

1.5 PCD1 – modular, expandable, compact CPU

The Saia PCD1 systems are the smallest programmable Saia PCD® controllers in a flat design. Along with the standard communication interfaces, integrated data memory and web/IT functionality, all controllers also have at least 18 integrated I/Os. The PCD1 controllers are ideally suited to small-scale automation tasks, whose challenges and tasks can be successfully processed by the powerful CPU.

The many communication options are another advantage:

Ethernet TCP/IP, USB port, the onboard RS-485 interface and the expansion options with BACnet® or Lon IP, for instance, are a small sample of the performance capability of PCD1.

1.5.1 Saia PCD1.M2 series

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Saia PCD1.M2xxx are compact and may be expanded via modules.

Types

- ▶ PCD1.M2160 with Ethernet TCP/IP and expanded memory
- ▶ PCD1.M2120 with Ethernet TCP/IP

18 integrated I/Os
2 free I/O slots



Potential use
in primary switch cabinet

1.5.2 Saia PCD1.Room (PCD1.M2110R1)

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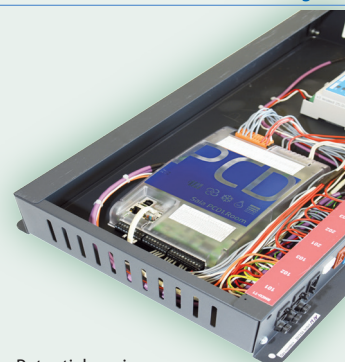


Saia PCD1.Room is for applications in the field of room automation and HeaVAC.

Type

- ▶ PCD1.M2110R1 with Ethernet TCP/IP for room automation applications

24 integrated I/Os
1 free I/O slot



Potential use in a room
(example: in a room box)

Saia PCD® E-Controller (PCD1.M0160E0)

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The E-controller in compact design includes in the default delivery condition S-Monitoring (energy)-functionalities, which can be customized with Saia PG5

Type: PCD1.M0160E0 with S-Monitoring function

- ▶ 18 integrated E/As
- ▶ no free I/O slots

Saia PCD1.M2220-C15

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The E-Line control is ideally suited by the compact design for installation in an electrical sub-distribution. It can be used for example for the other E-Line modules as zoning / master station.

Type: PCD1.M2220-C15 E-Line CPU with Ethernet, 512kB

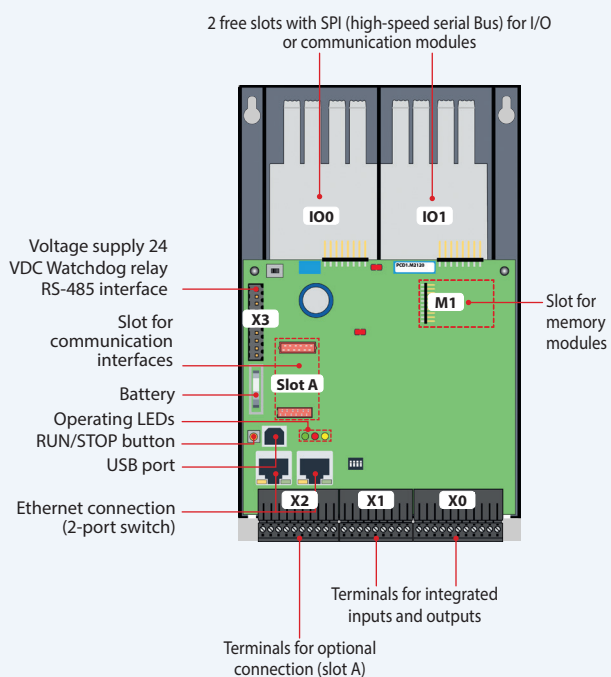
- ▶ integrated I/Os (4 DI, 2 AI, 1 WD)
- ▶ two free I/O Slots
- ▶ a variety of communication options

1.5.1 Saia PCD1.M2xxx controller

The Saia PCD1.M2xxx series is a compact controller with onboard I/Os and in addition two free I/O slots for plug-in or communication interface modules. The Web/IT functionality, the onboard memory, the range of standard communication interfaces and the expansion options offer ideal solutions for small to medium systems.



Device design



System properties

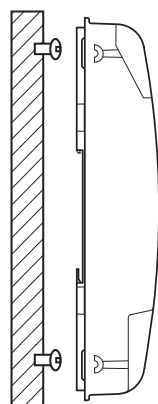
- ▶ Up to 50 inputs/outputs
May be expanded remotely with RIO PCD3.T66x or PCD3.T76x
- ▶ Up to 8 communication interfaces
- ▶ USB and Ethernet interface onboard
- ▶ Large onboard memory for programs (up to 1 MB) and data (up to 128 MB file system)
- ▶ Automation Server for integration into Web/IT systems



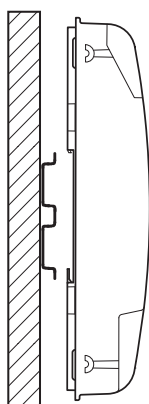
Types

- ▶ PCD1.M2160 with Ethernet TCP/IP and expanded memory
- ▶ PCD1.M2120 with Ethernet TCP/IP
- ▶ PCD1.M2020 without Ethernet TCP/IP

Mounting

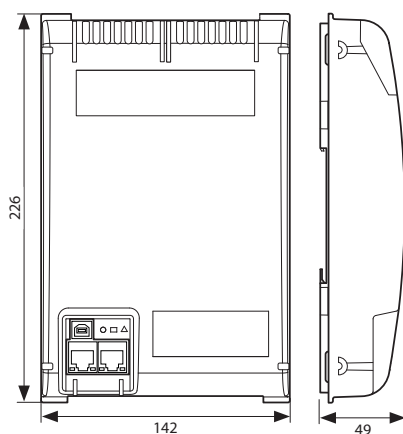


on a level surface



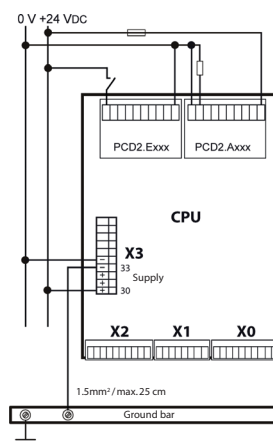
on two DIN rails
(2 × 35 mm in accordance with DIN EN 60715 TH35)

Dimensions



Compact mass:
142 × 236 × 49 mm



Power supply and connection concept



Additional information is provided in the Chapter Saia PCD3 power supply and connection concept, and in the Manual 26-875.

Overview Saia PCD1.M2xxx

Technical data

			
Memory and file system	Types:	PCD1.M2160	PCD1.M2120
Program memory, DB/Text (Flash)		1 MB	512 kByte
User memory, DB/Text (RAM)		1 MB	128 kByte
Onboard user flash file system		128 MB	8 MB
Integrated communication			
Ethernet connection (2-port switch) 10/100 Mbit/s, full-duplex, auto-sensing, auto-crossing		Yes	Yes
USB port USB 1.1 device 12 Mbit/s		Yes	Yes
RS-485 (terminal X3), up to 115 kbit/s		Yes	Yes

General specifications

Operating voltage	24 VDC, -20/+25 % max. inkl. 5% ripple (in accordance with EN/IEC 61131-2)
Battery for data backup (replaceable)	Lithium battery with a service life of 1 to 3 years
Operating temperature:	0...55 °C
Dimensions (W × H × D)	142 × 226 × 49 mm
Mounting location	2× DIN rails in accordance with DIN EN60715 TH35 (2 × 35 mm) or on a flat surface
Protection type	IP 20
Capacity 5 V/+V (24 V) internal	max. 500 mA/200 mA
Power consumption	typically 12 W

Onboard inputs/outputs

Inputs:

6 Digital inputs (4 + 2 interrupts)	15...30 VDC, 3 ms input filter (0.2 ms for the interrupts)	Terminal X1
2 Analogue inputs, selectable via DIP switch	-10...+10 VDC, 0...±20 mA, Pt1000, Ni1000, Ni1000 L&S, 0...2.5 kΩ, 12 bit resolution	Terminal X1

Outputs:

4 Digital outputs	24 VDC / 0.5 A	Terminal X0
1 PWM output	24 VDC / 0.2 A	Terminal X0

selectable/configurable via PG5

4 Digital inputs or outputs	24 VDC / data as digital inputs or outputs	Terminal X0
1 Watchdog relay or make contact	48 VAC or VDC, 1 A With DC switching voltage a free-wheeling diode should be connected in parallel to the load	Terminal X3

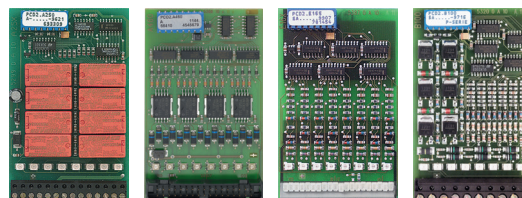
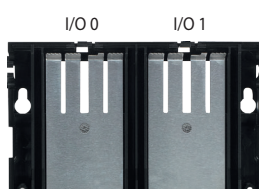
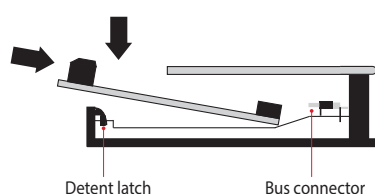
Analogue output module Saia PCD7.W600

This module has 4 analogue outputs 0 to +10 V with a 12-bit resolution and has been specifically developed for the new PCD1 CPUs (PCD1.M2xxx, PCD1.M0160E0, PCD1.M2110R1). It can be plugged into slot A of the PCD1 CPU like the PCD7.F1xxS communication module.



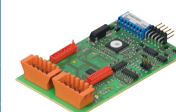
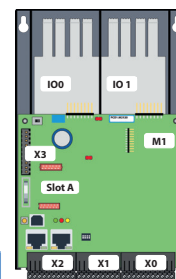
Plug-in I/O modules for slots I/O 0 and I/O 1

The modules listed in the PCD2.M5 series (Chapter 1.4) are also used for the Saia PCD1 series.



Saia PCD1.M2xxx interface options

In addition to the onboard interfaces, the interface functions can also be expanded in a modular way using the various slots. Numerous protocols are therefore supported by the Saia PCD1.M2 series. Detailed information and an overview is contained in the Chapter BA communication systems.



Communication		Electrical isolation	Internal current consumption 5V +V (24 V)		Slot	I/O connector type ¹⁾
PCD7.F110S	RS-485/RS-422	---	40 mA	–	Slot A	
PCD7.F121S	RS-232 with RTC/CTS, DTR/DSR, DCD suitable for modem, EIB connection	---	15 mA	–	Slot A	
PCD7.F150S	RS-485 with termination resistors that can be activated	•	130 mA	–	Slot A	
PCD7.F180S	Belimo MP-Bus, for connecting up to 8 drives on one line	---	15 mA	15 mA	Slot A	
PCD2.F2100	RS-422/RS-485 plus PCD7.F1xxS as option	---	110 mA	–	IO 0/1	2× K
PCD2.F2150	BACnet® MS/TP RS-485 plus PCD7.F1xxS as an option	---	110 mA	–	IO 0/1	2× K
PCD2.F2210	RS-232 plus PCD7.F1xxS as an option	---	90 Ma	–	IO 0/1	2× K
PCD2.F2400	LonWORKS® interface module	---	90 Ma	–	IO 0/1	L9
PCD2.F2610	DALI Master for up to 64 DALI devices	---	90 Ma	–	IO 0/1	L
PCD2.F27x0	M-Bus master with 2 M-Bus interfaces	---	70 mA	8 mA	IO 0/1	L
PCD2.F2810	Belimo MP-Bus plus PCD7.F1xxS as an option	---	90 Ma	15 mA	IO 0/1	2× K

¹⁾ Plug-in I/O terminal blocks are included with I/O modules. Spare terminals, ribbon connectors with system cables and separate terminals are ordered as accessories.



The use of external modem modules such as Q.M716-KS1 is recommended. The PCD2.T8xx modem modules can only be used with a PCD7.F121S module. External wiring is therefore required.

System properties of PCD2.F2xxx modules

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

- ▶ Max. 2 modules PCD2.F2xxx (4 interfaces) can be used in slots I/O 0/1 per PCD1.M2 system.
- ▶ Consult the information and examples provided in the Manual 26-875 for PCD1.M2 to determine the maximum communication capacity for each PCD1.M2 system.

Memory modules

The onboard memory of the Saia PCD1.M2xxx can be expanded using a Saia PCD7.Rxxx module in slot M1. In addition, the Saia PCD1.M21x0 can be expanded with BACnet® IP or Lon IP.

Additional information about the memory management and structure is contained in the Chapter Saia PCD® System Description.

Memory expansion and communication

PCD7.R550M04	Flash memory module with a 4 MB file system (for user program backup, web pages, etc.)	M1
PCD7.R560	Flash memory module for BACnet® firmware	M1
PCD7.R562	Flash memory module for BACnet® firmware with 128 MB file system	M1
PCD7.R580	Flash memory module for Lon IP firmware	M1
PCD7.R582	Flash memory module for Lon IP firmware with 128 MB file system	M1
PCD7.R610	Basic module for Micro SD flash card	M1
PCD7.R-MSD1024	Micro SD flash card 1024 MB, PCD formatted	PCD7.R610



PCD7.R55xM04

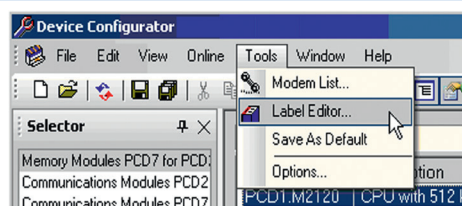
PCD7.R610



Accessories and consumables for Saia PCD1.M2xxx

Labelling

The self-adhesive labels can be printed direct with the SBC LabelEditor from the PG5 Device Configurator



EPLAN macros

EPLAN macros are available for project planning and engineering.



The EPLAN® electric P8 macros are available on the support site.
The macros and article data are also provided on the EPLAN® data portal.



Battery for data backup

Type	Description
4 507 4817 0	Lithium battery for PCD processor unit (RENATA button battery type CR 2032)



Plug-in screw terminal block

4 405 5089 0	Plug-in screw terminal block, 11-pin, labelling 0...10	Terminal X0
4 405 5087 0	Plug-in screw terminal block, 9-pin, labelling 11...19	Terminal X1
4 405 5088 0	Plug-in screw terminal block, 10-pin, labelling 20...29	Terminal X2
4 405 4919 0	Plug-in screw terminal block, 10-pin, labelling 30...39	Terminal X3



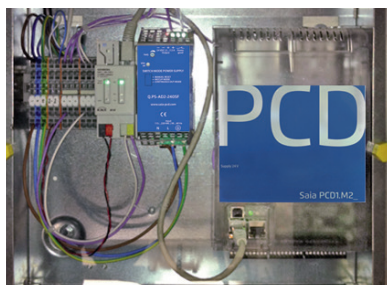
Cover

4 104 7759 0	Housing cover for PCD1.M2xxx without logo on-site with an overlay that can be individually designed
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Range of uses

- For small and medium systems
- Modernisation and expansion of existing systems through, for example, the compact construction
- Versatile interface options, including to existing systems as a gateway, for example: optimisation of a cooling system by setting all the free parameters



Connection to an existing EIB/KNX installation providing conference rooms with a web connection



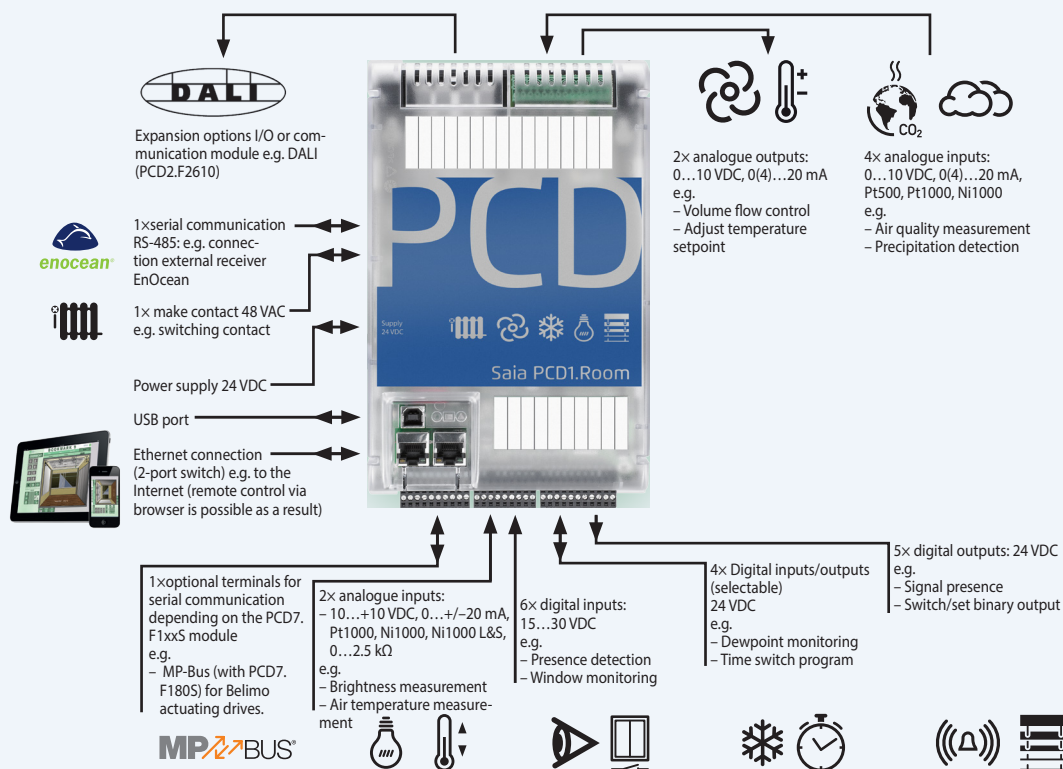
Use as communication interface with M-Bus in a district heating network

1.5.2 Saia PCD1.Room (PCD1.M2110R1)

Saia PCD1.Room (PCD1.M2110R1) is a programmable room controller for complex solutions with many communication options. In addition to the I/Os that are already integrated, the controller has a free I/O slot for individual expansion with inputs/outputs or communication modules. Web/IT functions for mobile operation, for instance, are also already onboard. Furthermore, Saia PCD1.Room offers various possibilities for integrating other systems in the room using standard communication interfaces. (Energy) efficient and individual room automation can be easily implemented as a result. The controller also provides a good basis for achieving the energy efficiency classes in accordance with EN 15232:2012.



Device design with connection example

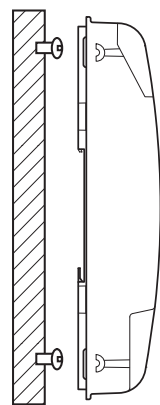


Lighting, sun protection and individual room regulation can be optimally coordinated with one another with this controller. This example showing possible assignments was compiled based on applications in accordance with the VDI 3813 list of room automation functions and the DIN EN 15232 list of building automation functions.

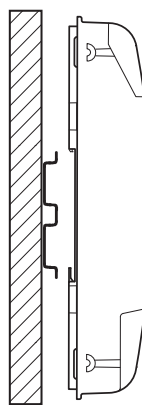


The Smart RIO Manager function is not supported!

Mounting

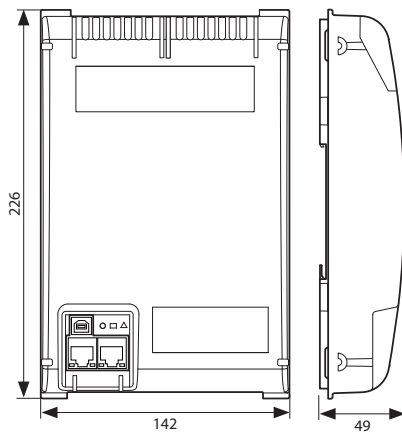


on a level surface



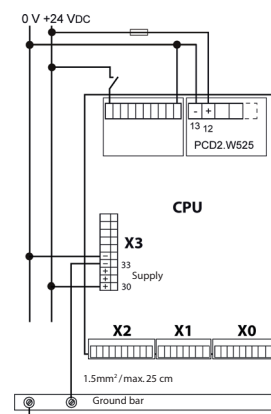
on two DIN rails
(2 x 35 mm in accordance
with DIN EN 60715 TH35)

Dimensions



Compact mass:
142 x 236 x 49 mm

Power supply and connection concept



Further information is provided in the Chapter Saia PCD3 power supply and connection concept, and in the Manual 26-875.

Overview of Saia PCD1.Room (PCD1.M2110R1)

Technical data

Memory and file system	Type:	PCD1.M2110R1
Program memory, DB/text (Flash)		256 kByte
User memory, DB/text (RAM)		128 kByte
Onboard user flash file system		8 MB
Integrated communication		
Ethernet connection (2-port switch) – 10/100 Mbit/s, full-duplex, auto-sensing, auto-crossing		yes
USB port – USB 1.1 device 12 Mbit/s		yes
RS-485 – (terminal X3), up to 115 kbit/s		yes

General specifications

Operating voltage	24 VDC, –20/+25 % max. inkl. 5% ripple (in accordance with EN/IEC 61131-2)
Battery for data backup (replaceable)	Lithium battery with a service life of 1 to 3 years
Operating temperature:	0...55 °C
Dimensions (W × H × D)	142 × 226 × 49 mm
Mounting location	2× DIN rails in accordance with DIN EN60715 TH35 (2 × 35 mm) or on a smooth surface
Protection type	IP 20
Capacity 5 V/+V (24 V) internal	max. 500 mA/200 mA
Power consumption	typically 12 W
Automation Server	Flash memory, file system, FTP and web server, email, SNMP



Onboard inputs/outputs

Inputs:

6 Digital inputs (4 + 2 interrupts)	15...30 VDC, 3 ms / 0.2 ms input filter	Terminal X1
2 Analogue inputs, selectable via DIP switch	–10...+10 VDC, 0...±20 mA, Pt1000, Ni1000, Ni1000 L&S, 0...2.5 kΩ, 12 bit resolution	Terminal X1
4 Analogue inputs, selectable via DIP switch	0...10 VDC, 0(4)...20 mA, Pt1000, Pt 500, Ni1000, 14 bit resolution	IO 1

Outputs:

4 Digital outputs	24 VDC / 0.5 A	Terminal X0
1 PWM output	24 VDC / 0.2 A	Terminal X0
2 Analogue outputs, selectable via PG5	0...10 VDC or 0(4)...20 mA, 12 bit resolution	IO 1

selectable/configurable via PG5

4 Digital inputs or outputs	24 VDC / data as digital inputs or digital outputs	Terminal X0
1 Watchdog relay or as make contact	48 VAC or VDC, 1 A With DC switching voltage a free-wheeling diode should be connected in parallel to the load	Terminal X3

Analogue output module Saia PCD7.W600

This module has 4 analogue outputs 0 to +10 V with a 12-bit resolution and has been developed specifically for use with the new PCD1 CPUs (PCD1.M2xx0, PCD1.M0160E0, PCD1.M2110R1). It can be plugged into slot A of the PCD1 CPU like the PCD7.F1xxS communication module.



Plug-in I/O modules for slot I/O 0

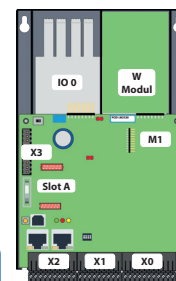
The modules listed in the PCD2.M5 series (Chapter 1.4) are also used for the Saia PCD1 series.



Only a PCD2.W525 module that is already supplied with the controller in the default setup functions in slot I/O 1. If the module is removed, the controller will go to Stop!

Saia PCD1.Room (PCD1.M2110R1) interface options

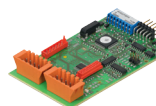
In addition to the onboard interfaces, the interface functions can also be expanded in a modular way using the various slots. Numerous protocols are therefore supported by the Saia PCD1.M2110R1. A detailed list of all the protocols can be found in the Chapter BA communication systems.



Communication		Electrical isolation	Internal current consumption 5V +V (24 V)		Slot	I/O connector type ¹⁾
PCD7.F110S	RS-485/RS-422 not electrically isolated	---	40 mA	–	Slot A	
PCD7.F121S	RS-232 with RTC/CTS, DTR/DSR, DCD suitable for modem or EIB connection	---	15 mA	–	Slot A	
PCD7.F150S	RS-485 electrically isolated, with termination resistors that can be activated	•	130 mA	–	Slot A	
PCD7.F180S	Belimo MP-Bus, for connecting up to 8 drives on one line	---	15 mA	15 mA	Slot A	
PCD2.F2100	RS-422/RS-485 (not electrically isolated) plus PCD7.F1xxS as an option	---	110 mA	–	IO 0/1	2x K
PCD2.F2150	BACnet® MS/TP RS-485 plus PCD7.F1xxS as an option	---	110 mA	–	IO 0/1	2x K
PCD2.F2210	RS-232 plus PCD7.F1xxS as an option	---	90 Ma	–	IO 0/1	2x K
PCD2.F2400	LONWORKS® interface module	---	90 Ma	–	IO 0/1	L9
PCD2.F2610	DALI master for up to 64 DALI devices	---	90 Ma	–	IO 0/1	L
PCD2.F27x0	M-Bus master with 2 M-Bus interfaces	---	70 mA	8 mA	IO 0/1	L
PCD2.F2810	Belimo MP-Bus plus PCD7.F1xxS as an option	---	90 Ma	15 mA	IO 0/1	2x K

¹⁾ Plug-in I/O terminal blocks are supplied with I/O modules.

Spare terminals, ribbon connectors with system cables and separate terminals are ordered as accessories.



System properties of PCD2.F2xxx modules

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

- ▶ Per PCD1.M2110R1 Room Edition a max. of 1 module PCD2.F2xxx (2 interfaces) can be used with slot I/O0.
- ▶ Consult the information and examples provided in the Manual 27-619 for PCD1.M2110R1 to determine the maximum communication capacity for each PCD1.M2 system.

Memory modules

The onboard memory can be expanded using a PCD7.Rxxx module in slot M1. In addition, BACnet® IP or Lon IP can be activated.

Additional information about the memory management and structure is contained in the Chapter Saia PCD® System description.

Memory expansion and communication

PCD7.R550M04	Flash memory module with a 4 MB file system (for user program backup, web pages, etc.)	M1
PCD7.R560	Flash memory module for BACnet® firmware,	M1
PCD7.R562	Flash memory module for BACnet® firmware with 128 MB file system	M1
PCD7.R580	Flash memory module for Lon IP firmware	M1
PCD7.R582	Flash memory module for Lon IP firmware with 128 MB file system	M1
PCD7.R610	Basic module for Micro SD flash card	M1
PCD7.R-MSD1024	Micro SD flash card 1024 MB, PCD formatted	PCD7.R610



PCD7.R55xM04

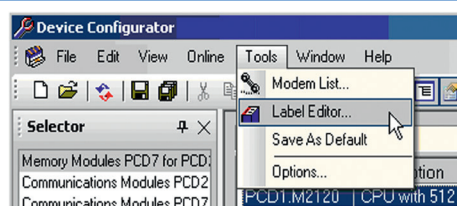
PCD7.R610



Accessories and consumables for Saia PCD1.Room (PCD1.M2110R1)

Labelling

The self-adhesive labels can be printed direct with the SBC LabelEditor from the PG5 Device Configurator



EPLAN macros

EPLAN macros are available for project planning and engineering



The EPLAN® electric P8 macros are available on the support site.

The macros and article data are also provided on the EPLAN® data portal.



Battery for data backup

Type	Description
4 507 4817 0	Lithium battery for PCD processor unit (RENATA button battery type CR 2032)



Plug-in screw terminal block

4 405 5089 0	Plug-in screw terminal block, 11-pin, labelling 0...10	Terminal X0
4 405 5087 0	Plug-in screw terminal block, 9-pin, labelling 11...19	Terminal X1
4 405 5088 0	Plug-in screw terminal block, 10-pin, labelling 20...29	Terminal X2



Cover

4 104 7759 0	Housing cover for PCD1.M2xxx without SBC logo on-site with an overlay that can be individually designed
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Range of uses:

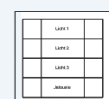
Applications



Options for programmable applications:

- ▶ Radiators
- ▶ Fan coil applications
- ▶ Cooling ceiling
- ▶ VAV – variable air volume
- ▶ Air quality control
- ▶ Signal contacts (occupancy control, presence detection, window monitoring)
- ▶ Lighting control
- ▶ Blind control
- ▶ etc.

Room control units



Connection options via the following:

- ▶ Analogue signals (onboard)
- ▶ S-Bus (onboard)
- ▶ Modbus (onboard)
- ▶ Internet access, web server (onboard)
- ▶ BACnet® with PCD7.R56x (slot M1)
- ▶ BACnet® MS/TP with PCD2.F2150 (slot I/O 0)
- ▶ LON IP with PCD7.R58x (slot M1)
- ▶ LON FTT 10 with PCD2.F2400 (slot I/O 0)
- ▶ KNX over IP (IP onboard)
- ▶ KNX TP with an external coupler
- ▶ EnOcean with external receiver



Applications must take the exact number of I/Os into account. Coupling relays (e.g.: PCD7.L252) or S-Bus RIOs (PCD7.L200/L210) required. The S-Bus stations are limited to a maximum of 10 units per PCD1.Room. The same applies to Modbus stations (total of 10 units).

