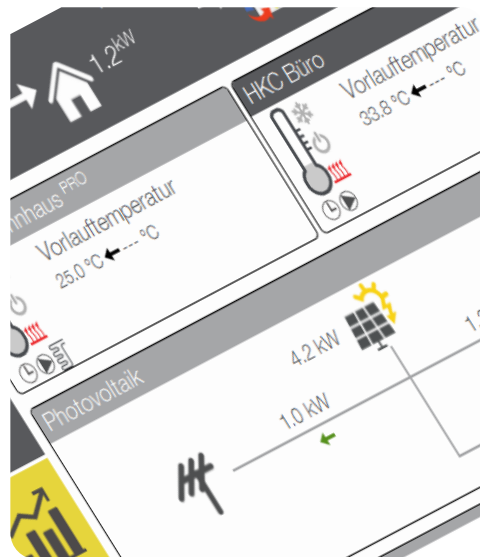


myiDM +energy

Photovoltaics power-usage Smart Grid Hourly energy rates



Heat Pumps with NAVIGATOR 2.0 CONTROL



1. GENERAL INFORMATION	3
1.1. The service platform myiDM	3
2. PHOTOVOLTAIC POWER USAGE	4
2.1. Own consumption PV-energy	4
2.1.1. Description	4
2.1.2. Calculation own consumption	4
2.2. Communication PV-system - heat pump	5
2.2.1. Communication via digital input (Potential-free contact)	6
2.2.2. Communication via 0-10 V signal	7
2.2.3. Communication via S0 signal	9
2.2.4. Communication via Solar-Log™	11
2.2.5. Communication via building management system (BMS)/Smartfox	14
2.2.6. Communication via Fronius Symo and Symo Hybrid	16
2.2.7. Communication via Fenecon Energie-Management-System (FEMS)	18
2.2.8. Communication with E3DC	19
2.2.9. Communication with SMA Datamanager	20
2.2.10. Communication with Sonnen battery	21
2.2.11. Communication with Huawei PV systems	22
2.3. Priorities by using PV-energy	24
2.4. Communication with NAVIGATOR 2.0 Pro	25
2.5. Settings NAVIGATOR 2.0 control	26
3. SMART GRID	30
3.1. Energy rates from the energy supplier	31
3.2. Hourly energy rates	32
3.2.1. Example: aWATTar (currently only available in Austria)	33

1.1. The service platform myiDM

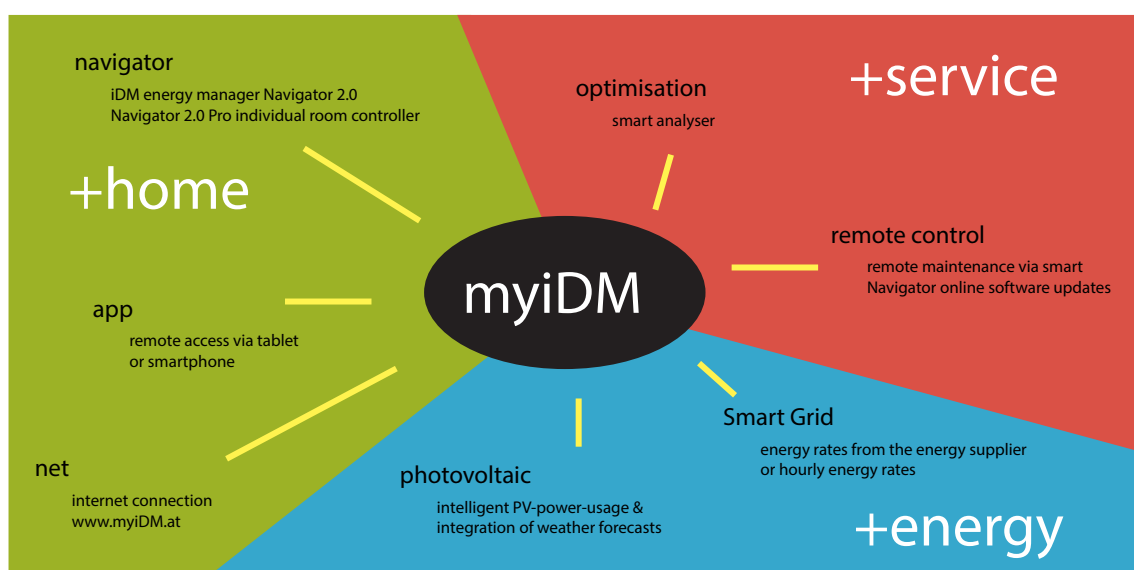
The service platform myiDM is divided in three sectors:

- » **myiDM +service**
- » **myiDM +energy**
- » **myiDM +home**

This technical document deals with the sector „myiDM +energy“, that’s why this sector is explained below. The service offering „myiDM +energy“ provides intelligent strategies for power management in combination with the operation of a heat pump. The input by the heat pump is the possibility of load transfer. The load transfer is made by thermal storage (increase the heating buffer or increase the temperature in the building) while low energy rates resp. high PV-yield or due to decrease mode (electric utility lock) while high energy rates resp. low PV-yield. While normal energy rates, the heat pump operates in normal mode. The combination off myiDM +energy with the NAVIGATOR 2.0 Control offers the following functions for the thermal load transfer:

- » **photovoltaic**
 - Intelligent PV-power-usage and integration of weather forecasts
- » **Smart Grid**
 - Energy rates from the energy supplier
 - Hourly energy rates

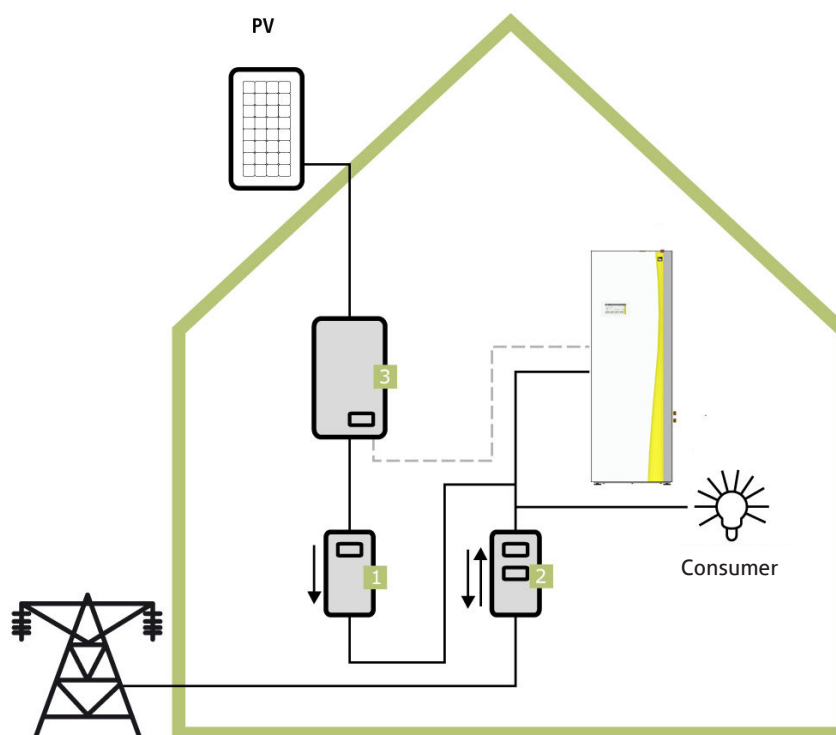
By using the above mentioned functions, the yearly energy costs caused by the heat pump are reduced and additionally the energy grids are relieved. For the usage of the “hourly energy rates” iDM Energiesysteme offers, in cooperation with the company aWATTar (an Austrian energy supplier start-up), the energy rate “myiDM+energy”.



2. Photovoltaic power usage

2.1. Own consumption PV-energy

Due to the grid parity of PV-systems and decreasing feed-in-rates, a high own consumption of the generated PV-energy offers economic advantages for the user. By using the PV-energy for heating, cooling and domestic hot water production in combination with the NAVIGATOR 2.0 control of the heat pump, a high amount of own consumption is generated. The yearly amount of own consumption can be up to 70%, if the design (heat pump, storage and PV-system) is proper.



2.1.1. Description

The heat pump (NAVIGATOR 2.0 control) communicates via a signal with the inverter resp. the energy consumption controller (3) of the PV-system and therefore the NAVIGATOR 2.0 knows when PV-energy is available. If solar current is available, the heat pump is using this solar current (optionally in conjunction with power from the electric supply company) to execute the domestic hot water preparation, to raise the heating buffer and floor heating set point or to cool the cooling buffer.

For the use of the PV-function, the inverter resp. the energy consumption controller have to communicate the current power resp. the excess power to the heat pump. To establish the communication between NAVIGATOR 2.0 and inverter resp. the energy consumption controller, different regulation and control functions have been implemented in the NAVIGATOR 2.0 control.

2.1.2. Calculation own consumption

The electric meter (1) measures the total quantity of the produced PV-energy. Not used electric power will be fed into the public electricity grid. A separate bidirectional counter (2) records this energy spill-over. The outcome of the difference between produced and the surplus of PV-energy is the own consumption.

2.2. Communication PV-system - heat pump

For using PV-energy following signals from the energy consumption controller resp. the inverter can be used for the communication with the NAVIGATOR 2.0 control:

- » Digital input (Potential-free contact)
- » 0-10V signal
- » S0 signal
- » Solar-Log™
- » Modbus TCP
- » Building management system/Smartfox
- » Fenecon
- » Fronius
- » E3/DC
- » SMA with datamanager
- » Sonnen
- » Huawei



By using the parameter PV008 in the menu "Settings/Configuration", findable in the service level from the NAVIGATOR 2.0 control, the PV-signal could be chosen. For the settings "0-10V Signal" or "S0 Signal" a further parameter must be configured. The parameter PV-signal Type (PV010) must be set as Excess or Yield (see chapter „2.5. Settings NAVIGATOR 2.0 control“).

Whenever the NAVIGATOR 2.0 receives one of the above mentioned input signals from the energy consumption controller resp. the inverter of the PV-system, the set superlevation strategies (domestic hot water preparation, heating buffer management, superlevation floor heating) are executed.



The possibilities/integration options for PV-energy usage with the heat pump must be clarified with the energy supply company!

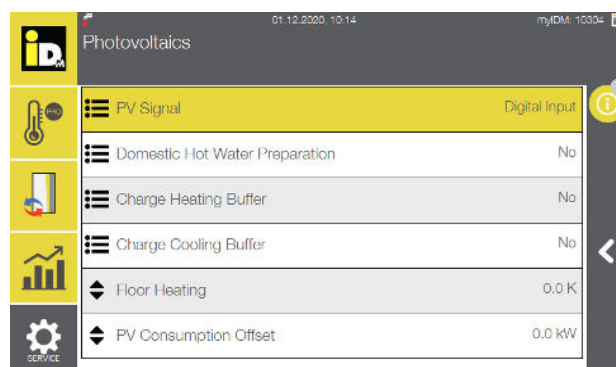
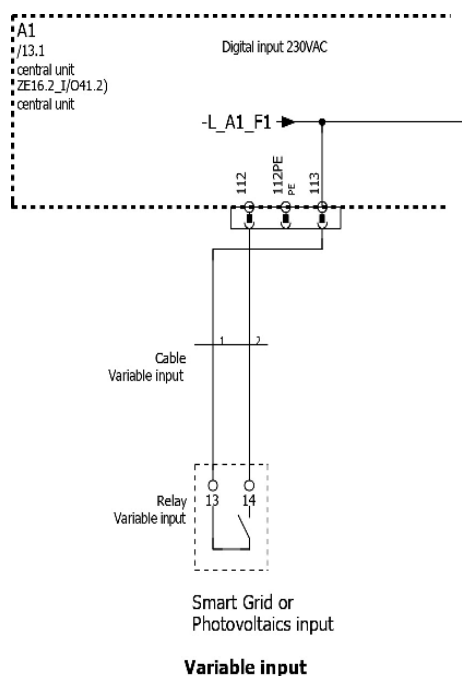


For cascade systems, all PV signal types are available except "Digital input". With 0-10 V signal, S0 signal and building management system/Smartfox, only the surplus control is active.

2.2.1. Communication via digital input (Potential-free contact)

To operate the heat pump with PV-energy, the inverter must output a signal when the set threshold, adjusted by the heat pump owner, is reached. The signal from the inverter must be connected to the variable input (clamp 112/113) of the NAVIGATOR 2.0 control. The configuration of the threshold always depends on the PV-system size and the heat pump power.

- » While setting a low threshold, the heat pump possibly runs with an electrical mix of PV-energy and energy from the energy provider
- » While setting a high threshold, the heat pump runs mostly by PV-energy. However, the time frame for the operation with PV usage is smaller.

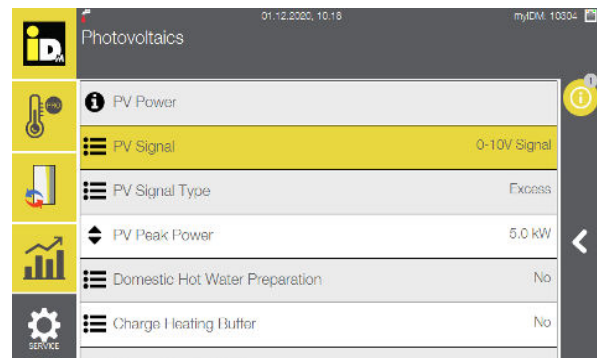
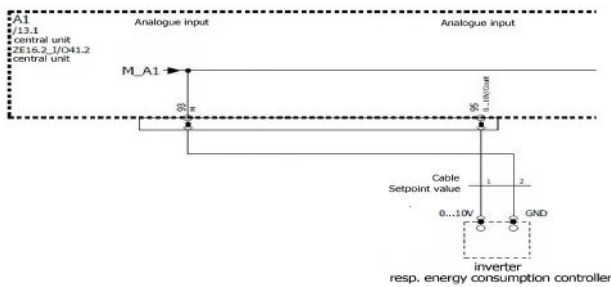


The heat pump does not know the instantaneous power of the PV-system!

2.2.2. Communication via 0-10 V signal

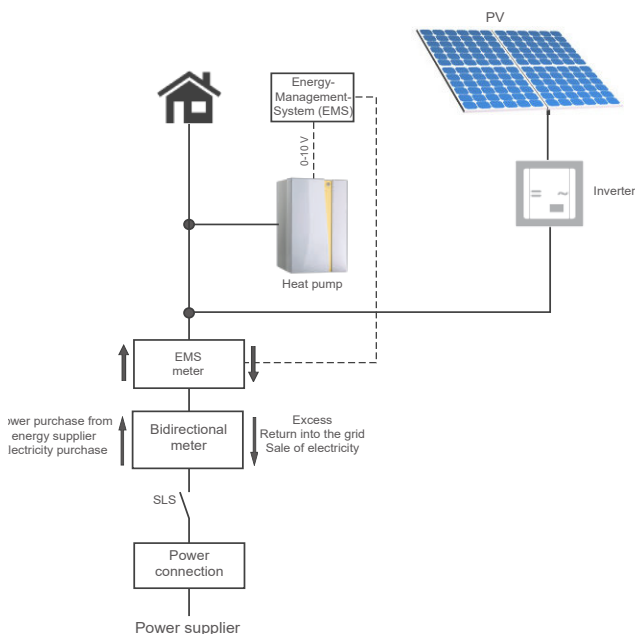
The PV inverter resp. the energy consumption controller communicates via a 0-10 V signal (analogue output) with the NAVIGATOR 2.0 control. The provided 0-10 V signal must be connected to the 0-10 V analogue input (clamp 93/95) of the heat pump.

- » The heat pump use the **actual power of the PV-system or the excess power** from an energy consumption control
- » A modulating heat pump runs with the **actual power or the excess power** of the PV-system

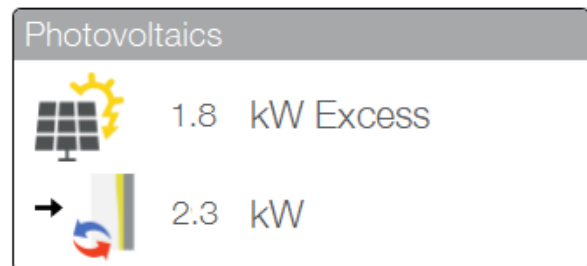


2.2.2.1. 0-10 V Signal from Energiemanagementsystems

The energiemanagementsystems (EMS) can communicate via a 0-10 V signal with the heat pump. The heat pump is operated with the **PV-excess-power**.

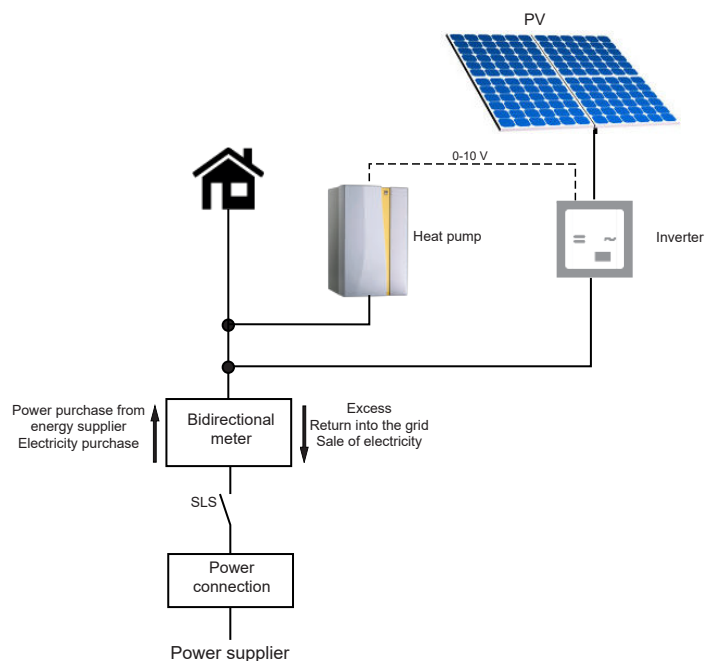


Integration 0-10V signal / Excess

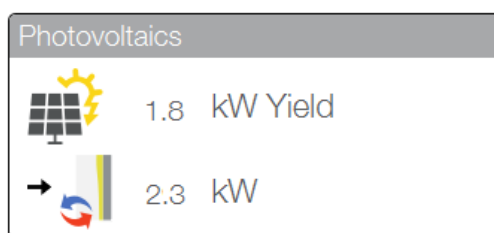


2.2.2.2. 0-10 V from Inverter

The inverter can communicate via a 0-10V signal with the heat pump. The heat pump is operated with the **actual PV-yield**. Thereby other electrical loads are not considered.



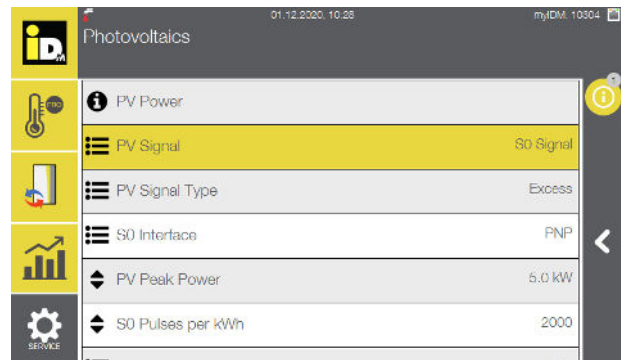
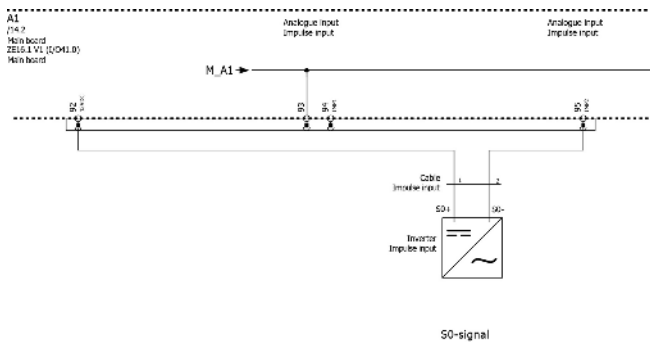
Integration 0-10V signal / Yield



2.2.3. Communication via S0 signal

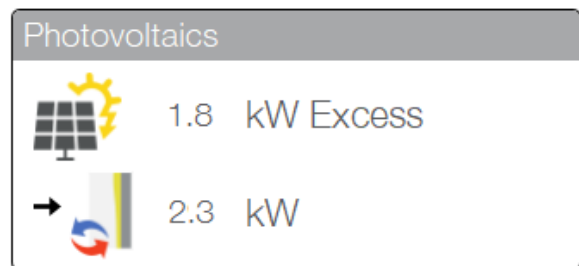
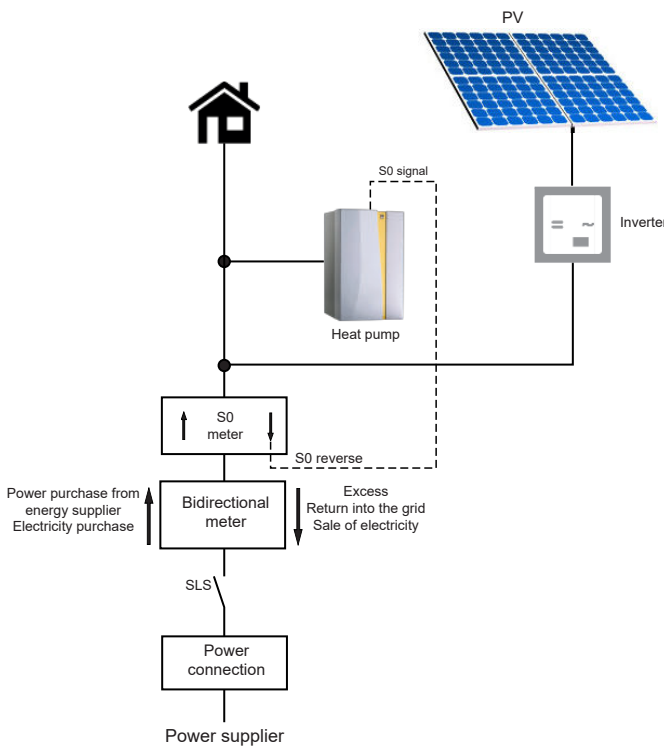
The inverter or the energy consumption controller communicates via a S0 signal with the NAVIGATOR 2.0 control. The S0 signal (pulse input is potential-free) must be connected to the analogue-/impulse input of the heat pump (clamp 92/95).

- » The heat pump uses the **actual power of the PV-system or the excess power** from an energy consumption control
- » A modulating heat pump runs with the **actual power or the excess power** of the PV-system



2.2.3.1. S0-Signal from energiemanagementsystems (S0-counter)

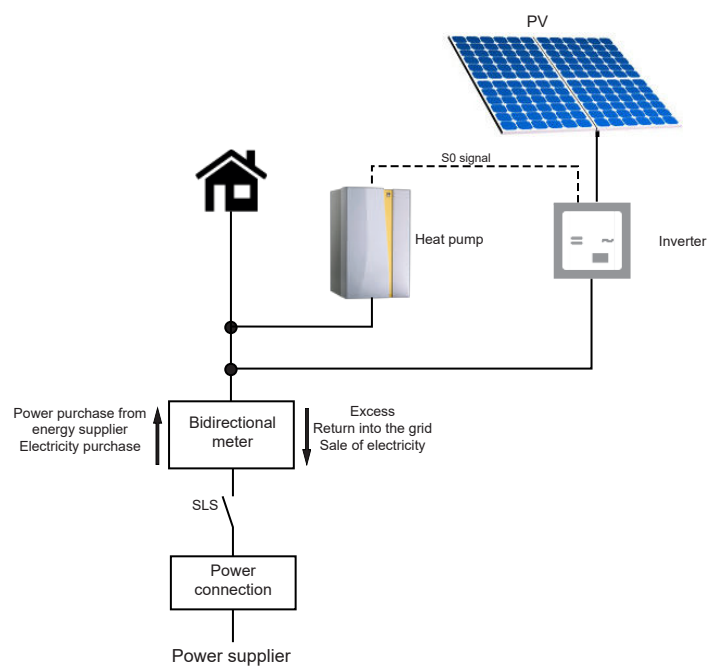
The energiemanagementsystems can communicate via a S0 signal with the heat pump. The heat pump is operated with the **PV-excess-power**.



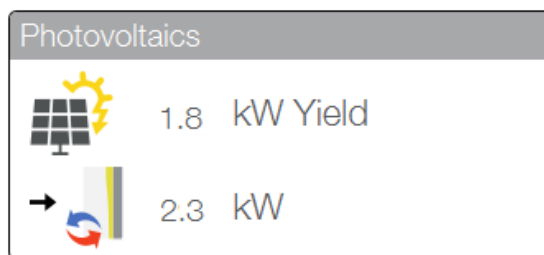
Integration S0 signal / Excess

2.2.3.2. S0-Signal from Inverter

The inverter (e.g. Kostal Piko) can communicate via a S0 signal with the heat pump. The heat pump is operated with the **actual PV-yield**. Thereby other electrical loads are not considered.



Integration S0 signal / Yield

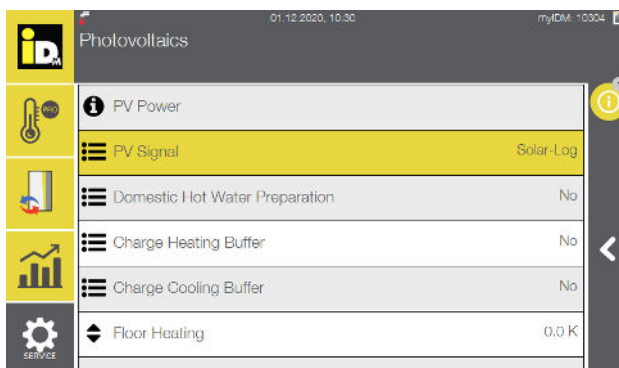


2.2.4. Communication via Solar-Log™

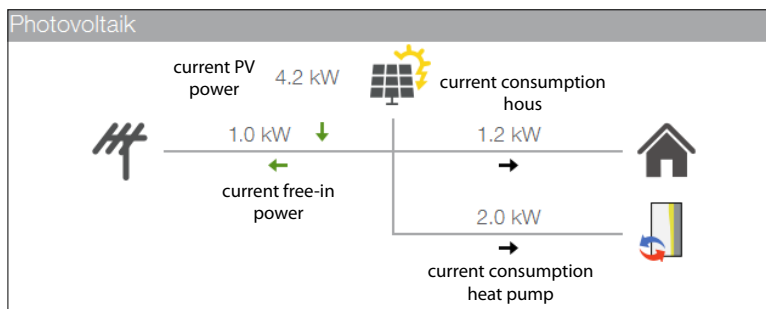
The intelligent communication interface for own consumption improvement and for monitoring the PV-system communicates via network connection with the NAVIGATOR 2.0 control. Therefore, the Solar-Log™ and the heat pump need a connection to a switch, hub or router (provided on site). Alternative the Solar-Log™ and the heat pump can be connected directly. The network socket is placed outside at the panelling of the heat pump resp. inside the heat pump at the electricity (for AERO ILM heat pumps). The heat pump is operated with the **PV-excess-power**.

Advantages:

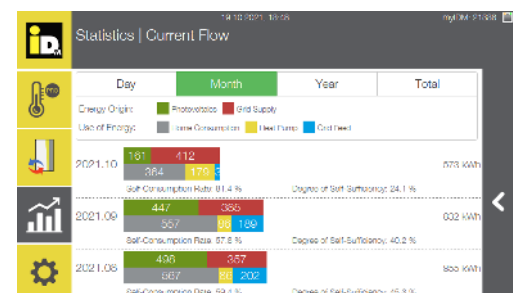
- » Communication with all relevant inverter types
- » Increase and optimization of the own consumption
- » Operation of the heat pump with the actual PV-excess-power
- » Forecast date (2 days)
- » Network connection



Setting the PV-Signal "Solar-Log" on the navigator



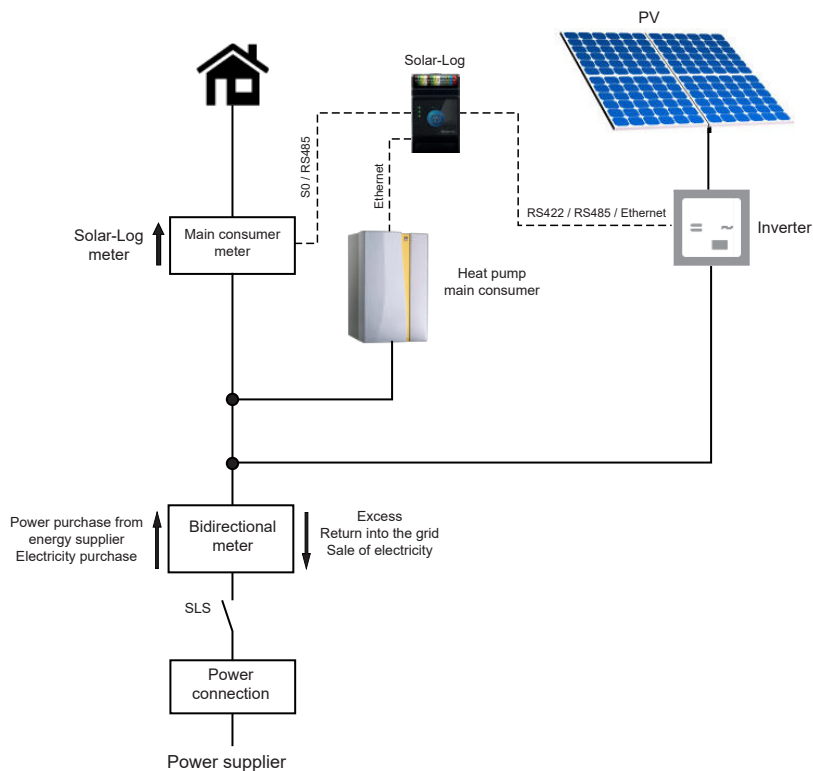
Graphics on main screen



Further information to Solar-Log™ under www.solar-log.com

2.2.4.1. Heat pump as main consumer

If the consumption of the heat pump is not recorded via a consumption meter, the following must be entered in the Solar-Log™: The operation mode have to be set to „consumer“ in the „Configuration | Devices | Configuration“.



Integration Solar-Log / Heat pump as main consumer

Settings on „Solar-Log™“:

Configuration / Devices / Configuration / Configuration

Configuration

Device Configuration

Device: 0: IDM

Modell: IDM

Address/Serial number:

Counter Configuration

Operating mode: Consumer

Module field, Power & Designation

Max. AC Power [W]	Designation
	IDM

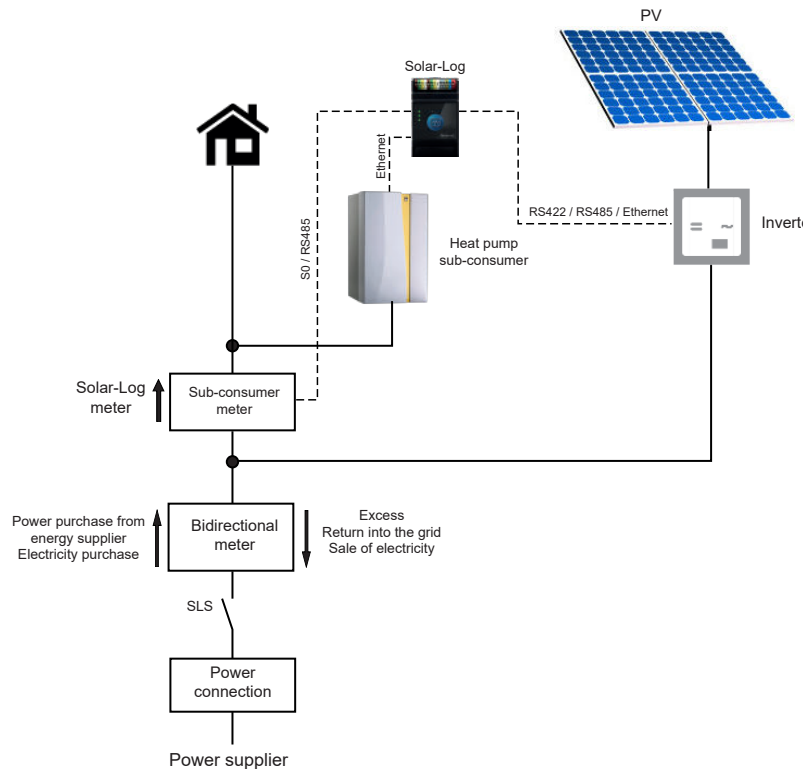
Device:

Cancel Save

Quelle: https://www.solar-log.com/manuals/manuals/de_DE/SolarLog_Handbuch_Smart_Energy_DE_01.pdf

2.2.4.2. Heat pump as underconsumer

If the consumption of the heat pump is recorded via a consumption meter, the following must be entered in the Solar-Log™: The operation mode have to be set to „underconsumer“ in the „Configuration | Devices | Configuration“.



Integration Solar-Log / Heat pump as sub-consumer

Settings on „Solar-Log™“:

Configuration / Devices / Configuration / Configuration

Configuration

Device Configuration

Device: 0: IDM

Modell: IDM

Address/Serial number:

Counter Configuration

Operating mode: Subconsumer

Module field, Power & Designation

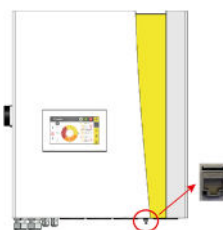
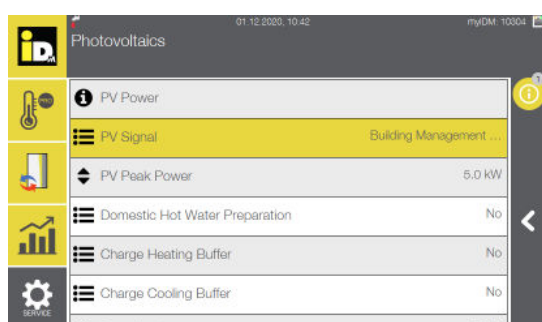
Max. AC Power [W]	Designation
Device: <input type="text"/>	IDM <input type="text" value="IDM"/>

Quelle: https://www.solar-log.com/manuals/manuals/de_DE/SolarLog_Handbuch_Smart_Energy_DE_01.pdf

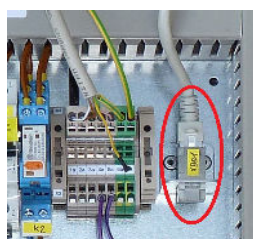
2.2.5. Communication via building management system (BMS)/Smartfox

The communication with the NAVIGATOR 2.0 control is executed by the Modbus TCP protocol (Server/Client) and the data transfer via TCP-IP-Ethernet (network connection). To connect the NAVIGATOR 2.0 control with the PV-system a network connection via a switch, hub or router (provided on site) has to be realised.

The network socket is placed outside at the panelling of the heat pump resp. inside the heat pump at the electricity (for AERO ILM heat pumps). The exact position of the network socket can be found in the installation instruction of the heat pump.



Network socket at the outside of the panelling of the electrical cabinet from a TERRA AL heat pump



Network socket inside a AERO ILM heat pump placed at the electricity

For the communication between NAVIGATOR 2.0 control and PV-system these addresses DEZ are available.

» Modbus TCP:

- Address 74 „Actual PV surplus“ with read and write access „RW“ (Holding Register)
- Address 4122 „ Actual heat pump power consumption“ with read access „RO“ (Input Register)

» BACnet IP:

- Object 74 „Actual PV surplus“ with read and write access „RW“ (Analog Value)
- Object 4122 „ Actual power consumption heat pump“ with read access „RO“ (Analog Input)

» EIB/KNX:

- Data point 995 „ Actual PV surplus“ with read and write access „RW“
- Data point 997 „ Actual power consumption heat pump“ with read access „RO“

Disply Navigatorregulation:



current PV-excess

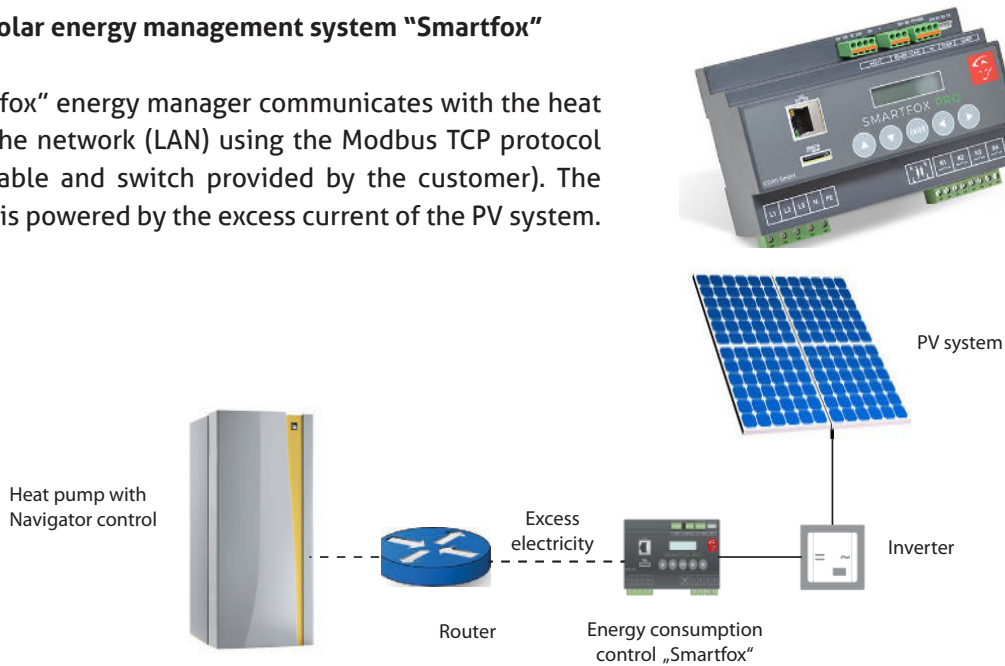
current heat pump power consumption



Modbus TCP „communicates via TCP port 502, BACnet IP via UDP port 47808. The building control system/Smartfox communication and myiDM work simultaneously if all network participants are in the same network!

Example: solar energy management system "Smartfox"

The "Smartfox" energy manager communicates with the heat pump via the network (LAN) using the Modbus TCP protocol (network cable and switch provided by the customer). The heat pump is powered by the excess current of the PV system.

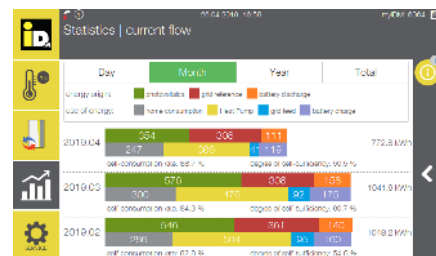
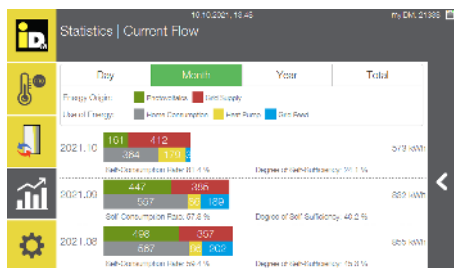
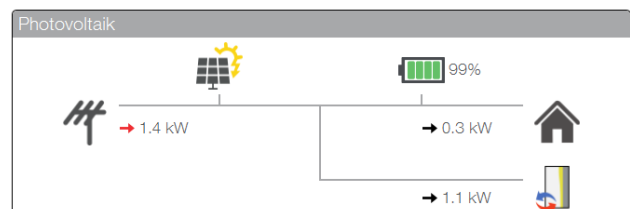
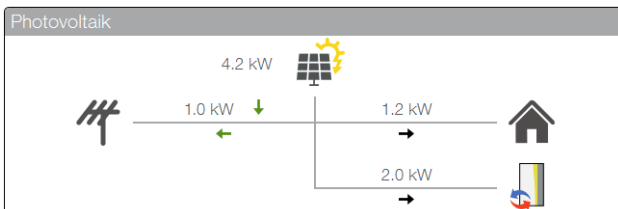


Settings on Navigatorregulation:

- » Building controll system („Modbus TCP“)
- » PV-Signal „BMS/ Smartfox“
- » Network connectivity
- » Enter IP-Address manually (DHCP „Aus“)

Settings on „Smartfox“:

- » Network connectivity
- » IP-Address of the heat pump must be entered



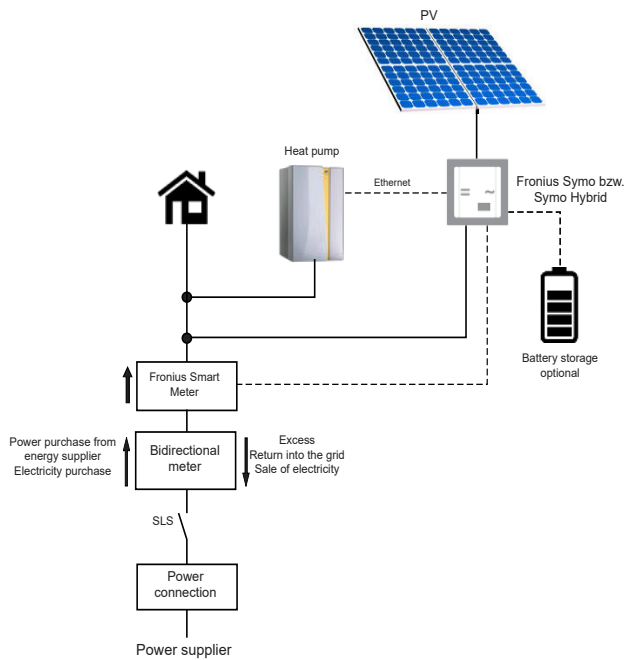
! For the communication with the iDM heat pump, you need a separate license for the "Smartfox". This license must be applied at "Smartfox" (<http://shop.smartfox.at/index.php>)!

! Heat pump and Smartfox must be in the same network. Network communication with the "Smartfox Light" is not possible!

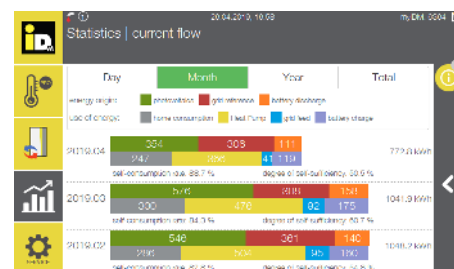
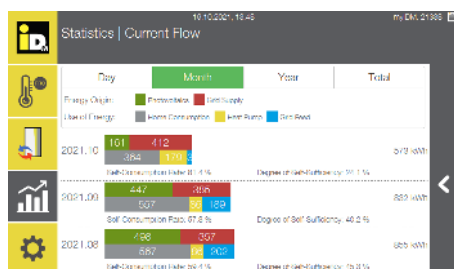
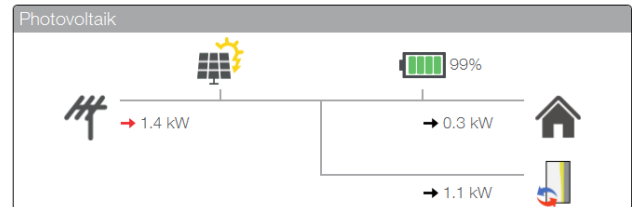
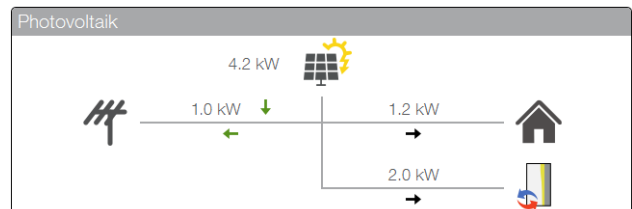
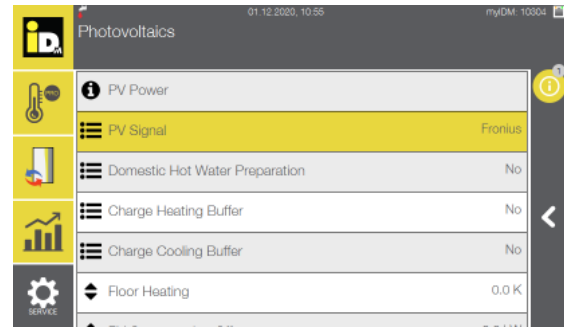
2.2.6. Communication via Fronius Symo and Symo Hybrid

For the communication with the Fronius Symo, it is important, that the heat pump and the Fronius Symo / Symo Hybrid are in the same network. The communication between the heat pump and Inverter takes place automatically via the network. The excess electricity is used for domestic hot water preparation, heat storage and heating management.

The excess flow for the heat pump is dependent on the Battery charge level. When the battery is low, it will be charged with priority. If the battery has a high charge level, the energy from the battery can also be used for the heat pump operation.



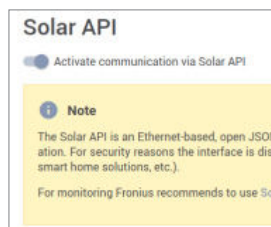
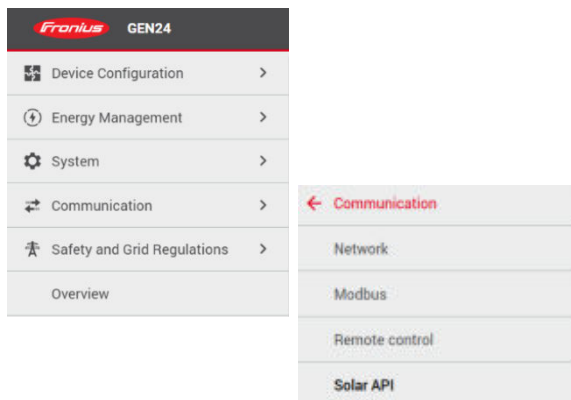
Integration Fronius Inverter



i The Fronius Smart Meter is absolutely essential for communication between the iDM heat pump and the Fronius system (Symo / Symo Hybrid / GEN24)! The Solar API interface must be activated on the Fronius system!

i Communication with multiple inverters is also possible (PV values are added). The Fronius Smart Meter is only required as an electricity meter for one inverter.

2.2.6.1. Activation Solar API interface



The „Solar API“ interface can be activated in the local network by entering the IP address of the inverter in a web browser.

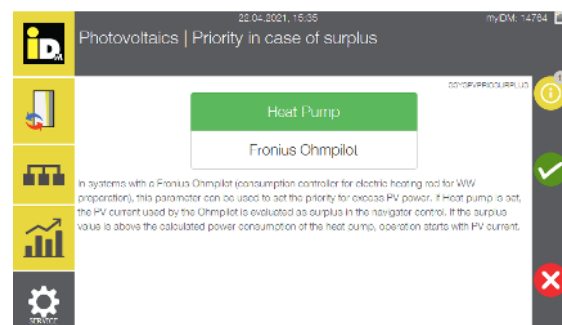
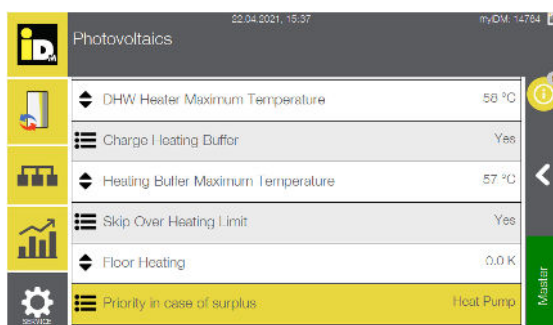
The login must be made as „Technician“ (password entry required, usually the same password as for „Customer“ login).

Then select „Communication“ in the menu navigation and then „Solar API“ (possibly also in the subfolder „Remote control“).

Communication via Solar API can then be activated there.

2.2.6.2. System with Fronius Ohmpilot

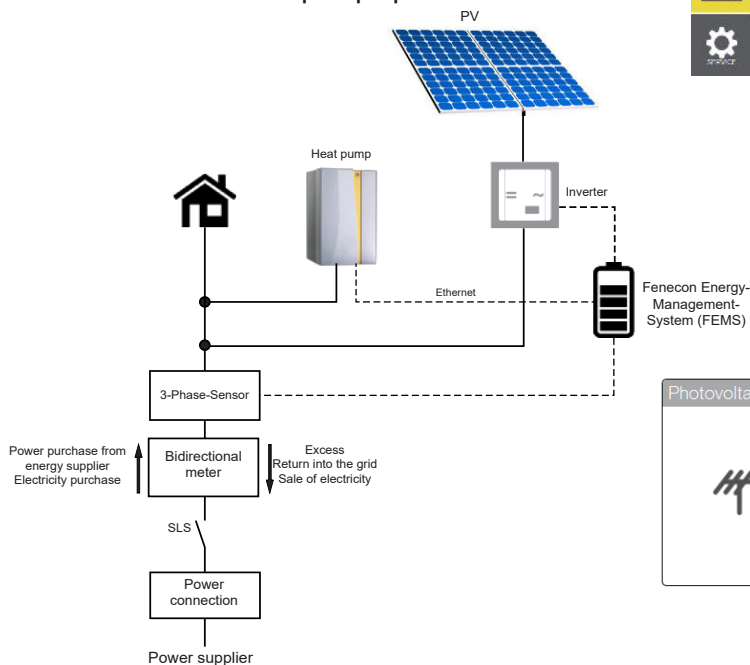
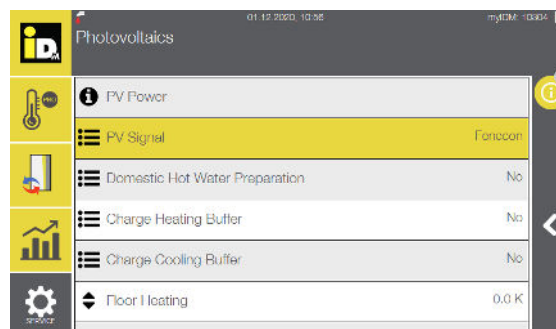
The Fronius Ohmpilot is a consumption controller that uses excess PV power for water heating. The Ohmpilot is taken into account in our software, i.e. for systems with Fronius inverters and Fronius Ohmpilot, the parameter „Priority for surplus“ appears in the PV menu when configuring the PV signal „Fronius“. In this case, the PV surplus current that the Ohmpilot uses for the electric heating rods is evaluated as „surplus“ in our control and as soon as this value is higher than the value that the Navigator control calculates for operation with PV current, the heat pump starts.



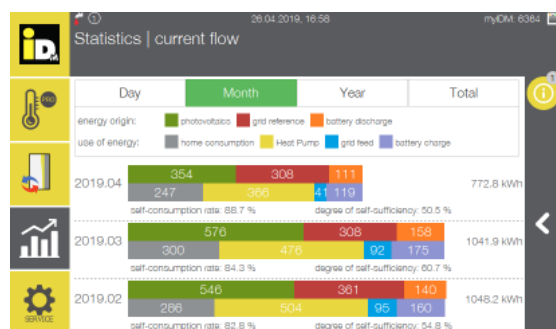
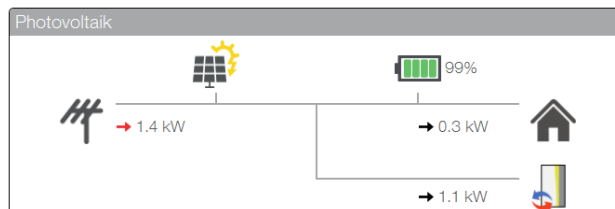
2.2.7. Communication via Fenecon Energie-Management-System (FEMS)

For the communication with the Fenecon Energie-Management-System, it is important, that the heat pump and the FEMS are in the same network. The communication between the heat pump and FEMS takes place automatically via the network. The excess electricity is used for domestic hot water preparation, heat storage and heating management.

The excess flow for the heat pump is dependent on the Battery charge level. When the battery is low, it will be charged with priority. If the battery has a high charge level, the energy from the battery can also be used for the heat pump operation.



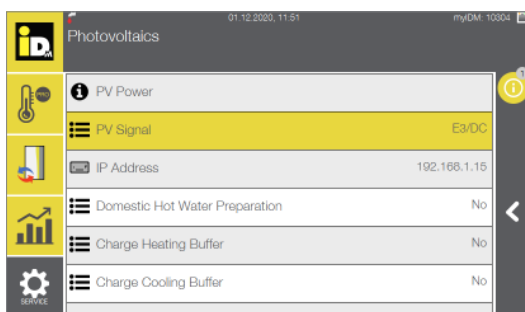
Integration Fenecon Energy-Management-System (FEMS)



When using Fenecon energy management systems, a battery is necessary because the energy is taken directly from the battery.

2.2.8. Communication with E3DC

When communicating with the E3DC energy management system, it is important that the heat pump and the energy management system are on the same network. Communication between the heat pump and E3DC is automatically done via the network (E3DC protocol / port 502). The excess electricity is used for domestic hot water preparation, heat storage and heating management.

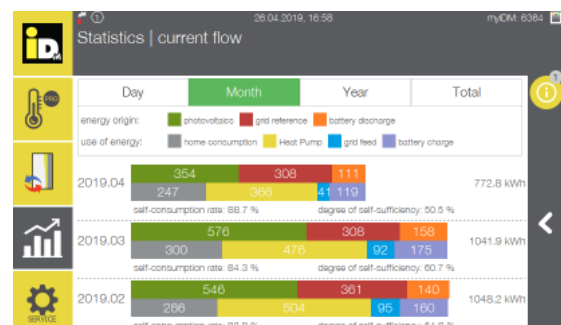
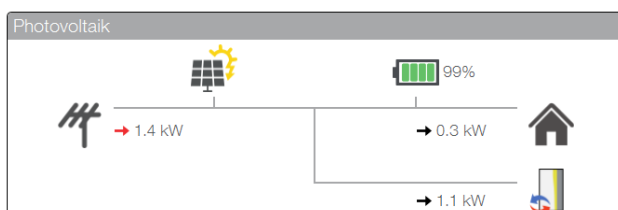
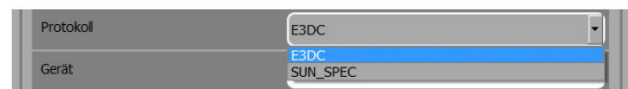
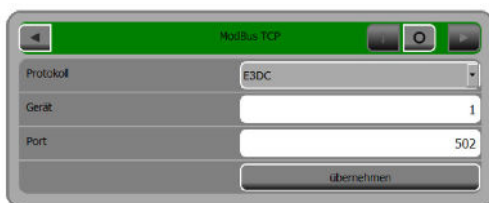


For the communication between iDM heat pump and the E3DC energy management system, the IP address of the E3DC must be set in the navigator control!



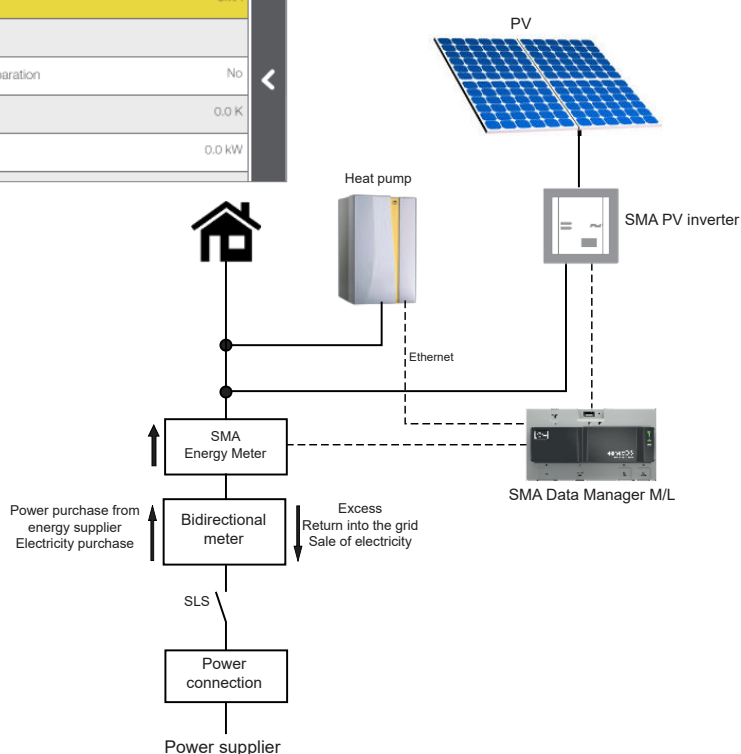
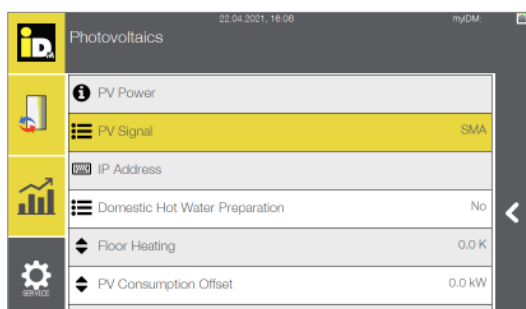
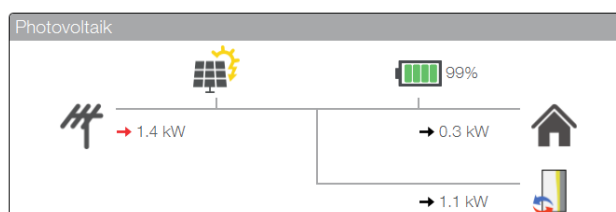
At the E3DC the Modbus TCP protocol „E3DC“ (Simple Mode) has to be configured!

Settings „Modbus function“ at the E3DC



2.2.9. Communication with SMA Datamanager

For communication with the SMA Datamanager, it is important that the heat pump and the Datamanager are in the same network. Communication between the heat pump and Datamanager takes place automatically via the network (Datamanager protocol / port 502). The surplus electricity is used for domestic hot water preparation, heating buffer- and heating management.



! A check mark must be set at "Enable Modbus Server" at the Data Manager.

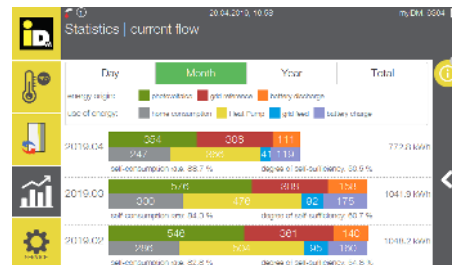
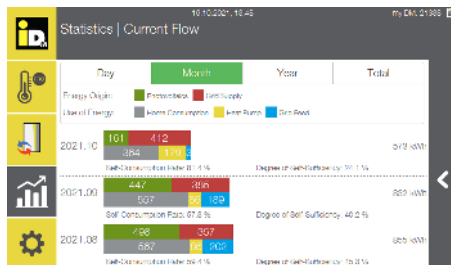
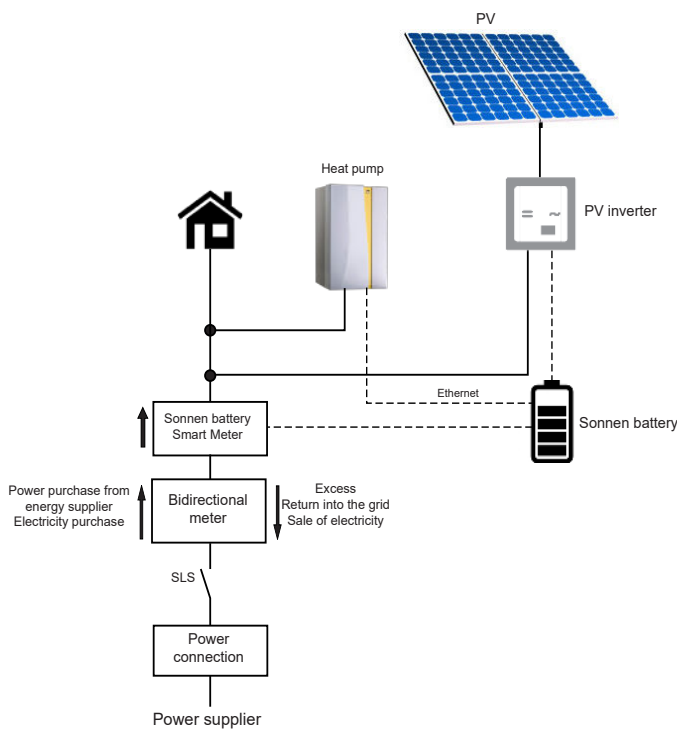
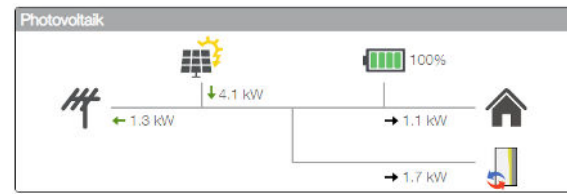
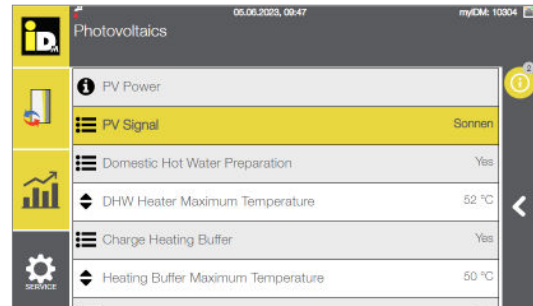
i The SMA Energy Meter is absolutely necessary for communication between the iDM heat pump and the SMA Datamanager!
The IP address of the SMA Datamanager must be set in the Navigator control!

! Communication with the "SMA Sunny Home Manager" is not possible!
The SMA Datamanager M Lite does not work in conjunction with systems with battery storage!

2.2.10. Communication with Sonnen battery

When communicating with the Sonnen battery, it is important that the heat pump and the Sonnen battery are in the same network. The communication between the heat pump and the solar battery takes place automatically via the network. The surplus electricity is used for domestic hot water preparation, heat storage and heating management.

The surplus electricity for the heat pump depends on the battery's state of charge. If the battery charge level is low, it is charged first. If the battery charge level is high, the energy from the battery is also used for heat pump operation.

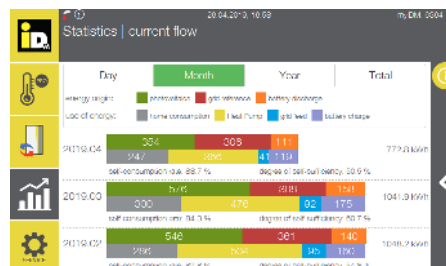
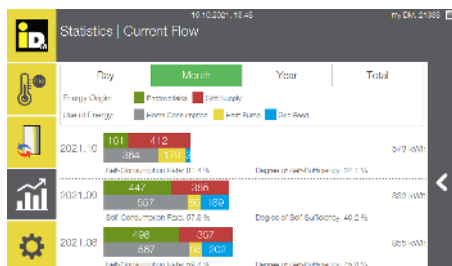
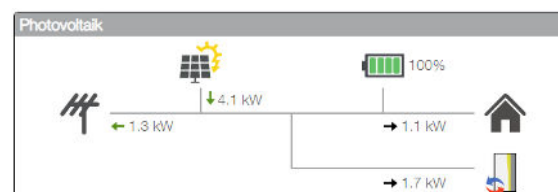
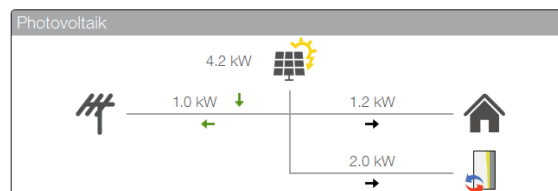
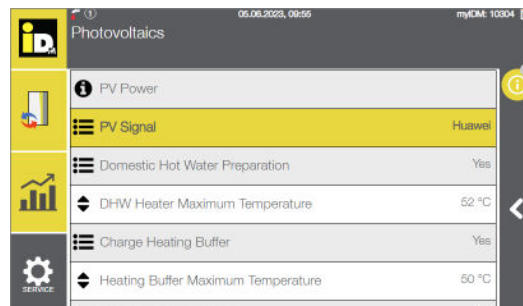
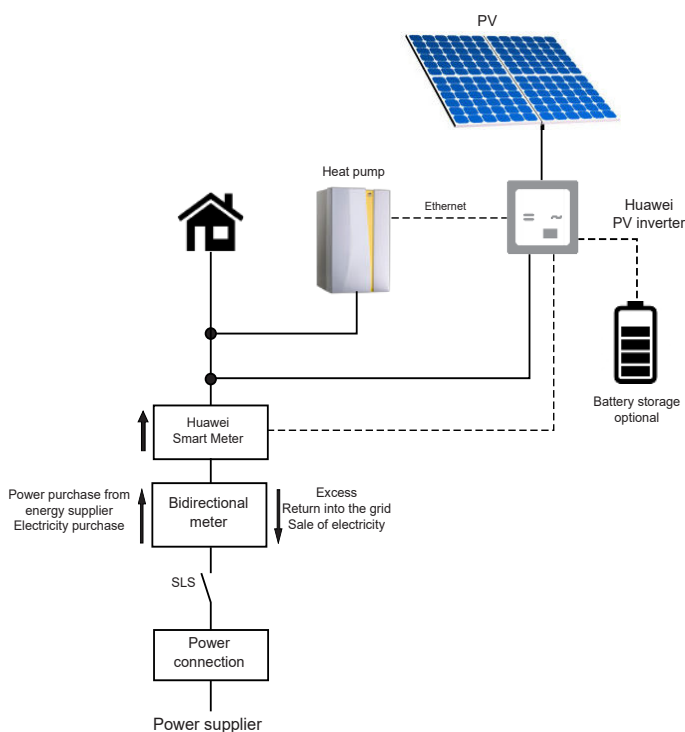


A smart meter from Sonnen is absolutely necessary for communication between the iDM heat pump and the Sonnen battery!

2.2.11. Communication with Huawei PV systems

When communicating with Huawei PV systems, it is important that the heat pump and the Huawei system are on the same network. The communication between the heat pump and the inverter takes place automatically via the network. The surplus electricity is used for domestic hot water preparation, heat storage and heating management.

The surplus electricity for the heat pump depends on the charge level of the battery. If the battery charge level is low, it is charged first. If the battery charge level is high, the energy from the battery is also used for heat pump operation.



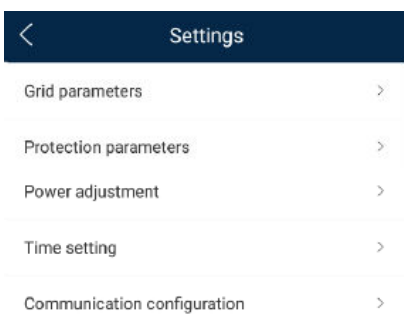
For communication between the iDM heat pump and the Huawei PV system, the Huawei Smart Meter is absolutely necessary and the „Modbus TCP“ interface must be activated via the mobile app!

2.2.11.1. Activation Modbus TCP communication/interface

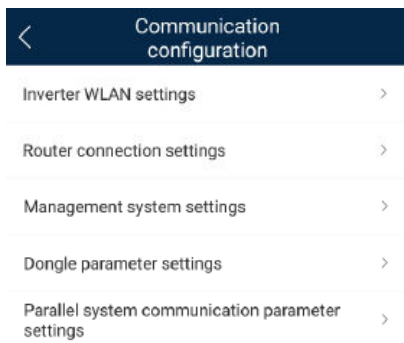


Modbus TCP communication must be set/activated via the mobile app.

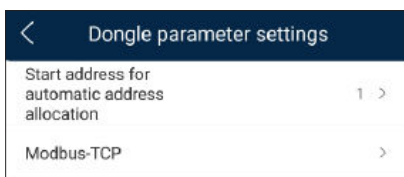
To do this, select the „Settings“ menu



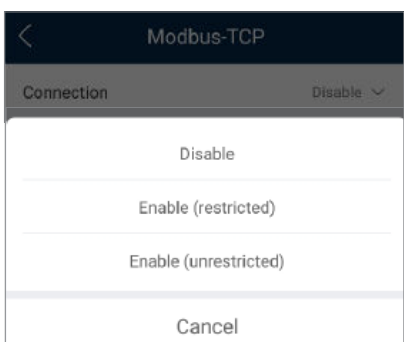
Select the „Communication configuration“ menu.



Select the „Dongle parameter settings“ menu.



Select „Modbus-TCP“.



Select „Enable (unrestricted)“.

2.3. Priorities by using PV-energy

Depending on the configured PV-signal-type, different priorities for the PV-energy usage are being applied:

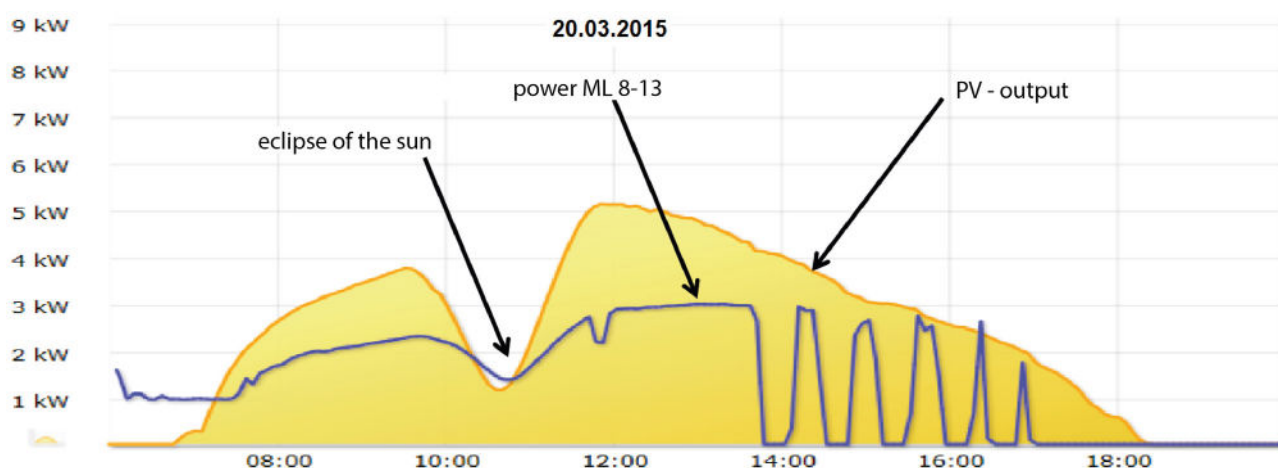
» **Digital input (Potential-free contact):**

After exceeding the threshold set by the heat pump owner, the heat pump uses the PV-energy to carry first the domestic hot water loading. After completion of the domestic hot water loading and present heating demand, the heat pump goes on with heating mode.

» **0-10V signal / SO signal / Solar-Log™ / Modbus TCP / Fronius / Fenecon / E3DC / SMA with dataman-ager / Sonnen / Huawei**

The heat pump starts with heating mode and goes on with domestic hot water loading, when the PV-yield resp. the excess overrun the current / predicted power consumption for the domestic hot water loading. After domestic hot water charging completion and present heating demand the heat pump starts again with heating mode.

Route of the daily output from a PV-system



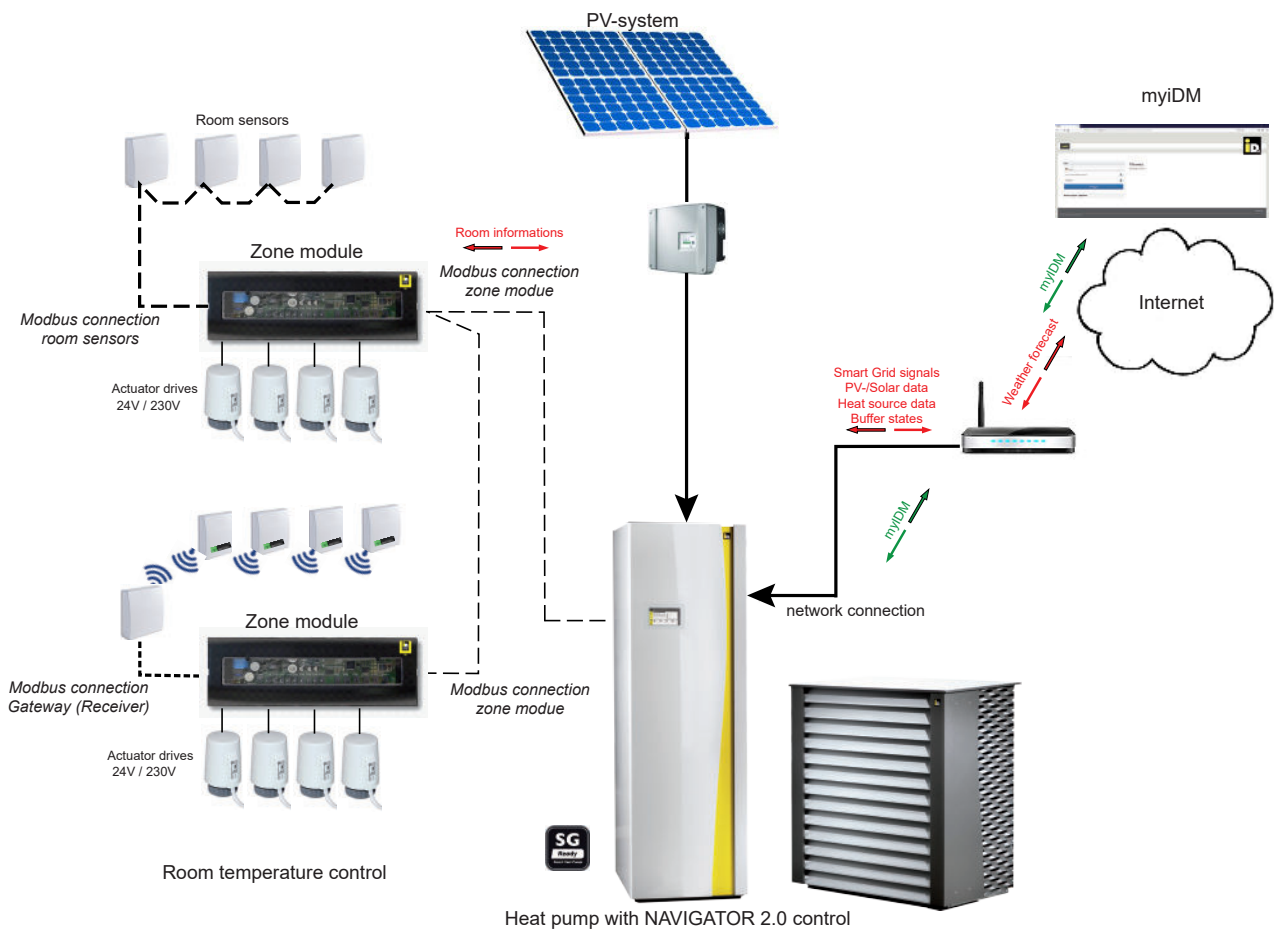
Actual power of the PV-system / Power consumption TERRA ML 8-13



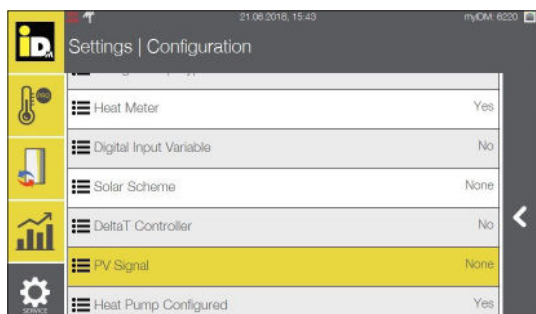
In order that the heat pump can perform the domestic hot water charging, at least the operation at nominal speed is needed. The relevant power consumption of the heat pump at nominal speed can be found in the performance data.

2.4. Communication with NAVIGATOR 2.0 Pro

In systems with NAVIGATOR 2.0 Pro (individual room control), the individual rooms can also be used as buffer zones. All rooms with the room type "Living" and the operating mode "Automatic" will be managed in case of PV-surplus to the set comfort temperature. This optimizes/increases the internal consumption.



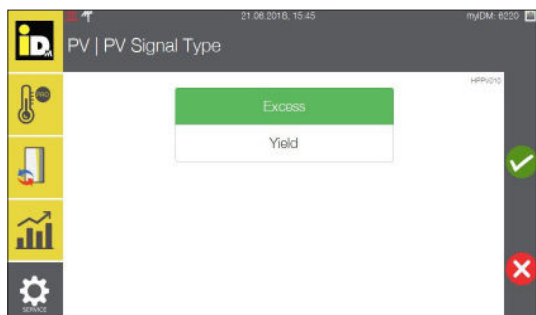
2.5. Settings NAVIGATOR 2.0 control



The kind of communication between PV-system and heat pump must be set in configuration menu (service level) of the Navigator-Regulation 2.0.



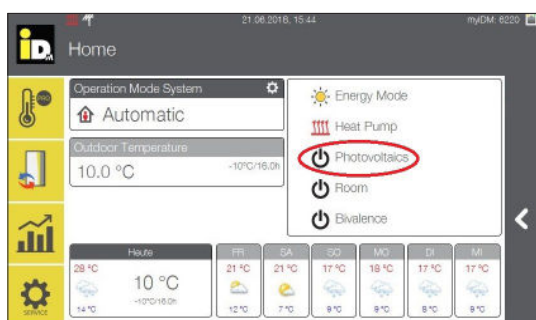
At setting 0-10V signal or S0 signal the kind of the "PV Signal Type" must be configured as well. With this parameter it is defined, if the power consumption of the heat pump will be included in the submitted PV-value or not.



» **Excess:** The power consumption is included. The submitted PV-value is reduced by the actual power consumption, as soon as the heat pump starts.

» **Yield:** The power consumption is **not** included.

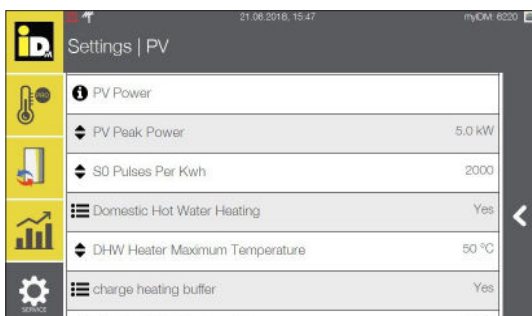
The submitted PV-value will **not** be reduced, when the heat pump starts.



As soon as the configuration is stored, the display Photovoltaics appears in the NAVIGATOR 2.0 - main menu.



Additionally the menu "PV" appears in the main menu "Settings".

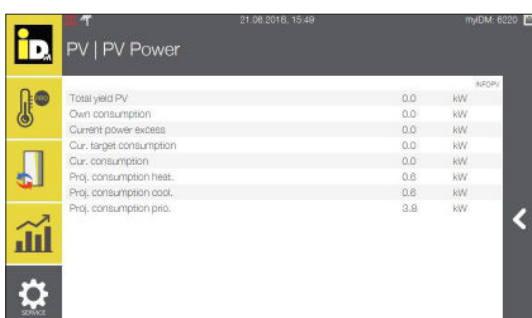


Depending on the configured PV input signal in the menu „PV“ different relevant parameters are shown.



In the submenu „PV Power“ the following values are shown for the input signals 0-10 V signal, S0 signal or Modbus TCP:

- » Current power excess
- » Current/projected power consumption (of the heat pump)



If Solar-Log™ is configured as input signal the following values are shown:

- » Total yield PV
- » Own consumption
- » Current power excess
- » Current target consumption
- » Current consumption
- » Projected consumption heating
- » Projected consumption cooling
- » Projected consumption priority

In addition to the compressor characteristics curve, the evaporating and condensing temperatures as well as the speed and the fan power (in the case of air heat pumps) are also included in the calculation of the current power consumption.

When calculating the projected power consumption (at heat pump standstill), the outside temperature, the heating buffer temperature / the heat pump return temperature / the min. speed and the domestic hot water buffer max. temperature are considered.

Photovoltaic power-usage

Parameter Photovoltaik (Settings/Photovoltaik)		
Par. Nr.	Name	Description
	PV Power	The parameter „PV Power“ shows the different PV-power values. After transmission of the signal from the inverter resp. energy consumption controller to the Navigator 2.0 control, the heat pump starts. For heating and cooling mode the heat pump stops after expiration of the min. runtime of the compressor, if the available PV power decreases below the requested PV power. In contrast to the domestic hot water loading, where the loading will be finished.
PV008	PV-Signal	This parameter is used to set the type of the PV signal. Digital Input, 0-10V signal, S0 signal, Solar-Log, building management system/Smartfox, Fenecon, Fronius, SMA with datamanager, Sonnen or Huawei can be set as PV signal.
PV010	PV signal type	This parameter defines for the signal types 0-10V and S0 whether it is a surplus or yield signal. If „Surplus“ is set, the signal value is reduced by the electrical power of the heat pump when the heat pump is switched on. If „Yield“ is set, the heat pump does not influence the value, which is transmitted via the S0 or 0-10V signal.
PV016	S0 interface	This setting specifies which type of transistor is installed in the S0 interface from which the signal is emitted. On most devices, a test signal can be output, which can be used to test the correct setting for this parameter. If the parameter is set incorrectly, no power will be generated from the S0 signal.
PV007	PV Peak Power [0 - 500 kW]	The parameter „PV Peak Power“ specifies the maximum power (size), in kWp, of the PV-system.
PV004	S0-Pulses per kWh [0 - 10.000]	For the S0 signal, the number of the pulses per kWh must be set. For the value of pulses see manufacturer of the inverter resp. S0 counter.
PV002	Domestic Hot Water Preparation [Yes/No]	If this parameter is set to „yes“, then the usage of PV-energy for domestic hot water preparation is activated. The DHW preparation will be done independent to the configuration of the DHW time schedule. The DHW preparation will be finalised, if the PV-power decrease is below the requested (needed) PV-power and if the minimum term has been exceeded.
PV025	DHW E-heating rod [Yes/No]	With iPump T, iPump A and AERO SLM heat pumps, if set to „Yes“, when there is sufficient PV power surplus, the electric heating element (in stages with 1 to 6 kW) can raise the DHW heater up to 70°C. However, the heat pump always carries out the increase first..
PV005	DHW Heater Maximum Temperature [50°C]	This parameter specifies the maximum temperature of the domestic hot water heater. The adjustable range depends on the heat pump maximum temperature.
PV001	Charge Heating Buffer [Yes/No]	When this parameter is set to „yes“, then the PV-energy is used for charging the heating buffer tank.
PV006	Heating Buffer Maximum Temperature [50°C]	This parameter specifies the maximum temperature of the heating buffer. The heating buffer will be charged to the heating buffer maximum temperature, independent to the configured heating limit. The adjustable range depends on the heat pump maximum temperature.
PV013	Skip Heating Limit [Yes/No]	This parameter specifies, if the heating buffer charge should be done also above the heating limit. The parameter „Charge Cooling Buffer“ must not be configured with „yes“.
PV012	Charge Cooling Buffer [Yes/No]	This parameter can be used to enable management/subcooling from the cooling buffer in systems with a PV system. This function is only possible with non-modulating heat pumps!
PV009	Cooling Buffer Minimum Temperature [18°C]	This parameter defines the minimum temperature of the cold storage (12-25°C) with sufficient PV power. The standard set/calculated switch-off temperature for cooling buffer management is therefore not observed during operation of the heat pump with sufficient PV power.
PV014	Skip Over Cooling Limit [Yes/No]	This parameter specifies, if the cooling buffer charge should be done also beneath the cooling limit. The parameter „Charge Heating Buffer“ must not be configured „yes“.

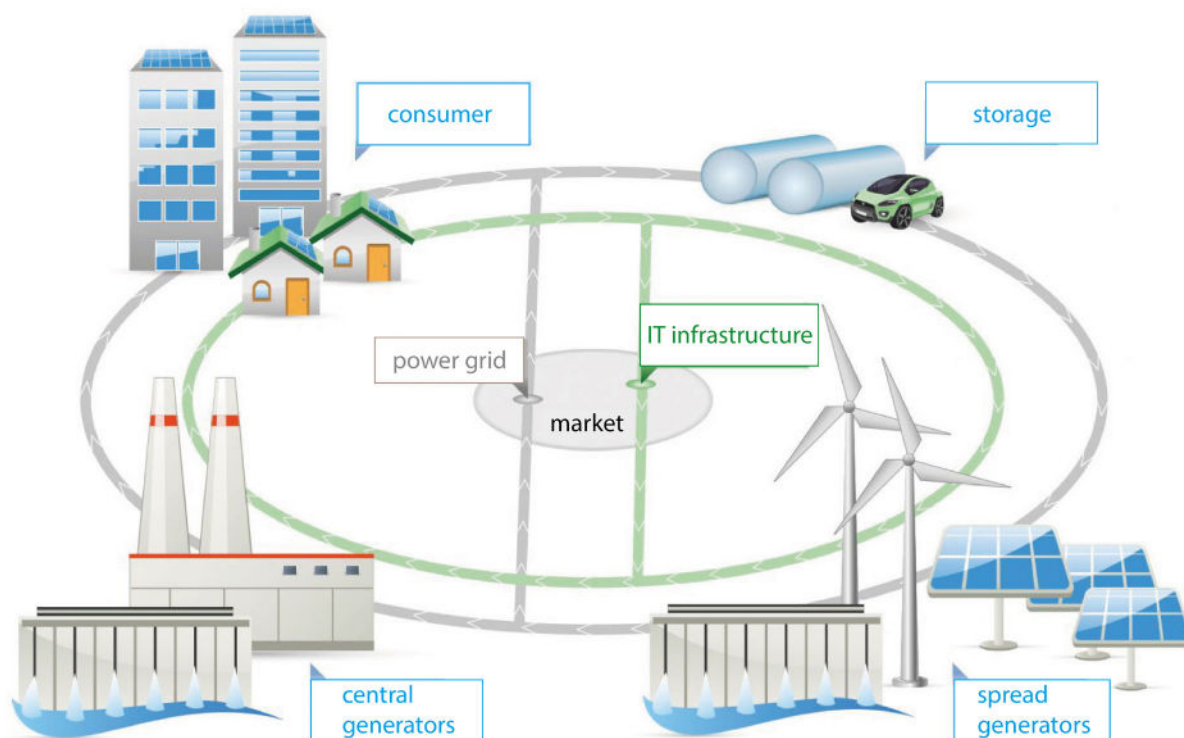
Parameter Photovoltaik (Settings/Photovoltaik)		
Par. Nr.	Name	Description
PV003	Floor Heating [0.0 K]	By setting this parameter to appropriate temperature settings additional, energy can be stored in the floor heating. The value (0.0-2.0K) by which the floor heating will be increased is regulated by this parameter. As a requirement, the system must be in heating mode, which means that the heating limit is undershoot.
PV011	Time Constant Average Value PV Power [2 min]	This parameter specifies the time frame (0.1-360 min.) for the average value of the PV-power.
PV015	PV-Consumption offset	This parameter can be used to increase or decrease the value of the „momentary/ predicted power consumption“.
PVPRIO	Priority in case of surplus [Heat pump / Fronius Ohmpilot]	This parameter can be used to set the priority for systems with a Fronius Ohmpilot (consumption controller for electric heating rod for WW preparation) in case of excess PV power. If „Heat pump“ is set, the PV power used by the Ohmpilot is evaluated as surplus in the Navigator control. If the surplus value is higher than the calculated power consumption of the heat pump, the operation with PV power starts.
PV-ROOMS	Rooms on comfort mode [Off / Heating and cooling / Heating / Cooling]	In systems with a PV system and iDM individual room control, this parameter can be used to enable the overheating of the rooms in heating mode and the undercooling of the rooms in cooling mode, if there is sufficient PV surplus. Only rooms with the operating mode „Automatic“ and the room type „Living“ are managed to the stored comfort temperature (depending on the set heating and cooling limits).



For applications with a thermal solar system and a PV-system both systems work in parallel, for the domestic hot water preparation.

3. Smart Grid

„Smart Grid“ is generally understood as an intelligent power grid, where all actors of an energy system, like grid components, generators, storage and consumers, are connected via a bidirectional communication network. Thereby an energy- and cost-efficient operation is made possible*.

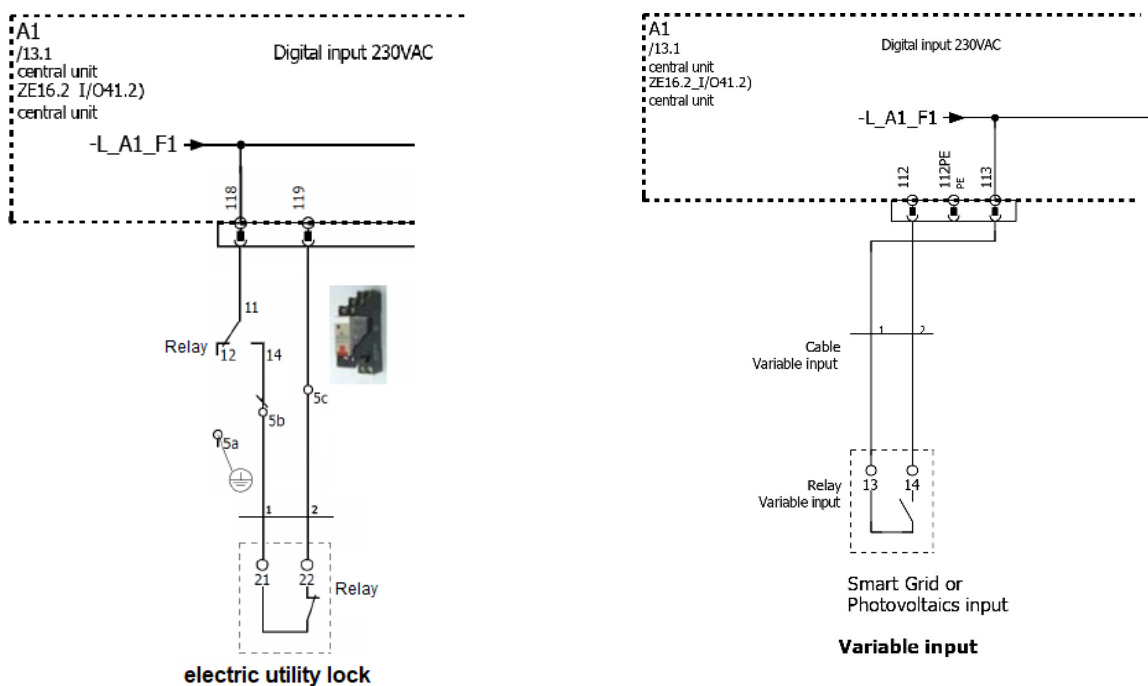


* Quelle: <https://www.smartgrids.at/smart-grids.html>

3.1. Energy rates from the energy supplier

The communication of energy rates to the NAVIGATOR 2.0 control is realized via two digital inputs (variable input and electric utility lock). Another important grid component, a Smart Meter (intelligent electric meter), is needed for the communication. With a Smart Meter it's possible to receive digital data provided by the energy supplier (e.g. energy rate changes) resp. to send digital data to the energy supplier (e.g. energy consumption). By means of the received digital data, the Smart Meter can control the digital inputs (e.g. from a heat pump with NAVIGATOR 2.0). In dependence to the switching state (0 or 1) of the two digital inputs, the energy rate is communicated to the NAVIGATOR 2.0 control.

The connection takes place at the clamp 118/119 resp. 112/113 of the NAVIGATOR 2.0 control.

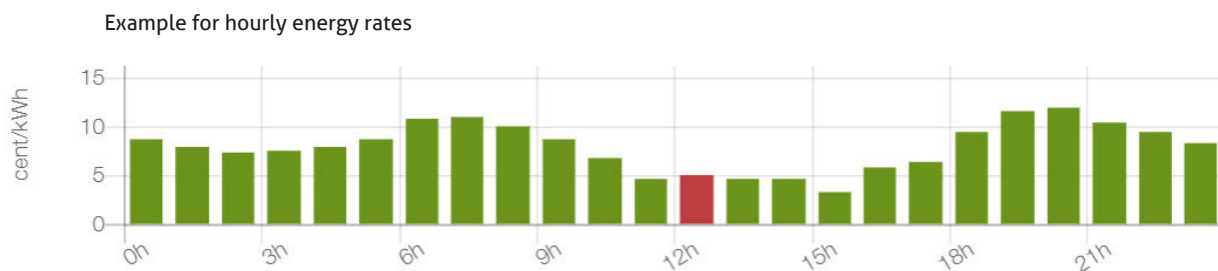


By this two digital inputs it's possible to communicate four switching states to the NAVIGATOR 2.0:

Smart Grid	Energy traffic light	Variable input	Electric utility lock input
High energy rates	Red	0	1
Normal energy rates	Yellow	0	0
Low energy rates	Green	1	0
„Free“ energy	Supergreen	1	1

3.2. Hourly energy rates

Due to the liberalization of the electricity market and the relating thereto “unbundling” from the energy supplier and grid operator it’s possible to deal energy on the Stock Exchange. By means of detailed weather forecasts, which inform about the fluctuating energy production of wind and PV systems, energy rates are notified at the Stock Exchange the day before. The energy rate is getting cheaper, when its sunnier and more windy, due to a surplus of green electricity. This could even lead to negative energy rates.



The NAVIGATOR 2.0 control acquire automatically the energy rate, provided by the energy supplier, for the next day and optimize automatically the operation of the heat pump. This optimization of the heat pump is possible because of thermal storage by load transfer.

If the energy rate is low, then the NAVIGATOR 2.0 control superelevate the temperature in the heating buffer (thermal storage). Due to the thermal storage the heat pump can run in set-back mode, while the energy rates are high and thus save energy costs. On the basis of the energy rates the domestic hot water loading time schedule is optimized as well. As an example in the table above the low energy rates are available from 03:00 till 05:00 am. According to the time schedule domestic hot water loading should be done at 07:00 am., where a high energy rate is settled. Due to the optimization of the NAVIGATOR 2.0 control the domestic hot water charging is brought forward in the time range where low energy rates are available.

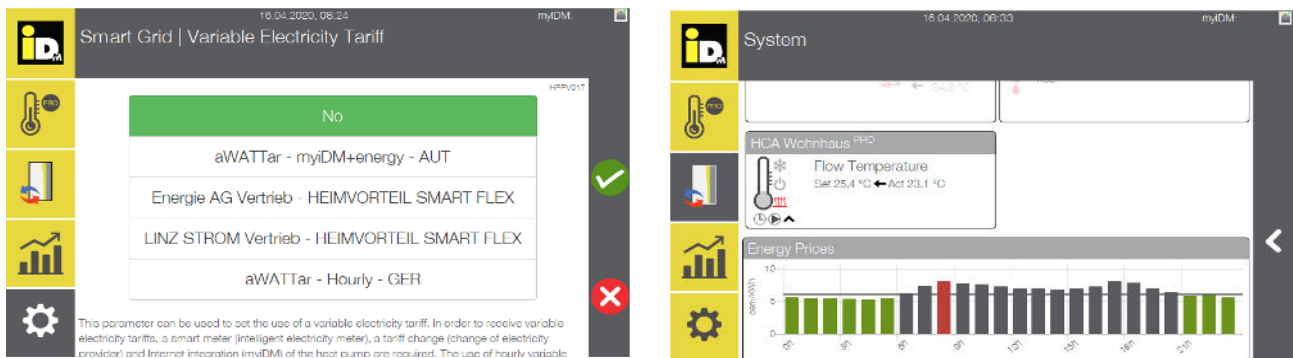
With use of the single room temperature control NAVIGATOR 2.0 Pro the thermal storage additionally takes place for rooms as well, besides the heating buffer. Therefore, the building mass is specifically utilized as a buffer.



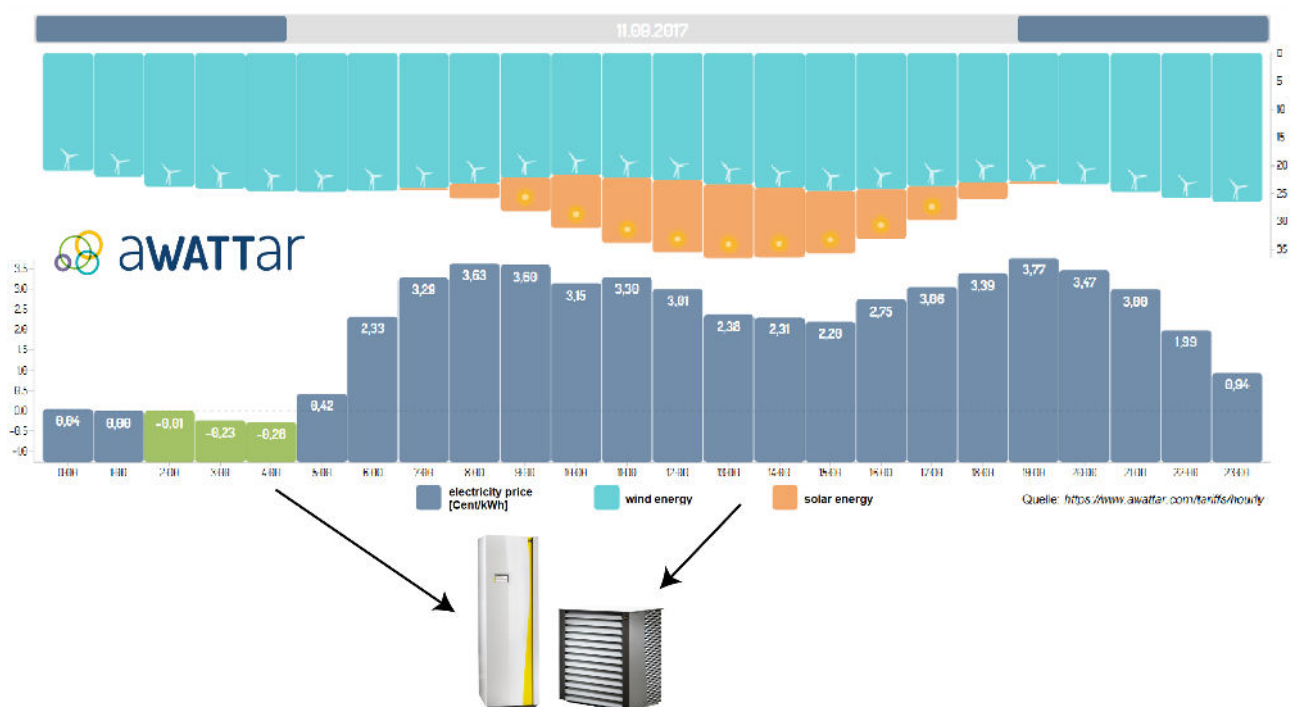
3.2.1. Example: aWATTar (currently only available in Austria)

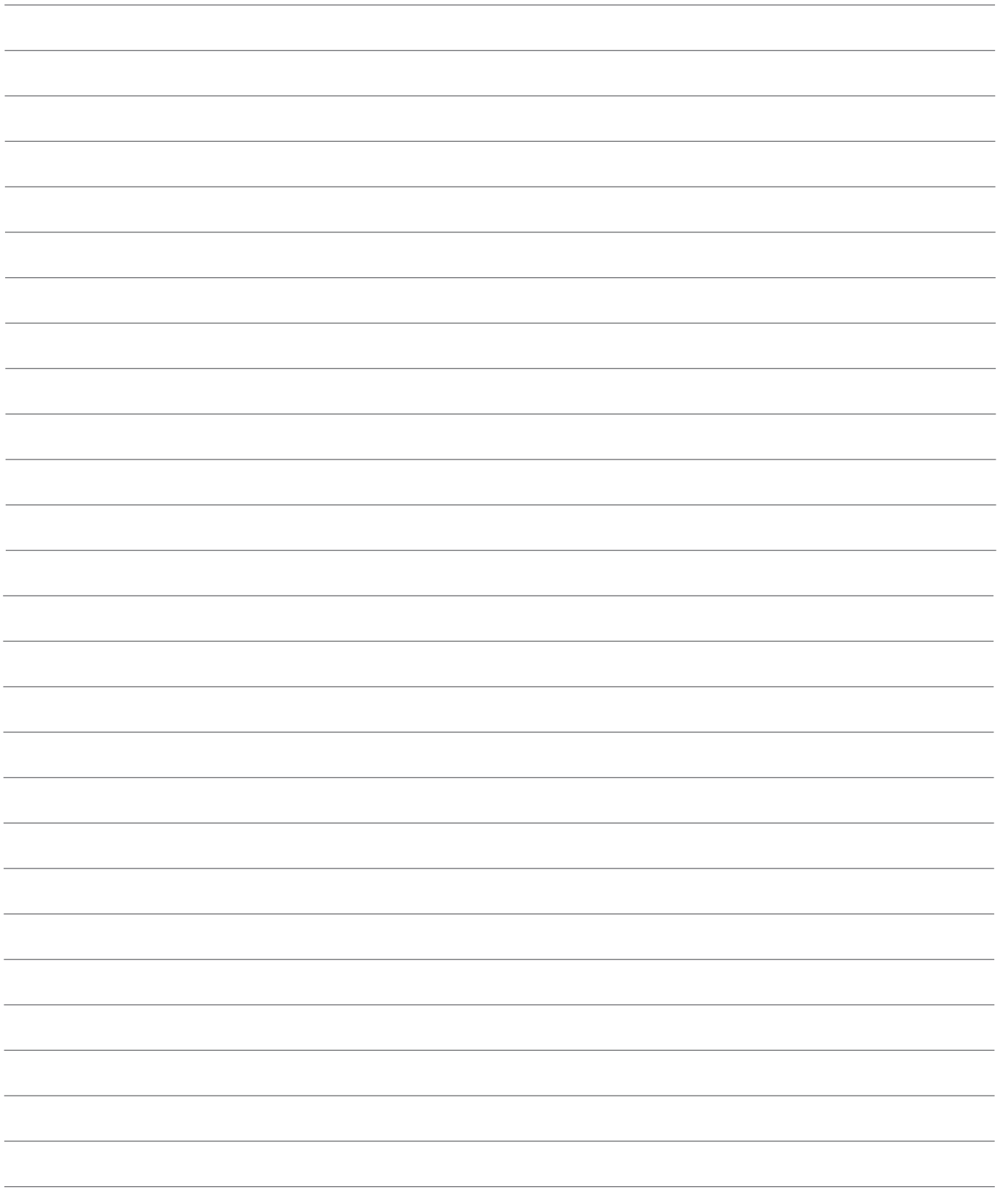
The start-up company aWATTar, placed in Vienna, is the first energy supplier in Austria who offers an hourly energy rate. The rate "myiDM+ energy" is provided daily from 2:00 pm for the following day. In order that, the NAVIGATOR 2.0 control can optimize the operation of the heat pump according to the present energy rate.

In the NAVIGATOR 2.0 control the energy supplier "aWATTar" can be configured in the "Smart Grid / Variable Electricity Tariff" menu.



The communication between energy supplier and NAVIGATOR 2.0 takes place by a Smart Meter.





ALWAYS THERE FOR YOU:

© IDM ENERGIESYSTEME GMBH
Seblas 16-18 | A-9971 Mauterhorn in Osttirol
www.idm-energie.at | team@idm-energie.at

iDM service technology:

COMMISSIONING - SERVICE - ON-SITE SERVICE

Our service technicians are happy to help on-site.
Contact details for your regional customer service center can be found on our website.

iDM academy:

PRACTICAL KNOWLEDGE FOR SALES AND TECHNOLOGY

The comprehensive range of seminars for specialists at the iDM POWER FAMILY is available to you any time on our website. We're looking forward to receive your registration.

iDM SALES Partner:

