



charge. fast. anywhere. The flexible Wallbox.

Setup PV-led Charging

Initial setup

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Version 2.0.

1. Initial setup

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HA

NRGkick requires a connection to the internet and must not be plugged into the EV, to be able to install the latest software. **1.1.** In the section "Extended" you will now find the function "PV guided charging". Tap on "Configure PV charging" to start the configuration.





1.2. First you have to name your profile. Then tap on "Continue".

1.3. Now all found devices in the network are automatically added to the profile. This only works for the brands Fronius and SMA, other devices can be added manually.



Explanation of devices:

You can add inverters, smart meters, batteries and smart loads.

Smart loads are smart devices such as heating elements that can be operated with PV surplus.

You can add up to five different devices per category. Battery and Smart Loads can have one device active at a time. **1.4.** If devices are not found immediately, you can tap on "Add" and there will be shown more devices.





1.5. If you want to add the inverter manually, you can tap on "Add Inverter".

1.6. First, you need to select the brand of your inverter.



1. Initial setup



1.6. After that, you can read through the setup information and tap "Continue".

1.6. Then enter the IP address and other information of the inverter and tap "Continue".

O and a block late	
Connection into	
Please enter the required connection information that will be used to detect the device.	t
Connection	
Enter the IP address and port of your device. Change the default p only if another port is configured f your device.	oort for
IP-address	
192.168.11.112	
Port	
80	



entries and press "Save" to return to the selection.

2. Options for loading strategies

Devices like smart meter, battery and smart loads can be integrated in the same way as in steps **1.5**. **to 1.8**.

You can find the further description of how to integrate your devices with Custom API in the document "Custom API".



Solar Charging Strategy

Please select a strategy for your solar charging profile.

Surplus

With this strategy, you can charge your e-car with the surplus energy generated by your PV system and charge without drawing from the grid.

>

>

Surplus

100% Sun

Charge your e-car with the total amount of solar energy produced. This strategy is well suited for PV systems without smart meters.

100% Sun

Feed-in limitPLUS

Use this strategy to counteract a feed-in limit. When you set your feed limit, the NRGkick uses the energy that would otherwise be lost.

Feed-in limitPLUS

Recommendation 1 - Surplus: If you have a smart meter, we recommend that you use the Surplus setting.

Recommendation 2 - 100% sun: If you don't have a smart meter, we recommend the 100% sun setting.

Recommendation 3 - Feed-in limitPLUS:

If you want to charge your car and feed into the grid at the same time, we recommend the feed-in limitPLUS setting. **2.2.** Now you can already start directly with the recommended default settings with the PV charging by tapping on "Next"! You will be forwarded directly to step **2.4**.

If you want to make changes, tap on "Customize". The options are described in more detail on the next pages.



AVERAGE HOUSELOAD:

Enter your average home consumption here. The charging power of the vehicle is reduced by this targer power.

In the case of the **Surplus** charging strategy, this value is only taken into account if communication to the smart meter fails or no smart meter is available.

Example: Production: 6000 w Average Houseload: 500 w 6000-500= 5500 Watt Target





CALCULATE LOAD VALUE:

In the case of **multiple inverters** installed in a PV system, different house load values can be calculated for each inverter module.

This setting can be used to find an average house load value.

If this setting is active, NRGkick calculates the house load depending on all configured devices.



2. Options for loading strategies

GLOBAL OFFSET:

With this setting you can influence the preset charging power of the NRGkick.

Set a positive value to increase the charging power. A negative value will decrease the charging power.

Example: Surplus of 3kW Offset +/-1kW = 3 +/-1



power in watt





GRID OFFSET:

The grid offset can only be defined for the Surplus loading strategy. A dynamic grid offset is activated by default. This ensures that <u>no</u> energy is drawn from the grid.

If the dynamic grid offset is deactivated, this value can be defined manually, for example, to always feed into the grid with a certain power.

If the value is negative, power is fed in and if the value is positive, power is drawn from the grid.



	12:00	at
<	Back	
	Global Offset 🛈	
	Reserves PV power for other lo accelerates charging.	ads or
	Value:	1.00
	Grid Offset 🚯	
	The dynamic grid offset makes energy gets drawn from the gri offset can also be set manually	sure no d. The g
	Use dynamic Grid Offset	(
	Value:	- <u>10</u>
	Apply per phase	(

Example:





Additionally you can define if the grid offset is applied per active load phase. This is especially useful for phase switching, because the number of phases, changes at runtime.

This means that e.g. -1000 Watt is applied per active phase. So with three active phases, it's -3000 watts.

GUARANTEE MINIMUM CHARGING POWER:

With this setting, you can define whether charging should continue with the minimum power even if PV production is too low. At least the minimum vehicle current (6A) is used for charging.

The **minimum charging power** ensures that your vehicle is charged even when PV production is low. You can also limit the power drawn from the grid or the battery.

The minimum charging power depends on the settings in the two sliders of the charging limits. If the lower power limit is below the minimum current, multiplied by the number of phases, multiplied by the voltage, the result of this calculation is used.

External energy sources include the battery, the grid and all smart loads that can draw excess energy.



Never:

As soon as the PV power exceeds the minimum charging power, charging is started. The charging process is stopped as quickly as possible if not enough PV power is produced to charge the vehicle.





Delayed: »

Example:

power in watt

target

3 phases

minimum

power

~4,200

charging

If the power falls below the minimum charging power, charging is stopped after the defined hold-off delay time. During this time, the energy required to reach this limit is drawn from external energy sources. As soon as the PV power exceeds the minimum charging power, charging is restarted after the defined hold-on delay time.



Always:



» Delayed with limit:

Example:

If the charging power falls below the minimum charge power, charging is stopped after the defined hold-off delay time. When the grid or external energy source limit is exceeded, charging is stopped as quickly as possible. As soon as the PV power exceeds the minimum charging power, charging is restarted after the defined hold-on delay time. If the grid is selected for the supporting energy source, the maximum discharge power of the house battery has to be defined as well.



time in sec.



Always with Limit:

In the case of insufficient PV production, charging is continued up to the set maximum grid or external energy source limit with the set minimum power. If this limit is exceeded, the charging process is stopped after the defined hold-off delay time. The charging process is restarted after the defined hold-on delay time when the power falls below the external energy source limit or grid. If the grid is selected for the supporting energy source, the maximum discharge power of the house battery has to be defined as well.



Minimum time:

Hold-off delay = 20 seconds, Hold-on delay = 10 seconds







In order to avoid frequent hold-on and hold-off processes due to external influences (e.g.: measurement errors, communication delays, production fluctuations), the following standard or minimum times have been defined.

> Standard: 90 seconds 30 seconds



CHARGING LIMITS:

Charging with the NRGkick can be limited in two ways:

1. power limit: Here you can limit the minimum and maximum power of the charging process.

2. current limit: Here you can limit the minimum and maximum current of the charging process.

In general, the energy is limited by the smart attachment, the vehicle and the settings made in the app.



CHARGING PRIORITY:

If you want your smart devices (home battery and smart loads) to be considered when charging, you can enable this setting.



If this setting is <u>not enabled</u>, the NRGkick will leave the priority to the other smart devices (Smart Load/House Battery).

After that, you have the option to split the produced PV power between NRGkick and house battery or to give your smart devices the highest priority in principle.

For example, if you want the house battery to always be fully charged first, you can set it to 100% battery and 0% NRGkick.

If you want to make sure your home battery is fully charged and the water is heated first (with Smart Load), you can set it to 100% Smart Devices and 0% NRGkick.

If you want to prioritize the charging of your car, you can set NRGkick to 100%. The excess energy used to charge the battery or to power smart devices (Smart Load) will then be used by NRGkick at 100% to charge the car.



More options:

Additionally you have the possibility to define a charge or discharge state limit under SOC dependent charging and a temperature upper or lower limit of the intelligent devices under temperature based charging.



SOC (State of Charge) dependant charging: With this setting, you can define a state of charge limit for the house battery if required. After exceeding this limit, the charging power of the house battery is withdrawn and diverted to the NRGkick.

In addition, you can define the discharge state limit of the battery if the option "Delayed with limit" or "Always with limit" is set.

» Temperature based charging: With this setting you can define a temperature upper limit of the smart devices if needed. After exceeding this limit. the charging power of the intelligent devices is withdrawn and diverted to the NRGkick.

In addition, if the option "Delayed with limit" or "Always with limit" is set, you can define the temperature lower limit of the intelligent devices. Up to this value, charging with the NRGkick is prevented in order to heat up as quickly as possible.



Example:

1. and 3. the NRGkick only takes the surplus energy which does not go into the battery or is used by intelligent devices. 2. From here on, the energy used by the battery and intelligent devices is also used. 4. From here on, no more charging takes place.



DYNAMIC FILTER:

When the dynamic filter is activated, strong fluctuations of the energy flow in the household are detected and compensated according to the defined setting of the charging priority. This attempts to prevent accidental consumption from the grid. By default, the filter is deactivated.



PHASE SWITCHING:

it generally under Settings,...



To be able to activate phase switching in the PV options, you have to activate

... activate under "Extended Features".



In the "Extended Features" section, you will find the second option "Phase switching". If you want to activate the phase switching, you will get a warning.

If you have read the warning and then activated the phase switching, you will see the Phase Switching activated in the "Extended Features" section.



	 1
12:00	

compatible vehicle can lead to the function at your own risk!

this feature.





After activating phase switching, you can now choose from one of four phase switching strategies:



» Manual:

If Manual is selected, it is possible to manually specify with how many phases to charge during PV charging.

Back			
Phase Switching (D		
Activate this function to switching on your NRGk the top left of the amper switch to phase selection	enable phase ick. Tap the icon at re selector to n mode.		
Activate Phase Switchi	ng		
Phase Switching Type 🛈			
Select how NRGkick sho respect to phase chang	ould behave with e.		
Selected option:	Automatic ≎		
Dhasa Calastian			
Phase Selection			
Phase Selection Select how many phase use for phase switching	s the NRGkick may		
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Phase Selection Select how many phase use for phase switching Allow 1-phase charging Allow 2-phase charging Allow 3-phase charging Phase switching Advar Enter additional settings phase switching exactly needs.	s the NRGkick may		

» Automatic:

With Automatic, an attempt is made to utilize the entire control range with minimum switching cycles. Switching between the configured phases is done as late as possible. Each number of phases can be allowed individually. After activating phase switching, you can now choose from one of four phase switching strategies:



» Min. Current Max. Phases:

Here, the maximum number of phases is switched up as early as possible. The number of phases is only reduced when the power falls below the minimum power of the current phase. The permitted phases can also be selected here.

Example:

In cases of insufficient power supply or power supply overload.



Max. Current Min. Phases:

An attempt is made to charge with the lowest number of phases and the highest current. The number of phases is only reduced/increased if the specified power cannot be achieved with the current number of phases.

Example:

If the vehicle can optimize charging efficiency by increasing current flow, this provides the opportunity to complete charging in less time and improve the overall performance of the electric vehicle. In addition, the following extended options are available for phase switching, which can only be selected if phase switching is not manual:



 » Disabled: The Phases switch over as quickly as possible.



Delay: An up-switching and downswitching delay time can be defined here. For the phase switch to take place, the specified power must exceed the power limit that applies to the number of phases for the specified time period.



» Delay with threshold:

A threshold value for immediate phase switch can also be defined here. If the power increases or decreases by this value since the last phase switch, the phase switch is performed as quickly as possible. It is important to note that switching is only performed when the necessary power limit for the number of phases is reached. **2.3.** If you have made all the settings you want, tap "Save".





2.4. Tap on "Complete" to finish the PV configuration.

3. Overview PV-led Charging



3.1. Once you have successfully set up your profile, you will be redirected to the overview page and just need to activate the PV-led Charging feature.

12:00		.ul 🔶 🕞
PV Ch	arging	
Configure and function. Con use your solar possible.	l activate the F nect to your in power as effic	PV charging verter and ciently as
PV Charging a	ctive	
State:		Limited
State Info:	Power	wihtin limit range
7kW 5kW 2kW -2kW -2kW -5kW -7kW -10kW	10:31 11:01 Tap for Fullscreen	11:31
Sun 9,02 kW	Grid 0,00 kW	House 0,74 kW
Battery -1,05 kW	Battery SOC 89,8 %	Smart Load 0,00 kW
Charging F	Power	0,1

12:00 .ul 🛜 🗌 **PV** Charging Configure and activate the PV charging function. Connect to your inverter and use your solar power as efficiently as possible. PV Charging active State Limited Power wihtin limit range State Info: Sun Grid House 0.74 kW 0,00 kW 9.02 kW Battery SOC Smart Load Battery -1.05 kW 0.00 kM Charging Power

- - plugged in.
 - to two minutes).

 - continued.
 - the vehicle.

Status: The status provides information about the connection to the vehicle.

» Inactive: PV charging is deactivated.

» Wait for EV: PV charging is activated, waiting until vehicle is

» Init: PV charging is preparing (vehicle is surveyed, duration up

» **Running:** PV control active, vehicle is being charged.

» Limited: Vehicle charging power is limited by the set limits or by the vehicle parameters.

» Threshold: Vehicle is not charged. Only when the PV production exceeds the minimum charging power and remains stable (for about two minutes), the charging process is

» **Error:** An error has been detected that causes the vehicle not to be charged. This can happen if the vehicle does not respond to the charge command as expected during the initialization phase. In addition, the NRGkick will enter the error state if the vehicle draws significantly more power than intended by the NRGkick and no longer responds to the specified power setting. You can correct the error by deactivating and reactivating the PV function or reconnecting the NRGkick to

3. Overview PV-led Charging

Status Info: The status info provides information about the PV-guided charging function. Here you can find explanations to the different status infos.

- » Not active: PV charging is deactivated.
- » **Power below limit:** The current target power of the NRGkick is below the minimum power. The vehicle is not charging.
- » **Power within limit range:** The current target power of the NRGkick is within the set limits. Depending on the status, the vehicle charges or not.
- » **Power limited:** The current target power of the NRGkick is limited to the power or current upper limit.

- » In hold-on phase: The target power of the NRGkick has exceeded the minimum power, but not yet for the defined hold-on delay time. The vehicle is not charging at the moment.
- » In hold-off phase: The target power of the NRGkick has fallen below the minimum power. Charging continues for the duration defined for the holdoff delay time.



- » Charges with min. power: The current tagret power of the NRGkick is given by the power or current lower limit. The vehicle is charging.
- Max. support reached: The maximum external energy source limit has been reached and charging has stopped. The vehicle is not charging.
- » Paused no network connection: The connection to the network has been lost and the load has been paused.
- » Error no responding devices: None of the configured devices is providing data at the moment.

- » Min. SOC reached: The current state of charge of the house battery has reached the defined minimum state of charge and charging has been stopped.
 - » Max. SOC reached: The current state of charge of the house battery has reached the defined maximum state of charge and the now surplus power is charged into the vehicle.
 - » Min. temperatur reached: The current temperature of the smart load has reached the defined minimum temperature and the load has been stopped.
 - » Max. temperatur reached: The current state of charge of the Smart Load has reached the defined maximum temperature and the now surplus power is loaded into the vehicle.



4.1. For time control, PV-led charging can now be defined in addition to charging and not charging. To do this, tap on "Time control" under "Extended". Tap on the desired day of the week.







4.2. Using the "Add event" button, PV charging can now also be set and various PV profiles can also be selected.



If you have any further questions or need help, please feel free to contact us by phone or email:

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