SAIA BURGESS CONTROLS

S Energy

www.saia-pcd.com

Saia PCD® Energy Manager

Saia PCD® Web Panel with Energy Management

5.7” VGA / TFT: PCD7.D457ET7F
10.4” VGA / TFT: PCD7.D410ET7F

Document 26-884; Edition ENG06; 2015-12-23

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0.1 Document history

Version	Published	Changed	Comments
EN01	4 Feb. 2011	Document published	
EN02	9 Mar. 2011	Chapter 16: Sales information	New type: ALD1D5FS00A3A00 with MID approval
EN03	16 May 2011	Document revised	
EN04	1 Feb. 2012 27 Jul. 2012	Chapters 2, 10, 13 and 16	Maximum possible number of S-Bus meters is new: 128 (previously: 254) Screenshots in German added; torage temperature changed from -20 to -25
EN05	20 January 2014	Entire manual	Document completely revised and new “Energy Manager 2” functions added New Logo and Brands
ENG06	2015-12-23	Kapitel 10.1.1 und A2	Baudrates of the energy meters

0.2 Trademarks

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Technical changes are subject to the latest technical developments.

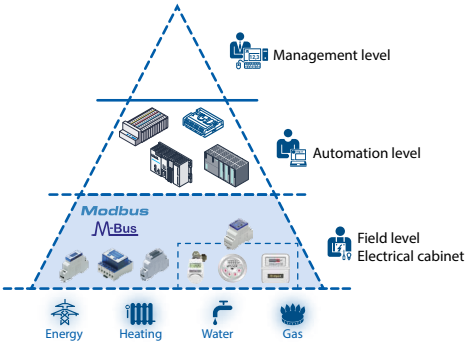
Published in Switzerland

1 Introduction

The purpose of this document is to provide basic information on the operation and installation of the PCD7.D410ET7F or the PCD7.D457ET7F components.

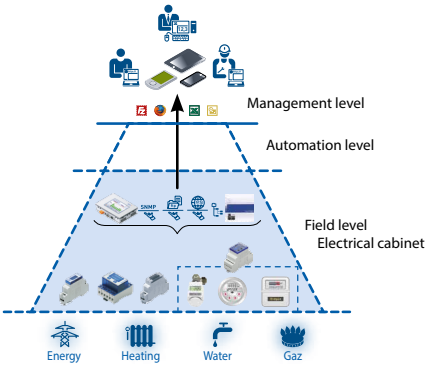
1.1 Consumption data in the Saia PCD® system context

SBC S-Monitoring is a system made for the recording, visualisation, storage and transport of consumption data. The special feature of SBC S-Monitoring is the open nature of the “management level”. Through the transparency, consistency and simplicity of the web and IT technology of S-Monitoring, every user in a property becomes a manager for the consumption of water, electricity, gas, heat, etc. Anyone can see all the data relevant to them and can influence it from anywhere and at any time. This means that substantial long-term improvements in efficiency are possible without any expensive and time-consuming investment projects. Increased awareness and responsibility eliminates energy wastage.



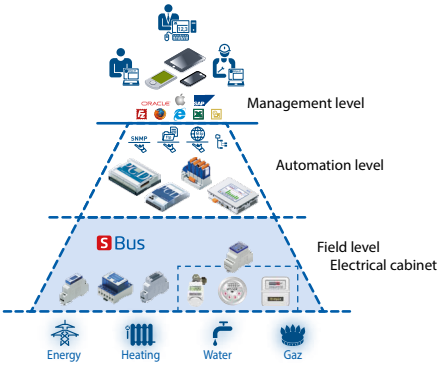
Integration into existing automation level

SBC devices map all types of consumption on standardised normal market communication interfaces. Of these, Modbus is the most widely used worldwide. The evaluation and visualisation functions are realised on the existing automation technology. However, the effort this requires in terms of project planning and programming makes optimising consumption less attractive. The interaction with existing automation technology creates complexity and risks.



S-Monitoring without automation level

In the “out of the box” version of an S-Monitoring system shown opposite, the measurement data is processed, stored and prepared for visualisation directly in the electrical cabinet. The web and IT technology is already implemented in the field level. The automation level remains unaffected for management. It also works without this level. This makes it easy and cost-effective to start the optimisation of consumption.



S-Monitoring fully integrated with Saia PCD®

If the automation level is run with Saia PCD® controllers, the S-Monitoring functions are already on board. With Saia PCD®, the properties of easily recording, visualising, storing and processing consumption data contribute to optimisation just as much as those of control and logic. Due to the web and IT technology, measurement data is available to everyone, from anywhere and at any time.

1.2 The Saia PCD® Energy Manager

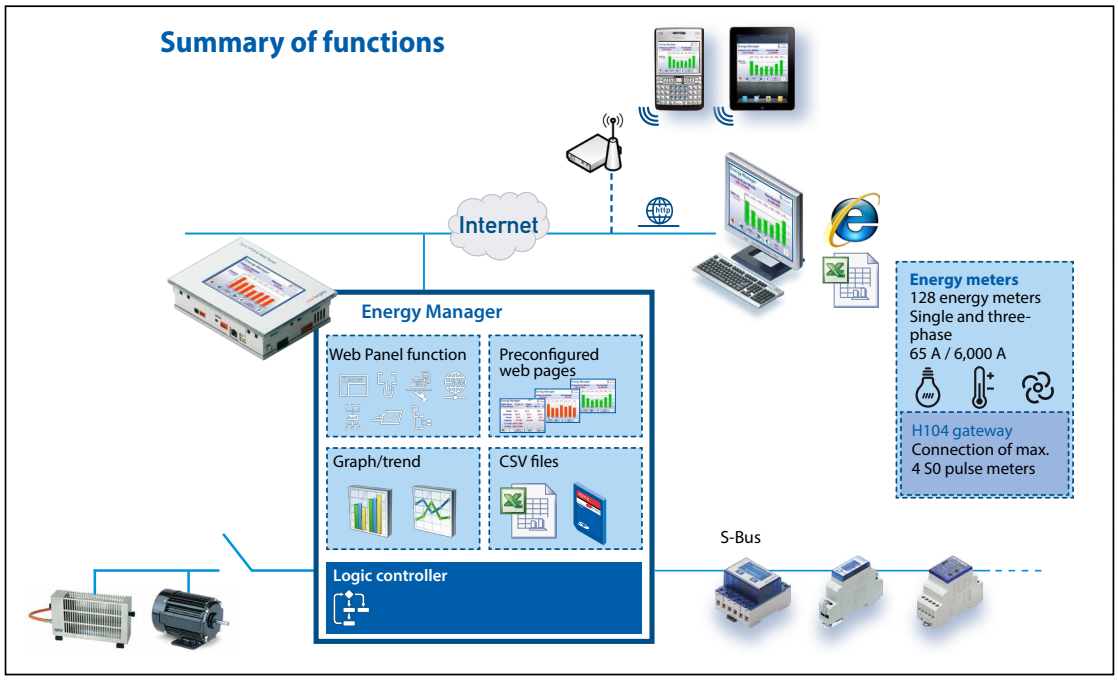
The heart of the system is a control unit designed as an energy manager. System inputs are made over bus-coupled 1- and 3-phase energy meters of up to 6,000 A or via the H104 S0 module. Both are developed and produced by Saia-Burgess.

The customer can use the Energy Manager immediately without programming skills and without software engineering experience. The connected energy meters are registered automatically in the Setup menu. The applications used for energy measurement, visualisation and data storage are ready to be used out of the box. Historical and current data (CSV/Excel files) and the web visualisation can be accessed from anywhere via the integrated automation server using FTP and HTTP.

As many as 128 S-Bus energy meters can be connected to the system.

The Energy Manager comes with a 5.7 inch or with a 10.4 inch TFT touch screen display that can be operated in both VGA and ¼-VGA modes. By default, Ethernet and USB connections as well as 2 RS-485 interfaces are integrated for communication. The device also has a real-time clock, an SD card slot and a battery.

Using the Saia PCD® Web-Editor software tool (from version 5.14), the system integrator can expand the Energy Manager's preinstalled visualisation and control application as desired. A control unit and/or PC can provide access to the data and to the status for the inputs and outputs found in the Energy Manager.



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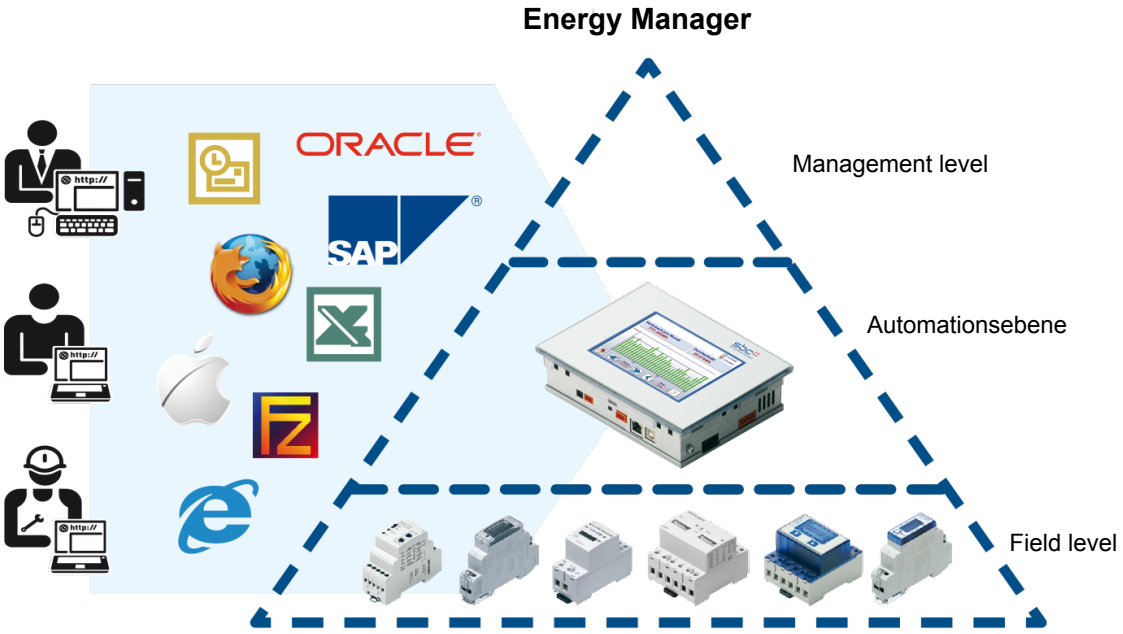
The user can execute logic applications in the Energy Manager and expand the control functions with remote data input and output. Flags, FCs, FB and DBs are available as resources. Since the SBC energy meter provides detailed information about every phase, the system makes it possible to not only optimise the use of energy but also to optimise maintenance and productivity.



Features:

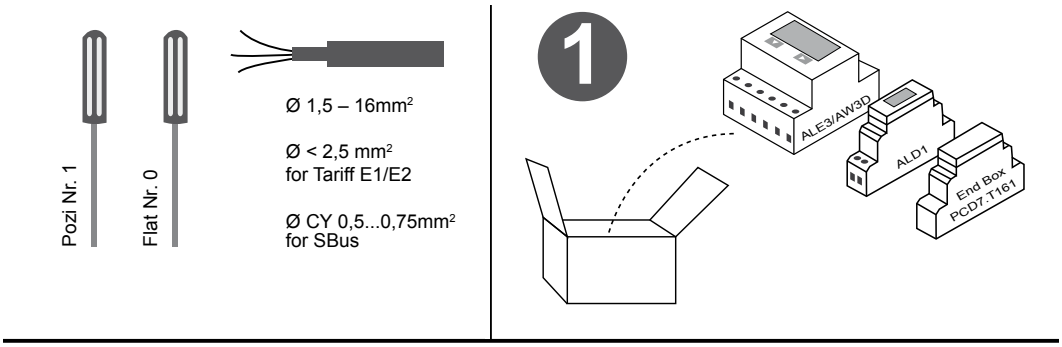
- Integrated programmable logic controller with which to implement active control functions → e.g. shutdown at peak loads
- Programmed with Step®7 from Siemens
- Display of current and historical data in the web visualisation
- Application over LAN and the Internet with the automation server (HTTP, FTP)
- Logging of energy values in CSV files which can be opened in Excel

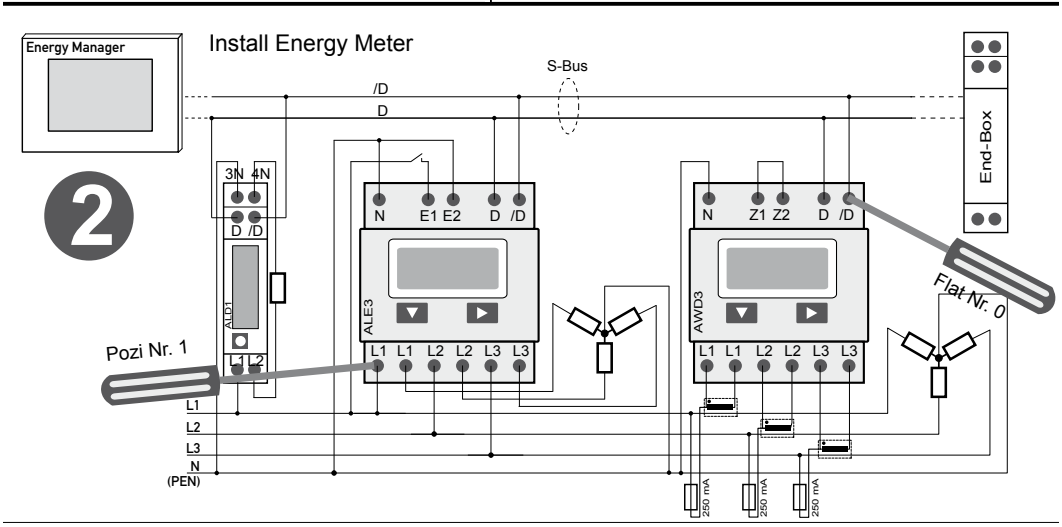
2 Step-by-Step – Quick Guide

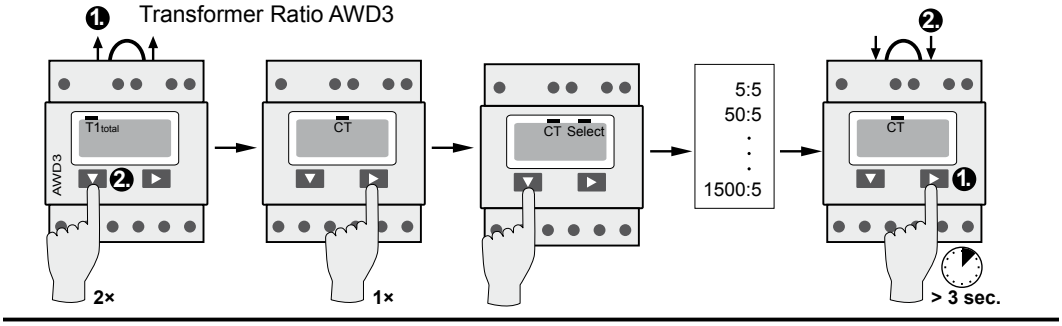
2.1 Installing the energy meter

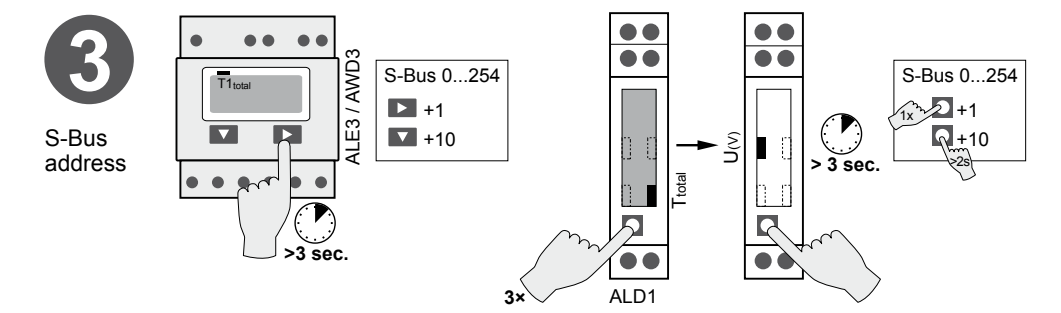
Install the S-Bus energy meter as shown in the following diagrams.

Fastening material:



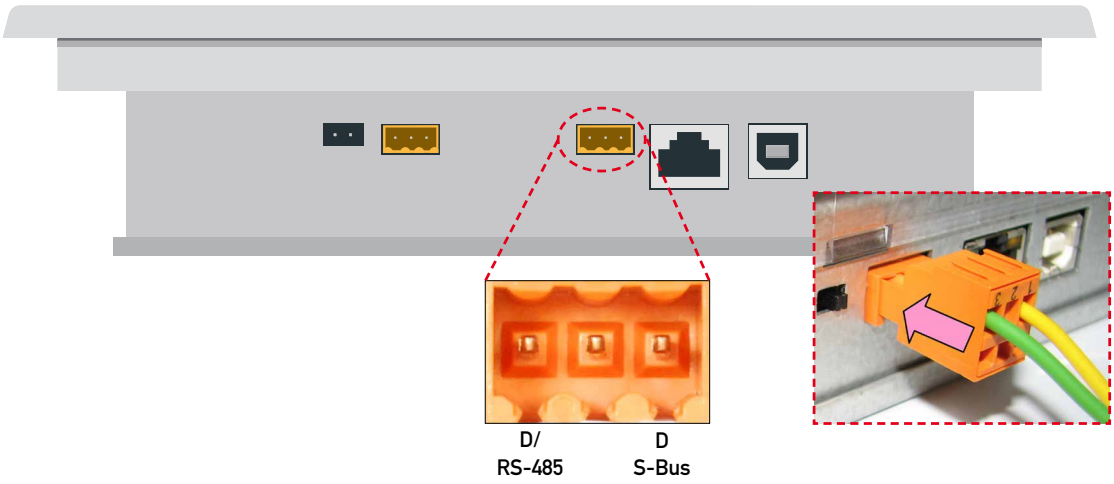






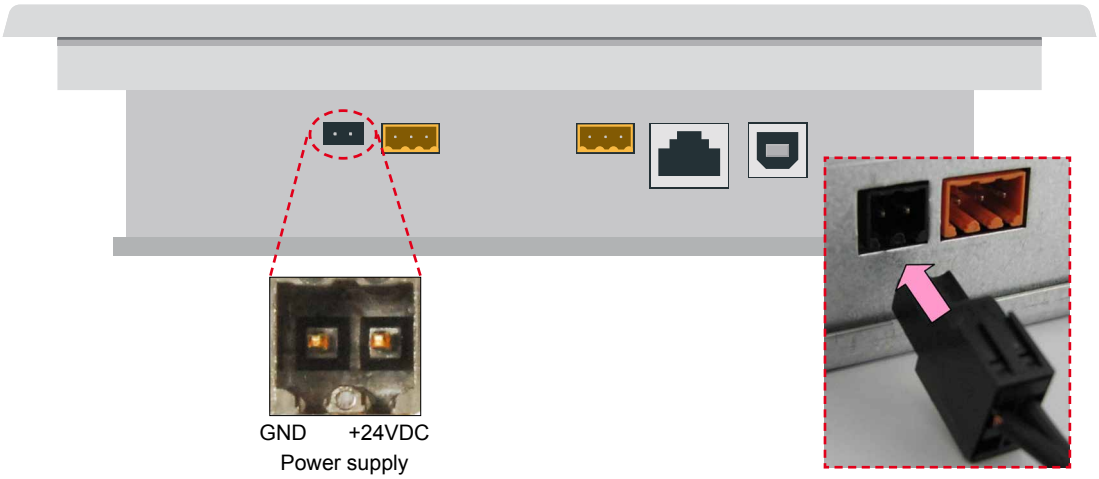
2.2 Connecting the energy meter to the panel via S-Bus

Connect the S-Bus network to the Energy Manager panel as shown here.

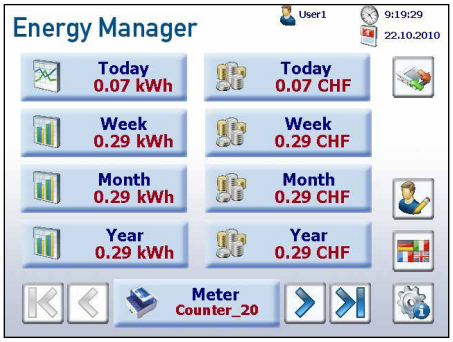


2.3 Connecting the Saia PCD® Energy Manager panel to the power supply

Connect the Energy Manager panel to the power supply.



This starts the Energy Manager. An automatic search run (scan) of the connected S-Bus network is carried out immediately following a short initialisation.



The Energy Manager enables up to 4 instances of web access (clients) simultaneously. If at least one session is available, the panel starts automatically. And if no session is available, the panel waits until a session becomes available.

2.4 Visualisation of the Saia PCD® Energy Manager panel

Chapter 9 provides a detailed graphic overview of the navigation.

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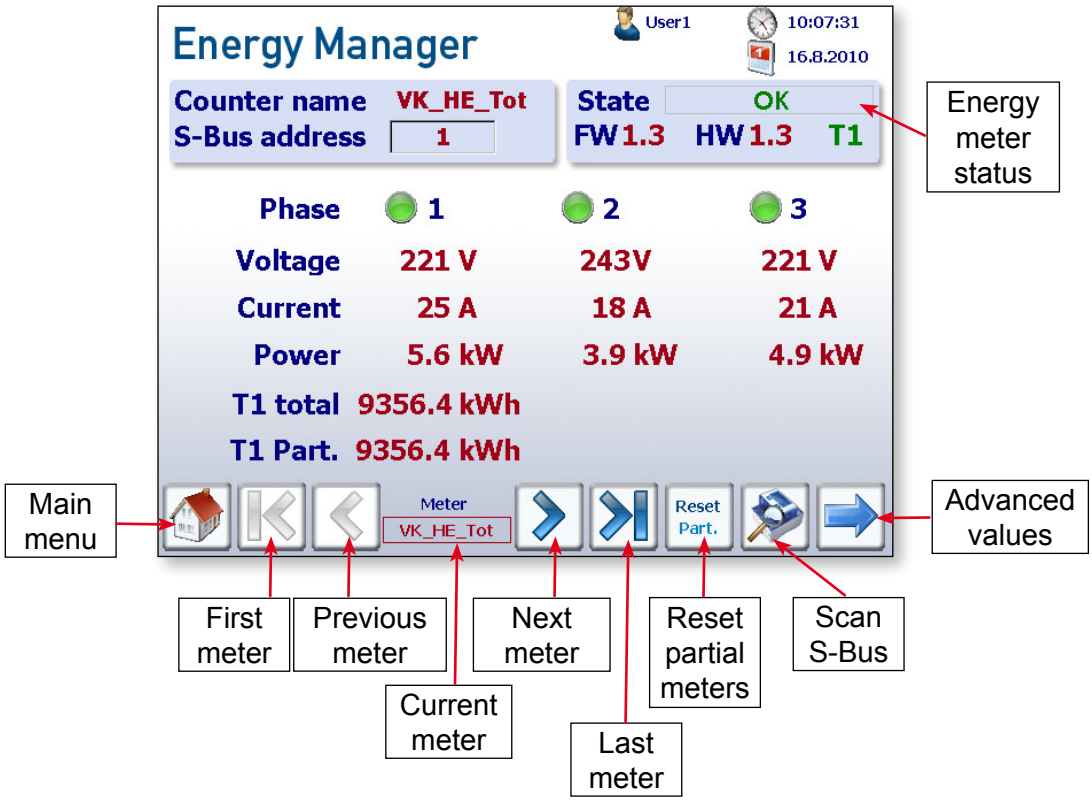
2.4.1 Data provided by the energy meter

Navigation: Main Menu → Meter

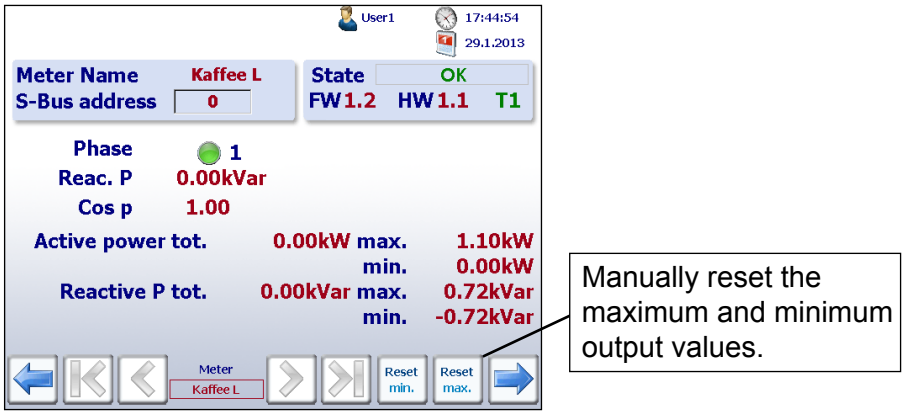


The status of the individual energy meters is checked continuously.
The following operating modes are displayed:

OK	Connection to energy meter OK
Connection Error	The meter is recognised, but there is a connection problem
Not Connected	No connection to the energy meter

Navigation: Main Menu → Meter → Advanced values

Advanced values:



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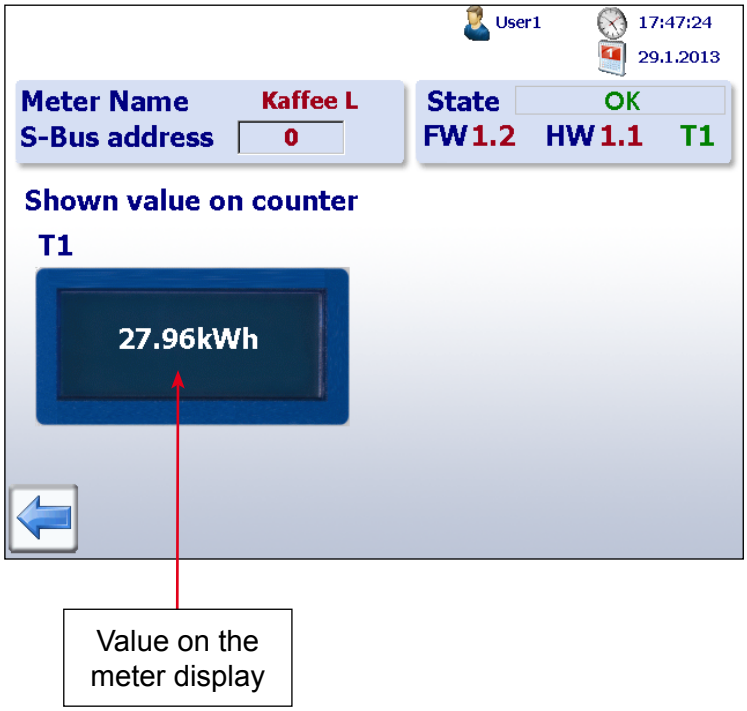
Current meter readings



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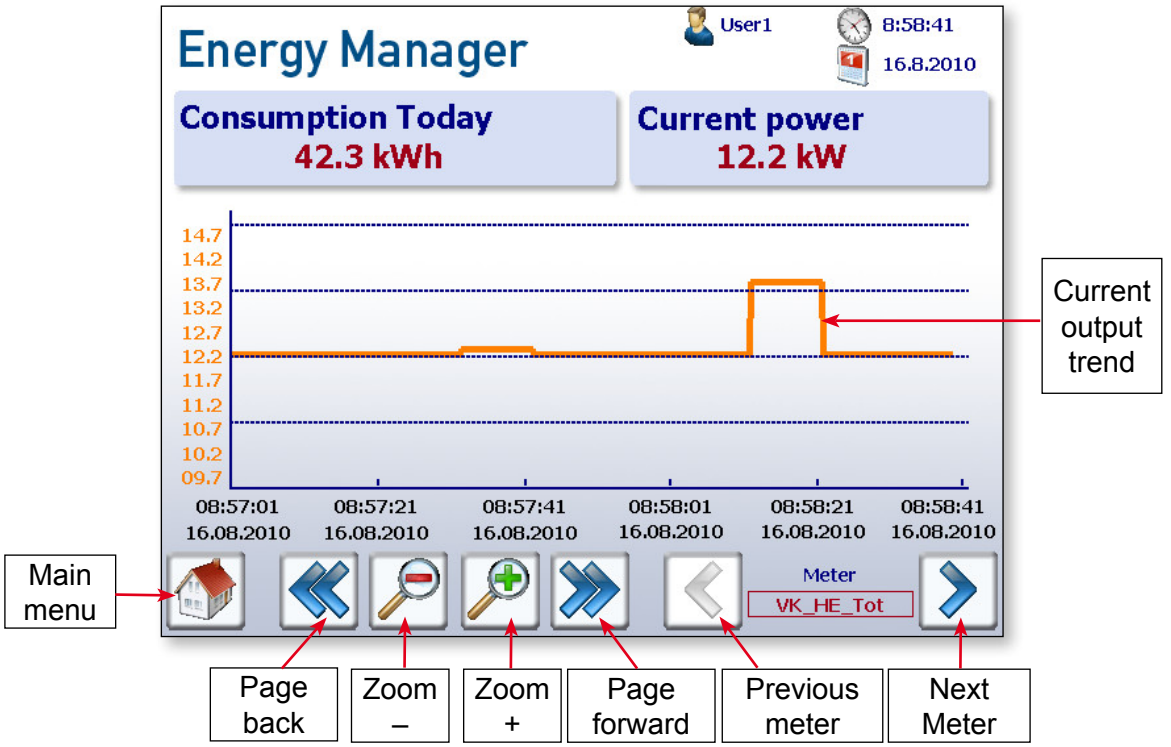
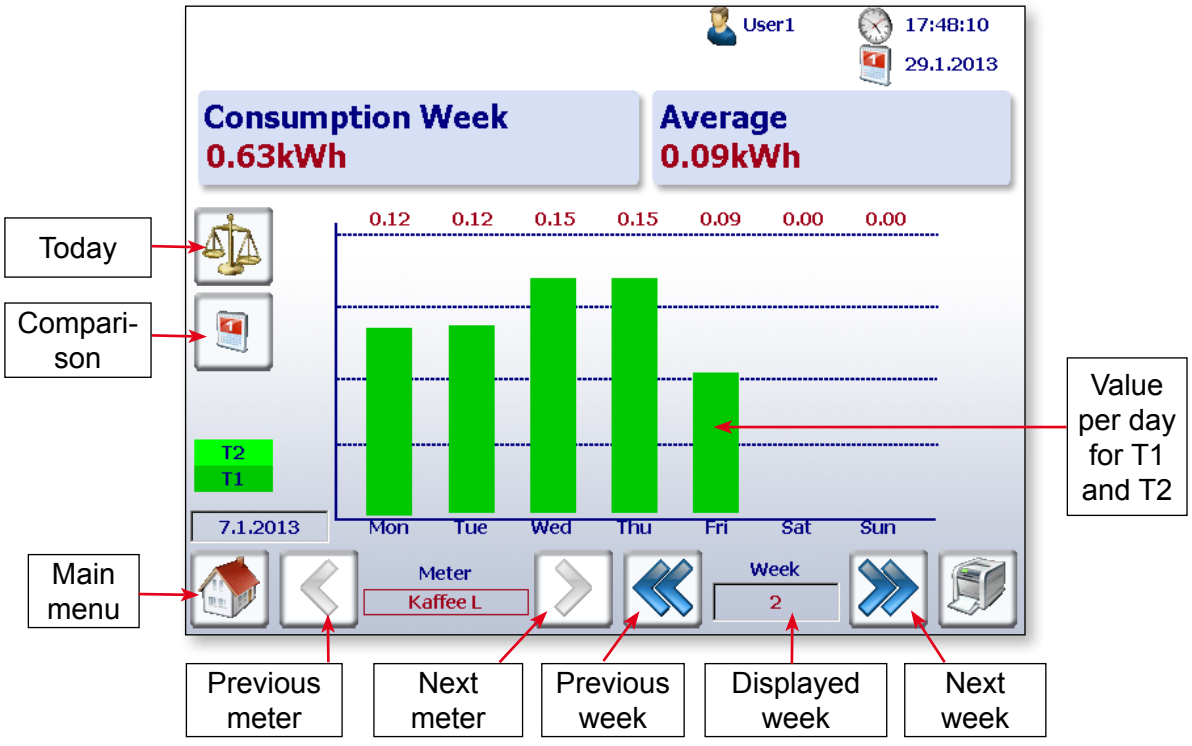
2.4.2 Energy meter – trend

Navigation: Main Menu → Today



2.4.3 Per week screen

Navigation: Main Menu → Week



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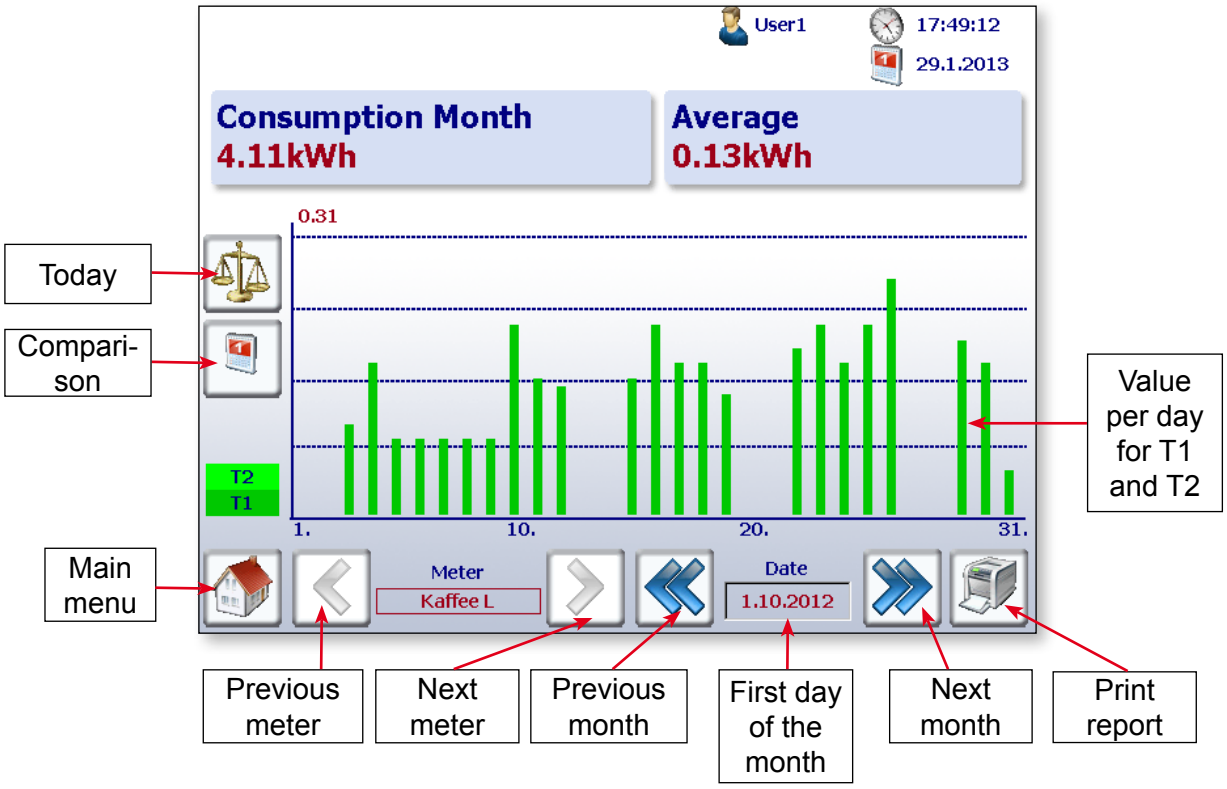
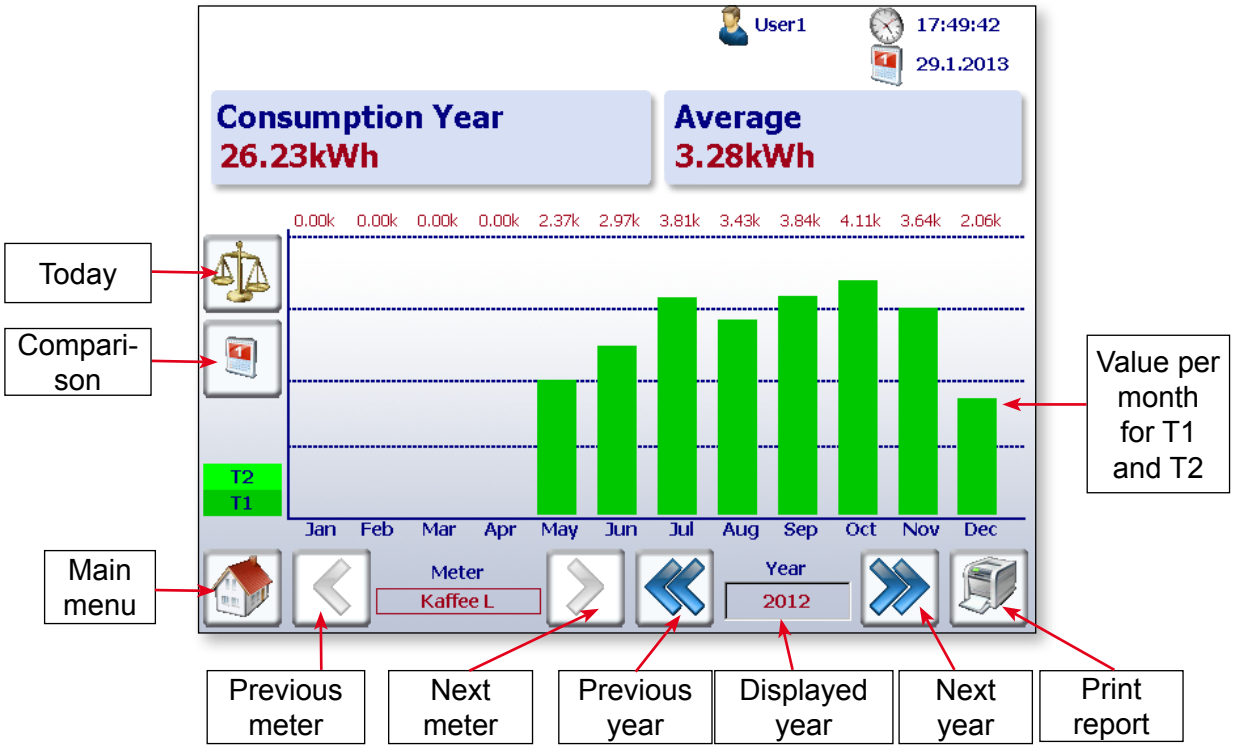
2.4.4 Per month screen

Navigation: Main menu → Month



2.4.5 Per year screen

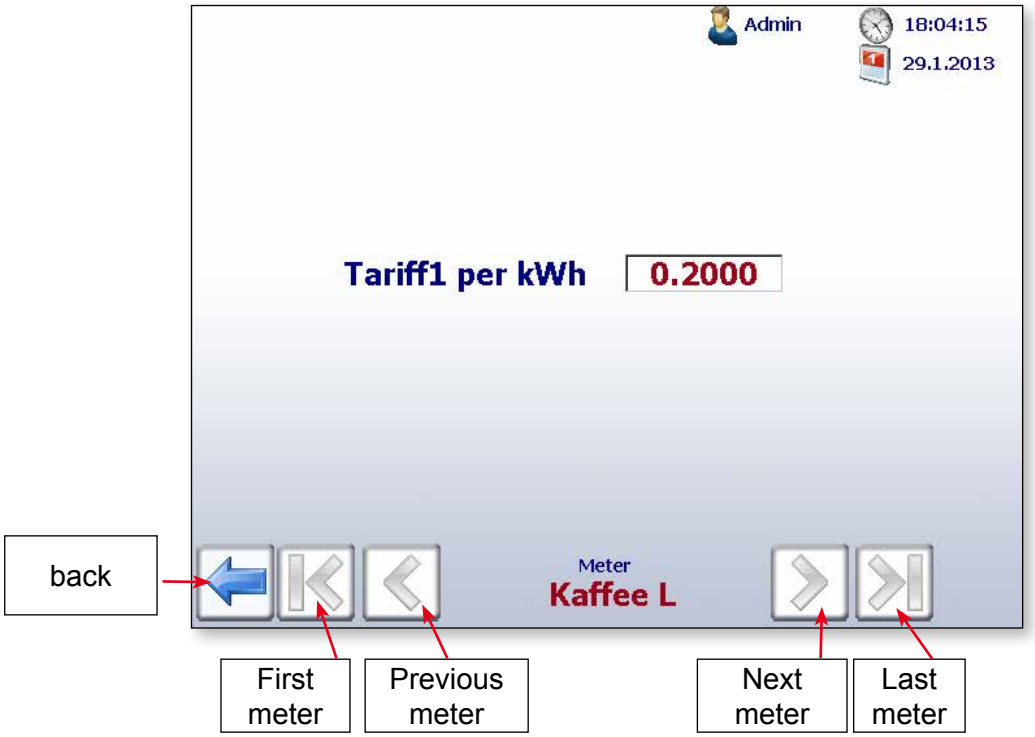
Navigation: Main menu → Year

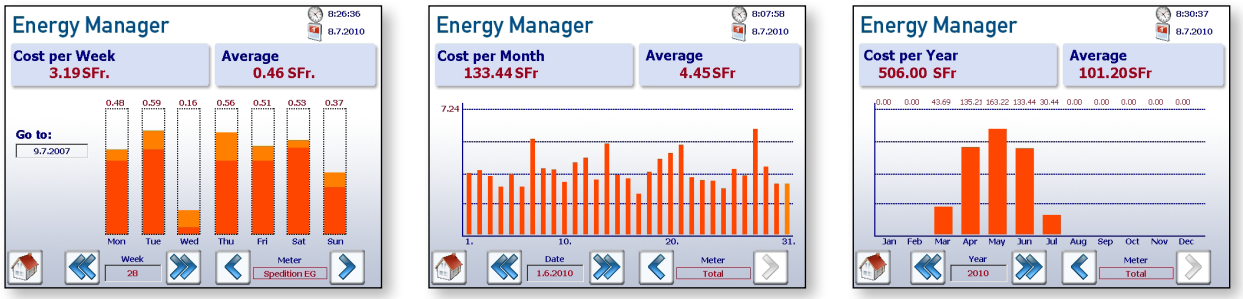


2.4.6 Costs

The costs per week, per month and per year shown in the graph correspond to the power consumption. Tariff 1 and Tariff 2 and any currency such as the euro, the Swiss franc or the US dollar can be input under Setup for each energy meter.

Setup → Energy meter → Tariff





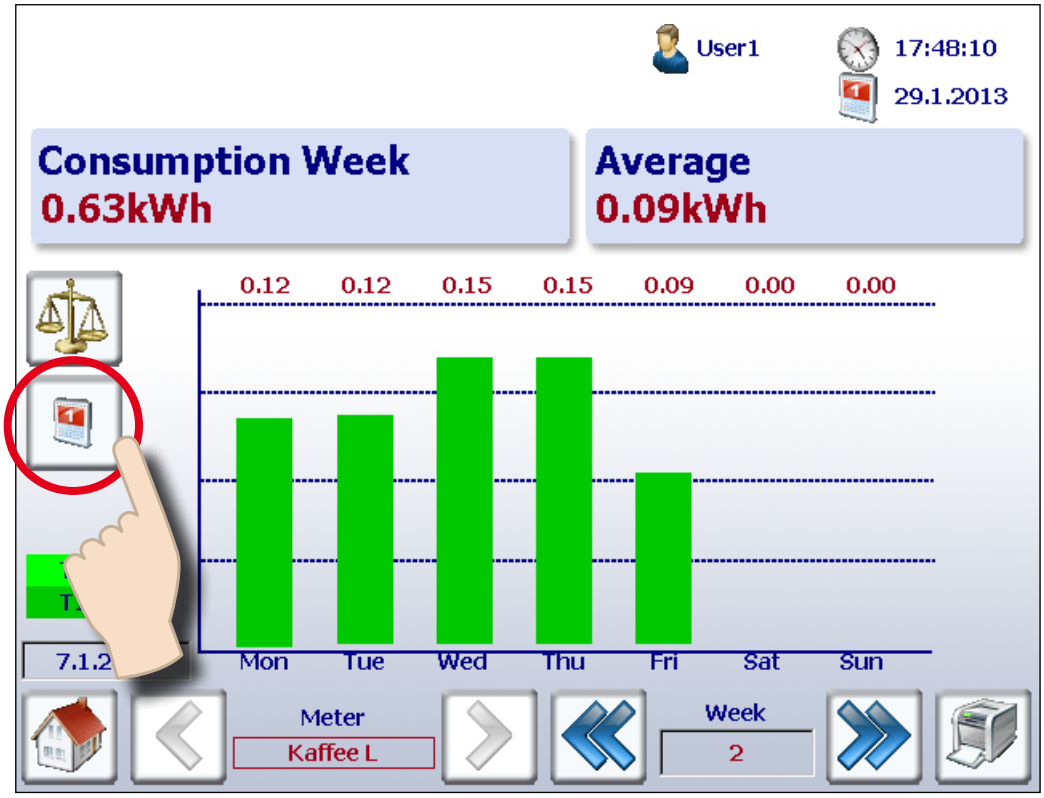
Costs per week | Costs per month | Costs per year

Ø: If this symbol appears, a midnight log was not prepared for the previous night. The energy consumption is averaged.

2.5 Today button

An additional button has been added on the websites for consumption per week, month and year and for costs per week, month and year. Pressing this button immediately switches the screen to the current date (week, month, year).

This function is useful if you want to navigate through time periods and quickly go back to the current date.

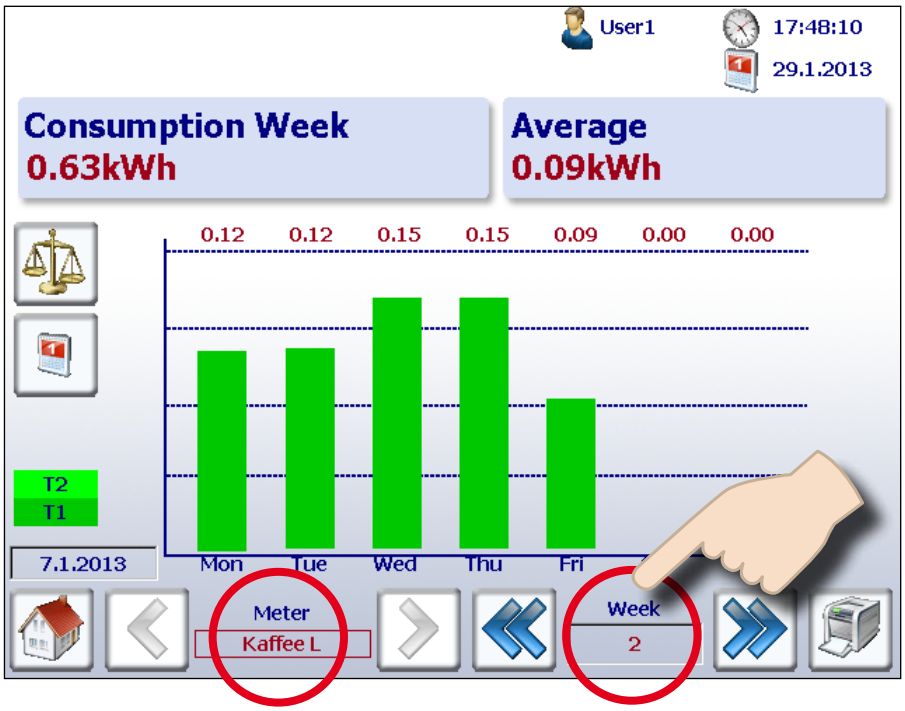


2.6 Comparison between meters and periods

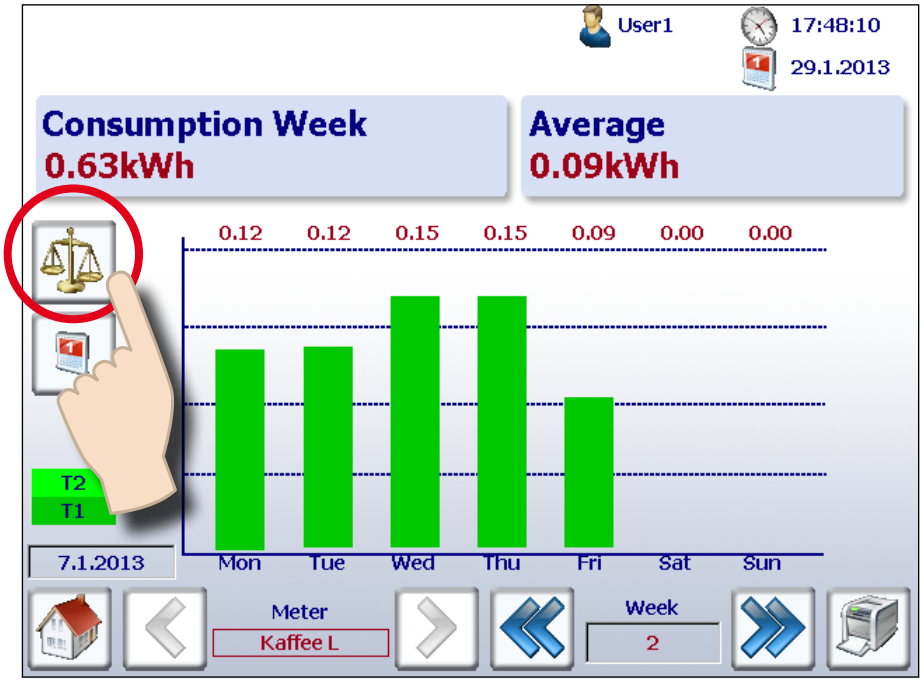
Visual comparisons can be made between meters and periods.

A comparison is made as follows:

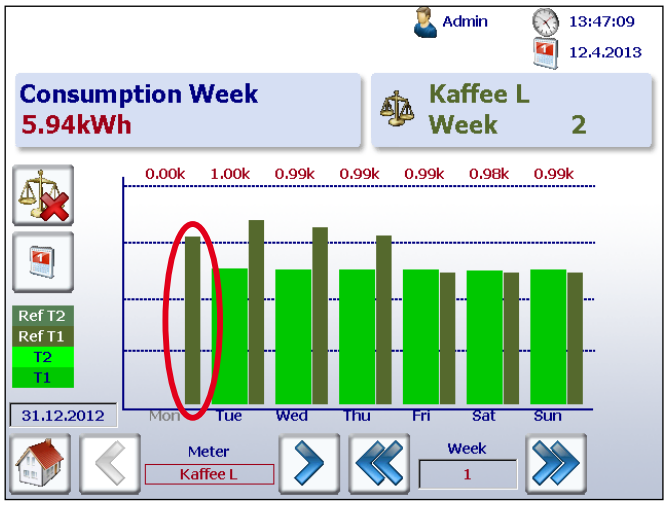
1. Navigate to select reference meters and periods.
   In the following example, the meter “Coffee L” and week “2”.



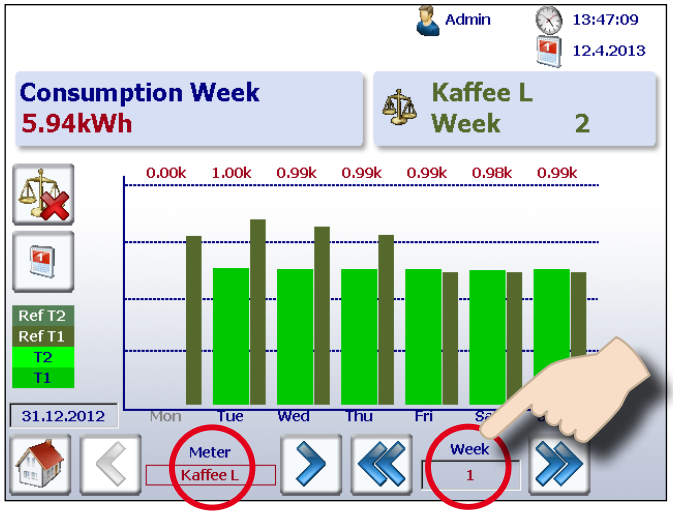
2. Start the comparison by pressing the comparison button.



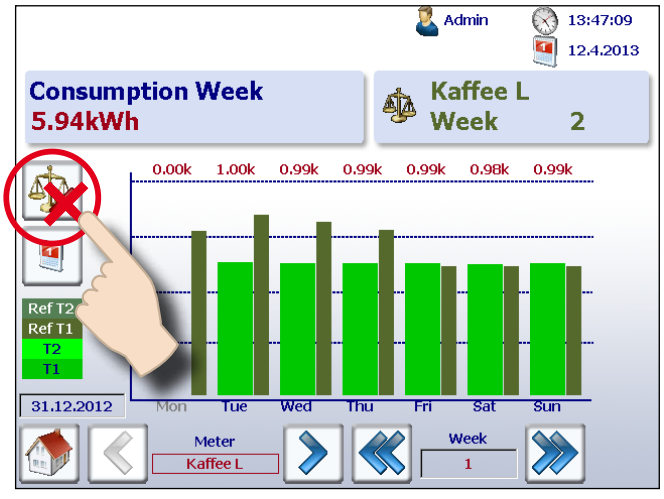
3. The reference bars are shown along with the name of the reference meter and the period at the top right of the screen.



4. You can now compare the reference and another meter or period by navigating as normal.



5. To deactivate the comparison screen, simply press the deactivate button.



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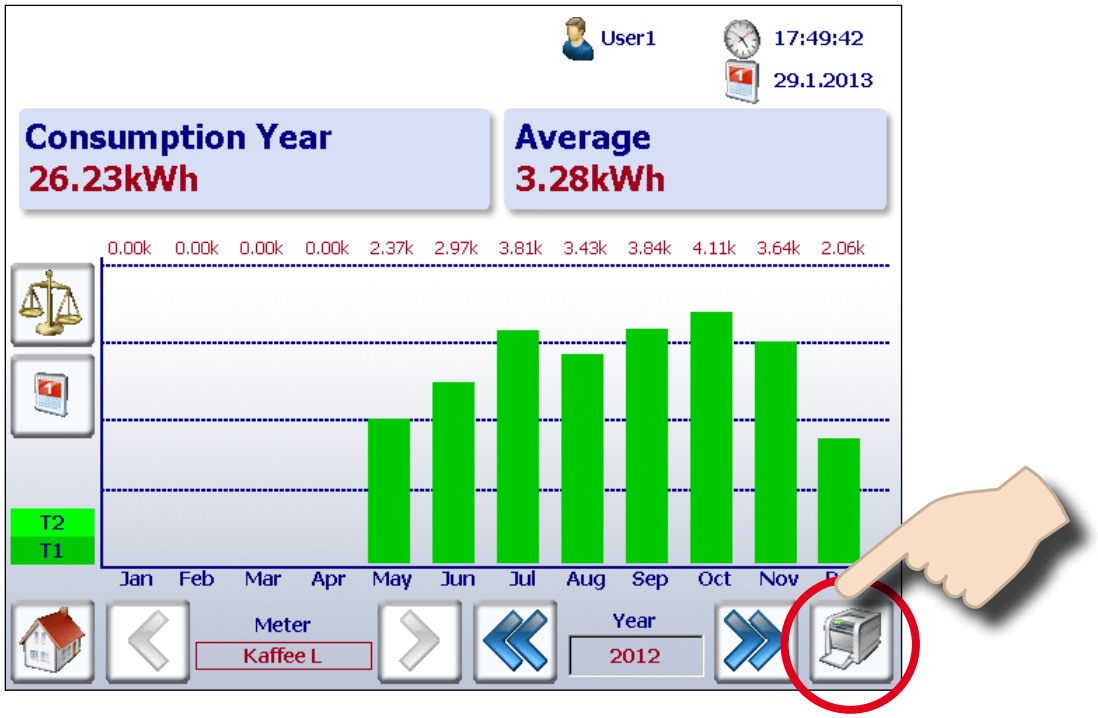
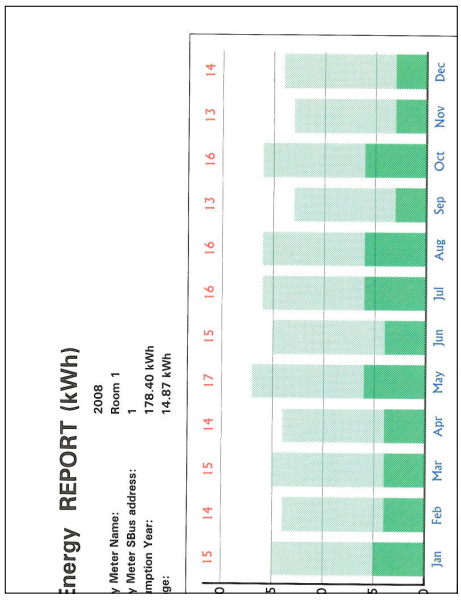
2.7 Printing an S-Energy report

With the Energy Manager, you can print the report on a connected network printer. To print a report, simply press the button on the bar graph screen as shown below.



S-Energy reports that can be printed:

- Consumption per week report
- Consumption per month report
- Consumption per year report
- Costs per week report
- Costs per month report
- Costs per year report



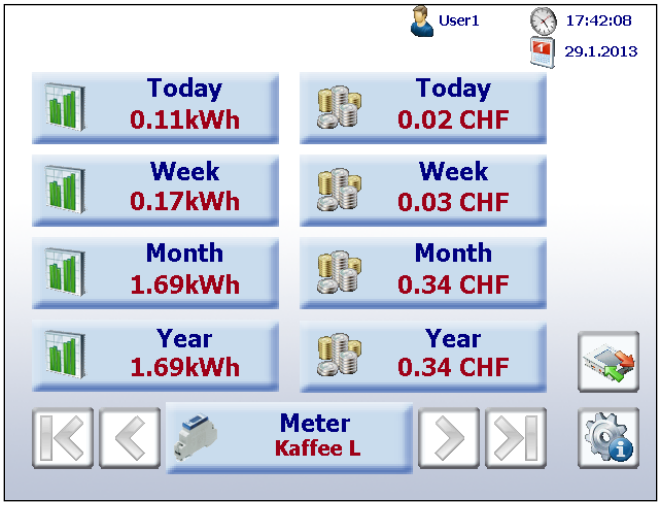
Note:
The printer must be on the same network as the Energy Manager panel.

Note: The Energy Manager does not support printing bidirectional energy meters.

2.8 Displaying bidirectional meters

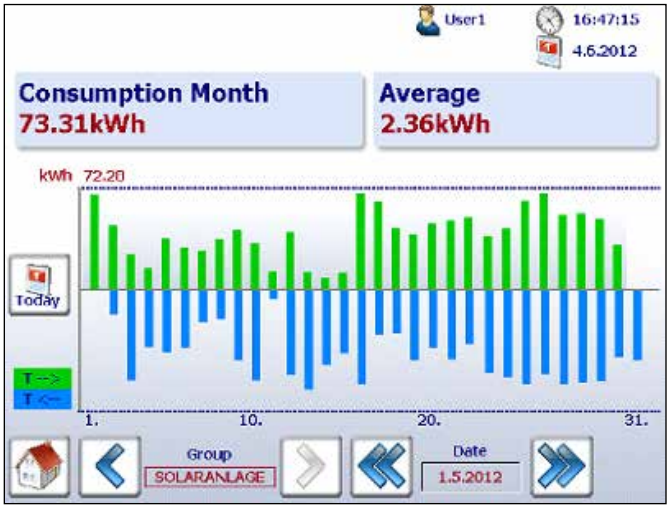
The Energy Manager displays the energy supplied and consumed.

Home overview:



The arrows show how much energy has been consumed and supplied.

Bar view:



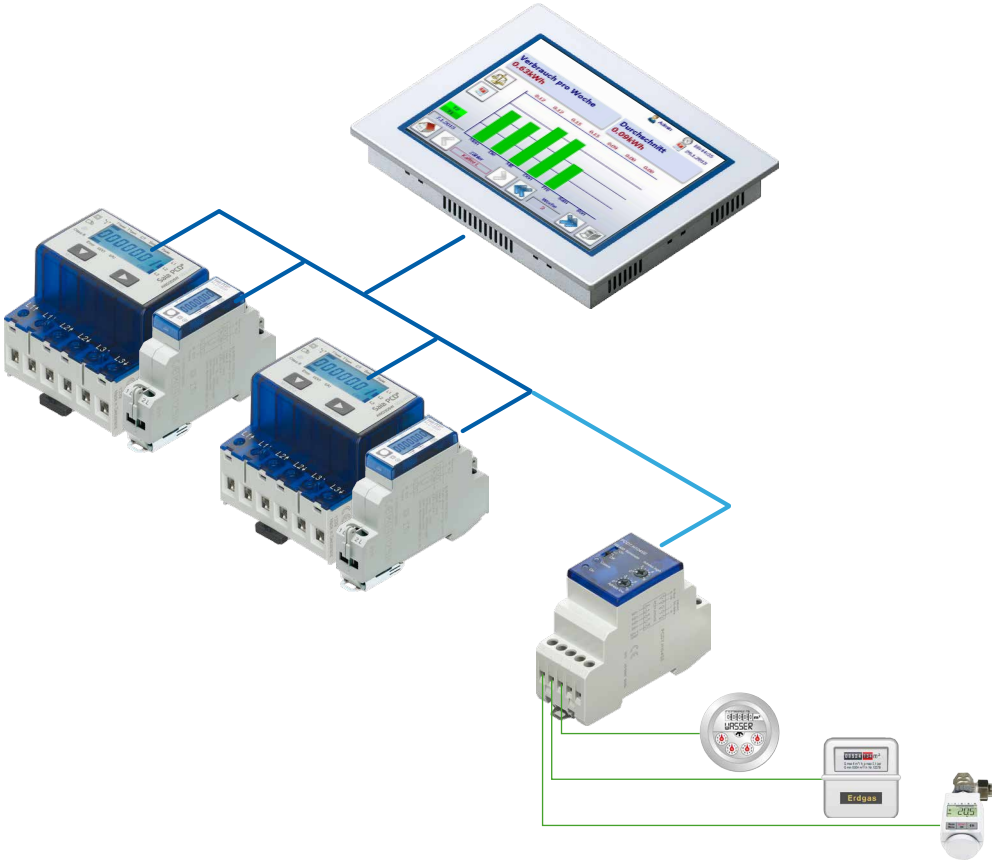
New macro for bar display with dynamic 0 line

Energy direction display:

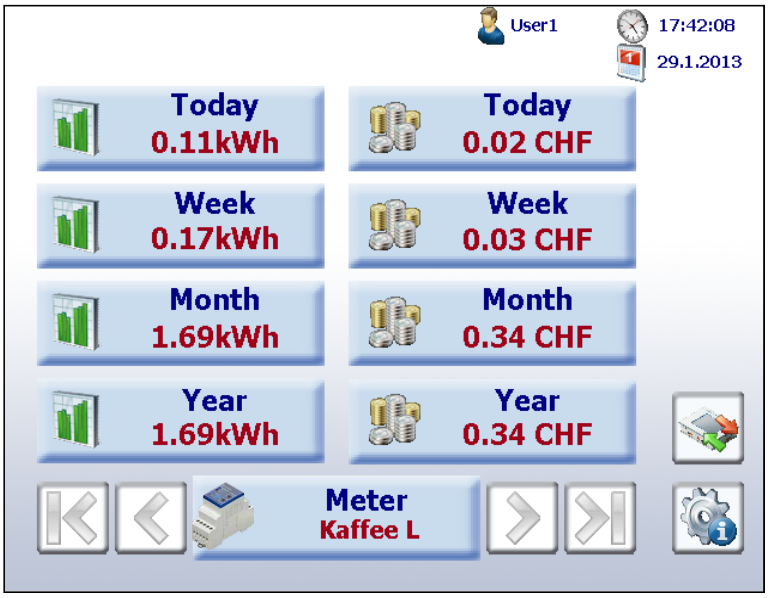
2.9 H104SE display

The Energy Manager automatically creates four virtual meters per PCD7.H104SE module. Each of these four meters is shown on the screen as an individual standard S-Bus meter. The meter values are logged in the CSV file.

Example with S-Bus-address 1
→ Meter 1.0 S01
→ Meter 1.1 S02
→ Meter 1.2 S03
→ Meter 1.3 S04

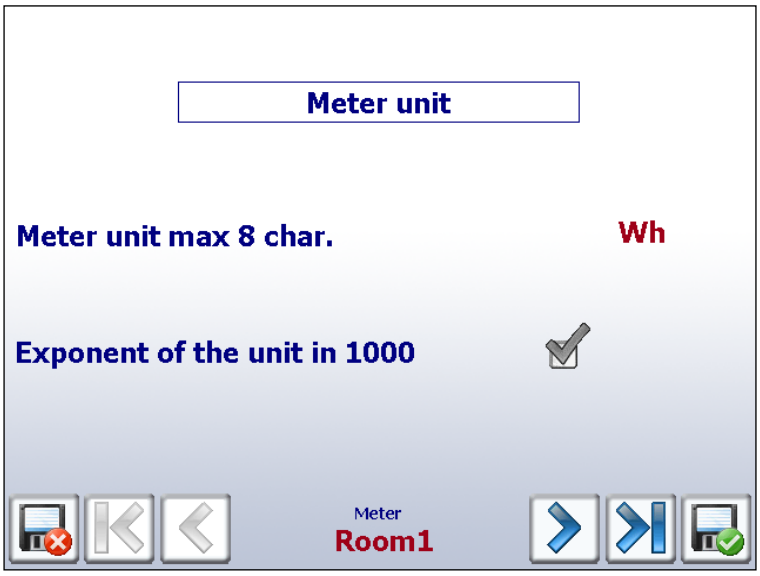


Every S0 meter is displayed with the standard navigation



The visualisation corresponds to the display of the standard S-Bus meter.

The unit and factor can be adjusted under “Setup → Energy meter → Meter unit”.



Example with “Liter” unit for first S0 meter

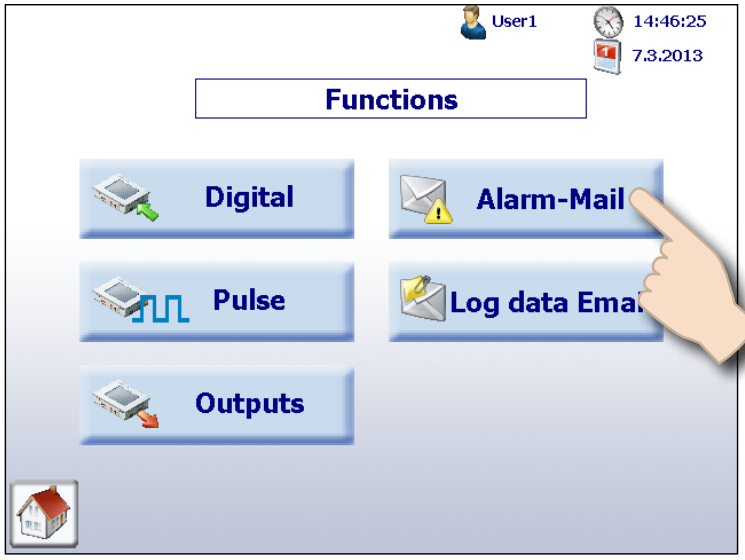
Note: The Energy Manager supports PCD7.H104SE modules, but current PCD7.H104S modules are not supported.

2.10 The “Manager” functions

The Manager would not be a manager if it only collected data but did not interact with the activity. The Energy Manager not only records the consumption and the costs, it also manages the process. An integrated programmable logic controller provides the Manager with the necessary functions.

Using six inputs, features such as expensive consumption peaks can be identified and actively managed. For this purpose, the Energy Manager has three relay outputs that can be used to toggle the respective shutdown signals for the process itself or its control system.

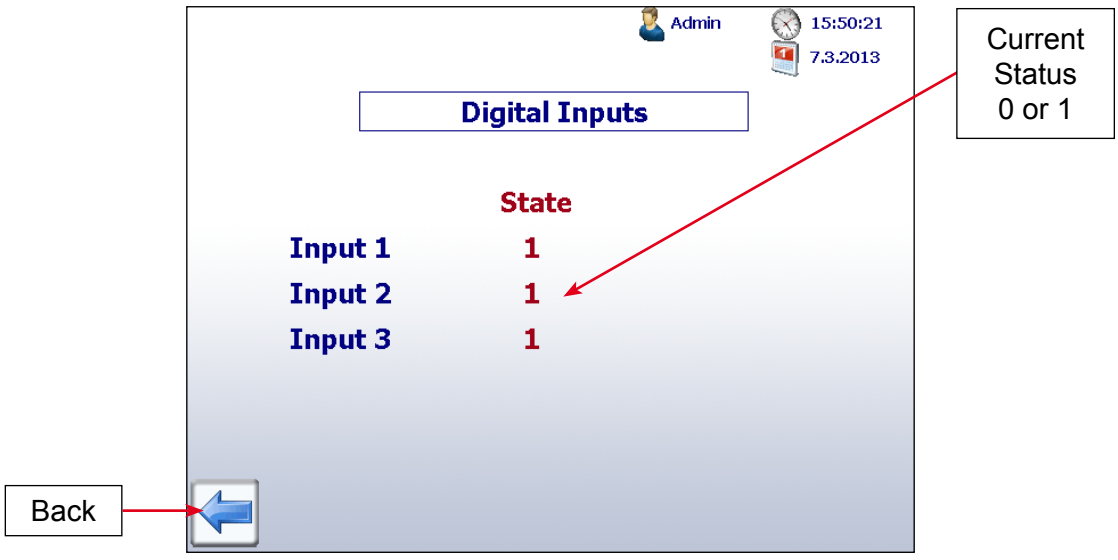
Navigation: Home → Functions



Further information on the programming of new functions can be found in Chapter 15 “Programmable logic controller”

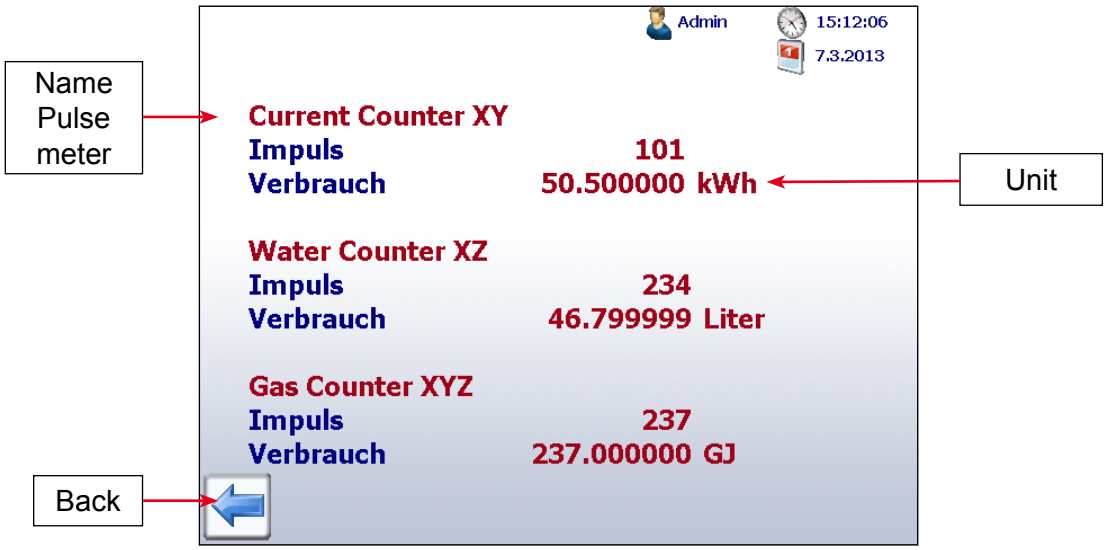
2.10.1 Digital inputs

Navigation: Home → Functions → Digital



2.10.2 Pulse inputs

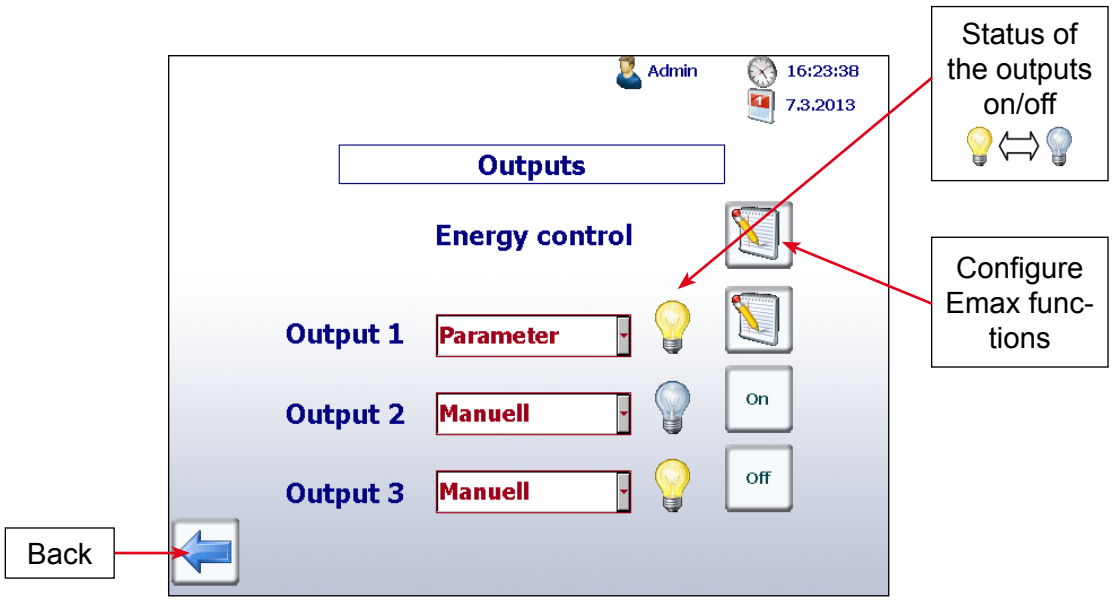
Navigation: Home ➞ Functions ➞ Pulse



2.10.3 Outputs

Navigation: Home ➞ Functions ➞ Outputs

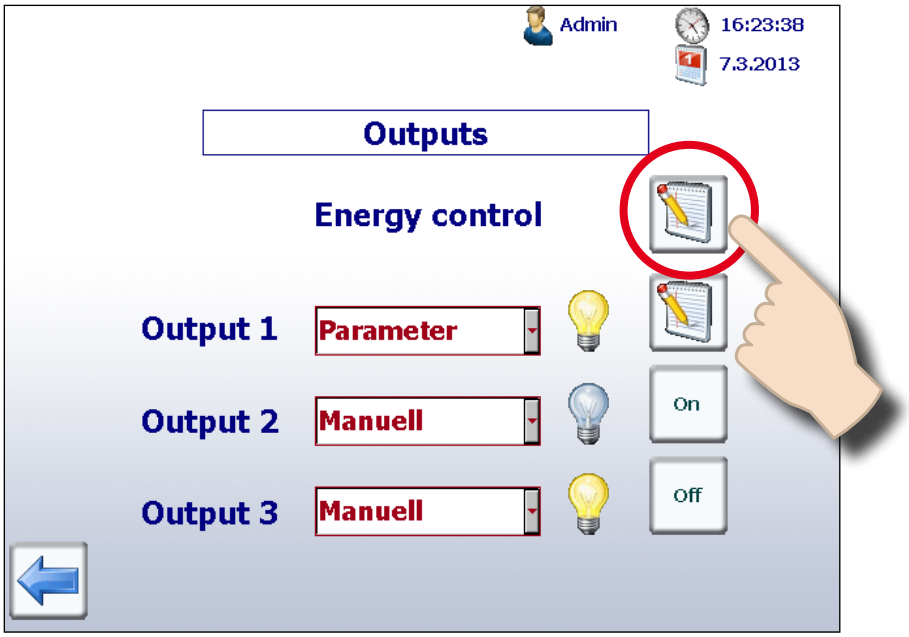
In the standard function, the three connected relay outputs can be tested by pressing the ON/OFF buttons as explained below. The light bulb indicates the output's current status.



Please refer to Chapter 12.8.5 "Outputs" for the output specifications

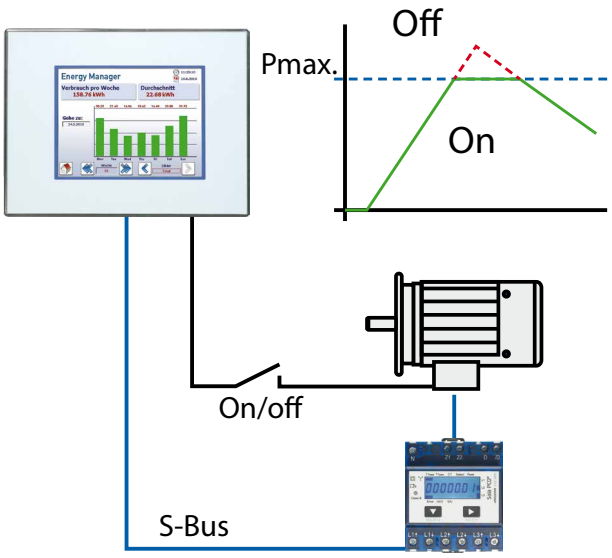
2.11 Energy monitoring with integrated outputs

The outputs integrated into the Energy Manager can be configured via “Home → Functions → Outputs”



2.11.1 The energy control (Emax) is active

With the energy control, you can limit the energy requirements of up to three consumers for a 15-minute period. Each consumer is controlled by a terminal output.



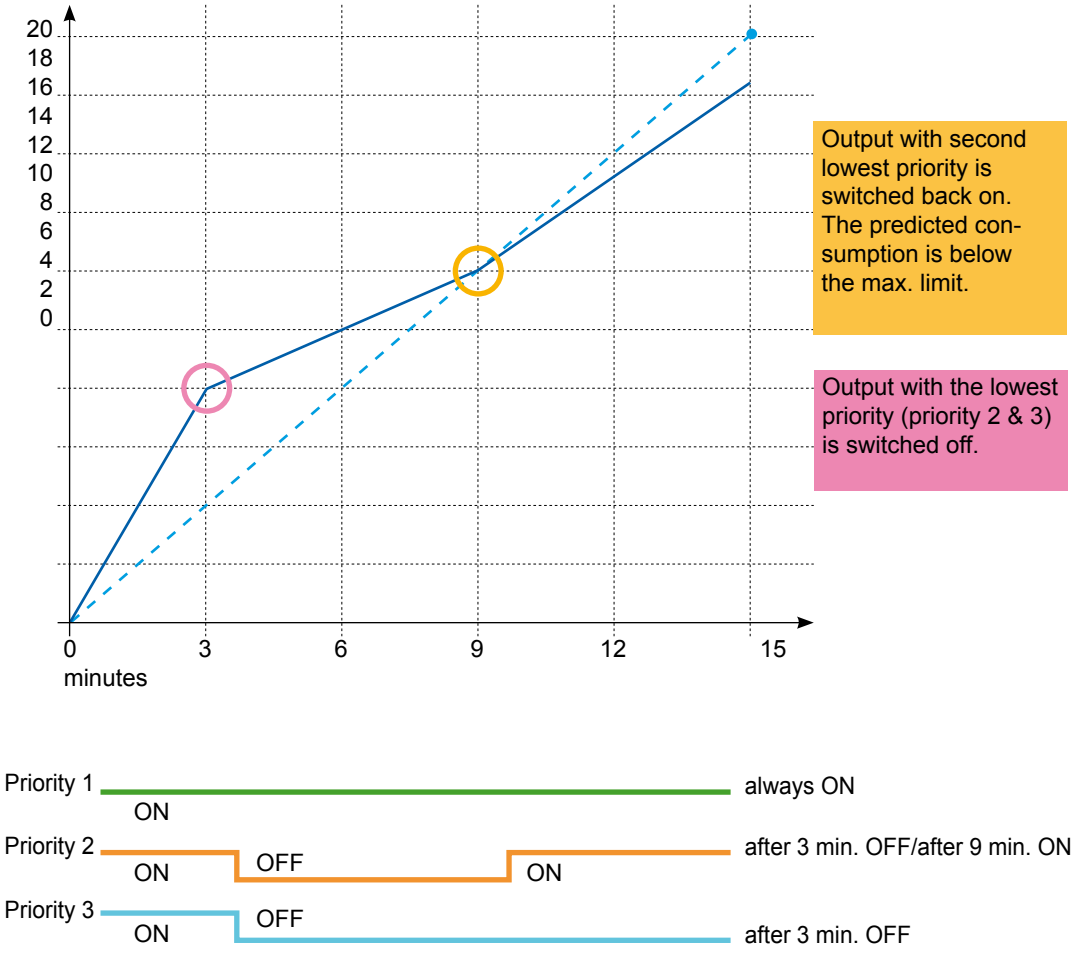
The average output over 15 minutes can be restricted automatically using the load dumping function.

2

How the energy control (Emax) works

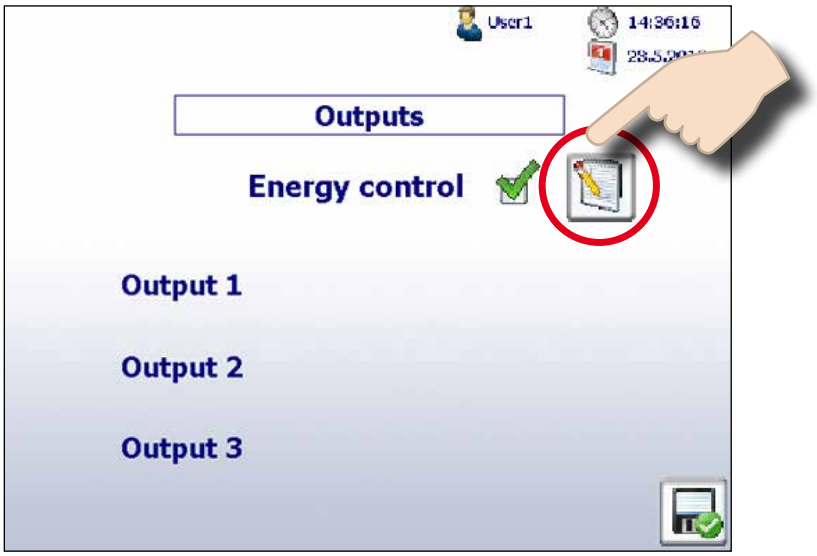
- The energy control uses a 15-minute cycle. The 15 minutes are divided into sample times of 0, 3 ,6 ,9 and 12 minutes
- At sample time 0, the energy consumed is set to 0 internally.
- The current consumption values are read from the assigned meters at the sample times. The consumption at the next sample time is then predicted.
- The terminal relies on the user's information about the power of the consumers connected for this. Any overrun time by the consumer is also taken into account here.
- If the terminal detects that the limit set will be exceeded at the next sample time, the consumer with the lowest priority is switched off. The prediction is now recalculated using the remaining consumers. Additional consumers are switched off where necessary. If spare energy is available, the algorithm can also switch consumers back on again.

Theoretical graphic presentation of the Emax function

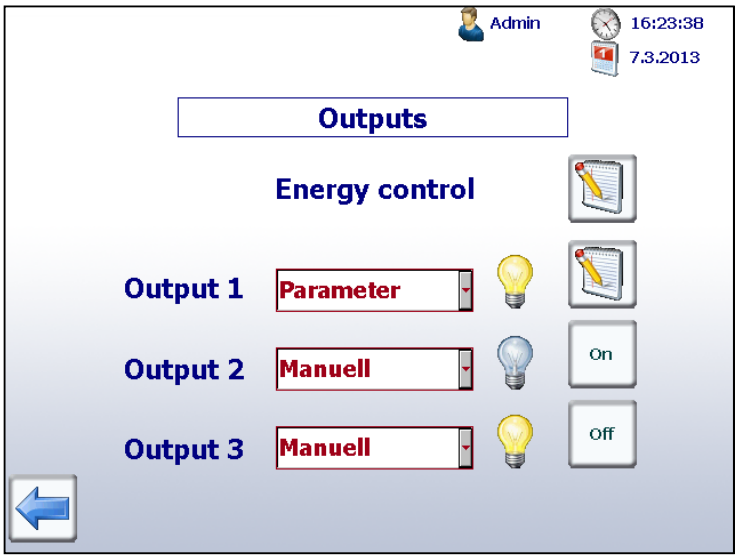


Setting parameters

1. Press the “Edit” button in order to set the parameters.



2. You will now see the screen for defining energy management.



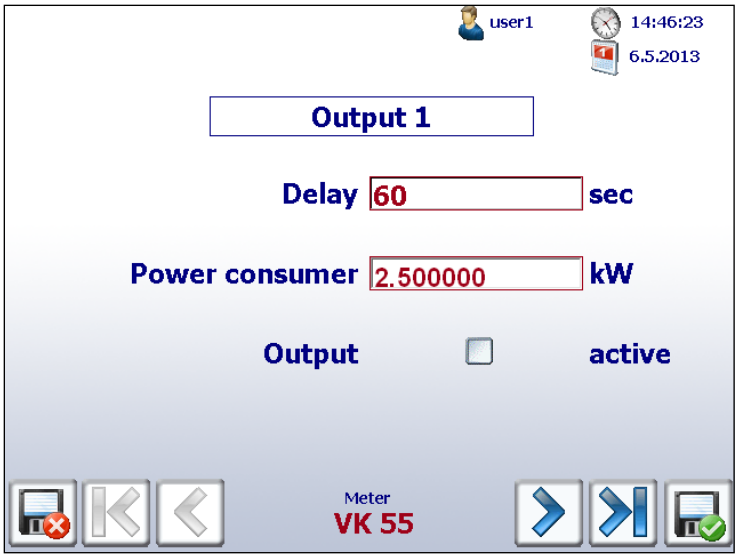
The parameters for each output are displayed in a line. The light bulb indicates the output’s current status. You can set the priority of the output in the drop-down list next to it. You can choose between:

- Priority 1
- Priority 2
- Priority 3

You can use the priorities to determine the order in which the outputs are to be switched off. Priority 1 is the highest. The terminal switches off consumers according to priority, i.e. consumers with the lowest priority are switched off first. Note that it is not possible to assign the same priorities. In this case, the energy control is stopped until the priorities are reset so they are not the same. Next to the priorities field you will see the current power of the consumer. The “Param” button takes you to another parameter screen.

Use the “Energy limit” text field to determine the maximum kWh allowed to be consumed. In the “Energy consumed” output field, the energy control shows you the energy consumed in this cycle.

3. After pressing the “Edit” button for one of the three outputs, the following screen appears:



In the **“Delay”** field, specify the time after which a consumer will no longer consume any energy after the terminal output is switched off by the energy control.

In the **“Power consumer”** field, enter the power of the consumer.

You can select or deselect the output in the **“Output active”** field.
A deselected output is not taken into consideration by the energy control.

The current consumption at the sample time is determined by the terminal using a meter or a group. For this reason, set the desired meter/group in the meter selection bar.

Notes on handling the energy control
The two parameters “Delay” and “Power consumer” are the basis for predicting future energy consumption. If you enter these parameters incorrectly, the energy limits could be exceeded. In this case, check the output parameters first.
Note that the energy control works up to a 15-minute limit. If you change priorities, time, date or other parameters whilst the energy control is active, the internal algorithm will be deactivated until the next 15-minute limit is reached. Since the energy control is not active during these transition periods, the three outputs are deactivated.

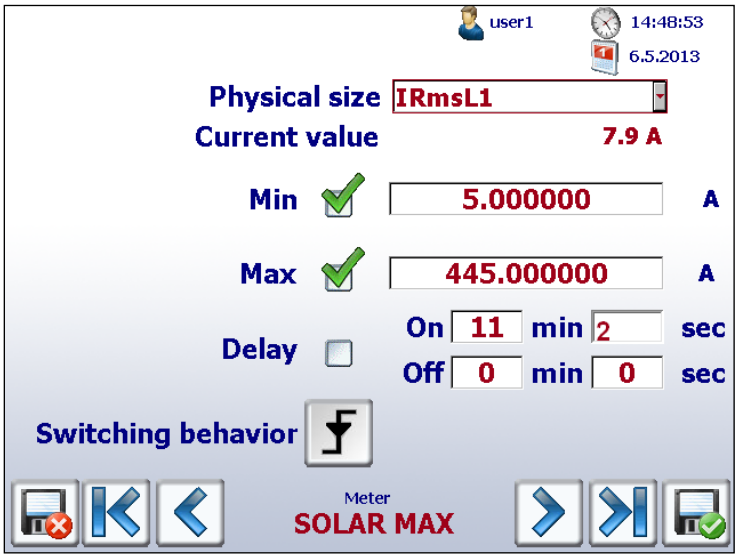
2.11.2 The energy control (Emax) is not active

A drop-down list is assigned to each output. The following can be selected in this list:

- Manual
- Parameter

If **"Manual"** is selected, the button assigned shows "On" or "Off". You can check the relay output by touching the ON/OFF button. The light bulb indicates the output's current status.

If **"Parameter"** is selected, the graphic in the button assigned switches to "PARAM". Press the button to go to the edit screen:



Here you have the option of specifying the meter or the group you wish to monitor.

The selection option in the **"Physical size"** drop-down list changes depending on the meter selected. If this is a single-phase meter, you have the following options:

- IRmsL1
- PrmsI1
- PrmsGes

If this is a three-phase meter or a group, you have the following options:

- IRmsL1
- IRmsL2
- IRmsL3
- PrmsL1
- PrmsL2
- PrmsL3
- PrmsGes

Use these options to select the element you want to monitor. The current value of the element is displayed in the “Current value” field. You can now enter a minimum value and/or a maximum value to be checked by the terminal.

For the **Min** value check, the terminal calculates whether the current value in the selected element is below the defined limit. The assigned output is switched if the condition is met.

For the **Max** value check, the terminal calculates whether the current value in the selected element is above the defined limit. The assigned output is switched if the condition is met.

Min or Max can be individually selected.

Using **“Switching behavior”,** you can determine whether the output is to be switched from 0 to 1 or from 1 to 0 if the condition is met.

You can define a switch on and switch off delay in the **“Delay”** field.
Switch on/off delays can be selected or disabled.

If the switching behavior is defined so that the output is switched from 0 to 1 if the condition is met, the switch on delay for setting the output will apply.

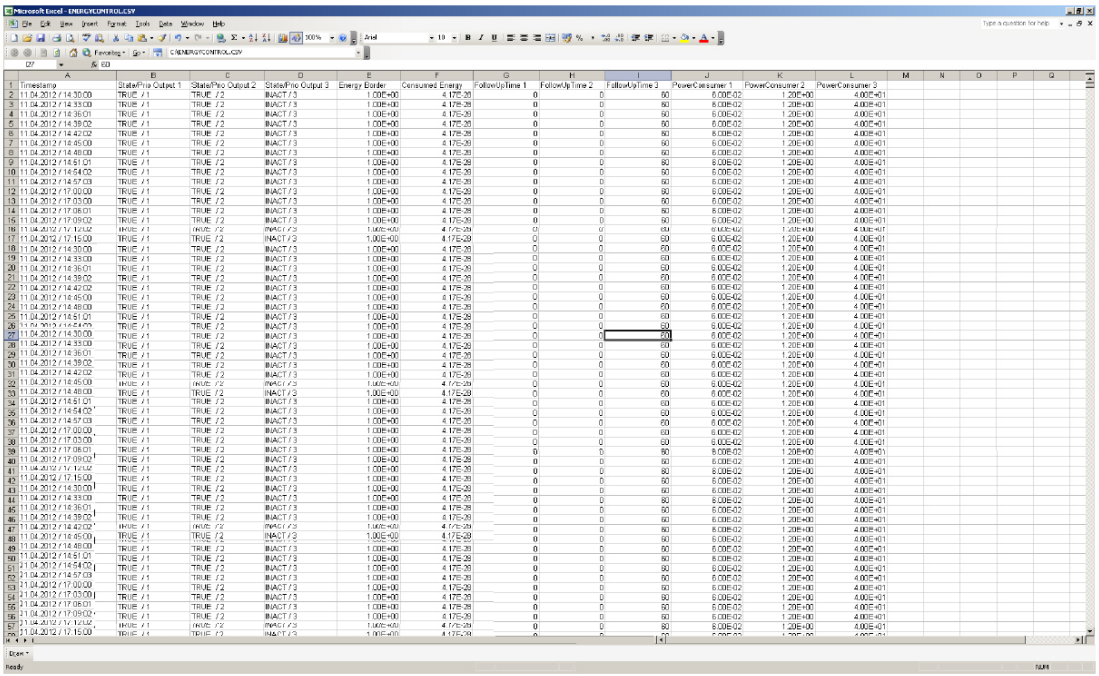
If the switching behaviour is defined so that the output is switched from 1 to 0 if the condition is met, the switch off delay for setting the output will be used.

To summarise, the three panel outputs can be linked to values within the meters and/or groups in this way.

2.11.3 Log data for energy control

The energy calculated and the status of the outputs is automatically saved in the CSV file. 1 file is created per day. The files can be found under the following path: /SLOFLASH/ENERGYLOG. Entries are made in the file every 3 minutes.
The files can be accessed using FTP and imported into Excel.

Example log file (opened in Excel):

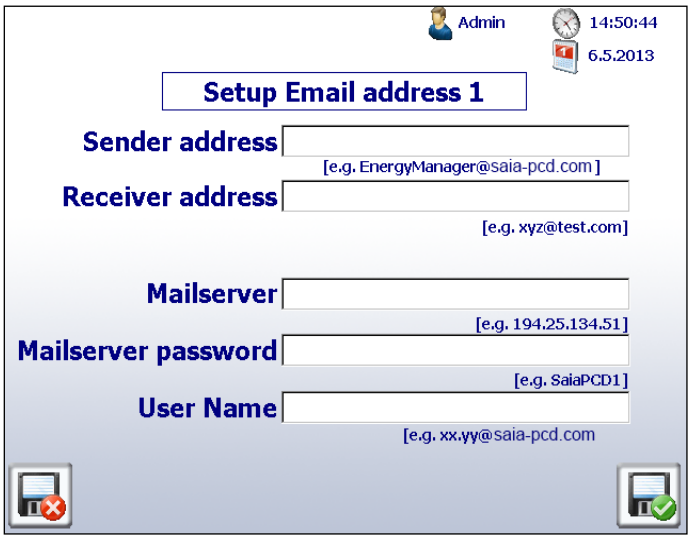


Note: The CSV file of the oldest day is automatically deleted after 1 week (7 days).

2.12 E-mail

2.12.1 Setting the e-mail parameter

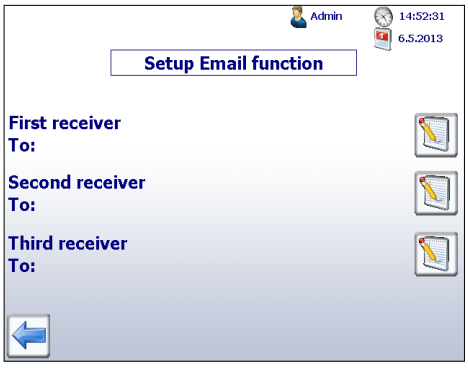
The e-mail parameter needs to be set before sending e-mails.
This is carried out in the following screen:



- Enter your e-mail address under **“Sender address”** (e.g. EnergyManager@saia-pcd.com).
- Enter the e-mail address of the receiver under **“Receiver address”** (e.g. xyz@test.com).
- Enter the name of your mail server under **“Mail server name”** (e.g. pop.1und1.de). Please note that this name will not be used to determine the IP address. You must enter the correct server IP address in the **“Mail server”** field.
- The server’s IP address is entered under **“Mail server”.** The server should have a static address. You can determine the address, e.g. by using “ping pop.1und1.de”.
- Enter the password that your provider has assigned to you under **“Mail server password”**.
- Enter the user name assigned to you under **“User name”**.

A total of three copies of this screen are available to you.
This allows you to send e-mails to three different receivers.

Access the three screens via Setup E-mail settings

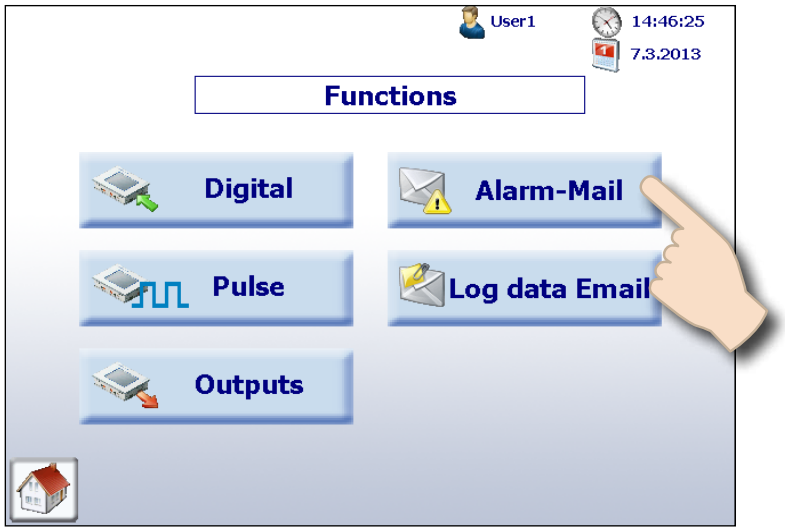


2.12.2 Alarm e-mail

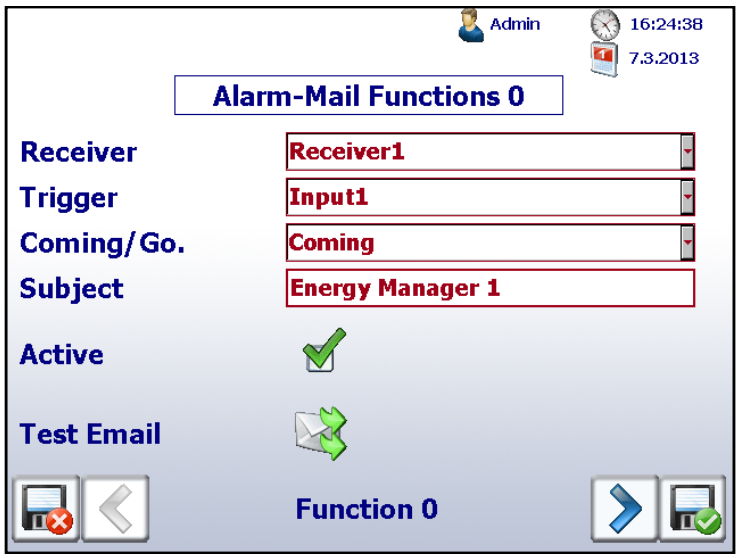
The alarm e-mail functionality provides the option of sending alarm e-mails if the status of inputs, outputs and meter values change.

Example:

For a definition of alarm e-mails, go to Home Functions → Alarm e-mail



The following screen appears:



Settings:

- In the **"Receiver"** line, enter the e-mail receiver to which the alarm e-mail is to be sent. You can define the receivers in the "E-mail parameters" screen.
- In line 2 **"Trigger"**, define what is to trigger the alarm e-mail.
  The following triggers can be selected:
  1. Input 1 to Input 6
  2. Output 1 to Output 3
  3. MinMax
- In line 3 **"Coming/Go."**, define which events are to lead to an alarm e-mail.
  You can choose between the following:
  - Coming
  - Going
  - Coming/Going
- If you select **Coming** and **Output 1**, the alarm e-mail is sent if the output switches from 0 to 1.
- If you select **Going** and **Input 2**, the alarm e-mail is sent if the input switches from 1 to 0.
- If you select **"Coming/Going"**, you will receive an e-mail every time an edge changes.
- In line 4 **"Alarm text"**, enter the text which you want to see in the subject line of your alarm e-mail.
- In line 5 **"Active"**, you can activate or deactivate the alarm e-mail.
- In line 6 **"Test e-mail"** you can send a test e-mail without the defined event having occurred. You will then receive an e-mail. This tests the fundamental correctness of your planning.

You therefore have the option of specifying the meter or the group you wish to monitor. The selection option in the **"Physical size"** drop-down list changes depending on the meter selected. If this is a single-phase meter, you have the following options:

- IRmsL1
- PrmsL1
- PrmsGes

If this is a three-phase meter or a group, you have the following options:

- IRmsL1
- IRmsL2
- IRmsL3
- PrmsL1
- PrmsL2
- PrmsL3
- PrmsGes

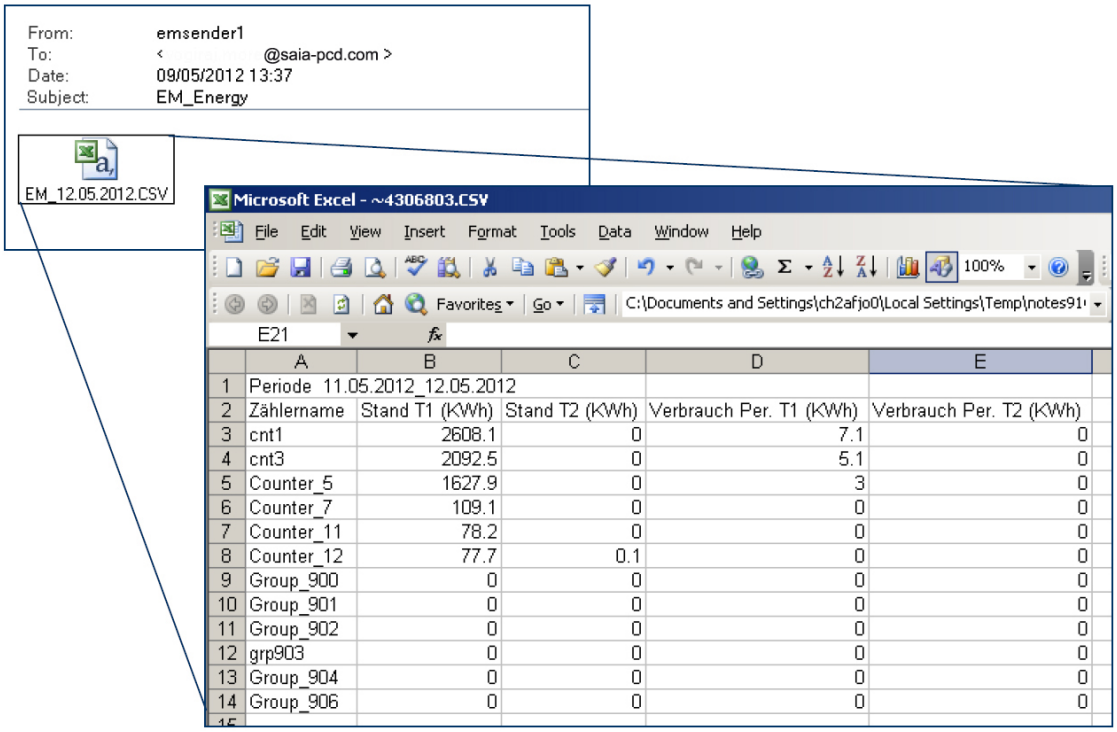
For the **Min** value check, the terminal calculates whether the current value in the selected element (meter, group) is below the defined limit. You receive an e-mail if this is the case.

For the **Max** value (meter, group) check, the terminal calculates whether the current value in the selected element is above the defined limit. You receive an e-mail if this is the case.

2.12.3 Data e-mail

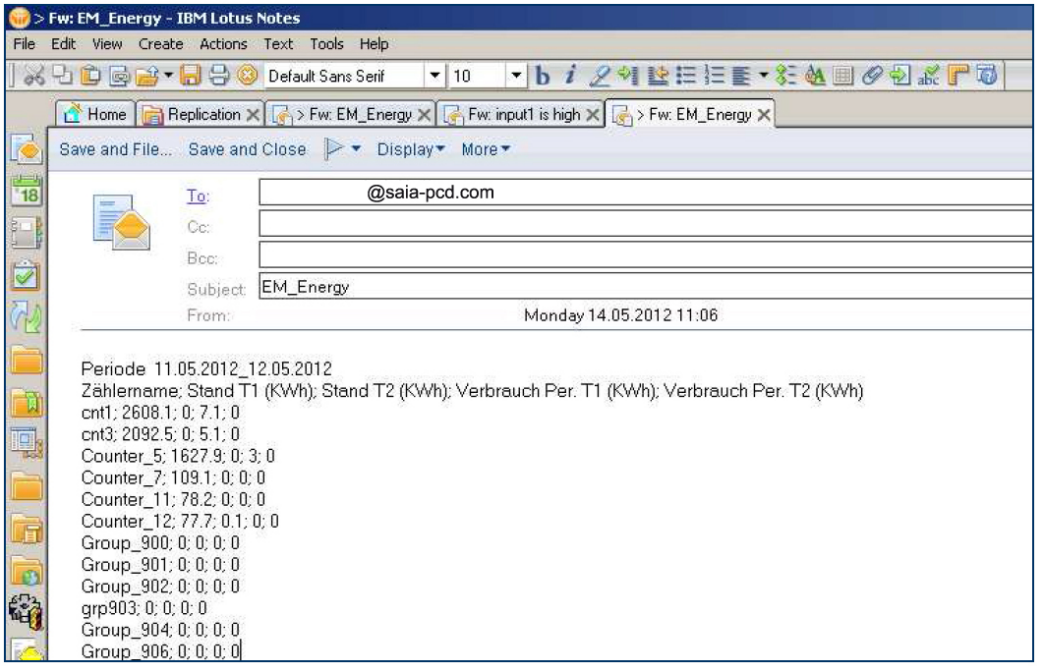
With the “Data e-mail” function you can periodically send meter statuses via e-mail.

Data as an attachment:

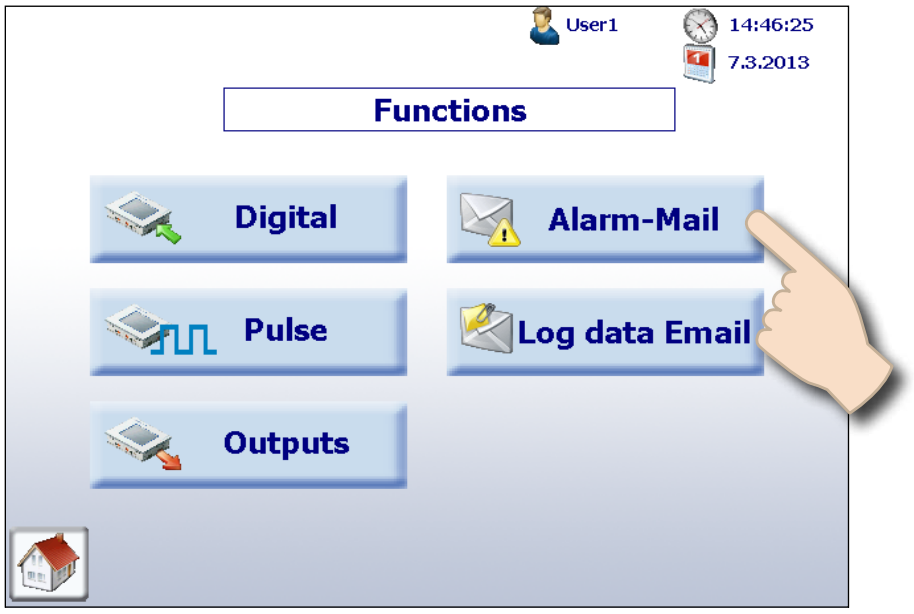


	A	B	C	D	E
1	Periode 11.05.2012_12.05.2012				
2	Zählername	Stand T1 (KWh)	Stand T2 (KWh)	Verbrauch Per. T1 (KWh)	Verbrauch Per. T2 (KWh)
3	cnt1	2608.1	0	7.1	0
4	cnt3	2092.5	0	5.1	0
5	Counter_5	1627.9	0	3	0
6	Counter_7	109.1	0	0	0
7	Counter_11	78.2	0	0	0
8	Counter_12	77.7	0.1	0	0
9	Group_900	0	0	0	0
10	Group_901	0	0	0	0
11	Group_902	0	0	0	0
12	grp903	0	0	0	0
13	Group_904	0	0	0	0
14	Group_906	0	0	0	0

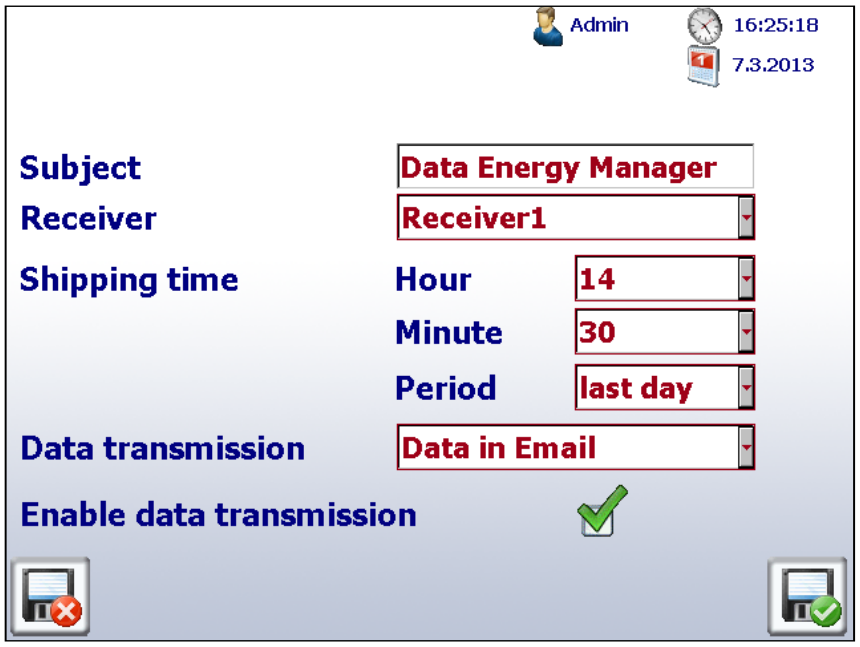
Data directly in the e-mail:



You can access the screen for planning the data e-mail via
“Home → Functions → Log data e-mail”



You will see the following screen:



Settings:

- In **"Subject"** field, enter the text which you want to have in the subject line of your alarm e-mail.
- In **"Receiver"** field, select the receiver to whom the e-mail is to be sent. You can define the receiver(s) in the planning e-mail parameter.

Using the send time, define the time of day at which the data e-mail is to be sent as well as the time period in which a data e-mail is to be sent.
In the "Period" drop-down list you can select from the following:

- last day
- last week
- last month

- In the **"Hour"** drop-down list you can select from 0 to 23 hours.
- In the **"Minute"** drop-down list you can select from 0 to 30 minutes.

In the **"Data transmission"** check box you can choose whether the meter data is to be sent in the e-mail itself or as a CSV file. If you opt to send the meter data as a CSV file attachment, you can read the data, such as by using Excel. Use the import function in Excel to do this. Use a semi-colon as the separator in the import function; do not select blank spaces as the separator.
Data transmission can be activated or deactivated using the checkbox.
Depending on the period set, the following will be performed:

- daily

Data is sent every time the day changes. In this case, when the send time is reached, the day's meter status for tariff 1 and tariff 2 and the day's consumption for tariff 1 and tariff 2 is sent. This is carried out for all active meters and groups.

- weekly

Data is sent every Monday. In this case, when the send time is reached, the week's meter status for tariff 1 and tariff 2 and the week's consumption for tariff 1 and tariff 2 is sent. This is carried out for all active meters and groups.

- monthly

Data is sent on the first day of every month. In this case, when the send time is reached, the month's meter status for tariff 1 and tariff 2 and the month's consumption for tariff 1 and tariff 2 is sent. This is carried out for all **active** meters and groups.

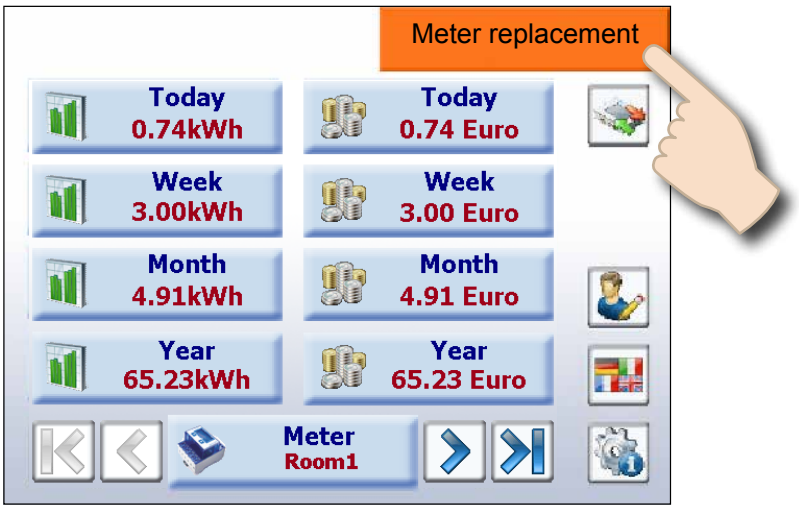
2.13 Replacing Saia PCD® energy meters

The Energy Manager automatically detects that a meter has been replaced if one of the following conditions is met on the same S-Bus address:

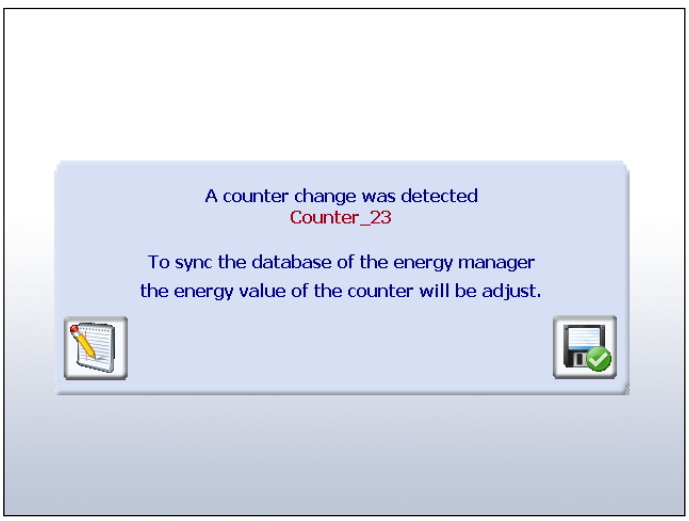
- ASN of the new energy meter is not the same as the old one (e.g. a different type of bidirectional meter or PCD7.H104SE module)
- Serial number is not the same
- Meter value is not plausible (new value is lower than the value of the exchanged meter)

Process for replacing a meter

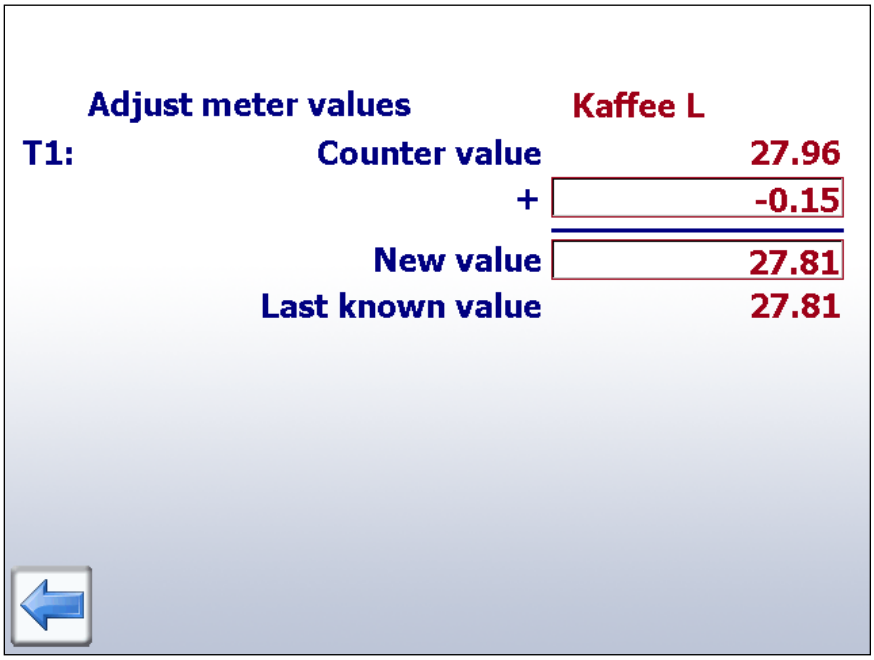
1. The Energy Manager continually saves the last known value of an energy meter during operation.
2. An energy meter is replaced and the new meter is configured to the same S-Bus address.
3. The Energy Manager detects the meter has been replaced and reports this on the user interface with a warning.



4. If the user presses the orange warning message, he is automatically taken to the Setup screen, where he can then have the Energy Manager automatically adjust the new value or change it manually.



5. The new meter value can be specified on the following website.
Navigation: Setup → Energy meters → Meter comparison



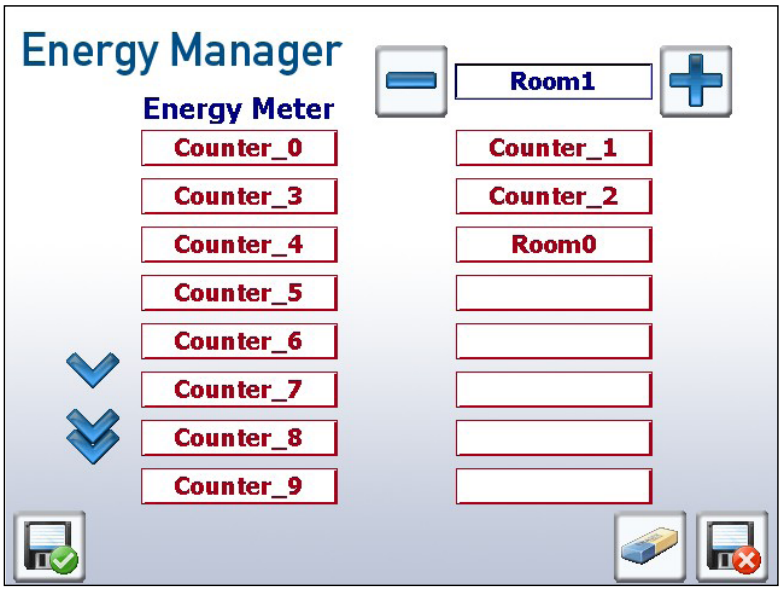
Replacing PCD7.H104SE with an energy meter:
The Energy Manager automatically creates a new log file (CSV file) when a PCD7.H104SE is replaced with an energy meter. However, the old files are not deleted.

Replacing PCD7.H104SE with PCD7.H104SE:
The same as for standard energy meters, but up to 4 values can be set (one for each S0 meter). This also applies, logically, to bidirectional meters. These can be replaced with any bidirectional meters, but information will subsequently be lost.

2.14 Calculating in a group

This can be used mainly to calculate the energy supplied and consumed with bidirectional energy meters as well as to display “Net energy”.

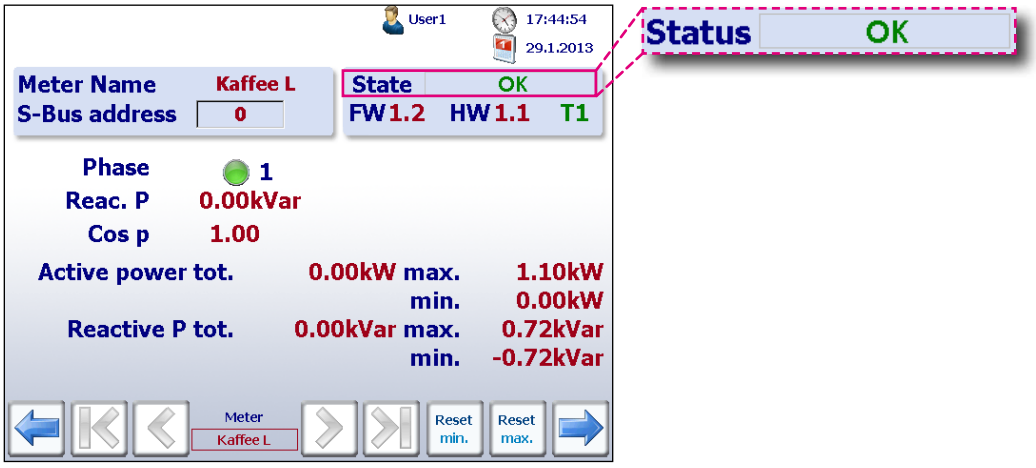
Navigation: Setup → Energy meters → Groups



In the example, the “Total” group corresponds to the energy from ALE3 – AWD3 + ALD1

A plausibility check for the unit is not carried out when grouping.
The Energy Manager does not therefore provide notification of whether, for example, the user is billing electrical energy using heat energy.

Note: A group is only displayed if each of the configured meters in it is configured (OK status).

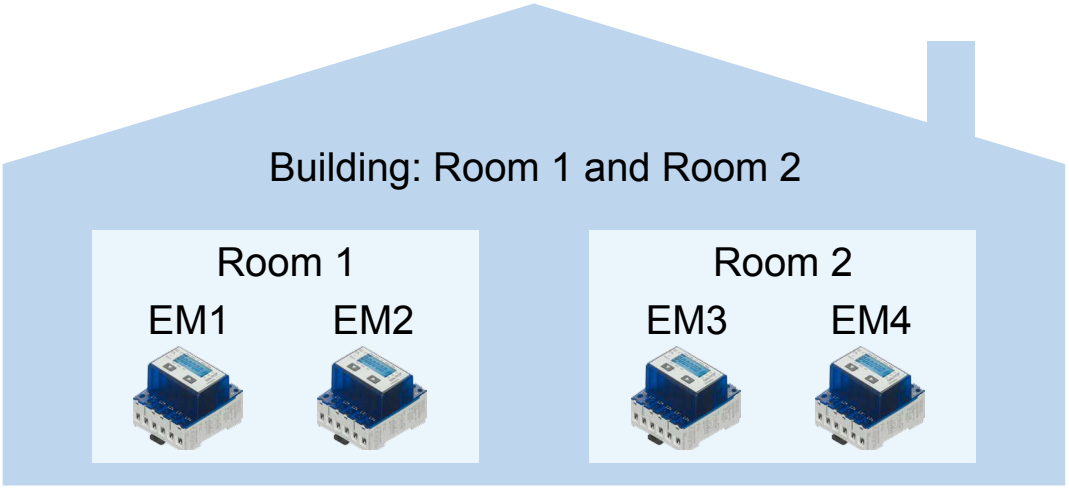


The Energy Manager designed for 64 subscribers makes it possible to group the energy meters. Up to 32 independent groups can be created. To add a meter, simply click on it in the configuration screen; this adds the selected energy meter to the group. To remove the meter from the group, simply click on it in the group. A group can also contain a group.

Values displayed for each group:

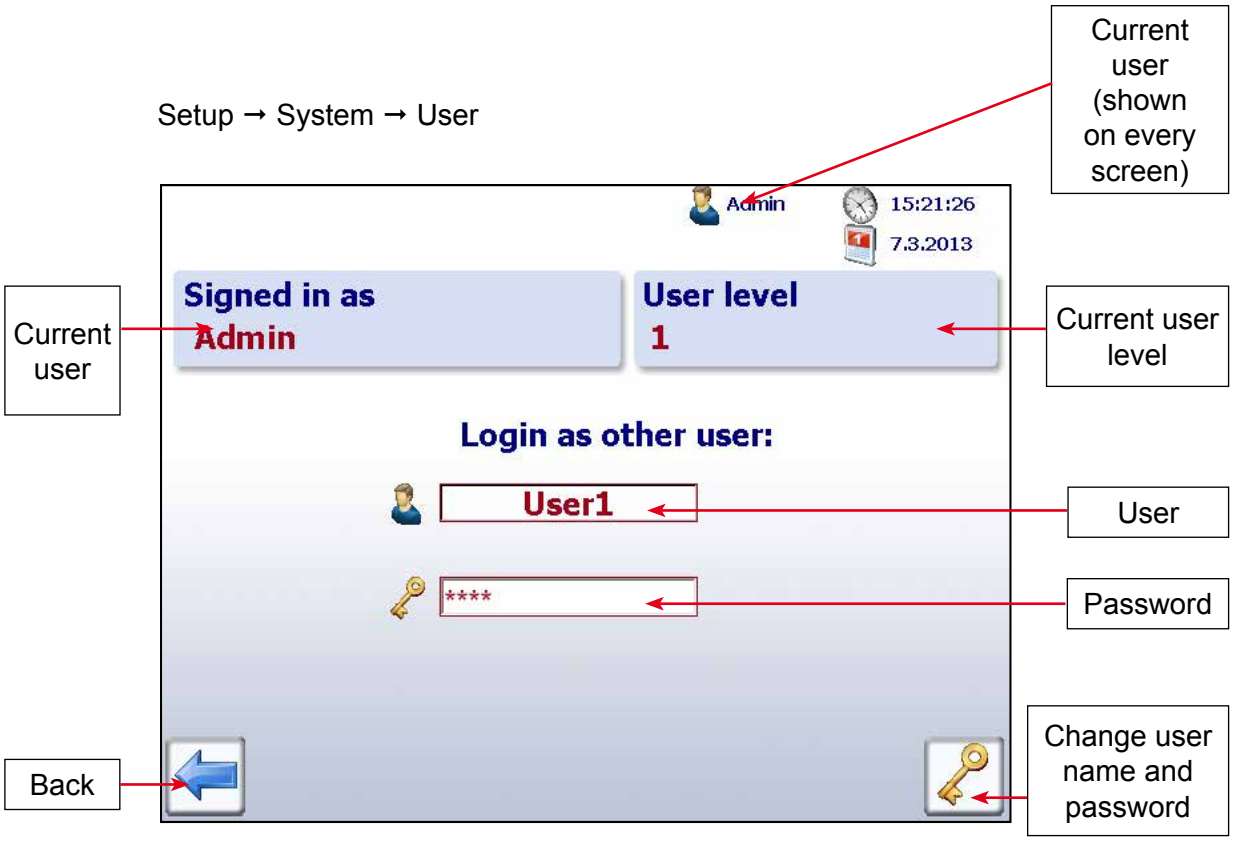
- Current phases 1, 2 and 3
- PMRS phases 1, 2 and 3
- QRMS phases 1, 2 and 3
- T1/T2 partial
- PRMS total
- QRMS total
- T1/T2 total

Example:



Room 1 group = Energy meter 1 + Energy meter 2
Room 2 group = Energy meter 3 + Energy meter 4
Group formation = Room 1 group + Room 2 group
Building = Room 1 group + Room 2 group = EM1 + EM2 + EM3 + EM4

2.15 User administration



The Energy Manager is based on 2 user levels. As a standard user, you only have read-only access with the exception of the ability to set the language and to change your own password and user name. When logged in as a level 1 user (administrator), your privileges are unrestricted, and you can configure and change all settings under Setup.

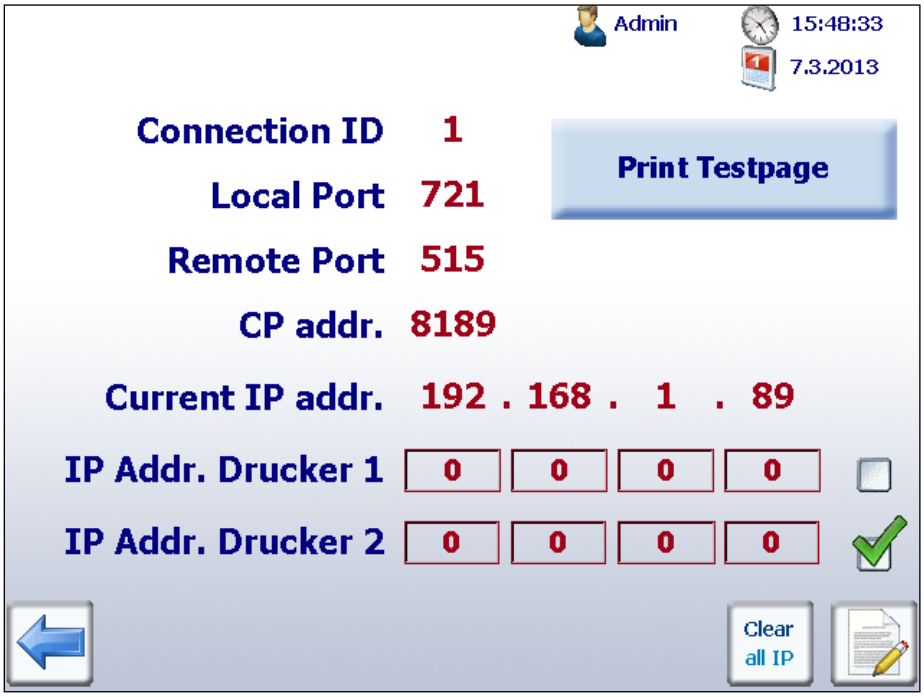
User level	Default name	Default password
1	Admin	saia
2	User1	saia

2.16 Configuring the printer

By default, the printer is set up with a fixed address.

Connection ID:	1
Local port:	721
Remote port:	515
CP address:	8189
IP address:	192.168.1.89

The user can define two additional connections for which each only requires one IP address. Make sure the printer's IP address cannot change during operation (manual setting) and goes together with the Energy Manager's subnet mask and IP address.



The "Set" button confirms the new Printer 1 configuration as Connection ID 2 and saves the configuration to the settings file. Since connections can only be assigned once, it will not be possible to edit the IP address for the newly defined connection. The same applies to the second printer's IP address.
It is possible to switch repeatedly between the two printer IP addresses 1 and 2. The user can therefore configure and switch between two printers.
The settings are saved to the settings file and loaded again when the PLC reboots, in which case the last used connection is initialised again.
The "Clear all IP" button deletes the IP addresses, which in turn deletes the existing connections, and makes it possible to edit them. A reboot must be carried out to be able to define the new connections.
"Print test page" prints a test page on which the printer settings and language are shown. Status messages are shown below the button during printing.

2.16.1 Printers

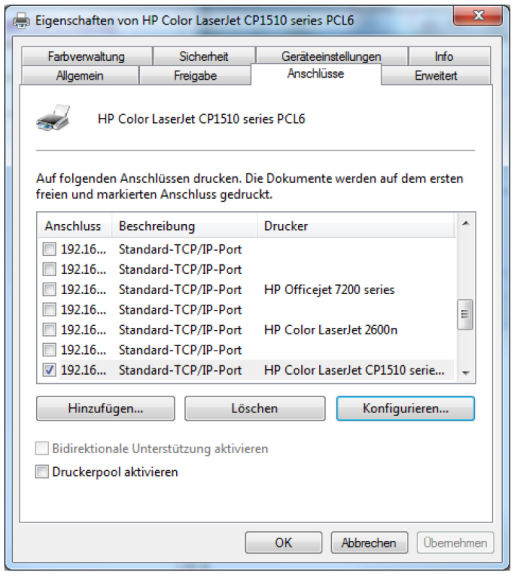
The printouts are in HPGL. The bar graphs also appear in colour.
The printer must also be network capable (Ethernet) and support the printer language PCL 5c or PCL 6.
The LPD/LPR protocol is used to print via the standard port 515.
This range also includes affordable colour laser printers such as the HP Color LaserJet CP1515n.

The following printers have been tested:

HP Color Laserjet CP1515n	OK
HP Laserjet 5200tn	OK
HP Laserjet P 3005dn	OK
HP Color Laserjet 2600n	LPR does not work /NOK
HP OfficeJet 7210	LPR does not work /NOK

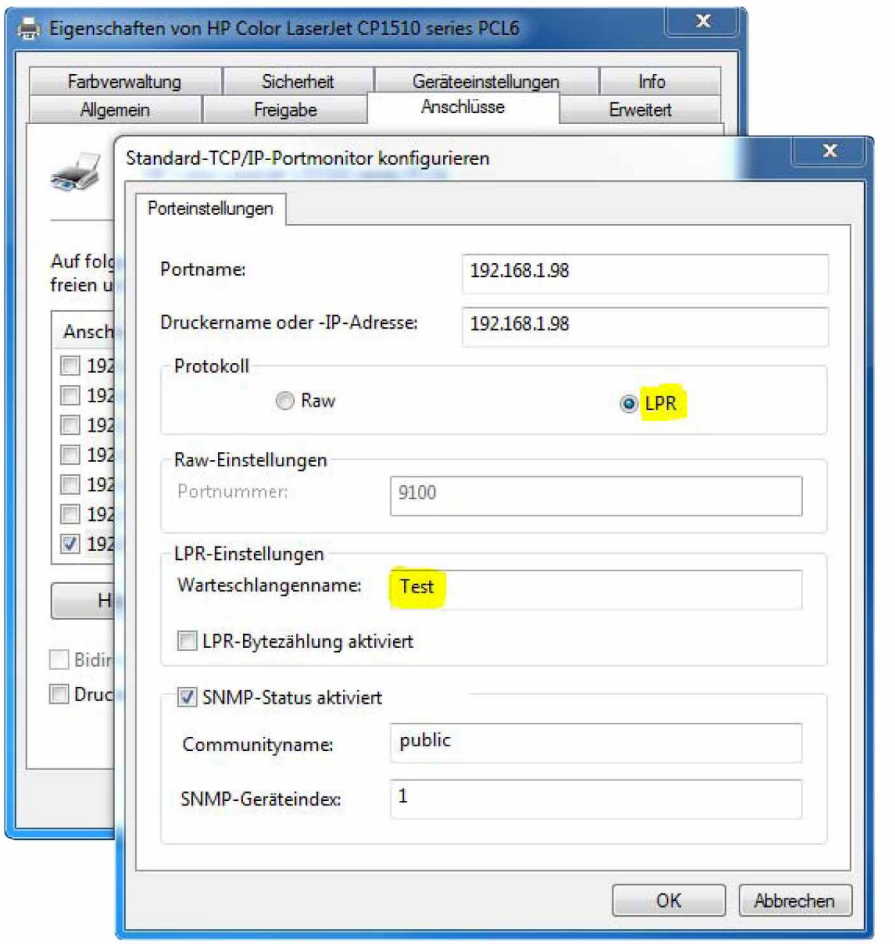
2.16.2 LPD/LPR test

The standard dialogue under Windows can be used to test whether the printer supports the LPD/LPR protocol. To check, open the printer settings for your printer.



The active connection's configuration can be changed under the "Connections" tab.
NB: The dialogue box is a standard Windows dialogue, so the ability to change the setting in the dialogue box does not necessarily mean that the LPR protocol is supported.

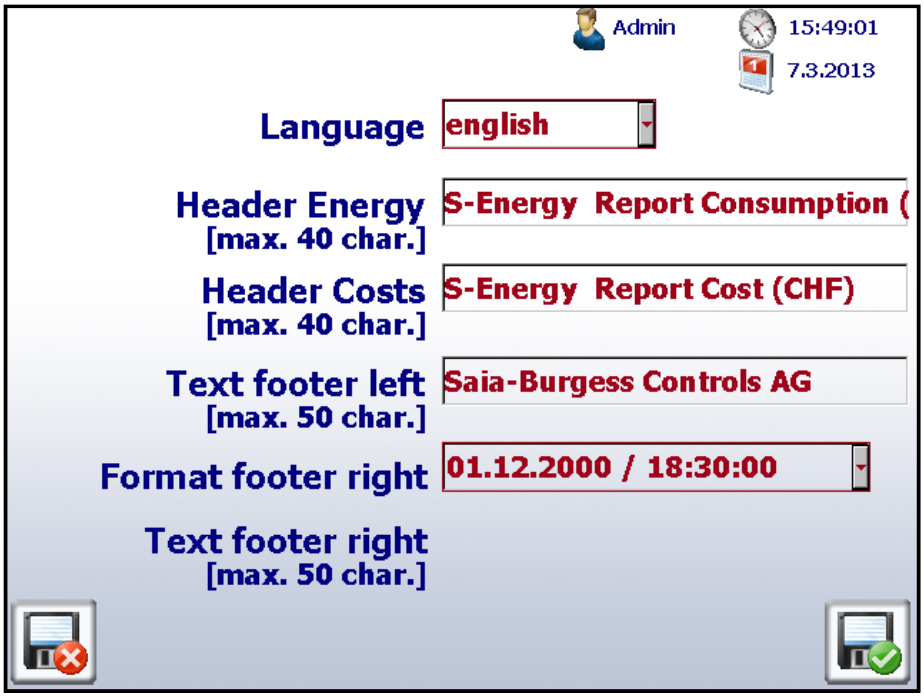
Select the “LPR” protocol and choose any name for the queue. If a test page can then be successfully printed under the “General” tab, your printer supports the protocol.



2.16.3 Printer texts

The report can be printed in different languages.

The language for print texts is selected in the sub-menu under printer settings.



A dialogue appears when leaving this screen that asks whether the changes should be saved permanently.

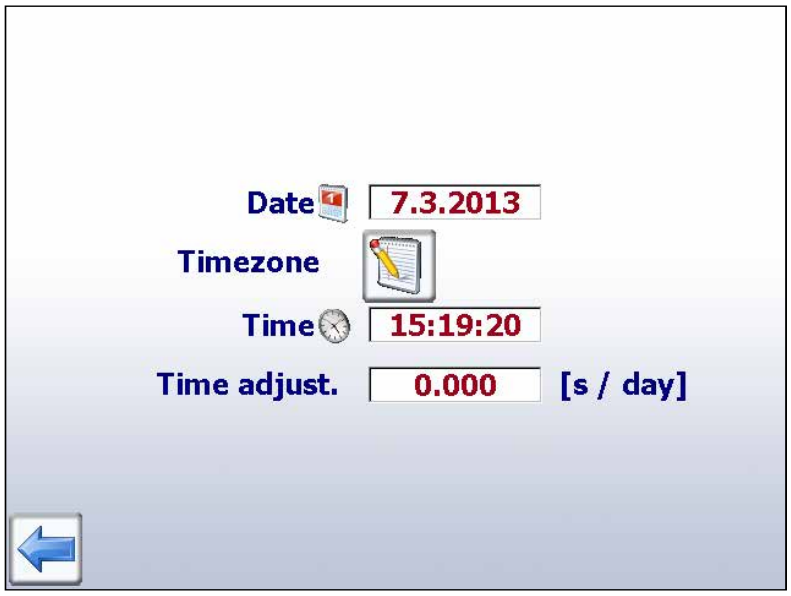
Language texts are predefined so personalising the texts shown above should suffice in most cases.

Note: The print function is not supported for bidirectional meters.

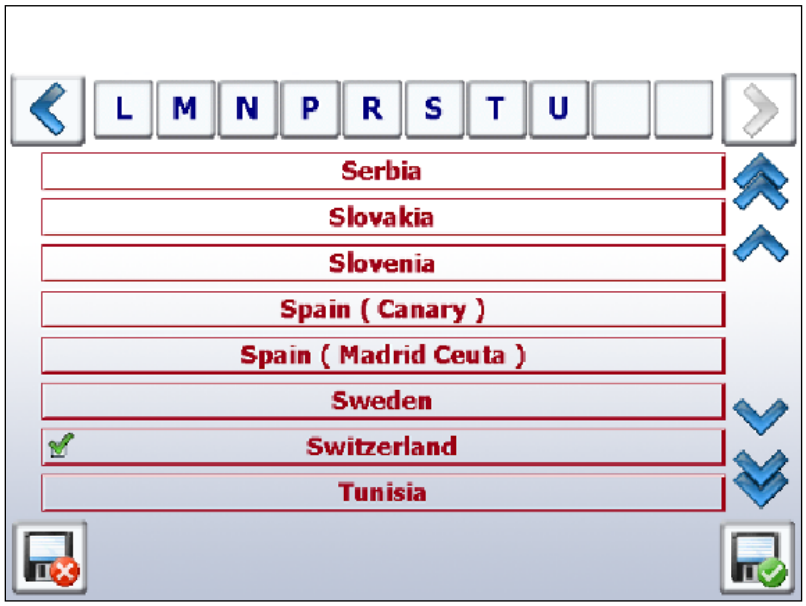
2

2.16.4 Time zones

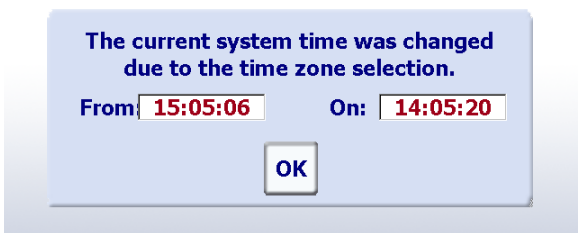
To set the time zone, select “Setup → System → Time & date”



You will see the following screen in which the desired time zone can be selected:



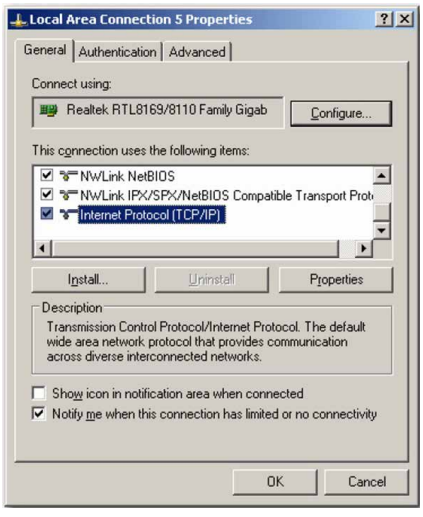
When you have selected the time zone and saved it, a message appears indicating that the zone has been changed. Confirm this with “OK”.



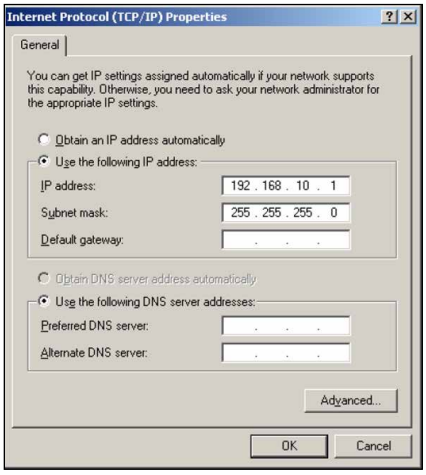
3 Visualisation over the Internet

The visualisation of current and earlier data can be displayed not only in the Energy Manager panel but in all standard web browsers as well.
The Ethernet connection enables the fastest communication connection.
The Energy Manager can be used in any network equipped with a switch or router.

3.1 Configuring the IP address on the PC



1. Open the Control Panel by pressing **Start → Settings → Control Panel**
2. Double-click on **Network connections**
3. A list of all the available network connections is displayed
4. Double-click on **Local Area Connection** and then on **Properties**
5. Select the option “Internet Protocol (TCP/IP)”

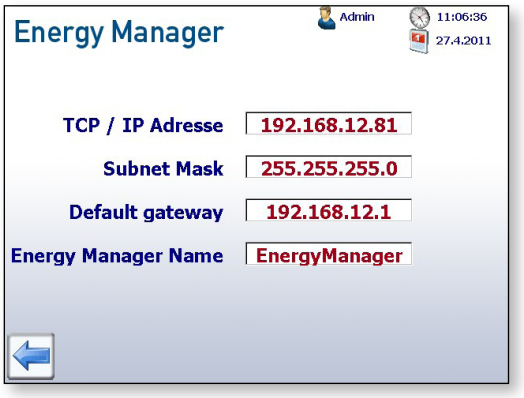


1. This is shown next to the window.
2. Select the desired **IP address** and the **subnet**
3. Confirm the selections with **OK**

3.2 Configuring the IP address with the Saia PCD® Energy Manager

For this visualisation, it is absolutely necessary to assign the Energy Manager a unique address. The desired IP address can be set and changed at any time in the Energy Manager's Setup menu.

Navigation: Setup → TCP/IP

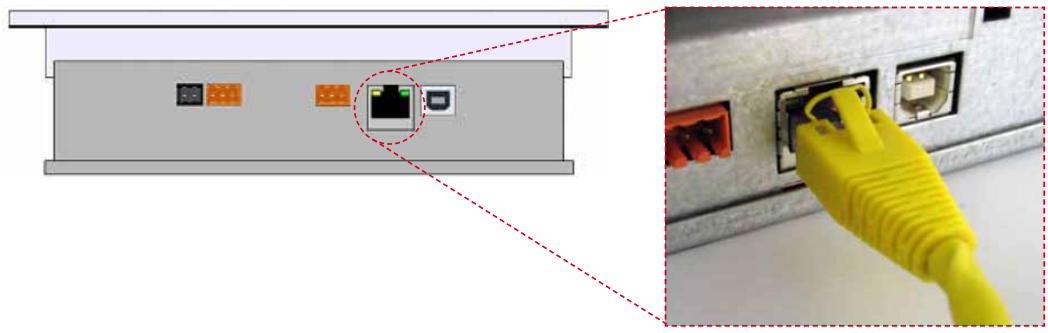


Make sure that the IP address and the network are in the same subnet.

Example: If the Energy Manager panel has the IP address 192.168.12.81, assign your computer (in the Network menu) the IP address 192.168.12.80, for example. The subnet mask is usually 255.255.255.0.

3.3 Connecting the Saia PCD® Energy Manager over the network

Using a network cable, connect your computer or laptop to the Energy Manager panel.

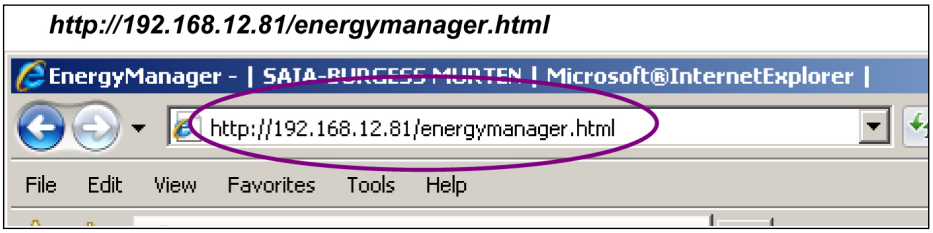


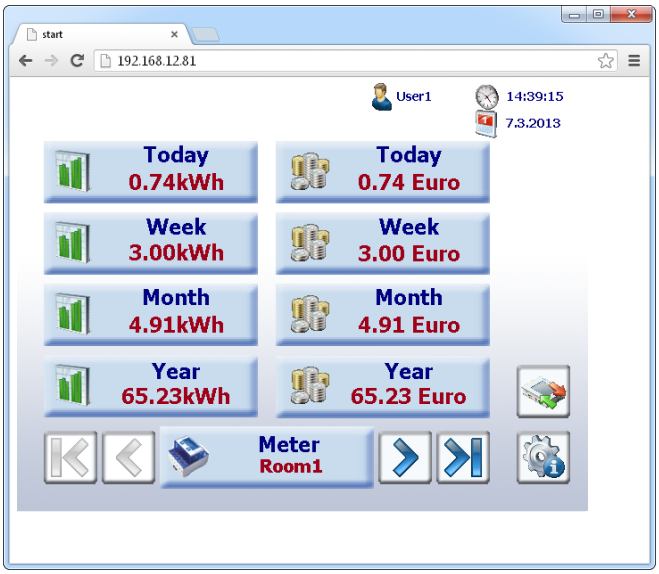
3.4 Accessing the visualisation in a browser

1. Open a standard browser (Internet Explorer, Firefox, Chrome, etc.).
   The following example uses Internet Explorer.

2. Open the Energy Manager's HTML screen in the browser.

Example (IP address 192.168.12.81)
http://192.168.12.81/energymanager.html or 12.82/start.htm





The same visualisation displayed on the Energy Manager panel will now be displayed. The visualisation is session-dependent, i.e. navigation can be carried out on the panel and on the Internet at the same time.

3.5 Energy Manager App

Controlling energy consumption with the iPhone and iPad

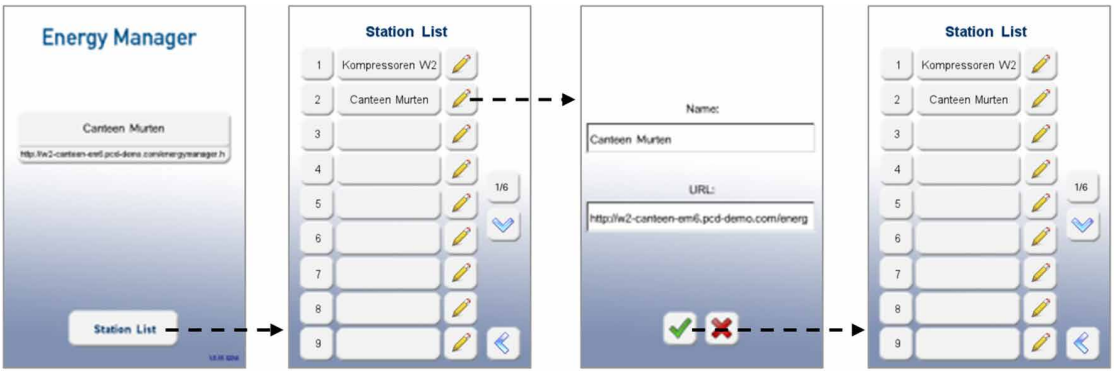
Mobile devices, whether for private or business use, are now an essential part of day-to-day life. With today's smartphones, anyone can access the Internet from anywhere and whenever they want. These therefore provide the basis for the 24-hour monitoring of all those involved in a property, be it the investor, the operator or the technician.
You simply need to download the Energy Manager app from the Apple App Store. This allows machines and systems to be monitored, operated and managed via Apple "i" devices using the normal user interface. This is user friendly and saves on long journeys.

Visualisation of energy consumption on the iPhone and iPad.

SBC Energy Manager app

SBC Energy Manager app in the Apple iTunes Store

http://itunes.apple.com/de/app/saia-s-energy-manager/id496176061?mt=8
Before the Energy Manager's web server can be accessed, the URL of the Energy Manager must be defined in the app.



Open station list | Edit station | Enter name and URL | Save station settings and connect to station

Live Energy Manager for testing:
http://w1-prod-em3.pcd-demo.com/energymanager.html

http://w2-tfk-em5.pcd-demo.com/energymanager.html

Connecting Energy Manager to the iPad/iPhone

S-Energy system with connection to iPad

3.6 SBC S-Energy on the Internet

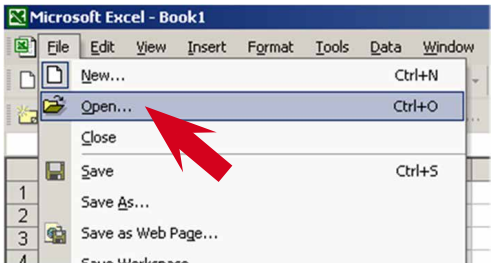
www.s-monitoring.com

4 Accessing log files

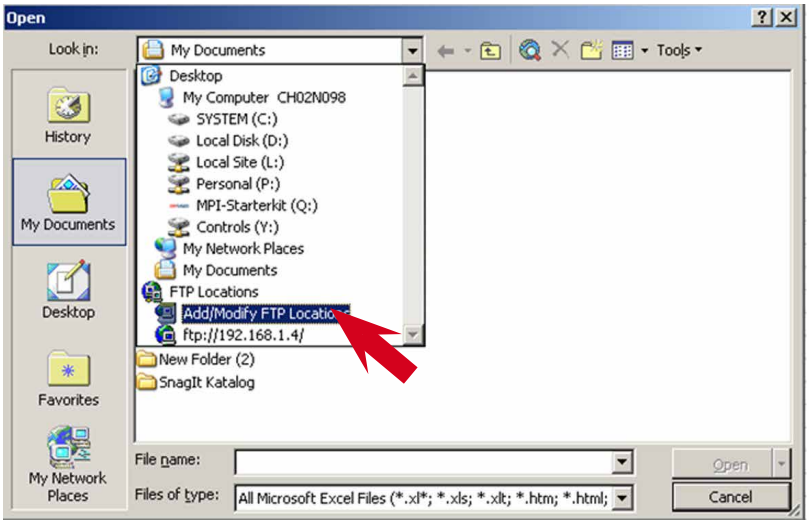
The Energy Manager records the data measured by the energy meter in CSV files that can be opened in Excel.

4.1 Direct connection via Excel

The CSV files can be read directly by the Energy Manager over the Ethernet connection. To do this, open Excel on your computer.

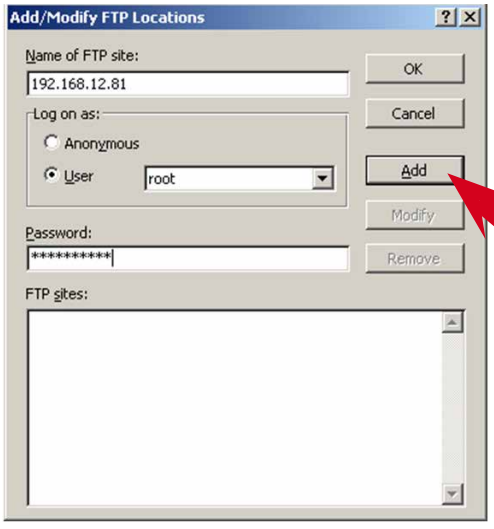


1. Select File → Open



2. Add the new FTP connection

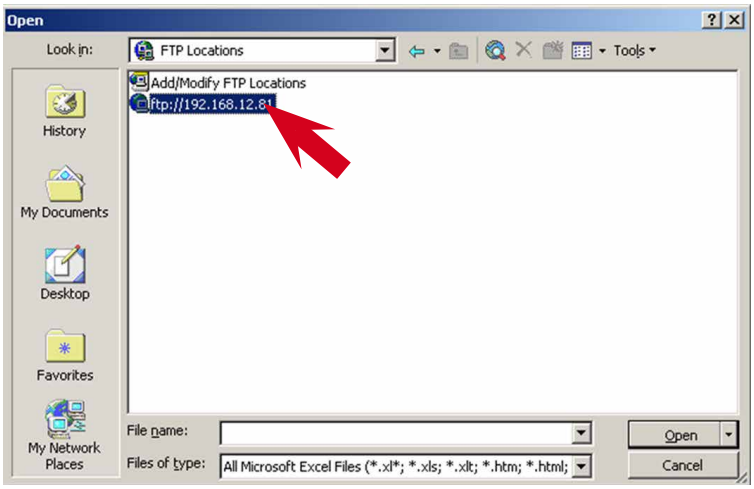
Adding/changing FTP addresses



3. Enter the following information:

Name:
IP address (e.g.: 198.168.12.81)
User: root
Password: rootpasswd

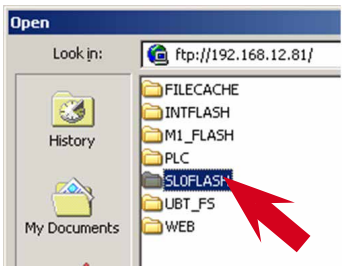
4. Add the link with **Add** and confirm with **OK**



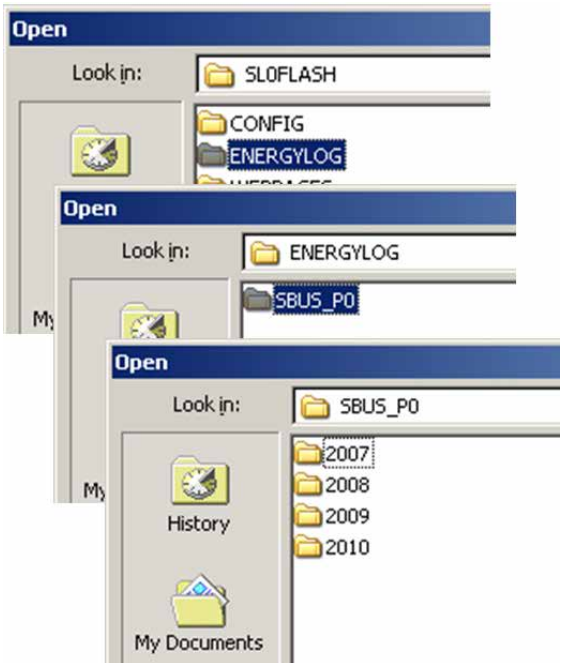
5. Select the new connection and click on **Open**:

ftp://192.168.12.81

Note:
If you delete system files, you may destroy data and lose control of the panel.



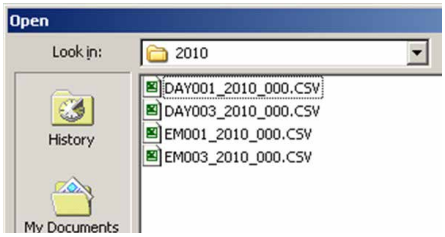
6. You will see the Energy Manager's entire file structure. All recorded data are saved to the **SL0FLASH** directory. This directory comprises the complete contents of the SD memory card.



7. Select the following directory in **SL0FLASH**:

SL0FLASH → ENERGYLOG → SBUS_P0

The data are organised by year, so you will see a directory for every year for which data were recorded.

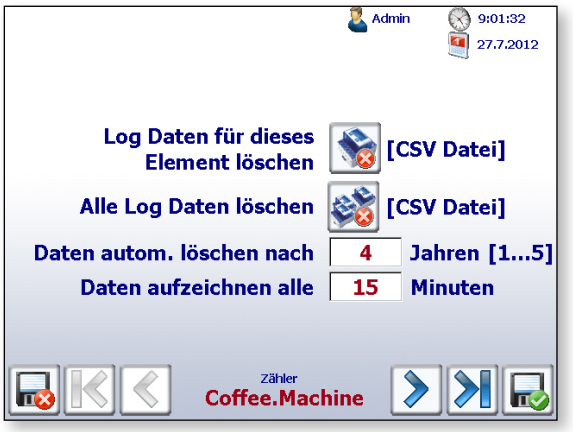


8. Two different types of data are recorded for each energy meter:

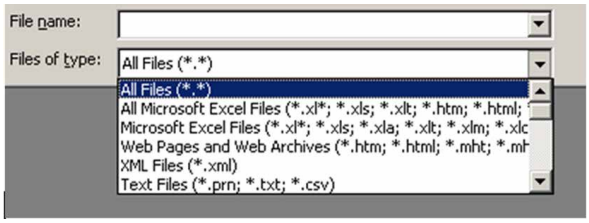
Midnight record (every day at midnight)
DAY001_2010_000.CSV
Regular record
(every 3 minutes…60 minutes)
EM001_2010_000.CSV

The recording interval can be set at between 3 and 60 minutes under Setup.

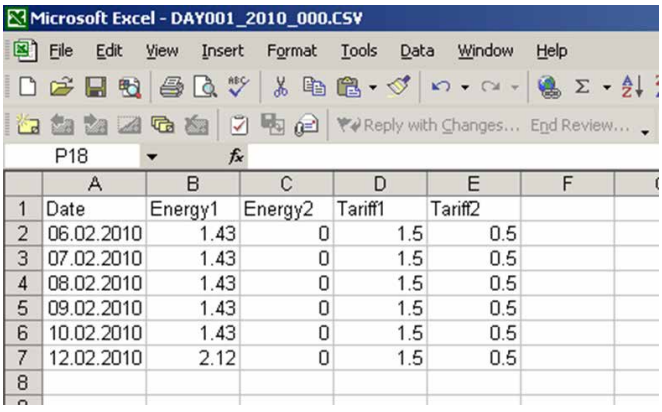
Navigation: Setup → Log data



All files older than 4 years are deleted automatically. This ensures that there is always enough memory available on the SD memory card.



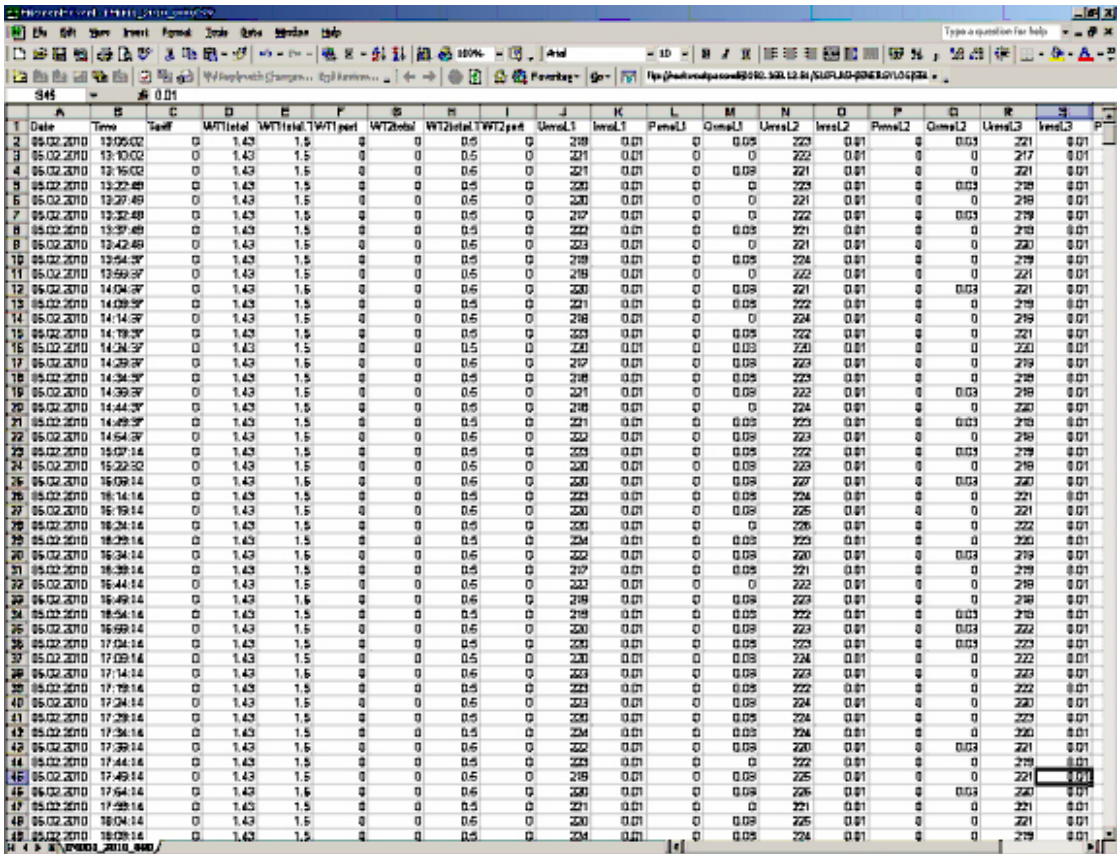
CSV files are only displayed if the file type **All files (*.*)** is selected.



	A	B	C	D	E	F
1	Date	Energy1	Energy2	Tariff1	Tariff2	
2	06.02.2010	1.43	0	1.5	0.5	
3	07.02.2010	1.43	0	1.5	0.5	
4	08.02.2010	1.43	0	1.5	0.5	
5	09.02.2010	1.43	0	1.5	0.5	
6	10.02.2010	1.43	0	1.5	0.5	
7	12.02.2010	2.12	0	1.5	0.5	
8						

9. The **midnight record DAY001_2010_000.CSV** is used primarily for the visualisation of energy consumption and costs (including tariffs) on the Energy Manager panel.

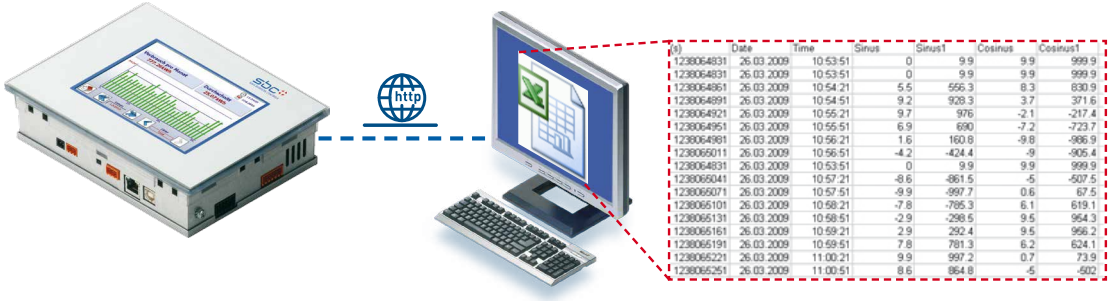
10. The **regular record EM001_2010_000.CSV** holds all values recorded by the energy meter, e.g. tariffs, energy, output, voltage, current, meter readings, etc.



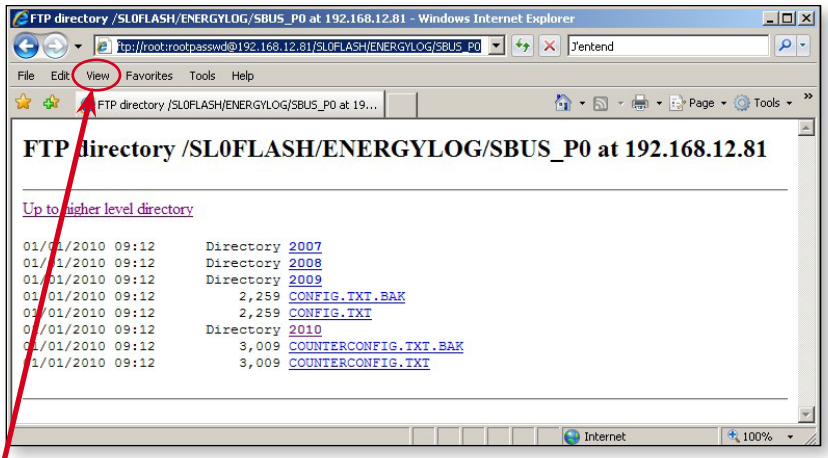
Note: The file is an “active” file. All changes are transmitted directly to the Energy Manager. You should therefore save the desired file to the local computer first before you make any changes to it.

4.2 Connection over FTP

The FTP server integrated into the Energy Manager makes it possible to exchange data with higher-level systems without the need for additional driver software.
The internal memory system can be accessed by setting up an FTP connection between the PC and the Energy Manager panel. To set this up, use the TCP/IP address (as with HTTP) indicated in the Control Panel.



4.2.1 Directly from the browser



ftp://root:rootpasswd@192.168.12.81/SL0FLASH/ENERGYLOG/SBUS_P0

4.2.2 FTP client

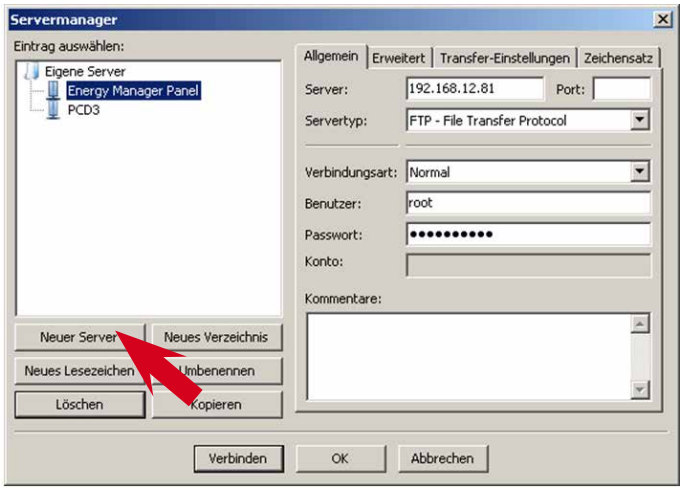
1. Open a standard FTP client that makes it possible to exchange files with the FTP server over the TCP/IP Ethernet interface (for example the client integrated in Total Commander, FileZilla, Internet Explorer, etc.). The following procedure is explained with a FileZilla client.

2. Select File → Server manager

3. Set up a new connection under“New server” with the following information:

Name: **Energy Manager Panel**
Server: **IP address (e.g.: 198.168.12.81)**
Server type: **FTP**
User: **root**
Password: **rootpasswd**

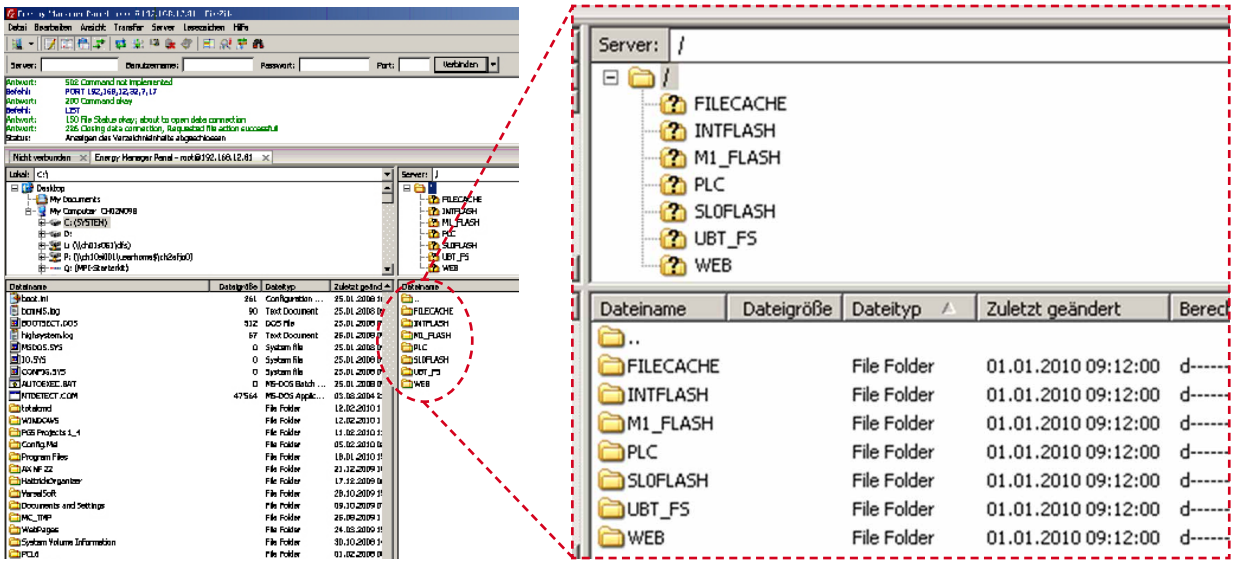
Start the connection by clicking the “**Connect**” button.



4. The entire file structure in the Energy Manager will be visible once the connection is established.

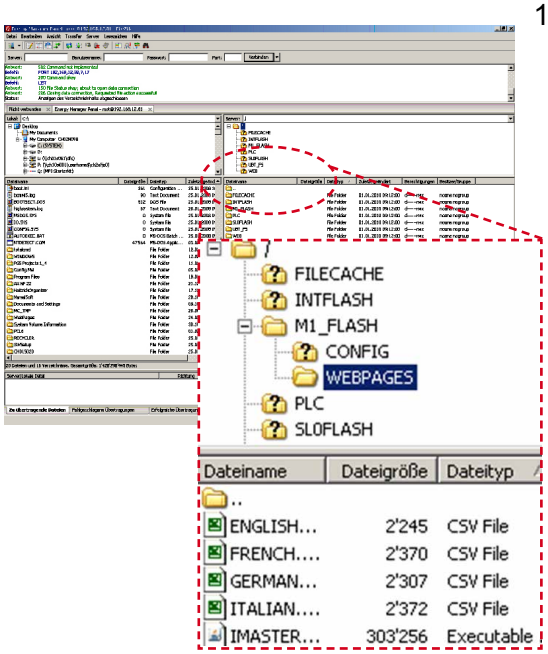
Note:
If you delete system files, you may destroy data and lose control of the panel.

→ The entire procedure is explained in Chapter 4.1 “**Direct connection via Excel**” from **item 7**.



5 Updating the web project over FTP

Establish an FTP connection between the Energy Manager and the PC as explained in the previous section.



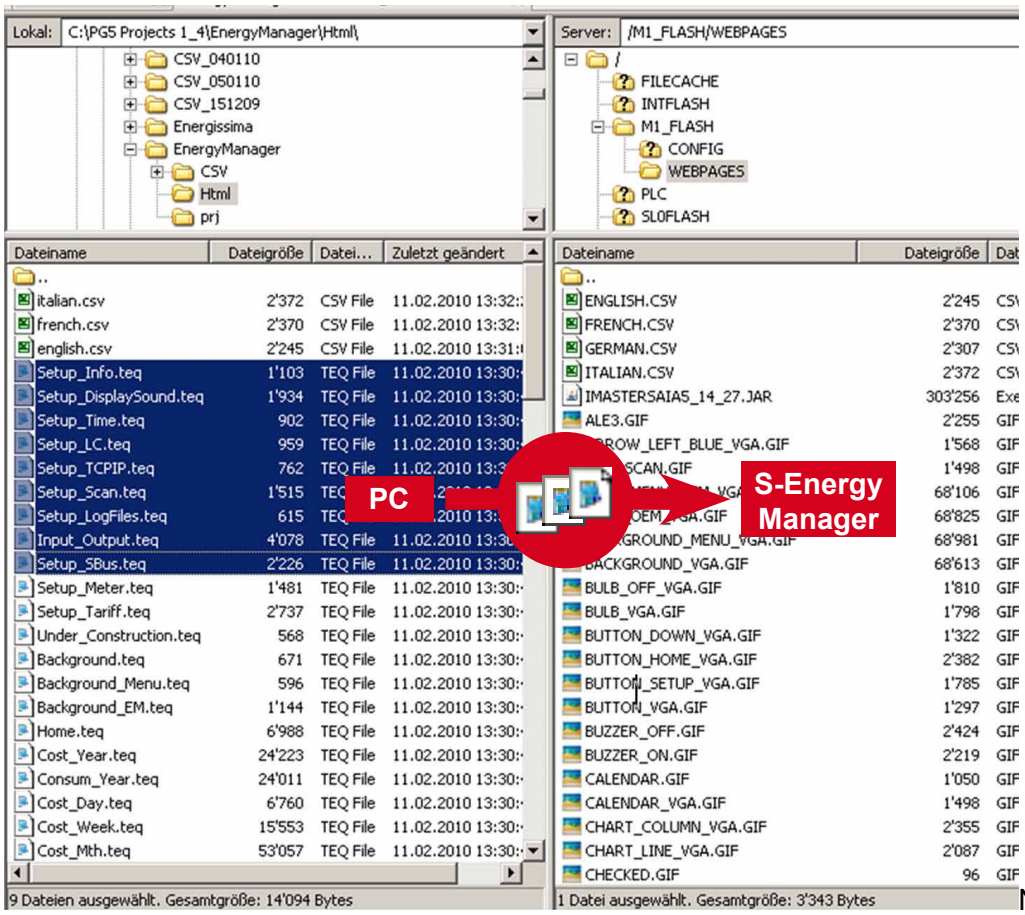
1. Select the directory **M1_FLASH → WEBPAGES**

   All of the files relevant for the Energy Manager are found in this directory.

   The Energy Manager has the following standard files:

   - HTML page (ENERGYMANAGER.HTML)
   - Graphic files (*.GIF)
   - Web project pages (*.TEQ)
   - German language file (GERMAN.CSV)
   - English language file (ENGLISH.CSV)
   - French language file (FRENCH.CSV)
   - Italian language file (ITALIAN.CSV)
   - Java applet (IMASTERSAIA5_14_27.JAR)

2. Copy the desired file from the PC to the Energy Manager's directory

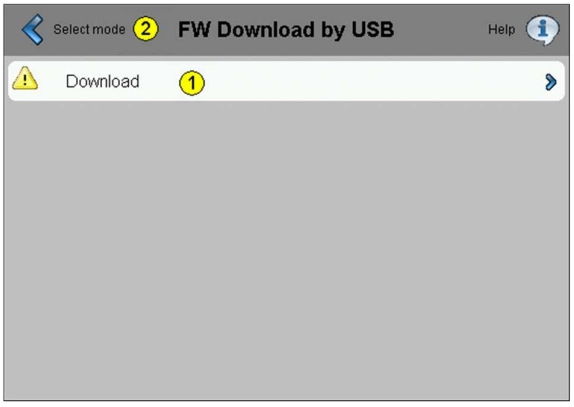


Note:
You must reboot the Energy Manager panel after an update.

6 Updating firmware

Please observe the following items when updating firmware.

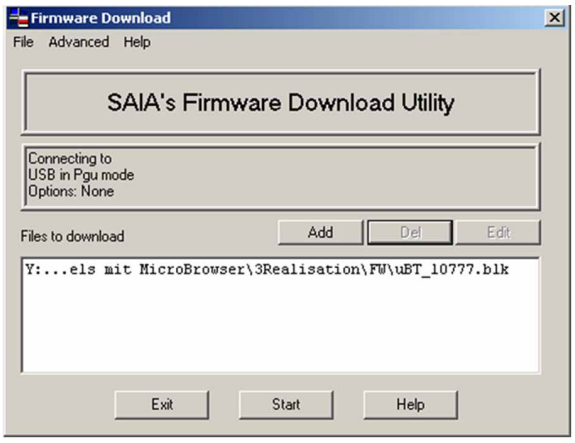
Navigation:
Panel Setup ➞ System ➞ FW download (Firmware download) ➞ Download by USB



1. Select “Download mode” by USB in the panel Setup (by pressing the touchscreen for 4 seconds).

1	Downloading over the USB connection	Press the “Download” button to switch the MB panel to download mode. Once the firmware has been successfully updated, the MB panel will reboot automatically.
2	Select the mode	Back to the firmware mode selection screen

2. Use a USB cable to connect the Energy Manager to the PC or laptop on which the download wizard is installed. This can be requested from Saia Support or downloaded from the Internet at www.sbc-support.ch.
3. Select the desired blk file with the **Add** function (e.g. uBT_EnergyManager_V1.00.blk).



4. Start the download by pressing “**Start**”.

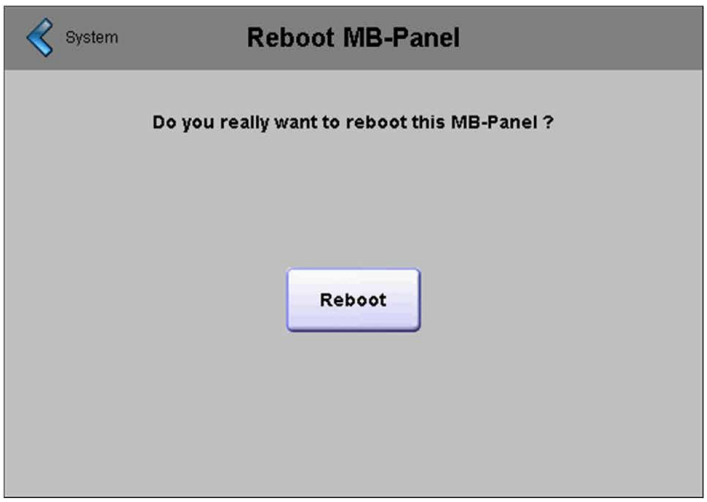
The Energy Manager reboots after every firmware update.

When updating firmware from version 1.16.xx to 1.18.xx or higher, the panel disconnects from the Internet.

7 Rebooting the Saia PCD® Energy Manager

Reboot the Energy Manager as follows:

Navigation: Panel Setup → System → Reboot



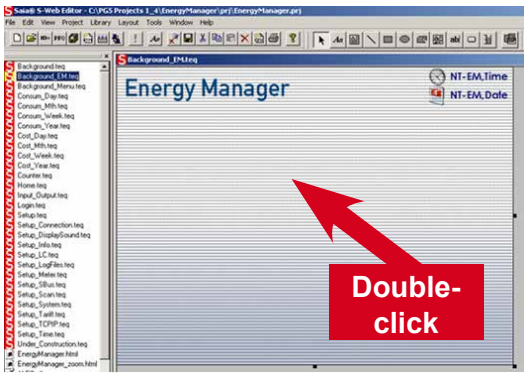
Select the **Reboot** function under **System** in the panel Setup
(by pressing the touchscreen for 4 seconds).

→ The Energy Manager carries out a reboot including a new initialisation.

8 Changing the web project

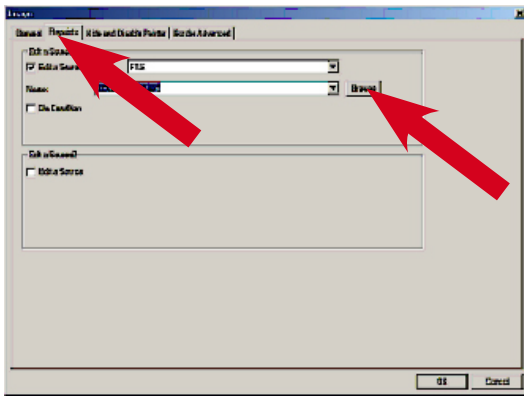
The SBC S-Web-Editor can be used as an auxiliary tool for PG5 or as a tool by itself. Comprehensive documentation on the Saia Web-Editor can be downloaded from our homepage. See 26-838_Manual_Web-Editor

8.1 Changing the graphics

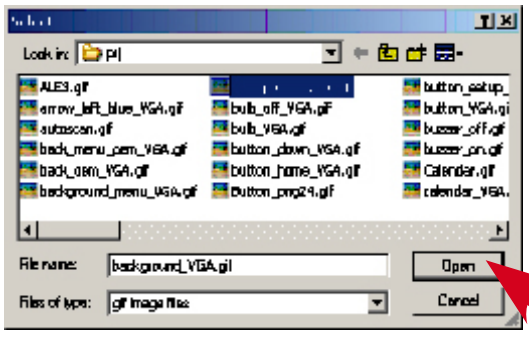


1. In Web-Editor,
   open the **Background_EM.teq** screen

2. Double-click in the middle of the page

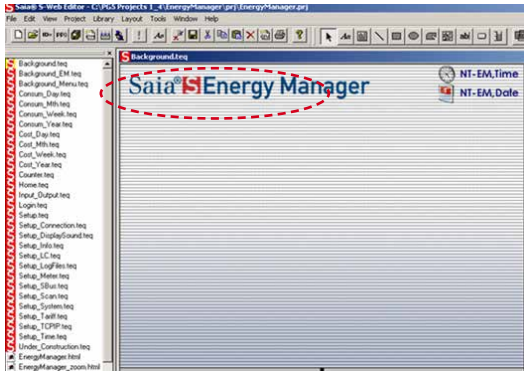


3. Select the **Repaints** menu and then **Browse**



4. Now select the new graphic and open it with Open.

   Note:
   The Energy Manager panel only supports GIF files.

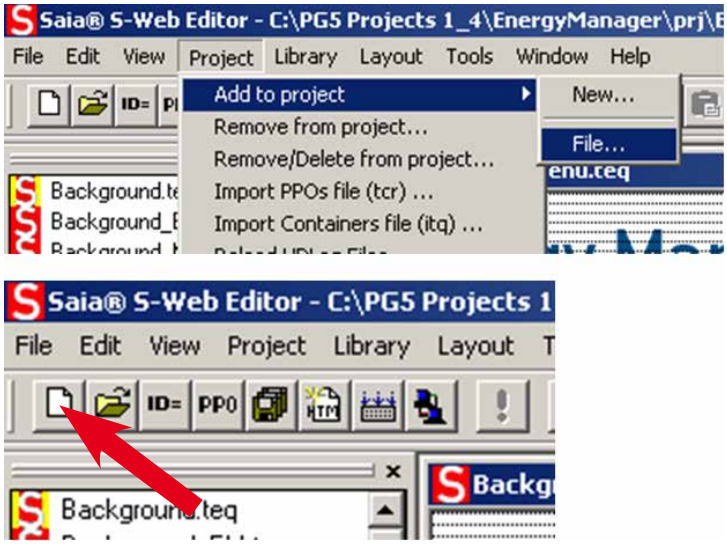


5. This loads the new graphic (in this case, the SBC S-Logo was added to the background). Edit the project under Project → Build All or with this button:

6. Then load the new web project to the Energy Manager panel as explained in Chapter 5.

8

8.2 Setting up an additional page

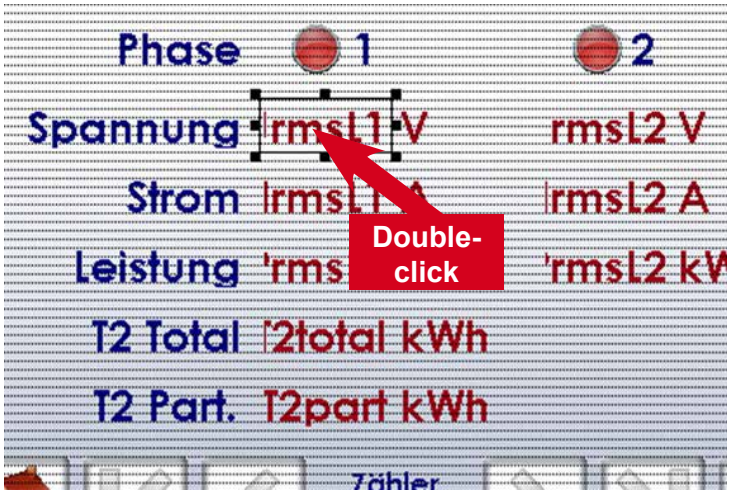


1. Set up a new page under **Project → Add to project →** File or with this button:

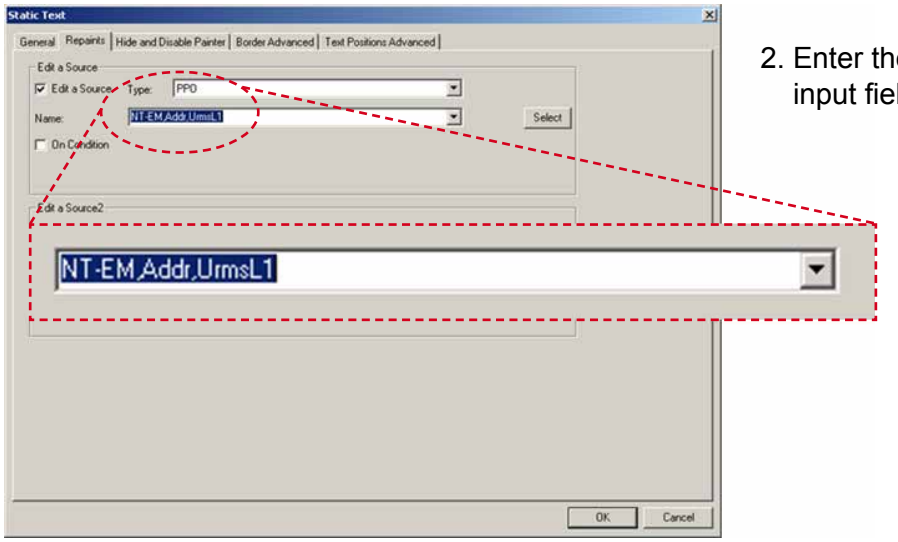
8

8.3 Inserting new tags

All of the available “Tags” are listed in Chapter 10.



1. Double-click on the tag you want to change.



2. Enter the new tag directly in the input field.

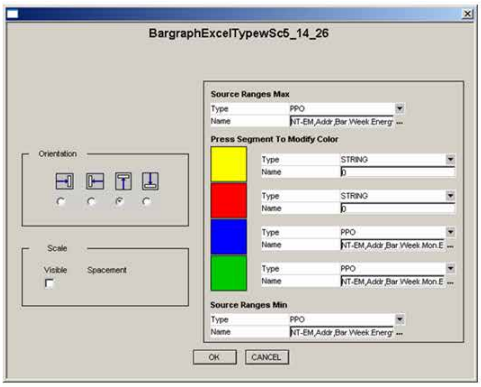
8.4 New macros

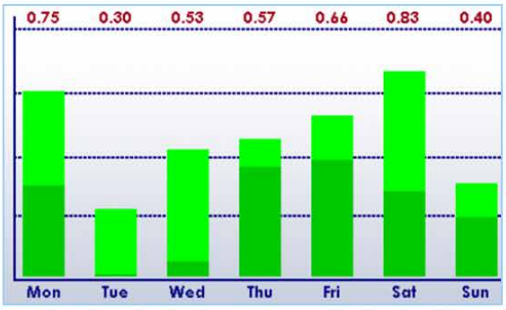
Visualisation of the Energy Manager is based on two new Web-Editor macros.

8.4.1 Bar macro

BargraphExcelTypewSc5_14_26.esm

The new bar macro can display 4 different values in a bar graph, in different colours. The minimum and maximum values can also be managed over a PPO at runtime. This macro is integrated into the per week, per month and per year visualisations.

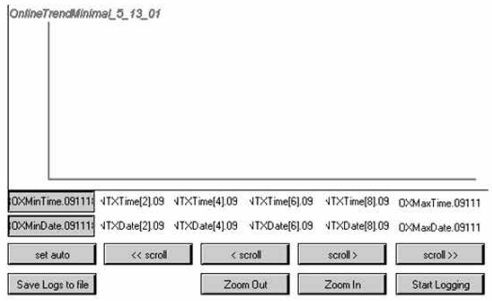


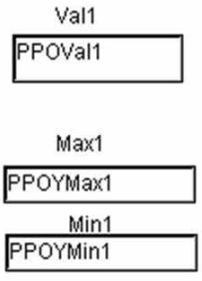


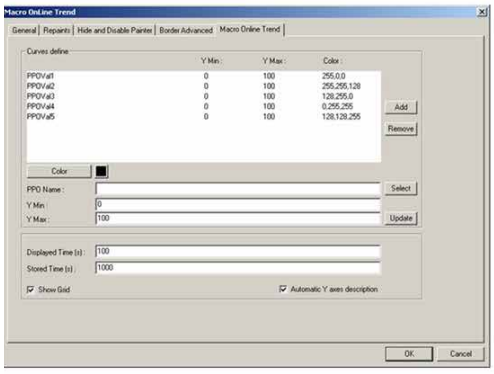
8.4.2 Online trend macro

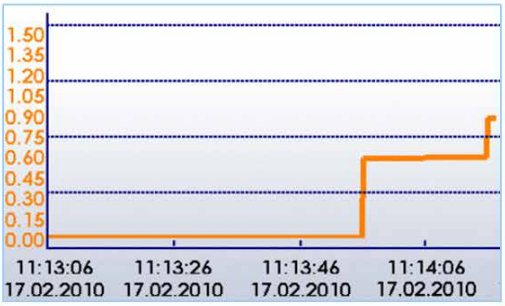
OnlineTrendMinimal_5_13_01.esm

The new trend macro provides the ability to set/adjust the min./max. values on the Y axis to the runtime over PPO, similar to the function explained above for the bar graph. This macro is integrated into the output trend visualisation.



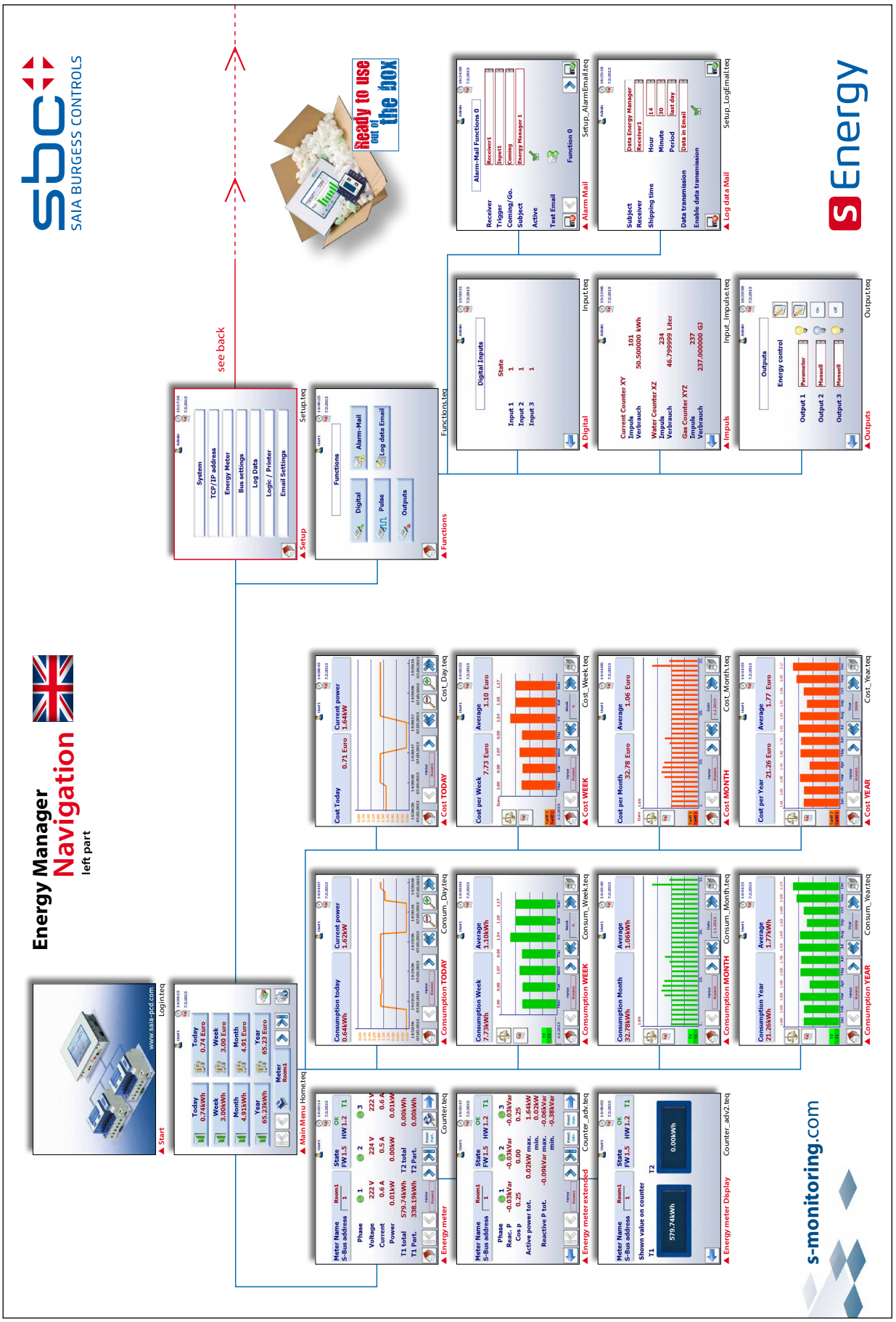


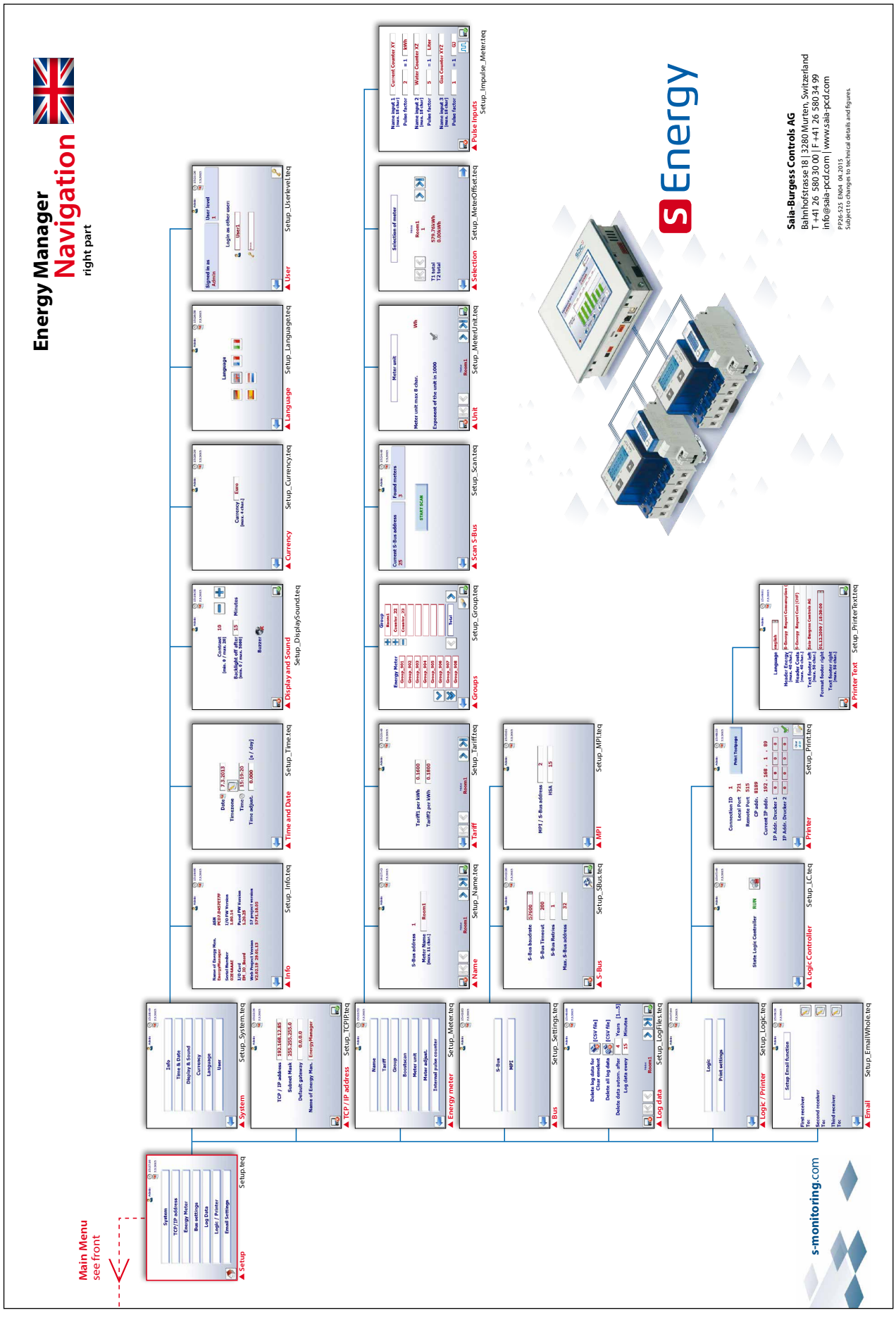




8

9 Navigating preconfigured websites




Energy Manager
Navigation
right part
Main Menu
see front
Setup.teq
Setup_System.teq
Setup_TCPIP.teq
Setup_Meter.teq
Setup_Settings.teq
Setup_Logic.teq
Setup_EmailWhole.teq
Setup_Info.teq
Setup_Time.teq
Setup_DisplaySound.teq
Setup_Currency.teq
Setup_Language.teq
Setup_Userlevel.teq
Setup_Name.teq
Setup_Tariff.teq
Setup_Group.teq
Setup_Scan.teq
Setup_MeterOffset.teq
Setup_MeterUnit.teq
Setup_Impulse_Meter.teq
Setup_SBus.teq
Setup_MPI.teq
Setup_LC.teq
Setup_Print.teq
Setup_PrinterText.teq
Energy
Saia-Burgess Controls AG
Bahnhofstrasse 18 | 3280 Murten, Switzerland
T +41 26 580 30 00 | F +41 26 580 34 99
info@saia-pcd.com | www.saia-pcd.com
PP26-525 ENG4 04.2015
Subject to changes to technical details and figures.
s-monitoring.com

10 Tags

Web visualisation is based on firmware tags. This interaction makes the function possible in the first place. If this kind of tag is changed (i.e. the file is edited), the Energy Manager panel must be rebooted so that the changes are applied.

10.1 Configuration

10.1.1 config.txt

Tag	unit	min.	def	max.		Meaning
SBus0MaxAddr	[]	0	32	127	R	The system searches for meters up to this S-Bus address. The firmware works with the displayed value.
					W	If this tag is written, the value is held in a shadow variable. However, the currently valid value will continue to be read. But “NeedReboot” assumes the value “1”. In this case, a reboot will be carried out automatically when saving the configuration.
SBus0Baudrate	[]	1,200	7,600	1,5200	RW	Valid baud rates*: 4,800, 9,600, 19,200, 38,400, 57,600 and 115,200. If the baud rate is changed, it can take up to one minute for the meter to adjust to the new speed.
SBus0BaudrateIndex	[]	0	6	7	RW	The baud rate can also be written/read via an index (drop-down box) 2 → 4,800 3 → 9,600 … 6 → 57,600 7 → 115,200
SBus0Retries	[]	1	1	5	RW	Number of retries in the S-Bus log
SBus0Timeout	ms	1	100	1,000	RW	Timeout in the S-Bus log
SBus0LogTime	[min]	3	5	60	RW	Time frame in which meter data are recorded
SBus0KeepTimeIndex	[]	0	4	4	RW	(Index + 1) years for which log files are saved (Example: current year = 2010 and Index = 1 → the years 2009 and 2008 are kept while 2007 and earlier are deleted)
SBus0PlcBaseDB	[]	1	100	1,000	RW	Beginning with this data module number, the meters are mirrored in the PLC. SBus0PLCBaseDB corresponds with the counter with the S-Bus address 0

*See chapter A2

10.1.2 EnergyManager.txt

Tag	Meaning
File name	The tags are saved to a dedicated file (EnergyManager.txt)
LogPath	This is where log files are written (SL0Flash:/EnergyLog). A directory is created here for each Bus (at present only “SBUS_P0”). The log files are saved here to a sub-directory created for each year.

10.2 General tags

NT-EM,<Tag>

Tag		Meaning
DeviceName	RW	Name of the Energy Manager (default = “EnergyManager”) Max 32 characters
Date	RW	Date
Time	RW	Time
DateRaw	R	Date directly from the RTC
TimeRaw	R	Time directly from the RTC
UserTrimm	RW	Trimmtime [seconds per 24 hours]
FoundCounter	R	Number of counters found
CurrentCounter	R	Last counter with which communication took place
BoostScan	R	0 → not active, 1 → active
	W	Starts “boostScan”
SaveConfig	W	SaveConfig = 1: The configuration is saved to SL0Flash:/EnergyLog/SBUS_P0/Config.txt. SaveConfig != 1: Changes to the configuration are rejected
NeedReboot	R	0 → Reboot not necessary 1 → Reboot necessary
	W	A reboot is triggered
User1, Password1 User2, Password2 User3, Password3 User4, Password4	RW	User name and password will be saved. (→ SaveConfig=1) Defaults: User1 = “Admin” Password1 = “saia” User2 = “User1” Password2 = “saia” User3 = “User2” Password3 = “saia” User4 = “User3” Password4 = “saia”
HasDuplicatedUser	R	Holds the value “1” for 5 seconds if the user has tried to set a user name that already exists.

10.3 Sessions/navigation

NT-EM,<Tag> (Example: NT-EM,<Addr>)

Tag	Read/Write (R/W)	Meaning
Addr	R/W	The session address can be read and written. The current session address is used if “Addr” is specified as the address in a tag.
First	R	“0” no “first” meter, otherwise “1”
	W	The session address is set to the first meter found
Prev	R	“0” no “prev” meter, otherwise “1”
	W	The session address is set to the previous meter
Next	R	“0” no “next” meter, otherwise “1”
	W	The session address is set to the next meter
Last	R	“0” no “last” meter, otherwise “1”
	W	The session address is set to the last meter found
HasSession	R	0 no session for this client 1 there is a session for this client **NOTE: only one browser may show the applet from a PC** **(→ the same SessionID with, for example, 3 Firefox instances, etc.)**

10.4 Meters

Tag		Meaning
CounterState	R	0 → never detected 1 → detected but no communication at the moment 2 → detected, everything OK
LiveSign	R	increases with every successful counter update
Name	RW	Name of the meter (max 23 characters). (Is saved to “CounterConfig.txt” → Day “SaveConfig”)
PresetTariff	W	Populates all of the meters with the current meter’s Tariff1, Tariff2
DeleteLogData	W	Value != –1 → The addressed meter’s data will be deleted Value = –1 → The data of all of the meters will be deleted

10.5 Groups

At the moment, groups populate the addresses 900 to 931 [DB 900 to 931]

Tag		Meaning
GroupConfig	R/W	Reads or writes the group configuration (a list of the group members separated by a comma “,”)

10.5.1 Group configuration (in the firmware)

It is possible to have up to 32 groups each of which has a max. of 64 nodes.

Tag		Meaning
GCActiveGroup Index	R/W	Read: returns the current group’s index Write: • value 0 to 3 → the group with this index becomes the current group • value == –1 → the current group configuration will be deleted
GCGroup Select		Read: • –1 the current group has no predecessors • 0 the current group has predecessors and successors • 1 the current group has no successors Write: if possible… • –1 …predecessor to the current group • 1 …successor to the current group
GCActiveGroup Name	R	Returns the current group’s name

Pool and group list:

The firmware provides two lists, the pool list and the list for the currently selected group. The following tags are used to navigate in these lists. The tag names are distinguished by list name.

Example: GC **<List>**First must be replaced by GS**Pool**First or GC**Group**First.

Tag		Meaning
GC <List>First	R/W	Read: Tag = “0” this form of navigation is not possible, e.g. GC <List> Up cannot be performed if already at the top of the list. Read: Tag = “0” this form of navigation is possible. Write: Set tag = “1” --> this form of navigation will be performed. Write: Set tag = “0” → no change.
GC <List>Up		
GC <List>Down		
GC <List>Last		

List elements

There are currently 8 visible elements → <n> 0 to 7

Tag		Meaning
GC<List>Elm_<n>	RW	Read: The name of the meter at this location is returned Write: If this kind of tag is written (the value is not relevant), this entry's current meter will be moved to the corresponding list.

10.6 Saia PCD® S-Bus meters

The general format of the tags has the following layout:NT-EM,<SBusAddr>,<Tag>

These tags are placed 1:1 on the respective meter's register → SMinMax supports ScaledMin, ScaledMax values

Tag	R/W	SMinMax	Meaning
FW version	R	N	
HW-Mod	R	N	
Asn1	R	N	Asn number (4 characters per register, → the entire string can be queried via the "Asn" tag)
Asn2			
Asn3			
TransRatio	R	N	0 → ALD meter otherwise AWD
Error	R	N	0 → no error 1 → an error on at least one phase
Error.1			ditto for Phase 1
Error.2			ditto for Phase 2
Error.3			ditto for Phase 3
Tariff		N	
WT1total	R	N	
WT1total.Day	R	N	Current consumption of energy meter 1
WT1total.Week			
WT1total.Month			
WT1total.Year			
WT1total.CostDay	R	N	Incurred costs
WT1total.CostWeek			
WT1total.CostMonth			
WT1total.CostYear			
WT1total.Tariff	RW	N	Tariff (→ see Tag: "SaveConfig")
WT1part	RW	N	Writing something other than 0 is obviously not accepted
WT2total	R	N	
WT2total.Day	R	N	Current consumption of energy meter 2
WT2total.Week			
WT2total.Month			
WT2total.Year			
WT2total.CostDay	R	N	Incurred costs
WT2total.CostWeek			
WT2total.CostMonth			
WT2total.CostYear			

WT2total.Tariff	RW	N	Tariff (→ see Tag: “SaveConfig”)
WT2part	RW	N	Writing something other than 0 is obviously not accepted
WTtotal	R	N	Sum of WT1total and WT2total
WTtotal.Day	R	N	Sum of WT1total[.xxx] and WT2total[.xxx]
WTtotal.Week			
WTtotal.Month			
WTtotal.Year			
WTtotal.CostDay	R	N	Sum of WT1total[.xxx] and WT2total[.xxx]
WTtotal.CostWeek			
WTtotal.CostMonth			
WTtotal.CostYear			
UrmsL1	R	Y	
IrmsL1	R	Y	
PrmsL1	R	Y	
QrmsL1	R	Y	
CosPL1	R	Y	
UrmsL2	R	Y	
IrmsL2	R	Y	
PrmsL2	R	Y	
QrmsL2	R	Y	
CosPL2	R	Y	
UrmsL3	R	Y	
IrmsL3	R	Y	
PrmsL3	R	Y	
QrmsL3	R	Y	
CosPL3	R	Y	
Prmstotal	R	Y	
Qrmstotal	R	Y	
PresetTariff	W	N	Writing this tag populates the tariffs for all of the meters with the values of these meters (WT1total.Tariff and WT2total.Tariff).
Type	R	N	0 S-Bus meters 1 Group

10.6.1 Scaled Min Max

Ex: NT-EM,<addr>,<RegName>.ScaledMax

Tag		Meaning
ScaleVal	RW	Range 0 to 100%Writing triggers the recalculation of the min/max values. The new limits are calculated automatically as soon as the current value leaves the range.
ScaledMin	R	ScaledVal [%] less than the current value but greater than or equal to 0.0
ScaledMax	R	ScaledVal [%] greater than the current value
Max.	RW	Maximum value
Min.	RW	Minimum value

10.7 Log data (→ bar graph)

Note: Addressing a bar tag loads the corresponding data into memory. This means that a page (TEQ) can only display data from one meter. Otherwise, a new address (→ no longer the same) will always trigger the loading of the data.

The tags must be available in the following format:
NT-EM,<addr>,Bar.<sel>.<bsel>.<tag>

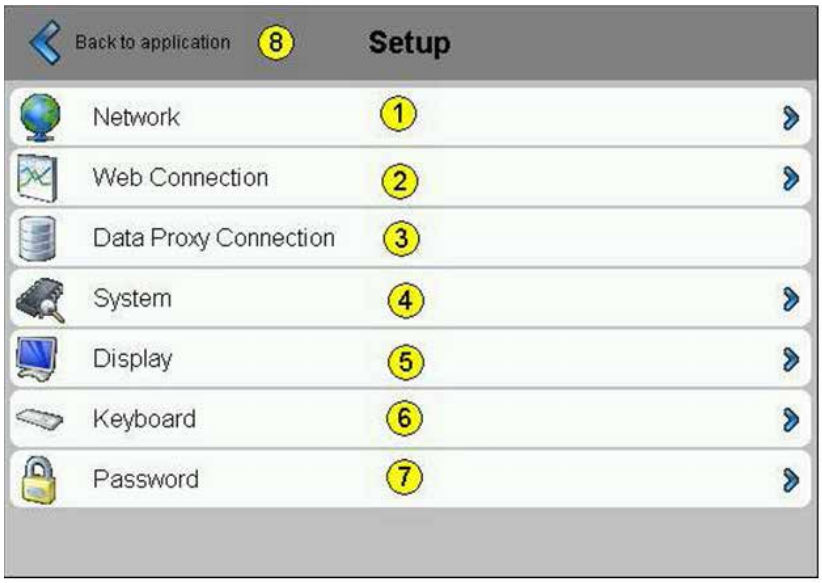
sel	bsel	R/W	tag
Week	Energy	R	ScaledMin (20% less than the smallest value (Energy1 or Energy2)
			Min (minimum energy (sum of Energy1 and Energy2)
			Max (maximum energy (sum of Energy1 and Energy2)
			ScaledMax (20% greater than max)
			Sum
			Average
	Cost	R	→ the same fields available under “Energy” are available
	Mon Tue Wed Thu Fri Sat Sun	R	IsValid IsAverage Energy1 Energy2 Energy Cost1 Cost2 Cost
	Num	RW	Displayed calendar week in the current year
	Date	RW	Date of the Monday in the displayed calendar week. The date is set to Monday if the written date specifies a different day
	NumInc	W	The displayed week is incremented
	NumDec	W	The displayed week is decremented
Month	Energy	R	ScaledMin (20% less than the smallest value (Energy1 or Energy2)
			Min (minimum energy (sum of Energy1 and Energy2)
			Max (maximum energy (sum of Energy1 and Energy2)
			ScaledMax (20% greater than max)
			Sum
			Average
	Cost	R	→ the same fields available under “Energy” are available
	Day.<DayNum>	R	IsValid IsAverage Energy1 Energy2 Energy Cost1 Cost2 Cost
	Date	RW	
	Days	R	
	Num	RW	
	MonthInc	W	
	MonthDec	W	

Year	Energy	R	ScaledMin (20% less than the smallest value (Energy1 or Energy2)
			Min (minimum energy (sum of Energy1 and Energy2)
			Max (maximum energy (sum of Energy1 and Energy2)
			ScaledMax (20% greater than max)
			Sum
			Average
	Cost	R	→ the same fields available under “Energy” are available
	Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec	R	IsValid IsAverage Energy1 Energy2 Energy Cost1 Cost2 Cost
	Year	RW	

11 Panel Setup

The panel Setup screen can be opened at any time by pressing the touch screen (but not the buttons) for 4 seconds.

The Setup screen is the first to appear when you open the Setup menu.



1	Network	Panel settings
2	Web Connection	Configuration of the web link
3	Data Proxy Connection	Not yet available
4	System	Info / Settings / Special / FW download and reboot
5	Display	Display settings
6	Keyboard	PS/2 keyboard settings
7	Password	Enter a password
8	Back to the application	Back to the application

A detailed description of the panel Setup can be found in the Saia-MB panel "**26-851_EN_Guide_PCD7D4xx**". This documentation can be requested from Saia Support or downloaded at www.sbc-support.ch

12 Hardware

12.1 Saia PCD® MB panel family

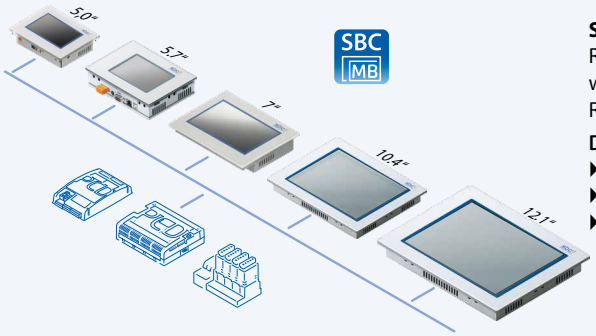
The Energy Manager's control panel is based on the Saia PCD® Web Panel family with micro browser and touch screen technology. The MB-Panel (Micro Browser Panel) product series is identified as PCD7.D4xx and comprises 5.0-inch to 12.1-inch LCDs.

These were developed for automation and industrial applications. Using the Web-Editor, these can easily display websites. The new product series provides many different graphic displays in QVGA, VGA and SVGA resolutions.

12.2 Overview of types, sizes and resources

Devices with Saia PCD® COSinus - Control Operating System

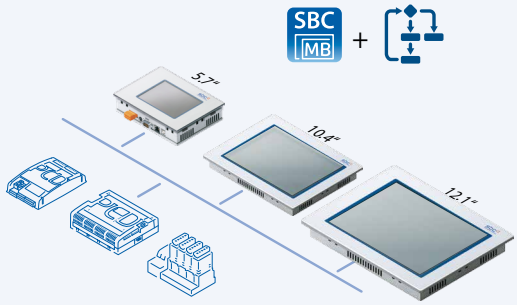
Saia PCD® Web Panel MB | Standard devices



Saia PCD® Web Panel MB | Standard devices
Robust control panel for displaying web visualizations created with the Saia PG5® Web Editor.
Ready to use immediately without any software installation.

Display sizes 5.0" / 5.7" / 7.0" / 10.4" / 12.1"
- Ethernet, USB and serial
- FTP server
- File system

Saia PCD® pWeb Panel MB | with programmable logic controller

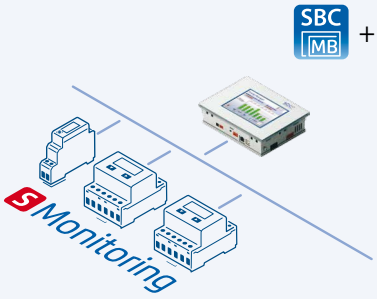


Saia PCD® pWeb Panel MB | with programmable logic controller
The programmable Web Panel combines an Automation Server for visualization with control and management functions in one device.

Display sizes 5.7" / 10.4" / 12.1"
- 2× Ethernet (switch), USB and RS-485
- Integrated logic controller
- Programmable with Saia PG5®
- Automation Server
- 128 MB of flash memory

12

Saia PCD® Web Panel MB – Functional HMI | Visualization and operation with ready-to-use functions



One step closer to the application
Functional HMI systems provide functions which support the user in the implementation of complex applications such as recording and visualizing data records. Here, the devices already have an application installed. This can be modified or expanded.

→ For more information, see Chapter 4

Windows®

Devices with Windows® operating system

Industrial Web Panel with Windows® operating system
For complex visualizations, functions can be expanded using JAVA or .Net components. Access to standard websites

Display sizes 10.4" / 12.1" / 15"
- Visualization using Micro Browser technology
- 2× Ethernet, USB and serial
- 500 MHz and 1.6 GHz CPU
- Web, FTP and VNC server
- Windows® CE 6.0 and Windows® eXP

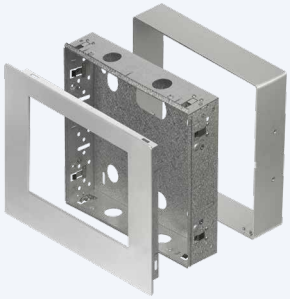
12.3 Micro Browser Panel accessories

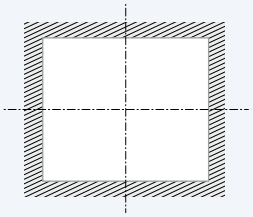
The right mounting kit for all Web-HMI devices
The Micro Browser Panel series not only fits in a switch cabinet but, using industrial in-wall and off-wall mounting kits, enables this modern technology to be easily and properly integrated into the area in close proximity to the user as well. The mounting kits therefore enable simple wall mounting, which is consistently available for all panels. This minimizes logistic and mounting costs.

5.7 inch / 7 inch

In-wall mounting
PCD7.D457-IWS2

On-wall mounting
PCD7.D457-OWS2



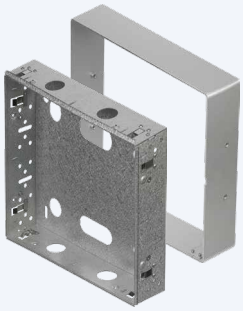


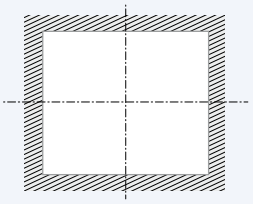
Cut-out	B × H, 270 × 211
Minimum depth	
For solid walls	75 mm
For cavity walls	65 mm

10.4 inch

In-wall mounting
PCD7.D410-IWS

On-wall mounting
PCD7.D410-OWS



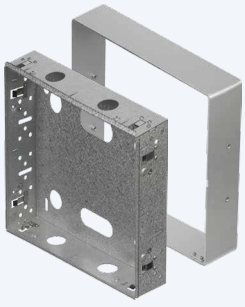


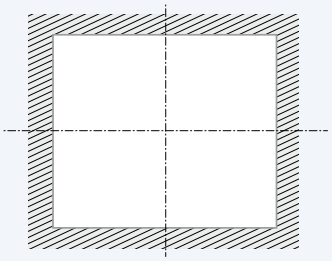
Cut-out	B × H, 270 × 211
Minimum depth	
For solid walls	75 mm
For cavity walls	65 mm

12.2 inch

In-wall mounting
PCD7.D412-IWS

On-wall mounting
PCD7.D412-OWS



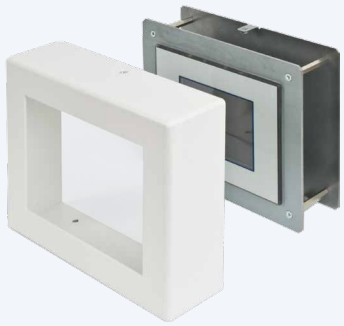


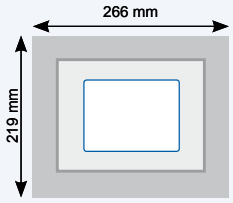
Cut-out	B × H, 309 × 245
Minimum depth	
For solid walls	75 mm
For cavity walls	65 mm

12

On-wall mounting kit 5.7 inch / 7 inch

On-wall mounting
PCD7.D457-OWS

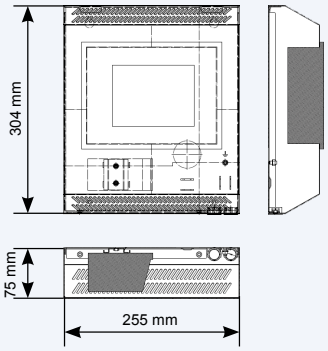




Width: 266 mm
Height: 219 mm
Depth: 73.5 mm

Wall mounting kit 5.7 inch / 7 inch

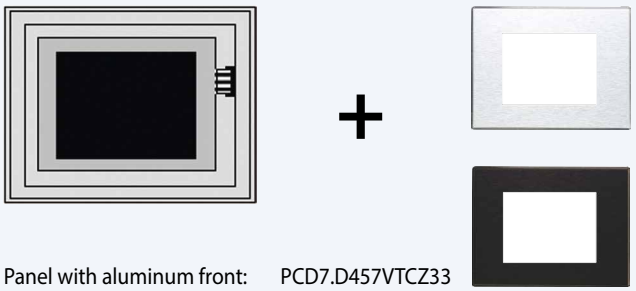
PCD7.D457-OWS1



12

OEM or proprietary design

The standard 5.7 inch Micro Browser Panel without a front panel offers room for individual creativity. Whether it's for modern rooms or rustic spaces with customer-specific front screens designed in aluminum, black or wood, this modern technology can be easily and unobtrusively integrated into a sophisticated space.



Panel with aluminum front:	PCD7.D457VTCZ33
Panel with black front:	PCD7.D457VTCZ35
Panel with mirror-effect front:	PCD7.D457VTCZ36
Panel with neutral film:	PCD7.D457VTCZ11

12.4 Saia PCD® Micro Browser App for Apple and Android

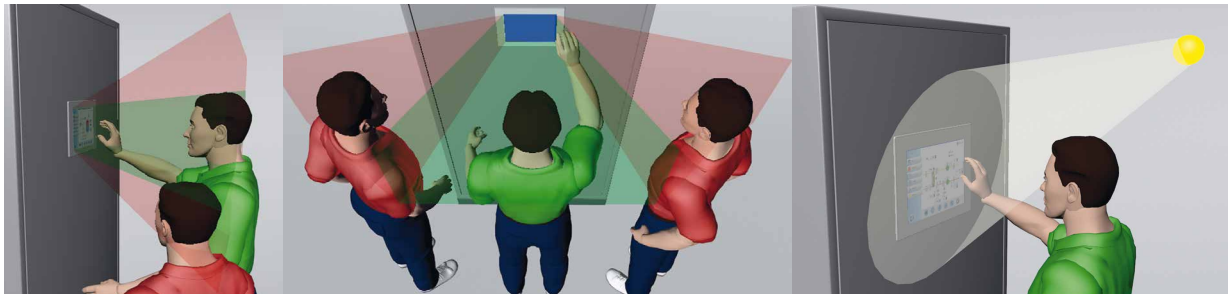
The Micro Browser apps breaks the limitations of the industrial world. Most tablets or smartphones are optimized for a long mobile runtime with high performance. The Micro Browser App is therefore the ideal way to fill the gap between stationary and mobile areas of use. This provides the foundation for 24-hour monitoring and direct intervention in system operation.

Technical data	SBC MB light	SBC MB	SBC MB Energy Manager	SBC MB
Operating system version	iOS > iOS version 3.2			> Android V.2.2
Resolution/pixels	Depends on the devices used			
Update management	AppStore			Google Play
Restrictions	No station list No URL jump	No restrictions	For Energy Manager only	No restrictions

12.4.1 Saia PCD®Web Panel MB | Standard devices

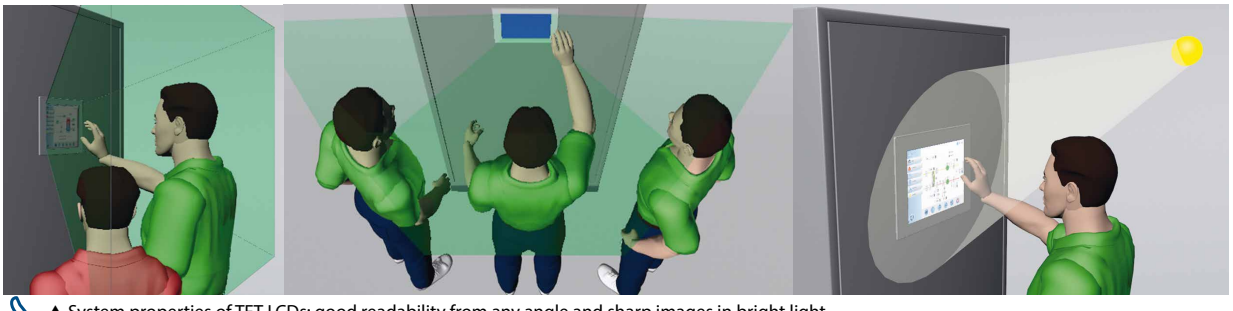
TFT displays: LED service life

The STN LCD displays have the system property whereby the displays can only be easily read when viewed from the front while standing vertically. In addition, the visibility of devices with CCFL backlights is restricted in bright light. Setting the maximum contrast generally compensates for this. However, this shortens the service life of the LCD display, which therefore needs to be replaced once or twice over the system lifecycle. The TFT LCD displays built into the Saia PCD® Web Panel MB ensure – using LED backlighting – a long life and good readability over a long period of time.



▲ System properties of STN LCDs: poor visibility when viewed from an angle

▲ Poor visibility in brightly light surroundings



▲ System properties of TFT LCDs: good readability from any angle and sharp images in bright light

12.4.2 Practical example of a wall mounting set | Lucerne Exhibition Centre

Control panels easily integrated into the building using the wall mounting set.
In the example of the Lucerne Exhibition Center, 2 control panels were placed in concrete walls and wooden doors using the wall mounting set. The individual front frames enable the color to be adjusted to the background.

www.youtube.com/watch?v=QlhLoMEkoF8

▲ External facade in accordance with Minergie standard

▲ Easy integration of the control panels into concrete and wooden walls in the example of the Lucerne Exhibition Center

12.4.3 Ways of using the Web Panels with S-Web technology

12

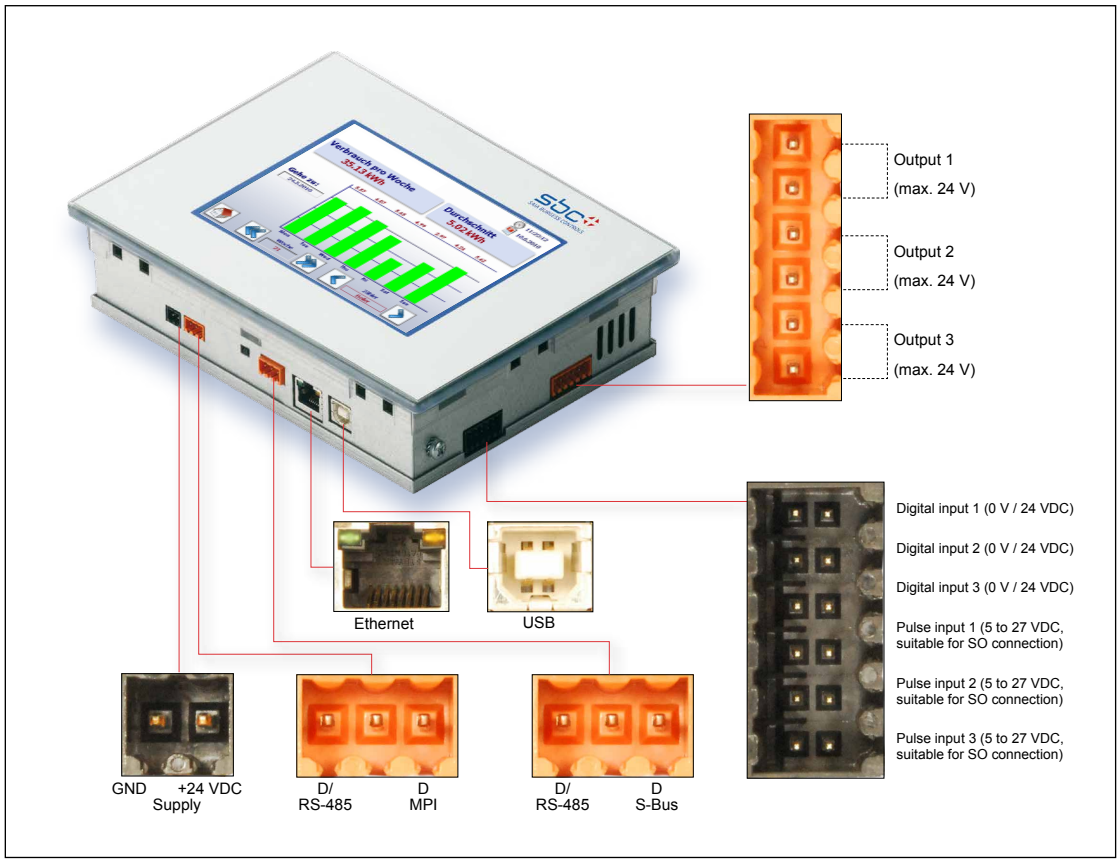
Using S-Web technology combined with the Micro Browser Panel systems, operation can be made transparent and clear for all users. Each individual operating side has a fully flexible design and can be created using the standard objects or existing function templates.

▲ DDC Suite / HVAC templates created with Saia PG5® Web Editor 8

▲ My HMI: Web pages created with Saia PG5® Web Editor 8

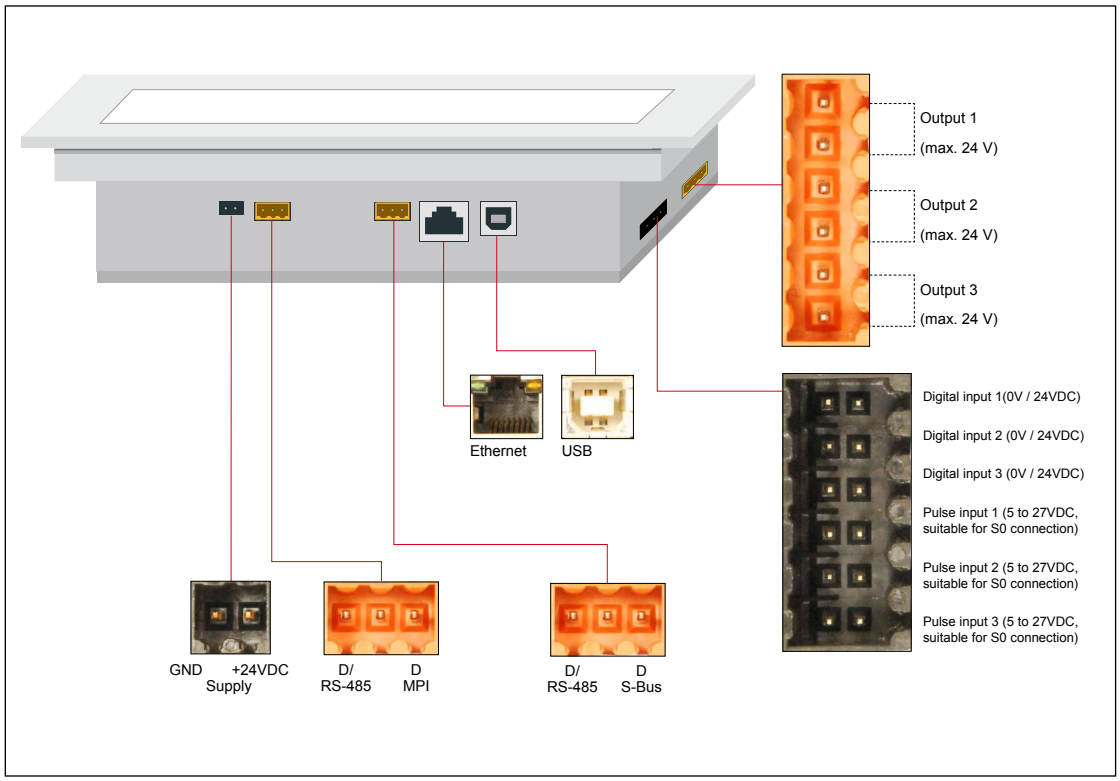
For further information, see the "S-Web technology" section

12.5 Connections for 5.7" Energy Manager



12

12.6 Connections for 10.4" Energy Manager



12.7 General data

Temperature range
• When in operation: 0 to 50 °C standard
• When stored: –25 to 70 °C

Humidity
• When in operation: 10 to 80 % without condensation (CE-compliant standard room)
• When stored: 10 to 98 % condensation

IP protection
• Front: IP65

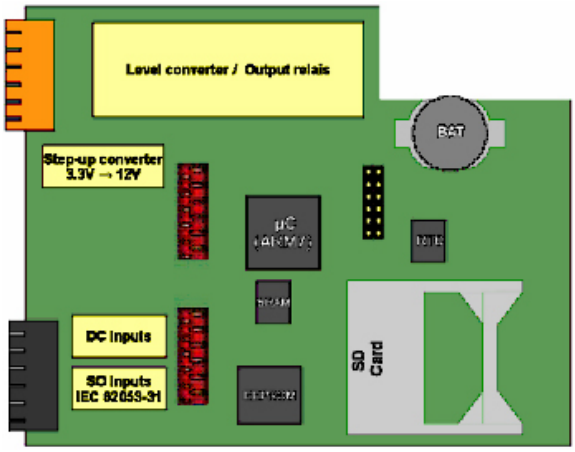
Vibrations
• IEC60068-2-6

Impact
• IEC60068-2-6

EMC resistance to interference and noise
IEC61131-2:2003

12.8 Integrated input and output module

A special input/output module designed primarily for energy management functions is integrated into the Saia PCD® Web Panel's circuit board.



12

12.8.1 SD memory card

The Energy Manager panel has a 1 GB (1,024 MB) SD memory card.

Features:

- 1,024 MB SD memory card
- FAT16 formatted
- Min. 9 MB/s,
- Oper. temperature range: –25 to 85 °C,
- Lifetime: 10,000 mating cycles
- Min. 1,000,000 read/write cycles

An additional card can be requested with the order number PCD7.R-SD1024.

12.8.2 Battery

The Energy Manager panel has a 3 V lithium battery.

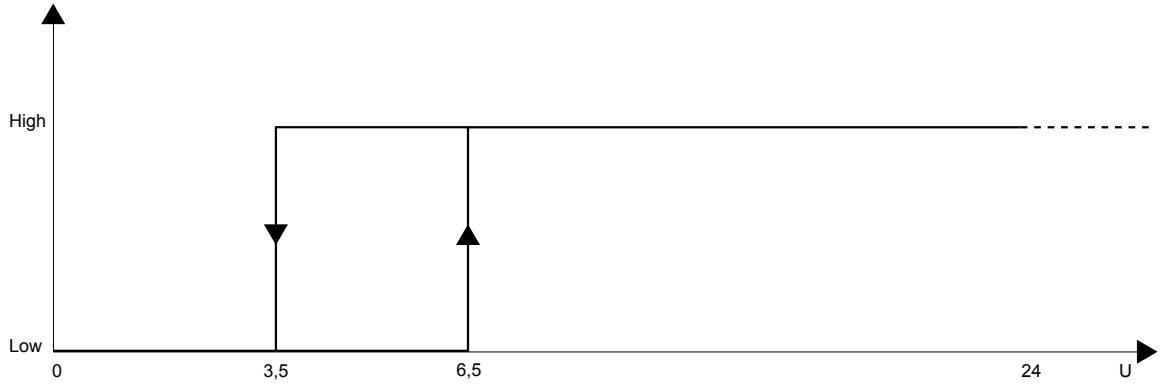
Features:

- 3 V lithium battery 200 mAh
- Li/MnO_2 (IEC60086)
- Standard discharge current 0.4 mA
- Max. discharge current 3.0 mA
- Temperature range –30 to +70 °C
- Self-discharge at 23 °C: <1%/year
- An additional battery can be requested with the order number 450748170.

12.8.3 Digital inputs

The Energy Manager panel has three digital inputs.

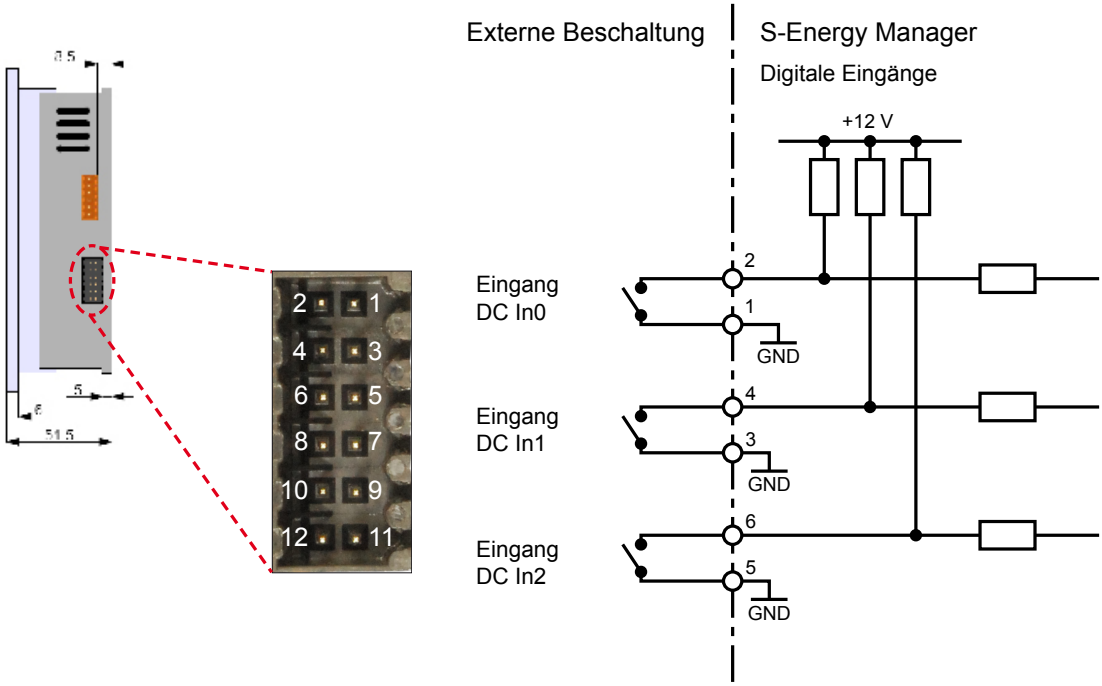
Definition of input signals:



Features:

- Input voltage 24 VDC (15 to 30 VDC) smoothed or pulsating
- 4 mA input current per input at 24 VDC
- Typical input delay of 8 ms
- Resistant to interference as specified by IEC61000-4-4

Connection diagram



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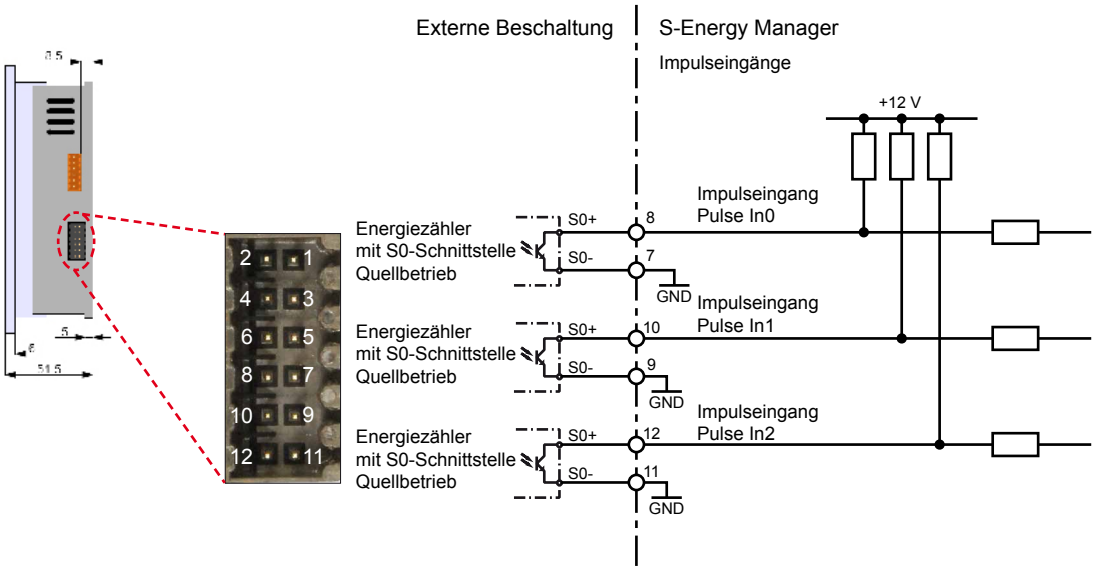
12.8.4 Pulse inputs

The Energy Manager panel has three pulse inputs. Pulse meters that transmit the S0 counting pulses can be connected to these.

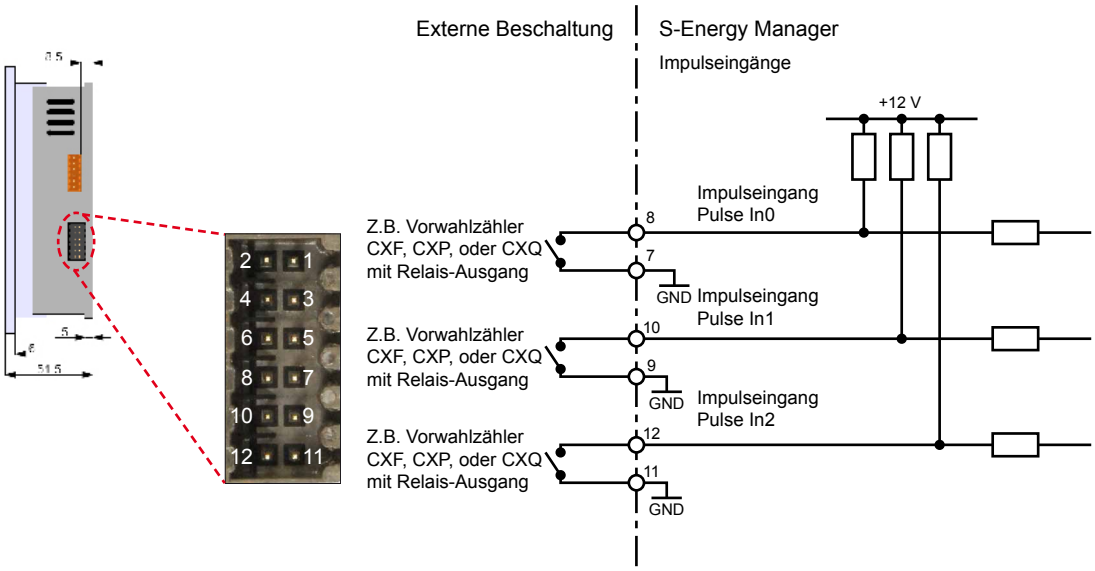
Features:

- Pulse signals as specified by the pulse meter standard CEI62053-031
- For precise power management and individual billing in shared facilities

Connection diagram with an S0 energy meter:



Connection diagram with another meter:



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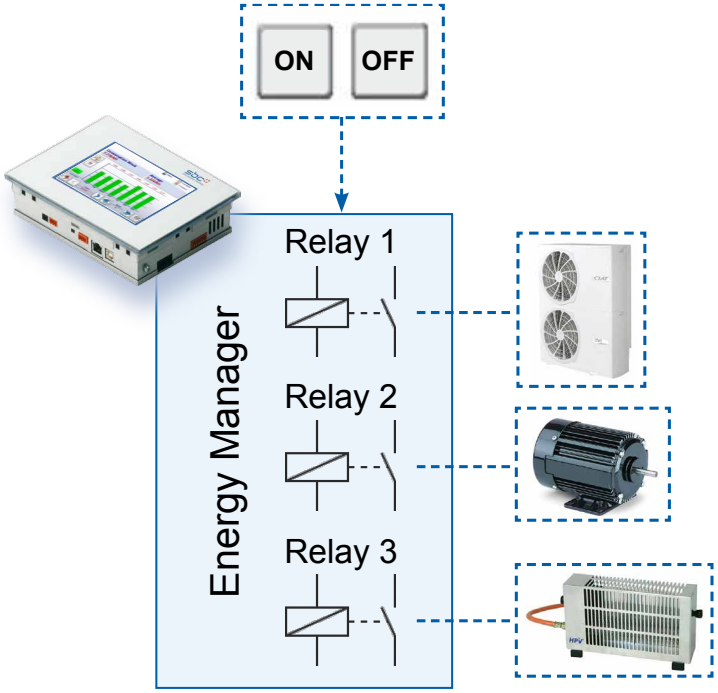
12.8.5 Outputs

The Energy Manager has three switchable outputs.

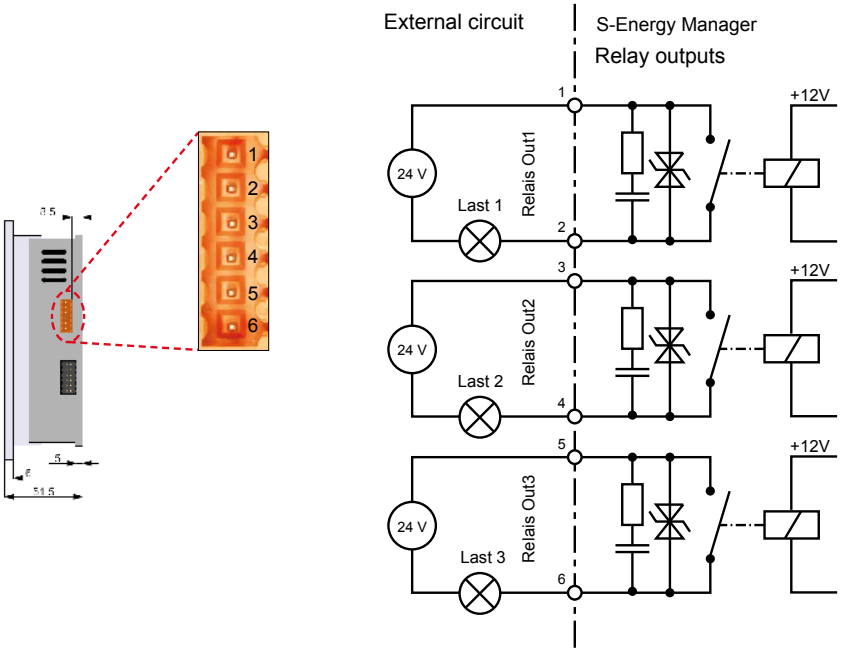
Features:

- Switch voltage 24 VAC / DC /1 A
- Test voltage 4 kV

By default, the outputs are configured so that they can be switched on/off with a single button.

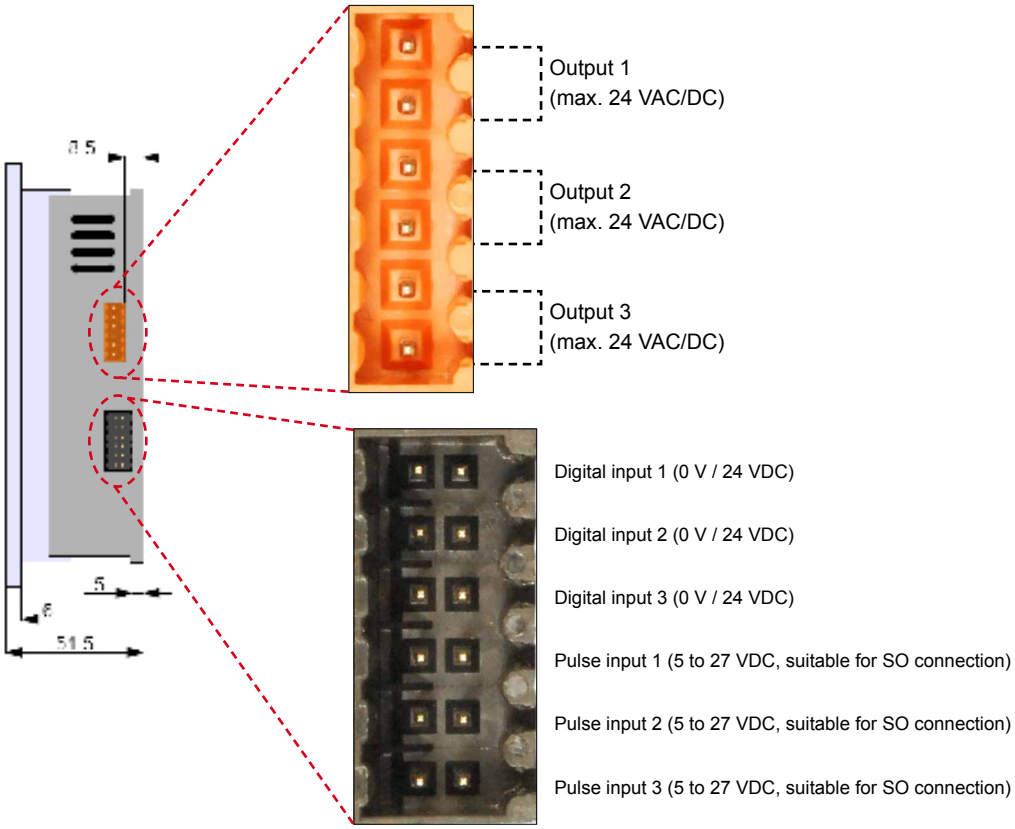


Connection diagram:



12

12.8.6 Cabling for inputs and outputs



13 Supported devices

ALD1	ALD1B5FS00A2A00
	ALD1B5FS00A3A00
	ALD1D5FS00A2A00
	ALD1D5FS00A3A00
ALE3	ALE3B5FS00C2A00
	ALE3B5FS00C3A00
	ALE3D5FS10C2A00
	ALE3D5FS10C3A00
AWC3	AWC3D5WS00C2A00
	AWC3D5WS00C3A00
AWD1	AWD1D5WS00A2A00
AWD3	AWD3B5WS00C2A00
	AWD3B5WS00C3A00
	AWD3D5WS00C2A00
	AWD3D5WS00C3A00
	AWD3D5WS00D2A00
H104	PCD7.H104SE

13.1 Saia PCD® energy meters with S-Bus

The Saia PCD® energy meters in the ALD, ALE and AWD family with integrated serial S-Net interface enable all relevant data to be read out, e.g. energy (total and partial), current and voltage per phase, active power and reactive power per phase or total.

Features:

- Single-phase or 3-phase energy meters
- Accuracy class B in accordance with EN50470-3, class 1 in accordance with IEC62053-21
- 128 devices can be connected to the S-Bus.
- The interface only functions if phase 1 is connected.
- The communication is ready 30 seconds after the meter is switched on.
- The data is updated every 10 seconds.
- The S-Bus interface has no termination resistor; this can be provided by the Energy Manager panel (see Chapter 14, S-Bus communication).

13.2 Changing the S-Bus address on ALE3 and AWD3

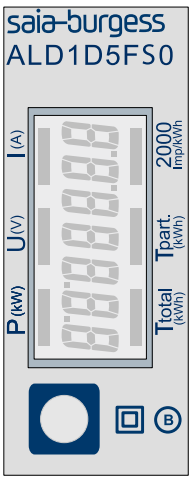
1. Press the ► button for 3 seconds to change the S-Bus address.
2. In the menu, ▼ increases the address by 10, while ► increases the address by 1.
3. Once the desired address has been reached, wait until the main display appears again.

13.3 Changing the S-Bus address on ALD1

- In the menu, select “U”
- Hold down (≥ 3 seconds) → “SBUS-ADR”
- Hold down → S-Bus address +1 briefly, hold down → S-Bus address +10 for longer
- Once the desired address has been selected, wait until the check has been completed and the main menu appears again.

See also Section 2.1 “Installing the energy meter”

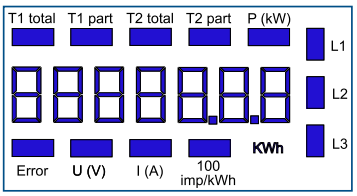
13.4 Displayed values on ALD1



- T total (kWh) Shows the total consumption
- T total (kWh) Shows the partial consumption This value can be reset
- P (kW) Shows the present output
- U (V) Shows the voltage
- I (A) Shows the current
- 2,000 pulses/kWh Pulse corresponds to the drawn output Error display (line 1L/2L inverted) pulses at 600/600 ms

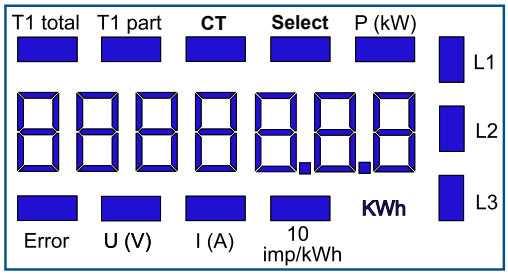
13

13.5 Displayed values on ALE3



T1total	Shows the total consumption for Tariff 1
T1part	Shows the partial consumption for Tariff 1; this value can be reset
T2total	Shows the total consumption for Tariff 2
T2part	Shows the partial consumption for Tariff 2; this value can be reset
P(kW)	Shows the present output per phase or for all phases
U(V)	Shows the voltage per phase
I(A)	Shows the current per phase
100 Imp/kWh	Pulse corresponds to the drawn output
kWh	Shows the kWh unit for the consumption display
Error	For a missing phase or for an incorrect direction of current flow. The corresponding phase is also displayed.
L1 / L2 / L3	The corresponding phase is displayed in the P, U, I or error display

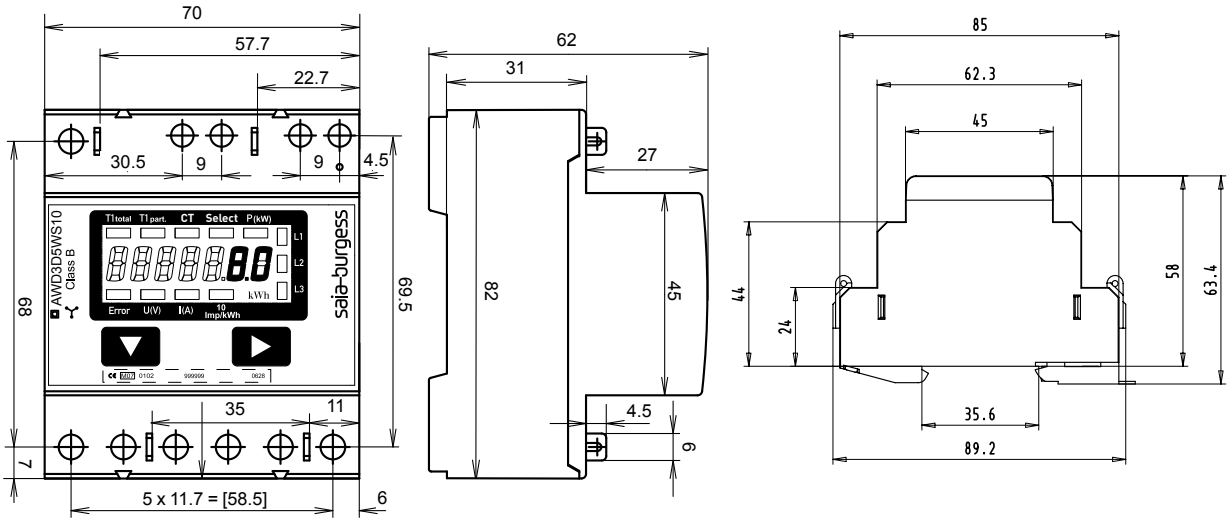
13.6 Displayed values on AWD3



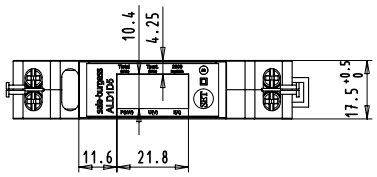
T1total	Shows the total consumption for Tariff 1
T1part	Shows the partial consumption for Tariff 1; this value can be reset
CT	Shows the set current transformation ratio
Select	The transformation ratio can be set under the menu item Select with an open Z1-Z2 bridge
P(kW)	Shows the present output per phase or for all phases
U(V)	Shows the voltage per phase
I(A)	Shows the current per phase
10 Imp/kWh	Pulse corresponds to the drawn output
kWh	Shows the kWh unit for the consumption display
Error	For a missing phase or for an incorrect direction of current flow. The corresponding phase is also displayed.
L1 / L2 / L3	The corresponding phase is displayed in the P, U, I or error display

13.7 Dimensions

Dimensions of ALE3 and AWD3



Dimensions of ALD1



13

13.8 Accessing energy meter data

13.8.1 ALD1

Registers

The following registers are available via the S-Bus. The 4, 10, 11, 12, 13, 18, 19, 22 and 23 registers are not used and always return 0 as the reply.

R	Read	Write	Description	Value
0	X		Firmware version	E.g.: "11" = FW 1.1
1	X		Number of supported registers	"29" is output
2	X		Number of supported flags	"0" is output
3	X		BAUDRATE	BPS
4	X		Not used	"0" is output
5	X		Type/ASN function	"ALD1" is output
6	X		Type/ASN function	"D5FS" is output
7	X		Type/ASN function	"00A" is output
8	X		Type/ASN function	" " is output
9	X		Hardware version	E.g.: "11" = FW 1.1
10	X		Not used	"0" is output
11	X		Not used	"0" is output
12	X		Not used	"0" is output
13	X		Not used	"0" is output
14	X		Status/protection	"0" = no problem "1" = problem with the last communication query
15	X		S-Bus timeout	ms
16	X	X	S-Bus address	
17	X		Error flags	0 : No error 1 : Error
18	X		Not used	"0" is output
19	X		Not used	"0" is output
20	X		Energy meter, total	10^{-2} kWh (Multiplier 0.01) E.g.: 00912351 = 009123.51 kWh
21	X	X	Energy meter, partial 0 must be written to reset the meter	10^{-2} kWh (Multiplier 0.01) E.g.: 00912351 = 009123.51 kWh
22	X		Not used	"0" is output
23	X		Not used	"0" is output
24	X		Active voltage	V E.g.: 230 = 230 V
25	X		Active current	10^{-1} A (Multiplier 0.1) E.g.: 314 = 31.4 A
26	X		Effective active power	10^{-2} kW (Multiplier 0.01) E.g.: 1545 = 15.45 kW
27	X		Effective reactive power	10^{-2} kVA (Multiplier 0.01) E.g.: 1545 = 15.45 kVA
28	X		Phase angle cos phi	10^{-2} (Multiplier 0.01) E.g.: 67 = 0.67

13.8.2 ALE3

Registers

The following registers are available via the S-Bus. The 4, 10, 11, 12, 13, and 18 registers are not used and always return 0 as the reply.

R	Read	Write	Description	Value
0	X		Firmware version	E.g.: "11" = FW 1.1
1	X		Number of supported registers	"41" is output
2	X		Number of supported flags	"0" is output
3	X		BAUDRATE	BPS
4	X		Not used	"0" is output
5	X		Type/ASN function	"ALE3" is output
6	X		Type/ASN function	"D5FS" is output
7	X		Type/ASN function	"10C" is output
8	X		Type/ASN function	" " is output
9	X		Hardware version	E.g.: "11" = FW 1.1
10	X		Not used	"0" is output
11	X		Not used	"0" is output
12	X	X	Not used	"0" is output
13	X	X	Not used	"0" is output
14	X		Status/protection	"0" = no problem "1" = problem with the last communication query
15	X		S-Bus timeout	ms
16	X	X	S-bus address	
17	X		Error flags	0 : No error 1 : Error phase 1 2 : Error phase 2 3 : Error phase 1 and 2 4 : Error phase 3 5 : Error phase 1 and 3 6 : Error phase 2 and 3 7 : Error phase 1, 2 and 3
18	X		Not used	"0" is output
19	X		Tariff flag	0 is Tariff 1 4 is Tariff 2
20	X		WT1 total Energy meter, total Tariff 1	10^{-2} kWh (Multiplier 0.01) E.g.: 00912351 = 009123.51 kWh
21	X	X	WT1 partial Energy meter, partial Tariff 1 0 must be written to reset the meter	10^{-2} kWh (Multiplier 0.01) E.g.: 00912351 = 009123.51 kWh
22	X		WT2 total Energy meter, total Tariff 2	10^{-2} kWh (Multiplier 0.01) E.g.: 00912351 = 009123.51 kWh
23	X	X	WT2 partial Energy meter, partial Tariff 2 0 must be written to reset the meter	10^{-2} kWh (Multiplier 0.01) E.g.: 00912351 = 009123.51 kWh
24	X		URMS phase 1 Active voltage phase 1	V E.g.: 230 = 230 V
25	X		IRMS phase 1 Active current phase 1	10^{-1} A (Multiplier 0.1) E.g.: 314 = 31.4 A
26	X		PRMS phase 1 Effective active power phase 1	10^{-2} kW (Multiplier 0.01) E.g.: 1545 = 15.45 kW
27	X		QRMS phase 1 Effective reactive power phase 1	10^{-2} kVA (Multiplier 0.01) E.g.: 1545 = 15.45 kVA
28	X		Cos phi phase 1	10^{-2} (Multiplier 0.01) E.g.: 67 = 0.67
29	X		URMS phase 2 Active voltage phase 2	V E.g.: 230 = 230 V
30	X		IRMS phase 2 Active current phase 2	10^{-1} A (Multiplier 0.1) E.g.: 314 = 31.4 A
31	X		PRMS phase 2 Effective active power phase 2	10^{-2} kW (Multiplier 0.01) E.g.: 1545 = 15.45 kW
32	X		QRMS phase 2 Effective reactive power phase 2	10^{-2} kVA (Multiplier 0.01) E.g.: 1545 = 15.45 kVA
33	X		Cos phi phase 2	10^{-2} (Multiplier 0.01) E.g.: 67 = 0.67
34	X		URMS phase 3 Active voltage phase 3	V E.g.: 230 = 230 V
35	X		IRMS phase 3 Active current phase 3	10^{-1} A (Multiplier 0.1) E.g.: 314 = 31.4 A
36	X		PRMS phase 3 Effective active power phase 2	10^{-2} kW (Multiplier 0.01) E.g.: 1545 = 15.45 kW
37	X		QRMS phase 3 Effective reactive power phase 3	10^{-2} kVA (Multiplier 0.01) E.g.: 1545 = 15.45 kVA
38	X		Cos phi phase 3	10^{-2} (Multiplier 0.01) E.g.: 67 = 0.67
39	X		PRMS total Effective active power of all phases	10^{-2} kW (Multiplier 0.01) E.g.: 1545 = 15.45 kW
40	X		QRMS total Effective reactive power of all phases	10^{-2} kVA (Multiplier 0.01) E.g.: 1545 = 15.45 kVA

13.8.3 AWD3

Registers

The following registers are available via the S-Bus. Various registers are not implemented for the pilot and return 0 as the reply. All values are in HEX.

R	Read	Write	Description	Value
0	X		Firmware version	E.g.: "11" = FW 1.1
1	X		Number of supported registers	"41" is output
2	X		Number of supported flags	"0" is output
3	X		BAUDRATE	BPS
4	X		Not used	"0" is output
5	X		Type/ASN function	"AWD3" is output
6	X		Type/ASN function	"D5WS" is output
7	X		Type/ASN function	"00C" is output
8	X		Type/ASN function	" " is output
9	X		Hardware version modif.	E.g.: "11" = FW 1.1
10	X		Not used	"0" is output
11	X		Not used	"0" is output
12	X	X	Not used	"0" is output
13	X	X	Not used	"0" is output
14	X		Status/protection	"0" = no problem "1" = problem with the last communication query
15	X		S-Bus timeout	ms
16	X	X	S-bus address	
17	X		Error flags	0 : No error 1 : Error phase 1 2 Error phase 2 3. Error phase 1 and 2 4: Error phase 3 5 Error phase 1 and 3 6: Error phase 2 and 3 7 Error phase 1, 2 and 3
18	X		Current transformation ratio	E.g.: Transformer 100 / 5 outputs 20
19	X		Tariff flag	0 is Tariff 1 4 is Tariff 2
20	X		WT1 total Energy meter, total Tariff 1	10^{-1} kWh (Multiplier 0.1) E.g.: 00912351 = 0091235.1 kWh
21	X	X	WT1 partial Energy meter, partial Tariff 1 0 must be written to reset the meter	10^{-1} kWh (Multiplier 0.1) E.g.: 00912351 = 0091235.1 kWh
22	X		Not used	"0" is output
23	X	X	Not used	"0" is output
24	X		URMS phase 1 Active voltage phase 1	V E.g.: 230 = 230 V
25	X		IRMS phase 1 Active current phase 1	A / Except. 5/5 = 10^{-1} A E.g.: 145 = 145 A
26	X		PRMS phase 1 Effective active power phase 1	10^{-1} kW (Multiplier 0.1) E.g.: 1545 = 154.5 kW
27	X		QRMS phase 1 Effective reactive power phase 1	10^{-1} kVA (Multiplier 0.1) E.g.: 1545 = 154.5 kVA
28	X		Cos phi phase 1	10^{-2} (Multiplier 0.01) E.g.: 67 = 0.67
29	X		URMS phase 2 Active voltage phase 2	V E.g.: 230 = 230 V
30	X		IRMS phase 2 Active current phase 2	A / Except. 5/5 = 10^{-1} A E.g.: 145 = 145 A
31	X		PRMS phase 2 Effective active power phase 2	10^{-1} kW (Multiplier 0.1) E.g.: 1545 = 154.5 kW
32	X		QRMS phase 2 Effective reactive power phase 2	10^{-1} kVA (Multiplier 0.1) E.g.: 1545 = 154.5 kVA
33	X		Cos phi phase 2	10^{-2} (Multiplier 0.01) E.g.: 67 = 0.67
34	X		URMS phase 3 Active voltage phase 3	V E.g.: 230 = 230 V
35	X		IRMS phase 3 Active current phase 3	A / Except. 5/5 = 10^{-1} A E.g.: 145 = 145 A
36	X		PRMS phase 3 Effective active power phase 2	10^{-1} kW (Multiplier 0.1) E.g.: 1545 = 154.5 kW
37	X		QRMS phase 3 Effective reactive power phase 3	10^{-1} kVA (Multiplier 0.1) E.g.: 1545 = 154.5 kVA
38	X		Cos phi phase 3	10^{-2} (Multiplier 0.01) E.g.: 67 = 0.67
39	X		PRMS total Effective active power of all phases	10^{-1} kW (Multiplier 0.1) E.g.: 1545 = 154.5 kW
40	X		QRMS total Effective reactive power of all phases	10^{-1} kVA (Multiplier 0.1) E.g.: 1545 = 154.5 kVA

13.8.4 PCD7.H104SE

R	Read	Write	Description	Unit or values
0	X		Firmware version	Ex: "10" = FW 1.0
1	X		Number of supported registers	Reply: "38"
2	X		Number of supported flags	Reply: "0"
3	X		BAUDRATE	BPS
4	X		Not used	Reply: "0"
5	X		Type/ASN function	Reply: "PCD7"
6	X		Type/ASN function	Reply: "H104"
7	X		Type/ASN function	Reply: "SE"
8	X		Type/ASN function	Reply: "0"
9	X		Hardware version modif.	Ex: "10" = HW 1.0
10	X		Not used	Reply: "0"
11	X		Not used	Reply: "0"
12	X		Serial number	The serial number is output
13	X		Not used	Reply: "0"
14	X		Status/Protect	"0" = no problem "1" = problem with the last communication query
15	X		S-Bus timeout	Value in ms
16	X		S-Bus address	0-99
17	X		Not used	Reply: "0"
18	X		Not used	Reply: "0"
19	X		Not used	Reply: "0"
20	X	X	S01 counter	E.g.: 912351 = 912351/2000 = 456.2 kWh
21	X	X	S02 counter	E.g.: 912351 = 912351/2000 = 456.2 kWh
22	X	X	S03 counter	E.g.: 912351 = 912351/2000 = 456.2 kWh
23	X	X	S04 counter	E.g.: 912351 = 912351/2000 = 456.2 kWh
24	X	X	Pulses per unit for S01	E.g.: 2,000 = 2,000 Imp/kWh
25	X	X	Pulses per unit for S02	E.g.: 2000 = 2,000 Imp/kWh
26	X	X	Pulses per unit for S03	E.g.: 2000 = 2,000 Imp/kWh
27	X	X	Pulses per unit for S04	E.g.: 2000 = 2,000 Imp/kWh
28	X	X	ID for S01	User-defined ID number
29	X	X	ID for S02	User-defined ID number
30	X	X	ID for S03	User-defined ID number
31	X	X	ID for S04	User-defined ID number
32	X		Not used	Reply: "0"
33	X		Not used	Reply: "0"
34	X		Not used	Reply: "0"
35	X		Not used	Reply: "0"
36	X	X	Transmission speed	1: 115200 2: 57600 3: 38400 4: 19200 5: 9600 6: 4800 7: 2400
37	X	X	Auto-Baud ON	0: Auto-Baud detect OFF 1: Auto-Baud detect ON

13.8.5 Bidirectional energy meter ALD1

R	Reading	Writing	Description	Values
0	X		Firmware version	Ex: «11» = FW 1.1
1	X		Number of supported registers	Issues «29»
2	X		Number of supported flags	Issues «0»
3	X		Baud rate	BPS
4	X		Not used	Issues «0»
5	X		Type/ASN function	Issues «ALD1»
6	X		Type/ASN function	Issues «B5FS»
7	X		Type/ASN function	Issues «00Ax» x: 2 = Non MID ; x: 1 = MID
8	X		Type/ASN function	Issues «A00»
9	X		HW version modif	Ex: «11» = FW 1.1
10			Not used	Issues «0»
11	X		Serial number	Higher part of serialnumber
12	X		Serial number	Lower part of serialnumber
13			Not used	Issues «0»
14	X		Status	«0» = no problem «1» = problems with the last communication query
15	X		S-bus time-out	ms
16	X	X	S-bus address	
17	X		Flags error	0: No errors 1: Error(s)
18			Not used	Issues «0»
19	X		Energy direction register	0 = energy direction «consumption» 4= energy direction «feeding back»
20	X		Counter total «energy consumption»	10^{-2} kWh. (multiplier 0.01) Example: 00912351= 009123.51 kWh
21	X		Counter total «energy feedback»	10^{-2} kWh. (multiplier 0.01) Example: 00912351= 009123.51 kWh
22			Not used	Issues «0»
23			Not used	Issues «0»
24	X		Effective value, voltage	V Example: 230 = 230 V
25	X		Effective value, current	10^{-1} A (multiplier 0.1) Example: 314 = 31.4 A
26	X		Effective value, active power positive: Energy «➡» negative: Energy «⬅»	10^{-2} kW (multiplier 0.01) Example: 1545 = 15.45 kW
27	X		Effective value, idle power	10^{-2} kvar (multiplier 0.01) Example: 1545 = 15.45 kvar
28	X		Cos phi	10^{-2} (multiplier 0.01) Example: 67 = 0.67

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13.8.6 Bidirectional energy meter ALE3

R	Read	Write	Description	Values	
0	X		Firmware version	Ex: «11» = FW 1.1	
1	X		Number of supported registers	Will give «41»	
2	X		Number of supported flags	Will give «0»	
3	X		Baud rate	BPS	
4			Not used	Will give «0»	
5	X		Type/ASN function	Will give «ALE3»	
6	X		Type/ASN function	Will give «B5FS»	
7	X		Type/ASN function	Will give «00Cx» x : 2 = non MID x : 3 = MID	
8	X		Type/ASN function	Will give «A00»	
9	X		HW version modif	Ex: «11» = FW 1.1	
10			Not used	Will give «0»	
11	X		Serial number	serial number high	
12	X		Serial number	serial number low	
13			Not used	Will give «0»	
14	X		Status/Protect	«0» = no problem «1» = problems with the last communication query	
15	X		S-bus timeout	ms	
16	X	X	S-bus address		
17	X		Flags error	0: No errors 1: Error, phase 1 2: Error, phase 2 3: Error, phase 1 and 2	4: Error, phase 3 5: Error, phase 1 and 3 6: Error, phase 2 and 3 7: Error, phase 1, 2 and 3
18			Not used	Will give «0»	
19	X		Energy direction register	0 = energy direction «consumption» 4 = energy direction «feedback»	
20	X		Counter total «energy → consumption»	10^{-2} kWh (multiplier 0.01) Example: 00912351= 009123.51 kWh	
21	X	X	Counter partial «energy → consumption» Every written value deletes the counter.	10^{-2} kWh (multiplier 0.01) Example: 00912351= 009123.51 kWh	
22	X		Counter total «energy ← feedback»	10^{-2} kWh (multiplier 0.01) Example: 00912351= 009123.51 kWh	
23	X	X	Counter partial «energy ← feedback» Every written value deletes the counter.	10^{-2} kWh (multiplier 0.01) Example: 00912351= 009123.51 kWh	
24	X		URMS, phase 1 Voltage, phase 1	V Example: 230 = 230 V	
25	X		IRMS, phase 1 Current, phase 1	10^{-1} A (multiplier 0.1) Example: 314 = 31.4 A	
26	X		PRMS, phase 1 Output, phase 1 positive: Energy "→" negative: Energy "←"	10^{-2} kW (multiplier 0.01) Example: 1545 = 15.45 kW	
27	X		QRMS, phase 1 Idle power, phase 1	10^{-2} kvar (multiplier 0.01) Example: 1545 = 15.45 kvar	
28	X		Cos phi, phase 1	10^{-2} (multiplier 0.01) Example: 67 = 0.67	
29	X		URMS, phase 2 Voltage, phase 2	V Example: 230 = 230 V	
30	X		IRMS, phase 2 Current, phase 2	10^{-1} A (multiplier 0.1) Example: 314 = 31.4 A	
31	X		PRMS, phase 2 Output, phase 2 positive: Energy "→" negative: Energy "←"	10^{-2} kW (multiplier 0.01) Example: 1545 = 15.45 kW	
32	X		QRMS, phase 2 Idle power, phase 2	10^{-2} kvar (multiplier 0.01) Example: 1545 = 15.45 kvar	
33	X		Cos phi, phase 2	10^{-2} (multiplier 0.01) Example: 67 = 0.67	
34	X		URMS, phase 3 Voltage, phase 3	V Example: 230 = 230 V	
35	X		IRMS, phase 3 Current, phase 3	10^{-1} A (multiplier 0.1) Example: 314 = 31.4 A	
36	X		PRMS, phase 3 Output, phase 3 positive: Energy "→" negative: Energy "←"	10^{-2} kW (multiplier 0.01) Example: 1545 = 15.45 kW	
37	X		QRMS, phase 2 Idle power, phase 3	10^{-2} kvar (multiplier 0.01) Example: 1545 = 15.45 kvar	
38	X		Cos phi, phase 3	10^{-2} (multiplier 0.01) Example: 67 = 0.67	
39	X		PRMS, total Output, total positive: Energy "→" negative: Energy "←"	10^{-2} kW (multiplier 0.01) Example: 1545 = 15.45 kW	
40	X		QRMS, total Idle power, total:	10^{-2} kvar (multiplier 0.01) Example: 1545 = 15.45 kvar	

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13.8.7 Bidirectional energy meter AWD

R	Read	Write	Description	Values	
0	X		Firmware version	Ex: «11» = FW 1.1	
1	X		Number of supported register	Will give «41»	
2	X		Number of supported flags	Will give «0»	
3	X		Baud rate	BPS	
4			Not used	Will give «0»	
5	X		Type/ASN function	Will give «AWD3»	
6	X		Type/ASN function	Will give «B5WS»	
7	X		Type/ASN function	Will give «00Cx» x : 2 = Non MID x : 3 = MID	
8	X		Type/ASN function	Will give «A00»	
9	X		HW version modif	Ex: «11» = FW 1.1	
10			Not used	Will give «0»	
11	X		Serial number	Serial number high	
12	X		serial number	Serial number low	
13			Not used	Will give «0»	
14	X		Status	«0» = no problem «1» = problems with the last communication query	
15	X		S-bus timeout	ms	
16	X	X	S-bus address		
17	X		Flags error	0: No errors 1: Error, phase 1 2: Error, phase 2 3: Error, phase 1 and 2	4: Error, phase 3 5: Error, phase 1 and 3 6: Error, phase 2 and 3 7: Error, phase 1, 2 and 3
18	X		Converter ratio	Example: Converter 100/5 Will give 20	
19	X		Energy direction register	0 = energy direction «consumption» 4 = energy direction «feedback»	
20	X		Counter total «energy → consumption»	10^{-1} kWh (multiplier 0.1) Example: 00912351= 0091235.1 kWh	
21	X		Counter total «energy ← feedback»	10^{-1} kWh (multiplier 0.1) Example: 00912351= 0091235.1 kWh	
22			Not used		
23			Not used		
24	X		URMS, phase 1 Voltage, phase 1	V Example: 230 = 230 V	
25	X		IRMS, phase 1 Current, phase 1	A / Except. 5/5=10^{-1} A Example: 145 = 145 A	
26	X		PRMS, phase 1 Output, phase 1 positive: Energy "→" negative: Energy "←"	10^{-1} kW (multiplier 0.1) Example: 1545 = 154.5 kW	
27	X		QRMS, phase 1 Idle power, phase 1	10^{-1} kvar (multiplier 0.1) Example: 1545 = 154.5 kvar	
28	X		Cos phi, phase 1	10^{-2} (multiplier 0.01) Example: 67 = 0.67	
29	X		URMS, phase 2 Voltage, phase 2	V Example: 230 = 230 V	
30	X		IRMS, phase 2 Current, phase 2	A / Except. 5/5=10^{-1} A Example: 145 = 145 A	
31	X		PRMS, phase 2 Output, phase 2 positive: Energy "→" negative: Energy "←"	10^{-2} kW (multiplier 0.1) Example: 1545 = 154.5 kW	
32	X		QRMS, phase 2 Idle power, phase 2	10^{-1} kvar (multiplier 0.1) Example: 1545 = 154.5 kvar	
33	X		Cos phi, phase 2	10^{-2} (multiplier 0.01) Example: 67 = 0.67	
34	X		URMS, phase 3 Voltage, phase 3	V Example: 230 = 230 V	
35	X		IRMS, phase 3 Current, phase 3	A / Except. 5/5=10^{-1} A Example: 145 = 145 A	
36	X		PRMS, phase 3 Output, phase 3 positive: Energy "→" negative: Energy "←"	10^{-1} kW (multiplier 0.1) Example: 1545 = 154.5 kW	
37	X		QRMS, phase 2 Idle power, phase 3	10^{-1} kvar (multiplier 0.1) Example: 1545 = 154.5 kvar	
38	X		Cos phi, phase 3	10^{-2} (multiplier 0.01) Example: 67 = 0.67	
39	X		PRMS, total Output, total positive: Energy "→" negative: Energy "←"	10^{-1} kW (multiplier 0.1) Example: 1545 = 154.5 kW	
40	X		QRMS, total Idle power, total:	10^{-1} kvar (multiplier 0.1) Example: 1545 = 154.5 kvar	

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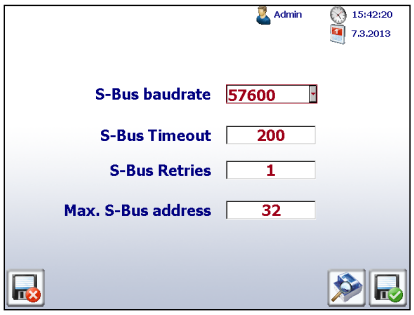
14 Communication

14.1 S-Bus communication via RS-485

The Energy Manager panel has an S-Bus interface that can be used in the RS-485 network.

Setup ➞ Bus settings ➞ S-Bus



S-Bus timeout: Timeout in the S-Bus log

S-Bus (repetitions): The number of repetitions in the S-Bus log

S-Bus baud rate*: Valid baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200

(Max. S-Bus address) The meter search is carried out (scanned) up to this S-Bus address.

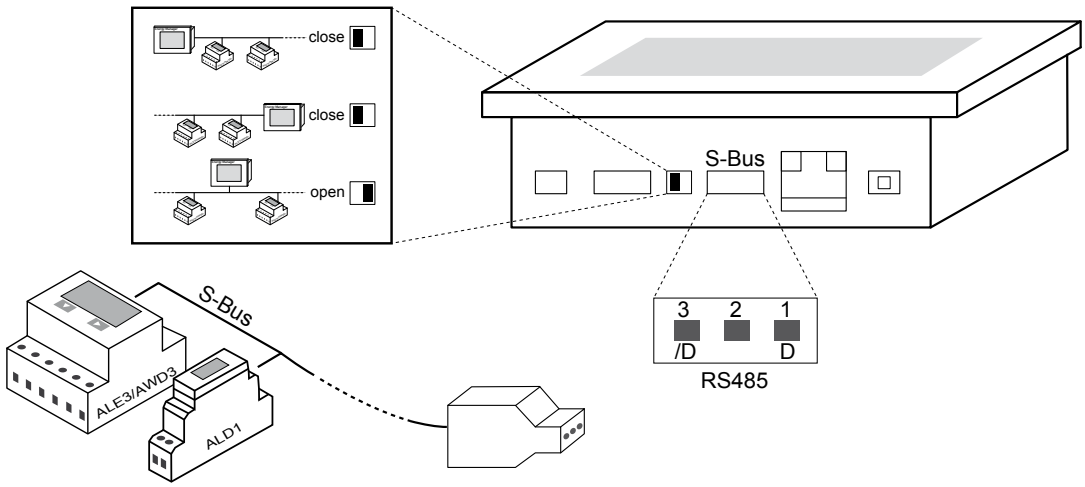
The Energy Manager has the S-Bus address 2 and the MPI address 2.

Make sure that the termination resistors are placed correctly in the RS-485 network.

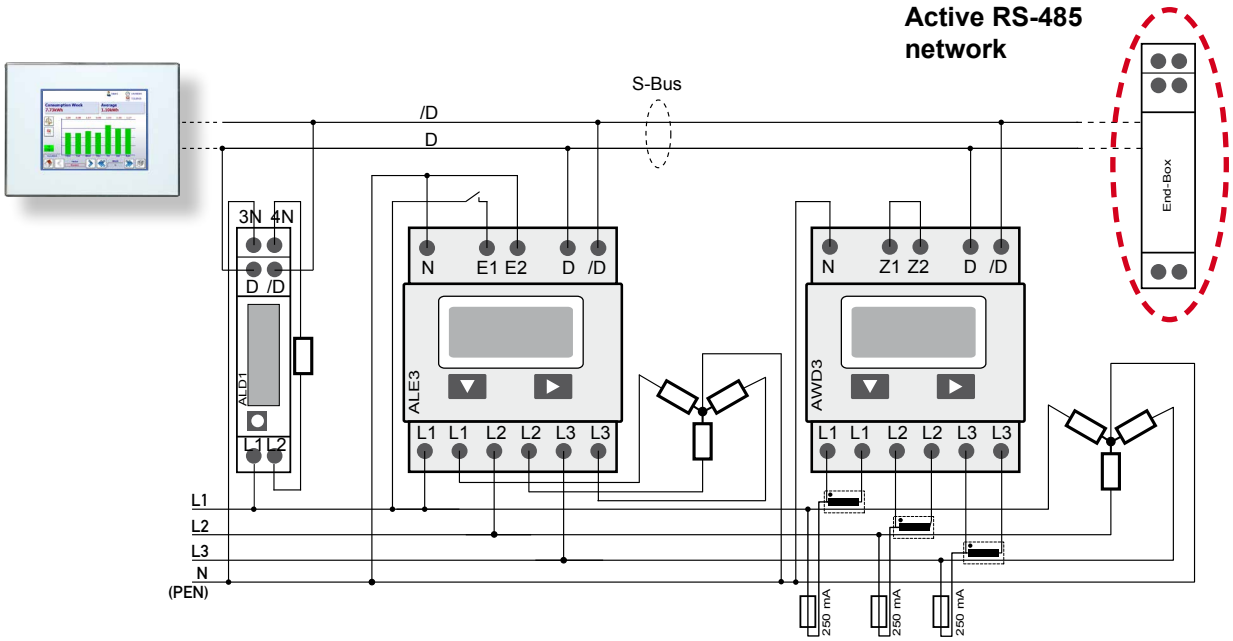
*See chapter A2

14.1.1 Termination resistor in the Saia PCD® Energy Manager

The network should be equipped with termination resistors to prevent reflections in the communication channel. The Energy Manager panel has these termination resistors. These can be opened or closed with a switch.

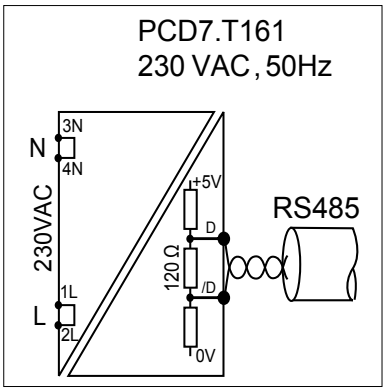


14.1.2 Terminator Box

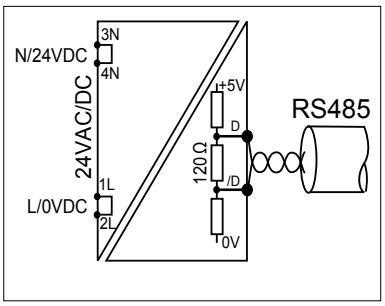


We recommend the following Saia products for terminating the RS-485 network:

- Terminator Box RS-485 230VAC
  Order number: PCD7.T161



- Terminator Box RS-485 24VAC/DC
  Order number: PCD7.T162



Please contact Saia Support for further information or download it at www.sbc-support.ch

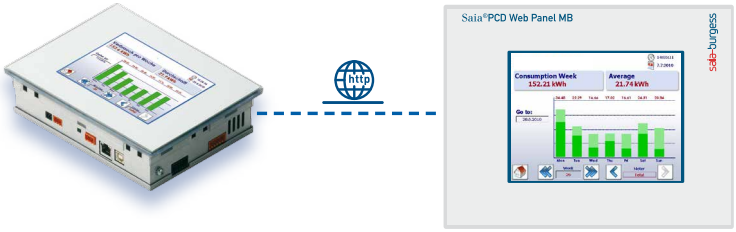
14.2 Recording, logging or visualising energy meter data

Please observe the instructions in Chapter 2 “Step-by-Step – Quick Guide”.

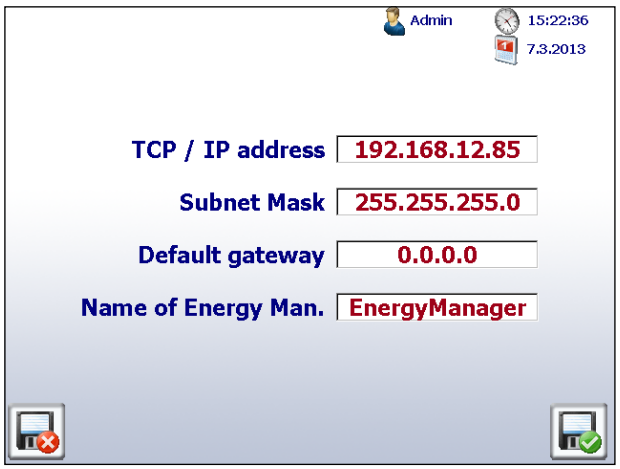
14.3 Visualising and accessing data from the PC

Please observe the instructions in Chapter 3 “Visualisation over the Internet”.

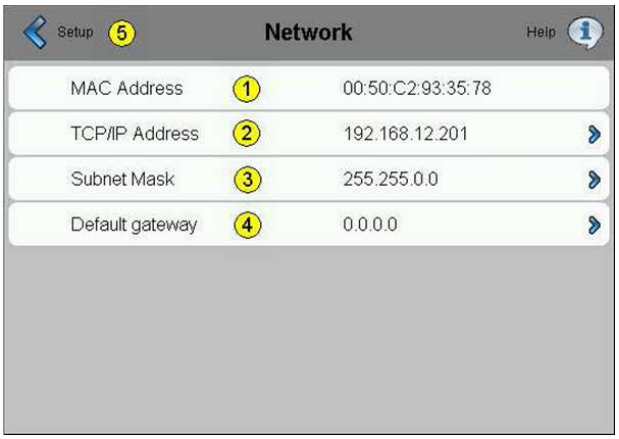
14.4 Visualisation from the Saia PCD® Web Panel



1. Using a network cable, connect the Energy Manager panel to the Saia PCD® Web Panel. See also Chapter 3.3 “Connecting the Energy Manager via the network”.



2. Assign the Energy Manager a unique address. The desired IP address can be set and changed at any time in the Energy Manager’s Setup menu. Navigation: Setup → TCP/IP



3. Configure the network by entering the Energy Manager’s IP address. Navigation: Panel Setup → Network → TCP/IP Address

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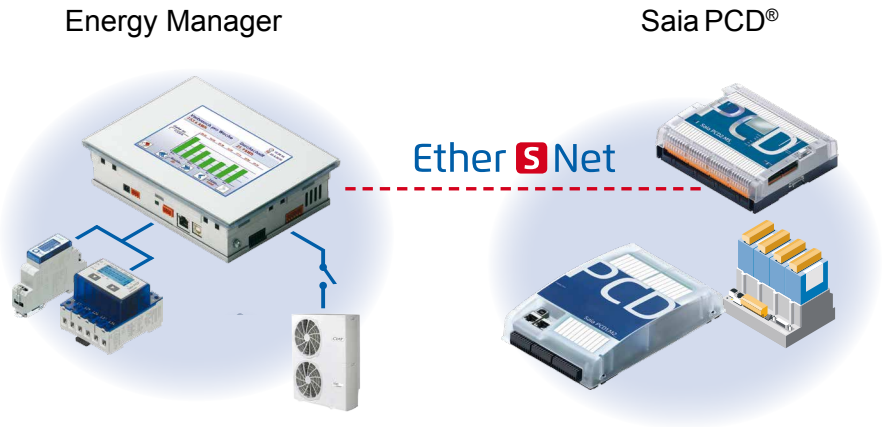
4. Using the Web Panel's Setup menu, open the Energy Manager's start screen. **Energymanager.html** Navigation: Panel Setup → Web Connection → Startup Connection

5. The same visualisation displayed on the Energy Manager panel is now available to you. The visualisation is session dependent, i.e. navigation can be carried out on the panel and on the web at the same time.

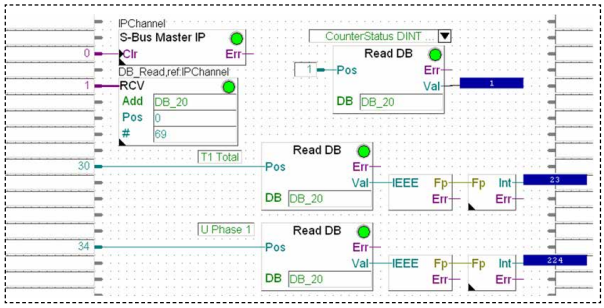
14.5 Using the Saia PCD® to access data and inputs/outputs



1. Using a network cable, connect the Energy Manager panel to the Saia PCD®. See also Chapter 3.3 "Connecting the Energy Manager via the network".

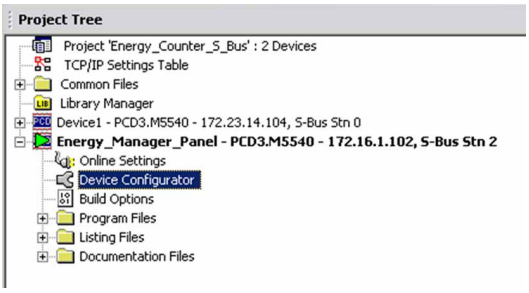
2. Data blocks can be used to open data in the Energy Manager panel. A PG5 program is used to access the Energy Manager's data. Set up a screen programmed in FUPLA in which the data blocks in the Energy Manager can be read.

Example: PG5 program

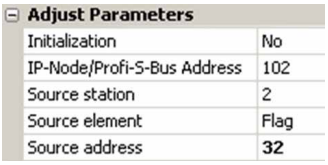


Each energy meter has its own database in the Energy Manager in which current values are saved. Chapter 15.1 provides an overview of the element addresses for the databases in the PCD “Database structure”.

3. Add another CPU to the project that has the same S-Bus and IP address as the Energy Manager.



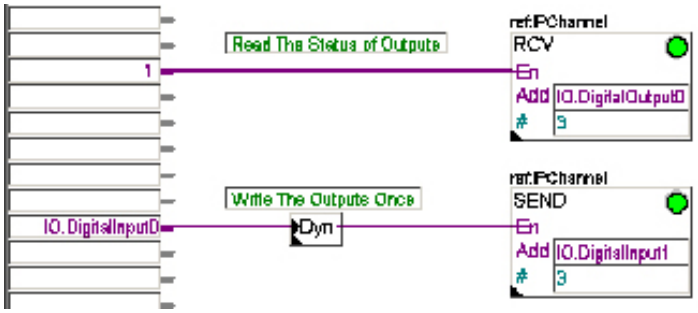
4. Read and write the inputs and outputs via the assigned flags.



- Flag 32 is output 0
- Flag 33 is output 1
- Flag 34 is output 2

Note: Do not write cyclically from the PCD, otherwise the outputs cannot be changed directly in the display.

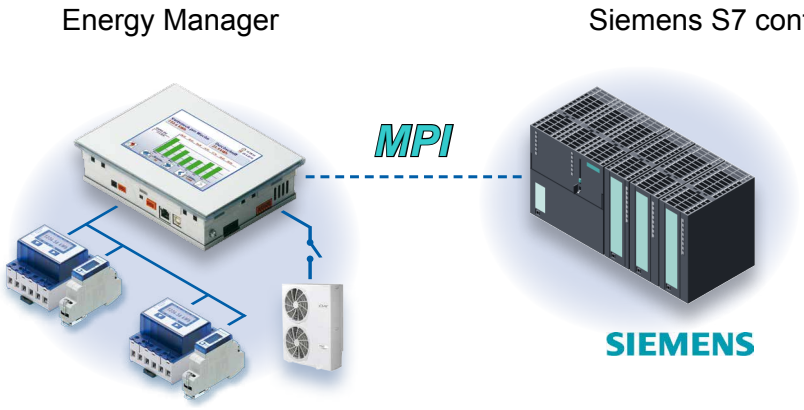
Example: PG5 program



The complete assignment of the Energy Manager’s media can be found in Chapter 15.2 “Standard program programmable logic controller”. The Energy Manager has the MPI address 2 and S-Bus address 2.

5. Download the program to the PCD and set the CPU to “Run”.

14.6 Accessing data and the inputs/outputs using the Siemens S7 controller

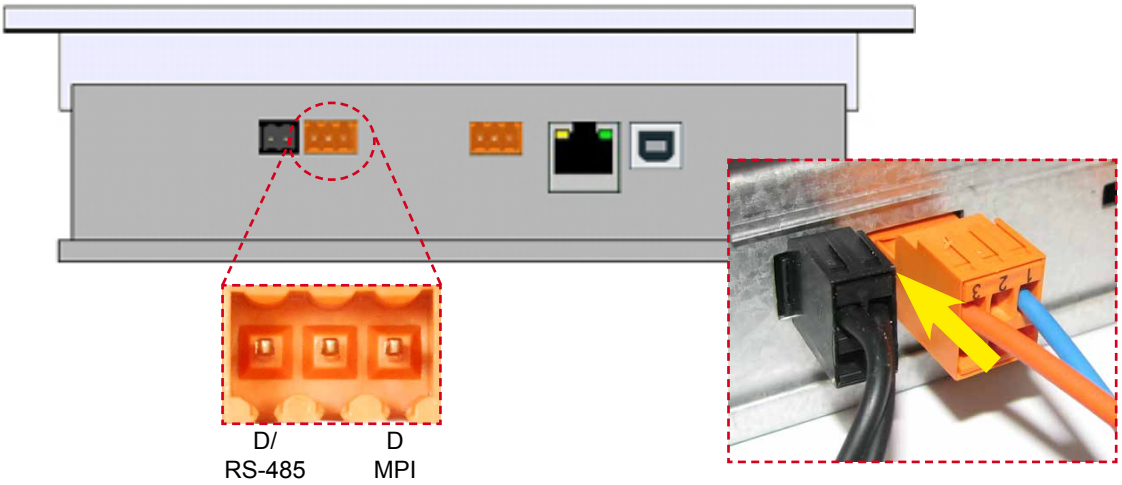


The Energy Manager panel has an MPI interface that can be used to connect a PLC in the RS-485 network. The Energy Manager has the MPI address 2.

Make sure that the termination resistors are planned correctly in the RS-485 network.

See Chapter 14.1.1 “Termination resistors in the Energy Manager”

1. Connect the Energy Manager panel to the Siemens controller via MPI/RS-485.



2. Using COM_FUNC SFCs, open the Energy Manager’s inputs and outputs via MPI. As shown below, SFC 67 “X_GET” is used to read and SFC 68 “X_PUT” is used to write.

Inputs with SFC 67 'X_GET':

```
CALL  "X_GET"                                SFC67          -- Read Data from a Communication Partner
 REQ     :=TRUE
 CONT    :=FALSE
 DEST_ID :=W#16#2
 VAR_ADDR:=P#M 0.0 BYTE 16
 RET_VAL :="Comm_Par".SFC67_Ret_Val_Sta2    DB31.DBW0      -- Temporary placeholder variable
 BUSY    :="Comm_Par".SFC67_Busy_Sta2       DB31.DBX2.0
 RD      :=P#M 0.0 BYTE 16
```

Outputs with SFC 68 'X_PUT':

```
CALL  "X_PUT"                                SFC68          -- Write Data to a Communication Partner
 REQ     :=TRUE
 CONT    :=FALSE
 DEST_ID :=W#16#2
 VAR_ADDR:=P#M 16.0 BYTE 20
 SD      :=P#M 16.0 BYTE 20
 RET_VAL :="Comm_Par".SFC68_Ret_Val_Sta2    DB31.DBW4      -- Temporary placeholder variable
 BUSY    :="Comm_Par".SFC68_Busy_Sta2       DB31.DBX6.0
```

A meter's energy manager data with SFC 67 'X_GET':

```
CALL  "X_GET"                                SFC67          -- Read Data from a Communication Partner
 REQ     :=TRUE
 CONT    :=FALSE
 DEST_ID :=W#16#2
 VAR_ADDR:=P#DB101.DBX0.0 BYTE 72
 RET_VAL :="Comm_Par".SFC67_Ret_Val_Sta2    DB31.DBW0      -- Temporary placeholder variable
 BUSY    :="Comm_Par".SFC67_Busy_Sta2       DB31.DBX2.0
 RD      :=P#DB101.DBX0.0 BYTE 72
```

Energy manager data for a "Variable table" with Siemens PLC

Var - [EMDATA -- @MB_Browser\Demo_S7 ONLINE]

Table Edit Insert PLC Variable View Options Window Help

	Address	Symbol	Display format	Status value	Modify value
6	DB101.DBD 100	"Meter1".Reg15	DEC	L#0	
7	DB101.DBD 104	"Meter1".Reg16	DEC	L#0	
8	DB101.DBD 108	"Meter1".Error	DEC	L#0	
9	DB101.DBD 112	"Meter1".TransRatio	DEC	L#1	
10	DB101.DBD 116	"Meter1".Tariff	DEC	L#0	
11					
12	DB101.DBD 120	"Meter1".Reg20	FLOATING_POINT	57.6	
13	DB101.DBD 124	"Meter1".Reg21	FLOATING_POINT	4.2	
14	DB101.DBD 128	"Meter1".Reg22	FLOATING_POINT	0.0	
15	DB101.DBD 132	"Meter1".Reg23	FLOATING_POINT	0.0	
16					
17	DB101.DBD 136	"Meter1".UrmsL1	FLOATING_POINT	224.0	
18	DB101.DBD 140	"Meter1".IrmsL1	FLOATING_POINT	0.5	
19	DB101.DBD 144	"Meter1".PrmsL1	FLOATING_POINT	0.0	
20	DB101.DBD 148	"Meter1".QrmsL1	FLOATING_POINT	0.0	
21	DB101.DBD 152	"Meter1".Reg28	FLOATING_POINT	0.0	
22					
23	DB101.DBD 156	"Meter1".UrmsL2	FLOATING_POINT	224.0	
24	DB101.DBD 160	"Meter1".IrmsL2	FLOATING_POINT	0.5	
25	DB101.DBD 164	"Meter1".PrmsL2	FLOATING_POINT	0.0	
26	DB101.DBD 168	"Meter1".QrmsL2	FLOATING_POINT	0.0	
27	DB101.DBD 172	"Meter1".Reg33	FLOATING_POINT	0.0	

The complete assignment of the Energy Manager's media can be found in Chapter 15.2 "Standard program programmable logic controller".

15 Programmable logic controller

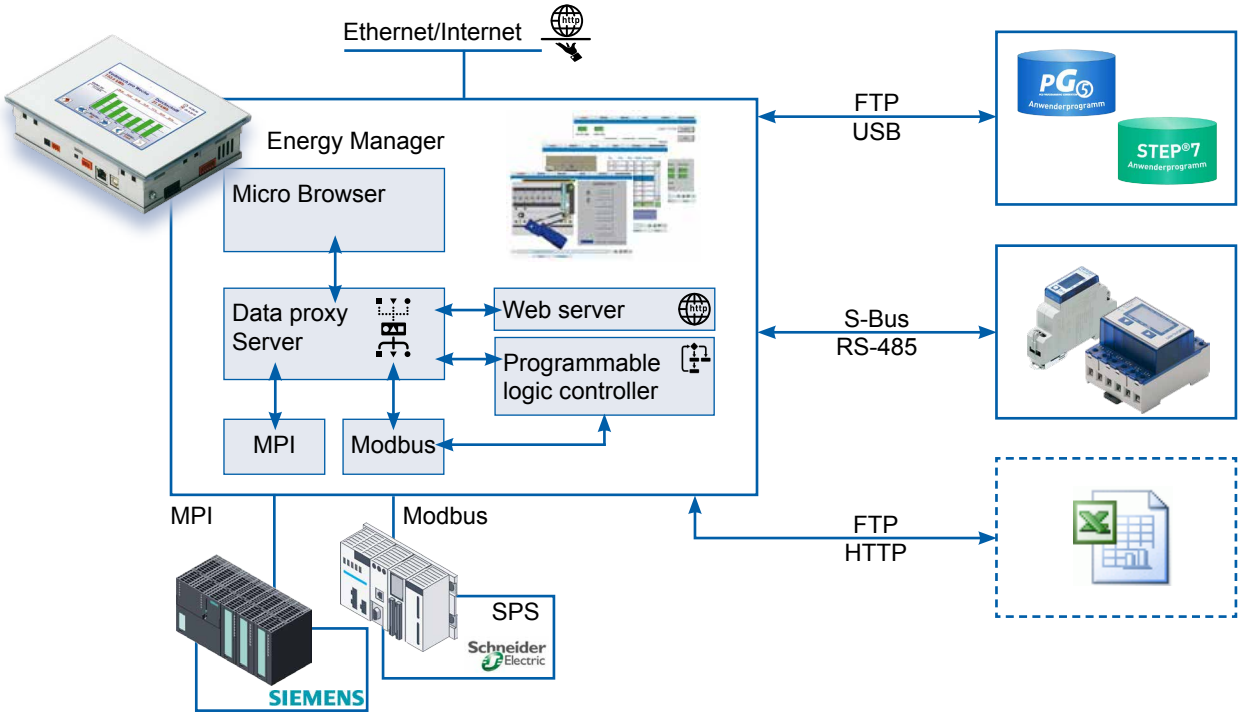
The programmable logic controller xx7 integrated into the Energy Manager and the interpreter make it possible for the user to program logic and communication functions. The user can display the status of “superordinate” equipment and/or devices. The programmable logic controller can also manage communication and data functions (connecting devices with additional protocols, logging data in the flash memory, forwarding of operating and alarm messages, e.g. via e-mail, etc.) that are not integrated by default into the Energy Manager’s firmware functions.

Programming is carried out with the Siemens Step®7 Manager via USB or Ethernet. The Energy Manager panel has no remanent data. The program is saved to the internal flash memory and, once this is switched on, transferred from the flash memory to RAM where it is executed. The user must explicitly save and restore data that has to be remanent, for example databases with parameters or changed formulae, using the file system functions in the flash memory.

To prevent the programmable logic controller from impairing the visualisation, the Energy Manager can be operated in QVGA display resolution to limit its draw on resources.

Features:

- Programmable in Step®7
- 4,096 flags, 256 timers and meters for each (not remanent)
- Max. 2,048 FCs, FBs and 2,048 DBs for each (not remanent)
- Supports OB1 (cyclically), OB 100 (start OB), error OBs (OB 80-OB 89 and OB 121/122) and OB35 (periodic OB, time can be set in ms).
- Integrated web server, FTP server, e-mail client
- Supports MPI communication
- Supports Modbus communication



15.1 Database structure

The S-Bus base address for energy meter values in the Energy Manager corresponds to DB100 in the PCD Classic.

Example: DB100 + element address 1 = DB101 must be read to read out the energy meter with the S-Bus address 1.

0	0	LiveSign	DWORD	Is increased every time the Energy Manager is updated
4	1	MeterStatus	DINT	0 → not detected 1 → detected, not updated 2 → updated
8…36	2…9	Fill0	ARRAY [1…8] OF DWORD	
40	10	FwVersion	DINT	0 : Firmware version of the meter
44	11	Reg1	REAL	1 :
48	12	Reg2	REAL	2 :
52	13	Reg3	REAL	3 :
56	14	Reg4	REAL	4 :
60	15	Reg5	REAL	5 :
64	16	Reg6	REAL	6 :
68	17	Reg7	REAL	7 :
72	18	Reg8	REAL	8 :
76	19	HWMod	DINT	9 : Hardware modification
80	20	Reg10	REAL	10 :
84	21	Reg11	REAL	11 :
88	22	Reg12	REAL	12 :
92	23	Reg13	REAL	13 :
96	24	Reg14	REAL	14 :
100	25	Reg15	REAL	15 :
104	26	Reg16	REAL	16 :
108	27	Error	DINT	17 : Error flags bit coded bit 0…2 ↔ Phase 1…3
112	28	TransRatio	DINT	18 : Transformation ratio (0 → ALD & ALE meter, otherwise AWD meter)
116	29	Tariff	DINT	19 : Tariff flag
120	30	WT1total	REAL	20 : Energy meter 1
124	31	WT1part	REAL	21 : Energy meter 1 partial
128	32	WT2total	REAL	22 : Energy meter 2
132	33	WT2part	REAL	23 : Energy meter 2 partial
136	34	URMSL1	REAL	24 : U RMS Phase 1
140	35	IRMSL1	REAL	25 : I RMS Phase 1
144	36	PRMSL1	REAL	26 : P RMS Phase 1
148	37	QRMSL1	REAL	27 : Q RMS Phase 1
152	38	CosPL1	REAL	28 : cos phi L1
156	39	URMSL2	REAL	29 : U RMS Phase 2
160	40	IRMSL2	REAL	30 : I RMS Phase 2
164	41	PRMSL2	REAL	31 : P RMS Phase 2
168	42	QRMSL2	REAL	32 : Q RMS Phase 2
172	43	CosPL1	REAL	33 : cos phi L2
176	44	URMSL3	REAL	34 : U RMS Phase 3
180	45	IRMSL3	REAL	35 : I RMS Phase 3
184	46	PRMSL3	REAL	36 : P RMS Phase 3
188	47	QRMSL3	REAL	37 : Q RMS Phase 3
192	48	CosPL1	REAL	38 : cos phi L3
196	49	PRMSTOTAL	REAL	39 : PRMSTOTAL
200	50	QRMSTOTAL	REAL	40 : QRMSTOTAL
204	51	WT1EnergyDay	REAL	Energy for today
208	52	WT1EnergyWeek	REAL	Energy per week
212	53	WT1EnergyMonth	REAL	Energy per month
216	54	WT1EnergyYear	REAL	Energy per year
220	55	WT1Tariff	REAL	Tariff
224	56	WT1CostDay	REAL	Costs for today
228	57	WT1CostWeek	REAL	Costs per week
232	58	WT1CostMonth	REAL	Costs per month
236	59	WT1CostYear	REAL	Costs per year
240	60	WT1EnergyDay	REAL	Energy for today
244	61	WT1EnergyWeek	REAL	Energy per week
248	62	WT1EnergyMonth	REAL	Energy per month
252	63	WT1EnergyYear	REAL	Energy per year
256	64	WT2Tariff	REAL	Tariff
260	65	WT2CostDay	REAL	Costs for today
264	66	WT2CostWeek	REAL	Costs per week
268	67	WT1CostMonth	REAL	Costs per month
272	68	WT2CostYear	REAL	Costs per year

Note: The floating point values correspond to the IEEE format.

15.2 Standard program programmable logic controller

The main cycle's functions:

1. If cycle work is disabled → abort
2. Copy digital inputs from the process image to flag
3. Copy energy meters to flag
4. When requested, send the default values to the peripheral card
5. Copy digital outputs from flag to the process image

15.3 Applied Step7 resources

The Energy Manager is delivered with a Step7 program. In addition to this, the following resources are reserved by the firmware and must not be overwritten during any potential adaptation of the program.

Energy meters	DB 100…D228
Groups	DB 900…D931
E/As	DB M0.0 – M37.7

M0.0 – M37.7

Name		LC		S-Bus		Comment:
CycleWorkDisabled	rw	M	32.7	F	263	If this variable is set to "1", the cyclical standard program is disabled
DigitalInputs	ro	MB	0	F	0...5	Digital inputs. Bit 0 corresponds to input 0 and so on
DigitalOutputs	rw	MB	4	F	32 34	Digital inputs. Bit 0 corresponds to output 0 and so on
EnergyCounter0	ro	MD	8	R	2	Energy meter 0...2
EnergyCounter1			12		3	
EnergyCounter2			16		4	
EnergyCounter0PresetVal	rw	MD	20	R	5	Preset values for energy meters
EnergyCounter1PresetVal			24		6	
EnergyCounter2PresetVal			28		7	
EnergyCounter0Preset	rw	M	32.0	F	256	If one of these bits is set to "1" , the corresponding energy meter will be set to the preset value. NOTE: The programmable logic controller's program will reset this bit (→ "0") so that it only has to write the preset value once.
EnergyCounter1Preset			32.1		257	
EnergyCounter2Preset			32.2		258	

Please take into account that the database resources have been saved in SLOFLASH so can be overwritten when loading a new Step7 program.

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16 Sales information

Our proposal/ordering information

	Description	Order number	Weight
	**Energy meter PN 32A, LCD with S-Bus** ▸ Single-phase energy meter, 230 VAC, 50 Hz ▸ LCD display ▸ S-Bus communication	ALD1D5FS00A2A00	80 g
	▸ MID certification	ALD1D5FS00A3A00	80 g
	**Energy meter 3P+N 65A 2T LCD with S-Bus** ▸ 3-phase energy meter, 3 × 230/400 VAC, 50 Hz ▸ LCD display ▸ 2 tariffs ▸ S-Bus communication	ALE3D5FS10C2A00	190 g
	▸ MID certification	ALE3D5FS10C3A00	190 g
	**Energy meter 3P+N, 5A, converter, LCD, S-Bus** ▸ 3-phase energy meter, 3 × 230/400 VAC, 50 Hz ▸ LCD display ▸ 1 tariff ▸ Converter measurement up to 1500 A (1500:5) ▸ S-Bus communication	AWD3D5WS00C2A00	190 g
	▸ MID certification	AWD3D5WS00C3A00	190 g
	**Energy Manager Web Panel** ▸ 5.7″ colour TFT display/VGA resolution ▸ 10.4″ colour TFT display/VGA resolution ▸ Integrated user interface with preconfigured web pages ▸ Recording of energy data ▸ 1 GB memory card for the recording of data ▸ Supports up to 128 bus-coupled energy meters ▸ Also programmable with STEP7 from Siemens ▸ Integrated inputs/outputs ▸ USB / Ethernet / RS-485 ▸ Current requirements: 600 mA at 24 VDC	PCD7.D457ET7F PCD7.D410ET7F	1100 g 2150 g
	**Power supply SMPS 24 VDC 2.5 A** ▸ Input: 115…230 VAC ▸ Output: 24 VDC, 2.5 A	Q.PS-AD2-2402F	450 g

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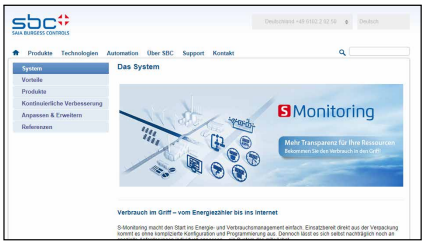
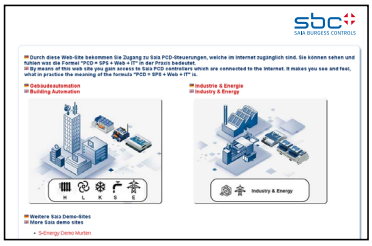
S-Energy on the Internet

SBC S-Energy im Internet



www.saia-pcd.com



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A Appendix

A.1 Symbols

	In operating manuals, this symbol refers the reader to other information in the manual or to information in other manuals or technical documentation. Direct links to other documentation are not provided.
	This symbol draws the reader's attention to components which, if touched, may produce an electrical discharge. Recommendation: At the very least, you should touch the system's negative pole (the PGU connection's switch cabinet) before you touch electrical components. However, we recommend an earthing strap, the cable of which is connected to the system's negative pole.
	Instructions with this symbol must always be observed.
	Explanations next to this symbol apply only to the Saia PCD® Classic series.
	Explanations next to this symbol apply only to the Saia PCD® xx7 series.

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A.2 Baud rates of the energy meters

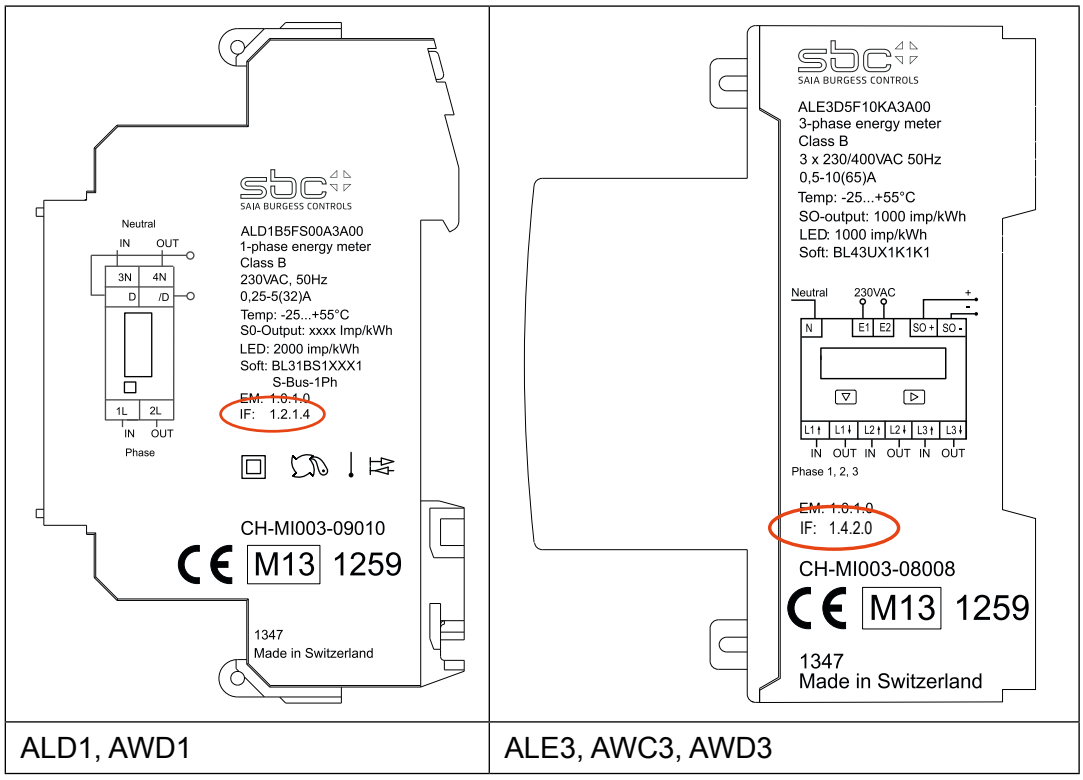
Single-phase energy meters up and including to the HW-version **1.2** and three-phase energy metersup to the and including HW-version **1.4** support the following baud rates:

1200, 2400, 4800, 9600, 19 200, 38 400, 57 600 and 115 200

Single-phase energy meter from the HW-version **1.3** and three-phase energy meter the HW version **1.5** support only the following baud rates:

4800, 9600, 19 200, 38 400, 57 600 and 115 200

The hardware version is lasered on the energy meter:



ALD1, AWD1	ALE3, AWC3, AWD3

Printing keys:

IF HW.HW.FW.FW

Example ALE3 with old hardware: IF 1.4.2.9

Example ALE3 with new hardware: IF 1.5.2.3

A.2.1 Drop-down lists for the baud rates of energy meters

List entry	Baud rate with old HW	Baud rate with new HW
0	1200	---
1	2400	---
2	4800	4800
3	9600	9600
4	19200	19200
5	38400	38400
6 (default)	57600	57600
7	115200	115200

A.5 Mailing address for Saia-Burgess Controls AG

Saia-Burgess Controls AG

Bahnhofstrasse 18
3280 Murten, Switzerland

Phone +41 26 580 30 00
Fax +41 26 580 34 99

E-Mail: info@saia-pcd.com
Homepage: www.saia-pcd.com
Support: www.sbc-support.com

Mailing address for return shipments from customers of the Swiss office:

Only for products with a Saia-Burgess Controls AG order number.

Saia-Burgess Controls AG

Service Après-Vente
Bahnhofstrasse 18
3280 Murten, Switzerland

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