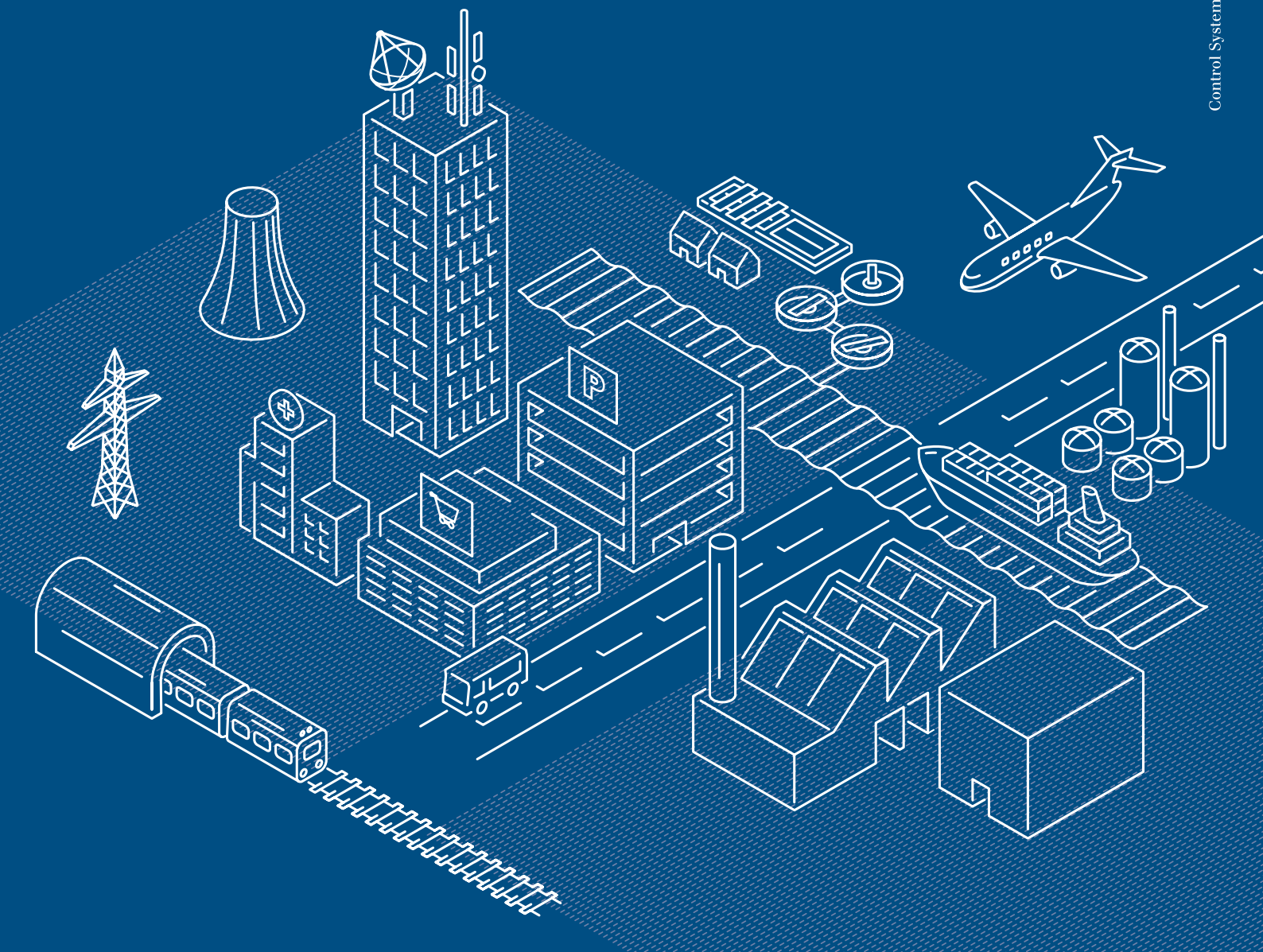
2010 | 11

Saia® System Catalogue

Quality, openness and flexibility
in automation

saia-burgess

Control Systems and Components



Saia-Burgess Controls on the web

www.saia-pcd.com

The overview of the company, products and applications

www.saia-pcd.com

www.sbc-support.ch Technischer Support

The technical reference in selection, implementation and operation of Saia® PCD systems

www.POM-Automation.com

The website for operators and planners on all aspects of «peace of mind in automation».

www.forum2010.ch

The event site for the international forum: Building Automation and Sustainability 2010 24 to 27 June 2010

Saia® System Catalogue: Content

Saia® Partnership concept

The system integrator as partner

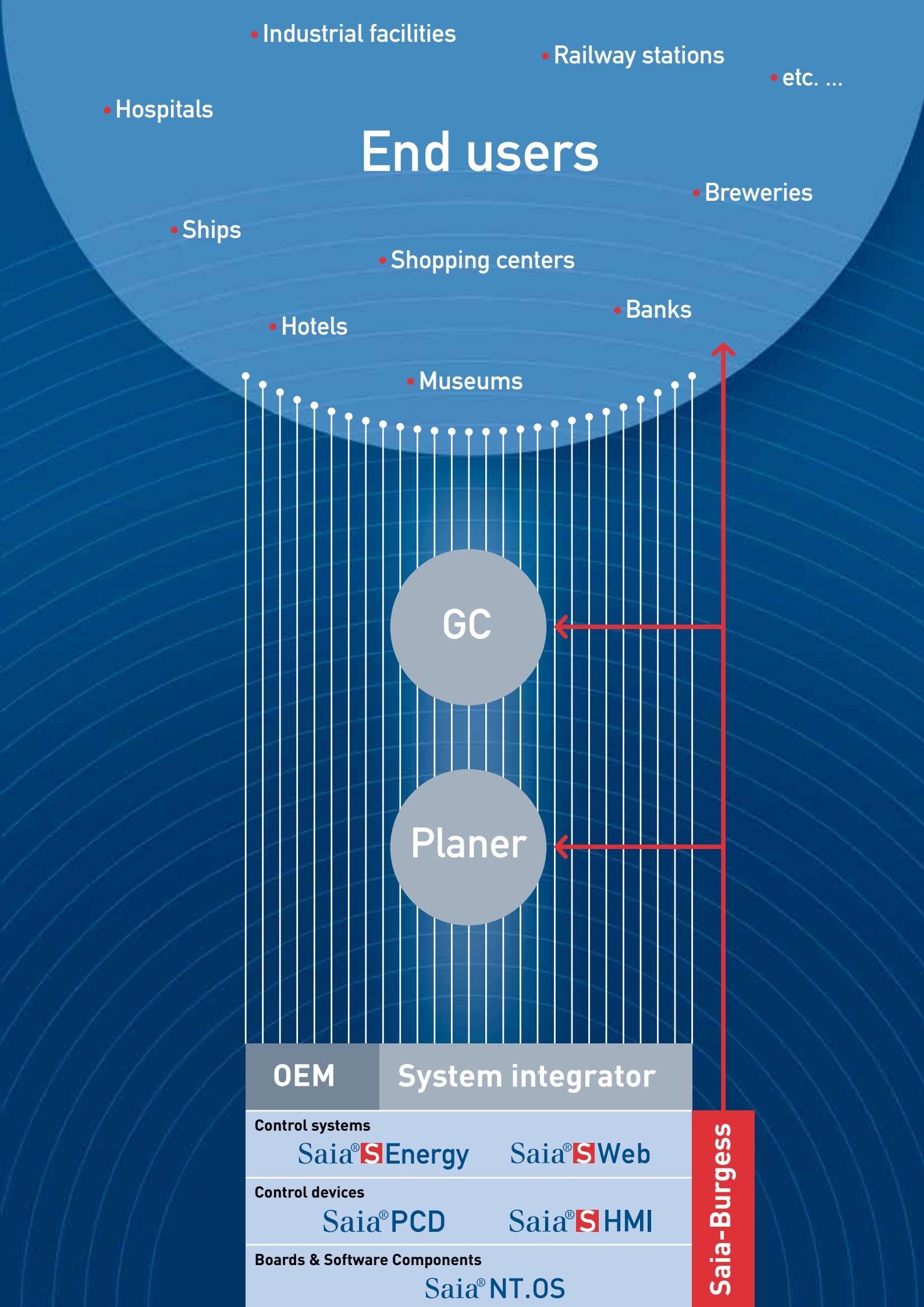
As a control and regulation specialist, Saia-Burgess Controls develops and produces all its own hardware, firmware and software components for the entire product range.

For the technical implementation of all building automation requirements, the company has collaborated for many years with trained system partners, who implement projects on behalf of the builders of houses, commercial properties and industrial facilities. System partners offer system solutions based on the portfolio of products for the entire lifecycle of the building's technical equipment. This goes through all the stages from planning and project management to complete system integration and operational control, including energy and technical facilities management.

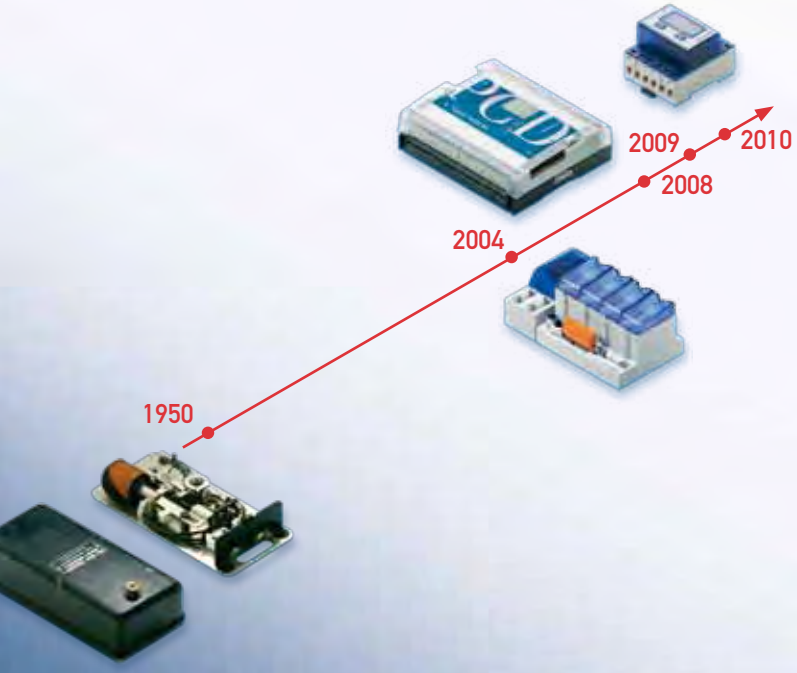
To focus its own company resources better, Saia® does not offer complete automation solutions, so a situation in which it might compete against its own customers can never arise.

The device manufacturer (OEM) as partner

The characteristics of the Saia® product portfolio make it particularly attractive for cost-optimized volume applications, where industrial grade quality and durability are required. With its high internal added value, it is a competitive, flexible and competent partner for the control technology of mass-produced machines, devices and apparatus. The range offered in the OEM segment starts with standard systems that have an OEM label and extends through customized interfaces for standard PCD/PCS systems to dedicated Smart Controls solutions. Partners can use the programming environment of Saia® PG5 controls suite to encapsulate their own know-how in protected functions and store them in the system where they are processed. A large basic memory not only lets them file web-compatible configuration menus for spare parts lists, but also system documentation. All these characteristics enhance the efficiency of commissioning, service and maintenance for OEMs.


Industrial facilities
Railway stations
etc. ...
Hospitals
End users
Breweries
Ships
Shopping centers
Banks
Hotels
Museums
GC
Planer
OEM
System integrator
Control systems
Saia® S Energy
Saia® S Web
Control devices
Saia® PCD
Saia® S HMI
Boards & Software Components
Saia® NT.OS
Saia-Burgess

Saia-Burgess Controls:
Continuing tradition



The Saia® system of today is a continuation of this company's long development history in building technology. Even before 1930, the former SAIA AG set out to develop, produce and market technical components for buildings. In the company's early history, these were mainly machines for use in the stair and landing areas. From the 1970s onwards, they evolved into a modern, highly flexible building automation system based on user-programmable control systems.

To continue along this successful path, the company employs a large number of hardware and software development engineers at its main plant in Switzerland.

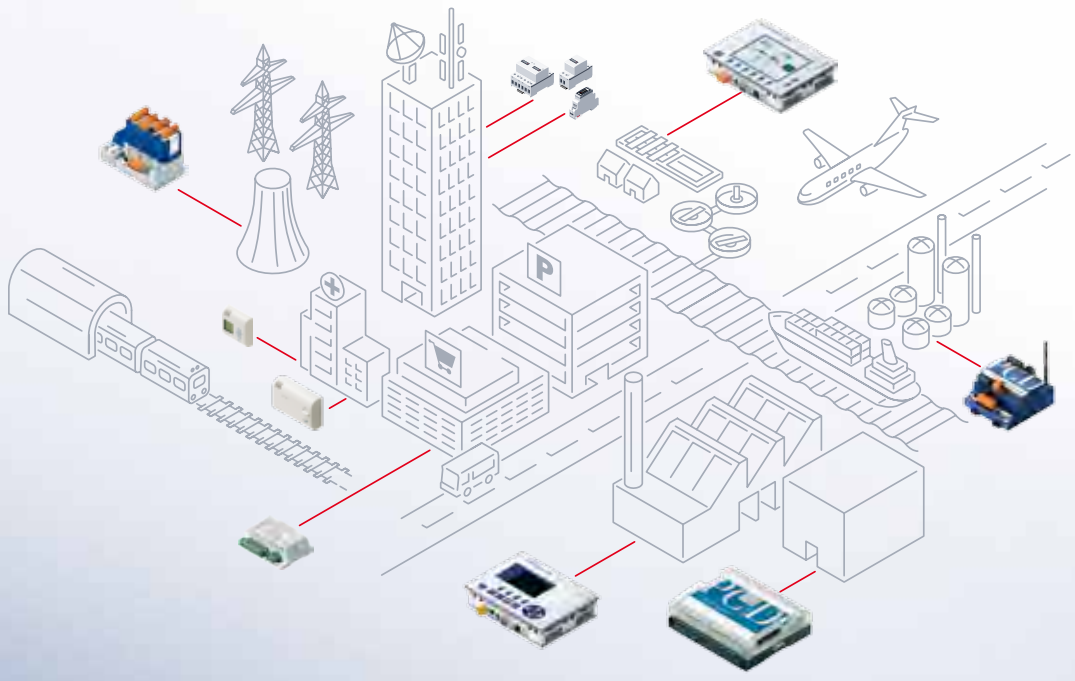
Every year, Saia-Burgess Controls produces more than 30000 controller CPUs with over 1.5 million data points for the automation engineering field. Volumes like this can, of suitable quality, only be developed and produced on the basis of a mature quality management system.

Infrastructure automation:
Our core competence

What lies behind the term «infrastructure automation»? Saia-Burgess Controls has focused the main thrust of its activities and the design concept of its product and service range at the very point where rigid market definitions typically leave a large gap: in the automation systems or sales/support organizations of leading automation suppliers.

We call this area «infrastructure automation». It includes the automation of commercial properties, covering all the necessary technical facilities, the wellbeing of people, and the smooth operation of installed machines and equipment. For this application area, Saia-Burgess Controls develops system solutions based on the latest PLC technology and characterized by high levels of flexibility, openness and quality.

Today our products are used across the spectrum, from building, traffic, power and water supply technologies to data management and logistics systems. To implement such extensive automation tasks, Saia-Burgess Controls works throughout Europe with over 500 selected system partners. Saia® system partners are suppliers of solutions for end-users and planners. According to individual requirements and problems, our partners put together a suitable system solution based on Saia® components. They carry out the integration and, if necessary, service and maintain the installation.



Saia® automation systems

Attractive technologies combined into a system of industrial quality
= PLC + IT + Web

Saia® S-Web based user prompting

With Saia-Burgess Controls, web technology means unlimited communication, with an integrated automation server at the automation level. Whether a web-based control panel gets its system data from the automation level, or energy data has to be provided within a building network, one and the same standards-based communication mechanism will always apply. A browser just has to be installed on the control units to display the information available in the automation server in a user-friendly way. Through the use of standard interfaces and services, energy data can be accessed or alarm messages sent world-wide.

Management level

A building management system is indispensable for the display, operation, optimization and processing of incoming alarms in the technical installations of any building. The Saia® Visi.Plus system offers a wide range of cost-effective uses in infrastructure automation with its scalable, web-based architecture.

Automation level

At the automation level, Saia-Burgess Controls offers a comprehensive range of user-programmable, compact and modular systems, whose rigorous compatibility sets them apart. With the help of user-friendly programming tools in the Saia® PG5 Controls Suite, it is possible to integrate and commission systems in the installation specifically for an application. Standard interfaces are used in most cases to network the separate plant areas and levels. Interfaces range from simple serial connections or modem segments all the way to Ethernet-TCP/IP communications and Internet networking.

Field automation level

To adjust for an optimum room climate, independently functioning room control units are used for the most diverse requirements. These units can be connected to the higher-level automation system via network connections, thus ensuring a direct effect on primary power supply installations.

In order to activate signals in widely separate parts of a building, local (remote) input/output modules or intelligent energy meters are used. These can be connected and monitored via a wide variety of standard interfaces, according to requirements.

Elements of the Saia® system:
Automation stations

As a company, Saia® has always stressed the importance of protecting your investment through the rigorous compatibility of our products. In the automation area, the company offers a wide range of compact and modular programmable systems. These can all be equipped with manual emergency control units. With the help of a user-friendly programming tool, the Saia®PG5 Controls Suite, these systems can be programmed for specific applications and then commissioned. The freedom with which automation systems and software components can be combined produces such flexibility that there are almost no limits to the range of uses.

Saia® PCS

Compact range
up to 44 data points

Chapter 6.1

PCS1.C42x PCS1.C62x PCS1.C82x

Saia® PCD3

Compact series, modular, extensible to up to 102 data points

PCD3.Compact Chapter 6.6

PCD3.M2x30V6

PCD3.WAC Chapter 6.7

PCD3.M2x30A4Tx

Saia® PCD

Modular range
up to 64 data points
up to 50 data points
up to 64 data points

Chapter 6.2

PCD1.M1x5

Chapter 6.3

PCD1.M2_

Chapter 6.5

PCD3.M3020

PCD3.M3120

up to 128 data points
up to 256 data points
up to 512 data points

Chapter 6.2

PCD2.M110

PCD2.M150

PCD2.M170

up to 1024 data points

Chapter 6.2

PCD2.M480

Chapter 6.4

PCD2.M5x40

Chapter 6.5

PCD3.M3230

PCD3.M3330

Chapter 6.5

Profi-S-Net

PCD3.M5340

PCD3.M5440 / PCD3.M5540

CAN / Profibus Master

PCD3.M6240 / PCD3.M6340

PCD3.M6440/ PCD3.M6540

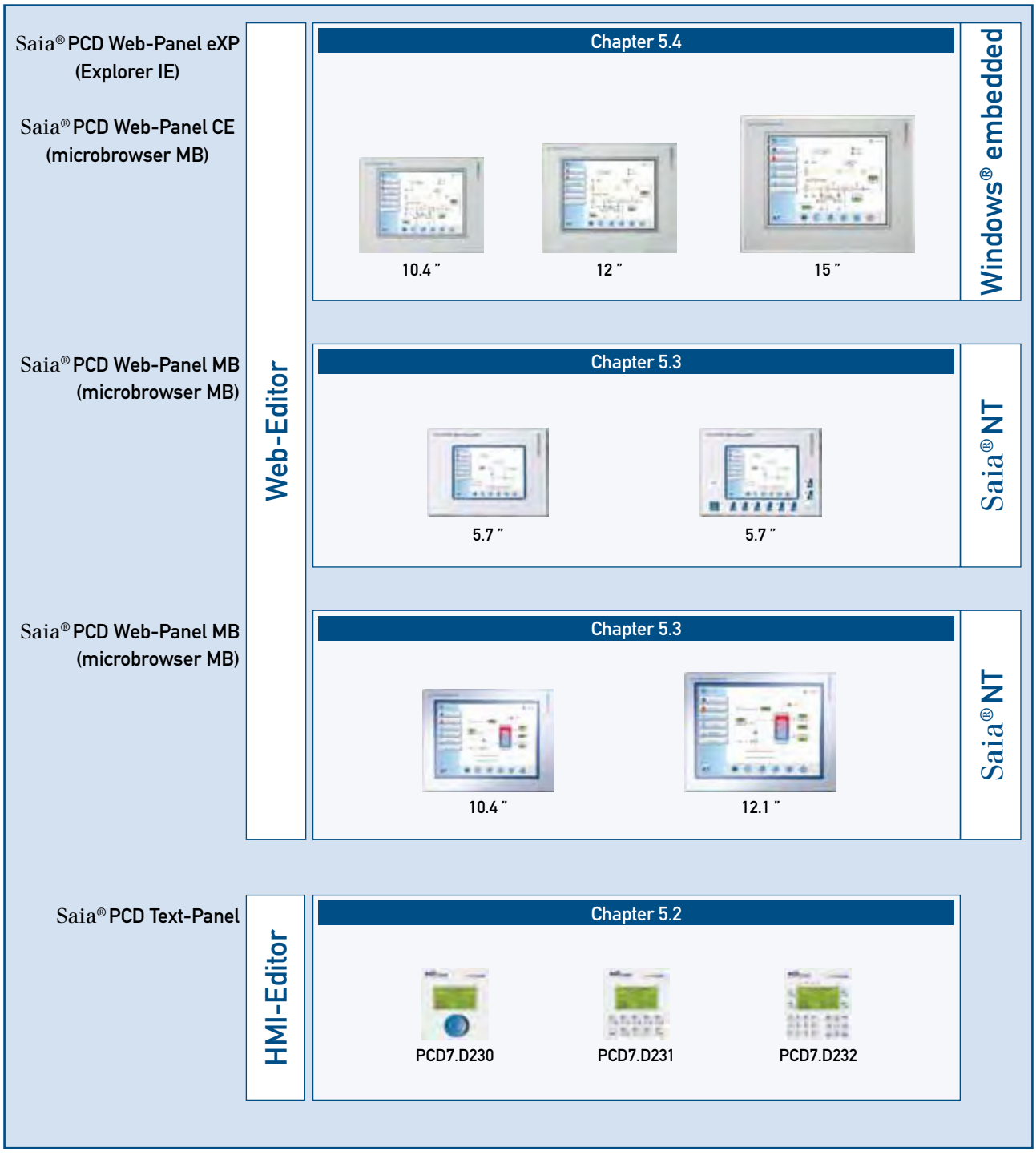
Elements of the Saia® system:
Local data points

Remote input/output components overcome great distances quickly, easily and at reasonable cost. Users can select the connection that meets their requirements: either serial, Profibus or Ethernet. There are two different mounting options for different areas of use: switch cabinet and field mounting.

	Switch cabinet mounting	Field mounting
Serial S-Net	Chapter 7.1	Chapter 7.1
	 PCD7.L1xx PCD7.L2xx PCD7.L3xx PCD7.L4xx	 PCD7.L121 IP66 housing
Profibus-DP / Profi-S-Net	Chapter 7.2	
	 PCD3.T760 PCD3.T765	
Ethernet / Ether-S-Net	Chapter 7.3	
	 PCD3.T66x	

Elements of the Saia® system:
Control panel

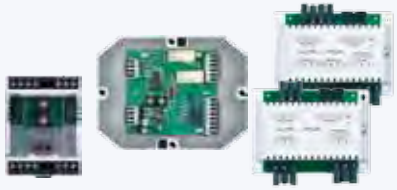
When it comes to displaying system-specific information, or entering parameters like time-switch functions, the spectrum extends from the simple Text-Panel to the powerful Web-Panel. This means that, depending on requirements, individual customer needs can be met in full. Whether these needs call for direct local control or for networked visualization through distributed control nodes, Saia® system components can be used to create open control concepts – without adding to design, implementation or maintenance costs.



Elements of the Saia® system:
Room automation

To adjust for an optimum room climate, independently functioning room control units are used for the most diverse requirements. They can be connected to a higher-level automation system via network connections, thus ensuring a direct influence on primary power supply installations.

heating, ventilation, air conditioning (HeaVAC)

	Serial S-Net	BACnet®	LonWorks®
Fan-coil	Chapter 8.3  PCD7.L60x	Chapter 8.3  PCD7.L60x	Chapter 8.3  PCD7.L61x
Radiator / cooling ceiling	Chapter 8.2 / Chapter 8.3  PCD7.L79x / PCD7.L60x	Chapter 8.3  PCD7.L60x	
Variable volume flow	Chapter 8.2 / Chapter 8.3  PCD7.L79x / PCD7.L60x	Chapter 8.3  PCD7.L60x	
Light and shade	Chapter 7.1 / Chapter 8.3  PCD7.L120 PCD7.L121 PCD7.L62x	Chapter 8.3  PCD7.L62x	Chapter 8.3  PCD7.L62x

Electrical

Elements of the Saia® system:
Operation and monitoring

The aim is individual control and monitoring: to achieve it, many system components have been placed at the disposal of building operators. They range from the management station, switch cabinet operation and manual control modules, all the way to room control units. With the help of these components, parts of an installation can be operated, monitored, or overridden.

Management control systems

Chapter 4.1	Chapters 3 + 4	Chapter 5.4
		
Management station	Web operation	Web-Panel eXP

"Wall-mounted" user interface

Chapter 5.2	Chapter 5.3	Chapter 5.4
		
Text-Panel	Web-Panel MB	Web-Panel CE

Manual control

Chapter 6.1	Chapter 10.4	Chapter 6.5	Chapter 7.1	Chapter 10.6
				
PCS1.Cxxx	PCD2.K552	PCD3.x	PCD7.Lxxx	PCD7.Lxxx

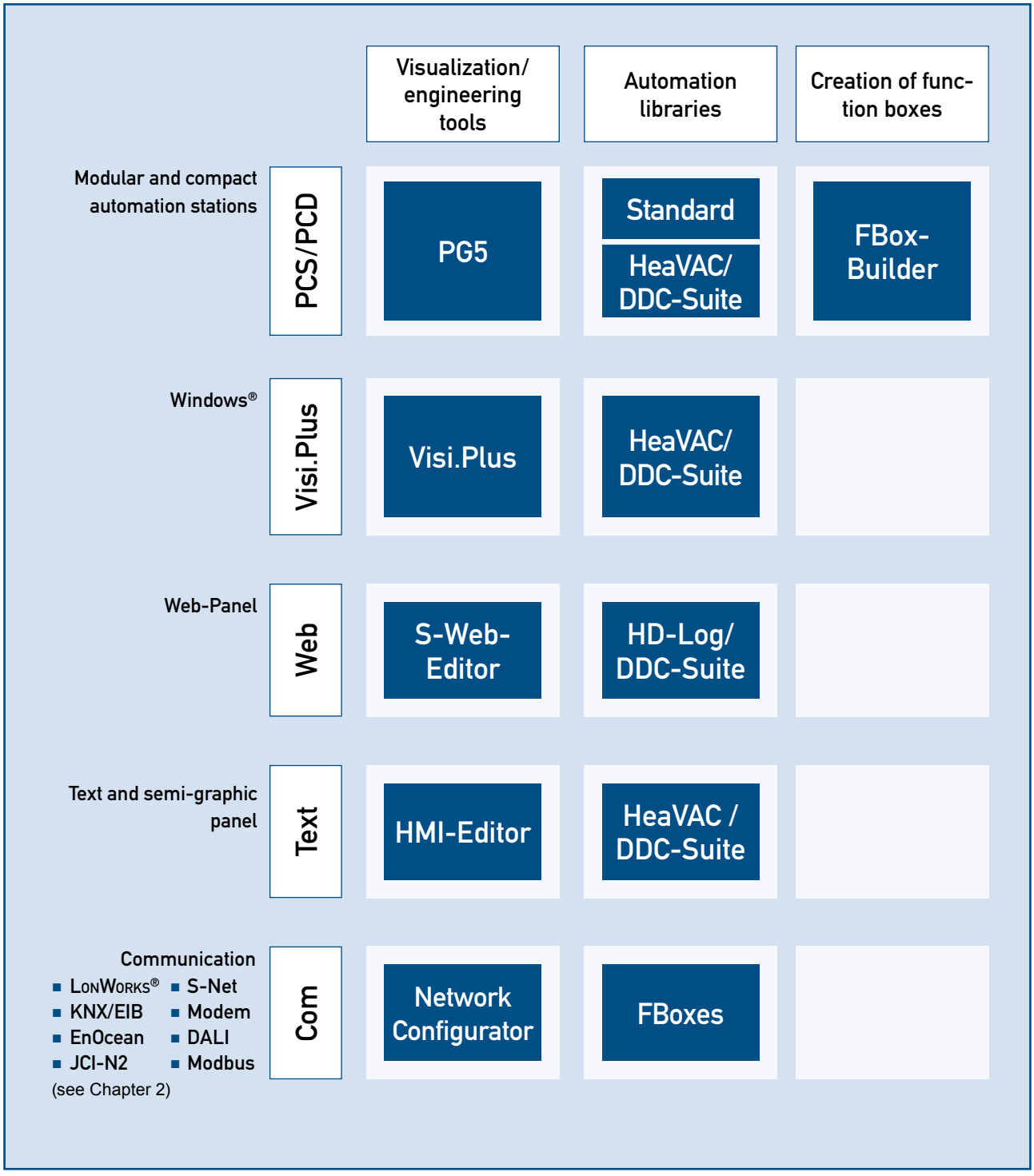
Room control units

Chapter 8.2		Chapter 8.3	
			
PCD7.L793	www.cirrusbv.eu	PCD7.L6xx	

Elements of the Saia® system:
Software tools

For programming, configuring, commissioning and monitoring all of the Saia® automation technology.

- Cost-optimized configuration, visualization and commissioning of standard installations with Compact-Easy
- Fast, convenient engineering through prefabricated libraries for the automation and management level with DDC-Suite
  - Tailor-made engineering with Saia® PG5 Controls-Suite
  - Know-how capture with Saia® FBox-Builder
  - Web applications made easy with Saia® S-Web



2 Limitless communication

2.1 Overview of communication interfaces on Saia® automation stations

	Compact				Compact, modular, extensible						Fully modular					
	PCS1				PCD3. Compact		PCD3.WAC Wide area controller				PCD1		PCD2			
	PCS1.C42x	PCS1.C62x	PCS1.C82x	PCS1.C88x	PCD3.M2030V6	PCD3.M2130V6	PCD3.M2330A4T1	PCD3.M2330A4T3	PCD3.M2330A4T5	PCD3.M2230A4T5	PCD1.M125	PCD1.M135	PCD2.M110	PCD2.M150	PCD2.M170	PCD2.M480
Up to 19 data points	■															
Up to 30 data points		■														
Up to 44 data points			■	■												
Up to 50 data points (of which 18 on board)																
Up to 64 data points											■	■				
Up to 78 data points (of which 14 on board)							■	■	■	■						
Up to 102 data points (of which 38 on board)					■	■										
Up to 128 data points													■			
Up to 256 data points (of which 128 on board)														■		
Up to 512 data points (of which 128 on board)															■	
Up to 1024 data points (of which 128 on board)																■
Maximum number of interfaces incl. PGU	3	3	3	4	3	4	5	5	5	4	3	3	4	4	6	9
Interfaces on board																
PGU RS232	■	■	■	■							■	■	■	■	■	■
PGU USB					■	■	■	■	■	■						■
Serial S-Net up to 38.4 kBit/s	■	■	■	■												
Profi-S-Net 187.5 MBit/s or RS485 up to 115 kBit/s					■	■	■	■	■	■						■
Profi S-Net 1.5 MBit/s																■
LonWorks®				■												
integrated PSTN Modem							■									
integrated ISDN Modem								■								
integrated GSM&GPRS Modem									■	■						
Ethernet						■	■	■	■							
Interface options																
Ethernet connection											1	1		1	1	2
Slot for PCD7.F1xx *	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Number of module slots for F5, 6, 7, 8 [module] - F5xx module 2 × serial (as F1xx *) - F655 module Ethernet - F7xx module Profibus + RS485 - F8xx module LonWorks® + RS485 (not with M480) It is not possible to use 2 interface modules of the same type (except PCD2.M480 with 2 x Ethernet)											1	1		1	2	2
Integral modem	■	■	■	■							■	■	■	■	■	■
External modem											■	■	■	■	■	■

* from 30 September 2010, replaced by PCD7.F1xxS

	Compact, modular	Fully modular														
	PCD1.M2	PCD2.M5		PCD3												
	PCD1.M2120	PCD2.M5440	PCD2.M5540	PCD3.M3020	PCD3.M3120	PCD3.M3230	PCD3.M3330	PCD3.M5340	PCD3.M5440	PCD3.M5540	PCD3.M5560	PCD3.M6340	PCD3.M6360	PCD3.M6440	PCD3.M6540	PCD3.M6560
Up to 50 data points (of which 18 on board)	■															
Up to 64 data points				■	■											
Up to 1024 data points (of which 128 on board)		■	■			■	■	■	■	■	■	■	■	■	■	■
Maximum number of interfaces incl. PGU With 2/4 modules PCD2/PCD3.F2xx (with 2 ports each)	7	11	12	10	11	10	11	13	13	13	13	13	13	13	13	13
Interfaces on board																
PGU RS232		■	■					■	■	■	■	■	■	■	■	■
PGU USB	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Ethernet TCP/IP	■		■		■		■	■		■	■	■	■		■	■
Controller Area Network (CAN 2.0B)												■	■			
Profibus DP Master up to 12 MBit/s														■	■	■
Profi S-Net 1.5 MBit/s		■	■						■	■	■					
Profi-S-Net 187.5 MBit/s or RS485 up to 115 kBit/s	■			■/■	■/■	■/■	■/■	■/■	-/■	-/■	-/■	■/■	■/■	-/■	-/■	-/■
RS422 up to 115 kBit/s								■								
Interface options																
Slot C for Controller Area Network (CAN 2.0B)		■	■													
Slot C for Profibus DP Master up to 12 MBit/s		■	■													
BACnet (with PCDx.R56x module)			■ [1]		■ [1]		■ [1]	■ [1]		■ [1]	■	■ [1]	■		■ [1]	■
Lon® over IP			■ [1]		■ [1]		■ [1]	■ [1]		■ [1]	■	■ [1]	■		■ [1]	■
Modbus (from FW ≥ 1.9.41)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Slot A1/A2 for PCD7.F1xxS	■	■/■	■/■													
I/O-slot 0 for PCD3.F1xxS				■	■	■	■	■	■	■	■	■	■	■	■	■
- RS232 for EIB, DALI, external modem, control panel, external system, etc. - RS485/422 for S-Bus, Modbus, EnOcean etc. - Belimo MP-Bus - Bluetooth																
I/O-slots 0…3 for - PCD2.F2100 (RS422 / RS485 & optional PCD7.F1xxS) - PCD2.F2210 (RS232 & optional PCD7.F1xxS) - PCD2.F2810 (Belimo MP-Bus & optional PCD7.F1xxS)	2	4	4													
I/O slots 0…3 for PCD3.F2xx Module 2 × serial (functions as F1xxS)				4	4	4	4	4	4	4	4	4	4	4	4	4
Slot A1/A2 for integral modem on I/O-slots		■	■													
External modem		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

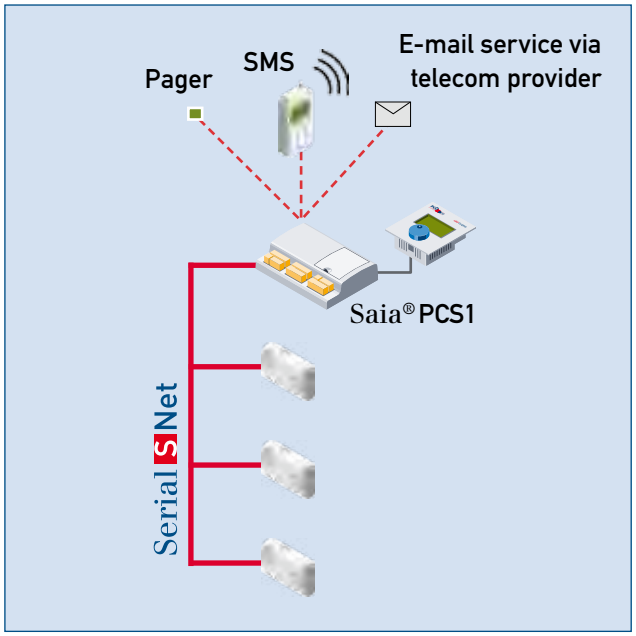
1) Either Lon® over IP or BACnet®, both protocols work together exclusively on the PCD3.Mxx60

2.2 Application examples

System structure for small-sized premises

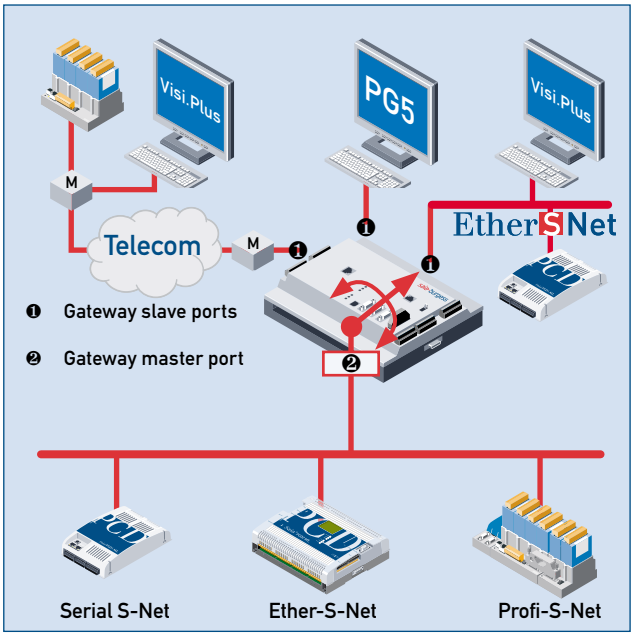
Saia® PCS1 compact automation station

Local user prompting and room control systems linked via S-Net. The integral modem allows alarm messages to be transmitted and remote maintenance functions performed.



Gateway function in all Saia® automation stations

The gateway function allows network crossovers and interface changes to be made. This provides continuous support for programming, data and web services that allow access via the web browser.

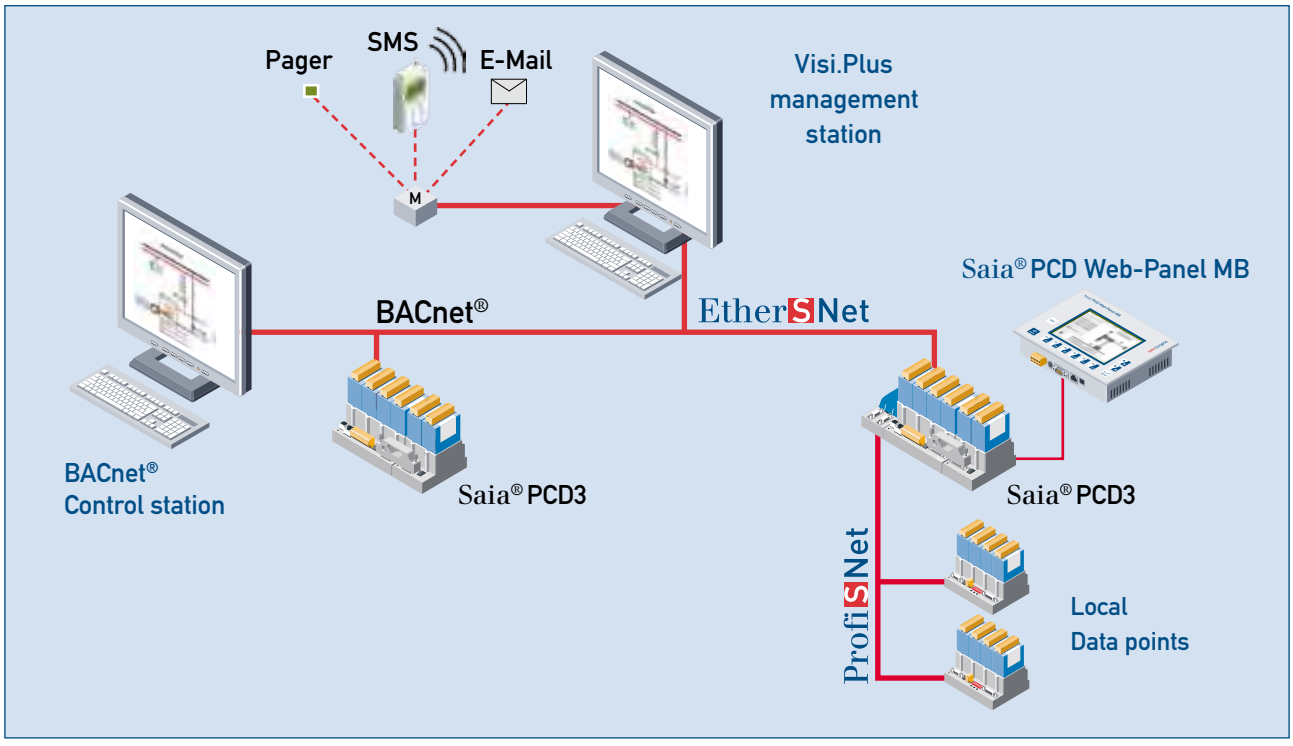


System structure for medium-sized premises

Saia® PCD3 distributed automation stations

Linked via Ether S-Net to the Visi.Plus building management system.

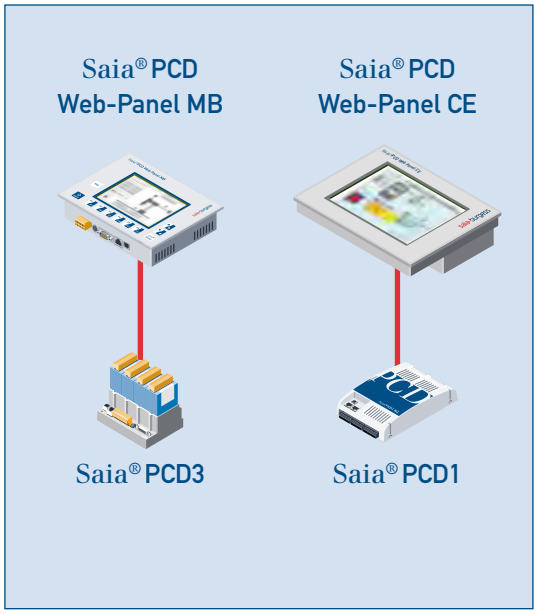
As an option, BACnet® external systems can also be incorporated within the combined automation system. This allows BACnet® client and server utilities to be executed at the automation level and even, via OPC, at the management level.

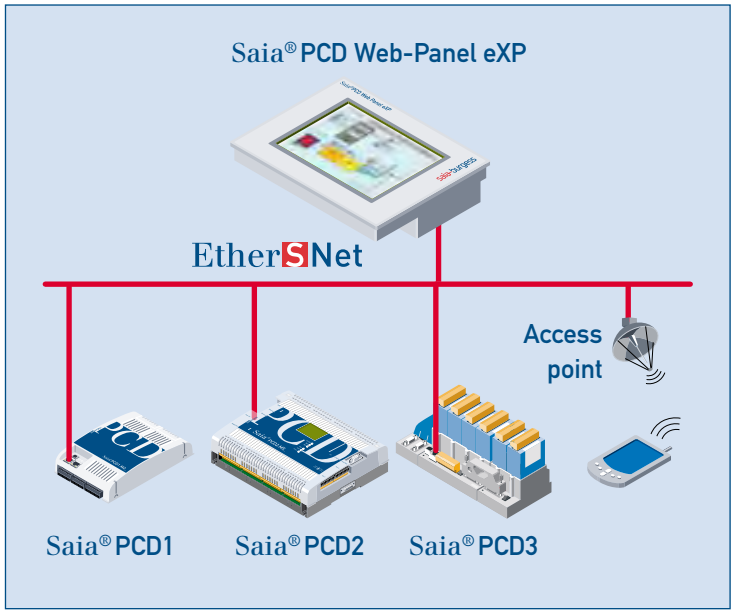


Example applications

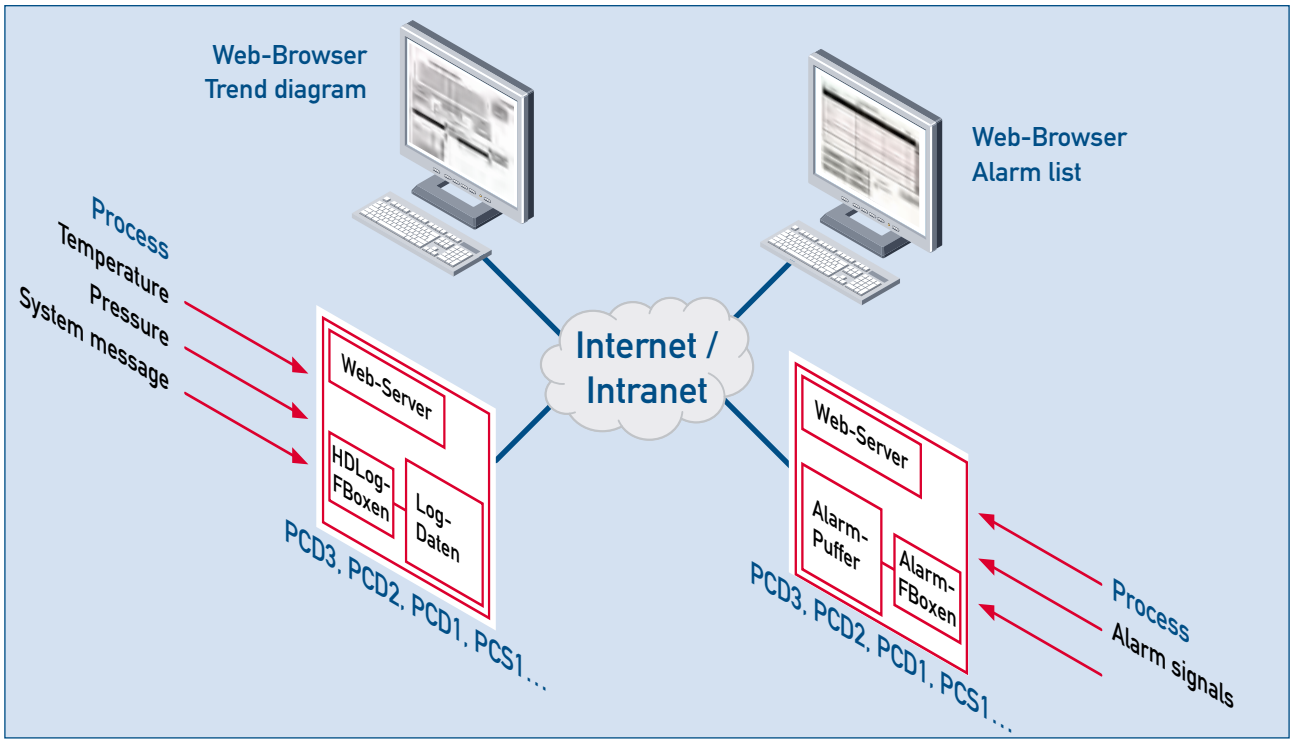
Web-based automation with Saia® S-Web

The automation stations have integral web servers that make it easy to create custom control concepts. Operation may be via Saia® Web-Panels and/or mobile PDAs.





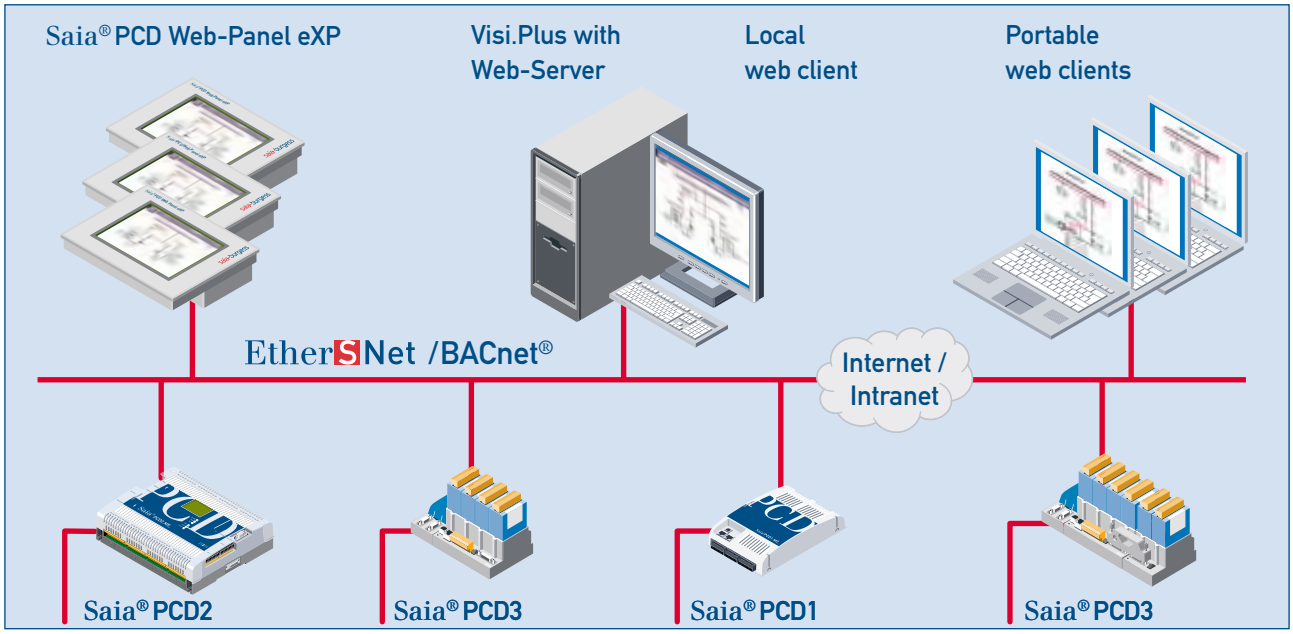
The web server includes integral "Trend" and "Alarm" functions. These may be used, for example, to track temperature sequences and report via the alarm module whenever any limit values are exceeded.



Example applications

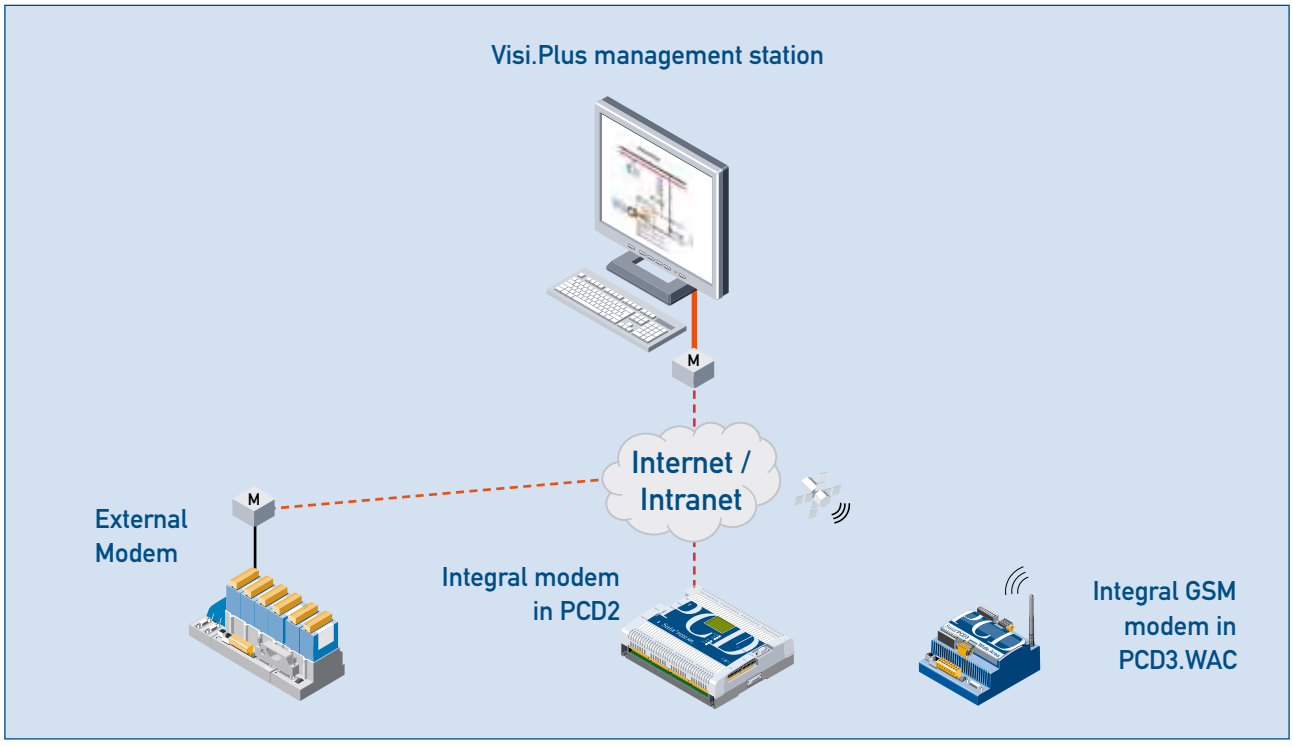
Web management with Visi.Plus

The Visi.Plus building management system has an integral web server that can be used to create PC or even web panel-based control concepts. This can enable every workstation in the building to influence climate, lighting and shade. This happens without installing any additional software on the client.



Telecommunication/tele-service with Tele-S-Net

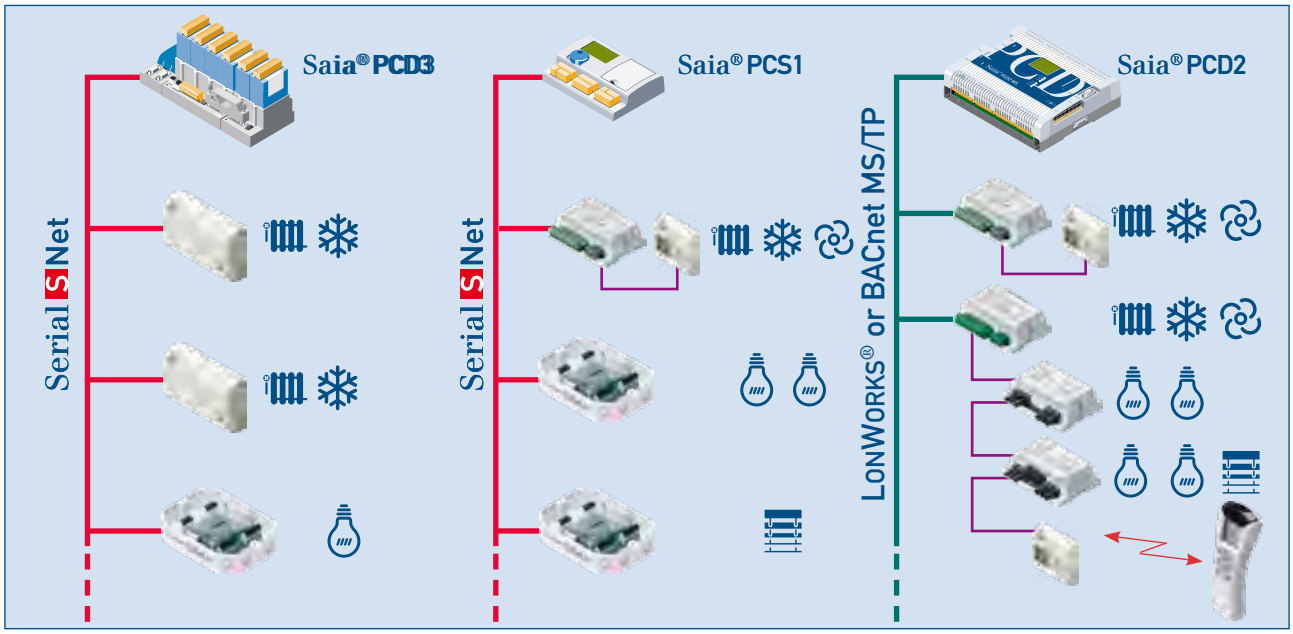
Tele-service functions are particularly indispensable in the building automation field. The Saia® system therefore offers a continuous solution, from analogue modems to ISDN and even GSM modems.
The different types of modem can be implemented as external or integral module variants.



Example applications

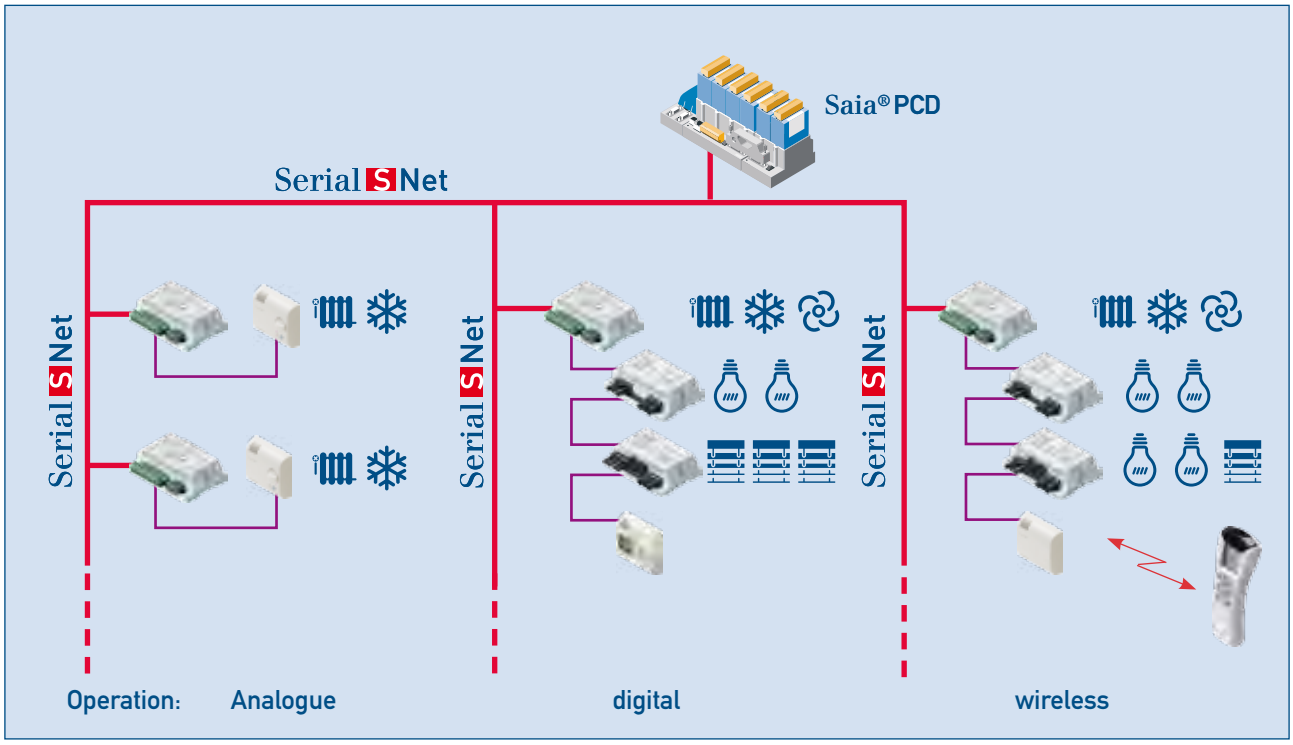
Individual room automation

A comprehensive range of room controllers is available to users for an individual room climate. These controllers can quickly and easily be linked within S-Net, BACnet or LonWorks® networks. Their range of uses extends from a simple radiator control to combinations of radiators and cooling ceilings, even including fan-coil and VVS applications.

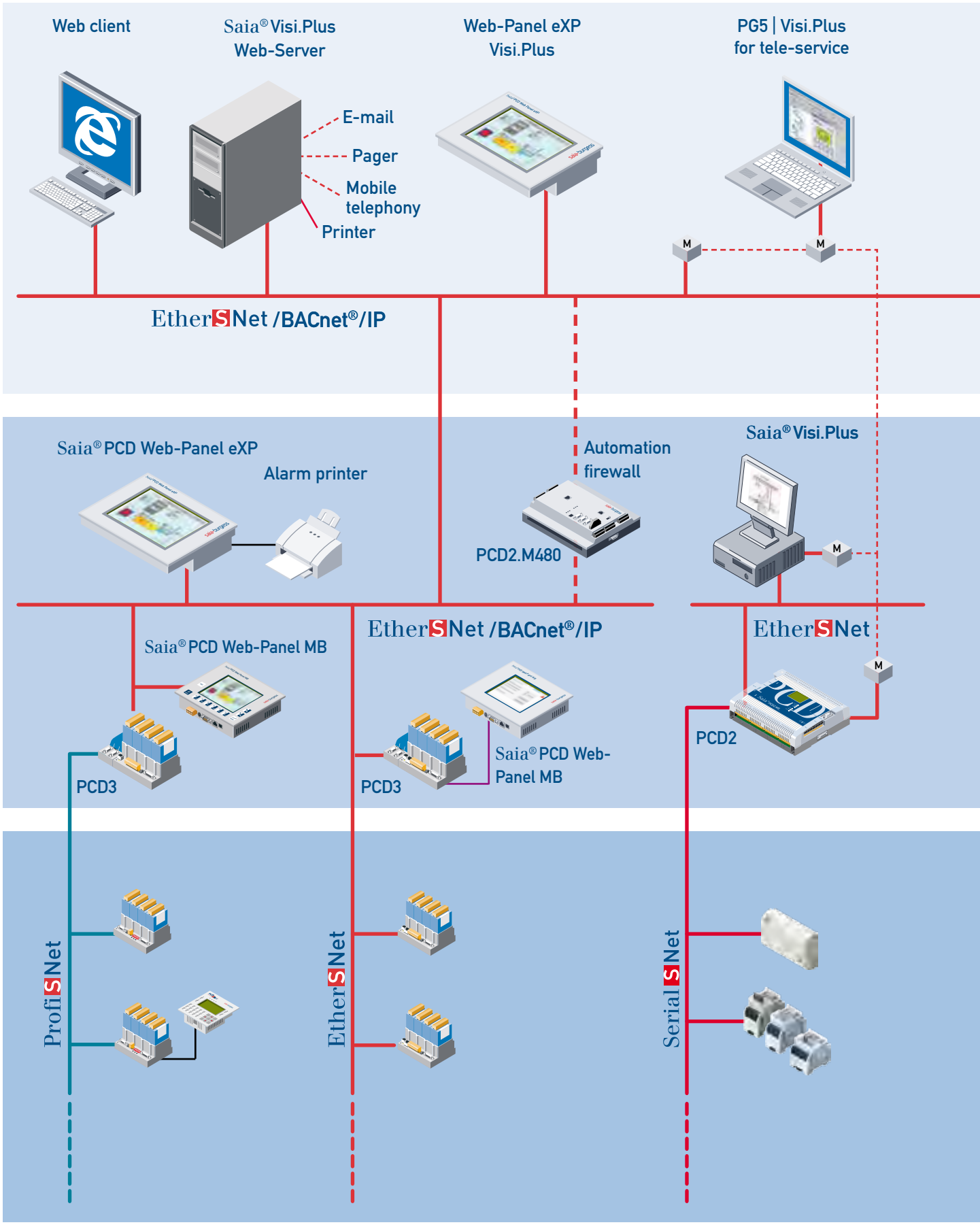


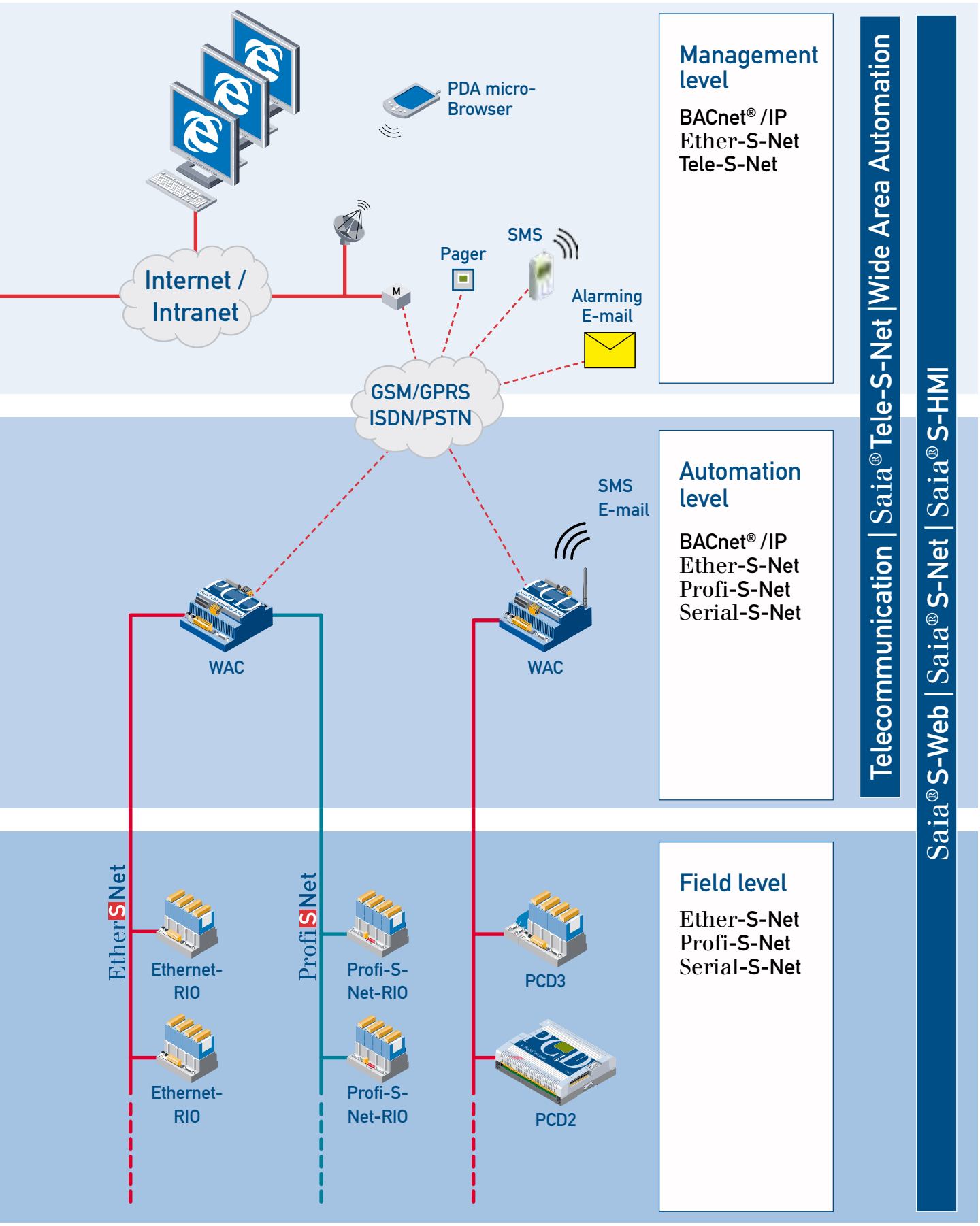
Inter-plant room automation

For uncomplicated inter-plant solutions, the control components for a building's electrical systems can simply be added to its room controllers. Matching software tools ensure speedy and efficient configuration of these components for their diverse application areas, and their integration within the network structure.



2.3 Saia® S-Net | networks of Saia® devices




PDA micro-
Browser
Internet /
Intranet
Pager
SMS
Alarming
E-mail
GSM/GPRS
ISDN/PSTN
SMS
E-mail
WAC
WAC
EtherSNet
ProfiSNet
Ethernet-
RIO
Ethernet-
RIO
Profi-S-
Net-RIO
Profi-S-
Net-RIO
PCD3
PCD2
Management
level
BACnet® /IP
Ether-S-Net
Tele-S-Net
Automation
level
BACnet® /IP
Ether-S-Net
Profi-S-Net
Serial-S-Net
Field level
Ether-S-Net
Profi-S-Net
Serial-S-Net
Telecommunication | Saia® Tele-S-Net | Wide Area Automation
Saia® S-Web | Saia® S-Net | Saia® S-HMI

Convenient communication with Saia® S-Net
Seamless integration

Fully integrated communication

Based on open standards like USB, Ethernet and Profibus, convenient and continuous integration of communication is possible. For Ethernet, Profibus and serial communication, S-Net covers all the necessary Saia® protocols for programming, data transfer and web server access.

USB, Ethernet and serial interfaces, such as RS232 or RS485, are ready integrated in the base unit and, with the operating system's integral S-Net protocols, form a strong communication platform.

Continuous data transfer

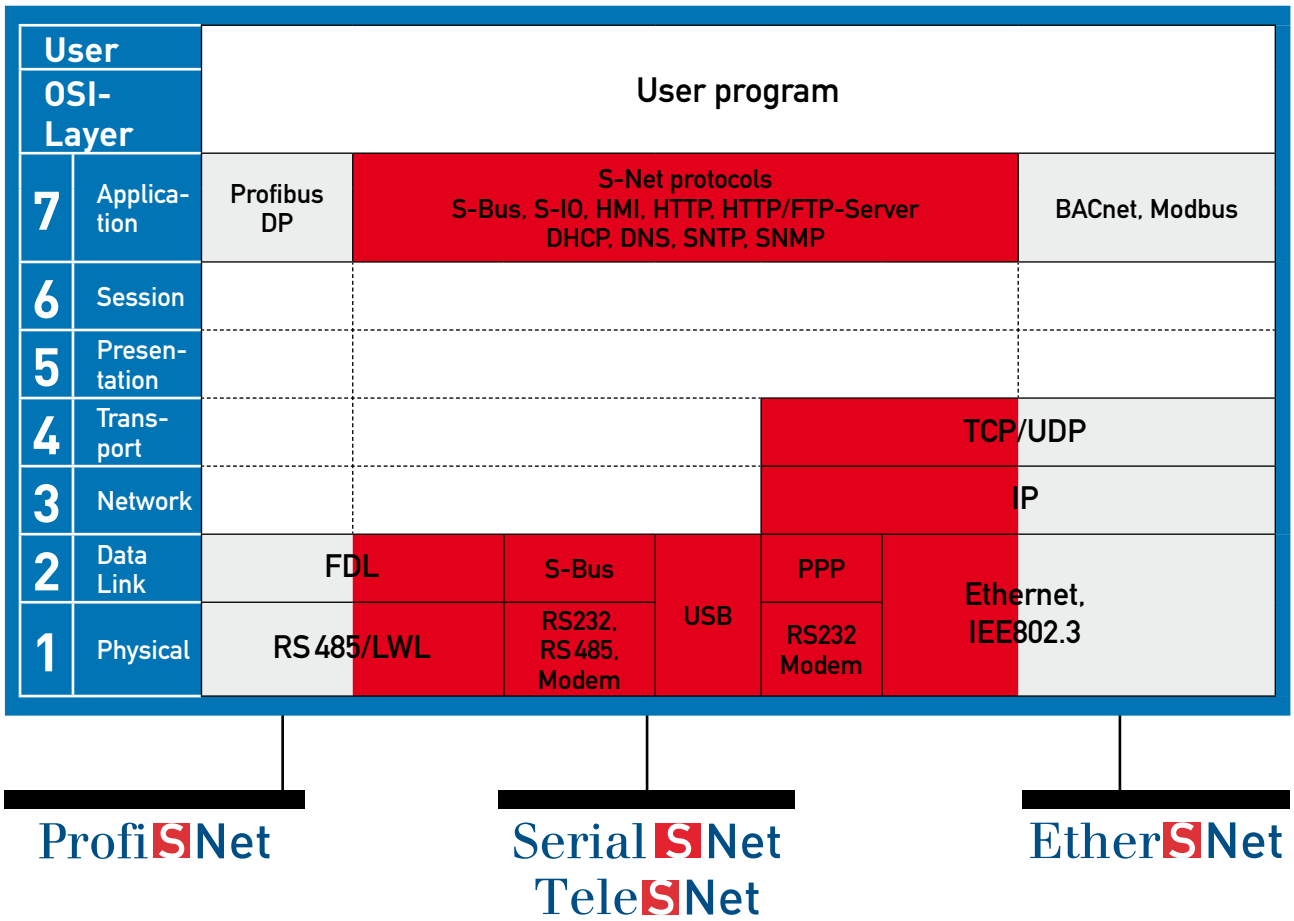
Through Ether-S-Net, Serial-S-Net or Profi-S-Net connections, continuous communication is provided for data transfer, programming and monitoring of controllers, and for access to the web server.

The integration of TCP/IP protocols like DHCP/DNS, SNMP or e-mail and PPP in the firmware of Saia® PCD controllers also guarantees the best possible interface to the IT world.

Benefits of web technology

At no extra charge, Saia® PCD controllers can be integrated into different networks (Ether-S-Net, Profi-S-Net or Serial-S-Net) providing access to web and FTP servers (only via PPP or Ethernet). This allows optimum expansion and use of existing network infrastructures.

The ISO/OSI communications model

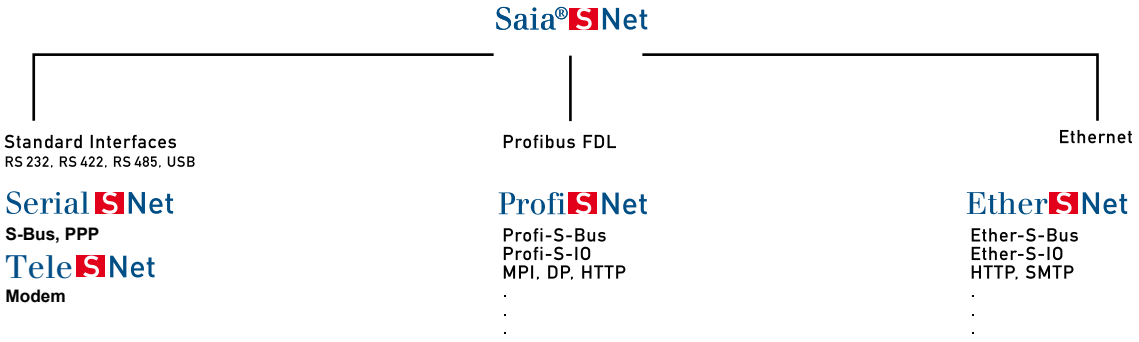


This diagram superimposes S-Net over the ISO/OS communications model, with the relevant system designations.

Topology and protocols

Strong base system with many forms

Saia®-S-Net	**Saia®-S-Net from Saia-Burgess Controls is based on the Profibus and Ethernet open standards. Great importance is attached today to the standards and functions of the IT world (Internet and web technologies).**
Serial-S-Net Tele-S-Net	Supports the S-Bus protocol on serial interfaces (RS232, RS485/422, USB, Modem) in master/slave mode
Profi-S-Net	Private control networks (PCNs) containing all protocols and services for running Saia® devices (PLCs, RIOs, HMIs, PGs) on Profibus. They support multi-protocol operation (Profibus: DP/MPI/S-Bus/S-IO/HTTP) on a single connector and cable
Ether-S-Net	Private control networks (PCNs) containing all protocols and services for running Saia® devices (PLCs, RIOs, HMIs, PGs) on Ethernet. They support multi-protocol operation (Ethernet: S-Bus/S-IO/HTTP/SMTP) on a single connector and cable
Ether-S-Bus | Profi-S-Bus	For event-controlled exchange of data with multi-master communication between controllers. Alongside the normal data services, they also include services for accessing PCD controllers with the PG5 programming unit, Saia® OPC-Server or web browser
Profi-S-IO	Optimized for running PCD3.RIOs. Alongside normal data services, they also include special services for configuration and diagnostics, and for the management of RIO plug-ins
Profibus-DP	Standard protocol for exchanging data with Profibus-DP devices (PLCs, RIOs, frequency converters, etc.)
MPI	Multi-point protocol for exchanging data with other devices (Saia® xx7 SIMATIC® STEP® 7 controllers, HMIs, SCADA systems)
HTTP	Hyper-text transfer protocol for accessing the PCD. Web-Server via Ether-S-Net and Profi-S-Net
SMTP	Simple Mail Transfer Protocol for sending e-mail messages via Ether-S-Net
SNTP	Simple Network Time Protocol, to synchronize the internal clocks of different network stations with an SNTP time server
PPP	Point-to-Point Protocol allows IP communication via modem or serial connections
DHCP	Dynamic Host Control Protocol allows the dynamic assignment of an IP network configuration to Saia® PCD systems from a server
DNS	The Domain Name Service allows Saia® PCD systems to be reached using a unique name, without knowing the IP address
SNMP	The Simple Network Management Protocol was developed to allow such network elements as routers, servers, switches or Saia® PCDs to be monitored and controlled from a central station.



Detailed information about:

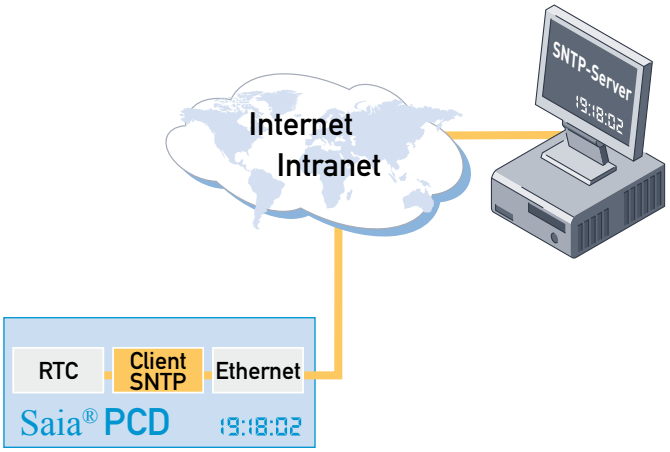
IP protocols

SNTP – Simple Network Time Protocol

The Simple Network Time Protocol is a standard for the time synchronization of multiple devices in IP networks. The protocol allows transmission of the current time from servers located on the Internet or an intranet.

Specially designed algorithms ensure that the different running times are reconciled through a network.

Synchronizing internal system clocks becomes child's play. Events like the switch from summer to winter time take place automatically for all network stations simultaneously.



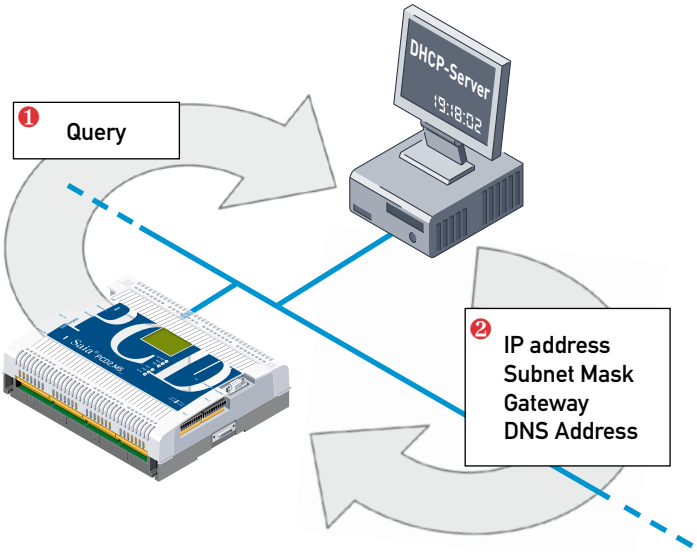
Standard	RFC-2030
Port	UDP 123
SNTP Mode	Unicast Point to Point (SNTP client starts a time query) Broadcast Point to Point (time sent by NTP server to all clients simultaneously)
Time format	UTC (Greenwich Mean Time), time zone adjustable
Time precision	500 ms for Unicast Point to Point 1 s for Broadcast Point to Point (without running time correction)
Polling interval	10 s
Interfaces	Ethernet or serial RS232 via PPP

DHCP – Dynamic Host Configuration Protocol

This is a protocol for the automatic configuration of Ethernet communication. Lengthy manual entry of communication parameters is no longer necessary; instead they are assigned directly from a central server.

Following a request, a DHCP client receives the parameter IP address, subnet mask, gateway and DNS address automatically. Without knowing the network parameters, devices can be integrated into existing networks.

This also makes it easier to increase the availability of devices and simplify the management of addresses used. Even service personnel with no technical background or knowledge of the precise data can exchange devices.

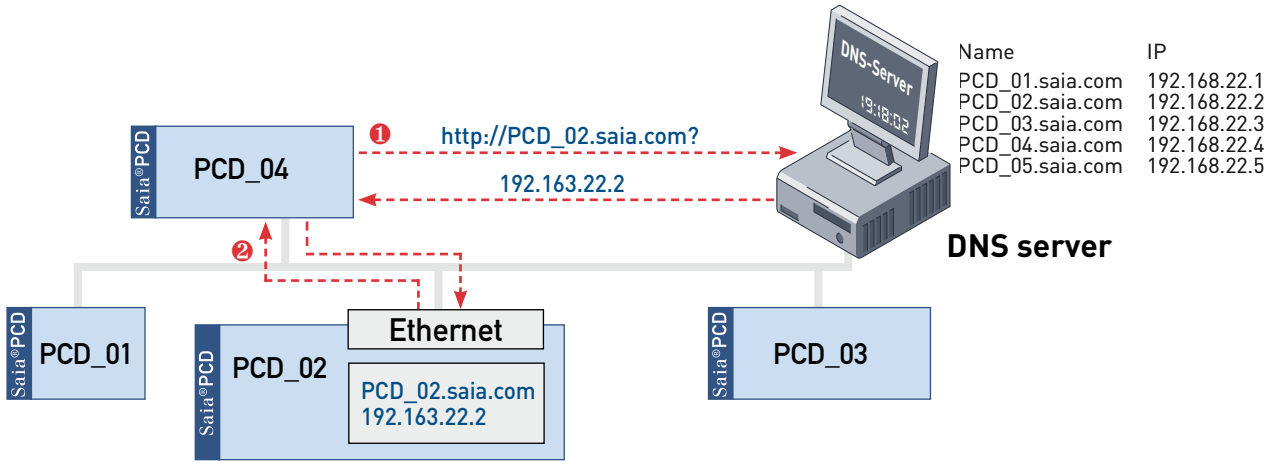


Standard	RFC-2131
Port	UDP 67 for server, UDP 68 for client
Assigned parameters	IP address Subnet mask Gateway (optional) DNS address (optional)

IP protocols

DNS – Domain Name System

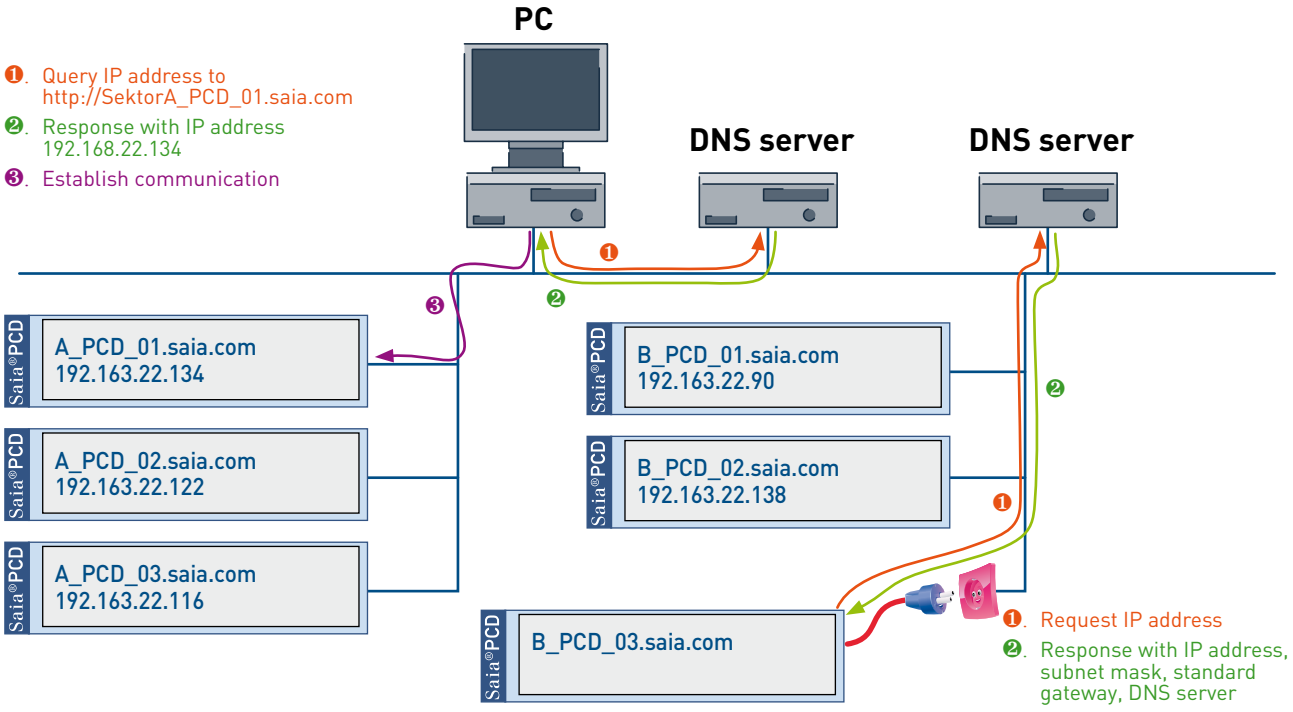
Access to controllers by assigning fixed host names. To establish communication between two controllers, it is not necessary to know the IP address of the target controller, only its host name. Using this name, the IP address can be requested from a DNS server. Devices no longer use anonymous IP addresses that contain little information. The structure and availability of individual networks are defined once, and do not need to be adapted to changes in the available IP addresses. Systems therefore become easier and more intuitive to operate. Documentation of networks with multiple stations can be displayed more clearly.



Standard	RFC-1035
Port	UDP 53

Case study with DHCP and DNS:

It is very easy to integrate devices into networks. A DHCP client automatically obtains network parameters from a DHCP server. This means that, without knowing the network parameters, controllers in existing networks can be integrated. The controller is conveniently accessed by name.

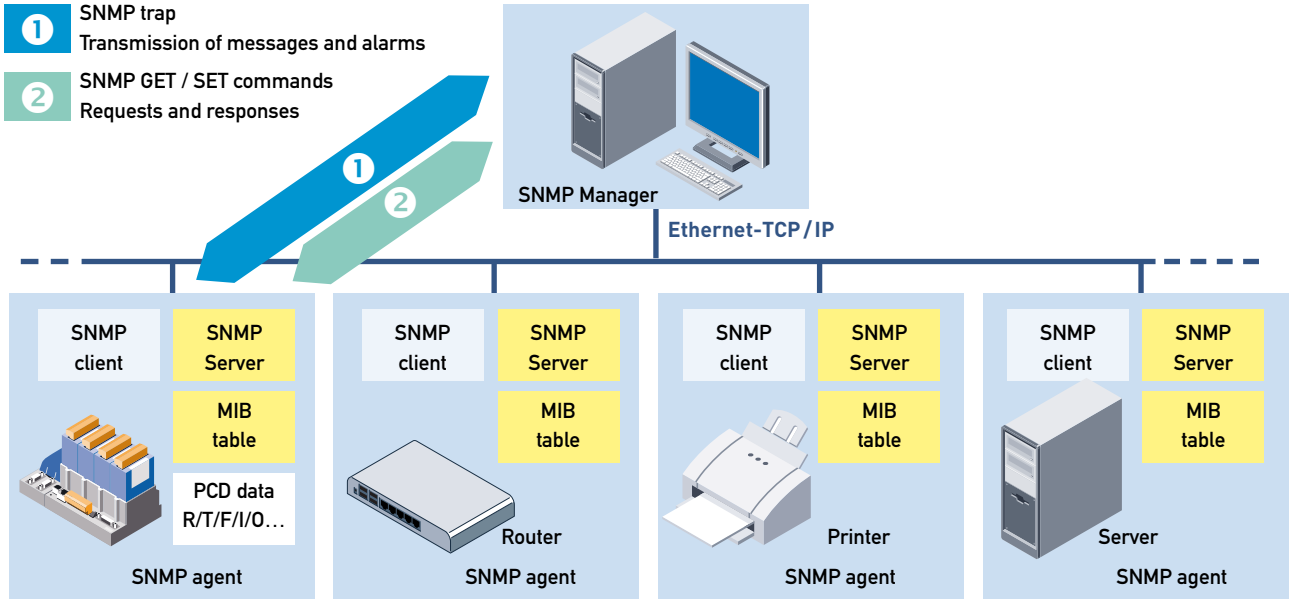


Detailed information about:

SNMP – Simple Network Management Protocol

The Simple Network Management Protocol was developed to allow 'agents' (network elements such as routers, servers, switches or Saia® PCD) to be monitored and controlled from a central station. The SNMP manager software usually runs on a server. It monitors and controls SNMP agents. The SNMP manager reads and sends data from the agent using SET and GET commands. The SNMP agent can also send unrequested 'trap' messages to the SNMP manager. This allows, for example, the direct reporting of faults.

Saia® PCD-MIB has been defined for Saia® PCD with SNMP support. Within it are represented all the resources that can be queried and modified with SNMP. Basically, all PCD media can be accessed (inputs/outputs, registers, flags, DBs, etc.). Within the MIB file, the programmer can restrict access to selected areas only.

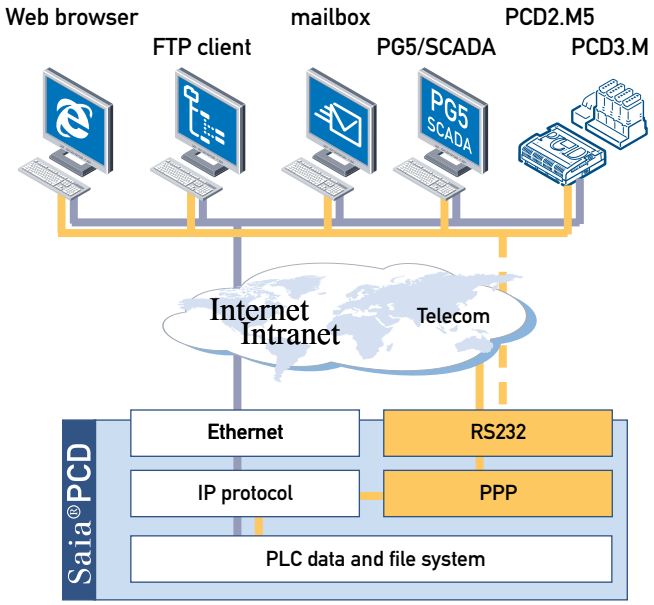


PPP – Point to Point Protocol

This is a protocol established over a communication line from one point (place) to another. PPP is a protocol used mainly to transport TCP/IP communication over a serial line or modem connection.

In order to satisfy the security requirements of dial-up within company networks or installations with critical tasks, the Challenge Authentication Protocol (CHAP) has been introduced.

Via one of the Saia® PCD controller's telecommunications interfaces (PSTN, ISDN, GSM/GPRS) the user has access to the web and FTP server. The same applies for applications with cheaper devices that do not have an Ethernet connection.

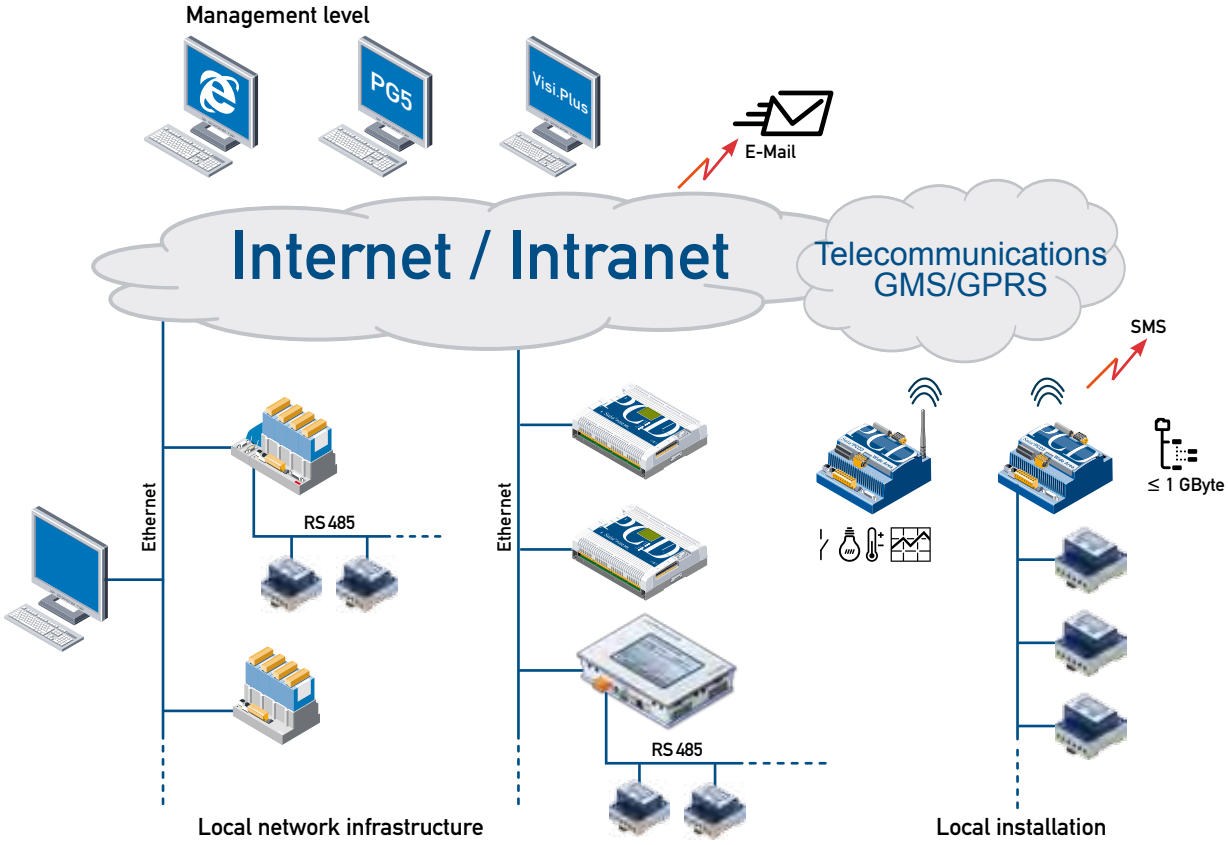


Standard	RFC-1661
Authentication	PAP, CHAP and MS-CHAP
Simultaneous PPP connections	For each Saia® PCD controller, only 1 PPP connection can be active (client or server)
PPP via Ethernet	No

Wide Area Automation

The demands placed on a system are often high when geographical distances are bridged with a relatively large number of substations. The integrated automation server can be used to connect geographically dispersed systems easily over the Internet or Intranet.

Individual controllers can also be accessed wirelessly via GPRS. During commissioning or troubleshooting at a customer site, the controllers can be accessed directly.

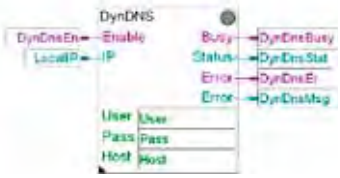


Data gateway via Internet or Intranet

With the extensive protocol library (Modbus-TCP/ RTU/ ASCII, MPI, EIB, M-Bus etc.) and serial RS485 interfaces, nothing can get in the way of efficient communication with components from the field level. Data can be entered quickly and stored locally on SD memory cards in the controller. There, the data can be processed before being transferred to downstream systems, e.g. by way of an e-mail attachment.

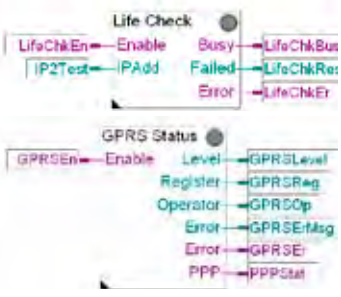
Connection and accessibility

Local networks are often connected to the Internet via routers. The router settings are used to specify the options for accessibility and security. In controllers with an integrated GSM/GPRS modem there is often a problem that GPRS network operators may no longer issue any fixed public IP addresses. One way of intercepting the dynamic allocation of IP addresses is via the DynDNS service. This service now allows the controller to be addressed by a fixed name. This service is controlled directly via FBoxes in the user program.



Diagnostic facilities

So-called "Lifechecks" allow the system to be checked at periodic intervals to see that the connection to the Internet is still in place. If the connection is broken, by a GPRS network fault for example, the controller can re-initialise the connection to the Internet. Other diagnostic parameters enable individual monitoring of communication, e.g. to avoid roaming costs.

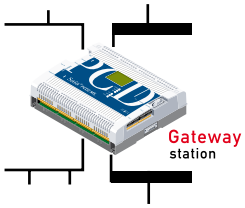


Convenient communication with Saia®S-Net Fact sheet

Properties | Functions | Components | Devices

Multi-protocol operation and multi-master communication

Ether-S-Net and Profi-S-Net controllers support multi-protocol operation, i.e. several different application protocols (S-Bus, S-IO, DP, HTTP…) can be used simultaneously on the same connector and cable. This dispenses with costly parallel wiring for different applications. Ether- and Profi-S-Net devices can exchange data on an event-driven basis in multi-master communication. This results in small network loads and short response times.



Gateway function for Saia®S-Bus

The gateway function allows network crossovers and interface changes to be made. This provides continuous support for programming, data and web services that allow access via the web browser.

The gateway function is an integral part of the PCD operating system and does not require an additional hardware module.

(For detailed information, please consult the PCD/PCS manuals)

Powerful software tools for programming, configuration, commissioning and diagnostics

Convenient network configurator that saves time designing S-Net communication projects.

- Easy programming with PG5 IL instructions or convenient FUPLA FBoxes.
- Continuous access to PCD devices with the PG5 programming tool via the network. With the gateway function, this is also possible across several network levels.

Visualization, control and monitoring

- S-Bus OPC server to connect SCADA systems to Profi-S-Net and Ether-S-Net.
- All new CPUs and RIOs have an integral web server for control, monitoring and diagnostics. The web server includes predefined, device-specific HTML pages for configuration and diagnostics. Application-specific HTML pages can also be created and stored with the convenient S-Web-Editor, or any standard editor (e.g. Frontpage).

Remote monitoring, control, alarms, programming and diagnostics via telecommunications networks

The modem connection (analogue, ISDN, GSM) is included in the operating system of all PCD controllers.

- Economical connection to telecommunications networks with modem modules that can be integrated in the controller.
- Powerful modem libraries simplify the programming of modem communications.

PCD2.M480

PCD3.Mxxxx

PCD3.Txxx (RIO)

PCD7.Dxxx (HMI)

Profi-S-Link

S-Net devices

All controllers with an Ethernet connection (PCD7.F651 or on board for PCD3.Mxxxx CPUs) can be operated on Ether-S-Net. The PCD2.M480, PCD2.M5, PCD3.Mxxxx and PCD3.T76x RIO controllers all have an integral Profi-S-Net interface (up to 1.5 Mbit/ s) in the basic system.

PCD7.D7xx terminals can run on Ether-S-Net. The Profi-S-Link adapter (PCD8.K120) enables programming devices, SCADA equipment, web terminals and web browsers to be connected via Ethernet to Profi-S-Net.

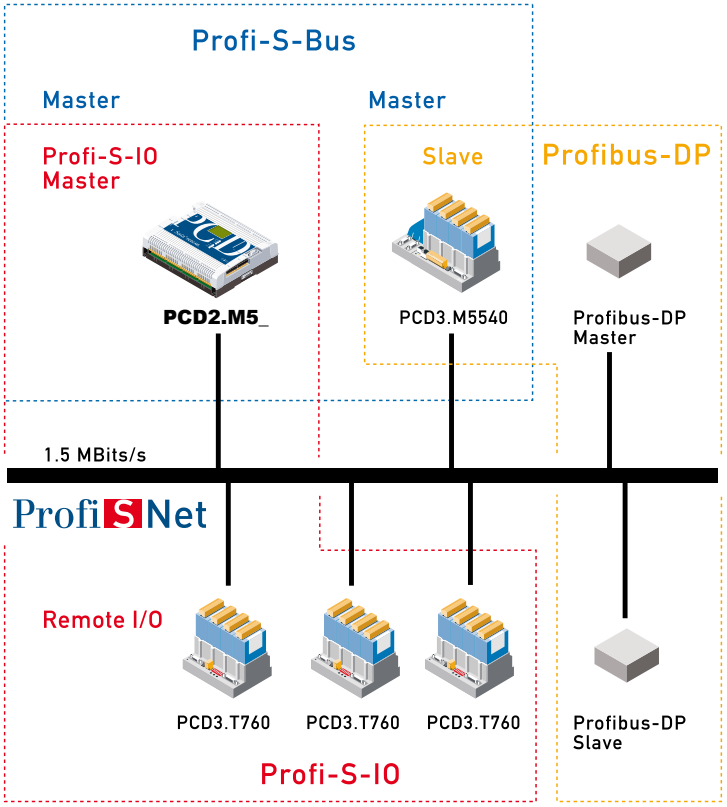
Typical cases

Practical possibilities with S-Net in applications

Multi-protocol operation

3 different logical networks run different tasks simultaneously on the same single physical network (cable).

- The PCD2.M5_ forms a logical network with the PCD3 remote I/O, managing and operating it with the Profi-S-IO protocol.
- In a second logical network, PCD2.M5_ and PCD3.M5540 controllers use the Profi-S-Bus protocol for event-controlled exchange of data in multi-master communication.
- In a third logical network, the PCD3.M5540 controller and one or more foreign slave devices are assigned to a foreign Profibus-DP master. These devices communicate using the Profibus-DP protocol.



Advantage

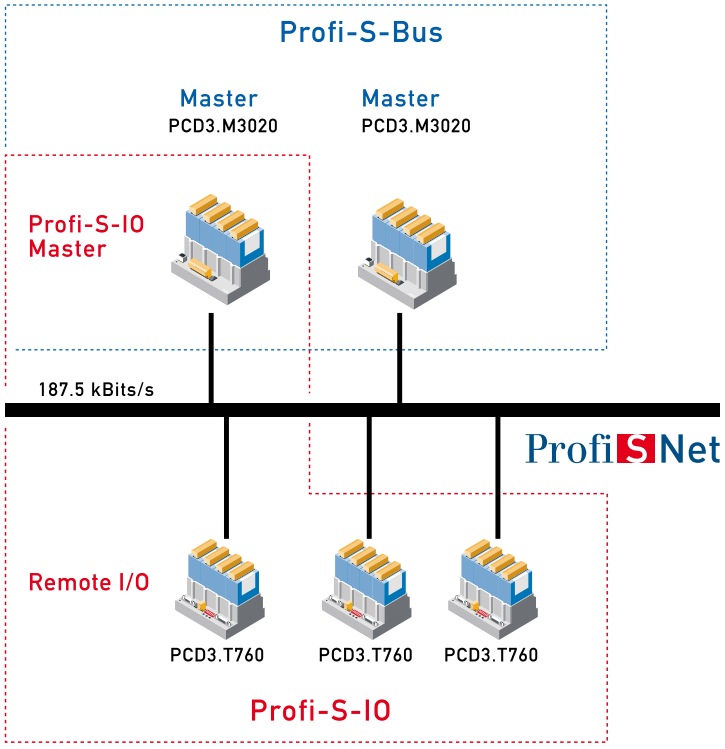
Different communication tasks are carried out on a single physical network with a single network connection to the PCD controllers. Costs are then saved in all areas:

- There is no requirement for separate physical network structures.
- Existing network infrastructures (e.g. Profibus-DP) can be exploited.
- No additional interface cards are required in the PCD controller.
- The design costs of the communication project (planning, configuration, programming) are therefore reduced.

Economical communication with Profi-S-Net

Low-cost PCD3.M3xxx controllers, PCD3.Txxx RIOs and PCD7.D7xx terminals can be used to produce efficient, economical networks. These devices all have a built-in Profi-S-Net interface that can run at up to 187.5 kBit/s.
At this baud rate, installation requirements are not high and economical cabling and connectors may therefore be used.

These economical Profi-S-Net networks are ideally suited for communications tasks that are not time-critical, such as in building automation. Multi-master functionality still allows the efficient exchange of data between master devices, particularly when there is a large number of network stations. This also gives the terminal access to all controllers.



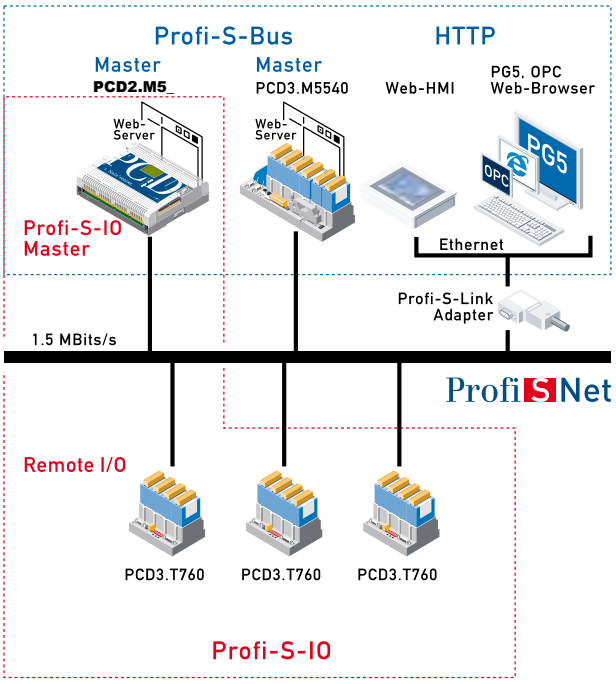
Typical cases

Practical possibilities with Saia® S-Net in applications

Direct connection of PCs to Profi-S-Net

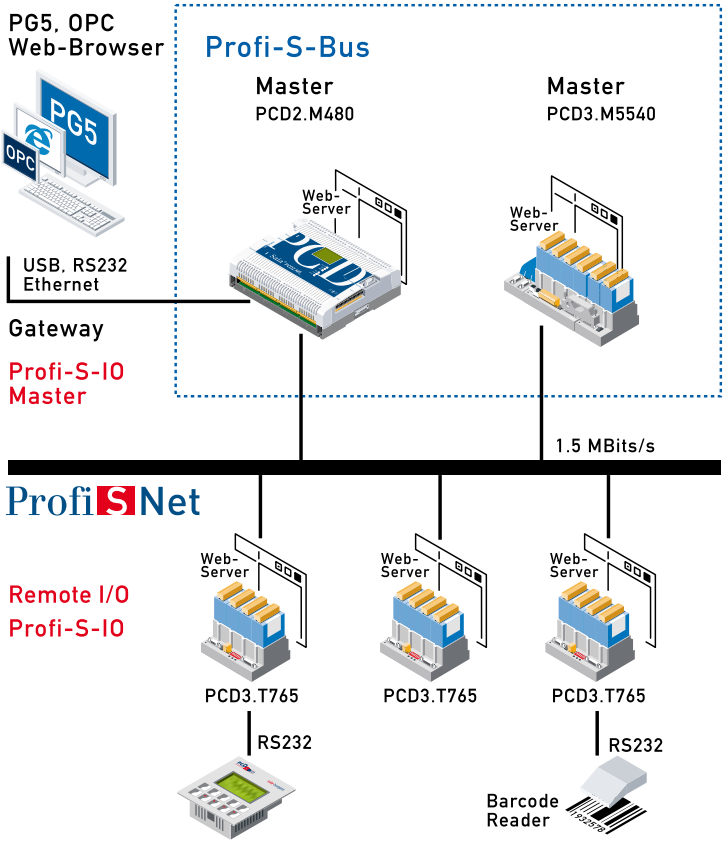
Standard PC systems and/or web terminals can be connected with the Profi-S-Link adapter directly to a Profi-S-Net network. In this way, a PG5 programming unit, web browser or SCADA system with OPC server can access Profi-S-Net devices. The web browser is used to upload HTML pages via Profi-S-Bus and the HTTP protocol from the controllers' built-in web servers. The compact size of the Profi-S-Link adapter makes it ideal not only for fixed installation, but also for mobile use with a notebook.

In contrast to a fixed interface card installed in the PC, the Profi-S-Link adapter can also be used with different PCs, simply by connecting to the Ethernet interface. This completely avoids the costly and time-consuming installation of hardware and software – with all the associated operating system and driver compatibility problems.



Interconnected communication and programming with gateway function

The integral gateway function in a PCD2.M480 or PCD3.Mxxxx provides interconnected communication via the USB, RS232, modem or Ethernet interface to devices on Profi-S-Net.



Central management of decentralized functions

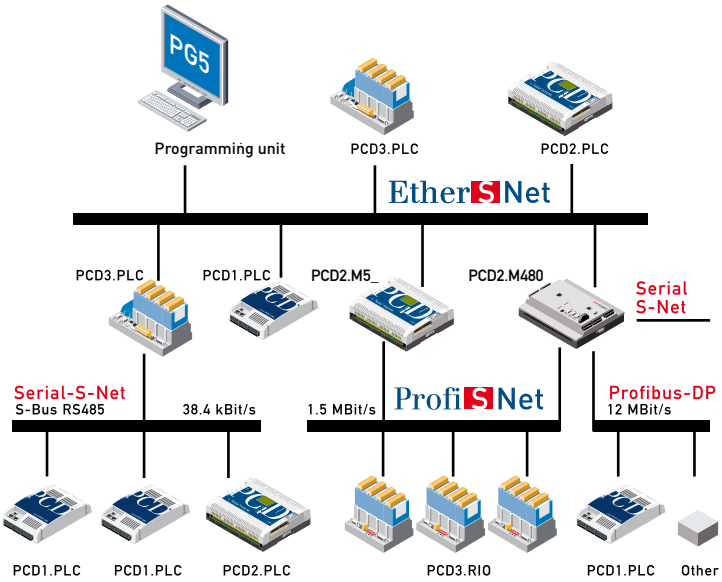
Plug-in technology turns even simple PCD3 remote I/O devices into intelligent, decentralized equipment. With functions assigned in the form of plug-in components (C code), PCD3-RIOs are capable of independently carrying out such tasks as:

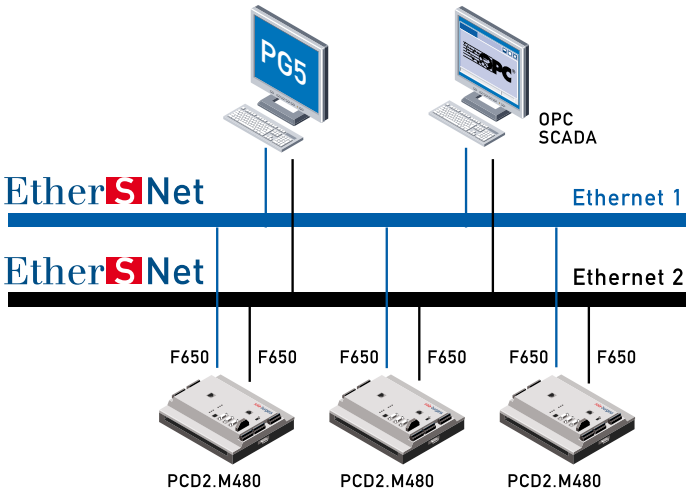
- Pre-processing of I/O signals
- Dealing with equipment (e.g. terminals, bar-code readers, etc.) that is connected to the RS232 interface included with PCD3.T765 RIOs
- Fast processes can be handled locally in the remote I/O.
- If the master controller fails, decentralized functions provide for emergency operation or stop the process in a controlled way. This involves management of remote functions by the PCD2.M480 Profi-S-IO master, with automatic distribution to PCD3.T765 RIOs via the HTTP protocol. In such cases, PCD3.RIOs will be active stations on the bus and will also autonomously request plug-in components as required from the Profi-S-IO master device.

These functions, which are supported by S-Net, demonstrably reduce the expense of commissioning and maintenance for devices and systems.

Continuity and investment protection

PCD2.M480, PCD2.M5 and PCD3.Mxxxx controllers all have S-Bus RS485 interfaces. These can be used to extend existing systems (having oldergeneration PCD devices) with Profi-S-Net and/or Ether-S-Net. The gateway function also supports interconnected access across multiple network levels. PCD1 or PCD2 controllers with a PCD7.F651 Ethernet module may also be integrated compatibly within an Ether-S-Net network. The Profibus-DP master module even allows devices running at 12 **MBit/s to be con**nected to a Profi-S-Net controller.





Redundant Ethernet connections

With 2 available slots for PCD2.F651 Ethernet modules, the PCD2.M480 can be easily and cheaply upgraded for use in redundant networks. This is often a requirement in systems with high security standards, such as traffic control in tunnels. Each connection has its own IP address and supports the Ether-S-Net protocols.

The Saia® OPC server also supports operation on two redundant networks, monitoring both communication paths to the PCD controllers, and automatically switching to the other connection in the event of a fault.

2 × Ethernet with firewall and as gateway

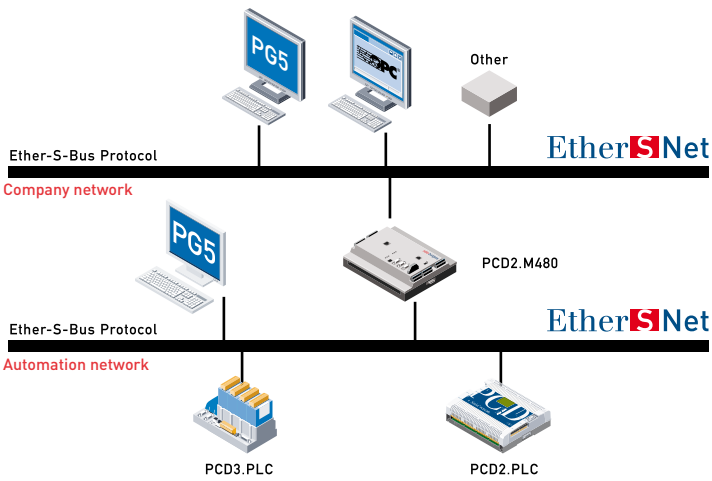
Two Ethernet interfaces enable the PCD2.M480 to be inserted as a gateway with firewall function between two physically separate networks (e.g. a company network and an automation network).

2 × Ethernet with firewall

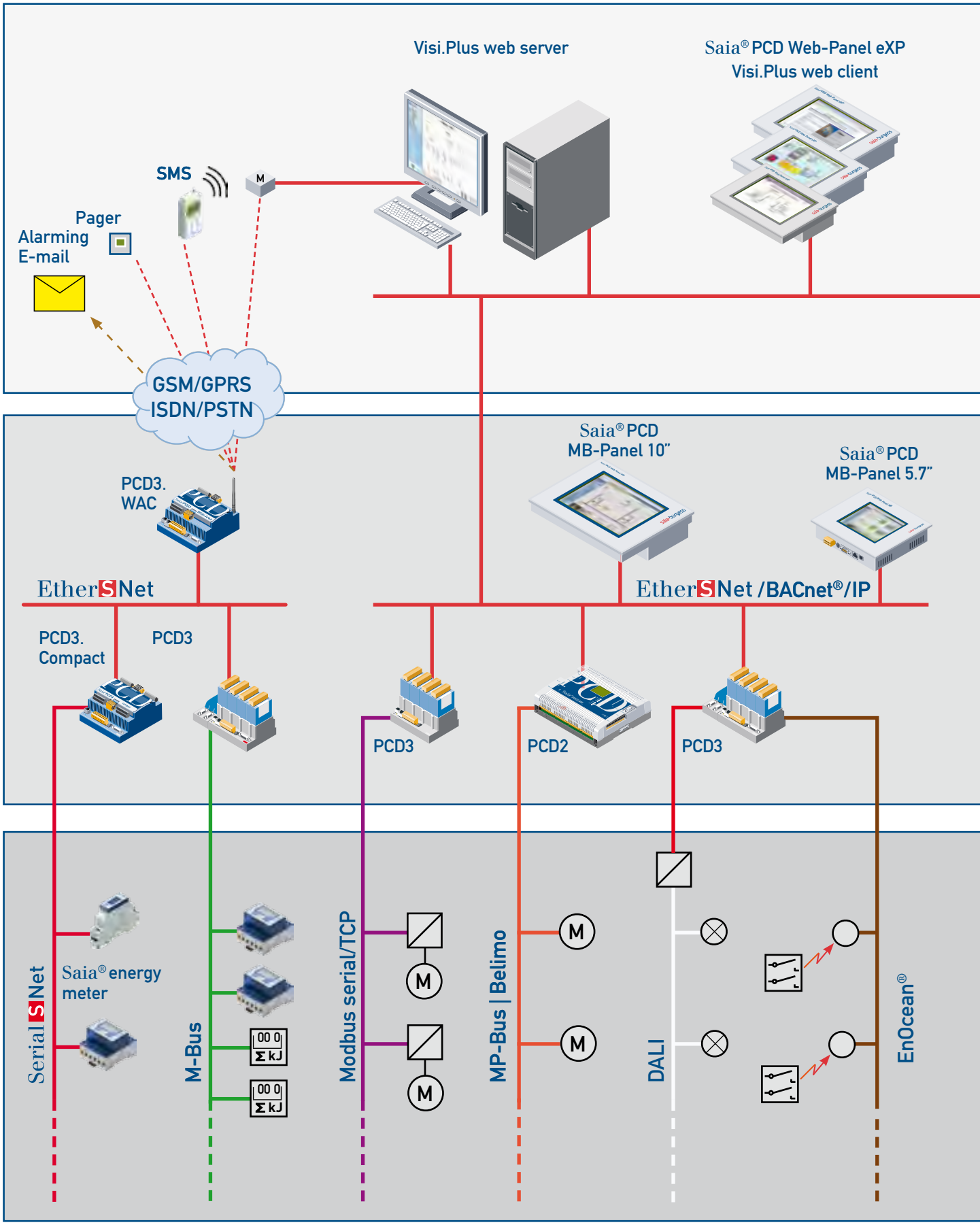
Both Ethernet interfaces have their own IP addresses and are completely separate at the Ethernet and TCP/IP level. Ethernet and IP telegrams are not transferred to the other network. Access to PLC media is only achieved through use of the Ether-S-Net protocol. Hackers using the TCP/IP protocol are excluded from attacking PLC media or the second Ethernet interface.

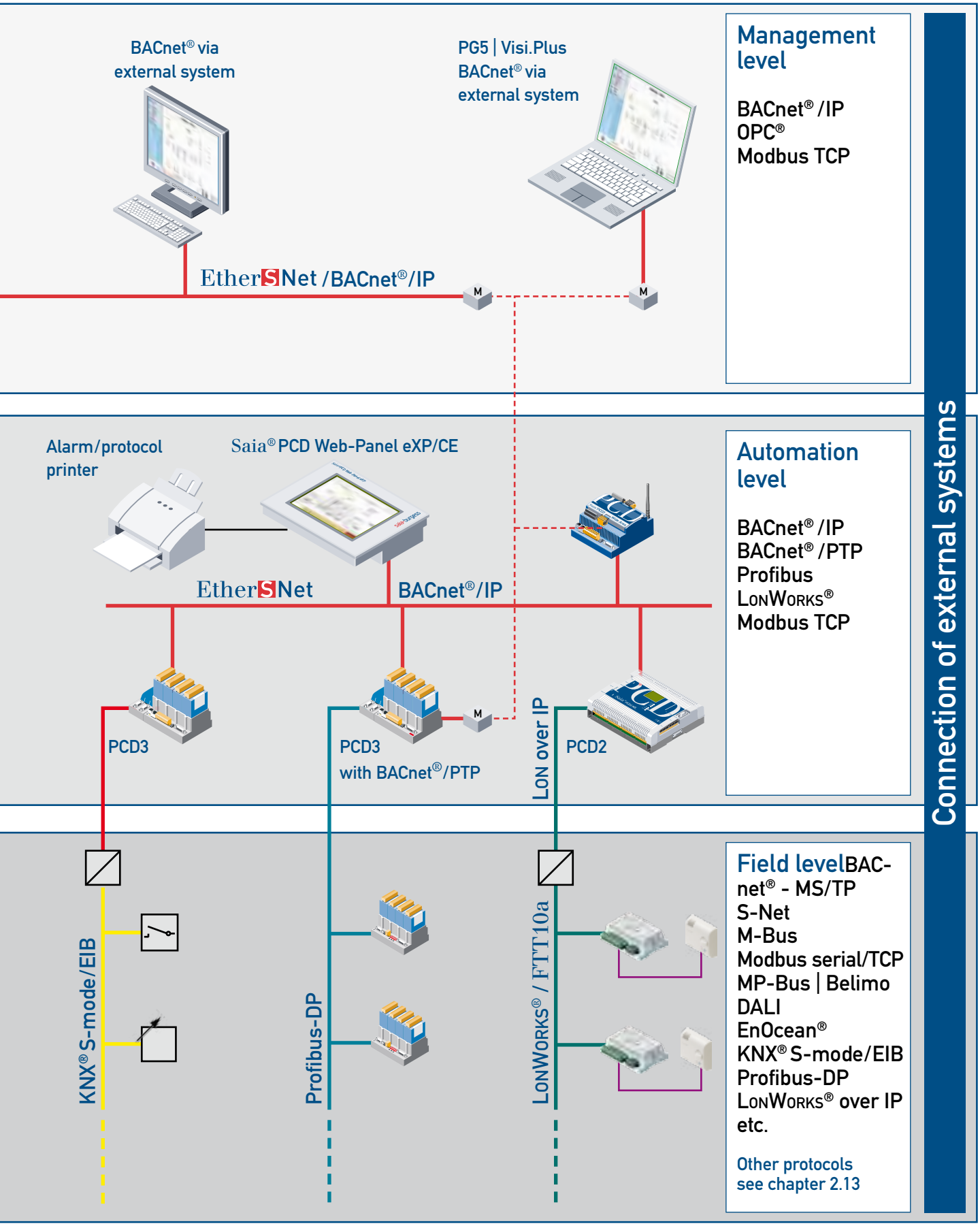
2 × Ethernet withgateway function

Thanks to the PCD2.M480's integrated gateway function, devices that support the Ether-S-Net protocol (PG5, OPC server, PCD controllers) have interconnected access to PCD controllers in the other, physically separate network.



2.4 Overview diagram | Open communication at all levels




BACnet® via external system
PG5 | Visi.Plus BACnet® via external system
EtherSNet /BACnet®/IP
M
M
Management level
BACnet® /IP
OPC®
Modbus TCP
Alarm/protocol printer
Saia® PCD Web-Panel eXP/CE
EtherSNet
BACnet®/IP
PCD3
PCD3 with BACnet®/PTP
M
LON over IP
PCD2
Automation level
BACnet® /IP
BACnet® /PTP
Profibus
LonWorks®
Modbus TCP
KNX® S-mode/EIB
Profibus-DP
LonWorks® / FTT10a
Field level BAC-net® - MS/TP
S-Net
M-Bus
Modbus serial/TCP
MP-Bus | Belimo
DALI
EnOcean®
KNX® S-mode/EIB
Profibus-DP
LonWorks® over IP
etc.
Other protocols see chapter 2.13
Connection of external systems

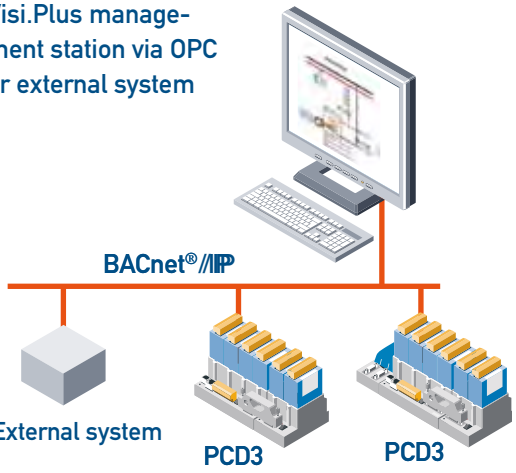
2.5 BACnet® | Interoperable and multivendor capable

Open systems are the prerequisites for integrated building technology. Saia-Burgess Controls wishes to take this fact into account and has therefore developed the new Saia® PCD product family as BACnet® Building Controller (B-BC) following ANSI/ASHRAE 135-2001.

Features

- BACnet® / IP server and client
- BACnet® / PTP on RS232 basis (inc. half-router function for modem)
- BACnet® / IP broadcast management device (BBMD) supports foreign device registration (FD)
- Up to 1200 BACnet® objects per controller
- Trend logs up to 4 GB
- Scheduler, Calendar, Event Enrolment, Alarming, Command and others
- Integration of other open protocols, e.g. KNX/EIBnet, Profibus, MP-Bus, etc.
- Freedom and ease of programming with Saia® PG5 Controls-Suite

Visi.Plus management station via OPC or external system



PCD as BACnet® Building Controller (B-BC) with complementary functions

The PCD supports 23 data objects, according to the ANSI ASHRAE 135-2004 standard:

Data exchange:
- Analogue Input, Output and Value with Priority Array
- Binary Input, Output and Value with Priority Array
- Multistate Input, Output and Value with Priority Array

BACnet® program: Accumulator, Averaging, Calendar, Command, Device, File, Group, Loop, Program, Pulse Converter, Schedule, Event Enrolment, Notification Class and Trendlog Object

BACnet® services:
- Data communication (data sharing) with change-of-value or polling
- Event-oriented alarm and event services
- Time Synchronization, UTC Time Synchronization (as master and slave)
- Bidirectional connection via modem
- Backup / restore according to B-BC requirement
- Flexible definition of write and read access, according to a priority mechanism
- User-programmable client configuration for exchanging data with other automation stations

Certificates

PCD3.M3

PCD3.M5

PCD2.M5

Efficient engineering

There is even more convenience for system integrators with new application FBox libraries, DDC Suite V2.0 and Room Controller V2.0. With BACnet® available at the press of a button, a BACnet® configuration will be generated automatically when the user program is written.

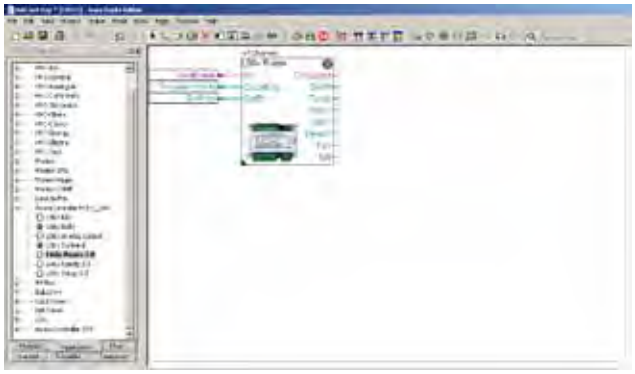
All the necessary settings are applied within the HeaVAC applications FBoxes.

The application can be written as usual with the Saia® PG5 controls suite .

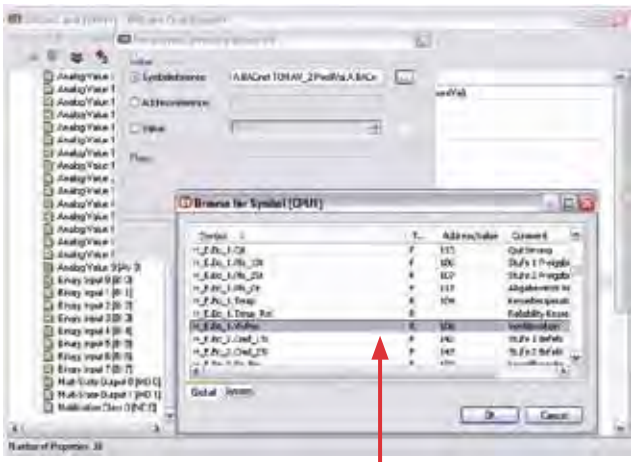
The BACnet® configurator it contains will allow complete freedom in setting the parameters of all BACnet® objects. Any conceivable task can then be undertaken.

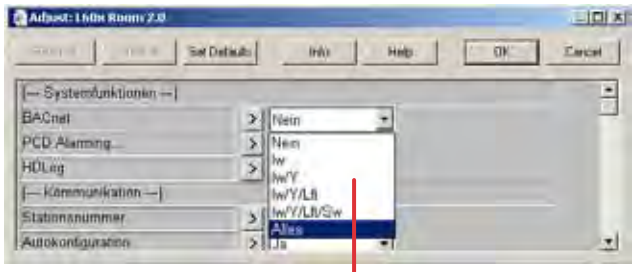
Clearly structured dialogues give a good overview when setting Scheduler, Trending, Alarming parameters, etc.

PG5 Fupla Editor

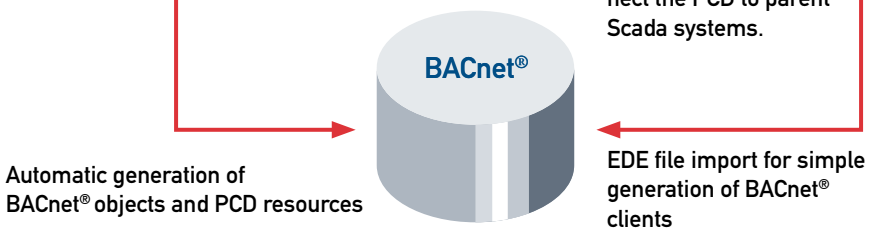


BACnet® configurator in the Saia® PG5 Controls-Suite



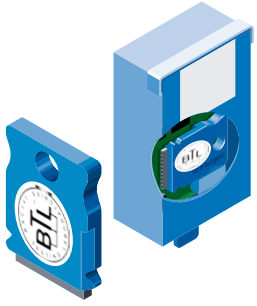


BACnet® adjust window



Ordering information: memory modules

Type	Description
PCD3.R560	BACnet® option module for PCD3.M3 and PCD3.M5, for I/O slot 0…3
PCD3.R561	BACnet® option module for PCD3.M3 and PCD3.M5, for I/O slot 0…3 Incl. 1 MB backup and 1 MB file system
PCD7.R560	BACnet® option module for PCD2.M5 and PCD3.M5, for memory slot M1 or M2
PCD7.R561	BACnet® option module for PCD2.M5 and PCD3.M5, for memory slot M1 or M2 Incl. 1 MB backup and 1 MB file system



2.6 LonWorks® | Wide selection for connecting the field level

The standard for building technology

LonWorks® technology is a universal communications protocol that has been established in building and factory automation for years. The various advantages of LonWorks® such as decentralized intelligence, modular structure, interfaces that match requirements and possibilities for adapting to existing infrastructures, all make it an interesting technology for data transfer in the field area and for backbone systems. The individual network users, the so-called nodes, can exchange data among themselves on an event-driven basis. LonWorks® forms the platform for vendor-independent communications within inter-plant building automation.

Saia® DDC.Plus systems satisfy the most diverse requirements, thanks to their modular construction and great flexibility. The "DDC.Plus" Lon IP host node is based on a modular, freely programmable control and automation system with the latest web-IT technology.

Features

- Variables supported according to LonMark®
- Platform change and modifications*, extensions* possible without loss of binding
- Lon systems supported on IP basis
- Integral Lon IP configurator in PG5 for selecting and defining standard network variables (SNVT)

*For Lon IP in preparation

Typical applications with LonWorks®

- Heating, air conditioning and ventilation control
- Lighting control
- Controls of sun blinds
- Safety
- Energy management etc.

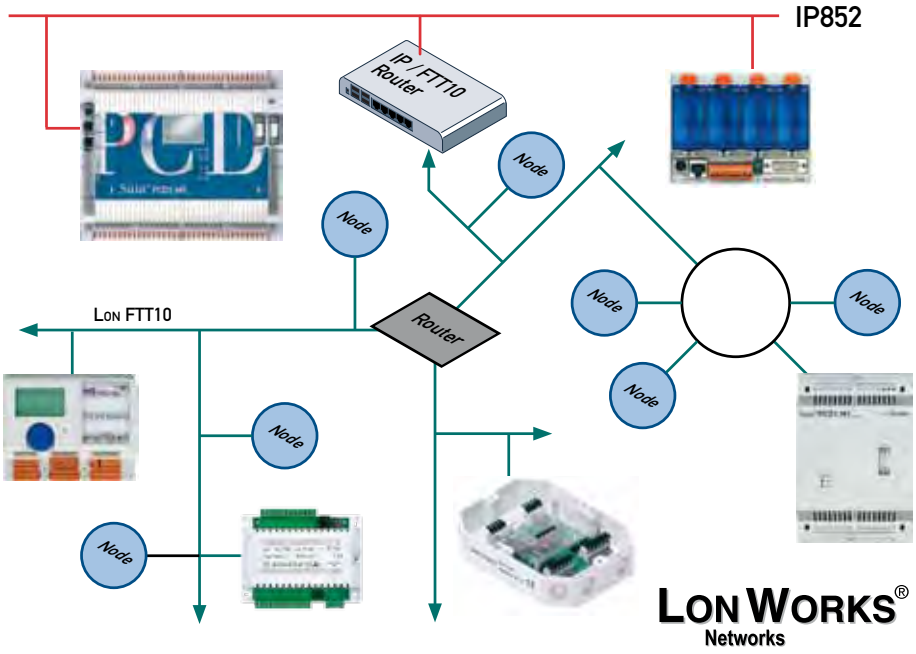
Lon systems on

FTT10 basis

- PCS1.C88x
- PCD1.M125, PCD1.M135
- PCD2.M150, PCD2.M170

Lon Systems on IP basis

- PCD3.M3xxx
- PCD3.M5xxx
- PCD2.M5540
- LonWorks® memory module
- Option PCDx.R58x

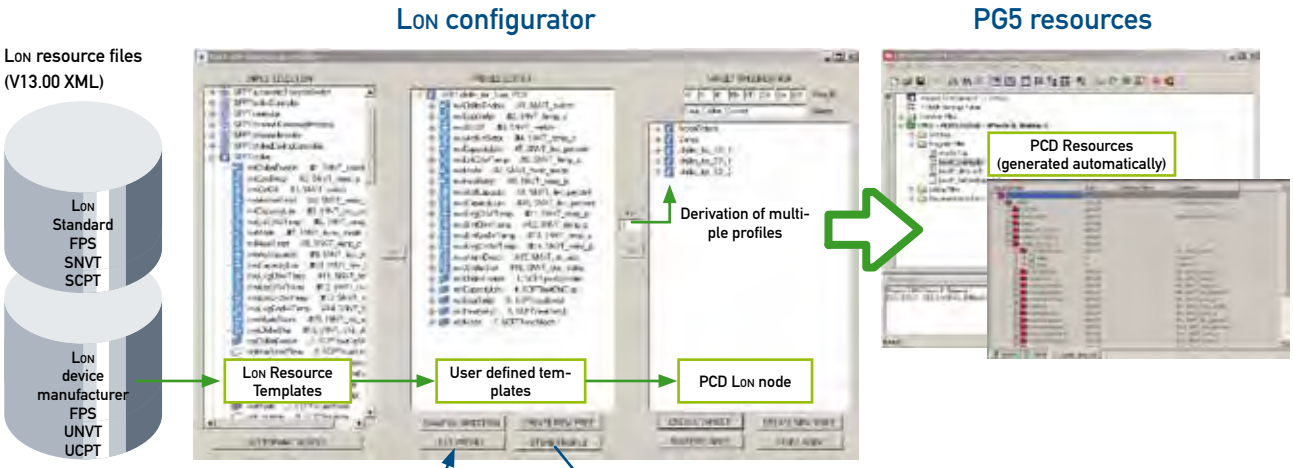


The Lon on IP System

Saia® automation stations can be expanded with a PCD7.R581 memory module option to become a powerful LonWorks® host. Communication is IP852-based. For transitions to other interfaces, e.g. FTT10 or Power Line, the system integrator can use external routers and media couplers.

Note: For each Lon IP network, an external LonWorks® configuration server should be provided (e.g. LIP from Loytec as FTT10 router, including configuration server).

Lon IP, efficient engineering with templates



Configurations

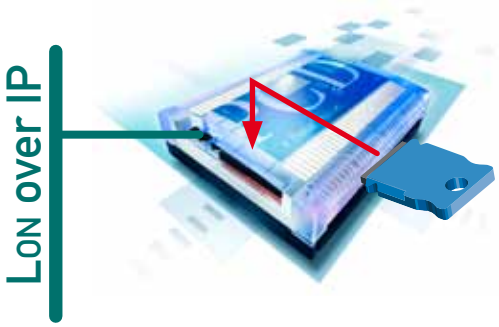
Configuring a PCD host node can be quite a big job, depending on the project size. Using a newly developed template concept, the system integrator can make just a few entries to derive hundreds of similar nodes from one definition and generate PCD resources automatically.

Templates from OEMs and in-house XML templates can be processed. In the Lon IP configurator, LonWorks® standard templates can be extended with additional information, such as resources used, scaling, etc. and saved as in-house templates. Templates edited in this way can be combined at will and reworked further to form the Lon node.

Thanks to the high reusability of templates, engineering becomes a critical advantage over the competition.

Standard network variables SNVT

Because it is implemented as an IP stack for the Saia® operating system NT-OS, up to 2000 SNVTs (standard network variable types) can be defined in one DDC substation and linked with other PCD or foreign systems. All SNTVs currently specified in LonMark® are supported by PCD systems.



Order details

Type	Description
Lon on IP with PCD3.M3xxx | PCD3.M5xxx and PCD3.M6xxx	
PCD3.R580	Flash memory module with Lon over IP firmware for PCD3.M3120 and ..M3330, plugs onto I/O slots 0...3
PCD3.R581	Flash memory module with Lon on IP firmware for PCD3.M3120 and ..M3330, with 1MByte as backup for user program and 1MByte with file system, plugs onto I/O slots 0...3
Lon on IP with PCD3.M5xxx | PCD3.M6xxx and PCD2.M5	
PCD7.R580	Flash memory module with Lon on IP firmware for PCD2.M5xxx and PCD3.M5xxx/..M6xxx plugs onto slot M1 or M2
PCD7.R581	Flash memory module with Lon on IP firmware for PCD2.M5xxx and PCD3.M5xxx/..M6xxx, with 1MByte as backup for user program and 1MByte with file system, plugs onto slot M1 or M2
Lon FTT10 with PCD1 | PCD2.M	
PCD7.F800	LonWorks® interface module
PCD7.F802	LonWorks® interface module with additional RS485 interface
Lon FTT10 with PCS1	
PCS1.C88x	Configured compact controllers with integral LonWorks® interface module

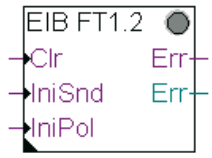
2.7 KNX® S-Mode/EIB | Ideal for the electrical trade and private buildings

Efficient networking of building technology requires powerful inter-plant functions and components to communicate with foreign devices. Freely programmable Saia® automation stations offer a wide variety of possibilities for integrating communication in the KNX/EIB field. Depending on which interfaces (RS232 or Ethernet) are available for accessing the KNX/EIB network, a comprehensive software library allows the necessary components to be linked with Saia® PCD or Saia® PCS systems.

Direct connection via Ethernet communications makes accessing KNX/EIB data significantly faster and more powerful.

Features

- Use of driver for all Saia® automation stations
- Easy communications pick-up with Fupla modules
- Comprehensive support for EIS data formats in EIB S-Mode
- The driver supports the new serial KNX BCU 2 interface via RS232
- The driver supports easy upgrading of existing systems with KNX-BCU1 to the KNX-BCU 2 interface
- The driver also supports KNXnet/IP (EIBnet/IP) communication for high-performance systems

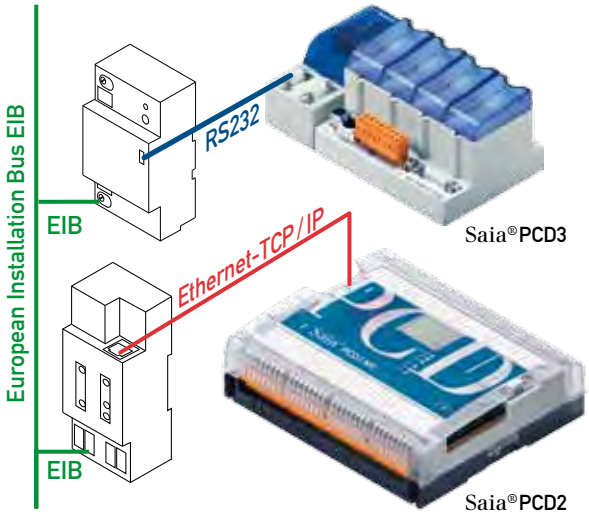


Function box 232 / BCU 2

Function box KNX / IP

Communication features

- BCU 1 mode with single-character acknowledgement (not recommended for new installations)
- BCU 2 mode with telegram acknowledgement
- KNX® S-Mode standard communication
- RS232 connection (BCU 1 or BCU 2)
- Ethernet connection via KNXnet/IP router



Different solutions for different tasks

Installations with an existing KNX/BCU 1 connection can be upgraded at little cost to KNX/BCU 2 mode.
The new Ethernet-based connection is recommended for medium to large installations and for new construction. This interface makes full use of speed advantages and therefore reduces the load on the Saia® PCS or Saia® PCD automation stations.

The following external EIB RS232/ Ethernet converters are recommended

SIEMENS® Gamma Instabus interface	5WG1 148-1AB21 KNXnet/IP
SIEMENS®Gamma Instabus router	5WG1 146 KNXnet/IP inc. router use
SIEMENS® Gamma Instabus interface	5WG1 148-1AB04 RS232 BCU 2 use

Order details

Hardware: Purchase of converters via the electrical installation market
PG5 software - EIB: EIB function box library for building automation

2.8 Profibus-DP
Integration of machines and the industrial environment

Profibus in building automation

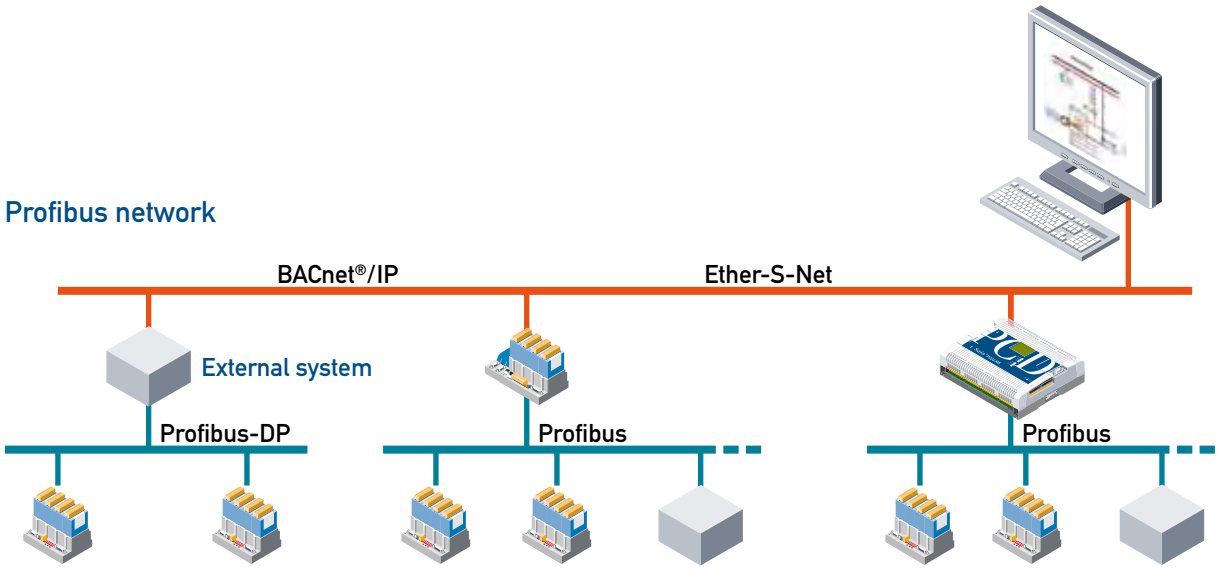
Profibus is the EN 50170 international standard bus for industry and building automation. Profibus opens up the world of standardised network communication for all kinds of applications between different manufacturers.

- Profibus is completely open and producer-independent
- More than 3 million different Profibus devices (such as PCs, controllers, control terminals, drives, valves, remote data points, etc. from more than 600 suppliers) are in use today worldwide. That results in a high degree of safety and investment protection for the user.
- The Profibus user organisation (PNO) maintains a qualified system of certification and checks that Profibus products comply with standards and interoperability requirements. Saia-Burgess Controls has PNO representation across Europe.
- Profibus-DP is the fast network protocol (up to 12 Mbit/s) for the field level in production automation. Increasingly, it is also used in building automation, because of its large range of accessories.

Profibus with Saia® PCD

In the broad Saia® PCD range, users will find all the control components they need for building decentralized controllers. The Profibus connections to DDC sub-stations are modular and can therefore be used specifically where they are needed. Remote data points - called PCD3.T7xx - and intelligent control terminals supplement the broad Profibus range of Saia® automation systems.

Profibus network



Profibus network configurators

The PG5 programming tool provides comfortable network configuration tools for all network versions. With these tools, users define variables, objects and network parameters.

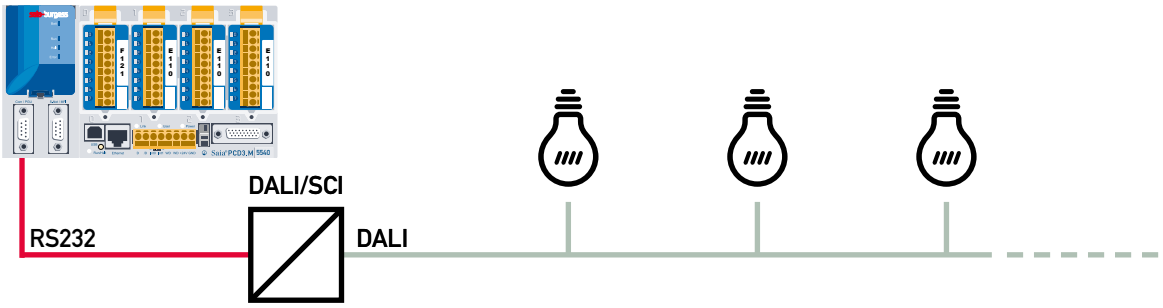
2.9 DALI | The bespoke system for lighting in difficult buildings

DALI® (Digital Addressable Lighting Interface) is a system for convenient, synchronous control of lighting units. With its origins in lighting equipment for theatres and the film industry, this system has now become established in building technology for simple lighting tasks as well as complex ones.

The Saia® PCD communications driver forms a bridge between the DALI® lighting control network and the HeaVAC automation system. With demand-oriented control concepts and intelligent management of lighting based on Saia® PCD automation systems, lighting concepts can be implemented with optimized use of energy.

Features

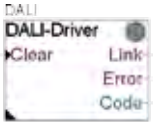
- Programmable via the Saia® PG5 Controls-Suite
- Easy configuration with convenient software function blocks (FBoxes)
- Communication via RS232 using the DALI® SCI interface from TRIDONIC.ATCO
- Control of individual lamps or groups of lamps
- Control of on/off settings and dimming factors
- Control of staging (requires setting of appropriate DALI® scene parameters)



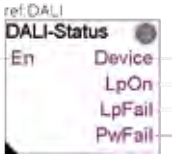
The range of function blocks allows individual lamps or lighting groups to be switched on or off or dimmed directly.

Elements of the library:

Driver element (1 per interface)



Status monitoring (1 per element to be monitored)

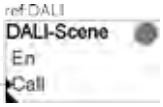


Lighting control - on/off (1 per lamp/group)

Lighting control - dimmer (1 per lamp/group)

Lighting control direct (1 per lamp/group)

Stage control (1 per set)



Recommended hardware

Type	Description	Manufacturer
DALI-SCI	DALI/RS232 converter Item number 24033463	TRIDONIC.ATCO

Software order details

Type	Description
PG5 DALI communication library	PG5 library to connect DALI network components to Saia® PCD|PCS automation systems

2.10 EnOcean® | Room automation with no cables for sensors and actuators

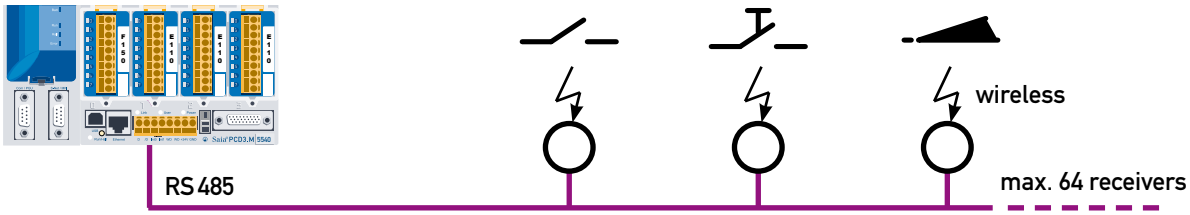
The FBox library from Saia® makes communication even easier with bidirectional transceivers. It is now possible not just to receive information, but to execute switching and configuration commands via wireless.

This technology can be easily and efficiently integrated with Saia® automation systems. With one or more EnOcean® couplers installed locally within the building, wireless-operated room control devices can be connected to the automation systems without any problem.

Features

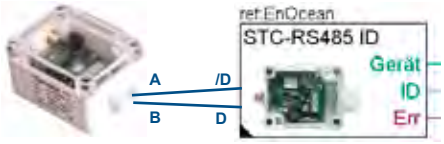
- Communication via RS485 and connection of up to 64 couplers
- Many standard EnOcean® components supported
- The communications driver also supports bidirectional communication
- FBox library for the various EnOcean® components
- Intuitive engineering and simple commissioning
- Event-driven communication, no network load from polling

Connection diagram of the wireless receiver via RS485:

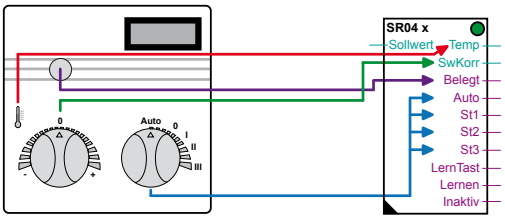


The number of transmitters per receiver is only limited by distance and reception quality.

Example of driver circuit in FUPLA editor



Example of a logical connection between the FBox and a room control device



Order details

Type	Description
EnOcean network components	
Q.SRC65-RS485E	EnOcean wireless receiver with RS485 interface, IP65 housing with external aerial
Q.STC65-RS485E	EnOcean wireless receiver/transmitter with RS485 interface (bidirectional), IP65 housing with external aerial
Q.APG03U-RS485	EnOcean wireless receiver with RS485 interface, White plastic - housing IP20 for interiors
Q.APG03B-RS485	EnOcean wireless receiver/transmitter with RS485 interface (bidirectional), White plastic - housing IP20 for interiors
Software	
PG5 - EnOcean	PG5 - EnOcean Library Bidirectional EnOcean library for connection of EnOcean technology

2.11 Modbus | The first open bus system to be a global standard for automation

Modbus is communications protocol based on a master/slave or client/server architecture. It is widely used and supported by many manufacturers and devices. In many cases, therefore, Modbus is the common denominator for exchanging data between different devices and systems.

Modbus with Saia® PCD

Modbus exists in three versions:

- Modbus-ASCII

Data is transferred in ASCII format across serial interfaces (RS232, RS485).

- Modbus-RTU

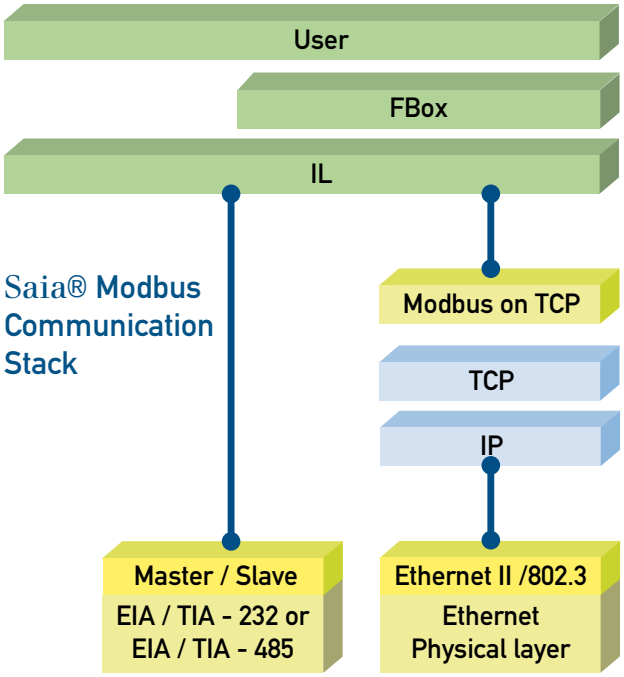
Data is transferred in ASCII format across serial interfaces (RS232, RS485).

- Modbus-TCP

Data is transferred in TCP/IP or UDP/IP packages via Ethernet.

The Modbus protocol is supported in the firmware of all Saia® PCD1.M2_, Saia® PCD2.M5_ and Saia® PCD3 CPUs. Client and server functionality is available for all types of protocol.

OSI/ISO graphic:

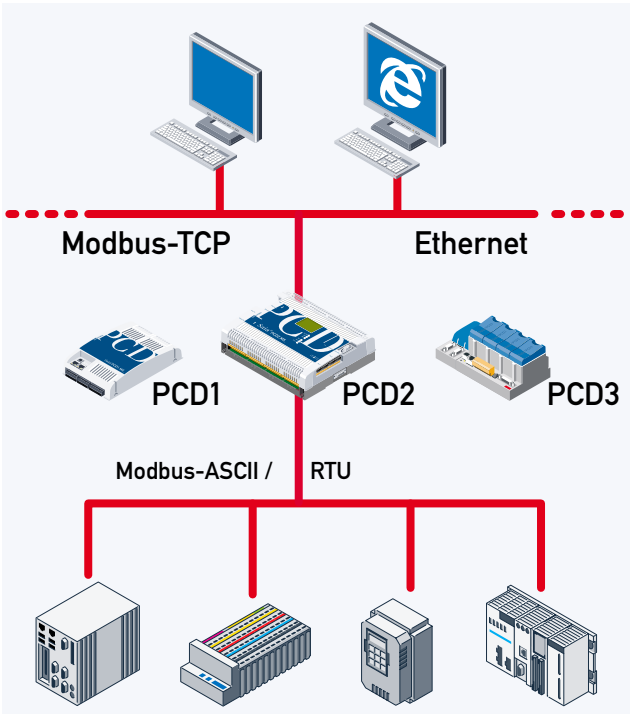


The ISO/OSI model shows the protocol variants and hardware interfaces supported by Saia°PCD systems.

The PCD controllers already contain the Ethernet and serial (RS232 and/or RS485) ports in the basic device. With additional plug-in modules, up to 9 serial Modbus interfaces can be run from each PCD system.

For efficient and simple use of the interfaces, users are provided with a convenient FBox library. IL programmers enjoy even greater flexibility with the CSF commands supported by the operating system.

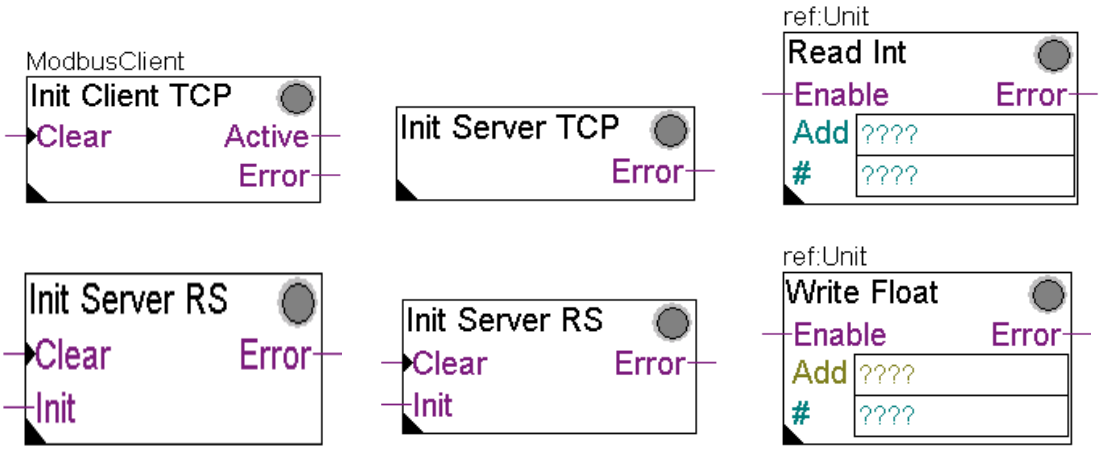
Example application:



Modbus with Saia® PCD

In conjunction with the integral Automation Server, third-party systems can also be easily incorporated via Modbus into higher ranking web/IT automation environments.

For the configuration and programming of data communications, CSF commands or convenient Fupla FBoxes are available.



Technical data Saia® Modbus

Function codes supported:

1 Read Coils
2 Read Discrete Inputs
3 Read Holding Registers
4 Read Input Registers
5 Write Single Coil
6 Write Multiple Coils
7 Write Single Holding Register
8 Write Multiple Holding Registers

Media mapping:	user-configurable
Mapping areas:	max. 10 per UID
Number of servers:	max. 4 per PCD System
Number of unit IDs:	max. 10 per PCD System
Number of channels:	max. 10 per PCD System

Number of connections:

A maximum of 26 connections can be established per Saia® PCD system. Of these, a maximum of 10 may be used as client connections on the Saia® PCD controller. The remaining connections can be used as server connections to the same Saia® PCD controller.

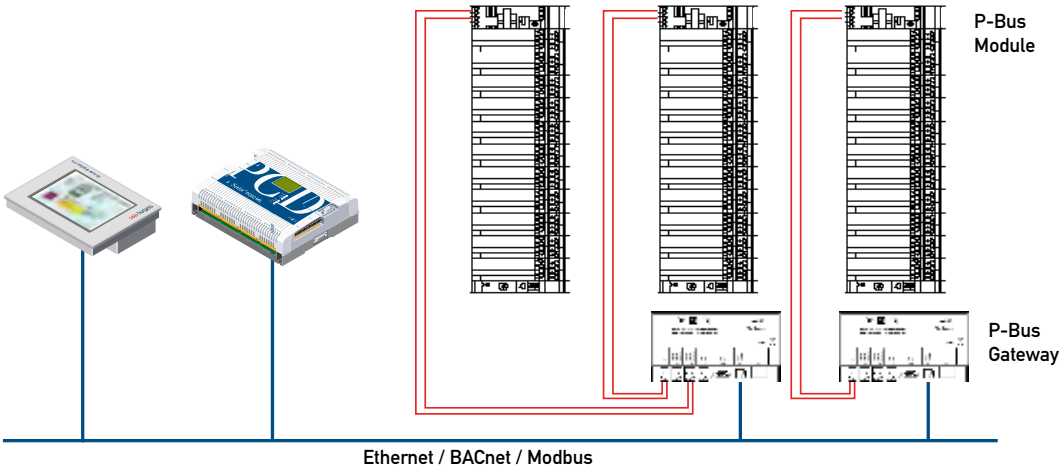
2.12 P-Bus | Integration of Siemens legacy systems into the Saia® PCD environment

Gateway module for Siemens® P-Bus or based on Modbus TCP

To modernize or extend the functionality of old systems that were fitted with PRU or PRV controllers, all you need is a gateway produced by Persy. This gateway can be used to address up to 2 P-Bus-branches, each with 64 data point modules, directly across a Saia® PCD controller. Direct connection is possible via the Ethernet, RS232 or RS485 interface. With an FBox family, P-Bus data point modules can be driven directly from the PCD application program.

Features

- 2 P-Bus branches each with 64 modules can be addressed using each gateway
- Parameters are set via a convenient web interface
- The interface can be connected to the PCD system via 232 or RS485
- P-Bus modules are addressed via an FBox family



Communication with the gateway is based on Modbus TCP (Modbus Library from SBC (previous page) needed).
These gateways can be obtained from Persy: www.persy.nl

2.13 MP-Bus | Convenient and secure integration of BELIMO® actuator drives

Networking of field devices

The networking of field devices gives high functionality and economical operation. This is achieved with the MP-Bus modules in Saia® automation systems, which exchange data with BELIMO® actuating drives.

- Software support for setting parameters and triggering the damper actuators.
- Information calling on current damper position, actuator status, number of movements, etc.
- Higher order networking via Saia® Serial S-Net (RS485), EIB, Profibus DP/FMS, LonWorks®, Ethernet-TCP/IP or BACnet®

Characteristics of the MP-Bus protocol

- No special cable or line termination resistors
- Costs saved due to reduced expenditure on cabling and easy handling
- Simple commissioning and maintenance

PCD2.F2xxx / PCD2.T500 / PCD3.F2xx / PCD7.F180 * connection modules

- Interface for a variety of Saia® devices and requirements
- Integration of up to 16 MP-Bus participants and sensors per PCD2.T500 connection module
- Comprehensive software library for a wide variety of damper actuator families

*from 30 September 2010: PCD7.F180S

MP-Bus design

The field bus was specially developed by BELIMO® for MFT and MFT2 actuators (MFT = multi-functional technology). Saia-Burgess Controls has developed two different connection modules to integrate it within the overall control architecture.

An MP-Bus network (MP = multi-point) consists of a 3-wire cable linking the connection at the automation system or controller to the damper actuators. Up to 8 actuators can be connected to one communications channel. The overall length of each branch of the network depends crucially on the choice of cable cross section and on the number and type of actuators connected. Generally, an overall length of approx. 100 m is attained. As the length of connection and number of drives are limited, no other requirements (e.g. line termination resistors or screened cable) are placed on bus topology.

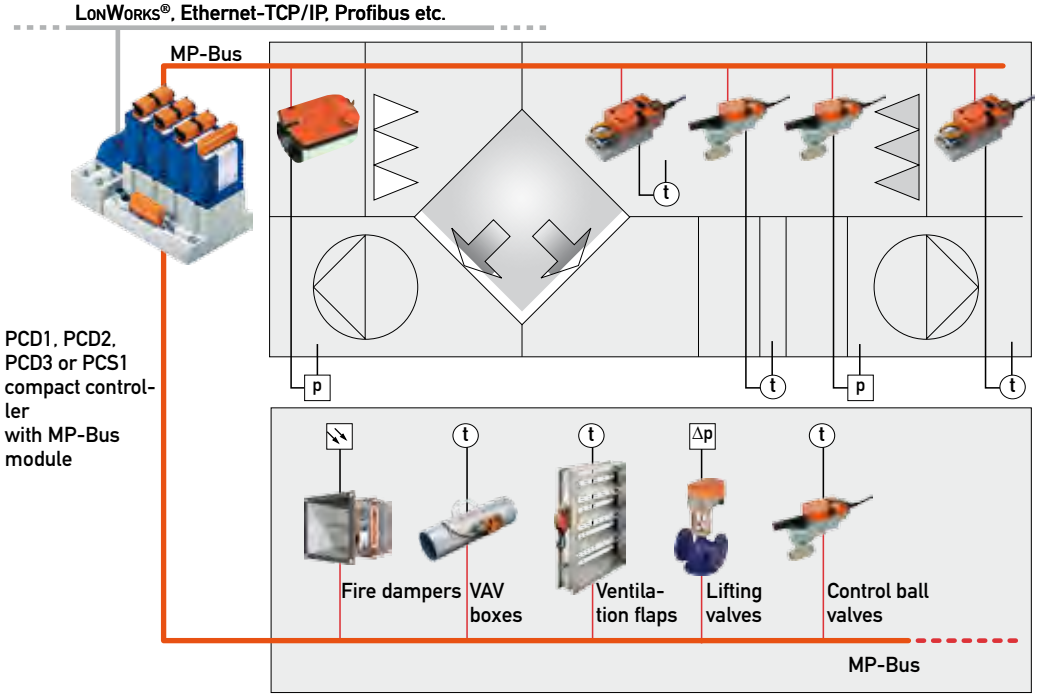
Direct sensor connection

In addition, further process information can be switched directly to any connected drives through add-on modules for the drive or MP-Bus.

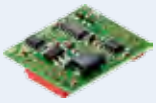
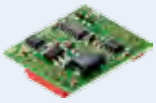
The direct connection to an MFT/MFT2 actuator of conventional sensors for humidity, temperature, etc., and of automatic contactors and switches, gives analogue sensors bus capabilities. This simple solution saves the use of expensive, bus-compatible sensors and significantly reduces cabling.

The following are supported:

- passive sensors
- active sensors
- switching contacts



Overview

Automation station	Number	MP-Bus module	Number of MP-Bus branches	Number of MP-Bus actuators	Number	MP-Bus module	Number of MP-Bus branches	Number of MP-Bus actuators
PCS1.C4xx / .C6xx / .C8xx 	1	PCD7.F180S 	1	8				
PCD3.Compact 	1	PCD7.F180S 	1	8				
PCD3.WAC 	1	PCD7.F180S 	1	8				
PCD1 	1	PCD7.F180S 	1	8	1	PCD2.T500 	2	16
PCD2.M1xx/.M480 	1	PCD7.F180S 	1	8	M110: 1	PCD2.T500 	2	16
					M120/M150: 3	PCD2.T500 	6	48
					M170/M480: 5	PCD2.T500 	10	80
PCD2.M5xxx 	2	PCD7.F180S 	2	16	4	PCD2.F2100 [1] PCD2.F2210 [1] 	4	32
					4	PCD2.F2810 [1] 	8	64
PCD2.M3xxx / M5xxx 					4	PCD3.F210 [1] PCD3.F221 [1] 	4	32
					4	PCD3.F281 [1] 	8	64

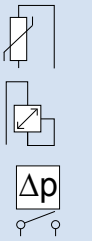
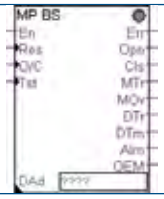
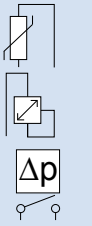
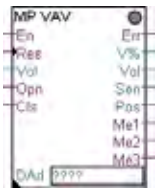
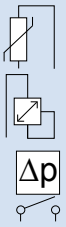
1) with additional PCD7.F180 modules

PCD2.T500 info

The module can control up to two branches (Bus connections) each with eight actuators connected. Each branch can be operated asynchronously, independently of the other. For the independent operation of both branches, the automation system also needs two logical RS232 communication channels. If required however, both branches can also be run on a single logical communication channel (multiplex operation).

MP-Bus | Function objects for BELIMO®MP-Bus

Saia-Burgess Controls provides a matching function box (FBox) for all actuator types available from BELIMO®. To enable the actuator to be correctly initialized and addressed by the master, the FBox necessary for that actuator family must be used.

Types/rating classes		Sensors	MP-Bus FBox
Ventilation applications			
Damper actuators without safety function: LM24A-MP (5 Nm), NM24A-MP (10 Nm) SM24A-MP (20 Nm), GM24A-MP (40 Nm) **Damper actuators with safety function:** TF24-MFT[1] (2 Nm), LF24-MFT2 (4 Nm) AF24-MFT2 (10 Nm) **Damper actuators linear:** LH24A-MP100 / 200 / 300 (150 N) SH24A-MP100 / 200 / 300 (450 N) **Damper actuators rotating:** LU24A-MP (3 Nm)			
Security applications			
Actuators for fire dampers: BF24TL-T-ST (18 Nm) BFG24TL-T-ST (11 Nm)			
Room and system applications			
VAV compact controller: LMV-D2-MP (5 Nm), NMV-D2-MP (10 Nm) SMV-D2-MP (20 Nm) **VAV compact controller linear:** LHV-D2-MP (150 N)			
VAV universal controller: VRP-M			
Water applications			
Lifting drives without failsafe function: NV24-MFT2 (1000 N), NVG24-MFT2 (1600 N) AV24-MFT2 (2000 N) **Lifting drives with failsafe function:** NVF24-MFT2 (800 N), NVF24-MFT2-E (800 N)			
Drives for control ball valves without failsafe function: LR24A-MP (5 Nm), SR24A-MP (20 Nm) **Drives for control ball valves with failsafe function:** TRF24-MFT[1] (2 Nm), LF24-MFT2 (4 Nm) ARF24-MP (15 Nm) **Drives for butterfly valves without failsafe function:** SR24A-MP-5 (20 Nm), GR24A-MP-5/-7 (40 Nm)			
Drives for 6-way control ball valves: LU24A-MP (5 Nm) **6-way control ball valve, 6-way, with internal thread:** R3015-P25-P25-B2, example with 0.25 [m3/h] each R3015-P25-P25-B2, example with 0.63 and 0.4 [m3/h] Various values at: www.belimo.ch			

1) Only active sensors and switches can be connected.

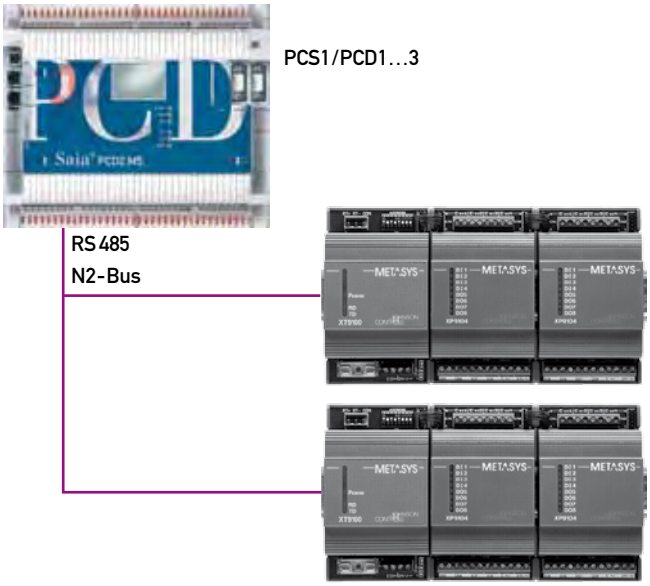
2.14 N2-Bus | Integration of Johnson Controls systems into the Saia® PCD environment

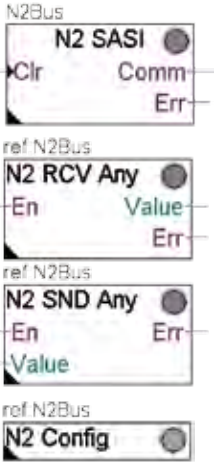
Communications driver JCI-N2-Bus

JCI modules with an N2-Bus interface can easily be linked to a PCD controller. The N2-Bus connection is established via a standard RS485 interface. No converter is needed.

Communication with the JCI modules is handled by an FBox library. The PCD is then either the master or slave, and can access or reply via write and read commands. Supported formats are: 1 byte, 8 bits, 2 bytes, 16 bits, 4 bytes and floating point. Floating point format is immediately converted into the HeaVAC format.

The Send/**Receive FBoxes use data for station numbers**/Item address/format definition, and so can be used with any module.

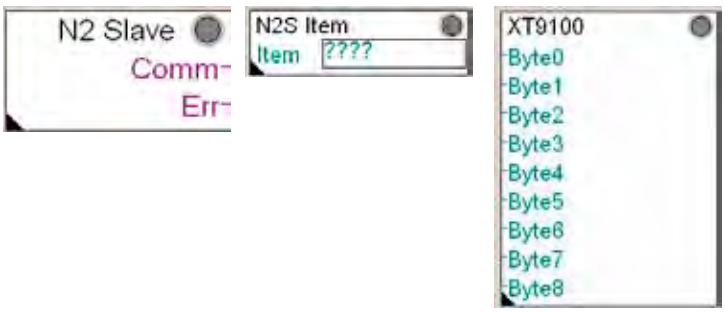




Ordering information:

Type	Description
PG5 - JCI N2 Bus	PG5 library to connect JCI master or slave systems

in preparation: FBoxes to emulate XT9100 modules; several modules can be emulated per PCD. Can be connected to a JCI SCADA.



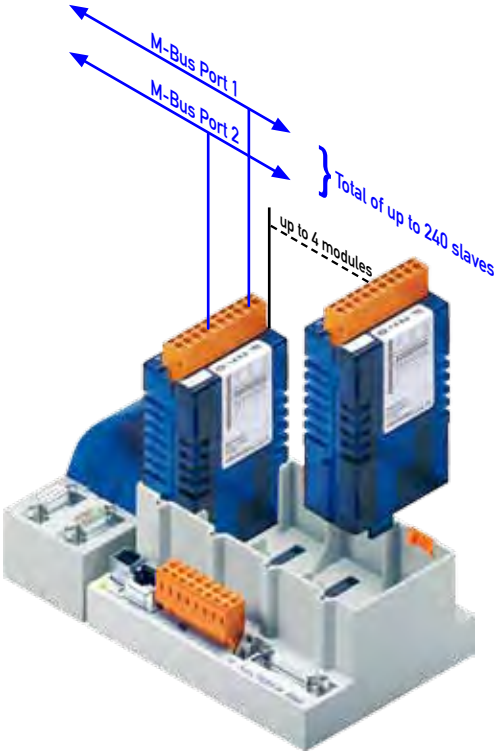
2.15 M-Bus | Fieldbus module for the consumption data acquisition

M-Bus Master Interface module

The M-Bus (EN1434-3) is an international standard for the distant reading of energy counting devices. The M-Bus connection is made through the communications modules PCD2.F2700 / PCD3.F270 on the slots 0…3 of PCD2.M5 and PCD3. This enables quantities of water, heat or electrical energy to be registered in a DDC sub-station. Further evaluation of measured data is done with a function box library in the Saia® Fupla.

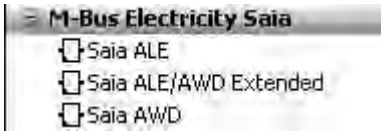
The M-Bus Master modules are compatible with existing FBox libraries based on an RS232 interface, such as the Engiby library.

For added flexibility, the two driver FBoxes from the Engiby library have been hived off to a separate FBox library. As component of the PG5 2.0, it serves as a basis for further M-Bus applications. Thus the FBox library of the Saia® energy meters is based on the drivers in the same way as the extensive M-Bus Engiby library. This allows the parallel operation of Saia® energy meters and other M-Bus participants on the same bus line.

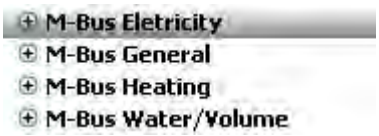


Royalty-free driver

Royalty-free Saia energy meters



Engiby M-Bus library, subject to royalty



The interface modules are equipped with a power pack and two separate M-Bus interfaces. The integrated power supply is sufficient for up to 240 M-Bus standard slave modules, whereby the allocation is on any of the two ports.

PCD2.F27xx

PCD3.F27x

Order details for PCD2

Type	Description	Weight
PCD2.F2700	M-Bus master interface for up to 240 slaves	60 g

Order details for PCD3

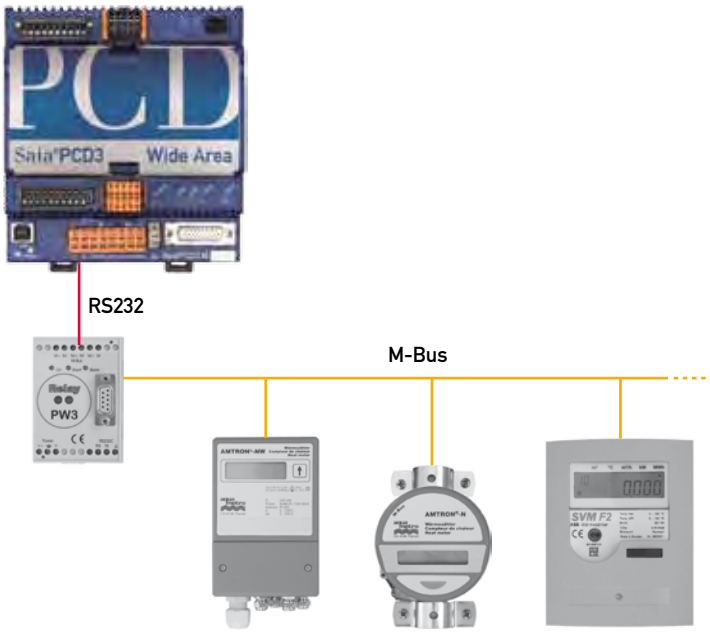
Type	Description	Weight
PCD3.F270	M-Bus master interface for up to 240 slaves	80 g

2.16 M-Bus | Fieldbus for the consumption data acquisition through communications driver

Communications driver for M-Bus protocol

The M-Bus (EN 1434-3) is an international standard for the distant reading of energy counting devices. The M-Bus connection is made through a RS 232 standard interface and an M-Bus converter. This enables quantities of water, heat or electrical energy to be registered in a DDC sub-station. Further evaluation of measured data is done with a function box library in the Saia® Fupla.

This driver is available at www.engiby.ch



2.17 Other communications drivers for external systems from Saia®- systems

Apart from the communication options listed above, there are other special drivers available for PCD systems. For detailed information, please contact your local Saia® office.

Field bus, standard/universal interfaces

Modicon Schneider	Schneider, Modicon, Telemecanique and many other devices via point-to-point connection - modem - RS232 - RS422 - RS485 Bus - TCP/IP - UDP/IP
M-Bus	Heating meters Water meters Pulse counters Electricity meters
3964(R)/RK512	Siemens: Point-to-point and multipoint-to-point connection
S-Bus for TCP/IP	S-Bus driver for multi-master applications
S-Bus for RSxxx	S-Bus driver for fast response times with priority
S-Bus for modem	S-Bus driver for modem applications with high reliability and security
ESPA 444	Message transmission Message reception Message forwarding and routing via SMS, pager or TAP
IEC 870-5-101	Power plant/energy management
IEC 870-5-103	Switchgear control
IEC 870-5-104	Power plant/energy management
Text Output	Configuration tool to send formatted text event-driven via serial interfaces, TCP or UDP. Also supports SMS and Syslog messages
Text Parser	Configuration tool to read and analyse PCD text input
SNMP Trap	Alarming / Messaging (NMS)
EIB	Configuration tool for the Saia® EIB communication driver

Controller / Energy

ExControl	Light and blind functions with remote control via RS232 or Ethernet
Menerga	Menerga controllers
APC	Uninterruptible power supply
TRSII	WITnet concept, remote control
COMSAB/York	SABROE compressor control units : - PROSAB II - UNISAB S/R/RT/RTH - UNISAB II
Luxmate	Lightning control BMS ZUMTOBEL

Alarm / messages / access

Cerberus	Siemens-Cerberus alarm systems (extended driver)
DMS 7000	Siemens-Cerberus alarm systems (reduced driver)
Tyco MX	Tyco MX 1000 and 4000 alarm system
Zetadress	Zetadress intruder alarm system from Tyco
Fidelio/FIAS	Hotel management system
Securiton, BMA, EMA	Fire and intruder alarm systems
TechTalk	Access control system

Video / Audio

Ernitec	Video Matrix Control
Dalmeier P-Serial	Video control panel
Grundig VAZ	Video matrix
Commend	Interphone system

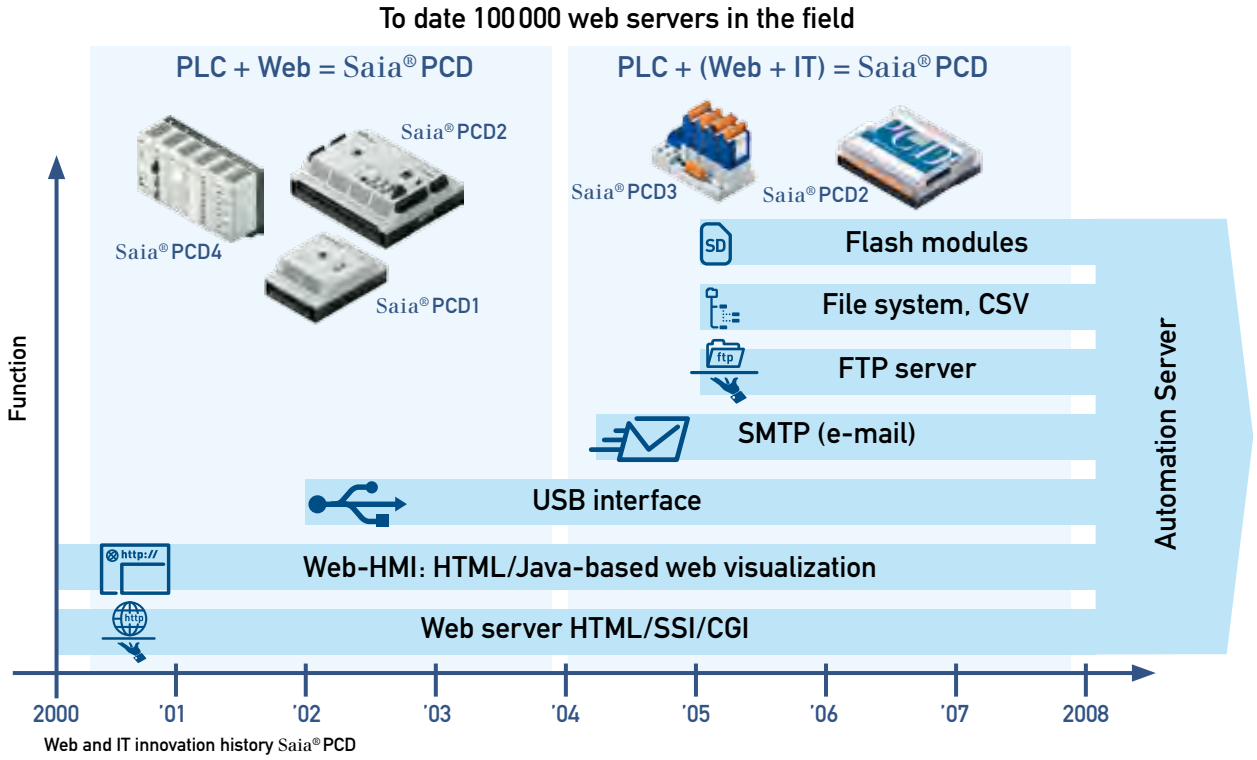
Others

Wilo/EMB	Pump control
Grundfos pump control	Genibus on RS485 G100 gateway via RS232 and Profibus DP
ebmBUS	Motor control ebmPapst
Clock and GPS	Reception of time data for DCF77 Reception of time and position data via GPS Reception of time and weather station data from Elsner Station
Marksman	Road traffic recorder

Available from www.engiby.ch

3 Web-based automation with Saia® S-Web

3.1 Decisive added value for the user from an advanced automation device



Culture of innovation and technology

In its first 20 years as a company, Saia-Burgess built up a good reputation for its PLCs and established a corporate culture marked by open and closed loop industrial control technology.

Saia® then began steadily combining the «old» with the «new». The «new» comprised technologies from the web and IT worlds, as well as from the fields of consumer electronics (e.g. SD-Flash, haptic) and telecommunications (e.g. GPRS).

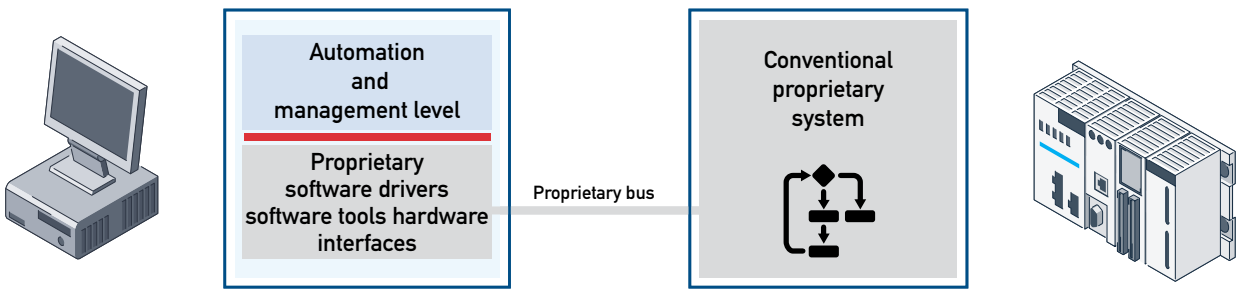
In themselves, the individual technologies are nothing new and their use is very widespread. However, it is something new to have all these technologies united in a freely programmable automation device with industrial design and a correspondingly long lifecycle.

Saia® has developed its longstanding PLC culture into a new, PLC-based innovation and technology culture, creating extremely attractive products in the process.

Automation Server – the missing link

The great advantage of the Automation Server is apparent when integrating proprietary automation equipment into the automation and management level of a system operator.

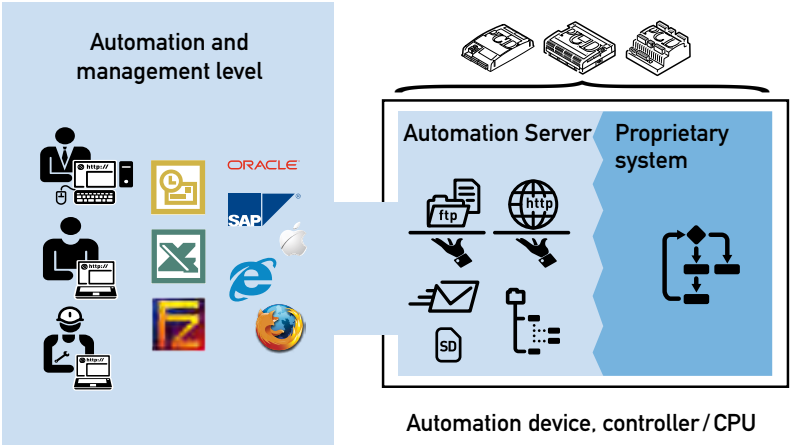
Any facility operator who wishes to integrate automation devices from different manufacturers into his automation and management level will be confronted with complex and costly tasks.



Integration of a conventional automation device into the automation and management level

For the management/ERP system etc. to access the automation devices of various manufacturers, the facility operator usually needs specific, proprietary software drivers and/or hardware interfaces.

The facility operator's desire for openness leads to higher costs and additional complexity. The manufacturers bear no responsibility for interoperability during the operational lifetime of the overall system.



All users can access the automation device directly for operation and maintenance. They do not need any additional software for this, but can use their standard software tools

It is ideal for the facility operator if he can use communications interfaces and software tools that are available in-house for the integration of automation equipment.

For this, the following conditions must be met:

- No proprietary protocols
- No proprietary data formats
- No proprietary drivers and plug-in cards
- No proprietary software tools

Starting with software, they have to be able to rely on something that is available everywhere and costs little or nothing extra. The solution is any choice of browser or FTP and e-mail client.

For management systems, whether large ERP systems like SAP or small ones based on EXCEL, it must be possible to exchange information simply and securely with any choice of automation device.

This is achieved with CGI bin instructions (supported by all operating systems) and the CSV data format (also universally understood).

In order for all these ideal wishes to be realized, a functional counterpart is required at both the field and automation levels to serve the operator's (client's) applications. This counterpart is the **Automation Server**.

The **Automation Server** comprises a web server, FTP server, SMTP client (e-mail) and its own file system with ample data memory.

The **Automation Server** is therefore a bridge from the open, standardized automation environment (based on universal web/IT technology) to the internal, proprietary resource and process model of the automation device.

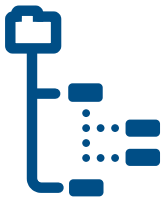
In all new Saia® PCD control devices, the **Automation Server** has been integrated as standard, at no extra cost.

Flash memory with file system, e-mail service plus FTP and web server

Flash memory

The large memory capacity of Saia® PCD2.M5 and PCD3 controllers makes them independent of any higher-level PC system, even for long periods. Any choice of process points (temperature, pressure, energy consumption, switch states, system messages, etc.) can be recorded in the flash memory modules. With SD flash cards, the data memory of Saia® PCD2 and PCD3 controllers can be extended by up to 4 GBytes. Additional, external memory systems (e.g. data loggers or even PC systems) can therefore be saved.

File system



In the flash memory modules, data is managed with a file system like that of a familiar Windows PC.

Unlike the office PC, however, machine controllers operate in rough industrial environments. Loss or corruption of data resulting from power cuts or other faults will not be accepted. Accordingly, the file system of Saia® PCD controllers has been implemented in a robust, secure way.

Up to 1000 files can be stored in a Saia® PCD system. Files and directories can be individually assigned to different user groups and thereby protected from unauthorized access. Since very diverse file formats are supported, data can be exchanged with overlying systems, e.g. CSV files for EXCEL applications.

For the simple integration of file system functions within PCD programs, FBox and IL libraries are available.

FTP and web server

The Saia® PCD operating system contains an integral FTP and web server that allows data to be exchanged with a higher ranking system, without any additional, specific software driver. Machines or systems equipped with Saia® PCD controllers can therefore always be integrated at no extra cost into existing IT systems (e.g. an ERP system). With a standard FTP client (included in, e.g. Internet Explorer, Filezilla, etc.) files are exchanged with the FTP server via the Ethernet TCP/IP interface. Access can be protected by assigning user names and passwords. With the web server, a web browser can be used to load stored files onto a PC for further processing. If necessary, stored data can also be sent via e-mail to a higher ranking system or to the persons concerned. For example, if a fault occurs, the system will be able to supply service personnel not only with the actual error message, but also with more detailed information about the problem at hand. Or else the system can independently transmit log data for long-term archiving by a higher ranking system.

E-mail

The e-mail function and integral SMTP (Simple Mail Transfer Protocol) client enable PCD controllers to send process and system information via the Ethernet interface to a mail server. Alarm, service and status messages – or any process information required – can therefore be sent by e-mail to a management centre and/or to service personnel. For the simple integration of e-mail functions within PCD programs, FBox and IL libraries are available.

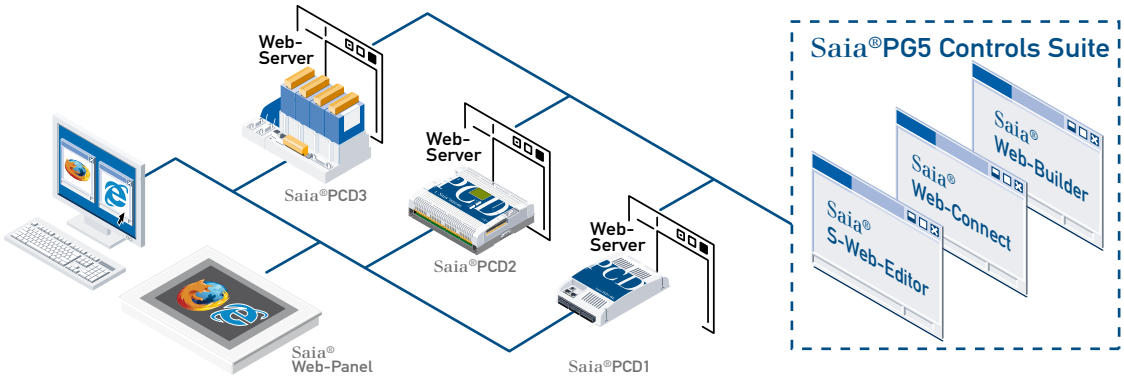
3.2 Automation Server | Saia® S-Web

Saia® PCD.Web technology, seamlessly integrated and applied, transforms the automation environment in all areas of commissioning, service, control and monitoring.

Highlights

- Web browser as tool for commissioning, service and visualization. No proprietary software tools or runtime licenses necessary
- Continuous access via any interface or network: from Ethernet-TCP/IP to Profibus
- Saia® PCD.Web-Server integrated within all products, from the most powerful controller to the simple remote I/O – at no extra cost
- Saia® S-Web-Editor – easy, convenient editing of Java-based web pages (knowledge of Java or HTML programming not required)
- Saia® Web-Panels – economical touch-screen panels with built in web browser for control and monitoring

A professional toolbox for the Saia® PCD.Web-Server



Operation, visualization, commissioning and maintenance

Saia® S-Web an complete system approach

All the more recent Saia® PCD control devices (PLCs and RIOs) include a built-in web server in the basic unit at no extra cost. Saia® S-Web is an integral system approach that not only includes the web server and browser, but also all the necessary tools (e.g. Saia® S-Web-Editor) for creating web applications with ease and convenience. Economical, industrial, web-based control stations are also available, in the form of embedded Windows touch-screen panels. The consistent system employed by Saia-Burgess to integrate web technology has not only led to a cost differentiation, but also to a positive functional differentiation from the general market level.

Web-based device and installation management

At present, most commissioning and service of systems and installations still takes place with specific, proprietary software tools. Thanks to the use of web technologies, these can now be replaced with standard tools, such as Internet Explorer. No specialist know-how is required to operate a browser, and it has a high level of user acceptance. Predefined HTML pages allow optimized device and system management during commissioning and service. All device or installation-specific documents and information (user guides, spare parts lists, other links, telephone contacts, etc.) can be stored directly in the PCD controller's web server, where they can be called online at any time with the browser from a service PC or any other connected Saia® Web-Panel. Moreover, with user group-specific HTML pages, comfort and security are significantly increased while costs are cut considerably at the same time.

Web-based control and visualization without runtime licenses

Expensive and often complex Scada systems or proprietary control panels have also been used for simple control and monitoring functions.

A web server with browser is ideally suited for such tasks. The costs involved with expensive development tools and runtime licenses can be avoided.

Information is located at the site of the action (in the controller) and is therefore always up-to-date.

All control devices, whether local (e.g. a touch-screen Saia® **Web-Panel**) or remote (e.g. a browser PC on intranet or internet) access the same data source (web server) and therefore have the same user interface. Decentralizing data and functions reduces the costs of application creation, administration and support.

Another advantage of web technology is the vendor-independent, standardized interface between the controller system and the management level.

Web technology seamlessly integrated within all devices and systems

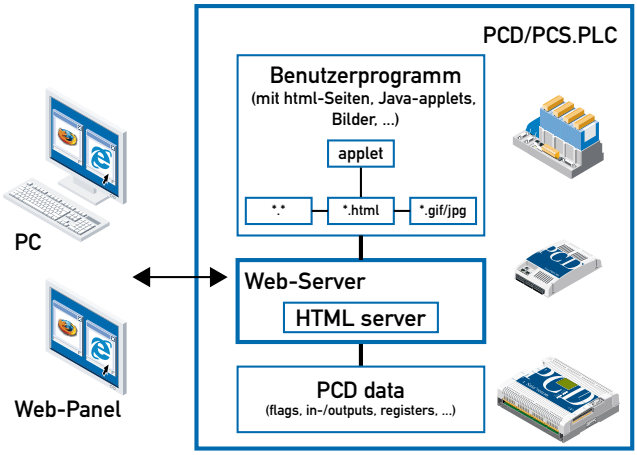
Web-Server integrated in Saia® PCD operating system

The web server is integrated within the operating system of all new PCD controllers and forms the heart of the S-Web concept. No additional module is required.

Building it into the operating system has made accessing PCD data very efficient and direct.

HTML files, Java applets, pictures and any files can be stored in the web server. The web server processes queries from the browser according to HTML standard 1.1 and delivers the required pages with data. PCD data is accessed within an HTML page with special text commands, or within Java applets or scripts using special CGI calls. It is possible to protect access to HTML pages and PLC data with a password. Four protection levels are available, each with a freely definable password.

Web project management forms part of the PG5 programming tool. Web pages are generated simply and efficiently with the Saia® **S-Web-Editor**, or with a standard HTML editor (e.g. Frontpage).



Seamless access via any choice of interface or network

Access to the Saia® **PCD.Web-Server** is possible not only via Ethernet TCP/IP, but also via economical standard serial ports (RS232, RS485, modem ...) or Profibus networks. It also takes place seamlessly across the various network levels.

This makes web technology feasible even for simple, low-cost devices without any Ethernet TCP/IP connection. Web browsers on Intranet/Internet have, via the frontend PC and Saia® **Web-Connect**, transparent access to all connected PCD.Web-Servers. Saia® **Web-Connect** software lets connections be established to the PCD.Web server, even without an IP address.

Automation Server | Open data access with Saia®.Net

Saia®.Net components

The CGI interface of a PCD web server can be used in web applications for the efficient exchange of data with Saia® PCD controllers. The CGI interface can also be used for straightforward data interchange with Windows applications via Port 80. This then enables Windows applications to access the integrated file system on the controller directly (read/write).

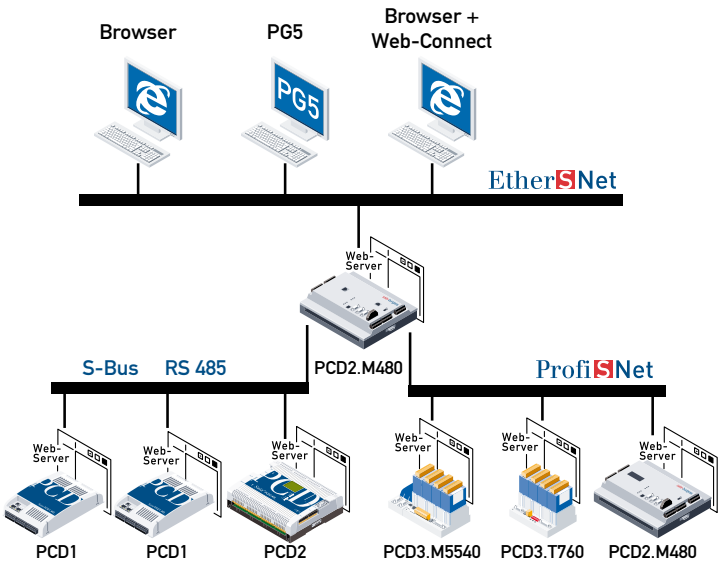
Standard .Net technology from Microsoft® and Saia®.Net communications components provide software developers with easy ways of integrating Saia® automation components into their Windows® applications, without having to worry about communications drivers or complex CGI syntax. The Saia®.Net suite includes components and class libraries for communication via S-Bus (master and slave) or across the CGI interface.

3.3 Web-based automation | Typical cases

Practical possibilities with S-Web in the application

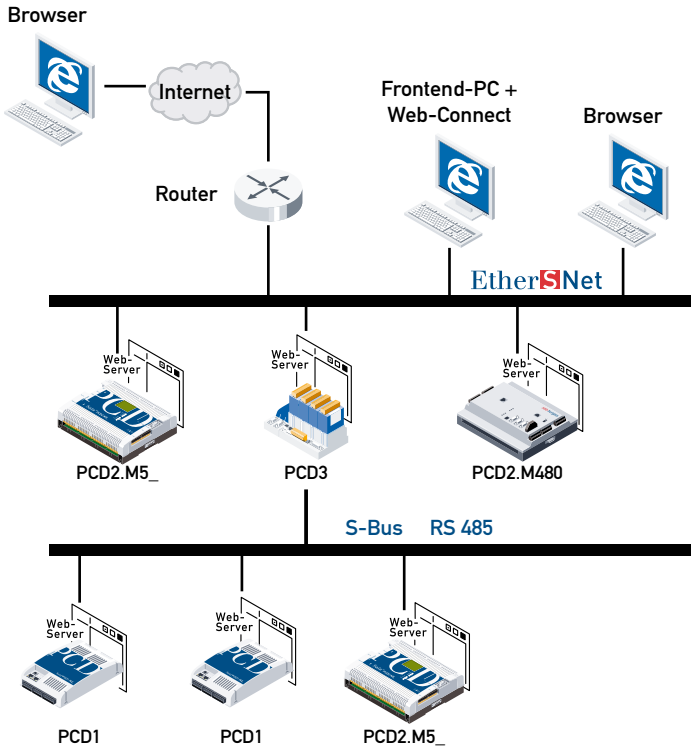
Seamless access by Ethernet via Profibus

The Saia® **Web-Connect** software, combined with the gateway function in PCD controllers, provides continuous access to all Saia® **PCD.Web Server** on Ether-S-Net, Profi-S-Net and even on simple, serial S-Bus (RS485) networks. This enables the seamless implementation of decentralized web-based control and monitoring concepts. Even simple, low-cost devices without an Ethernet-TCP/IP connection have a web server, and so can be integrated into the concept. The PG5 programming tool also has consistent access to PCD controllers via the same interfaces and networks. Therefore, no duplicate wiring is needed for file and programming services.



Internet access without IP addresses

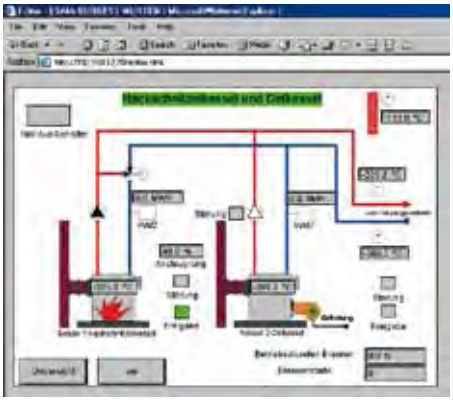
To access a web server via Internet, it is normally necessary to have a registered, public IP address for that web server. Such IP addresses still cost money. The S-Web concept with Saia® **Web-Connect** software allows access to all web servers, even those without an IP address. For this, the Saia® **Web-Connect** software is installed on the front-end PC. In this case, only a registered IP address for the front-end PC is needed. This gives all browser PCs (without any additional software) on the Intranet and Internet access to the web server in all PCD devices, and this, by way of the gateway function, across multiple network levels. For the user, the Saia® **Web-Connect** software is completely transparent. The connection is established in the browser in the usual way by entering the URL (e.g. www.frontend.com/PC.PCD-controller/web-page.html). Large files such as images or summary pages can also be stored on the front-end PC, to save space on the PCD controllers and optimise download times. If necessary, an OPC server or Scada system can also be operated on the front-end PC to complement the web application.



Practical possibilities with S-Web in the application

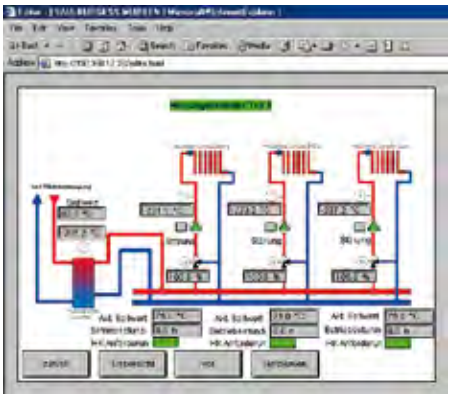
Web-based control and service concept for a warehouse stocking system using Saia® S-Web

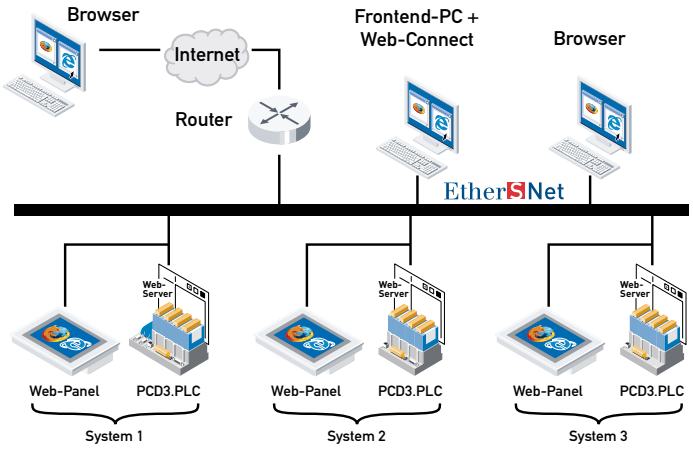
The S-Web concept is ideally suited to the implementation of a low-cost, web-based control concept for commissioning, operating and servicing machines and equipment. The diverse capabilities are represented with the help of a stocking system. The example shows a stocking system comprising three individual systems, each controlled by a PCD3 controller with integral PCD. Web-Server. Operation is either local, using Saia® **Web-Panels**, or remote, using a standard Intranet or Internet browser.



Local or remote control

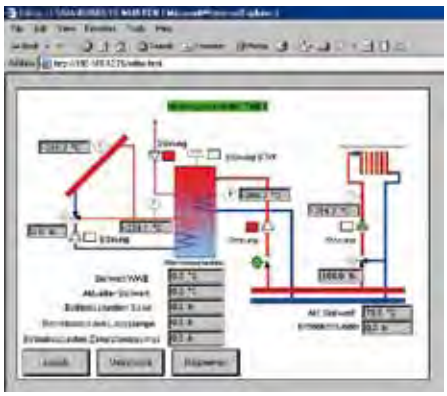
Regardless of whether control is local or remote, the user always encounters the same user interface with the same current data from decentralized PCD.Web-Servers. Decentralizing data and functions reduces the costs of application creation, administration and support.





Save costs by creating web pages simply and efficiently with the Saia® S-Web-Editor

The web pages shown here are Java-based and can be produced with the Saia® **S-Web-Editor** . The objects displayed can be drawn and animated very easily in this editor. Parameters for equipment and systems are animated and displayed with the help of Java applets in the browser in «auto-refresh» mode. The system parameters necessary for animation are transferred directly from the PLC user program by the PG5 resource manager. Duplicate entries are thereby avoided and costly project planning time is saved.



If the Saia® **S-Web-Editor**'s available functions are not enough, specific, personal Java applets can be programmed and employed by the user.

In the same way, personal HTML pages constructed with a standard HTML editor (e.g. Frontpage) can also be used in combination with Saia® **S-Web-Editor** projects.

Help pages, equipment/system descriptions and spare parts lists are mainly generated as standard HTML pages and then called from theSaia® **S-Web-Editor**. In the Saia® **S-Web-Editor**, system images and photographs that already exist in GIF format can be used and animated. It is also possible to produce user interfaces in many languages. Links to other web servers (e.g. information and support servers on Internet) can be called directly from the Saia® **S-Web-Editor** application. E-mails can be sent to the relevant service department via the browser PC. Service personnel have direct access via the Internet connection to the web server, enabling them to analyse problems quickly and take action. These capabilities reduce downtime and increase system availability.

4 Management system

Profile and application range of Saia® Visi.Plus

The Visi.Plus management system is successfully used in a very wide range of areas:

Building technology

The comfort and satisfaction of building users depend on reliable regulation of the room climate and lighting or shade control systems. Building management systems are now an indispensable tool for display, operation and fine-tuning and for the detection of any alarms within building systems.

All facilities controlled and regulated with Saia automation components can easily be connected to the Saia® Visi.Plus management system. Whether they are typical heating, ventilation, air-conditioning, sanitary or electrical applications or access control systems, connection is possible either via standard RS485 ports or even across direct Ethernet network links.

Typical application areas include:

- Building control systems
- Monitoring and security systems
- Monitoring of production halls
- Integration of access control systems
- Monitoring, logging and optimization
- etc.

Power engineering

Liberalization and deregulation of energy markets and the definition of targets for climate protection have resulted in a clear trend towards decentralized power supply systems. This tendency includes small, economically competitive units that act as highly efficient local energy providers for residential properties and commercial or industrial buildings.

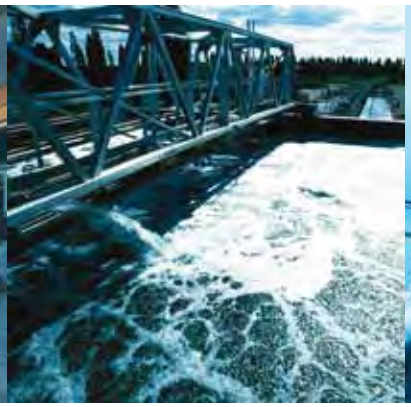
The broad market requirements of control engineering to the management level are covered with flexibility, innovation and speed. This is exemplified by commitment in the area of fuel cell heaters.

Other application areas include:

- Water turbines
- Wind power plants
- Cogeneration plants

In the infrastructure automation field






Traffic engineering

Increasing personal mobility and the constant growth in freight transport call for high-capacity traffic infrastructure. On roads, railways and waterways, the emphasis everywhere is on the demand for high levels of system availability and security. For many years now, automation systems from Saia-Burgess have been used in road and rail tunnels. At the same time, Saia® Visi.Plus, an efficient management tool, has been a key factor in assuring reliable and profitable operation.

Typical application areas include:

- tunnel ventilation
- lighting
- traffic regulation
- fire prevention
- energy optimization
- integration of tunnel wireless systems
- escape route control

Water engineering

There are a variety of ways to optimize water systems with state-of-the-art control and regulation technology. For many years, Saia-Burgess Controls has supplied products for this field and has, with its innovative products and concepts, helped to integrate individual processes within the overall supply systems. In water engineering as in other areas, global solutions require intelligent management systems with a modular structure.

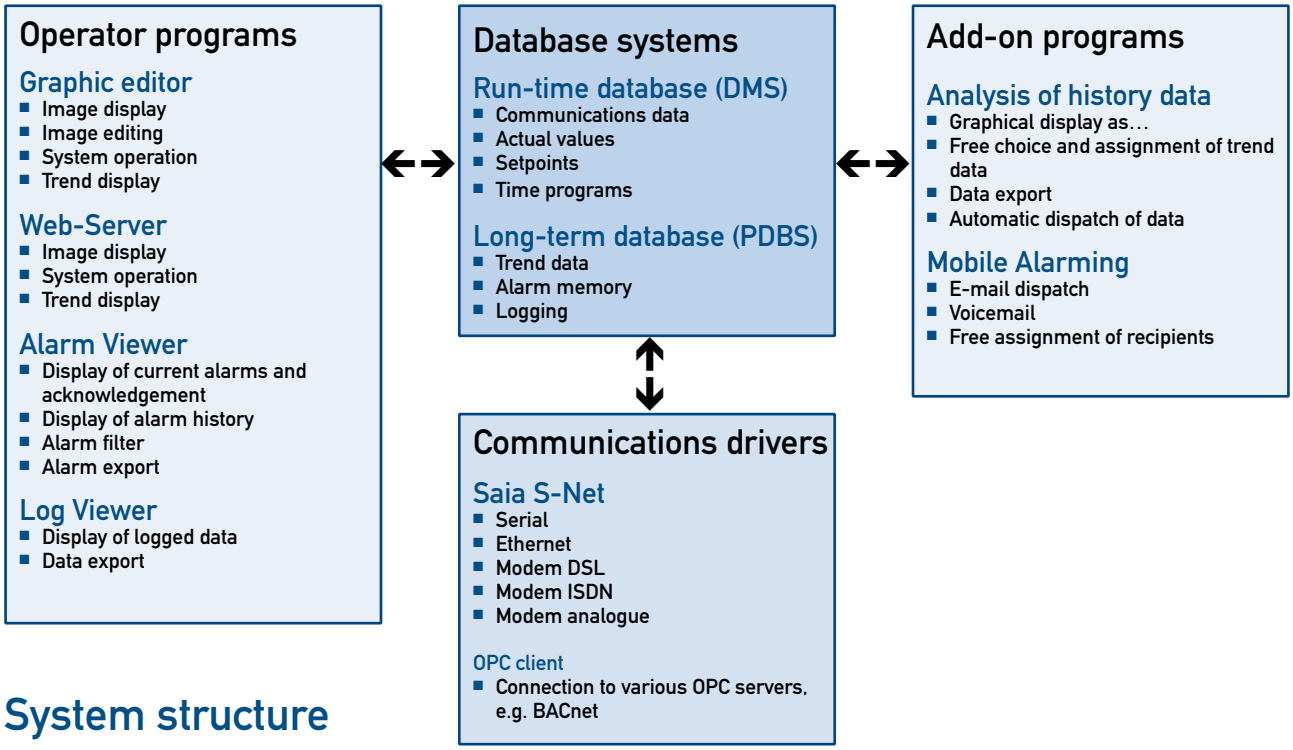
Typical application areas include:

- supply of drinking and service water
- sewage engineering
- industrial water systems
- general water regulation
- water power

4.1 Management system | Saia® Visi.Plus: Software package for the visualization and performance of management system tasks

Main characteristics of Saia® Visi.Plus

- Flexible range of applications, from building technology to process engineering
- Scalable architecture, for price optimization across a broad spectrum of use
- Substantial integration of the automation level, with matching engineering tool
- Prefabricated system objects to optimize engineering times (DDC-Suite)
- Highly developed alarm management, including remote alarms
- Reduced commissioning and maintenance costs, due to clear handling
- The integrated web server allows all process data to be displayed with a web browser via intranet or Internet connections
- No separate development environment required, so entry costs are low



System structure

The modular structure allows systems of any size to be implemented, including distributed systems that link many individual installations.

Visi.Plus offers complete, interactive visual display, operation and monitoring at an extremely attractive price. The system is expandable and open for different applications; it is also network-enabled with full data transparency. Visi.Plus makes full use of the networking capability of the operating system.

By coupling several systems together, computing power can be multiplied. Additional operator stations can be integrated into the overall system at any time.

The architecture used provides clear interfaces, so projects can be implemented reliably and economically.

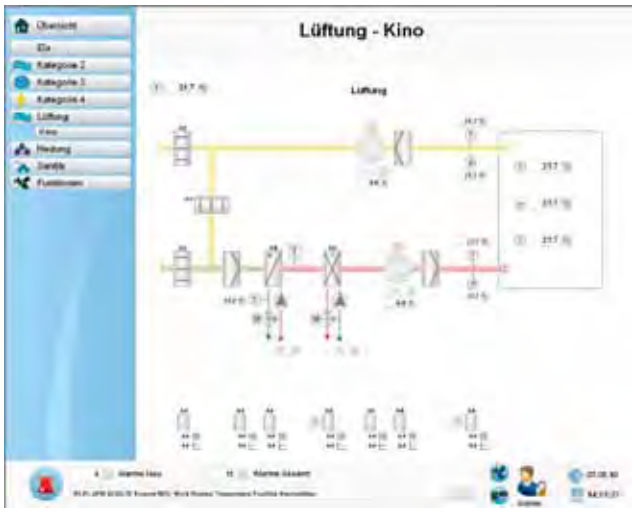
Visi.Plus is based on recognized standards and its main characteristics are as follows:

- distributed client/server processing
- interface to other Windows applications
- online help forum
- scalable, modular architecture
- multitasking capability within system
- WINDOWS® 2000 / XP / Vista operating system
- efficient database access
- object-oriented, graphical user interface
- network-oriented architecture
- innovative system functionality
- object-oriented data structures
- integration in PG5 (Saia-Burgess Controls Ltd)
- efficient project creation

Operator programs

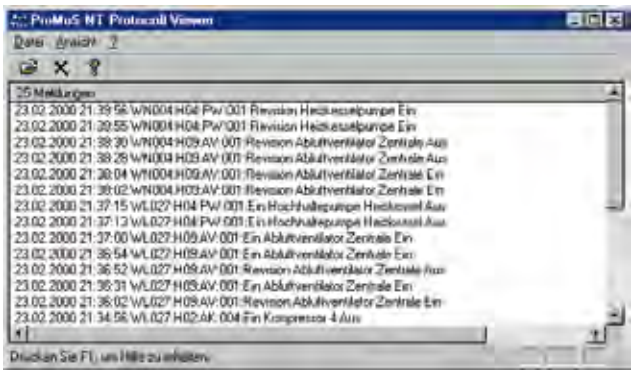
Visual display and graphical editor

All relevant parts of the facility can be presented to the user in the most appropriate way with the powerful graphical editor. The use of vector and bitmap graphics allows both overviews and detailed information to be displayed. The graphical editor also helps with visualisation in run-time mode. This means that the user can switch to editor mode at any time (via password) to make corrections and changes.



Logging

This module logs and stores all events at the user level. The log viewer, with its integral filter functions, allows all important events to be displayed in the most appropriate way to the user.

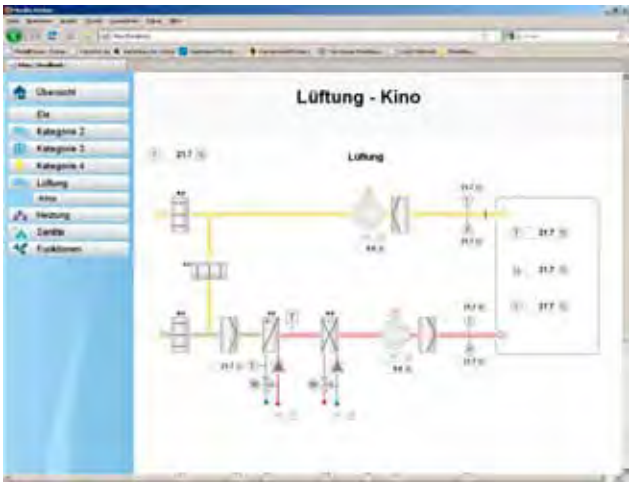


Alarm management

Alarm management is an essential constituent of any building management system. With Saia® Visi.Plus it is possible, by observing threshold values, to display all relevant points of information for the user in a plain-text alarm window. Two separate alarm lists provide a better overview. The first gives an overview of all alarms; the second enables all current alarms to be examined.

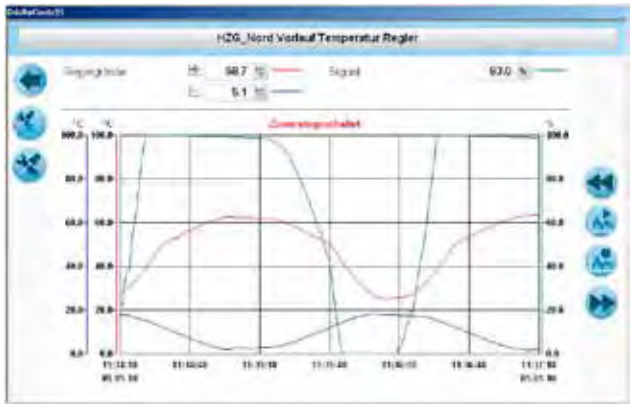
Web-Server

All diagram pages created are automatically stored as web pages. All generated pages can be displayed and operated using a browser, by activating the Visi.Plus web server.



Trend projection

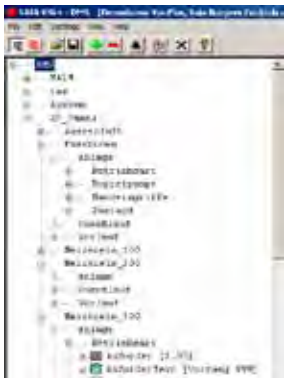
With this module you can, for example, receive a monthly summary energy balance sheet for all consumers in a building. Whether you have to monitor the consumption of water, electricity or heat, this trend analysis provides you with the necessary overview to enable suitable measures to be initiated.



Management system | Saia® Visi.Plus:

Database systems

Run-time database system (DMS)



The data management system is the central database of the entire Saia® Visi.Plus system. All process data is managed in the DMS and is available at all times. Communication with the individual program parts (e.g. the graphical editor) is event-oriented, via active connections called pipes (intertask communication).

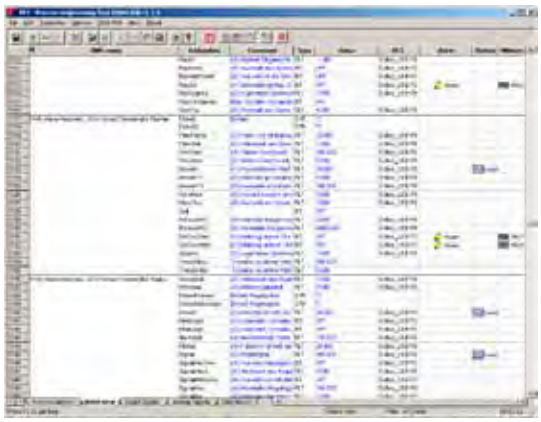
Number of DMS data points	PC RAM memory required	PLC/DDC data points
50'000	256 MB	500
100'000	512 MB	1'000
300'000	1 GB	3'000
3'000'000	2 GB	10'000

Long-term database system (PDBS)

The Saia® Visi.Plus database system stores and manages history data, alarms and logs. This module also allows data to be exported to other systems, enabling process data to be collected in real time and stored in different databases.

Process Engineering Tool (PET)

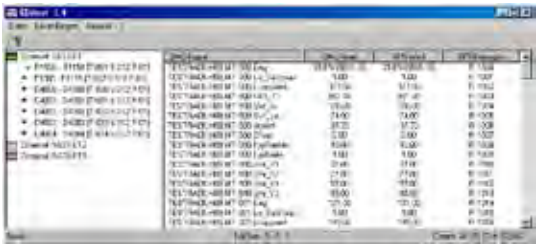
The PET provides a convenient and clear representation of all data from the data management system in tabular form. All data (including communication, alarms, logs, functions, etc.) belonging to aSaia® Visi.Plus project can therefore be recorded and managed in the Process Engineering Tool.



Communication drivers

Saia® SDriver

The SDriver is used for communication with Saia automation stations based on the S-Bus protocol. The driver supports all types of communication, e.g. serial interface, modem, USB and TCP/IP. Because the SDriver is based on Saia's own SCOMM-DLL, all PG5 tools can be used in parallel with it. The SDriver has a mechanism to optimize data traffic using automatically generated telegram packets. A further optimization is achieved by prioritizing telegrams according to categories, such as alarms, actual values, or setpoints.



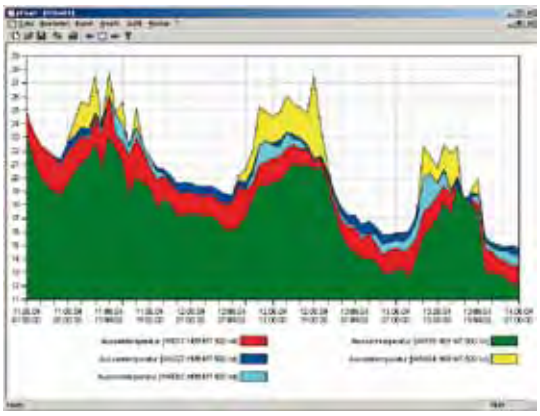
Visi.Plus as OPC client

To enable the neutral integration of automation systems even from other manufacturers, Visi.Plus offers an OPC client that reads data from the OPC server of a third-party supplier and automatically enters it in the Visi.Plus DMS database. The user can then access it for further processing in the Graphical Editor or Alarm Manager, or for storage in the history database.

Add-on programs

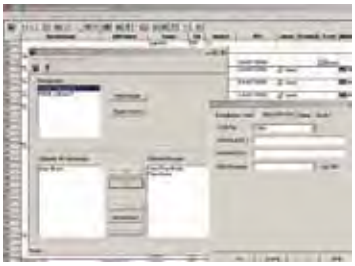
Analysis of trend data (PChart)

If the user wishes to display or export trends, however they have been compiled, PChart is the tool to use. The trend data can be displayed in a variety of colours and different scales.



Mobile Alarm (MALM)
Remote alarms via email/SMS

When monitoring technical building installations it is necessary to guarantee that, in the absence of service personnel, fault messages are forwarded quickly and safely. Direct diagnosis of the fault message is also possible via remote dial-in, thus avoiding unnecessary journeys by service personnel. The alarm is sent via SMS or email.



MALM Voice

When an alarm occurs, a voicemail message (sound file in WAV format) can be played back via telephone. The person called can then use the same call to acknowledge the alarm by entering a sequence of numbers (requires a DTMF-enabled telephone).

New add-on programs

MALM ESPA 4.4.4

Alarms can be forwarded to telecommunications systems with an ESPA 4.4.4 interface (serial, type RS232), to be output to the display of a telephone within the local telephone network.

ESPA 4.4.4 (RCV)

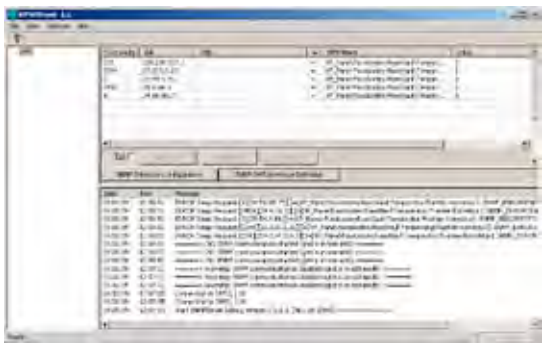
Messages transmitted by telecommunications systems with an ESPA 4.4.4 interface (serial, type RS232) can be implemented as alarm messages by Visi.Plus and used for further processing and logging.

pSMS

With a GSM-compatible modem (not included), SMS messages can be received and their content assessed according to a specification (e.g. to acknowledge alarms or modify values).

SNMP

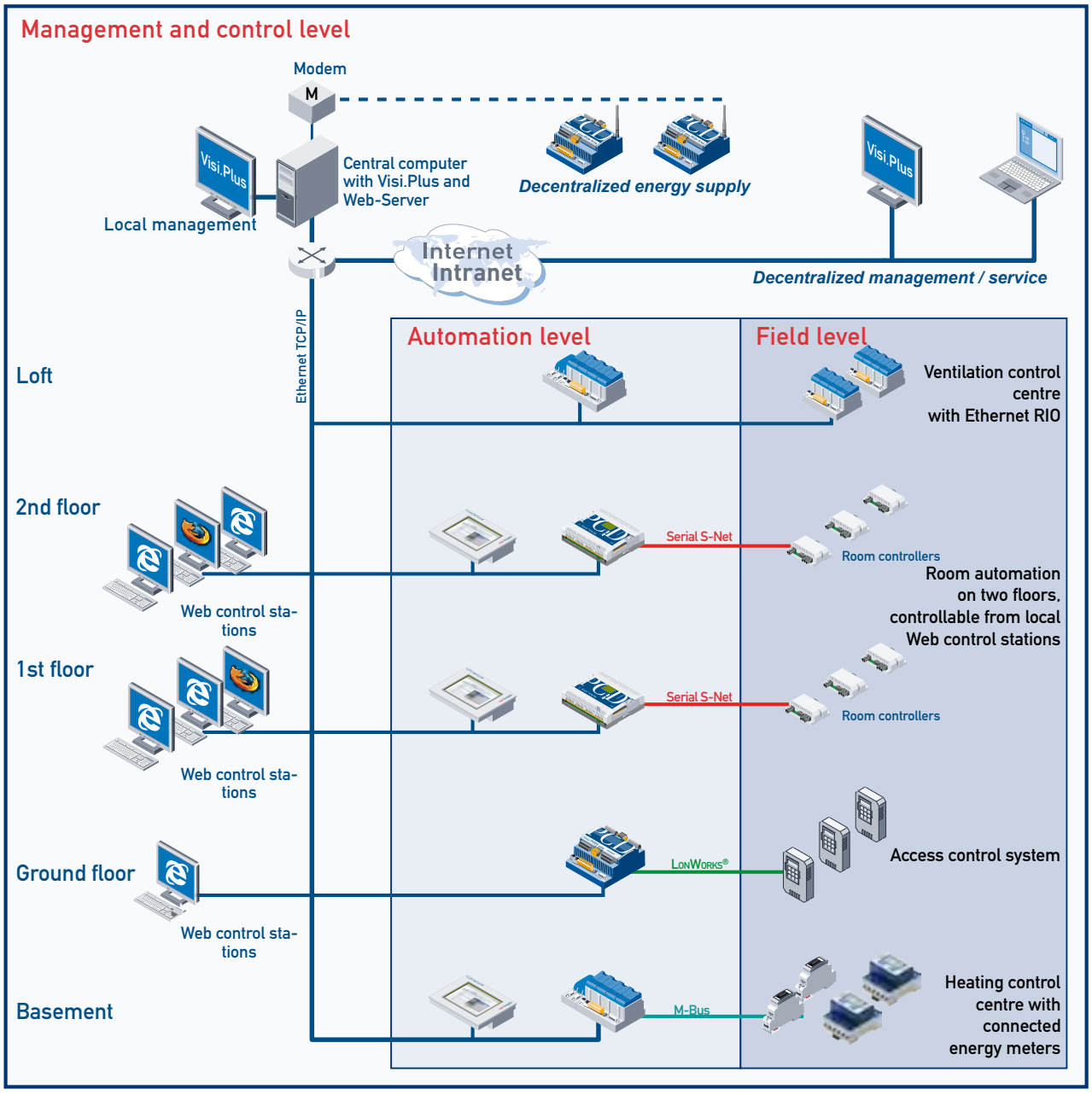
Driver to monitor network components that provide SNMP services, such as routers or controllers. The values polled (depending on parameters set) are integrated into the Visi.Plus database, where they can be processed further (e.g. for history data or alarms).



Management system | typical example

Management system with Web-Server and local web control stations

The example shows a building automation structure with automation stations for the primary energy and ventilation control centres, including a room automation system. With the Saia®Visi.Plus web server, all users can adjust their own workstations to their personal temperature and lighting needs via a local PC and standard browser. Service and data management are implemented through remote access via standard routers or modems. Alarm management can be local or decentralized and can use email, SMS or a voice module.



Due to the modular structure of Saia®Visi.Plus, the management system can be perfectly adapted to the relevant requirements.

Saia® Visi.Plus: | template library (DDC-Suite)

Object library to control and manage a building's technical installations

For speed and convenience in engineering the technical systems of buildings, consistency is required in the automation objects used at the functional, control and management levels.

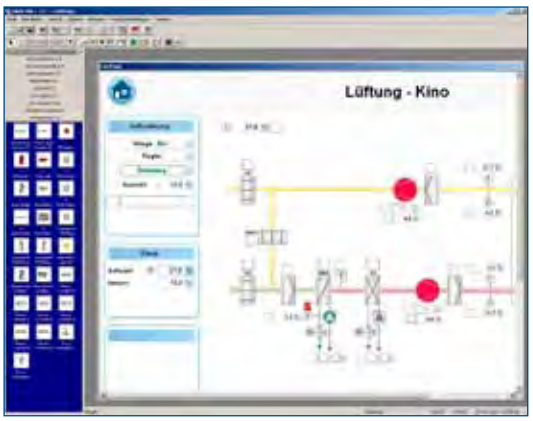
The two automation libraries «HeaVAC» and «DDC-Suite» form the basis of object structure. These libraries are made up of ready-made function objects called FBoxes (e.g. representing a fan motor or reheater) so that user programs can be created and their parameters set individually.

Control objects for the Saia® management system coordinate with the function library and can be used to create control concepts that meet customer requirements.

Consistency among all available objects ensures program quality in installations and minimizes the costs of program writing and service.

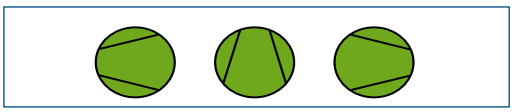
To ensure consistency, all graphics and control objects have also been created for the Saia® Visi.Plus building management system. A built-in mechanism allows all objects used in a automation project to be ported to this management system. It dispenses with the laborious assigning of individual resources, a process in which errors can occur. As with the Web-Panel library, objects consist of graphical symbols and the appropriate parameter windows

System integrators can use the ready-made automation templates (e.g. for the heating circuit, water heater, boiler and ventilation systems) to build complete installations and adapt them to the customer's wishes very quickly.



System template

Object library



Graphical object: Fan

Object control window

For uniform structuring of the complete project, navigation pages are available that can be used to configure project navigation as a whole at the click of a mouse.

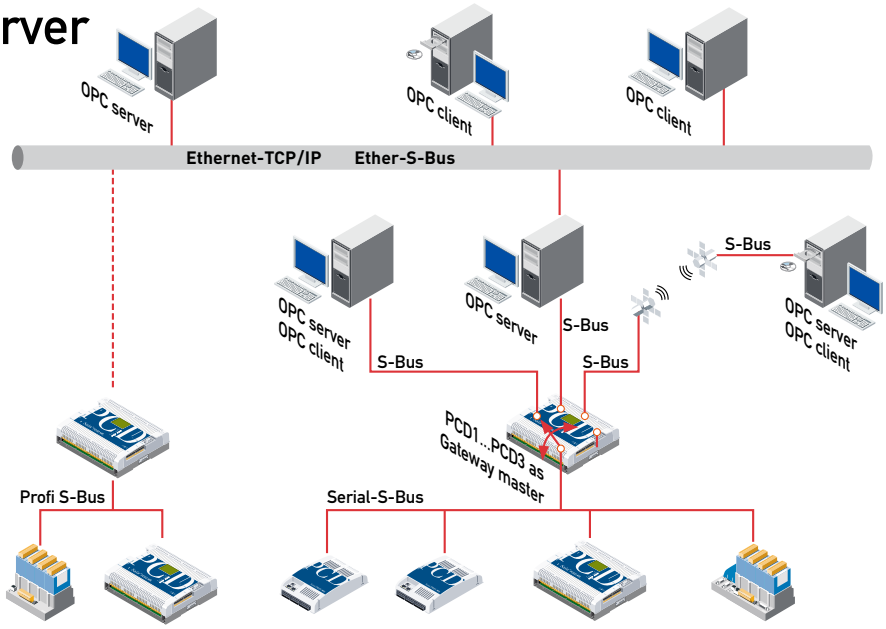
Ordering information Saia® Visi.Plus

Three basic Visi.Plus versions are available to system integrators. Depending on the job requirements and the complexity of the systems, the appropriate package for the client can be deployed and extended with add-on modules.

Type	Description
	Visi.Plus – basic package (one license per project), x = D (German), E (English)
PCD8.S89V00M1	Visi.Plus – demo package (free download from www.visiplus.org)
PCD8.S89V04x9	Visi.Plus Light – basic package. Data management system, database system, graphical editor, Saia S-Driver 250 data points, trend and alarm capture, scheduler, ASCII export program and engineering tool
PCD8.S89V05x9	Visi.Plus Medium – basic package. Data management system, database system, graphical editor, Saia S-Driver 1,000 data points, trend and alarm capture, scheduler, ASCII export program and engineering tool
PCD8.S89V06x9	Visi.Plus Large – basic package Data management system, database system, graphical editor, Saia S-Driver 10,000 data points, trend and alarm capture, logging, scheduler, ASCII export program, remote alarms by pager/SMS and engineering tool
PCD8.S89V39M5	Version update (basic package)
	S-Driver options for basic package
PCD8.S89V09M5	Visi.Plus – option for basic package Saia® S-Driver for 10,000 additional data points
PCD8.S89V10M5	Visi.Plus – option for basic package Saia® S-Driver for 25,000 additional data points
PCD8.S89V11M5	Visi.Plus – option for basic package Saia® S-Driver for 50,000 additional data points
PCD8.S89V12M5	Visi.Plus – option for basic package Saia® S-Driver for unlimited data points
	Module options for basic package
PCD8.S89V21M5	GE2 graphical editor Runtime system, two additional consoles
PCD8.S89V50M5	GE5 graphical editor Runtime system, five additional consoles
PCD8.S89V51M5	GE10 graphical editor Runtime system, ten additional consoles
PCD8.S89V52M5	GEUL graphical editor Runtime system, unlimited consoles
PCD8.S89V24M5	PRT logging (add-on module for Visi.Plus Light/Medium package)
PCD8.S89V53M5	PChart - trend display tool
PCD8.S89V27M5	MALM remote alarms via pager/SMS/e-mail (add-on module for Visi.Plus Light/Medium package)
PCD8.S89V70M5	MALM Voice – Transmission of voice mail with acknowledgement via DTMF
PCD8.S89V71M5	MALM ESPA 4.4.4 - Remote alarms using the ESPA protocol within telecomms systems (send only)
PCD8.S89V72M5	ESPA 4.4.4 (RCV) - Alarms/messages via ESPA protocol from telecomms systems to Visi.Plus (receive only)
PCD8.S89V73M5	pSMS - Receive and evaluate SMS via GSM modem (software module only)
PCD8.S89V74M5	SNMP driver to monitor network components
PCD8.S89V56M5	Web server 2, for 2 simultaneous connections
PCD8.S89V57M5	Web server 5, for 5 simultaneous connections
PCD8.S89V55M5	Web server 20, for 20 simultaneous connections
	Other drivers
PCD8.S89V46M5	OPC1 client for 250 data points
PCD8.S89V47M5	OPC2 client for 1000 data points
PCD8.S89V48M5	OPC3 client for 10,000 data points

4.2 Saia® OPC server

Network topology with Saia® S-Bus



The efficient way of integrating Saia® PCD controllers into any visual display and management system.

OPC-Server…

- Standardized OPC interface: Expertise in vendor-specific protocols is no longer required.
  This results in significantly lower costs for development, commissioning and maintenance
- OPC project: All OPC data for networked controllers is brought together in a single project. This produces a clear data structure and simplifies the proper definition of data points
- Import of PLC variables: Symbols and data points previously defined for the PLC program with the PG5 programming tools can be carried over and used unmodified by the OPC-Server
- Communication by all routes: Communication between the OPC-Server and the Saia® PCD can take place via RS232, RS485, modem, TCP/IP, Profibus, USB or dual-port RAM (PC/104).
  Several OPC clients can access the OPC-Server simultaneously across several PC ports

…in combination with the Saia® S-Bus

- OPC-Server/Saia® PCD: Visual display and management systems with OPC client interfaces can be connected to any Saia® PCD controller.
  This enables every OPC client, via the OPC-Server, to read data from the PCD or write data to the PCD
- S-Bus protocol:This is built into every Saia® PCD. The simple, safe and efficient protocol supports point-to-point, master-slave and master-master communication between the OPC-Server and the controller. The OPC-Server supports all S-Bus protocols, including the new protocols via UDP/IP or Profibus
- Master-slave network: Up to 3 external OPC-Servers can simultaneously access all Saia® PCD controllers present in the network and their data

- PG5 programming tool:
  Efficient programming and diagnosis of all Saia® PCD controllers present in the network via the Serial S-Net network

Technical data

OPC data access standards supported	1.01a, 2.05a
PC operating systems supported	MS Windows NT 4.0 SP4, MS Windows 95/98 Windows 2000, Windows XP
Protocols supported	S-Bus Data, Parity and Break mode, S-Bus via UDP/IP (Ether-S-Bus), S-Bus via Profibus (Profi-S-Bus), PGU-Mode, PC104
Controller types supported	All PCD controller types (excluding xx7 Series)
Possible connection types between OPC-Server (PC) and PLC	RS232/422/485, USB, modem, dual-port RAM (PCD2.M250), Profi-S-Link adapter, Ethernet 10/100 Base-T (PCD7.F65..)
PLC data that can be displayed in OPC-Server	Inputs, outputs, flags, registers, data blocks, texts, timers, counters, date-time, display register, firmware version
Data formats for import functions	*.src (PG3, PG4), *.pcd (PG4, PG5), *.sy5 (PG5), *.csv (comma-separated values, e.g. from Excel)
Special features	Redundant communication on different channels Internal data for exchange between OPC clients

Ordering information: OPC server

Type	Description
	OPC-Server for the Saia® S-Bus
PCD8.C59001M9	Complete version, for one PC and one application
PCD8.C59001M93	Complete version, for 3 PCs with the same application
PCD8.C59001M95	Complete version, for 5 PCs with the same application
PCD8.C59001M9A	Complete version, for 10 PCs with the same application
PCD8.C59001M9S	Complete version, for an unlimited number of PCs with the same application
PCD8.C59001M9U	Complete version, unlimited number of licenses for OEM
PCD8.C59001E1	Demo version, limited to one hour run time

5 Control systems

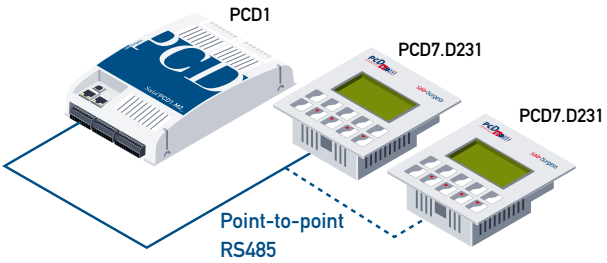
* in preparation

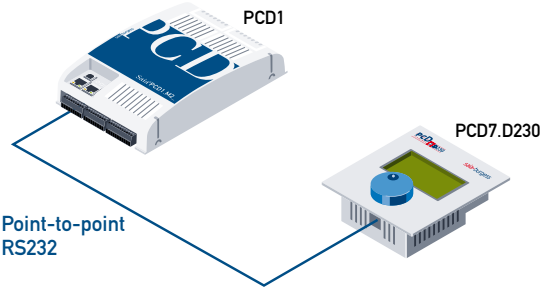
5.1 Control systems Saia® PCD panels

Text-Panels

Text information can be displayed on Saia® Text-Panels and, depending on the model, graphical elements may also be displayed. As these Text-Panels do not have their own memory, all information to be displayed is transferred from the automation station to the panel for display as and when required.

System configuration





Properties of the Saia® HMI-Editor*

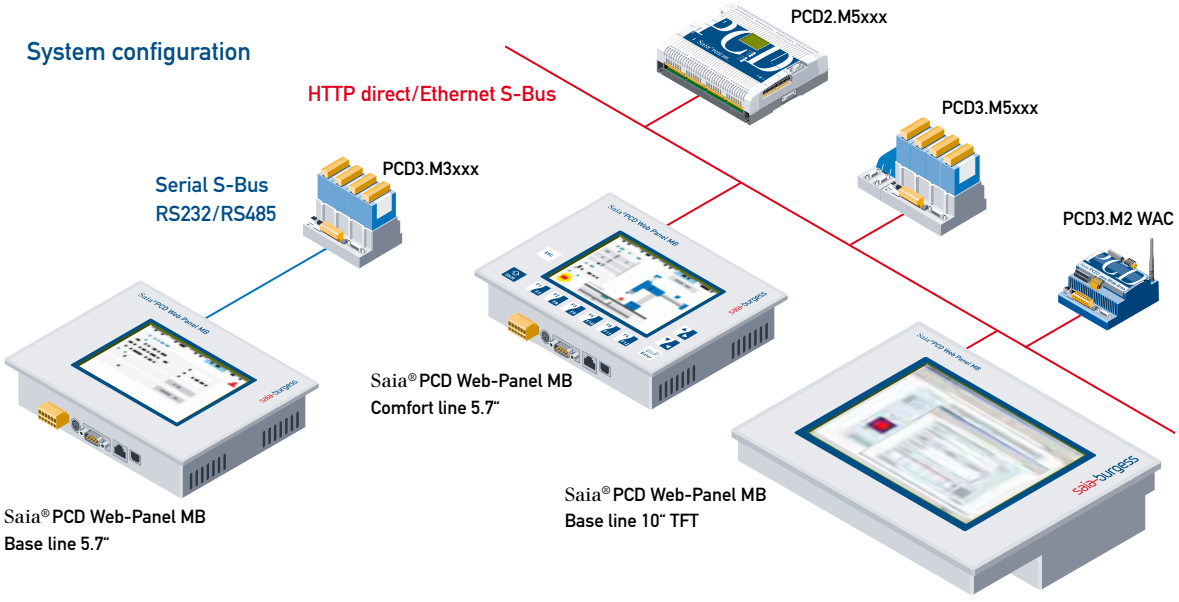
- The Saia® HMI-Editor is an integral part of the Saia® PG5 Controls-Suite
- Optimum integration of HMI-Editor projects in PG5. Automatic access to PG5 symbols for the use of PCD variables
- The HMI-Editor is used to build the menu structure, define the password hierarchy, display and edit variables, call internal FBox parameters and generate an alarm list
- Text-Panel configuration: terminal type, topology, access, serial connection type, baud rate, handshaking…
- Graphics: easy creation of icons using the ICON-Editor. Icons and trends can be displayed on screen (according to type and topology)
- Project preview with the Play function
- Administration of 10 password hierarchies
- In bus topology: maximum 6 terminals

* For more details on the HMI-Editor, see Chapter 10.7

Browser panels

The Saia® PCD Web-Panel MB family with micro-browser and touchscreen technology comprises control panels for the display of installation-specific web pages. Web-Panel MB devices have at least one Ethernet port and one USB port, plus RS232 and RS485 communications ports.

System configuration



5.2 Summary table: Text-Panels




4 lines × 16 chars. | 8 lines× 20 characters with graphics capability

	PCD7.D170/ PCD7.D16x	PCD7.D230	PCD7.D231	PCD7.D232
Display				
Colours	mono	mono	mono	mono
Display	Text	Graphic	Graphic	Graphic
Lines × characters	4 lns × 16 chars	8 lns × 20 chars	8 lns × 20 chars	8 lns × 20 chars
Resolution	–	128 × 63 pixels	128 × 63 pixels	128 × 63 pixels
Background lighting	LED on/off	LED on/off	LED on/off	LED on/off
Character size (W × H)	3 × 4.7 mm	2.5 × 3.5 mm	2.5 × 3.5 mm	2.5 × 3.5 mm
Character set	ASCII + spec. E, G, F, Sca	ASCII (West European)		
Keyboard				
Total keys	5	1 dial knob	10	25
Function keys and buttons	5 F-keys[4] or 5 keys	-	10 F-keys + 5 keys	8 F-keys + num. keypad
Key autorepeat	yes	no	yes	yes
Buzzer	no	yes	yes	yes
LED	no	no	no	8
Memory (PCD/PCS1)	depending on PLC	depending on PLC	depending on PLC	depending on PLC
Clock	on PLC	on PLC	on PLC	on PLC
Interfaces	RS232	RS232/422/485	RS232/422/485	RS232/422/485
Protocol	Point-to-point	Point-to-point	Point-to-point	Point-to-point
On-board interfaces				
NTC temperature sensor	-	-	-	-
Capacitive humidity sensor	-	-	-	-
Programming software	HMI-Editor [2]	HMI-Editor	HMI-Editor	HMI-Editor
Use of PG5 resources	yes	yes	yes	yes
Graphical display capabilities	no	yes [1]	yes [1]	yes [1]
Autorepeat function	yes	-	yes [3]	yes [3]
Function key commands	yes [4]	-	yes [3]	yes [3]
LED control commands	-	-	-	yes [3]
Buzzer control commands	-	yes [3]	yes [3]	yes [3]
General details				
Supply voltage	19…32 VDC	19…32 VDC	19…32 VDC	19…32 VDC
Front protection	IP 65	IP 54	IP 65	IP 65
Dimensions (W × H × D) [mm]	120 × 110 × 45	115 × 125 × 45	115 × 125 × 45	115 × 125 × 45
Cut-out (W × H) [mm]	109 × 99	99 × 109	99 × 109	99 × 109

[1] with RS232 RTS/CTS, XON/XOFF reduced, RS422 XON/XOFF reduced
[2] only with "shift key" setup mode
[3] not with FTP mode (RS485)
[4] function keys are not supported by the HMI-Editor
[5] Icon with RS232

5.3 Summary tables: MB-Panels

5.7"

5.7"

	PCD7.D457				PCD7.D457	
	BTCF	STCF [5]	VTCF [6]	VTCFH [4]	SMCF [5]	VMCF [5]
Display						
Colours	16 grey tones	256	65536	65536	256	65536
Display	5.7" STN	5.7" STN	5.7" TFT	5.7" TFT	5.7" STN	5.7" TFT
Resolution (pixels)	QVGA 320 × 240	QVGA 320 × 240	VGA 640 × 480	VGA 640 × 480	QVGA 320 × 240	VGA 640 × 480
Resistive touch screen	4 wires	4 wires	4 wires	4 wires HAPTIC	4 wires	4 wires
Contrast adjustment	yes	yes	yes	yes	yes	yes
Background lighting	LED	CCFL	LED	LED	CCFL	CCFL
Front LED	—	—	—	—	—	-
F-keys, alphanumeric keypad	—	—	—	—	2×6 F-keys	2×6 F-keys
Processor						
Processor	Coldfire CF5272. 66 MHz	Coldfire CF5272. 66 MHz	Coldfire CF5272. 66 MHz	Coldfire CF5272. 66 MHz	Coldfire CF5272. 66 MHz	Coldfire CF5272. 66 MHz
Memory for local web server	4 MB Flash	4 MB Flash	4 MB Flash	4 MB Flash	4 MB Flash	4 MB Flash
Clock (RTC)	—	—	—	—	—	—
Interfaces						
Ethernet 10 / 100 M (RJ45)	×1 Ethernet [1]	×1 Ethernet [1]	×1 Ethernet [1]	×1 Ethernet [1]	×1 Ethernet [1]	×1 Ethernet [1]
USB 12M	×1 client	×1 client	×1 client	× 1 client	×1 client	×1 client
Serial	×1 RS485 [2]	×1 RS485 [2]	×1 RS485 [2]	×1 RS485 [2]	×1 RS485 [2]	×1 RS485 [2]
Serial (D-Sub9)	×1 RS232 [2]	×1 RS232 [2]	×1 RS232 [2]	—	×1 RS232 [3]	×1 RS232 [3]
External keyboard/barcode	—	—	—	—	×1 PS/2	×1 PS/2
Operating system	Saia® NT	Saia® NT	Saia® NT	Saia® NT	Saia® NT	Saia® NT
Browser	Saia® Micro-Browser	Saia® Micro-Browser	Saia® Micro-Browser	Saia® Micro-Browser	Saia® Micro-Browser	Saia® Micro-Browser
Server	Web-Server (HTTP D)	Web-Server (HTTP D)	Web-Server (HTTP D)	Web-Server (HTTP D)	Web-Server (HTTP D)	Web-Server (HTTP D)
	FTF server	FTF server	FTF server	FTF server	FTF server	FTF server
Software tool						
Graphical editor *	Saia® Web-Editor	Saia® Web-Editor	Saia® Web-Editor	Saia® Web-Editor	Saia® Web-Editor	Saia® Web-Editor
* Use of PG5 resources	yes	yes	yes	yes	yes	yes
Technical data						
Supply voltage	18…32 VDC	18…32 VDC	18…32 VDC	18…32 VDC	18…32 VDC	18…32 VDC
Current consumption at Un	500 mA	500 mA	500 mA	500 mA	500 mA	500 mA
Front protection	IP65	IP65	IP65	IP65	IP65	IP65
Operating temperature	0–50° C	0–50° C	0–50° C	0–50° C	0–50° C	0–50° C
Dimensions (W×H×D) [mm]	202 × 156 × 42	202 × 156 × 42	202 × 156 × 42	202 × 156 × 42	202 × 156 × 42	202 × 156 × 42
Cut-out (W×H) mm	189 × 142	189 × 142	189 × 142	189 × 142	189 × 142	189 × 142
Accessories						
Kits for in-wall mounting	—	—	PCD7.D457-IWS	PCD7.D457-IWS	—	—
Kits for on-wall mounting	—	—	PCD7.D457-OWS	PCD7.D457-OWS	—	—
Communication modules (on slots)						
One slot for Bluetooth	—	—	—	—	—	—
Interface for SD Flash card	Option	Option	Option	Option	Option	Option

1) HTTP direct/Ether-S-Bus
2) Serial S-Bus
5) Available without logo and codes
6) Available without logo and codes, and with special colour/material (aluminium, gloss black front screen, mirror-effect front screen)

Bronze medal from Automation Award 2009 for the Saia® PCD Haptic PCD7.D457VTCFH Web-Panel

The 5.7" Saia® PCD Haptic Web-Panel was nominated for the Automation Award 2009. With the launch of Haptic technology as a world 'first' in automation, we have experienced great interest among users and attracted attention to ourselves. Thanks to the great reception we received from users to Europe's largest trade fair for electrical automation, we found ourselves in a brilliant third place, despite the stiff competition.

10.4"

12.1"

	PCD7.D410	PCD7.D412
	VTCF [5]	DTPF [4]
Display		
Colours	65536	65536
Display	10.4" TFT	12.1" TFT
Resolution (pixels)	VGA 640 × 480	SVGA 800 × 600
Resistive touch screen	4 wires	5 wires
Contrast adjustment	yes	yes
Background lighting	CCFL / LED [4]	LED
Front LED	—	Multi-colour
F-keys, alphanumeric keypad	—	—
Processor		
Processor	Coldfire CF5272. 66 MHz	Coldfire CF5373 240 Mhz
Memory for local web server	4 MB Flash	64 MB Flash
Clock (RTC)	—	yes, with Super-Cap
Interfaces		
Ethernet 10 / 100 M (RJ45)	×1 Ethernet [1]	×2 Ethernet [7] (switch)
USB 12M	×1 client	×1 client
Serial	×1 RS485 [2]	—
Serial (D-Sub9)	×1 RS232 [3]	—
External keyboard/barcode	×1 PS/2	—
Operating system	Saia® NT	Saia® NT
Browser	Saia® Micro-Browser	Saia® Micro-Browser
Server	Web-Server (HTTP D)	Web-Server (HTTP D)
	FTF server	FTF server
Software tool		
Graphical editor *	Saia® Web-Editor	Saia® Web-Editor
* Use of PG5 resources	yes	yes
Technical data		
Supply voltage	18…32 VDC	18…32 VDC
Current consumption at Un	600 mA	600 mA
Front protection	IP65	IP65
Operating temperature	0–50° C	0–50° C
Dimensions (W×H×D) [mm]	281 × 221 × 56	319 × 264 × 60
Cut-out (W×H) mm	262 × 202	300 × 244
Accessories		
Kits for in-wall mounting	PCD7.D410-IWS	PCD7.D412-IWS
Kits for on-wall mounting	PCD7.D410-OWS [4]	PCD7.D412-OWS [4]
Communication modules (on slots)		
One slot for Bluetooth	—	PCD7.F160S
Interface for SD Flash card	Option	—

3) Serial-S-Bus and printer
4) in preparation
7) HTTP direct
8) i New dimensions

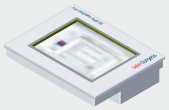
Ordering information | Accessories

Type	Description
4 109 4881 0	Fixing set (4) for Web Panel with embedded micro-browser
4 405 4933 0	Plug-in I/O spring terminal block, 6-pole for wiring up to 2.5 mm², labelled 1 to 6, for Web-Panel with embedded microbrowser (for PCD7.D457/D410 only)
PCD7.RD4-SD	Interface for SD Flash card (for PCD7.D457/D410 only) - SD Flash: see memory modules for the PCD2.M5_

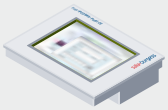
5.4 Summary table: Web-Panels CE/eXP

CE

6.4"



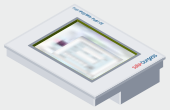
10.4"



10.4"

	PCD7.D5064TX010	PCD7.D5100TX010	PCD7.D5100TL010
Display (inches)			
Technology / colours	TFT / 65536	TFT / 65536	TFT / 16.7 m
Resolution / pixels	VGA 640×480	VGA 640×480	SVGA 800 × 600
Background lighting	CCFL	CCFL	CCFL
Operation	Resistive touch screen	Resistive touch screen	Resistive touch screen
CPU			
Processor	Xscale	Xscale	AMD Geode LX 800
(400 MHz)	(400 MHz)	(400 MHz)	(533 MHz)
RAM	64 MB	64 MB	256 MB
CFC slot, internal	—	—	×1
CFC slot, external	×1 with 128 MB Flash	×1 with 128 MB Flash	×1 with 128 MB Flash
Interfaces			
Ethernet	×1 10/100Base, RJ45	×1 10/100Base, RJ45	×2 10/100Base, RJ45
USB	×2 USB 1.1, host	×2 USB 1.1, host	×2 USB 2.0, host
Serial	×1 RS232, D-Sub 9	×1 RS232, D-Sub 9	×2 RS232, D-Sub 9
Keyboard / mouse / barcode	—	—	×1 Mini DIN PS/2
Monitor	—	—	×1 VGA
Electrical data			
Operating voltage	24 VDC, ±20 %	24 VDC, ±20 %	24 VDC, ±20 %
Current consumption	approx. 1.0 A	approx. 1.0 A	approx. 0.9 A
Mechanical specification			
Dimensions (W × H × D)	318 × 244 × 81 mm	364 × 296 × 74 mm	318 × 244 × 81 mm
Front aperture	303 × 229 mm	344 × 276 mm	303 × 229 mm
Protection class (front/back)	IP65 / IP 20	IP65 / IP 20	IP65 / IP 20
Kits for in-wall mounting	—	—	Page ?
Software setup			
Operating system	Windows CE 5.0	Windows CE 5.0	Windows CE 6.0
.Net	Microsoft .Net Compact Framework	Microsoft .Net Compact Framework	Microsoft .Net Compact Framework
Java Virtual Machine	yes	yes	yes
Browser	Micro-Browser CE Internet Explorer	Micro-Browser CE Internet Explorer	Micro-Browser CE Java Applet Viewer Internet Explorer
Server	Web-Server FTP server File server	Web-Server FTP server File server	Web-Server FTP server File server VNC server
Saia® Web-Panel configurator	—	—	yes
Saia® .Net	Web-Connect	Web-Connect	Web-Connect Web-HMI server
S-Energy	—	—	S-Energy logger, page 216
Software tool			
Graphical editor for web visualisation	Saia® S-Web-Editor	Saia® S-Web-Editor	Saia® S-Web-Editor

eXP

 12.1"	 15"	 10.4"	 12.1"	 15"
PCD7.D5120TL010	PCD7.D5150TL010	PCD7.D6100TL010	PCD7.D6120TL010	PCD7.D6150TL010
TFT / 16.7 m	TFT / 16.7 m	TFT / 16.7 m	TFT / 16.7 m	TFT / 16.7 m
SVGA 800 × 600	XGA 1024 × 768	SVGA 800 × 600	SVGA 800 × 600	XGA 1024 × 768
CCFL	CCFL	CCFL	CCFL	CCFL
Resistive touch screen	Resistive touch screen	Resistive touch screen	Resistive touch screen	Resistive touch screen
AMD Geode LX 800	AMD Geode LX 800	AMD Geode LX 800	AMD Geode LX 800	AMD Geode LX 800
(533 MHz)	(533 MHz)	(533 MHz)	(533 MHz)	(533 MHz)
256 MB	256 MB	512 MB	512 MB	512 MB
×1	×1	×1	×1	×1
×1 with 128 MB Flash	×1 with 128 MB Flash	×1 with 2 GB Flash	×1 with 2 GB Flash	×1 with 2 GB Flash
×2 10/100Base, RJ45	×2 10/100Base, RJ45	×2 10/100Base, RJ45	×2 10/100Base, RJ45	×2 10/100Base, RJ45
×2 USB 2.0, host	×2 USB 2.0, host	×2 USB 2.0, host	×2 USB 2.0, host	×2 USB 2.0, host
×2 RS232, D-Sub 9	×2 RS232, D-Sub 9	×2 RS232, D-Sub 9	×2 RS232, D-Sub 9	×2 RS232, D-Sub 9
×1 Mini DIN PS/2	×1 Mini DIN PS/2	×1 Mini DIN PS/2	×1 Mini DIN PS/2	×1 Mini DIN PS/2
×1 VGA	×1 VGA	×1 VGA	×1 VGA	×1 VGA
24 VDC, ±20 %	24 VDC, ±20 %	24 VDC, ±20 %	24 VDC, ±20 %	24 VDC, ±20 %
approx. 1.1 A	approx. 1.5 A	approx. 0.9 A	approx. 1.1 A	approx. 1.5 A
364 × 296 × 74 mm	452 × 357 × 86 mm	318 × 244 × 81 mm	364 × 296 × 74 mm	452 × 357 × 86 mm
344 × 276 mm	429 × 334 mm	303 × 229 mm	344 × 276 mm	429 × 334 mm
IP65 / IP 20	IP65 / IP 20	IP65 / IP 20	IP65 / IP 20	IP65 / IP 20
Page ?	Page ?	Page ?	Page ?	Page ?
Windows CE 6.0	Windows CE 6.0	Windows XP embedded	Windows XP embedded	Windows XP embedded
Microsoft .Net Compact Framework	Microsoft .Net Compact Framework	Microsoft .Net Framework	Microsoft .Net Framework	Microsoft .Net Framework
yes	yes	Java SE Runtime Environment 6	Java SE Runtime Environment 6	Java SE Runtime Environment 6
Micro-Browser CE Java Applet Viewer Internet Explorer	Micro-Browser CE Java Applet Viewer Internet Explorer	Micro-Browser CE Java Applet Viewer Internet Explorer	Micro-Browser CE Java Applet Viewer Internet Explorer	Micro-Browser CE Java Applet Viewer Internet Explorer
Web-Server FTP server File server VNC server	Web-Server FTP server File server VNC server	Web-Server FTP server File server VNC server	Web-Server FTP server File server VNC server	Web-Server FTP server File server VNC server
yes	yes	yes	yes	yes
Web-Connect Web-HMI server	Web-Connect Web-HMI server	Web-Connect Web-HMI server	Web-Connect Web-HMI server	Web-Connect Web-HMI server
S-Energy logger, page 216	S-Energy logger, page 216	S-Energy logger, page 216	S-Energy logger, page 216	S-Energy logger, page 216
Saia®S-Web-Editor	Saia®S-Web-Editor	Saia®S-Web-Editor	Saia®S-Web-Editor	Saia®S-Web-Editor

5.5 Wall-mounting | set for MB-Panels

Drywall installation set

Our micro-browsers are not just for mounting in the control cabinet: they also look very good in the office or living-room, or mounted on a wall.

New accessories for MB panel as mounting sets for in-wall and on-wall installation. As a result, this innovative technology is not just reserved to the control cabinet for the machine operator, but will also make a contribution to comfort in the office or at home too.

In-wall kit:

■ In-wall mounting MB 5.7"

● Size		
● Outside (W × H × D)	Size 275 × 230 mm (front)	
● Wall aperture (W × H)	235 × 210 mm (for solid wall)	
● Order details		
● PCD7.D457-IWS	Kit for in-wall mounting (solid wall)	1250 gr
● 4121 4910 0	Additional fixing set for cavity walls	100 gr

■ In-wall mounting MB 10.4"

● Size		
● Outside (W × H × D)	Size 276 × 216 × 65 mm	
● Wall aperture (W × H)	270 × 211 mm (for solid wall)	
● Order details		
● PCD7.D410-IWS [1])	Kit for in-wall mounting (solid wall)	850 gr

■ In-wall mounting MB 12.1"

● Size		
● Outside (W × H × D)	Size 331 × 276 × 65 mm	
● Wall aperture (W × H)	309 × 254 mm (for solid wall)	
● Order details		
● PCD7.D412-IWS [1])	Kit for in-wall mounting (solid wall)	1200 gr

■ On-wall mounting MB 5.7"

● Size		
● External (W × H × D)	Size 266 × 219 × 73.5 mm	
● Order details		
● PCD7.D457-OWS	Kit for on-wall mounting	2350 gr

■ On-wall mounting MB 10.4 and 12.1"

● Order details	
● PCD7.D410-OWS[1])	Kit for on-wall mounting (solid wall)
● PCD7.D412-OWS[1])	Kit for on-wall mounting (solid wall)

[1]) in preparation

5.6 Wall-mounting set | for Windows CE and eXP based Web-Panels

Web-Panels from the LX800 family with Windows CE and eXP (series PCD7.D51xxTL010 and PCD7.D61xxTL010) may also be obtained in the form of a practical wall-mounting kit. A total of 6 types are therefore available in display sizes from 10“ to 15“ – optionally with Windows CE or eXP – for easy mounting within buildings. The set is equally suitable for use with either drywall or solid wall construction. The technical specification of the Web-Panels matches that of the standard versions PCD7.D51xxTL010 and PCD7.D61xxTL010; only the internal slot for an added CFC compact flash card has been omitted. Mechanical dimensions have been adapted to enable optimum installation within buildings.

A wall-mounting set consists of three components:

■ Wall-mounting box

- Metal box with cable entries
- For drywall and solid wall construction
- For 10“, 12“ and 15“ Web-Panels

10”	Q.LIWBox-100M
12”	Q.LIWBox-120M
15”	Q.LIWBox-150M

■ Open-Frame Saia® PCD Web-Panel

- 10”, 12” and 15” Web-Panels
- Windows CE and Windows eXP

WinCE	10”	PCD7.D5100TLW10
WinCE	12”	PCD7.D5120TLW10
WinCE	15”	PCD7.D5150TLW10
Win eXP	10”	PCD7.D6100TLW10
Win eXP	12”	PCD7.D6120TLW10
Win eXP	15”	PCD7.D6150TLW10

■ Face frame

- Standard aluminium face frame
- Support for individually designed face frames

Support	10”	Q.LIWFrm-100-01
Support	12”	Q.LIWFrm-120-01
Support	15”	Q.LIWFrm-150-01
Aluminium	10”	Q.LIWFrm-100-02
Aluminium	12”	Q.LIWFrm-120-02
Aluminium	15”	Q.LIWFrm-150-02

Alongside the standard aluminium frame, a "basic" support is also available with the necessary spring bolts. A wide variety of materials (wood, metal, glass or stone) can be fitted onto it individually to match the building interior.

6 Automation stations

6.1 Automation station PCS1: Compact series

This compact, freely programmable automation system excels precisely where other compact controllers reach their limits. It has a mix of data points designed for the HeaVAC market and outstanding communication capabilities, allowing an almost limitless spectrum of uses.

Extensive functionality in the minimum space

- integral or remote graphics display with jog dial control
- integral manual and coupler level
- compact size 195 × 150 × 60 mm (W × H × D)
- plug-in spring terminals with cover
- large main memory for history data
- 19, 30 or 44 data points in the base unit, expandable via networks

Custom solution for all areas of application

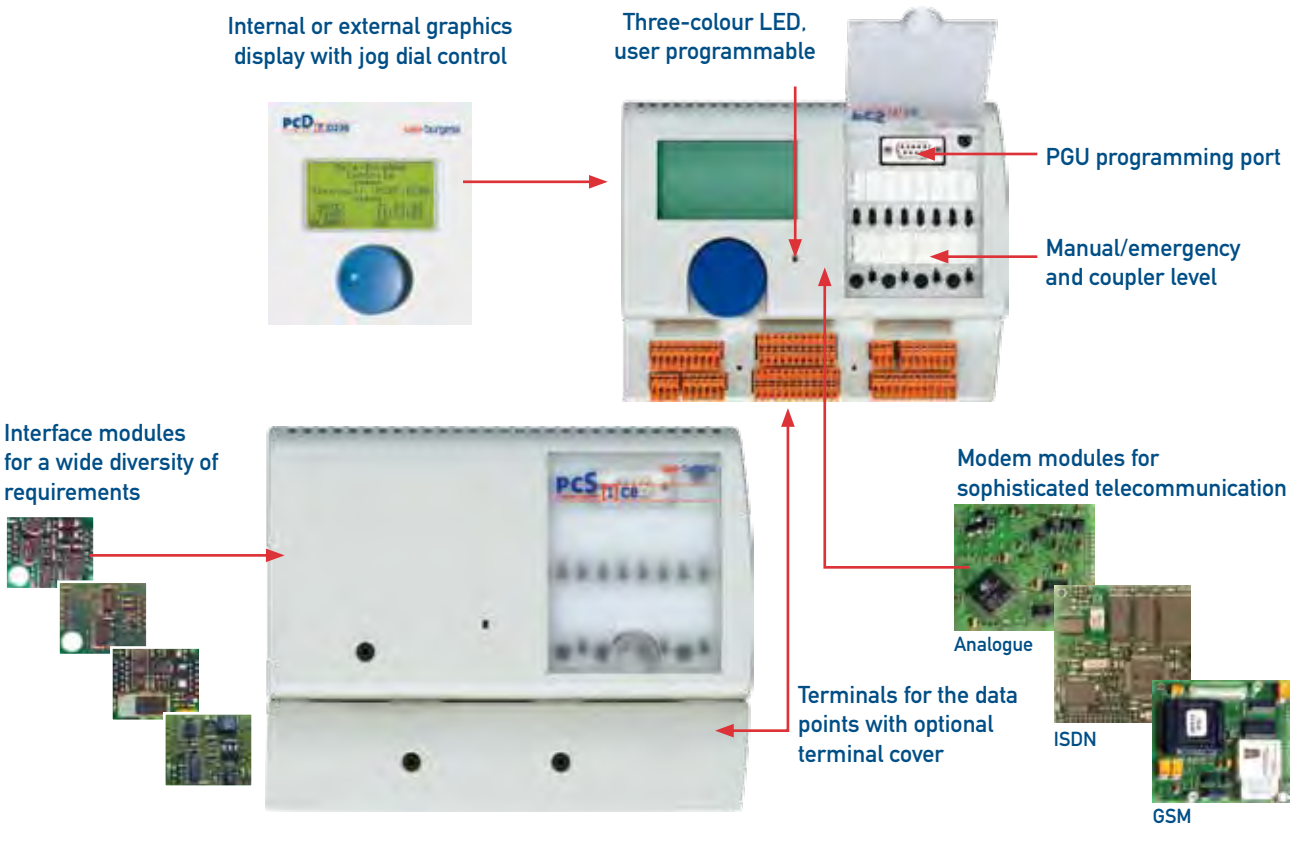
Through its distinctive data point structure, the DDC. Compact is ideally suited for use in:

- ventilation installations
- heating installations
- compact air-conditioning equipment
- district heating transfer stations etc.

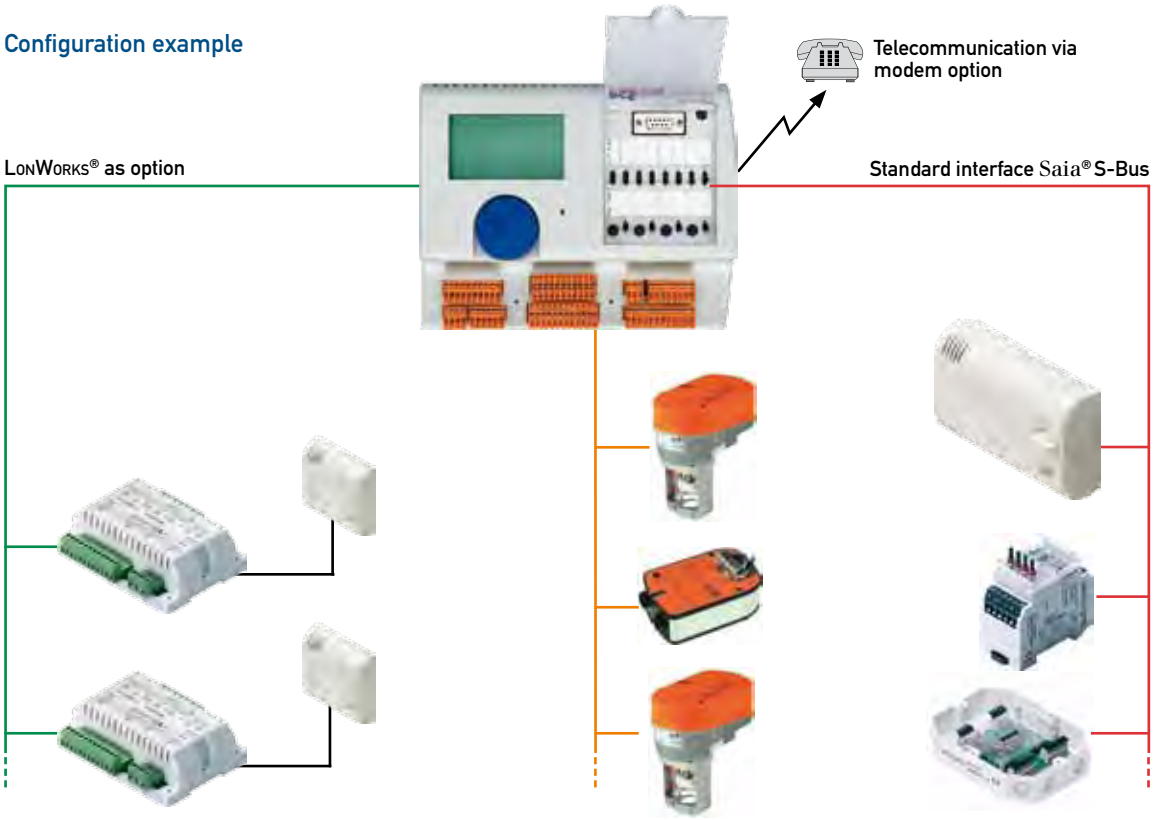
Interfaces make it a great communicator

- Saia® S-Bus (PCD/room control systems or remote data points)
- LonWorks®
- EIB/Konnex
- MP-BUS (BELIMO® MFT drives)
- M-Bus (remote counter reading)
- Modbus (RTU und ASCII) etc.
- Different networks
- Telecommunication via integrated analogue, ISDN or GSM modem with remote maintenance and diagnostics, SMS error messaging and remote programming!

Note: External modems cannot be connected.



Configuration example



* from 30 September 2010, replaced by PCD7.F180S

Technical data PCS1

Basic hardware

User memory	1 MByte as Flash EPROM and 896 KByte as RAM	
Processor	CPU with 32 bit, µC 68340 (16 MHz)	
Processing time	Bit command 5 µs, word command 20 µs	
Real-time clock	Time values:	s/min/h, week/day of week, month/day of month, year
	Accuracy: better than 60 s/month	
Data protection		
Flash	> 10 years	
RAM	5…15 days with super-capacitor protection (user memory, real-time clock)	
Supply voltage	24 VDC -20/+25 %, incl. 5 % ripple according to EN/IEC61131-2	
Power consumption	max. 10 W	

Number of digital inputs/outputs

	PCS1.C4xx	PCS1.C6xx	PCS1.C8xx
Digital inputs, I, 24 VDC, input delay typically 0.2 ms	0	2	3
Digital inputs, I, 24 VDC, input delay typically 8 ms	4	4	9
Digital I/Os, 24 VDC, input delay typically 8 ms, outputs 0.5 A in range 0…32 V	2	4	4
Relay outputs as 'make' contact, 2 × 2 A/2 × 4 A/250 VA [1]	4	4	4
Relay outputs as changeover switch, 2 × 2 A/2 × 4 A/250 VA [1]	0	4	4

[1] With manual control as option

Number of analogue inputs/outputs

Analogue inputs Pt/Ni 1000, 2-wire, resolution 10 bit (= approx. 0.6 °C)	0	0	4
Analogue inputs Pt/Ni 1000, 2-wire, resolution 12 bit (= max. 0.15 °C Pt 1000, or max. 0.08 °C Ni 1000)	4	6	8
Analogue outputs 0…10 V, resolution 10 bits [2]	3	4	4

[2] With manual control and potentiometer as option

Number of universal inputs

Analogue inputs 0…10 V, resolution 10 bit, alternatively usable as digital inputs	2	2	4

Performance overview PCS1




Technical data	PCS1.C42x				PCS1.C62x				PCS1.C82x				PCS1.C88x			
	PCS1.C420	PCS1.C421	PCS1.C422	PCS1.C423	PCS1.C620	PCS1.C621	PCS1.C622	PCS1.C623	PCS1.C820	PCS1.C821	PCS1.C822	PCS1.C823	PCS1.C880	PCS1.C881	PCS1.C882	PCS1.C883
Internal graphics display	■	■	–	–	■	■	–	–	■	■	–	–	■	■	–	–
Manual/emergency control	■	–	■	–	■	–	■	–	■	–	■	–	■	–	■	–
Data points																
Digital inputs 0.2 ms	0				2				3				3			
Digital inputs 8 ms	4				4				9				9			
Digital inputs/outputs	2				4				4				4			
Relay outputs as 'make' contact	4				4				4				4			
Relay outputs as changeover contact	0				4				4				4			
Universal inputs (0…10 V; 24 V on/off)	2				2				4				4			
Analogue inputs (Pt/Ni 1000, 0.6 °C)	0				0				4				4			
Analogue inputs (Pt/Ni 1000, 0.15 °C)	4				6				8				8			
Analogue outputs (0…10 V)	3				4				4				4			
Total	19				30				44				44			
Data interfaces																
PGU RS232	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
S-Bus RS485 M/S	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
RS232 for EIB/DALI/M-Bus etc.	Optional via PCD7.F1xx * module															
RS422 remote control terminal																
RS485 S-Bus, EnOcean etc.																
MP-Bus, Belimo																
LonWorks®	–	–	–	–	–	–	–	–	–	–	–	–	■	■	■	■
General details																
Supply voltage	24 Vdc -20/+25 %															
User memory	1 MByte Flash and 896 KByte RAM															
Hardware clock	yes															
Data backup Flash	> 10 years															
RAM	5…15 days															

* from 30 September 2010, replaced by PCD7.F1xxS

Order details for programmable PCS1s

The devices are supplied ready-assembled under the following order codes:

Data points	Base unit	PCD7.F1xxS	Modem	Software	Mechanical options
19	PCS1.C42x	0 = none	0 = none	0 = PG5	0 = no terminal cover
30	PCS1.C62x	A = ..F110S	1 = analogue		1 = with terminal cover
44	PCS1.C8xx	B = ..F121S	2 = ISDN		2 = without terminal cover, wall mounting
		D = ..F150S	3 = GSM		3 = with terminal cover, wall mounting
		E = ..F180S			

Example: PCS1.C820 A200
Base unit with graphics display and manual/emergency control, additional RS422/RS485 interface, ISDN modem, user programmable with PG5, without terminal cover.

Orders must quote the full details

Base units with 19 data points

PCS1.C420	with graphic display and manual/emergency operation
PCS1.C421	with graphic display
PCS1.C422	with manual/emergency operation
PCS1.C423	no display, no manual/emergency operation

Base units with 30 data points

PCS1.C620	with graphic display and manual/emergency operation
PCS1.C621	with graphic display
PCS1.C622	with manual/emergency operation
PCS1.C623	no display, no manual/emergency operation

Base units with 44 data points

PCS1.C820	with graphic display and manual/emergency operation
PCS1.C821	with graphic display
PCS1.C822	with manual/emergency operation
PCS1.C823	no display, no manual/emergency operation

LON base units with 44 data points

PCS1.C880	with graphic display and manual/emergency operation
PCS1.C881	with graphic display
PCS1.C882	with manual/emergency operation
PCS1.C883	no display, no manual/emergency operation

Accessories (spare parts)

4405 4941 0	Set of spring terminals, 8 parts
4111 4927 0	Terminal cover, incl. 2 screws
4109 4849 0	Set for wall mounting
4310 8681 0	Adhesive strip label for PCS1 with manual override function
PCD7.D230	External graphic terminal
PCD7.K423	Screened interface connection cable, length 2.5 m: between terminal (D-type, 9 pole) and RS232 interface with RTS/CTS of PCS1 or PCD (wire ends free)
PCD8.K111	Programming cable configuration/programming tool

PCD7.F1x0 communication modules (for swap-out)

PCD7.F110S	interface RS422/RS485, electrically connected
PCD7.F121S	interface RS232 (RTS/CTS only supported)
PCD7.F150S	interface RS485, electrically isolated
PCD7.F180S	MP-Bus connection module for BELIMO®MFT drives

Modem modules (for swap-out)

PCS1.T814	Analogue
PCS1.T851	ISDN-TA
PCS1.T830	GSM

Automation system | PCS1: Range of uses

The range of applications for PCS1 compact controllers is very diverse. The following examples are intended to show typical HeaVAC applications where DDC-Compact has been used.

Example applications PCS1.C62x

Example application 1

- Ventilation system with 2 control sequences
- 2-stage ventilation
- Pre-heated return monitoring
- Room temperature/air extraction control
- Single-stage air extraction with valve function, thermostat and external requesting

Example application 2

- Ventilation system with 3 control sequences
- Pressure control with remote monitoring, 2-stage
- Rotational heat recovery
- Process monitoring of media
- Remote setpoint transmitter
- Room temperature/air extraction control
- 2-stage direct vaporizer control

Example application 3

- 2-stage boiler controller
- Boiler return upkeep
- Emergency OFF function
- Pressure/water level monitoring
- Process/fault monitoring
- Heating group with room temperature monitoring
- Service water tank with 2 detectors
- Loading and circulation pumps

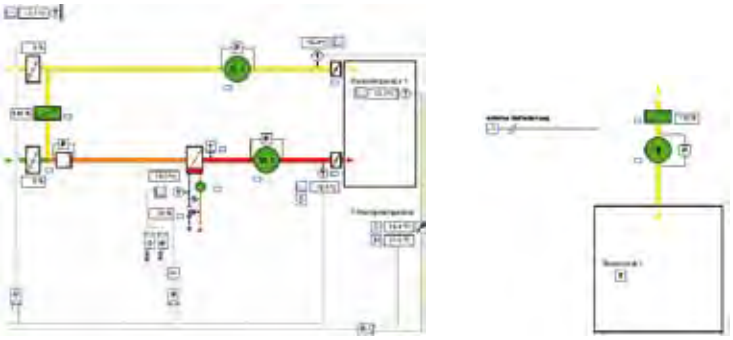
Example application 4

- 3 independent heating groups
- Extension of working hours
- Double pump (heating circuit 2)
- 3-point valve drive triggering
- Service water tank with 2 detectors
- Loading and circulation pumps

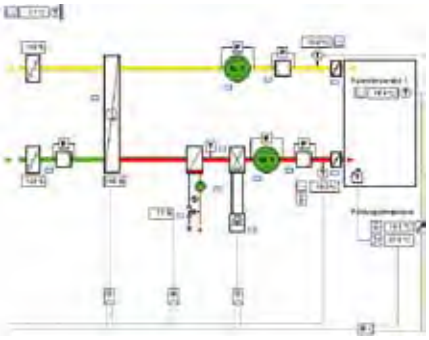
Special functions:

- Single or double pumps
- Individual time-switch program
- Display operation
- Integral manual switch function
- Modem-remote access
- Network-enabled

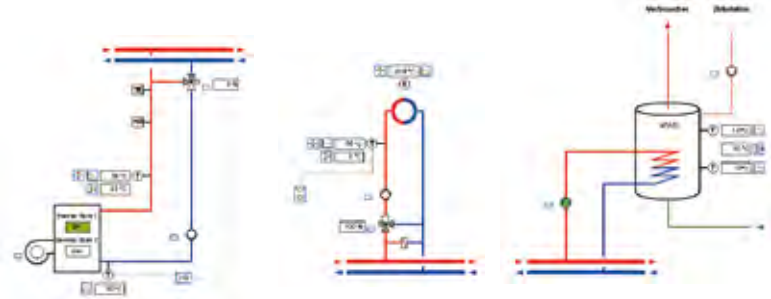
Example application 1



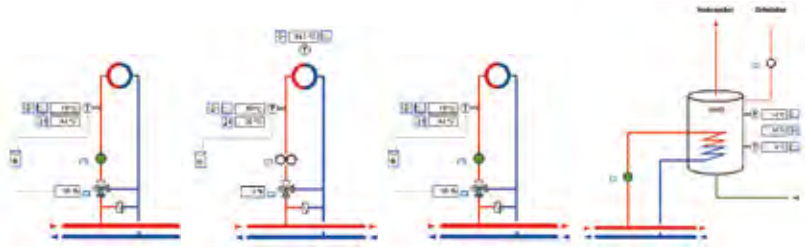
Example application 2



Example application 3

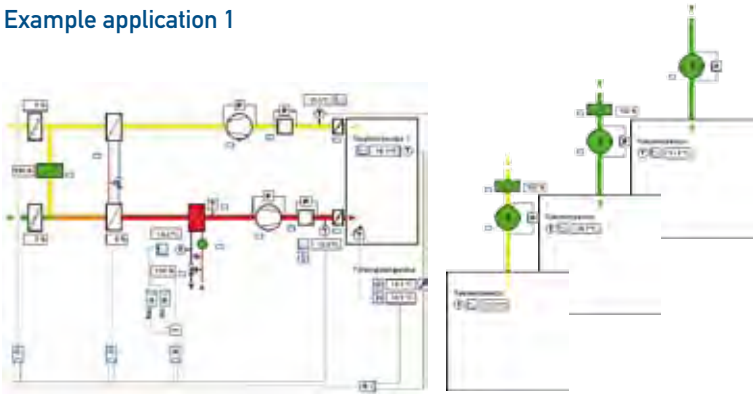


Example application 4

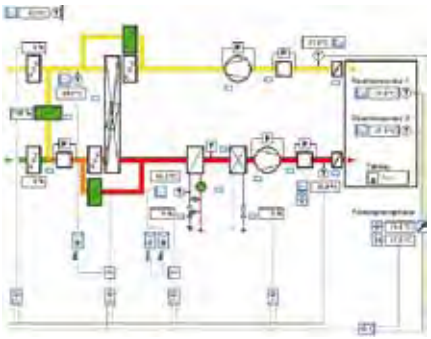


Application examples PCS1.C8xx

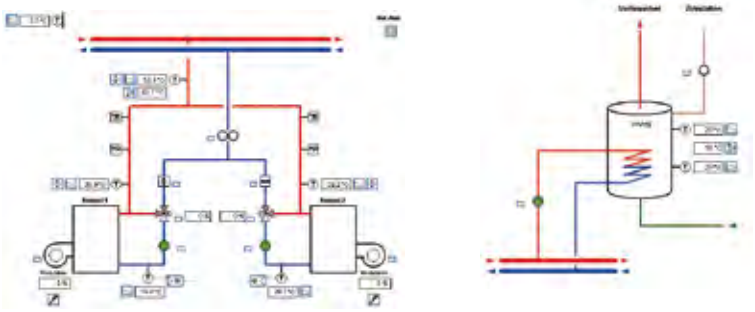
Example application 1



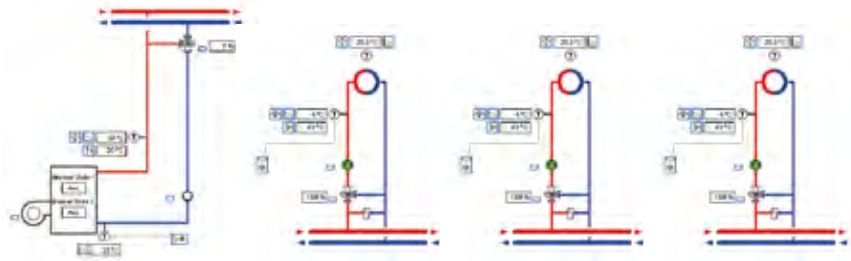
Example application 2



Example application 3



Example application 4



Example application 1

- Ventilation system with 4 control sequences
- 2-stage ventilation
- Remote setpoint transmitter
- Room temperature/air extraction control
- Single-stage air extraction with valve function
- Single-stage aeration with valve function
- Single-stage aeration

Example application 2

- Ventilation system with 4 control sequences
- Pressure control with remote monitoring, 2-stage
- Heat recovery function with disk changer
- Process monitoring of media
- Remote setpoint transmitter
- Room temperature/air extraction control
- Board switch: Auto–0–1

Example application 3

- Double boiler system with sequential control
- Double pump in main flow pipe
- Independent return upkeep
- Modulated burner control
- Emergency OFF function
- Service water tank with 2 detectors
- Loading and circulation pumps

Example application 4

- 2-stage boiler controller
- Flow-pipe temperature control
- Boiler return upkeep
- 3 independent heating groups
- Room temperature turn-on for heating groups

Special functions:

- Single or double pumps
- Individual time-switch program
- Display operation
- Integral manual switch function
- Modem-remote access
- Network-enabled

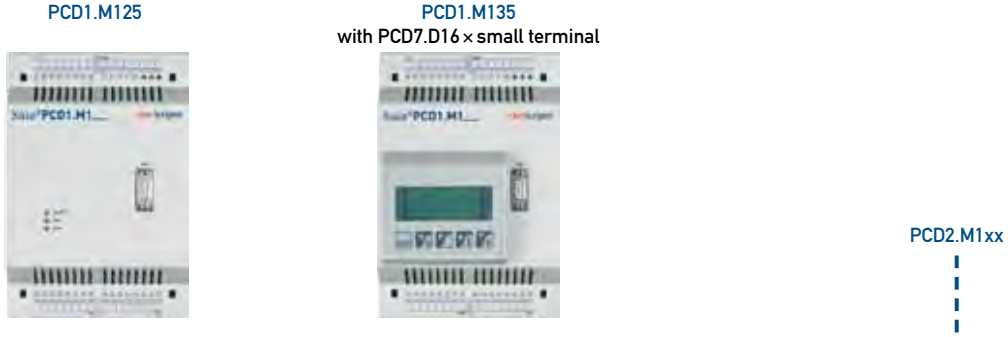
6.2 Automation stations | PCD1/PCD2: Fully modular device series, flat construction

Strong functions – already integrated in the base unit

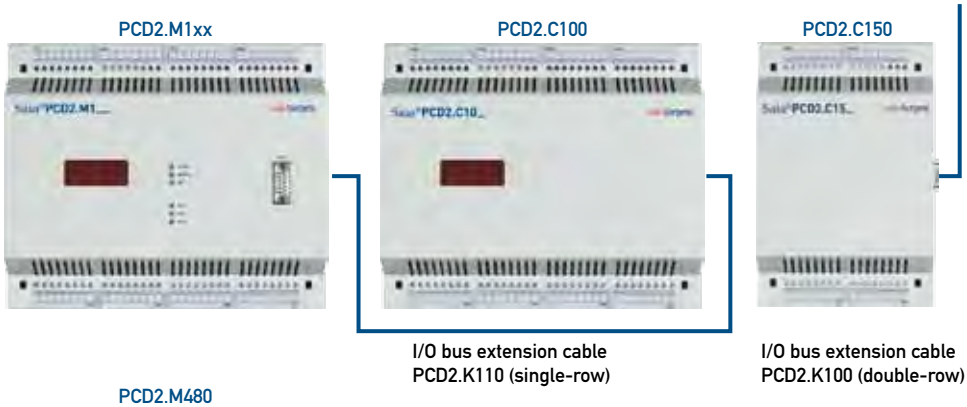
- Up to 1023 local inputs/outputs: all I/O sockets can be equipped with any choice of digital, analogue, counting, measuring and/or weighing modules
  - up to 1023 I/Os with PCD2.M480 and PCD3.LIO (up to 255 I/Os with PCD2.C100)
  - up to 23 536 local I/Os in PCD3.RIO/LIO (via ProfibusDP or Profi-S-IO)
- Up to 1 Mbyte user memory for programs, text and data blocks. 1 Mbyte flash memory as option for ease of down/uploading program modifications and backups
- Up to 9 serial ports can be fitted with choice of RS232, RS422, RS485, Belimo® MP-Bus or TTY/20 mA, field bus connections like Profibus FMS/DP, LonWorks® or Ethernet-TCP/IP, integral modems, USB and Profi-S-Net/MPI (PCD2.M480)
- Web server at no extra cost and without additional TCP/IP communication modules, already included in the base unit
- Up to 4 standard inputs for interrupts or fast counters, on the CPU

Configuration examples:

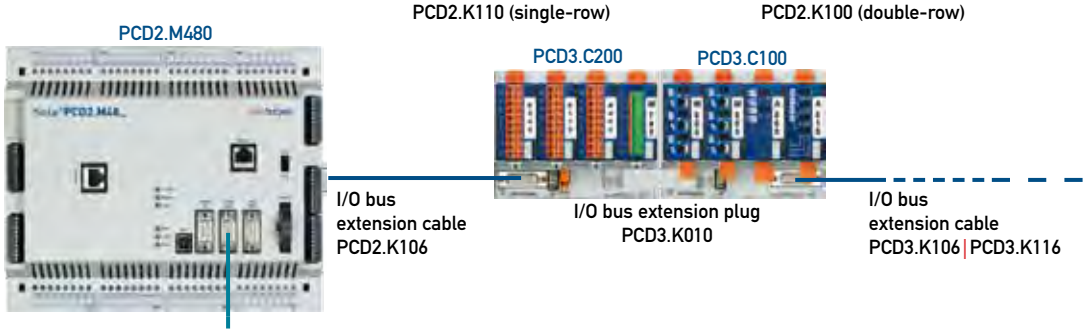
System structure PCD1.M1xx



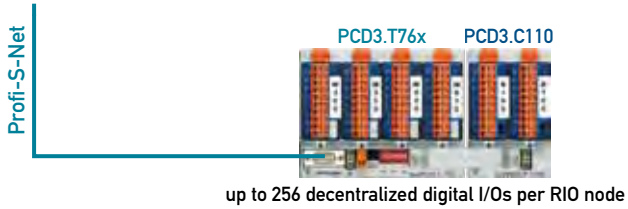
System structure PCD2.M1xx
Extension via I/O bus for single or double-row assembly



PCD2.M480
Extension with PCD3 components and RIO connection



Extension with PCD3.T76x RIOs via Profibus or Profi-S-Net

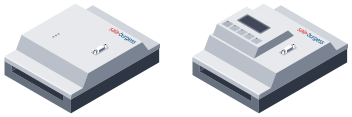


up to 256 decentralized digital I/Os per RIO node

Overview of system components

PCD1/PCD2.Mxx0 for centralized and remote automation tasks

The large choice of CPUs in different performance classes forms the backbone of the system. The 4|8 I/O module slots of the PCD1|PCD2 and the additional 4|8 slots in the PCD2.C150/C100 extension housings can be freely equipped and offer space for up to 255 data points. Extending a PCD2 with a PCD3.C100/110 and PCD3.C200 will support up to 1023 local data points. The CPUs can drive several interfaces at once (up to nine with the PCD2.M480).



PCD1.M110 and PCD1.M1x5

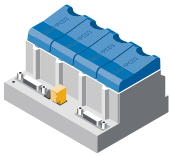
- The PCD1 system range takes up to 4 data point modules (max. 64. data points). Three different types of CPU are available for diverse requirements.

PCD2.M1x0

- The PCD2.M1x0 system range takes up to 32 data point modules (max. 512 data points). Its diversity of configuration makes it suitable for almost any application.

PCD2.M480

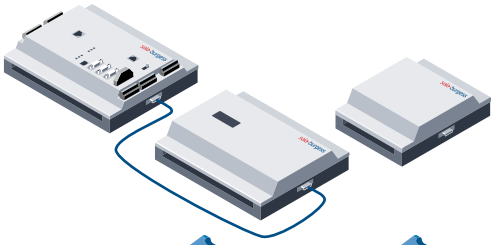
- The flagship of the PCD2 system range can process up to 64 data point modules (max. 1024 data points). With up to 9 interfaces (two Ethernet) and powerful CPU, there are almost no limits to its communications tasks.



Extension of input/output capacity

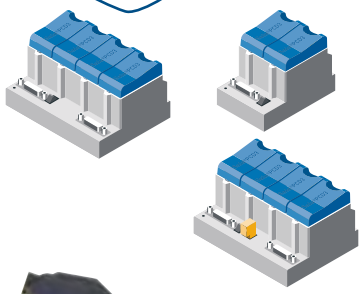
PCD3.T760 and PCD3.T765 RIO head stations

- PCD3.T76x head stations are used as remote peripheral nodes. Up to 3 PCD3.Cxxx module holders can be connected to the PCD3.T76x → 16 data point modules.



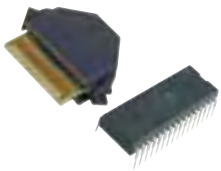
PCD2.C100 and PCD2.C150

- Local data point extension with PCD2 components is achieved via a PCD2.C150 extension for 8 additional module slots, or via a PCD2.C150 extension for 4 additional module slots.



PCD3.C100, PCD3.C110 and PCD3.C200 module holder

- 4 PCD3 module slots (2 with PCD3.C110)
- Extension module holder for PCD3.Mxxxx /Txxx/Cxxx and PCD2.Mxxx
- Additional PCD3.Cxxx devices connectable via extension cable/plug
- Indication of internal 5V supply voltage via LED
- PCD3.C200 has connecting terminals for 24 VDC feed to internal supply of connected PCD3 I/O modules and any superposed PCD3.Cxxx module holders.



User memory

PCD2.M170/M480 has 1 MByte RAM and an optional flash card for backup.
Other types have up to 128/640 KBytes RAM, EPROM or Flash EPROM.

Connection technology: plug-in spring/screw terminal blocks or system cable

Connection to the I/O level is via plug-in spring/screw terminal blocks, plug-in system cables, or ribbon ↔ screw terminal adapters.

Extension plug and cables

- PCD2.K100: Extension cable 0.5 m — PCD2.Mxxx ↔ PCD2.C1x0 ((below base unit))
- PCD2.K110: Extension cable 0.7 m — PCD2.Mxxx ↔ PCD2.C1x0 ((side-by-side))
- PCD2.K106: Extension cable 0.7 m — PCD2.Mxxx ↔ PCD3.Cxxx
- PCD3.K010: Extension plug — PCD3.Mxxxx /T76x/Cxxx ↔ PCD3.Cxxx
- PCD2.K106: Extension cable 0.7 m — PCD3.Mxxxx /T76x/Cxxx ↔ PCD3.Cxxx
- PCD3.K116: Extension cable 1.2 m — PCD3.Mxxxx /T76x/Cxxx ↔ PCD3.Cxxx

Performance overview PCD1 | PCD2 series



Technical data on PCD1 CPUs		PCD1.M110	PCD1.M125	PCD1.M135
Number of inputs/outputs or		64 [5]	64 [5]	64 [5]
PCD2 I/O module sockets		4	4	4
Expansion connection		no	no	no
Processing time [3]	Bit instruction	5 µs	5 µs	5 µs
	Word instruction	20 µs	20 µs	20 µs
User memory				
RAM basic specification		17 KBytes	128 KBytes	128 KBytes
Extension with RAM		128 KBytes	128…512 KBytes	128…512 KBytes
	EPROM or	128 KBytes	128 KBytes	128 KBytes
	Flash EPROM	112 KBytes	112…448 KBytes	112 .. 448 KBytes
Data backup		30 days with Super Cap	7 days with Super Cap	1…3 years [2] with lithium battery
Clock (RTC)		no	yes	yes
Integrated web server		no	yes	yes
Interrupt inputs or		no	2	2
fast counter inputs		no	1 kHz	1 kHz
FW downloadable		no	yes	yes
Serial data ports		2	1…2	1…2
On-board serial data interfaces				
PGU Transmission rates: up to 38.4 kbit/s		PGU RS232	PGU RS232	PGU RS232
RS422/485 Transmission rates: up to 38.4 kbit/s		RS422/485		
Optional serial data interfaces				
Slot A Transmission rates: up to 38.4 kBit/s, TTY/20 mA = 9.6 kBit/s			RS232, RS422, RS485, TTY/current loop 20 mA, Belimo® MP-Bus	RS232, RS422, RS485, TTY/current loop 20 mA, Belimo® MP-Bus
Socket B for network or data ports, LED display, small terminal		no [4]	yes	yes
Programmable		from PG3	from PG5 version 1.3.120	from PG5 version 1.3.120

[1] When using digital I/O modules PCD2.E16x or PCD2.A46x with 16 I/Os each.
[2] Depends on ambient temperature.
[3] Ethernet-TCP/IP as configured system with type no. PCD1.M135F655.
[4] Small terminal PCD7.D162 possible.
[5] Processing time is dependent on the load placed on communication ports.

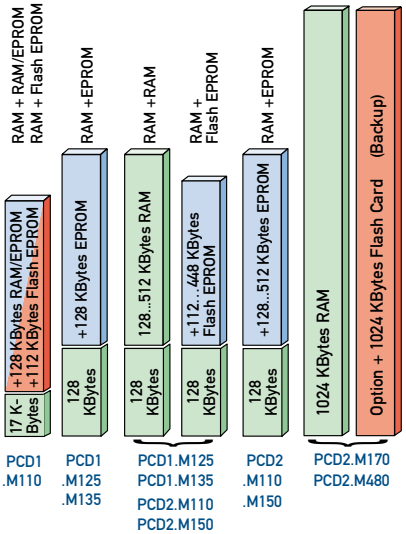
System resources PCD1 | PCD2 CPUs

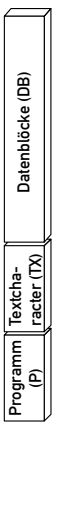
Flags	8192 × 1 bit, volatile or non-volatile, division programmable
Registers PCD2.M48x PCD2.M5xx0	4096 × 32 bit, non-volatile 16 384 × 32 bit, non-volatile 16 384 × 32 bit, non-volatile
Computational ranges	Integers: –2 147 483 648…+2 147 483 647 (-2^{31}…$+2^{31}-1$) Floating-point numbers: $\pm 9.22337 \times 10^{18}$…$\pm 5.42101 \times 10^{-20}$ Formats: decimal, binary, BCD, hexadecimal or floating point
Index registers	17 × 13 bits (1 each per COB and XOB)
Timers/Counters	1600 volatile timers or non-volatile counters, division programmable
Counting range	31 bit, unsigned (0…2 147 483 647)
Time range	31 bits, unsigned (0…2 147 483 647) timing signals, selectable (10 ms to 10 s)
Texts and DBs	8192
Hardware clock	Time values: s/min/h, week/day of week, month/day of month, year
Accuracy PCD1, PCD2 PCD2.M5xx0	 < 15 seconds per month < 1 minute per month
Power reserve	7 days up to 3 years

Technical data PCD2	PCD2.M110	PCD2.M150	PCD2.M170	PCD2.M480
Number of inputs/outputs or	128 [1]	255 [1][3]	510 [1][3]	1023 [1][3]
PCD2 |PCD3 I/O module sockets	8	16 [4]	32 [4]	64 [4]
Expansion connection	no	yes	yes	yes
Processing time [8] Bit instruction	4 µs	4 µs/2 µs	2 µs	0.1…0.8 µs [9]
Word instruction	20 µs	20 µs/10 µs	10 µs	0.3 µs [10]
User memory				
RAM basic specification	128 KBytes	128 KBytes	1024 KBytes	1024 KBytes
Extension with RAM	128…512 KBytes	128…512 KBytes		
EPROM or	128…512 KBytes	128…512 KBytes		
Flash-EPROM	112…448 KBytes	112…448 KBytes		
Flash card PCD7.R400 (Backup)			1024 KBytes	1024 KBytes
Data backup	1…3 years [2] with lithium battery	1…3 years [2] with lithium battery	1…3 years [2] with lithium battery	1…3 years [2] with lithium battery
Clock (RTC)	yes	yes	yes	yes
Integrated web server	no	yes	yes	yes
Interrupt inputs or	no	2	2	4 + 2 outputs
fast counter inputs	no	1 kHz	1 kHz	1 kHz
FW downloadable	no	no	yes	yes
Serial data ports	1…2	1…4	1…6	2…9
On-board data interfaces				
PGU	PGU RS232, 38.4 kBit/s	PGU RS232, 38.4 kBit/s	PGU RS232, 38.4 kBit/s	PGU RS232, 38.4 kBit/s
USB 1.1 Slave [5]	no	no	no	yes, 12 MBit/s
Optional data interfaces				
Socket A, B/B1 or B2 Transmission rates: up to 38.4 kBit/s, TTY/20 mA = 9.6 kBit/s PCD2.M480: up to 115 kbit/s (Ports #0, #1 and #6)	RS232, RS422,RS485, TTY/20 mA, Belimo® MP-Bus	RS232, RS422,RS485, TTY/20 mA, Belimo® MP-Bus	RS232, RS422,RS485, TTY/20 mA, Belimo® MP-Bus	RS232, RS422,RS485, TTY/20 mA, Belimo® MP-Bus
Network connections Transmission rates: * Profibus-DP-Master/Slave 12 MBit/s ** Profibus-DP-Master 12 MBit/s, DP-Slave 1.5 MBit/s Ethernet-TCP/IP 10/100 MBit/s (autosensing)	Saia® S-Bus, 38.4 kBit/s	Saia® S-Bus, 38.4 kBit/s Profibus FMS, 500 kBit/s Profibus-DP * Ethernet-TCP/IP [6] LonWorks®	Saia® S-Bus, 38.4 kBit/s Profibus FMS, 500 kBit/s Profibus-DP * Ethernet-TCP/IP LonWorks®	Saia® S-Bus, 115 kBit/s S-Net/MPI, 1.5 MBit/s Profibus-DP ** Ethernet-TCP/IP
Socket B/B1 for network and/or data ports, LED display, small terminal	no [7]	yes	yes	yes
Socket B2 for network or data ports	no	no	yes	yes
Programmable	from PG3	from PG3	from PG5 version 1.1	from PG5 version 1.3

[1] When using digital I/O modules PCD2/3.E16x or PCD2/3.A46xwith 16 I/Os each.
[2] Depends on ambient temperature.
[3] Address 255 (and 511 with PCD2.M170) are reserved for the watch-dog.
[4] Combined with PCD2.C100 or PCD3.Cx00.
[5] For programming or as S-Bus slave with WebConnect, Visi.Plus etc.
[6] Ethernet-TCP/IP as configured system with type no. PCD2.M150F655.
[7] Small terminal PCD7.D162 possible.
[8] Processing time is dependent on the load placed on communication ports.
[9] With direct access to peripheral unit.
[10] Only for double words.

Extensible and flexible user memory





PCD7.R400

General technical details

Supply voltage [1]	24 VDC -20/+25% incl. 5% ripple
Power consumption	15 W for 64 I/Os, 20 W for 128 I/Os
Max. load capacity internal 5 V Bus [3]	PCD1 750 mA PCD2 1600 mA PCD2.M480 = 2000 mA PCD2.M5xx0 = 1400 mA
Max. load capacity internal +V Bus (16…24 V) [3]	PCD1 100 mA PCD2 200 mA PCD2.M5xx0 = 800 mA
Short interruptions [1]	≤10 ms with an interval≥1 s
Watchdog relay	make contact = 48 VAC or VDC [2] = 1 A

[1] According to EN/IEC61131-2
[2] With VDC a free-wheeling diode should be connected in parallel to the load
[3] Extension housings PCD2.C100/C150 and PCD3.C100/C110 module holders receive their power supply via the extension cable from the base unit. The overall electrical requirement depends on the choice of modules equipped. Extension module holders PCD3.C200 possesses connections for an external 24 VDC supply and forms a separate supply segment.

Overview of digital I/O modules

Typ/ order-no.	Total I/Os	Input voltage	Breaking capacity DC	Breaking capacity AC	Input filter	Electrical isolation	Current draw 5 V-Bus[1]	Current draw + V-Bus[2]	I/O connector type PCD2	I/O connector type PCD3 [3]
PCD2/3.E110	8 I	15…30 VDC			8 ms		12 mA		The terminal blocks are supplied with the modules	A
PCD2/3.E111	8 I	15…30 VDC			0.2 ms		12 mA			A
PCD2/3.E112	8 I	7,5…15 VDC			9 ms		12 mA			A
PCD2/3.E116	8 I	3,5…7 VDC			0.2 ms		12 mA			A
PCD2.E160	16 I	15…30 VDC			8 ms		50 mA			
PCD3.E160	16 I	15…30 VDC			8 ms		8 mA			D
PCD2/3.E161	16 I	15…30 VDC			0.2 ms		50 mA			D
PCD2.E165	16 I	15…30 VDC			8 ms		50 mA			
PCD3.E165	16 I	15…30 VDC			8 ms		8 mA			C
PCD2/3.E166	16 I	15…30 VDC			0.2 ms		50 mA			C
PCD2/3.E500	6 I	80…250 VAC			20 ms	■	1 mA			A
PCD2/3.E610	8 I	15…30 VDC			10 ms	■	12 mA			A
PCD2.E611	8 I	15…30 VDC			0.2 ms	■	12 mA			
PCD2/3.E613	8 I	30…60 VDC			9 ms	■	12 mA			A
PCD2.E616	8 I	3,5…7 VDC			0.2 ms	■	12 mA			
PCD2/3.A200	4 O, relay (make/no)		2 A/50 VDC	2 A/250 VAC		■	10 mA			A
PCD2.A210	4 O, relay (break) [4]		2 A/50 VDC	2 A/250 VAC		■	10 mA			
PCD2/3.A220	6 O, relay (make) [4]		2 A/50 VDC	2 A/250 VAC		■	10 mA			A
PCD2.A250	8 A, relay (make)		2 A/50 VDC	2 A/48 VAC		■	15 mA			
PCD3.A251	8 O, relay (6 changeover + 2 make)		2 A/50 VDC	2 A/48 VAC		■	15 mA			C
PCD2/3.A300	6 O, transistor		2 A/10…32 VDC				12 mA			A
PCD2/3.A400	6 O, transistor		0.5 A/5…32 VDC				15 mA			A
PCD2/3.A410	6 O, transistor		0.5 A/5…32 VDC			■	15 mA			A
PCD2.A460	16 O, transistor [5]		0.5 A/10…32 VDC				50 mA			
PCD3.A460	16 O, transistor [5]		0.5 A/10…32 VDC				8 mA			D
PCD2.A465	16 O, transistor [5]		0.5 A/10…32 VDC				50 mA			
PCD3.A465	16 O, transistor [5]		0.5 A/10…32 VDC				8 mA			C
PCD3.A810	4 O, relay (2 changeover + 2 make)		2 A/50 VDC	5 A/250 VAC		■	40 mA			F
Manual control			2 A/50 VDC	6 A/250 VAC		■				
PCD3.A860	2 O, relay (make)		-	12 A/250 VAC		■	18 mA			G
Manual control	2 I	15…30 VDC			8 ms					H
PCD2/3.B100	2 I + 2 O + 4 I or O selectable I or O	I: 15…32 VDC O:	0.5 A/5…32 VDC		8 ms		15 mA			A

[3]) Plug-in I/O terminal blocks are included with I/O modules. Cables (see page 127) must be ordered separately
[4]) With contact protection [5]) With short-circuit protection

Capacity	PCD1	PCD2	PCD2.M48x	PCD2.M5xx0	PCD2.C1000	PCD2.C2000	PCD3.Mxxx0	PCD3.C200	PCD3.Txxx
[1]) Internal 5 V Bus	750 mA	1600 mA	2000 mA	1400 mA	1400 mA	1400 mA	600 mA	1500 mA	650 mA
[2]) Internal + V Bus	100 mA	200 mA	200 mA	800 mA	800 mA	800 mA	100 mA	630 mA	100 mA

The electrical requirement of the internal +5V and +V bus for the I/O modules is calculated in the PG5 2.0 Device Configurator.

PCD2.M480 extension with PCD3 components

I/O bus extension cable PCD2.K106

I/O bus extension cable PCD3.K106

I/O bus extension plug PCD3.K010

A manual control level can only be implemented on the PCD2 system series if the PCD3.C200 is used with PCD3.A810 and PCD3.W800 modules.

PCD3.A810
Relay outputs, 2 changeover/co and 2 make/no contacts

PCD3.A860
Light and shade 2 relay outputs and 2 inputs

PCD3.W800
4 analogue outputs (3 channels with manual control)

Overview of analogue I/O modules

Customized multifunctional I/O modules

Type/ Order no.	Total channels	Signal ranges	Resolution	Electrical isolation	Current consumption 5 V [1]	Current consumption 24 V [2]	I/O connector type PCD2	I/O connector type PCD3 [3]
PCD2/3.W200	8 I	0…+10 V	10 bits		8 mA	5 mA	The terminal blocks are supplied with the modules	A
PCD2/3.W210	8 I	0…20 mA[4]	10 bits		8 mA	5 mA		A
PCD2/3.W220	8 I	Pt 1000: –50 °C…400 °C/Ni 1000: –50 °C…+200 °C	10 bits		8 mA	16 mA		A
PCD2.W220Z02	8 I	NTC 10 temperature sensor	10 bits		8 mA	16 mA		
PCD3.W220Z03	8 I	NTC 10 temperature sensor	10 bits		8 mA	16 mA		A
PCD2/3.W220Z12	4 I + 4 I	4 I: 0…10 V and 4 I: Pt 1000: –50 °C…400 °C/Ni 1000: –50 °C…+200 °C	10 bits		8 mA	11 mA		A
PCD2/3.W300	8 I	0…+10 V	12 bits		8 mA	5 mA		A
PCD2/3.W310	8 I	0…20 mA[4]	12 bits		8 mA	5 mA		A
PCD2/3.W340	8 I	0…+10 V/0…20 mA [4] Pt 1000: –50 °C…400 °C/Ni 1000: –50 °C…+200 °C	12 bits		8 mA	20 mA		A
PCD2/3.W350	8 I	Pt 100: –50 °C…+600 °C/Ni 100: –50 °C…+250 °C	12 bits		8 mA	30 mA		A
PCD2/3.W360	8 I	Pt 1000: –50 °C…+150 °C	12 bits		8 mA	20 mA		A
PCD2/3.W305	7 I	0…+10 V	12 bits	■	60 mA	0 mA		E
PCD2/3.W315	7 I	0…20 mA/4…20 mA, parameters can be set	12 bits	■	60 mA	0 mA		E
PCD2/3.W325	7 I	–10 V…+10 V	12 bits	■	60 mA	0 mA		E
PCD2/3.W400	4 A	0…+10 V	8 bits		1 mA	30 mA		A
PCD2/3.W410	4 A	0…+10 V/0…20 mA/4…20 mA jumper selectable	8 bits		1 mA	30 mA		A
PCD2/3.W600	4 A	0…+10 V	12 bits		4 mA	20 mA		A
PCD2/3.W610	4 A	0…+10 V/–10 V…+10 V/0…20 mA/4…20 mA jumper selectable	12 bits		110 mA	0 mA		A
PCD2/3.W605	6 O	0…+10 V	10 bits	■	110 mA	0 mA		E
PCD2/3.W615	4 A	0…20 mA/4…20 mA, parameters can be set	10 bits	■	55 mA	0 mA		E
PCD2/3.W625	6 O	–10 V…+10 V	10 bits	■	110 mA	0 mA		E
PCD2/3.W525	4 I + 2 A	I: 0…10 V, 0(4)…20 mA, Pt 1000, Pt 500 or Ni 1000 (selectable by DIP switch) O: 0…10 V or 0(4)…20 mA (selectable by software (FBox, FB))	I: 14 bits O: 12 bits	■	40 mA	0 mA		E
PCD2/3.W720	2 I	Weighing module with 2 systems for up to 6 weighing cells, resolution 18 bits						E
PCD2/3.W745	4 I	Temperature module for TC and 4-wire Pt/Ni	16 bits	■	200 mA	0 mA		[6]
PCD3.W800	4 A 3 of them manually operated	0…+10 V, short circuit proofed	10 bits		45 mA	35 mA[5]		J

[3] Plug-in I/O terminal blocks are included with I/O modules. Cables (see page 127) must be ordered separately
[4] +4…+20 mA via user program [5] With 100 % output and 3 kΩ load [6] With soldered I/O spring terminal block

Capacity	PCD1	PCD2	PCD2.M48x	PCD2.M5xx0	PCD2.C1000	PCD2.C2000	PCD3.Mxxx0	PCD3.C200	PCD3.Txxx
[1] Internal 5 V Bus	750 mA	1600 mA	2000 mA	1400 mA	1400 mA	1400 mA	600 mA	1500 mA	650 mA
[2] Internal + V Bus	100 mA	200 mA	200 mA	800 mA	800 mA	800 mA	100 mA	630 mA	100 mA

The electrical requirement of the internal +5V and +V bus for the I/O modules is calculated in the PG5 2.0 Device Configurator.

Customized multifunctional I/O modules

The modules PCD2.G400 and PCD2.G410 are representative examples of the development and manufacture of customized versions.

PCD2.G400
- 10 digital inputs 24 VDC, as PCD2.E110, but without the sink mode option
- 8 digital transistor outputs 24 VDC/0.5 A, as PCD2.A400
- 2 analogue inputs 0…10 VDC, resolution 10 bit, as PCD2.W200
- 6 analogue inputs Pt/Ni 1000, resolution 10 bit, as PCD2.W220
- 6 analogue outputs 0…10 VDC, resolution 8 bit, as PCD2.W400
- current draw from 5 V bus: 10…65 mA

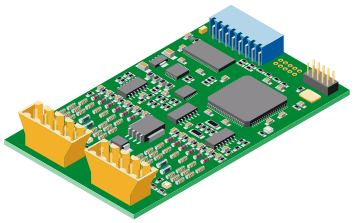
PCD2.G410
- 16 digital inputs 24 VDC, electrically isolated, as PCD2.E610, for source or sink operation.
- 4 relay outputs, electrically isolated changeover contacts each for 2 A, 250 VAC or 2 A, 50 VDC (ohmic), varistors for contact protection, as PCD2.A200
- 4 analogue inputs, 10 bit resolution, jumper selectable for 0…10 V, 0…20 mA or resistance thermometer Pt/Ni 1000 for –20…+100 °C, no electrical isolation, input filter 5…10 ms, as PCD2.W2xx
- 4 analogue outputs, 8 bit, for 0…10 V/0…20 mA, also as short-circuit proofed voltage output , D/A conversion time <5 µs, as PCD2.W410
- Current draw from 5 V bus: 10…50 mA

Rapid counting module for Saia® PCD2 and Saia® PCD3

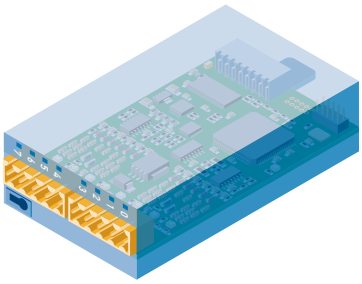
This universal module enable rapid counting functions up to 150 kHz for the PCD2 and PCD3 controllers. Communication between the PCD and the counter module is via the I/O bus.

The module is suitable for counting revolutions, distances, volumes etc. and for measurement by counting pulses. It has two inputs A and B and one configurable input C. Inputs A and B are suitable for connecting encoders for automatic incrementing/decrementing. In counter mode ×1, ×2 or x4, the module detects the direction of rotation of incremental rotation sensors. The counter is loaded with a starting value. The counter flag can be used to select the direction (forwards or backwards). A software enable is used to start/stop the counter. An intermediate value can be captured and read off with a trigger signal. A present signal will preload a counter value and load it into the counter when triggered by any event.

The CCO output CCO (counter-controlled output), controlled directly by the counter, can be used at the end of the counting process e.g. for precise control of external switching processes or to trigger an interrupt. The CCO output is set/reset via the CCO flag.



PCD2.H112 | PCD2.H114



PCD3.H112 | PCD3.H114

Features

- 2 (H112) or 4 (H114) counters per module
- 1 counter-controlled output (CCO) per counter
- 2 inputs A and B per counter
- 1 configurable input C per counter
- Range 0…16777215 (24 bit)
- Selectable digital filter for all inputs (10 kHz…150 kHz)

Inputs

The CTR_N_A and CTR_N_B inputs are used as count inputs for the counter.
The CTR_N_C input can be assigned the following functions:

- Trigger (edge-sensitive)
- Counter Enable (state-sensitive)
- Counter Preset (edge-sensitive)
- Counter Reset (edge-sensitive)

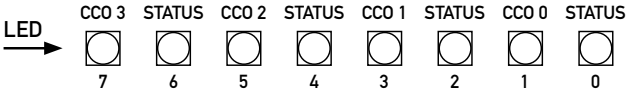
Technical data

Counting frequency	up to 150 kHz Config. frequency 10, 20, 50, 100, 150 kHz Pulse/pause length 50 %
Counting range	0…16777215 (24 bit), cascadable with CPU counter in standard base units
Counting modes	×1, ×2 or ×4 selectable
Digital inputs	A and B, detect direction of rotation with incremental rotation sensor, configurable input C
Input signals	24 VDC (Low = 0…5 V , High = +15…30 V)
Input current	5…6 mA
Digital output	CCO (Counter Controlled Output), switches at counter state 0 or 16777215 or at Compare Value
Breaking capacity	5…500 mA at 10…30 VDC
Breaker type	galvanically connected, short-circuit protected, positive switching
Potential difference	typ. 2 V at 500 mA
Data	Configuration register and counter on this module are not non-volatile, but can be loaded into non-volatile registers in the CPU at any time.

General details

Number of modules	max. 64
Supply voltage	10…30 VDC for CCO output
Current consumption	~50 mA internal from 5 V Bus 4m A internal from V+
Ambient temperature	Operation: 0...+55 °C without forced ventilation, Storage: -20...+85 °

Connection diagram

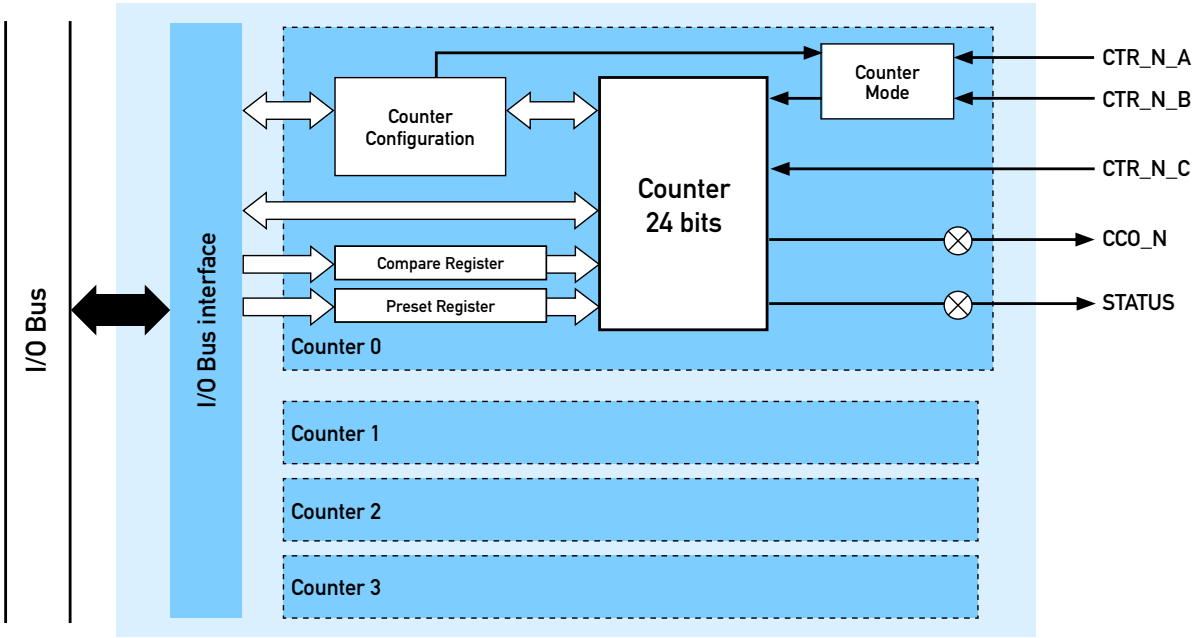


Connector 1					Connector 0				
8	6	4	2	0	8	6	4	2	0
GND	CTR_3_C	CTR_3_A	CTR_2_C	CTR_2_A	GND	CTR_1_C	CTR_1_A	CTR_0_C	CTR_0_A
N.C.	CCO_3	CTR_3_B	CCO_2	CTR_2_B	+24V	CCO_1	CTR_1_B	CCO_0	CTR_0_B
9	7	5	3	1	9	7	5	3	1

Signal description

Signal	IO	Description
CTR_N_A	I	Counter input
CTR_N_B	I	Counter input
CTR_N_C	I	Counter input
CCO_N	O	Command output

Block diagram



Order details

Type	Description	Weight
PCD2.H112	Fast intelligent counter module, 150 kHz, 2 counter channels with incremental sensor inputs	24 g
PCD2.H114	Fast intelligent counter module, 150 kHz, 4 counter channels with incremental sensor inputs	27 g
PCD3.H112	Fast intelligent counter module, 150 kHz, 2 counter channels with incremental sensor inputs	66 g
PCD3.H114	Fast intelligent counter module, 150 kHz, 4 counter channels with incremental sensor inputs	70 g

Overview of communication modules

The PCD supports a large number of protocols for connecting peripherals, such as sensors, actuators, printers, weighing machines, barcode readers, terminals or other controllers.
Without add-on module the following interfaces are available: RS232 with RTS/CTS or RS485 electrically connected (separate for PCD2.M480), RS485 with line termination resistors capable of activation, suitable for S-Bus.

Interface options

Serial data ports or MP bus at socket A

PCD7.F110S: RS422 with RTS/CTS or RS485 electrically connected, with line termination resistors capable of activation. Suitable for Modbus, S-Bus, EnOcean etc.

PCD7.F121S: RS232 with RTS/CTS, DTR/DSR, DCD, suitable for modem, EIB, DALI connection

PCD7.F130: TTY/20 mA (active or passive)…

PCD7.F150S: RS485 electrically isolated, with line termination resistors capable of activation

PCD7.F160S : wireless interface module Bluetooth

PCD7.F180S: Belimo MP-Bus, for connection of up to 8 drives on one line

Profibus connection modules at sockets B, B1 and/or B2

PCD7.F750: for connection of Profibus DP as master

PCD7.F770: for connection of Profibus DP as slave

PCD7.F772: for connection of Profibus DP as slave and RS485 electrically isolated

Technical data Profibus-DP

Master connection	12 Mbit/s, up to 4 masters
Slave connection	up to 124 slaves in segments of 32 stations each

Serial data ports at socket B, B1 and/or B2

PCD2.F520: RS232 with RTS/CTS and RS422 without RTS/CTS or RS485 electrically connected

PCD2.F522: choice possible between
2 × RS232 with RTS/CTS or
1 × RS232 full with RTS/CTS, DTR/DSR, DCD, (electrically connected) suitable for modem connection

PCD2.F530 with display:: (not on PCD2.M170/M480)
RS232 with RTS/CTS and
RS422 without RTS/CTS or
RS485 (electrically connected) and
6-digit display.

Network connections

(Serial S-Net, see chapter 2.3)

Ethernet-TCP/IP module at socket B, B2

(PCD2.M480: second module plugged on B1 for pre-configured version PCD2.M480F650-2)

PCD7.F655:
Intelligent interface module for connection to Ethernet-TCP/IP.

Technical data

Connection	10 Base-T/100 Base TX (RJ 45)
Speed	10/100 Mbit/s (autosensing)
Protocols and services	TCP/IP or UDP/IP Saia® S-Bus with UDP/IP for PG5↔PCD communication, PCD↔PCD multi-master communication and SCADA↔PCD communication

Field bus connections

Saia® S-Bus (without additional module)

The Saia® S-Bus, with its safe and easy protocol, is already available in the standard equipment of all PCDs as master or slave.

Technical data

Master connection	38.4 kBit/s (115 with PCD2.M480). High net data rates due to low protocol overhead, up to 4 masters via gateway function
Slave connection	up to 254 slaves in segments of 32 stations each

Profi-S-IO on the PCD2.M480 (without additional module)

Without additional Profibus interface, the user can connect a maximum of 126 RIO head stations PCD3.T76x.

Interface options

LonWorks® modules
on sockets B, B1 and/or B2
(not possible with PCD2.M480)

PCD7.F800: for connection to LonWorks® networks.

PCD7.F802: for connection to LonWorks® networks, with additional RS485 serial port, electrically connected.

Transceiver type	FTT-10A

MP-Bus interface for BELIMO® damper actuators
at I/O slot

PCD2.T500: Belimo® MP-Bus (RS232) for connection of up to 16 drives. The module can actuate two branches with eight actuators each. To run both branches independently 2 communications channels (RS232/TTL) are required.

Data exchange is asynchronous and runs at 200 bits/second.

Modem options

Telecommunication via integral modem at I/O socket

PCD2.T814, analogue

PCD2.T851, ISDN

- Integral modem in base unit saves expenditure on external installation.
- SMS messages can be transmitted directly from the PCD
- Data exchange across great distances via modem

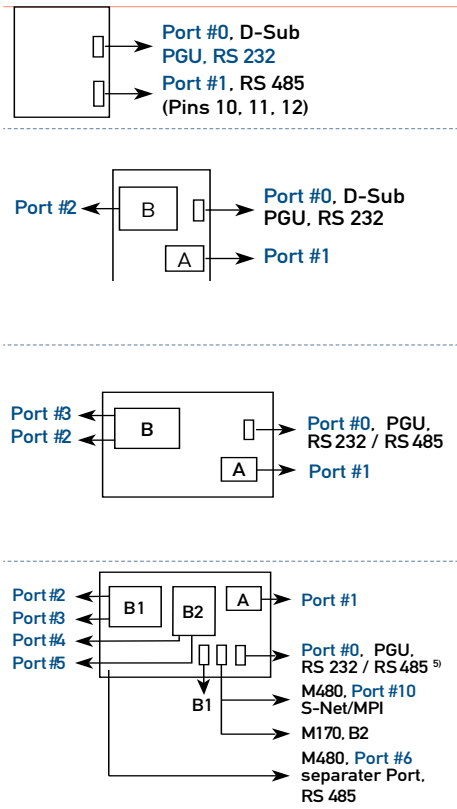
External modems

See chapter 9.5 and 10.2

Overview of available sockets and communication modules

PCD1 | PCD2.Mxx0

Base units and sockets for communication modules



	Socket	PCD7.F110 9)	PCD7.F121 1) 9)	PCD7.F130 9)	PCD7.F150 9)	PCD7.F180 9)	PCD2.F510 2)	PCD2.F520	PCD2.F522 1)	PCD2.F530	PCD7.F655	PCD7.F750	PCD7.F770	PCD7.F772	PCD7.F800	PCD7.F802
PCD1.M110		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
PCD1.M125	A	■	■	■	■	■	–	–	–	–	–	–	–	–	–	–
	B	–	–	–	–	–	–	–	–	–	–	■	■	–	■	–
PCD1.M135	A	■	■	■	■	■	–	–	–	–	–	–	–	–	–	–
	B	–	–	–	–	–	–	–	–	–	■ 3)	■	■	–	■	–
PCD2.M110	A	■	■	■	■	■	–	–	–	–	–	–	–	–	–	–
	B	–	–	–	–	–	■	–	–	■ 4)	–	–	–	–	–	–
PCD2.M150	A	■	■	■	■	■	–	–	–	–	–	–	–	–	–	–
	B	–	–	–	–	–	■	■	■	■	■ 5)	■	■	■	■	■
PCD2.M170	A	■	■	■	■	■	–	–	–	–	–	–	–	–	–	–
	B1	–	–	–	–	–	–	■	■	–	–	■ 6)	■ 6)	■ 6)	■ 6)	■ 6)
	B2	–	–	–	–	–	–	■	■	–	■	■ 6)	■ 6)	■ 6)	■ 6)	■ 6)
PCD2.M480	A	■	■	■	■	■	–	–	–	–	–	–	–	–	–	–
	B1	–	–	–	–	–	–	■	■	–	■ 7)	■	–	–	–	–
	B2	–	–	–	–	–	–	■	■	–	■	■ 8)	–	–	–	–

1) Suitable for modem connection due to provision of 6 control lines.
2) Display of six 7-segment LED digits (as PCD2.F530 but without communications port)
3) For PCD2.M135 at socket B with special housing cover 4 10 47 40 9 0 or as configured system with type number PCD1.M135F655.
4) Can be fitted, but the extra port is not available.
5) Für PCD2.M150 at socket B with special housing cover 4 10 47 41 0 0 as configured system with type number PCD2.M150F655.
6) The following combinations are not possible: 2 × Profibus-DP slave or 2 × LonWorks®
7) Für PCD2.M480 Ethernet (2 × PCD7.F655) at sockets B1 and B2 with special housing cover 4 10 47 50 3 0 or as configured system with type number PCD2.M480F655-2
8) PCD7.F750 at socket B2 on a PCD2.M480 not recommended
9) * from 30 September 2010, replaced by PCD7.F1xxS

PCD1 | PCD2 - additional communication channels on direct mounted small terminals

Saia® small terminals use the intelligence and large memory of Saia® PCD. For this reason the terminal communicates with the CPU via a communication module, which occupies socket B or B1. Depending on the terminal set, the following communication capabilities are available:

Terminal		Communications modules 1) with additional channels								Suitable for					
Terminal set Order no.	PCD7.D160	PCD2.F540 1) (no Com-chanel)	PCD2.F550 1)	RS422/RS485 2)	PCD7.F774 1)	Profibus-DP slave and RS485 2)	PCD7.F804 1)	LonWorks® and RS485 2)		PCD1.M110	PCD1.M125	PCD1.M135	PCD2.M110	PCD2.M150	PCD2.M170
PCD7.D162	■	■	–	–	–	–	–	–		■ 4)	■ 5)	■ 5)	■ 6)	■ 6)	■ 6)
PCD7.D163	■	–	■	■	–	–	–	–		–	–	–	–	■ 6)	■ 6)
PCD7.D164	■	–	–	–	■	■	–	–		–	–	■ 5)	–	■ 6)	■ 6)
PCD7.D165	■	–	–	–	–	–	■	■		–	–	■ 3) 5)	–	■ 6)	■ 6)

1) occupies Port #2, the modules are only obtainable as part of the PCD7.160 terminal set
2) occupies Port #3 - the connection is identical to Port #3 on a PCD2.F520
3) only Profibus-DP respectively LonWorks® (no RS485)
4) Cover with space for PCD1.M110: 4 10 47 42 7 0
5) Cover with space for PCD1.M1x5: 4 10 47 33 8 0
6) Mountable with original cover (as described in the manual 26/737)

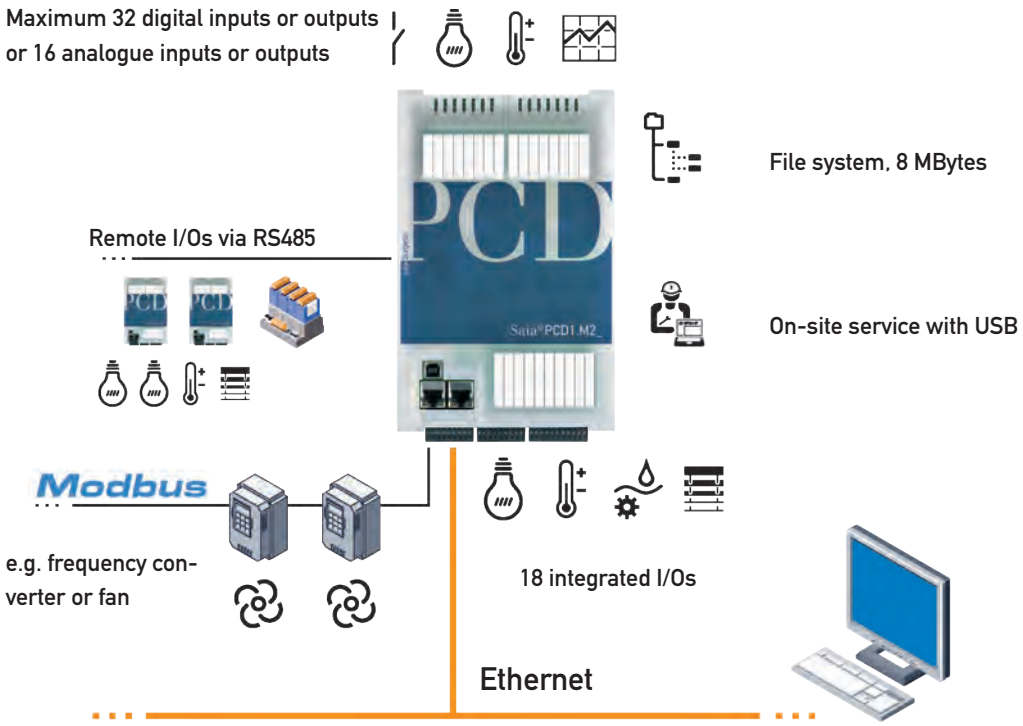
See TI P+P26/430 and manual 26/737

Ordering information for PCD1 | PCD2 accessories

Type	Description
	Accessories
4108481900	Display window for PCD2.M1xx
4507481700	Lithium battery
	Extension cables and ribbon ↔ screw terminals adapters
	Extension cables, programming cable
PCD2.K100	Extension cable, length 0.5 m (PCD2.C1x0 below of the base unit, max. gap 150 mm)
PCD2.K110	Extension cable, length 0.7 m (PCD2.C1x0 and base unit mounted side-by-side)
PCD2.K120	Extension cable, length 2 m (for coupling bus module)
PCD2.K106	Extension cable length 0.7 m (PCD2.Mxx0 ↔ PCD3.LI0)
PCD8.K111	Programming cable with 9-pole D-type connector for the connection to a PC
	Plug-in system cables (see chapter 9.4)
	for digital modules with 16 I/Os
PCD2.K221	Sheathed, round cable with 32 strands, each 0.25 mm², 1.5 m long, PCD side 34-pole ribbon cable connector type D, process side: strand ends free, colour coded
PCD2.K223	Sheathed, round cable with 32 strands, each 0.25 mm², 3.0 m long, PCD side 34-pole ribbon cable connector type D, process side: strand ends free, colour coded
	for adapters PCD2.K520/..K521/..K525
PCD2.K231	Sheathed, half-round cable with 34 strands, each 0.09 mm², 1.0 m long, both ends with 34-pole ribbon cable connector type D
PCD2.K232	Sheathed, half-round cable with 34 strands, each 0.09 mm², 2.0 m long, both ends with 34-pole ribbon cable connector type D
	for 2 adapters PCD2.K510/..K511 or 1 adapter and relay interface PCD2.K551
PCD2.K241	Sheathed, half-round cable with 34 strands, each 0.09 mm², 1.0 m long, PCD side: 34-pole ribbon cable connector; type D, process side: two 16 pole ribbon cable connectors
PCD2.K242	two 16 pole ribbon cable connectors Sheathed, half-round cable with 34 strands, each 0.09 mm², 2.0 m long, PCD side: 34-pole ribbon cable connector; type D, process side: two 16 pole ribbon cable connectors
	Ribbon ↔ screw terminals adapters
PCD2.K510	for 8 inputs/outputs, with 20 screw terminals, without LEDs
PCD2.K511	for 8 inputs/outputs, with 20 screw terminals and with LEDs (source operation only)
PCD2.K520	for 16 inputs/outputs, with 20 screw terminals, without LEDs
PCD2.K521	for 16 inputs/outputs, with 20 screw terminals and LEDs (source operation only)
PCD2.K525	for 16 inputs/outputs, with 3 × 16 screw terminals and LEDs (source operation only)
PCD2.K551	relay interface for 8 PCD transistor outputs with 24 screw terminals and LEDs
PCD2.K552	relay interface for 8 PCD transistor outputs with 24 screw terminals, LEDs and manual control mode (switch on-off-auto) and 1 output for acknowledgement of manual control mode

6.3 PCD1.M2120 automation stations
Compact but capable of modular expansion

The new Saia® PCD1 from Saia-Burgess is not just another compact controller. Alongside the standard communication ports and integrated I/Os, the new PCD1 with its integrated 8 MByte data memory and full web/IT functionality sets new standards for compact controllers in networked automation. The footprint is the same as a PCD1, i.e. half of a PCD2, only the unit height is less. The new PCD1 can be individually extended via 2 free I/O slots, and is ready for use in no time.



Technical overview

Program memory	512 kBytes	PCD media	14,483 flags, 16,384 registers
RAM for DBs and texts	128 kBytes	Programming	PG5 2.0 (IL, FUPLA and GRAFTEC)
Internal file system	8 MBytes	Field bus protocols	S-Bus, Modbus, EIB/KNX etc.
Backup memory	512 kBytes on uSD Flash memory	Web IT protocols	http, ftp, DHCP/DNS, e-mail etc.
Backup battery	For RAM DB/texts and PCD media	Dimensions W × H × D	140.8 × 226 × 49 mm
Operating system	Saia® NT operating system	Integrated communication	2-port Ethernet USB for programming and service 1 RS485 for field bus protocols

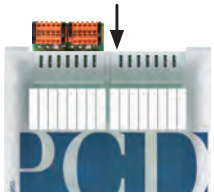
Integrated I/O data points:

4 digital inputs	15…30 VDC
4 digital outputs	24 VDC
4 digital in and outputs	Selectable one by one within the Device Configurator
2 analogue inputs	12 Bit + sign (2-wire) 0… ±10 VDC, 0… ±20 mA, PT1000, NI1000, NI1000 L&S, 0…2.5 kΩ
2 interrupt inputs	Reaction time 1 ms or 1 kHz counter The Interrupt inputs can also be used as standard digital inputs
1 Watchdog	Relay output, can also be used as standard digital output
1 PWM output	Max. 2 kHz The PWM output can also be used as standard digital output

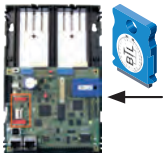
Order details

Base units		
PCD1.M2120	Base unit with Ethernet	
PCD1.M2020	Base unit without Ethernet (in preparation)	

Serial communication modules		
Option on Slot A		
PCD7.F110S	RS485 not electrically isolated.	Slot A
PCD7.F121S	RS232 with RTC/CTS, DTR/DSR, DCD, suitable for modem, EIB, DALI connection	Slot A
PCD7.F150S	RS485 electrically isolated, with line termination resistors capable of activation	Slot A
PCD7.F160S	Bluetooth	Slot A
PCD7.F180S	Belimo MP-Bus	Slot A

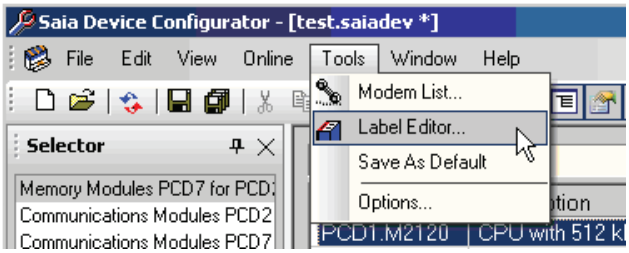


Option on I/O		
PCD2.F2100	RS422 / RS485 plus PCD7.FxxxS as option	SL0/SL1
PCD2.F2210	RS232 plus PCD7.FxxxS as option	SL0/SL1
PCD2.F2810	Belimo MP-Bus plus PCD7.FxxxS as option	SL0/SL1
Modem		
PCD2.T814	Analogue modem 33.6 kBit/s (RS232 and TTL interface)	SL0
PCD2.T851	Digital modem ISDN-TA (RS232 and TTL interface)	SL0



Memory extensions		
PCD7.R560	Flash card withBACnet	M1
PCD7.R580	Flash card with LON over IP	M1
PCD7.R550M04	Flash card with 4 MByte file system memory	M1

The self-adhesive labels can be printed directly with the Saia® Label Creator from the PG5 2.0 Device Configurator



Accessories

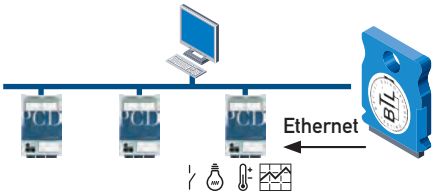
Set of self-adhesive labels

Spare terminals with numbering*

* in preparation, 1 set supplied as standard with the PCD1

Example applications

PCD1 as BACnet® or LON® over IP station:

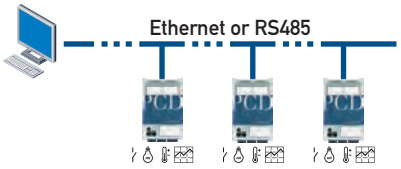


Open communication and systems are the prerequisites for integrated building technology. The new PCD1 combines SPS functionality and standard web IT technology with open protocols such as BACnet and LON over IP in one compact unit.

PCD1 as room controller with web IT functionality:

Applications as room controller with energy meter. The new PCD1 is ideally suited to many applications in the HeaVAC field. With the integrated web IT interfaces, it can be easily prepared for remote control via the Internet or Intranet at no extra cost.

PCD1 as remote I/O station:



With integrated network capability via RS485 or Ethernet, the new PCD1s can also be connected together in locally distributed applications. The integrated S-Bus gateway the enables end-to-end access.

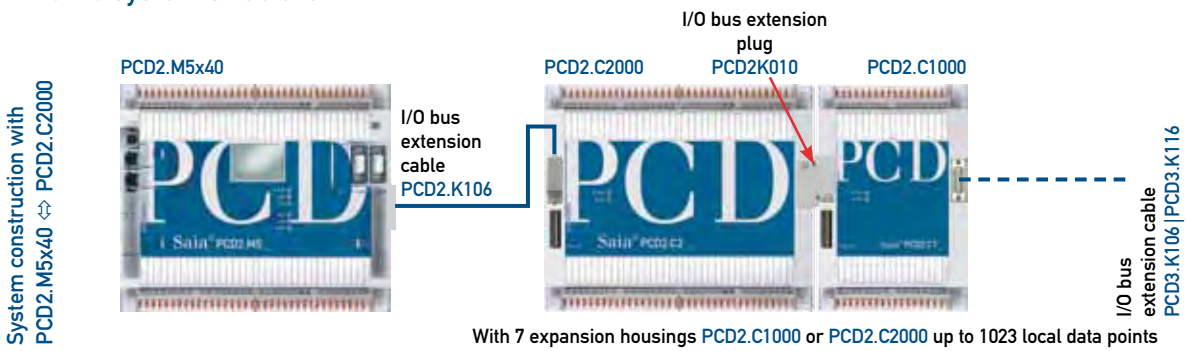
6.4 Automation systems | PCD2.M5: modular device series, flat construction

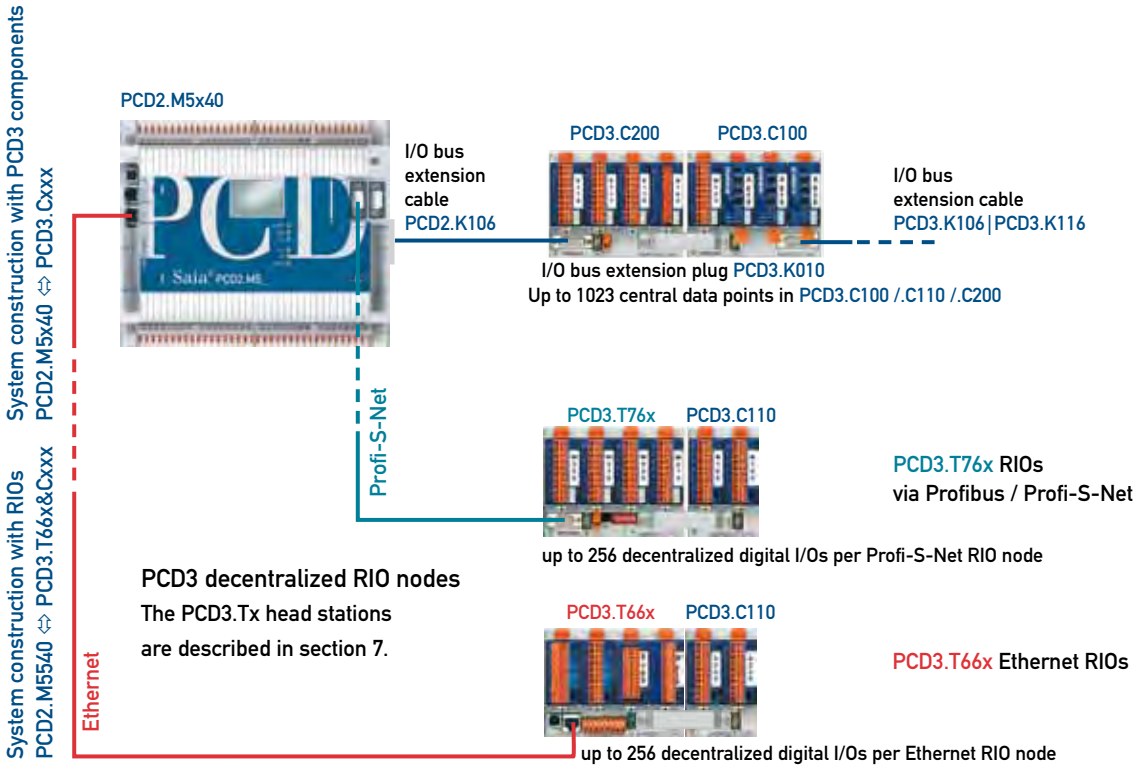
The Saia® PCD2 success story continues in a new housing. The PCD2.M5 is compatible with the existing PCD2 system in size, functions and technology. CPU versions correspond functionally to the PCD3.M series, with features including USB, Ethernet, an on-board web server and flash modules that have a file system.

Strong functions – already integrated in the base unit

- Up to 1023 digital inputs/outputs plus 8 onboard I/Os. All I/O sockets can be equipped with any choice of digital, analogue, counting, measuring and/or weighing modules
- Up to 1023 central data points with PCD2.C2000 / .C1000 or PCD3.C100 /.C110 / .C200
- up to 23'536 local data points in PCD3.T66x/PCD3.T76x via Profibus-DP, Profi-S-IO or Ether-S-Bus with PCD3. C100 /.C110 /.C200
- 1 MByte user memoryon board, for programs, text and data blocks
- Up to 4 GByte flash memory - large selection, for convenient up/downloading of program modifications and backups
- Up to 12 serial interfaces for optional equipping with RS232, RS422, RS485, Belimo® MP-Bus or TTY/20 mA, field-bus connections like ProfibusDP, Ethernet-TCP/IP, integral modems, USB and Profi S-Net/MPI
- Web server at no extra price already included in base unit (without additional TCP/IP communications modules)
- 6 standard inputs for interrupts or fast counters, plus 2 PWM outputs directly on the CPU
- All existing PCD2 data point modules can be used

PCD2.M5x40 system structure:

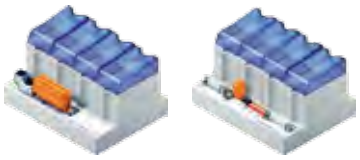




Overview of system components

PCD2.M5x40 for centralized and decentralized automation tasks

Up to 7 PCD2.C1000 or PCD2.C2000 extension housings can be connected to the PCD2.M5_. Users can connect up to 64 I/O modules or 1023 digital inputs/outputs. A base unit has room for 4/8 data point modules.



Input/output capacity

On board I/Os (on X6 terminal block)

- 6 digital inputs 24 VDC (4× interrupts)
- 2 digital outputs (2× pulse width modulation PWM)

Extension of input/output capacity with PCD2.C1000 and PCD2.C2000

- Local data point extension is achieved with up to 7 expansion housings, 24 VDC supply, each with 8 freely equippable I/O module slots for up to 1023 digital I/Os. No space is lost if housings are connected with the PCD2.K010 I/O bus connector

Extension with PCD3.C100 module holders with 4 PCD3 module slots

- Extension module holder for PCD3.Mxxxx /Txxx/Cxxx and PCD2.Mxxx
- Additional PCD3.Cxxx devices connectable via extension cable/plug
- Indication of internal 5V supply voltage via LED

Extension with PCD3.C110 module holders with 2 PCD3 module slots

- Extension module holder for PCD3.Mxxxx /Txxx/Cxxx and PCD2.Mxxx
- Indication of internal 5V supply voltage via LED

Extension with PCD3.C200 module holders with connection for 24 VDC supply

- 4 PCD3 module slots
- Extension module holder for PCD3.Mxxxx /Txxx/Cxxx and PCD2.Mxxx
- Additional PCD3.Cxxx devices connectable via extension cable/plug
- Indication of internal 5 V supply voltage via LED
- Connecting terminals for 24 VDC power supply for all connected PCD3 I/O modules, plus any downstream PCD3.C1xx module holders

Remote extension with RIO head stations PCD3.T66x / PCD3.T76x

- Up to 3 PCD3.Cxxx module holders can be connected to PCD3.T66x / PCD3.T76x devices. This corresponds to 16 data point modules with up to 256 digital I/Os (see chapter 6.4)

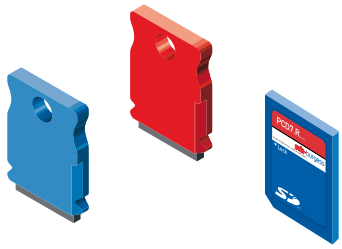
Communications interfaces integrated within base units

- RS232 (serial) on D-Sub X2 (PGU) or RS485 (serial) on terminal block X5 up to 115.2 kBit/s
- RS485 (serial) on D-Sub X1 with 2 ports for free protocols up to 115.2 kBit/s or Profi-S-Net / Profibus DP slave up to 1.5 MBit/s
- USB 1.1 (slave device) interface, for use as programming interface up to 12 MBit/s
- Ethernet-TCP/IP (1 port with 2 plugs and switch) up to 10/100 MBit/s (PCD2.M5540 only)

Integral e-display

Integral on-site configuration and control unit

Plentiful memory options



On board 1 MByte RAM basic equipment and 1 MByte backup flash memory

Optional flash memory cards for program and data backup

- 1 MByte flash card in slot for user program backup
- 4 MByte flash card with file system on slot
- 2 MByte flash card with BACnet option MByte Flash-Karte mit BACnet-Option
- base module (PCD2.R6000) for SD flash cards for I/O slots # 0…3, up to 4 GBytes

Performance overviewPCD2.M5xxx series

PCD2.M5440

PCD2.M5540

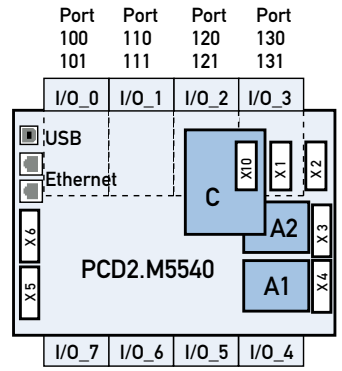
Technical data CPUs		Basic	Extended (Ethernet on board)
Number of digital inputs/outputs on board		6 digital inputs 24 VDC (4× interrupts) 2 digital outputs (2× pulse width modulation PWM)	
Number of digital inputs/outputs as option		≤128	≤128
or I/O module slots in base unit		≤8	≤8
Number of digital I/Os in ≤7 × PCD2.C2000		≤896	≤896
or I/O module slots		≤56	≤56
Processing time [µs]	■ Bit operation	0.3…1.5 µs	0.3…1.5 µs
	■ Word operation	0.9 µs	0.9 µs
User memory on board		1024 Kbyte RAM + 1024 Kbyte Flash	1024 Kbyte RAM + 1024 Kbyte Flash
User memory optional			
Backup flash card PCD7.R500		1 MByte	1 MByte
Flash card with file system PCD7.R550M04		4 MByte	4 MByte
Flash card with file system PCD7.R551M04		3 + 1 MByte backup	3 + 1 MByte backup
Flash card with BACnet firmware PCD7.R560		2 MByte	2 MByte
Flash card with BACnet firmware PCD7.R561		1 + 1 MByte backup	1 + 1 MByte backup
SD card with file system PCD7.R-SDxxx in PCD2.R6000		≤4 GByte	≤4 GByte
Data backup		1…3 years with lithium battery	1…3 years with lithium battery
Integrated Web server + USB + Date-time (RTC)		Yes, HTTP direct, S-Bus	Yes, HTTP direct, S-Bus
Communications interfaces on board			
RS232, RS485 / PGU		≤ 115 kBit/s	≤ 115 kBit/s
RS485 Profibus-DP–Slave, Profi-S-Net (S-IO, S-Bus))		≤ 1.5 MBit/s	≤ 1.5 MBit/s
USB 1.1 slave device		≤ 12 MBit/s	≤ 12 MBit/s
Ethernet-TCP/IP		–	10/100 MBit/s
Communications interfaces Optional			
Modules on socket A, A1, A2			
RS232, RS422, RS485, TTY/20 mA, Belimo MP-Bus		≤ 115 kBit/s	≤ 115 kBit/s
Module on socket C			
Profibus DP master		≤ 12 MBit/s	≤ 12 MBit/s
Controller Area Network CAN 2.0B		≤ 1 MBit/s	≤ 1 MBit/s
Module in I/O slots			
≤ 8 interfaces PCD2.F2xxx		≤ 115 kBit/s	≤ 115 kBit/s

General	
Supply voltage (acc. to EN/IEC61131-2)	24 VDC –20/+25% max. incl. 5% ripple
Loading capacity 5 V / + V internal	max. 1400 mA/800 mA
Programmable	from PG5 version 1.4.300

System resources PCD2.M5xxxx CPUs

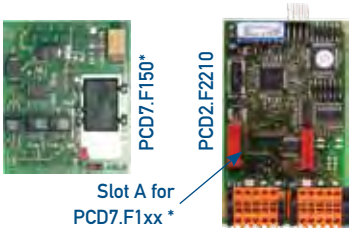
Flags	8192 × 1 bit, volatile or non-volatile, division programmable
Register PCD2.M5xx0	16384 × 32 bits, non volatile
Computational ranges	Integers: –2147483648…+2147483647 (-2^{31}…$+2^{31}-1$) Floating-point numbers: $\pm 9.22337 \times 10^{18}$…$\pm 5.42101 \times 10^{-20}$ Formats: decimal, binary, BCD, hexadecimal or floating point
Index registers	17 × 13 bits (1 each per COB and XOB)
Timers/Counters	1600 volatile timers or non-volatile counters, division programmable
Counting range	31 bit, unsigned (0…2147483647)
Time range	31 bits, unsigned (0…2147483647) timing signals, selectable (10 ms to 10 s)
Texts and DBs	8192
Hardware clock	Time values: s/min/h, week/day of week, month/day of month, year
Accuracy PCD2.M5xx0	Better than 1 minute per month
Power reserve	to 3 years

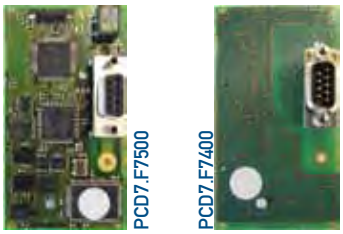
PCD2.M5 interfaces

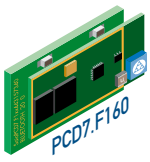


Communication interfaces

On Board	Port (in PG5)	PCD2.M5440	PCD2.M5540
RS232 (serial) on D-Sub X2 (PGU) or RS485 (serial) on terminal block X5	0 0	≤ 115.2 kBit/s ≤ 115.2 kBit/s	≤ 115.2 kBit/s ≤ 115.2 kBit/s
RS485 (serial) on D-Sub X1 with 2 Ports for free protocols or Profi-S-Net / Profibus DP slave	3 10	≤ 115.2 kbit/s ≤ 1.5 Mbit/s	≤ 115.2 kbit/s ≤ 1.5 Mbit/s
Ethernet-TCP/IP (2 port switch)	9	—	10/100 MBit/s
USB 1.1 Slave (PGU)		yes	yes







Options		Socket
PCD7.F110S	RS422 with RTS/CTS or RS485 electrically connected, with line termination resistors capable of activation. Suitable for Modbus, S-Bus, EnOcean etc.	A1 / A2
PCD7.F121S	RS232 with RTS/CTS, DTR/DSR, DCD, suitable for Modem, EIB, DALI connection	A1 / A2
PCD7.F130	TTY/20 mA (active or passive)	A1 / A2
PCD7.F150S	RS485 electrically isolated, with line termination resistors capable of activation	A1 / A2
PCD7.F160S	Bluetooth module	A1 / A2
PCD7.F180S	Belimo® MP bus (RS232), for connection of up to 8 drives.	A1 / A2
PCD2.F2100	RS422 / RS485 plus PCD7.F1xx as option	I/O_0-3
PCD2.F2210	RS232 plus PCD7.F1xx as option	I/O_0-3
PCD2.F2810	Belimo MP-Bus plus PCD7.F1xx as option	I/O_0-3
PCD7.F7500	Profibus DP master	C
PCD7.F7400	Control Area Network CAN 2.0B	C

Telecommunications via integral modems on I/O slot

PCD2.T814	Analogue modem 33.6 kBit/s (RS232 and TTL interface)	I/O_0-2 & 4-6
PCD2.T851	Digital modem ISDN-TA (RS232 and TTL interface)	I/O_4

External modems see chapter 9

Protocols supported by optional PCD2.F2xxx interface modules

The following protocols can run with the optional PCD2.F2xxx interface modules:

- Modem communication with the PCD FBox library
- HMI editor applications with PCD7.Dxxx text terminals (only with RS232 interface)
- Serial S Net
- Modbus
- Belimo MP-Bus
- JCI N2 - Bus
- KNX® S-Mode/EIB
- DALI
- EnOcean
- etc.

Transmission speeds supported:

- 1200, 2400, 4800, 9600, 19200, 38400, 56700, 115200 bps.

System properties of PCD2.F2xxx modules:

The following points must be observed when using the PCD2.F2xxx interface modules:

- Per PCD2 system, no more than 4 PCD2.F2xxx modules (8 interfaces can be used on slots 0…3.
- The PCD2 system has a powerful processor that deals with both the application and the serial interfaces. Processing of interface modules requires appropriate CPU power.

To determine the maximum communications power per PCD2.M5 system, consult the information and examples provided in manual 26/856 for PCD2.M5.

Integral e-display

Option integral nano-browser control panel Saia® PCD7.D3100E

With the PCD7.D3100E, Saia® has extended the concept of "seamless control", which has only one HMI project for all devices from the small control unit to any device with a browser (Explorer, Mozilla etc.), to include on-site display of the automation device. This is an exciting and totally new way of having on-site automation device control available anywhere in the network on the PC or PDA.
The web project is created with Saia® Web-Editor for micro-browser and Microsoft® Explorer applications.

Assembly:
Simply insert and fix in place

Technical details:

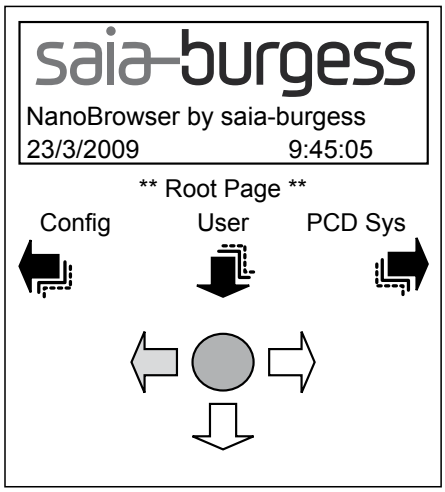
- Graphical display
- 4 grey shades
- Resolution 128 × 88 pixels
- LED backlighting
- Display size 35.8 × 24.8 mm
- Dimensions 47 × 67 mm
- Joystick for navigation
- Functionality:
  Sub-set of a micro-browser

Operation:
Joystick with 5 switches for configuration, editing user projects and for PCD system settings, such as CPU type, date and time, TCP/ IP address, etc.

Display:
Seamless, on-site control. The display on the automation device is also available throughout the network, on PC or PDA and on other displays.
This opens up completely new possibilities.

Predefined configuration screens

Together with the possibility of editing user defined projects with the Web Editor (version for e-display) a variety of predefined configuration screens for e-display and the PCD system are also available to the user. This makes it easy to implement initial on-site diagnosis and control.



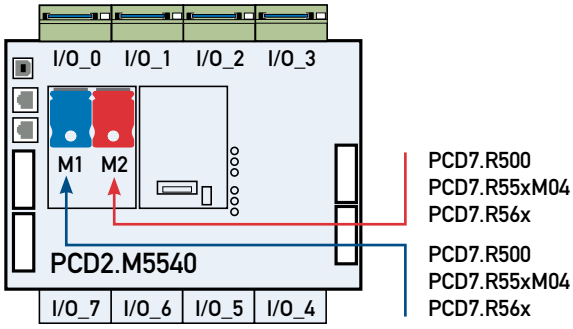
E-display:
Editable configuration parameters

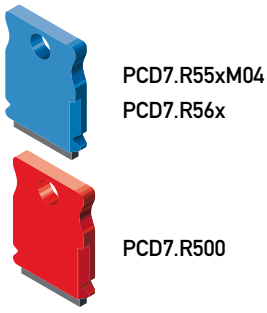
- User start page
- Setup timeout
- Backlighting timeout
- Contrast
- Inactivity timeout
- Sleep timeout
- Sleep refresh time

PCD2 System :
Status and configuration parameters

- CPU type and series number
- HW version
- FW version
- MAC address
- Program name
- TCP/IP parameters
- S-Bus address
- PCD status, time and date

PCD2.M5 memory modules





User memory

On Board

	1024 KByte RAM basic equipment 1024 KByte backup flash memory

Options

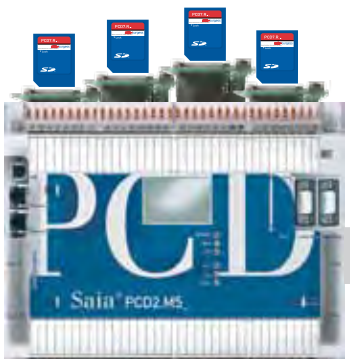
Flash memory with file system, program and data backup, BACnet

Flash memory cards in slot M1 and/or M2

PCD7.R550M04	4 MByte flash card with file system	M1 & M2
PCD7.R551M04	44 MByte flash card with 3 MByte file system & 1 MByte program backup	M1 & M2
PCD7.R560	Flash card with BACnet	M1 & M2
PCD7.R561	Flash card with BACnet, 1 MByte file system & 1 MByte pr. backup	M1 & M2
PCD7.R500	1 1 MByte flash card for program & data backup	M1 & M2

PCD2 base module for SD flash memory cards with file system

PCD2.R6000	Base module with slot for SD flash memory cards ((up to 4 modules in I/O slots 0 to 3 on a CPU)	I/O_0-3



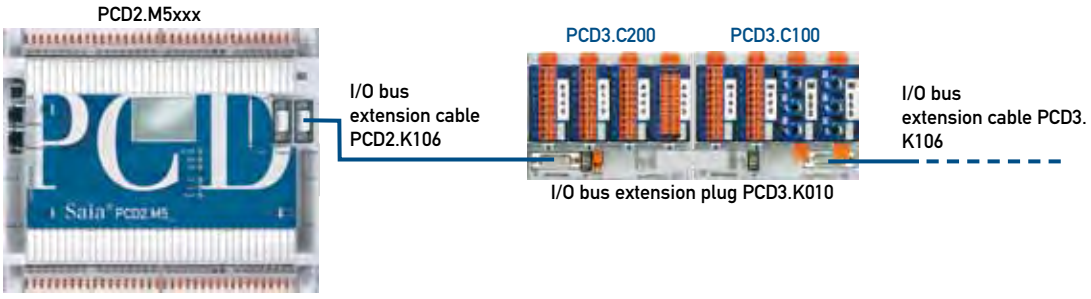
PCD7.R-SD256	Saia® SD flash memory card, 256 MBytes with file system
PCD7.R-SD512	Saia® SD flash memory card, 512 MBytes with file system
PCD7.R-SD1024	Saia®SD flash memory card, 1024 MByte with file system

Overview of digital I/O modules

Typ/ order-no.	Total I/Os	Input voltage	Breaking capacity DC	Breaking capacity AC	Input filter	Electrical isolation	Current draw 5 V-Bus[1]	Current draw + V-Bus[2]	I/O connector type PCD2	I/O connector type PCD3 [3]
PCD2/3.E110	8 I	15…30 VDC			8 ms		12 mA		The terminal blocks are supplied with the modules	A
PCD2/3.E111	8 I	15…30 VDC			0.2 ms		12 mA			A
PCD2/3.E112	8 I	7,5…15 VDC			9 ms		12 mA			A
PCD2/3.E116	8 I	3,5…7 VDC			0.2 ms		12 mA			A
PCD2.E160	16 I	15…30 VDC			8 ms		50 mA			
PCD3.E160	16 I	15…30 VDC			8 ms		8 mA			D
PCD2/3.E161	16 I	15…30 VDC			0.2 ms		50 mA			D
PCD2.E165	16 I	15…30 VDC			8 ms		50 mA			
PCD3.E165	16 I	15…30 VDC			8 ms		8 mA			C
PCD2/3.E166	16 I	15…30 VDC			0.2 ms		50 mA			C
PCD2/3.E500	6 I	80…250 VAC			20 ms	■	1 mA			A
PCD2/3.E610	8 I	15…30 VDC			10 ms	■	12 mA			A
PCD2.E611	8 I	15…30 VDC			0.2 ms	■	12 mA			
PCD2/3.E613	8 I	30…60 VDC			9 ms	■	12 mA			A
PCD2.E616	8 I	3,5…7 VDC			0.2 ms	■	12 mA			
PCD2/3.A200	4 O, relay (make/no)		2 A/50 VDC	2 A/250 VAC		■	10 mA			A
PCD2.A210	4 O, relay (break) [4]		2 A/50 VDC	2 A/250 VAC		■	10 mA			
PCD2/3.A220	6 O, relay (make) [4]		2 A/50 VDC	2 A/250 VAC		■	10 mA			A
PCD2.A250	8 A, relay (make)		2 A/50 VDC	2 A/48 VAC		■	15 mA			
PCD3.A251	8 O, relay (6 changeover + 2 make)		2 A/50 VDC	2 A/48 VAC		■	15 mA			C
PCD2/3.A300	6 O, transistor		2 A/10…32 VDC				12 mA			A
PCD2/3.A400	6 O, transistor		0.5 A/5…32 VDC				15 mA			A
PCD2/3.A410	6 O, transistor		0.5 A/5…32 VDC			■	15 mA			A
PCD2.A460	16 O, transistor [5]		0.5 A/10…32 VDC				50 mA			
PCD3.A460	16 O, transistor [5]		0.5 A/10…32 VDC				8 mA			D
PCD2.A465	16 O, transistor [5]		0.5 A/10…32 VDC				50 mA			
PCD3.A465	16 O, transistor [5]		0.5 A/10…32 VDC				8 mA			C
PCD3.A810	4 O, relay (2 changeover	+ 2 make)	2 A/50 VDC	5 A/250 VAC		■	40 mA			F
Manual control			2 A/50 VDC	6 A/250 VAC		■				
PCD3.A860	2 O, relay (make)		-	12 A/250 VAC		■	18 mA			G
Manual control	2 I	15…30 VDC			8 ms					H
PCD2/3.B100	2 I + 2 O + 4 I or O selectable I or O	I: 15...32 VDC O:	0.5 A/5…32 VDC		8 ms		15 mA			A

[3] Plug-in I/O terminal blocks are included with I/O modules. Cables (see page 127) must be ordered separately
[4] With contact protection [5] With short-circuit protection

PCD2.M5xxx extension with PCD3 components



A manual control level can only be implemented on the PCD2 system series if the PCD3.C200 is used with PCD3.A810 and PCD3.W800 modules.

PCD3.A810
Relay outputs, 2 changeover/co and 2 make/no contacts

PCD3.A860
Light and shade Relay outputs, 2 relay outputs and 2 inputs

PCD3.W800
4 analogue outputs (3 channels with manual control)

Overview of analogue I/O modules

Customized multifunctional I/O modules

Typ/ order-no.	Total channels	Signal ranges	Resolution	Electrical isolation	Current consumption 5 V [1]	Current consumption 24 V [2]	I/O connector type PCD2	I/O connector type PCD3 [3]
PCD2/3.W200	8 I	0…+10 V	10 bits		8 mA	5 mA	The terminal blocks are supplied with the modules	A
PCD2/3.W210	8 I	0…20 mA[4]	10 bits		8 mA	5 mA		A
PCD2/3.W220	8 I	Pt 1000: –50 °C…400 °C/Ni 1000: –50 °C…+200 °C	10 bits		8 mA	16 mA		A
PCD2.W220Z02	8 I	NTC 10 temperature sensor	10 bits		8 mA	16 mA		
PCD3.W220Z03	8 I	NTC 10 temperature sensor	10 bits		8 mA	16 mA		A
PCD2/3.W220Z12	4 I + 4 I	4 I: 0…10 V and 4 I: Pt 1000: –50 °C…400 °C/Ni 1000: –50 °C…+200 °C	10 bits		8 mA	11 mA		A
PCD2/3.W300	8 I	0…+10 V	12 bits		8 mA	5 mA		A
PCD2/3.W310	8 I	0…20 mA[4]	12 bits		8 mA	5 mA		A
PCD2/3.W340	8 I	0…+10 V/0…20 mA [4] Pt 1000: –50 °C…400 °C/Ni 1000: –50 °C…+200 °C	12 bits		8 mA	20 mA		A
PCD2/3.W350	8 I	Pt 100: –50 °C…+600 °C/Ni 100: –50 °C…+250 °C	12 bits		8 mA	30 mA		A
PCD2/3.W360	8 I	Pt 1000: –50 °C…+150 °C	12 bits		8 mA	20 mA		A
PCD2/3.W305	7 I	0…+10 V	12 bits	■	60 mA	0 mA		E
PCD2/3.W315	7 I	0…20 mA/4…20 mA, parameters can be set	12 bits	■	60 mA	0 mA		E
PCD2/3.W325	7 I	–10 V…+10 V	12 bits	■	60 mA	0 mA		E
PCD2/3.W400	4 A	0…+10 V	8 bits		1 mA	30 mA		A
PCD2/3.W410	4 A	0…+10 V/0…20 mA/4…20 mA jumper selectable	8 bits		1 mA	30 mA		A
PCD2/3.W600	4 A	0…+10 V	12 bits		4 mA	20 mA		A
PCD2/3.W610	4 A	0…+10 V/–10 V…+10 V/0…20 mA/4…20 mA jumper selectable	12 bits		110 mA	0 mA		A
PCD2/3.W605	6 O	0…+10 V	10 bits	■	110 mA	0 mA		E
PCD2/3.W615	4 A	0…20 mA/4…20 mA, parameters can be set	10 bits	■	55 mA	0 mA		E
PCD2/3.W625	6 O	–10 V…+10 V	10 bits	■	110 mA	0 mA		E
PCD2/3.W525	4 I + 2 A	I: 0…10 V, 0(4)…20 mA, Pt 1000, Pt 500 or Ni 1000 (selectable by DIP switch) O: 0…10 V or 0(4)…20 mA (selectable by software (FBox, FB))	I: 14 bits O: 12 bits	■	40 mA	0 mA		E
PCD2/3.W720	2 I	Weighing module with 2 systems for up to 6 weighing cells, resolution 18 bits						E
PCD2/3.W745	4 I	Temperature module for TC and 4-wire Pt/Ni	16 bits	■	200 mA	0 mA		[6]
PCD3.W800	4 A 3 of them manually operated	0…+10 V, short circuit proofed	10 bits		45 mA	35 mA [5]		J

[3] Plug-in I/O terminal blocks are included with I/O modules. Cables (see page 127) must be ordered separately
[4] +4…+20 mA via user program [5] With 100 % output and 3 kΩ load [6] With soldered I/O spring terminal block

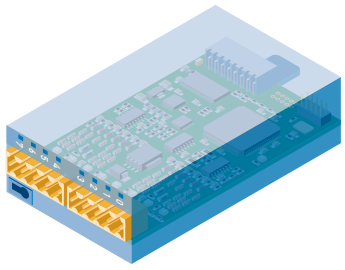
Capacity	PCD1	PCD2	PCD2.M48x	PCD2.M5xx0	PCD2.C1000	PCD2.C2000	PCD3.Mxxx0	PCD3.C200	PCD3.Txxx
Internal 5 V Bus [1]	750 mA	1600 mA	2000 mA	1400 mA	1400 mA	1400 mA	600 mA	1500 mA	650 mA
Internal + V Bus [2]	100 mA	200 mA	200 mA	800 mA	800 mA	800 mA	100 mA	630 mA	100 mA

The electrical requirement of the internal +5V and +V bus for the I/O modules is calculated in the PG5 2.0 Device Configurator.

Fast counter modules PCD3.H112/H114

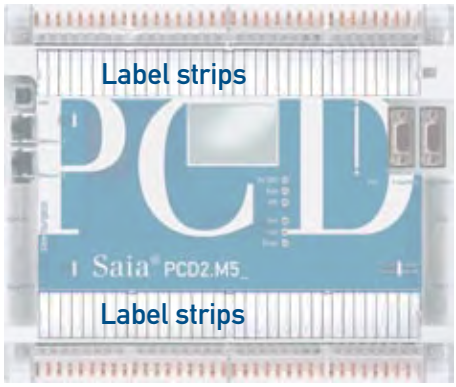
Features

- 2 (H112) or 4 (H114) counters per module
- 1 counter-controlled output (CCO) per counter
- 2 inputs A and B per counter
- 1 configurable input C per counter
- Range 0…16777215 (24 bit)
- Selectable digital filter for all inputs (10 kHz…150 kHz)



See chapter 6.2

Labelling of PCD2.M5



Fast labelling of I/O modules with the Saia® Label Creator

This software tool is used for the efficient inscribing of PCD2 label strips. The user enters unique data point texts in the tool. They can then be printed on A4 paper. For the different PCD2 module types, users can select a matching space format. Text entered can be stored and used again as a template.

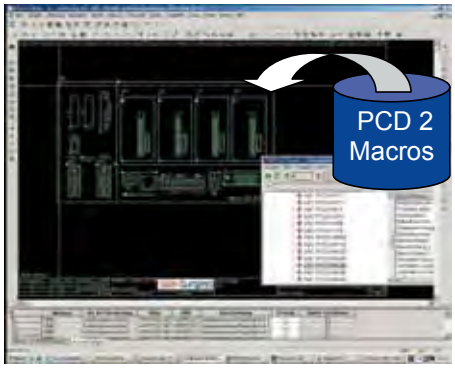
The Saia® Label Creator is supplied with the PG5 Controls-Suite package, or can be downloaded from the internet support site:

www.sbc-support.ch

ePLAN® electric P8 Special tools

Product macros for Saia® PCD2.M5

The PCD2.M5 series can be integrated into the system integrator's facility drawings. Designers can download ePLAN® electric P8 macros for Saia® products and copy them directly onto their CAD system wiring diagrams.



Downloading product macros immediately offers several advantages:

1. Designers waste no time copying parts lists, service plans, etc. because the macros in the ePLAN® electric P8file contain all the relevant product data.
2. As a result, design safety is increased, because errors in transmission can be excluded.
3. All data from wiring diagrams is available throughout subsequent design phases, for example, during the editing of documentation. All product-related graphs and master data are stored in the macro library. In addition, this data can be imported in DXF format from the library for processing in AutoCAD or another CAD system..

Download area: www.sbc-support.ch

Ordering information for PCD2.M5 accessories

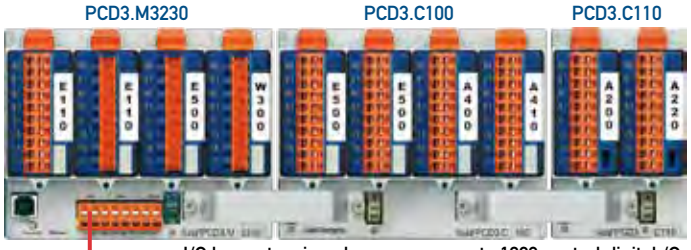
Type	Description
4 507 48170	Lithium battery for PCD processor unit and PCD7.D73 to ..D78 terminals (RENATA button battery type CR 2032)
	I/O extension
PCD2.C2000	Expansion housing with 8 I/O module slots for external 24 VDC supply
PCD2.C1000	Module holder for for 4 I/O modules
PCD3.C100	Module holder for for 4 I/O modules
PCD3.C110	Module holder for for 2 I/O modules
PCD3.C200	Module holder for 4 I/O modules with connection for external 24 VDC supply
	Connector
PCD2.K010	Connector plug PCD2.C2000 ⇔ PCD2.C2000
PCD3.K010	Connector plug PCD3.M/T/C ⇔ PCD3.Cxxx
	Extension cables
PCD2.K100	Extension cable, length 0.5 m, PCD2.M ⇔ PCD2.C1x0, below the base unit, max. gap 150 mm
PCD2.K106	Extension cable, length 0.7 m, PCD2.M ⇔ PCD2.C2000 or PCD3.C/T
PCD2.K110	Extension cable, length 0.7 m, PCD2.M ⇔ PCD2.C1x0, base unit mounted side-by-side
PCD2.K120	Extension cable, length2 m, PCD2.M ⇔ PCD2.C1x0 (for coupling bus module)
PCD3.K106	Extension cable, length0.7 m, PCD3.M/T/C ⇔ PCD3.C or PCD2.C2000 ⇔ PCD2.C2000
PCD3.K116	Extension cable, length 1.2 m, PCD3.M/T/C ⇔ PCD3.C or PCD2.C2000 ⇔ PCD2.C2000 (1.2 m)
	for analogue manual control modules PCD3.W800 (J-type plug)
PCD3.K800	Pluggable system cable, 2.5 m, PCD side: 8-pole plug-in spring terminal block.
	for relay outputs of analogue manual control modules PCD3.W810 (J-type plug)
PCD3.K810	Pluggable system cable, 2.5 m, PCD side: 12-pole plug-in spring terminal block.
	Programming cable
PCD8.K111	Programming cable, D-type, 9-pole (PGU) ⇔ D-type, 9-pole (IBM) – also for S-Bus
PCD8.K120	Profi-S-Link adapter
PCD3.K225	Interface cable 2.5 m, PCD3.T76x Web-Server ⇔ PC
	Plug-in system cables (see chapter 9.4)
	for digital modules with 16 I/Os
PCD2.K221	Sheathed, round cable with 32 strands, each 0.25 mm², 1.5 m long, PCD side 34-pole ribbon cable connector type D, process side: strand ends free, colour coded
PCD2.K223	Sheathed, round cable with 32 strands, each 0.25 mm², 3.0 m long, PCD side 34-pole ribbon cable connector type D, process side: strand ends free, colour coded
	for adapters PCD2.K520/..K521/..K525
PCD2.K231	Sheathed, half-round cable with 34 strands, each 0.09 mm², 1.0 m long, both ends with 34-pole ribbon cable connector type D
PCD2.K232	Sheathed, half-round cable with 34 strands, each 0.09 mm², 2.0 m long, both ends with 34-pole ribbon cable connector type D
	for 2 adapters PCD2.K510/..K511 or 1 adapter and relay interface PCD2.K551
PCD2.K241	Sheathed, half-round cable with 34 strands, each 0.09 mm², 1.0 m long, PCD side: 34-pole ribbon cable connector; type D, process side: two 16 pole ribbon cable connectors
PCD2.K242	two 16 pole ribbon cable connectors Sheathed, half-round cable with 34 strands, each 0.09 mm², 2.0 m long, PCD side: 34-pole ribbon cable connector; type D, process side: two 16 pole ribbon cable connectors
	for digital modules with 4, 6 / 8 I/Os or relay interface PCD2.K55x
PCD2.K261	Pluggable system cable, m, PCD side: 10-pole plug-in spring terminal block.
PCD2.K263	Pluggable system cable, m, PCD side: 10-pole plug-in spring terminal block.
	for analogue I/O modules and H modules
PCD2.K271	Sheathed, screened, round cable 1.5 m, PCD side: 10-pole plug-in spring terminal block.
PCD2.K273	Sheathed, screened, round cable 3 m, PCD side: 10-pole plug-in spring terminal block.
	for analogue modules PCD2.A250
PCD2.K281	Pluggable system cable, 1.5 m, PCD side: 14-pole plug-in spring terminal block.
PCD2.K283	Pluggable system cable, 3 m, PCD side: 14-pole plug-in spring terminal block.
	Adapter: ribbon connector⇔screw terminals
PCD2.K510	for 8 inputs/outputs, without LEDs PCD side: 16-pole ribbon connector, Process side: 2 × 6 screw terminals
PCD2.K511	for 8 inputs/outputs, with LEDs (for source operation only) PCD side: 16-pole ribbon connector, Process side: 2 × 6 screw terminals
PCD2.K520	for 16 inputs/outputs, without LEDs PCD side: 34-pole ribbon connector, Process side: 2 × 10 screw terminals
PCD2.K521	for 16 inputs/outputs, with LEDs (for source operation only) PCD side: 34-pole ribbon connector, Process side: 2 × 10 screw terminals
PCD2.K525	for 16 inputs/outputs, with LEDs (for source operation only) PCD side: 34-pole ribbon connector, Process side: 3 × 16 screw terminals
PCD2.K551	Relay interface for 8 PCD transistor outputs with LEDs PCD side: 16-pole ribbon connector or screq terminals, Process side: 24 screw terminals
PCD2.K552	Relay interface for 8 PCD transistor outputs with LEDs and manual operation (on-off-auto) and 1 output for feedback from manual operation PCD side: 16-pole ribbon connector or screw terminals, Process side: 24 screq terminals

6.5 Automation stations | PCD3: Fully modular device series, cassette design

The PCD3 series unites continuity with innovative ideas and new technology. As a result, it covers the performance/function spectrum of several conventional device series. It achieves this through a high degree of modularity in hardware and firmware.

The fast main processor has been incorporated in the back-plate of the device, unlike comparable systems. Its capacity can be increased individually with plug-in co-processor modules and/or intelligent I/O modules. These have a direct, very fast bus connection to the main processor. The PCD3 series is therefore excellently prepared for the rapidly increasing demands on performance that are to be expected.

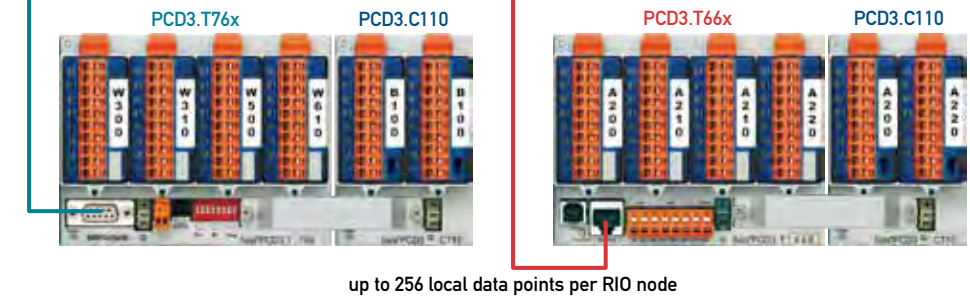
Configuration examples:
System construction PCD3.M3xxx
single-row mounting



Multiple-row mounting
and RIO connection

Extension via I/O Bus

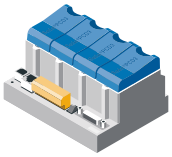
Local expansion with PCD3.T76x
RIOs via Profibus or Profi-S-Net
or with
PCD3.T66x Ethernet RIOs
via Ethernet or Ether-S-Net

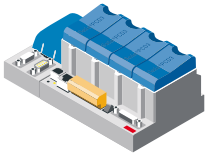


Overview of system components

PCD3.Mxxx0 for centralized and decentralized automation tasks

Up to 15 module holders PCD3.Cxxx can be attached to the PCD3.Mxxx0. This allows the user to attach a maximum of 64 I/O modules, or 1023 digital inputs/outputs. Every base unit has room for 4 data-point modules.





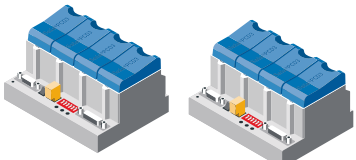
Interfaces integrated within base units

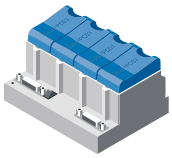
PCD3.Mxxxx

- USB 1.1 (slave device) interface, for use as programming interface
- RS485 port, up to 115.2 kbit/s, usable as free user interface or Profi-S-Net up to 187.5 kbit/s
- Ethernet-TCP/IP - with PCD3.M3120/M3330/M5340/M5540/M5560/M6340/M6540 and M6560

PCD3.M5xxx/M6xxx in addition

- RS232
- RS422/RS485 (with PCD3.M5340)
- Profi-S-Net (S-IO, S-Bus) – with PCD3.M5340/M5x40 and M6x40 – up to 1.5 Mbit/s
- Controller Area Network (CAN 2.0B) - with PCD3.M6340 and PCD3.M6360
- Profibus-DP Master – with PCD3.M6440, PCD3.M6540 and PCD3.M6560
- Optional
  - Memory/backup Flash card
  - BACnet/IP
  - Battery module





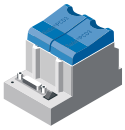
Extension of input/output capacity

PCD3.T760 and PCD3.T765 head stations (RIOs)

- PCD3.T76x head stations serve as remote peripheral nodes.
- Connection of up to 3 PCD3.Cxxx module holders per RIO node.

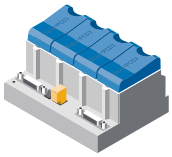
PCD3.C100 module holder

- 4 PCD3 module slots
- Extension module holder for PCD3.Mxxxx /Txxx/Cxxx and PCD2.Mxxx
- Additional PCD3.Cxxx devices connectable via extension cable/plug
- Indication of internal 5V supply voltage via LED



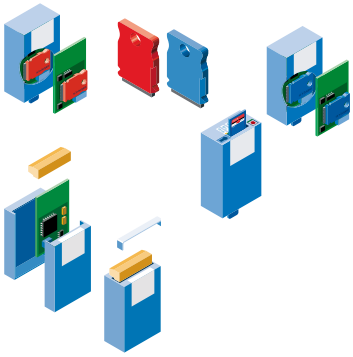
PCD3.C110 module holder

- 2 PCD3 module slots
- Extension module holder for PCD3.Mxxxx /Txxx/Cxxx and PCD2.Mxxx
- Indication of internal 5V supply voltage via LED



PCD3.C200 module holder with connecting terminals for 24 VDC supply

- 4 PCD3 module slots
- Extension module holder for PCD3.Mxxxx /Txxx/Cxxx and PCD2.Mxxx
- Additional PCD3.Cxxx devices connectable via extension cable/plug
- Indication of internal 5V supply voltage via LED
- Connecting terminals for 24 VDC power supply for all connected PCD3 I/O modules, plus any downstream PCD3.C1xx module holders



Plentiful memory options (see SI P+P26/458)

- Up to 1MByte RAM user memory (programs and data), buffer battery, for mid-range applications
- Up to 1MByte flash on board for backing up user-specific data
- Optional 1 MByte flash card (PCD7.R500) for user-program backups
- Optional 4 MByte flash-memory (PCD7.R550M04) with file system
- Optional base module (PCD3.R600) for SD flash cards on I/O slots #0...3

PCD3 I/O modules in cassette form (PCD3.Axxx/Exxx/Wxxx/Bxxx)

- More than 50 I/O modules available with differing functionality
- Status of digital signals indicated via LEDs
- Uniform PG5 and STEP®7 support in all CPUs and RIOs via FBs and FBoxes

Connection technology: plug-in spring/screw terminal blocks or system cable

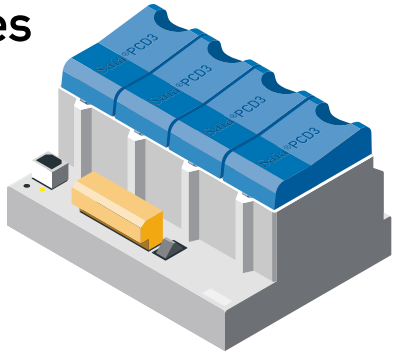
Connection to the I/O level is via plug-in spring/screw terminal blocks, plug-in system cables, or ribbon ↔ screw terminal adapters.

I/O terminal blocks and are included with I/O modules (except PCD3.W745).
System cables are NOT included, they have to be ordered separately. (see page 127)

Extension plug and cables

PCD2.K106: Extension cable 0.7 m	PCD2.Mxxx ↔ PCD3.Cxxx
PCD3.K010: Extension plug	PCD3.Mxxxx/T76x/Cxxx ↔ PCD3.Cxxx
PCD3.K106: Extension cable 0.7 m	PCD3.Mxxxx/T76x/Cxxx ↔ PCD3.Cxxx
PCD3.K116: Extension cable 1.2 m	PCD3.Mxxxx/T76x/Cxxx ↔ PCD3.Cxxx

Performance overview PCD3 series

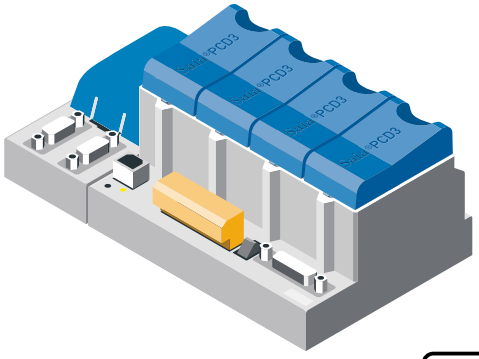


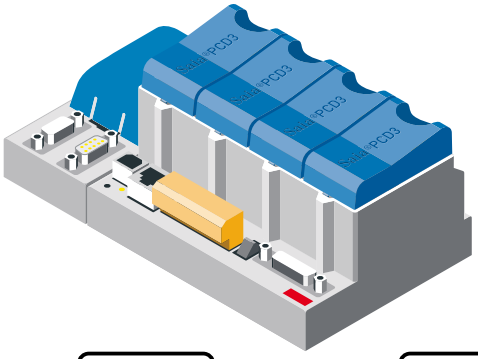
Technical data CPUs		PCD3.M3020 PCD3.M3120	PCD3.M3230 PCD3.M3330
		Basic	
Number of inputs/outputs or I/O module slots		64 4	1023[1]) 64
Expansion connection		no	yes
Processing time [µs]	■ bit operation ■ word operation	0.3…1.5 µs 0.9 µs	0.3…1.5 µs 0.9 µs
Integrated Web server + USB + Date-time (RTC)		yes	yes
On-board memory			
User memory (RAM)		128 KByte	512 KByte
Backup memory flash		128 KByte on board	512 KByte on board
Flash file system			
Data backup		4 hours with SuperCap	4 hours with SuperCap
Optional memory		up to 4 GByte	up to 4 GByte
On-board data interfaces		2…3	2…3
RS485 on terminal block(Profibus-DP slave, Profi-S-Net (S-IO, S-Bus))		up to 115.2 kBit/s oder Profi-S-Net up to 187.5 kBit/s	up to 115.2 kBit/s oder Profi-S-Net up to 187.5 kBit/s
USB 1.1		yes	yes
Ethernet-TCP/IP 10/100 MBit/s		with PCD3.M3120	with PCD3.M3330
RS232 up to 115.2 kBit/s		no	no
RS422/RS485 on Port #3		no	no
Profibus-DP slave, Profi-S-Net (S-IO, S-Bus), up to 1.5MBit/s		no	no
Controller Area Network (CAN 2.0B)		no	no
Profibus-DP Master up to 12 MBit/s		no	no
Optional data interfaces		Up to 8	Up to 8
Optional PCD3.F1xxmodules for RS232, RS485, RS422, TTY/20 mA and Belimo MP-Bus		only Slot #0	only Slot #0
Optional PCD3.F2xxmodules for RS232, RS485, RS422, TTY/20 mA and Belimo MP-Bus		Slot #0…3 up to 8 ports	Slot #0…3 up to 8 ports
General			
Supply voltage(according to EN/IEC61131-2)		24 VDC –20/+25% max.incl. 5% ripple	24 VDC –20/+25% max.incl. 5% ripple
Capacity 5 V/24 V intern		max. 600 mA/100 mA	max. 600 mA/100 mA
Programmable		from PG5 Version $1.4.100	from PG5 Version $1.3.100

[1]) when using PCD3.Cxxx and digital I/O-modules with 16 I/Os each.

System resources

Flags	14336 × 1 bit, volatile or non-volatile, division programmable [1])	Timing range:	31 bit, unsigned (0…2 147 483 647), timing signals selectable 10 ms to 10 s
Registers	16384 × 32 Bit, non-volatile	Texts and DBs	8192
Computational ranges	Integers: –2 147 483 648… +2 147 483 647 ($-2^{31}…+2^{31}-1$) Floating-point numbers: $\pm 9.22337 \times 10^{18}…\pm 5.42101 \times 10^{-20}$ Formats: decimal, binary, BCD, hexadecimal or floating-point	Hardware clock	Time values: S/min/h, week/day of week, month/day of month, year
Index registers	17 × 13 Bit (1 per COB and 1 for all XOBs)	Accuracy	better than 1 minute/month
Timers/Counters	1 600 volatile timers or non-volatile counters, division programmable	Power reserve	8 hours for PCD3.M3xx0 1 to 3years for PCD3.M5xx0 and PCD3.M6xx0
Counting range	31 bit, unsigned (0…2 147 483 647)	[1]) from firmware version 1.14.xx	





PCD3.M5340	PCD3.M5440 IN PREPARATION	PCD3.M5540	PCD3.M5560	PCD3.M6340	PCD3.M6440 IN PREPARATION	PCD3.M6360	PCD3.M6540	PCD3.M6560
Extended				**CAN**			**DP Master**	
1023[1]) 64	1023[1]) 64			1023[1]) 64	1023[1]) 64			
yes	yes			yes	yes			
0.3…1.5 µs 0.9 µs	0.3…1.5 µs 0.9 µs		0.1…0.8 µs 0.3 µs	0.3…1.5 µs 0.9 µs		0.1…0.8 µs 0.3 µs	0.3…1.5 µs 0.9 µs	0.1…0.8 µs 0.3 µs
yes	yes			yes			yes	
1 MByte	1 MByte		2 MB[2]) progr. + 1 MB[2]) text/DB	1 MByte		2 MB[2]) progr. + 1 MB[2]) text/DB	1 MByte	2 MB[2]) progr. + 1 MB[2]) text/DB
1 MByte (on board)	1 MByte (on board)			1 MByte (on board)			1 MByte (on board)	
			16 MByte			16 MByte		16 MByte
1 …3 years with Lithium battery	1 …3 years with Lithium battery			1 …3 years with Lithium battery			1 …3 years with Lithium battery	
up to 4 GByte	up to 4 GByte			up to 4 GByte			up to 4 GByte	
5	4…5			4…5			4…5	
up to 115.2 kBit/s oder Profi-S-Net up to 187.5 kBit/s	up to 115.2 kBit/s			up to 115.2 kBit/s oder Profi-S-Net up to 187.5 kBit/s			up to 115.2 kBit/s or Profi-S-Net up to 187.5 kBit/s	
yes	yes			yes			yes	
yes	with PCD3.M5540		yes	yes			with PCD3.M6540	yes
yes (on D-Sub)	yes (on D-Sub)			yes (on D-Sub)			yes (on D-Sub)	
yes (on D-Sub)	no			no			no	
no	yes (on D-Sub)			no			no	
no	no			yes (on D-Sub)			no	
no	no			no			yes (on D-Sub)	
Up to 8	Up to 8			Up to 8			Up to 8	
only Slot #0	only Slot #0			only Slot #0			only Slot #0	
Slot #0…3 up to 8 ports	Slot #0…3 up to 8 ports			Slot #0…3 up to 8 ports			Slot #0…3 up to 8 ports	
24 VDC -20/+25% max.incl. 5% ripple	24 VDC -20/+25% max.incl. 5% ripple			24 VDC -20/+25% max.incl. 5% ripple			24 VDC -20/+25% max.incl. 5% ripple	
max. 600 mA/100 mA	max. 600 mA/100 mA			max. 600 mA/100 mA			max. 600 mA/100 mA	
from PG5 Version $1.4.120	from PG5 Version $1.3.100		from PG5 Version $2.0.136	from PG5 Version $1.3.100		from PG5 Version $2.0.136	from PG5 Version $1.3.100	from PG5 Version $2.0.136

[2]) flash memory

PCD3 decentralized RIO nodes

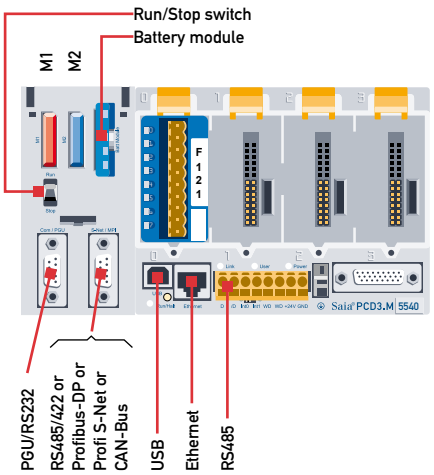
The PCD3.T76x head stations are described in chapter 7.

PCD3.T66x

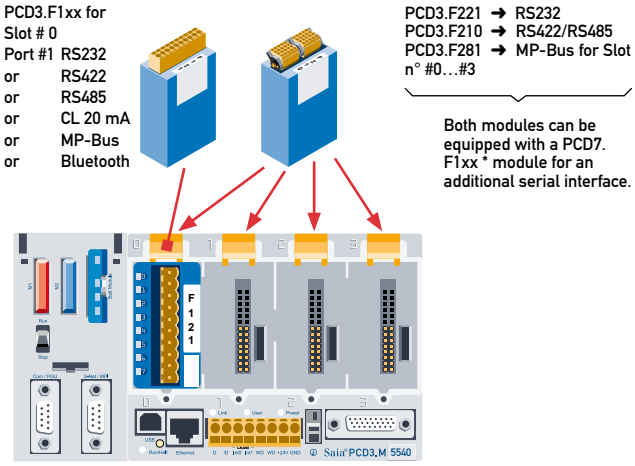
PCD3.T76x

PCD3 interfaces

PCD3 onboard interfaces



PCD3 optional interfaces



Protocols supported

Optional interfaces can be used to run the following protocols:

- Modem communication with the PCD FBox library
- HMI editor applications with PCD7.Dxxx text terminals (only with RS 232 interface)
- Serial S-Net
- Belimo MP-Bus
- JCI N2 - Bus
- KNX® S-Mode/EIB
- DALI
- EnOcean

Other protocols (drivers from third-party suppliers) are the responsibility of the manufacturer (e.g. restriction mode only up to 9600 bps).

Transmission speeds supported:

- 1200, 2400, 4800, 9600, 19200, 38400, 56700, 115200 bps.

System-dependent characteristics of PCD3.F2xx modules:

The following points should be noted when using PCD3.F2xx interface modules.

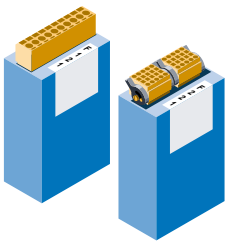
- Per PCD2 system, no more than 4 PCD3.F2xx modules (8 interfaces), can be used on Slots 0…3.
- The PCD3 system has a powerful processor to look after both the application and the serial interfaces. Processing of the interface modules requires the appropriate CPU capacity. When determining the maximum communications power per PCD3 system, the following should be taken into account:
- The communications volume is determined by peripheral devices connected. For example, this is the case if the PCD3 is being used as an S-Bus **slave station**. If a PCD3 controller is bombarded with heavy telegram traffic at high baud rates, there will not be much CPU capacity left for processing the actual application. The following rules apply here: The use of 8 interfaces with 9.6 kbps will take up approx. 50% of CPU capacity. Two interfaces with 57.6 kbps will also take up approx. 50% of CPU capacity. Two interfaces with 115 kbps will need around 60% of CPU capacity.
- If the PCD3 is the initiator of communication, the volume of communication and with it the communication capacity is determined by the user program in the PCD3 (PCD3 used as a **master station**). In theory, all interfaces can run at the top baud rate of 115kbps. Actual data throughput, however, depends on the user program and number of interfaces, and may therefore be small. It is crucial for any peripheral devices to be capable of running with the chosen configuration and communications capacity.

For these reasons we recommend that communications applications with a large number of interfaces and high transmission speeds should first be discussed with a local Saia® agent.

Order details

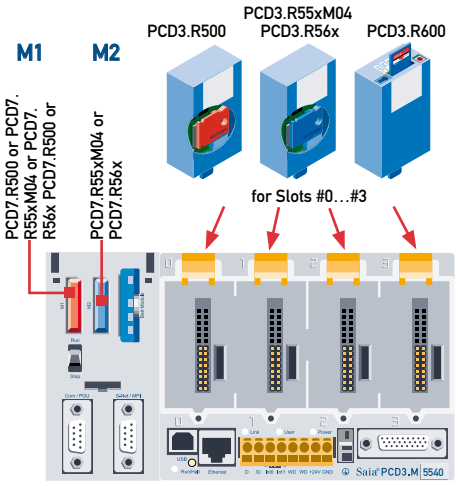
Communication modules

Type	Description	
PCD3.F110	Serial interface RS422/RS485	These modules are only used on I/O slot #0 and have one serial interface. Required connector type: A All PCD3.F1xx modules can be equipped with a PCD7.R5xx flash memory module.
PCD3.F121	Serial interface RS232/Modem	
PCD3.F130	Serial interface CL 20 mA	
PCD3.F150	Serial interface RS485 electrically isolated	
PCD3.F160	Bluetooth wireless interface module	
PCD3.F180	Belimo MP-Bus serial interface module	
PCD3.F221	Serial interface RS232	These modules are used on I/O slot #0…#3 and have one serial interface. With a PCD7.F1xx* interface module, these modules can be upgraded to max. 2 serial interfaces. Required connector type: K
PCD3.F210	Serial interface RS422/RS485	
PCD3.F281	Serial interface Belimo MP-Bus	

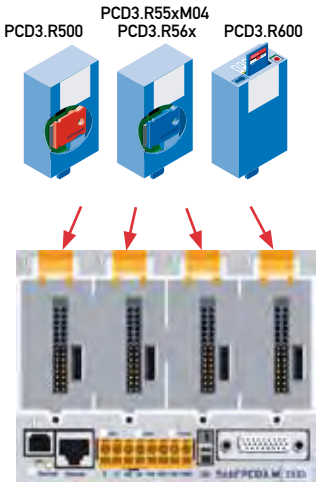


* from 30 September 2010, replaced by PCD7.F1xxS

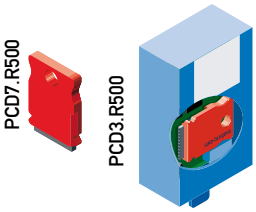
PCD3 memory modules



PCD3.M5xxx / PCD3.M6xxx



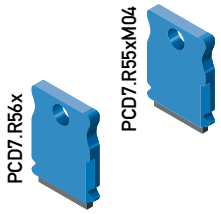
PCD3.M3xxx



Flash memory for program and data backup

PCD7.R500	1 MByte flash card on slot M1 or M2 of PCD3.M5xx0 and PCD3.M6xx0 CPUs
PCD3.R500	1 MByte flash module on any CPU I/O slot of all PCD3.Mxxx0 CPUs. One module can be used per system.

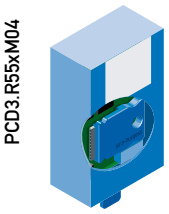
Note:
PCD7.R5xx cards can also be fitted into PCD3.F1xx communication interface modules (see page 120).



Flash memory with file system, program and data backup, BACnet option

Pluggable flash memory cards PCD7.R5xx on slot M1 or/and M2 of PCD3.M5xx0 CPUs

PCD7.R550M04	4 MByte Flash card with file system
PCD7.R551M04	4 MByte Flash card with 3 MByte file system and 1 MByte program backup
PCD7.R560	Flash card with BACnet option
PCD7.R561	Flash card with BACnet option, 1 MByte file system and 1 MByte program backup



Pluggable flash memory modules PCD3.R5xx on CPU I/O module slots of all PCD3.Mxxx0 CPUs

With type designation PCD3.R5xx such modules can also be fitted into CPU I/O slots #0…#3 . This enables the memory in PCD3.M3xx0 CPUs to be expanded. Four modules can be used per system.

PCD3.R550M04	4 MByte Flash module with file system
PCD3.R551M04	4 MByte Flash module with 3 MByte file system and 1 MByte program backup
PCD3.R560	Flash module with BACnet option
PCD3.R561	Flash module with BACnet option, 1 MByte file system and 1 MByte program backup

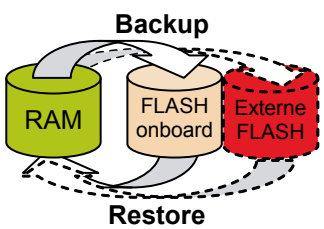
Note:
PCD7.R5xx cards can also be fitted into PCD3.F1xx communication interface modules (see page 120).

PCD3 basic module for SD flash memory cards with file system

PCD3.R600	Up to 4 modules can be fitted into the CPU I/O slots #0…#3.
PCD7.R-SD256	Saia® flash memory card, 256 MByte with file system
PCD7.R-SD512	Saia® SD flash memory card, 512 MByte with file system

Program backup into flash memory

PG5 can be used to load an application program into flash memory. All hardware settings will also be saved to flash. A flash card has priority over the onboard flash.



Maximum number of I/O modules per PCD

PCD Type	Maximum number of I/O modules			Maximum number of digital I/Os		
	Base CPU/RIO	PCD3.Cxxx extension	Total	Base CPU/RIO	PCD3.Cxxx extension	Total
PCD2.M12x PCD2.M15x	8	8	16	128	127	255
PCD2.M17x	8	24	32	128	382	510
PCD2.M48x PCD2.M5xxx	8	56	64	128	895	1023
PCD3.M3x3x PCD3.M5xxx PCD3.M6xxx	4	60	64	64	959	1023
PCD3.T76x (RIO)	4	12	16	64	191	256

Overview of digital input/output modules PCD3

Type	Total I/Os	Input voltage	Output breaking capacity DC	Output breaking capacity AC	Input delay	Electrical isolation	Internal current draw 5 V [1]	Internal current draw 24 V [2]	I/O connector type-Type [3]
PCD3.E110	8 I	15…30 VDC			8 ms		12 mA		A
PCD3.E111	8 I	15…30 VDC			0.2 ms		12 mA		A
PCD3.E112	8 I	7.5…15 VDC			9 ms		12 mA		A
PCD3.E116	8 I	3.5…7 VDC			0.2 ms		12 mA		A
PCD3.E160	16 I	15…30 VDC			8 ms		8 mA		D
PCD3.E161	16 I	15…30 VDC			0.2 ms		8 mA		D
PCD3.E165	16 I	15…30 VDC			8 ms		8 mA		C
PCD3.E166	16 I	15…30 VDC			0.2 ms		8 mA		C
PCD3.E500	6 I	80…250 VAC			20 ms	■	1 mA		A
PCD3.E610	8 I	15…30 VDC			10 ms	■	12 mA		A
PCD3.E613	8 I	30…60 VDC			9 ms	■	12 mA		A
PCD3.A200	4 O, relay (make/no)		2 A/50 VDC	2 A/250 VAC		■	10 mA		A
PCD3.A210	4 O, relay (break/nc)		2 A/50 VDC	2 A/250 VAC		■	10 mA		A
PCD3.A220	6 O, relay (make/no)		2 A/50 VDC	2 A/250 VAC		■	10 mA		A
PCD3.A251	8 O, relay (6 changeover + 2 make)		2 A/50 VDC	2 A/48 VAC		■	15 mA		C
PCD3.A300	6 O, transistor		2 A/10…32 VDC				15 mA		A
PCD3.A400	8 O, transistor		0.5 A/5…32 VDC				15 mA		A
PCD3.A410	8 O, transistor		0.5 A/5…32 VDC			■	15 mA		A
PCD3.A460	16 O, transistor		0.5 A/5…32 VDC				8 mA		D
PCD3.A465	16 O, transistor		0.5 A/5…32 VDC				8 mA		C
PCD3.A810	4 O, relay (2 changeover		2 A/50 VDC	5 A/250 VAC		■	40 mA		F
Manual control	+ 2 make)		2 A/50 VDC	6 A/250 VAC		■			
PCD3.A860	2 O, relay (make)		-	12 A/250 VAC		■	18 mA		G
Manual control	2 I	15…30 VDC			8 ms				H
PCD3.B100	2 I + 2 O + 4 selectable I or O	I:15…32 VDC	0.5 A/5…32 VDC		8 ms		15 mA		A

[3]) Plug-in I/O terminal blocks are included with I/O modules. Cables (see page 127) must be ordered separately

Capacity	PCD1	PCD2	PCD2.M48x	PCD2.M5xx0	PCD2.C1000	PCD2.C2000	PCD3.Mxxx0	PCD3.C200	PCD3.Txxx
[1]) Internal 5 V Bus	750 mA	1600 mA	2000 mA	1400 mA	1400 mA	1400 mA	600 mA	1500 mA	650 mA
[2]) Internal + V Bus	100 mA	200 mA	200 mA	800 mA	800 mA	800 mA	100 mA	630 mA	100 mA

The electrical requirement of the internal +5V and +V bus for the I/O modules is calculated in the PG5 2.0 Device Configurator.

Digital and analogue relay modules with manual control

PCD3.A810
Relay outputs, 2 changeover/co and 2 make/no contacts

PCD3.A860
Light and shade relay outputsand 2 inputs

PCD3.W800
4 analogue outputs (3 channels with manual control)

Details see P+P26/388

Overview of analogue input/output modules PCD3

Type	Total I/Os	Signal ranges/ Description	Resolution	Electrical isolation	Internal current draw 5 V [1]	Internal current draw 24 V [2]	I/O connector Type [3]
PCD3.W200	8 I	0…+10 V	10 Bit		8 mA	5 mA	A
PCD3.W210	8 I	0…20 mA	10 Bit		8 mA	5 mA	A
PCD3.W220	8 I	Pt 1000: –50 °C…400 °C/Ni 1000: –50 °C…+200 °C	10 Bit		8 mA	16 mA	A
PCD3.W220Z03	8 I	NTC10 temperature sensor	10 Bit		8 mA	16 mA	A
PCD3.W220Z12	4 I + 4 I	4 I: 0…10 V 4 E Pt 1000: –50 °C…400 °C/Ni 1000: –50 °C…+200 °C	10 Bit		8 mA	1 mA	A
PCD3.W300	8 I	0…+10 V	12 Bit		8 mA	5 mA	A
PCD3.W310	8 I	0…20 mA	12 Bit		8 mA	5 mA	A
PCD3.W340	8 I	0…+10 V/0…20 mA [4] Pt 1000: –50 °C…400 °C/Ni 1000: –50 °C…+200 °C	12 Bit		8 mA	20 mA	A
PCD3.W350	8 I	Pt 100: –50 °C…+600 °C/Ni 100: –50 °C…+250 °C	12 Bit		8 mA	30 mA	A
PCD3.W360	8 I	Pt 1000: –50 °C…+150 °C	12 Bit		8 mA	20 mA	A
PCD3.W305	7 I	0…+10 V	12 Bit	■	60 mA	0 mA	E
PCD3.W315	7 I	0…20 mA/4…20 mA parameters can be set	12 Bit	■	60 mA	0 mA	E
PCD3.W325	7 I	-10 V…+10 V	12 Bit	■	60 mA	0 mA	E
PCD3.W400	4 O	0…+10 V	8 Bit		1 mA	30 mA	A
PCD3.W410	4 O	0…+10 V/0…20 mA/4…20 mA jumper-selectable	8 Bit		1 mA	30 mA	A
PCD3.W600	4 O	0…+10 V	12 Bit		4 mA	20 mA	A
PCD3.W610	4 O	0…+10 V/0…20 mA/4…20 mA jumper-selectable	12 Bit		110 mA	0 mA	A
PCD3.W605	6 O	0…+10 V	10 Bit	■	110 mA	0 mA	E
PCD3.W615	4 O	0…20 mA/4…20 mA parameters can be set	10 Bit	■	55 mA	0 mA	E
PCD3.W625	6 O	–10 V…+10 V	10 Bit	■	110 mA	0 mA	E
PCD3.W525	4 I + 2 O	I: 0…10 V, 0(4)…20 mA, Pt 1000, Pt 500 or Ni 1000 (selectable by DIP switch) O: 0…10 V or 0(4)…20 mA (selectable by software (FBox, FB))	I: 14 Bit A: 12 Bit	■	40 mA	0 mA	E
PCD3.W720	2 I	Weighing module with 2 systems for up to 6 weighing cells, resolution 18 bits					E
PCD3.W745	4 I	Temperature module for TC and 4-wire Pt/Ni	16 Bit	■	200 mA	0 mA	[6]
PCD3.W800	4 O, 3 of them manually operated	0…+10 V, short circuit proofed	10 Bit		45 mA	35 mA [5]	J

[3] Plug-in I/O terminal blocks are included with I/O modules. Cables (see page 127) must be ordered separately

[4] 4…20 mA vua user program [5] At 100% output value and 3 kΩ load [6] With soldered I/O spring terminal block

Capacity	PCD1	PCD2	PCD2.M48x	PCD2.M5xx0	PCD2.C1000	PCD2.C2000	PCD3.Mxxx0	PCD3.C200	PCD3.Txxx
[1] Internal 5 V Bus	750 mA	1600 mA	2000 mA	1400 mA	1400 mA	1400 mA	600 mA	1500 mA	650 mA
[2] Internal + V Bus	100 mA	200 mA	200 mA	800 mA	800 mA	800 mA	100 mA	630 mA	100 mA

The electrical requirement of the internal +5V and +V bus for the I/O modules is calculated in the PG5 2.0 Device Configurator.

Fast counter modules PCD3.H112/H114

Features

- 2 (H112) or 4 (H114) counters per module
- 1 counter-controlled output (CCO) per counter
- 2 inputs A and B per counter
- 1 configurable input C per counter
- Range 0…16 777 215 (24 bit)
- Selectable digital filter for all inputs (10 kHz…150 kHz)

See chapter 6.2

PCD3.R010 battery kit (for PCD3.M3xxx)

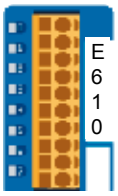
Consists of:

- Battery module for slot #3 only
- Lithium battery CR2032 (buffer time 1…3 years)

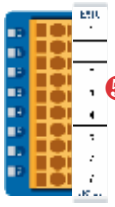
Labelling accessories

❶ (4310 8686 0)

❷ (4329 4819 0)



Without Clip



❺ (4310 8723 0)

With Clip

Addressing and marking I/O modules and module holders

I/O module slots in the module holder are labelled either with numbers

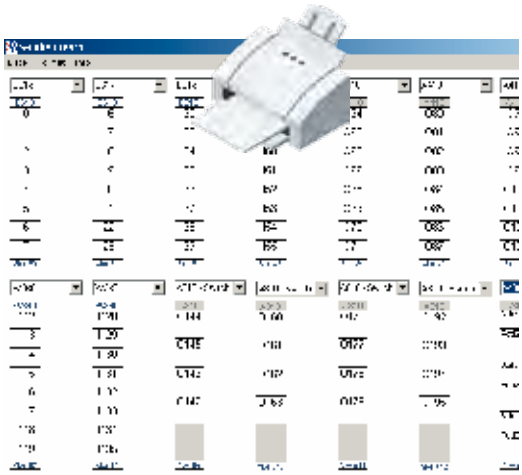
- 0…3 (PCD3.Mxxxx /T76x/C100, C200)
- 0…1 (PCD3.C110)

The inscription carriers ❷ supplied can either be used for additional labelling of the module holders, or for the I/O modules themselves. They are blank and, depending on requirements, may either be inscribed by hand or by means of preprinted adhesive strips ❶.

The connection diagram printed on the side of each I/O module ❸ not only makes wiring easier, it also helps during commissioning. On the opposite side of the cassette sufficient space ❹ is available for the user to add his own labelling.

❺ Additional labelling on the front

Since the summer of 2005, all PCD3 modules can also be labelled on the front panel. Optional, neutral labels with a snap-on cover (clip) are available for this purpose.



Fast labelling of I/O modules with the Saia® LabelCreator

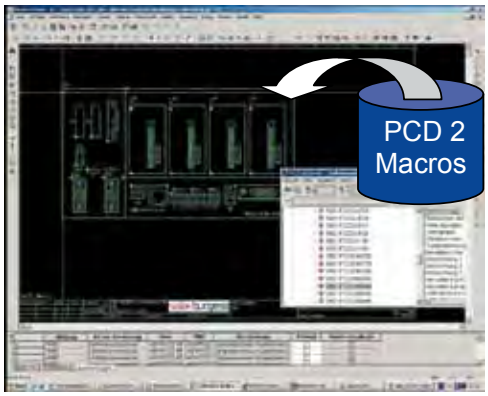
This software tool is used to inscribe PCD3 label clips efficiently. The user enters unique data-point texts in the tool. These can then be printed on the A4 master sheet. For the different types of PCD3 modules, the user selects formats with the corresponding spacing. Text entered and all standard text parameters (such as size, colour and font) can then be stored and reused as a master.

The Saia® LabelCreator is supplied with PG5 Controls-Suite, but may also be downloaded from the Internet support site www.sbc-support.ch

Special tools

Product macros for Saia® PCD3

Our PCD3 Series can be integrated into the system integrator's drawings. The constructor can download the ePLAN® electric P8 macros for our products now and to copy them directly in his CAD system and his circuit diagrams.

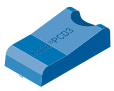


Downloading product macros offers multiple advantages at once: First, designers waste no time copying parts lists, service plans, etc. because the macros in the ePLAN® electric P8 file contain all the relevant product data. As a result, the construction safety increases because of transmission errors being avoided – a second advantage. In the third place, all data of the switchgears are available throughout the subsequent engineering stages, for instance when documentation must be compiled. All product-related graphs and master data are stored in the macro library. In addition, this data can be imported in DXF format from the library for processing in AutoCAD or another CAD system.

Download area: www.sbc-support.ch

Order details

Type	Description
	Accessories
PCD3.R010	Battery kit (for PCD3.M3xxx)
4 639 4898 0	Battery holder module (for PCD3.M5xxx)
4 507 4817 0	Lithium battery
PCD3.E009	Empty module housing (for unused PCD3 I/O sockets)
4 104 7515 0	Slot cover (for unused PCD3 I/O socket)
4 405 4995 0	Spring terminal block 8-pole for power supply PCD3.Mxxx0
4 405 4952 0	Screw terminal block 2-pole for power supply PCD3.C200
4 405 5005 0	Bolting device to screw terminal block 2-pole for power supply PCD3.C200

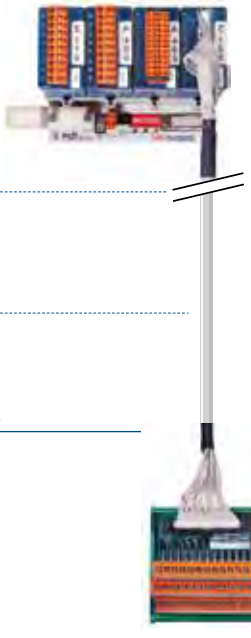
Terminal blocks, Inscription

4 405 4954 0	1: Plug-in I/O cage clamp terminal block 10-pole for wires up to 2.5 mm² (Type A)
4 405 4956 0	1: Plug-in I/O spring terminal block, 24-pole for wiring up to 1.0 mm² (Type C)
4 405 4998 0	1: Plug-in I/O spring terminal block, 14-pole for wiring up to 1.5 mm² (Type E)
4 405 4936 0	1: Plug-in I/O spring terminal block, 12-pole for PCD3.A810 for wiring up to 2.5 mm² (Type F)
4 405 5027 0	1: Plug-in I/O spring terminal block, 4-pole for PCD3.A860 for wiring up to 2.5 mm² (Type G)
4 405 5028 0	1: Plug-in I/O spring terminal block, 6-pole for PCD3.A860 for wiring up to 1.0 mm² (Type H)
4 405 4934 0	1: Plug-in I/O spring terminal block, 8-pole for PCD3.W800 for wires up to 1.5 mm² (Type J)
4 405 5048 0	1: Plug-in I/O spring terminal block, 10-pole for wiring up to 1.0 mm² (Type K)
4 310 8723 0	Set of 10: Transparent snap-on cover including neutral inscription labels (2×DIN A4)
4 329 4819 0	Set of 10: Snap-on inscription carrier for modules
4 310 8686 0	Set of 10: Preprinted adhesive strips for snap-on label holder 4 329 4819 0

System cables for manual control/emergency

	for PCD3.A810 manual control modules with 4 relay outputs
PCD3.K810	12 strands, each 1.0 mm², 2.5 m long, held together with cable binders PCD side: 12-pole, plug-in spring terminal block type F, process side: strand ends free, numbered
	for PCD3.A860 light and shade modules
PCD3.K860	4 strands, each 1.5 mm², 2.5 m long, held together with cable binders PCD side: 4-pole, plug-in spring terminal block type G, process side: strand ends free, numbered
PCD3.K861	6 strands, each 0.75 mm², 2.5 m long, held together with cable binders PCD side: 6-pole, plug-in spring terminal block type H, process side: strand ends free, numbered
	for PCD3.W800 manual control modules with 4 analogue output channels
PCD3.K800	8 strands, each 1.0 mm², 2.5 m long, held together with cable binders PCD side: 8-pole, plug-in spring terminal block type J, process side: strand ends free, numbered

System cables and ribbon ↔ screw terminals adapters (see chapter 10.4)



	System cables for digital modules with 16 I/Os
PCD2.K221	Sheathed, round cable with 32 strands of 0.25 mm², 1.5 m long, PCD side: 34-pole ribbon cable connector type D, process side: strand ends free, colour coded
PCD2.K223	Sheathed, round cable with 32 strands of 0.25 mm², 3.0 m long, PCD side: 34-pole ribbon cable connector type D, process side: strand ends free, colour coded
	System cables for adapters PCD2.K520/..K521/..K525
PCD2.K231	Sheathed, half-round cable with 34 strands of 0.09 mm², 1.0 m long, both ends with 34-pole ribbon cable connector Type D
PCD2.K232	Sheathed, half-round cable with 34 strands of 0.09 mm², 2.0 m long, both ends with 34-pole ribbon cable connector Type D
	System cables for 2 adapters PCD2.K510/..K511 or 1 adapter and relay interface PCD2.K551
PCD2.K241	Sheathed, half-round cable with 34 strands of 0.09 mm², 1.0 m long, PCD side: 34-pole ribbon cable connector; type D, process side: two 16 pole ribbon cable connectors
PCD2.K242	Sheathed, half-round cable with 34 strands of 0.09 mm², 2.0 m long, PCD side: 34-pole ribbon cable connector; type D, process side: two 16 pole ribbon cable connectors

	Ribbon ↔ screw terminal adapters
PCD2.K510	for 8 inputs/outputs, with 20 screw terminals, without LEDs
PCD2.K511	for 8 inputs/outputs, with 20 screw terminals and with LEDs (source operation only)
PCD2.K520	for 16 inputs/outputs, with 20 screw terminals, without LEDs
PCD2.K521	for 16 inputs/outputs, with 20 screw terminals and with LEDs (source operation only)
PCD2.K525	for 16 inputs/outputs, with 3×16 screw terminals and with LEDs (source operation only)
PCD2.K551	relay interface for 8 PCD transistor outputs with 24 screw terminals and LEDs
PCD2.K552	relay interface for 8 transistor outputs with 24 screw terminals, LEDs, manual control mode (switch on-off-auto) and 1 output for acknowledgement of manual control mode

6.6 Automation systems | PCD3.M2130V6 Compact
Compact, modular, extensible

Measuring less than 8 cm in depth, the PCD3.Compact fits neatly into the smallest environments. It includes all the features of PCD3 technology, including the automation server (web server, FTP server, file system etc.)

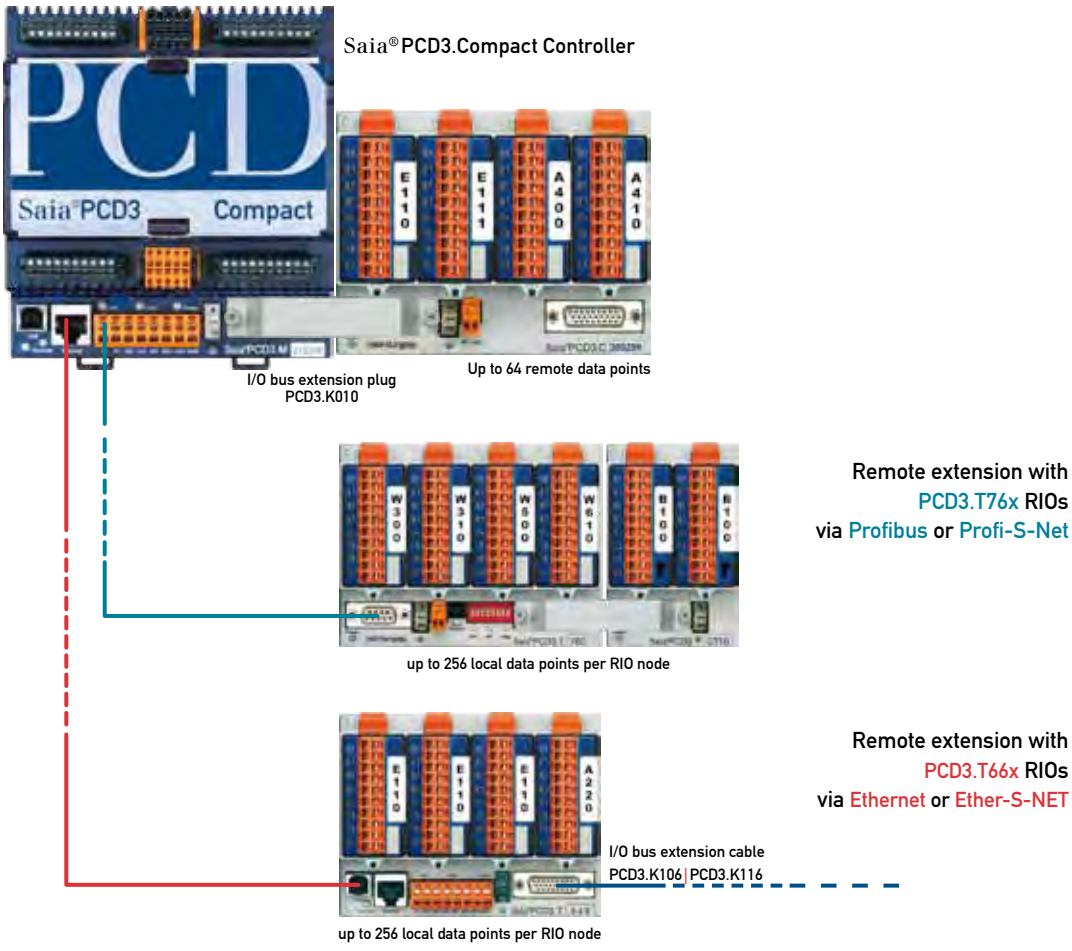
- Freely programmable with PG5 1.4 and/or PG5 2.0
- Compact size: 130 × 140 × 74 mm (W × H × D)
- Integral communications interfaces: USB, Ethernet and RS485
- Slot A for optional PCD7.F1xxS serial communications modules
- 38 inputs/outputs already in base unit
- Changeable lithium battery
- Configurable analogue inputs for voltage, current and temperature
- Expandable with PCD3.C200 or PCD3.C110 I/O module holder
- Decentralized I/O extension with remote I/O PCD3.T660 (Ethernet) or PCD3.T760 (Profi-S-IO)

General technical details

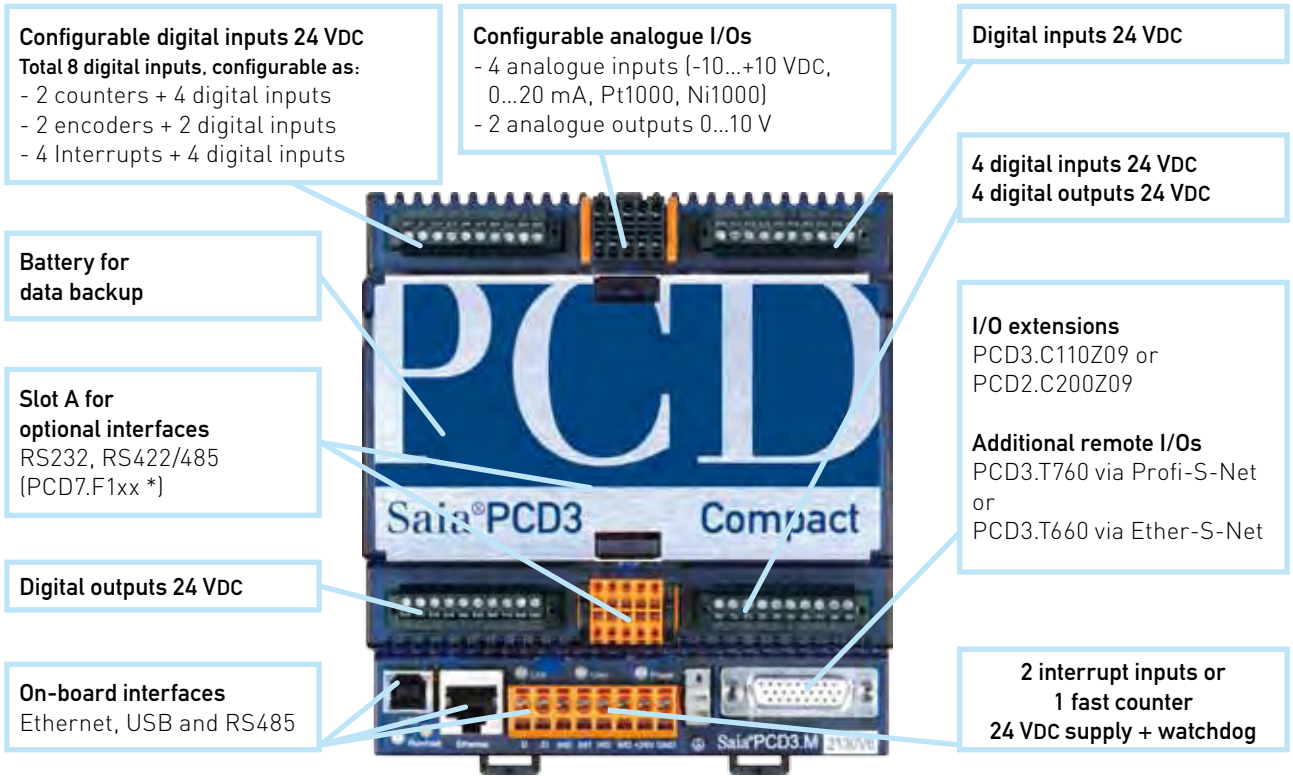
Power supply

Supply voltage (according to EN / IEC61131-2)	24 VDC –20 / +25 % incl. 5 % ripple
Current draw / Watt consumption	typ. 175 mA / 4.2 W max. 500 mA / 12 W
Loading capacity 5 V / 24 V intern	max. 600 mA / 100 mA
Short interruptions (according to EN / IEC61131-2)	≤ 10 ms at interval ≥ 1 s
Watchdog relay, make contact	48 VAC or VDC [1]), 1 A

Configuration examples:



Technical data Saia® PCD3.Compact



PCD3.Compact I/Os in base unit

Type	Number	Input Voltage	Signal ranges	Breaking capacity VDC	Resolution	I/O connector type
Digital inputs	20	15…30 VDC				plug-in screw terminals or push-in terminals with LED (optional)
Digital outputs transistor	12			0.5 A/5…32		
Analogue inputs configurable	4		–10 V…+10 V / 0…20 mA Pt/Ni 1000, Ni 1000 L&S, Resistance 0…2500 Ω		13 Bit / 12 Bit	Plug-in cage clamp terminals
Analogue outputs	2		0…10 V		12 Bit	Plug-in cage clamp terminals

Order details

Type	Description
PCD3.M2130V6	Base units with 38 I/Os (with plug-in terminal block) CPU with 512 Kbytes user program, backup with onboard Flash memory, 1 MByte File System, USB port for programming with PG5, RS485, 2 interrupt inputs, integral Web & FTP server, 1 Port (socket A) for communications interface PCD7.F1xx, lithium battery for data backup for 1…3 years, Ethernet TCP/IP interface
PCD3.M2030V6	Same as PCD3.M2130V6 but without Ethernet TCP/IP
4 405 5066 0	Optional: pluggable 10-pole push-in terminal block with LEDs, for digital I/Os
4 405 5079 0	Optional: 3 × 10 pole (3-wire connection), pluggable push-in terminal block with LEDs, for digital I/Os

* from 30 September 2010, replaced by PCD7.F1xxS

I/O extensions

PCD3.C110	2 module slots (connection with PCD3.K106/K116 cable only)	0 mA
PCD3.C200	4 module slots, with 24 VDC supply (connection with PCD3.K106/K116 cable only)	1500 mA / 630 mA (5 VDC / 24 VDC)
PCD3.C110Z09	2 module slots (connection with PCD3.K010 plug cable only)	0 mA
PCD3.C200Z09	4 module slots, with 24 VDC supply (connection with PCD3.K106/K116 cable only)	1500 mA / 630 mA (5 VDC / 24 VDC)

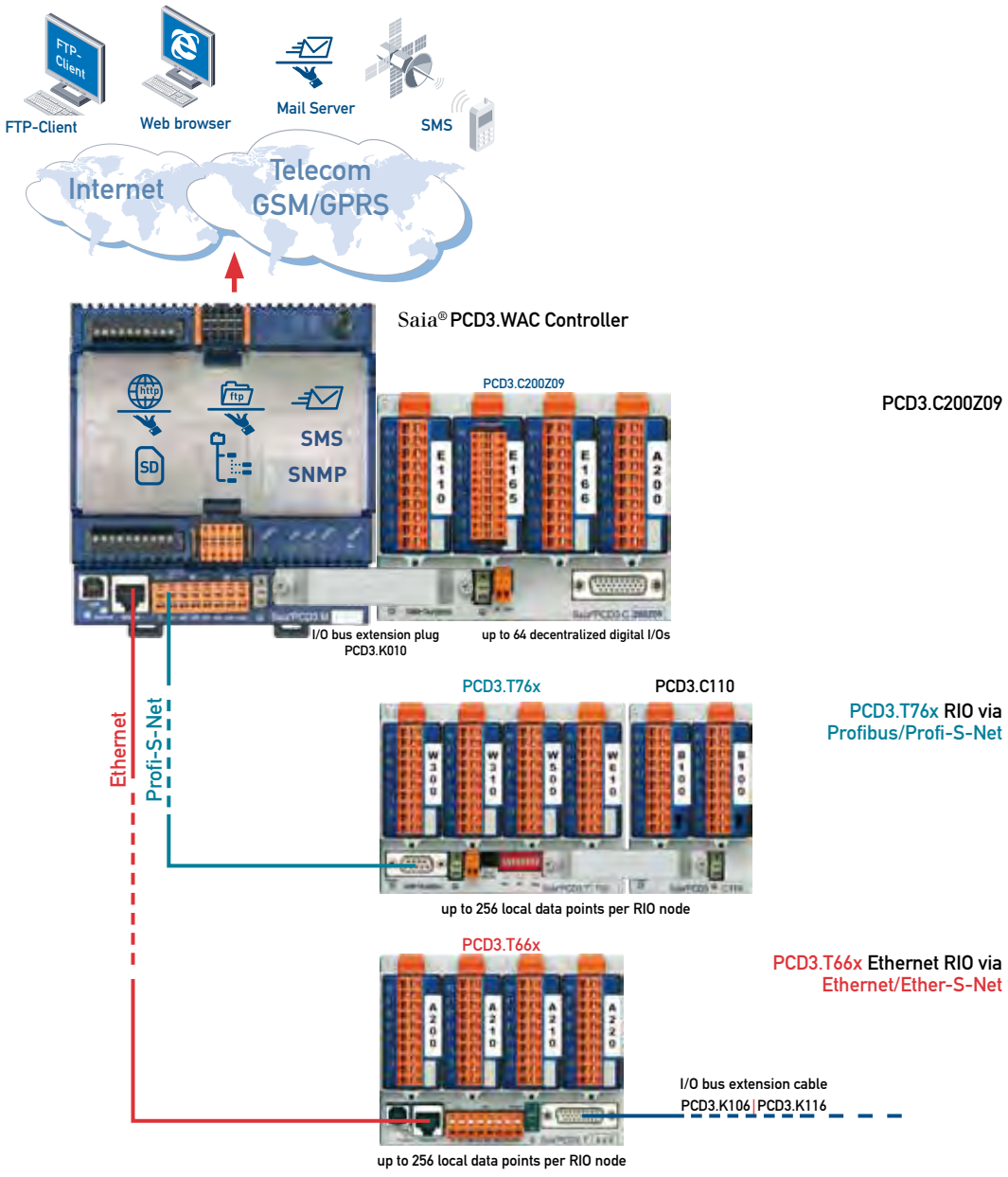
6.7 Automation systems | PCD3 WAC
Wide Area Controller, modular, extensible

Compact but capable of modular expansion

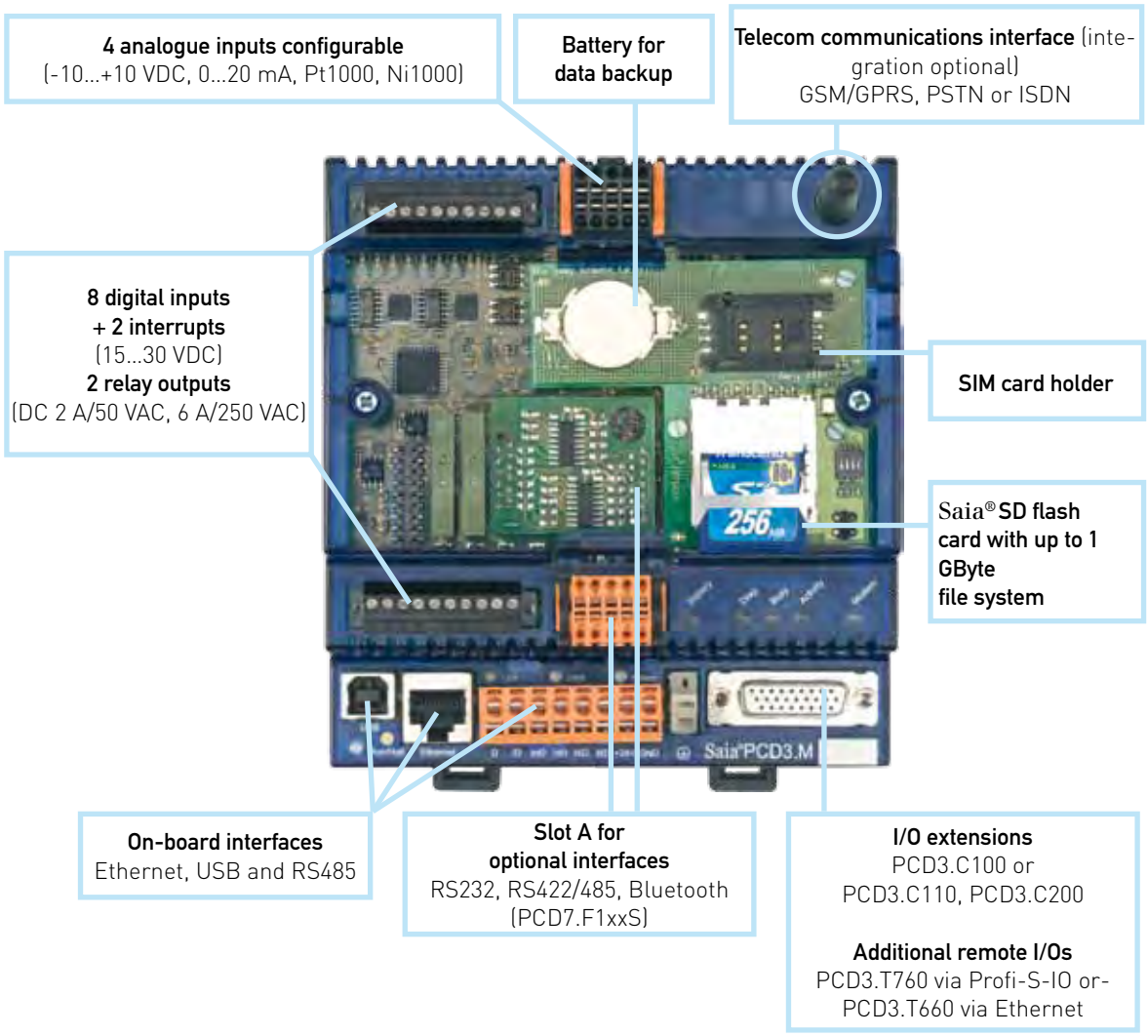
Saia® PCD3 Wide Area Controllers are freely programmable, industrial devices for control and automation with web, IT and telecommunications functions. Its potential uses therefore extend much further than those of a classical RTU station, which is normally only suitable for alarm monitoring with remote alarms and data logging. The PCD3 Wide Area Controller is also suitable for sophisticated control tasks.

It is not only compact in size, but also in its all-in-one functionality. With its compact dimensions, it can fit into the smallest switch cabinet, so it is ideal for upgrading existing installations.

- Freely programmable with PG5 2.0
- Compact size: 130 × 140 × 74 mm (W × H × D) (without antenna)
- Management of history data with up to 1 GByte flash memory
- Integral telecom interface (ISDN, PSTN, GSM/GPRS)
- Always available, thanks to redundant communication
- 14 inputs/outputs already in base unit



Technical data Saia® PCD3.WAC



Type	Description
PCD3.M2330A4T1	with PSTN modem
PCD3.M2330A4T3	with ISDN modem
PCD3.M2330A4T5	with GSM/GPRS modem *
PCD3.M2230A4T5	with GSM/GPRS modem, without Ethernet *

* without antenna

Accessories

Type	Description
PCD7.K840	GSM/GPRS dual-band 900/1800 antenna with magnetic base
PCD3.K010	Extension plug
4405506 6 0	Optional: pluggable 10-pole push-in terminal block with LED, for digital I/Os
4405507 9 0	Optional: 3 × 10-pole (3-wire connection) pluggable push-in terminal block with LEDs, for digital I/Os

CPU technology

RAM as user program memory	512 Kbytes
Back-up memory (Flash)	512 Kbytes
Memory for file system (Flash)	1 MByte (on board)
Operating system	Saia® NT operating system
PCD media	8192 Flags / 16,384 × 32 bit registers

Additional data storage

Slot for SD flash cards	Saia® SD card with up to 1 GByte file system
Writing cycles	600'000
Data files	Download and upload via ftp
Up to 1000 files with Saia® file system	
PCD7.R-SD256	Saia® SD flash memory card, 256 MByte with file system
PCD7.R-SD512	Saia® SD flash memory card, 512 MByte with file system
PCD7.R-SD1024	Saia® SD flash memory card, 1024 MByte with file system

Telecom communication interfaces (alternative interfaces for integration)

GSM / GPRS / PSTN / ISDN / SMS – Sending and receiving

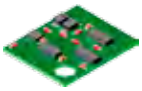
Internet and Intranet protocols

HTTP Server	Visualization with web browser and Web-Panel
FTP server	Easy exchange of data
TCP/IP-PPP Point to Point Protocol	Efficient communication
SMTP Client	Sending e-mails with files (e.g. log files) as attachment
DHCP and DNS Client	Easy integration into IP networks
SNTP Client	Synchronization of the internal clock
SNMP Server/Client	Network management (in preparation)

Communications interfaces to field level, on board

RS485 for free protocols or Profibus slave, Profi-S-Net	≤ 115 kBit/s or ≤ 187.5 kBit/s
USB 1.1 slave device	≤ 12 MBit/s
Ethernet TCP/IP	0 | 10/100 MBit/s

Communications interfaces to field level, options in slot A



PCD7.F110S	RS422 with RTS/CTS or RS485 electrically connected, with line termination resistors capable of activation. Suitable for Modbus, S-Bus, EnOcean etc.
PCD7.F121S	RS232 with RTS/CTS, DTR/DSR, DCD. Suitable for modem, EIB, DALI connection
PCD7.F150S	RS485 electrically isolated,with line termination resistors capable of activation
PCD7.F160S	Bluetooth wireless interface module
PCD7.F180S	Belimo® MP bus (RS232), for connection of up to 8 drives.

Field level protocols

Serial-S-Bus, Ether-S-Bus and Profi-S-Bus

MODBUS RTU or TCP EIB M-Bus IEC870-5-101/103/104

For other protocols please refer to chapter 2

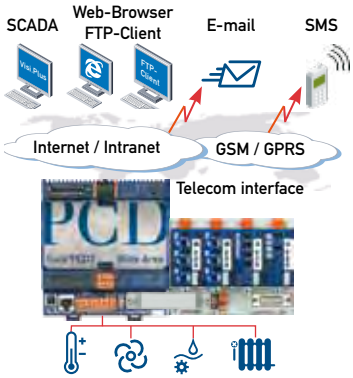
I/0 data points onboard

8 digital inputs + 2 interrupts	15…30 VDC
2 relay outputs	DC 2 A/50 V, AC 6 A/250 V
4 analogue inputs configurable	-10…+10 VDC, 0…±20 mA, Pt1000, Ni1000, Ni1000 L&S, 0…2.5 kΩ

I/O data points optional

PCD3.C110	2 module slots (connection with PCD3.K106/K116 cable only)	0 mA
PCD3.C200	4 module slots, with 24 VDC supply (connection with PCD3.K106/K116 cable only)	1500 mA / 630 mA (5 VDC / 24 VDC)
PCD3.C110Z09	2 module slots (connection with PCD3.K010 plug cable only)	0 mA
PCD3.C200Z09	4 module slots, with 24 VDC supply (connection with PCD3.K010 plug cable only)	1500 mA / 630 mA (5 VDC / 24 VDC)

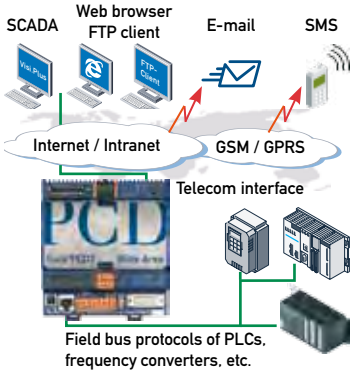
Example applications



PCD3.WAC as RTU controller

Send SMS messages and emails through the GSM/GPRS network. Use the PCD3.WAC with local IO and bring messages, states or alarms to the SCADA system or, by email and SMS, to the end user.

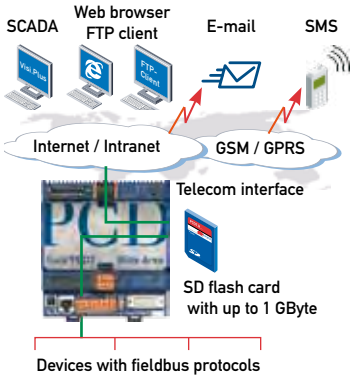
Via integrated web and FTP servers, external stations are easily brought together across internet and internet. The integrated web server also permits access to external stations via standard web browsers.



WAC communications gateway:

With integrated protocols like FTP, HTTP, or by using open data mode, Ethernet, or a serial interface, the Saia® PCD3.WAC can be used for non-Saia® systems as a communications gateway to internet or intranet applications.

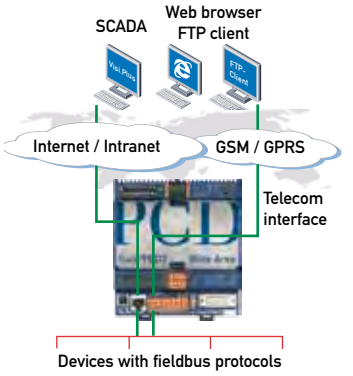
At the field level, there is the benefit of numerous field bus protocols like Modbus TCP/ RTU/ ASCII, EIB, M-Bus, …



Ready for data management:

With up to 1 Gbyte memory, the Saia® PCD3.WAC has enough memory to store data received from the field level over a long period. This data can be processed directly by the Saia® PCD and then transferred to the management or supervision system by email, FTP, HTTP or data communication. This makes the Saia® **PCD3 Wide Area Controller independent of manage**ment stations and therefore suitable as a data concentrator.

Many potential uses can be found wherever measurements are taken, transferred or monitored, wherever states are monitored and reported, and wherever remote operation and access are required.



Always reachable with redundant communication:

Bridging geographical distances is often a requirement for systems with a large number of distributed stations. With integrated telecom (GSM/GPRS, PSTN or ISDN) and an Ethernet interface, the Wide Area Controller is permanently available via its telecommunications interface and Ethernet port. Redundant communications paths (telecom or Ethernet interface) increase the reliability and availability of the system.

6.8 Adapter board Staefa Integral NRUF/A – NRUE/A

The Integral AS 1000 system was discontinued by Siemens Building Technologies in 2003. Since numerous examples of this product were built into the technical systems of buildings, there exists an acute need for action regarding replacement devices, system conversion and extension.

To deal with this problem, a Staefa Integral AS 1000 adapter board was developed that can be speedily inserted when any replacement is required, without converting the control cabinet. Since the adapter board can be equipped with a PCD2.M5540, there are practically no limits to its range of use. BACnet/IP installation is even possible without any problems.

Features:

Existing control cabinet infrastructure and all field devices can remain in place.

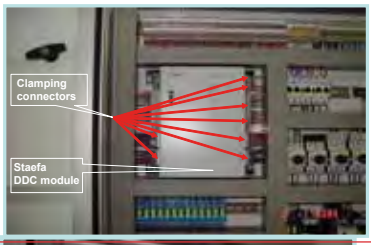
- With the adapter board, the integral system connector can be compatibly exchanged
- Universal adjustment of active, passive, non-isolated or isolated inputs via jumpers on the adapter board
- Data point extension on adapter board with standard PCD2 data point cards
- The adapter board has a variety of separately fused electric circuits
- By using the PCD2.M5540 with Ethernet on board, communications links can be implemented with higher ranking BACnet systems
- Web based operator guidance for old installations is easily achieved with Saia® Web-Panels

Order details

Type	Description
R.ADAP-BOARD	Staefa-Saia® Adaptor board

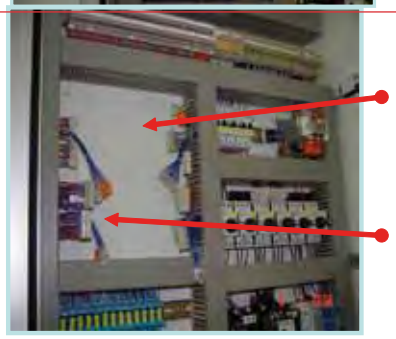
Step-by-step retrofit on Saia® PCD system:

❶



- Switch cabinet with Staefa DDC module before start of the system change

❷



- The existing clamping connectors can be used without modifying the connections of all inputs and outputs with the adapter board

❸

- Adapter connector of the clamping connectors of the DDC module Staefa
- Clamping connectors from the adapter board to the new Saia® DDC module

❹

- Adapter board mounted

❺

- New module mounted on the adapter board

❻

The adapter board makes it happen:

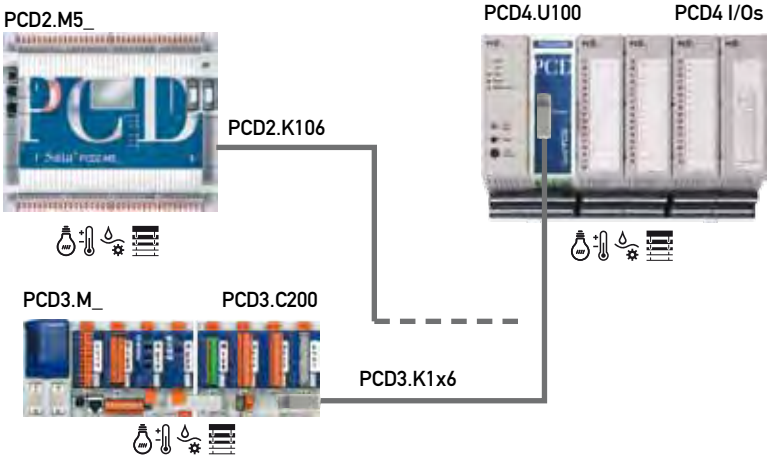
- The entire hardware of the old switch cabinet as well as the old field devices can be used without modifications!

6.9 PCD4.U100 upgrade kit

PCD4.U100 module provides a way of connection existing Saia® PCD4 I/O modules to the latest PCD3 and PCD2.M5_ systems. Upgrading to the latest Saia® PCD systems can improve the availability and reliability of the installation. The installations can also be enhanced with automation server functions and prepared for the future.

Assembly is easy: replace PCD4 CPU with PCD4.U100, install PCD3 or PCD2 CPU, connect new or existing PCD4 I/Os, and it's done. Whether IL or Fupla programming is used, the user programs can be transferred directly into new CPUs with only small program changes, i.e. with little programming effort. The upgrade also includes up to 8 new PCD2/3 I/O modules.
At minimal cost, existing installations can then be upgraded step by step and prepared for later conversion.

System overview



Features

Improve availability at minimal cost	Replaceold and no longer available PCD4 CPUs with the latest Saia® PCD CPUs. Using a new CPU can improve the availability and reliability of an existing installation or controller, saving time and money.
Benefits of the new automation server functions	New web/IT functions can also be made available in existing installations with PCD4 systems. The existing program structures can be transferred with minor program changes and then reused.
Extend PCD4 systems with new PCD2/3 I/O modules	By replacing the CPU, up to 8 additional PCD2/3 I/O modules can be integrated into existing installations.
Retain the wiring	The installation can be upgraded without costly rewiring.
Short upgrade time	The CPU can be replaced quickly and the installation made available again. The rewiring effort can then be deferred to a later date.

Technical overview

PCD types supported	PCD3.Mxx0 All PCDs with I/O bus connection PCD2.M5xx0 (without PCD2.C1000/C2000 expansion units)
PCD4 I/O modules supported	All PCD4 I/O modules apart from PCD4.H_ modules are not supported.
Number of PCD4 I/O modules	See technical documentation for PCD4 system
Max. number of PCD2/3 I/O modules*	8
PCD2/3 I/O modules supported*	All

* Max. 8 additional PCD2/3 I/O modules In combination with PCD3.M_ system, only PCD2.C200 module holders can be used.

Order details

Type	Description
PCD4.U100	PCD4 upgrade kit, basic module (without I/O bus cable)

Step-by-step retrofit on Saia® PCD system

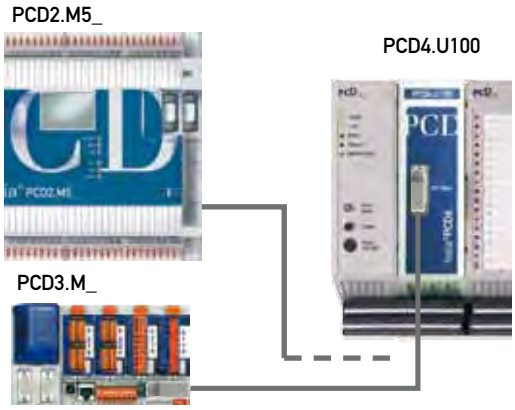
Once you have checked that all I/O modules are suitable for upgrading, assembly is quite simple: replace PCD4 CPU with PCD4.U100, install PCD3 or PCD2 CPU, and connect new or existing PCD4 I/Os.

1. Insert PCD4.U100 module

The existing PCD4 CPU is completely removed.
In order to maintain the I/O supply,
the PCD4 supply module should still be used.
The new PCD4.U100 module is deployed instead of the PCD4 CPU.

2. Connect PCD2.M5_ or PCD3.M_

New PCD CPU connected via the I/O bus cable with the PCD4.U100 module. For
PCD2.M5xxx: PCD2.K106
For PCD3.Mxxxx: PCD3.K116 or PCD3.K106



3. Serial interfaces

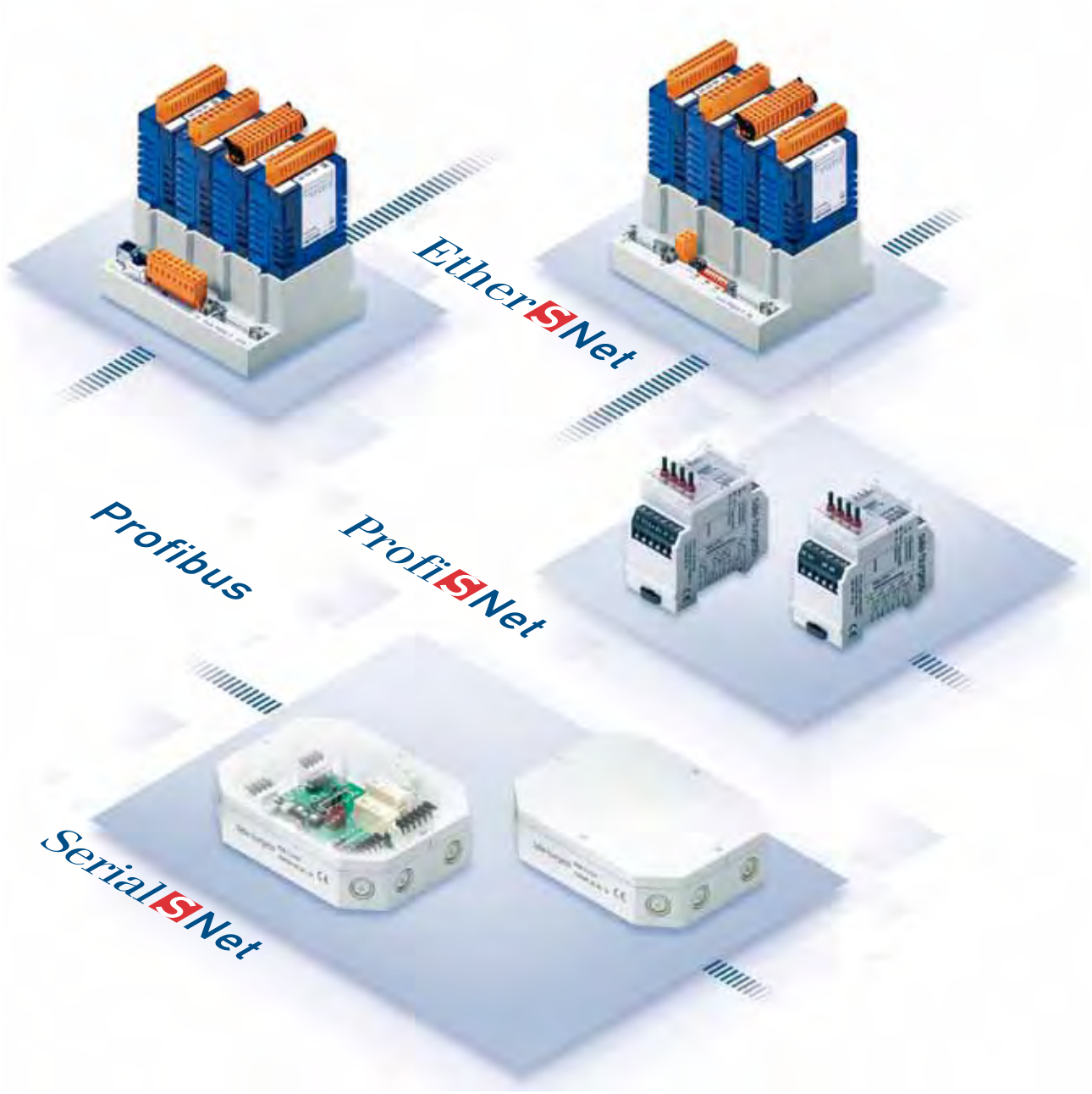
None of the serial interfaces on the PCD4 are supported and all need to be replaced with new PCD2/3 interfaces.
Max. 3 integrated serial interfaces on the PCD3.
Max. 4 integrated serial interfaces on the PCD2.
Additional expansion capability with PCD3.F1xx or PCD3/2.F2xx*

4. Programming with PG5

Then transfer user program to PG5, make program changes, download and it's done.
Detailed descriptions of the individual steps are given in the PCD4.U100 manual.

* Further serial interfaces can be implemented via SPI I/O slots. However, this will shift the I/O address range. See manual for further details.

7 Remote data points



7.1 Remote data points: Input/output modules for Serial S-Net (S-Bus)

Type RAIL – the switchboard solution

The RAIL-module is extremely expandable. Bridge plugs quickly and easily connect bus and supply voltage between the modules.

RAIL module

Their compact construction allows small units to be built up on site to form an optimum system. Thus these devices save much time and space while being more useful and efficient. These small field bus modules are very well suited for being built into switchboards and sub-distributors.

RAIL module in a Spelsberg housing

The RAIL-module can also be mounted in series in an IP66 housing for decentralized field assembly.

Type SAFE – the decentralized solution

The SAFE-module really is what the name promises, for the rugged reliable module can do much more than others. Safely built into a nicely shaped shock and water-resistant housing (water-jet protection IP65) the device provides extremely precise data services. The installation is made on-wall, under floor, in between ceilings, in cable or trunking canals, or on the sensor.

SAFE module

The SAFE module has a 40 **mm flat octagonal housing** for simple surface mounting assembly. By bayonet closings the lid can be opened or closed at once with a 90° turn.

Features of remote input/output modules

- Connection via simple two-wire line
- Automatic recognition of operating mode/Baud rate
- Serial S-Net connection with data and parity mode
- RAIL: Switch cabinet model for mounting on 35 mm DIN rail
- SAFE: Protected model for surface mounting with protection class IP65
- With manual control level and feedback via the bus
- State indication by LED

Use of slaves in Serial S-Net

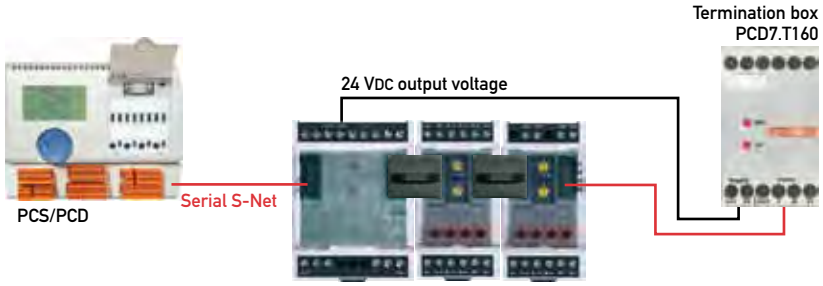
Slaves may be RIOs (remote input/output modules), external devices (e.g. electronic power meters) or PCD stations. When doing this the electric load of the Serial S- Net must be looked after. RAIL and SAFE remote input/output modules have a high impedance and load the Serial S- Net only slightly. Therefore up to 100 of these slaves can be used in one segment (without repeater).

Total PCD systems (inc. master PCD) and RIOs on one S-Bus branch

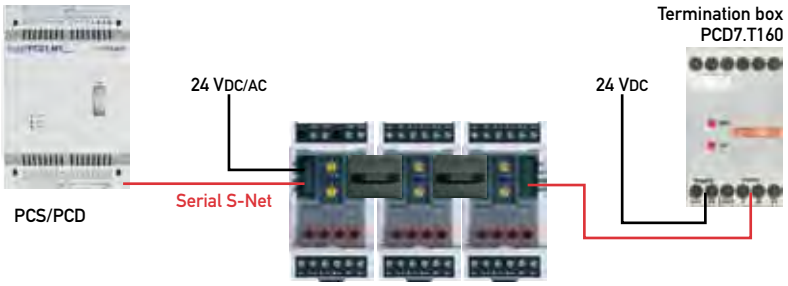
Number PCD	Total RIO	Number PCD	Total RIO	Number PCD	Total RIO	Number PCD	Total RIO
0…7	100	14	72	21	44	28	16
8	96	15	68	22	40	29	12
9	92	16	64	23	36	30	8
10	88	17	60	24	32	31	4
11	84	18	56	25	28	32	0
12	80	19	52	26	24		
13	76	20	48	27	20		

Examples, system structure Serial S-Net (S-Bus)

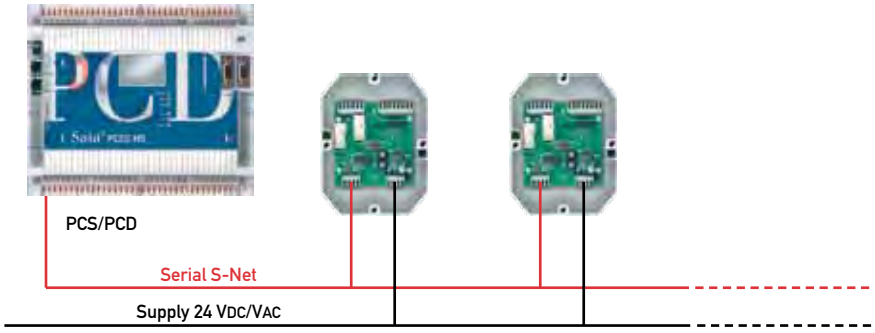
RAIL modules with Serial S-Net connection, power pack PCD7.L500 and termination box PCD7.T160



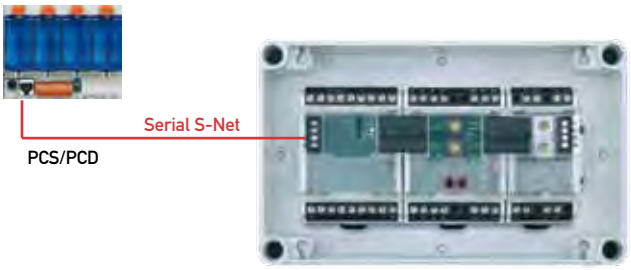
RAIL modules with Serial S-Net connection, separate module supply and termination box PCD7.T160



SAFE modules with Serial S-Net connection and separate module supply



RAIL modules with Serial S-Net connection, power pack PCD7.L500 and termination box IP66



Ordering information RAIL/SAFE

Serial S-Net RAIL (mounting on top-hat rail)

Type	Description
PCD7.L100	Input module with 4 digital inputs 24 VDC/VAC, with manual switch
PCD7.L110	Input module with 4 digital inputs 24 VDC/VAC, without manual switch
PCD7.L120	Input/output module with 2 relays 250 VAC and 4 digital inputs 24 VDC/VAC
PCD7.L130	Input module with 10 digital inputs 24 VDC/VAC
PCD7.L200	Output module with 4 relays, 250 VAC, 6 A
PCD7.L210	Output module with 4 triacs 24…250 VAC, 0.8 A
PCD7.L300	Analogue module with 4 inputs each of Pt 1000 and 0…10 VDC
PCD7.L310	Analogue module with 4 inputs each of Ni 1000 and 0…10 VDC
PCD7.L400	Analogue module with 4 outputs 0…10 VDC

Serial S-Net SAFE (surface mounted)

Type	Description
PCD7.L121	Input/output module with 2 relays 250 VAC and 4 digital inputs 24 VDC/VAC Range of uses: light and shade applications

Power pack 230 VAC/24 VDC

Type	Description
PCD7.L500	For supply of all RAIL and SAFE modules, 240 VAC|24 VDC/700 mA, max. 15 modules

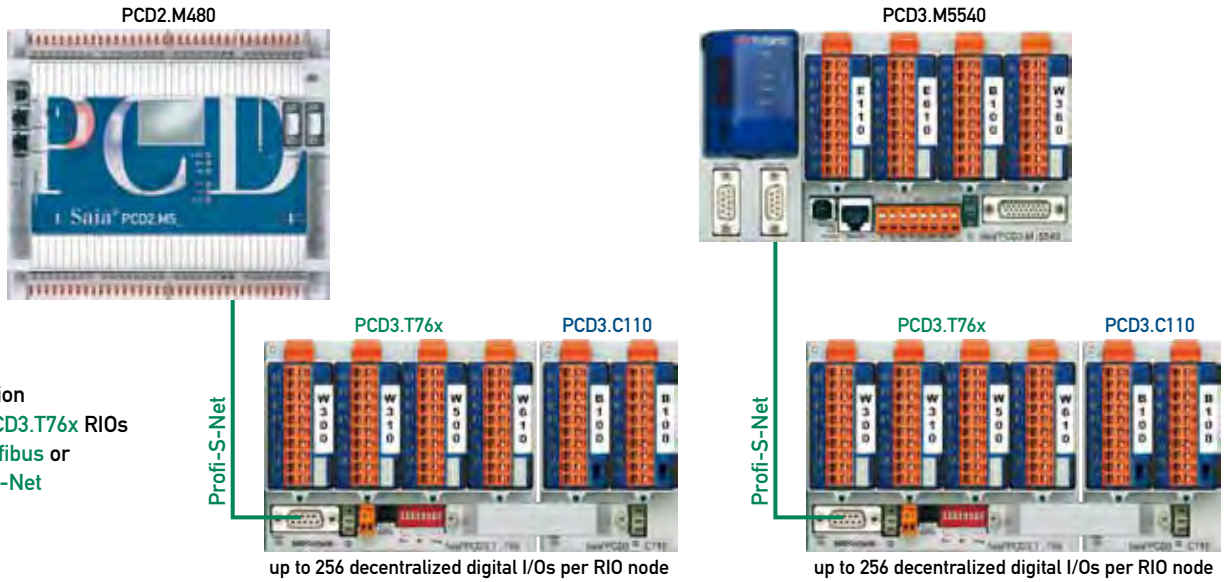
Example: Serial connector housing for surface mounting, IP 66, from Spelsberg [1)2)]

Type	Description
Rk 4/07-L [1)2)]	100×110×90 IP 66 with 35 mm DIN rail for max. 2 RAIL modules
Rk 4/018K-L [1)2)]	180×110×90 IP 66 with 35 mm DIN rail for max. 4 RAIL modules
…	Please consult manufacturers' catalogues for other housing types.

1) These products cannot be obtained from Saia-Burgess Controls AG
2) See www.spelsberg.com

7.2 PCD3.T76x remote devices (Profibus-RIO)

The PCD3.T76x head station serves as a remote peripheral node. These compact PCD3 RIOs snap onto 35 mm DIN rail and can be equipped with PCD3 I/O modules. Up to 3 PCD3.Cxxx module holders can be connected to the PCD3.T76x . This means that the user can connect a maximum of 16 I/O modules or 256 inputs/outputs per RIO node.



Web server for commissioning, diagnosis and service

The integral web server in the PCD3.T76x offers users the greatest advantages during commissioning, diagnostics and service. Access is via a widely known, easy to operate, standard web browser. Across RS232 or Profi-S-Net, the user has access not only to the predefined equipment and specific system HTML pages, but also to all information data in the RIOs.

This makes it easy to check the states of all I/O signals (digital/analogue/counters), and specifically modify these input/output states with a mouse click (Java applet «MonitoRIO», see illustration).

Technical data RIOs	PCD3.T760	PCD3.T765 (on request)
Number of inputs/outputs or I/O module slots	256 [1] 16 [2]	256 [1] 16 [2]
Expansion connection	yes	yes
Profibus-DP < 1.5 Mbits/s	DPV0	DPV0
User web server memory	128 KByte flash	128 KByte flash
Plug-in technology	–	yes
General		
Supply voltage	24 VDC ±20% smoothed or 19 VAC ±15% full-wave rectified	
Loading capacity 5V/24V-Bus	max. 650 mA/100 mA	

[1] When using digital I/O modules with 16 I/Os each.
[2] With PCD3.Cxxx module holders.

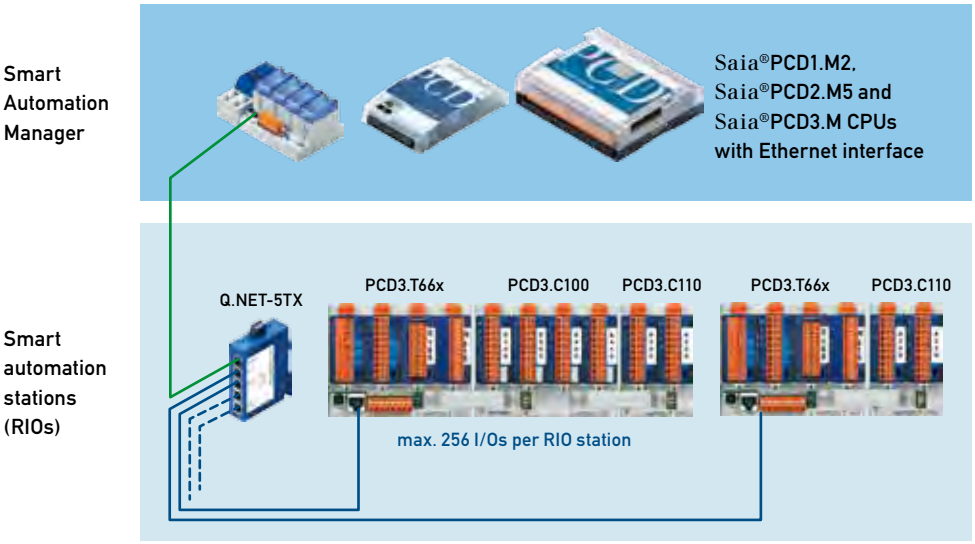
Ordering information to PCD3.T76x accessories

Type	Description
	Accessories for the configuration of the PCD3 RIOs
PCD3.K225	Interface cable PCD3.T76x Web server to PC (2,5 m); RIO configuration cable

7.3 PCD3.T66x remote devices (smart RIO)

The smart RIOs extend the PCD3 system family and enable efficient decentralization of automation tasks. They have unique functional enhancements and so stand out from traditional systems not only in functionality but also in terms of programming, commissioning and service. The new device series is a technological advance for greater peace of mind for users and owners.

Distributed Automation Net (DAN) system design



SPS functionality enables demanding tasks to be carried out directly in the S-RIO (smart automation station)

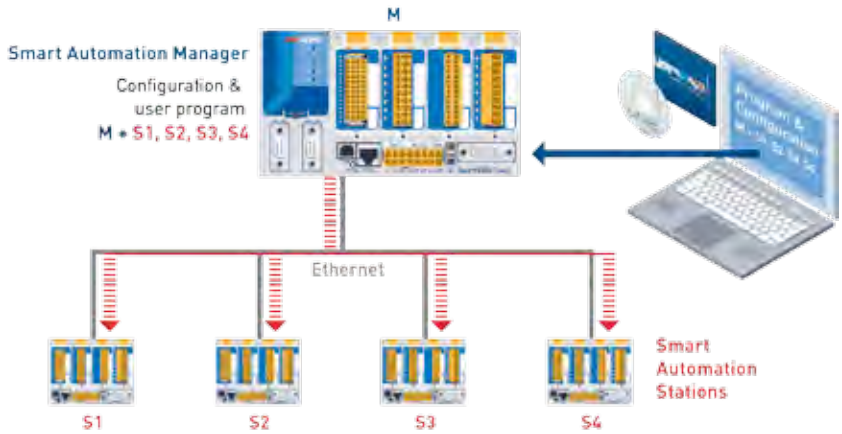
The S-RIO stations are not just remote I/O stations; they also have SPS functionality and so can remotely and autonomously process user programs producd with one of the familiar Saia® PG5 program editors (IL, Fupla, Graftec). Complex and critical tasks can then be handled directly within the RIO. If the RIO manager (master) fails, the (sub-)process continues to run, or it can be brought to a secure state by the S-RIO. Fast process can be monitored remotely by the two interrupt inputs, for example, analysed directly in the S-RIO and then processed further. Even complex and time-critical control algorithms can be run directly in the S-RIO.

Another advantage of the S-RIOs is the integrated web server. Pre-programmed web pages assist the user with commisisoning and diagnostics. Users can also produce their own application-sepcific web pages. These allow the installation/machine to be operated independently of the Smart Automation Manager directly in the S-RIO. Even if the Manager fails, the installation can still be used locally, e.g. with a Saia® micro-browser panel. With the all-web design, the local web server can also be accessed via an Ethernet network.

Central program management in the Smart Automation Manager saves costs

Programmable RIOs are important in many applications and make a number of tasks easier.

In traditional systems, the programs and configurations have to be loaded individually into the stations and also maintained individually. This creates additional costs over the whole lifecycle of the installation (project implementation, service, spare parts etc.). This is where the innovative concept of smart-RIOs stands out: these are programmable, but the programs are maintained centrally in the Smart Automation Manager (master station). What does this mean? The user programs for the Manager and the S-RIOs are produced with PG5 and then loaded into the Smart Automation Manager. The Manager automatically transfers the programs to the S-RIOs at initialisation time. This substantially simplifies commissioning, updates and swap-outs, because everything is managed from the central Manager. If an S-RIO needs to be replace with another from the spare parts store, for example,, the new device can be connected directly and will automatically receive its configuration and the application program from the Manager. The service staff need no special programming tools for this.

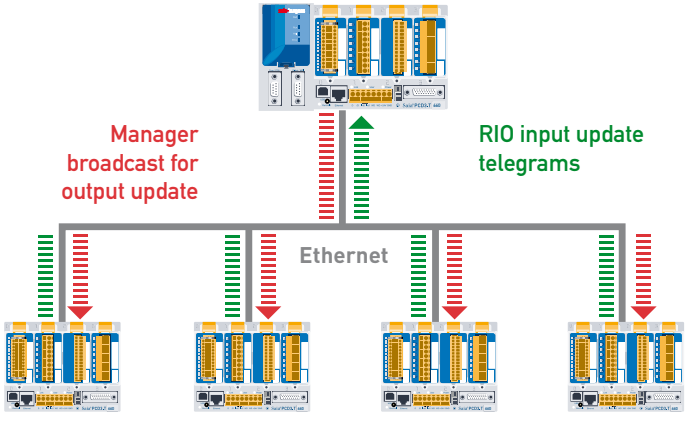


Remote program processing in the smart RIOs with central program management in the Smart Automation Manager

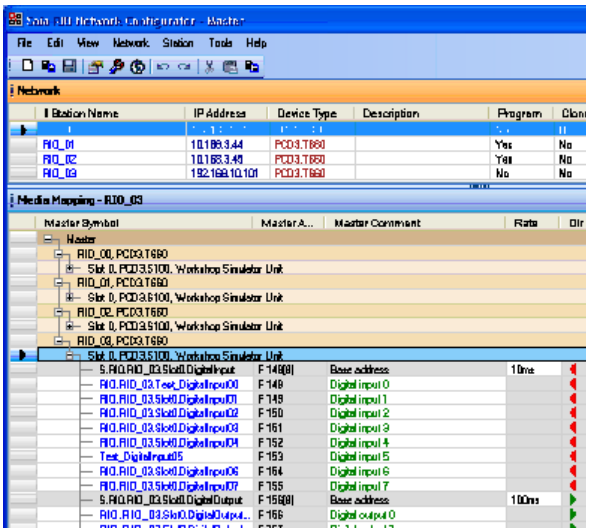
Data interchange with efficient Ether-S-IO protocol

In addition to the Ether-S-Bus protocol, the S-RIO now also supports the Ether-S-IO protocol, optimised for remote peripherals. Data transfer between Manager and RIO can be configured with just a few mouse clicks in the S-RIO network configurator. Once the configuration has been loaded into the manager station, the operating system carries out the data transfer autonomously in the background. No additional programming by the user is necessary

The Manager sends periodic broadcast and/or unicast telegrams to the S-RIOs to update their outputs. The use of broadcast telegrams significantly reduces data traffic across the network. At the same time, the S-RIOs also send the input states to the manager on a periodic basis. This relieves the manager of communication tasks. The cycle times can be individually configured for each station or even for each telegram. Time-critical processes or signals can then be prioritised.



Efficient data interchange with the Ether-SIO protocol



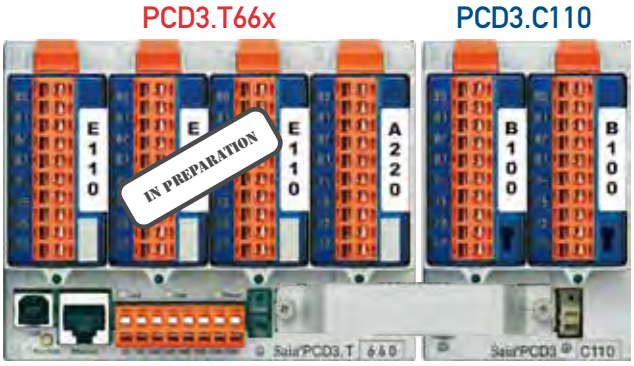
Cross-communication with Ether-S-Bus protocol

In parallel with Ether-S-IO communication, the S-RIOs also process read accesses with the Ether-S-Bus protocol. This means that other stations on the network beside the RIO manager can read data from an S-RIO station. S-RIOs connected together can also read data from another station. These options provide great flexibility, short response times and independence from the central manager. This also increases the availability of the installation.

Simple configuration and commissioning

The S-RIOs and I/O modules can be easily and efficiently configured in PG5 2.0 with the device configurator. The IP configuration is set using integrated web pages either locally via a USB port or over the Ethernet network using a standard web browser. Helpful diagnostic information can be retrieved at any time from the Smart Automation Manager and within the S-RIO via the integrated web server. A visual instant diagnosis can also be carried out locally via the integrated status LED on the S-RIO.

Modular bus coupler with PCD3 I/O modules, extensible up to 256 I/Os



up to 256 decentralized digital I/Os per RIO node

The base unit is a bus couple, a local CPU and I/O module holder in one. The base unit already has 4 slots for the use of standard PCD3 I/O modules. With the local expansion modules, the RIO station can be expanded with up to 256 I/Os. There is a choice of over 40 different PCD3 I/O modules. Foe example, the digital and analogue manual operation modules, and light and shade modules, can be used.

Another advantage of our PCD3 system is its great user-friendliness. For example, all our systems have a USB port, which can be used for local configuration, commisisoning and diagnostics. The use then has direct access to the RIOs at all times, regardless of the Ethernet network infrastructure and the IP settings. The plug-in terminals of the I/O modules allow the modules to be replaced qucikly and safely for service purposes.

Technical data

Property	PCD3.T660 [2]	PCD3.T665 [3]	PCD3.T666 [3]
Number of I/Os or	64 in base unit, extensible to 256[1]	64 in base unit, extensible to 256[1]	64 in base unit, extensible to 256[1]
I/O module sockets	4 in base unit, extensible to 16[1]	4 in base unit, extensible to 16[1]	4 in base unit, extensible to 16[1]
I/O modules supported	PCD3.Exxx, PCD3.Axxx, PCD3.Bxxx, PCD3.Wxxx	PCD3.Exxx, PCD3.Axxx, PCD3.Bxxx, PCD3.Wxxx	PCD3.Exxx, PCD3.Axxx, PCD3.Bxxx, PCD3.Wxxx
Max. number of RIO stations	254	128	128
Protocol for data transfer	Ether S-Bus	Ether-S-IO	Ether-S-IO
Ethernet connection	10/100 MBit/s	10/100 MBit/s	10/100 MBit/s
Default IP configuration IP address: 192.168.10.100 Subnet mask: 255.255.255.0 Default gateway: 0.0.0.0	yes	yes	yes
USB port for configuration and diagnostics	yes	yes	yes
Program memory	–	32 kB	128 kB
Web server for configuration and diagnostics	yes	yes	yes
Web server for user pages	–	yes	yes
On-board file system for web pages and data logging	no	256 kB	512 kB
On-board interrupt inputs	no	yes	yes
On-board RS485 interface	no	no	yes
Special modules	no	PCD3.H1xx	PCD3.F1xx M-Bus PCD3.H1xx
Watchdog	no	no	no
Real-time clock	no	no	no
Software clock (not battery-powered)	no	yes	yes
Battery on board	no	no	no
Smart Automation Manager (master station)			
Max. 16 RIO stations	PCD3.M2130, PCD3.M2330		
Max. 32 RIO stations	PCD1.M2120, PCD3.M3330		
Max. 64 RIO stations	PCD2.M5540, PCD3.M5340, PCD3.M5540, PCD3.M6x40		
Max. 128 RIO stations	PCD3.M5560, PCD3.M6360, PCD3.M6560		

[1] with PCD3.Cxxx I/O expansion modules
[2] do not use for new projects
[3] in preparation

General

Supply voltage	24 VDC ±20% geglättet oder 19 VAC ±15% full-wave rectified
Capacity of 5 V-Bus/24 V-Bus	max. 650 mA/100 mA
Ambient temperature	0…+55 °C or 0…+40 °C (depending on position)
Storage temperature	–20…+70 ↔
Relative humidity	30…95% with no condensation
Mechanical strength	according to EN/IEC61131-2

Order details

Type	Description
PCD3.T660	RIO, Ether-S-Bus data transfer, not programmable
PCD3.T665	Smart-RIO, Ether-S-IO data transfer, programmable 32 kB
PCD3.T666	Smart-RIO, Ether-S-IO data transfer, programmable 128 kB, serial ports

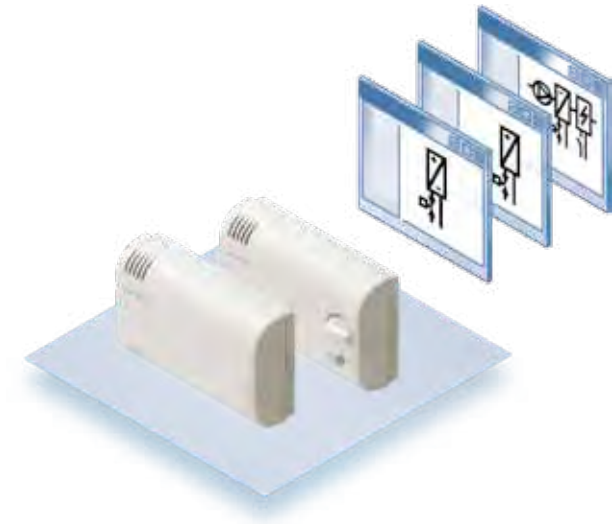
8 Room automation systems

8.1 The right system for every requirement: Compact, modular or individual

Compact room controllers (Chapter 8.2)

The compact controller series is especially suitable for simple systems for heating and/or cooling.

The room controllers in the PCD7.L79x series include operation for presence and setpoint, the room temperature sensor and the valve or flap control in one housing. The preconfigured regulating and controlling program is component of the basic software and can be extensively parameterized via network communication and adapted to individual needs.



Modular room automation system (Chapter 8.3)

For the automation of systems with a higher requirement profile like complex fan-coil applications or the integration of light and shade, a modular automation system is used, which provides the required flexibility in setup and application range.

The PCD7.L6xx series consist of several basic controllers, the extension modules for control of light and shade, as well as a multitude of room control units with analogue, digital or radio connections to the basic controller.

In this series as well, the preconfigured regulating and controlling program is a component of the basic software and can be extensively parameterized by means of communication and adapted to the individual needs.

According to requirements, the basic controller can be connected with the automation stations via communication interfaces like Saia® Serial S-Net, BACnet® or LonWorks®. This enhances the consistency and the quality of the entire building technology system.

Room automation solution
With individual user control (Chapter 8.4)

Complex systems, in which complete air conditioning including humidity control, pressure control, air quality monitoring or individual web-based user control are required, can be conveniently automated and operated on the basis of the Saia® PCD systems.

The product range is very much based on the individual requirements on the room automation and a customer-oriented user control. The system integrator has a comprehensive portfolio of system components at its disposal to fulfil the customer requirements at all levels.

If the requirements in the user control in shape, design and function are not covered, the system integrator can be directly connected to the automation station via open interfaces like EnOcean® wireless technology, KNX/EIB, LonWorks® or BACnet®, etc.

Operating modes of the room automation systems: autonomous, with communication or RIO operation

Standalone control with no communication

The controller regulates the room temperature without any connection to a bus system. Control is handled entirely by the individual room controller based on the specified default parameter settings.

The outputs are driven by a control algorithm depending on the measured temperature.

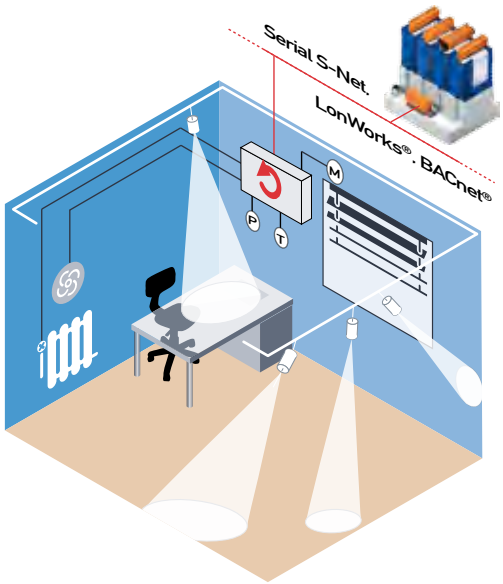
The default set-point setting of 21 °C can be modified by the set-point control (according to the device).

Autonomous regulation with communication to the automation station

The controller is run as a slave station with a unique Bus address within a Serial S-Net, LonWorks® or BACnet® network. Control is handled by the individual room controller with its own control algorithm.

The control functions - time or event-driven - are passed to the individual room controller by the automation station via suitably configurable function objects or network variables. This supports individual parameterization and operation of the room controller. The device, and hence the control function, can also be influenced at any time via the PCD master station.

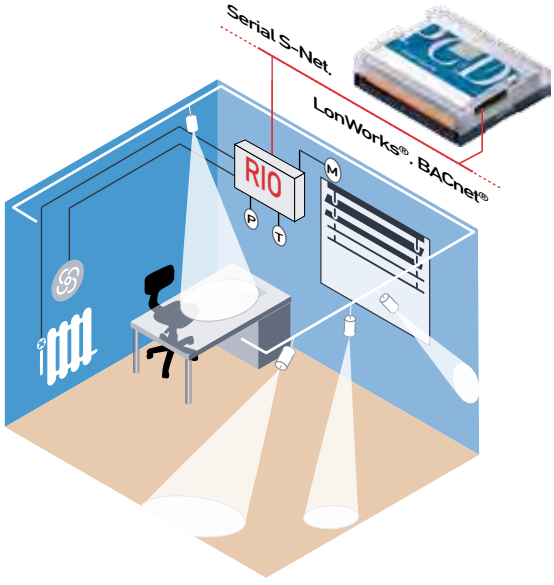
For parameterization, there is a function object available in the library for every room controller type. In the case of open network connections, this is handled via network variables or network objects.



External control and regulation by automation stations

The PCD master station handles all regulation and control tasks. The room controller itself is only used as a remote input/output unit. Regulation and control can then be adapted to requirements in a very flexible way.

For parameterization, RIO function objects are provided in the room controller library.



8.2 PCD7.L79x series | compact room controllers with Serial S-Net

For individual regulation of temperature based on compact single room controller.

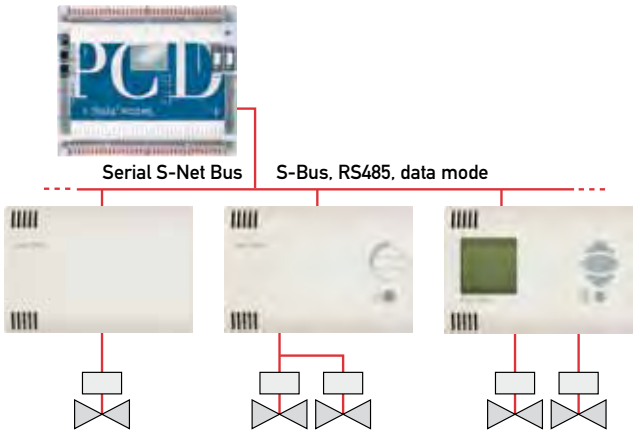
With single room control for individual comfort and energy efficiency

The PCD7.L79x single room controllers enable users to adjust the room climate to their individual needs.

Controllers have internal temperature acquisition and – depending on the version – a setpoint adjuster and occupancy button with LED indicator.

All devices from the PCD7.L79x product family can either be stand-alone controllers or they can be connected directly to the automation station as **S-Net slaves**. Various applications provide different control and operating options in **Serial S-Net**S-Net operation.

In RIO operating mode, control can be executed entirely externally in the master station. In this case, the single room controller is used simply as a hardware input/output for climate control.



The different usage and operating modes

The functionality of the single room controller is based on various different usage and operating modes. And each selectable operating mode can be assigned different set points.

Frost protection

No heating or cooling energy is routed to the room. This state is useful when a window is open. The room controller keeps the room temperature above the frost threshold of 8°C.

Non-use/standby

The room is prepared for use, but no presence has yet been registered in the room. As long as the room is not flagged as occupied by the occupancy function, the room controller maintains the room temperature within the specified limits at standby level.

Use

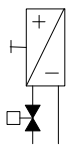
The room is in use and should be brought to a comfortable temperature. The state can be reached by pressing the presence key, addressing an external presence sensor or sending an instruction over the network.

Application overview

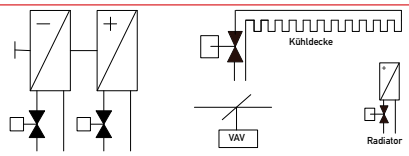
Communications friendly activation with Saia® Serial S-Net for all the usual heating/cooling groups, such as

- Radiators / heating, cooling with change over
- Radiator/cooling ceiling combinations
- Installations with variable air volume (VAV)

2-tube for heating, cooling or changeover

Application	Room controllers	Valves	Room operation
	PCD7.L790	24 V PWM	-
	PCD7.L791	24 V PWM or 24 V 3-point	-
	PCD7.L792	24 V PWM or 24 V 3-point	yes
	PCD7.L793	24 V PWM or 24 V 3-point or 0…10 V	yes
	PCD7.L794*	24 V PWM or 24 V 3-point or 0…10 V	Yes, via display

4-tube for heating, cooling or changeover

Application	Room controllers	Valves	
	PCD7.L791	24 V PWM	-
	PCD7.L792	24 V PWM	yes
	PCD7.L793	24 V PWM or 0…10 V	yes
	PCD7.L794*	24 V PWM or 0…10 V	Yes, via display

* In preparation

Product overview and technical data for the PCD7.L79x series

Type:	PCD7.L790	PCD7.L791	PCD7.L792	PCD7.L793	PCD7.L794*
Functions					
One output sequence	×				
Two output sequences		×	×	×	×
TRIAC output	×	×	×	×	×
0…10 V output				×	×
Changeover function	×	×	×	×	×
Presence key			×	×	×
Set-point setting			×	×	×
LED display			×	×	×
Display with HeaVAC function					×
S-Bus slave operation	×	×	×	×	×
NTC Internal temperature sensor	×	×	×	×	×
Additional inputs:					
Digital inputs: presence/window	2	2	2	2	2
Analogue inputs 0…10 VDC				1	1

General details

Temperature capture, internal sensor:	NTC 10 kΩ/0..40 °C
Control behaviour:	P or PI behaviour
Communications port:	Saia® S-Bus/RS485 interface/data mode/ 4800, 9600, 19200, 38400, 115200 bit/s with automatic detection on restart Bus terminal resistors to be installed on site - integrated with PCD7.L79x, software-activated
Power consumption:	1.5 W without actuator drives
TRIAC output specification:	24 VAC/800 mA max. total current for both TRIACs
TRIAC mode:	active direction can be inverted / default setting: open when currentless
Output specification 0…10 VDC:	0…10 VDC/max. load 2 mA
Housing:	Plastic, white, surface mounted, IP20 protection
Dimensions:	120 × 80 × 40 mm (W × H × D)

Maximum number of room controllers

The maximum number of room controllers that can be processed by a PCS/PCD system is dependent on the Bus cycle time and the resources used by the function objects.

Resources:	max. 600 program lines per FBox , max. 30 registers per FBox, max. 10 Flags per FBox, 1DB
Bus cycle time per controller:	approx. 15 ms
PCD cycles:	428 at 150 FBoxes measured with a PCD3.M5540

Ordering information PCD7.L79x

Type	Description compact room controller with Serial-S-Net (Saia® S-Bus)
PCD7.L790	Heating or cooling with TRIAC output, without user control
PCD7.L791	Heating or cooling with 2 TRIAC outputs, without user control
PCD7.L792	Heating or cooling with 2 triac outputs & analogue user prompts (setpoint potentiometer, occupancy button with LED acknowledgement)
PCD7.L793	Heating and cooling with 2 triac outputs and 2× 0…10 VDC outputs & analogue user prompts (setpoint potentiometer, occupancy button with LED acknowledgement)
PCD7.L794*	Heating and cooling with 2 triac outputs and 2× 0…10 VDC outputs & digital display with HeaVAC function for setpoint adjustment and occupancy user prompts
26/739 D	Manual for Saia® S-Bus

* in preparation

8.3 PCD7.L6xx series | modular room control system with Serial S-Net, LonWorks® or BACnet® MS/TP

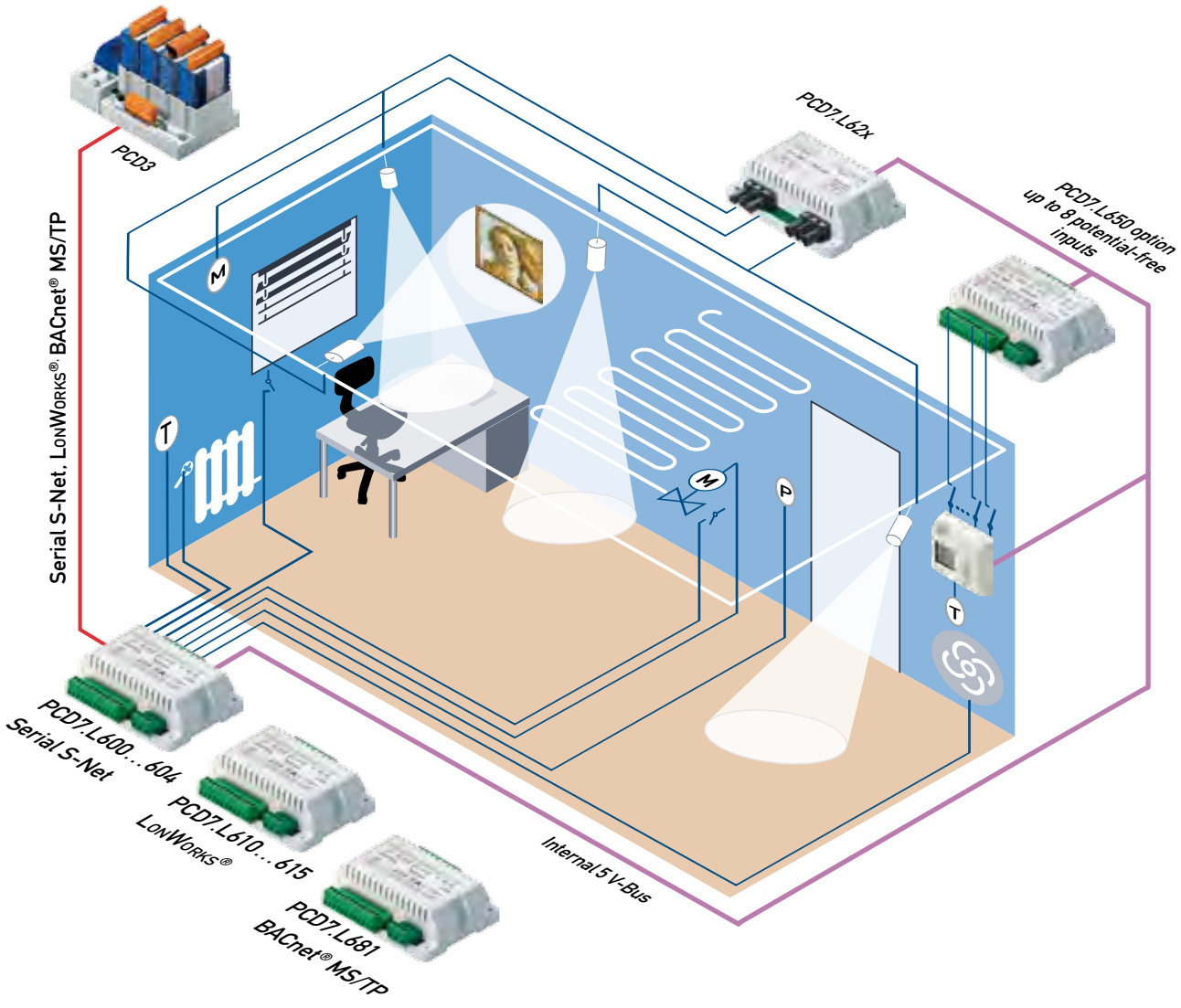
The PCD7.L6xx room controllers, based on Serial S-Net-, LonWorks® or BACnet® MS/TP networks, are mainly used for HeaVAC applications with fan-coil devices, radiator/cooled ceiling combinations or VVS systems. The extension module for light and shade allows the electrical systems to be easily integrated in to the room automation solution. Customer-specific operating concepts can be produced with the wide range of room control units. These room control units are connected to the room controller by cable, infra-red or wireless receivers.

Manufacturer-independent room control units

Operator devices with LonWorks® communication can be directly linked to LON room controllers. To connect EnOcean room components there is a receiver module that can be connected directly to the room controller via the internal RC bus. If the user control requirements should still not be met in terms of form, design or functionality, the system integrator can use the open interfaces to the automation station or analogue room control units to combine the room controller with third-party systems.

Features

- Comprehensive application range through application programs capable of parametrization
- Room controller for the communication via Serial S-Net, LonWorks® or BACnet® MS/TP
- Extension modules for the electrical items
- Large selection of analogue, digital or mobile room control units
- Combination potential of the basic controller with room control units of third-party suppliers.



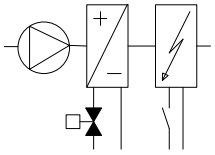
Application overview

A flexible solution for the room automation

Drives all the normal heating/cooling groups, such as
- Radiators
- Radiator/cooling ceiling combinations
- Installations with variable air volume (VAV)
- Fan-coil devices

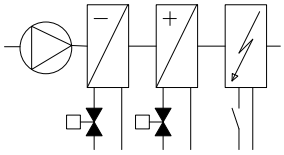
- Easy communications with Saia® Serial S-Net or LonWorks®, or BACnet
- Large selection of analogue, digital, or mobile room operator units
- Light and shade control through optional extension modules

Fan-Coil application (2-pipe) for heating, cooling or change-over



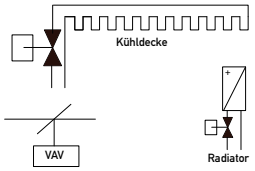
Application	Room controllers	Fan	1. Valve	2. Cooling valve	Electric heating
	PCD7.L6x0	3-step relay	230 V PWM 230 V 3-point	-	Relay to 2 kW
	PCD7.L6x1	3-step relay	230 V PWM 230 V 3-point 0…10 V	-	Relay to 2 kW
	PCD7.L6x3 PCD7.L6x4	3-step relay	24 V PWM 24 V 3-point 0…10 V	-	Relay to 2 kW

Fan-Coil application (4-pipe) for heating, cooling



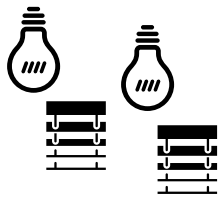
Application	Room controller	Fan	1. Heating valve	2. Cooling valve	Electric heating
	PCD7.L6x0	3-step relay	230 V PWM	230 V PWM	Relay to 2 kW
	PCD7.L6x1	3-step relay	230 V PWM 0…10 V	230 V PWM 0…10 V	Relay to 2 kW
	PCD7.L6x3 PCD7.L6x4	3-step relay	24 V PWM 0…10 V	24 V PWM 0…10 V	Relay to 2 kW

VAV, cooled ceiling and radiator applications for heating and cooling



Application	Room controller	Fan	1. Heating valve	2. Cooling valve	Electric heating
	PCD7.L6x0	3-step relay	230 V PWM	230 V PWM	Relay to 2 kW
	PCD7.L6x1	3-step relay	230 V PWM 0…10 V	230 V PWM 0…10 V	Relay to 2 kW
	PCD7.L6x3 PCD7.L6x4	3-step relay	24 V PWM 0…10 V	24 V PWM 0…10 V	Relay to 2 kW

Light and shade



Application	Expansion	Light	Shade
	PCD7.L620	2 rows of windows	-
	PCD7.L621	2 rows of windows	1×up/down, 230 VAC
	PCD7.L622	-	3×up/down, 230 VAC
	PCD7.L623	-	2×up/down, 24 VDC

Operating modes

The 4 operating modes are set depending on the presence detector, window contact, and the specifications of the communications master.

Comfort	Standard, default operating mode for an occupied room.
Standby	Reduced operating mode when the premises are temporarily unoccupied.
Reduced	Reduced operating mode when the premises are unoccupied for a long period of time.
Frost protection	The heating control is activated when the temperature drops below 8 °C (e.g. when a window is open)

Commissioning

When room controllers are used in a Saia® S-Bus network, configuration is either by the Saia® PCS/PCD master, the Saia® PG5 programming tool, or dedicated PC software. Practical function blocks (FBoxes) simplify commissioning.

When room controllers are used in a LON network, configuration is facilitated by provision of a LonWorks® tool such as NL220 or LonMaker®.

Room controllers match the user profile for the Fan Coil Unit Object (8020) from LonMark®.

Product overview:
Room controllers

Serial S-Net

PCD7.L600

PCD7.L601

PCD7.L603

PCD7.L604

LonWorks®

PCD7.L610

PCD7.L611

PCD7.L614

PCD7.L615

BACnet® MS/TP

PCD7.L681

Analogue inputs	1 1 —	Temperature sensor NTCA 010-040, Set-point potentiometer 10 kΩ | linear, 0…10 V	2 — —
Digital inputs	Main contact (e.g. window contact) Auxiliary contact selectable by user (e.g. presence, condensation, change-over…)		2 2
Analogue outputs	—	2×0…10 VDC	2
Digital outputs	2×Triac 230 VAC (10 mA…800 mA)	2×Triac 24 VAC (10 mA…800 mA)	4×Triac 230 VAC (10 mA…800 mA)
Relay outputs	3-step fan (4 connections) 230 VAC (3 A)		—
	Relays for electric heating: max. output 2 kW		2
Voltage supply	230 VAC with electronic fuse	24 VAC with electr. fuse	230 VAC with electr. fuse
Current consumption	approx. 100 mA		
Protection type	IP 20		
Dimensions	132 × 95 × 45 mm		
Temperature range	5…45 °C, 80% RH		
		The max. output capacity is 7 VA. For bigger valve loads, use the PCD7.L603	

Communication with Serial S-Net

Interface	RS485, max. cable length 1200 m, 128 .L60x room controllers on one PCD Master, without repeater*
Transmission rate	4800, 9600, 19200, 38400, 115200 bit/s with automatic detection after restart
Protocol	Saia® S-Bus data mode (slave)

Addressing at commissioning time via S-Net or an external manual control device.
Bus terminal resistors to be installed on site - integrated with L600, L601, L603 and L604, software-activated

Communication with LonWorks®

Interface	FTT 10a
Transmission rate	78 kBit/s
Topology	Free topology max. 500 m; bus topology max. 2700 m
Number of LON nodes	max. 64 per segment, over 32000 in a domain/according to LonMark® 8020 profile

Communication with BACnet® MS/TP

Interface	RS485, max. cable length 1200 m, 128 .L68x room controllers, without repeater*
Transmission rate	9600, 19200, 38400, 78600 bit/s - factory setting 38400 bit/s
Protocol	BACnet® MS/TP

* In mixed operation with RS485 standard transceivers, note the minimum impedance

Room control units

Analogue room control units



	PCD7.L630	PCD7.L631	PCD7.L632
Temperature sensor	NTCA 010-040	NTCA 010-040	NTCA 010-040
Setpoint adjuster		Poti 10 kΩ | linear	Poti 10 kΩ | linear
Presence sensor			Contact against GND
Acknowledgement			LED

Digital room control units




	PCD7.L640	PCD7.L641	PCD7.L642	PCD7.L644
Temperature sensor	×	×	×	×
Setpoint adjuster	×	×	×	×
Presence sensor		×	×	×
Acknowledgement		×	×	×
Fan controller			×	×
Display menu for:				
HeaVAC functions				parameters can be set
Light and shade				parameters can be set

Operator unit

Mobile room operator units with displays and function keys



PCD7.L660 PCD7.L662 PCD7.L664

Recipient




	PCD7.L661	PCD7.L663	PCD7.L665	PCD7.L666
Wall holder for operator unit	Included for fixed mounting	Included for fixed mounting	Optional for mobile Montage	Optional for mobile Montage
Communication | IR (infrared)	unidirectional		×	×
Communication | Radio		bidirectional		×
Temperature sensor	×	×		
Setpoint adjustment	×	×	×	×
Occupancy controller	×	×	Movement sensor	Movement sensor
Fan controller	×	×	×	×
Light and shade	×	×	×	×
Brightness sensor			×	×
Power supply, operator unit	2 × AAA 1.5 V micro	2 × AAA 1.5 V micro		
Temperature range	+5…45 °C, 80 % r.H.	+5…45 °C, 80 % r.H.	+5…45 °C, 80 % r.H.	+5…45 °C, 80 % r.H.

Light and shade extension modules

Light and shade modules as room controller extensions

Expansion modules of the same type connected to a given room controller cannot be controlled separately

	PCD7.L620	PCD7.L621	PCD7.L622	PCD7.L623	PCD7.L650
Light outputs, 1 relay per output	2×230 VAC, 5 A *	2×230 VAC, 5 A *			—
Motor outputs, 2 relays per output		1×230 VAC, 5 A *	3×230 VAC, 5 A *	2×24 VAC, 650 mA	—
Voltage supply	230 VAC	230 VAC	230 VAC	230 VAC	via RC-Bus
Max. current draw via supply terminal	10 A	10 A	10 A	650 mA	—
Potential-free contact inputs	—	—	—	—	8
RC bus activation	■	■	■	■	■
Protection type			IP 20		
Dimensions			132×95× 45 mm		
Temperature range			5…45 °C, 80% RH		

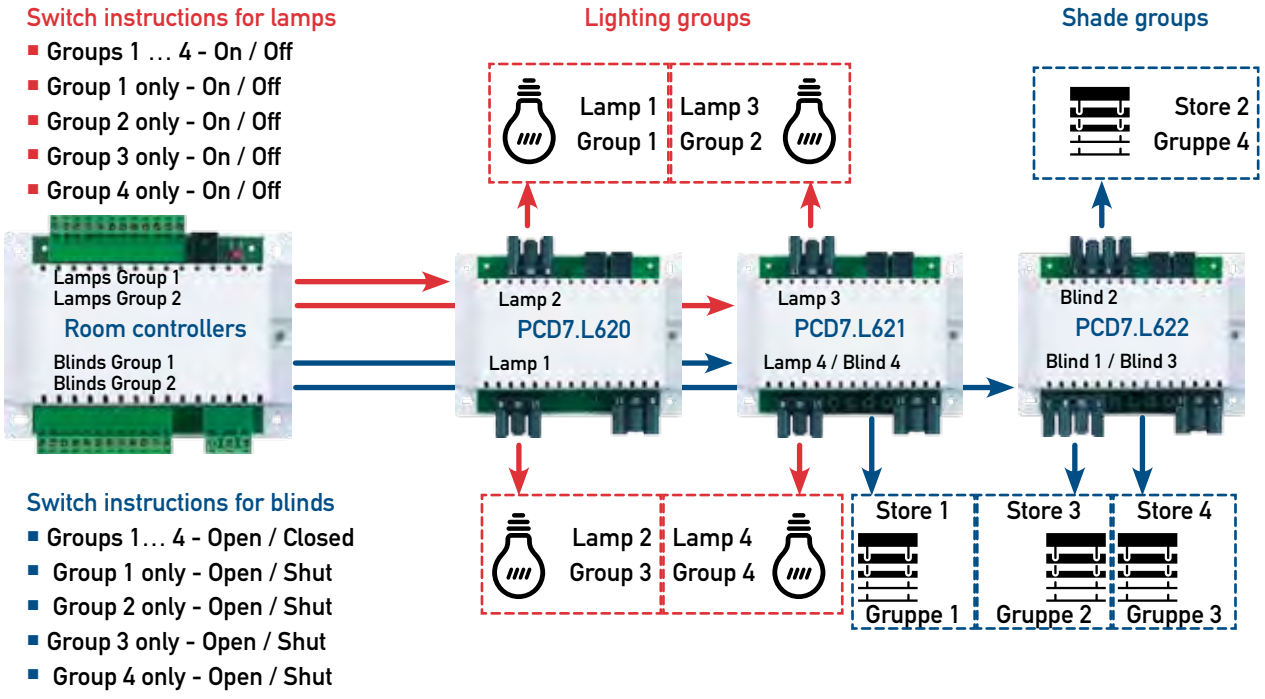
* 5 A at AC1 | 3 A at AC3

Light and shade in groups

Light and shade extension modules are controlled using group instructions. For each controller, four* independent light and shade groups are available. Each output can be assigned to one or more groups. Light groups can be switched on/off either together or separately. Equally, shade groups can drive the blinds up or down, independently of each other.

* with PCD7.L644, PCD7.L660 and PCD7.L662

Example of module output assignment to group



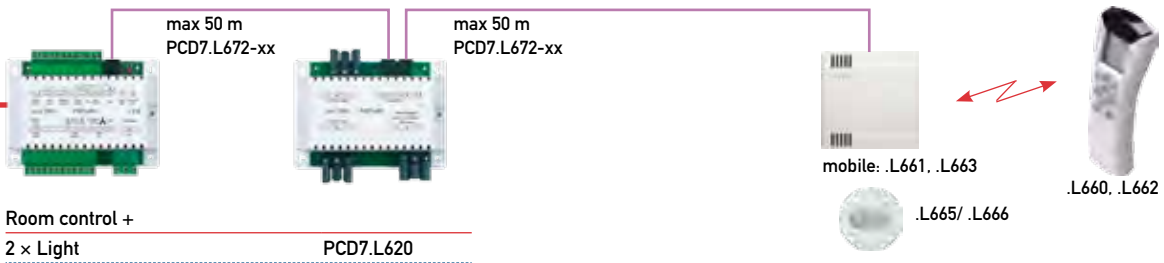
System structure with extension for light and shade

- Room controllers: Base types PCD7.L600, PCD7.L601, PCD7.L603, PCD7.L604 and PCD7.L611
- Room control units and extension modules are connected to the room controller as required.
  (Extension modules can only be operated in connection with a room controller.)
- No more than 4 groups can be configured per light and shade functions.

3 different ways of controlling expansion modules:

S-Net, BACnet® MS/TP, LonWorks®

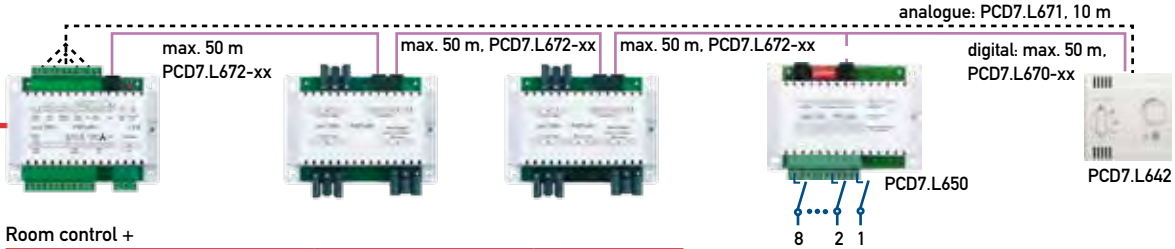
Room controller with extension module, input module and PCD7.L66x mobile room control unit



Room control +	
2 × Light	PCD7.L620
2 × Light 1 × Window blind drive	PCD7.L621
3 × Window blind drives	PCD7.L622
2 × Window blind drives 24 VDC	PCD7.L623

Room controller with two extension modules, an input module and digital or analogue room control unit

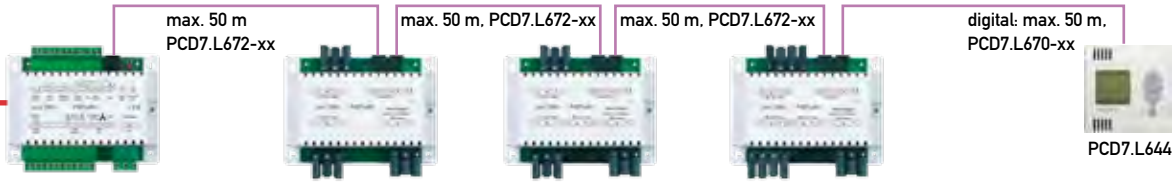
Expansion modules of the same type connected to a given room controller cannot be controlled separately



Room control +		
4 × Light 1 × Window blind drive	PCD7.L620	PCD7.L621
2 × Light 3 × Window blind drives	PCD7.L620	PCD7.L622
2 × Light 4 × Window blind drives	PCD7.L621	PCD7.L622
2 × Light 2 × Window blind drives 24 VDC	PCD7.L620	PCD7.L623

Room controller with three extension modules and PCD7.L644 digital room control unit

Expansion modules of the same type connected to a given room controller cannot be controlled separately



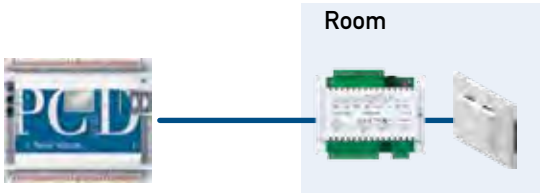
Room control +			
4 × Light 4 × Window blind drives	PCD7.L620	PCD7.L621	PCD7.L622

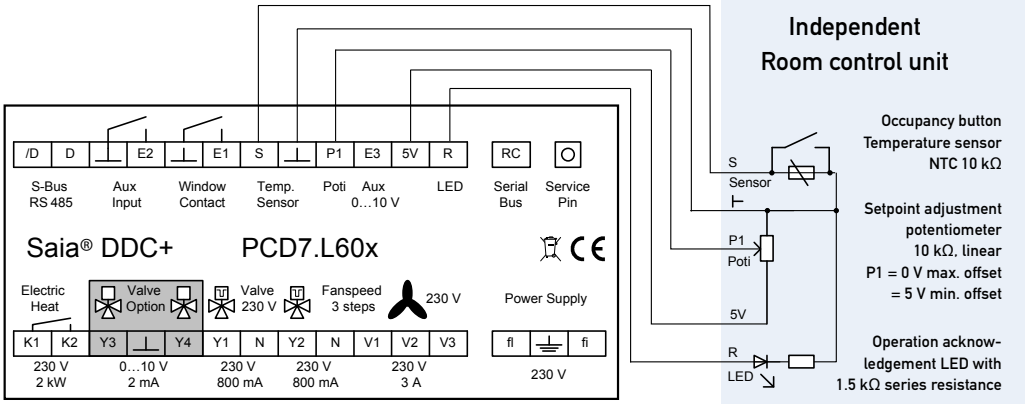
Connecting independent room control units

Analogue room control units

Connection of an independent analogue room control unit:

Temperature sensor	NTC 10 kΩ
Presence sensor	Potential-free contact
Setpoint adjustment	Potentiometer 10 kΩ linear
Operation acknowledgement	Active signal 5 VDC, max. 2 mA e.g. for control of a LED with 1,5 kΩ series resistance
Operation mode	«Unused» or «Standby»: 0 V, «Comfort»: 5 V.

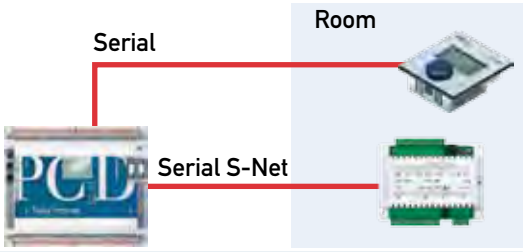




Communicative room control units

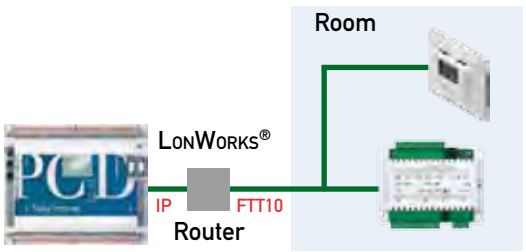
Direct connection of room control units via a serial interface*

System configuration: PCD system with Serial S-Net interface



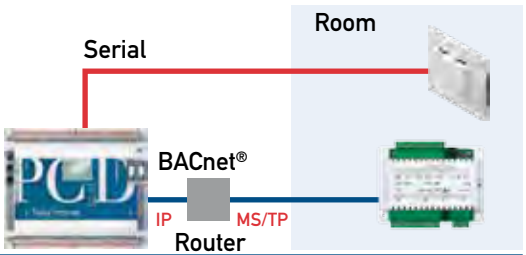
Direct connection of room control units via LonWorks®

System requirements:
Room controller with LonWorks® interface.
For additional connection to the automation station, a PCS1, PCD1|PCD2 with LonWorks® interface or
a PCD2.M55xx with an external FTT10/IP router or
a PCD3 with an external FTT10/IP router



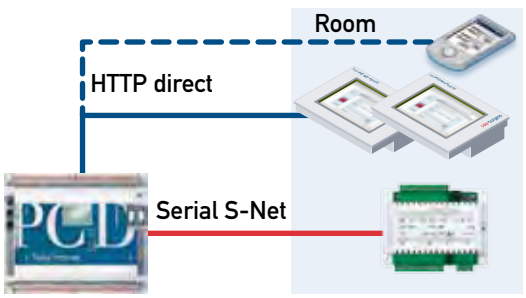
Direct connection of room control units via a serial interface *

System requirements:
Room controller with e.g. BACnet® MS/TP interface.
For additional connection to the automation station, a PCD with BACnet® option incl. external BACnet® IP/MSTP router is required



Individual solutions via web-based room control units

System requirements:
Room controller with communication to the PCD via S-Net, LonWorks® or BACnet®.
PCD with corresponding port and interface to connect
the required control units, e.g. web panel, PCD, home-automation system, etc.



* effective S-Bus communication cycle time needed

Ordering information for PCD7.L6xx

Room controllers

	Type	Description	
Serial S-Net	PCD7.L600	230 VAC room controller with 2 Triac outputs, relay for electric heating and 3-step fan control	
	PCD7.L601	230 VAC room controller with 2 Triac outputs, 2 0…10 V outputs, relays for electric heating and 3-step fan control	
	PCD7.L603	24 VAC room controller with 2 Triac outputs, 2 0…10 V outputs, relays for electric heating with 3-step fan control (230 VAC)	
	PCD7.L604	Room controller 230 VAC with 2 Triac outputs, 2 outputs 0…10 V, incl. 24 VAC (7 W) supply, relay for electric heater and 3-stage fan speed control	
LonWorks®	PCD7.L610	230 VAC room controller with 2 Triac outputs, relay for electric heating and 3-step fan control	
	PCD7.L611	230 VAC room controller with 2 Triac outputs, 2 0…10 V outputs, Relays for electric heating and 3-step fan control	
	PCD7.L614	Room controller 230 VAC with 2 Triac outputs, 2 outputs 0…10 V, incl. 24 VAC (7 W) supply, relay for electric heater and 3-stage fan speed control	
	PCD7.L615	Double room controller 230AC for radiator/cooling ceiling combinations and VAV applications, 4 triac outputs, 2 × 0…10 V outputs, 2 relays for electric heater and autonomous interfaces for digital room control units	
	PCD7.L616 *	Room controller, 230 VAC, to control air quality with 2 TRIAC outputs, 2 0...10 V outputs, 1 relay for electric heating, 3-stage fan control and 1 interface for a digital room control unit	
BAC-net®	PCD7.L681 *	Room controller 230 VAC with 2 Triac outputs, 2 outputs0…10 VDC, relay for electric heater and 3-stage fan speed control	

Extension modules for light and shade

PCD7.L620	Extension module to control 2 light bars	
PCD7.L621	Extension module to control 2 light bars and 1 blind motor	
PCD7.L622	Extension module to control 3 blind motors	
PCD7.L623	Extension module to control 2 blind motors 24 VAC with blade movement	

Room control units

Analogue	PCD7.L630	Temperature sensor	
	PCD7.L631	Temperature sensor and set-point setting	
	PCD7.L632	Temperature sensor, set-point setting, presence sensor and LED	
Digital	PCD7.L640	Temperature sensor and set-point setting	
	PCD7.L641	Temperature sensor, set-point setting, presence sensor and LED	
	PCD7.L642	Temperature sensor, set-point setting, presence sensor, LED and fan control	
	PCD7.L644	Temperature sensor, function keys and LCD display for HeaVAC and light and shade functions	
Remote control	PCD7.L660	IR remote control with LCD display, temperature sensor and wall mounting for fixed use	
	PCD7.L661	IR receiver	
	PCD7.L662	Wireless remote control with LCD display, temperature sensor and wall mounting for fixed use	
	PCD7.L663	Wireless receiver	
	PCD7.L664	Optional wall mounting for mobile use	
	PCD7.L665	IR (infra-red) receiver with multi-sensor for temperature, presence and brightness for PCD7.L660	
	PCD7.L666	IR and wireless receiver with multi-sensor for temperature, presence and brightness for PCD7.L660/ L662	

Expansion modules to connect third-party devices

PCD7.L650	Expansion module to connect up to 8 external contacts for light&shade	
PCD7.L651	Wireless receiver to connect EnOcean room control devices	

Accessories

PCD7.L670	Connecting cable for room control units RJ9/RJ9, 10 m
PCD7.L670-30	Connecting cable for room control units RJ9/RJ9, 30 m
PCD7.L670-50	Connecting cable for room control units RJ9/RJ9, 50 m
PCD7.L671	Connecting cable for room control units RJRJ11/cord, 10 m
PCD7.L672	Connecting cable for room controller/extension modules RJ11/RJ9, 0.3 m
PCD7.L672-10	Connecting cable for room controller/extension modules RJ11/RJ9, 10 m
PCD7.L672-50	Connecting cable for room controller/extension modules RJ11/RJ9, 50 m
PCD7.L673	Set of connecting cables for digital room control units, 3 × RJ9 and 1 × RJ11, length 11 m
PCD7.L679	Manual control unit for room controller configuration

* in preparation

8.4 Room control systems with individual user prompting

Application examples

Communicative room control units

for the local user control via bus-linked operation panel (PCD7.290 incl. temperature and humidity sensor) as well as decentralized input/output systems for the control and inclusion of all necessary units.

Decentralized intelligent IP65 modules

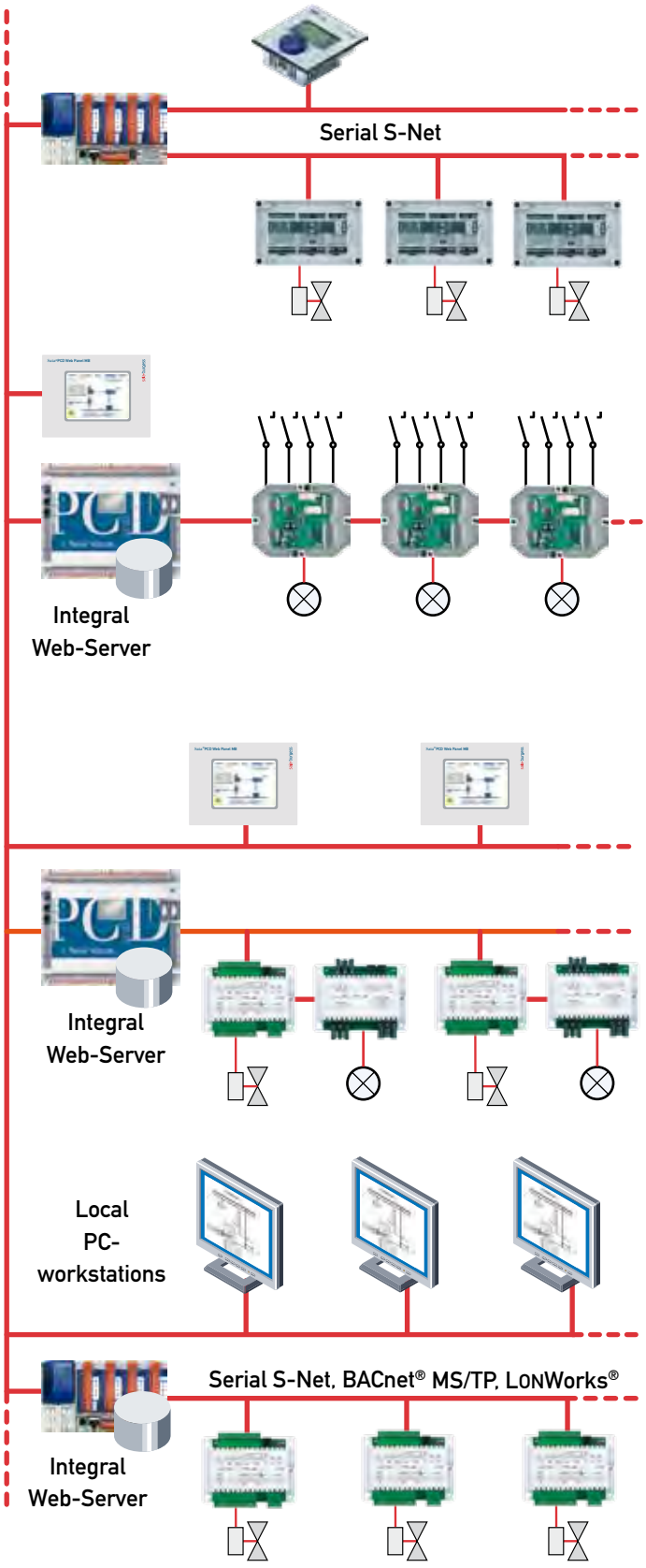
for the control of light and shade applications. To optimize the response time, the modules operate in a local mode for direct output circuit.
The operation takes place via a web-enabled operating panel, which uploads and displays the pages of the manual directly from the automation station

Integral room automation system

PCD7.L6xx for HeaVAC-type applications as well as the integration of electrical items. To enable the user control in fulfilling the high demands, web-enabled operating panels are used to execute the higher level functions like the setting of timer programs and the on-site operation

Local user control of PC workstation

The illustrations in the manual are uploaded and displayed directly from the password-protected web server integrated in the automation station. The control of the HeaVAC or electrical unit is carried out via network-linked room automation systems.

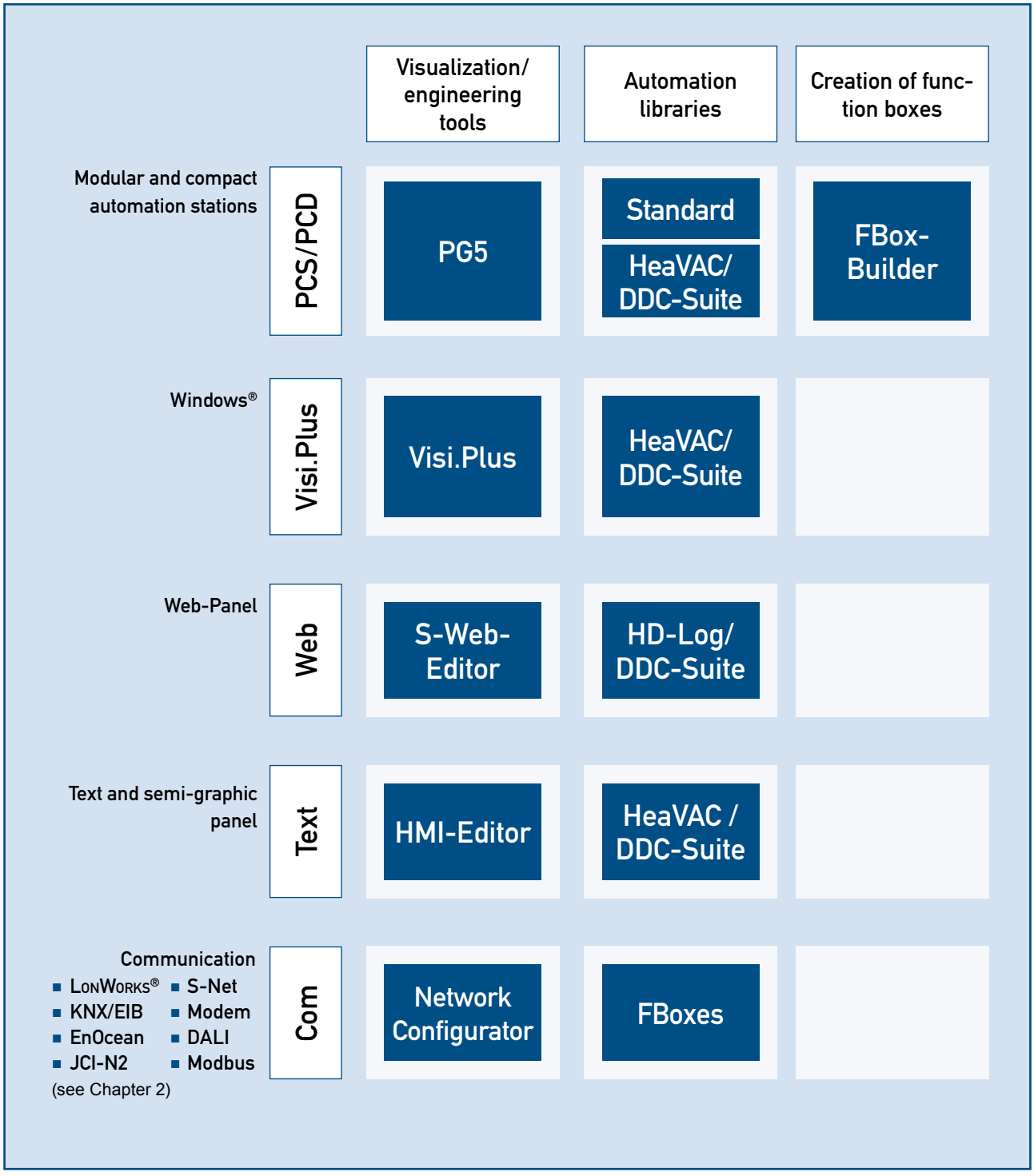


9 Software: From configuring to programming

9.1 System components: Software tools

For programming, configuring, commissioning and monitoring all of the Saia® automation technology.

- Cost-optimized configuration, visualization and commissioning of standard installations with Compact-Easy
- Fast, convenient engineering through prefabricated libraries for the automation and management level with DDC-Suite
- Tailor-made engineering with Saia® PG5 Controls-Suite
- Know-how transfer with Saia® FBox-Builder
- Web applications made easy with Saia® S-Web



9.2 Saia® PG5 controls suite: Engineering and programming

Advantages of the PG5 programming tool

- Program portability: PG5 programs can run on all Saia® PCD/PCS platforms.
- Program organization by files (containing several program blocks) simplifies the shared use of program files between several Saia® PCD/PCS-PCS controllers.
- Programming and debugging environments united in each program editor.
- Extensive function object (FBox) libraries
- Powerful instruction set supported by a host of assembler directives.

Properties

- Project Manager administers complex installations of networked DDC systems, including displays and documentation.
- Integrated programming environments :
  - Fupla (function block diagram)
  - S-Edit (instruction list IL) AWL)
  - Graftec (sequential function chart)
- Integrated network editors for Saia® S-Net, Profibus-DP, LonWorks®.
- Symbol Manager administers all local, global and network symbols or symbol groups. Automatic address allocation largely dispenses with the need for fixed addressing.
- Online functions for commissioning and error detection via USB, Ethernet-TCP/IP, Modem etc.
- Extensive additional libraries, like HeaVAC, Modem, DALI, EnOcean and EIB functions, broaden the scope of PG5 functions.

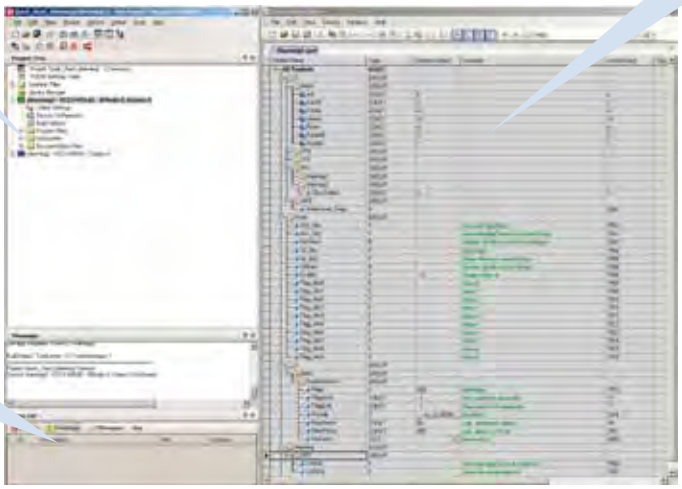
Overview of project Tree ...

This is similar to Windows Explorer in both appearance and operation. The Project Tree window allows direct access to all DDC systems 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 stations. Parts of the program that are used in common are located in a Common Files folder. Changes in one station are immediately effective in all associated stations.

... and Project Manager

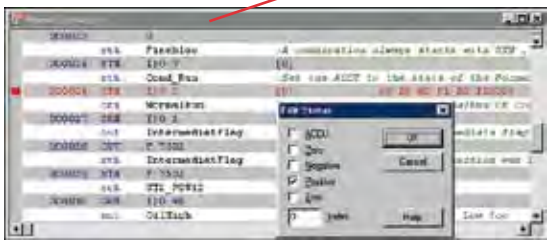
At all times the project tree and Project Manager windows provide a complete overview, even of complex projects with networked DDC systems.

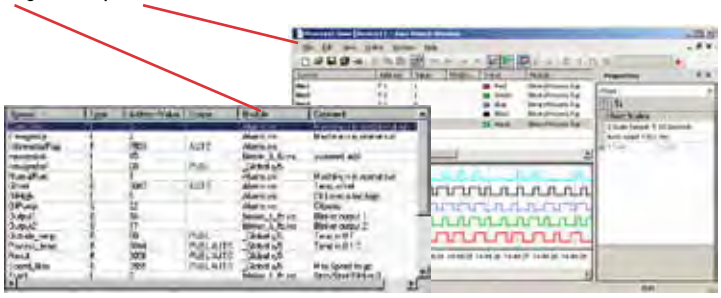


Message Window

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.

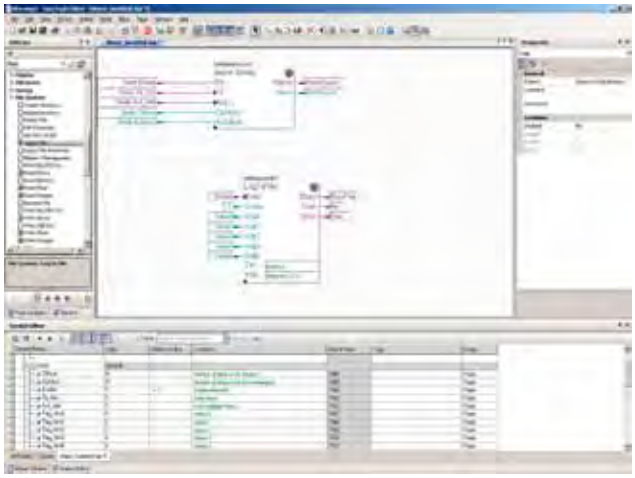
The PG5 package also contains additional modules - such as online debugger, cross-reference data window, etc. - that offer users easier oversight and operation.





Program management, symbol management and device configuration

Fupla editor



Fupla is Saia®'s own function block diagram editor. It differs in many respects from graphical interfaces:

- One Fupla file can contain several program blocks. This means that one file can encompass an entire building function. In symbolic programming, each program block is given an individual symbol name. This is used for precise identification of program parts.
- 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.
- Graphical functions (FBoxes) not only have inputs and outputs, but also parameter windows for configuring and online modification.

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 various editors are connected by the Symbol Manager. When a program uses new symbols, the symbol editor takes them up directly and makes them available to all program editors.
- The import/export function allows the reuse of pre-defined I/O lists in electrical diagrams and process visualization tools like ViSi.Plus.
- Auto-allocation largely dispenses with the need for fixed addressing.
- Each symbol can have a definition up to 80 characters long.
- Symbols can be grouped together. All the symbols required for a function form one group. This makes it easier to use functions and recognize symbols in the program, and also gives a clearer overview in the Symbol Manager.

Device Configurator

In the Device Configurator, all the parameters of a chosen automation system and its I/O modules are set and configured.

- Overview of all available options and modules
- All parameters and modules can be viewed at a glance and printed out as system documentation
- I/O label editor for PCD3 and PCD2.M5_ I/O modules
- Calculation of power consumption

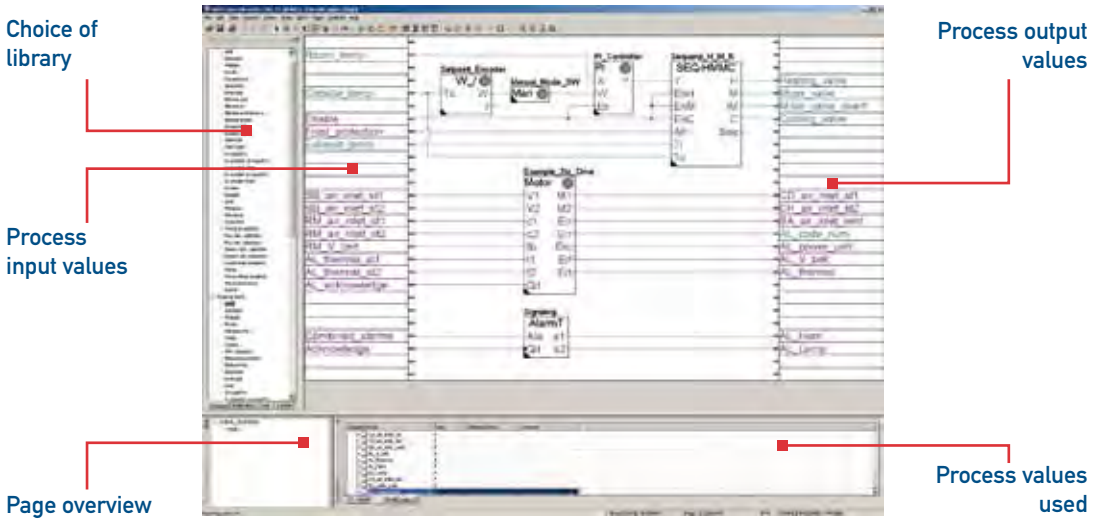
Network configuration

Multiple networks such as Saia® S-Net, Profibus-DP oder LonWorks® can be set up and configured on the screen.

9.3 Application libraries for the PG5 Fupla-Editor

- Programming is made much easier with pre-programmed function blocks (FBoxes) for all standard functions.
- Creation of complex user programs by simply positioning and linking of function blocks. This does not require extensive programming knowledge.
- Detailed context sensitive FBox information, clear parameter descriptions and graphical presentation in the Fupla editor make user programs easy to read and understand.
- On-line display of process values and parameter adjustment makes commissioning considerably easier and saves maintenance costs.

Structure



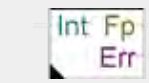
Features of the libraries

- Clearly set out in a tree structure makes FBox selection very easy
- Parameters are conveniently entered via adjust windows in the Fupla editor, without losing program clarity
- Obvious differentiation between data types through use of different colours
- Import of object lists to the HMI editor and Web Editor for Saia® control panels. This allows process parameters to be displayed and modified on a control terminal.

Clear differentiation of data types

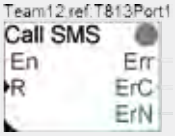
Each data type is identified by a different colour. This makes programs easier to read.

Binary data	purple
Integer data [1]	Blue
Floating-point data	Yellow
Texts (TX) and data blocks (DB)	Green



Text data is inserted in text fields.

Inputs triggered by flanks are marked with a wedge.



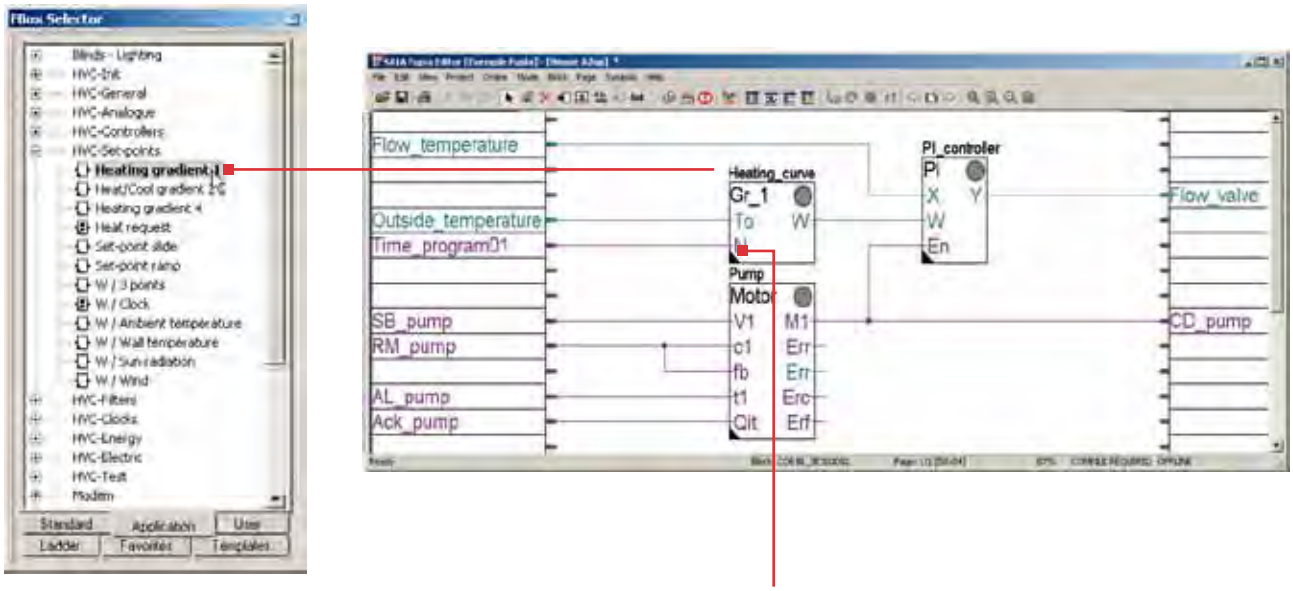
Static input
Flank-triggered input

[1] These values are used with a resolution of 1/10

Function blocks (FBoxes)

Clear grouping into families

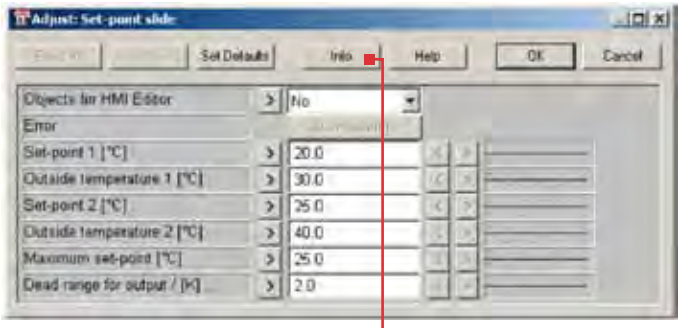
The libraries are in arranged function object families. Use drag-and-drop to position a selected function block in the program.



Parameter windows with online view

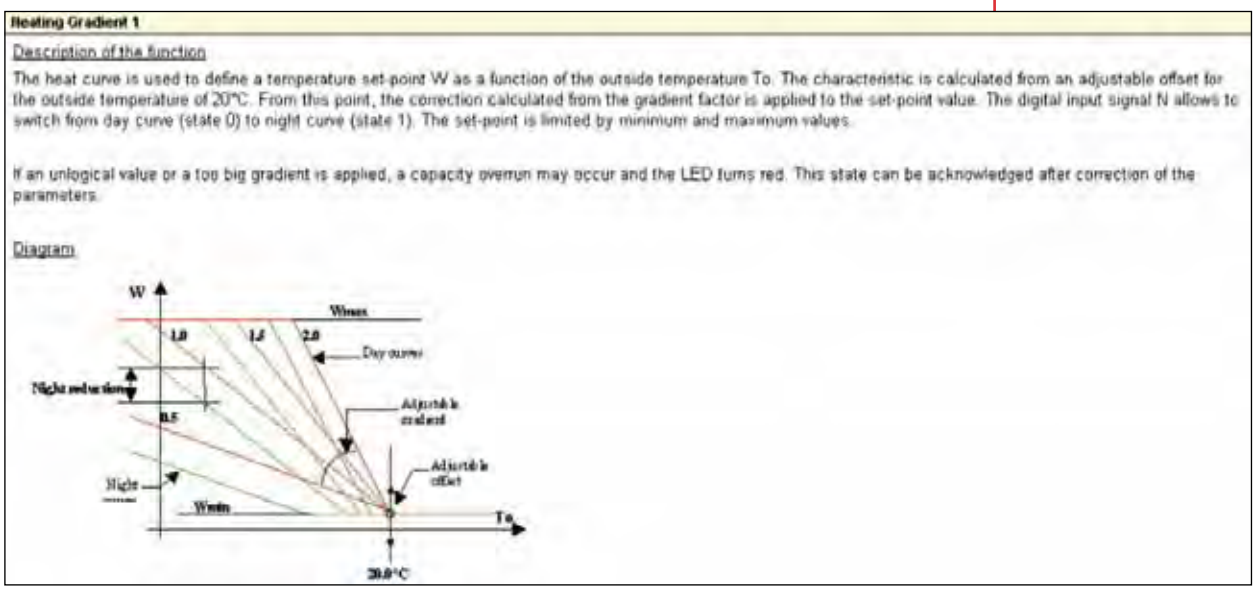
To avoid overloading the display with unnecessary lines, function blocks marked with a triangle have been provided with an «Adjust window».

Information on the installation is displayed online in the settings window. Parameters, e.g. for time-switching functions or controller settings can be modified directly by the user.



Info

Under **Info** users will find detailed information about inputs, outputs, parameters etc. of each function block (example: Heating Gradient 1).



9.4 Application library for building automation

For speed and comfort in engineering the technical systems of buildings, consistency is required in the automation objects used at the functional, control and management levels.

The two automation libraries «HeaVAC» and «DDC-Suite» form the basis of object structure. These libraries are made up of ready-made function objects called FBoxes (e.g. representing a fan motor or reheater) so that user programs can be created and their parameters set individually.

Control objects for Saia®Text-Panels, Saia®Web-Panels and the Saia® management system coordinate with the function library and can be used to create control concepts that meet customer requirements.

Consistency among all available objects ensures program quality in installations and minimizes the costs of program writing and service.

Features

- Automation objects that suit HeaVAC-specific installations
- Function objects for creating the user program
- Control objects that coordinate with the Saia® HMI Editor for text-oriented control panels
- Graphics and control objects that coordinate with the Saia® Web-Editor for web-based control panels
- Graphics and control objects that coordinate with the Saia® Visi-Plus management system
- Consistency throughout windows used to set and adjust parameters of all objects.
- Easy symbol and resource assignment with group addressing
- Complete system templates for the commonest applications, e.g. heating circuit, boiler, hot water tank, ventilation systems
- All templates are adaptable to individual use
- Web-Panel templates available with 2D or 3D visual effects
- Considerable reduction of programming time for system program and entire user prompting

Function library

for Saia® PCD/Saia® PCS systems

Comprehensive HeaVAC and DDC-Suite libraries provide system integrators with a basis on which to build fast, efficient, customer-specific system programs. Ready-made system components are encapsulated as function objects in these libraries. Their parameters can be set and adjusted with the appropriate configuration and adjustment windows.

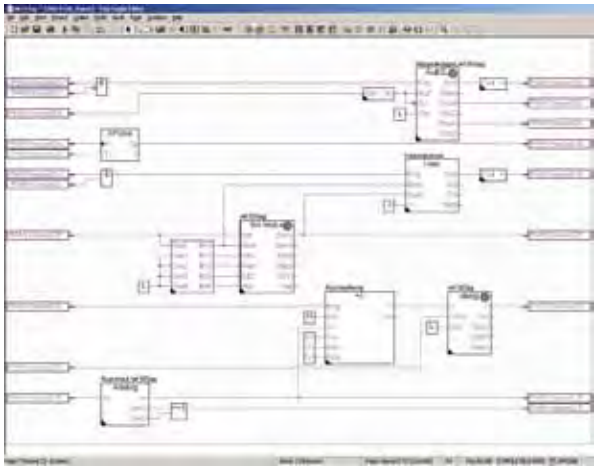
Such objects as, for example, a fan motor will include all necessary functions: enable; operating status; service and error messages; and the capture of switching cycles and running times. Through group addressing, fast error-free links can be made to user prompting and visualization.

To simplify the construction of complete sections of an installation, the library also includes system templates, e.g. for the heating circuit, water heater, boiler and ventilation systems.

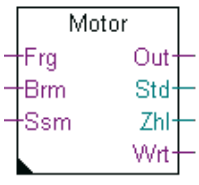
DDC-Suite features

This library differs from the HeaVAC library in the strictness of its attention to a high level of integration for individual, HeaVAC-specific functions. Moreover, from version 2.0 it has also been possible to add: the automatic set-up of offline trend tracking, generation of Web-Panel-compatible alarm entry, automatic construction of BACnet objects, and automatic editing of customer documentation.

Control templates



Function box for motor control with parameter window



Text-Panel library

for user prompting on text-oriented control panels

System integrators can use this library to build customer-specific user prompting for Saia®Text-Panels.

These control objects can be used to adjust all necessary parameters, such as set-points and time-switch functions, in accordance with the technical realities of an installation.

All object templates are also supplied in source code. Users can adapt the structure and text of templates to the customer's needs, as required.

Control object for text-oriented control panel

Web-Panel library

for user prompting on web-based control panels

For perfect adaptation of the comprehensive Saia® Web-Panel range to the requirements of a building's technical systems, a library of graphics and control objects has been developed with a regard to demands for engineering efficiency.

Since all control objects have a parameter structure that matches the function library, very fast linking of automation objects or entire automation templates is possible through group addresses in the user program.

The control objects comprise the graphical symbol in 2D or 3D format and a corresponding adjust window, through which object parameters are configured.

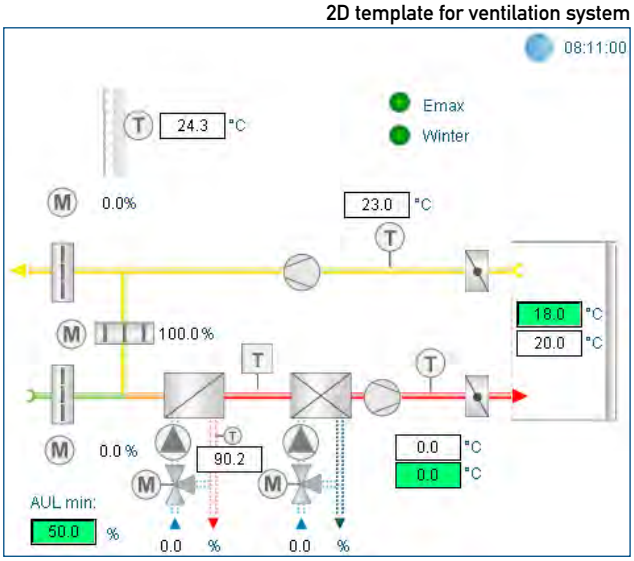
Alongside the control objects themselves, the graphically oriented Saia® Web-Editor configuration software also includes all the control templates that users find in the function library.

Menu : Automation templates

Menu : Language selection

Menu : Parameterisation and trend display

2D template for ventilation system

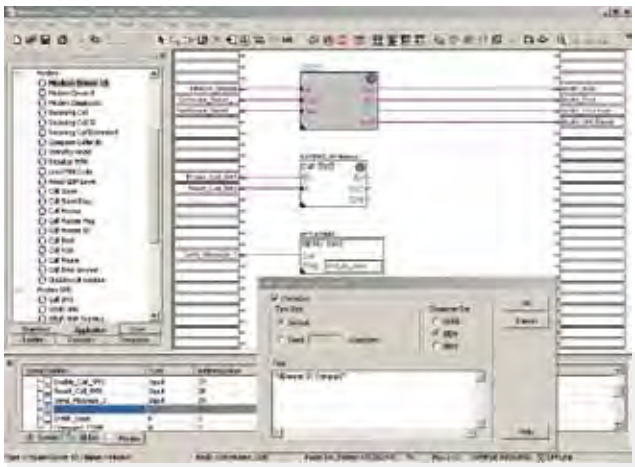


Visi.Plus library See Chapter 4.1

9.5 Application Library | Modem Communications

Modern telecommunication, when combined with systems, not only allows cost savings on commissioning and maintenance, but at the same time increases installation safety, availability and profitability. Examples of how this can be achieved include:

- remote support during commissioning.
- Event or time-driven information and requests to operations and support staff
- Fault clearance with remote diagnostics
- process optimization through software updates and/or the updating of process parameters.
- Efficient preventive maintenance by qualified specialists, giving lower repair costs
- remote user support directly on-screen and close to operations.



Software Libraries

Modem Basic

Initialization and diagnosis, user profiles, list of call numbers, password protection, establishing connection, event or time-controlled data transmission and reception between PCD systems and foreign devices (e.g. building management system), **Serial S-Net**-network via modem connections.

Modem Pager

Event or time-controlled transmission of single or multiple messages by pager. TAP and various country-specific protocols are supported.

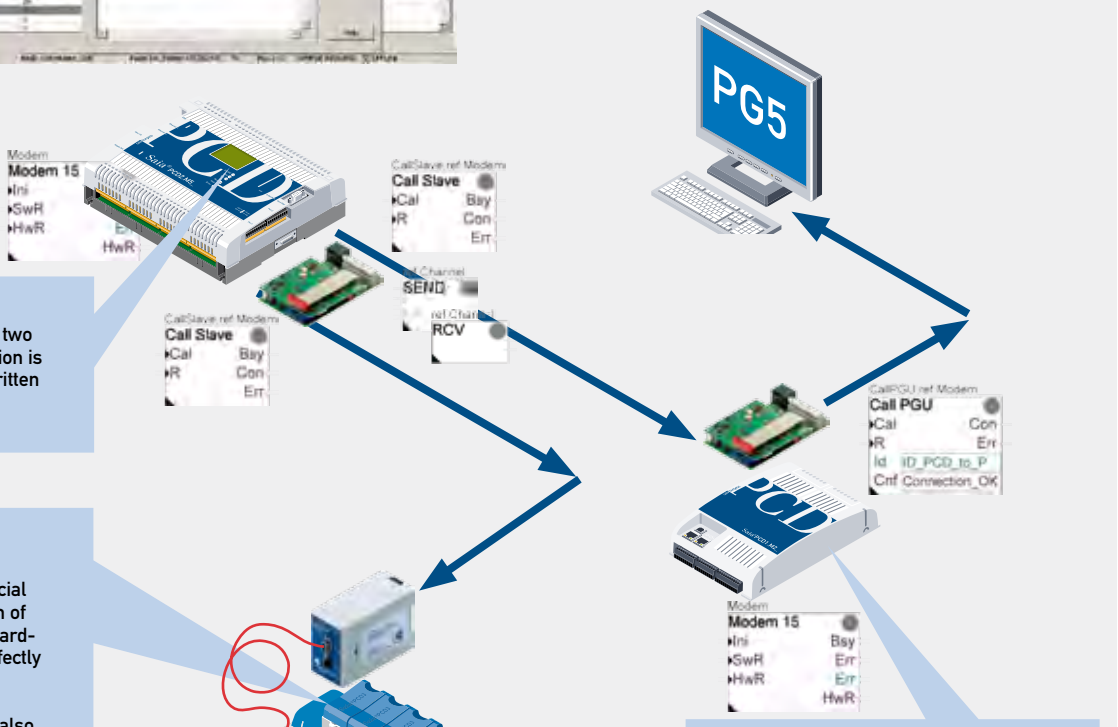
Modem SMS

Event or time-driven transmission of single or multiple SMS short messages. UCP and TAP are supported. Reception of SMS messages→ SMS for control of systems.

Modem DTMF

Supports reception of DTMF signals for control commands via telephone = control of systems by DTMF signals.

You will get further information from Technical Information 26/368.



Master station

The master station calls one of two slave stations. When a connection is present, data can be read or written with send and receive FBoxes.

Slave station 1

The slave station needs no special modem program. Configuration of the modem connection in the hardware settings in the PG5 is perfectly adequate.

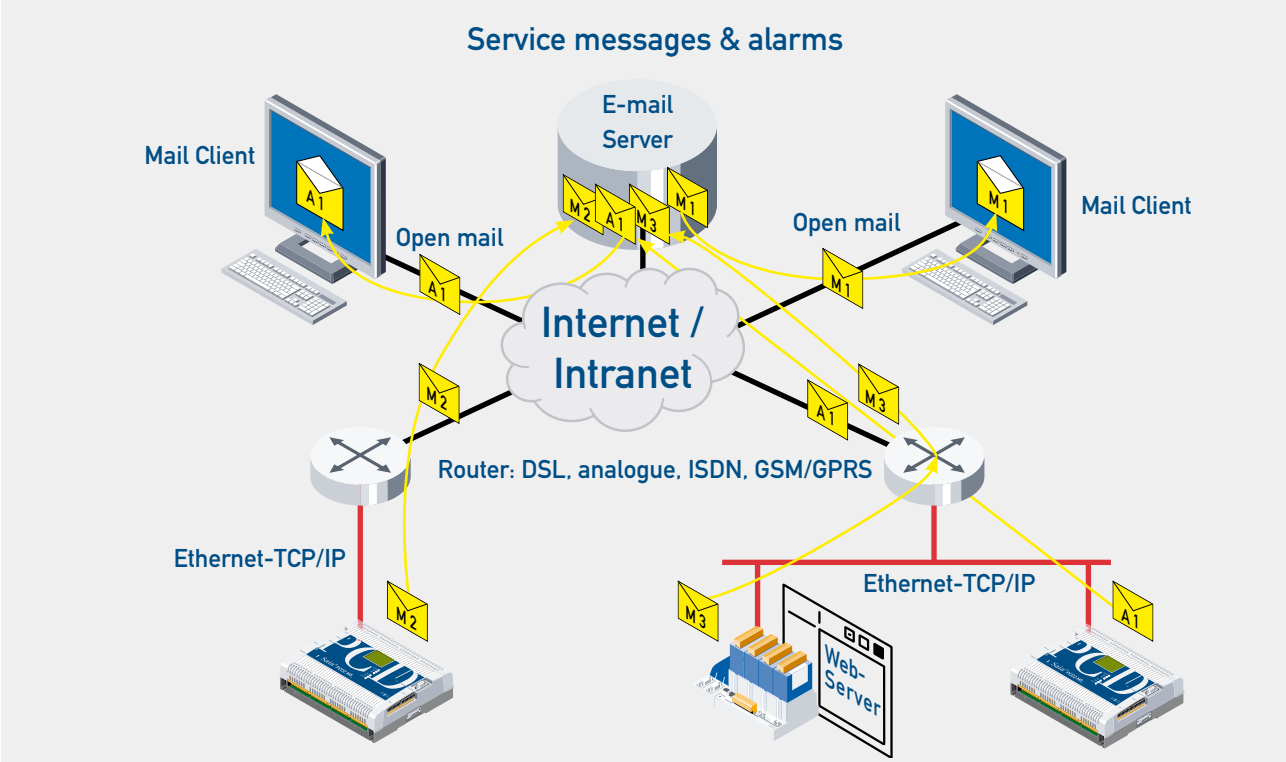
If the slave station's modem is also used for other functions, such as SMS or DTMF, the Modem Driver 15 FBox must be used rather than the hardware settings. Compare with slave station 2.

Slave station 2

The slave station does not just accept calls from the master, but can also call the PG5 programming software, if necessary.

9.6 Application Library E-Mail

Sending e-mail with PCD controllers

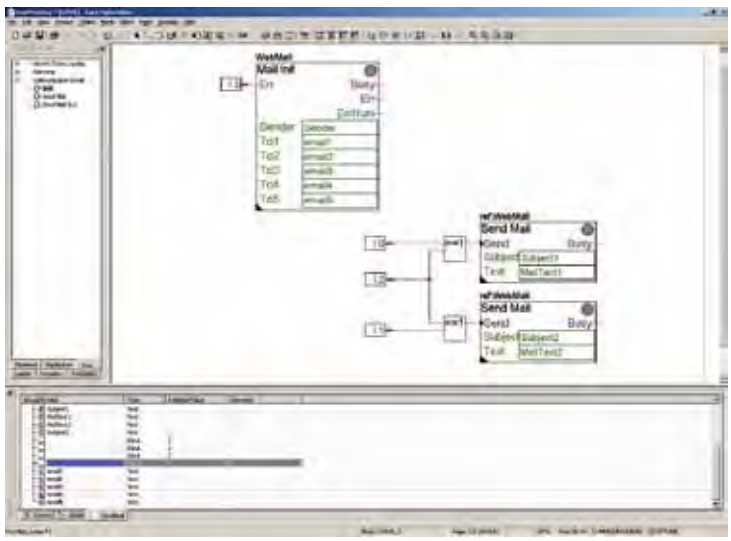


The e-mail function and integral SMTP (Simple Mail Transfer Protocol) client enable PCD controllers to send process and system information via the Ethernet interface to a mail server. Alarm, service and status messages – or any process information required – can therefore be sent by e-mail to a management centre and/or to service personnel.

To make the most of e-mail functions, IL instructions (Call System Function) and convenient Fupla FBoxes have been provided.

Technical characteristics of the e-mail function:

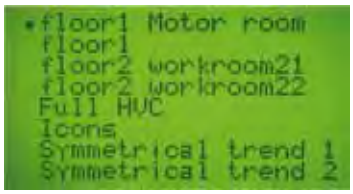
- E-mail subject PCD text
- E-mail text: PCD text
- E-mail with process data: PCD text can contain formatted data
- E-mail with attachment: transmission of files (e.g. log data) from file system, supported by PCD3.Mxxxx
- Authentication with mail server: supported by PCD3.Mxxxx
- Dispatch indicating multiple e-mail addresses
- Dispatch to multiple mail servers
- PCD systems with SMTP client: PCD3.Mxxxx, PCD1.M135F655, PCD2.M150F655, PCD2.M170 with PCD7.F655, PCD2.M480 with PCD7.F655



9.7 User prompting | HMI Editor: Individual presentation of system user prompts for Saia® Text Panels

Menu structure and organization

Unlike standard commercial editors, the operator's desktop editor has a hierarchical structure. Menus point to submenus, which in turn point to other submenus, and so on. This sequence of branches constitutes the menu structure. At the lowest level, the last menu or submenu item points to an OBJECT.



Root menu

This is the first menu, which shows the display. Depending on the topology selected, three different main menus are available:

- One single terminal connected: standby menu
- Multi-point connection of terminals: standby menu and busy menu
- Network connection of terminals: standby menu, login menu and busy menu

These menus can include: text, date/time, password, alarm states, state of acknowledgement and PCD variables.

The bottom 2 lines may be replaced with a line of icons.

Standard objects and elements

An object is a collection of elements. These always comprise a variable (flag, float…) and an access mode (read only, action…) but they may also include a unit of measurement (°C, kW…), or some limiting values. Instead of values, one can choose to display states (run/stop, manual/auto…).

The bottom 2 lines may be replaced with a line of icons.

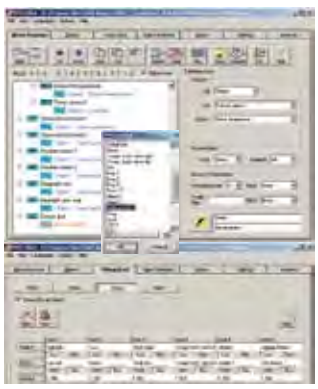
Resources

The variables (which are associated with elements and comprise the objects) are imported automatically from the PG5. The PG5's global resources constitute the database. These resources can be filtered by type, name etc. All these media types can be used: flags, registers, inputs, outputs, timers, counters, constants, DBs, etc.

Importing predefined objects

The «import/application» button is used to import an object library (HeaVAC library, modem library) with all its predefined texts.

Transfer also includes connection to the corresponding function box (FBox) with all its parameters (which then become object elements) and all its texts, data sources, formats, etc.



Icons und icon management

An icon is a predefined figure displayed on the screen.

The Icons Menu, with icons and status bar, are new features supported by PCD7.D23x series terminals. Status bars have a fixed number of 6 icons. Up to 100 icons can be imported to an HMI file and then loaded into the D23x terminals. Menu items can be created with an icon (static icon) and 2 text lines. Status bars can use static or dynamic icons. Any bars defined will appear on the 2 bottom lines of the display. Dynamic icons can be switched by means of a flag, or selected via a register value.

User prompting | HMI editor

Language manager

The language manager allows all text to be edited simultaneously in 5 languages in the same HMI project.

Text can be sorted and languages changed according to the revised language. Untranslated text is marked and translated text is checked.

Language selection prior to compiling a program is quick and simple.

Alarms and alarm settings

The «alarm» tab is used to create a list of alarms associated with flags, and to define alarm messages in the buffer. For each alarm, 4 lines of text can be defined, + 2 lines for the date, time, alarm state, acknowledgement and number.

Options and adjustment possibilities allow almost all requirements to be met. The bottom 2 lines may be replaced with a line of icons.

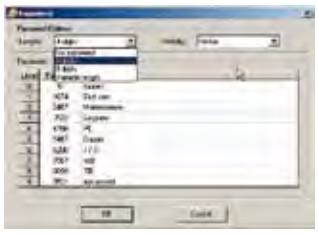
Terminal choice and settings

The «settings» tab is used to select terminal type (text (D170) or graphics (D23x), define topology (stand-alone, multipoint, network), and to choose the port number, serial interface type, transmission speed, etc.

Options can be defined, such as: duration of backlighting, access rights, types of media supported, etc.

Password and Enable flag

10 password levels of 4 or 8 characters (or of variable length) control the read/write access to each menu or submenu line. The passwords may be visible or hidden. They can also be made visible during editing then hidden, as with the D230. Enable flag: the status of a flag also allows restrictions to be applied that are similar to password restrictions.



PLAY function

By pressing the «PLAY» button, the terminal's menus can be displayed (offline) at any time. This is a way of checking presentation, alignment, spacing, window sequencing, navigation and word-breaks.

Also, by simply clicking on the «Preview» button, the contents of an object can be viewed in a virtual window. Complex objects and icons are not displayed.

Internal variables

The «Internals» button displays internal variables that can be accessed by the user program for interaction with the HMI editor's internal functions.

These variables (S.HMI.xxxxxx) are accessible with predefined system symbols. The variables comprise: passwords, LEDs, F-keys, buzzers, alarms, communications variables, root menu variables and text, and error registers.

Importing HMI projects

This command allows any part of an existing HMI project to be imported into a new HMI project.

A dialog box is used to select which parts of the project to import.

Parts to be imported are ticked: objects with or without resources, with or without min-max, alarms with or without text, with or without settings, etc.

ICON Editor

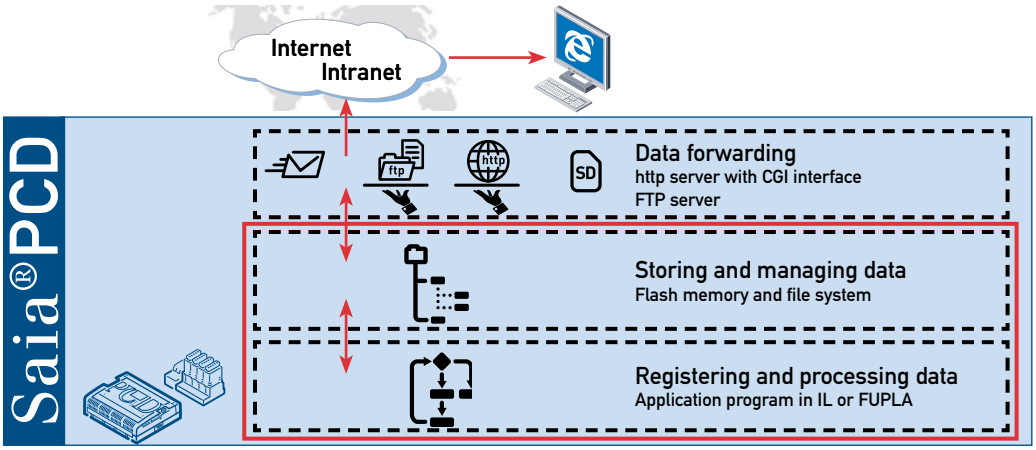
The icon editor is installed automatically in the PG5 when the HMI Editor is installed. It will be found in the «Tools». menu.

The icon editor is the only tool for creating a library of icons to use in the HMI editor. The icon editor always works with just one library at a time but may contain a large number of icons. When the icon editor is opened, one icon library is accessed by default. An icon is a rectangle of 18 × 16 pixels. Icons are very simple to create and freely definable for the requirements of each application.

9.8 Application libraries | FBox library for file systems

Files in the file system can be actively processed and managed by the Saia® PCD. With function libraries, system integrators can create their applications easily and conveniently with the PG5 programming tool.

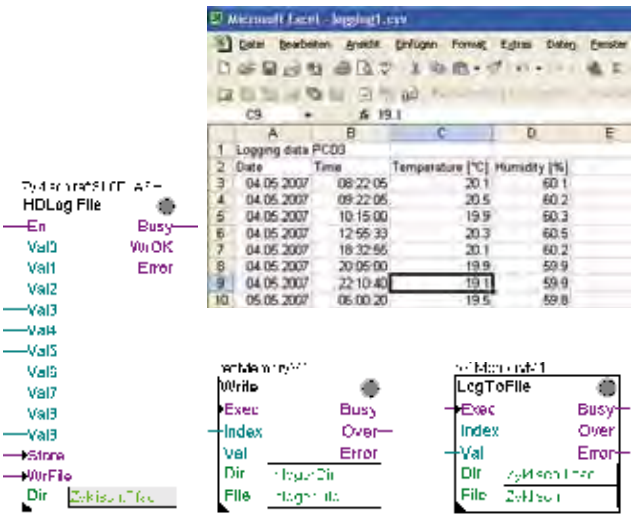
The integral web and FTP servers allow the direct exchange of files with higher ranking IT systems. No proprietary communications drivers are required.



Storing data

For application programming, users choose between the convenience of graphical Fupla FBoxes and the flexibility of instruction list (IL). Process data can therefore be saved directly to files.

The data recording format (binary, ASCII...) is freely definable by the user. For example, log data can be recorded in Excel-compatible CSV files. The advantage of this is that data can be further processed by a higher ranking PC system directly, without proprietary conversion programs.



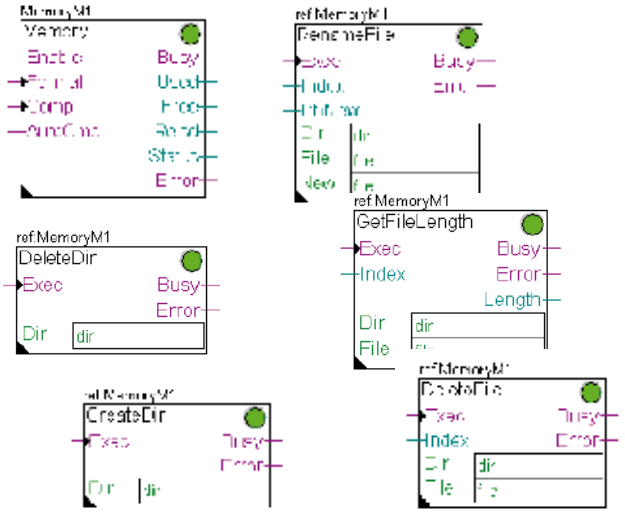
Managing files securely

Data in flash memory modules or on board memory is managed using a file system in the normal way for a Windows PC.

Unlike the office PC, however, machine controllers operate in rough industrial environments. Data loss or corruption resulting from power cuts or other faults will not be accepted. Accordingly, the file system in the Saia® PCD's operating system has been implemented for robustness and reliability.

Up to 1000 files can be stored in a Saia® PCD system. Files and directories can be individually assigned to different user groups and thereby protected from unauthorized access. Functions like Delete, Edit, Rename, Copy, etc. allow for efficient data management directly from the user program.

Fupla FBoxes for direct access to the Saia® file system



9.9 Web user navigation | S-Web Editor: Easy, efficient editing of Java-based web pages

One tool for all web-based Saia® HMI devices:

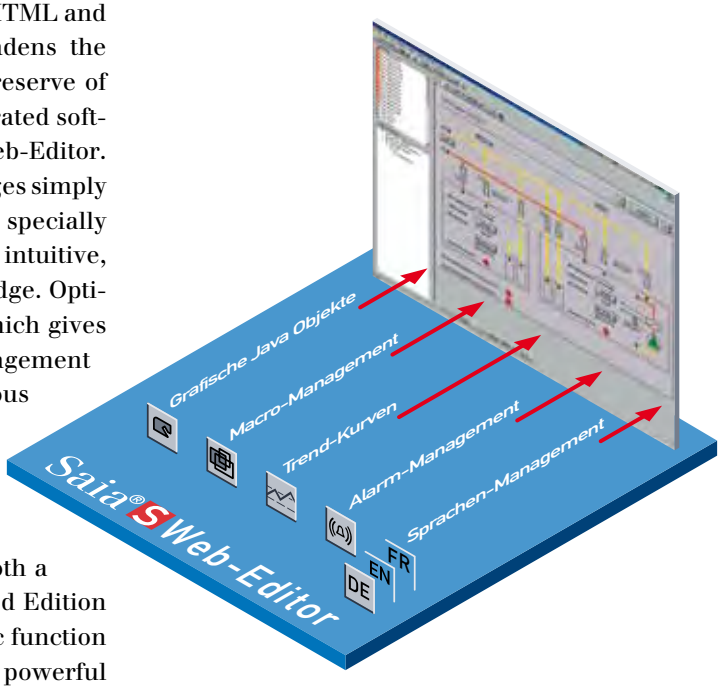
- Web pages are edited by placing on them graphical objects (which have been specially adapted to Saia® **PCD controllers**) and setting their parameters. Operation is intuitive and does not require knowledge of HTML or Java programming.
- Web pages are generated with the WYSIWYG procedure (what you see is what you get) for all normal screen resolutions.
- Precise, efficient operation is facilitated using familiar Windows formatting tools and extended drawing functions.
- The use of background and foreground pages saves valuable engineering time, following the principle: «edit once, use often».
- Macro-management for editing and reusing one's own macro objects, which are derived from basic objects.
- Additional, important engineering savings due to optimum integration within the Saia® **PG5 Controls Suite with its associated direct access to PG5 symbol variables.** Duplication of data entry – a source of potential errors – is therefore avoided.
- Comfortable trend function for the display and analysis of history data.
- Powerful alarm management for machine or system monitoring.

Powerful software tools are crucial

When producing web-based visualization and control interfaces, web-page editing is an essential element of engineering expenditure. Appealing, functionally designed web pages are the public face of the machine or installation, supporting operational efficiency and safety. A powerful tool for generating the web pages is therefore crucial.

Saia® S-Web Editor: simple, intuitive and efficient

Designing dynamic web pages with a normal HTML editor is laborious and requires specific know-how (in-depth HTML and Java programming knowledge). Saia-Burgess broadens the user base for this innovative technology (once the preserve of a small group of specialists) by offering an easily operated software tool for editing HMI web pages – the Saia® S-Web-Editor. The S-Web Editor is used to create Java-based web-pages simply and efficiently by placing and parameterizing objects specially tailored to the PCD web server. The use of the Editor is intuitive, and requires no HTML or Java programming knowledge. Optimum integration within Saia PG5 Controls-Suite – which gives direct access to all symbols, powerful macro management for editing one's own, reusable macros, and numerous other useful functions for the efficient design of web pages – significantly reduces engineering expenditure compared with other editors. The investment for the one-off license pays for itself in the very first project. The S-Web-Editor is available in both a Basic Edition and an Advanced Edition. The Advanced Edition provides important functions that go beyond the basic function set, such as the display and analysis of trend curves, or powerful alarm management.



S-Web-Editor | Trend capture and display

Recording and displaying historical data

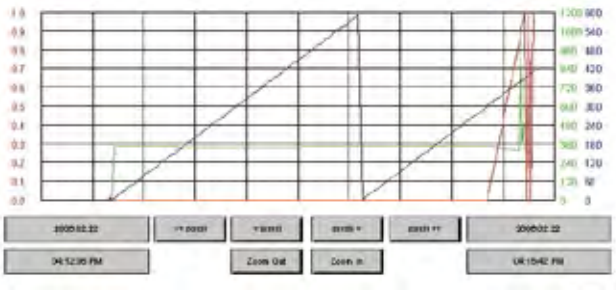
The Trend macros can be used to display historical data in the browser as graphical trend curves. Data capture and storage can take place either online (through the browser) or offline (through the PCD controller).

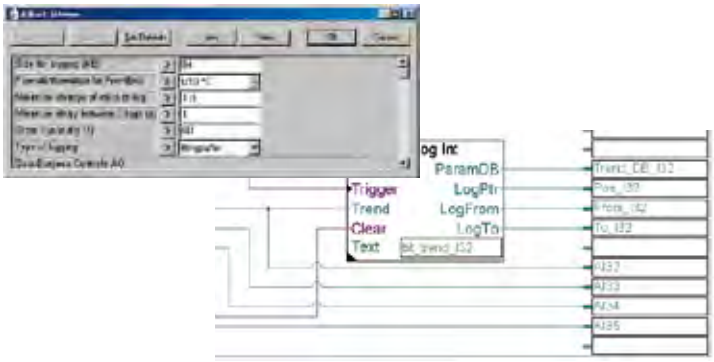
Data capture

Offline data registration in the controller takes place by means of the HDLog FBox library for PCD-Classic.

The user configures in FBoxes whether data registration should be event controlled and / or cyclic.

Data can be registered in compact SRam data blocks (binary format) or/and in an Excel-compatible CSV format in the file system of flash memory modules.





Data points are always recorded with a date and time stamp (1s resolution) in data blocks or CSV files.

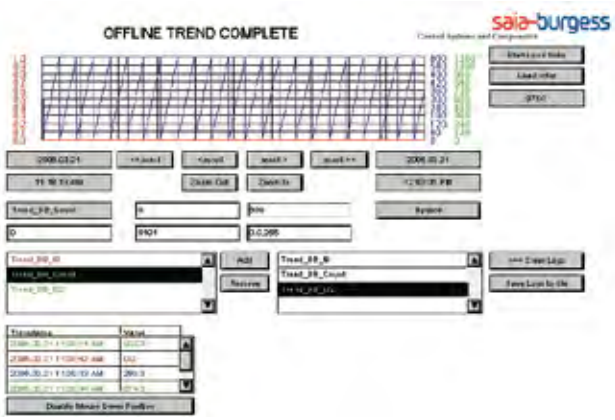
For registration in data blocks, the on-board SRam memory is used (up to 1 MByte for program and data). For registration in CSV files, flash memory modules may be used (up to 4 GBytes with SD flash cards).

Displaying trend curves in the web browser

Up to 5 **curves can appear simultaneously in one window.** These trend curves can be analysed in detail with powerful scroll and zoom functions. The ruler function allowed detailed values on the curves to be displayed for a specific point in time. The trend data can be saved to a file on the browser PC in Excel-compatible CSV format if required.

Depending on the macro used, runtime modification in the web browser of adjust parameters (number of trend curves, min/**max values, colours...) is also possible.**

Various trend macros are available for both online and offline data capture. In the case of online data capture, the HDLog library for data registration in the PLC is not needed. Data is read cyclically by the web browser and displayed online as trend curves. To record the data, the appropriate view must be displayed in the web browser.



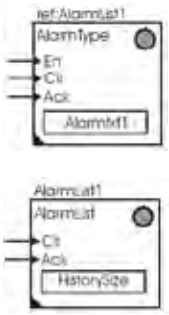
The user can choose from three different trending macros as required:

- TrendMinimal supports a reduced functional scope. The emphasis here has been placed on ease of operation.
- TrendComplete supports the full functionality
- TrendScalable supports reduced functionality and can be easily modified by the user.

With all macros, the design (size and arrangement of the various elements such as buttons, display fields, fonts etc.) can be individually tailored by the user according to his needs. The Web Editor is used to configure the properties and the display (colours, labels, scales etc.) of the trend curves.

S-Web-Editor | Alarm management

The monitoring of process signals and alarm capture take place independently of the web browser in the PCD controller. The actual alarm function is implemented in the firmware on the PCD control. Its activation and parameter setting take place with the Fupla FBox library for PCD-Classic.



The alarms are stored in alarm lists in the non-volatile internal memory of the PCD control. There is a clear distinction between the alarm status list and the alarm history list.

The alarm status list in the PCD controller contains the following information for each type of alarm defined:

- Alarm number (the relevant alarm text can be defined either as PCD text and/or with an HTML tag in a CSV file)
- Date and timestamp of the last alarm entry
- Status of alarm (pending or deactivated) or of date and time stamp when the alarm fell.
  - The acknowledgement status
  - Total counter for the alarm concerned

The alarm history list stores all alarm events in the PCD controller with the following information:

- Alarm number (the relevant alarm text can be defined either as PCD text and/or with an HTML tag in a CSV file)
- Date and timestamp of each incoming alarm
- Date and timestamp of each outgoing alarm
- The acknowledgement status

The alarm history list can be configured as ring memory or permanent memory.

For each alarm list, there is a generic alarm, signalling a new alarm entry. This enables the user to trigger individually defined actions (e.g. superimpose alarm message in browser).

Up to 10 different alarm lists can be defined and managed within a PCD control. Depending on the PCD type used, the memory reserved for the entire alarm database amounts to no more than 64 kBytes. Each entry in an alarm list requires 15 bytes. That means that up to 4,200 entries (alarm status list and alarm history list) can be stored in the alarm database.

Display and processing of alarm lists in the web browser

To display and edit alarm lists in the web browser, the user has a choice of 3 different alarm macros.

The «Alarm status list» macro lets the alarm status list be displayed and processed online. Alarms can be acknowledged and deleted individually or in groups, using multiple selection.

The Alarm history online macro lets the alarm history list be displayed and processed online. Alarms can be acknowledged and deleted individually or in groups.

The Alarm history offline macro lets the alarm history list be loaded into the browser and efficiently analysed offline (i.e. without connecting to the alarm list in the PCD controller). For this purpose, the list can be sorted by a variety of criteria, or saved in an Excel-compatible CSV file on the hard disk of the browser PC and, for example, sent by e-mail to other persons for further analysis.

The alarm texts can be defined as PCD text strings or using HTML tags. HTML tags are defined in CSV files and therefore support multiple languages. For each language, a CSV file exists that is activated in the browser during runtime.

Order details | PG5 Controls Suite

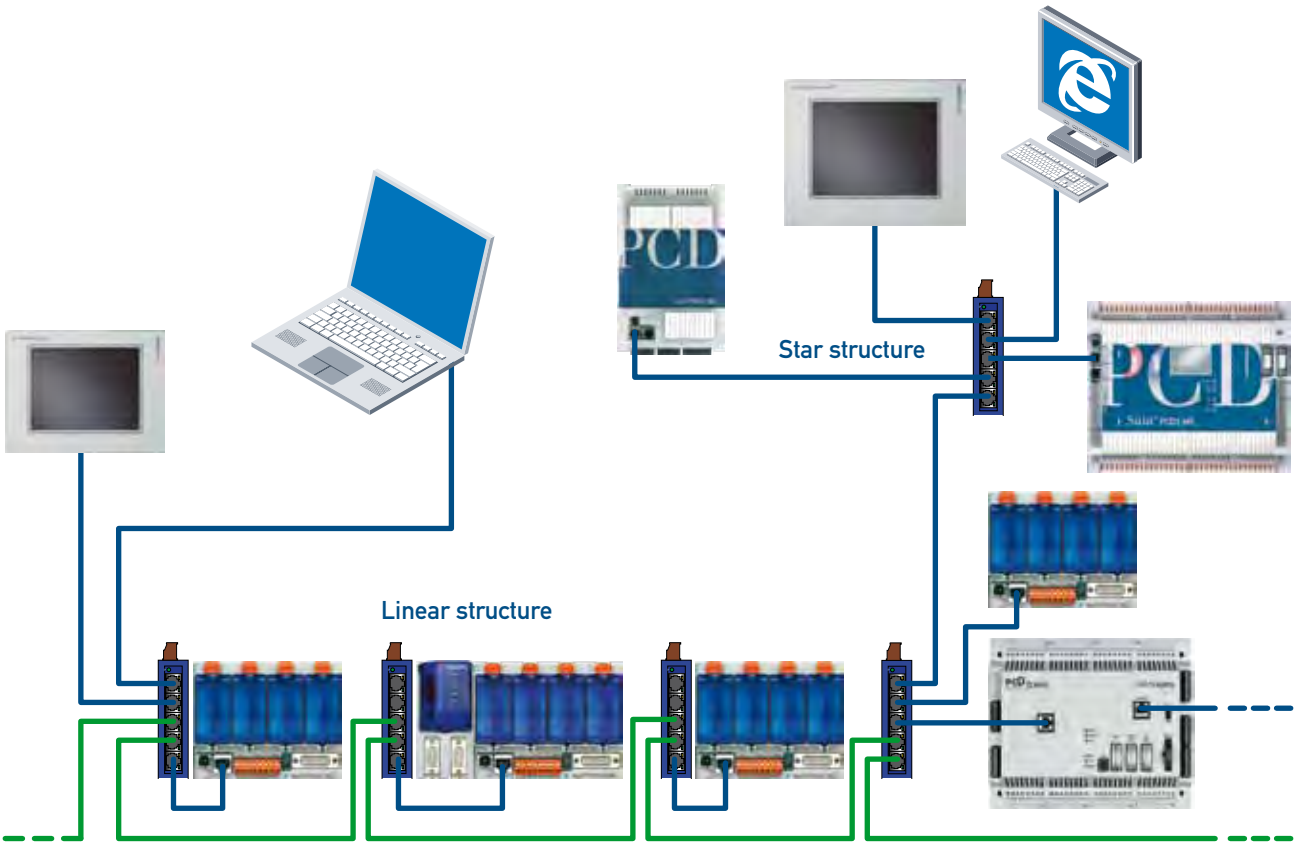
Ordering information

	Description	Type
Programming tools		
	PG5 – Demo version with all functions. Runtime limited to 90 days	PG5 – Demo
	PG5 – Standard Package Programming software including editors (IL, Fupla, Graftec, HMI), standard libraries (analogue, communication, LonWorks®, HMI, …), Network configurators (Profibus-DP/FMS, Profi-S-IO, LonWorks®, S-Net, CAN), Web-Builder and FBox Builder (basic version)	PG5 – Standard
	PG5 – Building Package Standard (HeaVAC) Like PG5 standard software package with added libraries (HeaVAC, Belimo, Room Controller and Modem)	PG5 – Building Std
	PG5 - Building Advanced Package (HeaVAC) Like PG5 building standard software package with added library (DDC-Suite)	PG5 – Building Adv
	Update (according to customer`s key) - version 1.4 to 2.0	PG5 - Update
PG5 options - Add-on tools		
	PG5 – Modem Library Modem base library incl. Data Buffer, DTMF, Pager & SMS libraries	PG5 – Modem
	PG5 – HeaVAC Library Standard library for building automation including all system objects for Fupla, HMI and Web Editor and Visi.Plus	PG5 – HeaVAC
	PG5 - DDC Suite Library DDC-Suite library for building automation including all system objects for Fupla, HMI and Web Editor and Visi.Plus	PG5 – DDC-Suite
	PG5 - Modbus Library Modbus library for Saia® PCD including library for Siemens® P-Bus	PG5 – Modbus
	PG5 – EIB Library EIB library for building automation	PG5 – EIB
	PG5 - DALI Library DALI Library	PG5 – DALI
	PG5 - EnOcean Library EnOcean Library	PG5 – EnOcean
	PG5 - Belimo MP-Bus Library Library for BELIMO MP-Bus	PG5 – MP-Bus
	PG5 – JCI N2-Bus Library Library to connect JCI installations	PG5 – JCI N2-Bus
	PG5 - Web Editor (basic version) Software package for Saia® S-Web operator panels including all system macros	PG5 – Web Editor basic version
	PG5 - Web Editor (advanced version) Software package for Saia® S-Web operator panels Like basic version with in addition Alarming and Trending functions	PG5 – Web Editor advanced version
	Saia®.Net Suite Communication components based on Microsoft.Net with documentation and examples as well as support service and access to updates for 1 year	PCD8.SNET-SUITE
	Saia®.Net Suite Support One year extension for support service and access to updates	PCD8.SNET-SUP

10 Switch cabinet components & energy meters

10.1 Industrial Ethernet switch Q.NET-5TX with 5 ports

Ethernet networks in industry and infrastructure automation



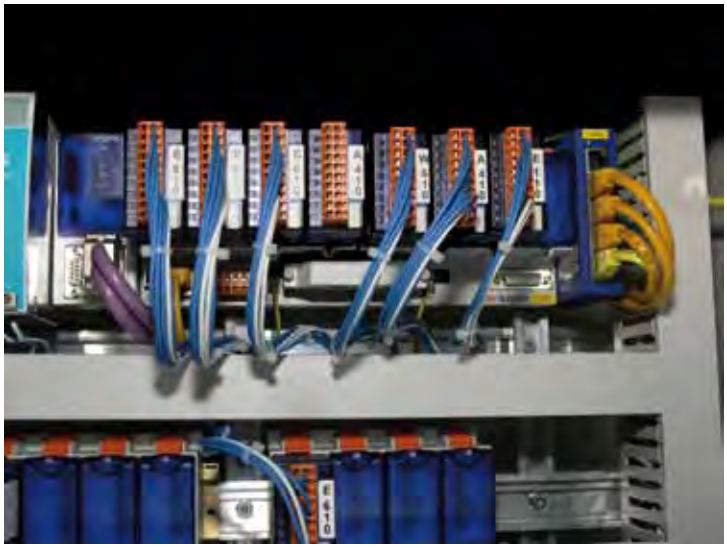
Build economical, industrial Ethernet networks with both linear and star structures

This compact, unmanaged switch operates according to the plug-and-work principle.

The mounted switch is equal in height to PCD3 systems, which saves space when it is snapped onto the DIN rail. The PCD controller is connected with the patch cable provided. With its robust construction, this switch is suitable for use in rugged industrial environments and in infrastructure automation.

Product characteristics

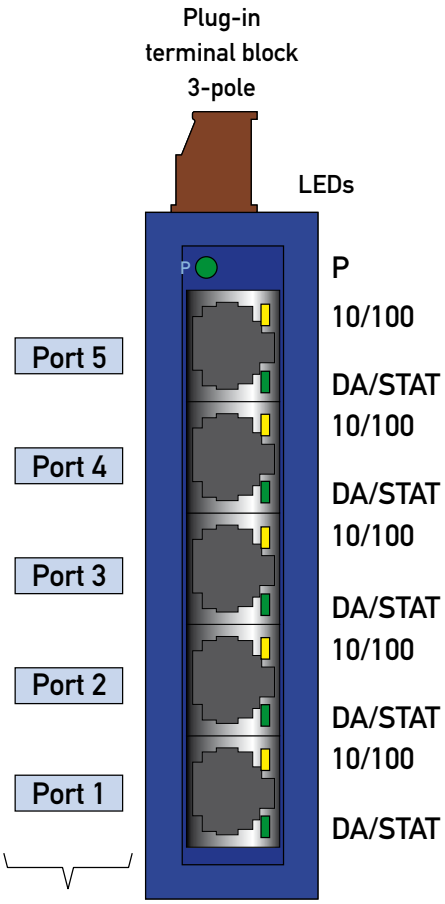
- Entry level industrial Ethernet rail switch, with store-and-forward switching mode
- Allows construction of switched Ethernet networks according to IEEE802.3 with copper technology
- The device has five 10/100 Mbit/s twisted pair ports (RJ45 connections)
- Up to five end devices or additional TP segments can be connected to the TP ports via twisted pair
- Extremely light, compact construction with IP30 protection system
- Simple commissioning with 'plug-and-work' via auto-negotiation, auto-polarity and auto-crossing
- Fast network diagnosis, due to integral LEDs at TP ports
- DIN rail mounting and 24 VDC supply for trouble-free use in infrastructure automation, and in rugged industrial environments



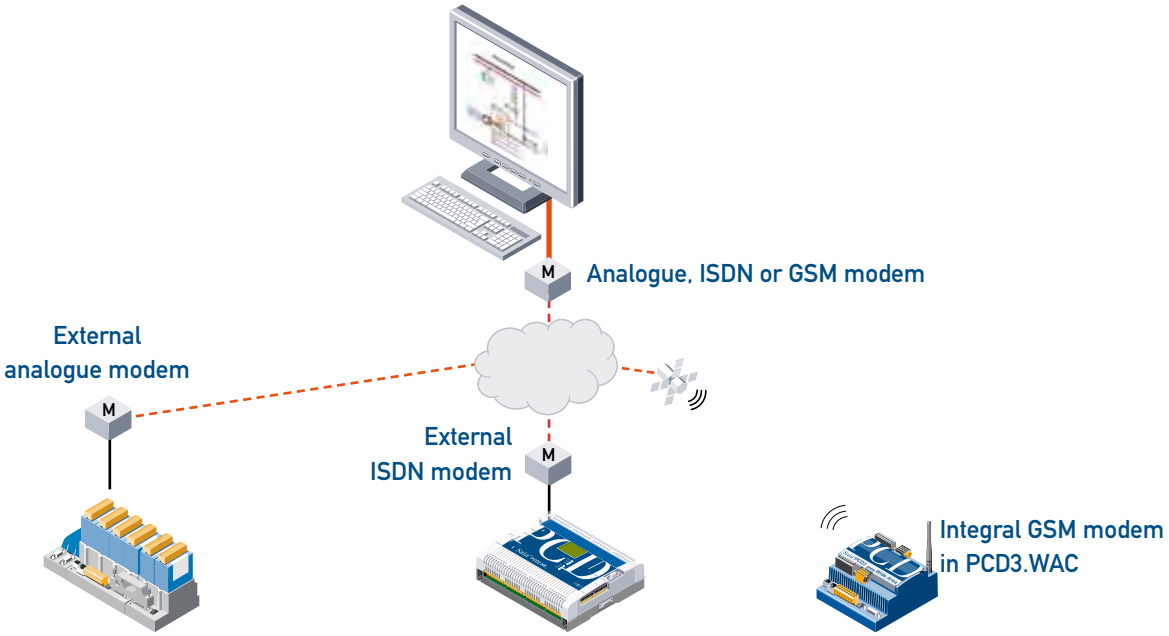
Example application:

Technical data Q.NET-5TX

Operation	
Port type and number Plug & Work	Ethernet 10/100 MBit/s, 5 × RJ45 autonegotiaton, autopolarity, autocrossing
Network line lengths	Twisted pair (TP), 0…100 m
Network cascade depth	Linear/star structure – any depth
Operating voltage	9.6 VDC…32.0 VDC
Current draw at 24 VDC	max. 100 mA
Displays/diagnostics	1 × green LED: P – Power, 5 × amber LED: 10/100 – data rate 5 × green LED: DA/STAT – data, link status
Environmental conditions	
Operating temperature	0 °C to +60 °C
Storage temperature	–40 °C to +70 °C
Humidity	95...95 %, non-condensing
Standards / approvals	
EMC protection:	EN61000-4
EMC protection:	EN55022 Class A, FCC CFR47 Part 15 Class A
Security for Ind. Control Equipment	cUL508 CSA22.2 No.142 E175531
Mechanical stability	IEC60068-2 (shock, vibration)
Mechanical	
Dimensions W × H × D	25 mm × 114 mm × 79 mm
Mounting	on 35 mm DIN rail
Weight	113 g
Protection type	IP30
Order details	Scope of delivery
Q.NET-5TX	Rail Switch Q.NET-5TX, terminal block, patch cable and operating instructions



10.2 External modems for DIN rail mounting



Telecommunication – today's choice for overcoming distances and saving costs

Combining modern telecommunications with the Saia® PCD will not only allow cost savings on commissioning and maintenance, but simultaneously increase the reliability, availability and profitability of an installation. This is achieved, for example, by:

- Remote support during commissioning
- Event or time-controlled transmission of information and requests to operating or service personnel
- Fault elimination by remote diagnosis
- Process optimization through software updates and/or updating of process parameters
- Preventive, efficient maintenance by qualified technicians, leading to low maintenance costs
- On-screen, remote support available directly to users, close to their operations

GSM modem

Technical data Q.G736-AS2

Frequency band	Dual band GSM 900 and GSM1800
SIM interface	SIM card: 3 V, slide-in
Transmission standards	2400 (V.22bis/V.110), 4800 (V.32/V.110), 9600 (V.32/V.110), 14400 (V.34/V.110) bps
Interface speed	1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200 bps, auto-bauding
Interface	V24 (RS232), D-type, 9-pole
Instruction set	Extended AT instruction set
Antenna connector	FME-m
Voltage supply	24 VDC +15%, -30%

Analogue modem

Technical data Q.M716-KS1

ITU transmission standards	V.21, V.22, V.22bis, V.23, V.32,V.32bis, V.34, Bell 103 , Bell 212A
Interface speeds	1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200 bps auto-bauding
Interface	V24 (RS232), D-type, 9-pole
Instruction set	Extended AT instruction set
Dialing procedure	DTMF (multiple frequency)
Telephone line	RJ11 and screw terminals for La + Lb
Voltage supply	24 VDC +15%, -30%

ISDN modem

Technical data Q.T726-RS1

ITU transmission standards	X.75, V.110, V.120
Interface speeds	1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200 bps auto-bauding
Interface	V24 (RS232), D-type, 9-pole
Instruction set	Extended AT instruction set
Telephone line	RJ45 (ISDN 4-wire)
Voltage supply	24 VDC +15%, -30%

Cable connector for external modem/PCD

Q.VM-09SAS/18: RS232 interface cable

External GSM antenna

PCD7.K830: antenna for GSM modem

Order details

	Telecommunication via external modems
Q.M716-KS1	Analogue modem
Q.T726-RS1	ISDN modem
Q.G736-AS2	GSM modem
PCD7.K830	Antenna for GSM modem
Q.VM-09SAS/18	RS232 interface cable external modem/PCD

10.3 Power units

Power supplies with 24 VDC output

- Short-circuit protection
- Overload protection
- Strong overload without switch-off
- IP20
- Mounting on DIN rail
- Extremely small size

From left to right: Q.PS-ADB, Q.PS-AD2, Q.PS-AD1

Advantages of the new Q.PS-AD2-24xxF:

- Saves space with even more compact design
- Power boost: +40% extra output current up to 60 °C for at least 3 minutes
- 3 different short-circuit modes available
- «Power good» relay for status display
- Simple parallel connection to incease max. output current
- In serial mode, output voltage up to 150 VDC possible

	Product Range			
Picture	Input	Output	Protection	Features
Q.PS-AD1 	Single phase 24 VAC / 40 VDC	24 VDC, 3 A 24 VDC, 5 A 24 VDC, 7 A	Short circuit Overload	
Q.PS-AD2-24xxF 	Single phase 110…240 VAC	24 VDC, 1.5…3 A 24 VDC, 5…7.5 A 24 VDC, 10…14 A	Short circuit Overload Overvoltage	Adjustable output voltage 22…27 VDC
Q.PS-AD3 	Double-phase 400…480 VAC	24 VDC, 5 A	Short circuit Overload Overvoltage	Adjustable output voltage 22…26 VDC
Q.PS-ADB 	Single phase 110…230 VAC / 24 VDC battery	24 VDC, 5 A	Short circuit Overload Overvoltage	Adjustable charging current 1…5 A, battery diagnostic and different charging modes

Applications

Control panels, where 24 VDC is required to supply PLCs, actors, sensors etc. Also high-output loads such as magnetic valves, motors, lamps etc. Can be used for applications in:

- Building automation
- Industrial automation
- Infrastructure plants, such as water or sewage treatment
- Machineries
- Material handling
- etc.

Norms and certifications

- According to EMC 2004/108/EEC and Low voltage 2006/95/EEC

Electrical safety

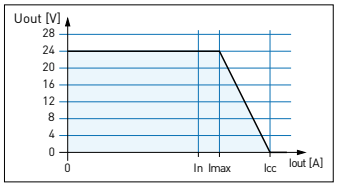
- According to IEC/EN50 (VDE 0805) and EN78 (VDE 0160) for assembling device. The unit must be installed according to IEC/EN50.

EMC Generic

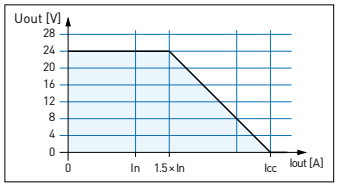
- Immunity according to EN61000-6-2
  Noise emission according to EN61000-6-4

Output characteristics

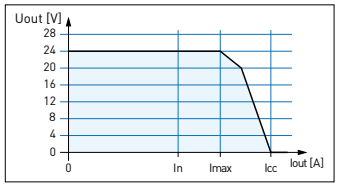
Output Characteristic Curve U/I
Q.PS-AD1-2403
Q.PS-AD1-2405
Q.PS-AD1-2407



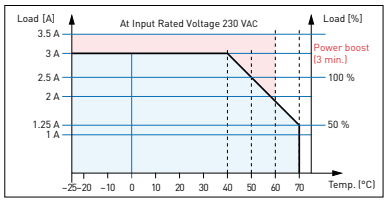
Output Characteristic Curve U/I
Q.PS-AD2-2402F
Q.PS-AD2-2405F
Q.PS-AD2-2410F



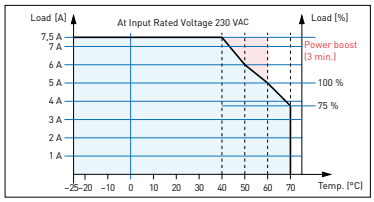
Output Characteristic Curve U/I
Q.PS-AD3-2405



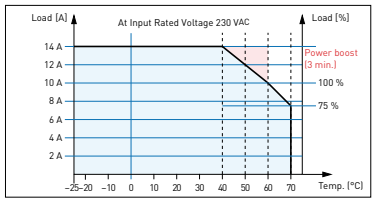
Output Derating Curve
Q.PS-AD2-2402F



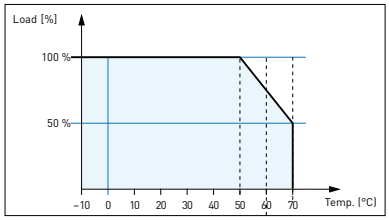
Output Derating Curve
Q.PS-AD2-2405F



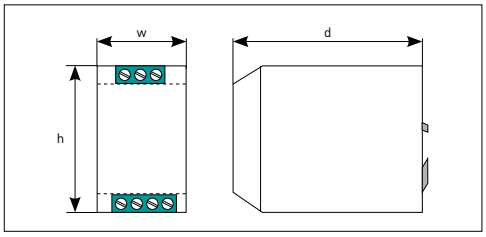
Output Derating Curve
Q.PS-AD2-2410F



Output Derating Curve
Q.PS-AD1-2403, -2405, -2407
Q.PS-AD3-2405



Dimension drawing



Dimensions

	Q.PS-AD1-2403	Q.PS-AD1-2405	Q.PS-AD1-2407	Q.PS-AD2-2402F	Q.PS-AD2-2405F	Q.PS-AD2-2410F	Q.PS-AD3-2405	Q.PS-ADB-2405
Width (w)	50 mm	50 mm	70 mm	50 mm	55 mm	72 mm	55 mm	65 mm
Height (h)	95 mm	95 mm	95 mm	120 mm	110 mm	115 mm	115 mm	115 mm
Depth (d)	61 mm	61 mm	61 mm	50 mm	105 mm	135 mm	155 mm	135 mm
Weight	0.20 kg	0.20 kg	0.35 kg	0.30 kg approx.	0.60 kg approx.	0.65 kg approx.	0.70 kg approx.	0.68 kg

Types and functions

Standard type

	Q.PS-AD1-2403	Q.PS-AD1-2405	Q.PS-AD1-2407
Input Data			
Input Rated Voltage	40 VDC / 28 VAC	40 VDC / 28 VAC	40 VDC / 28 VAC
Rated Voltage range	33…45 VDC / 24…32 VAC	33…45 VDC / 24…32 VAC	33…45 VDC / 24…32 VAC
Inrush Current (At V_n and I_n)			
Frequency	47…63 Hz	47…63 Hz	47…63 Hz
Input Current (Input Rated Voltage)			
Internal Fuse	No	No	No
External Fuse	Fast 4 A	Fast 6 A	Fast 6 A
Output Data			
Output Voltage (V_n) / Nominal Current (I_n)	24 VDC / 3 A ±2%	24 VDC / 5 A ±2%	24 VDC / 7 A ±2%
Linearity	0…3 A ± 0.25%	0…5 A ± 0.25%	0…5 A ± 0.25%
Adjustment range (V_{adj})			
Switching on delay applying mains voltage	≤ 100 msec	≤ 100 msec	≤ 100 msec
Start up with capacitive load	30.000 µF / 1.5 A	30.000 µF / 2 A	30.000 µF / 12 A
Continuous running at ≤40 °C			
Continuous running at ≤50 °C	3 A	3.5 A	5.5 A
Continuous running at ≤60 °C			
Max. continuous current	1.05 × I_n ± 7%	1.05 × I_n ± 7%	1.05 × I_n ± 7%
Reserve Out Current (within 1 minutes at ≤50 °C)			
Reserve Out Current (within 3 minutes at ≤60 °C)			
Short-circuit current (Icc)			
Hold-up Time (at 100…240 VAC)			
Residual Ripple	≤ 60 mVpp	≤ 60 mVpp	≤ 60 mVpp
Minimum Load	No	No	No
Efficiency (at 50% In)	≥ 88%	≥ 88%	≥ 88%
Short-circuit protection	Yes	Yes	Yes
Overload protection	Yes	Yes	Yes
Over Voltage Output protection	No	No	No
Parallel connection			
Battery Output (Battery Type 3 - 50 Ah)			
Boost charge (25 °C) (at I_n)			
Trickle charge (25 °C) (at I_n)			
Output 2: Battery Charging current max. I_{Batt}			
Setting range of charging current			
Recovery Charge after deep discharge			
Configuration Jumper: Battery Type			
Reverse polarity protection			
Control of the sulfation of the battery cells			
Detection of an element in short circuit			
Load Output			
Output voltage (at I_n)			
Max Nominal current . $I_n = I_{load} + I_{batt}$ (120 W)			
Output 1: Load current (Main) I_{load}			
Output 1: Load current (Back Up) I_{load}			
Signal Output (free switch contacts)			
Switching capacity			
Voltage drop >10%			
Main or Backup Power			
Low Battery			
Fault Battery			
Climatic Data			
Ambient Temperature (operation)	0…50 °C	0…50 °C	0…50 °C
Ambient Temperature (Storage)	-25… +85 °C	-25… +85 °C	-25… +85 °C
Humidity; no moisture condensation	95% at +25°C	95% at +25°C	95% at +25°C
General Data			
Isolation Voltage (Input/Output)			
Input / Ground isolation PE			
Output / Ground isolation PE			
Degree of protection	IP20	IP20	IP20
Pollution Degree Environment			
Protection class	I, with PE connected	I, with PE connected	I, with PE connected
Dimension (w-h-d) [mm]	50 × 95 × 61	50 × 95 × 61	70 × 95 × 61
Weight [kg]	0,20	0,20	0,35

					Battery type
	Q.PS-AD2-2402F	Q.PS-AD2-2405F	Q.PS-AD2-2410F	Q.PS-AD3-2405	Q.PS-ADB-2405
	115…230 VAC	115…230 VAC	115…230 VAC	400…480 VAC	115…230 VAC
	90…264 VAC	90…264 VAC	90…264 VAC	360…570 VAC	93…264 VAC
	≤ 7 A ≤ 5 msec.	≤ 11 A ≤ 5 msec.	≤ 16 A ≤ 5 msec.	≤ 17 A ≤ 5 msec.	≤ 14 A ≤ 5 msec.
	47…63 Hz ±6 %	47…63 Hz ±6 %	47…63 Hz ±6 %	47…63 Hz	47…63 Hz
	1.0…0.7 A	2.8…1.0 A	3.3…2.2 A	0.6 A	1.5…0.9 A
	F 4 A	F 4 A	F 6.3 A	F 4 A	F 4 A
	Fast 6 A	Fast 10 A	Fast 14 A	Fast 4 A	Fast 6 A
	24 VDC ±3% / 2.5 A	24 VDC ±3% / 5 A	24 VDC ±3% / 10 A	24 VDC ±3% 5 A @ 60°C | 7 A @ 50°C	24 VDC / 5 A
	22…27 VDC	22…27 VDC	22…27 VDC	22…26 VDC	
	2 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	2.5 sec. (max)
	≤ 50.000 µF	≤ 50.000 µF	≤ 50.000 µF	≤ 30.000 µF	≤ 30.000 µF
	3 A (230 VAC)/2 A (115 VAC)	7.5 A	14 A		
	2.5 A (230 VAC)/1.5 A (115 VAC)	6.0 A	12 A		
		5.0 A	10 A		
				10 A ± 5 % (max	1.1 × I_n ± 5 %
				I_{max} = I_n+25% approx	
	3,5 A	7,5 A	14 A		
	7 A	16 A	30 A		
	in general 20 msec	in general 20 msec	in general 20 msec	in general 27 msec	
	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp	≤ 60 mVpp	≤ 60 mVpp
	No	No	No	No	No
	≥ 88 %	≥ 91 %	≥ 91 %	≥ 88 %	≥ 81 %
	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes
	Yes (max 35 VDC)	Yes (max 35 VDC)	Yes (max 35 VDC)	Yes (max 35 VDC)	Yes
	Yes	Yes	Yes	Yes	No
					28.8 VDC
					27.5 VDC
					5 A ± 5%
					20…100 % of I_n
					Yes
					Yes
					Yes
					Yes
					Yes
					22…28.8 VDC
					1.1 x 5 A ± 5%
					15 A max.
					10 A max.
				1 A / 30 VDC	1 A / 30 VDC
				Yes	
					Yes
					Yes
					Yes
	-25…+70 °C (Derating >50 °C, 2.5%/°C)	-25…+70 °C (Derating >50 °C, 2.5%/°C)	-25…+70 °C (Derating >50 °C, 2.5%/°C)	-10…+70 °C (derating >50 °C)	0…50 °C
	-40… +85 °C	-25… +85 °C	-40… +85 °C	-25… +85 °C	-25… +85 °C
	95 % at +25 °C	95 % at +25 °C	95 % at +25 °C	95 % at +25 °C	95 % at +25 °C
	3000 VAC	3000 VAC	3000 VAC	3000 VAC	3000 VAC
	1605 VAC	1605 VAC	1605 VAC	1605 VAC	1605 VAC
	500 VAC	500 VAC	500 VAC	500 VAC	500 VAC
	IP20	IP20	IP20	IP20	IP20
	2	2	2		
	I, with PE connected	I, with PE connected	I, with PE connected	I, with PE connected	I, with PE connected
	50 × 120 × 50	55 × 110 × 105	72 × 115 × 135	55 × 115 × 155	65 × 115 × 135
	0.30 approx.	0.60 approx.	0.65 approx.	0.70 approx.	0.68

10.4 Plug-in system cables with connector at PCD end

The route to easy, fast connection is via these preconfigured cables. At the PCD end of the cable, the plug is pre-mounted, so it only has to be plugged in to make the connection.

At the process end there are ribbon connectors for the terminal adapters or relay interface, or numbered strands, or colour-coded strands.

For more detailed information, please consult the following double-page spread and refer to manual 26/792.

PCD2.K552

Increasingly, building automation applications require the necessary manual control and coupler level in automation stations.
Saia-Burgess Controls has decided to take this requirement into account in its new relay interface module, the PCD2.K552.

With relay interface modules, it is possible to override process outputs directly.

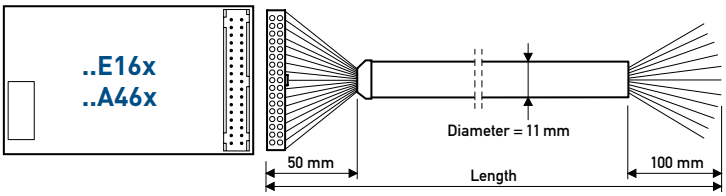
Features

- Manual control function at outputs
- Easy connection to a 16-point output module (PCD1, PCD2 or PCD3) via prefabricated cable
- Direct acknowledgement of manual mode to automation station via a common output
- Also suitable for two-stage functions

Plug-in system cables PCD1 | PCD2

Plug-in system cables with connector at PCD end

Cable for digital I/O modules with 16 inputs or 16 outputs



Cable PCD2.K221/K223

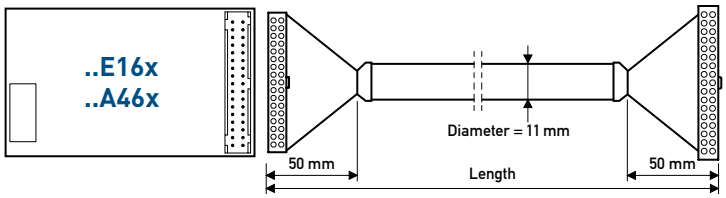
Sheathed, round cable with 32 strands of 0.5 mm² (AWG 24)

PCD end: 34-pole ribbon connector

Free ends on process side, unsheathed for 100 mm, with colour coded strands

Cable length PCD2.K221 = 1.5 m
PCD2.K223 = 3.0 m

Terminal adapters for digital I/Os

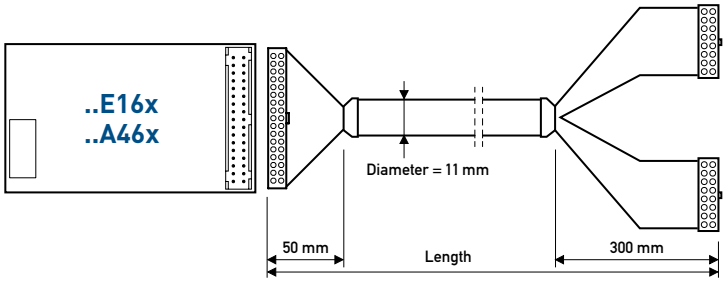


Cable PCD2.K231/K232

Sheathed, half-round cable with 34 strands of 0.09 mm²,

34-pole ribbon connector at both ends

Cable length PCD2.K231 = 1.0 m
PCD2.K232 = 2.0 m



Cable PCD2.K241/K242

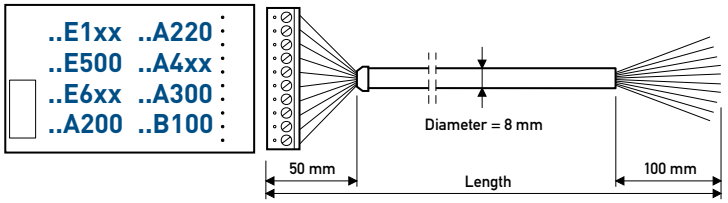
Sheathed, half-round cable with 34 strands of 0.09 mm²

34-pole ribbon connector at PCD end

Divided on process side into 2 branches, each 300 mm in length, leading to 16-pole ribbon connectors

Cable length PCD2.K241 = 1.0 m
PCD2.K242 = 2.0 m

Cable for 10-pole digital I/O modules



Cable PCD2.K261/K263

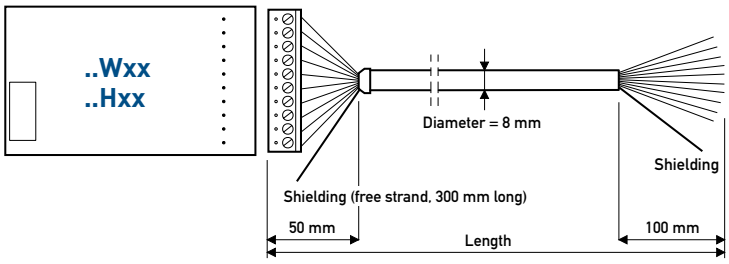
Sheathed, round cable with 10 strands of 0.5 mm²

10-pole, plug-in screw terminal block at PCD end (remove existing terminal block)

Free ends on process side, unsheathed for 100 mm, with numbered strands

Cable length PCD2.K261 = 1.5 m
PCD2.K263 = 3.0 m

Cable for analogue I/O and ..Hxx modules



Cable PCD2.K271/K273

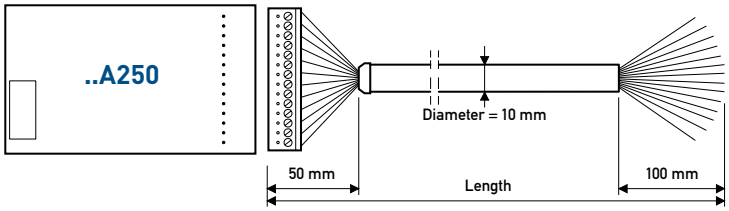
Sheathed, shielded, round cable with 10 strands of 0.25 mm², shielding drawn out at both ends

10-pole, plug-in screw terminal block at PCD end (remove existing terminal block)

Free ends on process side, unsheathed for 100 mm, with colour coded strands

Cable length PCD2.K271 = 1.5 m
PCD2.K273 = 3.0 m

Cable for PCD2.A250 relay output module



Cable PCD2.K281/K283

Sheathed, round cable with 14 strands of 0.5 mm²

14-pole, plug-in screw terminal block at PCD end (remove existing terminal block)

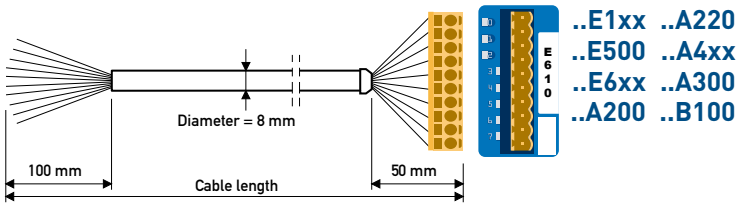
Free ends on process side, unsheathed for 100 mm, with numbered strands

Cable length PCD2.K281 = 1.5 m
PCD2.K283 = 3.0 m

Plug-in system cables PCD3

Plug-in system cables with connector at PCD end

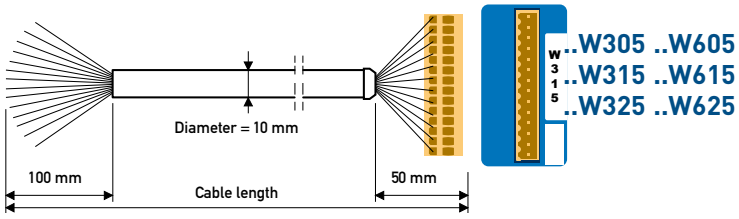
Cable for 10-pole digital I/O modules



Cable PCD3.K261/K263
Sheathed, round cable with 10 strands of 0.5 mm²
10-pole, plug-in spring terminal block at PCD end

Free ends on process side, unsheathed for 100 mm, with numbered strands
Cable length PCD3.K261 = 1.5 m
PCD3.K263 = 3.0 m

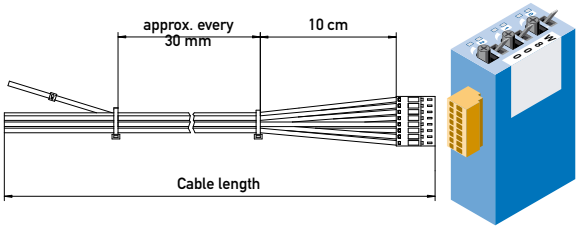
Cable for PCD2.A250 relay output module



Cable PCD3.K281/K283
Sheathed, round cable with 14 strands of 0.5 mm²
14-pole, plug-in spring terminal block at PCD end

Free ends on process side, unsheathed for 100 mm, with numbered strands
Length PCD3.K281 = 1.5 m
PCD3.K283 = 3.0 m

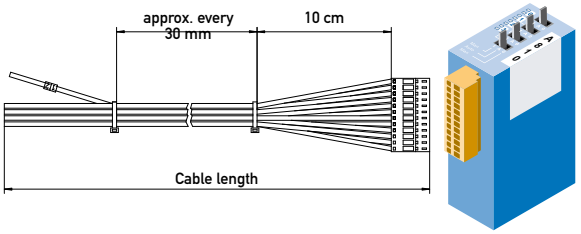
Cable for analogue manual control module PCD3.W800



Cable PCD3.K800
This cable is for PCD3.A810 manual control modules with 4 relay outputs. 8 black strands, each 1.0 mm², held together with black cable ties.

PCD side: 8-pole, plug-in spring terminal block, type F
Process side: free strands, numbered
Cable length: 2.5 m

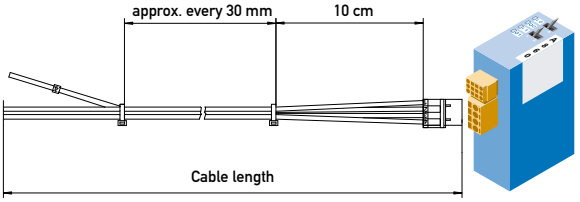
Cable for digital manual control module PCD3.W810



Cable PCD3.K810
This cable is for PCD3.A810 manual control modules with 4 relay outputs. 12 black strands, each 1.0 mm², held together with black cable ties.

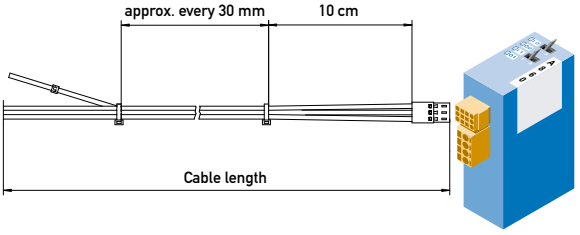
PCD side: 12-pole, plug-in spring terminal block, type F
Process side: free strands, numbered
Cable length: 2.5 m

Cable for digital manual control module PCD3.W860



Cable PCD3.K860 (for power outputs)
This cable is for PCD3.A860 light and shade modules. 4 black strands, each 1.5 mm², held together with black cable ties.

PCD side: 4-pole, plug-in spring terminal block, type G
Process side: free strands, numbered
Cable length: 2.5 m



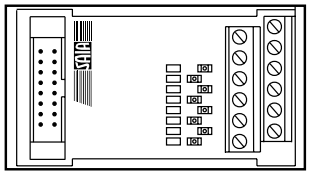
Cable PCD3.K861 (for the inputs)
This cable is for PCD3.A860 light and shade modules. 6 black strands, each 0.75 mm², held together with black cable ties.

PCD side: 6-pole, plug-in spring terminal block, type H
Process side: free strands, numbered
Cable length: 2.5 m

Adapter

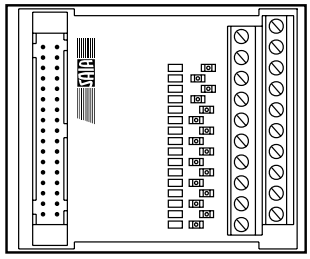
Ribbon/screw terminal adapters PCD2.K51x for 8 inputs or 8 outputs

Terminal adapter for 8 inputs / outputs



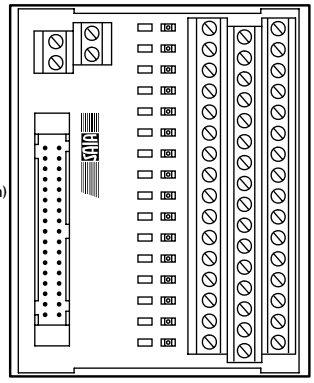
Terminal adapter PCD2.K51x
16-pole ribbon connector
at PCD end
Process side: 2×6
screw terminals 0.5…1.5 mm²
PCD2.K510 without LED
PCD2.K521 with LEDs (source operation)

Terminal adapter for 16 inputs / outputs



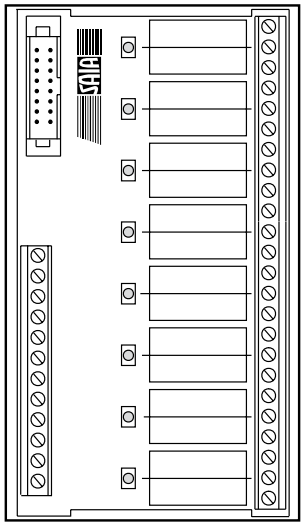
Terminal adapter PCD2.K520/K521
34-pole ribbon connector
at PCD end
Process side: 2×10
screw terminals 0.5…1.5 mm²
PCD2.K520 without LED
PCD2.K521 with LEDs (source operation)

Terminal adapter for 16 inputs / outputs



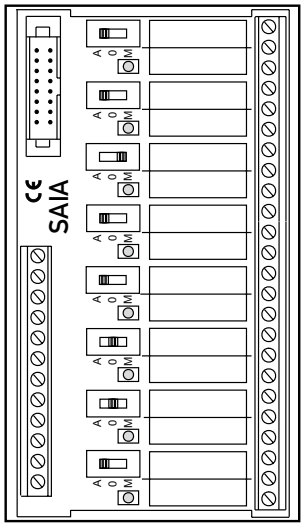
Terminal adapter PCD2.K525
34-pole ribbon connector
at PCD end
Process side: 3×16
screw terminals 0.5…1.5 mm²
with LEDs (source operation)

Relay interface adapter



Relay interface PCD2.K551 for 8 PCD transistor outputs with 24 screw terminals and LED
Breaking capacity of change-over contacts is 10 A/250 VAC or 10 A/24 VDC (ohmic),
coil 24 VDC
Screw terminals or 16-pole ribbon connector at PCD end
Process side:
24 screw terminals 0.5…1.5 mm²

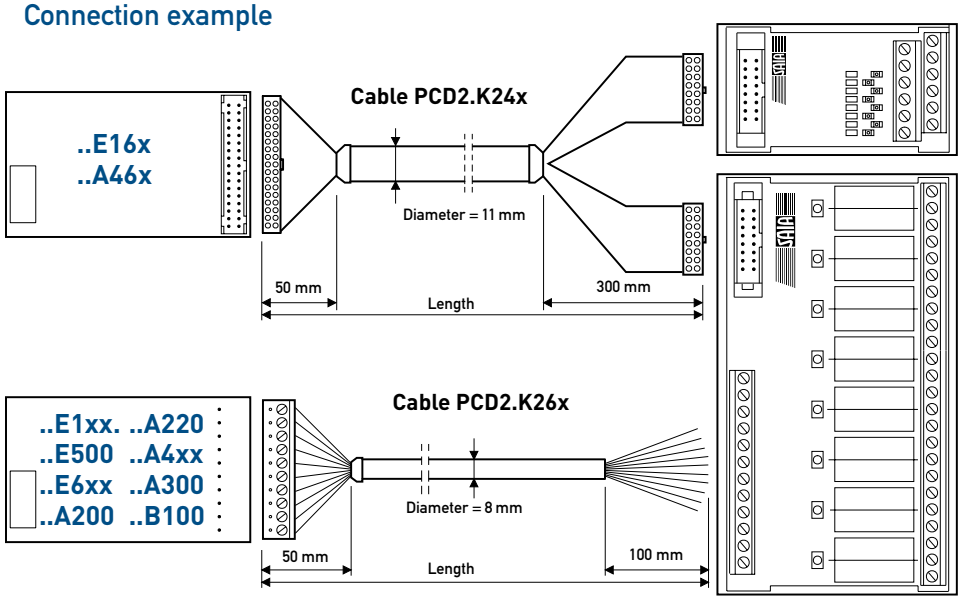
Mechanical data
Ø of screw terminals: M2.6 mm
Tightening torque: 0.4 Nm



Relay interface PCD2.K552 für 8 PCD transistor outputs with 24 screw terminals LED and manual control mode (switch on-off-auto) and 1 output feedback signal for manual mode
Breaking capacity of change-over contacts is 10 A/250 VAC or 10 A/24 VDC (ohmic),
coil 24 VDC
Screw terminals or 16-pole ribbon connector at PCD end
Process side:
24 screw terminals 0.5…1.5 mm²

Mechanical data
Ø of screw terminals: M2.6 mm
Tightening torque: 0.4 Nm

Connection example



Terminal adapter PCD2.K51x for 8 I/Os

Relay interface PCD2.K551 for 8 outputs

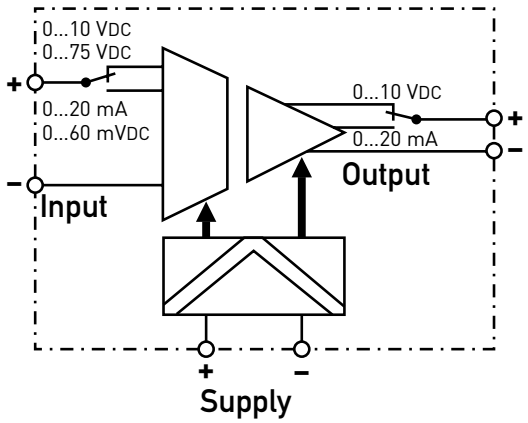
10.5 Isolating amplifier DC/DC

Electrical isolation of analogue signal circuits or for voltage/current conversion

As the name «isolating amplifier» states, the KFD1 isolates individual analogue channels not only from input to output, but also from the supply and from frame ground potential. This electrical separation is particularly recommended for long lines in large installations.

However, the KFD1 can also be used to amplify a weak signal and convert it into a noise-proof current signal.

Function diagram



Technical data

Input ranges [1]

KFD11 0…10 VDC, input impedance 200 kΩ or 0…20 mA, load 47 Ω [2])

KFD12 0…75 VDC, input current 0…20 mA or 0…60 mV, input current 0… 60 µA [3])

Output ranges [1]
0…10 VDC, load (≥3 kΩ); 0…20 mA, load (≤500 Ω)

Input/output
electrically isolated with optical isolating amplifier

Conversion time 20 ms

Short-circuit proof
yes, 1 minute, fault current 100 mA

Status display
LED green: supply voltage present

Isolating characteristics
800 VDC between supply, input and output

Accuracy
0.5 % of final value

Supply voltage
19…70 VDC or 24 V ±20 % full-wave rectified

Power consumption
1.0…2.4 W depending on voltage and load

Duty cycle 100 %

Terminals
screw terminals for 1 × 0.5 mm² to 2 × 2.5 mm²

Mounting
surface mounting; snap-on mounting onto Top-hat rail according to DIN EN60715 TH35 (formerly DIN EN50022) (1 × 35 mm) or screw fixing by adapter (accessory) and 2 screws M4

Ambient temperature
operation 0…50 °C, storage –25…+70 °C

Atmospheric humidity
95 % r. H. without condensation

EMC/Interference immunity
EN61000-4-4 (2 kV) at input and output
EN61000-4-4 (4 kV) at supply

EMC/Emissions
EN55022, class B

[1]) 2 input ranges/2 output ranges selectable with 2 slide switches on front panel
[2]) Overvoltage protection by stress limiter, 27 V max.
[3]) Overcurrent or overvoltage protection by stress limiter

Order details

	Isolating signal amplifier DC/DC
KFD11 JVTN	with input and output ranges VDC or 0…20 mA
KFD12 JVTN	with input ranges 0…75 VDC or 0…60 mA and output ranges 0…10 VDC or 0…20 mA

10.6 Coupler modules with manual operation to control actuator drives, valves or flap systems

PCD7.L252: Changeover switch with manual control level Auto / 0 / Hand

- 1 changeover switch
- Manual control level
- Auto acknowledge
- LED indicator
- 11.2 mm overall width
- Screw terminals

Single-stage coupler component with manual control level, acknowledgement of switch position and an LED for status indication.

PCD7.L260: Coupler module for two-stage motor control

- Mutually latched relay
- Manual control level
- Auto acknowledge
- LED indicator
- 22.5 mm overall width
- Screw terminals

When switching back from stage 2 to stage 1, stage 2 is switched off first and, after a <60 ms delay, stage 1 is switched on. A manual control level has been integrated for service purposes. The time function is operational here too.

PCD7.L450: Analogue value transmitter for manual correcting variables

- Potentiometer 0…10 V
- Manual control level
- Auto acknowledge
- LED indicator
- 22.5mm overall width
- Screw terminals

The analogue value transmitter has two operating modes: AUTO and MANU. In switch position AUTO, the control variable will be looped unchanged via the YR terminal to the control variable output Y. In switch position ON, the control variable can be set using the potentiometer on the front of the device. The output signal will be available at terminal Y.

	PCD7.L250	PCD7.L260	PCD7.L450
Input side			
Supply voltage	24 VDC/VAC, ±10%	24 VDC, ±10%	24 VDC/VAC, –15%/+20%
Current consumption	13 mA, protection wiring with recovery diode	30 mA	19 mA at 24 VDC 24 mA at 24 VAC
Input current	—	max. 4 mA, terminal B1 / B2	0.2 mA at 10 VDC (input YR)
Response / release time	10 ms/ 5 ms	20 ms/20 ms	—/—
Input / output voltage	—	—	0…10 VDC
Operating indicator	Red LED to indicate relay state	Two red LEDs to indicate relay state	Red LED (brightness in proportion to control variable)
Output side			
Output contact	1 changeover	1 changeover with 0 position	—
Turn-on voltage	max. 250 VDC/VAC	max. 250 VDC/VAC	—
On / off switching current,	max. 8 A/—	max. 6 A / max. 6 A	—/—
Output current	—	— position MANU	1 mA, output Y in switch
Constant current	6 A	4 A	—
Breaking capacity (ohmic load)	24 VDC/150 W 50 VDC/25 W 230 VDC/50 W 230 VAC/1500 VA	24 VDC/150 W 50 VDC/25 W 230 VDC/50 W 230 VAC/1500 VA	— — — —
Breaking capacity min.	24 VDC/20 mA	24 VDC/20 mA	—
Service life mechanical electrical	 2×10^7 switch cycles 1×10^5 hystereses	 1×10^7 switch cycles 1×10^5 hystereses	 — —
Switching frequency,	max. 600 hystereses/h at max. current	max. 1 hystereses/h	—

PCD7.L252: Changeover switch with manual control level Auto / 0 / Hand

- 1 changeover switch
- Manual control level
- Auto acknowledge
- LED indicator
- 11.2 mm overall width
- Spring terminals

Single-stage coupler component with manual control level, acknowledgement of switch position and an LED for status indication. Compared with the PCD7.L250, it has 2 added terminals for jumpers.
Screw terminals allow for quick and easy wire connection.

PCD7.L452: Analogue data encoder for manual control variables

- Potentiometer 0...10 V
- Manual control level
- Auto acknowledge
- LED indicator
- 11.2 mm overall width
- Spring terminals

The analogue data encoder has three operating modes: ON, OFF and AUTO. In switch position AUTO, the control variable will be looped unchanged via the YR terminal to the control variable output Y.
In switch position ON, the control variable can be set using the potentiometer on the front of the device. The output signal will be available at terminal Y.

	PCD7.L252	PCD7.L452
Input side		
Supply voltage	24 VDC/VAC, –15%/+10%	24 VDC/VAC, –15%/+20%
Current consumption	13 mA, protection wiring with recovery diode	19 mA at 24 VDC 30 mA at 24 VAC
Input current	—	2 mA at 10 VDC (input YR)
Response / release time	10 ms/ 5 ms	—/—
Input / output voltage	—	0...10 VDC
Operating indicator	Green LED to indicate relay state	Red LED (brightness in proportion to control variable)
Output side		
Output contact	1 changeover	—
Turn-on voltage	max. 250 VDC/VAC	—
On / off switching current,	max. 8 A/—	—/—
Output current	—	10 mA, output Y in switch position MANU
Constant current	8 A	—
Breaking capacity (ohmic load)	24 VDC/180 W 50 VDC/65 W 230 VDC/50 W 250 VAC/2000 VA	— — — —
Breaking capacity min.	24 VDC/20 mA	—
Service life mechanical electrical	 2×10^7 switch cycles 1×10^5 hystereses	 — —
Switching frequency,	max. 300 hystereses/h at max. current	—

Ordering information, accessories

Type	Description
PCD7.L290	Labelling plate for PCD7.L252

PCD7.L291	Jumper for connection of the supply voltage of up to 10 PCD7.L252 and PCD7.L452 modules

PCD7.L490	Labelling plate for PCD7.L452

10.7 Control components | Timer delay relays

Timer, electronic

KOL2 and KOL3

- Multi function or mono function
- 4 time ranges (KOL251)
- 6 time ranges (KOL 3)
- 17.5 mm width for DIN rail
- 24…48 VDC and 24…240 VAC
- 2 make contact (KOL 251)
- 1 changeover contact (KOL 3)

KOP.J

- Multi function or mono function
- 10 time ranges
- 22.5 mm width for DIN rail
- 24…48 VDC and 24…240 VAC
- 1 change-over contact

KOP.K

- Multi function or mono function
- Up to 10 time ranges
- 22.5 mm width for DIN rail
- 24…48 VDC and 24…240 VAC, 50/60 Hz
- 24…240 VAC/DC
- 1 or 2 changeover contacts, instantaneous and/or timed contacts


KOL251H...


KOL360H...


KOP160J...


KOP170J...


KOP219K...


KOP560K...

	Series	KOL2	KOL3xxH...	KOP1xx.J...		KOPxxx.K...	
	Order reference	KOL251H7MKVPN00	KOL360H7MRVPN00	KOP160J7MWVPN00	KOP170J7MWVPN00	KOP219K7MWVAN00	KOP560K7MWVPN00
Functions	Delayed operation		•	•			•
	Delayed release		•	•			•
	Delayed release after failure of operating voltage					•	
	Delayed operation and release			•			•
	Fleeting-on delay timer		•	•			•
	Fleeting-off delay timer			•			•
	Flasher relay		•				
	Star-delta timer	•					
	Pulse converter			•			•
	Pulse generator			•			•
	Flasher relay with pulse starting			•			•
	Asymmetrical pulse generator				•		
	On/off function for startup and maintenance			•			•
Time ranges	0.15 s…10 min	•				•	
	0.05 s…10 h		•				
	0.05 s…60 h			•	•		•
Operating voltage	24…48 VDC and 24…240 VAC	•	•	•	•		•
	24…240 VDC or 24…240 VAC					•	
Contacts	2 make contacts with a joint connection	•					
	1 changeover		•	•	•		
	2 changeover					•	
	2 changeover, instantaneous and/or timed contacts						•

10.8 Monitoring relays

Monitoring relays

KFE102 /103 /300 /302

- Voltage and current monitoring, Three-phase asymmetry monitoring
- Phase order, phase failure
- Three-phase voltage monitoring
- 230 VAC, 3 × 400 VAC 50/60 Hz
- 1 change-over contact

KFT100/200

- Electric motor monitoring by PTC
- PTC short circuit monitoring
- PTC wire break monitoring with memory function (KFT200)
- 230 VAC
- 1 relay (NO contact, KFT100)
- 2 relays (change-over contact, KFT200)

KFE102 KFE300 KFE302

KFT100 KFT200

	Series	KFE102 /103 /300 /302				KFT100/200	
	Order number	KFE102NE1N	KFE103NE1N	KFE300NE9N	KFE302NE9N	KFT100JE1N	KFT200KE1N
Function KFE102/103/300/302							
	Voltage monitoring	•					
	Current monitoring		•				
	Monitors phase loss, order, asymmetry and under voltage			•			
	3-phase voltage monitoring (AC)				•		
	Memory function	•	•		•		
Setting KFE102 /103 /300 /302							
	Parameterisable, LCD display	•	•				
	Analogue			•	•		
Function KFT100/200							
	Engine monitoring by PTC					•	•
	Short circuit monitoring in the PTC					•	•
	Broken wire detection in the PTC					•	•
	Memory function						•
Reset KFT100/200							
	automatic					•	
	manual or automatic						•
Operating voltage							
	230 VAC	•	•			•	•
	3 × 400 VAC			•	•		
Output							
	1 relay (NO contact)					•	
	1 relays (change-over contact)	•	•	•	•		
	2 relays (change-over contact)						•
Function control							
	LED display	•	•	•	•	•	•

10.9 Display counter | Temperature display | Preset counter

Display counters
CXG2xx, CXG301

- Pulse counting, position display, frequency-/speed display, time meter
- Multiplier and decimal setting for scalable figures
- Set value for time meters and position display
- Max. counting frequency up to 60 kHz
- Programmable using 2 large keys

Temperature display
CXM201, CXM211

- Input for Pt/Ni 100, galvanically separated (CXM 201)
- Input for J, K, N thermo elements, galvanically separated (CXM 21)
- Defined characteristic line
- Automatic minimum-/maximum display
- Programmable using 2 large keys

Multifunctional preset counters
CXQ312, CXQ322

- Preset, batch or totalling counter
- 1 or 2 presets
- Scalable figures via multiplication and decimal factor
- Max. counting frequency up to 60 kHz
- Programmable via easy-to-use decade keyboard

CXG2xx CXG291

CXM2x1

CXQ3x2

	Series	CXG2xx / CXG301							CXM2x1		CXQ312				CXQ322			
	Order number	CXG201M4N	CXG211M4N	CXG212M4N	CXG221M4N	CXG231M4N	CXG291M4N	CXG301M4N	CXM201M4N	CXM211M4N	CXQ312M4L	CXQ312M4N	CXQ312V3L	CXQ312V3N	CXQ322M4L	CXQ322M4N	CXQ322V3L	CXQ322V3N
Mounting	Flush mounting	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Functions	One-channel, adding counting method	•									•	•	•	•	•	•	•	•
CXG2xx & CXQ3x2	Two-channel counting method, counting direction, difference, totalling, phase discriminator (single, double, 4 times)		•	•							•	•	•	•	•	•	•	•
	Rotation display, frequency display, speed display (1/sec, 1/min)				•						•	•	•	•	•	•	•	•
	Operating hours/timer meters with resolution in msec					•					•	•	•	•	•	•	•	•
CXG291	Current input 0…20 mA, 4…20 mA						•											
	Voltage entry 0…10 VDC, 2…20 VDC						•											
CXG301	Double function for pulses, frequency and time							•										
CXM201	Input for resistance thermometers Pt/Ni 100 Correction over the entire measurement area								•									
CXM211	Input for J, K, N thermo elements External/internal reference point compensation									•								
Display range	0…999 999	•			•	•		•										
	–199 999…999 999		•	•														
	19.999…99 999 freely programmable						•											
	Min/max value display						•		•	•								
	Temperature display in °C or °F with 1 or 2 right-of-comma positions								•	•								
	Standard LCD display											•		•		•		•
	Display backlight										•		•		•		•	
Reset	manual and electrical	•	•	•		•		•										
	Only min./max. value								•	•								
Counting inputs	NPN	•	•	•	•	•		•										
	PNP	•	•	•	•	•		•										
Outputs	1/2 relay outputs for 1/2 presets										•	•	•	•	••	••	••	••
	Optocoupling signal output at 0			•														
Supply voltage	10…30 VDC	•	•	•	•	•	•	•	•	•	•	•			•	•		
	90…260 VAC												•	•			•	•

10.10 Energy meters | Single and three-phase

Whether in shopping centres, housing complexes. on camping sites or in marinas, today's rising energy costs mean that increasingly consumption based energy billing is required instead of an all-inclusive charge.

Sais-Burgess Controls therefore offers a range of small, economical energy meters. These meters not only have a built-in mechanical counter, but also a pulse counter output for the central capture of energy data in a Saia® PCD and its automatic processing for individual billing on a PC.

Alternating current / three-phase electricity meters, electronic

ALD1/AAE1, 1 tariff

- 1-phase alternating current meter, 230 VAC, 50 Hz, 5 (32) A, or 10 (65) A
- 7-digit display, MID
- Display of energy only, or energy, current, voltage and power
- Resettable counter
- Accuracy class 1 as per IEC62053-21, or B as per EN50470-3
- Sealable with lead cap as accessory
- S0 output

ALE3, AWD3, , 1 or 2 tariffs

- 3-phase energy counter, 3 × 230/400 VAC 50 Hz, 10 (65) A, or 5 (6) A
- Direct measurement or through converter up to 6000 A
- 7-digit display, MID
- Display of energy only, or energy, current, voltage and power
- Resettable counter
- Accuracy class 1 as per IEC62053-21, or B as per EN50470-3
- Sealable with lead cap as accessory
- S0 output


ALD1


AAE1


ALE3


ALE3, 2 Tariffe

	Series	ALD1		AAE1	ALE3		AWD3	
	Order reference	ALD1D5F10KB2A00	ALD1D5F10KA3A00	AAE1D5F10KR3A00	ALE3D5F10KB2A00	ALE3D5F11KC3A00	AWD3D5W10MC3A00	AWD3D5W10ND3A00
Tariff								
	1 tariff	•	•	•	•		•	•
	2 tariffs					•		
Approvals								
	MID guideline		•	•		•	•	•
	without	•			•			
Nominal/maximum current								
	I_N = 5 A, I_{max} = 6 A						•	•
	I_N = 5 A, I_{max} = 32 A	•	•					
	I_N = 10 A, I_{max} = 65 A			•	•	•		
Measurement type:								
	Direct measurement	•	•	•	•	•		
	Conversion to 1500 A						•	
	Conversion to 6000 A							•
Operating voltage								
	230 VAC, 50 Hz	•	•	•				
	3 × 230/400 VAC, 50 Hz				•	•	•	•
S0 output								
	1000 pulses./kWh	•	•	•	•	•		
	10 pulses./kWh						•	
	1 pulse./kWh							•
Counters								
	Resettable		•			•	•	•
Display								
	Electromechanical			•				
	LCD energy only	•			•			
	LCD energy, current, voltage, power		•			•	•	•

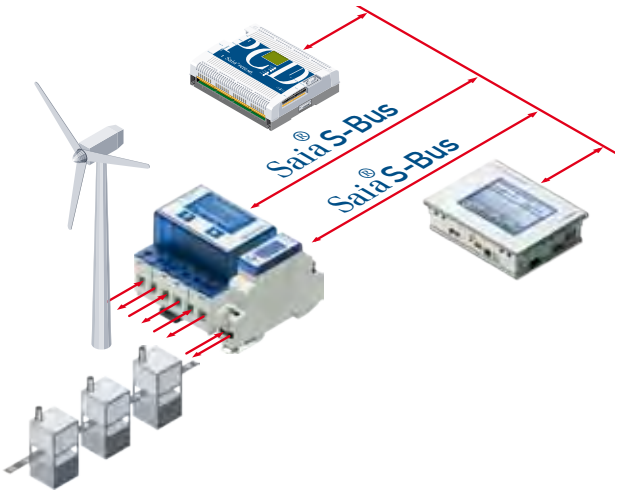
10.11 Energy meters | With integral Serial S-Net interface

Energy meters with an integral Serial S-Net interface allow direct reading of all relevant data, such as energy, current, voltage, power (active and reactive) and cosφ.

In addition, the following data can be called up via the Serial S-Net interface:

- Query total and partial energy
- Query current, voltage (active and reactive), power and cosφ

! Technical data as on previous page



ALD1 ALE3 AWD3

		Series	ALD1		ALE3		AWD3	
		Order reference	ALD1D5FS00A2A00	ALD1D5FS00A3A00	ALE3D5FS10C2A00	ALE3D5FS10C3A00	AWD3D5WS00C2A00	AWD3D5WS00C3A00
Tariff	1 tariff		•	•			•	•
	2 tariffs				•	•		
Approvals	MID guideline			•		•		•
	without		•		•		•	
Nominal/maximum current	I_N = 5 A, I_{max} = 6 A						•	•
	I_N = 5 A, I_{max} = 32 A		•	•				
	I_N = 10 A, I_{max} = 65 A				•	•		
Measurement type:	Direct measurement		•	•	•	•		
	Conversion to 1500 A						•	•
Operating voltage	230 VAC, 50 Hz		•	•				
	3 × 230/400 VAC, 50 Hz				•	•	•	•
Counters	Resettable		•	•	•	•	•	•
Display	LCD energy, current, voltage, power		•	•	•	•	•	•

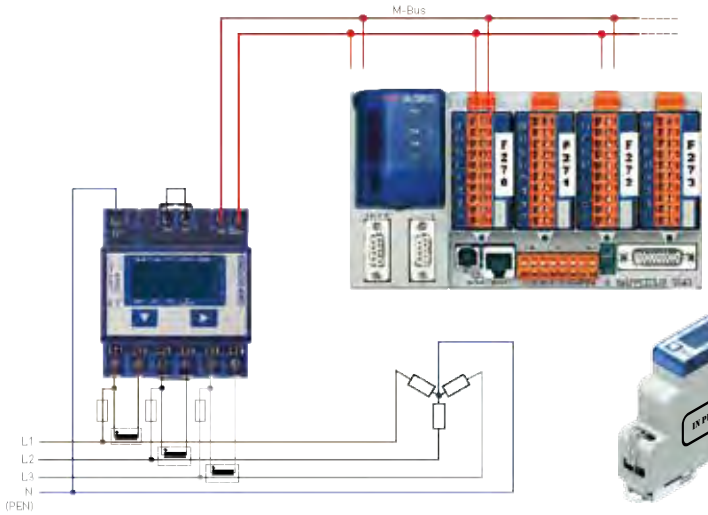
10.12 Energy meters | With integral M-Bus interface

Energy meters with an integral M-Bus interface allow direct reading of all relevant data, such as energy, current, voltage and power (active and reactive).

In addition, the following data can be called up via the Serial S-Net interface:

- Query total and partial energy
- Query current, voltage and power (active and reactive)

! Technical data as on previous page



ALD1 [1]

ALE3

AWD3

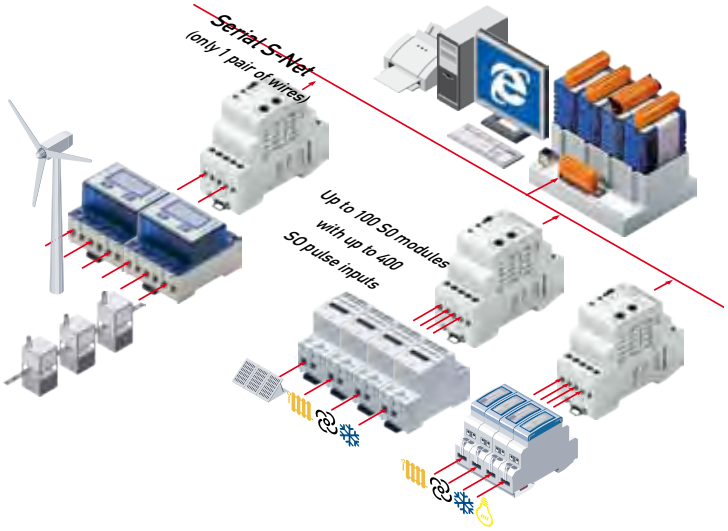
	Series	ALD1		ALE3		AWD3	
	Order reference	ALD1D5FM00A2A00	ALD1D5FM00A3A00	ALE3D5FM10C2A00	ALE3D5FM10C3A00	AWD3D5WM00C2A00	AWD3D5WM00C3A00
Tariff							
	1 tariff	•	•			•	•
	2 tariffs			•	•		
Approvals							
	MID guideline		•		•		•
	without	•		•		•	
Nominal/maximum current							
	I_N = 5 A, I_{max} = 6 A					•	•
	I_N = 5 A, I_{max} = 32 A	•	•				
	I_N = 10 A, I_{max} = 65 A			•	•		
Measurement type:							
	Direct measurement	•	•	•	•		
	Conversion to 1500 A					•	•
Operating voltage							
	230 VAC, 50 Hz	•	•				
	3 × 230/400 VAC, 50 Hz			•	•	•	•
Counters							
	Resettable	•	•	•	•	•	•
Display							
	LCD energy, current, voltage, power	•	•	•	•	•	•

[1] in preparation

10.13 Energy meter connection to Serial S-Net

With this interface module, Saia® energy meters or meters (water, heat) from other manufacturers can be directly connected via a serial link to automation stations. This allows for the efficient transmission, evaluation and forwarding of energy data.

Transfer of count pulses via Serial S-Net



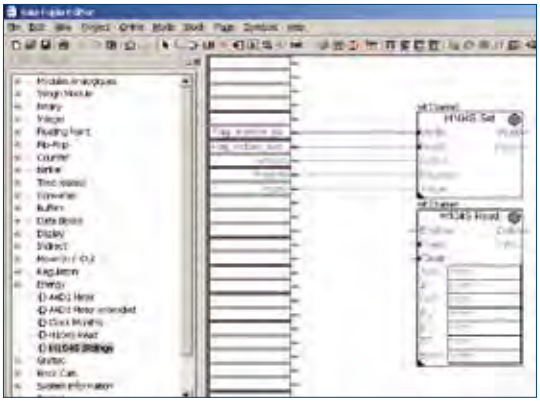
Low installation costs through transmission of individual consumption values via Serial S-Net

- Much lower installation costs with Saia® S-Bus S0 modules
- Up to 100 Saia® S-Bus S0 modules per Saia® PCD/PCS billing point
- Up to 400 meters (4 per Saia® S-Bus S0 module)
- 4 S0 pulse inputs (S01+…S04+) per Saia® S-Bus S0 module
- LED signalling: green = device-on indicator, rot = bus activity

Data transmission:

«Read and write instructions» are supported.
Registers are read and written to individually.
The default setting is «Automatic transmission rate».

The module has a voltage monitoring system that stores registers in EEPROM in case of power failure (S0 number of registers, transmission rate, etc.).



FBoxes H104S Set / Read. Download from www.sbc-support.ch

Convenient programming/parameter setting of energy meter networks with Saia® PG5 Fupla FBoxes

Technical details: S-Net

Bus system	Serial S-Net
Transmission rate	9600-19'200-28'800-33'600- 56'600
Transmission mode	Data
Maximum bus length	1200 m (without repeater)
Response time: (to system response)	Write: 200 ms Read: 10 ms
Reset time	200 ms

Technical data for Saia® S-Bus S0 modules

Order reference	PCD7.H104S
Operating voltage	230 VAC (-20/+15 %)
Current consumption	< 12 mA
Power consumption	< 3 W
Mounting	On DIN rail, 35 mm (EN 60715) Any mounting position
S0x, S-Bus, 230 VAC	0.5…2.5 mm²
Environmental conditions	
Operating temperature	-20 °C…+55 °C
Storage temperature	-25 °C…+70 °C
Humidity	25…40 °C 95 % rF. (according to IEC 60068-2-30)
LEDs	
Operating indicator	Green LED (On)
Function indicator	Red LED for bus activity
Protection type according to DIN 40050	IP 40 | IP 20 connections

11 Saia® S-Energy

IN PREPARATION

Saia® S Energy

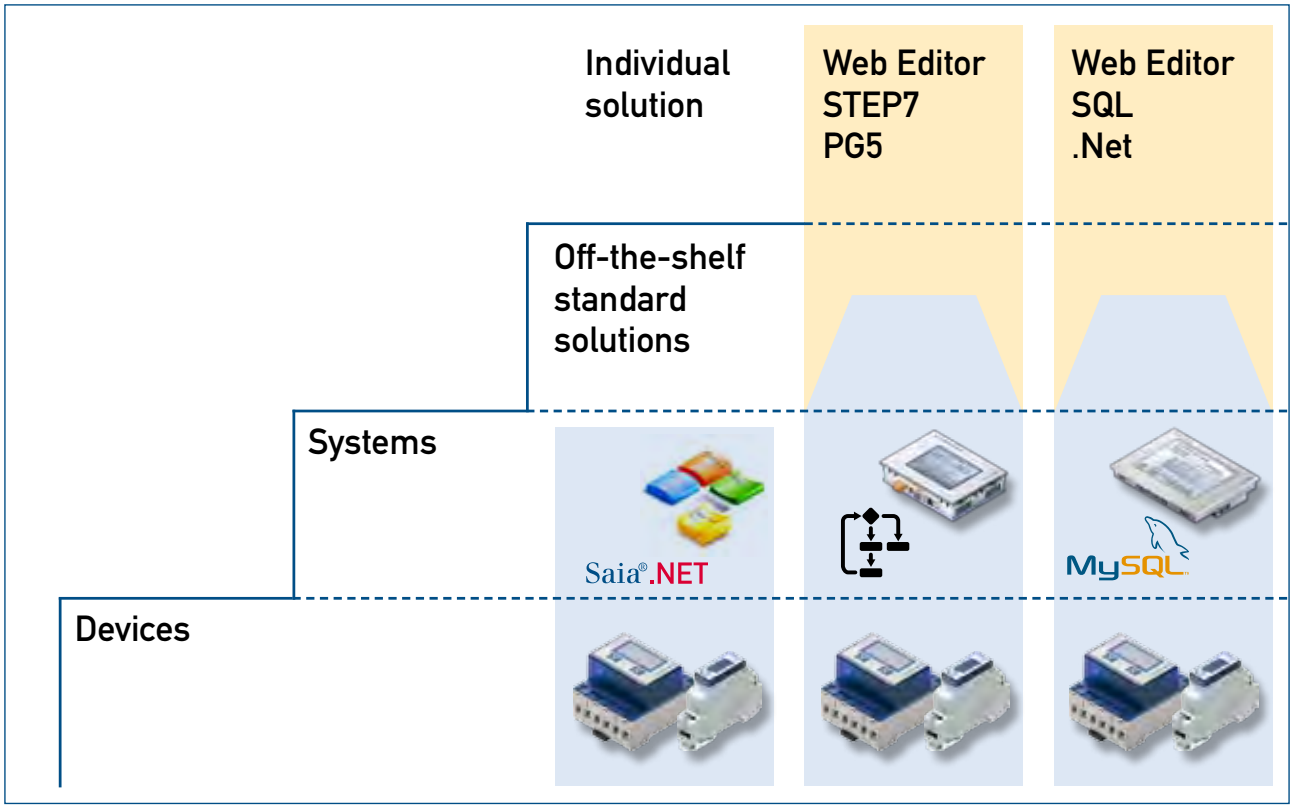
11.1 Saia® S-Energy Management
Capturing, visualising and managing energy

S-Energy from Saia-Burgess provides a set of products to capture and publish electrical consumption data. With S-Energy, both system integrators and manufacturers are ideally equipped to handle ever more demanding legal requirements and an increased need for information from operators.

Off-the-shelf solutions – open for individual tailoring

S-Energy encompasses off-the-shelf solutions for capturing, recording and publishing electrical consumption data. The individual components are ready to use right out of the box. The focus is on the greatest possible ease of use without any time-consuming configuration effort – no special tools are needed for commissioning, and all settings can be applied directly to the device.

The functionality of the off-the-shelf solution is based on standard Saia technologies, in the form of a Saia S-Web-Editor project. In practical terms, the user interface for the S-Energy Manager and S-Energy Logger can be flexibly customised using the Saia S-Web-Editor. The 'look and feel' and the functionality can then be tailored by the individual user, to include the company logo for example. The STEP7 programmable logic controller integrated into the S-Energy Manager also provides extensive scope for further logical/control functions such as a peak load cut-out or an e-mail/SMS alert when defined thresholds are exceeded.



Ready to go at all levels

S-Energy contains perfectly matched components for use at all levels of operation. From bus-enabled energy meters to control units with integrated logic functions and data capture with a database connection to your IT systems, S-Energy's end-to-end energy management processes cover the sensor/actuator, field and company levels.

Company level

- Saia® S-Energy Logger
- Capture
- Visualise
- Log
- Database connection

Field level

- Saia® S-Energy Manager
- Capture
- Visualise
- Log
- Control

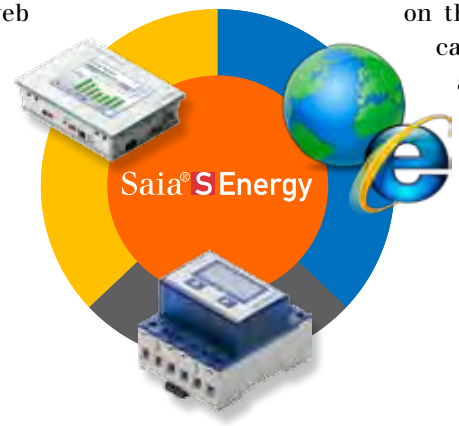
Sensor/actuator level

- Energy meters
- Bus-enabled for networking with automation systems
- MID approved

Experience and expertise

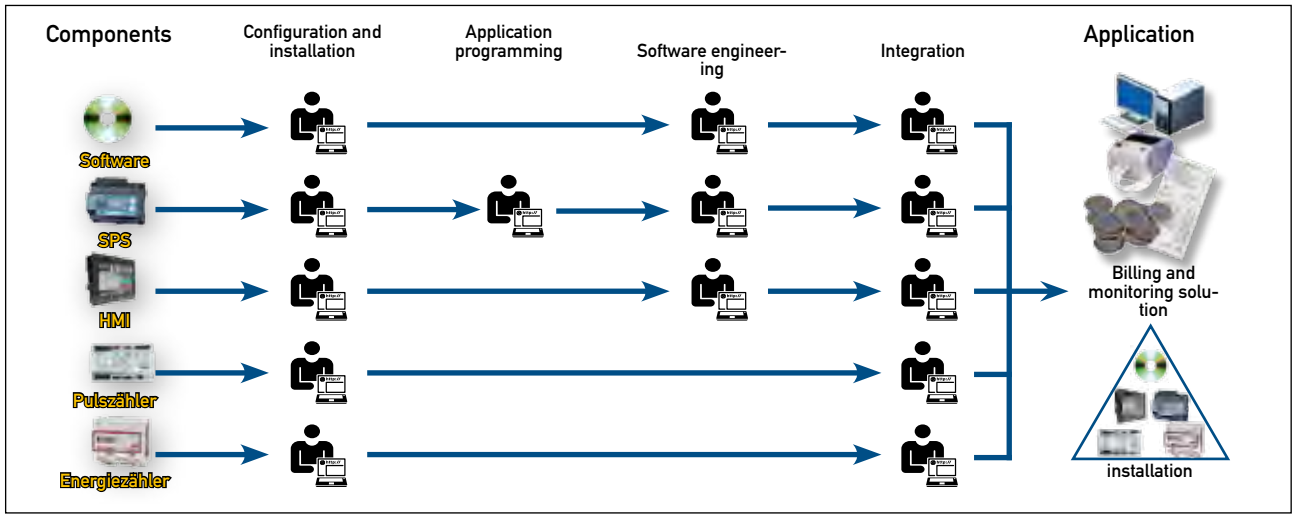
Saia-Burgess has been involved with energy meters for over 10 years. The first products in this area were domestic electric meters to be installed in fuse boxes. Ten years ago, Saia-Burgess also started to establish web-based operation and monitoring in the world of automation – today's web HMI system Saia S-Web. Over the last few years, the idea of running systems and machinery from a browser gathered pace, and the Web-Panel was born. All these areas of expertise have now found their way into the S-Energy concept:

Bus-enabled energy meters capture electrical consumption data, web-enabled control panels display the processed values and place them on the LAN or Internet, where they can be easily accessed with a PC and browser.



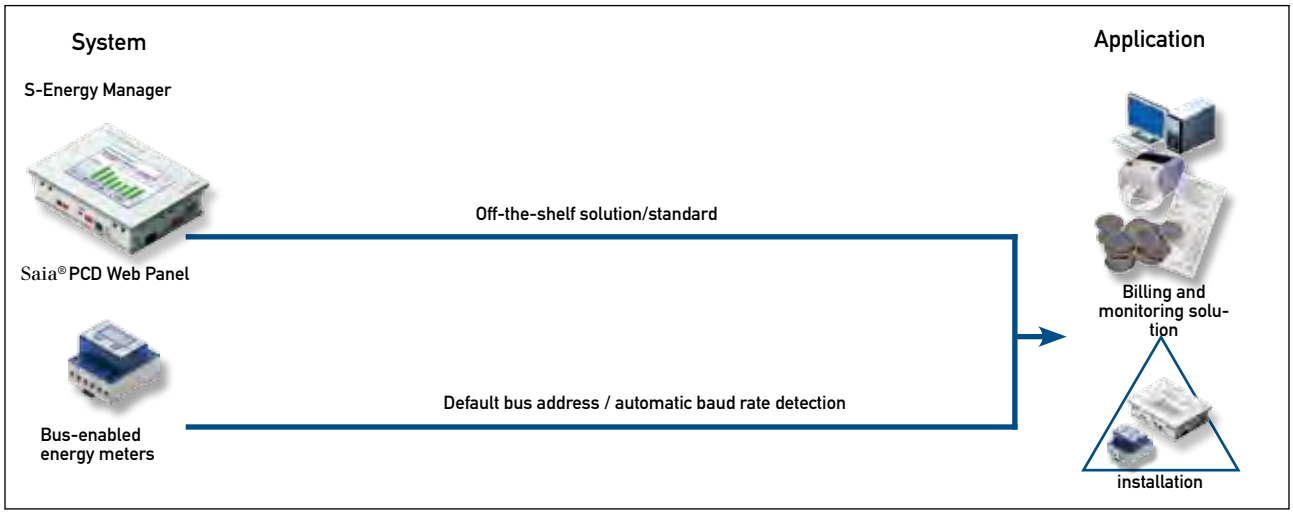
Cost transparency and energy optimisation made simple

Taking stock of your actual energy consumption can soon turn into a complex and expensive undertaking. With conventional technologies, the installation, operation and analysis of multiple energy meters involves significant integration effort. The result is usually complex, maintenance, intensive and error-prone, and trouble is inevitable.



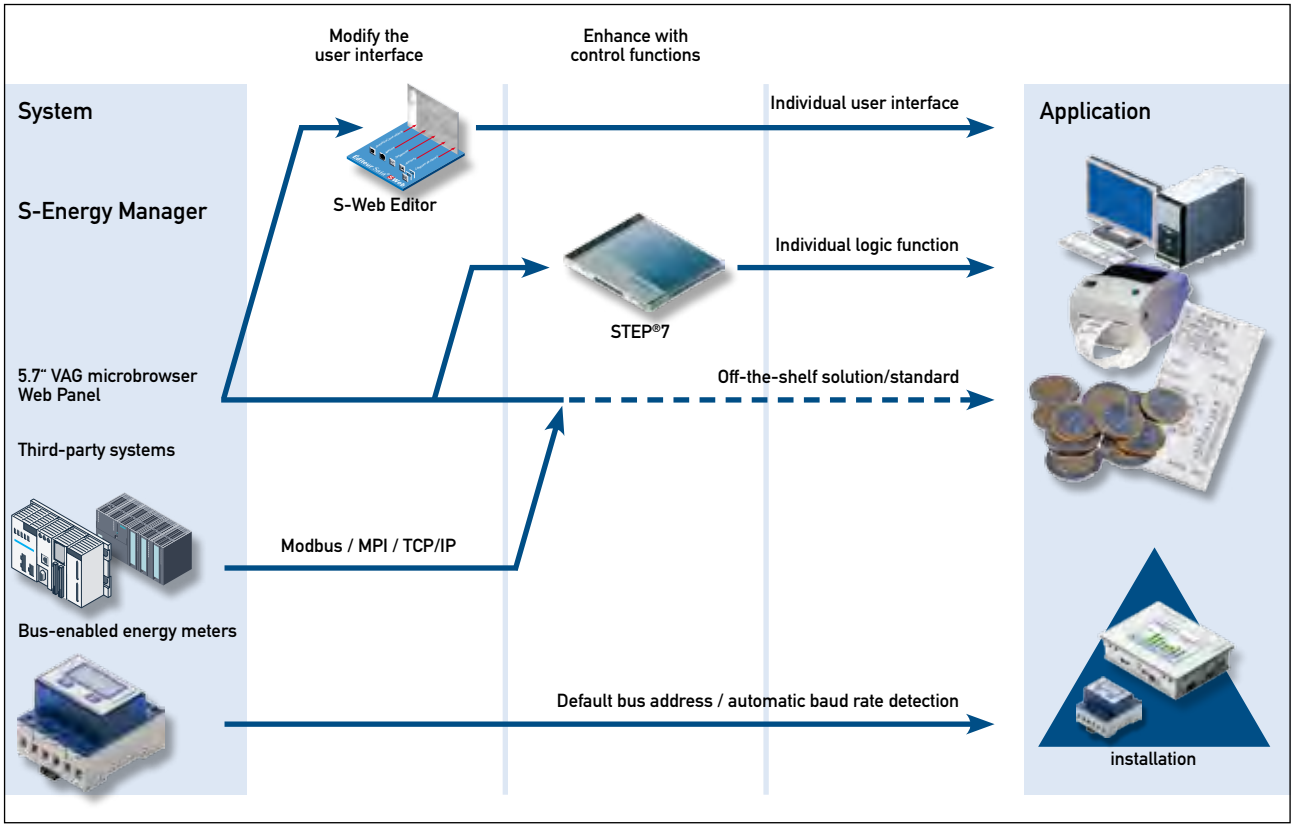
The situation today: an ill-assorted mix of different components from different manufacturers leads to great complexity and demands substantial integration work.

S-Energy significantly reduces the complexity of the process. The S-Energy Manager offers more functionality with fewer components. The whole installation is straightforward, maintenance and operating expenses are reduced to a minimum, and energy costs can be allocated and billed according to usage.



S-Energy: off-the-shelf solution - energy monitoring and management right out of the box, without any engineering effort. Connected energy meters and their communication parameters are detected automatically, and readings can be taken immediately.

If the standard functionality is not sufficient, the operation and functionality of S-Energy Manager and S-Energy Logger can also be precisely tailored to individual project requirements. With their comprehensive communication capabilities, integration into automation projects poses no problems at all. They can even be connected to third-party systems via Modbus or MPI (SIMATIC S7).



S-Energy flexible: modification and enhancement of standard functionality and provision of energy data to third-party systems (Modbus, SIMATIC S7)

11.2 Saia® S-Energy Manager
Graphical display of consumption data on-site

The S-Energy Manager captures electrical consumption data from bus-enabled energy meters and can be easily installed on-site, either in the switching cabinet itself or using a wall-mounting kit. The operator panel of the S-Energy Manager displays consumption data from the connected meters on a high-quality colour TFT screen. An intuitive user interface can be used to retrieve energy data such as electric power and work and to display costs in informative charts. The S-Energy Manager also records the input values in an Excel-readable CSV file, which can be easily transferred to a PC via FTP. The S-Energy Manager is ready for use immediately without any configuration effort. Connected electricity meters are detected automatically and displayed via the user interface.

- High-quality 5.7“ colour TFT display (VGA/640 × 480 pixels) with touchscreen operation
- Energy data collection
  - Current energy readings
  - Historical data recording (day/week/month/year)
  - Costs (day/week/month/year)
- Recording in Excel-readable CSV file on integrated SD memory card (1 GB)
- Up to 254 electricity meters can be connected; automatic detection with auto-scan

Ready to use out of the box

Off-the-shelf solution

Web visualisation

Built-in web server and Ethernet port enable integration into existing networks and communication via the Internet. The user interface can then be accessed from an office PC or even a mobile phone, providing access to usage data from anywhere:

- Local, on-site: Web Panel
- Factory/office: LAN/WLAN
- Global: Internet, telecommunications
- Mobile: PDA, iPad, iPhone, mobile phone

Individual design of user interface

The default user interface is produced with the standard Saia S-Web-Editor tool and stored on the S-Energy Manager as a project file, where it can be modified or enhanced at will.

- Customising the standard display
- Easy editing and development with the Saia S-Web Editor software tool

Logging of consumption data

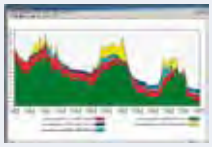
The S-Energy Manager records all values from the connected energy meters in a log file. The recording frequency can be set to a number of minutes. Log files can be read and processed in Microsoft Excel. The files are held in the S-Energy Manager file system and can be transferred to higher-level systems or PCs via the integrated FTP server.

- Data recording in Excel-readable CSV files
- Reporting and printout in Excel
- Access to log files via FTP
- Dispatch of log files by e-mail

Database connection

In conjunction with the S-Energy Logger, the consumption values captured by the S-Energy Manager can be passed on to SQL databases.

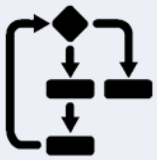
- Saving energy data in SQL databases with S-Energy Logger (optional))
- Supported databases: MySQL, Microsoft SQL Server

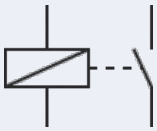


Integration into the control level

Control systems can access the consumption data stored in the S-Energy Manager via the S-Bus interface.

- Long-term data recording
- Visualisation

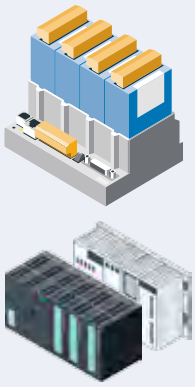




Usage-driven control function

The S-Energy Manager is fitted with a STEP7-programmable logic controller. Counter inputs for meters with a pulse output, digital 24 volt inputs and relay outputs are also included. All consumption values can be read off by the STEP7 program. This allows simple control functions, tailored to the individual application, to be developed.

- Logic controller for usage-driven control functions
- Peak load cut-out, alerts via e-mail and SMS, etc.
- Programmable with STEP7 from Siemens
- 3 digital 24 VDC inputs
- 3 digital 230 VAC relay outputs
- 3 24 VDC pulse inputs



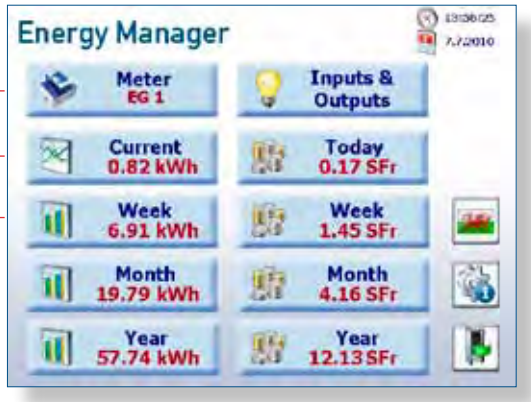
Capture of consumption values for SPS systems

More complex control functions are generally handled with remote controllers. Here, the S-Energy Manager acts as a data capture system for energy readings. With the right interfaces, even third-party controllers can communicate with the S-Energy Manager.

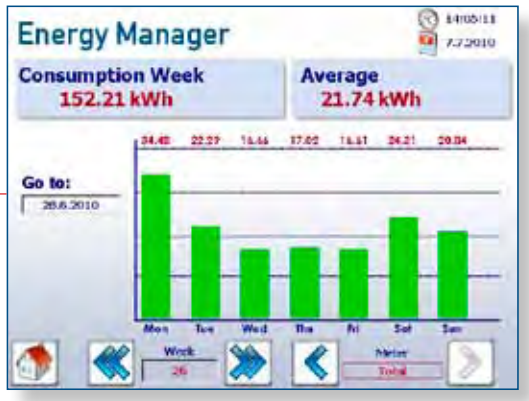
- Saia PCD controls via S-Bus
- SIMATIC-S7 via MPI
- Modbus

Integration and enhancement

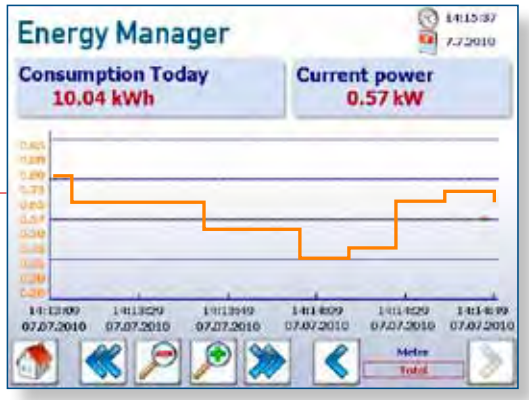
S-Energy Manager user interface



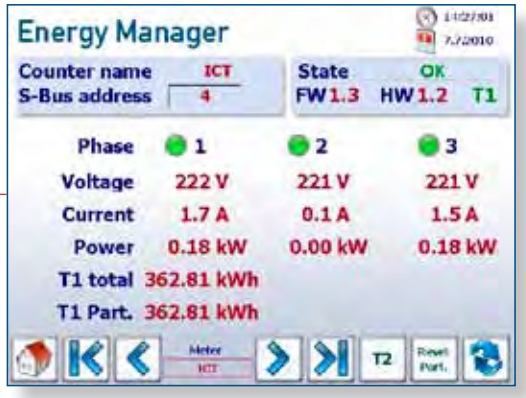
Main menu: all consumption values at a glance



Consumption and costs by week/month/ year, for each individual meter



Current consumption shown as a trend



Meter status, accessible separately for every connected meter

Technical data

Control panel

Display	5.7" colour TFT / 65,536 colours
Resolution (pixels)	VGA / 640 × 480
Operation	Resistive touch screen
Contrast adjustment	yes
Background lighting	LED

Interfaces and integrated servers

Ethernet 10/100M	× 1 RJ45
USB 12M	× 1 client
Serial 1	× 1 RS485 MPI
Serial 2	× 1 RS485 S-Bus
Server	Web server (HTTP D) FTP server

User interface

Technology	Predefined web pages, produced with Saia®S-Web-Editor
Display consumption values	– Current energy meter readings – Current and historical data recording of daily, weekly, monthly and annual values – Cost display by day, week, month or year
Remote access	LAN and Internet
Web-Server memory (for control pages)	4 MB Flash, internal

Energy data capture

S-Bus	Up to 254 energy meters
S-Bus configuration	Automatic; connected energy meters detected automatically
S0 counter signal	Up to 3 energy meters

Energy data recording

Logging	All values recorded in files retrievable externally via FTP
File format	Excel-readable CSV file
Memory	1 GB flash, SD card

Typical cases

Logic controller

Programming	STEP7 from Siemens
Energy meter data	Stored in data blocks (DBs)
Digital inputs	3× 24 VDC
Digital outputs	3× relays 250 VAC / 1 A
Digital counter inputs	3× 24 VDC (suitable for S0 counter pulses)

General details

Supply voltage	18…32 VDC
Power consumption	max. 500 mA at 24 VDC
Protection type	IP65 (front)
Dimensions (W × H × D) mm	202 × 156 × 50
Front aperture (W × H) mm	189 × 142
Temperature range	Operation: typ. 0...50 °C Storage: -20...+70 °C
Humidity	Operation: 10 to 80%, non-condensing Storage: 10 to 98%, non-condensing
Real-time clock	Battery-buffered
Battery for data buffering and real-time clock	Lithium Renata CR2032 (data retention 1…3 years)

Software tools

Graphical editor	Saia® S-Web Editor
SPS software	STEP7 programming tool from Siemens

*STEP is a registered trade mark of Siemens AG

Order information

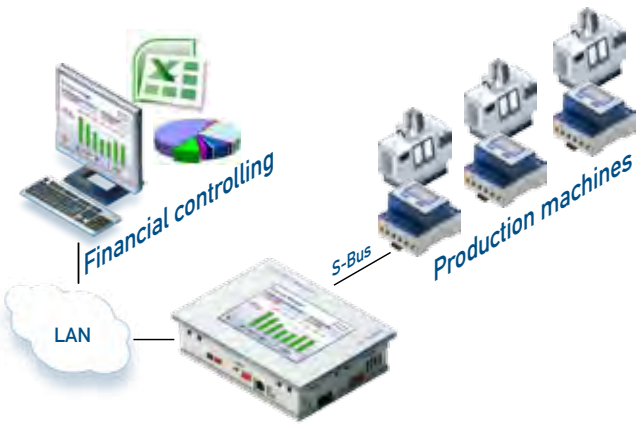
Type	Description	Weight
PCD7.D457ET7F	Energy Manager baseline version with S7 LC	1100 g

Sub-division of shopping malls for billing purposes

A shopping mall will contain several shops, sublet by the operator. The electricity costs incurred must be passed on to the shop-owners. For this, every individual store is fitted with at least one energy meter. As a special service 'on request', separate meters can be installed for e.g. lighting, cooler cabinets etc., to improve cost-transparency. The MID-compliant meters allow the consumption values to be used for billing purposes. All meters are connected to an S-Energy Manager installed in the main distribution frame for the premises. The readings can be taken locally by the caretaker on site or by the operator himself via LAN/Internet on the PC in his office.

Greater transparency of energy costs in live operation

A business with 40 plastic injection units no longer wants to allocate its energy costs at a fixed rate across all the products that it makes but to map them to individual product lines. The individual plastic injection units are each fitted with an energy meter and the readings are captured by an S-Energy Manager, which stores them in a log file. The log file (in CSV format) is read each week by the financial controlling group via LAN and FTP and reconciled against machine utilisation or production plans using Microsoft Excel.



11.3 Saia® S-Energy Logger
Store consumption values in databases

The S-Energy Logger is a software solution to capture, display and log electrical energy readings, precisely tailored to the Windows-based Web-Panel from Saia-Burgess. Electrical consumption values can be captured in two ways:

- S-Bus: energy readings captured from energy meters connected directly to the Web Panel (additional RS232/RS485 converter needed)
- Ethernet: energy values read from networked S-Energy Managers

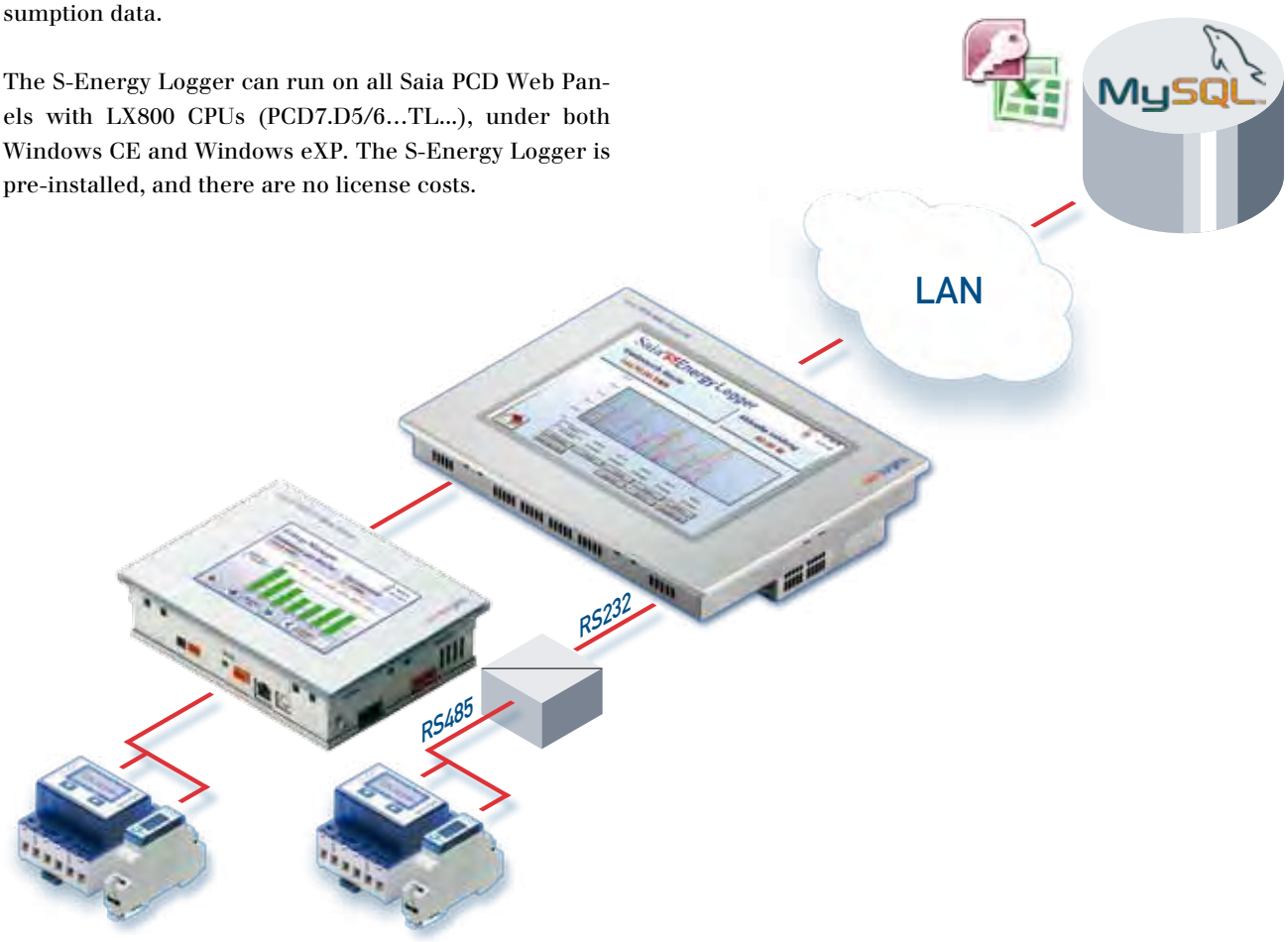
The S-Energy Logger logs consumption values in file, displays them in a web visualisation tool and transfers the values to SQL databases.

With its ability to store captured values in SQL databases, the S-Energy Logger is the ideal addition to higher-level energy management systems or commercial billing software. The decentralised local capture of electrical energy readings via a Web Panel on-site guarantees continuous data recording at short intervals. The provision of energy readings in SQL databases offers an IT-compatible interface for the central management and analysis of consumption data.

The S-Energy Logger can run on all Saia PCD Web Panels with LX800 CPUs (PCD7.D5/6...TL...), under both Windows CE and Windows eXP. The S-Energy Logger is pre-installed, and there are no license costs.

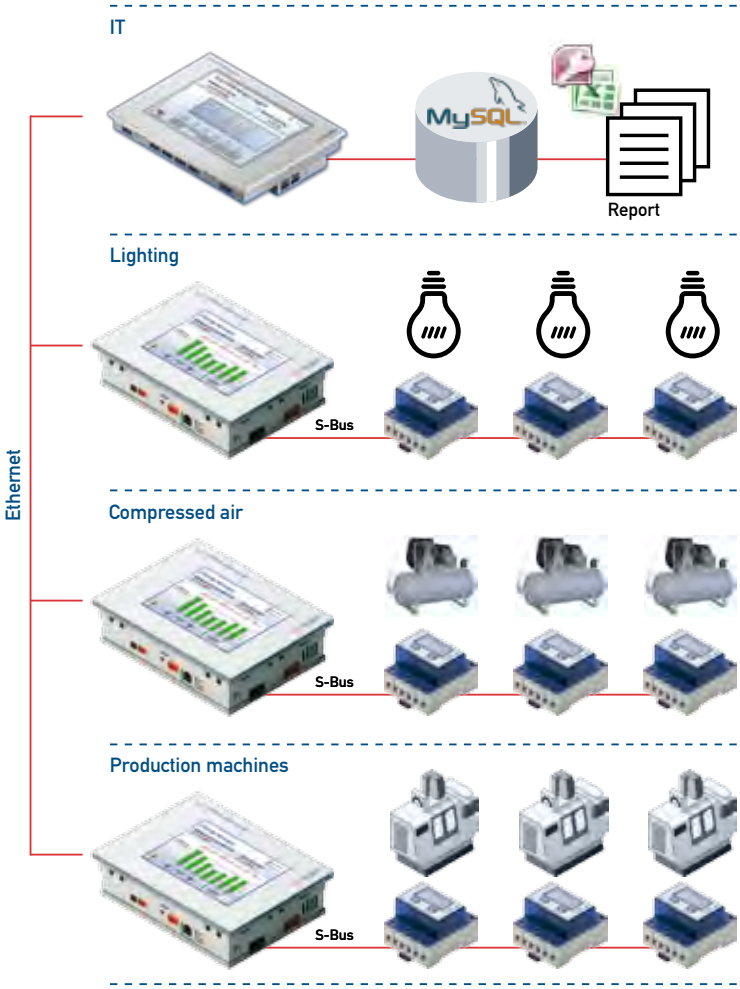
Features

- Capture electrical energy readings from S-Bus enabled energy meters
- Transfer consumption values from S-Energy Managers
- Output values on local display or in a standard browser via LAN and Internet
- Log data in Excel-readable CSV files
- Generate report files
- Pass energy values on to MySQL databases
- Elegant connection to energy management-systems and billing software
- Add-on function for Windows-based Saia PCD Web Panels with LX800 CPUs



Example of enterprise-wide capture or electrical energy readings

A manufacturing company captures the electricity consumption of production machines, compressors and lighting systems. The energy readings for the individual machines, compressors and lights are measured by separate energy meters and captured by locally installed S-Energy Managers. A higher-level S-Energy Logger takes the values from the S-Energy Managers and stores them in a SQL database. With a suitable front-end (e.g. Microsoft Access), monthly reports are generated from the database.



Technical data

Control panel

- Standard installation on Windows-based web panel with LX800 CPU
- Windows CE: PCD7.D5xxxTLx10 (10"/12"/15")
- Windows eXP: PCD7.D6xxxTLx10 (10"/12"/15")

Communication

- 2× USB / 2× Ethernet / 1× RS232
- Web server
- FTP server

User interface

- Predefined web pages, produced with Saia® S-Web Editor
- Current energy meter readings
- Current consumption shown as a trend

Energy data capture

- S-Bus: up to 254 energy meters, connected directly to web panel
- Ethernet: up to 254 energy meters via one or more S-Energy Managers

Energy data recording

- Slot for additional CFC memory card
- Recorded in Excel-compatible CSV files
- Report generation with template file
- Provision in local web-HMI server
- Energy values transferred to MySQL server

Order information

See section 5, pages 82 and 83

System Catalogue: type listing

Article	Weight [g]	Catalogue page
4 104 5754 0	240	–
4 104 7205 0	240	–
4 104 7238 0	160	–
4 104 7334 0	160	–
4 104 7338 0	160	104
4 104 7408 0	2	–
4 104 7410 0	243	104
4 104 7420 0	1	–
4 104 7427 0	150	104
4 104 7471 0	210	–
4 104 7485 0	1	–
4 104 7493 0	10	–
4 104 7502 0	8	–
4 104 7503 0	210	–
4 104 7504 0	210	–
4 104 7515 0	8	127
4 104 7539 0	150	–
4 104 7719 0	–	–
4 104 7720 0	–	–
4 108 4819 0	20	105
4 108 4836 0	2	–
4 109 4849 0	10	91
4 109 4881 0	25	81
4 111 4927 0	40	91
4 121 4910 0	70	84
4 310 8681 0	10	91
4 310 8686 0	–	127
4 310 8723 0	100	127
4 329 4819 1	1	127
4 405 4847 0	17	–
4 405 4848 0	26	–
4 405 4849 0	50	–
4 405 4850 0	35	–
4 405 4857 0	17	–
4 405 4869 0	9	–
4 405 4916 0	20	–
4 405 4917 0	20	–
4 405 4918 0	20	–
4 405 4919 0	20	–
4 405 4920 0	20	–
4 405 4921 0	–	–
4 405 4931 0	5	–
4 405 4932 0	6	–
4 405 4933 0	7	–
4 405 4934 0	8	–
4 405 4935 0	9	–
4 405 4936 0	11	–
4 405 4937 0	15	–
4 405 4938 0	15	–
4 405 4941 0	100	91
4 405 4952 0	15	127
4 405 4954 0	15	127
4 405 4955 0	15	–
4 405 4956 0	15	127
4 405 4995 0	12	127
4 405 4998 0	13	127
4 405 5027 0	6	127
4 405 5028 0	4	127
4 405 5048 0	6	127
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4 405 5056 0	–	–
4 405 5057 0	–	–
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4 405 5079 0	–	129 /131
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4 502 7126 0	12	–
4 502 7141 0	12	–
4 502 7175 0	12	–
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4 502 7224 0	12	–
4 502 7341 0	12	–
4 507 4817 0	10	105 /117 /127
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AAE1D5F10KR3A00	114	201
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AAE3D5F10PR3A00	114	–
AAE3D5F11PR2A00	114	–
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ALD1D5FS00A2A00	80	202
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ALE3D5F10KB2A00	217	201
ALE3D5F10KB3A00	217	–
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ALE3D5FS10C3A00	190	202
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Article	Weight [g]	Catalogue page
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AWD3D5WS00C3A00	190	202
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KFD12JVTN	116	195
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PCD1.M2120	420	8 /107
PCD2.A200	60	98 /114
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PCD2.A220	65	98 /114
PCD2.A250	65	98 /114
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PCD2.A400	40	98 /114
PCD2.A410	40	98 /114
PCD2.A460	30	98 /114
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PCD2.C2000	1040	109 /117
PCD2.E110	35	98 /114
PCD2.E111	35	98 /114
PCD2.E112	40	98 /114
PCD2.E116	35	98 /114

Article	Weight [g]	Catalogue page
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PCD2.E611	50	98 /114
PCD2.E613	50	98 /114
PCD2.E616	50	98 /114
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PCD2.F2700	60	51
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PCD2.F520	35	102 /104
PCD2.F522	40	102 /104
PCD2.F530	45	102 /104
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PCD2.G410	300	99
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PCD2.H110	45	–
PCD2.H112	24	100 /101
PCD2.H114	27	100 /101
PCD2.H150	20	–
PCD2.H210	50	–
PCD2.H222	25	–
PCD2.H310	35	–
PCD2.H311	35	–
PCD2.H320	100	–
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PCD2.K232	210	105 /117 /127 /192
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PCD2.K520	150	105 /117 /127 /194
PCD2.K521	150	105 /117 /127 /194
PCD2.K525	280	105 /117 /127 /194
PCD2.K551	350	105 /117 /127 /194
PCD2.K552	400	105 /117 /127 /194
PCD2.M110	860	8 /16 /97
PCD2.M150	920	8 /16 /97
PCD2.M150F655	965	97 /104 /175
PCD2.M170	950	8 /16 /97
PCD2.M480	950	8 /16 /97
PCD2. M480F655-2	1040	104

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PCD2.T814	120	103 /111 /107
PCD2.T851	120	103 /111 /107
PCD2.W200	35	99 /115
PCD2.W210	35	99 /115
PCD2.W220	40	99 /115
PCD2.W220Z02	40	99 /115
PCD2.W220Z12	40	99 /115
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PCD3.C100	100	95 /109 /117
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PCD3.C110Z09	250	129 /132
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PCD3.E160	65	98 /114 /124
PCD3.E161	65	98 /114 /124
PCD3.E165	65	98 /114 /124
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PCD3.E500	80	98 /114 /124
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PCD3.E613	65	98 /114 /124
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PCD3.F121	80	122

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PCD3.F180	80	122
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PCD3.F221	80	48 /122
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PCD3.H112	67	100 /115 /125
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PCD3.K106	170	95 /117 /129 /131
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PCD3.K225	185	117 /143
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PCD3.K281	140	193
PCD3.K283	140	193
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PCD3.M2130V6	880	8 /16 /129
PCD3.M2230A4T5	880	8 /16 /129

Article	Weight [g]	Catalogue page
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PCD3.M3230	400	8 /17 /120
PCD3.M3330	400	8 /17 /120
PCD3.M5340	560	8 /17 /121
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PCD3.M5540	560	8 /17 /121
PCD3.M5560	590	8 /17 /121
PCD3.M6340	560	8 /17 /121
PCD3.M6360	590	8 /17 /121
PCD3.M6440	560	8 /17 /121
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PCD3.M6560	590	8 /17 /121
PCD3.R010	30	125 /127
PCD3.R500	40	123
PCD3.R550M04	40	123
PCD3.R551M04	40	123
PCD3.R560	40	123
PCD3.R561	40	123
PCD3.R580	40	39
PCD3.R581	40	39
PCD3.R600	40	123
PCD3.S100	90	–
PCD3.T660	370	9 /144 /147
PCD3.T665	370	9 /144 /147
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PCD3.W200	60	99 /115 /125
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PCD3.W220	65	99 /115 /125
PCD3.W220Z03	65	99 /115 /125
PCD3.W220Z12	65	99 /115 /125
PCD3.W300	65	99 /115 /125
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PCD3.W350	65	99 /115 /125
PCD3.W360	65	99 /115 /125
PCD3.W400	60	99 /115 /125
PCD3.W410	45	99 /115 /125
PCD3.W525	80	99 /115 /125
PCD3.W600	60	99 /115 /125
PCD3.W605	80	99 /115 /125
PCD3.W610	45	99 /115 /125
PCD3.W615	80	99 /115 /125
PCD3.W625	80	99 /115 /125
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PCD3.W745	95	99 /115 /125
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PCD7.D231	400	10 /79 /91
PCD7.D231Z11	400	–
PCD7.D232	400	10 /79 /91
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PCD7.D3100E	40	112
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PCD7.D412-IWS	1260	81 /84
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PCD7.D457BTCF	1100	80
PCD7.D457BTCZ11	1100	–
PCD7.D457-IWS	1260	80 /84
PCD7.D457SMCF	1000	80
PCD7.D457SMCZ11	1000	–
PCD7.D457-OWS	–	80 /84
PCD7.D457STCF	1100	80
PCD7.D457STCZ11	1100	–
PCD7.D457VMCF	1000	80
PCD7.D457VMCZ11	1000	–
PCD7.D457VTCF	1000	80
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PCD7.D5150TL010	4100	83
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PCD7.D6100TL010	3700	83
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PCD7.D6100TM020	3700	–
PCD7.D6120TL010	3700	83
PCD7.D6120TLW10	3800	–
PCD7.D6120TM020	3700	–
PCD7.D6150TL010	3700	83
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PCD7.D6150TM020	3700	–
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Workshop Individual	–	–

Reference projects

Parking buildings
Railway stations
Banks
Office buildings
Breweries
Shopping centres
EXPO 2000
TV transmitters
Festival and event sites
Leisure and recreation centres
Hotels
Industrial facilities
Institutes
Cinemas
Churches
Power plants
Hospitals
Furniture warehouses
Museums
Private houses
Race tracks
Ships
Schools
Administrative buildings
Docks
etc.

Switzerland

Cadiom district heating, Onex
Sälipark shopping centre, Olten
Accor-Hotel, Berne
Kunsthaus, Zurich
Edipresse journal publishers, Lausanne
Road tunnel, A5
Grand Casino, Lucerne
Basic tunnel, Lötschberg
Stadthalle, Zurich
Hospital, Davos
Family Park, Embrach
University, Zurich
Metropole shopping centre, La Chaux-de-Fonds
etc.

Germany

Atlantis leisure pool, Neu-Ulm
Daimler Chrysler, Rastatt/Sindelfingen
EDEKA Center, Hamburg
Lidl stores, throughout Germany
Thermal baths, Bayreuth
District heating, Straubing
Zoo, Hanover
Deutsche Telekom Property, throughout Germany
University campus, Münster
Ritz-Carlton Hotel, Berlin
Müller chemist shops, throughout Germany
Winterberg clinics, Saarbrücken
GENO building (banking centre), Stuttgart
etc.

Austria

Admiral gambling, Vienna
Schwarzenberg barracks, Schwarzenberg
EU patent office, Vienna
Forensic Science, Salzburg
Telekom Head Office heating stations, Wien
Hospital, Lainz
Secondary School, Neumarkt
Sports Center, Traun
University Campus, Krems
University, Salzburg
Technology Park, Vienna
Readymix Fertigteile GmbH, Vienna
Hospital, Mittersill
etc.

France

Accor Building, Evry
Communal Administration, Nantes
Cultural Centre, Rennes
EI Building, Lyon
Hospital, Montpellier
Hospital, Nantes
Prison, Liancourt
etc.

Italy

European Space Agency, Frascatti
Hotel Tower, Cagliari
Hotel Villa Cimbrone, Ravello
Modern Art Gallery, Torino
Palaghiaccio (Olympic Games 2006), Pinerolo
Shopping centre Auchan, Volla and Giugliano
Hospital Accident and Emergency Department, S.Antonio, Padova
Town Hall – Nursery School – Fire Brigade, Corvara
Reale Mutua Insurance, Torino
Town swimming centre, Bressanone
Railway station, Padova
Technology Offices, Rozzano
Italcuscinetti Head Office, Rubiera
Town Theatre, Modena
etc.

Benelux

High Tech Campus, Eindhoven
Luxembourg Center, Kirchberg
Swimming centre, Velzen / Woerden
Flower Market Flora Holland, Naaldwijk
Flower Market Bloemenveiling, Aalsmeer
Flower Market Flora Holland, Rijnsburg
Hospital, Twenteborg
University hospital AMC, Amsterdam
KPN Cyber Centre, Amsterdam
Gefängnis, Vught / Grave
Steueramt, CJIB Leeuwarden
Financial Office, Apeldoorn
Lidl, Etten-Leur
SCANIA, Zwolle
etc.

Hungary

Airport, Budapest
Police station, Budapest
Sports Center, Györ
etc.

Scandinavia

Arla Milk Production, Vimmerby
Pharma Astra Zeneca, Gothenburg
Ersmark School, Umeà
Hospital, Mälarsjukhuset
Hospital, Nyköping
NK Shopping centre, Stockholm
Power Generation, Eskilstuna
Subway, Stockholm
Kattem Water Distribution, Trondheim
K-Rauta 75 Building, Helsinki
Lentoasema Building, Rovaniemen
etc.

Czech Republic

Hotel L'Opera, Prague
IKEM Hospital, Prague
Metro, Prague
Military Hospital, Prague
Nuclear factory, Dukovany
University, Prague
Skoda, Mlada Boleslav
Transgas, Prague
etc.

Poland

Air traffic control centre, Mielec
Fire brigade, Szczecin
Cultivation house, Silesia
Hospital, Szczecin
etc.

Portugal

Continente Supermarket, Oporto
Shopping centre, Loures
TAP, Lisbon
etc.

China

Pharmaceutical factory, Tianjing
Fanlin Center, Hong Kong
Stadium, Guanzhou
Jayin Building, Meizhou
Sony Factory III, Huizhou
Terra Cotta Museum, Xian
etc.







saia-burgess

Control Systems and Components

Saia-Burgess Controls AG
Bahnhofstrasse 18 | CH-3280 Murten | Schweiz
T +41 26 672 71 11 | F +41 26 672 74 99
www.saia-pcd.com | pcd@saia-burgess.com