

Heat element 0-10V – Integration

Integration of a 0-10V heat element can happen on a PowerDog device, or via the PowerDog webserver.

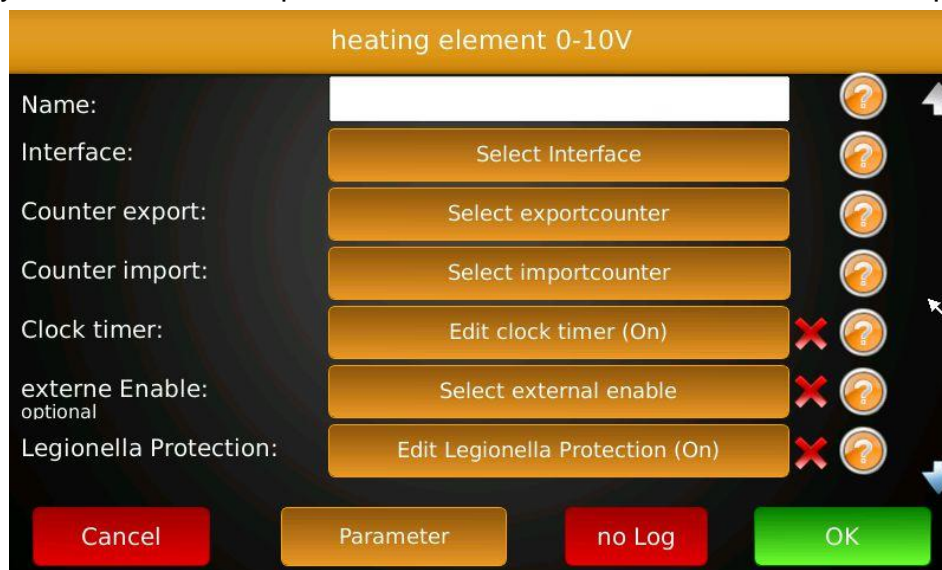


At the menu point “Controls”, you have got the possibility, to integrate your heat element. Press on the green plus, in the bottom left corner to create a new control function.



Now select „Heating element 0-10V“

Now you have different options, some are fundamental and some are optional.



Hint: with these arrows you can scroll up and down

Fundamental settings:

Name: enter a name for the heating element

Interface:



AO-1 is an analog output (0-10V) that is connected to the analog input of the power controller. The Internal Memory can be used, to process the output signal (0-100%) with a further component.

Counter export: Here you can select a counter for the export (needs to be setup before (see instructions of the counter)).

Counter import: Here you can select a counter for the import (needs to be setup before (see instructions of the counter)).

Overproduction point: This is the point, which the heating element is aiming for. A overproduction point of e.g.: 100 W, means, that any energy, that goes beyond 100 W, is used for the heating element. Note: Devices like refrigerators, freezers etc. turn on and off regularly. At an overproduction point of 0W, this leads to a short power import, until the control readjusts.

Temperature sensor:

For operation of the heating element, a temperature sensor is required. The temperature sensor (PT1000 or OneWire) can be put under the insulation in the boiler, in order to receive good contact to the boiler casing. With the mounting height, you set, how much water in the boiler is heated up. The sensor may not be mounted below the heating element. You can also directly create a new sensor here.

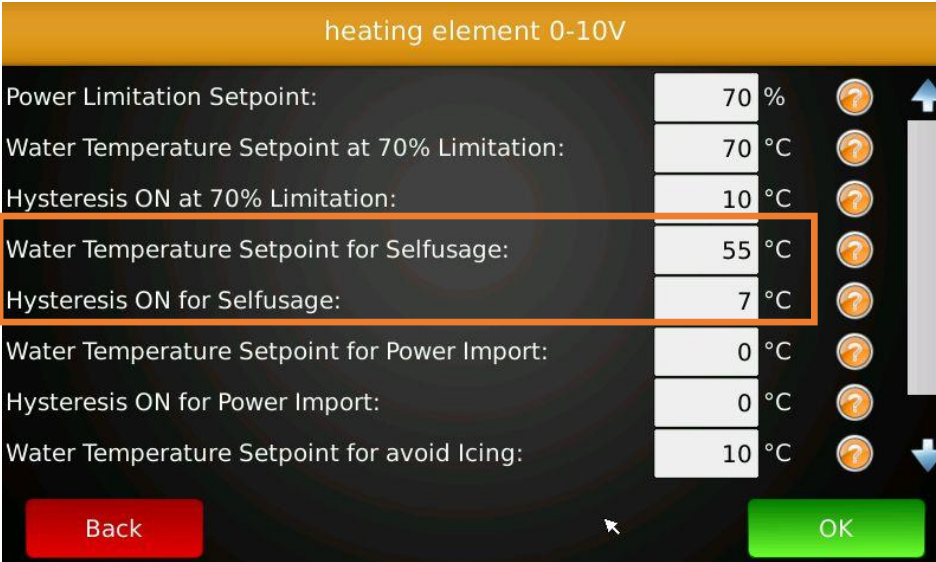
Max. power:

here the maximum power of the heating element can be limited

Update time:

How often the output readjusts the newly calculated value
Note: the output should not adjust faster, than new values come from the counter. At Modbus counters, this value can be set to one second, at S0 counters it depends on the S0-impulse factor.

Parameterization (Fundamental):



heating element 0-10V		
Power Limitation Setpoint:	70 %	?
Water Temperature Setpoint at 70% Limitation:	70 °C	?
Hysteresis ON at 70% Limitation:	10 °C	?
Water Temperature Setpoint for Selfusage:	55 °C	?
Hysteresis ON for Selfusage:	7 °C	?
Water Temperature Setpoint for Power Import:	0 °C	?
Hysteresis ON for Power Import:	0 °C	?
Water Temperature Setpoint for avoid Icing:	10 °C	?

Buttons: Back (red), OK (green)

For the basic function you only need the values „Water temperature set point for selfusage“ and „Hysteresis ON for selfusage“.

For example: „Water temperature set point for selfusage: 55°C“ – means, that the heating element is active until the water in the boiler has 55°C.
Additionally there is the function „Hysteresis ON for selfusage: 7°C“, which set how many degrees the value may be under the value 55, until the heating element starts to heat again.
That means, when the clock timer has been parameterized, only at „ON“ – times heating is allowed.

Optional settings:

Clock timer:



Mo	Tu	We	Th	Fr	Sa	Su	from	to
Mo	Tu	We	Th	Fr	Sa	Su	07:00:00	20:00:00
Mo	Tu	We	Th	Fr	Sa	Su	06:00:00	21:00:00
Mo	Tu	We	Th	Fr	Sa	Su	00:00:00	00:00:00
Mo	Tu	We	Th	Fr	Sa	Su	00:00:00	00:00:00
Mo	Tu	We	Th	Fr	Sa	Su	00:00:00	00:00:00
Mo	Tu	We	Th	Fr	Sa	Su	00:00:00	00:00:00
Mo	Tu	We	Th	Fr	Sa	Su	00:00:00	00:00:00

With the weekday timer, you can set, to which times heating should be allowed. You can also set, that grid power can be used, when the temperature in the boiler goes below the value for grid import (e.g.: when the heating element is deactivated in summer). Only set heating times, to which you need warm water e.g.: Mo-Fr from 7:00 to 20:00 and Sa-Su from 6:00 to 21:00. When doing so, no reheating with power import is done overnight, because the storages lose heat.

External enable:

Here you can trigger that control with an external component. You can for example use a controller for the boiler and one for the puffer storage. With the hysteresis component, you can enable boiler to a boiler temperature of e.g.: 55°C and then the puffer. If this input is bigger than 0, (internal memory has 0 – 100%), the control is active. At a value of 0, the control is inactive, that means the output is 0.

Legionella protection:



With legionella protection you can set, that a desired temperature needs to be reached in a given time span independent of import and export. With the minimum runtime you can set, how long the set point temperature needs to be held. With day/week/month you can set, how often the set point temperature should be reached. The optimal turn on time, helps to turn on the heating element in times of energy surplus, when reheating is required. PowerDog remembers the last time the temperature was reached and only heats after the period (e.g.: legionella protection is not always activated on Wednesdays, but only when needed).

Manual value:

If you want to control the heating element manually, you can choose an external value here. This can for example be a slider (you can find it at „Switches“). If this slider is on “Auto” the value of the control is used. If the slider is set to „Manual“ the value of the slider is used for the heating element.

Select inverters:

This function is only required in countries, where the inverter power is limited from the law. (e.g:70% regulation or 50% regulation at promoted storages in Germany)

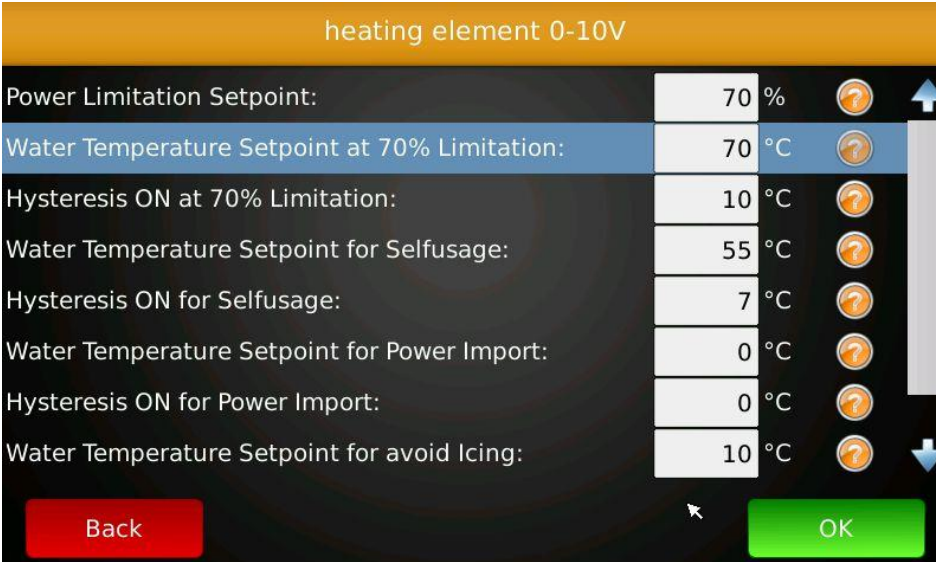
PowerDog prevents inverter power limitation by using excess power for the heating element. Energy is therefore not destroyed, but rather used cleverly.

Select the inverters, for those that already have a power reduction on the PowerDog (in the menu „Grid manager“)

Append regulation into priority list:

Here you have got the option to include this control to the priority list. In this priority list every control is processed step by step. By doing so, you can set which devices have which priority. e.g. at first, warm water should be produced, then the battery should be charged, and in the end, the electric car should be charged. The order can be changed in the menu point „Priority list“ at “Controls” with the buttons “Up” / “Down”.

Parameterization (Optional):



heating element 0-10V			
Power Limitation Setpoint:	70 %	?	↑
Water Temperature Setpoint at 70% Limitation:	70 °C	?	
Hysteresis ON at 70% Limitation:	10 °C	?	
Water Temperature Setpoint for Selfusage:	55 °C	?	
Hysteresis ON for Selfusage:	7 °C	?	
Water Temperature Setpoint for Power Import:	0 °C	?	
Hysteresis ON for Power Import:	0 °C	?	
Water Temperature Setpoint for avoid Icing:	10 °C	?	↓
Back		OK	

In the menu point “Parameterization” you can set different values as you like. The next three values only need to be adjusted, when you want an inverter limitation.

Power Limitation Setpoint:

Set the maximum allowed export in % of the plant size – at grid management a power reduction with the same inverters and the same reduction % needs to be setup.

Water Temperature Setpoint at 70% Limitation:

Here you can set the max. allowed temperature for the mode “Limitation prevention”. Switching times of the weekday program are not considered. Dimension this value, in order that enough energy finds place.

Hysteresis ON at 70% Limitation:

If the temperature reaches 70°C the heating element ends the mode limitation prevention. If the temperature goes below 60°C, it is activated again.

„Water temperature set point for selfusage“ and „Hysteresis ON for selfusage “– see above

Water Temperature Setpoint for Power Import:

If the temperature falls below this value, heating with power import is allowed, until the temperature reaches “Hysteresis ON for Power Import”. Heating times can be set with the weekday timer. That means, when the weekday timer has been parameterized, heating is only allowed to „ON“-times of the weekday timer.

Hysteresis ON for Power Import:

(see above)

Water temperature Setpoint for avoid icing:

The water temperature is regulated to this value, without considering the weekday program or energy surplus.

Hysteresis ON for avoid icing:

When the icing temperature is reached, heating is activated until the temperature reaches the minimum value plus hysteresis.