installation manual wattr

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1. Introduction

1.1. Sempl

Sempl is a Belgian company specializing in thermal/energy modelling and optimisation. With this knowledge, Sempl's mission is to facilitate today's energy transition. Indeed, we are increasingly using renewable energy and electrifying more and more equipment, creating both opportunities and challenges. Conventional controls are not adapted to this which mostly means that potential to save energy and make optimal use of it remains. Sempl addresses this potential by offering advanced controls that use thermal/energy modelling to make optimal use of (renewable) energy.

1.2. Wattr

Wattr is the brand name of Sempl's pool control system. Wattr is a revolutionary, self-learning and also user-friendly pool controller. Wattr communicates with the devices present within your pool installation, think of your heat pump, circulation pump, water treatment, automatic cover... and brings the control of these devices together in one convenient application.

Thanks to the use of unique self-learning thermal/energetic models of your swimming pool, Wattr can also actively optimise your energy consumption when the "Smart Mode" is activated. Wattr takes into account your comfort requirements, the performance of your heat pump, weather forecasts and much more. When linked to a household energy management/domotics system, the consumption of your swimming pool can also be coordinated with the consumption of your household, production of your solar panels, dynamic energy tariffs, etc. The possibilities are endless.

2. Product description

With Wattr, an intelligent pool controller, you can centrally control all the pool installation's devices using a single application. Thanks to self-learning models and algorithms, it is also possible to make significant savings on your energy costs when activating smart mode.

Wattr consists of a hardware module that is placed in the electrical cabinet of your swimming pool in the form of a Din-rail module. This hardware module is equipped with various inputs and outputs to enable communication with the equipment present. Thanks to multi-functional inputs and outputs, the Wattr module can be used to control various devices in various combinations.

Everything is presented visually and easily controllable in the Wattr app, available for Android and IOS. The app is also a handy tool for the installer to carry out the configuration of a module and then share it with the customer.

Wattr has several functionalities, the most important of which are listed below.

When coupled with a compatible heat pump using the Modbus RTU (RS485) protocol, Wattr can provide energy control for the heat pump. Thus, Wattr takes into account the characteristics of your specific heat pump to ensure that you can achieve your swimming comfort with the lowest possible energy cost. Moreover, by collecting data, Wattr learns installation-specific characteristics, such as recognizing when the heat pump is in the shade and is less efficient, in order to respond to this in control.

Wattr can also communicate with water treatment systems equipped with the Modbus RTU (RS485) protocol. The module recognizes the connected sensors and then visualizes the relevant data in the app, when the water treatment system also functions as filtration control, Wattr will also make these functionalities usable from the app. In this way, Wattr can ensure that water quality is not compromised.

When the water treatment system is not equipped with filtration control, the Wattr module can be used to control a variable speed circulation pump using the relay outputs, if a compatible pump is equipped with the Modbus RTU (RS 485) protocol it can also be used to control the pump.

The relay contacts can further be used to configure backwash functionalities, overflow control, simple water level control, lighting control and much more. Details of these functionalities can be found in this document.

The module is further equipped with input contacts. These are used, for example, for reading the cover (open or closed), a float contact for controlling the water level,...

3. Functionalities

The following is a summary of the various functionalities of the Wattr control.

3.1. Water pump control

The Wattr module communicates with the heat pump in every installation. This ensures that the heat pump can be controlled from the Wattr application. This allows you to set the desired temperature directly on the heat pump from the Wattr application using the circular slider on the home screen. You can also immediately read the current water temperature here and check the current running capacity of your inverter heat pump.

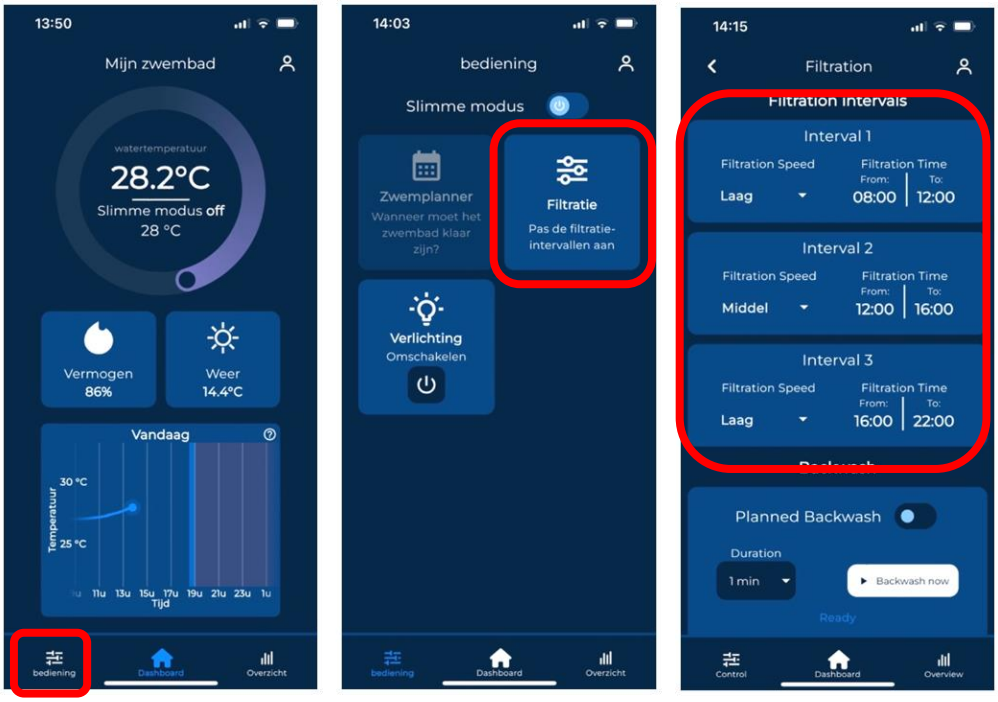
3.2. Circulation pump control

From the Wattr application, you can set the filtration intervals and corresponding filtration rates of your circulation pump. The pump is controlled either directly by the Wattr module or by a connected water treatment device.

The filtration menu can be found under "operation".

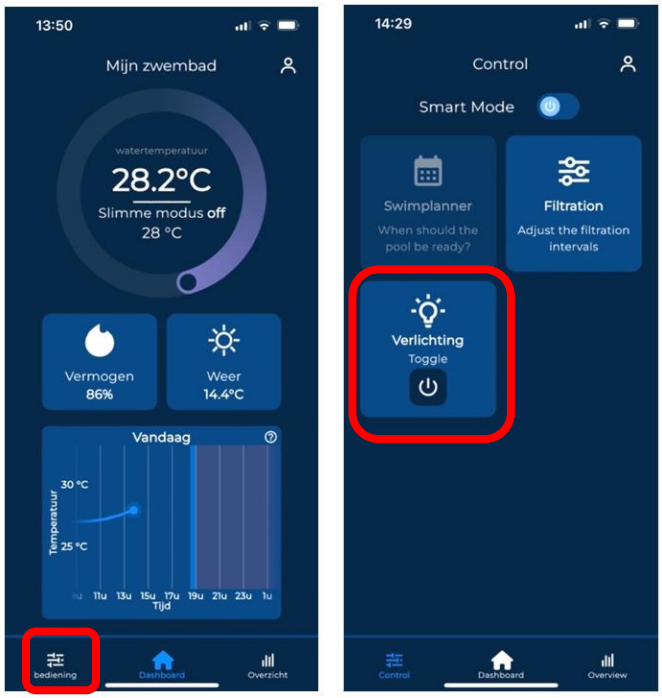
Attention

Always ensure sufficient hours of filtration to guarantee water quality. Respect local legislation for this as well. Always set the speeds on your circulation pump high enough for this purpose.



3.3. Lighting control

When lighting is connected to the Wattr module, it can be controlled from the Wattr application. Depending on the type of lighting/connection, 1 or 2 buttons will be present. When 1 button is present, the lighting can only be switched on or off. When 2 buttons are present, colours can also be changed.

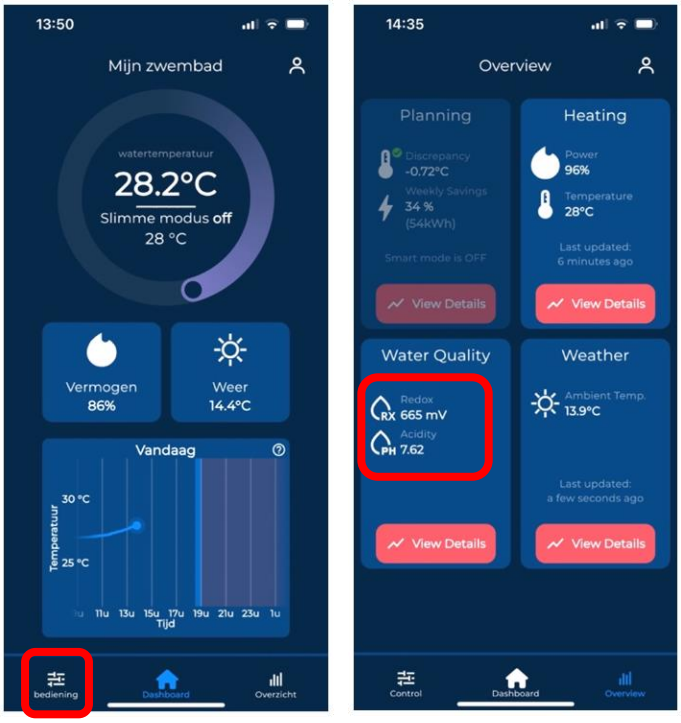


Attention

Whether or not you can change the color of the lighting from the Wattr application depends on the lighting installed and the connection to the Wattr module.

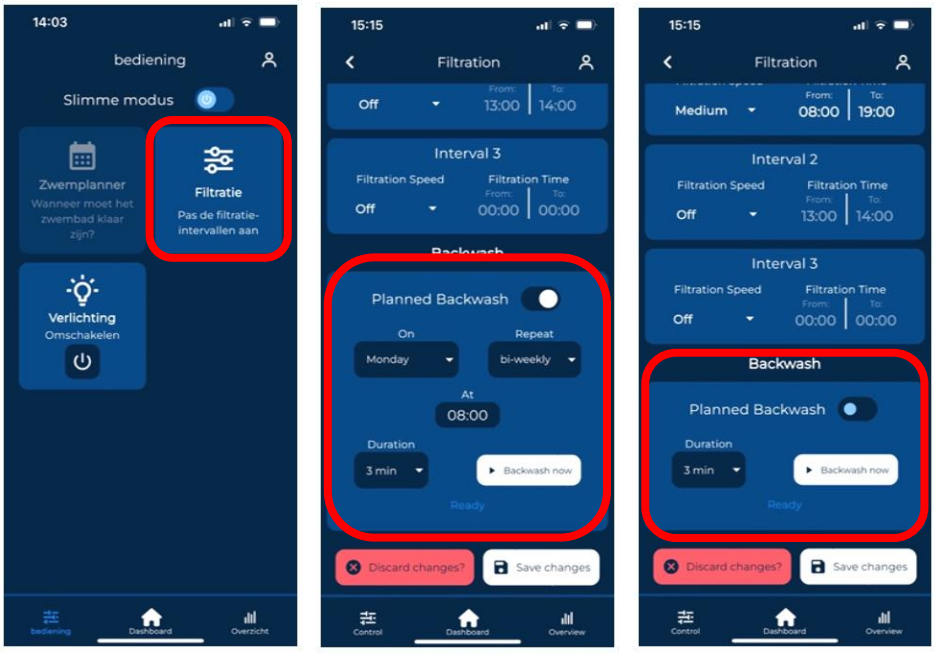
3.4. Monitoring water quality

When a compatible water treatment device is connected to the Wattr controller, water quality is also tracked in the application. This allows Wattr to detect any problems early on. The Wattr module detects which sensors are present in your water treatment device and visualizes the relevant measured values.



3.5. Backwash

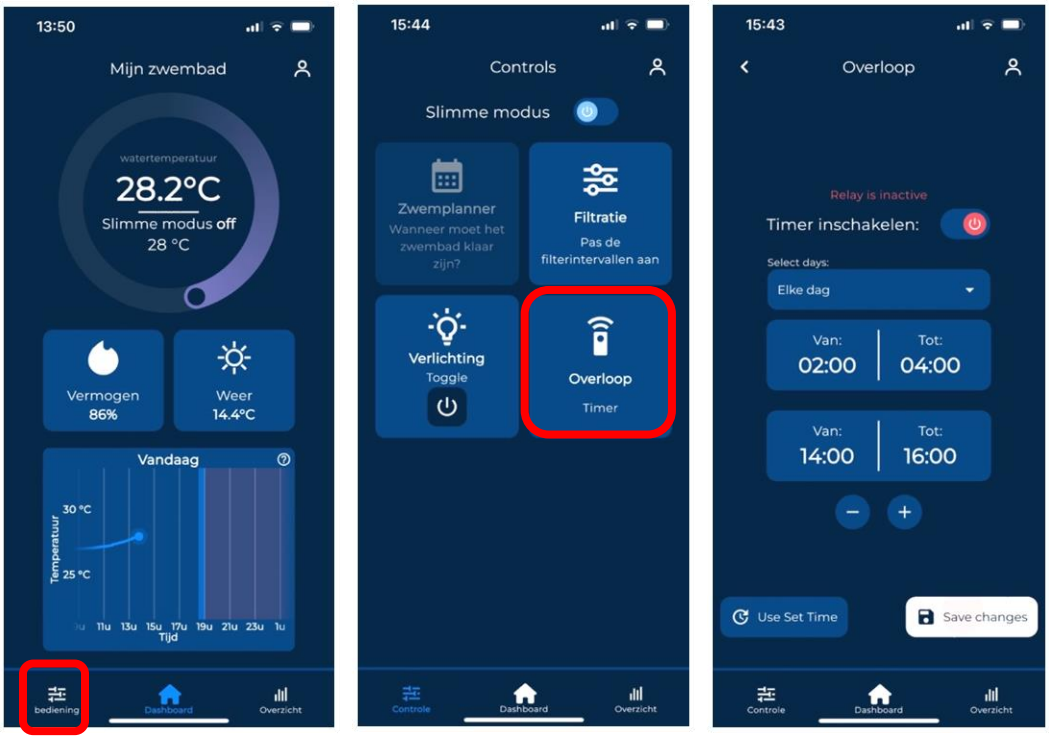
When the Wattr controller is equipped with a backwash valve, you can backwash manually or automatically from the Wattr application. The backwash control can be found in the filtration menu.



3.6. Overflow control

For overflow pools equipped with a buffer tank, the Wattr module can control the overflow valve. Thus, timers can be used to set at which times of the day the overflow should be triggered and filtration should take place from the buffer tank. At other times, filtration will take place from the pool bottom, with no overflow. Switching between bottom intake and overflow operation can save a substantial amount of energy associated with additional heat losses during overflow operation. In smart mode,

the Wattr module automatically takes into account additional heat losses during overflow operation to anticipate this with the heat pump.



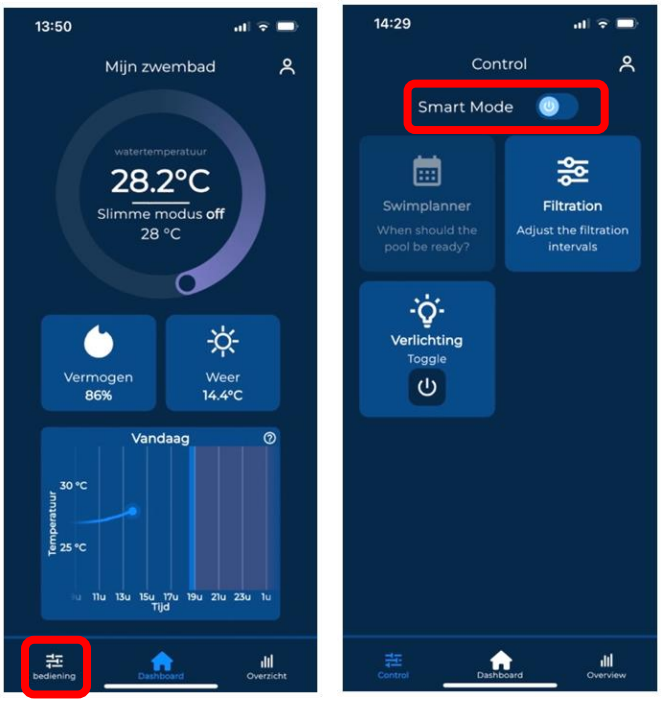
3.7. Level control

When configured, the Wattr module can be set up to perform simple level control. This uses a float switch that is placed at the pool (e.g. in a skimmer) and connected to an input of the Wattr module. When the water level is too low, the switch no longer gives contact, causing a relay contact of the Wattr module connected to a valve to switch on. This valve ensures water supply. The Wattr control is further equipped with an error detection system. If the pool needs refilling too frequently or for too long, the Wattr control stops refilling and reports the detected error.

3.8. Smart mode (only with subscription)

The Wattr module can do energy management by using self-learning thermal models of your pool and predictive algorithms. In this mode, Wattr takes over the control of your heat pump.

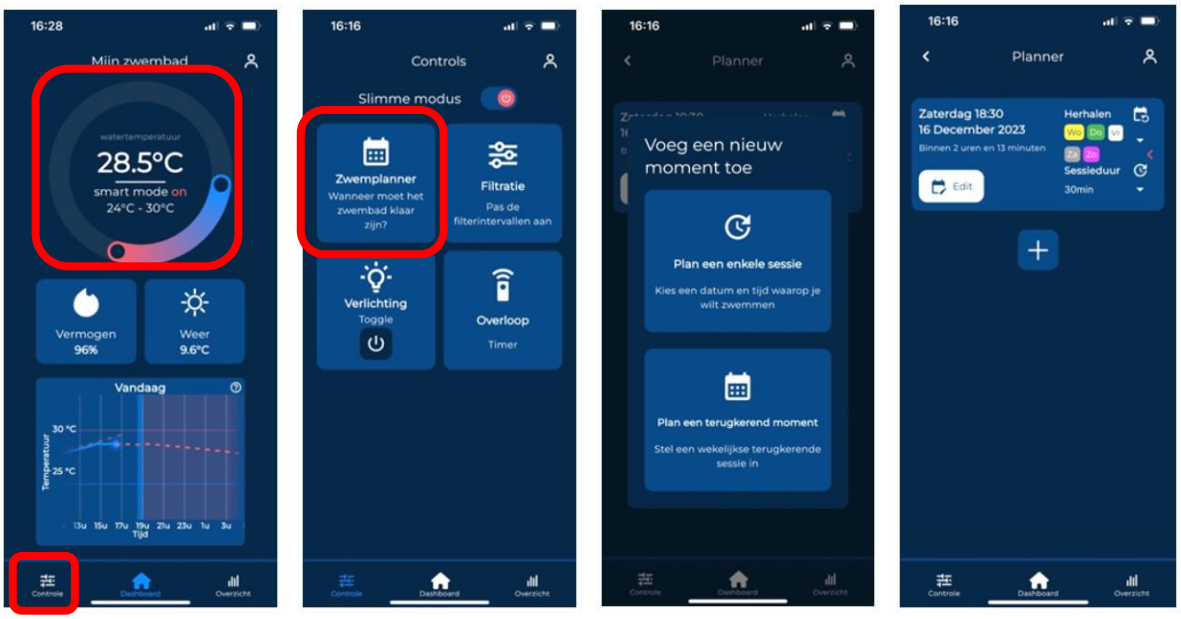
Smart mode can be enabled in the control menu as shown below..



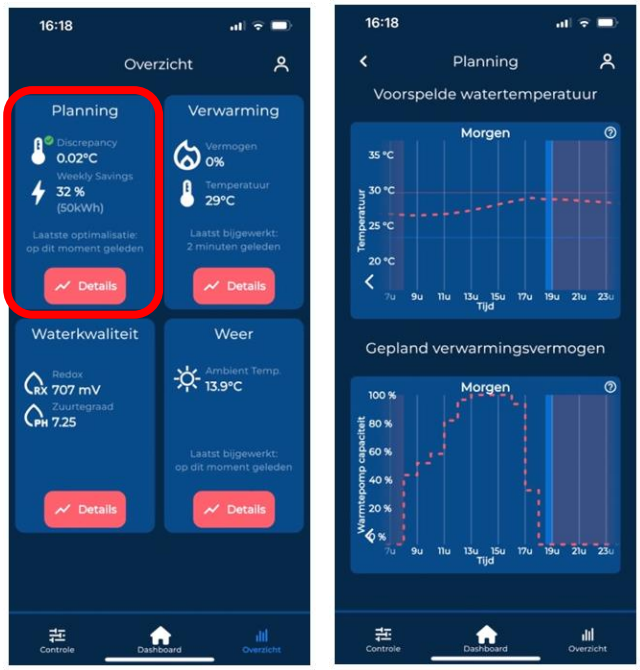
After enabling smart mode, the circular temperature slider of the home screen is adjusted. Here, 2 temperatures can be set: your comfort temperature and a minimum temperature. The comfort temperature is the temperature you wish to reach at the specified swimming times. The minimum temperature is the temperature the system must stay above.

In smart mode, you need to specify at what times you want to swim or usually swim. This is done using the so-called "swim planner", also found in the "operation" menu. Here, you always have the choice of scheduling a single swimming moment or a recurring swimming moment. For example, you can specify that every weekend from 2 p.m. to 5 p.m. is a swimming time.

Below are some screenshots from the Wattr application to indicate how such things can be set up.



The smart mode looks at weather forecasts, scheduled swimming times, expected yields of PV installations, expected consumption peaks of your household... to determine, together with your pool's self-learning thermal model, when and how hard the heat pump should run to provide optimal comfort at the lowest possible energy cost. The controller makes periodic predictions for this, which can also be consulted in the application. They also show the expected savings for the coming week (compared to standard heat pump control in which the setpoint is equal to the comfort temperature) and the deviation from the last prediction. If the deviation increases, due to an unexpectedly long opening of the pool, for example, the system automatically corrects itself.



When viewing the forecast graphs, the scheduled swimming moments are coloured light blue, the predicted water temperature and heat pump running capacity are indicated by red dotted lines.

Attention

The potential savings depend very much on the use of the pool and environmental factors. For example, it is highly recommended to always cover the pool when not in use.

Remark

The algorithm already takes into account possible solar panel yields and moments of peak consumption in software. This eliminates the need for a link with, for example, a digital meter/inverter of solar panels. Thus, if possible and necessary, the consumption of the heat pump is shifted by default to times when more green energy is available on the grid and typical times of peak consumption in the household (e.g. morning and evening) are taken into account to avoid additional costs associated with this.

Wattr control is designed to enable integration with energy management systems or home automation systems. With this integration, the predictive control will be able to work even more specifically in combination with charging stations, batteries... The first functionalities of this are expected summer 2024.

Safety regulations

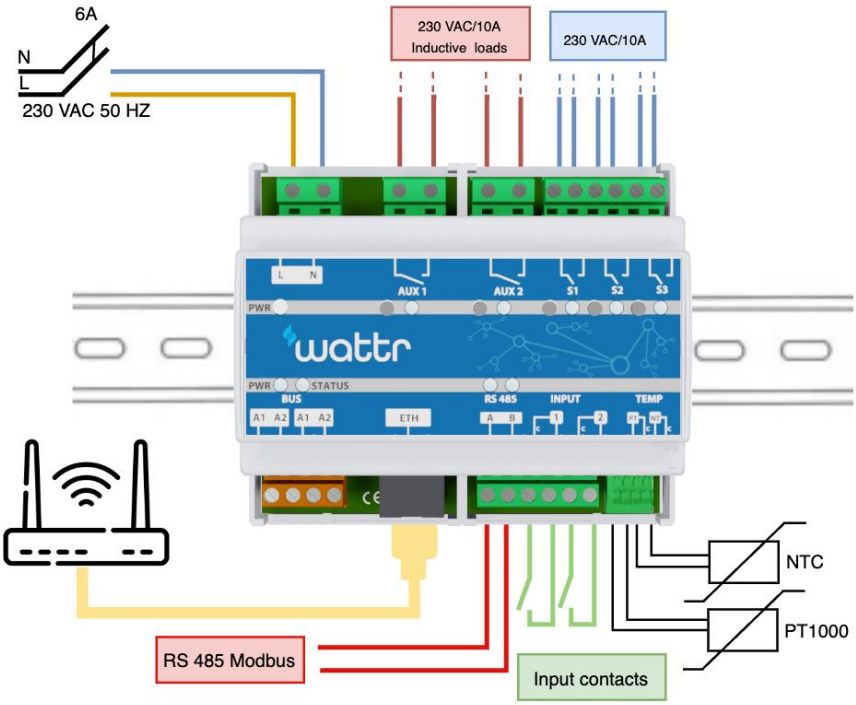
Read the complete manual before installing and activating the module!

Attention

- The module must be installed, started and maintained by a certified electrical installer in accordance with the applicable legal regulations of the country.
- This module is only suitable for DIN-rail installation EN50022. The module must be installed in a fireproof, closed junction box with ventilation grilles.
- Before working on the Wattr, the power must be switched off.
- Never connect external voltages (e.g. 230 VAC) to the RS485 bus, this will cause irreparable damage to the module and/or connected devices
- The module must not be opened. The warranty will be void if the module is opened.
- Attention! Not all systems will be suitable for steering. Always check the technical data sheet of the device to be coupled.

4. Connectors

Attention: DISCONNECT THE POWER SUPPLY TO THE MODULE BEFORE WORKING ON THE MODULE



4.1. Placement

Snap the module onto a DIN rail DIN EN50022. The module must be installed in a fireproof, closed distribution cabinet with ventilation grilles.

4.2. Feed

A two-pole automatic fuse of maximum 10A must be connected to the 230 VAC module power supply. However, a fuse from 2A upwards is sufficient. Conductor cross-section: minimum 1.5 mm2 at 10A. Remove approximately 7 mm of insulation from the conductor and screw the conductor into the connector L-N.

4.3. Relay contacts

The Wattr is equipped with 5 potential-free contacts, each capable of switching 10A. AUX1 and AUX2 can be used for inductive loads (motors, coils...). The function of each relay can be determined via configuration (backwash, control circulation pump, on/off, pulse, timers). Conductor cross-section: minimum 1.5mm2 at 10A. Remove about 7mm of insulation from the conductor and screw the conductors into the connectors.

Each relay contact is equipped with a button to test the contact during installation.

Attention

The button corresponding to the relay contact always takes precedence over control from software/app.

4.4. Modbus RTU (RS 485)

Use the screw connectors to connect the signal lines, A(-) and B(+), of the serial RS 485 communication. The Wattr module uses two-wire connection, when connecting to a device equipped with a four-wire connection (e.g. A(-), B(+), +12V and GND), unused wires should be adequately shielded. If desired, the GND wire can be connected to the common inputs of the Wattr module, this is usually not necessary.

The use of a shielded bus cable is strongly recommended.

Always check the manual of the appliance you wish to connect. Further on in this manual are some examples of how to connect heat pumps and water treatment appliances.

Attention

Never connect external voltages (e.g. 230 VAC) to the RS485 bus, this will cause irreparable damage to the module and/or connected devices

Remark

RS 485 uses a bus structure, so multiple devices can be connected to the Modbus RTU connection of the Wattr module.

4.5. Ethernet

Connect the network cable to connect the Wattr module to the local network. If possible, avoid using Wi-Fi Repeaters/extenders to ensure a stable network. Use of a 4G router is recommended if no network or an insufficiently stable network is available.

Attention

The Wattr module cannot be configured without a network connection.
The Wattr pool controller does not function properly without a network connection.

4.6. Input contacts

The Wattr module is equipped with 2 input contacts for connection of 2 potential-free contacts. The maximum length of the cable to which the contacts can be connected is 50m

Attention

Always use potential-free contacts.

4.7. Temperature sensors

The Wattr module is provided with an input for an NTC temperature sensor and a PT1000 temperature sensor. Connecting temperature sensors is not necessary for the operation of the Wattr system. If no sensors are connected, the sensors in the heat pump are used to measure water temperature.

5. Connection of devices

This chapter clarifies the connection of various devices.

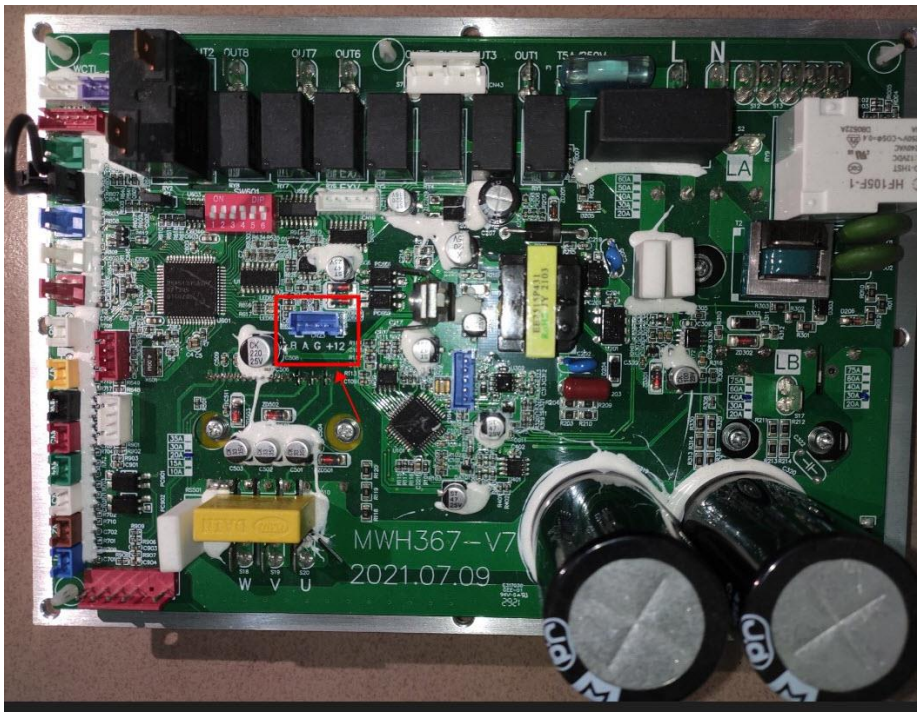
5.1. Heat pump connection

For the Wattr pool controller to work properly, it must always be connected to a compatible heat pump. The list of compatible heat pumps can be found in Compatible devices.

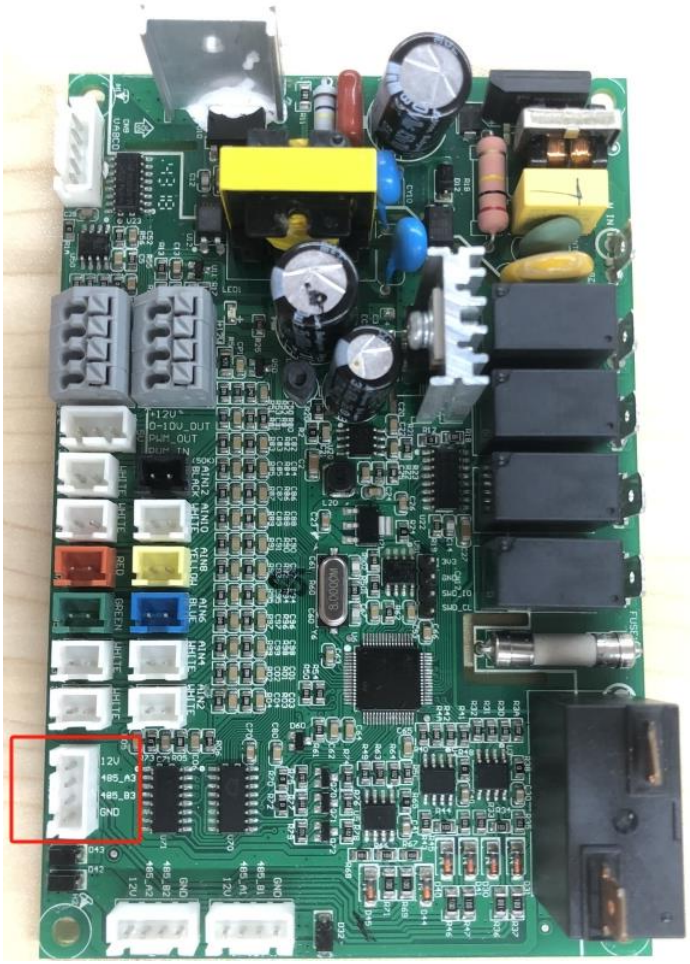
Consult your heat pump's documentation to find the position of the Modbus RTU (RS485) connector. It is usually marked A B G +12V. In some types of heat pumps, the connector can be found near the power connection, in others it is present on the circuit board. In the box of the Wattr module, you will find various connectors that can be used for connecting to the circuit board.

Below are 2 examples of commonly used heat pumps.

5.1.1. Example Fairland/Aquark heat pump



5.1.2. Example PHNIX heat pump

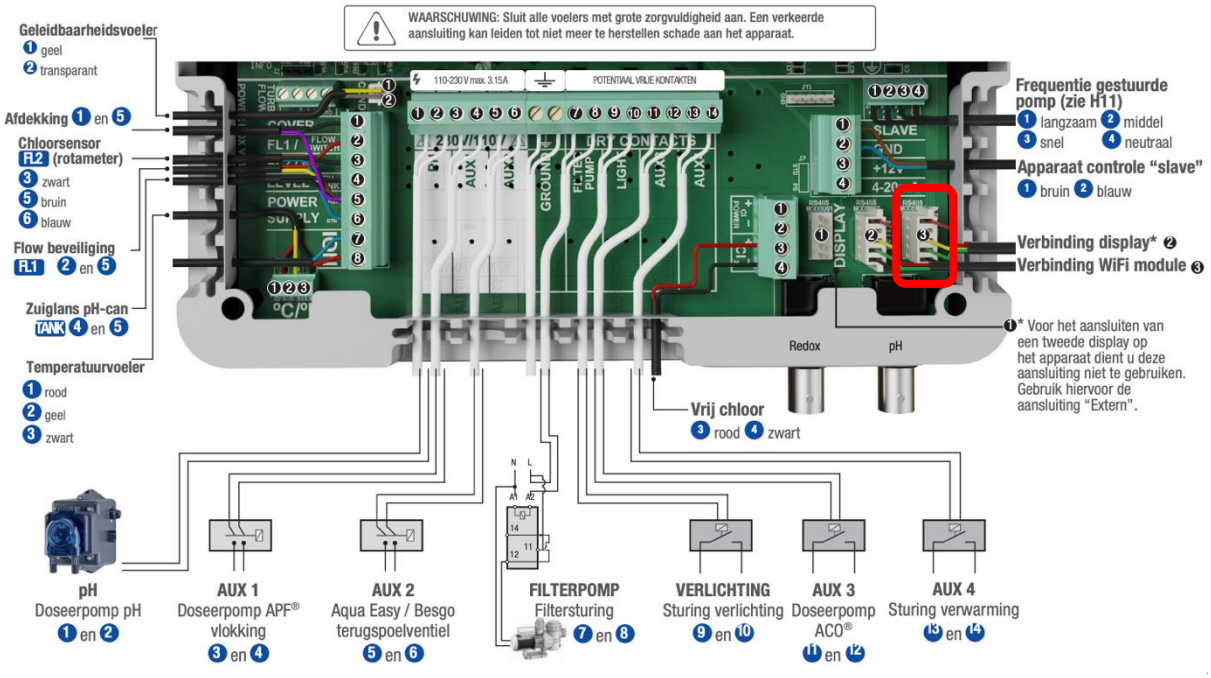


5.2. Connection to water treatment

To read and visualise water values in the Wattr application, the water treatment appliance must also be connected to the Wattr module. This is also done using the RS-485 connection on the Wattr module.

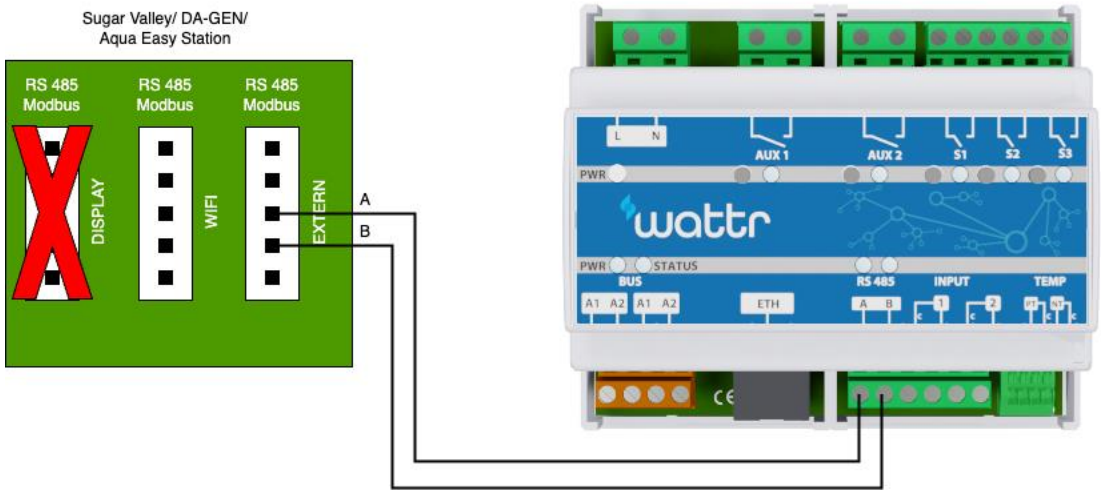
5.2.1. Connection Sugar Valley, Da-Gen, Aqua Easy Station

The device can be connected using the connector provided, use the designated output of the device "RS 485 Modbus" and screw the conductors into the RS 485 connectors of the Wattr module.



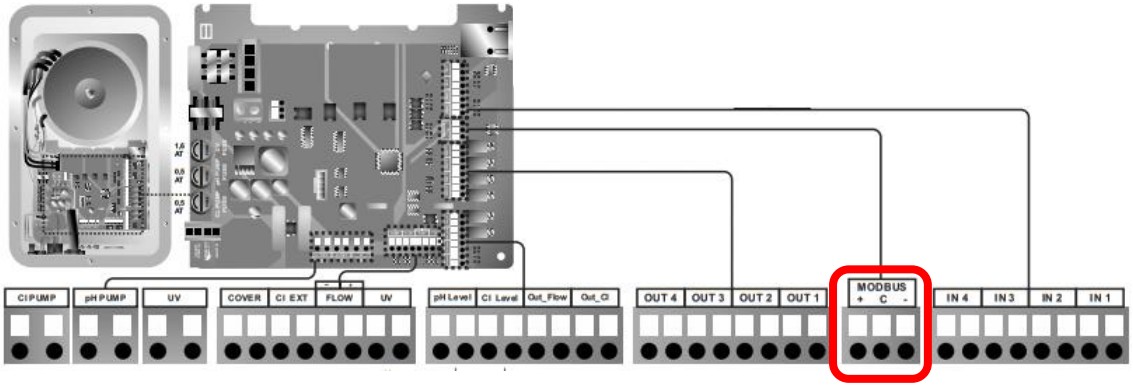
Attention

Always keep in mind the RS-485 A and B connections; the diagram below shows which pins of the 5-pin connector correspond to the A and B connections. Always adequately shield any unused conductors of the connector! The "WIFI" or "EXTERN" connection can be used, do not use the "DISPLAY" connection!



5.2.2. Connection Idegis

No additional connector is required for connecting Idegis Domotic devices. The connection can be made directly with the plug-in connectors present on the board of the Idegis device as indicated below.



Remark

If the water treatment appliance is also used to control the variable speed circulation pump, the Wattr module will control the pump via the water treatment appliance. In this case, the circulation pump should not be connected directly to the Wattr module.

Remark

The Wattr controller is not a water treatment appliance, so there is always a need for a separate water treatment appliance. Be sure to check your appliance's manual to ensure correct water quality settings. By linking to the Wattr module, the controller can monitor water quality and take it into account when controlling the appliances.

Attention

Connection to a water treatment appliance is not necessary for the operation of the Wattr system. In that case, however, water quality cannot be monitored. If the water treatment appliance is not connected, it is necessary for the Wattr module to directly control the variable-speed circulation pump, see also Circulation pump connection.

Attention

Make sure the water treatment appliance is equipped with a flow protection device when the appliance is not connected to the Wattr controller. Consult the manual of your water treatment appliance for this.

5.3. Connection circulation pump

Wattr controls variable speed circulation pumps via a connected water treatment appliance or directly via the Wattr module. When connected directly to the Wattr module, there are 2 options: control using potential-free contacts (Digital inputs) or using Modbus RS-485.

Attention

Always consult the manual of your pump to ensure correct connection.

5.3.1. Control using potential-free contacts

By controlling the circulation pump using 3 potential-free contacts, 3 pre-programmed speeds can be set. Refer to the manual of your circulator for the programming of the rotation speeds.

It is strongly recommended to use contacts S1, S2 and S3. This ensures that contacts AUX1 and AUX2, which can also switch inductive loads, remain free.

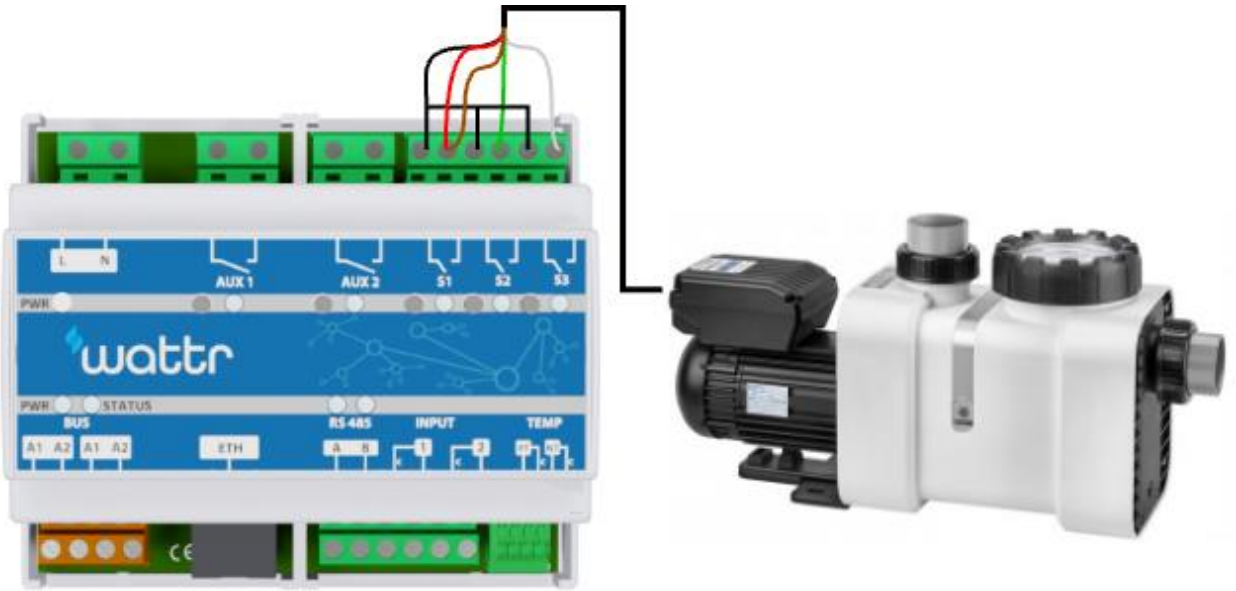
Below is an installation example with a Speck Badu Delta Eco VS. (black = GND, Red = stop, brown = speed 1, green = speed 2, white = speed 3) At low rotational speed, only contact S1 is energised, at medium rotational speed S1 and S2 are energised. At high rotational speed, S1, S2 and S3 are energised.

Attention

Program the correct switching behavior for the so-called stop conductor (red conductor in the example below). In the example below, it should be programmed so that the motor stops on an open contact between the red conductor and GND.

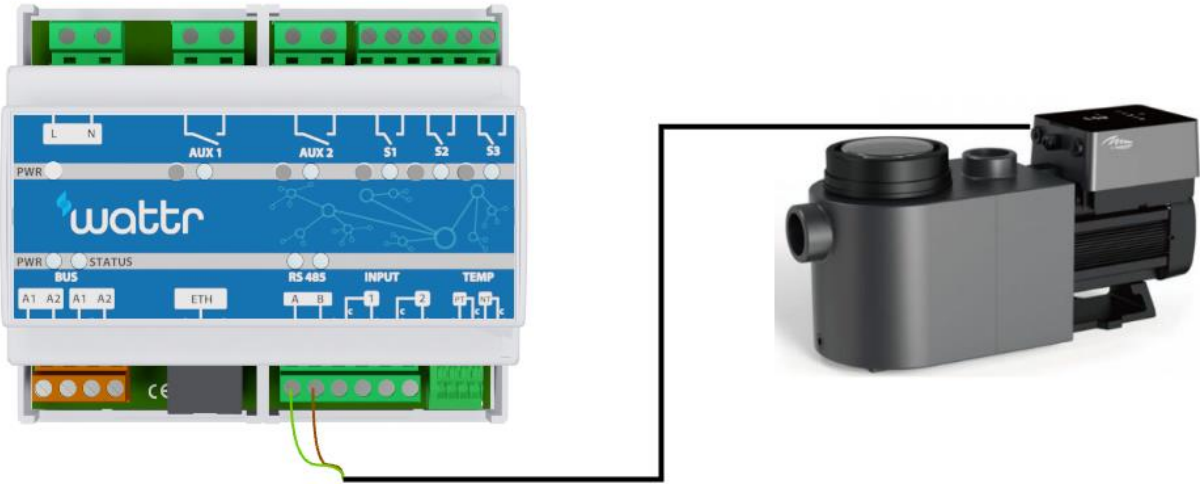
Attention

When the stop conductor is not used it should be set accordingly on the pump, screen the unused conductor adequately.



5.3.2. control using van Modbus RS-485

If the circulation pump can be controlled using Modbus RS-485 and the pump is compatible with Wattr control, the RS-485 connection to the Wattr module can be used. The following is an installation example using an Aquagem Inverpro. Always refer to the manual of the circulator to check which conductors/connectors correspond to the A and B conductor for RS-485 communication



Attention

Always verify if your pump is equipped with RS-485 control, which is optional on some pumps.

5.4. Connection AUX-contacts

The AUX contacts can be used for various purposes. There are a number of pre-programmed functionalities (Backwash, level control, overflow timer...). Other functionalities (lighting control, jets...) can be obtained using the following options:

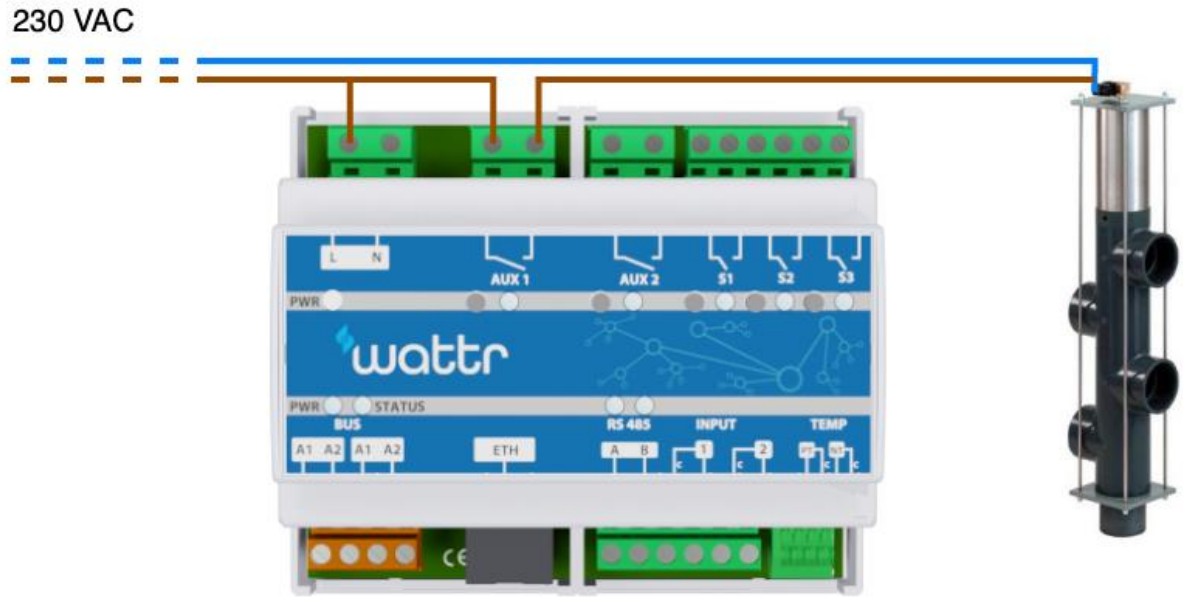
- On/ Off switching
- Timers
- Pulse

Attention

Always check the manual of the device you wish to control using the contacts.

5.4.1. Connection of backwash valve

The following shows how a Besgo backwash valve can be connected to the Wattr control. When contact AUX1 closes, the coil of the Besgo valve is energised to perform a backwash. The Wattr module automatically ensures that the circulation pump is stopped before the backwash valve switches and that the circulation pump runs at high speed during backwashing. Setting backwash frequency and duration is done from the Wattr application.

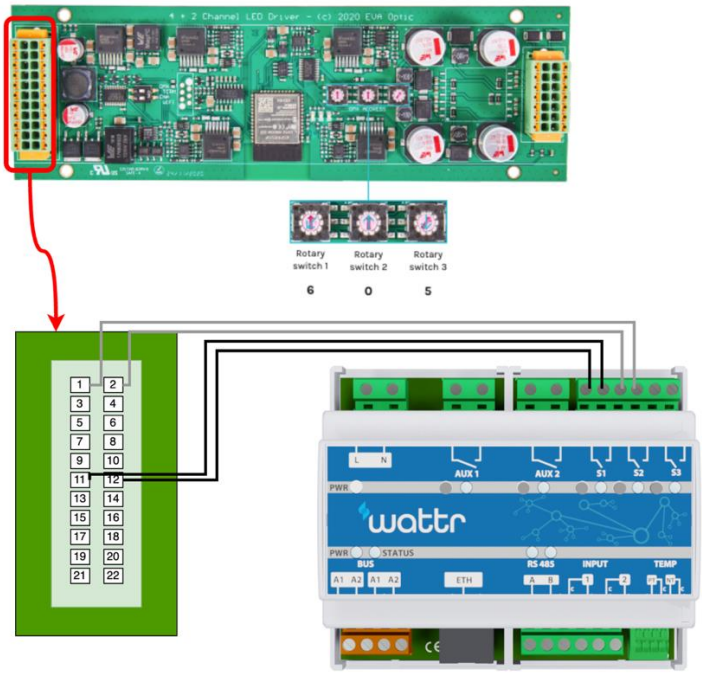


5.4.2. Lighting connection

The following explains how the contacts can be used to control the lighting. In the first example with Eva Optic lighting, contacts S1 and S2 are used to switch the lighting on or off and change colour, respectively. To do this, the contacts used are set to send pulses during configuration in the app. To enable such control in combination with Eva Optic lighting, the dials on the PCB must be set to the values 6-0-5 as indicated. Always consult the installation manual of your lighting before connecting to the Wattr module.

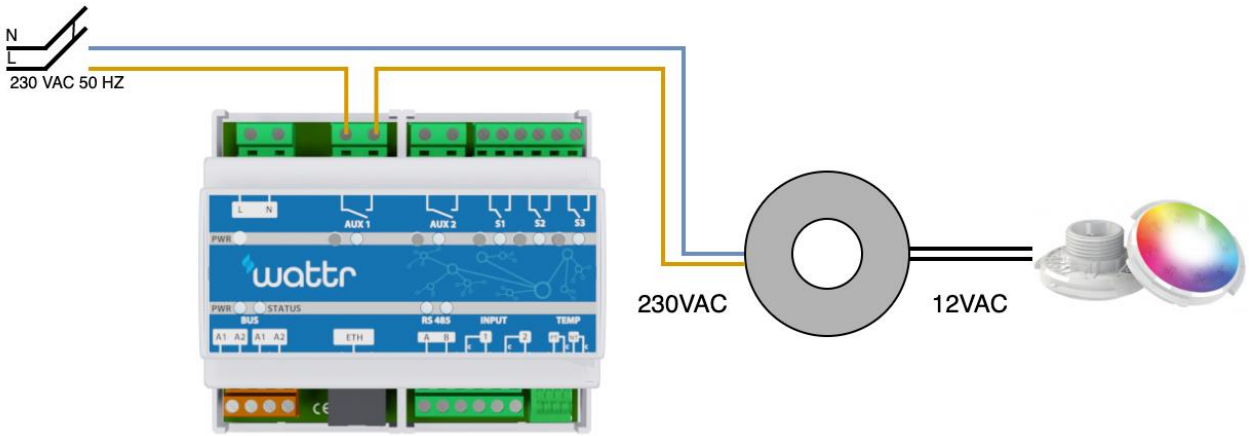
Remark

In the example below, the AUX contacts were not used. When the Wattr module does not need contacts S1, S2 and S3 to control the circulation pump (pump is controlled via water treatment or RS-485), the contacts can still be used for other purposes. This is set during configuration in the Wattr application.



Installation example Eva Optic lighting

Below is another example for connecting lights with Vision Adagio Pro lamps. Here, the AUX-1 contact interrupts the power supply to the transformer. This allows the lighting to be switched On/Off. When configured in the Wattr application, colour changing can also be set, this is obtained by briefly switching the lighting off and on again.



Attention

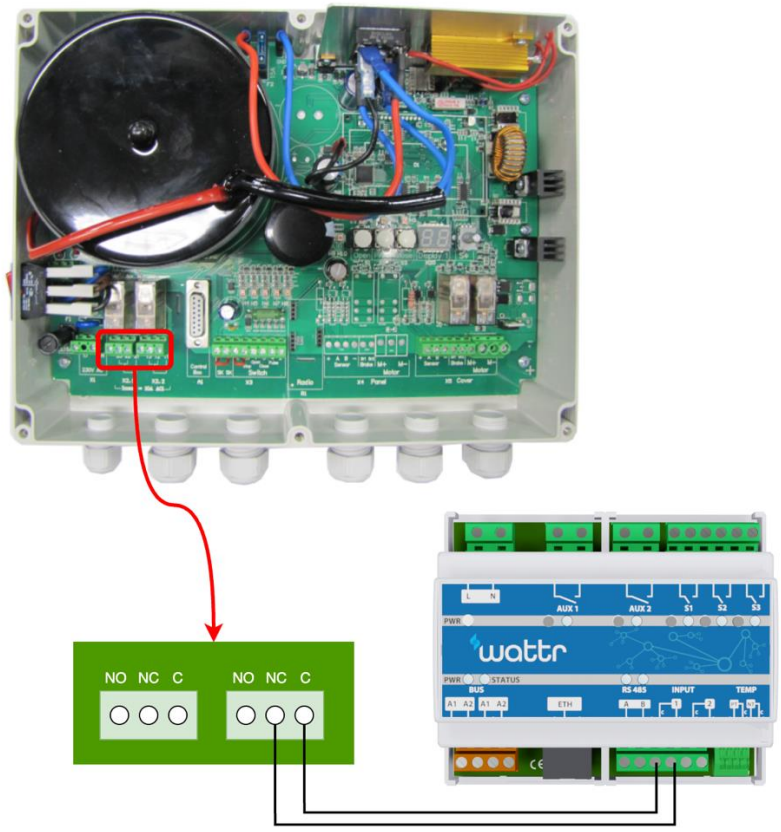
Always refer to the manual of the installed lighting to ensure correct installation.

5.5. Cover connection

To ensure proper operation of the Wattr control, it is necessary to read the status of the cover using a Wattr module input. This way, the Wattr module knows when the cover is open or closed and the control and thermal model can be adjusted accordingly. This is obtained by connecting to the control of the cover. In the example below, a contact is read from an Aquadeck controller.

Attention

Always check what the meaning of a closed or open contact of your cover's control means. (open contact = cover open or open contact = cover closed). Also indicate this correctly when configuring in the Wattr application.

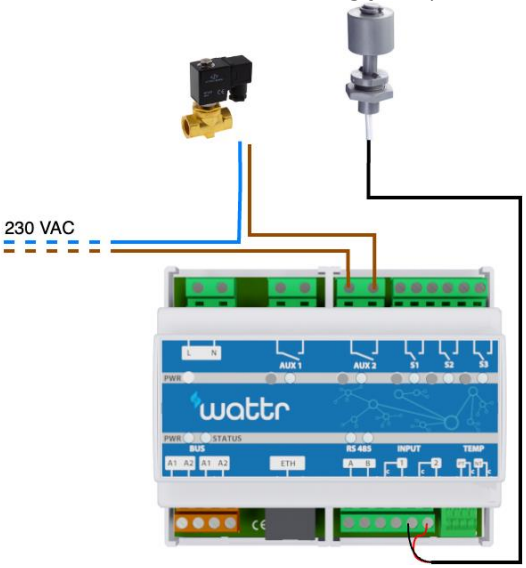


5.6. Connection level control

The Wattr controller can do simple water level control in combination with a float and a valve. The connections of this are shown using the example below. In this example, input 2 is used to connect the floating switch and AUX2 is used to energise the valve that shuts off the water supply to the pool.

Attention

Always take local legislation into account when connecting your pool to the water network.



Configuration

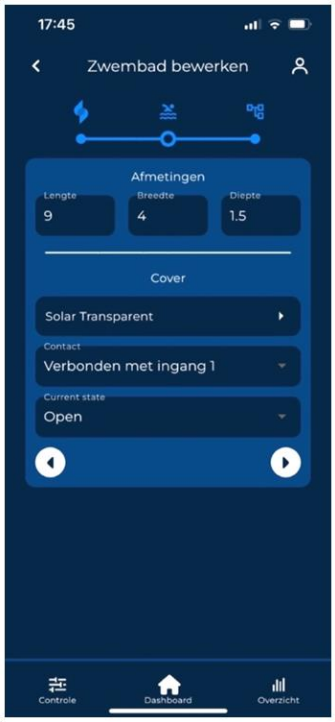
The following clarifies how to configure the Wattr controller after installing the module. Power up the module and verify if the PWR LED lights up green, also check the network connection using the LED lights present in the Ethernet port.

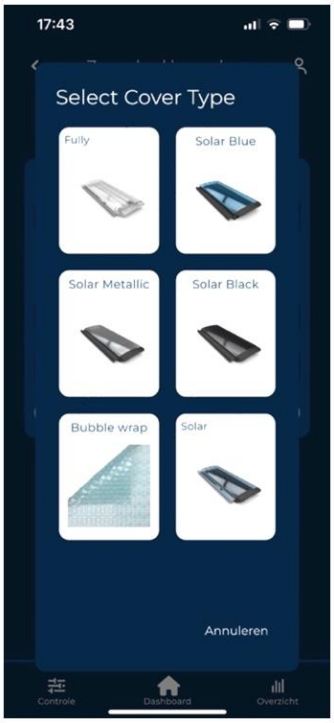
5.7. Configuation in app

Install the Wattr app on Ios or Android and create an account. On startup, you will see the screen below. Here, click on "Configure a new control system". If it is not your first installation, go to Account -> My Wattr systems and then click the plus sign at the bottom to bring back the screen below.

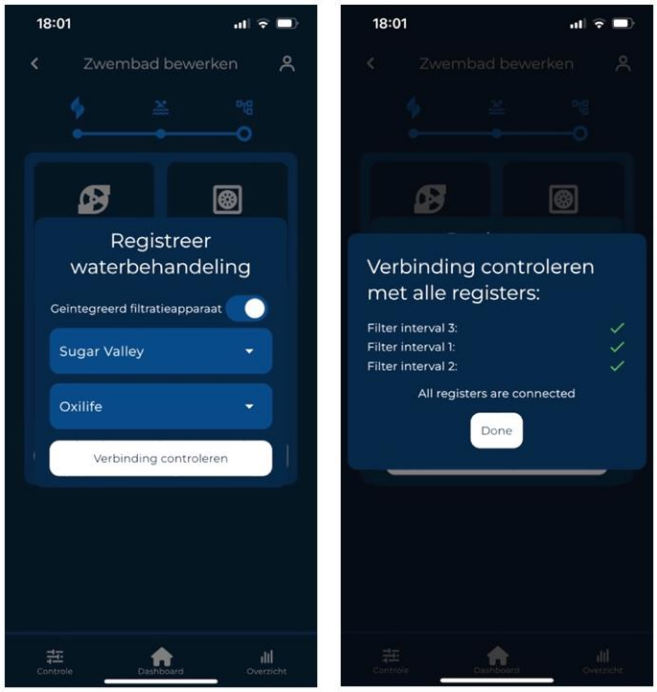
The configuration proceeds in 3 steps. In the first step, you scan the code present on the Wattr module. If scanning does not succeed, you can always enter the code manually; the text lights up when the Wattr module is known and the code is correct. Next, enter the name of the installation, which is visible when using the app, and the location of the pool. (A correct location is necessary for using weather data).

In the second step, you first enter the dimensions of the pool. Then click on the drop-down menu to select the cover that best matches the cover on the pool. In case of an automatic cover, you then indicate which input contact was connected to the control of the cover.

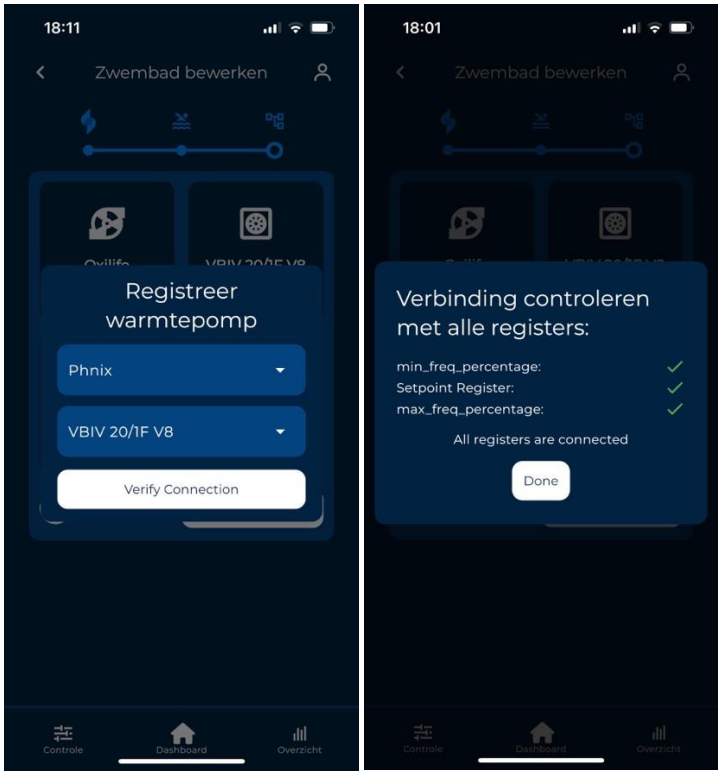




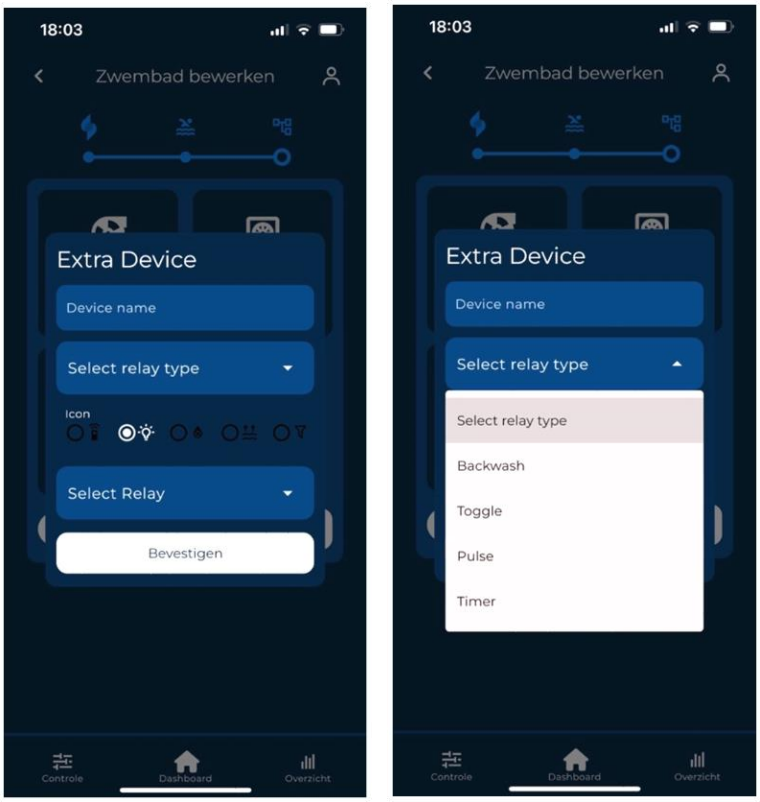
The last step asks which devices are connected to the Wattr module. The top left indicates which water treatment device is present. The toggle button "integrated filtration device" inquires if the water treatment device controls the circulation pump. If not, it specifies which contacts are kept free for the connection of the circulation pump. In the two selection menus, select the brand and type of the connected device. Then click on "Check connection". If the 3 commands used to check the connection receive a green tick, the device was connected correctly. If this is not the case, check the Modbus RS-485 connection of the water treatment appliance.



A similar procedure is repeated for the connection to the heat pump.



The last step is to configure the devices to be connected to the relay contacts. A name must be entered for each device/functionality, which will also be visible when using the app. Next, select the desired functionality (on/off, pulse, timer, backwash or level control) from the dropdown. When level control is selected, you will also be asked which input contact the float was connected to.



For each additional device/functionality added, you can also choose an icon that will be displayed when using the app. Finally, you select which contact was connected to this device. Previously designated contacts cannot be selected again.

Any incorrectly entered devices can always be removed using the red arrow.

When the configuration is allowed to be completed, click "Finish". The Wattr controller can now be used to control your pool.

5.8. Share configuration

After a successful configuration, you can select 'My Wattr Systems' via your account. Subsequently, you will get a list of all Wattr systems linked to your account. For each Wattr system, you can generate a QR code in the top right corner. You can also use the 'share' button to easily share the code when the end user is not present.

The end user needs to create an account on the Wattr app. Then, the end user clicks on 'Add an existing control system' to scan the generated QR code. When the scanning is successfully completed, the system will be added to their account. The end user can similarly share control of the pool with family members, friends, etc., if desired.

Compatible Devices

Below is a list providing an overview of compatible heat pumps and water treatment systems. This list is continuously expanding, so always refer to the website www.wattr.energy to access the latest version.

Contact your distributor if you have any questions.

Attention

It is necessary for your heat pump to be compatible with the Wattr control system for proper operation of the entire system. It is not necessary for your water treatment system to be compatible with the Wattr control system; in that case, the water treatment system must be equipped with a flow switch, and the circulation pump must be controlled by the Wattr module.

5.9. heat pumps

Brand	Type
Pool Power Package	VBIV
Pool Power Package	VBEX
Pool Power Package	Energy Eco
Fairland	Inverter+
Fairland	InverX
Fairland	Comfortline
Aquark	Mr. Silence
Aquark	Mr. Perfect
Norsup	PX
Norsup	PIV
Norsup	Silent-Pro

5.10. Water treatment systems

Brand	Type
Sugar Valley	Oxilife
Sugar Valley	Station
Sugar Valley	Hidrolife
Sugar Valley	Aquascenic
Sugar Valley	UV Scenic
Sugar Valley	Bionet
Sugar Valley	Hidroniser
Aqua Easy	Station
Dryden Aqua	Da-Gen
Hayward	Aquarite
Idegis	Domotic S2
Idegis	Neo S2
Idegis	Control S400