

# DRIVING INTO A SUSTAINABLE FUTURE

A guide on Sungrow's  
EV Charging Solution



# AC CHARGING IN NUMBERS: THE FUTURE IS ELECTRIC



**The growth of electric mobility and the popularity of EVs has surged in the past decade and continues to do so.** The future is electric and demand for a reliable charging infrastructure network is increasing. AC charging is the most widely used method for EVs using a plug and charging at home offers the convenience of a fully charged vehicle

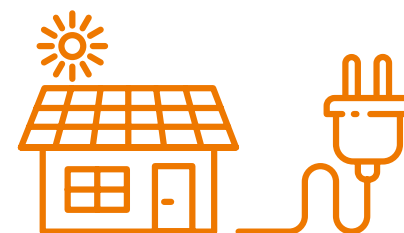
every day. In terms of actual electricity consumption, it is also the most cost-effective solution, as recent figures show. Combining solar energy with EV charging will advance the widespread acceptance of both technologies. Incorporating EV charging into PV installation will be a key factor in this growth in 2023.



## 50%

**increase of electricity costs for homeowners in Germany over the last**

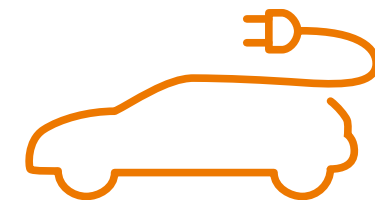
**10 years:** 0.24 ct./kWh in 2012 to 0.48 ct./kWh in 2022. This massive increase is a result of higher costs faced by providers in the procurement of electricity. Homeowners can avoid these costs and take advantage of significant price benefits by coupling EV charging solutions with a PV system.



## 1.8 million

**electric cars and plug-in hybrids chargeable with AC wallboxes were recorded in Germany in 2022.**

Record numbers of new registrations and vehicle-side AC charging capacities show that more electric vehicles are on the road than ever before and the market for EV products is becoming increasingly relevant.



## 80%

**of charging for electric cars and plug-in hybrids takes place at home or at work.**

Complicated tariffs and billing models still make charging in public areas less convenient. A wallbox at home is considered the safest, fastest, and most convenient charging option. Providing suitable and easy-to-use solutions for the residential sector is becoming more and more important.

# OUR 3-PHASE SOLUTION NOW WITH AC CHARGER

Sungrow now provides a new home charging solution.  
The 11 kW AC Charger can be controlled via iSolarCloud, taking self-consumption to the next level!

## 3 devices – 1 solution

The AC Charger is part of our 3-phase Solution.  
It's compatible with SH5.0-10RT or can be setup by itself as a standalone product.

## ONE-STOP SOLUTION

Improve your PV-System with Hybrid, Battery & AC-Charger from a single supplier.

## SUSTAINABLE CHARGING

Individual charging modes increase self-consumption and enable you to tailor the 3-phase Solution to your needs.

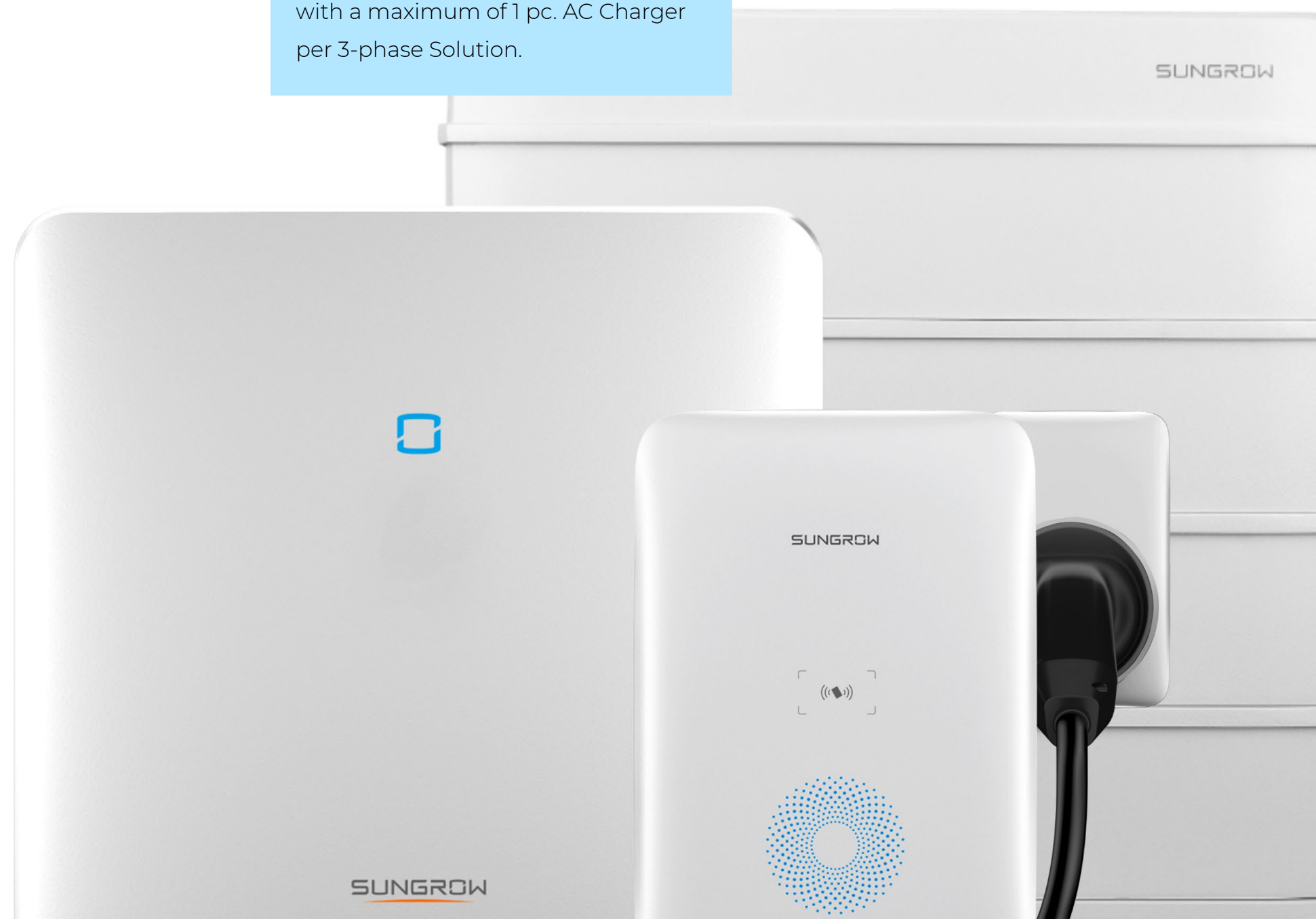
## ONE SOFTWARE FOR ALL

Easy and powerful monitoring of all connected devices with iSolarCloud.

## SAFE AND RELIABLE

Our setup fits almost any use case in residential application due to IP65 and electrical safety protection.

The **Sungrow EV Charger** can be used together with Hybrid & Battery with a maximum of 1 pc. AC Charger per 3-phase Solution.





# WHAT YOU'LL LEARN IN THIS WHITEPAPER



- 1 Why is an AC Wallbox beneficial? → 5
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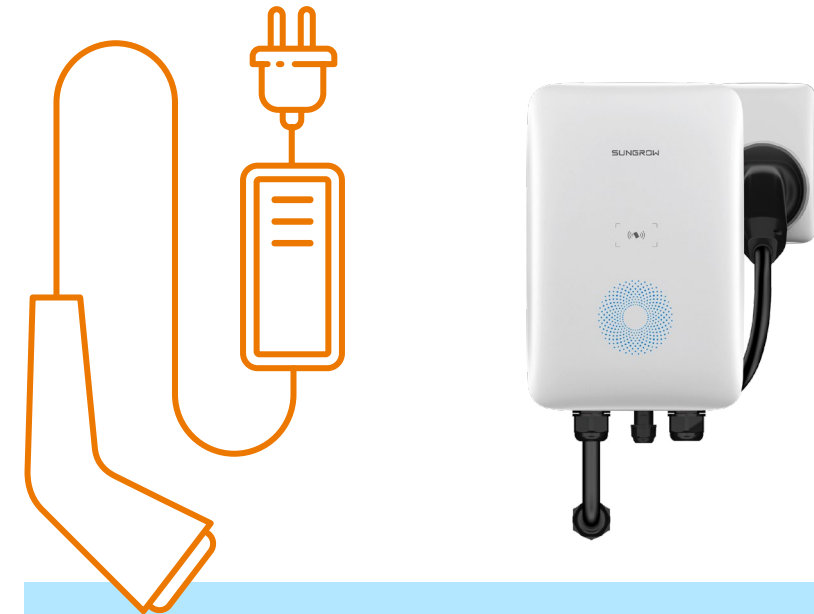
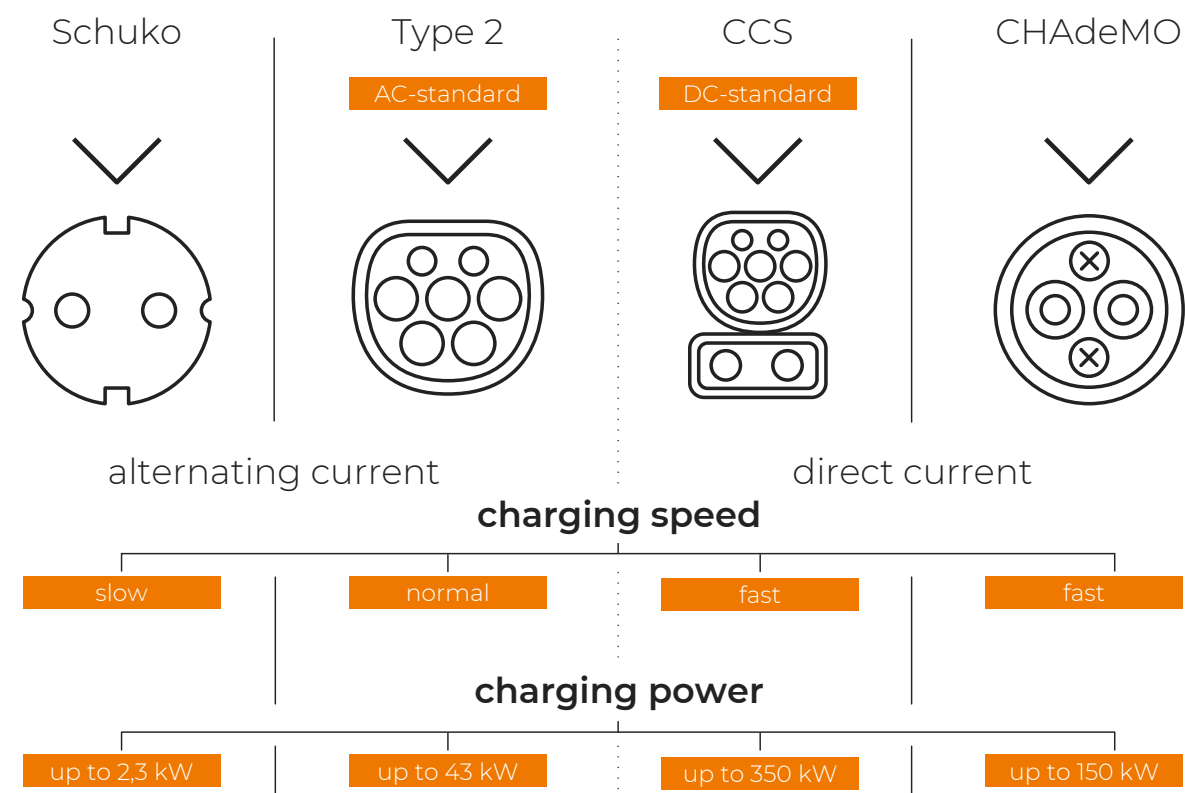
# WHY IS AN AC WALLBOX BENEFICIAL?

Most charging cycles of electric vehicles or plug-in hybrids occur at home.

**What is the advantage of charging with an AC Wallbox compared to a simple AC Power Plug, beyond full control and comfort?**

Let's take a closer look:

Comparing the different EV-charging solutions:



AC Power Plug vs. AC Wallbox

## AC Power Plug

Normal 230 V household sockets are designed to provide small amounts of electricity. Using a household socket to charge an electric vehicle can be risky. It can lead to a **fire hazard** due to overheating the device itself or the cables in the wall. Furthermore, it can cause **electrical shocks** by faulty or missing earthing of the socket.

**Charging times are 5-fold** compared to an 11 kW Wallbox due to the 2.3 kW limit.

It's advisable to only use Schuko or mobile chargers in emergencies.

## AC Wallbox

A wallbox (wall charging station) is safe, convenient, and offers several other benefits. It provides **convenient and safe charging** due to internal and external protective devices. It includes a **professional installation** by a qualified electrician or electrical contractor. The wallbox also offers an **intelligent integration** with PV-surplus and use of PV-power as well as **faster charging times** with either 11 or 22 kW. Visualization apps allow **Simple monitoring** of the charging process.

# WHAT DISTINGUISHES AC CHARGING FROM DC CHARGING?

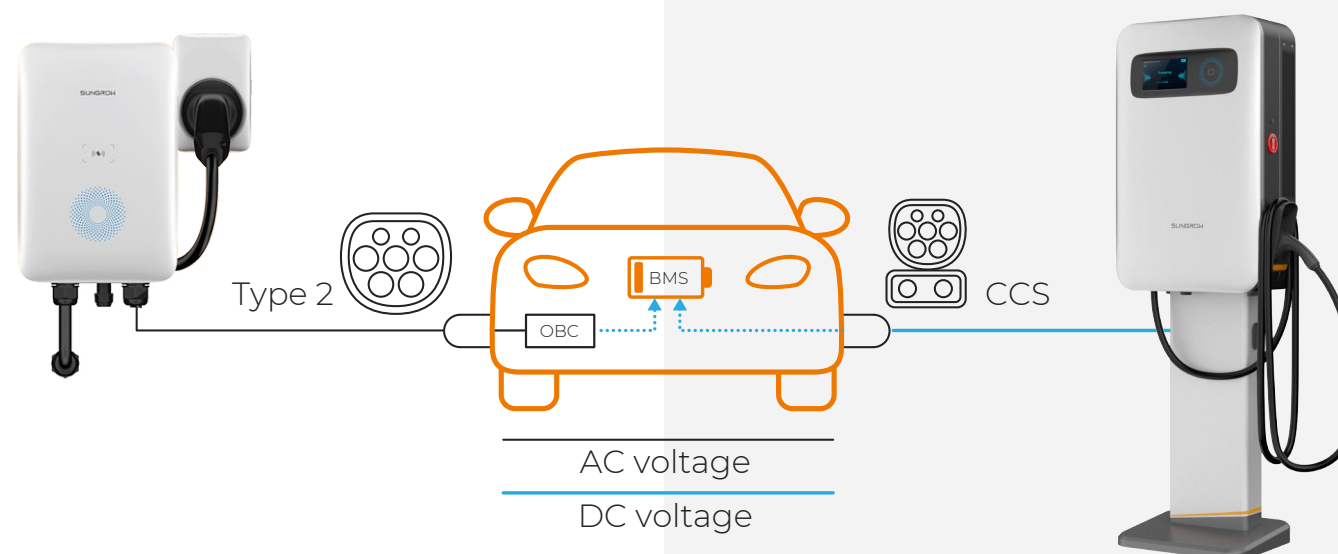
## AC CHARGING

- The key component is installed in the car: An **on-board-charger (OBC)** converts the alternating voltage provided by the AC Wallbox into direct voltage to charge the battery in electric vehicles or plug-in hybrids.
- 3-phase AC charging solutions or Wallboxes are available in **two versions** with either 11 or 22 kW maximum charging power.
- Charging periods are mostly **overnight or during working hours**, depending on the vehicle.
- AC Wallboxes are equipped with **Type2 plugs** by default.

**Summary:** The priority of AC charging is not fast, but safe and convenient charging.

**You have probably heard this question before. Here's how to explain the difference between AC charging and DC charging to your customers.**

In general, AC charging solutions are used mainly as standard charging method in the private or small-scale commercial sector. DC charging solutions or DC fast chargers are used mainly in public urban areas or along motorways.



## DC CHARGING

- DC charging solutions convert the AC power provided by the grid into DC power. The OBC in electric vehicles or plug-in hybrids is not required or bypassed. The vehicle's battery is **charged directly** with direct current.
- DC charging stations are most often equipped with **CCS plugs**, but sometimes feature **CHAdemo plugs**.
- DC charging solutions have **higher power and range** from approx. 50 kW to 350 kW. They provide fast charging within minutes.
- DC Wallboxes are **more expensive** to purchase and install on-site.

**Summary:** DC charging is faster by providing higher charging power (DC) at petrol stations, supermarkets, car parks, and along motorways.

# WHAT TO CONSIDER WHEN INSTALLING THE SUNGROW AC WALLBOX?

**You're not a fan of long manuals? Don't worry, we got you covered!**

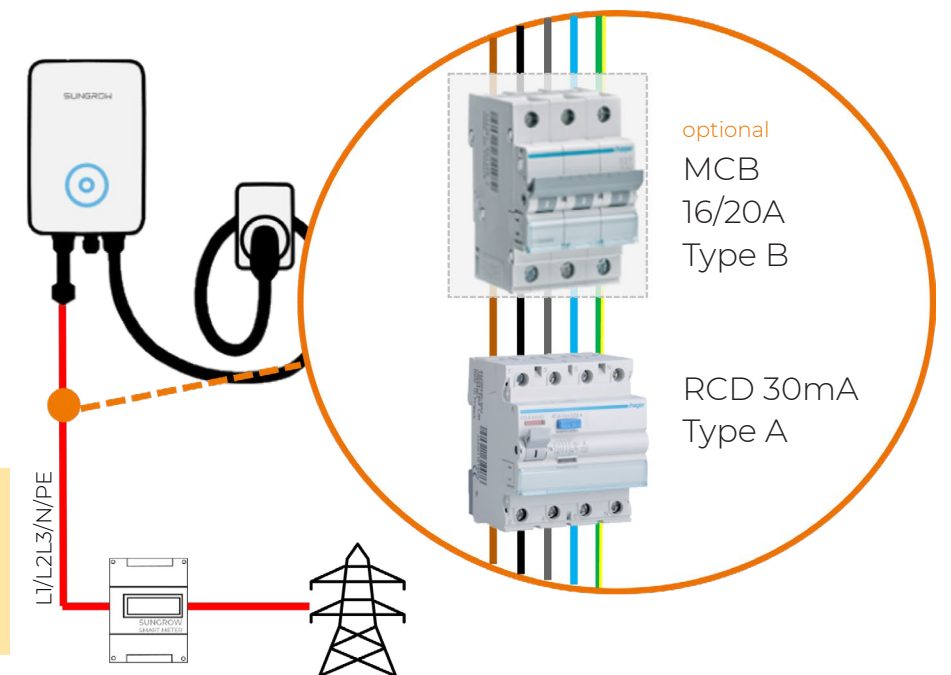
Check out our quick and easy installation tips for the AC Wallbox AC011E-01.

Still have questions? Then check out our **Quick Installation Guide**.

## 6 quick & easy installation tips

1. Make sure a **400 V supply line** is available at the installation location.
2. Ensure **minimum cable diameter** of 2.5 mm<sup>2</sup> for 11 kW.
3. Check or test whether the **cable is long enough** to reach the vehicle from the installation location. The connected Sungrow charging cable has a length of 7m.
4. Using an **RCD type A** in the supply line of the AC Wallbox is mandatory.
5. A **circuit breaker** appropriate for 3x16 A, the maximum current of the AC011E-01 Wallbox, is also recommended for the installation.
6. Good news: a **DC fault detection** (6 mA) is integrated in the Sungrow AC Wallbox and is therefore not necessary.

Wiring of the Sungrow  
AC Wallbox AC011E-01



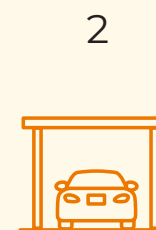
## Recommended installation locations

Select a suitable installation location that is always easily accessible and ideally not exposed to extreme weather conditions.

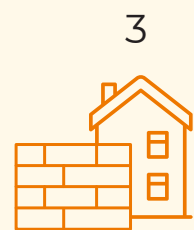
3 recommended locations are:



On the inner wall  
of the **garage**



In the **carport**, the  
building wall closest  
to the carport, or the  
optional Sungrow column

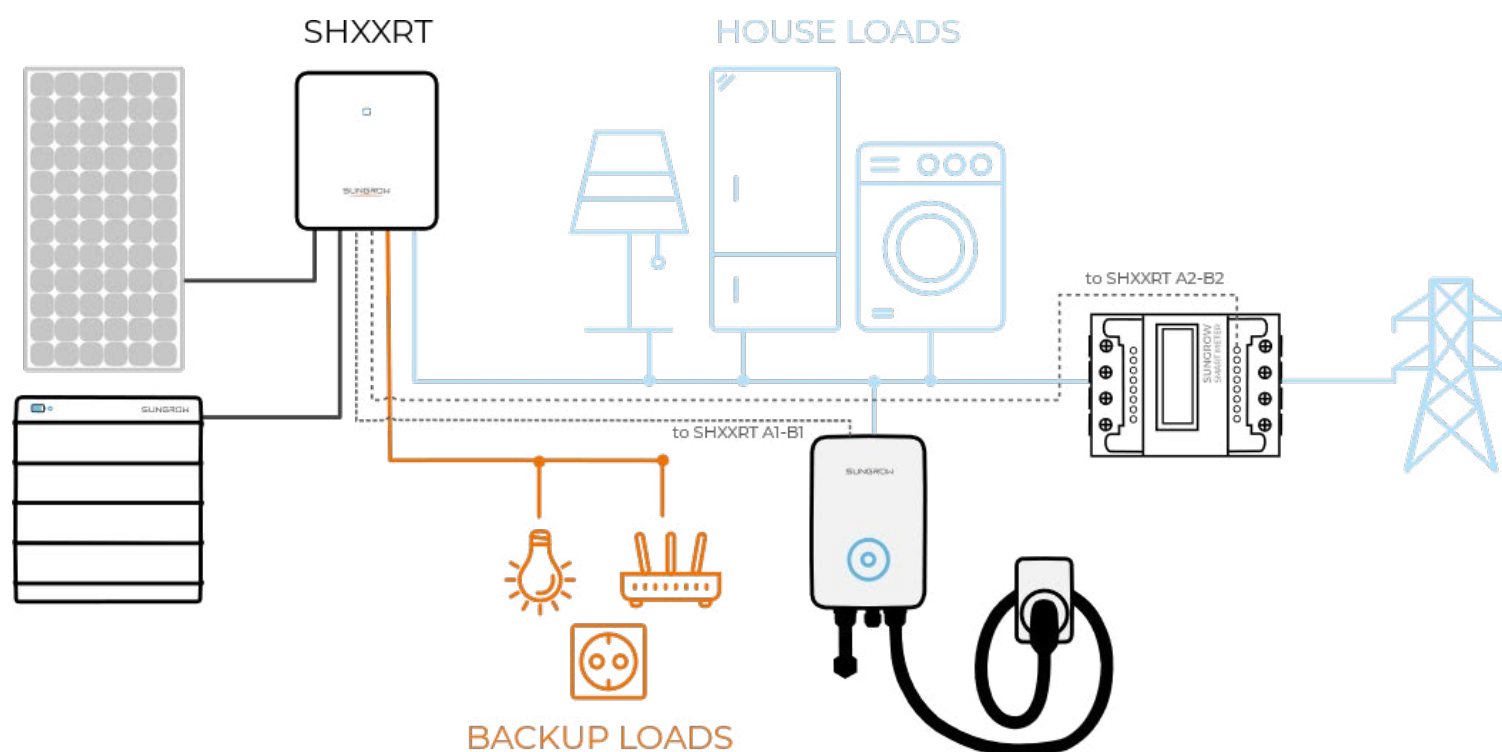


On the **house wall**,  
there is an eave  
providing protection  
from the elements.



# HOW DOES THE SUNGROW WALLBOX COMMUNICATE?

The Sungrow AC Wallbox offers two application and commissioning scenarios. Depending on the use case, communication and commissioning options also differ.



3-phase Solution with SHRT, SBR & AC011E-01

## Scenario

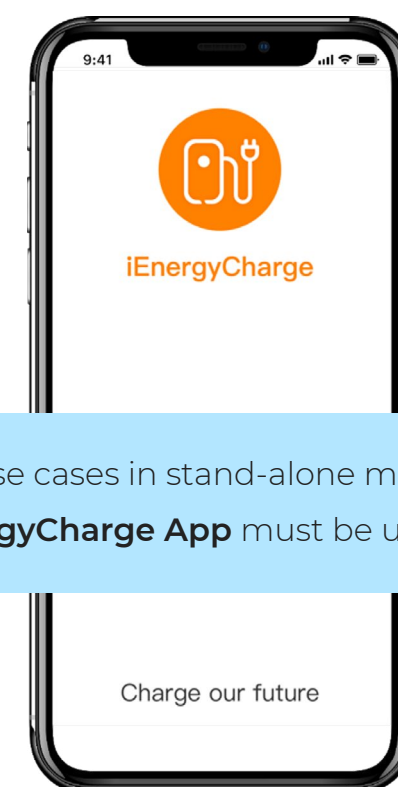
### 1 Combined installation with the 3-phase Hybrid and the Residential Battery from Sungrow

- AC011E-01 as part of a 3-phase Solution with the 3-phase Hybrid SHRT & Battery SBR.
- Communication occurs only via the wired RS485 communication line between the AC011E-01 and the Sungrow Hybrid Inverter SHRT.
- **ATTENTION:** Connecting to iSolarCloud requires a WiNet-S dongle. Older Sungrow communication devices are not compatible.
- Monitoring is possible with the free iSolarCloud monitoring platform accessible via App or web browser.

## Scenario

### 2 Installation as a standalone product

- AC011E-01 as a standalone product without the Sungrow PV system.
- In the standalone scenario, communication is only possible via WiFi.
- Monitoring is possible with the iEnergyCharge iOS / Android app.



For use cases in stand-alone mode the **iEnergyCharge App** must be used.



# WHICH SUNGROW DEVICES ARE COMPATIBLE WITH THE AC011E-01 WALLBOX?

Our 11 kW AC Wallbox can currently be installed together with the 3-phase Solution consisting of the SHRT Hybrid Inverter and the SBR Battery.

The key components for this setup are:

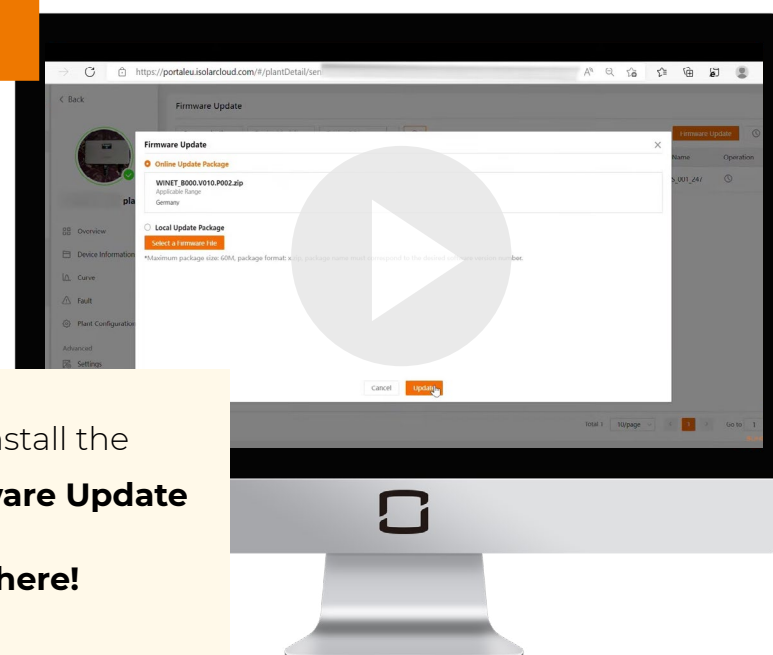
- **Sungrow SHRT Hybrid Inverter V11 & V20**

Addition: The SHRT V112 is compatible with the new firmware update available as of Q1/2023. It is possible to install the AC Charger (power and communication lines) in advance and remotely implement the firmware update on iSolarCloud afterwards.

- **Sungrow WiNet-S communication device**

**Please note:** To ensure error-free and lossless communication with the Sungrow AC Charger AC011E-01, all devices in the Sungrow system, especially SHRT and WiNet-S, must be updated to the latest firmware version.

How to install the  
**latest Firmware Update**  
**Click here!**

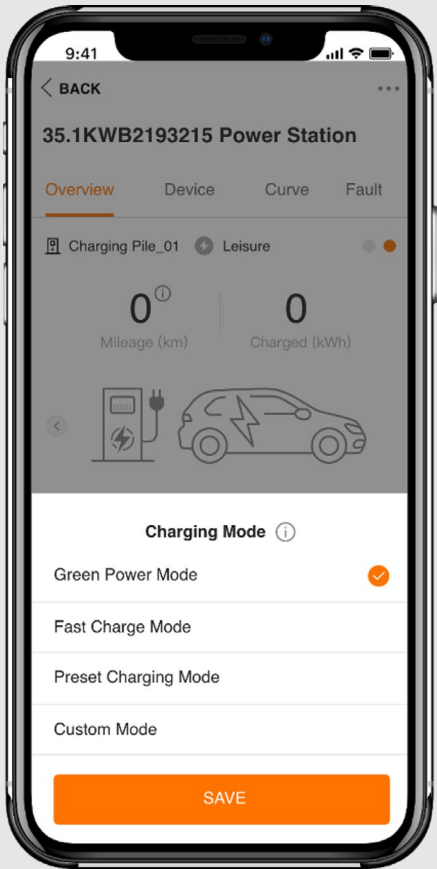


## Good to know

Of course, the AC011E-01 can be retrofitted in an existing PV system. Just make sure that the Sungrow SHRT Hybrid inverter and the WiNet-S dongle are installed and equipped with the latest Firmware.

# WHICH ENERGY SOURCES ARE USED IN EACH CHARGING MODE?

Using the 3-phase Solution and iSolarCloud, **the user can choose from four different charging modes.** These can be selected, started & stopped in the user account accessible via app or web browser.



1

Green Power Charging Mode

2

Fast Charging Mode

3

Preset Charging Mode

4

Customized Charging Mode

Sustainable charging:  
Green Power maximizes self-consumption by increased charging power when renewable energy is available. If PV surplus falls below the minimum charging power of 4.14 kW, power is provided from the grid and/or battery storage.

Maximum speed: Fast  
Charging charges at 11 kW AC power no matter whether power is sourced from renewables or the grid. The shortest charging time is prioritized.  
  
In this charging mode, the required charging power of max. 11 kW is provided from PV surplus, battery storage, or the grid. Loads and other consumers at the house are not limited.

Always ready: based on a preset amount of kWh and desired pickup time, the EV charger ensures the vehicle is ready at the desired time while still using as much renewable energy as possible.  
  
In this charging mode, users set a time window via iSolarCloud to automatically start or stop the charging process.  
  
iSolarCloud intelligently and cost-effectively switches between PV surplus charging and fast charging based on when the user has requested the charging process to be completed.

Charging based on your needs: select a custom time frame for charging. For example, charging could only work between 12 PM and 6 PM, even if the car is plugged in before.  
  
In this charging mode, users can set desired charging times and currents (6 – 16 A).  
  
The minimum charging time in this mode is 10 minutes.

**Please note:** Only the iSolarCloud user accounts can select charging modes and start or stop charging – this is not possible with the installer account!

Current (A)	6	8	10	12	14	16
Power (kW)	4.14	5.22	6.90	8.28	9.66	11.00

Customized charging mode: Selecting the desired charging current





# WHY IS THE SUNGROW WALLBOX NOT CHARGING AT 11 kW?

The maximum output power of the Wallbox AC011E-01 is 11 kW.

However, it is possible it doesn't reach its full output. In most cases, the cause is the car itself, as it can actively influence charging power.

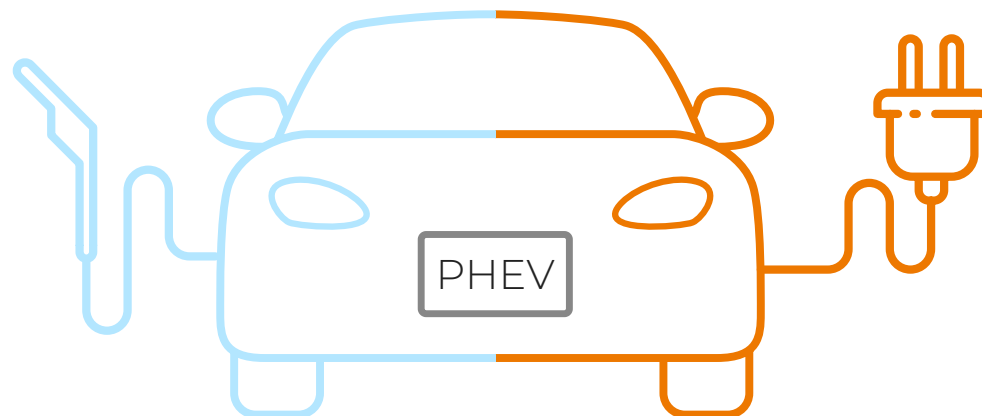
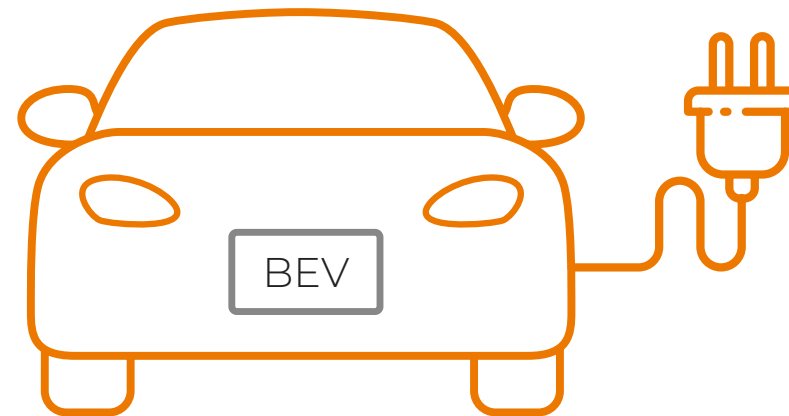
**This follows a simple principle:** The component with the lowest power determines total charging power.

## Limitations for battery electric vehicles (BEV) and plug-in hybrid electric vehicles (PHEV)

The wallbox and the corresponding BEV / PHEV must work together.

It's important to check, if the BEV / PHEV supports the number of phases and maximum current. The Sungrow AC Charger AC011E-01 charges a maximum of 16 A per phase.

Most currently available BEV can be charged on three phases, with 16A per phase for example.



Most PHEV, are limited to 3.7 kW charging power which is caused by the integrated OBC (on-board-charger). In this scenario the Sungrow Wallbox AC011E-01 charges with single phase.

## There may also be other reasons for limited charging power:

### 1. Charging in Green Power Mode

Green Power Mode focuses on using excess PV power and drawing no to very little power from the grid. Accordingly, the system will only add power beyond the minimum charge power of 4.14 kW if additional surplus PV power is available..

### 2. Professional installation and cable selection

Another factor that can limit charging power is inadequately dimensioned supply cables for the AC Wallbox. This can lead to higher operating temperatures in the cable and ultimately to power losses. Incorrect electrical routing of the supply cables can also result in reduced performance or power loss.

# IS ADDITIONAL SOFTWARE REQUIRED FOR THE SUNGROW AC WALLBOX?

Additional software requirements depend on the installation scenario:

## Installation within the 3-phase Solution

Only one application is required – iSolarCloud.

iSolarCloud is used for commissioning and firmware updates, monitoring energy flows in the system, selecting charging modes, and starting or stopping the charging process.

### Please note:

Only the end-customer account in iSolarCloud is authorised to select charging modes and start or stop the charging process!



For more information,  
please see the  
**FAQ Quick Guide:**  
Quick Start AC011E-01  
and SHRT

**Click here!**

In combination with the  
3-phase Solution the  
monitoring for all devices  
can easily be handled  
within the iSolarCloud App  
or Web-Browser.

## Installation as a stand-alone product

When using the AC Wallbox without a Sungrow PV system, the iEnergyCharge app is used to start and stop charging, either in the app itself or via the two included RFID cards.

iEnergyCharge also collects and visualises all relevant energy flow data.



For more information, please see  
the **FAQ Quick Guide:**  
Quick Start AC001E-01 Standalone

**Click here!**



# HOW TO PREVENT CHARGING BY UNAUTHORIZED THIRD PARTIES?

A wallbox located in a car park or residential area is not always as private as you would like it to be. Parking spaces or carports are often easily visible and accessible to the public.

To **prevent "electricity theft"**, the AC011E-01 Wallbox offers **two options to ensure** that the charging process can only be started by the user or authorised persons.

## 1 iSolarCloud or iEnergyCharge

Start and stop commands can easily be issued by using our mobile apps via smartphone or tablet.



## 2 RFID card

This user-friendly option starts or stops the charging process when presented with one of two included RFID cards.

**Please note:** When using the RFID cards, make sure that the charging process is started and stopped by the same card. Failure to do so may result in occasional malfunction.



Electric mobility is rapidly increasing. Combining solar energy with EV charging will advance the widespread acceptance of both technologies. Incorporating EV charging into PV installation will be a key factor in this growth in 2023.

For further information, check out the **product page of the AC Charger**.

There you may find useful information like datasheets, factsheets, certificates and much more.

**[Click here!](#)**



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