

# SBC Energy catalogue

2016 | 2017

**Energy consumption monitoring**

Electricity meters, S-Monitoring, E-Controller





# 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**  
[www.s-monitoring.com](http://www.s-monitoring.com)

## 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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## 2 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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## 3 Saia PCD® Radio Modem

Wireless transmission of RS-485 interfaces. Use as a wireless transponder or repeater.

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## 4 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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## 5 Saia PCD® Quality Analyzer

The Power Quality Analyzer (PQA) is a device for measuring and checking the quality of the electricity system, manufactured as a DIN rail unit in industrial quality.

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## 6 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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## 7 Saia PCD® E-Monitor

The E-Monitor combines data capture, visualisation and logging in one compact control panel. It is delivered pre-programmed with the S-Monitoring application.

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## 8 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.

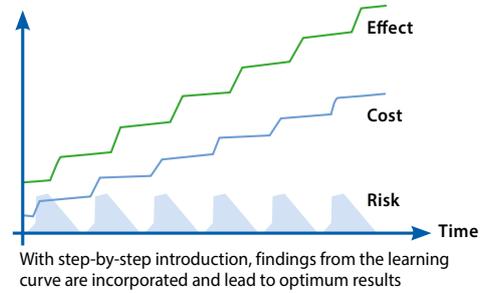
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### Continuous optimisation in calculable steps:

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. The E-Controller and E-Monitor are already pre-installed in the factory and are ready for use without further programming.

## 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.

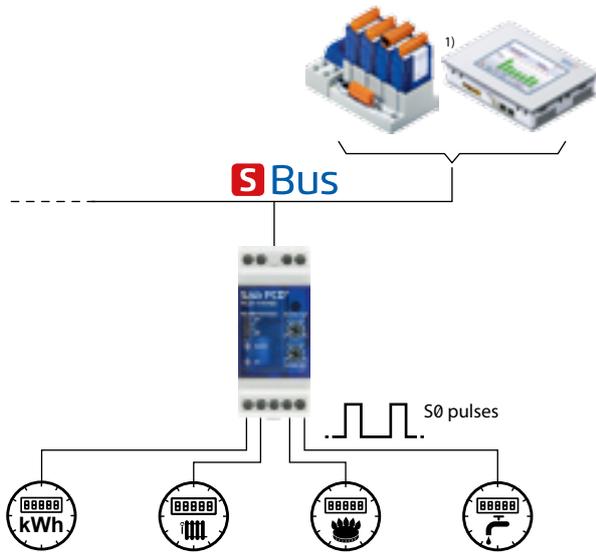
Saia PCD® energy meters and network analyzers follow established installation technology and are suitable for DIN rails of commercially available distribution boxes. Integrated into a bus system covering a distance of up to 1 km, the measured values are transmitted to the Web Panel and controllers for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

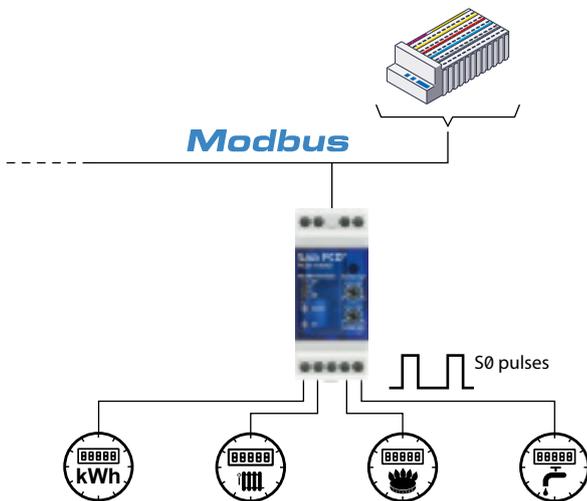
## 2 S0 impulse counter PCD7.H104

### S0 Collect, convert and transmit pulses

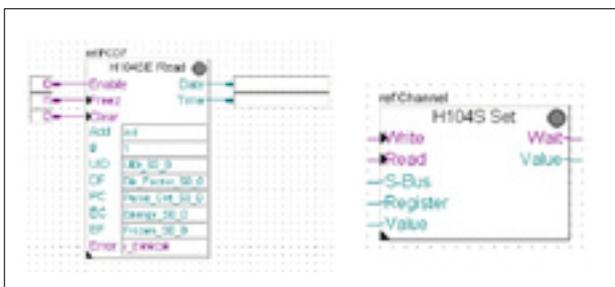
If already installed meters, which are not bus-capable, are to be integrated into an automation system, the Saia PCD7.H104 S0 pulse counter is the easiest way. This is the case for refurbishments, for example, if the existing meter infrastructure has to be made bus-capable and there is no question of 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, the E-Monitor 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.



<sup>1)</sup> Chapter 4.7 "E-Monitor" contains more information ON THIS TOPIC



#### FBoxes for integration into FUPLA



#### 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

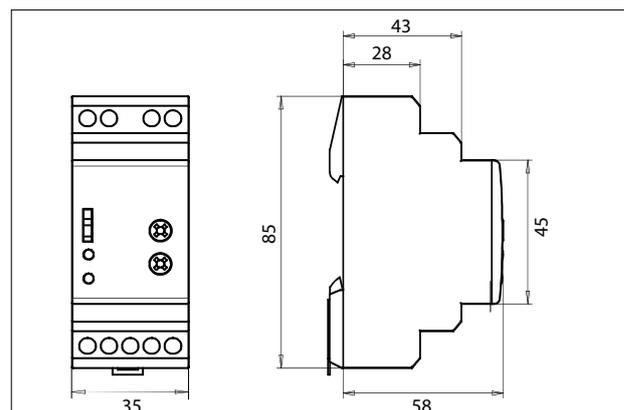
#### Modbus version

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



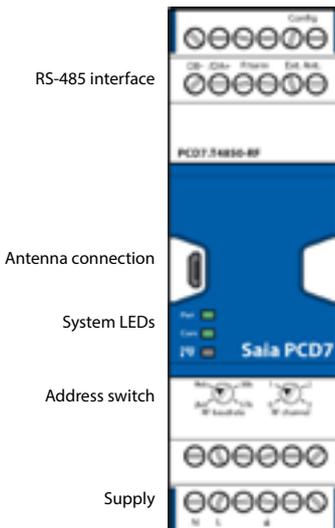
## 3 Radiomodem PCD7.T4850-RF

(RF modem, RS-485)

The PCD7.T4850-RF RF modem transparently transfers the connected RS-485 interface (Modbus and S-Bus) via radio. The frequency range of 869 MHz can be used in Europe. The devices can therefore be operated using the self-declaration with no additional approval required. The modules have an integrated antenna that enables data to be transferred with no additional hardware required. If an external antenna is required, it can be connected via a connector on the front plate. The classic hat-shape enables the 35 mm wide housing to fit into an electrical control cabinet. The device has rotary switches for parameter configuration that allows the speed of RF-data transmission and radio channel to be selected.



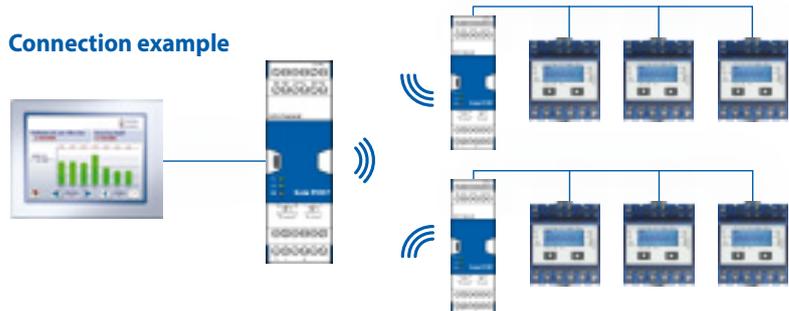
### Device design



### System properties

- ▶ Radio transmission of RS-485 interfaces (Modbus and S-Bus)
- ▶ 869 MHz band
- ▶ Can be used in Europe with no approval required
- ▶ Can be used as Point to Point, multipoint or repeater
- ▶ Internal or external antenna
- ▶ Galvanic isolation between supply and bus
- ▶ Status LEDs at the front
- ▶ NFC interface
- ▶ Configuration using FBoxes

### Connection example



### Technical Data

Interfaces	
Wire-connected communication interface	RS-485 with galvanic isolation Baud rate: 2,400, 4,800, 9,600, 19,200, 38,400, 57,600, 115,200 bps (autobauding, parity detection)
Radio communication	2,400, 9,600, 38,400, 57,600 bps, selected with rotary knob
Frequency band	869.475...869.6 MHz
Frequency channels (sub-bands)	4 channels, selected with rotary knob
Radio range (line of sight)	Internal antenna: 1000 m @2400 bps External antenna: 6000 m @2400 bps
Service interface	NFC (near field communication)
General specifications	
Supply voltage	230 VAC, -20 / +15%, (50 Hz)
Electrically isolated	2.3 kVDC between current supply and RS-485
Dimensions	Housing width 2 HP (35 mm), compatible with electrical cabinet (in accordance with DIN 43880, size 2 x 55 mm)
Mounting type	DIN rail in accordance with DIN EN 60715 TH35 (1 x 35 mm)
Ambient temperature	Operation: 0...+55°C without forced ventilation Storage: -40...+70°C
Power consumption	< 4 W
Adapter for external antenna	An adapter is supplied to connect an external SMA antenna to the radio module

### Accessories

PCD7.K840	External antenna	Antenna with SMA connection plug
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The PCD7.T4850-RF device may be used in all EU countries including Switzerland and Norway. Approvals for other countries are listed in the clarification. The limitation of broadcasting time must be limited in accordance with standard ERC 70-03 to 10%.

## 4 Energy meters ALD, ALE and AWD

small, robust, reliable and accurate

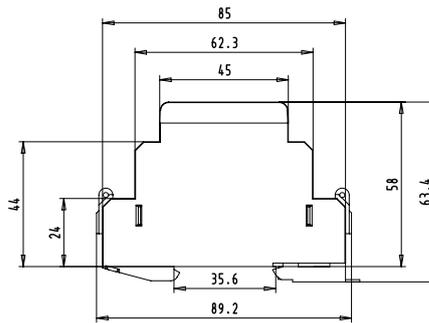
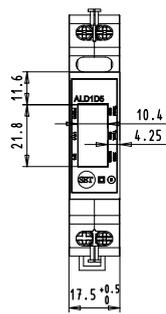
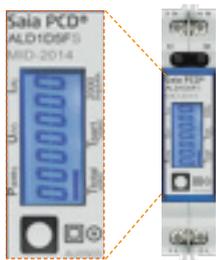
The very compact design makes the SBC energy meters ideally suited to accommodate a large number of measuring instruments in the smallest space. The small size means the meters can also be fitted in existing switch cabinets without having to install new switch cabinets. The robust design has certainly 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. Production at the Swiss site in Murten means the high quality of the energy meters is guaranteed. The display shows energy, current, voltage and active output.

Many energy meters in the smallest space ►



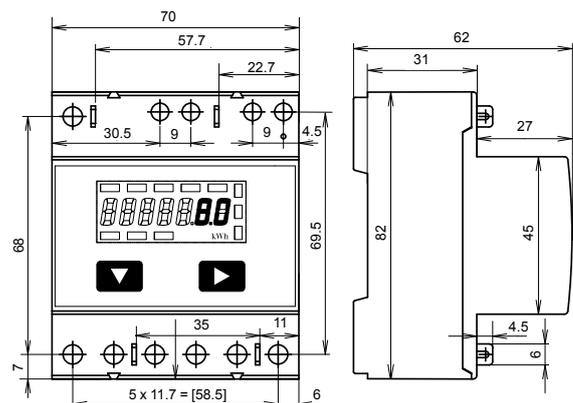
### Single-phase Saia PCD® energy meters

Interface	Single-phase	
	Direct measurement 0.25...32 A	
	Unidirectional	Bidirectional
<b>M-Bus</b>	ALD1D5FM00A3A00	-
<b>Modbus</b>	ALD1D5FD00A3A00	ALD1B5FD00A3A00
<b>S Bus</b>	ALD1D5FS00A3A00	ALD1B5FS00A3A00
<b>S0 interface</b>	ALD1D5F10KA3A00 EMD1L5F1KA00	ALD1B5F10KA3A00



### 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
<b>M-Bus</b>	ALE3D5FM10C3A00	ALE3B5FM00C3A00	AWD3D5WM00C3A00	-
<b>Modbus</b>	ALE3D5FD10C3A00	ALE3B5FD00C3A00	AWD3D5WD00C3A00	-
<b>S Bus</b>	ALE3D5FS10C3A00	ALE3B5FS00C3A00	AWD3D5WS00C3A00	AWD3B5WS00C3A00
<b>S0 interface</b>	ALE3D5F11KC3A00	ALE3B5F10KC3A00	AWD3D5W10MC3A00	AWD3B5W10MC3A00

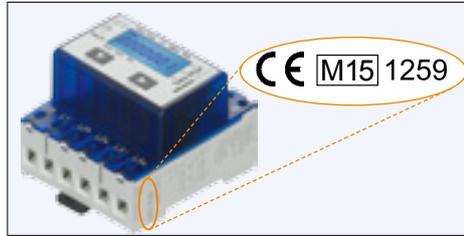


## 4.1 General information on energy meters

Reliable directly from the factory. The design and production of energy meters in Murten are such that the meters also exhibit high levels of reliability and durability even under extreme industrial conditions. The high quality standards of the Swiss 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 in Murten

### Meters for converter connection

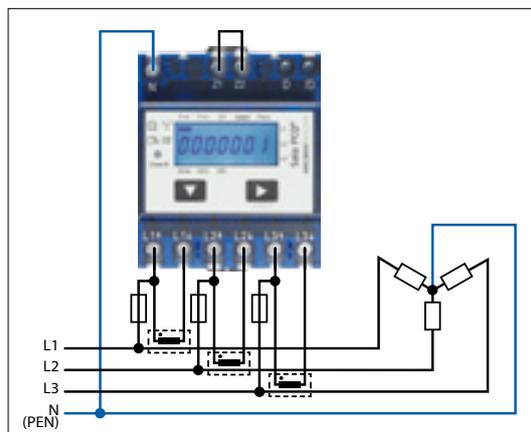
The use of current converters makes costly shutdowns of entire machines for meter installation a thing of the past. The replacement of an energy meter or current converter while the system is running is possible with the consistent use of flap current converters, since the faulty parts can be replaced 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

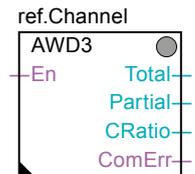
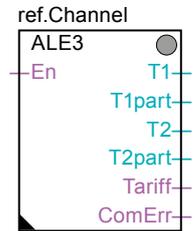
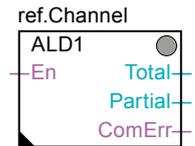
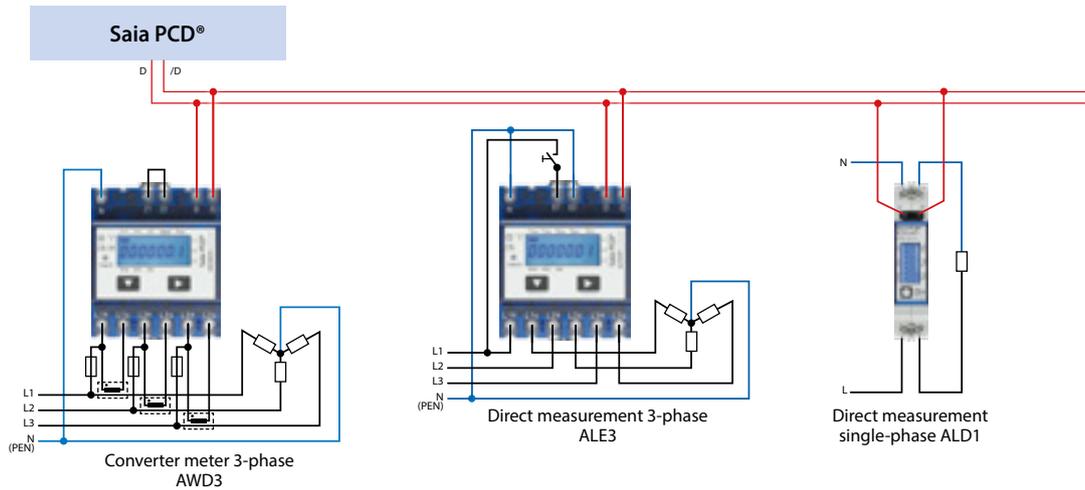
Energy meters with communication interface: 200 years



## 4.2 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



FBoxes available for every S-Bus meter type

### 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, $2 \times 0.5 \text{ mm}^2$ , max. 1200 m
Response time	Write: up to 60 ms Read: up to 60 ms

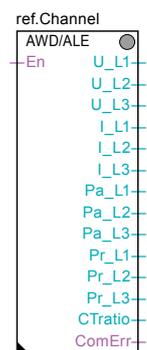
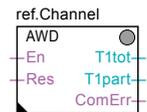
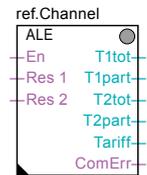
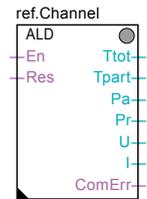
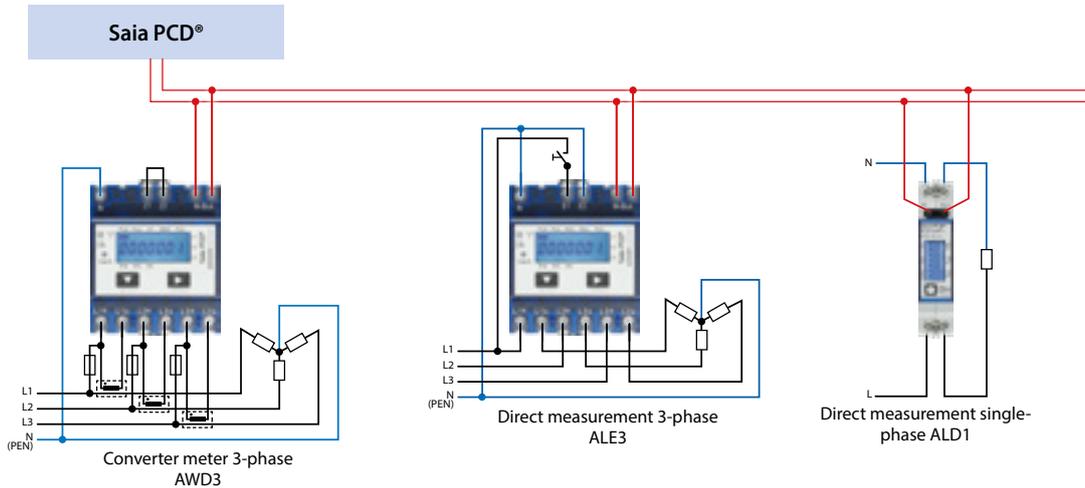


		ALD1		ALE3		AWD3	
		ALD1D5FS00A3A00	ALD1B5FS00A3A00	ALE3D5F510C3A00	ALE3B5FS00C3A00	AWD3D5WS00C3A00	AWD3B5WS00C3A00
Tariff	1 tariff	•	•	-	•	•	•
	2 tariffs	-	-	•	-	-	-
Meter type	Unidirectional design	•	-	•	-	•	-
	Bidirectional design	-	•	-	•	-	•
Approvals	With MID	•	•	•	•	•	•
Rated/max. current Current	$I_{\min} = 0.05 \text{ A}$ , $I_N = 5 \text{ A}$ , $I_{\max} = 6 \text{ A}$	-	-	-	-	•	•
	$I_{\min} = 0.25 \text{ A}$ , $I_N = 5 \text{ A}$ , $I_{\max} = 32 \text{ A}$	•	•	-	-	-	-
	$I_{\min} = 0.5 \text{ A}$ , $I_N = 10 \text{ A}$ , $I_{\max} = 65 \text{ A}$	-	-	•	•	-	-
Measurement type	Direct measurement	•	•	•	•	-	-
	Conversion up to 1500 A	-	-	-	-	•	•
Operating voltage	230 VAC, 50 Hz	•	•	-	-	-	-
	$3 \times 230/400 \text{ VAC}$ , 50 Hz	-	-	•	•	•	•
Partial meter	Resettable	•	-	•	•	•	-

## 4.3 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



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

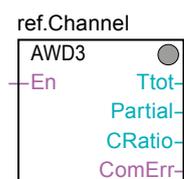
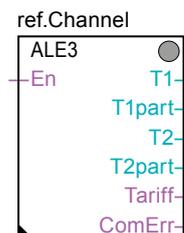
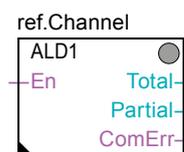
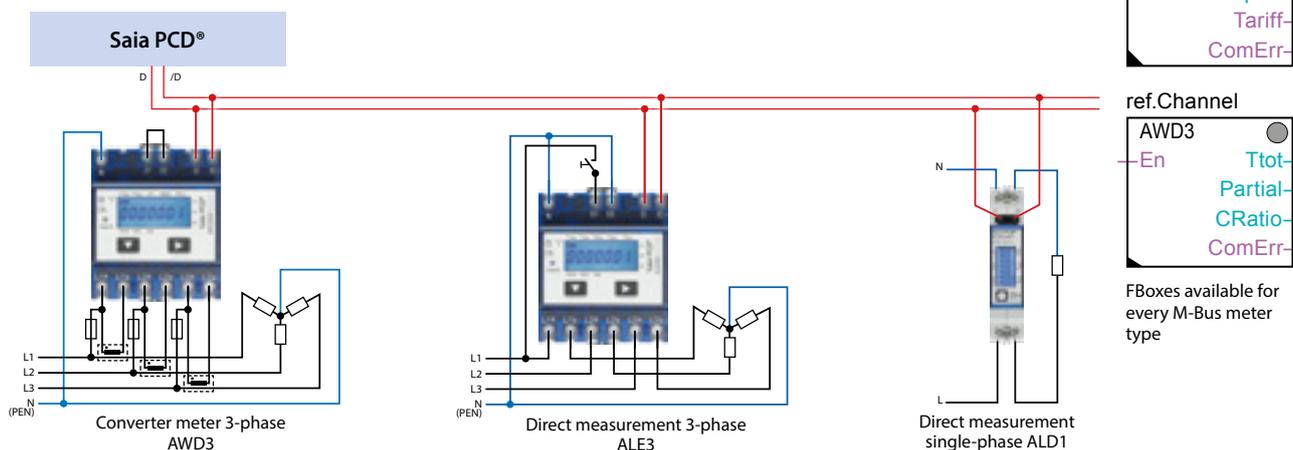


		ALD1	ALE3	AWD3
		ALD1D5FM00A3A00	ALE3D5FM10C3A00	AWD3D5WM00C3A00
Tariff	1 tariff	•	-	•
	2 tariffs	-	•	-
Meter type	Unidirectional design	•	•	•
	Bidirectional design	-	-	-
Approvals	With MID	•	•	•
Rated/max. current Current	$I_{\min} = 0.05 \text{ A}, I_N = 5 \text{ A}, I_{\max} = 6 \text{ A}$	-	-	•
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

## 4.4 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  $\cos\varphi$  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



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"> <li>▶ 8 databit, even parity, 1 stop bit</li> <li>▶ 8 databit, odd parity, 1 stop bit</li> <li>▶ 8 databit, no parity, 2 stop bit</li> </ul> The parity is automatically detected
Bus cable	Twisted, shielded, 2 × 0.5 mm <sup>2</sup> , max. 1200 m
Response time	Write: up to 60 ms Read: up to 60 ms



The following devices are available for Modbus parity 8N1:

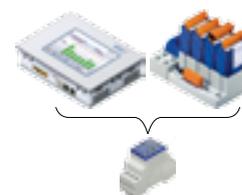
ALD1D5FD00A3A44  
ALD3D5FD10C3A44  
AWD3D5WD00C3A44



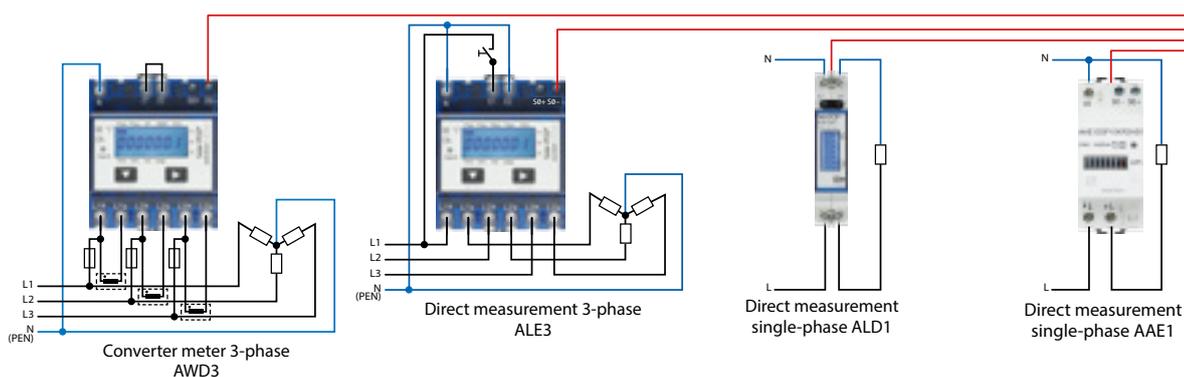
		ALD1	ALE3	AWD3
		ALD1D5FD00A3A00	ALD1B5FD00A3A00	ALE3D5FD10C3A00
		ALE3B5FD00C3A00		AWD3D5WD00C3A00
Tariff	1 tariff	•	•	-
	2 tariffs	-	-	•
Meter type	Unidirectional design	•	-	•
	Bidirectional design	-	•	-
Approvals	With MID	•	•	•
Rated/max. current Current	$I_{\min} = 0.05 \text{ A}, I_N = 5 \text{ A}, I_{\max} = 6 \text{ A}$	-	-	•
	$I_{\min} = 0.25 \text{ A}, I_N = 5 \text{ A}, I_{\max} = 32 \text{ A}$	•	•	-
	$I_{\min} = 0.5 \text{ A}, I_N = 10 \text{ A}, I_{\max} = 65 \text{ A}$	-	-	•
Measurement type	Direct measurement	•	•	-
	Conversion up to 1500 A	-	-	•
Operating voltage	230 VAC, 50 Hz	•	•	-
	3 × 230/400 VAC, 50 Hz	-	-	•
Partial meter	Resettable	•	-	•

## 4.5 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 and the E-Monitor 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



		EMD1	ALD1		AAE1	ALE3		AWD3	
		EMD1L5F1KA00	ALD1D5F10KA3A00	ALD1B5F10KA3A00	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	-	•	-	-	•	•	•	-

## 4.6 Energy meter – sealing cover

### Accessories

### Order no.

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

2 units are recommended for contact protection.

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



4 104 7420 0



ALD1 with assembled sealing cover

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

2 units are recommended for contact protection on AAE1.

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

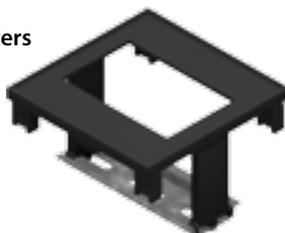


4 104 7485 0



ALE3 or AWD3 with sealing cover

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



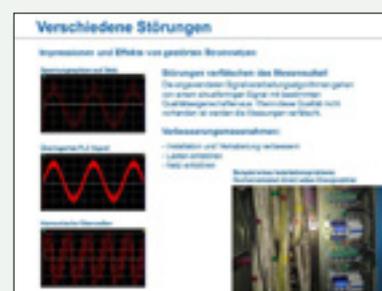
PMK-EEM400



ALE3 or AWD3 mounted in panel kit

## 4.7 Application notes

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

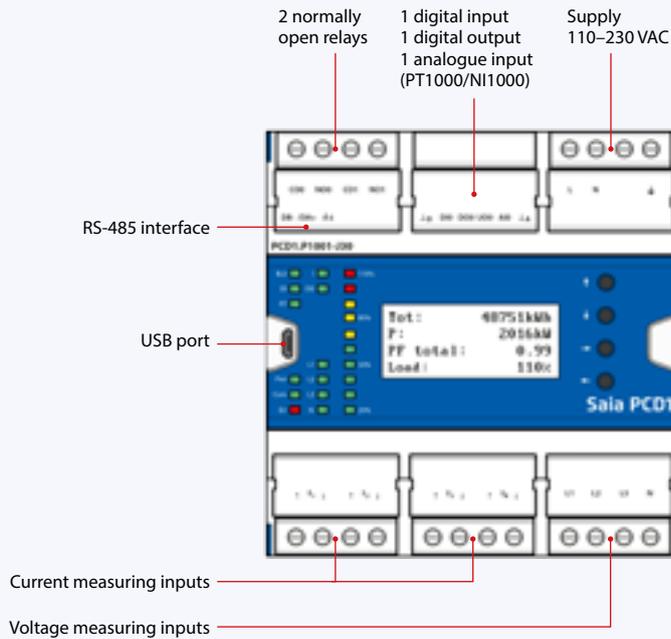


## 5 Power Quality Analyzer PCD1.P1001-J30



The Power Quality Analyser (PQA) is a device to measure and check the quality of the power supply and is manufactured as an industrial grade DIN rail device. The compact E-Line design enables installation in restricted spaces in electrical distributor boxes. The extensive measurement options enable an analysis of any disturbances with cyclic/event-oriented data capture and automatic messaging if a measured variable is outside the tolerance limits. The integrated RS-485 interface is available in the S-Bus/Modbus and enables communication with a Saia PCD® controller or other master devices. Programming is also very efficient and fast using a comprehensive FBox library with web templates.

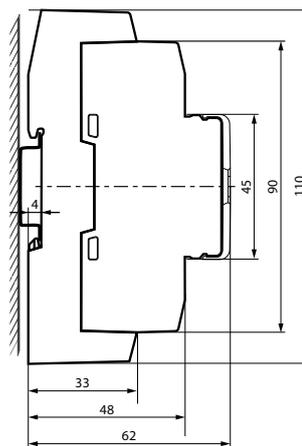
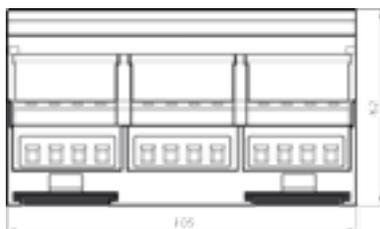
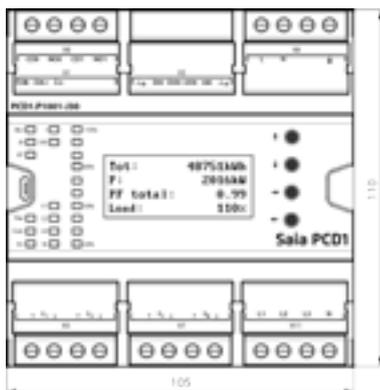
### Device design



### System properties

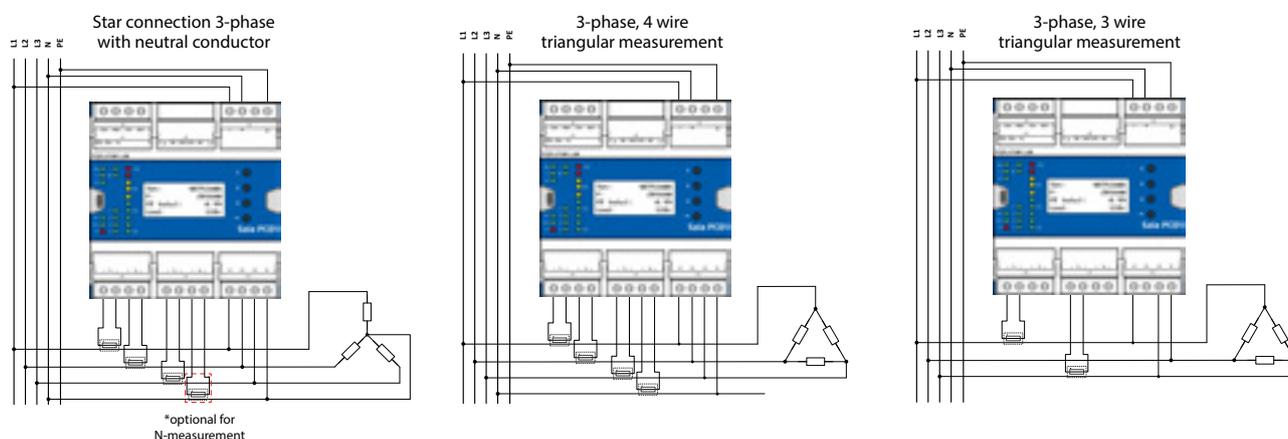
- ▶ Network analyser with 0.5% measurement accuracy
- ▶ Measurement of the 3 phases and neutral conductor
- ▶ Current measurement inputs for current converter connection
- ▶ Measurement data storage (event/cyclic) in internal memory
- ▶ 1.9 inch LCD
- ▶ Electrically isolated measuring inputs
- ▶ Temperature measuring input
- ▶ Electrically isolated RS-485 interface for S-Bus/Modbus (switchable)
- ▶ 105 mm wide DIN rail devices (6 modules)

### Dimensions and installation



Mounting on a 35 mm top-hat rail  
(in accordance with DIN EN 60715 TH35)

Housing width 6 modules (105 mm)  
Compatible with electrical control cabinets (in accordance with DIN 43880,  
size 2 × 55 mm)



## General technical data

<b>Power supply</b>	
Supply voltage	110–230 VAC, +15% –20%, 50/60 Hz
Electrically isolated	4,000 VAC between power supply and RS-485
Power consumption	Max.: 6 W typically: 1.5 W
<b>Interface</b>	
Communications interface	RS-485 with electrical isolation Baud rate: 4,800, 9,600, 19,200, 38,400, 57,600, 115,200 bps
Bus protocol	S-Bus or Modbus interface: Selectable via LCD
Configuration	Parity: Selectable via LCD
Address	Address range: S-Bus: 0 ... 255 Modbus: 1 ... 253 Selectable via LCD
Terminating resistor	Integrated, can be activated via the display and interface
<b>General data</b>	
Ambient temperature	Operation: –25°C ... +55°C Storage: –30°C ... +70°C
Mounting type	Top-hat rail pursuant to DIN EN 60715 TH35 (1 × 35 mm)
<b>Measurement accuracy</b>	
Active energy/power	Resistive load: ± 0.5% (5 A CT); ± 1.0% (1 A CT) Inductive load: ± 0.6% (5 A CT); ± 1.0% (1 A CT)
Reactive energy/power	Resistive load: ± 1.0% (5 A CT); ± 1.0% (1 A CT) Inductive load: ± 1.0% (5 A CT); ± 1.0% (1 A CT)

## Inputs/outputs

### Measured values

Voltage, current, effective power, reactive power, apparent power, real energy, reactive energy and apparent energy, THD, TDD, harmonics (1–40 order), frequency, low, high and peak detection for voltage and current, power factor, phase sequence, phase angle

### Voltage measuring inputs

Number	4 (L1, L2, L3, N)
Input voltage	L-N: Nom. 285 VAC, max. 700 VAC L-L: Nom. 480 VAC, max. 1,200 VAC
Input impedance	2 MOhm per input
Measurement frequency	45 ... 65 Hz
Isolation	4,000 VAC

### Current measuring inputs

Number	8 (each 2 per phase and neutral conductor)
Input current	1 A / 5 A (switchable)
Current range	Max. 6 A
Input impedance	15 mΩ
Isolation	4,000 VAC

### Inputs

1 digital input	5 ... 30 VDC, source operation (positive switching)
1 analogue input	Pt1000: –50°C ... +400°C Ni1000: –50°C ... +210°C

### Outputs

1 digital output	5 ... 30 VDC; max. 500 mA
2 relays	Make contact; 250 VAC / 24 VDC; 5 A / 1.5 A, 250 VAC (AC15) / 1 A, 24 VDC (DC13) pursuant to IEC60947-5-1

## 6 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 <b>73</b>	Found meters <b>5</b>	State <b>OK</b>
		FW <b>1.3</b> HW <b>1.3</b> 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:



#### Excel Report Tool

When the COSinus function is activated, the data can simply be imported into Excel without programming.

Download: [www.sbc-support.com](http://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.

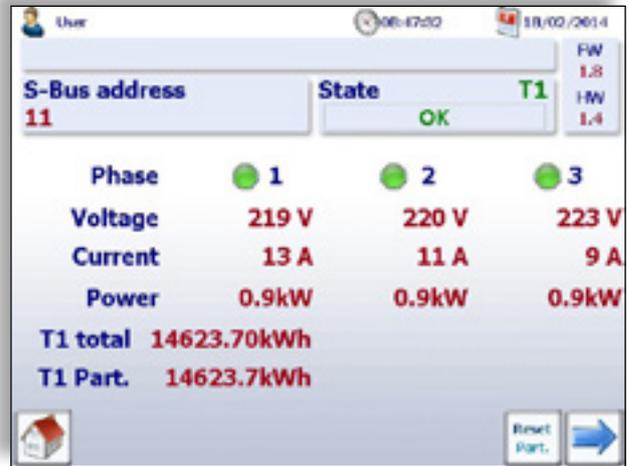
	A	B	C	D	E	F	G	H	I
1	Date	Energy1	Energy2	Tariff1	Tariff2	Energy3	Energy4	Tariff3	Tariff4
2	10.6.2013	206.10	0.00	0.1600	0.1300	160.00	13.23	0.1500	0.0800
3	11.6.2013	208.70	0.00	0.1600	0.1300	164.10	13.76	0.1500	0.0800
4	12.6.2013	214.43	0.00	0.1600	0.1300	168.13	14.82	0.1500	0.0800

## S-Monitoring web project

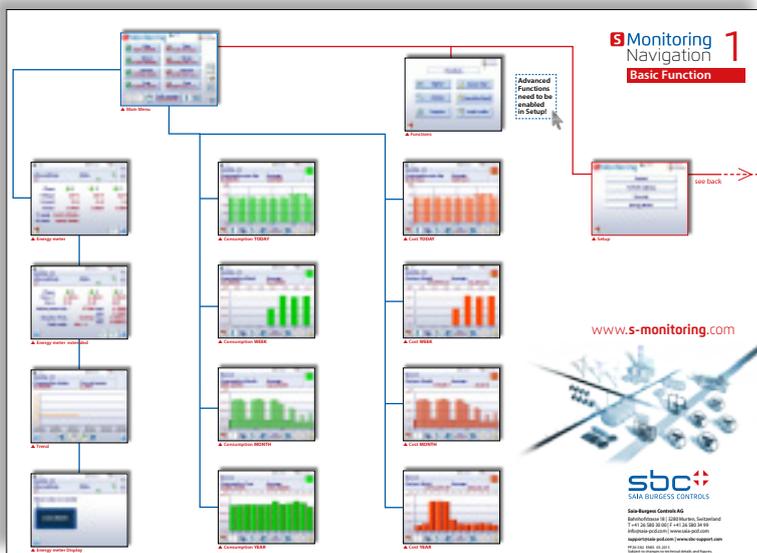
SBC delivers a PG5 project, which also includes a web visualisation. The project is based on the COSinus functions and enables saved data to be visualised on the PC immediately. As only the S-Monitoring COSinus function is accessed in the web project, it does not need a PG5 program. It can therefore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



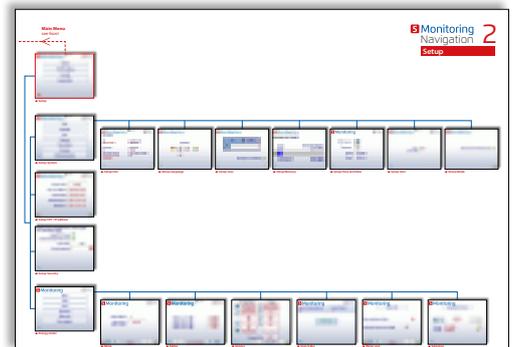
▲ Representation of historical energy consumption



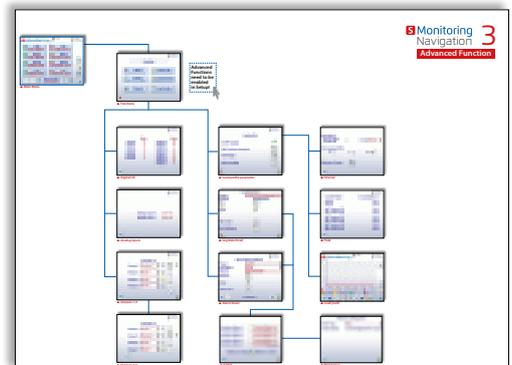
▲ Overview of the live values



▲ 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 and E-Monitor 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 $\cos\varphi$	 Evaluation and presentation of the costs
	Visualisation in bar charts and trend charts	 Consumption and costs presentation per day/week/month/year <sup>1)</sup>
	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

<sup>1)</sup> Daily view only available if memory extension is plugged in

## Technical data for SBC S-Monitoring

<b>SBC S-Monitoring COSinus function integrated in</b>	PCD1.M0160E0 (E-Controller) PCD1.M2160	PCD3.Mxx60 PCD7.DxxxxT5F (pWeb Panel MB)	PCD7.D457VT5E (E-Monitor)
<b>Supported meters</b>	– Saia PCD®S-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		
<b>Maximum number of meters</b>	128 Saia PCD® S-Bus meters* / 256 custom meters* / 32 groups*		*in total max. 256
<b>Data storage time</b>	4 years maximum; a recording per day		
<b>saved data</b>	max. 4 meter values with 4 tariffs per meter are saved once a day (at midnight)		

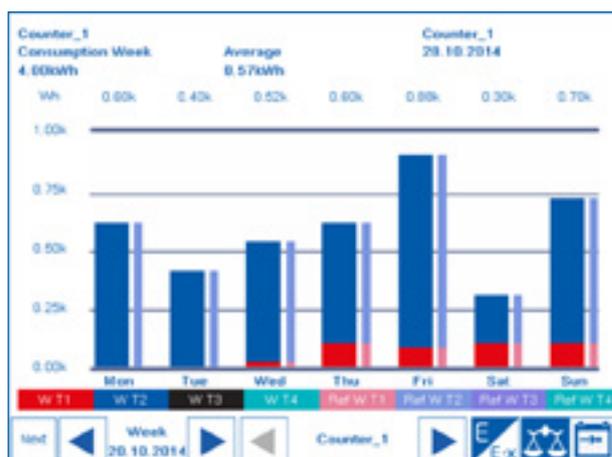
## 6.1 S-Monitoring Web Editor 8 Templates

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	2382.00
<input type="button" value="WT 1"/> <input type="button" value="WT 2"/> <input type="button" value="WT 3"/> <input type="button" value="WT 4"/>	

▲ Counter information

Day	12266.00 Wh	Day	22954.96 Euro
Week	207288.0 Wh	Week	387934.5 Euro
Month	207828.0 Wh	Month	388945.4 Euro
Year	221299.5 Wh	Year	414167.4 Euro
<input type="button" value="Month 1.10.2026"/> <input type="button" value="ALD1D5FS00A"/>			

▲ Overview of energy consumption

#### Available templates:

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

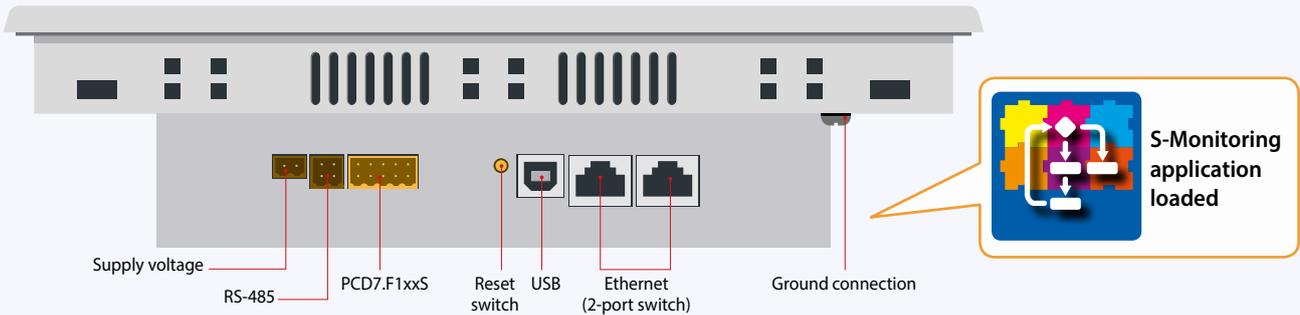
## 7 Saia PCD® E-Monitor

The E-Monitor is an SBC functions HMI, which can be used immediately on delivery with no additional programming. It combines data capture, 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 Chapter 4.6, simple control functions are already implemented on the E-Monitor (i.e. sending of data messages or the parallel recording of multiple load profiles).

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.



### Advanced functions

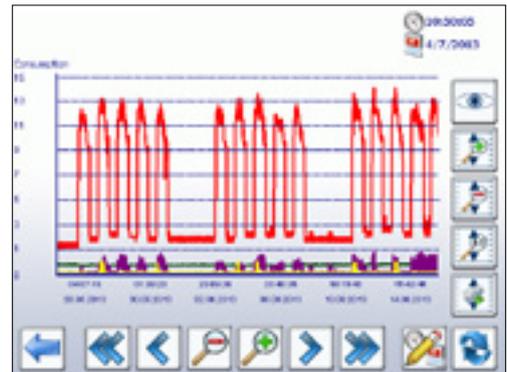
In addition to the basic functions of the S-Monitoring application (4.6), the E-Monitor Web Panel includes the following functions, which are programmed in Saia PG5®:



Load profile measurement of 8 consumption values

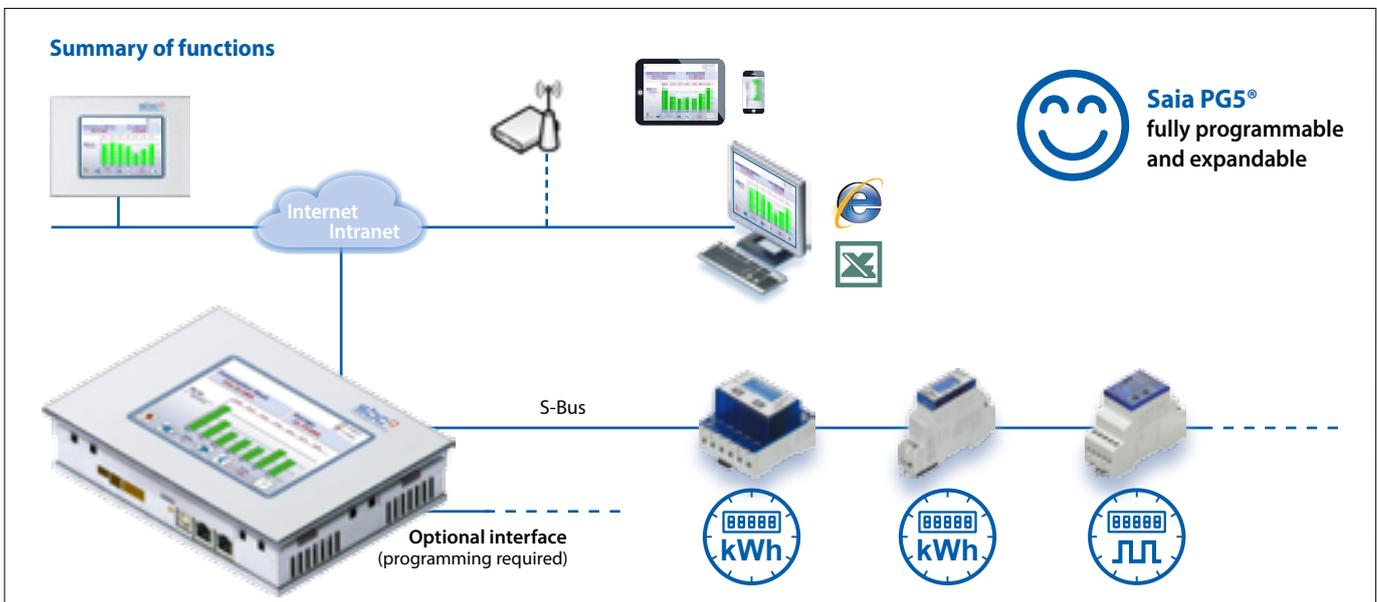


Sending of data email to up to 5 email addresses



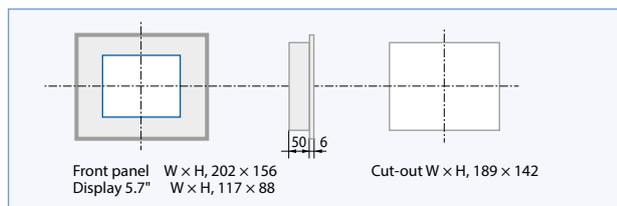
Load profile measurement

### Summary of functions



## Dimensions (W xHxD) and cut-out (WxH), [mm]

### PCD7.D457VT5E0



### SBC MB App

Operation and monitoring on iPhone, iPad and Android



### E-Monitor wall mounting set 5.7"

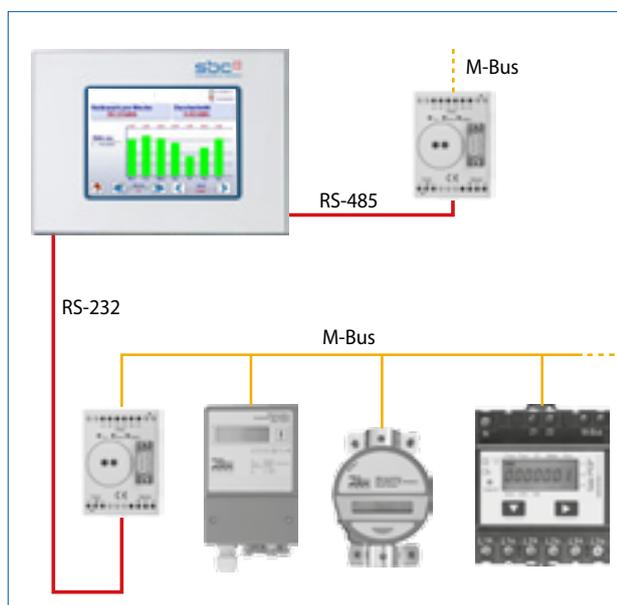
Q.OWSD457VT5E0

The package includes:

- ▶ Wall mounting kit with 5.7" PCD7.D457-OWS1
- ▶ E-Monitor 5.7" PCD7.D457VT5E0 with memory expansion
- ▶ Power supply 24 VDC Q.PS-AD2-2402F
- ▶ Cabling and AC power adapter CH/EU



### Connection example of M-Bus with external interface<sup>1)</sup>



<sup>1)</sup> programming required

## Overview of PCD7.D457VT5E0

### General specifications

Operating system	Saia PCD® COSinus with Micro-Browser expansions
Protection class	IP65
User program, ROM/DB/Text	1 Mbyte
RAM/DB/Text	1 Mbyte
Media	16,384 flags / 16,384 registers
Backup for users	The user program is saved on the integrated microSD card
File system for users	128 MB onboard
Program cycle time	10 cycles/sec. maximum
Field level protocols	Serial SBC S-Bus, Ether SBC S-Bus, Ether S-IQ, Modbus RTU or TCP
Internet services	SBC Micro Browser, Automation Server

### Memory expansion (supplied with device)

Carrier module	PCD7.R.610
Memory card	PCD7.R-MSD1024 Micro-SD, 1GB, PCD formatted

### Interfaces

Ethernet	2 x RJ45 (switch)
USB	1 x (1.1/2.0)
Serial interfaces	RS-485 1 slot for PCD7.F1xxS
Temperature range	Operation: 0 ... 50°C typically Storage: -25 ... 70°C
Humidity	Operation: 10 ... 80%, Storage: 10 ... 98%, non-condensing
Processor	Coldfire CF5373L, 240 MHz
Battery	Lithium Renata CR 2032 (service life of 1 ... 3 years)
Real-time clock (RTC)	with battery buffer

### Display

Size	5.7 inch TFT
Resolution / pixels	VGA 640 x 480
Touch screen	Resistive touch screen
Contrast adjustment	Yes
Background lighting	LED
Power supply	24 VDC ±20%
Current draw	max. 500 mA
Protection class (front)	IP 65

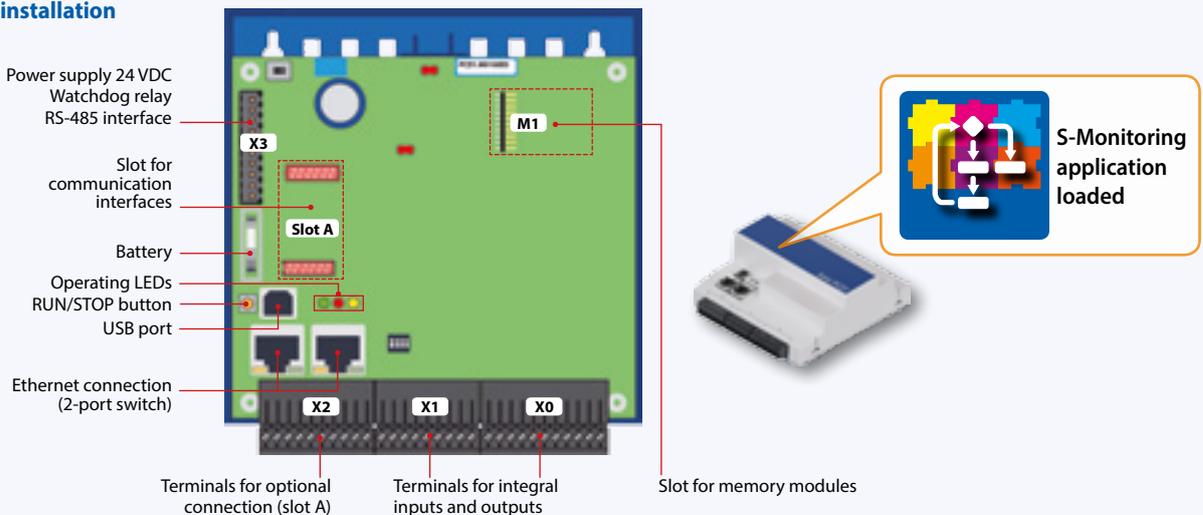
# 8 Saia PCD® E-Controller

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.



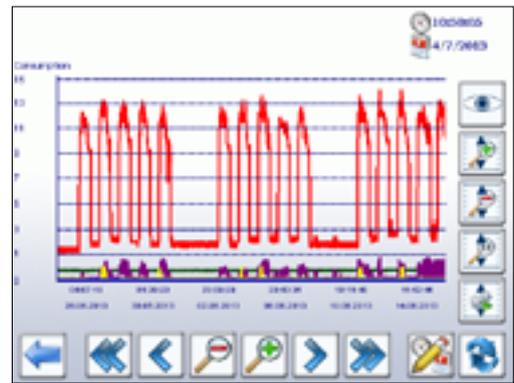
## Device installation



## Advanced functions

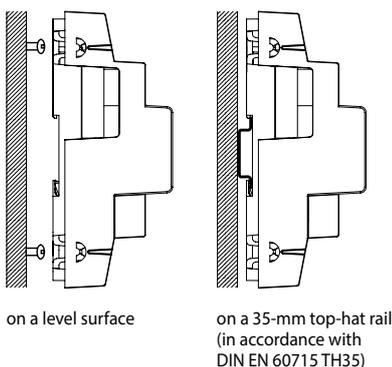
In addition to the basic functions of the web application (4.6), the E-Controller includes the following functions, which are programmed with Saia PG5®:

-  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

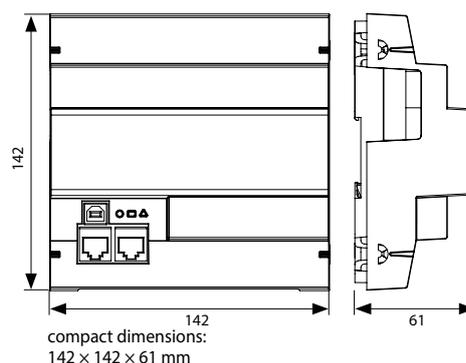


Load profile measurement

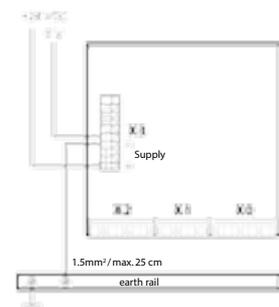
## Mounting



## Dimensions

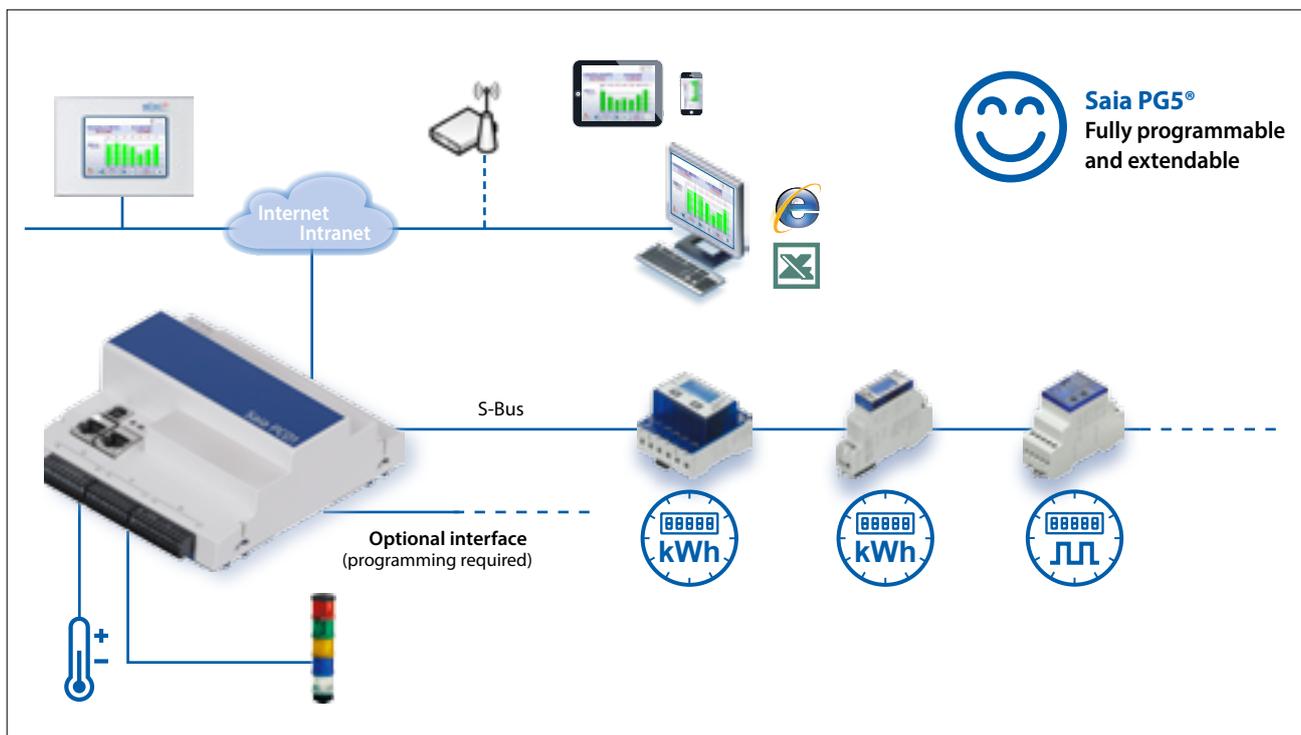


## Power supply and connection plan



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



**!** 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

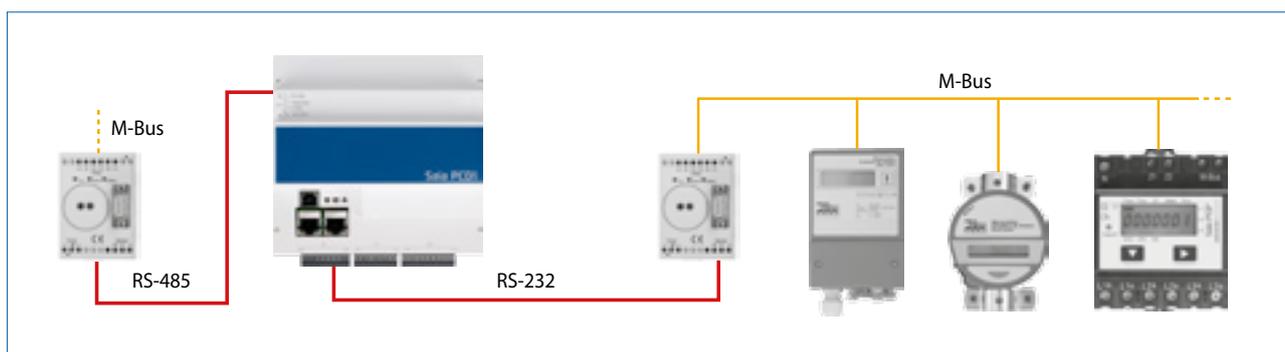
**SBC MB**

### Additional memory

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



### Connection example of M-Bus with external interface<sup>1)</sup>



<sup>1)</sup> programming required

## Overview of Saia PCD® E-Controller

### Technical Data

### PCD1.M0160E0

#### Memory and file system

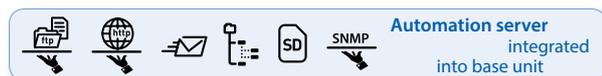
Program memory, DB/text (Flash)	1 Mbyte
User memory, DB/text (RAM)	1 Mbyte
User flash file system onboard	128 Mbyte

#### 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

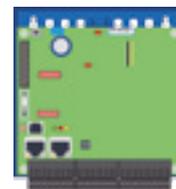
The Saia PCD1.M0160E0 has the dimensions 142 x 142 x 60 mm excluding terminals and connections. For easy assembly, a gap of 55 mm above the DIN rail and 75 mm below it is recommended.

### 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-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



### 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® or Lon IP.

For more information on memory management and structure, see 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 a 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



For the parallel operation of S-Monitoring and BACnet® or Lon IP, please note the instructions on the support site ([www.sbc-support.com](http://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

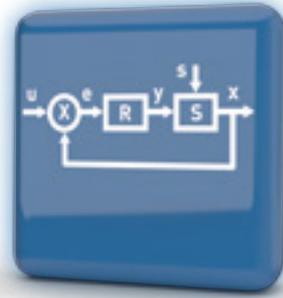
Type	Description
4 507 4817 0	Lithium battery for PCD processor unit (RENATA button battery type CR 2032)



### 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





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