

A4 Collect, visualise and process consumption data

With the field devices of the S-Monitoring system, electrical energy is measured and signals from water, gas and heating meters are captured. The S-Monitoring application processes and visualises data automatically in a clearly arranged manner. Thus, the system generates a high degree of transparency regarding resource consumption. This functions from just a few measuring points up to thousands of measuring points in distributed properties.



S Monitoring

4.1 System overview

S-Monitoring makes it easy to manage energy and consumption. Ready-to-use directly from the packaging and it does not require any complicated configuration and programming. It can also be customised to meet your specific requirements – it is a system, that grows with you.



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4.2 Energy meters ALD, ALE and AWD

Saia Burgess Controls, is a European market leader in bus-capable energy meters for sub metering of electrical energy data: for machines, plants and building components.



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4.3 S-Monitoring application

S-Monitoring is an integral part of the COSinus operating system and is integrated into all controls with the extension xx60 and the pWeb panels. It enables consumption data to be acquired automatically without time-consuming programming and saves it on the file system.



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4.4 Saia PCD® E-Controller

The E-Controller with S-Monitoring function combines data capture, visualisation and logging of energy consumption in one compact device. Users can use the inputs and outputs to intervene in processes for regulation.



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4.5 Saia PCD® S0 pulse counter

Collect, convert and transmit S0 pulses: With the PCD7.H104 pulse counter modules, non-bus-capable meters can also be integrated into an S-Monitoring system.



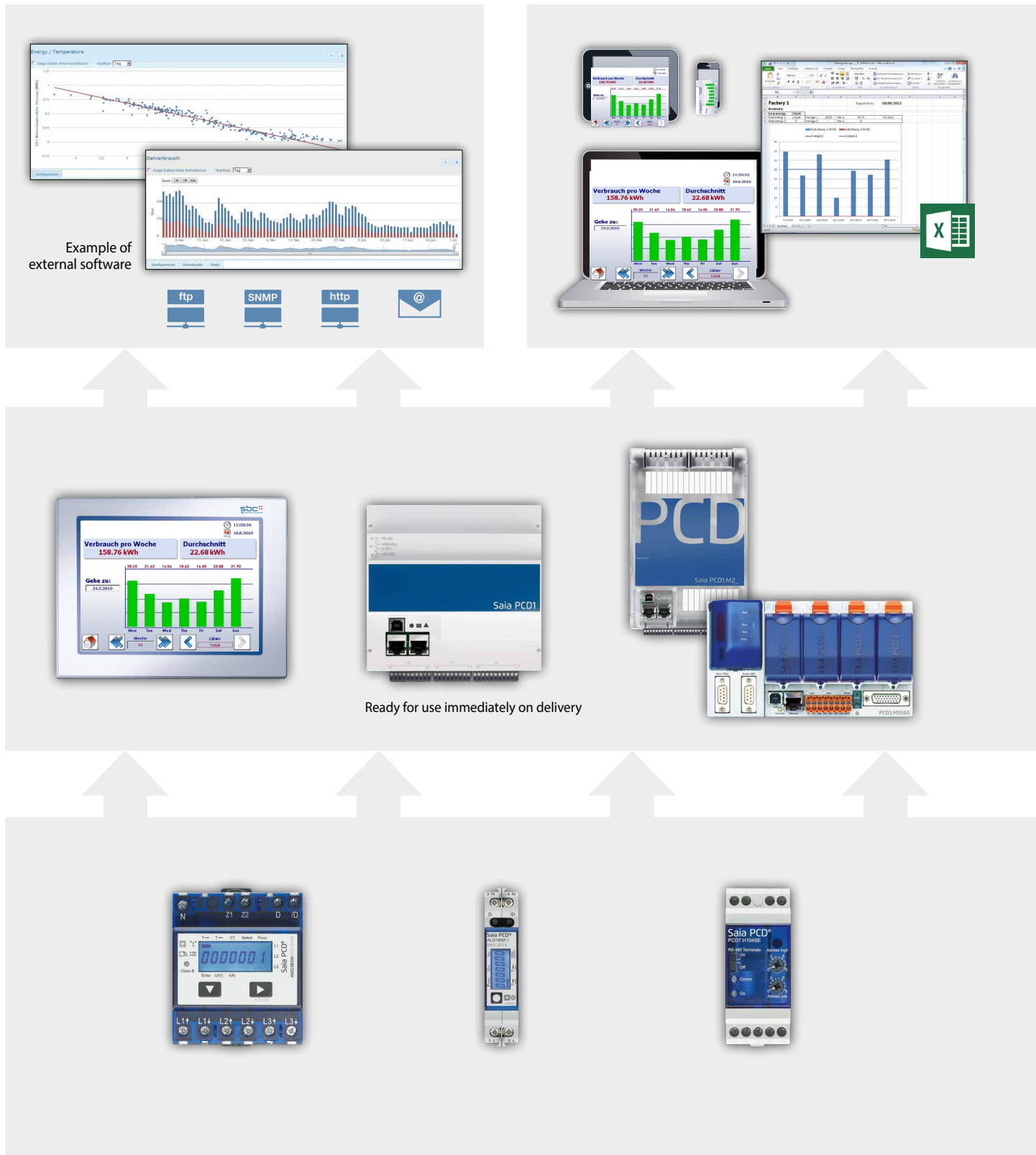
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4.1 System overview



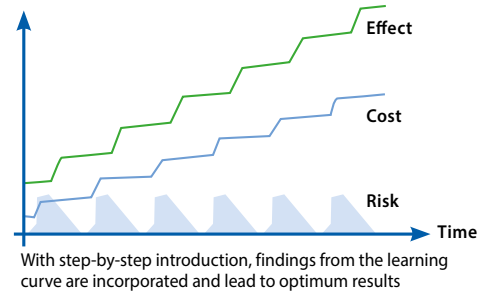
S-Monitoring makes it easy to manage energy and consumption. Ready-to-use directly from the packaging and it does not require any complicated configuration and programming. It can also be customised to meet your specific requirements – it is a system, that grows with you.

The system includes devices and components for capturing, recording and displaying consumption. With the Web Panel installed on-site, analysis can be carried out on the office PC or remotely via the Internet web browser. The open IT interfaces make it possible to connect the system to a superordinate data management system at any time. There is no need to replace the hardware to do this.



Continuous optimisation in calculable steps:

Sustainable resource management means a continuous gain in knowledge in a changing environment. The optimum solution is different for each business, and must be developed with careful consideration. S-Monitoring supports a cautious approach in small, controllable steps and starts with the basics. It is possible to start resource management without external help using cost-effective, easy-to-install components. Even after just a few days, initial results are set and point the way for further optimisation steps. The investment risk is negligible and remains limited to each individual development step.



Remote visualisation and evaluation of consumption

- ▶ Reading and operating via LAN/Internet with web browser and mobile devices
- ▶ Integration into other systems via standard interfaces

If the Web Panel and controller are connected to a network (LAN), meter readings and operation can be carried out using commercially available PCs with standard browsers. Special software installations are not required and apps are available for mobile devices. This can even be carried out across locations if there is an Internet connection.

Databases, energy management software or control systems can be connected via standard interfaces (e.g. FTP, CGI, HTTP, etc.).

Logging consumption

- ▶ Historical consumption readings (Day / Week / Month / Year)
- ▶ Logging in Excel-readable files

The Web Panel and controllers read consumption values of the connected meters and display them in the form of a web visualisation. This can be called up either directly on the Web Panel or via the controller's web server with a web browser. Consumption and costs can be called up in meaningful diagrams via an intuitive user interface. In addition, the Web Panel and controllers record captured values in Excel-readable CSV files, which can be easily transferred to a PC via FTP. The function can be activated on any new controller.

Record consumption

- ▶ Wide range of single and 3-phase energy meters and network analyzers
- ▶ S0 interface for the integration of commercially available meters for gas, water, oil, etc.

Saia PCD energy meters and network analyzers follow established installation technology and are suitable for DIN rails of commercially available distribution boxes. Integrated into a bus system covering a distance of up to 1 km, the measured values are transmitted to the Web Panel and controllers for the purpose of analysis and logging.

Via pulse counters with an interface, commercial available meters with S0 output can be connected to the bus system.

4.2 Energy meters ALD, ALE and AWD

small, robust, reliable and accurate

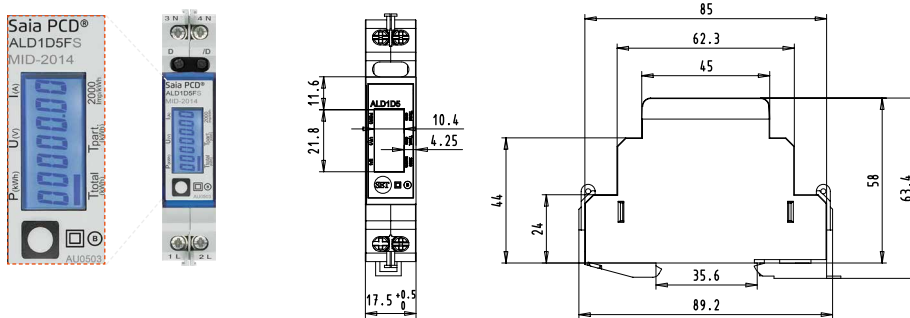
The very compact design makes the SBC energy meters ideally suited to accommodate a large number of measuring instruments in the smallest space. The small size means the meters can also be fitted in existing switch cabinets without having to install new switch cabinets. The robust design has certainly proven itself under tough industrial conditions. The design of the energy meters is specifically designed for such applications, as is shown by a high level of reliability and durability. The display shows energy, current, voltage and active output.



Many energy meters in the smallest space ►

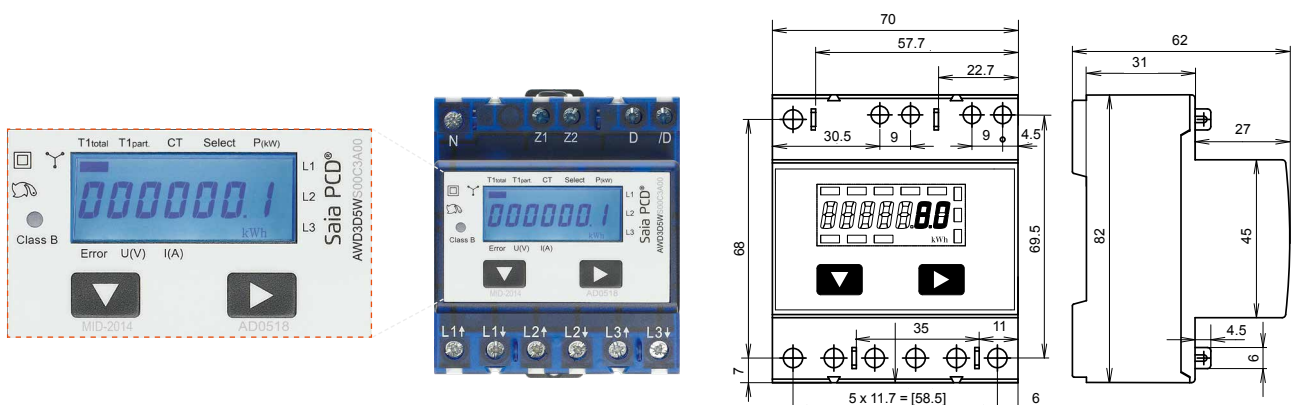
Single-phase Saia PCD® energy meters

Interface	Single-phase	
	Direct measurement 0.25...32 A	
	Unidirectional	Bidirectional
M-Bus	ALD1D5FM00A3A00	-
Modbus	ALD1D5FD00A3A00	ALD1B5FD00A3A00
S Bus	ALD1D5FS00A3A00	ALD1B5FS00A3A00
S0 interface	ALD1D5F10KA3A00	-



3-phase Saia PCD® energy meters

Interface	3-phase			
	Direct measurement 0.5...65 A		Converter connection up to 1500:5 A	
	Unidirectional	Bidirectional	Unidirectional	Bidirectional
M-Bus	ALE3D5FM10C3A00	ALE3B5FM00C3A00	AWD3D5WM00C3A00	-
Modbus	ALE3D5FD10C3A00	ALE3B5FD00C3A00	AWD3D5WD00C3A00	-
S Bus	ALE3D5FS10C3A00	ALE3B5FS00C3A00	AWD3D5WS00C3A00	AWD3B5WS00C3A00
S0 interface	ALE3D5F11KC3A00	ALE3B5F10KC3A00	AWD3D5W10MC3A00	AWD3B5W10MC3A00

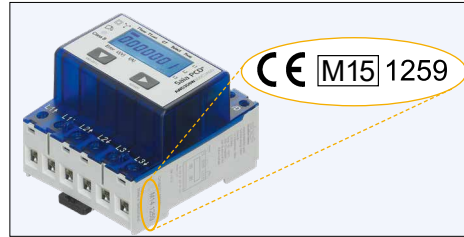


4.2.1 General information on energy meters

Reliable directly from the factory. The design and production of energy meters are such that the meters also exhibit high levels of reliability and durability even under extreme industrial conditions. The high quality standards of the production site guarantee high accuracy and enable the production of MID-approved energy meters, which have a guaranteed accuracy immediately following delivery and for their entire calibration period. This approval means that the measured values are considered totally accurate and can be used throughout Europe for billing purposes.



▲ Energy meters in tough industrial environment



▲ Marking on an MID meter



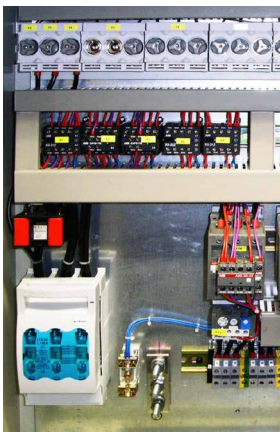
▲ Production cell for energy meters

Meters for converter connection

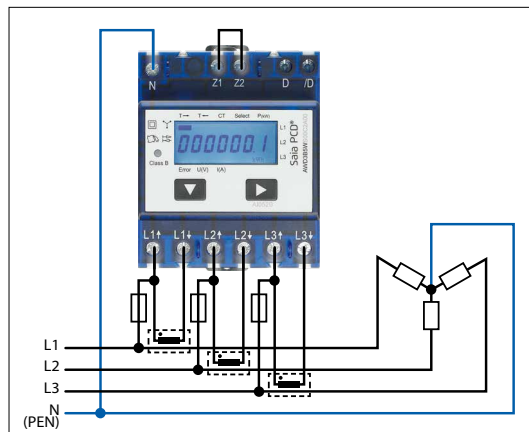
The use of current converters makes costly shutdowns of entire machines for meter installation a thing of the past. The replacement of an energy meter or current converter while the system is running is possible with the consistent use of flap current converters, since the faulty parts can be replaced easily without disconnecting the entire system from the power supply.

Available converter ratios in Saia PCD® energy meters

Three-phase energy meters – secondary current 5 A			
5:5	50:5	100:5	150:5
200:5	250:5	300:5	400:5
500:5	600:5	750:5	1000:5
1250:5	1500:5	---	---



▲ Current converter in switch cabinet



▲ Connected converters



▲ Built-in current converter directly in the cable duct

MTBF values for Saia PCD® energy meters

The quality, robustness and reliability of the energy meters is also shown by the MTBF values, which have been calculated in accordance with the Siemens standard SN 29500.

MTBF values at 25 °C

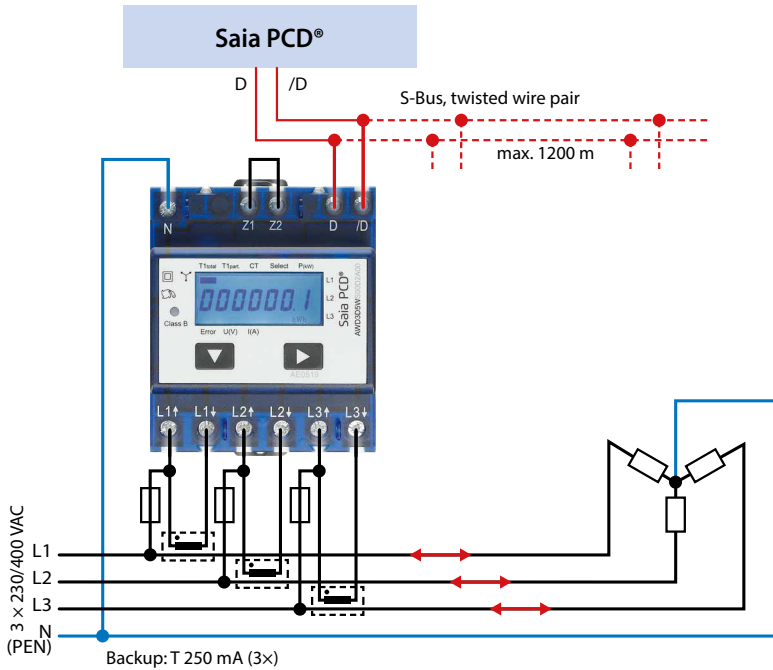
Energy meters without communication interface: 410 years

Energy meters with communication interface: 200 years

Measuring energy in both directions

With the bidirectional energy meters, energy can be measured in both directions of flow. The energy counters work in a balancing out fashion (mode 2), which means that they form the sum of all measured phase outputs analogue to the old Ferraris meters with a rotating disc.

The main area of use of bidirectional meters is wherever both energy flow directions occur (energy consumption and feed), such as in photovoltaic systems. FBoxes are installed for connection to the PCD world to capture the measured values.



▲ Energy measurement of both current directions with one Saia PCD for further processing of the measured values

ePLAN[®] electric P8

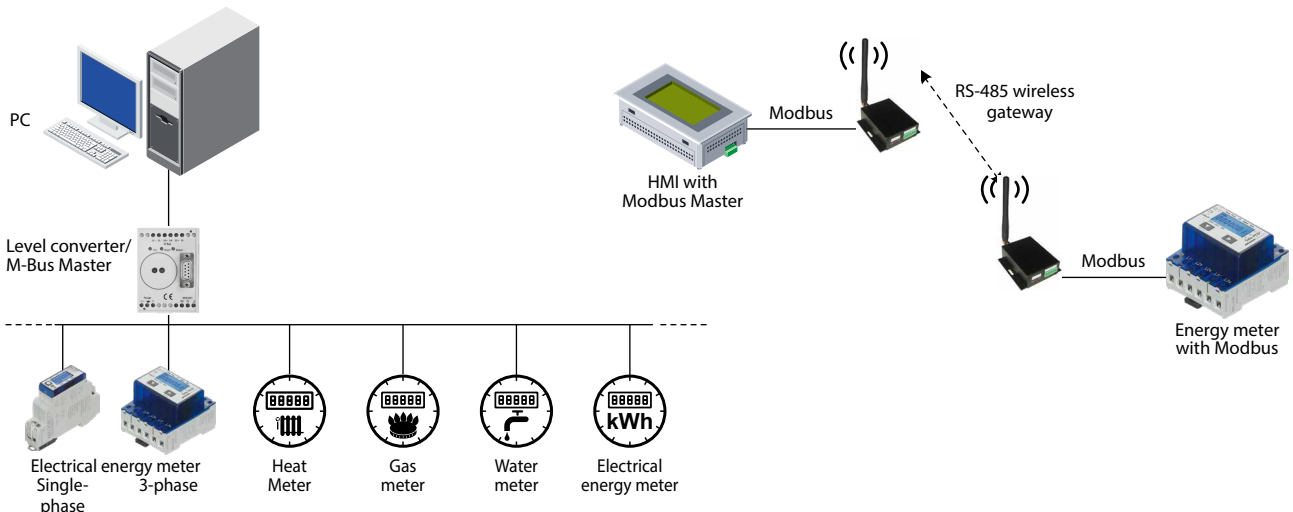
EPLAN macros are available for project planning and engineering



The eplan[®] electric P8 macros are available on the support page. The macros and article data are also provided on the eplan[®] data portal.

Integrating the energy meter as a component in an existing, external system

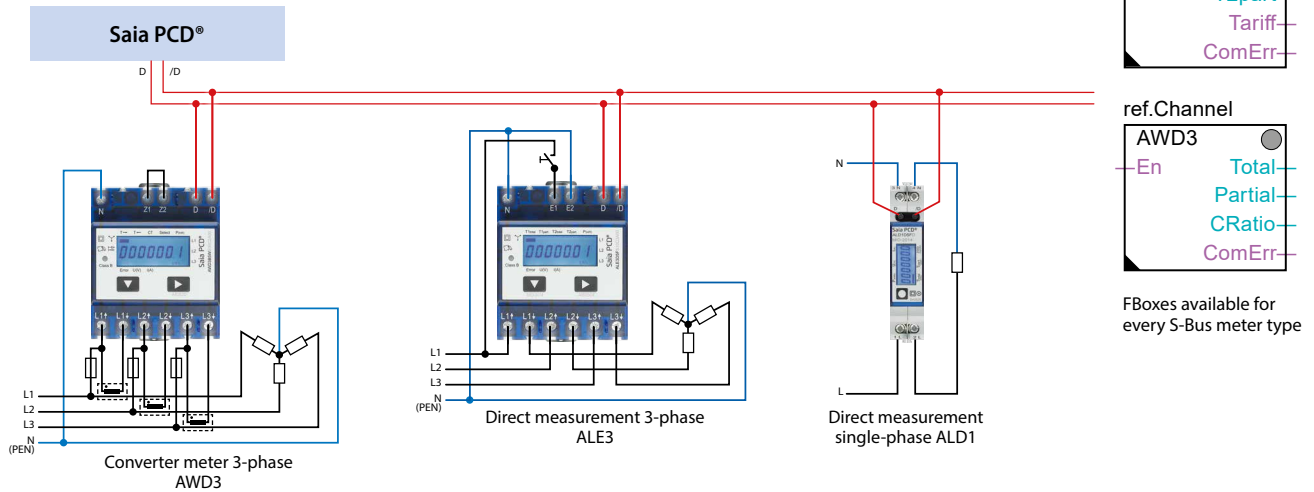
The M-Bus energy meters can be integrated into any M-Bus system and can be read out with any M-Bus Master. This enables use in existing systems with an existing M-Bus infrastructure or even in new projects with various other M-Bus components. The energy meters with integrated serial Modbus RTU interface enable fast and secure communication with superordinate systems. The market offers many components for data transfer, backup and visualization of the measured data. Simple integration via various transmission channels is possible owing to the wide variety. With Modbus, existing equipment can be used without making costly new acquisitions.



4.2.2 Energy meters with SBC S-Bus interface

The energy meters with integrated S-Bus interface offer all relevant data such as energy, current, voltage, output (active and reactive) and $\cos\phi$, which can be read out through the bus connection. The serial S-Bus interface (based on RS-485) can be connected directly to the Saia PCD range of devices. There are ready-made FBoxes for every meter type for this connection, which are available free of charge. The S-Bus energy meters are also available in a 2-way design (bidirectional). The bus address can be set on the display and the energy, current, voltage and active output can be read directly.

Connection diagram for M-Bus energy meters



Technical Data

SBC S-Bus

Bus system	Serial RS-485 interface
Log	S-Bus data mode
Transmission rate	4,800, 9,600, 19,200, 38,400, 57,600, 115,200 baud. The transmission rate is detected automatically.
Bus cable	Twisted, shielded, 2 × 0.5 mm ² , max. 1200 m
Response time	Write: up to 60 ms Read: up to 60 ms

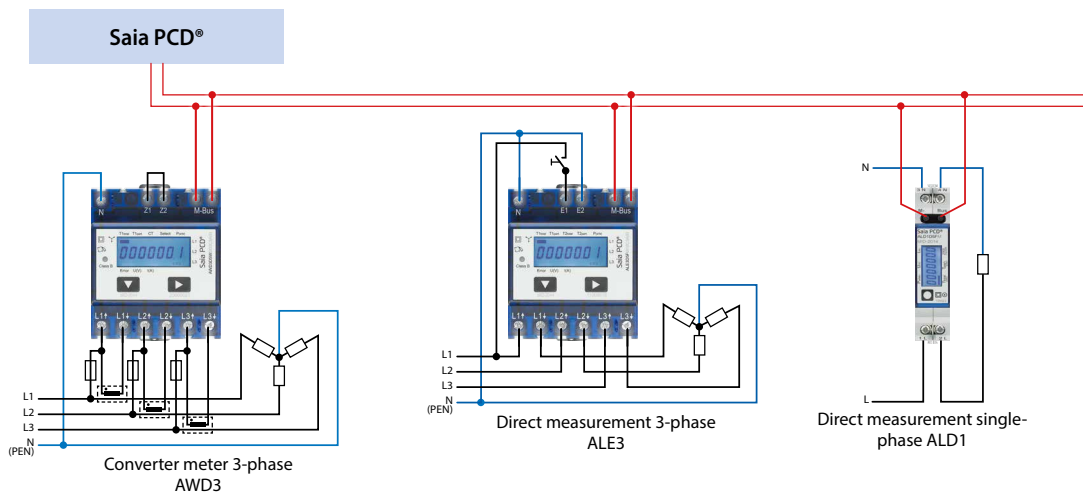


		ALD1		ALE3		AWD3	
		ALD1D5FS00A3A00	ALD1B5FS00A3A00	ALE3D5FS10C3A00	ALE3B5FS00C3A00	AWD3D5WS00C3A00	AWD3B5WS00C3A00
Tariff	1 tariff	•	•	-	•	•	•
	2 tariffs	-	-	•	-	-	-
Meter type	Unidirectional design	•	-	•	-	•	-
	Bidirectional design	-	•	-	•	-	•
Approvals	With MID	•	•	•	•	•	•
Rated/max. current Current	$I_{\min} = 0.05 \text{ A}, I_N = 5 \text{ A}, I_{\max} = 6 \text{ A}$	-	-	-	-	•	•
	$I_{\min} = 0.25 \text{ A}, I_N = 5 \text{ A}, I_{\max} = 32 \text{ A}$	•	•	-	-	-	-
	$I_{\min} = 0.5 \text{ A}, I_N = 10 \text{ A}, I_{\max} = 65 \text{ A}$	-	-	•	•	-	-
Measurement type	Direct measurement	•	•	•	•	-	-
	Conversion up to 1500 A	-	-	-	-	•	•
Operating voltage	230 VAC, 50 Hz	•	•	-	-	-	-
	3 × 230/400 VAC, 50 Hz	-	-	•	•	•	•
Partial meter	Resettable	•	-	•	•	•	-

4.2.3 Energy meter with M-Bus interface

The M-Bus interface enables the connection and reading of measured data through any Saia PCD or any M-Bus Master. The meters correspond to M-Bus standard EN 13757. For connection to Saia PCD systems, prefabricated FBoxes are available free of charge for Saia PCD energy meters. The relevant measurement data, such as energy, current, voltage and output (active and reactive) can be read out via the M-Bus interface. On the display, the bus primary address can be set and the energy, current, voltage and active output can be read directly.

Connection diagram for M-Bus energy meters



- ref.Channel
ALD
-En T1tot
-Res T1part
Pa
Pr
U
I
ComErr
- ref.Channel
ALE
-En T1tot
-Res 1 T1part
-Res 2 T2tot
T2part
Tariff
ComErr
- ref.Channel
AWD
-En T1tot
-Res T1part
ComErr
- ref.Channel
AWD/ALE
-En U_L1
U_L2
U_L3
I_L1
I_L2
I_L3
Pa_L1
Pa_L2
Pa_L3
Pr_L1
Pr_L2
Pr_L3
CTratio
ComErr

FBoxes available for every M-Bus meter type

Technical Data

M-Bus

Bus system	M-Bus
Transmission rates	300, 2,400, 9,600 Baud. The transmission rate is detected automatically
Addressing	Primary and secondary
Bus length (max.)	In accordance with M-Bus specifications
Response time	Write: up to 60 ms Read: up to 60 ms

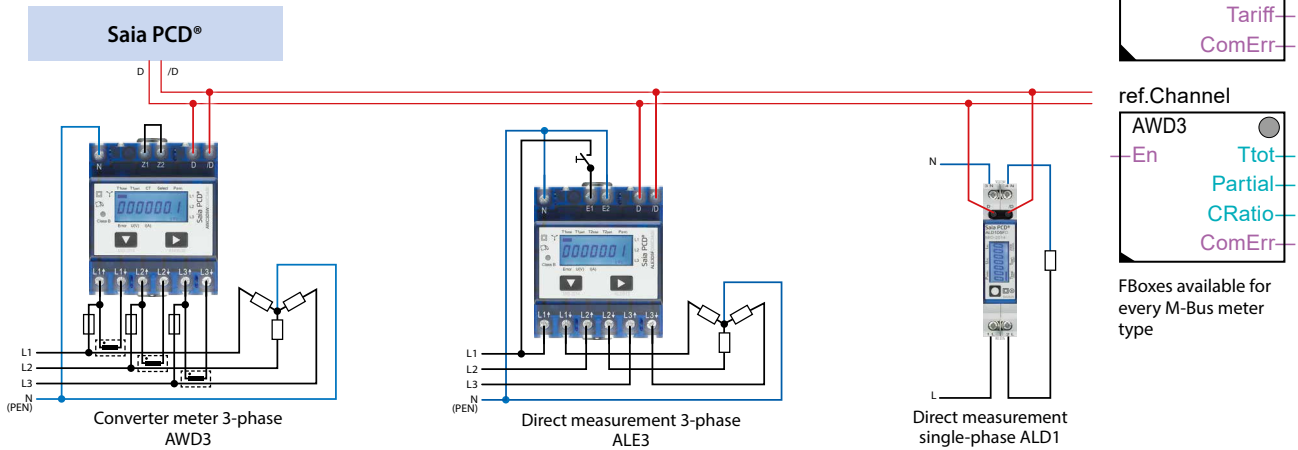


		ALD1	ALE3	AWD3
		ALD1D5FM00A3A00	ALE3D5FM10C3A00	AWD3D5WM00C3A00
Tariff	1 tariff	•	-	•
	2 tariffs	-	•	-
Meter type	Unidirectional design	•	•	•
	Bidirectional design	-	-	-
Approvals	With MID	•	•	•
Rated/max. current Current	$I_{min} = 0.05 A, I_N = 5 A, I_{max} = 6 A$	-	-	•
	$I_{min} = 0.25 A, I_N = 5 A, I_{max} = 32 A$	•	-	-
	$I_{min} = 0.5 A, I_N = 10 A, I_{max} = 65 A$	-	•	•
Measurement type	Direct measurement	•	•	-
	Conversion up to 1500 A	-	-	•
Operating voltage	230 VAC, 50 Hz	•	-	-
	3 × 230/400 VAC, 50 Hz	-	•	•
Partial meter	Resettable	•	•	•

4.2.4 Energy meter with Modbus interface

The integrated Modbus RTU interface complies with the IDA specification and is based on an RS-485 interface. The measurement data from the energy meter can be connected to any Modbus Master to read out the measured values. The relevant measurement data, such as energy, current, voltage, output (active and reactive) and $\cos\phi$ can be read out via the interface. The bus address can be set and the energy, current, voltage and active output can be read direct on the display. Prefabricated FBoxes are available to connect the energy meters to Saia PCD systems, which are supplied free of charge.

Connection diagram for Modbus energy meters



- ref.Channel
ALD1
En Total
Partial
ComErr
 - ref.Channel
ALE3
En T1
T1part
T2
T2part
Tariff
ComErr
 - ref.Channel
AWD3
En Ttot
Partial
CRatio
ComErr
- FBoxes available for every M-Bus meter type

Technical Data

Modbus

Bus system	Serial RS-485 interface
Log	Modbus RTU as per IDA specification
Transmission rates	4,800, 9,600, 19,200, 38,400, 57,600, 115,200 baud. The transmission rate is detected automatically
Bit settings	<ul style="list-style-type: none"> ▶ 8 databit, even parity, 1 stop bit ▶ 8 databit, odd parity, 1 stop bit ▶ 8 databit, no parity, 2 stop bit The parity is automatically detected
Bus cable	Twisted, shielded, 2 × 0.5 mm ² , max. 1200 m
Response time	Write: up to 60 ms Read: up to 60 ms



The following devices are available for Modbus parity 8N1:

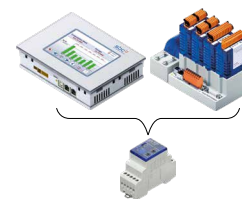
- ALD1D5FD00A3A44
- ALE3D5FD10C3A44
- AWD3D5WD00C3A44



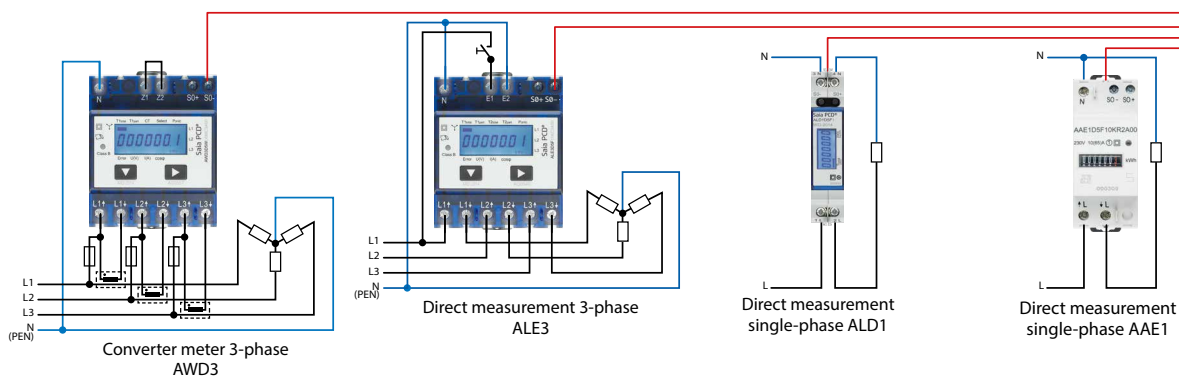
		ALD1	ALE3	AWD3
		ALD1D5FD00A3A00	ALE3D5FD10C3A00	AWD3D5WD00C3A00
Tariff	1 tariff	•	•	•
	2 tariffs	-	•	-
Meter type	Unidirectional design	•	•	•
	Bidirectional design	-	-	-
Approvals	With MID	•	•	•
Rated/max. current Current	$I_{min} = 0.05 \text{ A}, I_N = 5 \text{ A}, I_{max} = 6 \text{ A}$	-	-	•
	$I_{min} = 0.25 \text{ A}, I_N = 5 \text{ A}, I_{max} = 32 \text{ A}$	•	-	-
	$I_{min} = 0.5 \text{ A}, I_N = 10 \text{ A}, I_{max} = 65 \text{ A}$	-	•	-
Measurement type	Direct measurement	•	•	-
	Conversion up to 1500 A	-	-	•
Operating voltage	230 VAC, 50 Hz	•	-	-
	3 × 230/400 VAC, 50 Hz	-	•	•
Partial meter	Resettable	•	•	•

4.2.5 Energy meter with S0 pulse output

Energy meters with integrated S0 interface enable the transfer of measured energy to the devices of the Saia PCD family via pulses. With the S0 pulse counter PCD7.H104, the pulses can be requested via the RS-485 interface (S-Bus or Modbus).



Connection diagram of S0 pulse energy meters, with S-Bus connection via PCD7.H104SE



		ALD1	AAE1	ALE3	AWD3
		ALD1D5F10KA3A00	AAE1D5F10KR3A00	ALE3D5F11KC3A00 ALE3B5F10KC3A00	AWD3D5W10MC3A00 AWD3B5W10MC3A00
Tariff	1 tariff	•	•		•
	2 tariffs	-	-	•	-
Meter type	Unidirectional design	•	•	•	•
	Bidirectional design	-	-	-	•
Approvals	With MID	•	•	•	•
	Without MID	-	-	-	-
Rated/max. current	$I_{\min} = 0.05 \text{ A}, I_N = 5 \text{ A}, I_{\max} = 6 \text{ A}$	-	-	-	•
	$I_{\min} = 0.25 \text{ A}, I_N = 5 \text{ A}, I_{\max} = 32 \text{ A}$	•	-	-	-
	$I_{\min} = 0.5 \text{ A}, I_N = 10 \text{ A}, I_{\max} = 65 \text{ A}$	-	•	•	-
Measurement type	Direct measurement	•	•	•	-
	Conversion up to 1500 A	-	-	-	•
Operating voltage	230 VAC, 50 Hz	•	•	-	-
	$3 \times 230/400 \text{ VAC}, 50 \text{ Hz}$	-	-	•	•
S0 output	1000 Imp./kWh	•	•	•	-
	10 Imp./kWh	-	-	-	•
Partial meter	Resettable	•	-	•	-

4.2.6 Energy meter – sealing cover

Accessories

Order no.

Sealing cover for single-phase Saia PCD® energy meter EMD1 and ALD1

4104 74200

2 units are recommended for contact protection.



(Also for termination boxes PCD7.T161 and PCD7.T162, see Section 5.5)

ALD1 with assembled sealing cover

Sealing cover for
 – Single-phase Saia PCD® energy meter AAE1
 – 3-phase Saia PCD® energy meter ALE3, and AWD3

4104 74850

2 units are recommended for contact protection on AAE1.

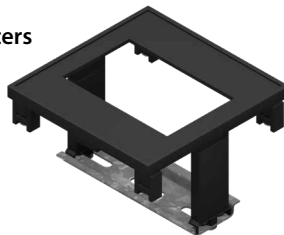


4 units are recommended for contact protection on ALE3 and AWD3.

ALE3 or AWD3 with sealing cover

Mounting frame for 3-ph energy meters of the families ALE3/AWD3

PMK-EEM400



ALE3 or AWD3 mounted in panel kit

4.2.7 Application notes

Application notes on the subject of "energy" can be found on the support page (www.sbc-support.com) under the section "energy meters".

Verschiedene Störungen

Impressionen und Effekte von gestörten Stromnetzen

Spannungsspitzen auf dem

Störungen verfälschen das Messresultat!
 Die angezeigten Signalwertungsdarstellungen gehen von einem sinusförmigen Signal mit bestimmten Qualitätseigenschaften aus. Wenn diese Qualität nicht vorhanden ist werden die Messungen verfälscht.

Verbesserungsmaßnahmen:

- Installation und Verkabelung verbessern
- Lasten entlasten
- Netz entlasten

Beispiel eines Installationsproblems:
 Hochstromerhöht direkt neben Energiezähler

Überlappende PLC Stand

Memorische Überwellen

Wandler Technik / Wandler Typen

Stromwandler

Vorteile:

- Hohe Genauigkeit
- Hoher Preis
- Kleine Kompakte Bauform
- Bessere Genauigkeitsklassen (0,2S; 0,5S2)

Nachteile:

- Austausch, da fix eingebaut

Kabelbau Stromwandler (Klappstromwandler)

Vorteile:

- Einfacher Ein- /Ausbau
- Einfach nachrüstbar

Nachteile:

- Hoher Preis
- Weniger Genauigkeitsklassen (0,5S12)

Beschriftung der Stromwandler Anschlussklemmen

Die Anschlüsse auf der primär Seite (Hauptstrom) sind IN, K, P1 / OUT, L, P2
 Die sekundär Seite (Messstrom) hat die Bezeichnungen IN, K, S1 / OUT, L, S2

ACHTUNG: Wenn die Klammern S1-S2 vertauscht werden ist der gemessene Strom 100-fach verhöbert!

4.3 Basic functions of the S-Monitoring application

Function for automatic capturing and saving of energy meter values – integrated into the operating system of the Saia PCD®



The S-Monitoring application works on all controllers ending in xx60 and on the pWeb Panels. The application consists of a COSinus function and an associated Web Editor project. This makes it possible to capture, save and visualise data without significant programming effort. With S-Bus meters, this works without any program in the controller.

S-Monitoring COSinus function

S-Monitoring is an integral part of the COSinus operating system and is integrated into all Saia PCD controllers ending with xx60 and having the pWeb Panel MB. It is activated in the PG5 Device Configurator and it scans connected meters automatically. The data is saved on the file system. In addition to connected S-Bus meters, any meter values available in the program can also be integrated.

The S-Monitoring function can read three different types of meters:

- ▶ Connected S-Bus energy meters and S0pulse counters (PCD7.H104SE)
- ▶ Other incremental meter values (M-Bus, Modbus, etc. are referred to as "custom meters" and captured via FBoxes in the Fupla program)
- ▶ Groups of meters

The S-Monitoring COSinus function comprises the following three parts:

1. Autoscan of S-Bus energy meters and pulse counters

If the S-Bus Autoscan is activated, meters connected to the RS-485 interface are automatically detected and read. By permanently requesting the meter data, remote diagnosis of the S-Bus meters and bus connection is possible.

Current S-Bus address 73	Found meters 5	State OK FW 1.3 HW 1.3 T1
------------------------------------	--------------------------	-------------------------------------

2. Provision of meter values via NT-EM tags (CGI interface)

All data and basic functions can be called up via CGI tags. These functions can therefore be accessed via the web interface or by other programs (e.g. Excel). The controller does not need a Fupla or IL program (see document 27-623).

NT-EM tag (CGI command) in the web browser:

	← Command
0.1	← Value

Excel Report Tool
When the COSinus function is activated, the data can simply be imported into Excel without programming.
Download: www.sbc-support.com

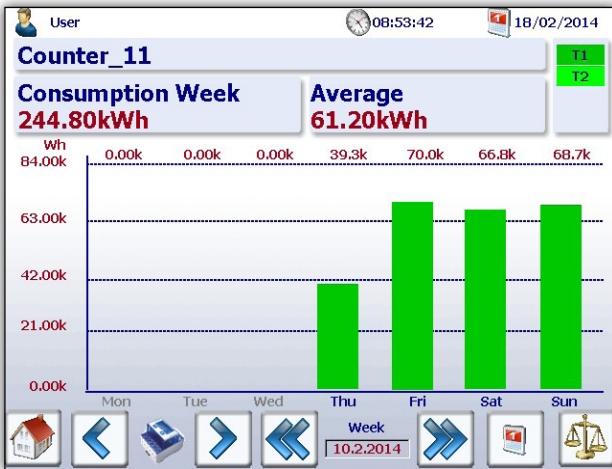
3. Saving the meter values in CSV files

The values of the energy meters connected are saved once a day at midnight in a CSV file on the internal file system of the PCD. The daily, weekly and monthly consumption can be calculated from this data. If an additional memory card is inserted, the values can be saved at 5-60 minute intervals. This makes it possible to visualise consumption over a day.

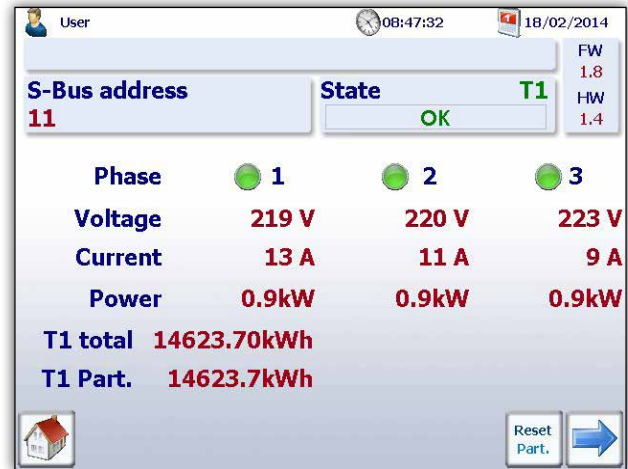
	A	B	C	D	E	F	G	H	I
1	Date	Energy1	Energy2	Tariff1	Tariff2	Energy3	Energy4	Tariff3	Tariff4
2	10.6.2013	206.10	0.00	0.1600	0.1300	160.00	13.23	0.1500	0.0800
3	11.6.2013	208.70	0.00	0.1600	0.1300	164.10	13.76	0.1500	0.0800
4	12.6.2013	214.43	0.00	0.1600	0.1300	168.13	14.82	0.1500	0.0800

S-Monitoring web project

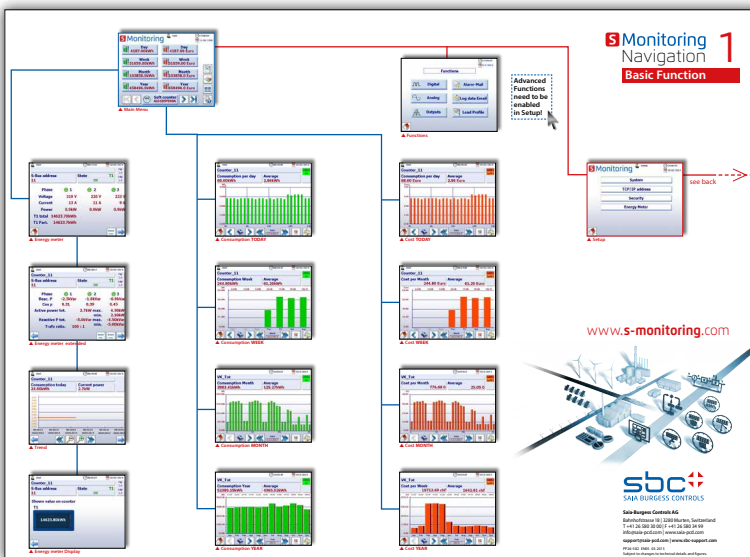
SBC delivers a PG5 project, which also includes a web visualisation. The project is based on the COSinus functions and enables saved data to be visualised on the PC immediately. As only the S-Monitoring COSinus function is accessed in the web project, it does not need a PG5 program. It can therefore be easily integrated into existing projects. In addition, the most important websites are available as macros in Web Editor 8.



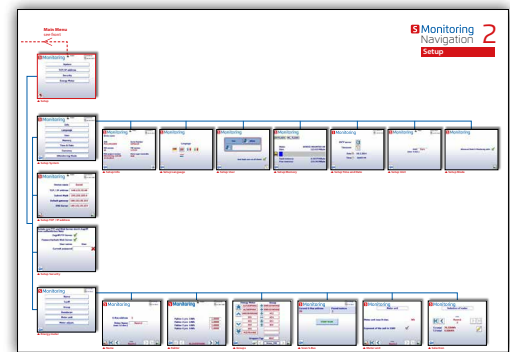
▲ Representation of historical energy consumption



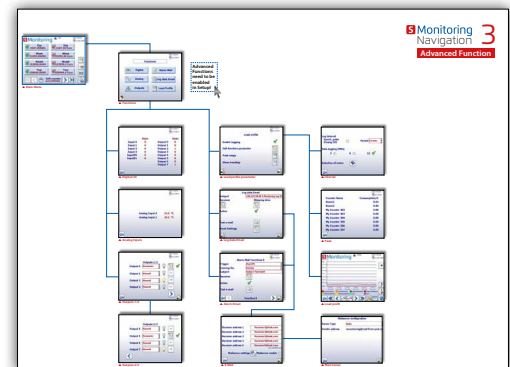
▲ Overview of the live values



▲ Complete overview of the basic application



▲ Setup





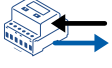














▲ Advanced

! S-Monitoring is also supported by pWeb Panel PCD7.DxxxxT5F, PCD1.M2160 and PCD3.Mxx60

😊 In the PG5 application for the E-Controller products supplied ready for use on delivery from the factory, additional "Advanced" functions are programmed in PG5. These cannot therefore be used without the program.

Basic functions of the S-Monitoring application

Recording of energy values	
 Automatic detection of connected energy meters	 Display of the energy meter status
 Grouping of energy meters	 Comparison between meter and periods
 Connection of bidirectional meters	 Connection PCD7.H104SE S0 impulse counter (for S0 meters)
Display and analysis of energy values	
 Current meter values such as consumption, voltage, current, active and reactive power and cosφ	 Evaluation and presentation of the costs
 Visualisation in bar charts and trend charts	 Consumption and costs presentation per day/week/month/year ¹⁾
 Data storage in Excel-readable CSV files	
Remote access via network and Internet	
 Operation at the PC with standard browser (IE, Chrome, Firefox)	 Operation via smartphone and tablet
 Access to log data and web project with FTP	 Integrated USB port for update and maintenance
User support	
 User administration	 Control interface in several languages

¹⁾ Daily view only available if memory extension is plugged in

Technical data for SBC S-Monitoring

SBC S-Monitoring COSinus function integrated in	PCD1.M0160E0 (E-Controller) PCD1.M2160	PCD3.Mxx60 PCD7.DxxxxT5F (pWeb Panel MB)
Supported meters	– Saia PCDS-Bus energy meters, PCD7.H104SE S0 pulse counters – Incremental meter values (M-Bus, Modbus, etc. are referred to as "custom meters" and captured via FBoxes in the Fupla program) – Meter groups	
Maximum number of meters	128 Saia PCD® S-Bus meters* / 256 custom meters* / 32 groups*	*in total max. 256
Data storage time	4 years maximum; a recording per day	
saved data	max. 4 meter values with 4 tariffs per meter are saved once a day (at midnight)	

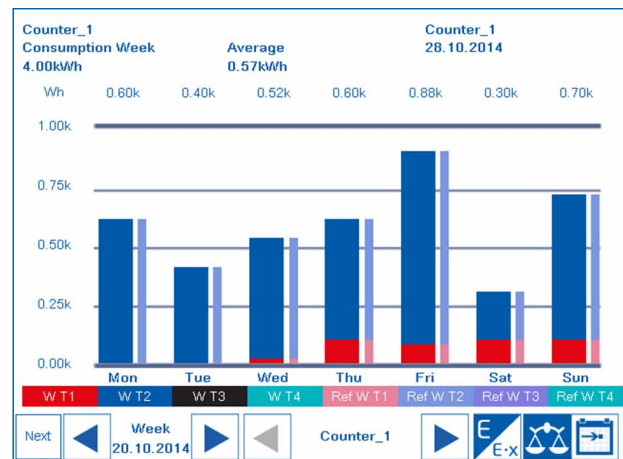
4.3.1 S-Monitoring Web Editor 8 Templates

High initial costs for energy management are one of the largest barriers against investment, and the S-Monitoring application was developed as a door-opener to minimise these costs as far as possible. The basic functions of this S-Monitoring application were integrated in Web Editor 8. The programmer can therefore extend his project in accordance with individual requirements with energy monitoring functions. Improved and faster engineering enables added value that delivers a significant competitive advantage. For system integrators who want to visualise the energy consumption, the free S-Monitoring templates provide a saving of up to 2 weeks of engineering time.

Name of the library in Web Editor 8: S-Monitoring



▲ Monthly consumption



▲ Comparison of weekly consumption

Name	ALD1D5FS00A
State	Connected
Address	300
Counter Type	Soft Counter
User Type	ALD1D5FS00A
ASN	Not available
Serial number	Not available
Hardware version	Not available
Firmware version	Not available
Unit	Wh
Unit Exponent	0
Direction	UC
Raw counter value	2392.00
<div style="display: flex; gap: 5px;"> WT 1 WT 2 WT 3 WT 4 </div>	

▲ Counter information



▲ Overview of energy consumption

Available templates

- ▶ Barograph day, week, month, year
- ▶ Navigation counter and period
- ▶ Live values of the energy counter
- ▶ Setup configuration

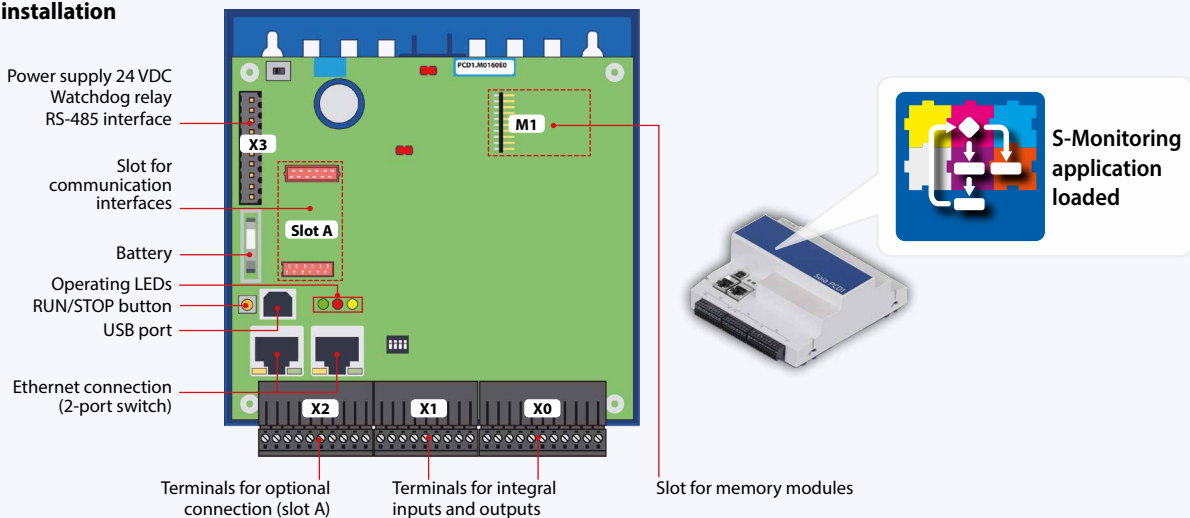
4.4 Saia PCD® E-Controller

Operational on delivery with local IOs

The E-Controller is an SBC functions PCD, which can be used immediately on delivery with no additional programming. It combines data capture, decentralised visualisation and logging in one compact device. Energy meters and pulse counters connected via the S-Bus interface are automatically detected and read. Historical data and the web visualisation can be accessed from anywhere via the integrated automation server using FTP and HTTP. This is also possible with mobile devices using SBC apps. In addition to the basic functions described in Section 4.6, simple control functions are already realised on the E-Controller. These include sending alarm emails and the parameterisation of outputs according to the meter values. The pre-installed S-Monitoring application can be adjusted, extended or replaced as required using PG5 and Web Editor. Additional protocols and data (e.g. from an M-Bus meter) can therefore be integrated using the optional communication interfaces. The design of the controller is suitable for installation in the distribution board next to the energy meters.






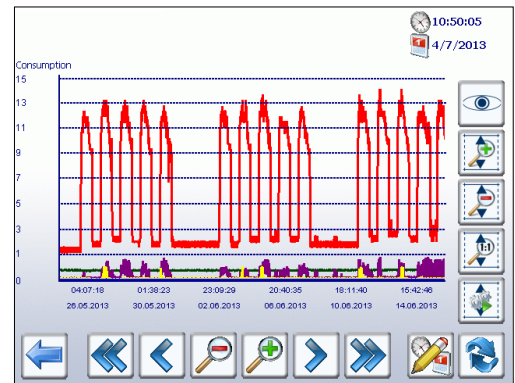
Device installation



Advanced functions

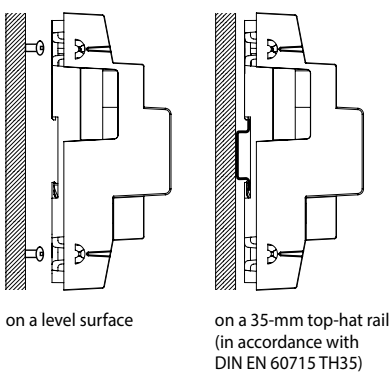
In addition to the basic functions of the web application (4.6), the E-Controller includes the following functions, which are programmed with Saia PG5®:

-  Load profile measurement of 8 consumption values
-  Sending of alarm and data emails to up to 5 email addresses
-  Parameterisation of outputs via min. and max. values

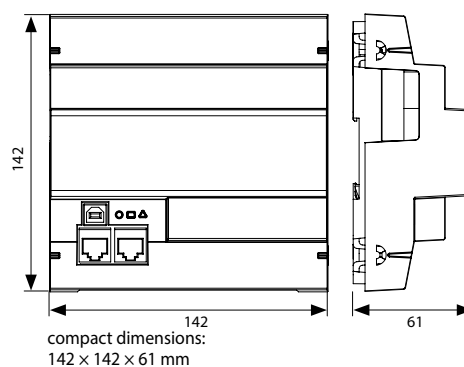


Load profile measurement

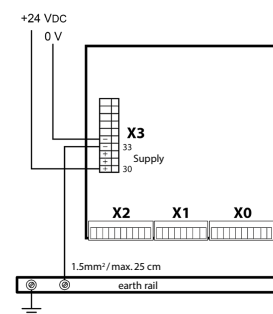
Mounting



Dimensions

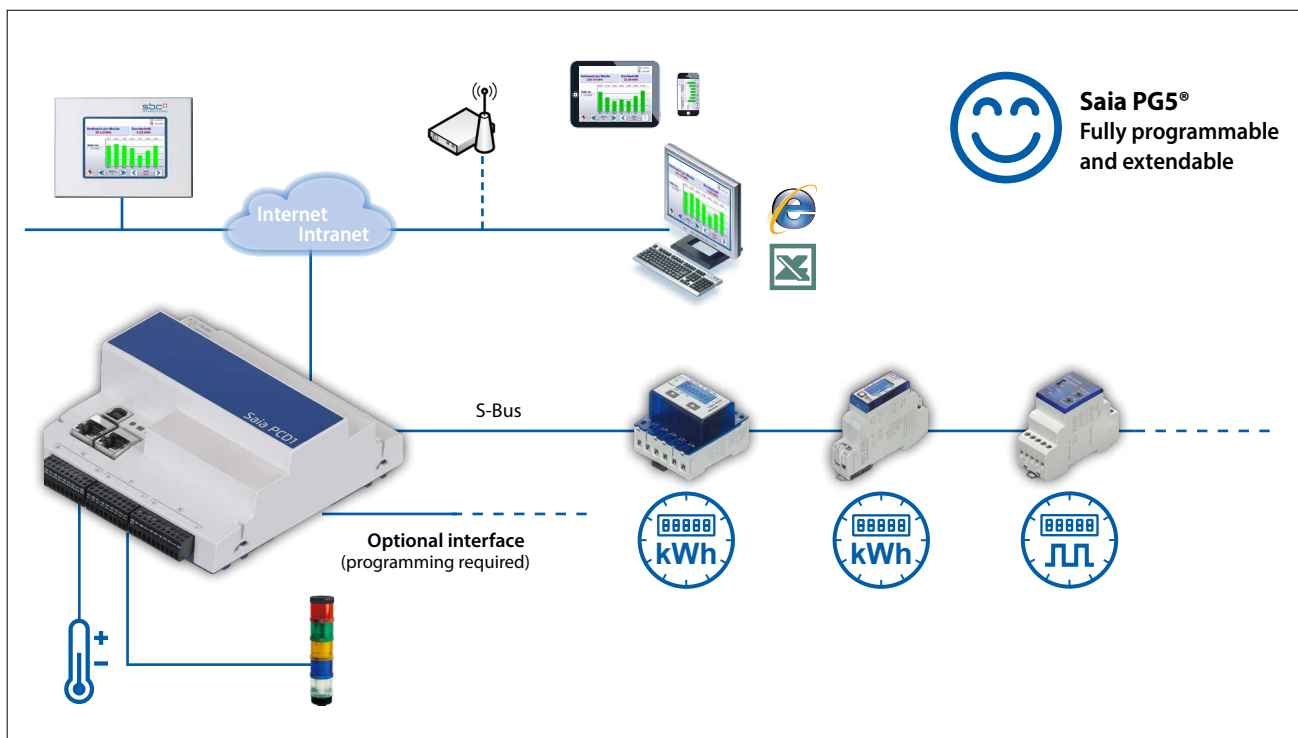


Power supply and connection plan



For more information, please see Chapter 1.2.1 Saia PCD3 power supply and connection plan, and in Manual 26-875.

Summary of E-Controller functions



Automation stations

1

Operation and monitoring

2

Room controllers

3

Consumer data acquisition

4

Switch cabinet components

5

! Both the automatic detection of the meters and the E-Monitoring functionality can be switched off in the PG5 Device Configurator for unrestricted use of PCD1.M0160E0.

SBC MB App
Operation and monitoring on iPhone, iPad and Android

The image shows a hand interacting with a tablet displaying the SBC MB App interface. The screen shows various data points for different meters, including 'Heute 0,07 kWh', 'Woche 0,20 kWh', 'Monat 0,29 kWh', 'Jahr 0,29 kWh', and 'Zähler Counter_00'. Below the tablet are the SBC MB logo, the Android logo, and the Apple logo.

Additional memory
Enables logs in 5–60 min. Interval and daily figures are illustrated for all meters in a bar chart.

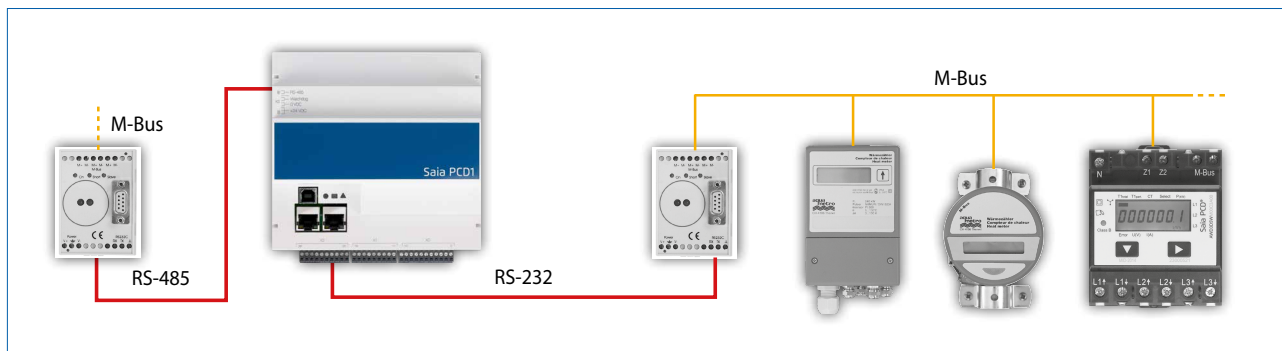


PCD7.R610 Holder module for microSD card



PCD7-R-MSD1024 MicroSD memory card 1 GB, PCD formatted

Connection example of M-Bus with external interface¹⁾



¹⁾ programming required

Overview of Saia PCD® E-Controller PCD1.M0160E0

Technical Data

Memory and file system	
Program memory, DB/text (Flash)	1 Mbyte
User memory, DB/text (RAM)	1 Mbyte
User flash file system onboard	128 Mbyte
Integrated communication	
Ethernet connection (2-port switch) 10/100 Mbit/s, full-duplex, auto-sensing, auto-crossing	Yes
USB connection 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. incl. 5% ripple (as defined by 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 x H x D)	142 x 142 x 60 mm
Mounting type	Top-hat rail in accordance with DIN EN 60715 TH35 (1 x 35 mm) or on a level 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, 8 ms / 0.2 ms input filter	Terminal X1
2	Analogue inputs, selectable via DIP switch, preconfigured for Ni1000 in the default setup	-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, preconfigured for digital inputs in the default setup	24 VDC/data such as digital inputs or digital outputs	Terminal X0
1	Watchdog relay or as a make contact	48 VAC or VDC, 1 A mount a freewheeling diode over the load when switching DC tension	Terminal X3

Installation notes and recommendations

Assembly in the distribution board

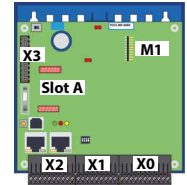
The Saia PCD1.M0160E0 has the dimensions 142 x 142 x 60 mm excluding terminals and connections. For easy assembly, a gap of 55 mm above the DIN rail and 75 mm below it is recommended.

Ethernet cable

For installation in the sub-distributor, an angled or flexible network cable (e.g. SlimWire PRO) is recommended. The installation of a conventional network cable cannot guarantee the assembly of the sub-distributor cover.

Interface options Saia PCD® E-Controller (PCD1.M0160E0)

In addition to the onboard interfaces, modular expansion of interface functions is possible using slot A. For this purpose, the Saia PCD1.M0160E0 supports numerous protocols. A detailed list of all protocols is contained in Chapter B2 "Communication & Interaction".



Communication		Current consumption at 5V bus	Current consumption at +V bus (24 V)	
PCD7.F110S	RS-422 avec RTS/CTS ou RS-485 ¹⁾	40 mA	---	Slot A
PCD7.F121S	RS-232 with RTC/CTS, DTR/DSR, DCD, suitable for modem, EIB or , DALI connection	15 mA	---	Slot A
PCD7.F150S	RS-485 ¹⁾	130 mA	---	Slot A
PCD7.F180S	Belimo MP-Bus, for connecting up to 8 drives on one line	15 mA	15 mA	Slot A

¹⁾ with line termination resistors that can be activated.



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 to use with 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.



Memory modules

The onboard memory can be expanded with a PCD7.Rxxx module in slot M1. The E-Controller can also be expanded with BACnet®.

For more information on memory management and structure, see the Chapter Saia PCD System Description.

Memory expansion and communication

PCD7.R562	Flash memory module for BACnet® 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.R562



PCD7.R610



For the parallel operation of S-Monitoring and BACnet®, please note the instructions on the support site (www.sbc-support.com).

Accessories and consumables

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
450748170	Lithium battery for PCD processor unit (RENATA button battery type CR 2032)



Plug-in screw terminal block

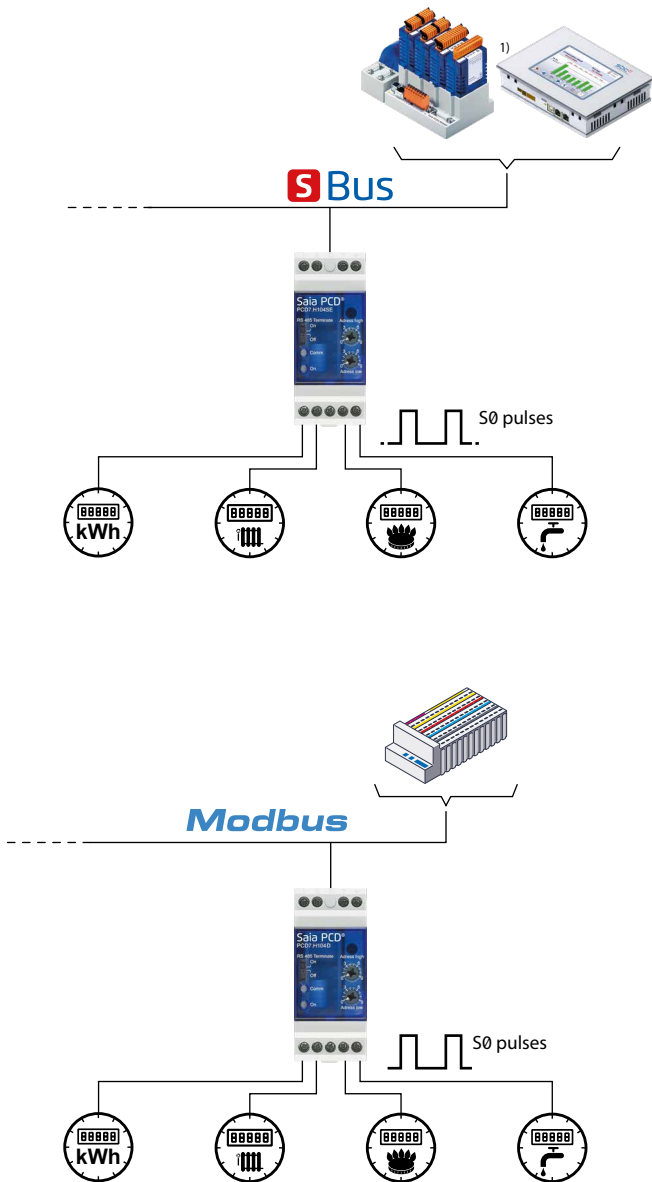
440550890	Plug-in screw terminal block, 11-pin, labelling 0...10	Terminal X0
440550870	Plug-in screw terminal block, 9-pin, labelling 11...19	Terminal X1
440550880	Plug-in screw terminal block, 10-pin, labelling 20...29	Terminal X2
440549190	Plug-in screw terminal block, 10-pin, labelling 30...39	Terminal X3



4.5 S0 impulse counter PCD7.H104

S0 Collect, convert and transmit pulses

If already installed meters, which are not bus-capable, are to be integrated into an automation system, the Saia PCD7.H104 S0 pulse counter is the easiest way. This is the case for refurbishments, for example, if the existing meter infrastructure has to be made bus-capable and there is no question of buying new meters. With this S0 pulse counter, meters (electricity, water, heat, etc.) with an S0 pulse output from any manufacturer can be connected directly using a serial RS-485 S-Bus or Modbus connection to the Saia PCD or any controller. This enables efficient transfer, evaluation and forwarding of energy data without additional complicated coupler modules. For connection to Saia PCD systems, there are ready-made FBoxes. Via the interfaces, the number or valence of pulses can be transmitted.



General technical data

Operating voltage	230 VAC (-20/+15 %)
Current draw	< 12 mA
Power consumption	< 3 W
Number of S0 inputs	4, in accordance with S0 IEC 62053-31
Frequency	max. 17 Hz
Pulse low/high	Min. 30 ms

S-Bus version

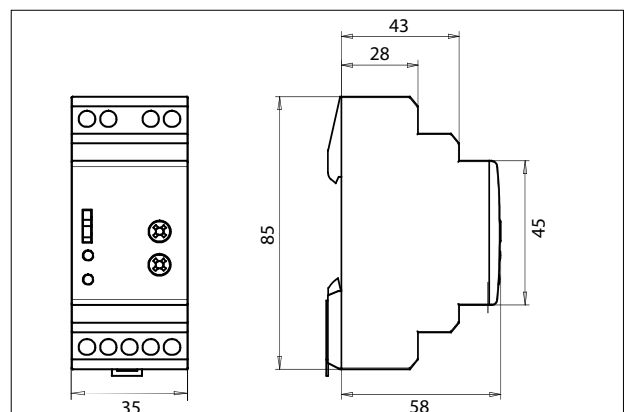
Order number	PCD7.H104SE
Log	S-Bus data mode
Bus system	Serial RS-485 interface
Transmission rate	2,400, 4,800, 9,600, 19,200, 38,400, 57,600, 115,200 The transmission rate is detected automatically
Bus length (max.)	1,200 m (without amplifier)
Response time	Write: 30 ms
System response time	Read: 20 ms

Modbus version

Order number	PCD7.H104D
Log	Modbus RTU as per IDA specification
Bus system	Serial RS-485 interface
Transmission rate (bit/s)	2,400, 4,800, 9,600, 19,200, 38,400, 57,600, 115,200 The transmission rate is detected automatically
Bit settings	8 databit, even parity, 1 stop bit 8 databit, odd parity, 1 stop bit 8 databit, no parity, 2 stop bit
Maximum bus length	1,200 m (without amplifier)
Response time	Type 5 characters
System response time	max. 60 ms

! Device PCD7.H104DZ44 must be used for parity 8N1!

Size



FBoxes for integration into FUPLA

