# PG5: Programming tool for Saia PCD® controllers

Programming, project planning and configuration of PLC-based systems.
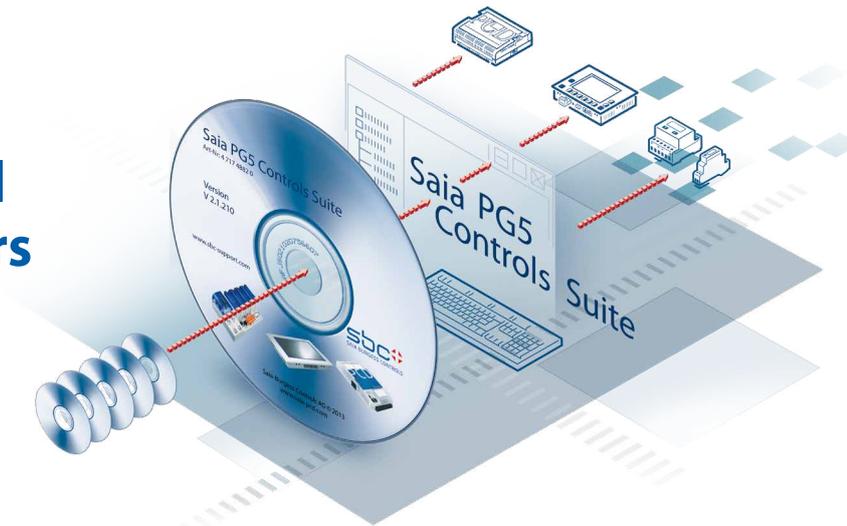
Advantages of the PG5 programming tools

▶ Program portability : PG5 programs can run on all Saia PCD® platforms.

▶ Program organization by files (containing several program blocks) simplifies the shared use of program files between several Saia PCD® controllers.

▶ Programming and debugging environments united in each program editor.

▶ Simple programming of terminal displays with the HMI Editor.

▶ Powerful instruction set supported by macros and assembler directives.

▶ Accepts existing PG3 and PG4 programs.

Features of the PG5

▶ Symbol Manager administers all local, global and network symbols or symbol groups.
Automatic address allocation largely dispenses with the need for fixed addressing.

▶ Project Manager administers complex installations of networked PCDs, including displays and documentation.

▶ Online functions for commissioning and error detection via Ethernet-TCP/IP, SBC S-Bus, modem, etc.

▶ Integrated programming environments :
– FUPLA (function block diagram)
– S-Edit (instruction list IL)
– GRAFTEC (sequential function chart)

▶ Integrated network editors for SBC S-Bus, SBC S-Net, Profibus DP and FMS, LonWorks®.

▶ Extensive additional libraries broaden the scope of PG5 functions.

Visualizes the entire project

Project Manager

The Project Manager and its Project Tree window provide
a complete overview of a project, including complex PCD
networks.

Project-Tree

This is similar to Windows Explorer in both appearance
and operation. The Project Tree window allows direct access
to all PCDs used in the project, their settings and the program
files and documents that go with them.

Program organization by files (containing one or more
program blocks) simplifies the shared use of program files
between several PCDs. Parts of the program that are used in
common are located in a Common Files folder. Changes in one
PCD are immediately effective in all associated PCDs
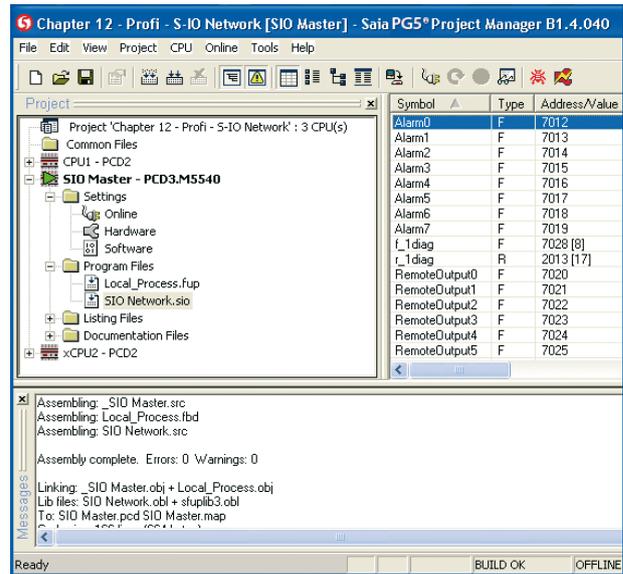
Tool-Bar

All essential operations are directly
accessible at all times using the key-
board or a mouse-click.

View Window

Displays program data and text files, with filters, searching and
cross-reference capabilities.

Provides an overview of program blocks used, resources
assigned and the structure of the program.
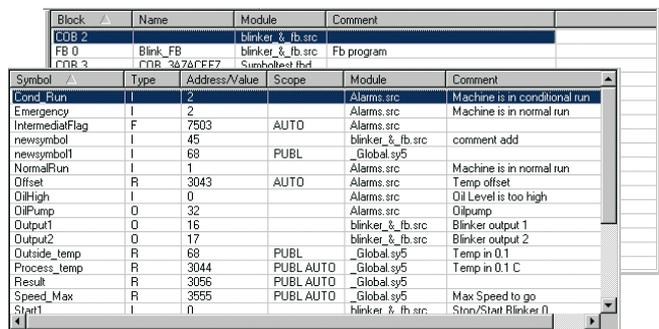
Cross-Reference

The cross-reference list indicates where a block or element
has been used in the program code.

Message Window

Displays the build log, error and status messages. Errors in
the program code are listed here after the build, and can be
located directly with a mouse-click.

# Transparenz in sämtlichen Programmen durch das ausgereifte Symbol-Management

Symbol-Editor

The symbol editor is the heart of the PG5. It defines and documents all symbols used by the program.

▶ Shortcuts and intelligent indexed addressing simplify the entry of symbols.

▶ The program editors share the same symbol editor. New symbols entered in the program code are added to or read from the symbol editor.

▶ The Import/Export function allows the reuse of pre-defined I/O lists in electrical diagrams and process visualization tools.

▶ Auto-allocation largely dispenses with the need for fixed addressing.

▶ Symbol names be up to 80 characters long.

▶ Symbols can be grouped by their function. This makes it easier to use and recognise symbols in the program, and also gives a clearer overview in the symbol editor.

Cross-Reference

The cross-reference list tool shows where a symbol has been declared, where it has been used in the program code and whether it is read or written by the program.
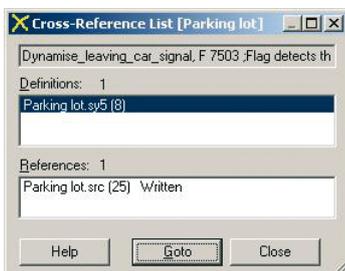
Debugging

Each editor has a built-in debugger. These have the familiar functions, such as step-by-step, breakpoints and the online editing of data and instructions. The IL Editor has a «Synchronous Data View», which continuously displays the contents of the ACCU, status flags, index register and data, synchronized with the real-time execution of the program. There is also a stand-alone IL debugger (S-Bug).
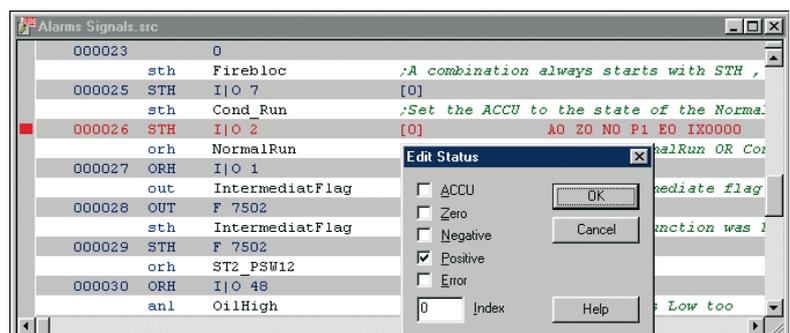
A choice of program editors

PG5 has three different programming methods:

– S-Edit (instruction list)
– GRAFTEC (sequential function chart)
– FUPLA (function block diagram)

S-Edit (instruction list)

The editor for the Saia PCD®'s powerful instruction set.
S-Edit combines an editor with an online debugger
in a single application.

▶ The «syntax colouring» feature recognizes valid key-
   words and colours them accordingly.
   This makes the program code easier to read and typing
   errors are noticed immediately.

▶ User-defined macros and powerful assembler directives
   increase flexibility. For example, different versions of a
   program may be assembled to run on several different
   machines, from the same source code.

▶ Editor functions as «Bookmarks», «Goto Line» and
   «Find and Replace« ease navigation and editing of large
   programs.

▶ «Code View» mode shows the generated instructions
   and the original source code. This feature is also used by
   the integrated debugger.
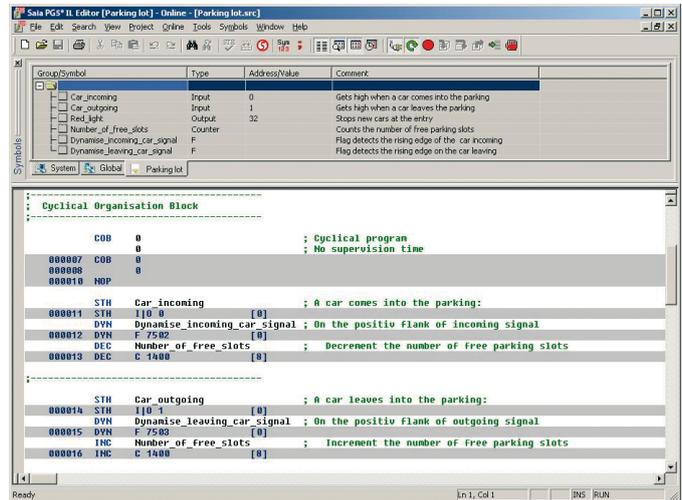
GRAFTEC

GRAFTEC (sequential function chart) is particularly
suitable for sequential processes. The PCD executes
GRAFTEC structure instructions directly, and optimises
processing time.

▶ Steps and transitions can be programmed either in
   Instruction List or graphically with the FUPLA editor.

▶ Sub-pages can be used to guarantee a good overview
   of even the largest sequential operations.

▶ In online mode, the active transitions are continuously
   highlighted.
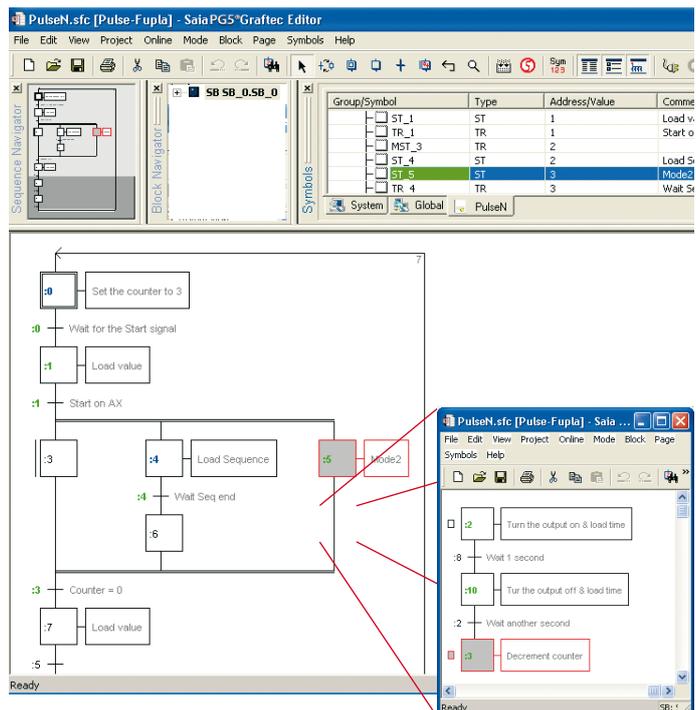
250 grafische Funktionen im Grundpaket enthalten

FUPLA

FUPLA is SBC's own function block diagram editor. It differs in many respects from FBD editors:

▶ One FUPLA file can contain several program blocks. This means that one file can encompass an entire machine function. Each program block has its own symbol name, to avoid duplication.

▶ FUPLA blocks are organized into pages. Each page can produce several outputs. Unlike conventional editors, this allows more functionality to be visible at a glance on a single page.

▶ The graphical function boxes (FBoxes) have inputs and outputs, and can also have configurable properties using parameter windows which can also be modified online.
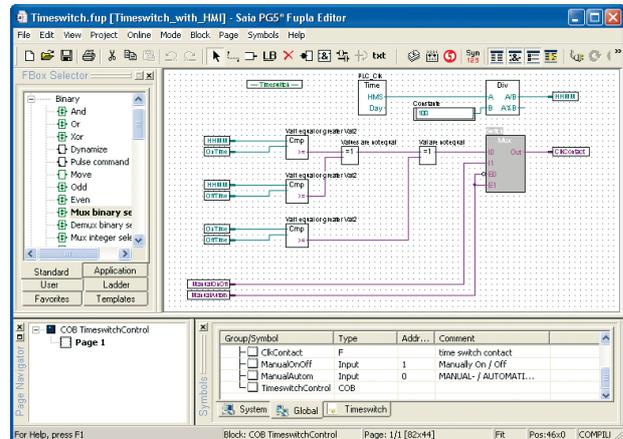
Standard FBoxes

Around 250 FBoxes are already provided in the basic PG5 package. The range of functions goes far beyond the normal binary and arithmetic functions.

For details see Technical Information 26/367.

Standard FBoxes are classified in families, as in the following summary:

Data Communications

This family of FBoxes allows resources to be read and written via a SBC S-NET network (Ether-SBus, Profi-Bus, serial). Communication does not always have to be cyclical, but can if necessary be program-controlled. Other functions can be used, for example, to synchronize all real-time clocks in a network.

Text Communications

Enables the simple reception and transmission of text via one of the serial ports.

Data Blocks

These simplify the saving of data in data blocks. A data logger FBox is also provided.

Controls

Every PCD has built-in PID control. The PID FBox has parameters which can be modified online.

Special

These allow the PCD's special functions to be used in FUPLA programs. For example:
– Read battery status
– Process hardware interrupt
– Read and write Flash EPROM registers

Time related

The conventional time function elements, plus:
– FBoxes for cycle time measurement
– Read and write the real-time clock
– A chronometer

Buffers

FIFO and LIFO buffers for binary, floating-point and integer data.

System information

Allows system information to be used in the FUPLA program so that, for example:
– The system counter can be read
– The SBC S-Bus station number can be read and modified
– The PCD type and firmware version can be read in the program. This makes it possible, for example, to monitor whether a program is actually running in the planned environment

Menu-driven network creation – remote programming and remote diagnosis are built in

Network configuration

Networks such as SBC S-NET, Profibus DP and FMS or LonWorks® can be constructed on the screen with menu prompting.

▶ Standard Saia PCD®s and Remote I/O devices appear in the device list and can be inserted in the network using drag-and-drop. Non-SBC products can also be imported into the network.

▶ CPUs listed in the Project Manager are recognized by the network editor.

▶ Named data exchanged between stations is shown by the symbol editor, and can therefore be easily used in different programs.
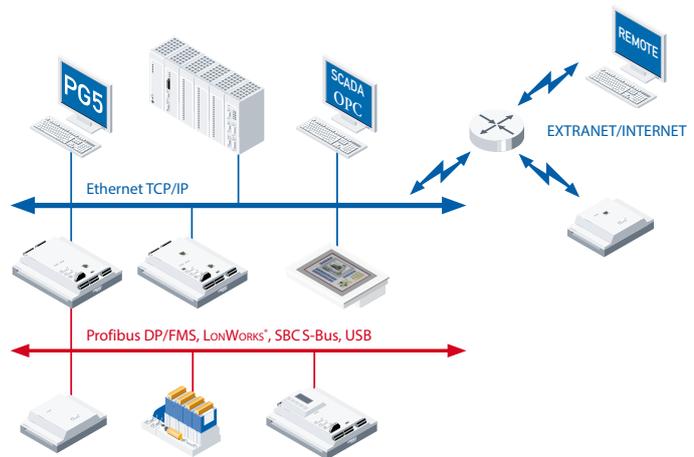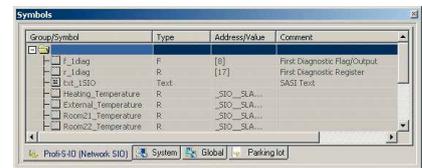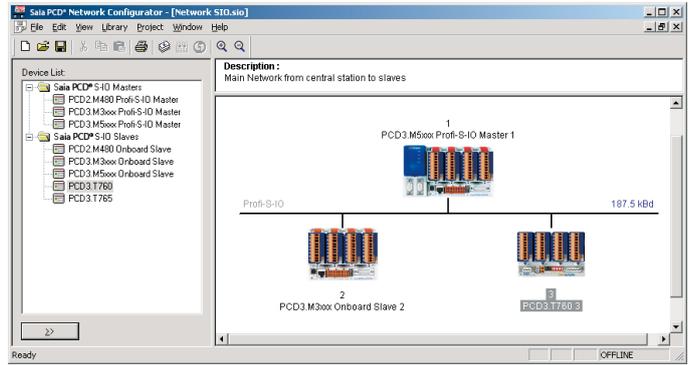
Teleservice

▶ Project planning, programming and diagnostics with PG5 via Modem (analogue, digital, GMS) thanks to the telservice functions which are part of the operating system.

▶ The gateway functions allow a continous acces via modem to the local networks (Ether-S-Bus, Profi-S-Bus, serial).

▶ Functions such as call-back and password protection increase the security of these tools.
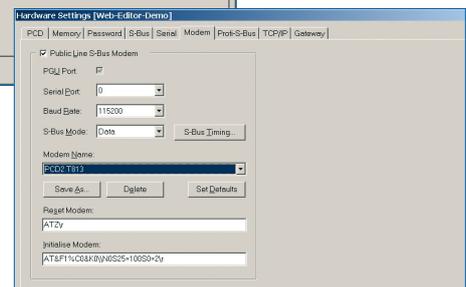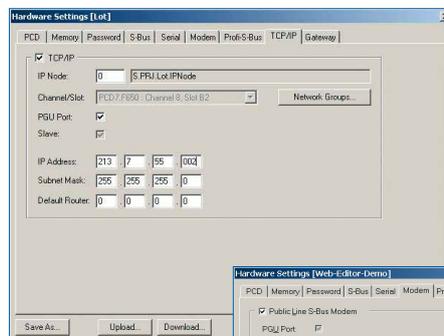
Useful programming refinements
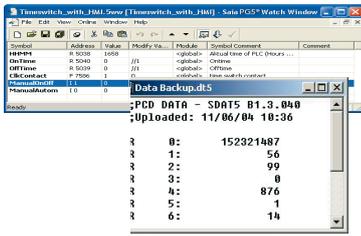
Online-Tools

Apart from the integrated debugger in all editors, the PG5 also provides additional practical tools that simplify commissioning for the user:

Watch Window

Continuously displays the values of selected online data, such as input/output states or the contents of variables. Data values can also be modified.

Data Transfer Tool

Saves and restores program data. The state of an installation can be saved and restored at any time. Also useful for «recipes».

Download Changed Blocks

Before downloading, a list of changed blocks is produced. The user can optionally only download the blocks which have been changed since the last download.
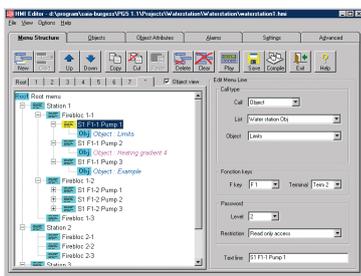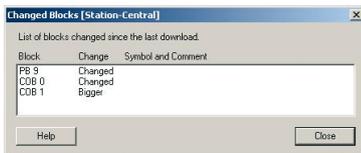
HMI-Editor

An editor for programming terminal displays. The «Human-Machine Interface» editor quickly creates user-programs for the fast navigation, display and optional editing of text and data on a terminal.

For details see Technical Information P+P26/430.

OPC-Server

An OPC server for PG5 communications is available.

For details see Technical Information P+P26/357.

Function libraries for special applications

Extensive libraries of interactive program blocks are available for all intelligent PCD modules, and also for industry and building automation. For further information please read the technical documentation on the relevant hardware modules and refer to Technical Information leaflets: «Building automation» and «Telecommunication».
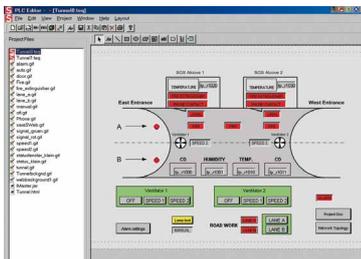
Web-Editor

SBC Web-Panels – economical Touch Screen Panels with Web Browser.

Combined with the SBC Web-Server and the SBC S-Web-Editor the SBC Web-Panels form an economical system for operation, monitoring and simple visualisation tasks. Various types of SBC Web-Panels with different display sizes are available.

FBox-Builder

The SBC FBox-Builder allows you to create your own FBoxes for FUPLA programming. The FBox-Builder greatly improves the FBox development process. You can build your FBoxes based on existing code like FB/PB/FBox or you can begin a new FBox from scratch.

The FBox-Builder supports you also in the deployment process of your FBox Library, functionalities like Language Management, Help File Generator, Install Library Package or Version Management at each level.

Library, family and FBox are the main strong points of this software tool.

Tecnical data

Operating system	from Windows 2000 SP4 from Windows XP
IBM-compatible PC	Pentium 500 or better; 64 MB RAM or more; 80 MB free harddisk; CD-ROM drive
PCD instruction set	all 150 PCD instructions are supported
Standard FBoxes	the PG5 has over 250 FBoxes
Modem	basic modem configuration and communication are implemented in the PG5. Libraries with more extensive modem functions, such as SMS and Pagers are also available
Programming languages	instruction list (IL), FUPLA (FBD) and GRAFTEC (SFC)
CPU's supported	all Saia PCD® CPU models are supported (excluding the xx7 series)
Compatibility	PG3 and PG4 programs can still be used with PG5
Communication	TCP/IP-, SBC S-Bus-, Profibus DP-, Profibus FMS- and LonWorks® communication are present in PG5

Orderinginformation

Type	Description
PG5 – Demo	**PG5 – Demo version with all functionalities** Runtime limited to 90 days
PG5 – Core Pakage	**Saia PG5® Core Package** Programming software with editors (IL, Fupla, Graftec), network configurators, standard libraries (Analog, Communication, Arithmetic & Logic), application libraries (Alarming, Blinds-Lighting, E-Mail, Trending [HDLog], Energy Meter, DALI, Modbus, EIB, EnOcean, JCI N2-Bus), Web Editor and FBox Builder (basic version)
PG5 – HVAC Pakage	**Saia PG5® HVAC Package** Same as Saia PG5® Core Package and associated libraries (HVAC, Belimo MP-Bus, LonWorks, Room controllers and Modem), BACnet
PG5 – Extended Pakage	**Saia PG5® Extended Package** Same as Saia PG5® HVAC Package and associated DDC Suite library