Manual



BACnet for the PCD series

Controls Division

Document 26/849; Version E2 | 2007-10-18

0

0	Index	
0.1	Document history	0-3
0.2	Trademarks	0-3
1	Introduction	
1.1	Purpose of this document	1-1
1.2	What is BACnet.	1-1
1.3	The ISO/OSI-Model	1-1
1.4	BACnet device profiles	1-1
1.5	BACnet standard objects	1-2
1.6	BACnet services	1-2
1.7	Description of a service: BIBB	1-2
1.8	Description of a device type: PICS	1-2
2	BACnet implementation of the PCD	
2.1	Supported controllers, Requirements and Limitations	2-1
2.2	Limitations	2-2
2.3	Tool Requirements	2-2
2.4	PCD Data model in BACnet	2-2
2.5	PCD Time Model	2-3
2.6	Modem drivers	2-3
3	Basic Workflow	
31	Overview of the basic Workflow of a BACnet Project	3-1
3.2	Engineering of Liser Program	3-1
3.3	Selecting all necessary Information for BACnet	3-1
3.4	BACnet Configurator Overview	3-2
3.5	Generation of Devices	3-3
3.6	Generation of Server Objects	3-5
3.7	Generation of Client Objects	3-5
3.8	Assigning PCD Resources to BACnet Properties	3-6
3.9	Parameterize Properties	3-6
3.10	The Build Process	3-7
3.11	Download and Upload	3-8
3.12	EDE Export	3-10
3.13	EDE Import	3-10
4	Advanced Features	
4.1	Generating an Assignment of a Series of Objects	4-1
4.2	Manual Operation with D23x. Web and BACnet	4-3
4.3	Alarming over BACnet and Fupla Boxes	4-4
4.4	Trending	4-4
4.5	Backup / Restore	4-4
4.6	Advanced Client Configuration	4-4
4.7	Time Master / Slave	4-6
4.8	Time Zone Setting	4-7
4.9	BBMD/FD	4-7
4.10	Modem Communication	4-9

4.11	Excel Export/Import	4-11
5	Maintenance	
5.1	Firmware Update	5-1
5.2	History List Error Messages	5-3
5.3	Transmission Logging	5-3
5.4	Literature	5-4
Α	Appendix	
A.1	Icons	A-1
A.2	Address of Saia-Burgess Controls AG	A-2

0

0.1 Document history

Edition	Publication	Changed	Modifications Remarks
PE1	01.10.2006		Preliminary Edition
PE2	31.03.2007		Additions to PE1
E1	01.06.2007		Few changes to PE2
E2	18.10.2007	Ch 2.1 Ch 2.2 Ch 2.3 Ch 2.4 Ch 4.6	New controllers, Limitations added Configurator version 1.4.1.0 ► 1.4.1.3 New values for the example Note added New screenshot, text added

0

0.2 Trademarks

Saia[®], Saia[®] PCS and Saia[®] PCD are registered trademarks of Saia-Burgess Controls AG.

BACnet is a registred trademark of American Society of Heating, Refrigeration and Air-Conditioning Engineer (ASHRAE).

Technical modifications and changes are subject to the state of technology

Saia-Burgess Controls AG, 2006.

© All rights reserved

Published in Switzerland

1

1 Introduction

1.1 Purpose of this document

This document contains all available information helping to implement a BACnet device on a Saia[®] PCD and integrating it into a BACnet network.

1.2 What is BACnet

BACnet is the abbreviation of Building Automation and Control Network

BACnet is a data protocol for the exchange of data between different systems and devices in the field of building automation

BACnet describes the projection of objects and ist interaction with other objects and not their internal functionality

BACnet is a registered trademark of ASHRAE

1.3 The ISO/OSI-Model

	1	BACnet La	yers			Equivalent OSI Layers	
	BACnet Application Layer						
	Network						
ISO 8802-2 (IEI Type	EE 8802.3) 1	MS/TP	РТР		BVLL	Data Link	
ISO 8802-3 (IEEE 802.3)	ARCNET	EIA-485	EIA-232	LonTalk	UDP/IP	Physical	

BACnet is defined for several physical layers. BACnet/IP has only later been added to the original group.

1.4 BACnet device profiles

Today 6 device profiles are defined with BACnet: BACnet Operator Workstation (B-OWS) BACnet Building Controller (B-BC) BACnet Advanced Application Controller (B-AAC) BACnet Application Specific Controller (B-ASC) BACnet Smart Actuator (B-SA) BACnet Smart Sensor (B-SS) For each device profile certain services are mandatory

1

1.5 BACnet standard objects

ANSI/ASHRAE 135-2004 defines 25 BACnet standard objects Further objects are in the process of notification

Data point oriented objects: Analog / Digital / Multistate Input / Value / Output

User data oriented objects: Calendar, Group, Schedule, Trendlog

Program oriented objects: Device, Command, Program, Loop, Notification Class, Accumulator, Average, Pulse Converter

Filehandling (File) und Alarmhandling (Alarm Enrollment)

Life Safety objects: Life Safety Point, Life Safety Zone

1.6 BACnet services

All services are client server applications

Each device can act simultaneously act as client and server

BACnet services are divided into five segments:

- 1) Object access
- 2) Filetransfer
- 3) Alarm- and event-functions
- 4) Remote device management
- 5) Virtual terminal

For each device profile certain services are mandatory

1.7 Description of a service: BIBB

Annex K of the BACnet standard defines all services in a formal way using the term "BACnet Interoperability Building Blocks"

Each BIBB is defined either from the Client (-A) or the Server (-B) Part.

Example: DS-RP-A is the description of the **D**ata **S**haring **R**ead **P**roperty Service (Client) whereas DS-RP-B describes the Server part of the same service.

1.8 Description of a device type: PICS

A PICS is a document with a given structure defined in Annex A of the BACnet standard.

This is a publicly available document summarizing the functionality contained in a well defined device type, such as pysical layers, objects and services supported.

The current version is 1.5: 26-848_E5_PICS_BACnet-PCD3.pdf

2 BACnet implementation of the PCD

2.1 Supported controllers, Requirements and Limitations

The following Controllers are supported and have been tested by WSPLab to comply with the BACnet Standard:



PCD3.M6340

PCD3.M6540

All information with respect to BACnet is stored on a Flash Memory. This is available in 4 Versions:

- PCD3.R560 and PCD7.R561 for the PCD3.M3120 and PCD3.M3330
- PCD7.R560 and PCD7.R561 for the PCD3.M5340, PCD3.M5540, PCD3.M6340 and PCD3.M6540

2

Limitations | Tool Requirements | PCD Data model in BACnet



The BACnet firmware will be downloaded with the same tool as the PCD3 main firmware.

2.2 Limitations

The amount of usable BACnet Objects depends on the CPU Performance of the PCD3 System.

If you have a lot of communication or other CPU intensive applications the amount of objects decreases significant.



Always take care to limit the amount of objects regarding to the CPU performance!



We recommend to use not more than 800 BACnet-Objects in one PCD3.

2.3 Tool Requirements

2.3.1 PG5

A PG5 1.4 SP 120 or higher is required.

2.3.2 Configurator

A Configurator Version 1.4.1.3 or higher is required.

2.4 PCD Data model in BACnet

2.4.1 Binary Data

A Binary property of the BACnet can either be mapped to a Flag or with an Input/Output.

2.4.2 Integer Data

An Integer property of the BACnet can be mapped to a Register. Converting of IEEE (BACnet floating point format) and Saia[®] Integer (PCD format) is done with the scale of the BACnet configuration.

Ex: Scaling Factor in 10, BACnet Value is 47.7 so the register contains the value 477.

The COV Increment is always related to the BACnet Value.

2.4.3 Text Data

To show text data is only possible as text of a PCD.

2.4.4 Trendlog Data

Trendlog data can be stored either in the SRAM or on a flash file system.

The location can be changed in the Log Buffer property:

2-2

PCD Time Model | Modem drivers

2

Symbolreference:		
Addressreference:		
⊙ Value:	M1_FLASH:/Trend-Log-Data	
Flags:		

Value is: - SRAM for SRAM Trendlog data ¹⁾

- M1_FLASH:/Trend-Log-Data for Slot M1 ²⁾

- M2_FLASH:/Trend-Log-Data for Slot M2 2)
- SL0FLASH:/Trend-Log-Data for IO Slot 0²⁾
- SL1FLASH:/Trend-Log-Data for IO Slot 1²⁾
- SL2FLASH:/Trend-Log-Data for IO Slot 2²⁾
- SL3FLASH:/Trend-Log-Data for IO Slot 3²⁾

¹⁾ Ring buffer only possible with SDRAM (Trendlog Property STOP_WHEN_FULL→FALSE)
 ²⁾ No ring buffer possible (Trendlog Property STOP_WHEN_FULL→TRUE)

2.5 PCD Time Model

Over BACnet the PCD can show either local time or UTC. However the PCD shows only local time (with RTIME or PG5!)

The time zone is configuring in the timezone property of the device object.

Attention: The time zone will store if the time will set. This can be done either over the PG5 or a BACnet GLT.



Make sure to set the time with PG5 after first download of a BACnet Project to the PCD!

2.6 Modem drivers

It is possible to use the same Modem for S-Bus and BACnet. The modem configuration will do in the PG5 Modem settings. To use the modem also for BACnet the PTP settings in the BACnet configurator is used. The FW detects then itself it the call is coming from a S-Bus Client or BACnet!

3 Basic Workflow

3.1 Overview of the basic Workflow of a BACnet Project

The following covers all basic steps of generating a simple BACnet device. All advanced features including all efficiency functions are covered in Chapter 4.

After the application program has been written and all needed information has been gathered in global symbols, the BACnet configurator is started. After configurating the identity of the BACnet device the required objects are created.

It's properties can either being mapped to PCD recources for On-line changing from within the PCD3 or the value can be configured with a fixed value or with a variable value which later can be accessed and changed from within a BACnet client.

The configuration will be compiled after the program has been linked and is downloaded separately to the PCD3 where it is stored directly on the BACnet Flash.

3.2 Engineering of User Program

If a strong linking of the Fupla program with the BACnet mechanisms is not required, the program can be written prior of the configuration of the BACnet Projection.

Exceptions are when a user interaction is superseding (overwriting) a result of the program logic. Here special Fupla FBoxes are required in order to allow the BACnet priority mechanism to interact with the Fupla program.

3.3 Selecting all necessary Information for BACnet

Any information on BACnet needs to be either a global or a system variable. A structured view of all resources does help during commissioning!



The usage of groups of symbols not only helps better structuring the data but also enables usage of Templates to faster create and parametrize objects. More details refer to Chapter 4.11.

3.4 BACnet Configurator Overview

The BACnet configurator contains all information necessary for the BACnet communication.

S New File [Erzeugung Ost]	X
File Name:	
Heizung	
Directory:	
C:\PG5_1_4 Projects\BACnet Testproject\Erzeugung Ost	
File Type:	
FMS Network Files (*.prf) Watch Window Files (*.5ww) Data Transfer Files (*.dt5) HMI Eile (*.kmi)	^
Web Server Project (*.wsp) Web Editor File (*.prj)	
BAUNet Hile (".bnt)	×
Description:	_
	<u>^</u>
	~
I Build I Open file now	
Help OK Cancel	

It is started by clicking on an existing configuration in PG5 or by selecting the "New" function in the "File" menu. In the dialog box select BACnet as File Type and give it a name.

Since this tool is supposed to help both newcomers to BACnet and Experts there are also two levels of engineering:

The "Standard View" will only present a reduced set of parameters for the User but is sufficient for simple projects.

The "Expert View" will present all parameters, also those which requires a skilled user such as Modem Configuration and others.

3

Generation of Devices

DACINELIDIII [PCD5_07] - DACI			كالكالك
Tojett Edit Coninguration view Her	P		
i z 🖷 👘 " – 🚺 🧃	1 X 8		
D PCD3_69_Demo [DE 69]	Name	Value/Link	
	Location	Murten	
	Description		
	Max APDU Length Accepted	1476	
	APDU Segment Timeout	2000	
	APDU Timeout	3000	
	Number Of APDU Retries	5	
	Time Synchronization Recipients	0	
	Restart Notification Recipients	<u>111</u>	
	Backup Failure Timeout	60	
	Profile Name		
	Time SyncMode	SLAVE	
	Timezone	CET-01CEST-02,M3.5.0/2,M10.5.0/2	
	Password RD DCC		
	Default Log Buffer		

The Main Window is separated in two main fields. At the left part, all devices and its containing objects are displayed. On the right part the Properties of the current object on the left side are displayed.

Double clicking on a property will display a specific dialog box to configure this property.

A special dialog box will configure the "Data Link" configuration but since this requires advanced skills this dialog is not available in the "Standard View".

3.5 Generation of Devices

BACnet relies strongly on Client-Server architecture. Hence both parts are also configurable with the PCD3:

A Server device will store all necessary information of all objects and its properties for access of a client.

The client device is not a device object but represents all information regarding the communication with a specific (external) server device and its objects.

Parameterizing the (Server) Device object in standard mode is fairly simple since only the description and the location of the device can be entered. In "Expert" Mode the time zone, the Time Master/Slave configuration and some parameters regarding communication behavior and telegram length can be changed.

Generation of Devices

🖻 🖩 💊 👟 📍 👘	Blue
	Nana VakeVink
	New Device
	Server Client Geret
	Nane: Heburg
	Templete [5]Dafwid_DE Imp
	OK

The (Slave) device object offers the possibility to Enable/Disable the complete communication to a specific server and to attach this to a PCD Flag. A register can also be attached to the communication status information.

1 🖬 🖬 🐁 📥 🗕 😵	The	
H D Sala PCD3 61 IDE 61	New Device	1.0
	Server/Client	
	C Server (-> C Server	
	Device ID: 65	
	Name:	
	Templates (5) Default_DE.brp 🔽	
	Z DK Cancel	
	MexAPDU Length Accepted 1475	
	Segmentation Supported 0	1

For each Server connection also two properties can be mapped to PCD Ressources:

- Setting the Flag "Communication Enabled" to the Value "True" will initiate the communication to the server and keep all COV subscription concurrent. Setting the Flag to "False" will immediately terminate the communication by first trying to de-subscribe all COV subscriptions.

- A register "Communication Status" represents the state of the communication:
- 0: Communication not established
- 1: Initiating Communication
- 2: Communication using Polling established
- 4: Communication using COV established
- 9: Communication Error

3.6 Generation of Server Objects

Server Objects are generated using a template, either the default template for this object or a user defined template which better suits for the intended purpose.

Project Eds. Computation new	1112				
D 📽 🖬 🔩 🌯 🗕 📍	Film:	-			
- D Helzing [DE 14]	Name		Value/Lir	nk	~
	Vendor Name		SAIA		
	Vendor Identifier		99		
	ModelNane.		PC03		
	E Farmer Bradine		Einsteine	20.0	
	New Object				
	Objectype:	Analog in	put.	•	
	Number of Objects	1		-	
	Naros.	Analog In	put (0)	_	
	FistInstancenumber	0		-	
	Incereentvalue:	1		-	
	Template:	[S]Deta	≬_Al.brp		
		OK.	T Car	ncal land	
	VPDLL Segment Time	ere d	2000		
	APDU Timeout	0.048	3000		
	X Number OF APDU R	etries	5		
	List Of Session Keys				
	Time Synchronization	n Recipients	0		
	Max Master				
	Maxinfo Franceo				v

In "Standard View" only a small part of the Properties are visible, all required properties will be parameterized with useful default values.

Besides the Object ID and name also some general selections can be made at this stage. A Checkbox to select "Intrinsic Alarming" and a "Commandable Present Value" is displayed where appropriate.

For the Generation of several objects at the same time also the position of an index variable in the object name can be made.

3.7 Generation of Client Objects

In "Standard View" only the "Present Value" of an object can be selected. All parameters regarding how the communication is set up are only visible in "Expert Mode" where also all possible properties are visible.

🖾 Untitled2.hnt* [Erzeugung Ost]	BACnet Configurator	r.	
Projec Edit Configuration West Help	New Object		
	Dbjecttype:	Binary Input	
	Number of Objects:	1	
	Nane:	Binaty Input (0)	
	First Instancenumber:	0 🚊	
	Incrementivalue	1	
	Template:	[S]Default_CL.bnp	
		OK Cancel	
	- <u> </u>		
Number of Objects: 0			15

3.8 Assigning PCD Resources to BACnet Properties

Each simple type variable can be assigned to a PCD resource:

A Flag for any binary information

A Register for any integer value

Image: Instant Present Value 0.000 Wat: Image: Instant Present Value Image: Instant Present Value Image: Instant Present Value Advectories rec: Image: Instant Present Value Advectories rec: Image: Instant Present Value Advectories rec: Image: Instant Present Value Image: Instant Present Value Image: Instant Instant Present Value Image: Instant Present Value Image: Instant Instant Present Value Image: Instant Present Present Instant Present Instant Present Instant Present Instant Present Instant Present Pre	D) Heigung [DE 14]	Name	Wert/Verknitinhung			0	
Araiog input	🔄 🗐 Anakog Input O (Al 0)	Record Viel w					
Symbol Address/value Wat: ID.0.00 * Symbol Browse for Symbol [Erzeugung 0st] Advacedraws: Symbol * Advacedraws: Symbol * fester Wet: Double * Read-Write Statismin SRAM/Flash * Read-Write Skalewing: © Read-Write Skalewing: © Read-Write Skalewing: © Wets: OK © Uestoond R Uestoond F State State Uestoond F Uestoone			Analog Input				
Wat: IDD.0.0 Symboleterere: IDD.0.0 Advecereforere: IDD.0.0 Fester Wet: IDD.0.0 Flegs: IDD.0.0 Read only Persistent in SRAM/Flash Read Avinte Skalewung: Usebband IDD.0.0 IDD.0.0 IDD.0.0 IDD.0.0 IDD.0.0 IDD.0.0 IDD.0.0 IDD.	enschaft: Present Value						
Symbole terere: Advecenderere: Advecenderere: Advecenderere: Advecenderere: Advecenderere: Symbol A Type Address/value Comment Symbol A Type Address/value Comment Device OHE_Child R 48 Device OHE_Child H_EBO_J.Cend_ISt F Device OHE H_EBO_J.Engle H_EBO_J.Engle Device OHE_Child Device	Wet		mnom				
Addressteforers: Symbol: Type Addresstylaus: Comment Fester: Wet: Image: O 22 O 22 Period: O 0 23 O 23 Device: OHIL: R 49 Outrie: OHIL: Device:	Symbolic interest		B Demons for further If				1.
Addressificance Fester Wert: Tester Wert: Tester Wert: Plage: Read Avrite: Skalewing: Device::042 Object::040 Read Avrite: Divice::042 Device::042 Device::042 <tr< td=""><td></td><td>4</td><td>Browse for Symbol [Er</td><td>zeugung ostj</td><td></td><td></td><td>12010</td></tr<>		4	Browse for Symbol [Er	zeugung ostj			12010
fester Wet:	Achecateforene:					1	
Instant West: 000 000 22 Flags: Device O23 0 23 Precident in SRAM/Flash Device O40_010 R 98 Device O40_011 R 90 Device O40_011 R			Synbol A	Туре	Addresspralue	Comment	
Flega: 0 23 Plega: Device 023 0 Read only Persident in SPAM/Flash 1 Read/Write Skalerung: Image: Control of the state of the	fester Wert: 0.000	크 니 티	Device.022	0	22		
Device OHB Ch0 R 49 Passident im SRAM/Flash Device OHB Ch0 R 49 Device OHB Ch1 R 49 Device OHB Ch2 R 51 Device OHB Ch2 R 50 Device OHB Ch2 R 50 Device OHB Ch2 F Stafe 1 BefeN H_E Bog 1 Cm glo F Kesselfreighte H_E Bog 1 Empty F Temperaturi shier H_E Bog 2 System OK Cancel			Device.023	O	23		
Bead only Percisident in SRAM/Flash Read Avinte Skalerung OK Cencel Uesdband F Link Enable Event Enable Acked Tenshions	Flace:		Device.048_Ch8	R	48		
Pread only Preserver in Shell African Read Aufrice Skalerung: OK Cancel Ueschand OK Cancel Ueschand Cancel Ueschand Cancel Ueschand Cancel Ueschand Cancel Ueschand Cancel Cancel	ter i i		Device.048_Ch1	R	49		
Device.cn.placy R S0 Devi	 Head only 	Perakkent monAM/Flash	Device.Off_Delay	R	51		
Instantion Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel Image: Concel	C D	the former 10 and 1	Device.On_Delay	R	50		
OK Cancel Ubscband F Ubscband F Limit Enable Acked Transhors	Read/write	skalerong lu 💌 🔪	H_E.Bo_J.Cnd_JSt	F		Stufe L Befehl	
OK Cancel H_E.Bo_J.En_Bo F Kesseffreigabe Ueschand H_E.Bo_J.En_T F Temperaturi énler Limit Enable F Resseffreigabe Event Enable Acked Transitions DK Cancel			H_E.9o_1/Cmd_2St	F		Stufe 2 Befeh	
Ueadband H_E.Bo. J. Em. T F Temperaturfisher Lind Enable Event Enable E Event Enable 0K Cancel		OK Cencel (H_E.Bo_1.En_Bo	F		Kesse Freigabe	
Ueadband (Lind Enable Event Enable Acked Transitions Mathe Trans		X	H_E-Bo_1.Em_T	F		Temperaturfishier	
Limit Enable Event Enable Acked Transitions Media Trans		Ueadband	H F Bold FirBu	F		Fehler	
Event Ensble Acked Transform		Limit Enable	Ginhal System				
Acked Transitions DK Cancel		Event Enable					
Noth Tree		Acked Transitions				0K	Cancel
		Notik Type	1				
		where the overlaps	01404.0			44	

A Register for any real value with an selection of the conversion factor. Since the real value of BACnet is stored internally as an integer, a factor of 10 is necessary to store with an accuracy of tenth of the unit.

3.9 Parameterize Properties

For properties which need more complex configuration special dialog boxes are available. With them the user is guided to correctly configure those properties.

Since the generic scheduler object offers too many possibilities and hence often confuses a user, three more specific templates are available for an "Analog Scheduler", a "Binary Scheduler", and a "Multistate Scheduler".

3.10 The Build Process

Since the BACnet Configurator and Compiler are fully integrated PG5 Add-On Tools, the BACnet Configuration file is integrated in the build process. Due to the Usage of global and system variables the BACnet configuration is compiled AFTER successfully compiling and linking the user program.

CBACret Testproject (Erzeopeng Ost) - Sala Project Manage	r 51.4.021	
Eds Eds View Project CRI Online Taols Help	202	100
	4 C O (# 15	
Enject Entertaint (1)	Messages	
Project BACret Testander		
TCP/IP Settings Table	Rebuild All Started Wednesday, September 14, 2005 at 13:51:58	
🗄 🧾 Connor Fles	CPU: Economica Dat	
Erzeugung Dat - PCD3/M5340 - IPNode 14, Station 14		
* Seconds	Compiling Files .	
Program ress NATTICommittee cel	Econoling: C. 945_1_4 Project/GLEwit Technological Econoling: C. 945_1_4 Project/GLEwit Technological Econoling: C. 945_1_4 Project/GLEwit Technological Econoling: C. 944_01 Project/GLEwit Technol	
1 Providine Witercommunation of the		
1 Heining bet	Sali PG5 Progran Builter B. 4.021a	
- HM PitrinslAp	Build the name: D'PS5 1 4Projects/BACted Tectorojec/AErzeuzuno Bo/E treucano Oct mak	
ACD13.mp		
- KDS_Wolkshiphodel.brt	Accenting _Ethiugung 0.0.00	
Text Jup	Assembling HW_Miniwal/bd	
- Waenwerteugung /up	Assembling Global of	
Detaing Files	Accenting1019-bissions Accenting1019-bissions	
	Assembly complete. Einste D Warnings: D	
	Linking Essegung Oxtob + PCD1D obj + HW, Jinkinglobi + Gildolobi + ICPIPD DX obj + olupan Lin Ber, Sapo Solo To Essegung Oxtob + TO Essegung Oxto Hap Cost and Salo Ham (XKS) Sale) Tanold Sale 11 FBK Aytes Estemation resources Linking Estemation resources Collections Estemation (175 Linkage consider, Devon, Ji waning).	15 oli
	Generating Block Information Nex Elock Information Files constate	
	Build successful Fotal enors: 0 Total warnings: 0	
	Freedlag Bay show a constant of Build	
	Compiling: C-IP65_1_4 Pojeds/BACnet TestprojechEtzeugung.Oxt/Heizung.bn/	
	Completion successful	
Concile, assemble and ink all files	BADOK KITAN	

The compiler will plot dots during its process so a progress can easily be seen for larger projects.

There are several conditions which cause the compiler to issue a warning or even an error message:

If the configuration in its binary form uses more than 80% of the available 256 kB a warning is issued. If the configuration is too big, an error message is displayed.

If two (or more) properties are assigned to the same PCD resource also an error message is displayed.

A mismatch of a data type should not be possible while using the configurator, but an error message will be displayed when encountered.

3.11 Download and Upload

Downloading the BACnet configuration is fully integrated into PG5 and is done automatically along with the user program.



When the function "Selected Download" will be used, the BACnet Configuration will be in the Group of "Downloadable Files".

0 🛩 🖬 🖉 🛎 🛎 🔳		ia C 🔍 🗮 🙀		
Noted: BAGnet Technolog() 1 Text(): Satings Table Conson Files Transgrang Out - PCDCI/MS548 SetTings Program Files	PU(s)	Petudid All Statist Wednesday, September 14 Poet: BACeet Textonijeot 2PU: Exerciping Ont Compiling Filez.	1, 2001 et 13:51:58 entre f Granavera But	YEDIGwap.
(MED(Overniew, pr) Endution_Wavernewgee Metaung.bnt	Download Program [Erzeugung Program File Name:	04)		in preserve
PCD10, wap PCD10, wap PCD3_Workshopwodelb Text, typ	CAPGS_1_II Projects/BhDnet Testpro Destination CPU: [PDDIM9540, on S-But S in 14, USB	(S-Buc USB)	Disveload Carcel	Ddf/Errengung Dittreek
Weenneerzeugung, tup Listing Nee Gecuneerlatiee Nes	C All	Selected Segneets	Charged Blocks	б. т.
	Cranged blocks Deveload in Run Selected Segments	Estension Memory Segment Downloadable Files	Options .	obi + _TEPIFOEKolii + slupartšobi
	C Facilitas Initialization Data Only	☑ First-line Initialization Data ☐ Booking scorprogram to Flook	Heb	
		unrage complete. Ulercol. Ulworwigt. Semanting Block Information Flots . Block Information Files complete		4
		Compling files after successful Build . Compling files after successful Build . Compling: C1PB5_1_4 Project//BACket Testp	projechErzeugung Dif	Heizung, brit
		Compilation successful		

An Upload function is activated in the Configurator and first uploads the current configuration including all user specific adaptations. This configuration is then merged into the active configuration file.

Download and Upload

S BACnet_Objekttest.bnt [PCD3_0	59] - BACnet Configurator			
Project Edit Configuration View Help				
🔳 🜉 🖷 📩 🗕 😽 🖶	* ?			
Disconstructure [DE 69]	Name	Value/Link		
Accumulator 0 (AC 0)	Location	Murten		
- D Analog Input 0 [AI 0]	Description	Testgeraet Modem		
Analog Output 0 (AO 0)	Max APDU Length Accepted	1476		
Analog Value U (AV U)	APDU Segment Timeout	2000		
Binary Input U [BI U]	APDU Timeout	3000		
Binary Output 0 (BO 0) Binary Value 0 (BV 0)	Number Of APDU Retries	5		
Calendar 0 [CA 0]	Time Synchronization Recipients	0		
	Restart Notification Recipients	<u></u>		
Event Enrollment 0 (EE 0)	Backup Failure Timeout	300		
Group 0 [GO 0]	Profile Name			
- D Loop 0 [LO 0]	Time SyncMode	SLAVE		
🗊 Multi-State Input 0 [MI 0]	Timezone	CET-01CEST-02,M3.5.0/2,M10.5.0/2		
— 🗊 Multi-State Output 0 [MO 0]	Password RD DCC			
— 🔲 Multi-State Value 0 (MV 0)	Default Log Buffer	SRAM		
Notification Class 0 [NC 0]				
Pulse Converter 0 [PC 0]				
Schedule 0 [SC 0]				
Schedule Analog 1 [SUA 1]				
 Schedule Binary 2 [SUB 2] Schedule Multistate 2 (SC M 2) 				
Schedule Multistate 3 [SU-M 3]				
Number of Objects: 22				

These rules apply:

- The upload MUST be made before any changes of the program is compiled.

- All objects which were generated on-line (using the "Create Object" function of BACnet) are imported and treated as configured objects, hence are not deletable online (using the "Delete Object" function of BACnet) anymore.

- The content of all properties which are not associated to a PCD Ressource are taken from the uploaded file.

💻 🖳 📩 📥 🚽 🖓 🖓	* ?				
Saia_PCD3_69_Devicetest [DE 69]	Name	Value/Link			
Accumulator 0 [AC 0]	Location	Murten			
Analog Input U [AI U]	Description	Testgeraet Modem			
Analog Uutput U (AU U)	Max APDU Length Accepted	1476			
Piperu logut 0 (PL 0)	APDU Segment Timeout	2000			
Binary Rutout 0 (B) 01	APDU Timeout	3000			
Binary Value 0 (BV 0)	Number Of APDU Retries	5			
Calendar 0 [CA 0]	Time Synchronization Recipients	ents ()			
D Command 0 (CO 0) D Event Enrollment 0 (EE 0) D Group 0 (GO 0)	Restart Notification Recipients				
	Backup Failure Timeout	CD Upload [temp]			
	Time SyncMode	Code Commune 440			
- D Multi-State Input 0 [MI 0]	Timezone	Code Segment: 448			
- 🗊 Multi-State Output 0 [MO 0]	Password RD DCC	23 %			
🗆 🔲 Multi-State Value 0 (MV 0)	Default Log Buffer				
Notification Class 0 [NC 0]					
Pulse Converter 0 [PC 0]		Cancel			
Schedule U [SU U]		Cancer			
Schedule Pinary 2 [SC P 2]					
Schedule Multistate 3 [SC-M 3]					

The Upload is then done automatically using PG5 System functions based on the current On-Line settings.

EDE Export | EDE Import



An error message will appear if the selected controller cannot be found using those settings.

3.12 EDE Export

When compiling a CPU the associated BACnet device will be stored in the EDE format in the "Doc" subdirectory of the CPU directory. Both Version of the standard (1.0 without and 2.0 with state texts) are saved and besides the object declaration also the state texts and unit texts are saved.

3.13 EDE Import

When configuring the Client configuration, the EDE files on any server can be directly imported creating all available objects in the respective server.

In standard mode only the "Present Value" of the objects can be accessed, in "Expert Mode" all properties are accessible.

🔯 BACnet. bnt [CPU1] - BACnet Co	nfigurator				
Project Edit Configuration View Help					
🗅 📽 🔳 😻 📥 📥 🔽	책 🛠 📍				
🕀 📓 Saia_PCD3_69 (DE 69)	Name		Value/Link		<u>^</u>
	Choose EDE-Fik				2 🔀
	Look in:	CDE Files		v 🔉 🕫 📼	
	Hecent Desktop My Decuments My Computer CHIO2NOD	NedeDetatio DedeStateTex	est HBD.csv		
		File name:	edeD ata60.csv	~	Open
	Ny Network	Files of type:	°.cav	~	Cancel
	Hai Master				>
Number of Objects: 41					

4 Advanced Features

The PCD3 Implementation supports all Standard Objects except Life Safety Point and Life Safety Zone.

For a detailed description of all properties of those objects, using the BACnet Standard 135-2004 is highly recommended!

4.1 Generating an Assignment of a Series of Objects

If several objects of the same type need to be generated, the use of the Template mechanism is recommended. One object is generated either from the default template or from an earlier template. This object is then parameterized in detail and stored as a template. First a template needs to be created using any existing object.

BACnet_Objekttest.bnt [PCD3_0	69] - BACnet Configurator		_ 0
ject Edit Configuration View Help			
💘 😃 📩 👈 🗕 😽 🖷	* ?		
Saia_PCD3_69_Devicetest (DE 69) Accumulator 0 (AC 0) Analog Input 0 (A1 0) Analog Value 0 (AV 0) Binary Input 0 (B1 0) Binary Output 0 (B0 0) Binary Output 0 (B0 0) Binary Output 0 (B0 0) Calend Comma Event E Group 0 Delete Multi-St Wew Properties Notification Class 0 (NC 0) Pulse Converter 0 (PC 0) Schedule Analog 1 (SCA 1) Schedule Multistate 3 (SC-M 3) Trendlog 0 (TR 0)	Name Present Value Description Reliability Out Of Service Inactive Text Active Text Minimum Off Time Minimum On Time Profile Name Unsolicited COV Enabled	Value/Link %(Device.017) Binary Value no-fault-detected FALSE Off On 0 0 FALSE FALSE	
ber of Properties: 17			



Don't use in the Preset name "/".

This is done using the context specific menu "right-clicking" on the object itself.

There's no template editor, but changes can be made using any type of text editor.

The key is that numbers within a register reference or even a symbol name can be generated using the object ID number.

The following is a part of the Object configuration of a Binary Input:

[BI]

present-value = %(Device.I0) || R

Generating an Assignment of a Series of Objects



The present Value is mapped to the symbol reference "Device.I0".

Let's assume that several inputs are to be mapped accordingly. The necessary global symbols were already created: "Device.I10" – "Device.I18"

Now the above line can be edited as follows

present-value = %(Device.I{0}) || R

The value inside the {} bracets does definie the minimum number of digits representing the Object ID.

When Binary Objects 10 – 18 are created using this template, the present value will already refer to the correct symbol!

If for some reasons the Object ID does not match the number within the global symbol, also a +/- can be used:

present-value = %(Device.I{0+9}) || R



then means if objects with the ID's 1-9 are generated, the present value will still refer to the already generated "Device.I10" – "Device.I18".

Any integer value can be entered.

Using the template is straight forward:

**************************************	X X				
Sala_PCD3_69_Devicetest (DE 69) E0_Automatica 014C 01	Name	Value/Linii.			1
Analog Input 0 [AD 0]	2 Precent Value Description	3(Device.10) Alamquelle 130			
 Analog Value 0 [AV 0] Binary Input 0 [BI 0] 	New Object		×		
Binary Dutput 0 (BO 0) Binary Value 0 (BV 0) Calendar 0 (CA 0)	Objecttype	Dinary Input	¥		
Command 0 [C0 0] Event Enrolment 0 [EE 0]	Number of Objects	6	0	-	
- D Group 0 [C0 0]	Name:	Binary Input (0)			
Multi-State Input 0 [MI 0] Multi-State Output 0 [MO 0] Multi-State Output 0 [MO 0]	First Instancenumber	1	0		
Notification Class 0 (NC 0) D. Pulse Converter 0 (PC 0)	Incrementvalue:	1	0		
Schedule 0 (SC 0) Schedule 0 (SC 0) Schedule Analog 1 (SC A 1) Schedule Analog 1 (SC A 2) Schedule Binay 2 (SC B 2) Schedule Multistate 3 (SC M 3) Trendlog 0 (TR 0)	Preset.	S) Default_BLbriv S) Default_BLbriv P) Alasting briv P) DAU Communication P) DAU Device 0 Lang P) DAU Device 0 Power	Enorbry Fakee b	(r', 'AD is Normar')	

The template will appear for the appropriate object type along the default templates.

4.2 Manual Operation with D23x, Web and BACnet

Using either "Analog Value", "Binary Value", or "Multistate Value" objects without "Commandibility" of its "Present Value", a local operation (with a Web or D23x) of the resource attached to the "Present Value" property is simultaneously possible.



Since the Resource needs to be mapped to either a global or a system variable, the

Alarming | Trending | Backup/Restore | Advanced Client Configuration

first step is to generate this resource, either in the Symbol Editor directly or by using a Fupla FBox which at compilation time generates automatically a system variable.

This variable can now be addressed in HMI Editor (for the use with a D23x), the Web Editor (for the use of any Web Client) or in the BACnet Configurator (for the Use over BACnet).

If a data point of the user program needs to be overridden using BACnet (and also Web Technology), a special FBox needs to be placed in the Fupla program where the user intervention is intended to be active.

The same FBox is required if a data point of a remote controller which is connected through S-Bus needs to be available on BACnet.

4.3 Alarming over BACnet and Fupla Boxes

The Alarming over BACnet and the Saia[®] specific alarming mechanism is not compatible with each other and hence no BACnet Alarm can be reset over the Saia[®] specific Boxes or versa. Of course assigning the "Present Value" of a Binary Value object to a Flag assigned to a global reset is always possible.

4.4 Trending

The Trendlog object allows the recording of historical data of the PCD3. Only "Present Value" properties of BACnet objects can be recorded, there is no direct access to PCD resources.

4.5 Backup / Restore

There is a Saia[®] specific Backup mechanism using the Programm Backup option on internal or external Flash such as the PCD7.R500 or the PCD7.R561 BACnet Flash with Backup option. This one is configured using the PG5.

On the other hand there's the Backup / Restore Mechanism defined in BACnet, where a B-OWS management station supporting the functionality DM-BR-A can initiate any device supporting DM-BR-B such as the PCD3 to Backup all its configuration data (user program, media mapping, BACnet object structure and configuration) to the management station and also restore this data any later date from the B-OWS. This functionality does not need any specific configuration on the PCD3!

4.6 Advanced Client Configuration

When configuring a client object in "Expert Mode" not only the "Present Value" is available as described in Chapter 3.7, but all Properties.

Also more options regarding the way the communication is established are available in the detailed configuration window: Alarming | Trending | Backup/Restore | Advanced Client Configuration

Value: O Symbolreference:		
Addressreference:		
Flags:		0000
Polling-Intervall:	COV-Resubscription	3600
Enable Write to Server	PCD-Increment	1.0 🗘
	Scale:	10.00 😂

There are two ways of retrieving data from a server or sending data to a server:

- Polling
- Subscribing "Change of Value"

With the default configuration above the following mechanism during startup is processed:

- 1) The Client sends a "Who Is" in order to find the Server
- 2) First some info such as the max. APDU length and segmentation support is fetched
- 3) Then the Bitstring about the ProtocolServiceSupported is read in order to find out wheather COV is supported with the server or not.
- If COV is supported subscriptions for the Object-Properties for the given server are sent.
- 5a) If the Subscribtion is achnowledged the communication is considered "Established"
- 6) If the subscription is rejected for any reason or the server does not support COV sbuscribtions, the Object-Property will be polled with a certain cycle.

If the Checkbox for COV Resubscription is deselected, the Client will directly switch to Polling without trying to establish a COV connection.

On the other hand if the Checkbox for "Polling" is deselected, the Client will not switch to polling even if the COV subscription for any reason fails.

The Scale Factor is used to scale the PCD integer value to the Bacnet Value.

Ex: Scaling Factor of 10 , register contains a value of 477 so the BACnet Value is 47.7

The PCD-Increment should be used if you write values from the PCD to a Server. The Increment defines how much the scaled value must change to activate a transmission. It is important to reduce the network traffic.

Ex. If the PCD-Increment has a value of 5.0 the and the scaled BACnet value is 20.0, the next transmission is started if the BACnet value is lower than 15.0 or higher than 25.0.



There are known project specific reasons to change the default values but is strongly discurraged to change anything without being well clear about the consequences!

4.7 Time Master / Slave

The defalut setting is "Time Slave" where only messages from other Time Masters are processed. This setting has no further configuration parameters.

		 	CLAY/E	
 Addressreference: Value: 	SLAVE			
Flags:			ОКС	ancel

Only a one time synchronisation with the configuration PC using the Functionality in the "On-Line Configuratior" in PG5 is required to activate the combined "Local Time"/ "UTC Time" Real Time Clock.

When changing the Setting to "Time Master" more options are available

Addressreference: Value: SLAVE	minutes or time
	(HH:MM:SS)
Flags:	

A Checkbox sets whether the synchronisation telegram will be set up as local time or as UTC.

The second parameter is either the interval of this message in minutes or when using the HH:MM:SS syntax, the telegram will be sent once a day at the time specified.

Of course without configurating the Property "Time Synchronisation Recepients" no message will be transmitted when configuring as "Master".

Either individual devices can be entered either with their device ID or using the BACnet MAC address. Entering the local broadcast address as recepient will force the PCD3 to send a Synchronisation message as local broadcast message which also will be forwarded from BBMD stations to the other IP subnets on the same BACnet network.

4.8 Time Zone Setting

The only time zone available with the factory settings of the BACnet configurator is "Central Europe". If another time zone needs to be selectable in the BACnet configurator, an adaption of the Configurator is neccessary.

By default only the Western European Time zone is available when selecting the. Time Zone. All possible time zone settings are stored in a text file which is stored in the directory. Using a Text Editor all lines of configuration can be copied into the "SBACnet_Config.bnp" in the part of the xml configuration starting with <!--Timezone use @ @ instead of , -->.

4.9 BBMD/FD

By default the PCD3 is configured as "Simple device".

DutaLink						
Dataline.						
BP MPP						
Network No:		1.	•			
UDP Port.		47508	•			
Autoconnect	C2.C12.C14.C15.C14.03					
Operating Mode	Single Device (Default)	ī.	-	Operating Mode:	Simple Device (Default)	*
	OK		ancel			

No parameters are available and no BBMD related functionality is activated on the PCD3 with this setting.

Selecting the "BBMD option", more configuration parameters are available

Time Zone Setting | BBMD/FD

het all hade				×	Operativ	a Mode:	Broad	loast Manageme	nt Dev	ice (BBMD)
Danka Denne					operaur	ig mode.	broad	icast manageme		
R.P. M.PDP					Broade	cast Manage	ement Devid	ce (BBMD)		
Network No			1	9	Add	ress	Port	Subnet Mask		
LDP Pat			47003							
Autoconnect	12.0	12014.015.016.03								
Coevaling Mode	Bea	doard Management 2	Device (BEN	C) - (3						
Broadcast Manage	mare Deve	ce (IEMO)								
Address	Put	Subret Mask								
Add	adrant in o	Edi an P scient (one)	Delete			Add		Edit		Delete
		C OK		ancel	🗖 Арр	oly direct bro	adcast in o	wn IP subnet (or	ie hop)	

A list with the IP address of all other BBMD's in the network can be entered and on the bottom there's an option for using "One Hop" IP routers. Since those are not well spread, this option can be left unchecked in most applications.

add/edit BBM	D		X
IP-Address:	192.168.191.1	: 47808	*
Mask:	255.255.255.255]	
	ОК	Canc	el

Only if the "One Hop" option is selected, a subnet mask other than the preset 255.255.255 should be entered.

When selecting BBMD, also the FD Support is activated by default, but contains no configuration parameters. If there's only one BBMD in a project, but several remote devices are to be configured as FD, the list of BBMD devices can be left empty.

The third	possible	selection	is	FD.
-----------	----------	-----------	----	-----

4.10 Modem Communication

4.10.1 PG5 HW settings

S-Bus settings



- 1) Activate S-Bus Support
- 2) Enter S-Bus Station Number

4

Modem settings

birdware Settin	es (PCD3_45	1						2
PCD [Hencey]	Patiwood 54	ui Se	of Noder	Prof-5-8 at	1054F	Galeria	d.	
Patie Line	5-But Noden							
POUPort.	E.							
Seld For	C	•						
Baul Rate	115206	•						
1-But Mode	Las	•	-But Timing	1				
Martine Marrie	0	- C - C		1				
LANE BUDRY								
ARE BUILD CPV VLDter Factory Detail 5756-632 SCNI Math a S GTM Sensers Haren Conto Haren	uli 1931-data 1941-data 1948- 1948- 1948- 1949-data 1949-data	6						
M 726-HS (W M 726-HS (W M 726-HS (W M 726-HS (C M 726-HS (C))) (C M 726-HS (C))) (C)) (C)) (C)) (C)) (C)) (C)) (C)	112) 122) 173 81 D.449680 2000			1	0	1	Cancet	HHD

- 1) Select Public Line S-Bus Modem
- 2) Select Serial Port and Baud Rate
- 3) S-Bus Mode is Data
- 4) Select Modem
- 5) Download to the PCD with Download...
- 6) Confirm with OK

Modem Communication

4.10.2 BACnet Configuration

S BACAN, PERMISSION DAVID (2013).	P) Billion Caellynader		201
front bit Configurate the trip-			
II was \$ \$ # # V for	17 T		
Beneficial Constructions Construction (Construction) Construction (Construction) Construction (Construction) Construction Construction	ne se conservation de la conserv	Valarije Robe Totpgel Kolon 107 202 202 202 202 202 202 202 202 202 2	
Briteste (BCR) Groupe Ander (BCR) Groupe Ander (BCR) Groupe Ander (BCR) Groupe Ander (BCR) Groupe Address (BCR) Groupe (BCR)			
arke of linear II		-	

- Open the BACnet configurator (Doubleclick on the BACnet configuration in the PG5 Projekt Manager)
- 2) Open Datalink Configuration

4

DataLink	
Datalink PTP	
🗐 IP 🛒 PTP	
Network No:	1

- 3) Select PTP
- 4) Network No: Set IP (Attention: has to be the same as the BACstac setting in PTP!)

ⓑ IP] 퓢 PTP [
SAIA SerialPort:		0	~
Connect Timeout:	60	🚖 Idle Tir	neout: 60 🔮
Autoconnect:	C2,C12,	C14,C15,C16,U	3
Password (IN):	Passia	ord	
Add	saia	010	
Edit			
Delete			
Phone Number (OUT):	N	Phone No	Password
Add	1	555-572839	saia
Edit			

- 5) Change to PTP
- 6) Select SAIA Serial Port (has to be the same as the HW settings!)
- 7) Connect Timeout on e.g. 60 (min.)
- 8) Select Autoconnect
- 9) Set Password (IN): Add for addition (e.g. saia) Identification will be ignored.
- 10) Set Phone Number (OUT), if necessary
- 11) Confirm with OK

Excel Export/Import

AutoConnect



- 1) Select user defined
- 2) Select functions by your own choice
- 3) Confirm with OK

4



The same configuration for the "Autoconnect Settings" is also available in the IP Settings. These settings are taken, when several devices are connected with IP and share a common modem for the communication to a remote network. These settings are not used if the network has no modems.

4.11 Excel Export/Import

It is not recommended to directly manipulate the bnt file when an automated manipulation of the BACnet configuration is required.

The Export/Import is intended to be used instead producing a set of csv files which each represent a single object type with all object instances in a row.

Any manual interaction with those files is discuraged since the Import from Excel no error checking will be performed.

5 Maintenance

5.1 Firmware Update

Firmware Download

1) Select menu: "Tools" => "Update Firmware".



2) Select BACnet firmware files (*.blk) with "Add"

nware Download Utility
Add Del

- 3) Delete other FW files (*.blk) with "Del" (be sure that there is only the BACnet_xxx.blk file in the list.
- 4) Change the Connection settings if necessary with File \rightarrow Settings



- 5) Start the FW download with "Start"
- 6. Press OK if the PCD is running



7) Wait until the Download is finished



- 8) The PCD is rebooting itself
- 9) Download your project

5

5

History List Error Messages | Transmission Logging

5.2 History List Error Messages

If there is a problem with the BACnet the follow error messages are written in the PCD history:

BNt FAIL xxyyyyy

Where: xx is the Object ID or ## for general errors yyyyy is the error or the Object number

Example:	BNt Fail ##00020	\rightarrow Out of Memory
	BNt Fail Al00001	\rightarrow Error in Object AI (Analog Input) 1

General error description:

ERR#	Description	
1	UNKNOWN_ERROR	
2	SERVICE_NOT_FOUND	If there is a problem in the Datalink-Layern (IP/PTP) configuration.
10	INVALID_PARAM	If there is a problem in the Datalink-Layern (IP/PTP) configuration.
12	ALREADY_EXISTS	An object with the same object ID does already exist.
13	BAD_CONFIG	Bad configuration
14	OBJECT_NOT_FOUND	Object not found
15	PROPERTY_NOT_FOUND	A property is set that does not exist for the given object.
20	OUT_OF_MEMORY	No more memory avaible
21	OUT_OF_RESOURCES	No more system recources (Mutexes, Timers) mehr
34	INVALID_DATA_TYPE	A property of an object contains illegal data.
35	VAL_OUT_OF_RANGE	A value of a property is out of range.
36	VAL_OUT_OF_SPACE	A value of a property uses more memory than re- served.
40	BACNET_ERROR	A value of a property is not BACnet conform.

5.3 Transmission Logging

There are several products available with which the traffic on a IP network can be logged. Two of them can be recommended for the use with BACnet:

Wireshark

An "open source" program which is available for most operating systems and is able to dessect BACnet telegrams to a certain degree. It can be downloaded free of charge from the Internet (www.wireshark.org).

Bas-o-matic

This program manufactured by Cimetrics is not only used by the BACnet Testing Laboratories, but also by a wide range of BACnet users. For details refer to the Cimetrics homepage (www.cimetrics.com) or contact a Saia® sales representative for an offer.

5.4 Literature

- ANSI ASHRAE 135-2004: BACnet A Data Communication Protocol for Building Automation and Control Networks ISSN 1041-2336
- 26-848_E5_PICS_BACnet-PCD3: Saia-Burgess Controls AG BACnet PCD3 Protocol Implementation Conformance Statement (PICS)

A Appendix

A.1 Icons

ľ	In manuals, this symbol refers the reader to further information in this manual or other manuals or technical information documents. As a rule there is no direct link to such documents.
1	This symbol warns the reader of the risk to components from electrostatic discharges caused by touch.
11	Recommendation: at least touch the Minus of the system (cabinet of PGU connector) before coming in contact with the electronic parts. Better is to use a grounding wrist strap with its cable attached to the Minus of the system.
••	This sign accompanies instructions that must always be followed.
U B C B C B C B C B C B C B C B C B C B	Explanations beside this sign are valid only for the Saia-Burgess PCD Classic series.
47	Explanations beside this sign are valid only for the Saia-Burgess PCD xx7 series.

Address of Saia-Burgess Controls AG

A.2 Address of Saia-Burgess Controls AG

Saia-Burgess Controls AG

Bahnhofstrasse 18 CH-3280 Murten/Switzerland

Tel: +41 26/672 71 11 Fax: +41 26/672 74 99

E-mail: <u>pcd@saia-burgess.com</u> Home page: <u>www.start-controls.com</u> Support: <u>www.sbc-support.ch</u>