used to create Saia PCD® projects. The Saia PG5® Core is included in every software package and it is identical throughout.

1.1.1.1 Saia PG5® Core | Basic properties

Wide range for large and complex projects



Saia PG5® Project Manager enables users to manage projects with a single set of controls or very large networks.

OEM manufacturers can use it with just one Saia PCD® per machine, just as it can be used for large properties such as tunnels with over a thousand installed Saia PCD® controllers.

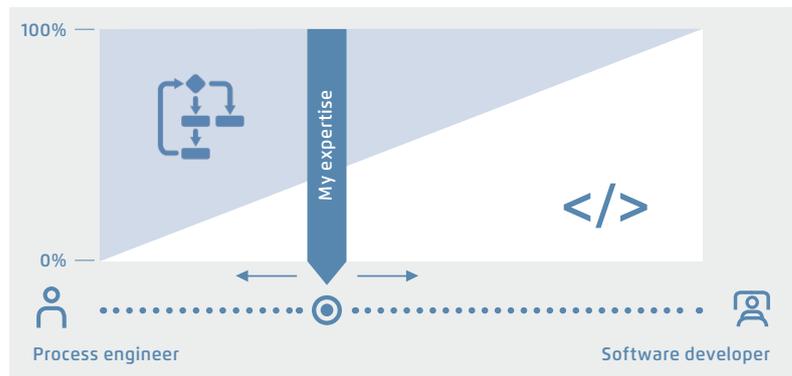
◀ The Saia PG5® Project Manager for individual devices and large control networks.

Software tool with broad user profile – all users can quickly master it

Saia PG5® Core provides to all groups of persons involved in MSR and automation technology suitable functions for performing tasks reliably and well.

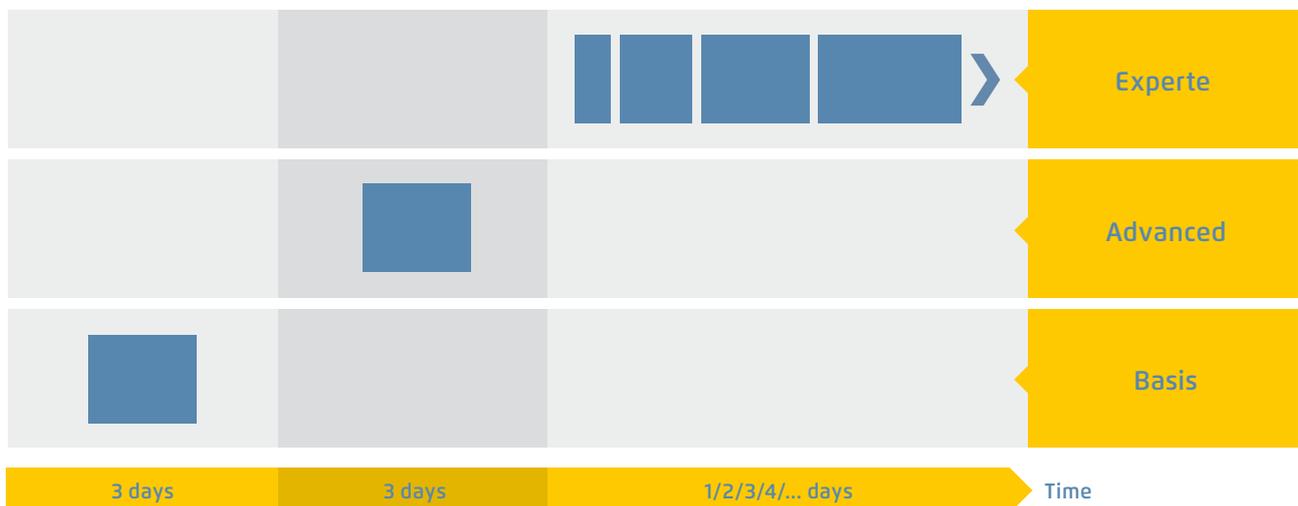
As an application engineering tool, users can also implement the most demanding automation projects using graphic application modules in the Fupla Editor without requiring programming in IL, Graftec or Kopla, etc.

As a development tool, dedicated control and logic functions, communication drivers and IT functions can be programmed in the Instructions List.



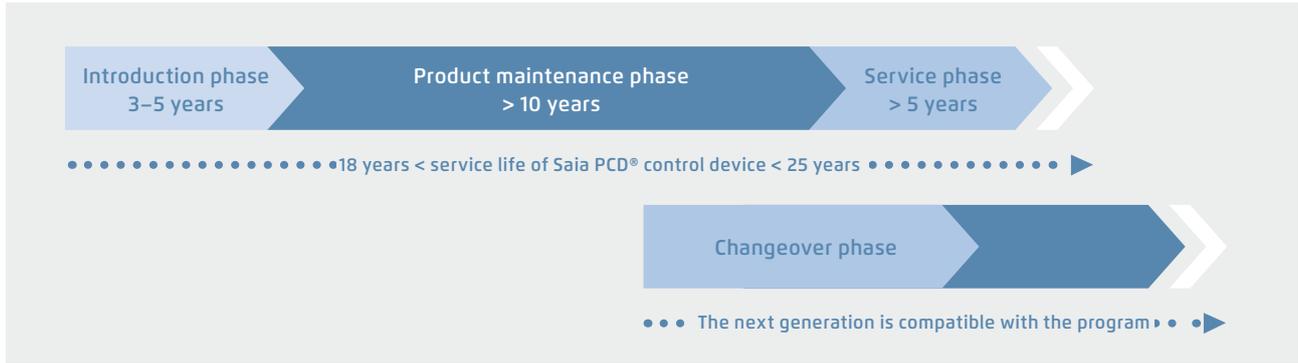
▲ Saia PG5® offers a wide range of solutions, the right product for everyone

The training program by Saia-Burgess Controls AG



▲ The time required to achieve solution competence

A standardised software – for all device types – now and in the future

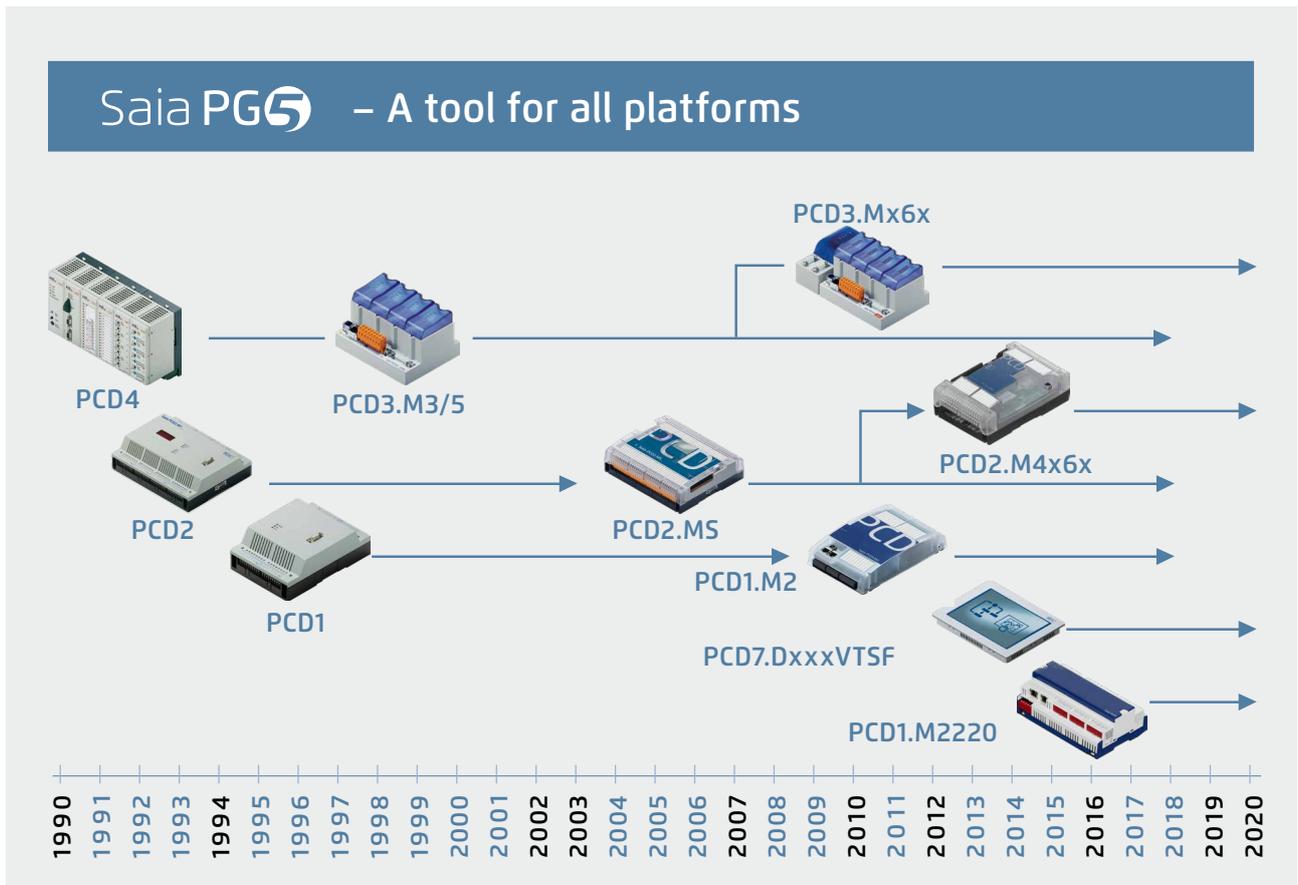


▲ Service life planning of Saia PCD® control devices. Enables maximum profitability of your investment in expertise and systems. Long service life without expensive reinvestment and no high service costs.

The control electronics should have the same service life as the systems technology. It must be possible to adapt and expand at any point in this cycle.

The compatibility and free portability of systems/machine software is guaranteed for 18–25 years across the entire

product generation. This can only be achieved if we develop all the engineering software ourselves and systematically use "interpreted program code". This requires more hardware resources, but enables the portability of user software across multiple generations of controllers.



▲ Old application programs can be used with new Saia PCD® controllers and further edited with Saia PG5® Core

1 SBC software

2 Communication & Interaction

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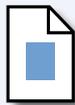
Licence policy for maximum security, flexibility and independence



- ▶ In principle, any company can acquire the licence for Saia PG5®. There are no market-related exclusions as is the case with other providers. The only requirement is the ability to implement the products professionally.
- ▶ With the acquisition of a Saia PG5® licence, a company can register any number of its employees as users. There are no costs per place or per user. However, a company must at least have verifiably one qualified Saia PG5® programmer. The qualification can be obtained via training by SBC.
- ▶ There is a special end user licence for operators of Saia PCD® automation systems. This includes all SBC software tools and SBC application libraries which an external service provider or OEM has used in a system/property to create an automation system. The end user licence only applies to the Saia PCD® devices installed by the operator and cannot be used to develop automation solutions for third parties.

◀ This certification as Saia PCD® system integrator demonstrates that a company can verifiably implement automation solutions in a reliable and professional manner with Saia PCD®. We recommend that operators, investors and planners consider certification when selecting service providers.

USER · KEY
KEY-Datei
1KB



Licence as a "user key"

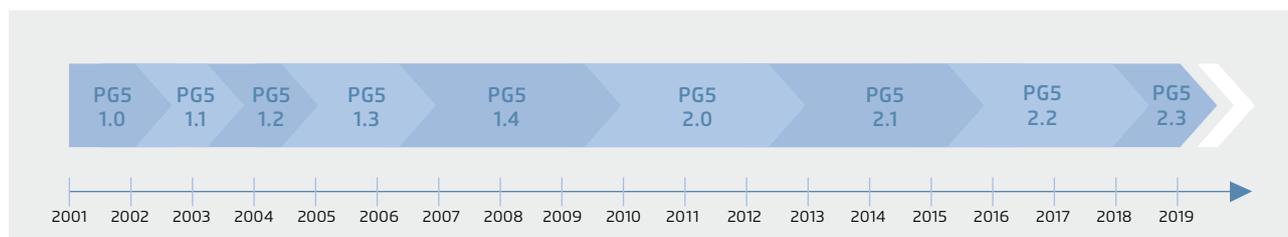
Licensing procedure

The Saia PG5® licence mechanism offers more flexibility and simplicity when installing licence expansions. The licence is distributed as a "user key" file which defines the user's permission for the software applications. A licence expansion can be quickly assigned by sending the customer an e-mail with a "user key" file or a *password*.

SBC can create customer-specific user keys using the licence manager. The keys can be tailored to any requests. It is possible to define editors or libraries which the customer is authorised to use. The scope, number and size of the projects are irrelevant here.

Software maintenance

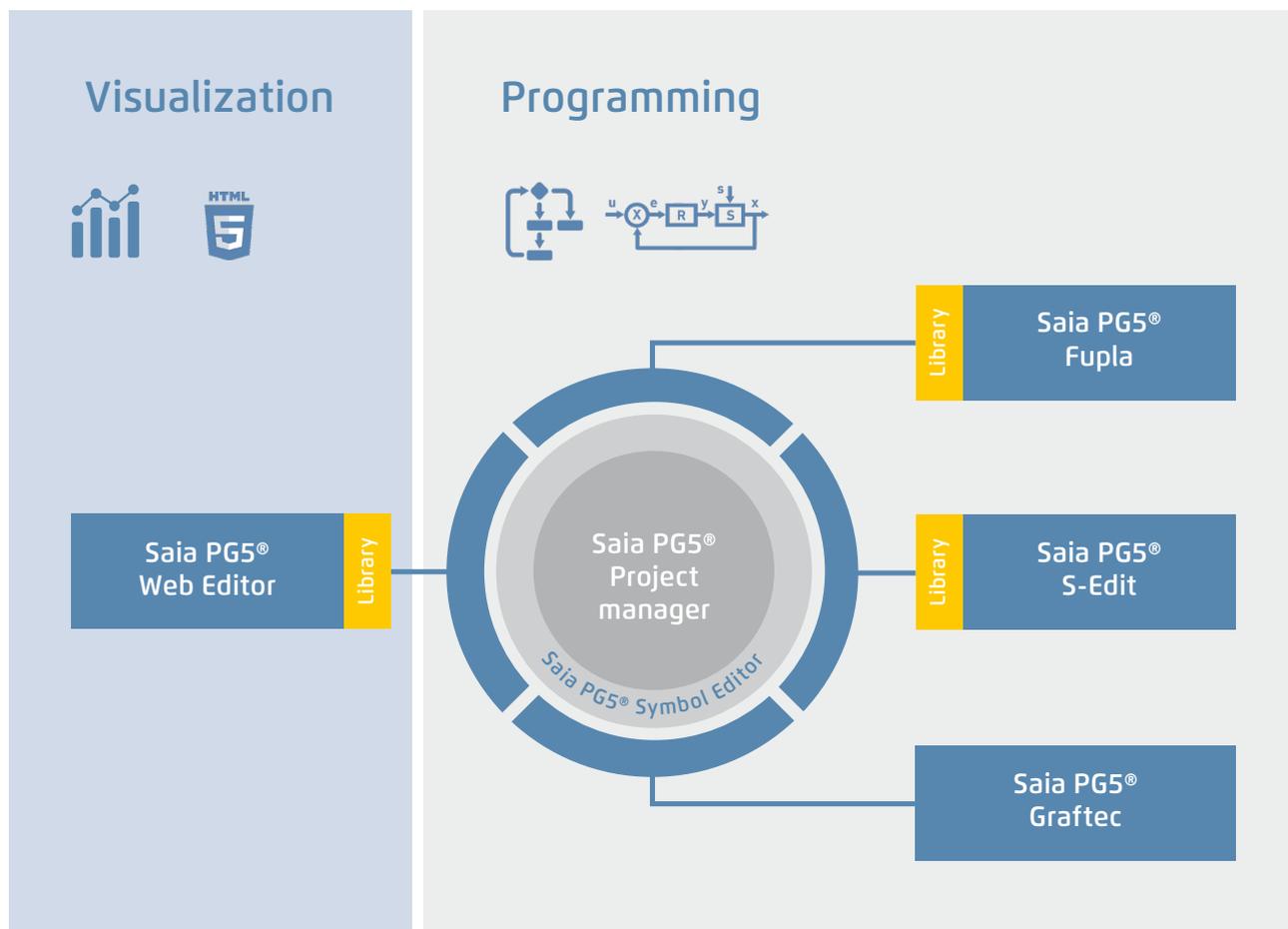
We are continually advancing our software in logical and easy-to-manage innovation steps. The following diagram shows the major version changes over the past 15 years. Patches are used to manage identified errors. Version changes are not required. New functions are first tested in beta versions before the sum of all the new functions is made official in a major new version. A moderate fee is charged for major version steps with substantial additional functions. This happens every 2 to 3 years.



▲ Milestones in software development and maintenance

1.1.1.2 Saia PG5® Core | Components

The following pages illustrate Saia PG5® Core and explain the components individually in detail.



Saia PG5® Core in a nutshell

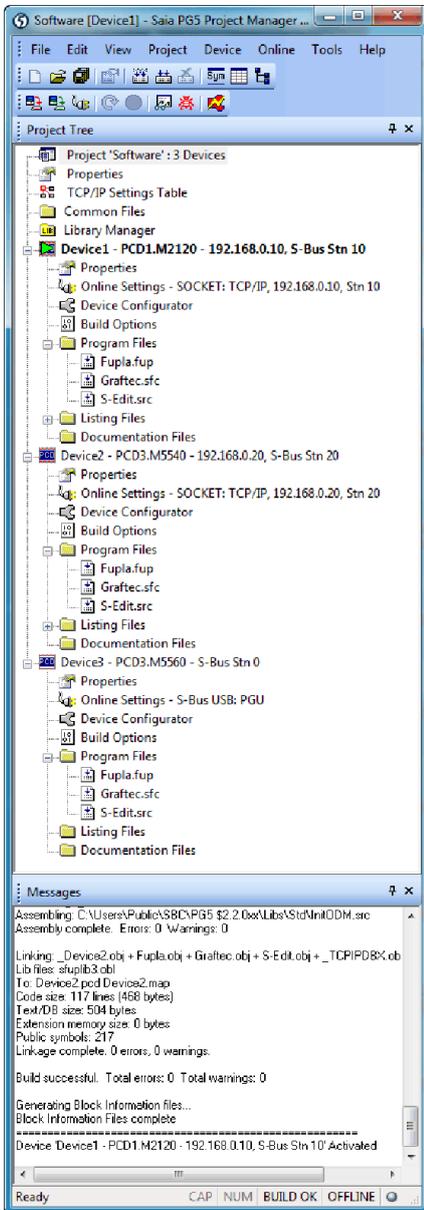
Saia PG5® Core contains the following components

- ▶ Project Manager (manages complex installations of networked Saia PCD® controllers including documentation)
- ▶ Network Configurator (integrated network editors for the configuration of devices and communications networks)
- ▶ Device Configurator (configuration of hardware parameters on the controller)
- ▶ Symbol Editor (manages all local, global and network symbols and symbol groups. Thanks to the automatic allocation, no fixed addressing is needed)
- ▶ Programming methods (integrated programming environments: Fupla [function block diagram], S-Edit [instruction list IL] and Graftec [flowchart])
- ▶ Libs (standard libraries which quickly and easily enable all the core functions of the MSR/automation technology)
- ▶ Web Editor (for WebSCADA functions in each controller)

Saia PG5® Project Manager

The configurations and applications are created, changed and managed in Saia PG5® Project Manager. Saia PG5® Project Manager is pivotal for all tasks with Saia PCD® controllers.

The following window appears on the left edge of the screen as soon as Saia PG5® Project Manager is opened. With desktop docking, there is still enough space on the right of the screen for additional windows.



Window of Saia PG5® Project Manager

Project Tree

The layout and structure largely correspond to Windows Explorer. The "Project Tree" window allows direct access to all Saia PCD's used in the project and their relevant settings, program files and documents. Program organisation by files (containing one or more program blocks) simplifies the shared use of program files in multiple Saia PCD's.

The "Program Files" folder can consist of different data types. Therefore, it is possible to save all types of programming in one folder.

Messages and Error List

Error and status messages are displayed in this window along with the assembly protocol. Errors in the program code are listed here after assembly, and can be located directly by clicking.

Network Configuration

Network configuration is used for the configuration of devices and communications networks. **There are three different basic configurations:**

1. Ethernet RIO Network Configurator

▶ Smart RIO – PCD3.T665 and PCD3.T666.

2. BACnet Network Configurator

▶ BACnet Configuration Files (*.bnt)

3. S-Net Network Configurator

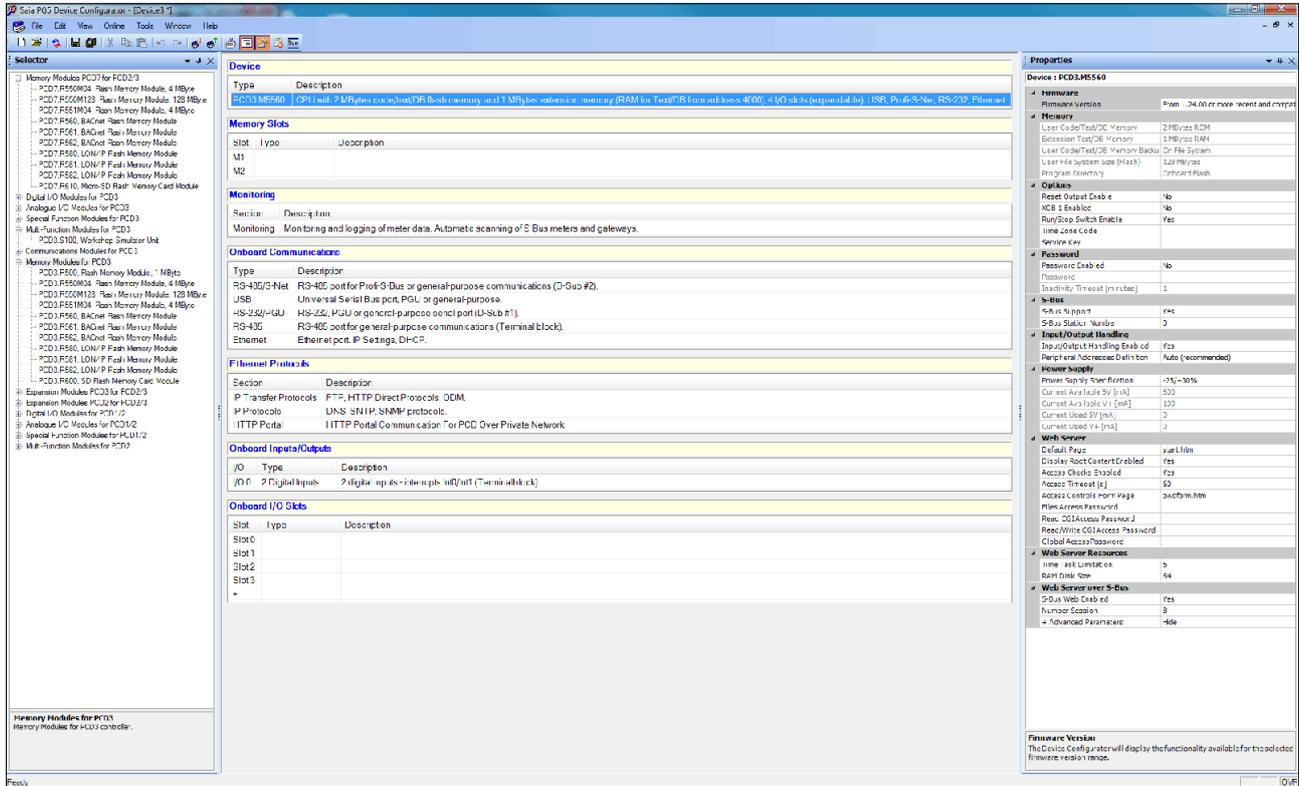
▶ Profibus DP Network File (*.dp)

▶ Profi S-IO Network File (*.sio)

▶ LONNetwork File (*.lon)

Device Configurator

The hardware and physical functions of the controller are defined in the Device Configurator; e.g. device type, memory modules, communication channels, associated modules and I/Os. The I/O configuration, parameterisation and designation, as well as the configuration of the Ethernet protocols, e.g. DNS, DHCP, etc. takes place here. The Device Configurator also controls the use of input/output modules in the internal power supply of PCDs and prints the labels which are placed on the I/O modules.

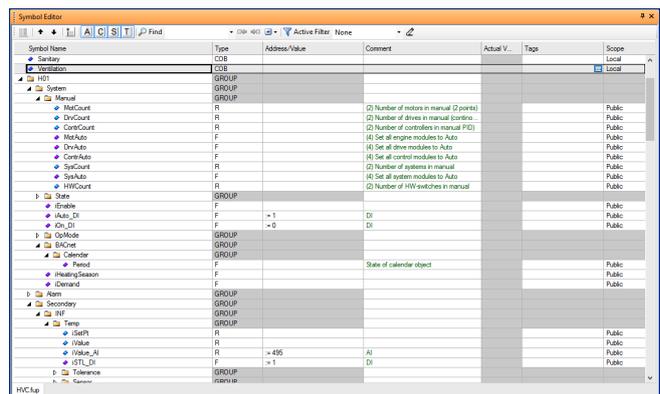


All parameters and modules can be viewed at a glance and printed out as system documentation in the Device Configurator

Symbol Editor

The Symbol Editor is the heart of Saia PG5® Core. It defines and documents all the symbols used by the program. The various editors are connected with the Symbol Editor. New symbols used in the program code are incorporated directly by the Symbol Editor.

- ▶ The import/export function allows the reuse of pre-defined I/O lists in electrical diagrams and visualisation tools.
- ▶ Symbols can be grouped together. All the symbols required for a function form one group. This makes it easier to use functions and recognise symbols in the program code, and also gives a clearer overview in the Symbol Editor.



Overview of all symbols used in the Symbol Editor

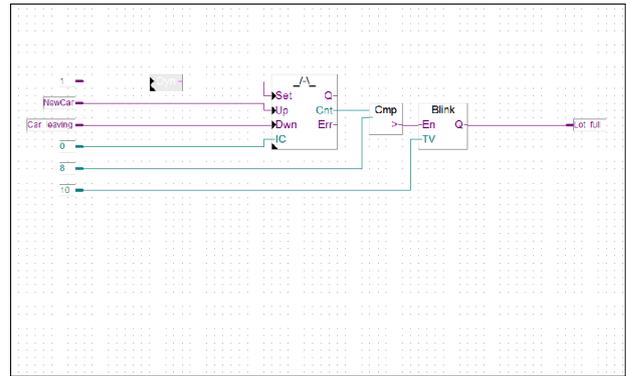
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Programming methods in the Saia PG5® Core

Saia PG5® Fupla (function block diagram)

Fupla is the SBC proprietary function block diagram editor. It differs in many respects from other graphic programming interfaces:

- ▶ One Fupla file may contain several program blocks. This means that one file can encompass an entire machine function. In symbolic programming, each program block is given an individual symbol name. This prevents collisions during the build.
- ▶ Fupla blocks are organised into pages. Each page can produce several outputs so that entire functions can be viewed at a glance on one page.
- ▶ Graphic functions (FBoxes) not only have inputs and outputs, but also parameter windows for configuration and online modification.



Saia PG5® Fupla (function block diagram)

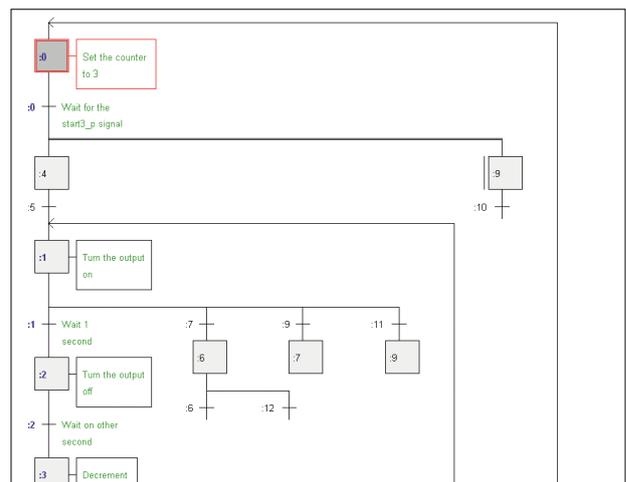
Comment:

The Kopla Editor (contact plan) is an integral part of Saia PG5® Fupla Editor. Unlike conventional graphic programming environments, FBoxes and contact plan elements can be combined in a single graphic.

Saia PG5® Graftec (sequential function chart)

Graftec (sequential function chart) is particularly suited to sequential processes. Sequential blocks are a fixed component of the PCD firmware and are processed by it efficiently.

- ▶ Steps and transitions can be programmed in IL and graphically in Fupla.
- ▶ To also ensure a good overview with extensive sequential processes, division into sub-pages is possible.
- ▶ In online mode, the active transition is permanently displayed.
- ▶ Option to process the code step-by-step in step mode.

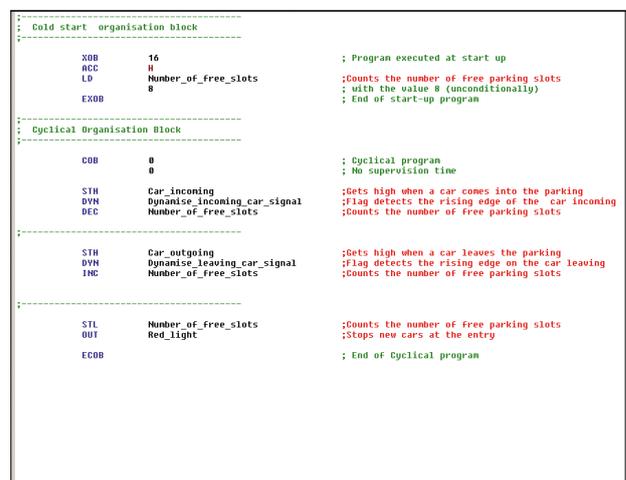


Saia PG5® Graftec (sequential function chart)

Saia PG5® S-Edit (instruction list IL)

The editor for the strong instruction set of Saia PCD®. S-Edit combines an editor and online debugger in one interface.

- ▶ The colour syntax function detects valid instructions and applies a colour to them. The program code is thus much easier to read and typographic errors are detected immediately.
- ▶ The "Bookmarks", "Goto Line", "Find and Replace" editor functions make it easier to navigate through extensive programs.
- ▶ The code built can be displayed directly in the original code. The function is also used by the integrated debugger.
- ▶ Complete functions can be copied from a library using drag & drop.



Saia PG5® S-Edit (instruction list IL)

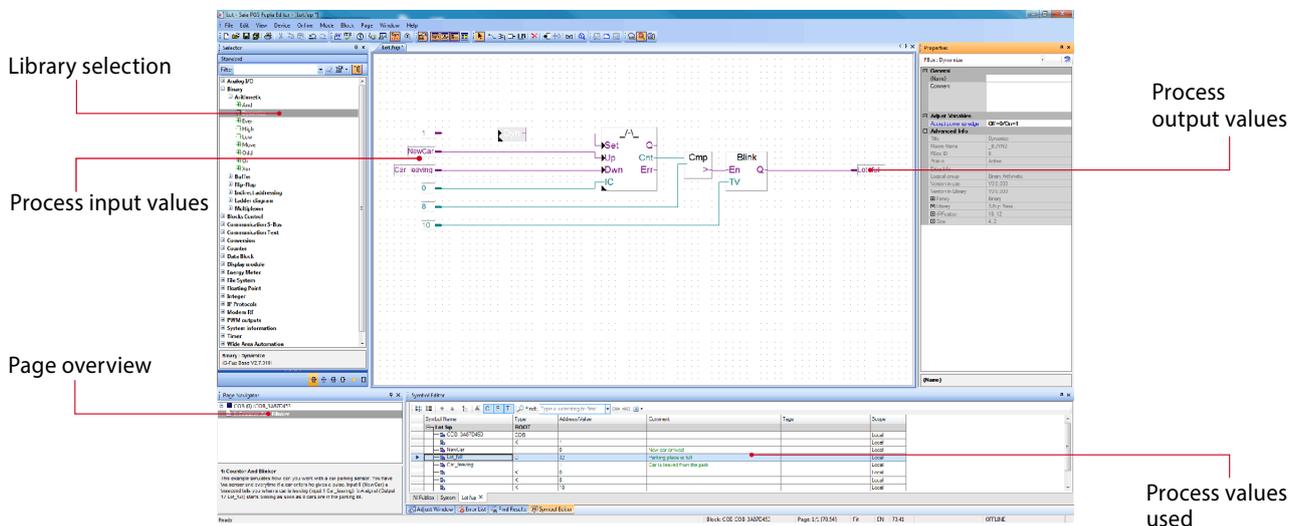
Saia PG5® Fupla

The Saia PG5® Fupla Editor is the quickest and most reliable method of implementing applications. This editor can also be easily used by those with no software programming experience. It is the right tool for optimising and modifying systems. All complex functions have been implemented by specialists in Saia PG5® S-Edit or Saia PG5® Graftec and packaged into graphic function blocks (FBoxes).

"Ready and simple to use" also by service technicians and process engineers. >95% of all applications can be implemented in the automation infrastructure through engineering using Saia PG5® Fupla alone. No line of code is written here.

Benefits of using the Fupla Editor

- ▶ Programming is facilitated with pre-programmed function blocks (FBoxes) for all standard functions
- ▶ Creation of complex user programs by simply positioning and linking FBoxes without requiring extensive programming knowledge.
- ▶ Extensive and high-performance FBox families for communication and building automation tasks
- ▶ Detailed context-sensitive FBox information, clear parameter descriptions and graphic presentation in the function block diagram editor (Fupla) make user programs easy to read and understand
- ▶ Online display of process values and parameter adjustment makes commissioning considerably easier and saves maintenance costs



Structure of the Fupla Editor

Features of the libraries

- ▶ The clearly arranged tree structure simplifies FBox selection.
- ▶ Parameters are conveniently entered via adjust windows in the Fupla editor, without losing the program overview
- ▶ Obvious differentiation between data types by using different colours

Each data type is identified by a colour. This makes programs easier to read.

- Binary data
- Integer data
- Floating point data
- Texts (TX) and data blocks (DB)

Purple
Blue
Yellow
Green

Fp	Int
TX	DB

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Clear grouping into families

All FBoxes (function boxes) are grouped into families. This provides a better overview and makes it easier to find individual FBoxes. A distinction is also made between standard, application and user FBox:

-  Standard: Shows the FBox libraries of the basic application components
-  Application: Shows the FBox libraries of the engineering application components
-  User: Only shows the FBox libraries which the user himself has created
-  All: Shows all available FBox libraries
-  Favourites: On this page the user can group together the most frequently used FBoxes (from all libraries). This means that it is no longer necessary to search for FBoxes or to switch between library tabs.

FBoxes in the Saia PG5® Core

The standard and application FBoxes are readily available for users in the Saia PG5® Core.

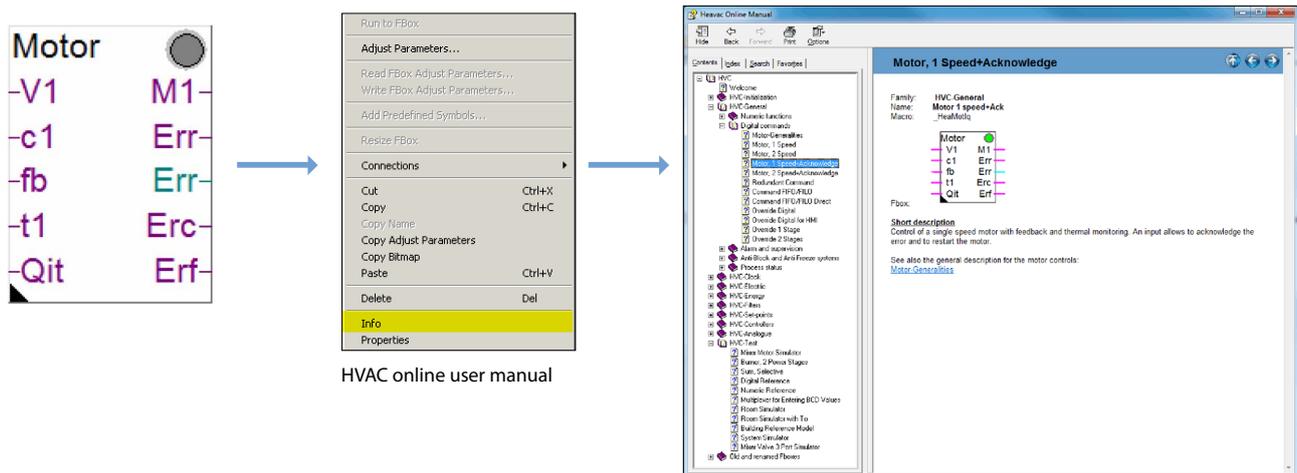
The standard FBox libraries are basic families which offer normal logical and arithmetic operations and numerous useful system functions.

In addition to the standard FBoxes, the Saia PG5® Core contains additional FBoxes. These include application FBox libraries which comprise engineering families.

The search function (Filter) in the Selector enables a specific FBox to be found quickly.

So that Engineering can access the correct FBoxes, their function and parameters must be known. The online user manual integrated into the PG5 Core is the ideal way to get a quick overview of the relevant FBoxes.

Clicking on the FBox makes information such as a brief description of the FBox, an explanation of inputs and outputs, information on the parameter settings and a function description of the FBox accessible to all.



Web Editor – a powerful software tool

The production of web-based visualisation and control interfaces is an essential element of the engineering effort. Appealing, functionally designed web pages are the public face of the system, supporting operational efficiency and safety. A powerful tool for generating the web pages is therefore crucial.

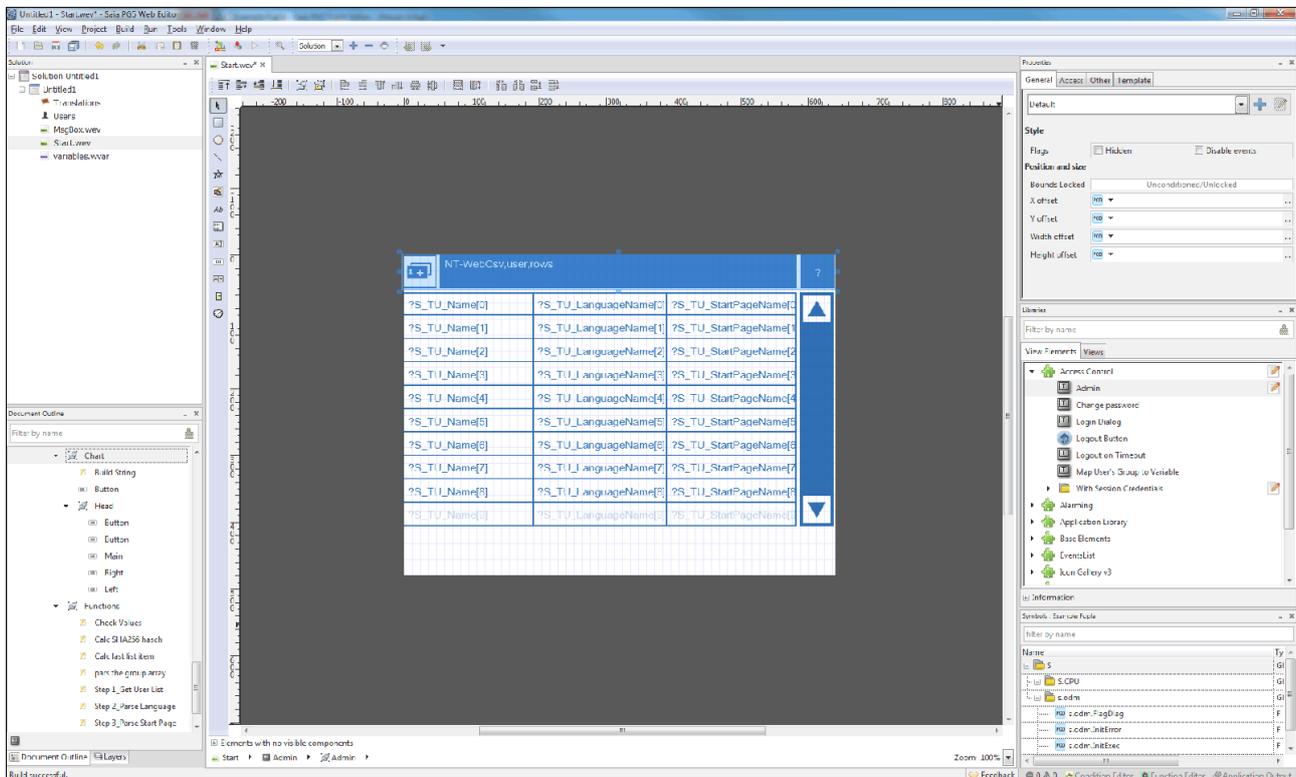


Start screen for Saia PG5® Web Editor 8

Saia PG5® Web Editor: simple, intuitive and efficient

Designing dynamic web pages with a normal HTML editor is laborious and requires specific expertise (in-depth HTML and Java programming knowledge). With the Saia PG5® Web Editor, SBC provides the user with an easy-to-use software tool for generating web pages to ensure that this innovative technology does not remain the preserve of a small number of specialists. The Web Editor is used to create web pages in HTML5 or in TEQ-format simply and efficiently by placing and parameterising objects. Operation of the editor is intuitive, and requires no HTML or Java programming knowledge. With optimum integration into the Saia PG5® Controls Suite and the associated direct access to all symbols, powerful macro management to generate your own reusable macros and many other useful functions for efficient generation of web pages, the engineering costs are significantly reduced compared to other editors.

The tool is designed for the automation environment. Applications include system visualisations, alarming and trending functions, or just one service page. The full integration into the Saia PG5® Core combined with Saia PCD® controllers guarantees a particularly efficient working method.



The Saia PG5® Web Editor produces appealing web visualisations with no web designer skills required.

The Web Editor includes a transparent and adjustable workspace for efficient operation. The workspace essentially comprises the menu/command bar, the View Editor (drawing area) and windows. With docking window technology, the user can position and show/hide the windows as required.