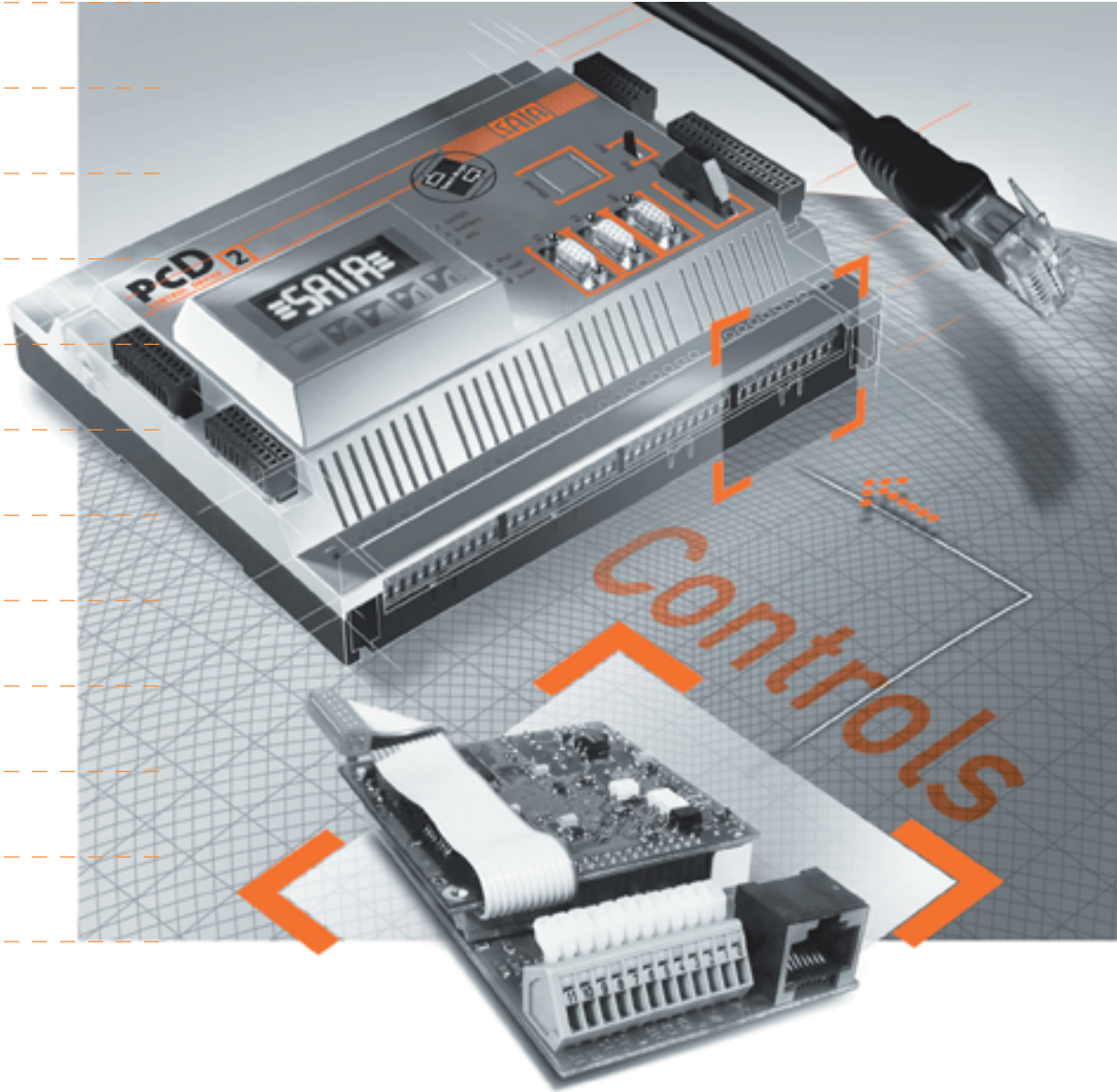


Manual PCD2.T8xx



0 Content

0.1	Document-History	0-2
0.2	Trademarks	0-2

1 Hardware

1.1	Introduction	1-1
1.2	Function and applications	1-3
1.3	Technical Data	1-4

2 Installation

2.1	Presentation	2-1
2.2	Terminals	2-2
2.3	Meaning of LED's for analogue modem	2-3
2.4	Meaning of LED's for ISDN modem	2-4
2.5	Installation in the PCD	2-5

3 Programming

3.1	General	3-1
3.2	Multiple Subscriber Number (MSN, ISDN only)	3-1
3.3	Working with FBoxes of the PG4/PG5 modem library	3-2
3.4	Power Down Reset	3-2

4 Appendix A, Init strings

4.1	Init string for PG3	4-1
4.2	Init string for PG4	4-3
4.3	Init string for PG5	4-5

5 Appendix B

5.1	Icons	5-1
5.2	Product and documentation concept	5-1
5.3	Technical support	5-2
5.4	Workshops, training literature	5-3
5.5	Reliability and safety of electronic controllers	5-3
5.6	About ourselves	5-4
	Addresses of SAIA-Burgess companies	5-5

0.1 Document-History

Document-No.	Edition	Modification	Publication	Remarks
26/771	E3	15.11.2003	15.11.2003	General revision

0.2 Trademarks

SAIA® and SAIA®PCD are registered trademarks of SAIA-Burgess Electronics AG.

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Technical modifications and changes depending on state of the art.

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Printed in Switzerland

1 Hardware

1.1 Introduction

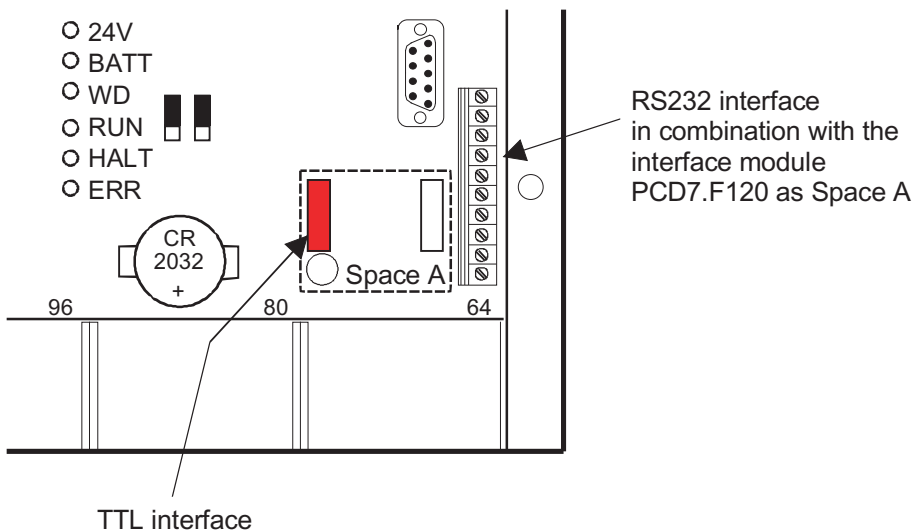
1

The PCD2.T8xx is a plug-in module for the connection of PCD systems to the analogue or digital (ISDN) telephone network. The module has the form of an input/output module and can be inserted in any I/O location (restrictions see chapter 2, Installation in the PCD). Modem modules accomplish all functions mentioned in the manual “Modem library 26/744”.

Types available:

- PCD2.T813: communication speed max. 33.600 bps, for analogue telephone network via RS232 or directly via TTL interface.
- PCD2.T813Z42: type-variant of PCD2.T813, necessary due a modification of the modem-module, compatible with PCD2.T813, except the DTMF functions of the modem library; there you have to choose the modem type PCD2.T813Z42, which is available up from version 2.3.007 of the modem library.
- PCD2.T850: communication speed max. 64.000 bps, for digital ISDN telephone network via RS232 or directly via TTL interface.

Serial interface No.1 e.g.for a PCD2.M110/M120



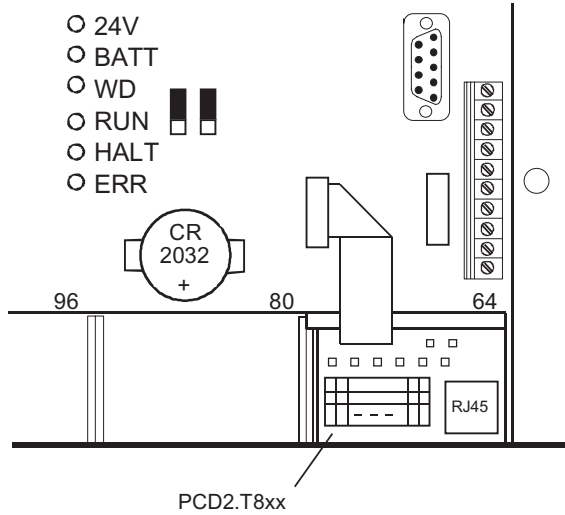
The PCD2.T8xx modem module can be connected directly to the TTL interface using the ribbon cable that is included. If this is done, **no** interface module is required. Depending of the PCD-type the modem module must be placed in the location with the following base address:

PCD-type	Base address of space
PCD1.M12x / M13x:	32
PCD2.M110 / M12x / M15x:	64
PCD2.M17x / M48x:	16 (0 also possible)

Using the ribbon cable, occupies always port 1 of the controller, therefore location A cannot be used for PCD7.F1xx modules.

1

Example for PCD2.M110/M120:

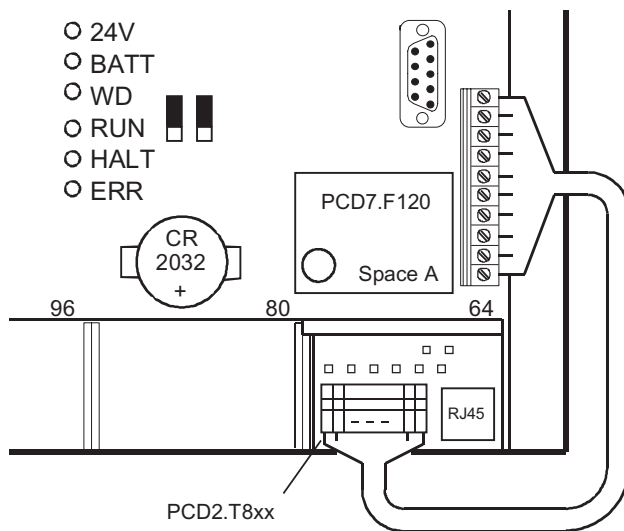


or

The modem module should be wired individually from the 12-pole cage clamp terminal to the 10-pole screw terminal of the RS232 interface. In this case, the module can be placed on another location or in an expansion unit.



Please, note: for mechanical reasons not all locations are suitable, for details see chapter 2.



1.2 Function and applications

Telecommunication - the up-to-date way to overcome distances and save costs

Modern telecommunication, when combined with SAIA®PCD, 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-controlled information and requests to operators or service personnel
- fault rectification by remote diagnostics
- process optimization through software updates and/or the updating of process parameters
- efficient, preventive maintenance by qualified specialists, resulting in low maintenance costs
- remote user support directly on-screen and close to operations

PCD2.T8xx modem modules are distinguished by these characteristics

- The economical, powerful and flexible solution for a virtually unlimited field of application in remote data transmission.
- Analogue and digital (ISDN-TA) versions that meet today's standards
- Integrated directly within the controller, inc. power supply (no external mains apparatus, PCD7.FI20 interface module not required).
- Easy installation and commissioning (plug-and-play).
- Connection to PCD with ribbon cable via port 1.
- Connection to telephone network with standard RJ 11/RJ 45 telephone connector.
- Possibility of operating two modems simultaneously.
- Powerful software libraries are available for very different tasks: convenient function boxes for the PCD-Utilities PG4/PG5 and function blocks (FBs) for the xx7 Series.

1.3 Technical Data

Technical Data for analogue modem

1

Data transmission:	V.34+, V.34, V.32bis, V.32, V.22, V.21, V.23, BELL-Norm 102.212
Data compression:	MNP 2-4, V.42, LAPM, MNP 10, MNP 10 EC
Functions:	expanded AT instruction set automatic call acceptance watchdog and reset

Data for digital modem ISDN-TA



Analogue protocols are not supported, therefore it's impossible to connect an analogue modem at the PC-site to a PCD2.T850.

Data transmission:	B-channel:	V.110, V.120, x.75, PPP, X.25/X.31, ML-PPP, HDLC (transparent)
	D-channel:	1TR6, DSS1, National I, 5ESS, JATE (INS64), VN4, TPH1962, X.31
ISDN-interface:		S0/I.430
Functions:		expanded AT instruction set

General technical Data

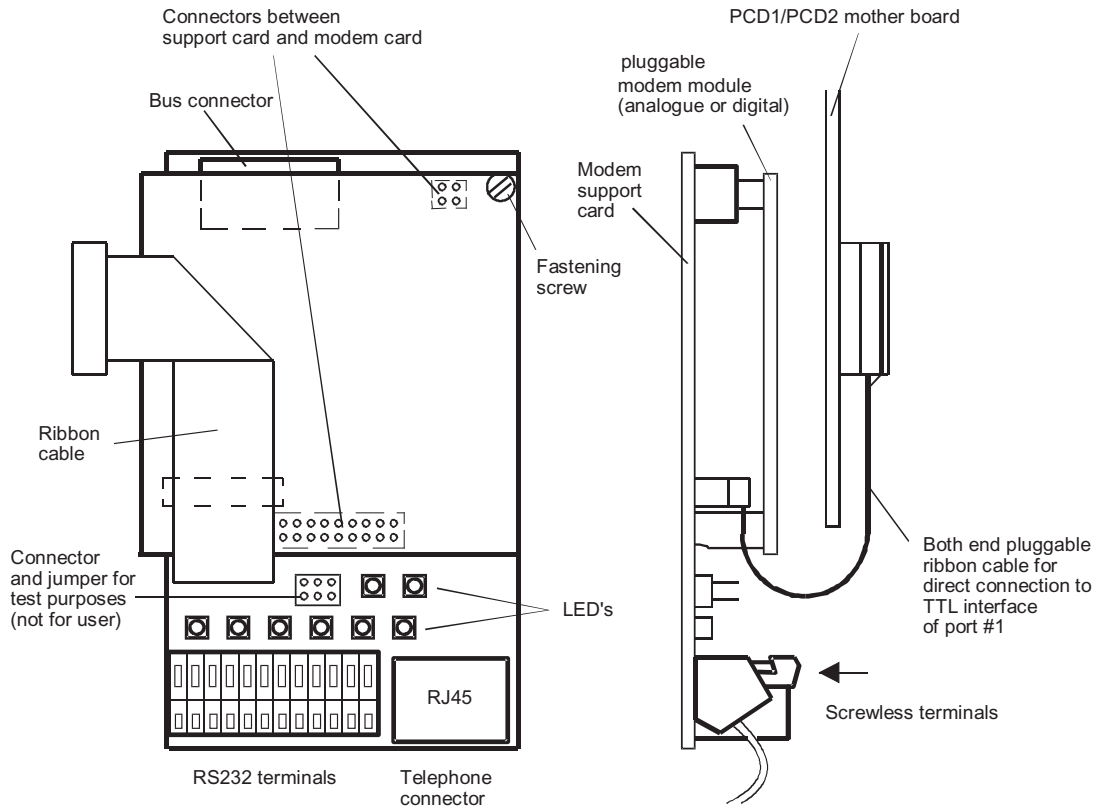
Power supply:	5 VDC (max. 250 mA), internal from PCD I/O-bus
Connections:	Modem ↔ PCD: RS232/TTL interface via ribbon cable at Port 1 (direct, without PCD7.F120) or RS232 interface via cage clamp terminals to any choice of RS232 port Modem ↔ telephone network: standard RJ11/RJ45 telephone connector
Function indication:	LEDs to indicate data transmission (TXD, RXD, DTR, DCD)
Approvals:	throughout Europe according to CTR21 compliance with the valid CE guidelines
Ambient temperature	operation: 0...+55°C

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. SCADA)
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-controlled transmission of single or multiple SMS short messages, UCP and TAP are supported
Modem DTMF	Supports reception of DTMF signals for control commands via telephone

2 Installation

2.1 Presentation



PCD2.T813



PCD2.T850

(Ribbon cable for TTL interface removed on both modules)

2.2 Terminals

Ribbon cable connector (12 pins) for direct connection to the TTL interface of port #1 of the PCD1/PCD2.

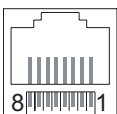
Pin no.	Pin name
1	RTS1
2	DCD1
3	COM1
4	CTS1
5	RXD1
6	+5V
7	DTR1
8	TXD1
9	V+
10	DSR1
11	GND
12	DETECT1

2

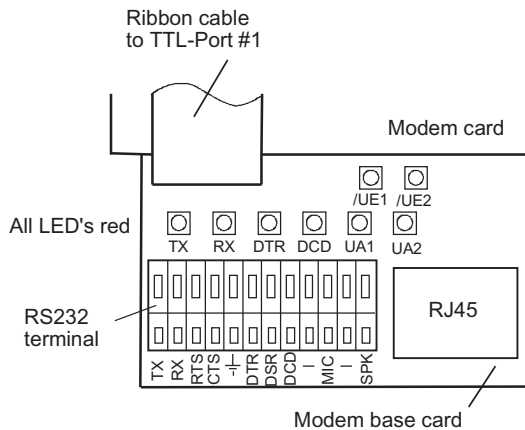
Screwless terminals (12 pins) for the connection to port #1 of the PCD1/PCD2 (RS232 interface).

Pin no.	Pin name
1	TXD
2	RXD
3	RTS
4	CTS
5	PGND
6	DTR
7	DSR
8	DCD
9	GND
10	NF IN (MIC)
11	GND
12	NF OUT (SPK)

RJ45 connector (8 pins)

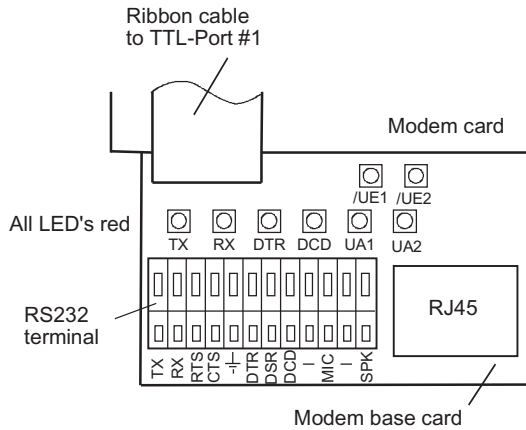
Pin no.	Analogue	Pin name	Connector female, front view
3		2a	
4	a	1a	
5	b	1b	
6		2b	

2.3 Meaning of LED's for analogue modem



- TX: Transmit Data**
on when modem receives data from PCD
- RX: Receive Data**
on when the PCD receives data from modem
- DTR: Data Terminal Ready**
on when the PCD is ready for communication
- DCD: Data Carrier Detect**
on when a valid support signal (carrier) is recognised from the tele-
phone network
- UA1: User Output 1 (seen from modem side)**
not yet implemented in modem firmware
- UA2: User Output 2 (seen from modem side)**
not yet implemented in modem firmware
- /UE : User Input 1 (seen from modem side)**
not yet implemented in modem firmware
- /UE2: User Input 2 (seen from modem side)**
not yet implemented in modem firmware

2.4 Meaning of LED's for ISDN modem



- TX: Transmit Data**
on when modem receives data from PCD
- RX: Receive Data**
on when the PCD receives data from modem
- DTR: Data Terminal ready**
on when the PCD is ready for the communication
- DCD: Data Carrier Detect**
on when an ISDN connection is active (B-Channel active and synchronised to the remote modem)
- UA1: User Output 1 (seen from modem side)**
on when an S0-Bus is active (digital connection)
- UA2: User Output 2 (seen from modem side)**
not yet implemented in modem firmware
- /UE1: User Input 1 (seen from modem side)**
not yet implemented in modem firmware
- /UE2: User Input 2 (seen from modem side)**
not yet implemented in modem firmware

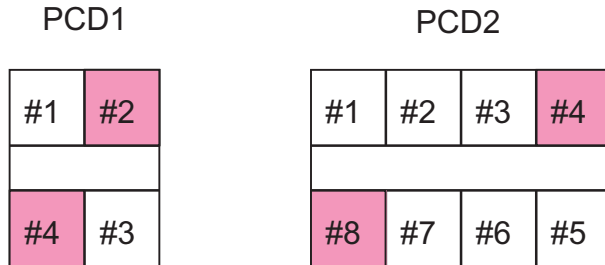
2.5 Installation in the PCD



Due to dimensional differences, the following points should be noted:

It is not possible to fit the PCD2.T8xx module into the following locations on a PCD1 or PCD2 system:

2



Location not allowed

In addition, the modem module cannot be inserted at addresses 176 or 240 of the PCD2.C100 expansion unit and/or addresses 144 or 176 of the PCD2.C150 expansion unit.

It is not possible to fit 2 modules adjacent to each other.



The PCD2.T8xx modem module can be connected directly to the RS232 TTL interface using the ribbon cable. Depending of the PCD-type the modem module must be placed in the location with the following base address:

PCD-type	Base address of space
PCD1.M12x / M13x:	32
PCD2.M110 / M12x / M15x:	64
PCD2.M17x / M48x:	16 (0 also possible)

Using the ribbon cable, occupies always port 1 of the controller, therefore space A cannot be used for PCD7.F1xx modules.

At other locations, ribbon cable cannot be used and wiring must be done via the RS 232 cage clamp terminal on the support card to the terminal of the modem interface. In this case, the PCD7.F120 or a PCD2.F522 (in the mode once interface module for RS232 interface) must be used.

3 Programming

3.1 General

Depending on the application (remote debugging, remote supervision or data transfer between PCDs) the init string in the PG3/PG4/PG5 environment must be adapted.

- See Appendix A for the listings of different init strings.
- For PG3 software, the init string (PCD and PC sides) for a user defined modem is in the file **modem.dat**, which is normally in the directory where the PG3 SW is installed
- For PG4 software, the init string (PCD and PC sides) for a user defined modem is in the file **Spg4modm.ini**, which is normally in the directory `..\windows`
- For PG5 software, the init string (PCD sides) for a user defined modem is in the file **pcdmodem.ini**, which is in the PG5-directory. The PC side works with the Windows TAPI. It's worth to install a standard modem with 9600 baud in the Windows Control Panel and to choose this modem with the connection options of PG5 (TAPI line). For further details, please refer to Appendix A, Init string for PG5.
- For the modem library, the init string (PCD and PC sides) for a user defined modem is in the file `modembase.dat`, which is in the directory where the FBoxes are installed (e.g. `..\FBox`)



For remote debugging or remote supervision, the protocol of both modems must be the same.

3.2 Multiple Subscriber Number (MSN, ISDN only)

An ISDN basic access enables to connect several terminals. With the configuration of the MSN it is registered on which number the modem should react and accept calls. By default, no MSN is configured in the PCD2.T850, this means all modem calls to that ISDN basic access are accepted.

The Modem library up from version 2.2.xxx allows the configuration of the MSN, which is set as parameter of the FBox with the same name. Normally the both last figures of the phone number have to be used, e.g. "82". This is the corresponding FBox:

```
ref:Modem
Init MSN
```



This function is only supported of Modem library version 2.2.xxx, if the modem port is **not** a S-Bus PGU port.

New functions up from version 2.3.010:

- the modem port can also be a S-Bus PGU port
- the MSN in the FBox can have in maximum 16 figures, instead of 8 like before
- it's possible to hand over the MSN by registers or changed with a terminal

Working without Modem library (modem only for remote diagnostics) a supplement to the init strings with AT#Z=MSN achieve the same effect. The registered MSN remain stored in the modem after an ATZ command and even after an AT&F command, but after an AT&F1 command the MSN will be deleted.

3

3.3 Working with FBoxes of the PG4/PG5 modem library

For a detailed description of programming using modem FBoxes refer to the Online help of the library.

3.4 Power Down Reset

The initialisation components of the modem library possess a Power Down Reset output. This output can be connected to an output of an external modem. With this function it's possible to cut off the power supply for a short moment after each call or in the case of no reaction. This interrupts the phone connection, if still exists, and refresh the initialization of the modem.



To use this function is high recommended, because a blocked modem creates considerable phone taxes and it could happen that remote stations couldn't respond anymore.

Due the PCD2.T8xx is supplied directly by the PCD, if connected with a ribbon cable, this mechanism must be used in an other manner. The corresponding output of the initialization component has to be connected to the output with the address (module address + 3). Example: the module is situated in the location with the address 64, then the Power Down Reset output has to be connected to output 67 in the Fupla program.

4 Appendix A, Init strings

The init string must be adapted in different files depending on the software package (PG3, PG4 or PG5). Information according to software type is supplied in the following pages.

4.1 Init string for PG3

(file "modem.dat")

```
[PCD2.T813] ; PCD1/2 Analogue Modem
BreakMode=No ; No=Break mode not supported,
default=Yes
ParityMode=No ; Yes=Parity mode supported,
default=No
;*** PC Modem
DataMode=Yes ; Yes=Data mode supported, default=No
Reset="ATZ\r" ; Reset modem
Init= ; Initialize modem ("AT&Q0\r" for
high-speed modem)
DialPrefix="ATDT" ; Sent before number ("ATDP"=pulse
dialling)
DialSuffix="\r" ; Sent after number
Hangup="ATH0\r" ; If blank, dropping DTR for 2 sec is
used
Command="~*~*~*~*~*~*" ; Switch modem to command mode
Delay="~*" ; Character to provide 0.5 second de-
lay
AnswerOn="ATS0=1\r" ; Turn on auto-answer mode (S0=1->an-
swer on 1st ring)
AnswerOff="ATS0=0\r" ; Turn off auto-answer mode
Timeout=90 ; Connect timeout in seconds
Retries=2 ; Number of dialler retries if Time-
out occurs
CmdOk="OK" ; Response string, command executed
OK
Connect="CONNECT" ; Response string, connected OK after
dial
;*** PCD Modem
PCDReset="ATZ\r" ; Reset PCD modem
PCDInit="AT&F1%C0&D0&K0&R1\N0S0=2\r"
; Init PCD modem, must include 'S0=x'
(with x not 0) to ; put the modem into auto answer mode
```

```
[PCD2.T850] ; PCD1/2 ISDN Modem
BreakMode=No ; No=Break mode not supported,
default=Yes
ParityMode=No ; Yes=Parity mode supported,
default=No
;*** PC Modem
DataMode=Yes ; Yes=Data mode supported, default=No
Reset="ATZ\r" ; Reset modem
Init= ; Initialize modem ("AT&Q0\r" for
high-speed modem)
DialPrefix="ATDT" ; Sent before number ("ATDP"=pulse
dialling)
```



```

DialSuffix="\r" ; Sent after number
Hangup="ATH0\r" ; If blank, dropping DTR for 2 sec is
used
Command="~~~~~" ; Switch modem to command mode
Delay="~" ; Character to provide 0.5 second de-
lay
AnswerOn="ATS0=1\r" ; Turn on auto-answer mode (S0=1->an-
swer on 1st ring)
AnswerOff="ATS0=0\r" ; Turn off auto-answer mode
Timeout=90 ; Connect timeout in seconds
Retries=2 ; Number of dialler retries if Time-
out occurs
CmdOk="OK" ; Response string, command executed
OK
Connect="CONNECT" ; Response string, connected OK after
dial
;*** PCD Modem
PCDReset="ATZ\r" ; Reset PCD modem
PCDInit="AT&FB10&D2&K0&R1&S0\r" ; Parameter B10 =for X.75 protocol
; the protocols X.75, V.110 or V.120

can not be ; set simultaneously
; Init PCD modem, must include 'S0=x'

(with x not 0) to ; put the modem into auto answer mode
;PCDInit="AT&FB0&D2&K0&R1&S0\r" ; Parameter B0 = for V.110 protocol
;PCDInit="AT&FB13&D2&K0&R1&S0\r" ; Parameter B13 = for V.120 protocol

```

4.2 Init string for PG4

(file "spg4modm.ini")

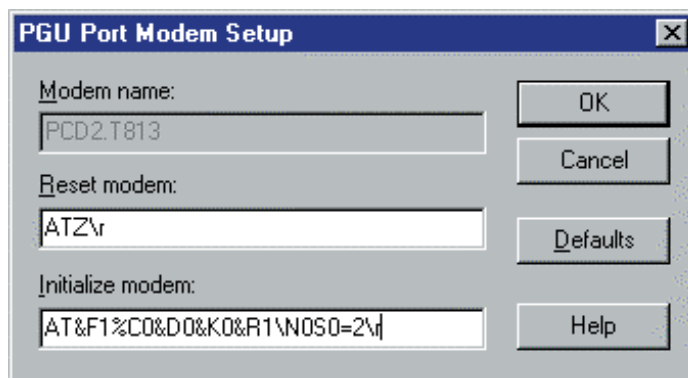
PCD2.T813

PCDReset=ATZ\r

PCDInit=AT&F1%C0&D0&K0&R1\N0S0=2\r

Definition of the PCD2.T813 on the PG4 'Online configurator':

Enter the following Reset and Init strings in the PG4 'Online configurator'.



Download this setting to the PCD.

PCD2.T850

For X.75 protocol

[PCD2.T850(X.75)]

PCDReset=ATZ\r

PCDInit=AT&FB10&D2&K0&R1&S0\r

For V.110 protocol

[PCD2.T850(V.110)]

PCDReset=ATZ\r

PCDInit=AT&FB0&D2&K0&R1&S0\r

For V.120 protocol

[PCD2.T850(V.120)]

PCDReset=ATZ\r

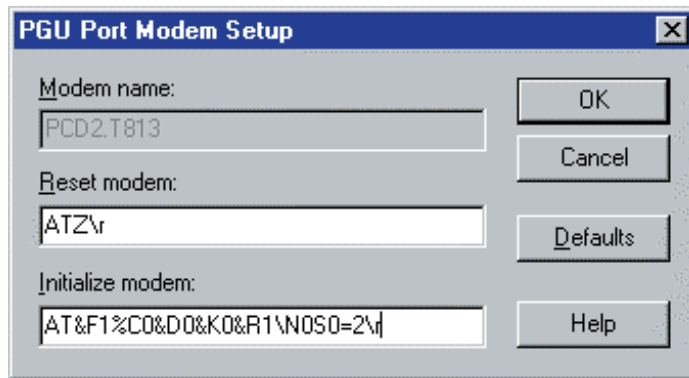
PCDInit=AT&FB13&D2&K0&R1&S0\r

All protocols can be used, however the protocol must be the same for both modems.

Definition of the PCD2.T850 on the PG4 'Online configurator':

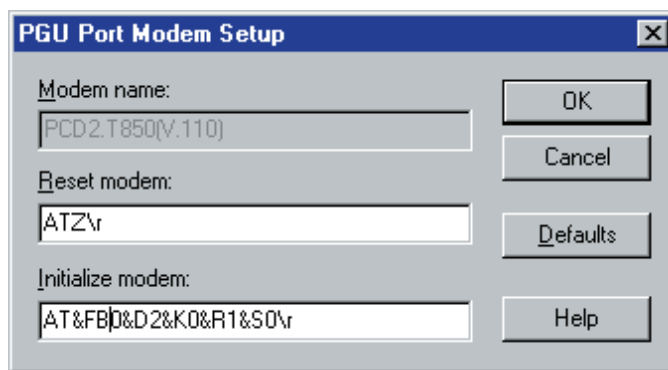
Depending on the communications protocol used by the ISDN modem on the PG4 side, different init strings must be entered in the PG4 online.

with protocol X.75:

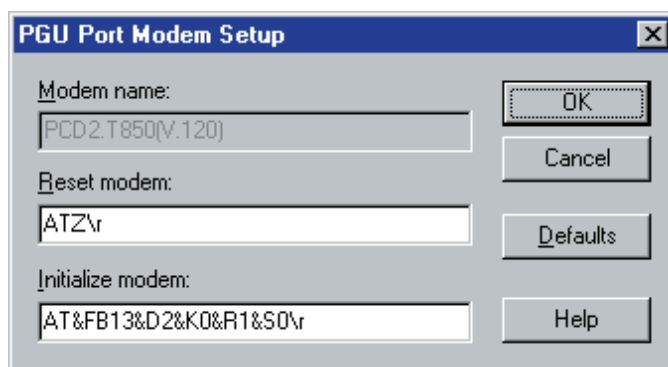


4

with protocol V.110:



with protocol V.120:



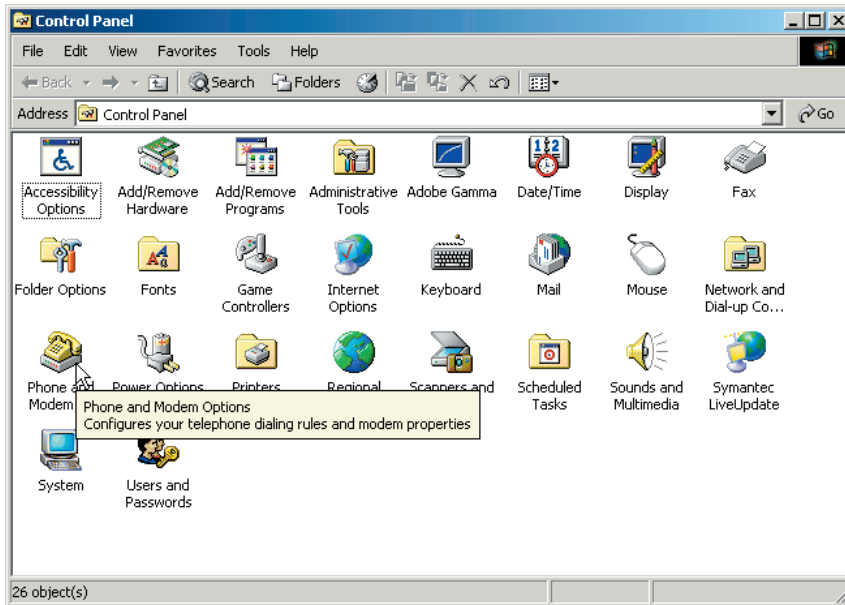
Download the setting to the PCD.

4.3 Init string for PG5

In the opposite to PG3 and PG4, PG5 uses the Windows functions of TAPI. As experience shows, this functions extremely well, if a standard modem will be installed on the PC, independent which modem is used at PC site.

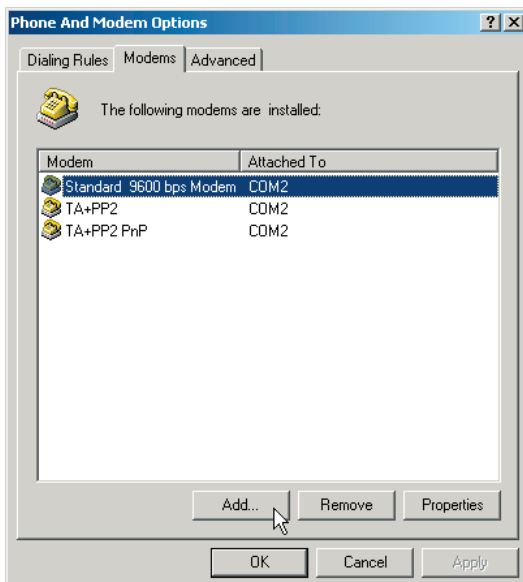
Steps to install a standard modem:

Open in the Control Panel the icon phone and modem

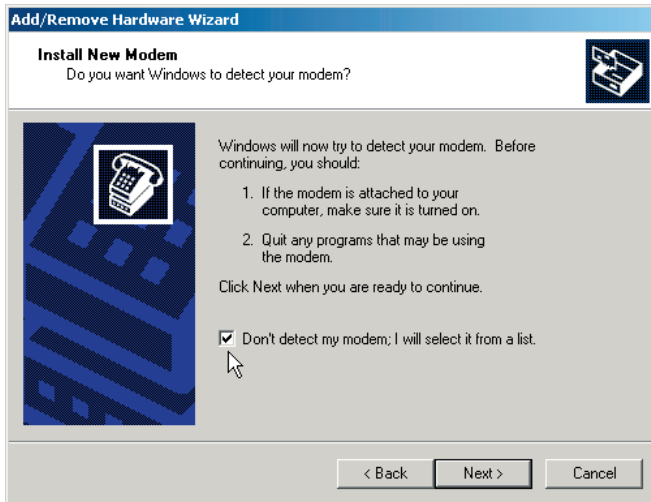


4

Choose the tab Modems and than "Add"

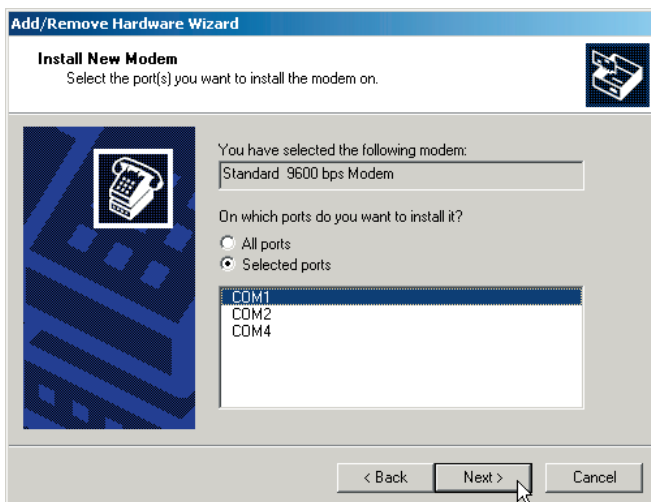
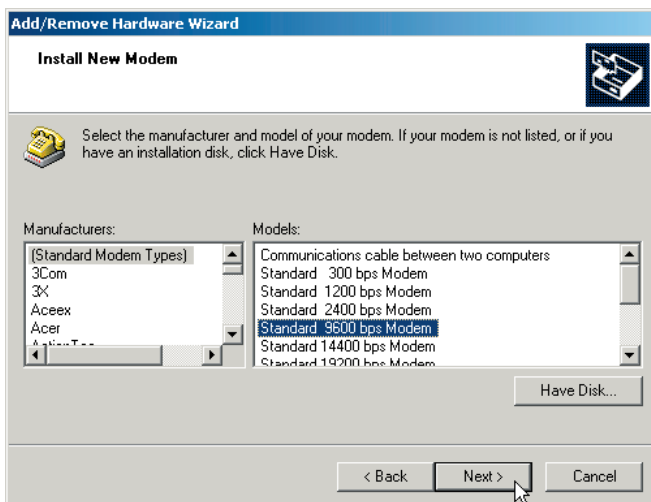


Deactivate the automatic detection of the modems and choose “Next”

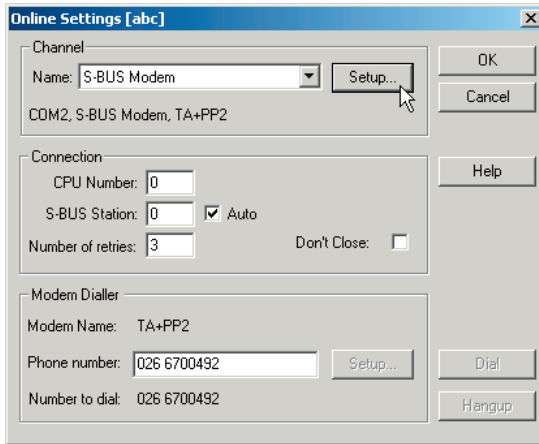


4

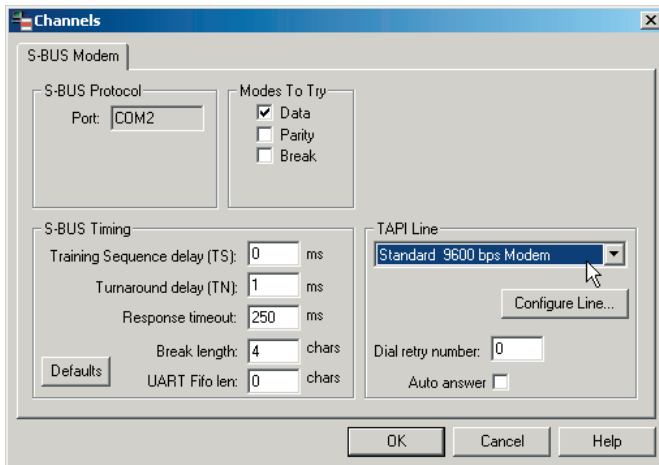
Choose a standard modem with 9600 Baud, then “Next”. After the choice of the serial ports, again “Next”.



With that the installation of the standard modem is finished. Select now in the PG5 in the Online-Settings of the CPU the S-Bus Modem, then “Setup” and under TAPI Line “Standard 9600 bps Modem”.








4



5 Appendix B

5.1 Icons

	<p>In manuals, this symbol refers the reader to further information in this manual or other manuals or technical information documents.</p> <p>As a rule there is no direct link to such documents.</p>
	<p>This symbol warns the reader of the risk to components from electrostatic discharges caused by touch.</p> <p>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.</p>
	<p>This sign accompanies instructions that must always be followed.</p>
	<p>Explanations beside this sign are valid only for the SAIA-Burgess PCD Classic serie.</p>
	<p>Explanations beside this sign are valid only for the SAIA-Burgess PCD xx7 serie.</p>

5

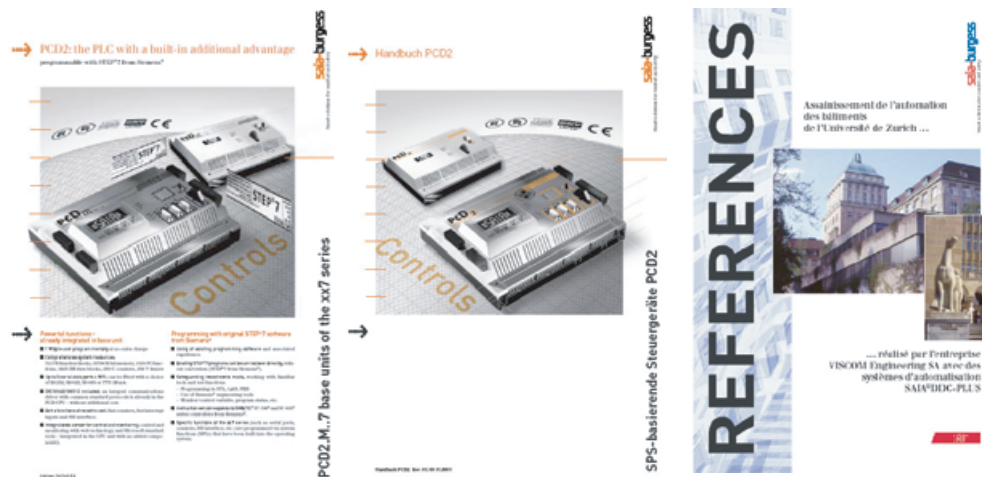
5.2 Product and documentation concept

The SAIA® PCD product range is rigorously modular in structure. It demonstrates a clear hierarchy of systems, sub-systems, functions and diverse accessories. Fully developed software tools allow the efficient creation of user programs.

All SAIA® PCD systems (up to PCD6) work with the same operating system. The PCD systems communicate easily with each other and PCD user programs run on all systems.

PCDn xx7 series controllers have a special operating system. This enables them to be programmed with Siemens® STEP®7 and to communicate readily with the corresponding systems of other manufacturers.

SAIA® PCD customer documentation comprises pre-sales and after-sales documents that complement each other. As a rule, they are published in three language versions (German, English, French).



Technical information

Manuals

References

Technical Information (TI) documents offer overviews of a system (e.g. the SAIA® PCD operating system OS), sub-system (e.g. PCD2) or product family with common features (e.g. digital I/O modules, etc.). TIs have been designed as pre-sales documents. They describe the system or product features and contain all the selection criteria necessary for a preliminary project. They offer the prospective customer more information than a normal brochure. TIs are available free-of-charge as brochures or in electronic form (on CD for a token fee or free of charge via Internet <http://www.sbc-support.ch>).

Manuals are after-sales documents. They contain all the detailed information and application examples necessary for the efficient realization of a project. Manuals are available to the SAIA® PCD customer in electronic form on CD (for a token fee) and free of charge via Internet <http://www.sbc-support.ch>.

References describe projects that have been successfully realized with SAIA® PCD's (after-sales). The solutions outlined in them will provide many ideas for the use of SAIA® PCD's in similar projects (pre-sales, closing the loop with the TI). References are available free-of-charge as brochures or in electronic form (on CD or via Internet <http://www.sbc-support.ch>). Please read also our Controls News published on internet side: <http://www.controls-news.ch>.

P documentation (P = preliminary) describes new or extensively redeveloped products. After extensive internal testing of function and integration, these products are supplied to external commercial partners for field trials under more difficult conditions. P documentation is provided for these field trials. Improvements suggested by these external partners influence the definitive documentation. P documents can be requested as PDF files and some are available free-of-charge via Internet <http://www.sbc-support.ch>.

5.3 Technical support

Any questions that you cannot answer by referring to the documentation will be dealt with promptly and reliably for you by the SAIA® PCD Support Team. The team is based in Switzerland and can be reached by

phone: **+41 26 672 71 11** or by

E-Mail: pcdsupport@saia-burgess.com

The addresses of Saia-Burgess sales companies and agents for other sales areas can be found under <http://www.saia-burgess.com>

5.4 Workshops, training literature

Interesting, informative SAIA®PCD workshops offer technically qualified people the opportunity to make valuable contacts and extend their technical knowledge of the PCD, taking home with them both the training literature and the solutions produced collaboratively during the workshop. Workshops are your route to joining the large group of enthusiastic SAIA®PCD users. Current workshop programs are among a wealth of other useful information to be found under <http://www.sbc-support.ch>

5.5 Reliability and safety of electronic controllers

5

Saia-Burgess Controls Ltd. is a company which devotes the greatest care to the design, development and manufacture of its products:

- state-of-the-art technology
- compliance with standards
- ISO 9001 certification
- international approvals: e.g. Germanischer Lloyd, United Laboratories (UL), Det Norske Veritas, CE mark...
- choice of high-quality componentry
- quality control checks at various stages of production
- in-circuit tests
- run-in (burn-in at 85°C for 48h)

Despite every care, the excellent quality which results from this does have its limits. It is therefore necessary, for example, to reckon with the natural failure of components. For this reason Saia-Burgess Controls Ltd. provides a guarantee according to the „General terms and conditions of supply“.

The plant engineer must in turn also contribute his share to the reliable operation of an installation. He is therefore responsible for ensuring that controller use conforms to the technical data and that no excessive stresses are placed on it, e.g. with regard to temperature ranges, overvoltages and noise fields or mechanical stresses.

In addition, the plant engineer is also responsible for ensuring that a faulty product in no case leads to personal injury or even death, nor to the damage or destruction of property. The relevant safety regulations should always be observed. Dangerous faults must be recognized by additional measures and any consequences prevented. For example, outputs which are important for safety should lead back to inputs and be monitored from software. Consistent use should be made of the diagnostic elements of the PCD, such as the watchdog, exception organization blocks (XOB) and test or diagnostic instructions.

If all these points are taken into consideration, the SAIA PCD will provide you with a modern, safe programmable controller to control, regulate and monitor your installation with reliability for many years.

5.6 About ourselves

Saia-Burgess Controls Ltd (SBC) is a medium-sized European controls technology company. SBC is committed to the values, standards and culture of PLC engineering.

All hardware, operating systems, software tools, CPUs, interfaces, etc. have been developed by SBC itself and are marketed as embedded controls.



5

With full technical knowledge of all system elements and with quality-oriented business processes, SBC is equipped to provide unique, custom solutions regarding range of use, functionality, openness, flexibility, reliability and price.

These core competencies, combined with innovative strength, a broad product range and a readiness to implement special customer requests rapidly, have made SBC the attractive, competitive partner of choice for a large number of international customers.

Addresses of SAIA-Burgess companies

Saia-Burgess Controls Ltd.

Bahnhofstrasse 18
CH-3280 Murten / Switzerland

Telephone ++41 26 672 71 11

Telefax ++41 26 670 44 43

E-mail: pcd@saia-burgess.com

Homepage: www.saia-burgess.com

Support: www.sbc-support.ch

Saia-Burgess Controls Kft.

Liget utca 1
H-2040 Budaörs

Telephone 023 / 501 170

Telefax 023 / 501 180

E-mail: office@saia-burgess.hu

Homepage: www.saia-burgess.hu

Support: www.sbc-support.ch

Your local contact: