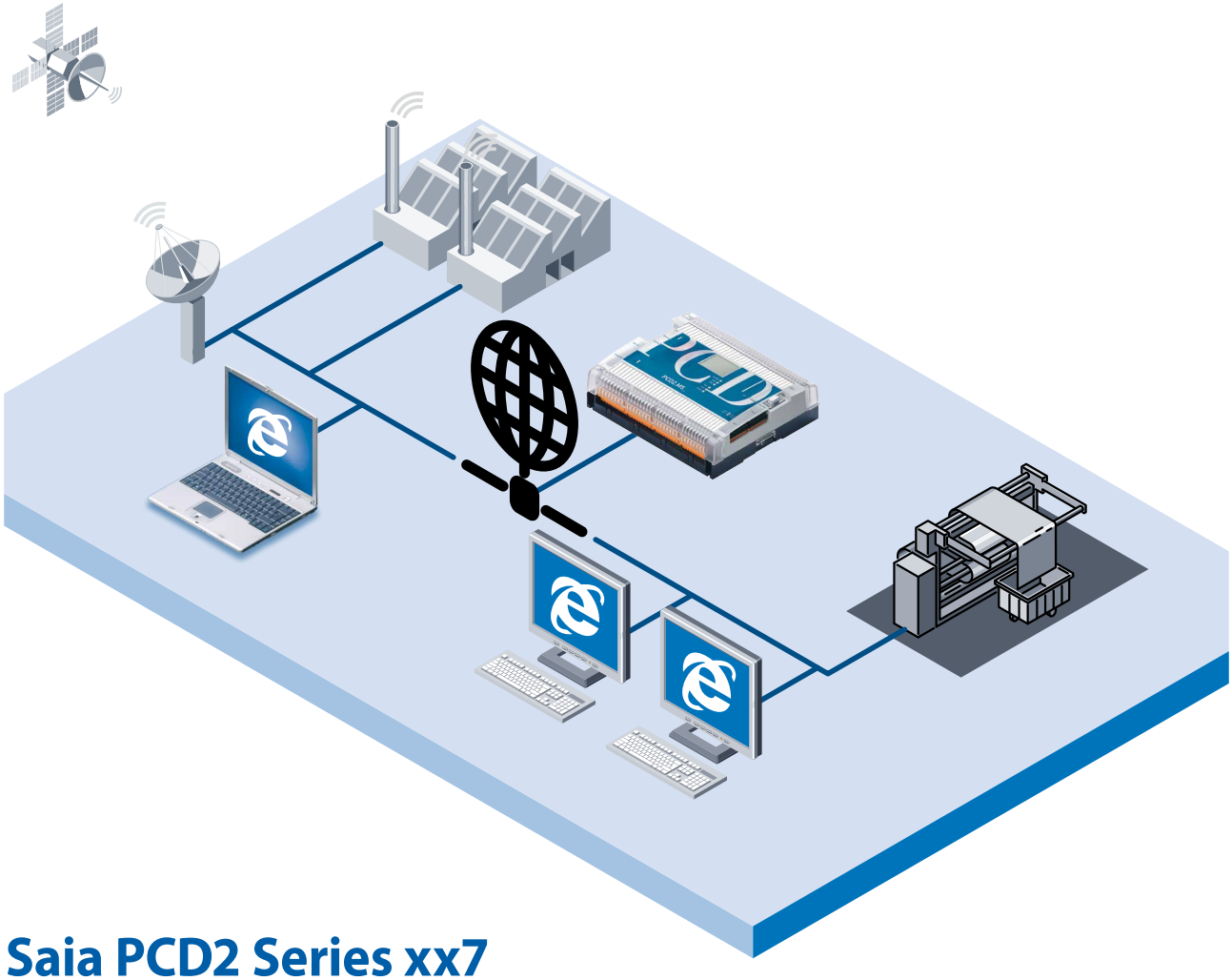


Saia PCD2 Series xx7
Control and monitoring with web technology

Substantial benefits from using web server

Creation of control and monitoring functions:

- Functions for the control and monitoring of states, sequences and processes in machines, installations, etc. are executed directly on the PLC.
- The creation and manipulation of control and monitoring functions is possible for everyone as no PLC-specific knowledge at all is required.
- Control and monitoring functions are realized on the basis of HTML pages.
- Efficient, economical development of control and monitoring functions with existing, well-known Microsoft standard tools (Frontpage, Word, Excel, Power-Point etc.).

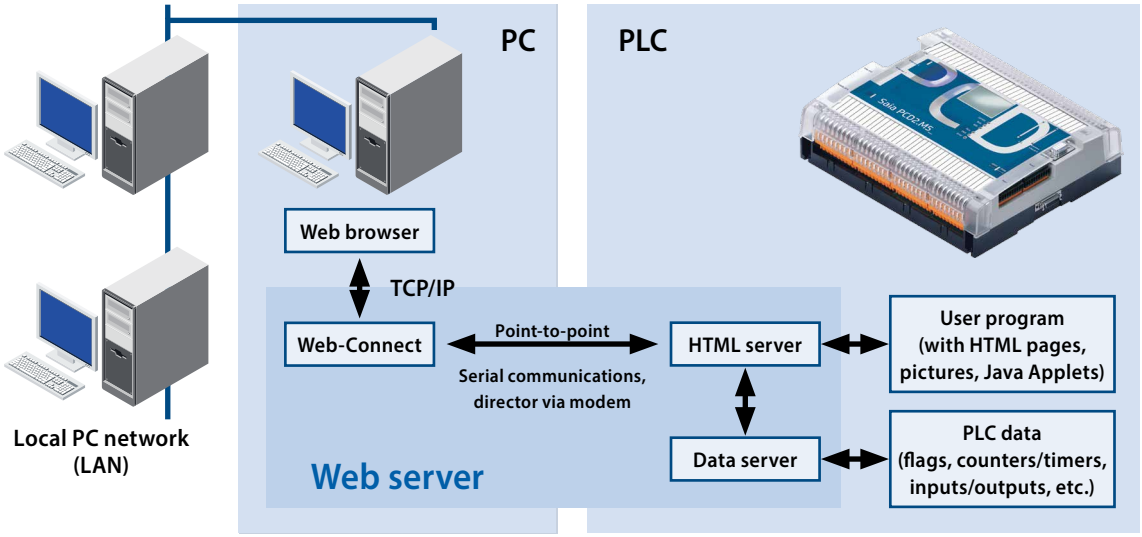
Display of control and monitoring functions:

- Control and monitoring functions are displayed and can be manipulated economically using a standard web browser (Internet Explorer, Netscape Navigator).
- Direct, local access to control and monitoring functions via a standard RS-232 interface.
- Indirect, local access to control and monitoring functions for all PCs connected to a local PC network.
- World-wide access to control and monitoring functions via modem.
- Convenience of commissioning, diagnosis and remote maintenance through on-line access to all PLC data via four, pre-defined, user-edited control and monitoring pages (variable pages).

Web server features

- Inexpensive web server integrated within PLC, requiring no additional TCP/IP communications components on the PLC
- User-definable HTML pages and the appropriate pictures can be stored in the PLC.
- Current PLC data can be displayed or modified with simple text command on the HTML page.
- HTML pages stored on the PLC can be displayed with any standard browser.
- Protected access to HTML pages through four password levels. An individual password can be defined as required for each password level.
- A solution offering good value for control and monitoring functions with web technology, since no cost-intensive investment is required in expensive internet infrastructure (internet connection, internet provider, Ethernet networks, TCP/IP components etc.).
- Compact, inexpensive solution: the web server function is already included in the PLC at no extra cost.

Web server concept



A web server can generally be divided into two parts: the communications section, which establishes the connection to the web browser, and the actual server section, which manages the HTML pages, any pictures they include and, in the present case, access to PLC data.

To relieve the CPU of the PLC in the actual control application from the intense computational burden of TCP/IP communication with the web browser, the Saia Burgess Controls web server uses a PC for its TCP/IP communications section. This communications section has been achieved with the PC driver program "Web-Connect". The PLC only contains the HTML server, data server and HTML pages plus any pictures they include.

Data is exchanged between the "Web-Connect" PC driver program in the PC and the HTML server in the PLC across a simple, point-to-point connection, which only places a small computational burden on the PLC's CPU. This division of labour between the PLC and the PC results in the following benefits:

- No additional TCP/IP cards on PLC or PC.
- Use of standard web browsers, even without Ethernet or TCP/IP networks.
- The modem connection can, alongside its web server function, also be used for transmitting SMS messages or loading programs.

HTML server

The HTML server represents the heart of the entire web server. It transmits the HTML pages requested by the web browser, and any pictures/files they include, to the PC via the serial interface.

Data server

The data server transfers current PLC data directly from PLC memory to the HTML server. It can access data words, data blocks, flags, inputs/outputs (process map), timers and counters. Current PLC data is then transferred from the HTML server into the required HTML pages.

HTML pages

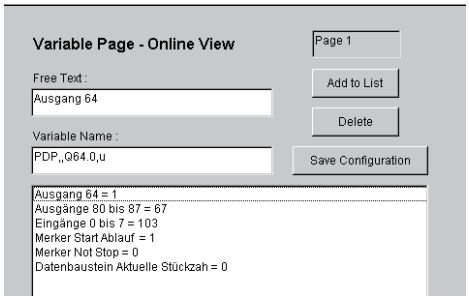
Control and monitoring functions are based on user-definable HTML pages, which may also contain pictures or Java Applets. These HTML pages are stored in the form of data blocks (DBs) within the PLC's user memory.

PC driver program "Web-Connect"

The "Web-Connect" PC driver program is installed on the PC that supplies the connection to the PLC. "Web-Connect" converts the point-to-point protocol between PC and PLC into a TCP/IP protocol. This enables the HTML pages stored in the PLC to be displayed on the web browser. Once installed, "Web-Connect" is transparent for the user.

Variable pages

For the purposes of diagnosis and maintenance, individual variable tables can be defined from which it is possible to access all PLC data directly. This allows flags, data blocks, timers, etc. to be displayed and modified on-line, without any programming unit or special software. The variable pages can be edited by the user as required and can be protected with a password. Up to 4 variable pages can be defined per controller and stored in the PLC.

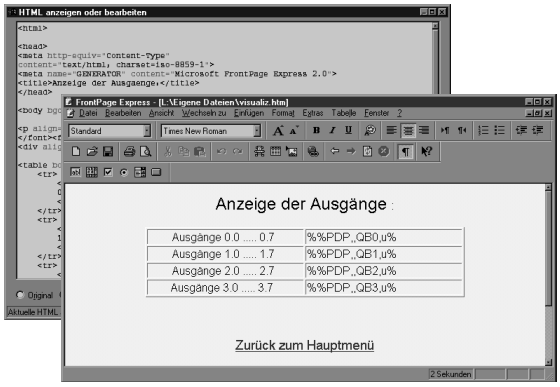


Five easy steps to integrate control and monitoring functions within the user program

With an integral web server in the PLC, creating control and monitoring functions is child's play. The following 5 steps are needed to construct a control and monitoring project:

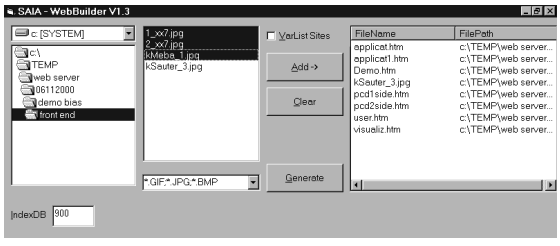
1. Creation of control and monitoring functions with HTML pages

Control and monitoring functions are constructed in the form of HTML pages. These can be developed with any HTML-generating tool, such as Microsoft Frontpage, Word, Excel or Power-Point. At the same time, pictures can also be integrated into the HTML pages.
In order to display current PLC data during run time, simple text commands are inserted in the HTML pages. For example, the status of output byte 3 is polled in the following way:
%%PDP,,QB3,x%



2. Conversion of HTML pages into PLC data

The conversion of HTML pages into PLC data blocks takes place with "Web-Builder", an easily operated software tool. It is used to select HTML pages and pictures for conversion and to define the data block start address.



3. Importing PLC data into the user program

Import takes place with the function "Insert, External Source" from STEP®7 programming software. When "Process, Translate" is then selected, the relevant data blocks containing the stored HTML pages and pictures are integ rated by STEP®7 programming software into the user program.

4. Definition of web server in the STEP®7 project

The fact that this STEP®7 project uses the web server must now be defined in the user program. For this purpose, a configuration data block is required that specifies the PLC interface to which the web server is connected and the baud rate and data format to be used for transmitting data between the PLC and PC. The possibility of defining passwords also exists here.

Adresse	Name	Typ	Anfangswert	Kommentar
0.0		STRUCT		
+0.0	Identificator	STRING[12]	'SAIA xx7 CDB'	
+14.0	Memory	STRING[8]	'MEM7:128'	
+24.0	WebComPara	STRING[30]	'COM1:PTP_MPI,RS232,38400,8,n	Init Port 1
+56.0	WebPassWord	STRING[60]	'WEB:PASSWORD=level1,level2,1	Passwörter
+118.0	Timeout	STRING[14]	'COM1:TIMEOUT=5'	Timeout von Port 1
+134.0	IndexDB	STRING[15]	'WEB:INDEXDB=900'	Start DB für WEB
=152.0		END_STRUCT		

5. Loading control and monitoring functions into the PLC

The data blocks containing the HTML pages are now an integral part of the STEP®7 project and can be loaded into the controller in the usual way.

Displaying HTML pages with web browsers

HTML pages stored in the PLC are displayed with a standard web browser, such as Microsoft Internet Explorer or Netscape Navigator.

Possibilities for accessing the web server's HTML pages

Local and direct: PC↔PLC
Local and indirect: PC↔LAN↔PC↔PLC
Via modem: PC↔Modem↔Modem↔PLC

Password protection

Access to HTML pages and PLC data can be protected with a password. Four access levels are available, each with a user definable password:
Level 1 - Display of HTML pages
Level 2 - Display of PLC data
Level 3 - Modification of PLC data
Level 4 - Modification and saving of variable list

Password

Level	Password	Comment
0	0	(none)
1	111	End user
2	222	Maintenance . After sales services
3	333	Engineer - modifications reserved
4	23456781	modifications reserved - level 4
5	23456782	modifications reserved - level 5
6	23456783	modifications reserved - level 6
7	23456785	modifications reserved - level 7
8	23456788	modifications reserved - level 8
9	65289102	Advanced

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Technical data

PLC hardware

Controller type	PCD2.M157 PCD2.M177 PCD2.M487 PCD2.M5547 PCD3.M5447 PCD3.M5547 PCD3.M5567 PCD3.M6347 PCD3.M6547
Communications ports	by inserting a communications module at socket A (port 1) and/or a function module or small terminal at socket B (ports 2 and 3)
Connection types	between web browser (PC) and PLC: directly as point-to-point (RS-232, RS-422, RS-485) or via modem
Transmission range	110…38 400 Bit/s (ports 2 and 3: max. 19 200 Bit/s)
Data bits	7 or 8 bits
Parity	even, odd, none
Stop bits	1 or 2 bits
Usable modems	– integral modem PCD2.T813 (analogue) or PCD2.T850 (ISDN) – all standard modems that support the AT instruction set, via PCD7.F120 communications module at socket A

Control and monitoring pages

Creation	with any tool that generates HTML code
Available memory	total user memory (up to 512 KBytes)
Memory required	single HTML page approx. 2 KBytes, maximum size per page or picture 32 KBytes
Conversion	into PLC data (data block): with the "Web-Builder" conversion tool»
Display	with standard web browsers (Internet Explorer, Netscape Navigator)
Passwords	4, user definable

PLC data in control and monitoring pages

Access	through simple text commands in the HTML pages
Displayable PLC data	data blocks, flags, inputs and outputs (process map), timers and counters
Data breadth	bit, byte, word, doubleword
Data formats	binary, optionally signed decimal, hexadecimal, octal, floating point, string, S7 string, S7 timer

Variable tables

Variable pages	4, user edited
Number of variables	16 per variable page
Displayable PLC data	data blocks, flags, inputs and outputs (process map), timers and counters

Ordering details

Type	Description
	Web-Server software package with the «Web-Builder» conversion tool (licence required), «Web-Connect» PC software (no licence required), examples and the Web Server manual
PCD8.C79020 D9	Complete version, single licence for the «Web-Builder»
PCD8.C79020 D9 U	Complete version, unlimited licence for the «Web-Builder»
PCD8.C79020 M1	Demoversion (only possible to convert 2 HTML pages)
26/775 EN	**Manual for Web Server xx7**

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